Introduction

Content

Edition: 07/16
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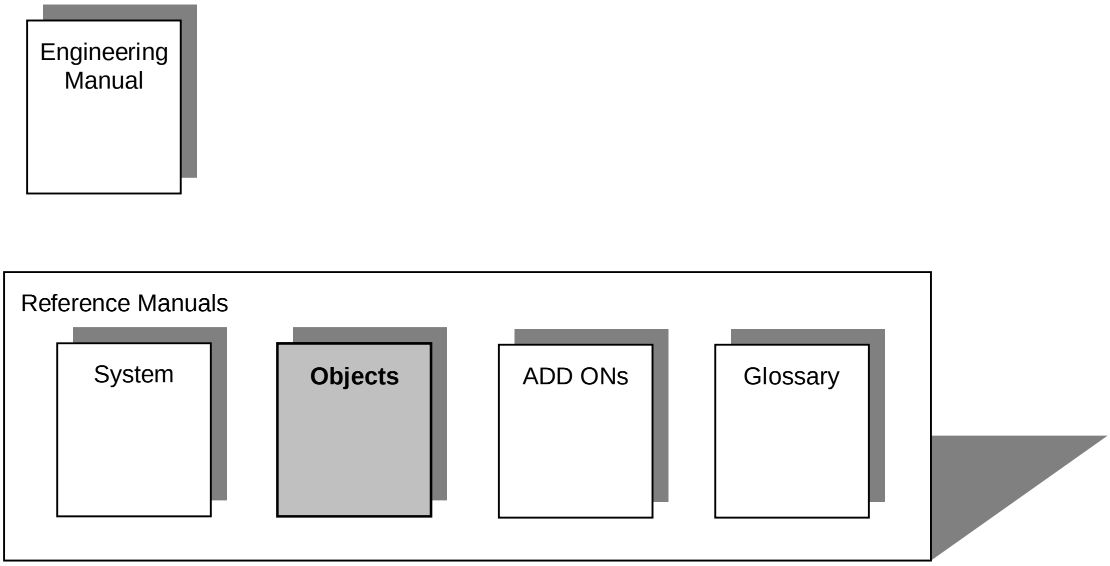
General

This is the **Object description** for CEMAT V8.2. It is part of the **Reference Manual** and it should support you in performing the work required to configure your plant.

The **Reference Manual** is part of a comprehensive CEMAT V8.2 documentation which consists of the volumes below:



After the installation of CEMAT V8.2 the CEMAT documentation is available as PDL in directory D:\CEMAT_CS\Docu

On the following pages you will find the content of each manual.

Documentation structure

The manuals contain the following chapters:

	Engineering Manual
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3	Installation of a PCS 7 Project
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Cemat V 8.2
Function Block Library ILS_CEM

Function Description **Edition 07/16**

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Safety Guidelines

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CEMAT Modules

The library "ILS_CEM" contains all blocks which are required for a running CEMAT AS. The Reference Manual Objects describes the functions of the CEMAT Object modules. All further Blocks you find in the general Documentation of PCS 7.

In this chapter you find the general, information about the CEMAT modules which is not specific for a certain object. You will find information about performance, an introduction to the module description (AS), general display rules (OS) and the representation forms of the objects.

In addition you will find operating instruction for the HMI.

Module data

FB/FC Number	Module (Type Name)	Comment from symbol list	Number of functions per AS	Runtime in (µs) CPU416-2 without fault	Runtime in (µs) CPU416-2 with 20% fault	Runtime (µs) CPU416-2 with 100% fault	Module length (bytes)	Loading memory (bytes)	Temp. memory (bytes)	Instance-DB length (bytes)	Instance-DB loading memory (bytes)	Multi-instance module	Number of HMI varia-bles	Number of annuncia-tions
FB1001	C_DRV_1D	Unidirectional drive		40	55	115	5670	7044	46	326	1318	yes	**45**	**8**
FB1002	C_DAMPER	Damper		65	77,5	127,5	8458	10198	86	408	1638	yes	**53**	**8**
FB1003	C_DRV_2D	Bi-directional drive		52,5	65	115	6842	8322	46	328	1392	yes	**45**	**8**
FB1004	C_ANNUNC	Annunciation module		17,5	32,5	92,5	3344	4154	20	146	640	yes	**18**	**3**
FB1005	C_ANNUN8	Annunciation module with 7 Alarms		30	40	80	4044	4936	20	178	774	yes	**29**	**8**
FB1006	C_MEASUR	Measuring value		45	60	120	6340	7704	62	442	1346	yes	**40**	**5**
FB1007	C_VALVE	Valve		42,5	55	105	6064	7432	46	260	1180	yes	**34**	**6**
FB1009	C_ROUTE	Route module		25			2814	3656	32	218	934	yes	**45**	**4**
FB1010	C_GROUP	Group module		30			3778	4796	36	234	1066	yes	**50**	**5**
FB1011	C_SILOP	Silo pilot		15	25	65	2246	2890	30	150	622	yes	**12**	**8**
FB1013	C_SELECT	Selection module		10			856	1264	20	128	492	yes	**10**	**2**
FB1015	C_COUNT	Counter block		5			1318	1624	42	152	358	yes	**13**	**---**
FB1016	C_RUNNT	Runtime supervision		5			678	846	18	114	254	yes	**11**	**---**
FB1018	C_PID3	PID mit 3 Sätzen für GAIN, TN,TV		***	***	***	1934	2970	84	916	1940	yes	**71**	**7**
FB1020	C_FB_PLC	AS-Objekt	1	**			304	480	2	68	220	no	**3**	**---**
FB1026	C_MEAS_I	Integration		5			214	328	8	80	172	yes	**7**	**---**
FB1034	C_SIMOS	Adapter for SIMOCODE		25	45	125	1400	1848	18	100	466	yes	**10**	**7**
FB1036	C_STO_MA	Storage Master Module					742	1816	24	1908	2910	yes	**92**	**---**

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FB1037	C_STORAG	Storage Module					4748	5904	52	796	1648	yes	**46**	**16**
FB1038	C_ANASEL	Analog value Selection		30			2850	3588	28	452	944	yes	**56**	**---**
FB1039	C_POLY3	Polygon Module					3970	4812	36	412	890	yes	**96**	**---**
FB1046	C_ODA	Object Data Acquisition					17996	22496	28	7688	12152	yes	**893**	**---**
FB1057	C_INTERL	Interlock with 10 Inputs		10			638	812	2	46	182	yes	**11**	**---**
FB1058	C_INTER5	Interlock with 5 Inputs		5			320	520	2	134	314	yes	**2**	**---**
FB1059	C_RelMod	Related Module					46	146	0	238	330	yes	**2**	**---**
FB1060	C_INTLK8	Interlock with 8 inputs					5618	6862	40	196	1204	yes	**23**	**---**
FB1061	C_INTLK4	Interlock with 4 inputs					3626	4738	40	180	1120	yes	**19**	**---**

Interlock Modules from PCS7 Advanced Process Library

FB/FC Number	Module (Type Name)	Comment from symbol list	Number of functions per AS	Runtime in (µs) CPU416-2 without fault	Runtime in (µs) CPU416-2 with 20% fault	Runtime (µs) CPU416-2 with 100% fault	Module length (bytes)	Loading memory (bytes)	Temp. memory (bytes)	Instance-DB length (bytes)	Instance-DB loading memory (bytes)	Multi-instance module	Number of HMI varia-bles	Number of annuncia-tions
FB1824	Intlk02	Interlock with 2 Inputs					2870	3628	52	178	698		**24**	**---**
FB1825	Intlk04	Interlock with 4 Inputs					3094	3900	58	206	770		**32**	**---**
FB1826	Intlk08	Interlock with 8 Inputs					3542	4444	70	262	914		**48**	**---**
FB1827	Intlk16	Interlock with 16 Inputs					4438	5532	94	374	1202		**80**	**---**

FB/FC Number	Module (Type Name)	Comment from symbol list	Number of functions per AS	Runtime in (µs) CPU416-2 without fault	Runtime in (µs) CPU416-2 with 20% fault	Runtime (µs) CPU416-2 with 100% fault	Module length (bytes)	Loading memory (bytes)	Temp. memory (bytes)	Instance-DB length (bytes)	Instance-DB loading memory (bytes)	Multi-instance module	Number of HMI varia-bles	Number of annuncia-tions
FC1017	C_MUX	Additional block for group/route		10			1534	1664	18	---	---	no	---	---
FC1018	C_ADAPT	Adapter block to con-nect non-CEMAT modules into group		5			832	964	24	---	---	no		
FC528	OB1_SYS2	ILS OB1 End	1	**			44	94	0	---	---	no	---	---
FC529	OB35_SYS1	ILS OB35 Begin	1	**			40	90	0	---	---	no	---	---
FC530	OB35_SYS2	ILS OB35 End	1	**			44	94	0	---	---	no	---	---
FC1028	C_PUSHBT	Control Desk Push Buttons and Lamps		**			286	360	10	---	---	no	---	---
FC1031	OB1_SYS1	ILS OB1 Begin		**			72	122	6	---	---	no	---	---
FC1032	C_OB1SY1	CEMAT OB1 Start		**			72	122	6	---	---	no	---	---

CAUTION: The modules specified in the table require the following FB, FC and DB: DB643, DB677-DB700, FB500, FB501, FB596, FB1021, FB1030, FB1055, FB1056, FC1, FC3, FC6, FC7, FC8, FC10, FC35, FC509 to FC530, FC1019, FC1021 to FC1027.

** not relevant
*** the runtime for the C_PID3 is 25% higher than for the FB61 CTRL_PID

Explanations to the Table Module Data:

Number of functions per AS
The system functions are called only once.

Runtime in ms
The time that the CPU needs to process the associated module program in the normal situation (e.g. in the case of a driver, the processing time of the watch-dog timer organizational block (OB), without producing an annunciation for a channel error).

The following table contains the runtimes in a S7 416-2 DP 6ES7416-2XK01-0AB0. The runtimes for other CPUs depend on their performance.

Work Memory
Memory requirement of the program code, once per module type.

Instance DB work memory
Memory requirements of an instance DB

Temporary memory
The local data storage required in a processing level for an invocation of the module. This is limited for a specific CPU, and causes a CPU stop should it be exceeded. You must check this in the CPU configuration and, if necessary, redistribute to the processing levels (OBs) in accordance with the actual requirement.

Multi-instance module
The technological module uses the specified modules and must be contained in the AP (application program). They are stored in the same library.

Cycle-time measurements for sample configuration:

Group	Route	Select	Motor	Damper	Annun.	Meas. value	Valve	Silopilot	Counter	Runtime	Controller	Cycl. S7	PBK	Compil.	Load	Map.
10	8	30	150	20	200	200	50	2	10	5	15	54ms	805	3 min.	4,5 min	7 min

Communication resources (PBK) for CPU 416-2 max. 600 i.e. number of CEMAT modules, max. 550
CPU 416-3 max. 1800 i.e. limitation via the cycle time
CPU 416-2 / 416-3 V5.2 max. 4000 i.e. limitation via the cycle time

Introduction to the Module Description (AS)

The module descriptions always have same form. This helps you to find the required information quickly when you read the description of the individual module.
Here is a description of the sections:

Type/number

The listed blocks have to be called if you want to use the object. The Blocks are listed with name and number.

Module name: Unique name of the S7 Block, e. g. C_DRV_1D.
For the CEMAT Objects this corresponds to the name of the object type.

Module no.: Unique number of the function block (FB) or function (FC).

Calling OBs

This provides details of the organizational blocks (OBs) in which the described block must be installed.

In contrast to the general PCS 7 libraries the CEMAT library has some specialties. Most of the CEMAT blocks must be called exclusively in the OB1 task. Exceptions to this are the counter and the pulse evaluation of the software speed monitor (only in Lafarge Version). These blocks can be called in a time interrupt OB. The detailed information you find in the object descriptions.

Some blocks of the system chart have to be called in more than one task, e. g. the system part of the PLC-PLC coupling. If you copy the complete system chart from the delivered library into the S7 Program of your project, the blocks are automatically called in the right tasks.

When you install the modules in the CFC they are automatically called after the most recently installed module. If necessary, you must change the processing sequence with the run-time editor. The CFC creates the necessary OBs during the compilation.

Function

This contains a summary of the function of the module. The section operating principle contains further information for complex modules.

Operating principle

This contains more detailed information on the function of individual inputs, operating modes, time processes, etc. You should understand the interrelationships described here in order to use the module effectively.

Error handling

The error display is located in the CFC plan at the ENO Boolean module exit. The value corresponds to the **BIE** (binary result in STEP 7-STL on completion of the module) or the OK bit (in SCL notation) and means:

ENO=BIE=OK=1 (TRUE) -> the module result is correct.

ENO=BIE=OK=0 (FALSE) -> the result or the general conditions for this calculation (e.g. entry values, operating mode, etc.) are invalid.

Start-up characteristics

A differentiation is made between:

First run
The module is called initially from the OB in which it has been inserted. This is usually the OB in which the normal, process-related processing takes place (e.g. OB1). The module is preset with the status corresponding to the input parameters. These can be default values (also refer to I/O bar) or previously configured values, which, for example, you have parameterized in the CFC. No special start-up behavior is described unless the module deviates from this rule.

Start-up
The module is processed once during a CPU start-up. To ensure this, the module has to be called from a start-up OB (where it is included automatically by the ES). The start-up behavior is described in this case.

The CEMAT object modules don't have start-up characteristics. The blocks are called exclusively in the cyclical program.

Time characteristics

A module with time characteristics must be installed in an cyclic interrupt OB. It calculates its time constants/parameters using its sampling time (the time interval between two successive, cyclical processing steps). The sampling is determined by the step downs for the so-called runtime group. This ensures that the module is not processed for every OB passage. This sampling time is entered in the I/O bar, in the SAMPLE_T parameter.

The time behavior is mentioned only when the module exhibits such behavior.

The CEMAT object modules don't have time characteristics. However for some of the objects the run sequence is important. This is described under time characteristics.

Annunciation characteristics

The module with this behavior reports various events to the higher-level OS. When present, the parameters needed to create the annunciation are documented. Modules without annunciation behavior can be augmented with additional annunciation modules. The description for modules with annunciation capability contains an indication of the annunciation behavior.

Module states

The status of the CEMAT Objects is shown in the symbol through change of the bitmap of change of the color and in the faceplate through a short info text. The presentation of the visualization status is shown under module status.

Commands

The possible commands for the object are listed in the OS variables table.

I/O bar of ...

The I/O bar provides the data interface for the module. You can use this to pass data to the module and to fetch results from the module.

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
ERM	Feedback ON	BOOL	0	I			

The "I/O-bar" table shows all input and output parameters of the module type which the user can access with his configuring means. Those elements that can be reached only from the module algorithm are not listed (so-called internal variables). The columns have the following meaning:

Name
Name of the parameter, derived from the designation, e.g. PV_IN = Process Variable Input (process quantity, control quantity). Where appropriate, the same name convention as for SIMATIC is used.

Description
Function (possibly short description)

Format
S7 data type of the parameter (BOOL, REAL, etc.).

Default
The value of the parameter before the module runs for the first time (provided it has not been changed during the configuring).

Type
Type of the module algorithm access to the parameter; a differentiation is made between inputs, non-isolated inputs and outputs (refer to table).

Parameter Types:

Abbreviation	Type
I	Input. Value supplied to the module (display in the CFC: left-hand parameter list)
O	Output. Output value (display in the CFC: right-hand parameter list)
IO	Input/Output. Non-isolated input, which can be written from the OS and rewritten from the module (display in the CFC: left-hand parameter list)

Attr. (Attribute)
Additional characteristics of the parameter when used in CFC. Non-connected input and input-output parameters can be parameterized (only input-output parameters for online FCs). Output parameters cannot be parameterized and can be transferred in the CFC by connecting to an input of the same data type. Additional or deviating properties of the parameter are specified as follows:

Attributes of the parameters:

Abbreviation	Attribute
B	Can be operated (only using the OS). An OS can make write access to the element. It is implicitly not visible in the CFC.
E	Transferred to the OS when changed
M	MESSAGE ID not parameterizable for annunciation module (e.g. ALARM 8P). ID specified from the annunciation server.
Q	Connectable. The element can be connected with another output of the same type.
U	Not visible in the CFC. Because the element is supplied by the CFC or the OS, it is not displayed in the CFC (e.g. message ID). It is a default value that can be changed in the CFC.

HMI
The parameters marked with "+" can be changed and monitored from the associated OS module.

Permitted values
Additional limitation within the data type value range.

OS variables table

In the OS variables table all variables with Attribute S7_m_c = true are listed. During the OS compile these variables are entered into the Tag Management of WinCC.

OS Variable
Name of the OS Variable

Description
Function (eventually short description)

PLC Data Type
S7 Data type of the parameter (BOOL, REAL, …)

OS Data Type
WinCC Data type of the parameter
Binary variable
Unsigned 8-bit value
Unsigned 16-bit value
Unsigned 32-bit value
Signed 16-bit value
32-bit floating-point number IEEE 754
Text variable 8-bit character set

Variable details

For the data exchange between AS and OS at many places the binary information is collected in a word or double-word, in order to save resources. In this table you find the meaning of the single bits.

Parameter
Parameter name used in the S7 program (internal information)

Function
Symbolic name of the parameter which describes the function.

OS Addr..
Variable number used WinCC and in the CFG-File (internal information)

Designation German
Description text of the parameter in German

Designation English
Description text of the parameter in English

Message Class
Message class, e. g. AL_H = Alarm - above

Fault Class
Classification according to the origin of the fault
E = Electrical
S = Safety
M = Mechanical
P = Process

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Cemat V 8.2
Function Block Library ILS_CEM

Function Description **Edition 07/16**

Unidirectional Drive C_DRV_1D

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Description of C_DRV_1D

Type/Number

Module name: C_DRV_1D
Module no.: FB1001

Calling OBs

C_DRV_1D must be called in OB1 (MAIN_TASK).

Function

General Function description

Module Type C_DRV_1D can be used to control all kind of unidirectional drives in a cement plant. Start/stop can be carried out in three different **operating modes**:

- In the **automatic mode** the drive is started/stopped by a superordinated group module.
- The **single-start mode** allows individual start/stop via operator faceplate of the drive.
- In the **local mode** the drive can be started and stopped by the locally installed pushbuttons **ESR** (start button) and **ESP** (stop button).

The following **standard signals** are monitored by the unidirectional drive block:

- Contactor feedback **ERM** in conjunction with the contactor output **EBE**
- Electrical availability **ESB**
- Overload or Bimetal **EBM**
- Local Switch **EVO** (1-Signal = Remote; 0-Signal = Local)
- Local stop button **ESP**
- Local start button **ESR**

Additionally there is an option of a **supervision of a speed monitor** fault. A continuous signal can or pulses can be evaluated (Software Speed monitor).

If the drive is in automatic or in single-start mode <u>and</u> the drive is in operation, a wrong status at any of the above mentioned signals leads to an **alarm message.**

If additional **protections** are available for the drive or for the equipment, those signals have to be linked to an Annunciation block C_ANNUNC or C_ANNUN8 in order to create an alarm. In order to stop the drive in case of a fault an output of the annunciation block has to be connected to the protection interlock of the drive. We distinguish between:

- Protection interlock **ESVG** or **IntProtG**	effective in all modes
- Protection interlock **ESVA** or **IntProtA**	not effective in local mode

Interlocks can be used in order to enable or disable the drive operation dependent on a process condition, like "previous drive is running" or a process signal:

- Start interlock **EEVG** or **IntStart**	effective only in auto and in single-start mode
- Operating interlock **EBVG** or **IntOper**	effective only in auto and in single-start mode
- Sporadic ON/OFF **ESPO**	only in auto mode

Through **process parameters** the following values can be configured online:

- Feedback time (s)	for the feedback supervision of the main contactor
- Start delay (s)	group start command is given and IL conditions are fulfilled
- Stop delay (s)	group stop command is given
- Speed Monitor time (s)	for the feedback supervision of the Speed Monitor
- Time for start-up warning (s)	for single-start mode and local mode (if enabled)
- Tolerance Speed Monitor	Tolerance value in case of Software Speed monitor function (Pulse evaluation)

Visualization

In the **block icon** of the unidirectional drive the most important operation status are displayed (stopped, running, operating mode, fault). Operation functions and detail information are only available after opening the **faceplate**.

Additional functions

Link to a measured value

- By connecting the percentage value of a measure to the drive block, the power or current of the drive in % can be displayed in the faceplate of the motor.
- An additional measure can be displayed in the drive faceplate, either through connection of the physical output of measured value block or through connection of the output of an analog value selection block to the drive.

SIMOCODE drives

If SIMOCODE is used, the communication between the drive block and the SIMOCODE can be carried out via adapter block C_SIMOS or C_SIM_AD.
An additional button in the drive faceplate opens the faceplate of the C_SIMOS in order to display the SIMOCODE details.
The percentage value of current and power are directly displayed in the faceplate of the motor.

Subcontrol Function

Sometimes function blocks and faceplates from sub suppliers are used, as e. g. for weigh feeders, filter, grate cooler etc. In order to have the same philosophy for all kind of equipment (block interfaces, summarizing indication in the group) a normal Cemat drive block can be used in order to give a start command to the subcontrol function. The general fault of the Subcontrol will be indicated in the diagnosis picture of the drive.
An additional button in the operator faceplate of the drive can be used to open another faceplate for the display of the detail information for the Subcontrol.

Setpoint Function

This function can be used to enter a setpoint (e. g. the Speed of a Variable Speed Drive). If the function is enabled, the drive Faceplate shows theSetpoint and the Actual Value.
The Setpoint can directly be entered via drive faceplate or transmitted by the program, via External Setpoint SP_EX (e. g. from a PID Controller).
The Setpoint is validated for Low and High Limits and written to the output SP_O (which can be used for the connection to a VSD block).

Sequence Test

In Sequence Test mode the motor can be started without hardware signals. The feedback of the contactor and eventually a speed monitor are simulated. The hardware inputs (ESB; EBM; EVO...) are still active and have to be simulated by a test program at the beginning of OB1 Cycle.

If driver blocks are used, the Output SIM_ON of the drive can be connected to input SIM_ON of the Driver blocks to enable the simulation.

Operating principle

Hardware inputs

ERM **Feedback ON** **Basic state 0-signal**

Format BOOL

The ERM parameter must be connected. It is appropriate to use the feedback contact of the main contactor for this purpose. The feedback is monitored in automatic mode and in the single-start mode. The monitoring time for switching on the motor can be set with the parameter FEEDBTIM. The monitoring time for switching off is 2s. An alarm is issued if no feedback occurs and/or the monitoring time expires.

ESB **Electrical availability** **Basic state 1-signal**

Format BOOL

The ESB parameter is used to monitor the electrical availability of the motor. The electrical availability is monitored in automatic mode and in single-start mode, and results in a shutdown with an alarm.

EBM **Overload** **Basic state 1-Signal**

Format BOOL

The EBM parameter is used to monitor the overload of the motor (bimetal). The overload is monitored in automatic mode and in single-start mode, and results in a shutdown with an alarm.

EVO **Local switch** **Basic state 1-Signal**

Format BOOL

The EVO parameter is used for the connection with the local switch of the motor. EVO = 1-signal means automatic position and EVO = 0-signal means local position. No alarm signal occurs in the control room in local mode.

In position Local (EVO = 0-signal) the motor can be started and stopped via ESR and ESP.

ESP **Local stop** **Basic state 1-Signal**

Format BOOL

The ESP parameter is used to stop the motor in local mode. This is a break contact, i.e. the 0-signal stops the motor.
By default the local stop ESP is only active if the drive is in local mode. Connecting a 1-signal to LST_ACT, the local stop is always effective.

ESR **Local start** **Basic state 0-Signal**

Format BOOL

The ESR parameter is used to start the motor in local mode. A 1-signal to ESR starts the motor. Prerequisite for the local start of the motor is the local release (interface ELOC interface = 1-signal) and the EVO switch positioned to Local (EVO = 0-signal).

Caution: The local start pushbutton must remain pressed until the ERM contactor feedback message arrives. For safety reasons, the signal is not stored.

Input interfaces

EEVG **Start interlock** **Basic state 1-Signal**

Format BOOL

The drive can be started in automatic mode or single-start mode only if the start interlock has 1-signal. 0-signal at interface EEVG prevents the start. In local mode the starting interlock is not effective.

<u>Typical application:</u>

The fan can be started only with closed fan damper. For this, the interface EEVG must be connected with the signal KVS1 of the damper. The run signal of the fan must be connected to the inching release of the damper, i.e. as soon as the fan is operating, the damper can be opened or positioned.

The start command of group GBE goes simultaneously to damper direction 1 and to the fan drive. As soon as the damper has reached limit position 1 the start interlock of the fan drive has 1-signal and the fan drive is also switched on.

IntStart **Start Interlock**

Format STRUCT

For function description, see EEVG. This interface can be connected with a structure output as e. g. signal **PosSig1** of a damper or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntStart.Value **Signal** **Basic state 1-signal**

Format BOOL

IntStart.ST **Signal status** **Default: 16#FF**

Format BYTE

EBVG **Operating interlock** **Basic state 1-Signal**

Format BOOL

The drive can run in automatic mode or single-start mode only if the operating interlock has 1-signal. 0-signal at interface EBVG prevents the start or switches off the running drive. In local mode the operating interlock is not effective.

<u>Typical application:</u>

Material transport: Only if the downstream drive is running may the following drive be started. As soon as the downstream drive fails the following drive must stop as well.

For this, interface EBVG must be connected with run-signal EVS of the downstream drive. The start command of group GBE goes simultaneously to both drives. As soon as the downstream drive is running the operating interlock of the following drive has 1-signal and this drive is also started.

IntOper **Operation Interlock**

Format STRUCT

For function description, see EBVG. This interface can be connected with a structure output as e. g. signal **RunSig** of the previous drive or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntOper.Value **Signal** **Basic state 1-signal**

Format BOOL

IntOper.ST **Signal status** **Default: 16#FF**

Format BYTE

ESVG **Protection interlock general** **Basic state 1-Signal**

Format BOOL

All signals which indicate a drive fault and which are not monitored by the drive module as per standard must be connected to the protection interlock of the drive. A 1-signal means status healthy, 0-signal means faulty.
Interface ESVG is effective for all operating modes of the drive.

Caution: When the drive is switched off via ESVG the drive module does not generate an alarm message. There is no summarizing fault indication at the group and the protection interlock is not shown in the status call.
For the fault message one must program an annunciation module. To connect the protective interlock one must use the output MAU of the appropriate annunciation module and not the input signal of the fault so that a possible time delay is taken into consideration.

Typical application:

All suppressor circuits concerning operator and machine safety and so which must be effective all the time (e.g. pull-rope).

IntProtG **Protection Interlock general**

Format STRUCT

For function description, see ESVG. This interface can be connected with a structure output as e. g. output **OutSig** of the annunciation block or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntProtG.Value **Signal** **Basic state 1-signal**

Format BOOL

IntProtG.ST **Signal status** **Default: 16#FF**

Format BYTE

ESVA **Protection interlock (only in remote)** **Basic state 1-signal**

Format BOOL

All signals which indicate a drive fault and which are not monitored by the drive module as per standard must be connected to the protection interlock of the drive. A 1-signal means status OK, 0-signal means faulty.
Interface ESVA is effective only in automatic mode and single-start mode, i.e. in the case of a fault the drive can still be operated in local mode.

⚠ **Caution:** When the drive is switched off via ESVA the drive module does not generate an alarm message. There is no summarizing fault indication at the group and the protection interlock is not shown in the status call.
For the alarm message one must program an annunciation module. To connect the protective interlock one must use the output MAU of the appropriate annunciation module and not the input signal of the fault so that a possible time delay is taken into consideration.

Typical application:

Belt drift switch: If the belt drift switch responds this means in automatic mode a drive fault. However, it must be possible to start the drive in local mode to align the belt.

IntProtA **Protection Interlock (only in remote)**

Format STRUCT

For function description, see ESVA. This interface can be connected with a structure output as e. g. output **OutSig** of the annunciation block or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntProtA.Value **Signal** **Basic state 1-signal**

Format BOOL

IntProtA.ST **Signal status** **Default: 16#FF**

Format BYTE

ESPO **Sporadic ON/OFF** **Basic state 1-signal**

Format BOOL

0-Signal at interface ESPO stops the motor without resetting of the command memory EKS. The motor is still activated and restarts automatically with 1-Signal at this interface.
To stop the motor completely 1-Signal at EBFA or 0-Signal at EBVG is required. If the motor is stopped by a fault, it must be restarted through the associated group.

Typical application:

A pump which is started and stopped depending on a pressure signal.

⚠ This interface is effective in automatic mode only. In Single start mode or local mode ESPO is not evaluated. For the change of operations mode the following has to be considered:
- If the drive is running in Automatic mode and switched to Single start mode, it keeps running continuously (without considering ESPO).
- If the drive is running in Single start mode and switched to Automatic mode, with the change of the operation mode ESPO is evaluated:
  If ESPO has 0-Signal the drive will be stopped completely (reset of EKS).
  If ESPO has 1-Signal the drive will to run in sporadic mode.

EDRW **Hardware speed monitor** **Basic state 1-signal**

Format BOOL

If a continuous 1-signal is available for speed monitor supervision the speed monitor signal must be connected to interface EDRW. At the same time the software speed monitor must be disabled (REL_SSM = 0-signal)

A 1-signal at interface EDRW means that the motor is running and the Speed monitor has responded. The Speed monitoring time can be set (process value SPEEDTIM). If the Speed monitor does not provide a continuous 1-signal within the default time, the drive module generates an alarm message.
The speed monitor supervision is only effective in automatic mode and in single-start mode.

REL_SSM **Release software speed monitor** **Basic state 0-signal**

Format BOOL

REL_SSM must be connected with a 1-signal if you wish to use the function of the software speed monitor. The EDRW interface is then no longer evaluated.
The 0-signal causes monitoring of the EDRW interface.

This interface is not operable through OS.

SW_SPEED **Pulse signal software speed monitor** **Basic state 0-signal**

Format BOOL

If you get pulses from the speed monitor, the pulse input must be connected to interface SW_SPEED. The software speed monitor function must be enabled via REL_SSM = 1-Signal.

The Speed monitoring time can be set (process value SPEEDTIM). If the Speed monitor does not provide pulses within the default time (considering the tolerance value TOL_SSM), the drive module generates an alarm message. Input-signal for software speed monitor.
The speed monitor supervision is only effective in automatic mode and in single-start mode.

⚠ Make sure that the duration of the pulses is long enough. Pulses and pause should be at least 200ms.

SM_EVS_I **EVS=1 when speed monitor 1-Signal** **Basic state 0-signal**

Format BOOL

With 0-Signal at SM_EVS_I, EVS gets 1-Signal after speed monitor has 1-Signal and the speed monitor supervision time has elapsed.
With 1-Signal at SM_EVS_I, EVS gets 1-Signal immediately with the 1-Signal of the speed monitor.

REL_EBD **Bypass Speed Monitor** **Basic state 0-signal**

Format BOOL

Speed Monitor Bypass can only be enabled/disabled from the Diagnostic Picture. If the Bypass is switched on the speed monitor supervision is not active.

⚠ **Caution:** This is no block parameter

L_STA_WA 1 = Start-up warning in local mode Basic state 0-signal

Format BOOL

With 0-signal at this parameter, no start-up warning is given in local mode.
With 1-signal at this parameter, by pressing the Local start button a start-up warning is given and the contactor output EBE is delayed by the start-up warning time HORN_TIM.

Caution: For security reasons the local start button must remain pressed until the drive is running!

NSTP_L_A No stop after switching local → auto Basic state 0-signal

Format BOOL

This parameter is foreseen for specific project-standards. 1-signal at this parameter causes no stop for running drives after switchover from local mode into automatic mode, if the interlocking conditions are fulfilled.

Caution: Parameter NSTP_L_A has to be modified only after an explicit instruction from the Cemat Development.

LST_ACT Local Stop active Basic state 0-signal

Format BOOL

With 0-signal at this parameter the local-stop is not effective in automatic mode.
1-signal at this parameter enables the local stop in automatic mode too and an alarm will be created.

ELOC Local mode release Basic state 0-signal

Format BOOL

A 1-Signal at this interface releases the drive for the local mode through the PLC, i.e. the drive can be started/stopped via inputs ESR and ESP. The operating mode is changed by the appropriate group. The group module sets in local mode signal GLO. This information is passed on to the drive module by connecting interface ELOC with signal GLO of the appropriate group.

In local mode operation via the PLC only the protective interlock ESVG is effective. The connection of interfaces EEVG, EBVG and ESVA is not analyzed in local mode. In local mode no logic signal EVS is generated!

EEIZ Single-start mode release Basic state 0-signal

Format BOOL

A 1-Signal at this interface releases the single-start mode for the drive, i.e. the drive can be started and stopped <u>separately</u> from the central control room. The operating modes are changed by the appropriate group. The group module sets the single-start mode signal GES. This information is passed on to the drive module by connecting the interface EEIZ with signal GES of the appropriate group.

In single-start mode all interlocks of the drive are effective! Start is carried out after the set horn time (process value HORN_TIM) has expired.

ESTB **Stand-by mode** **Basic state 0-signal**

Format BOOL

In the philosophy of CEMAT-Standards only the active plant sections can generate alarm messages. This means, if a drive at stop is faulty this is indicated in the symbol at the flow mimic but there will be no alarm message.
A 1-Signal at interface ESTB means that the drive is in stand-by mode. In this mode the drive is monitored for availability even under stand still conditions. If a fault occurs when the drive is in stand-by mode, an alarm message is generated.

ETFG **Inching release** **Basic state 0-signal**

Format BOOL

Interface ETFG must be connected with LOG1 if the drive is to be operated as a positioning drive, i.e. it is to be switched ON and OFF in short intervals (<= 2s).

EMFR **Annunciation release** **Basic state 1-signal**

Format BOOL

With 0-signal at this interface the annunciation function is blocked.

Typical application:

In the case of a control supply voltage failure for MCC or field signals, one alarm message would be triggered for each sensor signal. To prevent this one should connect the control voltage signal to the annunciation release interface at the appropriate modules. This causes no alarms to be generated. The cause of “control voltage failure” is generated by an annunciation module which has to be engineered for this purpose.

Caution: If EMFR has 0-Signal the drive fault is not shown in the summarizing indication of group and route and not listed in the status call.

EMZS **Fault interlock to the group** **Basic state 0-signal**

Format BOOL

A 1-signal on EMZS prevents that the dynamic and static fault is passed to the group. In the status call the drive fault can still be seen.

Typical application:

To interlock a main drive together with the affiliated auxiliary drive one must connect the feedback contact ERM and the ON command EBE of the auxiliary drive to the protective interlock of the main drive and vice versa. In this case, the group would indicate a fault as soon as one of the two drives is running. To prevent this one must connect ERM and EBE of the auxiliary drive together with OR to interface EMZS of the main drive.

GFSO **Group fault / status off** **Basic state 0-signal**

Format BOOL

1-Signal at GFSO completely deselects the drive for the Group Summarizing fault and for the Group Status Call.

ELPZ **Lamp test (additional)** **Basic state 0-signal**

Format BOOL

If one has several control desks with lamps and wants to test the lamps for each control desk separately, one can connect the corresponding lamp test signal to this interface.

Caution: Using ELPZ the lamp test interface at the C_PUSHBT module must **not** be connected.

EQIT **Acknowledge (additional)** **Basic state 0-signal**

Format BOOL

The acknowledgement of the drive fault is normally carried out together with the acknowledgement of any alarm within the same AS (default setting). Interface EQIT is only needed for individual acknowledgement (via push-button) or in case of group-wise acknowledgement.

A signal change from "0" to "1" at EQIT acknowledges the drive fault (resetting flag EST).

In case of a conventional control desk, a push-button can be connected to EQIT (for individual acknowledgement) or to the acknowledgement interface at block C_PUSHBT can be used (for AS-wise acknowledgement).

Caution: Using EQIT for individual acknowledgement, the acknowledgement interface at the C_PUSHBT must **not** be connected.

For group-wise acknowledgement connect the output ACK of the corresponding group to interface EQIT of the drives. See Engineering Manual, chapter AS-Engineering.

EBFE **Command ON** **Basic state 0-signal**

Format BOOL

Interface to start the drive in automatic mode. With 1-signal the drive is started. The interface is normally connected through the GBE signal of the associated group(s) or the WBE signal of the associated route(s).
The drive is started either immediately or delayed according to the set start delay time (process value STARTDEL).

Caution: Interface EBFE should not be connected with a continuous signal as a drive fault can then not be acknowledged! If a continuous signal is required, one must take care that the EBFE has signal zero when there is a fault.

EBFA **Command OFF** **Basic state 0-signal**

Format BOOL

Interface to switch off the drive in automatic mode. With 1-signal the drive is switched off. The interface is normally connected through the negated GDE signal of the associated group(s) or through the negated WDE signal of the associated route(s).
The drive is switched off either immediately or delayed according to the set stop delay time (process value STOPDEL).

QSTP **Quick stop** **Basic state 0-signal**

Format BOOL

In some situations it may be necessary to stop the drives of a group instantaneously (without stop delay). The connection of interface QSTP with 1-signal results in the immediate stopping of the drive in automatic mode (interface EBFA may have a delaying effect).

The group module sets during quick stop the signal GQS. Interface QSTP of the drives must be connected with this signal.

Typical application:

During ship loading, when a chamber of the ship is fully loaded, the ship moves slightly and loading continues immediately. For this, one stops the group with this function immediately (no stop delay), and restarts immediately and the already loaded belts continue to convey.

DSIG_BQ **Driver Signal(s) Bad Quality** **Basic state 0-signal**

Format BOOL

If driver blocks are used, the information "one ore more driver blocks have bad quality" can be displayed in the drive faceplate and in the block icon of the drive.
In order to achieve this, the outputs QBAD of the driver blocks must be connected with an OR function to Interface DSIG_BQ.

DSIG_SIM **Driver Signal(s) Simulation** **Basic state 0-signal**

Format BOOL

If driver blocks are used, the information "one or more driver blocks are switched to simulation" can be displayed in the drive faceplate and in the block icon of the drive.
In order to achieve this, the outputs QSIM of the driver blocks must be connected with an OR function to Interface DSIG_SIM.

If SIMOCODE Adapter block is used:

REL_SC **Enable SIMOCODE** **Basic state 0-signal**

Format BOOL

For drives with SIMOCODE you have to enable this function with 1-signal at this parameter. In the faceplate of the drive an additional button appears which allows opening the SIMOCODE faceplate. In the TEXT1 Variable (preset with C_SIMOS) the respective Adapter – Module can be set per instance.

STAT_SC **Status SIMOCODE** **Default: 16#00**

Format BYTE

For drives with SIMOCODE you have to connect this parameter with out-parameter STAT_SC of the Adapter block "C_SIMOS". Additional you have to enable this function with 1-signal at parameter "REL_SC".

If the SUBCONTROL function is used:

SUBC_FT **General fault Subcontrol** **Basic state 0-signal**

Format BOOL

A running drive will be stopped with 1-signal at this parameter. The drive becomes the status faulty and the symbol turns to red color. The alarm message has to be generated by the subcontrol block.

In order to display the motor current in % in the drive faceplate:

REL_MVC **Enable display of motor current** **Basic state 0-signal**

Format BOOL

With 1-signal at this parameter the motor faceplate shows a bar for the motor current (or power) in percent. Look also to parameter "MV_PERC".

MV_PERC **Motor current from C_MEASUR**

Format POINTER

If a measure block for the motor current exists or a SIMOCODE is used, the percentage value of the motor current (or power) can be displayed as bar in the faceplate of the motor. Therefore the output MV_PERC of the C_MEASUR or the output I_PERC of C_SIMOS has to be connected to this interface.

For the display of the percentage value in the drive faceplate, interface REL_MVC must be set.

Caution: In case of a measuring value the upper limit 1 of the measure corresponds to 100% value of motor current. In the bar of the drive faceplate 0-130% are displayed.

In order to link up to 16 measuring values to the drive:

If one ore more measuring values are used as additional process signals of the drive (e. g. winding temperatures, bearing temperatures, power, current, etc.), these measures can be linked to the drive.
The selected process value is displayed in the drive faceplate and the faceplate of the C_MEASUR or t the C_ANA_SEL can directly be opened from the drive.

PV **Process value input (general use)**

Format STRUCT

In order to display the process value in the drive faceplate, input PV must be connected with output PV_Out of C_MEASUR (for one value) or with output Out_Val of C_ANA_SEL (for up to 16 values).

Structure variables:

PV.Value **Value** **Default: 0.0**

Format REAL

PV.ST **Signal status** **Default: 16#FF**

Format BYTE

Caution: Only the selected measure is displayed in the drive faceplate.

PV_Stat **Process Value Status + Unit**

Format STRUCT

In order to transmit the status and the unit of the process value to the drive, the input PV_Stat must be connected with output PV_Stat of C_MEASUR or with output Out_Stat of C_ANA_SEL (for up to 16 values).

Structure variables:

PV_Stat.UNIT **Unit** **Default: %**

Format STRING[8]

PV_Stat.STATUS **Status** **Default: 16#00**

Format DWORD

Caution: Only the status and the unit of the selected measure are displayed in the drive faceplate.

For customizing of the diagnosis window:

STA2_B10 **Spare input for visualization** **Basic state 0-signal**

STA2_B10 till STA2_B17

Format BOOL

These parameters are transferred to the STATUS2 and can be used for additional purposes for e.g. in the diagnostic window.
Look at the table OS-variables.

If the setpoint function is used (e. g. for variable speed drives):

EN_SP **Enable setpoint** **Basic state 0-signal**

Format BOOL

With 1-Signal at input EN_SP the Setpoint input function is enabled. In the drive faceplate the input field and the display of the actual Setpoint and the Process value is activated (visible).

The Setpoint can either be entered via Drive Faceplate ore as an external Setpoint. The Setpoint is checked for Low limit SP_LLM and High limit SP_HLM. If the value exceeds the limits it is aborted. There is no further evaluation in the drive block, the Setpoint is directly written to the output SP_O.

SP_TR **Setpoint tracking** **Basic state 0-signal**

Format BOOL

1-Signal at input SP_TR enables the Setpoint tracking. The external Setpoint SP_EX is tracked to the internal Setpoint SP_IN.

EN_SPEX **Enable external setpoint** **Basic state 0-signal**

Format BOOL

With 1-Signal at the input EN_SPEX the drive block reads the Setpoint from Input SP_EX.

SP_IN **Setpoint from OS** **Default: 0**

Format REAL

Setpoint input from OS Standard Faceplate (must not be connected in the CFC).
The Unit is transmitted via Property "Unit" and the default setting is 'rpm'.

SP_EX **Setpoint extern**

Format STRUCT

Setpoint input from another AS module (e. g. from a PID controller).

Structure variables:

SP_EX.Value **Value** **Default: 0.0**

Format REAL

The Unit is transmitted via Property "Unit" and the default setting is 'rpm'.

SP_EX.ST **Signal status** **Default: 16#FF**

Format BYTE

PV_IN **Process Value input (actual value)**

Format STRUCT

Input PV_IN has to be connected to the Process value. The value will be displayed in the faceplate of the drive.

PV_IN.Value **Value** **Default: 0.0**

Format REAL

The Unit is transmitted via Property "Shortcut" and the default setting is 'rpm'.

PV_IN.ST **Signal status** **Default: 16#FF**

Format BYTE

UserFace **Select Faceplate**

Format ANY

Input UserFace can be connected to any block with an OS Interface (Faceplate). If a block is connected, an additional button "U" (User) appears in the faceplate of the drive block. With this button the Faceplate of the connected block can be opened.

Example:
In order to show the related Signals for the drive, input UserFace can be connected to block C_REL_MOD (for a list of up to 16 objects) or, if fewer signals are used, in can be directly connected to a C_INTERL, C_INTER5 or Intlk02.

Additional inputs for testing and as Interface to the OS:

TEST_OSS **Test interface** **Default: 0**

Format INTEGER

The test interfaces are only used during module development and must not be changed!

MSG8_EVID **Message ID** **Default: 16#00**

Format DWORD

Interface to OS

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

Group and Object links

Group/Route links

Each drive block, annunciation block or measurement block must be linked to a group or route in order to collect the status of these objects for summarizing indications.

The group link is essential for control and diagnosis and comprises the following functions:

- All objects, linked to the group (or route) are listed in the group (or route) object list.
- All objects, linked to the group (or route) are highlighted in the process picture with button "Show related objects".
- The faults of all objects, linked to the group (or route) are included in the summarizing fault indication of the group (or route).
- The warnings of all objects, linked to the group (or route) are included in the summarizing warning indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

A drive can be linked to two groups or routes via *GR_LINK1* and *GR_LINK2*. If a drive belongs to more than two groups or routes the additional block C_MUX must be inserted, which provides 5 additional link interfaces.

Caution: The main group (or main route) should be connected to *GR_LINK1*! This is the one which is opened with a click on button "Main group" in the drive faceplate.

GR_LINK1 **Link to group or route**

Format STRUCT

The GR_LINK1 interface of the drive must be connected with the R_LINK interface of the route or with the G_LINK interface of the group.

Structure variables:

GR_LINK1.Link **Link** **Default: 0**

Format INTEGER

GR_LINK1.Command **Group / Route Command** **Default: 16#00**

Format WORD

GR_LINK2 **Link to group or route**

Format STRUCT

If the drive belongs to two different routes or groups, the GR_LINK2 interface must be connected with the second route/group.

Structure variables:

GR_LINK2.Link **Link** **Default: 0**

Format INTEGER

GR_LINK2.Command **Group / Route Command** **Default: 16#00**

Format WORD

MUX_LINK **Link to C_MUX**

Format STRUCT

If the drive belongs to more than two different routes or groups, the C_MUX module must be series-connected. C_MUX has 5 inputs (GR_LINK1 to GR_LINK5) for connection with the groups/routes and one output (MUX_OUT) for connection with the MUX_LINK interface of the drive.

Caution: If a C_MUX block is used, the programming order is very important. The C_MUX must be called before the drive block!
The MUX_IN interface can under no circumstances be used for connection with a group or route. It is used exclusively for connection with another MUX module.

Structure variables:

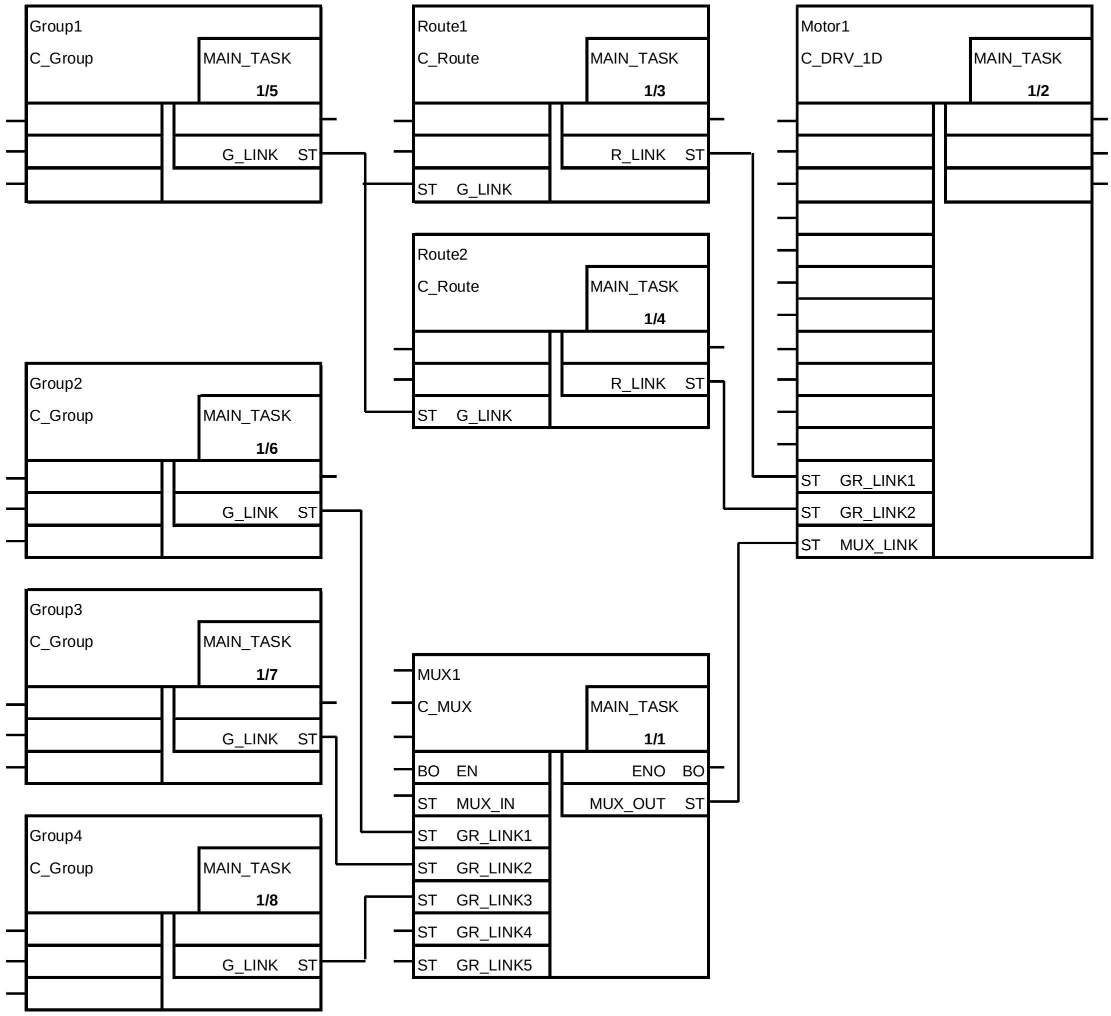
MUX_LINK.Point_GRL **Pointer** **Default: 0**

Format INTEGER

MUX_LINK.Command **Group / Route Command** **Default: 16#00**

Format WORD

Example of a circuit:

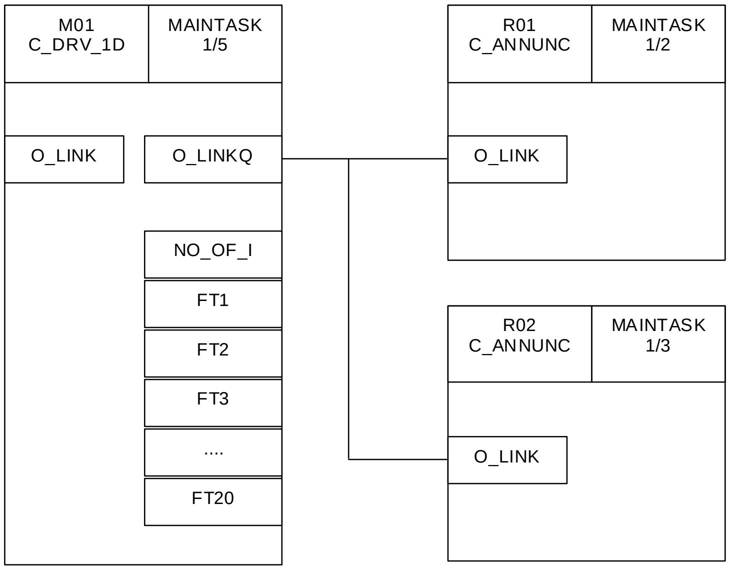


Caution:	Check the runtime sequence! The C_MUX module must be called before the drive. For the other modules the run sequence is as follows: first the drives, then the associated routes and finally the associated groups.

Caution:	Some people use one C_MUX block and connect its output to a number of drives/devices, annunciations and measurements. If you do so, make sure that the C_MUX is called before all the other objects and that no other C_MUX call comes in between. We don't recommend using the same C_MUX if the blocks are located in different runtime groups.

Object links to slave objects

Annunciations and measurements which belong to a drive must not be linked to the group (or route), if they are connected via Object link to the drive output *O_LINKQ*.



The drive block collects the information and forwards it to the group (or route). The result is as follows:

- All objects, linked to the drive are listed in the drive object list and in the group (or route) object list (one level below the drive).
- All objects, linked to the drive are highlighted in the process picture with button "Show related objects".
- The warnings of all objects, linked to the drive are included in the summarizing warning indication of the group (or route).
- The faults of all objects, linked to the drive are included in the summarizing fault indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

O_LINKQ **Link to slave object**

Format STRUCT

Drive output *O_LINKQ* must be connected to interface *O_LINK* of all allocated annunciations and measurements, while the drive itself is connected via *GR_LINK* to the group (or route).

Structure variables:

O_LINKQ.iDB **Instance DB master object**

Format INTEGER

O_LINKQ.iDW **DW number NO_OF_FT in master object**

Format INTEGER

O_LINKQ.Command **Group / Route Command**

Format BYTE

O_LINKQ.Status **Status master object**

Format BYTE

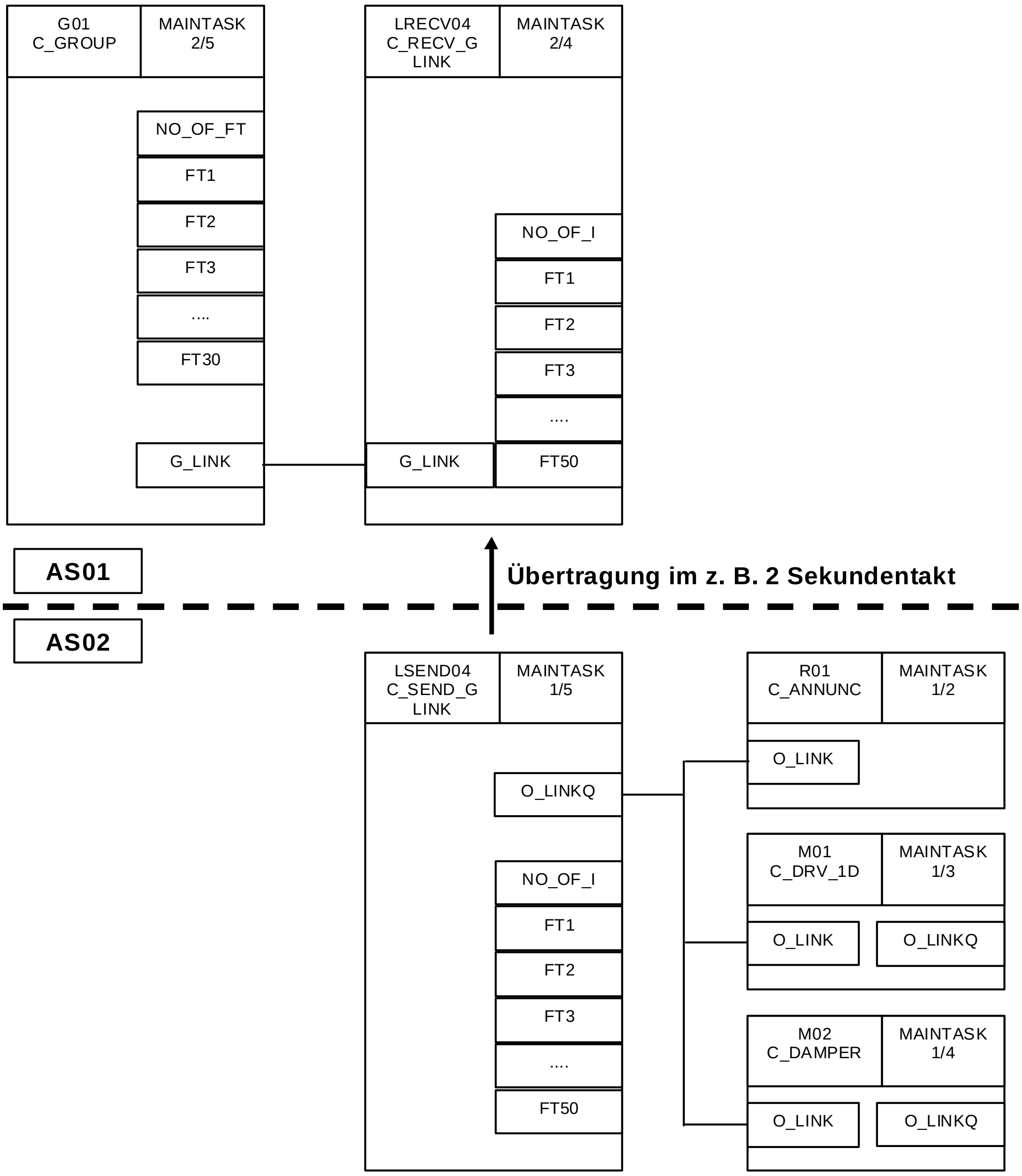
Object links to a group in a different AS

If a Cemat object is programmed in a different AS than the superordinated group a direct link between the drive and the group is not possible. In this case special send and receive blocks must be inserted which collect the object data and transmit it to the group.

In the AS of the group the group output *G_LINK* is connected to input *G_LINK* of the block C_RECV_G.

Caution: C_RECV_G can only be linked to a C_GROUP module. Linking to routes is not permitted and will not work!

In the AS of the Cemat Objects the output *O_LINKQ* of block C_SEND_G is connected to input *O_LINK* of the drives/devices, annunciations and measurements.



Caution: It is not allowed to use the Object link and the Group/Route link at the same time: If *O_LINK* is used, *GR_LINK1* and *GR_LINK2* or *C_MUX* must not be connected!

O_LINK **Link to another object**

Format STRUCT

Input interface *O_LINK* of the drive must be connected to output *O_LINKQ* of the C_SEND_G block.

Structure variables:

O_LINK.iDB **Instance DB master object** **Default: 0**

Format INTEGER

O_LINK.iDW **DW number NO_OF_FT in master object** **Default: 0**

Format INTEGER

O_LINK.Command **Group / Route Command** **Default: 16#00**

Format BYTE

O_LINK.Status **Status master object** **Default: 16#00**

Format BYTE

Caution: If annunciations or measurements belong to the drive, they don't need to be connected to output *O_LINKQ* of the C_SEND_G block.
They can also be programmed as slave objects and connected to output *O_LINKQ* of the drive.

Process values

The process values can be set during engineering and they can be changed online from the OS. To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

FEEDBTIM **Feedback time** **Default: 2**

Format INTEGER (0 – 999)

Value in seconds
The feedback monitoring time for starting the drive is preset to 2 seconds. If this time is not sufficient, e.g. with motors with star-delta starting, the time value must be extended correspondingly.

Caution: The minimum feedback monitoring time is 2 seconds. For switching off, the feedback monitoring time is always 2 seconds (adaptation not possible).

FBOFFTIM **Time for feedback off monitoring** **Default: 2**

Format INTEGER (0 – 999)

Value in seconds
The time for feedback monitoring FBOFFTIM is used for the supervision of the contactor feedback during the shut-down of the drive. By default the value is preset to 2 seconds. If this time is not sufficient, e.g. in case of a VSD drive, the time value must be extended correspondingly.

Caution: The minimum feedback off monitoring time is 2 seconds.
If an already running drive loses the contactor feedback, FBOFFTIM is not considered.

STARTDEL **Start delay** **Default: 0**

Format INTEGER (0 – 999)

Value in seconds
In automatic mode the start of the drive is delayed by the set time (staggered starting). In single-start mode and in local mode this time delay is not effective!

STOPDEL **Stop delay** **Default: 0**

Format INTEGER (0 – 9999)

Value in seconds
The stopping of the drive via interface EBFA is delayed by the set time.

SPEEDTIM **Speed monitor monitoring time** **Default: 0**

Format INTEGER (0 – 999)

Value in seconds
Within the set time the interface for the speed monitor EDRW must have 1-signal. When this time is exceeded, the drive generates a speed monitor fault.

Caution: In the default setting (SM_EVS_I = 0) the EVS signal becomes “1” only after this time has elapsed. In this case this value must be made “0” when no speed monitor is required. Otherwise there will be an unnecessary delay in the starting of the subsequent drives.
With SM_EVS_I = 1 the EVS-Signal becomes “1” immediately with the speed monitor signal.

HORN_TIM **Horn time for start-up warning** **Default: 10**

Format INTEGER (0 – 999)

Value in seconds
During the start of the drive in single-start mode a horn bit (module output HORN) is set for the duration of the set time and the start of the drive is delayed. The horn bit can be connected to trigger a start-up warning.

TOL_SSM **Tolerance value for software speed monitor** **Default: 50**

Format INTEGER (1 – 255)

Time value = TOL_SSM * 0,1s (default setting = 5 seconds).
The software speed monitor should sense an edge change at the pulse input within this time. Only then does the internal output have a 1-signal.

Additional process parameters for the Setpoint function (e. g. for variable speed drives):

SP_HLM **Setpoint High limit** **Default: 0**

Format REAL

The Setpoint values SP_IN and SP_EX are limited by SP_HLM and SP_LLM.

SP_HLM is the maximum value for Setpoint SP_IN and SP_EX

SP_LLM **Setpoint Low limit** **Default: 0**

Format REAL

The Setpoints valus SP_IN and SP_EX are limited by SP_HLM and SP_LLM.

SP_LLM is the minimum value for Setpoint SP_IN and SP_EX.

Additional process parameters for Maintenance function:

MAI_INT **Maintenance Interval** **Default: 16#00**

Format DWORD

The Maintenance Interval relates, depending on the parameterization, to a fixed time value, to the operating hours or to the number of starts. If the Maintenance Interval is exceeded the output MAI_AL will be set.

MAI_REQL **Maintenance Request Limit** **Default: 16#00**

Format DWORD

The Die Maintenance Request Limit can be used in order to indicate to the operator that the Maintenance interval will be completed soon. If the Maintenance Request Limit is exceeded, the output MAI_REQ will be set.

Input/Output interfaces

RES_RTOS **Reset time RT for OS** **Default: 16#00**
Format DWORD
Interface to OS

RT_OS **Run-time for OS** **Default: 16#00**
Format DWORD
Interface to OS

RT_H **Run-time for OS refreshed every hour** **Default: 16#00**
Format DWORD
Interface to OS

CNT_OS **Counter contactor for OS** **Default: 16#00**
Format DWORD
Interface to OS

CNT_H **Counter contactor for OS refreshed every hour** **Default: 16#00**
Format DWORD
Internal

MAI_CNT **Maintenance Actual counter – in hours or starts** **Default: 16#00**
Format DWORD
Interface to OS

CNT_TRIP **Maintenance Counter Trips** **Default: 16#00**
Format DWORD
Interface to OS

FT_DUR **Maintenance Fault duration in sec** **Default: 16#00**
Format DWORD
Interface to OS

MAI_STA **Maintenance Status** **Default: 16#80022**
Format DWORD
Interface to OS
For more information see Variable details.

MAI_X **Maintenance Spare** **Default: 16#00**
Format DWORD
Interface to OS

Output interfaces

EVS **Running signal**

Format BOOL

A 1-signal means “drive running“ in automatic mode or in single-start mode. It is mainly used for the interlocking with other drives and as a feedback to the route or the group. This signal is not generated in local mode!

RunSig **Running signal**

Format STRUCT

For function description, see EVS. This interface can be connected to a structure input as e. g. signal **IntOper** of the next drive.
Remark: For the feedback to the group or route you still have to use signal EVS because the group/route interfaces have no structure format.

Structure variables:

RunSig.Value **Signal**

Format BOOL

RunSig.ST **Signal status**

Format BYTE

EST **Dynamic fault**

Format BOOL

When a fault occurs in a running drive, during drive start up or during stand-by mode, the dynamic fault bit is set. It remains set until the fault is acknowledged.

Caution: In the following cases the drive fault cannot be acknowledged:
- If the ON-command is permanently active;
- With a welded contactor (ERM = 1-signal).

SST **Fault**

Format BOOL

A 1-signal means that at least one fault is present.

HORN **Start-up horn**

Format BOOL

This signal is set during the starting of the drive in single-start mode for a given time period and can be logically connected to trigger a start-up warning.

If L_STA_WA has 1-Signal the start-up warning is also given in local mode.

EVSP **Running signal sporadic drive**

Format BOOL

A 1-signal means „drive has received a start command in automatic mode or in single start mode“ (Command Memory is ON). The drive starts when the interface ESPO has 1-Signal. The EVSP-signal can be used as feedback to the route or the group.

SIM_ON **Simulation ON**

Format BOOL

In the Sequence Test mode SIM_ON has 1-Signal. If module drivers are used the output SIM_ON of the motor can be connected to SIM_ON of the driver blocks in order to switch all driver blocks to simulation mode.

Additional output for setpoint input function (e. g. for variable speed drives):

SP_O **Setpoint Output**

Format STRUCT

In case of a variable speed drive (if EN_SP has 1-Signal) the Setpoint can be entered via drive Faceplate of given via external Setpoint interface SP_EX. The Setpoint it then transferred to the Output SP_O.

Output SP_O can be connected to driver block or to a SUBCONTORL (VSD) block.

Structure variables:

SP_O.Value **Value**

Format REAL

The Unit is transmitted via Property "Unit" and the default setting is 'rpm'.

SP_O.ST **Signal status**

Format BYTE

Additional output for maintenance function:

MAI_REQ **Maintenance Request**

Format BOOL

The auto request value has been exceeded, which means the maintenance interval is nearly completed. This output can be connected to an annunciation block in order to generate an alarm.

MAI_AL **Maintenance Alarm**

Format BOOL

The Maintenance interval has been completed. This output can be connected to an annunciation block in order to generate an alarm.

Additional outputs for testing and as Interface to the OS:

SSM_CVOS **Display counter software speed-monitor**

Format BYTE

Interface to OS

INTFC_OS **Interface status for OS**

Format DWORD

Interface to OS

For more information see Variable details.

VISU_OS **Status for symbol display**

Format BYTE

Interface to OS

For more information see Variable details.

STATUS **Status word for OS**

Format DWORD

Interface to OS

For more information see Variable details.

STATUS2 **Status word for OS**

Format DWORD

Interface to OS

For more information see Variable details.

STATUS3 **Structure Input available**

Format DWORD

Interface to OS

For more information see Variable details.

ALARM **for Test**

Format WORD

For more information see Variable details.

CURR_OS **Display of the motor current**

Format INTEGER

Interface to OS

If a measuring value is assigned to the motor the parameter CURR_OS contains the measuring value in percentage. The text for the Faceplate description is defined in the object properties of parameter CURR_OS under "Identifier". The default value is "**I** =".

As the measuring value must not necessarily be a current value (often the power is used instead). In this case it is required to modify the text under "Identifier".

Note: The texts under "Identifier" are internal variables and for that reason a modification of the text requires a new OS Compile.

DLY_CNT **Delay Counter**

Format INTEGER

Interface to OS

Hardware outputs

EBE Command ON

Format BOOL

The EBE signal is used to trigger the main contactor.

ELS Running/fault lamp

Format BOOL

The ELS running/fault lamp signals the status of the drive and can be used for the connection of an annunciation lamp (when no visualization system is present).
A continuous 1-signal indicates that the drive is running. Rapid flashing indicates a dynamic fault (non-acknowledged) and slow flashing indicates a static fault (already acknowledged). A 0-signal indicates that the drive has stopped.

Time characteristics

The module must be called before the associated route or group.

Any called C_MUX modules must run before this module.

Message characteristics

The module uses the ALARM_8 module to generate annunciations.

A plausibility and priority logic at the process level analyses all object faults
only one fault annunciation is issued for each fault
secondary annunciations are suppressed automatically
the fault source is recorded in detail and uniquely.

Still faulty message:
During start in automatic mode, any failure which inhibits the drive start leads to an interrupt of the start procedure and must therefore be reported by an alarm message.
PCS7 can create the (incoming) alarm message only once and does not support the repetition of incoming alarm messages without outgoing message. For this reason, CEMAT creates a Message “Still faulty” for any alarm message which needs to be repeated.

The current operational state of the plant objects is automatically taken into consideration during the fault analysis, e.g. all fault annunciations are suppressed automatically for a stationary group
no superfluous fault annunciations are created
the operator does not need to manually disable/suppress any annunciations.

Each fault annunciation is also classified.
This shows whether an **electrical** or a **mechanical** fault, a **process fault** or a shut-down with a **local safety switch** applies.
An electrician does not always need to be called first
The production operator can give specific instructions.

Alarm archive and alarm logs show only "true" annunciations.
An annunciation release for each object means that the communication and OS are not overloaded with an "annunciation storm" – e.g. overloaded after a power failure.

Refer to the Variable details for the assignment of the annunciation text and annunciation class to the module parameters.

Module States

Variable VISU_OS:

No.	Status / Display Text	Display Symbol	Text Presentation
1	off	White	Black, white
2	fault not acknowledged	Blinking red	White, red
3	fault	Red	White, red
4	running	Green	Black, green
5	local mode	Yellow	Black, yellow
6	local mode running	Blinking yellow	Black, yellow
7	single mode	Blue	Black, blue
8	single mode running	Blinking blue	Black, blue

Also refer to the Variable details

Commands

Refer to the Variable details for the assignment of the command word.

I/O-bar of C_DRV_1D

C_DRV_1D

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
ERM	Feedback ON	BOOL	0	I			
ESB	Electrical availability	BOOL	1	I			
EBM	Overload	BOOL	1	I			
EVO	Local switch	BOOL	1	I			
ESP	Local stop	BOOL	1	I			
ESR	Local start	BOOL	0	I			
EEVG	Start interlock	BOOL	1	I			
IntStart	Start interlock	STRUCT		I			
IntStart.Value	Signal	BOOL	1	I	U	+	
IntStart.ST	Signal Status	BYTE	16#FF	I	U		
EBVG	Operating interlock	BOOL	1	I			
IntOper	Operating interlock	STRUCT		I			
IntOper.Value	Signal	BOOL	1	I	U	+	
IntOper.ST	Signal Status	BYTE	16#FF	I	U		
ESVG	Protection interlock general	BOOL	1	I			
IntProtG	Protection interlock general	STRUCT		I			
IntProtG.Value	Signal	BOOL	1	I	U	+	
IntProtG.ST	Signal Status	BYTE	16#FF	I	U		
ESVA	Protection interlock (only remote)	BOOL	1	I			
IntProtA	Protection interlock (only remote)	STRUCT		I			
IntProtA.Value	Signal	BOOL	1	I	U	+	
IntProtA.ST	Signal Status	BYTE	16#FF	I	U		
ESPO	Sporadic on/off	BOOL	1	I			
EDRW	Hardware speed monitor	BOOL	1	I			
ELOC	Local mode release	BOOL	0	I			

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
EEIZ	Single-start mode release	BOOL	0	I			
ESTB	Stand-by mode	BOOL	0	I			
ETFG	Inching release	BOOL	0	I			
EMFR	Annunciation release	BOOL	1	I			
EMZS	Fault interlock to the group	BOOL	0	I			
GFSO	Group fault / status off	BOOL	0	I	U		
ELPZ	Lamp test (additional)	BOOL	0	I	U		
EQIT	Acknowledge (additional)	BOOL	0	I	U		
EBFE	Command ON	BOOL	0	I			
EBFA	Command OFF	BOOL	0	I			
QSTP	Quick stop	BOOL	0	I			
DSIG_BQ	Driver Signal(s) Bad Quality	BOOL	0	I			
DSIG_SIM	Driver Signal(s) Simulation	BOOL	0	I			
STA2_B10	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B11	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B12	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B13	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B14	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B15	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B16	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B17	Spare input transferred into STATUS 2	BOOL	0	I	U		
L_STA_WA	1 = startup-warning in local mode	BOOL	0	I	U		
REL_SSM	Release software speed monitor	BOOL	0	I			
SW_SPEED	Pulse signal for software speed monitor	BOOL	0	I			
TOL_SSM	Tolerance value for software speed monitor	INT	50	I		+	
SM_EVS_I	EVS=1 when speed monitor 1-signal	BOOL	0	I			
NSTP_L_A	No stop after switchover local → auto	BOOL	0	I	U		

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
LST_ACT	Local stop active in automatic mode	BOOL	0	I	U		
REL_SC	Enable SIMOCODE	BOOL	0	I	U	+	
STAT_SC	Status SIMOCODE	BYTE	16#00	I	U		
SUBC_FT	General fault Subcontrol	BOOL	0	I	U		
REL_MVC	enable display of motor current	BOOL	0	I	U		
MV_PERC	Motor current from C_MEASUR	POINTER	0	I	U		
EN_SP	Enable setpoint function	BOOL	0	I	U		
EN_SPEX	Enable external setpoint	BOOL	0	I	U		
SP_TR	Setpoint tracking	BOOL	0	I	U		
SP_IN	Setpoint from OS	REAL	0.0	I	U	+	
SP_EX	External Setpoint	STRUCT		I	U		
SP_EX.Value	Value	REAL	0.0	I	U	+	
SP_EX.ST	Signal Status	BYTE	16#FF	I	U		
SP_HLM	Setpoint high limit	REAL	0.0	I	U	+	
SP_LLM	Setpoint low limit	REAL	0.0	I	U	+	
PV_IN	Process value input for setpoint function	STRUCT		I	U		
PV_IN.Value	Value	REAL	0.0	I	U	+	
PV_IN.ST	Signal Status	BYTE	16#FF	I	U		
PV	Process value input (general use)	STRUCT		I	U		
PV.Value	Value	REAL	0.0	I	U	+	
PV.ST	Signal Status	BYTE	16#FF	I	U		
PV_Stat	Process value status + unit	STRUCT		I	U		
PV_Stat.UNIT	Unit	STRING [8]	%	I	U	+	
PV_Stat.STATUS	Status	DWORD	16#00	I	U	+	
TEST_OSS	Not allowed to change	INT	0	I	U		
MSG8_EVID	Message ID	DWORD	16#00	I	U		
COMMAND	Command word	WORD	16#00	I	U	+	

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
FEEDBTIM	Time for feedback monitoring	INT	2	I		+	
FBOFFTIM	Time for feedback off monitoring	INT	2	I		+	
STARTDEL	Start delay	INT	0	I		+	
STOPDEL	Stop delay	INT	0	I		+	
SPEEDTIM	Speed monitor monitoring time	INT	0	I		+	
HORN_TIM	Horn time for start-up-warning	INT	10	I		+	
GR_LINK1	Link to group or route	STRUCT		I			
GR_LINK1. Link	Link	INT	0	I	U		
GR_LINK1. Command	Group/ route command	WORD	16#00	I	U		
GR_LINK2	Link to group or route	STRUCT		I			
GR_LINK2. Link	Link	INT	0	I	U		
GR_LINK2. Command	Group/ route command	WORD	16#00	I	U		
MUX_LINK	Link to C_MUX	STRUCT		I			
MUX_LINK. Point_GRL	Pointer	INT	0	I	U		
MUX_LINK. Command	Group/ route command	WORD	16#00	I	U		
O_LINK	Link to another object	STRUCT		I			
O_LINK. iDB	Instance DB master object	INT	0	I	U		
O_LINK iDW	DW number NO_OF_FT in master object	INT	0	I	U		
O_LINK. Command	Group/ route command	BYTE	16#00	I	U		
O_LINK. Status	Status master object	BYTE	16#00	I	U		
UserFace	Select Faceplate	ANY		I	U		
MAI_INT	Maintenance Interval	DWORD	16#00	I	U	+	
MAI_REQL	Maintenance Request Limit	DWORD	16#00	I	U	+	
RES_RTOS	Reset time RT for OS	DWORD	16#00	IO	U	+	
RT_OS	Runtime (s) refreshed every minute	DWORD	16#00	IO	U	+	
RT_H	Runtime (s) refreshed every hour	DWORD	16#00	IO	U	+	

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
CNT_OS	Counter contactor	DWORD	16#00	IO	U	+	
CNT_H	Counter contactor refreshed every hour	DWORD	16#00	IO	U		
MAI_CNT	Maintenance Actual Counter in hours or starts	DWORD	16#00	IO	U	+	
CNT_TRIP	Maintenance Counter for Trips	DWORD	16#00	IO	U	+	
FT_DUR	Maintenance Fault time duration in sec	DWORD	16#00	IO	U	+	
MAI_STA	Maintenance Status	DWORD	16# 0080022	IO	U	+	
MAI_X	Maintenance Spare	DWORD	16#00	IO	U	+	
RT_OS_O	Run-time for OS refreshed every minute	DWORD	16#00	O	U		
RT_H_O	Run-time for OS refreshed every hour	DWORD	16#00	O	U		
SP_O	Setpoint Output	STRUCT		O	U		
SP_O.Value	Value	REAL	0.0	O	U	+	
SP_O.ST	Signal Status	BYTE	16#80	O	U		
SSM_CVOS	Current Value SSM	BYTE	16#00	O	U	+	
INTFC_OS	Interface status for OS	DWORD	16#00	O	U	+	
VISU_OS	Status for symbol display	BYTE	16#00	O	U	+	
STATUS	Status word 1	DWORD	16#00	O	U	+	
STATUS2	Status word 2	DWORD	16#00	O	U	+	
STATUS3	Status word 3 Structure input available	DWORD	16#00	O	U	+	
ALARM	Alarm word for test	WORD	16#00	O	U		
CURR_OS	Display of motor current/ power in %	INT	0	O	U	+	
EVS	Running signal	BOOL	0	O			
RunSig	Running signal	STRUCT		O			
RunSig.Value	Signal	BOOL	0	O		+	
RunSig.ST	Signal status	BYTE	16#80	O		+	
EST	Dynamic fault (not acknowledged)	BOOL	0	O			
SST	Fault	BOOL	0	O			

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
HORN	Start-up horn	BOOL	0	O			
EVSP	Running signal sporadic drive	BOOL	0	O			
SIM_ON	1-signal during sequence test mode (to driver blocks)	BOOL	0	O			
EBE	Contactor ON Command	BOOL	0	O			
ELS	Lamp	BOOL	0	O	U		
O_LINKQ	Link to slave objects	STRUCT		O			
O_LINKQ. iDB	Instance DB master object	INT	0	O	U		
O_LINKQ iDW	DW number NO_OF_FT in master object	INT	0	O	U		
O_LINKQ. Command	Group/ route command	BYTE	16#00	O	U		
O_LINKQ. Status	Status master object	BYTE	16#00	O	U		
MAI_REQ	Maintenance Request	BOOL	0	O	U		
MAI_AL	Maintenance Alarm	BOOL	0	O	U		
DLY_CNT	Delay Counter	INT	0	O	U	+	

OS-Variable table

C_DRV_1D

OS Variable	Description	PLC Data Type	OS Data Type
IntStart#Value	Signal	BOOL	Binary variable
IntOper#Value	Signal	BOOL	Binary variable
IntProtG#Value	Signal	BOOL	Binary variable
IntProtA#Value	Signal	BOOL	Binary variable
TOL_SSM	Tolerance value for software speed monitor	INT	Signed 16-bit value
REL_SC	Enable SIMOCODE	BOOL	Binary variable
SP_IN	Setpoint from OS	REAL	32-bit floating-point number IEEE 754
SP_EX#Value	Value	REAL	32-bit floating-point number IEEE 754
SP_HLM	Setpoint high limit	REAL	32-bit floating-point number IEEE 754
SP_LLM	Setpoint low limit	REAL	32-bit floating-point number IEEE 754
PV_IN#Value	Value	REAL	32-bit floating-point number IEEE 754
PV#Value	Value	REAL	32-bit floating-point number IEEE 754
PV_Stat#UNIT	Unit	STRING [8]	Text variable 8-bit character set
PV_Stat#STATUS	Status	DWORD	Unsigned 32-bit value
COMMAND	Command word	WORD	Unsigned 16-bit value
FEEDBTIM	Time for feedback monitoring	INT	Signed 16-bit value
FBOFFTIM	Time for feedback off monitoring	INT	Signed 16-bit value
STARTDEL	Start delay	INT	Signed 16-bit value
STOPDEL	Stop delay	INT	Signed 16-bit value
SPEEDTIM	Speed monitor monitoring time	INT	Signed 16-bit value
HORN_TIM	Horn time for start-up-warning	INT	Signed 16-bit value
MAI_INT	Maintenance Interval	DWORD	Unsigned 32-bit value
MAI_REQL	Maintenance Request Limit	DWORD	Unsigned 32-bit value
RES_RTOS	Reset time RT for OS	DWORD	Unsigned 32-bit value
RT_OS	Runtime (s) refreshed every minute	DWORD	Unsigned 32-bit value

OS Variable	Description	PLC Data Type	OS Data Type
RT_H	Runtime (s) refreshed every hour	DWORD	Unsigned 32-bit value
CNT_OS	Counter contactor	DWORD	Unsigned 32-bit value
MAI_CNT	Maintenance Actual Counter in hours or starts	DWORD	Unsigned 32-bit value
CNT_TRIP	Maintenance Counter for Trips	DWORD	Unsigned 32-bit value
FT_DUR	Maintenance Fault time duration in sec	DWORD	Unsigned 32-bit value
MAI_STA	Maintenance Status	DWORD	Unsigned 32-bit value
MAI_X	Maintenance Spare	DWORD	Unsigned 32-bit value
SP_O.#Value	Value	REAL	32-bit floating-point number IEEE 754
SSM_CVOS	Current Value SSM	BYTE	Unsigned 8-bit value
INTFC_OS	Interface status for OS	DWORD	Unsigned 32-bit value
VISU_OS	Status for symbol display	BYTE	Unsigned 8-bit value
STATUS	Status word 1	DWORD	Unsigned 32-bit value
STATUS2	Status word 2	DWORD	Unsigned 32-bit value
STATUS3	Status word 3 Structure input available	DWORD	Unsigned 32-bit value
CURR_OS	Display of motor current/ power	INT	Signed 16-bit value
RunSig#Value	Signal	BOOL	Binary variable
RunSig#ST	Signal status	BYTE	Unsigned 8-bit value
DLY_CNT	Delay counter	INT	Signed 16-bit value

Variable details

Internal structure of the Commands, Alarms, Visualization status and Interface word:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Kommandowort**	**Commandword**		
COM_B20	OFF	0	AUS	OFF	Op. Inp.	
COM_B21	ON	1	EIN	ON	Op. Inp.	
COM_B22	R_RTOS	2	Laufzeit löschen	Reset Running Time OS	Op. Inp.	
COM_B23		3				
COM_B24	BDW_on/off	4	Brücke Drehwächter EIN/AUS	Bypass Speed monitor ON/OFF	Op. Inp.	
COM_B25		5				
COM_B26		6				
COM_B27		7				
COM_B10		8				
COM_B11	SACK	9	Einzel quittieren	Single acknowledge		
COM_B12		10				
COM_B13		11				
COM_B14		12				
COM_B15		13				
COM_B16		14				
COM_B17		15				
ALARM			**Alarm**	**Alarm**		
ALA_ESS	SIG1	0	Schütz	Feedback	AL_H	E
ALA_ESB	SIG2	1	El. Schaltbereit	Available	AL_H	E
ALA_EVO	SIG3	2	Vorort	Local	AL_H	S
ALA_EBM	SIG4	3	Bimetall	Overload	AL_H	M
ALA_ESD	SIG5	4	Drehwächter	Speed monitor	AL_H	M
ALA_LST	SIG6	5	Vorort Stop	Local stop	AL_H	S
ALA_SUB	SIG7	6	Subc. Sammelstörung	Subc. General Fault	AL_H	E
ALA_REP	SIG8	7	Noch gestört	Still faulty	AL_H	P
VISU_OS	**dezimal**	**hex**	**für Symbol und Texte**	**for Symbol and Text**		
schw, weiß	1	1	Steht	off		
Weiß ,rot	2	2	Störung nicht quittiert	fault not acknowledged		
Weiß ,rot	3	3	Störung quittiert	Fault acknowledged		
schw, grün	4	4	Läuft	running		
schw, gelb	5	5	Vorortbetrieb steht	local mode		
schw, gelb	6	6	Läuft in Vorortbetrieb	local mode running		
schw, türkis	7	7	Einzelbetrieb steht	single mode		
schw, türkis	8	8	Läuft in Einzelbetrieb	single mode running		

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
INTFC_OS			**Nahtstellenwort**	**Interface word**		
OS_IF_B40	EEVG	0	Einschaltverriegelung	Start interlock		
OS_IF_B41	EBVG	1	Betriebsverriegelung	Operating interlock		
OS_IF_B42	ESVG	2	Schutzverriegelung	Protection interlock (always active)		
OS_IF_B43	ESVA	3	Schutzverriegelung (nur Automatik und Einzel)	Protection interlock (only automatic and single)		
OS_IF_B44	ESPO	4	Sporadisch Ein/Aus	Sporadic ON/OFF		
OS_IF_B45	EDRW	5	Drehwächter	Speed monitor		
OS_IF_B46		6				
OS_IF_B47		7				
OS_IF_B30	ELOC	8	Vorortbetrieb Freigabe	Local mode release		
OS_IF_B31	EEIZ	9	Einzelbetrieb Freigabe	Single start mode release		
OS_IF_B32	ESTB	10	Betriebsart Stand-by	Stand-by mode		
OS_IF_B33	ETFG	11	Tipp-Freigabe	Inching release		
OS_IF_B34		12				
OS_IF_B35		13				
OS_IF_B36	REL_SSM	14	Freigabe Software Drehwächter	Rel. software Speed monitor		
OS_IF_B37	REL_EVS_I	15	Freigabe EVS sofort bei EDRW	EVS=1 immediately when EDRW=1		
OS_IF_B20	GFSO	16	Gruppenstörung/ Zustand aus	Group fault/ status off		
OS_IF_B21	EMFR	17	Meldefreigabe	Annunciation release		
OS_IF_B22	EMZS	18	Störungsverriegelung zur Gruppe	Fault interlock to group		
OS_IF_B23		19				
OS_IF_B24		20				
OS_IF_B25		21				
OS_IF_B26		22				
OS_IF_B27	ELPZ	23	Lampen prüfen (Zusatz)	Lamp test (additional)		
OS_IF_B10	EQIT	24	Quittieren (Zusatz)	Acknowledge (additional)		
OS_IF_B11		25				
OS_IF_B12		26				
OS_IF_B13	EBFE	27	Befehl Ein	Command ON		
OS_IF_B14	EBFA	28	Befehl Aus	Command OFF		
OS_IF_B15		29				
OS_IF_B16	QSTP	30	Schnellstopp	Quick stop		
OS_IF_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B40	LOCAL	0	Betriebsart Vorort	Local mode		
STA_B41	EIZ	1	Freigabe Einzelbetrieb	Single start mode released		
STA_B42	BDW	2	Brücke Drehwächter	Bypass speed monitor		
STA_B43	SSM	3	Softwaredrehwächter	Software speed mon. output		
STA_B44	HORN	4	Anfahrwarnung	Start up warning		
STA_B45	EST	5	Störung nicht quittiert	Fault not acknowledged		
STA_B46	ERM	6	Rückmeldung EIN	Feedback ON		
STA_B47	SC_FT	7	Störung SIMOCODE	General fault SIMOCODE		
STA_B30	ESS	8	Störung Schütz	Contactor fault		
STA_B31	ESB	9	Störung elektrische Schaltbereitschaft	Electrical availability fault		
STA_B32	EVO	10	Störung Vorort	Local switch fault		
STA_B33	EBM	11	Störung Bimetall	Overload fault		
STA_B34	ESD	12	Störung Drehwächter	Speed monitor fault		
STA_B35	ESV	13	Störung Schutzverriegelung	Protection interlock fault		
STA_B36	LST	14	Störung Vorort Stopp	Local Stop Fault		
STA_B37		15				
STA_B20	SIM_ON	16	Sequenz Test/Simulation	Sequence test/Simulation		
STA_B21	SST	17	Sammelstörung	general fault		
STA_B22	BQU	18	Signal Störung	Bad Quality of signals		
STA_B23	EVS	19	Laufsignal	Running Signal		
STA_B24	EVS_SP	20	Laufsignal sporadisch	Running Signal sporadic drive		
STA_B25	EKS	21	Kommando Speicher	Command memory		
STA_B26	ON_DLY	22	Einschaltverzögerung	ON delay		
STA_B27	OFF_DLY	23	Ausschaltverzögerung	OFF delay		
STA_B10	MOV_T	24	Rückmeldeüberwachung läuft	Feedback time is running		
STA_B11	SUW_T	25	Hupzeit läuft	Startup Warning time is running		
STA_B12	EN_SP	26	Freigabe Sollwerteingabe	Enable setpoint input		
STA_B13	EN_SPEX	27	Freigabe Sollwert extern	Enable external setpoint		
STA_B14	SP_TR	28	Freigabe Sollwert nachführen	Enable setpoint tracking		
STA_B15		29				
STA_B16		30				
STA_B17	SUBC_FT	31	Sammelfehler Subcontrol	General fault Subcontrol		

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS2			**Status**	**Status**		
STA2_B40	ERM	0	Rückmeldung EIN	Feedback ON		
STA2_B41	ESB	1	Schaltbereitschaft	El. Availability		
STA2_B42	EBM	2	Bimetall	Overload		
STA2_B43	EVO	3	Vorortschalter	Local Switch		
STA2_B44	ESP	4	Vorort Stop	Local Stop		
STA2_B45	ESR	5	Vorort Start	Local Start		
STA2_B46	EBE	6	Befehl Ein	Command ON / OFF		
STA2_B47		7				
STA2_B30		8				
STA2_B31		9				
STA2_B32		10				
STA2_B33		11				
STA2_B34		12				
STA2_B35		13				
STA2_B36		14				
STA2_B37		15				
STA2_B20	REL_SC	16	Freigabe SIMOCODE	Enable SIMOCODE		
STA2_B21	WA_SC	17	Warnung SIMOCODE	General Warning SIMOCODE		
STA2_B22	REL_MVC	18	Freigabe Anzeige Strom	Enable display of current		
STA2_B23	LST_ACT	19	Vorort Stopp aktiv in Automatik	Local stop active in automatic		
STA2_B24		20				
STA2_B25		21				
STA2_B26	L_STA_WA	22	Freigabe Hupe in Vorort	Release Start-up-warning in local mode		
STA2_B27		23				
STA2_B10	STA2_B10	24	Reserve für Anwender	Spare for User adaptations		
STA2_B11	STA2_B11	25	Reserve für Anwender	Spare for User adaptations		
STA2_B12	STA2_B12	26	Reserve für Anwender	Spare for User adaptations		
STA2_B13	STA2_B13	27	Reserve für Anwender	Spare for User adaptations		
STA2_B14	STA2_B14	28	Reserve für Anwender	Spare for User adaptations		
STA2_B15	STA2_B15	29	Reserve für Anwender	Spare for User adaptations		
STA2_B16	STA2_B16	30	Reserve für Anwender	Spare for User adaptations		
STA2_B17	STA2_B17	31	Reserve für Anwender	Spare for User adaptations		

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS3			**Status**	**Status**		
STA3_B40		0	IntStart angeschlossen	IntStart connected		
STA3_B41		1	IntOper angeschlossen	IntOper connected		
STA3_B42		2	IntProtG angeschlossen	IntProtG connected		
STA3_B43		3	IntProtA angeschlossen	IntProtA connected		
STA3_B44		4	SP_EX angeschlossen	SP_EX connected		
STA3_B45		5	PV_IN angeschossen	PV_IN connected		
STA3_B46	LINK	6	GR_LINK1 angeschlossen	GR_LINK1 connected		
STA3_B47		7	Analogwert angeschlossen	User Analog Value connected		
STA3_B30	MARK	8	Objekt markieren (Gruppenkommando)	Highlight object (group command)		
STA3_B31		9				
STA3_B32		10				
STA3_B33		11				
STA3_B34		12				
STA3_B35		13				
STA3_B36		14				
STA3_B37		15				
STA3_B20		16				
STA3_B21		17				
STA3_B22		18				
STA3_B23		19				
STA3_B24		20				
STA3_B25		21				
STA3_B26		22				
STA3_B27		23				
STA3_B10		24				
STA3_B11		25				
STA3_B12		26				
STA3_B13		27				
STA3_B14		28				
STA3_B15		29				
STA3_B16		30				
STA3_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
MAI_STA			**Maintenance Status**	**Maintenance Status**		
MAI_STA_B40		0	Maintenance Intervall:fest	Maintenance interval: fixed		
MAI_STA_B41		1	Maintenance Intervall: Betriebsstunden	Maintenance interval: Operating hour		
MAI_STA_B42		2	Maintenance Intervall: Starts	Maintenance Interval: starts		
MAI_STA_B43		3				
MAI_STA_B44		4	Maintenance Kommando Start	Maintenance Command: start		
MAI_STA_B45		5	Maintenance Komando Stop/Reset	Maintenance Command: stop/reset		
MAI_STA_B46		6				
MAI_STA_B47		7				
MAI_STA_B30		8	Status Alarm (Intervall überschr.))	Status Alarm (Interval exceeded))		
MAI_STA_B31		9	Status Anforderung (Anforderungswert überschr.)	Status Request (Req. Val. Exceeded))		
MAI_STA_B32		10	Status läuft (MT on)	Status Run (Maintenance on)		
MAI_STA_B33		11				
MAI_STA_B34		12				
MAI_STA_B35		13				
MAI_STA_B36		14				
MAI_STA_B37		15				
MAI_STA_B20		16	Bedienanforderng	Operation Request		
MAI_STA_B21		17	Bedienung	Operation In Progress		
MAI_STA_B22		18	Bedineung ausgeführt	Operation Completed		
MAI_STA_B23		19	Bedienung Temp (keine Bedienaktion)	Opartation Temp (No Operator Action)		
MAI_STA_B24		20				
MAI_STA_B25		21				
MAI_STA_B26		22				
MAI_STA_B27		23				
MAI_STA_B10		24				
MAI_STA_B11		25				
MAI_STA_B12		26				
MAI_STA_B13		27				
MAI_STA_B14		28				
MAI_STA_B15		29				
MAI_STA_B16		30				
MAI_STA_B17		31				

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Cemat V 8.2
Function Block Library ILS_CEM

Function Description **Edition 07/16**

Bi-directional Drive C_DRV 2D

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring to property damage only have no safety alert symbol. The notices shown below are graded according to the degree of danger.

Danger
indicates that death or severe personal injury **will** result if proper precautions are not taken.

Warning
indicates that death or severe personal injury **may** result if proper precautions are not taken.

Caution
with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution
without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention
indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel.** Within the context of the safety notices in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

Warning
This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.
Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens Aktiengesellschaft

Description of C_DRV_2D

Type/Number

Module name: C_DRV_2D
Module no.: FB1003

Calling OBs

C_DRV_2D must be called in OB1 (MAIN_TASK).

Function

General Function description

Module Type C_DRV_2D can be used to control all kind of bi-directional drives in a cement plant. Start/stop can be carried out in three different **operating modes**:

- In the **automatic mode** the drive is started/stopped by a superordinated group module.
- The **single-start mode** allows individual start/stop via operator faceplate of the drive.
- In the **local mode** the drive can be started and stopped by the locally installed pushbuttons **ESR1** and **ESR2** (start buttons) and **ESP** (start button).

The following **standard signals** are monitored by the bi-directional drive block:

- Contactor feedback **ERM1** in conjunction with the contactor output **EBE1**
- Contactor feedback **ERM2** in conjunction with the contactor output **EBE2**
- Electrical availability **ESB**
- Overload or Bimetal **EBM**
- Local Switch **EVO** (1-Signal = Remote; 0-Signal = Local)
- Local stop button **ESP**
- Local start button **ESR1**
- Local start button **ESR2**

Additionally there is an option of a **supervision of a speed monitor** fault. A continuous signal can or pulses can be evaluated (Software Speed monitor).

If the drive is in automatic or in single-start mode <u>and</u> the drive is in operation, a wrong status at any of the above mentioned signals leads to an **alarm message.**

If additional **protections** are available for the drive or for the equipment, those signals have to be linked to an Annunciation block C_ANNUNC or C_ANNUN8 in order to create an alarm. In order to stop the drive in case of a fault an output of the annunciation block has to be connected to the protection interlock of the drive. We distinguish between:

- Protection interlock **ESVG** or **IntProtG**	effective in all modes
- Protection interlock **ESVA** or **IntProtA**	not effective in local mode

Interlocks can be used in order to enable or disable the drive operation dependent on a process condition, like "previous drive is running" or a process signal:

- Start interlock **EEVG1** or **IntStrt1**	effective only in auto and in single-start mode
- Start interlock **EEVG2** or **IntStrt2**	effective only in auto and in single-start mode
- Operating interlock **EBVG1** or **IntOper1**	effective only in auto and in single-start mode
- Operating interlock **EBVG2** or **IntOper2**	effective only in auto and in single-start mode
- Sporadic ON/OFF **ESPO**	only in auto mode

Through **process parameters** the following values can be configured online:

- Feedback time (s)	for the feedback supervision of the main contactor
- Start delay (s)	group start command is given and IL conditions are fulfilled
- Stop delay (s)	group stop command is given
- Speed Monitor time (s)	for the feedback supervision of the Speed Monitor
- Time for start-up warning (s)	for single-start mode and local mode (if enabled)
- Monitoring of change direction (s)	to prevent immediate change of directions
- Tolerance Speed Monitor	Tolerance value in case of Software Speed monitor function (Pulse evaluation)

Visualization

In the **block icon** of the bi-directional drive the most important operation status are displayed (stopped, running, operating mode, fault). Operation functions and detail information are only available after opening the **faceplate**.

Additional functions

Link to a measured value

- By connecting the percentage value of a measure to the drive block, the power or current of the drive in % can be displayed in the faceplate of the motor.
- An additional measure can be displayed in the drive faceplate, either through connection of the physical output of measured value block or through connection of the output of an analog value selection block to the drive.

SIMOCODE drives

If SIMOCODE is used, the communication between the drive block and the SIMOCODE can be carried out via adapter block C_SIMOS or C_SIM_AD.
An additional button in the drive faceplate opens the faceplate of the C_SIMOS in order to display the SIMOCODE details.
The percentage value of current and power are directly displayed in the faceplate of the motor.

Sequence Test

In Sequence Test mode the motor can be started without hardware signals. The feedback of the contactor and eventually a speed monitor are simulated. The hardware signals (ESB; EBM; EVO…) are still active and have to be forced by a test program at the beginning of the OB1-Task.

If driver blocks are used, the Output SIM_ON of the drive can be connected to input SIM_ON of each driver block to enable the simulation.

Operating principle

Hardware inputs

ERM1 **Feedback ON direction 1** **Basic state 0-Signal**

Format BOOL

The ERM1 parameter must be connected. It is appropriate to use the feedback contact of the main contactor 1 for this purpose. The feedback is monitored in automatic mode and in the single-start mode. The monitoring time for switching on the motor can be set with the parameter FEEDBTIM. The monitoring time for switching off is 2s. An alarm is issued if no feedback occurs and/or the monitoring time expires.

ERM2 **Feedback ON direction 2** **Basic state 0-Signal**

Format BOOL

See ERM1

ESB **Electrical availability** **Basic state 1-Signal**

Format BOOL

The ESB parameter is used to monitor the electrical availability of the motor. The electrical availability is monitored in automatic mode and in single-start mode, and results in a shutdown with an alarm.

EBM **Overload** **Basic state 1-Signal**

Format BOOL

The EBM parameter is used to monitor the overload of the motor. The overload is monitored in automatic mode and in single-start mode, and results in a shutdown with an alarm.

EVO **Local switch** **Basic state 1-Signal**

Format BOOL

The EVO parameter is used for the connection with the local switch of the motor. EVO = 1-signal means automatic position and EVO = 0-signal means local position. No alarm signal occurs in the control room in local mode.

In position Local (EVO = 0-signal) the motor can be started and stopped via ESR1/ESR2 and ESP.

ESP **Local stop** **Basic state 1-Signal**

Format BOOL

The ESP parameter is used to stop the motor in local mode. This is a break contact, i.e. the 0-signal stops the motor.
By default the local stop ESP is only active if the drive is in local mode. Connecting a 1-signal to LST_ACT, the local stop is always effective.

ESR1 **Local start direction 1** **Basic state 0-Signal**

Format BOOL

A positive edge to the parameter ESR1 starts the motor in direction 1.
Prerequisite for the local start of the motor is the local release (interface ELOC interface = 1-signal) and the EVO switch positioned to Local (EVO = 0-signal).

Caution: The local start pushbutton must remain pressed until the ERM1 contactor feedback message arrives. For safety reasons, the signal is not stored.

ESR2 **Local start direction 2** **Basic state 0-Signal**

Format BOOL

A positive edge to the parameter ESR2 starts the motor in direction 2.
Prerequisite for the local start of the motor is the local release (interface ELOC interface = 1-signal) and the EVO switch positioned to Local (EVO = 0-signal).

Caution: The local start pushbutton must remain pressed until the ERM2 contactor feedback message arrives. For safety reasons, the signal is not stored.

Input interfaces

EEVG1 **Start Interlock direction 1** **Basic state 1-Signal**

Format BOOL

The drive can be started in automatic mode or single-start mode only if the start interlock has 1-signal. 0-signal at interface EEVG1 prevents the start. In local mode the starting interlock is not effective.

Typical application:

The fan can be started only with closed fan damper. For this, the interface EEVG1must be connected with the signal KVS1 of the damper. The run signal of the fan must be connected to the inching release of the damper, i.e. as soon as the fan is operating, the damper can be opened or positioned.

The start command of group GBE goes simultaneously to damper direction 1 and to the fan drive. As soon as the damper has reached limit position 1 the start interlock of the fan drive has 1-signal and the fan drive is also switched on.

IntStrt1 **Start Interlock direction 1**

Format STRUCT

For function description, see EEVG1. This interface can be connected with a structure output as e. g. signal **PosSig1** of the damper or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntStrt1.Value **Signal** **Basic state 1-signal**

Format BOOL

IntStrt1.ST **Signal status** **Default: 16#FF**

Format BYTE

EEVG2 **Start Interlock direction 2** **Basic state 1-Signal**

Format BOOL

For function description, see EEVG1

IntStrt2 **Start Interlock direction 2**

Format STRUCT

For function description, see EEVG1.

Structure variables:

IntStrt2.Value **Signal** **Basic state 1-signal**

Format BOOL

IntStrt2.ST **Signal status** **Default: 16#FF**

Format BYTE

EBVG1 **Operating Interlock direction 1** **Basic state 1-Signal**

Format BOOL

The drive can run in automatic mode or single-start mode only if the operating interlock has 1-signal. 0-signal at interface EBVG1 prevents the start or switches off the running drive. In local mode the operating interlock is not effective.

Typical application:

Material transport: Only if the downstream drive is running may the following drive be started. As soon as the downstream drive fails the following drive must stop as well.

For this, interface EBVG1 must be connected with run-signal EVS of the downstream drive. The start command of group GBE goes simultaneously to both drives. As soon as the downstream drive is running the operating interlock of the following drive has 1-signal and this drive is also started.

IntOper1 **Operation Interlock direction 1**

Format STRUCT

For function description, see EBVG1. This interface can be connected with a structure output as e. g. signal **RunSig** of the previous drive or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntOper1.Value **Signal** **Basic state 1-signal**

Format BOOL

IntOper1.ST **Signal status** **Default: 16#FF**

Format BYTE

EBVG2 **Operating Interlock direction 2** **Basic state 1-Signal**

Format BOOL

For function description, see EBVG1

IntOper2 **Operation Interlock direction 2**

Format STRUCT

For function description, see EBVG1.

Structure variables:

IntOper2.Value **Signal** **Basic state 1-signal**

Format BOOL

IntOper2.ST **Signal status** **Default: 16#FF**

Format BYTE

ESVG **Protection Interlock general** **Basic state 1-Signal**

Format BOOL

All signals which indicate a drive fault and which are not monitored by the drive module as per standard must be connected to the protection interlock of the drive. A 1-signal means status healthy, 0-signal means faulty.
Interface ESVG is effective for all operating modes of the drive.

Caution: When the drive is switched off via ESVG the drive module does not generate an alarm message. There is no summarizing fault indication at the group and the protection interlock is not shown in the status call.
For the fault message one must program an annunciation module. To connect the protective interlock one must use the output MAU of the appropriate annunciation module and not the input signal of the fault so that a possible time delay is taken into consideration.

Typical application:

All suppressor circuits concerning operator and machine safety and which therefore must be effective all the time (e.g. pull-rope).

IntProtG **Protection Interlock general**

Format STRUCT

For function description, see ESVG. This interface can be connected with a structure output as e. g. output **OutSig** of the annunciation block or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntProtG.Value **Signal** **Basic state 1-signal**

Format BOOL

IntProtG.ST **Signal status** **Default: 16#FF**

Format BYTE

ESVA **Protection Interlock (only in remote)** **Basic state 1-signal**

Format BOOL

All signals which indicate a drive fault and which are not monitored by the drive module as per standard must be connected to the protection interlock of the drive. A 1-signal means status OK, 0-signal means faulty.
Interface ESVA is effective only in automatic mode and single-start mode, i.e. in the case of a fault the drive can still be operated in local mode.

Caution: When the drive is switched off via ESVA the drive module does not generate an alarm message. There is no summarizing fault indication at the group and the protection interlock is not shown in the status call.
For the alarm message one must program an annunciation module. To connect the protective interlock one must use the output MAU of the appropriate annunciation module and not the input signal of the fault so that a possible time delay is taken into consideration.

Typical application:

Belt drift switch: If the belt drift switch responds this means in automatic mode a drive fault. However, it must be possible to start the drive in local mode to align the belt.

IntProtA **Protection Interlock (only in remote)**

Format STRUCT

For function description, see ESVA. This interface can be connected with a structure output as e. g. output **OutSig** of the annunciation block or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntProtA.Value **Signal** **Basic state 1-signal**

Format BOOL

IntProtA.ST **Signal status** **Default: 16#FF**

Format BYTE

ESPO **Sporadic ON/OFF** **Basic state 1-signal**

Format BOOL

0-Signal at interface ESPO stops the motor without resetting of the command memory EKS. The motor is still activated and restarts automatically with 1-Signal at this interface.
To stop the motor completely 1-Signal at EBFA or 0-Signal at EBVG is required. If the motor is stopped by a fault, it must be restarted through the associated group.

Typical application:

A pump which is started and stopped depending on a pressure signal.

This interface is effective in automatic mode only. In Single start mode or local mode ESPO is not evaluated. For the change of operations mode the following has to be considered:
- If the drive is running in Automatic mode and switched to Single start mode, it keeps running continuously (without considering ESPO).
- If the drive is running in Single start mode and switched to Automatic mode, with the change of the operation mode ESPO is evaluated:
  If ESPO has 0-Signal the drive will be stopped completely (reset of EKS).
  If ESPO has 1-Signal the drive will run in sporadic mode.

EDRW **Hardware speed monitor** **Basic state 1-signal**

Format BOOL

If a continuous 1-signal is available for speed monitor supervision the speed monitor signal must be connected to interface EDRW. At the same time the software speed monitor must be disabled (REL_SSM = 0-signal)

A 1-signal at interface EDRW means that the motor is running and the Speed monitor has responded. The Speed monitoring time can be set (process value SPEEDTIM). If the Speed monitor does not provide a continuous 1-signal within the default time, the drive module generates an alarm message.
The speed monitor supervision is only effective in automatic mode and in single-start mode.

REL_SSM **Release software speed monitor** **Basic state 0-signal**

Format BOOL

REL_SSM must be connected with a 1-signal if you wish to use the function of the software speed monitor. The EDRW interface is then no longer evaluated.
The 0-signal causes monitoring of the EDRW interface.

This interface is not operable through OS.

SW_SPEED **Pulse signal software speed monitor** **Basic state 0-signal**

Format BOOL

If you get pulses from the speed monitor, the pulse input must be connected to interface SW_SPEED. The software speed monitor function must be enabled via REL_SSM = 1-Signal.

The Speed monitoring time can be set (process value SPEEDTIM). If the Speed monitor does not provide pulses within the default time (considering the tolerance value TOL_SSM), the drive module generates an alarm message. Input-signal for software speed monitor.
The speed monitor supervision is only effective in automatic mode and in single-start mode.

⚠ Make sure that the duration of the pulses is long enough. Pulses and pause should be at least 200ms.

SM_EVS_I **EVS=1 when speed monitor 1-signal** **Basic state 0-signal**

Format BOOL

With 0-signal at SM_EVS_I, the EVS gets 1-signal after the speed monitor has got 1-signal <u>and</u> supervision time of the monitor has elapsed.

With 1-signal at SM_EVS_I, the EVS gets 1-signal immediately with the 1-signal of the speed monitor.

REL_EBD **Bypass Speed Monitor** **Basic state 0-signal**

Format BOOL

The Speed Monitor can be enabled/disabled from the Diagnostic Picture from the OS only. When the Bypass is set no supervision of speed monitor is active.

⚠ **Caution:** This is no block parameter

L_STA_WA **1 = Start-up warning in local mode** **Basic state 0-signal**

Format BOOL

With 0-signal at this parameter, no start-up warning is given in local mode.
With 1-signal at this parameter, by pressing the Local start button a start-up warning is given and the contactor output EBE is delayed by the start-up warning time HORN_TIM.

⚠ **Caution:** For security reasons the local start button must remain pressed until the drive is running!

NSTP_L_A **No stop after switching local → auto** **Basic state 0-signal**

Format BOOL

This parameter is foreseen for different project-standards. 1-signal at this parameter causes no stop for running drives after switchover from local mode into automatic mode, if the interlocking conditions are fulfilled.

⚠ **Caution:** Parameter NSTP_L_A has to be modified only after an explicit instruction from the Cemat Development.

LST_ACT **Local Stop active** **Basic state 0-signal**

Format BOOL

With 0-signal at this parameter the local-stop is not effective in automatic mode.
1-signal at this parameter enables the local stop in automatic mode too, and an alarm will be created.

ELOC **Local mode release** **Basic state 0-signal**

Format BOOL

A 1-Signal at this interface releases the drive for the local mode through the PLC, i.e. the drive can be started/stopped via inputs ESR and ESP. The operating mode is changed by the appropriate group. The group module sets in local mode signal GLO. This information is passed on to the drive module by connecting interface ELOC with signal GLO of the appropriate group.

In local mode operation via the PLC only the protective interlock ESVG is effective. The connection of interfaces EEVG, EBVG and ESVA is not analyzed in local mode. In local mode no logic signal EVS is generated!

EEIZ **Single-start mode release** **Basic state 0-signal**

Format BOOL

A 1-Signal at this interface releases the single-start mode for the drive, i.e. the drive can be started and stopped separately from the central control room. The operating modes are changed by the appropriate group. The group module sets the single-start mode signal GES. This information is passed on to the drive module by connecting the interface EEIZ with signal GES of the appropriate group.

In single-start mode all interlocks of the drive are effective! Start is carried out after the set horn time (process value HORN_TIM) has expired.

ESTB **Stand-by mode** **Basic state 0-signal**

Format BOOL

In the philosophy of CEMAT-Standards only the active plant sections can generate alarm messages. This means, if a drive at stop is faulty this is indicated in the symbol at the flow mimic but there will be no alarm message.
A 1-Signal at interface ESTB means that the drive is in stand-by mode. In this mode the drive is monitored for availability even under stand still conditions. If a fault occurs when the drive is in stand-by mode, an alarm message is generated.

ETFG **Inching release** **Basic state 0-signal**

Format BOOL

Interface ETFG must be connected with LOG1 if the drive is to be operated as a positioning drive, i.e. it is to be switched ON and OFF in short intervals (<= 2s).

EMFR **Annunciation release** **Basic state 1-signal**

Format BOOL

With 0-signal at this interface the annunciation function is blocked.

Typical application:

In the case of a control supply voltage failure for MCC or field signals, one alarm message would be triggered for each sensor signal. To prevent this one should connect the control voltage signal to the annunciation release interface at the appropriate modules. This causes no alarms to be generated. The cause of "control voltage failure" is generated by an annunciation module which has to be engineered for this purpose.

Caution: If EMFR has 0-Signal the drive fault is not shown in the summarizing indication of group and route and not listed in the status call.

EMZS **Fault interlock to the group** **Basic state 0-signal**

Format BOOL

A 1-signal on EMZS prevents that the dynamic and static fault is passed to the group. In the status call the drive fault can still be seen.

Typical application:

To interlock a main drive together with the affiliated auxiliary drive one must connect the feedback contact ERM and the ON command EBE of the auxiliary drive to the protective interlock of the main drive and vice versa. In this case, the group would indicate a fault as soon as one of the two drives is running. To prevent this one must connect ERM and EBE of the auxiliary drive together with OR to interface EMZS of the main drive.

GFSO **Group fault / status off** **Basic state 0-signal**

Format BOOL

1-Signal at GFSO completely deselects the drive for the Group Summarizing fault and for the Group Status Call.

ELPZ **Lamp test (additional)** **Basic state 0-signal**

Format BOOL

If one has several control desks with lamps and wants to test the lamps for each control desk separately, one can connect the corresponding lamp test signal to this interface.

Caution: Using ELPZ the lamp test interface at the C_PUSHBT module must **not** be connected.

EQIT **Acknowledge (additional)** **Basic state 0-signal**

Format BOOL

The acknowledgement of the drive fault is normally carried out together with the acknowledgement of any alarm within the same AS (default setting). Interface EQIT is only needed for individual acknowledgement (via push-button) or in case of group-wise acknowledgement.

A signal change from "0" to "1" at EQIT acknowledges the drive fault (resetting flag EST).

In case of a conventional control desk, a push-button can be connected to EQIT (for individual acknowledgement) or to the acknowledgement interface at block C_PUSHBT can be used (for AS-wise acknowledgement).

Caution: Using EQIT for individual acknowledgement, the acknowledgement interface at the C_PUSHBT must **not** be connected.

For group-wise acknowledgement connect the output ACK of the corresponding group to interface EQIT of the drives. See Engineering Manual, chapter AS-Engineering.

EBFE1 **Command ON direction 1** **Basic state 0-signal**

Format BOOL

Interface to start the drive in automatic mode. With 1-signal the drive is started in direction 1. The interface is normally connected through the GBE signal of the associated group(s) or the WBE signal of the associated route(s).
The drive is started either immediately or delayed according to the set start delay time (process value STARTDEL).

Caution: Interface EBFE1 should not be connected with a continuous signal as a drive fault can then not be acknowledged! If a continuous signal is required, one must take care that the EBFE1 has signal zero when there is a fault.

EBFE2 **Command ON direction 2** **Basic state 0-signal**

Format BOOL

See EBFE1

EBFA **Command OFF** **Basic state 0-signal**

Format BOOL

Interface to switch off the drive in automatic mode. With 1-signal the drive is switched off. The interface is normally connected through the negated GDE signal of the associated group(s) or through the negated WDE signal of the associated route(s).
The drive is switched off either immediately or delayed according to the set stop delay time (process value STOPDEL).

QSTP **Quick stop** **Basic state 0-signal**

Format BOOL

In some situations it may be necessary to stop the drives of a group instantaneously (without stop delay). The connection of interface QSTP with 1-signal results in the immediate stopping of the drive in automatic mode (interface EBFA may have a delaying effect).

The group module sets during quick stop the signal GQS. Interface QSTP of the drives must be connected with this signal.

Typical application:

During ship loading, when a chamber of the ship is fully loaded, the ship moves slightly and loading continues immediately. For this, one stops the group with this function immediately (no stop delay), and restarts immediately and the already loaded belts continue to convey.

DSIG_BQ **Driver Signal(s) Bad Quality** **Basic state 0-signal**

Format BOOL

If driver blocks are used, the information "one ore more driver blocks have bad quality" can be displayed in the drive faceplate and in the block icon of the drive.
In order to achieve this, the outputs QBAD of the driver blocks must be connected with an OR function to Interface DSIG_BQ.

DSIG_SIM **Driver Signal(s) Simulation** **Basic state 0-signal**

Format BOOL

If driver blocks are used, the information "one or more driver blocks are switched to simulation" can be displayed in the drive faceplate and in the block icon of the drive.
In order to achieve this, the outputs QSIM of the driver blocks must be connected with an OR function to Interface DSIG_SIM.

If SIMOCODE Adapter block is used:

REL_SC **Enable SIMOCODE** **Basic state 0-signal**

Format BOOL

For drives with SIMOCODE you have to enable this function with 1-signal at this parameter. In the faceplate of the drive an additional button appears which allows to open the SIMOCODE faceplate. In the TEXT1 Variable (preset with C_SIMOS) the respective Adapter – Module can be set per instance.

STAT_SC **Status SIMOCODE** **Default: 16#00**

Format BYTE

For drives with SIMOCODE you have to connect this parameter with out-parameter STAT_SC of the Adapter block "C_SIMOS". Additional you have to enable this function with 1-signal at parameter "REL_SC".

In order to display the motor current in % in the drive faceplate:

REL_MVC **Enable display of motor current** **Basic state 0-signal**

Format BOOL

With 1-signal at this parameter the motor faceplate shows a bar for the motor current (or power) in percent. Look also to parameter "MV_PERC".

MV_PERC **Motor current via C_MEASURE**

Format POINTER

If a measure block for the motor current exists or a SIMOCODE is used, the percentage value of the motor current (or power) can be displayed on the faceplate of the motor. Therefore the output MV_PERC of C_MEASUR or the output I_PERC of C_SIMOS has to be connected to this interface.

For the display of the percentage value in the drive faceplate, interface REL_MVC must be set.

Caution: In case of a measuring value the upper limit 1 of the measure corresponds to 100% value of motor current. In the bar of the drive faceplate 0-130% are displayed.

In order to link up to 16 measuring values to the drive:

If one ore more measuring values are used as additional process signals of the drive (e. g. winding temperatures, bearing temperatures, power, current, etc.), these measures can be linked to the drive.
The selected process value is displayed in the drive faceplate and the faceplate of the C_MEASUR or t the C_ANA_SEL can directly be opened from the drive.

PV **Process value input (general use)**

Format STRUCT

In order to display the process value in the drive faceplate, input PV must be connected with output PV_Out of C_MEASUR (for one value) or with output Out_Val of C_ANA_SEL (for up to 16 values).

Structure variables:

PV.Value **Value** **Default: 0.0**

Format REAL

PV.ST **Signal status** **Default: 16#FF**

Format BYTE

⚠ **Caution:** Only the selected measure is displayed in the drive faceplate.

PV_Stat **Process Value Status + Unit**

Format STRUCT

In order to transmit the status and the unit of the process value to the drive, the input PV_Stat must be connected with output PV_Stat of C_MEASUR or with output Out_Stat of C_ANA_SEL (for up to 16 values).

Structure variables:

PV_Stat.UNIT **Unit** **Default: %**

Format STRING[8]

PV_Stat.STATUS **Status** **Default: 16#00**

Format DWORD

⚠ **Caution:** Only the status and the unit of the selected measure are displayed in the drive faceplate.

For customizing of the diagnosis window:

STA2_B10 **Spare input for visualisation** **Basic state 0-signal**

STA2_B10 till STA2_B17

Format BOOL

These parameter are transferred to the STATUS2 and can be used for additional purposes for e.g. in the diagnostic window.
Look at the table OS-variables.

UserFace **Select Faceplate**

Format ANY

Input UserFace can be connected to any block with an OS Interface (Faceplate). If a block is connected, an additional button "U" (User) appears in the faceplate of the drive block. With this button the Faceplate of the connected block can be opened.

Example:
In order to show the related Signals for the drive, input UserFace can be connected to block C_REL_MOD (for a list of up to 16 objects) or, if fewer signals are used, in can be directly connected to a C_INTERL, C_INTER5 or Intlk02.

Additional inputs for testing and as Interface to the OS:

TEST_OSS **Test interface** **Default: 0**

Format INTEGER

The test interfaces are only used during module development and must not be changed!

MSG8_EVID **Message ID** **Default: 16#00**

Format DWORD

Interface to OS

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

Group and Object links

Group/Route links

Each drive block, annunciation block or measurement block must be linked to a group or route in order to collect the status of these objects for summarizing indications.

The group link is essential for control and diagnosis and comprises the following functions:

- All objects, linked to the group (or route) are listed in the group (or route) object list.
- All objects, linked to the group (or route) are highlighted in the process picture with button "Show related objects".
- The faults of all objects, linked to the group (or route) are included in the summarizing fault indication of the group (or route).
- The warnings of all objects, linked to the group (or route) are included in the summarizing warning indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

A drive can be linked to two groups or routes via *GR_LINK1* and *GR_LINK2*. If a drive belongs to more than two groups or routes the additional block C_MUX must be inserted, which provides 5 additional link interfaces.

Caution: The main group (or main route) should be connected to *GR_LINK1*! This is the one which is opened with a click on button "Main group" in the drive faceplate.

GR_LINK1 **Link to group or route**

Format STRUCT

The GR_LINK1 interface of the drive must be connected with the R_LINK interface of the route or with the G_LINK interface of the group.

Structure variables:

GR_LINK1.Link **Link** **Default: 0**

Format INTEGER

GR_LINK1.Command **Group / Route Command** **Default: 16#00**

Format WORD

GR_LINK2 **Link to group or route**

Format STRUCT

If the drive belongs to two different routes or groups, the GR_LINK2 interface must be connected with the second route/group.

Structure variables:

GR_LINK2.Link **Link** **Default: 0**

Format INTEGER

GR_LINK2.Command **Group / Route Command** **Default: 16#00**

Format WORD

MUX_LINK **Link to C_MUX**

Format STRUCT

If the drive belongs to more than two different routes or groups, the C_MUX module must be series-connected. C_MUX has 5 inputs (GR_LINK1 to GR_LINK5) for connection with the groups/routes and one output (MUX_OUT) for connection with the MUX_LINK interface of the drive.

Caution: If a C_MUX block is used, the programming order is very important. The C_MUX must be called before the drive block!
The MUX_IN interface can under no circumstances be used for connection with a group or route. It is used exclusively for connection with another MUX module.

Structure variables:

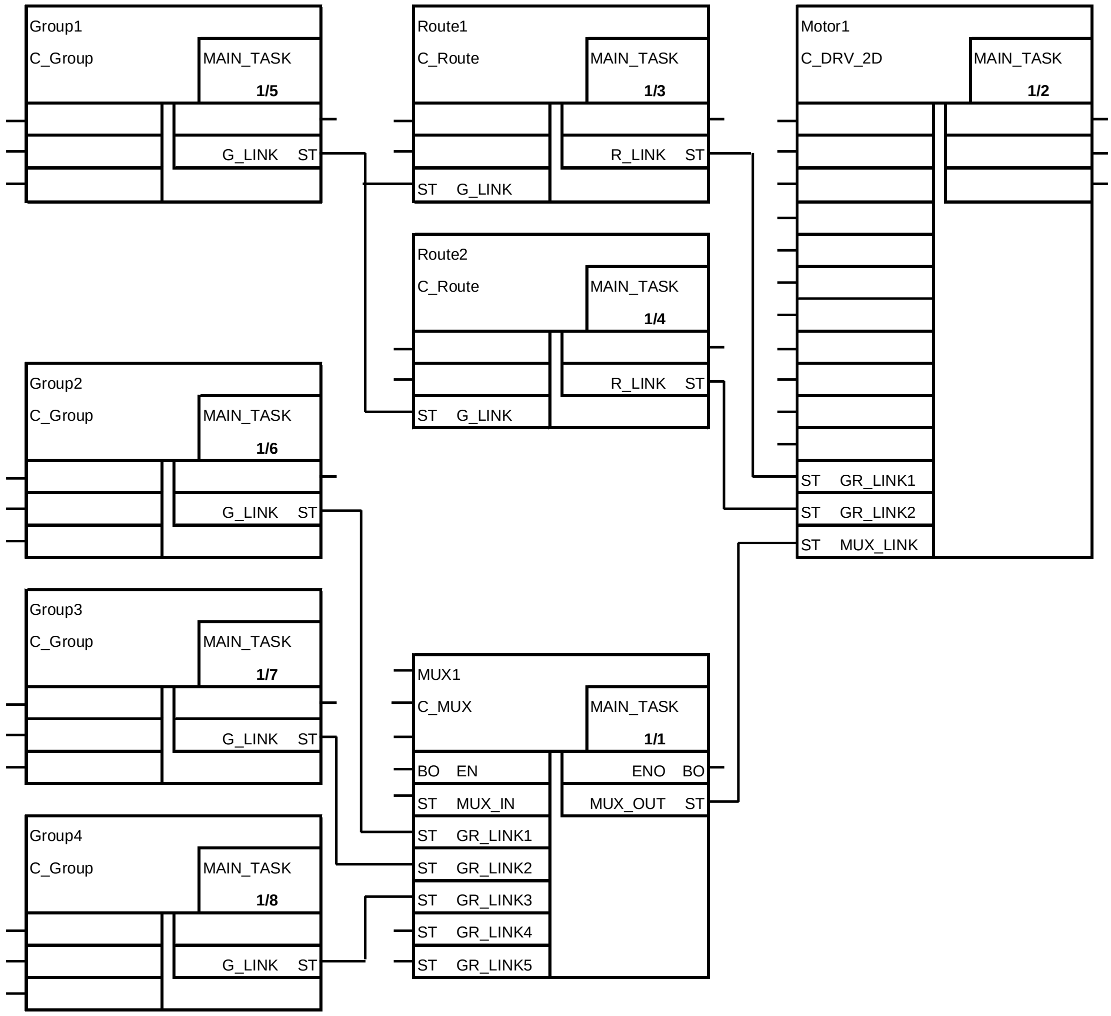
MUX_LINK.Point_GRL **Pointer** **Default: 0**

Format INTEGER

MUX_LINK.Command **Group / Route Command** **Default: 16#00**

Format WORD

Example of a circuit:

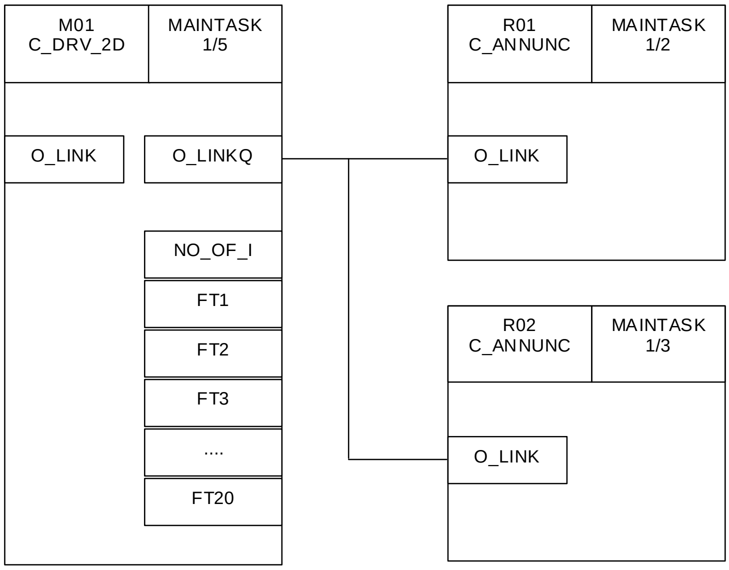


Caution:	Check the runtime sequence! The C_MUX module must be called before the drive. For the other modules the run sequence is as follows: first the drives, then the associated routes and finally the associated groups.

Caution:	Some people use one C_MUX block and connect its output to a number of drives/devices, annunciations and measurements. If you do so, make sure that the C_MUX is called before all the other objects and that no other C_MUX call comes in between. We don't recommend using the same C_MUX if the blocks are located in different runtime groups.

Object links to slave objects

Annunciations and measurements which belong to a drive must not be linked to the group (or route), if they are connected via Object link to the drive output *O_LINKQ*.



The drive block collects the information and forwards it to the group (or route). The result is as follows:

- All objects, linked to the drive are listed in the drive object list and in the group (or route) object list (one level below the drive).
- All objects, linked to the drive are highlighted in the process picture with button "Show related objects".
- The warnings of all objects, linked to the drive are included in the summarizing warning indication of the group (or route).
- The faults of all objects, linked to the drive are included in the summarizing fault indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

O_LINKQ **Link to slave object**

Format STRUCT

Drive output *O_LINKQ* must be connected to interface *O_LINK* of all allocated annunciations and measurements, while the drive itself is connected via *GR_LINK* to the group (or route).

Structure variables:

O_LINKQ.iDB **Instance DB master object**

Format INTEGER

O_LINKQ.iDW **DW number NO_OF_FT in master object**

Format INTEGER

O_LINKQ.Command **Group / Route Command**

Format BYTE

O_LINKQ.Status **Status master object**

Format BYTE

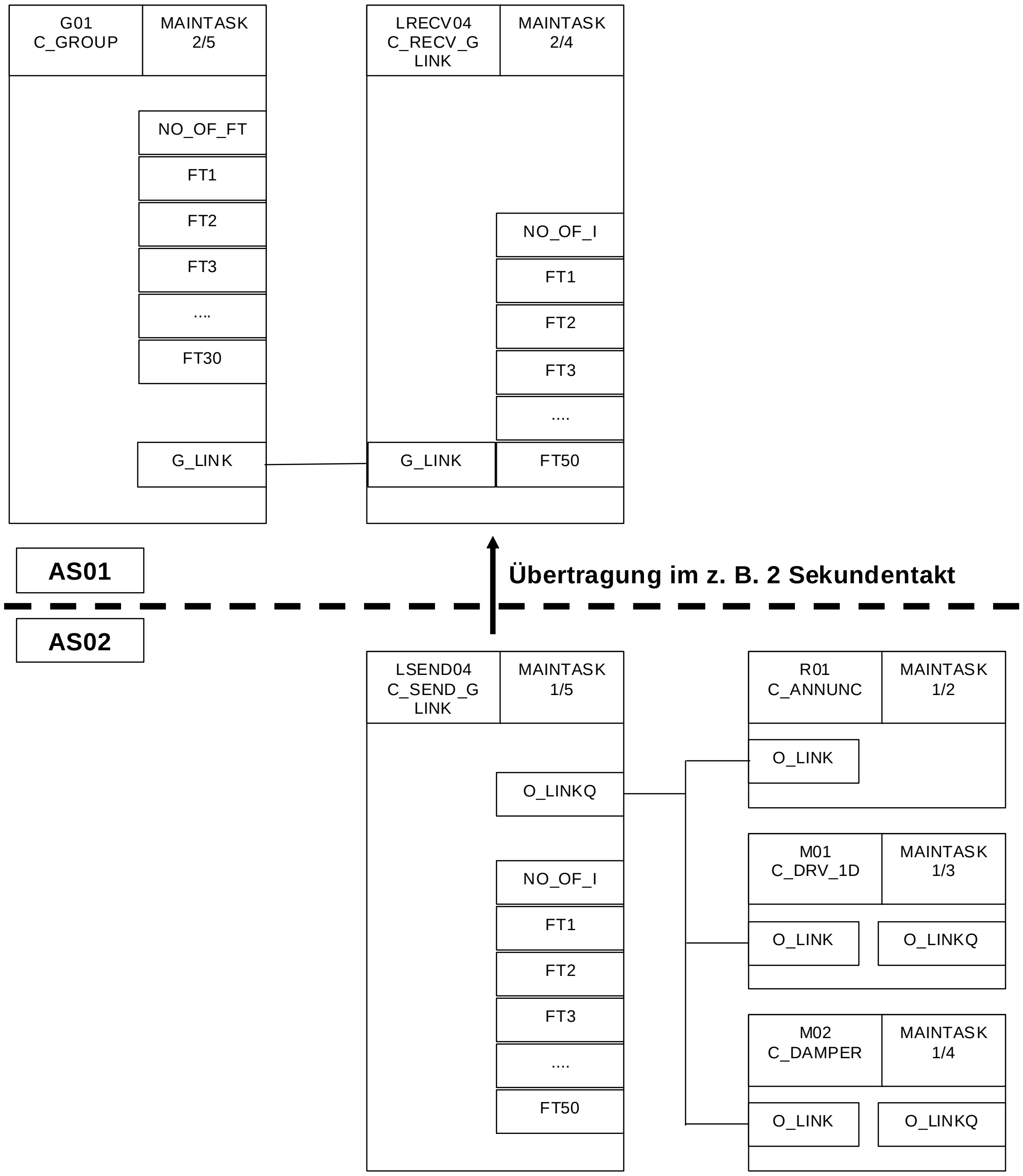
Object links to a group in a different AS

If a Cemat object is programmed in a different AS than the superordinated group a direct link between the drive and the group is not possible. In this case special send and receive blocks must be inserted which collect the object data and transmit it to the group.

In the AS of the group the group output *G_LINK* is connected to input *G_LINK* of the block C_RECV_G.

Caution: C_RECV_G can only be linked to a C_GROUP module. Linking to routes is not permitted and will not work!

In the AS of the Cemat Objects the output *O_LINKQ* of block C_SEND_G is connected to input *O_LINK* of the drives/devices, annunciations and measurements.



Caution: It is not allowed to use the Object link and the Group/Route link at the same time: If *O_LINK* is used, *GR_LINK1* and *GR_LINK2* or *C_MUX* must not be connected!

O_LINK **Link to another object**

Format STRUCT

Input interface *O_LINK* of the drive must be connected to output *O_LINKQ* of the C_SEND_G block.

Structure variables:

O_LINK.iDB **Instance DB master object** **Default: 0**

Format INTEGER

O_LINK.iDW **DW number NO_OF_FT in master object** **Default: 0**

Format INTEGER

O_LINK.Command **Group / Route Command** **Default: 16#00**

Format BYTE

O_LINK.Status **Status master object** **Default: 16#00**

Format BYTE

Caution: If annunciations or measurements belong to the drive, they don't need to be connected to output *O_LINKQ* of the C_SEND_G block.
They can also be programmed as slave objects and connected to output *O_LINKQ* of the drive.

Process values

The process values can be set during engineering and they can be changed online from the control room. To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

FEEDBTIM **Feedback time** **Default: 2**

Format INTEGER (0 - 999)

Value in seconds.
The feedback monitoring time for starting the drive is preset to 2 seconds. If this time is not sufficient, e.g. with motors with star-delta starting, the time value must be extended correspondingly.

Caution: The minimum feedback monitoring time is 2 seconds. For switching off, the feedback monitoring time is always 2 seconds (adaptation not possible).

FBOFFTIM **Time for feedback off monitoring** **Default: 2**

Format INTEGER (0 – 999)

Value in seconds
The time for feedback monitoring FBOFFTIM is used for the supervision of the contactor feedback during the shut-down of the drive. By default the value is preset to 2 seconds. If this time is not sufficient, e.g. in case of a VSD drive, the time value must be extended correspondingly.

Caution: The minimum feedback off monitoring time is 2 seconds.
If an already running drive loses the contactor feedback, FBOFFTIM is not considered.

STARTDEL **Start delay** **Default: 0**

Format INTEGER (0 - 999)

Value in seconds.
In automatic mode the start of the drive is delayed by the set time (staggered starting). In single-start mode and in local mode this time delay is not effective!

STOPDEL **Stop delay** **Default: 0**

Format INTEGER (0 - 9999)

Value in seconds.
The stopping of the drive via interface EBFA is delayed by the set time.

SPEEDTIM **Speed monitor monitoring time** **Default: 0**

Format INTEGER (0 - 999)

Value in seconds.
Within the set time the interface for the speed monitor EDRW must have 1-signal. When this time is exceeded, the drive generates a speed monitor fault.

Caution: The EVS signal becomes "1" only after this time has elapsed. Therefore this value must be made "0" when no speed monitor is required. Otherwise there will be an unnecessary delay in the starting of the subsequent drives.
With SM_EVS_I=1 the EVS-signal becomes 1-signal immediately with speed monitor signal.

HORN_TIM **Horn time for start-up warning** **Default: 10**

Format INTEGER (0 - 999)

Value in seconds.
During the start of the drive in single-start mode a horn bit (module output HORN) is set for the duration of the set time and the start of the drive is delayed. The horn bit can be connected to trigger a start-up warning.

CHMONTIM **Monitoring change direction** **Default: 10**

Format INTEGER (0 - 999)

Value in seconds

When the motor is running (EBE1 or EBE2 1-Signal) and you want to start in the opposite direction, the start will be delayed by the set time. This enables you to ensure that the start in the opposite direction only begins when the motor has stopped turning. This monitoring function works in all modes. If the start in the opposite direction is blocked, this is displayed in the operating window (Changing direction - Wait). As soon as the monitoring has expired, this display disappears and you can start in the opposite direction. If you want to start again in the same direction, this monitoring has no effect and you can restart immediately.

TOL_SSM **Tolerance value for software speed monitor** **Default: 50**

Format INTEGER (1 - 255)

Time value = TOL_SSM * 0,1s (default setting = 5 seconds).
The software speed monitor should sense an edge change at the pulse input within this time. Only then does the internal output have a 1-signal.

Additional process parameters for Maintenance function:

MAI_INT **Maintenance Interval** **Default: 16#00**

Format DWORD

The Maintenance Interval relates, depending on the parameterization, to a fixed time value, to the operating hours or to the number of starts. If the Maintenance Interval is exceeded the output MAI_AL will be set.

MAI_REQL **Maintenance Request Limit** **Default: 16#00**

Format DWORD

The Die Maintenance Request Limit can be used in order to indicate to the operator that the Maintenance interval will be completed soon. If the Maintenance Request Limit is exceeded, the output MAI_REQ will be set.

Input/Output interfaces

RES_RTOS **Reset time RT for OS** **Default: 16#00**
Format DWORD
Interface to OS

RT_OS **Run-time for OS** **Default: 16#00**
Format DWORD
Interface to OS

RT_H **Run-time for OS refreshed every hour** **Default: 16#00**
Format DWORD
Interface to OS

CNT_OS **Counter contactor direction1** **Default: 16#00**
Format DWORD
Interface to OS

CNT1_H **Counter contactor for OS refreshed every hour** **Default: 16#00**
Format DWORD
Internal

CNT2_OS **Counter contactor direction 2** **Default: 16#00**
Format DWORD
Interface to OS

CNT2_H **Counter contactor for OS refreshed every hour** **Default: 16#00**
Format DWORD
Internal

MAI_CNT **Maintenance Actual counter – in hours or starts** **Default: 16#00**
Format DWORD
Interface to OS

CNT_TRIP **Maintenance Counter Trips** **Default: 16#00**
Format DWORD
Interface to OS

FT_DUR **Maintenance Fault duration in sec** **Default: 16#00**
Format DWORD
Interface to OS

MAI_STA	**Maintenance Status**	**Default: 16#80022**
Format DWORD		
Interface to OS		

MAI_X	**Maintenance Spare**	**Default: 16#00**
Format DWORD		
Interface to OS		

Output interfaces

EVS1 **Running signal direction 1**

Format BOOL

A 1-signal means "drive running in direction 1" in automatic mode or in single-start mode. It is mainly used for the interlocking with other drives and as a feedback to the route or the group. This signal is not generated in local mode!

RunSig1 **Running signal direction 1**

Format STRUCT

For function description, see EVS1. This interface can be connected to a structure input as e. g. signal **IntOper** of the next drive.
Remark: For the feedback to the group or route you still have to use signal EVS1 because the group/route interfaces have no structure format.

Structure variables:

RunSig1.Value **Signal**

Format BOOL

RunSig1.ST **Signal status**

Format BYTE

EVS2 **Running signal direction 2**

Format BOOL

See EVS1

RunSig2 **Running signal direction 2**

Format STRUCT

For function description, see EVS1. This interface can be connected to a structure input as e. g. signal **IntOper** of the next drive.
Remark: For the feedback to the group or route you still have to use signal EVS2 because the group/route interfaces have no structure format.

Structure variables:

RunSig2.Value **Signal**

Format BOOL

RunSig2.ST **Signal status**

Format BYTE

EST **Dynamic fault**

Format BOOL

When a fault occurs in a running drive, during drive start up or during stand-by mode, the dynamic fault bit is set. It remains set until the fault is acknowledged.

Caution: In the following cases the drive fault cannot be acknowledged:
- If the ON-command is permanently active;
- With a welded contactor (ERM = 1-signal).

SST Fault

Format BOOL

A 1-signal means that at least one fault is present.

HORN Start-up horn

Format BOOL

This signal is set during the starting of the drive in single-start mode for a given time period and can be logically connected to trigger a start-up warning.

If L_STA_WA has 1-Signal the start-up warning is also given in local mode.

EVSP1 Running signal direction 1 sporadic drive

Format BOOL

A 1-signal means „drive has received a start command in automatic mode or in single start mode“ (Command Memory is ON). The drive starts when the interface ESPO has 1-Signal. The EVSP1-signal can be used as feedback to the route or the group.

EVSP2 Running signal direction 2 sporadic drive

Format BOOL

See EVSP1

SIM_ON Simulation ON

Format BOOL

In the Sequence Test mode SIM_ON has 1-Signal. If module drivers are used the output SIM_ON of the motor can be connected to SIM_ON of the driver blocks in order to switch all driver blocks to simulation mode.

Additional output for maintenance function:

MAI_REQ Maintenance Request

Format BOOL

The auto request value has been exceeded, which means the maintenance interval is nearly completed. This output can be connected to an annunciation block in order to generate an alarm.

MAI_AL Maintenance Alarm

Format BOOL

The Maintenance interval has been completed. This output can be connected to an annunciation block in order to generate an alarm.

Additional outputs for testing and as Interface to the OS:

SSM_CVOS Display counter software speed-monitor

Format BYTE

Interface to OS

INTFC_OS Interface status for OS

Format DWORD

Interface to OS

For more information see Variable details.

VISU_OS Status for symbol display

Format BYTE

Interface to OS

For more information see Variable details.

STATUS Status word for OS

Format DWORD

Interface to OS

For more information see Variable details.

STATUS2 Status word for OS

Format DWORD

Interface to OS

For more information see Variable details.

STATUS3 Structure Input available

Format DWORD

Interface to OS

For more information see Variable details.

ALARM for Test

Format WORD

For more information see Variable details.

CURR_OS To display the current of the motor

Format INTEGER

Interface to the OS

If a measuring value is assigned to the motor the parameter CURR_OS contains the measuring value in percentage. The text for the Faceplate description is defined in the object properties of parameter CURR_OS under "Identifier". The default value is "I =".

As the measuring value must not necessarily be a current value (often the power is used instead). In this case it is required to modify the text under "Identifier".

Note: The texts under "Identifier" are internal variables and for that reason a modification of the text requires a new OS Compile.

DLY_CNT Count down (when start/stop delay is active)

Format INTEGER

Interface to OS

Hardware outputs

EBE1 Command ON direction 1

Format BOOL

The EBE1 signal is used to trigger the main contactor for direction 1.

EBE2 Command ON direction 2

Format BOOL

See EBE1

ELS1 Running/fault lamp direction 1

Format BOOL

The ELS running/fault lamp signals the status of the drive and can be used for the connection of an annunciation lamp (when no visualization system is present).
A continuous 1-signal indicates that the drive is running. Rapid flashing indicates a dynamic fault (non-acknowledged) and slow flashing indicates a static fault (already acknowledged). A 0-signal indicates that the drive has stopped.

ELS2 Running/fault lamp direction 2

Format BOOL

See ELS1

Time characteristics

The module must be called before the associated route or group.

Any called C_MUX modules must run before this module.

Message characteristics

The module uses the ALARM_8 module to generate annunciations.

A plausibility and priority logic at the process level analyses all object faults
only one fault annunciation is issued for each fault
secondary annunciations are suppressed automatically
the fault source is recorded in detail and uniquely.

Still faulty message:
During start in automatic mode, any failure which inhibits the drive start leads to an interrupt of the start procedure and must therefore be reported by an alarm message.
PCS7 can create the (incoming) alarm message only once and does not support the repetition of incoming alarm messages without outgoing message. For this reason, CEMAT creates a Message “Still faulty” for any alarm message which needs to be repeated..

The current operational state of the plant objects is automatically taken into consideration during the fault analysis, e.g. all fault annunciations are suppressed automatically for a stationary group
no superfluous fault annunciations are created
the operator does not need to manually disable/suppress any annunciations.

Each fault annunciation is also classified.
This shows whether an **electrical** or a **mechanical** fault, a **process fault** or a shut-down with a **local safety switch** applies.
An electrician does not always need to be called first
The production operator can give specific instructions.

Alarm archive and alarm logs show only "true" annunciations.
An annunciation release for each object means that the communication and OS are not overloaded with an "annunciation storm" - e.g. overloaded after a power failure.

Refer to the Variable details table for the assignment of the annunciation text and annunciation class to the module parameters.

Module states

Variable VISU_OS:

No.	Status / Display Text	Display Symbol	Text Presentation
1	off	White	Black, white
2	fault not acknowledged	Blinking red	White, red
3	fault acknowledged	Red	White, red
4	running direction 1	Green	Black, green
5	running direction 2	Green	Black, green
6	local mode	Yellow	Black, yellow
7	local mode running in direction. 1	Blinking yellow	Black, yellow
8	local mode running in direction. 2	Blinking yellow	Black, yellow
9	single mode	Blue	Black, blue
10	single mode running in direction 1	Blinking blue	Black, blue
11	single mode running in direction 2	Blinking blue	Black, blue

Also refer to the Variable details

Commands

Refer to the Variable details for the assignment of the command word.

I/O-bar of C_DRV_2D

C_DRV_2D

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
ERM1	Feedback 1 ON	BOOL	0	I			
ERM2	Feedback 2 ON	BOOL	0	I			
ESB	Electrical availability	BOOL	1	I			
EBM	Overload	BOOL	1	I			
EVO	Local switch	BOOL	1	I			
ESP	Local stop	BOOL	1	I			
ESR1	Local start direction 1	BOOL	0	I			
ESR2	Local start direction 2	BOOL	0	I			
EEVG1	Start interlock direction 1	BOOL	1	I			
IntStrt1	Start interlock direction 1	STRUCT		I			
IntStrt1.Value	Signal	BOOL	1	I	U	+	
IntStrt1.ST	Signal Status	BYTE	16#FF	I	U		
EBVG1	Operating interlock direction 1	BOOL	1	I			
IntOper1	Operating interlock direction 1	STRUCT		I			
IntOper1.Value	Signal	BOOL	1	I	U	+	
IntOper1.ST	Signal Status	BYTE	16#FF	I	U		
EEVG2	Start interlock direction 2	BOOL	1	I			
IntStrt2	Start interlock direction 2	STRUCT		I			
IntStrt2.Value	Signal	BOOL	1	I	U	+	
IntStrt2.ST	Signal Status	BYTE	16#FF	I	U		
EBVG2	Operating interlock direction 2	BOOL	1	I			
IntOper1	Operating interlock direction 2	STRUCT		I			
IntOper1.Value	Signal	BOOL	1	I	U	+	
IntOper1.ST	Signal Status	BYTE	16#FF	I	U		
ESVG	Protection interlock general	BOOL	1	I			

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
IntProtG	Protection interlock general	STRUCT		I			
IntProtG.Value	Signal	BOOL	1	I	U	+	
IntProtG.ST	Signal Status	BYTE	16#FF	I	U		
ESVA	Protection interlock (only remote)	BOOL	1	I			
IntProtA	Protection interlock (only remote)	STRUCT		I			
IntProtA.Value	Signal	BOOL	1	I	U	+	
IntProtA.ST	Signal Status	BYTE	16#FF	I	U		
ESPO	Sporadic on/off	BOOL	1	I			
EDRW	Hardware speed monitor	BOOL	1	I			
ELOC	Local mode release	BOOL	0	I			
EEIZ	Single-start mode release	BOOL	0	I			
ESTB	Stand-by mode	BOOL	0	I			
ETFG	Inching release	BOOL	0	I			
EMFR	Annunciation release	BOOL	1	I			
EMZS	Fault interlock to the group	BOOL	0	I			
GFSO	Group fault / status off	BOOL	0	I	U		
ELPZ	Lamp test (additional)	BOOL	0	I	U		
EQIT	Acknowledge (additional)	BOOL	0	I	U		
EBFE1	Command direction 1 ON	BOOL	0	I			
EBFE2	Command direction 2 ON	BOOL	0	I			
EBFA	Command OFF	BOOL	0	I			
QSTP	Quick stop	BOOL	0	I			
DSIG_BQ	Driver-Signal(s) Bad Quality	BOOL	0	I			
DSIG_SIM	Driver Signal(s) Simulation	BOOL	0	I			
STA2_B10	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B11	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B12	Spare input transferred into STATUS 2	BOOL	0	I	U		

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
STA2_B13	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B14	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B15	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B16	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B17	Spare input transferred into STATUS 2	BOOL	0	I	U		
L_STA_WA	1 = startup-warning in local mode	BOOL	0	I	U		
REL_SSM	Release software speed monitor	BOOL	0	I			
SW_SPEED	Pulse signal for software speed monitor	BOOL	0	I			
TOL_SSM	Tolerance value for software speed monitor	INT	50	I		+	
SM_EVS_I	EVS=1 when speed monitor 1-signal	BOOL	0	I			
NSTP_L_A	No stop after switchover local → auto	BOOL	0	I	U		
LST_ACT	Local Stop active in Automatic	BOOL	0	I	U		
REL_SC	Enable SIMOCODE	BOOL	0	I	U		
STAT_SC	Status SIMOCODE	BYTE	16#00	I	U		
REL_MVC	enable display of motor current	BOOL	0	I	U		
MV_PERC	Motor current from C_MEASUR	POINTER	0	I	U		
PV	Process value input (general use)	STRUCT		I	U		
PV.Value	Value	REAL	0.0	I	U	+	
PV.ST	Signal Status	BYTE	16#FF	I	U		
PV_Stat	Process value status + unit	STRUCT		I	U		
PV_Stat.UNIT	Unit	STRING [8]	%	I	U	+	
PV_Stat.STATUS	Status	DWORD	16#00	I	U	+	
TEST_OSS	Must not be changed	INT	0	I	U		
MSG8_EVID	Message ID	DWORD	16#00	I	U		
COMMAND	Command word	WORD	16#00	I	U	+	
FEEDBTIM	Time for feedback monitoring	INT	2	I		+	
FBOFFTIM	Time for feedback off monitoring	INT	2	I		+	

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
STARTDEL	Start delay	INT	0	I		+	
STOPDEL	Stop delay	INT	0	I		+	
SPEEDTIM	Speed monitor monitoring time	INT	0	I		+	
HORN_TIM	Horn time for start-up-warning	INT	10	I		+	
CHMONTIM	Monitoring change direction	INT	10	I		+	
GR_LINK1	Link to group or route	STRUCT		I			
GR_LINK1.Link	Link	INT	0	I	U		
GR_LINK1.Command	Group/ route command	WORD	16#00	I	U		
GR_LINK2	Link to group or route	STRUCT		I			
GR_LINK2.Link	Link	INT	0	I	U		
GR_LINK2.Command	Group/ route command	WORD	16#00	I	U		
MUX_LINK	Link to C_MUX	STRUCT		I			
MUX_LINK.Point_GRL	Pointer	INT	0	I	U		
MUX_LINK.Command	Group/ route command	WORD	16#00	I	U		
O_LINK	Link to another object	STRUCT		I			
O_LINK. iDB	Instance DB master object	INT	0	I	U		
O_LINK iDW	DW number NO_OF_FT in master object	INT	0	I	U		
O_LINK. Command	Group/ route command	BYTE	16#00	I	U		
O_LINK. Status	Status master object	BYTE	16#00	I	U		
UserFace	Select Faceplate	ANY		I	U		
MAI_INT	Maintenance Interval	DWORD	16#00	I	U	+	
MAI_REQL	Maintenance Request Limit	DWORD	16#00	I	U	+	
RES_RTOS	Reset time RT for OS	DWORD	16#00	IO	U	+	
RT_OS	Runtime (s) refreshed every minute	DWORD	16#00	IO	U	+	
RT_H	Runtime (s) refreshed every hour	DWORD	16#00	IO	U	+	
CNT_OS	Counter contactor dir.1	DWORD	16#00	IO	U	+	

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
CNT1_H	Counter contactor dir.1 refreshed every hour	DWORD	16#00	IO	U		
CNT2_OS	Counter contactor dir.2	DWORD	16#00	IO	U	+	
CNT2_H	Counter contactor dir.2 refreshed every hour	DWORD	16#00	IO	U		
MAI_CNT	Maintenance Actual Counter in hours or starts	DWORD	16#00	IO	U	+	
CNT_TRIP	Maintenance Counter for Trips	DWORD	16#00	IO	U	+	
FT_DUR	Maintenance Fault time duration in sec	DWORD	16#00	IO	U	+	
MAI_STA	Maintenance Status	DWORD	16# 0080022	IO	U	+	
MAI_X	Maintenance Spare	DWORD	16#00	IO	U	+	
RT_OS_O	Run-time for OS refreshed every minute	DWORD	16#00	O	U		
RT_H_O	Run-time for OS refreshed every hour	DWORD	16#00	O	U		
SSM_CVOS	Display counter software speed monitor	BYTE	16#00	O	U	+	
INTFC_OS	Interface status for OS	DWORD	16#00	O	U	+	
VISU_OS	Status for symbol display	BYTE	16#00	O	U	+	
STATUS	Status word for test	DWORD	16#00	O	U	+	
STATUS2	Status word 2	DWORD	16#00	O	U	+	
STATUS3	Status word 3 Structure input available	DWORD	16#00	O	U	+	
ALARM	Alarm word for test	WORD	16#00	O	U		
CURR_OS	Display of motor current/ power	INT	0	O	U	+	
EVS1	Running signal direction 1	BOOL	0	O			
RunSig1	Running signal direction 1	STRUCT		O			
RunSig1.Value	Signal	BOOL	0	O		+	
RunSig1.ST	Signal status	BYTE	16#80	O		+	
EVS2	Running signal direction 2	BOOL	0	O			
RunSig2	Running signal direction 2	STRUCT		O			
RunSig2.Value	Signal	BOOL	0	O		+	
RunSig2.ST	Signal status	BYTE	16#80	O		+	

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
EST	Dynamic fault (not acknowledged)	BOOL	0	O			
SST	Fault	BOOL	0	O			
HORN	Start-up warning in single mode or local mode	BOOL	0	O			
EVSP1	Running signal direction 1 sporadic drive	BOOL	0	O			
EVSP2	Running signal direction 2 sporadic drive	BOOL	0	O			
SIM_ON	1-signal during sequence test mode (to driver blocks)	BOOL	0	O			
EBE1	Contactor ON command direction 1	BOOL	0	O			
EBE2	Contactor ON command direction 2	BOOL	0	O			
ELS1	Lamp direction 1	BOOL	0	O	U		
ELS2	Lamp direction 2	BOOL	0	O	U		
O_LINKQ	Link to slave objects	STRUCT		O			
O_LINKQ. iDB	Instance DB master object	INT	0	O	U		
O_LINKQ iDW	DW number NO_OF_FT in master object	INT	0	O	U		
O_LINKQ. Command	Group/ route command	BYTE	16#00	O	U		
O_LINKQ. Status	Status master object	BYTE	16#00	O	U		
MAI_REQ	Maintenance Request	BOOL	0	O	U		
MAI_AL	Maintenance Alarm	BOOL	0	O	U		
DLY_CNT	Delay Counter	INT	0	O	U		

OS-Variable table

C_DRV_2D

OS Variable	Description	PLC Data Type	OS Data Type
IntStrt1#Value	Signal	BOOL	Binary variable
IntOper1#Value	Signal	BOOL	Binary variable
IntStrt2#Value	Signal	BOOL	Binary variable
IntOper2#Value	Signal	BOOL	Binary variable
IntProtG#Value	Signal	BOOL	Binary variable
IntProtA#Value	Signal	BOOL	Binary variable
TOL_SSM	Tolerance value for software speed monitor	INT	Signed 16-bit value
REL_SC	Enable SIMOCODE	BOOL	Binary variable
PV#Value	Value	REAL	32-bit floating-point number IEEE 754
PV_Stat#UNIT	Unit	STRING [8]	Text variable 8-bit character set
PV_Stat#STATUS	Status	DWORD	32-bit floating-point number IEEE 754
COMMAND	Command word	WORD	Unsigned 16-bit value
FEEDBTIM	Time for feedback monitoring	INT	Signed 16-bit value
FBOFFTIM	Time for feedback off monitoring	INT	Signed 16-bit value
STARTDEL	Start delay	INT	Signed 16-bit value
STOPDEL	Stop delay	INT	Signed 16-bit value
SPEEDTIM	Speed monitor monitoring time	INT	Signed 16-bit value
HORN_TIM	Horn time for start-up-warning	INT	Signed 16-bit value
CHMONTIM	Delay for change direction	INT	Signed 16-bit value
MAI_INT	Maintenance Interval	DWORD	Unsigned 32-bit value
MAI_REQL	Maintenance Request Limit	DWORD	Unsigned 32-bit value
RES_RTOS	Reset time RT for OS	DWORD	Unsigned 32-bit value
RT_OS	Runtime (s) refreshed every minute	DWORD	Unsigned 32-bit value
RT_H	Runtime (s) refreshed every hour	DWORD	Unsigned 32-bit value
CNT_OS	Counter contactor dir.1	DWORD	Unsigned 32-bit value

OS Variable	Description	PLC Data Type	OS Data Type
CNT2_OS	Counter contactor dir.2	DWORD	Unsigned 32-bit value
MAI_CNT	Maintenance Actual Counter in hours or starts	DWORD	Unsigned 32-bit value
CNT_TRIP	Maintenance Counter for Trips	DWORD	Unsigned 32-bit value
FT_DUR	Maintenance Fault time duration in sec	DWORD	Unsigned 32-bit value
MAI_STA	Maintenance Status	DWORD	Unsigned 32-bit value
MAI_X	Maintenance Spare	DWORD	Unsigned 32-bit value
SSM_CVOS	Current Value SSM	BYTE	Unsigned 8-bit value
INTFC_OS	Interface status for OS	DWORD	Unsigned 32-bit value
VISU_OS	Status for symbol display	BYTE	Unsigned 8-bit value
STATUS	Status word 1	DWORD	Unsigned 32-bit value
STATUS2	Status word 2	DWORD	Unsigned 32-bit value
STATUS3	Status word 3 Structure input available	DWORD	Unsigned 32-bit value
CURR_OS	Display of motor current/ power	INT	Signed 16-bit value
RunSig1#Value	Signal	BOOL	Binary variable
RunSig1#ST	Signal status	BYTE	Unsigned 8-bit value
RunSig2#Value	Signal	BOOL	Binary variable
RunSig2#ST	Signal status	BYTE	Unsigned 8-bit value
DLY_CNT	Delay counter	INT	Signed 16-bit value

Variable details

Internal structure of the Commands, Alarms, Visualization status and Interface word:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Commandword**	**Commandword**		
COM_B20	OFF	0	AUS	OFF	Op. Inp.	
COM_B21	ON1	1	EIN Richtung 1	ON Direction 1	Op. Inp.	
COM_B22	R_RTOS	2	Laufzeit löschen	Reset Running Time OS	Op. Inp.	
COM_B23	ON2	3	EIN Richtung 2	ON Direction 2		
COM_B24	BDW_on/off	4	Brücke Drehwächter EIN/AUS	Bypass Speed monitor ON/OFF	Op. Inp.	
COM_B25						
COM_B26						
COM_B27						
COM_B10		8				
COM_B11	SACK	9	Einzel quittieren	Single acknowledge		
COM_B12		10				
COM_B13		11				
COM_B14		12				
COM_B15		13				
COM_B16		14				
COM_B17		15				
ALARM			**Alarm**	**Alarm**		
ALA_ESS1	SIG1	0	Schütz 1	Feedback 1	AL_H	E
ALA_ESS2	SIG2	1	Schütz 2	Feedback 2	AL_H	E
ALA_ESB	SIG3	2	El. Schaltbereit	Available	AL_H	E
ALA_EVO	SIG4	3	Vorort	Local	AL_H	S
ALA_EBM	SIG5	4	Bimetall	Overload	AL_H	M
ALA_DRW	SIG6	5	Drehwächter	Speed monitor	AL_H	M
ALA_LST	SIG7	6	Vorort Stop	Local stop	AL_H	S
ALA_REP	SIG8	7	Noch gestört	Still faulty	AL_H	P
VISU_OS	**dezimal**	**hex**	**für Symbol und Texte**	**for Symbol and Text**		
schw, weiß	1	1	Steht	off		
weiß, rot	2	2	Störung nicht quittiert	fault not acknowledged		
weiß, rot	3	3	Störung quittiert	fault acknowledged		
schw, grün	4	4	Läuft Richtung 1	running direction 1		
schw, grün	5	5	Läuft Richtung 2	running direction 2		
schw, gelb	6	6	Vorortbetrieb steht	local mode		
schw, gelb	7	7	Läuft im Vorortbetrieb Ri.1	local mode running direction 1		
schw, gelb	8	8	Läuft im Vorortbetrieb Ri.2	local mode running direction 2		
Schw türkis	9	9	Einzelbetrieb steht	single mode		
schw, türkis	10	A	Läuft im Einzelbetrieb Ri.1	single mode running direction 1		
Schw, türkis	11	B	Läuft im Einzelbetrieb Ri.2	single mode running direction 2		

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
INTFC_OS			**Nahtstellenwort**	**Interface word**		
OS_IF_B40	EEVG1	0	Einschaltverriegelung Ri.1	Start interlock direction 1		
OS_IF_B41	EBVG1	1	Betriebsverriegelung Ri1	Operating interlock direction 1		
OS_IF_B42	ESVG	2	Schutzverriegelung	Protection interlock (always active)		
OS_IF_B43	ESVA	3	Schutzverriegelung (nur Automatikb.)	Protection interlock (only automat.)		
OS_IF_B44	ESPO	4	Sporadisch Ein/Aus	Sporadic ON/OFF		
OS_IF_B45	EDRW	5	Drehwächter	Speed monitor		
OS_IF_B46	EEVG2	6	Einschaltverriegelung Ri.2	Start interlock direction 2		
OS_IF_B47	EBVG2	7	Betriebsverriegelung Ri2	Operating interlock direction 2		
OS_IF_B30	ELOC	8	Vorortbetrieb Freigabe	Local mode release		
OS_IF_B31	EEIZ	9	Einzelbetrieb Freigabe	Single start mode release		
OS_IF_B32	ESTB	10	Betriebsart Stand-by	Stand-by mode		
OS_IF_B33	ETFG	11	Tipp-Freigabe	Inching release		
OS_IF_B34		12				
OS_IF_B35		13				
OS_IF_B36	REL_SSM	14	Software-Drehwächter	release software speed monitoring		
OS_IF_B37	REL_EVS_I	15	EVS=1 sofort bei EDRW=1	EVS=1 immediately when EDRW=1		
OS_IF_B20	GFSO	16	Gruppenstörung/ Zustand aus	Group fault/ status off		
OS_IF_B21	EMFR	17	Meldefreigabe	Annunciation release		
OS_IF_B22	EMZS	18	Störungsverriegelung zur Gruppe	Fault interlock to group		
OS_IF_B23		19				
OS_IF_B24		20				
OS_IF_B25		21				
OS_IF_B26		22				
OS_IF_B27	ELPZ	23	Lampen prüfen (Zusatz)	Lamp test (additional)		
OS_IF_B10	EQIT	24	Quittieren (Zusatz)	Acknowledge (additional)		
OS_IF_B11		25				
OS_IF_B12	EBFE1	26	Befehl Richtung 1 Ein	Command direction 1 ON		
OS_IF_B13	EBFE2	27	Befehl Richtung 2 Ein	Command direction 2 ON		
OS_IF_B14	EBFA	28	Befehl Aus	Command OFF		
OS_IF_B15		29				
OS_IF_B16	QSTP	30	Schnellstop	Quick stop		
OS_IF_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B40	LOCAL	0	Betriebsart Vorort	Local mode		
STA_B41	EIZ	1	Freigabe Einzelbetrieb	Single start mode released		
STA_B42	RIW	2	Richtungswechsel - Warte	Changing direction - Wait		
STA_B43	BDW	3	Brücke Drehwächter	Bypass speed monitor		
STA_B44	SSM	4	Softwaredrehwächter Ausgang	Software speed monitor output		
STA_B45	EST	5	Störung nicht quittiert	Fault not acknowledged		
STA_B46	ERM 1	6	Rückmeldung EIN Richtung 1	Feedback ON Direction 1		
STA_B47	ERM 2	7	Rückmeldung EIN Richtung 2	Feedback ON Direction 2		
STA_B30	ESS1	8	Störung Schütz 1	Contactor fault 1		
STA_B31	ESB	9	Störung elektrische Schaltbereitschaft	Electrical availability fault		
STA_B32	EVO	10	Störung Vorort	Local switch fault		
STA_B33	EBM	11	Störung Bimetall	Overload fault		
STA_B34	ESD	12	Störung Drehwächter	Speed monitor fault		
STA_B35	ESV	13	Störung Schutzverriegelung	Protection interlock fault		
STA_B36	LST	14	Störung Vorort Stopp	Local Stop		
STA_B37	ESS2	15	Störung Schütz 2	Contactor fault 2		
STA_B20	SIM_ON	16	Sequenz Test/Simulation	Sequence test/Simulation		
STA_B21	SST	17	Sammelstörung	general fault		
STA_B22	BQU	18	Signal Störung	Bad Quality of signals		
STA_B23	SC_FT	19	Störung Simocode	General fault SIMOCODE		
STA_B24	EKS1	20	Kommandospeicher Richtung 1	Command memory Direction 1		
STA_B25	EKS2	21	Kommandospeicher Richtung 2	Command memory Direction 2		
STA_B26	ON_DLY	22	Einschaltverzögerung	ON delay		
STA_B27	OFF_DLY	23	Ausschaltverzögerung	OFF delay		
STA_B10	MOV_T	24	Rückmeldeüberwachung läuft	Feedback time is running		
STA_B11	SUW_T	25	Hupzeit läuft	Startup Warning time is running		
STA_B12		26				
STA_B13		27				
STA_B14		28				
STA_B15		29				
STA_B16		30				
STA_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS2			**Status**	**Status**		
STA2_B40	ERM1	0	Rückmeldung 1 EIN	Feedback 1 ON		
STA2_B41	ERM2	1	Rückmeldung 2 EIN	Feedback 2 ON		
STA2_B42	ESB	2	Schaltbereitschaft	El. Availability		
STA2_B43	EBM	3	Bimetall	Overload		
STA2_B44	EVO	4	Vorortschalter	Local Switch		
STA2_B45	ESP	5	Vorort Stopp	Local Stop		
STA2_B46	ESR1	6	Vorort Start Richtung 1	Local Start direction 1		
STA2_B47	ESR2	7	Vorort Start Richtung 2	Local Start direction 2		
STA2_B30	EBE1	8	Befehl Richtung 1 EIN	Command direction 1 ON/OFF		
STA2_B31	EBE2	9	Befehl Richtung 2 EIN	Command direction 2 ON/OFF		
STA2_B32		10				
STA2_B33		11				
STA2_B34		12				
STA2_B35		13				
STA2_B36		14				
STA2_B37	LST_ACT	15	Vorort Stopp aktiv in Automatik	Local stop active in automatic		
STA2_B20	HORN	16	Anfahrwarnung	startup warning		
STA2_B21	EVSP1	17	sporadisch Richtung 1	sporadic ON direction 1		
STA2_B22	EVSP2	18	sporadisch Richtung 2	sporadic ON direction 2		
STA2_B23	EVS1	19	Verknüpfungssignal Ri.1	Interlocking signal direction 1		
STA2_B24	EVS2	20	Verknüpfungssignal Ri.2	Interlocking signal direction 2		
STA2_B25	REL_SC	21	Freigabe SIMOCODE	Enable SIMOCODE		
STA2_B26	WA_SC	22	Warnung SIMOCODE	General Warning SIMOCODE		
STA2_B27	REL_MVC	18	Freigabe Anzeige Strom	Enable display of current		
STA2_B10	STA2_B10	24	Reserve für Anwender	Spare for User adaptations		
STA2_B11	STA2_B11	25	Reserve für Anwender	Spare for User adaptations		
STA2_B12	STA2_B12	26	Reserve für Anwender	Spare for User adaptations		
STA2_B13	STA2_B13	27	Reserve für Anwender	Spare for User adaptations		
STA2_B14	STA2_B14	28	Reserve für Anwender	Spare for User adaptations		
STA2_B15	STA2_B15	29	Reserve für Anwender	Spare for User adaptations		
STA2_B16	STA2_B16	30	Reserve für Anwender	Spare for User adaptations		
STA2_B17	STA2_B17	31	Reserve für Anwender	Spare for User adaptations		

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS3			**Status**	**Status**		
STA3_B40		0	IntStrt1 angeschlossen	IntStrt1 connected		
STA3_B41		1	IntStrt2 angeschlossen	IntStrt2 connected		
STA3_B42		2	IntOper1 angeschlossen	IntOper1 connected		
STA3_B43		3	IntOper2 angeschlossen	IntOper2 connected		
STA3_B44		4	IntProtG angeschlossen	IntProtG connected		
STA3_B45		5	IntProtA angeschlossen	IntProtA connected		
STA3_B46	LINK	6	GR_LINK1 angeschlossen	GR_LINK1 connected		
STA3_B47		7	Analogwert angeschlossen	User Analog Value connected		
STA3_B30	MARK	8	Objekt markieren (Gruppenkommando)	Highlight object (group command)		
STA3_B31		9				
STA3_B32		10				
STA3_B33		11				
STA3_B34		12				
STA3_B35		13				
STA3_B36		14				
STA3_B37		15				
STA3_B20		16				
STA3_B21		17				
STA3_B22		18				
STA3_B23		19				
STA3_B24		20				
STA3_B25		21				
STA3_B26		22				
STA3_B27		23				
STA3_B10		24				
STA3_B11		25				
STA3_B12		26				
STA3_B13		27				
STA3_B14		28				
STA3_B15		29				
STA3_B16		30				
STA3_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
MAI_STA			**Maintenance Status**	**Maintenance Status**		
MAI_STA_B40		0	Maintenance Intervall:fest	Maintenance interval: fixed		
MAI_STA_B41		1	Maintenance Intervall: Betriebsstunden	Maintenance interval: Operating hour		
MAI_STA_B42		2	Maintenance Intervall: Starts	Maintenance Interval: starts		
MAI_STA_B43		3				
MAI_STA_B44		4	Maintenance Kommando Start	Maintenance Command: start		
MAI_STA_B45		5	Maintenance Komando Stop/Reset	Maintenance Command: stop/reset		
MAI_STA_B46		6				
MAI_STA_B47		7				
MAI_STA_B30		8	Status Alarm (Intervall überschr.))	Status Alarm (Interval exceeded))		
MAI_STA_B31		9	Status Anforderung (Anforderungswert überschr.)	Status Request (Req. Val. Exceeded))		
MAI_STA_B32		10	Status läuft (MT on)	Status Run (Maintenance on)		
MAI_STA_B33		11				
MAI_STA_B34		12				
MAI_STA_B35		13				
MAI_STA_B36		14				
MAI_STA_B37		15				
MAI_STA_B20		16	Bedienanforderng	Operation Request		
MAI_STA_B21		17	Bedienung	Operation In Progress		
MAI_STA_B22		18	Bedineung ausgeführt	Operation Completed		
MAI_STA_B23		19	Bedienung Temp (keine Bedienaktion)	Opartation Temp (No Operator Action)		
MAI_STA_B24		20				
MAI_STA_B25		21				
MAI_STA_B26		22				
MAI_STA_B27		23				
MAI_STA_B10		24				
MAI_STA_B11		25				
MAI_STA_B12		26				
MAI_STA_B13		27				
MAI_STA_B14		28				
MAI_STA_B15		29				
MAI_STA_B16		30				
MAI_STA_B17		31				

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Damper C_DAMPER

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring to property damage only have no safety alert symbol. The notices shown below are graded according to the degree of danger.

Danger
indicates that death or severe personal injury **will** result if proper precautions are not taken.

Warning
indicates that death or severe personal injury **may** result if proper precautions are not taken.

Caution
with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution
without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention
indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel.** Within the context of the safety notices in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

Warning
This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.
Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens Aktiengesellschaft

Description of C_DAMPER

Type/Number

Module name: C_DAMPER
Module no.: FB1002

Calling OBs

C_DAMPER must be called in OB1 (MAIN_TASK).

Function

General Function description

Module Type C_DAMPER can be used to control dampers, actuators or gates in a cement plant. As per definition, **direction 1 = close** and **direction 2 = open**. Two modes are possible for the control:

- **Normal control mode:** The damper is controlled into direction 1 (close) or 2 (open), including a supervision of the Limit switches of the corresponding direction.
- **Positioning mode:** The damper is controlled into a certain position. The setpoint can be entered via operator faceplate or transferred as an external setpoint (e. g. from a controller). The **inching mode** can be used for manual positioning of the damper. In this case open or close commands can be given "step-wise" using buttons in the operator faceplate.

For the "normal control" the start/stop can be carried out in three different **operating modes**:

- In the **automatic mode** the damper is opened/closed by a superordinated group module.
- The **single-start mode** allows individual open/close via operator faceplate of the damper.
- In the **local mode** the damper can be opened and closed by the locally installed pushbuttons **KSP** (stop button) and **KCL** and **KOP** (start buttons for direction 1 and 2).

Priority of the operating modes (1 = highest priority)

Prio.	Operating mode	Condition at Parameters
1	Local mode	KLOC=1 + KVO=0
2	Positioning mode	KTFG=1 + KPOS=1
3	Inching from faceplate or buttons	KTFG=1 + KPOS=0
4	Single start mode	KEIZ=1
5	Open loop control mode (automatic)	KLOC=0 + KEIZ=0 + KPOS=0

The following **standard signals** are be monitored by the damper block:

- Limit Position **KWE1** and **KWE2** in conjunction with the controlled direction (**KB1** and **KB2)**
- The torque switches **KDR1** and **KDR1** in conjunction with the controlled direction
- Electrical availability **KSB**
- Overload **KBM**
- Local switch **KVO** (1-Signal = Remote; 0-Signal = Local)
- Local stop button **KSP**
- Local start direction 1 **KCL**
- Local start direction 2 **KOP**

Additionally there is an option of a **supervision of a torque switch** in both directions.

A **wagging function** can be activated in case of torque switch fault or if the runtime has exceeded.

If the damper is in automatic or in single-start mode <u>and</u> the damper is in operation, a wrong status at any of the above mentioned signals leads to an **alarm message.**

If additional **protections** are available for the damper or for the equipment, those signals have to be linked to an Annunciation block C_ANNUNC or C_ANNUN8 in order to create an alarm. In order to stop the drive in case of a fault an output of the annunciation block has to be connected to the protection interlock of the damper. We distinguish between:

- Protection interlock **KSV1** or **IntProt1** effective in all modes
- Protection interlock **KSV2** or **IntProt2** effective in all modes

Interlocks can be used in order to enable or disable the damper operation dependent on a process condition, like "previous drive is running" or a process signal:

- Start interlock **KEV1** or **IntStrt1**	Effective only in auto and in single-start mode. In local mode, in positioning mode and in inching mode not effective!
- Start interlock **KEV2** or **IntStrt2**	Effective only in auto and in single-start mode. In local mode, in positioning mode and in inching mode not effective!
- Operating interlock **KBV1** or **IntOper1**	Effective in all operation modes except local mode.
- Operating interlock **KBV2** or **IntOper2**	Effective in all operation modes except local mode.

Through **process parameters** the following values can be configured online:

- Limit switch delay time (s)	damper must not drift from limit position without command
- Runtime supervision (s)	monitoring time from limit position to limit position
- Wagging number	number of wagging operations to be carried out
- Time for start-up warning (s)	for single-start mode and local mode (if enabled)

Additional process parameters for the Positioning mode:

- Setpoint limit min	minimum value for Setpoint entry
- Setpoint limit max	maximum value for Setpoint entry
- Actuator Runtime (s)	real runtime of the actuator
- Hysteresis resp. threshold AN (%)	switch on of the dead zone
- Hysteresis resp. threshold AB (%)	switch off of the dead zone

Visualization

In the **block icon** of the damper the most important operation status are displayed (damper position, operating mode, fault status). Operation functions and detail information are only available after opening the **faceplate**.

Additional functions

Link to a measured value

- An additional measure can be displayed in the damper faceplate, either through connection of the physical output of measured value block or through connection of the output of an analog value selection block to the damper.

SIMOCODE drives

If SIMOCODE is used, the communication between the damper block and the SIMOCODE can be carried out via adapter block C_SIMOS or C_SIM_AD.
An additional button in the damper faceplate opens the faceplate of the C_SIMOS in order to display the SIMOCODE details.

Sequence Test

In Sequence Test mode the damper can be started without hardware signals. The limit switches are simulated. The hardware inputs (KSB; KBM; KVO...) are still active and have to be simulated by a test program at the beginning of OB1 Cycle.

If driver blocks are used, the Output SIM_ON of the damper can be connected to input SIM_ON of the driver blocks to enable the simulation.

Operating Principle

Hardware inputs

KWE1 **Limit position 1** **Basic state 0-signal**

Format BOOL

The KWE1 parameter is used to monitor the "closed" limit position of the damper. A 1-signal at KWE1 means that the "closed" limit position has been reached. The connection of the KWE1 parameter is made with the make contact of the position limit switch. The break contact is switched directly in the contactor control circuit.

KWE2 **Limit position 2** **Basic state 0-signal**

Format BOOL

The KWE2 parameter is used to monitor the "open" limit position of the damper. A 1-signal at KWE2 means that the "open" limit position has been reached. The connection of the KWE2 parameter is made with the make contact of the position limit switch. The break contact is switched directly in the contactor control circuit.

KSB **Electrical availability** **Basic state 1-signal**

Format BOOL

The KSB parameter is used to monitor the electrical availability of the damper. The electrical availability is monitored in automatic mode and in single-start mode, and results in a shut down with an alarm.

KBM **Overload** **Basic state 1-signal**

Format BOOL

The KBM parameter is used to monitor the overload of the damper (bimetal). The overload is monitored in automatic mode and in single-start mode, and results in a shut down with an alarm.

KVO **Local switch** **Basic state 1-signal**

Format BOOL

The KVO parameter is used for connecting the local switch of the damper. The KVO = 1-signal means the Automatic position and the KVO = 0-signal means the Local position. No alarm signal occurs in the control room in local mode.

In position Local (KVO = 0-signal) the damper can be started via KCL and KOP and stopped via KSP.

KSP **Local stop** **Basic state 1-signal**

Format BOOL

The KSP parameter is used to stop the damper in local mode. This is a break contact, i.e. a 0-signal stops the damper.
By default the local stop KSP is only active if the damper is in local mode. Connecting a 1-signal to LST_ACT, the local stop is always effective.

KCL **Local start direction 1** **Basic state 0-signal**

Format BOOL

The KCL parameter is used to close the damper in local mode. A 1-signal at KCL starts the damper in direction 1.
The prerequisite for closing the damper from local is the local release (KLOC interface = 1-signal) and the position of the KVO switch at local (KVO = 0-signal).

KOP **Local start direction 2** **Basic state 0-signal**

Format BOOL

The KOP parameter is used to open the damper in local mode. The 1-signal at KOP starts the damper in direction 2.
The prerequisite for opening the damper from local is the local release (KLOC interface = 1-signal) and the position of the KVO switch at local (KVO = 0-signal).

Input interfaces

KEV1 **Start interlock direction 1** **Basic state 1-signal**

Format BOOL

The damper can be operated in automatic mode or single-start mode only if the start interlock has 1-signal. A 0-signal at interface KEV1 prevents the operation in direction 1. In local mode, in positioning mode and in inching mode the start interlock is not effective.

IntStrt1 **Start Interlock direction 1**

Format STRUCT

For function description, see KEV1. This interface can be connected with a structure output as e. g. signal **RunSig** of a drive or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntStrt1.Value **Signal** **Basic state 1-signal**

Format BOOL

IntStrt1.ST **Signal status** **Default: 16#FF**

Format BYTE

KBV1 **Operating interlock direction 1** **Basic state 1-signal**

Format BOOL

The damper can be operated in automatic mode, in single-start mode, positioning mode and inching mode only if the operating interlock has 1-signal. A 0-signal at interface KBV1 prevents the starting or switches off the damper. In local mode the operating interlock is not effective.

IntOper1 **Operation Interlock direction 1**

Format STRUCT

For function description, see KBV1. This interface can be connected with a structure output as e. g. signal **RunSig** of the previous drive or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntOper1.Value **Signal** **Basic state 1-signal**

Format BOOL

IntOper1.ST **Signal status** **Default: 16#FF**

Format BYTE

KSV1 **Protection interlock direction 1** **Basic state 1-signal**

Format BOOL

All signals which indicate a damper fault and which are not monitored by the damper module as standard must be connected to the protection interlock. A 1-signal means status OK, a 0-signal means fault.
Interfaces KSV1 and KSV2 are effective in all operating modes of the damper.

Caution: When the damper is switched off via KSV1 or KSV2, the damper module does not generate an alarm message. There is no summarizing fault indication at the group and the protection interlock is not shown in the status call.
For the fault message one must program an annunciation module. To connect the protection interlock one must use the output MAU of the associated annunciation module and not the input signal of the fault so that a possible time delay is taken into consideration.

Remark: In older standard versions, interfaces KSV1/KSV2 were used for the torque monitoring. This interfacing is still possible but today it is much easier with interfaces KDR1 and KDR2.

IntProt1 **Protection Interlock direction 1**

Format STRUCT

For function description, see KSV1. This interface can be connected with a structure output as e. g. output **OutSig** of the annunciation block or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntProt1.Value **Signal** **Basic state 1-signal**

Format BOOL

IntProt1.ST **Signal status** **Default: 16#FF**

Format BYTE

KDR1 **Torque switch direction 1** **Basic state 0-signal**

Format BOOL

A 1-signal at interface KDR1 or KDR2 means the torque switch has responded. Depending on how interface KWED is connected, this fault is analysed and annunciated immediately or the damper resorts to wagging (see KWED).

KEV2 **Start interlock direction 2** **Basic state 1-signal**

Format BOOL

See KEV1

IntStrt2	**Start Interlock direction 2**	

Format STRUCT

For function description, see KEV1.

Structure variables:

IntStrt2.Value	**Signal**	**Basic state 1-signal**

Format BOOL

IntStrt2.ST	**Signal status**	**Default: 16#FF**

Format BYTE

KBV2	**Operating interlock direction 2**	**Basic state 1-signal**

Format BOOL

See KBV1

IntOper2	**Operation Interlock direction 2**	

Format STRUCT

For function description, see KBV1.

Structure variables:

IntOper2.Value	**Signal**	**Basic state 1-signal**

Format BOOL

IntOper2.ST	**Signal status**	**Default: 16#FF**

Format BYTE

KSV2	**Protection interlock direction 2**	**Basic state 1-signal**

Format BOOL

See KSV1

IntProt2	**Protection Interlock direction 2**	

Format STRUCT

For function description, see KSV1.

Structure variables:

IntProt2.Value	**Signal**	**Basic state 1-signal**

Format BOOL

IntProt2.ST	**Signal status**	**Default: 16#FF**

Format BYTE

KDR2	**Torque switch direction 2**	**Basic state 0-signal**

Format BOOL

See KDR1

L_STA_WA **1 = Start-up warning in local mode** **Basic state 0-signal**

Format BOOL

With 0-signal at this parameter, no start-up warning is given in local mode.
With 1-signal at this parameter, by pressing the Local start button a start-up warning is given and the contactor outputs KB1/KB2 are delayed by the start-up warning time HORN_TIM.

Caution: For security reasons the local start button must remain pressed until the drive is running!

LST_ACT **Local Stop active** **Basic state 0-signal**

Format BOOL

With 0-signal at this parameter the local-stop is not effective in automatic mode.
1-signal at this parameter enables the local stop in automatic mode too and an alarm will be created.

KLOC **Local mode release** **Basic state 0-signal**

Format BOOL

A 1-Signal at this interface enables the damper for the local mode through the PLC, i.e. the damper can be controlled via inputs KOP and KCL. The operation mode is changed by the associated group. The group module sets the local mode signal GLO. This information is passed on to the damper module by connecting interface KLOC with signal GLO of the associated group.

In local mode via the PLC only protection interlock KSV1/KSV2 is effective. The connection of interfaces KEV1/KEV2 and KBV1/KBV2 are not analysed in local mode.

KEIZ **Single-start mode release** **Basic state 0-signal**

Format BOOL

A 1-signal at this interface releases the single-start mode for the damper, i.e. the damper can be controlled individually from the central control room. The operating modes are changed by the associated group. The group module sets the single-start mode signal GES. This information is passed on to the damper module by connecting interface KEIZ with signal GES of the associated group.

In single-start mode all interlocks of the damper module are effective! Start is carried out after the set horn time (process value HORN_TIM) has expired.

KSTB **Stand-by mode** **Basic state 0-signal**

Format BOOL

In the philosophy of CEMAT-Standards only the active plant sections can generate alarm messages. This means, if a drive at stop is faulty, this is indicated in the symbol at the flow mimic but there will be no alarm message.
A 1-Signal at interface KSTB means that the damper is in stand-by mode. In this mode the damper is monitored for availability. If a fault occurs when the damper is in stand-by mode, an alarm message is generated.

KWED **Wagging release** **Basic state 0-signal**

Format BOOL

The connection of wagging release KWED with 1-signal causes the damper to wag when the run-time is exceeded or when the torque switch is activated. This means the damper returns to the old limit position and makes a new attempt to move in the required direction etc.

The number of attempts depends on the set wagging count (process value WAGG_NO). When the set number of wagging attempts is exceeded the damper signals a mechanical fault.

When wagging release KWED has 0-signal the response of the torque switch leads to direct switching off and the damper signals torque switch fault.

KWU1 **Changeover limit switch, make/break contact** **Basic state 1-signal**

Format BOOL

The standard module expects a make contact as the limit switch, i.e. when the limit position is reached then parameter KWE1 has 1-signal. A make contact may not always be available as limit switch (if e.g. the contacts were used elsewhere). In such cases if the interface KWU1 is programmed to have 0-signal, the limit switch is interpreted as a break contact.

KWU2 **Changeover limit switch, make/break contact** **Basic state 1-signal**

Format BOOL

See KWU1

KMFR **Annunciation release** **Basic state 1-signal**

Format BOOL

With 0-signal at this interface the annunciation function is blocked.

Typical application:

In the case of a control supply voltage failure for MCC or field signals, one alarm message would be triggered for each sensor signal. To prevent this, one should connect the control voltage signal to the annunciation release interface of the appropriate modules. This causes no alarm to be generated. The cause of “control voltage failure“ is generated by an annunciation module which has to be engineered for this purpose.

Caution: If KMFR has 0-Signal the damper fault is not shown in the summarizing indication of group and route and not listed in the status call.

KMZS **Fault interlock to the group** **Basic state 0-signal**

Format BOOL

A 1-signal on KMZS prevents that the dynamic and static fault is passed to the group. In the status call the drive fault can still be seen.

GFSO **Group fault / status off** **Basic state 0-signal**

Format BOOL

1-Signal at GFSO completely deselects the damper for the Group Summarizing fault and for the Group Status Call.

KLP1 **Lamp test (additional)** **Basic state 0-signal**

Format BOOL

If one has several control desks with lamps and wants to test the lamps for each control desk separately, one can connect the corresponding lamp test signal to this interface.

Caution: Using KLP1 the lamp test interface at the C_PUSHBT module must **not** be connected. There is only one interface for both direction 1 and direction 2.

KQT1 **Acknowledge (additional)** **Basic state 0-signal**

Format BOOL

The acknowledgement of the damper fault is normally carried out together with the acknowledgement of any alarm within the same AS (default setting). Interface KQT1 is only needed for individual acknowledgement (via push-button) or in case of group-wise acknowledgement.

A signal change from "0" to "1" at KQT1 acknowledges the drive fault (resetting flag KST1 and KST2 – there is only one interface for direction 1 and direction 2).

In case of a conventional control desk, a push-button can be connected to KQT1 (for individual acknowledgement) or to the acknowledgement interface at block C_PUSHBT can be used (for AS-wise acknowledgement).

Caution: Using KQT1 for individual acknowledgement, the acknowledgement interface at the C_PUSHBT must **not** be connected.

For group-wise acknowledgement connect the output ACK of the corresponding group to interface KQT1 of the damper. See Engineering Manual, chapter AS-Engineering.

KHA1 **Manual command (inching direction 1)** **Basic state 0-signal**

Format BOOL

Interfaces KHA1 and KHA2 are effective only in conjunction with inching release KTFG. They are used for manual positioning of the damper with +/- pushbuttons (conventional control desk). Damper output KB1 is given only as long as interface KHA1 has 1-signal.

KEB1 **Command ON (direction 1)** **Basic state 0-signal**

Format BOOL

Interface to move the damper in direction 1 in automatic mode. With 1-signal the damper is switched on. The GBE signal of the associated group(s) or the WBE signal of the associated route(s) is normally connected to this interface.

Caution: Interfaces KEB1 and KEB2 must **not** be connected with a continuous signal because then the damper fault cannot be acknowledged! If a continuous signal is required (e.g. for fan dampers) one must take care that the ON command becomes zero in the event of a fault (see engineering manual "Fan dampers").

KAB1 **Command OFF (direction 1)** **Basic state 0-signal**

Format BOOL

A 1-signal at this interface switches off the damper in direction 1 in automatic mode. This is actually needed only if the damper is to be switched off in an intermediate position (e.g. with dampers with 3 limit switches - see engineering manual).

KHA2 **Manual command (inching direction 2)** **Basic state 0-signal**

Format BOOL

See KHA1

KEB2 **Command ON (direction 2)** **Basic state 0-signal**

Format BOOL

See KEB1

KAB2 **Command OFF (direction 2)** **Basic state 0-signal**

Format BOOL

See KAB1

DSIG_BQ **Driver Signal(s) Bad Quality** **Basic state 0-signal**

Format BOOL

If driver blocks are used, the information "one ore more driver blocks have bad quality" can be displayed in the damper faceplate and in the block icon of the damper.
In order to achieve this, the outputs QBAD of the driver blocks must be connected with an OR function to Interface DSIG_BQ.

DSIG_SIM **Driver Signal(s) Simulation** **Basic state 0-signal**

Format BOOL

If driver blocks are used, the information "one or more driver blocks are switched to simulation" can be displayed in the damper faceplate and in the block icon of the damper.
In order to achieve this, the outputs QSIM of the driver blocks must be connected with an OR function to Interface DSIG_SIM.

The following input interfaces belong to the positioning function of the damper:

KPOS **Positioner** **Basic state 0-signal**

Format BOOL

For dampers with positioning functions the interfaces KPOS and KTFG must be connected with a 1-signal and an actual value for the damper position (0-100%) must be connected to the damper module using parameter POS_IN. If you want to inch the damper outputs directly, then the interface has to be KPOS=0 and KTFG=1.

KTFG **Inching release** **Basic state 0-signal**

Format BOOL

To position the damper (through positioning function of the damper or manually via +/- pushbuttons) the inching release must have a 1-signal.
A 1-signal at interface KTFG blocks the control via KEB1 and KEB2 as well as the control in single-start mode.

POS_IN **Position value (0-100%)**

Format STRUCT

Only for dampers with positioning function!

The POS_IN interface must be connected with the damper position (actual value of the positioner).

Caution: The value must be 0-100!

Structure variables:

POS_IN.Value **Value** **Default: 0.0**

Format REAL

POS_IN.ST **Signal status** **Default: 16#FF**

Format BYTE

POS_LZ **Live-zero position** **Basic state 0-signal**

Format BOOL

Only for dampers with positioning function!
The POS_LZ interface must be connected with the Live-Zero signal of the analog value for the damper position, so that the damper recognizes that the position value is erroneous.

Caution: The signal status of the structure variable POS_IN.ST is only used for display and does not stop the damper positioning. Therefore you must additionally connect output ULZ of the measure to input POS_LZ of the damper positioner.

KWEE **External setpoint ON** **Basic state 0-signal**

Format BOOL

Only for dampers with a positioning function!
When interface KWEE has a 1-signal the damper module reads the setpoint from input interface KWEX. This function is used if the setpoint is specified by a primary controller. In this case, one must connect the output of the corresponding controller to interface KWEX of the damper.

KWEX **External setpoint**

Format STRUCT

Only for dampers with positioning function and only effective if KWEE has 1-Signal!

In order to transmit the setpoint from a primary function (e. g. Controller), the output of the controller must be connected to input KWEX of the damper.

Structure variables:

KWEX.Value **Value** **Default: 0.0**

Format REAL

KWEX.ST **Signal status** **Default: 16#FF**

Format BYTE

KSNF **Setpoint tracking** **Basic state 1-signal**

Format BOOL

Only for dampers with positioning function!
In the operating mode positioning, the setpoints track each other. If **KSNF** = 0, the setpoints are not tracked to the actual value.

EN_INCH **Enable inching in positioning mode** **Basic state 0-signal**

Format BOOL

This is not a parameter at the block. It is possible to switch to inching mode from the diagnosis faceplate only.
When the damper is set to positioning mode by (KPOS=1 and KTFG=1) there is the possibility to switch over to the inching mode from the faceplate.

Attention: This is not a second function fort the „normal inching mode“. But if there are problems to reach the limit positions in positioning mode one can use the new function. The operator then is responsible to switch back into positioning mode.

The following conditions will switch off this special inching mode:
- the operator (by pressing the button in the diagnosis faceplate)
- when the damper is not in the condition of positioning anymore (KTFG=0 or KPOS=0)
- when the limit position1 or 2 is reached.

If SIMOCODE Adapter block is used:

REL_SC **Enable SIMOCODE** **Basic state 0-signal**

Format BOOL

For drives with SIMOCODE you have to enable this function with 1-signal at this parameter. In the faceplate of the damper an additional button appears which allows opening the SIMOCODE faceplate. In the TEXT1 Variable (preset with C_SIMOS) the respective Adapter – Module can be set per instance.

STAT_SC **Status SIMOCODE** **Default: 0**

Format BYTE

For drives with SIMOCODE you have to connect this parameter with out-parameter of the Adapter block "C_SIMOS". Additional you have to enable this function with 1-signal at parameter "REL_SC".

In order to link up to 16 measuring values to the damper:

If one ore more measuring values are used as additional process signals of the damper (e. g. power, current, etc.), these measures can be linked to the drive.
The selected process value is displayed in the damper faceplate and the faceplate of the C_MEASUR or t the C_ANA_SEL can directly be opened from the drive.

PV Process value input (general use)

Format STRUCT

In order to display the process value in the damper faceplate, input PV must be connected with output PV_Out of C_MEASUR (for one value) or with output Out_Val of C_ANA_SEL (for up to 16 values).

Structure variables:

PV.Value Value Default: 0.0

Format REAL

PV.ST Signal status Default: 16#FF

Format BYTE

Caution: Only the selected measure is displayed in the damper faceplate.

PV_Stat Process Value Status + Unit

Format STRUCT

In order to transmit the status and the unit of the process value to the damper, the input PV_Stat must be connected with output PV_Stat of C_MEASUR or with output Out_Stat of C_ANA_SEL (for up to 16 values).

Structure variables:

PV_Stat.UNIT Unit Default: %

Format STRING[8]

PV_Stat.STATUS Status Default: 16#00

Format DWORD

Caution: Only the status and the unit of the selected measure are displayed in the damper faceplate.

For customizing of the diagnosis window:

STA2_B10 Spare input for visualisation Basic state 0-signal

STA2_B10 till STA2_B17

Format BOOL

These parameter are transferred to the STATUS2 and can be used for additional purposes for e.g. in the diagnostic window.
Look at the table OS-variables.

UserFace **Select Faceplate**

Format ANY

Input UserFace can be connected to any block with an OS Interface (Faceplate). If a block is connected, an additional button "U" (User) appears in the faceplate of the drive block. With this button the Faceplate of the connected block can be opened.

Example:
In order to show the related Signals for the drive, input UserFace can be connected to block C_REL_MOD (for a list of up to 16 objects) or, if fewer signals are used, in can be directly connected to a C_INTERL, C_INTER5 or Intlk02.

Additional inputs for testing and as Interface to the OS:

TEST_OSS **Test interface** **Default: 0**

Format INTEGER

The test interfaces are only used during module development and must not be changed!

MSG8_EVID **Message ID** **Default: 16#00**

Format DWORD

Interface to OS

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

Group and Object links

Group/Route links

Each drive block, annunciation block or measurement block must be linked to a group or route in order to collect the status of these objects for summarizing indications.

The group link is essential for control and diagnosis and comprises the following functions:

- All objects, linked to the group (or route) are listed in the group (or route) object list.
- All objects, linked to the group (or route) are highlighted in the process picture with button "Show related objects".
- The faults of all objects, linked to the group (or route) are included in the summarizing fault indication of the group (or route).
- The warnings of all objects, linked to the group (or route) are included in the summarizing warning indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

A drive can be linked to two groups or routes via *GR_LINK1* and *GR_LINK2*. If a drive belongs to more than two groups or routes the additional block C_MUX must be inserted, which provides 5 additional link interfaces.

Caution: The main group (or main route) should be connected to *GR_LINK1*! This is the one which is opened with a click on button "Main group" in the drive faceplate.

GR_LINK1 **Link to group or route**

Format STRUCT

The GR_LINK1 interface of the damper must be connected with the R_LINK interface of the route or with the G_LINK interface of the group.

Structure variables:

GR_LINK1.Link	**Link**	**Default: 0**
Format INTEGER		
GR_LINK1.Command	**Group / Route Command**	**Default: 16#00**
Format WORD		

GR_LINK2 **Link to group or route**

Format STRUCT

If the damper belongs to two different routes or groups, the GR_LINK2 interface must be connected with the second route/group.

Structure variables:

GR_LINK2.Link	**Link**	**Default: 0**
Format INTEGER		
GR_LINK2.Command	**Group / Route Command**	**Default: 16#00**
Format WORD		

MUX_LINK **Link to C_MUX**

Format STRUCT

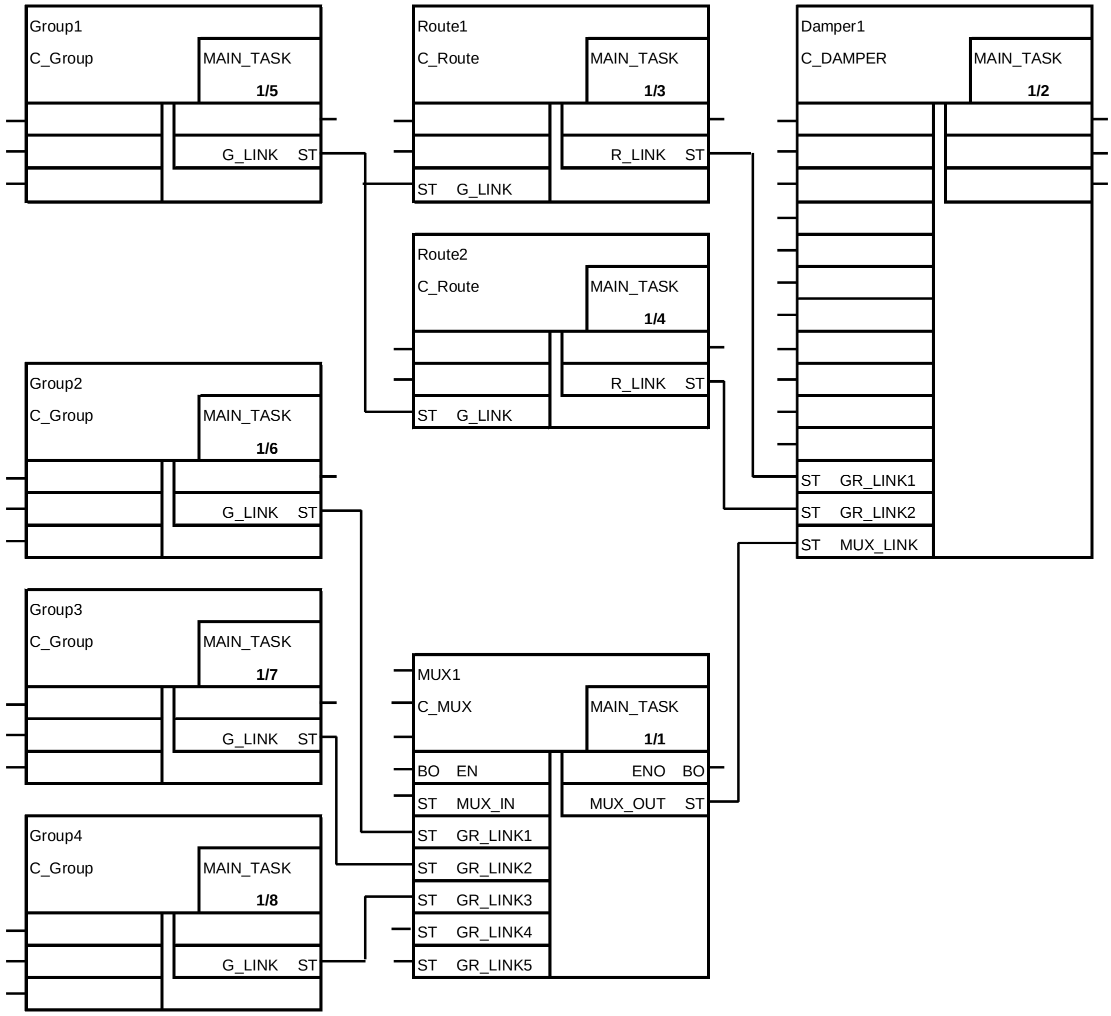
If the damper belongs to more than two different routes or groups, the C_MUX module must be series-connected. C_MUX has 5 inputs (GR_LINK1 to GR_LINK5) for connection with the groups/routes and one output (MUX_OUT) for connection with the MUX_LINK interface of the damper.

Caution: If a C_MUX block is used, the programming order is very important. The C_MUX must be called before the drive block!
The MUX_IN interface can under no circumstances be used for connection with a group or route. It is used exclusively for connection with another MUX module.

Structure variables:

MUX_LINK.Point_GRL	**Pointer**	**Default: 0**
Format INTEGER		
MUX_LINK.Command	**Group / Route Command**	**Default: 16#00**
Format WORD		

Example of a circuit:

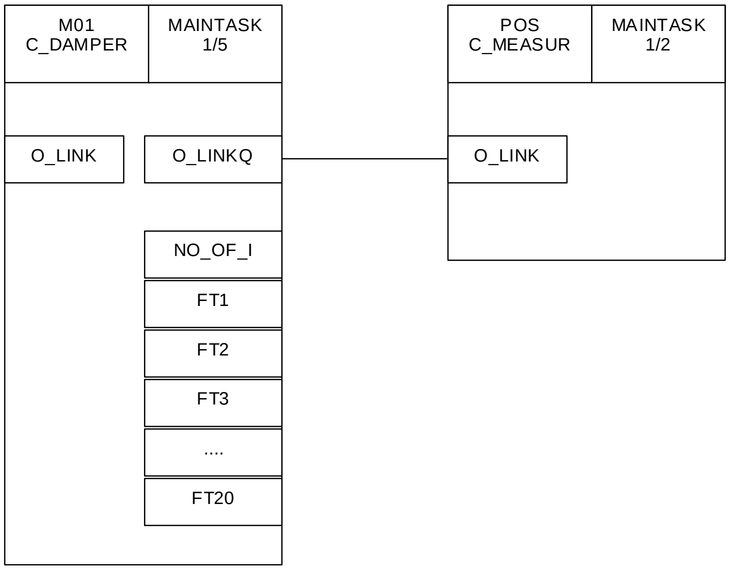


Caution: Check the runtime sequence! The C_MUX module must be called before the drive. For the other modules the run sequence is as follows: first the drives, then the associated routes and finally the associated groups.

Caution: Some people use one C_MUX block and connect its output to a number of drives/devices, annunciations and measurements.
If you do so, make sure that the C_MUX is called before all the other objects and that no other C_MUX call comes in between.
We don't recommend using the same C_MUX if the blocks are located in different runtime groups.

Object links to slave objects

Annunciations and measurements which belong to a drive must not be linked to the group (or route), if they are connected via Object link to the damper output *O_LINKQ*.



The damper block collects the information and forwards it to the group (or route). The result is as follows:

- All objects, linked to the damper are listed in the damper object list and in the group (or route) object list (one level below the damper).
- All objects, linked to the damper are highlighted in the process picture with button "Show related objects".
- The faults of all objects, linked to the damper are included in the summarizing fault indication of the group (or route).
- The warnings of all objects, linked to the damper are included in the summarizing warning indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

O_LINKQ Link to slave object

Format STRUCT

Damper output *O_LINKQ* must be connected to interface *O_LINK* of all allocated annunciations and measurements, while the damper itself is connected via *GR_LINK* to the group (or route).

Structure variables:

O_LINKQ.iDB Instance DB master object

Format INTEGER

O_LINKQ.iDW DW number NO_OF_FT in master object

Format INTEGER

O_LINKQ.Command Group / Route Command

Format BYTE

O_LINKQ.Status Status master object

Format BYTE

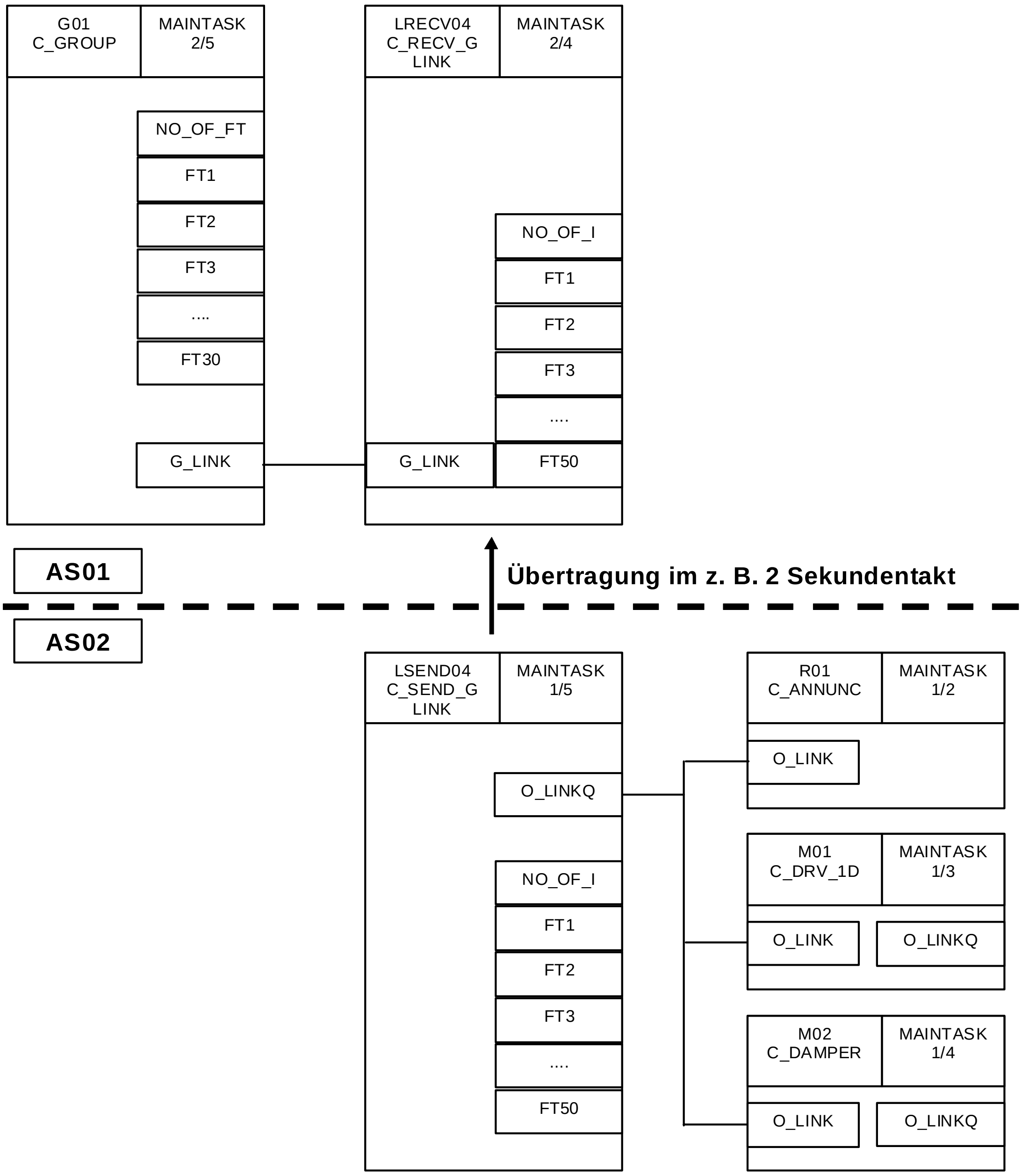
Object links to a group in a different AS

If a Cemat object is programmed in a different AS than the superordinated group a direct link between the damper and the group is not possible. In this case special send and receive blocks must be inserted which collect the object data and transmit it to the group.

In the AS of the group the group output *G_LINK* is connected to input *G_LINK* of the block C_RECV_G.

Caution: C_RECV_G can only be linked to a C_GROUP module. Linking to routes is not permitted and will not work!

In the AS of the Cemat Objects the output *O_LINKQ* of block C_SEND_G is connected to input *O_LINK* of the drives/devices, annunciations and measurements.



Caution: It is not allowed to use the Object link and the Group/Route link at the same time: If *O_LINK* is used, *GR_LINK1* and *GR_LINK2* or *C_MUX* must not be connected!

O_LINK **Link to another object**

Format STRUCT

Input interface *O_LINK* of the damper must be connected to output *O_LINKQ* of the C_SEND_G block.

Structure variables:

O_LINK.iDB **Instance DB master object** **Default: 0**

Format INTEGER

O_LINK.iDW **DW number NO_OF_FT in master object** **Default: 0**

Format INTEGER

O_LINK.Command **Group / Route Command** **Default: 16#00**

Format BYTE

O_LINK.Status **Status master object** **Default: 16#00**

Format BYTE

Caution: If annunciations or measurements belong to the damper, they don't need to be connected to output *O_LINKQ* of the C_SEND_G block.
They can also be programmed as slave objects and connected to output *O_LINKQ* of the damper.

Process values

The process values can be set during engineering and they can be changed online from the OS. To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

LSMONTIM Limit switch delay time Default: 2

Format INTEGER (0 - 999)

Value in seconds.
If the damper leaves the limit position without any command, this is interpreted as a mechanical fault. This monitoring is delayed by the set time.

RTMONTIM Run-time monitoring Default: 90

Format INTEGER (0 - 999)

Value in seconds.
The run-time monitoring is effective in automatic mode, single-start mode and positioning mode. In automatic mode and in single-start mode the damper must reach the limit position within the set time. In positioning mode the set point must be reached within this time.
If this time value is exceeded the damper annunciates the run-time fault as a mechanical fault. The parameter run-time monitoring must be adjusted depending on the damper run-time. The set time applies to both directions.
With the value 0 the run-time monitoring is switched off in all operating modes.

WAGG_NO Wagging counter Default: 0

Format INTEGER (0 - 999)

Number of wagging attempts.
If the wagging release KWED has 1-signal when a run-time fault occurs or the torque limit switch is activated, the damper returns to the start position and then tries to run again in the required direction. This process is called wagging. The number of wagging attempts can be set here. After an unsuccessful number of wagging attempts mechanical fault annunciation is generated.

HORN_TIM Horn time for start-up warning Default: 10

Format INTEGER (0 - 999)

Value in seconds.
When the damper is triggered in single-start mode, a horn bit (module output) is set for the duration of the set time and the start of the damper is delayed. The horn bit can be connected further for the triggering of a start-up warning.

Additional process parameters for positioner function:

W_OS Setpoint of OS Default: 0.0

Format REAL

Interface for the setpoint specification of the OS.

KWUG **Setpoint lower limit** **Default: 0.0**

Format REAL

The default setting corresponds to the scale beginning for the setpoint of the damper position.

KWOG **Setpoint upper limit** **Default: 100.0**

Format REAL

The default setting corresponds to the scale end for the setpoint of the damper position.

SCB **Scale beginning** **Default: 0.0**

Format REAL

Scale beginning for the setpoint of the damper position.

SCE **Scale end** **Default: 100.0**

Format REAL

Scale end for the setpoint of the damper position.

UNIT **Unit** **Default: '%'**

Format STRING

Unit of the setpoint of the damper position.

TMIN **Minimum pulse length** **Default: 0.5**

Format REAL (0.0 - 9.9)

Value in seconds.
Here, the smallest pulse width to be output as damper commands is set. This pulse width must be longer than the cycle time.

TM **Actuator runtime** **Default: 60.0**

Format REAL (0 - 999)

Value in seconds.
This is the run-time for the damper to travel from one limit position to the other. It has an effect on the length of the pulses to be output. In contrast to the run-time monitoring, which is always set as a higher value, you must enter the actual run-time here.

AN **Hysteresis response threshold** **Default: 1.0**

Format REAL (0.0 - 9.9)

Value in %.
This is the beginning of the dead zone. If the deviation exceeds this percentage value the positioner starts to output pulses.

AB **Hysteresis dropout threshold** **Default: 1.0**

Format REAL (0.0 - 9.9)

Value in %.
This is the end of the dead zone. If the deviation is smaller than this percentage value the positioner does not output further pulses.

Additional process parameters for Maintenance function:

MAI_INT **Maintenance Interval** **Default: 16#00**

Format DWORD

The Maintenance Interval relates, depending on the parameterization, to a fixed time value, to the operating hours or to the number of starts. If the Maintenance Interval is exceeded the output MAI_AL will be set.

MAI_REQL **Maintenance Request Limit** **Default: 16#00**

Format DWORD

The Die Maintenance Request Limit can be used in order to indicate to the operator that the Maintenance interval will be completed soon. If the Maintenance Request Limit is exceeded, the output MAI_REQ will be set.

Input/Output interfaces

RES_RTOS **Reset time for number of movements for OS** **Default: 16#00**
Format DWORD
Interface to OS

RT_OS **Number of movements for OS** **Default: 16#00**
Format DWORD
Interface to OS

RT_H **Number of movements refreshed every hour** **Default: 16#00**
Format DWORD
Interface to OS

CNT_OS **Counter contactor direction 1** **Default: 16#00**
Format DWORD
Interface to OS

CNT2_OS **Counter contactor direction 2** **Default: 16#00**
Format DWORD
Interface to OS

MAI_CNT **Maintenance Actual counter – in hours or starts** **Default: 16#00**
Format DWORD
Interface to OS

CNT_TRIP **Maintenance Counter Trips** **Default: 16#00**
Format DWORD
Interface to OS

FT_DUR **Maintenance Fault duration in sec** **Default: 16#00**
Format DWORD
Interface to OS

MAI_STA **Maintenance Status** **Default: 16#80022**
Format DWORD
Interface to OS

MAI_X **Maintenance Spare** **Default: 16#00**
Format DWORD
Interface to OS

Output interfaces

KVS1 Position 1

Format BOOL

A 1-signal means "Damper in limit position 1".
The logic signal is mainly used for the interlocking with other drives and as feedback for the route or the group.

PosSig1 Position 1

Format STRUCT

For function description, see KVS1. This interface can be connected to a structure input as e. g. signal **IntOper** of the next drive.
Remark: For the feedback to the group or route you still have to use signal KVS1 because the group/route interfaces have no structure format.

Structure variables:

PosSig1.Value Signal

Format BOOL

PosSig1.ST Signal status

Format BYTE

KVS2 Position 2

Format BOOL

A 1-signal means "Damper in limit position 2".
The logic signal is mainly used for the interlocking with other drives and as feedback for the route or the group.

PosSig2 Position 2

Format STRUCT

For function description, see KVS2. This interface can be connected to a structure input as e. g. signal **IntOper** of the next drive.
Remark: For the feedback to the group or route you still have to use signal KVS2 because the group/route interfaces have no structure format.

Structure variables:

PosSig2.Value Signal

Format BOOL

PosSig2.ST Signal status

Format BYTE

KST1/KST2 Dynamic fault

Format BOOL

If a fault occurs during the triggering of the damper module, or during stand-by mode the dynamic fault bits are set. They remaining set until the fault is acknowledged.

Caution: In the following cases the damper fault cannot be acknowledged.
- If the ON command is constantly present;
- If both limit switches have responded at the same time. (switch clogged)

SST Fault

Format BOOL

A 1-signal means that some fault is still present.

HORN Start-up horn

Format BOOL

This signal is set during the starting of the damper in single-start mode for a given time period and can be logically connected to trigger a start-up warning.

SIM_ON Simulation ON

Format BOOL

In Sequence Test mode SIM_ON has 1-Signal. If module drivers are used the output SIM_ON of the damper can be connected to SIM_ON of the driver blocks in order to switch all driver blocks to simulation mode.

Additional outputs for positioner function:

KPO Positioner ON

Format BOOL

A 1-signal means that the damper is in positioning mode. The negated KPO Signal can be used to switch the primary controller to local mode.

X_POS_OS Damper position display

Format STRUCT

Interface to OS

Structure variables:

X_POS_OS.Value Value

Format REAL

X_POS_OS.ST Signal status

Format BYTE

Additional output for maintenance function:

MAI_REQ Maintenance Request

Format BOOL

The auto request value has been exceeded, which means the maintenance interval is nearly completed. This output can be connected to an annunciation block in order to generate an alarm.

MAI_AL Maintenance Alarm

Format BOOL

The Maintenance interval has been completed. This output can be connected to an annunciation block in order to generate an alarm.

Additional outputs for testing and as Interface to the OS:

INTFC_OS Interface status for OS

Format DWORD

Interface to OS

For more information see Variable details.

VISU_OS Status for symbol display

Format BYTE

Interface to OS

For more information see Variable details.

STATUS Status word for OS

Format DWORD

Interface to OS

For more information see Variable details.

STATUS2 Status word for OS

Format DWORD

Interface to OS

For more information see Variable details.

STATUS3 Structure Input available

Format DWORD

Interface to OS

For more information see Variable details.

ALARM **for Test**

Format WORD

For more information see Variable details.

DLY_CNT **Delay counter**

Format INTEGER

Interface to OS

Hardware outputs

KB1 **Command direction 1**

Format BOOL

The KB1 signal is used to trigger the main contactor in direction 1 to close the damper.

KB2 **Command direction 2**

Format BOOL

The KB2 signal is used to trigger the main contactor in direction 2 to open the damper.

W_ACT_O **Active Setpoint**

Format STRUCT

During positioning mode the active setpoint (from OS or from external Setpoint) is transferred to W_ACT_O. This output can be used, if the damper is controlled via analog output (instead of using the digital output signal KB1 and KB2).

Structure variables:

W_ACT_O.Value **Value**

Format REAL

W_ACT_O.ST **Signal status**

Format BYTE

KL1 **Lamp 1**

Format BOOL

The KL1 lamp indicates the status of the damper and can be used for the connection of an annunciation lamp (when no visualization system is present). A continuous 1-signal indicates that the damper has reached the limit position 1 (closed). Rapid flashing indicates a dynamic fault (non-acknowledged) and slow flashing indicates a static fault (already acknowledged).

KL2 **Lamp 2**

Format BOOL

The KL2 lamp indicates the status of the damper and can be used for the connection of an annunciation lamp (when no visualization system is present). A continuous 1-signal indicates that the damper has reached the limit position 2 (open). Rapid flashing indicates a dynamic fault (non-acknowledged) and slow flashing indicates a static fault (already acknowledged).

Time characteristics

The module must be called before the associated route or group.

Any called C_MUX modules must run before this module.

Message characteristics

The module uses the ALARM_8 module to generate annunciations.

A plausibility and priority logic at the process level analyses all object faults
- only one fault annunciation is issued for each fault
- secondary annunciations are suppressed automatically
- the fault source is recorded in detail and uniquely.

Still faulty message:
During start in automatic mode, any failure which inhibits the actuation of the damper leads to an interrupt of the start procedure and must therefore be reported by an alarm message. PCS7 can create the (incoming) alarm message only once and does not support the repetition of incoming alarm messages without outgoing message. For this reason, CEMAT creates a Message “Still faulty” for any alarm message which needs to be repeated.

The current operational state of the plant objects is automatically taken into consideration during the fault analysis, e.g. all fault annunciations are suppressed automatically for a stationary group
- no superfluous fault annunciations are created
- the operator does not need to manually disable/suppress any annunciations.

Each fault annunciation is also classified.
This shows whether an **electrical** or a **mechanical** fault, a **process fault** or a shut-down with a **local safety switch** applies.
- An electrician does not always need to be called first
- The production operator can give specific instructions.

Alarm archive and alarm logs show only "true" annunciations.
An annunciation release for each object means that the communication and OS are not overloaded with an "annunciation storm" - e.g. overloaded after a power failure.

Refer to the Variable details for the assignment of the annunciation text and annunciation class to the module parameters.

Module states

Variable VISU_OS:

No.	Status / Text	Symbol Display	Text Presentation
1	limit position 2	Green	Black , green
2	limit position 1	Green	Black , white
3	moving to position 2	Blinking green	Black , green
4	moving to position 1	Blinking green	Black , white
5	fault not acknowledged	Blinking red	White , red
6	fault acknowledged	Red	White , red
7	no limit position	Gray	Black , white
8	fault acknowledged position 1	Red	White , red
9	fault acknowledged position 2	Red	White , red
10	local mode position 2	Yellow	Black , yellow
11	local mode position 1	Yellow	Black , yellow
12	local mode moving to position 2	Blinking yellow	Black , yellow
13	local mode moving to position 1	Blinking yellow	Black , yellow
14	local mode no limit position	Blinking gray	Black , yellow
15	single mode position 2	Cyan	Black , blue
16	single mode position 1	Cyan	Black , blue
17	single mode moving to position 2	Blinking cyan	Black , blue
18	single mode moving to position 1	Blinking cyan	Black , blue
19	single mode no limit position	Blinking cyan	Black , blue

Status display of a positioning damper:

1st column: **C** = control operation
T = inching operation
P = positioning operation

2nd column: **E** = external setpoint

3rd column: **D** = damper fault

4th column: **A** = analog value fault

No.	Status	Display (bitmap)
1	Controlled	C
2	Controlled + damper fault	C K
3	Controlled + analog value fault	C A
4	Controlled + damper fault + analog value fault	C D A
5	Inching operation	T
6	Inching operation + damper fault	T D
7	Inching operation + analog value fault	T A
8	Inching operation + damper fault + analog value fault	T D A
9	Positioning operation	P
10	Positioning operation + damper fault	P D
11	Positioning operation + analog value fault	P A
12	Positioning operation + damper fault + analog value fault	P D A
13	Positioning operation + ext. setpoint	P E
14	Positioning operation + ext. setpoint + damper fault	P E D
15	Positioning operation + ext. setpoint + analog value fault	P E A
16	Positioning operation + ext. setpoint + damper fault + analog value fault	P E D A

Commands

Refer to the Variable details for the assignment of the command word.

I/O-bar of C_DAMPER

C_DAMPER

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
KWE1	Limit position 1	BOOL	0	I			
KWE2	Limit position 2	BOOL	0	I			
KSB	Electrical availability	BOOL	1	I			
KBM	Overload	BOOL	1	I			
KVO	Local switch	BOOL	1	I			
KSP	Local stop	BOOL	1	I			
KCL	Local start direction 1	BOOL	0	I			
KOP	Local start direction 2	BOOL	0	I			
KEV1	Start interlock direction 1	BOOL	1	I			
IntStrt1	Start interlock direction 1	STRUCT		I			
IntStrt1.Value	Signal	BOOL	1	I	U	+	
IntStrt1.ST	Signal Status	BYTE	16#FF	I	U		
KBV1	Operating interlock direction 1	BOOL	1	I			
IntOper1	Operating interlock direction 1	STRUCT		I			
IntOper1.Value	Signal	BOOL	1	I	U	+	
IntOper1.ST	Signal Status	BYTE	16#FF	I	U		
KSV1	Protection interlock direction 1	BOOL	1	I			
IntProt1	Protection interlock direction 1	STRUCT		I			
IntProt1.Value	Signal	BOOL	1	I	U	+	
IntProt1.ST	Signal Status	BYTE	16#FF	I	U		
KDR1	Torque switch direction 1	BOOL	0	I			
KEV2	Start interlock direction 2	BOOL	1	I			
IntStrt2	Start interlock direction 2	STRUCT		I			
IntStrt2.Value	Signal	BOOL	1	I	U	+	
IntStrt2.ST	Signal Status	BYTE	16#FF	I	U		

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
KBV2	Operating interlock direction 2	BOOL	1	I			
IntOper2	Operating interlock direction 2	STRUCT		I			
IntOper2.Value	Signal	BOOL	1	I	U	+	
IntOper2.ST	Signal Status	BYTE	16#FF	I	U		
KSV2	Protection interlock direction 2	BOOL	1	I			
IntProt2	Protection interlock direction 2	STRUCT		I			
IntProt2.Value	Signal	BOOL	1	I	U	+	
IntProt2.ST	Signal Status	BYTE	16#FF	I	U		
KDR2	Torque switch direction 2	BOOL	0	I			
KLOC	Local mode release	BOOL	0	I			
KEIZ	Single-start mode release	BOOL	0	I			
KSTB	Stand-by mode	BOOL	0	I			
KWED	Wagging release	BOOL	0	I	U		
KWU1	Changeover limit switch 1 1=N.O. 0=N.C.	BOOL	1	I	U		
KWU2	Changeover limit switch 2 1=N.O. 0=N.C.	BOOL	1	I	U		
KMFR	Annunciation release	BOOL	1	I			
KMZS	Fault interlock to the group	BOOL	0	I			
KLP1	Lamp test	BOOL	0	I	U		
KQT1	Acknowledge	BOOL	0	I	U		
KHA1	Manual command 1 (inching)	BOOL	0	I			
KEB1	Command ON direction 1	BOOL	0	I			
KAB1	Command OFF direction 1	BOOL	0	I	U		
KHA2	Manual command 2 (inching)	BOOL	0	I			
KEB2	Command ON direction 2	BOOL	0	I			
KAB2	Command OFF direction 2	BOOL	0	I	U		
DSIG_BQ	Driver-Signal(s) Bad Quality	BOOL	0	I			
DSIG_SIM	Driver Signal(s) Simulation	BOOL	0	I			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
STA2_B10	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B11	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B12	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B13	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B14	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B15	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B16	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B17	Spare input transferred into STATUS 2	BOOL	0	I	U		
L_STA_WA	1 = startup-warning in local mode	BOOL	0	I	U		
LST_ACT	Local stop active in automatic mode	BOOL	0	I	U		
GFSO	Group fault / status off	BOOL	0	I	U		
REL_SC	Enable SIMOCODE	BOOL	0	I	U	+	
STAT_SC	Status SIMOCODE	BYTE	16#00	I	U		
PV	Process value input (general use)	STRUCT		I	U		
PV.Value	Value	REAL	0.0	I	U	+	
PV.ST	Signal Status	BYTE	16#FF	I	U		
PV_Stat	Process value status + unit	STRUCT		I	U		
PV_Stat.UNIT	Unit	STRING [8]	%	I	U	+	
PV_Stat. STATUS	Status	DWORD	16#00	I	U	+	
TEST_OSS	Must not be changed	INT	0	I	U		
MSG8_EVID	Message ID	DWORD	16#00	I	U		
COMMAND	Command word	WORD	16#00	I	U	+	
LSMONTIM	Limit switch monitoring time	INT	2	I		+	
RTMONTIM	Run-time monitoring controller	INT	90	I		+	
WAGG_NO	Wagging counter	INT	0	I	U	+	
HORN_TIM	Horn time for start-up-warning	INT	10	I		+	
KTFG	Inching release	BOOL	0	I			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
KPOS	Positioner	BOOL	0	I	U		
KSNF	Setpoint tracking	BOOL	1	I	U		
W_OS	Setpoint of OS (KWCO)	REAL	0.0	I	U	+	
KWUG	Setpoint lower limit	REAL	0.0	I	U	+	
KWOG	Setpoint upper limit	REAL	100.0	I	U	+	
KWEE	External setpoint active	BOOL	0	I	U		
KWEX	External setpoint	STRUCT		I	U		
KWEX.Value	Value	REAL	0.0	I	U	+	
KWEX.ST	Signal Status	BYTE	16#FF	I	U		
SCB	Scale beginning	REAL	0.0	I	U	+	
SCE	Scale end	REAL	100.0	I	U	+	
UNIT	Unit	STRING [8]	‚%'	I	U	+	
POS_IN	Position value 0-100	STRUCT		I	U		
POS_IN.Value	Value	REAL	0.0	I	U		
POS_IN.ST	Signal Status	BYTE	16#FF	I	U		
POS_LZ	Live-zero for position	BOOL	0	I	U		
TMIN	Min. pulse length	REAL	0.5	I	U	+	
TM	Actuator run-time	REAL	60.0	I	U	+	
AN	Switch on of the dead zone	REAL	1.0	I	U	+	
AB	Switch off of the dead zone	REAL	1.0	I	U	+	
GR_LINK1	Link to group or route	STRUCT		I			
GR_LINK1.Link	Link	INT	0	I	U		
GR_LINK1.Command	Group/ route command	WORD	16#00	I	U		
GR_LINK2	Link to group or route	STRUCT		I			
GR_LINK2.Link	Link	INT	0	I	U		
GR_LINK2.Command	Group/ route command	WORD	16#00	I	U		
MUX_LINK	Link to C_MUX	STRUCT		I			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
MUX_LINK.Point _GRL	Pointer	INT	0	I	U		
MUX_LINK.Com mand	Group/ route command	WORD	16#00	I	U		
O_LINK	Link to another object	STRUCT		I			
O_LINK. iDB	Instance DB master object	INT	0	I	U		
O_LINK iDW	DW number NO_OF_FT in master object	INT	0	I	U		
O_LINK. Command	Group/ route command	BYTE	16#00	I	U		
O_LINK. Status	Status master object	BYTE	16#00	I	U		
UserFace	Select Faceplate	ANY		I	U		
MAI_INT	Maintenance Interval	DWORD	16#00	I	U	+	
MAI_REQL	Maintenance Request Limit	DWORD	16#00	I	U	+	
RES_RTOS	Reset time for number of movements for OS	DWORD	16#00	IO	U	+	
RT_OS	Number of movements for OS	DWORD	16#00	IO	U	+	
RT_H	Run-time for MIS refreshed every hour	DWORD	16#00	IO	U	+	
CNT_OS	Counter contactor dir. 1	DWORD	16#00	IO	U	+	
CNT2_OS	Counter contactor dir. 2	DWORD	16#00	IO	U	+	
MAI_CNT	Maintenance Actual Counter in hours or starts	DWORD	16#00	IO	U	+	
CNT_TRIP	Maintenance Counter for Trips	DWORD	16#00	IO	U	+	
FT_DUR	Maintenance Fault time duration	DWORD	16#00	IO	U	+	
MAI_STA	Maintenance Status	DWORD	16# 80022	IO	U	+	
MAI_X	Maintenance Spare	DWORD	16#00	IO	U	+	
RT_OS_O	Run-time for OS	DWORD	16#00	O	U		
RT_H_O	Run-time for OS refreshed every hour	DWORD	16#00	O	U		
X_POS_OS	Damper position display	STRUCT		O	U		
X_POS_OS. Value	Value	REAL	0.0	I	U	+	
X_POS_OS. ST	Signal Status	BYTE	16#80	I	U		

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
INTFC_OS	Interface status for OS	DWORD	16#00	O	U	+	
VISU_OS	Status for symbol display	BYTE	16#00	O	U	+	
STATUS	Status word 1	WORD	16#00	O	U	+	
STATUS2	Status word 2	WORD	16#00	O	U	+	
STATUS3	Status word 3 Structure input available	DWORD	16#00	O	U	+	
ALARM	Alarm word for test	WORD	16#00	O	U		
KWUG_O	Setpoint lower limit	REAL	0.0	O	U		
KWOG_O	Setpoint upper limit	REAL	100.0	O	U		
SCB_O	Scale beginning	REAL	0.0	O	U		
SCE_O	Scale end	REAL	100.0	O	U		
W_ACT_O	Setpoint Output	STRUCT		O	U		
W_ACT_O. Value	Value	REAL	0.0	I	U		
W_ACT_O. ST	Signal Status	BYTE	16#80	I	U		
KVS1	Position 1	BOOL	0	O			
PosSig1	Position 1	STRUCT		O			
PosSig1.Value	Signal	BOOL	0	O		+	
PosSig1.ST	Signal status	BYTE	16#80	O		+	
KVS2	Logic signal 2	BOOL	0	O			
PosSig2	Position 2	STRUCT		O			
PosSig2.Value	Signal	BOOL	0	O		+	
PosSig2.ST	Signal status	BYTE	16#80	O		+	
KST1	Dynamic fault 1 (not acknowledged)	BOOL	0	O			
KST2	Dynamic fault 2 (not acknowledged)	BOOL	0	O			
SST	Fault	BOOL	0	O			
HORN	Start-up horn	BOOL	0	O			
SIM_ON	Simulation ON (driver)	BOOL	0	O			
KPO	Positioner ON	BOOL	0	O	U		

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
KB1	Command direction 1	BOOL	0	O			
KB2	Command direction 2	BOOL	0	O			
KL1	Lamp direction 1	BOOL	0	O	U		
KL2	Lamp direction 2	BOOL	0	O	U		
O_LINKQ	Link to slave objects	STRUCT		O			
O_LINKQ. iDB	Instance DB master object	INT	0	O	U		
O_LINKQ iDW	DW number NO_OF_FT in master object	INT	0	O	U		
O_LINKQ. Command	Group/ route command	BYTE	16#00	O	U		
O_LINKQ. Status	Status master object	BYTE	16#00	O	U		
MAI_REQ	Maintenance Request	BOOL	0	O	U		
MAI_AL	Maintenance Alarm	BOOL	0	O	U		
DLY_CNT	Delay Counter	INT	0	O	U		

OS-Variable table

C_DAMPER

OS Variable	Description	PLC Data Type	OS Data Type
IntStrt1#Value	Signal	BOOL	Binary variable
IntOper1#Value	Signal	BOOL	Binary variable
IntProt1#Value	Signal	BOOL	Binary variable
IntStrt2#Value	Signal	BOOL	Binary variable
IntOper2#Value	Signal	BOOL	Binary variable
IntProt2#Value	Signal	BOOL	Binary variable
REL_SC	Enable SIMOCODE	BOOL	Binary variable
PV#Value	Value	REAL	32-bit floating-point number IEEE 754
PV_Stat#UNIT	Unit	STRING [8]	Text variable 8-bit character set
PV_Stat#STATUS	Status	DWORD	Unsigned 32-bit value
COMMAND	Command word	WORD	Unsigned 16-bit value
LSMONTIM	Limit switch monitoring time	INT	Signed 16-bit value
RTMONTIM	Run-time monitoring controller	INT	Signed 16-bit value
WAGG_NO	Wagging counter	INT	Signed 16-bit value
HORN_TIM	Horn time for start-up-warning	INT	Signed 16-bit value
W_OS	Setpoint of OS (KWCO)	REAL	32-bit floating-point number IEEE 754
KWUG	Setpoint lower limit	REAL	32-bit floating-point number IEEE 754
KWOG	Setpoint upper limit	REAL	32-bit floating-point number IEEE 754
KWEX#Value	Value	REAL	32-bit floating-point number IEEE 754
SCB	Scale beginning	REAL	32-bit floating-point number IEEE 754
SCE	Scale end	REAL	32-bit floating-point number IEEE 754
UNIT	Unit	STRING [8]	Text variable 8-bit character set
TMIN	Min. pulse length	REAL	32-bit floating-point number IEEE 754
TM	Actuator run-time	REAL	32-bit floating-point number IEEE 754
AN	Switch on of the dead zone	REAL	32-bit floating-point number IEEE 754

OS Variable	Description	PLC Data Type	OS Data Type
AB	Switch off of the dead zone	REAL	32-bit floating-point number IEEE 754
MAI_INT	Maintenance Interval	DWORD	Unsigned 32-bit value
MAI_REQL	Maintenance Request Limit	DWORD	Unsigned 32-bit value
RES_RTOS	Reset time for number of movements for OS	DWORD	Unsigned 32-bit value
RT_OS	Number of movements for OS	DWORD	Unsigned 32-bit value
RT_H	Run-time for MIS refreshed every hour	DWORD	Unsigned 32-bit value
CNT_OS	Counter contactor dir. 1	DWORD	Unsigned 32-bit value
CNT2_OS	Counter contactor dir. 2	DWORD	Unsigned 32-bit value
MAI_CNT	Maintenance Actual Counter in hours or starts	DWORD	Unsigned 32-bit value
CNT_TRIP	Maintenance Counter for Trips	DWORD	Unsigned 32-bit value
FT_DUR	Maintenance Fault time duration	DWORD	Unsigned 32-bit value
MAI_STA	Maintenance Status	DWORD	Unsigned 32-bit value
MAI_X	Maintenance Spare	DWORD	Unsigned 32-bit value
X_POS_OS# Value	Value	REAL	32-bit floating-point number IEEE 754
X_POS_OS#ST	Signal status	BYTE	Unsigned 8-bit value
INTFC_OS	Interface status for OS	DWORD	Unsigned 32-bit value
VISU_OS	Status for symbol display	BYTE	Unsigned 8-bit value
STATUS	Status word 1	DWORD	Unsigned 32-bit value
STATUS2	Status word 2	DWORD	Unsigned 32-bit value
STATUS3	Status word 3 Structure input available	DWORD	Unsigned 32-bit value
PosSig1#Value	Signal	BOOL	Binary variable
PosSig1#ST	Signal status	BYTE	Unsigned 8-bit value
PosSig2#Value	Signal	BOOL	Binary variable
PosSig2#ST	Signal status	BYTE	Unsigned 8-bit value
DLY_CNT	Delay counter	INT	Signed 16-bit value

Variable details

Internal structure of the Commands, Alarms, Visualization status and Interface word:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Commandword**	**Commandword**		
COM_B20	INC_00	0	Freigabe Tippen EIN/AUS	Enable inching on/off	Op. Inp.	
COM_B21		1			Op. Inp.	
COM_B22		2			Op. Inp.	
COM_B23		3				
COM_B24	SACK	4	Einzel quittieren	Single acknowledge	Op. Inp.	
COM_B25		5				
COM_B26		6				
COM_B27		7				
COM_B10	ISD1	8	Tippen langsam Richtung 1	Inching slow direction 1		
COM_B11	ISD2	9	Tippen langsam Richtung 2	Inching slow direction 2		
COM_B12	IFD1	10	Tippen schnell Richtung 1	Inching fast direction 1		
COM_B13	IFD2	11	Tippen schnell Richtung 2	Inching fast direction 2		
COM_B14	OFF	12	STOP	OFF		
COM_B15	ON1	13	EIN Richtung 1	ON direction 1		
COM_B16	ON2	14	EIN Richtung 2	ON direction 2		
COM_B17	R_RTOS	15	Rücksetzen Zähler Anzahl Bewegungen	reset No. of operations (OIS)		
ALARM			**Alarm**	**Alarm**		
ALA_KSB		0	El. Schaltbereit	Available	AL_H	E
ALA_KVO		1	Vorort	Local	AL_H	S
ALA_KBM		2	Bimetall	Overload	AL_H	M
ALA_KM1		3	Mech. Ri1	Mechanic. dir. 1	AL_H	M
ALA_KM2		4	Mech. Ri2	Mechanic. dir. 2	AL_H	M
ALA_KDR1		5	Drehmom. Ri1	Torque dir. 1	AL_H	M
ALA_KDR2		6	Drehmom. Ri2	Torque dir. 2	AL_H	M
ALA_REP		7	Noch gestört	Still faulty	AL_H	P
VISU_OS	**dezimal**	**hex**	**für Symbol und Texte**	**for Symbol and Text**		
	1		Endlage 2	limit position 2		
	2		Endlage 1	limit position 1		
	3		Läuft in Richtung 2	moving to position 2		
	4		Läuft in Richtung 1	moving to position 1		
	5		Störung nicht quittiert	fault not acknowledged		
	6		Störung quittiert	fault ackniwledged		
	7		Keine Endlage	no limit position		
	8		Störung quittiert Endlage 1	fault acknowledged position 1		
	9		Störung quittiert Endlage 2	fault acknowledged position 2		
	10		Vorortbetrieb Endlage 2	local mode position 2		
	11		Vorortbetrieb Endlage 1	local mode position 1		
	12		Vorort läuft in Richtung 2	local mode moving to position 2		
	13		Vorort läuft in Richtung 1	local mode moving to position 1		
	14		Vorort keine Endlage	local mode no limit position		
	15		Einzelbetrieb Endlage 2	single mode position 2		
	16		Einzelbetrieb Endlage 1	single mode position 1		

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
	17		Einzelbetrieb läuft in Richt. 2	single mode moving to position 2		
	18		Einzelbetrieb läuft in Richt. 1	single mode moving to position 1		
	19		Einzelbetrieb keine Endlage	Single mode no limit position		
INTFC_OS			**Nahtstellenwort**	**Interface word**		
OS_IF_B40	KEV1	0	Einschaltverriegelung	Start interlock		
OS_IF_B41	KBV1	1	Betriebsverriegelung	Operating interlock		
OS_IF_B42	KSV1	2	Schutzverriegelung	Protection interlock		
OS_IF_B43	KDR1	3	Drehmomentendschalter	Torque switch		
OS_IF_B44	KEV2	4	Einschaltverriegelung	Start interlock		
OS_IF_B45	KBV2	5	Betriebsverriegelung	Operating interlock		
OS_IF_B46	KSV2	6	Schutzverriegelung	Protection interlock		
OS_IF_B47	KDR2	7	Drehmomentendschalter	Torque switch		
OS_IF_B30		8				
OS_IF_B31	KLOC	9	Vorortbetrieb Freigabe	Local mode release		
OS_IF_B32	KEIZ	10	Einzelbetrieb Freigabe	Single-start mode release		
OS_IF_B33	KSTB	11	Betriebsart Stand-by	Stand-by mode		
OS_IF_B34	KTFG	12	Tipp-Freigabe	Inching release		
OS_IF_B35	KPOS	13	Positionierer	Positioner		
OS_IF_B36	KWEE	14	Externer Sollwert ein	External setpoint ON		
OS_IF_B37	KSNF	15	Sollwert nachführen	Setpoint tracking		
OS_IF_B20	KWED	16	Wedelkennung	Wagging release		
OS_IF_B21	KWU1	17	Umschaltung Endschalter 1=Schliesser 0= Öffner	Changeover limit switch 1=N.O 0= N.C.		
OS_IF_B22	KWU2	18	Umschaltung Endschalter 1=Schliesser 0= Öffner	Changeover limit switch 1=N.O 0= N.C.		
OS_IF_B23	KMFR	19	Meldefreigabe	Annunciation release		
OS_IF_B24	KMZS	20	Störungsverriegelung zur Gruppe	Fault interlock to the group		
OS_IF_B25	KLP1	21	Lampen prüfen (Zusatz)	Lamp test (additional)		
OS_IF_B26	KQT1	22	Quittieren (Zusatz)	Acknowledge (additional)		
OS_IF_B27	GFSO	23	Gruppenstörung/ Zustand aus	Group fault/ status off		
OS_IF_B10	KHA1	24	Handbefehl (Tippen)	Manual command (inching)		
OS_IF_B11	KEB1	25	Befehl Ein	Command ON		
OS_IF_B12	KAB1	26	Befehl Aus	Command OFF		
OS_IF_B13	KHA2	27	Handbefehl (Tippen)	Manual command (inching)		
OS_IF_B14	KEB2	28	Befehl Ein	Command ON		
OS_IF_B15	KAB2	29	Befehl Aus	Command OFF		
OS_IF_B16		30				
OS_IF_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B40	LOC	0	Vorortbetrieb freigegeben	Local mode released		
STA_B41	EIZ	1	Einzelbetrieb freigegeben	Single-start mode released		
STA_B42	HORN	2	Anfahr-Hupe	Start-up warning		
STA_B43	KPO	3	Positionierer EIN	Positioner ON		
STA_B44	LST	4	Störung Vorort Stop	Fault local stop		
STA_B45	ULZ	5	Positionsmesswert live zero	position value live zero		
STA_B46	KST	6	Dynamische Störung	dynamic fault		
STA_B47	FT_SC	7	Störung SIMOCODE	General fault SIMOCODE		
STA_B30	KSB	8	Störung elektrische Schaltbereitschaft	Electrical availability fault		
STA_B31	KVO	9	Störung / Betriebsart Vorortschalter (Antrieb steht nicht auf Automatik)	Local fault / operating mode local switch (drive not in automatic)		
STA_B32	KBM	10	Störung Bimetall	Overload fault		
STA_B33	KSV	11	Störung Schutzverriegelung	Protection interlock fault		
STA_B34	KM1	12	Störung mechanisch Richtung 1	Mechanical fault direction 1		
STA_B35	KM2	13	Störung mechanisch Richtung 2	Mechanical fault direction 2		
STA_B36	KDR1	14	Störung Drehmoment Richtung 1	Torque fault direction 1		
STA_B37	KDR2	15	Störung Drehmoment Richtung 2	Torque fault direction 2		
STA_B20	SQT	16	Sequenz Test/Simulation	Sequence test/Simulation		
STA_B21	SST	17	Sammelstörung	fault		
STA_B22	BQU	18	Signal Störung	Bad Quality of signals		
STA_B23	KVS1	19	Position 1	Position 1		
STA_B24	KVS2	20	Position 2	Position 2		
STA_B25	STEU	21	Betriebsart Steuerung	Control mode		
STA_B26	TIPP	22	Tippbetrieb	Inching mode		
STA_B27	POSI	23	Positionierbetrieb	Positioner mode		
STA_B10	MOV_T	24	Rückmeldeüberwachung läuft	Feedback time is running		
STA_B11	SUW_T	25	Hupzeit läuft	Startup Warning time is running		
STA_B12		26				
STA_B13		27				
STA_B14		28				
STA_B15		29				
STA_B16		30				
STA_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS2			**Status**	**Status**		
STA2_B40	KWE1	0	Endstellung 1	Limit position 1		
STA2_B41	KWE2	1	Endstellung 2	Limit position 2		
STA2_B42	KSB	2	Schaltbereitschaft	El. availability		
STA2_B43	KBM	3	Bimetall	Overload		
STA2_B44	KVO	4	Vorortschalter	Local switch		
STA2_B45	KSP	5	Vorort Stopp	Local Stop		
STA2_B46	KCL	6	Vorort Richtung 1	Local Direction 1		
STA2_B47	KOP	7	Vorort Richtung 2	Local Direction 2		
STA2_B30	KB1	8	Befehl Richtung 1	Command Direction 1		
STA2_B31	KB2	9	Befehl Richtung 2	Command Direction 2		
STA2_B32		10				
STA2_B33		11				
STA2_B34		12				
STA2_B35		13				
STA2_B36		14				
STA2_B37		15				
STA2_B20	REL_SC	16	Freigabe SIMOCODE	Enable SIMOCODE		
STA2_B21	WA_SC	17	Warnung SIMOCODE	General Warning SIMOCODE		
STA2_B22	W_EX	18	Externer Sollwert	ext. Setpoint		
STA2_B23	LST_ACT	19	Vorort Stopp aktiv in Automatik	Local stop active in automatic		
STA2_B24		20				
STA2_B25		21				
STA2_B26		22				
STA2_B27	EN_INCH	23	Freigabe Tippen im Positionierbetrieb	Enable inching in position mode		
STA2_B10	STA2_B10	24	Reserve für Anwender	Spare for User adaptations		
STA2_B11	STA2_B11	25	Reserve für Anwender	Spare for User adaptations		
STA2_B12	STA2_B12	26	Reserve für Anwender	Spare for User adaptations		
STA2_B13	STA2_B13	27	Reserve für Anwender	Spare for User adaptations		
STA2_B14	STA2_B14	28	Reserve für Anwender	Spare for User adaptations		
STA2_B15	STA2_B15	29	Reserve für Anwender	Spare for User adaptations		
STA2_B16	STA2_B16	30	Reserve für Anwender	Spare for User adaptations		
STA2_B17	STA2_B17	31	Reserve für Anwender	Spare for User adaptations		

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS3			**Status**	**Status**		
STA3_B40		0	IntStrt1 angeschlossen	IntStrt1 connected		
STA3_B41		1	IntStrt2 angeschlossen	IntStrt2 connected		
STA3_B42		2	IntOper1 angeschlossen	IntOper1 connected		
STA3_B43		3	IntOper2 angeschlossen	IntOper2 connected		
STA3_B44		4	IntProt1 angeschlossen	IntProt1 connected		
STA3_B45		5	IntProt2 angeschlossen	IntProt2 connected		
STA3_B46	LINK	6	GR_LINK1 angeschlossen	GR_LINK1 connected		
STA3_B47		7	Analogwert angeschlossen	User Analog Value connected		
STA3_B30	MARK	8	Objekt markieren (Gruppenkommando)	Highlight object (group command)		
STA3_B31		9				
STA3_B32		10	KWEX angeschlossen	KWEX connected		
STA3_B33		11	POX_IN angeschlossen	POS_IN connected		
STA3_B34		12				
STA3_B35		13				
STA3_B36		14				
STA3_B37		15				
STA3_B20		16				
STA3_B21		17				
STA3_B22		18				
STA3_B23		19				
STA3_B24		20				
STA3_B25		21				
STA3_B26		22				
STA3_B27		23				
STA3_B10		24				
STA3_B11		25				
STA3_B12		26				
STA3_B13		27				
STA3_B14		28				
STA3_B15		29				
STA3_B16		30				
STA3_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
MAI_STA			**Maintenance Status**	**Maintenance Status**		
MAI_STA_B40		0	Maintenance Intervall:fest	Maintenance interval: fixed		
MAI_STA_B41		1	Maintenance Intervall: Betriebsstunden	Maintenance interval: Operating hour		
MAI_STA_B42		2	Maintenance Intervall: Starts	Maintenance Interval: starts		
MAI_STA_B43		3				
MAI_STA_B44		4	Maintenance Kommando Start	Maintenance Command: start		
MAI_STA_B45		5	Maintenance Komando Stop/Reset	Maintenance Command: stop/reset		
MAI_STA_B46		6				
MAI_STA_B47		7				
MAI_STA_B30		8	Status Alarm (Intervall überschr.))	Status Alarm (Interval exceeded))		
MAI_STA_B31		9	Status Anforderung (Anforderungswert überschr.)	Status Request (Req. Val. Exceeded))		
MAI_STA_B32		10	Status läuft (MT on)	Status Run (Maintenance on)		
MAI_STA_B33		11				
MAI_STA_B34		12				
MAI_STA_B35		13				
MAI_STA_B36		14				
MAI_STA_B37		15				
MAI_STA_B20		16	Bedienanforderng	Operation Request		
MAI_STA_B21		17	Bedienung	Operation In Progress		
MAI_STA_B22		18	Bedineung ausgeführt	Operation Completed		
MAI_STA_B23		19	Bedienung Temp (keine Bedienaktion)	Opartation Temp (No Operator Action)		
MAI_STA_B24		20				
MAI_STA_B25		21				
MAI_STA_B26		22				
MAI_STA_B27		23				
MAI_STA_B10		24				
MAI_STA_B11		25				
MAI_STA_B12		26				
MAI_STA_B13		27				
MAI_STA_B14		28				
MAI_STA_B15		29				
MAI_STA_B16		30				
MAI_STA_B17		31				

SIEMENS

Cemat V 8.2
Function Block Library ILS_CEM

Function Description Edition 07/16

Valve C_VALVE

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring to property damage only have no safety alert symbol. The notices shown below are graded according to the degree of danger.

Danger
indicates that death or severe personal injury **will** result if proper precautions are not taken.

Warning
indicates that death or severe personal injury **may** result if proper precautions are not taken.

Caution
with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution
without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention
indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel.** Within the context of the safety notices in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

Warning
This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.
Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens Aktiengesellschaft

Description of C_VALVE

Type/Number

Module name: **C_VALVE**
Module no.: **FB1007**

Calling OBs

C_VALVE must be called in OB1 (MAIN_TASK).

Function

General Function description

Module Type C_VALVE can be used to open and close pneumatic valves in a cement plant. By default the active direction is direction 2 (open). Through parameterization direction 1 (close) can be defined as active as well. The valve can be controlled in three different **operating modes**:

- In the **automatic mode** the valve is controlled through the superordinated group module.
- The **single-start mode** allows individual control via operator faceplate of the valve.
- In the **local mode** the valve can be opened and closed by the locally installed pushbuttons **VCL** (close button) and **VOP** (open button).

The following **standard signals** are monitored by the valve block:

- Limit Position **VE1** and **VE2** in conjunction with the output **VBE**
- Electrical availability **VSB**
- Local switch **VVO** (1-Signal = Remote; 0-Signal = Local)
- Local close button **VCL**
- Local open button **VOP**

If the valve is in automatic or in single-start mode <u>and</u> if the valve is in activated, a wrong status at any of the above mentioned signals leads to an **alarm message.**

If additional **protections** are available for the valve, those signals have to be linked to an Annunciation block C_ANNUNC or C_ANNUN8 in order to create an alarm. In order to deactivate the valve in case of a fault an output of the annunciation block has to be connected to the protection interlock of the valve:

- Protection interlock **VSVG** or **IntProtG**	effective in all modes

Interlocks can be used in order to enable or disable the valve operation dependent on a process condition, like "previous drive is running" or a process signal:

- Start interlock **VEVG** or **IntStart**	effective only in auto and in single-start mode
- Operating interlock **VBVG** or **IntOper**	effective only in auto and in single-start mode
- Sporadic ON/OFF **VSPO**	only in auto mode

Through **process parameters** the following values can be configured online:

- Limit switch delay time (s)	valve must not drift from limit position without command
- Runtime supervision (s)	Supervision of the Limit position open and closed
- Start delay (s)	group start command is given and IL conditions are fulfilled
- Stop delay (s)	group stop command is given
- Time for start-up warning (s)	for single-start mode and local mode (if enabled)

Visualization

In the **block icon** of the valve the most important operation status are displayed (Limit position, operating mode, fault status). Operation functions and detail information are only available after opening the **faceplate**.

Additional functions

SIMOCODE valves

If SIMOCODE is used, the communication between the valve block and the SIMOCODE can be carried out via adapter block C_SIMOS or C_SIM_AD.
An additional button in the valve faceplate opens the faceplate of the C_SIMOS in order to display the SIMOCODE details.

Sequence Test

In Sequence Test mode the Valve can be started without hardware signals. The limit switches are simulated. The hardware inputs (VSB; VVO...) are still active and have to be simulated by a test program at the beginning of OB1 Cycle.

If driver blocks are used, the Output SIM_ON of the valve can be connected to input SIM_ON of the Driver blocks to enable the simulation.

Valve active

When the valve is active, the position 2 will be reached. With parameter RI1A=1 the position 1 will be reached when the valve is active.

Please pay attention to the following signal assignments.

Parameter RI1A=0 direction 2 is active (pre setting)

Automatic

Parameter VBFE automatic start	Parameter VBFA automatic stop	VBE Output contactor	limit position switch direction 1 closed	limit position switch direction 2 opened
0	**1**	**0**	**1**	**0**
1	**0**	**1**	**0**	**1**

Single start from faceplate

button direction 2	button direction 1	VBE Output contactor	limit position switch direction 1 closed	limit position switch direction 2 opened
-----	**pressed**	**0**	**1**	**0**
pressed	**----**	**1**	**0**	**1**

Start / Stop with local buttons

Parameter VOP Local button open	Parameter VCL Local button close	VBE Output contactor	limit position switch direction 1 closed	limit position switch direction 2 opened
x	**0**	**0**	**1**	**0**
1	**1**	**1**	**0**	**1**

Please note that the push button for the non-active mode must be a normal-close contact. Parameter (VCL)

Parameter RI1A=1 direction 1 is active

Automatic

Parameter VBFE automatic start	Parameter VBFA automatic stop	VBE Output contactor	limit position switch direction 1 closed	limit position switch direction 2 opened
0	**1**	**0**	**0**	**1**
1	**0**	**1**	**1**	**0**

Single start from faceplate

button direction 2	button direction 1	VBE Output contactor	limit position switch direction 1 closed	limit position switch direction 2 opened
----	**pressed**	**1**	**1**	**0**
pressed	**----**	**0**	**0**	**1**

Start / Stop with local buttons

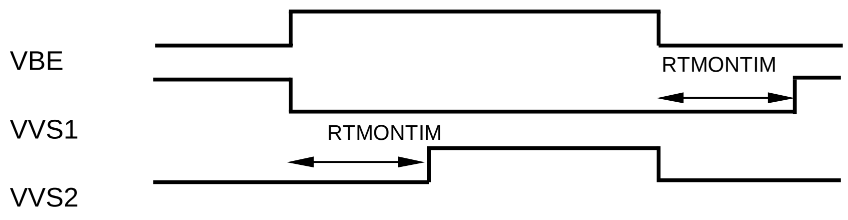
Parameter VOP Local button open	Parameter VCL Local button close	VBE Output contactor	limit position switch direction 1 closed	limit position switch direction 2 opened
1	**1**	**1**	**1**	**0**
0	**x**	**0**	**0**	**1**

Please note that the push button for the non-active mode must be a normal-close contact. Parameter (VOP)

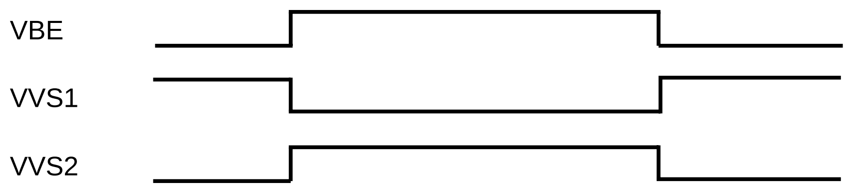
Limit position switches

If the valve has 2 limit position switches the parameters VKR1 and VKR2 have to be 0-signal. In this case the positions are monitored.

If the valve has no limit position switches the parameters VKR1 and VKR2 have to be 1-signal. In this case the logic signals (VVS1 / VVS2) will be set after the run-time monitoring time "RTMONTIM" is elapsed. If the monitoring time is set to 0, the logic signals will be set directly with the output contactor (VBE).



If the run-time monitoring time (RTMONTIM=0)



In case of a single limit position switch, parameter VKR1 and VKR2 can only be used if the non-activated limit position switch is missing. The limit switch for the active direction must be available.

- In case direction 2 is the "active" direction (parameter RI1A = 0), the limit switch for direction 2 must be available.
  If the limit position switch 1 is not available you have to set the parameter VKR1 to 1-Signal (no limit switch for direction 1).

- In case direction 1 is the "active" direction (parameter RI1A = 1), the limit switch for direction 1 must be available.
  If the limit position switch 2 is not available you have to set the parameter VKR2 to 1-Signal (no limit switch for direction 2).

Operating Principle

Hardware inputs

VE1 **Limit position 1** **Basic state 1-signal**

Format BOOL

The VE1 parameter is used to monitor the "close" limit position of the valve. A 1-signal at VE1 means that the "close" limit position has been reached.

VE2 **Limit position 2** **Basic state 0-signal**

Format BOOL

The VE2 parameter is used to monitor the "open" limit position of the valve. A 1-signal at VE2 means that the "close" limit position has been reached.

VSB **Electrical availability** **Basic state 1-signal**

Format BOOL

The VSB parameter is used to monitor the electrical availability of the valve. The electrical availability is monitored in automatic mode and in single-start mode and results in a shut down with an alarm.

VVO **Local switch** **Basic state 1-signal**

Format BOOL

The VVO parameter is used for connecting the local switch of the valve. VVO = 1-signal means Automatic position and VVO = 0-signal means Local position. No alarm signal occurs in the control room in local mode.

In position Local (VVO = 0-signal) the valve can be opened via VOP and closed via VCL.

VCL **Local direction 1** **Basic state 1-signal**

Format BOOL

The VCL parameter is used to close the valve in local mode.

VOP **Local direction 2** **Basic state 0-signal**

Format BOOL

The VOP parameter is used to open the valve in local mode.

When direction 2 is active, (parameter RI1A=0 pre setting) then parameter VCL is a normal close contact. That means the valve will be closed with 0-signal at VCL. The valve will be opened with 1-signal at VOP.

When direction 1 is active, (parameter RI1A=1) then parameter VOP is a normal close contact. That means the valve will be opened with 0-signal at VOP. The valve will be closed with 1-signal at VCL.

Caution: The local start pushbutton must remain pressed until the limit position is reached. For safety reasons, the signal is not stored.

Input interfaces

VEVG **Start interlock** **Basic state 1-signal**

Format BOOL

The valve can be operated in automatic mode or single-start mode only if the start interlock has 1-signal. 0-signal at interface VEVG prevents the start. In local mode the start interlock is not effective.

IntStart **Start Interlock**

Format STRUCT

For function description, see VEVG. This interface can be connected with a structure output as e. g. signal **RunSig** of the drive or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntStart.Value **Signal** **Basic state 1-signal**

Format BOOL

IntStart.ST **Signal status** **Default: 16#FF**

Format BYTE

VBVG **Operating interlock** **Basic state 1-signal**

Format BOOL

The valve can be operated in automatic mode or single-start mode only if the operating interlock has 1-signal. 0-signal at interface VBVG prevents the start or switches off the valve. In local mode the operating interlock is not effective.

<u>Typical application:</u>

Material transport: Only if the downstream drive is running can the valve be opened. As soon as the downstream drive fails the valve must close as well.

For this, interface VBVG must be connected with run-signal EVS of the downstream drive. The start command of group GBE goes simultaneously to both, drive and valve. As soon as the downstream drive is running the operating interlock of the valve has 1-signal and the valve is also started.

IntOper **Operation Interlock**

Format STRUCT

For function description, see VBVG. This interface can be connected with a structure output as e. g. signal **RunSig** of the previous drive or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntOper.Value **Signal** **Basic state 1-signal**

Format BOOL

IntOper.ST **Signal status** **Default: 16#FF**

Format BYTE

VSVG **Protection interlock** **Basic state 1-signal**

Format BOOL

All signals which indicate a valve fault and which are not monitored by the valve module as per standard must be connected to the protection interlock. 1-signal means status OK, 0-signal means faulty.
Interface VSVG is effective for all operating modes of the valve.

Caution: When the valve is switched off via VSVG the valve module does not generate an alarm message. There is no summarizing fault indication at the group and the protection interlock is not shown in the status call.
For the alarm message one must program an annunciation module. To connect the protection interlock one must use the output MAU of the associated annunciation module and not the input signal of the fault so that a possible time delay is taken into consideration.

IntProtG **Protection Interlock general**

Format STRUCT

For function description, see VSVG. This interface can be connected with a structure output as e. g. output **OutSig** of the annunciation block or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntProtG.Value **Signal** **Basic state 1-signal**

Format BOOL

IntProtG.ST **Signal status** **Default: 16#FF**

Format BYTE

VSPO **Sporadic ON/OFF** **Basic state 1-signal**

Format BOOL

0-Signal at interface VSPO resets the output of the valve without resetting of the command memory VKS. The valve remains activated and the output is automatically set again with 1-Signal at this interface. To stop the valve completely 1-Signal at VBFA or 0-Signal at VBVG is required. If the valve is stopped by a fault, it must be restarted through the associated group.

This interface is effective in automatic mode only. In Single start mode or local mode VSPO is not evaluated. For the change of operations mode the following has to be considered:
- If the valve is activated in Automatic mode and switched to Single start mode, it remains activated continuously (without considering VSPO).
- If the valve is activated in Single start mode and switched to Automatic mode, with the change of the operation mode VSPO is evaluated:
  If VSPO has 0-Signal the valve will be deactivated completely (reset of VKS and VBE = 0).
  If VSPO has 1-Signal, the valve will be activated sporadically.

L_STA_WA **1 = Start-up warning in local mode** **Basic state 0-signal**

Format BOOL

With 0-signal at this parameter, no start-up warning is given in local mode.
With 1-signal at this parameter, by pressing the Local start button a start-up warning is given and the output VBE is delayed by the start-up warning time HORN_TIM.

Caution: For security reasons the local start button must remain pressed until the valve has reached the limit position!

NSTP_L_A **No stop after switching local → auto** **Basic state 0-signal**

Format BOOL

This parameter is foreseen for different project-standards. 1-signal at this parameter causes no stop for running drives after switchover from local mode into automatic mode if the interlocking conditions are fulfilled.

Caution: Parameter NSTP_L_A has to be modified only after an explicit instruction from the Cemat Development.

LST_ACT **Local Stop active** **Basic state 0-signal**

Format BOOL

With 0-signal at this parameter the local-stop is not effective in automatic mode.
1-signal at this parameter enables the local stop in automatic mode too and an alarm will be created.

VLOC **Local mode release** **Basic state 0-signal**

Format BOOL

A 1-signal at this interface releases the valve for the local mode through the PLC, i.e. the valve can be opened/closed via inputs VOP and VCL. The operation mode is changed by the associated group. The group module sets in local mode signal GLO. This information is passed on to the drive module by connecting interface VLOC with signal GLO of the associated group.

In local mode operation via the PLC only protection interlock VSVG is effective. The status of interfaces VEVG and VBVG is not effective in local mode.

VEIZ **Single-start mode release** **Basic state 0-signal**

Format BOOL

A 1-Signal at this interface releases the single-start mode for the valve, i.e. the valve can be started and stopped <u>individually</u> from the central control room. The operating modes are changed by the associated group. The group module sets the single-start mode signal GES. This information is passed on to the drive module by connecting the interface VEIZ with signal GES of the associated group.

In single-start mode all interlocks of the valve are effective! Start is carried out after the set horn time (process value HORN_TIM) has expired.

VSTB **Stand-by mode** **Basic state 0-signal**

Format BOOL

In the philosophy of CEMAT-Standards only the active plant sections can generate alarm messages. This means, if a drive at stop is faulty this is indicated in the symbol at the flow mimic but there will be no alarm message.
A 1-Signal at interface VSTB means that the valve is in stand-by mode. In this mode the valve is monitored for availability. If a fault occurs in stand-by mode, an alarm message is generated.

RI1A **Normal open valve (direction 1 active)** **Basic state 0-signal**

Format BOOL

In case of a normally open valve, the controlled (active) direction is direction 1 instead of direction 2. In this case Parameter RI1A has to be set to 1-Signal.
Please also see the description under "*Valve active*" and "*Limit Position Switches*".

VKR1 **No feedback contact 1** **Basic state 0-signal**

Format BOOL

The way of working is depending on the limit switches of the valve and which direction is active. For details see chapter *“Limit position switches”*

VKR2 **No feedback contact 2** **Basic state 0-signal**

Format BOOL

The way of working is depending on the limit switches of the valve and which direction is active. For details see chapter *“Limit position switches”*

VMFR **Annunciation release** **Basic state 1-signal**

Format BOOL

With 0-signal at this interface the annunciation function is blocked.

Typical application:

In the case of a control supply voltage failure for MCC or field signals, one alarm message would be triggered for each sensor signal. To prevent this, one should connect the control voltage signal to the annunciation release interface of the appropriate modules. This causes no alarms to be generated. The cause of “control voltage failure“ is generated by an annunciation module which has to be engineered for this purpose.

Caution: If VMFR has 0-Signal the valve fault is not shown in the summarizing indication of group and route and not listed in the status call.

VMZS **Fault interlock to the group** **Basic state 0-signal**

Format BOOL

A 1-signal on VMZS prevents that the dynamic and static fault is passed to the group. In the status call the valve fault can still be seen.

GFSO **Group fault / status off** **Basic state 0-signal**

Format BOOL

1-Signal at GFSO completely deselects the valve for the Group Summarizing fault and for the Group Status Call.

VLPZ **Lamp test (additional)** **Basic state 0-signal**

Format BOOL

If one has several control desks with lamps and wants to test the lamps for each control desk separately, one can connect the corresponding lamp test signal to this interface.

Caution: Using VLPZ the lamp test interface at the C_PUSHBT module must **not** be connected.

VQIT **Acknowledge (additional)** **Basic state 0-signal**

Format BOOL

The acknowledgement of the valve fault is normally carried out together with the acknowledgement of any alarm within the same AS (default setting). Interface VQIT is only needed for individual acknowledgement (via push-button) or in case of group-wise acknowledgement.

A signal change from "0" to "1" at VQIT acknowledges the valve fault (resetting flag VST).

In case of a conventional control desk, a push-button can be connected to VQIT (for individual acknowledgement) or to the acknowledgement interface at block C_PUSHBT can be used (for AS-wise acknowledgement).

Caution: Using VQIT for individual acknowledgement, the acknowledgement interface at the C_PUSHBT must **not** be connected.

For group-wise acknowledgement connect the output ACK of the corresponding group to interface VQIT of the valve. See Engineering Manual, chapter AS-Engineering.

VBFE **Command ON** **Basic state 0-signal**

Format BOOL

Interface to start the valve in automatic mode. With 1-signal the valve is started. The interface is normally connected through the GBE signal of the associated group(s) or the WBE signal of the associated route(s).
The start is initiated either immediately or delayed according to the set start delay time (process values).

Caution: Interface VBFE should not be connected with a continuous signal as a valve fault can then not be acknowledged! If a continuous signal is required one must take care that the VBFE has signal zero in case of a fault.

VBFA **Command OFF** **Basic state 0-signal**

Format BOOL

Interface to switch off the valve in automatic mode. With 1-signal the valve is switched off. The interface is normally connected through the negated GDE signal of the associated group(s) or through the negated WDE signal of the associated route(s). The switch off is either immediately or delayed according to the set stop delay time (process values).

QSTP **Quick stop** **Basic state 0-signal**

Format BOOL

In some situations it may be necessary to stop the drives of a group instantaneously (without stop delay). The connection of interface QSTP with 1-signal results in the immediate de-energizing of the valve in automatic mode (interface VBFA may have a delaying effect).

The group module sets during quick stop the signal GQS. Interface QSTP of the drives must be connected with this signal.

DSIG_BQ **Driver Signal(s) Bad Quality** **Basic state 0-signal**

Format BOOL

If driver blocks are used, the information "one ore more driver blocks have bad quality" can be displayed in the valve faceplate and in the block icon of the valve.
In order to achieve this, the outputs QBAD of the driver blocks must be connected with an OR function to Interface DSIG_BQ.

SIG_SIM **Driver Signal(s) Simulation** **Basic state 0-signal**

Format BOOL

If driver blocks are used, the information "one or more driver blocks are switched to simulation" can be displayed in the valve faceplate and in the block icon of the valve.
In order to achieve this, the outputs QSIM of the driver blocks must be connected with an OR function to Interface DSIG_SIM.

If SIMOCODE Adapter block is used:

REL_SC **Enable SIMOCODE** **Basic state 0-signal**

Format BOOL

For drives with SIMOCODE you have to enable this function with 1-signal at this parameter. In the faceplate of the drive an additional button appears which allows to open the SIMOCODE faceplate. In the TEXT1 Variable (preset with C_SIMOS) the respective Adapter – Module can be set per instance.

STAT_SC **Status SIMOCODE** **Default: 0**

Format BYTE

For drives with SIMOCODE you have to connect this parameter with out-parameter of the adapter block "C_SIMOS".
Additional one has to enable this function with 1-signal at parameter "REL_SC".

For the adaptation of the display in the diagnostic picture:

STA2_B10 **Spare input for visualization** **Basic state 0-signal**

STA2_B10 till STA2_B17

Format BOOL

These parameter are transferred to the STATUS2 and can be used for additional purposes for e.g. in the diagnostic window.
Look at the table OS-variables.

UserFace **Select Faceplate**

Format ANY

Input UserFace can be connected to any block with an OS Interface (Faceplate). If a block is connected, an additional button "U" (User) appears in the faceplate of the valve block. With this button the Faceplate of the connected block can be opened.

Example:
In order to show the related Signals for the valve, input UserFace can be connected to block C_REL_MOD (for a list of up to 16 objects) or, if fewer signals are used, in can be directly connected to a C_INTERL, C_INTER5 or Intlk02.

Additional inputs for testing and as Interface to the OS:

TEST_OSS **Test interface** **Default: 0**

Format INTEGER

The test interfaces are only used during module development and must not be changed!

MSG8_EVID **Message ID** **Default: 16#00**

Format DWORD

Interface to OS

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

Group and Object links

Group/Route links

Each drive block, annunciation block or measurement block must be linked to a group or route in order to collect the status of these objects for summarizing indications.

The group link is essential for control and diagnosis and comprises the following functions:

- All objects, linked to the group (or route) are listed in the group (or route) object list.
- All objects, linked to the group (or route) are highlighted in the process picture with button "Show related objects".
- The faults of all objects, linked to the group (or route) are included in the summarizing fault indication of the group (or route).
- The warnings of all objects, linked to the group (or route) are included in the summarizing warning indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

A valve can be linked to two groups or routes via *GR_LINK1* and *GR_LINK2*. If a valve belongs to more than two groups or routes the additional block C_MUX must be inserted, which provides 5 additional link interfaces.

Caution: The main group (or main route) should be connected to *GR_LINK1*! This is the one which is opened with a click on button "Main group" in the valve faceplate.

GR_LINK1 Link to group or route

Format STRUCT

The GR_LINK1 interface of the valve must be connected with the R_LINK interface of the route or with the G_LINK interface of the group.

Structure variables:

GR_LINK1.Link Link Default: 0

Format INTEGER

GR_LINK1.Command Group / Route Command Default: 16#00

Format WORD

GR_LINK2 Link to group or route

Format STRUCT

If the valve belongs to two different routes or groups, the GR_LINK2 interface must be connected with the second route/group.

Structure variables:

GR_LINK2.Link Link Default: 0

Format INTEGER

GR_LINK2.Command Group / Route Command Default: 16#00

Format WORD

MUX_LINK Link to C_MUX

Format STRUCT

If the valve belongs to more than two different routes or groups, the C_MUX module must be series-connected. C_MUX has 5 inputs (GR_LINK1 to GR_LINK5) for connection with the groups/routes and one output (MUX_OUT) for connection with the MUX_LINK interface of the valve.

Caution: If a C_MUX block is used, the programming order is very important. The C_MUX must be called before the valve block!
The MUX_IN interface can under no circumstances be used for connection with a group or route. It is used exclusively for connection with another MUX module.

Structure variables:

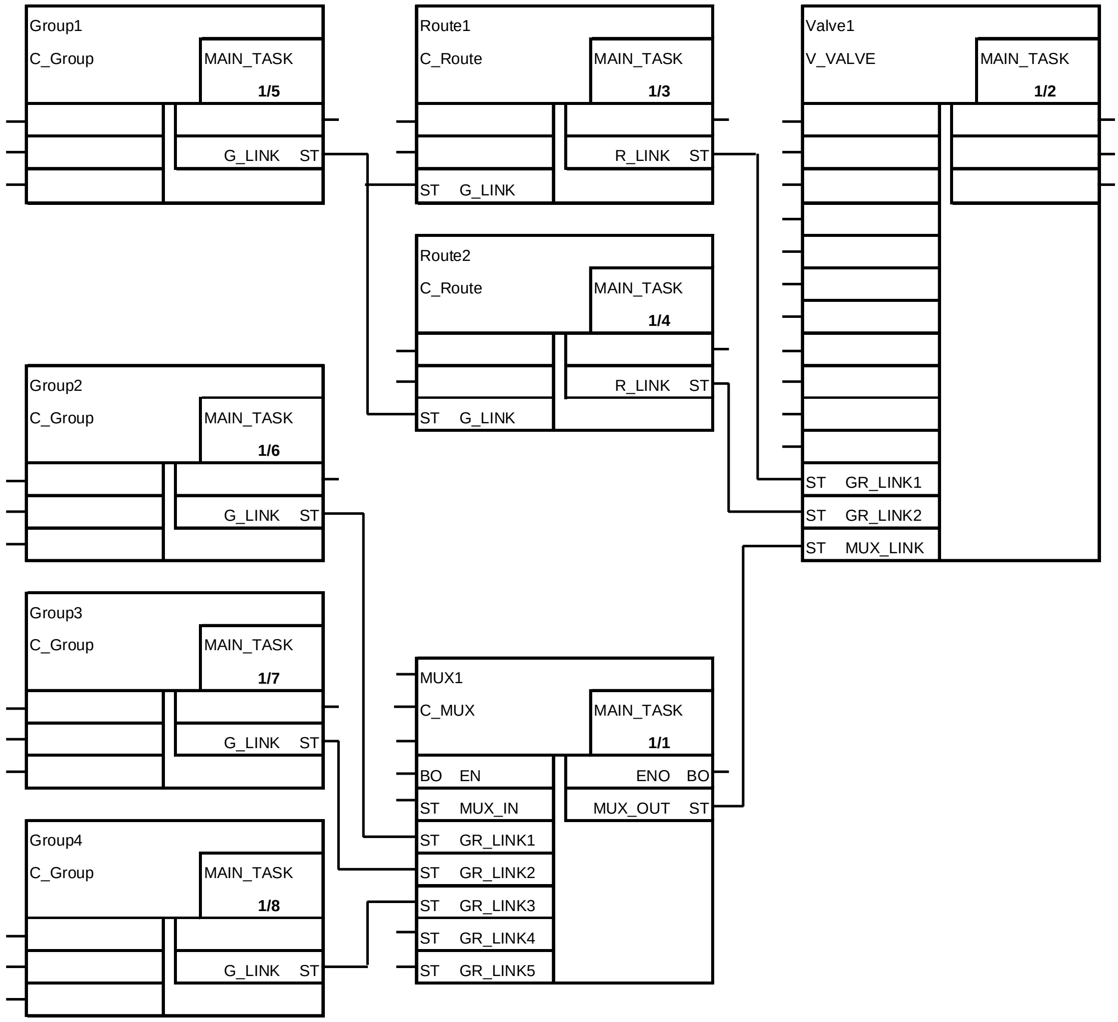
MUX_LINK.Point_GRL Pointer Default: 0

Format INTEGER

MUX_LINK.Command Group / Route Command Default: 16#00

Format WORD

Example of a circuit:

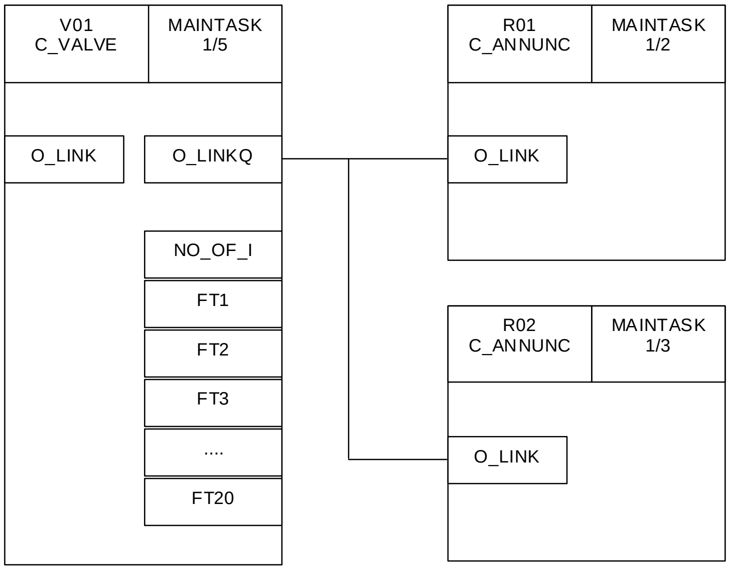


Caution: Check the runtime sequence! The C_MUX module must be called before the drive. For the other modules the run sequence is as follows: first the drives, then the associated routes and finally the associated groups.

Caution: Some people use one C_MUX block and connect its output to a number of drives/devices, annunciations and measurements.
If you do so, make sure that the C_MUX is called before all the other objects and that no other C_MUX call comes in between.
We don't recommend using the same C_MUX if the blocks are located in different runtime groups.

Object links to slave objects

Annunciations and measurements which belong to a valve must not be linked to the group (or route), if they are connected via Object link to the valve output *O_LINKQ*.



The valve block collects the information and forwards it to the group (or route). The result is as follows:

- All objects, linked to the valve are listed in the valve object list and in the group (or route) object list (one level below the valve).
- All objects, linked to the valve are highlighted in the process picture with button "Show related objects".
- The faults of all objects, linked to the valve are included in the summarizing fault indication of the group (or route).
- The warnings of all objects, linked to the valve are included in the summarizing warning indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

O_LINKQ **Link to slave object**

Format STRUCT

Valve output *O_LINKQ* must be connected to interface *O_LINK* of all allocated annunciations and measurements, while the valve itself is connected via *GR_LINK* to the group (or route).

Structure variables:

O_LINKQ.iDB **Instance DB master object**

Format INTEGER

O_LINKQ.iDW **DW number NO_OF_FT in master object**

Format INTEGER

O_LINKQ.Command **Group / Route Command**

Format BYTE

O_LINKQ.Status **Status master object**

Format BYTE

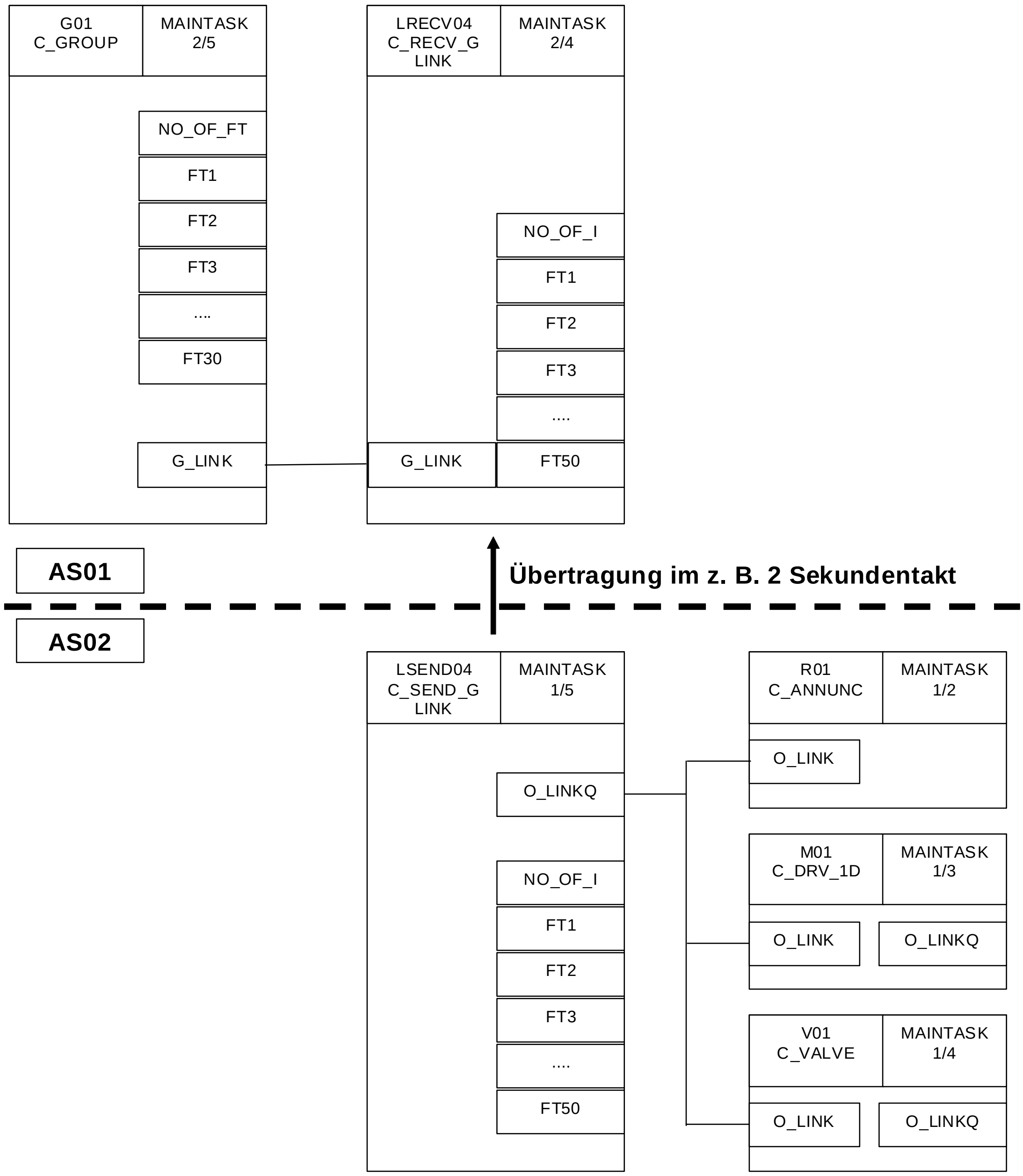
Object links to a group in a different AS

If a Cemat object is programmed in a different AS than the superordinated group a direct link between the valve and the group is not possible. In this case special send and receive blocks must be inserted which collect the object data and transmit it to the group.

In the AS of the group the group output *G_LINK* is connected to input *G_LINK* of the block C_RECV_G.

Caution: C_RECV_G can only be linked to a C_GROUP module. Linking to routes is not permitted and will not work!

In the AS of the Cemat Objects the output *O_LINKQ* of block C_SEND_G is connected to input *O_LINK* of the drives/devices, annunciations and measurements.



Caution: It is not allowed to use the Object link and the Group/Route link at the same time: If *O_LINK* is used, *GR_LINK1* and *GR_LINK2* or *C_MUX* must not be connected!

O_LINK **Link to another object**

Format STRUCT

Input interface *O_LINK* of the valve must be connected to output *O_LINKQ* of the C_SEND_G block.

Structure variables:

O_LINK.iDB	**Instance DB master object**	**Default: 0**
Format INTEGER		
O_LINK.iDW	**DW number NO_OF_FT in master object**	**Default: 0**
Format INTEGER		
O_LINK.Command	**Group / Route Command**	**Default: 16#00**
Format BYTE		
O_LINK.Status	**Status master object**	**Default: 16#00**
Format BYTE		

Caution: If annunciations or measurements belong to the valve, they don't need to be connected to output *O_LINKQ* of the C_SEND_G block.
They can also be programmed as slave objects and connected to output *O_LINKQ* of the valve.

Process values

The process values can be set during engineering and they can be changed online from the OS. To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

RTMONTIM **Run-time monitoring** **Default: 10**

Format INTEGER (0 - 999)

Value in seconds.
The valve module checks whether the required limit position has been reached within the set time. If the time is exceeded the valve module signals a run time fault. This time must be adjusted according to the true valve run time. The set time is valid for both directions (open and close).

LSMONTIM **Limit switch delay time** **Default: 0**

Format INTEGER (0 - 999)

Value in seconds.
The limit position switches are monitored. If a limit position gets lost without any command the valve will be switched off and an alarm is generated. This monitoring function is delayed by the time of LSMONTIM.

STARTDEL **Start delay** **Default: 0**

Format INTEGER (0 - 999)

Value in seconds.
In automatic mode the triggering of the valve is delayed by the set time (staggered starting). In single-start mode and in local mode this time delay is not effective!

STOPDEL **Stop delay** **Default: 0**

Format INTEGER (0 - 9999)

Value in seconds.
The stopping of the valve via interface VBFA is delayed by the set time.

HORN_TIM **Horn time for start-up warning** **Default: 10**

Format INTEGER (0 - 999)

Value in seconds.
When the valve is triggered in single-start mode a horn bit (module output) is set for the duration of the set time and the start of the valve is delayed. The horn bit can be connected to trigger a start-up warning.

Additional process parameters for Maintenance function:

MAI_INT Maintenance Interval Default: 16#00

Format DWORD

The Maintenance Interval relates, depending on the parameterization, to a fixed time value, to the operating hours or to the number of starts. If the Maintenance Interval is exceeded the output MAI_AL will be set.

MAI_REQL Maintenance Request Limit Default: 16#00

Format DWORD

The Die Maintenance Request Limit can be used in order to indicate to the operator that the Maintenance interval will be completed soon. If the Maintenance Request Limit is exceeded, the output MAI_REQ will be set.

Input/Output interfaces

RES_RTOS **Reset time RT for OS** **Default: 16#00**

Format DWORD

Interface to OS

RT_OS **Number of Movements for OS** **Default: 16#00**

Format DWORD

Interface to OS

RT_H **Run-time for OS refreshed every hour** **Default: 16#00**

Format DWORD

Interface to OS

CNT_OS **Counter contactor for OS** **Default: 16#00**

Format DWORD

Interface to OS

MAI_CNT **Maintenance Actual counter – in hours or starts** **Default: 16#00**

Format DWORD

Interface to OS

CNT_TRIP **Maintenance Counter Trips** **Default: 16#00**

Format DWORD

Interface to OS

FT_DUR **Maintenance Fault duration in sec** **Default: 16#00**

Format DWORD

Interface to OS

MAI_STA **Maintenance Status** **Default: 16#80022**

Format DWORD

Interface to OS

For more information see Variable details.

MAI_X **Maintenance Spare** **Default: 16#00**

Format DWORD

Interface to OS

Output interfaces

VVS1 **Position 1**

Format BOOL

A 1-signal means “Valve in limit position 1”.
The logic signal is mainly used for interlocking with other drives and as a feedback for the route or the group.

PosSig1 **Position 1**

Format STRUCT

For function description, see VVS1. This interface can be connected to a structure input as e. g. signal **IntOper** of the next drive.
Remark: For the feedback to the group or route you still have to use signal VVS1 because the group/route interfaces have no structure format.

Structure variables:

PosSig1.Value **Signal**

Format BOOL

PosSig1.ST **Signal status**

Format BYTE

VVS2 **Position 2**

Format BOOL

A 1-signal means "Valve in limit position 2“.
The logic signal is mainly used for interlocking with other drives and as a feedback for the route or the group.

PosSig2 **Position 2**

Format STRUCT

For function description, see VVS2. This interface can be connected to a structure input as e. g. signal **IntOper** of the next drive.
Remark: For the feedback to the group or route you still have to use signal VVS2 because the group/route interfaces have no structure format.

Structure variables:

PosSig2.Value **Signal**

Format BOOL

PosSig2.ST **Signal status**

Format BYTE

VST **Dynamic fault**

Format BOOL

When a fault occurs during the triggering of the valve or in stand-by mode the dynamic fault bit is set. It remains set until the fault is acknowledged.

Caution: In following cases the valve fault cannot be acknowledged.
- If the ON command is constantly present;
- if the valve is not in limit position 1
(corresponds to welded contactor in C_DRV_1D or C_DRV_2D)

SST **Fault**

Format BOOL

A 1-signal means that some fault is still present.

HORN **Start-up horn**

Format BOOL

This signal is set for a given time period during the starting of the valve in single-start mode and can be logically connected to trigger a start-up warning.

If L_STA_WA has 1-Signal the start-up warning is also given in local mode.

VVSP **Sporadic on (command memory is on)**

Format BOOL

A 1-signal means „valve has received a command to open in automatic mode or in single start mode“ (Command Memory is ON). The valve is opened when the interface VSPO has 1-Signal. The VVSP-signal can be used as feedback to the route or the group.

SIM_ON **Simulation ON**

Format BOOL

In Sequence Test mode SIM_ON has 1-Signal. If module drivers are used the output SIM_ON of the valve can be connected to SIM_ON of the driver block in order to switch all driver blocks to simulation mode.

Additional output for maintenance function:

MAI_REQ **Maintenance Request**

Format BOOL

The auto request value has been exceeded, which means the maintenance interval is nearly completed. This output can be connected to an annunciation block in order to generate an alarm.

MAI_AL **Maintenance Alarm**

Format BOOL

The Maintenance interval has been completed. This output can be connected to an annunciation block in order to generate an alarm.

Additional outputs for testing and as Interface to the OS:

INTFC_OS **Interface status for OS**

Format DWORD

Interface to OS

For more information see Variable details.

VISU_OS **Status for symbol display**

Format BYTE

Interface to OS

For more information see Variable details.

STATUS **Status word for OS**

Format DWORD

Interface to OS

For more information see Variable details.

STATUS2 **Status word for OS**

Format DWORD

Interface to OS

For more information see Variable details.

STATUS3 **Structure Input available**

Format DWORD

Interface to OS

For more information see Variable details.

ALARM **for Test**

Format WORD

For more information see Variable details.

DLY_CNT **Delay counter**

Format INTEGER

Interface to OS

Hardware outputs

VBE **Command ON**

Format BOOL

The VBE signal is used to trigger the valve.

VL1 **Position/fault lamp**

Format BOOL

The position/fault lamp VL1 indicates the status of the valve and can be used for the connection of an annunciation lamp (when no visualization system is present).
A continuous 1-signal indicates that the valve is fault-free and has reached the limit position 1 (closed). Rapid flashing indicates a dynamic fault (non-acknowledged) and slow flashing indicates a static fault (already acknowledged).

VL2 **Position/fault lamp**

Format BOOL

The position/fault lamp VL2 indicates the status of the valve and can be used for the connection of an annunciation lamp (when no visualization system is present).
A continuous 1-signal indicates that the valve is fault-free and has reached the limit position 2 (open). Rapid flashing indicates a dynamic fault (non-acknowledged) and slow flashing indicates a static fault (already acknowledged).

Time characteristics

The module must be called before the associated route or group.

Any called C_MUX modules must run before this module.

Message characteristics

The module uses the ALARM_8 module to generate annunciations.

A plausibility and priority logic at the process level analyses all object faults
- only one fault annunciation is issued for each fault
- secondary annunciations are suppressed automatically
- the fault source is recorded in detail and uniquely.

Still faulty message:
During start in automatic mode, any failure which inhibits the actuation of the valve leads to an interrupt of the start procedure and must therefore be reported by an alarm message.
PCS7 can create the (incoming) alarm message only once and does not support the repetition of incoming alarm messages without outgoing message. For this reason, CEMAT creates a Message “Still faulty” for any alarm message which needs to be repeated. In CEMAT Minerals Automation Standard, as additional information, the fault type is added to the “Still Faulty” information, e. g. “Available Still Faulty”.

The current operational state of the plant objects is automatically taken into consideration during the fault analysis, e.g. all fault annunciations are suppressed automatically for a stationary group
- no superfluous fault annunciations are created
- the operator does not need to manually disable/suppress any annunciations.

Each fault annunciation is also classified.
This shows whether an **electrical** or a **mechanical** fault, a **process fault** or a shut-down with a **local safety switch** applies.
- An electrician does not always need to be called first
- The production operator can give specific instructions.

Alarm archive and alarm logs show only "true" annunciations.
An annunciation release for each object means that the communication and OS are not overloaded with an "annunciation storm" - e.g. overloaded after a power failure.

Refer to the Variable details for the assignment of the annunciation text and annunciation class to the module parameters.

Module states

Variable VISU_OS:

No.	Status / Text Display	Symbol Display	Text Presentation
1	limit position 1	Gray	Black, white
2	moving to position 1	Blinking gray	Black, white
3	limit position 2	Green	Black, green
4	moving to position 2	Blinking green	Black, green
5	fault not acknowledged	Blinking red	White, red
6	fault acknowledged	Red	White, red
7	local mode position 1	Yellow	Black, yellow
8	local mode moving to position 1	Blinking yellow	Black, yellow
9	local mode position 2	Yellow	Black, yellow
10	local mode moving to position 2	Blinking yellow	Black, yellow
11	single mode position 1	Blue	Black, blue
12	single mode moving to position 1	Blinking blue	Black, blue
13	single mode position 2	Blue	Black, blue
14	single mode moving to position 2	Blinking blue	Black, blue
19	limit position 1	Green	Black, green
20	moving to position 1	Blinking green	Black, green
21	limit position 2	Gray	Black, white
22	moving to position 2	Blinking gray	Black, white
23	fault not acknowledged	Blinking red	White, red
24	fault acknowledged	Red	White, red

See also Variable details

Note: The status 19 until 24 are used when direction 1 is active.

Commands

Refer to the Variable details for the assignment of the command word.

I/O-bar of C_VALVE

C_VALVE

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
VE1	Limit position 1	BOOL	1	I			
VE2	Limit position 2	BOOL	0	I			
VSB	Electrical availability	BOOL	1	I			
VVO	Local switch	BOOL	1	I			
VCL	Local direction 1	BOOL	1	I			
VOP	Local direction 2	BOOL	0	I			
VEVG	Start interlock	BOOL	1	I			
IntStart	Start interlock	STRUCT		I			
IntStart.Value	Signal	BOOL	1	I	U	+	
IntStart.ST	Signal Status	BYTE	16#FF	I	U		
VBVG	Operating interlock	BOOL	1	I			
IntOper	Operating interlock	STRUCT		I			
IntOper.Value	Signal	BOOL	1	I	U	+	
IntOper.ST	Signal Status	BYTE	16#FF	I	U		
VSVG	Protection interlock	BOOL	1	I			
IntProtG	Protection interlock	STRUCT		I			
IntProtG.Value	Signal	BOOL	1	I	U	+	
IntProtG.ST	Signal Status	BYTE	16#FF	I	U		
VSPO	Sporadic on/off	BOOL	1	I			
VLOC	Local mode release	BOOL	0	I			
VEIZ	Single-start mode release	BOOL	0	I			
VSTB	Stand-by mode	BOOL	0	I			
RI1A	Normally open valve (Direction 1 is active)	BOOL	0	I			
VKR1	No feedback contact 1	BOOL	0	I			
VKR2	No feedback contact 2	BOOL	0	I			

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
VMFR	Annunciation release	BOOL	1	I			
VMZS	Fault interlock to the group	BOOL	0	I			
VLPZ	Lamp test (additional)	BOOL	0	I	U		
VQIT	Acknowledge (additional)	BOOL	0	I	U		
VBFE	Command ON	BOOL	0	I			
VBFA	Command OFF	BOOL	0	I			
QSTP	Quick stop	BOOL	0	I			
DSIG_BQ	Driver-Signal(s) Bad Quality	BOOL	0	I			
DSIG_SIM	Driver Signal(s) Simulation	BOOL	0	I			
STA2_B10	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B11	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B12	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B13	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B14	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B15	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B16	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B17	Spare input transferred into STATUS 2	BOOL	0	I	U		
L_STA_WA	1 = startup-warning in local mode	BOOL	0	I	U		
NSTP_L_A	No stop after switchover local → auto	BOOL	0	I	U		
LST_ACT	Local stop active in automatic mode	BOOL	0	I	U		
GFSO	Group fault / status off	BOOL	0	I	U		
REL_SC	Enable SIMOCODE	BOOL	0	I	U	+	
STAT_SC	Status SIMOCODE	BYTE	16#00	I	U		
TEST_OSS	Must not be changed	INT	0	I	U		
MSG8_EVID	Message ID	DWORD	16#00	I	U		
COMMAND	Command word	WORD	16#00	I	U	+	
RTMONTIM	Run-time monitoring	INT	10	I		+	

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
LSMONTIM	Limit switch delay time	INT	0	I		+	
STARTDEL	Start delay	INT	0	I		+	
STOPDEL	Stop delay	INT	0	I		+	
HORN_TIM	Horn time for start-up-warning	INT	10	I		+	
GR_LINK1	Link to group or route	STRUCT		I			
GR_LINK1.Link	Link	INT	0	I	U		
GR_LINK1.Command	Group/ route command	WORD	16#00	I	U		
GR_LINK2	Link to group or route	STRUCT		I			
GR_LINK2.Link	Link	INT	0	I	U		
GR_LINK2.Command	Group/ route command	WORD	16#00	I	U		
MUX_LINK	Link to C_MUX	STRUCT		I			
MUX_LINK.Point_GRL	Pointer	INT	0	I	U		
MUX_LINK.Command	Group/ route command	WORD	16#00	I	U		
O_LINK	Link to another object	STRUCT		I			
O_LINK. iDB	Instance DB master object	INT	0	I	U		
O_LINK iDW	DW number NO_OF_FT in master object	INT	0	I	U		
O_LINK. Command	Group/ route command	BYTE	16#00	I	U		
O_LINK. Status	Status master object	BYTE	16#00	I	U		
UserFace	Select Faceplate	ANY		I	U		
MAI_INT	Maintenance Interval	DWORD	16#00	I	U	+	
MAI_REQL	Maintenance Request Limit	DWORD	16#00	I	U	+	
RES_RTOS	Reset time RT for OS	DWORD	16#00	IO	U	+	
RT_OS	Number of movements for OS	DWORD	16#00	IO	U	+	
RT_H	Number of movements for OS refreshed every hour	DWORD	16#00	IO	U	+	
CNT_OS	Counter contactor for OS	DWORD	16#00	IO	U	+	
MAI_CNT	Maintenance Actual Counter in hours or starts	DWORD	16#00	IO	U	+	

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
CNT_TRIP	Maintenance Counter for Trips	DWORD	16#00	IO	U	+	
FT_DUR	Maintenance Fault time duration	DWORD	16#00	IO	U	+	
MAI_STA	Maintenance Status	DWORD	16# 0080022	IO	U	+	
MAI_X	Maintenance Spare	DWORD	16#00	IO	U	+	
RT_OS_O	Run-time for OS	DWORD	16#00	O	U		
RT_H_O	Run-time for OS refreshed every hour	DWORD	16#00	O	U		
INTFC_OS	Interface status for OS	DWORD	16#00	O	U	+	
VISU_OS	Status for symbol display	BYTE	16#00	O	U	+	
STATUS	Status word 1	DWORD	16#00	O	U	+	
STATUS2	Status word 2	DWORD	16#00	O	U	+	
STATUS3	Status word 3 Structure input available	DWORD	16#00	O	U	+	
ALARM	Alarm word for test	WORD	16#00	O	U		
VVS1	Position 1	BOOL	0	O			
PosSig1	Position 1	STRUCT		O			
PosSig1.Value	Signal	BOOL	0	O		+	
PosSig1.ST	Signal status	BYTE	16#80	O		+	
VVS2	Position 2	BOOL	0	O			
PosSig2	Position 2	STRUCT		O			
PosSig2.Value	Signal	BOOL	0	O		+	
PosSig2.ST	Signal status	BYTE	16#80	O		+	
VST	Dynamic fault (not acknowledged)	BOOL	0	O			
SST	Fault	BOOL	0	O			
HORN	Start-up horn	BOOL	0	O			
VVSP	Running signal sporadic drive	BOOL	0	O			
SIM_ON	1-signal during sequence test mode (to driver blocks)	BOOL	0	O			
VBE	Command ON	BOOL	0	O			

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
O_LINKQ	Link to slave objects	STRUCT		O			
O_LINKQ. iDB	Instance DB master object	INT	0	O	U		
O_LINKQ iDW	DW number NO_OF_FT in master object	INT	0	O	U		
O_LINKQ. Command	Group/ route command	BYTE	16#00	O	U		
O_LINKQ. Status	Status master object	BYTE	16#00	O	U		
MAI_REQ	Maintenance Request	BOOL	0	O	U		
MAI_AL	Maintenance Alarm	BOOL	0	O	U		
DLY_CNT	Delay counter	INT	0	O	U	+	
VL1	Lamp direction 1	BOOL	0	O	U		
VL2	Lamp direction 2	BOOL	0	O	U		

OS-Variable table

C_VALVE

OS Variable	Description	PLC Data Type	OS Data Type
IntStart#Value	Signal	BOOL	Binary variable
IntOper#Value	Signal	BOOL	Binary variable
IntProtG#Value	Signal	BOOL	Binary variable
REL_SC	Enable SIMOCODE	BOOL	Binary variable
COMMAND	Command word	WORD	Unsigned 16-bit value
RTMONTIM	Run-time monitoring	INT	Signed 16-bit value
LSMONTIM	Limit switch delay time	INT	Signed 16-bit value
STARTDEL	Start delay	INT	Signed 16-bit value
STOPDEL	Stop delay	INT	Signed 16-bit value
HORN_TIM	Horn time for start-up-warning	INT	Signed 16-bit value
MAI_INT	Maintenance Interval	DWORD	Unsigned 32-bit value
MAI_REQL	Maintenance Request Limit	DWORD	Unsigned 32-bit value
RES_RTOS	Reset time RT for OS	DWORD	Unsigned 32-bit value
RT_OS	Number of movements for OS	DWORD	Unsigned 32-bit value
RT_H	Number of movements for OS refreshed every hour	DWORD	Unsigned 32-bit value
CNT_OS	Counter contactor for OS	DWORD	Unsigned 32-bit value
MAI_CNT	Maintenance Actual Counter in hours or starts	DWORD	Unsigned 32-bit value
CNT_TRIP	Maintenance Counter for Trips	DWORD	Unsigned 32-bit value
FT_DUR	Maintenance Fault time duration	DWORD	Unsigned 32-bit value
MAI_STA	Maintenance Status	DWORD	Unsigned 32-bit value
MAI_X	Maintenance Spare	DWORD	Unsigned 32-bit value
INTFC_OS	Interface status for OS	DWORD	Unsigned 32-bit value
VISU_OS	Status for symbol display	BYTE	Unsigned 8-bit value
STATUS	Status word 1	DWORD	Unsigned 32-bit value
STATUS2	Status word 2	DWORD	Unsigned 32-bit value

OS Variable	Description	PLC Data Type	OS Data Type
STATUS3	Status word 3 Structure input available	DWORD	Unsigned 32-bit value
PosSig1#Value	Signal	BOOL	Binary variable
PosSig1#ST	Signal status	BYTE	Unsigned 8-bit value
PosSig2#Value	Signal	BOOL	Binary variable
PosSig2#ST	Signal status	BYTE	Unsigned 8-bit value
DLY_CNT	Delay counter	INT	Signed 16-bit value

Variable details

Internal structure of the Commands, Alarms, Visualization status and Interface word:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Commandword**	**Commandword**		
COM_B20	OFF	0	AUS	OFF	Op. Inp.	
COM_B21	ON	1	EIN	ON	Op. Inp.	
COM_B22	R_RTOS	2	Anzahl Operationen löschen	Reset No of Operations OS	Op. Inp.	
COM_B23		3				
COM_B24		4			.	
COM_B25		5				
COM_B26		6				
COM_B27		7				
COM_B10		8				
COM_B11	SACK	9	Einzel quittieren	Single acknowledge		
COM_B12		10				
COM_B13		11				
COM_B14		12				
COM_B15		13				
COM_B16		14				
COM_B17		15				
ALARM			**Alarm**	**Alarm**		
ALA_VSB	SIG1	0	El. Schaltbereit	Available	AL_H	E
ALA_VVO	SIG2	1	Vorort	Local	AL_H	S
ALA_RMF	SIG3	2	Laufzeit	Move time	AL_H	M
ALA_LST	SIG4	3	Vorort Stop	Local stop	AL_H	S
ALA_B24	SIG5	4	Endlage	Limit Position	AL_H	M
ALA_B25	SIG6	5				
ALA_B26	SIG7	6				
ALA_REP	SIG8	7	Noch gestört	Still Faulty	AL_H	P
VISU_OS	**dezimal**	**hex**	**für Symbol und Texte**	**for Symbol and Text**		
	1	1	Endlage 1	limit position 1		
	2	2	Fährt Richtung 1	moving to position 1		
	3	3	Endlage 2	limit position 2		
	4	4	Fährt Richtung 2	moving to position 2		
	5	5	Störung nicht QT	fault not acknowledged		
	6	6	Störung QT	fault acknowledged		
	7	7	Vorort Endlage 1	local mode position 1		
	8	8	Vorort fährt Richtung 1	local mode moving to position 1		
	9	9	Vorort Endlage 2	Local mode position 2		
	10	A	Vorort fährt Richtung 2	Local mode moving to position 2		
	11	B	Einzelbetrieb Endlage 1	Single mode position 1		
	12	C	Einzelbetrieb fährt Richtung 1	Single mode moving to position 1		
	13	D	Einzelbetrieb Endlage 2	Single mode position 2		
	14	E	Einzelbetrieb fährt Richtung 2	Single mode moving to position 2		

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
	19	13	Endlage 1	Position 1		
	20	14	Fährt Richtung 1	Moving to position 1		
	21	15	Endlage 2	Position 2		
	22	16	Fährt Richtung 2	Moving to position 2		
	23	17	Störung nicht QT	Fault not acknowledged		
	24	18	Störung QT	Fautl acknowledged		
INTFC_OS			**Nahtstellenwort**	**Interface word**		
OS_IF_B40	VEVG	0	Einschaltverriegelung	Start interlock		
OS_IF_B41	VBVG	1	Betriebsverriegelung	Operating interlock		
OS_IF_B42	VSVG	2	Schutzverriegelung	Protection interlock		
OS_IF_B43		3				
OS_IF_B44		4				
OS_IF_B45	VSPO	5	Sporadisch Ein/Aus	Sporadic ON/OFF		
OS_IF_B46		6				
OS_IF_B47		7				
OS_IF_B30	VLOC	8	Vorortbetrieb Freigabe	Local mode release		
OS_IF_B31	VEIZ	9	Einzelbetrieb Freigabe	Single start mode release		
OS_IF_B32	VSTB	10	Betriebsart Stand-by	Stand-by mode		
OS_IF_B33		11				
OS_IF_B34		12				
OS_IF_B35	RI1A	13	Richtung 1 ist aktiv	Direction 1 is active		
OS_IF_B36	VKR1	14	Kein Rückmeldekontakt 1	no feedback contact 1		
OS_IF_B37	VKR2	15	Kein Rückmeldekontakt 2	no feedback contact 2		
OS_IF_B20	GFSO	16	Gruppenstörung/ Zustand aus	Group fault/ status off		
OS_IF_B21	VMFR	17	Meldefreigabe	Annunciation release		
OS_IF_B22	VMZS	18	Störungsverriegelung zur Gruppe	Fault interlock to group		
OS_IF_B23		19				
OS_IF_B24		20				
OS_IF_B25		21				
OS_IF_B26		22				
OS_IF_B27	VLPZ	23	Lampen prüfen (Zusatz)	Lamp test (additional)		
OS_IF_B10	VQIT	24	Quittieren (Zusatz)	Acknowledge (additional)		
OS_IF_B11		25				
OS_IF_B12		26				
OS_IF_B13	VBFE	27	Befehl Ein	Command ON		
OS_IF_B14	VBFA	28	Befehl Aus	Command OFF		
OS_IF_B15		29				
OS_IF_B16	QSTP	30	Schnellstop	Quick stop		
OS_IF_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B40	LOC	0	Freigabe Vorort	Local mode released		
STA_B41	EIZ	1	Freigabe Einzelbetrieb	Single start mode released		
STA_B42	VVS1	2	Endlage 1	Limit Position 1		
STA_B43	VVS2	3	Endlage 2	Limit Position 2		
STA_B44	HORN	4				
STA_B45	VST	5	Störung nicht quittiert	Fault not acknowledged		
STA_B46		6				
STA_B47	VKS	7	Kommandospeicher	Command memory		
STA_B30	VSB	8	Störung elektrische Schaltbereitschaft	Electrical availability fault		
STA_B31	VVO	9	Störung Vorort	Local switch fault		
STA_B32	RMF	10	Störung Rückmeldung	Feedback fault		
STA_B33	VSV	11	Störung Schutzverriegelung	Protection interlock fault		
STA_B34	LST	12	Störung Vorort Stopp	Fault local stop		
STA_B35	LP	13	Störung Endlage	Limit position fault		
STA_B36		14				
STA_B37	FT_SC	15	Störung SIMOCODE	General fault SIMOCODE		
STA_B20	SQT	16	Sequenz Test/Simulation	Sequence test/Simulation		
STA_B21	SST	17	Sammelstörung	general fault		
STA_B22	BQU	18	Signal Störung	Bad Quality of signals		
STA_B23		19				
STA_B24	VVSP	20	Verknüpfungssignal sporadisch	Running Signal sporadic valve		
STA_B25		21				
STA_B26	ON_DLY	22	Einschaltverzögerung	ON delay		
STA_B27	OFF_DLY	23	Ausschaltverzögerung	OFF delay		
STA_B10	MOV_T	24	Rückmeldeüberwachung läuft	Feedback time is running		
STA_B11	SUW_T	25	Hupzeit läuft	Startup Warning time is running		
STA_B12		26				
STA_B13		27				
STA_B14		28				
STA_B15		29				
STA_B16		30				
STA_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS2			**Status**	**Status**		
STA2_B40	VE1	0	Endlage 1	Limit Position 1		
STA2_B41	VE2	1	Endlage 2	Limit Position 2		
STA2_B42	VSB	2	Schaltbereitschaft	El. Availability		
STA2_B43	VVO	3	Vorortschalter	Local Switch		
STA2_B44	VCL	4	Vorort Start Richtung 1	Local Start Direction 1		
STA2_B45	VOP	5	Vorort Start Richtung 2	Local Start Direction 2		
STA2_B46	VBE	6	Befehl Ein	Command ON / OFF		
STA2_B47		7				
STA2_B30		8				
STA2_B31		9				
STA2_B32		10				
STA2_B33		11				
STA2_B34		12				
STA2_B35		13				
STA2_B36		14				
STA2_B37		15				
STA2_B20	REL_SC	16	Freigabe SIMOCODE	Enable SIMOCODE		
STA2_B21	WA_SC	17	Warnung SIMOCODE	General Warning SIMOCODE		
STA2_B22		18				
STA2_B23	LST_ACT	19	Vorort Stopp aktiv in Automatik	Local stop active in automatic		
STA2_B24		20				
STA2_B25		21				
STA2_B26		22				
STA2_B27		23				
STA2_B10	STA2_B10	24	Reserve für Anwender	Spare for User adaptations		
STA2_B11	STA2_B11	25	Reserve für Anwender	Spare for User adaptations		
STA2_B12	STA2_B12	26	Reserve für Anwender	Spare for User adaptations		
STA2_B13	STA2_B13	27	Reserve für Anwender	Spare for User adaptations		
STA2_B14	STA2_B14	28	Reserve für Anwender	Spare for User adaptations		
STA2_B15	STA2_B15	29	Reserve für Anwender	Spare for User adaptations		
STA2_B16	STA2_B16	30	Reserve für Anwender	Spare for User adaptations		
STA2_B17	STA2_B17	31	Reserve für Anwender	Spare for User adaptations		

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS3			**Status**	**Status**		
STA3_B40		0	IntStart angeschlossen	IntStart connected		
STA3_B41		1	IntOper angeschlossen	IntOper connected		
STA3_B42		2	IntProtG angeschlossen	IntProtG connected		
STA3_B43		3				
STA3_B44		4				
STA3_B45		5				
STA3_B46	LINK	6	GR_LINK1 angeschlossen	GR_LINK1 connected		
STA3_B47		7				
STA3_B30	MARK	8	Objekt markieren (Gruppenkommando)	Highlight object (group command)		
STA3_B31		9				
STA3_B32		10				
STA3_B33		11				
STA3_B34		12				
STA3_B35		13				
STA3_B36		14				
STA3_B37		15				
STA3_B20		16				
STA3_B21		17				
STA3_B22		18				
STA3_B23		19				
STA3_B24		20				
STA3_B25		21				
STA3_B26		22				
STA3_B27		23				
STA3_B10		24				
STA3_B11		25				
STA3_B12		26				
STA3_B13		27				
STA3_B14		28				
STA3_B15		29				
STA3_B16		30				
STA3_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
MAI_STA			**Maintenance Status**	**Maintenance Status**		
MAI_STA_B40		0	Maintenance Intervall:fest	Maintenance interval: fixed		
MAI_STA_B41		1	Maintenance Intervall: Betriebsstunden	Maintenance interval: Operating hour		
MAI_STA_B42		2	Maintenance Intervall: Starts	Maintenance Interval: starts		
MAI_STA_B43		3				
MAI_STA_B44		4	Maintenance Kommando Start	Maintenance Command: start		
MAI_STA_B45		5	Maintenance Komando Stop/Reset	Maintenance Command: stop/reset		
MAI_STA_B46		6				
MAI_STA_B47		7				
MAI_STA_B30		8	Status Alarm (Intervall überschr.))	Status Alarm (Interval exceeded))		
MAI_STA_B31		9	Status Anforderung (Anforderungswert überschr.)	Status Request (Req. Val. Exceeded))		
MAI_STA_B32		10	Status läuft (MT on)	Status Run (Maintenance on)		
MAI_STA_B33		11				
MAI_STA_B34		12				
MAI_STA_B35		13				
MAI_STA_B36		14				
MAI_STA_B37		15				
MAI_STA_B20		16	Bedienanforderng	Operation Request		
MAI_STA_B21		17	Bedienung	Operation In Progress		
MAI_STA_B22		18	Bedineung ausgeführt	Operation Completed		
MAI_STA_B23		19	Bedienung Temp (keine Bedienaktion)	Opartation Temp (No Operator Action)		
MAI_STA_B24		20				
MAI_STA_B25		21				
MAI_STA_B26		22				
MAI_STA_B27		23				
MAI_STA_B10		24				
MAI_STA_B11		25				
MAI_STA_B12		26				
MAI_STA_B13		27				
MAI_STA_B14		28				
MAI_STA_B15		29				
MAI_STA_B16		30				
MAI_STA_B17		31				

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Cemat V 8.2
Function Block Library ILS_CEM

Function Description Edition 07/16

Adapter C_ADAPT

Safety Guidelines

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indicates that death or severe personal injury **may** result if proper precautions are not taken.

Caution

with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution

without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention

indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Technical data subject to change.

Siemens Aktiengesellschaft

Description from C_ADAPT

Type/Number

Module name: **C_ADAPT**
Module number: **FC1018**

Calling OBs

C_ADAPT must be called in OB1 (MAIN_TASK)

Function

The C_ADAPT can connect non-CEMAT modules to CEMAT groups and routes.

In the case of faults of the non-CEMAT module, this is also displayed on the collective display for group / route. When a status call is made, the TAG and the module comment from the non-CEMAT modules are displayed in the status messages window.

In the Group Instance list the non-CEMAT module is also displayed. With a double-click on the non-CEMAT module the faceplate is opened.
If the non-CEMAT block has a status word with information for "drive stopped", drive running", drive faulty", through parameterization of the configuration-file the status of the block is shown in the group instance list.

Operation principle

Input interfaces

DUMMY Pointer

Format BOOL

This input is not visible and it is not allowed to link this input. The input DUMMY will only be used for internal functions!

FAULT Pointer

Format BOOL

This input must be connected with an output of the non-CEMAT module. The output of the non-CEMAT module must have the 1-signal for a fault.
NOTE: Only FBs with an instance-DB can be interconnected.

FT_NACK Fault not acknowledged Basic state 0-signal

Format BOOL

When the non-CEMAT module has an output that indicates 1-signal for a non-acknowledged fault, you can connect this output with FT_NACK.
For 1-signal at FT_NACK, a red flashing light indicates a started group / route.

WARNING Pointer

Format BOOL

This input must be connected with an output of the non-CEMAT module. The output of the non-CEMAT module must have the 1-signal for a warning.
NOTE: Only FBs with an instance-DB can be interconnected.

WA_NACK Warning not acknowledged Basic state 0-signal

Format BOOL

When the non-CEMAT module has an output that indicates 1-signal for a non-acknowledged warning, you can connect this output with WA_NACK.
For 1-signal at WA_NACK, a yellow flashing light indicates a started group / route.

AMZS Fault locking for the group Basic state 0-signal

Format BOOL

A 1-signal on AMZS locks the display of the fault on the group fault lamp (red).

Typical application

Refer to C_DRV_1D EMZS interface.

Links

The failure of the drive is represented as a collective fault in the status display of the associated group / route. The Status Call function for group or route displays the fault details.
To ensure this function, each drive must at least be interconnected with a route or group to which it belongs with regard to signaling.

GR_LINK1 Link to group or route

Format STRUCT

The GR_LINK1 interface of the drive must be connected with the R_LINK interface of the route or with the G_LINK interface of the group.

Structure variables:

GR_LINK1.Link Link Default: 0

Format INTEGER

GR_LINK1.Command Group / Route Command Default: 16#00

Format WORD

GR_LINK2 Link to group or route

Format STRUCT

If the drive belongs to two different routes or groups, the GR_LINK2 interface must be connected with the second route/group.

Structure variables:

GR_LINK2.Link Link Default: 0

Format INTEGER

GR_LINK2.Command Group / Route Command Default: 16#00

Format WORD

MUX_LINK Link to C_MUX

Format STRUCT

If the drive belongs to more than two different routes or groups, the C_MUX module must be series-connected. C_MUX has 5 inputs (GR_LINK1 to GR_LINK5) for connection with the groups/routes and one output (MUX_OUT) for connection with the MUX_LINK interface of the drive.

Caution: The MUX_IN interface can under no circumstances be used for connection with a group or route. It is used exclusively for connection with another MUX module.

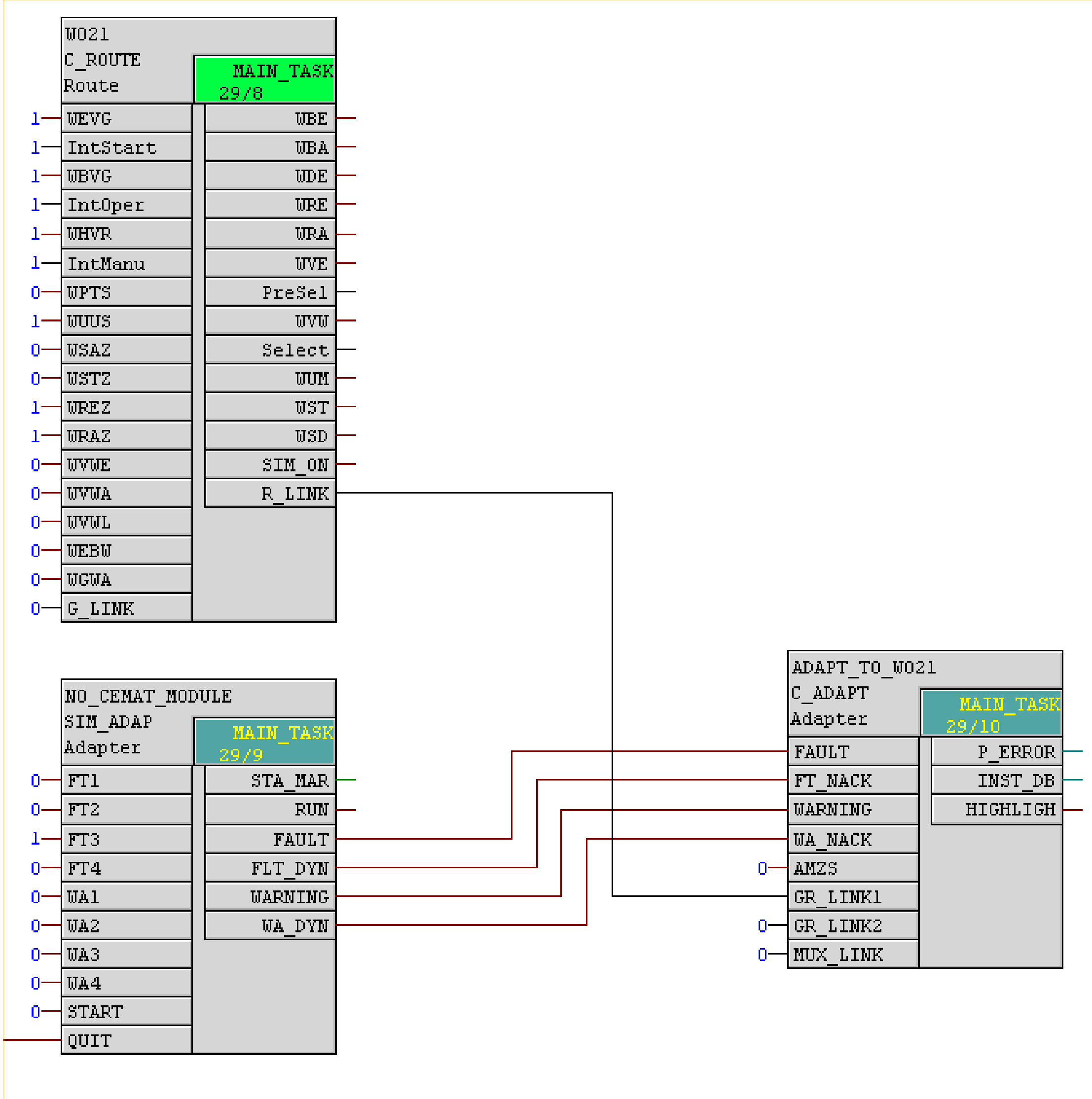
Structure variables:

MUX_LINK.Point_GRL Pointer Default: 0

Format INTEGER

MUX_LINK.Command Group / Route Command Default: 16#00

Format WORD



Example: Non-CEMAT module using C_ADAPT assigned to a CEMAT route module.

Output interfaces

P_ERROR Parameterization error

Format INTEGER

The FAULT input must be connected with an output signal of the non-CEMAT module. The non-CEMAT module must be a FB that has an instance DB.

No inputs, outputs or flags may be switched to the FAULT input, otherwise P_ERROR indicates -1.

INST_DB Instance DB of the non-CEMAT module

Format INTEGER

You may only switch signals to the FAULT input from FBs that have an instance DB. The C_ADAPT cannot recognize when you interconnect an FC. To allow you in the case of any problems to test whether the correct module has been interconnected, the C_ADAPT displays the number of the instance DB.

HIGHLIGH Highlight (mark) symbol

With faceplate button "R" (Related objects in picture), all objects linked to the group are marked for the duration of MARK_TIM. For this time also output HIGHLIGH is set to 1-signal.
If the Non-Cemat Object has a highlight function, this bit can be used in order do highlight this object through the related group.

Adaptations in the OS

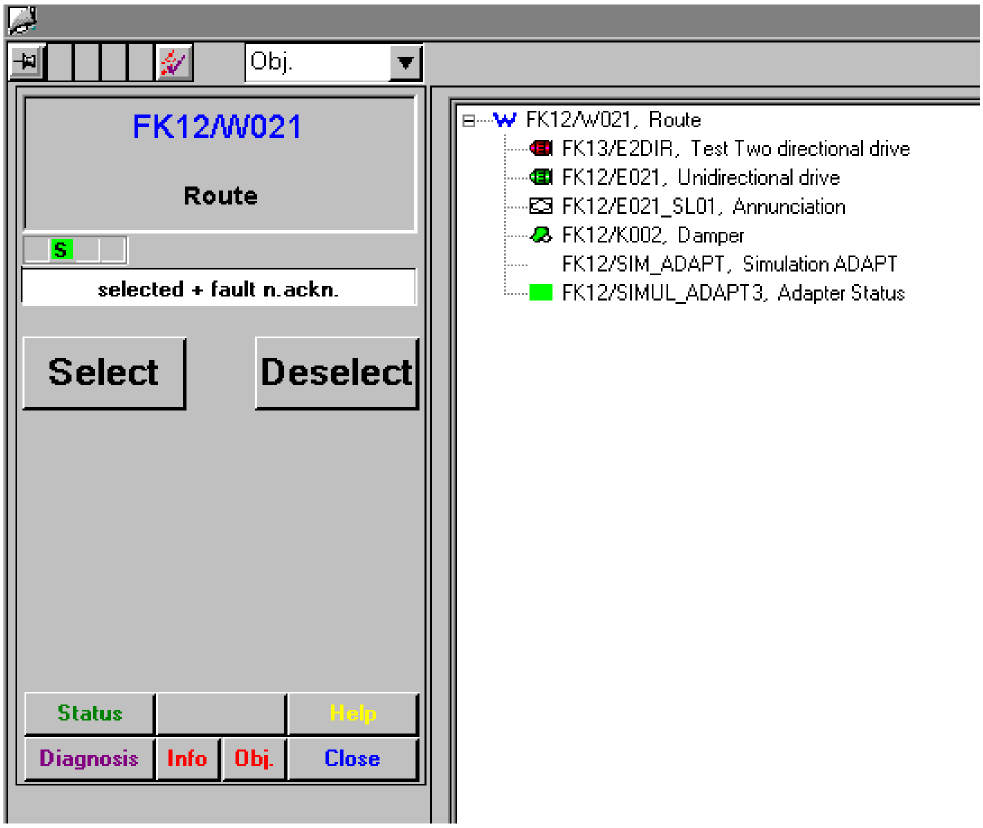
No additional parameterization is necessary to permit the display of "non-CEMAT" modules in the group "status-call" and in the "object-list".

In this case, only the plant identifier and the comment are displayed (no fault type).

But the "non-CEMAT" module must have the attributes ***S7_m_c = true***. And at least one parameter must have the attribute ***S7_m_c = true***.

Non CEMAT block with status word

When a non CEMAT block has a status word with defined bits the group status-call can display several faults in detail and the object list can display the status of the block with several colour (white = not running, green =running, red = fault).



To get this feature you have to increase the config file C_Config.cfg and you have to provide a new config file for each non CEMAT block.

The status word of the block must have the attribute ***S7_m_c = true.***

Edit CFG file

Config file for the non CEMAT block

In order to display the non-CEMAT block in the same way as a normal CEMAT, it must have a status word (16 Bit) or double word (32 Bit) which contains a bit for *running*, *summarizing fault* and for *each specific fault type*.

Example for the definition of a status word in a non-CEMAT block:

Bit No.	description	Bit No. in Config file
0		1
1		2
2		3
3		4
4		5
5		6
6		7
7		8
8		9
9		10
10		11
11		12
12		13
13		14
14		15
15		16
16	fault 1	17
17	fault 2	18
18	fault 3	19
19	fault 4	20
20	warning 1	21
21	warning 2	22
22	warning 3	23
23	warning 4	24
24	running	25
25	General fault	26
26	Fault not acknowledged	27
27	General warning	28
28	Warning not acknowledged	29
29		30
30		31
31		32

Attention: The bits in the config file are counted from 1-32.
Example: Summarizing fault = FaultBit in Config file = 26

In the Config file of the non-Cemat block, which must have the same name as the block itself (block name + Language code + Ending) the addresses are submitted which are needed for the status call function and for the instance list.

Fitting to block SIM_ADAP3, a config file with name SIM_ADAP3_009.cfg exists, which already has the proper format. This file must be copied, renamed and modified.

Example of SIM_ADAP3_009.cfg:

```
; This is an example file for an SIMATIC block of an subcontractor
; to show this object in the CEMAT Group/Route-Status

[Control]
; The name of the variable, which is an equivalent
; to the CEMAT Status variable
StatusVariableName=STA_MAR            (Parametername for Status word)

[Run]
; This section is only for the Group Instance List (GRINZ)
; Bit (1-32) from StatusVariableName for Status Run
RunBit=25
; Bit (1-32) from StatusVariableName for Status Fault
FaultBit=26
; Bit (1-32) from StatusVariableName for Status Warning
WarningBit=28

[Fault]
;Visible, Attribut,Comment,Bit,Fault Class,Warning
1,FT1,Störungstext 1,17,P,F
1,FT2,Störungstext 2,18,P,F
1,FT3,Störungstext 3,19,P,F
1,FT4,Störungstext 4,20,P,F
1,WA1,Warnungstext 1,21,P,W
1,WA2,Warnungstext 2,22,P,W
1,WA3,Warnungstext 3,23,P,W
1,WA4,Warnungstext 4,24,P,W
;End of List
```

Attention: Do not delete this line ";End of List"

A line in sector [Fault] is structured like follows.

Visible = e. g. "1" = visible (entry has to be there, but will not used)
Attribut = e. g. "FT1" = Parameter name (entry has to be there, but will not used)
Comment = e. g. "fault text 1" = Text in status call of group or route module
Bit = e. g. "17" = Bit (1-32) from Status word
Fault Class = e. g. "P" = Fault Class (entry has to be there, but will not used)
Warning = e. g. "F" = Fault (F) or Warning (W) (By a "F" the status call line will be colored red, by a "W" the status call line will be colored yellow).

Time behavior

The ADAPT module and the non-CEMAT module must be called before the associated route or group.

Any called C_MUX modules must run prior to this module.

Signal behavior

The module does not issue any messages.

Commands

There are no commands.

Display

No user interface

I/O-bar of C_ADAPT

C_ADAPT

Element	Meaning	Format	Default	Typ	Attr.	HMI	Permitted Values
DUMMY	Dummy pointer to a CFC pool DB	POINTER		I			
FAULT	Static Fault	POINTER		I			
FT_NACK	Fault not acknowledged	BOOL	0	I			
WARNING	Static Warning	POINTER		I			
WA_NACK	Warning not acknowledged	BOOL	0	I			
AMZS	Fault interlock to group	BOOL	0	I			
GR_LINK1	Link to group or route	STRUCT		I			
GR_LINK1. Link	Link	INT	0	I	U		
GR_LINK1. Command	Group/ route command	WORD	16#00	I	U		
GR_LINK2	Link to group or route	STRUCT		I			
GR_LINK2. Link	Link	INT	0	I	U		
GR_LINK2. Command	Group/ route command	WORD	16#00	I	U		
MUX_LINK	Link to C_MUX	STRUCT		I			
MUX_LINK. Point_GRL	Pointer	INT	0	I	U		
MUX_LINK. Command	Group/ route command	WORD	16#00	I	U		
P_ERROR	Parameter fault	INT	0	O			
INST_DB	Instanz-DB from not CEMAT Module	INT	0	O			
HIGHLIGH	Highlight (mark) symbol	BOOL	0	O			

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Cemat V 8.2
Function Block Library ILS_CEM

Function Description **Edition 07/16**

Annunciation Module C_ANNUNC

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Description of C_ANNUNC

Type/Number

Module name: C_ANNUNC
Module no.: FB1004

Calling OBs

C_ANNUNC must be called in OB1 (MAIN_TASK).

Function

With block C_ANNUNC a binary process signal can be displayed. The input signal is compared with the signal OKS (Signal OK) and in case of a fault a message can be created (alarm or warning).

Some of the main applications are:

<u>Drive faults:</u>

The protection signals of a motor (e.g. belt drift, pull-rope, bearing temperature etc.) cannot be signaled by the Cemat drive block itself. In this case the annunciation block is used to create the additional messages. The output of the annunciation block is used in order to stop the drive in case of a fault.

<u>Process signals:</u>

An annunciation block is used to display binary process signals such as silo levels, pressure supervisions etc. In case of a fault a message is created.

<u>Interlocking conditions:</u>

Annunciation blocks are used in order to show the interlocking conditions for groups and routes in the group/route status call. These can be interlocks through process signals as well as "internal" interlocking conditions, such as route selections or the operation status of another group.

Read Process signal:

The annunciation block has 2 input channels, a structure input and a binary input. The structure input has higher priority, which means if the structure input is connected the binary input is not evaluated any more.

Via the binary input MST0 a binary signal can be read. MST0 can be connected with a hardware input or with any value in BOOL format (e. g. the output of a PCS7 driver block).

Via the structure input PV the process value can be read as structure. (The driver blocks of the APL Library provide a structure output which contains the value in BOOL format and the signal status.)

Evaluation of the signal quality:

With a direct connection to the hardware input no information about the quality of the signal is available. The quality code is preset to "valid value".

If the driver block CH_DI is used certain connections between driver block and annunciation block are required (see below). The driver block delivers the information of the quality code which has to be connected to input QUALITY of the annunciation block.

The driver block Pcs7DiIn provides the signal status in the structure. If the Structure variable ST contains value 16#00, the value is invalid.

In the block symbol and in the faceplate the signal status is shown. The code is additionally displayed in the diagnosis window.

Output of the Process signal:

If the signal is not suppressed or delayed by parameterization of the block, the input value is available at output MAU and at the structure output OutSig.

Exception: In case of warnings only the output Warn is set because warnings should not influence the process.

All further functions are optional and can be defined through corresponding parameterization of the block parameters.

Signal evaluation:

The input signal is compared with the OK-Signal OKS. If the input value is not equal to OKS this means faulty. In this case dependent on the parameterization of the block an alarm or a warning is created.

The display and alarm behavior of the block can be configured through parameterization:

- The outputs can be delayed for incoming and for outgoing faults using parameter IN_DEL and OUT_DEL.
- In order to achieve for the protections signals of a drive the same message behavior as for the faults which are annunciated by the drive itself, the alarms can be triggered via interface MAAT.
- With interface MAMV alarms and dynamic faults can be suppressed in general. (In case of a fault the block shows only static indications).
  This behavior can be desired during the start-up or for non running equipment.
- The annunciation release MMFR can be used in order to prevent an onrush of messages in case of power failure. As long as MMFR has 0-Signal the message generation in the block is frozen and neither incoming nor outgoing messages are created.
- Via interface MMZS the block can be deselected for the summarizing indication in group and route. In the status call the fault and warnings can still be seen.
- Via interface GFSO the block can also be deselected form the summarizing indication in group and route. In this case the block faults and warnings are not entered in the status call.
- Important messages can be repeated. This is done through configuration of an annunciation repeat time REP_TIM.
- Via parameter WMOD the block can be configured in order to give warnings instead of fault messages. The warnings have no influence on the block outputs.
- Via configuration of the delay time WARN_DEL, in case of a fault the block generates first a warning message and then an alarm message (after the time has elapsed).
  Two-level-alarms are given if the connected drive is already running.
- Via parameter MTRIP it can be decided to memorize the fault until the acknowledgement.

Release, block or simulation functions:

Under certain circumstances it can be necessary to suppress the supervision completely. Here fore the annunciation block has different options:

- Via interface RELS the complete supervision can be enabled or disabled. If the supervision is disabled, the fault bit is reset.
  The enable can be delayed via timer REL_DEL, e. g. suppress faults in the start-up phase of a motor.
- If the block is switched to simulation, instead of the input value the simulation value is displayed and transferred to the output MAU and structure output OutSig.
  The change to simulation is carried out via diagnosis window or automatically if the AS is switched to sequence test mode.

Message Classes:

<u>Alarm:</u>

By default setting the annunciation block creates (red) fault messages (Alarm High).

<u>Two-level-alarm (Warning before Alarm):</u>

This option exists only for drive faults and only in case the motor is already running. If al fault occurs a warning is created first and only if the fault stays longer than a specified time it leads to a fault message + switch off of the drive (e. g. in case of drift switches).
If the fault exists at the moment of drive start, no warning message is created and the fault message is created immediately.

<u>Warning:</u>

By switching parameter WMOD to 1-Signal the annunciation block will always create warning messages. In warning mode no two-level-alarming is possible.

Operating principle

Input interfaces

MST0 **Input Signal** **Basic state 0-signal**

Format BOOL

When this interface changes its state unequal to OKS an alarm is generated. If a time delay is set for response, then the output signal MAU and the alarm are delayed by this time. If a time delay is set for dropout, then the output signal and the outgoing message are delayed by this time.

OKS Signal status for OK	MST0/PV.Value Input signal	Alarm	MAU Output signal
0	0	no	0
0	1	yes	1
1	1	no	1
1	0	yes	0

Caution: If the structure input PV is connected, MST0 will not be evaluated any more

QUALITY **Quality Code of the driver** **Default: 16#FF**

Format BYTE

If Driver blocks CH_DI are used, the output QUALITY of the driver block must be connected to Interface QUALITY of the annunciation block.
With Quality Code = 16#FF (or Quality code 16#99 for migrated projects) the annunciation block knows that no driver block exists.

PV **Input Signal**

Format STRUCT

The function of structure variable PV.Value corresponds to MST0. Structure variable PV.ST contains the quality code. Interface PV can be connected with a structure output as e. g. the output of a PCS7 driver block Pcs7DiIn.

The structure input PV has higher priority than input MST0.

Structure variables:

PV.Value **Value** **Basic state 1-signal**

Format BOOL

PV.ST **Signal status** **Default: 16#FF**

Format BYTE

OKS **OK-Signal** **Basic state 0-Signal**

Format BOOL

This input can be used to define the fault-free status of the input signal (input signal OK). See table above.

The setting of OKS must be always "0" or always "1". A dynamical change of OKS-Status during the operation is not permitted.

RELS **Release Supervision** **Basic state 1-Signal**

Format BOOL

Only if input RELS has 1-Signal the supervision function of the annunciation block is released.
0-Signal blocks the supervision functions which means output MAU shows the good condition, Structure Variable Warn.Value has 0-Signal and no message is generated.
The supervision function can additionally be delayed via parameter REL_DEL.

Example Pressure supervision:
A pressure supervision should only be active after the pump which generates the pressure has been started for some time. By connecting the Running signal of the motor to input RELS of the annunciation block, output MAU remains in good condition as long as the drive is not running.

Caution: Simulation has the highest priority. If the simulation is enabled for the annunciation block, the supervision is automatically released.

MSIG **Process Signal** **Basic state 0-Signal**

Format BOOL

With this interface the annunciation block is able to show additionally to the fault also the actual status of the process signal. 1-Signal at interface MSIG and no fault switches the OS Symbol to green color.

Typical Application:
Pressure switches. As soon as the Supervision is released (e. g. Motor running), the missing oil pressure leads to a red indication. Connecting the pressure signal to MSIG changes the display to green as soon as the oil pressure is available.

no fault, no pressure	white
no fault, pressure ok	green
unacknowledged fault	red blinking
acknowledged fault	red

REL_SIM_ON **Simulation On** **Basic state 0-Signal**

Format BOOL

The enable for simulation can be switched on/off only from Diagnostic Picture. When using drivers the output SIM_ON of the annunciation block has to be connected to input SIM_ON of the driver block.

Caution: REL_SIM_ON is no block parameter

MAMV **Alarm interlock** **Basic state 1-signal**

Format BOOL

If a 0-signal is connected to this interface, the alarm, the horn and the blinking at the group fault lamp are suppressed. In this case the group fault lamp indicates continuous red. When making a status call this fault is indicated there.

Typical application:

If under stand still conditions of a group an affiliated annunciation module should not generate an alarm, one can connect MAMV with GRE. If there is a fault it is indicated by a continuous red at the group fault lamp. With the status call one can look for the cause. As soon as the group is running completely the alarms become active.

MAAT **Alarm activation** **Basic state 1-signal**

Format BOOL

The protection interlock (ESV, KSV, VSV) is not annunciated by the respective drive module. For each signal (e.g. pull-rope, belt drift etc.) one has to program an annunciation module which annunciates these events.

Connecting interface MAAT with signal EST (KST, VST) of the motor insures that the fault messages created by the annunciation block react in the same way as messages created by the motor block itself:

- No alarm if the drive is stopped
- If the fault already exists, every restart of the drive leads to a new fault message.

The activation of the message in the restart of a drive is essential; otherwise it can lead to a dynamic fault of the drive without any additional information about the kind of fault.

In the warning mode interface MAAT is not evaluated, in this case the warning message is created only once!

Caution: In the AS wide acknowledgement the faults are acknowledged automatically with the acknowledgement of the alarm in the alarm line. If no alarm is present, fault acknowledgement is not possible.

WMOD **Warning Mode (1 = Warning, 0 = Fault)** **Basic state 0-signal**

Format BOOL

With 1-Signal at WMOD the annunciation block is configured to generate warning messages (yellow) instead of alarm messages. The fault text for the warning must be inserted in SIG2 of the message definition.
In the warning mode two-level-alarm is not possible and for this reason parameter WARN_DEL is not relevant.
Alarm repetition is also not possible in warning mode and parameter REP_TIM is ignored.
The Alarm activation is not evaluated in Warning Mode.

Caution: WMOD must be connected with a continuous 1-Singal or continuous 0-Signal. It must not be connected by a logic.

AWAN **Activate Warning** **Basic state 0-signal**

Format BOOL

This parameter is used when two-level-alarming is required. Connect this parameter with the running signal EVS of the drive.
Only if the drive is already running, in case of a fault a warning message is created first and after a delay time the fault message is created. If the fault is present at the moment of drive start, the fault message is created immediately.

In Holcim Standard no running signal EVS is generated in single start mode. If you want to have a two-level-alarm also in single start mode the interface AWAN must be connected with an AND logic:

A	R	(Contactor Feedback)
AN	LOCAL	(Drive in local mode)

MMFR **Annunciation release** **Basic state 1-signal**

Format BOOL

With 0-signal at this interface the annunciation function is blocked. **Caution:** Module output MAU and thus the signal for interlocking is still effective.

<u>Typical application:</u>

In the case of a control supply voltage failure for MCC or field signals, one alarm message would be triggered for each sensor signal. To avoid this, one should connect the control voltage signal to the annunciation release interface. This results in no alarm being produced. An annunciation module must be configured to report the “control voltage failure“ cause.

Caution: If MMFR has 0-Signal the annunciation fault is not shown in the summarizing indication of group and route and not listed in the status call.

MMZS **Fault interlock to the group** **Basic state 0-signal**

Format BOOL

A 1-signal on MMZS prevents that the dynamic and static fault is passed to the group. The GBE is not effected by this fault when the group is started.
If one does not want to indicate a fault with the annunciation module but an interlock, then MMZS must be connected with a 1-signal. The alarm in the annunciation line appears like a fault but then indicates the interlock.

GFSO **Group fault / status off** **Basic state 0-signal**

Format BOOL

1-Signal at GFSO completely deselects the annunciation block for the Group Summarizing fault <u>and</u> for the Group Status Call.

MTRIP **Memorize trip** **Basic state 0-signal**

Format BOOL

Some process signals (e. g. pressure signals) immediately change to good condition after the trip. In this case the drive which was stopped by protection interlock does not show any fault after switching off. Even in the status call the fault is not visible any more.

With 1-Signal at input MTRIP the trip is memorized. The output MAU remains faulty and fault bit MS0 remains set until the annunciation block gets acknowledged.

Caution: If the annunciation repetition time is set and the fault is not yet acknowledged, the repetition of the alarm acknowledges the fault automatically.

MLPZ **Lamp test (additional)** **Basic state 0-signal**

Format BOOL

If one has several control desks with lamps and wants to test the lamps for each control desk separately, one can connect the corresponding lamp test signal to this interface.

Caution: Using MLPZ the lamp test interface at the C_PUSHBT module must **not** be connected.

MQIT **Acknowledge (additional)** **Basic state 0-signal**

Format BOOL

The acknowledgement of the annunciation block fault is normally carried out together with the acknowledgement of any alarm within the same AS (default setting). Interface MQIT is only needed for individual acknowledgement (via push-button) or in case of group-wise acknowledgement.

A signal change from "0" to "1" at MQIT acknowledges the annunciation block fault.

In case of a conventional control desk, a push-button can be connected to MQIT (for individual acknowledgement) or to the acknowledgement interface at block C_PUSHBT can be used (for AS-wise acknowledgement).

Caution: Using MQIT for individual acknowledgement, the acknowledgement interface at the C_PUSHBT must **not** be connected.

For group-wise acknowledgement connect the output ACK of the corresponding group to interface MQIT of the annunciation block. See Engineering Manual, chapter AS-Engineering.

GR_STP **Group is stopped (only Holcim)** **Basic state 0-signal**

Format BOOL

In the Holcim Standard, if the group is stopped, the status indication of an annunciation block in case of a fault is "not ready" (violet). For this reason the annunciation block must know that the group has not been started. To achieve this, the output GR_STP of the group must be connected to input GR_STP of the annunciation block.

Additional inputs for testing and as Interface to the OS:

TEST_OSS **Test interface** **Default: 0**

Format INTEGER

The test interfaces are only used during module development and must not be changed!

MSG8_EVID **Message ID** **Default: 16#00**

Format DWORD

Interface to OS

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

Group and Object links

Group/Route links

Each drive block, annunciation block or measurement block must be linked to a group or route in order to collect the status of these objects for summarizing indications.

The group link is essential for control and diagnosis and comprises the following functions:

- All objects, linked to the group (or route) are listed in the group (or route) object list.
- All objects, linked to the group (or route) are highlighted in the process picture with button "Show related objects".
- The faults of all objects, linked to the group (or route) are included in the summarizing fault indication of the group (or route).
- The warnings of all objects, linked to the group (or route) are included in the summarizing warning indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

An annunciation block can be linked to two groups or routes via *GR_LINK1* and *GR_LINK2*. If an annunciation block belongs to more than two groups or routes the additional block C_MUX must be inserted, which provides 5 additional link interfaces.

Caution: The main group (or main route) should be connected to *GR_LINK1*! This is the one which is opened with a click on button "Main group" in the faceplate of the annunciation block.

An Annunciation block which belongs to a drive can be connected to the drive via interface *O_LINK* instead of the connection to the group or route vie *GR_LINK1* and *GR_LINK2* or via C_MUX. The main group (or main route) information is not available in this case.

Caution: It is not allowed to use the Object link and the Group/Route link at the same time: If *O_LINK* is used, *GR_LINK1* and *GR_LINK2* or *C_MUX* must not be connected!

GR_LINK1 **Link to group or route**

Format STRUCT

The GR_LINK1 interface of the annunciation module must be connected with the R_LINK interface of the route or with the G_LINK interface of the group.

Structure variables:

GR_LINK1.Link **Link** **Default: 0**

Format INTEGER

GR_LINK1.Command **Group / Route Command** **Default: 16#00**

Format WORD

GR_LINK2 **Link to group or route**

Format STRUCT

If the annunciation module belongs to two different routes or groups, the GR_LINK2 interface must be connected with the second route/group.

Structure variables:

GR_LINK2.Link **Link** **Default: 0**

Format INTEGER

GR_LINK2.Command **Group / Route Command** **Default: 16#00**

Format WORD

MUX_LINK **Link to C_MUX**

Format STRUCT

If the annunciation module belongs to more than two different routes or groups, the C_MUX module must be series-connected. C_MUX has 5 inputs (GR_LINK1 to GR_LINK5) for connection with the groups/routes and one output (MUX_OUT) for connection with the MUX_LINK interface of the annunciation module.

Caution: If a C_MUX block is used, the programming order is very important. The C_MUX must be called before the annunciation block!
The MUX_IN interface can under no circumstances be used for connection with a group or route. It is used exclusively for connection with another MUX module.

Structure variables:

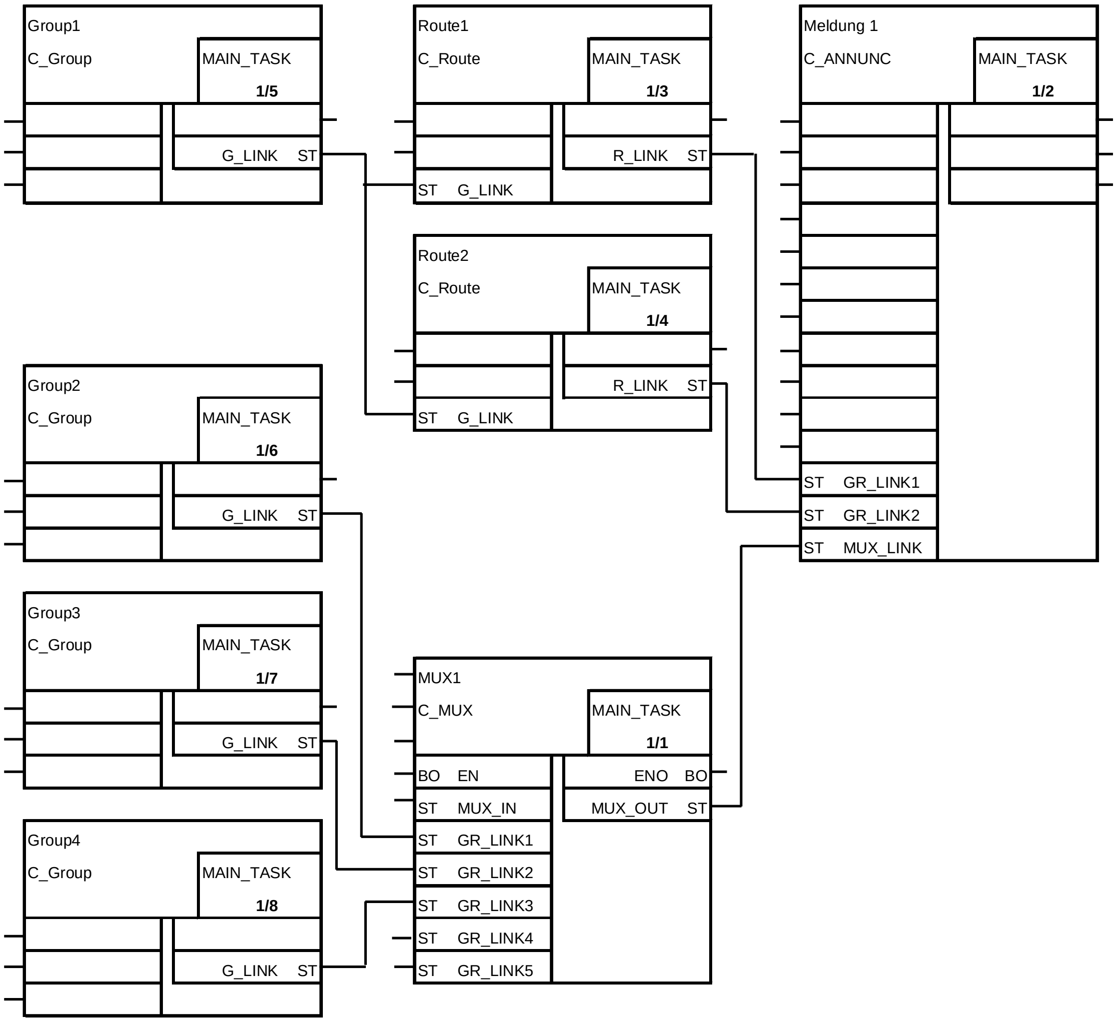
MUX_LINK.Point_GRL **Pointer** **Default: 0**

Format INTEGER

MUX_LINK.Command **Group / Route Command** **Default: 16#00**

Format WORD

Example of a circuit:

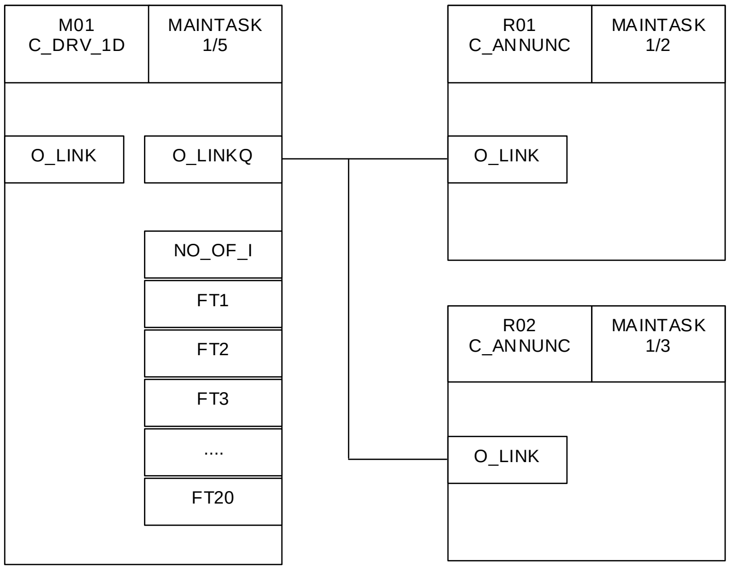


Caution:	Check the runtime sequence! The C_MUX module must be called before the annunciation module. For the other modules the run sequence is as follows: first the annunciations, measured values and drives, then the associated routes and finally the associated groups.

Caution:	Some people use one C_MUX block and connect its output to a number of drives/devices, annunciations and measurements. If you do so, make sure that the C_MUX is called before all the other objects and that no other C_MUX call comes in between. We don't recommend using the same C_MUX if the blocks are located in different runtime groups.

Object links to master objects

Annunciations, measurements and process feedback blocks which belong to a drive must not be linked to the group (or route), if they are connected via Object link to the drive output *O_LINKQ*.



The drive block collects the information and forwards it to the group (or route). The result is as follows:

- All objects, linked to the drive are listed in the drive object list and in the group (or route) object list (one level below the drive).
- All objects, linked to the drive are highlighted in the process picture with button "Show related objects".
- The faults of all objects, linked to the drive are included in the summarizing fault indication of the group (or route).
- The warnings of all objects, linked to the drive are included in the summarizing warning indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

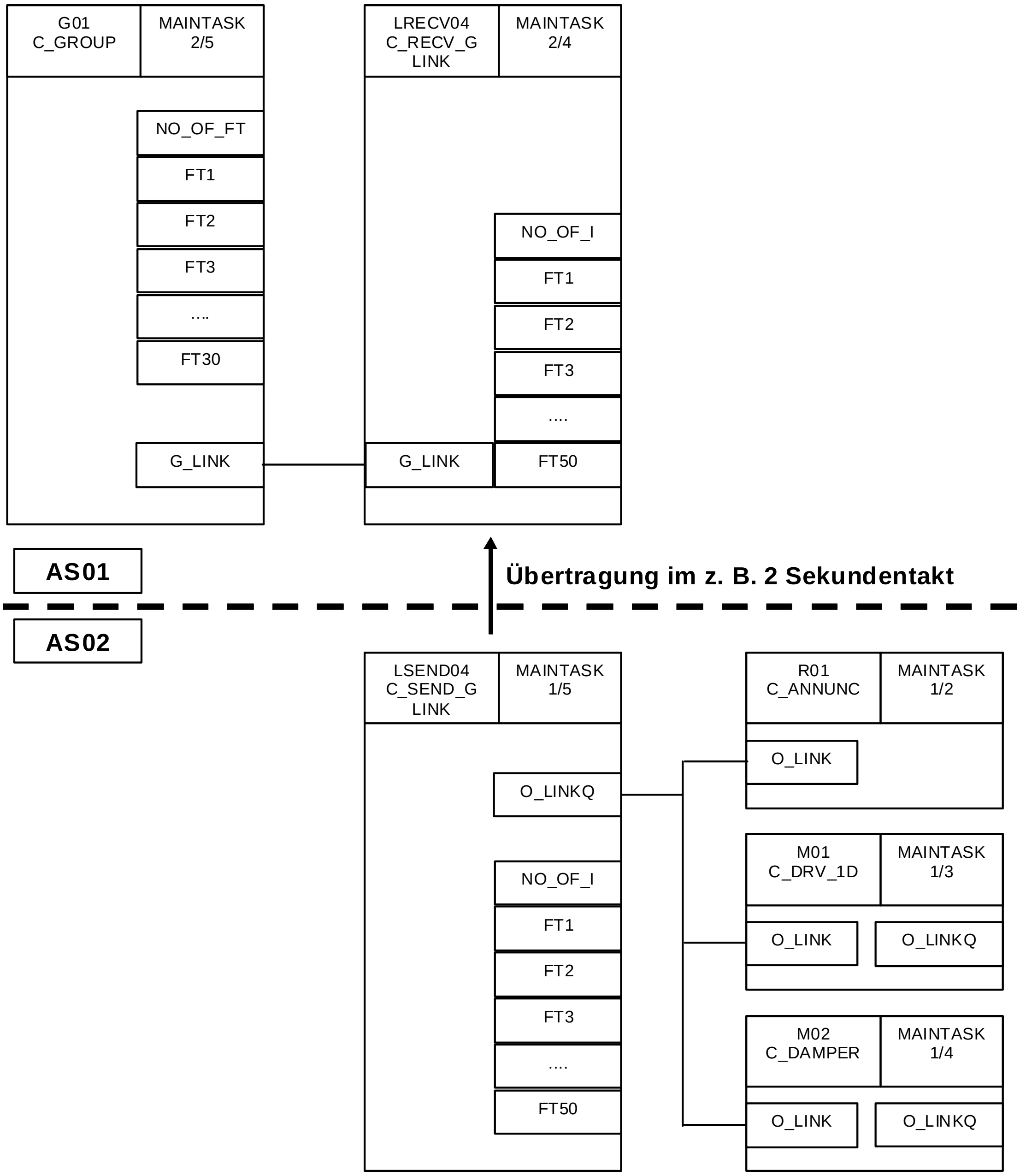
Object links to a group in a different AS

If a Cemat object is programmed in a different AS than the superordinated group a direct link between the annunciation block and the group is not possible. In this case special send and receive blocks must be inserted which collect the object data and transmit it to the group.

In the AS of the group the group output *G_LINK* is connected to input *G_LINK* of the block C_RECV_G.

Caution:	C_RECV_G can only be linked to a C_GROUP module. Linking to routes is not permitted and will not work!

In the AS of the Cemat Objects the output *O_LINKQ* of block C_SEND_G is connected to input *O_LINK* of the drives/devices, annunciations, measurements and process feedback blocks.



O_LINK **Link to another object**

Format STRUCT

Interface *O_LINK* of the annunciation block is used for the link to a master object (drive/device) or for the link to the group of a different AS via C_SEND_G.

<u>Link to a master object:</u>

Output *O_LINKQ* of the drive/device must be connected to interface *O_LINK* of the allocated annunciations, measurements and process feedback blocks, while the drive/device itself is connected via *GR_LINK* to the group (or route).

<u>Link to the group of a different AS:</u>

Output *O_LINKQ* of the send block C_SEND_G must be connected to interface *O_LINK* of the allocated annunciations, measurements and process feedback block.

Caution: If annunciations, measurements or process feedback blocks belong to the drive, they don't need to be connected to output *O_LINKQ* of the C_SEND_G block. They can also be programmed as slave objects and connected to output *O_LINKQ* of the drive.

Structure variables:

O_LINK.iDB **Instance DB master object** **Default: 0**

Format INTEGER

O_LINK.iDW **DW number NO_OF_FT in master object** **Default: 0**

Format INTEGER

O_LINK.Command **Group / Route Command** **Default: 16#00**

Format BYTE

O_LINK.Status **Status master object** **Default: 16#00**

Format BYTE

Process values

The process values can be set during engineering and they can be changed online from the OS. To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

REL_DEL **Release supervision delay time** **Default: 0**

Format INTEGER (0 - 999)

Value in seconds.
With the release of the supervision function (RELS = 1-Signal) the delay time REL_DEL is started. After this time has elapsed the supervision of the input signal is activated. See description for RELS.

IN_DEL **Signal delay on activation** **Default: 0**

Format INTEGER (0 - 999)

Value in seconds.
During signal change from 0 to 1 signal output MAU and the alarm message are delayed by the set time.

⚠ **Caution:** Beside the configuration of the process value, parameter IN_DEL has an additional function:
Via Object Property "Identifier" the fault text for status call can be entered (max. 16 characters).
After the OS compile this text string is available as an internal variable in the tag management and it will be displayed as "fault text" in the status call.
See also description 06_AS_Engineering, connect and parameterize blocks.

OUT_DEL **Signal delay on dropout** **Default: 0**

Format INTEGER (0 - 999)

Value in seconds.
During signal change from 1 to 0 the signal output MAU and the outgoing message are delayed by the set time.

WARN_DEL **Delay between warning and alarm message** **Default: 0**

Format INTEGER (0 - 999)

Value in seconds.
In case of two-level-alarming the time delay between warning and alarm has to be set at parameter WARN_DEL. After the time delay has been elapsed the status of the input MST0 will be transferred to the output MAU.

⚠ The time delay is only considered if input AWAN has 1-Signal (corresponding drive is running).
In the start-up of a drive no warning is created and a fault leads immediately into a fault message.

REP_TIM **Annunciation repetition time** **Default: 0**

Format INTEGER (0 - 9999)

Value in seconds.
If a value is entered here and input signal MST0 or PV is faulty, after the time value has elapsed an outgoing message is created and then an alarm message is generated again.

The annunciation repeat function is only effective if the alarm activation MAAT has 1-Signal. This means that a drive fault annunciation will only be repeated in case the fault has not yet been acknowledged (EST is still set).
If MTRIP = 1-Signal and the fault is not yet acknowledged, the annunciation repetition acknowledges the fault automatically.

M_SIM **Simulation value** **Default: 0**

Format BOOL (0-1)

If you do not use drivers the given value from the parameter M_SIM is used as the input-signal in simulation mode.

M_SIM should correspond to the fault-free status of the input signal, which means it should have the same status as OKS.

If driver block CH_DI is used, output SIM_ON of the annunciation block must be connected to input SIM_ON of the driver block.
As soon as the annunciation block is switched to simulation, the driver is also switched to simulation and delivers quality code 16#60. Output Q of the driver block contains the simulation value which is transmitted to input MST0.

If driver block Pcs7DiIn is used, output SIM_ON of the annunciation block must be connected to input SimOn of the driver block (via Structure converter StruDiOu).
As soon as the annunciation block is switched to simulation, the driver is also switched to simulation and delivers quality code 16#60. Output OutSig of the driver block contains the simulation value which is transmitted to input PV

With the above described connections the inputs MST0 and PV always contain the correct value (which corresponds to the simulation value in case of Quality Code = 16#60). If SIM_ON = 1-Signal and Quality Code = 16#60, the Annunciation block always uses the input value itself.

If the annunciation block was switched to simulation (SIM_ON = 1-Signal) and the Quality Code remains unequal to 16#60, this either means there is no driver block connected or the above described connection are not carried out. In this case in case of Simulation the annunciation block uses the value from input M_SIM.

SimRight **User right for Simulation** **Default: 24**

Format INTEGER (0 - 99)

Via Parameter SimRight the User right can be defined, which is required for switching the annunciation block to Simulation.
By default the parameter SimRight is set to right 24 "Interlocking Signals", but it is also possible to define new, project specific rights and assign them.

This parameter can also be used in order to inhibit the Simulation completely or to enable it dependent on a plant situation (dynamically). If SimRight = 0, the simulation is not possible.

Output interfaces

MAU **Output signal**

Format BOOL

Output MAU displays the status of the input signal (delayed by IN_DEL and OUT_DEL). For interlocks, always use the output of the annunciation block and not the input itself; in order to make sure that the alarming and switching off takes place simultaneously.

Output MAU must always be seen together with OKS:
- If OKS is set to "1-Signal", MAU has 0-Signal in case of a fault.
- If OKS is set to "0-Signal", MAU has 1-Signal in case of a fault.

In Warning mode MAU will never be faulty (drive should not be switched off in case of a warning.)

OutSig **Output Signal**

Format STRUCT

The value of the structure variable OutSig.Value corresponds to the output signal MAU. The Structure variable OutSig.ST contains the Quality Code. The output OutSig can be connected to a structure input as e. g. the interlocking conditions IntStart, IntOper, IntProtG or IntProtAof a drive.

Structure variables:

OutSig.Value **Value**

Format BOOL

OutSig.ST **Signal status**

Format BYTE

MSO **Fault/warning**

Format BOOL

1-signal means that a fault or a warning is present.

MST **Dynamic fault/warning**

Format BOOL

1-Signal at MST means that the fault or warning was not yet acknowledged.

SIM_ON **Simulation EIN**

Format BOOL

If you use drivers this output has to be connected to input SIM_ON of the driver block. The simulation value is transmitted from the driver block via M_SIM.

Warn **Warning active**

Format STRUCT

In the warning mode (WMOD = 1) and for two-level-alarms before timer WARN_DEL has elapsed, in case of a fault (MST0 unequal OKS) the Structure variable Warn.Value is set to 1-Signal. If the timer has elapsed a fault message is created and the Structure variable Warn.Value has 0-Signal.

Structure variables:

Warn.Value **Value**

Format BOOL

Warn.ST **Signal status**

Format BYTE

AWA **Warning Active (only Holcim)**

Format BOOL

In the Holcim Standard the function Warning message exists since Cemat V6.1 In the warning mode (WMOD = 1= and for two-level-alarms before timer WARN_DEL has elapsed, in case of a fault (MST0 unequal OKS) the output AWA is set to 1-Signal. In difference to output "Warn" the output AWA remains in 1-Signal after the time WARN_DEL has elapsed.

Additional outputs for testing and as Interface to the OS:

STATUS **Status word for OS**

Format DWORD

Interface to OS

For more information see Variable details.

STATUS2 **Status word for OS**

Format DWORD

Interface to OS

For more information see Variable details.

ALARM **for Test**

Format WORD

For more information see Variable details.

DLY_CNT **Time delay (Counter)**

Format INTEGER

Counter for Supervision delay, delay on activation, delay on drop-out, delay between warning and alarm.

Interface to OS

Hardware outputs

MLA **Annunciation lamp**

Format BOOL

The MLA signal can be used to connect an annunciation lamp (when no visualization system is present). A flashing light indicates a dynamic annunciation (non-acknowledged) and a continuous light indicates a static annunciation (already acknowledged). A 0-signal indicates that no annunciation is present.

Time characteristics

The module must be called before the associated route or group.

Any called C_MUX modules must run before this module.

Message characteristics

The module uses the ALARM_8 module to generate annunciations.

A plausibility and priority logic at the process level analyses all object faults
only one fault annunciation is issued for each fault
secondary annunciations are suppressed automatically
the fault source is recorded in detail and uniquely.

Still faulty message:
During start in automatic mode, any failure which inhibits the drive start leads to an interrupt of the start procedure and must therefore be reported by an alarm message.
PCS7 can create the (incoming) alarm message only once and does not support the repetition of incoming alarm messages without outgoing message. For this reason, CEMAT creates a Message “Still faulty” for any alarm message which needs to be repeated.

The current operational state of the plant objects is automatically taken into consideration during the fault analysis, e.g. all fault annunciations are suppressed automatically for a stationary group
no superfluous fault annunciations are created
the operator does not need to manually disable/suppress any annunciations.

Each fault annunciation is also classified.
This shows whether an **electrical** or a **mechanical** fault, a **process fault** or a shut-down with a **local safety switch** applies.
An electrician does not always need to be called first
The production operator can give specific instructions.

Alarm archive and alarm logs show only "true" annunciations.
An annunciation release for each object means that the communication and OS are not overloaded with an "annunciation storm" - e.g. overloaded after a power failure.

Refer to the Variable details for the assignment of the annunciation text and annunciation class to the module parameters.

Module states

Status Indications:

Status / Text Display	Icon Display	Text Presentation
No fault, no signal	White	Black, white
No fault, signal available	Green	Black, white
Warning not acknowledged	Blinking yellow	Black, yellow
Warning	Yellow	Black, yellow
Fault not acknowledged	Blinking red	White, red
Fault acknowledged	Red	White, red

Also refer to the Variable details

Commands

Refer to the Variable details for the assignment of the command word.

I/O-bar of C_ANNUNC

C_ANNUNC

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
MST0	Input Signal	BOOL	0	I			
QUALITY	Quality code from the driver block	BYTE	16#FF	I		+	
PV	Input Signal	STRUCT		I			
PV.Value	Value	BOOL	1	I	U	+	
PV.ST	Signal Status	BYTE	16#FF	I	U		
OKS	OK-Signal	BOOL	0	I			
MSIG	Process Signal	BOOL	0	I			
RELS	Release Supervision	BOOL	1	I	U		
MAMV	Alarm interlock	BOOL	1	I			
MAAT	Alarm activation	BOOL	1	I			
MMFR	Annunciation release	BOOL	1	I			
MMZS	Fault interlock to the group	BOOL	0	I			
GFSO	Group fault / status off	BOOL	0	I	U		
MLPZ	Lamp test (additional)	BOOL	0	I	U		
WMOD	Warning Mode 1 = Warning, 0 = Fault	BOOL	0	I	U		
AWAN	Activate Warning	BOOL	0	I			
MQIT	Acknowledge (additional)	BOOL	0	I	U		
MTRIP	Memorize Trip	BOOL	0	I	U		
M_SIM	Simulation value display on OS	BOOL	0	I			
SimRight	User right for Simulation	INT	24	I		+	
TEST_OSS	Must not be changed	INT	0	I	U		
MSG8_EVID	Message ID	DWORD	16#00	I	U		
COMMAND	Command word	WORD	16#00	I	U	+	
REL_DEL	Release supervision delay time	INT	0	I	U	+	

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
IN_DEL	Signal delay on activation	INT	0	I		+	
OUT_DEL	Signal delay on dropout	INT	0	I		+	
WARN_DEL	Delay between warning and fault message	INT	0	I		+	
REP_TIM	Annunciation repetition time	INT	0	I		+	
GR_STP	Group is stopped (only Holcim)	BOOL	0	I			
GR_LINK1	Link to group or route	STRUCT		I			
GR_LINK1. Link	Link	INT	0	I	U		
GR_LINK1. Command	Group/ route command	WORD	16#00	I	U		
GR_LINK2	Link to group or route	STRUCT		I			
GR_LINK2. Link	Link	INT	0	I	U		
GR_LINK2. Command	Group/ route command	WORD	16#00	I	U		
MUX_LINK	Link to C_MUX	STRUCT		I			
MUX_LINK. Point_GRL	Pointer	INT	0	I	U		
MUX_LINK. Command	Group/ route command	WORD	16#00	I	U		
O_LINK	Link to another object	STRUCT		I			
O_LINK. iDB	Instance DB master object	INT	0	I	U		
O_LINK iDW	DW number NO_OF_FT in master object	INT	0	I	U		
O_LINK. Command	Group/ route command	BYTE	16#00	I	U		
O_LINK. Status	Status master object	BYTE	16#00	I	U		
STATUS	Status word for test	DWORD	16#00	O	U	+	
STATUS2	Status word for test	DWORD	16#00	O	U	+	
ALARM	Alarm word for test	WORD	16#00	O	U		
MAU	Output signal	BOOL	0	O			
OutSig	Output signal	STRUCT		O			
OutSig.Value	Value	BOOL	0	O	U	+	
OutSig.ST	Signal Status	BYTE	16#80	O	U	+	

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
MSO	Fault/warning	BOOL	0	O			
MST	Dynamic fault/warning (not acknowledged)	BOOL	0	O			
MLA	Annunciation lamp	BOOL	0	O	U		
SIM_ON	Simulation on	BOOL	0	O			
Warn	Warning active	STRUCT		O			
Warn.Value	Value	BOOL	0	O	U	+	
Warn.ST	Signal Status	BYTE	16#80	O	U		
AWA	Warning active (only Holcim)	BOOL	0	O			
DLY_CNT	Delay Counter	INT	0	O	U	+	

OS-Variable table

C_ANNUNC

OS Variable	Description	PLC Data Type	OS Data Type
QUALITY	Quality code from the driver block	BYTE	Unsigned 8-bit value
PV#Value	Value	BOOL	Binary variable
SimRight	User right for Simulation	INT	Signed 16-bit value
COMMAND	Command word	WORD	Unsigned 16-bit value
REL_DEL	Release supervision delay time	INT	Signed 16-bit value
IN_DEL	Signal delay on activation	INT	Signed 16-bit value
OUT_DEL	Signal delay on dropout	INT	Signed 16-bit value
WARN_DEL	Delay between warning and fault message	INT	Signed 16-bit value
REP_TIM	Annunciation repetition time	INT	Signed 16-bit value
STATUS	Status word for test	DWORD	Unsigned 32-bit value
STATUS2	Status word for test	DWORD	Unsigned 32-bit value
OutSig#Value	Value	BOOL	Binary variable
OutSig#ST	Signal Status	BYTE	Unsigned 8-bit value
Warn#Value	Value	BOOL	Binary variable
DLY_CNT	Delay Counter	INT	Signed 16-bit value

Variable details

Internal structure of the Commands, Alarms and Visualization status:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Kommandowort**	**Commandword**		
COM_B20	SOO	0	Simulation ON/OFF	Simulation ON/OFF	Op. Inp.	
COM_B21		1			.	
COM_B22		2			.	
COM_B23		3				
COM_B24		4				
COM_B25		5				
COM_B26		6				
COM_B27		7				
COM_B10		8				
COM_B11	SACK	9	Einzel quittieren	Single acknowledge		
COM_B12		10				
COM_B13		11				
COM_B14		12				
COM_B15		13				
COM_B16		14				
COM_B17		15				
ALARM			**Alarm**	**Alarm**		
ALA_MS0	SIG1	0	Störung	Fault	AL_H	P
ALA_B21	SIG2	1	Warnung	Warning	WA_H	P
ALA_B22	SIG3	2				
ALA_B23	SIG4	3				
ALA_B24	SIG5	4				
ALA_B25	SIG6	5				
ALA_B26	SIG7	6				
ALA_REP	SIG8	7	Noch gestört	Still faulty	AL_H	P

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B40	FAULT	0	Störung quittiert	Fault acknowledged		
STA_B41	NQT	1	Störung nicht quittiert	Fault not acknowledged		
STA_B42	MSIG	2	Prozess Signal = 1	Process Signal = 1		
STA_B43	WMOD	3	1= Mode Warnung, 0 = Störung	1= Mode warning, 0 = Alarm		
STA_B44	AWAN	4	Warnzeit aktiv	Warning Time active		
STA_B45	RELSU	5	freigabe Überwachung	release supervision		
STA_B46	LINK	6	GR_LINK1 angeschlossen	GR_LINK1 connected		
STA_B47	STRC	7	PV angeschlossen	PV connected		
STA_B30	MAU/ OutSig	8	Ausgangssignal	Output signal		
STA_B31	MARK	9	Objekt markieren (Gruppenkommando)	Highlight object (group command)		
STA_B32	M_SIM	10	Interner Simulationswert	Internal simulation value		
STA_B33	DRV	11	Verbunden mit Treiber	Connected to a driver		
STA_B34	MTRIP	12	Fehler speichern bis Quitt	memorize trip until acknowledgement		
STA_B35	RELS_ST	13	Freigabe Überwachung Status	Release supervision status		
STA_B36	SON	14	Simulation ON	Simulation ON		
STA_B37	SIV	15	Simulationswert	Simulation value		
STA_B20	MST0	16	Störung	Fault		
STA_B21	MSIG	17	Prozesssignal	Process Signal		
STA_B22	MAMV	18	Alarmverriegelung	Alarm interlock		
STA_B23	MAAT	19	Alarmaktivierung	Alarm activation		
STA_B24	MMFR	20	Meldefreigabe	Annunciation release		
STA_B25	MMZS	21	Störungsverriegelung zur Gruppe	Fault interlock to group		
STA_B26	MLPZ	22	Lampen prüfen (Zusatz)	Lamp test (additional)		
STA_B27	MQIT	23	Quittieren (Zusatz)	Acknowledge (additional)		
STA_B10	OKS	24	OK-Signalzustand	OK-signal		
STA_B11	WARNING	25	Störungsart = Warnung	Fault type = warning		
STA_B12	GFSO	26	Gruppenstörung/ Zustand aus	Group Fault / Status off		
STA_B13	WARN	27	Aktuelle Störung ist Warnung	Active fault is a warning		
STA_B14	AWA	28	aktuelle Störung ist Warnung	active fault is a warning		
STA_B15	GR_STP	29	aktuelle Störung ist Warnung (Holcim)	active fault is a warning (Holcim)		
STA_B16	BADQ	30	Gruppe gestoppt (Holcim)	group stopped (Holcim)		
STA_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS2			**Status**	**Status**		
STA2_B40	INTI	0	Freigebezeit ein	Inhibit time on		
STA2_B41	WTI	1	Warnzeit ein	Warning Time on		
STA2_B42	ONDTI	2	Verzögerungszeit für Kommend-Meldung ein	On Delay Time on		
STA2_B43	OFFDT	3	Verzögerungszeit der Gehend-Meldung ein	Off Delay Time on		
STA2_B44	REP_TIM	4	Meldewiederholzeit läuft	Annunciation repeat time is running		
STA2_B45		5				
STA2_B46		6				
STA2_B47		7				
STA2_B30		8				
STA2_B31		9				
STA2_B32		10				
STA2_B33		11				
STA2_B34		12				
STA2_B35		13				
STA2_B36		14				
STA2_B37		15				
STA2_B20		16				
STA2_B21		17				
STA2_B22		18				
STA2_B23		19				
STA2_B24		20				
STA2_B25		21				
STA2_B26		22				
STA2_B27		23				
STA2_B10		24				
STA2_B11		25				
STA2_B12		26				
STA2_B13		27				
STA2_B14		28				
STA2_B15		29				
STA2_B16		30				
STA2_B17		31				

SIEMENS

Cemat V 8.2
Function Block Library ILS_CEM

Function Description Edition 07/16

Annunciation 8 C_ANNUN8

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring to property damage only have no safety alert symbol. The notices shown below are graded according to the degree of danger.

Danger
indicates that death or severe personal injury **will** result if proper precautions are not taken.

Warning
indicates that death or severe personal injury **may** result if proper precautions are not taken.

Caution
with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution
without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention
indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel.** Within the context of the safety notices in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

Warning
This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.
Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens AG 2005
Technical data subject to change.

Description of C_ANNUN8

Type/Number

Module name: C_ANNUN8
Module no.: FB1005

Calling OBs

C_ANNUN8 must be called in OB1 (MAIN_TASK).

Function

Block Type C_ANNUN8 can generate 7 individual alarms. The 8th alarm is used for alarm repetition. With annunciation modules, binary signals can be displayed on the screen as an alarm message.

There are two basic applications for annunciation modules:

Drive faults
Annunciation of drive faults which cannot be signaled by the drive itself. These are the signals which are connected to the protection interlock (e.g. belt drift, pull-rope, bearing temperature etc.).

Process signal annunciations (interlocks)
Annunciation of process signals such as silo levels and interlocks.

Operating principle

Input interfaces

FLS1 – FLS7 Fault Basic state 0-signal

Format BOOL

When a signal changes its state from 0 to 1 at one of these interfaces, an alarm is generated. If a signal delay (e.g. TFLS1) is set for response, the output signal F1 and the alarm are delayed by this time. Corresponds to MST0 of the C_ANNUNC.

INH1 – INH7 Fault interlock Basic state 0-signal

Format BOOL

With 1-signal at INH1 the input FLS1 is blocked. In this case the output F1 has 0-signal and no alarm is generated even when the input FLS1 has 1-signal. With the edge from 1 to 0 at INH1 the input FLS1 will become active after the time TINH has elapsed.

<u>Typical application:</u>

When a drive is not started or it is during the starting phase and should not generate any alarm (e.g. pump with pressure monitoring) the negated EVS-signal of the drive can be applied to the INHx The activation of the fault can be specified via the delay TINH.

FAT1 – FAT7 Alarm activation Basic state 1-Signal

Format BOOL

If the Block is used together with drives, e.g. in order to give an alarm for Protection signals like rope switch, belt drift etc. The EST (KST, VST) of the corresponding drive must be connected to this interface.
With this connection the annunciation block generates an alarm every time the drive is stopped by this fault or if the fault already exists and anybody tries to start the drive.

WARN1 – WARN7 Warning Mode (1 = Warning, 0 = Fault) Basic state 0-Signal

Format BOOL

The C_ANNUN8 block can be configured to create faults or warnings. By default setting, faults are created.
In order configure the signal FLS1 for warnings the interface WARN1 must be set to 1-Signal and in the messages the message class for the signal must be changed from "alarm – above" to "warning – above".
The Alarm activation is not evaluated in Warning Mode.

REL_SIM_ON Simulation On Basic state 0-Signal

Format BOOL

The enable for simulation can be switched on/off only from Diagnostic Picture. To enable the Simulation value from the driver block, the output SIM_ON of the annunciation block has to be connected to input SIM_ON of the driver block.

Caution: REL_SIM_ON is no block parameter

SWK **Fault release** **Basic state 1-signal**

Format BOOL

With 0-signal at this interface, the annunciation function as well as all outputs are blocked. Valid for all eight fault inputs. Corresponds to MMFR with output block.

Typical application:

In the case of a control supply voltage failure for MCC or field signals, one alarm message would be triggered for each sensor signal. To avoid this, one should connect the control voltage signal to the annunciation release interface at the appropriate modules. This results in no alarm being produced. The cause of the "control voltage failure" is reported by an annunciation module configured for this.

Caution: If MMFR has 0-Signal the annunciation fault is not shown in the summarizing indication of group and route and not listed in the status call.

FAIG **Fault interlock to the group** **Basic state 0-signal**

Format BOOL

A 1-signal on FAIG prevents that the dynamic and static fault is passed to the group. The GBE is not effected by this fault when the group is started. Valid for all eight inputs.
If one does not want to indicate a fault with the annunciation module but an interlock, then FAIG must be connected with 1-signal. The alarm in the annunciation line appears like a fault, but then indicates the interlock. Corresponds to MMZS.

GFSO **Group fault / status off** **Basic state 0-signal**

Format BOOL

1-Signal at GFSO completely deselects the annunciation block for the Group Summarizing fault and for the Group Status Call.

QUIT **Acknowledge (additional)** **Basic state 0-signal**

Format BOOL

The acknowledgement of the annunciation block fault is normally carried out together with the acknowledgement of any alarm within the same AS (default setting). Interface QUIT is only needed for individual acknowledgement (via push-button) or in case of group-wise acknowledgement.

A signal change from "0" to "1" at QUIT acknowledges the annunciation block fault.

In case of a conventional control desk, a push-button can be connected to QUIT (for individual acknowledgement) or to the acknowledgement interface at block C_PUSHBT can be used (for AS-wise acknowledgement).

Caution: Using QUIT for individual acknowledgement, the acknowledgement interface at the C_PUSHBT must **not** be connected.

For group-wise acknowledgement connect the output ACK of the corresponding group to interface QUIT of the annunciation block. See Engineering Manual, chapter AS-Engineering.

DSIG_BQ **Driver Signal(s) Bad Quality** **Basic state 0-signal**

Format BOOL

If driver blocks are used, the information "one ore more driver blocks have bad quality" can be displayed in the faceplate and in the block icon of the C_ANNUN8.
In order to achieve this, the outputs QBAD of the driver blocks must be connected with an OR function to Interface DSIG_BQ.

DSIG_SIM **Driver Signal(s) Simulation** **Basic state 0-signal**

Format BOOL

If driver blocks are used, the information "one or more driver blocks are switched to simulation" can be displayed in the faceplate and in the block icon of the C_ANNUN8.
In order to achieve this, the outputs QSIM of the driver blocks must be connected with an OR function to Interface DSIG_SIM.

Additional inputs for testing and as Interface to the OS:

TEST_OSS **Test interface** **Default: 0**

Format INTEGER

The test interfaces are only used during module development and must not be changed!

MSG8_EVID **Message ID** **Default: 16#00**

Format DWORD

Interface to OS

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

Group and Object links

Group/Route links

Each drive block, annunciation block or measurement block must be linked to a group or route in order to collect the status of these objects for summarizing indications.

The group link is essential for control and diagnosis and comprises the following functions:

- All objects, linked to the group (or route) are listed in the group (or route) object list.
- All objects, linked to the group (or route) are highlighted in the process picture with button "Show related objects".
- The faults of all objects, linked to the group (or route) are included in the summarizing fault indication of the group (or route).
- The warnings of all objects, linked to the group (or route) are included in the summarizing warning indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

An annunciation block can be linked to two groups or routes via *GR_LINK1* and *GR_LINK2*. If an annunciation block belongs to more than two groups or routes the additional block C_MUX must be inserted, which provides 5 additional link interfaces.

Caution: The main group (or main route) should be connected to *GR_LINK1*! This is the one which is opened with a click on button "Main group" in the faceplate of the annunciation block.

An Annunciation block which belongs to a drive can be connected to the drive via interface *O_LINK* instead of the connection to the group or route vie *GR_LINK1* and *GR_LINK2* or via C_MUX. The main group (or main route) information is not available in this case.

Caution: It is not allowed to use the Object link and the Group/Route link at the same time: If *O_LINK* is used, *GR_LINK1* and *GR_LINK2* or *C_MUX* must not be connected!

GR_LINK1 **Link to group or route**

Format STRUCT

The GR_LINK1 interface of the annunciation module must be connected with the R_LINK interface of the route or with the G_LINK interface of the group.

Structure variables:

GR_LINK1.Link	**Link**	**Default: 0**
Format INTEGER		
GR_LINK1.Command	**Group / Route Command**	**Default: 16#00**
Format WORD		

GR_LINK2 **Link to group or route**

Format STRUCT

If the annunciation module belongs to two different routes or groups, the GR_LINK2 interface must be connected with the second route/group.

Structure variables:

GR_LINK2.Link	**Link**	**Default: 0**
Format INTEGER		
GR_LINK2.Command	**Group / Route Command**	**Default: 16#00**
Format WORD		

MUX_LINK **Link to C_MUX**

Format STRUCT

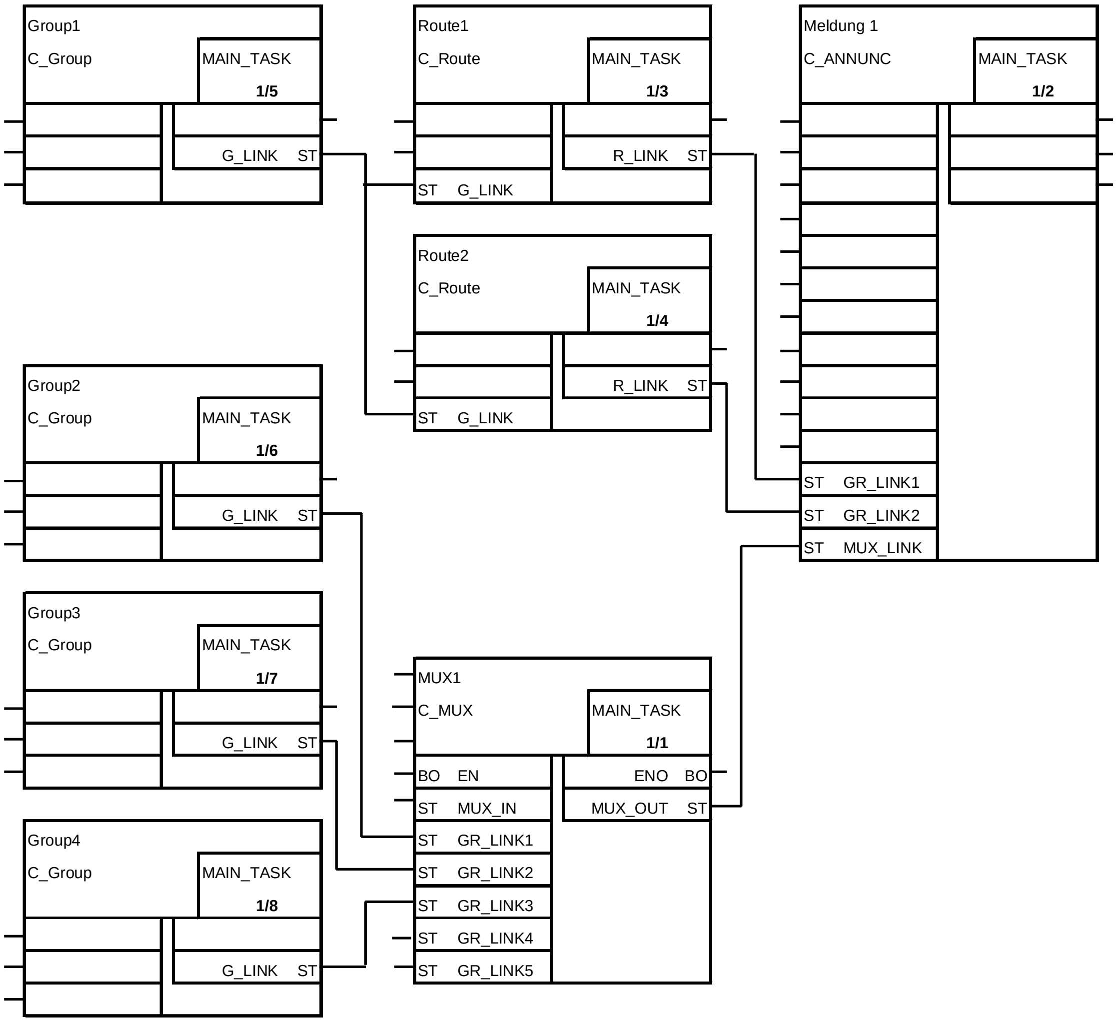
If the annunciation module belongs to more than two different routes or groups, the C_MUX module must be series-connected. C_MUX has 5 inputs (GR_LINK1 to GR_LINK5) for connection with the groups/routes and one output (MUX_OUT) for connection with the MUX_LINK interface of the annunciation module.

Caution: If a C_MUX block is used, the programming order is very important. The C_MUX must be called before the annunciation block!
The MUX_IN interface can under no circumstances be used for connection with a group or route. It is used exclusively for connection with another MUX module.

Structure variables:

MUX_LINK.Point_GRL	**Pointer**	**Default: 0**
Format INTEGER		
MUX_LINK.Command	**Group / Route Command**	**Default: 16#00**
Format WORD		

Example of a circuit:

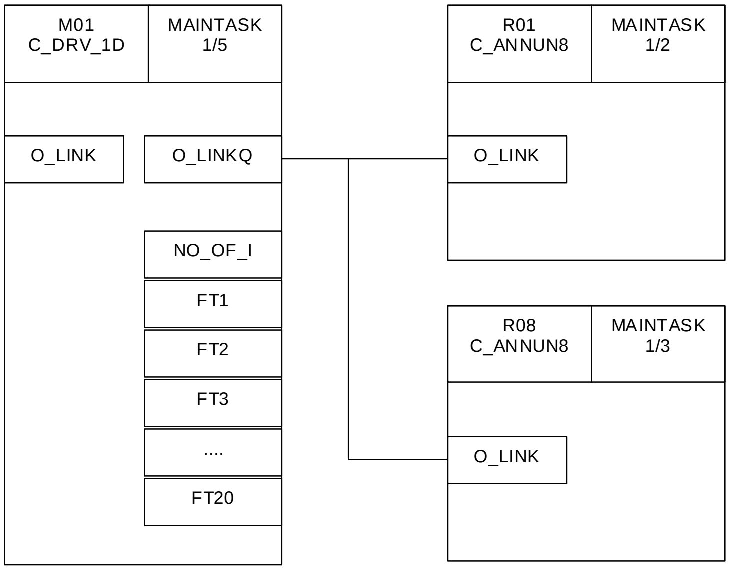


Caution: Observe the processing sequence! The C_MUX module must be called before the annunciation module. For the other modules, the run sequence is as follows: First the annunciations, measured values and drives, then the associated routes and finally the associated groups.

Caution: Some people use one C_MUX block and connect its output to a number of drives/devices, annunciations and measurements.
If you do so, make sure that the C_MUX is called before all the other objects and that no other C_MUX call comes in between.
We don't recommend using the same C_MUX if the blocks are located in different runtime groups.

Object links to master objects

Annunciations, measurements and process feedback blocks which belong to a drive must not be linked to the group (or route), if they are connected via Object link to the drive output *O_LINKQ*.



The drive block collects the information and forwards it to the group (or route). The result is as follows:

- All objects, linked to the drive are listed in the drive object list and in the group (or route) object list (one level below the drive).
- All objects, linked to the drive are highlighted in the process picture with button "Show related objects".
- The faults of all objects, linked to the drive are included in the summarizing fault indication of the group (or route).
- The warnings of all objects, linked to the drive are included in the summarizing warning indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

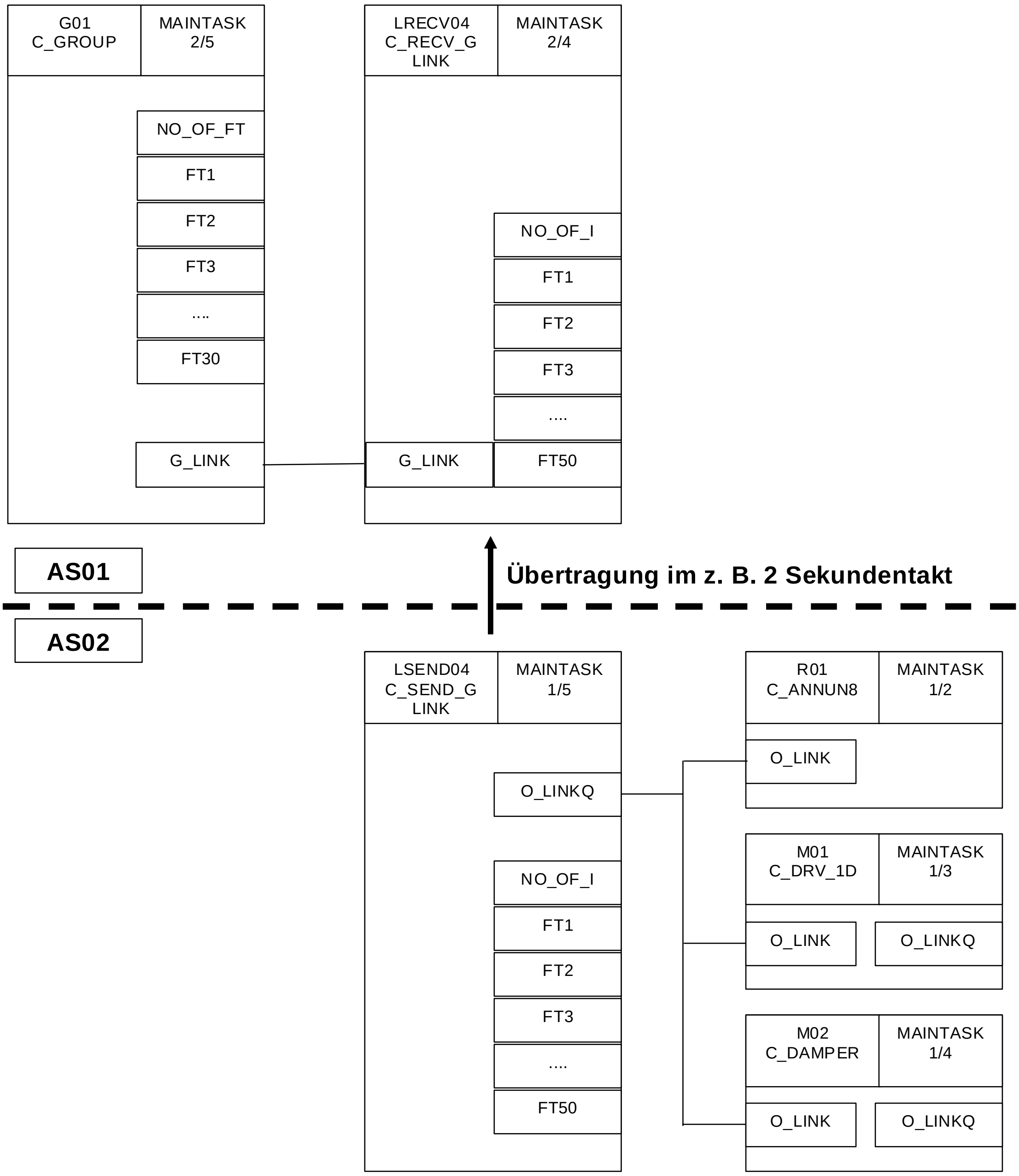
Object links to a group in a different AS

If a Cemat object is programmed in a different AS than the superordinated group a direct link between the annunciation block and the group is not possible. In this case special send and receive blocks must be inserted which collect the object data and transmit it to the group.

In the AS of the group the group output *G_LINK* is connected to input *G_LINK* of the block C_RECV_G.

Caution: C_RECV_G can only be linked to a C_GROUP module. Linking to routes is not permitted and will not work!

In the AS of the Cemat Objects the output *O_LINKQ* of block C_SEND_G is connected to input *O_LINK* of the drives/devices, annunciations, measurements and process feedback blocks.



O_LINK **Link to another object**

Format STRUCT

Interface *O_LINK* of the annunciation block is used for the link to a master object (drive/device) or for the link to the group of a different AS via C_SEND_G.

<u>Link to a master object:</u>

Output *O_LINKQ* of the drive/device must be connected to interface *O_LINK* of the allocated annunciations, measurements and process feedback blocks, while the drive/device itself is connected via *GR_LINK* to the group (or route).

<u>Link to the group of a different AS:</u>

Output O_LINKQ of the send block C_SEND_G must be connected to interface *O_LINK* of the allocated annunciations, measurements and process feedback block.

Caution: If annunciations, measurements or process feedback blocks belong to the drive, they don't need to be connected to output *O_LINKQ* of the C_SEND_G block. They can also be programmed as slave objects and connected to output *O_LINKQ* of the drive.

Structure variables:

O_LINK.iDB **Instance DB master object** **Default: 0**

Format INTEGER

O_LINK.iDW **DW number NO_OF_FT in master object** **Default: 0**

Format INTEGER

O_LINK.Command **Group / Route Command** **Default: 16#00**

Format BYTE

O_LINK.Status **Status master object** **Default: 16#00**

Format BYTE

Process values

The process values can be set during configuration and they can be changed online from the OS. To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

TFLS1 – TFLS7 Signal delay on activation Default: 0

Format INTEGER (0 - 999)

Value in seconds.
During signal change from FLS 0 to 1, the signal output F1 – F8 and the alarm message are delayed by the set time.

TINH1 – TINH7 Signal delay of the fault interlock Default: 0

Format INTEGER (0 - 999)

Value in seconds.
During signal change from INH 1 to 0, the fault interlock is released again after the set time. The output and the alarms are active again.

SimRight User right for Simulation Default: 24

Format INTEGER (0 - 99)

Via Parameter SimRight the User right can be defined, which is required for switching the annunciation block to Simulation.
By default the parameter SimRight is set to right 24 "Interlocking Signals", but it is also possible to define new, project specific rights and assign them.

This parameter can also be used in order to inhibit the Simulation completely or to enable it dependent on a plant situation (dynamically). If SimRight = 0, the simulation is not possible.

Output interfaces

F1 – F7 **Output signals, fault**

Format BOOL

Always use one of these signals for the control so that delays that have been configured can take effect.

FX **Presence of an active fault**

Format BOOL

If one of the output signals F1 – F7, which is configured as "fault" has 1-signal, FX also has 1-signal. If there are no faults on the entire module, FX is 0.

WX **Presence of an active warning**

Format BOOL

If one of the output signals F1 – F7, which is configured as "warning" has 1-signal, FX also has 1-signal. If there are no warnings on the entire module, WX is 0.

SIM_ON **Simulation ON**

Format BOOL

This output has to be connected to input SIM_ON of the driver block. This enables to switch on/off the simulation from the faceplate. Refer to Release functions.

Additional outputs for testing and as Interface to the OS:

INTFC_OS **Interface status for OS**

Format DWORD

Interface to OS

For more information see Variable details.

STATUS **Status word for test**

Format DWORD

Interface to OS

For more information see Variable details.

ALARM **Alarm word for test**

Format WORD

For more information see Variable details.

Time characteristics

The module must be called before the associated route or group.

Any called C_MUX modules must run before this module.

Message characteristics

The module uses the ALARM_8 module to generate annunciations.

A plausibility and priority logic at the process level analyses all object faults
 Only one fault annunciation is issued for each fault
 Secondary annunciations are suppressed automatically
 The fault source is recorded in detail and uniquely.

Still faulty message:
During start in automatic mode, any failure which inhibits the drive start leads to an interrupt of the start procedure and must therefore be reported by an alarm message.
PCS7 can create the (incoming) alarm message only once and does not support the repetition of incoming alarm messages without outgoing message. For this reason, CEMAT creates a Message “Still faulty” for any alarm message which needs to be repeated.

The current operational state of the plant objects is automatically taken into consideration during the fault analysis, e.g. all fault annunciations are suppressed automatically for a stationary group
 No superfluous fault annunciations are created
 The operator does not need to manually disable/suppress any annunciations.

Each fault annunciation is also classified.
This shows whether an **electrical** or a **mechanical** fault, a **process fault** or a shut-down with a **local safety switch** applies.
 An electrician does not always need to be called first
 The production operator can give specific instructions.

Refer to the Variable details for the assignment of the annunciation text and annunciation class to the module parameters.

Module states

Variable STATUS:

Status / Text Display	Icon Display	Text Presentation
No fault	White	Black, white
Warning not acknowledged	Blinking yellow	Black, yellow
Warning acknowledged	Yellow	Black, yellow
Fault not acknowledged	Blinking red	White, red
Fault acknowledged	Red	White, red

See also Variable details

Commands

Refer to the Variable details for the assignment of the command word.

I/O-bar of C_ANNUN8

C_ANNUN8

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
SWK	Fault release	BOOL	1	I		+	
FLS1	Signal input for fault 1	BOOL	0	I		+	
INH1	Fault interlock 1	BOOL	0	I			
FAT1	Alarm activation 1	BOOL	1	I	U		
WARN1	Signal no. 1 is a warning	BOOL	0	I	U		
FLS2	Signal input for fault 2	BOOL	0	I		+	
INH2	Fault interlock 2	BOOL	0	I			
FAT2	Alarm activation 2	BOOL	1	I	U		
WARN2	Signal no. 2 is a warning	BOOL	0	I	U		
FLS3	Signal input for fault 3	BOOL	0	I		+	
INH3	Fault interlock 3	BOOL	0	I			
FAT3	Alarm activation 3	BOOL	1	I	U		
WARN3	Signal no. 3 is a warning	BOOL	0	I	U		
FLS4	Signal input for fault 4	BOOL	0	I		+	
INH4	Fault interlock 4	BOOL	0	I			
FAT4	Alarm activation 4	BOOL	1	I	U		
WARN4	Signal no. 4 is a warning	BOOL	0	I	U		
FLS5	Signal input for fault 5	BOOL	0	I		+	
INH5	Fault interlock 5	BOOL	0	I			
FAT5	Alarm activation 5	BOOL	1	I	U		
WARN5	Signal no. 5 is a warning	BOOL	0	I	U		
FLS6	Signal input for fault 6	BOOL	0	I		+	
INH6	Fault interlock 6	BOOL	0	I			
FAT6	Alarm activation 6	BOOL	1	I	U		
WARN6	Signal no. 6 is a warning	BOOL	0	I	U		

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
FLS7	Signal input for fault 7	BOOL	0	I		+	
INH7	Fault interlock 7	BOOL	0	I			
FAT7	Alarm activation 7	BOOL	1	I	U		
WARN7	Signal no. 7 is a warning	BOOL	0	I	U		
FAIG	Fault interlock to the group	BOOL	0	I	U		
QUIT	Acknowledge (additional)	BOOL	0	I	U		
DSIG_BQ	Driver Signal(s) bad quality	BOOL	0	I			
DSIG_SIM	Driver Signal(s) Simulation	BOOL	0	I			
TFLS1	Signal delay on activation 1	INT	0	I		+	
TINH1	Signal delay of the fault interlock 1	INT	0	I		+	
TFLS2	Signal delay on activation 2	INT	0	I		+	
TINH2	Signal delay of the fault interlock 2	INT	0	I		+	
TFLS3	Signal delay on activation 3	INT	0	I		+	
TINH3	Signal delay of the fault interlock 3	INT	0	I		+	
TFLS4	Signal delay on activation 4	INT	0	I		+	
TINH4	Signal delay of the fault interlock 4	INT	0	I		+	
TFLS5	Signal delay on activation 5	INT	0	I		+	
TINH5	Signal delay of the fault interlock 5	INT	0	I		+	
TFLS6	Signal delay on activation 6	INT	0	I		+	
TINH6	Signal delay of the fault interlock 6	INT	0	I		+	
TFLS7	Signal delay on activation 7	INT	0	I		+	
TINH7	Signal delay of the fault interlock 7	INT	0	I		+	
GFSO	Group fault / status off	BOOL	0	I	U		
SimRight	User right for Simulation	INT	24	I		+	
TEST_OSS	Not allowed to change	INT	0	I	U		
MSG8_EVID	Message ID	DWORD	16#00	I	U		
COMMAND	Command word	WORD	16#00	I	U	+	

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
GR_LINK1	Link to group or route	STRUCT		I			
GR_LINK1. Link	Link	INT	0	I	U		
GR_LINK1. Command	Group/ route command	WORD	16#00	I	U		
GR_LINK2	Link to group or route	STRUCT		I			
GR_LINK2. Link	Link	INT	0	I	U		
GR_LINK2. Command	Group/ route command	WORD	16#00	I	U		
MUX_LINK	Link to C_MUX	STRUCT		I			
MUX_LINK. Point_GRL	Pointer	INT	0	I	U		
MUX_LINK. Command	Group/ route command	WORD	16#00	I	U		
O_LINK	Link to another object	STRUCT		I			
O_LINK. iDB	Instance DB master object	INT	0	I	U		
O_LINK iDW	DW number NO_OF_FT in master object	INT	0	I	U		
O_LINK. Command	Group/ route command	BYTE	16#00	I	U		
O_LINK. Status	Status master object	BYTE	16#00	I	U		
INTFC_OS	Interface status for OS	DWORD	16#00	O	U	+	
STATUS	Status word for test	DWORD	16#00	O	U	+	
ALARM	Alarm word for test	WORD	16#00	O	U		
FX	Presence of active faults	BOOL	0	O			
WX	Presence of active warnings	BOOL	0	O			
F1	Output signal, fault 1	BOOL	0	O			
F2	Output signal, fault 2	BOOL	0	O			
F3	Output signal, fault 3	BOOL	0	O			
F4	Output signal, fault 4	BOOL	0	O			
F5	Output signal, fault 5	BOOL	0	O			
F6	Output signal, fault 6	BOOL	0	O			
F7	Output signal, fault 7	BOOL	0	O			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
SIM_ON	Simulation on	BOOL	0	O			

OS-Variable table

C_ANNUN8

OS Variable	Description	PLC Data Type	OS Data Type
SWK	Fault release	BOOL	Binary variable
FLS1	Signal input for fault 1	BOOL	Binary variable
FLS2	Signal input for fault 2	BOOL	Binary variable
FLS3	Signal input for fault 3	BOOL	Binary variable
FLS4	Signal input for fault 4	BOOL	Binary variable
FLS5	Signal input for fault 5	BOOL	Binary variable
FLS6	Signal input for fault 6	BOOL	Binary variable
FLS7	Signal input for fault 7	BOOL	Binary variable
TFLS1	Signal delay on activation 1	INT	Signed 16-bit value
TINH1	Signal delay of the fault interlock 1	INT	Signed 16-bit value
TFLS2	Signal delay on activation 2	INT	Signed 16-bit value
TINH2	Signal delay of the fault interlock 2	INT	Signed 16-bit value
TFLS3	Signal delay on activation 3	INT	Signed 16-bit value
TINH3	Signal delay of the fault interlock 3	INT	Signed 16-bit value
TFLS4	Signal delay on activation 4	INT	Signed 16-bit value
TINH4	Signal delay of the fault interlock 4	INT	Signed 16-bit value
TFLS5	Signal delay on activation 5	INT	Signed 16-bit value
TINH5	Signal delay of the fault interlock 5	INT	Signed 16-bit value
TFLS6	Signal delay on activation 6	INT	Signed 16-bit value
TINH6	Signal delay of the fault interlock 6	INT	Signed 16-bit value
TFLS7	Signal delay on activation 7	INT	Signed 16-bit value
TINH7	Signal delay of the fault interlock 7	INT	Signed 16-bit value
SimRight	User right for Simulation	INT	Signed 16-bit value
COMMAND	Command word	WORD	Unsigned 16-bit value
INTFC_OS	Interface status for OS	DWORD	Unsigned 32-bit value

OS Variable	Description	PLC Data Type	OS Data Type
STATUS	Status word for test	DWORD	Unsigned 32-bit value

Variable details

Internal structure of the Commands, Alarms, Visualization status and Interface word:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Kommandowort**	**Commandword**		
COM_B20	SOO	1	Simulation ON/OFF	Simulation ON/OFF	Op. Inp.	
COM_B21		1			Op. Inp.	
COM_B22		2			Op. Inp.	
COM_B23		3				
COM_B24		4			Op. Inp.	
COM_B25		5				
COM_B26		6				
COM_B27		7				
COM_B10		8				
COM_B11	SACK	9	einzel quittieren	single acknowledge		
COM_B12		10				
COM_B13		11				
COM_B14		12				
COM_B15		13				
COM_B16		14				
COM_B17		15				
ALARM			**Alarm**	**Alarm**		
ALA_MST1		1	Störung 1	Fault 1	AL_H	P
ALA_MST2		2	Störung 2	Fault 2	AL_H	P
ALA_MST3		3	Störung 3	Fault 3	AL_H	P
ALA_MST4		4	Störung 4	Fault 4	AL_H	P
ALA_MST5		5	Störung 5	Fault 5	AL_H	P
ALA_MST6		6	Störung 6	Fault 6	AL_H	P
ALA_MST7		7	Störung 7	Fault 7	AL_H	P
ALA_REP		8	Noch gestört	Still faulty	AL_H	P

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
INTFC_OS			**Nahtstellenwort**	**Interface word**		
OS_IF_B40	FLS1	1	Störung 1	Fault 1		
OS_IF_B41	INH1	2	Störungsverrieglung 1	Fault interlock 1		
OS_IF_B42	FAT1	3	Alarmaktivierung 1	Alarm activation 1		
OS_IF_B43	FLS2	4	Störung 2	Fault 2		
OS_IF_B44	INH2	5	Störungsverrieglung 2	Fault interlock 2		
OS_IF_B45	FAT2	6	Alarmaktivierung 2	Alarm activation 2		
OS_IF_B46	FLS3	7	Störung 3	Fault 3		
OS_IF_B47	INH3	8	Störungsverrieglung 3	Fault interlock 3		
OS_IF_B30	FAT3	9	Alarmaktivierung 3	Alarm activation 3		
OS_IF_B31	FLS4	10	Störung 4	Fault 4		
OS_IF_B32	INH4	11	Störungsverrieglung 4	Fault interlock 4		
OS_IF_B33	FAT4	12	Alarmaktivierung 4	Alarm activation 4		
OS_IF_B34	FLS5	13	Störung 5	Fault 5		
OS_IF_B35	INH5	14	Störungsverrieglung 5	Fault interlock 5		
OS_IF_B36	FAT5	15	Alarmaktivierung 5	Alarm activation 5		
OS_IF_B37	FLS6	16	Störung 6	Fault 6		
OS_IF_B20	INH6	17	Störungsverrieglung 6	Fault interlock 6		
OS_IF_B21	FAT6	18	Alarmaktivierung 6	Alarm activation 6		
OS_IF_B22	FLS7	19	Störung 7	Fault 7		
OS_IF_B23	INH7	20	Störungsverrieglung 7	Fault interlock 7		
OS_IF_B24	FAT7	21	Alarmaktivierung 7	Alarm activation 7		
OS_IF_B25		22				
OS_IF_B26		23				
OS_IF_B27	GFSO	24	Gruppenstörung/ Zustand aus	Group fault / status off		
OS_IF_B10	QUIT	25	Quittieren (Zusatz)	Acknowledge (additional)		
OS_IF_B11	FAIG	26	Störungsverriegelung zur Gruppe	Fault interlock to group		
OS_IF_B12	SWK	27	Störungsfreigabe	Fault release		
OS_IF_B13		28				
OS_IF_B14		29				
OS_IF_B15		30				
OS_IF_B16		31				
OS_IF_B17		32				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B40	FX	0	Statische Störung gesamt	Static fault		
STA_B41	DYN	1	Störung nicht quittiert	Fault not acknowledged		
STA_B42	SIG1	2	Störung 1 quittiert	Fault 1 acknowledged		
STA_B43	SIG2	3	Störung 2 quittiert	Fault 2 acknowledged		
STA_B44	SIG3	4	Störung 3 quittiert	Fault 3 acknowledged		
STA_B45	SIG4	5	Störung 4 quittiert	Fault 4 acknowledged		
STA_B46	SIG5	6	Störung 5 quittiert	Fault 5 acknowledged		
STA_B47	SIG6	7	Störung 6 quittiert	Fault 6 acknowledged		
STA_B30	SIG7	8	Störung 7 quittiert	Fault 7 acknowledged		
STA_B31	WX	9	Statische Warnung gesamt	Static warning		
STA_B32	DYW	10	Warnung nicht quittiert	Warning not acknowledged		
STA_B33	MARK	11	Objekt markieren (Gruppenkommando)	Highlight object (group command)		
STA_B34	LINK	12	GR_LINK1 angeschlossen	GR_LINK1 connected		
STA_B35	D_SIM	13	Eingang DSIG_SIM	Input DSIG_SIM		
STA_B36	SIM	14	Simulation ON	Simulation ON		
STA_B37	BQU	15	Signal Störung	Bad Quality of signals		
STA_B20	F1	16	Ausgangssignal 1	Output signal 1		
STA_B21	F2	17	Ausgangssignal 2	Output signal 2		
STA_B22	F3	18	Ausgangssignal 3	Output signal 3		
STA_B23	F4	19	Ausgangssignal 4	Output signal 4		
STA_B24	F5	20	Ausgangssignal 5	Output signal 5		
STA_B25	F6	21	Ausgangssignal 6	Output signal 6		
STA_B26	F7	22	Ausgangssignal 7	Output signal 7		
STA_B27	FX	23	Sammelstörung	Output total fault		
STA_B10	MARK	24	Objekt markieren (Gruppenkommando)	Highlight object (group command)		
STA_B11	WARN1	25	Signal 1 ist eine Warnung	Signal No. 1 is a warning		
STA_B12	WARN2	26	Signal 2 ist eine Warnung	Signal No. 2 is a warning		
STA_B13	WARN3	27	Signal 3 ist eine Warnung	Signal No. 3 is a warning		
STA_B14	WARN4	28	Signal 4 ist eine Warnung	Signal No. 4 is a warning		
STA_B15	WARN5	29	Signal 5 ist eine Warnung	Signal No. 5 is a warning		
STA_B16	WARN6	30	Signal 6 ist eine Warnung	Signal No. 6 is a warning		
STA_B17	WARN7	31	Signal 7 ist eine Warnung	Signal No. 7 is a warning		

SIEMENS

Cemat V 8.2
Function Block Library ILS_CEM

Function Description **Edition 07/16**

Measured Value C_MEASUR

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring to property damage only have no safety alert symbol. The notices shown below are graded according to the degree of danger.

⚠ Danger

indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ Warning

indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ Caution

with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution

without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention

indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel.** Within the context of the safety notices in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

⚠ Warning

This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.
Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens AG 2005
Technical data subject to change.

Description of C_MEASUR

Type/Number

Module name: C_MEASUR
Module no.: FB1006

Calling OBs

C_MEASUR must be called in OB1 (MAIN_TASK).

Function

The measured value module can be used to read analog process values and to monitor up to 8 limit values.

Read Measuring value:

The measured value block has 3 input channels, one of which must be chosen via parameter TYP:

TYP = 10

Via input MV_PHYS the measured value block can read a physical value in REAL Format (e. g. from a PCS7 driver block, from a recipe or from a simulation program).

TYP = 20

Via input PV the measured value block can read the physical value as Structure. (The driver blocks of the APL Library provide a structure output which contains the value in REAL format and the signal status.)

TYP = 77

Via input MV_CARD the analog value can be read as input word directly from the S7-Periphery (Format WORD). In this case the measured value block converts the card value into the physical value.

For the calculation the following formula is used:

$$\frac{(\text{Scale end SCE} - \text{Scale beginning SCB}) * \text{MV\_CARD}}{(\text{CARD\_SCE} - \text{CARD\_SCB})} + \text{Scale beginning SCB}$$

S5-Periphery can not be read directly. The measuring value block is not able to read the coding of the S7 Periphery card.

Calibration Option

In case of a Card value it may happen that the Start and End value of the Analog Input card don't correspond to the Scale low and high Value. In this case the calibration option can be used in order to calculate the correct Physical value.

Via a special calibration dialog the values for SCB and SCE can be entered online.

For adjustment of the Scale beginning (SCB)

- The transmitter must be adjusted to "begin of measurement". The Scale beginning which corresponds to this card value must be entered and after confirmation via button "Set low value" this value is used as *SCB*.

For adjustment of the Scale end (SCE) two options exist:

- The transmitter must be adjusted to "end of measurement". The Scale end which corresponds to this card value must be entered and after confirmation via button "Set high value" this value is used as *SCE*.
- If it is not possible to reach the "end of measurement", the transmitter must be adjusted to a "known position of measurement". The Scale value which corresponds to this card value must be entered and via button "Calculate High value" the Scale high value is calculated and used as *SCE*.

⚠ The calibration function must be enabled via interface REL_CALI and it is only possible for Card Values (reading via Interface MV_CARD).

Evaluation of the signal quality:

TYP = 77: If no driver block is used: validation check of the read analogue value (QVZ, rated range, overflow -> live zero)
A measured value is invalid if the module does not exist (QVZ), or when the read measured value has overshot or undershot (7FFF or 8000 hexadecimal).
The module output ULZ (Live Zero) is set to the 1-signal for an invalid measured value. An alarm message is created for "Bad Quality".

TYP = 10: Using driver block CH_AI, certain connections between driver block and measuring value block are required (see below).
If the driver block has status 16#00 (invalid value) the measuring value block also sets block output ULZ (Live Zero) to 1-Signal. An alarm message is created for "Bad Quality".
This behavior was changed in Cemat V7.0 SP1 because in case of a card failure no message was created by C_MEASUR and there was no indication of the fault in the diagnosis functions of the group (Summarizing indication, Status call).

TYP = 20: The driver block Pcs7AnIn provides the signal status in the structure. If the Structure variable ST contains value 16#00, the value is invalid and the measuring value block sets block output ULZ (Live Zero) to 1-Signal. An alarm message is created for "Bad Quality".

In the block symbol and in the faceplate the signal status is shown. The code is additionally displayed in the diagnosis window.

Output of the measuring value:

The physical value (raw value) is transferred to output MV_I and it is displayed in the diagnosis window.

If the behavior of the block is not changed via parameterization, the same physical value is transferred to output MV and structure output PV_Out.
Additionally the physical value is calculated into a percentage value (upper limit 1 = 100%) and available at output MV_PERC.

All further functions are optional and can be defined through corresponding parameterization of the block parameters.

Limit Supervision:

The analogue value can be monitored at 8 limits. With limit violation of lower limit 1 or upper limit 1 a warning is generated. With limit violation of lower limit 2 or upper limit 2, an alarm (fault message) is created. The status "limit violated" is additionally available as binary block output and in structure format.

With the limit violation for switching limits (2 upper limits, 2 lower limits) only a binary block output and a structure output is set. No alarm is created.

The display and alarming for lower limit 1 and two and upper limits 1 and 2 can be configured through parameterization of the measuring value block.

- Via functions RA_HH, RA_H, RA_L, RA_LL and RA_LZ the message can be suppressed and the lower and upper limits behave like switching limits and, in case of Live Zero, only the output is set.
- Via the interface RA_OI the behavior of RA_HH, RA_H, RA_L and RA_HH can be changed in a way that in case of a limit violation even the block output are not set.
- With interface UAMV alarms and dynamic faults can be suppressed in general. (In case of a limit violation the block shows only static indications).
  This behavior can be desired during the start-up or for non running equipment.
- The annunciation release UMFR can be used in order to prevent an onrush of messages in case of power failure. As long as UMFR has 0-Signal the message generation in the block is frozen and neither incoming nor outgoing messages are created.
- Via interface UMZS the block can be deselected for the summarizing indication in group and route. In the status call the fault and warnings can still be seen.
- Via interface GFSO the block can also be deselected form the summarizing indication in group and route. In this case the block faults and warnings are not entered in the status call.
- Through release at input REL_SPIK and configuration of a time delay at SPIK_TIM, spikes can be suppressed.
- Through configuration of a hysteresis at parameter HYSTERES it can be prevented that a process value which is very close to the limit (sometimes below, sometimes above) continuously creates incoming and outgoing messages. The outgoing message will only be created if the value goes above the hysteresis value.
- Via parameter LZ_TIM the live zero message can be delayed. If the Value is invalid for a short time, no message is created.
- If the gradient supervision is enabled at input REL_GRAD, the block outputs UGP or UGN will indicate that the process value increases or decreases to fast.
- Via parameter MTRIP it can be decided to memorize the fault until the acknowledgement.

Manipulation of the measured value:

- Through releasing input REL_SMOO and the configuration of the smoothing time SMOO_TIM the smoothing function is enabled. This is useful for values which change very fast or for controller values.
- Via parameters REL_SQAR and REL_ROOT the calculation functions for squaring and root extraction can be enabled. The outputs MV and the structure output PV_Out change accordingly.

Release, block or simulation functions:

Under certain circumstances it can be necessary to suppress the supervision completely. Here fore the measured value block has different options:

- Via interface RELS the complete supervision can be enabled or disabled. If the supervision is disabled, all limit bits and fault bits are reset.
  The enable can be delayed via timer REL_DEL, e. g. suppress faults in the start-up phase of a motor. Only the live zero supervision remains active.
- Via interface UGWB the limit value calculation will be released or suppressed. In this case the status of the limit bits and the fault bits is frozen. The live zero supervision remains active.
- If the bypass function is activated via BYBP_ACT, the measured value can be switched into service mode via diagnosis window (or via input UGWA). In this mode the output of the measuring value MV and the structure output PV_Out are still actualized but the limit bits and the fault bits are forced to "0".
- If the bypass function BYBP_ACT is deactivated, the measuring channel can be blocked via UGWA. In this case the output of the measuring value MV and the structure output PV_Out are not actualized any more and the limit bits and fault bits are frozen.
- Via interface USCB the output can be switched to scale beginning. E. g. in order to avoid the display of small current values if the drive is stopped.
- If the block is switched to simulation, instead of the input value the simulation value is displayed and transferred to the output MV and structure output PV_Out.
  The change to simulation is carried out via diagnosis window or automatically if the AS is switched to sequence test mode.

Adaptations in the Display functions:

- Via Parameter REL_SUC the measurement can be defined as Suction Measurement. In this case the faceplate will show the bar upside down (Starting from top and growing towards the bottom). An additional text "Suction Measurement!" will be displayed.

Connection between Driver block CH_AI and C_MEASUR

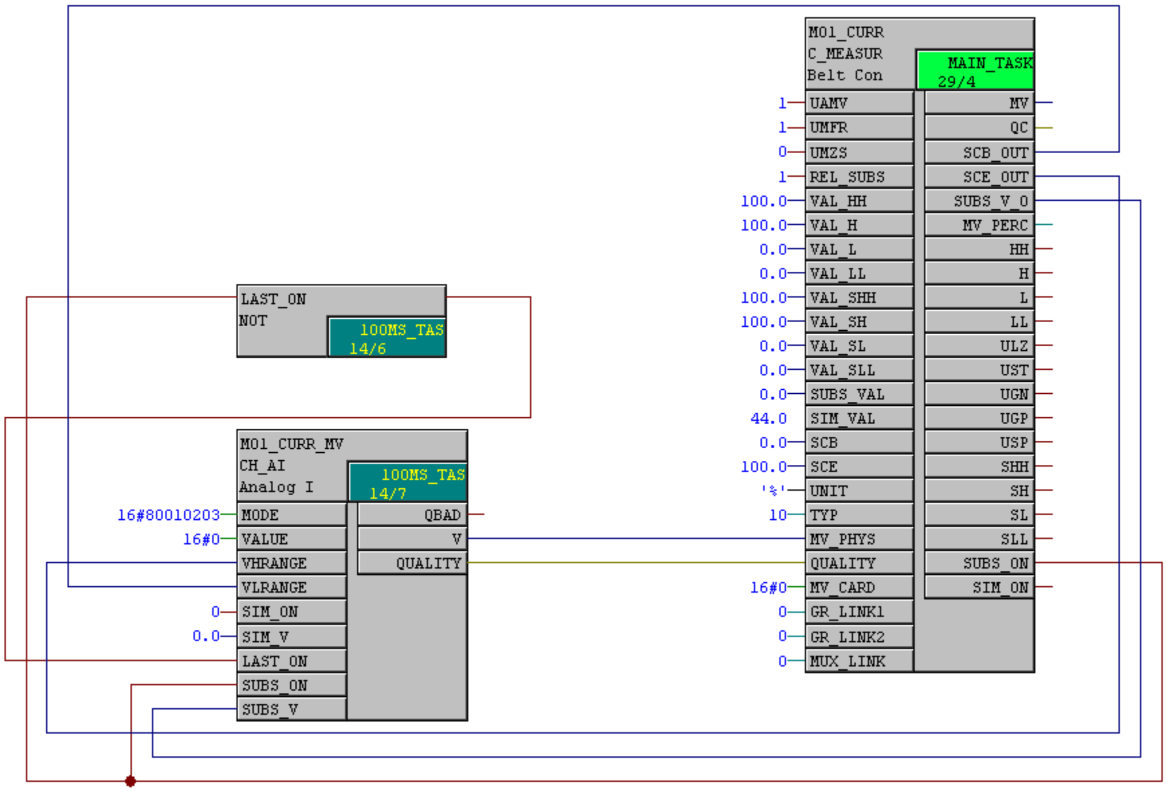
To enable the selection and parameterization of substitution value and simulation value from the Operator Station the Driver block CH_AI has to be connected to the Measuring value in the following way:

- The settings for scale beginning and scale end (SCB and SCE) can either be carried out at the driver block or at C_MEASUR. In the following example the settings at the C_MEASUR are used and transferred via SCB_OUT and SCE_OUT to the driver block.

Caution: Caution: For PT100 this connection has to be removed. Value at VHRANGE and VLRANGE must be "0".

- In PCS7 V7 you have three choices to configure the behavior in case of "Bad Quality" from the driver block: to keep the last valid value, to use a substitution value or to use the invalid value.
  The Cemat Measure block has a Process Parameter for "**Substitution value"**, in order to show this value in the diagnosis picture. If you chose this option, you have to set REL_SUBS to 1-Signal and enter the Substitution value to SUBS_VAL.
  In order to transmit this information to the PCS7 driver block, connect output SUBS_V_O of the measure to input SUBS_V of the driver block. To enable the function at the driver block, connect output SUBS_ON of the measure to input SUBS_ON of the driver block and the inverted information to input LAST_ON of the driver block.
  In order to use the **"Last valid value"**, set input REL_SUBS to 0-Signal and connect output SUBS_ON of the measure to input SUBS_ON of the driver block and the inverted information to input LAST_ON of the driver block.
  For option **"Invalid Value"**, set input REL_SUBS to 0-Signal and at the driver block you may set signals LAST_ON and SUBS_ON either both to 1-Signal or both to 0-Signal.

- The Simulation option at the Driver block itself must not be used in Cemat. The C_MEASUR has a Simulation option itself and only if you enter the Simulation Value at input SIM_VAL of the C_MEASUR, the Simulation Value is indicated in the Diagnosis Picture correctly.



Operating principle

Hardware / measuring channel inputs

TYP	**Type of the imported value**	**Default: 77**

Format INTEGER

The type decides via which input channel the measuring value is read. This depends on the format of the value.

TYPE 10: Import the measured value in REAL format.
The physical value must be connected to parameter MV_PHYS. If PCS7 driver blocks are used the Quality code is transmitted via parameter QUALITY.

TYPE 20: Import the measured value as structure.
The physical value must be connected to parameter PV. The structure contains the value and the signal status.

TYPE 77: Import the measured value from the S7 peripheral card.
The card value (Input word) must be connected to parameter MV_CARD. The CARD_SCB and CARD_SCE parameters are used to define the scale beginning and scale end of the card.

MV_PHYS	**Process value in REAL format**	**Default: 0.0**

Format REAL

Parameter MV_PHYS is used to read a measured value as a physical value. This can be a value from the program (e. g. from a recipe, a calculated or a simulated value) or the output value of a PCS7 driver block. In the last case the quality code must be transmitted additionally.

The MV_PHYS parameter is read only when the measured value type = 10.

QUALITY	**Quality code**	**Default: 16#FF**

Format BYTE

If Driver blocks CH_AI are used, the output QUALITY of the driver block must be connected to Interface QUALITY of the measured value block.
With Quality Code = 16#FF (or Quality code 16#99 for migrated projects) the measured value block knows that no driver block exists.

PV	**Process value in REAL format as structure**

Format STRUCT

The function of structure variable PV.Value corresponds to MV_PHYS. Structure variable PV.ST contains the quality code. Interface PV can be connected with a structure output as e. g. the output of a PCS7 driver block Pcs7AnIn.

The MV_PHYS parameter is read only when the measured value type = 20.

Structure variables:

PV.Value	**Value**	**Default: 0.0**

Format REAL

PV.ST	**Signal status**	**Default: 16#FF**

Format BYTE

MV_CARD **Process value directly from the input card** **Default: 16#FF**

Format WORD

The MV_CARD parameter is used to import a measured value directly from the card. The calculation of the physical value is carried out in the measured value block itself, based on beginning value and end value of the card (CARD_SCB and CARD_SCE).

The MV_CARD parameter is read only when the measured value type = 77.

CARD_SCB **Beginning value of the card** **Default:0**

Format INTEGER

This is the beginning value for the rated range of the analog input card.

CARD_SCE **End value of the card** **Default: 27648**

Format INTEGER

This is the end value for the rated range of the analog input card.

Calibration function

REL_CALI **Enable Calibration function** **Basic state 0-signal**

Format BOOL

Calibration is only possible for Card Values (reading via Interface MV_CARD) and if interface REL_CALI is set to 1-Signal.

The following interfaces are internally used for the calculation of Scale beginning SCB and Scale end SCE.

CaTe_SCB **Temp Start value for SCB** Default: 0.0

Format REAL

In case of calibration, the temporary Start value *CaTe_SCB* is used for the calculation of Scale beginning SCB.

CaTe_SCE **Temp End value for SCE** **Default: 0.0**

Format REAL

In case of calibration, the temporary End value *CaTe_SCE* is used for the calculation of Scale end SCE.

CaVa_Low **Card value low for calculation** **Default: 0**

Format INTEGER

In case of calibration, the Card low value *CaVa_Low* is used for the calculation of Scale beginning SCB.

CaVa_Hi **Card value high for calculation** **Default: 27648**

Format INTEGER

In case of calibration, the Card high value *CaVa_Hi* is used for the calculation of Scale end SCE.

Input interfaces

RA_HH **Release of fault message Upper limit 2** **Basic state 1-signal**

Format BOOL

If a 0-signal is applied at this interface, no alarm message is generated; no summarizing fault indication for group and route, and no color change to the digital display at the control.

<u>Application:</u>

If these limits are to be used as a switching limit.

RA_H **Release of fault message Upper limit 1** **Basic state 1-signal**

Format BOOL

See RA_HH

RA_L **Release of fault message Lower limit 1** **Basic state 1-signal**

Format BOOL

See RA_HH

RA_LL **Release of fault message Lower limit 2** **Basic state 1-signal**

Format BOOL

See RA_HH

RA_LZ **Release of fault message Life Zero** **Basic state 1-signal**

Format BOOL

See RA_HH

RA_OI **Release output interface fault limits** **Basic state 1-signal**

Format BOOL

If the Release of fault message (RA_HH, RA_H, RA_L or RA_LL) is connected with 0-Signal, no alarm message is created in case of a limit violation, but the fault output (HH, H, L, LL) is still set. The output can be used as switching limit.

In order to prohibit the setting of the output, the interface RA_OI must be connected with 0-Signal.

Example for the limit violation of upper limit 1:

RA_OI	RA_H	Alarm	Output H
1	1	yes	1
1	0	no	1 (Output is used as switching limit)
0	1	yes	1
0	0	no	0 (Output will be suppressed)

UAMV **Alarm interlock** **Basic state 1-signal**

Format BOOL

No alarm message is generated at this interface for a 0-signal. The group fault lamp lights continually red if a fault has occurred. The status call can be used to query the fault cause.

Typical application*:*

If, for example, a measured value module is not to produce any alarm when the group is stationary, log '0' is applied to the UAMV. If the group is stationary, this fault is displayed as GZS (red continuous light). UAMV can, for example, be connected with GRE; i.e. the alarms are activated as soon as the group starts to run.

UMFR **Annunciation release** **Basic state 1-signal**

Format BOOL

This interface is used in order to avoid incorrect alarms in case of power supply failure. In case of 0-Signal at this interface, no alarm messages are created (neither incoming nor outgoing messages, the actual status gets frozen) and no group displays are triggered for group and route.

Example:
If the control voltage fails for MCC or field signals, every sensor signal would initiate an alarm message (surge of messages). To avoid this, you have to connect the signal "control voltage ok" to the interface UMFR.
As a result no alarms are produced if the control voltage fails. An annunciation module must be configured to report the "control voltage failure" cause.

UMZS **Fault interlock to the group** **Basic state 0-signal**

Format BOOL

A 1-signal on UMZS prevents that the dynamic and static fault of the measuring value is passed to the summarizing indication of group and route. In the status call the fault can still be seen.

GFSO **Group fault / status off** **Basic state 0-signal**

Format BOOL

1-Signal at GFSO completely deselects the measured value block for the summarizing indication in group and route and also for the Status Call.

MTRIP **Memorize trip** **Basic state 0-signal**

Format BOOL

Some process signals (e. g. motor current or pressure signals) may immediately change to good condition after the trip. In this case the drive which was stopped by protection interlock does not show any fault after switching off. Even in the status call the fault is not visible any more.

With 1-Signal at input MTRIP the trip is memorized. The output signals HH, H, L or LL remain set until the measured value block gets acknowledged.
If HH and H were set, after the outgoing of the fault only HH is memorized. The same applies to LL an L.

In connection with other interfaces, if the trip is memorized the following must be considered:

- The alarm interlocking UAMV has higher priority than MTRIP. If UAMV = 0-Signal the faults are not memorized.
- The annunciation release UMFR has higher priority than MTRIP. If UMFR = 0-Signal the faults are not memorized.
- UGWB is higher prior than MTRIP. If UGWB = 0-Signal the faults are not memorized
- With change to "Bypass" the memorized fault bits get reset as well.

RELS **Release Supervision** **Basic state 1-Signal**

Format BOOL

Only if input RELS has 1-Signal the supervision function of the measured value block is released.

In case of 0-Signal the input is still read but the supervision functions are blocked, which means outputs HH, H, L and LL show good condition and no limit message is generated. The live zero supervision is still active.
The supervision function can additionally be delayed via parameter REL_DEL.

Example Motor current:
The limit values for the motor current should only be active after the motor has been started for some time. By connecting the Running signal of the motor to input RELS of the measured value block, the limits are not evaluated as long as the drive is not running.

Caution: Simulation has the highest priority. If the simulation is enabled for the measured value block, the supervision is automatically released.

UGWB **Release limit value calculation** **Basic state 1-signal**

Format BOOL

With 0-Signal at interface UGWB the limit value calculation is blocked. The block continues to read the input but the limit bits are frozen.
The Measuring value module monitors and signals then only live-zero.

USCB **Force MV output at scale beginning** **Basic state 0-signal**

Format BOOL

If a 1-signal is applied to this interface, then the value of the scale beginning is available at output MV. This function can be used if, for example, a motor current is measured, and the measurement still shows a low value although the motor is switched off.

BYPB_ACT **Bypass-button active** **Basic state 0-Signal**

Format BOOL

With 1-signal at this parameter the button "BYPASS" in the diagnosis faceplate is displayed. With this button one can activate and deactivate the bypass-function.

Caution: If BYPB_ACT is set to 1-Signal the mode of action for interface UGWA is different. The function is known as "*SERVICE"* too.

UGWA **block measuring channel / bypass** **Basic state 0-signal**

Format BOOL

The way of working is depending from parameter BYPB_ACT.

if **BYPB_ACT = 0**

and with 1-signal at UGWA :
- the analogue value is no longer read
- the module flag USP has 1-signal
- monitoring for limit value and gradient, computation, smoothing, etc. are switched off
- the limit value bits are no longer updated
- ***no*** alarm message generated!

Typical case of application is the gas analysis:
During the gas analysis the measuring probe must be cleaned after certain intervals. For this the measuring probe is retracted from the kiln. In order not to have faulty measuring the measuring channel is blocked during the phase of cleaning. For this, a corresponding signal must be connected to interface UGWA.

if **BYPB_ACT = 1** (*SERVICE*)

and with 1-signal at UGWA :

- the analogue value is still read and displayed
- the module flag USP has 1-signal, **all the other module flags are forced to 0-signal**
- monitoring for limit values and gradient, computation, smoothing, etc. are switched off
- ***no*** alarm message generated!

Note: One can switch on the bypass-function from the diagnose faceplate too.

UQIT **Acknowledge (additional)** **Basic state 0-signal**

Format BOOL

The acknowledgement of the measured value fault is normally carried out together with the acknowledgement of any alarm within the same AS (default setting). Interface UQIT is only needed for individual acknowledgement (via push-button) or in case of group-wise acknowledgement.

A signal change from "0" to "1" at UQIT acknowledges the measured value fault.

In case of a conventional control desk, a push-button can be connected to UQIT (for individual acknowledgement) or to the acknowledgement interface at block C_PUSHBT can be used (for AS-wise acknowledgement).

Caution: Using UQIT for individual acknowledgement, the acknowledgement interface at the C_PUSHBT must **not** be connected.

For group-wise acknowledgement connect the output ACK of the corresponding group to interface UQIT of the measured value block. See Engineering Manual, chapter AS-Engineering.

GR_STP **Group is stopped (only Holcim)** **Basic state 0-signal**

Format BOOL

In the Holcim Standard, if the group is stopped, the status indication in case of a fault or warning is "not ready" (violet). For this reason the measured value block must know that the group has not been started. To achieve this, the output GR_STP of the group must be connected to input GR_STP of the measured value block.

Squaring, Root extraction, Spike Suppression, Smoothing (Filter) and Gradient Supervision must be enabled in the CFC. Otherwise the process parameters do not effect:

REL_SQAR **Enable function squaring** **Basic state 0-signal**

Format BOOL

A 1-signal at the REL_SQAR interface releases the Squaring function. The value is calculated based on the following formula:

$$\frac{XE * XE}{SKE - SKA}$$

REL_ROOT **Enable function root extraction** **Basic state 0-signal**

Format BOOL

A 1-signal at the REL_ROOT interface releases the root extraction function. The value is calculated based on the following formula:

$$\sqrt{XE * (SKE - SKA)}$$

REL_SPIK **Enable function spike suppression** **Basic state 0-signal**

Format BOOL

A 1-signal at the REL_SPIK interface releases the spike suppression. The parameter SPIK_TIM is used to set the process value of the spike suppression time.

REL_SMOO **Enable function smoothing** **Basic state 0-signal**

Format BOOL

For each measured value you can set and release a smoothing according to the trapezoidal formula:

$$X_A = \frac{X_E - X_{EA}}{\frac{T_A}{2 * T_G} + 1} * \frac{T_A}{2 * T_G} + X_{EA} \qquad X_{EA} = \frac{X_E - X_{EA}}{\frac{T_A}{2 * T_G} + 1} * \frac{T_A}{T_G} + X_{EA}$$

T_A = 1s is set as standard as the invocation time. This results - without taking the physical unit [s] into account - in the following simplified formulas:

$$X_A = \frac{X_E - X_{EA}}{\frac{1}{2 * T_G} + 1} * \frac{1}{2 * T_G} + X_{EA} \qquad X_{EA} = \frac{X_E - X_{EA}}{\frac{1}{2 * T_G} + 1} * \frac{1}{T_G} + X_{EA}$$

$$\boxed{X_A = \frac{X_E - X_{EA}}{1 + 2 * T_G} + X_{EA}} \qquad X_{EA} = \frac{X_E - X_{EA}}{\frac{1}{2} + T_G} + X_{EA}$$

$$\boxed{X_{EA} = \frac{2 * (X_E - X_{EA})}{1 + 2 * T_G} + X_{EA}}$$

XE	=	New analog value
XA	=	Smoothed analog value (result)
XEA	=	Old value for smoothing
TG	=	Smoothing time
TA	=	Invocation time (here always set to 1s)

A 1-signal at the REL_SMOO interface releases the smoothing. The parameter SMOO_TIM is used to set the process value for the smoothing time.
With the smoothing time SMOO_TIM one can determine the degree of smoothing.

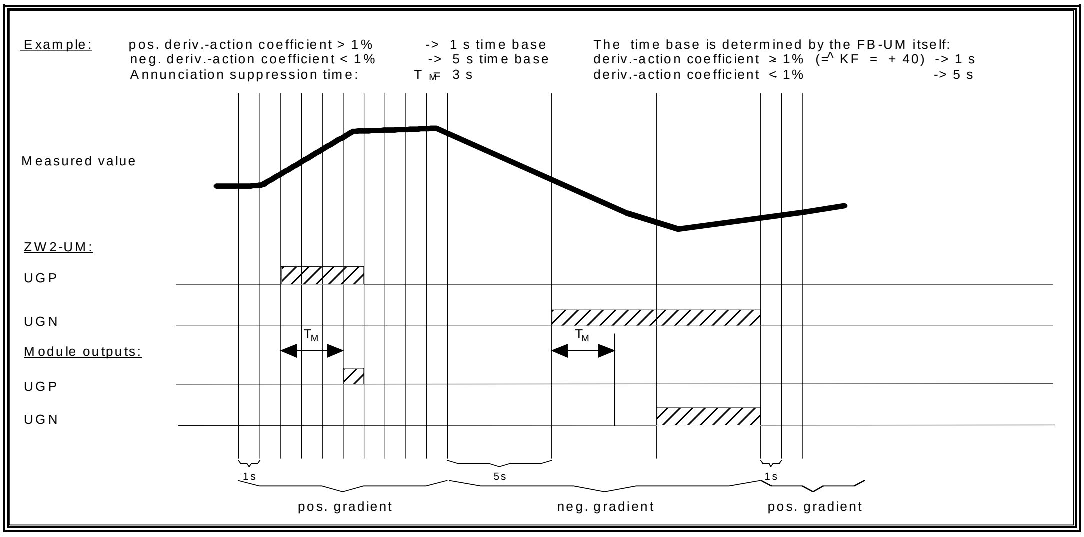
REL_GRAD Enable function gradient monitoring Basic state 0-signal

Format BOOL

Changes of the measured value can be monitored separately, i.e. in the positive as well as in the negative direction (positive/negative gradient). When the monitoring is released one module output is set to a 1 signal in each case if the maximum permitted positive or negative derivative-action coefficient is exceeded. The monitoring can be delayed by setting a time in the OS.

The gradient monitoring does **not** generate **any alarms**, an alarm message line does not appear on the OS. Should, however, this function be requested, then an annunciation module must be programmed for this.

Time progression with the gradient monitoring:



In this diagram you can see that the detection and changeover of "positive gradient" to "negative gradient" and vice-versa happens only after the access to the measured value. This means, changes between two access points are not detected immediately. The newly read measured value is always compared with the measured value read during the last access. In this context, the term "measured value" refers to a read-in analog value which has been, smoothed and calculated, depending on the release functions. If the new measured value is greater than or equal to the last read-in measured value the gradient is positive and the difference is compared with the set "positive derivative-action coefficient". If the difference is greater than the set value, then the module output UGP is set after the delay has elapsed. The same applies to the negative gradient.

The variables "positive/negative derivative-action coefficient", necessary for the gradient monitoring, must each be entered with a **positive** sign!

A 1-signal at the REL_GRAD interface releases the gradient monitoring. The parameters GRAD_POS, GRAD_NEG and GRAD_TIM are used to set the process values of the gradient monitoring.

Substitution value and Simulation value:

REL_SUBS **Enable Substitution value active** **Basic state 0-signal**

Format BOOL

Interface REL_SUBS is used in order to parameterize the channel driver block behavior in case of a fault. Same as for the driver block 1-Signal means "Substitution value" in case of a card failure and 0-Signal means "last valid value".

The Information on REL_SUBS is displayed in the diagnostic picture of the measuring value and also available at output SUBS_ON, which can then be connected to parameter SUBS_ON of the Driver block CH_AI.

REL_SIM **Enable Simulation value active** **Basic state 0-signal**

Format BOOL

Via Diagnosis Picture of the Measure the Simulation can be enabled and disabled. REL_SIM can not be used for connection in the CFC. When switching the AS into sequence test mode all C_MEASURE are automatically switched to simulation.

After the Simulation is activated the value at Parameter SIM_VAL is used as input value.

The Simulation can always be used, independent of whether driver blocks are used or not. The Simulation input SIM_ON at the driver block itself can not be used anymore. This would lead to a wrong indication.

Caution: Simulation-function has the highest priority, which means it is active irrespective of the quality code of the measure (except if Bypass function is enabled).

For customizing of the faceplate and the diagnosis window:

REL_SUC **Suction measurement** **Basic state 0-signal**

Format BOOL

Via Parameter REL_SUC the measurement can be defined as Suction Measurement. In this case the faceplate shows the bar upside down (starting from top and growing towards the bottom). The curve itself does not change (in WinCC the high value is always on top and the low value at the bottom).
As a reminder, additional texts "Low Suction", "High Suction" and "Suction Measurement!" will be displayed.

STA2_B10 **Spare input for visualization** **Basic state 0-signal**

STA2_B10 till STA2_B17

Format BOOL

These parameter are transferred to the STATUS2 and can be used for additional purposes for e.g. in the diagnostic window.
Look at the table OS-variables.

Additional inputs for testing and as Interface to the OS:

TEST_OSS **Test interface** **Default: 0**

Format INTEGER

The test interfaces are only used during module development and must not be changed!

MSG8_EVID **Message ID** **Default: 16#00**

Format DWORD

Interface to OS

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

Group and Object links

Group/Route links

Each drive block, annunciation block or measurement block must be linked to a group or route in order to collect the status of these objects for summarizing indications.

The group link is essential for control and diagnosis and comprises the following functions:

- All objects, linked to the group (or route) are listed in the group (or route) object list.
- All objects, linked to the group (or route) are highlighted in the process picture with button "Show related objects".
- The faults of all objects, linked to the group (or route) are included in the summarizing fault indication of the group (or route).
- The warnings of all objects, linked to the group (or route) are included in the summarizing warning indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

A measurement block can be linked to two groups or routes via *GR_LINK1* and *GR_LINK2*. If a measurement block belongs to more than two groups or routes the additional block C_MUX must be inserted, which provides 5 additional link interfaces.

Caution: The main group (or main route) should be connected to *GR_LINK1*! This is the one which is opened with a click on button "Main group" in the faceplate of the measurement block.

A measurement block which belongs to a drive can be connected to the drive via interface *O_LINK* instead of the connection to the group or route vie *GR_LINK1* and *GR_LINK2* or via C_MUX. The main group (or main route) information is not available in this case.

Caution: It is not allowed to use the Object link and the Group/Route link at the same time: If *O_LINK* is used, *GR_LINK1* and *GR_LINK2* or *C_MUX* must not be connected!

GR_LINK1 **Link to group or route**

Format STRUCT

The GR_LINK1 interface of the measured value must be connected with the R_LINK interface of the route or with the G_LINK interface of the group.

Structure variables:

GR_LINK1.Link **Link** **Default: 0**

Format INTEGER

GR_LINK1.Command **Group / Route Command** **Default: 16#00**

Format WORD

GR_LINK2 **Link to group or route**

Format STRUCT

If the measured value module belongs to two different routes or groups, the GR_LINK2 interface must be connected with the second route/group.

Structure variables:

GR_LINK2.Link **Link** **Default: 0**

Format INTEGER

GR_LINK2.Command **Group / Route Command** **Default: 16#00**

Format WORD

MUX_LINK **Link to C_MUX**

Format STRUCT

If the measured value belongs to more than two different routes or groups, the C_MUX module must be series-connected. C_MUX has 5 inputs (GR_LINK1 to GR_LINK5) for connection with the groups/routes and one output (MUX_OUT) for connection with the MUX_LINK interface of the measured value module.

Caution: If a C_MUX block is used, the programming order is very important. The C_MUX must be called before the measured value block!
The MUX_IN interface can under no circumstances be used for connection with a group or route. It is used exclusively for connection with another MUX module.

Structure variables:

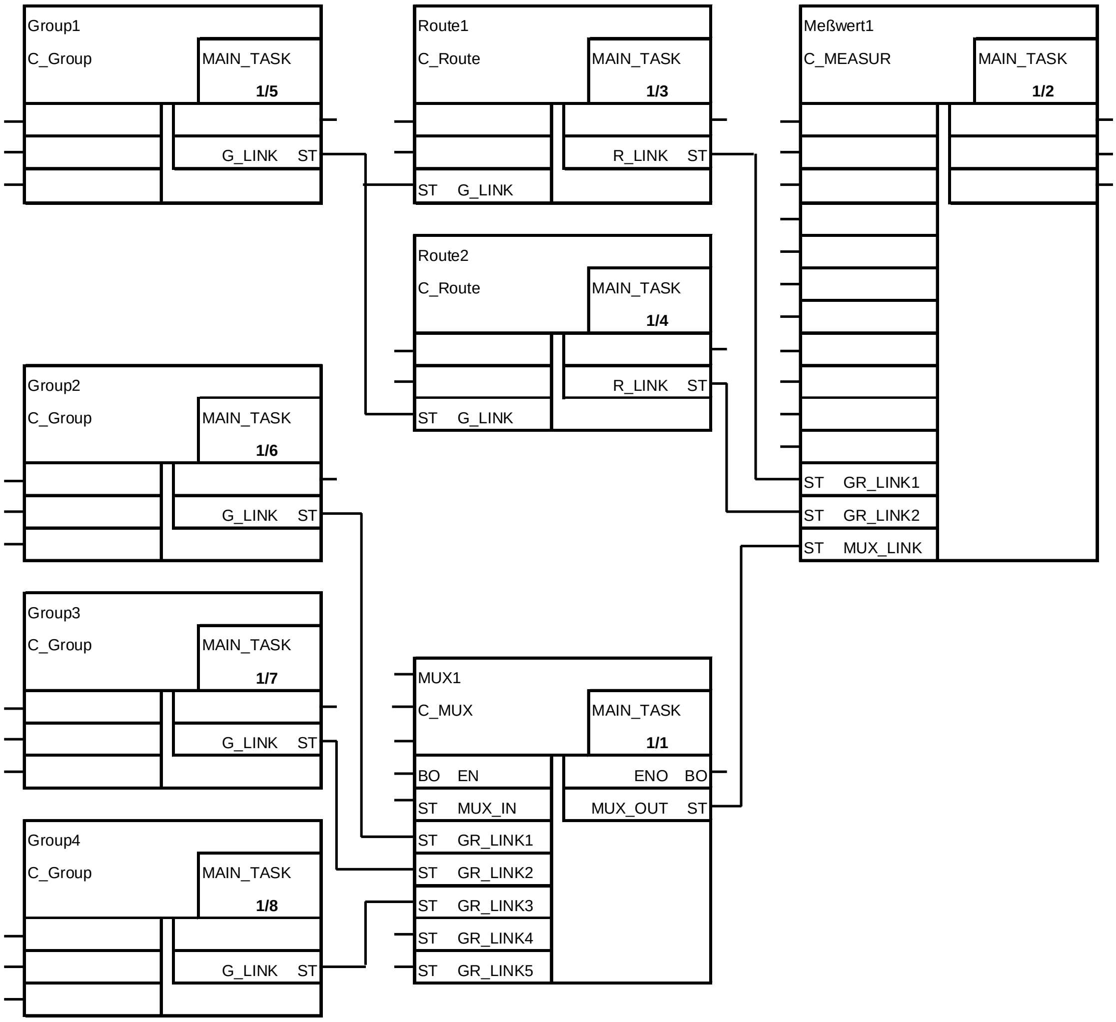
MUX_LINK.Point_GRL **Pointer** **Default: 0**

Format INTEGER

MUX_LINK.Command **Group / Route Command** **Default: 16#00**

Format WORD

Example of a circuit:

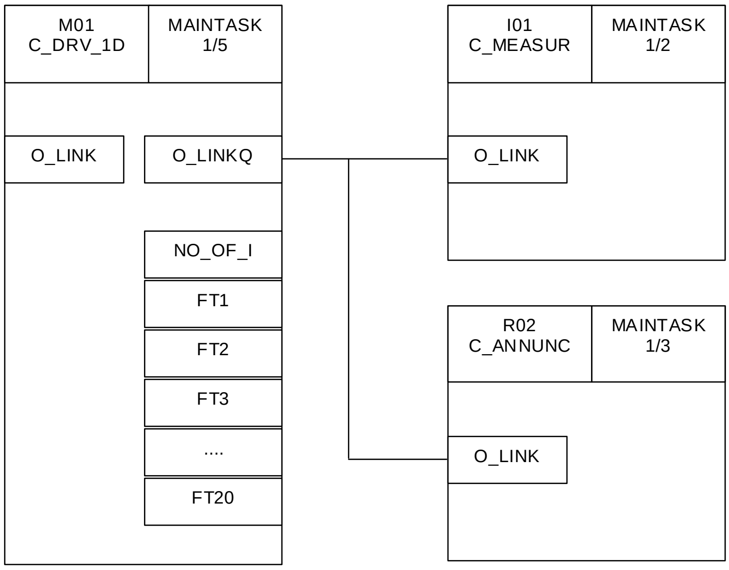


Caution: Check the runtime sequence! The C_MUX module must be called before the measured value. For the other modules the run sequence is as follows: first the annunciations, measured values and drives, then the associated routes and finally the associated groups.

Caution: Some people use one C_MUX block and connect its output to a number of drives/devices, annunciations and measurements.
If you do so, make sure that the C_MUX is called before all the other objects and that no other C_MUX call comes in between.
We don't recommend using the same C_MUX if the blocks are located in different runtime groups.

Object links to master objects

Annunciations, measurements and process feedback blocks which belong to a drive must not be linked to the group (or route), if they are connected via Object link to the drive output *O_LINKQ*.



The drive block collects the information and forwards it to the group (or route). The result is as follows:

- All objects, linked to the drive are listed in the drive object list and in the group (or route) object list (one level below the drive).
- All objects, linked to the drive are highlighted in the process picture with button "Show related objects".
- The faults of all objects, linked to the drive are included in the summarizing fault indication of the group (or route).
- The warnings of all objects, linked to the drive are included in the summarizing warning indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

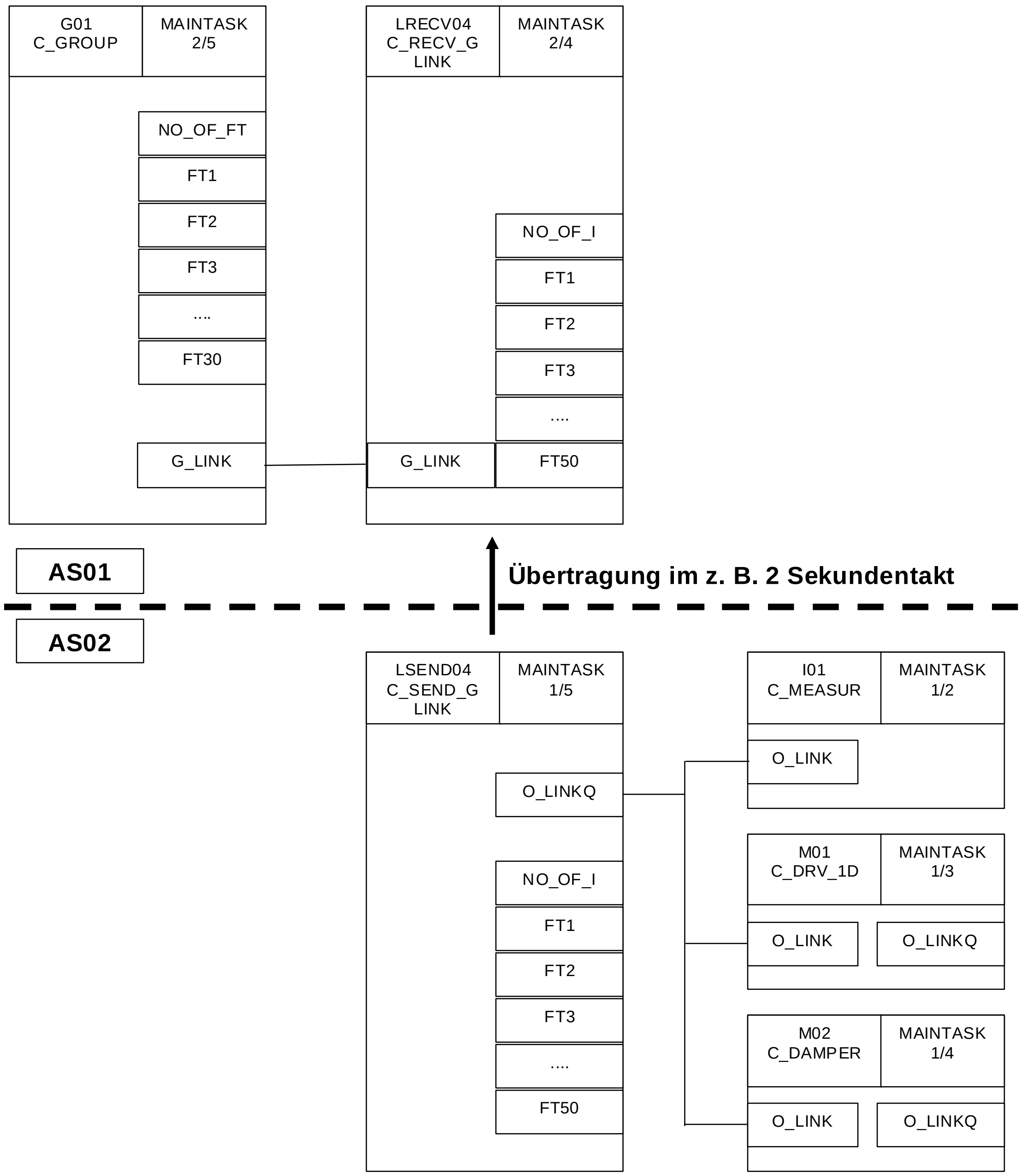
Object links to a group in a different AS

If a Cemat object is programmed in a different AS than the superordinated group a direct link between the measured value block and the group is not possible. In this case special send and receive blocks must be inserted which collect the object data and transmit it to the group.

In the AS of the group the group output *G_LINK* is connected to input *G_LINK* of the block C_RECV_G.

Caution: C_RECV_G can only be linked to a C_GROUP module. Linking to routes is not permitted and will not work!

In the AS of the Cemat Objects the output *O_LINKQ* of block C_SEND_G is connected to input *O_LINK* of the drives/devices, annunciations, measurements and process feedback blocks.



O_LINK **Link to another object**

Format STRUCT

Interface *O_LINK* of the measured value block is used for the link to a master object (drive/device) or for the link to the group of a different AS via C_SEND_G.

Link to a master object:

Output *O_LINKQ* of the drive/device must be connected to interface *O_LINK* of the allocated annunciations, measurements and process feedback blocks, while the drive/device itself is connected via *GR_LINK* to the group (or route).

Link to the group of a different AS:

Output *O_LINKQ* of the send block C_SEND_G must be connected to interface *O_LINK* of the allocated annunciations, measurements and process feedback block.

Caution: If annunciations, measurements or process feedback blocks belong to the drive, they don't need to be connected to output *O_LINKQ* of the C_SEND_G block. They can also be programmed as slave objects and connected to output *O_LINKQ* of the drive.

Structure variables:

O_LINK.iDB	**Instance DB master object**	**Default: 0**
Format INTEGER		
O_LINK.iDW	**DW number NO_OF_FT in master object**	**Default: 0**
Format INTEGER		
O_LINK.Command	**Group / Route Command**	**Default: 16#00**
Format BYTE		
O_LINK.Status	**Status master object**	**Default: 16#00**
Format BYTE		

Process values

The process values can be set during engineering and they can be changed online from the OS. To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

VAL_HH **Upper limit 2** **Default: 100.0**

Format REAL.

This is the value of upper limit 2. If this limit value is overshot, then the module generates an alarm message and sets module output HH.

VAL_H **Upper limit 1** **Default: 100.0**

Format REAL.

This is the value of upper limit 1. If this limit value is overshot, then the module generates an alarm message and sets module output H.

If the measure is connected to the drive block in order to display the motor current in the drive faceplate, upper limit 1 corresponds to 100% of the current value.

VAL_L **Lower limit 1** **Default: 0.0**

Format REAL.

This is the value of the lower limit 1. If this limit value is undershot, then the module generates an alarm message and sets module output L.

VAL_LL **Lower limit 2** **Default: 0.0**

Format REAL.

This is the value of lower limit 2. If this limit value is undershot, then the module generates an alarm message and sets module output LL.

LZ_TIM **Delay Live Zero** **Default: 3**

Format INTEGER (0 - 999)

Value in seconds.
When a live-zero fault occurs, the corresponding alarm message and the module output ULZ is delayed by the set time value.

T_V = 0s means: no delay

SPIK_TIM **Spike suppression time** **Default: 3**

Format INTEGER (0 - 999)

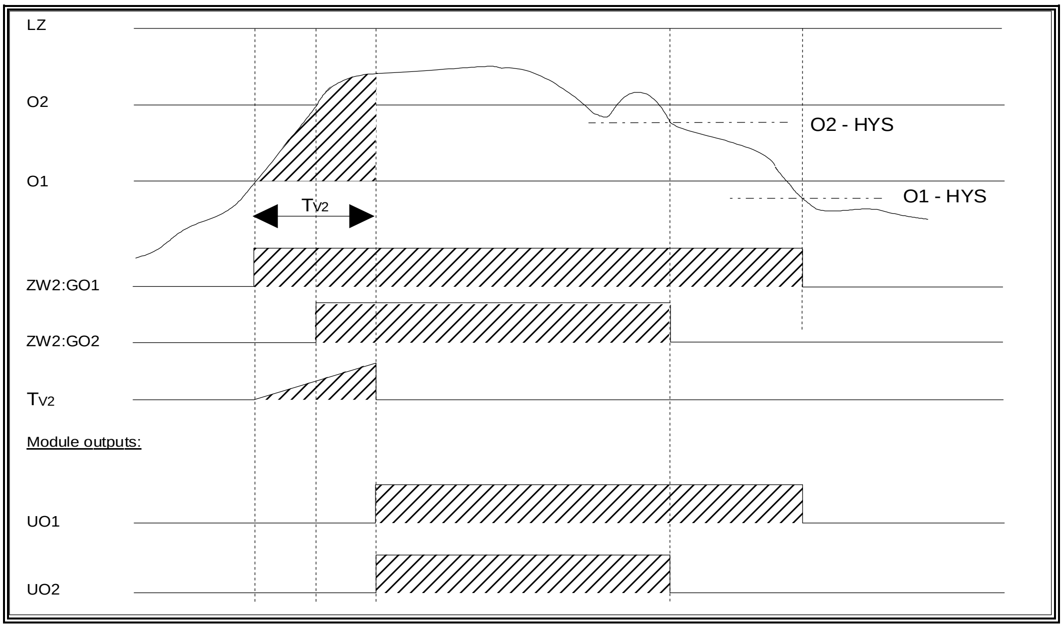
Value in seconds.
If the spike suppression is released (release functions), then, with the occurrence of a limit violation, the corresponding annunciation is delayed by the set time value.

HYSTERES Hysteresis Default: 0.0

Format REAL (0.0 - 9.9)

To avoid constant coming and going of a limit value alarm message - if, e.g. the measured value "varies" around a limit value - one can enter a hysteresis value from the OS. The hysteresis value in Percent is entered at parameter HYSTERES. If a limit value is undershot or overshot (value < Lower limit 1/2 or value > Upper limit 1/2), a fault is reported if the appropriate connection is available. This fault is corrected only when the limit value (including hysteresis) is once again overshot or undershot (value > Lower limit 1/2 + hysteresis, or value < Upper limit 1/2 - hysteresis).

The hysteresis function is also valid for switching limits.



Time progression during spike suppression with hysteresis being taken into consideration:

In this diagram you can see that the delay time for the spike suppression is not re-triggered in every case. The delay starts in the example after an overshoot of UL1. In the example, UL2 is also exceeded shortly after UL1 but T_{V2} continues to run (no reset!). At the end of T_{V2} , UL1 and UL2 are signaled ***simultaneously***.

GRAD_POS **Gradient positive** **Default: 0.0**

Format REAL (0.0 - 99.9)

Value in %.
If the gradient monitoring has been released (release functions), the measured value will be monitored to ensure that an increase of the measured value (positive gradient Δy) does not exceed the value specified here. However, the UGP module output is set if Δy is larger than the positive gradient specified here.

GRAD_NEG **Gradient negative** **Default: 0.0**

Format REAL (0.0- 99.9)

Value in %.
If the gradient monitoring has been released (release functions), the measured value will be monitored to ensure that a decrease of the measured value (negative gradient Δy) does not exceed the value specified here. However, the UGN module output is set if Δy is larger than the negative gradient specified here.

GRAD_TIM **Gradient delay** **Default: 0**

Format INTEGER (0 - 999)

Value in seconds.
If the gradient monitoring is released (release functions), in the occurrence of a positive or negative gradient overshoot, the corresponding module output (UGN/UGP) is delayed by the set time value.

SMOO_TIM **Smoothing time** **Default: 0**

Format INTEGER (0 - 999)

Value in seconds.
If the smoothing is released (release functions), then the smoothing time, set here, is the degree of smoothing. The longer the smoothing time the stronger the smoothing.

T_G = 0s means: no smoothing

Variable "invocation time T_A", appearing in the trapezoidal formula, is set in the standard with T_A = 1s.

REL_DEL **Release supervision delay time** **Default: 0**

Format INTEGER (0 - 999)

Value in seconds.
With the release of the supervision function (RELS = 1-Signal) the delay time REL_DEL is started. After this time has elapsed the Limit value supervision for the process signal is activated.
See description for RELS.

VAL_SHH **Upper switching limit 2** **Default: 100.0**

Format REAL

This is the value of the upper switching limit 2. If this limit value is overshot, then the module sets module output SHH.

VAL_SH **Upper switching limit 1** **Default: 100.0**

Format REAL

This is the value of the upper switching limit 1. If this limit value is overshot, then the module sets module output SH.

VAL_SL **Lower switching limit 1** **Default: 0.0**

Format REAL

This is the value of the lower switching limit 1. If this limit value is undershot, then the module sets module output SL.

VAL_SLL **Lower switching limit 2** **Default: 0.0**

Format REAL

This is the value of the lower switching limit 2. If this limit value is undershot, then the module sets module output SLL.

SUBS_VAL **Substitution value** **Default: 0.0**

Format REAL

Therefore one has to connected the output SUBS_V_O of the C_MEASUR with the parameter SUBS_V of the driver block.

SIM_VAL **Simulation value from OS** **Default: 0.0**

Format REAL

The simulation value can be entered from the Operating System.

SimRight **User right for Simulation** **Default: 24**

Format INTEGER (0 - 99)

Via Parameter SimRight the User right can be defined, which is required for switching the measured value block to Simulation.
By default the parameter SimRight is set to right 24 "Interlocking Signals", but it is also possible to define new, project specific rights and assign them.

This parameter can also be used in order to inhibit the Simulation completely or to enable it dependent on a plant situation (dynamically). If SimRight = 0, the simulation is not possible.

SCB **Scale beginning** **Default: 0.0**

Format REAL

Physical value (start of measuring range).

SCE **Scale end** **Default: 100.0**

Format REAL

Physical value (end of measuring range).

UNIT **Unit** **Default: ‘%‘**

Format STRING (8 characters)

Unit of the measured value.

Output interfaces

MV **Process value output**

Format REAL

Output of the physical measured value.

QC **Quality code**

Format BYTE

Output of the measured value quality code when driver modules are used.

PV_Out **Process value output**

Format STRUCT

In order to display one process value in the drive faceplate, output PV_Out of C_MEASUR must be connected with output PV of the drive (for one value).
If more than one process values shall be assigned to the drive, outputs PV_Out of C_MEASUR have to be connected to C_ANA_SEL (for up to 16 values). In the faceplate of C_ANA_SEL the measuring value can be selected which shall be displayed in the drive faceplate.

Structure variables:

PV_Out.Value **Value** **Default: 0.0**

Format REAL

PV_Out.ST **Signal status** **Default: 16#80**

Format BYTE

Note: If more than one Process Value Archive is used, the OS must be told in which Process Value Archive the Archive Tag of each measure is located. This can be defined via structure variable PV_Out.Value under 'Shortcut'.
The name which is written there will be entered into variable *messwert.*PV_Out#Value#Shortcut and has the highest priority in the detection of the measuring value archive.
Unlike the setting at the block icon (via Attribute ReturnPath) this information is also available for indirect calls of the Measure faceplate.

PV_Stat **Process Value Status + Unit**

Format STRUCT

In order to transmit the status and the unit of one process value to the drive, the output PV_Stat of C_MEASUR must be connected to output PV_Stat of the drive.
In case of the assignment of more than one process values to the drive this is carried out via block C_ANA_SEL.

Structure variables:

PV_Stat.UNIT **Unit** **Default: %**

Format STRING[8]

PV_Stat.STATUS **Status** **Default: 16#00**

Format DWORD

MV_I **Measured value (Input value)**

Format STRUCT

MV_I contains the raw value of the analog input without any manipulation (e. g. smoothing, bypass, simulation etc.). The value is directly derived from MV_PHYS (Type = 10) or read from MV_CARD and converted into a physical value (Type = 77).

MV_I is only used for indication in the faceplate of the measure. It gives the operator the real picture about the status of the measure, especially during simulation or bypass (Service mode).

Structure variables:

MV_I.Value **Value** **Default: 0.0**

Format REAL

MV_I.ST **Signal status** **Default: 16#80**

Format BYTE

SCB_OUT **Scale beginning**

Format REAL

Physical value (start of measuring range).

SCE_OUT **Scale end**

Format REAL

Physical value (end of measuring range).

SUBS_V_O **Substitute value (to driver)**

Format REAL

If driver block CH_AI is used, this parameter can be connected to parameter SUBS_V of the driver block. This enables to enter the substitute value from the Operating System.

MV_PERC **Measured value in %**

Format INTEGER

The percentage value of the motor current can be displayed in the faceplate of the motor. Therefore the output MV_PERC of the C_MEASUR has to be connected to interface MV_PERC of the motor. The 100 % Output value is equal to Upper limit 1.

Note: MV_PERC is always calculated based on the input value (raw value) and therefore not affected by smoothing, simulation etc.

V_HH_O **Upper limit 2**

Format REAL.

Output V_HH_O contains the value of upper limit 2 VAL_HH.

V_H_O **Upper limit 1**

Format REAL.

Output V_H_O contains the value of upper limit 1 VAL_H.

V_L_O **Lower limit 1**

Format REAL.

Output V_L_O contains the value of lower limit 1 VAL_L.

V_LL_O **Lower limit 2**

Format REAL.

Output V_LL_O contains the value of lower limit 2 VAL_LL.

V_SHH_O **Upper switching limit 2**

Format REAL

Output V_SHH_O contains the value of upper switching limit 2 VAL_SHH.

V_SH_O **Upper switching limit 1**

Format REAL

Output V_SH_O contains the value of upper switching limit 1 VAL_SH.

V_SL_O **Lower switching limit 1**

Format REAL

Output V_SL_O contains the value of lower switching limit 1 VAL_SL.

V_SLL_O **Lower switching limit 2**

Format REAL

Output V_SLL_O contains the value of lower switching limit 2 VAL_SLL.

HH **Upper limit 2**

Format BOOL

If the measured value overshoots the upper limit 2, the HH bit is set when the spike suppression time has expired.

H **Upper limit 1**

Format BOOL

If the measured value overshoots the upper limit 1, the H bit is set when the spike suppression time has expired.

L **Lower limit 1**

Format BOOL

If the measured value undershoots the lower limit 1, the L bit is set when the spike suppression time has expired.

LL **Lower limit 2**

Format BOOL

If the measured value undershoots the lower limit 2, the LL bit is set when the spike suppression time has expired.

ULZ **Live Zero or Bad Quality**

Format BOOL

In case of a card/channel failure, the measured value is interpreted as being faulty and, after the live zero delay time has elapsed, bit ULZ is set and an alarm message for "Bad Quality" is created.

The indication of the card/channel fault depends on the method how the input signal is evaluated:

1. The Analog Input is read directly from the Card via Input MV_CARD. (Type = 77; Quality code = 16#FF; Quality code = 16#99 for migrated projects). QVZ is detected during reading of the analog value or if the peripheral card indicates overshoot/undershoot.

   In this case output ULZ is set to 1-signal, a message is created for "Bad Quality", the output MV is forced to Scale End (SCE) and all outputs HH, H, L and LL are set to 1-signal.
2. A PCS7 driver block is used and the Measure reads the physical value from the driver block via Input MV_PHYS. The Quality code from the driver block is 16#00 (Invalid value) because of "Bad Quality" from the drive block.

   In this case output ULZ is set to 1-signal, a message is created for "Bad Quality", the output MV is forced to Scale End (SCE) and all outputs HH, H, L and LL are set to 1-signal.
3. A PCS7 driver block is used and the Measure reads the physical value from the driver block via Input MV_PHYS. The Quality code from the driver block is 16#44 (Last valid value) or 16#48 (Substitution value) because of "Bad Quality" from the driver block.

   In this case output ULZ is set to 1-signal and a message is created for "Bad Quality". As the measure still gets a "good value" from the driver block (which can be either the Last valid value or the Substitution value), this value will still be written to output MV and the outputs HH, H, L and LL depend on the actual value from the driver block.

UST Fault not acknowledged

Format BOOL

UST=1 when the upper limit 2 or the lower limit 2 is violated and an alarm is generated. UST=0 after the acknowledge button has been pressed.

UGN Negative Gradient Overshot

Format BOOL

If the permitted negative gradient is overshot during the reduction of the measured value, then "negative gradient has been overshot", the UGN bit is set when the delay expires.

UGP Positive Gradient Overshot

Format BOOL

If the permitted positive gradient is overshot during the increase of the measured value, then "positive gradient has been overshot", the UGP bit is set when the delay expires.

USP Measuring channel blocked / bypassed

Format BOOL

The measuring channel is blocked if interface bit UWFR has 0-signal. In this case bit USP is set to 1-signal.

SHH Upper Switching Limit 2

Format BOOL

If the measured value overshoots the upper switching limit 2, the SHH bit is set when the spike suppression time has expired.

SH Upper Switching Limit 1

Format BOOL

If the measured value overshoots the upper switching limit 1, the SH bit is set when the spike suppression time has expired.

SL Lower Switching Limit 1

Format BOOL

If the measured value undershoots the lower switching limit 1, the SL bit is set when the spike suppression time has expired.

SLL Lower Switching Limit 2

Format BOOL

If the measured value undershoots the lower switching limit 2, the SLL bit is set when the spike suppression time has expired.

SUBS_ON Substitution value active (driver)

Format BOOL

Using driver block CH_AI this signal can be connected to input SUBS_ON of the driver block. This allows the selection from the Operator station whether in case of a failure the substitution value SUBS_VAL or the last valid value is used as measuring value.

Refer to Release function REL_SUBS.

SIM_ON Simulation value active

Format BOOL

Indicates that the input value is taken from parameter SIM_VAL

Refer to Release function REL_SIM.

Additional outputs for testing and as Interface to the OS:

INTFC_OS Interface status for OS

Format DWORD

Interface to OS

For more information see Variable details.

STATUS Status word for OS

Format DWORD

Interface to OS

For more information see Variable details.

STATUS2 Status word for OS

Format DWORD

Interface to OS

For more information see Variable details.

VSTATUS Status word for Display

Format WORD

Interface to OS

For more information see Variable details.

ALARM for Test

Format WORD

For more information see Variable details.

Time characteristics

The module must be called before the associated route or group.

Any called C_MUX modules must run before this module.

Message characteristics

The module uses the ALARM_8P module to generate annunciations.

A plausibility and priority logic at the process level analyses all object faults
only one fault annunciation is issued for each fault
secondary annunciations are suppressed automatically
the fault source is recorded in detail and uniquely.

The current operational state of the plant objects is automatically taken into consideration during the fault analysis, e.g. all fault annunciations are suppressed automatically for a stationary group
no superfluous fault annunciations are created
the operator does not need to manually disable/suppress any annunciations.

Each fault annunciation is also classified.
This shows whether an **electrical** or a **mechanical** fault, a **process fault** or a shut-down with a **local safety switch** applies.
An electrician does not always need to be called first
The production operator can give specific instructions.

Alarm archive and alarm logs show only "true" annunciations.
An annunciation release for each object means that the communication and OS are not overloaded with an "annunciation storm" - e.g. overloaded after a power failure.

Refer to the Variable details for the assignment of the annunciation text and annunciation class to the module parameters.

Module states

Variable STATUS:

Digital display

Status / Text Display	Icon Display
Measured value OK	black, gray
Measured value > UL2	white, red
Measured value > UL1	black, yellow
Measured value < LL1	black, yellow
Measured value < LL2	white, red
Measured value faulty (LZ)	yellow , black
Gradient overshot	white , violet
Measuring channel blocked	white ,blue

See also Variable details

Bar display

Status	Display
Measured value OK	green
Measured value > UL2	red
Measured value > UL1	yellow
Measured value < LL1	yellow
Measured value < LL2	red
Measured value faulty (LZ)	black
Gradient overshot	green
Measuring channel blocked	green

Commands

Refer to the Variable details for the assignment of the command word.

I/O-bar of C_MEASUR

C_MEASUR

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
RA_HH	Release fault message HH	BOOL	1	I			
RA_H	Release fault message H	BOOL	1	I			
RA_L	Release fault message L	BOOL	1	I			
RA_LL	Release fault message LL	BOOL	1	I			
RA_LZ	Release fault message LZ	BOOL	1	I			
RA_OI	Enable output interface fault limits	BOOL	1	I	U		
UGWA	Interlock measuring channel / measured value	BOOL	0	I			
USCB	Force Measured value output to scale beginning	BOOL	0	I			
UGWB	Release limit value calculation	BOOL	1	I			
UAMV	Alarm interlock	BOOL	1	I			
UMFR	Annunciation release	BOOL	1	I			
UMZS	Fault interlock to the group	BOOL	0	I			
GFSO	Group fault / status off	BOOL	0	I	U		
UQIT	Acknowledge (additional)	BOOL	0	I	U		
RELS	Release Supervision	BOOL	1	I	U		
STA2_B10	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B11	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B12	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B13	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B14	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B15	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B16	Spare input transferred into STATUS 2	BOOL	0	I	U		
STA2_B17	Spare input transferred into STATUS 2	BOOL	0	I	U		
REL_SQAR	Enable function Square	BOOL	0	I			
REL_ROOT	Enable function Route extraction	BOOL	0	I			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
REL_SMOO	Enable function smoothing	BOOL	0	I			
REL_GRAD	Enable function gradient monitoring	BOOL	0	I			
REL_SPIK	Enable function spike suppression	BOOL	0	I			
REL_SUBS	Enable substitution value active	BOOL	0	I			
REL_SUC	Suction measurement	BOOL	0	I			
REL_CALI	Enable calibration function	BOOL	0	I	U		
BYPB_ACT	Bypass button active	BOOL	0	I			
MTRIP	Memorize Trip	BOOL	0	I	U		
SimRight	User right for Simulation	INT	24	I		+	
TEST_OSS	Must not be changed	INT	0	I	U		
MSG8_EVID	Message ID	DWORD	16#00	I	U		
COMMAND	Command word	WORD	16#00	I	U	+	
VAL_HH	Upper limit HH	REAL	100.0	I		+	
VAL_H	Upper limit H	REAL	100.0	I		+	
VAL_L	Lower limit L	REAL	0.0	I		+	
VAL_LL	Lower limit LL	REAL	0.0	I		+	
LZ_TIM	Delay Live Zero	INT	3	I		+	
SPIK_TIM	Spike suppression time	INT	3	I		+	
HYSTERES	Hysteresis	REAL	0.0	I		+	
GRAD_POS	Gradient positive	REAL	0.0	I		+	
GRAD_NEG	Gradient negative	REAL	0.0	I		+	
GRAD_TIM	Gradient delay	INT	0	I		+	
SMOO_TIM	Smoothing time	INT	0	I		+	
REL_DEL	Release supervision delay time	INT	0	I	U	+	
VAL_SHH	Upper switching limit HH	REAL	100.0	I		+	
VAL_SH	Upper switching limit H	REAL	100.0	I		+	
VAL_SL	Lower switching limit L	REAL	0.0	I		+	

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
VAL_SLL	Lower switching limit LL	REAL	0.0	I		+	
SUBS_VAL	Substitute value from OS	REAL	0.0	I		+	
SIM_VAL	Simulation value from OS	REAL	0.0	I		+	
SCB	Scale beginning	REAL	0.0	I		+	
SCE	Scale end	REAL	100.0	I		+	
UNIT	Unit	STRING [8]	'%'	I			
TYP	Type of the imported value	INT	77	I		+	
MV_PHYS	Process value in REAL format	REAL	0.0	I			
QUALITY	The quality code if drivers are used	BYTE	16#FF	I			
PV	Process value in REAL format	STRUCT		I			
PV.Value	Value	REAL	0.0	I	U	+	
PV.ST	Signal Status	BYTE	16#FF	I	U		
MV_CARD	Process value directly from input card	WORD	16#00	I			
CARD_SCB	Beginning value of the card	INT	0	I			
CARD_SCE	End value of the card	INT	27648	I			
CaTe_SCB	Temp Start value for SCB	REAL	0.0	I	U	+	
CaTe_SCE	Temp End value for SCE	REAL	0.0	I	U	+	
CaVa_Low	Card value low for calculation	INT	0	I	U	+	
CaVa_Hi	Card value high for calculation	INT	27648	I	U	+	
GR_STP	Group is stopped (only Holcim)	BOOL	0	I			
GR_LINK1	Link to group or route	STRUCT		I			
GR_LINK1. Link	Link	INT	0	I	U		
GR_LINK1. Command	Group/ route command	WORD	16#00	I	U		
GR_LINK2	Link to group or route	STRUCT		I			
GR_LINK2. Link	Link	INT	0	I	U		
GR_LINK2. Command	Group/ route command	WORD	16#00	I	U		
MUX_LINK	Link to C_MUX	STRUCT		I			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
MUX_LINK. Point_GRL	Pointer	INT	0	I	U		
MUX_LINK. Command	Group/ route command	WORD	16#00	I	U		
O_LINK	Link to another object	STRUCT		I			
O_LINK. iDB	Instance DB master object	INT	0	I	U		
O_LINK iDW	DW number NO_OF_FT in master object	INT	0	I	U		
O_LINK. Command	Group/ route command	BYTE	16#00	I	U		
O_LINK. Status	Status master object	BYTE	16#00	I	U		
INTFC_OS	Interface status for OS	DWORD	16#00	I	U	+	
MV	Process value output	REAL	0.0	I		+	
QC	Quality code	BYTE	16#80	I		+	
PV_Out	Process value output	STRUCT		I			
PV_Out.Value	Value	REAL	0.0	I	U	+	
PV_Out.ST	Signal Status	BYTE	16#80	I	U	+	
PV_Stat	Process value status + unit	STRUCT		I			
PV_Stat.UNIT	Unit	STRING [8]	%	I	U	+	
PV_Stat. STATUS	Status	DWORD	16#00	I	U	+	
MV_I	Measured value (input value)	STRUCT		O	U		
MV_I.Value	Value	REAL	0.0	O	U	+	
MV_I.ST	Signal status	BYTE	16#80	O	U	+	
SCB_OUT	Scale begin	REAL	0.0	O			
SCE_OUT	Scale end	REAL	0.0	O			
SUBS_V_O	Substitute value (to driver)	REAL	0.0	O			
MV_PERC	Measured value in %	INT	0	O		+	
STATUS	Status word 1	DWORD	16#00	O	U		
STATUS2	Status word 2	DWORD	16#00	O	U	+	
VSTATUS	Status for Display	DWORD	16#00	O	U	+	

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
ALARM	Test display alarm word	WORD	16#00	O	U		
V_HH_O	Upper limit HH	REAL	0.0	O	U		
V_H_O	Upper limit H	REAL	0.0	O	U		
V_L_O	Lower limit L	REAL	0.0	O	U		
V_LL_O	Lower limit LL	REAL	0.0	O	U		
V_SHH_O	Upper switching limit HH	REAL	0.0	O	U		
V_SH_O	Upper switching limit H	REAL	0.0	O	U		
V_SL_O	Lower switching limit L	REAL	0.0	O	U		
V_SLL_O	Lower switching limit LL	REAL	0.0	O	U		
HH	Limit HH overshot	BOOL	0	O			
H	Limit H overshot	BOOL	0	O			
L	Limit H overshot	BOOL	0	O			
LL	Limit LL undershot	BOOL	0	O			
ULZ	Live zero / Bad Quality	BOOL	0	O			
UST	Fault not acknowledged	BOOL	0	O			
UGN	Gradient negative	BOOL	0	O			
UGP	Gradient positive	BOOL	0	O			
USP	Measuring channel blocked	BOOL	0	O			
SHH	Switching limit HH overshot	BOOL	0	O			
SH	Switching limit H overshot	BOOL	0	O			
SL	Switching limit L undershot	BOOL	0	O			
SLL	Switching limit LL undershot	BOOL	0	O			
SUBS_ON	Substitute value active (driver)	BOOL	0	O			
SIM_ON	Simulation value active (driver)	BOOL	0	O			

OS-Variable table

C_MEASUR

OS Variable	Description	PLC Data Type	OS Data Type
SimRight	User right for Simulation	INT	Signed 16-bit value
COMMAND	Command word	WORD	Unsigned 16-bit value
VAL_HH	Upper limit HH	REAL	32-bit floating-point number IEEE 754
VAL_H	Upper limit H	REAL	32-bit floating-point number IEEE 754
VAL_L	Lower limit L	REAL	32-bit floating-point number IEEE 754
VAL_LL	Lower limit LL	REAL	32-bit floating-point number IEEE 754
LZ_TIM	Delay Live Zero	INT	Signed 16-bit value
SPIK_TIM	Spike suppression time	INT	Signed 16-bit value
HYSTERES	Hysteresis	REAL	32-bit floating-point number IEEE 754
GRAD_POS	Gradient positive	REAL	32-bit floating-point number IEEE 754
GRAD_NEG	Gradient negative	REAL	32-bit floating-point number IEEE 754
GRAD_TIM	Gradient delay	INT	Signed 16-bit value
SMOO_TIM	Smoothing time	INT	Signed 16-bit value
REL_DEL	Release supervision delay time	INT	Signed 16-bit value
VAL_SHH	Upper switching limit HH	REAL	32-bit floating-point number IEEE 754
VAL_SH	Upper switching limit H	REAL	32-bit floating-point number IEEE 754
VAL_SL	Lower switching limit L	REAL	32-bit floating-point number IEEE 754
VAL_SLL	Lower switching limit LL	REAL	32-bit floating-point number IEEE 754
SUBS_VAL	Substitute value from OS	REAL	32-bit floating-point number IEEE 754
SIM_VAL	Simulation value from OS	REAL	32-bit floating-point number IEEE 754
SCB	Scale beginning	REAL	32-bit floating-point number IEEE 754
SCE	Scale end	REAL	32-bit floating-point number IEEE 754
TYP	Type of the imported value	INT	Signed 16-bit value
PV#Value	Value	REAL	32-bit floating-point number IEEE 754
CaTe_SCB	Temp Start value for SCB	REAL	32-bit floating-point number IEEE 754

OS Variable	Description	PLC Data Type	OS Data Type
CaTe_SCE	Temp End value for SCE	REAL	32-bit floating-point number IEEE 754
CaVa_Low	Card value low for calculation	INT	Signed 16-bit value
CaVa_Hi	Card value high for calculation	INT	Signed 16-bit value
INTFC_OS	Interface status for OS	DWORD	Unsigned 32-bit value
MV	Process value output	REAL	32-bit floating-point number IEEE 754
QC	Quality code	BYTE	Unsigned 8-bit value
PV_Out#Value	Value	REAL	32-bit floating-point number IEEE 754
PV_Out#ST	Signal status	BYTE	Unsigned 8-bit value
PV_Stat#UNIT	Unit	STRING [8]	Text variable 8-bit character set
PV_Stat#STATUS	Status	DWORD	Unsigned 32-bit value
MV_I#Value	Value	REAL	32-bit floating-point number IEEE 754
MV_I#ST	Signal status	BYTE	Unsigned 8-bit value
MV_PERC	Measured value in %	INT	Signed 16-bit value
STATUS2	Status word 2	DWORD	Unsigned 32-bit value
VSTATUS	Status for Display	DWORD	Unsigned 32-bit value

Variable details

Internal structure of the Commands, Alarms, Visualization status and Interface word:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Kommandowort**	**Commandword**		
COM_B20		0				
COM_B21	CalSCB	1	Skalenanfang setzen	Set Scale Begin	Op. Inp.	
COM_B22	CalSCE	2	Skalenende setzen	Set Scale End	Op. Inp.	
COM_B23	CalcHigh	3	Skalenende berechnen	calculate Scale high	Op. Inp.	
COM_B24		4				
COM_B25		5				
COM_B26		6				
COM_B27		7				
COM_B10		8				
COM_B11	SACK	9	Einzel quittieren	Single acknowledge		
COM_B12		10				
COM_B13		11				
COM_B14		12				
COM_B15		13				
COM_B16	SIM	14	Simulation ON/OFF	Simulation ON/OFF		
COM_B17	BYP	15	Bypass	Bypass		
ALARM			**Alarm**	**Alarm**		
ALA_HH	SIG1	0	HH Grenze @1%-1.2f@ @5%s@	HH Limit @1%-1.2f@ @5%s@	AL_H	P
ALA_H	SIG2	1	H Grenze @2%-1.2f@ @5%s@	H Limit @2%-1.2f@ @5%s@	WA_H	P
ALA_L	SIG3	2	L Grenze @3%-1.2f@ @5%s@	L Limit @3%-1.2f@ @5%s@	WA_L	P
ALA_LL	SIG4	3	LL Grenze @4%-1.2f@ @5%s@	LL Limit @4%-1.2f@ @5%s@	AL_L	P
ALA_LZ	SIG5	4	Bad Quality	Bad Quality	AL_H	E
ALA_B25	SIG6	5				
ALA_B26	SIG7	6				
ALA_B27	SIG8	7				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
INTFC_OS			**Nahtstellenwort**	**Interface word**		
OS_IF_B40	RA_HH	0	Freigabe Störmeldung Obergrenze 2	Release of fault indication for Upper limit 2		
OS_IF_B41	RA_H	1	Freigabe Störmeldung Obergrenze 1	Release of fault indication for Upper limit 1		
OS_IF_B42	RA_L	2	Freigabe Störmeldung Untergrenze 1	Release of fault indication for lower limit 1		
OS_IF_B43	RA_LL	3	Freigabe Störmeldung Untergrenze 2	Release of fault indication for lower limit 2		
OS_IF_B44	RA_LZ	4	Freigabe Störmeldung Live zero	Release of fault indication for live zero		
OS_IF_B45	UGWA	5	Messkanal/Messwert freigeben	Rel. Meas.channel/MV		
OS_IF_B46	USCB	6	Messwert-Ausgang auf SKA	Set MV Output to SCB		
OS_IF_B47	UGWB	7	Freigabe Grenzwertberechnung	Rel. Limit value calculation		
OS_IF_B30		8				
OS_IF_B31		9				
OS_IF_B32		10				
OS_IF_B33		11				
OS_IF_B34		12				
OS_IF_B35		13				
OS_IF_B36		14				
OS_IF_B37		15				
OS_IF_B20	UAMV	16	Alarmverriegelung	Alarm interlock		
OS_IF_B21	RA_OI	17	Freigabe Grenzwertbits	Release Fault Outputs		
OS_IF_B22		18				
OS_IF_B23	UMFR	19	Meldefreigabe	Annunciation release		
OS_IF_B24	UMZS	20	Störungsverriegelung zur Gruppe	Fault interlock to the group		
OS_IF_B25	GFSO	21	Gruppenstörung/ Zustand aus	Group fault / status off		
OS_IF_B26	RELS	22	Freigabe Überwachung	Release Supervision		
OS_IF_B27		23				
OS_IF_B10		24				
OS_IF_B11	UQIT	25	Quittieren (Zusatz)	Acknowledge (additional)		
OS_IF_B12		26				
OS_IF_B13		27				
OS_IF_B14		28				
OS_IF_B15		29				
OS_IF_B16		30				
OS_IF_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B40	HH	0	Messwert > Obergrenze 2	MV > upper limit 2		
STA_B41	H	1	Messwert > Obergrenze 1	MV > upper limit 1		
STA_B42	L	2	Messwert < Untergrenze 1	MV < lower limit 1		
STA_B43	LL	3	Messwert < Untergrenze 2	MV < lower limit 2		
STA_B44	ULZ	4	Live Zero	Live Zero		
STA_B45	UGN	5	Gradient negativ überschritten	Negative gradient overshot		
STA_B46	UGP	6	Gradient positiv überschritten	Positive gradient overshot		
STA_B47	USP	7	Messkanal gesperrt (Bypass)	Measuring channel blocked		
STA_B30	SHH	8	Messwert > Schalt_Obergrenze 2	MV > upper switching limit 2		
STA_B31	SH	9	Messwert > Schalt_Obergrenze 1	MV > upper switching limit 1		
STA_B32	SL	10	Messwert < Schalt_Untergrenze 1	MV < lower switching limit 1		
STA_B33	SLL	11	Messwert < Schalt_Untergrenze 2	MV < lower switching limit 1		
STA_B34	UST	12	Störung nicht quittiert	Fault not acknowledged		
STA_B35	CL_WARN	13	Kollektiv Warnung aktiv	Collective Warning active		
STA_B36		14				
STA_B37	REL_CALI	15	Freigabe Kalibrieren	Release Calibration		
STA_B20	DRV	16	Verbunden mit Treiber	Connected to a driver		
STA_B21	LVV	17	Letzter gültiger Wert	Last valid value		
STA_B22	SUB	18	Ersatzwert	Substitution value		
STA_B23	SIM	19	Simulation ON	Simulation ON		
STA_B24	BYP_A	20	Taster Bypass aktiv	Switch Bypass active		
STA_B25	RELS	21	Freigabe Überwachung	release supervision		
STA_B26	REL_TIM_RUN	22	Release Zeit läuft	release time is running		
STA_B27	STRC	23	PV angeschlossen	PV connected		
STA_B10	MARK	24	Objekt markieren (Gruppenkommando)	Highlight object (group command)		
STA_B11	LINK	25	GR_LINK1 angeschlossen	GR_LINK1 connected		
STA_B12	MTRIP	26	Fehler speichern bis Quittierung	memorize trip until acknowledgement		
STA_B13	RELS_ON	22	Freigabezustand	Release status		
STA_B14		28				
STA_B15		29				
STA_B16		30				
STA_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS2			**Status**	**Status**		
STA2_B40	HH	0	Messwert > Obergrenze HH	MV > upper limit 2		
STA2_B41	H	1	Messwert > Obergrenze H	MV > upper limit 1		
STA2_B42	L	2	Messwert < Untergrenze L	MV < lower limit 1		
STA2_B43	LL	3	Messwert < Untergrenze LL	MV < lower limit 2		
STA2_B44	ULZ	4	Live Zero	Live Zero		
STA2_B45	UGN	5	Gradient negativ überschritten	Negative gradient overshot		
STA2_B46	UGP	6	Gradient positiv überschritten	Positive gradient overshot		
STA2_B47	USP	7	Meßkanal gesperrt / bypassed	Measuring channel blocked		
STA2_B30	SHH	8	Messwert > Schalt_Obergrenze HH	MV > upper switching limit 2		
STA2_B31	SH	9	Messwert > Schalt_Obergrenze H	MV > upper switching limit 1		
STA2_B32	SL	10	Messwert < Schalt_Untergrenze L	MV < lower switching limit 1		
STA2_B33	SLL	11	Messwert < Schalt_Untergrenze LL	MV < lower switching limit 1		
STA2_B34	UST	12	Störung dynamisch	Fault dynamic		
STA2_B35		13				
STA2_B36		14				
STA2_B37		15				
STA2_B20	SQAR	16	Freigabe Quadrieren	Release squaring		
STA2_B21	RADI	17	Freigabe Radizieren	Release root extraction		
STA2_B22	SMOO	18	Freigabe Glätten	Release smoothing		
STA2_B23	GRAD	19	Freigabe Gradientenüberwachung	Release gradient monitoring		
STA2_B24	SPIKE	20	Freigabe Störspitzenunterdrückung	Release spike suppression		
STA2_B25	SUBS	21	Freigabe Ersatzwert	Release substition value active		
STA2_B26	SIM	22	Freigabe Simulation	Release simulation value active		
STA2_B27	SUC	23	Freigabe Unterdruck	Release suction		
STA2_B10		24	Reserve für Anwender	Spare for User adaptations		
STA2_B11		25	Reserve für Anwender	Spare for User adaptations		
STA2_B12		26	Reserve für Anwender	Spare for User adaptations		
STA2_B13		27	Reserve für Anwender	Spare for User adaptations		
STA2_B14		28	Reserve für Anwender	Spare for User adaptations		
STA2_B15		29	Reserve für Anwender	Spare for User adaptations		
STA2_B16		30	Reserve für Anwender	Spare for User adaptations		
STA2_B17		31	Reserve für Anwender	Spare for User adaptations		

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
VSTATUS			**Visualisierungsstatus**	**Visualization status**		
VS_B40		0				
VS_B41		1				
VS_B42		2				
VS_B43		3				
VS_B44		4				
VS_B45		5				
VS_B46		6				
VS_B47		7				
VS_B30		8				
VS_B31		9				
VS_B32		10	Nicht benutzen	Don't use		
VS_B33	vs_TH_B	11				
VS_B34		12				
VS_B35	vs_WH_B	13				
VS_B36		14				
VS_B37	vs_AH_B	15				
VS_B20	vom Mesure bedingt gesetzt	16				
VS_B21		17				
VS_B22		18				
VS_B23	vs_GSTP	19	Gruppe gestoppt	Group stopped		
VS_B24	vs_OR	20	Gradient	Gradient		
VS_B25		21				
VS_B26		22				
VS_B27	vs_FLASH	23	dyn. Störung oder Warnung	Dynamic Fault or warning		
VS_B10	vs_ASF	24	Live Zero (Bad Quality)	Live Zero (Bad Quality)		
VS_B11	vs_ASS	25				
VS_B12	vs_TL	26	Service	Service		
VS_B13	vs_TH	27				
VS_B14	vs_WL	28	Warnung gelb	Warning yellow		
VS_B15	vs_WH	29				
VS_B16	vs_AL	30	Alarm rot	Alarm red		
VS_B17	vs_AH	31				

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Cemat V 8.2
Function Block Library ILS_CEM

Function Description Edition 07/16

Meas. Value Integrator C_MEAS_I

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indicates that death or severe personal injury **will** result if proper precautions are not taken.

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indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ **Caution**
with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution
without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention
indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

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Qualified Personnel

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Siemens AG 2005
Technical data subject to change.

Description of C_MEAS_I

Type/Number

Function block name: C_MEAS_I
Function block number: FC1026

Calling OBs

The C_MEAS_I must be called in OB1 (MAIN_TASK).

Function

This function block (FB) integrates a measured value and forms the interface. First the measured value is normalized (0% = 0 and 100% = 4095). The time grid of the integration is 60 seconds.

If the connected measured value is 100%, then the result of the integration after 60 seconds is 4095, after 120 seconds 8190, after 180 seconds 12285 etc.

The FB has 2 outputs for integration values. Integration value 1 is updated every 5 seconds. Integration value 2 is updated every hour. These values are not reset by the FB but continue to run.

CEMAT MIS can evaluate the result of the integration. For recalculation to physical values, MIS uses the scaling parameters SCB and SCE and the dimensioning factor PULS_VAL. An integration corresponds to the multiplication of the measured value dimension with a time unit. If this time unit is 1 hour (e.g. kW -> kWh or t/h -> t), PULS_VAL must have the value 1. In all other cases, PULS_VAL must have the ratio of 1 hour to the time unit of the measured value.

Example:

Measured value = l / s, integration value should be l: PULS_VAL = 1h / 1s = 3600s / 1 s = 3600

A conversion of the measured value to physical units of the same value can also be carried out via PULS_VAL.

Example:

Measured value = l / h, integration value should be hl: PULS_VAL = 1 l / 1 hl = 1 / 100.

Measured value = kg / s, integration value should be t: PULS_VAL = (1 h / 1 s) * (1 kg / 1 t) = 3600 * (1 / 1000) = 3.6.

Operating Principle

Input interfaces

MV_IN **Measured value** **Default: 0.0**

Format REAL

Input for a physical measured value. Can be connected to the MV output of C_MEASURE.

QC **Quality Code from C_MEASURE** **Default: 16#80**

Format BYTE

Transfer of the Quality Code from the upstream measured value FB. Can be connected to the QC of C_MEASURE.

SCB **Start of scale** **Default: 0.0**

Format REAL

Physical value (start of measuring range). Can be connected to the SCB_OUT output of C_MEASURE.

SCE **End of scale** **Default: 100.0**

Format REAL

Physical value (end of measuring range). Can be connected to the SCE_OUT output of C_MEASURE.

REL_INT **Integrator release** **Basic state 1 signal**

Format BOOL

The integrate function is released with the 1 signal at the REL_INT interface.

PULS_VAL **Dimensioning factor** **Default: 1.0**

Format REAL

Factor for the weighting of the integration time / dimensions conversion; see Function.

Process values

The process values can be set during configuration and can be changed from the control room. The process values should not be switched in the CFC, as they cannot then be operated from the faceplates.

UNIT **Dimension** **Default: '%'**

Format STRING[8]

Dimension of the count value.

Interfaces to the OS

RT_MIS **Integration value (update every 5 seconds)** **Default: 16#00**

Format DWORD

Interface to MIS

RT_MIH **Integration value (update every hour)** **Default 16#00**

Format DWORD

Interface to MIS

MIH_OK **Integration value RT_MIH ok** **Basic state 0-signal**

Format BOOL

Interface to MIS. MIH_OK has 1-signal if there were no invalid measured values during the past hour.

Time Characteristics

None

Message characteristics

The FB has no messages.

Commands

There are no commands.

I/O-bar of C_MEAS_I

C_MEAS_I

Element	Meaning	Type	Default	Type	Attr.	HMI	Permissible values
MV_IN	Measured value	REAL	0.0	I			
QC	Quality code	BYTE	16#80	I			
SCB	Start of scale	REAL	0.0	I		+	
SCE	End of scale	REAL	100.0	I		+	
REL_INT	Enable integration	BOOL	1	I			
PULS_VAL	Dimensioning factor	REAL	1.0	I		+	
UNIT	Unit	STRING [8]	'%'	I		+	
RT_MIS	Integration value 1 (5 s update)	DWORD	16#00	O		+	
RT_MIH	Integration value 2 (hourly update)	DWORD	16#00	O		+	
MIH_OK	Integration value 2 OK	BOOL	1	O		+	

OS-Variable table

C_MEAS_I

OS Variable	Description	PLC Data Type	OS Data Type
SCB	Start of scale	REAL	32-bit floating-point number IEEE 754
SCE	End of scale	REAL	32-bit floating-point number IEEE 754
PULS_VAL	Dimensioning factor	REAL	32-bit floating-point number IEEE 754
UNIT	Unit	STRING [8]	Text variable 8-bit character set
RT_MIS	Integration value 1 (5 s update)	DWORD	Unsigned 32-bit value
RT_MIH	Integration value 2 (hourly update)	DWORD	Unsigned 32-bit value
MIH_OK	Integration value 2 OK	BOOL	Binary variable

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Cemat V 8.2
Function Block Library ILS_CEM

Function Description **Edition 07/16**

STORAGE Module C_STORAG

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Description of C_STORAG

Type/Number

Module name: **C_STORAG**
Module no.: **FB1037**

Calling OBs

C_STORAG must be called in OB1 (MAIN_TASK)

Function

General functional description

The STORAGE module provides the Operator with status information's of the storage locations and gives information about the contained material and the filling level. The storage type definition defines whether it is a bunker, a silo, a multi chamber silo, a pile, or a water tank (visualization information.)

In addition to that, there is the possibility of calling external applications like Stockpile manager, Multichamber charging or homogenization modules directly from the Faceplate.

As standard interfaces are used:
- analog value of the silo filling level,
- a release, filling, and discharge signal
- as well as all static parameters like limits or timer.

The following Values are evaluated and announced depending on the release of the corresponding Storage Symbols:

- current storage filling level as digital value with a corresponding dimension
  - current storage filling level as bar
  - Storage full
  - Storage empty
  - alarm limit full
  - warning limit full
  - warning limit empty
  - alarm limit empty
  - Storage locked
  - charging on
  - discharging on
  - no dedusting
  - no original material
  - homogenization on
  - material name
  - brief name storage

Operating principle

Input interfaces

S_TYPE **Storage Type** **Default: 1**

Format INTEGER

S_TYP define the Storage Type.
1 = normal Silo, Bin
2 = Multi chamber silo
3 = Stockpile
4 = Water tank, Well

2 means, the Storage module is a "Multi chamber Silo" and will send his information via Output structure to the C_STO_MA module.

The Storage Type will be only shown.

APF_ACT **APF Faceplates release** **Basic state 0-Signal**

Format BOOL

1-Signal means, the Storage Faceplate is released and all module parameter can be stored in to the APF User archive Data structure

GROUP_ON **Storage Group on** **Basic state 1-Signal**

Format BOOL

1-Signal means, the Group is running complete.

S_LOCK **Storage locked** **Basic state 0-Signal**

Format BOOL

S_LOCK is a general lock signal which can be connected on the CFC Input or from the OS. It will be shown in the Symbol and Faceplate.

S_INT **Storage interlocked** **Basic state 1-Signal**

Format BOOL

S_INT is a process related interlock signal and shows that the Storage is not ready to fill up. „0“Signal will also reset the output „Ready“.

S_CHARG **Storage charging is on** **Basic state 0-Signal**

Format BOOL

1-Signal means, Storage charging on.

S_DISC **Storage discharging on** **Basic state 0-Signal**

Format BOOL

1-Signal means, Storage discharging on.

S_HOMOG **Storage Homogenization on** **Basic state 0-Signal**

Format BOOL

S_HOMOG is just an indication that the homogenization is started.

S_EMPTY **Storage external empty signal** **Basic state 1-Signal**

Format BOOL

Empty signal from an external Level Instrument.

S_FULL **Storage external full signal** **Basic state 1-Signal**

Format BOOL

Full signal from an external Level Instrument

S_DEDU **Storage Dedusting on** **Basic state 0-Signal**

Format BOOL

1-Signal means the Storage dedusting is on.

S_DIFFM **Storage different material** **Basic state 0-Signal**

Format BOOL

1-Signal means, the filling material is not the assigned material but allowed.

SAMV **Alarm interlocks** **Basic state 1-Signal**

Format BOOL

No alarm message is generated at this interface for a 0-signal. The group fault lamp lights continually red if a fault has occurred. The status call can be used to query the fault cause.

Typical application*:*

If, for example, a Storage module is not to produce any alarm when the group is stationary, log '0' is applied to the SAMV. If the group is stationary, this fault is displayed as GZS (red continuous light). SAMV can, for example, be connected with GRE; i.e. the alarms are activated as soon as the group starts to run.

SMFR **Annunciation release** **Basic state 1-Signal**

Format BOOL

This interface is used in order to avoid incorrect alarms in case of power supply failure. In case of 0-Signal at this interface, no alarm messages are created (neither incoming nor outgoing messages, the actual status gets frozen) and no group displays are triggered for group and route.

Example:
If the control voltage fails for MCC or field signals, every sensor signal would initiate an alarm message (surge of messages). To avoid this, you have to connect the signal "control voltage ok" to the interface UMFR.
As a result no alarms are produced if the control voltage fails. An annunciation module must be configured to report the "control voltage failure" cause.

SMZS **Fault interlocks to the group** **Basic state 0-Signal**

Format BOOL

A 1-signal on SMZS prevents that the dynamic and static fault of the measuring value is passed to the summarizing indication of group and route. In the status call the fault can still be seen.

GFSO **Group fault / status off** **Basic state 0-Signal**

Format BOOL

1-Signal at GFSO completely deselects the measured value block for the summarizing indication in group and route and also for the Status Call.

SQIT **Acknowledge (additional)** **Basic state 0-Signal**

Format BOOL

The acknowledgement of the measured value fault is normally carried out together with the acknowledgement of any alarm within the same AS (default setting). Interface UQIT is only needed for individual acknowledgement (via push-button) or in case of group-wise acknowledgement.

A signal change from "0" to "1" at UQIT acknowledges the measured value fault.

REL_SIM **Simulation-function** **Basic state 0-Signal**

Format BOOL

Via Diagnosis Picture of the Storage the Simulation can be enabled and disabled. REL_SIM cannot be used for connection in the CFC. When switching the AS into sequence test mode all C_STORAG are automatically switched to simulation.

After the Simulation is activated the value at Parameter SIM_VAL is used as input value.

The Simulation can always be used, independent of whether driver blocks are used or not. The Simulation input SIM_ON at the driver block itself cannot be used anymore. This would lead to a wrong indication.

Caution: Simulation-function has the highest priority, which means it is active irrespective of the quality code of the measure (except if Bypass function is enabled).

SimRight **Simulations Right** **Default: 24**

Format INTEGER

Interface to OS, with SimRight <=0 it is possible to lock the simulation.

MSG8_EVID1	**Message ID 1**	**Default: 16#00**

Format DWORD

Interface to OS

MSG8_EVID2	**Message ID 2**	**Default: 16#00**

Format DWORD

Interface to OS

COMMAND	**Command word**	**Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

Group and Object links

Group/Route links

Each storage block must be linked to a group or route in order to collect the status of the objects for summarizing indications.

The group link is essential for control and diagnosis and comprises the following functions:

- All objects, linked to the group (or route) are listed in the group (or route) object list.
- All objects, linked to the group (or route) are highlighted in the process picture with button "Show related objects".
- The faults of all objects, linked to the group (or route) are included in the summarizing fault indication of the group (or route).
- The warnings of all objects, linked to the group (or route) are included in the summarizing warning indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

A storage block can be linked to two groups or routes via *GR_LINK1* and *GR_LINK2*. If a storage block belongs to more than two groups or routes the additional block C_MUX must be inserted, which provides 5 additional link interfaces.

Caution: The main group (or main route) should be connected to *GR_LINK1*! This is the one which is opened with a click on button "Main group" in the faceplate of the storage block.

GR_LINK1 **Link to group or route**

Format STRUCT

The GR_LINK1 interface of the Storage module must be connected with the R_LINK interface of the route or with the G_LINK interface of the group.

Structure variables:

GR_LINK1.Link **Link** **Default: 0**

Format INTEGER

GR_LINK1.Command **Group / Route Command** **Default: 16#00**

Format WORD

GR_LINK2 **Link to group or route**

Format STRUCT

If the Storage module belongs to two different routes or groups, the GR_LINK2 interface must be connected with the second route/group.

Structure variables:

GR_LINK2.Link **Link** **Default: 0**

Format INTEGER

GR_LINK2.Command **Group / Route Command** **Default: 16#00**

Format WORD

MUX_LINK **Link to C_MUX**

Format STRUCT

If the Storage module belongs to more than two different routes or groups, the C_MUX module must be series-connected. C_MUX has 5 inputs (GR_LINK1 to GR_LINK5) for connection with the groups/routes and one output (MUX_OUT) for connection with the MUX_LINK interface of the annunciation module.

Caution: If a C_MUX block is used, the programming order is very important. The C_MUX must be called before the drive block!
The MUX_IN interface can under no circumstances be used for connection with a group or route. It is used exclusively for connection with another MUX module.

Structure variables:

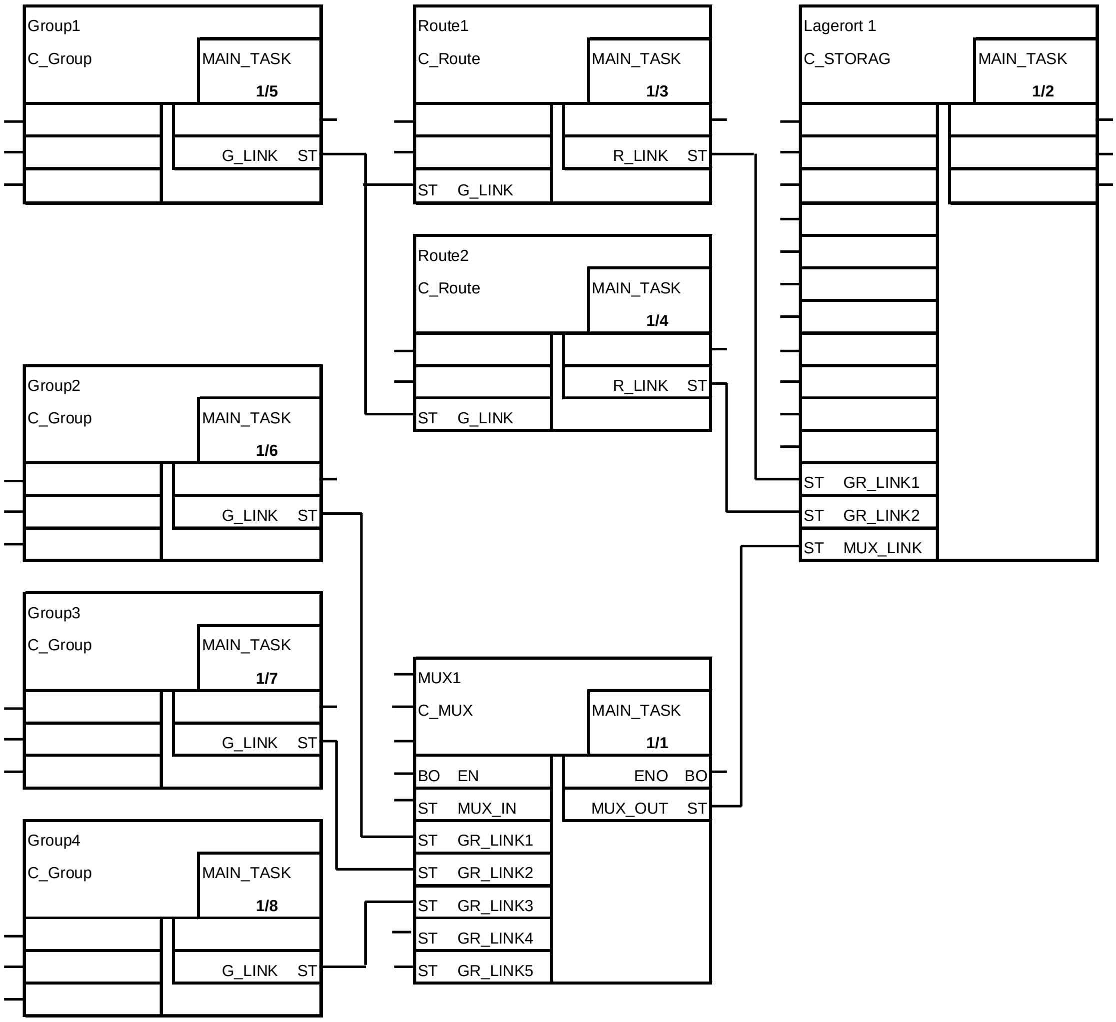
MUX_LINK.Point_GRL **Pointer** **Default: 0**

Format INTEGER

MUX_LINK.Command **Group / Route Command** **Default: 16#00**

Format WORD

Example of a circuit:



Caution: Check the runtime sequence! The C_MUX module must be called before the Storage module. For the other modules the run sequence is as follows: first the Storage, measured values and drives then the associated routes and finally the associated groups.

Caution: Some people use one C_MUX block and connect its output to a number of drives/devices, annunciations and measurements.
If you do so, make sure that the C_MUX is called before all the other objects and that no other C_MUX call comes in between.
We don't recommend using the same C_MUX if the blocks are located in different runtime groups.

Process values

The Process values can be set during engineering and they can be changed online from the OS. To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

PV **Process value filling level**

Format STRUCT

Interface *PV* must be connected with the process signal of the filling level. Input *PV* can be connected to output *PV_Out* of a PCS7 channel driver block Pcs7AnIn or to a physical value in REAL format.

Structure variable:

PV.Value **Value Default: 0.0**

Format REAL

PV.ST **Signal status** **Default: 16#FF**

Format BYTE

SIM_VAL **Simulation value** **Default: 0.0**

Format REAL

The simulation value will be set from the OS.

VAL_HH **Upper limit 2** **Default: 100.0**

Format REAL.

This is the value of upper limit 2. If this limit value is overshot, then the module generates an alarm message and sets module output HH.

VAL_H **Upper limit 1** **Default: 100.0**

Format REAL.

This is the value of upper limit 1. If this limit value is overshot, then the module generates an alarm message and sets module output H.

VAL_L **Lower limit 1** **Default: 0.0**

Format REAL.

This is the value of the lower limit 1. If this limit value is undershot, then the module generates an alarm message and sets module output L.

VAL_LL **Lower limit 2** **Default: 0.0**

Format REAL.

This is the value of lower limit 2. If this limit value is undershot, then the module generates an alarm message and sets module output LL.

LZ_TIM **Delay Live Zero** **Default: 3**

Format INTEGER (0 - 999)

Value in seconds.
When a live-zero fault occurs, the corresponding alarm message and the module output ULZ is delayed by the set time value.

T_V = 0s means: no delay

HYSTERES **Hysteresis** **Default: 0.0**

Format REAL (0.0 - 9.9)

To avoid constant coming and going of a limit value alarm message - if, e.g. the measured value "varies" around a limit value - one can enter a hysteresis value from the OS. The hysteresis value in Percent is entered at parameter HYSTERES. If a limit value is undershot or overshot (value < Lower limit 1/2 or value > Upper limit 1/2), a fault is reported if the appropriate connection is available. This fault is corrected only when the limit value (including hysteresis) is once again overshot or undershot (value > Lower limit 1/2 + hysteresis, or value < Upper limit 1/2 - hysteresis).

HEIGHT **Height of Storage** **Default: 0.0**

Format REAL

The Parameter HEIGHT can be
- the Storage height in meter
- or the Storage filling level as %
- or the Storage amount in tons

The value will be used internal as parameter **SCE**.

WIDTH **Width of Storage** **Default: 0.0**

Format REAL

Storage width in meter, only for information.

LENGTH **Length of Storage** **Default: 0.0**

Format REAL

Storage length in meter, only for information.

DIAM **Diameter of Storage** **Default: 0.0**

Format REAL

Storage diameter in meter, only for information

CAPAC **Capacity of Storage** **Default: 0.0**

Format REAL

Storage Capacity as tons.

STORAH **charge/discharge hours** **Default: 0.0**

Format REAL

Time that will be used to fill up complete or emptying complete the Storage.
That calculation is related to Input values **MQ_IN** and **MQ_OUT.**

SCB **Scale begin** **Default: 0.0**

Format REAL

Physical value (measurement begin).

DD_TIM **Delay time dedusting fault** **Default: 10**

Format INTEGER (0 - 999)

Value as minute.

If the input „GROUP_ON" has the Signal status„1" and the input „Dedusting on (S_DEDU)" changed from „1" to „0" an warning Alarm will be generated. After the DD_TIM is counted down to zero the Fault Output will be set und an alarm generated.

S_CHAMB **Chamber Number** **Default: 0**

Format INTEGER

Chamber- Number of Multi chamber silo.

Q_MAT **Quality of filling material** **Default: 0**

Format INTEGER

0 = ok identical with the assigned Material
1 = < worse as the assigned Material
2 = > better as the assigned Material

MQ_IN **Material Quantity charge**

Format STRUCT

Material Quantity charge as Structure. e.g. from weigh feeder.

Structure variable:

MQ_IN.Value **Value** **Default: 0.0**

Format REAL

MQ_IN.ST **Signal status** **Default: 16#FF**

Format BYTE

MQ_OUT **Material Quantity discharge**

Format STRUCT

Material Quantity discharge as Structure. e.g. from weigh feeder.

Structure variable:

MQ_OUT.Value **Value** **Default: 0.0**

Format REAL

MQ_OUT.ST **Signal status** **Default: 16#FF**

Format BYTE

MQ_UNIT **Dimension** **Default: '%'**

Format STRING (8 Characters)

MATERIAL **Storage Material** **Default: ''**

Format STRING (32 Characters)

Name of assigned Material for Storage

CA_MAT **Storage charging Material** **Default: ''**

Format STRING (32 Characters)

Name of actual charging Material for Storage

ASMatCl **Material class memory** **Default: 0**

Format INTEGER

Memory of Material class from APF Database

ASMatTY **Material Type memory** **Default: 0**

Format INTEGER

Memory of Material type from APF Database

ASMat **Material memory** **Default: 0**

Format INTEGER

Memory of Material No. from APF Database

ASStoCl **Storage class memory** **Default: 0**

Format INTEGER

Memory of Storage class from APF Database

ASStora **Storage memory** **Default: 0**

Format INTEGER

Memory of Storage No. from APF Database

UserFace **Faceplate-Call**

Format ANY

The Input UserFace can be interconnected to any module with an OS interface (Faceplate). A button "U" (user) is shown in the Faceplate if the interconnected exist and can be used to open the external Faceplate.

BatchEn **Batch Enabled** **Basic state 0-Signal**

Format BOOL

Enable Batch Operation

BatchID **Batch ID** **Default: 0**

Format DWORD

Show the Batch Number which belong to these Storage

BatchName **Batch Name** **Default: 0**

Format STRING (32 Characters)

Show the Batch Name which belong to these Storage.

Output interfaces

CHA_OUT Output of Chamber Structure Values

Format STRUCT

Transmit the Values to the Multi Chamber Master module

Structure variable:

CHA_OUT.STATUS STATUS Info's

Format DWORD

CHA_OUT.PV_Out_Value Process value

Format REAL

CHA_OUT.ST Signal status

Format BYTE

CHA_OUT.PV_Stat_STATUS Status PV

Format DWORD

CHA_OUT.V_HH_O HH Limit

Format REAL

CHA_OUT.V_H_O H Limit

Format REAL

CHA_OUT.V_L_O L Limit

Format REAL

CHA_OUT.V_LL_O LL Limit

Format REAL

CHA_OUT.HEIGHT Height

Format REAL

CHA_OUT.WIDTH Width

Format REAL

CHA_OUT.LENGTH Lenght

Format REAL

CHA_OUT.DIAMDiameter

Format REAL

CHA_OUT.CAPAC Capacity

Format REAL

CHA_OUT.STORAH Charge/discharge hour

Format REAL

CHA_OUT.SCB Scale Begin

Format REAL

CHA_OUT.DD_TIM Dedusting Time

Format INTEGER

CHA_OUT.S_CHAMB Chamber No.

Format INTEGER

CHA_OUT.Q_MAT **Material Quality**

Format INTEGER

CHA_OUT.MQ_IN **Material quantity charge**

Format REAL

CHA_OUT.MQ_IN_ST **Material quantity charge Status**

Format BYTE

CHA_OUT.MQ_OUT **Material quantity discharge**

Format REAL

CHA_OUT.MQ_OUT_ST **Material quantity discharge Status**

Format BYTE

CHA_OUT.MQ_UNIT **Material quantity Dimension**

Format STRING

CHA_OUT.MATERIAL **Assigned Material**

Format STRING

CHA_OUT.CA_MAT **Actual filling material**

Format STRING

STATUS **Status word OS**

Format DWORD

Interface to OS

Additional Information you will find under Variable details

PV_OUT **Process value**

Format STRUCT

To show the actual level

Structure variable:

PV_OUT.Value **Value**

Format REAL

PV.ST **Signal status**

Format BYTE

PV_OUT_Stat **Process value status + Unit**

Format STRUCT

To send the Status and Unit of the Storage module to an other module.

Structure variable:

PV_OUT_Stat.UNIT **Unit**

Format STRING (8 Characters)

PV_OUT_Stat.STATUSStatus

Format DWORD

V_HH_O **High limit 2**

Format REAL

On the Output V_HH_O the value of High limit VAL_HH is shown.

V_H_O **High limit 1**

Format REAL

On the Output V_H_O the value of High limit VAL_H is shown

V_L_O **Low limit 1**

Format REAL

On the Output V_L_O the value of High limit VAL_L is shown.

V_LL_O **Low limit 2**

Format REAL

On the Output V_LL_O the value of High limit VAL_LL is shown

Ready **Ready**

Format BOOL

The Output Ready will be set, if:
- the Storage is not locked „S_LOCK“ = 0
- Interlock signal is ok „S_INT“ = 1
- no high Alarms are present
- Annunciations are acknowledge

HH **Upper limit 2**

Format BOOL

If the measured value overshoots the upper limit 2, the HH bit is set.

H **Upper limit 1**

Format BOOL

If the measured value overshoots the upper limit 1, the H bit is set.

L **Lower limit 1**

Format BOOL

If the measured value undershoots the lower limit 1, the L bit is set.

LL **Lower limit 2**

Format BOOL

If the measured value undershoots the lower limit 2, the LL bit is set.

SLZ **Live Zero or Bad Quality**

Format BOOL

In case of a card/channel failure, the measured value is interpreted as being faulty and, after the live zero delay time has elapsed, bit ULZ is set and an alarm message for "Bad Quality" is created.

DEDU **Dedusting fault**

Format BOOL

After expiry of the waiting time (DD_TIM) this Output is set and an alarm generated.

SFD **Fault/warning not acknowledged**

Format BOOL

SFD=1 when the upper limit 2 or the lower limit 2 is violated and an alarm is generated. SFD=0 after the acknowledge button has been pressed.

SFS **Fault/warning**

Format BOOL

The module will set SFS=1 after the acknowledge button has been pressed.

SIM_ON **Simulation value active**

Format BOOL

Indicates that the input value is taken from parameter SIM_VAL

Refer to Release function REL_SIM.

MV_I **Process value Input**

Format STRUCT

Shows the actual level

Structure variable:

MV_I.Value **Value**

Format REAL

MV_I.ST **Signal status**

Format BYTE

ALARM **only for Test**

Format WORD

Additional Information you will find in the Variable details.

DLY_CNT **Count down counter**

Format INTEGER

Interface to OS

Time characteristics

The module must be called before the associated route or group.

Any called C_MUX modules must run before this module.

Message characteristics

The module uses the ALARM_8 module to generate annunciations.

A plausibility and priority logic at the process level analyses all object faults
only one fault annunciation is issued for each fault
secondary annunciations are suppressed automatically
the fault source is recorded in detail and uniquely.

The current operational state of the plant objects is automatically taken into consideration during the fault analysis, e.g. all fault annunciations are suppressed automatically for a stationary group
no superfluous fault annunciations are created
the operator does not need to manually disable/suppress any annunciations.

Each fault annunciation is also classified.
This shows whether an **electrical** or a **mechanical** fault, a **process fault** or a shut-down with a **local safety switch** applies.
An electrician does not always need to be called first
the production operator can give specific instructions.

Alarm archive and alarm logs show only "true" annunciations.
An annunciation release for each object means that the communication and OS are not overloaded with an "annunciation storm" - e.g. overloaded after a power failure.

Refer to the Variable details for the assignment of the annunciation text and annunciation class to the module parameters.

Module states

Status Indications:

Variable STATUS:

Digital display

Status / Text Display	Icon Display
Measured value OK	black, gray
Measured value > UL2	white, red
Measured value > UL1	black, yellow
Measured value < LL1	black, yellow
Measured value < LL2	white, red
Measured value faulty (LZ)	yellow , black

See also Variable details

Bar display

Status	Display
Measured value OK	green
Measured value > UL2	red
Measured value > UL1	yellow
Measured value < LL1	yellow
Measured value < LL2	red
Measured value faulty (LZ)	black

Commands

Refer to the Variable details for the assignment of the command word.

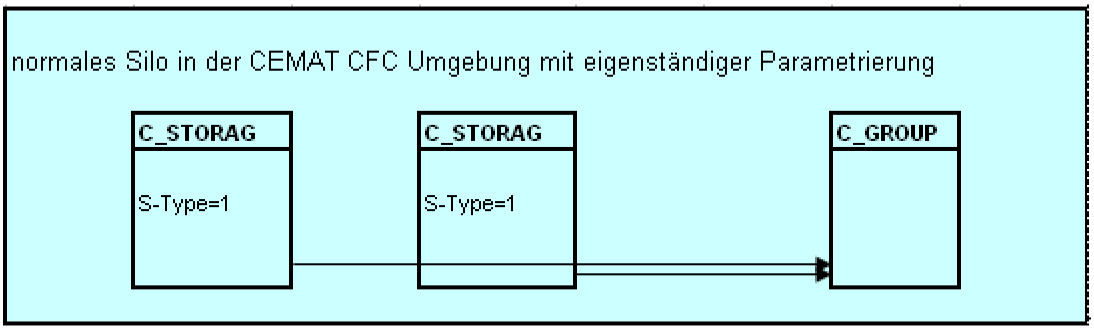
Engineering

AS

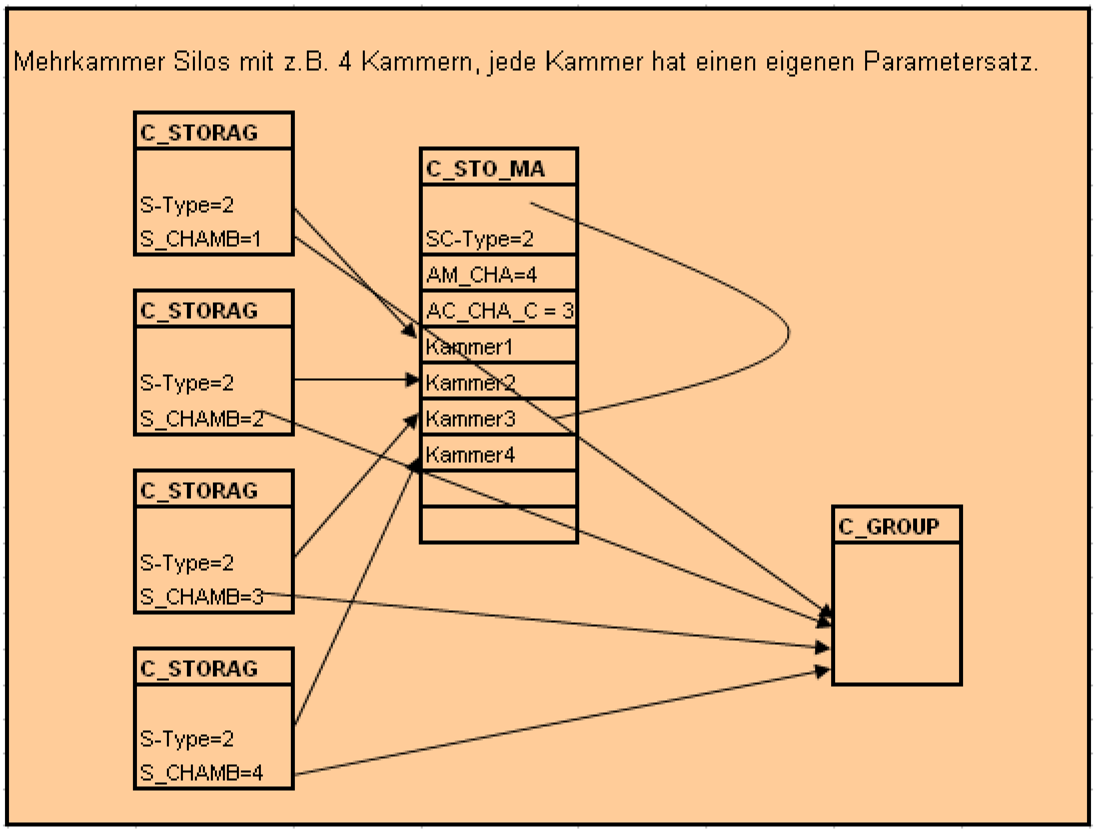
The C_STORAG can be used in the pure CEMAT environment and in connection with the APF. The module is connected to the group by the GR_LINK and has a message behavior like every other CEMAT module.

At the use of the APF a central engineering becomes, carried out with storage of the parameter data in the user archives. The update happens upon request from the Faceplate. The advantage is a general overview of the Storage Parameter data, incl. the current filling level.

1. The following interconnections are possible:
2. Simple integration in the CEMAT environment with individual connection and parameter setting of the respective storage module...



Expansion of the silo information at an multi chamber silo by connection or choice of the active chamber data.



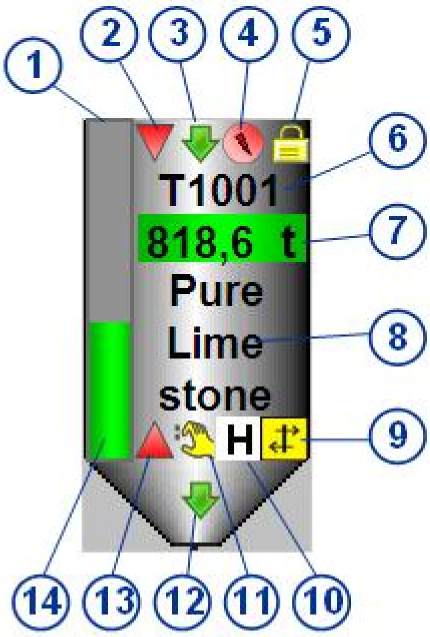
OS

Symbols

The symbols for C_STORAG and C_STO_MA will be only shown in the flow mimics. Symbols for different Storage Types are prepared in @PCS7Typicals_CEMxx.pdl. The symbol is generated automatically and the properties are filled up by "create/change Process tag types".

Example for a small Silo

.



(1) Current storage filling level as bar

(2) Binary indication Storage full.

(3) Charging on

(4) Dedusting fault

(5) Storage locked

(6) Short description Storage

(7) Current storage filling level as digital value with a corresponding dimension and change of background color (same as bar)

(8) Material Name

(9) Actual filling Material is not equal the assigned Material

(10) Homogenization is active

(11) Measurement of filling level is on Simulation

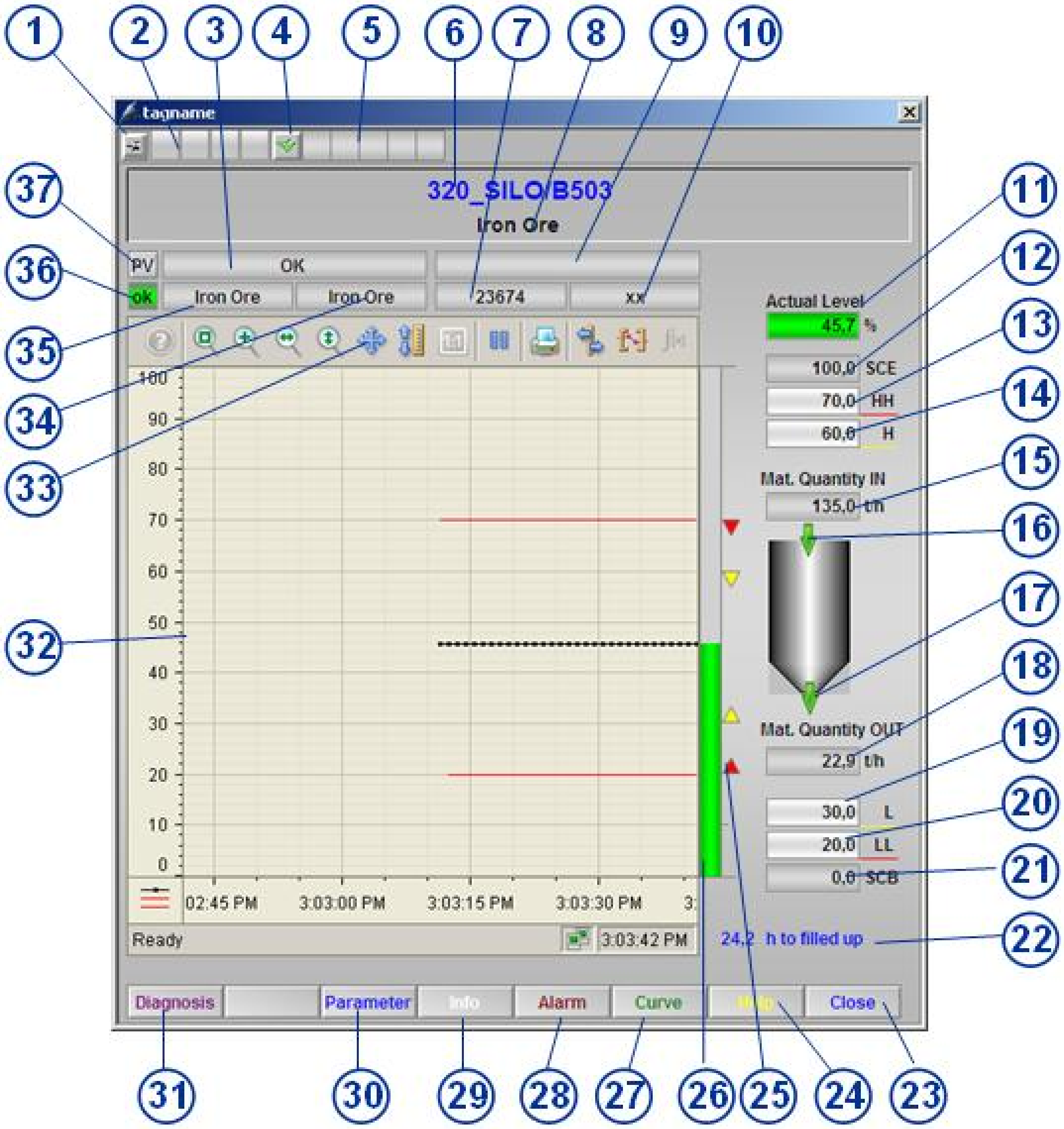
(12) Storage discharge active

(13) Binary indication Storage empty

(14) The level indication will change the color if the corresponding limit has reached.

Faceplate

With mouse click on the module symbol the Faceplate will be open.



The following functions and information are shown there:

(1) Fix the Dialog

(2) Annunciation symbols (Alarm, Warning, etc.).

(3) Note texts output (simulation on, Life zero, different material.)

(4) Annunciation acknowledge

(5) Status symbols (Status display of the measurement, user right)

(6) TAG

(7) Batch ID

(8) Comment

(9) Time value counter (Dedusting fault)

(10) Batch Name

(11) Actual level as % , m , Tons

(12) measurement scale end

(13) Alarm level full

(14) Alarm level full

(15) Material quantity charging

(16) Charging on (additional is shown: :

- Storage full
- no dedusting
- Storage locked
- no original material
- Homogenization on
- Simulation on
- Storage empty

(17) Silo discharge active

(18) Material quantity discharge

(19) Warning level empty

(20) Alarm level empty

(21) Measurement scale begin

(22) Remaining time (h) till the Storage is full or empty.

(23) Close Dialog

(24) Help

(25) Limit Symbols

(26) Filling level Indication as bar

(27) Open Curve Dialog

(28) Open Alarm Dialog

(29) Open Information- Dialog

(30) Open Parameter Dialog (only in connection with the APF user archives)

(31) Open Diagnosis Dialog

(32) Curve window with the measurement and the two alarm limits

(33) Operating devices of the curve window

(34) Actual charge Material

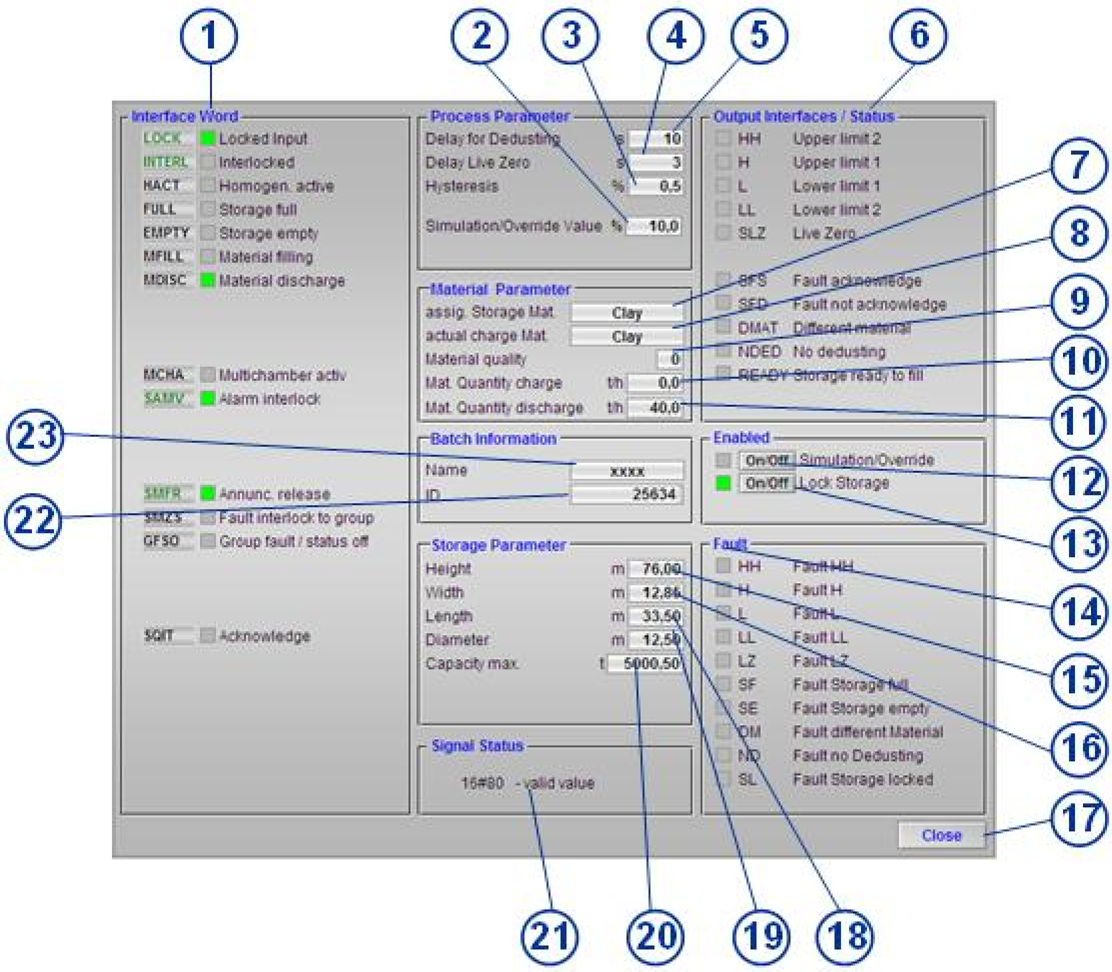
(35) Assigned Material

(36) Material quality 0 = "ok", 1 = worse "<", 2 = ">" better

(37) Calling preconnected measurement module

Diagnosis Dialog

With Mouse click on button „Diagnosis“, a dialog with all Status information and Parameter values from the Storage instance will be shown. In addition the locked or simulation function can be switched on or off...



The following functions and information are shown:

(1) Interface word with the binary status of input signals

(2) Simulation- Value. (with user right 24)

(3) Hysteresis of limit monitoring (with user right 22)

(4) Delay time for „Live Zero“ (with user right 22)

(5) Delay time for dedusting fault (with user right 22)

(6) Output- Interface- Status of AS module

(7) Assigned Material (with user right 22)

(8) Actual charging material (with user right 22)

(9) Material- Quality- identifier (with user right 22)

(10) Material quantity charging (with user right 22)

(11) Material quantity discharging (with user right 22)

(12) Simulation switch on and off (with user right 24)

(13) Storage locked (with user right 24)

(14) Listing and status display of alarm messages

(15) Storage Dimension parameter „height“(with user right 22)

(16) Storage Dimension parameter „Width“(with user right 22)

(17) Close Dialog

(18) Storage Dimension parameter „Length“(with user right 22)

(19) Storage Dimension parameter „Diameter“(with user right 22)

(20) Defining a maximum amount of material (with user right 22) With that value the remaining fill or emptying time is calculated.

(21) Signal status of filling level – Analog signal (with user right 22)

(22) Batch ID (with user right 22)

(23) Batch Name (with user right 22)

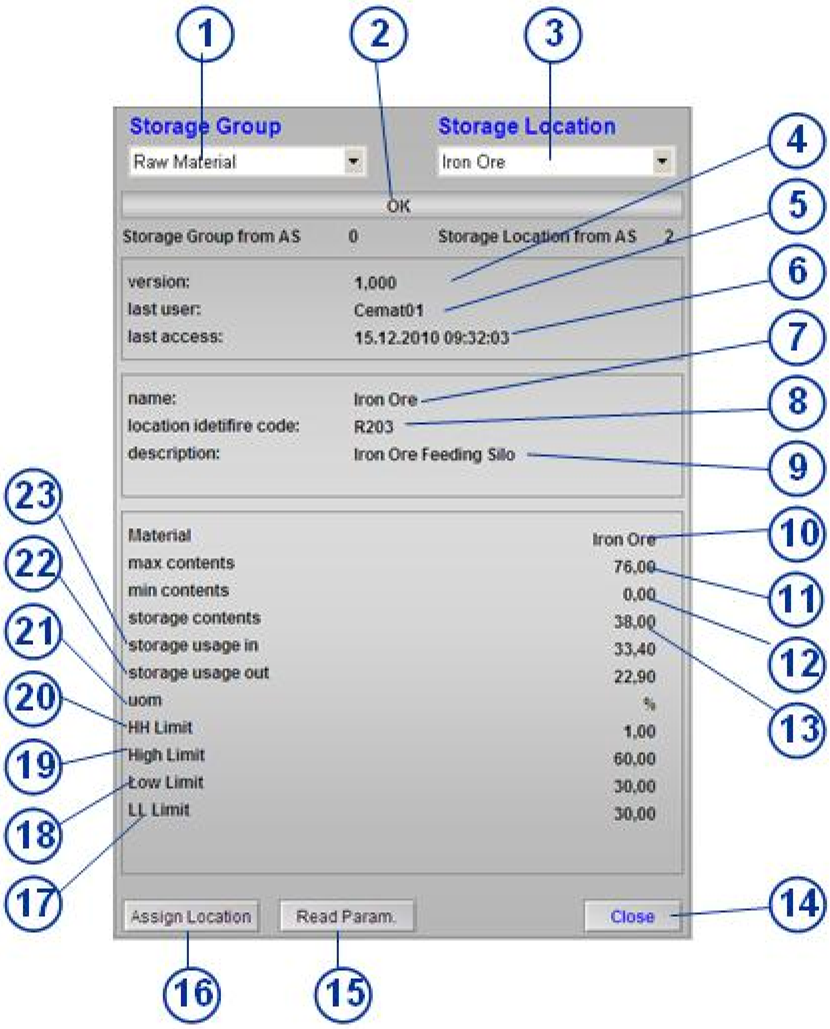
(Right 22 permits changing process parameters)

Save Storage Parameter

This dialog only can be opened, if the Interface "APF_ACT" is on "LOG1". (i.e. the software package APF and the corresponding user archives be available.)

The last stored Module parameters can be read and reported from the user archives.

The Storage location assignment must be done once to be able to store the parameters in the user archives.



(1) Choice of the Storage Group (raw material, cement etc..)

(2) Error messages to the user archive processing

(3) Choice Storage location

(4) Version- No.

(5) Last User

(6) Last access- Time

(7) Storage Name

(8) Storage LIC

(9) Storage description

(10) Storage Material assignment

(11) Storage maximum contents

(12) Storage minimum contents

(13) Actual storage content on save time

(14) Close Dialog

(15) Read module parameter from AS and store them in to the User archive

(16) assign the Storage location to AS module. (Storage Group No. and Storage No.)

(17) Limit Alarm low

(18) Limit Warning low

(19) Limit Warning high

(20) Limit Alarm high

(21) Measurement value dimension

(22) Amount of discharging quantity at save time

(23) Amount of charging quantity at save time

A Storage Parameter overview is possible with APF dialogs...

I/O-bar of C_STORAG

C_STORAG

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
S_TYPE	1=normal, 2=multi, 3=stock pile, 4=tank	INT	2	I		+	
APF_ACT	APF data structure	BOOL	0	I			
GROUP_ON	group is completely running	BOOL	1	I			
S_INT	interlock	BOOL	1	I			
S_CHARG	charging is running	BOOL	1	I			
S_DISC	discharging is running	BOOL	0	I			
S_HOMOG	homogenizing is running	BOOL	1	I			
S_EMPTY	storage is empty	BOOL	0	I			
S_FULL	storage is full	BOOL	0	I			
S_DEDU	dedusting is running	BOOL	1	I			
S_DIFFM	different material	BOOL	0	I			
SAMV	alarm interlock	BOOL	1	I			
SMFR	enable Annunciations	BOOL	1	I			
SMZS	fault interlock to the group	BOOL	0	I			
GFSO	R Group fault/status off	BOOL	0	I			
SQIT	acknowledge (additional)	BOOL	0	I			
PV	PV	STRUCT		I			
PV.Value	Value	REAL	61.0	I			
PV.ST	Signal Status	BYTE	16#80	I			
UNIT	unit	STRING[8]	'%'	I			
SIM_VAL	simulation value from OS	REAL	10. Jan	I			
VAL_HH	HH limit	REAL	100.0	I			
VAL_H	H limit	REAL	90.0	I			
VAL_L	L limit	REAL	10.0	I			
VAL_LL	LL limit	REAL	5.0	I			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
LZ_TIM	time delay Live Zero	INT	3	I			
HYSTERES	hysteresis	REAL	0.5	I			
AM_CHA	max. number of chambers	INT	0	I			
HEIGHT	storage height	REAL	100.0	I			
WIDTH	storage width	REAL	20.0	I			
LENGTH	storage length	REAL	33.1	I		+	
DIAM	storage diameter	REAL	24.0	I			
CAPAC	Storage capacity	REAL	5000	I			
STORAH	Storage charge/discharge Time	REAL	0.0	I			
SCB	start of scale	REAL	0.0	I			
DD_TIM	time delay dedusting	INT	10	I			
S_CHAMB	chamber number (only for S_TYPE = 2)	INT	1	I			
Q_MAT	material quality	INT	1	I			
MQ_IN	MQ_IN charging material quantity	STRUCT		I			
MQ_IN.Value	Value	REAL	0.0	I			
MQ_IN.ST	Signal Status	BYTE	16#FF	I			
MQ_OUT	MQ_OUT discharging material quantity	STRUCT		I			
MQ_OUT.Value	Value	REAL	0.0	I			
MQ_OUT.ST	Signal Status	BYTE	16#FF	I			
MQ_UNIT	unit	STRING [8]	'%'	I			
MATERIAL	assigned material	STRING [32]	' '	I			
CA_MAT	Filling material	STRING [32]	' '	I			
SimRight	Simulation right	INT	24	I			
ASMatCl	memory Material class	INT	-1	I			
ASMatTy	memory Material type	INT	-1	I			
ASMat	memory Material	INT	-1	I			
ASStoCl	memory Storage class	INT	-1	I			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
ASStore	memory Storage	INT	-1	I			
UserFace	User Faceplate Call	ANY		I			
BatchEn	Enable Remote Operation of Controller by Batch Recipe	BOOL	0	I		+	
BatchID	Current Batch ID (number)	DWORD	16#00000000	I			
BatchName	Current Batch Name	STRING [32]	"	I			
MSG8_EVID1	Message-ID 1	DWORD	16#000000A7	I			
MSG8_EVID2	Message-ID 2	DWORD	16#000000A6	I			
COMMAND	Commando Word	WORD	16#0000	I			
GR_LINK1	GR_LINK1 link to group or route	STRUCT		I			
GR_LINK1.Link	LINK	INT		I			
GR_LINK1.Command	Group / Route Command	WORD		I			
GR_LINK2	GR_LINK2 link to group or route	STRUCT		I			
GR_LINK2.Link	LINK	INT	0	I			
GR_LINK2.Command	Group / Route Command	WORD	16#0000	I			
MUX_LINK	link to C_MUX	STRUCT		I			
MUX_LINK.Point_GRL	POINTER	INT	0	I			
MUX_LINK.Command	Group / Route Command	WORD	16#0000	I			
ENO		BOOL	0	O		+	
CHA_OUT	CHAMBER OUT	STRUCT		O			
CHA_OUT.STATUS	STATUS Interface To OS	DWORD	16#00000000	O			
CHA_OUT.PV_Out_Value	Process Value (Analog Output)	REAL	0.0	O			
CHA_OUT.PV_Out_ST	Process Value Signal Status	BYTE	16#80	O			
CHA_OUT.PV_Stat_UNIT	Process Value Unit	STRING [8]	'%'	O			
CHA_OUT.PV_Stat_STATUS	Process Value Status	DWORD	16#00000000	O			
CHA_OUT.V_HH_O	HH limit	REAL	0.0	O			
CHA_OUT.V_H_O	H limit	REAL	0.0	O			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
CHA_OUT.V_L_O	L limit	REAL	0.0	O			
CHA_OUT.V_LL_O	LL limit	REAL	0.0	O			
CHA_OUT.HEIGHT	storage height	REAL	0.0	O			
CHA_OUT.WIDTH	storage width	REAL	0.0	O			
CHA_OUT.LENGTH	storage length	REAL	0.0	O			
CHA_OUT.DIAM	storage diameter	REAL	0.0	O			
CHA_OUT.CAPAC	storage capacity	REAL	0.0	O			
CHA_OUT.SCB	start of scale	REAL	0.0	O		+	
CHA_OUT.DD_TIM	time delay dedusting	INT	10	O			
CHA_OUT.S_CHAMB	Chamber number	INT	0	O			
CHA_OUT.Q_MAT	material quality	INT	1	O			
CHA_OUT.MQ_IN_Value	Material quantity IN Value (Analog Output)	REAL	0.0	O			
CHA_OUT.MQ_IN_ST	Material quantity IN Status	BYTE	16#80	O			
CHA_OUT.MQ_OUT_Value	Material quantity OUT Value (Analog Output)	REAL	0.0	O			
CHA_OUT.MQ_OUT_ST	Material quantity OUT Status	BYTE	16#80	O			
CHA_OUT.MQ_UNIT	unit	STRING [8]	'%'	O			
CHA_OUT.MATERIAL	assigned material	STRING [32]	''	O			
CHA_OUT.CA_MAT	Actual filling material	STRING [32]	''	O			
STATUS	STATUS Interface To OS	DWORD	16#00000000	O			
PV_Out	Process Value (Analog Output)	STRUCT		O			
PV_Out.Value	Value	REAL	0.0	O			
PV_Out.ST	Signal Status	BYTE	16#80	O			
PV_Stat	Analog Output Status + Unit	STRUCT		O			
PV_Stat.UNIT	Unit	STRING [8]	'%'	O			
PV_Stat.STATUS	Status	DWORD	16#00000000	O			
V_HH_O	HH limit	REAL	0.0	O			
V_H_O	H limit	REAL	0.0	O		+	

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
V_L_O	L limit	REAL	0.0	O			
V_LL_O	LL limit	REAL	0.0	O			
READY	Storage ready to fill	BOOL	0	O			
HH	overshoot Limit HH	BOOL	0	O			
H	overshoot Limit H	BOOL	0	O			
L	undershoot Limit L	BOOL	0	O			
LL	undershoot Limit LL	BOOL	0	O			
SLZ	Live zero	BOOL	0	O			
DEDU	dedusting fault	BOOL	0	O			
SFD	dynamic fault (not acknowledged)	BOOL	0	O			
SFS	static fault (acknowledged)	BOOL	0	O			
SIM_ON	simulation value activ (driver)	BOOL	0	O			
MV_I	Measured Value Input	STRUCT		O			
MV_I.Value	Value	REAL	0.0	O			
MV_I.ST	Signal Status	BYTE	16#80	O			
ALARM	for test	WORD	16#0000	O			
DLY_CNT	DLY_CNT dedusting delay activ (counter)	INT	0	O			

OS-Variable table

OS Variable	Description	PLC Data Type	OS Data Type
S_TYPE	1=normal, 2=multi, 3=stock pile, 4=tank	INT	Signed 16-bit value
PV.Value	Value	REAL	32-bit floating-point number IEEE 754
SIM_VAL	simulation value from OS	REAL	32-bit floating-point number IEEE 754
VAL_HH	HH limit	REAL	32-bit floating-point number IEEE 754
VAL_H	H limit	REAL	32-bit floating-point number IEEE 754
VAL_L	L limit	REAL	32-bit floating-point number IEEE 754
VAL_LL	LL limit	REAL	32-bit floating-point number IEEE 754
LZ_TIM	time delay Live Zero	INT	Signed 16-bit value
HYSTERES	hysteresis	REAL	32-bit floating-point number IEEE 754
AM_CHA	max. number of chambers	INT	Signed 16-bit value
HEIGHT	storage height	REAL	32-bit floating-point number IEEE 754
WIDTH	storage width	REAL	32-bit floating-point number IEEE 754
LENGTH	storage length	REAL	32-bit floating-point number IEEE 754
DIAM	storage diameter	REAL	32-bit floating-point number IEEE 754
CAPAC	storage capacity	REAL	32-bit floating-point number IEEE 754
STORAH	Storage charge/discharge time	REAL	32-bit floating-point number IEEE 754
SCB	start of scale	REAL	32-bit floating-point number IEEE 754
DD_TIM	time delay dedusting	INT	Signed 16-bit value
S_CHAMB	chamber number (only for S_TYPE = 2)	INT	Signed 16-bit value
Q_MAT	material quality	INT	Signed 16-bit value
MQ_IN.Value	Value	REAL	32-bit floating-point number IEEE 754
MQ_OUT.Value	Value	REAL	32-bit floating-point number IEEE 754
MQ_UNIT	unit	STRING [8]	Text variable 8-bit character set
MATERIAL	Assigned material	STRING [32]	Text variable 8-bit character set
CA_MAT	Actual filling material	STRING [32]	Text variable 8-bit character set
ASMatCl	memory Material class	INT	Signed 16-bit value

OS Variable	Description	PLC Data Type	OS Data Type
ASMatTy	memory Material type	INT	Signed 16-bit value
ASMat	memory Material	INT	Signed 16-bit value
ASStoCl	memory Storage class	INT	Signed 16-bit value
ASStore	memory Storage	INT	Signed 16-bit value
BatchID	Current Batch ID (number)	DWORD	Unsigned 32-bit value
BatchName	Current Batch Name	STRING [32]	Text variable 8-bit character set
COMMAND	Command word	INT	Unsigned 16-bit value
STATUS	Status word	DWORD	Unsigned 32-bit value
PV_Out.Value	Value	REAL	32-bit floating-point number IEEE 754
PV_Out.ST	Signal Status	BYTE	Unsigned 8-bit value
PV_Stat.UNIT	Unit	STRING [8]	Text variable 8-bit character set
PV_Stat.STATUS	Status	DWORD	Unsigned 32-bit value
MV_I.Value	Value	REAL	32-bit floating-point number IEEE 754
MV_I.ST	Signal Status	BYTE	Unsigned 8-bit value
DLY_CNT	Down time counter	INTEGER	Signed 16-bit value

Variable details

Internal structure of the Commands, Alarms, Visualization status and Interface word

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Kommandowort**	**Commandword**		
COM_B20						
COM_B21						
COM_B22						
COM_B23						
COM_B24						
COM_B25						
COM_B26						
COM_B27						
COM_B10						
COM_B11						
COM_B12						
COM_B13		11				
COM_B14	LOCK	12	Storagesperren	Lock Storage		
COM_B15	AFP	13	APF Daten lesen	Read APFData Value		
COM_B16	SIM	14	Simulation ON/OFF	Simulation ON/OFF		
COM_B17	QUIT	15	Quittierung	Acknowledge		
ALARM			**Alarm**	**Alarm**		
ALA_HH	SIG1	0	HH Grenze @1%-1.2f@ @5%s@	HH Limit @1%-1.2f@ @5%s@	AL_H	P
ALA_H	SIG2	1	H Grenze @2%-1.2f@ @5%s@	H Limit @2%-1.2f@ @5%s@	WA_H	P
ALA_L	SIG3	2	L Grenze @3%-1.2f@ @5%s@	L Limit @3%-1.2f@ @5%s@	WA_L	P
ALA_LL	SIG4	3	LL Grenze @4%-1.2f@ @5%s@	LL Limit @4%-1.2f@ @5%s@	AL_L	P
ALA_LZ	SIG5	4	Bad Quality	Bad Quality	AL_H	E
ALA_SL	SIG6	5	Storagegesperrt	Storage locked	AL_H	P
ALA_SF	SIG7	6	Storagevoll	Storage full	AL_H	P
ALA_SE	SIG8	7	Storageleer	Storage empty	AL_H	P
ALARM1			**Alarm**	**Alarm**		
ALA_MA	SIG1	0	Unterschiedliches Material	Different Material	WA_H	P
ALA_DW	SIG2	1	keine Entstaubung warn.	No dedusting warn.	WA_H	P
ALA_DA	SIG3	2	keine Entstaubung Abschaltung	No dedusting switch of.	AL_H	P
ALA_HOMO	SIG4	3	Homogenisierung läuft	Homogenization on	OP	P
ALA_CAS	SIG5	4	StorageBefüllung Start	Storage charging start	OP	P
ALA_CAO	SIG6	5	StorageBefüllung Stop	Storage charging stop	OP	P
ALA_DISS	SIG7	6	StorageEntleerung start	Storage discharge start	OP	P
ALA_DISO	SIG8	7	StorageEntleerung stop	Storage discharge stop	OP	P

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B40	Diff. Material	0	kein Original Material	Different Material		
STA_B41	No dedusting	1	keine Entstaubung	No dedusting		
STA_B42	HH	2	Alarm oben	HH		
STA_B43	H	3	Warnung oben	H		
STA_B44	L	4	Warnung unten	L		
STA_B45	LL	5	Alarm unten	LL		
STA_B46	Fault n. Ackn.	6	Fault n. Ackn.	Storage Fault n. Ackn.		
STA_B47	Fault acknow.	7	Fault acknow.	Storage Fault acknow.		
STA_B30	RELAPF	8	Freigabe APF Faceplate	Release APF Faceplate		
STA_B31	Ready	9	StorageBereit zum befüllen	Storage ready to fill up		
STA_B32	MultiChamb	10	Mehrkammer Silo freigabe	Multi Chamber release		
STA_B33	LZ	11	Live Zero			
STA_B34	SAMV	12	Alarmverriegelung	Alarm interlock		
STA_B35	SMFR	13	Meldefreigabe	Annunciation release		
STA_B36	SMZS	14	Störungsverriegelung zur Gruppe	Fault interlock to the group		
STA_B37	GFSO	15	Gruppenstörung/ Zustand aus	Group fault / status off		
STA_B20	locked	16	Storagegesperrt	Storage locked		
STA_B21	interlocked	17	Storageverriegelt	Storage interlocked		
STA_B22	Fill	18	befüllen	Fill		
STA_B23	Discharge	19	entleeren	Discharge		
STA_B24	Full	20	StorageVoll	Storage full		
STA_B25	empty	21	Storageleer	Storage empty		
STA_B26	HOMO aktiv	22	Homogenisierung läuft	Homogenisierung aktiv		
STA_B27	SIMUL	23	Simulation	Simulation		
STA_B10	MARK	24	Objekt markieren (Gruppenkommando)	Highlight object (group command)		
STA_B11	LINK	25	GR_LINK1 angeschlossen	GR_LINK1 connected		
STA_B12	STRC	26	PV angeschlossen	PV connected		
STA_B13	LW	27	Letzter gültiger Wert	Last valid value		
STA_B14	SUB	28	Ersatzwert	Substitution value		
STA_B15	SQIT	29	Quittieren (Zusatz)	Acknowledge (additional)		
STA_B16	DDTR	30	Entstaubungszeit läuft	Dedusting time is running		
STA_B17	FTIMN	31	Füllzeit negativ	Fill up time negative		

PV_Stat.						
STATUS			**Status**	**Status**		
STA_B40	HH	0	Messwert > Obergrenze 2	MV > upper limit 2		
STA_B41	H	1	Messwert > Obergrenze 1	MV > upper limit 1		
STA_B42	L	2	Messwert < Untergrenze 1	MV < lower limit 1		
STA_B43	LL	3	Messwert < Untergrenze 2	MV < lower limit 2		
STA_B44	ULZ	4	Live Zero	Live Zero		
STA_B45		5				
STA_B46		6				
STA_B47		7				
STA_B30		8				
STA_B31		9				
STA_B32		10				
STA_B33		11				
STA_B34	UST	12	Störung nicht quittiert	Fault not acknowledged		
STA_B35		13				
STA_B36		14				
STA_B37		15				
STA_B20	DRV	16	Verbunden mit Treiber	Connected to a driver		
STA_B21	LVV	17	Letzter gültiger Wert	Last valid value		
STA_B22	SUB	18	Ersatzwert	Substitution value		
STA_B23	SIM	19	Simulation ON	Simulation ON		
STA_B24		20				
STA_B25		21				
STA_B26		22				
STA_B27	STRC	23	PV angeschlossen	PV connected		
STA_B10		24				
STA_B11		25				
STA_B12		26				
STA_B13		22				
STA_B14		28				
STA_B15		29				
STA_B16		30				
STA_B17		31				

SIEMENS

Cemat V 8.2
Function Block Library ILS_CEM

Function Description **Edition 07/16**

STORAGE Module C_STO_MA

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring to property damage only have no safety alert symbol. The notices shown below are graded according to the degree of danger.

Danger
indicates that death or severe personal injury **will** result if proper precautions are not taken.

Warning
indicates that death or severe personal injury **may** result if proper precautions are not taken.

Caution
with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution
without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention
indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel.** Within the context of the safety notices in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

Warning
This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.
Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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Disclaimer of Liability
We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens AG 2005
Technical data subject to change.

Description of C_STO_MA

Type/Number

Module name: **C_STO_MA**
Module no.: **FB1036**

Calling OBs

C_STO_MA must be called in OB1 (MAIN_TASK)

Function

General functional description

The STORAGE module provides the Operator with status information's of the multichamber storage locations and gives information about the contained material and the filling level.

The information of the individual chambers will be send from each C_STORAG Module Output to the CHA_I_x input of C_STO_MA.

In addition to that, there is the possibility of calling external applications like Stockpile manager, Multichamber charging or homogenization modules directly from the Faceplate.

Only the data of the C_STORAG modules and the current chamber number serve as a standard interface.

Depending on the actual filling chamber the following Values are evaluated and announced on the corresponding Storage Symbols:

- current storage filling level as digital value with a corresponding dimension
- current storage filling level as bar
- Storage full
- Storage empty
- alarm limit full
- warning limit full
- warning limit empty
- alarm limit empty
- Storage locked
- charging on
- discharging on
- no dedusting
- no original material
- homogenization on
- material name
- brief name storage
- active chamber discharge
- active chamber charge
- No. of shown chamber values

Operating principle

Input interfaces

SC_TYPE **Visualization Type** **Default = 1**

Format INTEGER

SC_TYPE defines the visualization type.
1 = 5 Chamber silo
2 = 8 Chamber Silo
3 = xx
4 = xx

AM_CHA **Amount of Chamber** **Default: 0**

Format INTEGER

Maximum number of chambers of a multichamber silo.

CHA_DISP **displayed Chamber** **Default: 0**

Format INTEGER

This chamber shall be displayed. The choice is carried out about the OS.

AC_CHA_C **actual Chamber charge** **Default: 0**

Format INTEGER

Actual Chamber charge.

AC_CHA_D **actual Chamber discharge** **Default: 0**

Format INTEGER

Actual Chamber discharge.

CHA_I_1 **Storage Chamber 1 Information** **Default: 0**

Format STRUCT

Is the value of Input AC_CHA_C =“1“the Structure of Storage Chamber 1 will be read in and the associated parameter copied

CHA_I_2 **Storage Chamber 2 Information** **Default: 0**

Format STRUCT

Is the value of Input AC_CHA_C =“2“the Structure of Storage Chamber 2 will be read in and the associated parameter copied

CHA_I_3 **Storage Chamber 3 Information** **Default: 0**

Format STRUCT

Is the value of Input AC_CHA_C =“3“the Structure of Storage Chamber 3 will be read in and the associated parameter copied

CHA_I_4 Storage Chamber 4 Information Default: 0

Format STRUCT

Is the value of Input AC_CHA_C =“4“the Structure of Storage Chamber 4 will be read in and the associated parameter copied

CHA_I_5 Storage Chamber 5 Information Default: 0

Format STRUCT

Is the value of Input AC_CHA_C =“5“the Structure of Storage Chamber 5 will be read in and the associated parameter copied

CHA_I_6 Storage Chamber 6 Information Default: 0

Format STRUCT

Is the value of Input AC_CHA_C =“6“the Structure of Storage Chamber 6 will be read in and the associated parameter copied

CHA_I_7 Storage Chamber 7 Information Default: 0

Format STRUCT

Is the value of Input AC_CHA_C =“7“the Structure of Storage Chamber 7 will be read in and the associated parameter copied

CHA_I_8 Storage Chamber 8 Information Default: 0

Format STRUCT

Is the value of Input AC_CHA_C =“8“the Structure of Storage Chamber 8 will be read in and the associated parameter copied

CHA_I_9 Storage Chamber 9 Information Default: 0

Format STRUCT

Is the value of Input AC_CHA_C =“9“the Structure of Storage Chamber 9 will be read in and the associated parameter copied

CHA_I_10 Storage Chamber 10 Information Default: 0

Format STRUCT

Is the value of Input AC_CHA_C =“10“the Structure of Storage Chamber 10 will be read in and the associated parameter copied

UserFace Faceplate-Call

Format ANY

The Input UserFace can be interconnected to any module with an OS interface (Faceplate). A button "U" (user) is shown in the Faceplate if the interconnected exist and can be used to open the external Faceplate.

BatchEn **Batch Enabled** **Default: 0**

Format BOOL.

Enable Batch Operation

BatchID **Batch ID** **Default: 0**

Format DWORD.

Show the Batch Number which belong to these Storage

BatchName **Batch Name** **Default: 0**

Format STRING (32 characters)

Show the Batch Name which belong to these Storage.

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

Output interfaces

STATUS **Status word OS**

Format DWORD

Interface to OS

Output STATUS contains the status information for the selected chamber.

PV_OUT **Process value**

Format STRUCT

Output *PV_Out* contains the actual storage level for the selected chamber.

Structure variable:

PV_OUT.Value **Value**

Format REAL

PV.ST **Signal status**

Format BYTE

PV_OUT_Stat **Process value status + Unit**

Format STRUCT

Output PV_Stat contains the Status and the Unit of the Storage level for the selected chamber.

Structure variable:

PV_OUT_Stat.UNIT **Unit**

Format STRING[8]

PV_OUT_Stat.STATUSStatus

Format DWORD

VAL_HH **High limit 2**

Format REAL

Output VAL_HH contains the value of high high limit VAL_HH for the selected chamber.

VAL_H **High limit 1**

Format REAL

Output VAL_H contains the value of high limit VAL_H for the selected chamber.

VAL_L **Low limit 1**

Format REAL

Output VAL_L contains the value of low limit VAL_L for the selected chamber.

VAL_LL **Low limit 2**

Format REAL

Output VAL_LL contains the value of low low limit VAL_LL for the selected chamber.

HEIGHT Height of Storage

Format REAL

Output HEIGHT contains the storage height for the selected chamber.

The Parameter HEIGHT can be
- the Storage height in meter
- or the Storage filling level as %
- or the Storage amount in tons

The value will be used internal as parameter **SCE**.

WIDTH Width of Storage

Format REAL

Output WIDTH contains the storage width in meter for the selected chamber.

LENGTH Length of Storage

Format REAL

Output LENGTH contains the storage length in meter for the selected chamber.

DIAM Diameter of Storage

Format REAL

Output DIAM contains the storage diameter in meter for the selected chamber.

SCB Scale begin

Format REAL

Output SCB contains the start of scale for process value filling level (Physical value) for the selected chamber.

DD_TIM Delay time dedusting fault

Format INTEGER (0 - 999)

Value as minute.

Output DD_TIM contains the delay time for dedusting fault for the selected chamber.

If the input „GROUP_ON" has the Signal status„1" and the input „Dedusting on (S_DEDU)" changed from „1" to „0" an warning Alarm will be generated. After the DD_TIM is counted down to zero the Fault Output will be set und an alarm generated.

S_CHAMB Chamber Number

Format INTEGER

Output C_CHAMB contains the Chamber Number of the selected chamber.

Q_MAT **Quality of filling material**

Format TEXT

Output Q_MAT contains the Quality of charging material for the selected chamber.

0 = ok identical with the assigned Material
1 = < worse as the assigned Material
2 = > better as the assigned Material

MQ_IN **Material Quantity charge**

Format STRUCT

Output MQ_IN contains the Material charging quantity for the selected chamber.

Structure variable:

MQ_IN.Value **Value**

Format REAL

MQ_IN.ST **Signal status**

Format BYTE

MQ_OUT **Material Quantity discharge**

Format STRUCT

Output MQ_OUT contains the Material discharging quantity for the selected chamber.

Structure variable:

MQ_OUT.Value **Wert**

Format REAL

MQ_OUT.ST **Signal status**

Format BYTE

MQ_UNIT **Dimension**

Format STRING (8 characters)

Output MQ_UNIT contains the physical Unit for material quantity for the selected chamber.

MATERIAL **Storage Material**

Format STRING (32 characters)

Output MATERIAL contains the Name of Material which is assigned to the selected chamber.

CA_MAT **Storage charging Material**

Format STRING (32 characters)

Output CA_MAT contains the Name of Material which is currently charged to the selected chamber.

HH **Upper limit 2**

Format BOOL

If the storage level of the selected chamber overshoots limit HH, the output HH is set.

H **Upper limit 1**

Format BOOL

If the storage level of the selected chamber overshoots limit H, the output H is set.

L **Lower limit 1**

Format BOOL

If the storage level of the selected chamber undershoots limit L, the output L is set.

LL **Lower limit 2**

Format BOOL

If the storage level of the selected chamber undershoots limit LL, the output LL is set.

SLZ **Live Zero or Bad Quality**

Format BOOL

In case of a card/channel failure for the analog input of the selected chamber, the measured value is interpreted as being faulty and, after the live zero delay time has elapsed, bit ULZ is set and an alarm message for "Bad Quality" is created.

DEDU **Dedusting fault**

Format BOOL

Output DEDU contains the dedusting fault for the selected chamber.

SFD **Fault not acknowledge**

Format BOOL

Output SDF contains the dynamic fault/warning for the selected chamber.

SFD=1 when the upper limit 2 or the lower limit 2 is violated and an alarm is generated. SFD=0 after the acknowledge button has been pressed.

SFS **Fault acknowledge**

Format BOOL

Output SFS contains the fault for the selected chamber.

Time characteristics

The module must be called behind the C_STORAG .

Message characteristics

There is no ALARM_8 module used.

Module states

See Variable STATUS:

Commands

Refer to the Variable details for the assignment of the command word.

Engineering

AS

The C_STO_MA can be used in the pure CEMAT environment and in connection with the APF.

The following interconnections are possible:

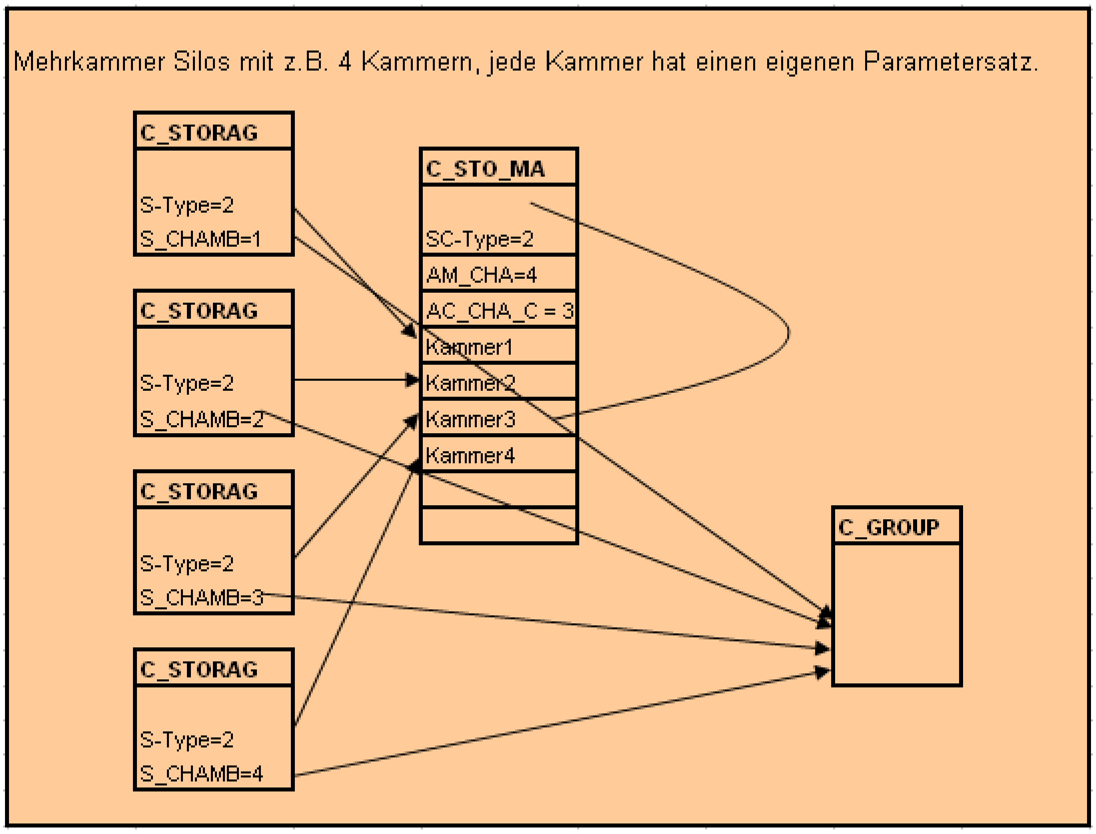
Expansion of the silo information at a multichamber silo by connection or choice of the active chamber data.

According to the chamber number the C_Storage modules must be consistently connected to the Input structure „CHA_I_x“and not pass over the value of „AM_CHA“. (max. chamber).

The representation of the silo can be adapted over the Interface "SC_Type".

To make the current information to the charged chamber actively in the flow mimic, the Input interface "AC_CHA_C" has to be connected with the related process information.

The same is to do with the Input interface „AC_CHA_D“, no know the discharging chamber.



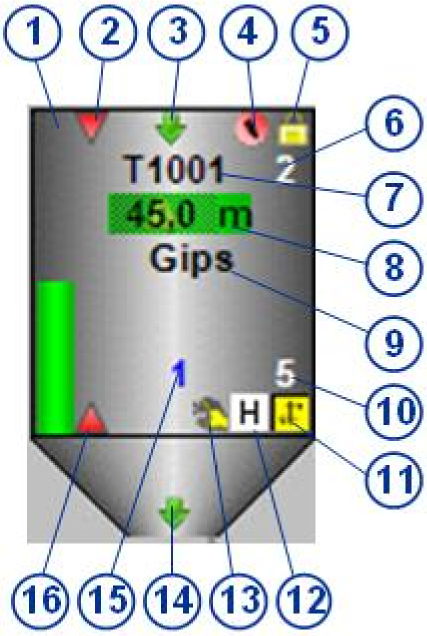
OS

Symbols

The symbols for C_STORAG and C_STO_MA will be only shown in the flow mimics. Symbols for different Storage Types are prepared in @PCS7Typicals_CEMxx.pdl. The symbol is generated automatically and the properties are filled up by "create/change Process tag types".

Example for a multi chamber silo symbol

.



(1) Current storage filling level as bar

(2) Binary indication Storage full.

(3) Charging on

(4) Dedusting fault

(5) Storage locked

(6) Chamber x will be charged

(7) Short description Storage

(8) Current storage filling level as digital value with a corresponding dimension and change of background color (same as bar).

(9) Material Name

(10) Chamber x will be discharged

(11*)* Actual filling Material is not equal the assigned Material

(12) Homogenization is active

(13) Measurement of filling level is on Simulation

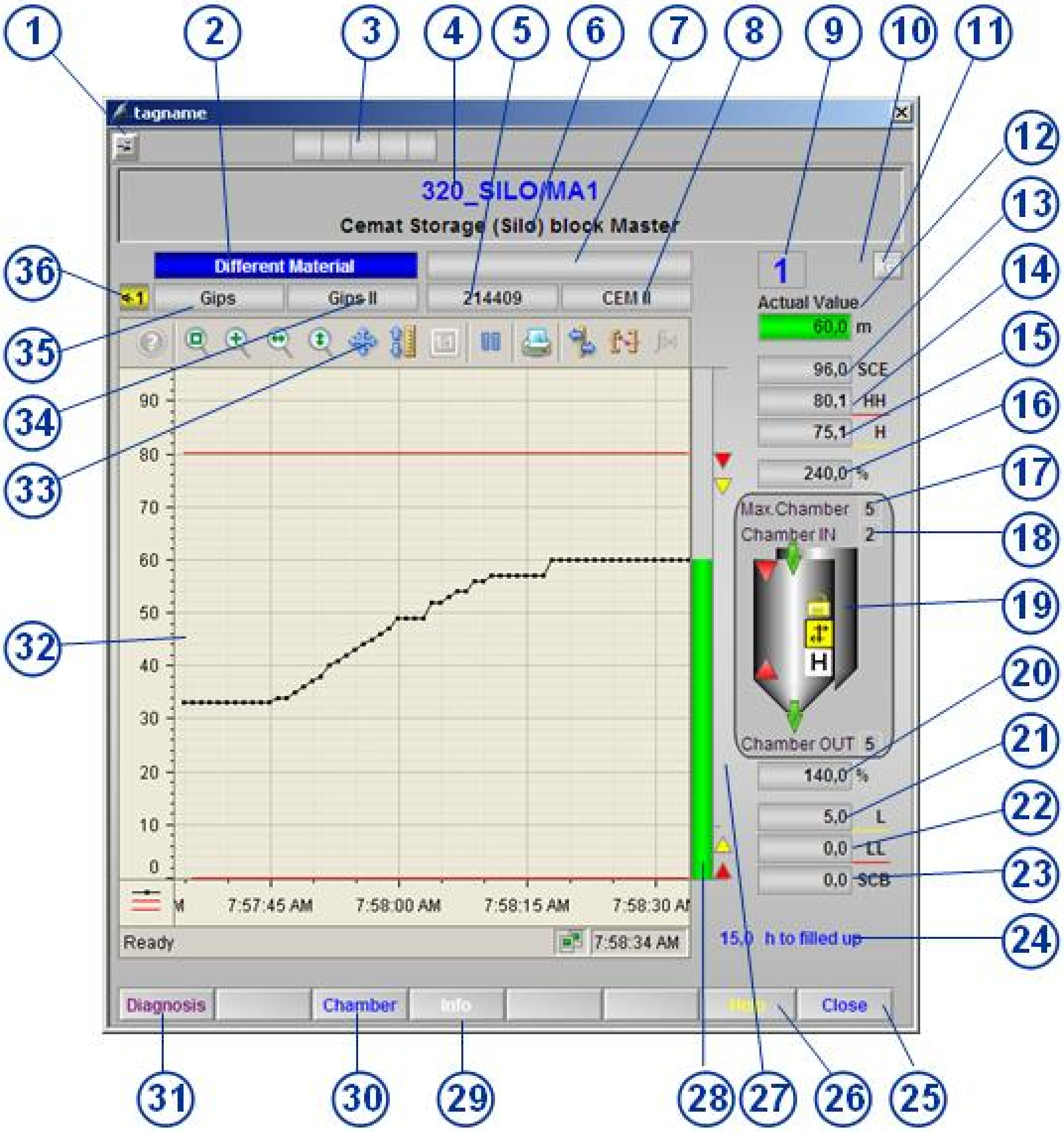
(14) Discharging on

(15) selected Chamber (to show the specific parameter)

(16) Binary indication Storage empty

Faceplate

With mouse click on the module symbol the Faceplate will be open.



The following functions and information are shown there:

(1) Fix the Dialog

(2) Note texts output (simulation on, Life zero, different material.)

(3) Status symbols (Status display of the measurement, user right)

(4) TAG

(5) Batch ID

(6) Comment

(7) Time value counter (Dedusting fault)

(8) Batch Name

(9) Selected Chamber no., whose parameter and status are shown

(10) Open user faceplate

(11) Open Group Faceplate

(12) Actual level as % , m , Tons

(13) Measurement scale end

(14) Alarm level full

(15) Alarm level full l

(16) Material quantity charging

(17) Maximum amount of Chamber

(18) charged chamber no.

(19) Silo Information as in the Symbol:

- Charging on
- Storage full
- no dedusting
- Storage locked
- no original material
- Homogenization on
- Simulation on
- Storage empty
- discharging on-

(20) Material quantity discharging

(21) Warning level empty

(22) Alarm level empty

(23) Measurement scale begin

(24) Remaining time (h) till the Storage is full or empty.

(25) Close Dialog

(26) Help

(27) Limit Symbols

(28) Filling level Indication as bar

(29) Open Information- Dialog

(30) Open chamber Dialog

(31) Open Diagnosis Dialog

(32) Curve window with the measurement and the two alarm limits

(33) Operating devices of the curve window

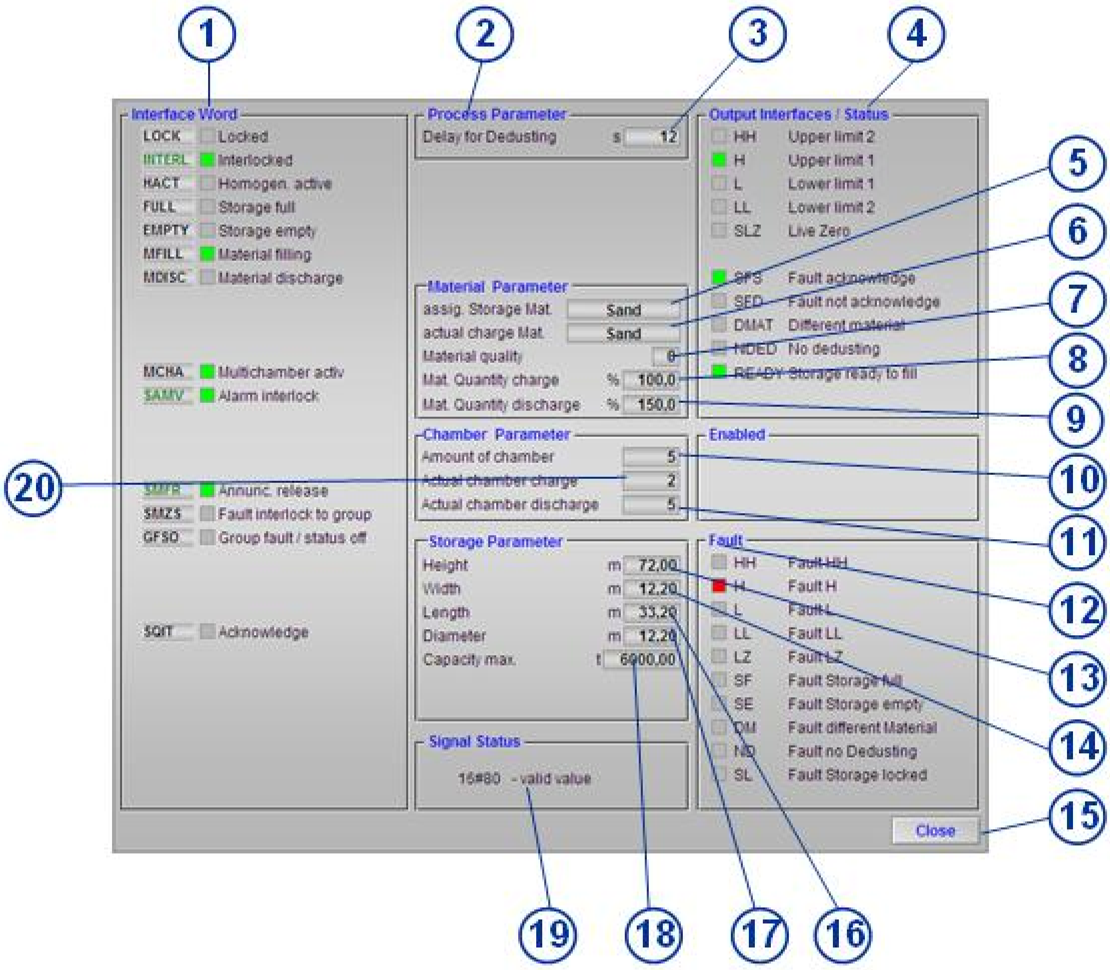
(34) Actual charge Material

(35) Assigned Material

(36) Material quality 0 = "ok", 1 = worse "<", 2 = ">" better

- ***Diagnosis Dialog***

With Mouse click on button „Diagnosis“, a dialog with all Status information and Parameter values from the Storage instance will be shown.



The following functions and information are shown:

(1) Interface word with the binary status of input signals

(2) Process Parameter (only shown from the selected chamber, no change possible)

(3) Delay time for dedusting fault

(4) Output- Interface- Status of AS module

(5) Assigned Material

(6) Actual charging material

(7) Material- Quality- identifier

(8) Material quantity charging

(9) Material quantity discharging

(10) Max. Amount of chamber

(11) Actual chamber discharge

(12) Listing and status display of alarm messages

(13) Storage Dimension parameter „height“

(14) Storage Dimension parameter „Width“

(15) Close Dialog

(16) Storage Dimension parameter „Length“

(17) Storage Dimension parameter „Diameter“

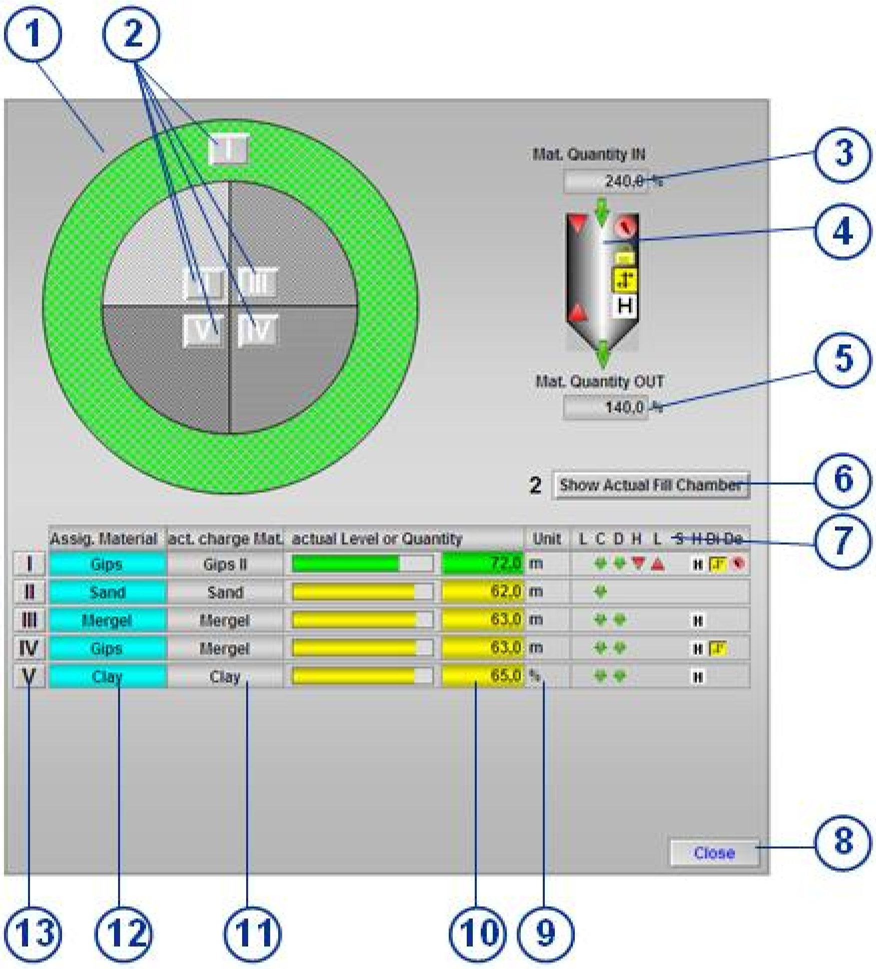
(18) Defining a maximum amount of material (with that value the remaining fill or emptying time is calculated).

(19) Signal status of filling level – Analog signal

(20) Actual chamber discharge

Multi- Chamber overview

This dialog is called over the button "chamber" in the standard dialog.
He shows a tabular view of all chamber data and permits the selection of a certain chamber.
The data then visualized in the symbol.
The chambers can in addition be called also as independent dialogs.



(1) Multi chamber representation into dependence of the input parameter "SC_TYPE"

1 = 5 chamber Silo
2 = 8 chamber Silo

(2) Selection button to show the specific Chamber Information in the symbol and Faceplate.

(3) Actual charging material

(4) Silo Information as in the Symbol:

- charging on
- Storage full
- no dedusting
- Storage locked
- no original material
- Homogenization on
- Simulation on
- Storage empty
- discharging on-

(5) Actual discharging material

(6) Selected Chamber no., which is connected to the Input „AC_CHA_C“.

(7) Tabular status overview of all chambers

(8) Close Dialog

(9) Dimension of analog input

(10) Filling level Indication as bar and value

(11) Actual charge Material

(12) Assigned Material (Chamber)

(13) Faceplate call of the single chambers.

I/O-bar of C_STO_MA

C_STO_MA

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
SC_Type	Visualization Type	INT	1	I			
AM_CHA	max. number of chambers	INT	0	I			
AM_DISP	Displayed chamber	INT	0	I			
AC_CHA_C	Actual charging chamber	INT	0	I			
AC_CHA_D	Actual discharging chamber	INT	0	I			
CHA_I_1	Chamber 1 Input structure	STRUCT		I			
CHA_I_1. STATUS	STATUS Interface To OS	DWORD	16#00000000	I			
CHA_I_1. PV_Out_Value	Process Value (Analog Output)	REAL	0.0	I			
CHA_I_1. PV_Out_ST	Process Value Signal Status	BYTE	16#80	I			
CHA_I_1. PV_Stat_UNIT	Process Value Unit	STRING [8]	'%'	I			
CHA_I_1. PV_Stat_STATUS	Process Value Status	DWORD	16#00000000	I			
CHA_I_1. V_HH_O	HH limit	REAL	0.0	I			
CHA_I_1. V_H_O	H limit	REAL	0.0	I			
CHA_I_1. V_L_O	L limit	REAL	0.0	I			
CHA_I_1. V_LL_O	LL limit	REAL	0.0	I			
CHA_I_1. HEIGHT	storage height	REAL	0.0	I			
CHA_I_1. WIDTH	storage width	REAL	0.0	I			
CHA_I_1. LENGTH	storage length	REAL	0.0	I			
CHA_I_1. DIAM	storage diameter	REAL	0.0	I			
CHA_I_1. SCB	start of scale	REAL	0.0	I		+	
CHA_I_1. DD_TIM	time delay dedusting	INT	10	I			
CHA_I_1. S_CHAMB	Chamber No.	INT	0	I			
CHA_I_1. Q_MAT	material quality	INT	1	I			
CHA_I_1. MQ_IN_Value	Material quantity charging. Value (Analog Output)	REAL	0.0	I			
CHA_I_1. MQ_IN_ST	Material quantity charging .Status	BYTE	16#80	I			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
CHA_I_1. MQ_OUT_Value	Material quantity discharging Value (Analog Output)	REAL	0.0	I			
CHA_I_1. MQ_OUT_ST	Material quantity discharging Status	BYTE	16#80	I			
CHA_I_1. MQ_UNIT	unit	STRING [8]	'%'	I			
CHA_I_1. MATERIAL	assigned material	STRING [32]	''	I			
CHA_I_1. CA_MAT	Actual charge material	STRING [32]	''	I			
CHA_I_2	Chamber 2 Input structure	STRUCT		I			
	As described on CHA_I_1						
CHA_I_3	Chamber 3 Input structure	STRUCT		I			
	As described on CHA_I_1						
CHA_I_4	Chamber 4 Input structure	STRUCT		I			
	As described on CHA_I_1						
CHA_I_5	Chamber 5 Input structure	STRUCT		I			
	As described on CHA_I_1						
CHA_I_6	Chamber 6 Input structure	STRUCT		I			
	As described on CHA_I_1						
CHA_I_7	Chamber 7 Input structure	STRUCT		I			
	As described on CHA_I_1						
CHA_I_8	Chamber 8 Input structure	STRUCT		I			
	As described on CHA_I_1						
CHA_I_9	Chamber 9 Input structure	STRUCT		I			
	As described on CHA_I_1						
CHA_I_10	Chamber 10 Input structure	STRUCT		I			
	As described on CHA_I_1						
UserFace	User Faceplate Call	ANY		I			
BatchEn	Enable Remote Operation of Controller by Batch Recipe	BOOL	0	I		+	
BatchID	Current Batch ID (number)	DWORD	16#00000000	I			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
BatchName	Current Batch Name	STRING [32]	''	I			
COMMAND	Command Word	WORD	16#0000	I			
STATUS	STATUS Interface To OS	DWORD	16#00000000	O			
PV_Out	Process Value (Analog Output)	STRUCT		O			
PV_Out.Value	Value	REAL	0.0	O			
PV_Out.ST	Signal Status	BYTE	16#80	O			
PV_Stat	Analog Output Status + Unit	STRUCT		O			
PV_Stat.UNIT	Unit	STRING [8]	'%'	O			
PV_Stat.STATUS	Status	DWORD	16#00000000	O			
VAL_HH	HH limit	REAL	65.1	O			
VAL_H	H limit	REAL	60.1	O			
VAL_L	L limit	REAL	30. Jan	O			
VAL_LL	LL limit	REAL	20. Jan	O			
HEIGHT	storage height	REAL	71.0	O			
WIDTH	storage width	REAL	12. Jan	O			
LENGTH	storage length	REAL	33.1	O		+	
DIAM	storage diameter	REAL	12. Jan	O			
SCB	start of scale	REAL	0.0	O			
DD_TIM	time delay dedusting	INT	10	O			
S_CHAMB	chamber number (only for S_TYPE = 2)	INT	1	O			
Q_MAT	material quality	INT	1	O			
MQ_IN	MQ_IN charging material quantity	STRUCT		O			
MQ_IN.Value	Value	REAL	0.0	O			
MQ_IN.ST	Signal Status	BYTE	16#FF	O			
MQ_OUT	MQ_OUT discharging material quantity	STRUCT		O			
MQ_OUT.Value	Value	REAL	0.0	O			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
MQ_OUT.ST	Signal Status	BYTE	16#FF	O			
MQ_UNIT	unit	STRING [8]	'%'	O			
MATERIAL	assign material	STRING [32]	'Gips'	O			
CA_MAT	Actual charging materiall	STRING [32]	'Gips II'	O			
HH	overshoot Limit HH	BOOL	0	O			
H	overshoot Limit H	BOOL	0	O			
L	undershoot Limit L	BOOL	0	O			
LL	undershoot Limit LL	BOOL	0	O			
SLZ	Live zero	BOOL	0	O			
DEDU	dedusting fault	BOOL	0	O			
SFD	dynamic fault (not acknowledged)	BOOL	0	O			
SFS	static fault (acknowledged)	BOOL	0	O			

OS-Variable table

OS Variable	Description	PLC Data Type	OS Data Type
SC_TYPE	Visualization Type	INT	Signed 16-bit value
AM_CHA	max. number of chambers	INT	Signed 16-bit value
AC_CHA_C	Actual charge Chamber	INT	Signed 16-bit value
AC_CHA_D	Actual discharge Chamber	INT	Signed 16-bit value
CHA_I_1#STATUS	Status word	DWORD	Unsigned 32-bit value
CHA_I_1#PV_Out_Value	Value	REAL	32-bit floating-point number IEEE 754
CHA_I_1#PV_Stat_UNIT	Unit	STRING [8]	Text variable 8-bit character set
CHA_I_1#MATERIAL	assigned Material	STRING [8]	Text variable 8-bit character set
CHA_I_1#CA_MAT	actual Material	STRING [8]	Text variable 8-bit character set
CHA_I_2#STATUS	Statusword	DWORD	Unsigned 32-bit value
CHA_I_2#PV_Out_Value	Value	REAL	32-bit floating-point number IEEE 754
CHA_I_2#PV_Stat_UNIT	Unit	STRING [8]	Text variable 8-bit character set
CHA_I_2#MATERIAL	assigned Material	STRING [8]	Text variable 8-bit character set
CHA_I_2#CA_MAT	actual Material	STRING [8]	Text variable 8-bit character set
CHA_I_3#STATUS	Statusword	DWORD	Unsigned 32-bit value
CHA_I_3#PV_Out_Value	Value	REAL	32-bit floating-point number IEEE 754
CHA_I_3#PV_Stat_UNIT	Unit	STRING [8]	Text variable 8-bit character set
CHA_I_3#MATERIAL	assigned Material	STRING [8]	Text variable 8-bit character set
CHA_I_3#CA_MAT	actual Material	STRING [8]	Text variable 8-bit character set
CHA_I_4#STATUS	Statusword	DWORD	Unsigned 32-bit value
CHA_I_4#PV_Out_Value	Value	REAL	32-bit floating-point number IEEE 754
CHA_I_4#PV_Stat_UNIT	Unit	STRING [8]	Text variable 8-bit character set
CHA_I_4#MATERIAL	assigned Material	STRING [8]	Text variable 8-bit character set
CHA_I_4#CA_MAT	actual Material	STRING [8]	Text variable 8-bit character set
CHA_I_5#STATUS	Statusword	DWORD	Unsigned 32-bit value
CHA_I_5#PV_Out_Value	Value	REAL	32-bit floating-point number IEEE 754

OS Variable	Description	PLC Data Type	OS Data Type
CHA_I_5#PV_Stat_UNIT	Unit	STRING [8]	Text variable 8-bit character set
CHA_I_5#MATERIAL	assigned Material	STRING [8]	Text variable 8-bit character set
CHA_I_5#CA_MAT	actual Material	STRING [8]	Text variable 8-bit character set
CHA_I_6#STATUS	Statusword	DWORD	Unsigned 32-bit value
CHA_I_6#PV_Out_Value	Value	REAL	32-bit floating-point number IEEE 754
CHA_I_6#PV_Stat_UNIT	Unit	STRING [8]	Text variable 8-bit character set
CHA_I_6#MATERIAL	assigned Material	STRING [8]	Text variable 8-bit character set
CHA_I_6#CA_MAT	actual Material	STRING [8]	Text variable 8-bit character set
CHA_I_7#STATUS	Statusword	DWORD	Unsigned 32-bit value
CHA_I_7#PV_Out_Value	Value	REAL	32-bit floating-point number IEEE 754
CHA_I_7#PV_Stat_UNIT	Unit	STRING [8]	Text variable 8-bit character set
CHA_I_7#MATERIAL	assigned Material	STRING [8]	Text variable 8-bit character set
CHA_I_7#CA_MAT	actual Material	STRING [8]	Text variable 8-bit character set
CHA_I_8#STATUS	Statusword	DWORD	Unsigned 32-bit value
CHA_I_8#PV_Out_Value	Value	REAL	32-bit floating-point number IEEE 754
CHA_I_8#PV_Stat_UNIT	Unit	STRING [8]	Text variable 8-bit character set
CHA_I_8#MATERIAL	assigned Material	STRING [8]	Text variable 8-bit character set
CHA_I_8#CA_MAT	actual Material	STRING [8]	Text variable 8-bit character set
CHA_I_9#STATUS	Statusword	DWORD	Unsigned 32-bit value
CHA_I_9#PV_Out_Value	Value	REAL	32-bit floating-point number IEEE 754
CHA_I_9#PV_Stat_UNIT	Unit	STRING [8]	Text variable 8-bit character set
CHA_I_9#MATERIAL	assigned Material	STRING [8]	Text variable 8-bit character set
CHA_I_9#CA_MAT	actual Material	STRING [8]	Text variable 8-bit character set
CHA_I_10#STATUS	Statusword	DWORD	Unsigned 32-bit value
CHA_I_10#PV_Out_Value	Value	REAL	32-bit floating-point number IEEE 754
CHA_I_10#PV_Stat_UNIT	Unit	STRING [8]	Text variable 8-bit character set
CHA_I_10#MATERIAL	assigned Material	STRING [8]	Text variable 8-bit character set

OS Variable	Description	PLC Data Type	OS Data Type
CHA_I_10#CA_MAT	actual Material	STRING [8]	Text variable 8-bit character set
BatchID	Current Batch ID (number)	DWORD	Unsigned 32-bit value
BatchName	Current Batch Name	STRING [8]	Text variable 8-bit character set
COMMAND	WORD	STRING [8]	Unsigned 16-bit value
STATUS	Status word	STRING [8]	Unsigned 32-bit value
PV_Out#Value	Value	REAL	32-bit floating-point number IEEE 754
PV_Out#ST	Signal Status	BYTE	Unsigned 8-bit value
PV_Stat#UNIT	Unit	STRING [8]	Text variable 8-bit character set
PV_Stat#STATUS	Status	DWORD	Unsigned 32-bit value
VAL_HH	HH limit	REAL	32-bit floating-point number IEEE 754
VAL_H	H limit	REAL	32-bit floating-point number IEEE 754
VAL_L	L limit	REAL	32-bit floating-point number IEEE 754
VAL_LL	LL limit	REAL	32-bit floating-point number IEEE 754
HEIGHT	storage height	REAL	32-bit floating-point number IEEE 754
WIDTH	storage width	REAL	32-bit floating-point number IEEE 754
LENGTH	storage length	REAL	32-bit floating-point number IEEE 754
DIAM	storage diameter	REAL	32-bit floating-point number IEEE 754
SCB	start of scale	REAL	32-bit floating-point number IEEE 754
DD_TIM	time delay dedusting	INT	Signed 16-bit value
S_CHAMB	chamber number (only for S_TYPE = 2)	INT	Signed 16-bit value
Q_MAT	material quality	INT	Signed 16-bit value
MQ_IN#Value	Material quantity IN Value	REAL	32-bit floating-point number IEEE 754
MQ_OUT#Value	Material quantity OUT Value	REAL	32-bit floating-point number IEEE 754
MQ_UNIT	Material quantity UNIT	STRING [8]	Text variable 8-bit character set
MATERIAL	assigned material	STRING [32]	Text variable 8-bit character set
CA_MAT	actual Material	STRING [32]	Text variable 8-bit character set

Variable details

Internal structure of the Commands, Alarms, Visualization status and Interface word

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Kommandowort**	**Commandword**		
COM_B20	CHAM1	0	Kammer 1 Daten kopieren	Copy Chamber 1 information		
COM_B21	CHAM2	1	Kammer 2 Daten kopieren	Copy Chamber 2 information		
COM_B22	CHAM3	2	Kammer 3 Daten kopieren	Copy Chamber 3 information		
COM_B23	CHAM4	3	Kammer 4 Daten kopieren	Copy Chamber 4 information		
COM_B24	CHAM5	4	Kammer 5 Daten kopieren	Copy Chamber 5 information		
COM_B25	CHAM6	5	Kammer 6 Daten kopieren	Copy Chamber 6 information		
COM_B26	CHAM7	6	Kammer 7 Daten kopieren	Copy Chamber 7 information		
COM_B27	CHAM8	7	Kammer 8 Daten kopieren	Copy Chamber 8 information		
COM_B10	CHAM9	8	Kammer 9 Daten kopieren	Copy Chamber 9 information		
COM_B11	CHAM10	9	Kammer 10 Daten kopieren	Copy Chamber 10 information		
COM_B12	CHAAC	10	Aktive Kammer kopieren	Copy active Chamber		
COM_B13		11				
COM_B14		12				
COM_B15		13				
COM_B16		14				
COM_B17		15				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B40	Diff. Material	0	kein Original Material	Different Material		
STA_B41	No dedusting	1	keine Entstaubung	No dedusting		
STA_B42	HH	2	Alarm oben	HH		
STA_B43	H	3	Warnung oben	H		
STA_B44	L	4	Warnung unten	L		
STA_B45	LL	5	Alarm unten	LL		
STA_B46	Fault n. Ackn.	6	Fault n. Ackn.	Storage Fault n. Ackn.		
STA_B47	Fault acknow.	7	Fault acknow.	Storage Fault acknow.		
STA_B30	APF_ACT	8	Freigabe APF Faceplate	Release APF Faceplate		
STA_B31	Ready	9	Lagerort Bereit zum befüllen	Storage ready to fill up		
STA_B32	MultiChamb	10	Mehrkammer Silo freigabe	Multi Chamber release		
STA_B33	LZ	11	Live Zero			
STA_B34	SAMV	12	Alarmverriegelung	Alarm interlock		
STA_B35	SMFR	13	Meldefreigabe	Annunciation release		
STA_B36	SMZS	14	Störungsverriegelung zur Gruppe	Fault interlock to the group		
STA_B37	GFSO	15	Gruppenstörung/ Zustand aus	Group fault / status off		
STA_B20	ready	16	Lagerort ready	Storage ready		
STA_B21	locked	17	Lagerort gesperrt	Storage locked		
STA_B22	Fill	18	befüllen	Fill		
STA_B23	Discharge	19	entleeren	Discharge		
STA_B24	Full	20	Lagerort Voll	Storage full		
STA_B25	empty	21	Lagerort leer	Storage empty		
STA_B26	HOMO aktiv	22	Homogenisierung läuft	Homogenization active		
STA_B27	SIMUL	23	Simulation	Simulation		
STA_B10	MARK	24	Objekt markieren (Gruppenkommando)	Highlight object (group command)		
STA_B11	LINK	25	GR_LINK1 angeschlossen	GR_LINK1 connected		
STA_B12	STRC	26	PV angeschlossen	PV connected		
STA_B13	LW	27	Letzter gültiger Wert	Last valid value		
STA_B14	SUB	28	Ersatzwert	Substitution value		
STA_B15	SQIT	29	Quittieren (Zusatz)	Acknowledge (additional)		
STA_B16	DDTR	30	Entstaubungszeit läuft	Dedusting time is running		
STA_B17	FTIMN	31	Füllzeit negativ	Fill up time negative		

SIEMENS

Cemat V 8.2
Function Block Library ILS_CEM

Function Description **Edition 07/16**

Silo pilot C_SILOP

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring to property damage only have no safety alert symbol. The notices shown below are graded according to the degree of danger.

Danger
indicates that death or severe personal injury **will** result if proper precautions are not taken.

Warning
indicates that death or severe personal injury **may** result if proper precautions are not taken.

Caution
with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution
without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention
indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel.** Within the context of the safety notices in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

Warning
This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.
Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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Disclaimer of Liability
We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens Aktiengesellschaft

Description of C_SILOP

Type/Number

Module name: **C_SILOP**
Module no.: **FB1011**

Calling OBs

C_SILOP must be called in OB1 (MAIN_TASK).

Function

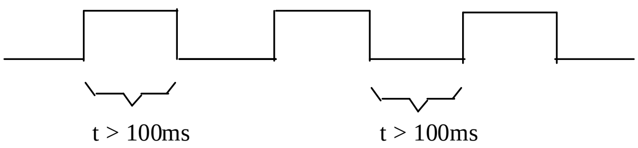
With the silopilot module one can determinate silo levels by means of silopilots according to an electromechanical plummet system.

The silopilot can be started via command from the control room or via the interface bit SBFE. The silopilot unwinds a measuring tape which is weighed down with a sensing weight. When the weight reaches the material surface, the tractive power at the measuring tape falls. The motor reverses and the sensing weight returns to its start position. The silopilot supplies pulses during the retraction and insertion.

Pulse acquisition

The pulses are acquired and summated directly in the PLC. For this, one must parameterize for this silopilot in the 100 ms program a pulse acquisition function module C_SPCNT.

For software reasons one must make sure that the pulses of the silopilot have a pulse duration as well as an interpulse period of >100 s each:



If a measurement is completed without any fault, then module C_SILOP calculates the physical silo filling level from the sum of the accrued pulses.

If a measurement is aborted with a fault, the last valid measurement is displayed. A faulty measurement can be due to a hardware fault of the silopilot (motor overload, belt-break alarm, time-out, etc.).

The silopilot module monitors the run-time of the silopilot from the time of start to the return to the start position. To determine the start position of the silopilot it is necessary to have the input signal “upper limit position of the sensing weight“ (interface SOEF). Should this signal not be available from the hardware, then one must release the simulation at module C_SILOP.

Reading an analog value

As an alternative to the pulse acquisition, a physical measured value of the silo pilot can also be processed.

Calibration:

The values for the maximum run-time and maximum number of pulses can be parameterized at module C_SILOP or be determined with a calibration run.

Caution: A calibration run can only be performed if signal SOEF is available as hardware! If SOEF has to be simulated by the silopilot module, then a calibration run is not possible!

Settings necessary for the monitoring:

maximum number of pulses with an empty silo

maximum permissive run-time with an empty silo.

The calibration run can be started from the control room. This requires an empty silo. The sensing weight is let down to the lower limit of the measurement (tape max. or min. safety SMIN). Afterwards the silopilot retracts the sensing weight to its upper limit position.
The run-time (plus 15 % tolerance) required for this is then stored as “max. permissive run-time“. The sum of the accrued pulses is also stored, it serves for the calculation of the normalized silo filling level and silo empty level value during pulse acquisition.

Relationship between signals during a silopilot measurement:

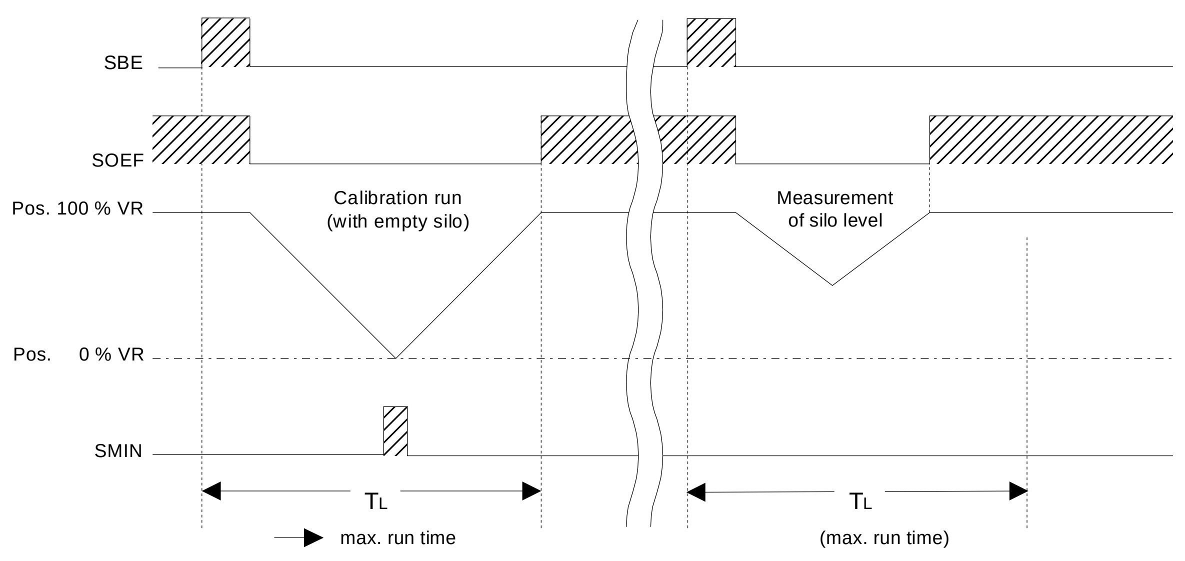
T_E: Duration of the starting process
The silopilot is started either via command or via interface SBFE.

The module output SBE remains set until the signal “Upper limit position SOEF“ has a 0-signal, or until the first count pulse. If these conditions are not fulfilled after 10 seconds, then output SBE is reset and an alarm annunciation is output.

T_L: Run-time of the silopilot
It is monitored by the silopilot module. If this time exceeds the set value “max. run-time“, then the silopilot is regarded as being faulty, and an alarm annunciation is output.

If SOEF is simulated, the silopilot “reaches“ again its start position after the “max. run-time“ has elapsed.

Sequence of a silopilot measurement:



with calibration run max. run time = actual run time + 15 %

Operating principle

Input interfaces

SEVG	**Start interlock**	**Basic state 1-signal**

Format BOOL

A 0-signal at interface SEVG means that the silopilot cannot be started.

Apart from being used as an interlock during the filling of a silo (danger of spilling or tear-off of the sensing weight), this signal can also be used, amongst other things, to guarantee a minimum starting cycle, i.e. the minimum period between two silopilot starts. If the silopilot manufacturer lays down, for example, for single-phase motors such a waiting time, this must be taken into consideration in the user program by connecting interface SEVG! Disregard of this manufacturer’s specification can cause damage at the silopilot drive!.

SMUE	**Motor overload**	**Basic state 0-signal**

Format BOOL

A 1-signal at interface SMUE means that the silopilot drive has signalled overload (bimetal).

SBRA	**Belt-break alarm**	**Basic state 0-signal**

Format BOOL

A 1-signal at interface SBRA means that the silopilot has signalled a belt-break alarm (tear-off of the sensing weight).

SVOS	**Local switch**	**Basic state 1-signal**

Format BOOL

A 0-signal at interface SVOS means that the silopilot operates in local mode.

SOEF	**Upper limit position of sensing weight**	**Basic state 1-signal**

Format BOOL

A 1-signal at interface SOEF means that the silopilot is at the upper limit position.

SBFE	**Command ON**	**Basic state 0-signal**

Format BOOL

A 1-signal at interface SBFE means that the silopilot is to be started.

Caution: Interface SBFE should *not* be connected to a continuous signal!

QUIT **Acknowledge (additional)** **Basic state 0-signal**

Format BOOL

The acknowledgement of the silo pilot fault is normally carried out together with the acknowledgement of any alarm within the same AS (default setting). Interface QUIT is only needed for individual acknowledgement (via push-button) or in case of group-wise acknowledgement.

A signal change from "0" to "1" at QUIT acknowledges the silo pilot fault.

In case of a conventional control desk, a push-button can be connected to QUIT (for individual acknowledgement) or to the acknowledgement interface at block C_PUSHBT can be used (for AS-wise acknowledgement).

Caution: Using QUIT for individual acknowledgement, the acknowledgement interface at the C_PUSHBT must **not** be connected.

For group-wise acknowledgement connect the output ACK of the corresponding group to interface QUIT of the silo pilot. See Engineering Manual, chapter AS-Engineering.

DSIG_BQ **Driver Signal(s) Bad Quality** **Basic state 0-signal**

Format BOOL

If driver blocks are used, the information "one ore more driver blocks have bad quality" can be displayed in the silo pilot faceplate and in the block icon of the silo pilot.
In order to achieve this, the outputs QBAD of the driver blocks must be connected with an OR function to Interface DSIG_BQ.

REL_SIM **Release simulation of SOEF** **Basic state 0-signal**

Format BOOL

A 1-signal at the REL_SIM interface simulates the upper limit-position sensing weight (SOEF signal) from the silo pilot module.

MODE_P **Pulse acquisition operating mode** **Basic state 1-signal**

Format BOOL

The MODE_P interface is used to select the operating mode of the silo pilot.
1-signal = pulse acquisition.
0-signal = import a physical measured value after finishing the measurement.

PULS_IN **Input Pulse** **Basic state 0-Signal**

Format BOOL

In mode "pulse acquisition" the silo pilot counts + 1 with each edge from 0 to 1-signal.

REL_ANNU **Release operational annunciations** **Basic state 1-signal**

Format BOOL

A 1-signal at the REL_ANNU interface issues an operational annunciation when the silo pilot starts.

Additional inputs for testing and as Interface to the OS:

TEST_OSS **Test interface** **Default: 0**

Format INTEGER

The test interfaces are only used during module development and must not be changed!

MSG8_EVID **Message ID** **Default: 16#00**

Format DWORD

Interface to OS

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

Links

The fault of the silo pilot is represented as a group fault in the status display of the associated group/route. The status call function for group or route displays the detailed fault.
To ensure this function, every silo pilot must be connected with a route or a group to which it belongs from an annunciation viewpoint.

GR_LINK1 Link to group or route

Format STRUCT

The GR_LINK1 interface of the silo pilot must be connected with the R_LINK interface of the route or with the G_LINK interface of the group.

Structure variables:

GR_LINK1.Link Link Default: 0

Format INTEGER

GR_LINK1.Command Group / Route Command Default: 16#00

Format WORD

GR_LINK2 Link to group or route

Format STRUCT

If the silo pilot belongs to two different routes or groups, the GR_LINK2 interface must be connected with the second route/group.

Structure variables:

GR_LINK2.Link Link Default: 0

Format INTEGER

GR_LINK2.Command Group / Route Command Default: 16#00

Format WORD

MUX_LINK Link to C_MUX

Format STRUCT

If the silo pilot belongs to more than two different routes or groups, the C_MUX module must be series-connected. C_MUX has 5 inputs (GR_LINK1 to GR_LINK5) for connection with the groups/routes and one output (MUX_OUT) for connection with the MUX_LINK interface of the silo pilot.

Caution: The MUX_IN interface can under no circumstances be used for connection with a group or route. It is used exclusively for connection with another MUX module.

Structure variables:

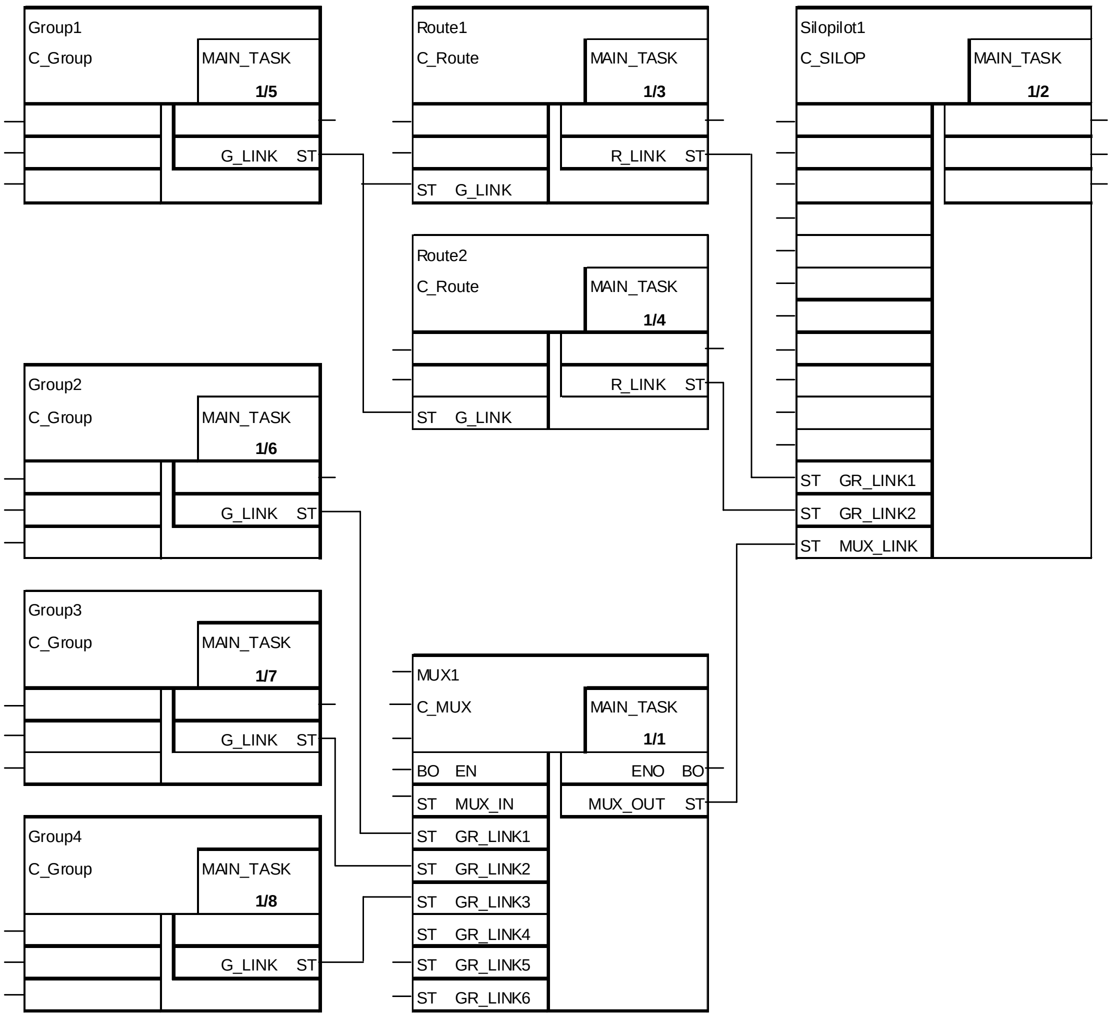
MUX_LINK.Point_GRL Pointer Default: 0

Format INTEGER

MUX_LINK.Command Group / Route Command Default: 16#00

Format WORD

Example of a circuit:



Caution: Check the runtime sequence! The C_MUX module must be called before the silo pilot. For the other modules the run sequence is as follows: first the silo pilot, then the associated routes and finally the associated groups.

Process values

The process values can be set during engineering and they can be changed online from the OS. To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

MAXR_TIM **Max. permitted run-time** **Default: 15**

Format INTEGER (0 - 999)

Value in seconds.
This is the time which the silopilot may max. use for a complete run (retraction and insertion), i.e. from leaving its upper limit position after having received the START command to the renewed reaching of its upper limit position.

If this time is exceeded without reaching the limit switch "upper limit position of sensing weight" (interface SOEF), then the silopilot is regarded as being faulty, the measurement is "aborted with fault". The silopilot is no longer faulty from the moment when the interface "upper limit position of sensing weight" has a 1-signal and the fault is acknowledged.

If signal SOEF does not exist as hardware and thus has to be simulated, one cannot determine in this case a run-time error. The measurement is then generally terminated after the end of the max. run-time.

The maximum permitted run-time must never be set shorter than 11 seconds.

MAX_PULS **Max. number of pulses (with empty silo)** **Default: 1**

Format INTEGER (0 – 999)

You must set the maximum number of pulses which are received when the silo is completely empty.

PULS_VAL **Pulse value** **Default: 1.0**

Format REAL

The number of counted pulses is multiplied by this value.

UNIT **Unit** **Default: '%**

Format STRING [8]

Unit of the measured value.

MV_PHYS **Input for physical values** **Default: 0.0**

Format REAL

Parameter MV_PHYS is used to read the silo filling level as a physical value. Parameter MV_PHYS is only read if parameter MODE_P is connected with a 0-signal (no pulse acquisition).

QUALITY **Quality code when using driver modules** **Default: 16#80**

Format BYTE

The quality code is transferred to the measured value when using driver modules.

Output interfaces

MV Measured value

Format REAL

Output of the physical silo filling level value.

SPL Silo pilot running

Format BOOL

When the silopilot module has been started and runs in automatic mode (= measurement runs) then bit “silopilot running“ is set. It has a 1-signal until the measurement is completed (upper limit position reached) or a fault has occurred.

SPS Silo pilot faulty

Format BOOL

Bit “silopilot faulty“ has a 1-signal if
- a not-acknowledged fault is present or
- fault “motor overload“ is present or
- fault “belt-break alarm“ is present.

The bit has again a 0-signal after the above-mentioned conditions do not apply any more.

SEL Limit position fault

Format BOOL

Bit “Limit position fault“ has a 1-signal if
- the silopilot should have been started while it was not in upper limit position,
- the silopilot does not leave the upper limit position (10s after the start) or
- the silopilot has not reached the upper limit position at the end of the max. run-time.

The bit has again a 0-signal after the fault has been acknowledged, after a renewed start command or (depending on the fault type) after the upper limit position has been reached again.

SSW Faulty silo value

Format BOOL

Bit SSW has a 1-signal, if after ending the measuring procedure (depending on the parameterisation)
- more pulses have accrued than been parameterized (-> max. No. of pulses),
- QVZ has been detected during reading of the analog value,
- the read analog value has overshot or undershot its nominal range.

As soon as the silopilot is restarted SSW has a 0-signal again.

SIM_ON Simulation ON

Format BOOL

In Sequence Test mode SIM_ON has 1-Signal. If module drivers are used the output SIM_ON of the motor can be connected to SIM_ON of the driver block.

Additional outputs for testing and as Interface to the OS:

MSTIM_OS **Time of last valid measurement**

Format DWORD

Interface to OS

VISU_OS **Status for symbol display**

Format BYTE

Interface to OS

STATUS **Status word**

Format DWORD

Interface to OS

VSTATUS **Status word**

Format DWORD

Interface to OS

ALARM **for Test**

Format WORD

For more information see Variable details

CNT_PULS **Counted pulses**

Format INTEGER

Test interface

RUN_TIM **Run-time in seconds**

Format INTEGER

Test interface

Hardware outputs

SBE **Command ON to silo pilot**

Format BOOL

The SBE signal is used to trigger the silo pilot.

Time characteristics

The module must be called before the associated route or group.

Any called C_MUX modules must run before this module.

Message characteristics

The module uses the ALARM_8 module to generate annunciations.

A plausibility and priority logic at the process level analyses all object faults
only one fault annunciation is issued for each fault
secondary annunciations are suppressed automatically
the fault source is recorded in detail and uniquely.

The current operational state of the plant objects is automatically taken into consideration during the fault analysis, e.g. all fault annunciations are suppressed automatically for a stationary group
no superfluous fault annunciations are created
the operator does not need to manually disable/suppress any annunciations.

Each fault annunciation is also classified.
This shows whether an **electrical** or a **mechanical** fault, a **process fault** or a shut-down with a **local safety switch** applies.
An electrician does not always need to be called first
The production operator can give specific instructions.

Alarm archive and alarm logs show only "true" annunciations.
An annunciation release for each object means that the communication and OS are not overloaded with an "annunciation storm" - e.g. overloaded after a power failure.

Refer to the Variable details for the assignment of the annunciation text and annunciation class to the module parameters.

Module states

Variable VISU_OS:

No.	Status / Text Display	Symbol Display	Text Presentation
1	Pilot in start position, ready to run	White	Black, white
2	Pilot in start position + interlocked	White	Black, white
3	Pilot in start position + fault	Red	Black, white
4	Pilot in Start position + fault not acknowledged	Blinking red	Black, white
5	Pilot not in start position + fault	Red	Black, white
6	Pilot not in start position + fault not acknowledged	Blinking red	Black, white
7	Pilot running	Green	Black, white
8	Local	Yellow	Black, white

See also Variable details

Commands

Refer to Variable details for the assignment of the command word.

I/O-bar of C_SILOP

C_SILOP

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
SMUE	Motor overload	BOOL	0	I			
SBRA	Belt-break alarm	BOOL	0	I			
SVOS	Local switch	BOOL	1	I			
SOEF	Upper limit position of sensing weight	BOOL	1	I			
SBFE	Command ON	BOOL	0	I			
SEVG	Start interlock	BOOL	1	I			
QUIT	Acknowledge (additional)	BOOL	0	I	U		
DSIG_BQ	Driver Signal(s) Bad Quality	BOOL	0	I			
REL_SIM	Release simulation of SEOF	BOOL	0	I			
MODE_P	Pulse acquisition mode	BOOL	1	I			
PULS_IN	Input Pulse	BOOL	0	I			
REL_ANNU	Release operational annunciations	BOOL	1	I	U		
TEST_OSS	Must not be changed	INT	0	I	U		
MSG8_EVID	Message ID	DWORD	16#00	I	U		
COMMAND	Command word	WORD	16#00	I	U	+	
MAXR_TIM	Maximum permitted run-time	INT	15	I		+	
MAX_PULS	Maximum number of pulses (with empty silo)	INT	1	I		+	
PULS_VAL	Pulse value	REAL	1.0	I		+	
UNIT	Unit	STRING [8]	‘%‘	I		+	
MV_PHYS	Input for physical values	REAL	0.0	I			
QUALITY	Quality code when using driver modules	BYTE	16#80	I			
GR_LINK1	Link to group or route	STRUCT		I			
GR_LINK1. Link	Link	INT	0	I	U		
GR_LINK1. Command	Group/ route command	WORD	16#00	I	U		
GR_LINK2	Link to group or route	STRUCT		I			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
GR_LINK2. Link	Link	INT	0	I	U		
GR_LINK2. Command	Group/ route command	WORD	16#00	I	U		
MUX_LINK	Link to C_MUX	STRUCT		I			
MUX_LINK. Point_GRL	Pointer	INT	0	I	U		
MUX_LINK. Command	Group/ route command	WORD	16#00	I	U		
MSTIM_OS	Time of last valid measurement	DWORD	16#00	O	U		
VISU_OS	Status for symbol display	BYTE	16#00	O	U	+	
MV	Measured value	REAL	0.0	O		+	
STATUS	Status word	DWORD	16#00	O	U	+	
VSTATUS	Status word	DWORD	16#00	O	U	+	
ALARM	Alarm word for test	WORD	16#00	O	U		
CNT_PULS	Counted pulses	INT	0	O			
RUN_TIM	Run-time in sec.	INT	0	O			
SPL	Silo pilot running	BOOL	0	O			
SPS	Silo pilot faulty	BOOL	0	O			
SEL	Limit position fault	BOOL	0	O			
SSW	Faulty silo	BOOL	0	O			
SIM_ON	Simulation ON	BOOL	0	O			
SBE	Command ON to silo pilot	BOOL	0	O			

OS-Variable table

C_SILOP

OS Variable	Description	PLC Data Type	OS Data Type
COMMAND	Command word	WORD	Unsigned 16-bit value
MAXR_TIM	Maximum permitted run-time	INT	Signed 16-bit value
MAX_PULS	Maximum number of pulses (with empty silo)	INT	Signed 16-bit value
PULS_VAL	Pulse value	REAL	32-bit floating-point number IEEE 754
UNIT	Unit	STRING [8]	Text variable 8-bit character set
VISU_OS	Status for symbol display	BYTE	Unsigned 8-bit value
MV	Measured value	REAL	32-bit floating-point number IEEE 754
STATUS	Status word	DWORD	Unsigned 32-bit value
VSTATUS	Status word	DWORD	Unsigned 32-bit value

Variable details

Internal structure of the Commands, Alarms and Visualization status:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Kommandowort**	**Commandword**		
COM_B20	START	0	Start	Start	Op. Inp.	
COM_B21	ST_CAL	1	Start Kalibrierlauf	Start calibration run	Op. Inp.	
COM_B22		2				
COM_B23		3				
COM_B24		4				
COM_B25		5				
COM_B26		6				
COM_B27		7				
COM_B10		8				
COM_B11	SACK	9	Einzel quittieren	Single acknowledge		
COM_B12		10				
COM_B13		11				
COM_B14		12				
COM_B15		13				
COM_B16		14				
COM_B17		15				
ALARM			**Alarm**	**Alarm**		
ALA_SMU	SIG1	0	Überlast	Overload	AL_H	M
ALA_SBA	SIG2	1	Bandriss	Belt-break	AL_H	M
ALA_SVO	SIG3	2	Vorort	Local	AL_H	S
ALA_SOE	SIG4	3	Endlage n. verlassen	Not moving	AL_H	M
ALA_SLU	SIG5	4	Laufzeitfehler	Time out	AL_H	M
ALA_SSP	SIG6	5	Keine Startposition	No start position	AL_H	M
ALA_B06	SIG7	6	Messfehler	Wrong measurement	AL_H	
ALA_START	SIG8	7	Start	Start	Oper..	B
VISU_OS	**dezimal**	**hex**	**für Symbol und Texte**	**for Symbol and Text**		
	1	1	Pilot in Startposition, laufbereit	SP in start position + ready to run		
	2	2	Pilot in Startposition + verriegelt	SP in start position + interlocked		
	3	3	Pilot in Startposition + Störung	SP in start position + fault		
	4	4	Pilot in Startposition + Störung nicht QT	SP in start position + fault not acknowledged		
	5	5	Pilot nicht in Startposition + Störung	SP not in start position + fault		
	6	6	Pilot nicht in Startposition + Störung nicht QT	SP not in start position + fault not acknowledged		
	7	7	Pilot läuft	SP running		
	8	8	Vorort	SP in local mode		

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B40	LOCAL	0	Betriebsart Vorort	Local mode		
STA_B41	SOE	1	Silopilot in oberer Endlage	Pilot in start position (upper limit)		
STA_B42	SVG	2	Silopilot verriegelt	Pilot interlocked		
STA_B43	RUN	3	Silopilot läuft	Pilot is running		
STA_B44		4				
STA_B45		5				
STA_B46	LINK	6	GR_LINK1 angeschlossen	GR_LINK1 connected		
STA_B47	SBE	7	Start Silopilot	Start Silo pilot		
STA_B30	FAULT	8	Störung	Fault		
STA_B31	NQT	9				
STA_B32	MESS_OK	10	Letzte Messung ohne Fehler beendet	Last measurement quit without fault		
STA_B33		11				
STA_B34		12				
STA_B35		13				
STA_B36	SQT	14	Sequenz Test	Sequence Test		
STA_B37	BQU	15	Bad Quality	Bad Quality		
STA_B20	SPL	16	Silopilot läuft	Silo pilot runs		
STA_B21	SPS	17	Silopilot gestört	Silo pilot faulty		
STA_B22	SEL	18	Endlagenfehler	Limit position fault		
STA_B23	SSW	19	Fehler Messwert	Faulty silo value		
STA_B24		20				
STA_B25		21				
STA_B26		22				
STA_B27		23				
STA_B10	SEVG	24	Einschaltverriegelung	Start interlock		
STA_B11	SMUE	25	Motorüberlast	Drive overload		
STA_B12	SBRA	26	Bandrissalarm	Belt-break-alarm		
STA_B13	SVOS	27	Vorortschalter	Local Switch		
STA_B14	SOEF	28	Obere Endlage Füllgewicht	Upper limit position of sensing weight		
STA_B15	SBFE	29	Befehl Ein	Start		
STA_B16	REL_SIM	30	Freig. Simulation obere Endlage	rel. simulation of upper limit		
STA_B17	REL_ANNU	31	Freigabe Betriebsmeldungen	rel. operator annunciation		

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
VSTATUS			**Status**	**Status**		
VS_B40		0	Fest auf 1-Signal	Set to 1-Signal		
VS_B41		1	Fest auf 1-Signal	Set to 1-Signal		
VS_B42		2	Fest auf 1-Signal	Set to 1-Signal		
VS_B43		3	Fest auf 1-Signal	Set to 1-Signal		
VS_B44		4	Fest auf 1-Signal	Set to 1-Signal		
VS_B45		5	Fest auf 1-Signal	Set to 1-Signal		
VS_B46		6	Fest auf 1-Signal	Set to 1-Signal		
VS_B47		7				
VS_B30		8	Fest auf 1-Signal	Set to 1-Signal		
VS_B31		9	Fest auf 1-Signal	Set to 1-Signal		
VS_B32		10	Fest auf 1-Signal	Set to 1-Signal		
VS_B33		11	Fest auf 1-Signal	Set to 1-Signal		
VS_B34		12	Fest auf 1-Signal	Set to 1-Signal		
VS_B35		13	Fest auf 1-Signal	Set to 1-Signal		
VS_B36		14	Fest auf 1-Signal	Set to 1-Signal		
VS_B37		15	Fest auf 1-Signal	Set to 1-Signal		
VS_B20		16	Fest auf 0-Signal	Set to 0-Signal		
VS_B21		17	Fest auf 0-Signal	Set to 0-Signal		
VS_B22		18	Fest auf 0-Signal	Set to 0-Signal		
VS_B23		19	Fest auf 0-Signal	Set to 0-Signal		
VS_B24	VS_OR	20	Silopilot läuft (SPL)	Silo pilot running (SPL)		
VS_B25		21	Fest auf 0-Signal	Set to 0-Signal		
VS_B26		22	Fest auf 0-Signal	Set to 0-Signal		
VS_B27		23	Fest auf 0-Signal	Set to 0-Signal		
VS_B10		24	Fest auf 0-Signal	Set to 0-Signal		
VS_B11		25	Fest auf 0-Signal	Set to 0-Signal		
VS_B12		26	Fest auf 0-Signal	Set to 0-Signal		
VS_B13		27	Fest auf 0-Signal	Set to 0-Signal		
VS_B14		28	Fest auf 0-Signal	Set to 0-Signal		
VS_B15		29	Fest auf 0-Signal	Set to 0-Signal		
VS_B16	VS_AL	30	Alarm red (SPS)	Alarm red (SPS)		
VS_B17		31	Fest auf 0-Signal	Set to 0-Signal		

SIEMENS

Cemat V 8.2
Function Block Library ILS_CEM

Function Description **Edition 07/16**

Group C_GROUP

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring to property damage only have no safety alert symbol. The notices shown below are graded according to the degree of danger.

Danger
indicates that death or severe personal injury **will** result if proper precautions are not taken.

Warning
indicates that death or severe personal injury **may** result if proper precautions are not taken.

Caution
with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution
without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention
indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel.** Within the context of the safety notices in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

Warning
This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.
Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Technical data subject to change.

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I/O-bar of C_RECV_G **56**

Description of C_GROUP

Type/Number

Main module:

Module name: **C_GROUP**
Module no.: **FB1010**

Supplementary module:

Module name: **C_MUX**
Module no.: **FC1017**

Calling OBs

C_GROUP must be called in OB1 (MAIN_TASK).

Function

General Function description

Module Type C_GROUP is a superordinated module for starting and stopping and for the monitoring of technologically grouped plant sections.

The group module allows the visualization of the operational conditions of a plant section, displayed as a status display, and a detailed fault diagnosis (status call).

The group module generates operating messages for start and stop.

By linking all the drives, annunciations and measures of a plant section to the group module, the block icon of the group shows the summarizing indications for faults and warnings and it interrupts the start procedure in case of a fault.

- With a **group status call** function (Button 'Status'), all the present faults and interlocks of the affiliated drives, measured values and process signals in this plant section can be queried at anytime. For a group with routes, the status call affects only the pre-selected routes of the group.
- The **group instance list** (Button 'Objects') shows all objects (drives, annunciations, measures), belonging to the group or plant section. All objects are shown with "Actual status", "Tagname" and "Comment". In case of an active "Simulation" the object is highlighted with red color.

If some objects of a group run in another PLC please use the function blocks C_SEND_G and C_RECV_G to connect these objects to the group.

The operating modes (automatic mode, single-start mode and local mode) are enabled from the group Faceplate. The group generates the release signals for operating modes “local mode" and “single-start mode“, which must be connected to the interfaces of the corresponding drives.

- In **automatic mode** one starts and stops a technological plant section with this group. During the start the group generates a start-up warning. After the start of the group all affiliated objects (drives, measured values and process signals (annunciation modules)) are monitored. An alarm message is generated automatically in the case of a fault.
- If **single-start mode** is enabled one can start and stop the drives belonging to a group separately. All interlocks are effective. This means, one can start the drives only in the order set by the interlocking sequence. An alarm message is generated automatically in the case of a fault. In this mode no Group start is possible.
- If **local mode** is enabled the drives can be controlled with locally installed switches/ pushbuttons. Only the protection interlock for the safety switches is effective. **No** alarm message is generated in the case of a fault. The start and operating interlock as well as the protection interlock of automatic mode (e.g. belt drift) are **not** effective. **No** EVS signal is generated either. In this mode no Group start is possible.

Changeover between automatic <--> local mode at the group:
Open the faceplate of the group and press the button *Local*. Running drives continue to run.

Changeover between automatic <--> single-start mode at the group:
Open the faceplate of the group and press the button *Single*. Already running drives continue to run. All interlock conditions are active.

A changeover between local mode and single-start mode is not possible.

Starting a group

The group can be started via the Operator Faceplate or via the program.

With the group start a start-up warning is triggered. After the start-up warning has elapsed, the group generates the ON-command to start the drives. The ON-command is limited by the release time, i.e. the start process is aborted after the release time has elapsed.

New: The start can be interrupted at any time. Press the start button again to continue.

Stopping a group

The group can be stopped via Operator Faceplate or via program.

Immediate stop is possible via Operator Faceplate or via program. In this case the stop delay of the drives is not considered. With an immediate stop all drives are switched to automatic mode.

New: The stop can be interrupted at any time. Press stop button again to continue.

Phases during the start-up of the group:

After the group start a start-up warning is given.
- The output GLA is set to 1-Signal. It will be reset when the start-up is completed (or if the release time has elapsed). GLA can be used for a start-up warning lamp.
- A **horn time** can be configured. The horn time starts together with the group start. Within the horn time the output GHA has 1-Signal. This output can be used for an acoustical signal.
- A **waiting time** can be configured. The waiting time starts together with the group start. After the waiting time has elapsed the group gives the ON-command to the drives. (The waiting time should be a little longer than the horn time)

After the start-up warning is completed (horn time and waiting time have elapsed) the ON-command is given to the drives.
- A **release time** can be configured, which is triggered after the start-up warning has elapsed. Only within the release time the start command is given to the drives.

Interlocks can be used in order to enable or disable the group operation dependent on a process condition, like "previous group is running" or a process signal:

- Start interlock **GEVG or IntStart**	effective only before the group start
- Operating interlock **GBVG or IntOper**	always effective
- Switch-off interlock **GAVG or IntSwOff**	effective during group stop

Through **process parameters** the following values can be configured on the CFC or online:

- Start-up warning time (s)	timer for the Horn Output GHA
- Waiting time (s)	after this timer has elapsed the group creates ON-command
- Release time (s)	for the limitation of the ON-command

Visualization

In the **block icon** of the group the most important operation status are displayed:

Operation mode:	Automatic, local or single-start mode.
Operation status:	Operation status of the group (running, stopped, start-up etc.)
Fault:	Fault in any object that is assigned to the group
Warning:	Warning in any object that is assigned to the group
Interlocking:	Interlocking of the group or interlocking of the pre-selected route

Operation functions and detail information are only available after opening the **faceplate**.

Operating principle

Hardware inputs

GTA **Group push button OFF** **Basic state 1-signal**

Format BOOL

If the group is to be started/stopped using conventional control desk pushbuttons, the GTA parameter must be connected with the input signal of the Stop pushbutton. A 0-signal deactivates the group. Two-handed operation is necessary to switch off the group using control desk pushbuttons. GTA and the FGS release pushbutton must be pressed simultaneously.

Caution: The control desk pushbuttons take effect only when the GPTS (release control desk pushbuttons) interface has been connected with a 1-signal.

GTE **Group push button ON** **Basic state 0-signal**

Format BOOL

If the group is to be started/stopped using conventional control desk pushbuttons, the GTE parameter must be connected with the input signal of the Start pushbutton. A 1-signal activates the group. Two-handed operation is necessary to switch on the group using control desk pushbuttons. GTE and the FGS release pushbutton must be pressed simultaneously.

Caution: The control desk pushbuttons take effect only when the GPTS (release control desk pushbuttons) interface has been connected with a 1-signal.

Input interfaces

GEVG **Start interlock** **Basic state 1-signal**

Format BOOL

A 0-signal at interface GEVG prevents the starting of the group.

Interface GEVG must be connected with all interlock conditions which are necessary to start the group (e.g. the route must be selected or another group must be running). This ensures that the group does not generate a start-up warning when starting conditions are missing.

The start interlock is visualized in the group status display. If one wants to see the reason for the interlock in the status call of the group, one must program an annunciation module and assign it to the group (see engineering manual: interlock annunciations).

IntStart **Start Interlock**

Format STRUCT

For function description, see GEVG. This interface can be connected with a structure output as e. g. signal **Select** of a **C_ROUTE** or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntStart.Value **Signal** **Basic state 1-signal**

Format BOOL

IntStart.ST **Signal status** **Default: 16#FF**

Format BYTE

GBVG **Operating interlock** **Basic state 1-signal**

Format BOOL

A 0-signal at interface GBVG prevents the start of the group or switches off a running group. The switching off of a group through this interlock must be acknowledged, otherwise the group cannot be started again!

The operating interlock is visualized in the group status display. If one wants to see the reason for the interlock in the status call of the group, one must program an annunciation module and assign it to the group (see engineering manual: interlock annunciations).

IntOper **Operation Interlock**

Format STRUCT

For function description, see GBVG. This interface can be connected with a structure output as e. g. signal **RunSig** of another group or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntOper.Value **Signal** **Basic state 1-signal**

Format BOOL

IntOper.ST **Signal status** **Default: 16#FF**

Format BYTE

GAVG **Switch-off interlock** **Basic state 1-signal**

Format BOOL

When interface GAVG is connected with a 0-signal it is not possible to switch off the group with the normal Stop-button, but the Quick-stop-button and the interface GABG are still active.

IntSwOff **Switch-off Interlock**

Format STRUCT

For function description, see GAVG. This interface can be connected with a structure output as e. g. signal **OffSig** of another group or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntSwOff.Value **Signal** **Basic state 1-signal**

Format BOOL

IntSwOff.ST **Signal status** **Default: 16#FF**

Format BYTE

GAFS **Start-up warning external trigger** **Basic state 0-signal**

Format BOOL

External start of the start-up warning. Therefore the interface GUMS must be set to 0-signal. The start-up warning is not given with the group start, but with 1-signal at GAFS. After start-up-warning and the waiting time has elapsed the group can be started by pressing the start button.

GUMS **Enable internal start up warning** **Basic state 1-signal**

Format BOOL

With 1-signal at GUMS the start-up-warning is given by pressing the start button.
A 0-signal at the interface GUMS inhibits the normal start-up warning. The start-up warning must be started from extern via interface GAFS.

GASL **Delete selection memory** **Basic state 0-signal**

Format BOOL

With a 1-signal at interface GASL the group status OFF (GRAZ has a 1-signal) is pretended.

Application with groups with very long overtravel times. When switching off the group, the group status display would blink until the last drive is stopped. One can forestall the GRAZ by connecting the OFF Feedback of all drives to interface GASL, except for those that have a long overtravel time.

GSAZ **Supplementary fault (dynamic)** **Basic state 0-signal**

Format BOOL

A possibility for connecting dynamic faults which cannot be automatically acquired via drives and annunciation modules. With a 1-signal at interface GSAZ the group indicates dynamic faults.

Caution: If the interface is to behave exactly like a drive fault, one must ensure that the interface becomes 0 after acknowledgement.

GSTZ **Supplementary fault (static)** **Basic state 0-signal**

Format BOOL

A possibility for connecting static faults which cannot be automatically acquired via drives and annunciation modules. With 1-signal at interface GSTZ the group indicates static faults.

GFGS **Release signal** **Basic state 0-signal**

Format BOOL

Application with control desk engineering. If there are several control desks with several release pushbuttons, then one must connect the corresponding release pushbuttons to this interface.

Caution: Using GFGS the release interface at the C_PUSHBT module must **not** be connected.

GFTR **Enable start re-trigger** **Basic state 1-signal**

Format BOOL

When the start-up-procedure of a group has been interrupted by a fault and one restarts the group within the release-time, no start-up-warning will be given and the Command ON (GBE) becomes 1-signal at once. The release time will be reset to the start value.
With 0-signal at GFTR a start-up-warning will be given for each start.

GQSP **Quick stop** **Basic state 0-signal**

Format BOOL

In some situations it may be necessary to stop the drives of a group instantaneously (without stop delay). The so-called quick stop is possible via the OS or via 1-Signal at interface GQSP. For this, one must connect signal GQS of the group to interface QSTP of the drives (E and V). Separate interlocking is also possible with dampers (e.g. forced close).

GPTS **Release of control desk pushbuttons** **Basic state 0-signal**

Format BOOL

In the basic state, operation via the OS is released and the control desk pushbuttons are inhibited. By connecting this interface with a 1-signal, the control desk pushbuttons are released and operation through OS is inhibited.

GREZ **Feedback ON** **Basic state 0-signal**

Format BOOL

This interface must be connected with a 1-signal if all drives in this group are running. It can be, for example, the last drive of a conveyor system or also a series of drives if they are triggered in parallel. The group feedback ON limits the start command of the group (reset of GBE signal) and is necessary for the visualization (group runs completely).
Depending on whether or not the group has routes, one must use for the connection the logic signal of the drives (EVS) or the limit position of the dampers and valves (KVS1/2, VVS1/2) or the feedback of the routes WRE.

Caution: Please observe the connection examples in the engineering manual, because with sporadically running drives one must also interlock the start conditions!
Starting the group is only possible if there is a 0-signal at interface GREZ! This is important when additional routes shall be started while a group is already running.

GRAZ **Feedback OFF** **Basic state 1-signal**

Format BOOL

This interface must be connected with a 1-signal if all drives in this group are stopped. It can, for example, be the first drive of a conveyor system or also a series of drives if they are triggered in parallel. The group feedback OFF limits the switch-off command of the group (reset of GDA signal) and is necessary for the visualization (group status off).
Depending on whether or not the group has routes, one must use the negated logic signal of the drives (EVS) or the limit position of the dampers and valves (KVS1/2, VVS1/2) or the negated feedback of the routes WRA. For connection examples refer to the engineering manual.

GLPZ **Lamp test (additional)** **Basic state 0-signal**

Format BOOL

If one has several control desks with lamps and wants to test the lamps for each control desk separately, one can connect the corresponding lamp test signal to this interface.

Caution: Using GLZP the lamp test interface at the C_PUSHBT module must **not** be connected.

GQIT **Acknowledge (additional)** **Basic state 0-signal**

Format BOOL

If the group is switched off via operation interlock (GBVG) it must be acknowledged before restart of the group. The acknowledgement is normally carried out automatically with the acknowledgement of the message in the alarm line (default setting). Interface GQIT is only needed for individual acknowledgement (e. g. in case of a conventional control desk).

A signal change from "0" to "1" at GQIT acknowledges the interlocking of the group. Interface QT at block C_PUSHBT acknowledges the complete AS.

Caution: Using GQIT for individual acknowledgement, the acknowledgement interface at the C_PUSHBT must **not** be connected.

GEBG **Command ON** **Basic state 0-signal**

Format BOOL

Interface to start the group via the program. The group is switched on with a positive edge at interface GEBG (signal change from 0 to 1).

GABG **Command OFF** **Basic state 0-signal**

Format BOOL

Interface for automatic switch off of the group through the program. With a 1-signal at interface GABG the group is switched off.

DSIG_BQ **Driver Signal(s) Bad Quality** **Basic state 0-signal**

Format BOOL

This Interface can be used for the visualization of bad quality status for the I/O Card. This is only possible if driver blocks are used.

For the visualization of the module status the outputs QBAD of the driver blocks must be connected with an OR Function to Interface DSIG_BQ. The status Bad Quality is then shown in the Faceplate of the group.

REL_A_ST **Release start/stop operating message** **Basic state 1-signal**

Format BOOL

A 1-signal at the REL_A_ST interface produces an operating message to be issued as soon as the group is started and stopped.

REL_A_OP **Release running/stopped operat. Message** **Basic state 0-signal**

Format BOOL

A 1-signal at the REL_A_OP interface causes an operating message to be issued as soon as the group runs completely or stops completely.

UserFace **Select Faceplate**

Format ANY

Input UserFace can be connected to any block with an OS Interface (Faceplate). If a block is connected, an additional button "U" (User) appears in the faceplate of the group block. With this button the Faceplate of the connected block can be opened.

Example:
In order to show the related Signals for the group, input UserFace can be connected to block C_REL_MOD (for a list of up to 16 objects) or, if fewer signals are used, in can be directly connected to a C_INTERL, C_INTER5 or Intlk02.

Additional inputs for testing and as Interface to the OS:

TEST_OSS **Test interface** **Default: 0**

Format INTEGER

The test interfaces are only used during module development and must not be changed!

MSG8_EVID **Message ID** **Default: 16#00**

Format DWORD

Interface to OS

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

Group and Object links

Group/Route links

Each drive block, annunciation block or measurement block must be linked to a group or route in order to collect the status of these objects for summarizing indications.

The group link is essential for control and diagnosis and comprises the following functions:

- All objects, linked to the group (or route) are listed in the group (or route) object list.
- All objects, linked to the group (or route) are highlighted in the process picture with button "Show related objects".
- The faults of all objects, linked to the group (or route) are included in the summarizing fault indication of the group (or route).
- The warnings of all objects, linked to the group (or route) are included in the summarizing warning indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

A drive can be linked to two groups or routes via *GR_LINK1* and *GR_LINK2*. If a drive belongs to more than two groups or routes the additional block C_MUX must be inserted, which provides 5 additional link interfaces.

Caution: The main group (or main route) should be connected to *GR_LINK1*! This is the one which is opened with a click on button "Main group" in the drive faceplate.

G_LINK Link to routes/objects

Format STRUCT

The G_LINK interface of the group must be connected with the G_LINK interface of the route or with the GR_LINK interface of the drives, annunciation modules and measured values.

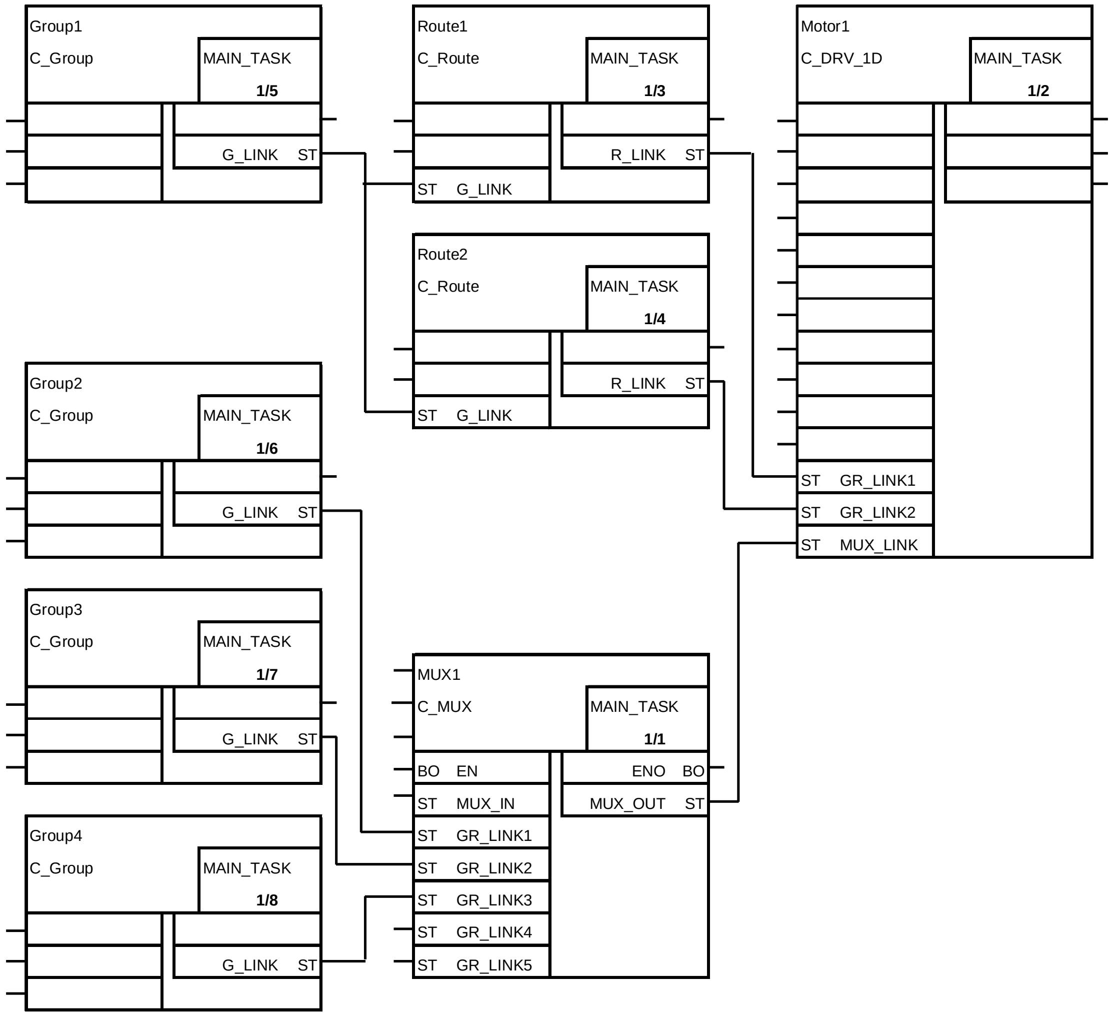
Structure variables:

G_LINK.Link	**Link**	**Default: 0**
Format INTEGER		
G_LINK.Command	**Group / Route Command**	**Default: 16#00**
Format WORD		

If objects belong to more than 2 routes or groups, the C_MUX module must be called before the associated object (drive, annunciation module, measured value). C_MUX has five inputs (GR_LINK1 to GR_LINK5) for connection with the groups/routes and one output (MUX_OUT) for the connection with the MUX_LINK interface of the drive.

This facility permits the objects to be assigned to a maximum of 7 groups/routes. If this also does not suffice, further C_MUX modules must be switched in sequence.

Example of a circuit:



Caution: Check the runtime sequence! The C_MUX module must be called before the drive. For the other modules the run sequence is as follows: first the drives, then the associated routes and finally the associated groups.

Caution: Some people use one C_MUX block and connect its output to a number of drives/devices, annunciations and measurements.
If you do so, make sure that the C_MUX is called before all the other objects and that no other C_MUX call comes in between.
We don't recommend using the same C_MUX if the blocks are located in different runtime groups.

Process values

The process values can be set during engineering and they can be changed online from the OS. To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

HORN_TIM Horn time Default: 10

Format INTEGER (0 - 999)

Value in seconds.
During the start of the group, the GHA signal is set for the duration of the horn time to give an audible warning.

WAIT_TIM Waiting time Default: 15

Format INTEGER (0 - 999)

Value in seconds.
The waiting time is the time between the start of the group and the starting of the drives. The waiting time must be set long enough to enable people to leave the danger zone.

RELS_TIM Release time Default: 300

Format INTEGER (0 - 9999)

Value in seconds.
The ON-command of the group required to start the drives is limited to this set release time. The release time starts when the waiting time elapses and ends

- after the set period of time
- when the group runs completely (GREZ has 1-signal)
- when the group detects a fault
- when the group is switched off.

MARK_TIM Highlight time Default: 5

Format INTEGER (0 - 999)

Value in seconds.
With Faceplate button "R" (Related objects in picture), all objects linked to the group are highlighted for the duration of time MARK_TIM.

Output interfaces

GBE Command ON

Format BOOL

After a group is started and the waiting time has elapsed the GBE signal is set and it has status 1 until

- the release time has elapsed
- the group runs completely
- the group recognizes a fault
- the group is switched off during the start-up.

Signal GBE is used mainly to start the drives.

GBA Command OFF

Format BOOL

Signal GBA is generated with the group stop. GBA is only a switch-off impulse (1-signal is only present as long as the OFF-pushbutton is pressed or as long as the OFF-command of the group is present).

GBA is normally not used for switching off the drives (impulse is too short), however it is used to reset stored start conditions, e.g. with sporadically operating drives.

GDE Continuous command ON

Format BOOL

Signal GDE is set together with signal GBE and has status 1 until a stop command is given.

Most common application: switching off of the drives through the negated signal GDE.

GDA Continuous command OFF

Format BOOL

Signal GDA is set together with signal GBA and has status 1 until the group is completely stopped.

One can use signal GDA to switch off the drives. However it is better to use the negated GDE signal, especially if the drive is to be started/stopped by several groups.

GRE Feedback ON

Format BOOL

Signal GRE has status 1 when the group runs completely, i.e. when interface GREZ of the group has a 1-signal.

RunSig **Feedback ON**

Format STRUCT

For function description, see GRE. This interface can be connected to a structure input as e. g. signal **IntOper** of the next group.

Structure variables:

RunSig.Value **Signal**

Format BOOL

RunSig.ST **Signal status**

Format BYTE

GRA **Feedback OFF**

Format BOOL

Signal GRA has status 1 when the group is completely switched off, i.e. when interface GRAZ has a 1-signal.

OffSig **Feedback OFF**

Format STRUCT

For function description, see GRA. This interface can be connected to a structure input as e. g. signal **IntSwOff** of another group.

Structure variables:

OffSig.Value **Signal**

Format BOOL

OffSig.ST **Signal status**

Format BYTE

GLO **Local mode**

Format BOOL

A 1-signal means the group is in local mode.

Connecting Signal GLO to the local release xLOC of all affiliated drives, the local mode of the drives will be enabled group-wise (by switching the group into local mode).

The local release xLOC of the affiliated drives is connected with signal GLO of the group, i.e. only if the group is in local mode, is the local mode released by the PLC.

GES **Single-start mode**

Format BOOL

A 1-signal means the group is in single-start mode.

Connecting Signal GES to the Single start release xEIZ of all affiliated drives, the single start mode of the drives will be enabled group-wise (by switching the group into single-start mode).

GVG Selection memory

Format BOOL

Signal GVG is set during the start of the group and has status 1 until the group is stopped completely (interface GRAZ has a 1-signal).

Signal GVG is used for general interlocks. One can, for example, OR the negated signal GVG with the GRE signal. With this, one has a signal which has status 0 only during the start-up time and the shut-down time of a group, otherwise it has status 1. This signal could, for example, be connected to the manual interlock WHVR of the route. Hence, the route changeover is inhibited for the duration of the start-up and shut-down.

GQS Quick stop

Format BOOL

Signal GQS has status 1 when the pushbutton "quick stop" on the OS is activated or when interface GQSP is connected with a 1-signal. This function is meant for suppressing the stop delay of the drives and for the immediate stopping of the group.

If quick stop is required, one must connect interface QSTP of drives E and V with signal GQS of the corresponding group.

GST Fault

Format BOOL

Signal GST has status 1 if there are dynamic or static faults in the group.

GSD Fault dynamic

Format BOOL

If there is a dynamic fault (alarm) GSD has 1-signal. After quit the GSD becomes 0-signal.

SIM_ON Simulation ON

Format BOOL

In Sequence Test mode SIM_ON has 1-Signal. If module drivers are used the output SIM_ON of the motor can be connected to SIM_ON of the driver block.

ACK Acknowledge group-wise

Format BOOL

Output ACK is only used in case of group-wise acknowledgement (see Engineering Manual, chapter 06_AS_Engineering, Acknowledgement mode). By pressing the button "GR_ACK" in the faceplate of the group this output becomes 1-signal for one cycle.
In order to acknowledge the drive/annunciations faults, the output ACK must be connected to the acknowledgement interface xQIT of all objects belonging to this group (e. g. to EQIT for C_DRV_1D).

Additional outputs for testing and as Interface to the OS:

INTFC_OS **Interface status for OS**

Format DWORD

Interface to OS

For more information see Variable details.

STATUS **Status word for OS**

Format DWORD

Interface to OS

For more information see Variable details.

STATUS2 **Status word for OS**

Format DWORD

Interface to OS

For more information see Variable details.

STATUS3 **Structure Input available**

Format DWORD

Interface to OS

For more information see Variable details.

ALARM **for Test**

Format WORD

For more information see Variable details.

NO_OF_FT **Number in status call buffer for OS**

Format INTEGER

Interface to OS

FT1 **Cell in status call buffer for OS**

FT2 **Cell in status call buffer for OS**

.

.

FT30 **Cell in status call buffer for OS**

Format INTEGER

Interface to OS

DLY_CNT **Delay Counter**

Format INTEGER

Interface to OS

Hardware outputs

GZV Group interlocked lamp

Format BOOL

Signal GZV can be used to connect a control desk lamp (if no visualization system is available). A 0-signal means that no interlock is present. A blinking light means a dynamic (not acknowledged) interlock and a continuous light means a static (already acknowledged) interlock of the group.

GZS Group fault lamp

Format BOOL

Signal GZS can be used to connect a control desk lamp (if no visualization system is available). A 0-signal means that no fault is present. A blinking light means a dynamic (not acknowledged) fault and a continuous light means a static (already acknowledged) fault of the group.

GZB Group operation lamp

Format BOOL

Signal GZB can be used to connect a control desk lamp (if no visualization system is available). A 0-signal means that the group is not running. A continuous light means that the group is running completely and a blinking light means the start-up or shut-down of the group.

GLA Start-up warning lamp

Format BOOL

With the start of the group (setting of signal GVG) signal GLA is also set. It has status 1 until the start-up process is completed, i.e.

- the group runs completely (GREZ has 1-signal) or
- the release time has elapsed or
- the group recognizes a fault or
- the group is switched off.

Signal GLA of the group can be allocated to an output in order to switch on a warning lamp.

GHA Start-up warning horn

Format BOOL

Signal GHA is set during the start of the group. It has status 1 until the set horn time has elapsed (process value).

Signal GHA of the group can be allocated to an output to switch on the horn.

Time characteristics

The module must be called after the associated objects and routes.

Message characteristics

The module uses the ALARM_8 module to generate annunciations.

A plausibility and priority logic at the process level analyses all object faults
only one fault annunciation is issued for each fault
secondary annunciations are suppressed automatically
the fault source is recorded in detail and uniquely.

The current operational state of the plant objects is automatically taken into consideration during the fault analysis, e.g. all fault annunciations are suppressed automatically for a stationary group
no superfluous fault annunciations are created
the operator does not need to manually disable/suppress any annunciations.

Each fault annunciation is also classified.
This shows whether an **electrical** or a **mechanical** fault, a **process fault** or a shut-down with a **local safety switch** applies.
An electrician does not always need to be called first
The production operator can give specific instructions.

Alarm archive and alarm logs show only "true" annunciations.
An annunciation release for each object means that the communication and OS are not overloaded with an "annunciation storm" **-** e.g. overloaded after a power failure.

Refer to the Variable details for the assignment of the annunciation text and annunciation class to the module parameters.

Module states

Status display of the group:

1st column:	**A** (white)	= automatic
	L (yellow)	= local
	S (blue)	= single mode
2nd column:	**O** (green)	= operation (white if incomplete; arrows for start-up /shutdown)
3rd column:	**F** (red)	= fault
4th column:	**W** (yellow)	= warning
5th column:	**I** (yellow)	= interlock

Status indications:

Status Display Operating Mode	Display	Symbol
Automatic	A	Black, white
Local	L	Black, yellow
Single-start	S	Black, blue

Status/Text Display Operation	Display	Symbol
Group not in operation	A	Gray, gray
start-up in automatic mode	A ↑	Black, green blinking
shut-down in automatic mode	A ↓	Black, green blinking
running	A 0	Black, green
not completely started	A ↑	Black, white blinking
does not run completely anymore	A 0	Black, green blinking
start command ON	A ↑	Black, green blinking

Status Display Fault	Display	Symbol
No fault	A	Gray, gray
In STOP + fault	A F	White, red
Not in STOP + fault not acknowledged	A F	White, red blinking
Not in STOP + fault acknowledged	A F	White, red

Status Display Warning	Display	Symbol
No warning	A	Gray, gray
In STOP + warning	A W	Black, yellow
Not in STOP + warning not acknowledged	A W	Black, yellow blinking
Not in STOP + warning acknowledged	A W	Black, yellow

Status Display Interlocked	Display	Symbol
No interlock	A	Gray, gray
Interlocked	A I	Black, yellow
Interlock resulted in switch-off	A I	Black, yellow blinking

See also Variable details

Commands

Refer to the Variable details for the assignment of the command word.

I/O-bar of C_GROUP

C_GROUP

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
GTA	Group pushbutton OFF	BOOL	1	I	U		
GTE	Group pushbutton ON	BOOL	0	I	U		
GEVG	Start interlock	BOOL	1	I			
IntStart	Start interlock	STRUCT		I			
IntStart.Value	Signal	BOOL	1	I	U	+	
IntStart.ST	Signal Status	BYTE	16#FF	I	U		
GBVG	Operating interlock	BOOL	1	I			
IntOper	Operating interlock	STRUCT		I			
IntOper.Value	Signal	BOOL	1	I	U	+	
IntOper.ST	Signal Status	BYTE	16#FF	I	U		
GAVG	Switch-off interlock	BOOL	1	I			
IntSwOff	Switch-off interlock	STRUCT		I			
IntSwOff.Value	Signal	BOOL	1	I	U	+	
IntSwOff.ST	Signal Status	BYTE	16#FF	I	U		
GAFS	Start-up warning external trigger	BOOL	0	I	U		
GUMS	Changeover signal start-up warning	BOOL	1	I	U		
GASL	Delete selection memory	BOOL	0	I	U		
GSAZ	Supplementary fault (dynamic)	BOOL	0	I			
GSTZ	Supplementary fault (static)	BOOL	0	I			
GFGS	Release signal (additional)	BOOL	0	I	U		
GFTR	enable start re-trigger	BOOL	1	I	U		
GQSP	Quick stop	BOOL	0	I			
GPTS	Release of control desk pushbuttons	BOOL	0	I	U		
GREZ	Feedback ON	BOOL	0	I			
GRAZ	Feedback OFF	BOOL	1	I			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
GLPZ	Lamp test (additional)	BOOL	0	I	U		
GQIT	Acknowledge (additional)	BOOL	0	I	U		
GEBG	Command ON	BOOL	0	I			
GABG	Command OFF	BOOL	0	I			
DSIG_BQ	Driver-Signal(s) Bad Quality	BOOL	0	I			
REL_A_ST	Release operating message start/stop	BOOL	1	I	U		
REL_A_OP	Release operating message running/stopped	BOOL	0	I	U		
UserFace	Select Faceplate	ANY		I	U		
TEST_OSS	Must not be changed	INT	0	I	U		
MSG8_EVID	Message ID	DWORD	16#00	I	U		
COMMAND	Command word	WORD	16#00	I	U	+	
HORN_TIM	Horn time	INT	0	I		+	
WAIT_TIM	Waiting time	INT	15	I		+	
RELS_TIM	Release time	INT	300	I		+	
MARK_TIM	Highlight time	INT	5	I	U		
INTFC_OS	Interface status for OS	DWORD	16#00	O	U	+	
STATUS	Status word for test	DWORD	16#00	O	U	+	
STATUS2	Status display interlocked for OS	DWORD	16#00	O	U	+	
STATUS3	Status word 3 Structure input available	DWORD	16#00	O	U	+	
ALARM	Alarm word for test	WORD	16#00	O	U		
NO_OF_FT	Number in status call buffer	INT	0	O	U	+	
FT1	Cell in status call buffer	INT	0	O	U	+	
FT2	Cell in status call buffer	INT	0	O	U	+	
FT3	Cell in status call buffer	INT	0	O	U	+	
FT4	Cell in status call buffer	INT	0	O	U	+	
FT5	Cell in status call buffer	INT	0	O	U	+	
FT6	Cell in status call buffer	INT	0	O	U	+	

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
FT7	Cell in status call buffer	INT	0	O	U	+	
FT8	Cell in status call buffer	INT	0	O	U	+	
FT9	Cell in status call buffer	INT	0	O	U	+	
FT10	Cell in status call buffer	INT	0	O	U	+	
FT11	Cell in status call buffer	INT	0	O	U	+	
FT12	Cell in status call buffer	INT	0	O	U	+	
FT13	Cell in status call buffer	INT	0	O	U	+	
FT14	Cell in status call buffer	INT	0	O	U	+	
FT15	Cell in status call buffer	INT	0	O	U	+	
FT16	Cell in status call buffer	INT	0	O	U	+	
FT17	Cell in status call buffer	INT	0	O	U	+	
FT18	Cell in status call buffer	INT	0	O	U	+	
FT19	Cell in status call buffer	INT	0	O	U	+	
FT20	Cell in status call buffer	INT	0	O	U	+	
FT21	Cell in status call buffer	INT	0	O	U	+	
FT22	Cell in status call buffer	INT	0	O	U	+	
FT23	Cell in status call buffer	INT	0	O	U	+	
FT24	Cell in status call buffer	INT	0	O	U	+	
FT25	Cell in status call buffer	INT	0	O	U	+	
FT26	Cell in status call buffer	INT	0	O	U	+	
FT27	Cell in status call buffer	INT	0	O	U	+	
FT28	Cell in status call buffer	INT	0	O	U	+	
FT29	Cell in status call buffer	INT	0	O	U	+	
FT30	Cell in status call buffer	INT	0	O	U	+	
GBE	Command ON	BOOL	0	O			
GBA	Command OFF	BOOL	0	O			
GDE	Continuous command ON	BOOL	0	O			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
GDA	Continuous command OFF	BOOL	0	O			
GRE	Feedback ON	BOOL	0	O			
RunSig	Feedback ON	STRUCT		O			
RunSig.Value	Signal	BOOL	0	O		+	
RunSig.ST	Signal status	BYTE	16#80	O		+	
GRA	Feedback OFF	BOOL	0	O			
OffSig	Feedback OFF	STRUCT		O			
OffSig.Value	Signal	BOOL	0	O		+	
OffSig.ST	Signal status	BYTE	16#80	O		+	
GLO	Local mode	BOOL	0	O			
GES	Single start mode	BOOL	0	O			
GVG	Selection memory	BOOL	0	O			
GQS	Quick stop	BOOL	0	O			
GST	Fault	BOOL	0	O			
GSD	Fault dynamic	BOOL	0	O			
SIM_ON	Simulation ON	BOOL	0	O			
ACK	Acknowledge group-wise	BOOL	0	O			
GZV	Group interlocked lamp	BOOL	0	O	U		
GZS	Group fault lamp	BOOL	0	O	U		
GZB	Group operation lamp	BOOL	0	O	U		
GLA	Start-up warning lamp	BOOL	0	O			
GHA	Start-up warning horn	BOOL	0	O			
G_LINK	Link to route / objects	STRUCT		O			
G_LINK. Link	Link	INT	0	O	U		
G_LINK. Command	Group/ route command	WORD	16#00	O	U		
DLY_CNT	Delay Counter	INT	0	O	U	+	

OS-Variable table

C_GROUP

OS Variable	Description	PLC Data Type	OS Data Type
IntStart#Value	Signal	BOOL	Binary variable
IntOper#Value	Signal	BOOL	Binary variable
IntSwOff#Value	Signal	BOOL	Binary variable
COMMAND	Command word	WORD	Unsigned 16-bit value
HORN_TIM	Horn time	INT	Signed 16-bit value
WAIT_TIM	Waiting time	INT	Signed 16-bit value
RELS_TIM	Release time	INT	Signed 16-bit value
INTFC_OS	Interface status for OS	DWORD	Unsigned 32-bit value
STATUS	Status word for test	DWORD	Unsigned 32-bit value
STATUS2	Status display interlocked for OS	DWORD	Unsigned 32-bit value
STATUS3	Status word 3 Structure input available	DWORD	Unsigned 32-bit value
NO_OF_FT	Number in status call buffer	INT	Signed 16-bit value
FT1	Cell in status call buffer	INT	Signed 16-bit value
FT2	Cell in status call buffer	INT	Signed 16-bit value
FT3	Cell in status call buffer	INT	Signed 16-bit value
FT4	Cell in status call buffer	INT	Signed 16-bit value
FT5	Cell in status call buffer	INT	Signed 16-bit value
FT6	Cell in status call buffer	INT	Signed 16-bit value
FT7	Cell in status call buffer	INT	Signed 16-bit value
FT8	Cell in status call buffer	INT	Signed 16-bit value
FT9	Cell in status call buffer	INT	Signed 16-bit value
FT10	Cell in status call buffer	INT	Signed 16-bit value
FT11	Cell in status call buffer	INT	Signed 16-bit value
FT12	Cell in status call buffer	INT	Signed 16-bit value
FT13	Cell in status call buffer	INT	Signed 16-bit value

OS Variable	Description	PLC Data Type	OS Data Type
FT14	Cell in status call buffer	INT	Signed 16-bit value
FT15	Cell in status call buffer	INT	Signed 16-bit value
FT16	Cell in status call buffer	INT	Signed 16-bit value
FT17	Cell in status call buffer	INT	Signed 16-bit value
FT18	Cell in status call buffer	INT	Signed 16-bit value
FT19	Cell in status call buffer	INT	Signed 16-bit value
FT20	Cell in status call buffer	INT	Signed 16-bit value
FT21	Cell in status call buffer	INT	Signed 16-bit value
FT22	Cell in status call buffer	INT	Signed 16-bit value
FT23	Cell in status call buffer	INT	Signed 16-bit value
FT24	Cell in status call buffer	INT	Signed 16-bit value
FT25	Cell in status call buffer	INT	Signed 16-bit value
FT26	Cell in status call buffer	INT	Signed 16-bit value
FT27	Cell in status call buffer	INT	Signed 16-bit value
FT28	Cell in status call buffer	INT	Signed 16-bit value
FT29	Cell in status call buffer	INT	Signed 16-bit value
FT30	Cell in status call buffer	INT	Signed 16-bit value
RunSig#Value	Signal	BOOL	Binary variable
RunSig#ST	Signal status	BYTE	Unsigned 8-bit value
OffSig#Value	Signal	BOOL	Binary variable
OffSig#ST	Signal status	BYTE	Unsigned 8-bit value
DLY_CNT	Delay Counter	INT	Signed 16-bit value

Variable details

Internal structure of the Commands, Alarms, Visualization status and Interface word:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Commandword**	**Commandword**		
COM_B20	GRUZU	0	Gruppen-Zustandsaufruf	Group status call-up		
COM_B21	GRINZ	1	Aufruf Gruppenobjektliste	Gruppe object list call		
COM_B22		2				
COM_B23		3				
COM_B24		4				
COM_B25		5				
COM_B26	SOBJ	6	Zeige alle zugehörigen Objekte an	Show all objects belonging to the group	Op. Inp.	
COM_B27		7				
COM_B10	ACK	8	Störung Quittieren	Fault acknowledgement		
COM_B11	STP	9	AUS	OFF	Op. Inp.	
COM_B12	STA	10	EIN	ON	Op. Inp.	
COM_B13	RSON	11	Einzelbetrieb EIN	single-start mode	Op. Inp.	
COM_B14	AUTON	12	Automatik EIN	Automatic ON	Op. Inp.	
COM_B15	LOC_ON	13	Vorortbetrieb EIN	local mode	Op. Inp.	
COM_B16	STINT		Start Stop Unterbrechung	Start Stop interrupt	Op. Inp.	
COM_B17	QSTP	15	Schnellstop	Quick stop	Op. Inp.	
ALARM			**Alarm**	**Alarm**		
ALA_STOP		0	Stop	Stop	Op. Inp.	
ALA_START		1	Start	Start	Op. Inp.	
ALA_IOP		2	Läuft	In Operat.	Op. Inp.	
ALA_NIO		3	Steht	Not in Oper.	Op. Inp.	
ALA_B24		4	Schnellstop	Quick Stop	Op. Inp.	
ALA_B25		5				
ALA_B26		6				
ALA_B27		7				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
INTFC_OS			**Nahtstellenwort**	**Interfaceword**		
OS_IF_B40	GEVG	0	Einschaltverriegelung	Start interlock		
OS_IF_B41	GBVG	1	Betriebsverriegelung	Operating interlock		
OS_IF_B42	GAVG	2	Ausschaltverriegelung	Switch-off interlock		
OS_IF_B43		3				
OS_IF_B44		4				
OS_IF_B45	GAFS	5	Anfahrsignal	Start-up signal		
OS_IF_B46	GUMS	6	Umschaltung Signal Anfahrwarnung	Signal start-up warning method		
OS_IF_B47	GASL	7	Anwahlspeicher löschen (GVG)	Delete Group selection (GVG)		
OS_IF_B30	GSAZ	8	Störungszusatz (dynamisch)	Supplementary fault (dynamic)		
OS_IF_B31	GSTZ	9	Störungszusatz (statisch)	Supplementary fault (static)		
OS_IF_B32	GFGS	10	Freigabesignal	Release signal (additional)		
OS_IF_B33	GFTR	11	Freigabe-Triggerung	Release - triggering		
OS_IF_B34	GQSP	12	Schnellstop	Quick stop		
OS_IF_B35		13				
OS_IF_B36	GPTS	14	Freigabe Pulttasten	Release of pushbuttons		
OS_IF_B37		15				
OS_IF_B20		16				
OS_IF_B21	GREZ	17	Rückmeldung Ein	Feedback ON		
OS_IF_B22	GRAZ	18	Rückmeldung Aus	Feedback OFF		
OS_IF_B23		19				
OS_IF_B24		20				
OS_IF_B25		21				
OS_IF_B26		22				
OS_IF_B27	GLPZ	23	Lampen prüfen (Zusatz)	Lamp test (additional)		
OS_IF_B10	GQIT	24	Quittierung (Zusatz)	Acknowledgement (additional)		
OS_IF_B11		25				
OS_IF_B12		26				
OS_IF_B13	GEBG	27	Befehl Ein	Command ON		
OS_IF_B14	GABG	28	Befehl Aus	Command OFF		
OS_IF_B15		29				
OS_IF_B16		30				
OS_IF_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B40	O_NIO	0	Gruppe steht	Group not in operation		
STA_B41	O_START	1	Start im Automatikbetrieb	Start-up in automatic mode		
STA_B42	O_GBE	2	Startbefehl ein	Start command ON		
STA_B43	O_IOP	3	läuft vollständing	Completely running		
STA_B44	O_NFUSTA	4	nicht vollständig angelaufen	not completely started		
STA_B45	O_NIOANY	5	läuft nicht mehr vollständig	does not run completely anymore		
STA_B46	O_DOWN	6	Auslauf im Automatikbetrieb	shut-down in automatic mode		
STA_B47		7				
STA_B30	STST	8	Störung	Fault acknowledged		
STA_B31	STDY	9	Störung nicht quittiert	Fault not acknowledged		
STA_B32	WAST	10	Warnung	Warning acknowledged		
STA_B33	WADY	11	Warnung nicht quittiert	Warning not acknowledged		
STA_B34		12				
STA_B35	VIS_OP13	13	Visu-SS für Betriebszustand	Visu-SS for operation		
STA_B36	VIS_OP14	14	Visu-SS für Betriebszustand	Visu-SS for operation		
STA_B37	VIS_OP15	15	Visu-SS für Betriebszustand	Visu-SS for operation		
STA_B20	GBE	16	Befehl Ein	Command On		
STA_B21	GBA	17	Befehl Aus	Command Off		
STA_B22	GDE	18	Dauerbefehl Ein	Continuous Command On		
STA_B23	GDA	19	Dauerbefehl Aus	Continuous Command Off		
STA_B24	GRE	20	Rückmeldung Ein	Feedback On		
STA_B25	GRA	21	Rückmeldung Aus	Feedback Off		
STA_B26	GLO	22	Betriebsart Vorort	Local mode		
STA_B27	GES	23	Betriebsart Einzelstart	Single-start mode		
STA_B10	GVG	24	Anwahlspeicher	Pre-selection flag		
STA_B11	GLA	25	Lampe Anfahrwarnung	Start-up-warning lamp		
STA_B12	GHA	26	Hupe Anfahrwarnung	Start-up-warning horn		
STA_B13	GST	27	Störung	Fault		
STA_B14	GSD	28	Störung dynamisch	Fault dynamic		
STA_B15		29				
STA_B16		30				
STA_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS2			**Status**	**Status**		
STA2_B40	M_AUTO	0	Automatic	Automatic mode		
STA2_B41	M_LOCAL	1	Vorort	Local mode		
STA2_B42	M_SINGLE	2	Einzelbetrieb	Single mode		
STA2_B43		3				
STA2_B44		4				
STA2_B45		5				
STA2_B46		6				
STA2_B47		7				
STA2_B30	I_INT	8	verriegelt	interlocking		
STA2_B31	I_NQT	9	verriegelung führt zum Stopp	Stopped by interlocking		
STA2_B32		10				
STA2_B33		11				
STA2_B34		12				
STA2_B35		13				
STA2_B36	SQT	14	Sequenz Test	Sequence Test		
STA2_B37	BQU	15	Bad Quality	Bad Quality		
STA2_B20	GTA	16	Gruppentaste AUS	Group key OFF		
STA2_B21	GTE	17	Gruppentaste EIN	Group key ON		
STA2_B22	GZV	18	Gruppenzustand verriegelt	Group status interlocked		
STA2_B23	GZS	19	Gruppenzustand Störung	Group status Fault		
STA2_B24	GZB	20	Gruppenzustand Betrieb	Group status Operation		
STA2_B25		21				
STA2_B26		22				
STA2_B27		23				
STA2_B10	REL_A_ST	24	Start/Stop	Start/stop		
STA2_B11	REL_A_OP	25	läuft/steht	On/off		
STA2_B12		26				
STA2_B13		27				
STA2_B14		28				
STA2_B15		29				
STA2_B16		30				
STA2_B17	ACK_GR	31	Quittieren gruppenweise	Acknowledge group-wise		

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS3			**Status**	**Status**		
STA3_B40		0	IntStart angeschlossen	IntStart connected		
STA3_B41		1	IntOper angeschlossen	IntOper connected		
STA3_B42		2	IntSwOff angeschlossen	IntSwOff connected		
STA3_B43		3				
STA3_B44		4				
STA3_B45		5				
STA3_B46		6				
STA3_B47		7				
STA3_B30		8				
STA3_B31		9				
STA3_B32		10				
STA3_B33		11				
STA3_B34		12				
STA3_B35		13				
STA3_B36		14				
STA3_B37		15				
STA3_B20	SUW_T	16	Hupzeit läuft	Startup Warning time is running		
STA3_B21	WAIT_T	17	Wartezeit läuft	Waiting time is running		
STA3_B22	REL_T	18	Freigabezeit läuft	Release time is running		
STA3_B23		19				
STA3_B24		20				
STA3_B25		21				
STA3_B26		22				
STA3_B27		23				
STA3_B10		24				
STA3_B11		25				
STA3_B12		26				
STA3_B13		27				
STA3_B14		28				
STA3_B15		29				
STA3_B16		30				
STA3_B17		31				

Description of C_MUX

Type/Number

Module name: **C_MUX**
Module no.: **FC1017**

Calling OBs

OB1 (MAIN-TASK)

Function

The C_MUX module is used when an object for the status call is assigned to more than 2 groups and/or routes.

Each object can be directly assigned to a maximum of 2 groups and/or routes. If more groups/routes are needed, one or, if necessary, more C_MUX must be connected up-stream. The C_MUX must lie before the Object-FB in the call sequence.

Operating principle

Input interfaces

MUX_OUT To connect several C_MUX modules

Format STRUCT

To connect several C_MUX modules, the MUX_OUT output of a C_MUX must be connected with the MUX_IN input of the next C_MUX.

Caution: The MUX_IN interface may only be connected with a MUX_OUT signal of another C_MUX module! Note that the upstream C_MUX must also run beforehand in the processing sequence!

Structure variables:

MUX_IN.Point_GRL	**Pointer**	**Default: 0**
Format INTEGER		
MUX_IN.Command	**Group / Route Command**	**Default: 16#00**
Format WORD		

GR_LINK1 Link to group or route

Format STRUCT

The GR_LINK1 interface of the drive must be connected with the R_LINK interface of the route or with the G_LINK interface of the group.

Structure variables:

GR_LINK1.Link	**Link**	**Default: 0**
Format INTEGER		
GR_LINK1.Command	**Group / Route Command**	**Default: 16#00**
Format WORD		

GR_LINK2 Link to group or route

Format STRUCT

The GR_LINK2 interface of the drive must be connected with the R_LINK interface of the route or with the G_LINK interface of the group.

Structure variables:

GR_LINK2.Link	**Link**	**Default: 0**
Format INTEGER		
GR_LINK2.Command	**Group / Route Command**	**Default: 16#00**
Format WORD		

GR_LINK3 **Link to group or route**

Format STRUCT

The GR_LINK3 interface of the drive must be connected with the R_LINK interface of the route or with the G_LINK interface of the group.

Structure variables:

GR_LINK3.Link **Link** **Default: 0**

Format INTEGER

GR_LINK3.Command **Group / Route Command** **Default: 16#00**

Format WORD

GR_LINK4 **Link to group or route**

Format STRUCT

The GR_LINK4 interface of the drive must be connected with the R_LINK interface of the route or with the G_LINK interface of the group.

Structure variables:

GR_LINK4.Link **Link** **Default: 0**

Format INTEGER

GR_LINK4.Command **Group / Route Command** **Default: 16#00**

Format WORD

GR_LINK5 **Link to group or route**

Format STRUCT

The GR_LINK5 interface of the drive must be connected with the R_LINK interface of the route or with the G_LINK interface of the group.

Structure variables:

GR_LINK5.Link **Link** **Default: 0**

Format INTEGER

GR_LINK5.Command **Group / Route Command** **Default: 16#00**

Format WORD

Output interfaces

MUX_OUT **Link to the objects**

Format STRUCT

The MUX_OUT interface must be connected with the MUX_LINK interface of the objects.

Caution: The C_MUX must be called before the object FB!

Structure variables:

MUX_OUT.Point_GRL **Pointer** **Default: 0**

Format INTEGER

MUX_OUT.Command **Group / Route Command** **Default: 16#00**

Format WORD

I/O-bar of C_MUX

C_MUX

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
MUX_IN	Link to C_MUX	STRUCT		I			
MUX_IN. Point_GRL	Pointer	INT	0	I	U		
MUX_IN.Command	Group/ route command	WORD	16#00	I	U		
GR_LINK1	Link to group or route	STRUCT		I			
GR_LINK1. Link	Link	INT	0	I	U		
GR_LINK1. Command	Group/ route command	WORD	16#00	I	U		
GR_LINK2	Link to group or route	STRUCT		I			
GR_LINK2. Link	Link	INT	0	I	U		
GR_LINK2. Command	Group/ route command	WORD	16#00	I	U		
GR_LINK3	Link to group or route	STRUCT		I			
GR_LINK3. Link	Link	INT	0	I	U		
GR_LINK3. Command	Group/ route command	WORD	16#00	I	U		
GR_LINK4	Link to group or route	STRUCT		I			
GR_LINK4. Link	Link	INT	0	I	U		
GR_LINK4. Command	Group/ route command	WORD	16#00	I	U		
GR_LINK5	Link to group or route	STRUCT		I			
GR_LINK5. Link	Link	INT	0	I	U		
GR_LINK5. Command	Group/ route command	WORD	16#00	I	U		
MUX_OUT	Link to input MUX_LINK	STRUCT		O			
MUX_OUT. Point_GRL	Pointer	INT	0	O	U		
MUX_OUT. Command	Group/ route command	WORD	16#00	O	U		

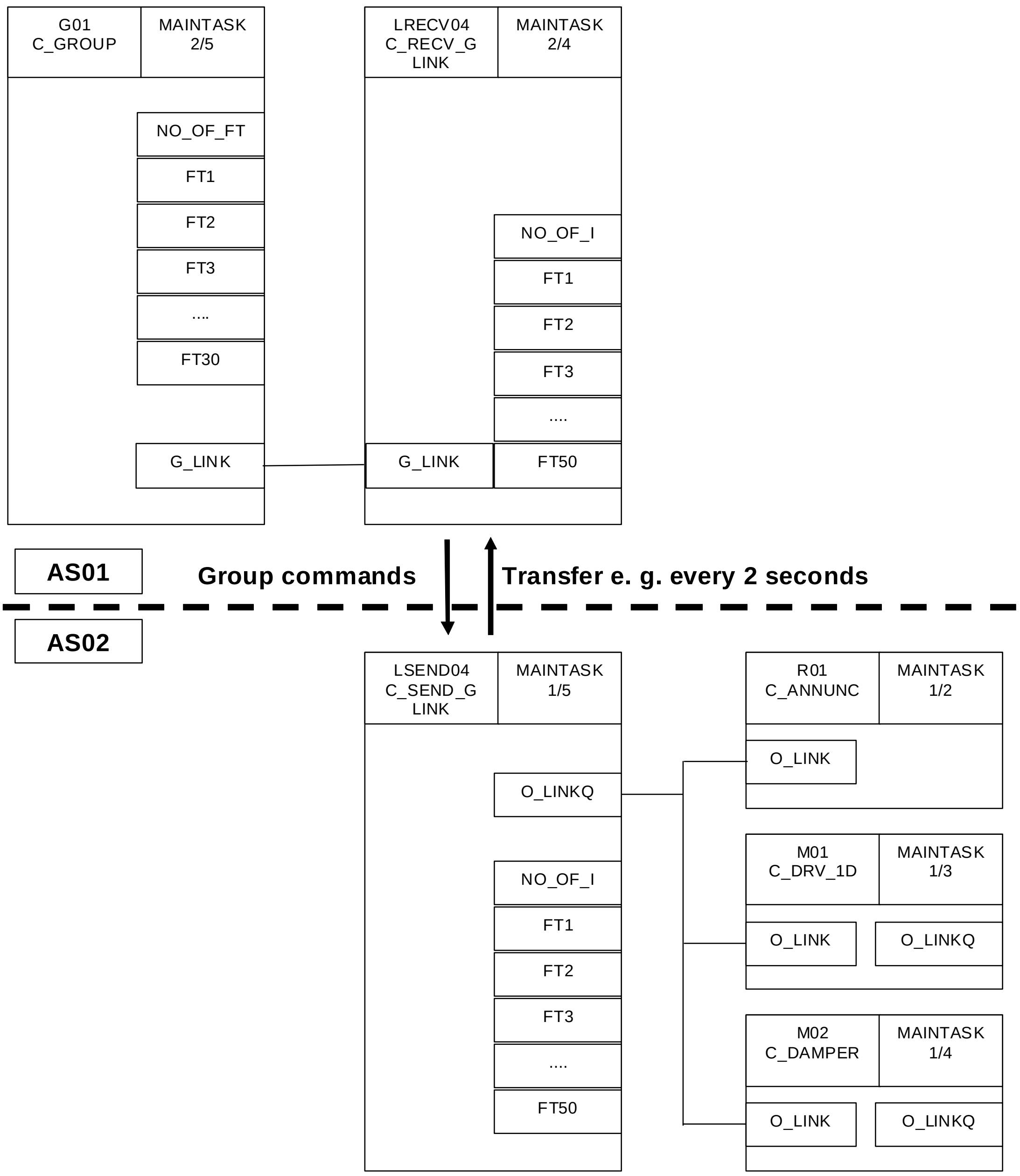
Object links to a group in a different AS

If a Cemat object is programmed in a different AS than the superordinated group a direct link between the drive and the group is not possible. In this case special send and receive blocks must be inserted which collect the object data and transmit it to the group.

In the AS of the group the group output *G_LINK* is connected to input *G_LINK* of the block C_RECV_G.

Caution: C_RECV_G can only be linked to a C_GROUP module. Linking to routes is not permitted and will not work!

In the AS of the Cemat Objects the output *O_LINKQ* of block C_SEND_G is connected to input *O_LINK* of the drives/devices, annunciations and measurements.

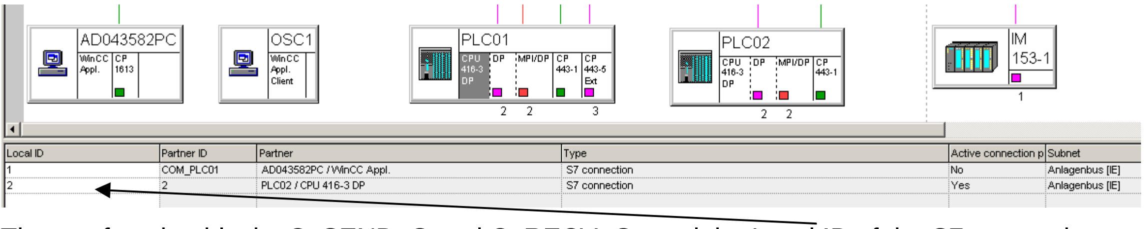


Caution: It is not allowed to use the Object link and the Group/Route link at the same time: If *O_LINK* is used, *GR_LINK1* and *GR_LINK2* or *C_MUX* must not be connected!

Project Settings

Between the two AS you need a S7 connection.

Example:



The two function blocks C_SEND_G and C_RECV_G need the Local ID of the S7 connection. To identify different telegrams using the same S7 connection you need also a telegram ID = R_ID of the SFBs BSEND (SFB12) and BRCV (SFB13). BSEND and BRCV are internally used for the data transmission.

Example for TEL_ID / R_ID (ID S7 connection is in this example always = 2):

	TEL_ID = R_ID C_SEND_G	TEL_ID = R_ID C_RECV_G	R_ID	R_ID
Send group data	0	0		
Send group command word	1	1		
Send group ON/OFF commands			3	3
Send drive feedbacks for group			4	4

Caution: The addressing parameters ID and R ID are evaluated only at the first call of the block (the actual parameters or the predefined values from the instance). The first call therefore specifies the communication relation (connection) with the remote partner until the next warm or cold restart. If you make an engineering fault for a running AS, please remove the blocks with the wrong ID and TEL_ID and create them new! Otherwise you need an AS restart!!!!!!!

Object data

The objects send the following status word via C_SEND_G and C_RECV_G to the group:

Bit 0 = General fault
Bit 1 = Fault not acknowledged
Bit 2 = General warning
Bit 3 = Warning not acknowledged
Bit 4 = Simulation active
Bit 5 = Out of Service Mode
Bit 6 = Parameter GrFltLck
Bit 7 = Stopped with fault (material fault to group)
Bit 8 = Running or Running direction 1
Bit 9 = Running direction 2
Bit 10 = Manual Mode
Bit 11 = Local Mode
Bit 12 = Parameter MsgEn
Bit 13 = Feedback ON (direction 1 or 2)
Bit 14 = Puls (ON OFF)
Bit 15 = 0

Caution: The status "Switched off by emergency stop" is not transmitted to a group in another AS. Therefore the group can't display this status from drives in another AS:

Group commands via G_LINK

The group sends the following command word via C_SEND_G and C_RECV_G to the objects:

Bit 0 = Highlight object (group command)
Bit 1 = Automatic mode ON
Bit 2 = Manuel mode ON
Bit 3 = Local mode ON
Bit 4 = Acknowledge command
Bit 5 = Group is stopped

Additional CFC interconnections

All other signals which are needed for connections between group and objects must be transmitted via normal AS-AS communication.

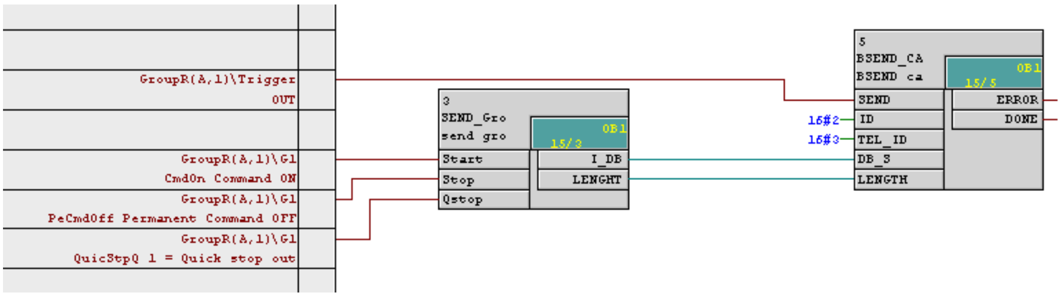
These are for example:

- The group start command for the connection to the start command of the drive.
- The group stop command for the connection to the stop command of the drive.
- The quick stop command for the connection to the quick stop of the drive.
- The running signal / position signal of the drive(s) for the connection to the feedback of the group.

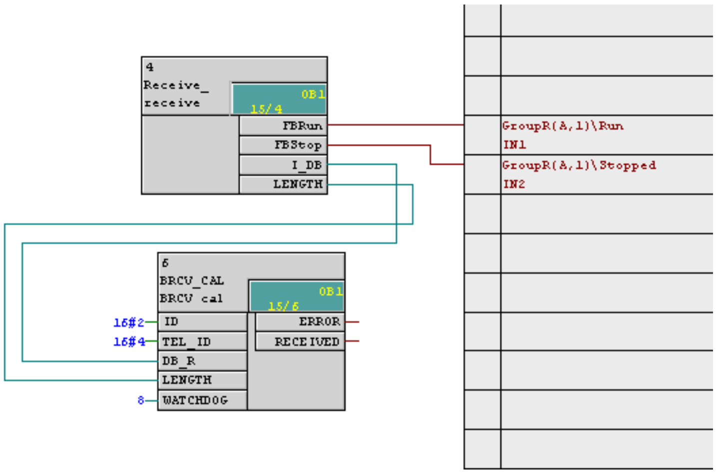
CFC interconnection links

All signals, which are normally interconnected in CFC, have to be transferred via an extra communication (same S7 connection, but different TEL_ID / R_ID). You can use the Cemat AddOn blocks BSEND_CALL and BRCV_CALL. Refer to engineering manual "07_AS-AS_Coupling_009.pdf".

Example "Send group commands ON / OFF / Quick stop":



Example "Receive feedback for group RUN / STOPPED":

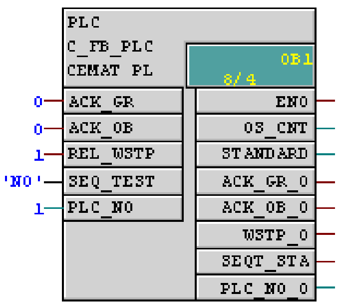


AS / PLC number

The system chart SYSPLCxx contains the block C_FB_PLC. The parameter PLC_NO must get the AS number.

Example:

In the chart SYSPLC01 set a "1" on PLC_NO.
In the chart SYSPLC02 set a "2" on PLC_NO.
In the chart SYSPLC03 set a "3" on PLC_NO.
etc.



Description of C_SEND_G

Type/Number

Module name: C_SEND_G
Module no.: FB1055

Calling OBs

All Cemat Functions must be installed in the same OB, which is preferable OB1. The System Chart SYSPLCxx contains infrastructure blocks which must be called at the Beginning (Runtime group OB1_START) and at the End (Runtime group OB1_END) of this OB.
The application program must be called between OB1_START and OB1_END.

Calling of the Cemat blocks in a cyclic interrupt OB (OB34 or OB35) is possible, but only if the complete program is called in the same cyclic interrupt OB. In this case the infrastructure blocks must as well be moved to the cyclic interrupt OB (see Engineering Manual 14_Tips_Tricks_009.doc)

Function

The module C_SEND_G and the module C_RECV_G connect objects from another AS to the group module.

Operating principle

Input interfaces

Cycle **Send cycle in sec** **Default: 2**

Format INTEGER

Send cycle in seconds to transfer the object data.

WatchCom **Command Receive watchdog time in sec** **Default: 5**

Format INTEGER

Watchdog time for receiving the group command word.

ID **ID connection** **Default: 0**

Format WORD

Local ID S7 connection.

TEL_ID **R_ID of BSEND (object data)** **Default: 0**

Format DWORD

Refer to the parameter R_ID of the SFB 12 (BSEND) The R_ID parameter must be identical at the SFB/FB on the send end and at the SFB on the receive end. This allows the communication of several SFB/FB pairs via the same logic connection. The block pairs of a logic connection which are specified in R_ID must be unique for this connection. This means the TEL_ID for the function block pair C_SEND_G and C_RECV_G must be the same!

TEL_ID_C **R_ID of BRCV (group command)** **Default: 1**

Format DWORD

Refer to the parameter R_ID of the SFB 13 (BRCV) The R_ID parameter must be identical at the SFB/FB on the send end and at the SFB on the receive end. This allows the communication of several SFB/FB pairs via the same logic connection. The block pairs of a logic connection which are specified in R_ID must be unique for this connection. This means the TEL_ID_C for the function block pair C_SEND_G and C_RECV_G must be the same!

Output interfaces

ERROR PLC SEND Error

Format BOOL

The send communication (object data) is not working. The reason could be an engineering fault or a communication fault.

DONE DONE

Format BOOL

The send job (object data) was done successfully.

STAT Kind of Error

Format WORD

If there is a communication problem, please check the error code in STAT. Please check the help of SFB 12 (BSEND) parameter STATUS for details.

ERROR_COM PLC RECEIVE Error

Format BOOL

The receive communication (group command) is not working. The reason could be an engineering fault or a communication fault.

RECV_COM Command received

Format BOOL

The group command received successfully.

STAT_COM Kind of Error

Format WORD

If there is a communication problem, please check the error code in STAT_COM. Please check the help of SFB 13 (BRCV) parameter STATUS for details.

COMMAND_RECV Group command

Format WORD

Last received Group command

NO_I_SD **Number of status entries (send buffer)**

Format INT

Internal use

PLC_NO **PLC number from system chart**

Format INT

Internal use

NO_OF_I **Number of status entries**

Format INT

Internal use

FT1 **Cell in status buffer**

Format STRUCT

Internal use

Structure variables:

FT1.D1 **Instance DB Object**

Format INT

FT1.D2 **Instance DB Master Object**

Format INT

FT1.D3 **Object Type**

Format INT

1= C_DRV_1D, 2 = C_DAMPER, 3 = C_DRV_2D, 4 = C_ANNUNC, 5 = C_ANNUN8, 6 = C_MEASUR, 7 = C_VALVE, 8 = C_PROFB

FT1.D4 **Status word object**

Format WORD

FT2 **Cell in status buffer**

FT3 **Cell in status buffer**

.

.

.

FT50 **Cell in status buffer**

O_LINKQ **Link to slave object**

Format STRUCT

C_SEND_G output *O_LINKQ* must be connected to interface *O_LINK* of all allocated objects. C_SEND_G sends the object data (status) to C_RECV_G. C_RECV_G is connected via *GR_LINK* to the group.

Structure variables:

O_LINKQ.iDB **Instance DB master object**

Format INTEGER

O_LINKQ.iDW **DW number NO_OF_FT in master object**

Format INTEGER

O_LINKQ.Command **Group Command**

Format WORD

O_LINKQ.Status **Status master object**

Format WORD

Engineering Errors

ErrorNum **Error Number** **Default: -1**

Format INTEGER

In case of invalid parameter settings the functionality of the block cannot be guaranteed any more. If the error number is different than 0 you have to check the application program and correct it:

Error number	Fault description
22	Send cycle too short (parameter *Cycle* less than 1s)
23	Command receive Watchdog time too short (Parameter *WatchCom* less than 1s)
24	S7 interconnection ID is not in the between 0x1 to 0xFFF

Caution: Only one error number can be indicated at a time!

I/O-bar of C_SEND_G

C_SEND_G

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
Cycle	Send cycle in sec	INT	2	I			> 0
WatchCom	Command Receive watchdog time in sec	INT	5	I			> 0
ID	ID connection	WORD	16#00	I			0 to FFF
TEL_ID	R_ID of BSEND (object data)	DWORD	16#00	I			
TEL_ID_C	R_ID of BRCV (group command)	DWORD	16#01	I			
ERROR	PLC SEND Error	BOOL		O			
DONE	DONE	BOOL		O			
STAT	Kind of Error	WORD		O	U		
ERROR_COM	PLC RECEIVE Error	BOOL		O			
RECV_COM	Command received	BOOL		O			
STAT_COM	Kind of Error	WORD		O	U		
COMMAND_RECV	Group command	WORD		O			
NO_I_SD	Number of status entries (send buffer)	INT	0	O	U		
PLC_NO	PLC number from system chart	INT	0	O	U		
NO_OF_I	Number of status entries	INT	0	O	U		
FT1	Cell in Status Buffer	STRUCT		O	U		
FT1.D1	Instance DB object	INT	0	O	U		
FT1.D2	Instance DB master object	INT	0	O	U		
FT1.D3	Object type	INT	0	O	U		
FT1.D4	Status word object	WORD	16#00	O	U		
FT2	Cell in Status Buffer	STRUCT		O	U		
FT2.D1	Instance DB object	INT	0	O	U		
FT2.D2	Instance DB master object	INT	0	O	U		
FT2.D3	Object type	INT	0	O	U		

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
FT2.D4	Status word object	WORD	16#00	O	U		
FT3	Cell in Status Buffer	STRUCT		O	U		
FT3.D1	Instance DB object	INT	0	O	U		
FT3.D2	Instance DB master object	INT	0	O	U		
FT3.D3	Object type	INT	0	O	U		
FT3.D4	Status word object	WORD	16#00	O	U		
.....	.....	.....	.....	.....	.....	.....	.....
FT50	Cell in Status Buffer	STRUCT		O	U		
FT50.D1	Instance DB object	INT	0	O	U		
FT50.D2	Instance DB master object	INT	0	O	U		
FT50.D3	Object type	INT	0	O	U		
FT50.D4	Status word object	WORD	16#00	O	U		
O_LINKQ	Link to slave objects	STRUCT		O			
O_LINKQ. iDB	Instance DB master object	INT	0	O	U		
O_LINKQ iDW	DW number NO_OF_FT in master object	INT	0	O	U		
O_LINKQ. Command	Group/ route command	WORD	16#00	O	U		
O_LINKQ. Status	Status master object	WORD	16#00	O	U		
ErrorNum	Error Number	INT	-1	O			

Description of C_RECV_G

Type/Number

Module name: **C_RECV_G**
Module no.: **FB1056**

Calling OBs

All Cemat Functions must be installed in the same OB, which is preferable OB1. The System Chart SYSPLCxx contains infrastructure blocks which must be called at the Beginning (Runtime group OB1_START) and at the End (Runtime group OB1_END) of this OB.
The application program must be called between OB1_START and OB1_END.

Calling of the Cemat blocks in a cyclic interrupt OB (OB34 or OB35) is possible, but only if the complete program is called in the same cyclic interrupt OB. In this case the infrastructure blocks must as well be moved to the cyclic interrupt OB (see Engineering Manual 14_Tips_Tricks_009.doc)

Function

The module C_SEND_G and the module C_RECV_G connect objects from another AS to the group module.

Operating principle

Input interfaces

Watchdog **Receive watchdog time in sec** **Default: 5**

Format INTEGER

Watchdog time for receiving the object data.

CycleCom **Send cycle (group command) in sec** **Default: 2**

Format INTEGER

Send cycle in seconds to transfer the group command.

ID **ID connection** **Default: 0**

Format WORD

Local ID S7 connection.

TEL_ID **R_ID of BRCV (object data)** **Default: 0**

Format DWORD

Refer to the parameter R_ID of the SFB 13 (BRCV) The R_ID parameter must be identical at the SFB/FB on the send end and at the SFB on the receive end. This allows the communication of several SFB/FB pairs via the same logic connection. The block pairs of a logic connection which are specified in R_ID must be unique for this connection. This means the TEL_ID for the function block pair C_SEND_G and C_RECV_G must be the same!

TEL_ID_C **R_ID of BSEND (group command)** **Default: 1**

Format DWORD

Refer to the parameter R_ID of the SFB 12 (BSEND) The R_ID parameter must be identical at the SFB/FB on the send end and at the SFB on the receive end. This allows the communication of several SFB/FB pairs via the same logic connection. The block pairs of a logic connection which are specified in R_ID must be unique for this connection. This means the TEL_ID_C for the function block pair C_SEND_G and C_RECV_G must be the same!

G_LINK **Link to the group command**

Format STRUCT

The *G_LINK* interface of the group must be connected with the *G_LINK* interface of the C_RECV_G.

Structure variables:

G_LINK.Link **Link** **Default: 0**

Format INTEGER

G_LINK.Command **Group Command** **Default: 16#00**

Format WORD

Output interfaces

ERROR PLC RECEIVE Error

Format BOOL

The receive communication (object data) is not working. The reason could be an engineering fault or a communication fault.

RECEIVED Data received

Format BOOL

The receive job (object data) has successfully received data.

STAT Kind of Error

Format WORD

If there is a communication problem, please check the error code in STAT. Please check the help of SFB 13 (BRCV) parameter STATUS for details.

ERROR_COM PLC SEND Error

Format BOOL

The send communication (group command) is not working. The reason could be an engineering fault or a communication fault.

DONE_COM Group command sent

Format BOOL

The send job (group command) was done successfully.

STAT_COM Kind of Error

Format WORD

If there is a communication problem, please check the error code in STAT_COM. Please check the help of SFB 12 (BSEND) parameter STATUS for details.

NO_I_SD Number of status entries (send buffer)

Format INT

Internal use

PLC_NO PLC number from system chart (object AS)

Format INT

Internal use

NO_OF_I **Number of status entries**

Format INT

Internal use

FT1 **Cell in status buffer**

Format STRUCT

Internal use

Structure variables:

FT1.D1 **Instance DB Object**

Format INT

FT1.D2 **Instance DB Master Object**

Format INT

FT1.D3 **Object Type**

Format INT

1= C_DRV_1D, 2 = C_DAMPER, 3 = C_DRV_2D, 4 = C_ANNUNC, 5 = C_ANNUN8, 6 = C_MEASUR, 7 = C_VALVE, 8 = C_PROFB

FT1.D4 **Status word object**

Format WORD

FT2 **Cell in status buffer**

FT3 **Cell in status buffer**

.

.

.

FT50 **Cell in status buffer**

Engineering Errors

ErrorNum **Error Number** **Default: -1**

Format INTEGER

In case of invalid parameter settings the functionality of the block cannot be guaranteed any more. If the error number is different than 0 you have to check the application program and correct it:

Error number	Fault description
22	Send cycle (Group command) too short (parameter *CycleCom* less than 1s)
23	Receive Watchdog time too short (Parameter *WatchCom* less than 1s)
24	S7 interconnection ID is not between 0x1 to 0xFFF
25	The block is not connected to *G_LINK*

Caution: Only one error number can be indicated at a time!

I/O-bar of C_RECV_G

C_RECV_G

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
Watchdog	Receive watchdog time in sec	INT	5	I			> 0
CycleCom	Send cycle (group command) in sec	INT	2	I			> 0
ID	ID connection	WORD	16#00	I			0 to FFF
TEL_ID	R_ID of BRCV (object data)	DWORD	16#00	I			
TEL_ID_C	R_ID of BSEND (group command)	DWORD	16#01	I			
G_LINK	Link to the group command	STRUCT		I			
G_LINK. Link	Link	INT	0	I	U		
G_LINK. Command	Group command	WORD	16#00	I	U		
ERROR	PLC RECEIVE Error	BOOL		O			
RECEIVED	Data received	BOOL		O			
STAT	Kind of Error	WORD		O	U		
ERROR_COM	PLC SEND Error	BOOL		O			
DONE_COM	Group command sent	BOOL		O			
STAT_COM	Kind of Error	WORD		O	U		
NO_I_SD	Number of status entries (send buffer)	INT	0	O	U		
PLC_NO	PLC number from system chart (object AS)	INT	0	O	U		
NO_OF_I	Number of status entries	INT	0	O	U		
FT1	Cell in Status Buffer	STRUCT		O	U		
FT1.D1	Instance DB object	INT	0	O	U		
FT1.D2	Instance DB master object	INT	0	O	U		
FT1.D3	Object type	INT	0	O	U		
FT1.D4	Status word object	WORD	16#00	O	U		
FT2	Cell in Status Buffer	STRUCT		O	U		
FT2.D1	Instance DB object	INT	0	O	U		

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
FT2.D2	Instance DB master object	INT	0	O	U		
FT2.D3	Object type	INT	0	O	U		
FT2.D4	Status word object	WORD	16#00	O	U		
FT3	Cell in Status Buffer	STRUCT		O	U		
FT3.D1	Instance DB object	INT	0	O	U		
FT3.D2	Instance DB master object	INT	0	O	U		
FT3.D3	Object type	INT	0	O	U		
FT3.D4	Status word object	WORD	16#00	O	U		
.....	.....	.....	.....	.....	.....	.....	.....
FT50	Cell in Status Buffer	STRUCT		O	U		
FT50.D1	Instance DB object	INT	0	O	U		
FT50.D2	Instance DB master object	INT	0	O	U		
FT50.D3	Object type	INT	0	O	U		
FT50.D4	Status word object	WORD	16#00	O	U		
ErrorNum	Error Number	INT	-1	O			

SIEMENS

Cemat V 8.2
Function Block Library ILS_CEM

Function Description **Edition 07/16**

Route C_ROUTE

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring to property damage only have no safety alert symbol. The notices shown below are graded according to the degree of danger.

Danger
indicates that death or severe personal injury **will** result if proper precautions are not taken.

Warning
indicates that death or severe personal injury **may** result if proper precautions are not taken.

Caution
with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution
without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention
indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel.** Within the context of the safety notices in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

Warning
This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.
Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens AG 2005
Technical data subject to change.

Description of C_ROUTE

Type/Number

Module name: C_ROUTE
Module no.: FB1009

Calling OBs

C_ROUTE must be called in OB1 (MAIN_TASK).

Function

General Function description

Module Type C_ROUTE is a module for the selection of transport directions within a group.

The route module allows the visualization of the operational conditions for a transport direction within group, displayed as a status display, and a detailed fault diagnosis (status call).

Using routes the start/stop command from the group is not directly given to the drives, it is connected to the routes and the selected route forwards the signal to the drive.

The feedback signal of the drives is also connected to the routes and the selected route transmits the feedback signal to the group.

Linking the drives and annunciation blocks to the route instead of the group also allows filtering for diagnosis functions:

- The summarizing fault and warning indications in the group block icon only considers the drives and annunciations which belong to "selected" routes. The operator is not disturbed by plant objects which are not "in use".
- The status call of the group only shows the faults for selected plant objects.
- The group instance list shows the routes and in the second level the drives and annunciations within each route.

All diagnosis functions such as summarizing fault and warning indications, status call function and instance list are also available for the route itself. This means that diagnosis is possible also if the route is not yet selected:

- With a **route status call** function (Button 'Status'), all the present faults and interlocks of the affiliated drives, measured values and process signals in this route can be queried at anytime.
- The **route instance list** (Button 'Objects') shows all objects (drives, annunciations, measures), belonging to the route. All objects are shown with "Actual status", "Tagname" and "Comment". In case of an active "Simulation" the object is highlighted with red color.

The route selection must be carried out before the group start.

The route can be selected and deselected via the Operator faceplate or through the program, e. g. by a process signal.

The route module generates operating messages for selection and de-selection.

Interlocks can be used in order to enable or disable the route selection or operation dependent on a process condition or a process signal:

- Start interlock **WEVG or IntStart**	effective only before the route selection
- Operating interlock **WBVG or IntOper**	always effective
- The manual Interlock **WHVR or IntManu**	enables the selection/ de-selection buttons

Visualization

In the **block icon** of the group the most important operation status are displayed:

Locked :	Selection changeover released or locked (manual interlocking).
Operation mode:	Operational condition of the route (deselected, pre-selected, etc.)
Fault:	Fault in an object that is assigned to the route
Warning:	Warning in an object that is assigned to the route
Interlocking:	Interlock of the route

Operation functions and detail information are only available after opening the **faceplate**.

Operating principle

Hardware inputs

WVT **Pre-selection ON/OFF Pushbutton** **Basic state 0-signal**

Format BOOL

If the route is to be selected/deselected using a conventional control desk key, the WVT parameter must be connected with the input signal of the pushbutton. A 1-signal at WVT parameter results in selection when the route has been deselected and in de-selection when the route has been pre-selected. Two-handed operation is needed to pre-select/deselect the route using control desk pushbuttons. WVT and the FGS release pushbutton must be pressed simultaneously.

Caution: The control desk pushbutton can be used only when the GPTS interface (control desk pushbutton release) is connected with a 1-signal and in the system chard "SYSPLCxx" the parameter "FGS" of the block C_PUSHBT is connected with a signal (release button).

Input interfaces

WEVG **Start interlock** **Basic state 1-signal**

Format BOOL

A 0-signal at interface WEVG prevents the setting of route selection WVW. Via interface WEVG one can interlock mutually several routes.

The start interlock is visualized in the status display of the routes. If one wants to see the reason for the interlock in the status call of the route, one must program an annunciation module and assign it to the route (see engineering manual: interlock annunciations).

IntStart **Start Interlock**

Format STRUCT

For function description, see WEVG. This interface can be connected with a structure output as e. g. signal **Select** of another route or output **Out** of an interlock bock, e. g. **Intlk02**

Structure variables:

IntStart.Value **Signal** **Basic state 1-signal**

Format BOOL

IntStart.ST **Signal status** **Default: 16#FF**

Format BYTE

WBVG **Operating interlock** **Basic state 1-signal**

Format BOOL

A 0-signal at interface WBVG prevents the setting of route selection WVW. An already operating route is switched off if the operating interlock is missing.
The operating interlock is visualized in the status display of the routes. If one wants to see the reason for the interlock in the status call of the route, one must program an annunciation module and assign it to the route (see engineering manual: interlock annunciations).

IntOper **Operation Interlock**

Format STRUCT

For function description, see WBVG. This interface can be connected with a structure output as e. g. signal **Select** of another route or output **Out** of an interlock bock, e. g. **Intlk02.**

Structure variables:

IntOper.Value **Signal** **Basic state 1-signal**

Format BOOL

IntOper.ST **Signal status** **Default: 16#FF**

Format BYTE

WHVR **Manual interlock** **Basic state 1-signal**

Format BOOL

A 0-signal at interface WHVR locks the route changeover via pushbutton or through the OS. E.g., with this one can prevent a route from being deselected while a group is running or prevent a route changeover from being possible during start-up and slow-down.

IntManu **Manual interlock**

Format STRUCT

For function description, see WHVR. This interface can be connected with a structure output as e. g. signal **Select** of another route or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntManu.Value **Signal** **Basic state 1-signal**

Format BOOL

IntManu.ST **Signal status** **Default: 16#FF**

Format BYTE

WPTS **Release of control desk pushbuttons** **Basic state 0-signal**

Format BOOL

In the basic state, the route changeover is released via the OS. The control desk pushbuttons are locked. By connecting this interface with a 1-signal the control desk pushbuttons are released and operation via OS is blocked.

WUUS **Release “Pre-selection OFF” WVWL** **Basic state 1-signal**

Format BOOL

The delete pre-selection function (interface WVWL) and the setting of the changeover flag WUM is possible only if interface WUUS is connected with a 1-signal.

For details of the application of the interface for an uninterrupted route changeover refer to the engineering manual.

WSAZ **Supplementary fault (dynamic)** **Basic state 0-signal**

Format BOOL

A possibility for connecting with dynamic faults which cannot automatically be acquired via drives and annunciation modules. With a 1-signal at interface WSAZ and selected route the group indicates dynamic faults.

Caution: If the interface is to behave exactly like a drive fault one must ensure that the interface becomes 0 after the acknowledgement.

WSTZ **Supplementary fault (static)** **Basic state 0-signal**

Format BOOL

A possibility for connecting with static faults which cannot automatically be acquired drives and annunciation modules. With a 1-signal at interface WSTZ of the selected route the group indicates static faults.

WREZ **Feedback ON** **Basic state 1-signal**

Format BOOL

The WREZ interface must have status 1-signal if all drives of the route are running. It can be, for example, the last drive of a conveyor system or also a series of drives which are triggered in parallel.

The connection is made through the logic signal of the drives (EVS) or the limit positions of the dampers and valves (KVS1/2, VVS1/2).

Caution: Please observe the connection examples in the engineering manual because one must also interlock the starting condition for sporadically operating drives!

WRAZ **Feedback OFF** **Basic state 1-signal**

Format BOOL

The WRAZ interface must have status 1-signal if all drives of the route are stopped. It can be, for example, the first drive of a conveyor system or also a series of drives which are triggered in parallel.

The connection is made through the negated logic signal of the drives (EVS) or the limit positions of the dampers and valves (KVS1/2, VVS1/2).

WVWT **Pre-selection ON/OFF** **Basic state 0-signal**

Format BOOL

Interface WVWT is synonymous with module parameter WVT. Signal change from 0 to 1 at WVWT or WVT effects a route changeover, i.e. the pre-selected route is deselected and the deselected route is pre-selected.
Attention: The parameter is effective only when in the system chard "SYSPLCxx" the parameter "FGS" of the block C_PUSHBT is connected with a signal (release button)

WVWE **Pre-selection ON** **Basic state 0-signal**

Format BOOL

Via a 1-signal at interface WVWE one can pre-select a route through the program (e.g. through a process signal). This function is required for automatic route changeovers.

WVWA **Selection OFF** **Basic state 0-signal**

Format BOOL

WVWA has a similar effect as signal GASL of the group. (With a 1-signal at the interface WVWA, an OFF feedback is simulated to the route.) For this the route must already be deselected and switched off. (WVE and WDE must have a 0-signal).

Application with uninterrupted route changeover:

Route selection WVW is normally cancelled only if the complete route is stationary. Since for an uninterrupted changeover there are always some drives continuing to operate, this is actually never the case. The cancelling of the route selection must be done “artificially“ with WVWA. (See also uninterrupted route changeover in the engineering manual!)

WVWL **Pre-selection OFF** **Basic state 0-signal**

Format BOOL

A 1-Signal at interface WVWL deletes the route pre-selection (WVE). With a running route, signal WBA is set for switching off the drives. By means of interface WVWL the route can be deselected via program (e.g. through pre-selection of another route or through a process signal).
For this function the parameter WUUS must have 1-signal.

WLPZ **Lamp test (additional)** **Basic state 0-signal**

Format BOOL

If one has several control desks with lamps and wants to test the lamps for each control desk separately, one can connect the corresponding lamp test signal to this interface.

Caution: Using WLPZ the lamp test interface at the C_PUSHBT module must **not** be connected.

WEBW **Command ON** **Basic state 0-signal**

Format BOOL

Interface WEBW must be connected with the GBE-signal of the associated group. During the start of the group (1-signal at interface WEBW) the selected route sets the ON command WBE to start the drives.

WGWA **Command OFF** **Basic state 0-signal**

Format BOOL

Interface WGWA must be connected with the GDA-signal or the negated GDE-signal of the associated group. During the stop of the group (1-signal at interface WGWA) the selected route sets the OFF command WBA to stop the drives.

DSIG_BQ **Driver Signal(s) Bad Quality** **Basic state 0-signal**

Format BOOL

This Interface can be used for the visualization of bad quality status for the I/O Card. This is only possible if driver blocks are used.

For the visualization of the module status the outputs QBAD of the driver blocks must be connected with an OR Function to Interface DSIG_BQ. The status Bad Quality is then shown in the Faceplate of the route.

REL_A_SL **Release select/deselect operating message** **Basic state 1-signal**

Format BOOL

A 1-signal at the REL_A_SL interface causes an operating message to be issued as soon as the route gets selected or deselected.

REL_A_OP **Release running/stopped operating message** **Basic state 0-signal**

Format BOOL

A 1-signal at the REL_A_OP interface causes an operating message to be issued as soon as the route runs completely or stops completely.

UserFace **Select Faceplate**

Format ANY

Input UserFace can be connected to any block with an OS Interface (Faceplate). If a block is connected, an additional button "U" (User) appears in the faceplate of the route block. With this button the Faceplate of the connected block can be opened.

Example:
In order to show the related Signals for the route, input UserFace can be connected to block C_REL_MOD (for a list of up to 16 objects) or, if fewer signals are used, in can be directly connected to a C_INTERL, C_INTER5 or Intlk02.

Additional inputs for testing and as Interface to the OS:

TEST_OSS **Test interface** **Default: 0**

Format INTEGER

The test interfaces are only used during module development and must not be changed!

MSG8_EVID **Message ID** **Default: 16#00**

Format DWORD

Interface to OS

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

Group and Object links

Group/Route links

Each drive block, annunciation block or measurement block must be linked to a group or route in order to collect the status of these objects for summarizing indications.

The group link is essential for control and diagnosis and comprises the following functions:

- All objects, linked to the group (or route) are listed in the group (or route) object list.
- All objects, linked to the group (or route) are highlighted in the process picture with button "Show related objects".
- The faults of all objects, linked to the group (or route) are included in the summarizing fault indication of the group (or route).
- The warnings of all objects, linked to the group (or route) are included in the summarizing warning indication of the group (or route).
- In case of a dynamic fault during the startup of the group, the group start will be interrupted.

A drive can be linked to two groups or routes via *GR_LINK1* and *GR_LINK2*. If a drive belongs to more than two groups or routes the additional block C_MUX must be inserted, which provides 5 additional link interfaces.

Caution: The main group (or main route) should be connected to *GR_LINK1*! This is the one which is opened with a click on button "Main group" in the drive faceplate.

G_LINK **Link to the group**

Format STRUCT

The G_LINK interface of the group must be connected with the G_LINK interface of the route.

Structure variables:

G_LINK.Link	**Link**	**Default: 0**
Format INTEGER		
G_LINK.Command	**Group / Route Command**	**Default: 16#00**
Format WORD		

R_LINK **Link to the objects**

Format STRUCT

The R_LINK interface of the route must be connected with the GR_LINK interface of the drives, annunciation modules and measured values.

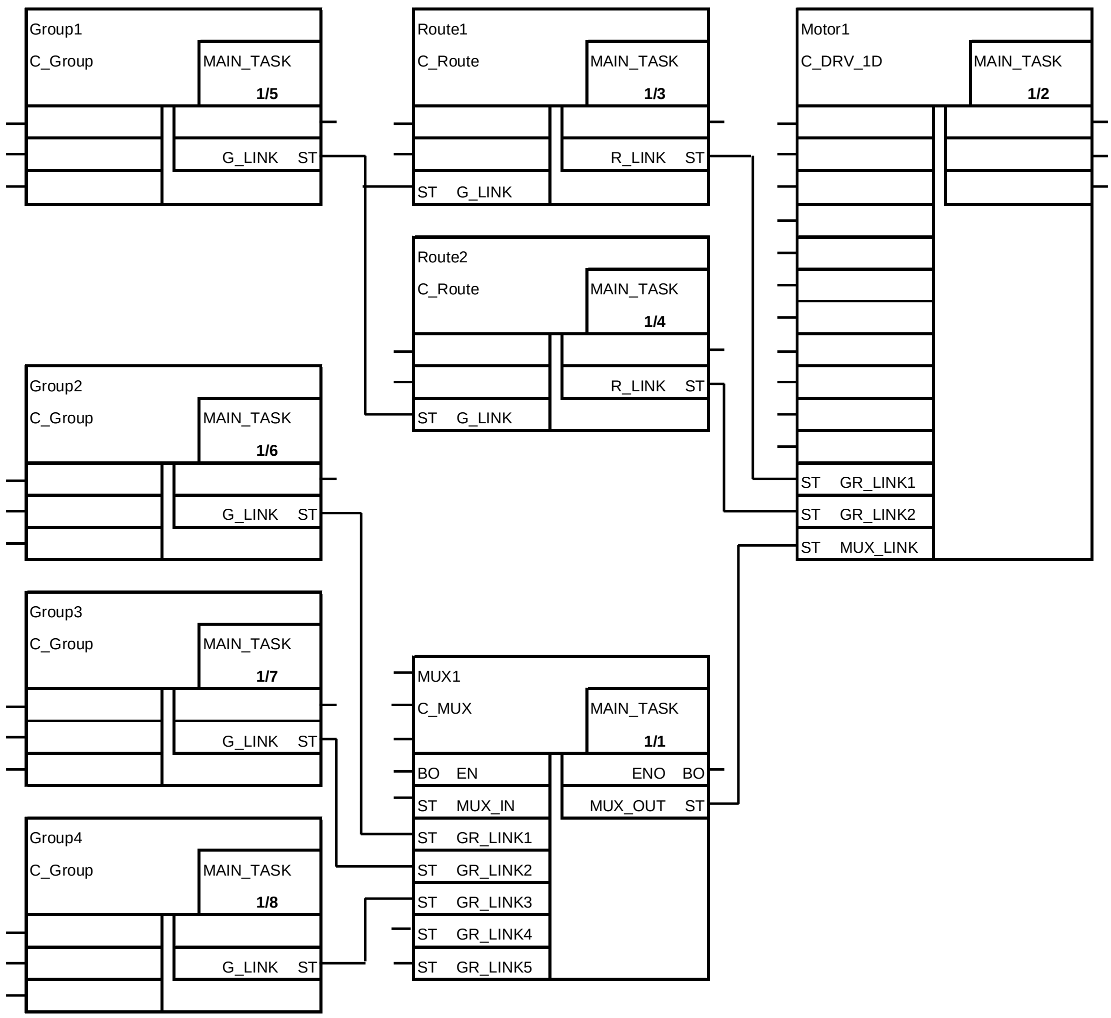
Structure variables:

R_LINK.Link	**Link**	**Default: 0**
Format INTEGER		
R_LINK.Command	**Group / Route Command**	**Default: 16#00**
Format WORD		

If objects belong to more than 2 routes or groups, the C_MUX module must be called before the associated object (drive, annunciation module, measured value). C_MUX has five inputs (GR_LINK1 to GR_LINK5) for connection with the groups/routes and one output (MUX_OUT) for the connection with the MUX_LINK interface of the drive.

This facility permits the objects to be assigned to a maximum of 7 groups/routes. If this also does not suffice, further C_MUX modules must be switched in sequence.

Example of a circuit:



Caution: Observe the processing sequence! The C_MUX module must be called before the drive. For the other modules the run sequence is as follows: first the drives, then the associated routes and finally the associated groups.

Caution: Some people use one C_MUX block and connect its output to a number of drives/devices, annunciations and measurements.
If you do so, make sure that the C_MUX is called before all the other objects and that no other C_MUX call comes in between.
We don't recommend using the same C_MUX if the blocks are located in different runtime groups.

Process values

The process values can be set during engineering and they can be changed online from the OS. To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

MARK_TIM **Highlight time** **Default: 5**

Format INTEGER (0 - 999)

Value in seconds.
With Faceplate button "R" (Related objects in picture), all objects linked to the route are highlighted for the duration of time MARK_TIM.

Output interfaces

WBE **Command ON**

Format BOOL

With a 1-signal at interface WEBW the route generates signal WBE.
For this, the route must be selected (WVW and WVE be set) and operating interlock WBVG must have a 1-signal.
Signal WBE is mainly used for starting the drives.

WBA **Command OFF**

Format BOOL

WBA is the signal of the route to stop the drives. WBA depends on pre-selection memory WVW and has status 1

- if the <u>selected</u> route is switched off (group stop or route changeover),
- during de-selection of the route,
- if the operating interlock is not present anymore.

WDE **Continuous command ON**

Format BOOL

Signal WDE is set together with signal WBE and has status 1 until the route is switched off.
Most common application: Switch-off of the drives through negated signal WDE instead of WBA.

WRE **Feedback ON**

Format BOOL

Signal WRE has status 1 if the route runs completely i.e. if interface WREZ of the route is connected with 1-signal.
The WRE-signal is applied to connect to the group feedback ON.

WRA **Feedback OFF**

Format BOOL

Signal WRA has status **0** if the route is completely at stop or if the route is not selected (WVW has 0-signal).
The <u>negated</u> WRA-signal is applied to connect to the group feedback OFF.

WVE **Route pre-selected**

Format BOOL

Signal WVE has status 1 if the route is pre-selected. The following have an effect on signal WVE:
- the route pre-selection key (WVT)
- a programmed route changeover via interfaces (WVWE, WVWL, WVWT)
- the commands from the OS (Pre-selection ON, Pre-selection OFF, Changeover).

PreSel **Route pre-selected**

Format STRUCT

For function description, see WVE. This interface can be connected to a structure input, e. g. as an interlocking condition for another route.

Structure variables:

PreSel.Value **Signal**

Format BOOL

PreSel.ST **Signal status**

Format BYTE

WVW **Route selected**

Format BOOL

Signal WVW stores pre-selection WVE depending on the operational condition of the route. With a switched off route and when all interlocks are OK, signal WVW corresponds to signal WVE, that means, both have exactly the same status.

Set condition: The route sets signal WVW if, together with the 1-signal of WVE, the operating interlock and the start interlock (WBVG and WEVG) also have 1-signal.

Reset condition: To reset WVW one must deselect the route (WVE and WDE must have a 0-signal) and the route must be completely switched off (connecting interface WRAZ or WVWA with 1-signal).

WVW and WVE can both be used for interlocking purposes. WVE expresses the pre-selection of the route (route pre-selected) and WVW the status of the route selection (route selected).

Select **Route selected**

Format STRUCT

For function description, see WVW. This interface can be connected to a structure input, e. g. as an interlocking condition for another route or a start/run condition for the group or drive.

Structure variables:

Select.Value **Signal**

Format BOOL

Select.ST **Signal status**

Format BYTE

WUM **Route changeover flag**

Format BOOL

Signal WUM is present for the duration of the route changeover.

Set condition: Signal WUM is set with the route pre-selection (interface WVWE or WVWT, OS command or route pre-selection key WVT).

Reset condition is the route feedback ON (WREZ) or the de-selection of the route (negated WVE signal).

The route module sets the changeover flag only if one connects interface WUUS (uninterrupted changeover) with a 1-signal.

You will find an example of the application of signal WUM in the uninterrupted route changeover in the engineering manual).

WST **Fault**

Format BOOL

Signal WST has status 1 if the route has a dynamic or static fault.

GSD **Fault dynamic**

Format BOOL

If there is a dynamic fault (alarm) GSD has 1-signal. After quit the GSD becomes 0-signal.

SIM_ON **Simulation ON**

Format BOOL

In Sequence Test mode SIM_ON has 1-Signal. If module drivers are used the output SIM_ON of the motor can be connected to SIM_ON of the driver block.

Additional outputs for testing and as Interface to the OS:

INTFC_OS **Interface status for OS**

Format DWORD

Interface to OS

For more information see Variable details.

STATUS **Status word for OS**

Format WORD

Interface to OS

For more information see Variable details.

STATUS2 **Status word for OS**

Format DWORD

Interface to OS

For more information see Variable details.

ALARM **for Test**

Format WORD

For more information see Variable details.

NO_OF_FT **Number in status call buffer for OS**

Format INTEGER

Interface to OS

FT1 **Cell in status call buffer for OS**

FT2 **Cell in status call buffer for OS**

.

.

FT30 **Cell in status call buffer for OS**

Format INTEGER

Interface to OS

Hardware outputs

WVL **Route pre-selection lamp**

Format BOOL

The WVL signal can be applied to connect a control desk lamp (when no visualization system is present). A continuous light indicates the pre-selection of the route. A flashing light indicates an interlock or a fault. A 0-signal indicates that the route has been deselected.

Time characteristics

The module must be called after the associated objects and before the associated group.

Message characteristics

The module uses the ALARM_8 module to generate annunciations.

A plausibility and priority logic at the process level analyses all object faults
only one fault annunciation is issued for each fault
secondary annunciations are suppressed automatically
the fault source is recorded in detail and uniquely.

The current operational state of the plant objects is automatically taken into consideration during the fault analysis, e.g. all fault annunciations are suppressed automatically for a stationary group
no superfluous fault annunciations are created
the operator does not need to manually disable/suppress any annunciations.

Each fault annunciation is also classified.
This shows whether an **electrical** or a **mechanical** fault, a **process fault** or a shut-down with a **local safety switch** applies.
An electrician does not always need to be called first
The production operator can give specific instructions.

Alarm archive and alarm logs show only "true" annunciations.
An annunciation release for each object means that the communication and OS are not overloaded with an "annunciation storm" **-** e.g. overloaded after a power failure.

Refer to the Variable details for the assignment of the annunciation text and annunciation class to the module parameters.

Module states

Status display of the route:

1st column:	**L** (blue)	= locked
2nd column:	**D** (white)	= deselected
	P (green)	= pre-selected
	S (green)	= selected
	O (green)	= operation (all drives are running, dampers in limit position)
3rd column:	**F** (red)	= fault
4th column:	**W** (yellow)	= warning
5th column:	**I** (yellow)	= interlock

Status indications:

Status/Text Display Locked	Display	Symbol
not locked		Gray, gray
locked	L	Black, blue

Status/Text Display Selection	Display	Symbol
deselected	D	Black, white
preselected	P	Black, green
selected	S	Black, green
selected *)	S	Black, white
running completely	O	Black, green

Status Display Fault	Display	Symbol
no fault		Gray, gray
in STOP + fault	F	White, red
not in STOP + fault not acknowledged	F	White, red blinking
not in STOP + fault acknowledged	F	White, red

Status Display Warning	Display	Symbol
no warning		Gray, gray
in STOP + warning	W	Black, yellow
not in STOP + warning not acknowledged	W	Black, yellow blinking
not in STOP + warning acknowledged	W	Black, yellow

Status/Text Display Interlocked	Display	Symbol
no interlock		Gray, gray
interlocked	I	Black, yellow

See also Variable details

*) The indication "selected" will be still displayed even after deselecting the route until all drives are stopped (WRAZ = 1-Signal). To distinguish this, the symbol will be shown with the colors black/white.

Commands

Refer to the Variable details for the assignment of the command word.

I/O-bar of C_ROUTE

C_ROUTE

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
WVT	Route pre-selection pushbutton	BOOL	0	I	U		
WEVG	Start interlock	BOOL	1	I			
IntStart	Start interlock	STRUCT		I			
IntStart.Value	Signal	BOOL	1	I	U	+	
IntStart.ST	Signal Status	BYTE	16#FF	I	U		
WBVG	Operating interlock	BOOL	1	I			
IntOper	Operating interlock	STRUCT		I			
IntOper.Value	Signal	BOOL	1	I	U	+	
IntOper.ST	Signal Status	BYTE	16#FF	I	U		
WHVR	Manual interlock	BOOL	1	I			
IntManu	Manual interlock	STRUCT		I			
IntManu. Value	Signal	BOOL	1	I	U	+	
IntManu.ST	Signal Status	BYTE	16#FF	I	U		
WPTS	Release of control desk pushbuttons	BOOL	0	I	U		
WUUS	Uninterrupted route changeover	BOOL	0	I			
WSAZ	Supplementary fault (dynamic)	BOOL	0	I			
WSTZ	Supplementary fault (static)	BOOL	0	I			
WREZ	Feedback ON	BOOL	1	I			
WRAZ	Feedback OFF	BOOL	1	I			
WVWT	Pre-selection ON/OFF	BOOL	0	I			
WVWE	Pre-selection ON	BOOL	0	I			
WVWA	Selection OFF	BOOL	0	I			
WVWL	Pre-selection OFF	BOOL	0	I			
WLPZ	Lamp test (additional)	BOOL	0	I	U		
WEBW	Command ON	BOOL	0	I			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
WGWA	Command OFF	BOOL	0	I			
DSIG_BQ	Driver-Signal(s) Bad Quality	BOOL	0	I			
REL_A_SL	Release operating message select/deselect	BOOL	1	I	U		
REL_A_OP	Release operating message running/stopped	BOOL	0	I	U		
UserFace	Select Faceplate	ANY		I	U		
MARK_TIM	Highlight time	INT	5	I	U		
TEST_OSS	Must not be changed	INT	0	I	U		
MSG8_EVID	Message ID	DWORD	16#00	I	U		
COMMAND	Command word	WORD	16#00	I	U	+	
G_LINK	Link to the group	STRUCT		I			
G_LINK.Link	Link	INT	0	I	U		
G_LINK. Command	Group/ route command	WORD	16#00	I	U		
INTFC_OS	Interface status for OS	DWORD	16#00	O	U	+	
STATUS	Status word for test	WORD	16#00	O	U	+	
STATUS2	Block output status for OS	DWORD	16#00	O	U	+	
ALARM	Alarm word for test	WORD	16#00	O	U		
NO_OF_FT	Number in status call buffer	INT	0	O	U	+	
FT1	Cell in status call buffer	INT	0	O	U	+	
FT2	Cell in status call buffer	INT	0	O	U	+	
FT3	Cell in status call buffer	INT	0	O	U	+	
FT4	Cell in status call buffer	INT	0	O	U	+	
FT5	Cell in status call buffer	INT	0	O	U	+	
FT6	Cell in status call buffer	INT	0	O	U	+	
FT7	Cell in status call buffer	INT	0	O	U	+	
FT8	Cell in status call buffer	INT	0	O	U	+	
FT9	Cell in status call buffer	INT	0	O	U	+	
FT10	Cell in status call buffer	INT	0	O	U	+	

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
FT11	Cell in status call buffer	INT	0	O	U	+	
FT12	Cell in status call buffer	INT	0	O	U	+	
FT13	Cell in status call buffer	INT	0	O	U	+	
FT14	Cell in status call buffer	INT	0	O	U	+	
FT15	Cell in status call buffer	INT	0	O	U	+	
FT16	Cell in status call buffer	INT	0	O	U	+	
FT17	Cell in status call buffer	INT	0	O	U	+	
FT18	Cell in status call buffer	INT	0	O	U	+	
FT19	Cell in status call buffer	INT	0	O	U	+	
FT20	Cell in status call buffer	INT	0	O	U	+	
FT21	Cell in status call buffer	INT	0	O	U	+	
FT22	Cell in status call buffer	INT	0	O	U	+	
FT23	Cell in status call buffer	INT	0	O	U	+	
FT24	Cell in status call buffer	INT	0	O	U	+	
FT25	Cell in status call buffer	INT	0	O	U	+	
FT26	Cell in status call buffer	INT	0	O	U	+	
FT27	Cell in status call buffer	INT	0	O	U	+	
FT28	Cell in status call buffer	INT	0	O	U	+	
FT29	Cell in status call buffer	INT	0	O	U	+	
FT30	Cell in status call buffer	INT	0	O	U	+	
WBE	Command ON	BOOL	0	O			
WBA	Command OFF	BOOL	0	O			
WDE	Continuous command ON	BOOL	0	O			
WRE	Feedback ON	BOOL	0	O			
WRA	Feedback OFF	BOOL	0	O			
WVE	Route pre-selected	BOOL	0	O			
PreSel	Route pre-selected	STRUCT		O			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
PreSel.Value	Signal	BOOL	0	O		+	
PreSel.ST	Signal status	BYTE	16#80	O		+	
WVW	Route selected	BOOL	0	O			
Select	Route selected	STRUCT		O			
Select.Value	Signal	BOOL	0	O		+	
Select.ST	Signal status	BYTE	16#80	O		+	
WUM	Route changeover flag	BOOL	0	O			
WST	Fault	BOOL	0	O			
WSD	Fault not acknowledged	BOOL	0	O			
SIM_ON	Simulation ON	BOOL	0	O			
WVL	Route pre-selection lamp	BOOL	0	O	U		
R_LINK	Link to the objects	STRUCT		O			
R_LINK.Link	Link	INT	0	O	U		
R_LINK. Command	Group/ route command	WORD	16#00	O	U		

OS-Variable table

C_ROUTE

OS Variable	Description	PLC Data Type	OS Data Type
IntStart#Value	Signal	BOOL	Binary variable
IntOper#Value	Signal	BOOL	Binary variable
IntManuff#Value	Signal	BOOL	Binary variable
COMMAND	Command word	WORD	Unsigned 16-bit value
INTFC_OS	Interface status for OS	DWORD	Unsigned 32-bit value
STATUS	Status word for test	WORD	Unsigned 16-bit value
STATUS2	Block output status for OS	DWORD	Unsigned 32-bit value
NO_OF_FT	Number in status call buffer	INT	Signed 16-bit value
FT1	Cell in status call buffer	INT	Signed 16-bit value
FT2	Cell in status call buffer	INT	Signed 16-bit value
FT3	Cell in status call buffer	INT	Signed 16-bit value
FT4	Cell in status call buffer	INT	Signed 16-bit value
FT5	Cell in status call buffer	INT	Signed 16-bit value
FT6	Cell in status call buffer	INT	Signed 16-bit value
FT7	Cell in status call buffer	INT	Signed 16-bit value
FT8	Cell in status call buffer	INT	Signed 16-bit value
FT9	Cell in status call buffer	INT	Signed 16-bit value
FT10	Cell in status call buffer	INT	Signed 16-bit value
FT11	Cell in status call buffer	INT	Signed 16-bit value
FT12	Cell in status call buffer	INT	Signed 16-bit value
FT13	Cell in status call buffer	INT	Signed 16-bit value
FT14	Cell in status call buffer	INT	Signed 16-bit value
FT15	Cell in status call buffer	INT	Signed 16-bit value
FT16	Cell in status call buffer	INT	Signed 16-bit value
FT17	Cell in status call buffer	INT	Signed 16-bit value

OS Variable	Description	PLC Data Type	OS Data Type
FT18	Cell in status call buffer	INT	Signed 16-bit value
FT19	Cell in status call buffer	INT	Signed 16-bit value
FT20	Cell in status call buffer	INT	Signed 16-bit value
FT21	Cell in status call buffer	INT	Signed 16-bit value
FT22	Cell in status call buffer	INT	Signed 16-bit value
FT23	Cell in status call buffer	INT	Signed 16-bit value
FT24	Cell in status call buffer	INT	Signed 16-bit value
FT25	Cell in status call buffer	INT	Signed 16-bit value
FT26	Cell in status call buffer	INT	Signed 16-bit value
FT27	Cell in status call buffer	INT	Signed 16-bit value
FT28	Cell in status call buffer	INT	Signed 16-bit value
FT29	Cell in status call buffer	INT	Signed 16-bit value
FT30	Cell in status call buffer	INT	Signed 16-bit value
PreSel#Value	Signal	BOOL	Binary variable
PreSel#ST	Signal status	BYTE	Unsigned 8-bit value
Select#Value	Signal	BOOL	Binary variable
Select#ST	Signal status	BYTE	Unsigned 8-bit value

Variable details

Internal structure of the Commands, Alarms, Visualization status and Interface word:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Commandword**	**Commandword**		
COM_B20	WEGZU	0	Wege-Zustandsaufruf	Route status call-up		
COM_B21	GRINZ	1	Aufruf Gruppenobjektliste	Gruppe object list call		
COM_B22		2				
COM_B23		3				
COM_B24		4				
COM_B25		5				
COM_B26	SHOW_OBJ	6	Zugehörige Objekte markieren	Show related objects		
COM_B27		7				
COM_B10		8				
COM_B11	SEL_OFF	9	Vorwahl AUS	Selection OFF	Op. Inp.	
COM_B12	SEL_ON	10	Vorwahl EIN	Selection ON	Op. Inp.	
COM_B13		11				
COM_B14		12				
COM_B15		13				
COM_B16		14				
COM_B17		15				
ALARM			**Alarm**	**Alarm**		
ALA_DSEL		0	Abwahl	Deselected	Op. Inp.	
ALA_SEL		1	Anwahl	Selected	Op. Inp.	
ALA_IOP		2	Läuft	In Operat.	Op. Inp.	
ALA_NIO		3	Steht	Not in Oper.	Op. Inp.	
ALA_B24		4				
ALA_B25		5				
ALA_B26		6				
ALA_B27		7				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
INTFC_OS			**Nahtstellenwort**	**Interface word**		
OS_IF_B40	WEVG	0	Einschaltverriegelung	Start interlock		
OS_IF_B41	WBVG	1	Betriebsverriegelung	Operating interlock		
OS_IF_B42	WHVR	2	Handverriegelung	Manual interlock		
OS_IF_B43		3				
OS_IF_B44		4				
OS_IF_B45		5				
OS_IF_B46		6				
OS_IF_B47	WPTS	7	Freigabe Pulttasten	Release of Pushbuttons		
OS_IF_B30	WUUS	8	Unterbrechungsfreie Umschaltung	Uninterrupted Route changeover		
OS_IF_B31		9				
OS_IF_B32		10				
OS_IF_B33		11				
OS_IF_B34		12				
OS_IF_B35	WSAZ	13	Störungszusatz (dynamisch)	Supplementary fault (dynamic)		
OS_IF_B36	WSTZ	14	Störungszusatz (statisch)	Supplementary fault (static)		
OS_IF_B37		15				
OS_IF_B20		16				
OS_IF_B21	WREZ	17	Rückmeldung Ein	Feedback ON		
OS_IF_B22	WRAZ	18	Rückmeldung Aus	Feedback OFF		
OS_IF_B23		19				
OS_IF_B24		20				
OS_IF_B25	WVWT	21	Vorwahl-Taste	Pre-selection key		
OS_IF_B26	WVWE	22	Vorwahl Ein	Pre-selection ON		
OS_IF_B27	WVWA	23	Vorwahl Aus	Pre-selection OFF		
OS_IF_B10	WVWL	24	Vorwahl löschen	De-selection		
OS_IF_B11	WLPZ	25	Lampen prüfen (Zusatz)	Lamp test (additional)		
OS_IF_B12		26				
OS_IF_B13	WEBW	27	Befehl Ein	Command ON		
OS_IF_B14	WGWA	28	Befehl Aus	Command OFF		
OS_IF_B15		29				
OS_IF_B16		30				
OS_IF_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B20	DESEL	0	Abgewählt	Deselected		
STA_B21	PRESEL	1	Vorgewählt	Pre-selected		
STA_B22	SEL	2	Gewählt	Selected		
STA_B23	IOP	3	läuft vollständig	Completely running		
STA_B24	INT	4	Verriegelt	Interlocked		
STA_B25	LOCK	5	Gesperrt	Locked		
STA_B26		6				
STA_B27	MARK	7	Objekt markieren (Gruppenkommando)	Highlight object (group command)		
STA_B10	STST	8	Störung quittiert	Fault acknowledged		
STA_B11	STDY	9	Störung nicht quittiert	Fault not acknowledged		
STA_B12	WAST	10	Warnung quittiert	Warning acknowledged		
STA_B13	WADY	11	Warnung nicht quittiert	Warning not acknowledged		
STA_B14		12				
STA_B15		13				
STA_B16		14				
STA_B17		15				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS2			**Status**	**Status**		
STA2_B40	WBE	0	Befehl Ein	Command On		
STA2_B41	WBA	1	Befehl Aus	Command Off		
STA2_B42	WDE	2	Dauerbefehl Ein	Continuous Command On		
STA2_B43	WRE	3	Rückmeldung Ein	Feedback On		
STA2_B44	WRA	4	Rückmeldung Aus	Feedback Off		
STA2_B45	WVE	5	Vorwahl Ein	Pre-selection ON		
STA2_B46	WVW	6	Weg gewählt	Route selected		
STA2_B47	WUM	7	Wegeumschaltmerker	Route changeover flag		
STA2_B30	WST	8	Störung	Fault		
STA2_B31	WSD	9	Störung dynamisch	Fault dynamic		
STA2_B32		10				
STA2_B33		11				
STA2_B34		12				
STA2_B35		13				
STA2_B36	SQT	14	Sequenz Test	Sequence Test		
STA2_B37	BQU	15	Bad Quality	Bad Quality		
STA2_B20	WVT	16	Wegvorwahltaste	Route pre-selection key		
STA2_B21	WVL	17	Wegvorwahllampe	Route pre-selection lamp		
STA2_B22	REL_A_SL	18	Freigabe Meldung (Start/Stop)	Release annunciation (Start/Stop)		
STA2_B23	REL_A_OP	19	Freigabe Meldung (läuft/Steht)	Release annunciation (run/stop)		
STA2_B24		20				
STA2_B25		21				
STA2_B26		22				
STA2_B27		23				
STA2_B10		24	IntStart angeschlossen	IntStart connected		
STA2_B11		25	IntOper angeschlossen	IntOper connected		
STA2_B12		26	IntManu angeschlossen	IniManu connected		
STA2_B13	LINK	27	GR_LINK1 angeschlossen	GR_LINK1 connected		
STA2_B14		28				
STA2_B15		29				
STA2_B16		30				
STA2_B17		31				

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Cemat V 8.2
Function Block Library ILS_CEM

Function Description **Edition 07/16**

Selection C_SELECT

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Technical data subject to change.

Description of C_SELECT

Type/Number

Module name: **C_SELECT**
Module no.: **FB1013**

Calling OBs

C_SELECT must be called in OB1 (MAIN_TASK).

Function

General Function description

Module Type C_SELECT can be used for any kind of selection function. In contrast to the route, it does not provide detailed fault analysis (status call). But, on the other hand, the selection is relatively simple to handle and can be easily used for the selection of individual drives.

Selection and de-selection can be done via the Operator Station or through the program. During selection signal AZE is set, which may be used, e.g. to interlock drives.

The status of the selection module (ON, OFF, interlocked) can be visualized.

The selection module generates operating messages for selection and de-selection.

In addition to the Operator commands **selection and de-selection** can be carried out by program using interfaces AEIN and AAUS.

Interlocks can be used in order to enable or disable the selection or de-selection dependent on a process condition or a process signal:

- Selection Interlock **AEVG** or **IntStart** can be used in order to inhibit selection
- De-selection Interlock **AAVG** or **IntSwOff** can be used in order to inhibit de-selection

Visualization

In the **block icon** of the Selection block the most important operation status are displayed:

Operation mode: Operational condition of the route (deselected, pre-selected, etc.)
Interlocking: Interlock of the route

Operation functions and detail information are only available after opening the **faceplate**.

Operating principle

Hardware inputs

The selection module does not have any parameters for hardware inputs.

Input interfaces

AEVG **Selection interlock** **Basic state 1-signal**

Format BOOL

A 0-signal at interface AEVG prevents the setting of the selection memory. The selection interlock is visualized in the status display.

IntStart **Selection Interlock**

Format STRUCT

For function description, see AEVG. This interface can be connected with a structure output as e. g. signal **Select** of another selection block or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntStart.Value **Signal** **Basic state 1-signal**

Format BOOL

IntStart.ST **Signal status** **Default: 16#FF**

Format BYTE

AAVG **De-selection interlock** **Basic state 1-signal**

Format BOOL

A 0-signal at interface AAVG prevents the resetting of the selection memory. The de-selection interlock is visualized in the status display.

IntSwOff **De-selection interlock**

Format STRUCT

For function description, see AAVG. This interface can be connected with a structure output as e. g. signal **Select** of another selection block or output **Out** of an interlock bock, e. g. **Intlk02**.

Structure variables:

IntSwOff r.Value **Signal** **Basic state 1-signal**

Format BOOL

IntSwOff.ST **Signal status** **Default: 16#FF**

Format BYTE

AEIN **Selection ON** **Basic state 0-signal**

Format BOOL

With a 1-signal at interface AEIN and a 1-signal at interface AEVG the “selection memory“ AZE is set by the program.

AAUS **Selection OFF** **Basic state 0-signal**

Format BOOL

With a 1-signal at interface AAUS and a 1-signal at interface AAVG the “selection memory“ AZE is reset by the program.

DSIG_BQ **Driver Signal(s) Bad Quality** **Basic state 0-signal**

Format BOOL

If driver blocks are used, the information "one ore more driver blocks have bad quality" can be displayed in the drive faceplate and in the block icon of the selection block.
In order to achieve this, the outputs QBAD of the driver blocks must be connected with an OR function to Interface DSIG_BQ.

This input is normally not used because the selection block has no hardware inputs.

REL_ANNU **Release operating message Select/deselect** **Basic state 1-signal**

Format BOOL

A 1-signal at the REL_ANNU interface causes an operating message to be issued as soon as a selection or de-selection is carried out.

UserFace **Select Faceplate**

Format ANY

Input UserFace can be connected to any block with an OS Interface (Faceplate). If a block is connected, an additional button "U" (User) appears in the faceplate of the selection block. With this button the Faceplate of the connected block can be opened.

Example:
In order to show the related Signals for the selection, input UserFace can be connected to block C_REL_MOD (for a list of up to 16 objects) or, if fewer signals are used, in can be directly connected to a C_INTERL, C_INTER5 or Intlk02.

Additional inputs for testing and as Interface to the OS:

TEST_OSS **Test interface** **Default: 0**

Format INTEGER

The test interfaces are only used during module development and must not be changed!

MSG8_EVID **Message ID** **Default: 16#C0**

Format DWORD

Interface to OS

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

Process values

The process values can be set during engineering and they can be changed online from the OS. To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

There are no process values for the selection module.

Output interfaces

Format BOOL

AZE **Selected**

Signal AZE has status 1 with selection ON, status 0 means selection OFF.
Selection memory AZE is used to evaluate selection, e.g. to select sporadically operating drives.

Select **Selected**

Format STRUCT

For function description, see AZE. This interface can be connected to a structure input, e. g. as an interlocking condition for another selection or a start/run condition for a group or drive.

Structure variables:

Select.Value **Signal**

Format BOOL

Select.ST **Signal status**

Format BYTE

NON_INTL **No active interlock**

Format BOOL

The Signal NON_INTL has Status “1” if AEVG or AAVG is “1”. The new output is used in OS styles.

Additional outputs for testing and as Interface to the OS:

STATUS **Status word for OS**

Format DWORD

Interface to OS

For more information see Variable details.

Hardware outputs

There are no hardware module outputs for the selection module.

Time characteristics

The run sequence can be chosen as desired for the selection module.

Message characteristics

The module uses the ALARM_8 module to generate annunciations.

A plausibility and priority logic at the process level analyses all object faults
only one fault annunciation is issued for each fault
secondary annunciations are suppressed automatically
the fault source is recorded in detail and uniquely.

The current operational state of the plant objects is automatically taken into consideration during the fault analysis, e.g. all fault annunciations are suppressed automatically for a stationary group
no superfluous fault annunciations are created
the operator does not need to manually disable/suppress any annunciations.

Each fault annunciation is also classified.
This shows whether an **electrical** or a **mechanical** fault, a **process fault** or a shut-down with a **local safety switch** applies.
An electrician does not always need to be called first
The production operator can give specific instructions.

Alarm archive and alarm logs show only "true" annunciations.
An annunciation release for each object means that the communication and OS are not overloaded with an "annunciation storm" - e.g. overloaded after a power failure.

Refer to the Variable details for the assignment of the annunciation text and annunciation class to the module parameters.

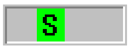
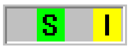
Module states

Status display of the selection module:

2nd column: **D** (white) = deselected
S (green) = selected

4th column: **I** (yellow) = interlocked

Variable STATUS:

Status / Text Display	Display	Text Presentation
deselected		Black, white
deselected + interlocked		Black, white
selected		Black, white
selected + interlocked		Black, white

See also Variable details

Commands

Refer to the Variable details for the assignment of the command word.

I/O-bar of C_SELECT

C_SELECT

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
AEVG	Selection Interlock	BOOL	1	I			
IntStart	Selection interlock	STRUCT		I			
IntStart.Value	Signal	BOOL	1	I	U	+	
IntStart.ST	Signal Status	BYTE	16#FF	I	U		
AAVG	De-selection interlock	BOOL	1	I			
IntSwOff	Se-selection interlock	STRUCT		I			
IntSwOff.Value	Signal	BOOL	1	I	U	+	
IntSwOff.ST	Signal Status	BYTE	16#FF	I	U		
AEIN	Selection	BOOL	0	I			
AAUS	De-selection	BOOL	0	I			
DSIG_BQ	Driver-Signal(s) Bad Quality	BOOL	0	I	U		
REL_ANNU	Release operational annunciations	BOOL	1	I	U		
UserFace	Select Faceplate	ANY		I	U		
TEST_OSS	Must not be changed	INT	0	I	U		
MSG8_EVID	Message ID	DWORD	16#C0	I	U		
COMMAND	Command word	WORD	16#00	I	U	+	
STATUS	Status word for test	DWORD	16#00	O	U	+	
ALARM	Alarm word for test	WORD	16#00	O	U		
AZE	Selected	BOOL	0	O			
Select	Selected	STRUCT		O			
Select.Value	Signal	BOOL	0	O		+	
Select.ST	Signal status	BYTE	16#80	O		+	
NON_INTL	No active interlock	BOOL	0	O		+	

OS-Variable table

C_SELECT

OS Variable	Description	PLC Data Type	OS Data Type
IntStart#Value	Signal	BOOL	Binary variable
IntSwOff#Value	Signal	BOOL	Binary variable
COMMAND	Command word	WORD	Unsigned 16-bit value
STATUS	Status word	DWORD	Unsigned 32-bit value
Select#Value	Signal	BOOL	Binary variable
Select#ST	Signal status	BYTE	Unsigned 8-bit value
NON_INTL	No active interlock	BOOL	Binary variable

Variable details

Internal structure of the Commands, Alarms and Visualization status:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Commandword**	**Commandword**		
COM_B20		0				
COM_B21		1				
COM_B22		2				
COM_B23		3				
COM_B24		4				
COM_B25		5				
COM_B26		6				
COM_B27		7				
COM_B10		8				
COM_B11	DESEL	9	Abwahl	Deselect	Op. Inp.	
COM_B12	SEL	10	Anwahl	Select	Op. Inp.	
COM_B13		11				
COM_B14		12				
COM_B15		13				
COM_B16		14				
COM_B17		15				
ALARM			**Alarm**	**Alarm**		
ALA_SEL		0	Anwahl	Selected	Op. Inp.	
ALA_DSEL		1	Abwahl	Deselected	Op. Inp.	
ALA_B22		2				
ALA_B23		3				
ALA_B24		4				
ALA_B25		5				
ALA_B26		6				
ALA_B27		7				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B40	SELECTED	0	Gewählt	Selected		
STA_B41	INT	1	Verriegelt	Interlocked		
STA_B42		2				
STA_B43		3				
STA_B44		4				
STA_B45		5				
STA_B46		6				
STA_B47		7				
STA_B30		8				
STA_B31		9				
STA_B32		10				
STA_B33		11				
STA_B34		12				
STA_B35		13				
STA_B36		14				
STA_B37		15				
STA_B20	AEVG	16	Einschaltverriegelung	Selection interlock		
STA_B21	AAVG	17	Ausschaltverriegelung	Deselection interlock		
STA_B22	AEIN	18	Anwahl	Select		
STA_B23	AAUS	19	Abwahl	Deselect		
STA_B24	REL_ANNU	20	Freigabe Meldung	Release Annunciation		
STA_B25	DSIG_BQ	21	Treiberbaustein(e) bad quality	Driver signal(s) bad quality		
STA_B26		22				
STA_B27		23				
STA_B10		24				
STA_B11		25				
STA_B12		26				
STA_B13		27				
STA_B14		28				
STA_B15		29				
STA_B16		30				
STA_B17		31				

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Cemat Minerals V 8.2
Function Block Library

Function Description Edition 07/16

Interlock with 8 inputs C_INTLK8

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Description of C_INTLK8

Type/Number

Module name: C_INTLK8
Module no.: FB1060

Calling OBs

All Cemat Functions must be installed in the same OB, which is preferable OB1. The System Chart SYSPLCxx contains infrastructure blocks which must be called at the Beginning (Runtime group OB1_START) and at the End (Runtime group OB1_END) of this OB.
The application program must be called between OB1_START and OB1_END.

Calling of the Cemat blocks in a cyclic interrupt OB (OB34 or OB35) is possible, but only if the complete program is called in the same cyclic interrupt OB. In this case the infrastructure blocks must as well be moved to the cyclic interrupt OB (see Engineering Manual 14_Tips_Tricks_009.doc)

Note: In order to get the correct indication at the interlock block the runtime sequence is very important and must be correct:
1. Interlocking Condition → 2. Interlock block → 3. Drive block

Function

General Function description

Block C_INTLK8 is used to calculate a standardized interlock that can be displayed on the OS. A maximum of 8 input signals can be supplied to the block. They are linked using selectable binary logic. The signal status of the output signal is also determined.

Each input can be bypassed. If a bypass is set the according input value will be ignored and the current state is displayed at the Out output parameter:

Out = 0: Interlock
Out = 1: "Good" state

Logic operators

Use the Logic input to specify the logic operator that the block should employ when determining the interlock state. Make the following settings:

Logic = 0: OR
Logic = 1: AND

Inversion of logic signals

You can invert the input signals by setting the input parameter *InvIn0x* for the input concerned to In0x = 1, e.g. for input *In01* set the I/O *InvIn01*.

The inversion is displayed in the faceplate. If you invert signals using any other method this is not shown in the faceplate.

Bypass Function

Note: Bypassing means that a bypassed interlock signal (In0x) is excluded from the logic of the interlock block, in other words, this signal is ignored in the logic operation.

There are two possibilities to bypass interlock inputs, a permanent bypass and a temporary bypass, which have to be activated with Feature bits 20 and 21 to be able to use them.

BitNr.	Function/Features	Default value
20	Temporary bypass	TRUE
21	Permanent bypass	TRUE

Operations via faceplate need additionally the according OS permission bits 20 and 21.

BitNr.	Function/OS Permission	Default value
20	1 = Operator can set/reset temporary bypass	TRUE
21	1 = Operator can set/reset permanent bypass	TRUE

Permanent bypass:

Permanent bypass means that the input is bypassed until a reset command is carried out. A permanent bypass can be set with a rising edge on *BypIn0x* or via faceplate and has to be reset with a rising edge on *RstBypIn0x* or via faceplate.

Temporary bypass:

A temporary bypass is meant to be used for unhealthy interlock signals which should get healthy whilst starting or running a drive within a short period of time (e.g. for maintenance purposes).
A number of inputs can be selected and will be activated via a common activation button. The bypass will timeout automatically after the configured time of *TmpBypTi* (in seconds), or after a reset via a common Reset button.

Permanent and the temporary bypass cannot be activated at the same time. The activation of the permanent bypass resets the temporary bypass of the corresponding input, as well as a rising edge on input *RstBypIn0x*.

Each input has to be individually configured that it can be bypassed permanently or temporarily by using Feature bits 0 to 7.

BitNr.	Function/Features	Default value
0	Bypass In01	TRUE
1	Bypass In02	TRUE
2	Bypass In03	TRUE
3	Bypass In04	TRUE
4	Bypass In05	TRUE
5	Bypass In06	TRUE
6	Bypass In07	TRUE
7	Bypass In08	TRUE

Operations via faceplate need additionally the according OS permission bits 0 and 7.

BitNr.	Function/OS Permission	Default value
0	1 = Operator can bypass In01	TRUE
1	1 = Operator can bypass In02	TRUE
2	1 = Operator can bypass In03	TRUE
3	1 = Operator can bypass In04	TRUE
4	1 = Operator can bypass In05	TRUE
5	1 = Operator can bypass In06	TRUE
6	1 = Operator can bypass In07	TRUE
7	1 = Operator can bypass In08	TRUE

Handling of not connected inputs

Inputs which are not interconnected are not evaluated. They are not displayed in the faceplate either.

Special situation: If no inputs are connected, the output value is set TRUE. The signal status depends on the configuration of feature bit 28. If feature bit 28 is FALSE the output status will be 16#FF. This status makes the interlock in the faceplate of the interlocked device invisible and disables the jump functionality as well. If feature bit 28 is TRUE the output status will be 16#60.

BitNr.	Function/Features	Default value
28	Set module outputs Out.ST and ST_Worst 16#60 if no input is connected (else = 16#FF)	FALSE

Opening additional faceplates

This block provides the function to open the faceplate of connected objects by clicking on the arrow buttons of the according inputs.

First-in detection for interlock blocks

This block provides the function to detect the first signal that sets the interlock output *Out* to FALSE and records date and time while the block parameter *FiInEn* is TRUE. *FiInEn* is typically interconnected to the contactor on command (*ContOn*) of the interlocked drive.
If an interlock detected first-in the output *FiInAct* will be additionally set TRUE to synchronize interlocks or further usage within the program logic.

If external conditions cause the device to be interlocked (e.g. another parallel interlock block instance) setting the input *FiInExt* = TRUE, then the interlock block writes a healthy status to the first-in output *LaStopRe* and records the date and time. *FiInExt* is typically connected to the output *FiInAct* of all other parallel interlock blocks to ensure all parallel interlock blocks have synchronized first-up histories and time stamps.

BitNr.	Function/Features	Default value
29	External first input is transferred to FiInOut	FALSE

All interlock inputs In0x will not be evaluated for the first-in as long as *FinInExt* is TRUE.

Caution: Make sure that the runtime sequence is correct:
Interlocking Condition → Interlock block → Drive block

Latched output after first-in:

The Feature bit 12 determines whether the interlock output *Out* is latched after a first-in or not.

BitNr.	Function/Features	Default value
12	Latched output	FALSE

Out will remain FALSE if a first-in interlock is recorded and Feature bit 12 is TRUE. A block reset (*RstOut* or operator reset via faceplate) will then be required to reset *Out*.
If Feature bit 12 = FALSE, the output *Out* will not require a reset to return to a healthy state when all interlock inputs are healthy (or bypassed).

Operations via faceplate need additionally the according OS permission bit 12.

BitNr.	Function/OS Permission	Default value
12	1 = Operator can reset latched output	FALSE

Forming the signal status for blocks

This block provides the standard function "Forming and outputting the signal status for interlock blocks".

The worst signal status *ST_Worst* for the block is formed from the following parameters:

In0x.ST

If Feature bit 22 is set TRUE, *ST_Worst* will be written to the module output *Out.ST*.

BitNr.	Function/Features	Default value
22	Write quality code ST_Worst to module output	TRUE

Process parameters

The following values can be configured online:

- TmpBypTi (s) Temporary bypass elapse time

Change of operation mode

The interlock block C_INTLK8 does not have any operation modes.

Sequence Test

C_INTLK8 is not affected by the sequence test mode.

Visualization

C_INTLK8 does not have any **block icon** and can only be opened from the faceplate of the object or interlock it is connected to. Refer to Variable Details. Control functions and detail information are only available after opening the **faceplate**.

For status information the following variables exist:

STATUS	General Running and Status Information
FeatureOut	Status display for Feature Word
OS_PermOut	Status display for OS_PermOut Word
OS_PermLog	Status display for OS_PermLog Word (includes add. AS connection code)

Opening additional faceplates

This block provides the function to open the faceplate of connected objects by clicking on the arrow buttons of the according inputs.

Operating principle

Input interfaces

In0x **Input Signal 0x**

Format STRUCT

Interface *In0x* is used for the signals which are relevant for the interlock logic.

Structure variables:

In0x.Value **Value** **Basic state 1-signal**

Format BOOL

In0x.ST **Signal status** **Default: 16#FF**

Format BYTE

Structure variable *In0x.Value* has the properties Text 0 and Text 1. Via these properties, texts can be configured which are displayed in the in the faceplate dependent on the input signal value.

Text 0 is displayed if the input signal value is FALSE
Text 1 is displayed if the input signal value is TRUE

InvIn0x **Invert input 0x** **Basic state 0-signal**

Format BOOL

InvIn0x is used to invert the corresponding input signal *In0x*.

BypIn0x **Set permanent bypass input 0x** **Basic state 0-signal**

Format BOOL

A rising edge on *BypIn0x* sets a permanent bypass for I*n0x*.

RstByp0x **Reset bypass input 0x** **Basic state 0-signal**

Format BOOL

A rising edge on *RstByp0x* resets any bypass for *In0x*.

Logic **1 = AND logic, 0 = OR logic** **Basic state 1-signal**

Format BOOL

This parameter defines the logic of the interlock block. The logic is also shown in the faceplate.

0 = OR logic
1 = AND logic

FiInEn **Enable first input detection** **Basic state 0-signal**

Format BOOL

This input enables the first-in detection if it is set TRUE (typically connected to the contactor on command or running signal of the interlocked drive).

Caution: In order to get the correct indication at the interlock block the runtime sequence must be correct:
1. Interlocking Condition → 2. Interlock block → 3. Drive block

FiInExt **Extern first input detected** **Basic state 0-signal**

Format BOOL

FiInExt is used for external first-in signals (e.g. from a parallel interlock block). It is only active if feature bit 29 is TRUE.

RstOut **Reset latched output** **Basic state 0-signal**

Format BOOL

RstOut resets a latched output.

Process Parameters

The process parameters can either be set in the CFC during engineering and/or modified by the operator, if the Operator has the corresponding OS Permission:

BitNr.	Function/OS Permission	Default value
31	1 = Operator can modify process parameters	TRUE

Caution: To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

TmpBypTi **Temporary bypass elapse time in seconds** **Default: 10**

Format INTEGER (0 - 32767)

Value in seconds.
This value is used as a timeout to automatically reset a temporary bypass.

DefaultOut **Default output value** **Basic state 1-signal**

Format BOOL

Default value at block output *Out*

Inputs for testing and as Interface to the OS

TEST_OSS **Internal test value** **Default: 0**

Format INTEGER

The test interfaces are only used during module development and must not be changed!

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

OS Permissions and Features:

Via **Feature bits** certain functions of the Cemat block can be enabled and disabled and the behavior of the block can be configured.

Via **OS Permissions** operator actions can be enabled or disabled.

Feature bits and OS Permissions of block C_INTLK8 can be modified at any time.

A Feature Master block does not exist.

OS_Perm Operator Permissions

Format STRUCT

Via **OS Permissions** operator actions can be enabled or disabled.

Chapter OS Permissions contains a list of all available Permission bits. The function of the individual permission is described with the corresponding interfaces.

Note: It is not allowed to connect any logic to input *OS_Perm*.

Feature Status of various features

Format STRUCT

Via **Feature bits** certain functions of the Cemat block can be enabled and disabled and the behavior of the block can be configured.

Chapter Feature bits contains a list of all available Features. The function of the individual feature bits is described with the corresponding interfaces.

Note: It is not allowed to connect any logic to input *Feature*.

Output Interfaces

Output status for connection to other blocks

Out 1 = Output Signal ok

Format STRUCT

In case of the interlock logic getting FALSE *Out* becomes 0-signal.

Structure variables:

Out.Value Value

Format BOOL

Out.ST Signal status

Format BYTE

BypAct 1 = Bypass active

Format BOOL

1-signal means that any bypass is active

BypPerm 1 = Permanent bypass active

Format BOOL

1-signal means that any permanent bypass is active

BypTemp 1 = Temporary bypass active

Format BOOL

1-signal means that any temporary bypass is active

BypTime Remaining bypass time

Format INTEGER

BypTime displays the time which is left before the temporary bypass will be reset.

FiInAct 1 = First input signal detected

Format BOOL

1-signal means that this block has a first-in. If *FiInExt* is TRUE *FiInAct* cannot become a 1-signal. This signal is used to connect it to the *FiInExt* input of parallel interlock blocks.

LaStopRe **Last Stop Reason**

Format STRUCT

In case of a first-in detection the number of the first-in and its time stamp will be recorded into these values.

Structure variables:

LaStopRe.Value **Reason**

Format BOOL

LaStopRe.STime **Stop time**

Format STRING[22]

Structure variable *LaStopRe.Value* contains the code for the last stop reason. The texts are defined in a dataset in @Overview1.pdl (Master_Stoptext_Dataset).

The following reasons may stop a unidirectional drive C_INTLK8.

Code	Stop reason
100	External first input
101	Input01
102	Input02
103	Input03
104	Input04
105	Input05
106	Input06
107	Input07
108	Input08

Outputs for testing and as Interface to the OS

STATUS **Interface to OS**

Format DWORD

Interface to OS

For more information see Variable details.

STATUS2 **Interface to OS**

Format DWORD

Interface to OS

For more information see Variable details.

FeatureOut **Feature word to OS**

Format DWORD

For more information see Table Feature bits.

OS_PermOut **Operator Permissions to OS**

Format DWORD

For more information see Table OS Permissions.

OS_PermLog **Operator Permissions: Output for OS**

Format DWORD

For more information see Table OS Permissions.

ST_Worst **Worst Signal Status**

Format BYTE

For all structure interfaces the status information (Simulation, Bad quality etc.) is displayed in the diagnostic window:

In0x

The worst status of these signals is transmitted to output *ST_Worst* and always displayed.

Via feature bit setting it can be decided whether the Signal status is visible in the block outputs as well:

BitNr.	Function/Features	Default value
22	Write quality code ST_Worst to module output	FALSE

If **Feature bit 22** = TRUE, the worst status is additionally transmitted to the block outputs (and via this to the next block).

The worst status of the binary signals *In0x* is transmitted to output *Out.*

Engineering Errors

ErrorNum **Error Number** **Default: -1**

Format INTEGER

In case of an invalid connection or an invalid feature bit setting the functionality of the block cannot be guaranteed any more. If the error number is different than -1 you have to check the application program or the feature bits and correct it:

Error number	Fault description
1	
2	
3	
4	

ErrorNum is spare. At present no error numbers exist.

Caution: Only one error number can be indicated at a time!

Operator Commands

Refer to the Variable details for the assignment of the command word *COMMAND*.

Operator commands are restricted by the following criteria:

1. **Feature bit** settings:
   Via feature bits the complete function can be enabled or disabled.
2. **OS PermissionLog**:
   Via OS Permission it can be decided to allow or not to allow operator action.
   The OS PermissionLog is built dependent on the OS Permissions and the actual status of the object. (Example: Group start is enabled via OS Permission, but if the group is already running completely the OS PermissionLog = FALSE and the button "start" is disabled).
3. **Operation levels**
   Via WinCC User Administration Operation levels are defined. Each user gets the permission to operate certain levels in certain areas.
   The currently logged in user can carry out any operation belonging to this level.
4. The Operation level for each type of operation is defined at the **block parameters** in the CFC and can be modified. This allows modular (instance specific) adjustments for individual operator commands.
   If additional user rights are defined in WinCC, operation can be permitted to restricted personal only.

The following table shows the Operator commands for C_INTLK8 and the required settings:

	OS Commands	Feature Bit	OS_Per-mission Log	Op_ Level	Block Parameter
Permanent bypass	(Reset) Bypass In01	21 + 0	21 + 0	23	Command
	(Reset) Bypass In02	21 + 1	21 + 1	23	Command
	(Reset) Bypass In03	21 + 2	21 + 2	23	Command
	(Reset) Bypass In04	21 + 3	21 + 3	23	Command
	(Reset) Bypass In05	21 + 4	21 + 4	23	Command
	(Reset) Bypass In06	21 + 5	21 + 5	23	Command
	(Reset) Bypass In07	21 + 6	21 + 6	23	Command
	(Reset) Bypass In08	21 + 7	21 + 7	23	Command
Temporary bypass	Bypass In01	20 + 0	20 + 0	5	In01
	Bypass In02	20 + 1	20 + 1	5	In02
	Bypass In03	20 + 2	20 + 2	5	In03
	Bypass In04	20 + 3	20 + 3	5	In04
	Bypass In05	20 + 4	20 + 4	5	In05
	Bypass In06	20 + 5	20 + 5	5	In06
	Bypass In07	20 + 6	20 + 6	5	In07
	Bypass In08	20 + 7	20 + 7	5	In08
Latched output	Reset latched output	12	12	5	RstOut
Process Parameter	Temporary bypass elapse time		31	22	TmpBypTi

Feature Bits

Via **Feature bits** certain functions of the Cemat block can be enabled and disabled and the behavior of the block can be configured.

The bits in Structure *Feature* and *FeatureOut* are used as follows:

BitNr.	Function/Features	Default value
0	Bypass In01	TRUE
1	Bypass In02	TRUE
2	Bypass In03	TRUE
3	Bypass In04	TRUE
4	Bypass In05	TRUE
5	Bypass In06	TRUE
6	Bypass In07	TRUE
7	Bypass In08	TRUE
8		FALSE
9		FALSE
10		FALSE
11		FALSE
12	Latched output	FALSE
13		FALSE
14		FALSE
15		FALSE
16		FALSE
17		FALSE
18		FALSE
19		FALSE
20	Temporary bypass	TRUE
21	Permanent bypass	TRUE
22	Write quality code ST_Worst to module output	FALSE
23		FALSE
24		FALSE
25		FALSE
26		FALSE
27		FALSE
28	Set module outputs Out.ST and ST_Worst 16#60 if no input is connected (else = 16#FF)	FALSE
29	External first input is transferred to FiInOut	FALSE
30		FALSE
31		FALSE

A detailed description of the individual Feature bits can be found can be found in the chapters above.

Feature bits of block C_INTLK8 can be modified at any time.

Note: Do not connect any logic to input *Feature*.

OS Permissions

Via **OS Permissions** operator actions can be enabled or disabled.

The bits in *OS_Perm, OS_PermOut* and *OS_PermLog* are used as follows:

BitNr.	Function/OS Permission	Default value
0	1 = Operator can bypass In01	TRUE
1	1 = Operator can bypass In02	TRUE
2	1 = Operator can bypass In03	TRUE
3	1 = Operator can bypass In04	TRUE
4	1 = Operator can bypass In05	TRUE
5	1 = Operator can bypass In06	TRUE
6	1 = Operator can bypass In07	TRUE
7	1 = Operator can bypass In08	TRUE
8		FALSE
9		FALSE
10		FALSE
11		FALSE
12	1 = Operator can reset latched output	FALSE
13		FALSE
14		FALSE
15		FALSE
16		FALSE
17		FALSE
18		FALSE
19		FALSE
20	1 = Operator can set/reset temporary bypass	TRUE
21	1 = Operator can set/reset permanent bypass	TRUE
22		FALSE
23		FALSE
24		FALSE
25		FALSE
26		FALSE
27		FALSE
28		FALSE
29		FALSE
30		FALSE
31	1 = Operator can modify process parameters	TRUE

A detailed description of the individual OS Permission bits can be found can be found in the chapters above.

OS Permissions of block C_INTLK8 can be modified at any time.

Note: Do not connect any logic to input *OS_Perm*.

I/O-bar of C_INTLK8

C_INTLK8

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
EN		BOOL	1	I	U		
In01	Input Signal 01	STRUCT		I			
In01.Value	Input Signal 01 Value	BOOL	1	I	U	+	
In01.ST	Input Signal 01 Signal Status	BYTE	16#FF	I	U		
InvIn01	1 = Invert input 01	BOOL	0	I			
BypIn01	1 = Set permanent bypass input 01	BOOL	0	I	U		
RstByp01	1 = Reset permanent bypass input 01	BOOL	0	I	U		
In02	Input Signal 02	STRUCT		I			
In02.Value	Input Signal 02 Value	BOOL	1	I	U	+	
In02.ST	Input Signal 02 Signal Status	BYTE	16#FF	I	U		
InvIn02	1 = Invert input 02	BOOL	0	I			
BypIn02	1 = Set permanent bypass input 02	BOOL	0	I	U		
RstByp02	1 = Reset permanent bypass input 02	BOOL	0	I	U		
In03	Input Signal 03	STRUCT		I			
In03.Value	Input Signal 03 Value	BOOL	1	I	U	+	
In03.ST	Input Signal 03 Signal Status	BYTE	16#FF	I	U		
InvIn03	1 = Invert input 03	BOOL	0	I			
BypIn03	1 = Set permanent bypass input 03	BOOL	0	I	U		
RstByp03	1 = Reset permanent bypass input 03	BOOL	0	I	U		
In04	Input Signal 04	STRUCT		I			
In04.Value	Input Signal 04 Value	BOOL	1	I	U	+	
In04.ST	Input Signal 04 Signal Status	BYTE	16#FF	I	U		
InvIn04	1 = Invert input 04	BOOL	0	I			
BypIn04	1 = Set permanent bypass input 04	BOOL	0	I	U		
RstByp04	1 = Reset permanent bypass input 04	BOOL	0	I	U		

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
In05	Input Signal 05	STRUCT		I			
In05.Value	Input Signal 05 Value	BOOL	1	I	U	+	
In05.ST	Input Signal 05 Signal Status	BYTE	16#FF	I	U		
InvIn05	1 = Invert input 05	BOOL	0	I			
BypIn05	1 = Set permanent bypass input 05	BOOL	0	I	U		
RstByp05	1 = Reset permanent bypass input 05	BOOL	0	I	U		
In06	Input Signal 06	STRUCT		I			
In06.Value	Input Signal 06 Value	BOOL	1	I	U	+	
In06.ST	Input Signal 06 Signal Status	BYTE	16#FF	I	U		
InvIn06	1 = Invert input 06	BOOL	0	I			
BypIn06	1 = Set permanent bypass input 06	BOOL	0	I	U		
RstByp06	1 = Reset permanent bypass input 06	BOOL	0	I	U		
In07	Input Signal 07	STRUCT		I			
In07.Value	Input Signal 07 Value	BOOL	1	I	U	+	
In07.ST	Input Signal 07 Signal Status	BYTE	16#FF	I	U		
InvIn07	1 = Invert input 07	BOOL	0	I			
BypIn07	1 = Set permanent bypass input 07	BOOL	0	I	U		
RstByp07	1 = Reset permanent bypass input 07	BOOL	0	I	U		
In08	Input Signal 08	STRUCT		I			
In08.Value	Input Signal 08 Value	BOOL	1	I	U	+	
In08.ST	Input Signal 08 Signal Status	BYTE	16#FF	I	U		
InvIn08	1 = Invert input 08	BOOL	0	I			
BypIn08	1 = Set permanent bypass input 08	BOOL	0	I	U		
RstByp08	1 = Reset permanent bypass input 08	BOOL	0	I	U		
Logic	1 = AND-logic, 0=OR-logic	BOOL	AND	I			
FiInEn	1 = Enable first input detection	BOOL	0	I			
FiInExt	1 = External first input detected	BOOL	0	I	U		

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
RstOut	1 = Reset latched output	BOOL	0	I	U		
TmpBypTi	Temporary bypass elapse time	INT	10	I	U	+	
DefaultOut	Default output value	BOOL	1	I	U		
TEST_OSS	Internal test value	INT	0	I	U		
COMMAND	CommandWord	DWORD	16#00000000	I	U	+	
OS_Perm	Operator Permissions	STRUCT		I	U		
OS_Perm.Bit0	1 = Operator can bypass In01	BOOL	1	I	U		
OS_Perm.Bit1	1 = Operator can bypass In02	BOOL	1	I	U		
OS_Perm.Bit2	1 = Operator can bypass In03	BOOL	1	I	U		
OS_Perm.Bit3	1 = Operator can bypass In04	BOOL	1	I	U		
OS_Perm.Bit4	1 = Operator can bypass In05	BOOL	1	I	U		
OS_Perm.Bit5	1 = Operator can bypass In06	BOOL	1	I	U		
OS_Perm.Bit6	1 = Operator can bypass In07	BOOL	1	I	U		
OS_Perm.Bit7	1 = Operator can bypass In08	BOOL	1	I	U		
OS_Perm.Bit8		BOOL	0	I	U		
OS_Perm.Bit9		BOOL	0	I	U		
OS_Perm.Bit10		BOOL	0	I	U		
OS_Perm.Bit11		BOOL	0	I	U		
OS_Perm.Bit12	1 = Operator can reset latched output	BOOL	0	I	U		
OS_Perm.Bit13		BOOL	0	I	U		
OS_Perm.Bit14		BOOL	0	I	U		
OS_Perm.Bit15		BOOL	0	I	U		
OS_Perm.Bit16		BOOL	0	I	U		
OS_Perm.Bit17		BOOL	0	I	U		
OS_Perm.Bit18		BOOL	0	I	U		
OS_Perm.Bit19		BOOL	0	I	U		
OS_Perm.Bit20	1 = Operator can set/reset temporary bypass	BOOL	1	I	U		

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
OS_Perm.Bit21	1 = Operator can set/reset permanent bypass	BOOL	1	I	U		
OS_Perm.Bit22		BOOL	0	I	U		
OS_Perm.Bit23		BOOL	0	I	U		
OS_Perm.Bit24		BOOL	0	I	U		
OS_Perm.Bit25		BOOL	0	I	U		
OS_Perm.Bit26		BOOL	0	I	U		
OS_Perm.Bit27		BOOL	0	I	U		
OS_Perm.Bit28		BOOL	0	I	U		
OS_Perm.Bit29		BOOL	0	I	U		
OS_Perm.Bit30		BOOL	0	I	U		
OS_Perm.Bit31	1 = Operator can modify process parameters	BOOL	1	I	U		
Feature	Status of various features	STRUCT		I	U		
Feature.Bit0	Bypass In01	BOOL	1	I	U		
Feature.Bit1	Bypass In02	BOOL	1	I	U		
Feature.Bit2	Bypass In03	BOOL	1	I	U		
Feature.Bit3	Bypass In04	BOOL	1	I	U		
Feature.Bit4	Bypass In05	BOOL	1	I	U		
Feature.Bit5	Bypass In06	BOOL	1	I	U		
Feature.Bit6	Bypass In07	BOOL	1	I	U		
Feature.Bit7	Bypass In08	BOOL	1	I	U		
Feature.Bit8		BOOL	0	I	U		
Feature.Bit9		BOOL	0	I	U		
Feature.Bit10		BOOL	0	I	U		
Feature.Bit11		BOOL	0	I	U		
Feature.Bit12	Latched output	BOOL	0	I	U		
Feature.Bit13		BOOL	0	I	U		
Feature.Bit14		BOOL	0	I	U		

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
Feature.Bit15		BOOL	0	I	U		
Feature.Bit16		BOOL	0	I	U		
Feature.Bit17		BOOL	0	I	U		
Feature.Bit18		BOOL	0	I	U		
Feature.Bit19		BOOL	0	I	U		
Feature.Bit20	Temporary bypass	BOOL	1	I	U		
Feature.Bit21	Permanent bypass	BOOL	1	I	U		
Feature.Bit22	Write quality code ST_Worst to module output	BOOL	0	I	U		
Feature.Bit23		BOOL	0	I	U		
Feature.Bit24		BOOL	0	I	U		
Feature.Bit25		BOOL	0	I	U		
Feature.Bit26		BOOL	0	I	U		
Feature.Bit27		BOOL	0	I	U		
Feature.Bit28	Set module outputs Out.ST and ST_Worst 16#60 if no input is connected (else = 16#FF)	BOOL	0	I	U		
Feature.Bit29	External first input is transferred to FiInOut	BOOL	0	I	U		
Feature.Bit30		BOOL	0	I	U		
Feature.Bit31		BOOL	0	I	U		
ENO		BOOL	0	O	U		
Out	1 = output signal ok	STRUCT		O			
Out.Value	Value	BOOL	0	O	U	+	
Out.ST	Signal Status	BYTE	16#80	O	U		
BypAct	1= Bypass active	BOOL	0	O	U		
BypPerm	1= Permanent bypass active	BOOL	0	O	U		
BypTemp	1= Temporary bypass active	BOOL	0	O	U		
Byptime	Remaining bypass time	INT	0	O	U	+	
FiInAct	1= First input signal detected	BOOL	0	O	U		

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
LaStopRe	Last Stop Reason	STRUCT		O	U		
LaStopRe. .Value	Reason	INT	0	O	U	+	
LaStopRe .STime	Stop time	STRING [22]	''	O	U	+	
STATUS	Interface to OS	DWORD	16#00000 000	O	U	+	
STATUS2	Interface to OS	DWORD	16#00000 000	O	U	+	
FeatureOut	Feature Word to OS	DWORD	16#00000 000	O	U	+	
OS_PermOut	OS Permission to OS	DWORD	16#00000 000	O	U	+	
OS_PermLog	Operator Permission: Output for OS	DWORD	16#FFFF FFFF	O	U	+	
ST_Worst	Worst Signal Status	BYTE	16#80	O	U	+	
ErrorNum	Error Number	INT	-1	O	U	+	

OS-Variable table

C_INTLK8

OS Variable	Description	PLC Data Type	OS Data Type
In01#Value	Input value 01	BOOL	Binary variable
In02#Value	Input value 02	BOOL	Binary variable
In03#Value	Input value 03	BOOL	Binary variable
In04#Value	Input value 04	BOOL	Binary variable
In05#Value	Input value 05	BOOL	Binary variable
In06#Value	Input value 06	BOOL	Binary variable
In07#Value	Input value 07	BOOL	Binary variable
In08#Value	Input value 08	BOOL	Binary variable
RstOut	1 = Reset latched output	BOOL	Binary variable
TmpBypTi	Temporary bypass elapse time	INT	Signed 16-bit value
COMMAND	Command word	DWORD	Unsigned 32-bit value
Out#Value	Output value	BOOL	Binary variable
BypTime	Remaining bypass time	INT	Signed 16-bit value
LaStopRe#Value	Reason	INT	Signed 16-bit value
LaStopRe#STime	Stop time	STRING	Text tag 8-bit character set
STATUS	Status for OS	DWORD	Unsigned 32-bit value
STATUS2	Status for OS	DWORD	Unsigned 32-bit value
FeatureOut	Status of various features	DWORD	Unsigned 32-bit value
OS_PermOut	Operator Permissions: Output for OS	DWORD	Unsigned 32-bit value
OS_PermLog	Operator Permissions: Output for OS	DWORD	Unsigned 32-bit value
ST_Worst	Worst Signal Status	BYTE	Unsigned 8-bit value
ErrorNum	Error Number	INT	Signed 16-bit value

Variable details

Internal structure of the Commands, Alarms, Visualization status and Interface word:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Kommandowort**	**Commandword**		
COM_B40	Reset	0	Halten des Ausgangs zurücksetzen	Reset latched output		
COM_B41		1				
COM_B42		2				
COM_B43		3				
COM_B44		4				
COM_B45		5				
COM_B46		6				
COM_B47		7				
COM_B30	Bypass Reset	8	Bypass In01 zurücksetzen	Reset Bypass In01		
COM_B31	Bypass Reset	9	Bypass In02 zurücksetzen	Reset Bypass In02		
COM_B32	Bypass Reset	10	Bypass In03 zurücksetzen	Reset Bypass In03		
COM_B33	Bypass Reset	11	Bypass In04 zurücksetzen	Reset Bypass In04		
COM_B34	Bypass Reset	12	Bypass In05 zurücksetzen	Reset Bypass In05		
COM_B35	Bypass Reset	13	Bypass In06 zurücksetzen	Reset Bypass In06		
COM_B36	Bypass Reset	14	Bypass In07 zurücksetzen	Reset Bypass In07		
COM_B37	Bypass Reset	15	Bypass In08 zurücksetzen	Reset Bypass In08		
COM_B20	Bypass	0	Dauerhafter Bypass In01 ein	Set permanent Bypass In01		
COM_B21	Bypass	1	Dauerhafter Bypass In02 ein	Set permanent Bypass In02		
COM_B22	Bypass	2	Dauerhafter Bypass In03 ein	Set permanent Bypass In03		
COM_B23	Bypass	3	Dauerhafter Bypass In04 ein	Set permanent Bypass In04		
COM_B24	Bypass	4	Dauerhafter Bypass In05 ein	Set permanent Bypass In05		
COM_B25	Bypass	5	Dauerhafter Bypass In06 ein	Set permanent Bypass In06		
COM_B26	Bypass	6	Dauerhafter Bypass In07 ein	Set permanent Bypass In07		
COM_B27	Bypass	7	Dauerhafter Bypass In08 ein	Set permanent Bypass In08		
COM_B10	Bypass	8	Temporärer Bypass In01 ein	Set Temporary Bypass In01		
COM_B11	Bypass	9	Temporärer Bypass In02 ein	Set Temporary Bypass In02		
COM_B12	Bypass	10	Temporärer Bypass In03 ein	Set Temporary Bypass In03		
COM_B13	Bypass	11	Temporärer Bypass In04 ein	Set Temporary Bypass In04		
COM_B14	Bypass	12	Temporärer Bypass In05 ein	Set Temporary Bypass In05		
COM_B15	Bypass	13	Temporärer Bypass In06 ein	Set Temporary Bypass In06		
COM_B16	Bypass	14	Temporärer Bypass In07 ein	Set Temporary Bypass In07		
COM_B17	Bypass	15	Temporärer Bypass In08 ein	Set Temporary Bypass In08		

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B40		0	Invert In01	Invert In01		
STA_B41		1	Invert In02	Invert In02		
STA_B42		2	Invert In03	Invert In03		
STA_B43		3	Invert In04	Invert In04		
STA_B44		4	Invert In05	Invert In05		
STA_B45		5	Invert In06	Invert In06		
STA_B46		6	Invert In07	Invert In07		
STA_B47		7	Invert In08	Invert In08		
STA_B30		8	Ausgangssignal	Output		
STA_B31		9	Bypass aktiv	Bypass active		
STA_B32		10	Dauerhafter Bypass aktiv	Permanent bypass active		
STA_B33		11	Temporärer Bypass aktiv	Temporary bypass active		
STA_B34		12	Erstsignalerkennung aktiv	First input detected		
STA_B35		13	Ausgang gehalten	Output latched		
STA_B36		14	Verriegelungsslogik	Interlock logic		
STA_B37		15				
STA_B20		16	Erstsignalerkennung In01	First input In01		
STA_B21		17	Erstsignalerkennung In02	First input In02		
STA_B22		18	Erstsignalerkennung In03	First input In03		
STA_B23		19	Erstsignalerkennung In04	First input In04		
STA_B24		20	Erstsignalerkennung In05	First input In05		
STA_B25		21	Erstsignalerkennung In06	First input In06		
STA_B26		22	Erstsignalerkennung In07	First input In07		
STA_B27		23	Erstsignalerkennung In08	First input In08		
STA_B10		24	Bypass In01	Bypass In01		
STA_B11		25	Bypass In02	Bypass In02		
STA_B12		26	Bypass In03	Bypass In03		
STA_B13		27	Bypass In04	Bypass In04		
STA_B14		28	Bypass In05	Bypass In05		
STA_B15		29	Bypass In06	Bypass In06		
STA_B16		30	Bypass In07	Bypass In07		
STA_B17		31	Bypass In08	Bypass In08		

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS2			**Status**	**Status**		
STA2_B40		0	Eingangssignal 01 angeschlossen	Input Signal 01 connected		
STA2_B41		1	Eingangssignal 02 angeschlossen	Input Signal 02 connected		
STA2_B42		2	Eingangssignal 03 angeschlossen	Input Signal 03 connected		
STA2_B43		3	Eingangssignal 04 angeschlossen	Input Signal 04 connected		
STA2_B44		4	Eingangssignal 05 angeschlossen	Input Signal 05 connected		
STA2_B45		5	Eingangssignal 06 angeschlossen	Input Signal 06 connected		
STA2_B46		6	Eingangssignal 07 angeschlossen	Input Signal 07 connected		
STA2_B47		7	Eingangssignal 08 angeschlossen	Input Signal 08 connected		
STA2_B30		8	interner Zustand von In01	internal value of In01		
STA2_B31		9	interner Zustand von In02	internal value of In02		
STA2_B32		10	interner Zustand von In03	internal value of In03		
STA2_B33		11	interner Zustand von In04	internal value of In04		
STA2_B34		12	interner Zustand von In05	internal value of In05		
STA2_B35		13	interner Zustand von In06	internal value of In06		
STA2_B36		14	interner Zustand von In07	internal value of In07		
STA2_B37		15	interner Zustand von In08	internal value of In08		
STA2_B20		16	Temporärer Bypass In01	Temporary bypass In01		
STA2_B21		17	Temporärer Bypass In02	Temporary bypass In02		
STA2_B22		18	Temporärer Bypass In03	Temporary bypass In03		
STA2_B23		19	Temporärer Bypass In04	Temporary bypass In04		
STA2_B24		20	Temporärer Bypass In05	Temporary bypass In05		
STA2_B25		21	Temporärer Bypass In06	Temporary bypass In06		
STA2_B26		22	Temporärer Bypass In07	Temporary bypass In07		
STA2_B27		23	Temporärer Bypass In08	Temporary bypass In08		
STA2_B10		24	Dauerhafter Bypass In01	Permanent bypass In01		
STA2_B11		25	Dauerhafter Bypass In02	Permanent bypass In02		
STA2_B12		26	Dauerhafter Bypass In03	Permanent bypass In03		
STA2_B13		27	Dauerhafter Bypass In04	Permanent bypass In04		
STA2_B14		28	Dauerhafter Bypass In05	Permanent bypass In05		
STA2_B15		29	Dauerhafter Bypass In06	Permanent bypass In06		
STA2_B16		30	Dauerhafter Bypass In07	Permanent bypass In07		
STA2_B17		31	Dauerhafter Bypass In08	Permanent bypass In08		

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS3			**Status**	**Status**		
STA3_B40		0				
STA3_B41		1				
STA3_B42		2				
STA3_B43		3				
STA3_B44		4				
STA3_B45		5				
STA3_B46		6				
STA3_B47		7				
STA3_B30		8				
STA3_B31		9				
STA3_B32		10				
STA3_B33		11				
STA3_B34		12				
STA3_B35		13				
STA3_B36		14				
STA3_B37		15				
STA3_B20		16	Temporärer Bypass In01 gewählt	Temporary bypass In01 selected		
STA3_B21		17	Temporärer Bypass In02 gewählt	Temporary bypass In02 selected		
STA3_B22		18	Temporärer Bypass In03 gewählt	Temporary bypass In03 selected		
STA3_B23		19	Temporärer Bypass In04 gewählt	Temporary bypass In04 selected		
STA3_B24		20	Temporärer Bypass In05 gewählt	Temporary bypass In05 selected		
STA3_B25		21	Temporärer Bypass In06 gewählt	Temporary bypass In06 selected		
STA3_B26		22	Temporärer Bypass In07 gewählt	Temporary bypass In07 selected		
STA3_B27		23	Temporärer Bypass In08 gewählt	Temporary bypass In08 selected		
STA3_B10		24				
STA3_B11		25				
STA3_B12		26				
STA3_B13		27				
STA3_B14		28				
STA3_B15		29				
STA3_B16		30				
STA3_B17		31				

SIEMENS

Cemat Minerals V 8.2
Function Block Library

Function Description **Edition 07/16**

Interlock with 4 inputs C_INTLK4

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring to property damage only have no safety alert symbol. The notices shown below are graded according to the degree of danger.

Danger
indicates that death or severe personal injury **will** result if proper precautions are not taken.

Warning
indicates that death or severe personal injury **may** result if proper precautions are not taken.

Caution
with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution
without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention
indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel.** Within the context of the safety notices in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

Warning
This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.
Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Description of C_INTLK4

Type/Number

Module name: C_INTLK4
Module no.: FB1061

Calling OBs

All Cemat Functions must be installed in the same OB, which is preferable OB1. The System Chart SYSPLCxx contains infrastructure blocks which must be called at the Beginning (Runtime group OB1_START) and at the End (Runtime group OB1_END) of this OB.
The application program must be called between OB1_START and OB1_END.

Calling of the Cemat blocks in a cyclic interrupt OB (OB34 or OB35) is possible, but only if the complete program is called in the same cyclic interrupt OB. In this case the infrastructure blocks must as well be moved to the cyclic interrupt OB (see Engineering Manual 14_Tips_Tricks_009.doc).

Note: In order to get the correct indication at the interlock block the runtime sequence is very important and must be correct:
1. Interlocking Condition → 2. Interlock block → 3. Drive block

Function

General Function description

Block C_INTLK4 is used to calculate a standardized interlock that can be displayed on the OS. A maximum of 4 input signals can be supplied to the block. They are linked using selectable binary logic. The signal status of the output signal is also determined.

Each input can be bypassed. If a bypass is set the according input value will be ignored and the current state is displayed at the Out output parameter:

Out = 0: Interlock
Out = 1: "Good" state

Logic operators

Use the Logic input to specify the logic operator that the block should employ when determining the interlock state. Make the following settings:

Logic = 0: OR
Logic = 1: AND

Inversion of logic signals

You can invert the input signals by setting the input parameter *InvIn0x* for the input concerned to In0x = 1, e.g. for input *In01* set the I/O *InvIn01*.

The inversion is displayed in the faceplate. If you invert signals using any other method this is not shown in the faceplate.

Bypass Function

Note: Bypassing means that a bypassed interlock signal (In0x) is excluded from the logic of the interlock block, in other words, this signal is ignored in the logic operation.

There are two possibilities to bypass interlock inputs, a permanent bypass and a temporary bypass, which have to be activated with Feature bits 20 and 21 to be able to use them.

BitNr.	Function/Features	Default value
20	Temporary bypass	TRUE
21	Permanent bypass	TRUE

Operations via faceplate need additionally the according OS permission bits 20 and 21.

BitNr.	Function/OS Permission	Default value
20	1 = Operator can set/reset temporary bypass	TRUE
21	1 = Operator can set/reset permanent bypass	TRUE

Permanent bypass:

Permanent bypass means that the input is bypassed until a reset command is carried out. A permanent bypass can be set with a rising edge on *BypIn0x* or via faceplate and has to be reset with a rising edge on *RstBypIn0x* or via faceplate.

Temporary bypass:

A temporary bypass is meant to be used for unhealthy interlock signals which should get healthy whilst starting or running a drive within a short period of time (e.g. for maintenance purposes).
A number of inputs can be selected and will be activated via a common activation button. The bypass will timeout automatically after the configured time of *TmpBypTi* (in seconds), or after a reset via a common Reset button.

Permanent and the temporary bypass cannot be activated at the same time. The activation of the permanent bypass resets the temporary bypass of the corresponding input, as well as a rising edge on input *RstBypIn0x*.

Each input has to be individually configured that it can be bypassed permanently or temporarily by using Feature bits 0 to 3.

BitNr.	Function/Features	Default value
0	Bypass In01	TRUE
1	Bypass In02	TRUE
2	Bypass In03	TRUE
3	Bypass In04	TRUE

Operations via faceplate need additionally the according OS permission bits 0 and 3.

BitNr.	Function/OS Permission	Default value
0	1 = Operator can bypass In01	TRUE
1	1 = Operator can bypass In02	TRUE
2	1 = Operator can bypass In03	TRUE
3	1 = Operator can bypass In04	TRUE

Handling of not connected inputs

Inputs which are not interconnected are not evaluated. They are not displayed in the faceplate either.

Special situation: If no inputs are connected, the output value is set TRUE. The signal status depends on the configuration of feature bit 28. If feature bit 28 is FALSE the output status will be 16#FF. This status makes the interlock in the faceplate of the interlocked device invisible and disables the jump functionality as well. If feature bit 28 is TRUE the output status will be 16#60.

BitNr.	Function/Features	Default value
28	Set module outputs Out.ST and ST_Worst 16#60 if no input is connected (else = 16#FF)	FALSE

Opening additional faceplates

This block provides the function to open the faceplate of connected objects by clicking on the arrow buttons of the according inputs.

First-in detection for interlock blocks

This block provides the function to detect the first signal that sets the interlock output *Out* to FALSE and records date and time while the block parameter *FiInEn* is TRUE. *FiInEn* is typically interconnected to the contactor on command (*ContOn*) of the interlocked drive.
If an interlock detected first-in the output *FiInAct* will be additionally set TRUE to synchronize interlocks or further usage within the program logic.

If external conditions cause the device to be interlocked (e.g. another parallel interlock block instance) setting the input *FiInExt* = TRUE, then the interlock block writes a healthy status to the first-in output *LaStopRe* and records the date and time. *FiInExt* is typically connected to the output *FiInAct* of all other parallel interlock blocks to ensure all parallel interlock blocks have synchronized first-up histories and time stamps.

BitNr.	Function/Features	Default value
29	External first input is transferred to FiInOut	FALSE

All interlock inputs In0x will not be evaluated for the first-in as long as *FinInExt* is TRUE.

Caution: Make sure that the runtime sequence is correct:
Interlocking Condition → Interlock block → Drive block

Latched output after first-in:

The Feature bit 12 determines whether the interlock output *Out* is latched after a first-in or not.

BitNr.	Function/Features	Default value
12	Latched output	FALSE

Out will remain FALSE if a first-in interlock is recorded and Feature bit 12 is TRUE. A block reset (*RstOut* or operator reset via faceplate) will then be required to reset *Out*.
If Feature bit 12 = FALSE, the output *Out* will not require a reset to return to a healthy state when all interlock inputs are healthy (or bypassed).

Operations via faceplate need additionally the according OS permission bit 12.

BitNr.	Function/OS Permission	Default value
12	1 = Operator can reset latched output	FALSE

Forming the signal status for blocks

This block provides the standard function “Forming and outputting the signal status for interlock blocks”.

The worst signal status *ST_Worst* for the block is formed from the following parameters:

In0x.ST

If Feature bit 22 is set TRUE, *ST_Worst* will be written to the module output *Out.ST*.

BitNr.	Function/Features	Default value
22	Write quality code ST_Worst to module output	TRUE

Process parameters

The following values can be configured online:

- TmpBypTi (s) Temporary bypass elapse time

Change of operation mode

The interlock block C_INTLK4 does not have any operation modes.

Sequence Test

C_INTLK4 is not affected by the sequence test mode.

Visualization

C_INTLK4 does not have any **block icon** and can only be opened from the faceplate of the object or interlock it is connected to. Refer to Variable Details. Control functions and detail information are only available after opening the **faceplate**.

For status information the following variables exist:

STATUS	General Running and Status Information
FeatureOut	Status display for Feature Word
OS_PermOut	Status display for OS_PermOut Word
OS_PermLog	Status display for OS_PermLog Word (includes add. AS connection code)

Operating principle

Input interfaces

In0x **Input Signal 0x**

Format STRUCT

Interface *In0x* is used for the signals which are relevant for the interlock logic.

Structure variables:

In0x.Value **Value** **Basic state 1-signal**

Format BOOL

In0x.ST **Signal status** **Default: 16#FF**

Format BYTE

Structure variable *In0x.Value* has the properties Text 0 and Text 1. Via these properties, texts can be configured which are displayed in the in the faceplate dependent on the input signal value.

Text 0 is displayed if the input signal value is FALSE
Text 1 is displayed if the input signal value is TRUE

InvIn0x **Invert input 0x** **Basic state 0-signal**

Format BOOL

InvIn0x is used to invert the corresponding input signal *In0x*.

BypIn0x **Set permanent bypass input 0x** **Basic state 0-signal**

Format BOOL

A rising edge on *BypIn0x* sets a permanent bypass for I*n0x*.

RstByp0x **Reset bypass input 0x** **Basic state 0-signal**

Format BOOL

A rising edge on *RstByp0x* resets any bypass for *In0x*.

Logic **1 = AND logic, 0 = OR logic** **Basic state 1-signal**

Format BOOL

This parameter defines the logic of the interlock block. The logic is also shown in the faceplate.

0 = OR logic
1 = AND logic

FiInEn **Enable first input detection** **Basic state 0-signal**

Format BOOL

This input enables the first-in detection if it is set TRUE (typically connected to the contactor on command or running signal of the interlocked drive).

Caution: In order to get the correct indication at the interlock block the runtime sequence must be correct:
1. Interlocking Condition → 2. Interlock block → 3. Drive block

FiInExt **Extern first input detected** **Basic state 0-signal**

Format BOOL

FiInExt is used for external first-in signals (e.g. from a parallel interlock block). It is only active if feature bit 29 is TRUE.

RstOut **Reset latched output** **Basic state 0-signal**

Format BOOL

RstOut resets a latched output.

Process Parameters

The process parameters can either be set in the CFC during engineering and/or modified by the operator, if the Operator has the corresponding OS Permission:

BitNr.	Function/OS Permission	Default value
31	1 = Operator can modify process parameters	TRUE

Caution: To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

TmpBypTi **Temporary bypass elapse time in seconds** **Default: 10**

Format INTEGER (0 - 32767)

Value in seconds.
This value is used as a timeout to automatically reset a temporary bypass.

DefaultOut **Default output value** **Basic state 1-signal**

Format BOOL

Default value at block output *Out*

Inputs for testing and as Interface to the OS

TEST_OSS **Internal test value** **Default: 0**

Format INTEGER

The test interfaces are only used during module development and must not be changed!

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

OS Permissions and Features:

Via **Feature bits** certain functions of the Cemat block can be enabled and disabled and the behavior of the block can be configured.

Via **OS Permissions** operator actions can be enabled or disabled.

Feature bits and OS Permissions of block C_INTLK4 can be modified at any time.

A Feature Master block does not exist.

OS_Perm Operator Permissions

Format STRUCT

Via **OS Permissions** operator actions can be enabled or disabled.

Chapter OS Permissions contains a list of all available Permission bits. The function of the individual permission is described with the corresponding interfaces.

Note: It is not allowed to connect any logic to input *OS_Perm*.

Feature Status of various features

Format STRUCT

Via **Feature bits** certain functions of the Cemat block can be enabled and disabled and the behavior of the block can be configured.

Chapter Feature bits contains a list of all available Features. The function of the individual feature bits is described with the corresponding interfaces.

Note: It is not allowed to connect any logic to input *Feature*.

Output Interfaces

Output status for connection to other blocks

Out **1 = Output Signal ok**

Format STRUCT

In case of the interlock logic getting FALSE *Out* becomes 0-signal.

Structure variables:

Out.Value **Value**

Format BOOL

Out.ST **Signal status**

Format BYTE

BypAct **1 = Bypass active**

Format BOOL

1-signal means that any bypass is active

BypPerm **1 = Permanent bypass active**

Format BOOL

1-signal means that any permanent bypass is active

BypTemp **1 = Temporary bypass active**

Format BOOL

1-signal means that any temporary bypass is active

BypTime **Remaining bypass time**

Format INTEGER

BypTime displays the time which is left before the temporary bypass will be reset.

FiInAct **1 = First input signal detected**

Format BOOL

1-signal means that this block has a first-in. If *FiInExt* is TRUE *FiInAct* cannot become a 1-signal. This signal is used to connect it to the *FiInExt* input of parallel interlock blocks.

LaStopRe **Last Stop Reason**

Format STRUCT

In case of a first-in detection the number of the first-in and its time stamp will be recorded into these values.

Structure variables:

LaStopRe.Value **Reason**

Format BOOL

LaStopRe.STime **Stop time**

Format STRING[22]

Structure variable *LaStopRe.Value* contains the code for the last stop reason. The texts are defined in a dataset in @Overview1.pdl (Master_Stoptext_Dataset).

The following reasons may stop a unidirectional drive C_INTLK4.

Code	Stop reason
100	External first input
101	Input01
102	Input02
103	Input03
104	Input04

Outputs for testing and as Interface to the OS

STATUS **Interface to OS**

Format DWORD

Interface to OS

For more information see Variable details.

STATUS2 **Interface to OS**

Format DWORD

Interface to OS

For more information see Variable details.

FeatureOut **Feature word to OS**

Format DWORD

For more information see Table Feature bits.

OS_PermOut **Operator Permissions to OS**

Format DWORD

For more information see Table OS Permissions.

OS_PermLog **Operator Permissions: Output for OS**

Format DWORD

For more information see Table OS Permissions.

ST_Worst **Worst Signal Status**

Format BYTE

For all structure interfaces the status information (Simulation, Bad quality etc.) is displayed in the diagnostic window:

In0x

The worst status of these signals is transmitted to output *ST_Worst* and always displayed.

Via feature bit setting it can be decided whether the Signal status is visible in the block outputs as well:

BitNr.	Function/Features	Default value
22	Write quality code ST_Worst to module output	FALSE

If **Feature bit 22** = TRUE, the worst status is additionally transmitted to the block outputs (and via this to the next block).

The worst status of the binary signals *In0x* is transmitted to output *Out.*

Engineering Errors

ErrorNum **Error Number** **Default: -1**

Format INTEGER

In case of an invalid connection or an invalid feature bit setting the functionality of the block cannot be guaranteed any more. If the error number is different than -1 you have to check the application program or the feature bits and correct it:

Error number	Fault description
1	
2	
3	
4	

ErrorNum is spare. At present no error numbers exist.

Caution: Only one error number can be indicated at a time!

Operator Commands

Refer to the Variable details for the assignment of the command word *COMMAND*.

Operator commands are restricted by the following criteria:

1. **Feature bit** settings:
   Via feature bits the complete function can be enabled or disabled.
2. **OS PermissionLog**:
   Via OS Permission it can be decided to allow or not to allow operator action.
   The OS PermissionLog is built dependent on the OS Permissions and the actual status of the object. (Example: Group start is enabled via OS Permission, but if the group is already running completely the OS PermissionLog = FALSE and the button “start” is disabled).
3. **Operation levels**
   Via WinCC User Administration Operation levels are defined. Each user gets the permission to operate certain levels in certain areas.
   The currently logged in user can carry out any operation belonging to this level.
4. The Operation level for each type of operation is defined at the **block parameters** in the CFC and can be modified. This allows modular (instance specific) adjustments for individual operator commands.
   If additional user rights are defined in WinCC, operation can be permitted to restricted personnel only.

The following table shows the Operator commands for C_INTLK4 and the required settings:

	OS Commands	**Feature Bit**	**OS_Per-mission Log**	**Op_ Level**	**Block Parameter**
Permanent bypass	(Reset) Bypass In01	21 + 0	21 + 0	23	Command
	(Reset) Bypass In02	21 + 1	21 + 1	23	Command
	(Reset) Bypass In03	21 + 2	21 + 2	23	Command
	(Reset) Bypass In04	21 + 3	21 + 3	23	Command
Temporary bypass	Bypass In01	20 + 0	20 + 0	5	In01
	Bypass In02	20 + 1	20 + 1	5	In02
	Bypass In03	20 + 2	20 + 2	5	In03
	Bypass In04	20 + 3	20 + 3	5	In04
Latched output	Reset latched output	12	12	5	RstOut
Process Parameter	Temporary bypass elapse time		31	22	TmpBypTi

Feature Bits

Via **Feature bits** certain functions of the Cemat block can be enabled and disabled and the behavior of the block can be configured.

The bits in Structure *Feature* and *FeatureOut* are used as follows:

BitNr.	Function/Features	Default value
0	Bypass In01	TRUE
1	Bypass In02	TRUE
2	Bypass In03	TRUE
3	Bypass In04	TRUE
4		FALSE
5		FALSE
6		FALSE
7		FALSE
8		FALSE
9		FALSE
10		FALSE
11		FALSE
12	Latched output	FALSE
13		FALSE
14		FALSE
15		FALSE
16		FALSE
17		FALSE
18		FALSE
19		FALSE
20	Temporary bypass	TRUE
21	Permanent bypass	TRUE
22	Write quality code ST_Worst to module output	FALSE
23		FALSE
24		FALSE
25		FALSE
26		FALSE
27		FALSE
28	Set module outputs Out.ST and ST_Worst 16#60 if no input is connected (else = 16#FF)	FALSE
29	External first input is transferred to FiInOut	FALSE
30		FALSE
31		FALSE

A detailed description of the individual Feature bits can be found can be found in the chapters above.

Feature bits of block C_INTLK4 can be modified at any time.

Note: Do not connect any logic to input *Feature*.

OS Permissions

Via **OS Permissions** operator actions can be enabled or disabled.

The bits in *OS_Perm, OS_PermOut* and *OS_PermLog* are used as follows:

BitNr.	Function/OS Permission	Default value
0	1 = Operator can bypass In01	TRUE
1	1 = Operator can bypass In02	TRUE
2	1 = Operator can bypass In03	TRUE
3	1 = Operator can bypass In04	TRUE
4		FALSE
5		FALSE
6		FALSE
7		FALSE
8		FALSE
9		FALSE
10		FALSE
11		FALSE
12	1 = Operator can reset latched output	FALSE
13		FALSE
14		FALSE
15		FALSE
16		FALSE
17		FALSE
18		FALSE
19		FALSE
20	1 = Operator can set/reset temporary bypass	TRUE
21	1 = Operator can set/reset permanent bypass	TRUE
22		FALSE
23		FALSE
24		FALSE
25		FALSE
26		FALSE
27		FALSE
28		FALSE
29		FALSE
30		FALSE
31	1 = Operator can modify process parameters	TRUE

A detailed description of the individual OS Permission bits can be found can be found in the chapters above.

OS Permissions of block C_INTLK4 can be modified at any time.

Note: Do not connect any logic to input *OS_Perm*.

I/O-bar of C_INTLK4

C_INTLK4

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
EN		BOOL	1	I	U		
In01	Input Signal 01	STRUCT		I			
In01.Value	Input Signal 01 Value	BOOL	1	I	U	+	
In01.ST	Input Signal 01 Signal Status	BYTE	16#FF	I	U		
InvIn01	1 = Invert input 01	BOOL	0	I			
BypIn01	1 = Set permanent bypass input 01	BOOL	0	I	U		
RstByp01	1 = Reset permanent bypass input 01	BOOL	0	I	U		
In02	Input Signal 02	STRUCT		I			
In02.Value	Input Signal 02 Value	BOOL	1	I	U	+	
In02.ST	Input Signal 02 Signal Status	BYTE	16#FF	I	U		
InvIn02	1 = Invert input 02	BOOL	0	I			
BypIn02	1 = Set permanent bypass input 02	BOOL	0	I	U		
RstByp02	1 = Reset permanent bypass input 02	BOOL	0	I	U		
In03	Input Signal 03	STRUCT		I			
In03.Value	Input Signal 03 Value	BOOL	1	I	U	+	
In03.ST	Input Signal 03 Signal Status	BYTE	16#FF	I	U		
InvIn03	1 = Invert input 03	BOOL	0	I			
BypIn03	1 = Set permanent bypass input 03	BOOL	0	I	U		
RstByp03	1 = Reset permanent bypass input 03	BOOL	0	I	U		
In04	Input Signal 04	STRUCT		I			
In04.Value	Input Signal 04 Value	BOOL	1	I	U	+	
In04.ST	Input Signal 04 Signal Status	BYTE	16#FF	I	U		
InvIn04	1 = Invert input 04	BOOL	0	I			
BypIn04	1 = Set permanent bypass input 04	BOOL	0	I	U		
RstByp04	1 = Reset permanent bypass input 04	BOOL	0	I	U		

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
Logic	1 = AND-logic, 0=OR-logic	BOOL	AND	I			
FiInEn	1 = Enable first input detection	BOOL	0	I			
FiInExt	1 = External first input detected	BOOL	0	I	U		
RstOut	1 = Reset latched output	BOOL	0	I	U		
TmpBypTi	Temporary bypass elapse time	INT	10	I	U	+	
DefaultOut	Default output value	BOOL	1	I	U		
TEST_OSS	Internal test value	INT	0	I	U		
COMMAND	CommandWord	DWORD	16#00000000	I	U	+	
OS_Perm	Operator Permissions	STRUCT		I	U		
OS_Perm.Bit0	1 = Operator can bypass In01	BOOL	1	I	U		
OS_Perm.Bit1	1 = Operator can bypass In02	BOOL	1	I	U		
OS_Perm.Bit2	1 = Operator can bypass In03	BOOL	1	I	U		
OS_Perm.Bit3	1 = Operator can bypass In04	BOOL	1	I	U		
OS_Perm.Bit4		BOOL	0	I	U		
OS_Perm.Bit5		BOOL	0	I	U		
OS_Perm.Bit6		BOOL	0	I	U		
OS_Perm.Bit7		BOOL	0	I	U		
OS_Perm.Bit8		BOOL	0	I	U		
OS_Perm.Bit9		BOOL	0	I	U		
OS_Perm.Bit10		BOOL	0	I	U		
OS_Perm.Bit11		BOOL	0	I	U		
OS_Perm.Bit12	1 = Operator can reset latched output	BOOL	0	I	U		
OS_Perm.Bit13		BOOL	0	I	U		
OS_Perm.Bit14		BOOL	0	I	U		
OS_Perm.Bit15		BOOL	0	I	U		
OS_Perm.Bit16		BOOL	0	I	U		
OS_Perm.Bit17		BOOL	0	I	U		

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
OS_Perm.Bit18		BOOL	0	I	U		
OS_Perm.Bit19		BOOL	0	I	U		
OS_Perm.Bit20	1 = Operator can set/reset temporary bypass	BOOL	1	I	U		
OS_Perm.Bit21	1 = Operator can set/reset permanent bypass	BOOL	1	I	U		
OS_Perm.Bit22		BOOL	0	I	U		
OS_Perm.Bit23		BOOL	0	I	U		
OS_Perm.Bit24		BOOL	0	I	U		
OS_Perm.Bit25		BOOL	0	I	U		
OS_Perm.Bit26		BOOL	0	I	U		
OS_Perm.Bit27		BOOL	0	I	U		
OS_Perm.Bit28		BOOL	0	I	U		
OS_Perm.Bit29		BOOL	0	I	U		
OS_Perm.Bit30		BOOL	0	I	U		
OS_Perm.Bit31	1 = Operator can modify Process Parameters	BOOL	1	I	U		
Feature	Status of various features	STRUCT		I	U		
Feature.Bit0	Bypass In01	BOOL	1	I	U		
Feature.Bit1	Bypass In02	BOOL	1	I	U		
Feature.Bit2	Bypass In03	BOOL	1	I	U		
Feature.Bit3	Bypass In04	BOOL	1	I	U		
Feature.Bit4		BOOL	0	I	U		
Feature.Bit5		BOOL	0	I	U		
Feature.Bit6		BOOL	0	I	U		
Feature.Bit7		BOOL	0	I	U		
Feature.Bit8		BOOL	0	I	U		
Feature.Bit9		BOOL	0	I	U		
Feature.Bit10		BOOL	0	I	U		
Feature.Bit11		BOOL	0	I	U		

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
Feature.Bit12	Latched output	BOOL	0	I	U		
Feature.Bit13		BOOL	0	I	U		
Feature.Bit14		BOOL	0	I	U		
Feature.Bit15		BOOL	0	I	U		
Feature.Bit16		BOOL	0	I	U		
Feature.Bit17		BOOL	0	I	U		
Feature.Bit18		BOOL	0	I	U		
Feature.Bit19		BOOL	0	I	U		
Feature.Bit20	Temporary bypass	BOOL	1	I	U		
Feature.Bit21	Permanent bypass	BOOL	1	I	U		
Feature.Bit22	Write quality code ST_Worst to module output	BOOL	0	I	U		
Feature.Bit23		BOOL	0	I	U		
Feature.Bit24		BOOL	0	I	U		
Feature.Bit25		BOOL	0	I	U		
Feature.Bit26		BOOL	0	I	U		
Feature.Bit27		BOOL	0	I	U		
Feature.Bit28	Set module outputs Out.ST and ST_Worst 16#60 if no input is connected (else = 16#FF)	BOOL	0	I	U		
Feature.Bit29	External first input is transferred to FiInOut	BOOL	0	I	U		
Feature.Bit30		BOOL	0	I	U		
Feature.Bit31		BOOL	0	I	U		
ENO		BOOL	0	O	U		
Out	1 = output signal ok	STRUCT		O			
Out.Value	Value	BOOL	0	O	U	+	
Out.ST	Signal Status	BYTE	16#80	O	U		
BypAct	1= Bypass active	BOOL	0	O	U		
BypPerm	1= Permanent bypass active	BOOL	0	O	U		

Name	Description	Format	Default	Type	Attr.	HMI	Permitted Values
BypTemp	1= Temporary bypass active	BOOL	0	O	U		
Byptime	Remaining bypass time	INT	0	O	U	+	
FiInAct	1= First input signal detected	BOOL	0	O	U		
LaStopRe	Last Stop Reason	STRUCT		O	U		
LaStopRe. .Value	Reason	INT	0	O	U	+	
LaStopRe .STime	Stop time	STRING [22]	''	O	U	+	
STATUS	Interface to OS	DWORD	16#00000 000	O	U	+	
STATUS2	Interface to OS	DWORD	16#00000 000	O	U	+	
FeatureOut	Feature Word to OS	DWORD	16#00000 000	O	U	+	
OS_PermOut	OS Permission to OS	DWORD	16#00000 000	O	U	+	
OS_PermLog	Operator Permission: Output for OS	DWORD	16#FFFF FFFF	O	U	+	
ST_Worst	Worst Signal Status	BYTE	16#80	O	U	+	
ErrorNum	Error Number	INT	-1	O	U	+	

OS-Variable table

C_INTLK4

OS Variable	Description	PLC Data Type	OS Data Type
In01#Value	Input value 01	BOOL	Binary variable
In02#Value	Input value 02	BOOL	Binary variable
In03#Value	Input value 03	BOOL	Binary variable
In04#Value	Input value 04	BOOL	Binary variable
RstOut	1 = Reset latched output	BOOL	Binary variable
TmpBypTi	Temporary bypass elapse time	INT	Signed 16-bit value
COMMAND	Command word	DWORD	Unsigned 32-bit value
Out#Value	Output value	BOOL	Binary variable
BypTime	Remaining bypass time	INT	Signed 16-bit value
LaStopRe#Value	Reason	INT	Signed 16-bit value
LaStopRe#STime	Stop time	STRING	Text tag 8-bit character set
STATUS	Status for OS	DWORD	Unsigned 32-bit value
STATUS2	Status for OS	DWORD	Unsigned 32-bit value
FeatureOut	Status of various features	DWORD	Unsigned 32-bit value
OS_PermOut	Operator Permissions: Output for OS	DWORD	Unsigned 32-bit value
OS_PermLog	Operator Permissions: Output for OS	DWORD	Unsigned 32-bit value
ST_Worst	Worst Signal Status	BYTE	Unsigned 8-bit value
ErrorNum	Error Number	INT	Signed 16-bit value

Variable details

Internal structure of the Commands, Alarms, Visualization status and Interface word:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Kommandowort**	**Commandword**		
COM_B40	Reset	0	Halten des Ausgangs zurücksetzen	Reset latched output		
COM_B41		1				
COM_B42		2				
COM_B43		3				
COM_B44		4				
COM_B45		5				
COM_B46		6				
COM_B47		7				
COM_B30	Bypass Reset	8	Bypass In01 zurücksetzen	Reset Bypass In01		
COM_B31	Bypass Reset	9	Bypass In02 zurücksetzen	Reset Bypass In02		
COM_B32	Bypass Reset	10	Bypass In03 zurücksetzen	Reset Bypass In03		
COM_B33	Bypass Reset	11	Bypass In04 zurücksetzen	Reset Bypass In04		
COM_B34		12				
COM_B35		13				
COM_B36		14				
COM_B37		15				
COM_B20	Bypass	0	Dauerhafter Bypass In01 ein	Set permanent Bypass In01		
COM_B21	Bypass	1	Dauerhafter Bypass In02 ein	Set permanent Bypass In02		
COM_B22	Bypass	2	Dauerhafter Bypass In03 ein	Set permanent Bypass In03		
COM_B23	Bypass	3	Dauerhafter Bypass In04 ein	Set permanent Bypass In04		
COM_B24		4				
COM_B25		5				
COM_B26		6				
COM_B27		7				
COM_B10	Bypass	8	Temporärer Bypass In01 ein	Set Temporary Bypass In01		
COM_B11	Bypass	9	Temporärer Bypass In02 ein	Set Temporary Bypass In02		
COM_B12	Bypass	10	Temporärer Bypass In03 ein	Set Temporary Bypass In03		
COM_B13	Bypass	11	Temporärer Bypass In04 ein	Set Temporary Bypass In04		
COM_B14		12				
COM_B15		13				
COM_B16		14				
COM_B17		15				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B40		0	Invert In01	Invert In01		
STA_B41		1	Invert In02	Invert In02		
STA_B42		2	Invert In03	Invert In03		
STA_B43		3	Invert In04	Invert In04		
STA_B44		4				
STA_B45		5				
STA_B46		6				
STA_B47		7				
STA_B30		8	Ausgangssignal	Output		
STA_B31		9	Bypass aktiv	Bypass active		
STA_B32		10	Dauerhafter Bypass aktiv	Permanent bypass active		
STA_B33		11	Temporärer Bypass aktiv	Temporary bypass active		
STA_B34		12	Erstsignalerkennung aktiv	First input detected		
STA_B35		13	Ausgang gehalten	Output latched		
STA_B36		14	Verriegelungsslogik	Interlock logic		
STA_B37		15				
STA_B20		16	Erstsignalerkennung In01	First input In01		
STA_B21		17	Erstsignalerkennung In02	First input In02		
STA_B22		18	Erstsignalerkennung In03	First input In03		
STA_B23		19	Erstsignalerkennung In04	First input In04		
STA_B24		20				
STA_B25		21				
STA_B26		22				
STA_B27		23				
STA_B10		24	Bypass In01	Bypass In01		
STA_B11		25	Bypass In02	Bypass In02		
STA_B12		26	Bypass In03	Bypass In03		
STA_B13		27	Bypass In04	Bypass In04		
STA_B14		28				
STA_B15		29				
STA_B16		30				
STA_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS2			**Status**	**Status**		
STA2_B40		0	Eingangssignal 01 angeschlossen	Input Signal 01 connected		
STA2_B41		1	Eingangssignal 02 angeschlossen	Input Signal 02 connected		
STA2_B42		2	Eingangssignal 03 angeschlossen	Input Signal 03 connected		
STA2_B43		3	Eingangssignal 04 angeschlossen	Input Signal 04 connected		
STA2_B44		4				
STA2_B45		5				
STA2_B46		6				
STA2_B47		7				
STA2_B30		8	interner Zustand von In01	internal value of In01		
STA2_B31		9	interner Zustand von In02	internal value of In02		
STA2_B32		10	interner Zustand von In03	internal value of In03		
STA2_B33		11	interner Zustand von In04	internal value of In04		
STA2_B34		12				
STA2_B35		13				
STA2_B36		14				
STA2_B37		15				
STA2_B20		16	Temporärer Bypass In01	Temporary bypass In01		
STA2_B21		17	Temporärer Bypass In02	Temporary bypass In02		
STA2_B22		18	Temporärer Bypass In03	Temporary bypass In03		
STA2_B23		19	Temporärer Bypass In04	Temporary bypass In04		
STA2_B24		20				
STA2_B25		21				
STA2_B26		22				
STA2_B27		23				
STA2_B10		24	Dauerhafter Bypass In01	Permanent bypass In01		
STA2_B11		25	Dauerhafter Bypass In02	Permanent bypass In02		
STA2_B12		26	Dauerhafter Bypass In03	Permanent bypass In03		
STA2_B13		27	Dauerhafter Bypass In04	Permanent bypass In04		
STA2_B14		28				
STA2_B15		29				
STA2_B16		30				
STA2_B17		31				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS3			**Status**	**Status**		
STA3_B40		0				
STA3_B41		1				
STA3_B42		2				
STA3_B43		3				
STA3_B44		4				
STA3_B45		5				
STA3_B46		6				
STA3_B47		7				
STA3_B30		8				
STA3_B31		9				
STA3_B32		10				
STA3_B33		11				
STA3_B34		12				
STA3_B35		13				
STA3_B36		14				
STA3_B37		15				
STA3_B20		16	Temporärer Bypass In01 gewählt	Temporary bypass In01 selected		
STA3_B21		17	Temporärer Bypass In02 gewählt	Temporary bypass In02 selected		
STA3_B22		18	Temporärer Bypass In03 gewählt	Temporary bypass In03 selected		
STA3_B23		19	Temporärer Bypass In04 gewählt	Temporary bypass In04 selected		
STA3_B24		20				
STA3_B25		21				
STA3_B26		22				
STA3_B27		23				
STA3_B10		24				
STA3_B11		25				
STA3_B12		26				
STA3_B13		27				
STA3_B14		28				
STA3_B15		29				
STA3_B16		30				
STA3_B17		31				

SIEMENS

Cemat V 8.2
Function Block Library ILS_CEM

Function Description **Edition 07/16**

Interlock C_INTERL

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring to property damage only have no safety alert symbol. The notices shown below are graded according to the degree of danger.

Danger
indicates that death or severe personal injury **will** result if proper precautions are not taken.

Warning
indicates that death or severe personal injury **may** result if proper precautions are not taken.

Caution
with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution
without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention
indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel.** Within the context of the safety notices in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

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Note the following:

Warning
This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.
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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens AG 2005
Technical data subject to change.

Description of C_INTERL

Type/Number

Module name: C_INTERL
Module no.: FB1057

Calling OBs

In the same OB with and after the last block whose signals are to be displayed on the C_INTERL.

Function

The C_INTERL block is used to implement a standardized interlock display which can be called on the OS. The block can be assigned a maximum of 10 input signals, which can each be inverted as required.

The first five inputs I1_1 to I1_5 form a group. Each signal can be linked logically either directly or inverted by setting the corresponding inputs NEG1_1 to NEG1_5.

Important: The modification of the negation inputs NEG1_1 to NEG1_5 in runtime (download for changes) can lead to a loss of the RLO for one CPU Cycle.
Therefore we recommend inverting directly at the Inputs I1_1 to I1_5.

The same applies to the second group of five inputs.

The type of logic operation of the first group is set at the AND_OR1 parameter. NEGRES_1 = 1 inverts the result of Q1 used to form Q via AND_OR3. Output Q1, however is not inverted.

The two group results can be operated linked logically by an AND/OR operation.

The logic result “LOG1” is represented by green color.

Operating principle

Input Interfaces

I1_1 **Input Signal 1, first group** **Basic state 1-Signal**

Format BOOL

The status of this interface is displayed in the interlock faceplate. The display is grey if the signal is ok and red if the signal is missing.

The display text must be entered under Object Properties under Text1 (only one text can be defined per interface). The maximum length of the text string is 16 characters.

At input I1_1 a direct connection of a negation can be used. The indicated status is the status after the negation. The negation itself is not shown in the faceplate.

NEG1_1 **I1_1 will be inverted** **Basic state 0-Signal**

Format BOOL

1-Signal at the interface NEG1_1 leads to a negation at input I1_1. In this case the negation is visible at the Interlock Faceplate.

Note: The modification of the negation input NEG1_1 in runtime (download for changes) can lead to a loss of the RLO for one CPU Cycle.
Therefore we recommend inverting directly at Input I1_1.

I1_2 **Input Signal 2, first group** **Basic state 1-Signal**

Format BOOL

See I1_1

NEG1_2 **I1_2 will be inverted** **Basic state 0-Signal**

Format BOOL

See NEG1_1

I1_3 **Input Signal 3, first group** **Basic state 1-Signal**

Format BOOL

See I1_1

NEG1_3 **I1_3 will be inverted** **Basic state 0-Signal**

Format BOOL

See NEG1_1

I1_4 **Input Signal 4, first group** **Basic state 1-Signal**

Format BOOL

See I1_1

NEG1_4 **I1_4 will be inverted** **Basic state 0-Signal**

Format BOOL

See NEG1_1

I1_5 **Input Signal 5, first group** **Basic state 1-Signal**

Format BOOL

See I1_1

NEG1_5 **I1_5 will be inverted** **Basic state 0-Signal**

Format BOOL

See NEG1_1

AND_OR1 **1= AND, 0= OR first group** **Basic state 1-Signal**

Format BOOL

1-Signal at the interface AND_OR1 connects the inputs of the first signal group with an AND function.
0-Signal at the interface AND_OR1 connects the inputs of the first signal group with an OR function.

I2_1 **Input Signal 1, second group** **Basic state 1-Signal**

Format BOOL

See I1_1

NEG2_1 **I2_1 will be inverted** **Basic state 0-Signal**

Format BOOL

See NEG1_1

I2_2 **Input Signal 2, second group** **Basic state 1-Signal**

Format BOOL

See I1_1

NEG2_2 **I2_2 will be inverted** **Basic state 0-Signal**

Format BOOL

See NEG1_1

I2_3 **Input Signal 3, second group** **Basic state 1-Signal**

Format BOOL

See I1_1

NEG2_3 **I2_3 will be inverted** **Basic state 0-Signal**

Format BOOL

See NEG1_1

I2_4 **Input Signal 4, second group** **Basic state 1-Signal**

Format BOOL

See I1_1

NEG2_4 **I2_4 will be inverted** **Basic state 0-Signal**

Format BOOL

See NEG1_1

I2_5 **Input Signal 5, second group** **Basic state 1-Signal**

Format BOOL

See I1_1

NEG2_5 **I2_5 will be inverted** **Basic state 0-Signal**

Format BOOL

See NEG1_1

AND_OR2 **1= AND, 0= OR second group** **Basic state 1-Signal**

Format BOOL

1-Signal at the interface AND_OR2 connects the inputs of the second signal group with an AND function.
0-Signal at the interface AND_OR2 connects the inputs of the second signal group with an OR function.

AND_OR3 **1= AND, 0= OR both groups** **Basic state 1-Signal**

Format BOOL

With 1-Signal at the interface AND_OR3 both signal groups are connected with an AND function.
With 0-Signal at the interface AND_OR3 both signal groups are connected with an OR function.

QC_Q_I **Quality Code for output Q** **Default: 16#80**

Format BYTE

Input QC_Q_I can be connected with the quality code of a driver block. This quality code is transferred to output QC_Q.

Output Interfaces

Q1 **Interim result, first group**

Format BOOL

Output Q1 shows the interim result of the first AND/OR function.

Q2 **Interim result, second group**

Format BOOL

Output Q1 shows the interim result of the second AND/OR function.

Q **Output signal**

Format BOOL

The result of the complete interlock function is shown at output Q. This output is used for the connection to the interface of the CEMAT block.

QC_Q **Quality Code for Q**

Format BYTE

This quality from input QC_O_I.

Additional output as Interface to the OS:

VSTATUS **Status word for OS**

Format DWORD

Interface to OS

For more information see Variable details.

Engineering

AS:

CFC Plan editing example:
The assignment of instance names is particularly important when the Interlock module is used. Depending on the "main object", the name is formed as follows.

For example, C_DRV_1D motor with plant identifier "FK11/E001" should be given an interlock protective circuit on the input interface "ESVG".

The name of the interlock module instances consists of:

FK11/E001	= main object
_ESVG	= interface description
1-3	= number of the interlock modules, max 3 units

i. e. FK11/E001_ESVG1 is the name of the first interlock module.

Please note:

- Correctly select the interconnection logic (red background means error)
- Assign the signal designations for the control room operator with understandable text.
- Only Text_1 is displayed in the Faceplate
- on one Interface it could only connect **one** of the Interlock module **Type** (Interlock or Interlock5)

OS:

No further parameterization is necessary.

However, an OS compile must be carried out (in order to generate the tags in the tag management).

Error handling

Only by means of the operating system.

Start-up characteristics

No special measures taken.

Time response

The block does not have a time response.

Assignment of the 32-bit status word VSTATUS

See VSTATUS for C_INTERL

Message characteristics

Does not exist.

Monitoring of process variables

Does not exist.

I/O-bar of C_INTERL

C_INTERL

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
I1_1	Input signal 1, first group	BOOL	1	I		+	
NEG1_1	1 = I1_1 will be inverted	BOOL	0	I			
I1_2	Input signal 2, first group	BOOL	1	I		+	
NEG1_2	1 = I1_2 will be inverted	BOOL	0	I			
I1_3	Input signal 3, first group	BOOL	1	I		+	
NEG1_3	1 = I1_3 will be inverted	BOOL	0	I			
I1_4	Input signal 4, first group	BOOL	1	I		+	
NEG1_4	1 = I1_4 will be inverted	BOOL	0	I			
I1_5	Input signal 5, first group	BOOL	1	I		+	
NEG1_5	1 = I1_5 will be inverted	BOOL	0	I			
AND_OR1	1= AND, 0= OR first group	BOOL	1	I			
I2_1	Input signal 1, second group	BOOL	1	I		+	
NEG2_1	1 = I2_1 will be inverted	BOOL	0	I			
I2_2	Input signal 2, second group	BOOL	1	I		+	
NEG2_2	1 = I2_2 will be inverted	BOOL	0	I			
I2_3	Input signal 3, second group	BOOL	1	I		+	
NEG2_3	1 = I2_3 will be inverted	BOOL	0	I			
I2_4	Input signal 4, second group	BOOL	1	I		+	
NEG2_4	1 = I2_4 will be inverted	BOOL	0	I			
I2_5	Input signal 5, second group	BOOL	1	I		+	
NEG2_5	1 = I2_5 will be inverted	BOOL	0	I			
AND_OR2	1= AND, 0= OR second group	BOOL	1	I			
AND_OR3	1= AND, 0= OR both groups	BOOL	1	I			
QC_Q_I	Quality Code for output Q	BYTE	16#80	I	U		

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
Q1	Interim result, first group	BOOL	0	O			
Q2	Interim result, second group	BOOL	0	O			
Q	Output signal	BOOL	0	O			
QC_Q	Quality Code for Q	BYTE	16#80	O	U		
VSTATUS	Extended status display in block icons	DWORD	16#00	O	U	+	

OS-Variable table

C_INTERL

OS Variable	Description	PLC Data Type	OS Data Type
I1_1	Input signal 1, first group	BOOL	Binary variable
I1_2	Input signal 2, first group	BOOL	Binary variable
I1_3	Input signal 3, first group	BOOL	Binary variable
I1_4	Input signal 4, first group	BOOL	Binary variable
I1_5	Input signal 5, first group	BOOL	Binary variable
I2_1	Input signal 1, second group	BOOL	Binary variable
I2_2	Input signal 2, second group	BOOL	Binary variable
I2_3	Input signal 3, second group	BOOL	Binary variable
I2_4	Input signal 4, second group	BOOL	Binary variable
I2_5	Input signal 5, second group	BOOL	Binary variable
VSTATUS	Extended status display in block icons	DWORD	Unsigned 32-bit value

Variable details

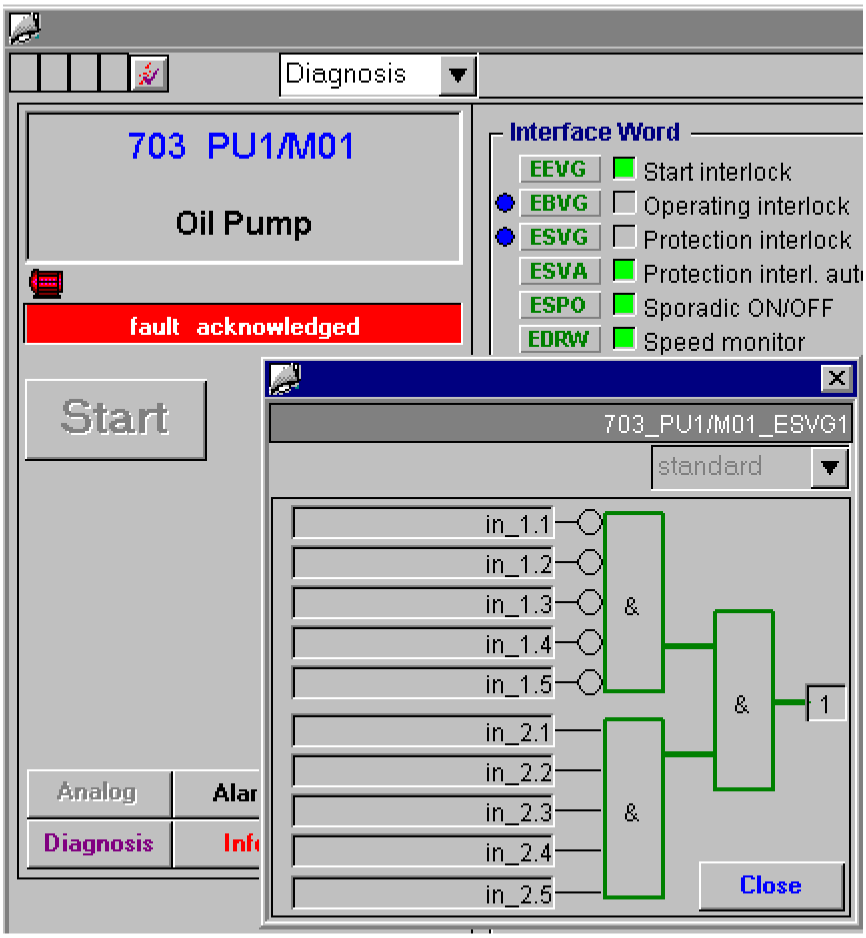
Internal structure of the Status word:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
VSTATUS			**Status**	**Status**		
VSTATUS_B41	I1_1	0	Eingangssignal 1, erste Gruppe	Input signal 1, first group		
VSTATUS_B41	I1_2	1	Eingangssignal 2, erste Gruppe	Input signal 2, first group		
VSTATUS_B42	I1_3	2	Eingangssignal 3, erste Gruppe	Input signal 3, first group		
VSTATUS_B43	I1_4	3	Eingangssignal 4, erste Gruppe	Input signal 4, first group		
VSTATUS_B44	I1_5	4	Eingangssignal 5, erste Gruppe	Input signal 5, first group		
VSTATUS_B45	I2_1	5	Eingangssignal 1, zweite Gruppe	Input signal 1, second group		
VSTATUS_B46	I2_2	6	Eingangssignal 2, zweite Gruppe	Input signal 2, second group		
VSTATUS_B47	I2_3	7	Eingangssignal 3, zweite Gruppe	Input signal 3, second group		
VSTATUS_B30	I2_4	8	Eingangssignal 4, zweite Gruppe	Input signal 4, second group		
VSTATUS_B31	I2_5	9	Eingangssignal 5, zweite Gruppe	Input signal 5, second group		
VSTATUS_B32	NEG1_1	10	1= I1_1 wird invertiert	1 = I1_1 will be inverted		
VSTATUS_B33	NEG1_2	11	1= I1_2 wird invertiert	1 = I1_2 will be inverted		
VSTATUS_B34	NEG1_3	12	1= I1_3 wird invertiert	1 = I1_3 will be inverted		
VSTATUS_B35	NEG1_4	13	1= I1_4 wird invertiert	1 = I1_4 will be inverted		
VSTATUS_B36	NEG1_5	14	1= I1_5 wird invertiert	1 = I1_5 will be inverted		
VSTATUS_B37	NEG2_1	15	1= I2_1 wird invertiert	1 = I2_1 will be inverted		
VSTATUS_B20	NEG2_2	16	1= I2_2 wird invertiert	1 = I2_2 will be inverted		
VSTATUS_B21	NEG2_3	17	1= I2_3 wird invertiert	1 = I2_3 will be inverted		
VSTATUS_B22	NEG2_4	18	1= I2_4 wird invertiert	1 = I2_4 will be inverted		
VSTATUS_B23	NEG2_5	19	1= I2_5 wird invertiert	1 = I2_5 will be inverted		
VSTATUS_B24		20				
VSTATUS_B25		21				
VSTATUS_B26	AND_OR1	22	1= AND, 0= OR erste Gruppe	1= AND, 0= OR first group		
VSTATUS_B27	AND_OR2	23	1= AND, 0= OR zweite Gruppe	1= AND, 0= OR second group		
VSTATUS_B10	AND_OR3	24	1= AND, 0= OR beider Gruppen	1= AND, 0= OR both groups		
VSTATUS_B11		25				
VSTATUS_B12	Q	26	Ausgangssignal	Output signal		
VSTATUS_B13	Q1	27	Zwischenergebnis erste Gruppe	Interim result, first group		
VSTATUS_B14	Q2	28	Zwischenergebnis zweite Gruppe	Interim result, second group		
VSTATUS_B15		29				
VSTATUS_B16		30				
VSTATUS_B17		31				

Operator control and monitoring

Display

When an interlock protective circuit is present, the corresponding interface is indicated with a blue point in the diagnostic dialog of the associated module type.



The interlock dialog displays the input parameter name of its logical state and the subsequent interconnection.

In an error situation, the input signal is displayed with a red background.

For the control room operator meaningful designations should be chosen for the input parameters.

Operator Control:

A single click on the corresponding interface designation opens the Interlock dialog.

The interlock dialog can be closed using the “Close” Button.

Further functions are not enabled.

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Cemat V 8.2
Function Block Library ILS_CEM

Function Description **Edition 07/16**

Interlock C_INTER5

Safety Guidelines

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indicates that death or severe personal injury **may** result if proper precautions are not taken.

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with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution
without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention
indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

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Prescribed Usage

Note the following:

Warning
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Disclaimer of Liability
We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens AG 2005
Technical data subject to change.

Siemens Aktiengesellschaft

Description of C_INTER5

Type/Number

Module name: C_INTER5
Module no.: FB1058

Calling OBs

In the same OB with and after the last block whose signals are to be displayed on the C_INTER5.

Function

The C_INTER5 block is used to implement a standardized interlock display which can be called on the OS. The block can be assigned a maximum of 5 input signals, which can each be inverted as required.

The main object of the C_INTER5 block was developed in order to save much as possible OS variables. Therefore the signal designations are not entered at the input signals, but in the string variable S_TEXT.
The designations of all 5 input signals must be entered in this string variable S_TEXT, separated by a semicolon “;”. The string length for each signal designation is 16 characters.

The five inputs I1_1 to I1_5 form a group. Each signal can be linked logically either directly or inverted by setting the corresponding inputs NEG1_1 to NEG1_5.

Important: The modification of the negation inputs NEG1_1 to NEG1_5 in runtime (download for changes) can lead to a loss of the RLO for one CPU Cycle.
Therefore we recommend inverting directly at the Inputs I1_1 to I1_5.

The type of logic operation of the group is set at the AND_OR1 parameter.

The logic result “LOG1” is represented by green color.

Operating principle

Input Interfaces

I1_1 **Input Signal 1** **Basic state 1-Signal**

Format BOOL

The status of this interface is displayed in the interlock faceplate. The display is grey if the signal is ok and red if the signal is missing.

At input I1_1 a direct connection of a negation can be used. The indicated status is the status after the negation. The negation itself is not shown in the faceplate.

NEG1_1 **I1_1 will be inverted** **Basic state 0-Signal**

Format BOOL

1-Signal at the interface NEG1_1 leads to a negation at input I1_1. In this case the negation is visible at the Interlock Faceplate.

Note: The modification of the negation input NEG1_1 in runtime (download for changes) can lead to a loss of the RLO for one CPU Cycle.
Therefore we recommend inverting directly at Input I1_1.

I1_2 **Input Signal 2** **Basic state 1-Signal**

Format BOOL

See I1_1

NEG1_2 **I1_2 will be inverted** **Basic state 0-Signal**

Format BOOL

See NEG1_1

I1_3 **Input Signal 3** **Basic state 1-Signal**

Format BOOL

See I1_1

NEG1_3 **I1_3 will be inverted** **Basic state 0-Signal**

Format BOOL

See NEG1_1

I1_4 **Input Signal 4** **Basic state 1-Signal**

Format BOOL

See I1_1

NEG1_4 **I1_4 will be inverted** **Basic state 0-Signal**

Format BOOL

See NEG1_1

I1_5 Input Signal 5 Basic state 1-Signal

Format BOOL

See I1_1

NEG1_5 I1_5 will be inverted Basic state 0-Signal

Format BOOL

See NEG1_1

AND_OR1 1= AND, 0= OR Basic state 1-Signal

Format BOOL

1-Signal at the interface AND_OR1 connects the inputs with an AND function.
0-Signal at the interface AND_OR1 connects the inputs with an OR function.

QC_Q_I Quality Code for output Q Default: 16#80

Format BYTE

Input QC_Q_I can be connected with the quality code of a driver block. This quality code is transferred to output QC_Q.

S_TEXT Texts for Input Signals 1 to 5

Format STRING

String variable S_TEXT contains the text definition for signal 1-5. Each partial string must be separated by semicolon.

Each partial string is limited to 16 characters.

Output Interfaces

Q **Output signal**

Format BOOL

The result of the interlock function is shown at output Q. This output is used for the connection to the interface of the CEMAT block.

QC_Q **Quality Code for Q**

Format BYTE

This quality from input QC_O_I.

Additional output as Interface to the OS:

VSTATUS **Status word for OS**

Format DWORD

Interface to OS

For more information see Variable details.

Configuring

AS:

CFC Plan editing example:

The assignment of instance names is particularly important when the Interlock module is used.

Depending on the "main object", the name is formed as follows.

For example, C_DRV_1D motor with plant identifier "FK11/E001" should be given an interlock protective circuit on the input interface "ESVG".

The name of the interlock module instances consists of:

FK11/E001	= main object
_ESVG	= interface description
1-3	= number of the interlock modules, max. 3 units

i.e. FK11/E001_ESVG1 is the name of the first interlock module.

Please note:

- Correctly select the interconnection logic (red background means error)
- Assign the signal designations for the control room operator with understandable text.
- Enter the signal designations in S_TEXT.
- on one Interface it could only connect **one** of the Interlock module **Type** (Interlock or Interlock5)

OS:

No further parameterization is necessary.

However, an OS compile must be carried out (in order to generate the tags in the tag management).

Error handling

Only by means of the operating system.

Start-up characteristics

No special measures taken.

Time response

The block does not have a time response.

Assignment of the 32-bit status word VSTATUS

see VSTATUS for C_INTER5

Message characteristics

Does not exist.

Monitoring of process variables

Does not exist.

I/O-bar of C_INTER5

C_INTER5

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
I1_1	Input signal 1, first group	BOOL	1	I			
NEG1_1	1 = I1_1 will be inverted	BOOL	0	I			
I1_2	Input signal 2, first group	BOOL	1	I			
NEG1_2	1 = I1_2 will be inverted	BOOL	0	I			
I1_3	Input signal 3, first group	BOOL	1	I			
NEG1_3	1 = I1_3 will be inverted	BOOL	0	I			
I1_4	Input signal 4, first group	BOOL	1	I			
NEG1_4	1 = I1_4 will be inverted	BOOL	0	I			
I1_5	Input signal 5, first group	BOOL	1	I			
NEG1_5	1 = I1_5 will be inverted	BOOL	0	I			
AND_OR1	1= AND, 0= OR first group	BOOL	1	I			
QC_Q_I	Quality Code for output Q	BYTE	16#80	I	U		
S_TEXT	Signal designations for the input signals 1 to 5, separated by a semicolon.	STRING [86]	aaaaaaaa aaaaaaaa; bbbbbbbb bbbbbbbb; ccccccccc ccccccc; dddddddd dddddddd; eeeeeeee eeeeeeee	I		+	
Q	Output signal	BOOL	0	O			
QC_Q	Quality Code for Q	BYTE	16#80	O	U		
VSTATUS	Extended status display in block icons	DWORD	16#00	O	U	+	

OS-Variable table

C_INTER5

OS Variable	Description	PLC Data Type	OS Data Type
S_TEXT	Signal designations for the input signals 1 to 5, separated by a semicolon.	STRING [86]	Text variable 8-bit character set
VSTATUS	Extended status display in block icons	DWORD	Unsigned 32-bit value

Variable details

Internal structure of the Status word:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
VSTATUS			**Status**	**Status**		
VSTATUS_B41	I1_1	0	Eingangssignal 1, erste Gruppe	Input signal 1, first group		
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VSTATUS_B42	I1_3	2	Eingangssignal 3, erste Gruppe	Input signal 3, first group		
VSTATUS_B43	I1_4	3	Eingangssignal 4, erste Gruppe	Input signal 4, first group		
VSTATUS_B44	I1_5	4	Eingangssignal 5, erste Gruppe	Input signal 5, first group		
VSTATUS_B45		5				
VSTATUS_B46		6				
VSTATUS_B47		7				
VSTATUS_B30		8				
VSTATUS_B31		9				
VSTATUS_B32	NEG1_1	10	1= I1_1 wird invertiert	1 = I1_1 will be inverted		
VSTATUS_B33	NEG1_2	11	1= I1_2 wird invertiert	1 = I1_2 will be inverted		
VSTATUS_B34	NEG1_3	12	1= I1_3 wird invertiert	1 = I1_3 will be inverted		
VSTATUS_B35	NEG1_4	13	1= I1_4 wird invertiert	1 = I1_4 will be inverted		
VSTATUS_B36	NEG1_5	14	1= I1_5 wird invertiert	1 = I1_5 will be inverted		
VSTATUS_B37		15				
VSTATUS_B20		16				
VSTATUS_B21		17				
VSTATUS_B22		18				
VSTATUS_B23		19				
VSTATUS_B24		20				
VSTATUS_B25		21				
VSTATUS_B26	AND_OR1	22	1= AND, 0= OR erste Gruppe	1= AND, 0= OR first group		
VSTATUS_B27		23				
VSTATUS_B10		24				
VSTATUS_B11		25				
VSTATUS_B12	Q	26	Ausgangssignal	Output signal		
VSTATUS_B13		27				
VSTATUS_B14		28		I		
VSTATUS_B15		29				
VSTATUS_B16		30				
VSTATUS_B17		31				

Operator control and monitoring

Display

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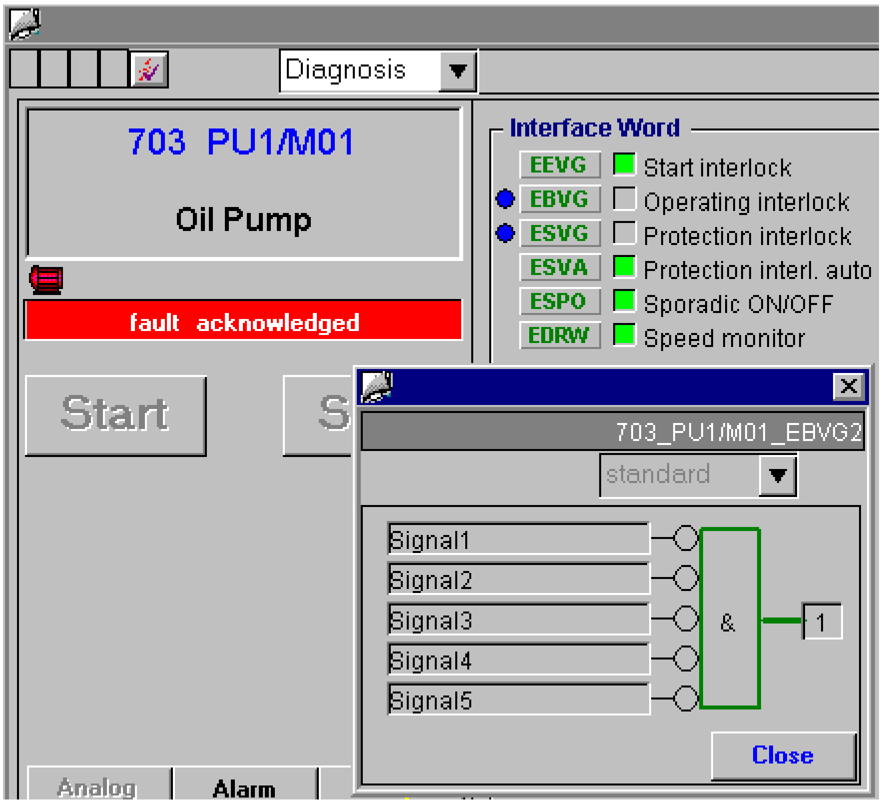

The interlock dialog displays the input parameter name of its logical state and the subsequent interconnection.

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For the control room operator meaningful designations should be chosen for the input parameters.

Operator Control

A single click on the corresponding interface designation opens the Interlock dialog.

Further functions are not enabled.

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Cemat V 8.2
Function Block Library ILS_CEM

Function Description **Edition 07/16**

Object Data Acquisition

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Siemens Aktiengesellschaft

Description of C_ODA

Type/Number

Module name: **C_ODA**
Module no.: **FB1060 and FB 1061**

Calling OBs

C_ODA must be called in OB1 (MAIN_TASK). (min. cycle time 60ms).

Function

Via the CEMAT ODA (Operation Data Acquisition) block, the shift- or daily-values can be provided for an operating data protocol through preconfigured CFC-data acquisition blocks.

An operating data protocol usually has the following structure:

Data acquisition:

The data acquisition means the detection of all values which are necessary for the construction of the BDP.

To these abovementioned values belongs a. o.:

- operating time (RT module, Motor)
- operating cycle (Counter, Damper, Valve)
- amounts
- electrical Energy
- temperatures
- pressure
- states of plants or plant components

The main characteristic of the data acquisition is that information comes from the plant itself and is processed via independent acquisition modules or CEMAT control blocks.

Data storage:

The data storage serves the purpose to deposit the information coming from the plant, and it can be done hierarchically.

Viz.: Each acquisition block can handle a maximum of 15 values for local intermediate storage of 24 hourly values and a summarizing for the current day.

The input values are also subdivided by the data format into 5 DWords and 10 REAL.

The information is stored in a data block, whose Data words are available as WinCC variable on the OS.

The hourly values can be stored as continuing values or as differential values.

If you use the difference values you can additionally consider a conversion factor (e.g. conversion in hours).

The next storage level is made then on the OS level in a data base (User archive or TAG Logging)

Data handling:

The data handling is the processing of the recorded information from the data acquisition.

Here you can carry out additional conversions or totalizing for shift-, week- or month- protocols.

Data output:

The data output is the print of the Operation data protocol in a previously defined form at a defined time.

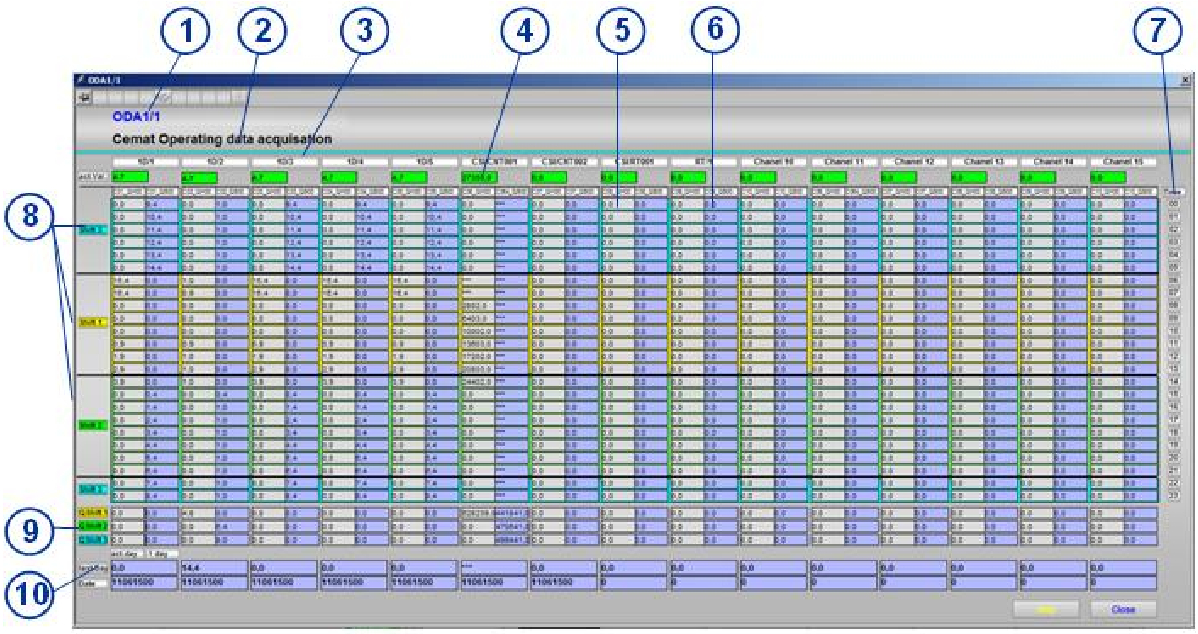
Via PCS7 Reports or in the AddOn "WinCC Data Monitoring " the Output format can be designed.

Alarm messages:

None

Visualization:

C_ODA_STANDARD.PDL.



(1) TAG of ODA Object

(2) Comment of ODA Object

(3) TAG of connected object to that channel

(4) Actual Value of channel

(5) Actual Values per hour

(6) Values per hour from the day before

(7) Hour

(8) Shift indication

(9) Sum of shift values

(10) Sum of the day

Operating principle

Input interfaces

SHIFT1	Start time shift 1
SHIFT2	Start time shift 2
SHIFT3	Start time shift 3

Parameter instructions each acquisition port:

C01_PV	Process value
C01_SCAN	Acquisition time
C01_ENPV	Release process value acquisition
C01_DIF	Difference calculation at hour value storage
C01_FAC	Calculation factor
C01_OPM	Calculation mode 0= off; 1 multiply; 2 divide

Output interfaces

QT_DAY	Day values are transferred
QT_S1-S3	Shift values are transferred
QTOG_DAY	Toggle day values are transferred
QTOG_S1-S3	Toggle shift values are transferred

Output values each acquisition port:

C01_QT	Pulse value is transferred
C01_QA	Current process output value
C01_QH00-QH23	Hours value storage
C01_QS00-QS23	Hours storage for the past day
C01_QS1-3	Summarizing value of the single shifts for the current day
C01_QCS1-3	Summarizing value of the single shifts for the past day
C01_QCDAY	Day value
C01_DATE	Date of the storage day

Via interfaces "SHIFT1-3“ the "shift initiation times” are defined.

With the release input C01_ENPV the connected process value C01_PV is read in the adjusted acquisition time C01_SCAN and written to the output C01_QA.

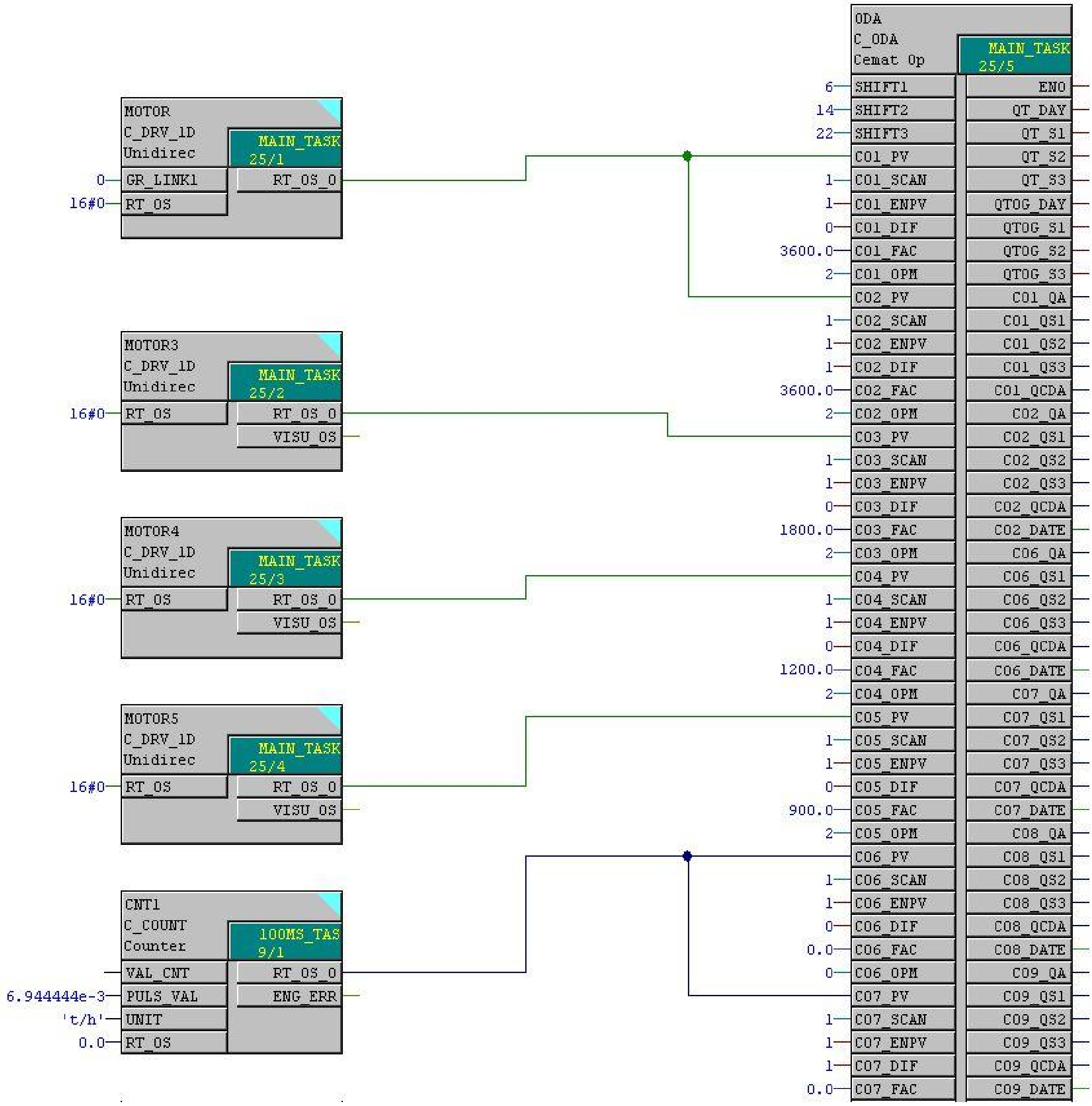
After the expiration of one full hour the output C01_QA or, depending on the parameterization, the calculated value or difference value is written into the accordant output C01_QHxx and an edge output bit C01_QT is triggered.

At the end of each shift the summarizing value is assigned to the shift output.

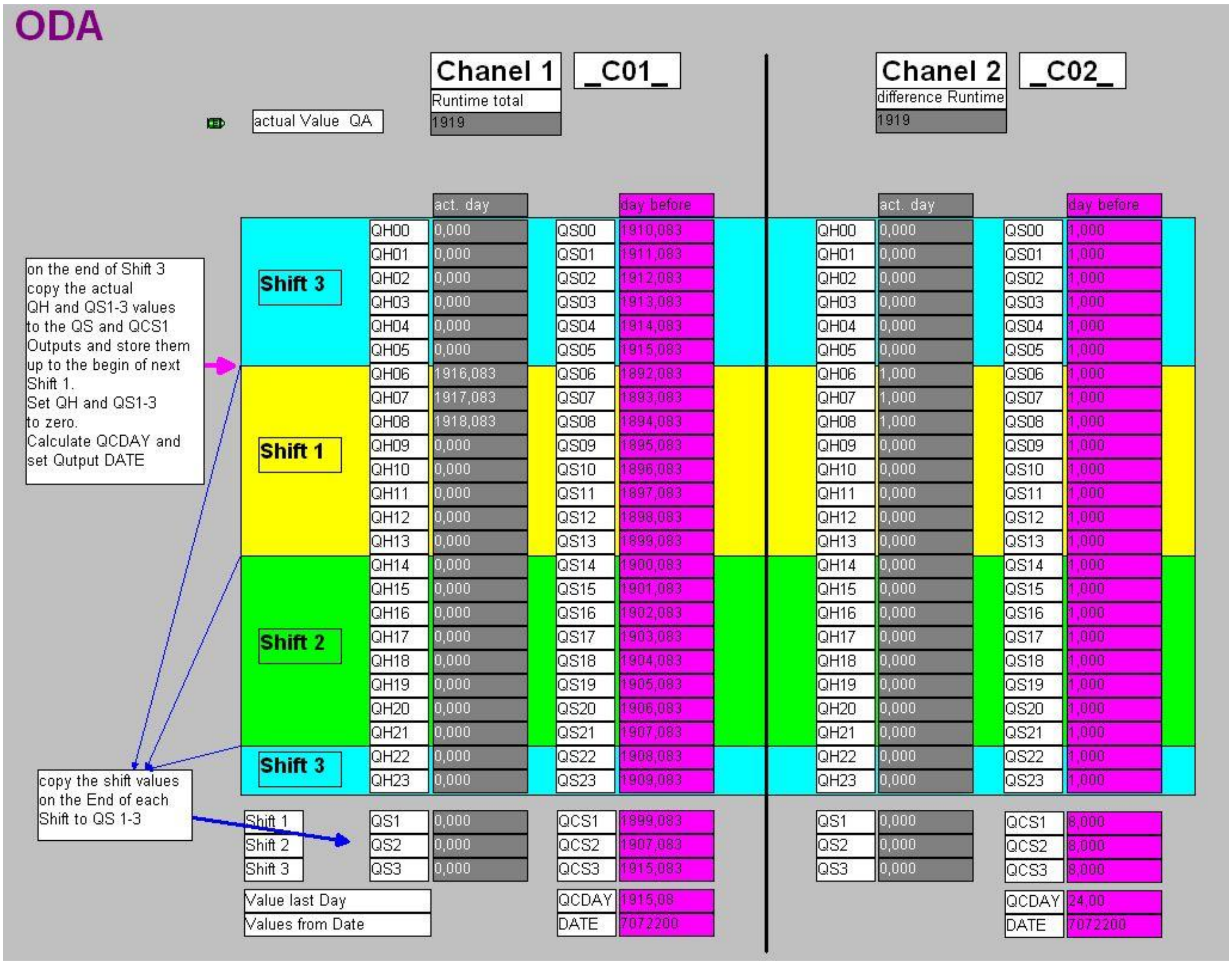
At the shift end 3 all hour values and shift values are copied into the security area C01_QSxx and C01_QCSx, the day value is calculated and the current output values are deleted. The security area also gets a date item for the expired day.

The release Cxx_ENPV cannot be operated via the OS.

Example of a circuit:



Variables on the OS



Time characteristics

None

Message characteristics

No messages are deposited.

Module states

None

Commands

None

I/O-bar of C_ ODA

C_ODA

Element	Meaning	Type	Default	Form	Attr.	B&B	Permitted values
SHIFT1	Beginning shift 1	INT	0	I			
SHIFT2	Beginning shift 2	INT	0	I			
SHIFT3	Beginning shift 3	INT	0	I			
C01_PV	Process value	DWORD	16#00	I			
C01_SCAN	Scan time in minutes	INT	10	I			
C01_ENPV	Release process value	BOOL	0	I			
C01_DIF	Difference value release	BOOL	0	I	U		
C01_FAC	Conversion factor	REAL	0.0	I	U		
C01_OPM	Calculating mode 0= off 1= multiply 2= divide	INT	0	I	U		
C05_PV	Process value	DWORD	16#00	I			
C05_SCAN	Scan time in minutes	INT	10	I			
C05_ENPV	Release process value	BOOL	0	I			
C05_DIF	Difference value release	BOOL	0	I	U		
C05_FAC	Conversion factor	REAL	0.0	I	U		
C05_OPM	Calculating mode 0= off 1= multiply 2= divide	INT	0	I	U		
C06_PV	Process value	REAL	0.0	I			
C06_SCAN	Scan time in minutes	INT	10	I			
C06_ENPV	Release process value	BOOL	0	I			
C06_DIF	Difference value release	BOOL	0	I	U		
C06_FAC	Conversion factor	REAL	0.0	I	U		
C06_OPM	Calculating mode 0= off 1= multiply 2= divide	INT	0	I	U		

Element	Meaning	Type	Default	Form	Attr.	B&B	Permitted values
C15_PV	Process value	REAL	0.0	I			
C15_SCAN	Scan time in minutes	INT	10	I			
C15_ENPV	Release process value	BOOL	0	I			
C15_DIF	Difference value release	BOOL	0	I	U		
C15_FAC	Conversion factor	REAL	0.0	I	U		
C15_OPM	Calculating mode 0= off 1= multiply 2= divide	INT	0	I	U		
QT_DAY	Day values transferred	BOOL	0	O		+	
QT_S1	Shift 1 values transferred	BOOL	0	O		+	
QT_S2	Shift 2 values transferred	BOOL	0	O		+	
QT_S3	Shift 3 values transferred	BOOL	0	O		+	
QTOG_DAY	Toggle day value transferred	BOOL	0	O		+	
QTOG_S1	Toggle shift 1 transferred	BOOL	0	O		+	
QTOG_S2	Toggle shift 2 transferred	BOOL	0	O		+	
QTOG_S3	Toggle shift 3 transferred	BOOL	0	O		+	
C01_QT	Impetus value transferred	BOOL	0	O	U	+	
C01_QA	Current value	Real	0.0	O		+	
C01_QH00	Hour value 00	Real	0.0	O	U	+	
C01_QH01	Hour value 01 current day	Real	0.0	O	U	+	
C01_QH02	Hour value 02 current day	Real	0.0	O	U	+	
C01_QH03	Hour value 03 current day	Real	0.0	O	U	+	
C01_QH04	Hour value 04 current day	Real	0.0	O	U	+	

Element	Meaning	Type	Default	Form	Attr.	B&B	Permitted values
C01_QH05	Hour value 05 current day	Real	0.0	O	U	+	
C01_QH06	Hour value 06 current day	Real	0.0	O	U	+	
C01_QH07	Hour value 07 current day	Real	0.0	O	U	+	
C01_QH08	Hour value 08 current day	Real	0.0	O	U	+	
C01_QH09	Hour value 09 current day	Real	0.0	O	U	+	
C01_QH10	Hour value 10 current day	Real	0.0	O	U	+	
C01_QH11	Hour value 11 current day	Real	0.0	O	U	+	
C01_QH12	Hour value 12 current day	Real	0.0	O	U	+	
C01_QH13	Hour value 13 current day	Real	0.0	O	U	+	
C01_QH14	Hour value 14 current day	Real	0.0	O	U	+	
C01_QH15	Hour value 15 current day	Real	0.0	O	U	+	
C01_QH16	Hour value 16 current day	Real	0.0	O	U	+	
C01_QH17	Hour value 17 current day	Real	0.0	O	U	+	
C01_QH18	Hour value 18 current day	Real	0.0	O	U	+	
C01_QH19	Hour value 19 current day	Real	0.0	O	U	+	
C01_QH20	Hour value 20 current day	Real	0.0	O	U	+	
C01_QH21	Hour value 21 current day	Real	0.0	O	U	+	
C01_QH22	Hour value 22 current day	Real	0.0	O	U	+	
C01_QH23	Hour value 23 current day	Real	0.0	O	U	+	
C01_QS00	Hour value 00 past day	Real	0.0	O	U	+	
C01_QS01	Hour value 01 past day	Real	0.0	O	U	+	
C01_QS02	Hour value 02 past day	Real	0.0	O	U	+	
C01_QS03	Hour value 03 past day	Real	0.0	O	U	+	
C01_QS04	Hour value 04 past day	Real	0.0	O	U	+	
C01_QS05	Hour value 05 past day	Real	0.0	O	U	+	
C01_QS06	Hour value 06 past day	Real	0.0	O	U	+	
C01_QS07	Hour value 07 past day	Real	0.0	O	U	+	

Element	Meaning	Type	Default	Form	Attr.	B&B	Permitted values
C01_QS08	Hour value 08 past day	Real	0.0	O	U	+	
C01_QS09	Hour value 09 past day	Real	0.0	O	U	+	
C01_QS10	Hour value 10 past day	Real	0.0	O	U	+	
C01_QS11	Hour value 11 past day	Real	0.0	O	U	+	
C01_QS12	Hour value 12 past day	Real	0.0	O	U	+	
C01_QS13	Hour value 13 past day	Real	0.0	O	U	+	
C01_QS14	Hour value 14 past day	Real	0.0	O	U	+	
C01_QS15	Hour value 15 past day	Real	0.0	O	U	+	
C01_QS16	Hour value 16 past day	Real	0.0	O	U	+	
C01_QS17	Hour value 17 past day	Real	0.0	O	U	+	
C01_QS18	Hour value 18 past day	Real	0.0	O	U	+	
C01_QS19	Hour value 19 past day	Real	0.0	O	U	+	
C01_QS20	Hour value 20 past day	Real	0.0	O	U	+	
C01_QS21	Hour value 21 past day	Real	0.0	O	U	+	
C01_QS22	Hour value 22 past day	Real	0.0	O	U	+	
C01_QS23	Hour value 23 past day	Real	0.0	O	U	+	
C01_QS1	Shift value 1 current day	Real	0.0	O	U	+	
C01_QS2	Shift value 2 current day	Real	0.0	O	U	+	
C01_QS3	Shift value 3 current day	Real	0.0	O	U	+	
C01_QCS1	Shift value 1 past day	Real	0.0	O	U	+	
C01_QCS2	Shift value 2 past day	Real	0.0	O	U	+	
C01_QCS3	Shift value 2 past day	Real	0.0	O	U	+	
C01_QCDAY	Sum day	Real	0.0	O	U	+	
C01_DATE	Date of past day	DWORD	16#00	O	U	+	
C02_QT	Impetus value transferred	BOOL	0	O	U	+	
C02_QA	Current value	Real	0.0	O	U	+	

Element	Meaning	Type	Default	For m	Attr.	B&B	Permitted values
C02_QH00-H23	Hour value 00 to 23 current day	Real	0.0	O	U	+	
C02_QS00-S23	Hour value 00 to 23 past day	Real	0.0	O	U	+	
C02_QS1-3	Shift value 1-3 current day	Real	0.0	O	U	+	
C02_QCS1-3	Shift value 1-3 past day	Real	0.0	O	U	+	
C02_QCDAY	Sum day	Real	0.0	O	U	+	
C02_DATE	Date of past day	DWORD	16#00	O	U	+	
C03_QT	Impetus value transferred	BOOL	0	O	U	+	
C03_QA	Current value	Real	0.0	O	U	+	
C03_QH00-H23	Hour value 00 to 23 current day	Real	0.0	O	U	+	
C03_QS00-S23	Hour value 00 to 23 past day	Real	0.0	O	U	+	
C03_QS1-3	Shift value 1-3 current day	Real	0.0	O	U	+	
C03_QCS1-3	Shift value 1-3 past day	Real	0.0	O	U	+	
C03_QCDAY	Sum day	Real	0.0	O	U	+	
C03_DATE	Date of past day	DWORD	16#00	O	U	+	
C15_QT	Impetus value transferred	BOOL	0	O	U	+	
C15_QA	Current value	Real	0.0	O	U	+	
C15_QH00-H23	Hour value 00 to 23 current day	Real	0.0	O	U	+	
C15_QS00-S23	Hour value 00 to 23 past day	Real	0.0	O	U	+	
C15_QS1-3	Shift value 1-3 current day	Real	0.0	O	U	+	
C15_QCS1-3	Shift value 1-3 past day	Real	0.0	O	U	+	
C15_QCDAY	Sum day	Real	0.0	O	U	+	
C15_DATE	Date of past day	DWORD	16#00	O	U	+	

OS-Variable table

C_ODA

OS Variable	Description	PLC Data Type	OS Data Type
QT_DAY	Day values transferred	BOOL	Binary variable
QT_S1	Shift 1 values transferred	BOOL	Binary variable
QT_S2	Shift 2 values transferred	BOOL	Binary variable
QT_S3	Shift 3 values transferred	BOOL	Binary variable
QTOG_DAY	Toggle day value transferred	BOOL	Binary variable
QTOG_S1	Toggle shift 1 transferred	BOOL	Binary variable
QTOG_S2	Toggle shift 2 transferred	BOOL	Binary variable
QTOG_S3	Toggle shift 3 transferred	BOOL	Binary variable
C01 – C15_QT	Impetus value transferred	BOOL	Binary variable
C01 - C15_QA	Current value	Real	Binary variable
C01 - C15_QH00	Hour value 00	Real	32-bit floating-point number IEEE 754
C01 - C15_QH01	Hour value 01 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH02	Hour value 02 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH03	Hour value 03 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH04	Hour value 04 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH05	Hour value 05 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH06	Hour value 06 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH07	Hour value 07 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH08	Hour value 08 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH09	Hour value 09 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH10	Hour value 10 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH11	Hour value 11 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH12	Hour value 12 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH13	Hour value 13 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH14	Hour value 14 current day	Real	32-bit floating-point number IEEE 754

OS Variable	Description	PLC Data Type	OS Data Type
C01 - C15_QH15	Hour value 15 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH16	Hour value 16 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH17	Hour value 17 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH18	Hour value 18 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH19	Hour value 19 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH20	Hour value 20 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH21	Hour value 21 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH22	Hour value 22 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QH23	Hour value 23 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS00	Hour value 00 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS01	Hour value 01 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS02	Hour value 02 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS03	Hour value 03 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS04	Hour value 04 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS05	Hour value 05 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS06	Hour value 06 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS07	Hour value 07 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS08	Hour value 08 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS09	Hour value 09 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS10	Hour value 10 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS11	Hour value 11 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS12	Hour value 12 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS13	Hour value 13 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS14	Hour value 14 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS15	Hour value 15 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS16	Hour value 16 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS17	Hour value 17 past day	Real	32-bit floating-point number IEEE 754

OS Variable	Description	PLC Data Type	OS Data Type
C01 - C15_QS18	Hour value 18 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS19	Hour value 19 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS20	Hour value 20 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS21	Hour value 21 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS22	Hour value 22 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS23	Hour value 23 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS1	Shift value 1 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS2	Shift value 2 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QS3	Shift value 3 current day	Real	32-bit floating-point number IEEE 754
C01 - C15_QCS1	Shift value 1 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QCS2	Shift value 2 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QCS3	Shift value 2 past day	Real	32-bit floating-point number IEEE 754
C01 - C15_QCDAY	Sum day	Real	32-bit floating-point number IEEE 754
C01 - C15_DATE	Date of past day	DWORD	Unsigned 32-bit value

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Cemat V 8.2
Function Block Library ILS_CEM

Function Description **Edition 07/16**

PID with 3 Parameter sets C_PID3

Safety Guidelines

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Danger
indicates that death or severe personal injury **will** result if proper precautions are not taken.

Warning
indicates that death or severe personal injury **may** result if proper precautions are not taken.

Caution
with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution
without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention
indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel.** Within the context of the safety notices in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

Warning
This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.
Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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Automation and Drives
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Disclaimer of Liability
We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Description of C_PID3

Type/Number

Module name: C_PID3
Module no.: FB1018

Calling OBs

C_PID3 must be called in a Time-OB e.g. OB35.

Function

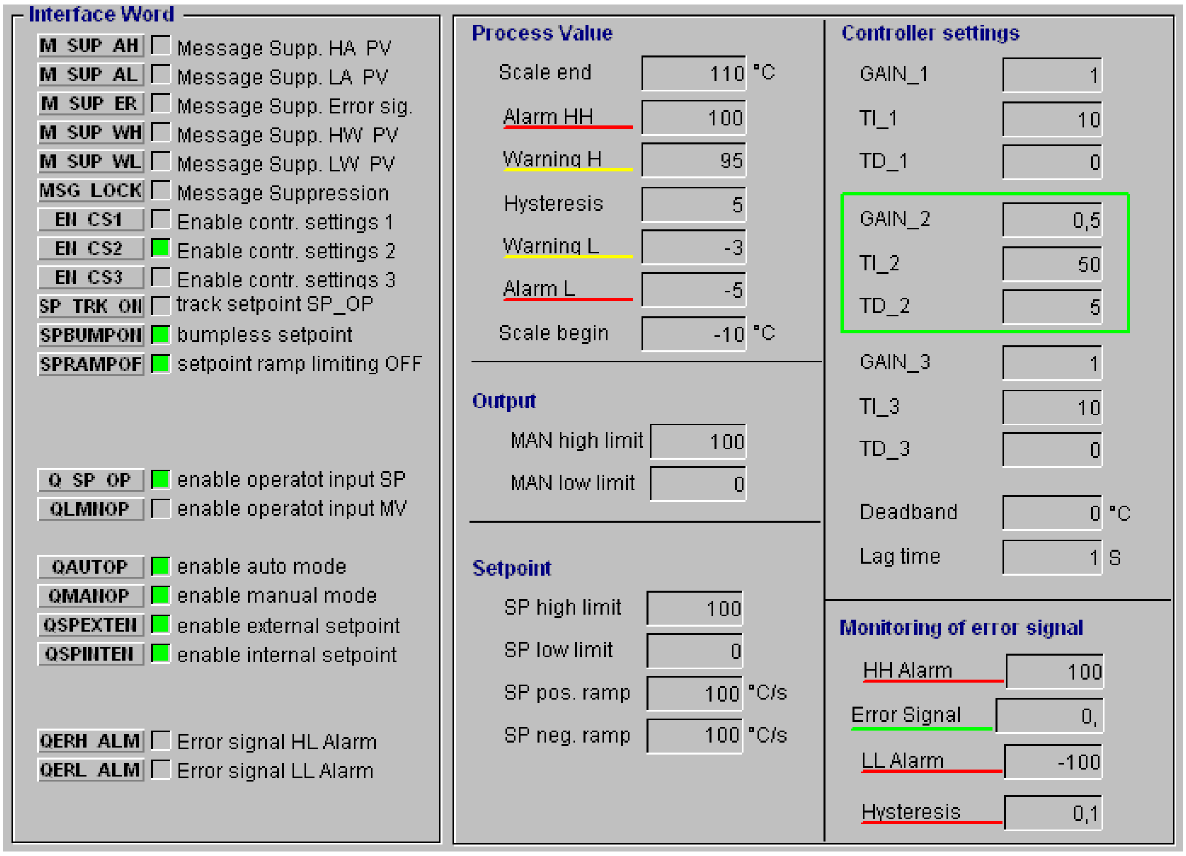
The C_PID3 calls inside the standard controller FB61 CTRL_PID. The improved block C_PID3 can handle 3 several sets of controller settings for (GAIN, TI, TD). With 3 binary inputs one can enable one set of controller settings (1-3).

The presetting is parameter set 1. If there are more than one set are enabled, the set with the lower number is active. If there are no set enabled then the parameter set 1 is active.

At the diagnosis faceplate the active parameter set is marked with a green frame. Look at the following picture.

Recommendation:

If there is no need for a controller with 3 several settings use the standard controller FB61 CTRL_PID because the FB1018 needs more performance.


Interface Word
M SUP AH
Message Supp. HA PV
M SUP AL
Message Supp. LA PV
M SUP ER
Message Supp. Error sig.
M SUP WH
Message Supp. HW PV
M SUP WL
Message Supp. LW PV
MSG LOCK
Message Suppression
EN CS1
Enable contr. settings 1
EN CS2
Enable contr. settings 2
EN CS3
Enable contr. settings 3
SP TRK ON
track setpoint SP_OP
SPBUMPON
bumpless setpoint
SPRAMPOF
setpoint ramp limiting OFF
Q SP OP
enable operatot input SP
QLMNOP
enable operatot input MV
QAUTOP
enable auto mode
QMANOP
enable manual mode
QSPEXTEN
enable external setpoint
QSPINTEN
enable internal setpoint
QERH ALM
Error signal HL Alarm
QERL ALM
Error signal LL Alarm
Process Value
Scale end 110 °C
Alarm HH 100
Warning H 95
Hysteresis 5
Warning L -3
Alarm L -5
Scale begin -10 °C
Output
MAN high limit 100
MAN low limit 0
Setpoint
SP high limit 100
SP low limit 0
SP pos. ramp 100 °C/s
SP neg. ramp 100 °C/s
Controller settings
GAIN_1 1
TI_1 10
TD_1 0
GAIN_2 0,5
TI_2 50
TD_2 5
GAIN_3 1
TI_3 10
TD_3 0
Deadband 0 °C
Lag time 1 S
Monitoring of error signal
HH Alarm 100
Error Signal 0,
LL Alarm -100
Hysteresis 0,1

Input interfaces

The additional parameters are described only.

EN_CS1 Enable controller settings 1 Basic state 1-Signal

Format BOOL

1-signal at this interface enables the first set of the controller settings (GAIN_1, TI_1, TD_1) active.

EN_CS2 Enable controller settings 2 Basic state 0-Signal

Format BOOL

1-signal at this interface enables the second set of the controller settings (GAIN_2, TI_2, TD_2) active.

EN_CS3 Enable controller settings 3 Basic state 0-Signal

Format BOOL

1-signal at this interface enables the third set of the controller settings (GAIN_3, TI_3, TD_3) active.

Process values

The process values can be set during engineering and they can be changed online from the OS. To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

GAIN_1 **Proportional gain 1** **Default: 1.0**

Format REAL

TN_1 **Tracking time 1** **Default: 1.0**

Format REAL

Value in seconds

TV_1 **Derivative time 1** **Default: 0.0**

Format REAL

Value in seconds

GAIN_2 **Proportional gain 2** **Default: 1.0**

Format REAL

TN_2 **Tracking time 2** **Default: 1.0**

Format REAL

Value in seconds

TV_2 **Derivative time 2** **Default: 0.0**

Format REAL

Value in seconds

GAIN_3 **Proportional gain 3** **Default: 1.0**

Format REAL

TN_3 **Tracking time 3** **Default: 1.0**

Format REAL

Value in seconds

TV_3 **Derivative time 3** **Default: 0.0**

Format REAL

Value in seconds

Interfaces to OS

STATUS **Statusword to OS**

Format DWORD

Interface to OS

Variable details

Internal structure of the Visualization status:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B40		0				
STA_B41		1				
STA_B42		2				
STA_B43		3				
STA_B44		4				
STA_B45		5				
STA_B46		6				
STA_B47		7				
STA_B30		8				
STA_B31		9				
STA_B32		10				
STA_B33		11				
STA_B34		12				
STA_B35		13				
STA_B36		14				
STA_B37		15				
STA_B20	SET1	16	Parameter Satz 1 aktiv	Controller settings 1 active		
STA_B21	SET2	17	Parameter Satz 2 aktiv	Controller settings 2 active		
STA_B22	SET3	18	Parameter Satz 3 aktiv	Controller settings 3 active		
STA_B23	EN_CS1	19	Freigabe Parameter Satz 1	Enable contr. Settings 1		
STA_B24	EN_CS2	20	Freigabe Parameter Satz 2	Enable contr. Settings 2		
STA_B25	EN_CS3	21	Freigabe Parameter Satz 3	Enable contr. Settings 3		
STA_B26		22				
STA_B27		23				
STA_B10		24				
STA_B11		25				
STA_B12		26				
STA_B13		27				
STA_B14		28				
STA_B15		29				
STA_B16		30				
STA_B17		31				

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Cemat V 8.2
Function Block Library ILS_CEM

Function Description Edition 07/16

Polygon Module C_POLY3

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Siemens AG 2005
Technical data subject to change.

POLYGON MODULE C_POLY3 1

Description of C_POLY3

Typ/Number

Module name: C_POLY3
Module no.: FB1039

Calling OBs

C_POLY3 must be called in OB1 (MAIN_TASK).

Function

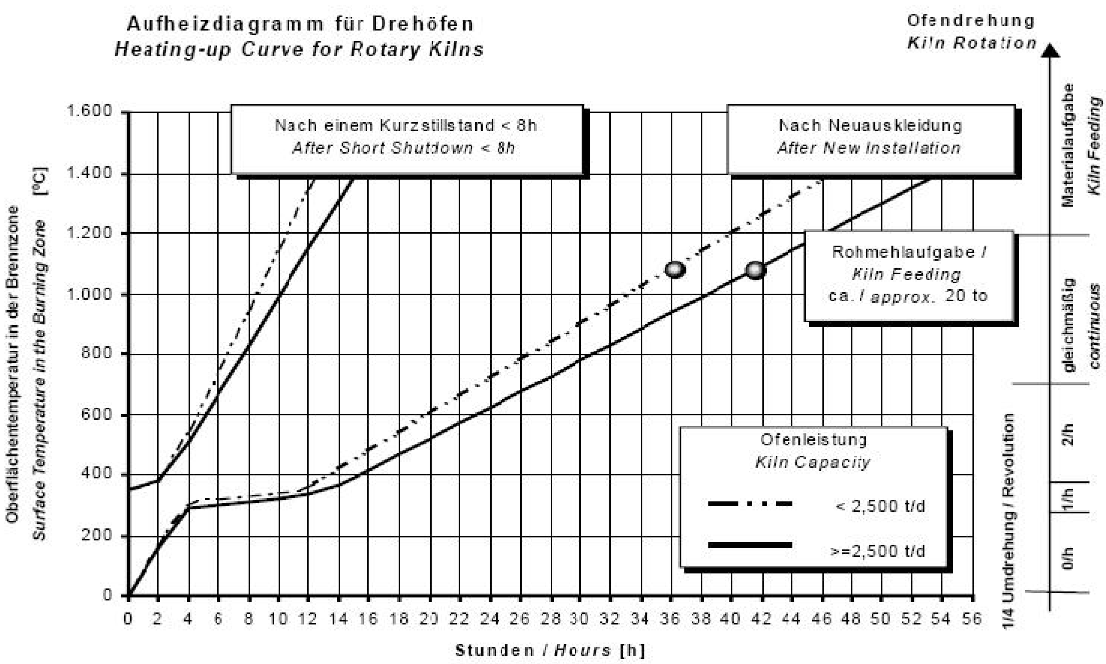
General User Description

The C_POLY3 is used for the following Applications:

- Convert the input signal to a non-linear characteristic curve for a maximum of 3 outputs with up to 8 interpolation points.

- additional Speed outputs with pulse/silent period in a defined time range

That means startup or shutdown diagrams simply can be realized to heading up a Kiln or start a mill.



Function Description

After fixing the Interpolation Points by setting the parameter of Interface "Num" a second and third polygon can be switched on from the OS Faceplate.

With the definition of the min and Max Values of Input and Output values the scope is enclosed for the parameter setting.

Is the Input [Release] is set and an Input value [IN] or the internal Time is carried out between the defined bases the calculation of the Outputs can start.

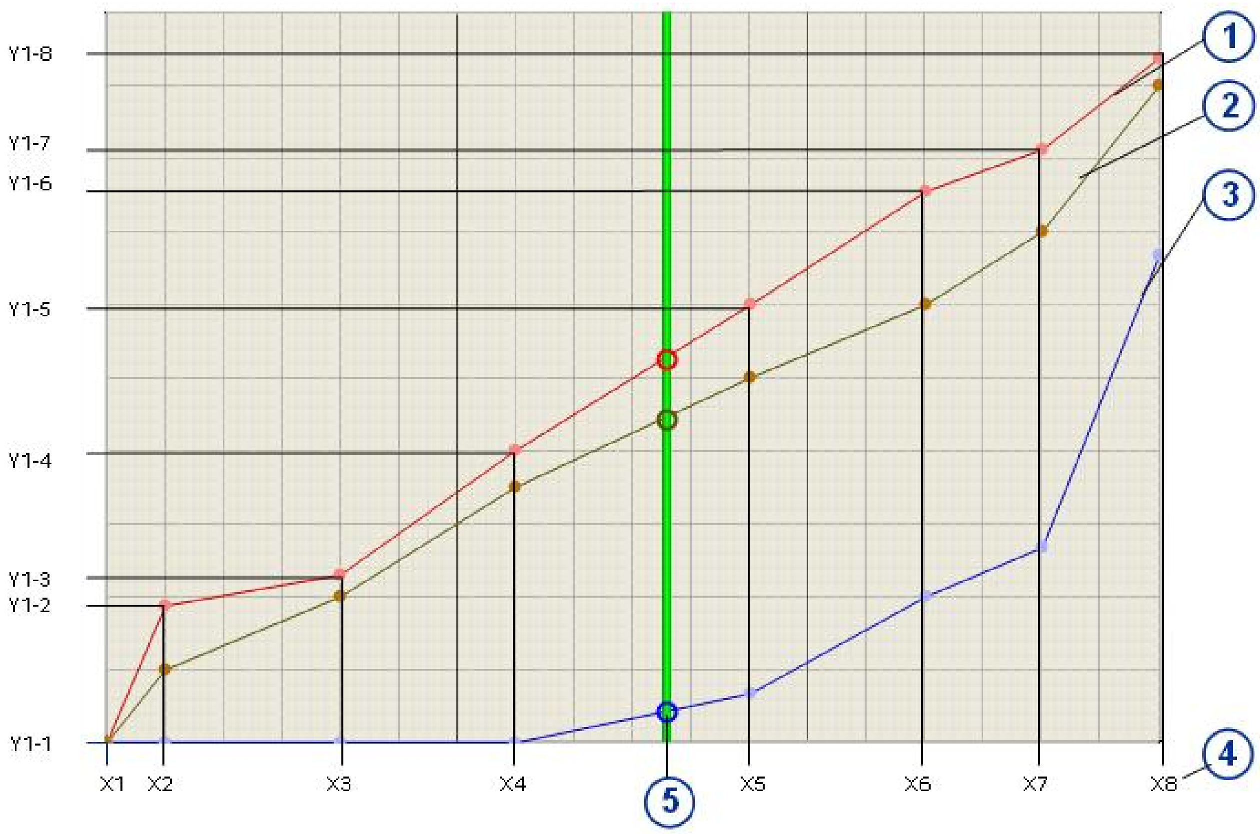
In dependence of the Input signal [IN] and the defined Interpolation Points [X1/Y1(1) as well as X8/Y8(1) (1) and X1/Y1(2) to X8/Y8(2) (2) and X1/Y1(3) to X8/Y8(3) (3)] the Outputs Out1, Out2 and Out3 become a linearly value between the IP.

Is the last IP [X/Y] reached, the Output value will be frozen and the binary Output signal [Complete] set.

Only with the change of input [Release] to “0” the output values are also changed to “0”.

Is a fault is appeared on one of the Inputs or Parameter the corresponding Quality code is shown and a plain text will be reported in the parameter dialog.

The current [X] position (5) and the intersection points with the polygons are represented by a reading line as well as circle symbols with tool tip information and corresponding digital outputs.



Operating principle

Input interfaces

Num **Amount of Interpolation points** **2>= Num <=8**

Format INTEGER

Minimum 2 I-Points, maximum 8 Interpolation Points.

Release **Release of calculation** **Basic state 0-signal**

Format BOOL

1-Signal means, the calculation of output values will start, if the first I-point is reached and no status fault is present. (See fault list)

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

Process values

The Interpolation process values can be set during engineering and they can be changed online from the OS. To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

IN **Input Value for X axis**

Format STRUCT

Structure variables:

IN.Value **Value Default: 0.0**

Format REAL

IN.ST **Signal status** **Default: 16#FF**

Format BYTE

The comment for the input X will be used from that module which is connected to the Input structure.

FB_Out1 **Feedback value of the output 1**

Format STRUCT

Structure variable:

FB_Out1.Value **Value Default: 0.0**

Format REAL

FB_Out1.ST **Signal status** **Default: 16#FF**

Format BYTE

The comment for Feedback Output 1 will be used from that module which is connected to the Input structure.

FB_Out2 **Feedback value of the output 2**

Format STRUCT

Structure variable:

FB_Out2.Value **Value Default: 0.0**

Format REAL

FB_Out2.ST **Signal status** **Default: 16#FF**

Format BYTE

The comment for Feedback Output 2 will be used from that module which is connected to the Input structure.

FB_Out3 **Feedback value of the output 3**

Format STRUCT

Structure variable:

FB_Out3.Value **Value** **Default: 0.0**

Format REAL

FB_Out3.ST **Signal status** **Default: 16#FF**

Format BYTE

The comment for Feedback Output 3 will be used from that module which is connected to the Input structure.

FB_Speed **Feedback value of the speed setpoint output**

Format STRUCT

Structure variable:

FB_Speed.Value **Value** **Default: 0.0**

Format REAL

FB_Speed.ST **Signal status** **Default: 16#FF**

Format BYTE

The comment for Speed Setpoint Output will be used from that module which is connected to the Input structure.

IN_UNIT **Dimension of Input** **Default: h**

Format INTEGER

Out1_UNIT **Dimension of Out1** **Default: %**

Format INTEGER

Out2_UNIT **Dimension of Out2** **Default: %**

Format INTEGER

Out3_UNIT **Dimension of Out3** **Default: %**

Format INTEGER

X1 **X Value for Interpolation point 1** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimX and X2.

Y1_1 **Y Value of Polygon 1 for I-Point 1** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimY1 and HiLimY1.

Y1_2 Y Value of Polygon 2 for I-Point 1 Default: 0.0

Format REAL

The value has to be between the limits LowLimY2 and HiLimY2.

Y1_3 Y Value of Polygon 3 for I-Point 1 Default: 0.0

Format REAL

The value has to be between the limits LowLimY3 and HiLimY3.

X2 X Value for Interpolation point 2 Default: 0.0

Format REAL

The value has to be between the limits X1 and X3.

Y2_1 Y Value of Polygon 1 for I-Point 2 Default: 0.0

Format REAL

The value has to be between the limits LowLimY1 and HiLimY1.

Y2_2 Y Value of Polygon 2 for I-Point 2 Default: 0.0

Format REAL

The value has to be between the limits LowLimY2 and HiLimY2.

Y2_3 Y Value of Polygon 3 for I-Point 2 Default: 0.0

Format REAL

The value has to be between the limits LowLimY3 and HiLimY3.

X3 X Value for Interpolation point 3 Default: 0.0

Format REAL

The value has to be between the limits X2 and X4.

Y3_1 Y Value of Polygon 1 for I-Point 3 Default: 0.0

Format REAL

The value has to be between the limits LowLimY1 and HiLimY1.

Y3_2 Y Value of Polygon 2 for I-Point 3 Default: 0.0

Format REAL

The value has to be between the limits LowLimY2 and HiLimY2.

Y3_3 Y Value of Polygon 3 for I-Point 3 Default: 0.0

Format REAL

The value has to be between the limits LowLimY3 and HiLimY3.

X4 **X Value for Interpolation point 4** **Default: 0.0**

Format REAL

The value has to be between the limits X3 and X5.

Y4_1 **Y Value of Polygon 1 for I-Point 4** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimY1 and HiLimY1.

Y4_2 **Y Value of Polygon 2 for I-Point 4** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimY2 and HiLimY2.

Y4_3 **Y Value of Polygon 3 for I-Point 4** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimY3 and HiLimY3.

X5 **X Value for Interpolation point 5** **Default: 0.0**

Format REAL

The value has to be between the limits X4 and X6.

Y5_1 **Y Value of Polygon 1 for I-Point 5** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimY1 and HiLimY1.

Y5_2 **Y Value of Polygon 2 for I-Point 5** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimY2 and HiLimY2.

Y5_3 **Y Value of Polygon 3 for I-Point 5** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimY3 and HiLimY3.

X6 **X Value for Interpolation point 6** **Default: 0.0**

Format REAL

The value has to be between the limits X5 and X7.

Y6_1 **Y Value of Polygon 1 for I-Point 6** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimY1 and HiLimY1.

Y6_2 **Y Value of Polygon 2 for I-Point 6** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimY2 and HiLimY2.

Y6_3 **Y Value of Polygon 3 for I-Point 6** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimY3 and HiLimY3.

X7 **X Value for Interpolation point 7** **Default: 0.0**

Format REAL

The value has to be between the limits X6 and X8.

Y7_1 **Y Value of Polygon 1 for I-Point 7** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimY1 and HiLimY1.

Y7_2 **Y Value of Polygon 2 for I-Point 7** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimY2 and HiLimY2.

Y7_3 **Y Value of Polygon 3 for I-Point 7** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimY3 and HiLimY3.

X8 **X Value for Interpolation point 8** **Default: 0.0**

Format REAL

The value has to be between the limits X7 and HiLimX.

Y8_1 **Y Value of Polygon 1 for I-Point 8** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimY1 and HiLimY1.

Y8_2 **Y Value of Polygon 2 for I-Point 8** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimY2 and HiLimY2.

Y8_3 **Y Value of Polygon 3 for I-Point 8** **Default: 0.0**

Format REAL

The value has to be between the limits LowLimY3 and HiLimY3.

SPEED1 **Speed setpoint** **Default: 0**

Format REAL.

Value in rpm, between the limit „0“and HiLimSP

SP_T2 **Timevalue point 2 speed X axis** **Default: 0.0**

Format REAL.

(The timevalue in Point 1 is automatically „0“)

The value has to be between the limits “0” and SP_T3

SP_ON2 **Setpoint time value „ON“in sec.** **Default: 0.0**

Format REAL.

Setpoint Puls “ON” between Time SP_T1 and SP_T2

Limits for the value are “0” and “10000”.
On the same time the output „Speed_ON“will be set.

SP_OFF2 **Setpoint time value „OFF“in sec.** **Default: 0.0**

Format REAL.

Idle time off setpoint between Time SP_T1 and SP_T2

Limits for the value are “0” and “10000”
For the time period between SP_T1 and SP_T2 periodical the defined Setpoint will be set.

SPEED2 **Speed setpoint** **Default: 0**

Format REAL.

Value in rpm, between the limit „0“and HiLimSP

SP_T3 **Timevalue point 3 speed X axis** **Default: 0.0**

Format REAL.

(The time value in Point 1 is automatically „0“)

The value has to be between the limits SP_T2 and SP_T4

SP_ON3 **Setpoint time value „ON“in sec.** **Default: 0.0**

Format REAL.

Setpoint Puls “ON” between Time SP_T1 and SP_T2

Limits for the value are “0” and “10000”.
On the same time the output „Speed_ON“will be set.

SP_OFF3 **Setpoint time value „OFF“in sec.** **Default: 0.0**

Format REAL.

Idle time off setpoint between Time SP_T1 and SP_T2

Limits for the value are “0” and “10000”
For the time period between SP_T1 and SP_T2 periodical the defined Setpoint will be set.

SPEED3 **Speed setpoint** **Default: 0**

Format REAL.

Value in rpm, between the limit „0“and HiLimSP

SP_T4 **Timevalue point 4 speed X axis** **Default: 0.0**

Format REAL.

(The time value in Point 1 is automatically „0“)

The value has to be between the limits SP_T2 and SP_T4

SP_ON4 **Setpoint time value „ON“in sec.** **Default: 0.0**

Format REAL.

Setpoint Puls “ON” between Time SP_T1 and SP_T2

Limits for the value are “0” and “10000”.
On the same time the output „Speed_ON“will be set.

SP_OFF4 **Setpoint time value „OFF“in sec.** **Default: 0.0**

Format REAL.

Idle time off setpoint between Time SP_T3 and SP_T5

Limits for the value are “0” and “10000”
For the time period between SP_T3 and SP_T5 periodical the defined Setpoint will be set.

SPEED4 **Speed setpoint** **Default: 0**

Format REAL.

Value in rpm, between the limit „0“and HiLimSP

SP_T5 **Timevalue point 5 speed X axis** **Default: 0.0**

Format REAL.

(The time value in Point 1 is automatically „0“)

The value has to be between the limits SP_T4 and SP_T6

SP_ON5 **Setpoint time value „ON“in sec.** **Default: 0.0**

Format REAL.

Setpoint Puls “ON” between Time SP_T4 and SP_T6

Limits for the value are “0” and “10000”.
On the same time the output „Speed_ON“will be set.

SP_OFF5 **Setpoint time value „OFF“in sec.** **Default: 0.0**

Format REAL.

Idle time off setpoint between Time SP_T4 and SP_T6

Limits for the value are “0” and “10000”
For the time period between SP_T4 and SP_T6 periodical the defined Setpoint will be set.

SPEED5 **Speed setpoint** **Default: 0**

Format REAL.

Value in rpm, between the limit „0“and HiLimSP

SP_T6 **Timevalue point 6 speed X axis** **Default: 0.0**

Format REAL.

The value has to be between the limits SP_T6 and HiLimX.

SPEED6 **Speed setpoint** **Default: 0**

Format REAL.

Value in rpm, between the limit „0“and HiLimSP
This value cannot get timed.

SP_SL1 **Setpoint 1 with ramp functionality** **Default: 10**

Format INTEGER (0 - 1)

In case of „SP_SL1“= “1” the Speed Setpoint will be changed to Speed2 in the period of time 0 - SP_T2. (Positive or negative ramp)

SP_SL5 **Setpoint 5 with ramp functionality** **Default: 10**

Format INTEGER (0 - 1)

In case of „SP_SL5“= “1” the Speed Setpoint will be changed to Speed5 in the period of time SP_T4 - SP_T5. (Positive or negative ramp)

SP_SL6 **Setpoint 6 with ramp functionality** **Default: 10**

Format INTEGER (0 - 1)

In case of „SP_SL6“= “1” the Speed Setpoint will be changed to Speed6 in the period of time SP_T5 - HiLimX. (Positive or negative ramp)

HiLimX **High limit IN value (X)** **Default: 0.0**

Format REAL.

High limit of the Input **IN**

HiLimY1 **High limit Y1 value** **Default: 0.0**

Format REAL.

High limit of the Input **Y1**

HiLimY2 **High limit Y2 value** **Default: 0.0**

Format REAL.

High limit of the Input **Y2**

HiLimY3 **High limit Y3 value** **Default: 0.0**

Format REAL.

High limit of the Input **Y3**

HiLimSP **High limit Speed Setpoint** **Default: 0.0**

Format REAL.

High limit of the Speed Setpoint

LoLimX **Low limit IN value (X)** **Default: 0.0**

Format REAL.

Low limit of the Input **IN**

LoLimY1 **Low limit Y1 value** **Default: 0.0**

Format REAL.

Low limit of the Input **Y1**

LoLimY2 **Low limit Y2 value** **Default: 0.0**

Format REAL.

Low limit of the Input **Y2**

LoLimY3 **Low limit Y3 value** **Default: 0.0**

Format REAL.

Low limit of the Input **Y3**

VChange **Value has been changed** **Default = 0**

Format BOOL.

Parameter value has been changed from OS.

DataSet **selected Dataset** **Default = xx**

Format STRING[24] .

Selected Dataset description. (is shown on Faceplate if an Dataset was read)

Output Interfaces

IN_I **Value for the internal Input X Axis**

Format STRUCT

Structure variables:

IN_I.Value **Value Default: 0.0**

Format REAL

IN.ST **Signal status** **Default: 16#FF**

Format BYTE

With the possibility to select the X Input value from the interface "IN" or use of the “internal time”, the internal calculation of the X position is always carried out with "IN_I".

Out1 **Setpoint Output 1**

Format STRUCT

Structure variables:

Out1.Value **Value Default: 0.0**

Format REAL

Out1.ST **Signal status** **Default: 16#FF**

Format BYTE

Out2 **Setpoint Output 2**

Format STRUCT

Structure variables:

Out2.Value **Value Default: 0.0**

Format REAL

Out2.ST **Signal status** **Default: 16#FF**

Format BYTE

Out3 **Setpoint Output 3**

Format STRUCT

Structure variables:

Out3.Value **Value Default: 0.0**

Format REAL

Out3.ST **Signal status** **Default: 16#FF**

Format BYTE

Speed **Setpoint Speed Output**

Format STRUCT

Structure variables:

Speed.Value **Value Default: 0.0**

Format REAL

Speed.ST **Signal status** **Default: 16#FF**

Format BYTE

Speed_ON **Speed Output active** **Default: 0**

Format BOOL

Together with the Speed Setpoint the binary Output „Speed_ON“will be set. It can be used as release or start signal for other CFC modules.

MD_ON **Main drive active** **Default: 0**

Format BOOL

Is the release for the main drive is given in the parameter dialog, the Speed setpoint, the "Speed_ON" signal and the "MD_ON" signal will be set at the same time.

STATUS **STATUS Word**

Format DWORD

See separate description on the end of document

ErrorNum **Error- No.**

Format INTEGER

See separate Error description on the end of document

ErrorPar **Error- Parameter-No.**

Format INTEGER

This information has to be evaluated in connection with the ErrorNum.
See separate Error description on the end of document

X_No **Working area of X Axis**

Format INTEGER

Additional user information for internal use.

Speed_No **Working area of Speed Axis**

Format INTEGER

Additional user information for internal use

X_active **Polygon Outputs are calculated**

Format BOOL

Can be used for further interlocks.

Complete **Polygon Interpolation Point N is reached**

Format BOOL

Can be used for further interlocks.

The Polygon calculation is on the last interpolation point. All Output values are still valid up to the Input signal [Release] change to “0”.

Time characteristics

There are no special time characteristics.

Message characteristics

No Messages

Module states

Variable STATUS, refer to the Variable details.

Commands

Refer to the Variable details for the assignment of the command word.

Engineering

AS

The C_POLY3 will be called in a CFC that run's in OB1.

The following connections are possible/necessary:

- Type in Module TAG, Comment and Symbol-No.
- Define the amount of Interpolation points in „Num".
- Connect the Input structure "IN".(only if the internal time is not used)
- Connect the Feedback structures of the correspondent Outputs. The comment of this Inputs are used for the Polygon description text.
- Connect the Input „Release" with a start signal from the Process. Only with a "1" signal the Polygon calculation will be released.
  If the Input moved from „1-> 0" the Output values will reset to Zero.
- Type in units for Input and output values as Integer.
- Type in the scale begin and –end values for all inputs and outputs
- Connect the Output value with the subsequent module (Controller)
- Define the logic for release subsequent modules with Outputs „X_active" and „Complete".
- Connect the analog value of Speed Output with a controller and build up the logic with „Speed_ON" and „MD_ON".
- If necessary check the „ErrorNum" and connect an annunciation module.

OS

Symbols

Use or adapt correspondingly the symbols for C_POLY3 from the CEMAT Typicals

It is then generated automatically by "producing/updating constituent symbols".

The Properties are filled automatically.

Userarchiv

Import Userarchiv Structure „C_POLY3.uap“and store it.

Import C_POLY3.csv Dummy Dataset.

Curve archive

Define the Input- and Output values FB_xxx and OutY values of the C_Poly3 module in the curve archive of Tag Logging.

OS online parameter setting

- Release Polygon 2 and 3 if necessary
- Release internal time if required
- type in the Interpolation points of the X values in ascending order
- type in the Interpolation points of the Y values (the polygons are defined with that and are shown in the Faceplate.)
- type in the X values of Speed Interpolation point in ascending order
- type in the running time in sec. corresponding to these X Values
- Type in the idle time in sec. corresponding to these X Values
  (About this value definitions can be adjusted e.g. a quarter of a turn per hour over a period of 4 hours). Is the idle period "0" becomes the binary run signal "Speed_ON" “1” signal and a necessary set point will set over the complete time range.
- With the selection of “set point ramp” fields the Setpoint started up linearly of an X value to the next one.
- If the main drive shall run on a particular time, the field "MD On" must be selected in addition.

This parameter setting can be stored under a freely eligible name.

Procedure:

- Press Button "new" and entering the new name.
- Then press Button „save“ to store the Parameter set
- If a data set shall be only changed, he has to be selected and then stored with the “save” button.
- To delete a dataset, use the same procedure. Select the name of Dataset in the listing field and press the button “delete”.

OS Design

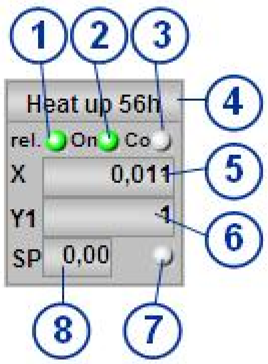
Symbols

There is one C_POLY3 Symbol in the C_@PCS7Typicals_CemV7xxx.pdl.
It will be automatically generated if the box “create block icon” is marked.

In that case the properties are connected automatically

If you need more Information on the Symbols it is possible to create additional Symbols.

Example of a small polygon symbol



(1) Release operation

(2) X active, Calculation is active on the X Value **(5)** below**.**

(3) Polygon calculation is on the last Interpolations point (complete)

(4) Active Dataset description

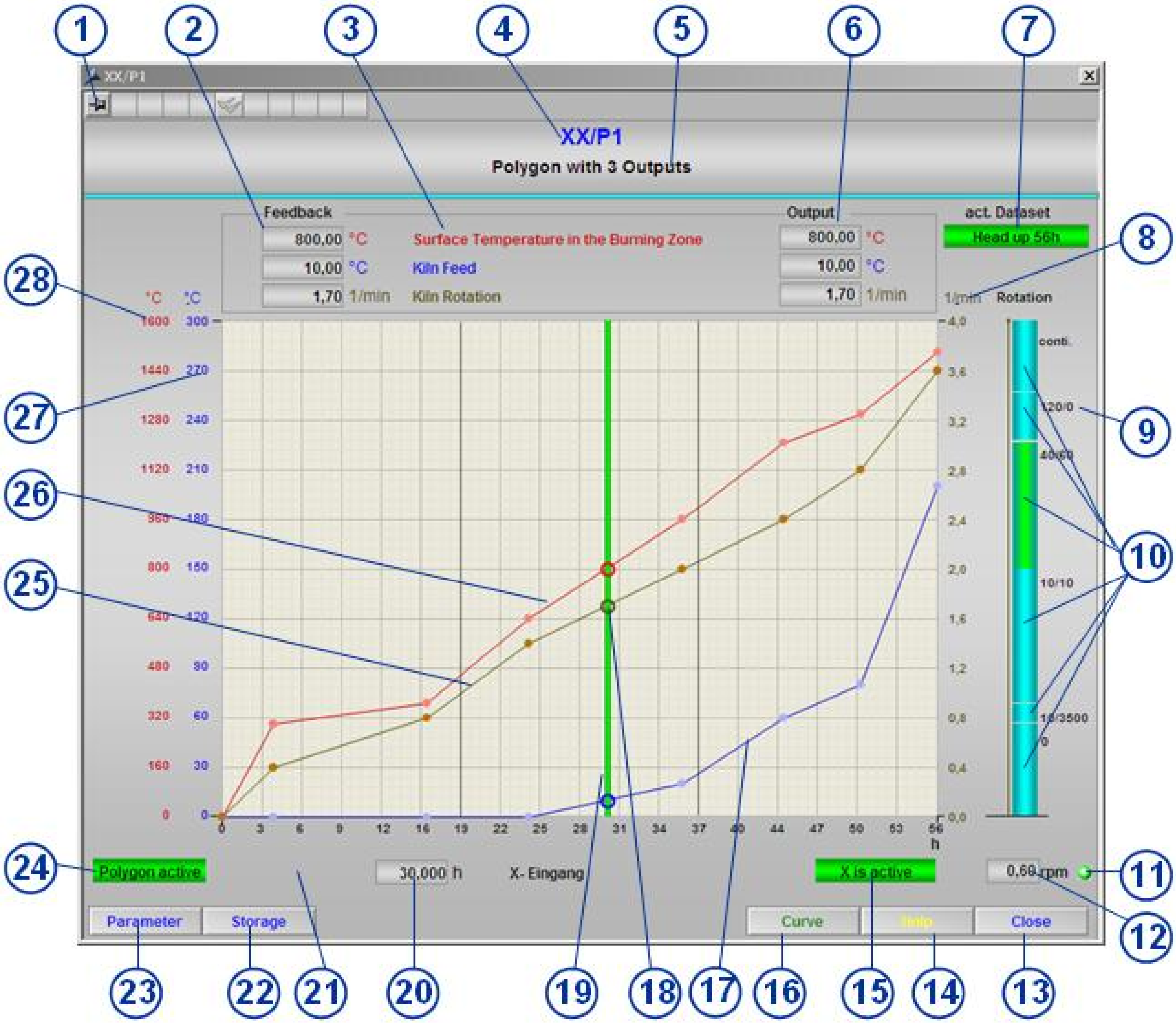
(6) Y1 Value on the actual X Position

(7) “Move on” binary output. (E.g. for auxiliary drive.)

(8) Speed Setpoint

Faceplate

With mouse click on the constituent symbol the Faceplate opens.



The following functions and information are shown there:

(1) Fix the Dialog

(2) Actual value feedback belongs to the Output.

(3) The comment text will be read from the feedback Input

(4) TAG of Poly module

(5) Comment of Poly module

(6) Output value on the current calculation position **(19)**

(7) Name of the loaded parameter data set

(8) Y-Axis of the 3. Output values

(9) View the run-/ idle period of the auxiliary drive

(10) The time response of the exit speed is defined the 6 areas in these. The active one Area is green highlighted. This one becomes the height of the areas about the separate X values "Speed" charged to definition and the polygon 1

(11) „Speed active“Indication. (Green active)

(12) Speed value belongs to „Speed active“Indicator

(13) Close Dialog

(14) Call Help Dialog

(15) Calculation of Output values are active (is also an Output on CFC- module)

(16) Call Curve Dialog

(17) Polygon 2

(18) Intersection points of the X/Y values which are displayed as a tool tip

(19) Input value position as reading lines representation

(20) Actual Input value

(21) Start of internal timer (if released)

(22) Overview dialog of stored parameter values

(23) Call Parameter dialog

(24) CFC Input „Release“= „1“.

(25) Polygon 3

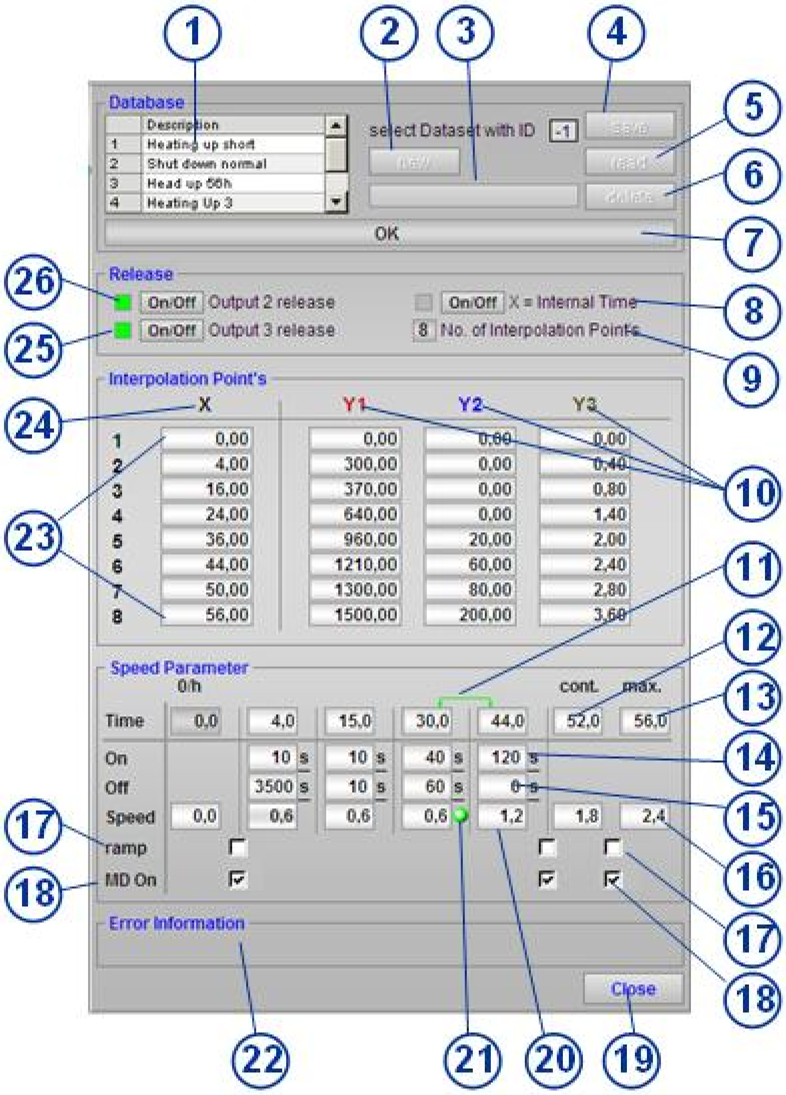
(26) Polygon 1

(27) Y-Axis of 2. Output value

(28) Y-Axis of 1. Output value s

Parameter- Dialog

With mouse click on button "parameter" the following dialog will be open. All parameter values can be modified. In addition it is possible to store or read the Parameter from a database. These write and also the read operation is only possible with the user right “21” and Input "Release" = "0", i.e. no Output values are calculated.



The following functions and information are shown:

(1) Selection dialog box of the stored parameters data sets. With the button “new” **(2)**and input of a description**(3)** followed by pressing the button “save” **(4),** a new dataset will be inserted. With the button "delete" **(6)** the selected data set is deleted.
(7) In case of faults the corresponding error message are shown here.

(8) With the button „Internal Time“the “start of internal time “will be released. Instead of CFC Input signal „IN“ the internal timer can be started/stopped with the button „Start/Stop Time“ **(21)**.

(9) Number of interpolation points defined in the CFC on the X axis.

(10) Interpolation points of the 3 Y axes

(11) Speed Area active

(12) X values for speed Output (only ascending from 0 till max. possible)

(13) Maximum X value

(14) Run period of the auxiliary drive in seconds

(15) Stop period of the auxiliary drive in seconds

(16) Maximum speed per min

(17) Ramp calculation of base X to Y.

(18) Use main drive

(19) Close Dialog

(20) Speed set points in rpm

(21) Output "speed active" is shown green for the duration of the running time

(22) Parameter fault or faulty status information of the Input structures

(23) X Values climb for the interpolation points of 1 to max.8. The upper limit is "HiLimX".

(24) X axes definition values.

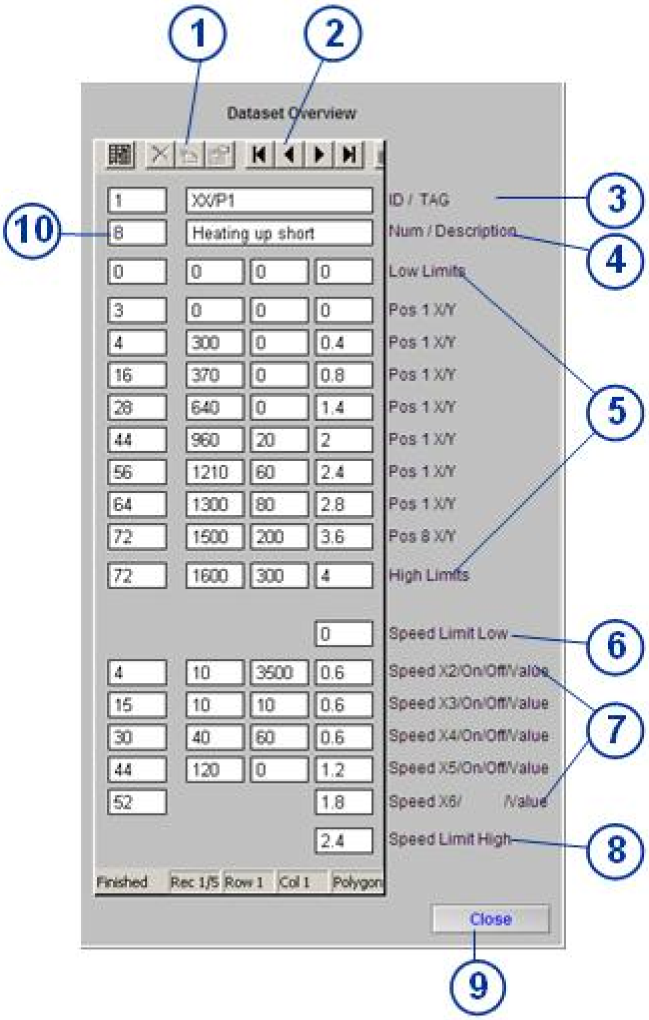
(25) Releasing polygon 3.

(26) Releasing polygon 2

Storage- Dialog

This dialog shows only the individual parameters of the stored data sets **(1)**. Editing is not possible.

The individual data sets of the stored Module parameters can be read and displayed from the user archives. Use the button set **(2)**.



The following representation was chosen.

(3) TAG of Poly3 Module as Search string

(4) Description of the data set.

(5) Polygon Interpolation definition values with lower- and upper limit in the following order from left to right: - X value/Y1/Y2/Y3

(6) Speed low limit

(7) Revolutions per minute parameter set in the following order from left to right: - X value/On time/off time/speed

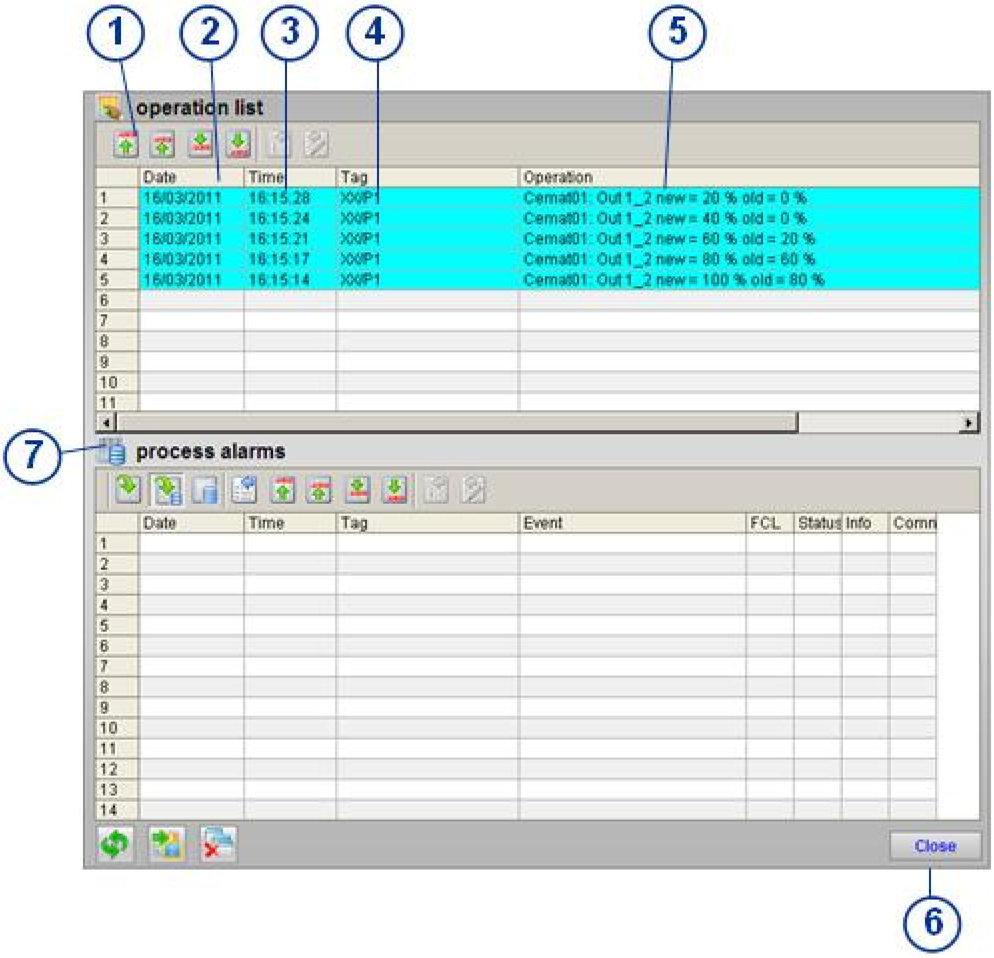
(8) Speed high limit

(9) Close Dialog

(10) Number of interpolation points

Operation/Alarm- Dialog

This dialog shows the Operator annunciations. Alarms are not caused.



The following representation and operating options are available.

(1) Scroll in the Operation list

(2) Date of the operating message

(3) Time of the operating message

(4) TAG of Poly3 module.

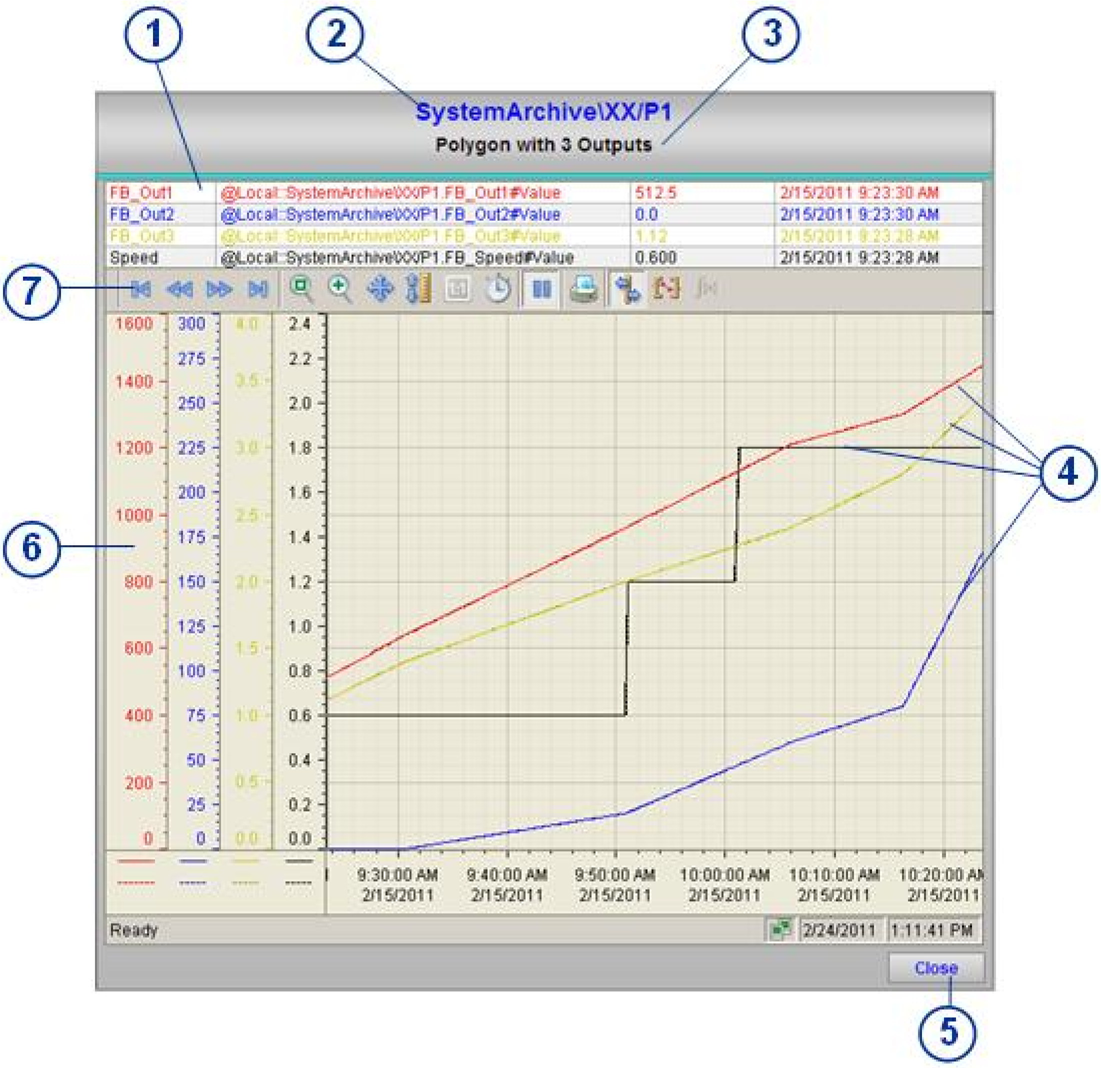
(5) Operating message with user input name, new value, and old value

(6) Close dialog

(7) Process Alarm window (will be not used for this module)

Curve- Dialog

This dialog shows the 4 Output values (Out1, Out2, Out3, speed) and the actual curve values, if



there is a definition for this Poly3 object in the curve archives.

The following representation was chosen.

(1) Shows actual values at the ruler

(2) TAG of Poly3 module and curve archive name

(3) Description of Poly3 module

(4) Curve view of the current or archived Output values and necessary Input values.

(5) Close Dialog

(6) Curve control

(7) Navigation buttons of Curve window

I/O bar of C_POLY3

C_POLY3

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
Num	Amount of Interpolations Points	INT	2	I		+	
Release	Polygon calculation-release	BOOL	0	I		+	
IN	Input value	STRUCT	0	I		+	
IN.Value	Value	REAL	0	I			
IN.ST	Signal Status	BYTE	16#80	I			
FB_Out1	Feedback of Output 1	STRUCT	0	I		+	
FB_Out1.Value	Value	REAL	0	I			
FB_Out1.ST	Signal Status	BYTE	16#80	I			
FB_Out2	Feedback of Output 2	STRUCT	0	I		+	
FB_Out2.Value	Value	REAL	0	I			
FB_Out2.ST	Signal Status	BYTE	16#80	I			
FB_Out3	Feedback of Output 3	STRUCT	0	I		+	
FB_Out3.Value	Value	REAL	0	I			
FB_Out3.ST	Signal Status	BYTE	16#80	I			
IN_UNIT	Input Unit	INT		I		+	
Out1_UNIT	Output Unit 1	INT		I		+	
Out2_UNIT	Output Unit 2	INT		I		+	
Out3_UNIT	Output Unit 3	INT		I		+	
X1	X Value 1	REAL	0	I		+	
Y1_1	Interpolation point 1_1	REAL	0	I		+	
Y1_2	Interpolation point 1_2	REAL	0	I		+	
Y1_3	Interpolation point 1_3	REAL	0	I		+	
X2	X Value 1	REAL	0	I		+	
Y2_1	Interpolation point 2_1	REAL	0	I		+	
Y2_2	Interpolation point 2_2	REAL	0	I		+	

Element	Meaning	Format	Default	Typ e	Attr.	HMI	Permitted Values
Y2_3	Interpolation point 2_3	REAL	0	I		+	
X3	X Value 1	REAL	0	I		+	
Y3_1	Interpolation point 3_1	REAL	0	I		+	
Y3_2	Interpolation point 3_2	REAL	0	I		+	
Y3_3	Interpolation point 3_3	REAL	0	I		+	
X4	X Value 4	REAL	0	I		+	
Y4_1	Interpolation point 4_1	REAL	0	I		+	
Y4_2	Interpolation point 4_2	REAL	0	I		+	
Y4_3	Interpolation point 4_3	REAL	0	I		+	
X5	X Value 5	REAL	0	I		+	
Y5_1	Interpolation point 5_1	REAL	0	I		+	
Y5_2	Interpolation point 5_2	REAL	0	I		+	
Y5_3	Interpolation point 5_3	REAL	0	I		+	
X6	X Value 6	REAL	0	I		+	
Y6_1	Interpolation point 6_1	REAL	0	I		+	
Y6_2	Interpolation point 6_2	REAL	0	I		+	
Y6_3	Interpolation point 6_3	REAL	0	I		+	
X7	X Value 1	REAL	0	I		+	
Y7_1	Interpolation point 7_1	REAL	0	I		+	
Y7_2	Interpolation point 7_2	REAL	0	I		+	
Y7_3	Interpolation point 7_3	REAL	0	I		+	
X8	X Value 1	REAL	0	I		+	
Y8_1	Interpolation point 8_1	REAL	0	I		+	
Y8_2	Interpolation point 8_2	REAL	0	I		+	
Y8_3	Interpolation point 8_3	REAL	0	I		+	
SPEED1	Speed 1	REAL	0	I		+	
SP_T2	Time 2 value for Speed	REAL	0	I		+	

Element	Meaning	Format	Default	Typ e	Attr.	HMI	Permitted Values
SP_ON2	ON time 2 for Speed	INT	0	I		+	
SP_OFF2	OFF time 2 for Speed	INT	0	I		+	
SPEED2	Speed 2	REAL	0	I		+	
SP_T3	Time 3 value for Speed	REAL	0	I		+	
SP_ON3	ON time 3 for Speed	INT	0	I		+	
SP_OFF3	OFF time 3 for Speed	INT	0	I		+	
SPEED3	Speed 3	REAL	0	I		+	
SP_T4	Time 4 value for Speed	REAL	0	I		+	
SP_ON4	ON time 4 for Speed	INT	0	I		+	
SP_OFF4	OFF time 4 for Speed	INT	0	I		+	
SPEED4	Speed 4	REAL	0	I		+	
SP_T5	Time 5 value for Speed	REAL	0	I		+	
SP_ON5	ON time 5 for Speed	INT	0	I		+	
SP_OFF5	OFF time 5 for Speed	INT	0	I		+	
SPEED5	Speed 5	REAL	0	I		+	
SP_T6	Time 6 value for Speed	REAL	0	I		+	
SPEED6	Speed 6	REAL	0	I		+	
SP_SL1	sliding Setpoint from Speed 0 to 1	INT	0	I		+	
SP_SL5	sliding Setpoint from Speed 5 to 6	INT	0	I		+	
SP_SL6	sliding Setpoint from Speed 6 to HiLimSP	INT	0	I		+	
HiLimX	High Limit X	REAL	0	I		+	
HiLiY1	High Limit Y values 1	REAL	0	I		+	
HiLiY2	High Limit Y values 2	REAL	0	I		+	
HiLiY3	High Limit Y values 3	REAL	0	I		+	
HiLiSP	High Limit Speed values	REAL	0	I			
LoLimX	Low Limit X	REAL	0	I			
LoLiY1	Low Limit Y values 1	REAL	0	I			

Element	Meaning	Format	Default	Typ e	Attr.	HMI	Permitted Values
LoLiY2	Low Limit Y values 2	REAL	0	I		+	
LoLiY3	Low Limit Y values 3	REAL	0	I		+	
VChange	Input or Output value has changed	Bool	0	I		+	
DataSet	Description of selected Dataset	STRING [26]	xx	I		+	
COMMAND	Command word	WORD	0	I			
IN_I	Internal Input value	STRUCT		O			
IN_I.Value	Input Value	REAL	0.0	O			
IN_I.ST	Input Signal Status	BYTE	16#80	O			
Out1	Output value 1	STRUCT		O			
Out1.Value	Output 1Value	REAL	0.0	O			
Out1.ST	Output 1 Signal Status	BYTE	16#80	O			
Out2	Output value 2	STRUCT		O			
Out2.Value	Output 2Value	REAL	0.0	O			
Out2.ST	Output 2 Signal Status	BYTE	16#80	O			
Out3	Output value 3	STRUCT		O			
Out3.Value	Output 3Value	REAL	0.0	O			
Out3.ST	Output 3 Signal Status	BYTE	16#80	O			
Speed	Speed	STRUCT		O			
Speed.Value	Speed Value	REAL	0.0	O			
Speed.ST	Speed Signal Status	BYTE	16#80	O			
Speed_ON	Speed_ON	STRUCT		O			
Speed_ON. Value	Speed_ON Value	BOOL	0.0	O			
Speed_ON.ST	Speed_ON Signal Status	BYTE	16#80	O			
MD_ON	MD_ON	STRUCT		O			
MD_ON. Value	MD _ON Value	BOOL	0.0	O			
MD_ON.ST	MD _ON Signal Status	BYTE	16#80	O		+	

Element	Meaning	Format	Default	Typ e	Attr.	HMI	Permitted Values
STATUS	Interface to OS	DWORD		O			
ErrorNum	Error Number	INT		O			
ErrorPar	Parameter Number	INT		O			
X_NO	X Area Number	INT		O			
Speed_No	Speed Area Number	INT		O			
X_active	IN is between X1 and X[N]	BOOL		O			
Complete	IN has X[N] reached	BOOL		O			

OS Variable table

OS Variable	Beschreibung	AS Datentyp	OS Datentyp
Num	Amount of Interpolations points	INT	Signed 16-bit value
Release	Release of Polygon calculation	BOOL	Binary variable
IN#Value	IN Value	REAL	32-bit floating-point number IEEE 754
FB_Out1#Value	FB_Out1_Value	REAL	32-bit floating-point number IEEE 754
FB_Out2#Value	FB_Out2_Value	REAL	32-bit floating-point number IEEE 754
FB_Out3#Value	FB_Out3_Value	REAL	32-bit floating-point number IEEE 754
FB_Speed#Value	FB_Speed_Value	REAL	32-bit floating-point number IEEE 754
IN_UNIT	Input Unit	INT	Signed 16-bit value
Out1_UNIT	Output Unit 1	INT	Signed 16-bit value
Out2_UNIT	Output Unit 2	INT	Signed 16-bit value
Out3_UNIT	Output Unit 3	INT	Signed 16-bit value
X1	X Value 1	REAL	32-bit floating-point number IEEE 754
Y1_1	Interpolation point 1_1	REAL	32-bit floating-point number IEEE 754
Y1_2	Interpolation point 1_2	REAL	32-bit floating-point number IEEE 754
Y1_3	Interpolation point 1_3	REAL	32-bit floating-point number IEEE 754
X2	X Value 1	REAL	32-bit floating-point number IEEE 754
Y2_1	Interpolation point 2_1	REAL	32-bit floating-point number IEEE 754
Y2_2	Interpolation point 2_2	REAL	32-bit floating-point number IEEE 754
Y2_3	Interpolation point 2_3	REAL	32-bit floating-point number IEEE 754
X3	X Value 1	REAL	32-bit floating-point number IEEE 754
Y3_1	Interpolation point 3_1	REAL	32-bit floating-point number IEEE 754
Y3_2	Interpolation point 3_2	REAL	32-bit floating-point number IEEE 754
Y3_3	Interpolation point 3_3	REAL	32-bit floating-point number IEEE 754
X4	X Value 4	REAL	32-bit floating-point number IEEE 754
Y4_1	Interpolation point 4_1	REAL	32-bit floating-point number IEEE 754

OS Variable	Beschreibung	AS Datentyp	OS Datentyp
Y4_2	Interpolation point 4_2	REAL	32-bit floating-point number IEEE 754
Y4_3	Interpolation point 4_3	REAL	32-bit floating-point number IEEE 754
X5	X Value 5	REAL	32-bit floating-point number IEEE 754
Y5_1	Interpolation point 5_1	REAL	32-bit floating-point number IEEE 754
Y5_2	Interpolation point 5_2	REAL	32-bit floating-point number IEEE 754
Y5_3	Interpolation point 5_3	REAL	32-bit floating-point number IEEE 754
X6	X Value 6	REAL	32-bit floating-point number IEEE 754
Y6_1	Interpolation point 6_1	REAL	32-bit floating-point number IEEE 754
Y6_2	Interpolation point 6_2	REAL	32-bit floating-point number IEEE 754
Y6_3	Interpolation point 6_3	REAL	32-bit floating-point number IEEE 754
X7	X Value 1	REAL	32-bit floating-point number IEEE 754
Y7_1	Interpolation point 7_1	REAL	32-bit floating-point number IEEE 754
Y7_2	Interpolation point 7_2	REAL	32-bit floating-point number IEEE 754
Y7_3	Interpolation point 7_3	REAL	32-bit floating-point number IEEE 754
X8	X Value 1	REAL	32-bit floating-point number IEEE 754
Y8_1	Interpolation point 8_1	REAL	32-bit floating-point number IEEE 754
Y8_2	Interpolation point 8_2	REAL	32-bit floating-point number IEEE 754
Y8_3	Interpolation point 8_3	REAL	32-bit floating-point number IEEE 754
SPEED1	Speed 1	REAL	32-bit floating-point number IEEE 754
SP_T2	Time 2 value for Speed	REAL	32-bit floating-point number IEEE 754
SP_ON2	ON time 2 for Speed	INT	Signed 16-bit value
SP_OFF2	OFF time 2 for Speed	INT	Signed 16-bit value
SPEED2	Speed 2	REAL	32-bit floating-point number IEEE 754
SP_T3	Time 3 value for Speed	REAL	32-bit floating-point number IEEE 754
SP_ON3	ON time 3 for Speed	INT	Signed 16-bit value
SP_OFF3	OFF time 3 for Speed	INT	Signed 16-bit value
SPEED3	Speed 3	REAL	32-bit floating-point number IEEE 754

OS Variable	Beschreibung	AS Datentyp	OS Datentyp
SP_T4	Time 4 value for Speed	REAL	32-bit floating-point number IEEE 754
SP_ON4	ON time 4 for Speed	INT	Signed 16-bit value
SP_OFF4	OFF time 4 for Speed	INT	Signed 16-bit value
SPEED4	Speed 4	REAL	32-bit floating-point number IEEE 754
SP_T5	Time 5 value for Speed	REAL	32-bit floating-point number IEEE 754
SP_ON5	ON time 5 for Speed	INT	Signed 16-bit value
SP_OFF5	OFF time 5 for Speed	INT	Signed 16-bit value
SPEED5	Speed 5	REAL	32-bit floating-point number IEEE 754
SP_T6	Time 6 value for Speed	REAL	32-bit floating-point number IEEE 754
SPEED6	Speed 6	REAL	32-bit floating-point number IEEE 754
SP_SL1	sliding Setpoint from Speed 0 to 1	INT	Signed 16-bit value
SP_SL5	sliding Setpoint from Speed 5 to 6	INT	Signed 16-bit value
SP_SL6	sliding Setpoint from Speed 6 to HiLimSP	INT	Signed 16-bit value
HiLimX	High Limit X	REAL	32-bit floating-point number IEEE 754
HiLiY1	High Limit Y values 1	REAL	32-bit floating-point number IEEE 754
HiLiY2	High Limit Y values 2	REAL	32-bit floating-point number IEEE 754
HiLiY3	High Limit Y values 3	REAL	32-bit floating-point number IEEE 754
HiLiSP	High Limit Speed values	REAL	32-bit floating-point number IEEE 754
LoLimX	Low Limit X	REAL	32-bit floating-point number IEEE 754
LoLiY1	Low Limit Y values 1	REAL	32-bit floating-point number IEEE 754
LoLiY2	Low Limit Y values 2	REAL	32-bit floating-point number IEEE 754
LoLiY3	Low Limit Y values 3	REAL	32-bit floating-point number IEEE 754
VChange	Input or Output value has changed	Bool	Binary variable
DataSet	Description of selected Dataset	STRING [26]	Text variable 8 bit
COMMAND	Command word	WORD	Signed 16-bit value
IN_I#Value	Input Value	REAL	32-bit floating-point number IEEE 754
IN_I#ST	Signal Status	BYTE	Signed 8-bit value

OS Variable	Beschreibung	AS Datentyp	OS Datentyp
Out1#Value	Output 1Value	REAL	Signed 16-bit value
Out1#ST	Signal Status	BYTE	Signed 8-bit value
Out2#Value	Output 2Value	REAL	32-bit floating-point number IEEE 754
Out2#ST	Signal Status	BYTE	Signed 8-bit value
Out3#Value	Output 3Value	REAL	32-bit floating-point number IEEE 754
Out3#ST	Signal Status	BYTE	Signed 8-bit value
Speed#Value	Speed Value	REAL	32-bit floating-point number IEEE 754
Speed#ST	Signal Status	BYTE	Signed 8-bit value
Speed_ON#Value	Speed Value	BOOL	Binary variable
Speed_ON#ST	Signal Status	BYTE	Signed 8-bit value
MD_ON#Value	MD _ON Value	BOOL	Binary variable
MD_ON#ST	MD _ON Signal Status	BYTE	Signed 8-bit value
STATUS	Interface to OS	DWORD	Unsigned 32-bit value
ErrorNum	Error Number	INT	Signed 16-bit value
ErrorPar	Parameter Number	INT	Signed 16-bit value
X_NO	X Area Number	INT	Signed 16-bit value
Speed_No	Speed Area Number	INT	Signed 16-bit value

Variable details

Internal structure of the Commands, Alarms and Visualization status:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Kommandowort**	**Commandword**		
COM_B20	X=TIM	0	Input = interne Zeit	Input = internal Timer		
COM_B21	Y2_Rel	1	Ausgang 2 freigeben	Output 2 released		
COM_B22	Y3_Rel	2	Ausgang 3 freigeben	Output 3 released		
COM_B23		3				
COM_B24		4				
COM_B25		5				
COM_B26		6				
COM_B27		7				
COM_B10	Start TIM	8	Start interne Zeit	Start internal Timer		
COM_B11		9				
COM_B12		10				
COM_B13		11				
COM_B14		12				
COM_B15		13				
COM_B16		14				
COM_B17		15				

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS			**Status**	**Status**		
STA_B40	IN =TIM	0	Input = interne Zeit	Input = internal Timer		
STA_B41	Y2 Rel	1	Ausgang 2 freigeben	Output 2 released		
STA_B42	Y3 Rel	2	Ausgang 3 freigeben	Output 3 released		
STA_B43		3	Polygon ist aktiv	Polygon is activ		
STA_B44		4	X_aktiv = X is between X1 u. xNum	X_aktiv = X is between X1 u. xNum		
STA_B45		5	Fertig X erreicht XNum	Complete = X reached XNum		
STA_B46		6				
STA_B47		7				
STA_B30	Start TIM	8	Start interne Zeit	Start internal Timer		
STA_B31		9				
STA_B32		10				
STA_B33		11				
STA_B34	INCON	12	IN Struktur angeschlossen	IN Structure connected		
STA_B35	FBO1CON	13	OUT1 Struktur angeschlossen	OUT1 Structure connected		
STA_B36	FBO2CON	14	OUT2 Struktur angeschlossen	OUT2 Structure connected		
STA_B37	FBO3CON	15	OUT3 Struktur angeschlossen	OUT3 Structure connected		
STA_B20	SP_Ph1	16	Speed Phase 1	Speed Phase 1		
STA_B21	SP_Ph2	17	Speed Phase 2	Speed Phase 2		
STA_B22	SP_Ph3	18	Speed Phase 3	Speed Phase 3		
STA_B23	SP_Ph4	19	Speed Phase 4	Speed Phase 4		
STA_B24	SP_Ph5	20	Speed Phase 5	Speed Phase 5		
STA_B25	SP_Ph6	21	Speed Phase 6	Speed Phase 6		
STA_B26		22				
STA_B27		23				
STA_B10	SP1 act	24	Speed 1 aktiv	Speed 1 active		
STA_B11	SP2 act	25	Speed 2 aktiv	Speed 2 active		
STA_B12	SP3 act	26	Speed 3 aktiv	Speed 3 active		
STA_B13	SP4 act	27	Speed 4 aktiv	Speed 4 active		
STA_B14	SP5 act	28	Speed 5 aktiv	Speed 5 active		
STA_B15	SP6 act	29	Speed 6 aktiv	Speed 6 active		
STA_B16		30				
STA_B17		31				

Fault details

Fehler deutsch	Fault English	ErrorNum	ErrorPar n = 1to 8
Kein Fehler	No Fault	0	0
"Num" ist kleiner 2 oder größer 8	"Num" is smaller than 2 or geater than 8	1	0
Xn ist keine gültige Realzahl	Xn is not a valid real number	2	n
Yn_1 ist keine gültige Realzahl	Yn_1 is not a valid real number	3	n
Yn_2 ist keine gültige Realzahl	Yn_2 is not a valid real number	4	n
Yn_3 ist keine gültige Realzahl	Yn_3 is not a valid real number	5	n
Xn ist größer als HiLimX	Xn is greater than HiLimX	6	n
Yn_1 ist größer als HiLimY1	Yn_1 is greater than HiLimY1	7	n
Yn_2 ist größer als HiLimY2	Yn_2 is greater than HiLimY2	8	n
Yn_3 ist größer als HiLimY3	Yn_3 is greater than HiLimY3	9	n
X1 oder XNum ist kleiner als LoLimX	Xn is smaller than LoLimX	10	n
Y1_1 oder YNum_1 ist kleiner als LoLimY1	Yn_1 is smaller than LoLimY1	11	n
Y1_2 oder YNum_2 ist kleiner als LoLimY2	Yn_2 is smaller than LoLimY2	12	n
Y1_3 oder YNum_3 ist kleiner als LoLimY3	Yn_3 is smaller than LoLimY3	13	n
X Werte sind nicht aufsteigend	X values are not ascending	14	n
IN ist keine gültige Realzahl	In value is not a valid real number	15	0
IN ist kleiner als LoLimX	In value is smaller than LoLimX	16	0
IN ist kleiner als X1	In value is smaller than X1	17	0
IN ist größer als XNum	In value is greater than Xnum	18	n
IN ist größer als HiLimX	In value is greater than HiLimX	19	0
Speedtime n ist keine gültige Realzahl	Speed time n is not a valid real number	20	n
Speed n ist keine gültige Realzahl	Speed n is not a valid real number	21	n
Speed time n ist größer als HiLimX	Speed time n is greater than HiLimX	22	n
Speed n ist größer als HiLimSP	Speed n is greater than HiLimSP	23	n
Speed time n ist kleiner 0	Speed time n is smaller than 0	24	n
Speed n ist kleiner 0	Speed n is smaller than 0	25	n
Speed time Werte sind nicht aufsteigend	Speed time values are not ascending	26	n
Auswertungsfehler Keinen X-Bereich gefunden zwischen denen IN liegt! Kann eigentlich nicht vorkommen!	Analysis error No Xn Range found for the input value! Normally not possible!	27	0

SIEMENS

Cemat V 8.2
Function Block Library ILS_CEM

Function Description **Edition 07/16**

Counter C_COUNT

Safety Guidelines

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring to property damage only have no safety alert symbol. The notices shown below are graded according to the degree of danger.

Danger
indicates that death or severe personal injury **will** result if proper precautions are not taken.

Warning
indicates that death or severe personal injury **may** result if proper precautions are not taken.

Caution
with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution
without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention
indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel.** Within the context of the safety notices in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Prescribed Usage

Note the following:

Warning
This device and its components may only be used for the applications described in the catalog or the technical description, and only in connection with devices or components from other manufacturers which have been approved or recommended by Siemens.
Correct, reliable operation of the product requires proper transport, storage, positioning and assembly as well as careful operation and maintenance.

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We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens AG 2005
Technical data subject to change.

Description of C_COUNT

Type/Number

Module name: C_COUNT
Module no.: FB1015

Calling OBs

C_COUNT must be called in every cycle (e.g. OB35 (100MS_TASK)).

Function

The Counter module C_COUNT can be used to acquire counter values and to make it available for the visualization. Depending on the parameterization the following options can be selected:

a) Pulse acquisition (via input **CNZS** or structure input **PV_Puls**)

b) Reading an accumulated value as differential value (via input **VAL_CNT**). After reading the value, the data source is deleted.

c) Reading an accumulated value as result of a measurement (transfer function) (via input **VAL_CNT** or the structure inputs **PV_Int** or **PV_Real**)

The counted pulses/accumulated value is multiplied with factor PULS_VAL and the result is available at output **RT_OS_O** and structure output **PV_Out**.

Note: In case of using pulses or counter values from input cards, you have to read the inputs from the process image and never directly from the periphery.
Direct connection to the periphery input leads to permanent entries into the diagnosis buffer in case of periphery failure.

Pulse acquisition:

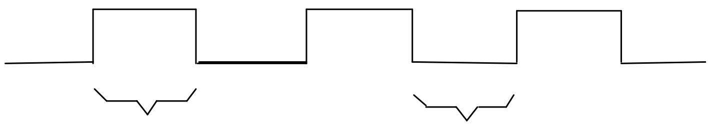
Parameterization:

MODE_V = 0

Function:

It the pulse evaluation is enabled (1-Signal at REL_PULS), each positive edge at input signal CNZS or PV_Puls increments the pulse counter by 1. The pulse counter is multiplied with factor PULS_VAL and transferred to the output RT_OS_O (REAL format) and to the output PV_Out (Structure).

The input signals must be so structured that the pulse duration and the pulse pause are each longer than the cycle-time of the calling OB.



t > cycle-time of the OB-task   t > cycle-time of the OB task

Read summation value as differential value:

Parameterization:

MODE_V = 1
NEW_VAL = 0

Function:

From input VAL_CNT the differential value is read and added to the existing "old" accumulated value. After reading the differential value from the source data area is deleted.

The new calculated accumulated value is multiplied with factor PULS_VAL and transferred to the output RT_OS_O (REAL format) and to the output PV_Out (Structure).

This is only possible if input VAL_CNT is used. With the new structure inputs PV_Int and PV_Real this function is not possible.

Read summation value and overwrite "old" value:

Parameterization:

MODE_V = 1
NEW_VAL = 1

Function:

From input VAL_CNT or from the structure inputs PV_Int or PV_Real the actual accumulated value is read and the existing "old" accumulated value us overwritten. The data soured is not deleted in this case.

The actual accumulated value is multiplied with factor PULS_VAL and transferred to the output RT_OS_O (REAL format) and to the output PV_Out (Structure).

In this case resetting the counter value via RESET button is not possible because the input is permanently available and the program will immediately overwrite the counter value.

Operating principle

Input interfaces

CNZS **Pulse signal (digital input)**

Format POINTER

The pulse signal which is to be acquired has to be connected to the interface CNZS. With each positive edge the internal pulse counter value is incremented by 1.

⚠ Caution: If the structure input PV_Puls is connected, CNZS will not be evaluated any more

PV_Puls **Pulse signal (digital input)**

Format STRUCT

For function description, see CNZS. This interface can be connected with a structure output, e. g. with the output of a PCS7 Driver block.

⚠ The structure input PV_Puls has higher priority than input CNZS.

Structure variables:

PV_Puls.Value	**Signal**	**Basic state 0-signal**
Format BOOL		
PV_Puls.ST	**Signal status**	**Default: 16#FF**
Format BYTE		

REL_PULS **Release pulse acquisition** **Basic state 1-signal**

Format BOOL

A release condition for pulse acquisition can be connected to interface REL_PULS. If a 0-signal is connected to REL_PULS, then no pulses are acquired.

MODE_V **Pulse acquisition / import value** **Basic state 0-signal**

Format BOOL

The MODE_V interface can be used to set whether the counter is to count pulses or import counter values.

MODE_V = 0-signal:
The counter block acquires pulsed from binary input CNZS or via structure PV_Puls

MODE_V = 1-signal:
The counter block reads a counter value via input VAL_CNT or via Structure PV_Int or PV_Real.

⚠ The structure inputs PV_Int and PV_Real can only be used if NEW_VAL = 0-Signal.

NEW_VAL **New value overwrites old value** **Basic state 1-signal**

Format BOOL

The NEW_VAL interface has significance only when the counter is used to import an accumulated value (not for pulse acquisition). When a 1-signal is applied, the old value is overwritten with the new counter value. For a 0-signal, the new value is added to the old value.

In the "overwrite mode" resetting the counter value via RESET button is not possible because the input is permanently available and the program will immediately overwrite the counter value.

DSIG_BQ **Driver Signal(s) Bad Quality** **Basic state 0-signal**

Format BOOL

If a driver block is, the information "driver blocks bad quality" can be displayed in the counter faceplate and in the block icon of the counter.
In order to achieve this, the outputs QBAD of the driver block must be connected to Interface DSIG_BQ.

VAL_CNT **Counter value (already counted pulses)**

Format ANY

Interface to import the accumulated value.

Type of data:	WORD, INT, DWORD, DINT, REAL is allowed,	otherwise ENG_ERR=1
Area:	DB, Memory	otherwise ENG_ERR=2

Attention: When NEW_VAL = 0, the data source will be deleted.
When VAL_CNT = REAL, the maximum counter value is 8.388.607.

If one of the structure inputs PV_Int or PV_Real is connected the input VAL_CNT is not evaluated any more.

PV_Int **Counter value (already counted pulses)**

Format STRUCT

If a structure is given which contains the accumulated counter value in INTEGER format, the structure output must be connected to PV_Int.

Input PV_Int has higher priority than VAL_CNT and PV_Real.

Structure variables:

PV_Int.Value **Value** **Default: 0**

Format INTEGER

PV_Int.ST **Signal status** **Default: 16#FF**

Format BYTE

PV_Real **Counter value (already counted pulses)**

Format STRUCT

If a structure is given which contains the accumulated counter value in REAL format, the structure output must be connected to PV_Int.

If the structure input PV_Int is connected the input PV_Real is not evaluated any more.

Structure variables:

PV_Real.Value **Value** **Default: 0.0**

Format REAL

PV_Real.ST **Signal status** **Default: 16#FF**

Format BYTE

PULS_VAL **Value of one pulse** **Default: 1.0**

Format REAL

This is the value of one pulse

Additional input as Interface to the OS:

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

Process values

The process values can be set during engineering and they can be changed online from the OS. To permit the modification of the process values from the faceplates, they must not be connected in the CFC.

UNIT	**Unit**	**Default: '%'**

Format STRING (8 characters)

Unit of the counter value.

Input/Output interfaces

RES_RTOS	**Date/Time for counter reset from OS**	**Default: 16#00**

Format DWORD

Interface to OS

RT_OS	**Counter value**	**Default: 0.0**

Format REAL

Interface to OS

RT_H	**Counter value refreshed every hour**	**Default: 0.0**

Format REAL

Interface to OS

RT_MIS	**Counted pulses (32 bit long)**	**Default: 16#00**

Format DWORD

Result of thecounted value (raw value) in DWORD format. The variable will only be filled if pulse input (CNZS or PV_Puls) is available. If the accumulated counter value is read, RT_MIS remains unchanged.

Prepared as interface to OS (can be transferred to the OS if required).

RT_MIH	**Counted pulses (refr. every hour) (32 bit)**	**Default: 16#00**

Format DWORD

Result of the counted value (raw value) in DWORD format. The variable will only be filled if pulse input (CNZS or PV_Puls) is available. If the accumulated counter value is read, RT_MIH remains unchanged.

Prepared as interface to OS (can be transferred to the OS if required)

Output interfaces

RT_OS_O **Counter value** **Default: 0.0**

Format REAL

Interface to OS

PV_Out **Counter value**

Format STRUCT

The structure contains the counter value in REAL format.

Structure variables:

PV_Out.Value **Value** **Default: 0.0**

Format REAL

PV_Out.ST **Signal status** **Default: 16#80**

Format BYTE

RT_H_O **Counter value refreshed every hour** **Default: 0.0**

Format REAL

Interface to OS

PV_OutH **Counter value refreshed every hour**

Format STRUCT

The structure contains the counter value in REAL format. In difference to PV_Out this value is refreshed every hour.

Structure variables:

PV_OutH.Value **Value** **Default: 0.0**

Format REAL

PV_OutH.ST **Signal status** **Default: 16#80**

Format BYTE

RT_MIS_O **Counted pulses (32 bit long)** **Default: 16#00**

Format DWORD

Result of the counted value (raw value) in DWORD format

Prepared as interface to OS

RT_MIH_O **Counted pulses (refr. every hour) (32 bit)** **Default: 16#00**

Format DWORD

Result of the counted value (raw value) in DWORD format

Prepared as interface to OS

ENG_ERR **Engineering Error**

Format BYTE

0 = no error
1 = wrong data type with parameter VAL_CNT, look to VAL_CNT
2 = wrong area of data with parameter VAL_CNT, look at VAL_CNT

RES_OUT **Reset Counter**

Format BOOL

With the reset command from the OS the output RES_OUT gets 1-Signal for 1 cycle.
This signal can be used to reset external counters from the OS.

Time characteristics

The run sequence for the counter can be chosen as desired.

Message characteristics

The C_COUNT has no Messages.

Commands

Refer to Variable details for the assignment of the command word.

I/O-bar of C_COUNT

C_COUNT

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
CNZS	Pulse signal (digital input)	POINTER	0	I			
PV_Puls	Pulse signal (digital input)	STRUCT		I			
PV_Puls.Value	Signal	BOOL	0	I	U	+	
PV_Puls ST	Signal Status	BYTE	16#FF	I	U		
REL_PULS	Release pulse acquisition	BOOL	1	I			
MODE_V	Mode: 0 = Pulse / 1 = value	BOOL	0	I			
NEW_VAL	New value overwrites old value	BOOL	0	I			
DSIG_BQ	Driver Signal(s) Bad Quality	BOOL	0	I			
VAL_CNT	Counter value (already counted pulses)	ANY		I			
PV_Int	Counter value (already counted pulses)	STRUCT		I			
PV_Int.Value	Value	INT	0	I	U	+	
PV_Int.ST	Signal Status	BYTE	16#FF	I	U		
PV_Real	Counter value (already counted pulses)	STRUCT		I			
PV_Real.Value	Value	REAL	0.0	I	U	+	
PV_Real.ST	Signal Status	BYTE	16#FF	I	U		
PULS_VAL	Value of one pulse	REAL	1.0	I		+	
COMMAND	Command word	WORD	16#00	I	U	+	
UNIT	Unit	STRING [8]	‘%‘	I		+	
RES_RTOS	Date/Time for counter reset from OS	DWORD	16#00	IO	U	+	
RT_OS	Counter value	REAL	0.0	IO		+	
RT_H	Counter value (refreshed every hour)	REAL	0.0	IO	U	+	
RT_MIS	Counted pulses 32 Bit DWORD	DWORD	16#00	IO	U		
RT_MIH	Counter pulses 32 Bit DWORD (refreshed every hour)	DWORD	16#00	IO	U		

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
RT_OS_O	Counter value	REAL	0.0	O			
PV_Out	Counter value	STRUCT		O			
PV_Out.Value	Value	REAL	0.0	O	U	+	
PV_Out.ST	Signal Status	BYTE	16#80	O	U	+	
RT_H_O	Counter value (refreshed every hour)	REAL	0.0	O	U		
PV_OutH	Counter value (refreshed every hour)	STRUCT		O	U		
PV_OutH.Value	Value	REAL	0.0	O	U	+	
PV_OutH.ST	Signal Status	BYTE	16#80	O	U	+	
RT_MIS_O	Counted pulses 32 Bit DWORD	DWORD	16#00	O	U		
RT_MIH_O	Counter pulses 32 Bit DWORD (refreshed every hour)	DWORD	16#00	O	U		
ENG_ERR	Engineering Error	BYTE	16#00	O			
RES_OUT	Reset Counter (1 cycle)	BOOL	0	O			

OS-Variable table

C_COUNT

OS Variable	Description	PLC Data Type	OS Data Type
PV_Puls#Value	Signal	BOOL	Binary variable
PV_Int#Value	Value	INT	Signed 16-bit value
PV_Real#Value	Value	REAL	32-bit floating-point number IEEE 754
PULS_VAL	Value of one pulse	REAL	32-bit floating-point number IEEE 754
COMMAND	Command word	WORD	Unsigned 16-bit value
UNIT	Unit	STRING [8]	Text variable 8-bit character set
RES_RTOS	Date/Time for counter reset from OS	DWORD	Unsigned 32-bit value
RT_OS	Counter value	REAL	32-bit floating-point number IEEE 754
RT_H	Counter value (refreshed every hour)	REAL	32-bit floating-point number IEEE 754
PV_Out#Value	Value	REAL	32-bit floating-point number IEEE 754
PV_Out#ST	Signal Status	BYTE	Unsigned 8-bit value
PV_OutH#Value	Value	REAL	32-bit floating-point number IEEE 754
PV_OutH#ST	Signal Status	BYTE	Unsigned 8-bit value

Variable details

Internal structure of the Commands word:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Kommandowort**	**Commandword**		
COM_B20		0				
COM_B21		1				
COM_B22	R_RTOS	2	Zähler löschen	Reset Counter for OS	Op. Inp.	
COM_B23		3				
COM_B24		4				
COM_B25		5				
COM_B26		6				
COM_B27		7				
COM_B10		8				
COM_B11		9				
COM_B12		10				
COM_B13		11				
COM_B14		12				
COM_B15		13				
COM_B16		14				
COM_B17		15				

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Function Block Library ILS_CEM

Function Description Edition 07/16

Running time C_RUNNT

Safety Guidelines

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indicates that death or severe personal injury **will** result if proper precautions are not taken.

Warning
indicates that death or severe personal injury **may** result if proper precautions are not taken.

Caution
with a safety alert symbol indicates that minor personal injury can result if proper precautions are not taken.

Caution
without a safety alert symbol indicates that property damage can result if proper precautions are not taken.

Attention
indicates that an unintended result or situation can occur if the corresponding notice is not taken into account.

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Description of C_RUNNT

Type/Number

Module name: **C_RUNNT**
Module no.: **FB1016**

Calling OBs

C_RUNNT must be called in OB1 (MAIN_TASK).

Function

With the run-time module one can acquire running times and operating times.

Operating principle

Input interfaces

RTLS **Input Signal** **Basic state 0-signal**

Format BOOL

If this interface has a 1-signal, then the running time is acquired.

⚠ Caution: If the structure input PV is connected, RTLS will not be evaluated any more

PV **Input Signal**

Format STRUCT

For function description, see RTLS. This interface can be connected with a structure output, e. g. with the output of a PCS7 Driver block.

⚠ The structure input PV has higher priority than input RTLS.

Structure variables:

PV.Value **Signal** **Basic state 0-signal**

Format BOOL

PV.ST **Signal status** **Default: 16#FF**

Format BYTE

REL_RT **Release runtime acquisition** **Basic state 1-signal**

Format BOOL

One can connect a release condition to interface REL_RT for the acquisition of the running time. With a 0-signal at REL_RT **no** running time is acquired.

Additional input as Interface to the OS:

COMMAND **Command word** **Default: 16#00**

Format WORD

Interface to OS

For more information see Variable details.

Input/Output interfaces

RES_RTOS **Date/Time for RT reset from OS** **Default: 16#00**

Format DWORD

Interface to OS

RT_OS **Run-time in hours** **Default: 0.0**

Format REAL

Interface to OS

RT_H **Run-time in hours refreshed every hour** **Default: 0.0**

Format REAL

Interface to OS

RT_MIS **Run-time in seconds (32-bit long)** **Default: 16#00**

Format DWORD

Result of the counted value in DWORD format

Prepared as interface to OS (can be transferred to the OS if required)

RT_MIH **Run-time in sec. (32-bit, refr. every hour)** **Default: 16#00**

Format DWORD

Result of the counted value in DWORD format

Prepared as interface to OS (can be transferred to the OS if required)

Output interfaces

RT_OS_O **Runtime in hours** **Default: 0.0**

Format REAL

Interface to OS

PV_Out **Runtime in hours**

Format STRUCT

The structure contains the counter value in REAL format.

Structure variables:

PV_Out.Value **Value** **Default: 0.0**

Format REAL

PV_Out.ST **Signal status** **Default: 16#80**

Format BYTE

RT_OS_H **Hours of the Runtime value** **Default: 0**

Format DINT

Interface to OS

This variable contains the completed hours

RT_OS_M **Minutes of the Runtime value** **Default: 0**

Format DINT

Interface to OS

This variable contains the rest in minutes

RT_H_O **Run-time in hours refreshed every hour** **Default: 0.0**

Format REAL

Interface to OS

PV_OutH **Counter value refreshed every hour**

Format STRUCT

The structure contains the counter value in REAL format. In difference to RT_OS_O this value is refreshed every hour.

Structure variables:

PV_OutH.Value **Value** **Default: 0.0**

Format REAL

PV_OutH.ST **Signal status** **Default: 16#80**

Format BYTE

RT_MIS_O **Counted pulses (32 bit long)** **Default: 16#00**

Format DWORD

Result of the counted value in DWORD format

Prepared as interface to OS

RT_MIH_O **Counted pulses (refr. every hour) (32 bit)** **Default: 16#00**

Format DWORD

Result of the counted value in DWORD format

Prepared as interface to OS

Time characteristics

The run sequence for the run-time module can be chosen as desired.

Message characteristics

The C_RUNNT has no Messages.

Commands

Refer to the OS variables table for the assignment of the command word.

I/O-bar of C_RUNNT

C_RUNNT

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
RTLS	Input Signal	BOOL	0	I			
PV	Input Signal	STRUCT		I			
PV.Value	Signal	BOOL	0	I	U	+	
PV.ST	Signal Status	BYTE	16#FF	I	U		
REL_RT	Release acquisition	BOOL	1	I			
COMMAND	Command word	WORD	16#00	I	U	+	
RES_RTOS	Date/Time for RT reset from OS	DWORD	16#00	IO	U	+	
RT_OS	Run-time in hours	REAL	0.0	IO		+	
RT_H	Run-time in hours (refreshed every hour)	REAL	0.0	IO	U	+	
RT_MIS	Run-time in seconds 32 Bit DWORD	DWORD	16#00	IO	U		
RT_MIH	Run-time in seconds 32Bit DWORD (refreshed every hour)	DWORD	16#00	IO	U		
RT_OS_O	Run-time in hours	REAL	0.0	O			
PV_Out	Run-time in hours	STRUCT		O			
PV_Out.Value	Value	REAL	0.0	O	U	+	
PV_Out.ST	Signal Status	BYTE	16#80	O	U	+	
RT_OS_H	Hours of the runtime value	DINT	0	O		+	
RT_OS_M	Minutes of the runtime value (Rest)	DINT	0	O		+	
RT_H_O	Run-time in hours (refreshed every hour)	REAL	0	O	U		
PV_OutH	Run-time in hours (refreshed every hour)	STRUCT		O	U		
PV_OutH.Value	Value	REAL	0.0	O	U	+	
PV_OutH.ST	Signal Status	BYTE	16#80	O	U	+	
RT_MIS_O	Run-time in seconds 32 Bit DWORD	DWORD	16#00	O	U		

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
RT_MIH_O	Run-time in seconds 32 Bit DWORD (refreshed every hour)	DWORD	16#00	O	U		

OS-Variable table

C_RUNNT

OS Variable	Description	PLC Data Type	OS Data Type
PV#Value	Signal	BOOL	Binary variable
COMMAND	Command word	WORD	Unsigned 16-bit value
RES_RTOS	Date/Time for RT reset from OS	DWORD	Unsigned 32-bit value
RT_OS	Run-time in hours	REAL	32-bit floating-point number IEEE 754
RT_H	Run-time in hours (refreshed every hour)	REAL	32-bit floating-point number IEEE 754
PV_Out#Value	Value	REAL	32-bit floating-point number IEEE 754
PV_Out#ST	Signal Status	BYTE	Unsigned 8-bit value
RT_OS_H	Hours of the runtime value	DINT	Signed 32-bit value
RT_OS_M	Minutes of the runtime value (Rest)	DINT	Signed 32-bit value
PV_OutH#Value	Value	REAL	32-bit floating-point number IEEE 754
PV_OutH#ST	Signal Status	BYTE	Unsigned 8-bit value

Variable details

Internal structure of the Commands word:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
COMMAND			**Kommandowort**	**Commandword**		
COM_B20		0				
COM_B21		1				
COM_B22	R_RTOS	2	Zähler löschen	Reset Runtime for OS	Op. Inp.	
COM_B23		3				
COM_B24		4				
COM_B25		5				
COM_B26		6				
COM_B27		7				
COM_B10		8				
COM_B11		9				
COM_B12		10				
COM_B13		11				
COM_B14		12				
COM_B15		13				
COM_B16		14				
COM_B17		15				

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Function Description **Edition 07/16**

Related Modules C_RelMod

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Description of C_RELMOD

Type/Number

Module name: **C_RelMod**
Module no.: **FB1077**

Calling OBs

C_RelMod must be called in OB1 (MAIN_TASK).

Function

Common overview of digital and analog Objects belonging to a technological Object, e. g. a Bucked Elevator with Power measurement, drift switch, Level Switch, Maintenance door closed, Auxiliary drive….)

Via 20 input parameters of block C_RelMod (*SelFPD1* to *SelPPD20*) up to 20 objects can be linked to block type C_DRV_1D, C_DRV_2D, C_DAMPER, C_VALVE, C_GROUP, C_ROUTE, C_SELECT or C_ANASEL.

The Faceplate-Call of C_RelMod is carried out via button "U" of the above listed Objects. The C_RelMod shows the connected Objects and allows opening of the corresponding Faceplate.

In the faceplate of block C_RelMod the following information is displayed:

- The Tagename of the connected object
- The comment is shown as a tooltip text.

Operation:

- Opening the faceplates of connected input object
- Jump to the main object

Operating principle

Input interfaces

SelFpD1- 20 **Input interface**

Format ANY

Via 20 input parameters of block C_RelMod (*SelFPD1* to *SelPPD20*) up to 20 objects can be linked to the main object.

The inputs are only needed in order to create a JUMP variable, containing the Tagname of the connected object. There is no further code. The variable SelFpDxx#JUMP is created during OS Compile.

Input/Output interfaces

none

Output interfaces

Out_Sig **Output Interface**

Format STRUCT

Output *OutSig* contains the connection information for the Faceplate call and is only used as a connection point to the main object.

Structure variables:

OutSig.Value **Value** **Default: 0**

Format BOOL

OutSig.ST **Signal status** **Default: 16#80**

Format BYTE

Time characteristics

The run sequence for the C_RelMod can be chosen as desired.

Message characteristics

The C_RelMod has no Messages.

Commands

Not used.

I/O-bar of C_RelMod

C_RelMod

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
SelFpD1-SelFpD20	Input value	ANY		I			
Out_Sig	Output value	STRUCT		O		+	
Out_Sig.Value	Value	REAL	0	O	U		
Out_Sig.ST	Signal Status	BYTE	16#80	O	U	+	

OS-Variable table

C_RelMod

OS Variable	Description	PLC Data Type	OS Data Type
Out_Sig#Value	Value	BOOL	Binary variable
Out_Sig#ST	Signal Status	BYTE	Unsigned 8-bit value

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Function Block Library ILS_CEM

Function Description **Edition 07/16**

Analog Value Selection C_ANASEL

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Description of C_ANASEL

Type/Number

Module name: C_ANASEL
Module no.: FB1038

Calling OBs

C_ANASEL must be called in OB1 (MAIN_TASK).

Function

The block is used for the following applications :

- Display of Analog Values which belong to an technological Object (e.g. Mill Drive)
- Selecting one of 16 analog values and switching it through to the output. (The most important Process Value can be shown in the Drive Symbol and in the Faceplate.
- generation of overall limit values ("OR" function for the limits of all input values))

Operating principle

The block transfers the value of one of the input parameters “In01” to “In16” to the output parameter “Out_Val”. The selection is carried out via input parameter SelInt.

The corresponding unit and limit status must be provided via inputs In01Stat to In16Stat. The unit and the limits of the selected input value are transferred to output parameter Out_Stat.

Additional functions

- The worst signal status of all connected inputs is detected and provided at output ST_Worst.
- The summarizing information for the limits HH, H, L, LL is built and transferred to the corresponding outputs. (These can be used as protection interlock of a motor.)

Display in the Faceplate:

- the TAG, the Analog Value, the UNIT and the related comment as Tooltip Text
- the Limit violation of the Input parameter and the signal status
- the summarizing information of each limit (HH, H, L, LL)
- the worst signal status of all Input parameter
- the TAG name of the Object which is connected to the Output.(e.g. Drive)

Operation:

- Selection of Input which should be switched to the Output
- Opening the Faceplates of Input Object (Measure, Controller)
- Opening the Faceplates of Output Object (Drive)

Input interfaces

In01 **Input Signal 01**

Format STRUCT

Interfaces In01 to In16 can be connected with a structure output as e. g. signal PV_Out of MEASURE. The structure contains the value and the signal status.

Structure variables:

In01.Value **Value** **Default: 0.0**

Format REAL

In01.ST **Signal Status** **Default: 16#FF**

Format BYTE

In02 – In16 **Input Signal 02 - 16**

Format STRUCT

For description see In01.

In01Stat **Input Signal 01 (Unit and STATUS)**

Format STRUCT

Interface In01Stat to In16Stat can be connected with a structure output as e. g. signal PV_Stat of MEASURE. The UNIT and Object STATUS of the connected Object will be read in. (Variable STATUS has the information about the limit bits)

Structure variables:

In01.UNIT **Unit** **Default: %**

Format STRING[8]

In01.STATUS **STATUS** **Default: 16#0**

Format DWORD

In02Stat – InStat16 **Input Signal 02 - 16 (Unit and STATUS)**

Format STRUCT

For description see In01Stat.

SelInt **Input Selection** **Default: 0**

Format INT

The Interface SelInt contains the number of the Input Interface(IN01-IN16) which has to be copied to the Output.

UserFace **Select Faceplate**

Format ANY

Input UserFace can be connected to any block with an OS Interface (Faceplate). If a block is connected, an additional button "U" (User) appears in the faceplate of the C_ANASEL block. With this button the Faceplate of the connected block can be opened.

Output interfaces

Out_Val **Output signal**

Format STRUCT

The Structure “Out_Val” contains the Analog Value in REAL Format and the associated Signal Status

Interface to OS

Structure Variable:

Out_Val.Value	**Value**	**Default: 0.0**
Format REAL		
Out_Val.ST	**Signal Status**	**Default: 16#80**
Format BYTE		

Out_Stat **Output signal (Unit and STATUS)**

Format STRUCT

The Structure “Out_Stat” contains the UNIT as STRING and Object STATUS as DWORD

Interface to OS

Structure Variable:

Out_Val.Unit	**Unit**	**Default: %**
Format STRING[8]		
Out_Val.STATUS	**Object Status**	**Default: 16#00**
Format DWORD		

InSelected **Selected Input Value**

Format STRUCT

The Interface “SelInt” contains the number of the Input Interface (IN01-IN16) which is selected.

Structure Variable:

InSelected.Value	**Wert**	**Default: 1**
Format INT		
InSelected.ST	**Signalstatus**	**Default: 16#80**
Format BYTE		

ST_Worst **Worst Signal Status** **Default: 0**

Format BYTE

Interface to OS

The Interface “ST_Worst” contains the Quality code No. of the worst Input Quality.

STATUS3 **Input Interface in use** **Default: 0**

Format DWORD

In STATUS3 the bit information of connected Objects are stored (In01 = Bit 0, In16 = Bit 15) as well as the status of the overall limit bits (HH = Bit 16, H = Bit 15, L = Bit 18, LL = Bit 19).

CL_HH **Overall Limit Alarm (HH)**

Format STRUCT

The Structure CL_HH contains the accumulative “HH” limits of all connected Inputs and can be used as Safety-interlock Signal of Drives.

Structure Variable:

CL_HH.Value **Value** **Default: 0.0**

Format BOOL

CL_HH.ST **Signal Status** **Default: 16#80**

Format BYTE

CL_H **Overall Limit Warning (H)**

Format STRUCT

The Structure CL_H contains the accumulative “H” limits of all connected Inputs and can be used as Safety-interlock Signal of Drives.

Structure Variable:

CL_H.Value **Value** **Default: 0.0**

Format BOOL

CL_H.ST **Signal Status** **Default: 16#80**

Format BYTE

CL_L **Overall Limit Warning (L)**

Format STRUCT

The Structure CL_L contains the accumulative ”L” limits of all connected Inputs and can be used as Safety-interlock Signal of Drives.

Structure Variable:

CL_L.Value **Value** **Default: 0.0**

Format BOOL

CL_L.ST **Signal Status** **Default: 16#80**

Format BYTE

CL_LL **Overall Limit Alarm (LL)**

Format STRUCT

The Structure CL_LL contains the accumulative “LL” limits of all connected Inputs and can be used as Safety-interlock Signal of Drives.

Structure Variable:

CL_LL.Value **Value** **Default: 0.0**

Format BOOL

CL_LL.ST **Signal Status** **Default: 16#80**

Format BYTE

Time characteristics

The run sequence can be chosen as desired for the C_ANASEL module.

Message characteristics

Block C_ANASEL does not generate annunciations.

Commands

No commands available.

I/O-bar of C_ANASEL

C_ANASEL

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
In01 - In16	Input Signal 01 - 16	STRUCT		I			
In01 - In16.Value	Value	REAL	0	I	U	+	
In01 - In16.ST	Signal Status	BYTE	16#FF	I	U		
In01Stat - In16Stat	Input Signal 01 – 16 (Unit and STATUS)	STRUCT		I			
In01Stat - In16Stat .UNIT	Unit	STRING [8]	%	I	U	+	
In01Stat - In16Stat .STATUS	Object status	DWORD	16#0	I	U		
SelInt	Selections Number	INT	1	I	U	+	
UserFace	User Faceplate	ANY	-	I	U	+	
Out_Val	Output signal	STRUCT		O		+	
Out_Val.Value	Value	REAL	0	O	U		
Out_Val.ST	Signal Status	BYTE	16#80	O	U	+	
Out_Stat	Output signal (Unit and STATUS)	STRUCT		O			
Out_Stat.UNIT	Unit	STRING [8]	%	O	U	+	
Out_Stat.STATUS	Object STATUS	DWORD	16#00	O	U		
InSelected	Selected Input	STRUCT		O	U	+	
InSelected.Value	Value	INT	0	O	U	+	
InSelected.ST	Signal Status	BYTE	16#80	O	U	+	
StWorst	Worst Signal Status	BYTE	16#80	O	U	+	
STATUS3	Used Inputs (active)	DWORD	16#00	O	U	+	
CL_HH	Overall Limits HH	STRUCT		O			
CL_HH.Value	Value	BOOL	0	O	U		
CL_HH.ST	Signal Status	BYTE	16#80	O	U		
CL_H	Overall Limits H	STRUCT		O			

Element	Meaning	Format	Default	Type	Attr.	HMI	Permitted Values
CL_H.Value	Value	BOOL	0	O	U		
CL_H.ST	Signal Status	BYTE	16#80	O	U		
CL_L	Overall Limits L	STRUCT		O			
CL_L.Value	Value	BOOL	0	O	U		
CL_L.ST	Signal Status	BYTE	16#80	O	U		
CL_LL	Overall Limits LL	STRUCT		O			
CL_LL.Value	Value	BOOL	0	O	U		
CL_LL.ST	Signal Status	BYTE	16#80	O	U		

OS-Variable table

C_ANASEL

OS Variable	Description	PLC Data Type	OS Data Type
In01-In16#Value	Value	REAL	32-bit floating-point number IEEE 754
In01-In16#UNIT	Dimension	STRING	Text variable 8 bit
In01-In16#STATUS	Object Status	DWORD	Unsigned 32-bit value
SelInt	Selected Input Value	INT	Unsigned 16-bit value
Out_Val#Value	Value	REAL	32-bit floating-point number IEEE 754
Out_Val #UNIT	Unit, Dimension	STRING	Text variable 8 bit
Out_Val #STATUS	Object Status	DWORD	Unsigned 32-bit value
InSelected#Value	Selected Input Value	INT	Unsigned 16-bit value
St_Worst	Worst Quality code	BYTE	Unsigned8-bit value
STATUS3	Used Inputs	DWORD	Unsigned 32-bit value

Variable details

Internal structure of the **STATUS3** word:

Parameter	Function	OS-Addr.	Designation German	Designation English	Msg Class	Fault Class
STATUS3			**Status**	**Status**		
STA3_B40		0	In01 angeschlossen	In01 connected		
STA3_B41		1	In02 angeschlossen	In02 connected		
STA3_B42		2	In03 angeschlossen	In03 connected		
STA3_B43		3	In04 angeschlossen	In04 connected		
STA3_B44		4	In05 angeschlossen	In05 connected		
STA3_B45		5	In06 angeschlossen	In06 connected		
STA3_B46		6	In07 angeschlossen	In07 connected		
STA3_B47		7	In08 angeschlossen	In08 connected		
STA3_B30		8	In09 angeschlossen	In09 connected		
STA3_B31		9	In10 angeschlossen	In10 connected		
STA3_B32		10	In11 angeschlossen	In11 connected		
STA3_B33		11	In12 angeschlossen	In12 connected		
STA3_B34		12	In13 angeschlossen	In13 connected		
STA3_B35		13	In14 angeschlossen	In14 connected		
STA3_B36		14	In15 angeschlossen	In15 connected		
STA3_B37		15	In16 angeschlossen	In16 connected		
STA3_B20		16	Sammel Grenze HH	over all limit HH		
STA3_B21		17	Sammel Grenze H	over all limit H		
STA3_B22		18	Sammel Grenze L	over all limit L		
STA3_B23		19	Sammel Grenze LL	over all limit LL		
STA3_B24		20				
STA3_B25		21				
STA3_B26		22				
STA3_B27		23				
STA3_B10		24				
STA3_B11		25				
STA3_B12		26				
STA3_B13		27				
STA3_B14		28				
STA3_B15		29				
STA3_B16		30				
STA3_B17		31				

Out_Val.STATUS

Parameter	**Function**	**OS-Addr.**	**Designation German**	**Designation English**	**Msg Class**	**Fault Class**
Out_Val. STATUS			**Status**	**Status**		
STA_B40	HH	0	Messwert > Obergrenze 2	MV > upper limit 2		
STA_B41	H	1	Messwert > Obergrenze 1	MV > upper limit 1		
STA_B42	L	2	Messwert < Untergrenze 1	MV < lower limit 1		
STA_B43	LL	3	Messwert < Untergrenze 2	MV < lower limit 2		
STA_B44	ULZ	4	Live Zero	Live Zero		
STA_B45	UGN	5	Gradient negativ überschritten	Negative gradient overshot		
STA_B46	UGP	6	Gradient positiv überschritten	Positive gradient overshot		
STA_B47	USP	7	Messkanal gesperrt (Bypass)	Measuring channel blocked		
STA_B30	SHH	8	Messwert > Schalt_Obergrenze 2	MV > upper switching limit 2		
STA_B31	SH	9	Messwert > Schalt_Obergrenze 1	MV > upper switching limit 1		
STA_B32	SL	10	Messwert < Schalt_Untergrenze 1	MV < lower switching limit 1		
STA_B33	SLL	11	Messwert < Schalt_Untergrenze 2	MV < lower switching limit 1		
STA_B34	UST	12	Störung nicht quittiert	Fault not acknowledged		
STA_B35	CL_WARN	13	Kollektiv Warnung aktiv	Collective Warning active		
STA_B36		14				
STA_B37		15				
STA_B20	DRV	16	Verbunden mit Treiber	Connected to a driver		
STA_B21	LVV	17	Letzter gültiger Wert	Last valid value		
STA_B22	SUB	18	Ersatzwert	Substitution value		
STA_B23	SIM	19	Simulation ON	Simulation ON		
STA_B24	BYP_A	20	Taster Bypass aktiv	Switch Bypass activ		
STA_B25	RELS	21	Freigabe Überwachung	release supervision		
STA_B26	REL_TIM_RUN	22	Release Zeit läuft	release time is running		
STA_B27	STRC	23	PV angeschlossen	PV connected		
STA_B10	MARK	24	Objekt markieren (Gruppenkommando)	Highlight object (group command)		
STA_B11	LINK	25	GR_LINK1 angeschlossen	GR_LINK1 connected		
STA_B12	MTRIP	26	Fehler speichern bis Quittierung	memorize trip until acknowledgement		
STA_B13	RELS_ON	22	Freigabezustand	Release status		
STA_B14		28				
STA_B15		29				
STA_B16		30				
STA_B17		31				