SIEMENS

Equipment for Machine Tools
SINUMERIK 805SM-P
Basic Version 2
Roll Feed Module

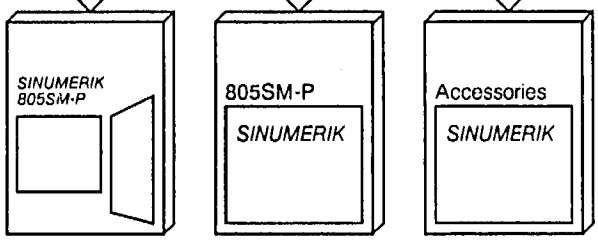
Planning Guide

Edition 06.93

Manufacturer Documentation

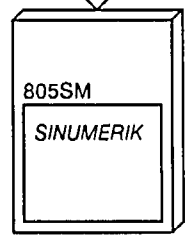
Overview of the SINUMERIK 805SM-P Documentation

General Documentation



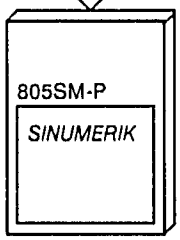
Product Brief | Catalog | Catalog NC 90

User, Manufacturer and Service Documentation



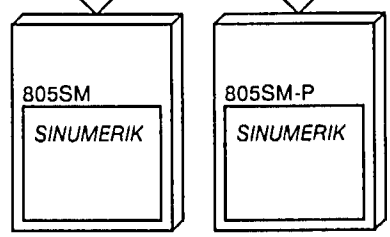
Communication (FH)

User Documentation



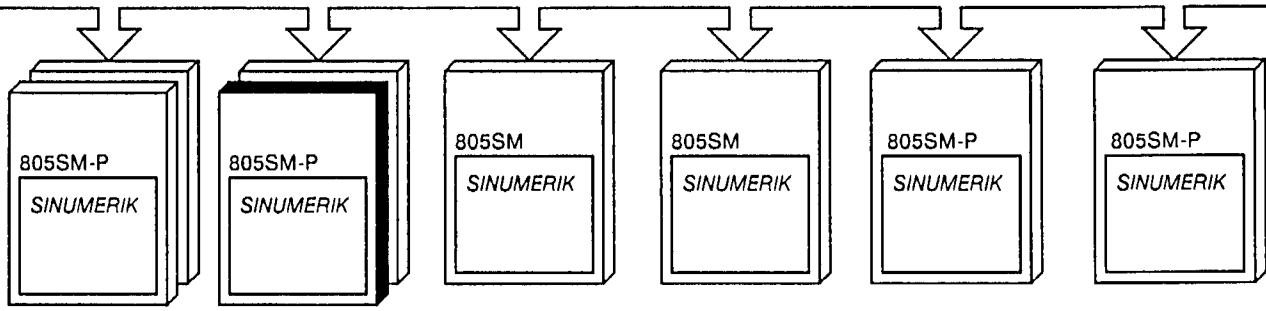
Operating Guide Technology (BA)

Manufacturer Documentation



Instruction Manual (BE) | Operator's Guide Standard (BA)

Manufacturer Documentation

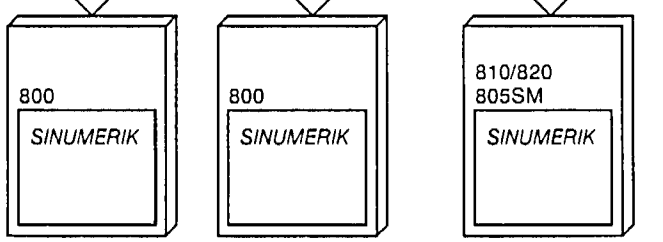


Interface (PJ):
- Signals
- Connection Conditions

Press Modules (PJ):
- **Roll Feed Module**
- Pressure Module

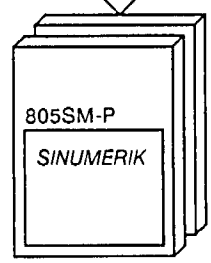
PLC Programming (PJ) | NC Programming (PG) | Cycles (PJ) | Operating Environment (PJ)

Manufacturer Documentation



Universal Interface (PJ) | SINUMERIK WS 800A, CL 800 Cycle Language (PJ) | Host PLC Link (BS) (in German) | Linking to SINEC L2-DP with IM 328-N Interface Module(BS) (in German)

Service Documentation



Installation Guide (IA):
- Instructions
- Lists

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Basic Version 2
Roll Feed Module

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SINUMERIK® documentation

Printing history

Brief details of this edition and previous editions are listed below.

The status of each edition is shown by the code in the "Remarks" column.

Status code in "Remarks" column:

A . . . New documentation
B . . . Unrevised reprint with new Order Number
C . . . Revised edition with new status
If factual changes have been made on the page since the last edition, this is indicated by a new edition coding in the header on that page.

Edition	Order No.	Remarks
12.91	6ZB5 440-0MW02-0AA0	A
06.93	6ZB5 440-0MW02-0AA1	C

Other functions not described in this documentation might be executable in the control. This does not, however, represent an obligation to supply such functions with a new control or when servicing.

This publication was produced on the Siemens 5800 Office System.
Subject to change without prior notice.

Preliminary remarks

Notes for the reader

The documentation for the SINUMERIK 805SM-P control is subdivided into four levels:

- General Documentation
- User Documentation
- Manufacturer Documentation
- Service Documentation

The Manufacturer Documentation consists of the following manuals:

- Instruction Manual
- Interface Description Part 1: Signals
- Interface Description Part 2: Connection Conditions
- PLC Programming Guide
- Standard Operating Guide
- NC Programming Guide
- Roll Feed Module, Planning Guide
- Pressure Module, Planning Guide
- Cycles, Planning Guide

This manual, the planning instructions for the roll feed, describes the entire planning of the module and is meant to be a supplement of the available user, manufacturer and service documentation.

The hardware components (connections, jumper settings, cable diagrams...) and the start-up procedures as well as the machine data and alarm displays to be assigned parameters are described in it.

This manual is written for technically qualified personnel, especially those having knowledge of or being trained in automation and control technology.

The knowledge, understanding and correct observance of all the Safety rules and warnings are the necessary preconditions for the safe installation and commissioning as well as for the safe operation and maintenance of the product described in this manual. This manual describes the General Safety Rules and Warnings. Only qualified personnel has the necessary technical knowledge to properly interpret and apply all the Safety Rules and Warnings in a particular case.

The contents of this instruction manual shall not become part or modify any prior or existing agreement, commitment or relationship. The Sales Contract contains the entire obligations of Siemens. Any statements contained herein do not create new warranties or modify the existing warranty.

If you need further documentation for the SINUMERIK 805SM-P, please contact your local Siemens representative.

Technical Notes

- The roll feed axes (RF axis 1 and RF axis 2) are functional only with the corresponding option.
- For the start-up of the RF axes, the function INSTALLATION is available in the SINUMERIK 805SM-P.
- By actuating the SHIFT key and the left softkey, the operator can select the menu DATA TRANSFER (NC operating modes) for each selected press operating mode. It can be deselected by actuating the RECALL key.
- Description of Cables and Connectors:

The order numbers for the ready-made cables (cables with the attached connectors) have an empty square □ to mark a space for the cable length code letter. If ordering a ready-made cable, the square has to be substituted by the code letter for the cable length desired. The section 1.6, "Accessories, order data", lists the available cable lengths.

Very important information is displayed in the text by this form of representation.

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1 Overview

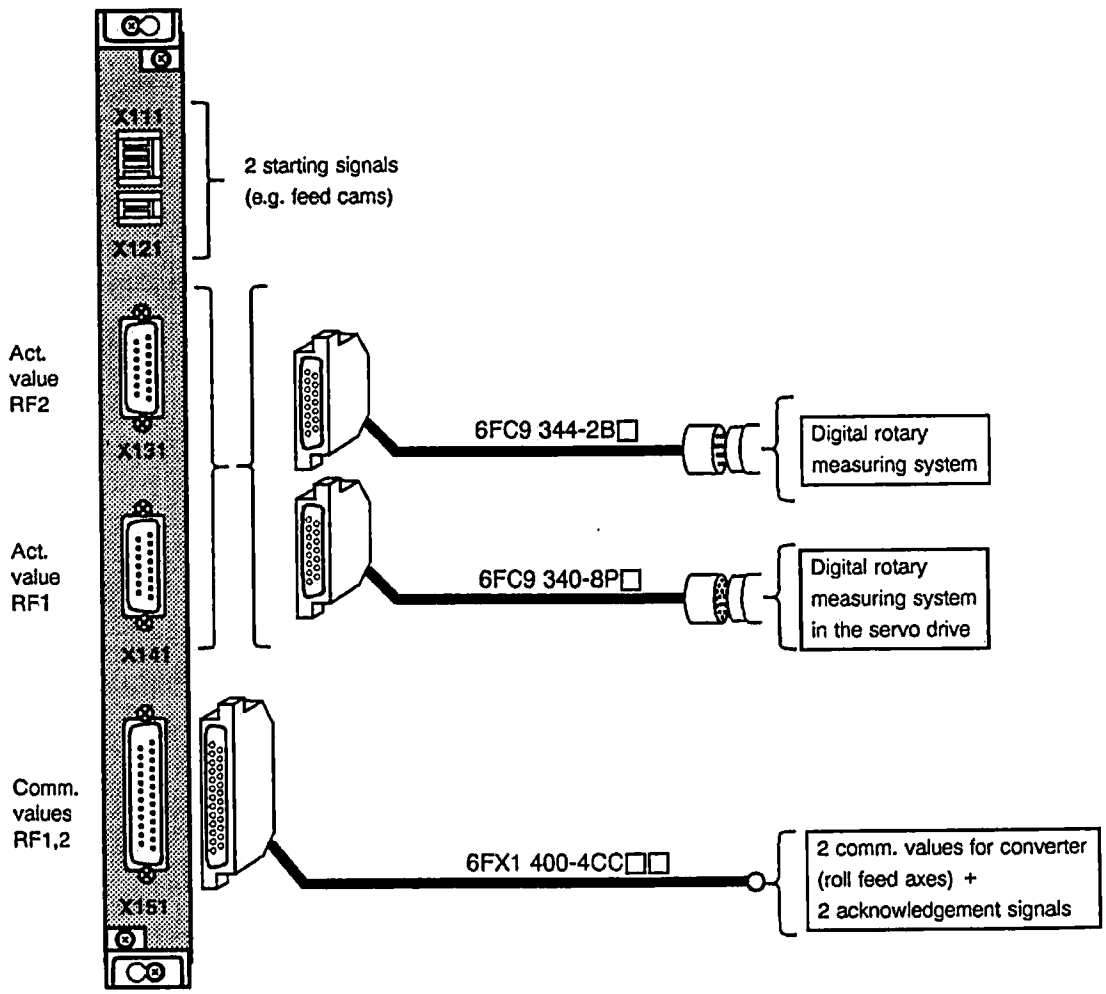
1.1 General

Using the roll feed module in presses, the major part of the complex mechanical feed system can be dispensed with. The resulting degree of automation reduces the set-up times and thus increases the flexibility during operation. One roll feed axis, for example, uncoils the material from a coil. A second roll feed (RF) axis can be used for pushing the pressed workpiece out of the press.

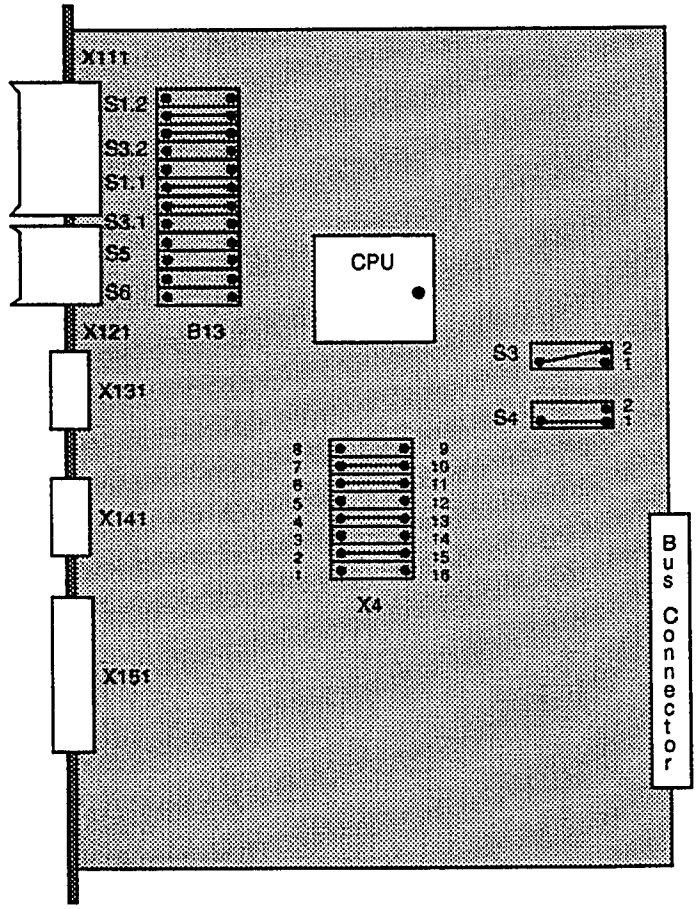
As the time available for material transport is very short, the response times must also be kept short. To ensure this, the RF module is provided with a separate microprocessor.

The new module makes it possible to use one or two additional axes besides the four axes that have been available in the SINUMERIK 805SM-P Press Control up to now, which makes a total of six operable axes.

HW Reference No.: 6FX1 127-4AC01
Order No.: 6FM2 805-5AA85 (RF module + 1st RF axis)
6FM2 805-5AA86 (2nd RF axis)



1.2 Positions of sockets and jumpers



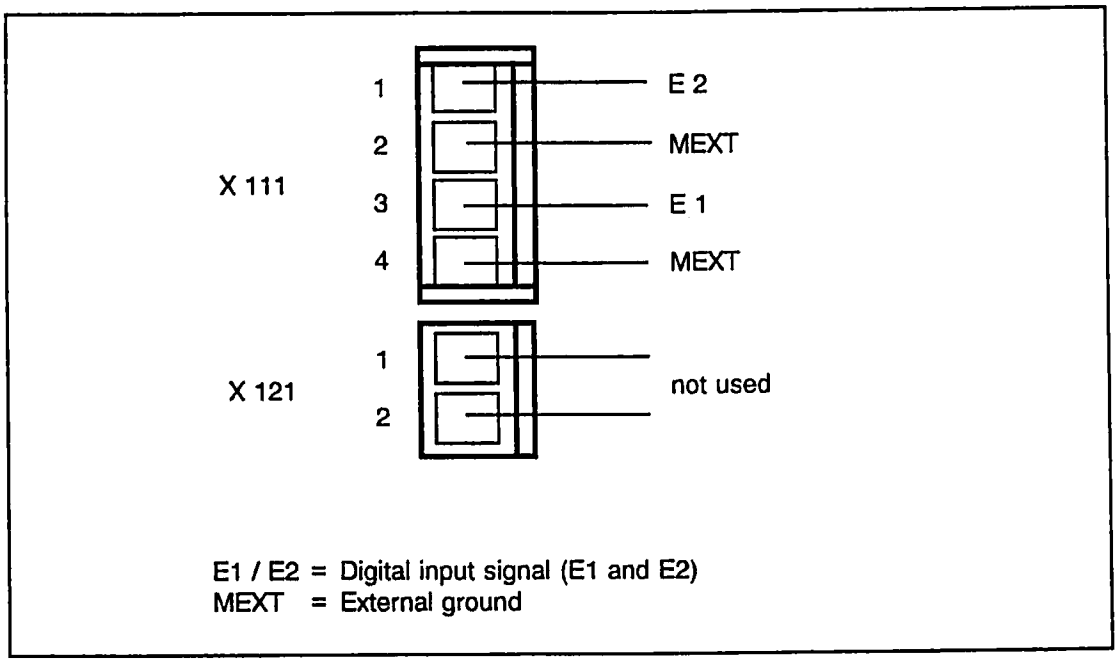
Standard jumper setting

Switch block	B13: (cf. figure)			
Socket	X4:	jumper	1–16	open
			2–15	closed
			3–14	open
			4–13	closed
			5–12	open
			6–11	closed
			7–10	closed
			8–9	open
Switch	S3:	jumper	3–2	closed
Switch	S4:	jumper	4–1	closed

1.3 Interfaces

1.3.1 Interface for digital inputs

Connector X111/121



Connector pin assignment of digital input signals

With one RF axis the input E1 is used as start input for roll feed. Via the input E2 the roll feed can be informed about the lifting phase.

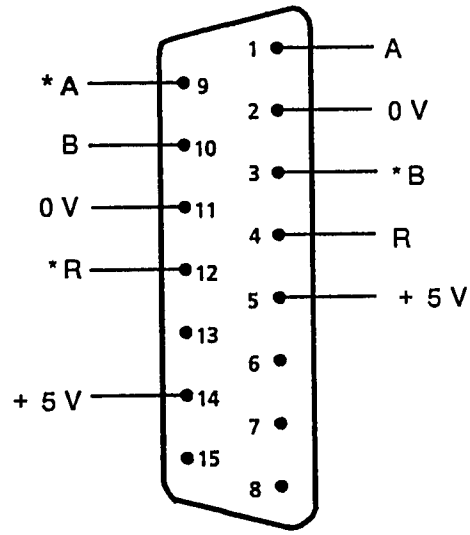
With two RF axes both inputs are used as start inputs, one for each axis.

E1 → Start signal RF axis 1
E2 → Start signal RF axis 2 or lifting of RF axis 1 with direct position measurement.

1.3.2 Incremental actual-value inputs for RF axes

The NC is supplied with the actual value via a 15-pin connector.

Connector: SUB-D, pin connector,15-pin

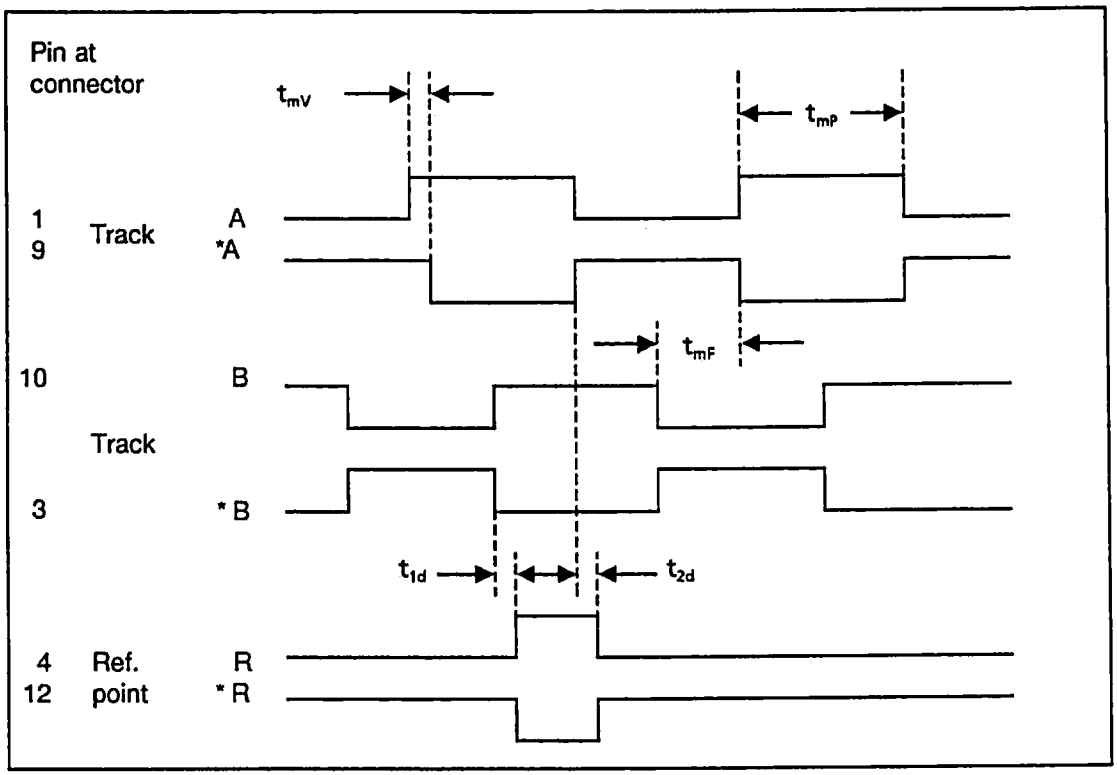


X141 (Encoder 1)
X131 (Encoder 2)

Connector pin assignment for the terminal of the incremental encoder

Signal designation:

A pulses:	Track A / *A
B pulses:	Track B / *B
Reference pulses:	Track R / *R
5 V:	Supply voltage for encoder
0 V:	Ground reference for supply voltage

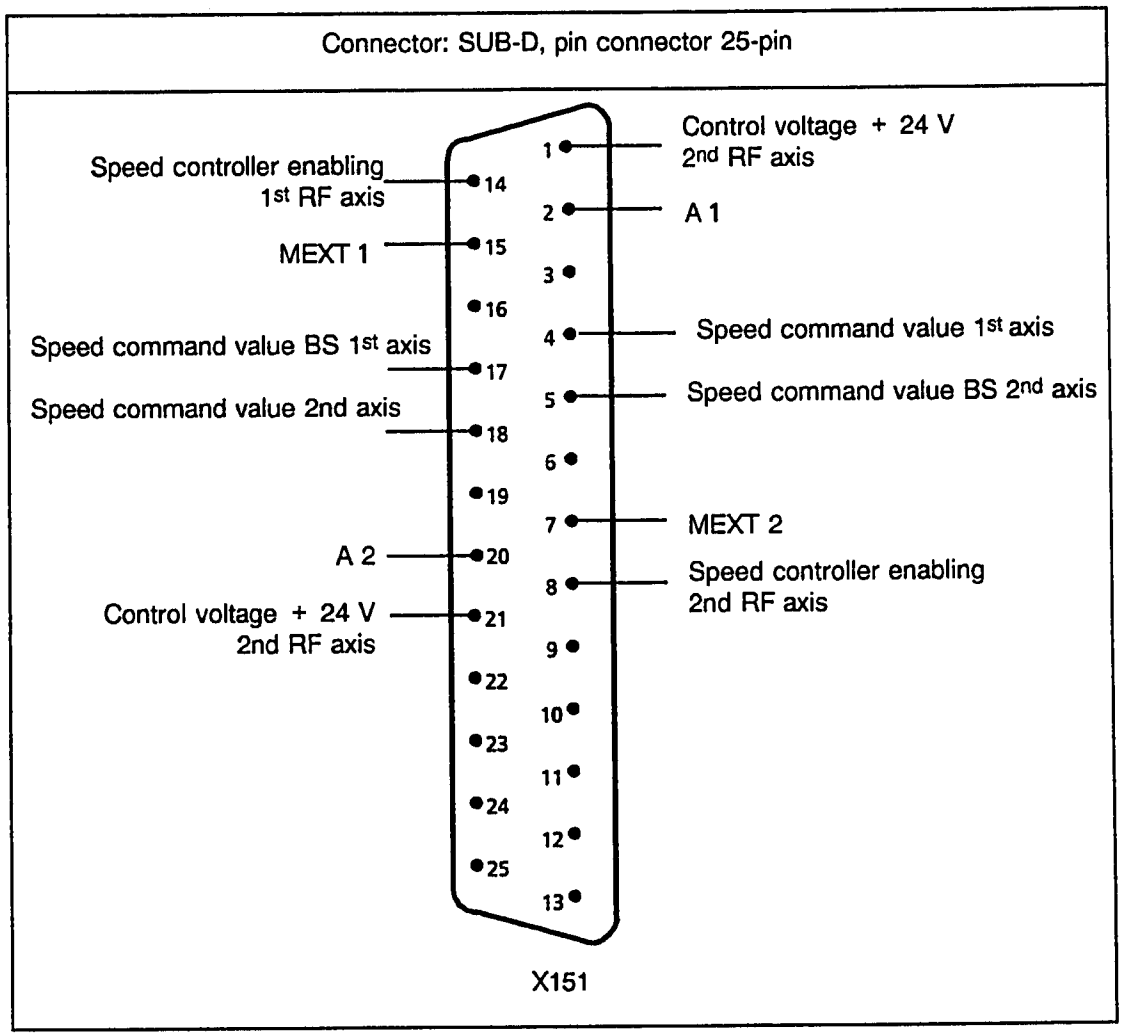


Input signals and characteristic values for digital measuring systems with differential output

- Supply voltage of encoder 5 V + 5 %
- Current per encoder system ≤ 300 mA
- Ohmic input resistance 470 Ω
- Differential input voltage
  e.g. between A and *A ≥ 1 V
- Maximum differential input voltage 10 V
- Maximum input frequency with electrical phase lag of 90° between A- and B-track pulses 500 kHz
- Minimum pulse width t_{mp} 1 µs
- Minimum gap between two successive edges t_{mf} 500 ns
- t_{1d} and t_{2d} ≥ 200 ns
- Maximum delay between two successive edges of one track t_{mv} ≤ 50 ns

1.3.3 Interface for command value and digital output signals

The speed setpoints and controller enabling signals for the RF axes are output by the RF module via a 25-pin connector. Additionally, the two digital output signals (A1 and A2) are carried via this connector.



Connector pin assignment for setpoints and output signals

Analog setpoint voltage	± 10V
Maximum current	2 mA
Maximum current for controller enablings	100 mA/short-circuit-proof

A = Digital output signal (A 1 and A 2): This output is N-switched. The contact element at the output must be connected to 24 V. MEXT is connected through. Maximum current carrying capacity 100 mA (not short-circuit-proof!)

MEXT = Reference point for digital output signal

1.4 Protective measures

With correct connection of the external devices, the RF module cannot carry dangerous voltages. Be sure to switch the control off before inserting the module.

Before taking the roll feed into operation, ensure that the electrical interlocks and the emergency stop circuit function properly. Since the SINUMERIK 805SM-P Press Control is only responsible for the automation of a press, all safety functions concerning the press must be effected by means of contactors or with an electronic fail-safe press control system, such as the SIMATIC S5-95 F/P.

1.5 Position encoder and motor drive

The roll feed function is subject to incremental position measurement and to the closed-loop position control operation. The feed length can optionally be measured at the sheet ifself (directly) or at the motor (indirectly).

We recommend using the 6FC9 320.... incremental position encoder from Siemens (for details see SINUMERIK accessories, Catalogue NC 90).

Due to the high accelerations required for the roll feed axes, AC feed drives and transistor units with an electronic incoming/recovery unit should be used. An analog signal ± 10 V/2 mA is used for controlling the drive setter by the roll feed module.

We recommend using AC drives of the Siemens SIMODRIVE series (for details see SIMODRIVE, catalogue SD 12, SD 22 and SD 23).

1.6 Accessories, order data

Designation	Max. possible length	HW Reference No.	Order No.
Roll feed module + 1st RF axis 2nd RF axis		6FX1 127-4AC01	6FM2 805-5AA85 6FM2 805-5AA86
Actual-value cable to digital rotary incremental encoder in servo drive Length 5 m Length 10 m Length 18 m Length 25 m	35 m		 6FC9 340-8PB 6FC9 340-8PC 6FC9 340-8PE 6FC9 340-8PF
Actual-value cable to digital rotary incremental encoder Length 5 m Length 10 m Length 18 m Length 25 m	35 m		 6FC9 344-2BB 6FC9 344-2BC 6FC9 344-2BE 6FC9 344-8BF
Command-value cable to converter Length 2 m Length 5 m Length 10 m	50 m		 6FX1 400-4CC02 6FX1 400-4CC05 6FX1 400-4CC10

2 Method of Operation and Features

The task of the roll feed is to uncoil the material to be formed and to push it into the press, defined with each stroke.

In addition, a second roll feed can be used for pushing the pressed workpiece out of the press.

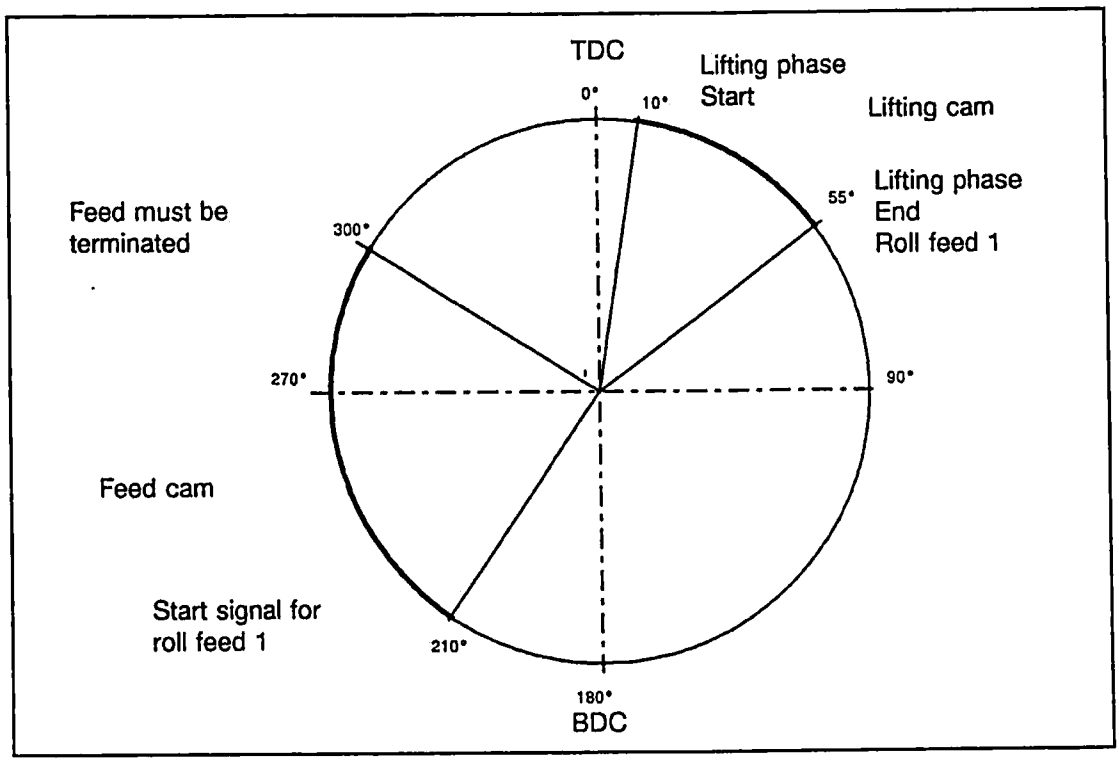
As the time is very short for a material feed, high demands are made on the control and the drive system.

2.1 Material feed during press operation (NC operating mode AUTOMATIC)

With every stroke of the press a defined feed length (FL), which depends on the tool, is pushed into the press. Depending on the program the individual feed lengths can be different for the individual strokes.

Positioning is started by a feed cam. Having passed through the cam, the programmed position has to be reached exactly.

After feeding the sheet into the press, the type of tool might make it necessary to open (lift) the roll mechanism in order to adjust the sheet precisely by means of trapping pins. During this time there must not be any feed motion.

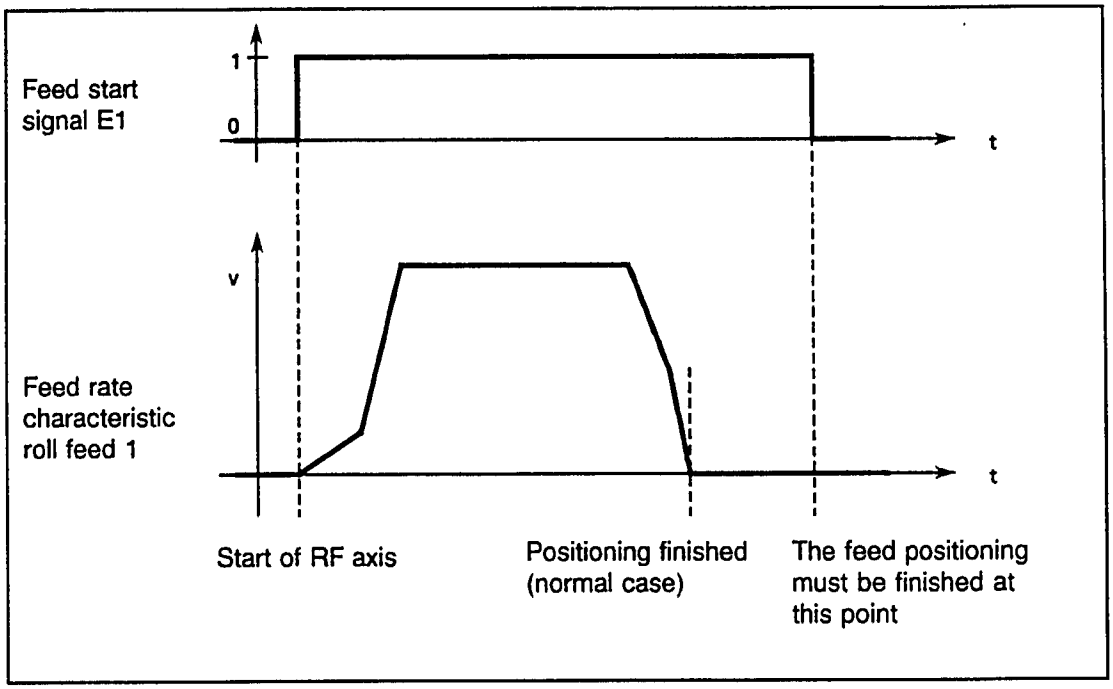


Feed and lift cam

2.1.1 Feed start signals E1 and E2

A digital signal (e. g. feed cam) transmitted via a highspeed digital input informs the control of the starting instant for material feed. As soon as the control detects this signal, a feed length will be passed into the press. The start signal must be present throughout the whole traversing movement. The roll feed must reach the exact position within this feed angle. If the positioning is not completed within this time, the press must be stopped. The RF module detects this and sends out an emergency stop signal to halt the press.

If two roll feed axes are connected, the two start signals must be present either simultaneously or alternately. It is not possible to start one axis twice in succession. This way the module controls if one of the start signals is missing (wire break, false programming).



Feed signal and traversing movement of the roll feed

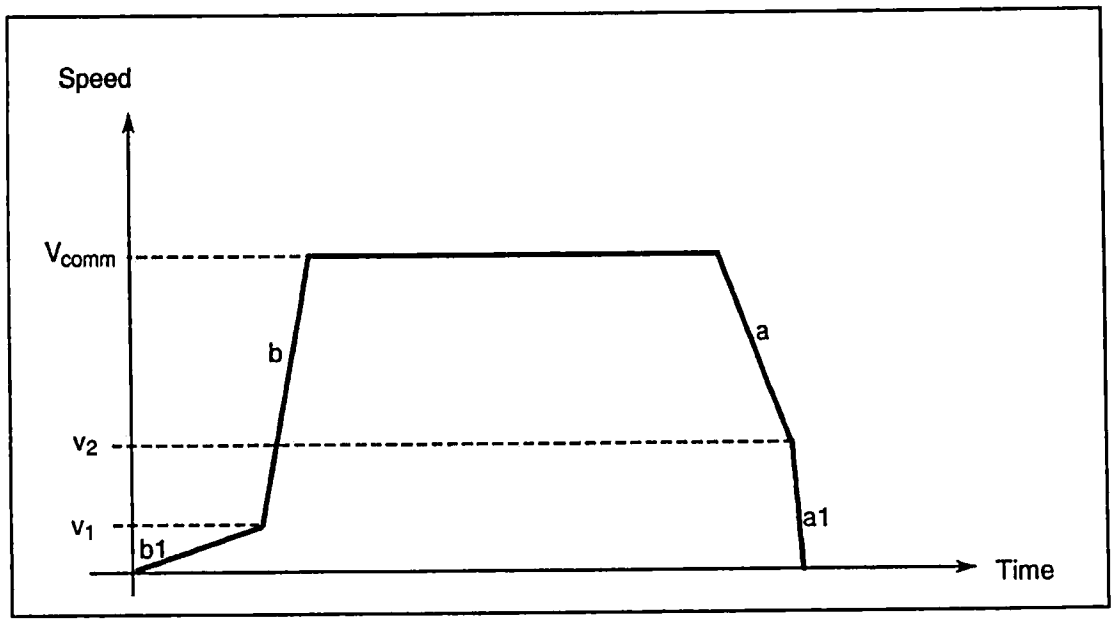
2.1.2 Acceleration and deceleration ramps

As soon as the input signal is present, the feed rolls are started. The axis is accelerated from its position of rest to the programmed feed rate via a defined acceleration ramp. Roll deceleration is executed likewise. Since the time for material feed is very short, the rates of acceleration must be very high.

To prevent the material from slipping during the initial phase, the acceleration and deceleration characteristics - the so-called ramps - are divided into two phases; during the first phase the rolls are accelerated moderately; from a defined point of the ramp the final acceleration becomes effective. The same sequence applies for deceleration.

The acceleration and deceleration values are input tool-dependently. It is possible to optionally define the start and end areas either tool-dependent or as machine data.

During operation the programmed values are modifiable via overriding until the best setting is found. The thus established value can be stored automatically as new tool data.

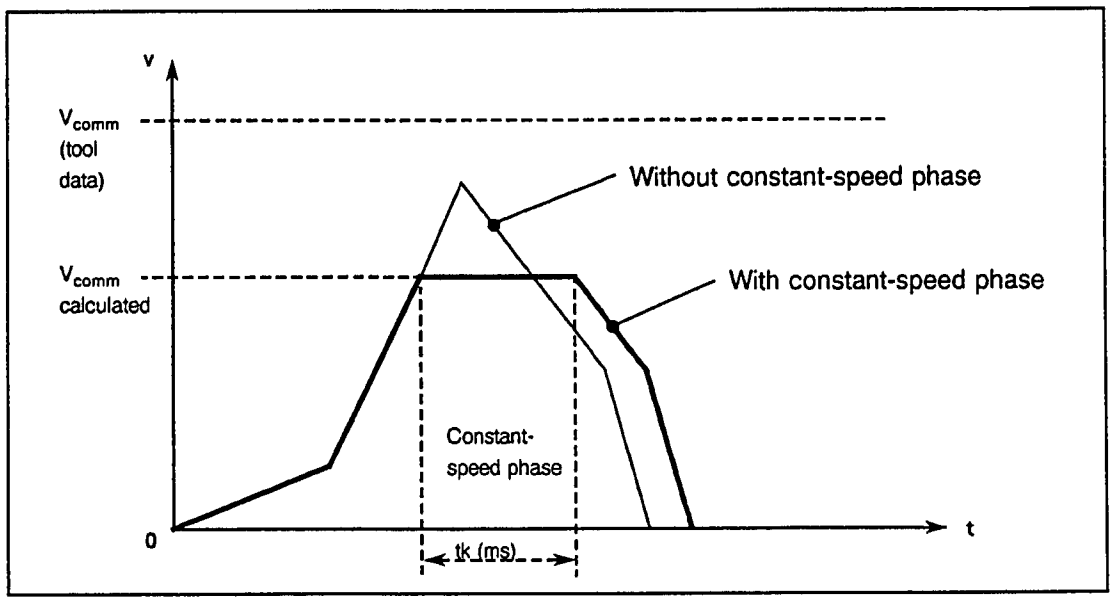


Acceleration / deceleration ramp for one roll feed axis

V_{comm} = Speed of axis in mm or inch/sec.
b = Acceleration of axis in mm or inch/sec^2
b_1 = Starting acceleration as % of acceleration of axis
a = Deceleration of axis in mm or inch/sec^2
a_1 = Final deceleration as % of deceleration of axis
v_1 = Speed up to which the starting acceleration b_1 shall be effective, as % of the speed of the axis v_{comm}
v_2 = Speed from which the end deceleration a_1 shall become effective, as % of the axis speed v_{comm}

Special case: short feed lengths

With very short feed lengths, where the programmed feedrate cannot be reached, the control prevents the deceleration phase following directly after the acceleration phase, by calculating the so-called constant-speed phase. This ensures that the rolls convey the material at a constant speed for a short period of time before they slow down again, thus reducing the strain put on the drive.

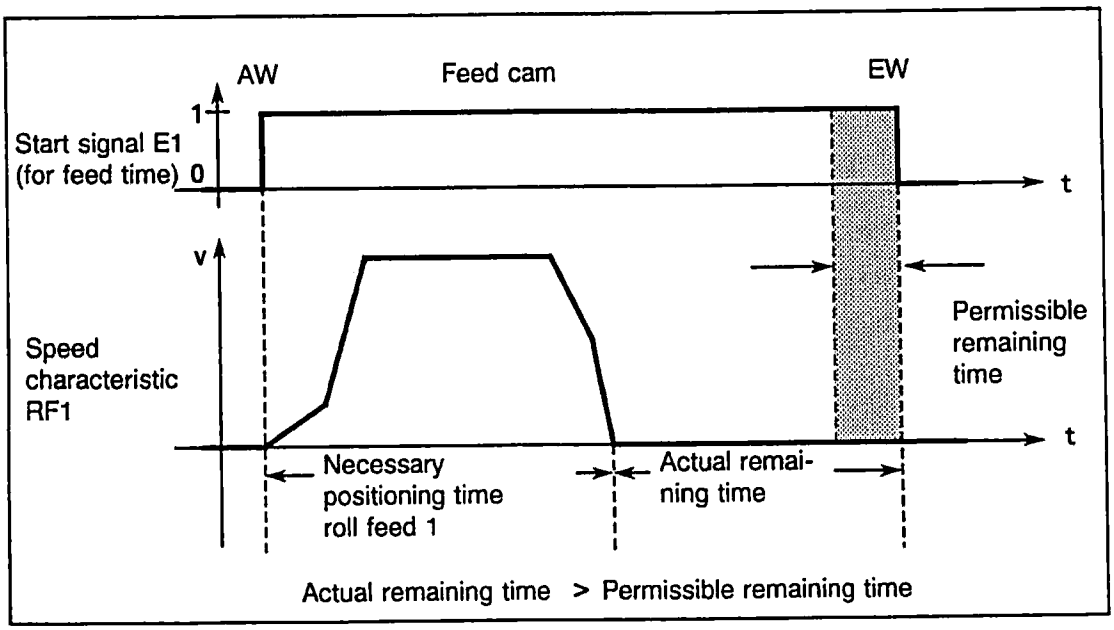


Constant-speed phase

2.1.3 Remaining time monitoring

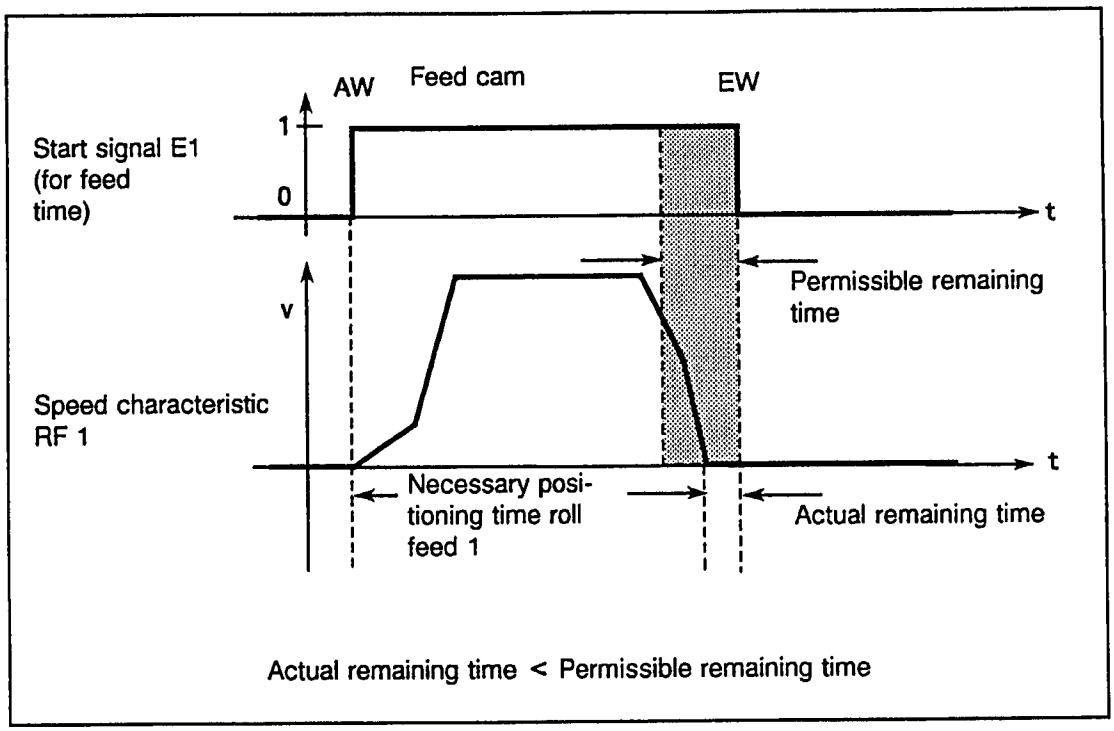
An increase in the press cycle speed reduces the time available for feeding. To achieve optimum press efficiency, one tries to raise the cycle speed up to that point where the feed time is just long enough for positioning.

By monitoring the remaining time, this point can be found automatically and the press cycle speed can be limited at the correct moment. The RF module constantly calculates the interval between the end of positioning and the end of the start signal. If the roll feed control detects that the time falls short of the allowable remaining time, the control stops increasing the cycle speed. The permissible remaining time is deposited tool-dependently.



Remaining time sufficient

In the figure above the press runs at the programmed cycle speed. The time limit has not been reached, so the cycle speed can still be increased.

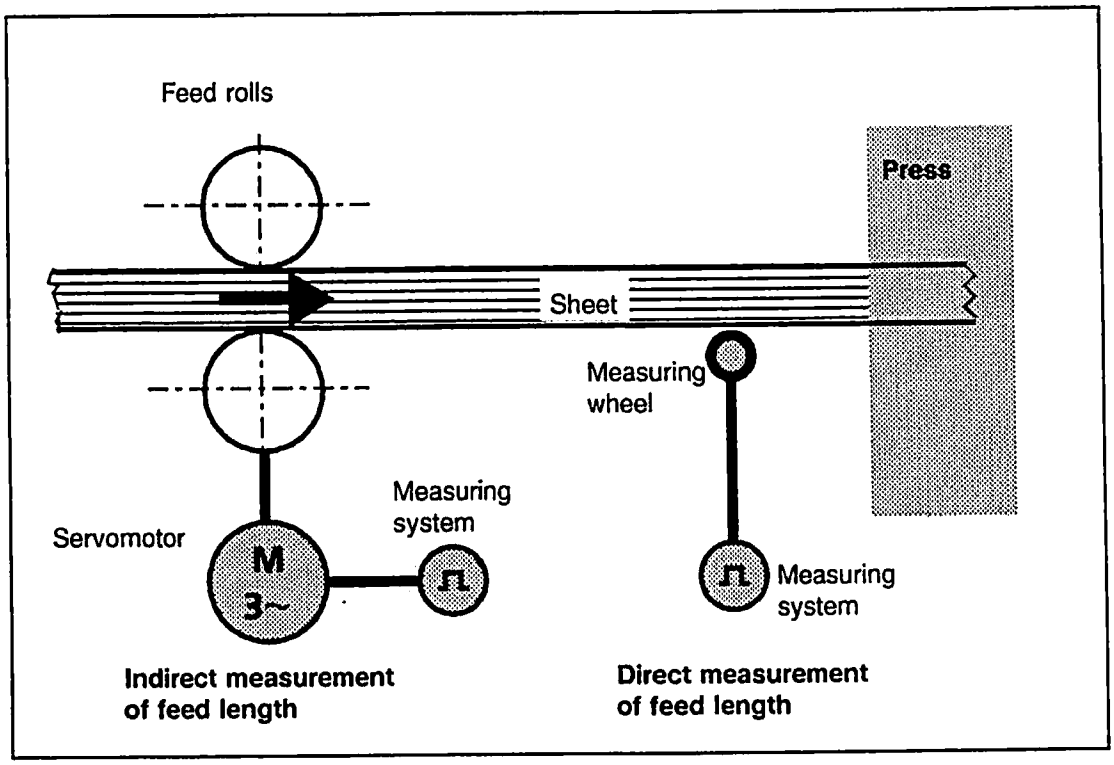


Remaining time too short

The figure above shows the press running at increased cycle speed. The available feed time became so short that it remained under the permissible remaining time. The control prevents any further increase in the press cycle speed, with the result that the positioning has to be finished within the feed time.

2.1.4 Direct and indirect position measurement

When turning the feed rolls the sheet will be conveyed. An incremental sensor acquires the respective feed length. For this purpose, either the direct or the indirect position measurement can be used.



Direct and indirect position measurement

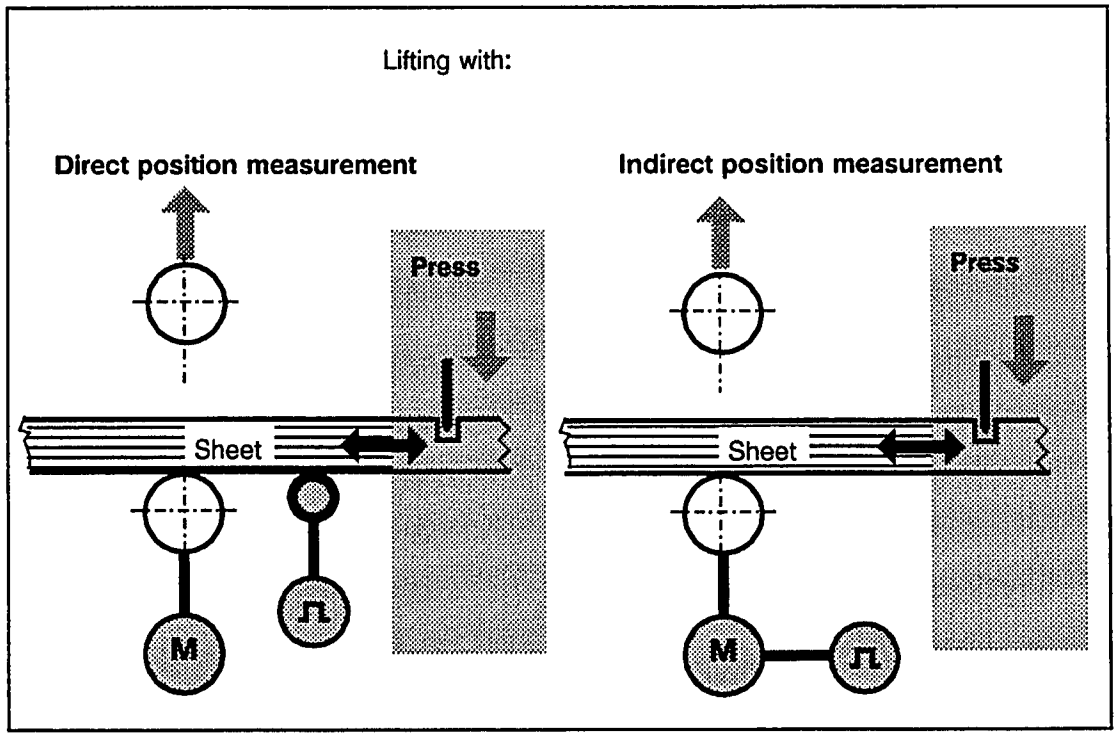
During **indirect** measurement the sensor is connected directly to the motor. This means the feed length is derived from the drive's angle of rotation.

During **direct** measurement the sensor acquires the feed length directly at the sheet via a measuring wheel, which is moved by the sheet.

2.1.5 Lifting

After pushing the sheet into the press, the material can be adjusted finely, if required, in the tool by means of trapping pins. For this purpose the roll mechanism must be opened (lifted) for a short period of time. During press operation lifting is selected via a cam signal.

Due to differing prerequisites, a distinction must be made between direct and indirect position measurement during lifting.



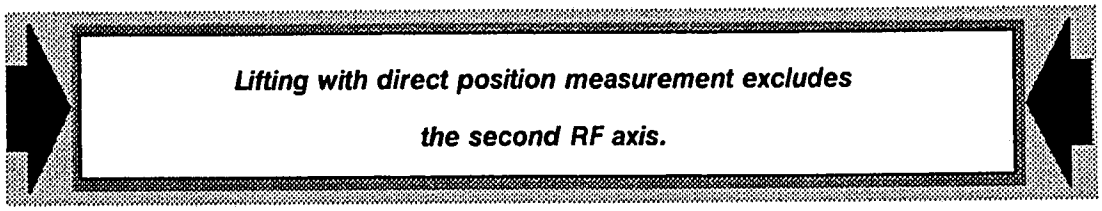
Lifting with direct or indirect measurement

The roll feed axis must not be started in the lifting phase. Lifting executed during the positioning triggers an emergency stop signal with which the press can be stopped.

2.1.5.1 Lifting with direct measurement

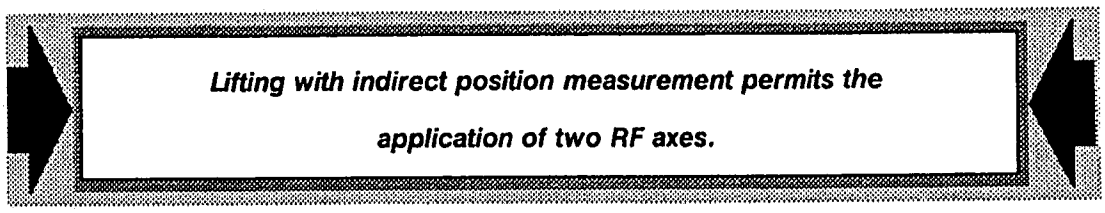
Fine adjustment of the sheet can cause minor position changes with direct position measurement. The position control would immediately try to compensate for these deviations. Therefore the control must not take the encoder's pulses into consideration during this phase.

The control will be informed about the lifting process via digital start input E2. During this phase the encoder pulses remain unconsidered. As there are only two start inputs (E1 and E2) available on the RF module, lifting with direct position measurement can only be executed using the 1st RF axis.



2.1.5.2 Lifting with indirect measurement

With indirect position measurement fine adjustment does not cause any position deviations since the encoder cannot be moved by the sheet. Rotating movements cannot occur, because the motor keeps the position control. For this reason there are, with this measuring method, no special demands placed on the position control; thus both RF axes can be used.

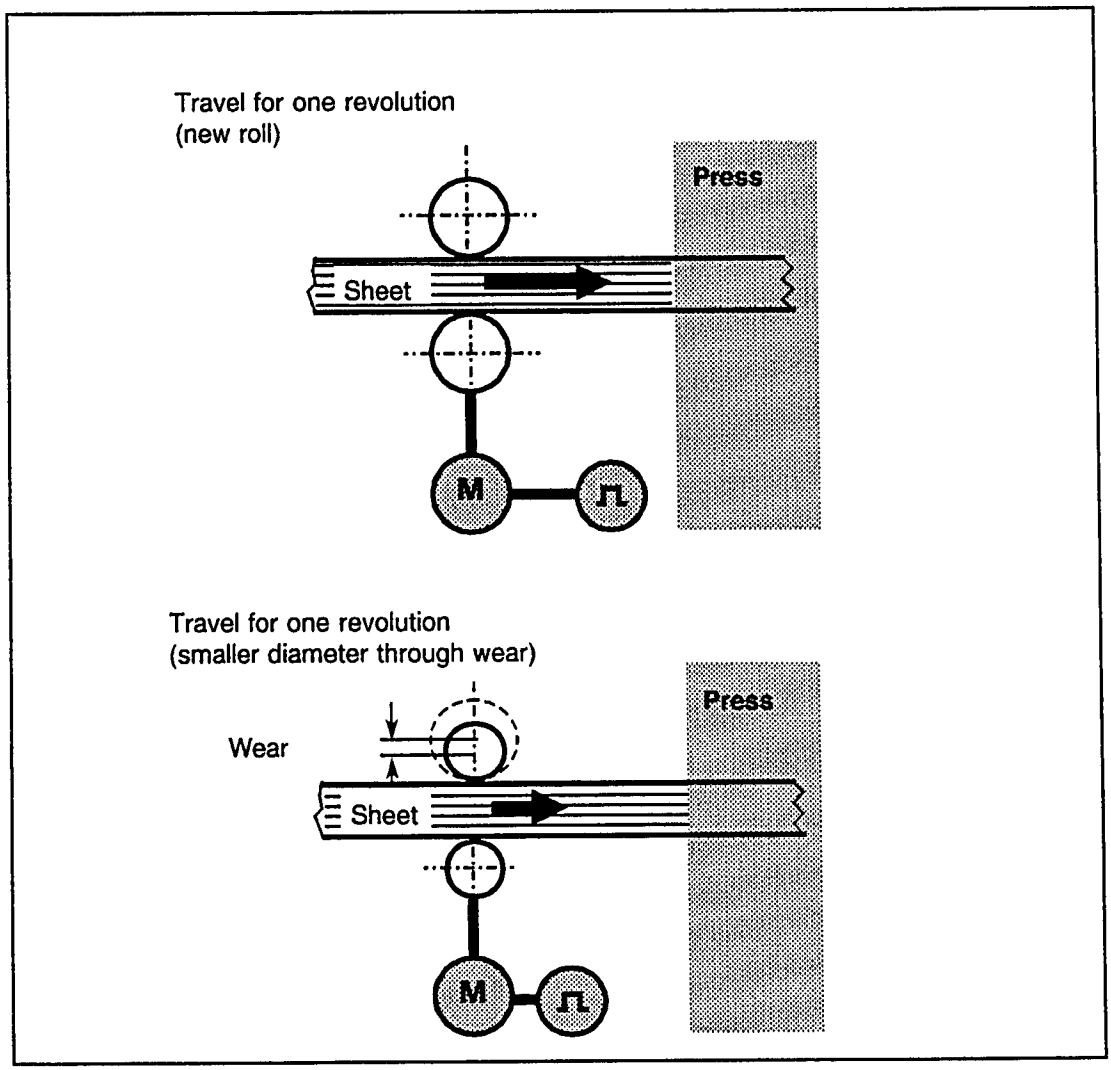


2.1.6 Correction facilities

The RF module offers extensive corrective actions. The acceleration and deceleration ramps as well as the total feed length can be corrected during press operation. In addition, a correction of the roll diameter or the measuring wheel diameter is possible when the press is at a standstill.

2.1.6.1 Correction of roll/measuring wheel diameter

To avoid position errors, which result from a change of the roll diameter or the measuring wheel diameter (e.g. through wear), a correction of the diameter can be effected. For that purpose measure the actual roll diameter and enter this value into a correction mask to inform the control of the change. After correction the control calculates the feed lengths with the current roll diameter and positions them correctly.



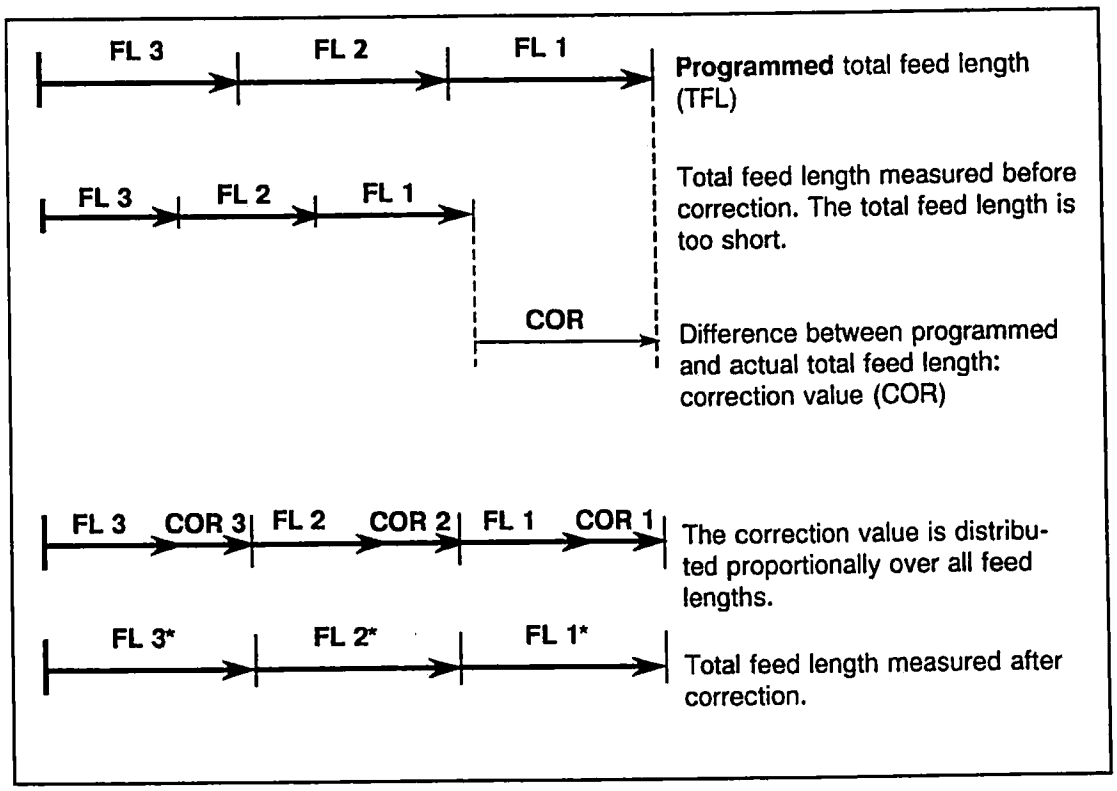
Example: Roll diameter correction with indirect position measurement

2.1.6.2 Correction of total feed length

Quality tolerances of the sheet surface can change the slip of the rolls or of the measuring wheel. This has the effect that the desired feed length will not be reached.

One can correct this error by entering the difference between the programmed and the actual total feed length. The total feed length (TFL) is made up of the sum of all feed lengths (FL) of a roll feed program.

The SINUMERIK 805SM-P automatically distributes the correction value proportionally over all feed lengths.

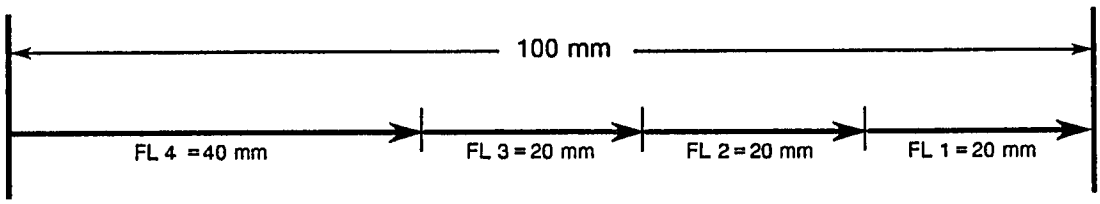


Correction of total feed length with several feed lengths (FL)

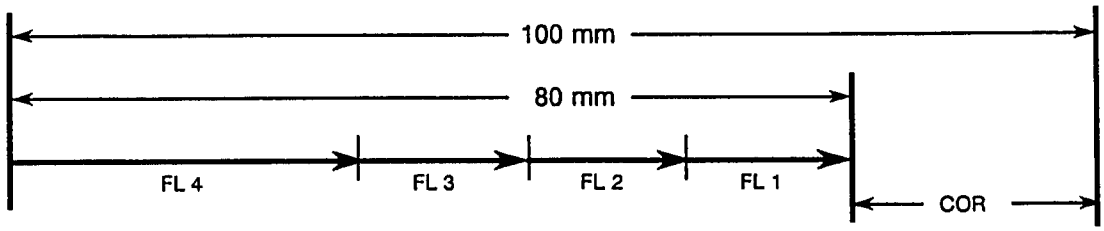
Example:

RF program:	Block	Repetition	FL in mm
	1	3	20.00
	2	1	40.00

Programmed total feed length = 20 mm × 3 + 40 mm × 1 = 100 mm



Measured total feed length = 80 mm



Hence follows:

Correction value (COR) = programmed TFL - actual TFL =
= 100 mm - 80 mm = 20 mm

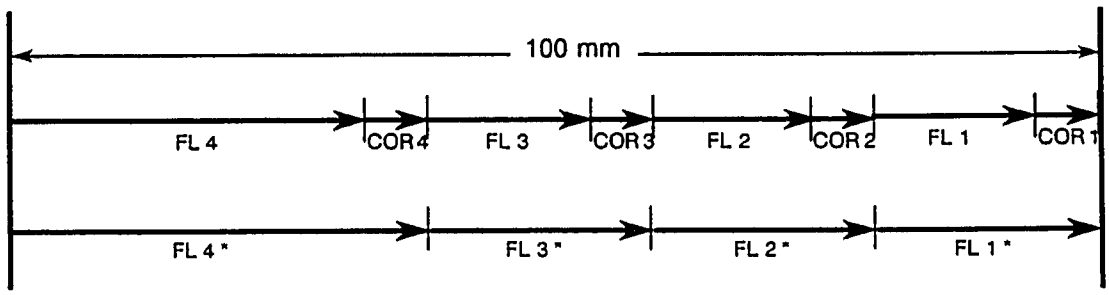
Calculation of the correction value is effected by the control, calculating the correction value with all feed lengths of an RF program.

Resulting in:

$$\text{Correction factor} = \frac{\text{progr. TFL} + \text{COR}}{\text{progr. TFL}} = 1.20$$

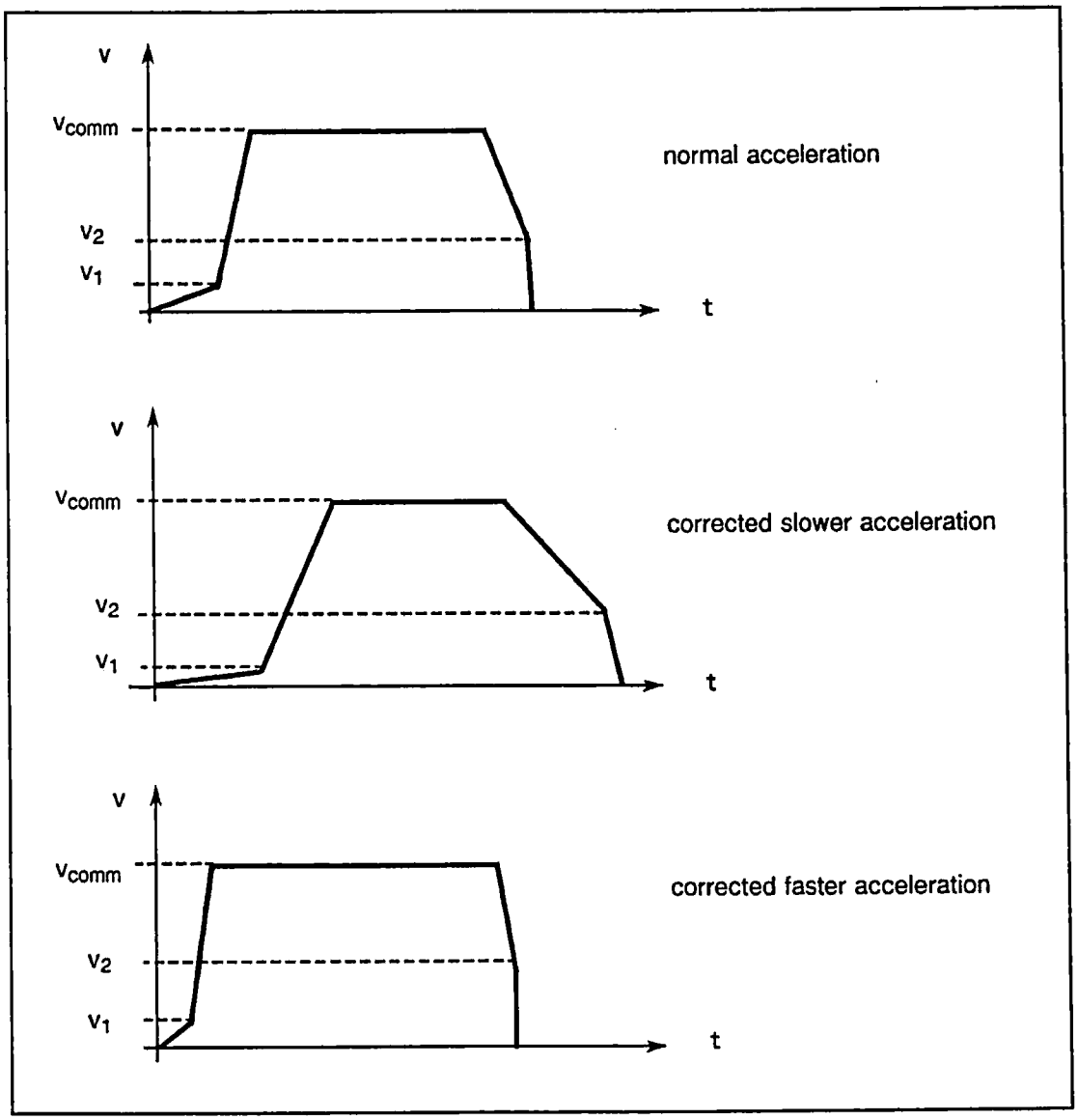
FL 1* = FL 2* = FL 3* = 20 mm x 1.20 = 24 mm
FL 4* = 40 mm x 1.20 = 48 mm

Corrected total feed length = 100 mm



2.1.6.3 Correction of acceleration and deceleration

The characteristic for the acceleration / deceleration ramp defined by the tool data can be adapted to the present situation via the softkeys OVERRIDE+ and OVERRIDE- during press operation. If desired, the changed characteristic can be transferred to the tool data. This way it is available even after tool exchange.



Example: Correction range of an acceleration / deceleration ramp for a roll feed axis

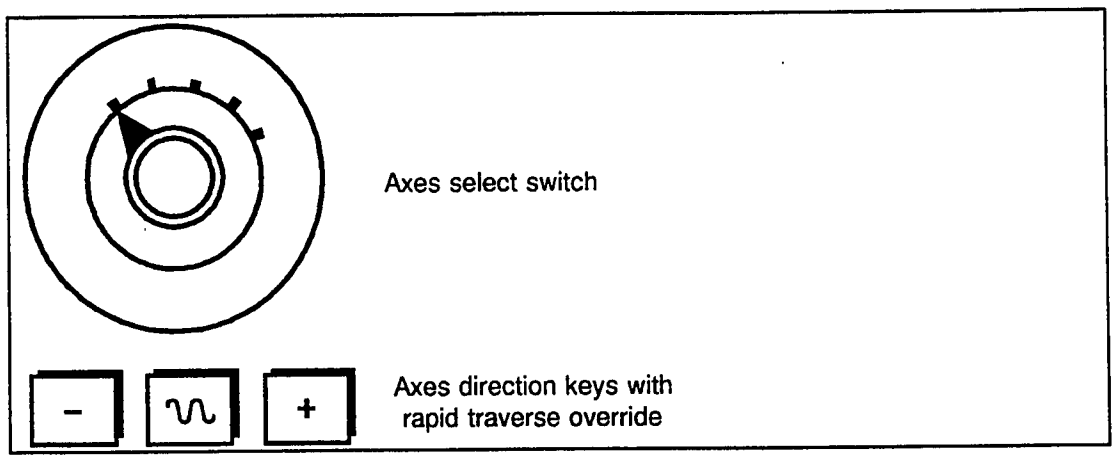
2.2 Set-up functions in JOG operating mode

During the set-up phase the rolls are operated manually via the direction keys. This must be done when e.g. a new sheet is fed in or the residual pieces are pushed out.

Note:

Manual traversing of the RF axes is possible in the JOG operating mode and in the SET UP press operating mode (see also chapt. 6.4).

2.2.1 Traversing via direction keys

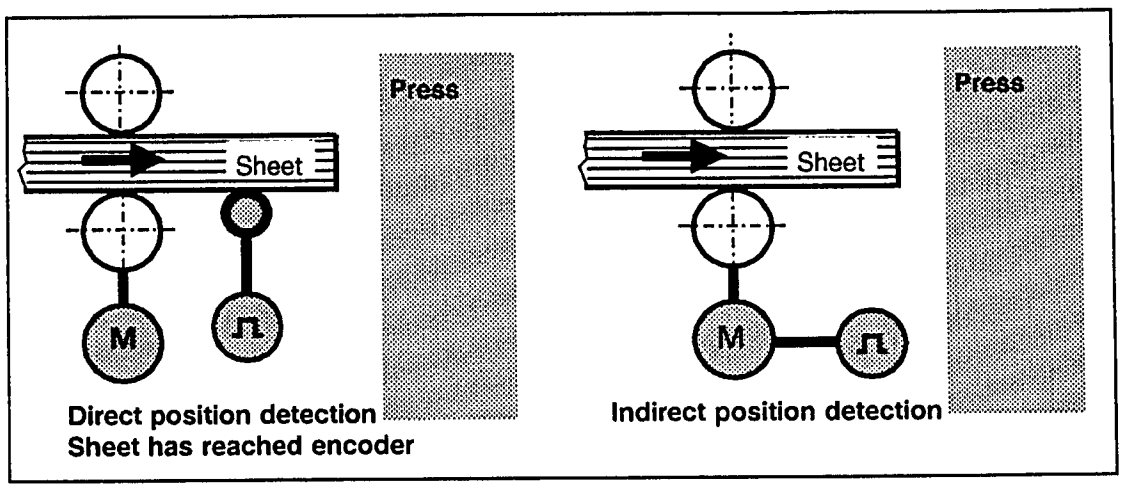


Traversing the RF through direction keys

By selecting the RF axis via the axes select switch and pressing one axis direction key, the roll feed axis can be position-controlled or speed-controlled.

The axes select switch and the axis direction keys are controls of the user control panel (UCP) and are assigned by the press manufacturer (see OPERATING GUIDE STANDARD).

2.2.1.1 Traversing - "position-controlled"

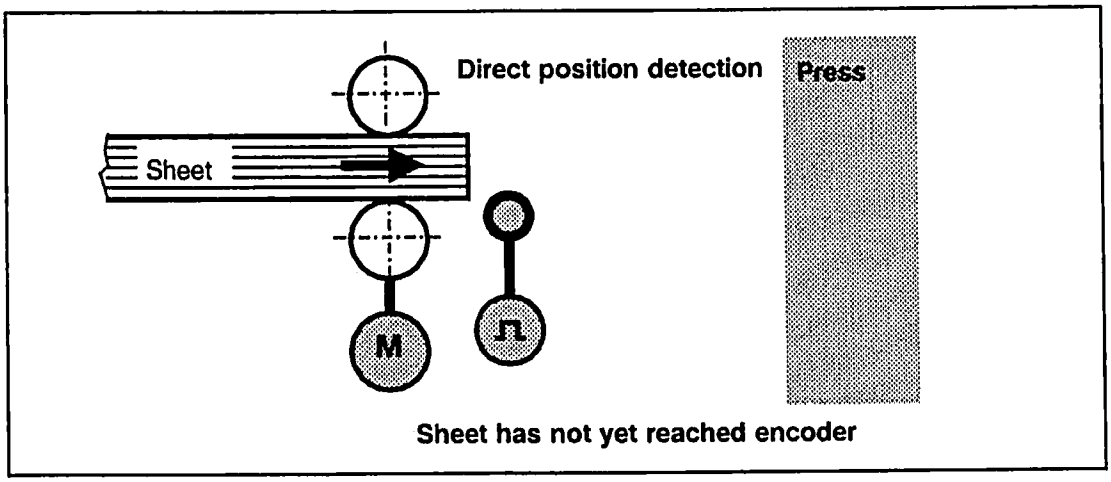


Position-controlled set-up with direct/indirect position measurement

During position control the axis can only be traversed if the encoder transmits pulses to the roll feed module. With indirect position detection this is true in all situations because the encoder is connected to the motor. With direct position detection, however, the sheet must have reached the encoder because otherwise errors could occur in the position control. By depressing the key "Rapid traverse" simultaneously, the axis can be run at rapid traverse rate.

If you hold the direction keys down, the axis will advance by one maximum feed length (MD). The direction key must then be released and pressed again.

2.2.1.2 "Speed-controlled" positioning

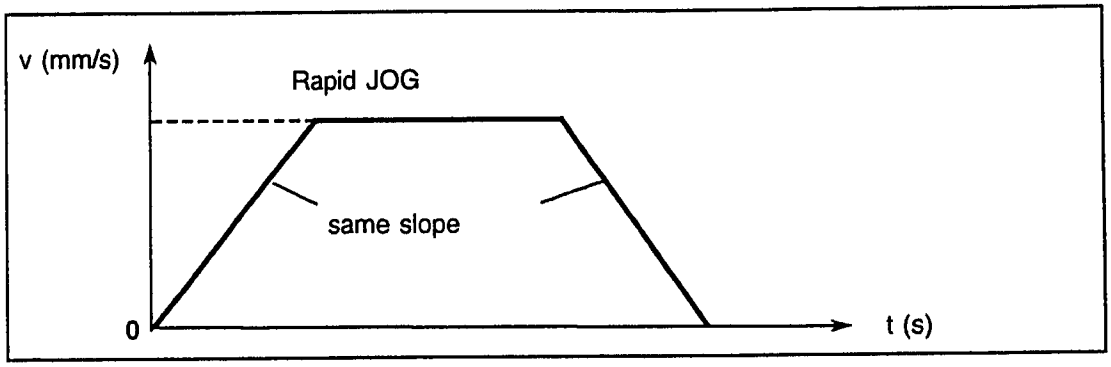


Example: Speed-controlled traversing with direct measurement

During speed-controlled traversing of the RF axes the position control loop is opened. The encoder pulses are not evaluated. The RF module outputs a rotary speed command value which is permantly deposited as machine data. Applying this speed command value, the RF axes are traversed as long as the direction keys are actuated. The speed (velocity) command value is output according to the sign and dependent on the selected traversing direction. Selection of this function effects via a PLC interface signal (JOG SPEED-CONTROLLED). Using the direct measurement the axes can also be traversed if the sheet has not yet reached the measuring wheel of the encoder.

2.2.2 Acceleration/deceleration characteristic

In the NC operating mode, JOG acceleration and deceleration is always carried out applying an acceleration value deposited in the machine data.



Acceleration/deceleration ramp in the NC mode JOG

2.2.3 Lifting

For the purpose of sheet alignment, the roll mechanism is opened to adjust the sheet manually. During this time the encoder pulses must not be evaluated because they would cause the position control to compensate for the position deviations.

The corresponding axis can be informed about roll lifting via an interface signal which is normally derived from a pressure-operated switch (roll pressure).

While the rolls are lifted, you cannot traverse the concerned axis via the direction keys. The zero-speed control is switched off.

2.3 Incremental traversing

In the NC operating mode JOG-INC, the axes are traversed by means of the direction keys with the selected incremental feed (1,10,100,1000). Except for the signal "SPEED-CONTROLLED" which cannot be used here, the PLC signals and starting conditions are the same as in JOG mode.

Therefore, with "direct position measurement" ensure that the sheet has already reached the effective range of the encoder.

2.4 Acknowledgement and error signals

On the RF module, two highspeed digital monitoring outputs are available for the NC operating mode AUTOMATIC.

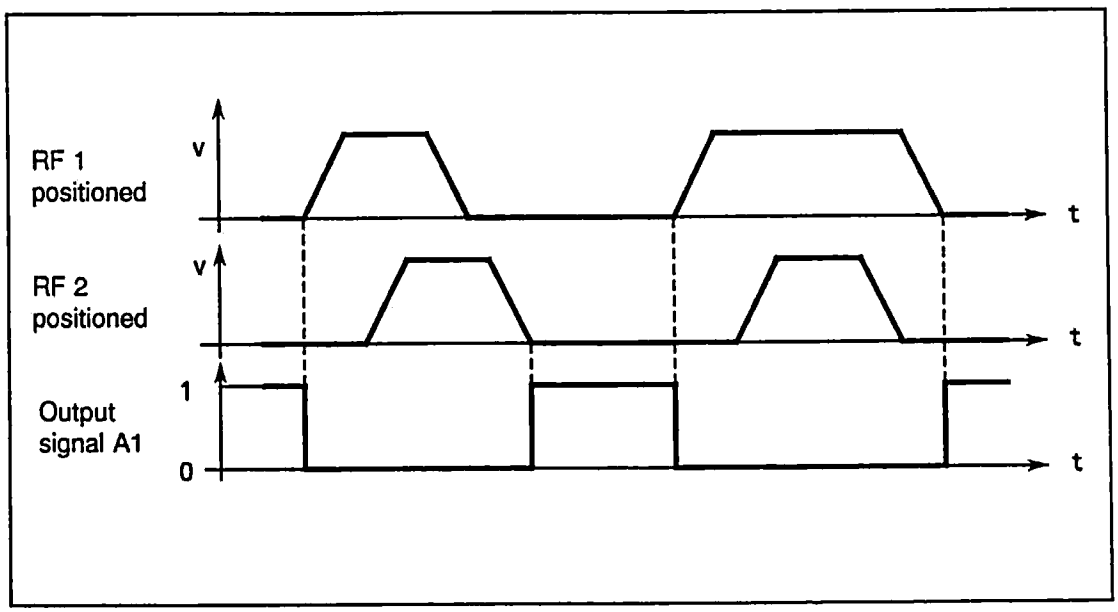
A1 = 1 → Feed in tolerance window
A1 = 0 → Feed positioned

A2 = 1 → No error
A2 = 0 → Error detected by RF (emergency stop)

Additionally, errors are flagged on the NC-PLC interface. Any error is displayed in plain text on the screen.

2.4.1 Output signal A1 (feed in the tolerance window)

This output goes to 1 when both axes are in the tolerance window. When traversing is started, the output is reset. As soon as both axes have reached the tolerance window, this output goes high again.



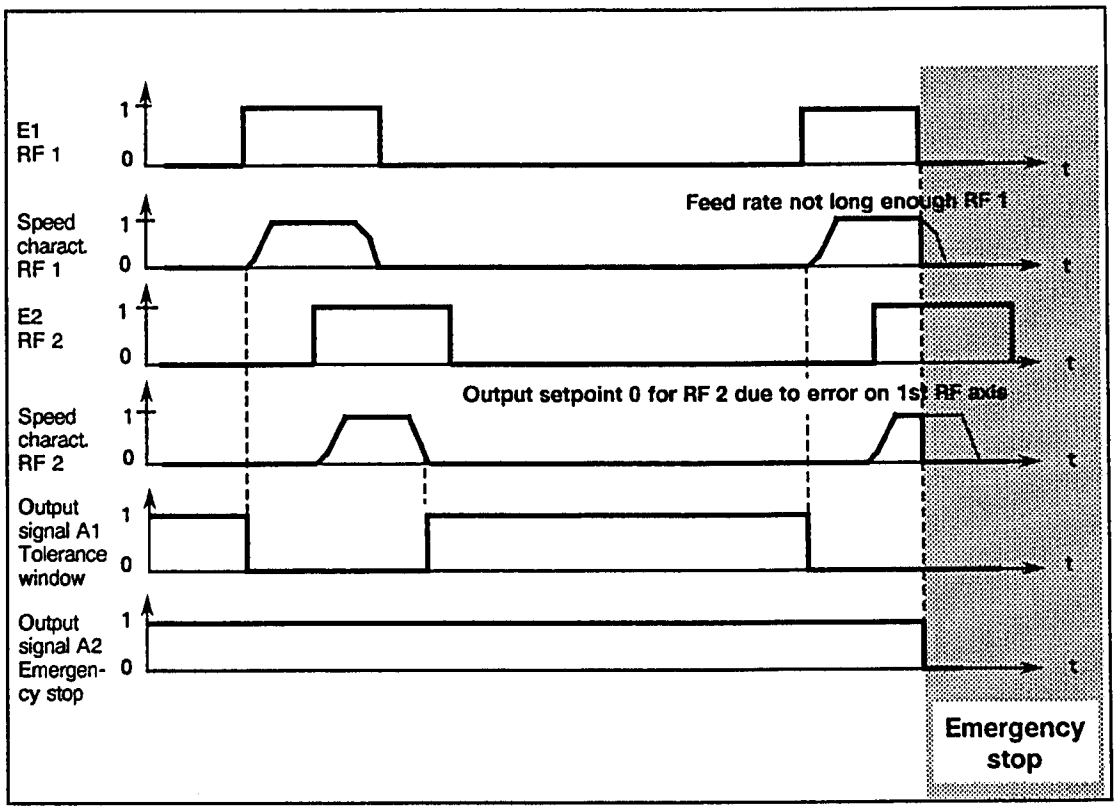
Signal characteristic of A1 - Roll feeds in the tolerance window

2.4.2 Output signal A2 (emergency stop)

This output goes to 0 when the RF module has detected an error. This means that the press can be stopped via this output (e.g. by opening the coupling).

The roll feed monitors the following errors which lead to an emergency stop:

- Position of axis not reached while the respective start signal (E1 or E2) was available
- Omission of a start signal when two RF axes are used
- Input signal "lifting" (E2) while RF axis is traversing
- Clearing the controller enable signal while RF axis is traversing
- Clearing the signal "Sheet is adjusted" while RF axis is traversing
- Switching over the NC operating mode from AUTOMATIC to JOG while RF axis is traversing
- Measuring circuit error
- Drive fault
- Set up error (incorrect tool data)



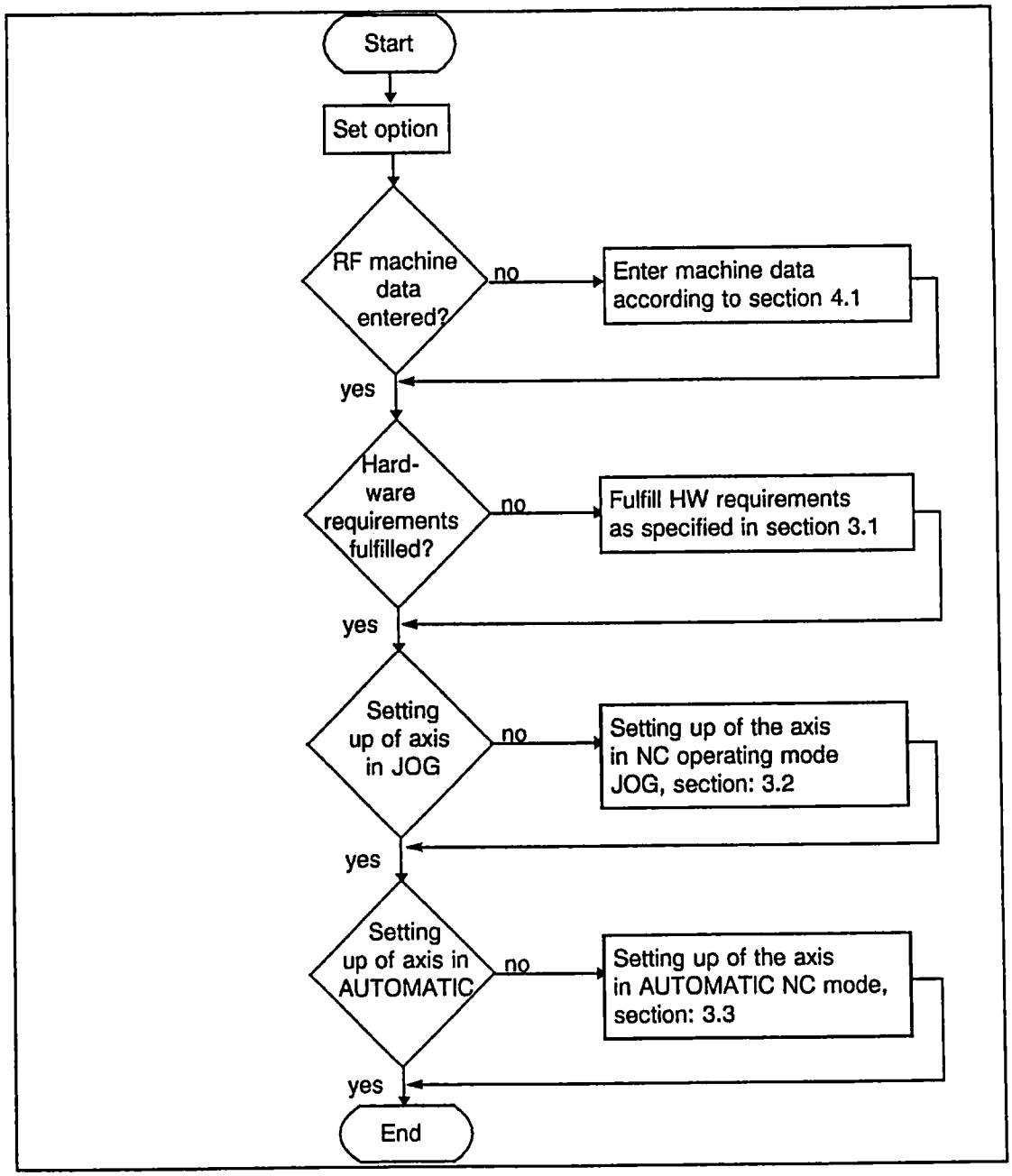
Example: Signal characteristic with "Position of axis not reached"

Signal designation:

E1: Start signal and duration for roll feed 1
E2: Start signal and duration for roll feed 2
A1 Signal = 1: feed/feeds in tolerance window
A2 Signal = 0: feed could not be finished before trailing edge of start signal

3 Starting-up Procedures

The following chapter describes the procedure for setting up the RF module.



Representation of the standard set-up procedure in a flowchart

3.1 Hardware requirements

The jumpers in the roll feed module must be set in accordance with section 1.2 POSITIONS OF SOCKETS AND JUMPERS.

Before setting up the roll feed module, the mechanical installation of the press and the roll feed must be completed. Additionally, all protective equipment must be inspected and in good working order. There should be no sheet between the rolls in the first place.

When all these prerequisites are met, the priority is to start the motor and the drive. You can read up on the procedure in the COMMISSIONING INSTRUCTIONS for the specific motor or drive used.

Link the incremental position encoders for the actual value with connectors X141 (for the 1st RF axis) and X131 (for the 2nd RF axis). The assignment of the interface and the standard cable is dealt with in chapter 1.3 or chapter 8.1 respectively. In the case of failure ("Control Loop Hardware"), the encoder can be checked using the diagram (chapter 1.3.2, differential output).

Before linking the command value cable, it is absolutely necessary to adjust the sense of position control (see chapter 3.2). The command value (± 10 V) is output via the X151 connector. Moreover, the controller enabling for the drive is connected through via this interface. These outputs are short-circuit-proof.

Additionally, the digital output signals A1 and A2 (tolerance window and emergency stop) are output via this connector. These outputs are N-switched. This means that the contact element must be connected to 24 V and that the ground is switched through. The outputs are not short-circuit-proof (max. 100 mA). The assignment of the connector pins and of the standard cable is described in chapters 1.3 or 8.2 respectively.

The digital input signals E1 and E2 are linked with connector X111. With two RF axes, the start signals (e. g. feed cams) for the axes are connected. With one RF axis, input E1 is used for the start signal. Input E2 can be used for detection of the lifting phase. A pressure switch may for example be connected to this input. Chapter 1.3.1 describes the connector pin assignment.

Before inserting or unplugging the modules or the connectors of the SINUMERIK 805SM-P, make sure mains are switched off first.

3.2 Start-up of the roll feed in NC operating mode JOG

The preconditions for starting up the roll feed are that the machine data must have been entered and the hardware requirements described in chapter 3.1 must be fulfilled.

The following interface signals must be assigned values in the NC operating mode JOG:

CONTROLLER ENABLING:	Q 74.2	for	RF 1
	Q 76.2	for	RF 2
FOLLOW-UP OPERATION:	Q 73.2	for both	RF axes
AXIS IS LIFTED:	Q 74.0	for	RF 1
	Q 76.0	for	RF 2
TRAVEL COMMAND CONVENTIONAL +/–:	Q 74.7 / A 74.6	for	RF 1
	Q 76.7 / A 76.6	for	RF 2
RAPID TRAVERSE OVERRIDE:	Q 74.5	for	RF 1
	Q 76.5	for	RF 2
JOG SPEED-CONTROLLED:	Q 73.1	for both	RF axes

The user control panel (UCP) offers the following combinations for the axis select switch:

Position 6	and	key	+	=	I 72.1	pos. direction RF 1
Position 6	and	key	–	=	I 72.0	neg. direction RF 1
Position 7	and	key	+	=	I 72.3	pos. direction RF 2
Position 7	and	key	–	=	I 72.2	neg. direction RF 2

Before closing the control loop, it is absolutely necessary to check the sense of position and speed control, since an incorrectly adjusted sense of control would cause uncontrolled movements of the axis at maximum speed.

Adjusting the sense of position control:

- Lock the drives (e. g. take off fuses, remove command value cable, actuate emergency stop switch etc.)
- Set the interface signal "Follow-up operation" via PLC-program. Reset the remaining RF interface signals.
- Move the feed axis mechanically into positive direction.
- Observe direction of the changing actual value within the service masks by means of the present actual value display.
- Adjust the sign of the actual values for the respective RF axis via machine data 5151/5153 bit 2.

Adjusting the sense of speed control:

- Cancel locking for one RF axis.

There are two possibilities to check the sense of speed control:

1st possibility: Check the polarity of the voltage of the speed command value at the drive. State the voltage of the command voltage for the positive traversing direction by means of a battery. Then input correspondingly the machine data bit "Change of sign of command value" (MD 5152/5153 bit 1).

2nd possibility: Check the sense of speed control in the NC operating mode JOG with JOG SPEED-CONTROLLED.

a) Set interface signal JOG SPEED-CONTROLLED.
b) Set controller enabling and reset interface signals FOLLOW-UP OPERATION and AXIS IS LIFTED". It is absolutely necessary to observe this succession, since otherwise the RF axis is immediately operated under position control.

If the axis does not travel in positive direction when direction key + is pressed, change the polarity of the voltage of the command value by modifying the machine data bit "Change of sign of command value". The output of the command value and the controller enabling are in working order provided that the RF axis moves in both directions with the correct sign. Now, repeat this sequence for the 2nd RF axis. You can change the command value via MD 821/822.

When the feed axis is in uncontrolled motion, activate the "EMERGENCY STOP" at once.

Reasons for uncontrolled movement	Description
Position control loop or speed control loop incorrectly polarized (NC machine data bits incorrect)	Axis travels with max. speed
Position control loop not closed	Axis travels at a constant low speed; measuring device does not follow the axis movement (e. g. loose coupling) Short circuit to frame, interruption or short circuit in line cause the measurement circuit supervision to respond
Command value not at speed controller	Axis travels at a constant low speed (drift)
Control loop error • Tachometer feedback interrupted • Tachometer feedback incorrectly polarized • Incorrect optimization • K_V factor too high	Axis hunts strongly and swings

Switch off the interface signal JOG SPEED-CONTROLLED and specify controller enabling for one axis. In doing so, the RF axis switches to position control. Provided that on actuation of the direction keys the RF axis traverses in the correct direction, the following error can be checked in the service masks and the fine adjustment can be done using the multgain.

A drift compensation must be carried out if the following error does not become 0 after having released the direction keys. Repeat procedure for the other RF axis. Selection of service masks is shown in chapter M 6.6 (Service display).

Simultaneous depression of the direction key and the key RAPID TRAVERSE OVERRIDE creates the possibility to traverse the RF axes at rapid traverse rate.

Annotation:

With direct position measurement, the RF axes can only by traversed in position control if the sheet has already reached the encoder's measuring wheel.

3.3 Start-up of the roll feed in NC operating mode AUTOMATIC

Provided that the RF axes are traversed under position control in NC operating mode JOG, you can start up the RF functions in the NC operating mode AUTOMATIC.

The following interface signals are required for the NC operating mode AUTOMATIC:

CONTROLLER ENABLING	Q 74.2	for	RF 1
	Q 76.2	for	RF 2
FOLLOW-UP OPERATION	Q 73.2	for both	RF axes
SHEET IS ADJUSTED	Q 73.0	for both	RF axes

First of all a tool is programmed with an RF program. This is done via the user interface of the SINUMERIK 805SM-P. Operating this user interface is described in chapter 6. After tool programming, the tool change is carried out. Signals CONTROLLER ENABLING and SHEET IS ADJUSTED must be set and output FOLLOW-UP OPERATION must be reset on the PLC-NC interface.

When the start signal (feed cam) changes from "0" to "1" at the digital input E1, the 1st feed length will be positioned; with the next signal the 2nd feed length will be positioned etc. Having two RF axes, the start signal for RF 2 must be present simultaneously or alternately with the start signal for RF 1. With one RF axis, there must not be a signal on input E2 during positioning, because in this version the digital input E2 is transmitted for the lifting phase.

With each edge change from "low" to "high" of signal SHEET IS ADJUSTED, the roll feed will be reset. The RF branches back again to program start. This is required for certain RF errors or for beginning with the 1st RF length again.

The part counter reduction is selected by setting the machine data bit 5052 bit 5. The part counters are no longer incremented after each press stroke but after each processed RF program. When the selected number of parts is reached, the press will be stopped.

The RF axes can be switched off (de-selected) via the controller enabling. This means that the feed length will not be processed even if the start signal is present.

During positioning the digital output A1 is 0. It returns to "high" as soon as the sheet is positioned within the tolerance window.

In case of an error the digital output A2 goes to "low". Via this signal the press can be stopped if an error occurs. After eliminating the error and resetting, the output returns to "high".

4 Data

4.1 Machine data

4.1.1 Overview of NC machine data

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
690	Clamping tolerance	2 000	16 000	MS	units
691	Clamping tolerance	2 000	16 000	MS	units
692	KV-factor	1 666	10 000	MS	0.01 s^{-1}
693	KV-factor	1 666	10 000	MS	0.01 s^{-1}
694	Multgain	4 800	64 000 1)		
695	Multgain	4 800	64 000 1)		
696	Threshold for drive fault	9 600	15 000		VELO
697	Threshold for drive fault	9 600	15 000		VELO
698	Max. speed setpoint	8 192	8 192		VELO
699	Max. speed setpoint	8 192	8 192		VELO
700	Drift compensation	0	+/– 500		VELO
701	Drift compensation	0	+/– 500		VELO
702	Max. speed	24 000	24 000	IS	1 000 units/min
703	Max. speed	24 000	24 000	IS	1 000 units/min
704	Max. acceleration	2 000	2 000	IS	10 000 units/s2
705	Max. acceleration	2 000	2 000	IS	10 000 units/s2
706	Max. deceleration	2 000	2 000	IS	10 000 units/s^2
707	Max. deceleration	2 000	2 000	IS	10 000 units/s2
708	Conventional speed	2 000	15 000	IS	1 000 units/min
709	Conventional speed	2 000	15 000	IS	1 000 units/min
710	Conventional acceleration	100	2 000	IS	10 000 units/s2
711	Conventional acceleration	100	2 000	IS	10 000 units/s2
712	Rapid JOG	7 000	24 000	IS	1 000 units/min
713	Rapid JOG	7 000	24 000	IS	1 000 units/min
714	Incremental feedrate	10	15 000	IS	1 000 units/min
715	Incremental feedrate	10	15 000	IS	1 000 units/min
716	Variable pulse number	1	60 000		Encoder pulses
717	Variable pulse number	1	60 000		Encoder pulses

1) The product of MD 692 (693) and MD 694 (695) must be less than 2,9 · 10^9.

MD No.	Designation	Standard value	Maximum input value	Reference system	Input unit
718	Traversed distance increment evaluation	2	60 000	MS	0.5 · unit
719	Traversed distance increment evaluation	2	60 000	MS	0.5 · unit
720	Starting acceleration as % of tool-dependent acceleration of axes	60	100		%
721	Starting acceleration as % of tool-dependent acceleration of axes	60	100		%
722	Final deceleration as % of tool-dependent deceleration of axes	120	200		%
723	Final deceleration as % of tool-dependent deceleration of axes	120	200		%
724	Effective range of starting acceleration	20	100		%
725	Effective range of starting acceleration	20	100		%
726	Effective range of final deceleration	80	100		%
727	Effective range of final deceleration	80	100		%
728	Number of 1st RF R parameter	1 137	1 480		
729	Delay of controller disabling RF axes	200	1 000		ms
811	Max. number of blocks for roll feed	3	15		
812	Max. feed length RF	100 000	10 000 mm	IS	10 units
813	Min. feed length RF	100	10 000 mm	IS	10 units
814	Roll/measuring wheel diameter	100 000	1 000 mm	IS	10 units
815	Roll/measuring wheel diameter	100 000	1 000 mm	IS	10 units
816	Step size of acceleration change	10	10		%
817	Step size of acceleration change	10	10		%
818	No. of steps for acceleration change	20	20		Steps
819	No. of steps for acceleration change	20	20		Steps
820	Constant-speed phase, short distances	10	10		ms
821	Command speed for JOG speed-controlled	2 000	8 192		VELO
822	Command speed for JOG speed-controlled	2 000	8 192		VELO

Note:

In the case of machine data having the same designation, the first machine datum is valid for roll feed axis 1 (RF 1) and the second for roll feed axis 2 (RF 2).

4.1.2 Overview of NC machine data bits

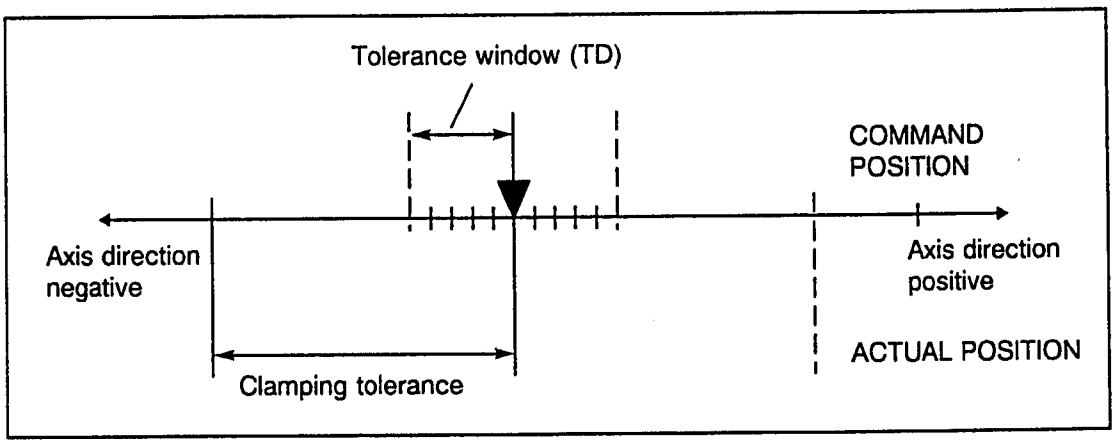
MD No.	Bit No. 7	6	5	4	3	2	1	0
5002		Input resolution		Reset pos. G70				
5052			Part counter reduction					
5151 RF1 + RF2				Tool data are ranges for starting acceleration and final deceleration		Position control sensitivity		
5152 RF1						Change of sign actual value	Change of sign command value	No hardware monitoring
5153 RF2						Change of sign actual value	Change of sign command value	No hardware monitoring

Standard assignment

MD No.	Bit No. 7	6	5	4	3	2	1	0
5002	0	0	1	0	0	0	1	0
5052	0	0	0	0	1	0	0	1
5151	0	0	0	1	0	0	1	0
5152	0	0	0	0	0	0	0	0
5153	0	0	0	0	0	0	0	0

4.1.3 Description of the NC machine data

MD No.	Meaning		
690	**Clamping tolerance**		**RF 1**
691	**Clamping tolerance**		**RF 2**
Sign	Input limits	Standard value	Units
+	0 to 16 000	2 000	units (MS)



Representation of the clamping tolerance

The NC checks the position in standstill (axis stopped). If the clamping tolerance is exceeded in standstill, alarm 2380/2381 (standstill monitoring) is displayed.

Possible causes:

a) The NC cannot hold the axis in position if the PLC resets the drive enable. The PLC itself must hold the axis in position by means of clamping it (activating the holding brake). A mechanically clamped axis can be pushed out of position by external forces.

b) The axis might be pushed out of position by high mechanical forces, or by a fault in the drive unit.

The clamping tolerance must be **greater** than the tollerance window (TD).

MD No.	Meaning		
692	**K_V factor**		**RF 1**
693	**K_V factor**		**RF 2**
Sign	Input limits	Standard value	Units
+	0 to 10 000	1 666	0.01 s^{-1}

When entering the K_V factor, it should be taken into account that the gain factor for the complete feedback loop also depends on several other parameters of the loop. In reality a distinction has to be made between a "desired" K_V factor (MD 692/693) and a "real" K_V factor (the one given by the machine). The K_V factors are only equal if all parameters of the feedback loop are adjusted to each other.

Those parameters are:

- Multgain (MD 694/695)
- Tacho adjustment on the speed controller
- Tacho generator on the drive unit

Note:

Axes which are to work together during path control (interpolation) **must** have exactly the same gains in their position control loops (i.e. the same following error for the same speed = 45° rising angle).

Deviations cause contour errors!

Different values can only be used on axis which **do not** participate in the path control (interpolation).

Example for calculation of the K_V factor::

Input sensitivity:	$1 \cdot 10^{-3}$ mm	MD 5002
Position control sensitivity:	$0.5 \cdot 10^{-3}$ mm	MD 5151
K_V factor 1):	1 666	MD 692/693
Multgain:	2 700	MD 694/695
Max. speed (10 m/min):	10 000 $^{mm}/_{min}$	MD 702/703

The drive must be adjusted to 9 V according to 10 $^{m}/_{min}$ with battery case. The axis to be set is traversed in JOG mode with a speed of 1 $^{m}/_{min}$. In doing so, the following error in the service display must be taken into account.

$$K_V = \frac{\text{Speed}}{\text{Following error}} \left[\frac{\text{m/min}}{\text{mm}}\right]$$

$$\text{Following error} = \frac{\text{Speed}}{K_V}$$

$$\text{Following error} = \frac{1\,\text{m/min}}{1\ \frac{\text{m/min}}{\text{mm}}}$$

1 mm is equal to 2000 positioning resolutions in the service display. The command calue of the speed should be about 737 VELO [2] 0 ≙ 0.9 V (10% of the maximum speed). If the deviations from the theoretically calculated following error are greater, the tacho adjustment potentiometer at the drive unit should be readjusted. The following error resolution is carried out with the multgain because this allows a more precise setting.

To check the settings, the axis is then traversed at maximum speed. For this, the drive command value must be approximately 9 V.

The actual K_V value is 1 if a following error of 1 mm is present for an axis speed of 1 $^{m}/_{min}$.

---

1) $Kv \text{ in } \frac{m/min}{mm} = \left[\frac{m}{60\ sec\ .\ mm}\right]\left[\frac{1000\ mm}{1\ m}\right] = 16.66\ s^{-1}$

therefore: $16{,}66\ s^{-1} \rightarrow 1666 \cdot 0{,}01\ s^{-1}$

2) *In case of a 14-bit DAC:* $1\ VELO = \frac{10\ V}{8192} = 1.22\ mV$

therefore: **737 VELO ≙ 0,9 V**

MD No.	Meaning		
694	**Multgain**		**RF 1**
695	**Multgain**		**RF 2**
Sign	Input limits	Standard value	Units
+	0 to 64 000	4 800	min/1000 units (MS)

The mult gain is used to adapt the feedback path (measuring system) to the K_V factor which is given in MD 692/693. The mult gain is only a multiplication factor for the entered K_V gain; it should be used for **fine digital tachogenerator adjustment**, since it allows very fine adjustment. After correct entry or adaption of the mult gain, the axis should have exactly the same K_V factor as the value entered in the machine data.

Note:

The adaption of the actual K_V factor with the MD 692/693 is not recommended, since different axes would have different K_V factors, even with the same gain in the position control loop.

The mult gain is calculated with the following formula: $\frac{3 \cdot 10^7}{V_{max}} \cdot \frac{U_{max}}{10[V]}$

V_{max}: max. speed [1000 units (MS)/min]
U_{max}: max. voltage at V_{max} [Volt]

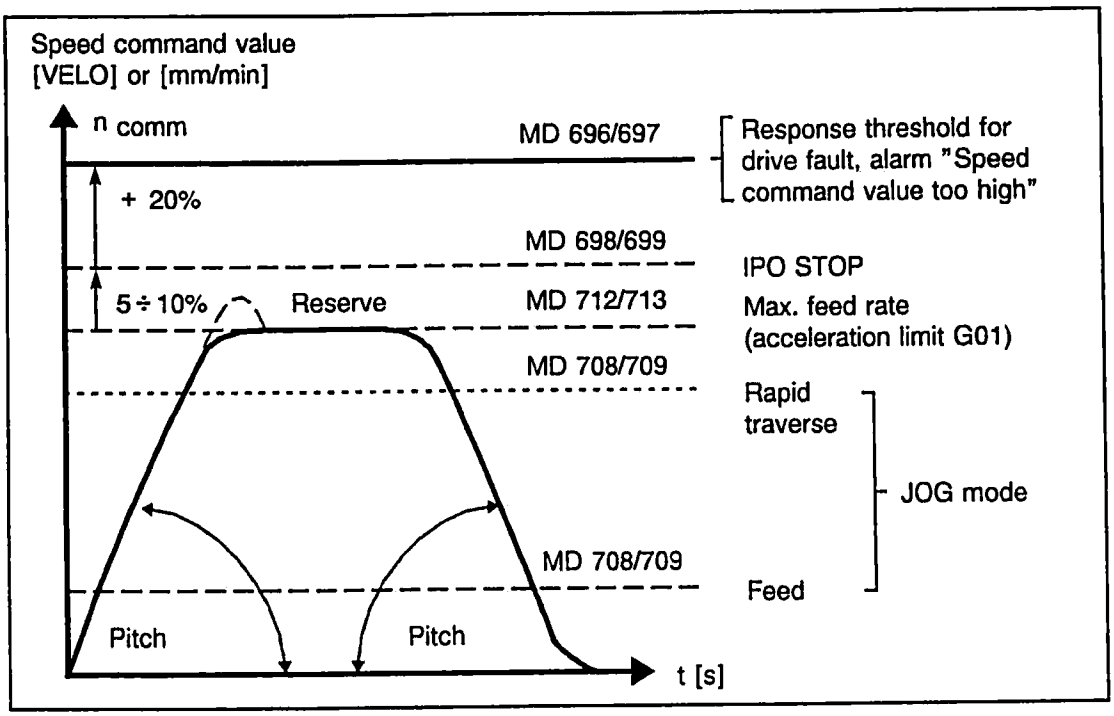
Determination of the multgain:

Max. feed rate [1000 units (MS)/min]	Speed command value			
	4 Volts	8 Volts	9 Volts	9,5 Volts
24000	500	1000	1125	1188
22000	545	1090	1227	1296
20000	600	1200	1350	1425
18000	666	1332	1500	1883
16000	750	1500	1687	1781
15000	800	1600	1800	1900
14000	857	1714	1928	2036
12000	1000	2000	2250	2375
10000	1200	2400	2700	2850
8000	1500	3000	3375	3663
6000	2000	4000	4500	4750
5000	2400	4800	5400	5700
4000	3000	6000	6750	7125
3000	4000	8000	9000	9500
2000	6000	12000	13500	14250
1000	12000	24000	27000	28500
750	16000	32000	36000	38000
500	24000	48000	–	57000
375	32000	–	–	–
187	64000	–	–	–

MD No.	Meaning		
696	**Threshold for drive fault**		**RF 1**
697	**Threshold for drive fault**		**RF 2**
Sign	Input limits	Standard value	Units
+	0 to 15 000	9 600	VELO

This monitoring activates alarm 2384/2385 (speed command value too high) if the speed command value entered is too high. This value must be greater than the greatest one entered in NC MD 698/699 (Max. speed command value) (IPO STOP).

Recommended value: approx. 20% higher than MD 698/699



Representation of the response threshold for drive fault

MD No.	Meaning		
698	**Max. speed command value**		**RF 1**
699	**Max. speed command value**		**RF 2**
Sign	Input limits	Standard value	Units
+	0 to 8 192	8 192	units (MS)

This entry specifies the maximum voltage of the speed command output. It depends on the maximum voltage the drive unit can handle (for speed controllers normally 10 V). If the value is exceeded, the interpolator (IPO) is stopped and alarm 2390/2391 (DAC limitation) is displayed.

The standard value of 8192 corresponds to a voltage of 10 V.

Note:

It must be ensured that the maximum feed rate (rapid raverse) can be reached, i.e. the tacho adjustment has to be made in such a way that reading and adjusting errors of feed rates during operation do not exceed the limit which causes IPO STOP (e.g. maximum feed rate = 9 to 9.5 V).

VELO: smallest unit of the digital-analog converter

In the case of a 14-bit converter : 1 VELO = $\frac{10\ V}{8192}$ = 1.22 mV

MD No.	Meaning		
700	**Drift compensation**		**RF 1**
701	**Drift compensation**		**RF 2**
Sign	Input limits	Standard value	Units
±	0 to 500	0	VELO

The temperature drift of analog electronic components (mainly in the motor drive unit) causes a drift of the axes from their command position. (The temperature drift effective at a given moment is automatically compensated for by the control.)

A software drift compensation is carried out with the following operation:

- Select the basic menu of the startup operator interface (enable it first if required).
- Select the DIAGNOSIS menu with the appropriate softkey.
- Press the SERVICE softkey.
- Press the MAIN DRIVE/AXES softkey.
- Press softkey DRIFT COMP. A1/A2/A3 and/or A4. A software drift compensation of the selected axis is carried out.

The new compensation value is displayed in the MD.
If the compensation value is greater than approximately 500 VELO, the deviation from the position is no longer a drift but something else is wrong; therefore, alarm 160* (Drift too high) is displayed.

Note:

It is also possible to enter a drift compensation value by hand in the machine data.

MD No.	Meaning		
702	**Max. speed**		**RF 1**
703	**Max. speed**		**RF 2**
Sign	Input limits	Standard value	Units
+	0 to 24 000	24 000	1 000 units (IS)/min

The entered value is the maximum speed of the axis (rapid traverse).

This speed is used when rapid traverse, G00, has been programmed

The axis-specific maximum feed rate and the position control sensitivity correlate as follows:

Position control sensitivity		max. axis speed
$0.5 \cdot 10^{-4}$ mm	→	≤ 2,4 $^{m}/_{min}$
$0.5 \cdot 10^{-3}$ mm	→	≤ 24 $^{m}/_{min}$
$0.5 \cdot 10^{-2}$ mm	→	≤ 240 $^{m}/_{min}$

The following correlation is also possible for axes that are not used for 2D or 3D interpolation.

Position control sensitivity		max. axis speed
$0.5 \cdot 10^{-4}$ mm	→	≤ 4.5 $^{m}/_{min}$
$0.5 \cdot 10^{-3}$ mm	→	≤ 45 $^{m}/_{min}$
$0.5 \cdot 10^{-2}$ mm	→	≤ 450 $^{m}/_{min}$

MD No.	Meaning		
704	**Max. acceleration**		**RF 1**
705	**Max. acceleration**		**RF 2**
Sign	Input limits	Standard value	Units
+	0 to 2 000	2 000	10 000 units (IS)/s²

MD No.	Meaning		
706	**Max. deceleration**		**RF 1**
707	**Max. deceleration**		**RF 2**
Sign	Input limits	Standard value	Units
+	0 to 2 000	2 000	10 000 units (IS)/s²

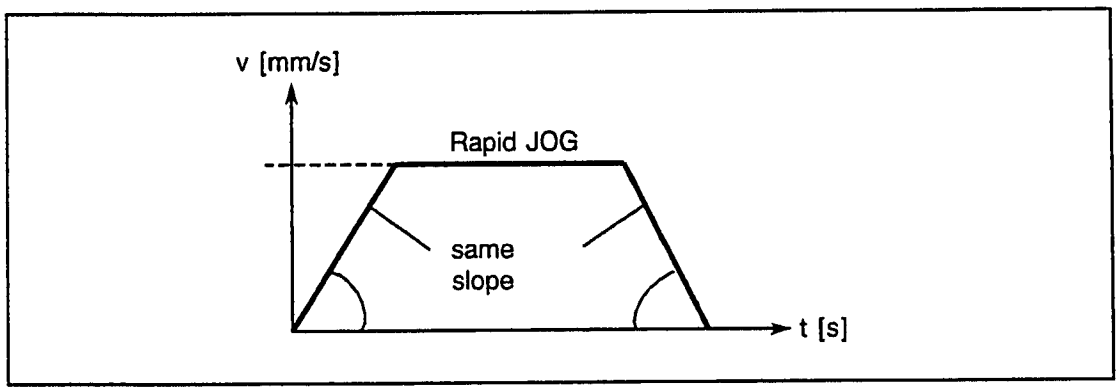
The accelerations/decelerations for the RF axes are entered in dependence on the tool data. In these machine data, the maximum acceleration/deceleration values are entered. They are used as limit values during operation.

MD No.	Meaning		
708	**Conventional speed**		**RF 1**
709	**Conventional speed**		**RF 2**
Sign	Input limits	Standard value	Units
+	0 to 15 000	2 000	1 000 units (IS)/min

The value entered applies to traversing in NC operating mode JOG with 100% speed correction.

MD No.	Meaning		
710	**Conventional acceleration/deceleration**		**RF 1**
711	**Conventional acceleration/deceleration**		**RF 2**
Sign	Input limits	Standard value	Units
+	0 to 2 000	100	10 000 units (IS)/s^2

In the NC operating modes JOG and JOG-INC, acceleration and deceleration are executed with this value.



Acceleration and deceleraton ramps in JOG mode

MD No.	Meaning		
712	**Rapid JOG**		**RF 1**
713	**Rapid JOG**		**RF 2**
Sign	Input limits	Standard value	Units
+	0 to 24 000	7 000	1 000 units (IS)/min

The value entered is used for traversing in JOG mode with the rapid traverse key depressed and the feed override at 100%. This value is not used for programmed rapid raverse G00. The programmed rapid traverse G00 is determined by MD 280* (Max. speed).

Recommended value:

Somewhat lower than the speed in rapid traverse G00, in order to take the reaction time of the operator into account.

MD No.	Meaning		
714	**Incremental feed rate**		**RF 1**
715	**Incremental feed rate**		**RF 2**
Sign	Input limits	Standard value	Units
+	0 to 15 000	10	1 000 units (IS)/min

The feed rate entered is active only in the NC operating mode JOG-INC.

MD No.	Meaning		
716	**Number of pulses for variable increment evaluation**		**RF 1**
717	**Number of pulses for variable increment evaluation**		**RF 2**
Sign	Input limits	Standard value	Units
+	1 to 60 000	1	encoder pulses

For explanation of these MD, see MD 718/719.

MD No.	Meaning		
718	**Traversed distance for variable increment evaluation**		**RF 1**
719	**Traversed distance for variable increment evaluation**		**RF 2**
Sign	Input limits	Standard value	Units
+	1 to 60 000	2	0.5·units (MS)

MD 716/717 = Number of encoder steps per corresponding traversing distance (mm)

$$\text{MD 718/719} = \frac{\text{corresponding traversing distance (mm)}}{\text{position control sensitivity (MD 5151)}}$$

For setting the machine data 716/717 and 718/719, the pulse number of the encoder and the corresponding traversing distance must be given to the press. The value of the traversing distance must be entered into MD 718/719 in dependence on the position control sensitivity (MD 5151. The number of encoder pulses must be entered into MD 716/71 if the machine data values do not exceed 65000. In the other case, both values must be divided by a common multiple.

Example: Traversing distance of the axis is 80 mm with 4000 encoder steps.
Position control sensitivity = $1/2 \cdot 10^{-3}$ mm = 0.0005 mm

$$\text{MD 718/719} = \frac{80\ \text{mm}}{0.0005\ \text{mm}} = \underline{160\ 000}$$

As this value is higher than 65000, both values must be divided by a common factor.

e.g. factor = 10 : MD 716/717 ⇒ 400
MD 718/719 ⇒ 16000

Special conditions for incremental encoders:

The pulses of these encoders are multiplied by four on the measuring circuit module. Therefore, the value for MD 716/717 must be multiplied by four.

In the case of this example: MD 716/717 = 400 x 4
= 1600

MD No.	Meaning		
720	**Starting acceleration as % of the tool-dependent acceleration of axes** **RF 1**		
721	**Starting acceleration as % of the tool-dependent acceleration of axes** **RF 2**		
Sign	Input limits	Standard value	Units
+	0 to 100	60	%

For explanation of these MD see MD 726/727.

The acceleration of the roll feed axes is read out with the tool data for every tool. It is possible to influence this acceleration at the beginning. MD 720/721 displays the percentage of the entered acceleration which is to be active at the beginning.

These machine data are only effective if MD 5151 bit 4 is not set.

MD No.	Meaning		
722	**Final deceleration as % of the tool-dependant axis deceleration** **RF 1**		
723	**Final deceleration as % of the tool-dependant axis deceleration** **RF 2**		
Sign	Input limits	Standard value	Units
+	0 to 200	120	%

For explanation of these MD, see MD 726/727.

The deceleration of rollfeed axes is also entered in the tool data. The deceleration can be influenced at the end of traversing. In this MD, the percentage of the entered deceleration which is to be active at the end is entered.

These machine data are only effective, if

MD 5151 bit 4 is not set.

MD No.	Meaning		
724	**Effective range of starting acceleration** **RF 1**		
725	**Effective range of starting acceleration** **RF 2**		
Sign	Input limits	Standard value	Units
+	0 to 100	20	%

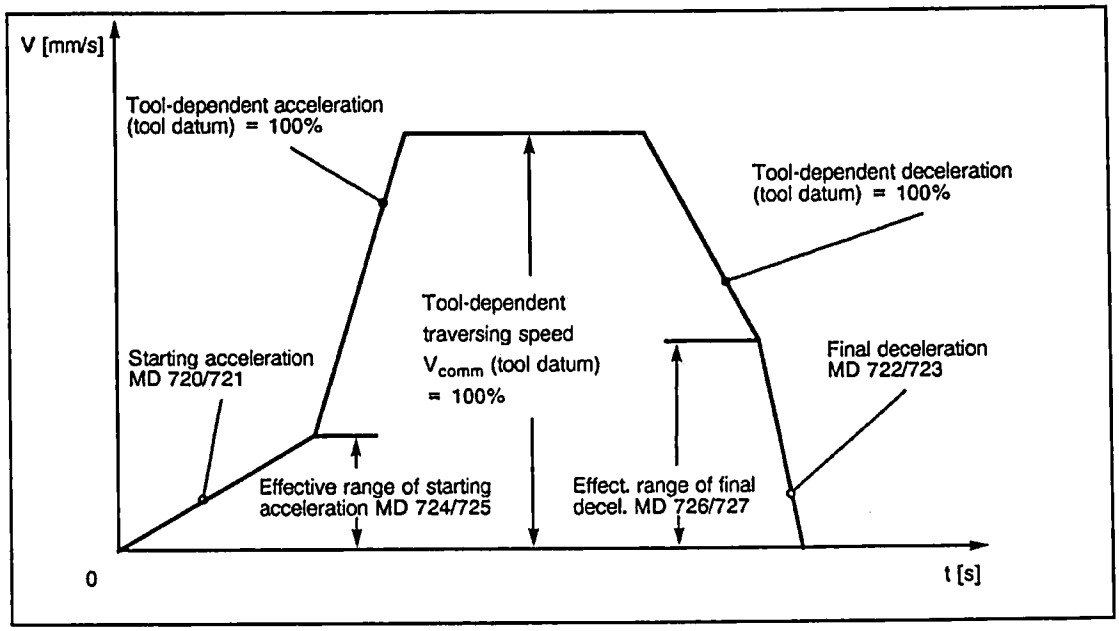
For explanation of these MD, see MD 726/727.

MD No.	Meaning		
726	**Effective range of final deceleration**		**RF 1**
727	**Effective range of final deceleration**		**RF 2**
Sign	Input limits	Standard value	Units
+	0 to 100	80	%

These machine data determine up to which speed the starting acceleration and from which speed on the final deceleration is effective. These ranges are ascertained by means of the tool-dependent traversing speed.

The value entered determines at which percentage the starting acceleration ends or the final deceleration starts.

These machine data are only effective if MD 5151 bit 4 is not set.



Characteristics of the acceleration/decleration for an RF-axis

MD No.	Meaning		
728	**Number of the 1st RF R parameter**		
Sign	Input limits	Standard value	Units
+	1 100 to 1 500	1 137	

This machine datum determines the 1st R parameter for the roll feed. Beginning at this R parameter, all RF specific tool data must be deposited in a defined sequence. Enter the value 1137 if you use the standard cycles.

Note:

If you use the standard cycles, see also Planning Guide for CYCLES.

MD No.	Meaning		
729	**Delay of controller disabling RF axes**		
Sign	Input limits	Standard value	Units
+	0 to 1 000	200	

For explanations of this MD, see MD 156.

MD No.	Meaning		
811	**Maximum number of blocks for roll feed**		
Sign	Input limits	Standard value	Units
+	1 to 15	3	

The SINUMERIK 805SM-P reserves three R parameters for each traversing block. Since 15 blocks can be entered per tool, however, only part of them is required, most of the tool data storage would be left unused. To avoid this, the storage can be adapted to the number of traversing blocks actually to be expected. Therefore, more tool data blocks can be stored (see also MD 306).

MD No.	Meaning		
812	**Maximum feed length for roll feed**		
Sign	Input limits	Standard value	Units
+	1 mm to 10 m	100 000	10 · units (IS)

This MD determines the maximum feed length per RF block. If the feed length exceeds this MD in an RF-block, the tool cannot be set up.
Alarm 2400 is activated: "Tool datum RF not within the permissible limits".

Note:

This MD is valid for both traversing directions. The value must be entered in10 · units (IS) of the desired input sensitivity (MD 5002).

MD No.	Meaning		
813	**Minimum feed length for roll feed**		
Sign	Input limits	Standard value	Units
+	1 mm to 10 m	100	10 · units (IS)

This MD determines the minimum feed length per RF block. If the feed length falls short of this MD in an RF block, the tool cannot be reset .
Alarm 2400 is activated: "Tool datum RF not within the permissible limits".

Note:

This MD is valid for both traversing directions. The value must be entered in10 · units (IS) of the desired input sensitivity (MD 5002).

MD No.	Meaning		
814	**Diameter roll/measuring wheel**		**RF 1**
815	**Diameter roll/measuring wheel**		**RF 2**
Sign	Input limits	Standard value	Units
+	10 mm to 1 000 mm	100 000	10 · units (IS)

These MD store the diameter of the new roll or the new measuring wheel respectively. When correcting the roll diameter, this value is used as reference value and the encoder pulses are evaluated anew. The corrected roll diameter can be entered in a standard mask.

MD No.	Meaning		
816	**Step size acceleration change**		**RF 1**
817	**Step size acceleration change**		**RF 2**
Sign	Input limits	Standard value	Units
+	1 to 10	10	%

MD No.	Meaning		
818	**Number of steps for acceleration change**		**RF 1**
819	**Number of steps for acceleration change**		**RF 2**
Sign	Input limits	Standard value	Units
+	0 to 20	20	Steps

Via the standard masks the tool-dependent acceleration/deceleration of the axes can be jointly increased or reduced during operation (override).

MD 816/817 determine the step size by which correction is to be made through actuation of one softkey . MD 818/819 contain the permissible number of softkey actuations.

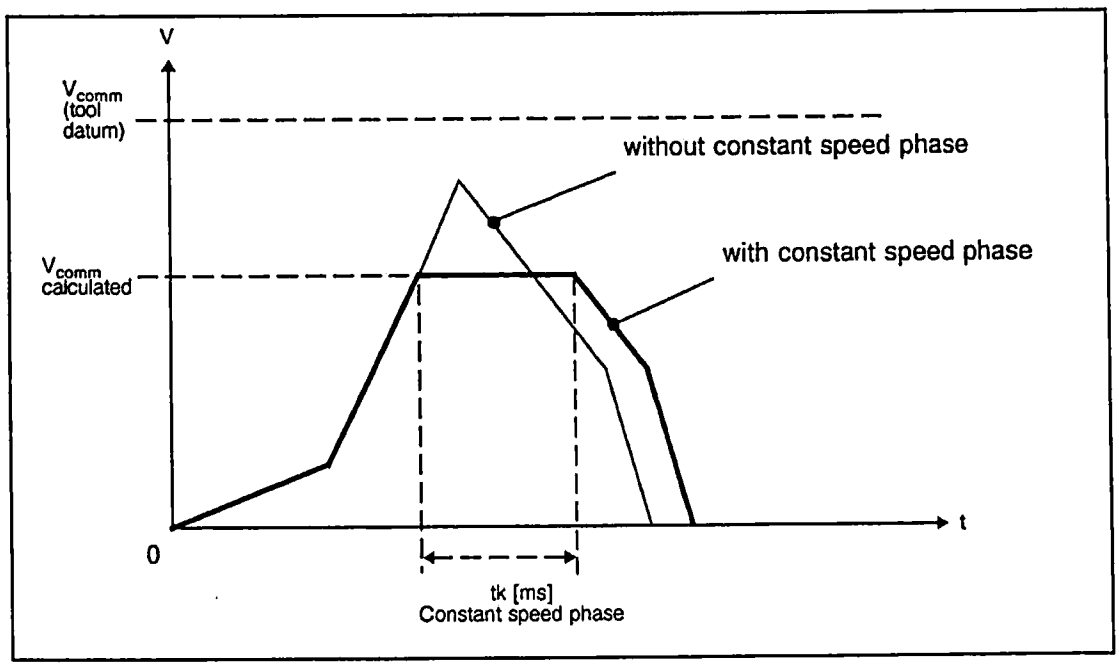
The correction value is calculated as follows:

Correction value [%] = Step size (MD 816/817) [%] × Number of softkey actuations

The correction does not influence the ranges for starting acceleration and final deceleration.

MD No.	Meaning		
820	**Constant-speed phase for short distances**		
Sign	Input limits	Standard value	Units
+	0 to 10	10	ms

In order to avoid (the command speed[V_{comm}] is not reached) that the deceleration phase follows directly after the acceleration phase when using short traversing, this MD defines a period of time during which the speed between the two ramps remains constant. In this case the control will calculate the speed command value autonomously.



Note:

- This MD is rounded off to a multiple of the RF sampling time.
- MD 820 is valid for both RF axes.

MD No.	Meaning		
821	**Command speed for JOG speed-controlled**		**RF 1**
822	**Command speed for JOG speed-controlled**		**RF 2**
Sign	Input limits	Standard value	Units
+	0 to 8192	2000	VELO

In NC operating mode "JOG" you can traverse (control) the RF axes even if the position control circuit is open. If this function was activated by the PLC interface signal JOG SPEED-CONTROLLED (Q73.1), on activation of RF axis 1 or 2 and actuation of the + direction key the voltage will be output with the correct sign.

4.1.4 Description of the NC machine data bits

Note:

The meaning of the MD bits always refers to the **set** bit. If the bit is not set, the opposite applies.

NC-MD	Bit No.							
	7	6	5	4	3	2	1	0
5002		Input sensitivity						

The input sensitivity (IS) determines the increment evaluation for displays and measurements entered. It also defines the reset position G70 (inch) or G71 (mm).

Standard value (bit 6–4): 010

Bit 6	Bit 5	Bit 4	Meaning
0	0	0	10^{-2} mm
0	0	1	10^{-3} inch
0	1	0	10^{-3} mm
0	1	1	10^{-4} inch
1	0	0	10^{-4} mm
1	0	1	10^{-5} inch

Possible combination of input and position control sensitivity

Position control sensitivity	Input sensitivity					
	10^{-2} mm	10^{-3} mm	10^{-4} mm	10^{-3} inch	10^{-4} inch	10^{-5} inch
$0.5 \cdot 10^{-2}$ mm	—	—		—	—	
$0.5 \cdot 10^{-3}$ mm	—	—	—		—	—
$0.5 \cdot 10^{-4}$ mm		—	—			—
$0.5 \cdot 10^{-3}$ inch	—			—	—	
$0.5 \cdot 10^{-4}$ inch	—	—		—	—	—
$0.5 \cdot 10^{-5}$ inch		—	—		—	—

All combinations marked with "—" are allowable and can be entered.

If the combination selected is not allowable, a conversion factor of 1/1 is assumed and alarm 4 (incorrect unit system) is displayed on the screen.

Notes:

- The position control sensitivity should always be less than 1/2 of the input sensitivity. This is indispensable to ensure that the programmed position is exactly reached.
- The position control sensitivity is entered in MD 5151, and its description is found in the section on this MD.

NC MD	Bit No.							
	7	6	5	4	3	2	1	0
5052			Part counter reduction					

Bit 5 **Bit 5 = 1** The part counters are increased each time an RF program has been executed.

Bit 5 = 0 The part counters are increased with each stroke.

NC MD	Bit No. 7	6	5	4	3	2	1	0
5151 RF 1+2				The ranges for starting acceleration/ final deceler. are tool data		Position control sensitivity		

Bit 4 **Bit 4 = 0** The ranges for starting acceleration and final deceleration are entered as machine data. The machine data 720 to 727 are effective.

Bit 4 = 1 The ranges for starting acceleration and final deceleration are entered as tool data.

Bit 2,1 and 0 The position control sensitivity assigns an increment of the actual part value to a traversing distance.

The measuring system must be adapted to this position control sensitivity via machine data by means of the software.

Position control sensitivity for RF axes

Bit 2	Bit 1	Bit 0	Meaning
0	0	0	$1/2 \cdot 10^{-2}$ mm
0	0	1	$1/2 \cdot 10^{-3}$ inch
0	1	0	$1/2 \cdot 10^{-3}$ mm
0	1	1	$1/2 \cdot 10^{-4}$ inch
1	0	0	$1/2 \cdot 10^{-4}$ mm
1	0	1	$1/2 \cdot 10^{-5}$ inch

Standard value (bit 2–0): 010

Note: The input sensitivity is determined in MD 5002.

NC MD	Bit No. 7	6	5	4	3	2	1	0
5152 RF 1						Change of sign actual value	Change of sign command value	No hardware monitoring
5153 RF 2						Change of sign actual value	Change of sign command value	No hardware monitoring

5152 Bit 2, 5153 Bit 2

The sign of the measuring equipment pulses can be changed by converting the bit. This must be done when the axis traverses uncontrolled at maximum speed or when during the starting up procedure with standard MD the alarm 2380/2381 ("Standstill monitoring") is set.

5152 Bit 1, 5153 Bit 1

Converting this bit means a change of polarity of the speed controller's command value voltage (required if the axis traverses into a mechanically wrong direction).

With the wrong sense of position control, change either bit 1 or 2.

With the correct position control loop and wrong traversing direction, both bits must be changed.

5152 Bit 0, 5153 Bit 0

Bit 0 **Bit 0 = 1** Alarm 2382/2383 is cancelled. The measuring circuits are not monitored any longer for cable break.

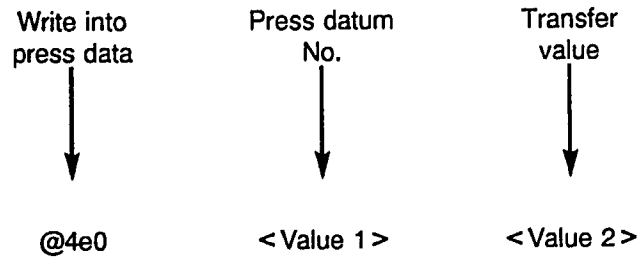
Bit 0 = 0 The monitoring is active.

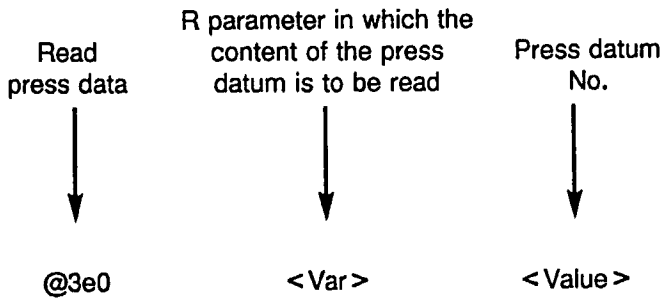
4.2 Press data (PD)

Press data are storage locations which can be read or written into by the NC program using @ functions. They act as an interface between the NC program and the system program, thus allowing to execute functions in the NC program in dependence on certain data (such as the mean value of n strokes). Furthermore, all data can be displayed directly on the screen.

Certain functions (such as minimum force monitoring) can be executed by writing into the press data.

The columns "Read" and "Write" of the press data list show how the press datum may be processed by the NC program.





PD No.	Designation	Input values	Read[1]	Write[2]
5	Number of occupied tool locations		*	
15	Tool change with tool data store (complete tool change) Tool change with RAM (only roll feed) Load RAM Tool change with RAM (all data)	1 4 6 7		*
20	Current actual value RF1		*	
21	Current actual value RF2		*	
22	Actual following error roll feed 1		*	
23	Actual following error roll feed 2		*	
24	Current actual value RF1 (calculated command value)		*	
25	Current actual value RF2 (calculated command value)		*	
26	Current command-actual-difference RF1		*	
27	Current command-actual-difference RF12		*	
28	Remaining time of largest feed length		*	
29	Time falls short of remaining time (is set to 1 by SINUMERIK 805SM-P) Reset identification via @4e0 in cycle	1 0	*	*
30	Actual block number of roll feed	0 - 15	*	*
31	Last block of roll feed was processed (PD30 = 0 → act. block no. = 0) The identification must be reset via @4e0 if it is polled in a subroutine.	1	*	*
32	Correction of roll diameter 1	+/- 99 999 999	*	*
33	Must be set to 1 to provide that the correction (PD32) is accepted.	1		*
34	Correction of roll diameter 2	+/- 99 999 999	*	*
35	Must be set to 1 to provide that the correction (PD34) is accepted.	1		*

1) with @3e0
2) with @4e0
** effective*

PD No.	Designation	Input values	Read[1)]	Write[2)]
36	Correction of total feed length RF1 The correction is distributed proportionally over all feed lengths	+/– 99 999 999	*	*
37	Must be set to 1 to provide that the correction (PD36) is accepted	1		*
38	Correction of total feed length RF2 The correction is distributed proportionally over all feed lengths	+/– 99 999 999	*	*
39	Must be set to 1 to provide that the correction (PD38) is accepted	1		*
40	Act. acceleration override in [%] RF1		*	
41	Must be set to 1 to provide that the correction (PD40) is accepted	1		*
42	Act. acceleration override in [%] RF2		*	
43	Must be set to 1 to provide that the correction (PD40) is accepted	1		*
44	Corrected curr. acceleration RF 1 [mm/s^2]		*	
45	Corrected curr. deceleration RF 1 [mm/s^2]		*	
46	Corrected curr. acceleration RF 2 [mm/s^2]		*	
47	Corrected curr. deceleration RF 2 [mm/s^2]		*	
48	Present number of processed feed blocks (only with part counter reduction)		*	
49	Command speed RF1 (Velo)		*	
50	Command speed RF2 (Velo)		*	
51	Time for largest feed length RF1 [ms]		*	
52	Time for largest feed length RF2 [ms]		*	
53	Sum of repetition factors		*	
54	Traversing time of block 1 for RF1 [ms]		*	
68	Traversing time of block 15 for RF1 [ms]		*	
69	Traversing time of block 1 for RF2 [ms]		*	

1) *with @3e0*
2) *with @4e0*
* *effective*

PD No.	Designation	Input values	Read[1]	Write[2]
83	Traversing time of block 15 for RF2 [ms]		*	
84	Current roll diameter RF1		*	
85	Current roll diameter RF2		*	

Example:

Tool change for roll feed with RAM by entering the value "4" into press datum 15:

@4e0 K15 K4

Read the current block number of the roll feed (press datum 30) into R parameter R50:

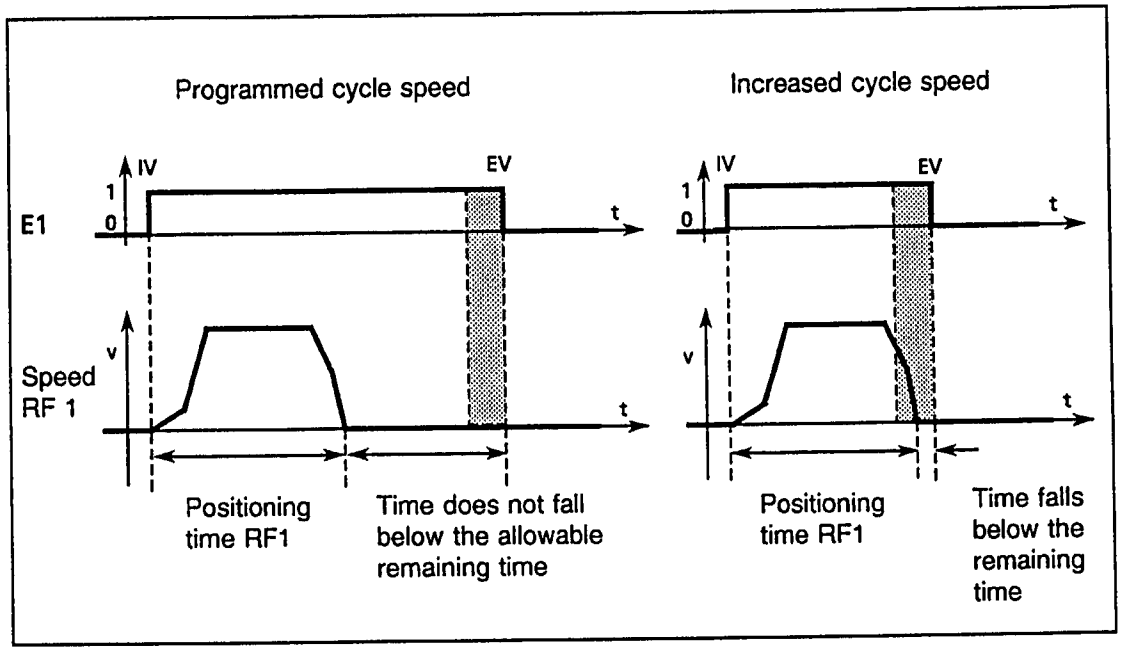
@3e0 R50 K30

1) *with @3e0*
2) *with @4e0*
* *effective*

4.3 Tool data

4.3.1 Allowable remaining time

The remaining time is the period of time between the end of the feed movement and the trailing edge of the input signal (E1 or E2). Increasing the cycle speed means reducing the time between the two edges.



TD for remaining time monitoring

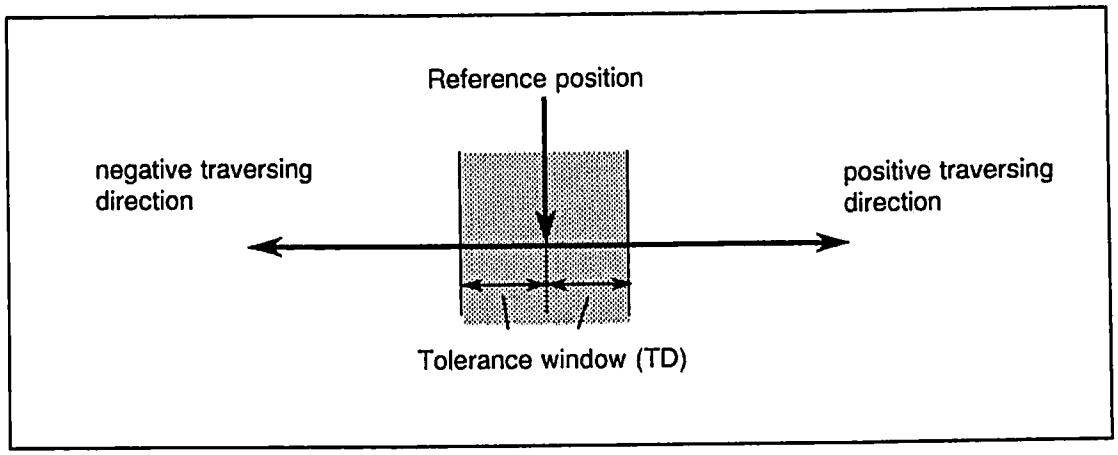
If the actual time is equal to or less than the input remaining time, the cycle speed cannot be increased further. Thus, the remaining time is a safety clearance to prevent minor variations of cycle speed or positioning time from triggering an emergency stop. With one RF program, the cycle speed is limited in such a way that the remaining time is even sufficient for the block containing the longest positioning time.

Allowable limits for remaining time:

2 to 1000 ms

4.3.2 Tolerance window

The traversing movement is considered to be completed when the reference feed length ± of the entered window was passed. If positioning was effected simultaneously on both RF axes within this tolerance window, output A1 is set.



TD for tolerance window

Positioning is considered to be completed if the actual position is within the shaded area.

Allowable limit values for the tolerance window:

0.001	to	9.99 mm
0.0001	to	0.394 inch

4.3.3 Traversing speed

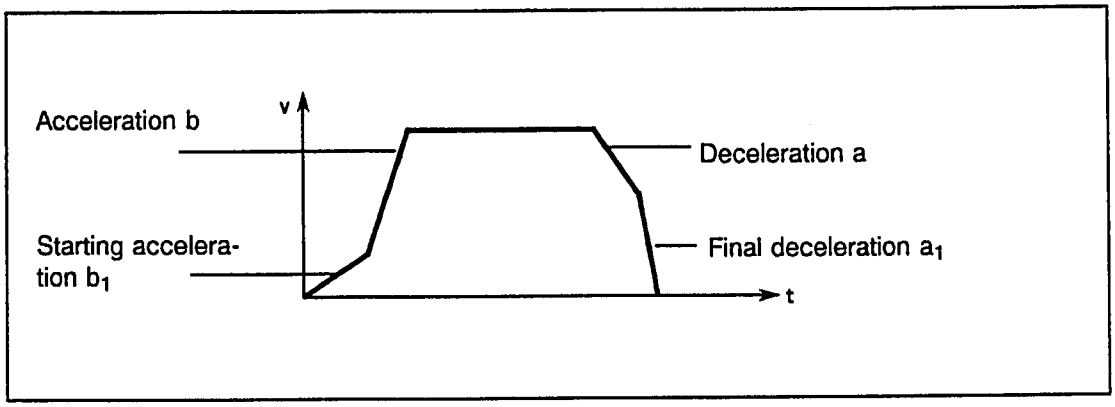
This value defines the speed at which the axis is to be traversed at the end of the acceleration phase. The traversing speed is valid for all feed blocks of an axis. See also section 2.1.2 (v_{comm}).

Allowable limits for the traversing speed:

10 mm/min	to	200 m/min
2.6 inch/min	to	8661 inch/min

4.3.4 Acceleration/Deceleration

This parameter defines the acceleration value for speeding the axis up to the programmed traversing speed or the deceleration value for stopping the axis. The selected input values should be high enough so that even during the starting acceleration and final deceleration the limit values will be met.



TD for acceleration/deceleration

Correct:

b = 15000mm/s²
b_1 = 30%

$$b_1 = \frac{15000\ mm/s^2 \times 30\ \%}{100\ \%} = 4500\ mm/s^2$$

b_1 > 640 mm/s²

Error:

b = 2000 mm/s²
b_1 = 30%

$$b_1 = \frac{2000\ mm/s^2 \times 30\ \%}{100\ \%} = 600\ mm/s^2$$

b1 < 640 mm/s²

Allowable limit values for the acceleration / deceleration:

640	to	25000 mm/s²
26	to	985 inch/s²

4.3.5 Starting acceleration/final deceleration

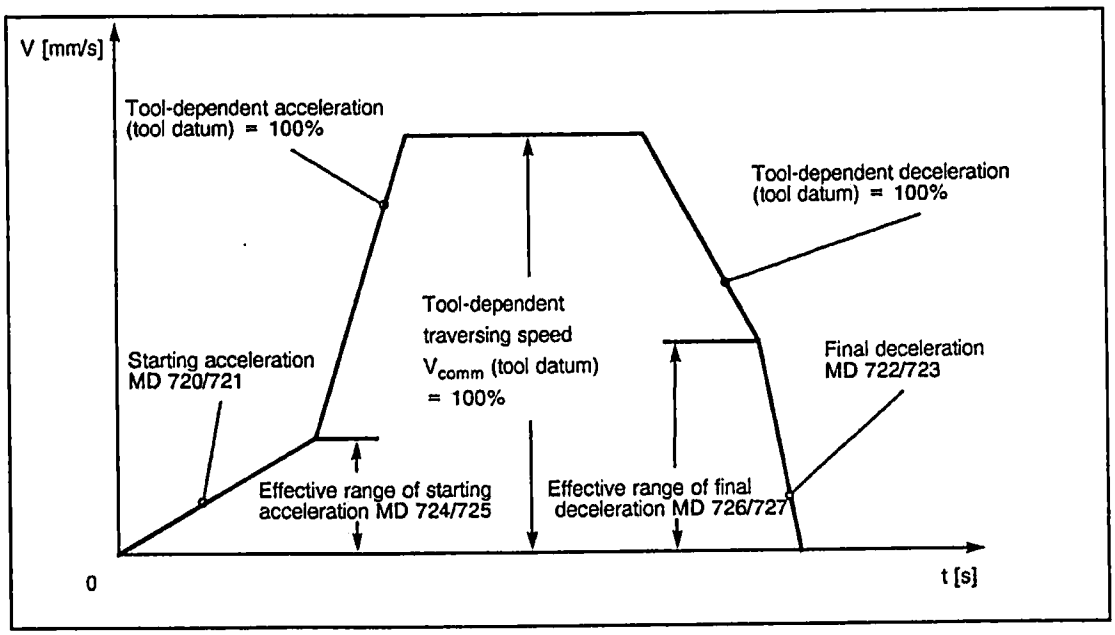
The acceleration and the deceleration of the RF axes for each tool are entered in the tool data. It is possible to influence the acceleration in the starting phase and the deceleration in the final phase.

The MD 720/721 and MD 722/723 respectively are used to define what percentage of the acceleration/deceleration is to be effective.

4.3.6 Effective range of the starting acceleration/final deceleration

These machine data determine up to which speed the starting acceleration and from which speed on the final deceleration is effective. These ranges are ascertained by means of the tool-dependent traversing speed.

The value entered determines at which percentage the starting acceleration ends or the final deceleration starts.



Characteristics of the acceleration/decleration for an RF axis

4.3.7 Feed Length

The programmable value for the feed length describes the distance to be traversed for one block. The number of blocks is defined in MD 811. 3 to 15 blocks can be programmed. The feed length is entered for each RF axis.

Allowable limits for the feed length:

+/– 1 mm	to	+/– 10 m
+/– 0.04 inch	to	+/– 394 inch

4.3.8 Repetition factor

Every signal edge change from "low" to "high" at the start input starts a feed block.

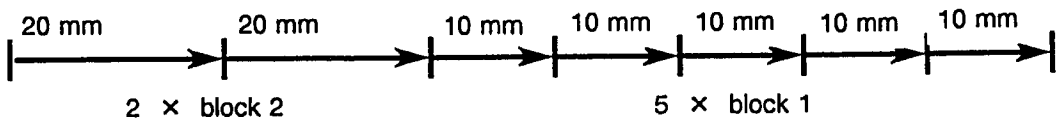
The repetition factor (RPF) determines the number by which the respective feed block is repeated in succession. Afterwards, the next R block is processed. Repetition factor 0 identifies the end of a RF program. This means that after a block with repetition factor 0 the roll feed branches back to the start of the RF program. The repetition factor is valid for both RF axes.

Allowable limits for the repetition factor:

1	to	99
0	=	End of RF program

Example: Feed program

Block	RPF	FL in mm
1	5	10.00
2	2	20.00
3	0 ← End of feed program	0.00



This is the sequence in which the individual feed lengths are processed.

4.3.9 Step size, number of steps after correction of the total feed length

The correction of the total feed length means that the programmed total feed length (sum of all traversing blocks considering the repetition factors) is changed, in that, the correction factor is distributed among the individual feed blocks.

The step size specifies by which length (in mm) the total feed length shall be corrected on one softkey depression (step). The number of steps determines the maximum number of softkey actuations (steps) and therefore limits the correction value.

For that, see also section 2.1.6.2

Input limits:

Step size:	0.01 mm	to	999.99 mm
Number of steps:	0	to	255

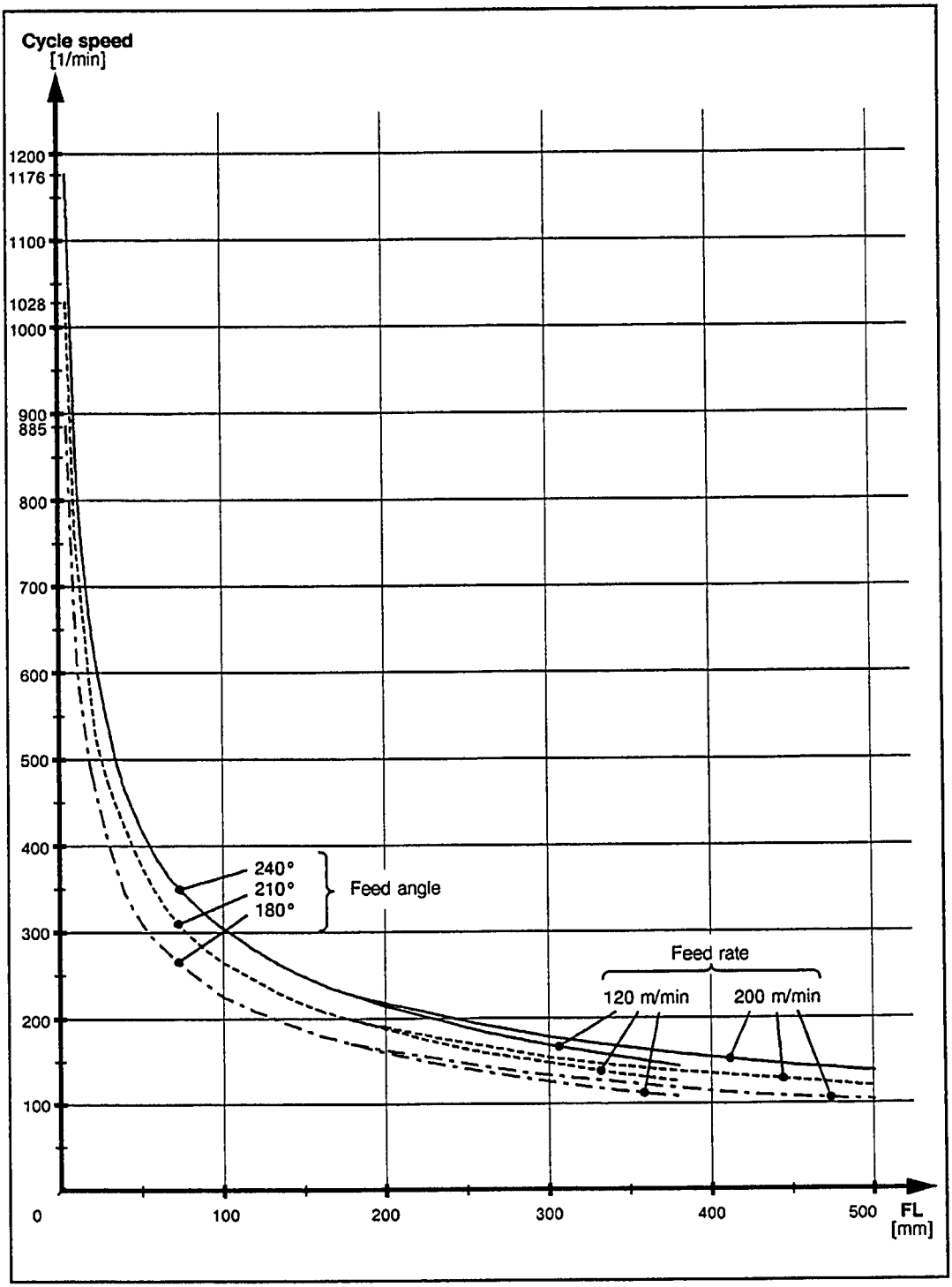
4.3.10 Maximum cycle speed

The maximum possible cycle speed depends on various factors as for example feed angle, feed rate and feed length (FL).

- By means of the following table you can determine the permissible cycle speed per minute depending on the factors indicated. The cycle speed values for FL ≤ 180 mm apply for the feed rates **V = 120 m/min** and **200 m/min**. If FL > 200 mm, the cycle speed values for **V = 200 m/min** are different and put into parentheses.

FL [mm]	Cycles per minute for feed angle		
	180°	**210°**	**240°**
5	885	1028	1176
10	650	760	870
20	482	566	644
30	404	472	540
40	345	406	465
60	288	335	384
80	254	296	338
100	225	265	303
120	208	244	279
160	180	209	240
180	170	198	227
200	160 (163)	188 (190)	214 (218)
260	138 (144)	160 (168)	184 (192)
300	126 (133)	148 (154)	168 (178)
340	116 (126)	136 (145)	156 (168)
380	108 (118)	126 (138)	144 (158)
450	– (108)	– (128)	– (145)
500	– (104)	– (120)	– (138)

- Determination of the permissible cycle speed by means of a graphical representation



4.4 R parameters

For the purpose of storing the tool data for the roll feed, the R parameters are used from that address onwards which is defined in the machine datum 728. Therefore, in the following explanation of the R parameters relative numbers are used. The absolute R parameter numbers are calculated by adding the MD 728 to the relative R parameter numbers. Tool data for start and end acceleration (R5 - R8) can optionally be defined as MD or TD.

Data independent of axis:

R0 Allowable remaining time [ms]
R1 Tolerance window [mm]/[inch]

Data for roll feed axis 1:

R2 Speed RF1 [mm/min]/[inch/min]
R3 Acceleration RF1 [mm/sec^2]/[inch/sec^2]
R4 Deceleration RF1 [mm/sec^2]/[inch/sec^2]

R5 Starting acceleration as % of tool-dependent acceleration of axis
R6 Final deceleration as % of tool-dependent deceleration of axis
R7 Effective range of the starting acceleration up to % of the tool-dependent axis speed
R8 Effective range of the final deceleration from % of the tool-dependent axis speed onwards

Feed programm block 1-15

R9	RPF	R10	FL 1	R11	FL 2	Block 1
R12	RPF	R13	FL 1	R14	FL 2	Block 2
R15	RPF	R16	FL 1	R17	FL 2	Block 3
R18	RPF	R19	FL 1	R20	FL 2	Block 4
R21	RPF	R22	FL 1	R23	FL 2	Block 5
R24	RPF	R25	FL 1	R26	FL 2	Block 6
R27	RPF	R28	FL 1	R29	FL 2	Block 7
R30	RPF	R31	FL 1	R32	FL 2	Block 8
R33	RPF	R34	FL 1	R35	FL 2	Block 9
R36	RPF	R37	FL 1	R38	FL 2	Block 10
R39	RPF	R40	FL 1	R41	FL 2	Block 11
R42	RPF	R43	FL 1	R44	FL 2	Block 12
R45	RPF	R46	FL 1	R47	FL 2	Block 13
R48	RPF	R49	FL 1	R50	FL 2	Block 14
R51	RPF	R52	FL 1	R53	FL 2	Block 15

RPF = Repetition factor Range from 0 to 99

FL = Feed length Range from ±1 mm to ±10 m
Range from ±0.04 inch to ±394 inch

If for a tool a smaller number of blocks is required than defined in MD 811, 0 must be entered for the RPF of the first block that is not programmed, in order to designate the program end.

If the max. number of feed blocks defined via MD 811 is less than 125, then the next free R parameter will be calculated according to the following formula:

MD 728 + 9 + (MD 811 × 3) MD 728 = Start address R parameter RF
MD 811 = Maximum number of blocks

With only one axis connected, the control does not evaluate any R parameters from this address onwards.

When two axes are connected, the axis-specific data for the 2nd axis will start from the calculated address as follows:

Data for roll feed axis 2:

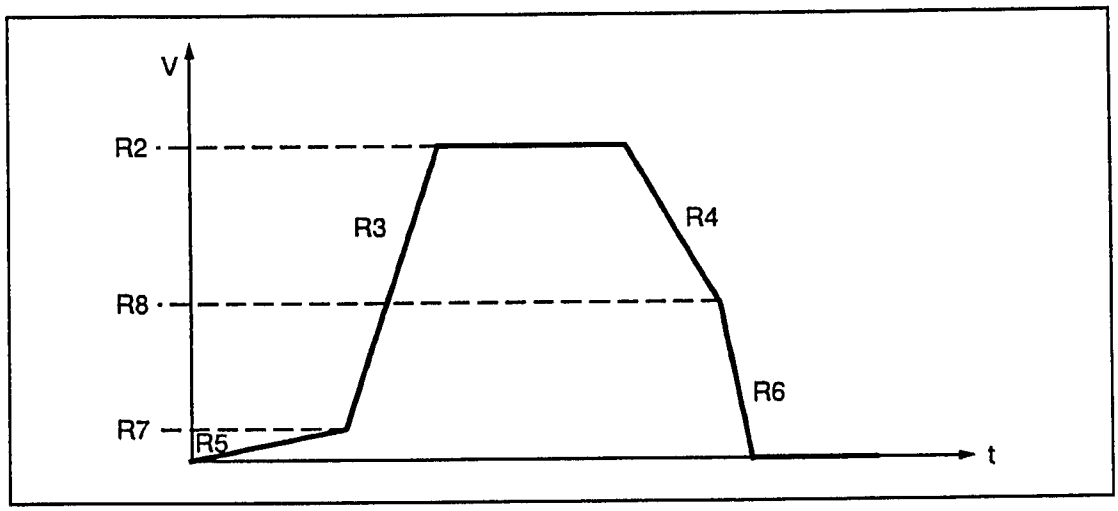
R.. Speed [mm/min]/[inch/min]
R.. Acceleration [mm/sec²]/[inch/sec²]
R.. Deceleration [mm/sec²]/[inch/sec²]

R.. Starting acceleration as % of tool-dependent acceleration of axis
R.. Final deceleration as % of tool-dependent deceleration of axis
R.. Effective range of the final deceleration up to % of the tool-dependent axis speed
R.. Effective range of the final deceleration from % of the tool-dependent axis speed onwards

Note:

If the machine data 5151 Bit 4 is "1", you can enter a tool-dependent starting acceleration and final deceleration. The entry is made via the last four R parameters of the respective axis.

The effect of the relative parameters R2 to R8 is shown in the figure below:



Acceleration characteristics of RF axis 1, as example, applying a tool-dependent starting/final acceleration

Example:

Specifications:

MD 728 = 1137 → Starting parameter = R1137
MD 811 = 3 → The max. no. of RF blocks must not excced 3
MD 5151.4 = 1 → Starting and final acceleration as machine datum

In doing so the following tool data subdivision is made:

New Assignment	Standard-Assignment	Meaning
		Data independent of axis
R ...	R 1137	Allowable remaining time
R ...	R 1138	Tolerance window
		Data for RF 1
R ...	R 1139	Speed RF 1
R ...	R 1140	Acceleration RF 1
R ...	R 1141	Deceleration RF 1
R ...	R 1142	Reserved for starting/final acceleration RF 1 as machine/tool data
R ...	R 1143	
R ...	R 1144	
R ...	R 1145	
		Feed program Block 1 - 3
R ...	R 1146	Repetition factor } Block 1
R ...	R 1147	Feed length RF 1 } Block 1
R ...	R 1148	Feed length RF 2 } Block 1
R ...	R 1149	Repetition factor } Block 2
R ...	R 1150	Feed length RF 1 } Block 2
R ...	R 1151	Feed length RF 2 } Block 2
R ...	R 1152	Repetition factor } Block 3
R ...	R 1153	Feed length RF 1 } Block 3
R ...	R 1154	Feed length RF 2 } Block 3
		Feed program Block 4 - 15
R ...		Repetition factor } Block 4
R ...		Feed length RF 1 } Block 4
R ...		Feed length RF 2 } Block 4
R ...		Repetition factor } Block 5
R ...		Feed length RF 1 } Block 5
R ...		Feed length RF 2 } Block 5
R ...		Repetition factor } Block 6
R ...		Feed length RF 1 } Block 6
R ...		Feed length RF 2 } Block 6
R ...		Repetition factor } Block 7
R ...		Feed length RF 1 } Block 7
R ...		Feed length RF 2 } Block 7
R ...		Repetition factor } Block 8
R ...		Feed length RF 1 } Block 8
R ...		Feed length RF 2 } Block 8
R ...		Repetition factor } Block 9
R ...		Feed length RF 1 } Block 9
R ...		Feed length RF 2 } Block 9
R ...		Repetition factor } Block 10
R ...		Feed length RF 1 } Block 10
R ...		Feed length RF 2 } Block 10

New Assignment	Standard-Assignment	Meaning
R ...		Repetition factor
R ...		Feed length RF 1 } Block 11
R ...		Feed length RF 2
R ...		Reptition factor
R ...		Feed length RF 1 } Block 12
R ...		Feed length RF 2
R ...		Repetition factor
R ...		Feed length RF 1 } Block 13
R ...		Feed length RF 2
R ...		Repetition factor
R ...		Feed length RF 1 } Block 14
R ...		Feed length RF 2
R ...		Repetition factor
R ...		Feed length RF 1 } Block 15
R ...		Feed length RF 2
		Data for RF 2
R ...	R 1155	Speed RF 2
R ...	R 1156	Acceleration RF 2
R ...	R 1157	Deceleration RF 2
R ...	R 1158	Reserved for
R ...	R 1159	starting/final acceleration RF 2
R ...	R 1160	as machine/tool data
R ...	R 1161	

Notes:

- The column STANDARD ASSIGNMENT applies for standard settings of MD 728 and MD 811. If these machine data are set differently, the new assignment can be written into the column provided.
- The distribution of the R parameters with the ROLL FEED option is to be found in the instructions on CYCLES.

5 PLC Signals

5.1 Decoded signals of the user control panel

Decoded signals of user control panel								
Byte No.	**Bit: 7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
IB 72					Roll feed 2+	Roll feed 2−	Roll feed 1+	Roll feed 1−

Direction keys **I72.0 to I72.3**

The decoded signals of all direction keys are provided in the corresponding input bits if the codings of the axes select switch are available.

The decoding evaluates:

- the position of the AXES SELECT SWITCH
- the position of the +/− DIRECTION KEYS

Signal 1: The corresponding direction key of the set axis is pressed.
Signal 0: The corresponding direction key of the set axis is not pressed.

Notes:

- The decoding verifies if impermissible key combinations have been set and actuated (e.g. + and − direction keys are pressed simultaneously).
- If a roll feed axis 1 or 2 is activated, the positions 6 or 7 of the axes select switch are encoded as RF 1+, RF − or RF 2+, RF 2 − when actuating a direction key.

5.2 Input signals NC→PLC

Input signals of roll feed axes								
Byte No.	**Bit: 7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
IB 89 Roll feed 1		RF axis is closed-loop regulated			Travel command +	Travel command -		Position reached exact stop
IB 90 Roll feed 1								
IB 91 Roll feed 2		RF axis is closed-loop regulated			Travel command +	Travel command -		Position reached exact stop
IB 92 Roll feed 2								

ROLL FEED AXIS IS CLOSED-LOOP REGULATED **I89.6, I91.6**

Signal 1: The roll feed axis is closed-loop regulated.
Signal 0: The roll feed axis is either in follow-up or lifting operation or the controller enabling was cancelled.

TRAVEL COMMAND + **I89.3, I91.3**
TRAVEL COMMAND - **I91.2, I91.2**

NC operating mode AUTOMATIC

Signal 1: As soon as the travel command (digital HW input signal I1 or I2) is detected.
Signal 0: As soon as the axis has reached the exact position window or when the travel command has been cancelled before that.

NC operating mode JOG/JOG-INC

The signal is available as long as the traversing key is depressed.

POSITION REACHED, EXACT POSITIONING **I89.0, I91.0**

Signal 1: The axis is within the programmed tolerance window.
Signal 0: The axis is not within the tolerance window because, for example, a direction key has been actuated.

5.3 Output signals PLC→NC

Output signals of the roll feed axes

Byte No.	Bit: 7	6	5	4	3	2	1	0
QB 73 Roll feed 1+2						Follow-up operation	JOG speed-controlled	Sheet is positioned
QB 74 Roll feed 1	Conventional +	Conventional −	Rapid traverse override			Controller enabling		RF axis is lifted
QB 75 Roll feed 1								
QB 76 Roll feed 2	Conventional +	Conventional −	Rapid traverse override			Controller enabling		RF axis is lifted
QB 77 Roll feed 2								
QB 82					Selection of RF operating modes D	C	B	A

FOLLOW-UP OPERATION **Q73.2**

Signal 1: Opened NC position control loop; the feed axes are moved via an external speed command value. It is not possible to traverse the RF axes via control.

Signal 0: Normal state; NC position control loops are closed.

Notes:

- With stopped axis, signal 1 causes the position control loop to open.
- With moving axis, signal 1 causes a quick stopping with maximum braking current and, after a time defined in the machine data, an opening of the position control loop. Afterwards only the actual position value is maintained.

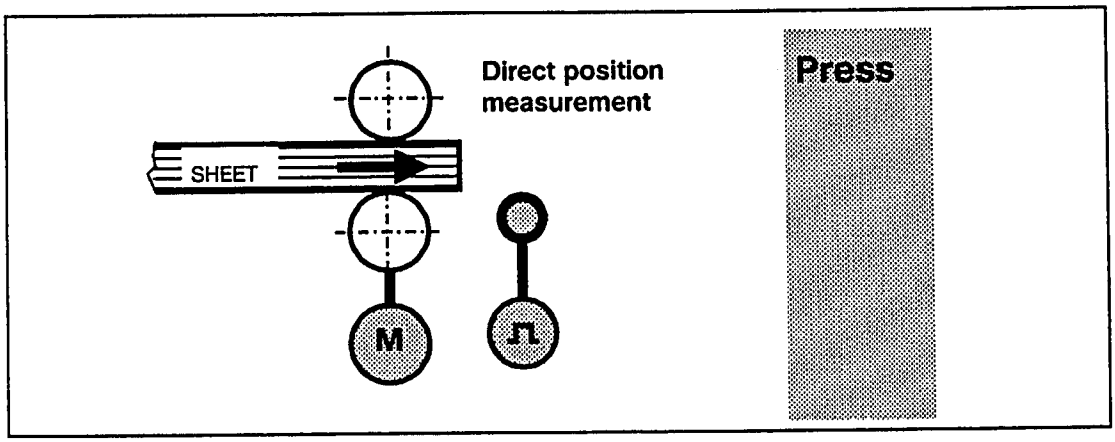
JOG SPEED-CONTROLLED Q73.1

Signal 1: In NC operating mode JOG, the RF axes are only traversed with a defined speed command value. The encoder's actual values are not evaluated.
Signal 0: The axes can only be traversed with position control.

Annotation: When changing a signal during a traversing movement, traversing of the axis will be carried on using the function selected before, till deactivation of the direction keys.Traversing via the other function is possible only if the actuation of the direction keys is repeated.

Applicability

With direct position detection (encoder at sheet) the roll feed axis can be traversed during sheet alignment without the encoder returning pulses.



Example: Sheet positioning with direct position measurement

SHEET IS POSITIONED Q73.0

Signal 1: Must always be available for traversing the RF axes in NC operating mode AUTOMATIC.
Signal 0: Roll feed axis cannot be started.

A signal edge change from "high" to "low", during the traversing movement, leads to a follow-up operation in both roll feed axes.

A signal edge change from "low" to "high" terminates the follow-up operation. With the successive start signal traversing is made with the 1st roll feed block of an RF program.

TRAVEL COMMAND CONVENTIONAL Q74.7, Q74.6, Q76.7, Q76.6

Signal 1: In the set up modes the axis is traversed in the specified direction.
Signal 0: No effect.

RAPID TRAVERSE OVERRIDE — Q74.5, Q76.5

Signal 1: With roll feed axes operating via conventional +/- and simultaneous transmission of the signal "Rapid traverse override", the axes are traversed rapidly.

Signal 0: Conventional traversing at the speed determined in the machine data.

CONTROLLER ENABLING — Q74.2, Q76.2

Signal 1: Effects the closing of the position control loop with position-controlled traversing of the RF axes. Enables the output of the speed command values with JOG SPEED-CONTROLLED.

Signal 0: With stopped axis, the speed command value 0 and the controller enabling are output immediately and the zero-speed control is activated.
With moving axis, signal 0 causes a quick stopping.
Moreover, follow-up operation will be activated for both RF axes.

RF AXIS IS LIFTED — Q74.0, Q76.0

Signal 1: In NC operating mode JOG, the lifting phase is activated. The pulses of the encoder during direct position measurement are not considered. It is not possible to traverse the axes by means of the direction keys.

Signal 0: The encoder pulses are evaluated. The axes can be traversed using the direction keys.

This interface signal is only effective in NC operating mode JOG.

SELECTION OF RF OPERATING MODES — Q82.0 to Q82.3

The roll feed is selected according to the bitmap in Q82.0 to Q82.3:

Bit no. 3	2	1	0	Operating mode
0	1	1	0	JOG
0	1	1	1	JOG-INC 1
0	1	0	1	JOG-INC 10
0	1	0	0	JOG-INC 100
1	1	0	0	JOG-INC 1000
1	1	1	0	AUTOMATIC
1	0	1	0	AUTOMATIC
1	0	1	1	JOG-REF
1	0	0	1	JOG-REF
1	0	0	0	JOG-REF
1	0	0	0	JOG-REF

Note:

The signals for the selection of the RF operating modes can be preset by IB 87 (active NC operating mode) or by IB 103 (NC operating message), by the operator keyboard or the PLC program.

5.4 PLC flags

PLC flags								
Byte No.	**Bit: 7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
FB 24			Roll feed ready for operation					

ROLL FEED READY FOR OPERATION	**F24.5**

Signal 1: The roll feed module is in cyclic operation with the CPU module.

Signal 0: a) No roll feed module is available.
b) After signal 1 if the cyclic operation is disturbed (see also alarm 61 "RF: CPU not ready").

6 Operator Interface

The roll feed is a component of the press control SINUMERIK 805SM-P. Operation and programming is carried out via monitor screen and keyboard.

6.1 Installation display

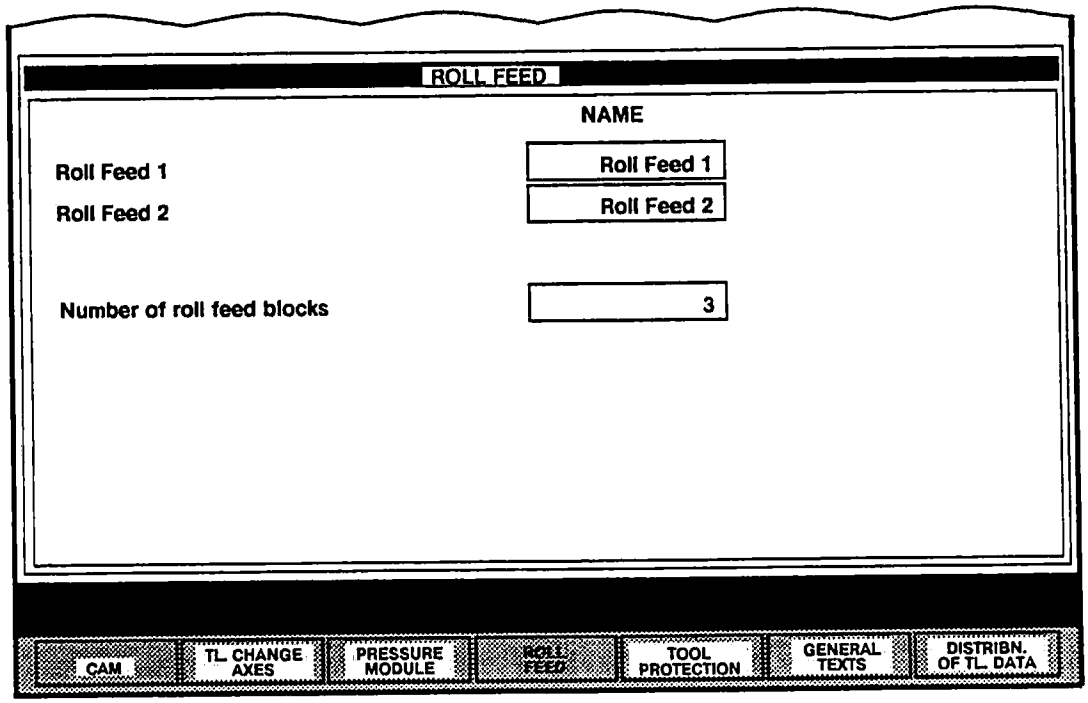
In order to operate the pressure module, the operator interface must be adapted via the INSTALLATION function.

Prerequisites:

- The INSTALLATION basic display in the COMMISSIONING OPERATOR INTERFACE must have been selected.
- The ROLL FEED option is available.

ROLL FEED

On actuating the ROLL FEED softkey, the following display appears on the monitor screen:



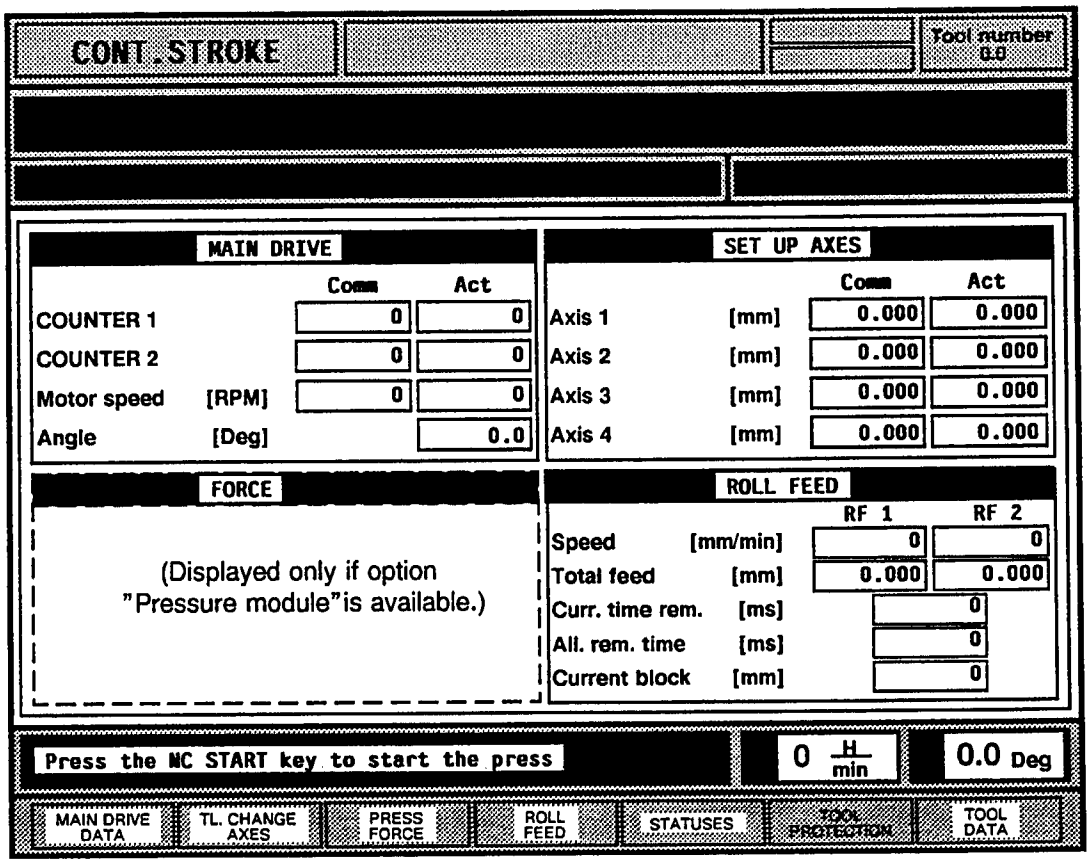
Here you can select roll feed axes. Upon roll feed axis selection the corresponding machine data bit is set. The texts in the NAME input field are stored in a subroutine (standard preassignment with ROLL FEED 1 or ROLL FEED 2) and can be changed as desired. Moreover, the number of roll feed blocks can be entered in this menu.

Note:

The sequence of operations for changing the data largely coincides with that described in the chapter CAMS or with the sequence of operations for changing the cam data.

6.2 Display of operating data

The parameters for the roll feed etc. are displayed if the softkeys CONTINOUS STROKE, SINGLE STROKE, SET UP or BASIC FUNCTIONS have been actuated or after selection via select switch.



Annotation:

The PRESS FORCE function (softkey and window) and the TOOL PROTECTION softkey only appear if the corresponding option is available.

Speed (mm/min):

The traversing speed for the respective axis per block, which is reached after the acceleration phase, is displayed in mm/min.

Total feed length (mm):

The total traversing distance for the respective axis per block is displayed in mm/s.

Current remaining time (ms):

The current time interval between the end of the feed motion and the trailing edge of the start signal is displayed in ms.

All. remaining time:

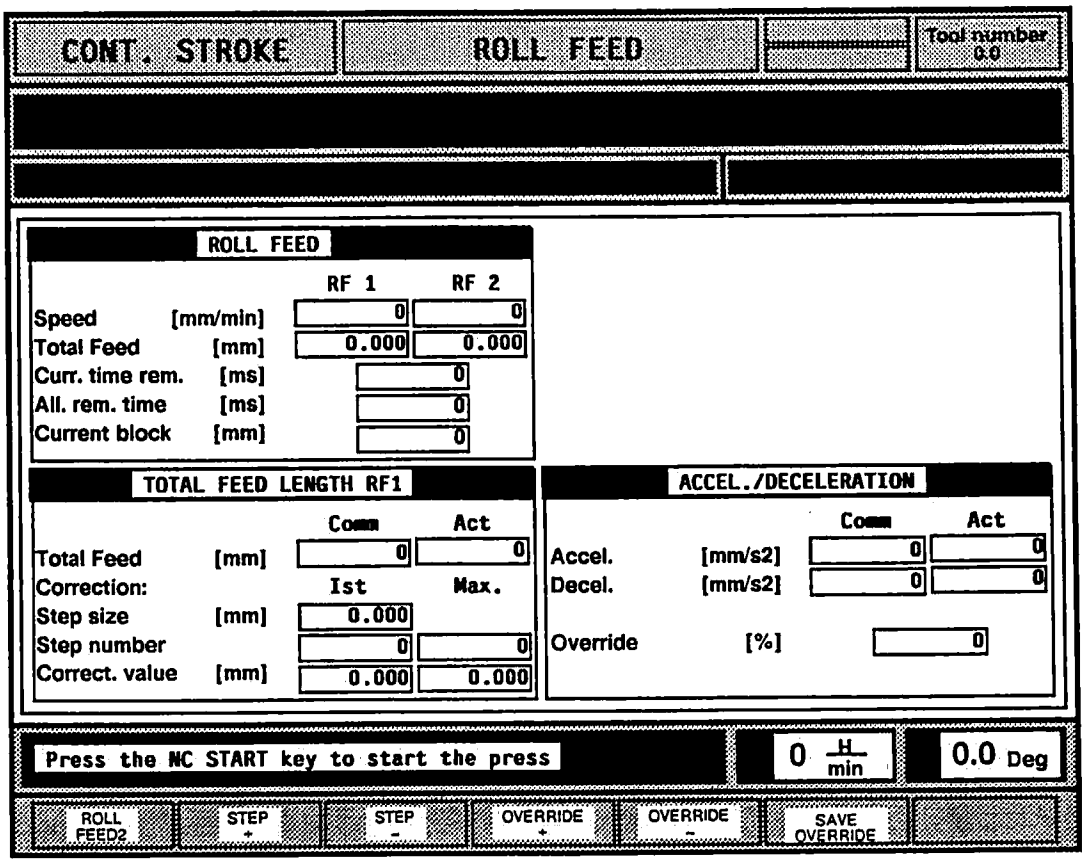
The allowable time interval between the end of the feed motion and the trailing edge of the start signal is displayed in ms.

Current block:

The block number of the block being processed is displayed.

6.3 Display/change of roll feed data

If you actuate the softkey ROLL FEED in the basic menu, the following menu is displayed:



Annotations:

- The value in the STEP NUMBER field may be raised by actuating the STEP + softkey or reduced via the STEP ▮ softkey.
- The value in the OVERRIDE field may be raised by actuating the OVERRIDE + softkey or reduced via the OVERRIDE ▮ softkey. The changes are stored, however, only after actuating the SAVE OVERRIDE softkey.
- By actuating the ROLL FEED2 softkey you receive the corresponding data for the 2nd RF axis. Now ROLL FEED1 appears in the text bar. By actuating the ROLL FEED1 softkey the data for the 1st RF axis are obtained.

Speed (mm/min):

The traverse speed for the respective RF axis per block, which is reached after the acceleration phase, is displayed in mm/min.

Total feed [mm]:

Here the total traversing distance of the respective RF axis per block is displayed. The programmed total feed length is displayed in the COMMAND field and the valid command feed length (prog. total feed length + correction) is displayed in the ACT field.

Curr. rem. time (ms):

The current time interval between the end of the feed motion and the trailing edge of the start signal is displayed in ms.

All. rem. time:

The allowable time interval between the end of the feed motion and the trailing edge of the start signal is displayed in ms.

Current block:

The block number of the block being processed is displayed.

Step size:

On each actuation of a softkey (STEP +/-) the total feed length is changed by this value.

Step number:

This value is increased/reduced with each softkey actuation (STEP +/-). Here the actual correction steps are displayed.

Correct. value:

This field displays the valid correction value, which is calculated using step size and actual number of steps.

Accel./Decel. [mm/s^2]:

The COMM field displays the programmed acceleration/deceleration values.

The ACT field displays the valid acceleration and deceleration values (programmed value + correction value).

Override [%]:

This field displays the current override value in %. 100 % means that the axis is accelerated and decelerated by the programmed values.

6.4 Input of tool data

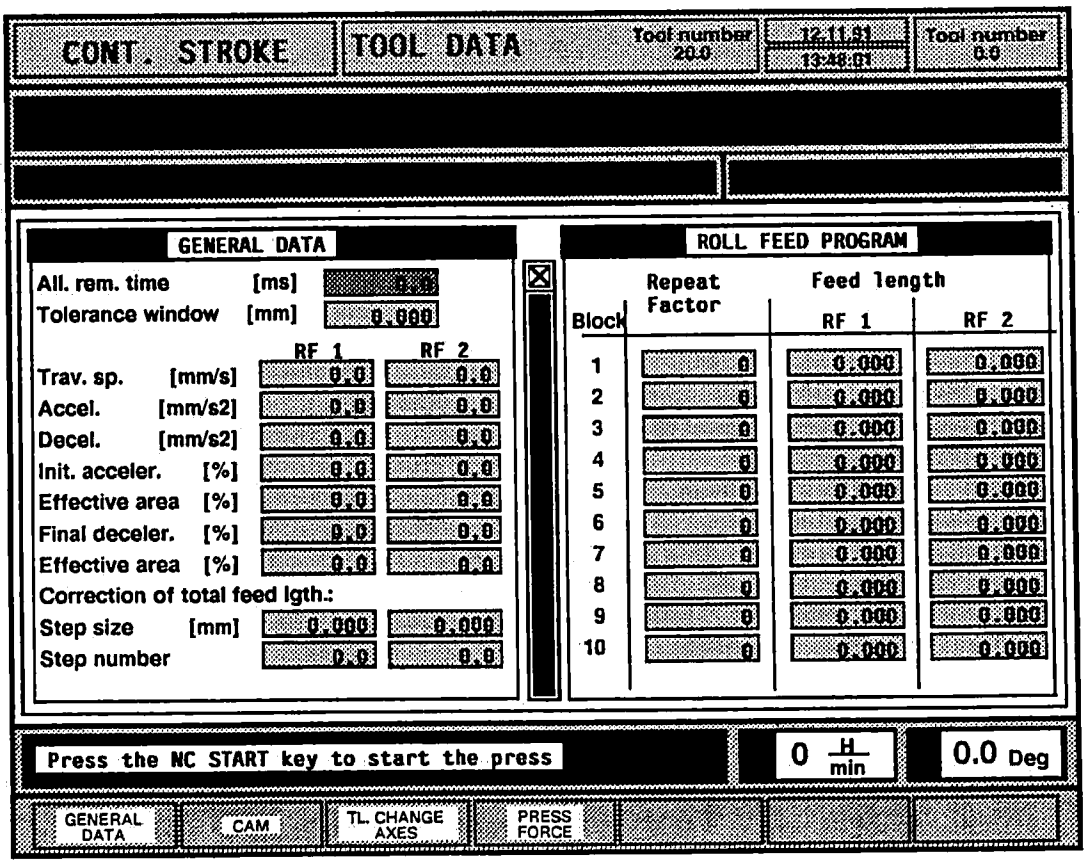
The roll feed is programmed via this branch of the menu. The meaning and explanation of the individual parameters can be found in section 4.3 (tool data).

You may determine the number of feed blocks via machine data (MD 811) or via the INSTALLATION menu of the roll feed, because the number of tools which can be stored in the SINUMERIK 805SM-P depends on the amount of necessary tool parameters.

The general data (acceleration, speed data etc.) can be programmed via machine data or via tool parameters respectively.

Sequence of operations:

- Actuate softkey CONTINOUS STROKE/SINGLE STROKE/TOOL CHANGE/SET UP
- Actuate softkey TOOL DATA
- Actuate softkey EDIT
  - Input number of tool to be edited
  - Acknowledge "Carry out function" with Y/N
- Actuate softkey ROLL FEED



Notes:

- The number of roll feed blocks and the general tool data may be entered into the corresponding input fields via the INSTALL. softkey.
- The tool data displayed in this branch of the menu are described in detail in section 4.3.
- Besides the EDIT function it is possible to carry out the functions DELETE, COPY, RENAME, READ-IN, READ-OUT and OVERVIEW in this branch of the menu.

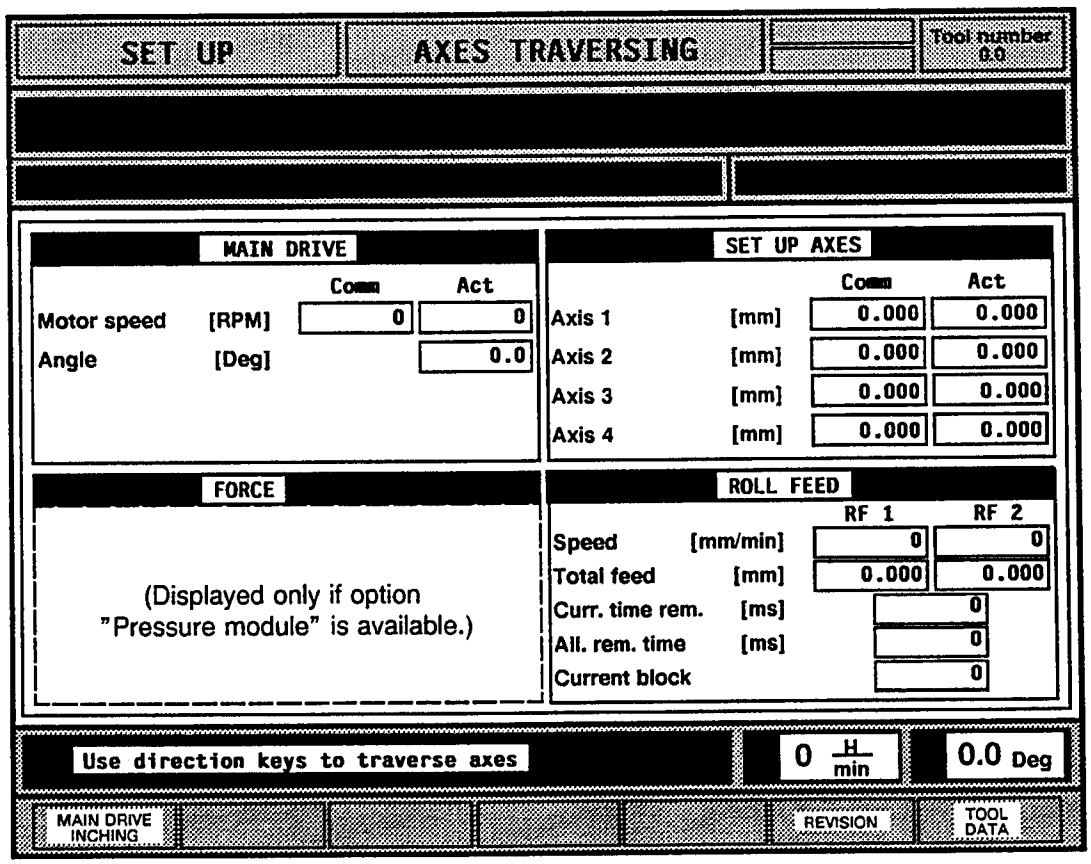
6.5 Axes traversing (press operating mode SET UP)

You may select the menu for manual traversing of the RF axes in the press operating modes as follows:

Sequence of operations:

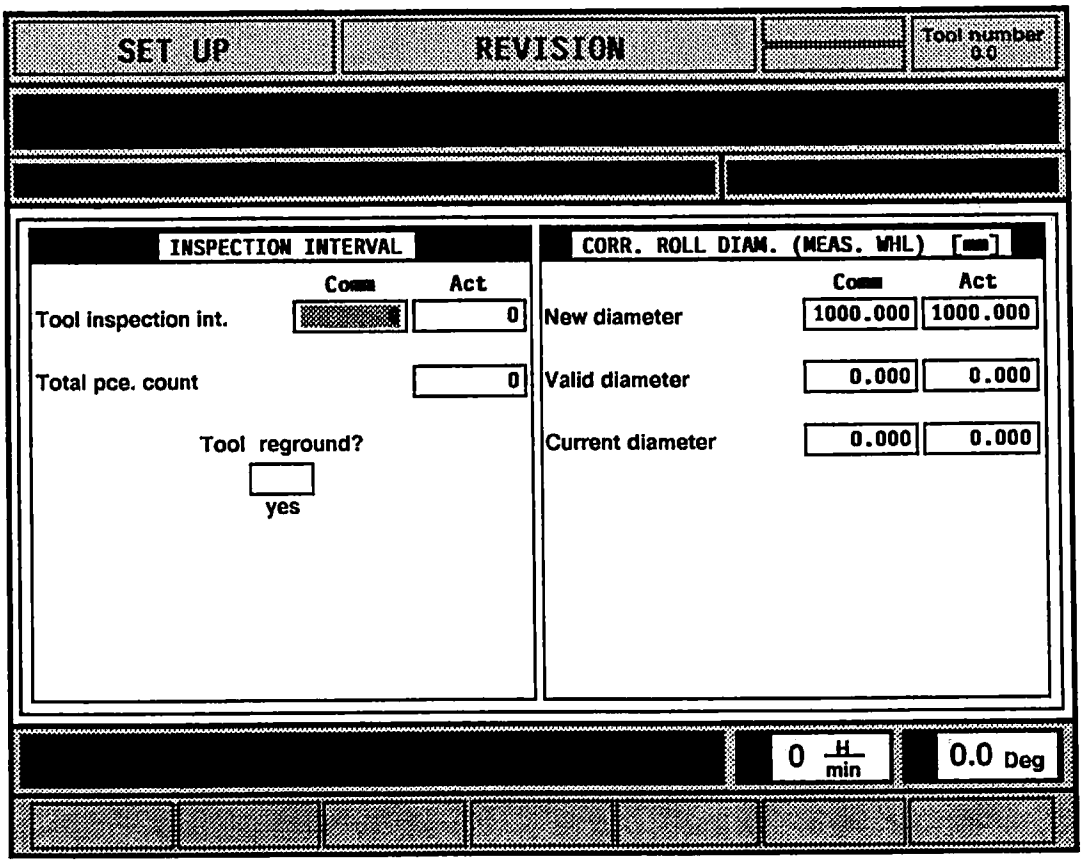
- Actuate softkey SET UP
- Actuate softkey AXIS TRAVERSING
- Select RF axis via axes select switch
- Traverse RF axis via direction keys (see also section 2.2)

In this menu the parameters for the roll feed are displayed. The explanations of the parameters can be found in section 6.1.



6.6 Correction of roll diameter/measuring wheel

Starting from the basic menu you obtain the following menu after actuating the SET UP and REVISION softkey:



In this menu the values for the roll diameter/for the measuring wheel etc. are displayed.

New diameter:

This field displays the diameter of the roll or the measuring wheel which has been specified via MD. This display is not changed via corrections.

Valid diameter:

All feed lengths are calculated by means of this roll diameter. The changed diameter is displayed here after a valid correction.

Present diameters:

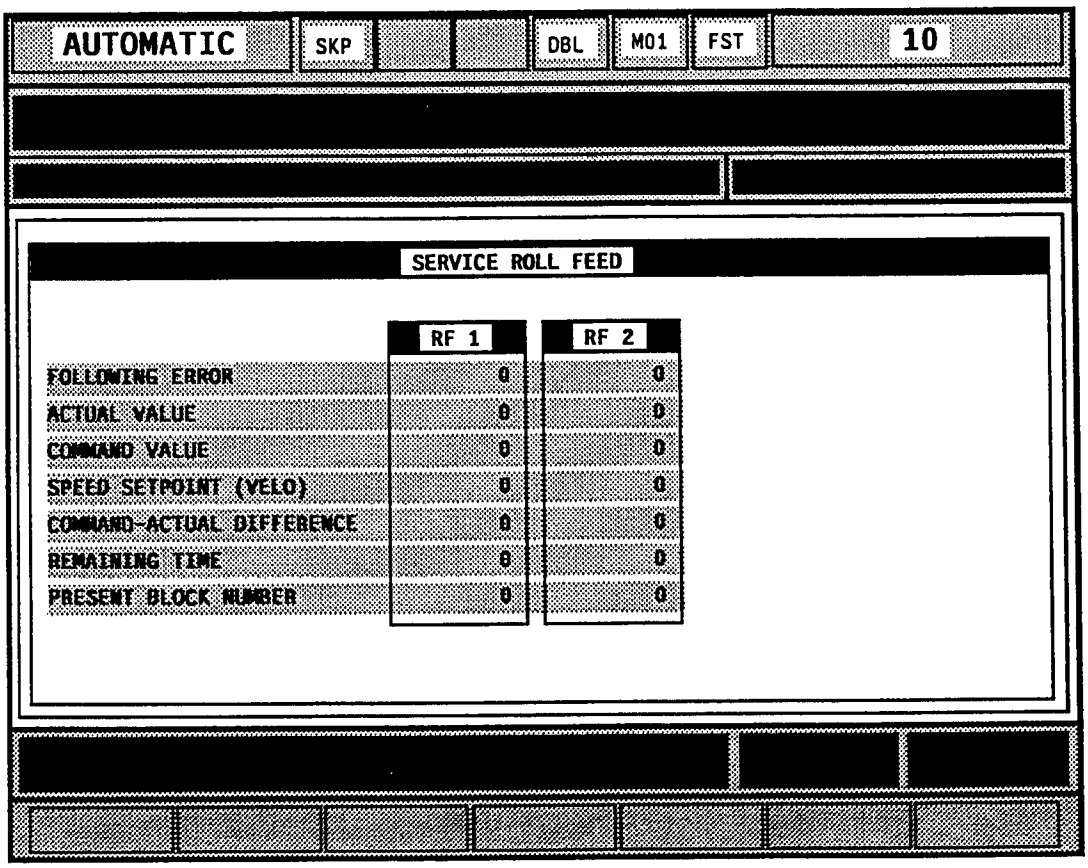
This field displays the newly measured roll diameter. The entry is made in mm. After the input the corrected roll diameter is accepted and declared valid. If there are incorrect diameter values (not within min./max. limits), the previous diameter will remain valid.

6.7 Service display

It is necessary for error diagnosis and for optimization to display the data transferred from the control to the axes and the data transferred from the measuring system to the SINUMERIK 805SM-P (e.g. speed command value, actual value,...).

The service display is selected in the following sequence:

Sequence of operations:
- Actuate softkey PRESS COMM.
- Actuate softkey DIAGNOSIS
- Actuate softkey SERVICE
- Actuate softkey ROLL FEED



- **Following error** — Difference between absolute command value and absolute actual value, (indicated in positioning resolutions)
- **Actual value** — Actual position of the RF axis in the press, (indicated in positioning resolutions)
- **Command value** — The position of an axis specified by the control according to the RF program. Absolute command value. During standstill of the press the absolute actual value and the command value should be equally high (following error 0). If there is still a difference, you can correct it by means of drift compensation. (Indicated in positioning resolutions)

- **(VELO) Speed setpoint** — Digital command value determined by the RF module. It is converted into an analog command value (0 - 10 V) and output to the drive setter. The unit used is "VELO". (1 VELO = 1.22 mV, 8192 VELO = 10 V).
- **Command-actual difference** — Difference between programmed final position and absolute actual value.
- **Remaining time** — Difference between the end of positioning and the end of the start signal (actual remaining time).
- **Present block number** — Currently processed block number.

7 Alarm Messages

7.1 Overview of alarms/acknowledgements

Type	Numbers	Groups	Acknowledged by ...
NC alarms	59 . . . 62	Power On alarms	... switching the control off and on again
	2376 . . . 2406	Reset alarms	... pressing the RESET key
	3066 . . . 3069	Acknowledge alarms	... pressing the QUIT key

7.2 Alarms list

59	**Roll feed: RAM error on roll feed module**
Cause:	The RAM test revealed an error (RAM of RF module)
Effect:	• Follow up operation in master • Interlocking of NC-START • Removal of NC-BB2 • Switch off roll feed function • CYCLE STOP is triggered • Processing is stopped
Remedy:	• Exchange RAM on RF module • then turn the power on

60	Roll feed: EPROM check error
Cause:	During operation an EPROM error was detected
Effect:	• RF function is switched off • Processing is stopped • CYCLE STOP is triggered • Interlocking of NC-START • Removal of NC-BB2
Remedy:	Exchange EPROM on RF module

61	Roll feed: CPU not ready
Cause:	• RF CPU does not response during a restart • RF module is not inserted although the option is present • RF module does not respond during operation
Effect:	• Roll feed is shut down • Processing is stopped • CYCLE STOP is triggered • Interlocking of NC-START • Removal of NC-BB2
Remedy:	• Check the RF feed module • If there are further roll feed alarms present, evaluate them

62	Roll feed: Link RAM error
Cause:	During restart an error is detected in the link RAM on the RF module
Effect:	• RF is shut down • Processing is stopped • CYCLE STOP is triggered • Interlocking of NC-START • Removal of NC-BB2
Remedy:	Exchange either the link RAM or the whole RF module

2376	Option not available
Cause:	The 2nd RF axis option was added; the RF option, however, is not yet available
Effect:	• CYCLE STOP is triggered • Processing is stopped • Interlocking of NC-START • Removal of NC-BB2 • The roll feed function is switched off • Additionally, alarm 61 is output
Remedy:	• Inform the repair service and have the option added

2377	RF: Programmed axis not connected
Cause:	A new start revealed that the measuring circuit of an RF axis is interrupted or not connected
Effect:	• CYCLE STOP is triggered • Processing is stopped • Interlocking of NC-START • Removal of NC-BB2 • The roll feed function is switched off • Additionally, alarm 61 is output
Remedy:	• Check the measuring circuits • Connect the axis

2378	RF: Lifting while axis running signal
Cause:	During operation the signal "lifting" (digital input signal 2) was detected
Effect:	• CYCLE STOP is triggered • Processing is stopped • Interlocking of NC-START • Removal of NC-BB2 • Axes are stopped • Follow-up operation
Explanation:	• The input signal E2 was present during the input signal E1 or during the trailing edge of E1.
Remedy:	• Check cam program • Check the hardware link of the lifting signal "lifting"

2379	Roll feed active, no mode change
Cause:	The "Operating mode" key has been actuated for selecting another mode although a roll feed program is running
Effect:	• CYCLE STOP is triggered • Processing is stopped • Interlocking of NC-START • Removal of NC-BB2
Remedy:	Terminate the cycle

2380	Roll feed 1: Standstill monitoring
2381	**Roll feed 2: Standstill monitoring**
Polling:	• During deceleration • At standstill • In case of jamming
Cause:	• Wrong position control sense • Axis was pushed away from position • Error in control device (setter), in tacho, motor, mechanical system or NC measuring circuit hardware
Explanation:	• During the time entered by positioning the following error at positioning could not be compensated • With jamming the limit fixed in MD 690/691 was exceeded
Effect:	• Trigger CYCLE STOP • Processing is stopped • Interlocking of NC-START • Removal of NC-BB2
Remedy:	• Remove error in control device (setter), in tacho, motor, mechanical system or NC measuring circuit hardware • MD 729 (switch off delay for controller enabling) must be so high that the following error can be compensated within this period of time.

2382	Roll feed 1: Hardware control loop
2383	**Roll feed 2: Hardware control loop**
Polling:	• Cyclic
Effect:	• Interlocking of NC-START • The command value relay drops out • Removal of NC–BB2 • Processing is stopped • CYCLE STOP is triggered
Explanation:	• Drive enable is taken away after the time in MD 729 • Following mode • The differential signals of the measuring circuit – are not in phase – have a short circuit – are missing altogether
Remedy:	• Check if the connectors are plugged in. • By using the short circuit connectors, it is possible to check if the measuring circuit module is working. • Check the differential signals with an oscilloscope. • Change the encoder.

2384	Roll feed 1: Speed command value too high
2385	**Roll feed 2: Speed command value too high**
Polling:	• Cyclical
Effect:	• Interlocking of NC-START • Command value 0 • CYCLE STOP is triggered • Processing is stopped • Removal of NC–BB2 • Drive enable is taken away after the time in MD 729 • Following mode
Explanation:	The control internal speed command value is higher than MD 696/697. • The motor could not follow the speed command value.
Remedy:	• Check if the value in MD 696/697 is higher than the value in MD 698/699 • Check the drive unit • Check the measuring system • Grounding starpoint on the NC? • Check the drive controller • Check the polarity of the feedback (command/actual value connected correctly?)

2386	Roll feed 1: Overflow of partial actual value factor
2387	**Roll feed 2: Overflow of partial actual value factor**
Polling: Effect: Cause: Remedy:	• With every axis movement (also in following mode) • Interlocking of NC-START • CYCLE STOP is triggered • Processing is stopped • Command value 0 (The command value relay drops out) • Removal of NC–BB2 • Drive enable is taken away after the time in MD 729 • Following mode • The machine lost the actual value (wrong position) • If a value ≠1:1 is entered in NC MD 716 to MD 719 (pulse evaluation), the partial actual value must be multiplied by the control. • For the absolute encoder, the zero mark (encoder range) was overtravelled (jump from maximum positive to maximum negative value) • Defective encoder • In case of error during fast traversing of axis, a register overflow has occurred. The reference point has been lost. • Decrease maximum speed (dependent on MD 716 to MD 719) • Check the MD for variable increment evaluation (MD 716 to MD 719) • Connect the absolute encoder in such a way that the encoder range is not overtravelled. • Check the actual values (encoder)

2388	Roll feed 1: Control enable for running axis
2389	**Roll feed 2: Control enable for running axis**
Polling: Effect: Explanation: Remedy:	With every axis movement • Interlocking of NC-START • CYCLE STOP is triggered • Processing is stopped • Command value 0 • Drive enable is taken away after the time in MD 729 • Following mode The axis-specific drive enable has been taken away by the PLC program during an axis movement • Check the PLC program

2390	Roll feed 1: DAC limitation
2391	**Roll feed 2: DAC limitation**
Polling:	Cyclic
Effect:	• The error increases the following error → alarm 2384/2385 • CYCLE STOP is triggered • Processing is stopped • Interlocking of NC START
Explanation:	• The command value to the DAC is greater than MD 698/699 (max. DAC command value). A further increase of the command value is not possible.
Remedy:	• Use smaller feed rate • Check the actual values (encoder) • Check MD 698/699 • Check the drive unit (tacho adjustment at Vmax.) • Check MD 716/717 and MD 718/719 (variable increment evaluation)

2392	Roll feed 1: Measuring system dirty
2393	**Roll feed 2: Measuring system dirty**
Polling:	• Cyclic
Effect:	• Interlocking of NC START • Processing is stopped • CYCLE STOP is triggered
Explanation:	Measuring systems with a contamination signal (e.g. EXE) transfer an error to the NC
Remedy:	• Check the measuring system

2394	Roll feed 1: Start signal edge missing
2395	**Roll feed 2: Start signal edge missing**
Cause:	In automatic mode one axis was started twice in succession without starting the other axis
Effect:	• Interlocking of NC START • Removal of the output signal A2 (emergency stop)
Remedy:	• Check cam program • Check input signals
Explanation:	The start signals (E1 and E2) must be present either alternately or simultaneously. RF must be synchronized anew (A28.0).

2396	Roll feed 1: Positioning too long
2397	**Roll feed 2: Positioning too long**
Cause:	Positioning was not finished while the input signal E1 or E2 was present
Effect:	• Interlocking of NC START • CYCLE STOP is triggered • Processing is stopped • Removal of output signal A2 (emergency stop)
Remedy:	• Reduce cycle speed • Increase speed of axis • Extend input signal • Extend remaining time

2398	RF: No sheet enabled for active block
Cause:	The signal "Sheet is adjusted" was cancelled during traversing
Effect:	• Interlocking of NC START • CYCLE STOP is triggered • Processing is stopped • Removal of output signal A2 (emergency stop)
Remedy:	• Check PLC program
Explanation:	• After the signal "Sheet is adjusted" has returned, the RF program is started again with the 1st block.

2399	Roll feed: MD out of allowed range
Cause: Effect: Remedy:	• One roll feed MD is not within the allowed limits • Interlocking of NC START • Check machine data for RF • The incorrect MD is displayed in the ALL MESSAGES menu under BLOCK.

2400	Roll feed: WD out of allowed range
Cause: Effect: Remedy:	One roll feed tool datum is not within the allowed limits • No valid tool change on control • CYCLE STOP is triggered • Processing is stopped • Check input values for tool • Check tool data subdivision on installation (see section 4.4) • The wrong WD (R parameter) is displayed under BLOCK in the ALL MESSAGES menu.

2401	Roll feed: MD Plausibility error
Cause: Effect: Remedy:	• Value for one RF MD is not valid • Interlocking of NC START • CYCLE STOP is triggered • Check machine data for RF • The incorrect MD is displayed under BLOCK in the ALL MESSAGES menu.

2402	Roll feed: WD Plausibility error
Cause: Effect: Remedy:	• Value for one tool datum is not valid • No valid tool change on control • CYCLE STOP is triggered • as for alarm 2400

2403	Roll feed 1: Tool data > axis MD
2404	**Roll feed 2: Tool data > axis MD**
Cause:	• Tool-dependent acceleration > MD 704 / 705 • Tool-dependent deceleration > MD 706 / 707 • Tool-dependent traversing speed > MD 702 / 703 • Starting accel./final deceleration not within the maximum limits • No valid tool change on control
Effect:	• CYCLE STOP is triggered
Remedy:	• Check tool data • as for alarm 2400

2405	Roll feed: illogical condition
Cause:	• A software error was detected on the RF CPU
Effect:	• Following mode • CYCLE STOP is triggered • Processing is stopped • Interlocking of NC START • Removal of NC BB2 • Simultaneously, alarm 61 is output
Remedy:	• as for alarm 61

2406	Roll feed: Error on set up
Cause:	• During precalculation of the feed characteristic an error occurred in the control
Effect:	• No valid tool change on the control • CYCLE STOP is triggered • Interlocking of NC START
Remedy:	• Check tool data • as for alarm 2400

3066	Roll feed: Correction refused
Cause:	• With length correction, the allowable maximum length was exceeded • With acceleration override the max. acceleration/deceleration (MD...) was exceeded • With roll diameter correction the maximum roll diameter (MD...) was exceeded or value 0 was entered
Effect:	• The last step of the correction will not be executed
Remedy:	• Reduce the correction value

3067	Roll feed: Lifting signal at mode change
Cause:	The input signal E2 was present during change of operating mode (e.g. from AUTOMATIC to JOG).
Effect:	• Output A2 is reset (emergency stop) • CYCLE STOP is triggered
Remedy:	• Mode change only during inactivity of RF

3068	Roll feed: Module not connected
Cause:	RF function is selected (option bit is set) but the RF module is not inserted
Effect:	• Following mode • Removal of NC BB2 • CYCLE STOP is triggered
Remedy:	• Insert the RF module • Deselect option RF (inform repair service)

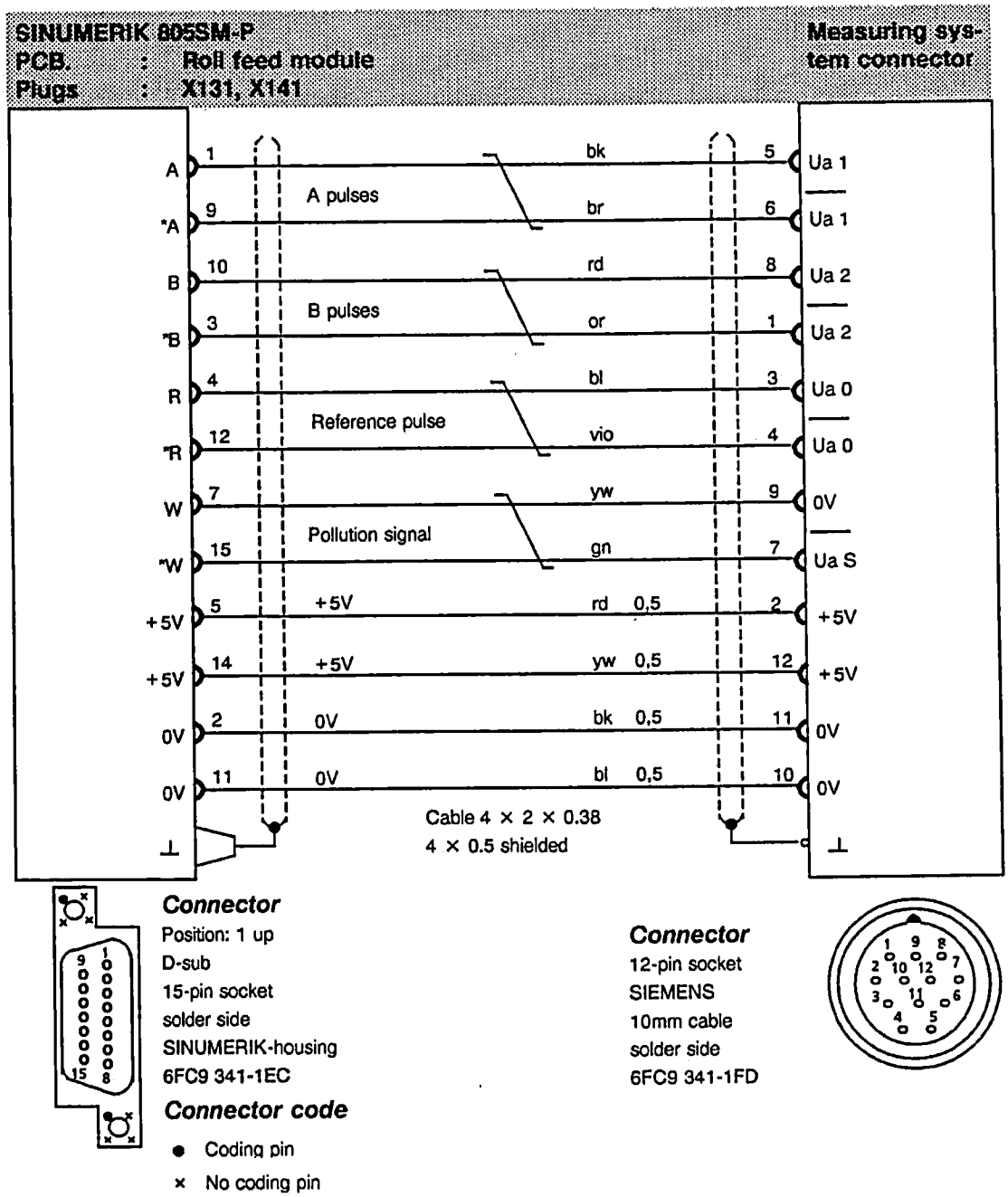
3069	Roll feed: CPU not responding
Cause:	The RF module does not respond to the master
Effect:	• Following mode • CYCLE STOP is triggered • Removal of NC BB2 • Switching the RF function off
Remedy:	• Check the RF module • Check the RF system software

8 Cable Diagrams

8.1 Actual value cables for incremental encoder

Cable to the digital rotary position measuring encoder 6FC9 320-3□□□□

Order No.: **6FC9 344-2B□**



Connector
Position: 1 up
D-sub
15-pin socket
solder side
SINUMERIK-housing
6FC9 341-1EC

Connector code
- ● Coding pin
- × No coding pin

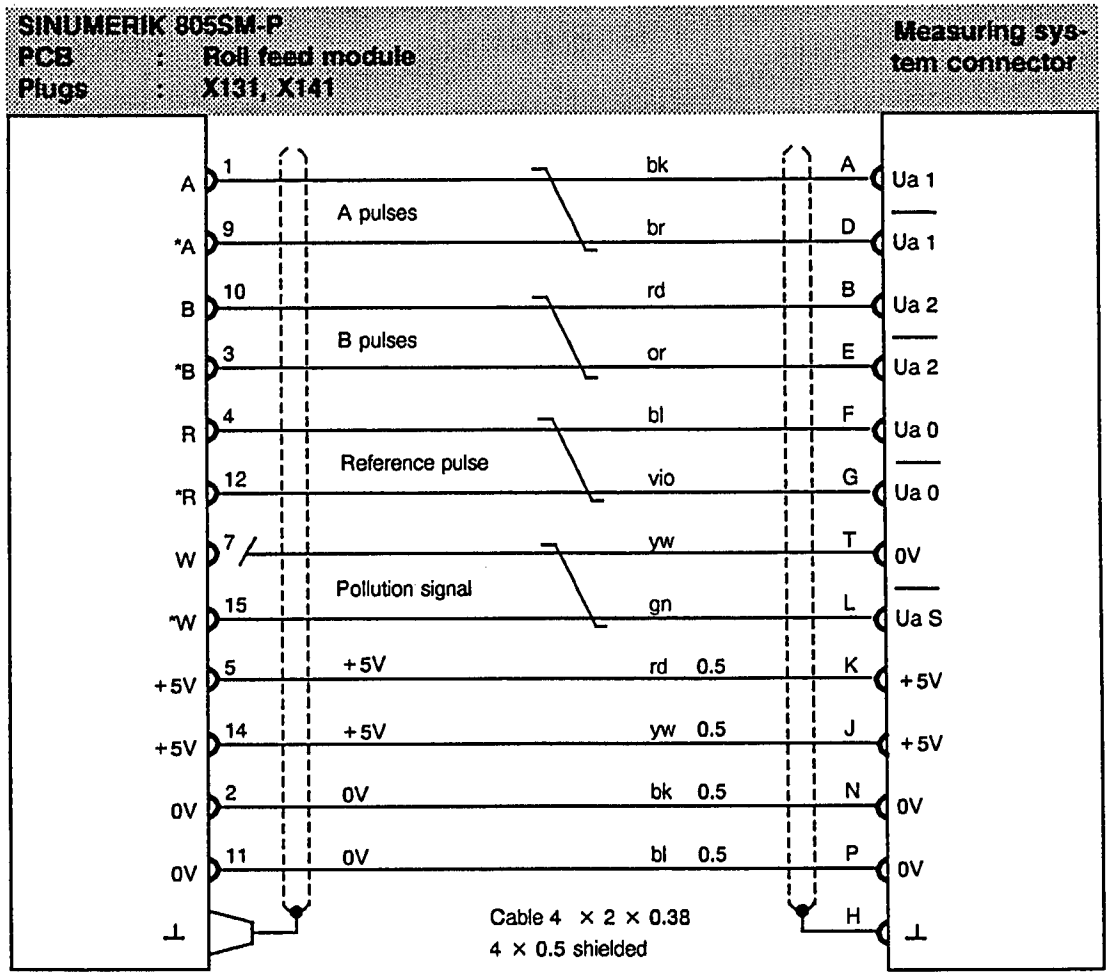
Connector
12-pin socket
SIEMENS
10mm cable
solder side
6FC9 341-1FD

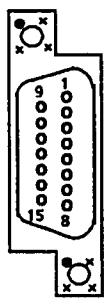
Note:

Before the cable is connected to the RF module, the connector coding pins must be pulled out (no connector coding on the RF module).

Cable to the digital rotary position measuring encoder in servo-drive

Order No.: **6FC9 340-8P□**



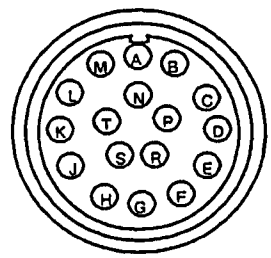


Connector
Position: 1 up
D-sub
15-pin socket
solder side
SINUMERIK-housing
6FC9 341-1EC

Connector code

- ● Coding pin
- × No coding pin

Connector
17-pin socket
Tuchel
CA 08-20-295
solder side
6FC9 341-1AC



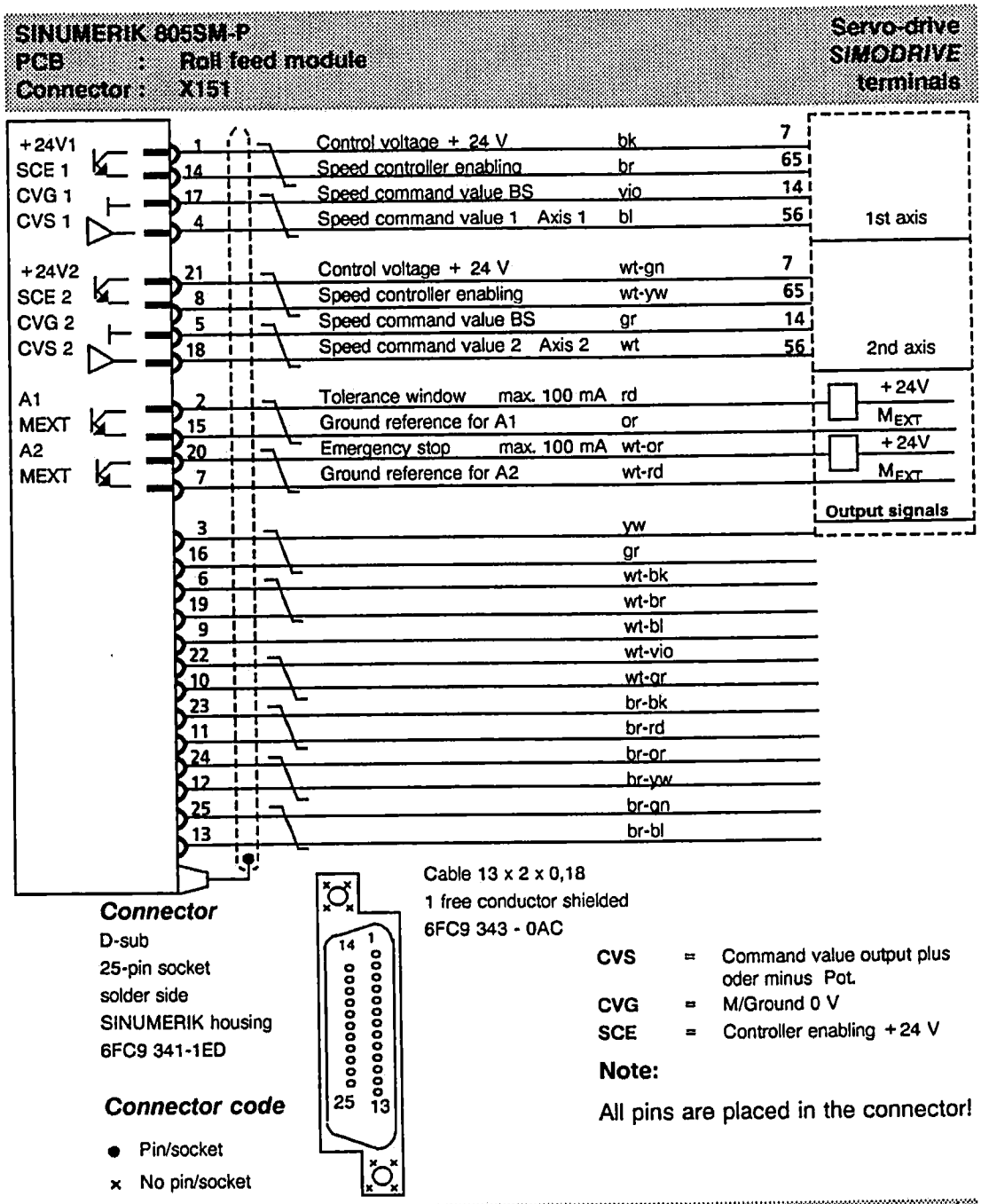
Note:

Before the cable is connected to the RF module, the connector coding pins must be pulled out (no connector coding on the RF module).

8.2 Command value cable

Cable from interface for RF command value, open cable end.

Order No.: **6FX 1400-4CC□□**



Connector

D-sub
25-pin socket
solder side
SINUMERIK housing
6FC9 341-1ED

Connector code

- ● Pin/socket
- × No pin/socket

Cable 13 x 2 x 0,18
1 free conductor shielded
6FC9 343 - 0AC

CVS = Command value output plus oder minus Pot.
CVG = M/Ground 0 V
SCE = Controller enabling +24 V

Note:

All pins are placed in the connector!

The outputs A1 and A2 must <u>not</u> be connected directly to 24 V (short circuit)!

9 Abbreviations/Definitions

COR	Correction value
CPU	**C**entral **P**rocessing **U**nit
DAC	**D**igital-**A**nalog **C**onverter
EPROM	**E**rasable **P**rogrammable **R**ead-**O**nly **M**emory
EV	**E**nd **V**alue
FL1	**F**eed **L**ength for 1st axis
FL2	**F**eed **L**ength for 2nd axis
HW	Hardware
INC	Incremental mode
IV	**I**nitial **V**alue
JOG	Jogging mode
MD	**M**achine **D**ata
NC	**N**umeric **C**ontrol
OP. MODE	Operating mode
PLC	**P**rogrammable **L**ogic **C**ontrol
POWER ON	– Switch on power supply – State of switched-on processor
RAM	**R**andom **A**ccess **M**emory
RESET	Resetting
RF	**R**oll **F**eed
TDC	**T**op **D**ead **C**enter
TFL	**T**otal **F**eed **L**ength
UCP	**U**ser **C**ontrol **P**anel
WD	see TD
TD	**T**ool **D**ata
RPF	Repetition Factor

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AUT V260
Postfach 48 48
D-90327 Nürnberg
Federal Republic of Germany

Suggestions

Corrections

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Basic Version 2
Roll Feed Module

Manufacturer Documentation

Planning Guide

Order No.: 6ZB5 440-0MW02-0AA1
Edition: 06.93

From:

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Company/Dept. _____

Address _____

Telephone /

Should you come across any printing errors when reading this publication, please notify us on this sheet. Suggestions for improvement are also welcome.

Suggestions and/or corrections

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