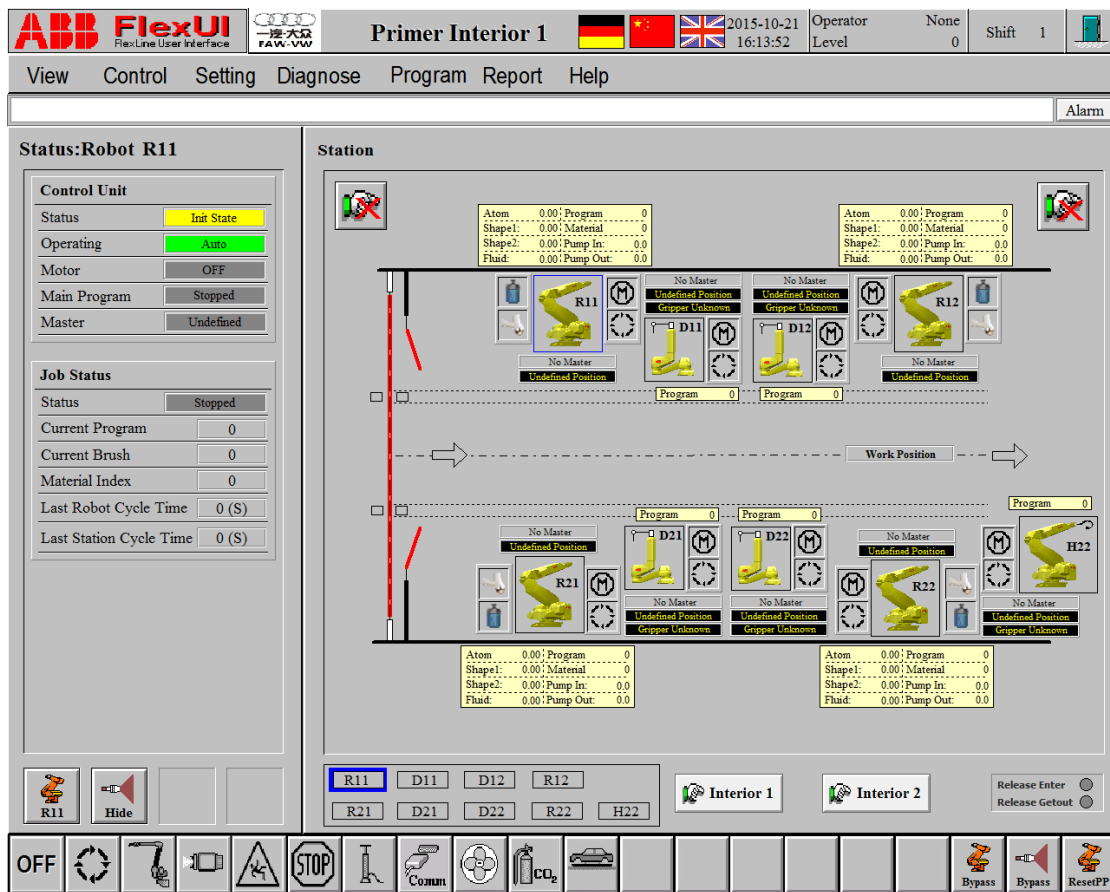


Operation Manual

ABB Painting Shop FlexUI Operation Manual



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Operation Manual

1 Introduction

ABB painting station include primer, base coat, clean coat

- A panel with buttons and operation keys
- Some operating status indicator
- Some station running status indicator
- FlexUI control software of the computer

The HMI will monitor two devices: PLC and robot. The IP address of the site to see the factory is given.

Each station HMI including menu in shown in the table below:

- ◆ **View**
 - *Zone*
 - *Station*
 - *Production*
 - *Lubrication*
- ◆ **Control**
 - *Robot*
 - *Position*
 - *Function*
 - *New Start*
 - *Backup*
 - *Opener Control*
 - *Fluid System*
 - *FIFO*
 - *Ghost*
 - *Bypass*
- ◆ **Setting**
 - *Type Setting*
 - *Color Setting*
 - *Color Table*
 - *Line FIFO*
 - *Parameter Setting*
 - *Alarm Setting*
 - *Security*
 - *Miscellaneous Setting*
- ◆ **Diagnose**
 - *Alarm*
 - *IO*

- *Network*
- *Profibus*
- ◆ **Program**
 - *SHOP Floor*
 - *Robot Studio*
 - *RobView*
 - *Process Manage*
- ◆ **Report**
 - *Production*
 - *Consumption*
 - *Operation*
 - *Alarm*
 - *Air and solvent consumption*
- ◆ **Help**
 - *Robot*
 - *FlexUI*

2 Bar

This chapter will introduce the FlexUI interface of the title bar and status bar

2.1 Title

The title bar of the FlexUI, including ABB's logo, user identification, station information, language switch, time and login information



2.1.1 ABB Logo



2.1.2 Station Information

Station information introduced FlexUI, language selection and date information are also included in the title bar




2.1.3 User Login

Local user login and the user level

用户	ABB
权限	10

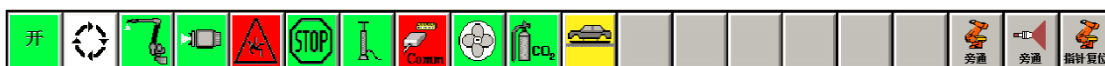
2.1.4 login/logout

FlexUI is restricted to some windows of the login, to limit the irrelevant personnel for important parameter changes, such as: spraying parameters, data....If current access level is lower than the request will not be able to open the high authority, must log in to the high authority of account to open the can and do change. Click ON

the image  at the top right of the screen, in the pop-up the login window, fill in the user name and password, after enter into the corresponding modify permissions

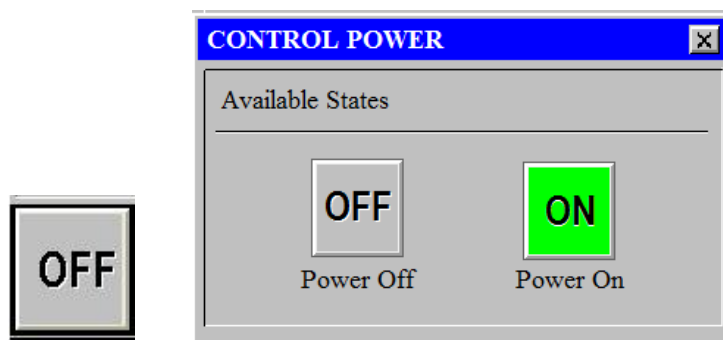
2.2 Status bar

This section will introduce the FlexUI of the status bar.Spraying systems commonly used information will be displayed in the status bar on the left side of the information will be display in real time. Some commonly used shortcut button is on the right side of the status bar

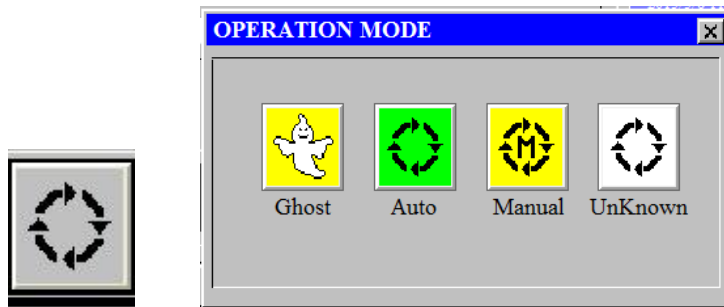


2.2.1 State

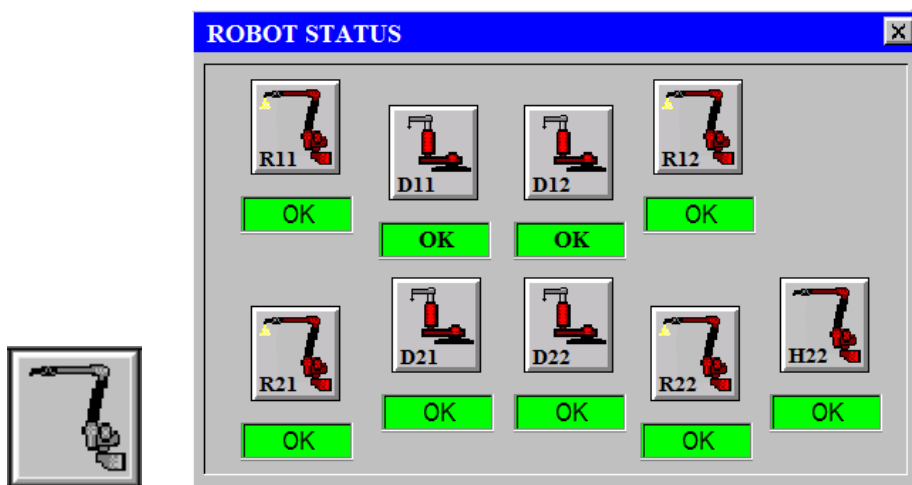
Power State: the status bar represent the power state of the PLC control cabinet



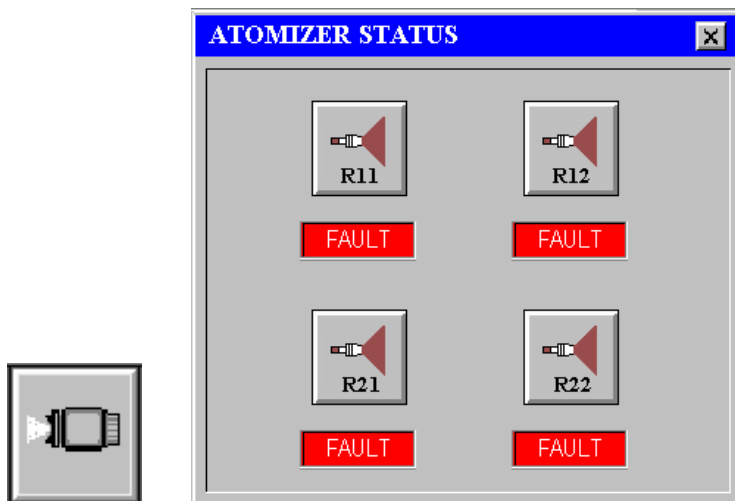
Operation Mode: the status bar represent the current operation mode of the station



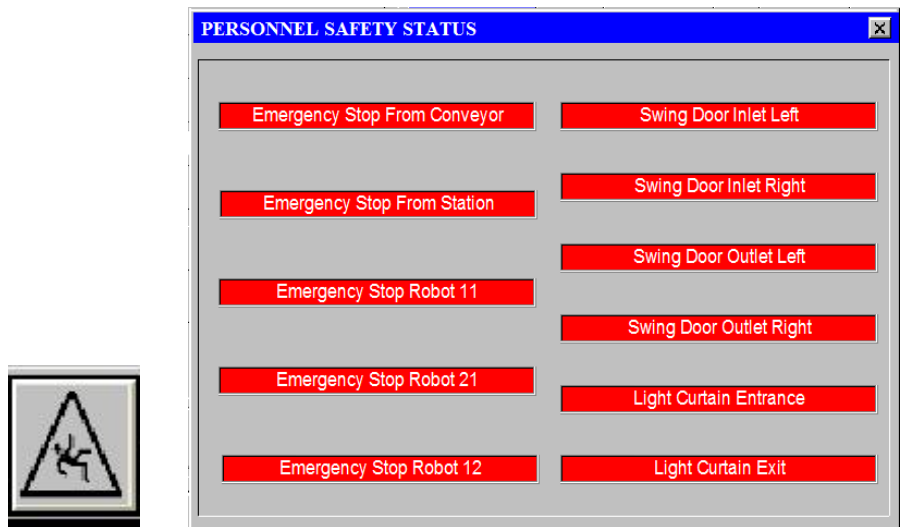
Robot Status: this status bar indicates that the current state



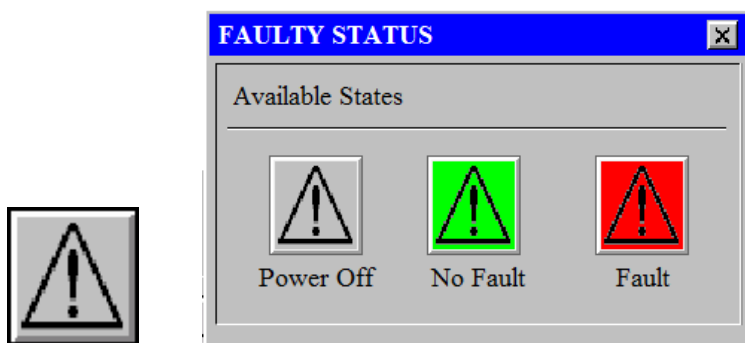
Atomizer: this status bar indicates that the current atomizer state



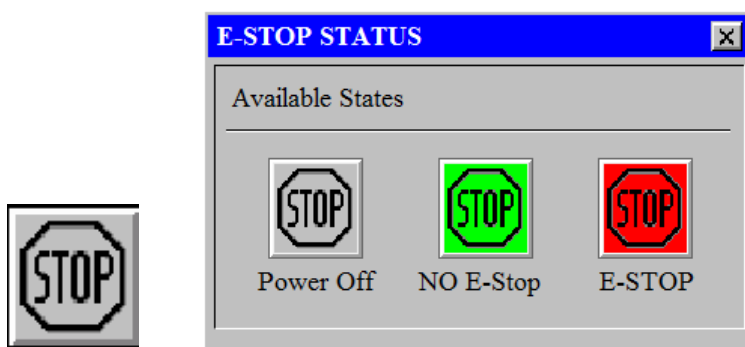
Safety Status: the status bar represent the security state of the station now



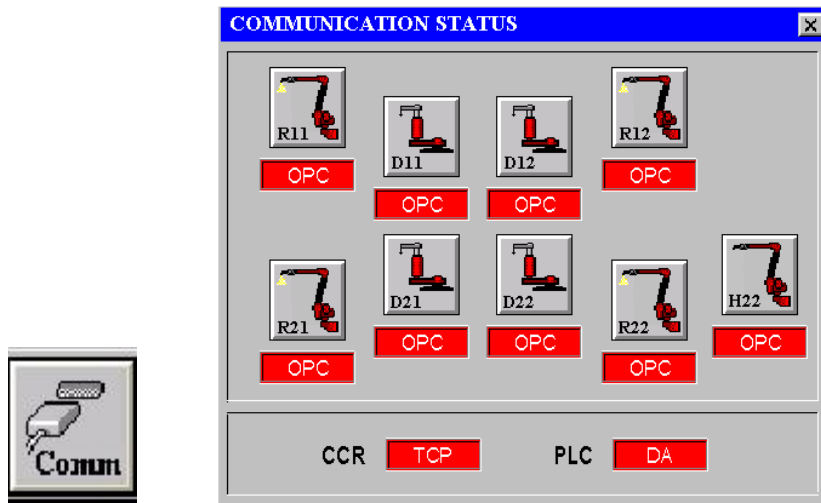
Faulty Status: the status bar, said the current station of fault condition



E-Stop Status: the status bar, said the current station of scram



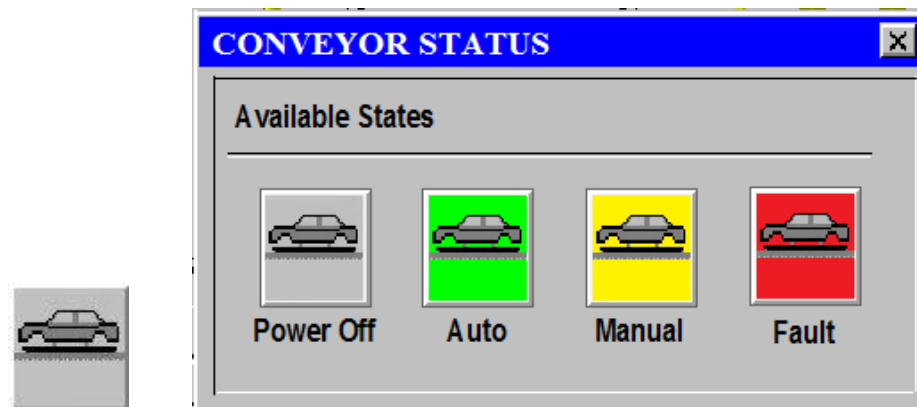
Communication Status: the status bar, said the HMI with robots and PLC communication



Fire Status: the status bar, said the current fire station



Conveyor Status: the status bar said the current state



- Green: Conveyor auto mode
- Red: Conveyor fault
- Yellow: Conveyor manual mode
- Grey: Power off

2.2.2 shortcut button



2.3 Alarm Bar

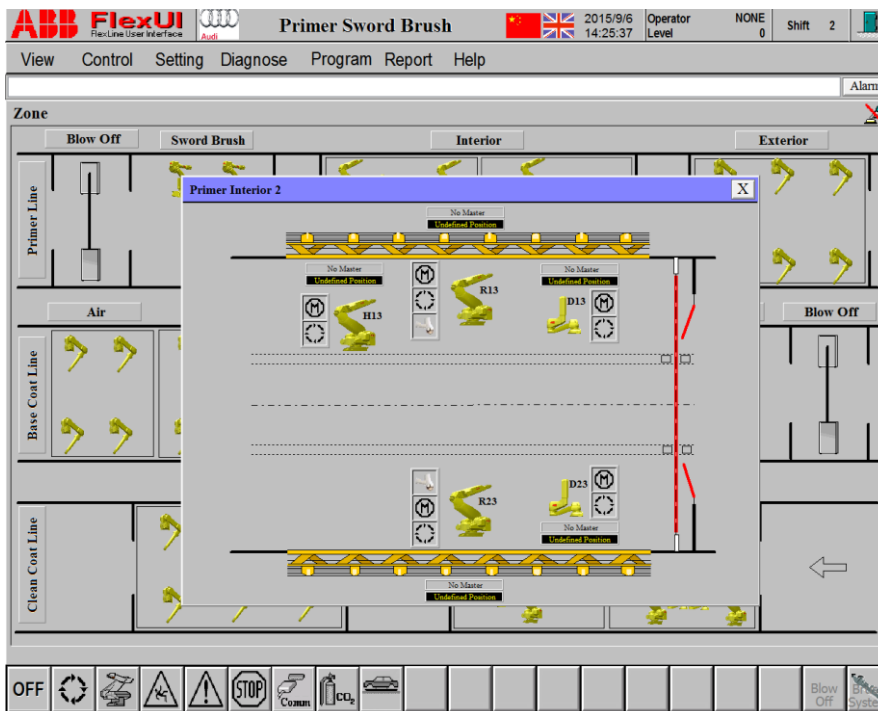


Click the button will jump to the alarm view

3 View

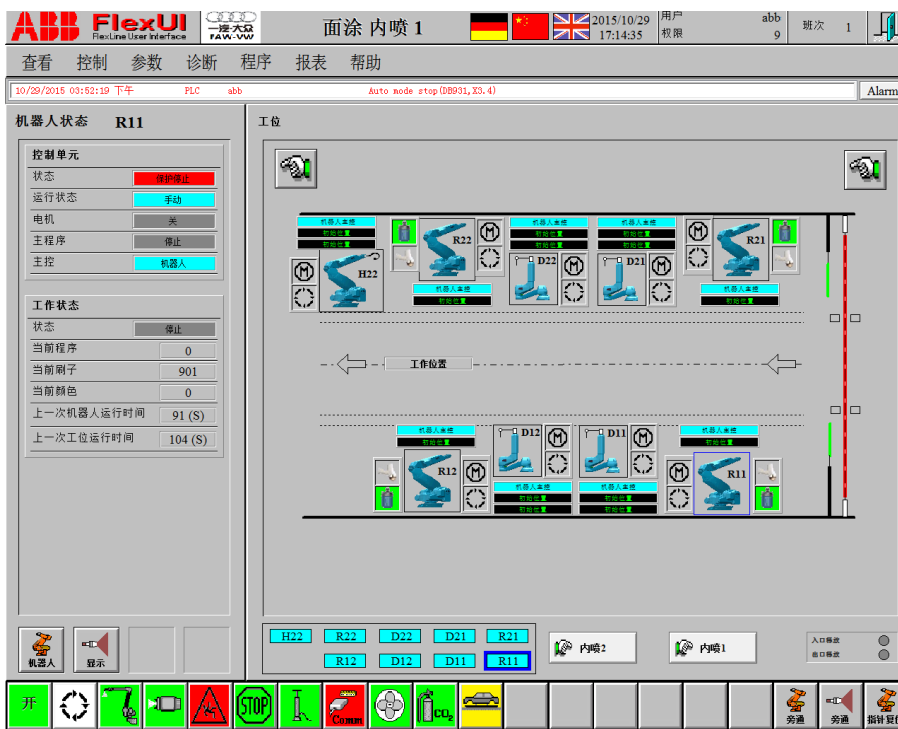
3.1 Zone

Area to check the spray can display the basic information of all stations, click on the location area, can display the selected location detail information



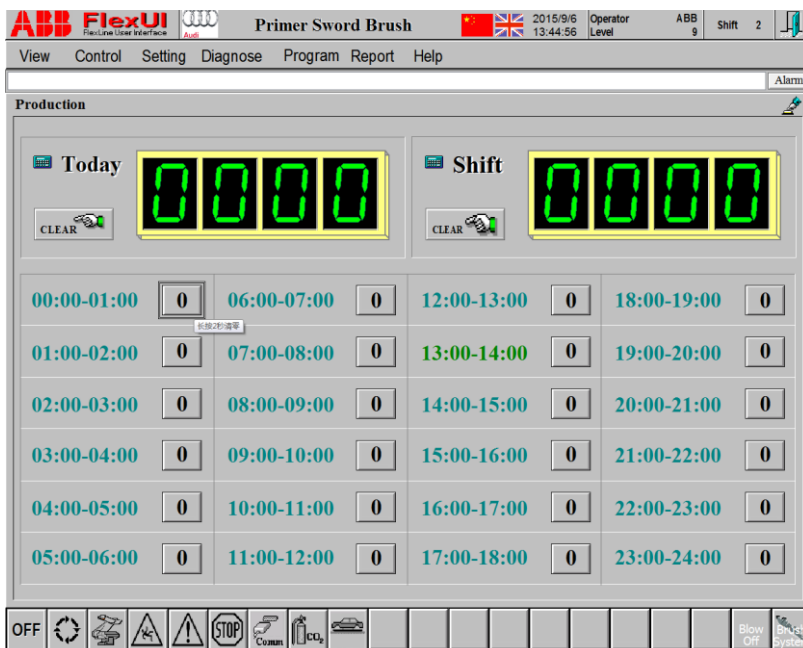
3.2 Station

This page allows the user to view the details of a robot

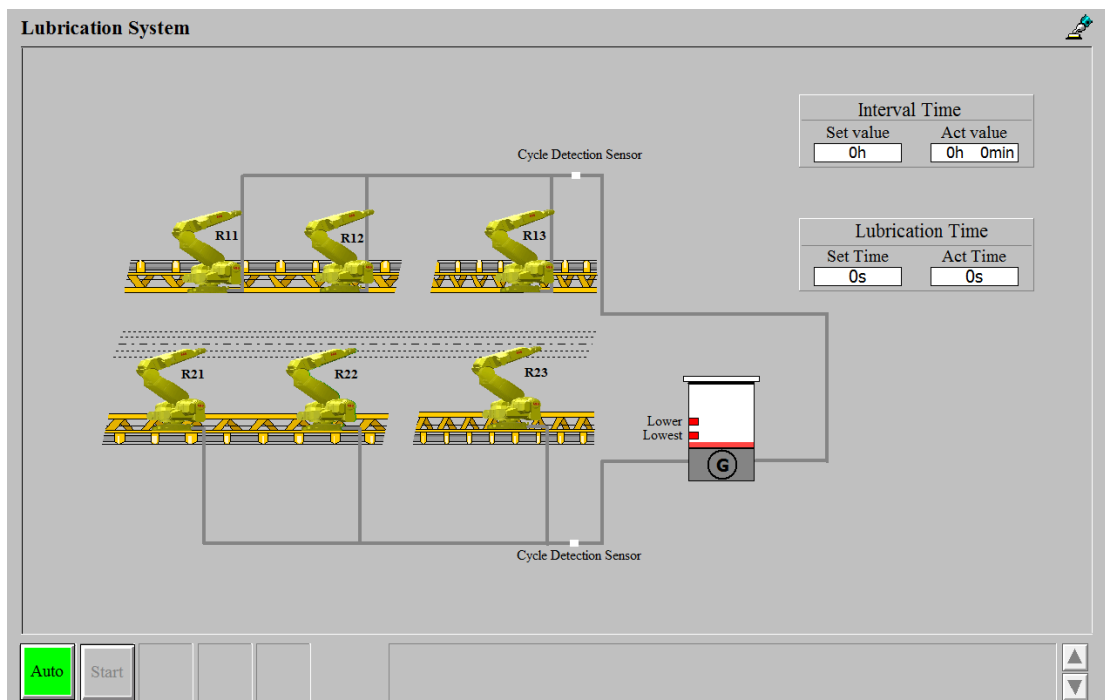


3.3 Production

This page shows the current shift/day production, long by two seconds data can be reset



3.4 Lubrication



Cycle detection sensor

Interval time: (Set value: act value:)

Lubrication time: (Set value: act value:)



: Lubrication system mode switch button and start button

4 Control

4.1 Robot

4.1.1 Robot position move

Robot control and position control page description HMI software system mobile robot to a defined position

When this page is open, can be obtained by manual control of the robot
Each mobile robot position to the Home position of Pos, the starting point must be the Home position Pos

Automatic mode, the Master of the robot in the PLC, collective run for the realization of the robot, the operation must be control to FlexUI, will stand mode

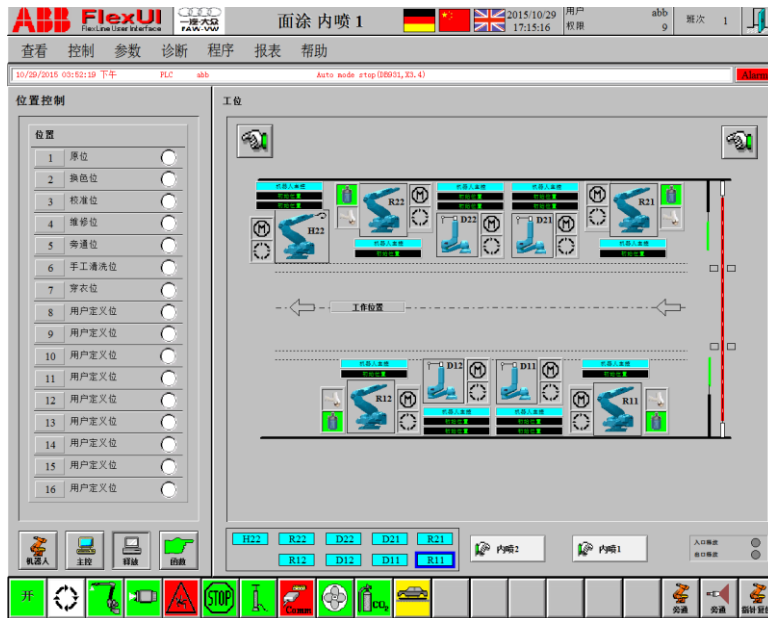
switch to manual mode, to release the Master PLC

Note 1: because of data exchange time, choose to perform after a time interval between the robot starts moving, generally between 2 s to 5 s

Note 2: if a robot system is restarted before, will not be able to move through the this picture the implementation of the robot, you must first through the use of teaching device to control the robot move to the Home position again

Note 3: the robot's movement unless it is to control the robot from another location to move to the Home position, other cases the starting position of the robot to the Home position

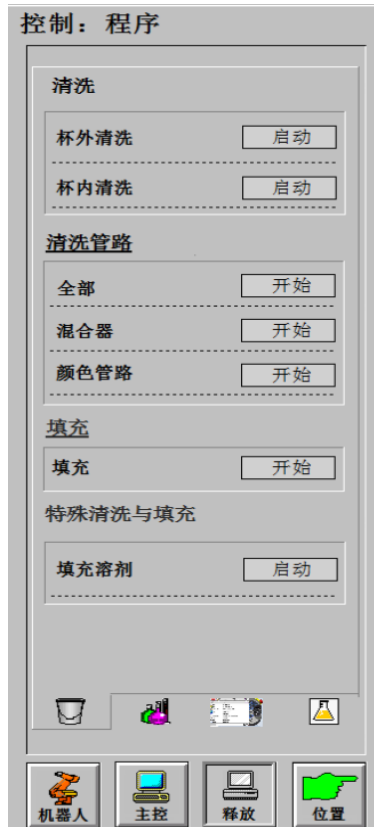
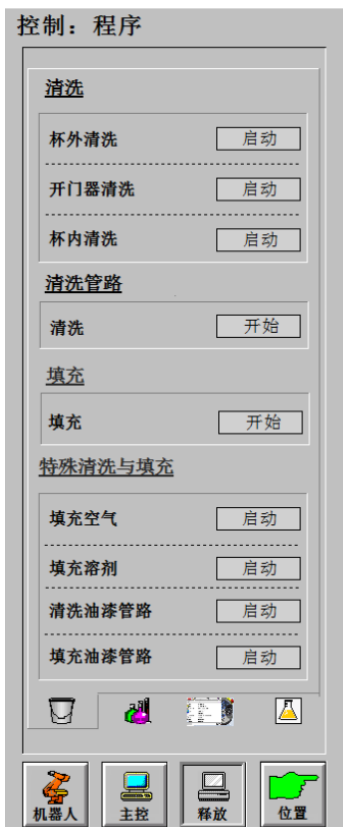
Note: some special place or before the program execution need to check whether the robot is to meet the execution conditions



4.1.2 Robot function


Robot function have 4 sub menu

1.1 clean and fill



1.1.1 Clean include bell clean, tool clean, hub clean and pip clean

—robot must at auto mode

—select robot 


—click start button 


—click OK button



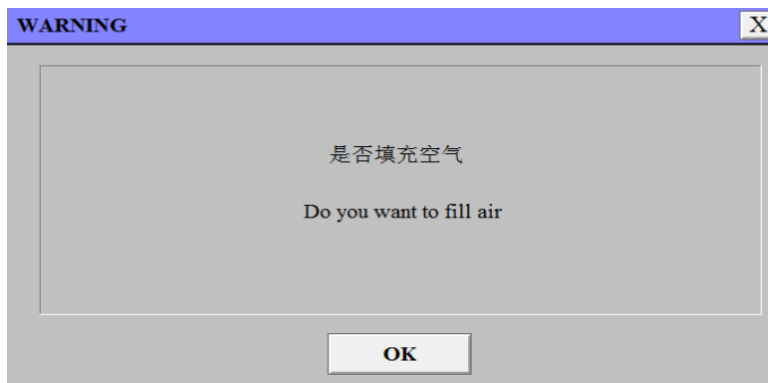
1.1.2 fill function include fill material, fill air、fill solvent、fill material supply。

—robot must at auto mode

—select robot  机器人

—click start button 

—Select fill color and click OK button



1. Material change、Test、Calibration





1.2.1 Material change include cancel, enable, suspend and resume

1.2.1.1 Cancele

—robot must at auto mode

—station must at manual mode

—select robot 

—select master 

—click start button 


—click OK button




1.2.1.2 Enable

—robot must at auto mode

—station must at manual mode

—select robot 

—select master 

—click start button 


—click OK button




1. 2. 1. 3 Suspend

—robot must at auto mode

—station must at manual mode

—select robot 

—select master 

—click start button 


—click OK button




1. 2. 1. 4 Resume

—robot must at auto mode

—station must at manual mode

—select robot 

—select master 

—click start button 

—click OK button



1. 2. 2 HV Test

1. 2. 2. 1 Dynamic HV Test

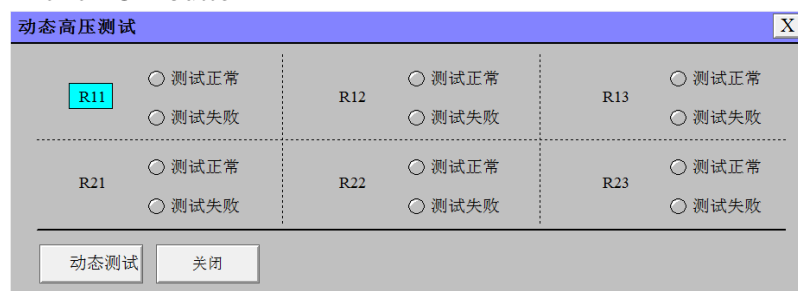
—robot must at auto mode

—station must at manual mode

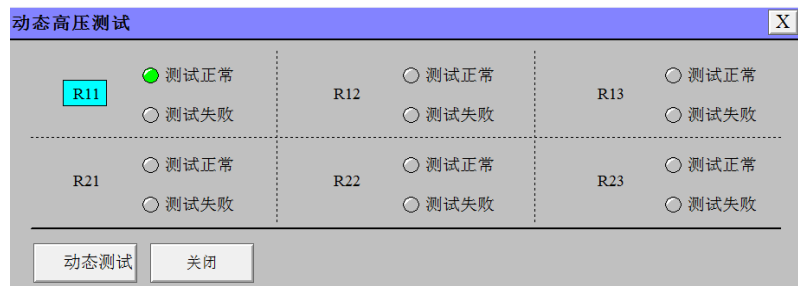
—select robot 

—click start button 

—click OK button



If test finish, it will be shown as below



1. 2. 2. 2 Static HV Test

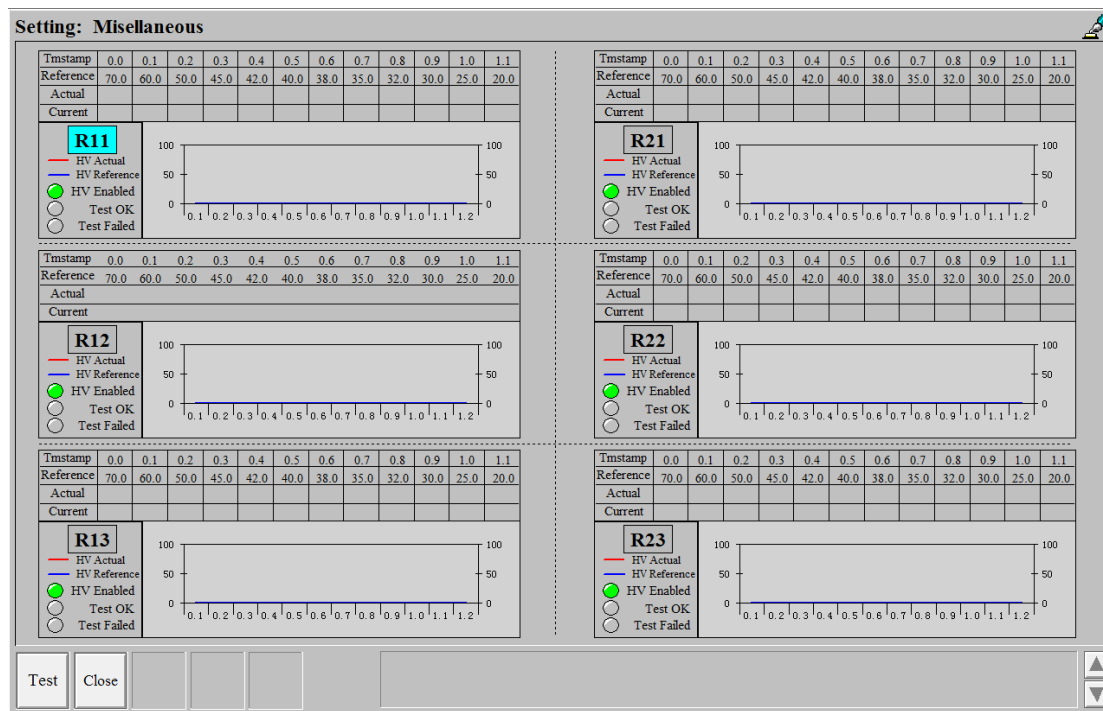
—robot must at auto mode

—station must at manual mode

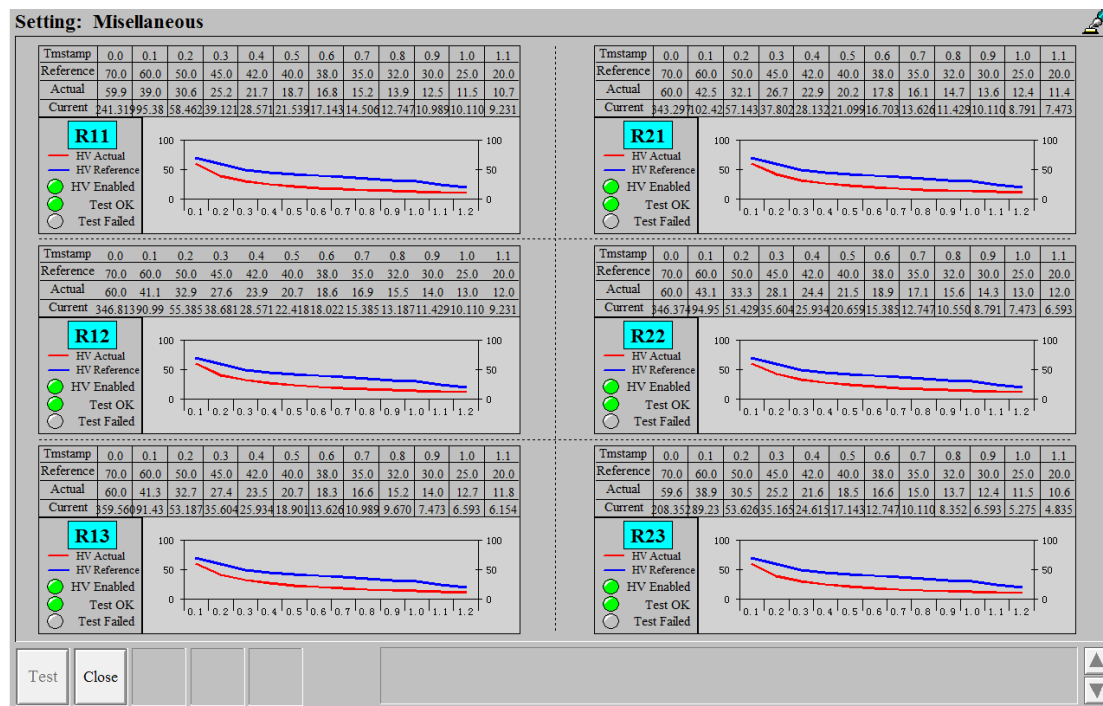
—select robot 

—click start button 

—click OK button




If test finish, it will be shown as below

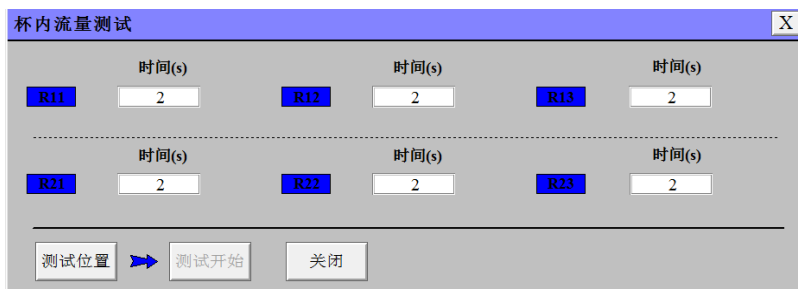


1.2.3 Application Test
 1.2.3.1 Bell Fluid Test

- Remove bell
- robot must at auto mode
- station must at manual mode

—select robot 


—click start button 



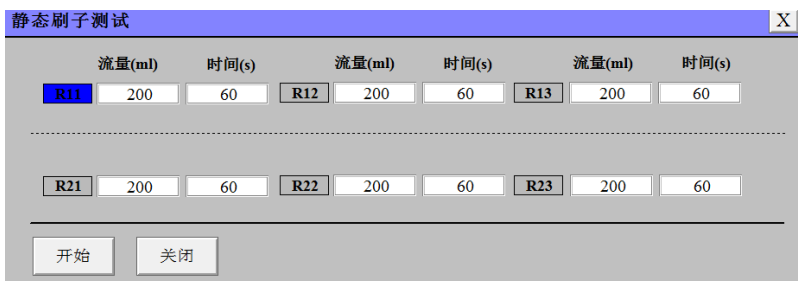
Input time and click Test Positon, after robot move to test position. Click Start button




1.2.3.2 Static brush test
 —robot must at auto mode
 —station must at manual mode

—select robot 

—after set volume and time, click start button



1.2.3.3 Dynamic brush test
 —robot must at auto mode
 —station must at manual mode

—select robot 

—click start button 


—click OK button



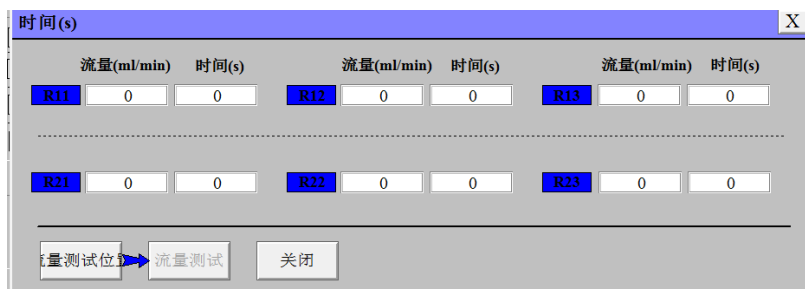
1. 2. 3. 4 Fluid Test

—robot must at auto mode

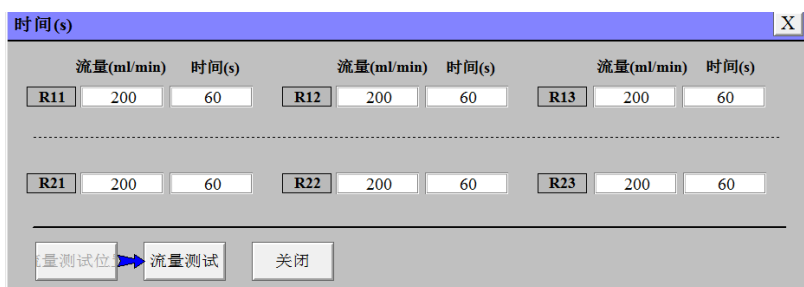
—station must at manual mode

—select robot 

—click start button



Input time and click Test Position, after robot move to test position. Click Start button




1. 2. 4 Calibration

1. 2. 4. 1 IPS curve

—robot must at auto mode

—station must at manual mode

—select robot

—select master 

—click start button 

—Select atom option and set parameters




1. 2. 4. 2 IPS Curve (Shape 1)

—robot must at auto mode

—station must at manual mode

—select robot

—select master 

—click start button 

—Select shape 1 option and set parameters




1. 2. 4. 3 IPS Curve (Shape 2)

—robot must at auto mode

—station must at manual mode

—select robot

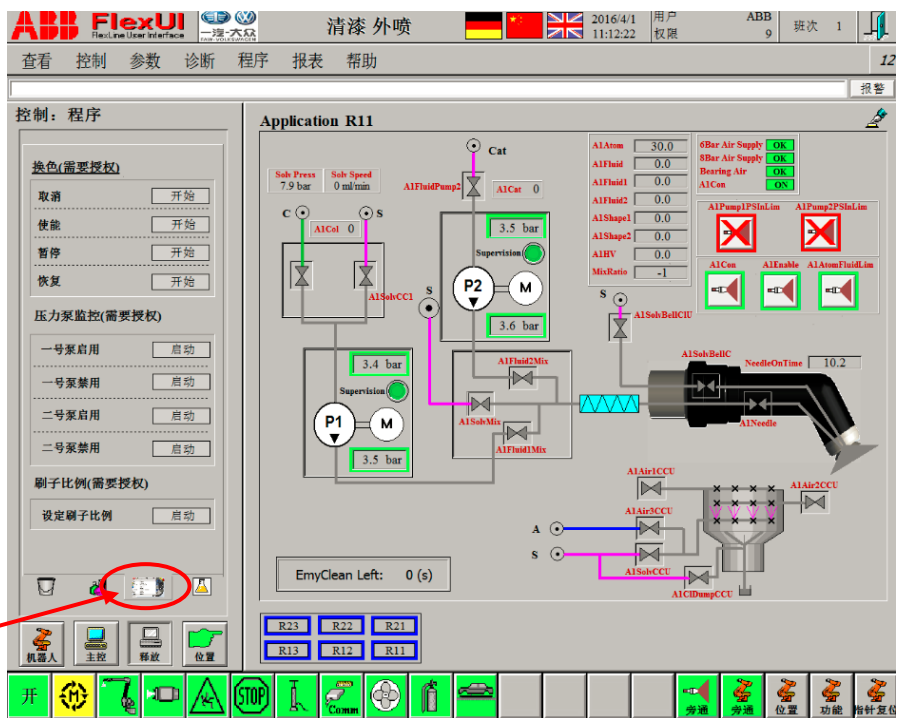
—select master 

—click start button 

—Select shape 2 option and set parameters



1.3 Function description



1.3.1 Pump supervise、Brush factor、RCC operation、Paint Push




1.3.2 Pump supervise

1.3.2.1 Pump 1 enable

—robot must at auto mode

—station must at manual mode

—select robot

—select master 

—click start button 




1.3.2.2 Pump 1 disable

—robot must at auto mode

—station must at manual mode

—select robot

—select master 

—click start button 




1.3.2.3 Pump 2 enable

—robot must at auto mode

—station must at manual mode

—select robot

—select master 

—click start button 




1.3.2.4 Pump 2 disable

—robot must at auto mode

—station must at manual mode

—select robot

—select master 

—click start button 




1.3.3 Set brush Factor

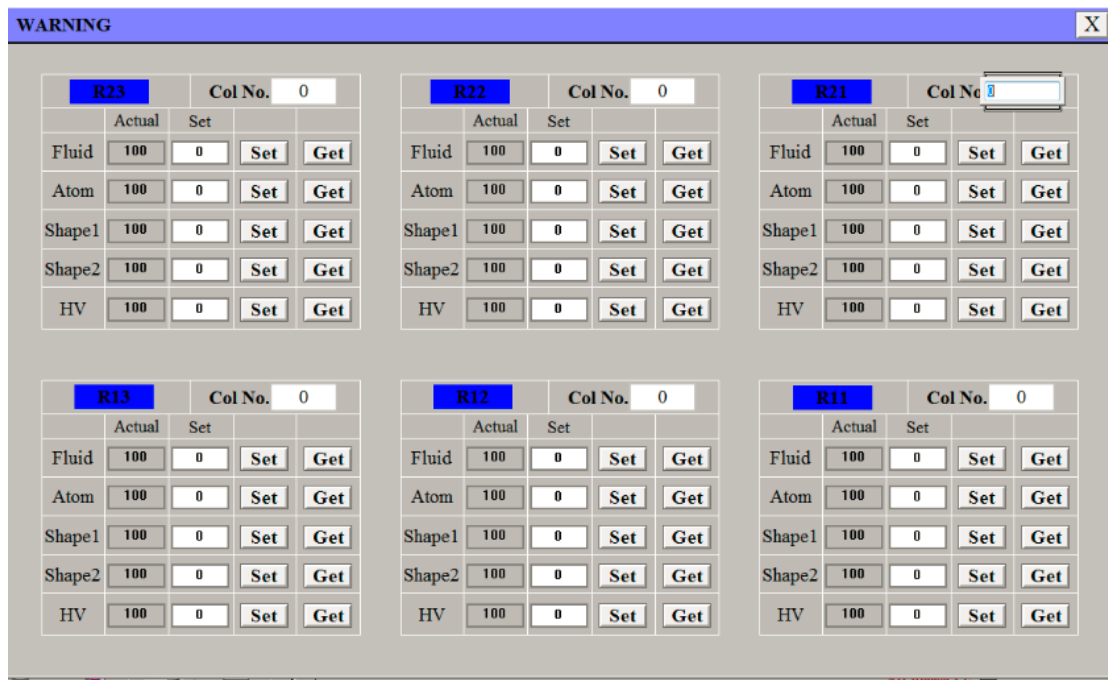
1.3.3.1 set brush facotr

—robot must at auto mode

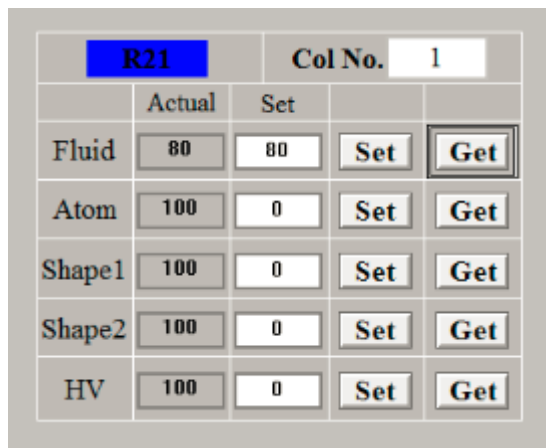
—select robot

—select master 

—click start button 




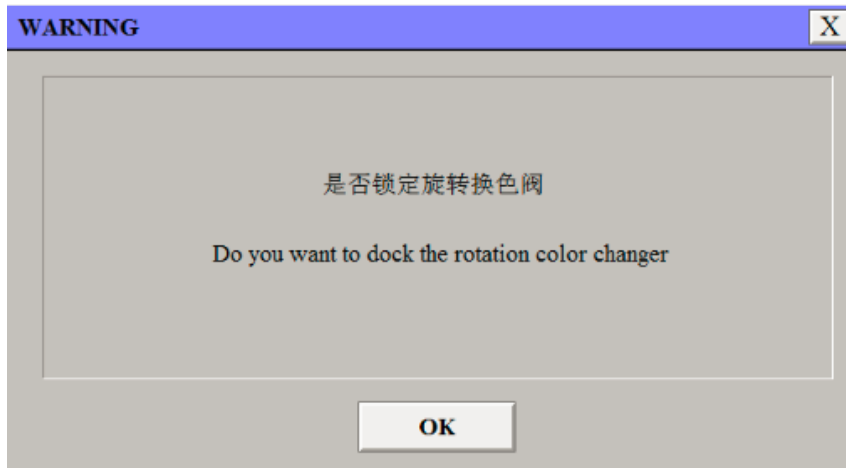
- input color number , “0”present globe
- Click Set button can update brush factor to robot system
- Click Get button can read brush factor from robot system



1.3.4 RCC control

1.3.4.1 Dock

- robot must at auto mode
- station must at manual mode
- select robot
- select master 
- click start button




1.3.4.2 UnDock

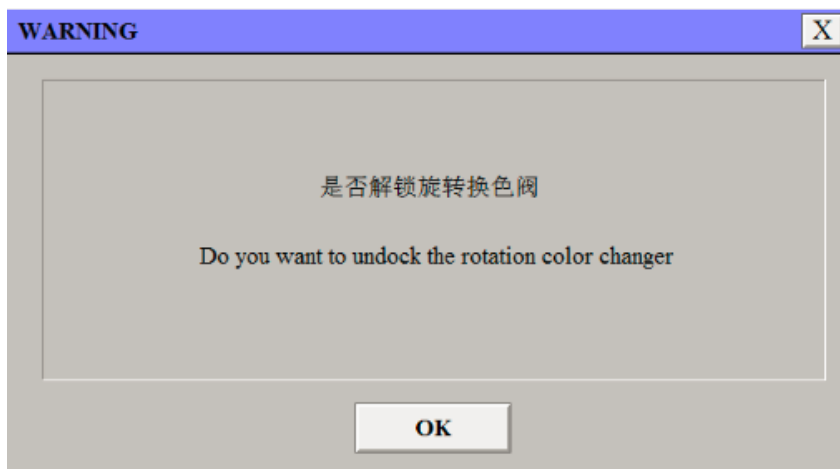
—robot must at auto mode

—station must at manual mode

—select robot

—select master 

—click start button




1.3.4.3 calibration RCC

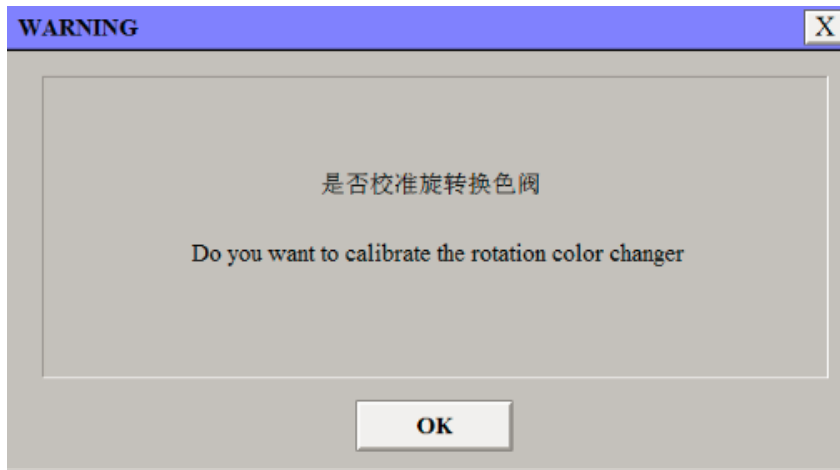
—robot must at auto mode

—station must at manual mode

—select robot

—select master 

—click start button




1.3.4.4 Move to calibration position

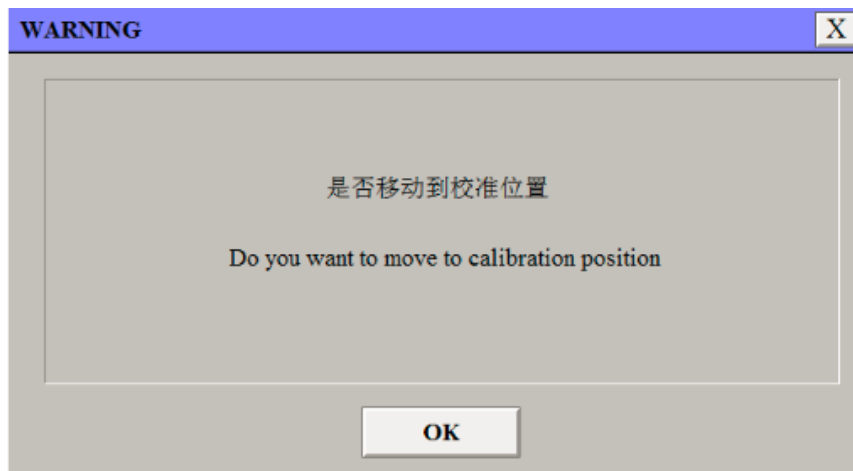
—robot must at auto mode

—station must at manual mode

—select robot

—select master 

—click start button




1.3.4.5 move position

—robot must at auto mode

—station must at manual mode

—select robot

—select master 

—click start button



1.3.5 Paint Push

1.3.5.1 Paint Push Enable

—robot must at auto mode

—station must at manual mode

—select robot

—click start button



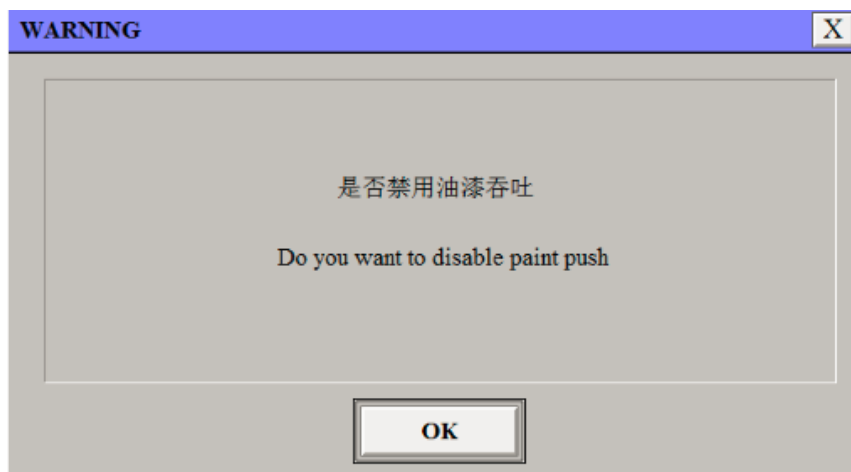
1.3.5.2 Paint Push Disable

—robot must at auto mode

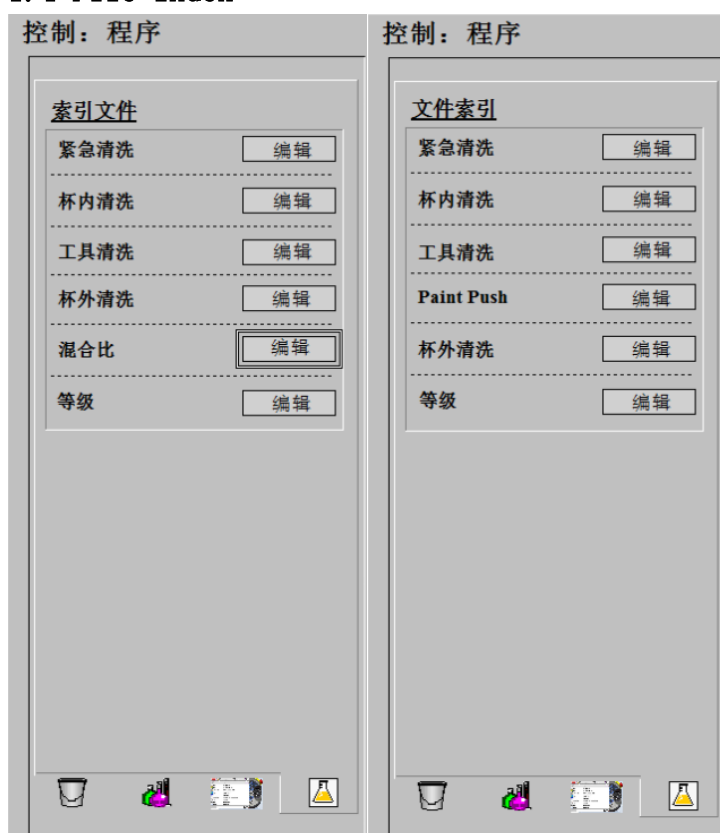
—station must at manual mode

—select robot

—click start button



1.4 File Index



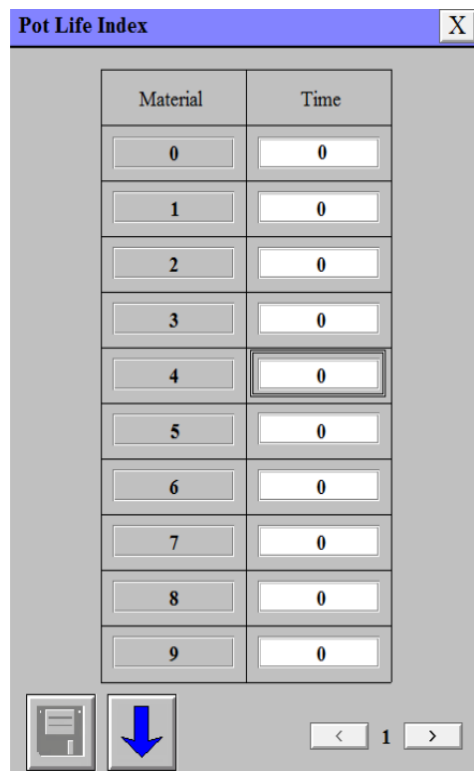
User can use this function to update some index file from robot system, include bell clean, hub clean, tool clean, mix ratio, paint push

1.4.1 clean

Robot in manual mode or auto mode, pipe is filled, when the setting time is zero then do dump fill.

—robot must at manual mode

—select robot and click **修改索引文件**

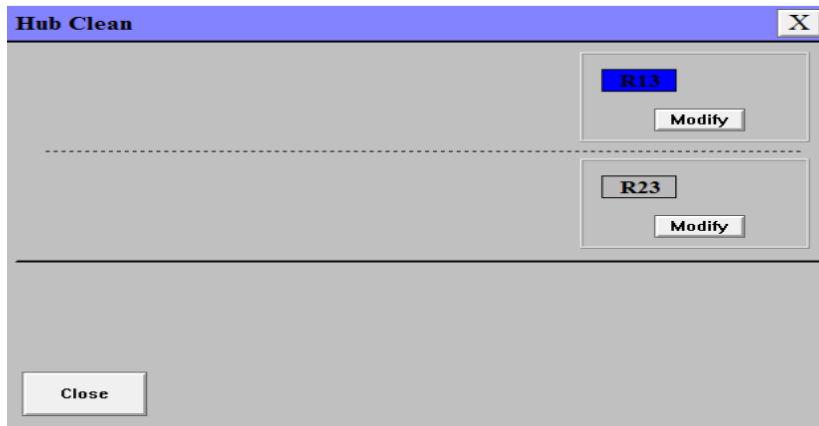


—click , save index file

1.4.2 Hub Clean

—robot must at manual mode

—select robot and click 



Hub Clean Index


Material	Clean Interval	Clean Time
1	0	1.5
2	0	1.5
3	0	1.5
4	0	1.5
5	0	1.5
6	0	1.5
7	0	1.5
8	0	1.5
9	0	1.5
10	0	1.5

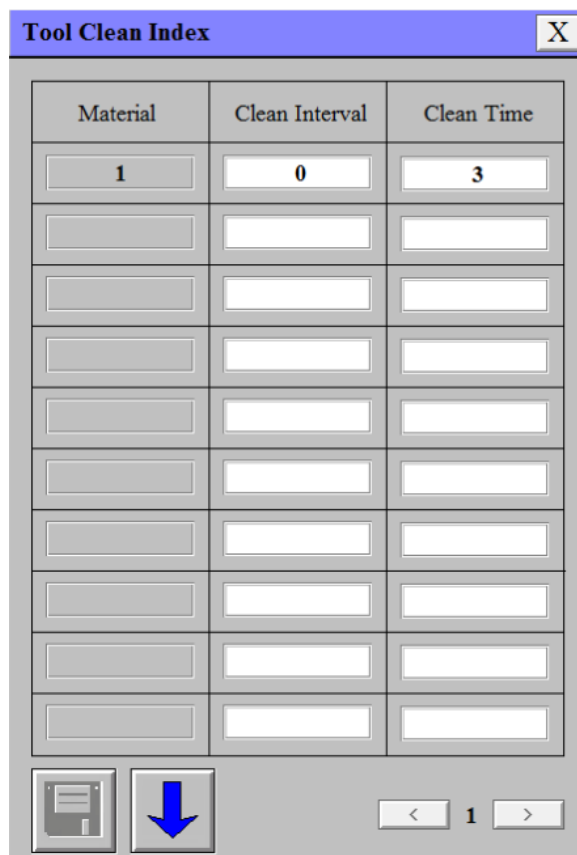
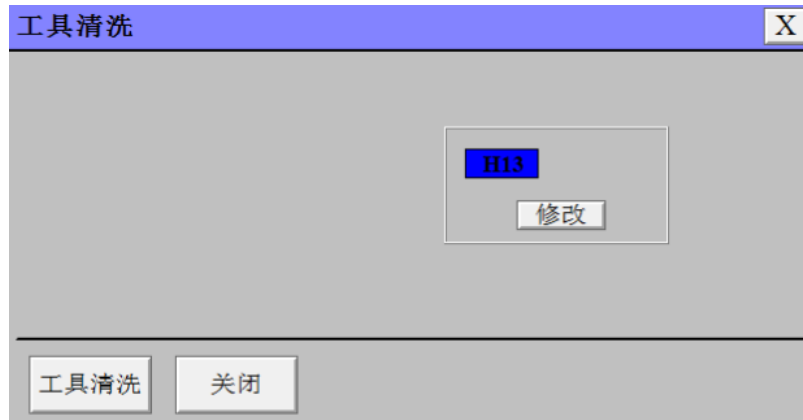
File icon, Blue arrow icon, < 1 >

—click , save index file

1.4.3 Tool Clean

—robot must at manual mode

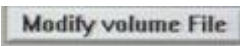
—select robot and click 

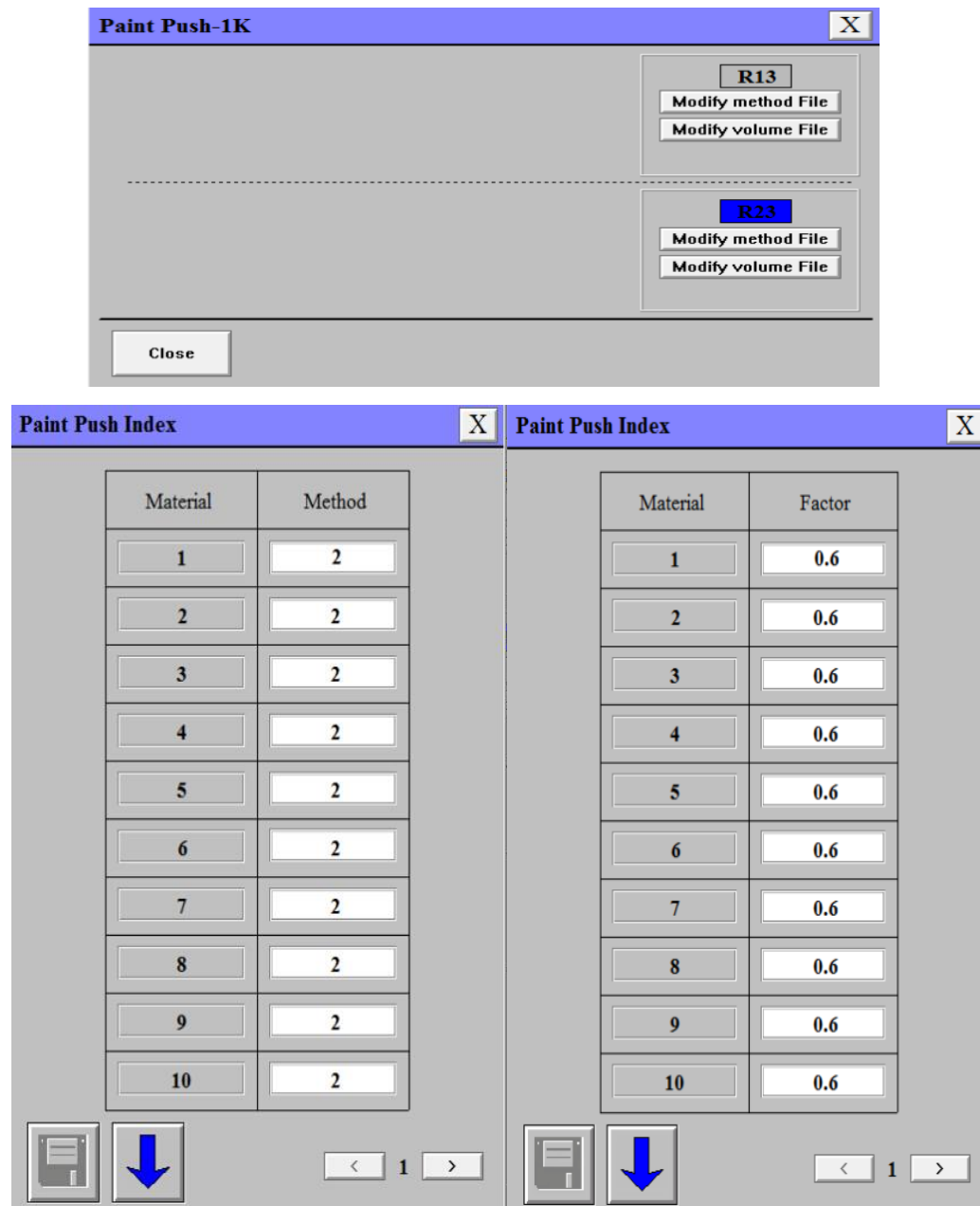


—click , save index file

1.4.4 paint push

—robot must at manual mode

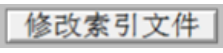
—select robot and click  or 

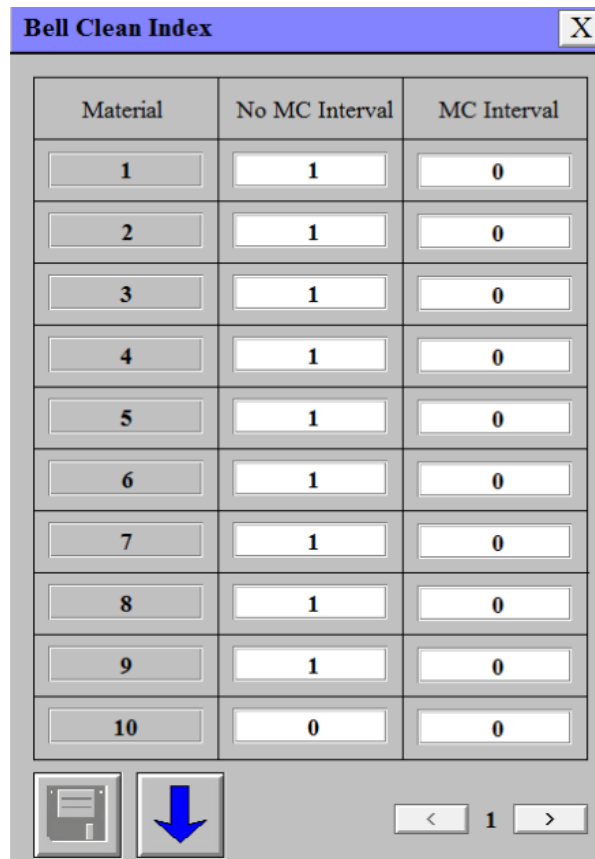
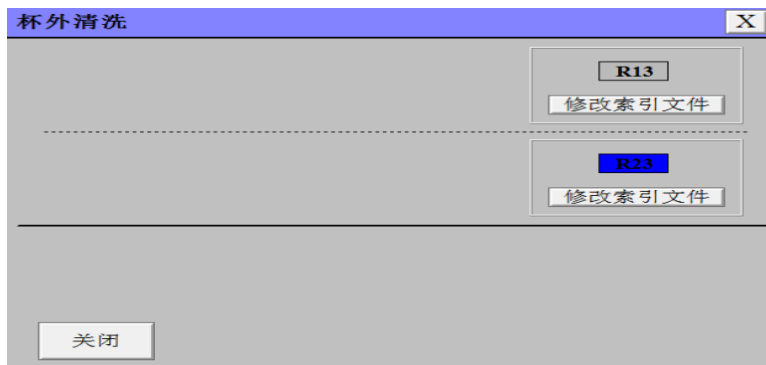


—click , save index file

1.4.5 bell clean

—robot must at manual mode

—select robot and click 



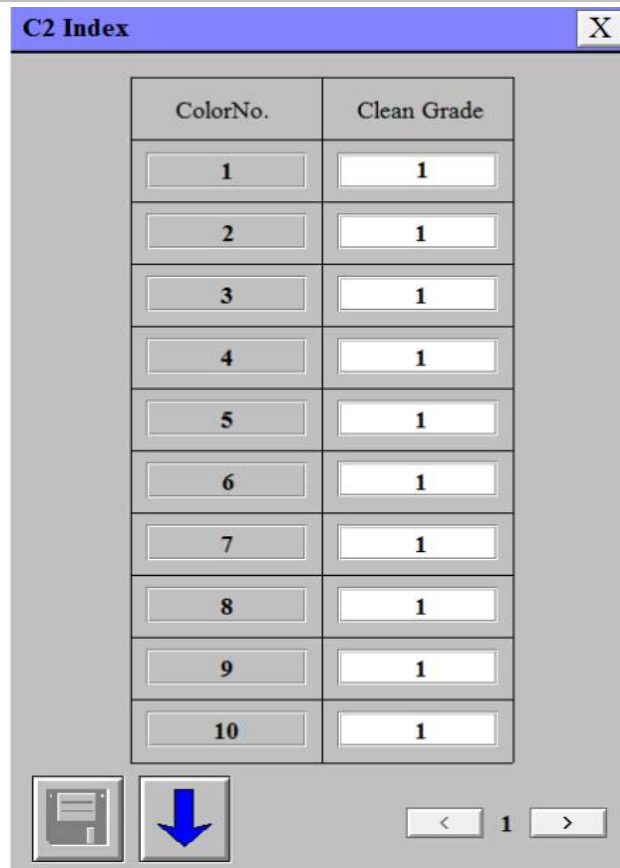
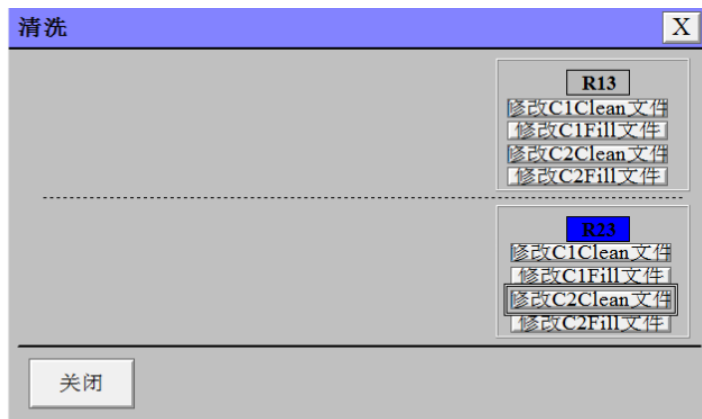
—click , save index file

1.4.6 fill

—robot must at manual mode

—select robot and click  or 

or  or 

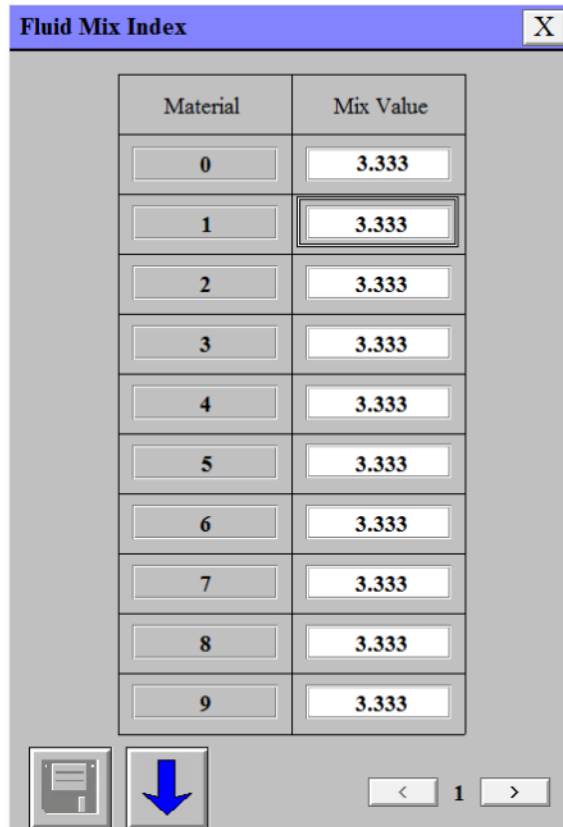
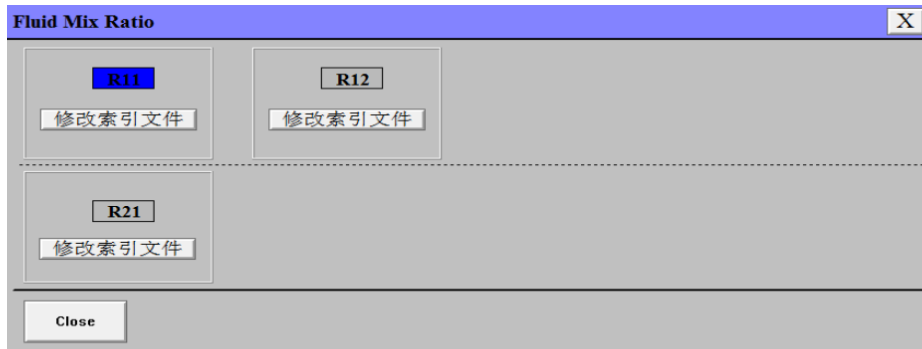


—click , save index file

1.4.7 Mix ratio

—robot must at manual mode

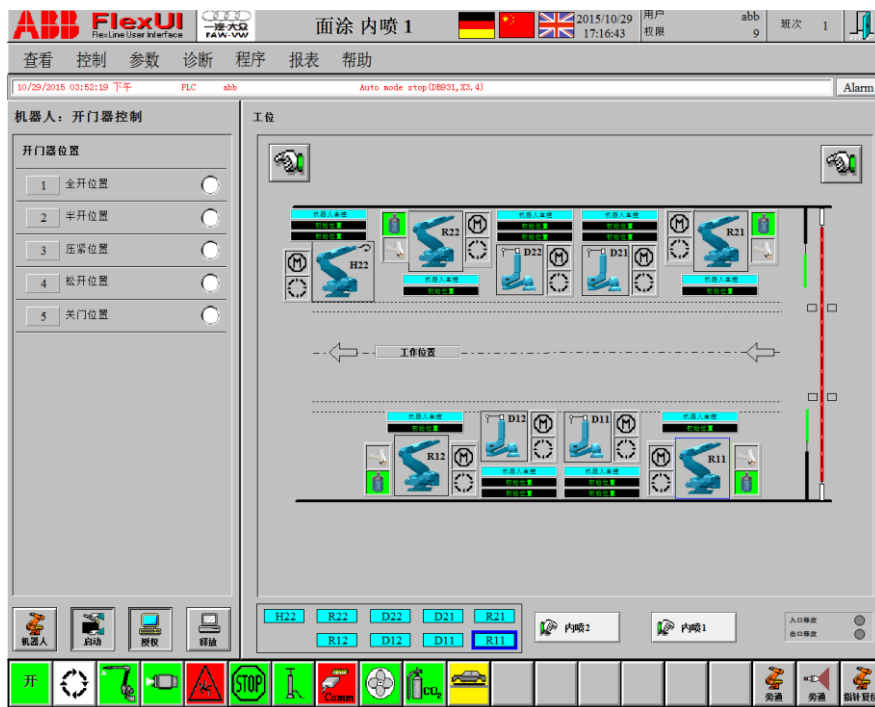
—select robot and click 



—click , save index file

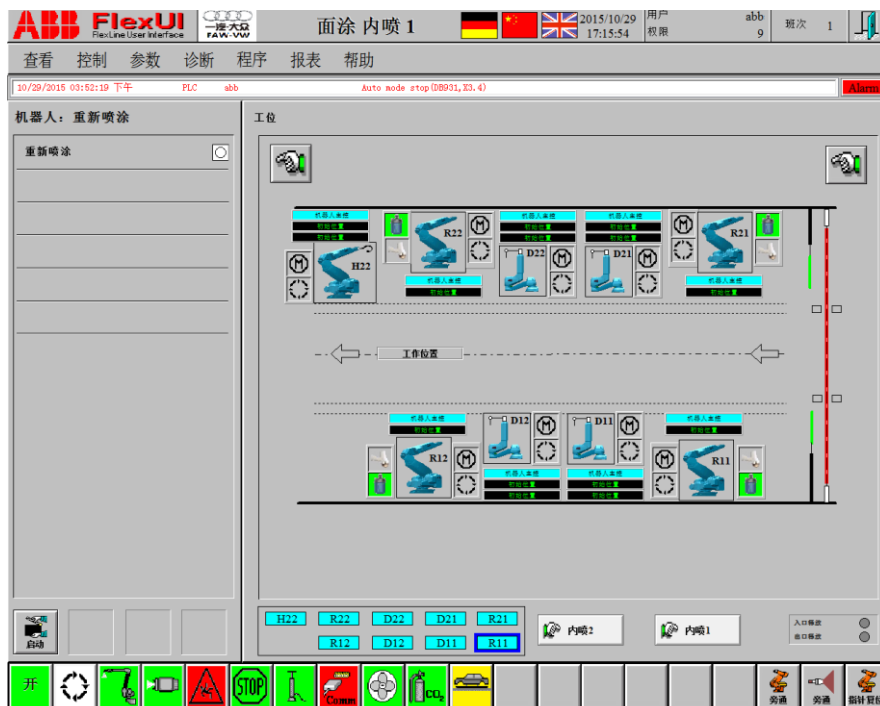
4.1.3 Opener Control

User can manual control opener in this page



4.1.4 New Start

When a sudden situation, need to work on car, can control station in this page to start again

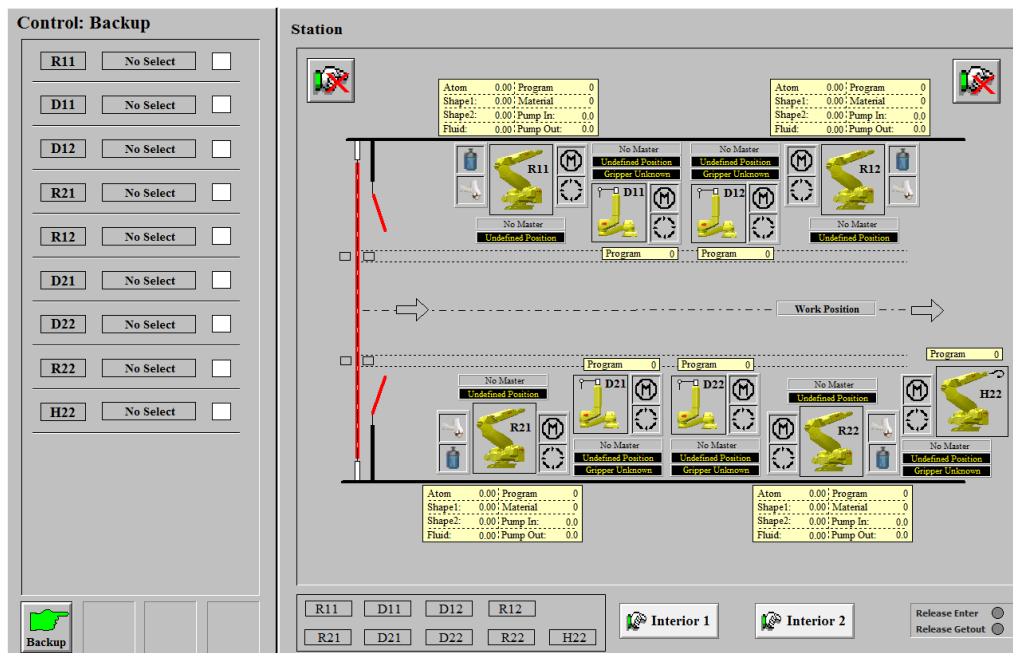


4.1.5 Backup

Backup robot program and copy to pc disk.

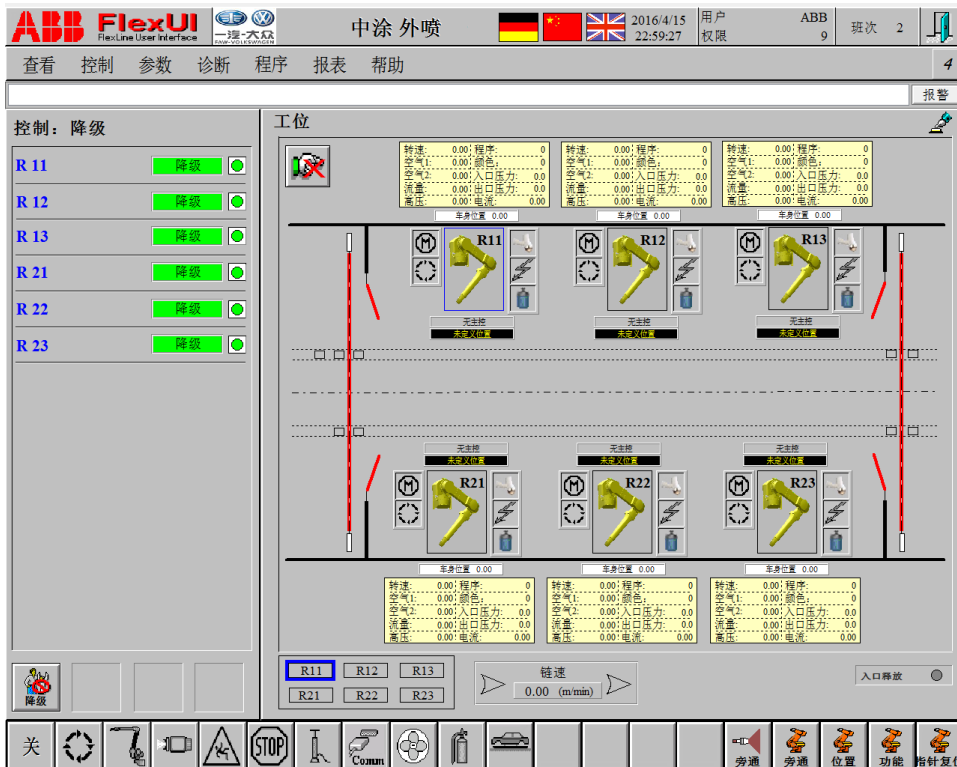
Situation:

- Station must be at manual mode
- Robot must switch to auto mode



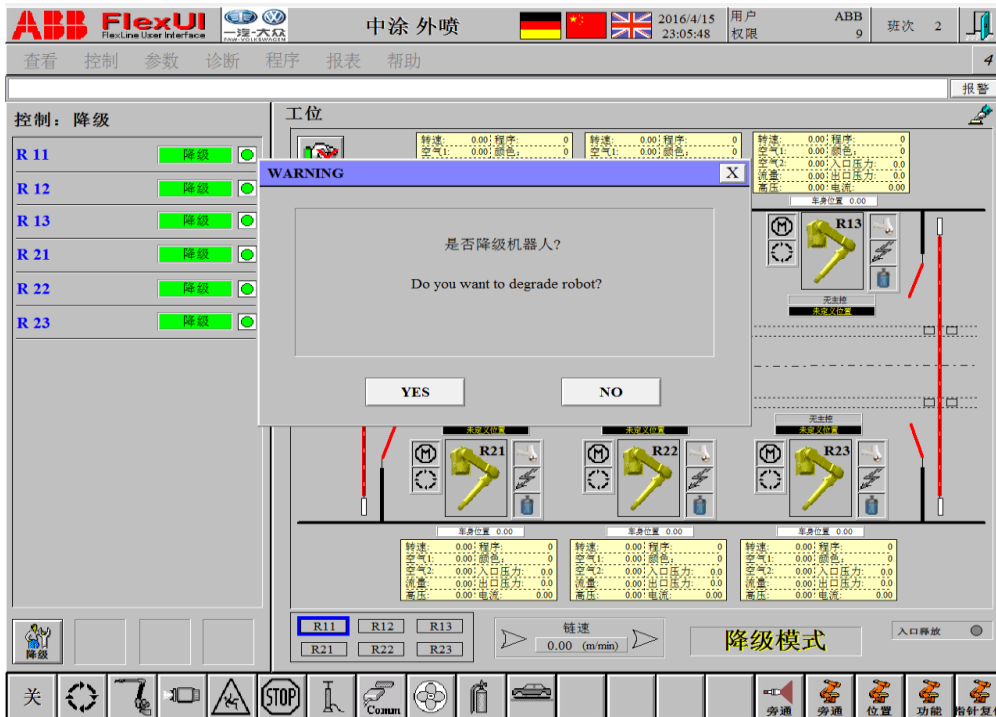
4.1.6 Degrade Mode

Only exterior station has degrad mode. And one station only one robot can be degrade



Click degrade button  Next .

Select robot which you want to degrade.



确定。

4.2 Fluid System

User can set process parameter and control valve in this page

The screenshot displays the ABB FlexUI interface for the Fluid System (Application R11). The interface is divided into several sections:

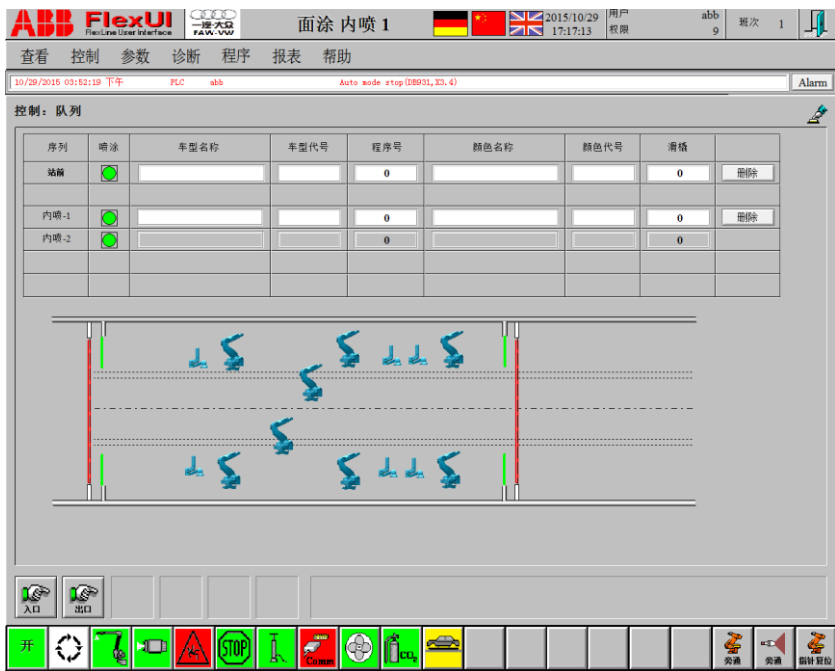
- Top Bar:** Shows the ABB FlexUI logo, the title '中涂 外喷', the date '2016/4/15 23:07:08', and user information '用户 ABB 9 班次 2'.
- Navigation Bar:** Includes buttons for '查看', '控制', '参数', '诊断', '程序', '报表', and '帮助'.
- Left Panel (涂装系统 R11):**
 - 参数 (Parameters):** A table with columns for '设定值' (Setpoint) and '实际值' (Actual Value).

参数	设定值	实际值
溶剂压力	0.0 bar	0.0 bar
流量	0	0.00
转速	0	0.00
空气1	0	0.00
空气2	0	0.00
高压	0	0.00
电流	0.00	
 - 颜色号 (Color Code):** 0
 - 偏移 (Offset):** 0.00%
 - 其他选项 (Other Options):**

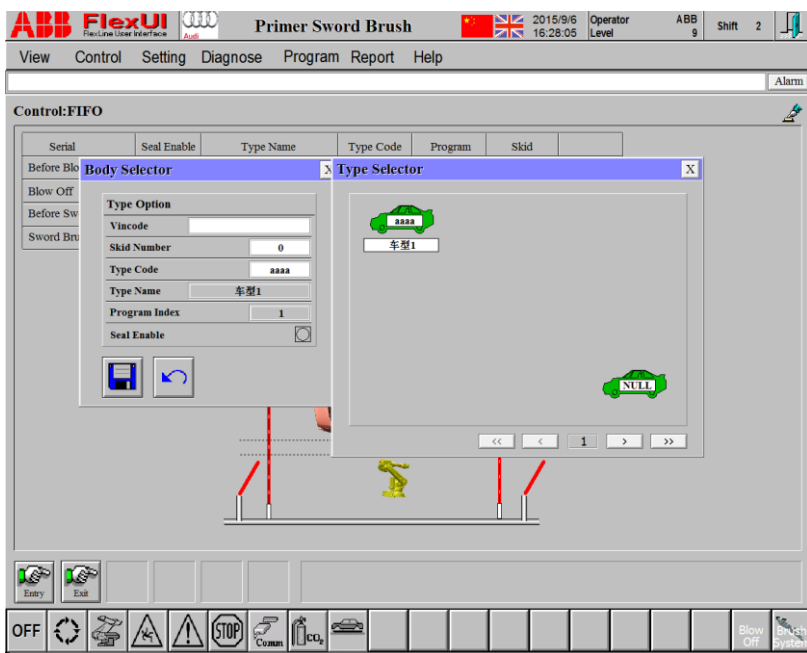
其他选项	状态
A1PistonPos	Unknown
校准 (Calibration)	否 (No)
换色阀角度 (Color Valve Angle)	0
- Center Panel (Application R11):** A detailed hydraulic schematic showing pumps (A1Sol1Pump, A1Sol2Pump), valves (A1Air1CCU, A1Air2CCU, A1Air3CCU, A1Air4CCU), and a spray gun. Pressure gauges show 0.0 bar. A 'Reload Left' indicator shows 0 (s).
- Right Panel (Status Indicators):**
 - 6Bar Air Supply: OK
 - 8Bar Air Supply: OK
 - Bearing Air: OK
 - A1Con: OFF
 - Deck/Undeck: OFF
 - A1Atom: 0.0
 - A1Fluid: 0.0
 - A1Shape1: 0.0
 - A1Shape2: 0.0
 - A1HV: 0.0
 - A1Can: OFF
 - A1PumpPSInLim: OFF
 - A1Enable: OFF
 - A1AtomFluidLim: OFF
 - NeedleOnTime: 0.0
- Bottom Panel:** A toolbar with icons for power, stop, and other functions.

4.3 FIFO

This page you can view/modify the current operation vehicle information and station vehicle information



If user want to add the vehicle information, click on the input box will pop up a window for your input.



4.4 Ghost

This page allows the user to modify the value of the information and start simulation. Users can input analog data, the maximum six car body can be simulated. The necessary condition to simulated experiment is as follows:

- the robot in the automatic state.
- stand in the automatic state.
- the robot motor is in ON state.
- robot CycleOn signal in the On state.

- the PLC in the Master state.
- no any alarm.
- the current program number is 0.



Click the first button to start the simulation mode, enter the vehicle information.

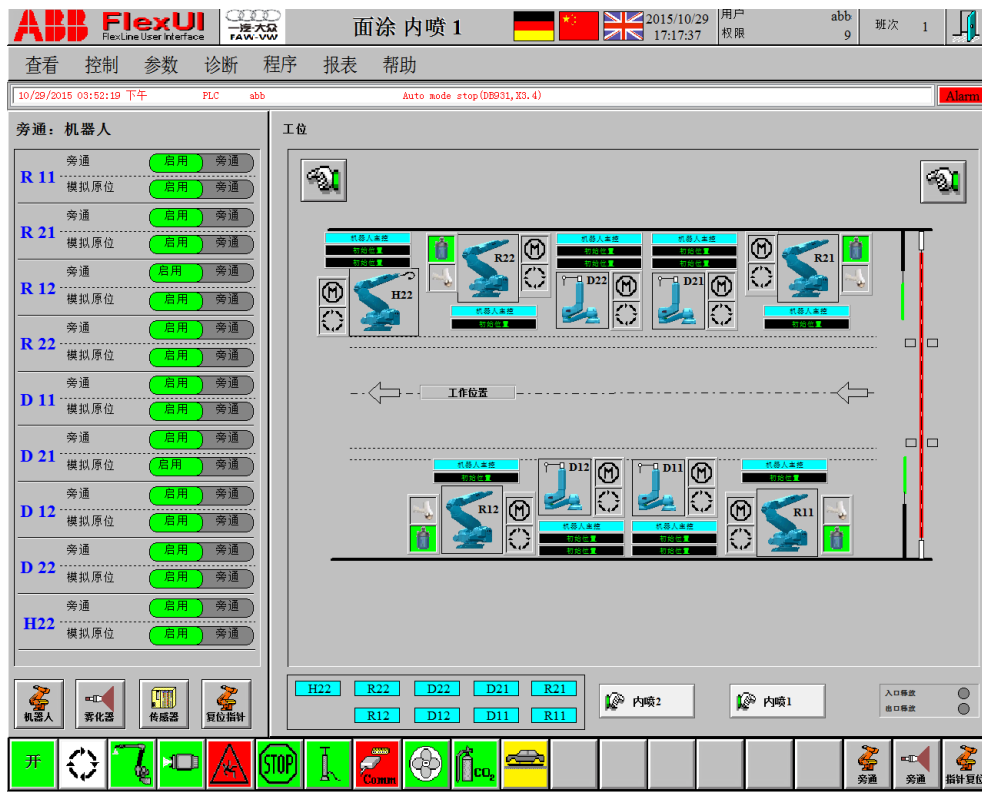
Upon the input, click on "start" start simulation, click "Cancel" to Cancel.

Click on the "Station" button, then back to the main interface.



4.5 Bypass

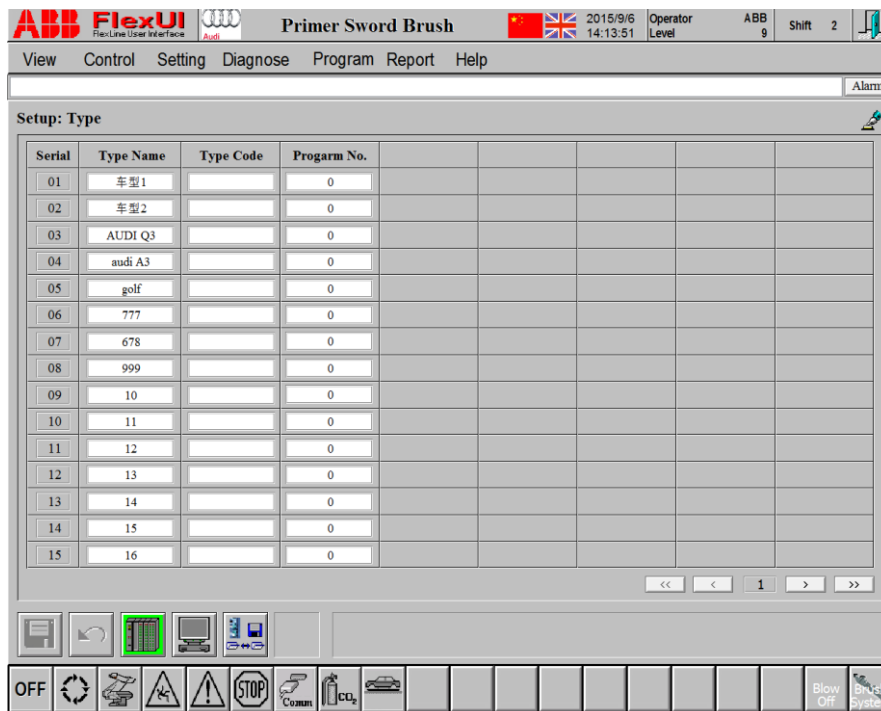
This page provides a robot, Home and application bypass, click on the corresponding button to bypass. White to bypass status.



5 Setting

5.1 Type Setting

This is a model parameter Settings. Each line represents a model parameter, is offered up to 50 kinds of models.



- Type Name: This column to fill in the names of the models, can be arbitrarily defined by the customer.
- Type Code: This column is controlled to fill in the Code of a model has been defined.
- Program Number: This column number fill in the application of PLC is sent to the robot.



From function buttons (from left) :

- button 1: to save values to the PLC.
- button 2: to keep the value of the local.
- button 3: cancel button.
- button 4: according to the value of the PLC.
- button 5: according to the value of the local.
- button 6: save all values (from PLC to local; or from the local to the PLC)

5.2 Color Setting

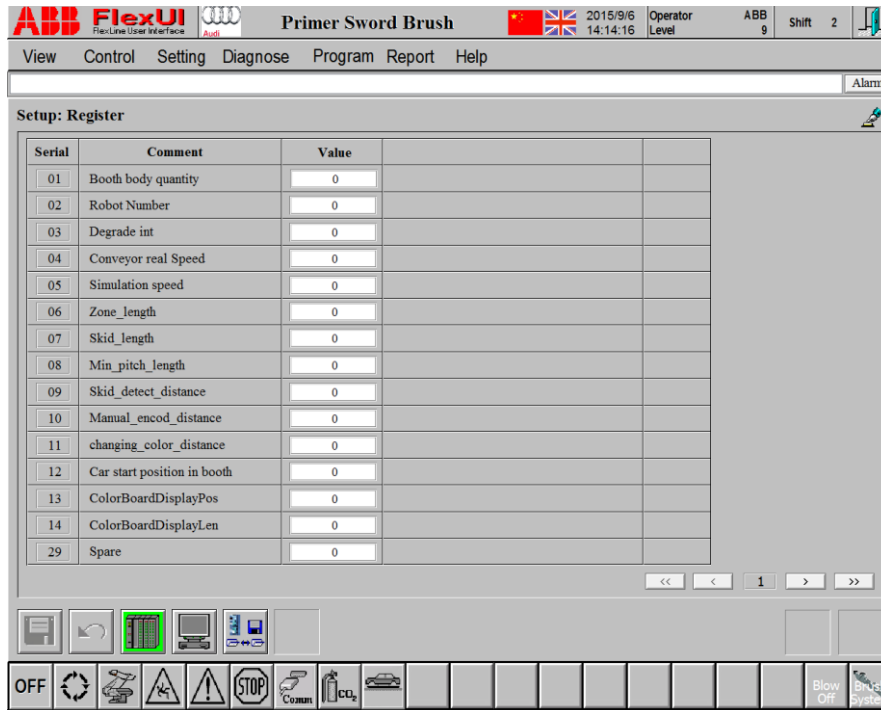
This is a model parameter Settings. Each line represents a model parameter, is offered up to 50 kinds of colors

- Color enable:
- Mixroom:
- Color Name:
- Color Code:
- Supplier:
- Color:
- Ring pipe:
- Level:
- Max day: if color not paint max day later, it will be alarm
- Manual paint: user open color valve to paint the color

序号	颜色使能	调漆间状态	颜色名称	颜色代号	供应商	颜色	管路号	等级	最大天数	手动挤漆
01	是	否	ibiswhite	104	Hemmelrath		1	0	2	
02	是	否	darkgrey	171	Hemmelrath		2	0	2	
03	是	否	anthrazit	172	Hemmelrath		3	0	2	
04	是	否	brilliantred	137	Hemmelrath		4	0	2	
05	是	否					0	0	0	
06	是	否					0	0	0	
07	是	否					0	0	0	
08	是	否					0	0	0	
09	是	否					0	0	0	
10	是	否					0	0	0	
11	是	否					0	0	0	
12	是	否					0	0	0	
13	是	否					0	0	0	
14	是	否					0	0	0	
15	是	否					0	0	0	

5.3 Parameter Setting

This page allows the user to set the parameter value of the PLC



5.4 Alarm Setting

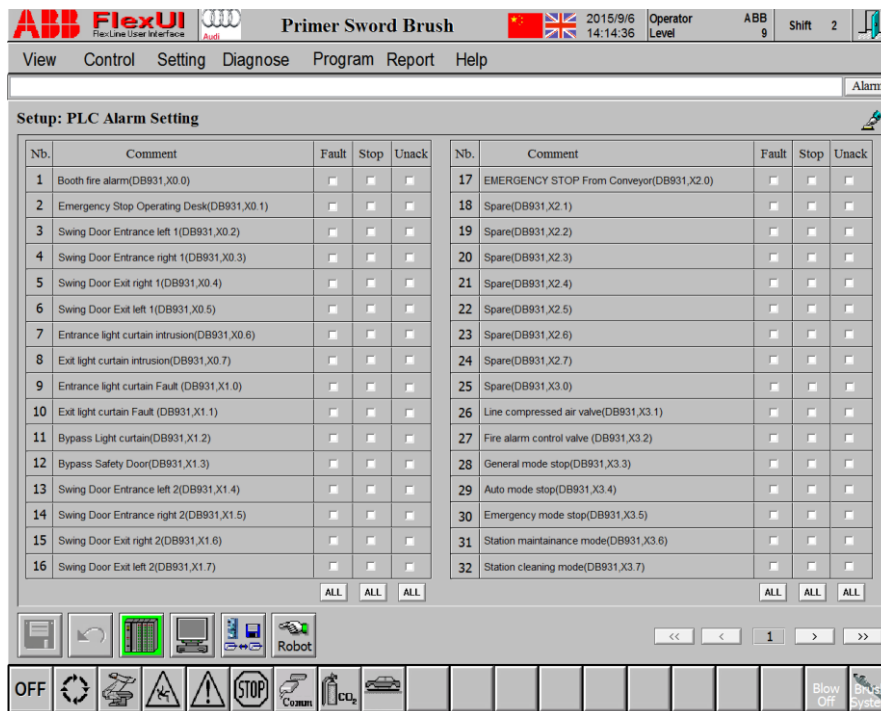
This page is the handling of fault from the robot Settings.

"Alarm" column is selected, said the bank's failure happens, three color column light red light flashing, until the fault is excluded

"Buzz" column is selected, said the bank's failure happens, three color column light buzzer buzzer, until the operating platform of fault reset button is pressed

"Stop chain" column is selected, said the bank's failure happens, it will stop the running conveyor chain, after failure is ruled out, need to restart the conveyor chain

"Unconfirmed" column is selected, said the bank's failure happens, only in the alarm picture on the FlexUI query that does not affect other processes




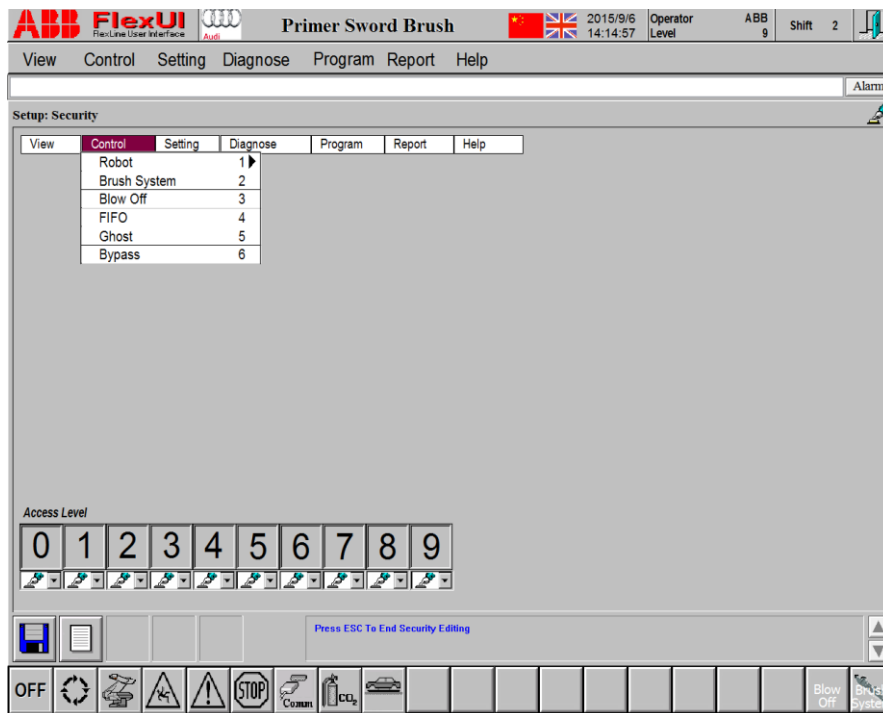
5.5 Security


This page set the authorization level operation. Only with the highest authority level 10 operator can be set. 10 operators have all permissions.

Permissions setup steps:

- Click on the menu corresponding to certain needs, set up the page, the level of use is shown in the figure below the permissions of the operators can operate this picture permissions, divided into can modify, read only does not change, and could not enter the operation of the page.

- Click the Numbers in the access to the following drop-down menu and choose modify finished click screen ICON  in the lower left corner after completed the modification



Click on the images after the ICON  in the lower left corner will jump out of a dialog box, can increase the account, account level of permissions set.

The increase of account:

In the field "User Name" enter new account Name and then click the "Add" button to complete the account of the increase. Input is selected in the "Password"

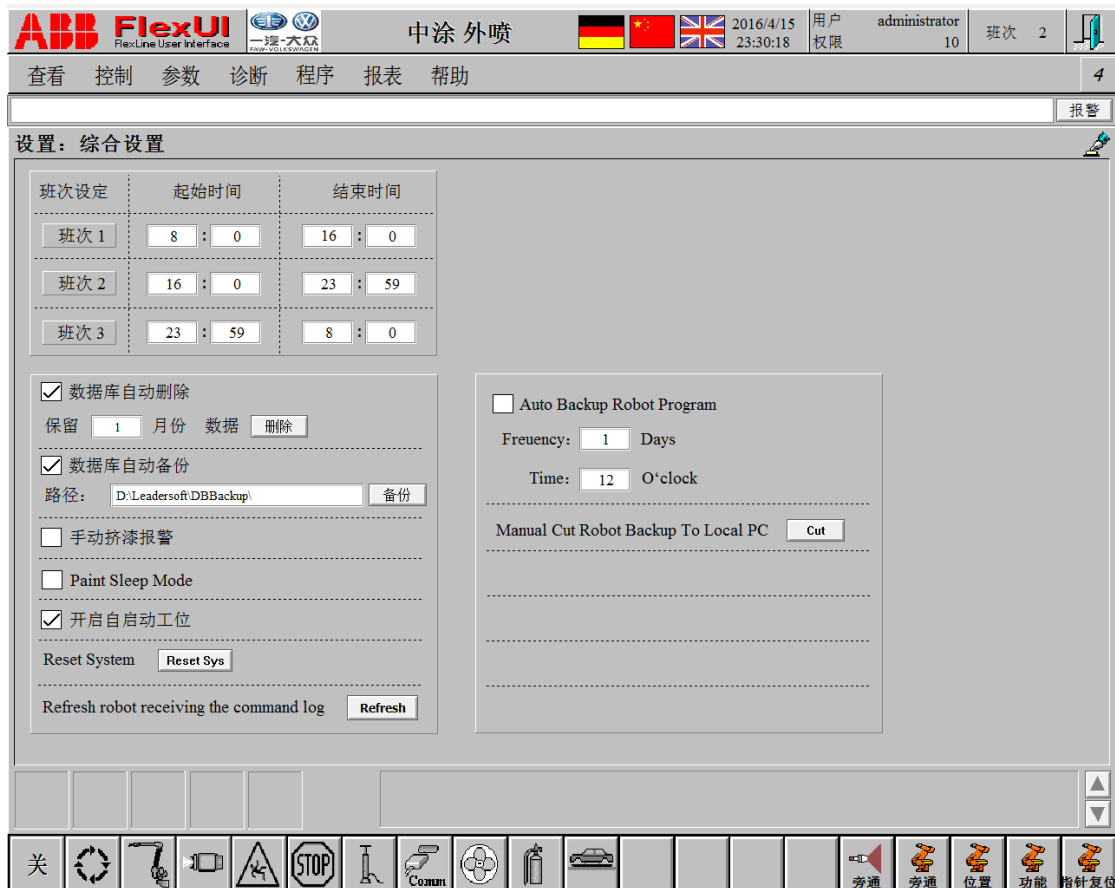
The deletion of the account:

Want to Delete the account name of selected, make its color to blue, the mouse to click "Delete" button to complete the deletion of the account



5.6 Miscellaneous Setting

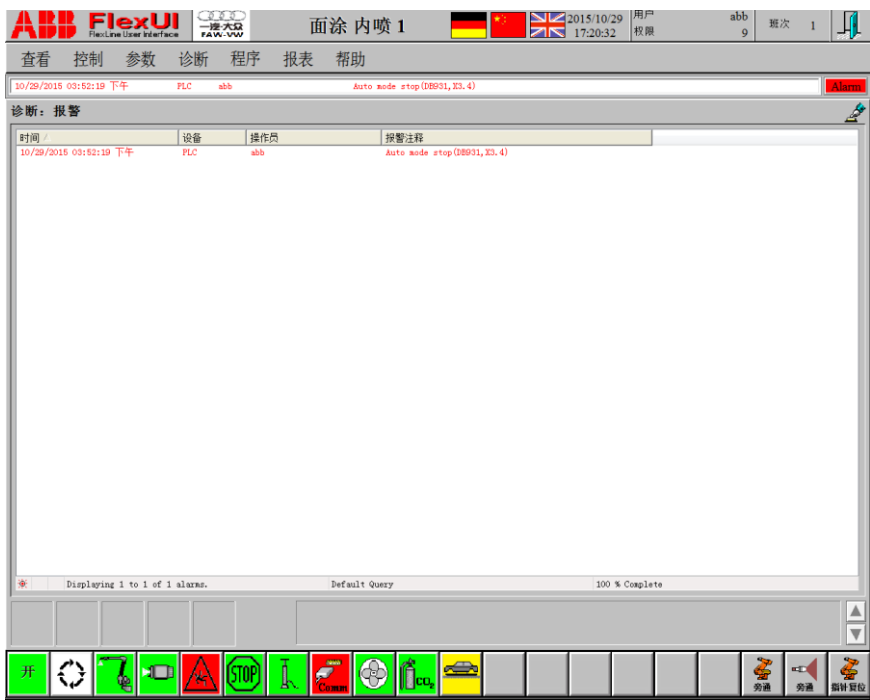
This page can be within the 24 hours a day on shift time setting.
 Can be set to delete and backup database functionality.
 Robot suto backup function.
 Manual Cut Robot backup to local PC.



6 Diagnose

6.1 Online alarm page displays all the alarm Alarm

content in real time.



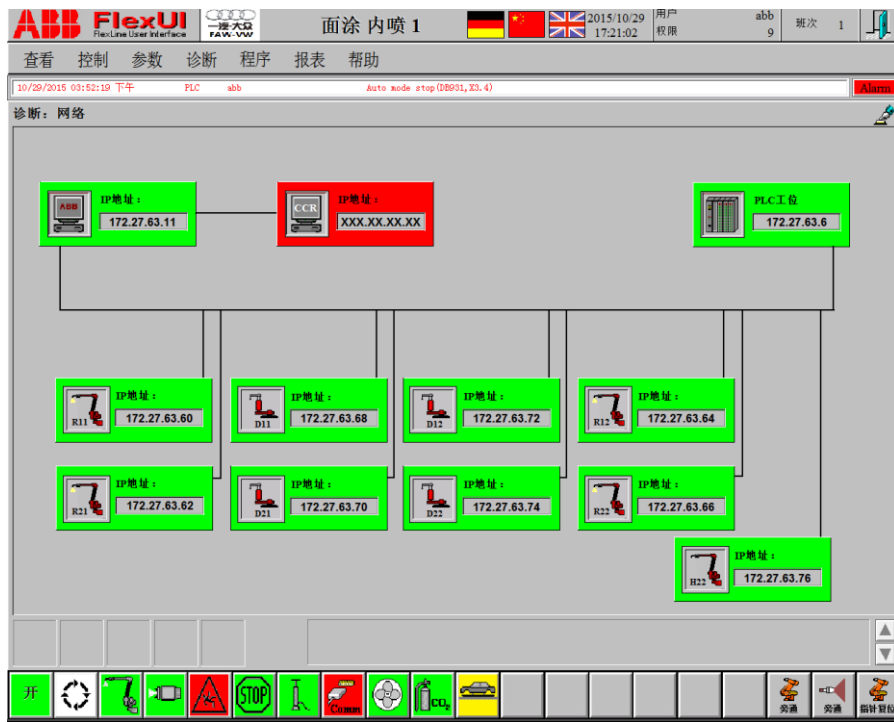
6.2 IO

Input/output page shows all the PLC/robot/remote module input and output of information, only as a read-only information. Can be used to check for user input output state.



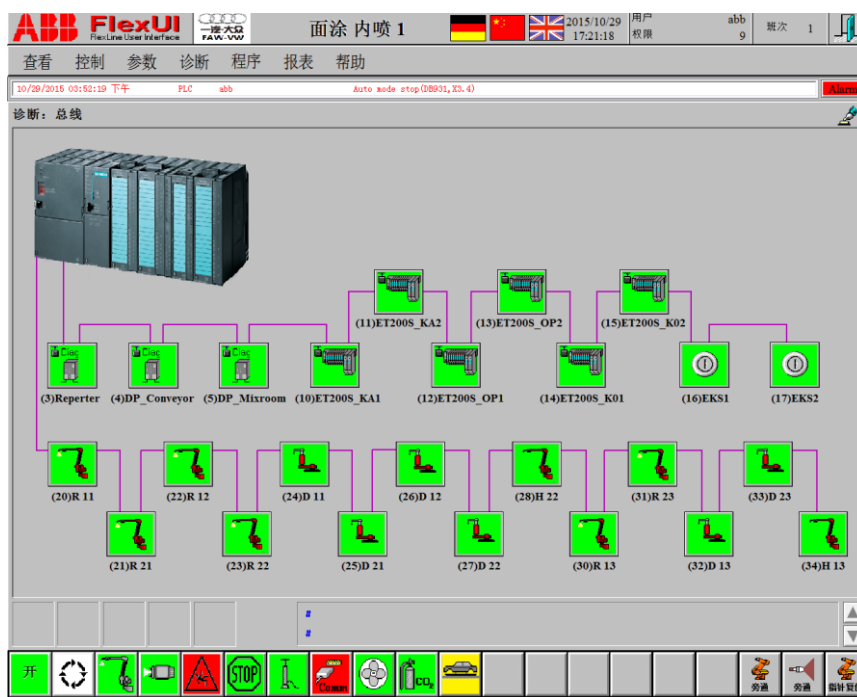
6.3 Network

Ethernet communication page shows all the Ethernet connection communication way and the man-machine interface. Note: green (connection)/red (failure)



6.4 Profibus

Can profibus page shows all the PLC communication state.



7 Report

This chapter introduces the man-machine interface of the reporting system.

7.1 Production

The history of the production report page allows users to view this site in the production of statistical reports.

From the switch to the other picture, will be displayed in the default Settings on the day of the recent article 100 under the all models all color in descending order of production records.

On the right side of the production report will record every car of automatic spraying stops time, outbound time, whether spraying, car model, color, production shift, shift production quantity, the total consumption of paint on the local volume.

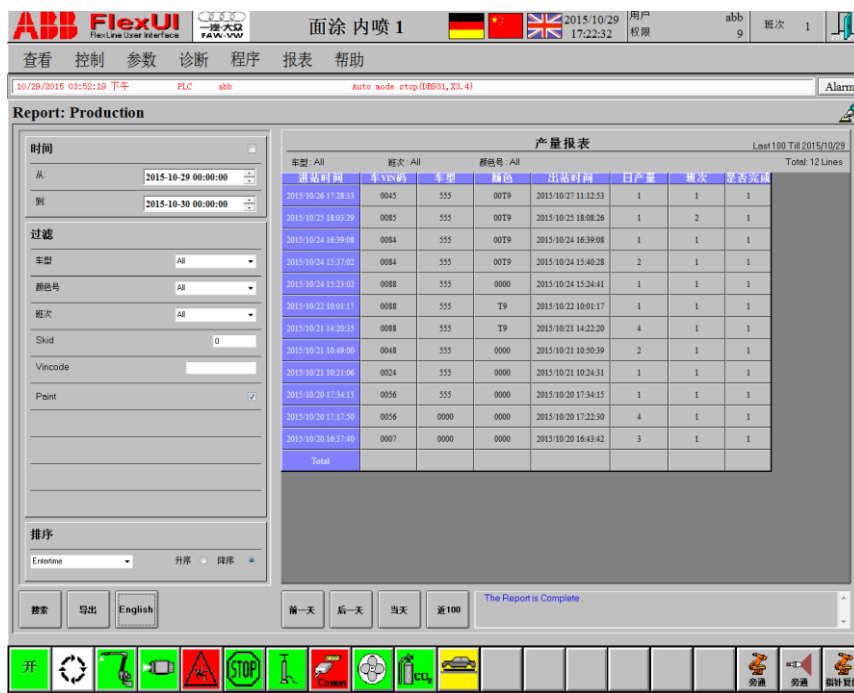
Column can be set to "time" to display the beginning and end of the production of statistical time Settings

To "filter" column can be set set need to statistical models

"Color" filter - need to color Settings

For "shift" column can be set to the divisions of the statistics need to be set

To "sort" column can be set in accordance with the specified parameters are ascending or descending order Settings



- Function button (from left) :
- Search: search capabilities
- Export: export to Excel file
- English: change to Chinese
- Records of the day: the day before
- Day 2: record the next day
- Today is: today's record
- Over the past 100, 100 records in the past

7.2 Consumption

The history of consumption log report page allows users to view this site consumption log statements.

From the switch to the other picture, will be displayed in the default Settings of the day's recent article 1000 of the most important operation record.

On the right side of the production report will record every important operation records, including time, operator, registration operation, divisions, and operating content page.

Column can be set to "time" to display the beginning and end of the production of statistical time Settings

"Column for" filter - operators can be set to statistical operator set

To "filter - shift" column can be set to the divisions of the statistics need to be set

To "filter - page" column can set need statistics page Settings

To "sort" column can be set in accordance with the specified parameters are ascending or descending order Settings



7.3 Operation

The history of operation log report page allows users to view this site operation log statements.

From the switch to the other picture, will be displayed in the default Settings of the day's recent article 1000 of the most important operation record.

On the right side of the production report will record every important operation records, including time, operator, registration operation, divisions, and operating content page.

Column can be set to "time" to display the beginning and end of the production of statistical time Settings

"Column for" filter - operators can be set to statistical operator set

To "filter - shift" column can be set to the divisions of the statistics need to be set

To "filter - page" column can set need statistics page Settings

To "sort" column can be set in accordance with the specified parameters are ascending or descending order Settings



7.4 Alarm

Alarm log report page allows users to view this site by PLC read alarm log statements. From the switch to the other picture, will be displayed in the default Settings on the day of the recent article 100 alarm record.

On the right side of the production report will be recorded by PLC told police record, including time, equipment, type, number, duration, frequency, message.

Column can be set to "time" to display the beginning and end of the production of statistical time Settings

The "filter - equipment" column can set the set of equipment to be statistical

To filter - type "column" can set the type of alarm set need to statistics

To "filter - shift" column can be set to the divisions of the statistics need to be set

To "filter - news" column can set need statistics message set

To "sort" column can be set in accordance with the specified parameters are ascending or descending order Settings



8 Tool

8.1 ShopFloor Editor

8.2 Robot Studio

8.3 RobView

8.4 Process Manage

Process Manage is the tools for update robot brush tables.

	Fluid	Atom	Shape 1	Shape 2	HV	Description
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						

Choose Robot: 用来选择要修改的机器人。

Choose Brush: 选择将要修改机器人的刷子。

Create: 用来创建新的刷子表。



: 用来修改完成后保存到机器里面的按钮。

9 Help

9.1 FlexUI

FlexUI help pages connected FlexUI man-machine interface of user manuals.

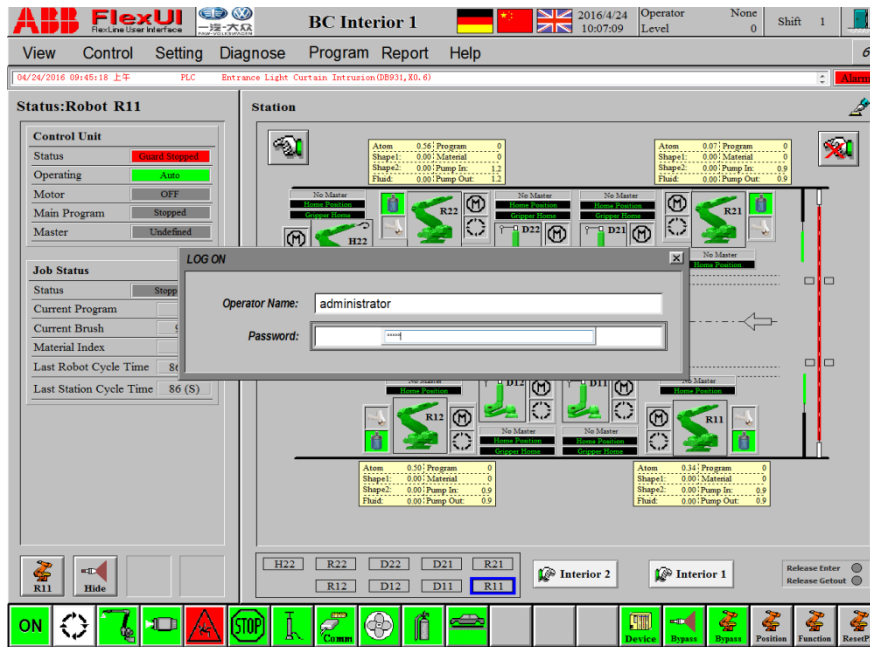
9.2 Robot

Robot help page link Robot user manuals.

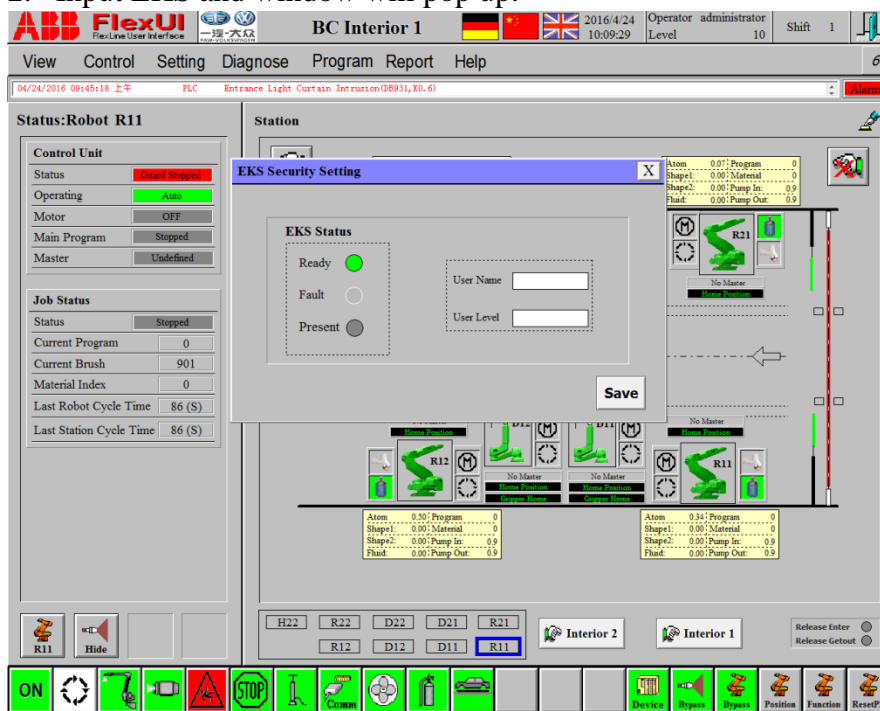
10 EKS Setting

Administrator access is needed when you want to manage EKS.

1. First input administrator user name and password log on FlexUI.



2. Input EKS and window will pop up.



Input user name.

Inputs user level.

Click save button and wait a moment.

Pull out EKS and finish setting.