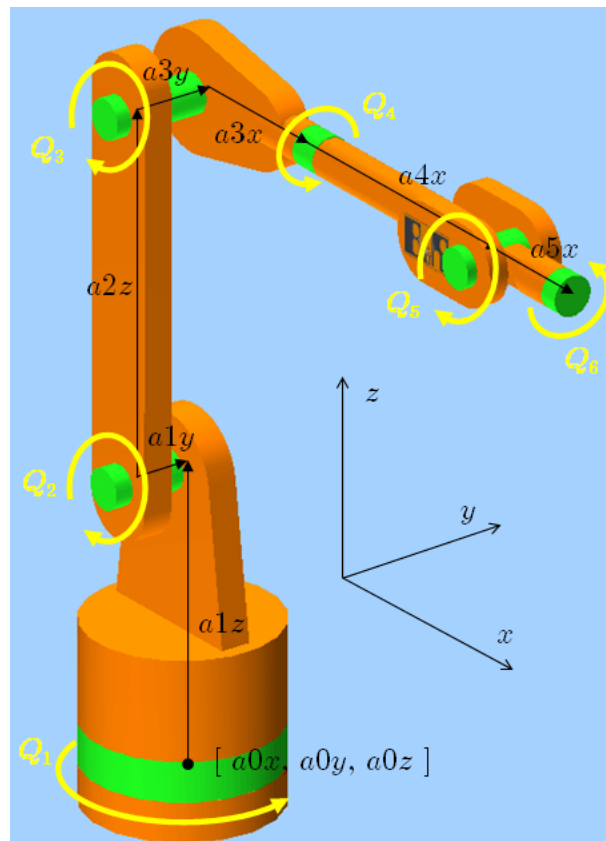


6-Joints B&R robot Documentation

ABB B&R 6 JOINTS INDUSTRIAL ROBOT
JOHNSON HAORAN JI



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1. Version

Version number	Date	Illustration	Author
06.20	2025/06/20	The version 1.0	Johnson Ji
06.27	2025/06/27	Update with new status bar and information monitoring	Johnson Ji
07.11	2025/07/11	Update with new login system and manual mode	Johnson Ji

Table 1-Verison

2. Distribution

Name	Department	Quantity	Comments

Table 2-Distribution

3. Security



Security notation	Description
Dangerous!	It will be life-threatening if ignore
Warning!	It will cause serious damage to both humans and means of production
Attention!	It will cause damage to both humans and means of production
Note:	Important information to avoid the error happening

Table 3-Security

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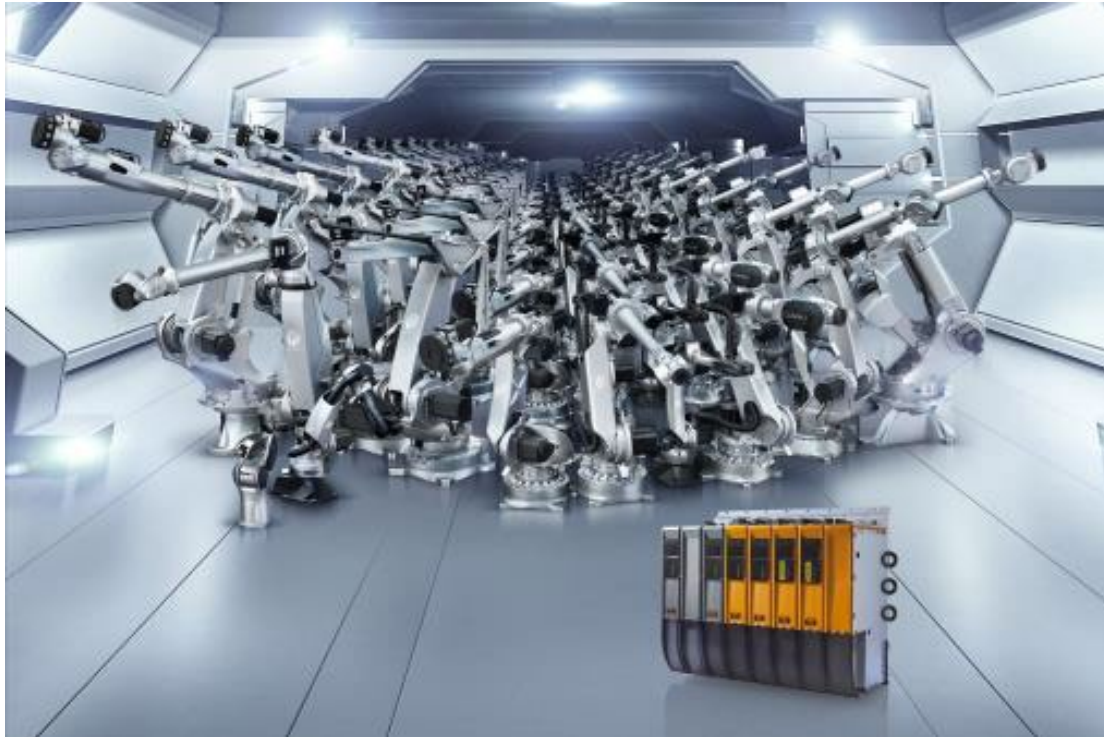


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1. Brief description of the equipment

◆ 6-Joints robot



The six-joint robot is applicable to high-speed palletizing, logistics handling, machine tool loading/unloading, and other fields. Through optimal trajectory planning, it ensures high-speed, high-precision, and smooth operation. Enabled by Mapp modular intelligent machine development, a web-based graphical configuration and diagnostic interface replaces programming with configuration, making robot development and operation faster, simpler, and more efficient.

◆ Prerequisite



Operators must fully read and understand the documentation before operating the robot.

Programmers must master the ST (Structured Text) programming language compliant with the IEC 61131-3 standard.

◆ **Security**

Before operating this system, you must thoroughly read and fully master this manual and all supporting materials. Only after acquiring complete knowledge of equipment operations, safety protocols, and precautionary measures may you commence usage. Safety precautions in this manual are categorized into four levels and marked respectively as: "DANGER!", "WARNING!", "ATTENTION!", and "NOTICE: ".

● **1.1 Hardware**

ATTENTION!

Use standardized power supply (380V AC, 3-phase).

Ensure the braking resistor's rated power and impedance match actual requirements.

Verify proper shielding integrity of signal cables and enhance motor shielding protection with compliant ground wiring.

● **1.2 Load weight**

DANGEROUS!

Please do not make the actual load weight higher than the maximum designed weight.



● 1.3 Working environment

Return the robot to zero position when not in use for extended periods.

DANGER! Do not approach the operating area while the robot is in motion.

DANGER! Press the EMO button immediately in emergencies.

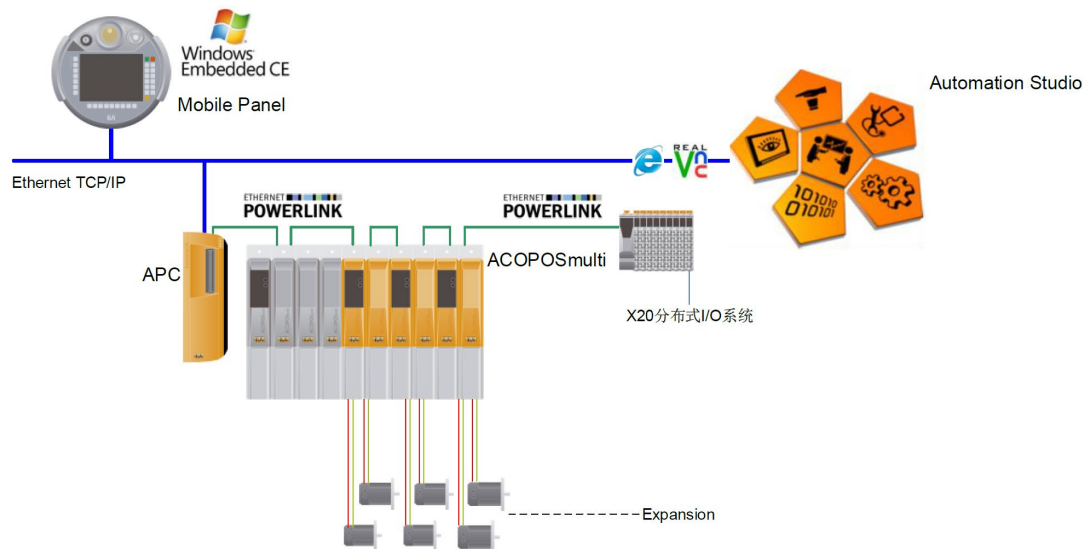


ATTENTION! The bottom of the robot must be fixed, otherwise it will cause vibration when doing the high-speed motion.

WARNING! Please read the documentation carefully and fully understand the basic knowledge of how to operate the robot.

1 Hardware configuration

The hardware configuration overview is shown; the hardware configuration will be different according to the actual requirements; for example, choose APC2100 as IPC, operation panel T30, and servo motor from other companies.



The brief description of the hardware configuration is shown on the next page; for the details of using the PLC, please make a reference from the corresponding hardware operation document.

Controller:

X20 series controller, X20CP1586. Intel Atom 1.6 GHz processor, 512MB DDR2 SDRAM memory 4GB, 4 cores.

Display & monitoring:

This HCI is based on the HTML web page, which is using mouse and touchscreen to do the operation.

The alternative controller is Mobile Panel MP50 series: 6.5 inch SRGB touch screen with 31 system buttons, emergent stop button and key switch.



Drive and motor:

ACOPOSmulti servo motor drive system with modular design, also support the extension I/O.

Support to other servo drive and motors.

I/O system:

X20 distributed I/O module, can be extended by actual requirements.

2 Description of operation interface





This documentation is based on touchscreen control, so the following examples are done on the touchscreen rather than MP50 controller.

The function and navigation buttons lie on the left and right tools bar, the upper bar displays the status of the robot and shows information. The center is the monitoring window.

● 3.1 Information bar






The information bar is on the top of HMI; from the left to right which are: system status signal, power signal, username, page navigation, program name, run program mode, error status signal, robot status signal and local time.


The system status signal  indicates the robot system is ready to work without error; the  red light indicates the hardware has errors and the






robot cannot work.


The power signal  indicates the power system is on and robot can execute the following commands (e.g. Move Program); the power signal  indicates the power of the robot is off and all the other functions are blocked unless the power is on.

The username bar  shows the name of the current login user; for example, if the current user is User_1, then the bar will display User_1.


The page navigation bar shows the name of the current page , and the page navigation bar only shows the top-level menu, not for second-level menu.

The program name bar  shows the name of the current program that is executed by robot. The default program is “Robotics.st”.

The single step mode  indicates the execution of the program will be line by line; after executing a code line, the program will stop until the continuing signal is true.  The continuous step mode indicates the execution of the program will continuously running until detect the END_PROGRAM. More details of the single step will be written in the introduction of the operation interface.




 The “no error” single indicates there is no software error, and the operator can execute the program or use the manual mode to manipulate the



robot. The error signal  indicates the AS has software error (e.g. when the program has conflict with the physical restriction of the robot, the AS will raise an error), the program cannot be executed unless the error is solved.



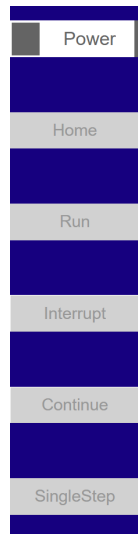
“IsHomed” signal indicates whether the robot has homed. Attention: the signal will be visible after the first time to execute the “homing” command.



In the program status bar, the signal  represents the program is running and robotic arm is moving as well;  the pause signal represents the program is interrupted but not over. The  stop signal appears if and only if the stop variable is set to true; normally when the program is over the stop signal will not appear.



Monday, July 21, 2025 1:06:58 PM

The clock bar is displaying the local time in PLC, while the smallest unit is second. Clicking the bar can get time.

● 3.2 Left tools bar

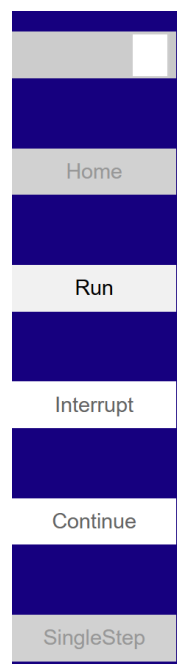


The left tool bar integrates the functional buttons and switches; the top switch is power switch; when the user enters the system, if the power switch is off  then all the other functional buttons are not enabled to be used unless the power is on  (Warning! This is considering the potential risks and errors for executing the program without opening the power, might cause the AS software errors). After manipulating the power switch, the power signal on the information bar will change correspondingly.

The home button is a toggle button, which means it also has 2 statuses (on  or off ). Note: in order to make the “homing the robot” function easier to use, this HMI makes the home button to be auto reset; when the robot is homed successfully, the home button will automatically reset to false status. Note: for the first time that entering the system, the user should click the home button first after the power is on, unless other functional buttons are not enabled to use.



The run button is binding to the “move program” command in AS, which means execute the current selected program in AS (e.g. in this paragraph, the run & run button only represents the “move program” command, rather than other types of running like move direct absolute). The run button also be a toggle button, when the programing is running, the run button is on and all the buttons except “interrupt” and “continue” buttons are not enabled to use, until the program is ending (Warning! This is protecting the equipment since the important status signal like run program or power can not be changed during the robot is moving, otherwise will cause the unexpected behavior and cause the potentially dangerous events). The run program button also be auto reset; when the program is end then the run program button will be reset to false.



Interrupt and continue buttons are using to pause and continue the current program; they are enable to use if and only if the program is running, and when the robot is in IDLE status (leisure status) then the interrupt and



continue are not enabled to use (Note: this is because the command of interruption and continue are only be meaningful when the robot is moving). The interrupt and continue buttons are designed as mutex lock, when the interrupt button is triggered (e.g. the value of interrupt variable in fbMy6Axis is true is AS), then the continue button is set to be false to avoid the conflict signal, and vice versa. Note: the interrupt button will not terminate the program, unless the program is executed to END_PROGRAM.

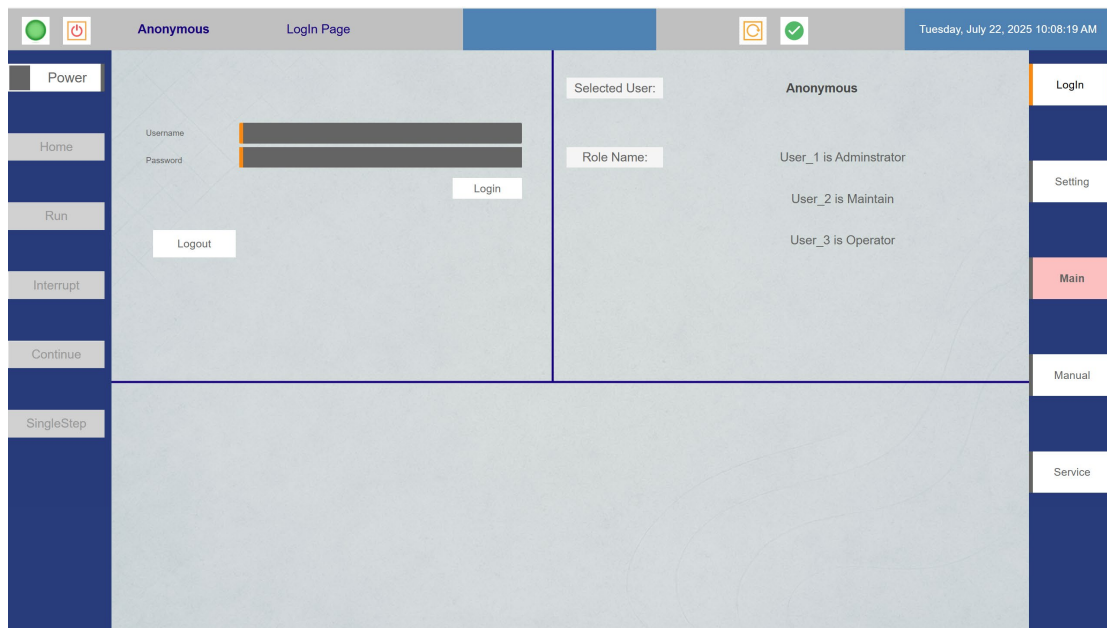
The single step button is a toggle button, the default status continues, which means the program will be executed until finish, unless it will not stop. The single step mode will only execute one line of code, then the program executor will stop until the signal of continue to be true. Note: in the single step mode, the operator should click the “continue button” after the robot executes a line of the program, otherwise the execution of program will stop.

- **3.3 Right tools bar**



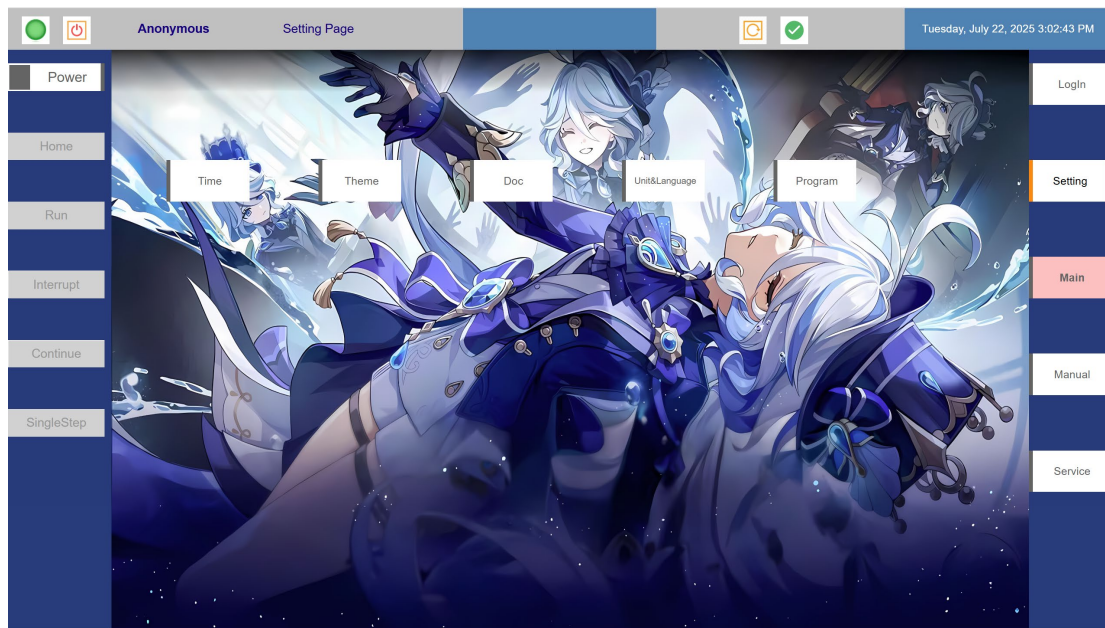
There is a total of 5 navigation buttons on the right tools bar: login button, setting button, main page (monitor) button, manual mode button and service page button. The default page is the main page; when the user enters the system, even though the power is off. The navigation buttons will change the current displayed page to the corresponding page.

■ 3.3.1 Login page

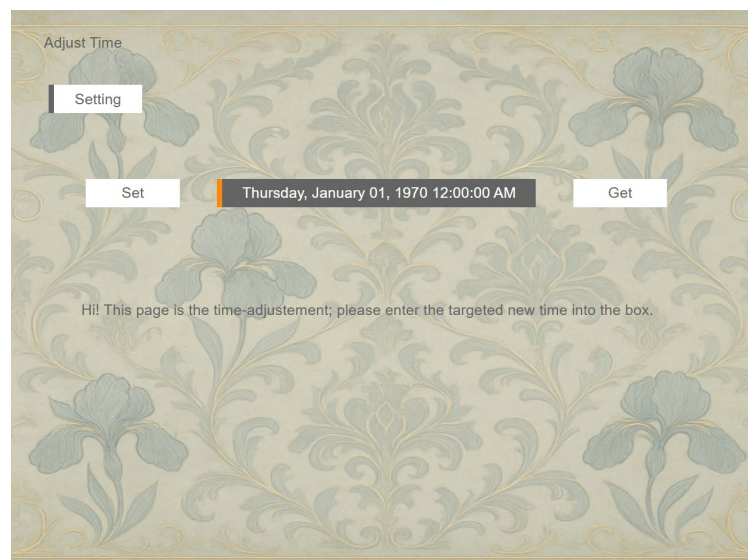


Login page is a self-user management system; users can log into corresponding roles based on their required operation permissions (three preset roles: Administrator, Maintainer, and Operator). In the login window at the top-left corner, enter a username (e.g., User_1) and the corresponding password to access the current role.

■ 3.3.2 Setting page



Setting page contains five second level page navigation buttons, which are time adjustment, theme adjustment, documentation page, unit & language settings and program selection.

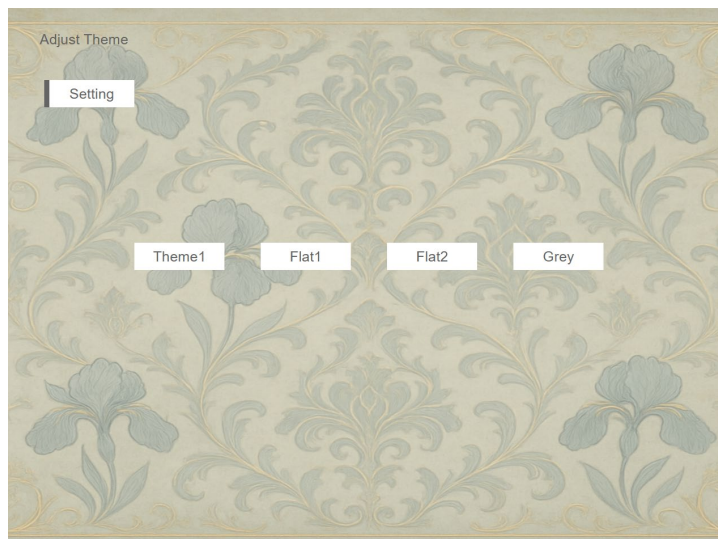


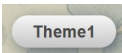
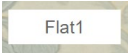
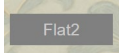
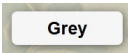
In the time adjustment second level page, the centered widget is time input, which allows the user to select the time since 1970:



Thursday, January 01, 1970 12:00:00 AM						
1968						
1969						
1970	January	01	00	00	00	
1971	February	02	01	01	01	
1972	March	03	02	02	02	
Reset					Enter	

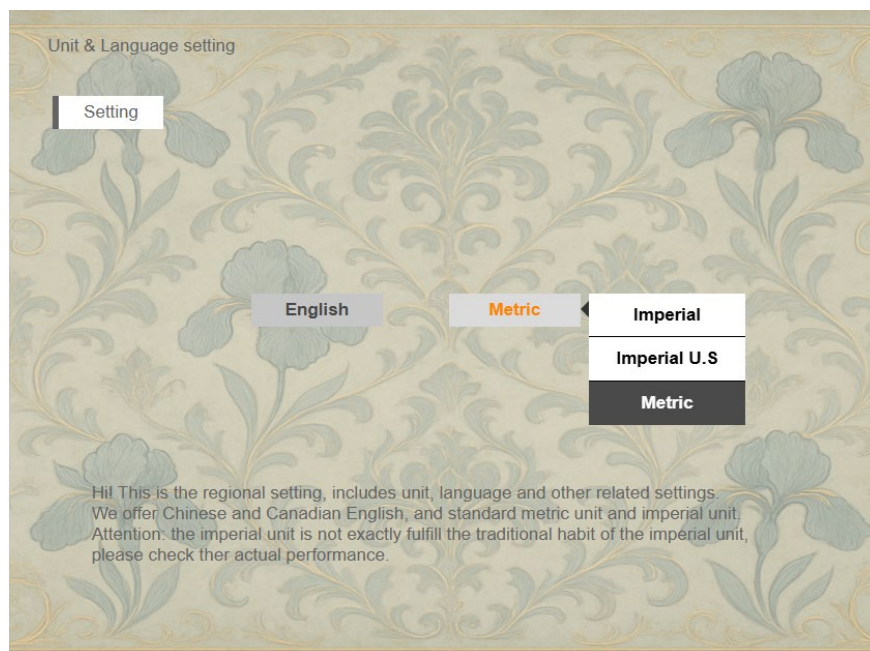
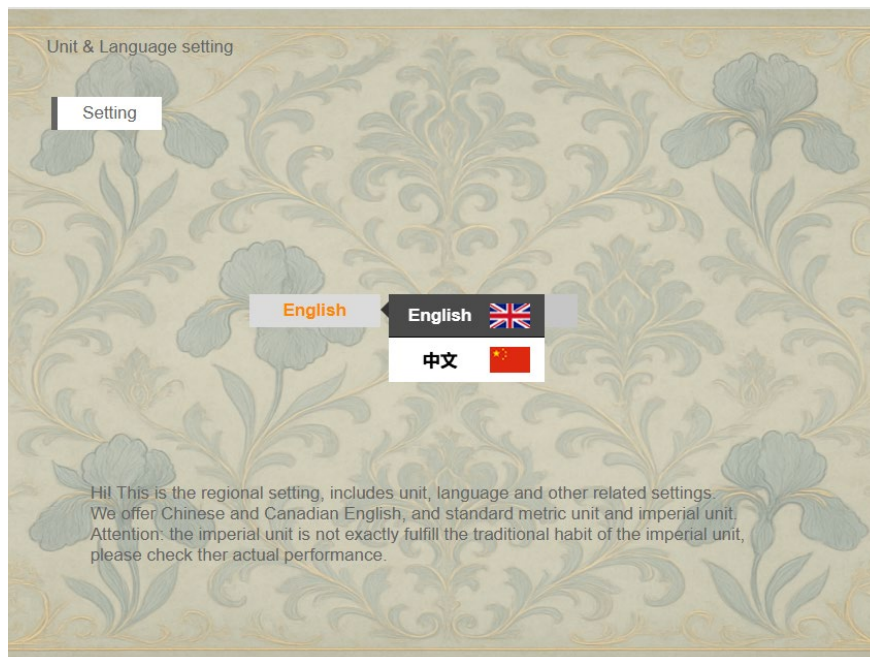
. Click “Enter” to save the adjusted time. If the user wants to apply the new time that saved by time input widget, click “Set” button to override the current local PLC time; click “Get” to access the latest updated time and asynchronized to the time output widget on the information bar.



The theme adjustment page can allow the user to change the theme from the 4 default themes: Theme 1 , Flat 1 , Flat 2 , and Grey .

The documentation page is used to display the documentation of this 6 joints robot (is the doc that currently showing).

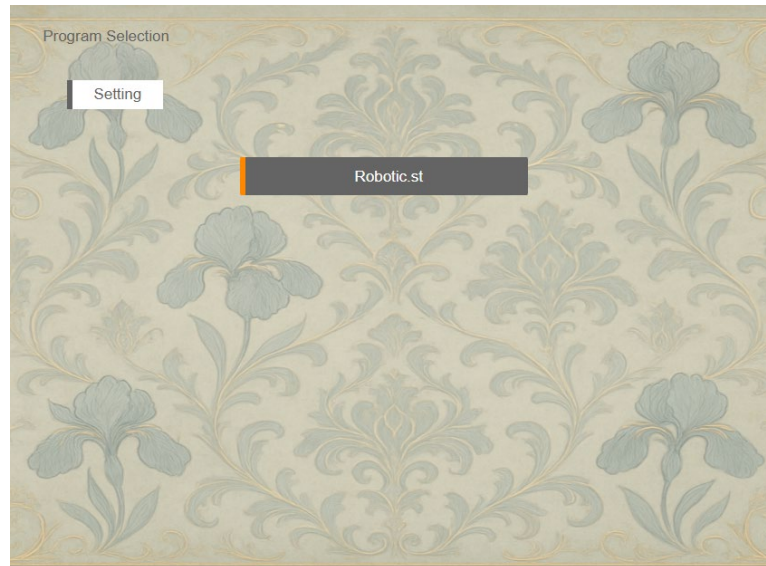
The unit & language page is used to adjust the system language and the displayed unit. The default language is English and international standard metric; the Chinese and imperial unit are available.



The program selection page is used to choose the program that want be executed by robot. Note: the program input bar needs the user to type

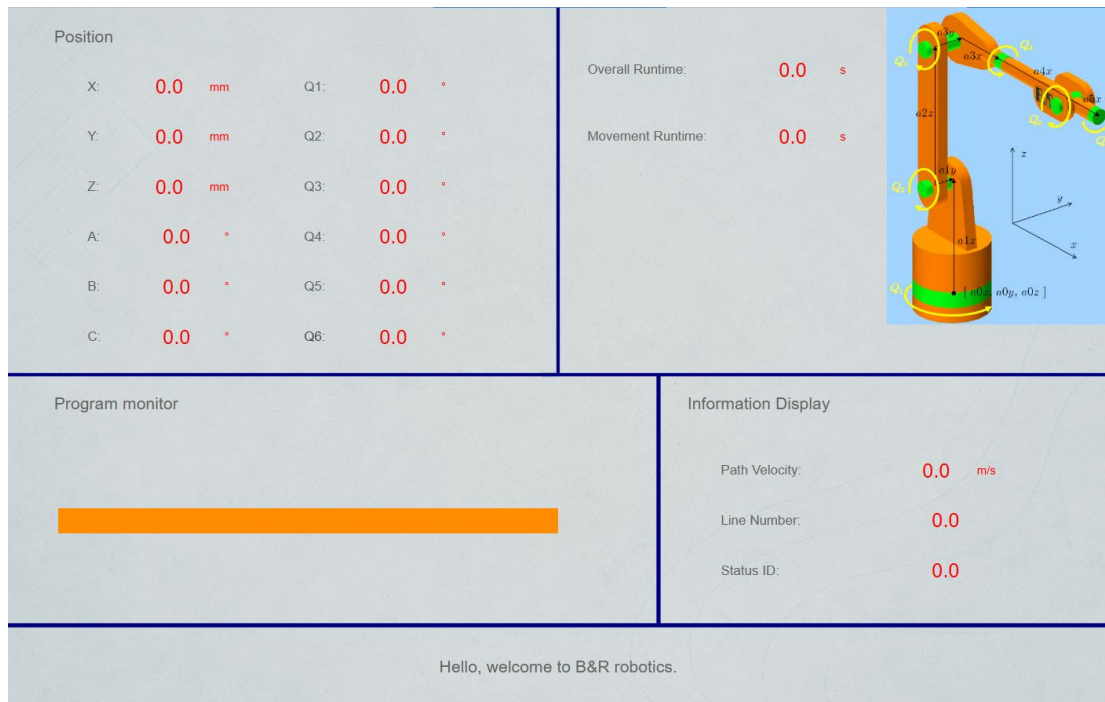


the correct name of the program, otherwise the AS will raise the error.



■ 3.3.3 Main Page

Main page is the monitor, which can visualize the key parameters of the robot and monitor the execution of the program.



There are 5 different regions in the main page, which are position display (up left), runtime & robot overview (up right), program monitor (down left), system information monitor (down right) and the message bar (bottom). The following paragraphs describe the functions of each part.

The position monitor is used to display the relative position (TCP position, X, Y, Z, A, B, C) of the robotic arm, and the rotation degree of each joint (Q1 to 6).



Position					
X:	0.0	mm	Q1:	0.0	°
Y:	0.0	mm	Q2:	0.0	°
Z:	0.0	mm	Q3:	0.0	°
A:	0.0	°	Q4:	0.0	°
B:	0.0	°	Q5:	0.0	°
C:	0.0	°	Q6:	0.0	°

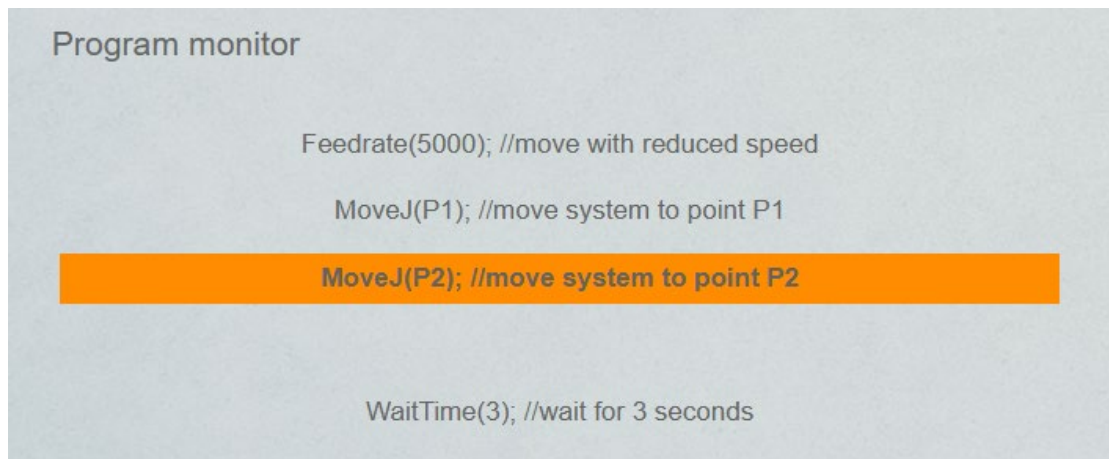
The default units are millimeters (mm) and degree (°) in metric, and in imperial unit system are inch (in) and radian (rad).

The robot overview region displays the overview axis reference picture of the robot, overall runtime and movement runtime (for recording the time of the movement of the robotic arm).

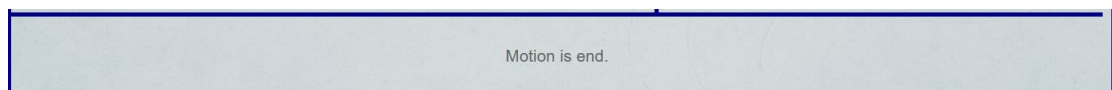




The program monitor has five lines, which can show the current, previous, next, second previous and second next line of the current executing program. The current line of the code is highlighted by the orange background.



The system information monitor shows the velocity of the moving arm, the line number of the current executing code and the status ID is the status series number in AS.

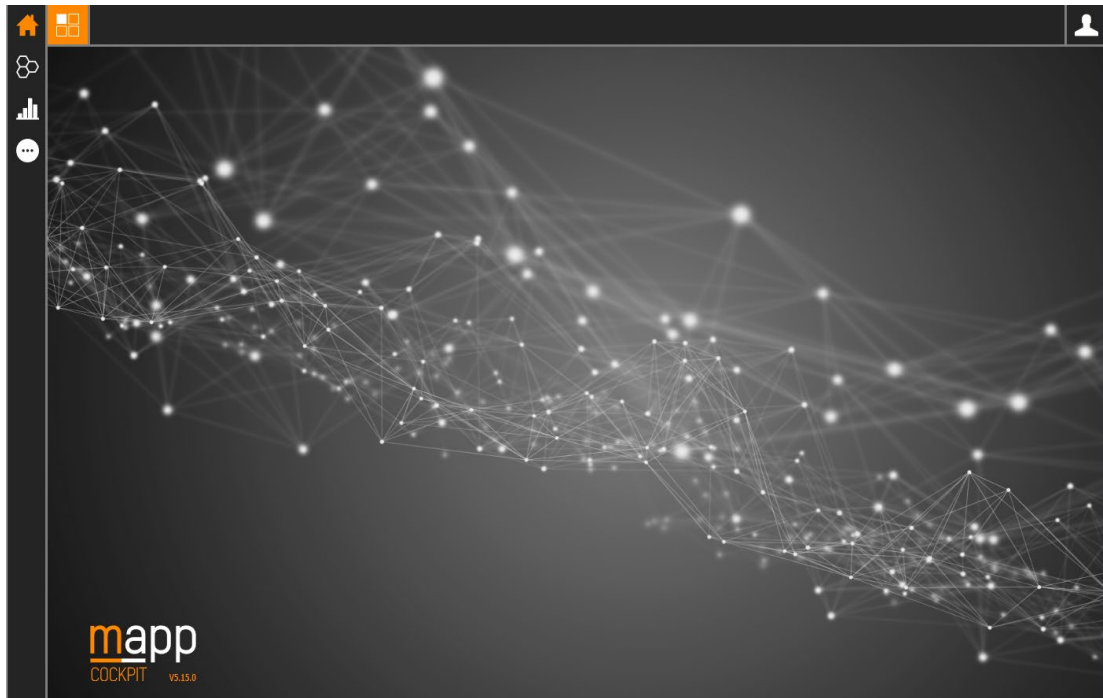


The message bar will display the brief description of the current status and behaviors of the robot; when the user enters the system, the message bar will display “Hello, welcome to B&R robotics” to navigate the user to do the next step. When the power is on, but the robot has not homed, the message bar will show “The robotics has not homed yet”; when the home button is clicked then the message bar will show “The robotic is homed”. When the move program is clicked then the message will change to “The robotics is moving and driven by program”, and if the program is done, then



the message will change back to “Motion is end”. Note: this is only for the move the robot by executing the program; for the manual mode, when the user operates the robotic arm in move absolute command, then the message bar will show “The robotics is moving and driven by manual input”. When the system has the software errors, the message bar will display “Error! Please check the SDM and reset the error”. Also, when the system is interrupted, the message bar displays “The program is interrupted” to notice the user that the robot is stopped; when the continue signal is received by the robot, then message bar will redisplay “The robotics is moving and driven by program”.


■ 3.3.4 Manual Mode

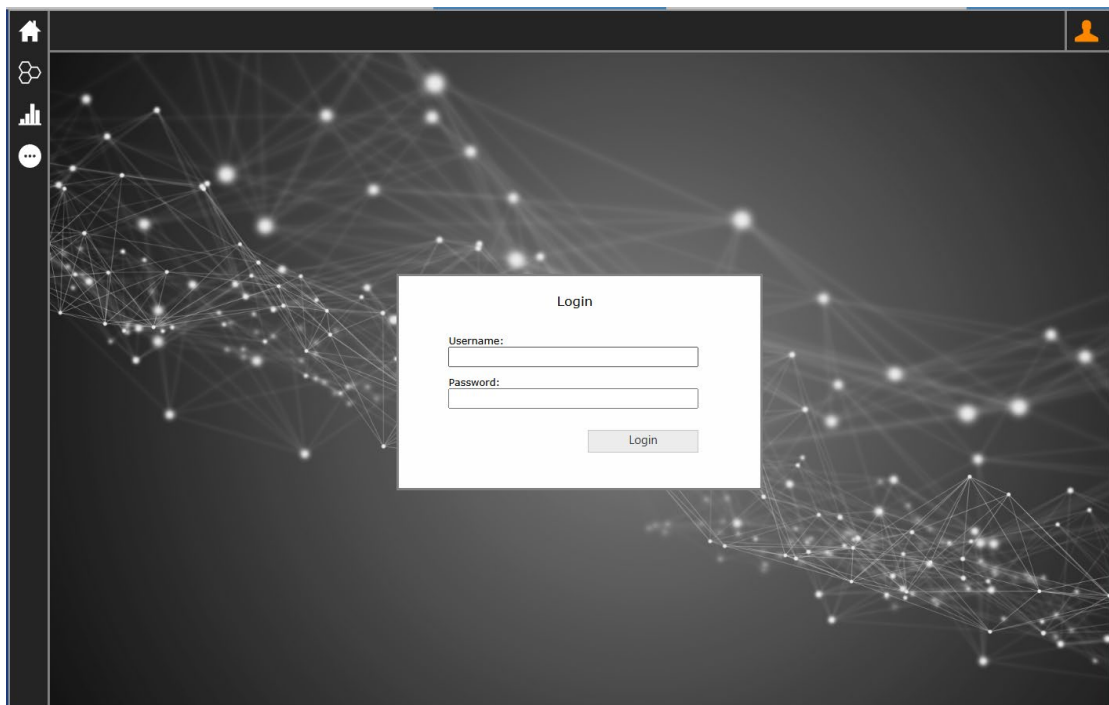



The manual mode is developed by the technology of mapp cockpit, which



integrates the web page into the operating system and allows the user to do the built-in command to operate the robot.

For each time that user enters the manual page, the upright icon, which represents the login button for manual mode,  should be clicked and the user needs to login the mapp cockpit with the same username and password with the same account in the login page (i.e., the account of this robotic OS).



After login the mapp cockpit, user should click the component overview , then click the common button of g6AxRobA





The screenshot displays the B&R software interface with three main panels: Commands, Watch, and Configuration.

Commands Panel: Lists various control commands such as Power on, Power off, Reset, Stop, Home, Continue, Interrupt, Move program, Move program continue, Move block, Move direct absolute, and Move direct relative. Below the list is a table for parameters:

Parameter	Value	Unit

Watch Panel: Displays real-time data for various system states and positions.


Name	Value
PLCopen state	Group standby
Communication ready	true
Ready for power on	true
Is powered	true
Is homed	true
MCS position 0 X	1237.500
MCS position 1 Y	0.000000
MCS position 2 Z	1466.000
MCS position 3 A	0.000000
MCS position 4 B	0.000000
MCS position 5 C	0.000000
JACS position 0 Q1	0.000000
JACS position 1 Q2	0.000000
JACS position 2 Q3	0.000000
JACS position 3 Q4	8.282925
JACS position 4 Q5	0.000000
JACS position 5 Q6	-8.282925
ACS position 0 gAxisQ1	0.000000

Configuration Panel: Shows the setup for the robot's axes and joints.

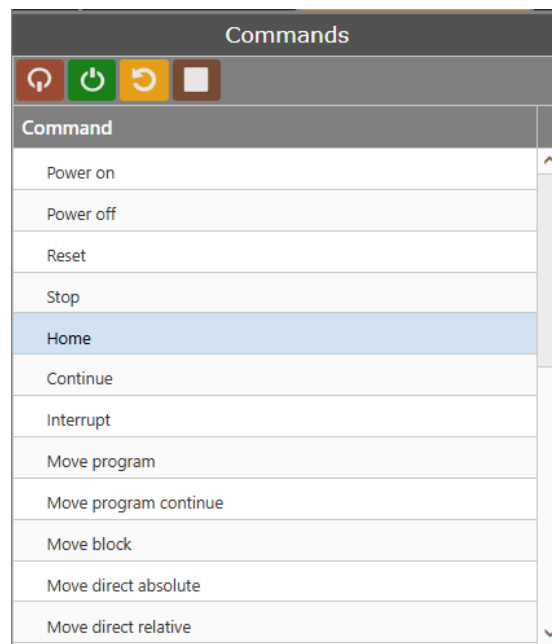
Name	Value	Unit
[DEV]Settings		
[DEV]Processing task class	Cyclic #1	
[DEV]License	Single	
[DEV]PhysicalAxes		
[DEV]JointAxes		
[DEV]JointAxis[0]		
[DEV]Name	Q1	
[DEV]Axis reference	gAxisQ1	
[DEV]JointAxis[1]		
[DEV]Name	Q2	
[DEV]Axis reference	gAxisQ2	
[DEV]JointAxis[2]		
[DEV]Name	Q3	
[DEV]Axis reference	gAxisQ3	
[DEV]JointAxis[3]		
[DEV]Name	Q4	
[DEV]Axis reference	gAxisQ4	
[DEV]JointAxis[4]		

Log Panel: Shows a history of events.

Seq	Time	Description	ID
1	2025-07-29 14:41:08.099000	The axes group state has changed from GroupMoving to GroupStandby	1080229893
2	2025-07-29 14:41:08.099000	Command MoveProgram finished	1080279944

Note: if accidentally select the wrong page, click “home button”  to jump back to the last page.

Attention: when executing the robot in manual mode, please make sure to close the switches and buttons on the main page, left tool bar, or restart the AS (that is because some commands will cause the conflict and might cause the unexpected behaviors of the robot).



When the user successfully logs in and enters the control panel, the command region shows all the manual commands that can be applied on this robot; when the user chooses a specific command (for example, “move linear absolute”), the detail of this command is shown under the command region,

Parameter	Value	Unit
Position[0]	0.000000	mm
Position[1]	0.000000	mm
Position[2]	0.000000	mm
Position[3]	0.000000	deg

Move linear absolute ▶

user can enter the destination under the “value” option (for example, for position [0], the user can enter the desired value like 5 mm into the value box, then click the “move linear absolute” to execute it)

Dangerous! Since each joint has its own space limitation in each direction,



so before executing the move command, please check the space limitation document (x chapter).

The watch window allows the user to monitor the key OPC UA variables and no need to monitor them in the AS, which is a kind of encapsulation.

Watch			
Name	Value	Unit	Trend
PLCopen state	Group disabled		
Communication ready	true		
Ready for power on	true		
Is powered	false		
Is homed	false		
MCS position 0 X	1237.500	mm	
MCS position 1 Y	0.000000	mm	
MCS position 2 Z	1466.000	mm	
MCS position 3 A	0.000000	deg	
MCS position 4 B	0.000000	deg	
MCS position 5 C	0.000000	deg	
JACS position 0 Q1	0.000000	deg	
JACS position 1 Q2	0.000000	deg	
JACS position 2 Q3	0.000000	deg	
JACS position 3 Q4	0.000000	deg	
JACS position 4 Q5	0.000000	deg	
JACS position 5 Q6	0.000000	deg	
ACS position 0 gAxisQ1	0.000000	deg	
ACS position 1 gAxisQ2	0.000000	deg	

Note: the watch window cannot

monitor the variable that is defined by the user; only the system variables can be seen.

The configuration window is used to set the name of each joint; also, the user can also adjust the other hardware settings of the mechanical system (for example, the TCP resolution).



Configuration			
Name	Value	Unit	Description
[-] [DEV]SingleAxes			
[-] [DEV]SingleAxis Count	0		
[-] [DEV]MechanicalSystem			
[-] [DEV]Mechanical system reference	MechSys_6AxRobA		Name of the mechanical system reference
[-] [DEV]BasicSettings			
[-] [DEV]Modal data behaviour	Reset to default		All modal data is reset to the default/configured value for the n
[-] [DEV]GeometryPlanning			
[-] [DEV]Rounding mode	Standard		Defines the used rounding mode
[-] [DEV]Max corner deviation	0.000000	measurement un	Defines the maximum corner deviation for non tangential path
[-] [DEV]Max tangential transition deviation	0.000000	measurement un	Defines the maximum contour deviation for tangential path tra
[-] [DEV]Max radius deviation	0.001000000	measurement un	Defines the tolerance if circle interpolation is programmed with
[-] [DEV]Working plane	XY		Defines the initial active working plane
[-] [DEV]TCPResolution			
[-] [DEV]Length resolution	0.001000000	measurement un	Resolution of linear TCP coordinates
[-] [DEV]Angle resolution	0.001000000	measurement un	Resolution of rotary TCP coordinates
[-] [DEV]Trajectory planning	Basic		
[-] [DEV]Limit check resolution	User defined time		Time resolution of the trajectory planner in which the limits
[-] [DEV]Time	0.01000000	s	
[-] [DEV]Buffer time	User defined time		Maximum buffered timespan which is precomputed

The notification bar lies at the bottom of the mapp cockpit window, which is similar to the message bar, whose mentioned at previous paragraph; there are 4 regions in the notification bar: severity, time, description and ID. “Severity” represents the priority of the message; “time” represents the time of the command that be executed by the user; description gives the brief explanation of each message, and explain their types (for example, this message comes from an error, and caused by the software error from AS, etc.). The far right is the status ID, which offers a 10 digits long series number, and the user can check for more information according to this status ID in the BRhelp.



Severity	Time	Description	ID
	2025-07-30 09:01:56.111000	Command GroupSetOverride started	1080279059
	2025-07-30 09:01:56.111000	Command GroupSetOverride started	1080279059
	2025-07-30 09:01:56.111000	Command GroupSetOverride started	1080279059
	2025-07-30 09:01:55.291000	The axes group state has changed from GroupStartup to GroupDisabled	1080229893
	2025-07-30 09:01:55.291000	Command: GroupInitialization finished	1080242179
	2025-07-30 09:01:53.912000	MpRoboArm6Axis.Update call	1083182720
	2025-07-30 09:01:53.912000	MpRoboArm6Axis.Enable call	1083182720
	2025-07-30 09:01:53.912000	MpRoboArm6Axis.Enable call	1083182720
	2025-07-30 09:01:52.132000	Using System Module 'McPathXT'	1080033316
	2025-07-30 09:01:52.132000	Command: Initialization of Interpreter for g6AxRobA finished	1080575619

■ 3.3.5 SDM service page

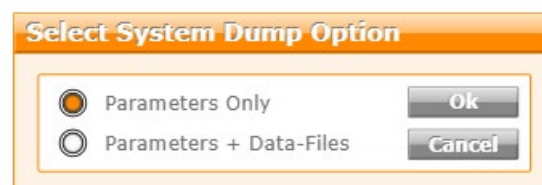
The service page is developed by the technology of SDM, which is B&R system diagnostic manager. In the service page, the user can monitor the status ID of the system and the error status (note: the error status can only be 0 or 1; when the system does not have the error, then error status is 0, otherwise it will be 1). The error reset button also is a toggle button, and it is valid if and only if the system has the software errors. For the systematic or hardware errors, the error reset button is not applicable; for these circumstances, try to warm restart the system in AS or detect the hardware errors of equipment.



In the SDM control panel (which is 1024x768 pixels); in the home page, there are 6 sections: system dump, target, hardware, motion, application status, CPU mode.

■ 3.3.5.1 System dump

There are two default modes for the system dump option, which are parameters only (the default one), and the parameters + data files. The second option is used for the external file assistant.



■ 3.3.5.2 Target



B&R System Diagnostics Manager
PERFECTION IN AUTOMATION
A MEMBER OF THE ABB GROUP

SDM
System
General
Memory
Timing
CPU Usage
Software
Hardware
Motion
Logger
Profiler

System - General

Operational Values

Node number: -
Current CPU mode: RUN
Battery status: OK

CPU temperature: -
Current CPU usage: 0% History
Storage wear: -

Target time: 2025-07-31 / 12:24:47
Operating hours: -
Power-on cycles: -

CPU Configuration

Host name: br-automation
Default domain: -

CPU mode switch: 0x04
Reboot mode:
after reset: service
after powerfail: warm start

Profiling: enabled
FTP: enabled
USB install: -
USER-partition install: -

Time Synchronisation

Time zone: -
NTP server: -
NTP client: -
NTP server 1: -
NTP server 2: -
NTP server 3: -
NTP server 4: -

Ethernet Network Devices

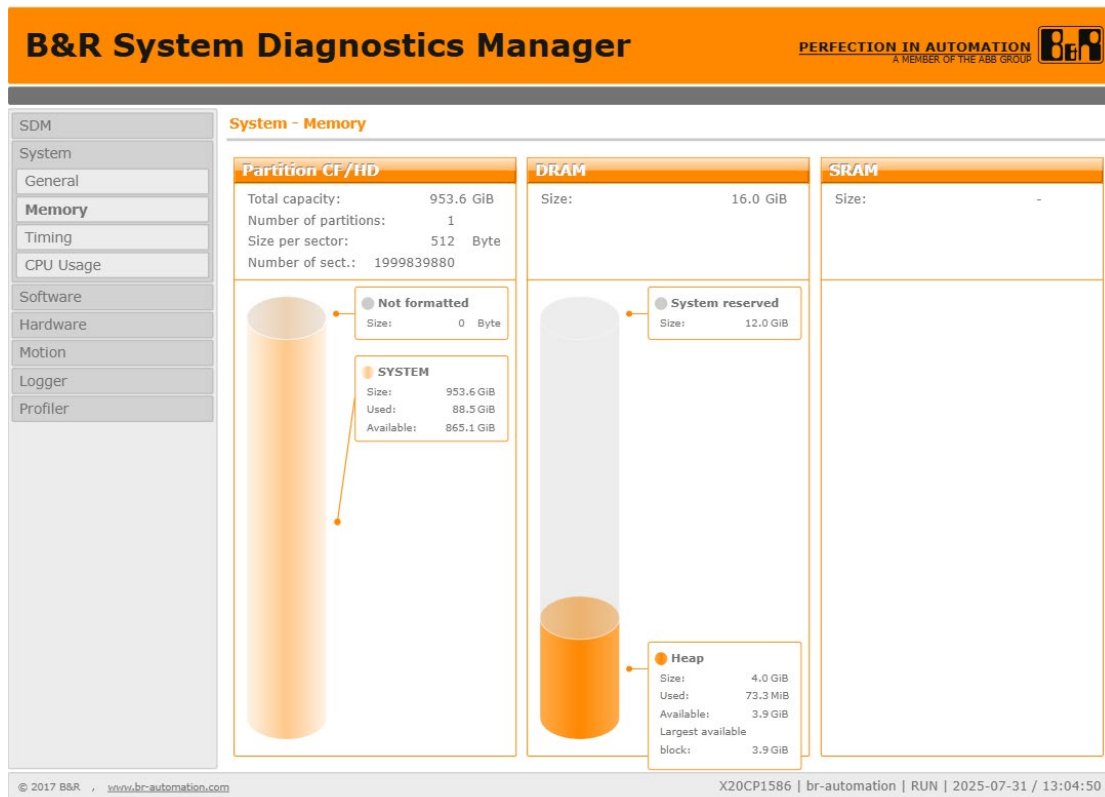
Default gateway: -
IF103 127.0.0.1

Software Versions

Automation Runtime: J4.93
Visual Components: -
Motion Control: -
CNC software: -

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X20CP1586 | br-automation | RUN | 2025-07-31 / 12:24:47

The first section under the target is the system - general. There are 5 sub sections under the target option, which are operational values, time synchronization, software versions, CPU configuration, and ethernet network device, which belong to general system information.



The second section is system – memory. There are 3 sub sections: partition CF/HD, DRAM and SRAM. This section is the memory management and PLC architecture.



B&R System Diagnostics Manager

PERFECTION IN AUTOMATION
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SDM

System

General

Memory

Timing

CPU Usage

Software

Hardware

Motion

Logger

Profiler

System - Timing

Timer Configuration

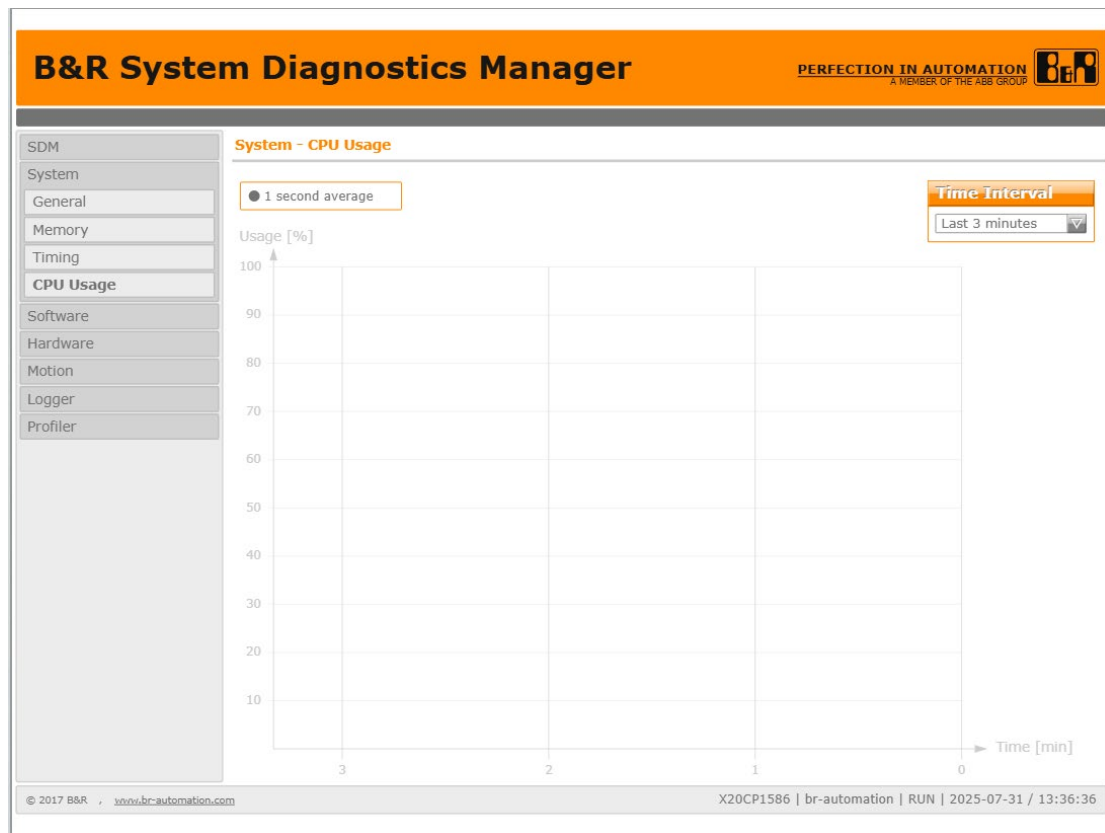
System timer:	CPU Timer	Idle task class:	-
System tick:	1000 µs	Task class idle time:	-
Multiple value of system timer cycle:	1		

Task Class Configuration

Task class	Cycle time	Tolerance	Stack	Input delay	Output delay
Cyclic #1	10.0 ms	10.0 ms	8192 Bytes	no delay	no delay
Cyclic #2	20.0 ms	20.0 ms	8192 Bytes	no delay	no delay
Cyclic #3	50.0 ms	50.0 ms	8192 Bytes	no delay	no delay
Cyclic #4	100.0 ms	100.0 ms	8192 Bytes	no delay	no delay
Cyclic #5	200.0 ms	200.0 ms	8192 Bytes	no delay	no delay
Cyclic #6	500.0 ms	500.0 ms	8192 Bytes	no delay	no delay
Cyclic #7	1000.0 ms	1000.0 ms	8192 Bytes	no delay	no delay
Cyclic #8	10.0 ms	30.0 s	8192 Bytes	no delay	no delay

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The third section is system – timing, which can monitor the timer configuration and change the period in each cycle loop.



The last sub section is the CPU usage, which is monitoring the consumption of the CPU and its energy efficiency curve for usage (in %) vs time.

■ 3.3.5.3 Hardware



The hardware section displays the hardware interface status (for example, POWERLINK); the module status and module details are on the right. If the PLC is connected to the external I/O interface, the information can be seen in IO Info.

■ 3.3.5.4 Motion

The motion section has four sub sections: axis information, NW command trace, trace data and trace operate.



SDM

System

Software

Hardware

Motion

Axis Information

NW Command Trace

Trace Data

Trace Operate

Logger

Profiler

Name:

Drive:

Address:

Not defined

Not defined..

Homing					
Controller					
Simulation					
Movement status					
Act. position [Units]	0				
Act. speed [Units/s]	0				
Enable					
Trigger 1					
Trigger 2					
Positive endswitch					
Negative endswitch					
Reference switch					
Alarm					

Axis 1 to 1 of 1

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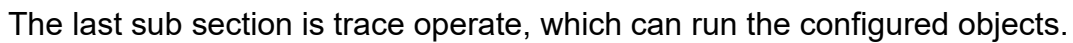
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Axis information gives the hardware status for each device.

NW command trace is tracing the running history of each project.

Trace data is monitoring the data during the execution of each project.





B&R System Diagnostics Manager
PERFECTION IN AUTOMATION
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SDM

System

Software

Hardware

Motion

Logger

Profiler

Logger

Logger Module

\$arlogsys
Upload from target

Severity	Date / Time	ID	Entered by	ASCII data
⚠	2025-07-31 / 10:54:46.797	9227	ROOT	Boot
⚠	Warning: Warm restart after software reset			
⚠	2025-07-31 / 10:54:09.065	9210	ROOT	Boot
⚠	Warning: Halt/service after watchdog or manual reset			
⚠	2025-07-30 / 09:01:46.857	9227	ROOT	Boot
⚠	Warning: Warm restart after software reset			
⚠	2025-07-29 / 14:38:01.856	7421	ansISvTcpRecv_07114D00	
⚠	Warning: PLC reset: Warm restart via communication			
✅	2025-07-29 / 14:37:56.675	3157279	inst	Configuration ID="X20CP1586_C...
✅	Project installation completed successfully			
ℹ	2025-07-29 / 14:37:56.675	1076899103	inst	Keep PV Values=No, Execute Exit/I...
ℹ	Installation settings			
ℹ	2025-07-29 / 14:37:55.851	1076899102	inst	
ℹ	Start of project installation			
⚠	2025-07-29 / 14:22:04.180	7421	ansISvTcpRecv_0DF45BC0	
⚠	Warning: PLC reset: Warm restart via communication			
✅	2025-07-29 / 14:17:43.667	3157279	inst	Configuration ID="X20CP1586_C...
✅	Project installation completed successfully			

Line 1 to 9 of 23

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The logger is the tool from the AS, which can monitor the history of each execution; the logger in the SDM basically is the integration from the AS.

■ 3.3.5.6 CPU Mode

The CPU mode is used to control the simulated device and can execute the existing project. There are 5 sub sections: operational values, CPU configuration, time synchronization, ethernet network devices and software versions.



B&R System Diagnostics Manager

PERFECTION IN AUTOMATION
A MEMBER OF THE ABB GROUP

SDM

System

General

Memory

Timing

CPU Usage

Software

Hardware

Motion

Logger

Profiler

System - General

Operational Values

Node number:	-
Current CPU mode:	RUN
Battery status:	OK
CPU temperature:	-
Current CPU usage:	0% <input style="width: 50px;" type="text"/>
Storage wear:	-
Target time:	2025-08-04 / 09:09:34
Operating hours:	-
Power-on cycles:	-

Time Synchronisation

Time zone:	-
NTP server:	-
NTP client:	-
NTP server 1:	-
NTP server 2:	-
NTP server 3:	-
NTP server 4:	-

Software Versions

Automation Runtime:	J4.93
Visual Components:	-
Motion Control:	-
CNC software:	-

CPU Configuration

Host name:	br-automation
Default domain:	-
CPU mode switch:	0x04
Reboot mode	
after reset:	service
after powerfail:	warm start
Profiling:	enabled
FTP:	enabled
USB install:	-
USER-partition install:	-

Ethernet Network Devices

Default gateway:	-
IF103	127.0.0.1

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X20CP1586 | br-automation | RUN | 2025-08-04 / 09:09:34



4. Mechanical system

The mechanical system of the robot has physical limitations to protect the operator and avoid the harmful effects. The following chart will show the major information of the technical data and limitations of the robot.

■ 4.1 Config_1. axes group

Name	Value	Unit	Description
Length resolution	0.001	Measurement unit	Resolution of linear TCP coordinates
Angle resolution	0.001	Measurement unit	Resolution of rotary TCP coordinates
Rounding mode	Standard		Defines the used rounding mode
Max corner deviation	0.0	Measurement unit	Defines the maximum corner deviation for non-tangential path transitions
Max tangential transition deviation	0.0	Measurement unit	Defines the maximum contour deviation for tangential path transitions
Max radius deviation	0.001	Measurement unit	Defines the tolerance if circle interpolation is programmed with numeric inconsistencies
Working plane	XY		Defines the initial active working



			plane
Limit check resolution	0.01	Second (s)	Time resolution of the trajectory planner in which the limits are checked
Buffer time	0.1	Second (s)	Maximum buffered timespan which is precomputed

■ 4.2 Config_2. Axis

gAxisQ1:

Name	Value	Unit	Description
Measurement unit	Degree		Measurement unit for axis
Measurement resolution	0.01	Measurement unit	Possible resolution of measurement unit that can be achieved
Count direction	Standard		Direction of the axis in which the position value is increasing
Movement limits	Internal		Various limit values that will be considered for axis movements
Position			Movement range of the axis via two position boundaries
Lower limit	-180	Measurement unit	Lower software limit position



Upper limit	180	Measurement unit	Upper software limit position
Velocity	100	Measurement unit/s	Velocity limit in any movement direction
Acceleration	200	Measurement unit/s ²	Acceleration limit in any movement direction
Deceleration	200	Measurement unit/s ²	Deceleration limit in any movement direction

gAxisQ2:

Name	Value	Unit	Description
Measurement unit	Degrees		Measurement unit for the axis
Measurement resolution	0.01	Measurement unit	Possible resolution of measurement unit that can be achieved
Count direction	Standard		Direction of the axis in which the position value is increasing
Lower limit	-90	Measurement units	Lower software limit position
Upper limit	80	Measurement units	Upper software limit position
Velocity	100	Measurement units / s	Velocity limit in any movement direction
Acceleration	500	Measurement units / s ²	Acceleration limit in any movement direction



Deceleration	200	Measurement units / s ²	Deceleration limit in any movement direction
--------------	-----	------------------------------------	--

gAxisQ3:

Name	Value	Unit	Description
Measurement unit	Degrees		Measurement unit for the axis
Measurement resolution	0.01	Measurement units	Possible resolution of measurement unit that can be achieved
Count direction	Standard		Direction of the axis in which the position value is increasing
Lower limit	-120	Measurement units	Lower software limit position
Upper limit	120	Measurement units	Upper software limit position
Velocity	100	Measurement units / s	Velocity limit in any movement direction
Acceleration	200	Measurement units / s ²	Acceleration limit in any movement direction
Deceleration	200	Measurement units / s ²	Deceleration limit in any movement direction

gAxisQ4:

Name	Value	Unit	Description
Measurement	Degrees		Measurement



unit			unit for the axis
Measurement resolution	0.01	Measurement units	Possible resolution of measurement unit that can be achieved
Count direction	Standard		Direction of the axis in which the position value is increasing
Lower limit	-120	Measurement units	Lower software limit position
Upper limit	120	Measurement units	Upper software limit position
Velocity	100	Measurement units / s	Velocity limit in any movement direction
Acceleration	200	Measurement units / s ²	Acceleration limit in any movement direction
Deceleration	200	Measurement units / s ²	Deceleration limit in any movement direction

gAxisQ5:

Name	Value	Unit	Description
Measurement unit	Degrees		Measurement unit for the axis
Measurement resolution	0.01	Measurement units	Possible resolution of measurement unit that can be achieved
Count direction	Standard		Direction of the axis in which the



			position value is increasing
Lower limit	-120	Measurement units	Lower software limit position
Upper limit	120	Measurement units	Upper software limit position
Velocity	100	Measurement units / s	Velocity limit in any movement direction
Acceleration	200	Measurement units / s ²	Acceleration limit in any movement direction
Deceleration	200	Measurement units / s ²	Deceleration limit in any movement direction

gAxisQ6:

Name	Value	Unit	Description
Measurement unit	Degrees		Measurement unit for the axis
Measurement resolution	0.01	Measurement units	Possible resolution of measurement unit that can be achieved
Count direction	Standard		Direction of the axis in which the position value is increasing
Lower limit	-120	Measurement units	Lower software limit position
Upper limit	120	Measurement units	Upper software limit position
Velocity	100	Measurement units / s	Velocity limit in any movement



			direction
Acceleration	200	Measurement units / s ²	Acceleration limit in any movement direction
Deceleration	200	Measurement units / s ²	Deceleration limit in any movement direction

■ 4.3 Config_3. Mechanical system

Dimensions:

Translation from base to Q1:

Name	Value	Unit	Description
X	0.0	Measurement units	Translation in X direction
Y	0.0	Measurement units	Translation in Y direction
Z	0.0	Measurement units	Translation in Z direction

Translation from Q1 to Q2:

Name	Value	Unit	Description
X	120.0	Measurement units	Translation in X direction
Y	0.0	Measurement units	Translation in Y direction
Z	640.0	Measurement units	Translation in Z direction

Translation from Q2 to Q3:



Name	Value	Unit	Description
X	0.0	Measurement units	Translation in X direction
Y	0.0	Measurement units	Translation in Y direction
Z	630.0	Measurement units	Translation in Z direction

Translation from Q3 to Q4:

Name	Value	Unit	Description
X	827.5	Measurement units	Translation in X direction
Y	0.0	Measurement units	Translation in Y direction
Z	196.0	Measurement units	Translation in Z direction

Translation from Q4 to Q5:

Name	Value	Unit	Description
X	0.0	Measurement units	Translation in X direction

Translation from Q5 to Q6:

Name	Value	Unit	Description
X	160.0	Measurement units	Translation in X direction

Translation from Q6 to Flange:

Name	Value	Unit	Description
X	0.0	Measurement units	Translation in X direction



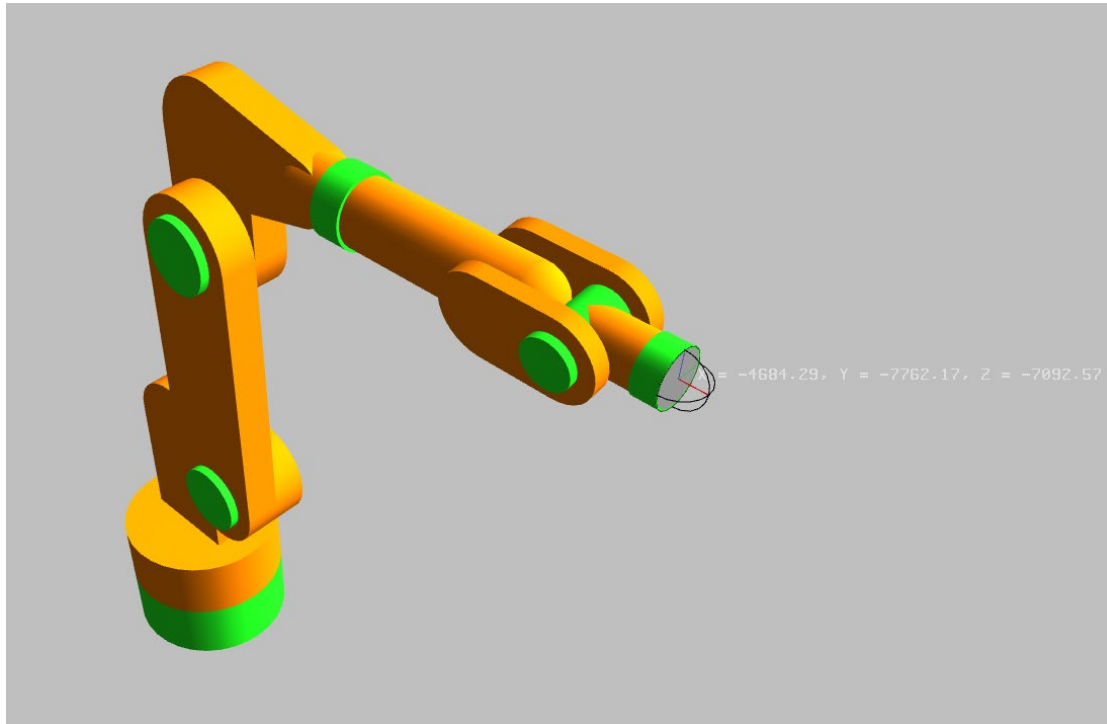
Y	0.0	Measurement units	Translation in Y direction
Z	0.0	Measurement units	Translation in Z direction

Model zero position offsets

Name	Value	Unit	Description
Joint axis 1	Standard		Count direction for joint axis
Joint axis 2	Standard		Count direction for joint axis
Joint axis 3	Standard		Count direction for joint axis
Joint axis 4	Standard		Count direction for joint axis
Joint axis 5	Standard		Count direction for joint axis
Joint axis 6	Standard		Count direction for joint axis

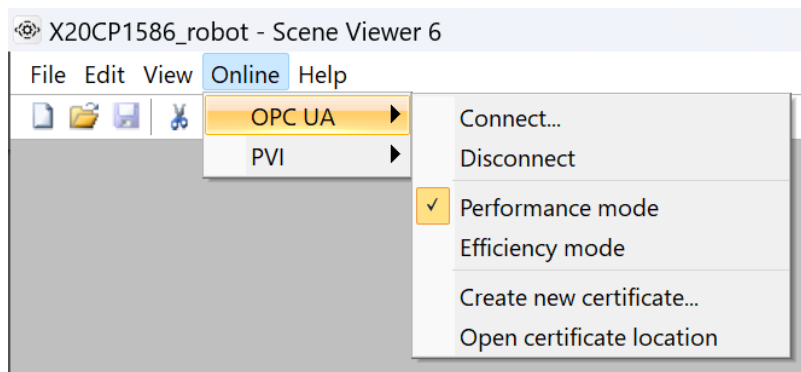


5. Robot and simulation

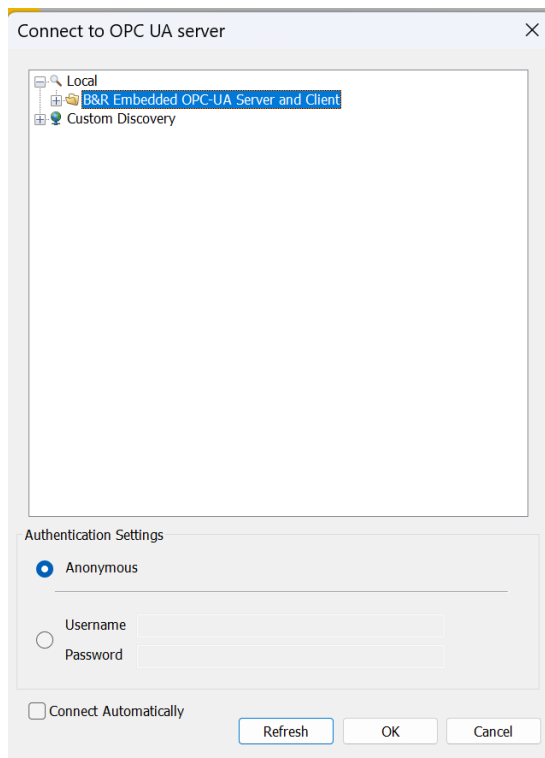


This is the simulation of the 6 joints robotic arm, which is powered by Scene Viewer 6. Attention! If wants to activate the robot that has more than 4 joints, the user needs to get the authorization from B&R Europe HQ.

Before running the simulation, the user should connect the robot to the AS by OPC UA. (Note, the user should configure the OPC UA variable in AS).



click “connect” to match the robot. Attention! Make sure that the simulation of AS is running properly before starting the simulation in Scene Viewer.



When the connection panel shows the B&R embedded OPC UA server and client option, click “OK” and wait for the OPC UA is running. `OPC UA: RUN`