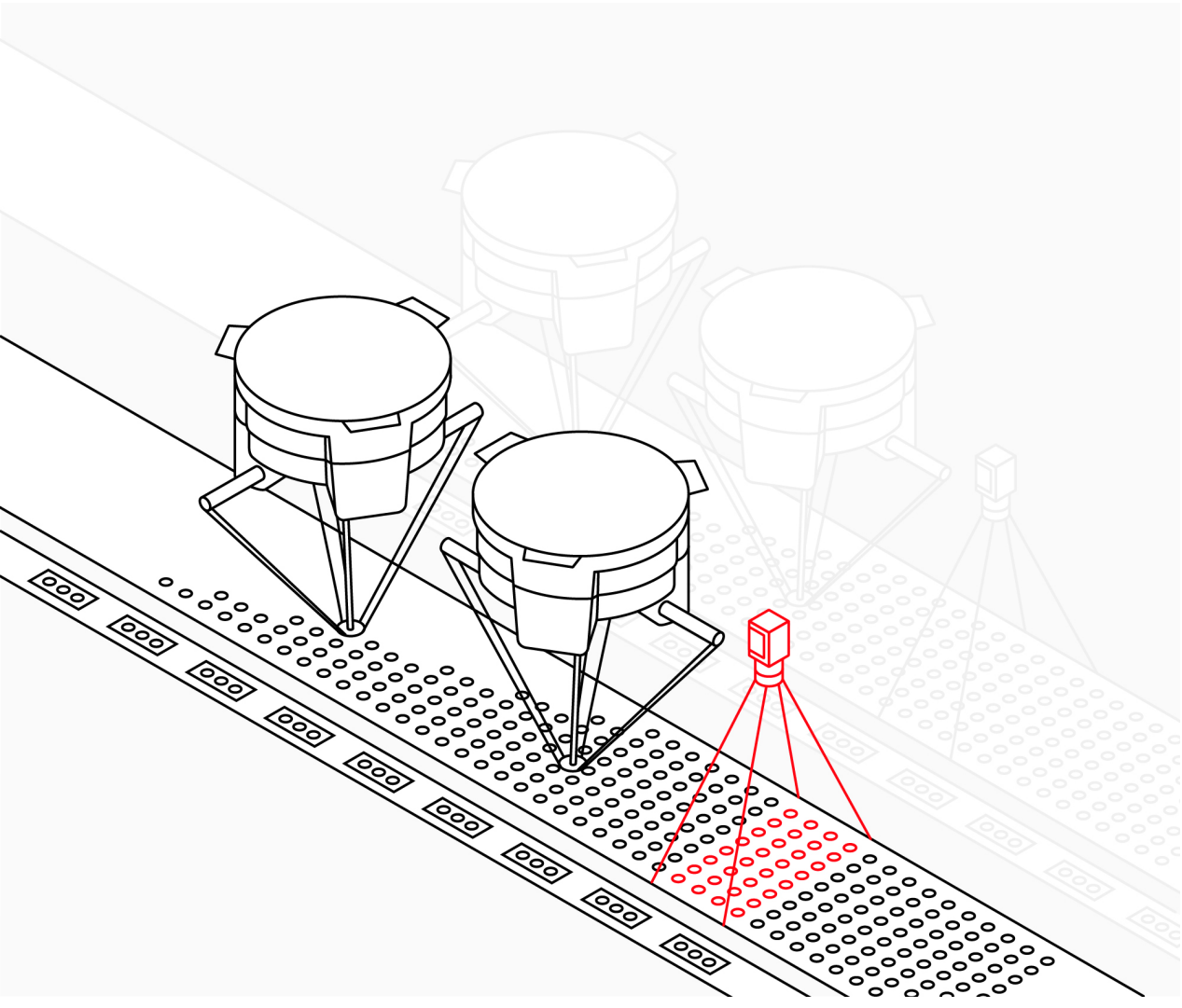
ROBOTICS

Application manual

PickMaster® Twin - Operator



Trace back information:
Workspace Main version a504
Checked in 2023-03-09
Skribenta version 5.5.019

Application manual

PickMaster® Twin - Operator Release 2.1.1

IRC5 and OmniCore

Document ID: 3HAC069977-001

Revision: H

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Original instructions.

Table of contents

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Overview of this manual

About this manual

This manual contains instructions for installation, configuration, and daily operation of PickMaster Operator.

Usage

This manual should be used during installation, configuration, and operation of a PickMaster system.

Who should read this manual?

This manual is intended for:

- Installation personnel
- Programmers
- Integrators
- Operators

Prerequisites

Any maintenance/repair/installation personnel working with an ABB robot must be trained by ABB and have the required knowledge of mechanical and electrical installation/repair/maintenance work.

Disclaimer

PickMaster Operator is a robot application software that requires the user to ensure the safety of the robot or equipment during operation. If losses are caused by user negligence or improper operation, the corresponding responsibility shall be borne by the user.

Cybersecurity

This product is designed to be connected to and to communicate information and data via a network interface. It is your sole responsibility to provide, and continuously ensure, a secure connection between the product and to your network or any other network (as the case may be).

You shall establish and maintain any appropriate measures (such as, but not limited to, the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. ABB Ltd and its entities are not liable for damage and/or loss related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

The PickMaster Operator will use the following ports:

- 50000
- 80

Continues on next page

Continued

References

Reference	Document ID
Product specification - PickMaster® Twin	*3HAC073650-001*
Circuit diagram - PickMaster Twin	*3HAC024480-020*
Application manual - PickMaster Twin - PowerPac	*3HAC064218-001*
Operating manual - RobotStudio	*3HAC032104-001*
Application manual - Conveyor tracking	*3HAC050991-001*
Product manual - IRC5	*3HAC047136-001*
Product manual - IRC5 Panel Mounted Controller	*3HAC027707-001*
Operating manual - IRC5 with FlexPendant	*3HAC050941-001*
Operating manual - Troubleshooting IRC5	*3HAC020738-001*
Technical reference manual - RAPID Instructions, Functions and Data types	*3HAC050917-001*
Technical reference manual - RAPID Overview	*3HAC050947-001*
Technical reference manual - System parameters	*3HAC050948-001*

Revisions

Revision	Description
A	First edition.
B	Published in release 21A. The following updates are made in this revision: • Added information on supporting OmniCore controller. • Minor corrections. • Updated Zenon installation chapter. • Added notes for real Runtime connection. • Added Zenon license description. • Updated whole solution folder from PickMaster Powerpac is needed when importing a solution in PickMaster Operator.
C	The following updates are made in this revision: • Minor corrections.
D	Published in release 21B. The following updates are made in PMTW 1.1.1 revision: • Updated System requirements in chapter *Installing and uninstalling ABB ZENON on page 19*. • Updated installation procedure in chapter *Installing and uninstalling ABB ZENON on page 19*.
E	Published in release 22A. The following updates are made in PickMaster® Twin 2.0 revision: • Updated software requirements to .Net Framework 3.5 in chapter *Installing and uninstalling ABB ZENON on page 19*. • Updated preparation installation procedure in chapter *Installing and uninstalling ABB ZENON on page 19*. • Updated ABB ZENON installation procedure in chapter *Installing and uninstalling ABB ZENON on page 19*. • Added Recipe Manager function and Remote Controller signal definition. • Updated information for PickMaster® Twin 2.0 revision.

Continues on next page

Revision	Description
F	The following updates are made in PickMaster® Twin 2.0.1 revision: • Added RobotStudio software requirements to in chapter *System requirements on page 17*. • Updated Recipe Manager function and Remote Controller signal definition for Profinet. • Minor corrections.
G	Released with PickMaster® Twin 2.1 revision: • Supported multiple languages. • Updated user management function. • Updated PackML information. • Added PMRT login function when connecting to PMRT. • Added ProfiNet slot in Appendix. • Minor corrections.
H	Released with PickMaster® Twin 2.1.1: • Minor corrections.

Safety

Safety of personnel

A robot is heavy and extremely powerful regardless of its speed. A pause or long stop in movement can be followed by a fast hazardous movement. Even if a pattern of movement is predicted, a change in operation can be triggered by an external signal resulting in an unexpected movement.

Therefore, it is important that all safety regulations are followed when entering safeguarded space.

Safety regulations

Before beginning work with the robot, make sure you are familiar with the safety regulations described in the manual *Safety manual for robot - Manipulator and IRC5 or OmniCore controller*.

When using PickMaster® Twin products

- When using with PickMaster® Twin products, it is the user's responsibility to adhere to the relevant standards and safety directives. In addition, the application manuals for proper use must be observed.
- Only personnel with appropriate training and required knowledge are allowed to use PickMaster® Twin products.
- The integrator installing the PickMaster® Twin is responsible for the safety.
- Wherever possible, the auto mode of operation shall be performed with all persons outside the safeguarded space.
- An emergency stop must also be available to make sure the emergency stop function is enabled.
- PickMaster® Twin only provides Operational Stop (Program Stop). The integrator shall make sure that proper Normal Stop (machinery stop) is configured correctly in the system.
- Make sure the hazardous situation that resulted in the emergency stop condition no longer exists. Release the emergency stop button manually to remove the emergency stop condition.
- Stops for the machine is the responsibility of the integrator and must be addressed according to local legislation.
- The integrator is responsible to conduct a risk assessment of the final application.
- Sensitive body parts, such as the eyes and the larynx, must be protected by personal protective equipment (PPE).
- Protective measures should be the precondition when using PickMaster® Twin products. PickMaster® Twin does not guarantee the robot targets are always in safe zone. It is integrator's responsibility to take protection measures, like using safe-move or setting proper robot work range etc.

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- Safety related status and operations shall be handled on the controller and by safety rated systems. PickMaster® Twin status information shall not be used as input for safety related information and operations.
- Protective measures should be the precondition when install/adjust/replace hardware parts, for example, the camera.
- The stop functions in PickMaster® Twin can never be used to replace A-stop/E-stop or any other safety related stops.

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1 Introduction and installation

1.1 Introduction to PickMaster Operator

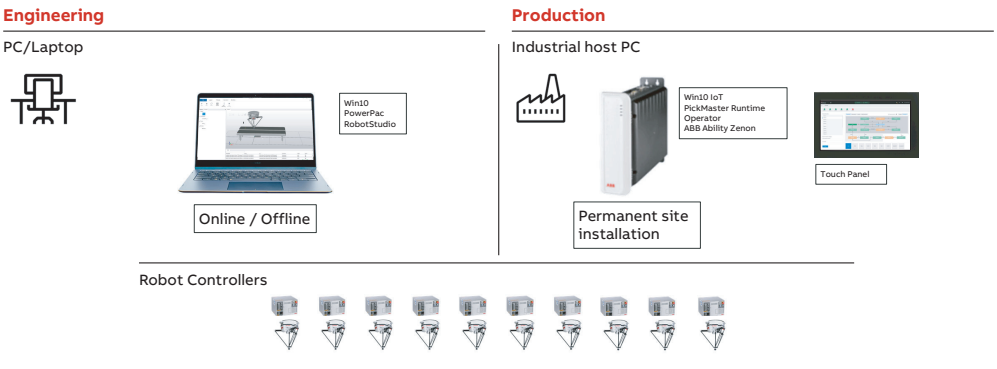
About PickMaster® Twin

PickMaster® Twin is an application product designed for vision based high speed picking of random flow products on the fly. PickMaster® Twin supports ease-of use configuration, simulation and operation of a big variation of smaller or larger line layouts composed of a multitude of robots, cameras, conveyors and fixed work areas. It is a production system that comprises all steps in the life cycle of a picking installation from proposal, engineering, commissioning, operation to maintenance and support.

PickMaster Operator can be customized for some of the following special needs:

- With the integrated vision system it can be used for full random operation on a continuously moving conveyors and for absolute accurate positioning on indexed feeders or trays.
- Without vision recognition it can be used as a tool for the efficient production with guided product flows on multiple conveyors.
- For efficient quality inspection and product categorization alone or together with the position recognition.

PickMaster® Twin is a modular product for controlling ABB robots in picking applications through the robot controller. It is configurable to perform pick and place operations of items. A vision system is used to find randomly placed items on conveyor belts or indexing static work areas. PickMaster Operator is the engineering software aimed at configuring and validating the application in offline simulation with a virtual system and in online mode directly connected to the real installation. It uses comprehensive graphical interfaces to configure powerful applications, where it can control multiple robots picking and placing sensor-detected items on different conveyor belts.



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PickMaster® Twin comprises the following modules:

PickMaster® Twin

Ease of Use software for offline and online configuration and commissioning in a visual 3D environment, powered by RobotStudio™.

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PickMaster® Operator

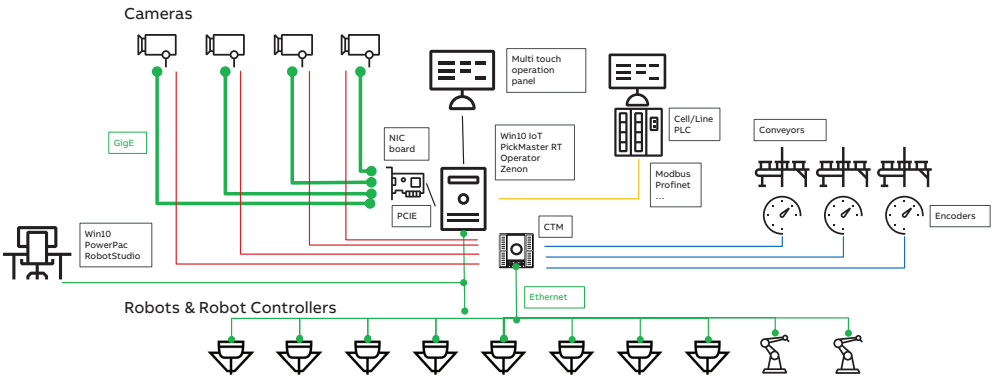
State-of-the art user interface for operating PickMaster on the shop floor, built on ABB's Ability™ Zenon data management software.

PickMaster® Runtime

Efficient runtime operation software for orchestrating the coordination of the packaging process for a multitude of robots and conveyors including integrated vision software for precise robot guidance and quality inspection.

- Virtual Runtime: running the PickMaster process in a simulated virtual environment on a client system connected to virtual robot controllers.
- Real Runtime: running the PickMaster process in the real production installation on the host computer connected to real robot controllers.

The following illustration is showing an installation example with 10 robots, 4 cameras and 3 conveyors.



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Note

PickMaster® Twin is delivered with different hardware configurations. For more information, see *Product specification - PickMaster® Twin*.

About PickMaster Operator

PickMaster Operator is the production interface providing intuitive control and data visualization to PickMaster Runtime. It provides modern comprehensive touch control interfaces for safe operation of a PickMaster installation with up to ten robots. PickMaster Operator is designed to run on an industrial PC with a multi-touch color panel.

The operator built on the ABB Ability™ Zenon platform acts as a modern local control panel to run the line. Moreover, compliant with the OMAC PackML industry standard, it is easily connected to a cell PLC through modern fieldbus communication, understanding the same commands and status as related upstream and downstream packaging machinery. It also integrates with factory control systems for reporting and optimizing production pace and overall equipment efficiency (OEE).

PickMaster Operator features

- Operational top information bar

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- Graphical tile page selection
- Full user authentication management and login control
- Compliance with OMAC PackML standard and additional transparency control and status of individual robots in a PickMaster line
- Integrated soft PLC with PackML operation logics
- Two hand operation safety
- Recipe management system
- Production dashboard
- Online parameter tuning
- Customized graphical line layout
- Production control page
- Vision result display and recording

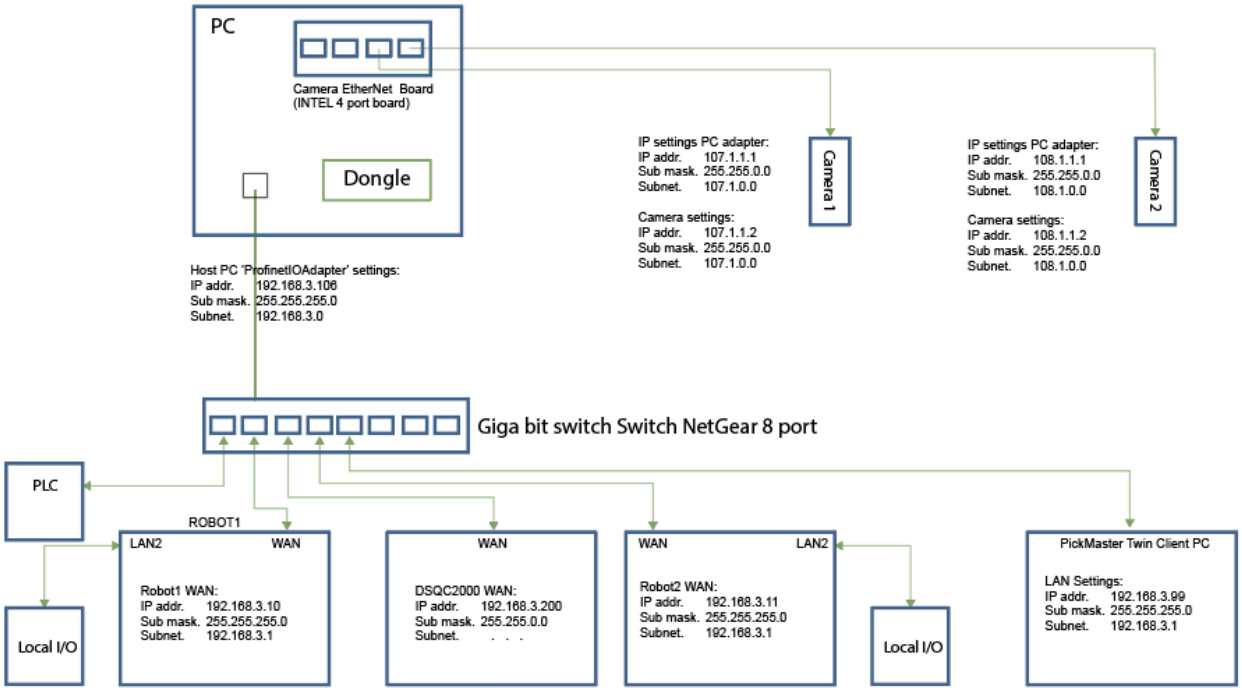
About this chapter

This chapter will guide you through the installation process, which consists of these steps:

- *Installing and uninstalling ABB ZENON on page 19*
- *Installing PickMaster Twin Host on page 38*
- *Network setting on page 40*

1.2 PickMaster® Twin Hardware connection illustration

Example



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1.3 System requirements

1.3.1 Hardware and software requirements

Hardware and software requirements for PickMaster Twin Client

Hardware requirements

Following are the hardware requirements:

- A log on account with administrator rights on the computer.
- CPU: 2.0 GHz or faster processor. Multicore processor is recommended.
- Memory: 8 GB if running Windows 64 bit edition. 16 GB or more if working with heavy CAD models.
- Free disk space: 10+ GB free space, solid state drive (SSD) recommended.
- Graphics card: High-performance, DirectX 11 compatible, gaming graphics card from any of the leading vendors. For the Advanced lightning mode Direct3D feature level 10_1 or higher is required.
- Display settings: 1920 x 1080 pixels or higher resolution is recommended.
- Mouse: Three-button mouse
- If robot movement can be initiated from an external control panel then an emergency stop must also be available.

Note

When running the software, close other software that consumes a lot of memory, otherwise it will affect the software normal use.

Software requirements

Following are the software requirements:

- Windows 10 (64 bit).
- Acrobat reader
- RobotStudio 2022.3.2
- IRC5 with RobotWare 6.15.01
- Omnicore with RobotWare 7.8.1.

Hardware and software requirements for PickMaster Twin Host

Recommended hardware

- Windows 10 (64 bit) IPC, 2GHz, 500 GBit SSD, 8 GBit RAM
- Recommended 17 inches 1920x1080 multi-touch screen
- Minimum two USB slots, one Ethernet port and one free PCI Express slot for a 168 mm x 110 mm size PCIE card
- Unmanaged Ethernet switch (robot network)

Software requirements

- Microsoft Windows 10, 64 bit (Home, Pro, Enterprise, Education, IoT, x64 versions) for touch panel

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1.3.1 Hardware and software requirements
Continued

- Environment Requirement：.Net Framework 3.5
- RobotStudio 2022.3.2
- IRC5 with RobotWare 6.15.01
- Omnicore with RobotWare 7.8.1.

1.4 Installing and uninstalling ABB ZENON

Overview

This section describes the installation process for the ABB ZENON.

Tip

The ABB ZENON 8.0 installation file is included in the host installation package.

Note

Each ABB ZENON installation file contains at least one demo license.

This has a pre-defined duration or number of permitted starts. If these are used up, the product can continue to be used in demo mode, but production is ended after running for 10 minutes. You can find the usage period that is available in the License Manager in the License usage tab in the details of the license.

Prerequisites

To start the installation process, the following must be available:

- A computer that meets or exceeds the *System requirements on page 17*.
- A log on account with administrator rights on the computer.

Installing ABB ZENON

Preparation

Before installing ABB ZENON:

1. All current operating system updates must be installed.

   Note

   If you always use the latest version (Service Pack) of your operating system, you cannot only avoid compatibility issues but also security problems.

2. There must not be a restart pending.
3. The system requirements are checked before installation. If the requirements are not met, these will be shown on a separate page with notices on how to rectify this.
4. **Automatic Windows updates** influence the installation. If an update of the Windows operating system is carried out while the ABB ZENON setup is running, it can cause problems.

   To prevent this: Deactivate the automatic Windows update during the ABB ZENON installation and carry out the Windows update before starting the ABB ZENON installation.
5. During the installation of ABB ZENON, the ABB Multiple Network Protocol Driver (cdprotdrv.sys) is installed. To start the driver, the operating system must be restarted after installation.

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Tip

Installing ABB ZENON offline is recommended.

Due to the accidental network unstable issue, the online installation may be interrupted and cause problem.

Tip

The installation will take a long time.

Do not power off your computer during the installation.

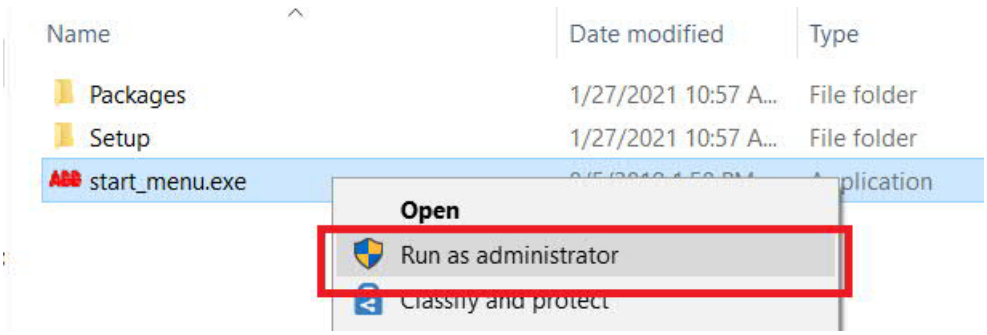
Installing ABB ZENON

Use this procedure to install ABB ZENON offline:

1 Open the ABB ZENON installation folder in the host installation package and run the installation file `start_menu.exe` as administrator to open the installation window.

Note

Install ABB ZENON from the computer directly. If install ABB ZENON from a mobile device, for example an U-disk, PickMaster Operator may fail to work during the production.



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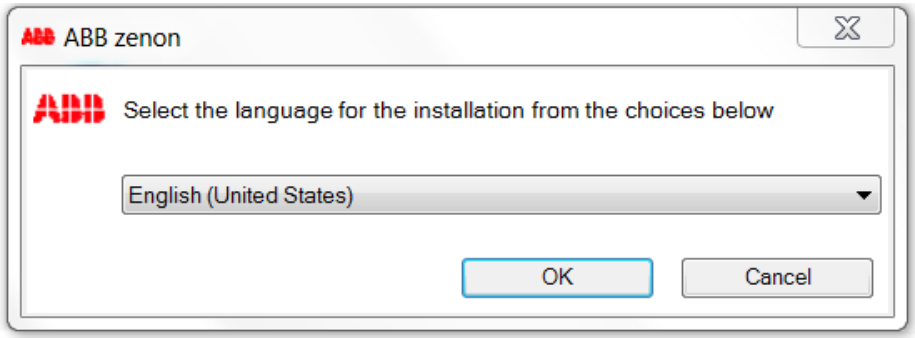
2 Choose the language.



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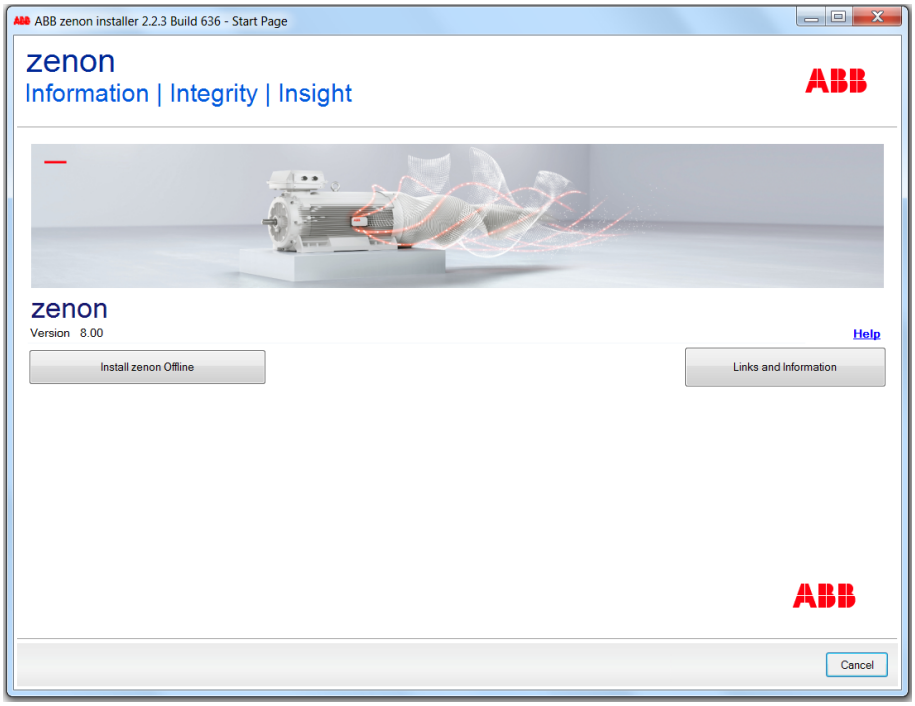
3 Click on **Install Zenon Offline** button to show next page.



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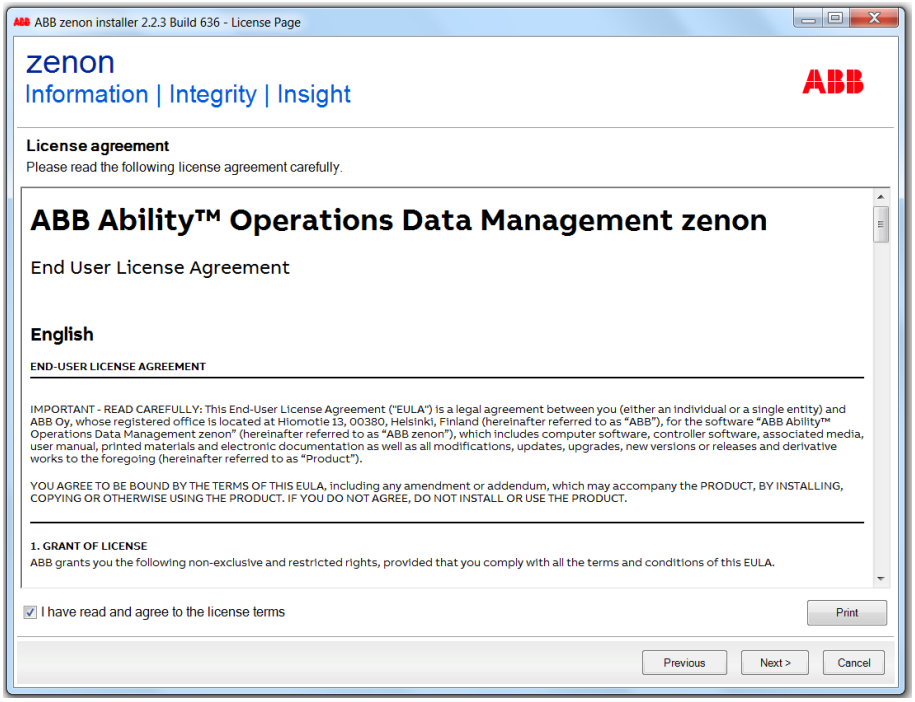
4 On the pop-up following page, read the **license agreement** and accept the terms. Then click on **Next**.



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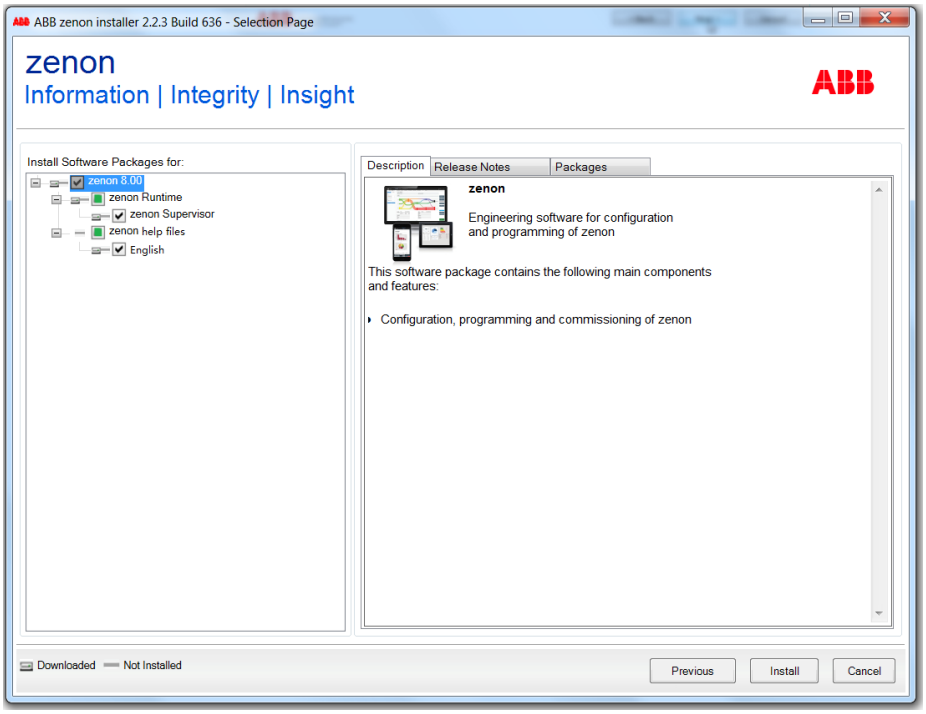
5 On the pop-up following page, confirm the installation information and click on **Install** to start the installation.



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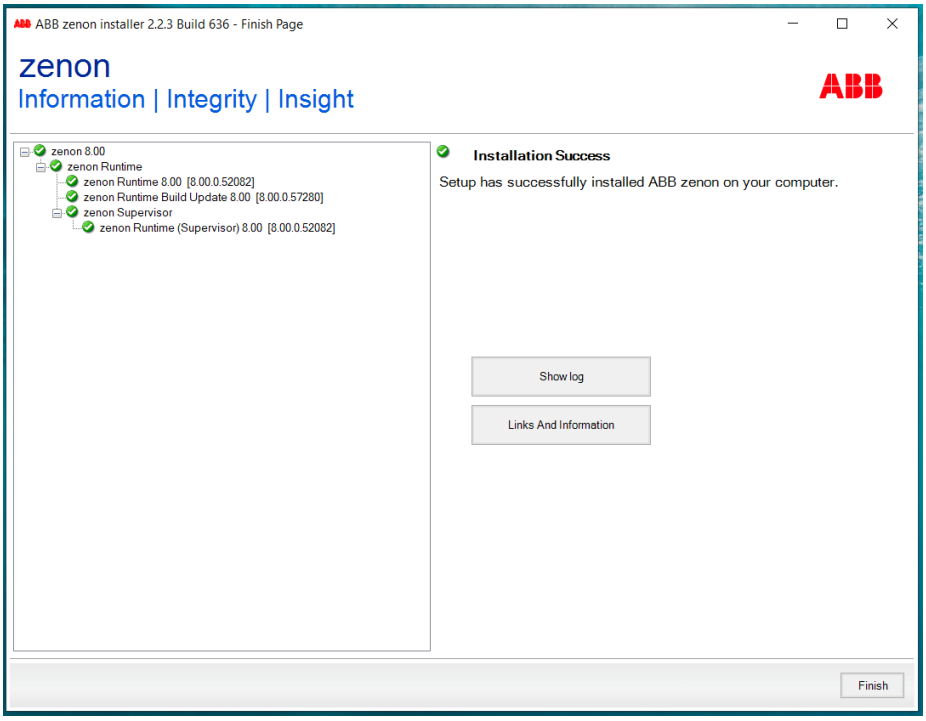
6 When the installation is complete, click **Finish**.



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Uninstalling ABB ZENON

Note

Follow the procedure to uninstall the ABB ZENON. Or the ABB ZENON cannot be installed on the same computer normally.

Note

Return the license to release it before any uninstalling ABB ZENON work.

Or the license will be occupied by the uninstalled ABB ZENON and may not be reused anymore.

If this already happened, please contact ABB.

Use this procedure to uninstall ABB ZENON:

1 Start the ZENON 8.00 Installation Manager.

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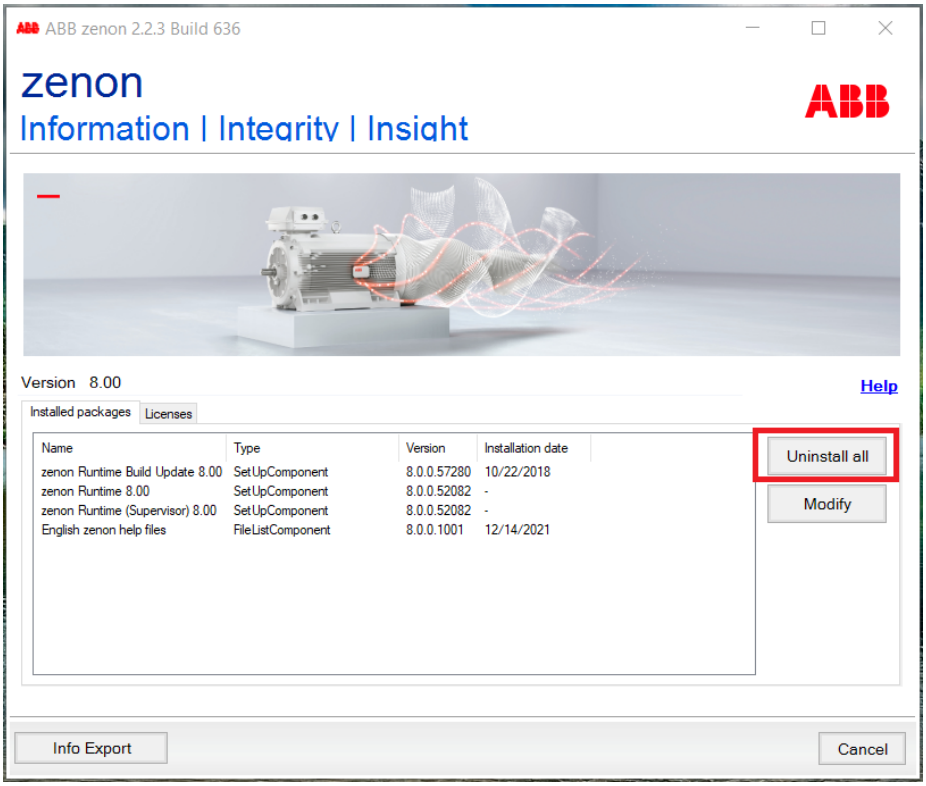
2 Click **Uninstall all** on the pop-up window.



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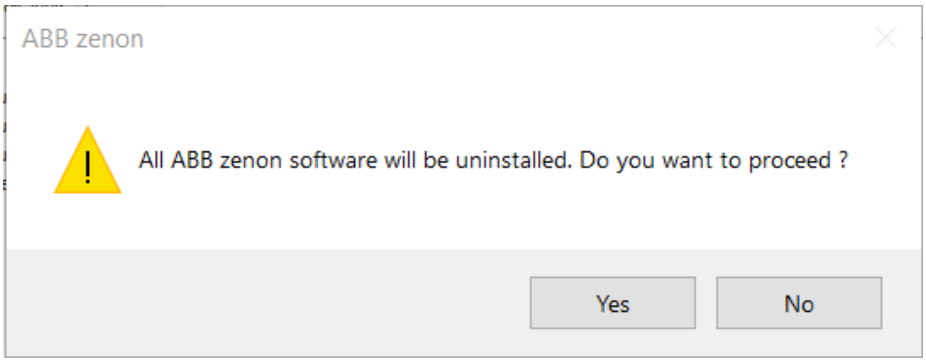
3 Click **Yes** on the pop-up dialog box.



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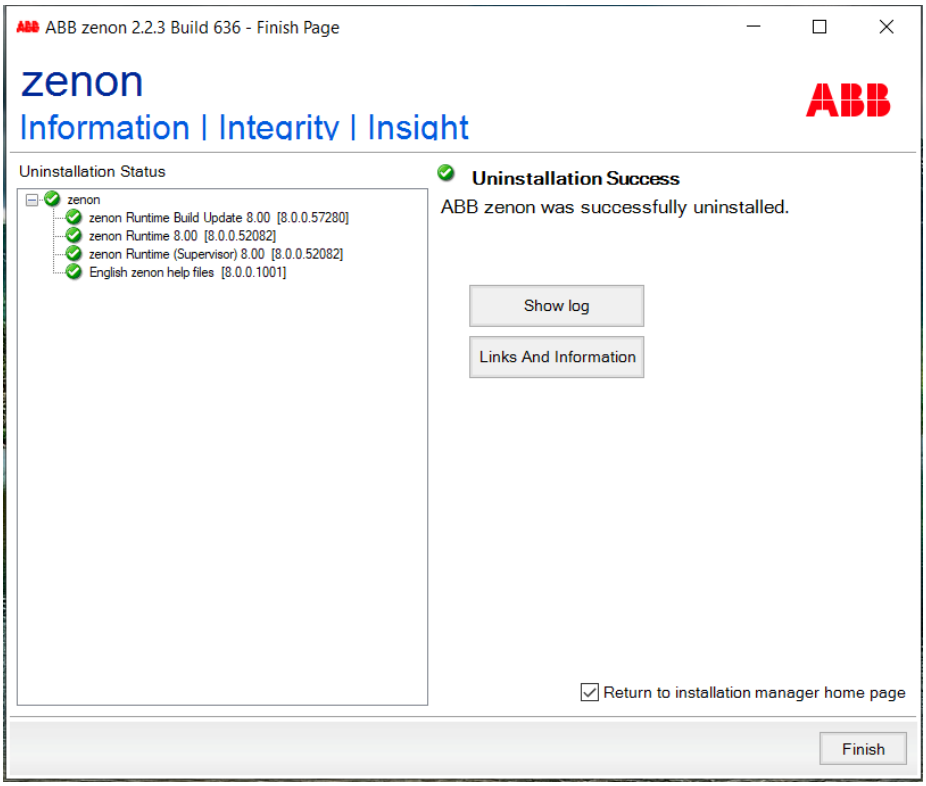
4 When the uninstallation is completed, click **Finish**.



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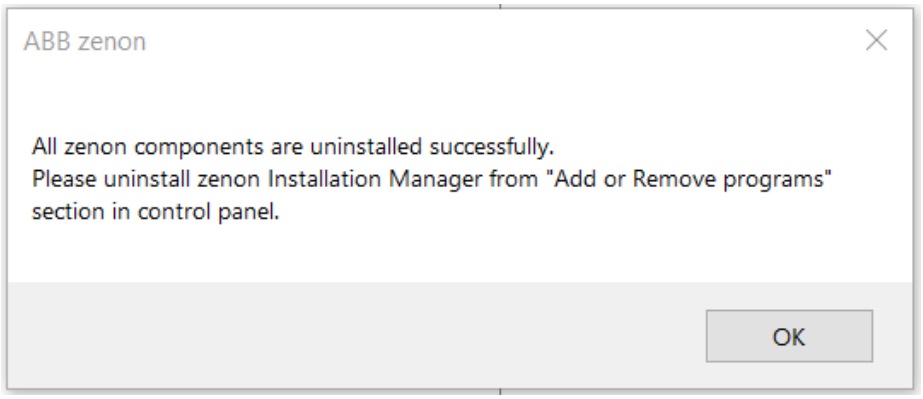
A notice to remove the ZENON 8.00 Installation Manager will pop up after clicking **Finish**.



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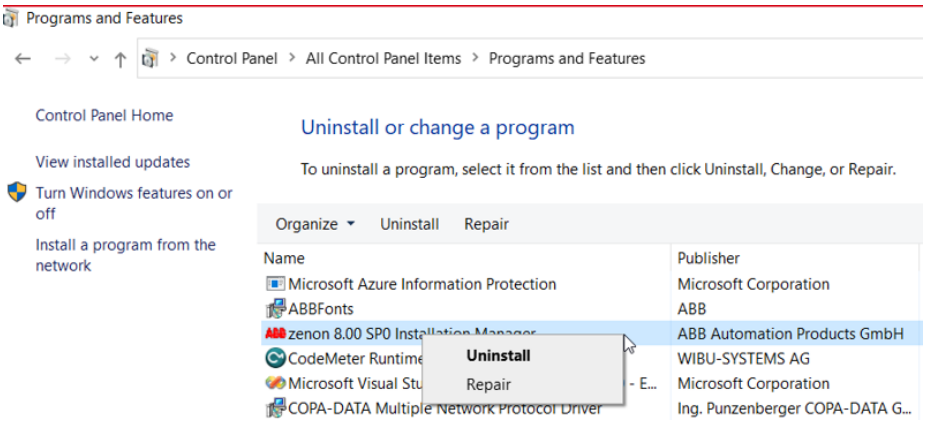
5 Remove the ZENON 8.00 Installation Manager from the control panel.



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Frequent sources of error during installation

1 The virus scanner is active and blocks the installation because the scanner may take it as a virus.

   Solution: Separate the system from the network and disable the virus scanner, then execute the installation again.

2 The firewall was not configured correctly.

   Solution: Separate the system from the network and disable the firewall, then execute the installation again.

3 Erroneous SQL-installation on the system.

   Solution: Create project.

4 The ABB ZENON earlier version is not uninstalled correctly. For more details on correct uninstall method, see *Uninstalling ABB ZENON on page 23*.

   Solution: If this happens, please contact ABB.

5 Proxy configuration settings pops up during the installation.

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For the ABB internal customer, please check the proxy settings before the installation. Select “Automatic detect settings”.

The installer cannot download the package when it can’t create a valid connection to the Amazon storage.

Please start installation again after resetting. If the problem still persists, please contact the IT service.

1.5 ABB ZENON license

Introduction

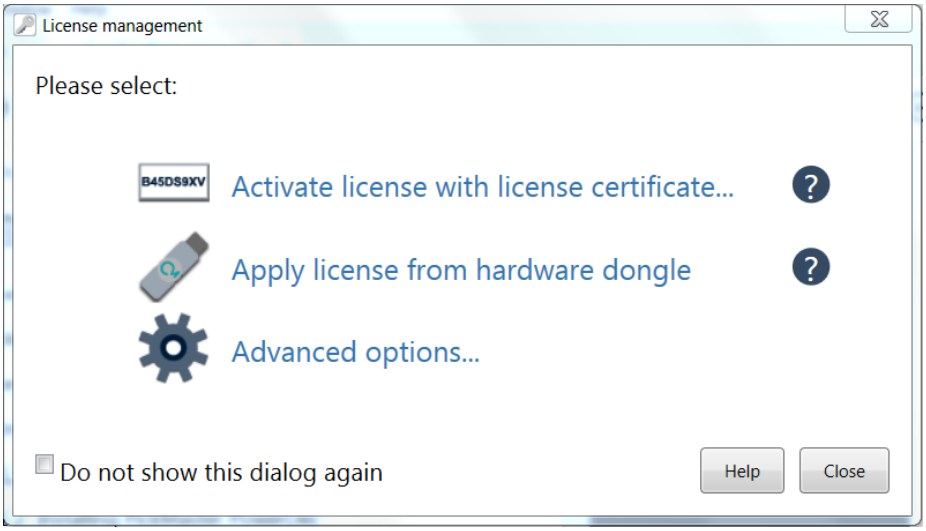
The license is enclosed in an envelope with the hardware product when it is purchased.

Access to the **License Manager** from the **License Manager** button on the user interface or the start menu of the computer.

Overview of activated license on the computer

Get an overview of the activated license with following steps:

1 Open the **License Manager**.



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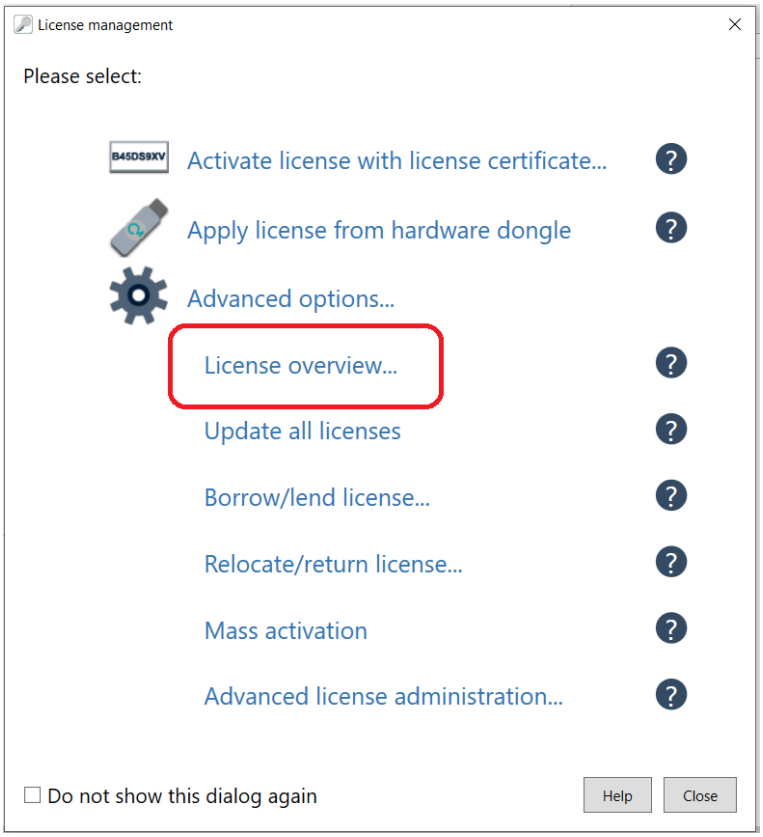
2 Click on **License overview.**



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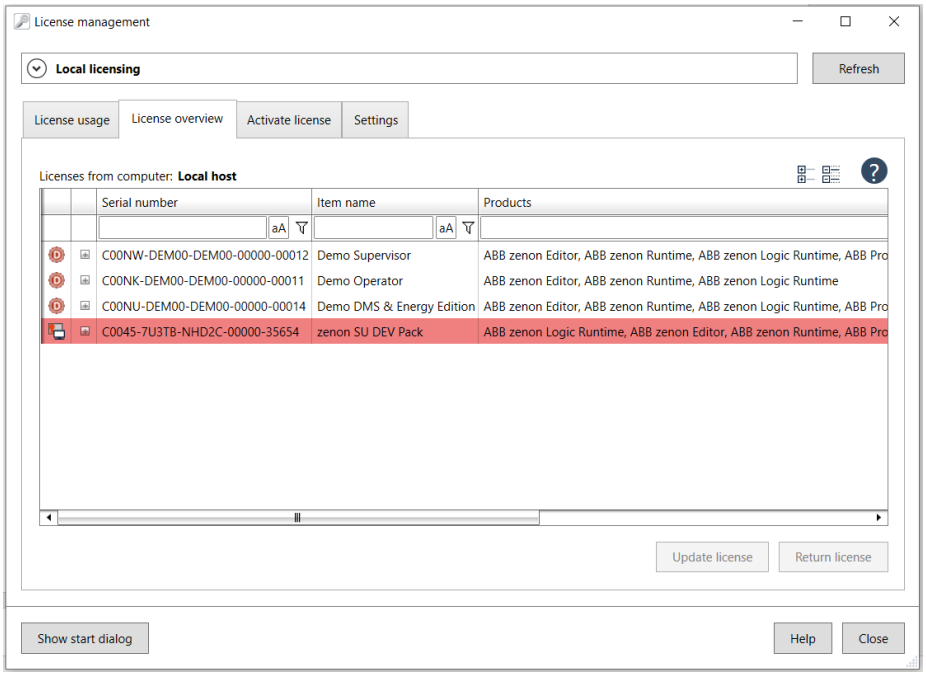
3 The all activated license show up in the pop-up window.



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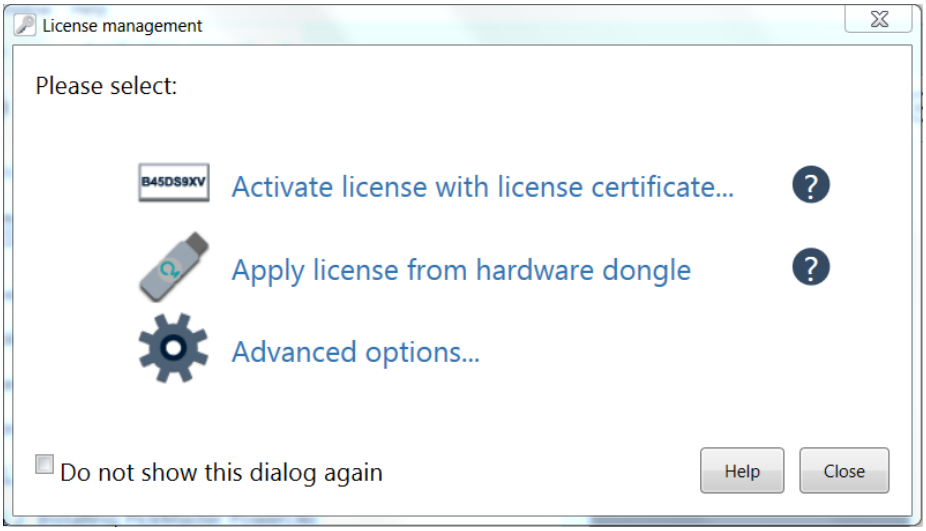
Activating a license

Activating a license online

If this computer is with internet access, active the license with following steps:

1 Open the **License Manager**.



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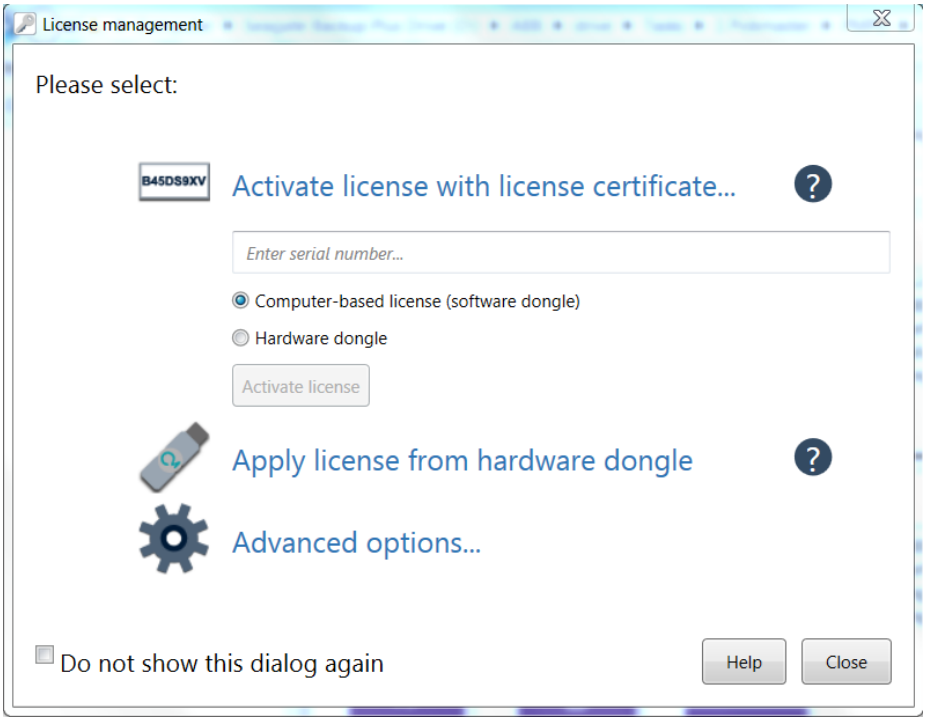
2 Click on **Activate license with license certificate...** to open the *Enter serial number* text box.



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3 Enter a valid license for the PickMaster Operator in the text box.

4 Click **Activate license** button.

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1.5 ABB ZENON license
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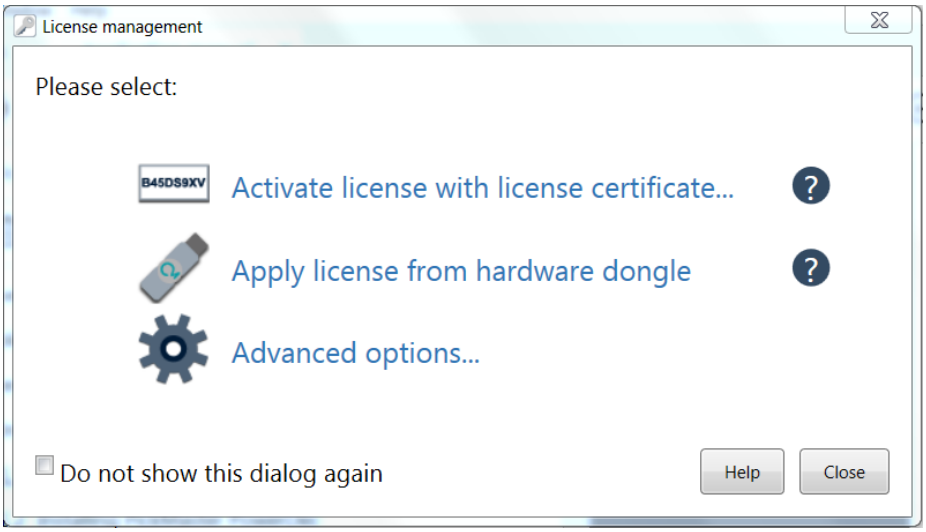
Activating a license offline

If this computer is without internet access, active the license with following steps:

1 Open the **License Manager**.



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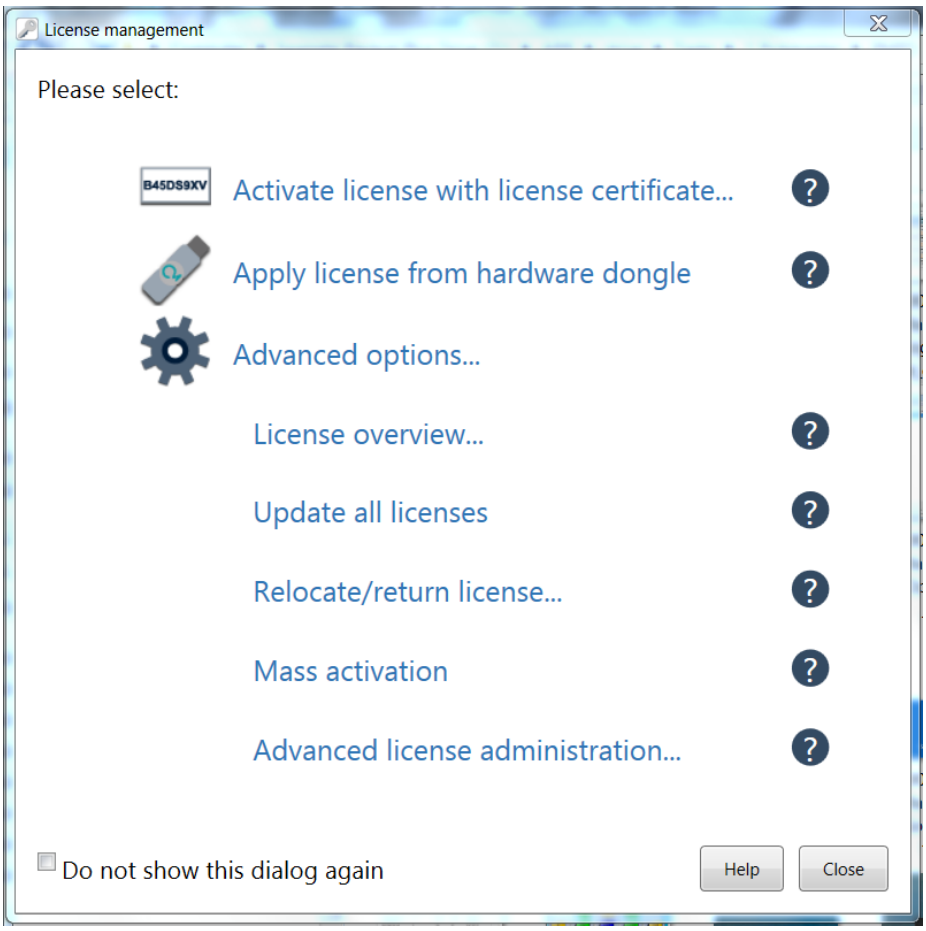
2 Click on **Advanced options...** and then **Advanced license administration...**.



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1.5 ABB ZENON license

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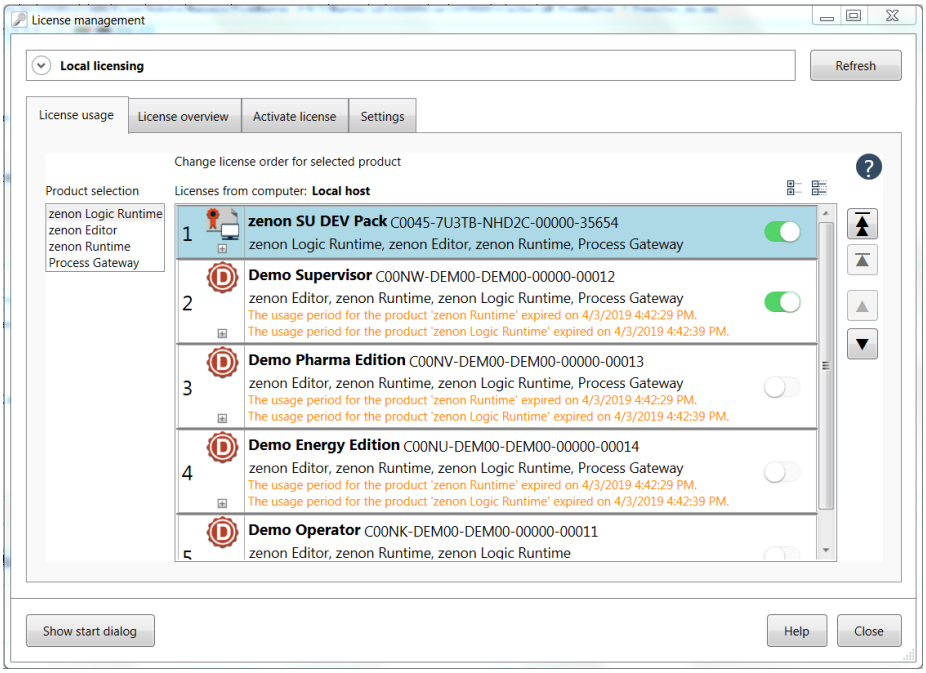

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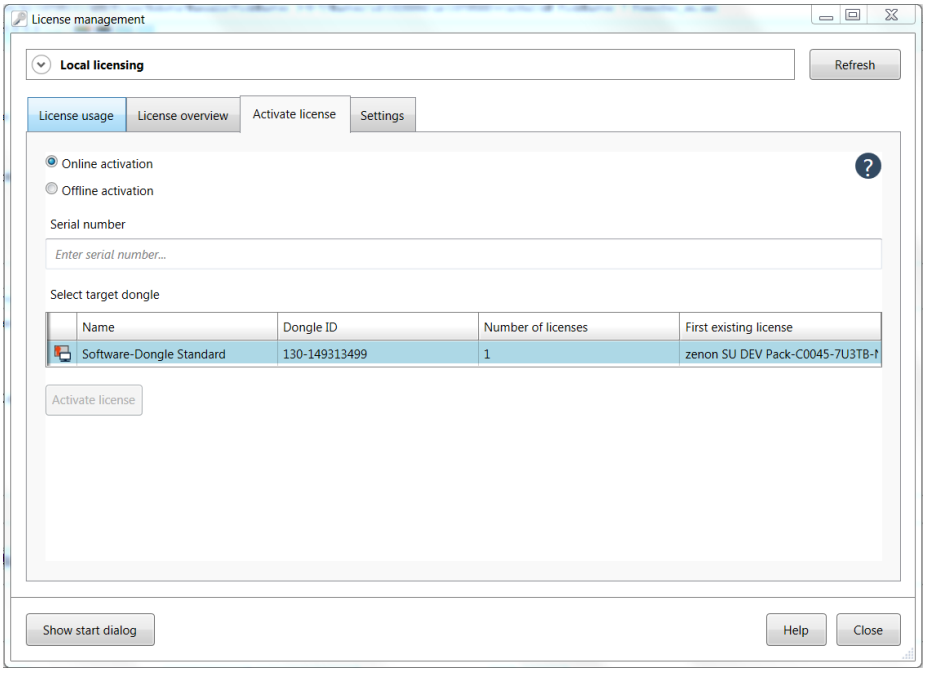
3 Click on the **Activate license** tab.



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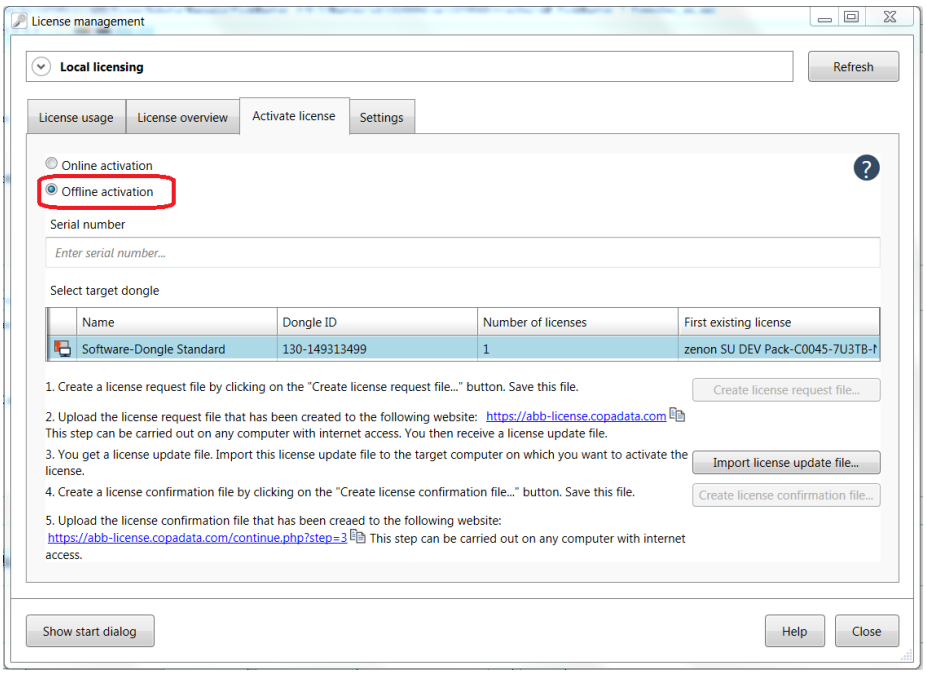
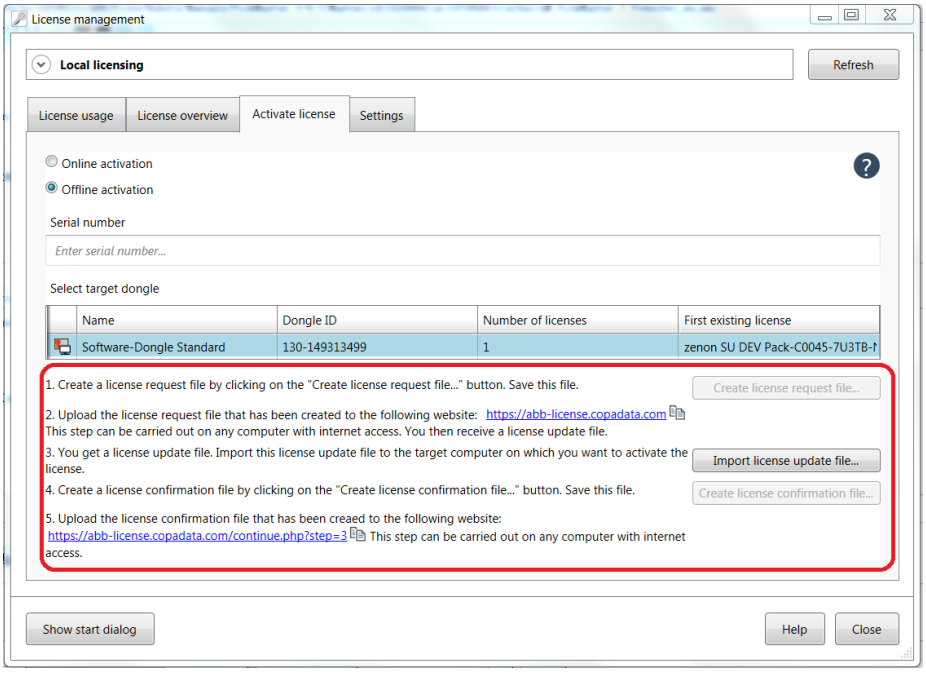
4 Click on the **Offline activation** option.



xx1900000693

5 Follow the steps to access an available license and activate it on your PickMaster Operator computer.



xx1900002351

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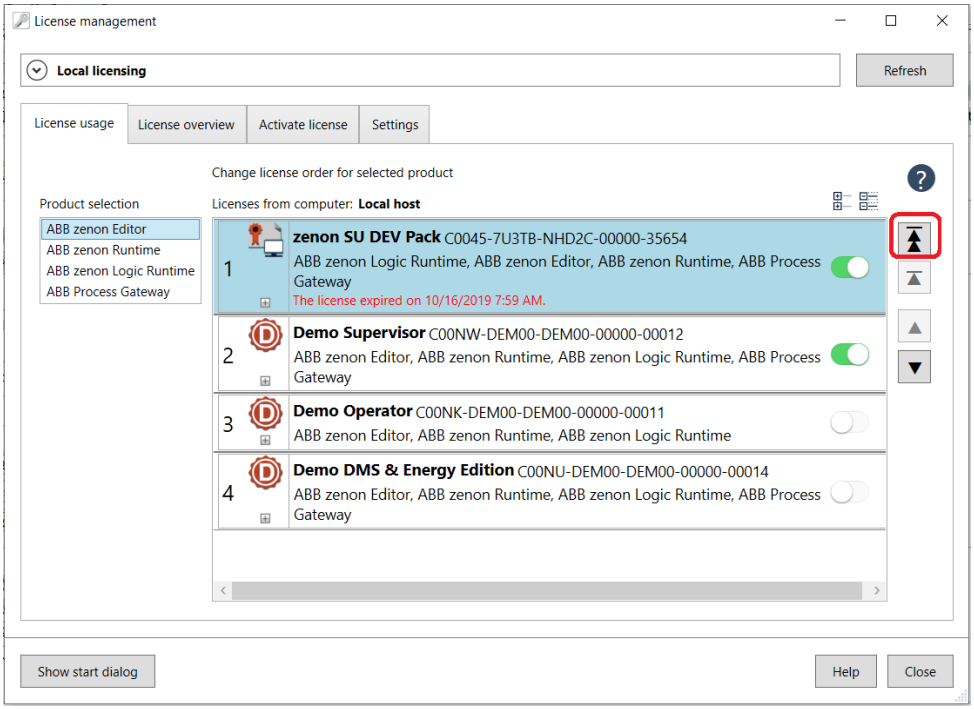
Note

If a valid license is already activated but the user still use the Demo license when launching PickMaster Operator, this is caused by that the license is not mentioned in the first choice.

Select the activated license and click the up button to bring the activated license to the first choice of the license.



xx2000000239

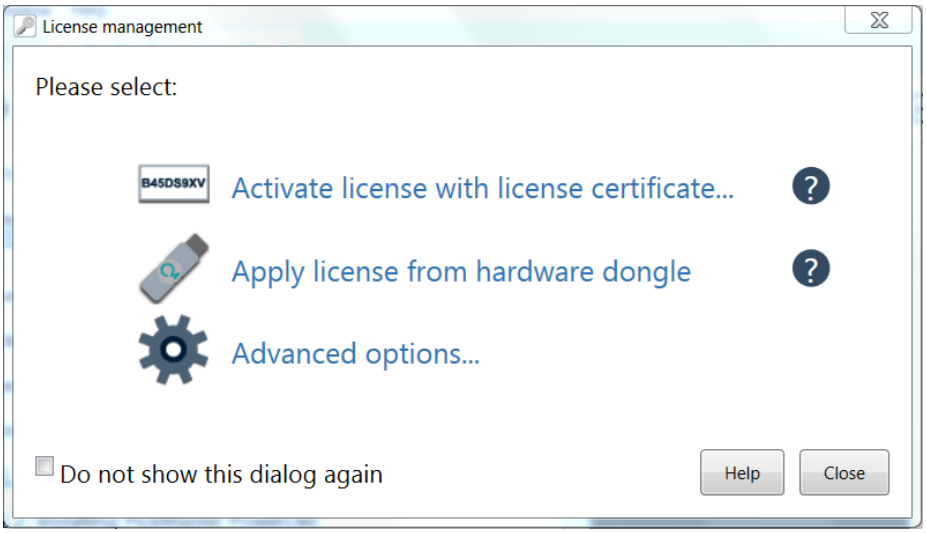
Retuning a license

When a license need to be released from one computer, return it first. During the validity period, it's allowed to activate the returned license on another proper computer.

Continues on next page

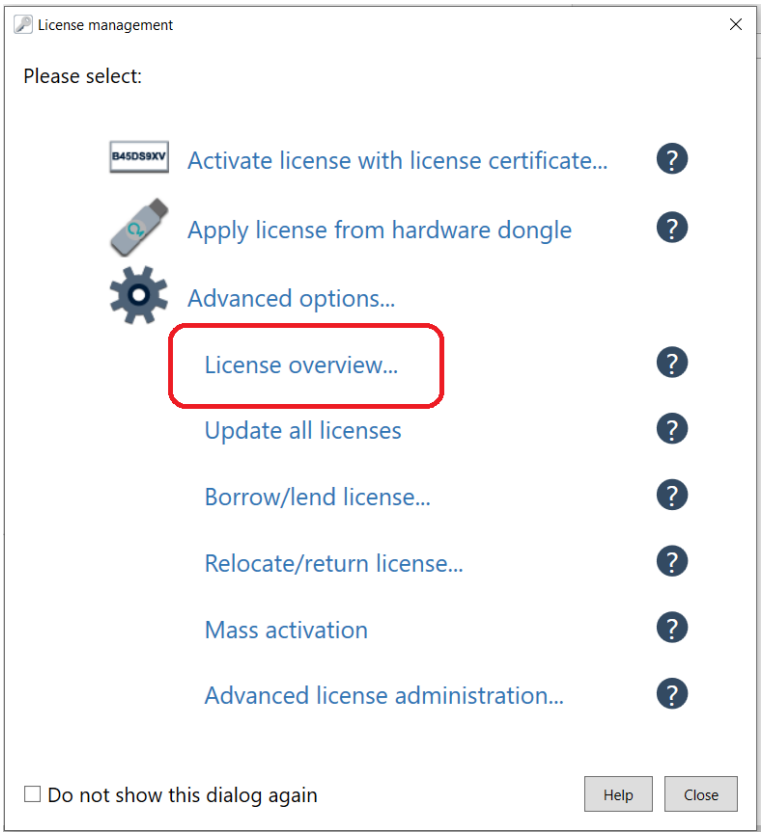
Return a license with the following steps:

1 Open the **License Manager**.



xx1900000799

2 Click on **License overview**.



xx2000000224

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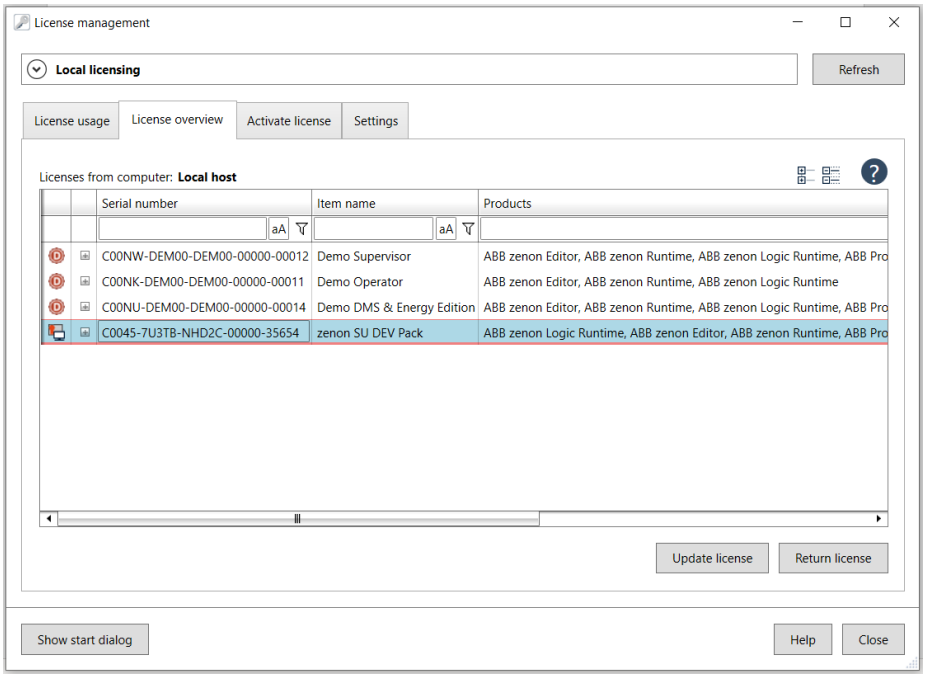
1.5 ABB ZENON license

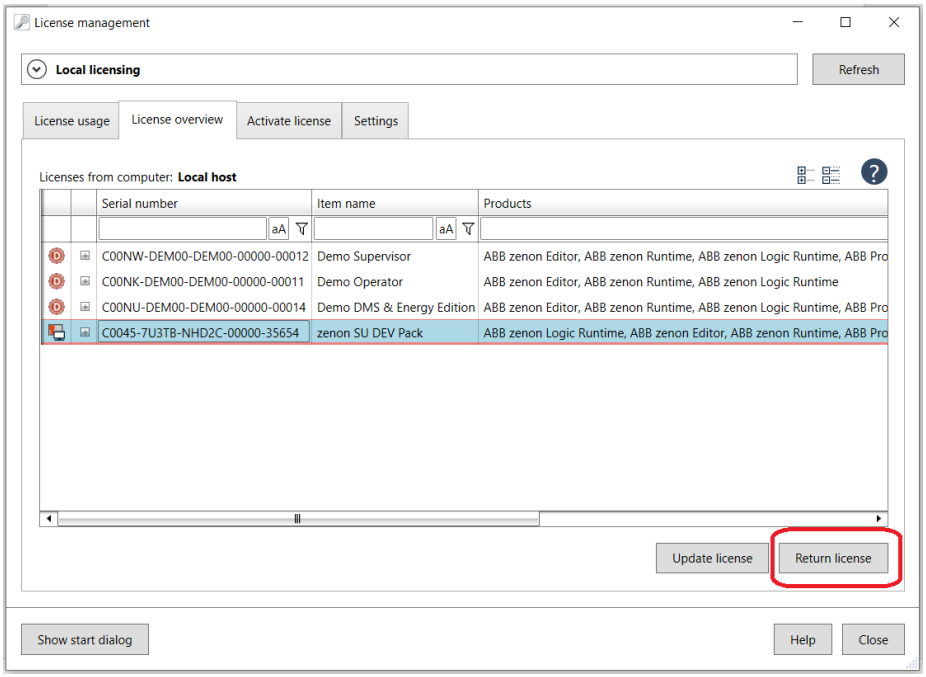
Continued

3 Click on the license to be returned.



xx2000000227

4 Click on **Return License**.



xx2000000228

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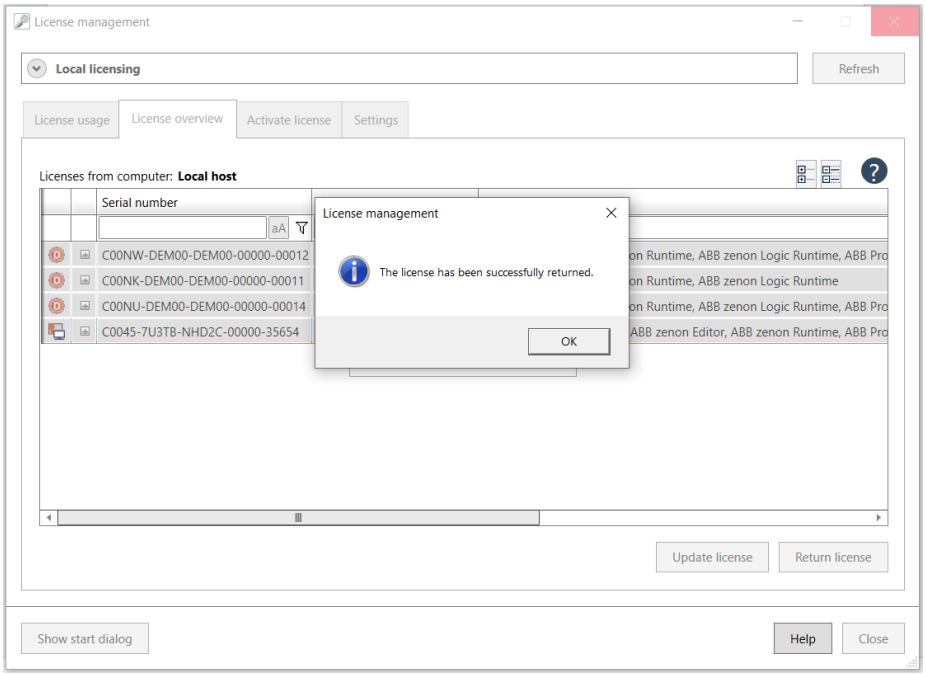
5 Click **OK** when the license is successfully returned.



xx2000000229

Note

Return the license to release it before any uninstalling ABB ZENON work.

Or the license will be occupied by the uninstalled ABB ZENON and may not be reused anymore.

If this already happened, please contact ABB.

1.6 Installing PickMaster Twin Host

Overview

This section describes the installation process for the PickMaster Twin Host.

The PickMaster Twin Host contains the PickMaster Operator and real Runtime for production.

Prerequisites

To start the installation process, the following must be available:

- A computer with ABB ZENON installed.
- A computer that meets or exceeds the *System requirements on page 17*.
- A log on account with administrator rights on the computer.
- PickMaster Twin Host installation package
- A license certificate

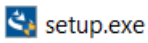
> **Note**
>
> The PickMaster Twin Client and PickMaster Twin Host are not recommended to be installed on a same PC.

Installing PickMaster Twin Host

Use this procedure to install the PickMaster Twin Host:

1. Browse to the PickMaster Operator installation package `PickMaster Twin Host` and double-click `setup.exe`.

   The installation starts.

   xx1900001752

2. Click **Next**.

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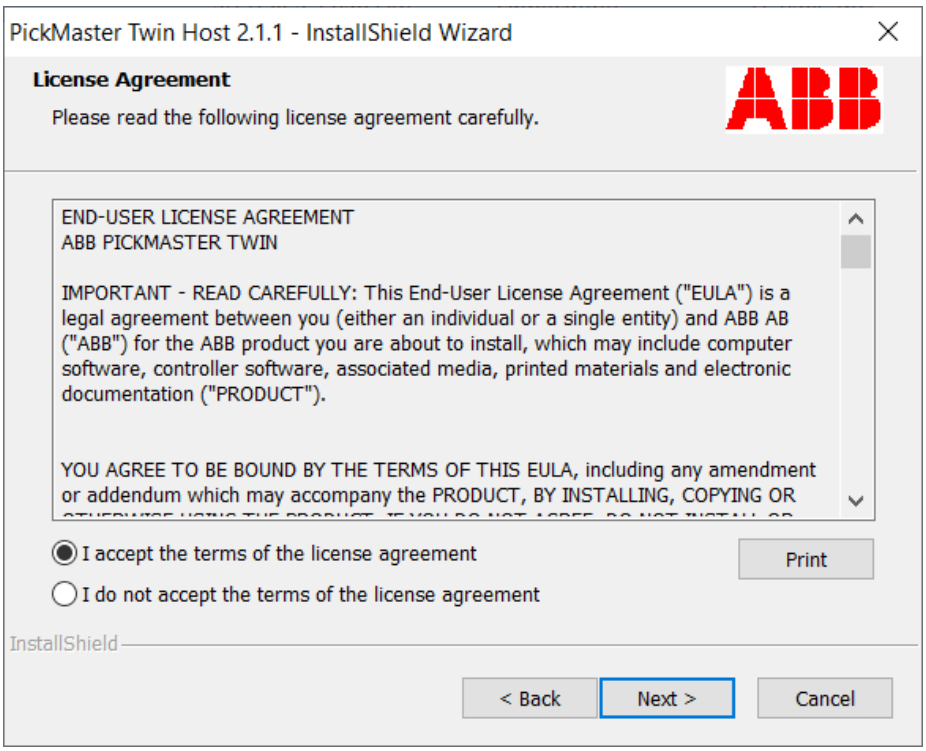
3 Read the **license agreement** and accept the terms.



xx1900001754

4 Choose the destination location folder and click **Next**.

5 Choose to install the **Congnex vision driver** and click **Next**.

6 Choose a folder for the application to set SFTP and click **Next**.

7 Choose an IP address for network adaptor configuration and click **Next**.

8 Click **Next** to start the installation.

9 When the installation is complete, choose to restart the computer now or later and click **Finish**.

1.7 Network setting

Overview

This chapter describes the procedures on setting up the Internet. Otherwise the PackML function cannot work normally.

Renaming the Network Adaptor

CAUTION

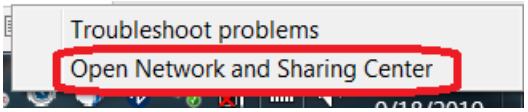
If the Network Adaptor is not renamed correctly, the PickMaster Operator cannot work normally.

Use this procedure to rename the Network adaptor:

1 Right click on the Wifi icon in the lower right corner of desktop.

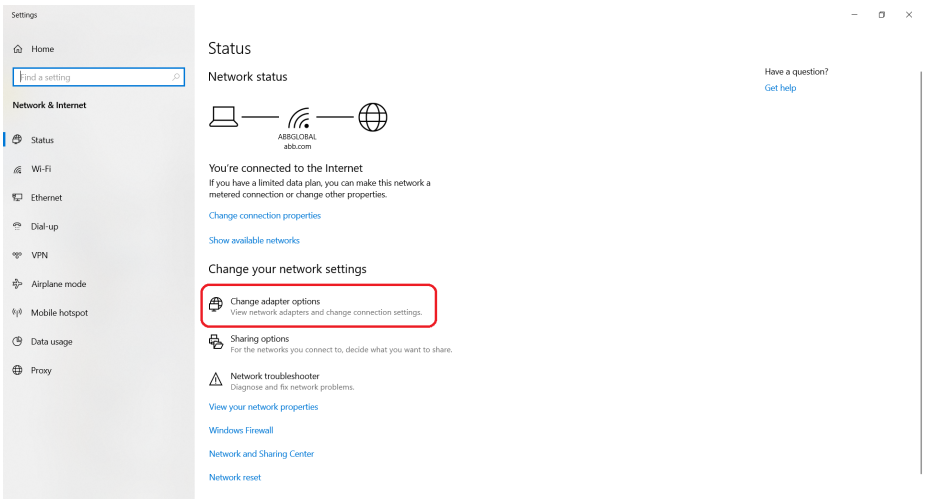
xx1900000797

2 Click **Open Network and Sharing Center** option.



xx1900000798

3 Click the "**Change adapter settings**" option.



xx1900001502

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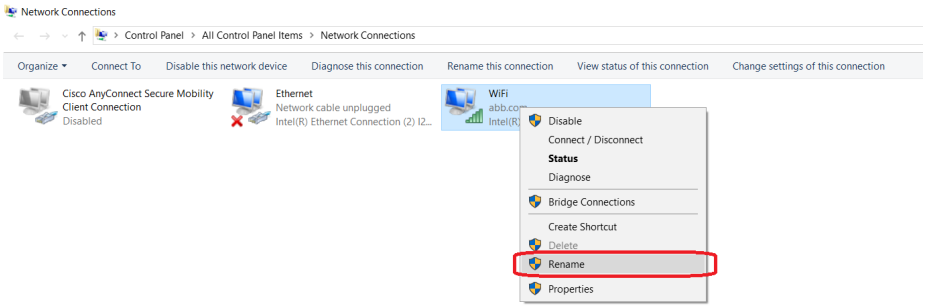
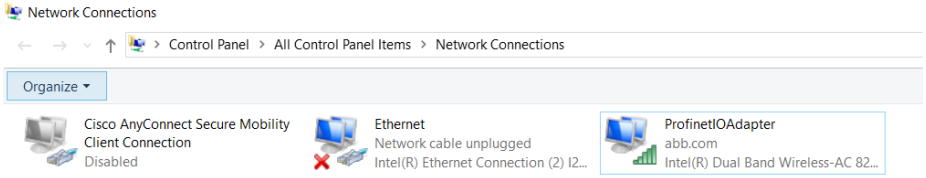
4 Enter the **Network Connections** setting page, right click on the network you are currently using for connecting PickMaster Operator and rename the network name to "ProfinetIOAdapter".



xx1900001503

For example: If the your computer is using wi-fi. Rename the network name "WiFi" to "ProfinetIOAdapter".



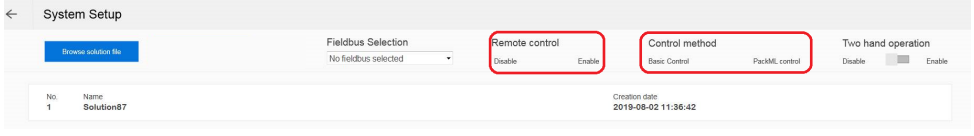
xx1900001504

5 If your computer uses a wired network, rename the network name from "Ethernet" to "ProfinetIOAdapter" with the same way.

Note

If the button of control mode selection disappeared, check whether the network name is changed to 'ProfinetIOAdapter' or not.

If not, change the name to fix the problem.



xx1900001727

1.8 Accessing the user interface

Overview

This chapter describes the procedures before login.

> **Note**
>
> After install PickMaster Twin Client and PickMaster Twin Host on different PC as recommended, there will be two real Runtime available but only the one connected to controller or camera should be used. This is the one that user should connect PickMaster Operator with and login.
>
> The real Runtime on Host PC and Client PC are identical but the one on Host is for production. Robot controllers and cameras should also be connected to this one.

Prerequisites

To start the PickMaster Operator, the following must be available:

- ABB ZENON must have been installed to the computer.
- PickMaster Operator must have been installed to the computer.
- A log on account with administrator rights on the computer.

Opening PickMaster Operator

Use this procedure to start PickMaster Operator:

1. Double click the `PickMaster Operator` file to open the **Welcome to ABB PickMaster** window.

xx1900001506

2. Enter the IP address of the PickMaster Runtime which need to be connected.

> **Tip**
>
> Check the IPv4 address of the computer which the PickMaster Runtime is installed on.

> **Note**
>
> Loopback address is NOT allowed to use as the PickMaster Runtime IP address, for example 127.0.0.1.
>
> Loopback address will cause errors in vision function.

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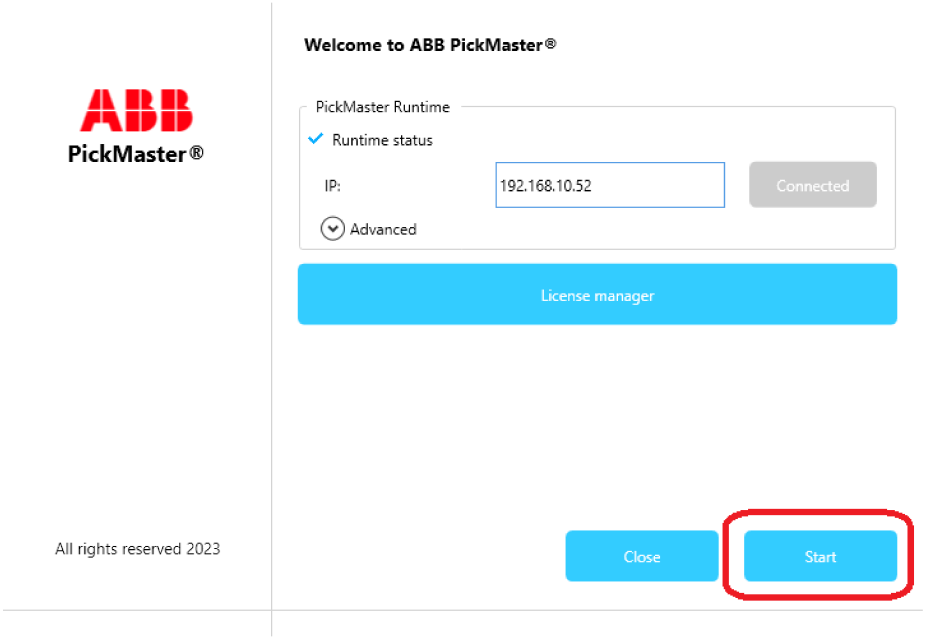

xx1900001507

3 If needed, click **Advance** to open the setting view for Runtime user and language.

Tip

The default Runtime user name and password is the credential for connecting the PickMaster Runtime by `https` protocol.

Default Username: `admin` with Password: `password`

Note

The user should change the password of the default user account for higher Cyber Security.

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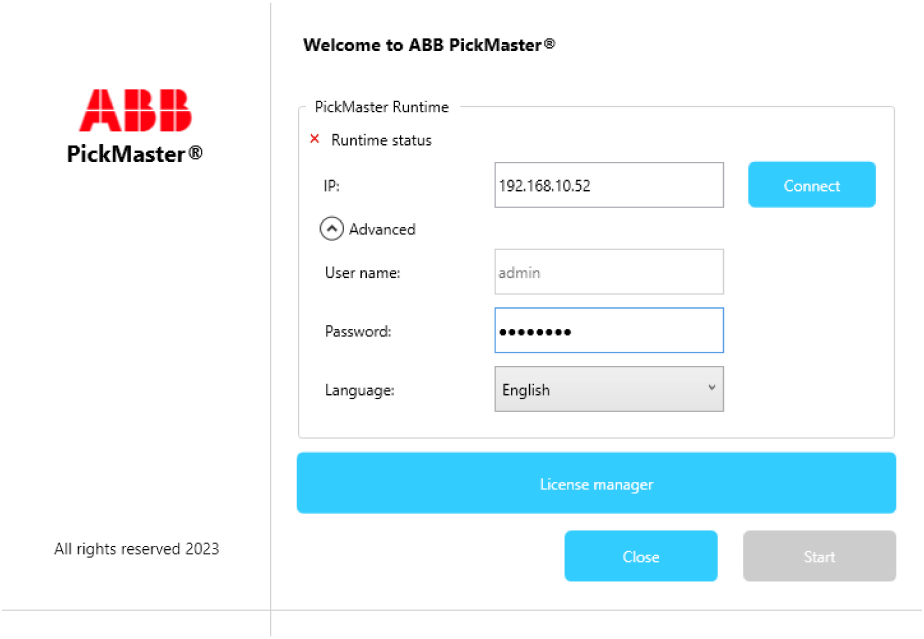
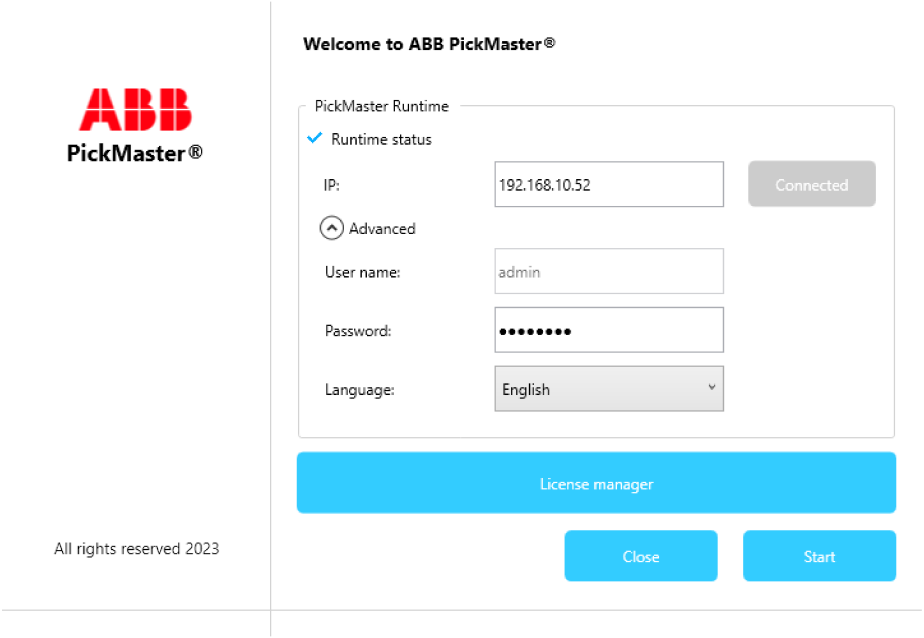


xx2200002005

4 Click **Connect** button.

> **Note**
>
> When the **SSL** dialog box pops up during the first operation of the PickMaster Operator, click **Yes**.
>
> Otherwise the PickMaster Operator cannot work normally.

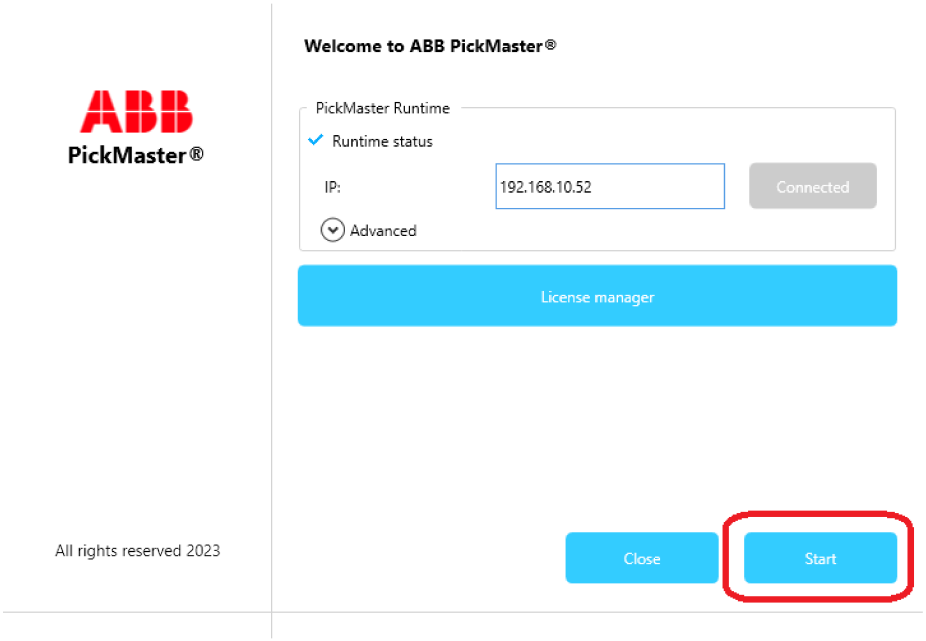


xx2200002006

5 Click the **License Manager** button to open the **License Management** window. For more detail on activating the license, see *ABB ZENON license on page 27*.

Continues on next page

6 Click **Start** button to open the login interface.



xx1900001508

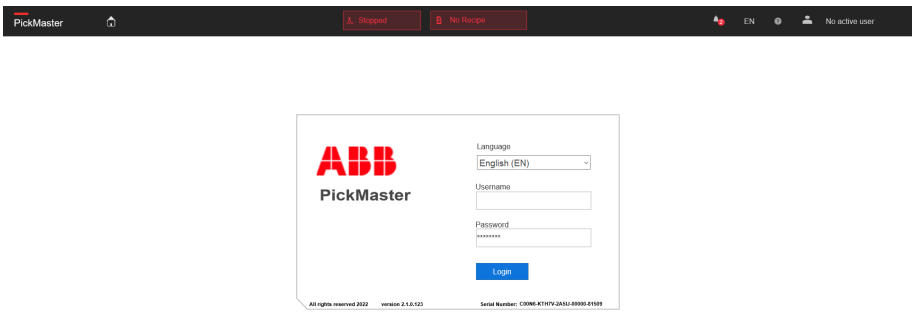
Note

If the user meets any problem when building connection between PickMaster Operator and real Runtime, please check from below possible reasons:

a Using a host account that is not administrator;
b Firewall blocking;
c VPN interference;
d Host IP address incorrect;
e The network name not renamed to "profinetIOAdapter".

Continues on next page

7 Login with an effective user account.



xx1900000783

Tip

A default user and password have been created for each role.

Administrator Username: `admin` with Password: `password`

Note

The default user `admin` cannot be deleted.

Note

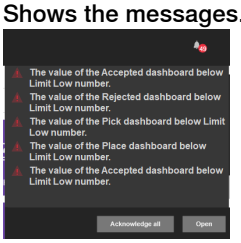
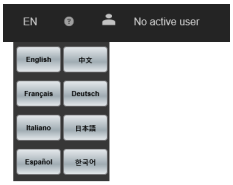
The Username and Password are case sensitive.

2 PickMaster Operator main navigation bar

Structure of the main navigation bar

The PickMaster Operator main navigation bar provides a series of basic functions.

xx1900000321

ID	Object	Description
1	**Home Page** icon	Go back to the main page when you open any page.
2	Status indicator	Shows the status of the production.
3	Recipe indicator	Shows the recipe in use. **No recipe**: No recipe is loaded or no mandatory robot is selected. **Recipe partly loaded**: Mandatory and option both exist. **Recipe Loaded**: All robots are mandatory. For more information, see *Recipe Settings on page 70*.
4	Bell	Shows the messages.  xx1900000324
5	Language	Change the language. Available languages: • English • Simplified Chinese • German • Italian • Spanish • Japanese • French • Korean  xx1900000322

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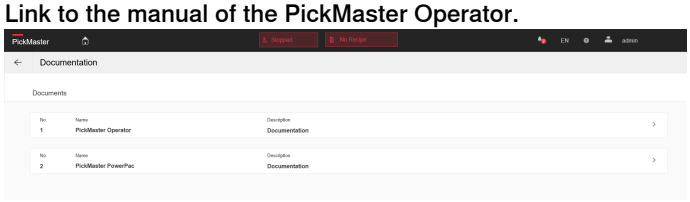
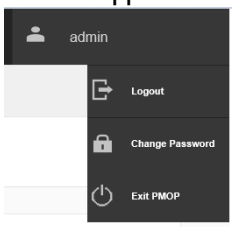
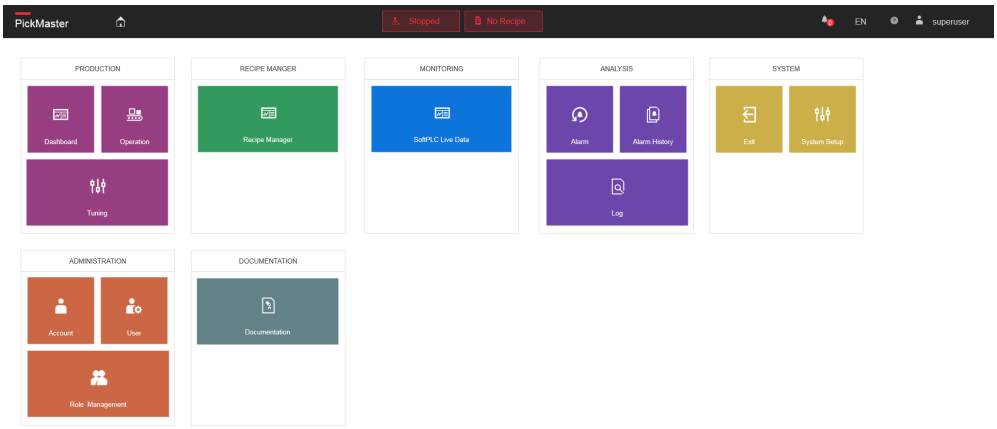
ID	Object	Description
6	Help	Link to the manual of the PickMaster Operator.  xx2000000368
7	Login	Log in, log off, manage PickMaster Operator user password and exit application.  xx1900000323

3 PickMaster Operator main page

3.1 Overview

Overview

The following figure shows the PickMaster Operator main page.



xx1900000320

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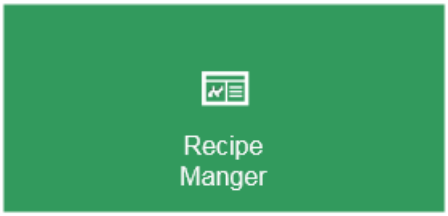
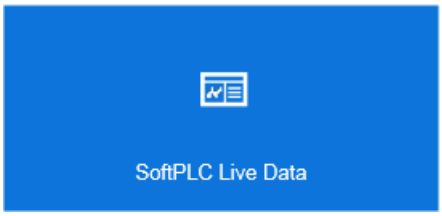
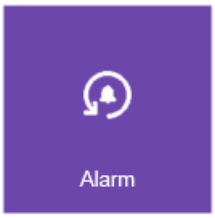
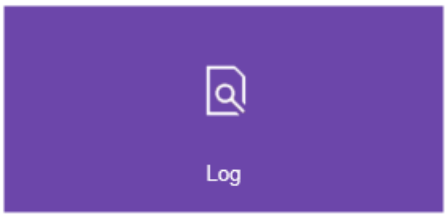
Elements on the main page

Group	Menu	Description
PRODUCTION	Dashboard	 xx1900000325 Shows the status of the robots. For detailed description, see *Dashboard on page 54*.
	Operation	 xx1900000326 Send commands from PickMaster Operator and reflect the states of PackML in PickMaster Operator. For detailed description, see *Operation on page 55*.
	Tuning	 xx1900000327 Adjust recipe parameters during operation. For detailed description, see *Tuning on page 61*.
RECIPE MANAGER	Recipe Manager	 xx1900000328 Choose a recipe. For detailed description, see *Recipe Manager on page 69*.

Continues on next page

Group	Menu	Description
MONITORING	SoftPLC Live Data	 xx1900000790 Monitor the live data of the softPLC. For detailed description, see *SoftPLC Live Data on page 72*.
ANALYSIS	Alarm	 xx1900000791 Monitor the alarms that are not acknowledged. For detailed description, see *SoftPLC Live Data on page 72*.
	Alarm History	 xx1900000792 Monitor all the alarms. **Tip** The acknowledged alarms are in black color and the un-acknowledged alarms are in red color. For detailed description, see *SoftPLC Live Data on page 72*.
	Log	 xx1900000793 Monitor all the operations that happened. For detailed description, see *SoftPLC Live Data on page 72*.

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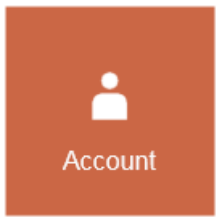
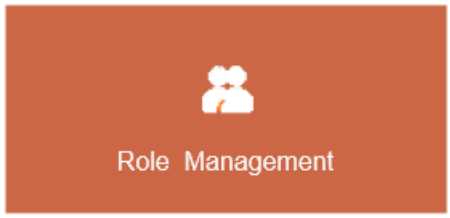
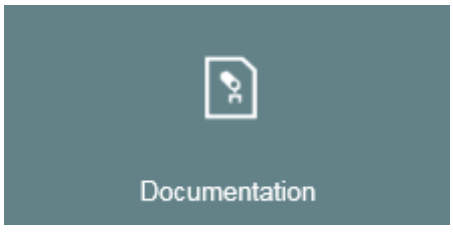
Continued

Group	Menu	Description
SYSTEM	Exit Runtime	 xx1900000329 End the PickMaster Operator. For detailed description, see *Exit on page 80*.
	System Setup	 xx1900000330 Import solutions. For detailed description, see *System Setup on page 80*.

Continues on next page

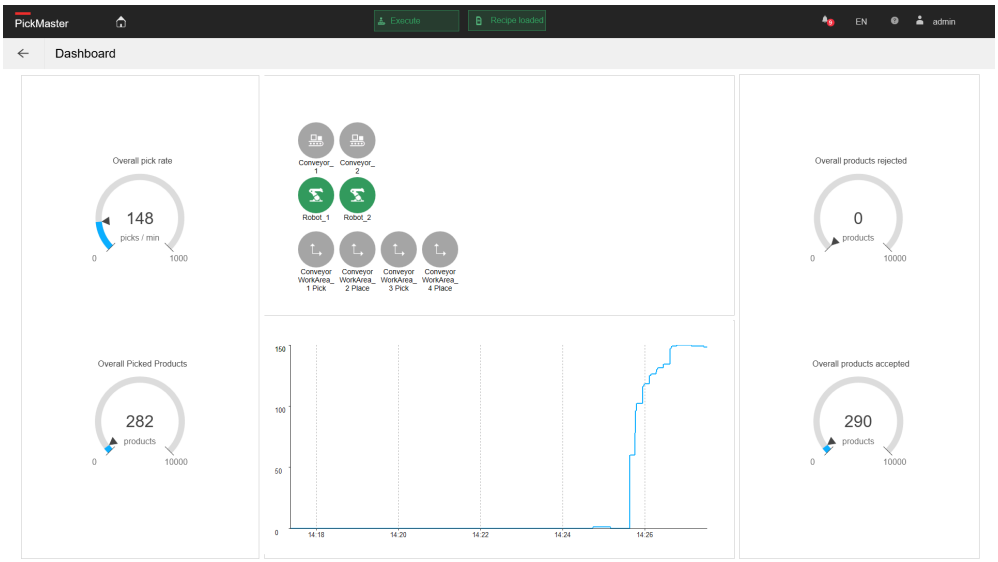
Group	Menu	Description
ADMINISTRATOR	Account	 xx1900000331 Manage the account in use. For detailed description, see *Account on page 86*.
	User Management	 xx1900000332 Manage the users. For detailed description, see *User Management on page 86*.
	Role Management	 xx1900000333 Manage the roles. For detailed description, see *Role Management on page 88*.
DOCUMENTATION	PickMaster	 xx1900000334 Open the related documents. For detailed description, see *PickMaster on page 93*.

3.2 PRODUCTION group

Dashboard

Overview

Dashboard allows you to show the layout of the solution, the quantity and status of the components in the solution, the status of the robots and the live data of pick/place rate.



xx1900000335

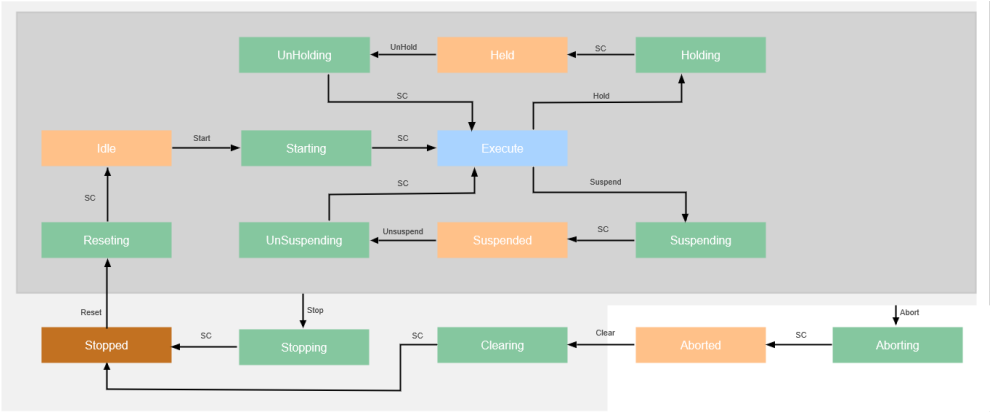
Parameter	Description
Overall pick rate	The pick rate for all robots in current solution.
Overall Picked Products	The total number of the picked products in current solution.
Overall products rejected	The total number of the rejected products in current solution.
Overall products accepted	The total number of the accepted products in current solution.
2D Layout	Shows all equipment in current solution.
Trend	Shows the trend of the overall pick rate.

Continues on next page

Operation

What is PackML?

PickMaster® Twin includes an internal SoftPLC, which controls a state machine following the PackML standard according to OMAC (Organization for Machine Automation and Control: omac.org). PackML stands for Packaging machine language and it defines a unified way of operating packaging machinery as well as the inter-machinery communication.



xx1900000796

- A transition State (Green in picture) is a state that holds a process until certain conditions are met.
- A Wait State (Orange in picture) - A stable state used to identify that a unit/machine has achieved a defined set of conditions.
- Dual state (Blue) - The unit/machine is in a stable acting state - unit/machine is producing; but in case of batch production, it can be a transition state.

The states in orange and blue are stable states, i.e. they can be valid for a longer period of time. The states in green are states that are only valid for a certain period of time and transfer to the next state without intervention from an operator. The transition is automatically done if the state is complete (SC = State Complete).

Shown above is the full state diagram with the state Execute (in blue) the producing state. The loop under-neath, via Suspended, is a waiting loop for material to be worked upon. The loop above, via Held, is the loop where the operator holds the system out of the producing state.

After all products are made, the producing state Execute is left via Complete, and ready for a new production order.

At power on, the state Stopped is valid. After a Reset it moves to the state Idle via Resetting.

Issuing ‘Start’ gets the unit to ‘Execute’ via ‘Starting’.

Continues on next page

The PackML state diagram leaves its normal loop via either Abort or Stop. The Abort is coupled to the error handling from every state. The Stop is for the operator interface.

PackML state diagram

	State Commands									State Complete
Current State	**Start**	**Reset**	**Hold**	**Un-hold**	**Suspend**	**UnSuspend**	**Clear**	**Stop**	**Abort**	
IDLE	STARTING							STOPPING	ABORTING	
STARTING								STOPPING	ABORTING	EXECUTE
EXECUTE			HOLDING		SUSPENDING			STOPPING	ABORTING	COMPLETING
COMPLETING								STOPPING	ABORTING	
COMPLETE		RESETTING						STOPPING	ABORTING	
RESETTING								STOPPING	ABORTING	
HOLDING								STOPPING	ABORTING	
HELD				UNHOLDING				STOPPING	ABORTING	
UNHOLDING								STOPPING	ABORTING	
SUSPENDING								STOPPING	ABORTING	
SUSPENDED						UNSUSPENDING		STOPPING	ABORTING	
UNSUSPENDING								STOPPING	ABORTING	
STOPPING									ABORTING	
STOPPED		RESETTING							ABORTING	
ABORTING										
ABORTED							CLEARING			
CLEANING									ABORTING	

Continues on next page

Actions for each command

Command	Step 1: Active state	Step 2: PickMaster actions	Step 3: Robot and controller actions	Step 4: Expected command result	Step 5: Expected active state
Reset	Resetting	Create line and project files; Initiate vision; Start vision; Initiate robots (position sources, pipes, RAPID program, etc).	Controller Motors ON; Robots move to Safe position.	Controller Motors on; Init vision finished; Init robots finished.	Idle
Start	Starting	Start robots.	Running pickplace routine	Robots is in running state.	Execute
Stop	Stopping	Stop vision; Stop robots; Stop project; Close project.	Moving to safe positions	Robots stopped; Project stopped and closed.	Stopped
Hold	Holding	Hold robots.	Executing holding operation Robots; stopped in HOLD position.	Robots reached hold position.	Held
Un-hold	Un-Holding	Start robot to pick/place.	Restarting pick or place	Robots is running.	Execute
Suspend	Suspending	Suspend robots.	Executing Suspending operation; Robots stopped in SUSPEND position.	Robots reached suspend position.	Suspended
Un-Suspend	Un-Suspending	Start robot ready to pick/place.	Restarting pick or place	Robots is running.	Execute
Abort	Aborting	Stop vision; Stop robots; Stop project.	Moving to safe positions	Robots stopped in safe position.	Aborted
Clear	Clearing	Close project.	Stopped in safe position	Close project completed.	Stopped

Self-diagnosis processing PackML state

Mandatory robot command result when PML is Execute				
Robot command (UI buttons or remote commands)	**Production State**	**Optional Robot**	**Other Mandatory Robot**	**Remark**
Pause	Holding	Pause in Safe position	Pause in Safe position	/
Stop	Holding	Pause in Safe position	Pause in Safe position	/
Start (not allowed)	/	/	/	/
AutoStop (A-stop)	Holding	Pause in Safe position	Pause in Safe position	/
E-stop	Stopping	Stop	Stop	/

Continues on next page

3.2 PRODUCTION group
Continued

Optional robot command result when PML is Execute				
Robot command (UI buttons or remote commands)	**Production State**	**Other Optional Robot**	**Mandatory Robot**	**Remark**
Pause	no effect	no effect	no effect	Only the commanded robot is influenced
Stop	no effect	no effect	no effect	
Start(after robot stopped or paused)	no effect	no effect	no effect	
AutoStop (A-stop)	no effect	no effect	no effect	
E-stop	no effect	no effect	no effect	

When Mandatory robot enters stop state (not E-stop)		
PML states when robot stop happens	**PML state reactions**	**Remark**
Restting/Idle	PackML automatically go to stopping	
Starting/Un-Holding/Un-suspending	Stay in current state	Other robots will be started and PML state goes to Execute, at this moment it fulfills the condition to go to Held, then PML goes to Held.
Holding/Suspending/Held/Suspended/Aborting/Aborted/Clearing/Stopping/stopped	Do nothing	/
Execute	PackML automatically go to Holding	/

Continues on next page

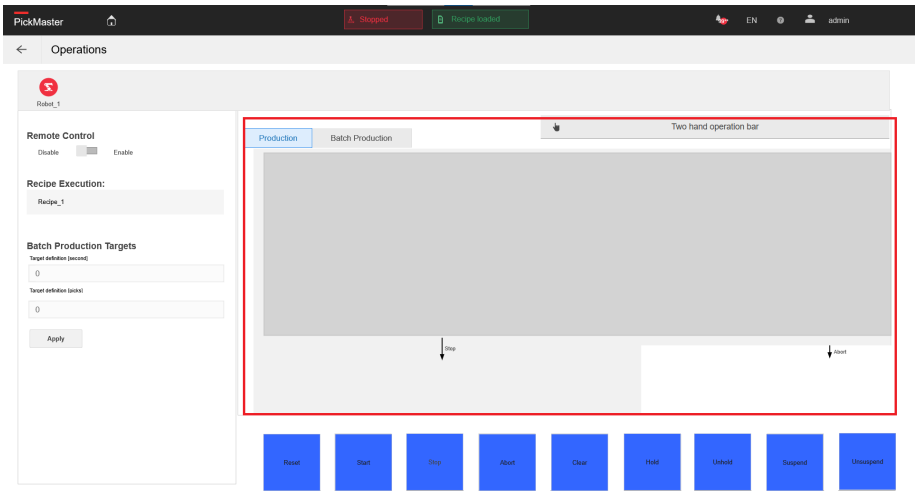
PackML for PickMaster Operator

This function is used to send commands from PickMaster Operator and reflect the states of PackML in PickMaster Operator.

Note

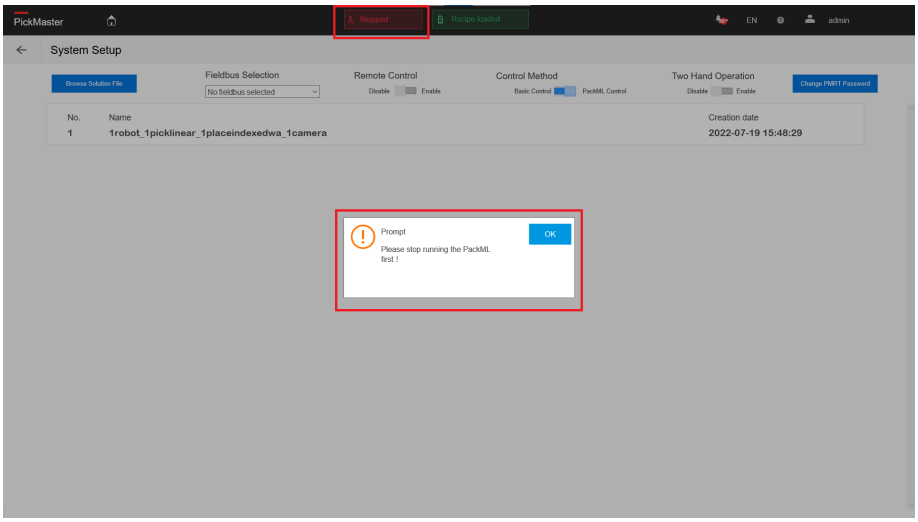
Reinstall the ABB ZENON when the following phenomenon occurs:

1 The PackML page is partially disappeared.



xx2200002116

2 This error message pops up when the PackML is already stopped.



xx2200002117

For more information, see *Installing and uninstalling ABB ZENON on page 19*.

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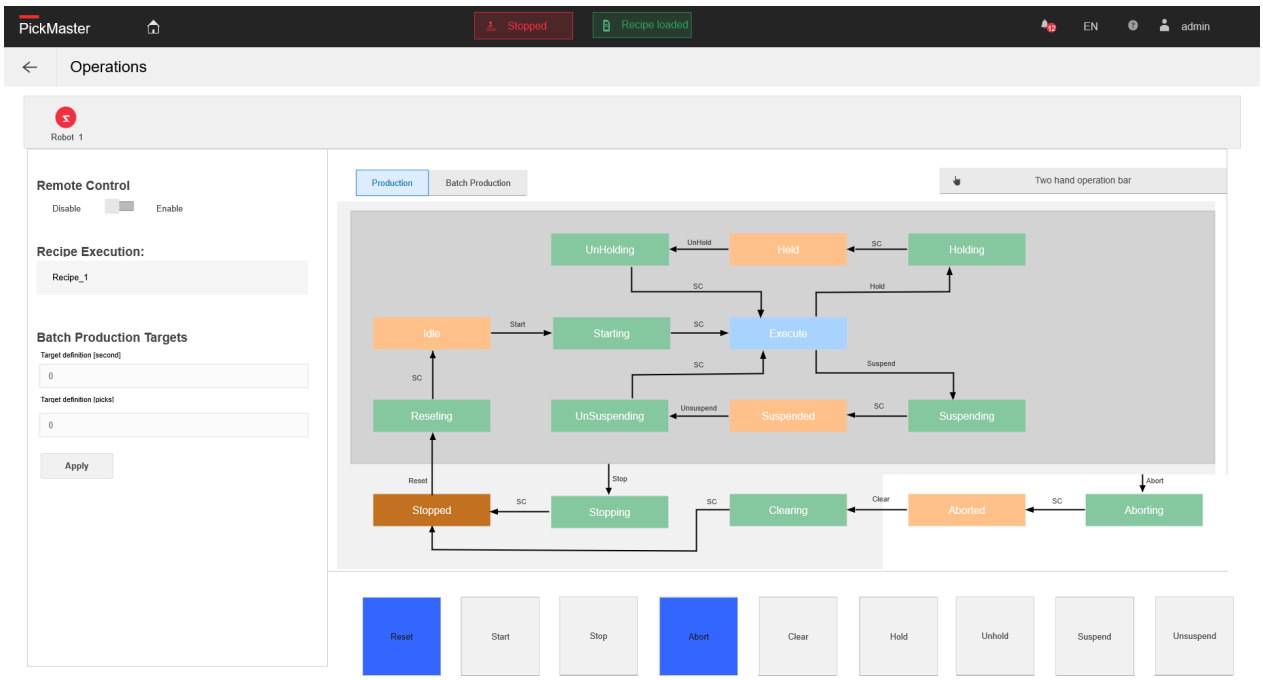
3.2 PRODUCTION group

Continued

Production

Production is the basic operation of the state machine.



xx1900000336

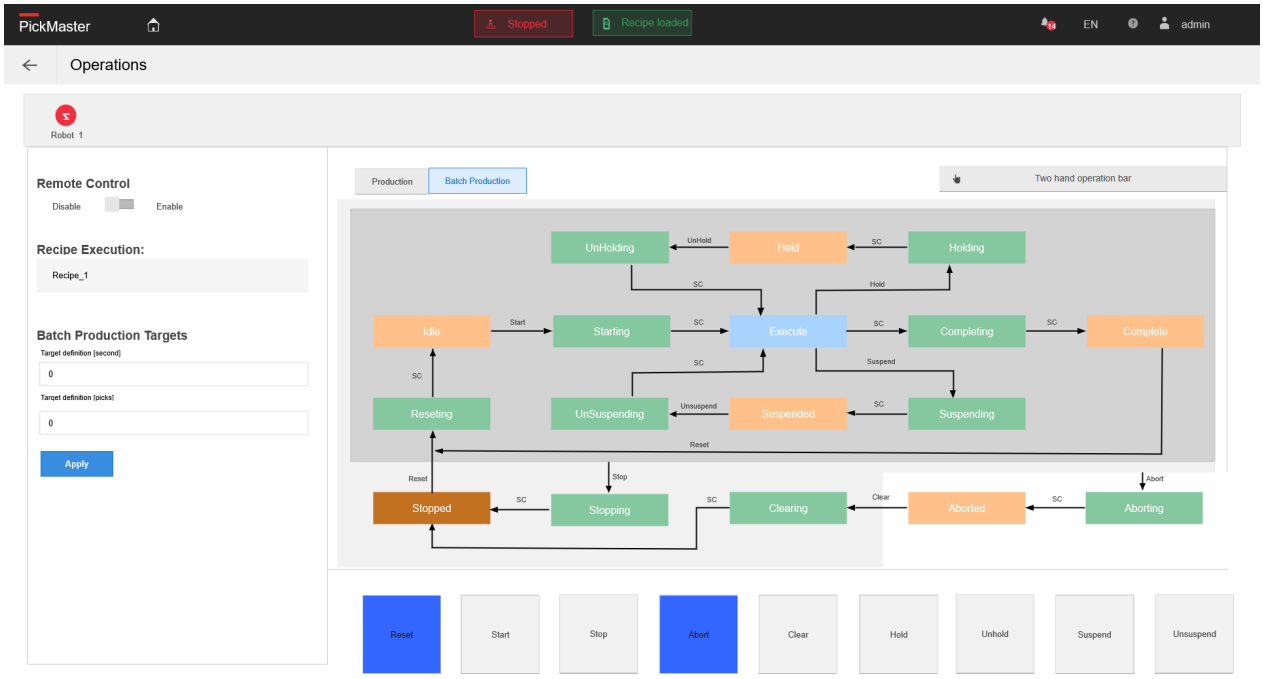
Batch production

Batch production is the basic operation with the complete operation of the state machine.

Pick Number or **Pick Time** can be set as the judgment condition. If the set condition is reached, the system will enter the **Complete** process automatically.

> **Note**
>
> If need to use the batch production function in remote control mode, the **Pick Number** or **Pick Time** need to be set before changing to remote control mode.
>
> Or the batch production function cannot be used.

Continues on next page

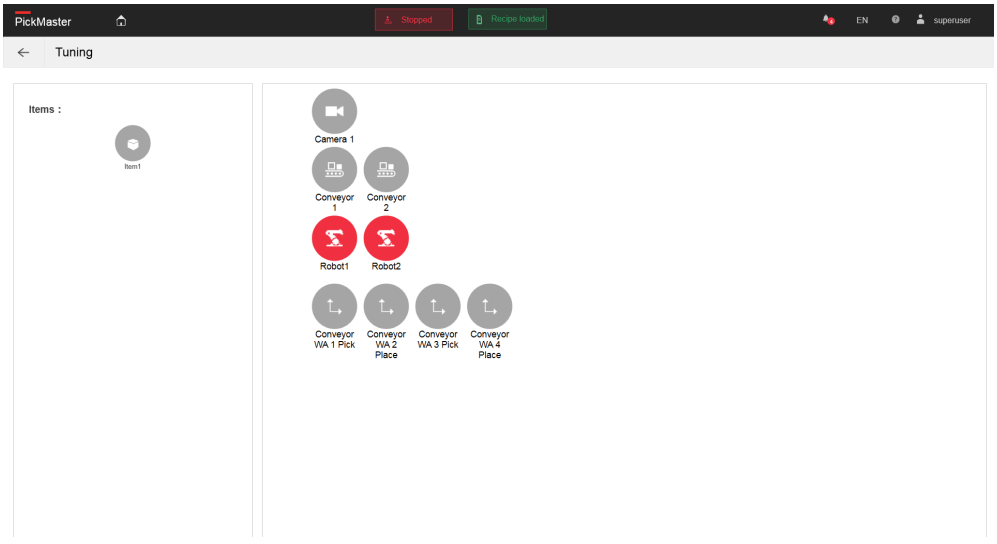


xx1900000965

Tuning

Overview

This function is used to change the parameters of the conveyors, robot and items during operation, such as positions, speed, offset and timing.

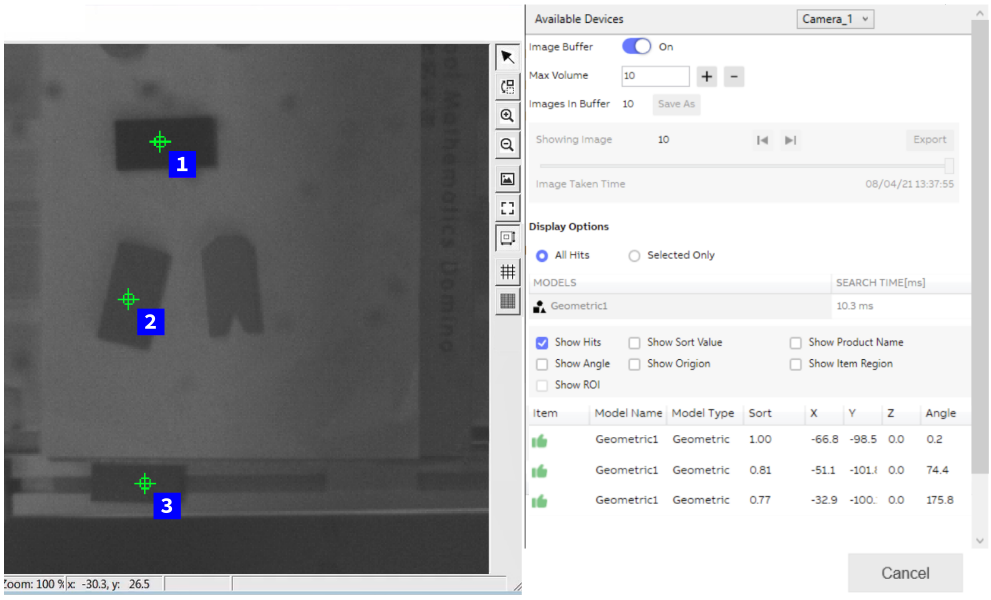


xx1900000786

Click on the icon to open the tuning windows. Clicking the camera icon opens the detail vision window, which displays the camera images with the object hits. The

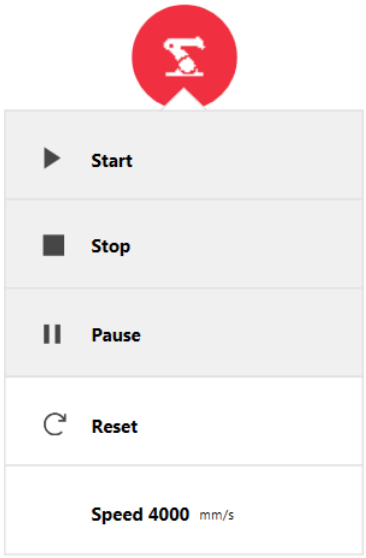
Continues on next page

images and results can be recorded and saved to a file for later analysis with the PickMaster Vision Viewer.



xx2100000697

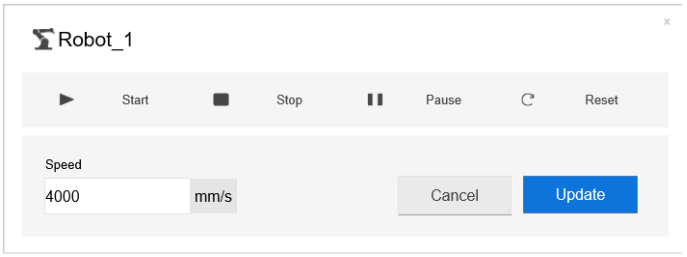
Tuning the robot



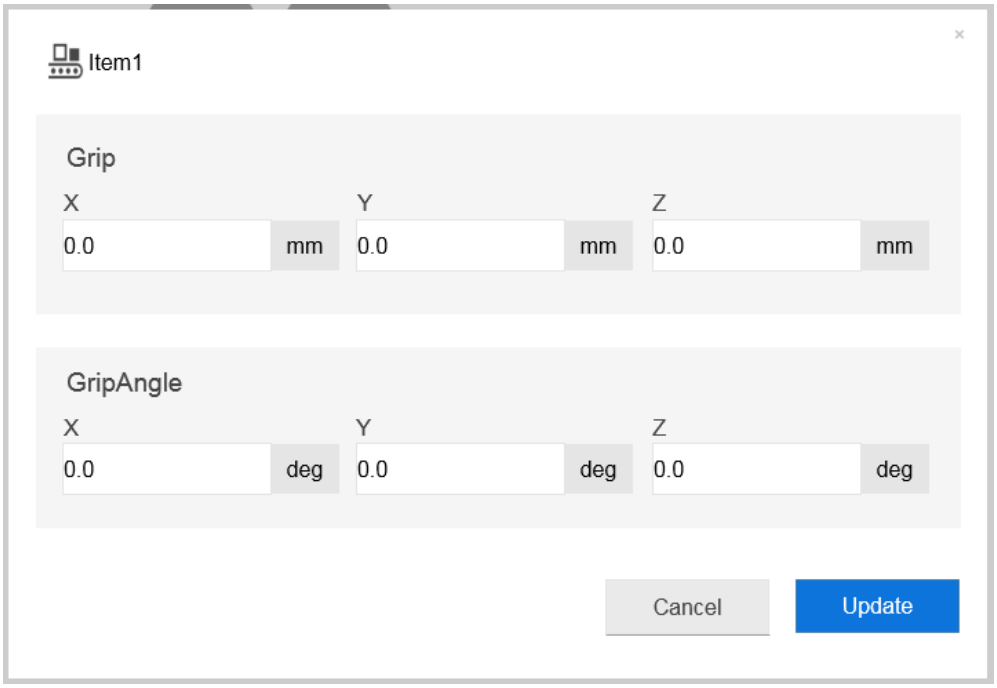
xx1900000787

Item	Description
Start	Start the selected robot.
Stop	Stop the selected robot. A robot stop empties all targets in the position queue. At a re-start after a stop, the robot waits until new targets are generated from the position source.
Pause	Pause the selected robot. A robot pause keeps all targets in the position queue. At a re-start after a pause, the robot resumes operation immediately with the next target in the queue.

Continues on next page

Item	Description
Reset	Reset the selected robot from emergency stop activated.
Speed	Change the speed of the selected robot in mm/s.  xx1900000966 **Note** When the data in the tuning is updated, it will be saved to the recipe.

Tuning the item



xx1900000968

	Description
GripX	Set the location of the gripper when doing the picking and placing operation in X direction.
GripY	Set the location of the gripper when doing the picking and placing operation in Y direction.
GripZ	Set the location of the gripper when doing the picking and placing operation in Z direction.
GripAngleX	Set the angle of the gripper when doing the picking and placing operation in X direction.

Continues on next page

3.2 PRODUCTION group
Continued

	Description
GripAngleY	Set the angle of the gripper when doing the picking and placing operation in Y direction.
GripAngleZ	Set the angle of the gripper when doing the picking and placing operation in Z direction.

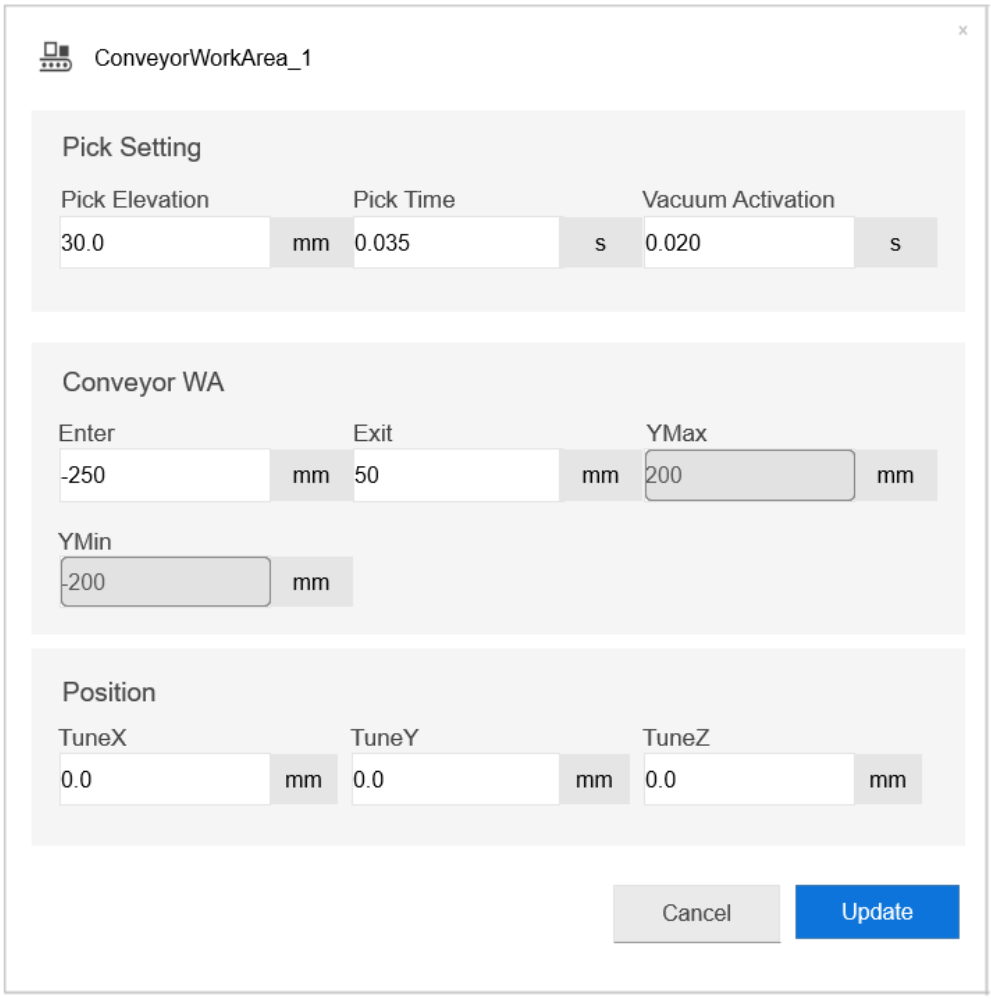
Note

When adjusting the angles, IRB 360 does not support adjusting the angles in the X and Y direction.

Note

When the data in the tuning is updated, it will be saved to the recipe.

Tuning the work area



xx2000000199

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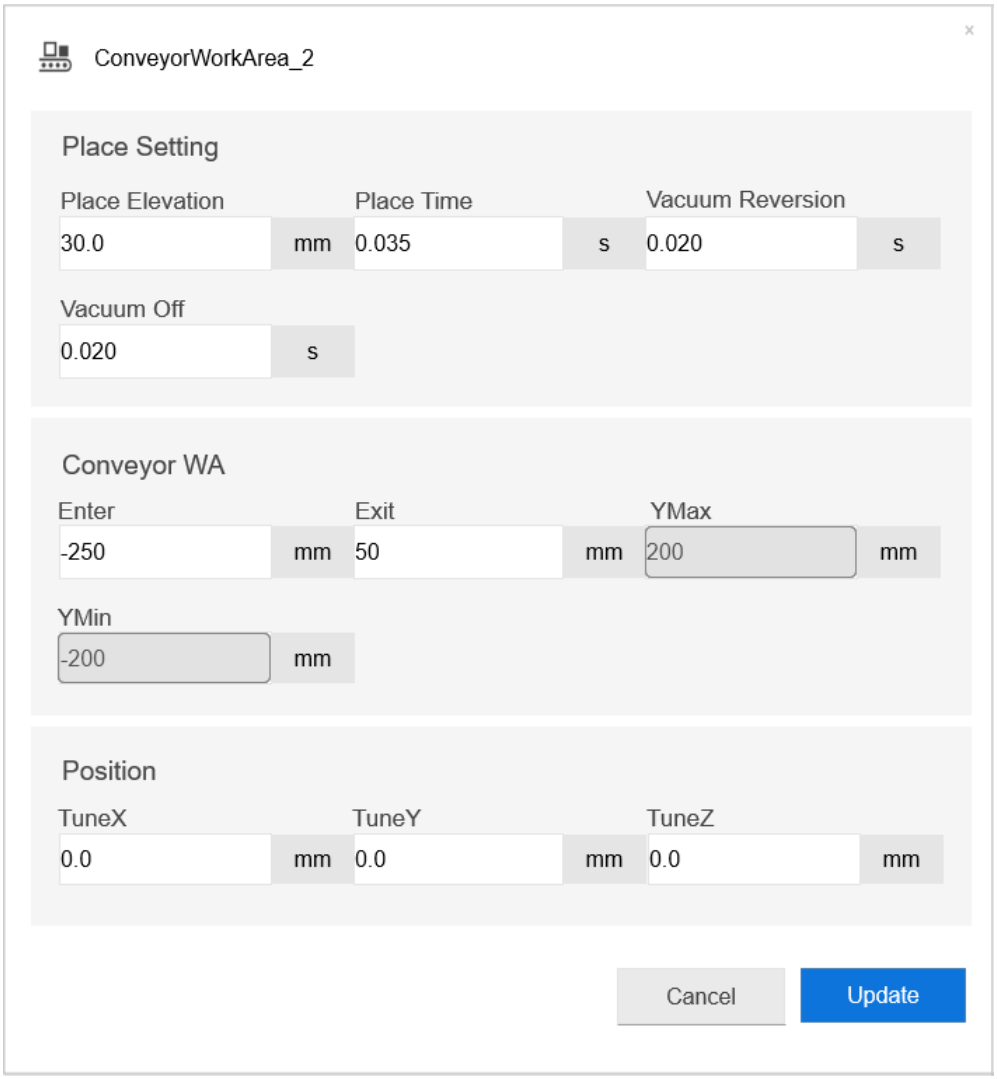

xx2000000200

	Description
Pick/PlaceElevation	**Pick/PlaceElevation** is the distance, in negative z-direction relative to the tool, from where the robot approaches the item target.
Pick/PlaceTime	**Pick/PlaceTime** is the time the robot is in the pick/place position. If the conveyor is moving during the pick/place time, the robot will track along the conveyor to keep the relative position on the moving conveyor.
Vacuum Activation	**Vacuum Activation** is the time in seconds before the middle of the corner path of the approaching position, when the vacuum I/O should be set. If a negative value is entered, the vacuum I/O will be set the time after the middle of the corner path. This value is only valid for work areas of type **Pick** or **Other**.

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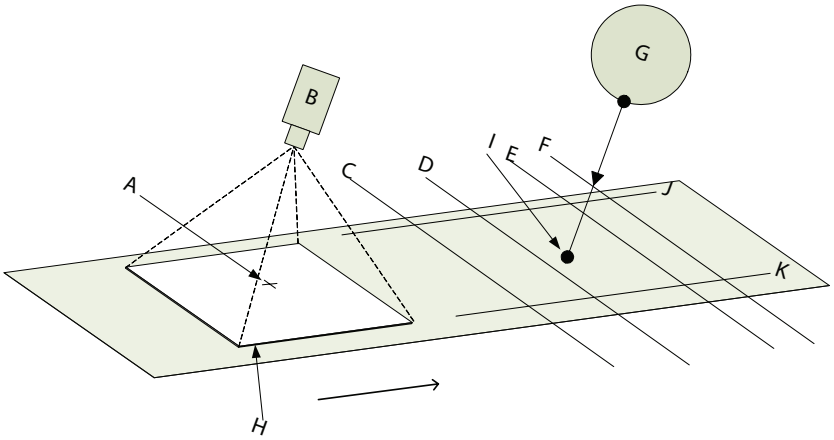
	Description
Enter	After you define a start entry in a work area which may called Start X , you can define a same start entry which may called Start Y at the vertical direction of the Start X.



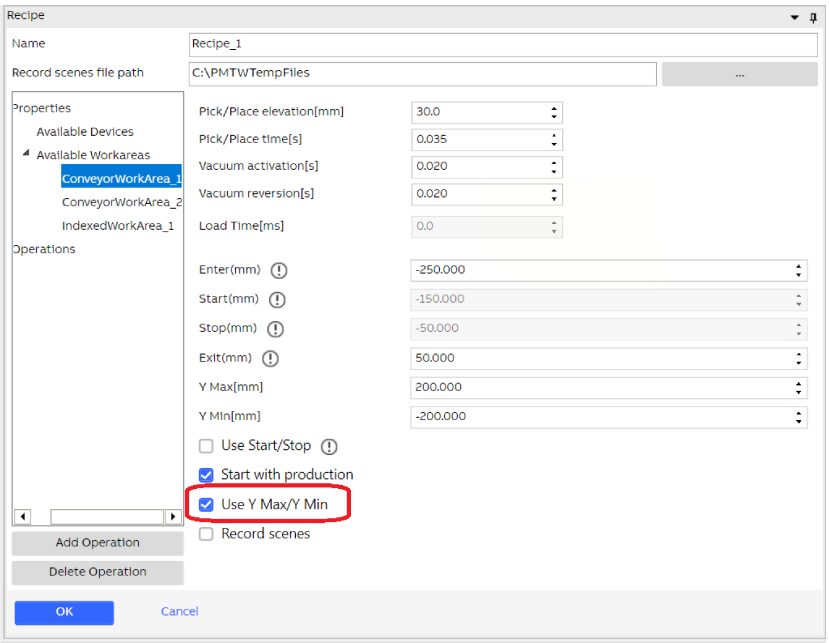
xx1800001747

A	Camera and Baseframe origin
B	Camera
C	Enter
D	Start
E	Stop
F	Exit
G	Robot
H	Image frame
I	Center of Robot
J	UpperLimit
K	LowerLimit

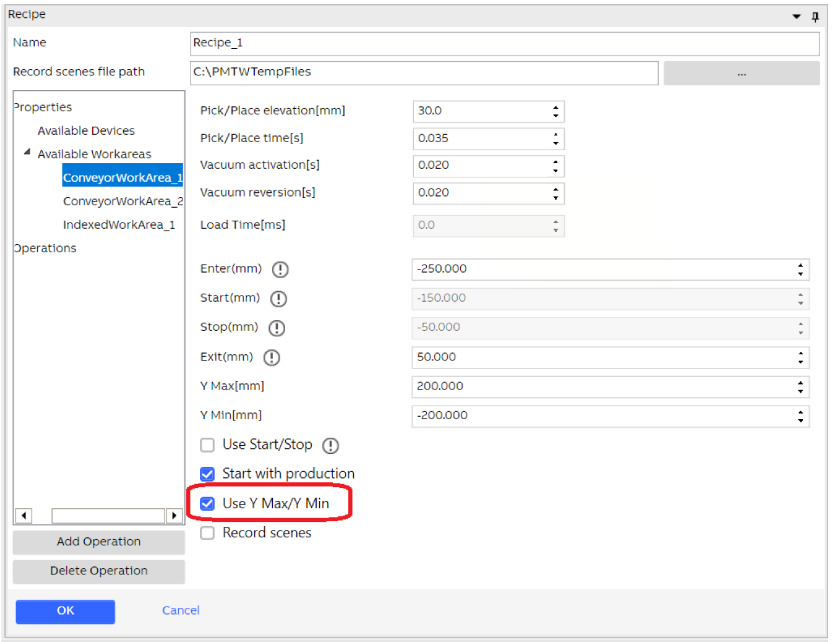
Enter is the limit from where the robot starts to execute item targets on the work area (Start X). The distance is calculated in millimeters from the center of the robot. The range is positive if the limit is beyond the center of the robot, relative to the moving direction of the conveyor. Make sure that the enter limit can be reached by the robot.

Exit	**Exit** is the limit from where the robot considers an item target as lost on the work area (Start X). The distance is calculated in millimeters from the center of the robot. The range is positive if the limit is beyond the center of the robot, relative to the moving direction of the conveyor. When the tracked item passes beyond this limit it will be dropped. This limit must be chosen well within the maximum reach of the robot. The robot must be able to reach this position from an arbitrary position in the robot's working area before the position is out of reach.

Continues on next page

	Description
YMax	**YMax** is the limit form where robot considers an item target as lost on the work area in End Y.The distance is calculated in millimeters from the center of the robot. The range is positive if the limit is beyond the center of the robot, relative to the moving vertical direction of the conveyor.Make sure that the enter limit can be reached by the robot. **Note** To enable this function, you need to select the **Use Start/Stop** checkbox for this function in the recipe configuration page.  xx2100001616

Continues on next page

	Description
YMin	**YMin** is the limit form where robot starts to execute item targets on the work area in Start Y. The distance is calculated in millimeters from the center of the robot. The range is positive if the limit is beyond the center of the robot, relative to the moving vertical direction of the conveyor.If the y coordinate value of the item's position is greater than the YMax, the robot will not grab the item. So when the tracked item passes beyond this limit it will be dropped. This limit must be chosen well within the maximum reach of the robot. **Note** To enable this function, you need to select the **Use Start/Stop** checkbox for this function in the recipe configuration page.  xx2100001616
TuneX	**X** is the offset of the gripping location on the x-direction in the conveyor base frame.
TuneY	**Y** is the offset of the gripping location on the y-direction in the conveyor base frame.
TuneZ	**Z** is the offset of the gripping location on the z-direction in the conveyor base frame.

Note

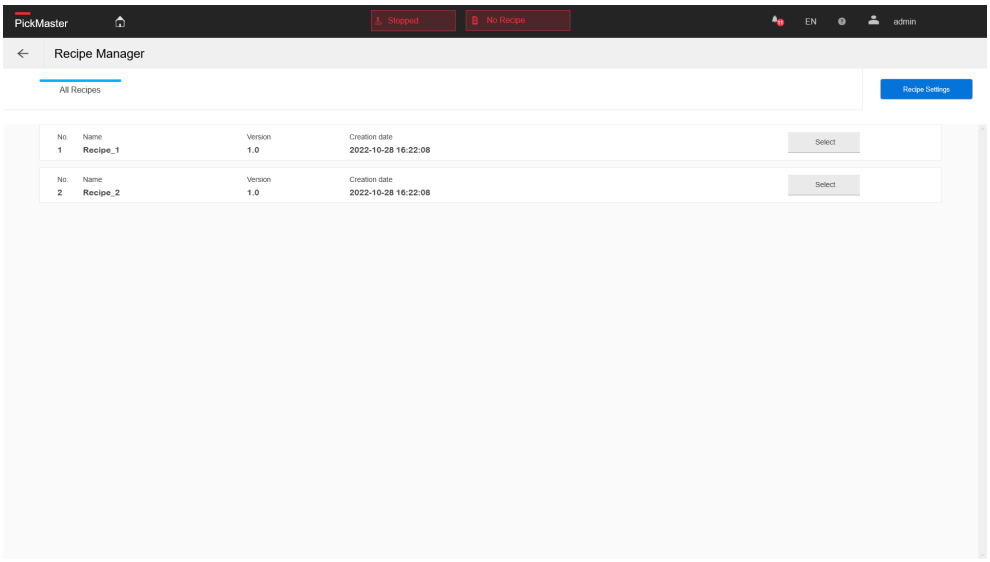
When the data in the tuning is updated, it will be saved to the recipe.

3.3 RECIPE MANAGER group

Recipe Manager

Overview

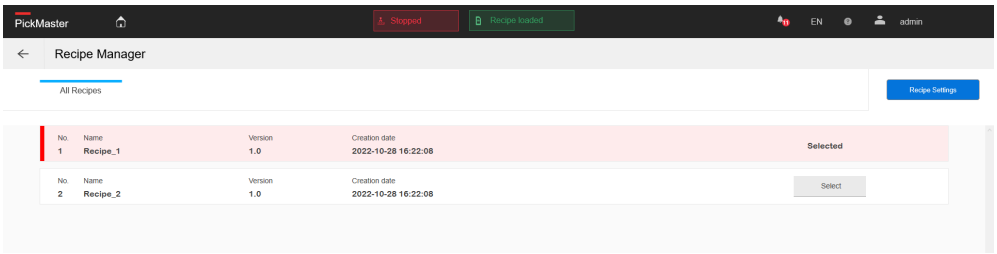
This function is used to select the working recipe.



xx1900000337

Click on the **Select** to activate the recipe you need.

When the recipe is selected, the selected recipe will be highlighted as pink.



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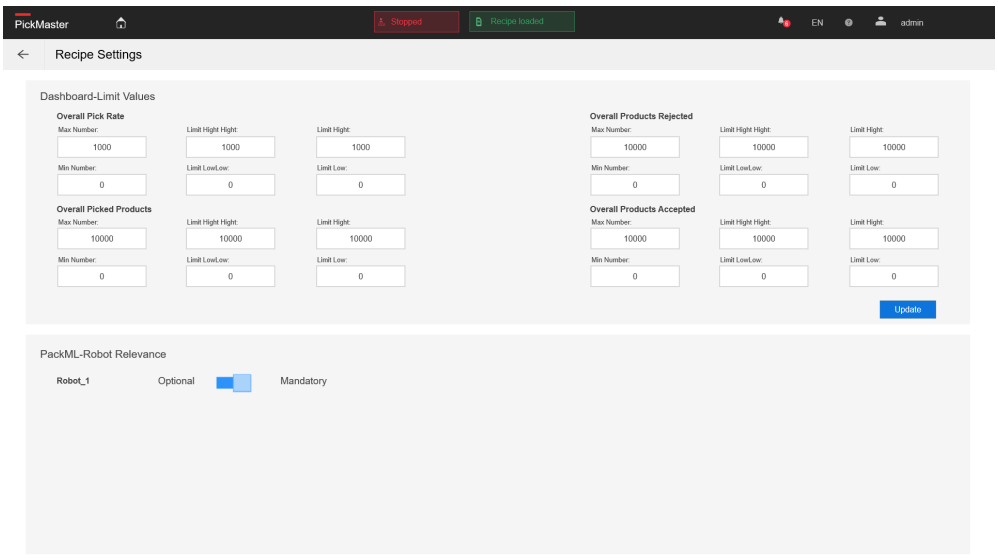
3.3 RECIPE MANAGER group

Continued

Recipe Settings

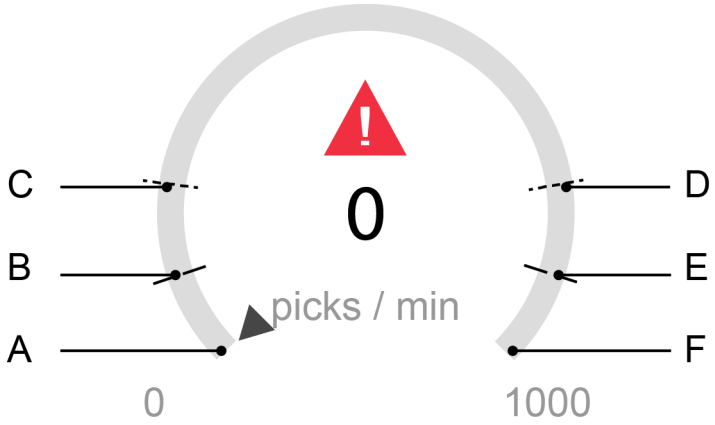
Click on the **Recipe Settings** to open the recipe settings window.



xx1900000689

Parameter		Description
Dashboard-Limit Values	Overall pick rate	The pick rate for all robots in current solution.
	Overall Picked Products	The total number of the picked products in current solution.
	Overall products rejected	The total number of the rejected products in current solution.
	Overall products accepted	The total number of the accepted products in current solution.
PackML-Robot Relevence	Optional	The robot is optional for this production. If this robot stops, it will not influent the other robots and the production.
	Mandatory	The robot is mandatory for this production. If this robot stops, it will stop the whole production. **Note** There is at least one robot set as mandatory for each recipe. Or the PackML can not work normally. **Note** If there are more than one robot in the recipe, and partially robots are selected as mandatory, then it will show **Recipe partially loaded**. on the main navigation bar, which means that there are both mandatory robots and optional robots in the recipe. If all the robot's in the recipe are selected as mandatory, then it will show **Recipe loaded** on the main navigation bar, which means that all the robots in the recipe are mandatory.

Continues on next page



xx1900000695

	Parameter	Description
A	Min Number	The lowest value of the dashboard.
B	LimitLowLow	Extreme low value: if the data is lower than this limit, there will be an alarm on the screen and the color of the real time data will be red.
C	LimitLow	Early warning for low value: if the data is lower than this limit, there will be an alarm on the screen and the color of the real time data will be red.
D	LimitHight	Early warning for high value: if the data is higher than this limit, there will be an alarm on the screen and the color of the real time data will be orange
E	LimitHightHight	Extreme high value: if the data is higher than this limit, there will be an alarm on the screen and the color of the real time data will be red.
F	Max Number	The highest value of the dashboard.

Tip

Please set the parameters according to the actual situation of the system, then the warning on the dial has practical significance.

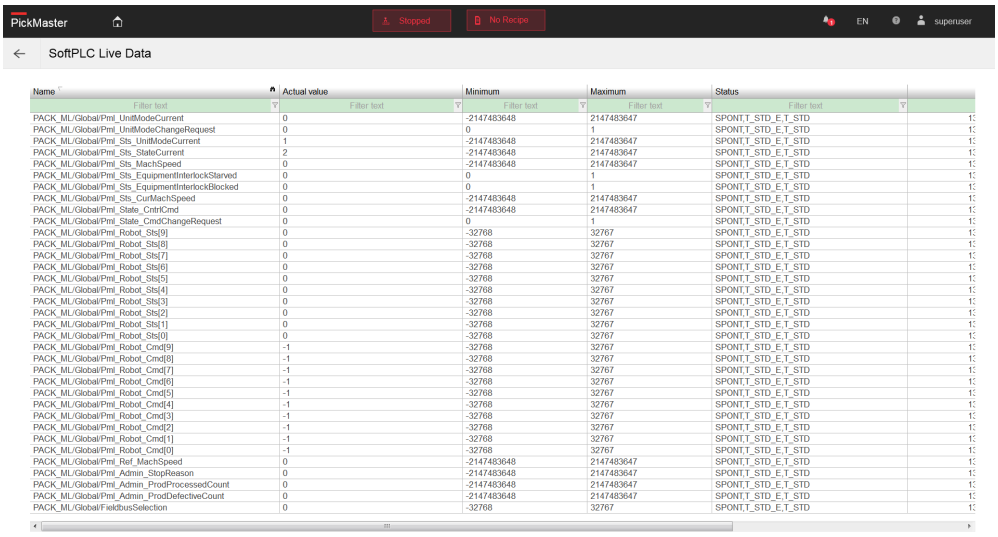
Only when the data is between **LimitLow** and **LimitHight**, the robot works normally. The color for the real time data will be blue.

3.4 MONITORING group

SoftPLC Live Data

Overview

This function is used to monitor the live data of the softPLC.



xx1900000795

According to the definition of the smallest order Packtag from the standard **ANSI / ISA-TR88.00.02-2015** chapter 7.5 Tag details, Table 7 PackTags Minimum required for information / machine monitoring and Table8 PackTags Minimum required for supervisory control:

PACK_ML/Global/Pml_UnitModeCurrent -> UnitName.Command.UnitModeCurrent

Data Type: INT (32bit)

Value: **1 - Production**; **4 - Batch production**

Tag Descriptor: Unit Mode in current use

This value is predefined by the user / OEM, and are the desired unit modes of the machine. The UnitMode tag is a numerical representation of the commanded tag. There can be any number of unit modes and for each unit mode there is an accompanying state model. Example unit modes are Production, Maintenance, Manual, Clean Out, Dry Run, Setup, etc.

PACK_ML/Global/Pml_UnitModeChangeRequest -> UnitName.Command.UnitModeChangeRequest

Data Type: Bool

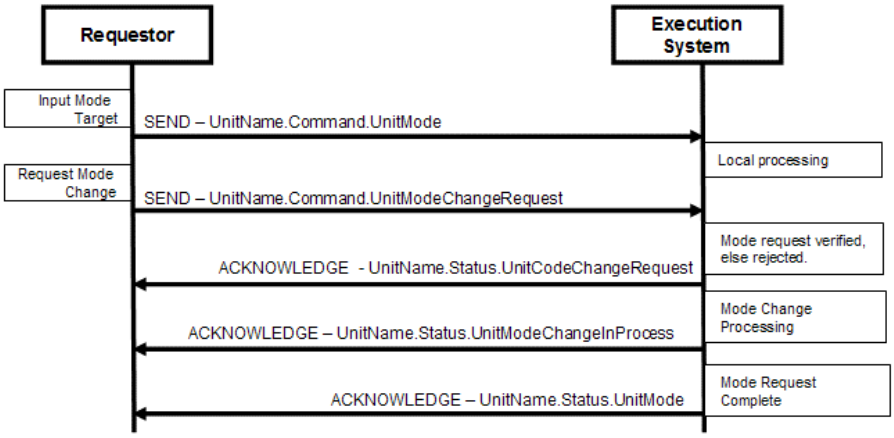
Tag Descriptor: Request Unit Mode Change

Value: **0 - False**; **1 - True**

When a unit mode request takes place a numerical value must be present in the Command.UnitMode tag to change the unit mode. Local processing and conditioning of the requested mode change is necessary in order to accept, reject, or condition the timing of the change request.

Continues on next page

The request for changing the unit mode in the remote command. The changed working mode can only take effect when the change request is set as **True**.



xx1900000964

PACK_ML/Global/Pml_State_CntrlCmd -> UnitName.Command.CntrlCmd

Data Type: INT (32bit)

Tag Descriptor: Control Command

The tag holds the value of the command that provides the state command to drive a state change in the Base State Model, this tag is typically manipulated locally. Local processing of this tag can be combined with remote or local machine conditions to drive the state model from Wait state to a Transient state. This tag can be set by a local or remote source. All values in the table below are reserved.

0	Undefined
1	Reset
2	Start
3	Stop
4	Hold
5	Unhold
6	Suspend
7	Unsuspend
8	Abort
9	Clear

PACK_ML/Global/Pml_State_CmdChangeRequest -> UnitName.Command.CmdChangeRequest

Data Type: Bool

Tag Descriptor: State Change Request

Value: **0 - False**; **1 - True**

This CmdChangeRequest bit will command the machine to proceed to change the state to the target state. The tag can be used to condition when a change of state can occur. The target state will be one of the states in the base state model.

Continues on next page

The request for changing state machine command in the remote command. The command can only take effect when the command is set as **True**.

PACK_ML/Global/Pml_Sts_UnitModeCurrent -> UnitName.Status.UnitModeCurrent

Data Type: INT (32bit)

Tag Descriptor: Unit Mode in current use

Value: **1 - Production**; **4 - Batch production**

This value is predefined by the user / OEM of the available unit modes of the machine allowing a possible different set of states for the base State Model and could provide completely different functionality in the same machinery such as Cleanout, Production, Etc.

0	Invalid
1	Production
2	Maintenance
3	Manual
4-31	User Definable

PACK_ML/Global/Pml_Sts_StateCurrent -> UnitName.Status.StateCurrent

Data Type: INT (32bit)

Tag Descriptor: Current State Number

The StateCurrent status tag specifies the current state in the current unit mode of the unit machine. The numerical values are in the table below are reserved.

0	Undefined
1	Clearing
2	Stopped
3	Starting
4	Idle
5	Suspended
6	Execute
7	Stopping
8	Aborting
9	Aborted
10	Holding
11	Held
12	UnHolding
13	Suspending
14	Unsuspending
15	Resetting
16	Completing
17	Complete

PACK_ML/Global/Pml_Ref_MachSpeed -> UnitName.Command.MachSpeed

Data Type: REAL

Continues on next page

Units: Primary packages/minute

Tag Descriptor: Current Machine Speed

This describes the set point for the current speed of the machine in primary packages per minute. Keeping speed in a primary package unit of measure (UOM) allows for easier control integration. The primary package UOM is the normalized rate for the machine, normalized to a value chosen on the line. The following example is for a bottle line running at balance line speed of 1000 packages/minute. The UOM chosen is equivalent to be the actual count of the Filler, or Labeler.

Machine	Actual Pack Counts	Primary packages (UOM)
Bulk Depalletizer	41.6666 (24 pack equiv)	1000
Filler	1000	1000
Labeler	1000	1000
Packer	66.666 (15 packs)	1000

PACK_ML/Global/Pml_State_CurMachSpeed -> UnitName.Status.CurMachSpeed

Data Type: Real

Tag Descriptor: Current Machine Speed in primary packages/minute

This the actual value of the machine speed. Keeping units in primary package unit of measure (UOM), allows for easier control integration. The primary package UOM is the normalized rate for the machine, normalized to a value chosen on the line. Pack Counts are parameters stored in the Administration tags or downloaded parameters stored in Command tags parameters.

PACK_ML/Global/Pml_State_EquipmentInterllockBlocked -> UnitName.Status.EquipmentInterllock.Blocked

Data Type: Bool

This bit indicates that a downstream system is not able to accept product. In this condition, the equipment is capable of producing product but is in a suspended state due to a downstream system. This tag is necessary for external equipment monitoring so that the reason for the machine being in a suspended state can be identified.

PACK_ML/Global/Pml_State_EquipmentInterllockStartved -> UnitName.Status.EquipmentInterllock.Startved

Data Type: Bool

This bit indicates that an upstream system is not able to supply product. In this condition, the equipment is capable of producing product but is in a suspended state due to an upstream system. This tag is necessary for external equipment monitoring so that the reason for the machine being in a suspended state can be identified.

PACK_ML/Global/Pml_Admin_ProdProcessedCount -> UnitName.Admin.ProdProcessedCount.count

Data Type: INT (32bit)

This tag represents the number of products processed by the production machine. An example of tag usage would be the number of products that were made, including all good and defective products. This tag can be used locally or remotely if needed. The extent of the array is typically limited to the number of products

Continues on next page

needed to be counted. The number of products processed minus the defective count is the number of products made by the machine. The array index of # = 0 can be reserved for the count of the number of units from the primary production stream.

PACK_ML/Global/Pml_Admin_ProdDefectiveCount -> UnitName.Admin.ProdDefectiveCount.count

Data Type: INT (32bit)

This tag represents the product that is marked as defective in the production machine, to be used if applicable. An example of tag usage would the number of products rejected or products that are termed defective. This tag can be used locally or remotely if needed. The extent of the array is typically limited to the number of products needed to be counted as defective. When this tag is used with Admin.ProdProcessedCount[#] the number of good products / well formed cycles made by the machine can be calculated. The array index of # = 0 can be reserved for the total cumulative rejected units from the primary production stream.

PACK_ML/Global/Pml_Admin_StopReason--- UnitName.Admin.StopReason

Data Type: INT (32bit)

Descriptor: Machine Stop Reason is typically used for “First Out Fault” reporting and other stoppage events. The stop reason is the first event captured during an abort, held, suspended or stop event.

PACK_ML/Global/FieldbusSelection

The selected remote control mode is Modbus or Profinet. Modebus is 1 and Profinet is 2.

PACK_ML/Global/Pml_Robot_Sts[0-9]

The status of the 10 robots.

Value	Robot status
0	NO_ROBOTID
2	PROJ_STOPPED
7	PROJ_CLOSED
17	IDLE
18	INIT RAPID
19	CLEARALL START
20	INIT QUEUES
21	RUNNING
22	PAUSED
23	RAPID STOPPED
24	CLEARALL STOP
25	RAPID STOPPED PAUSING
26	HELD
27	SUSPENDED

PACK_ML/Global/Pml_Robot_Cmd[0-9]

The command for the 10 robots.

Continues on next page

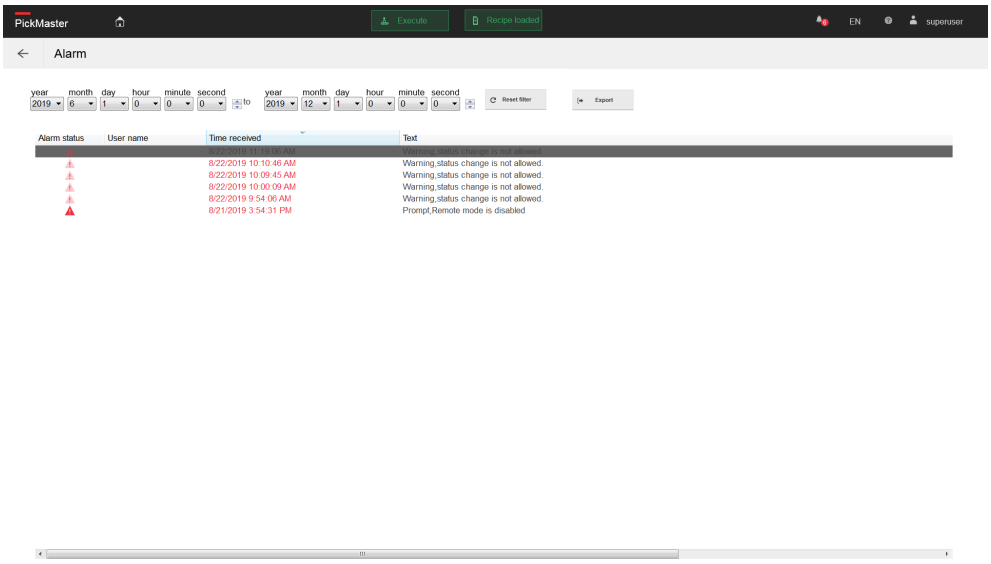
Value: **1 - Start**; **2 - Pause**; **3 - Reset**; **4 - Stop**

3.5 ANALYSIS group

Alarm

This function is used to show the alarms which are not acknowledged for the user.

The alarms in **Alarm** are not acknowledged. If you double-click an alarm information, the alarm information will disappear in the **Alarm** page;

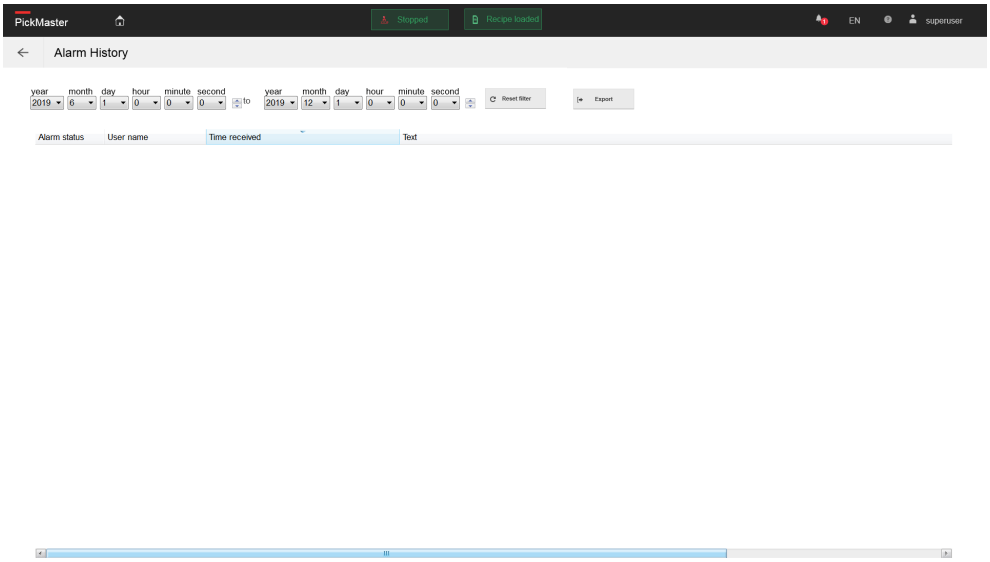


xx1900000697

Alarm history

This function is used to show all alarms for the user.

The alarm history page contains all the alarm information. If it is acknowledged, it is in black; if it is not acknowledged, it is in red.

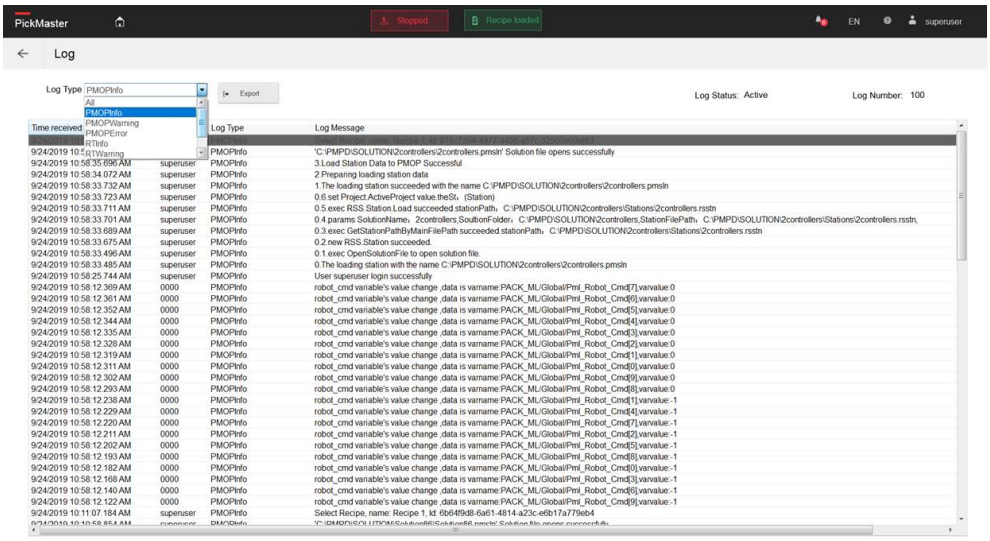


xx1900000698

Continues on next page

Log

This function is used to show the logs for the user. Logs can be exported with **Export** button.



xx1900000699

Tip

The 0000 in the user column means that no user is logged on.

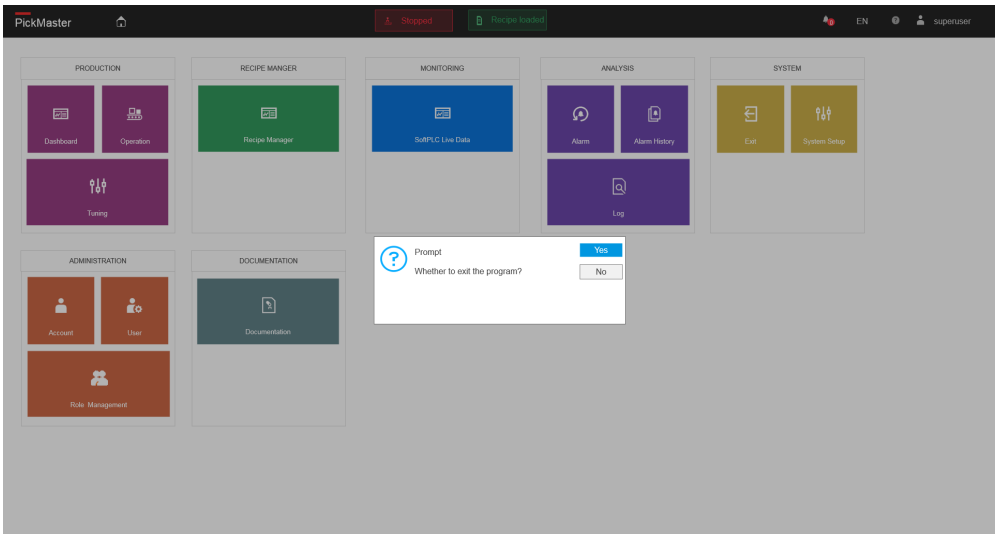
Item	Description
PMOPInfo	The logs for the PickMaster Operator.
PMOPWarning	The warnings for the PickMaster Operator.
PMOPError	The errors for the PickMaster Operator.
RTInfo	The logs for the PickMaster Runtime.
RTWarning	The warnings for the PickMaster Runtime.
RTError	The errors for the PickMaster Runtime.
RTStatus	The status of the PickMaster Runtime.

3.6 SYSTEM group

Exit

Overview

This function is used to exit the PickMaster Operator.

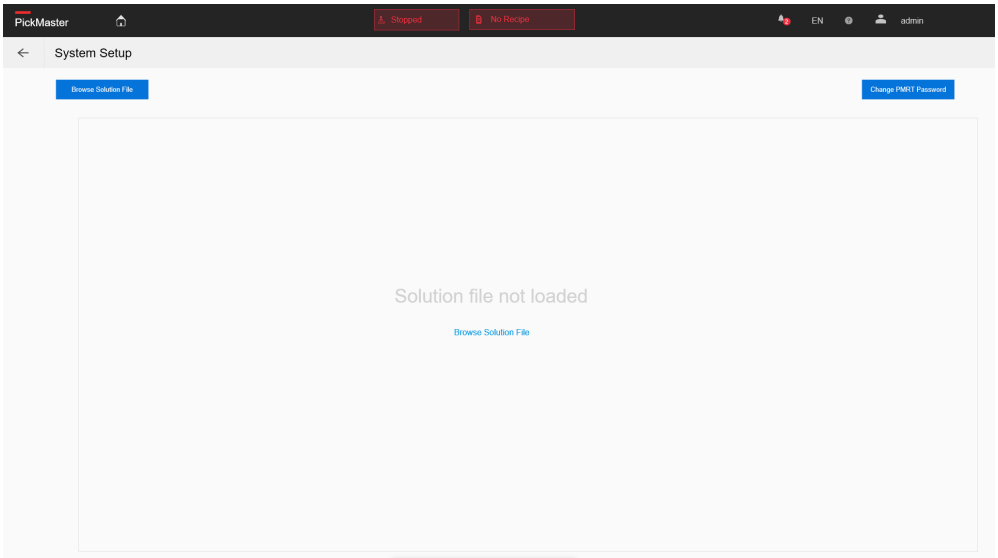


xx1900000338

System Setup

Overview

This function is used to load solutions and enable the PackML for selected solution.



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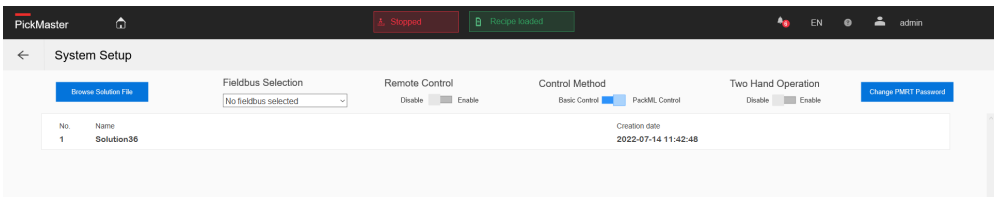
Continues on next page

When the solution is loaded, more functions show up in this window.



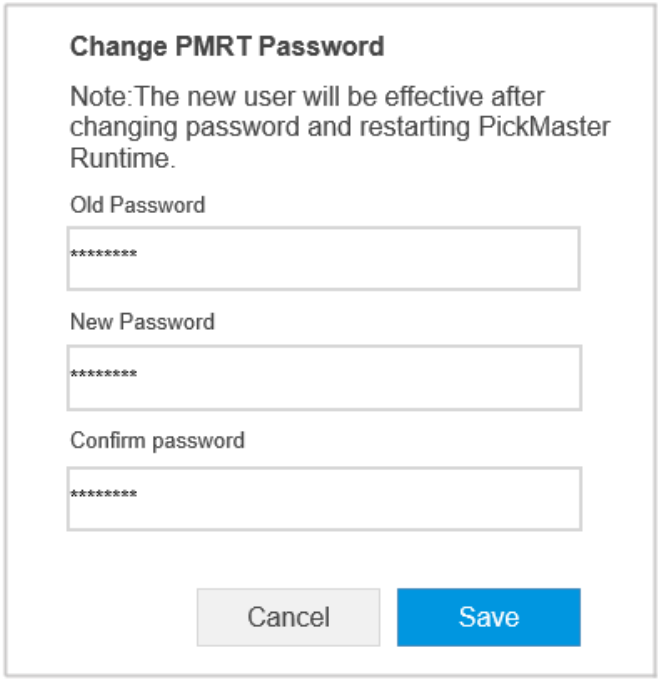
xx1900000688

Note

If the recipe cannot show up, check that whether the real controller configuration is added to the solution.

Function	Description
Browse solution file	Load a new solution.
Fieldbus Selection	Select the fieldbus mode: • EtherNet/IP • Modbus • Profinet
Remote Control	Enable/disable the remote control function with EtherNet/IP, Modbus or Profinet. **Note** The PLC with CatMod or Profinet need to be configured correspondingly to support the remote control. For more detail information, refer to the *Remote Control*.
Control Method	Enable/disable the **PackML** function. Only when the **PackML control** option is selected, the PackML flow in the **Operation** window is available. When the **Basic control** option is selected, the PackML function will be disabled.
Two hand operation	Enable/disable the **Two hand operation** function. When the **Two hand operation** function is enabled, you need to hold the **Two hand operation** button during the operation. **Note** Multi-touch screen is a prerequisite for the **Two hand operation** function.

Continues on next page

Function	Description
Change PMRT Password	Change the password for login the **PMRT**(User name: admin).  xx2200001991 • **Old Password**: input the old password. • **New Password**: input the new password. • **Confirm Password**: input the new password again. **Note** Restart the **PMRT** after changed the password to effect the new password.

Use the following procedures to import a solution:

1 Click on the **Browse solution file** button.

> **Note**
>
> The solution loaded in the PickMaster Operator must have been connected to a real controller with the same configuration on PickMaster PowerPac.

2 In the pop-up **Open** window, select the solution file `.pmsln` in the local folder.

3 Click **Open**.

4 Wait until the solution is totally imported.

> **Tip**
>
> During the importing, a note that says "Solution is loading" will show up on the upper right position.

Continues on next page

5 If need, click on the **Control Method** button to enable/disable the **PackML** function.

6 If need, click on the **Two hand operation** button to enable/disable the **Two hand operation** function.

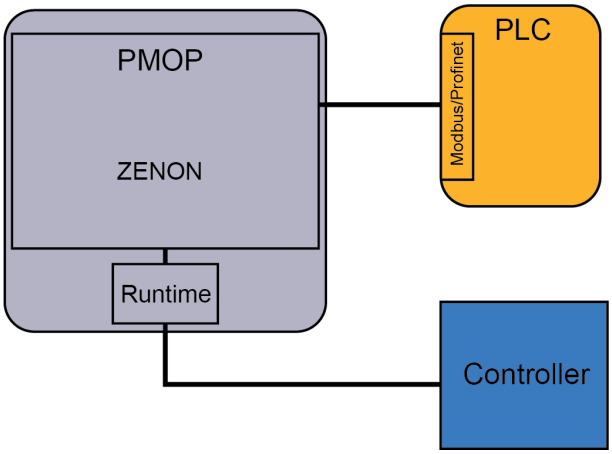
Remote control

Overview

Remote control is that the remote control terminal, such as PLC, can send or read the corresponding PackTag through the industrial bus to control the PickMaster Operator.

PickMaster Operator supports the following buses:

- EtherNet/IP
- Modbus
- Profinet



xx2000000230

Note

The firewall setting on the host computer may cause the failure that connects to PickMaster Operator through the fieldbus.

Prerequisites

To work with the remote control, the following requirements must be fulfilled:

- Format of the PackTags (Communication Directive) must meet the **ANSI/ISA-TR88.00.02-2015** standard.
- The remote control terminal and the PickMaster Operator are in the same LAN.

Continues on next page

3.6 SYSTEM group
Continued

Format of the PackTags

Machine Implementation Guide chapter 11.PACKTAGS, Table 19 Minimum PackTags.

PackTag type	PackTag	Example of end user term	Datatype	TR 88.00.02 Minimum tags	End user Minimum tags	Available
Status	StateCurrent	State	INT(32)	x	x	x
Status	UnitModeCurrent	Mode	INT(32)	x	x	x
Status	MachSpeed	Nominal Speed	REAL	x	x	
Status	CurMachSpeed	Current Speed	REAL	x	x	
Status	EquipmentInterlock.Blocked	Blockage	BIT	x	x	
Status	EquipmentInterlock.Starved	Starvation	BIT	x	x	
Status	Parameter [#]	Machine data/parameter	Array Structure		x	Robot state
Status	Parameter[#].ID	Parameter ID	INT(32)		x	
Status	Parameter[#].Name	Name of parameter	STRING		x	
Status	Parameter[#].Unit	Unit of measure	STRING[5]		x	
Status	Parameter[#].Value	Value of parameter	User Defined		x	
Status	RemoteInterface.Parameter[#]	Additional production data	Structure		x	
Status	RemoteInterface.Parameter[#].ID	Parameter ID	INT(32)		x	
Status	RemoteInterface.Parameter[#].Name	Name of parameter	STRING		x	
Status	RemoteInterface.Parameter[#].Unit	Unit of measure	STRING[5]		x	
Status	RemoteInterface.Parameter[#].Value	Value of parameter	REAL		x	
Admin	Warning[#]	Warning	Array Structure		x	
Admin	Warning[#].Trigger	Trigger			x	
Admin	Warning[#].ID	ID	Int (32bit)		x	
Admin	Warning[#].Value	Value	Int (32bit)		x	
Admin	ProdDefectiveCount	OEE.Bad count	INT(32)	x	x	
Admin	ProdProcessedCount	OEE.Total count	INT(32)	x	x	Total Pick number
Admin	StopReason.ID	Event and stop reason	INT(32)	x	x	
Admin	StopReason.Value	Detailed Error Information	INT(32)		x	
Command	CntrlCmd	Command	INT(32)	x	x	x
Command	Parameter [#]	Machine data/parameter	Array Structure		x	Robot command
Command	Parameter[#].ID	Parameter ID	INT(32)		x	

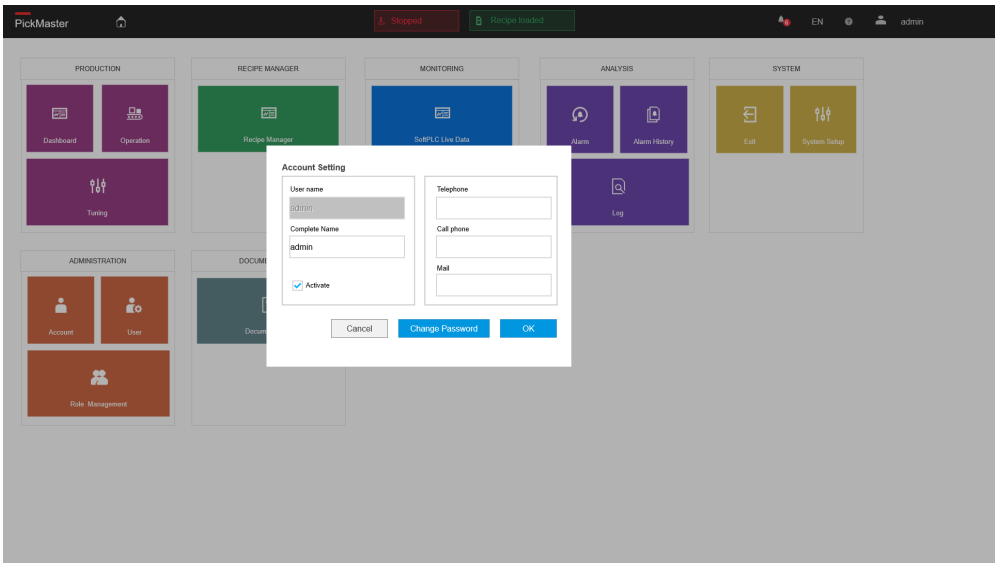
Continues on next page

PackTag type	PackTag	Example of end user term	Datatype	TR 88.00.02 Minimum tags	End user Minimum tags	Available
Command	Parameter[#].Name	Name of parameter	STRING		x	
Command	Parameter[#].Unit	Unit of measure	STRING[5]		x	
Command	Parameter[#].Value	Value of parameter	User Defined		x	
Command	RemoteInterface.Parameter [#]	Additional Production data	Array Structure		x	
Command	RemoteInterface.Parameter[#].ID	Parameter ID	INT(32)		x	
Command	RemoteInterface.Parameter[#].Name	Name of parameter	STRING		x	
Command	RemoteInterface.Parameter[#].Unit	Unit of measure	STRING[5]		x	
Command	RemoteInterface.Parameter[#].Value	Value of parameter	REAL		x	
Command	UnitMode	Mode	INT(32)	x	x	x
Command	UnitModeChangeRequest	Change mode	BOOL	x	x	x
Command	MachSpeed	Mach Speed	REAL	x	x	
Command	CmdChangeRequest	Change command	BOOL	x	x	x

3.7 ADMINISTRATOR group

Account

This function is used to modify the information for the active account.



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User Management

Overview

This function is used to manage the users and roles.

PickMaster Operator provides two types of users:

- **Administrator**

  The users whose User Type is **Administrator** can add, delete or edit other users, and can add, delete or edit roles.

  The default user of User Type administrator contains:

  - admin

- **Power User**

  The users whose User Type is **Power User** can add, delete or edit other users, and can add, delete or edit roles, except the **Administrator** role or user.

- **Users**

  The users whose User Type is **User** are not authorized to add or delete other users, and they are not authorized to add or delete roles.

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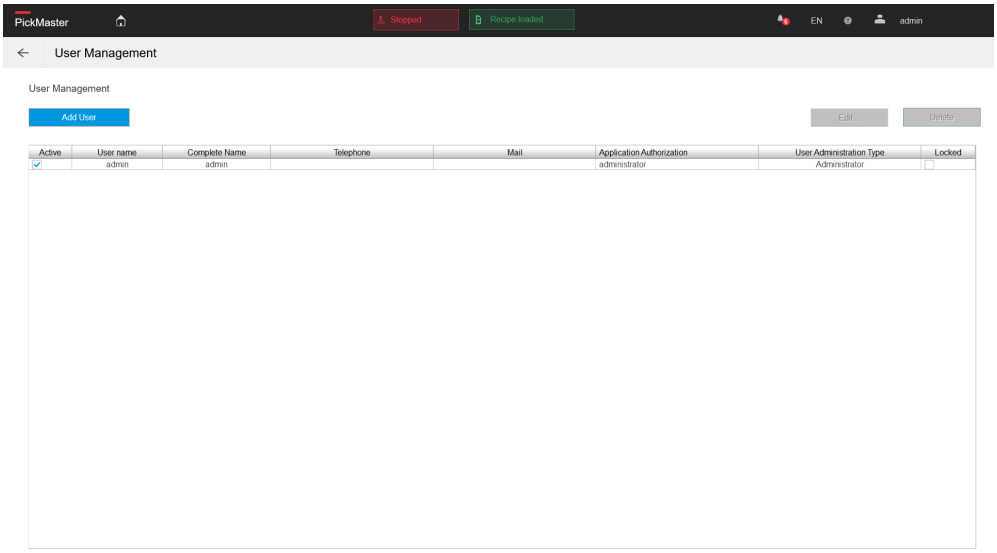


xx1900000341

Function	Description
Add user	Add a new user.
Edit	Edit an existed user.
Delete	Delete an existed user.

Group	Description
Active	Active the selected user.
User name	Shows the name of the user.
Complete name	Shows the complete name of the user.
Telephone	Shows the telephone of the user.
Mail	Shows the mail of the user.
Application Authorization	Shows the roles of the user. **Note** Available role: • administrator
User Administration type	Shows the type of the user.
Locked	Active/unactive the selected user.

New user

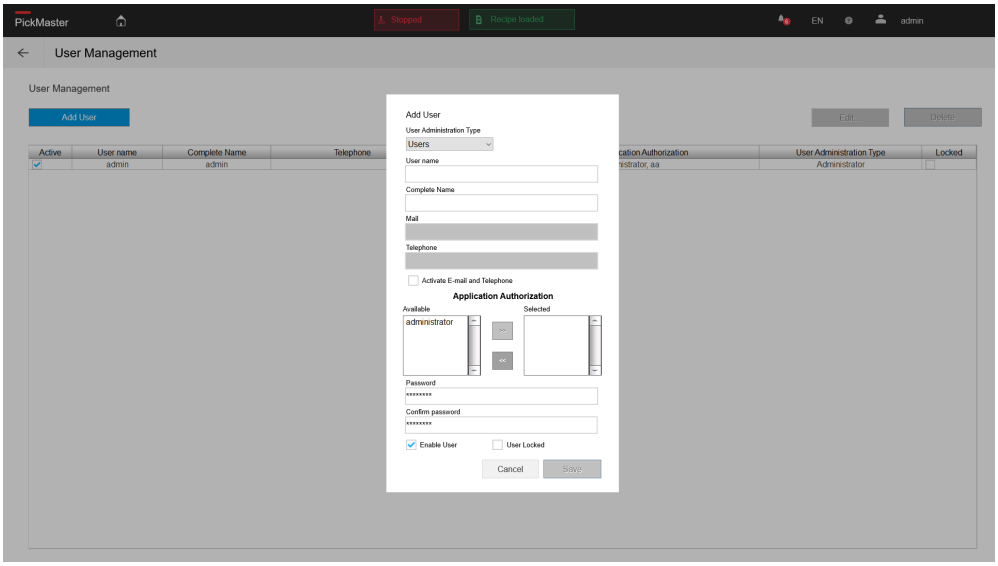
Note

When a new user is added, change the password and restart the PickMaster runtime to active the new user account.

Continues on next page

3.7 ADMINISTRATOR group

Continued



xx1900000344

Group	Description
User Administration type	Select the type of the user.
User name	Enter the name of the new user.
Complete name	Enter the complete name of the new user.
Mail	Enter the mail of the new user.
Telephone	Enter the telephone of the new user.
Active E-mail and Telephone	Active the E-mail and telephone of the new user.
Authorization	Choose the authority from the available list to the selected list.
Password	Enter a password for the new user.
Confirm Password	Confirm the password for the new user.
Enable user	Enable the new user.
User Locked	Disable the new user.

Role Management

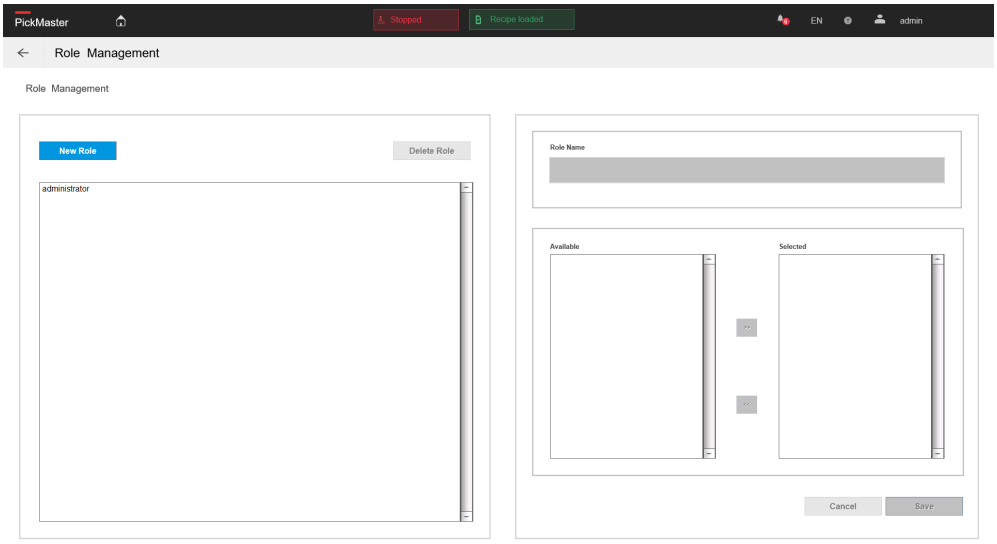
Overview

This function is used to manage the roles for PickMaster Operator. Add new roles or delete existing roles are available.

PickMaster Twin provides one default role:

- administrator

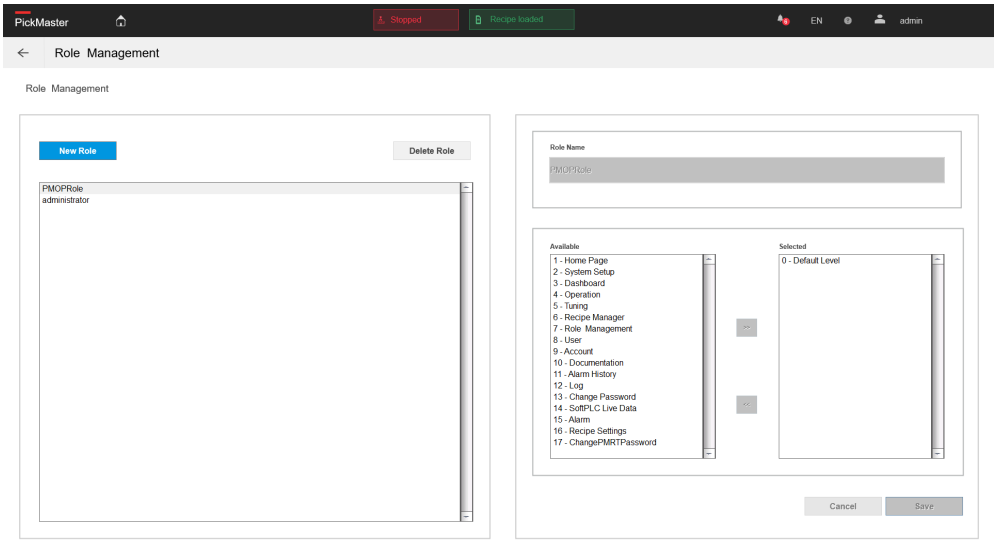
Continues on next page



xx1900000342

Function	Description
New role	Create a new role.
Delete role	Delete a role.

New role



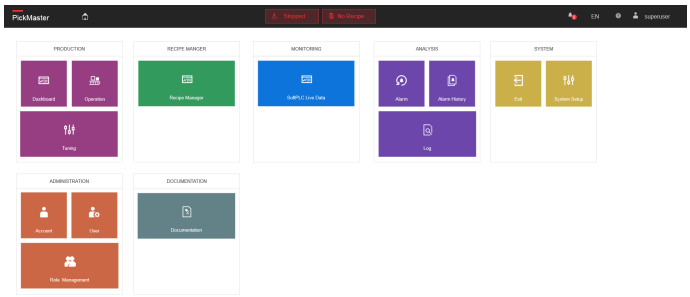
xx1900000345

Group	Description
Role name	Enter the name for a new role.
Available	Choose the authority for the new role.
Selected	Shows the chosen authority for the new role.
Save	Save the changes.
Cancel	Discard the changes.

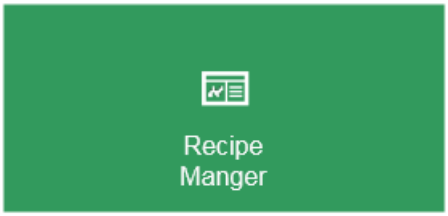
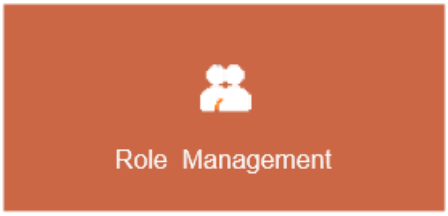
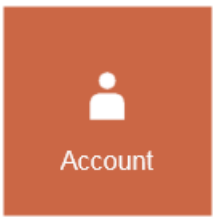
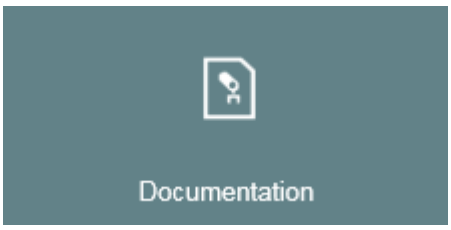
Continues on next page

3.7 ADMINISTRATOR group

Continued

Available permission	Description
1.Home Page	 xx1900000320
2.System Setup	 xx1900000330
3.Dashboard	 xx1900000325
4.Operation	 xx1900000326
5.Tuning	 xx1900000327

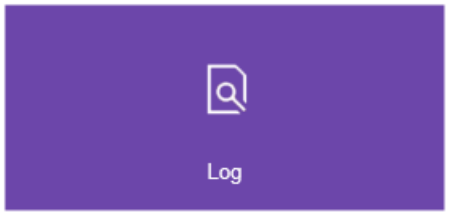
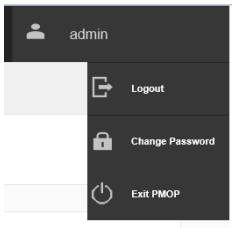
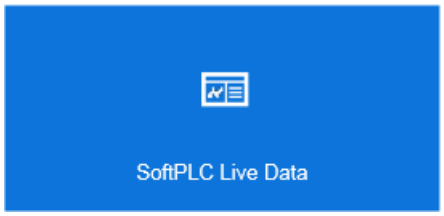
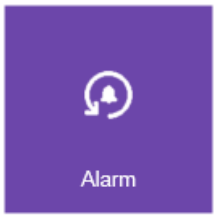
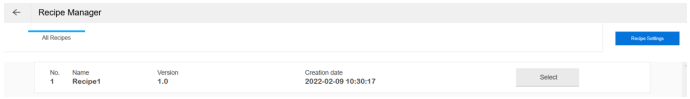
Continues on next page

Available permission	Description
6.Recipe Management	 xx1900000328
7.Role Management	 xx1900000333
8.User	 xx1900000332
9.Account	 xx1900000331
10.Documentation	 xx1900000334
11.Alarm History	 xx1900000792

Continues on next page

3.7 ADMINISTRATOR group

Continued

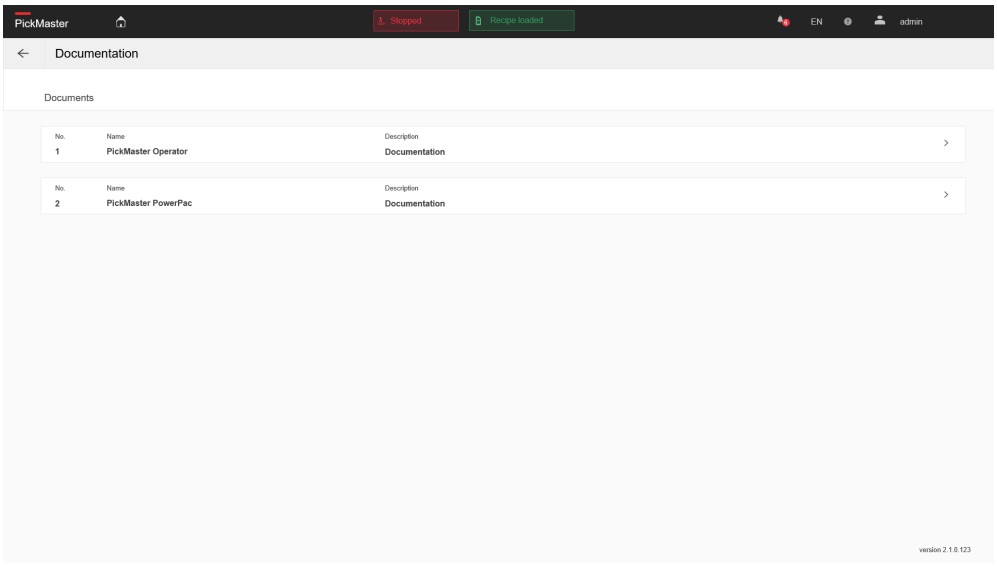
Available permission	Description
12.Log	 xx1900000793
13.ChangePassword	 xx1900000323
14.SoftPLC Live Data	 xx1900000790
15.Alarm	 xx1900000791
16.Recipe Settings	 xx1900002556

3.8 DOCUMENTATION group

PickMaster

Overview

This function is used to open the related documentation.



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4 PickMaster Operator workflow

4.1 About the workflow

Overview

This chapter describes examples step-by-step to guide you how to work with the PickMaster Operator.

Note

For most scenarios, you are recommended to follow the workflow from start to finish, even though other sequences maybe possible.

4.2 Production

Opening PickMaster Operator

Use this procedure to start PickMaster Operator:

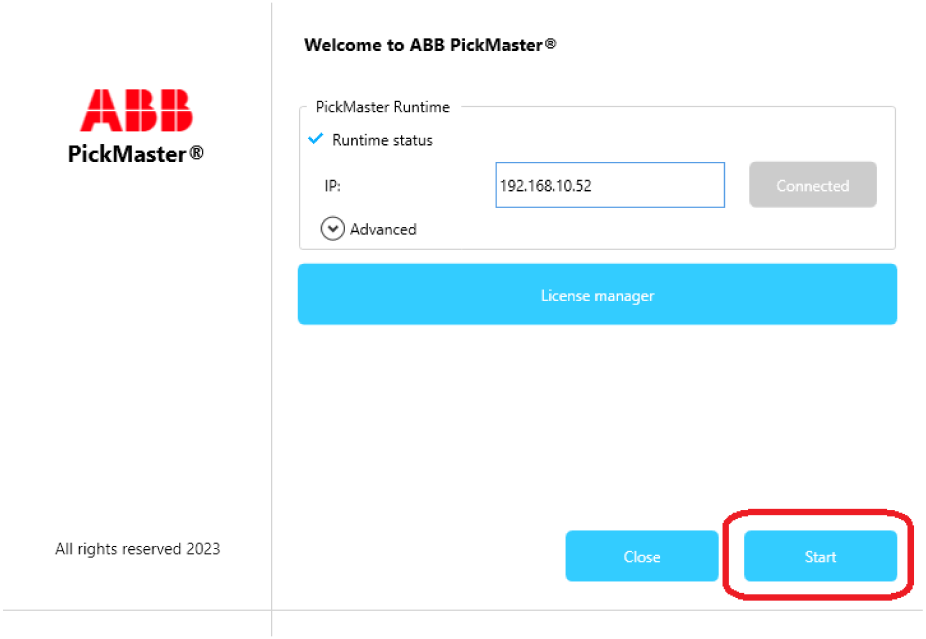
1 Double click the `PickMaster Operator` file to open the **Welcome to ABB PickMaster** window.

xx1900001506

2 Enter the IP address of the PickMaster Runtime which need to be connected.

> **Tip**
>
> Check the IPv4 address of the computer which the PickMaster Runtime is installed on.

> **Note**
>
> Loopback address is NOT allowed to use as the PickMaster Runtime IP address, for example 127.0.0.1.
>
> Loopback address will cause errors in vision function.



xx1900001507

Continues on next page

3 If needed, click **Advance** to open the setting view for Runtime user and language.

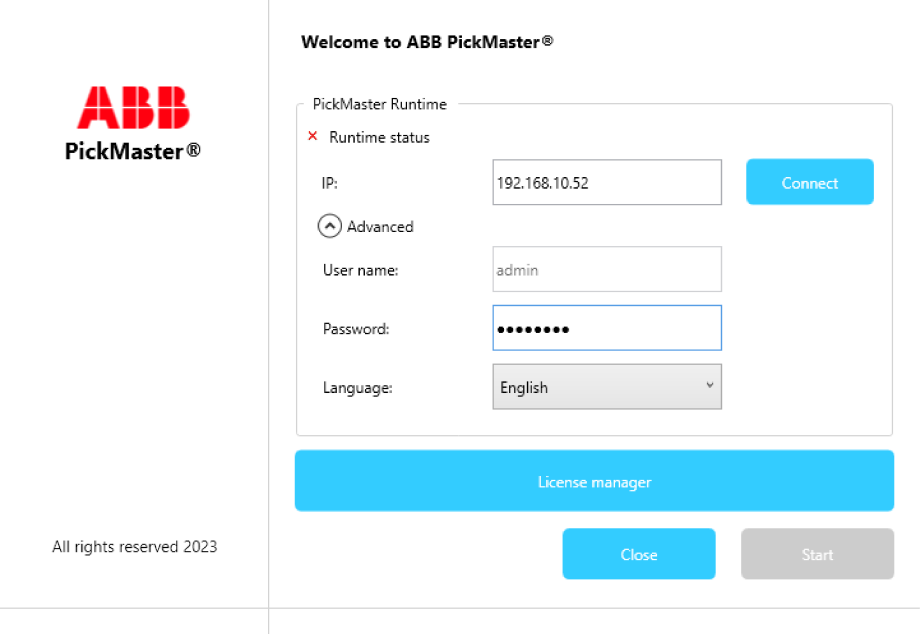
Tip

The default Runtime user name and password is the credential for connecting the PickMaster Runtime by `https` protocol.

Default Username: `admin` with Password: `password`

Note

The user should change the password of the default user account for higher Cyber Security.



xx2200002005

4 Click **Connect** button.

Note

When the **SSL** dialog box pops up during the first operation of the PickMaster Operator, click **Yes**.

Otherwise the PickMaster Operator cannot work normally.

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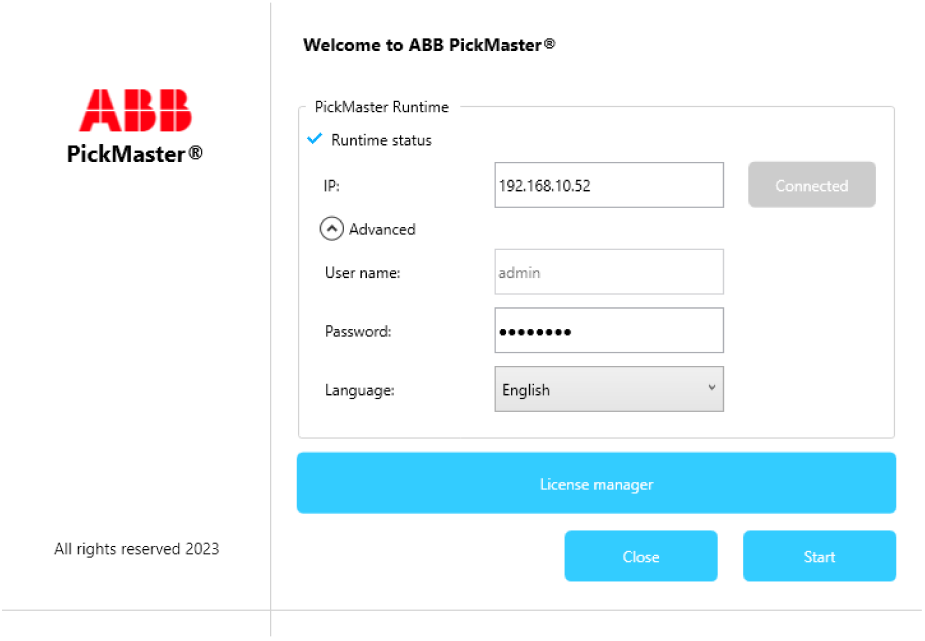
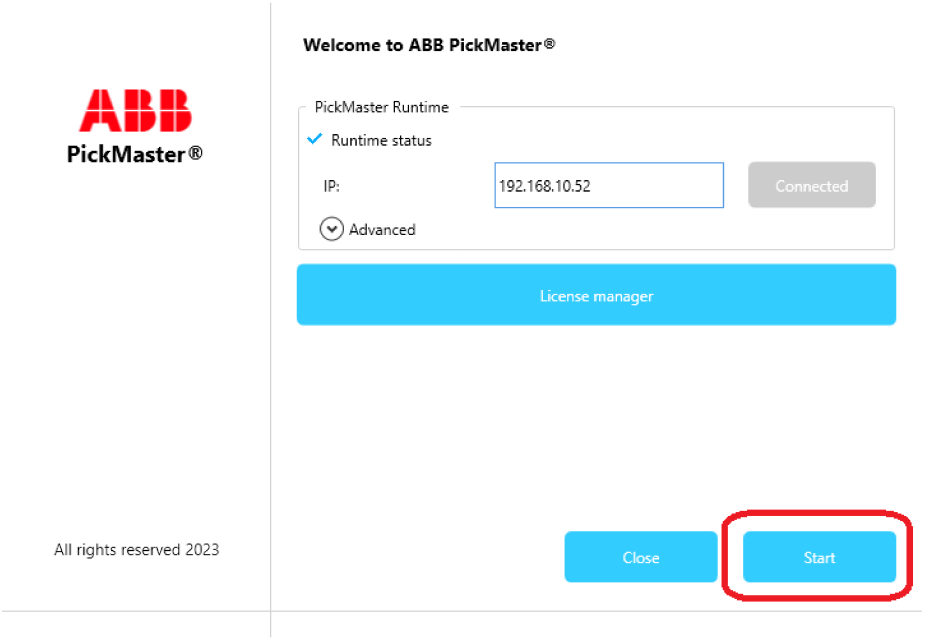


xx2200002006

5 Click the **License Manager** button to open the **License Management** window. For more detail on activating the license, see *ABB ZENON license on page 27*.

6 Click **Start** button to open the login interface.



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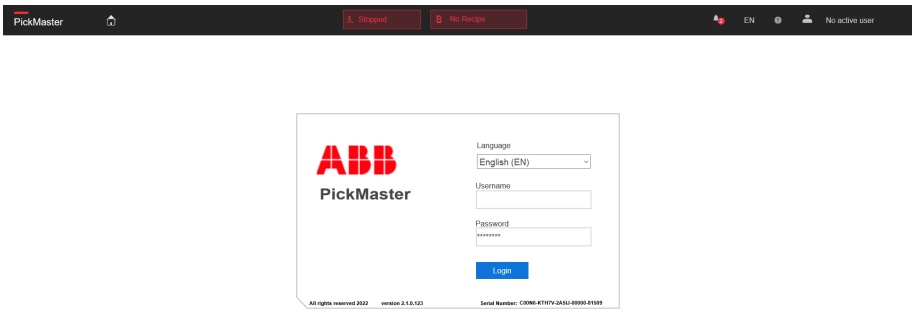
Note

If the user meets any problem when building connection between PickMaster Operator and real Runtime, please check from below possible reasons:

a Using a host account that is not administrator;
b Firewall blocking;
c VPN interference;
d Host IP address incorrect;
e The network name not renamed to "profinetIOAdapter".

7 Login with an effective user account.



xx1900000783

Tip

A default user and password have been created for each role.
Administrator Username: `admin` with Password: `password`

Note

The default user `admin` cannot be deleted.

Note

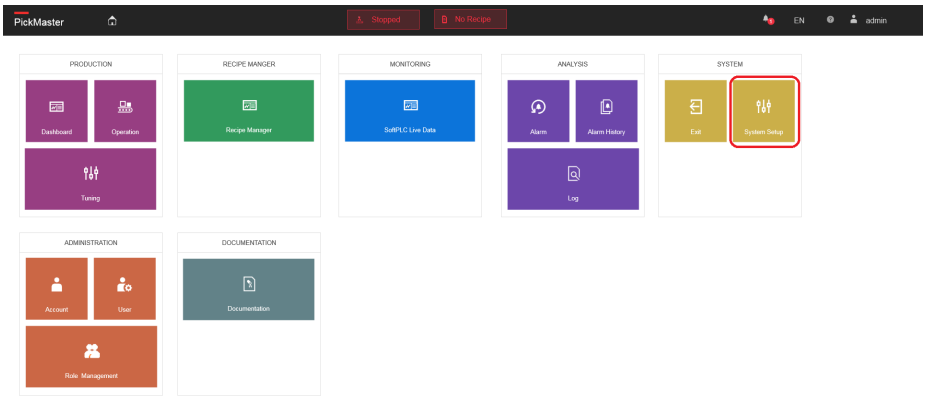
The Username and Password are case sensitive.

Continues on next page

Loading solution

Use this procedure to load the solution:

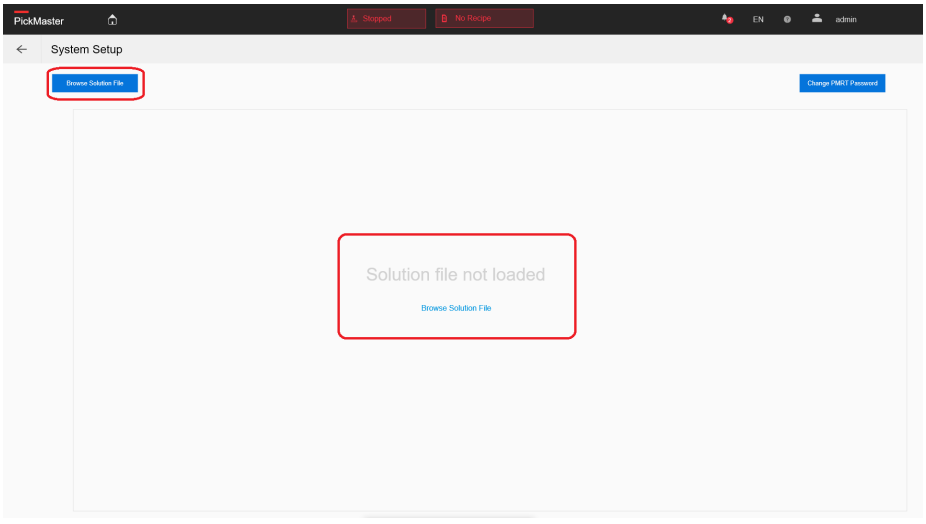
1 In PickMaster Operator main page, click **System Setup**.



xx1900001509

2 Click on the **Browse solution file** button.

> **Note**
>
> The solution loaded in the PickMaster Operator must have been connected to a real controller with the same configuration on PickMaster PowerPac.



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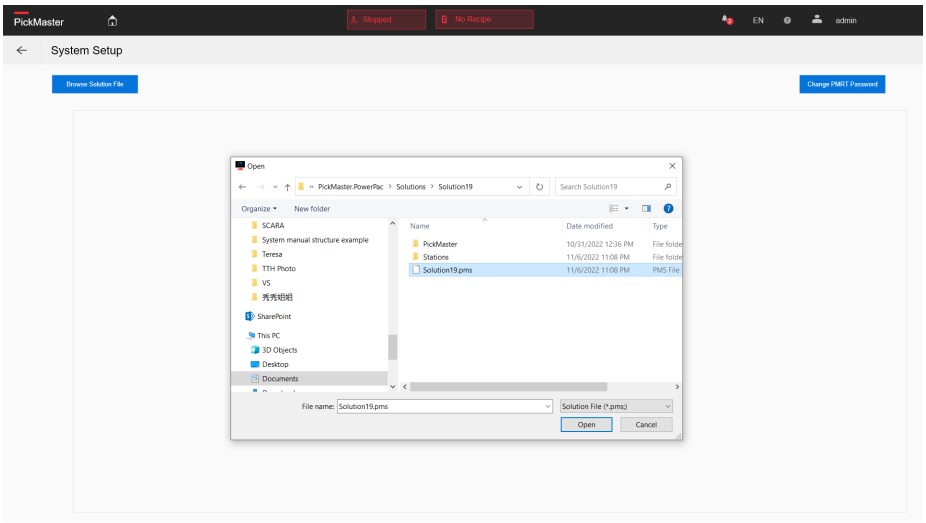
3 In the pop-up **Open** window, select the solution file `.pms` in the local folder.

> **Note**
>
> Copy the whole solution folder to the local computer.
>
> The whole solution folder from PickMaster PowerPac is needed when loading a solution to PickMaster Operator, not only the solution file `.pms`.



xx1900001519

4 Click **Open**.

5 Wait until the solution is totally imported.

> **Tip**
>
> During the importing, a note that says "Solution is loading" will show up on the upper right position.

6 If needed, click on the **PackML Disabled** button to select the **Enable PackML** function.

Only when the **Enable PackML** function is selected, the **PackML** flow in the operation can be available.

> **Tip**
>
> Only when the **Enable PackML** function is selected, the PackML flow in the operation can be available.

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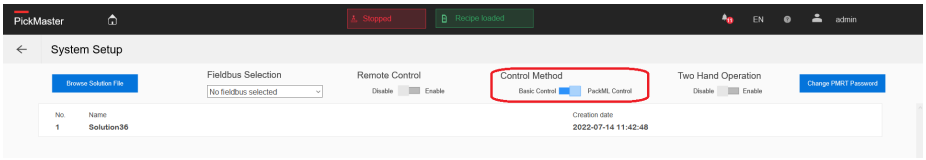
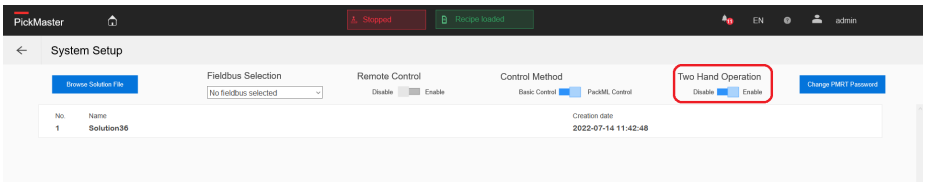


xx1900001510

7 If needed, open the **Two Hand Operation bar** function by selecting **Enable** option in the **Two Hand Operation**.



xx1900001512

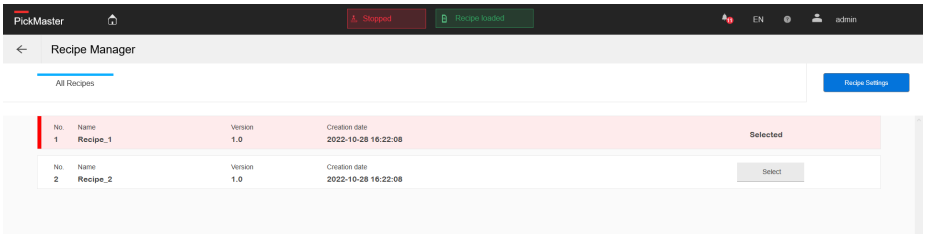
Selecting recipe

Use this procedure to select the recipe:

1 In PickMaster Operator main page, click **Recipe Manager**.

2 Click on the **Select** button to activate the recipe you need.

When the recipe is selected, the selected recipe will be highlighted as pink.



xx1900000794

Note

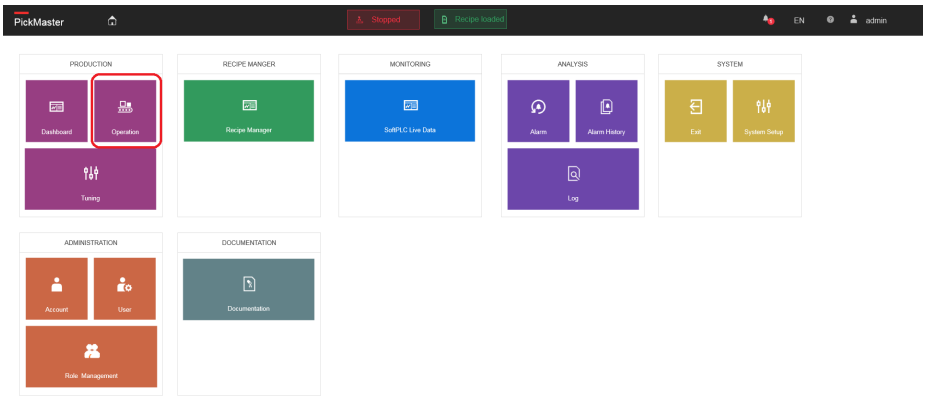
There is at least one robot set as mandatory for each recipe.

Continues on next page

Starting production

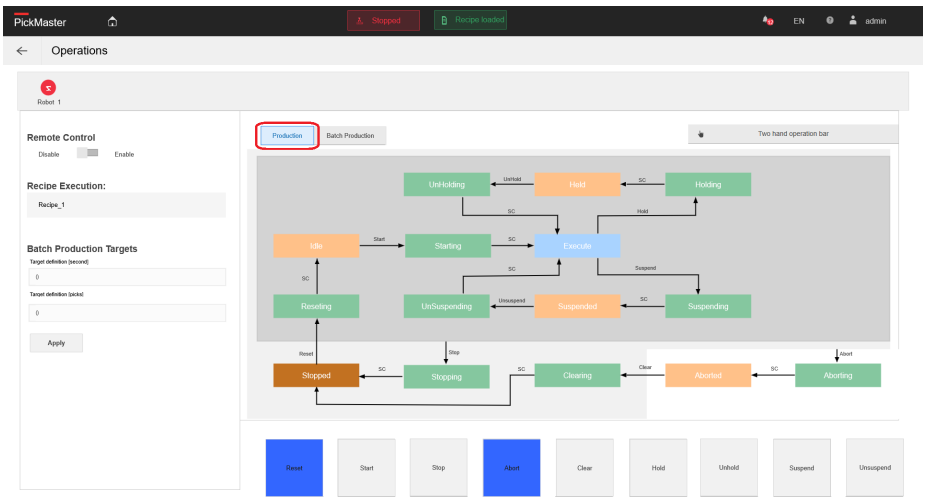
Use this procedure to start the production:

1 In PickMaster Operator main page, click **Operation**.



xx1900001513

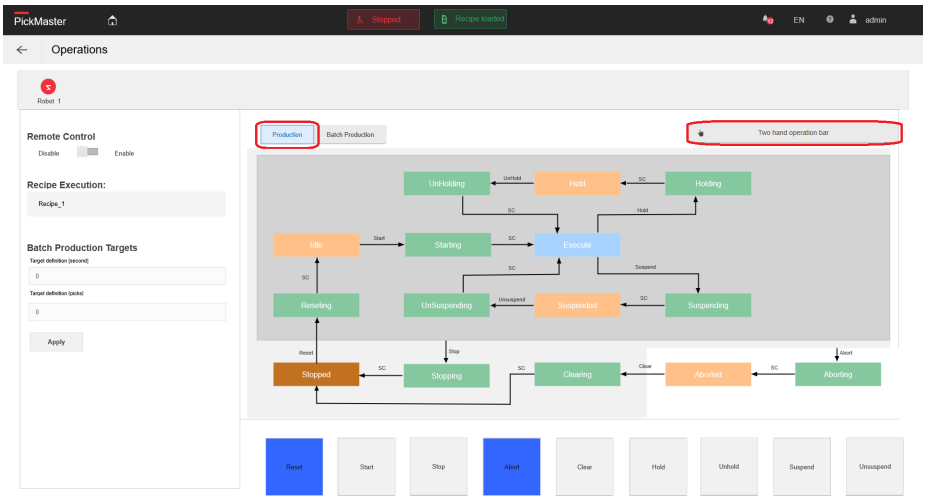
2 Choose the **Production**.



xx1900001515

Continues on next page

3 Hold the **Two Hand Operation bar** button to enable the operation.



xx1900001514

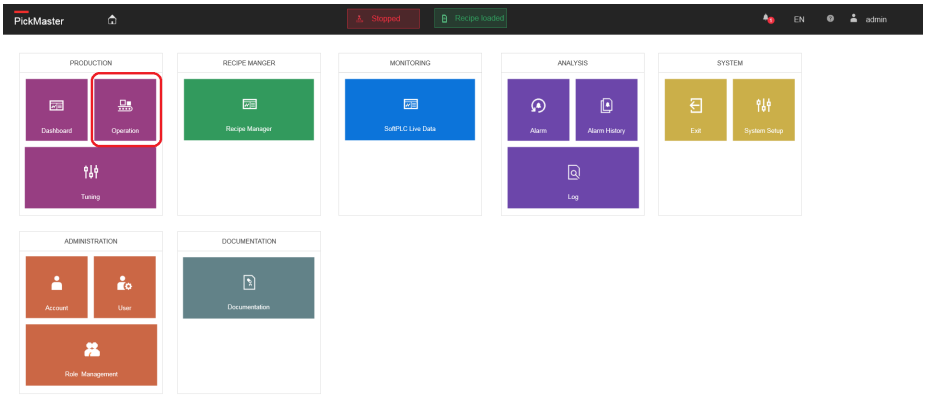
4 Click on the **Reset** button and then **Start** button to start the production.

4.3 Batch production

Starting batch production

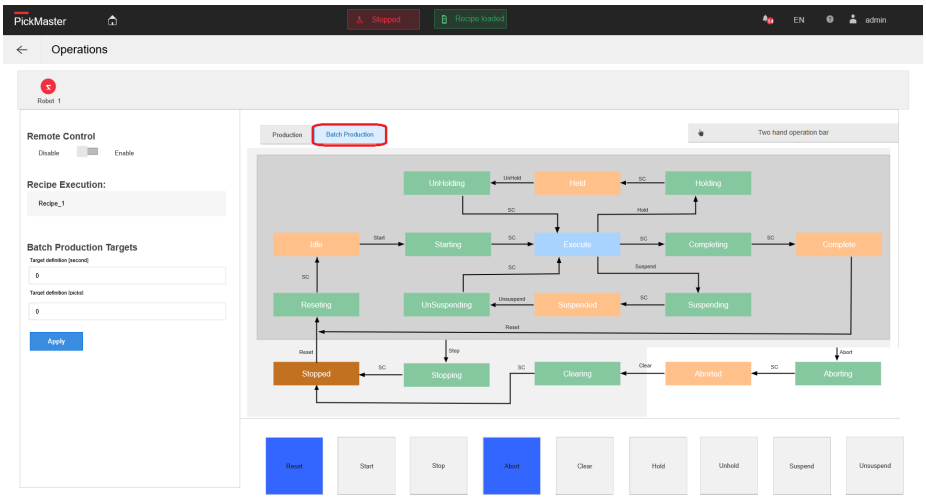
Use this procedure to start the production:

1 In PickMaster Operator main page, click **Operation**.



xx1900001513

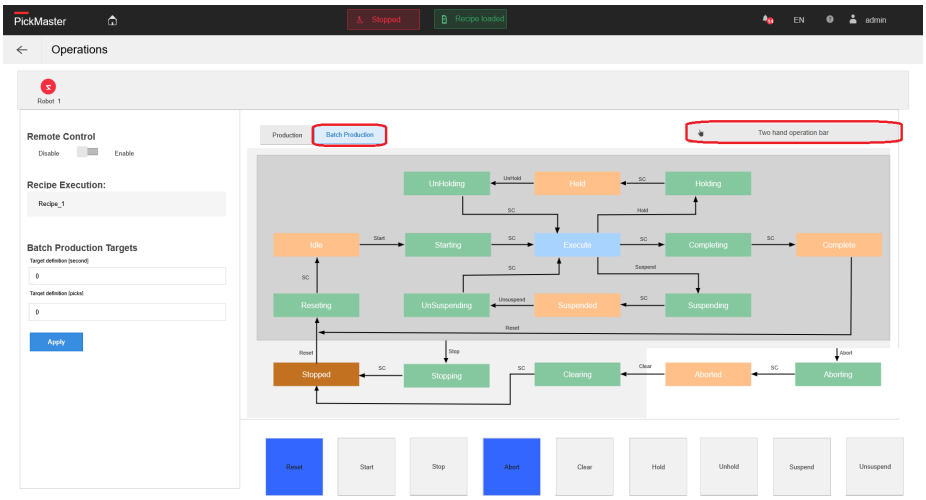
2 Choose the **Batch Production**.



xx1900001516

Continues on next page

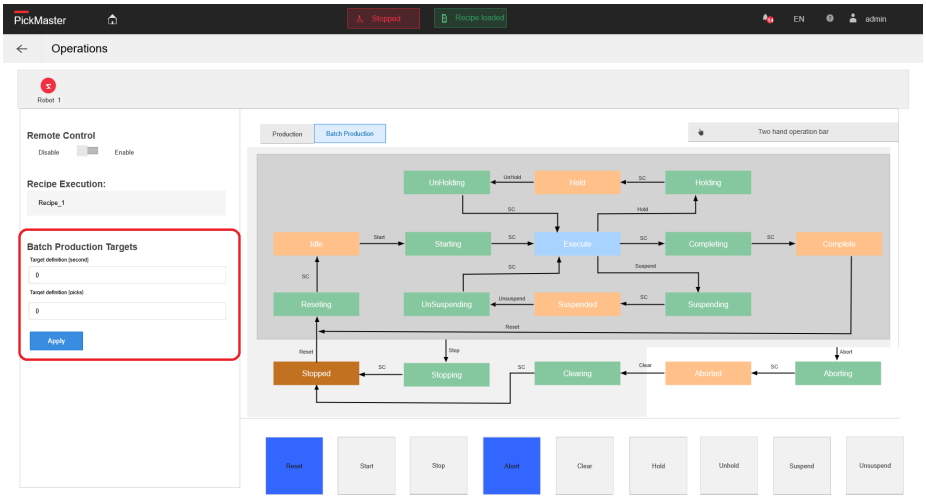
3 If needed, choose the **Two Hand Operation bar** to enable the operation.



xx1900001514

4 Enter the target time or counts for the Batch Production in the **Batch Production targets** text box.

> **Note**
>
> Pick time and Pick number are alternative. When one is fulfilled, the other input box will be grayed out.



xx1900001517

5 Click the **Apply** button.

6 Click the **Reset** button and then **Start** button to start the production.

> **Note**
>
> When the conditions are met, the state machine will jump to the **Completing** state, and it will stop the operation. And finally jump to the **Stopped** state.

4.4 Remote control

Tip

The reader for this chapter should have the basic knowledge of automatic control.

Continues on next page

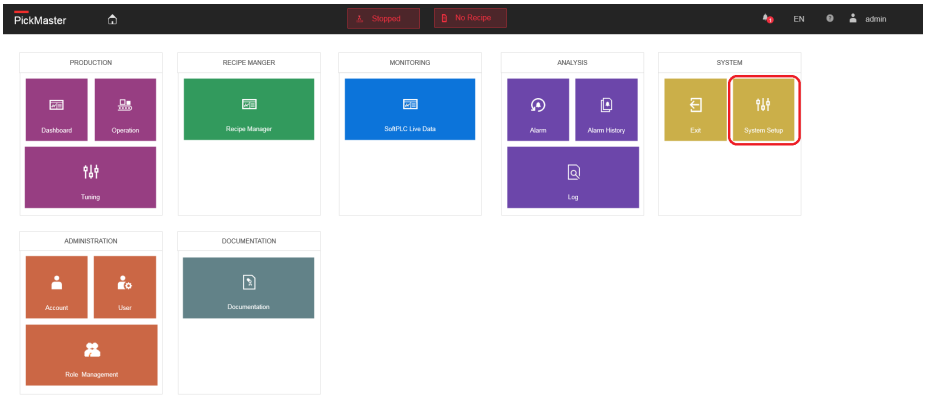
4.4.1 Enabling Remote control

How to enable Remote control

This section describes how to enable the **Remote control** in PickMaster Operator.

Users can choose the appropriate fieldbus connection according to their requirements.

1 In PickMaster Operator main page, click **System Setup**.

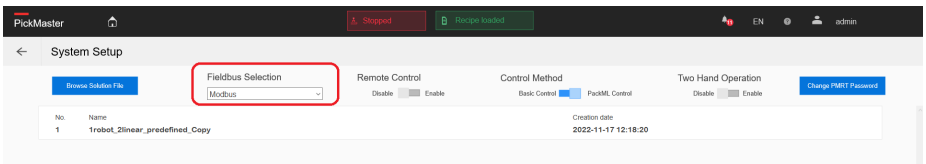


xx2000000143

2 Select **EtherNet IP**/ **Modbus**/ **Profinet** in **Fieldbus Selection** drop-down list.

> **Note**
>
> For more information about **EtherNet IP**/ **Modbus**/ **Profinet** signals, see *Appendix on page 127*.

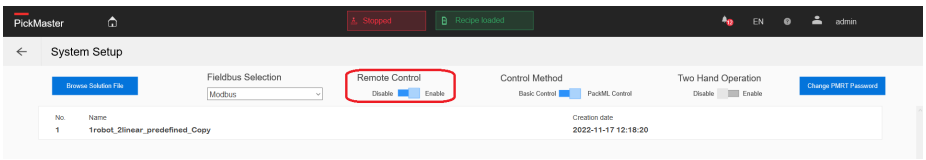
> **Note**
>
> If **Profinet** is used, the user needs to obtain the GSDML files under `C:\ProgramData\ABB\zenon800\straton\GSDML` folder.



xx2000000144

Continues on next page

3 Enable **Remote Control** function.

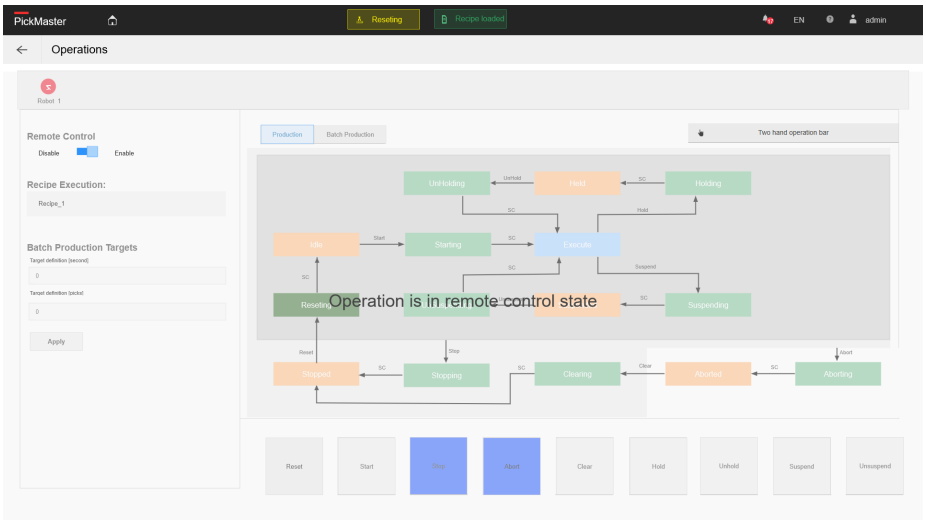


xx2000000145

4 Back to PickMaster Operator main page, click **Operation**.

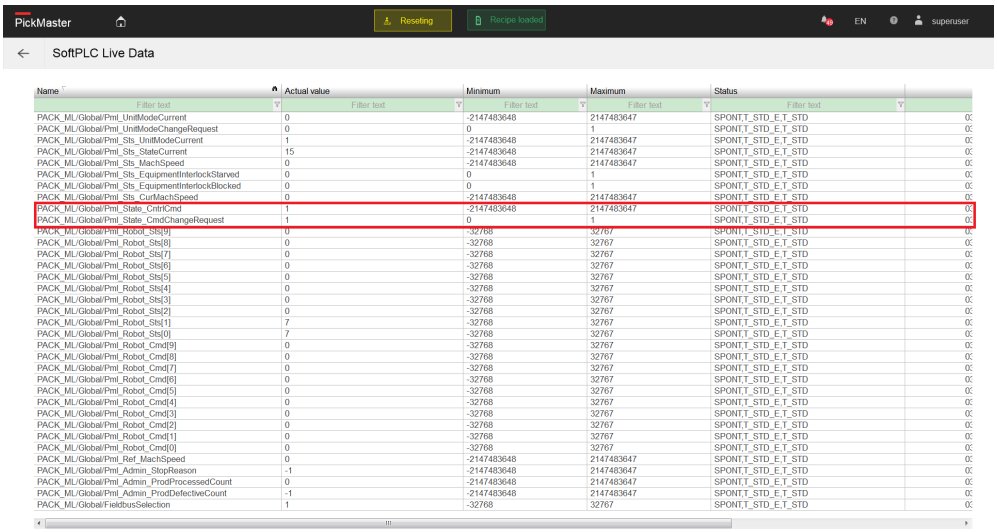
The user cannot control the production from the **Operation** page.

All commands are from the remote controller.



xx2000000146

This following page shows the parameters which reflect the real data of the selected fieldbus signal.



xx2000000274

Continues on next page

4.4.1 Enabling **Remote control**

Continued

The data structure of the following Packtag is based on the data structure defined by the previous Packtag (see *Format of the PackTags on page 84*). Users can refer to the following Packtag data structure when using Modbus for remote control.

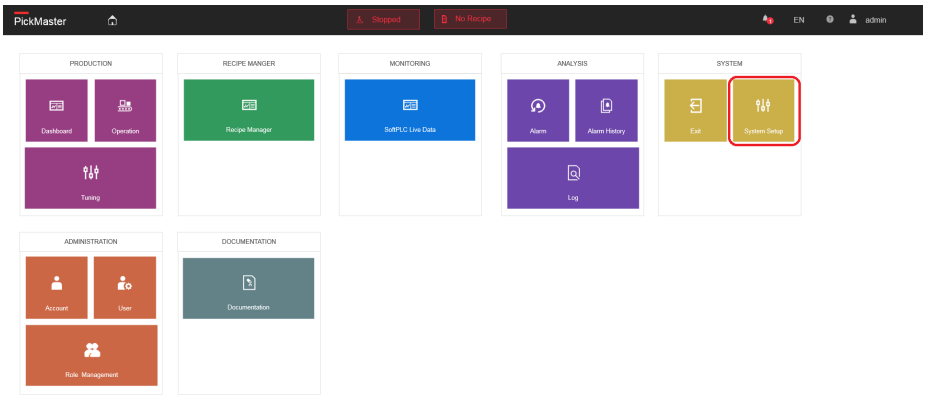
4.4.2 Examples

Remote control - Basic function - PackML

This section describes an example for some basic function of **Remote control**.

1 Open PickMaster Operator and load solution.

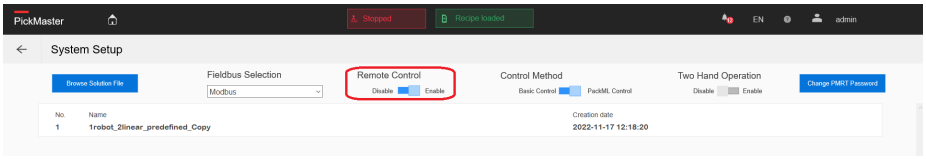
2 In PickMaster Operator main page, click **System Setup**.



xx2000000143

3 Select **EtherNet IP**/ **Modbus**/ **Profinet** in **Fieldbus Selection** drop-down list.

4 Enable **Remote Control** function.



xx2000000145

5 Send the command from the remote control equipment to PickMaster Operator.

6 Set the **UnitMode** to **1** (1=Production/4=Batch Production) and **UnitModeChangeRequest** from **0** to **1**.

> **Tip**
>
> For more details about the signal information, see *PACK_ML/Global/Pml_Sts_StateCurrent -> UnitName.Status.StateCurrent on page 74*.

7 Check **UnitModeCurrent**:

- If **UnitModeCurrent**=1, it means that PickMaster Operator now is in Production mode.
- If **UnitModeCurrent**=4, it means that PickMaster Operator now is in Batch Production mode.

Continues on next page

8 Set the **CntrlCmd** to **1** (1=Reset) and **CmdChangeRequest** from **0** to **1** to trigger the PickMaster Operator preparing for production.

> **Tip**
>
> For more details about the signal information, see *PACK_ML/Global/Pml_State_CntrlCmd -> UnitName.Command.CntrlCmd on page 73*.

9 Check PickMaster Operator current state by **StateCurrent**=15 and change to **StateCurrent**=4.

> **Tip**
>
> For more details about the signal information, see *PACK_ML/Global/Pml_State_CntrlCmd -> UnitName.Command.CntrlCmd on page 73*.

10 Set the **CntrlCmd** to **2** (2=Start) and **CmdChangeRequest** from **0** to **1** to trigger the PickMaster Operator running production.

> **Tip**
>
> For more details about the signal information, see *PACK_ML/Global/Pml_State_CntrlCmd -> UnitName.Command.CntrlCmd on page 73*.

11 Check PickMaster Operator current state by **StateCurrent**=3 (Starting) then **StateCurrent**=6 (Execute) which means that production is running.

> **Tip**
>
> For more details about the signal information, see *PACK_ML/Global/Pml_State_CntrlCmd -> UnitName.Command.CntrlCmd on page 73*.

12 Set the **CntrlCmd** to **3** (3=Stop) and **CmdChangeRequest** from **0** to **1** to trigger the PickMaster Operator to stop the production.

> **Tip**
>
> For more details about the signal information, see *PACK_ML/Global/Pml_State_CntrlCmd -> UnitName.Command.CntrlCmd on page 73*.

Continues on next page

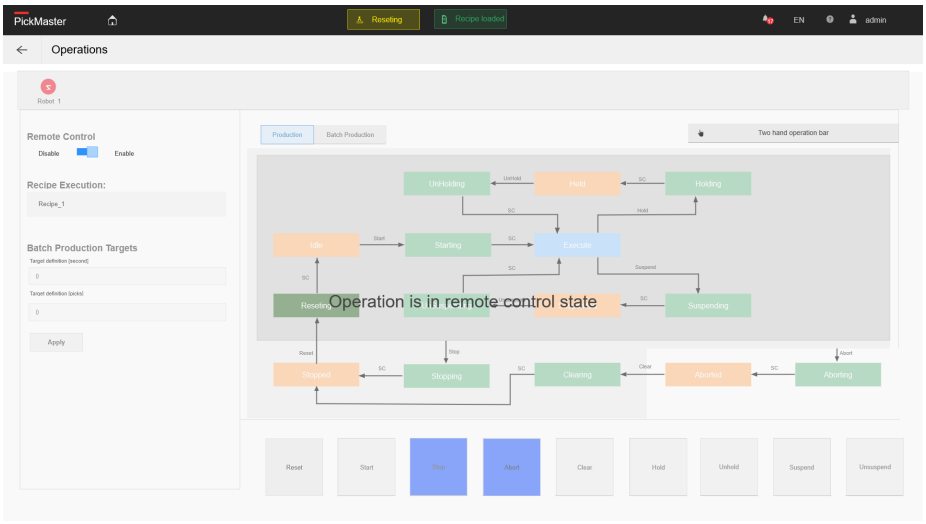
13 Check PickMaster Operator current state by **StateCurrent**=7 and change to **StateCurrent**=2 which means that production is stopped.

> **Tip**
>
> For more details about the signal information, see *PACK_ML/Global/Pml_State_CntrlCmd -> UnitName.Command.CntrlCmd on page 73*.

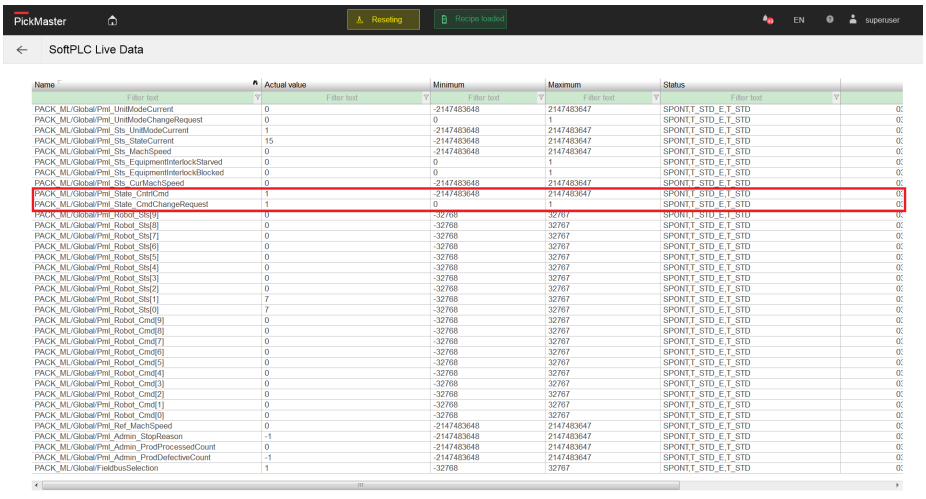
14 Back to PickMaster Operator main page, click **Operation**.

The user cannot control the production from the **Operation** page.

All commands are from the remote control equipment.



xx2000000146



xx2000000274

The data structure of the following Packtag is based on the data structure defined by the previous Packtag (see *Format of the PackTags on page 84*).

Continues on next page

4.4.2 Examples
Continued

Users can refer to the following Packtag data structure when using Modbus for remote control.

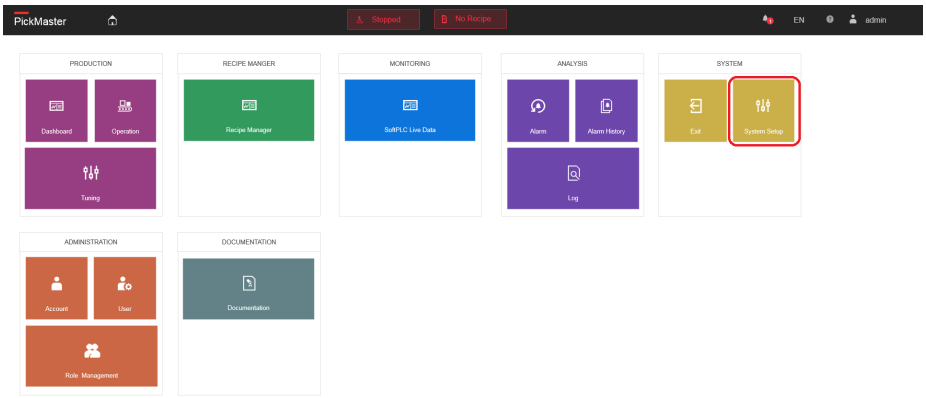
> **Note**
>
> Besides the Fieldbus logic interface listed in the Appendix, any other Fieldbus protocol will be invalid in PickMaster Operator. For example, ModbusRTU, Modbus_Energy or the Modbus process gateway are all invalid.

Remote control - Recipe switch

This section describes an example for the recipe switch function of **Remote control**.

1 Open PickMaster Operator and load solution.

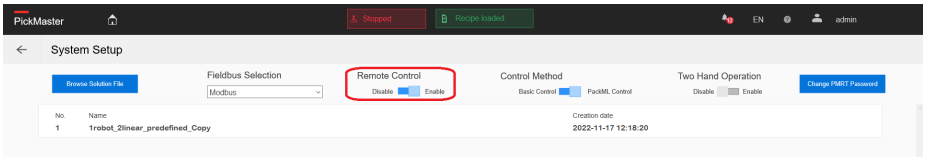
2 In PickMaster Operator main page, click **System Setup**.



xx2000000143

3 Select **EtherNet IP**/ **Modbus**/ **Profinet** in **Fieldbus Selection** drop-down list.

4 Enable **Remote Control** function.



xx2000000145

5 Check the **Idle** signal in **ScadaToRemote** window is **1**.

Continues on next page

If the idle signal is 1, it means that the PickMaster Operator can receive remote command. The **ScadaToRemote** window will show current recipe ID and recipe ID list.

> **Note**
>
> The maximum number of the items in the recipe ID list for **EtherNet IP**/**Modbus** is 150.
>
> The maximum number of the items in the recipe ID list for **Profinet** is 50.

6 Set **RequestRecipeID** as request (For example 70001) and the **RequestOrder** to 101 in **RemoteToScada** window.

> **Tip**
>
> 101 is the job number for remote recipe switch.

7 Set the command **Request** signal from **0** to **1** in **RemoteToScada** window. This can trigger the PickMaster Operator to switch the recipe by **RecipeRequestID**. The PickMaster Operator only monitors the rising edge of the command **Request** signal.

> **Note**
>
> After the PickMaster Operator received the command **Request** signal, the recipe in PickMaster Operator will switch accordingly and the **Idle** signal in **ScadaToRemote** window will change back to **0**.

8 If need to switch the recipe again, set the command **Request** signal from **1** to **0** and repeat step 5 to 8.

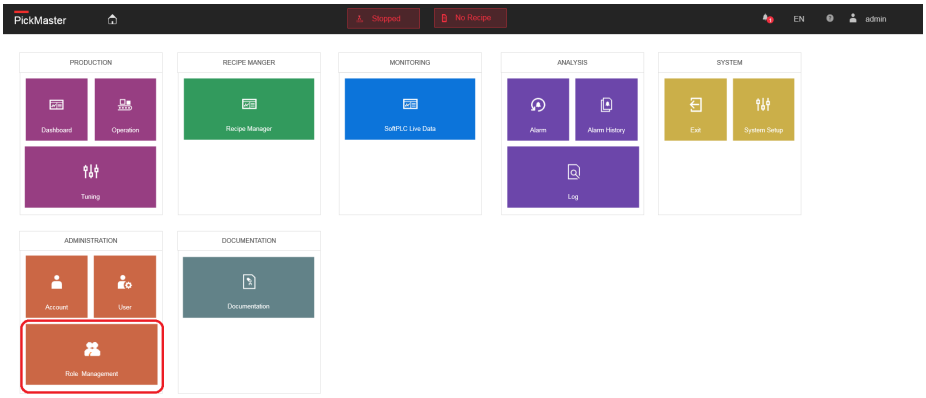
> **Note**
>
> If any error raised, PickMaster Operator will send an error signal and error code to the remote control equipment.
>
> The error signal must be reset before sending any other command to PickMaster Operator. Reset the PickMaster Operator error by sending a pulse signal of **ResetError** from the remote control equipment.

4.5 Adding a new user with new role

Adding a new role

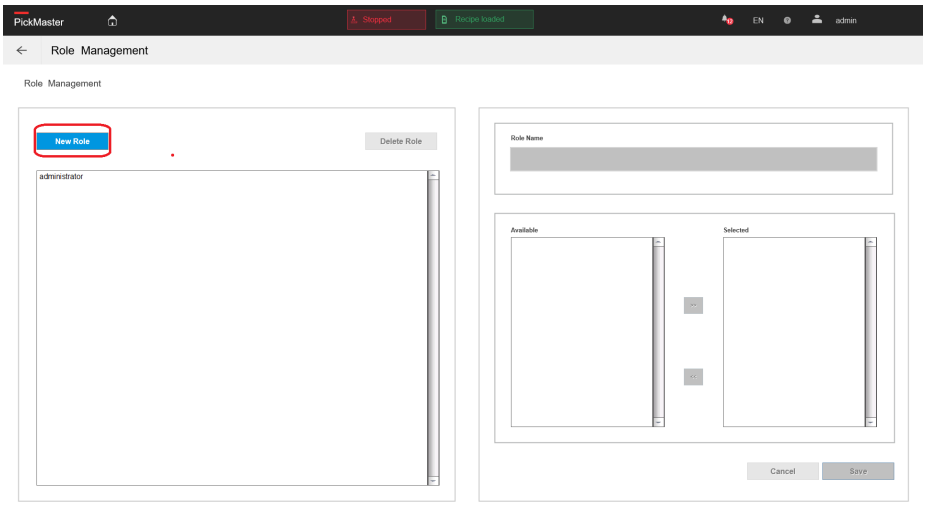
Use this procedure to add a new role:

1 In PickMaster Operator main page, click **Role Management.**



xx1900002595

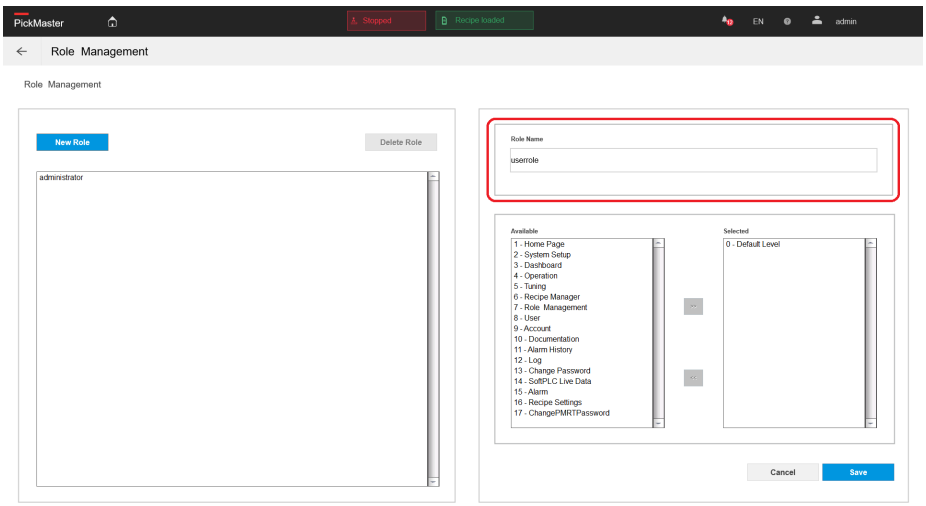
2 Click **New Role.**



xx1900002596

Continues on next page

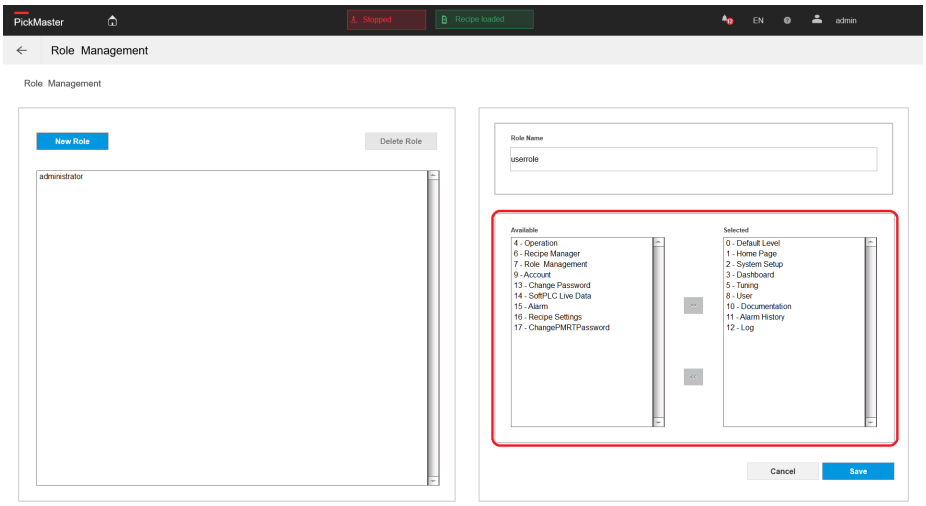
3 Enter the role name as **userrole**.



xx1900002597

4 Add the following functions for the new role from the available list to selected list.

- Default Level
- Home Page
- System Setup
- Dashboard
- Tuning
- User
- Documentation
- Log
- Alarm



xx1900002598

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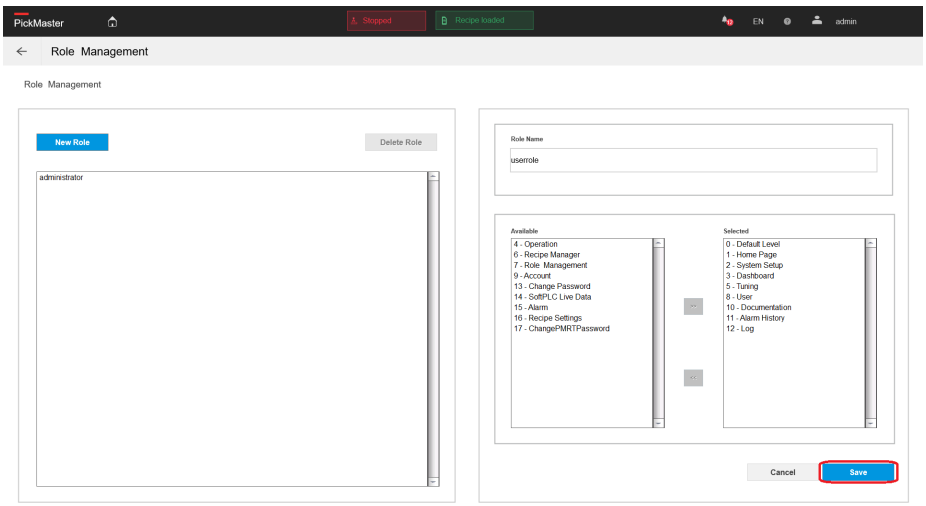
4.5 Adding a new user with new role

Continued

5 Click **Save**.

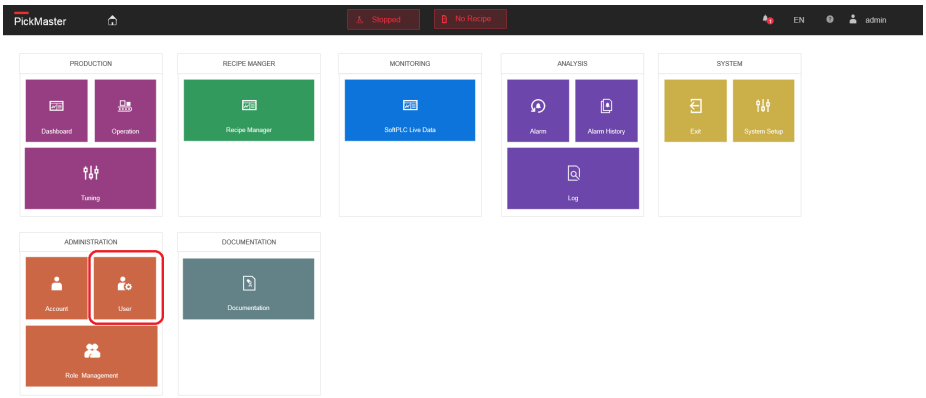


xx1900002599

Adding a new user

Use this procedure to add a new role:

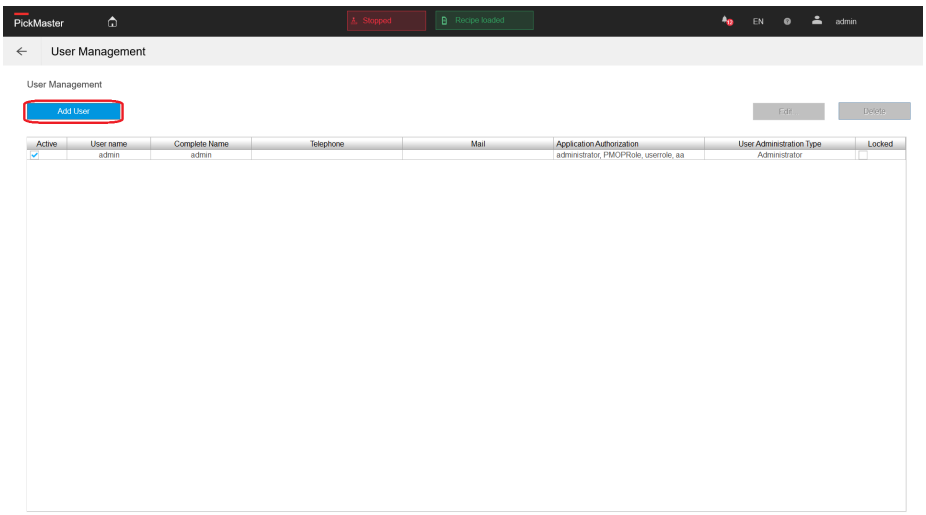
1 In PickMaster Operator main page, click **User**.



xx1900002600

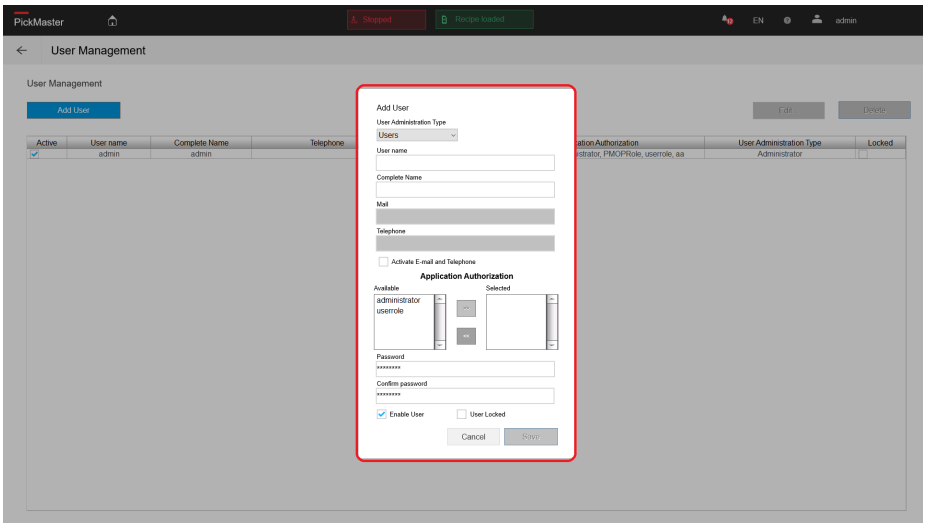
Continues on next page

2 Click **Add User**.



xx2000000191

The new user page will pop up.



xx2000000137

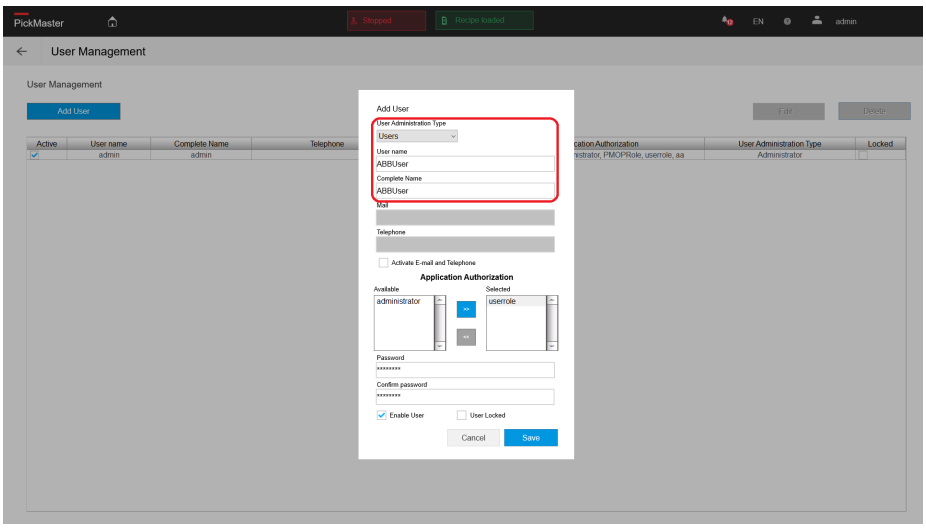
3 Select the **User Administration Type** as **Users**.

Continues on next page

4.5 Adding a new user with new role

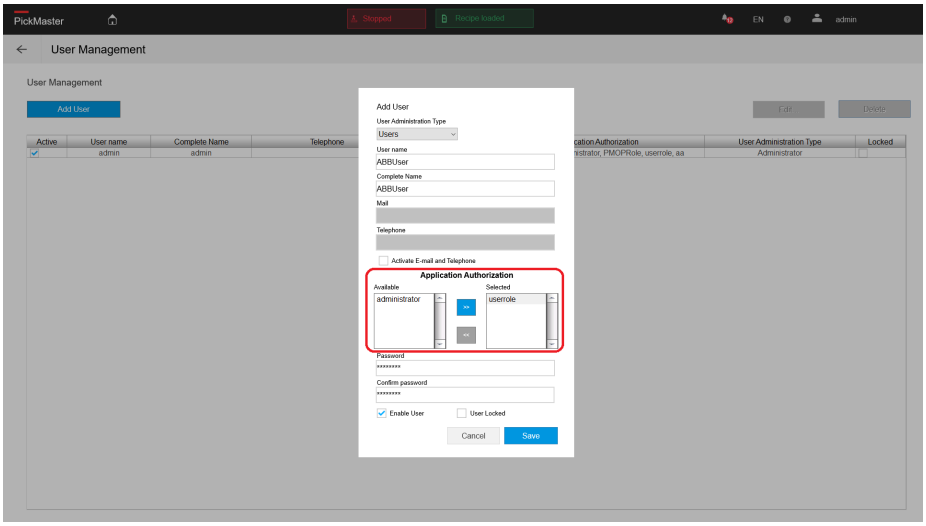
Continued

4 Enter the user name and the complete name as **ABBUser**.



xx2000000138

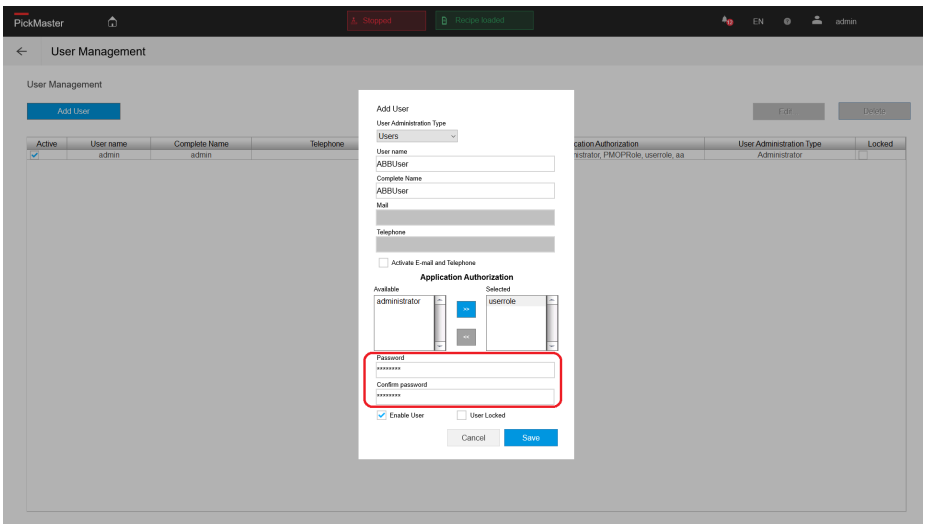
5 Select the authorization for the new user from the available list to selected list.



xx2000000139

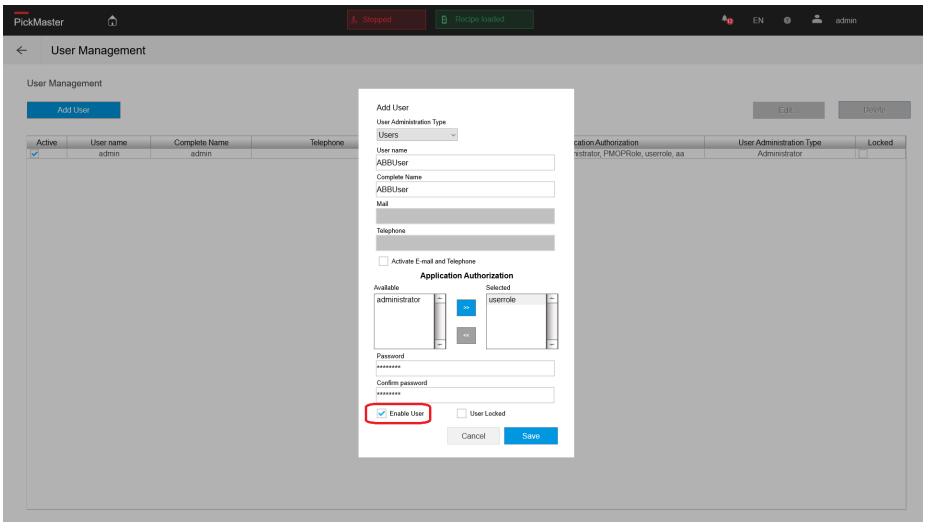
Continues on next page

6 Enter the password for new user and confirm it.



xx2000000140

7 Select **Enable user**.



xx2000000141

Note

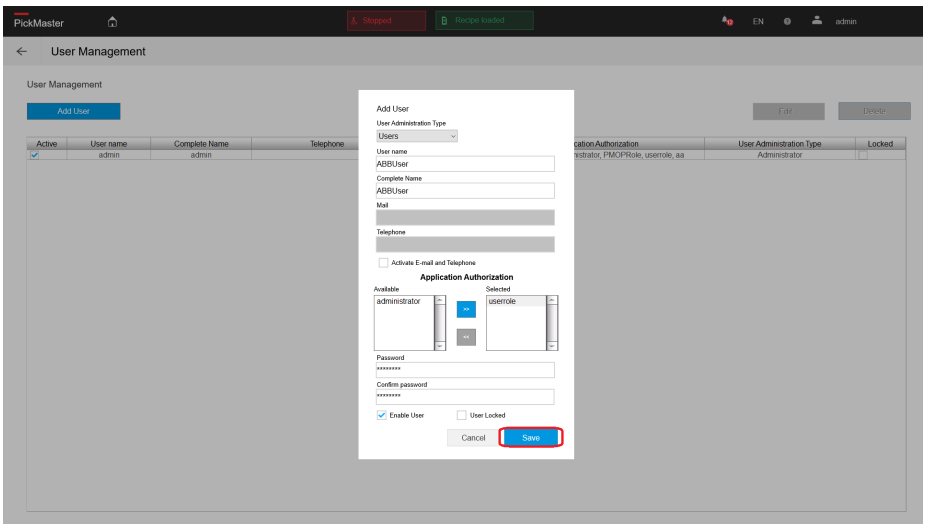
If **User Locked** is selected, the new created user will not be able to login.

Continues on next page

4.5 Adding a new user with new role

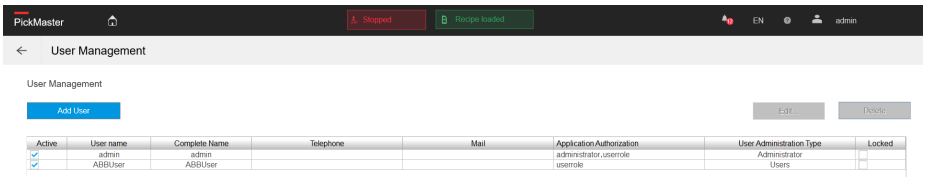
Continued

8 Click **Save**.



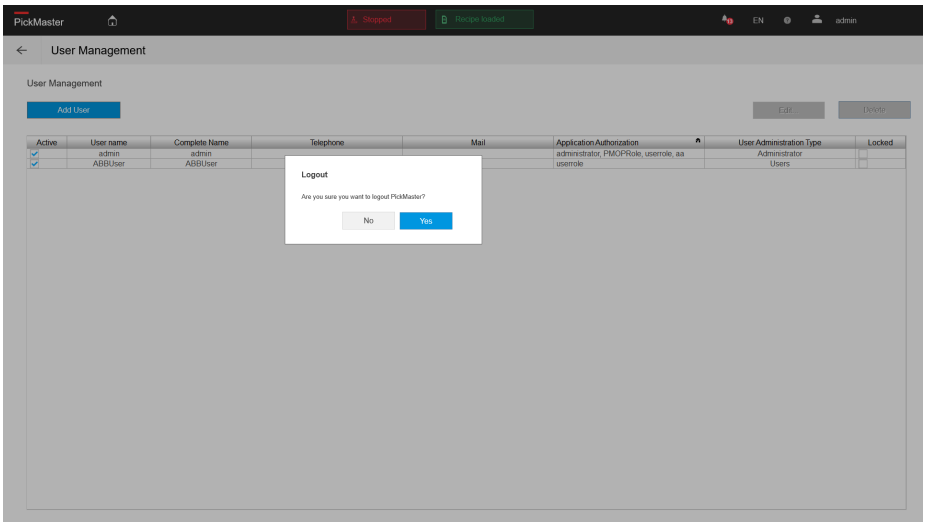
xx2000000142

The new user will show up in the user list.



xx2000000192

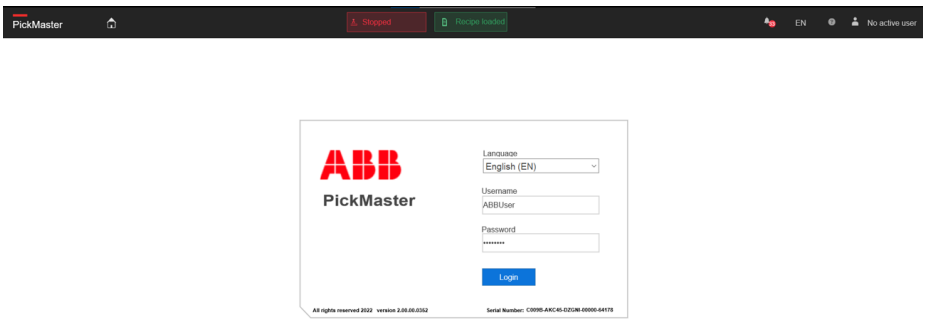
9 Logout current user.



xx2000000193

Continues on next page

10 Login with the new user.

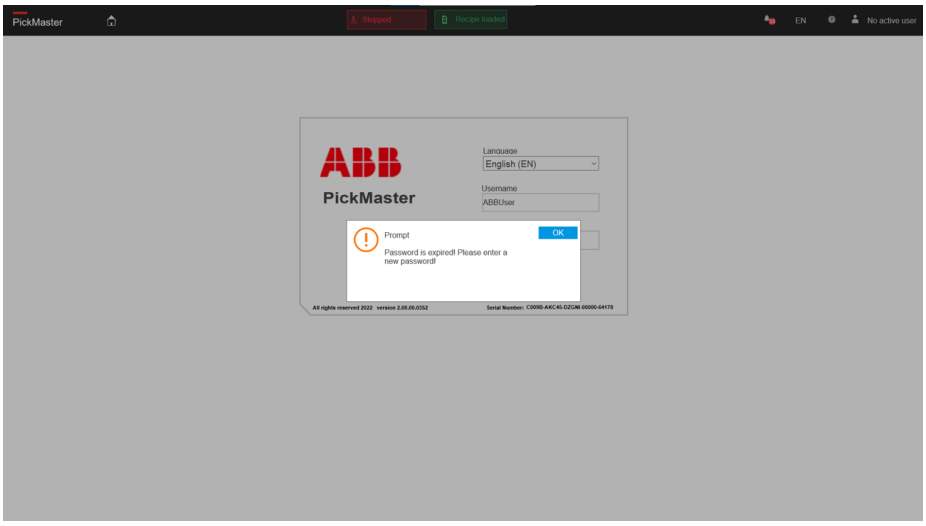


xx2000000194

Note

The first time when you log in with the new created user, you will be prompted to the password expired page. You need to change the password to active the new user.

When you click **Login**, this page will show up.



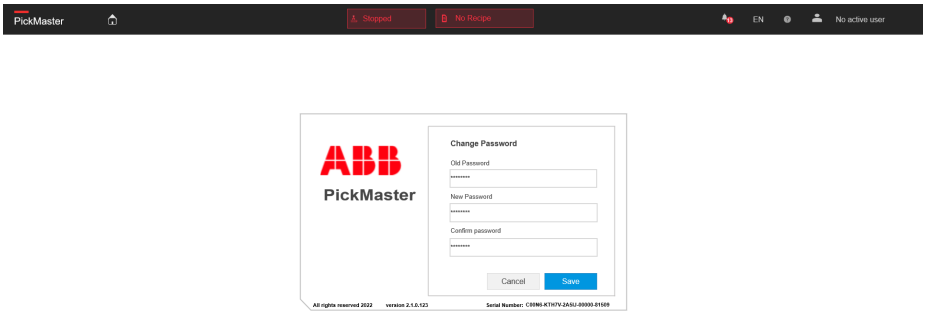
xx2000000195

Continues on next page

4.5 Adding a new user with new role

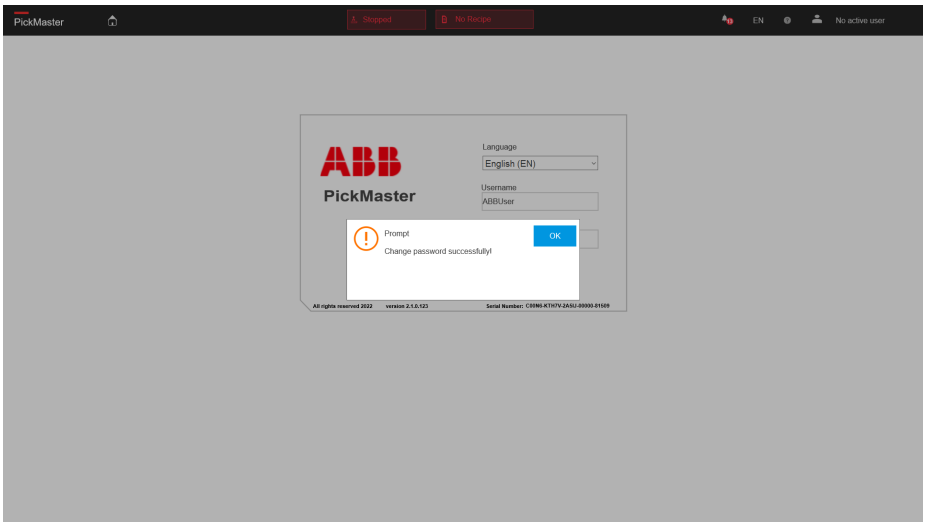
Continued

11 Change the password and click **Save**.



xx2000000196

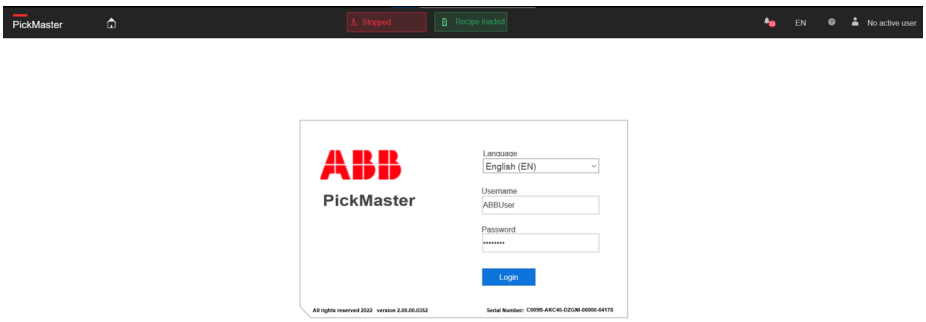
When the password is changed successfully, the following page will show up.



xx2200000578

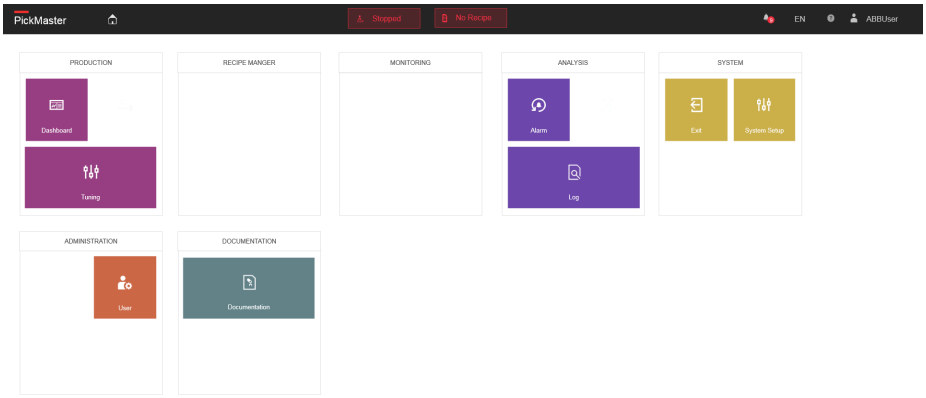
Continues on next page

12 Login with the new user and the new password.



xx2000000429

When you login successfully, the selected functions will show up in the main page.



xx2000000430

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5 Appendix

5.1 EtherNet/IP signal definition

EtherNet/IP Instance

Data	Name	Messaging	Type	Instance	Class	Size	Description
ScadaToRemote	ScadaToRemote	implicit	Inputs	101		496	Current, Command, RecipeID
ScadaToRemote	ScadaToRemoteRecipeIDList1	explicit	Inputs	113	3	400	RecipeIDList[0]-[99]
ScadaToRemote	ScadaToRemoteRecipeIDList2	explicit	Inputs	114	3	200	RecipeIDList[100]-[149]
RemoteToScada	RemoteToScada	implicit	Outputs	201		496	Current, Command, RecipeID

Scada to Remote

Instance	Byte	Bit	Signal	Type	Description
101	0		UnitModeCurrent	int32	
101	4		StateCurrent	int32	
101	8		CurMachSpeed	int32	
101	12		MachSpeed	int32	
101	16		ProdProcessedCount	int32	
101	20		ProdDefectiveCount	int32	
101	24		StopReason	int32	
101	28		Robot Status [10]	int16	
101	48	0	EquipmentInterlockBlocked	bool	
101	48	1	EquipmentInterlockStarved	bool	
101	48	2			
101	48	3			
101	48	4			
101	48	5			
101	48	6			
101	48	7			
101	64	0	Idle	bool	
101	64	1	Error	bool	
101	64	2			
101	64	3			
101	64	4			
101	64	5			
101	64	6			

Continues on next page

5.1 EtherNet/IP signal definition

Continued

Instance	Byte	Bit	Signal	Type	Description
101	64	7			
101	66	0	Modbus	bool	
101	66	1	PROFINET	bool	
101	66	2	EtherNet/IP	bool	
101	66	3			
101	66	4			
101	66	5			
101	66	6			
101	66	7			
101	68		ActiveOrder	uint32	
101	72		ErrorCode	uint32	
101	128		Current Recipe ID	uint32	
113	0		Recipe ID List [0]	uint32	
113	…		Recipe ID List […]	uint32	
113	396		Recipe ID List [99]	uint32	
114	0		Recipe ID List [100]	uint32	
114	…		Recipe ID List […]	uint32	
114	196		Recipe ID List [149]	uint32	

Remote to Scada

Instance	Byte	Bit	Signal	Type	Description
201	0		UnitMode	int32	
201	4		CntrlCmd	int32	
201	8		MachSpeed	int32	
201	12		Robot Cmd [10]	int16	
201	32	0	UnitModeChangeRequest	bool	
201	32	1	CmdChangeRequest	bool	
201	32	2			
201	32	3			
201	32	4			
201	32	5			
201	32	6			
201	32	7			
201	64	0	Request	bool	
201	64	1	ResetError	bool	
201	64	2			
201	64	3			
201	64	4			

Continues on next page

Instance	Byte	Bit	Signal	Type	Description
201	64	5			
201	64	6			
201	64	7			
201	68		RequestOrder	uint32	
201	128		Request Recipe ID	uint32	

5.2 Modbus signal definition

Scada to Remote (Input Registers)

Register	Bit	Signal	Type	Description
0		UnitModeCurrent	int32	
2		StateCurrent	int32	
4		CurMachSpeed	int32	
6		MachSpeed	int32	
8		ProdProcessedCount	int32	
10		ProdDefectiveCount	int32	
12		StopReason	int32	
14		Robot Status [10]	int16	
24	0	EquipmentInterlockBlocked	bool	
24	1	EquipmentInterlockStarved	bool	
24	2			
24	3			
24	4			
24	5			
24	6			
24	7			
24	8			
24	9			
24	10			
24	11			
24	12			
24	13			
24	14			
24	15			
26	0	Idle	bool	
26	1	Error	bool	
26	2			
26	3			
26	4			
26	5			
26	6			
26	7			
26	8			
26	9			
26	10			

Continues on next page

Register	Bit	Signal	Type	Description
26	11			
26	12			
26	13			
26	14			
26	15			
27	0	Modbus	bool	
27	1	PROFINET	bool	
27	2	EtherNet/IP	bool	
27	3			
27	4			
27	5			
27	6			
27	7			
27	8			
27	9			
27	10			
27	11			
27	12			
27	13			
27	14			
27	15			
28		ActiveOrder	uint32	
30		ErrorCode	uint32	
32		Current Recipe ID	uint32	
34		Recipe ID List [0]	uint32	
…		Recipe ID List […]	uint32	
332		Recipe ID List [149]	uint32	

Remote to Scada (Holding Registers)

Register	Bit	Signal	Type	Description
0		UnitMode	int32	
2		CntrlCmd	int32	
4		MachSpeed	int32	
6		Robot Cmd [10]	int16	
16	0	UnitModeChangeRequest	bool	
16	1	CmdChangeRequest	bool	
16	2			
16	3			

Continues on next page

5.2 Modbus signal definition

Continued

Register	Bit	Signal	Type	Description
16	4			
16	5			
16	6			
16	7			
16	8			
16	9			
16	10			
16	11			
16	12			
16	13			
16	14			
16	15			
17	0	Request	bool	
17	1	ResetError	bool	
17	2			
17	3			
17	4			
17	5			
17	6			
17	7			
17	8			
17	9			
17	10			
17	11			
17	12			
17	13			
17	14			
17	15			
18		RequestOrder	uint32	
20		Request Recipe ID	uint32	

5.3 PROFINET signal definition

PROFINET Slot

Slot	Name	Type	Description
1	Input 32 bit - DINT	ScadaToRemote	
2	Input 32 bit - DINT	ScadaToRemote	
3	Input 32 bit - DINT	ScadaToRemote	
4	Input 32 bit - DINT	ScadaToRemote	
5	Input 32 bit - DINT	ScadaToRemote	
6	Input 32 bit - DINT	ScadaToRemote	
7	Input 32 bit - DINT	ScadaToRemote	
8	Input 16 bit - INT	ScadaToRemote	
9	Input 16 bit - INT	ScadaToRemote	
10	Input 16 bit - INT	ScadaToRemote	
11	Input 16 bit - INT	ScadaToRemote	
12	Input 16 bit - INT	ScadaToRemote	
13	Input 16 bit - INT	ScadaToRemote	
14	Input 16 bit - INT	ScadaToRemote	
15	Input 16 bit - INT	ScadaToRemote	
16	Input 16 bit - INT	ScadaToRemote	
17	Input 16 bit - INT	ScadaToRemote	
18	Input 8 bit - USINT	ScadaToRemote	
19	Output 32 bit - DINT	RemoteToScada	
20	Output 32 bit - DINT	RemoteToScada	
21	Output 32 bit - DINT	RemoteToScada	
22	Output 16 bit - INT	RemoteToScada	
23	Output 16 bit - INT	RemoteToScada	
24	Output 16 bit - INT	RemoteToScada	
25	Output 16 bit - INT	RemoteToScada	
26	Output 16 bit - INT	RemoteToScada	
27	Output 16 bit - INT	RemoteToScada	
28	Output 16 bit - INT	RemoteToScada	
29	Output 16 bit - INT	RemoteToScada	
30	Output 16 bit - INT	RemoteToScada	
31	Output 16 bit - INT	RemoteToScada	
32	Output 8 bit - USINT	RemoteToScada	
33	Input 16 bit - UINT	ScadaToRemote	
34	Input 16 bit - UINT	ScadaToRemote	
35	Input 32 bit - UDINT	ScadaToRemote	

Continues on next page

Slot	Name	Type	Description
36	Input 32 bit - UDINT	ScadaToRemote	
37	Input 32 bit - UDINT	ScadaToRemote	
38	Output 16 bit - UINT	RemoteToScada	
39	Output 32 bit - UDINT	RemoteToScada	
40	Output 32 bit - UDINT	RemoteToScada	
41	Input STRING - 255 byte	ScadaToRemote	

Scada to Remote

Slot	Subslot	Module	Bit	Signal	Type	Description
1	1	DINT		UnitModeCurrent	int32	
2	1	DINT		StateCurrent	int32	
3	1	DINT		CurMachSpeed	int32	
4	1	DINT		MachSpeed	int32	
5	1	DINT		ProdProcessedCount	int32	
6	1	DINT		ProdDefectiveCount	int32	
7	1	DINT		StopReason	int32	
8~17	1	INT		Robot Status [10]	int16	
18	1	USINT	0	EquipmentInterlockBlocked	bool	
18	1	USINT	1	EquipmentInterlockStarved	bool	
18	1	USINT	2			
18	1	USINT	3			
18	1	USINT	4			
18	1	USINT	5			
18	1	USINT	6			
18	1	USINT	7			
33	1	UINT	0	Idle	bool	
33	1	UINT	1	Error	bool	
33	1	UINT	2			
33	1	UINT	3			
33	1	UINT	4			
33	1	UINT	5			
33	1	UINT	6			
33	1	UINT	7			
33	1	UINT	8			
33	1	UINT	9			
33	1	UINT	10			
33	1	UINT	11			
33	1	UINT	12			

Continues on next page

Slot	Subslot	Module	Bit	Signal	Type	Description
33	1	UINT	13			
33	1	UINT	14			
33	1	UINT	15			
34	1	UINT	0	Modbus	bool	
34	1	UINT	1	PROFINET	bool	
34	1	UINT	2	EtherNet/IP	bool	
34	1	UINT	3			
34	1	UINT	4			
34	1	UINT	5			
34	1	UINT	6			
34	1	UINT	7			
34	1	UINT	8			
34	1	UINT	9			
34	1	UINT	10			
34	1	UINT	11			
34	1	UINT	12			
34	1	UINT	13			
34	1	UINT	14			
34	1	UINT	15			
35	1	UDINT		ActiveOrder	uint32	
36	1	UDINT		ErrorCode	uint32	
37	1	UDINT		Current Recipe ID	uint32	
41	1	STRING 255byte	0	Recipe ID List [0]	uint32	
…	1	STRING 255byte	…	Recipe ID List […]	uint32	
41	1	STRING 255byte	196	Recipe ID List [49]	uint32	

Remote to Scada

Slot	Subslot	Module	Bit	Signal	Type	Description
19	1	DINT		UnitMode	int32	
20	1	DINT		CntrlCmd	int32	
21	1	DINT		MachSpeed	int32	
22~31	1	INT		Robot Cmd [10]	int16	
32	1	USINT	0	UnitModeChangeRequest	bool	
32	1	USINT	1	CmdChangeRequest	bool	
32	1	USINT	2			
32	1	USINT	3			

Continues on next page

Slot	Subslot	Module	Bit	Signal	Type	Description
32	1	USINT	4			
32	1	USINT	5			
32	1	USINT	6			
32	1	USINT	7			
38	1	UINT	0	Request	bool	
38	1	UINT	1	ResetError	bool	
38	1	UINT	2			
38	1	UINT	3			
38	1	UINT	4			
38	1	UINT	5			
38	1	UINT	6			
38	1	UINT	7			
38	1	UINT	8			
38	1	UINT	9			
38	1	UINT	10			
38	1	UINT	11			
38	1	UINT	12			
38	1	UINT	13			
38	1	UINT	14			
38	1	UINT	15			
39	1	UDINT		RequestOrder	uint32	
40	1	UDINT		Request Recipe ID	uint32	

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