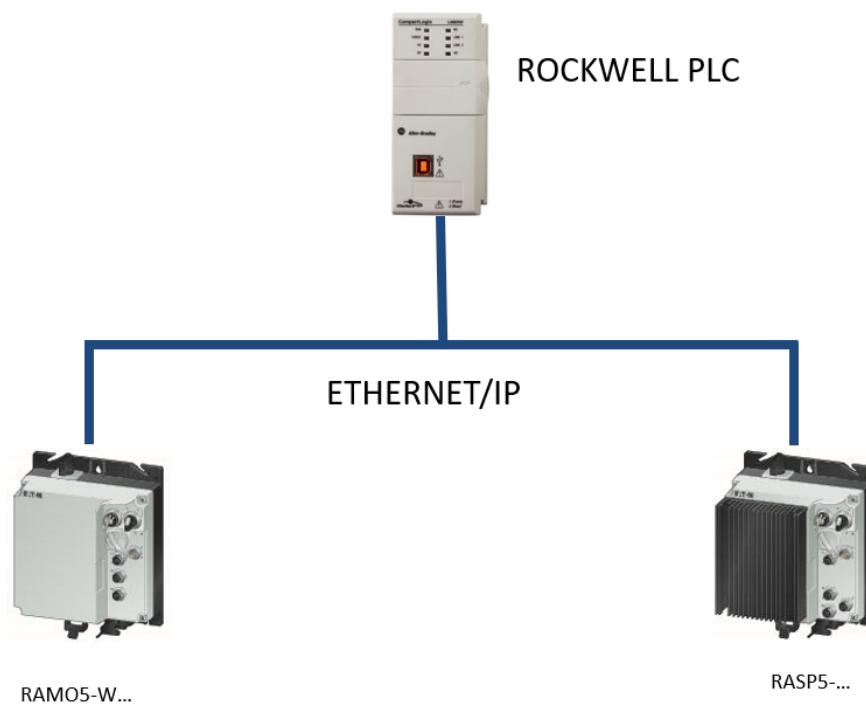


Rapid Link 5

RAMO5, RASP5

Configuration to Rockwell PLC



Level 3	<p>1 – Fundamental – No previous experience necessary</p> <p>2 – Basic – Basic knowledge recommended</p> <p>3 – Advanced – Reasonable knowledge required</p> <p>4 – Expert – Good experience recommended</p>
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Break-Down Service

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Eaton.eu/aftersales

Eaton.com/us/en-us/support.html

Hotline After Sales Service:

+49 (0) 1805 223822 (de, en)

AfterSalesEGBonn@eaton.com

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All non-English language versions of this document are translations of the original application note.

2. Edition 2020, publication date 08/2020

New layout

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Danger! - Dangerous electrical voltage!

- Disconnect the power supply of the device.
- Ensure that devices cannot be accidentally restarted.
- Verify isolation from the supply.
- Cover or enclose any adjacent live components.
- Follow the engineering instructions (AWA/IL) for the device concerned.
- Only suitably qualified personnel in accordance with EN 50110-1/-2 (VDE 0105 Part 100) may work on this device/system.
- Before installation and before touching the device ensure that you are free of electrostatic charge.
- The functional earth (FE, PES) must be connected to the protective earth (PE) or the potential equalization. The system installer is responsible for implementing this connection.
- Connecting cables and signal lines should be installed so that inductive or capacitive interference does not impair the automatic control functions.
- Suitable safety hardware and software measures should be implemented for the I/O interface so that an open circuit on the signal side does not result in undefined states.
- Deviations of the mains voltage from the rated value must not exceed the tolerance limits given in the specification, otherwise this may cause malfunction and/or dangerous operation.
- Emergency stop devices complying with IEC/EN 60204-1 must be effective in all operating modes. Unlatching of the emergency-stop devices must not cause a restart.
- Devices that are designed for mounting in housings or control cabinets must only be operated and controlled after they have been properly installed and with the housing closed.
- Wherever faults may cause injury or material damage, external measures must be implemented to ensure a safe operating state in the event of a fault or malfunction (e.g. by means of separate limit switches, mechanical interlocks etc.).
- Frequency inverters may have hot surfaces during and immediately after operation.
- Removal of the required covers, improper installation or incorrect operation of motor or frequency inverter may destroy the device and may lead to serious injury or damage.
- The applicable national safety regulations and accident prevention recommendations must be applied to all work carried on live frequency inverters.
- The electrical installation must be carried out in accordance with the relevant electrical regulations (e. g. with regard to cable cross sections, fuses, PE).
- Transport, installation, commissioning and maintenance work must be carried out only by qualified personnel (IEC 60364, HD 384 and national occupational safety regulations).
- Installations containing frequency inverters must be provided with additional monitoring and protective devices in accordance with the applicable safety regulations. Modifications to the frequency inverters using the operating software are permitted.
- All covers and doors must be kept closed during operation.
- To reduce the hazards for people or equipment, the user must include in the machine design measures that restrict the consequences of a malfunction or failure of the frequency inverter (increased motor speed or sudden standstill of motor). These measures include: – Other independent devices for monitoring safety related variables (speed, travel, end positions etc.).
 - Electrical or non-electrical system-wide measures (electrical or mechanical interlocks).
 - Never touch live parts or cable connections of the frequency inverter after it has been disconnected from the power supply. Due to the charge in the capacitors, these parts may still be alive after disconnection. Consider appropriate warning signs.

Disclaimer

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1 General

Rapid Link 5 is a modern, efficient drive which is suitable for both simple and complex tasks in all material handling systems, but specially in horizontal conveying systems. The Rapid Link 5 System can be fitted into a power and data bus, it allows electrical drives to be installed and taken into operation much more quickly and cost-efficiently than with conventional methods. Thanks to a power bus and a data bus that are plugged into every Rapid Link 5 module, the system is quick and easy to install.

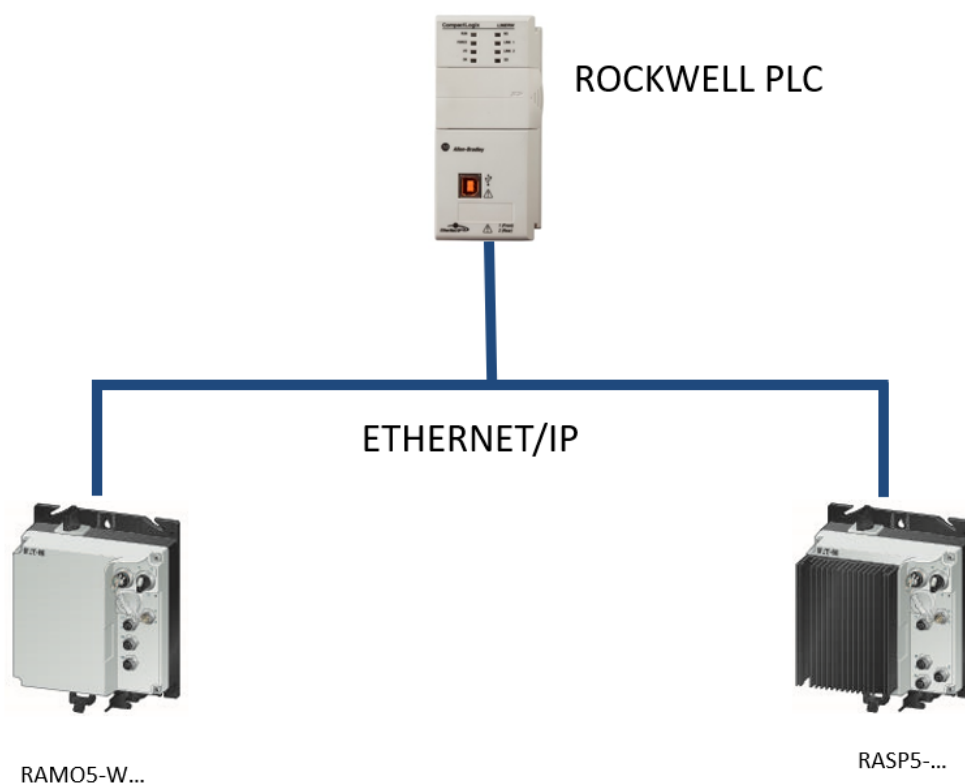
2 Purpose of Use

The purpose of this application note is to demonstrate how to operate a RASP5 via Ether-net/IP and a Rockwell CompactLogix PLC. Furthermore, how to commission, control and monitor RASP5 using RS Logix 5000.

Beginning with version 30 of RSLogix5000, Ethernet/IP EDS files can be imported into the software tool allowing Eaton motor control products to be easily added to a project by name

The Rapid Link 5 Modules has 2 onboard Ethernet ports that supports Ethernet/IP communication.

3 System Overview



4 Material for the Application

4.1 Hardware

- Rapid Link Modules RASP5
- Cable: Ethernet Cable CAT5
- Rockwell PLC (here: Compact Logix L33ER)
- Computer (PC)

4.2 Software

- RSLogix 5000 (Rockwell)

4.3 Downloading Files

- EDS-File for RASP5

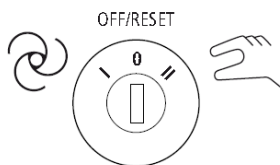
5 Configuring RASP5

The MAC address will be printed on the corresponding nameplate. The default IP Address is 192.168.1.254, subnet mask 255.255.255.0. By having an IP address assigned to RASP5, it can be integrated into the Ethernet/IP environment and enabled.

RASP5 Parameters: Speed control unit RASP5 is configured for direct operation via Ethernet/IP in the Rapid Link system by default. Parameterization is not required.

IP Address Setting Procedure

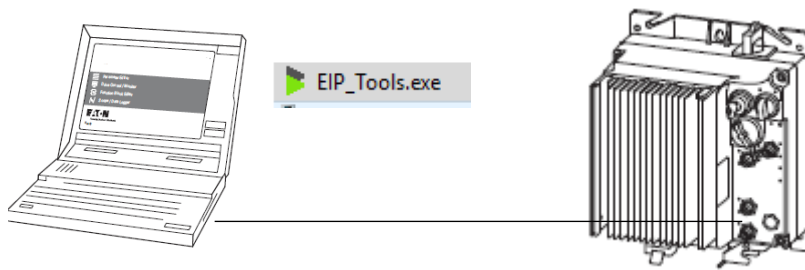
- Turn Key-switch to '0' before starting the configuration.



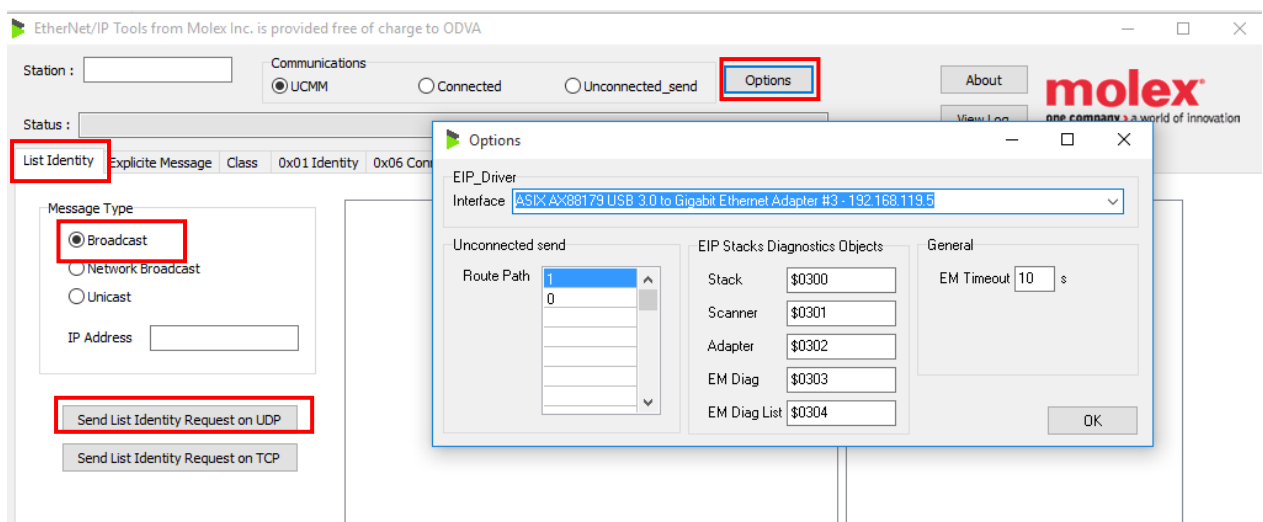
- Set the address of the Rapid Link Modules with a programming PC tool. the IP address must be changed via EiP protocol EIP_Tools_2.3 is available via **molex** following link:

<https://www.molex.com/molex/contact/icccDownload.jsp>

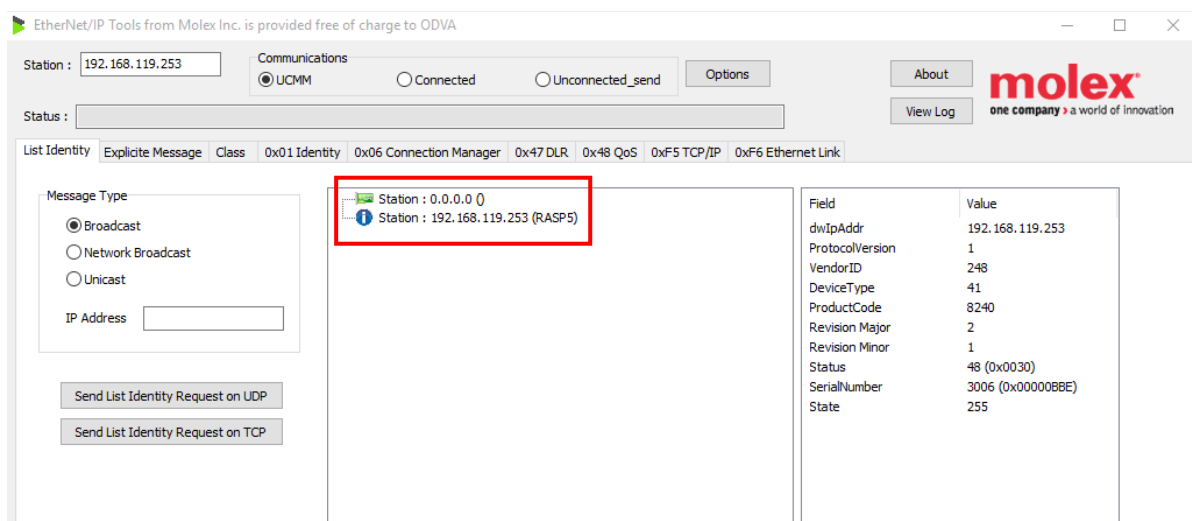
After installing molex tool start the software and connect RASP5 to the PC via Ethernet cable (M12, D coded Ethernet Cable)



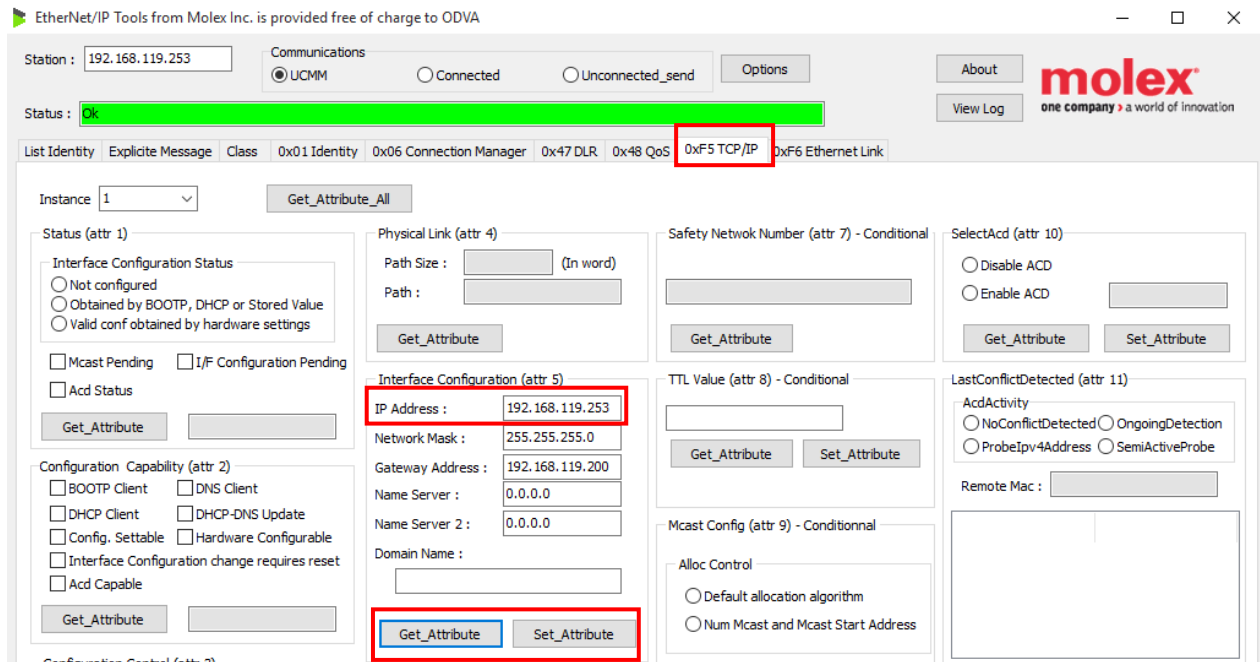
1. Open EIP Tool
2. Select **Options** and choose right interface of computer



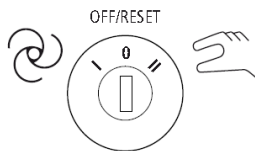
3. Click on tab **List Identity**
4. Select **Broadcast**
5. Select **Send Identity Request on TCP**
6. Select the station which is found on right hand side (**RASP5**)



7. Select **0xF5 TCP/IP** Tab
8. Select Get attribute on the Interface Configuration (**attr 5**). The current IP Address will be shown.
Type your IP address and select **Set Attribute**.



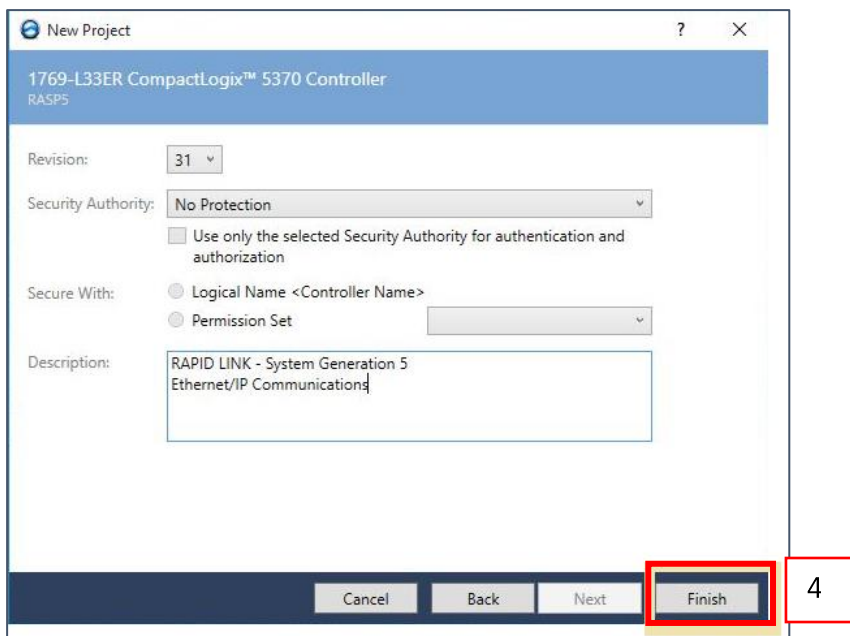
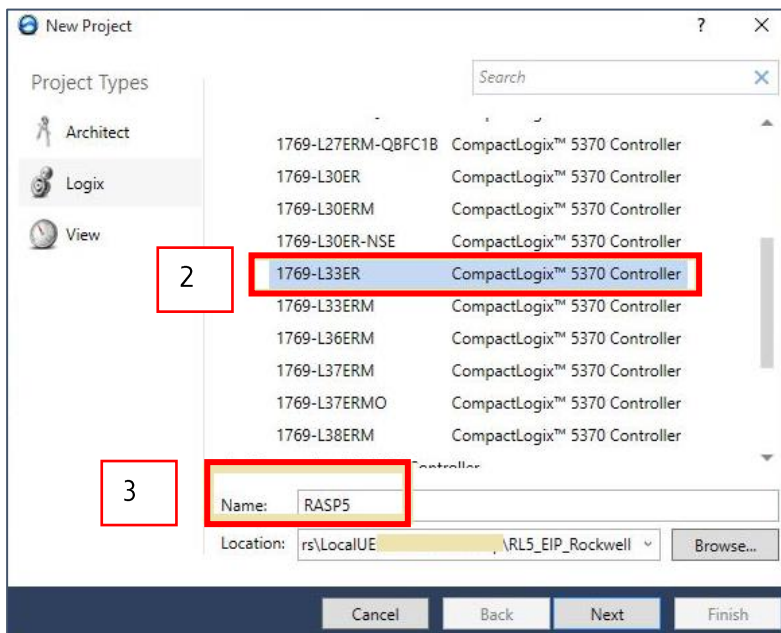
- Automatic operation via PLC will only be possible if the Rapid Link key switched to the "automatic mode".



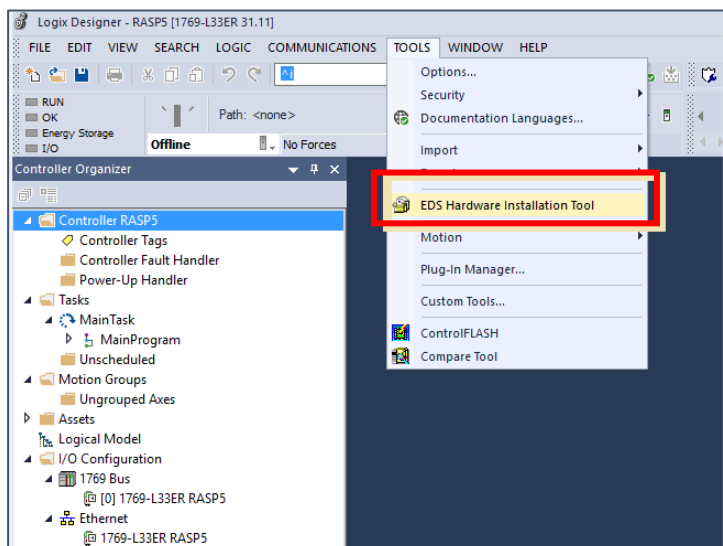
6 Creating a Configuration in RSLogix5000

- Start a new project, give the project name and select the controller type.

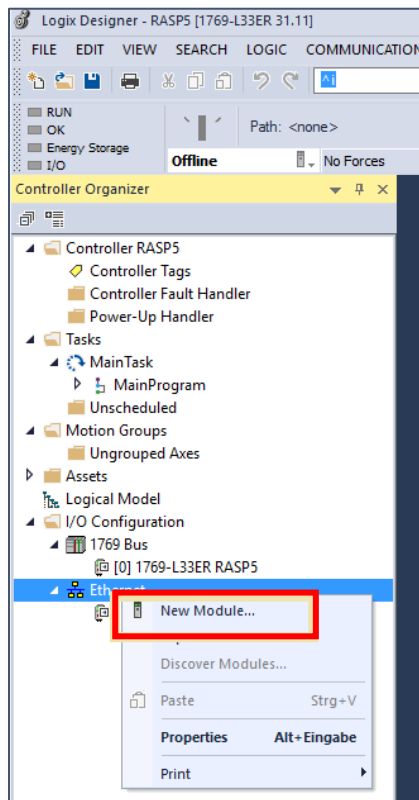




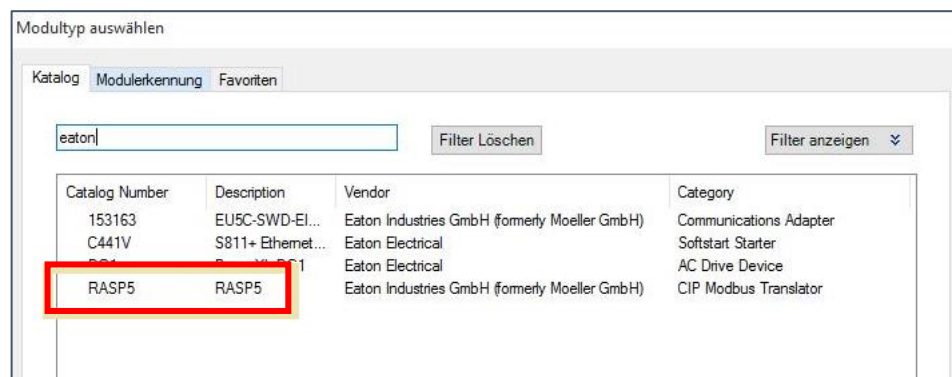
- Install the corresponding EDS Files. “Tools-> Hardware Installation Tool”



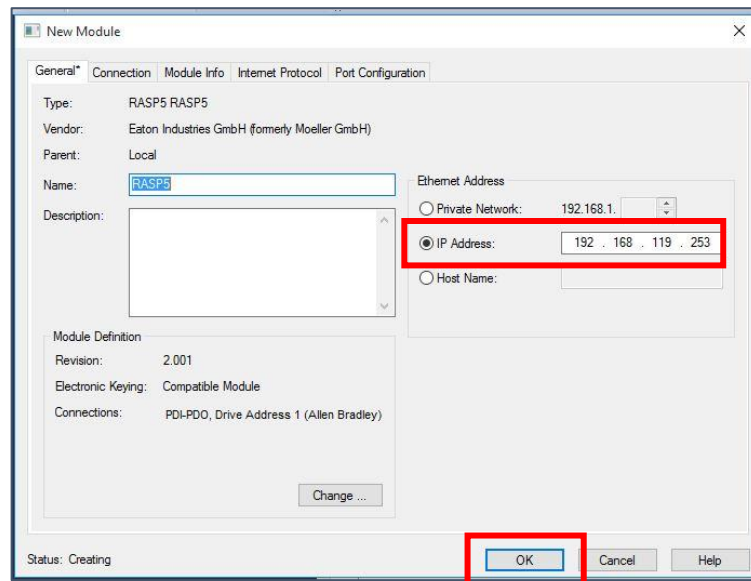
- Under "I/O Configuration" right click on "Bus" to append a "New Module"



- 2. Select RASP5 and then click "Create".



- Give a name and IP Address.



- Download project to the PLC

7 System Control

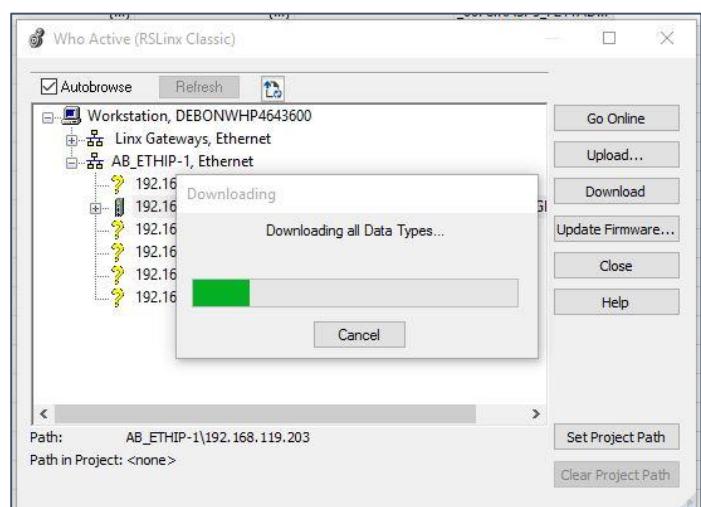
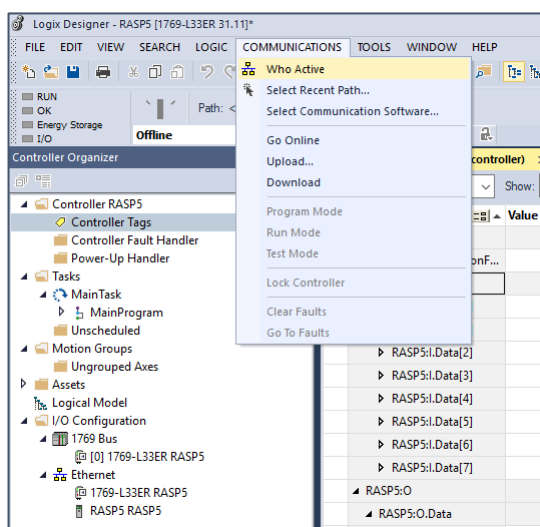
Before commissioning Rapid Link modules make sure that:

- The motor is correctly connected and that the motor cable has been plugged in.
- The UV LED will light up if the mains voltage is switched on.
- Addresses to the components are assigned

Proceed following to start the system:

- Put together all required components and make the necessary connections: 400 V AC, AS-Interface, motor, and sensors and actuators if applicable.
- Set the parameters of RASP and correct motor data.

For information on how to set Parameter, refer Rapid Link Manual.

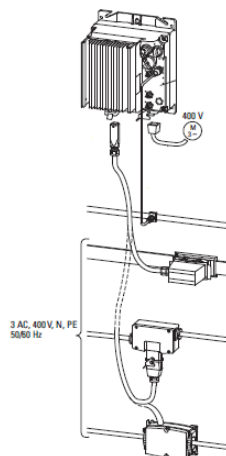


- Download the project to the PLC and go online.
- Click on Controller Tags. The programming system will have the I/O data and you will be able to use this data for your user program as usual.

Name	Value	Force Mask	Style	Data Type	Description	Constant
RASP5:I	{...}	{...}	{...}	Decimal	_00F8:RASP5_F211AD...	<input type="checkbox"/>
RASP5:I.ConnectionF...	0		Decimal	BOOL		
RASP5:I.Data	{...}	{...}	Decimal	SINT[8]		
RASP5:I.Data[0]	0		Decimal	SINT		
RASP5:I.Data[1]	0		Decimal	SINT		
RASP5:I.Data[2]	0		Decimal	SINT		
RASP5:I.Data[3]	0		Decimal	SINT		
RASP5:I.Data[4]	0		Decimal	SINT		
RASP5:I.Data[5]	0		Decimal	SINT		
RASP5:I.Data[6]	0		Decimal	SINT		
RASP5:I.Data[7]	0		Decimal	SINT		
RASP5:O	{...}	{...}	{...}	Decimal	_00F8:RASP5_DD7B81...	<input type="checkbox"/>
RASP5:O.Data	{...}	{...}	Decimal	SINT[8]		
RASP5:O.Data[0]	0		Decimal	SINT		
RASP5:O.Data[1]	0		Decimal	SINT		
RASP5:O.Data[2]	0		Decimal	SINT		
RASP5:O.Data[3]	0		Decimal	SINT		
RASP5:O.Data[4]	0		Decimal	SINT		
RASP5:O.Data[5]	0		Decimal	SINT		
RASP5:O.Data[6]	0		Decimal	SINT		
RASP5:O.Data[7]	0		Decimal	SINT		

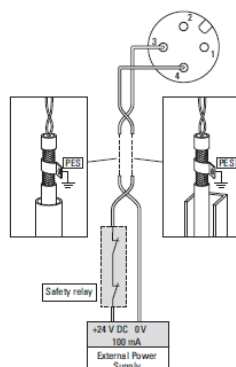
• Power Connections

The system can only be started if motor and energy cable is connected to the RASP5. Below figure shows different ways of the connection types.



• STO-Input

The Hardware enable must be done by STO Input. Figure below shows example diagram for STO signal.



8 CONTROL RASP5

8.1 Output Tags (Online)

The START signal or enable for the requested operating direction is issued through RASP5:0.Data[0] (FWD) or 0.Data[1] (REV).

▲ RASP5:0	{...}	{...}		_00F8:RASP5_DD7B81...	
▲ RASP5:0.Data	{...}	{...}	Decimal	SINT[8]	
▲ RASP5:0.Data[0]	0		Decimal	SINT	RUN COMMAND
RASP5:0.Data[0].0	0		Decimal	BOOL	REVERSE COMMAND
RASP5:0.Data[0].1	0		Decimal	BOOL	RESET
RASP5:0.Data[0].2	0		Decimal	BOOL	COAST
RASP5:0.Data[0].3	0		Decimal	BOOL	NOT USED
RASP5:0.Data[0].4	0		Decimal	BOOL	Not Used
RASP5:0.Data[0].5	0		Decimal	BOOL	QUICK STOP
RASP5:0.Data[0].6	0		Decimal	BOOL	FF1
RASP5:0.Data[0].7	0		Decimal	BOOL	SET to 0
RASP5:0.Data[1]	0		Decimal	SINT	

ID	Designation	Scaling Factor	Unit
1	Fieldbus command	–	Binary code
2	Fieldbus speed reference value	0.1	Hz
3	reserved	–	–
4	Modbus ramp time	0.01	s

- Command Word

Bit	Description Value = 0	Value = 1
0	Stop	RUN
1	Clockwise rotating field (FWD)	Anticlockwise rotating field (REV)
2	No action	Reset error
3	No action	Coast to stop
4	Not used	–
5	No action	Quick stop (ramp)
6	No action	Fixed frequency (FF1)
7	No action	Overwrite setpoint value with 0

- Setpoint value

The permissible values fall within a range of P1-02 (minimum frequency) to P1-01 (maximum frequency). This value will be scaled with a factor of 0.1 in the application.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
MSB															LSB

The Setpoint issued through RASP5:1.Data [0-7] and 2.Data[0-7]

- Process data input 3 (PZD3) – User Ramp time

Refer to settings of P5-07.

The permissible value fall within a range of the RASP5, 0 to 600 sec. Refer to setting of P-03. Value is scaled with a factor of 0.01 in the application.

- Process data input 4 (PZD4) – Not used

This channel can be set by P5-08. Refer to settings of P5 group

9 STATUS OF RASP5

9.1 Input Tags (Online)

Controller Tags - RASP5(controller)							
Scope: RASP5		Show: All Tags					
Name	Value	Force Mask	Style	Data Type	Description	Cons	
▲ RASP5:I.Data	{...}		{...}	Decimal	SINT[8]		
▲ RASP5:I.Data[0]	-56		Decimal	SINT			
RASP5:I.Data[0].0	0		Decimal	BOOL	Ready		
RASP5:I.Data[0].1	0		Decimal	BOOL	Running		
RASP5:I.Data[0].2	0		Decimal	BOOL	Reverse		
RASP5:I.Data[0].3	1		Decimal	BOOL	Faulty		
RASP5:I.Data[0].4	0		Decimal	BOOL	REF RUN		
RASP5:I.Data[0].5	0		Decimal	BOOL	Zero Speed		
RASP5:I.Data[0].6	1		Decimal	BOOL	Output Active		
RASP5:I.Data[0].7	1		Decimal	BOOL	STO Active		
▶ RASP5:I.Data[1]	50		Decimal	SINT			
▶ RASP5:I.Data[2]	0		Decimal	SINT			
▶ RASP5:I.Data[3]	0		Decimal	SINT			
▶ RASP5:I.Data[4]	0		Decimal	SINT			
▶ RASP5:I.Data[5]	0		Decimal	SINT			
▶ RASP5:I.Data[6]	0		Decimal	SINT			
▶ RASP5:I.Data[7]	0		Decimal	SINT			

Information regarding the device status and fault messages is specified in the status and fault word.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
MSB															LSB
Fault word								Status word							

- Status Word

Bit	Description Value = 0	Value = 1
0	Drive not ready	Ready for operation (READY)
1	Stop	Running operation message (RUN)
2	Clockwise rotating field (FWD)	Anticlockwise rotating field (REV)
3	no error	Fault detected (FAULT)
4	Acceleration ramp	Frequency actual value equals reference value
5	–	Zero speed
6	Speed control deactivated	Speed control activated
7	DI1 disabled	DI1 Enabled

- Actual speed

The RASP5' actual speed will fall within a range of P-02 (min. frequency) to P-01 (max. frequency). In the application, the value will be scaled by a factor of 0.1.

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
MSB															LSB

- Process data out 3 (PDO3) – motor current

The permissible value is to provide the motor current. The current is specified with one decimal place.

Example: 34 = 3.4 A.

10 References

Documentation	device	LINK
Manual RASP...	MN034004EN	DownloadCenter
Instruction Leaflet RASP...	IL034085ZU	DownloadCenter
drivesConnect Software	MN040003EN	DownloadCenter
Application Note - Parametrization per Bluetooth	AP040189EN	eaton.com/ap/overview/drives

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