## PACSystems<sup>™</sup> RSTi-EP

# MODBUS® NETWORK ADAPTER MODULE (EPXMBE101)



Door for Micro USB Port



#### Warnings and Caution Notes as Used in this Publication

#### **WARNING**

Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist in this equipment or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

#### **A** CAUTION

Caution notices are used where equipment might be damaged if care is not taken.

**Note:** Notes merely call attention to information that is especially significant to understanding and operating the equipment.

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## **Product Description**

The EPXMBE101 network adapter is a variant of the EPXMBE001 network adaptor, which supports the Modbus Dual LAN mode of operation. In this mode of operation, both the Ethernet ports communicate with two separate networks. For this purpose, the EPXMBE101 has two MAC addresses and two IP addresses which can be defined separately, The "Modbus Dual LAN mode" is suitable to communicate with two synchronized control units simultaneously on two different LAN networks. Thereby both the control units have complete read and write access. If the "Modbus Dual LAN mode" is disabled in EPXMBE101, the network adaptor functions as EPXMBE001 with a single LAN network,

The network adapter can be accessed with a system-independent web server application via the USB service interface or the Ethernet. Thus, all information, such as diagnostics, status values, and parameters, can be read and all connected modules can be simulated or forced.

The station's main power supply is integrated with the network adapter. Power is supplied via two 4-pole connectors, separated into the input and output current paths.

Caution, the RSTi-EP station is usually installed on a horizontally positioned DIN rail. Installation on vertically positioned DIN rails is also possible. However, the heat dissipation is reduced such that the derating values change (refer to the section, Thermal Derating).

Modules should be allowed to de-energize for a minimum of 10 seconds after powering down, before starting any maintenance activity. The network adapter cannot be hot-swapped.

Refer to the RSTi-EP Slice I/O User Manual (GFK-2958) for additional information.

Refer to the RSTi-EP Power Supply Reference Guide, a software utility available on PAC Machine Edition(PME) V9.00, for detailed power-feed requirements.

#### **Module Features**

- Supports up to 64 active RSTi-EP modules
- Spring-style technology for ease of wiring
- DIN rail mounted
- Double-click installation for positive indication of correct installation
- Built-in Web Server for diagnostic information and firmware update through Ethernet and micro USB port
- Option of fixed or DHCP IP address configuration
- Support for daisy-chain/line, star topologies

#### **Ordering Information**

Module	Description
EPXMBE101	RSTi-EP Slice I/O Dual LAN Modbus TCP Network Adapter

## **Specifications**

SPECIFICATION	EPXMBE101				
System data					
Connection	2 x RJ-45				
Fieldbus protocol	Modbus TCP				
	Input data width	max. 8 KB			
Process image	Parameter data	max. 1024 Bytes			
	Diagnostic data	max. 1024 Bytes			
Number of modules	max. 64 active				
Configuration interface	Micro USB 2.0				
Transfer rate	Fieldbus	10 Mbps/100 Mbps			
Transier rate	RTSi-EP system bus	Max. 48 Mbps			
Supply					
Supply voltage for system and inputs	20.4V – 28.8V				
Supply voltage for outputs	20.4V – 28.8V				
Max. feed-in current for input modules	10 A				
Max. feed-in current for output modules	10 A				
Current consumption from system	112 mA				
current path ISYS					
Connection data					
Type of connection	Spring style				
Conductor cross-section	Single-wired, fine-	0.14 – 1.5 mm2 (AWG 26 – 16)			
	wired	0.14 - 1.5 minz (AVVG 20 - 10)			
General data					
Operating temperature	-20°C to +60°C (-4 °F to +140 °F)				
Storage temperature	-40°C to +85°C (-40 °F to +185 °F)				
Air humidity (operation/transport)	5% to 95%, noncondensing as per IEC 61131-2				
Width	52 mm (2.05 in)				
Depth	76 mm (2.99 in)				
Height	120 mm (4.72 in)				
Weight	223 g (7.87 oz)				

## **LEDs**

LED	Indication	LED State/Description
PWR	Power LED	Green: Supply voltage connected
SF	System Fault	<b>Red:</b> Configuration error, or error in the network adapter, or error in a module, or there is a new diagnostic report
		Red flashing: Station in Force mode
		Red: No connection to the Fieldbus
BF	Bus fault	<b>Red flashing</b> : Configuration error, no connection to the control unit, or error in the parameter set
MT	Maintenance Required	Yellow: Error on the system bus or Fieldbus
L/A X1	Connection/Active	Green / Yellow <sup>†</sup> : Connection established between port 1 of the network adapter and another field device
		Green flashing / Yellow flashing†: Data being exchanged on port 1
L/A X2	Connection/Active	<b>Green:</b> Connection established between port 2 of the network adapter and another field device
		Green flashing: Data being exchanged on port 2
†Green: 7	ransfer rate 100 MBit/s	•
Yellow:	Transfer rate 10 MBit/s	

## **LED Indicators**



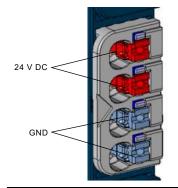
LED	EPXMBE101
Dowar Supply	Green: Supply voltage > 18 V DC
Power Supply	Red: At least one current path < 18 V

LED	EPXMBE101
3.1	Green: Input current path supply voltage > 18 V DC
3.2	Red: Input current path supply voltage < 18 V DC
3.3	
3.4	Red: Internal fuse defective
4.1	Green: Output current path supply voltage > 18 V DC
4.2	Red: Output current path supply voltage < 18 V DC
4.3	
4.4	Red: Internal fuse defective

## Field Wiring

The connection frame has one connector, and two 24 V DC wires can be connected to each connector, along with two ground connections. Those four connectors are used as shown in the following figure. The Spring style technology allows either finely stranded or solid wire with crimped wire-end ferrules or ultrasonically welded wires, each with a maximum cross-section of 1.5 mm² (16 gauge), to be inserted easily through the opening in the clamping terminal without having to use tools. To insert fine stranded wires without wire-end ferrules, the pusher must be pressed in with a screwdriver and released to latch the wire.

**Figure 1: Connector Block** 



## **Connector Specifications:**

- Conductor cross-section 0.14 to 1.5 mm² (26 16 guage)
- Max. ampacity: 10 A
- 4-pole

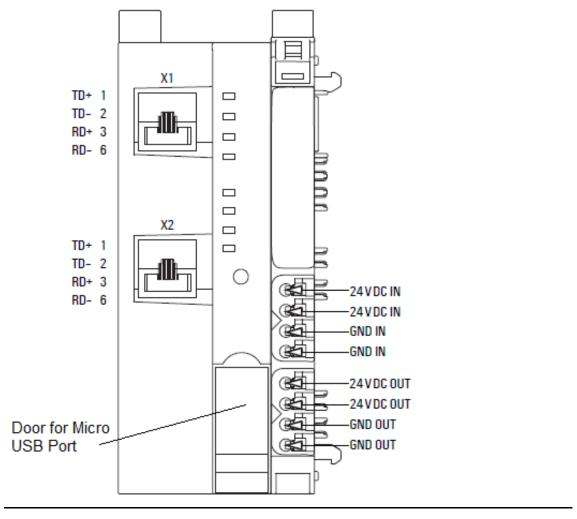
The modules do not have a fused sensor/activator power supply. All cables to the connected sensors/actuators must be fused corresponding to their conductor cross-sections (as per Standard DIN EN 60204-1, section 12).

Refer to the RSTi-EP Slice I/O User Manual (GFK-2958) for additional information.

For technical assistance, go to <a href="https://www.emerson.com/Industrial-Automation-Controls/support">https://www.emerson.com/Industrial-Automation-Controls/support</a>.

## **Connection Diagram**

Figure 2: Connection Diagram for EPXMBE101



## **Connection Block Diagram**

Figure 3: Connection Block Diagram for EPXMBE101

USB | System | USB | System | USB | USB

**Installation in Hazardous Areas** 

#### **WARNING**

- EQUIPMENT LABELED WITH REFERENCE TO CLASS I, GROUPS A, B, C & D, DIV. 2 HAZARDOUS AREAS IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C, D OR NON-HAZARDOUS AREAS ONLY
- EXPLOSION HAZARD SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2;
- EXPLOSION HAZARD WHEN IN HAZARDOUS AREAS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES; AND
- EXPLOSION HAZARD DO NOT CONNECT OR DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.

#### **ATEX Marking**

II 3 G Ex nA IIC T4 Gc

Ta:  $-20^{\circ}$ C to  $+60^{\circ}$ C ( $-4^{\circ}$  F to  $+140^{\circ}$ F)

DEMKO 16 ATEX 1591X

## **Thermal Derating**

The power supply is restricted according to the temperature. The following values apply for the horizontal and vertical positioning of the RSTi-EP station:

#### **Temperature-dependent Values for the Power Supply**

Power Supply	Horizontal	Vertical	
Network adapter power supply	60°C (140 °F) : 2 x 8 A	55°C (131 °F) : 2 x 6 A	
Network adapter power supply	55°C (131 °F) : 2 x 10 A	50°C (122 °F) : 2 x 8 A	
Power-feed module power supply	60°C (140 °F) : 1 x 10 A	55°C (131 °F): 1 x 8 A	

Refer to the RSTi-EP Slice I/O Module User Manual (GFK-2958) for additional information.

### **Supported Modules and Power Supplies**

The following modules can be used with this release of the RSTi-EP Modbus Network Adaptor:

Catalog Number	Module Description
Digital Input Modu	les
EP-1214	Digital Input, 4 Points, Positive Logic 24VDC, 2,3, or 4 Wire
EP-1218	Digital Input, 8 Points, Positive Logic, 24VDC 2 Wire
EP-1318	Digital Input, 8 Points, Positive Logic, 24VDC 3 Wire
EP-125F	Digital Input, 16 Points, Positive Logic, 24VDC, 1 Wire
EP-153F	Digital Input, 16 Points, Negative Logic, 24VDC, 1 Wire
EP-12F4	Digital Input, 4 Points, Positive Logic 24VDC, 2,3, or 4 Wire, Timestamp
EP-1804	Digital Input, 4 Points 110/230 VAC (65 – 277 VAC), 2 Wire, Isolated
Digital Output Mod	lules
EP-2214	Digital Output, 4 Points, Positive Logic 24VDC, 0.5A, 2,3, or 4 Wire
EP-2614	Digital Output, 4 Points, Positive Logic 24VDC, 2.0A, 2,3, or 4 Wire
EP-2634	Digital Output, 4 Points, Positive/Negative Logic 24VDC, 2.0A, 2,3, or 4 Wire
EP-2218	Digital Output, 8 Points, Positive Logic, 24VDC, 0.5A, 2 Wire
EP-225F	Digital Output, 16 Points, Positive Logic, 24VDC, 0.5A, 1 Wire
EP-291F	Digital Output, 16 Points, Negative Logic, 24VDC, 0.5A, 1 Wire
Digital Relay Outp	ut Modules
EP-2714	Digital Relay Output, 4 Points, Positive Logic, 24 - 220 VDC/VAC, 6A, 2 Wire
EP-2814	Solid-state Relay Output Module
Analog Input Modu	ules
EP-3164	Analog Input, 4 Channels Voltage/Current 16 Bits 2, 3, or 4 Wire
EP-3264	Analog Input, 4 Channels Voltage/Current 16 Bits with Diagnostics 2, 3, or 4 Wire
EP-3124	Analog Input, 4 Channels Voltage/Current 12 Bits 2, 3, or 4 Wire
EP-3368	Analog Input, 8 Channels Current 16 Bits 2, 3, or 4 Wire
EP-3468	Analog Input, 8 Channels Current 16 Bits 2, 3, or 4 Wire, Channel Diagnostic
EP-3664	Analog Input, 4 Channels Voltage/Current 16 Bits with Diagnostics 2, 3, or 4 Wire, Differential
	Input
EP-3704	Analog Input, 4 Channels RTD 16 Bits with Diagnostics 2, 3, or 4 Wire
EP-3804	Analog Input, 4 Channels TC 16 Bits with Diagnostics 2, 3, or 4 Wire
EP-1813	Power Measurement Module, 8 Channels
Analog Output Mo	
EP-4164	Analog Output, 4 Channels Voltage/Current 16 Bits 2, 3, or 4 Wire
EP-4264	Analog Output, 4 Channels Voltage/Current 16 Bits with Diagnostics 2, 3, or 4 Wire
Speciality Modules	
EP-5111	1 Channel High Speed Counter, AB 100 kHz 1 DO 24VDC, 0.5A

Catalog Number	Module Description					
EP-5112	2 Channel High Speed Counter, AB 100 kHz					
EP-5212	2 Channel Frequency Measurement, 100 kHz					
EP-5261	1 Channel Serial Communications, 232, 422, 485					
EP-5311	1 Channel SSI Encoder, BCD or Gray-Code Format, 5/24 VDC					
EP-5422	2 Channels PWM Output, Positive Logic, 24VDC, 0.5 A					
EP-5442	2 Channels PWM Output, Positive Logic, 24VDC, 2 A					
EP-5324	IO-Link Communication Module , 4 Channels					
Power Feed Modul	es for Input Current Path					
EP-7631	Power Module, 1 Channel 24VDC Input Flow 10A					
Power Feed Modul	es for Output Current Path					
EP-7641	Power Module, 1 Channel 24VDC Output Flow 10A					
Safe Feed-input Mo	odules					
EP-1901	1 Safe Feed-Input, 24 VDC					
EP-1902	2 Safe Feed-Inputs, 24 VDC, Programmable Delay					
EP-1922	2 Safe Feed-Inputs, 24 VDC					
Potential Distributi	ion Modules					
EP-711F	Power Module, 16 Channels 24VDC Potential Distribution +24 VDC from Input Current Path					
EP-751F	Power Module, 16 Channels 24VDC Potential Distribution +24 VDC from Output Current Path					
EP-700F	Power Module, 16 Channels 24VDC Potential Distribution Functional Earth					
EP-710F	Power Module, 16 Channels 24VDC Potential Distribution +0VDC from Input Current Path					
EP-750F	Power Module, 16 Channels 24VDC Potential Distribution +0VDC from Output Current Path					
Hot swap Modules						
EP-7990	Bump-less Output Hot Swap Module					

## **Release History**

Catalog Number	Hardware Version	Firmware Version	Date	Comments		
EPXMBE101-ADAH	01.01.00	02.04.04	Feb 24	Firmware release 02.04.04  Support for EP-7990 is added to enable bump-less hot swap operation.		
EPXMBE101-ACAG	01.01.00	02.04.94	Dec 22	Release of firmware to fix erroneous broadcast/ARP packets		
EPXMBE101-ACAF	01.01.00	02.04.01	May 22	Firmware release 02.04.01		
EPXMBE101-ACAE	01.01.00	02.03.00	Dec 19	Support for two newly introduced IO modules EP- 1813 (Power Measurement module) and EP-5324 ( IO-Link Communication Module) with only IPI update.		
EPXMBE101-ACAE	01.01.00	02.03.00	Sep 19	<ul> <li>Following Emerson's acquisition of this product, changes have been made to apply appropriate branding and registration of the product with required certification agencies. No changes to the material, process, form, fit, or functionality.</li> <li>Brand labeling of Web Application to EMERSON.</li> <li>Updates to the webserver:         <ul> <li>Ordering data' is removed from General information section of Emerson branded products.</li> </ul> </li> </ul>		

Catalog Number	Hardware Version	Firmware Version	Date	Comments		
				Improved module parameter setting dialogue in web application     Factory reset over a Modbus-Register possible		
EPXMBE101-AAAD	01.00.00	02.02.00	Oct 18	Support of AD firmware for EPXMBE101-AAXX.  Documentation update		
EPXMBE101-ABAD	01.01.00	02.02.00	Apr 18	The product revision is updated to be usable in Marine Application and pass Marine certification tests. Refer GFK-2958 for certification details.  The new enhancements are part of the FW version for the Webserver:-  The reset button appears automatically when changes in parameter settings require a restart to take effect  Added display of slot numbers to list of compatible modules after selecting a firmware file in multi-update view.  Added HTTPS support and new parameter 'HTTPS settings' [Available with Hardware version "AB" & above only in combination with firmware version "AD" & above]  Added password policy and weak password check - default username and password will remain the same.  New languages for Web Server available. Korean, French, Spanish, Portuguese and Italian  Support for EP-3664  Issue Fixes:-  Fixed issue that live module unplug/replug sometimes corrupts I/O mapping  Fixed issue that re-installation attempt of language files sometimes causes an error message.		
EPXMBE101-AAAC	01.00.00	02.01.00	Nov 17	Initial Release		

## **Important Product Information for this Release**

#### **Updates**

EPXMBE101-ADAH default factory image will be 02.04.04.

**Note**: The product may be upgraded in the field using the Web firmware upgrade kit, which can be downloaded from <a href="https://www.emerson.com/Industrial-Automation-Controls/support">https://www.emerson.com/Industrial-Automation-Controls/support</a>

Modules	Firmware Version	Upgrade Kit		
EPXMBE101-ADAH	02.04.04	EPXMBE101-0007675-02_04_04-7.zip consists of files  1. EPXMBEx01-0007675-02_04_04-7.bsc  2. FW_upgrade_procedure		

#### **Functional Compatibility**

	FW Index [Ver]						
HW Index [Ver]	AC	AD	AE	AF	AG	AH	
	[02.01.00]	[02.02.00]	[02.03.00]	[02.04.01]	[02.04.94]	[02.04.04]	
AA [01.00.00]	OK	ОК	NO	NO	NO	NO	
AB [01.01.00]	NO	ОК	ОК	OK	OK	ОК	
AC [01.01.00]	NO	ОК	OK	OK	OK	ОК	
AD [01.01.00]	NO	ОК	ОК	OK	OK	ОК	

#### Problems Resolved by this Release

Subject	Description
Output behavior during hot-swapping	During hot insertion or removal of IO modules, a transient Loss
	of Power up to 500 ms may occur on the network adapter and IO
	modules, during which all outputs may drop to zero. This system
	behavior should be verified against the application requirements
	before hot insertion or removal of the IO module is done.
Channel diagnostics faults are reported during hot- swapping of the modules.	During the hot swap of an I/O module, the network adapter may
	report additional channel diagnostics messages in addition to the
	expected Loss of Module or Addition of Module fault.

#### **New Features and Enhancements**

None

#### Known Restrictions and Open Issues

None

## **Operational Notes**

Subject	Description
Establishing Modbus Connection during LAN re-connection scenarios	The time taken to re-establish Modbus connection and re-start of IO data
	exchange between network adaptor and Modbus Client, when LAN port is
	re-connected, may vary (typically ~5secs to ~30 secs) with the different
	Modbus Client devices. It is recommended to consider this factor for
	applications.

#### **Product Documentation**

RSTi-EP Slice I/O Module User Manual (GFK-2958)

RSTi-EP Slice I/O Functional Safety Module User Manual (GFK-2956)

#### **General Contact Information**

Home link: <a href="http://www.emerson.com/industrial-automation-controls">http://www.emerson.com/industrial-automation-controls</a>

Knowledge Base: <a href="https://www.emerson.com/iac-support">https://www.emerson.com/iac-support</a>

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+65-3157-9591(All other Countries)

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Any escalation request should be sent to: mas.sfdcescalation@emerson.com

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