IMPORTANT PRODUCT INFORMATION

GFK-2962L

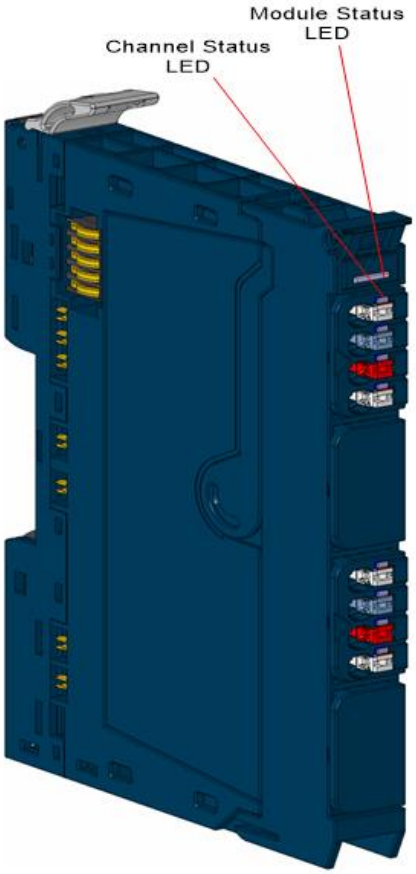
Jan 2024

PACSystems™ RSTi-EP

SPECIALITY MODULES

(EP-5111, EP-5112, EP-5212,

EP-5261, EP-5311, EP-5422, EP-5442 & EP-5324)



EMERSON

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.

⚠ 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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Introduction

Emerson provides several RSTi-EP specialty modules, which can be used to meet specific needs in your system. Each module has a Module Status LED and each channel has a LED for visual indication of connectivity.

The counter module EP-5111 can read one square-wave signal (1 channel) (for example, from an incremental encoder) with a maximum input frequency of 100 kHz. The 32-bit counter can count up or down within a predetermined range of values.

The digital counter module EP-5112 can read two square-wave signals (2 channels) (for example, from an incremental encoder) with a maximum input frequency of 100 kHz. Depending on the operating mode, both 32-bit counters can count up or down independent of each other in a preset range of values. The counters can be controlled via software by setting the appropriate control word.

The digital counter module EP-5212 can read frequency of one square-wave signal (1 channel) from one or two external sensors with a maximum input frequency of 100 kHz. Frequencies to be counted are applied to channel CH0 and/or channel CH1, the measurement will be started via control word 1 and 2 respectively. Measuring cycles can be defined in µs. The longer the measuring cycle the more exactly the measurement.

The digital pulse width modulation modules EP-5422 and EP-5442 are used for the control of small motors with current requirements of 0.5 A up to 2 A which can also be used for the control of valve flaps. The switching frequencies are adjustable up to 40 kHz and, in addition to this, the push/pull output levels can be used for motor activation; for example: change of rotation direction. As with all modules of the RSTi-EP system, the characteristics are outstanding – from the modular design and the interchangeable electronics to the removable plug-in terminal strip.

The EP-5311 SSI Encoder Interface module can read differential signals (RS422) from a SSI encoder. It can be connected as a master directly to the encoder providing the clock. To synchronize two SSI encoders, a second SSI module running in Listening mode can be placed between the encoder and a master module from which it receives the clock.

The EP-5261 Serial communication module can be used to exchange data between the PLC and a data terminal device. The device (such as a barcode scanner, printer) can be connected through an interface type RS232, RS485 or RS422. The data transfer rate can be parameterized between 300 and 115200 bps.

The EP-5324 module is an IO Link Communication module according to the IO-Link specification V1.1.2. The IO-Link devices must conform to port class A. Port class B is also possible if additionally, potential distribution modules are used. The four communication channels can be used as digital inputs or outputs together with standard field devices. IO-Link Configurator Software tool (win 10 supported) can be used to support IO-Link configuration and parametrization of IO-Link end devices (sensors or actuators) through the Network Adapter. This IO-Link configurator tool is a standalone tool which is used to create and export IO-Link device configurations, Parameterize IO-Link devices during ongoing operation and read out identification data, process data and diagnoses of IO-Link devices.

The RSTi-EP station is usually installed on a horizontally positioned DIN rail. Installation on vertically positioned DIN rails is also possible.

Modules should to be allowed to de-energize for a minimum 10 seconds after power down, prior to starting any maintenance activity.

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 V9.50, for detailed power-feed requirements.

Module Features

- Spring style technology for ease of wiring
- DIN rail mounted
- Double-click installation for positive indication of correct installation
- Compatible for 2 and 3 wire connection
- Built-in Web server for diagnostic information and firmware update through RSTi-EP Network Adapters.

Ordering Information

Module	Description
EP-5111	1 Channel High Speed Counter, AB 100 kHz 1 DO 24 VDC, 0.5A
EP-5112	2 Channel High Speed Counter, AB 100 kHz
EP-5212	2 Channel Frequency Measurement, 100 kHz
EP-5422	2 Channels PWM Output, Positive Logic, 24 VDC, 0.5 A
EP-5442	2 Channels PWM Output, Positive Logic, 24 VDC, 2.0 A
EP-5261	1 Channel Serial Communications, 232, 422, 485
EP-5311	SSI Encoder, BCD or Gray-Code Format, 5/24 VDC
EP-5324	IO-Link Communication Module , 4 Channels

Specifications

Specifications	EP-5111	EP-5112	EP-5212
System Data			
Data	Process, parameter, and diagnostic data depend on the network adapter used.		
Interface	RSTi-EP System bus		
System bus transfer rate	48 Mbps		
Galvanic isolation	-	500 V DC between the current paths	
Inputs			
Number of counter inputs	1	2	2
Type	Incremental encoders and other input characteristics for sensor types 1 and 3 are in accordance with EN 61131-2		-
Input filter	Filter time adjustable from 0,01 to 1 ms		Adjustable between 3Hz and 187kHz (333ms and 5µs)
Low input voltage	< 5 V		
High input voltage	> 11 V		

Specifications	EP-5111	EP-5112	EP-5212
Max. input current per channel	3.5 mA		
Sensor supply	Yes		
Sensor connection	2-wire and 3-wire		
Reverse polarity protection	Yes		
Module diagnostics	Yes		
Individual channel diagnostics	Yes	Yes	No
Counter width		32 bits	
Maximum input frequency	100 kHz		
Latch, gate, reset input	Yes	--	--
Mode of operation	Pulse and direction / AB mode with 1-, 2-, 4-times sampling	Pulse and direction / AB mode with 1-, 2-, 4-times sampling	Pulse rising edge
Status, alarm, diagnostics			
Status indicator	Yes		
Process alarm	Yes, parametrizable	Yes, parametrizable	--
Diagnostic alarm	Yes	Yes	--
Outputs			
Number	1	--	--
Output Current	0.5 A	--	--
Reverse polarity protection	Yes	--	--
Module diagnosis	Yes	--	--
Individual channel diagnosis	Yes	--	--
Supply			
Supply voltage	20.4V – 28.8V		
Current consumption from system current path I_{SYS}	8 mA		
Current consumption from output current path Iin	35 mA plus output current for the digital output	35 mA	35 mA plus sensor supply current
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	11.5 mm (0.45 in)		
Depth	76 mm (2.99 in)		

Specifications	EP-5111	EP-5112	EP-5212
Height	120 mm (4.72 in)		
Weight	83 g (2.93 oz)	72 g (2.54 oz)	83 g (2.93 oz)

Specifications

Specifications	EP-5261
System data	
Data	Process, parameter and diagnostic data depend on the network Adapter used (refer to the table in the section, Order and arrangement of modules)
Interface	RSTi-EP I/O communication bus
System bus transfer rate	48 Mbps
Serial Interface	
Number	1
Type	RS-232, RS-485, RS-422, parameterizable
Transfer rate	300 – 115200 Bps, parameterizable
Supply voltage	5VDC or 24VDC
Current of power supply output	max. 500 mA
Standards RS232	DIN 66020, DIN 66259, EIA-RS232C, CCITT V.24/V.28
Standards RS485/RS422	120 Ω, parameterisable
Short-cicuit proof	Yes
Module diagnosis	Yes
Individual channel diagnosis	Yes
Supply	
Supply voltage	20.4V – 28.8V
Current consumption from system current path I_{SYS},	8 mA
Current consumption from input current path Iin	16 mA + load
General Data	
Weight	92 g (3.25 oz)
For additional general data, refer to the section, General Technical Data for I/O Modules	

Specifications	EP-5311
System Data	
Data	Process, parameter and diagnostic data depend on the network Adapter used (refer to the table in the section, order & arrangement of modules)
Interface	RSTi-EP I/O communication bus

Specifications	EP-5311
System bus transfer rate	48 Mbps
Number of channels	1
Type	SSI (Differential RS-422)
SSI transfer rate	125 kHz – 2 MHz
Delay time	1 µs – 64 µs
Data width	8 – 32 Bit
Data format	Binary / Gray-Code
SSI mode	Listening / Master
Sensor supply	500 mA (24 V DC) / 400 mA (5 V DC)
Reverse polarity protection	Yes
Module diagnosis	Yes
Individual channel diagnosis	No
Cable length	max. 320 m (1049.(ft) at 125 kHz; shielded
Supply	
Supply voltage	20.4V – 28.8V
Current consumption from system current path I_{SYS},	8 mA
Current consumption from input current path I_{in}	25 mA + sensor supply current
General Data	
Weight	87 g (3.07 oz)
For additional general data, refer to the section, General Technical Data for I/O Modules	

Specifications	EP-5422		EP-5442	
System Data				
Data	Process, parameter, and diagnostic data depend on the network adapter used.			
Interface	RSTi-EP system bus			
System bus transfer rate	48 Mbps		48 Mbps	
Outputs				
Number	2		2	
Type	PN output stage		PN output stage	
Response time	< 0.1 µs		< 0.1 µs	
Period duration	25 µs t o 175 ms (40 kHz to 6 Hz)			
Max. output current	per channel	0.5 A	per channel	2 A
	per module	1 A	per module	4 A
Switching frequency	Resistive load (min. 47 Ω)	static, 6 Hz to 40 kHz	Resistive load (min. 12 Ω)	6 Hz to 40 kHz

Specifications	EP-5422		EP-5442	
	Inductive load (DC 13)	static, 6 Hz to 40 kHz	Inductive load (DC 13)	6 Hz to 40 kHz
	Lamp load (12 W)	static, 6 Hz to 40 kHz	Lamp load (48 W)	6 Hz to 40 kHz
Actuator connection	2-wire, 3-wire, 3-wire + FE			
Actuator supply	max. 2 A per plug, total max. 4 A		max. 2 A per plug, total max. 8 A	
Pulse/period ratio	0–100 % PN-switching or P-switching, adjustable			
Short-circuit-proof	Yes			
Response time of the protective circuit	< 100 µs			
Module diagnosis	Yes			
Individual channel diagnosis	No			
Reactionless	Yes			
Supply				
Supply voltage	20.4V – 28.8V			
Current consumption from system current path I_{SYS}	8 mA			
Current consumption from output current path I_{OUT}	40 mA + Load			
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			
Dimensions				
Width	11.5 mm (0.45 in)			
Depth	76 mm (2.99 in)			
Height	120 mm (4.72 in)			
Weight	77 g (2.72 oz)		82 g (2.89 oz)	

Specifications	EP-5324
System data	
Data	Process, parameter and diagnostic data depend on the network Adapter used (refer to the table in the section, order & arrangement of modules)
Interface	RSTi-EP I/O communication bus
System bus transfer rate	48 Mbps
Digital Inputs	
Number	4

Sensor types	Type 1 and Type 3 as per IEC 61131-2
Low input voltage	< 5V
High input voltage	> 11V
IO-Link Interfaces	
Number	4
Type	IO-Link as per IEC 61131-9
Transfer rate	4.8 kBaud / 38.4 kBaud / 230.4 kBaud, depending on the connected IO Link device
Output current C/Q (in DO mode)	0.1 A
Input type C/Q (in DI mode)[1)]	Type 1 and Type 3 as per IEC 61131-2
Output current L+	0.5 A per channel, Total max. 2 A
Line Break Detection	yes
Short-circuit-proof	yes
Module diagnosis	yes
Individual channel diagnosis	yes
Supply	
Supply voltage	20.4V – 28.8V
Current consumption from system current path I_{SYS}, typ.	8 mA
Current consumption from input current path I_{IN}	25 mA + sensor supply
General data	
Weight	88 g (3.10 oz)
Width	11.5 mm (0.45 in)
Depth	76 mm (2.99 in)
Height	120 mm (4.72 in)
For additional general data, refer to the section, General Technical Data for I/O Modules.	

1) If C/Q is used as digital input, the connected device shall only be supplied via L+ and L- connection of the respective channel.
2) For parametrization of the IO Link Sensor, EMERSON IO-link configurator can be used which is a standalone tool & directly connects to IO-Link Communication module through Network Adapters. Download the latest version of IO-link configurator utility from support site.

LED Status

LED	EP-5111	EP-5112	EP-5212	EP-5261	EP-5311
Module Status	**Green:** Communication over the system bus **Red:** Module System Fault or Diagnostic Fault				

LED	EP-5111	EP-5112	EP-5212	EP-5261	EP-5311
1.1	**Yellow:** A/pulse controlled	**Yellow:** CH0 A pulse controlled		**Yellow:** RS-232 parameterized **Yellow flashing:** Data are being received	**Yellow:** Data In active
1.2				**Yellow:** RS-232 parameterized **Yellow flashing:** Data are being transmitted	
1.3					
1.4	**Yellow:** B/direction controlled	**Yellow:** CH0 B direction controlled	**Yellow:** CH0 active (1-level)		
2.1	**Yellow:** output set				**Yellow:** Clock In active
2.2					
2.3					
2.4	**Yellow:** reset input controlled				
3.1	**Yellow:** latch input controlled	**Yellow:** CH1 A pulse controlled		3.1 – 3.4 **Yellow:** RS-422 parameterized 3.1 + 3.2 Off, 3.3 + 3.4 **Yellow:** RS-485 parameterized 3.3 **Yellow flashing:** Data are being received 3.4 Yellow flashing: Data are being transmitted	**Yellow:** Clock Out active
3.2					
3.3					
3.4	**Yellow:** gate input (HW gate) controlled		**Yellow:** CH0 active (1-level)		
4.1		**Yellow:** CH1 B direction controlled		**Green:** Supply voltage +5VDC	**Green:** Power supply sensor +5VDC
4.2					
4.3				**Green:** Supply voltage +24VDC	**Green:** Power supply sensor +24VDC

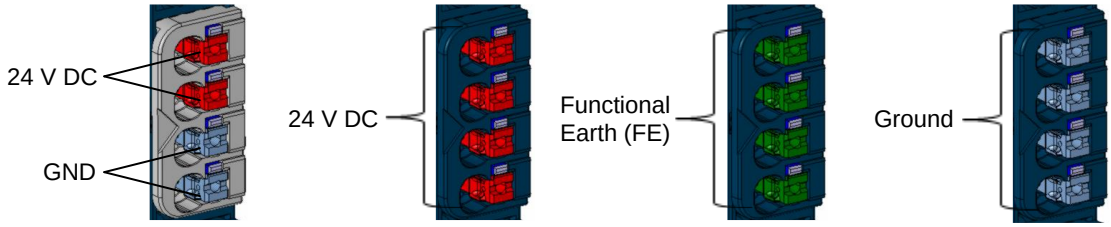
LED	EP-5422	EP-5442
Module Status	**Green**: Communication over the system bus **Red**: Module System Fault or Diagnostic Fault	

LED	EP-5422	EP-5442
1.1	**Yellow:** PWM output 0 – 100%, P-switching **Yellow** flashing at 2 Hz: PWM output 0 is > 0 and < 100%, PN-switching or P-switching	**Yellow**: PWM output 0 – 100%, P-switching Yellow flashing at 2 Hz: PWM output 0 is > 0 and < 100%, PN-switching or P-switching
1.2		
1.3		
1.4		
2.1		
2.2		
2.3		
2.4		
3.1	**Yellow**: PWM output 1 – 100%, P-switching Yellow flashing at 2 Hz: PWM output 0 is > 0 and < 100%, PN-switching or P-switching	**Yellow**: PWM output 1 – 100%, P-switching Yellow flashing at 2 Hz: PWM output 0 is > 0 and < 100%, PN-switching or P-switching
3.2		
3.3		
3.4		
4.1		
4.2		
4.3		
4.4		

LED	EP-5324
Module Status	**Green**: Communication over the system bus **Red**: Module System Fault or Diagnostic Fault
1.1	**Yellow**: Status COM 1
1.2	**Red:** Error IO Link port 1
1.3	
1.4	**Yellow:** Status DI 1
2.1	**Yellow**: Status COM 2
2.2	**Red:** Error IO Link port 2
2.3	
2.4	**Yellow:** Status DI 2
3.1	**Yellow**: Status COM 3
3.2	**Red:** Error IO Link port 3
3.3	
3.4	**Yellow:** Status DI 3
4.1	**Yellow**: Status COM 4
4.2	**Red:** Error IO Link port 4
4.3	
4.4	**Yellow:** Status DI 4

Field Wiring

The connection frame has one connector block, 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 mm^2 (16 guage), 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.



Connector Blocks

Connector Specifications

- Conductor cross-section 0.14 to 1.5 mm^2 (26 – 16 guage)
- Maximum ampacity: 10 A
- 4-pole

The pushers are color-coded for the following connections:

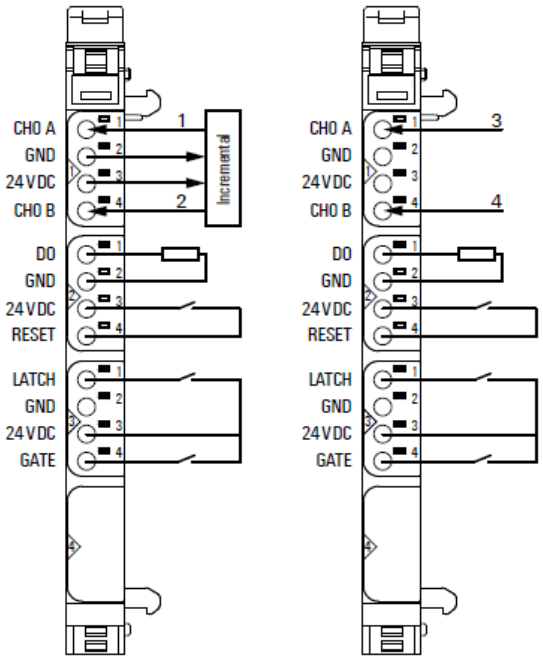
- White Signal
- Blue GND
- Red 24 V DC
- Green Functional earth (FE)

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).

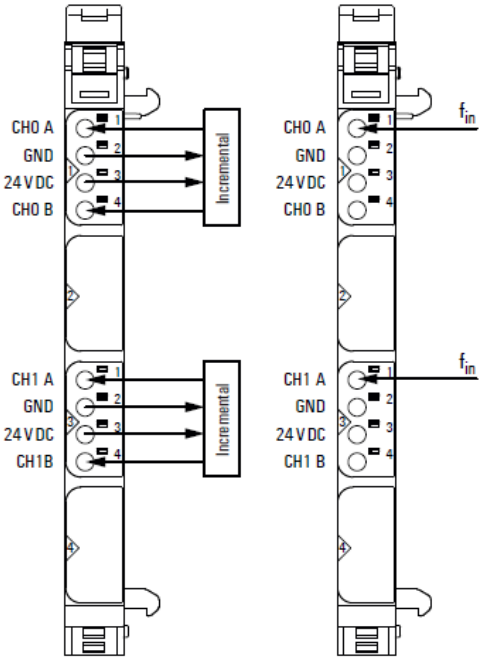
Refer to the RSTi-EP Slice I/O User Manual (GFK-2958) for additional information.

For technical assistance, go to https://www.emerson.com/Industrial-Automation-Controls/support.

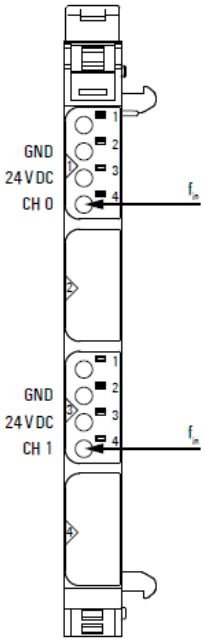
Connection Diagrams



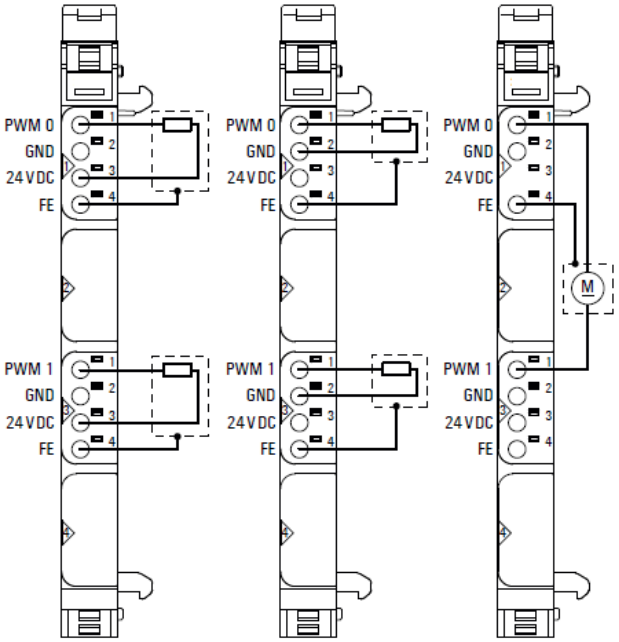
EP-5111



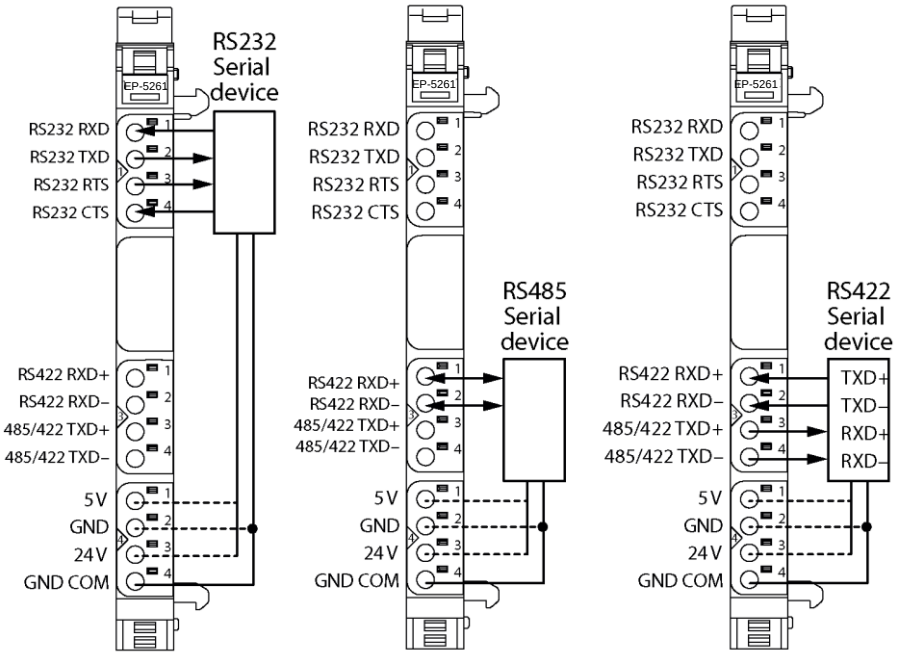
EP-5112



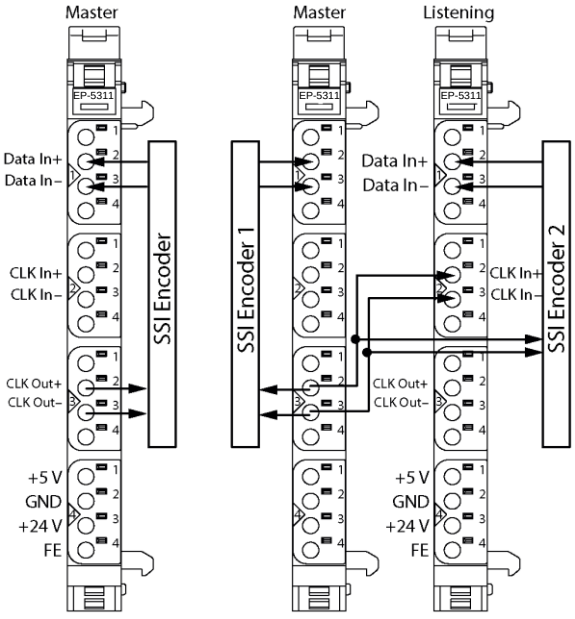
EP-5212



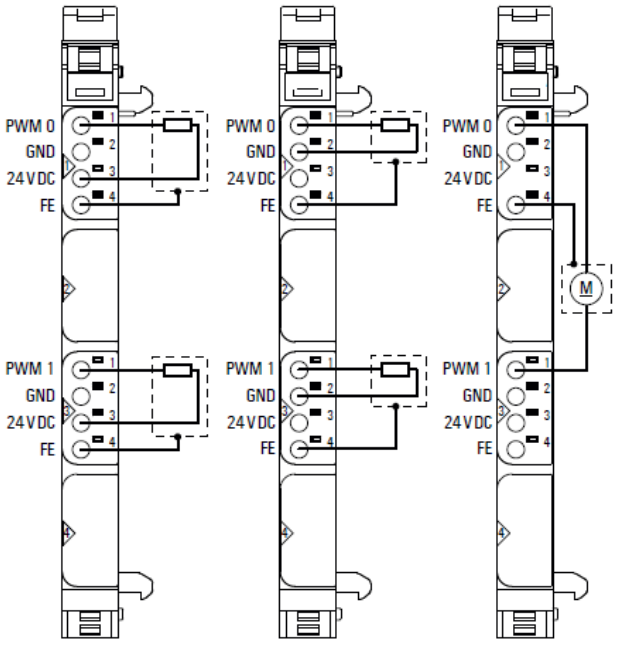
EP-5422



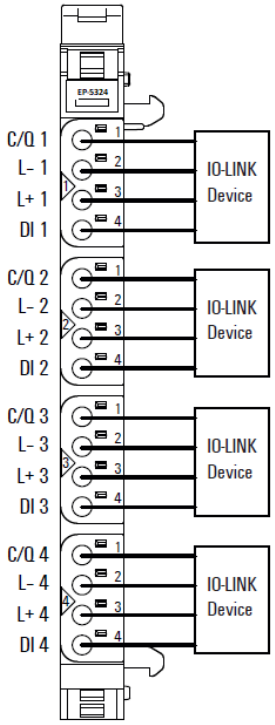
EP-5261



EP-5311

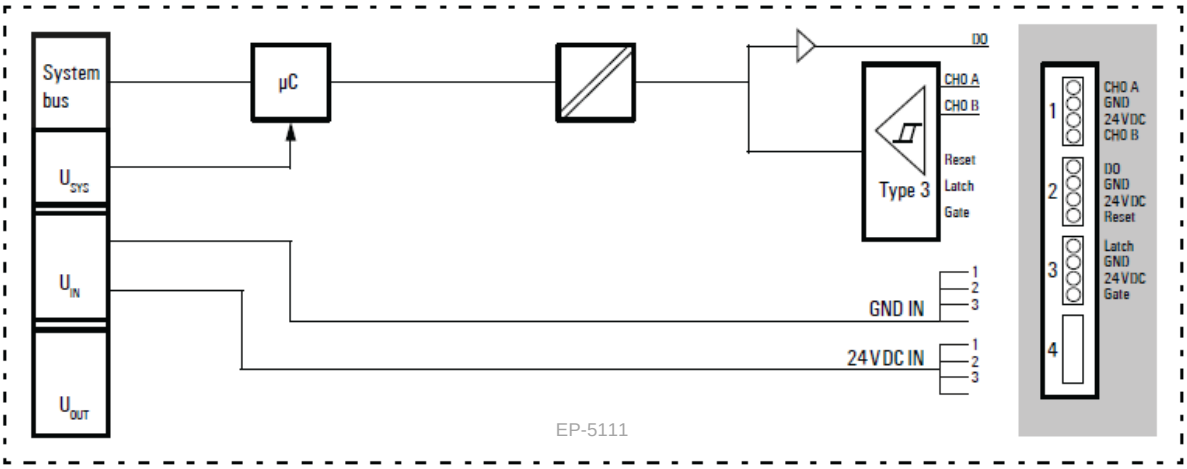


EP-5442

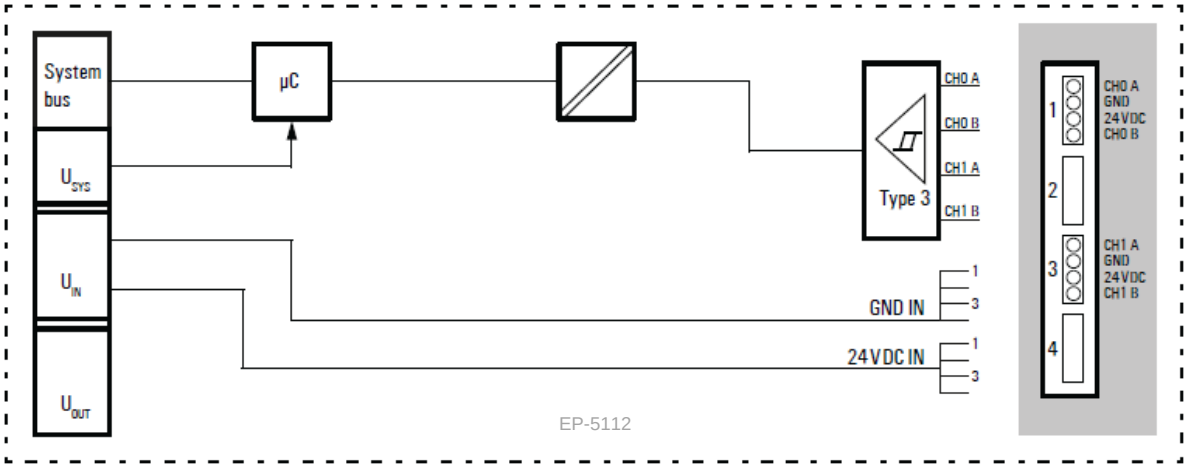


EP-5324

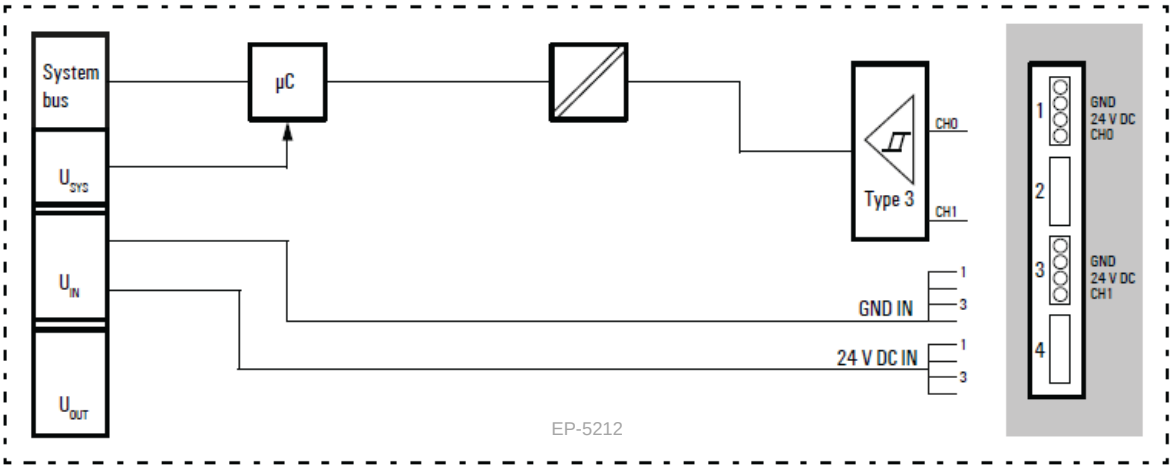
Connection Block Diagrams



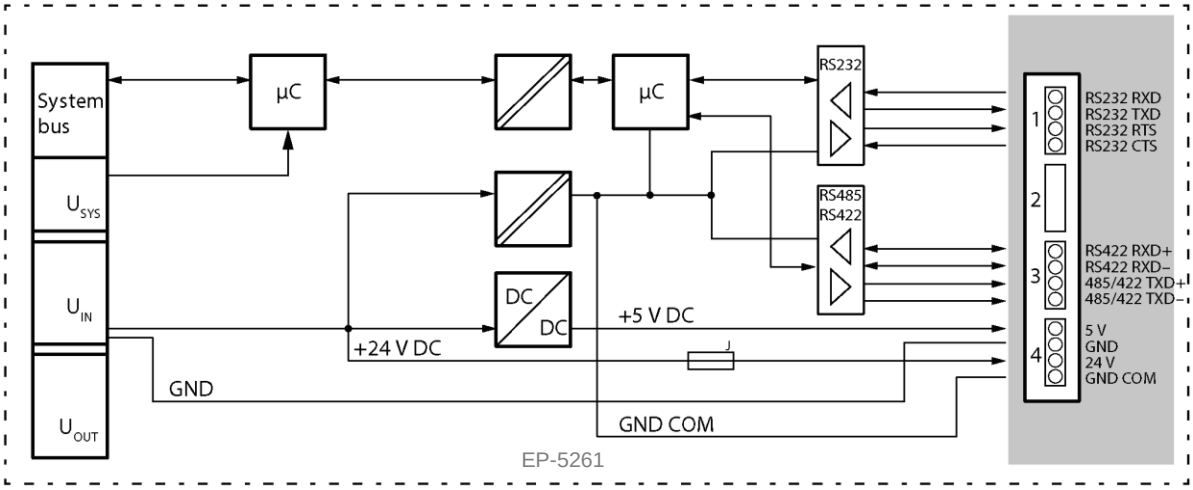
EP-5111



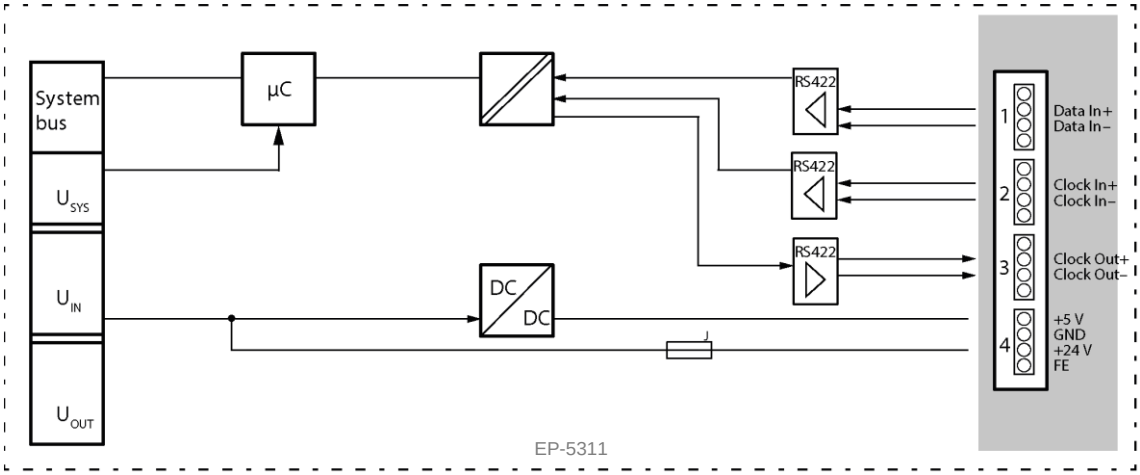
EP-5112



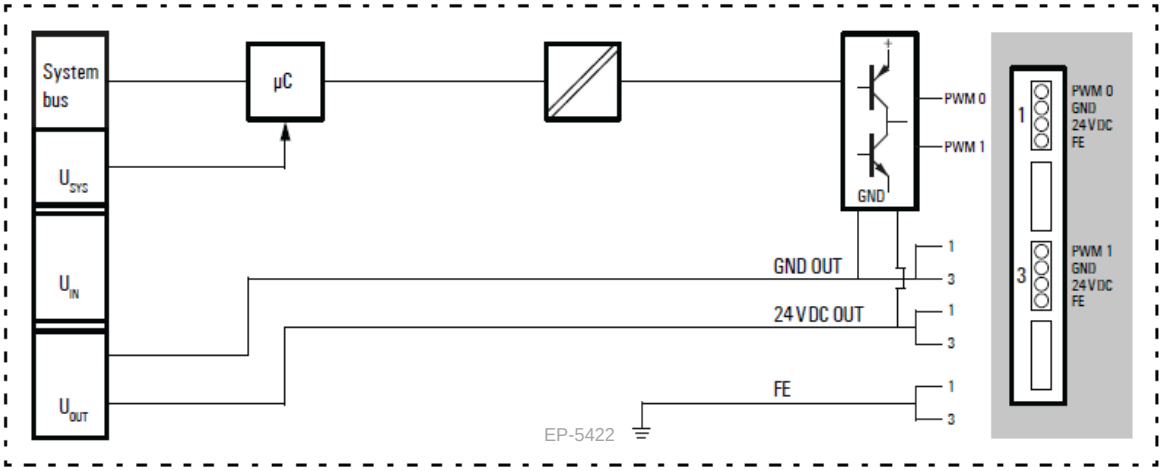
EP-5212



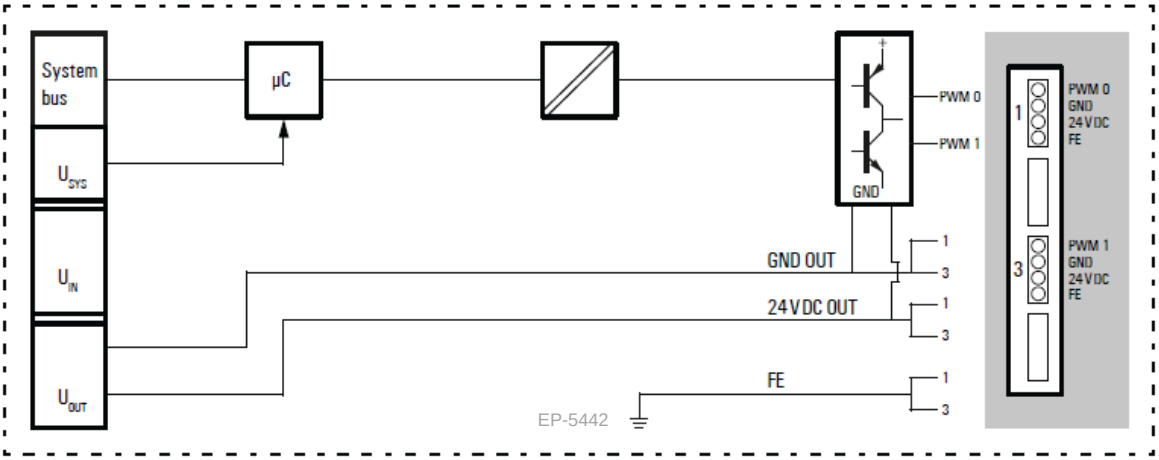
EP-5261



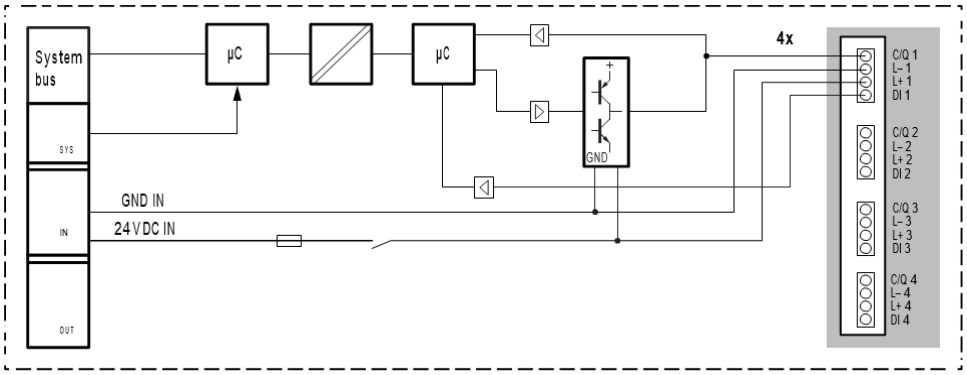
EP-5311



EP-5422



EP-5442



EP-5324

Installation in Hazardous Areas

⚠ WARNING

- EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR ZONE 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 NON-HAZARDOUS.

ATEX Markings

Ⓔx II 3 G Ex nA IIC T4 Gc

Ta: -20°C to +60°C (-4° F to +140 °F)

Release History

Catalog Number	Firmware Version	Date	Comments
EP-5111-D EP-5112-D EP-5212-D EP-5261-CD EP-5311-D EP-5422-C EP-5442-C EP-5324-BB	N/A	Jan 2024	Updated product markings to include UKCA, CCC & Morocco.
EP-5324 – IO Link Configurator Tool	1.4.1	Dec 2023	Software updated to address compatibility issues with few IO link devices

Catalog Number	Firmware Version	Date	Comments
EP-5261-PLC communication blocks	FB_MBM_RTU_Master: 01.02	Oct 2021	Reset of serial communications after losing profinet or serial communications.
N/A	N/A	Jul 2021	Correction issued to the module description in section Ordering Info of this IPI.
EP-5324-AB	01.04.00	Jun 2020	Increased startup timeout to support IO-Link devices having longer startup times.
EP-5324-AA	01.03.00	Dec 2019	IO-Link Communication Module, 4 Channels :-Initial Release
EP-5324 - IO-Link Configurator Tool	01.02.00	Dec 2019	Software Installation Package (win 10) for IO-Link Configurator Tool – Initial Release.
EP-5261-BD	01.00.16	Sep 2019	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 material, process, form, fit or functionality. Firmware updates done to fix. - Increased size of RX buffer to 4kByte Module freezes when the force modus is used or after doing a software reset of the network adapter.
EP-5111-C EP-5112-C EP-5212-C EP-5422-B EP-5442-B	N/A	Sep 2019	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 material, process, form, fit or functionality.
EP-5261-AC	01.00.13	Sep 2018	Minor Firmware updates – No change to functionality
EP-5111-B EP-5112-B EP-5212-B EP-5311-B	N/A	Apr 2018	These product revisions are updated to be usable in Marine application and pass Marine certification tests. Refer GFK-2958 for certification details.
EP-5261-AB	01.00.12	Oct 2017	Release for firmware enhancements and addressing issue in PLC Stop handling.
EP-5261 EP-5311	N/A	Aug 2016	Added Phase-2 modules
EP-5111 EP-5112,	N/A	Dec 2015	Documentation update only

Catalog Number	Firmware Version	Date	Comments
EP-5212 EP-5422 EP-5442			
EP-5111 EP-5112 EP-5212 EP-5422 EP-5442	N/A	Nov 2015	Initial Release

Important Product Information for this Release

Updates

The RSTi-EP module EP-5324 is released with pre-loaded firmware 1.03.00. This product may be upgraded in the field using the Web firmware upgrade kit. This also releases a Software installation package – IO-Link Configurator Tool, This is a standalone tool, which can be used to configure IO-Link Devices through the Network Adapter. The upgrade Kit and the software installation package can be downloaded from https://www.emerson.com/Industrial-Automation-Controls/support.

Module	Firmware/Software Version	Upgrade Kit & Configuration File
EP-5324-AB	01.04.00	EP-5324-0702654-01_04_00-3.zip consists of a. EP-5324-0702654-01_04_00-3.bsm b. IPI-GFK-2962H c. FW_Upgrade_Procedure
IO-Link Configurator Tool for EP-5324	01.02.00	EMERSON-IOLink-Device-Configurator-Setup_1.2.0.zip

Functional Compatibility

Refer to the Network Adapter IPIs for this information.

Problems Resolved by this Release

EP-5324-AB IO-Link Firmware has been updated with Increased startup timeout to support IO-link devices having longer startup times.

New Features and Enhancements

None

Known Restrictions and Open Issues

None

Operational Notes

None

Product Documentation

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

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

RSTi-EP Serial Communication Module IPI (GFK-2992)

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