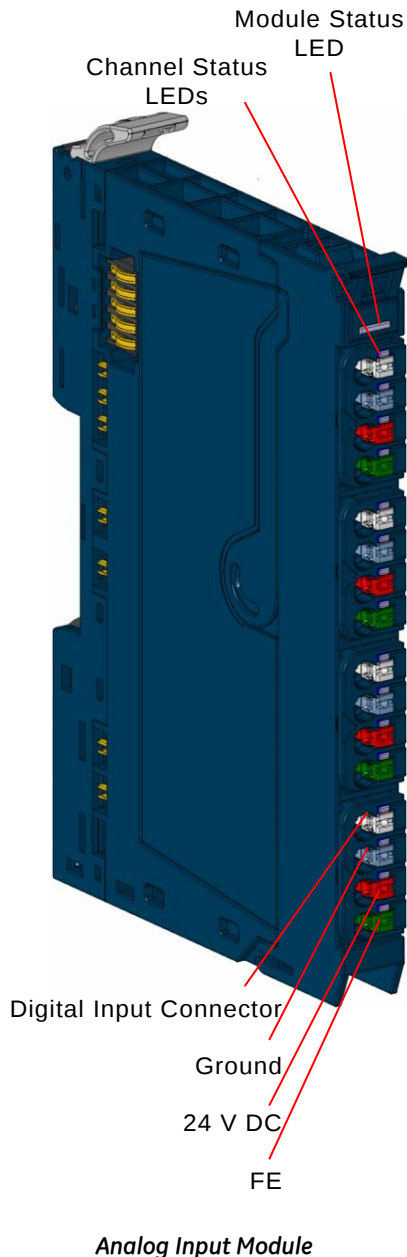


Analog Input Modules

**EP-3164, EP-3264, EP-3124, EP-3368, EP-3468
EP-3664, EP-3704, EP-3804**

GFK-2960F

September 2018



GE provides a range of RSTi-EP analog input modules with 4 or 8 inputs and up to 16-bit resolution. The measurement range is defined by parameterization with an accuracy of 0.1% FSR with the exception of EP3124, which 0.25% FSR. The parameters for the measurement range can be individually set for each channel.

The EP-3704 module can detect up to 4 analog resistance temperature detectors. The resolution is 16 bit per channel.

The EP-3804 module can detect up to 4 analog thermocouple sensors or voltages between ± 15 mV and ± 2 V.

The wiring connectors on each module are color coded for ease of wiring. Refer to the section, [Field Wiring](#) for additional information.

Each module features a type plate, which includes identification information, the key technical specifications, and a block diagram. In addition, a QR code allows for direct online access to the associated documentation. The software for reading the QR code must support inverted QR codes.

Markers are available as accessories for labelling equipment. Each I/O module can be labelled using the markers to ensure clear identification when replacing individual modules or electronic units.

A green *Module Status* LED indicates there is communication on the system bus. In addition, each channel has its own status LED.

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 Module User Manual* (GFK-2958) for additional information.

Refer to the *RSTi-EP Power Supply Reference Guide*, a software utility available on PME V9.00, 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
- Up to 8 analog inputs
- Supports indirect firmware update through network adapter using Web server
- Supports hot insertion and extraction

GFK-2960F

Ordering Information

Module	Description
EP-3124	Analog Input, 4 Channels Voltage/Current 12 Bits 2, 3, or 4 Wire
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-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

Specifications

	EP-3124	EP-3164	EP-3264	EP-3368	EP-3468
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				
Potential isolation	Test voltage: max. 28.8 V within one channel, 500 V DC field/system Pollution severity level: 2 Overvoltage category: II				
Common mode voltage	Against: 0V - ±50V Channel-Channel: ±3V				
Inputs					
Number	4	4	4	8	8
Input values	1. Voltage (0 to 5 V, ±5 V, 0 to 10 V, ±10 V, 1 to 5 V, 2 to 10 V) 2. Current (0 to 20 mA, 4 to 20 mA)			Current input (0 to 20 mA, 4 to 20 mA)	
Resolution	12 bits	16 bits			
Frequency suppression	Options: disabled (0) / 50 Hz (1) / 60 Hz (2) / Average over 16 values (3) Default: disabled				
Accuracy	0.25 % max. at 25 °C (77 °F) 50 ppm/K max. Temperature coefficient max. -10 mV/A additional inaccuracy in the voltage mode due to sensor power supply current	0.1 % max. at 25 °C (77 °F) 50 ppm/K max. Temperature coefficient max. -10 mV/A additional inaccuracy in the voltage mode due to sensor power supply current		0.1 % max. at 25 °C (77 °F) 50 ppm/K max. Temperature coefficient	
Sensor supply	max. 2 A per plug, total max. 8 A	max. 2 A per plug, total max. 8 A	max. 0,5 A per plug	max. 125 mA per channel; channel 0 to 3 and 4 to 7 respectively are fused in combination	
Sensor connection	2-wire, 3-wire, 3-wire + FE				
Conversion time	1 ms				
Internal resistance	Voltage mode: 100 kΩ; Current mode: 41.2 Ω			approx. 45 Ω	

For public disclosure

	EP-3124	EP-3164	EP-3264	EP-3368	EP-3468
Inputs continued					
Reverse polarity protection	Yes				
Short-circuit-proof	Yes				
Response time of the protective circuit	< 0.1 s with short-circuit to +24 V	< 50 ms	< 50 ms	< 0.1 s with short-circuit to +24 V	
Reset time	--	--	--	Temperature-dependent (< 30 s at 20°C)	
Module diagnostics	Yes				
Individual channel diagnostics	No	No	Yes	No	Yes
Supply					
Supply voltage	20.4V – 28.8V via system bus				
Current consumption from system current path I _{sys}	8 mA				
Current consumption from input current path I _{in}	25 mA + sensor supply current			20 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				
Width	11.5 mm (0.45 in)				
Depth	76 mm (2.99 in)				
Height	120 mm (4.72 in)				
Weight	87 g (3.07 oz)	89 g (3.14 oz)	89 g (3.14 oz)	90 g (3.17 oz)	90 g (3.17 oz)

GFK-2960F

	EP-3664
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
Potential isolation	Test voltage: max. 28.8 V within one channel, 500 V DC field/system Pollution severity level: 2 Overvoltage category: II
Common mode voltage	Against: -30 V ...+30 V
Inputs	
Number	4
Input values	1. Voltage (0 to 5 V, ± 5 V, 0 to 10 V, ± 10 V, 1 to 5 V, 2 to 10 V) 2. Current (0 to 20 mA, 4 to 20 mA)
Resolution	16 bits
Frequency suppression	Options: disabled (0) / 50 Hz (1) / 60 Hz (2) / Average over 16 values (3) Default: disabled
Accuracy	0.1 % max. at 25 °C (77 °F) 50 ppm/K max. Temperature coefficient
Sensor supply	max. 0.5 A per plug, no galvanic isolation
Sensor connection	2-wire, 3-wire, 4-wire
Conversion time	1 ms
Internal resistance	Voltage mode: 89 k Ω ; Current mode: 16 Ω
Reverse polarity protection	Yes
Short-circuit-proof	Yes
Module diagnostics	Yes
Individual channel diagnostics	Yes
Supply	
Supply voltage	20.4V – 28.8V via system bus
Current consumption from system current path I_{SVS}	8 mA
Current consumption from input current path I_{IN}	31 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
Width	11.5 mm (0.45 in)
Depth	76 mm (2.99 in)
Height	120 mm (4.72 in)
Weight	91 g (3.21 oz)

	EP-3704		EP-3804†	
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			
Potential isolation	Test voltage: max. 28.8 V within one channel, 500 V DC field/system Pollution severity level: 2 Overvoltage category: II			
Inputs				
Number	4			
Sensor types	Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni 200, Ni500, Ni1000, Cu10, and resistors with 40 Ω, 80 Ω, 150 Ω, 300 Ω, 500 Ω, 1 kΩ, 2 kΩ, 4 kΩ		J, K, T, B, N, E, R, S, L, U, C, mV	
Resolution	16 bits			
Accuracy	max. 0.2 % FSR / 0.3 % FSR for Ni sensors / 0.6 % FSR for Cu10		Conversion time ≥ 80 ms: 10 μV + 0.1 % of voltage measurement range (without cold-junction measurement error)	
Temperature coefficient	±50 ppm/K max.		50 ppm	
Sensor connection	2-wire, 3-wire, 4-wire		2-wire	
Sensor current	Depending on the sensor type 0,75 mA (Pt100, Ni100, Ni120, Cu10, 40 Ω, 80 Ω, 150 Ω, 300 Ω) or 0,25 mA (Pt200, Pt500, Pt1000, Ni200, Ni500, Ni1000, 500 Ω, 1 kΩ, 2 kΩ, 4 kΩ)		0,25 mA for the cold-junction compensation with a Pt1000	
Cold junction compensation	--		Internal and external (Pt1000), int. accuracy ≤ 3 K	
Max. wire resistance / measurement range	2.5 Ω / 40 Ω, 5 Ω / 80 Ω, 10 Ω / 150 Ω and Cu10, 25 Ω in all other measuring ranges		--	
Temperature range	-200 to +850°C (-328 to 1562 °F)			
Conversion time	36 to 240 ms, adjustable			
Internal resistance	--		> 1 MΩ	
Common mode input voltage range	Channel to channel: max. ±2 V		--	
	Channel to voltage supply: max. ±50 V			
Reverse polarity protection	Yes			
Module diagnostics	Yes			
Individual channel diagnostics	Yes			
Supply				
Supply voltage	20.4V – 28.8V via system bus			
Current consumption from system current path I _{SVS}	8 mA			
Current consumption from input current path I _{IN}	20 mA			

GFK-2960F

	EP-3704	EP-3804 [†]
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)	
Height	120 mm (4.72 in)	
Weight	91 g (3.21 oz)	86 g (3.03 oz)
[†] Warm up time for the module to get the required accuracy is 30 minutes		

Current Demand for Analog Input Modules

Product	I _{sys}	I _{IN}	I _{OUT}	I _s	I _L
EP-3124	8 mA	25 mA	--	x	--
EP-3164	8 mA	25 mA	--	x	--
EP-3264	8 mA	25 mA	--	x	--
EP-3368	8 mA	20 mA	--	--	--
EP-3468	8 mA	20 mA	--	--	--
EP-3664	8 mA	31 mA + Load	--	--	--
EP-3704	8 mA	20 mA	--	--	--
EP-3804	8 mA	20 mA	--	--	--
I _{sys}	Current consumption from the system current path				
I _{IN}	Power consumption from input current path				
I _{OUT}	Power consumption from output current path				
I _s	Current demand of the connected sensors				
I _L	Current demand of the connected actuators				
x	Must be included when calculating the power supply				

LEDs

LED	EP-3124	EP-3164	EP-3224	EP-3704	EP-3804
Module Status	Green: Communication over the system bus Red: Module System Fault or Diagnostic Fault	Green: Communication over the system bus Red: Module System Fault or Diagnostic Fault	Green: Communication over the system bus Red: Module System Fault or Diagnostic Fault	Green: Communication over the system bus Red: Module System Fault or Diagnostic Fault	Green: Communication over the system bus Red: Module System Fault or Diagnostic Fault
1.1	Red: channel error	Red: channel error	Red: channel error	Red: channel error	Red: channel error
1.2	--	--	--	--	--
1.3	--	--	Red: +24 V short circuit or line break (with current < 1 mA)	--	--
1.4	--	--	--	--	--
2.1	Red: channel error	Red: channel error	Red: channel error	Red: channel error	Red: channel error
2.2	--	--	--	--	--
2.3	--	--	Red: +24 V short circuit or line break (with current < 1 mA)	--	--
2.4	--	--	--	--	--
3.1	Red: channel error	Red: channel error	Red: channel error	Red: channel error	Red: channel error
3.2	--	--	--	--	--
3.3	--	--	Red: +24 V short circuit or line break (with current < 1 mA)	--	--
3.4	--	--	--	--	--
4.1	Red: channel error	Red: channel error	Red: channel error	Red: channel error	Red: channel error
4.2	--	--	--	--	--
4.3	--	--	Red: +24 V short circuit or line break (with current < 1 mA)	--	--
4.4	--	--	--	--	--

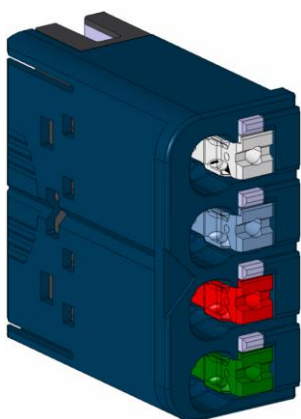
GFK-2960F

LED	EP-3368	EP-3468
Module Status	Green: Communication over the system bus Red: Module System Fault or Diagnostic Fault	Green: Communication over the system bus Red: Module System Fault or Diagnostic Fault
1.1	Red: channel error	Red: channel error
2.1	Red: channel error	Red: channel error
3.1	Red: channel error	Red: channel error
4.1	Red: channel error	Red: channel error
5.1	Red: channel error	Red: channel error
6.1	Red: channel error	Red: channel error
7.1	Red: channel error	Red: channel error
8.1	Red: channel error	Red: channel error

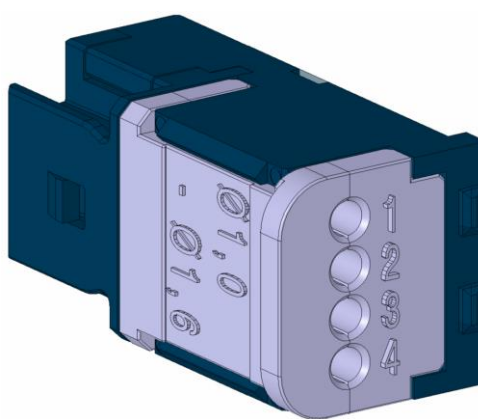
LED	EP-3664
Module Status	Green: Communication over the system bus Red: Module System Fault or Diagnostic Fault (Collective error diagnostics)
1.1	Red: Line break or range exceeded input 0
1.2	--
1.3	Red: Line break or short circuit in sensor supply
1.4	--
2.1	Red: Line break or range exceeded input 1
2.2	--
2.3	Red: Line break or short circuit in sensor supply
2.4	--
3.1	Red: Line break or range exceeded input 2
3.2	--
3.3	Red: Line break or short circuit in sensor supply
3.4	--
4.1	Red: Line break or range exceeded input 3
4.2	--
4.3	Red: Line break or short circuit in sensor supply
4.4	--

Field Wiring

The connection frame can take up to four connectors, and four wires can be connected to each connector. The *Spring style* technology allows for 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 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 with Four Wire Connectors



Connector for HD Module (requires special tool)

Note: The four wire connector image is for illustration of color coding only.

Connector Specifications:

- conductor cross-section 0.14 to 1.5 mm² (26 – 16 gauge)
- max. ampacity: 10 A
- 4-pole

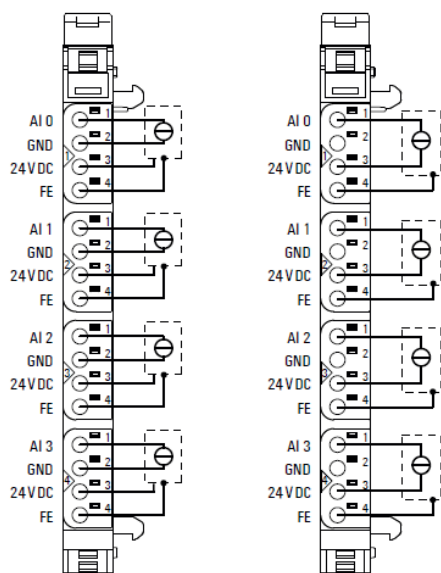
The pushers are color-coded for the following connections:

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

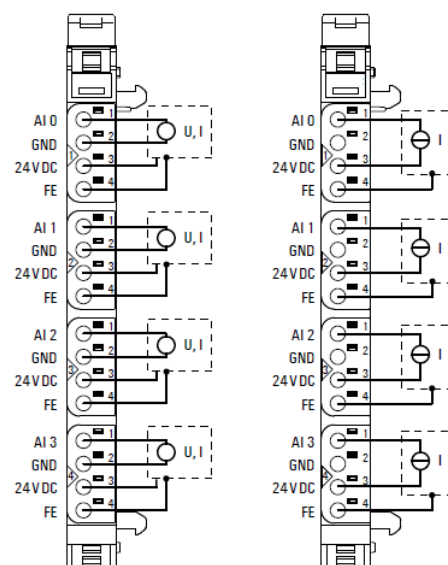
Refer to the *RSTi-EP Slice I/O Module User Manual* (GFK-2958) for additional information.

For technical assistance, go to <http://support.ge-ip.com>.

Connection Diagrams

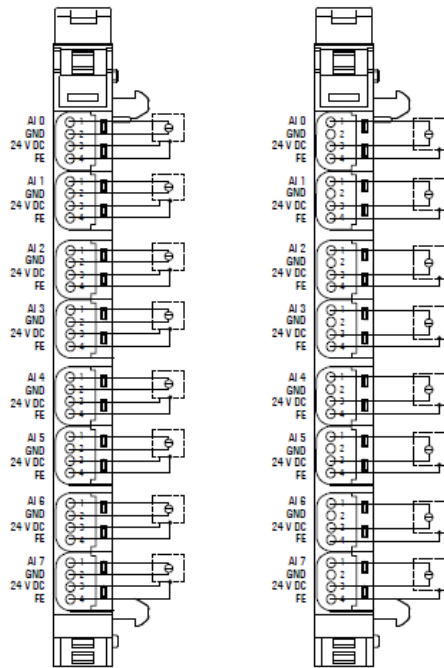


EP-3164 and EP-3264

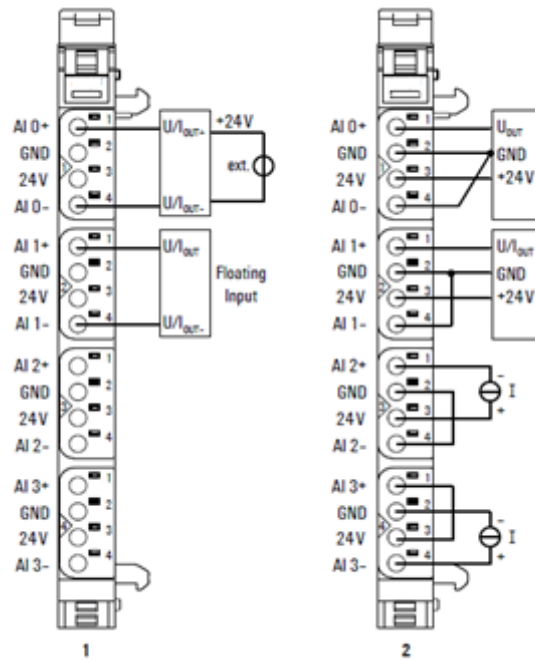


EP-3124

GFK-2960F

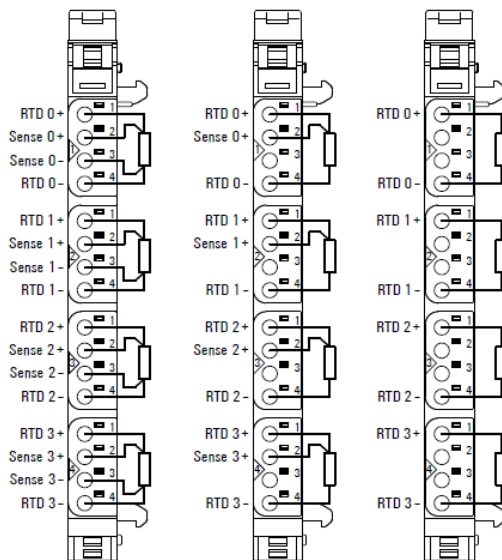


EP-3368 and EP-3468

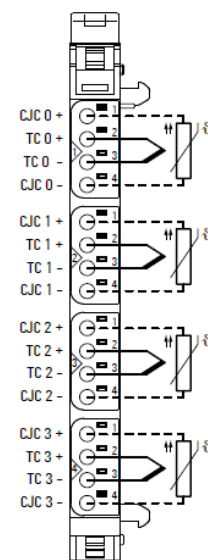


EP-3664

Note: 1= Standard, 2= Alternative option.



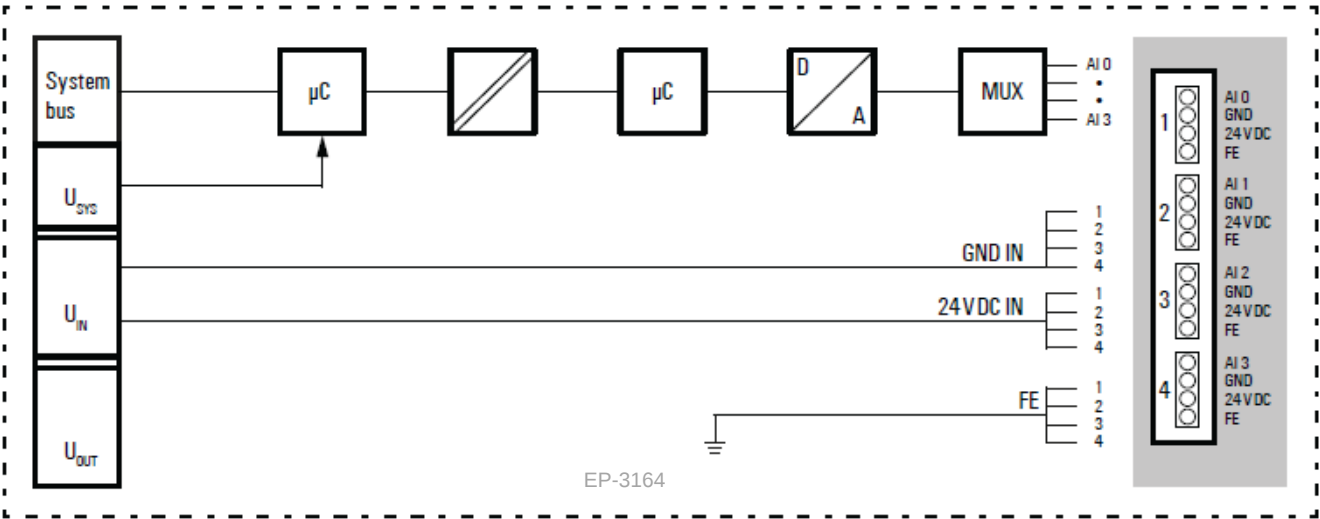
EP-3704



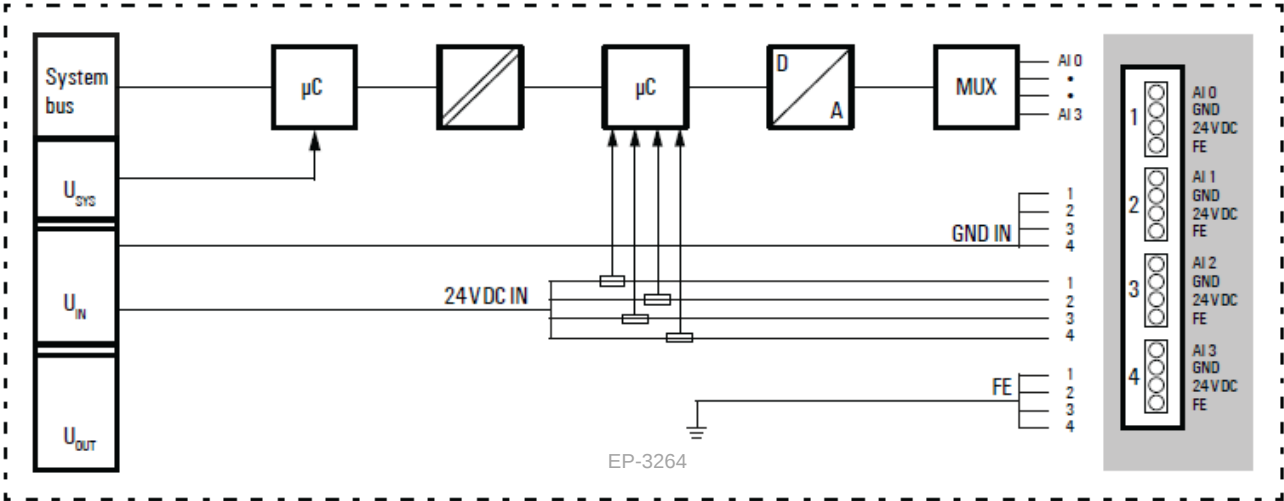
EP-3804

Note: For EP-3804, the external CJC shown with a dotted line is optional. An internal CJC can also be used.

Connection Block Diagrams

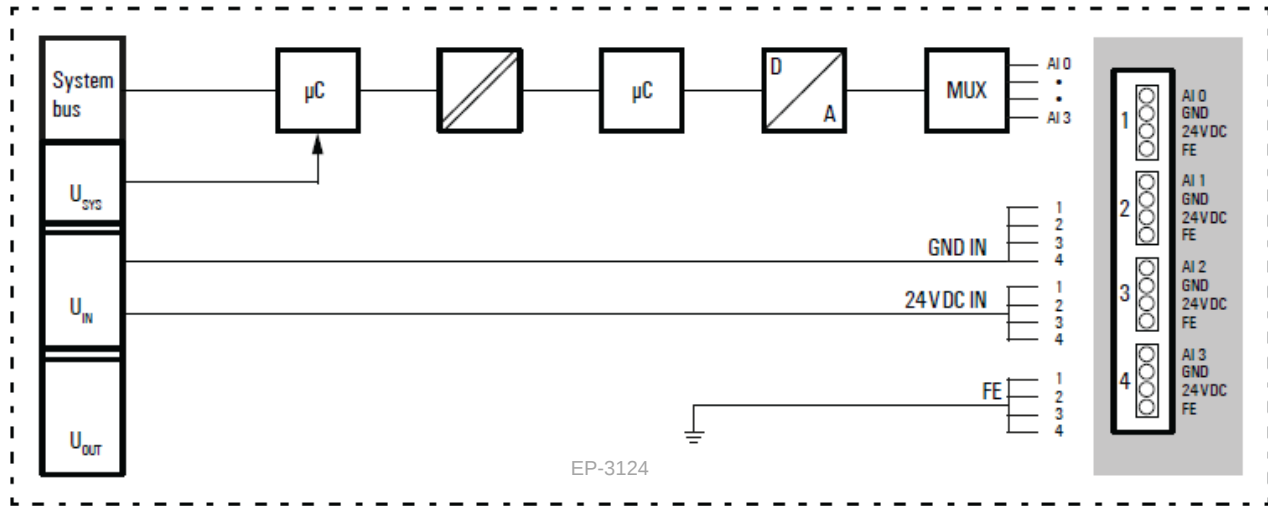


EP-3164

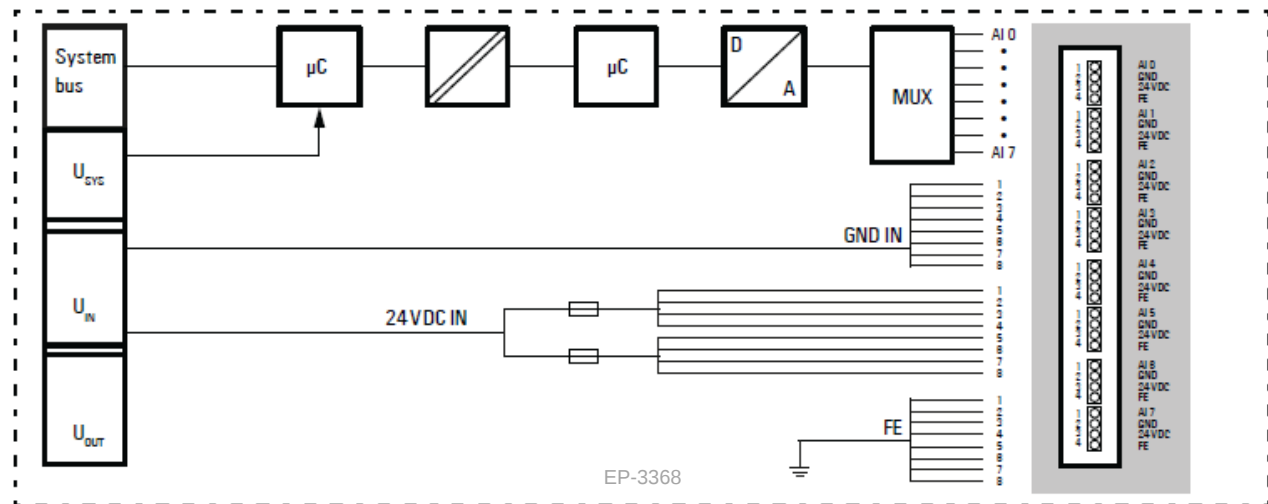


EP-3264

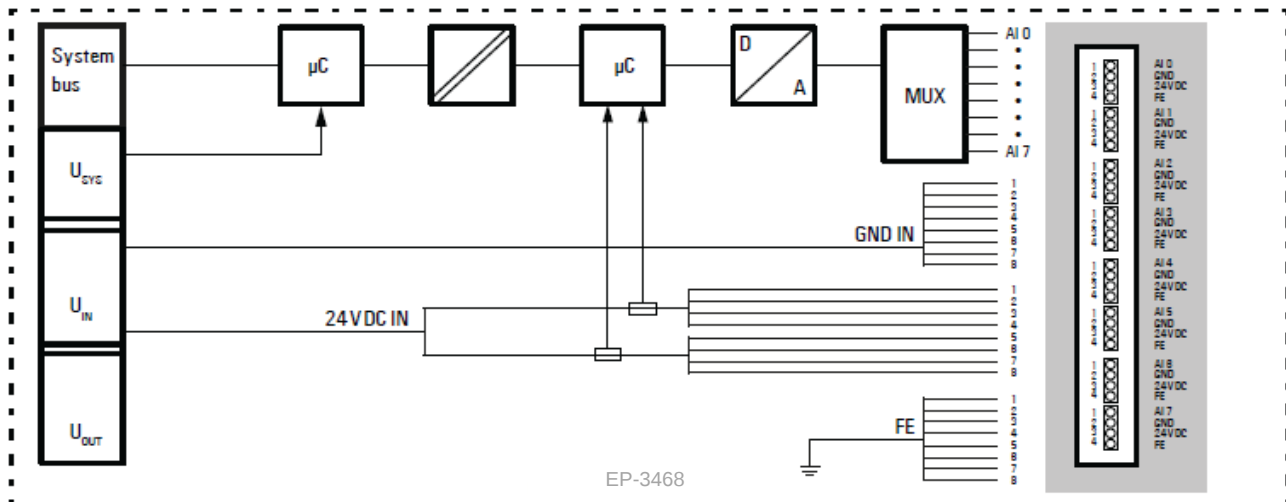
GFK-2960F



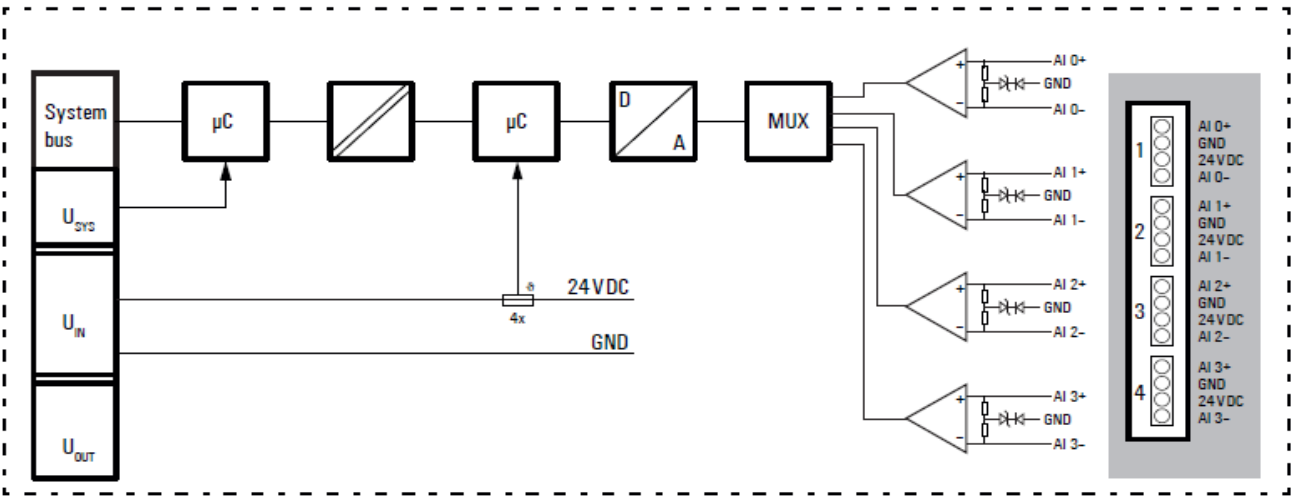
EP-3124



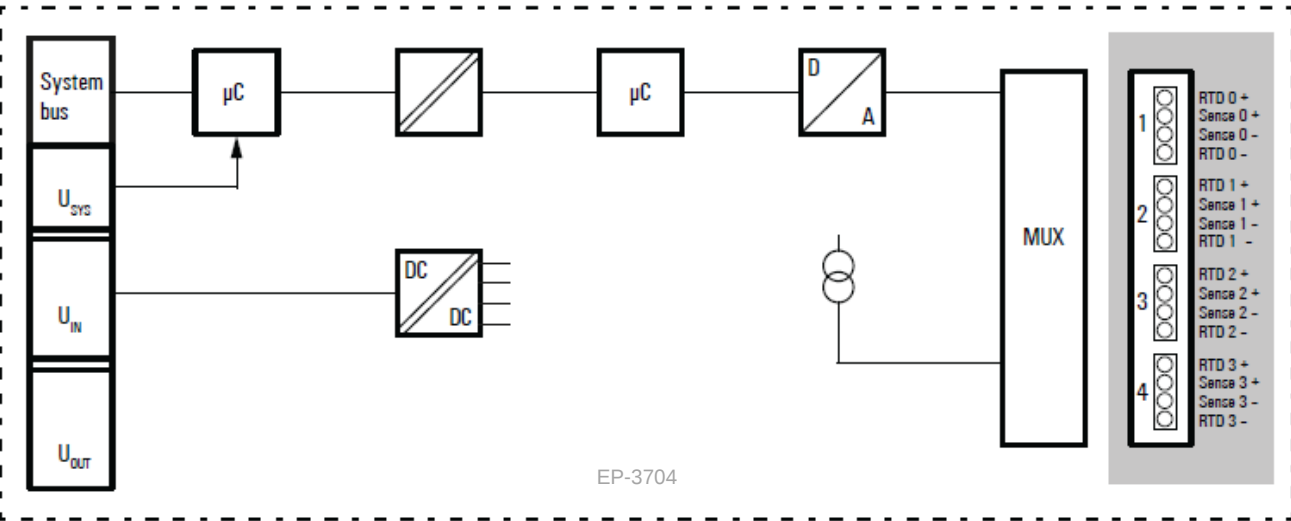
EP-3368



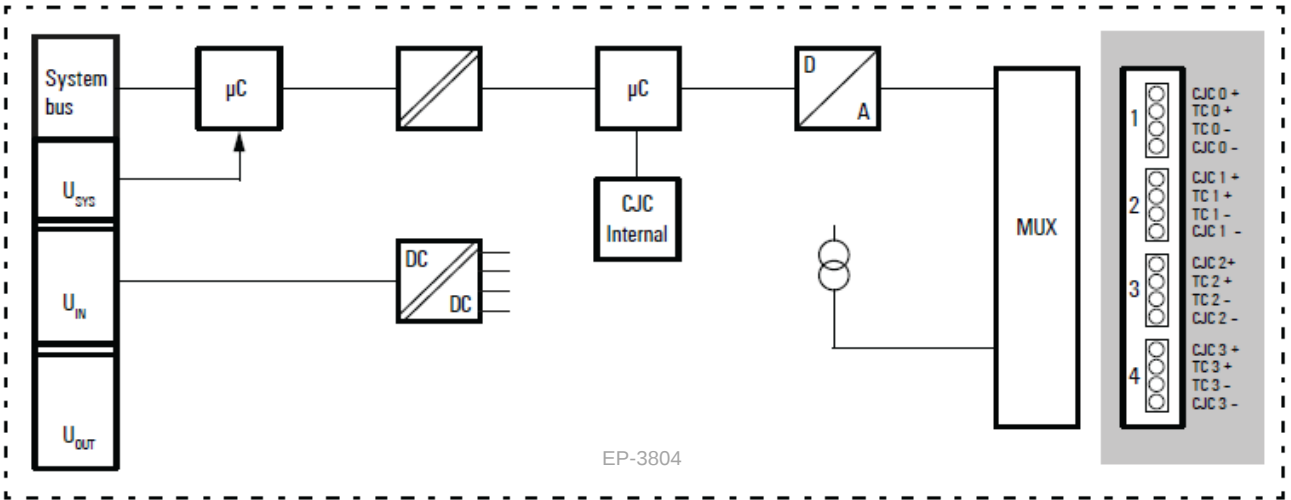
EP-3468



EP-3664



EP-3704



EP-3804

GFK-2960F

Installation in Hazardous Areas

- 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



WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2;



WARNING - EXPLOSION HAZARD - WHEN IN HAZARDOUS AREAS, TURN OFF POWER BEFORE REPLACING OR WIRING MODULES; AND



WARNING - EXPLOSION HAZARD - DO NOT CONNECT OR DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.

ATEX Marking

Ex 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-3164-BD, EP-3124-BD, EP-3264-BD, EP-3368-AD, EP-3468-AD	01.00.36	Sep-2018	Firmware update for addition of low pass filter 2Hz
EP-3704-CD, EP-3804-CD	01.00.11	Sep-2018	Improved process alarm behaviour, if there is no more alarm, the flag will be reset
EP-3664-AA	01.03.05	Sep-2018	Initial Release. This is product revision and later is usable in Marine applications. Refer GFK-2958 for certification details.
EP-3124-BC, EP-3164-BC, EP-3264-BC, EP-3704-CC, EP-3804-CC	01.00.34	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-3368-AC, EP-3264-AC, EP-3124-AC, EP-3164-AC, EP-3468-AC	01.00.34	Mar-2018	Standardization of the Signal Level for the Failure Information of Digital Transmitters
EP-3704-AC and EP-3804-AC	01.00.10	Nov-2017	Linearization curve for CU10 sensors >200°C corrected
EP-3124, EP-3164, EP-3264, EP-3704, EP-3804	01.00	Dec-2015	Documentation update only
EP-3124, EP-3164, EP-3264, EP-3704, EP-3804	01.00	Nov-2015	Initial Release

Important Product Information for this Release

Updates

The product has undergone firmware updates for enhancements :- EP-3164-BD, EP-3124-BD, EP-3264-BD, EP-3368-AD, EP-3468-AD, EP-3704-CD, EP-3804-CD. The products may be upgraded in the field using the Web firmware upgrade kit, which can be downloaded from <http://support.ge-ip.com>.

Modules	Firmware Version	Upgrade Kit
EP-3164-BD, EP-3124-BD, EP-3264-BD, EP-3368-AD, EP-3468-AD,	01.00.36	EP-3xxx-0007618-01_00_36-6.bsm
EP-3704-CD, EP-3804-CD	01.00.11	EP-37xx_EP-38xx-0007616-01_00_11-9.bsm

Functional Compatibility

N/A

Problems Resolved by this Release

None

New Features and Enhancements

Subject	Modules	Description
Filter	EP-3164-BD , EP-3124-BD, EP-3264-BD, EP-3368-AD, EP-3468-AD,	Added low pass filter 2Hz
Alarm	EP-3704-CD, EP-3804-CD	Improved process alarm behaviour, if there is no more alarm, the flag will be reset

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)



1-800-433-2682

1-434-978-5100

www.ge-ip.com

For public disclosure