MICROCYBER

MCAFD Series

Active Fieldbus Distributor

User Manual

Warning

1.It is forbidden for users to disassemble components by themselves.

2.Please check whether the power supply voltage of the gateway is in accordance with the power supply voltage requirement in the user manual.

Disclaimers

The contents of this manual have been checked to confirm the consistency of the hardware and software described. Since errors cannot be completely excluded, absolute consistency cannot be guaranteed. However, we will periodically check the data in this manual and make the necessary corrections in subsequent versions. Any suggestions for improvements are welcome.

Technical data is subject to change at any time.

Company Profile

Microcyber Corporation is a high-tech enterprise initiated and founded by Shenyang Institute of Automation, Chinese Academy of Sciences, mainly engaged in networked control system, industrial communication and instrumentation, development, production and application. Microcyber Corporation has undertaken a number of national science and technology projects such as the National Science and Technology Major Project, National High Technology Research and Development Program (863 Program), Smart Manufacturing Equipment Development Project, etc. It is the unit for the construction of National Engineering Research Center for Networked Control System.

Microcyber Corporation successfully developed the first internationally certified fieldbus protocol master stack, the first nationally certified fieldbus instrument, the first domestic safety instrument certified by TÜV Germany, and co-hosted with other units the formulation of the first domestic industrial Ethernet protocol standard EPA and the first industrial wireless communication protocol standard WIA-PA, which became an IEC international standard.

Our products and technologies have won two National Science and Technology Progress Awards, one National Science and Technology Invention Award, one First Prize of Science and Technology Progress of Chinese Academy of Sciences, one First Prize of Science and Technology Progress of Liaoning Province, and our products have been exported worldwide. We have successfully completed more than 200 large-scale automation projects.

Microcyber Corporation is a member of FCG organization; a member of PNO.

Microcyber Corporation has successfully passed ISO9001:2008 quality management system certification and ISO/TS16949 quality system certification for the automotive industry. Excellent R&D team, rich experience in automation engineering design and implementation, industry-leading products, large market network and excellent corporate culture have laid a solid foundation for the company's start-up and sustainable development.

Carrying employees' ideals, creating customer value and promoting corporate development.

Content

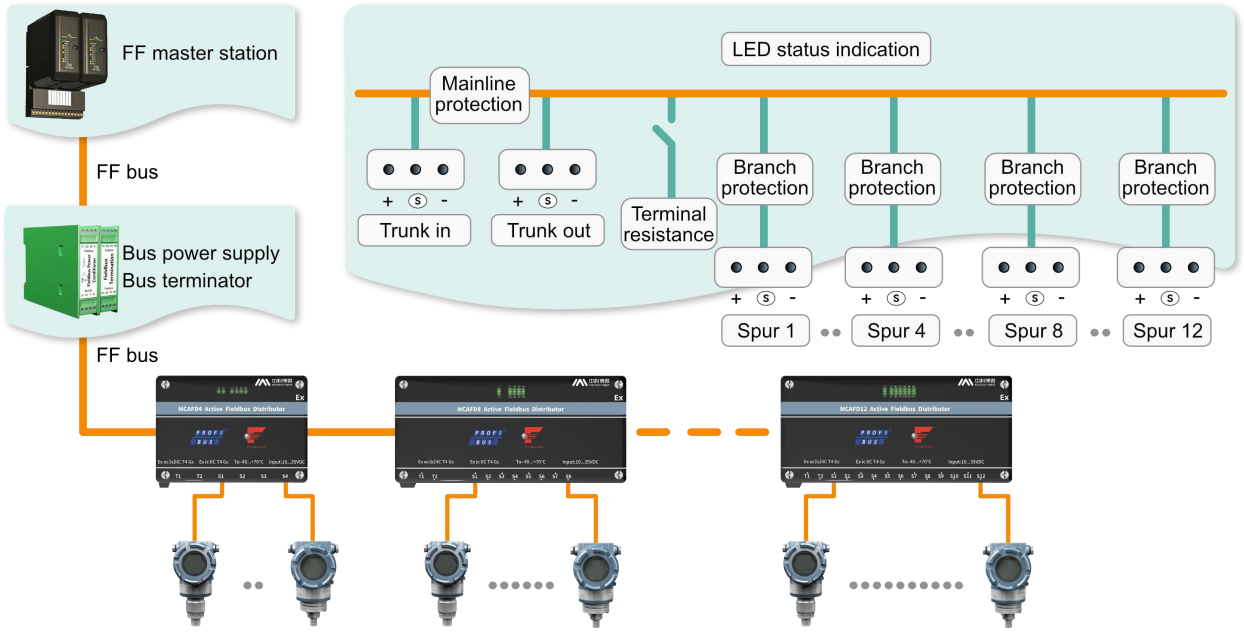
1 Product Overview

MCAFD series active fieldbus distributors are suitable for FF-H1 and PROFIBUS PA fieldbus applications. Field devices are connected to the system through the distributor in a trunk branch topology. Each MCAFD4/MCAFD8/MCAFD12 distributor has 4/8/12 branches, with built-in automatic bus terminals. LED status indication can quickly diagnose the short circuit status of main lines and branch lines, automatically isolate fault sections, and the distributor has multiple protection functions to ensure safe operation of the system.

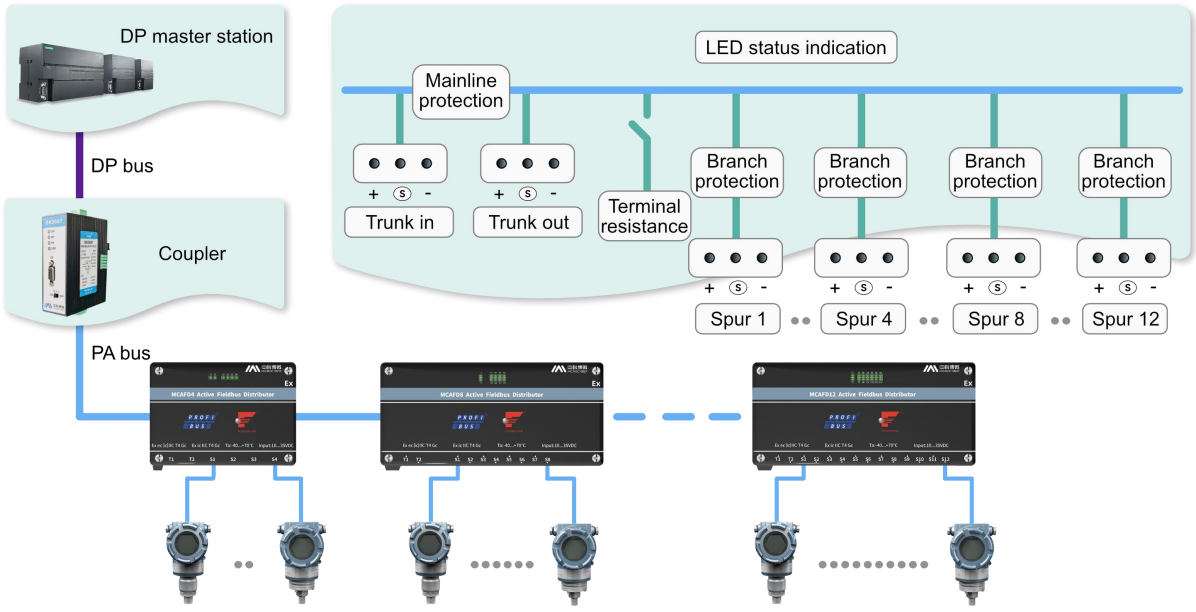
2 Features

- Applicable to FOUNDATION Fieldbus H1 and PROFIBUS PA
- LED indicator fault diagnosis
- Power supply through field bus
- Automatic bus terminal
- Reverse wiring protection
- Automatic isolation of fault ports
- IP code: IP67
- Applicable to Zone 2 and safety zone

3 System Connection Diagram



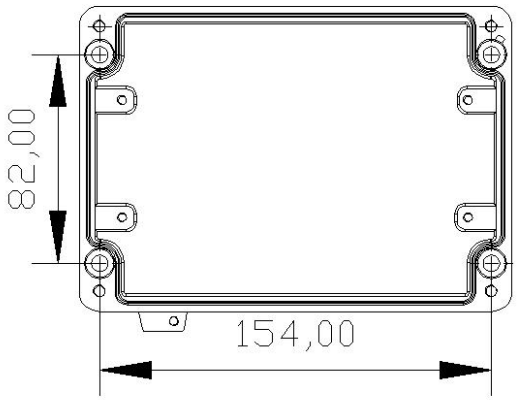
Example: FF bus system composed of fieldbus distributor



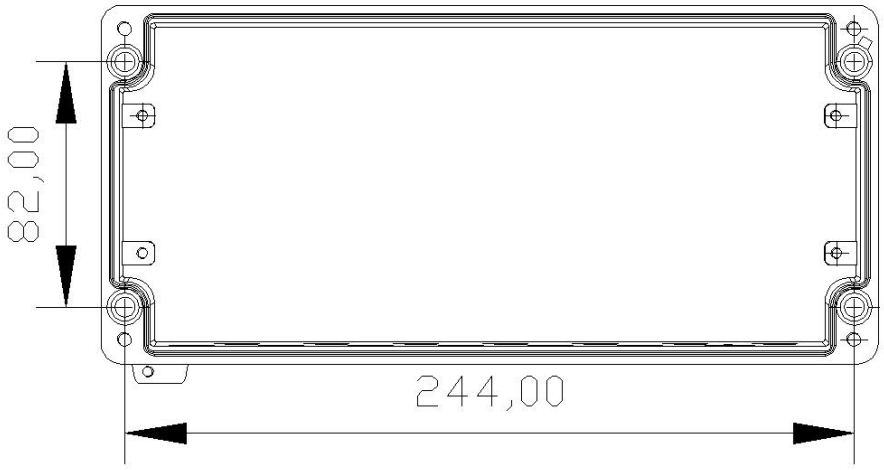
Example: PA bus system composed of fieldbus distributor

4 Installation and Wiring

4.1 Installation hole size diagram



MCAFD4 installation hole size diagram



MCAFD8/12 installation hole size diagram

4.2 Installation

1. Connect the main line through T1 and T2, where T1 is the bus input and T2 is the bus output. Connect the fieldbus devices through branch lines S1 to S4/S8/S12.

2. Open the upper cover of the active fieldbus distributor and install it on a flat surface, ensuring that there is 60mm of space below the distributor for wiring.

3. Unscrew the electrical connector cover, thread the fieldbus cable through the electrical connector

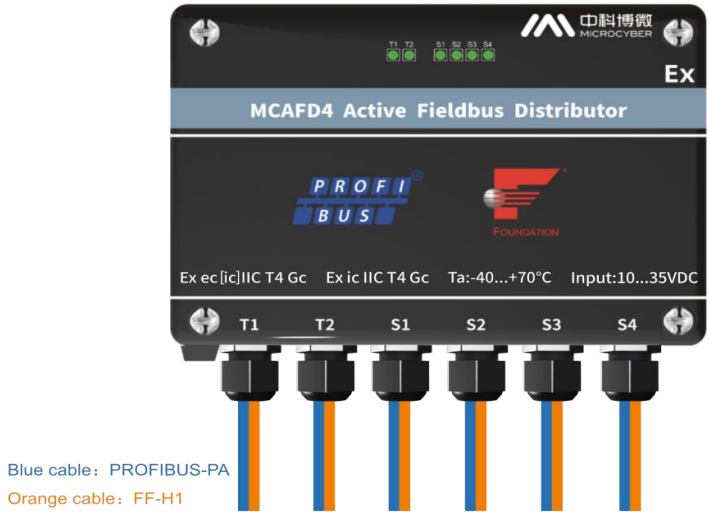
cover, and secure the cable to the corresponding terminal to ensure correct polarity of the wiring.

4. Close the upper cover of the active fieldbus distributor and tighten the fixing screws on the upper cover.

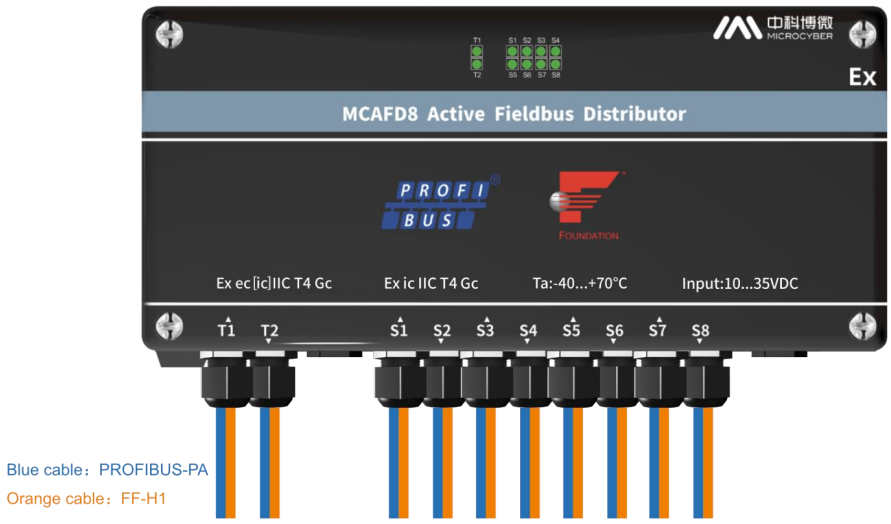
5. Use sealing plugs to seal unused cable entry glands to ensure IP67 protection level.

6. According to the on-site situation, two-point grounding or one point grounding can be selected to ensure equal potential at both ends of the device and distributor. Two point grounding can move the internal grounding switch of the distributor to the grounding position. When it is impossible to ensure equal potential at both ends of the device and distributor, one point grounding should be used to keep the grounding switch in the ungrounded position.

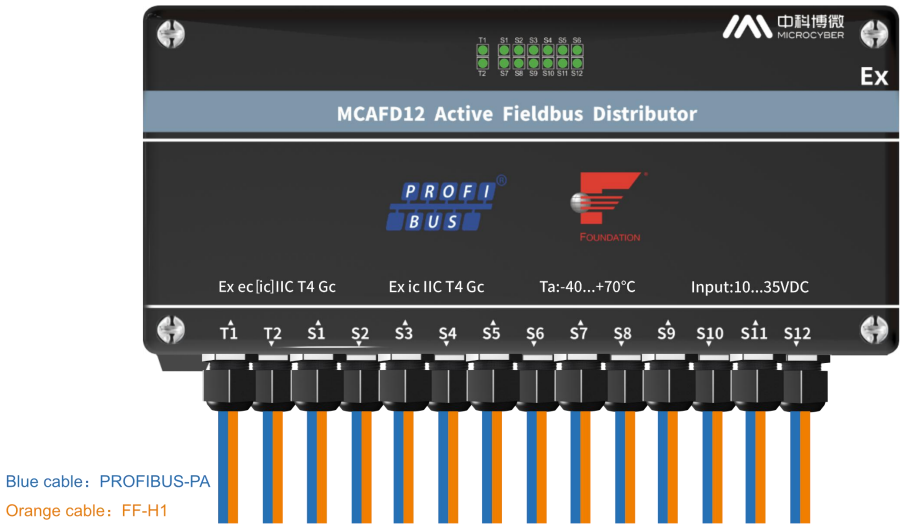
7. The connection of the bus distributor needs to be powered off before operation.



MCAFD4 connection diagram

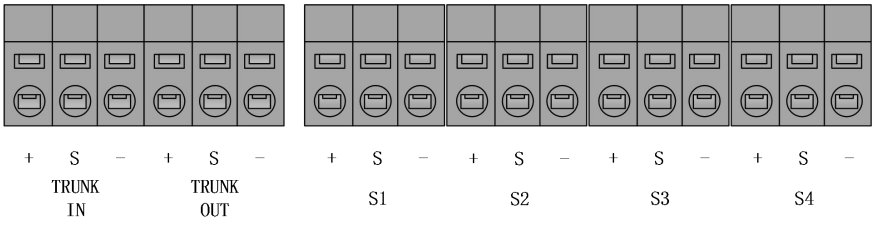


MCAFD8 connection diagram

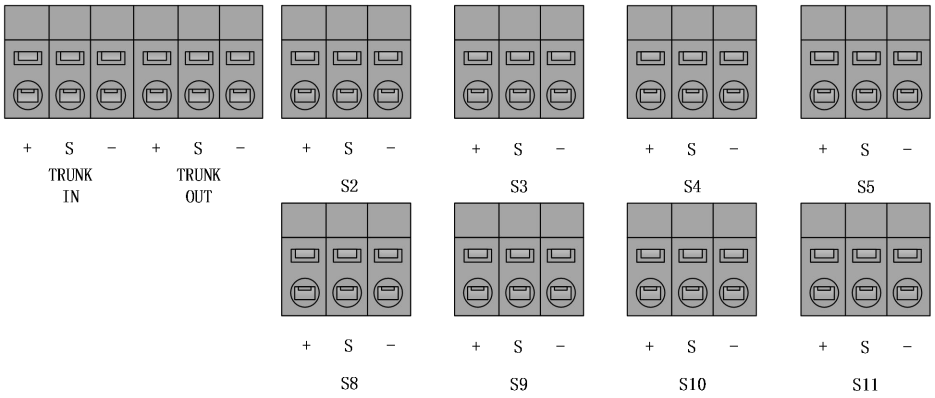


MCAFD12 connection diagram

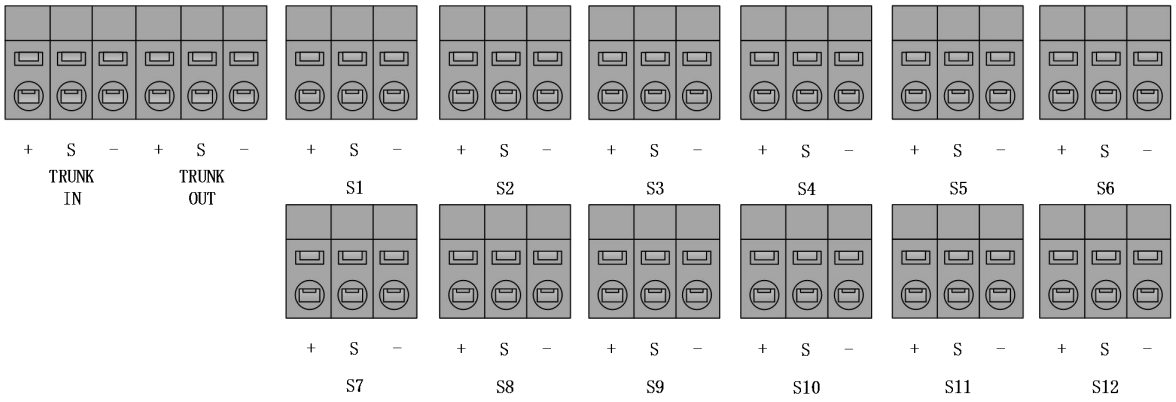
4.3 Terminal distribution



MCAFD4 terminal distribution



MCAFD8 terminal distribution

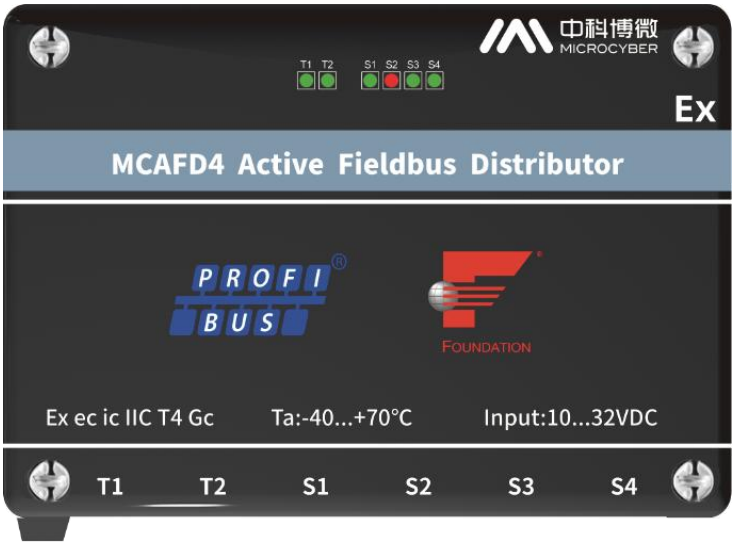


MCAFD12 terminal distribution

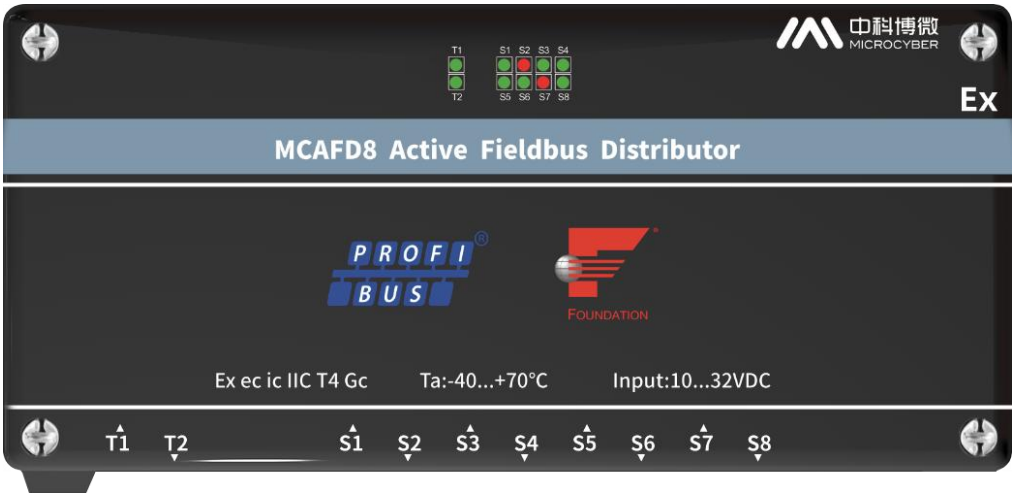
Connection		Terminal	Distribution
TRUNK IN	Main line	+	Data wire positive
		S	Shielding wire
		-	Data wire negative
TRUNK OUT	Main line	+	Data wire positive
		S	Shielding wire
		-	Data wire negative
S1-S4（MCAFD4） S2-S5（MCAFD8） S8-S11（MCAFD8） S1-S1（MCAFD12）	Field device branch line	+	Data wire positive
		S	Shielding wire
		-	Data wire negative

5 Maintenance

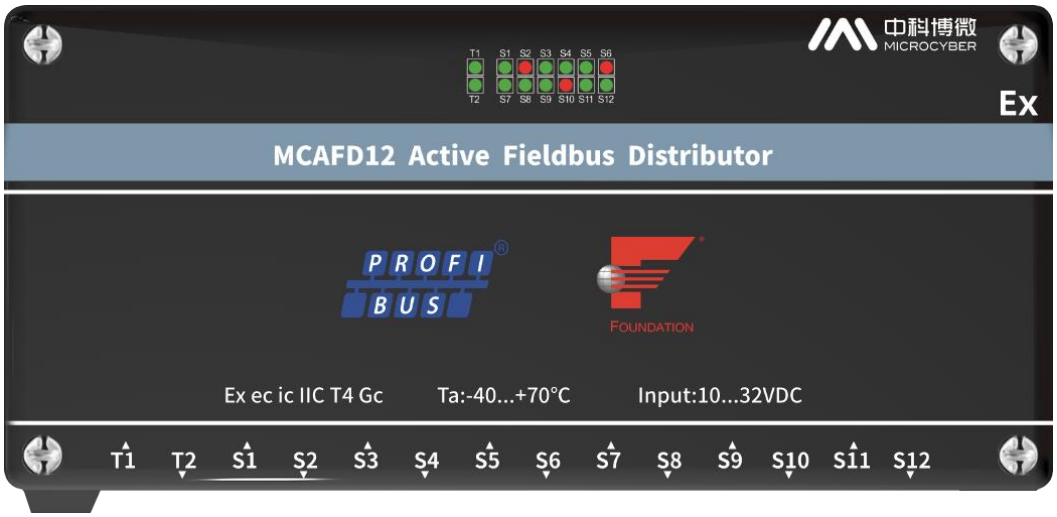
5.1 Indicator status



Schematic diagram of MCAFD4 indicator light



Schematic diagram of MCAFD8 indicator light



Schematic diagram of MCAFD12 indicator light

Port	LED indicator	Meaning	Solution
T1-T2	Green	Main line connection is normal Bus terminal not active (T2 green)	—
	Red	Main line short circuit fault (T2 flashing red)	Troubleshooting
	Off	Main line not connected Main line connected but reversed Bus terminal activation (T2 off)	Correct wiring
Port	**LED indicator**	**Meaning**	**Solution**
S1-S12	Green	Branch line connection is normal	—
	Red	Branch line short circuit fault	Troubleshooting
	Off	Main line not connected Main line connected but reversed	Correct wiring

5.2 Product maintenance

In Zone 2: Maintenance should be carried out every 6 months.

The maintenance of MCAFD4/MCAFD8/MCAFD12 is limited to visual inspection only. During this process, MCAFD4/MCAFD8/MCAFD12 may be in operation.

1. Please check if the cable entry and grounding terminal sealing of the casing are intact and undamaged

2. Please check if there is water or dust in the casing. If so, please investigate the cause of this situation.

3. Please check if the wiring is secure (connectors, cables).

5.3 Product replacement

Please disconnect the power supply voltage or FF bus power of the coupler before proceeding with the operation. To replace the active on-site distributor, please follow these steps:

1. Use a Phillips screwdriver to remove the 4 screws from the housing cover plate

2. Disconnect on-site equipment S1 to S4/S8/S12

3. Disconnect the main line connection

4. Disconnect the grounding cable connected to the grounding terminal of the on-site distributor

5. Replace the distributor

6. Connect the grounding cable to the grounding terminal

7. Connect the on-site device to the new MCAFD4/MCAFD8/MCAFD12

8. Connect the main cable T1/T2 and close the upper cover plate, then tighten the nut

6 Specification

6.1 MCAFD4 specification

Power Consumption	
No load current power consumption	<10mA
Power consumption	<180mW
Interface	
PROFIBUS PA	√
FOUNDATION Fieldbus H1	√
Main Line	
Number of electrical connectors	2
Electrical connector	M16*1.5 increased safety gland
Cable diameter	4~9mm
Cross section of wire	0.2~2.5mm^2
Wiring terminals	Spring type PCB terminal block (3-pin)
Rated voltage	10~32VDC
Rated current	≤1A
Main line pressure drop	<0.3V
Automatic bus termination	√
Branch Line	
Number of electrical connectors	4
Number of on-site devices that can be connected	4
Electrical connector	M16*1.5 increased safety gland
Cable diameter	4~9mm
Cross section of wire	0.2~2.5mm^2
Wiring terminals	Spring type PCB terminal block (3-pin)
Branch output voltage	≤32VDC

Maximum output current of branch line	60±0.5mA
Short circuit protection current	<800uA
Main and branch line pressure drop	<1V
Environmental	
Working temperature	-40℃~+70 ℃
Storage temperature	-40 ℃~+85 ℃
Relative humidity	5%RH~5%RH
Protection level	IP67
Ex	Ex ec ic IIC T4 Gc
Size and Weight	
Size (WxHxD) (mm)	170x80x145
Weight (kg)	1.5

6.2 MCAFD8 specification

Power Consumption	
No load current power consumption	<15mA
Power consumption	<250mW
Interface	
Interface	
PROFIBUS PA	√
FOUNDATION Fieldbus H1	√
Main Line	
Number of electrical connectors	2
Electrical connector	M16*1.5 increased safety gland
Cable diameter	4~9mm
Cross section of wire	0.2~2.5mm^2
Wiring terminals	Spring type PCB terminal block (3-pin)
Rated voltage	10~32VDC
Rated current	≤1A

Main line pressure drop	<0.3V
Automatic bus termination	√
Branch Line	
Number of electrical connectors	8
Number of on-site devices that can be connected	8
Electrical connector	M16*1.5 increased safety gland
Cable diameter	4~9mm
Cross section of wire	0.2~2.5mm^2
Wiring terminals	Spring type PCB terminal block (3-pin)
Branch output voltage	≤32VDC
Maximum output current of branch line	60±0.5mA
Short circuit protection current	<800uA
Main and branch line pressure drop	<1V
Environmental	
Working temperature	-40℃~+70 ℃
Storage temperature	-40 ℃~+85 ℃
Relative humidity	5%RH~95%RH
Protection level	IP67
Ex	Ex ec ic IIC T4 Gc
Size and Weight	
Size (WxHxD) (mm)	260x100x145
Weight (kg)	2.4

6.3 MCAFD12 specification

Power Consumption	
No load current power consumption	<20mA
Power consumption	<350mW
Interface	
PROFIBUS PA	√

FOUNDATION Fieldbus H1	√
Main Line	
Number of electrical connectors	2
Electrical connector	M16*1.5 increased safety gland
Cable diameter	4~9mm
Cross section of wire	0.2~2.5mm^2
Wiring terminals	Spring type PCB terminal block (3-pin)
Rated voltage	10~32VDC
Rated current	≤1A
Main line pressure drop	<0.3V
Automatic bus termination	√
Branch Line	
Number of electrical connectors	12
Number of on-site devices that can be connected	12
Electrical connector	M16*1.5 increased safety gland
Cable diameter	4~9mm
Cross section of wire	0.2~2.5mm^2
Wiring terminals	Spring type PCB terminal block (3-pin)
Branch output voltage	≤32VDC
Maximum output current of branch line	60±0.5mA
Short circuit protection current	<800uA
Main and branch line pressure drop	<1V
Environmental	
Working temperature	-40℃~+70 ℃
Storage temperature	-40 ℃~+85 ℃
Relative humidity	5%RH~95%RH
Protection level	IP67
Ex	Ex ec ic IIC T4 Gc
Size and Weight	

Size (WxHxD) (mm)	260x100x145
Weight (kg)	2.4

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