

# 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.

**Microcyber Corporation 2024**

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 .....                 | - 1 -  |
| 2 Features .....                         | - 1 -  |
| 3 System Connection Diagram .....        | - 2 -  |
| 4 Installation and Wiring .....          | - 3 -  |
| 4.1 Installation hole size diagram ..... | - 3 -  |
| 4.2 Installation .....                   | - 3 -  |
| 4.3 Terminal distribution .....          | - 5 -  |
| 5 Maintenance .....                      | - 7 -  |
| 5.1 Indicator status .....               | - 7 -  |
| 5.2 Product maintenance .....            | - 9 -  |
| 5.3 Product replacement .....            | - 9 -  |
| 6 Specification .....                    | - 10 - |
| 6.1 MCAFD4 specification .....           | - 10 - |
| 6.2 MCAFD8 specification .....           | - 11 - |
| 6.3 MCAFD12 specification .....          | - 12 - |

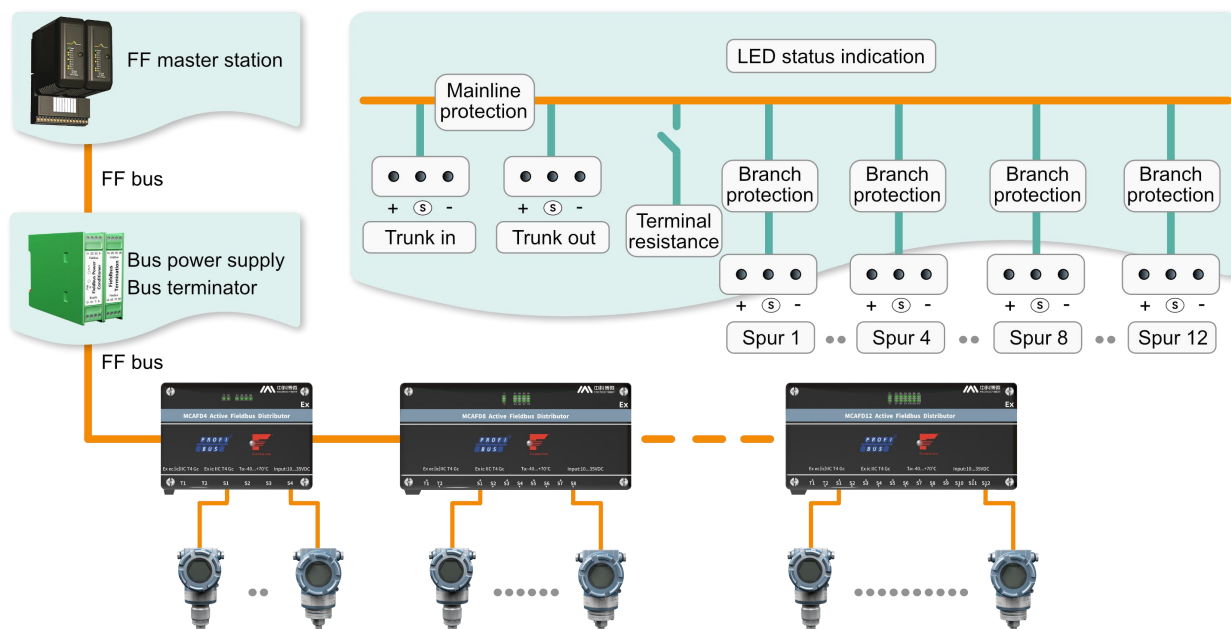
# 1 Product Overview

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.

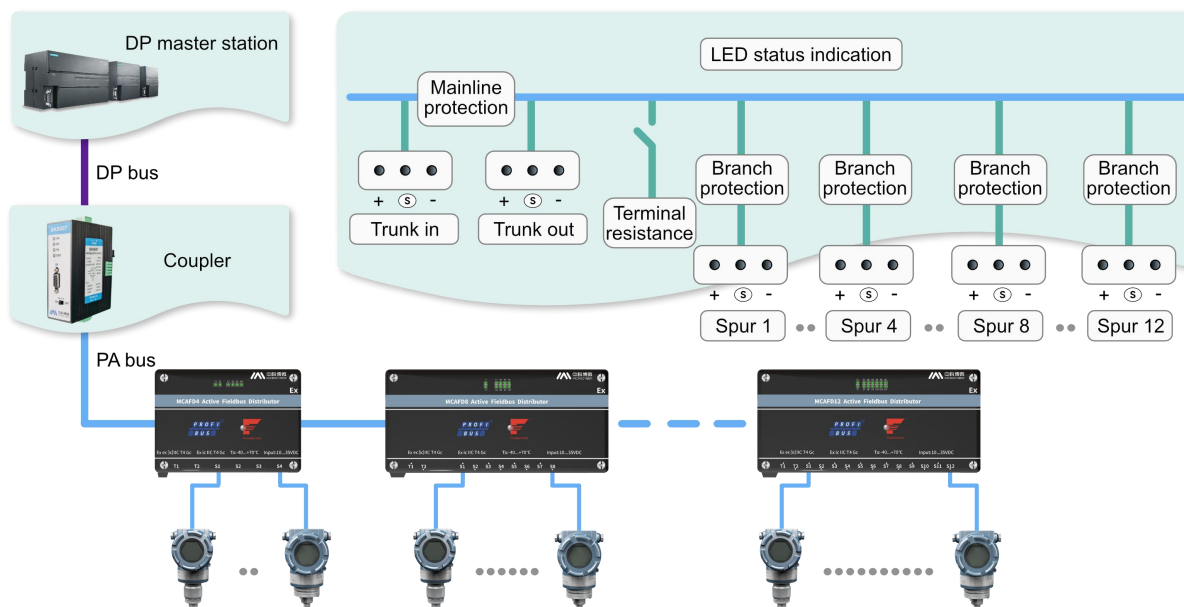
## 2 Features

- 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



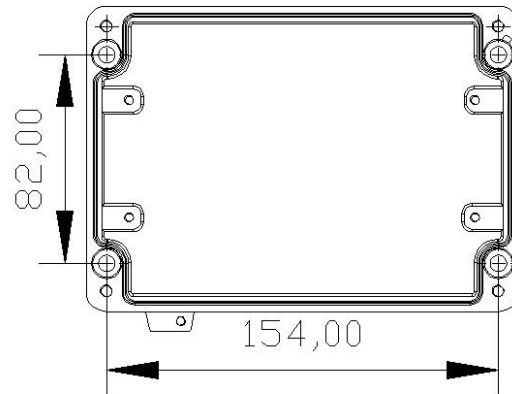
Example: FF bus system composed of fieldbus distributor



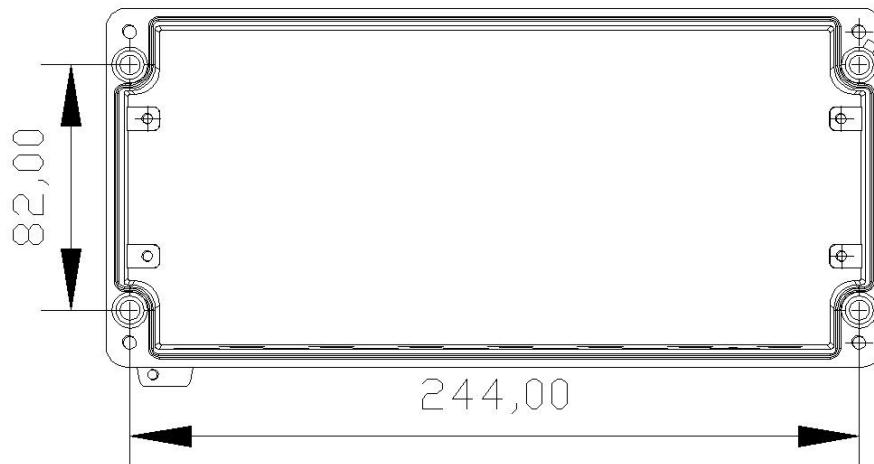
Example: PA bus system composed of fieldbus distributor

## 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

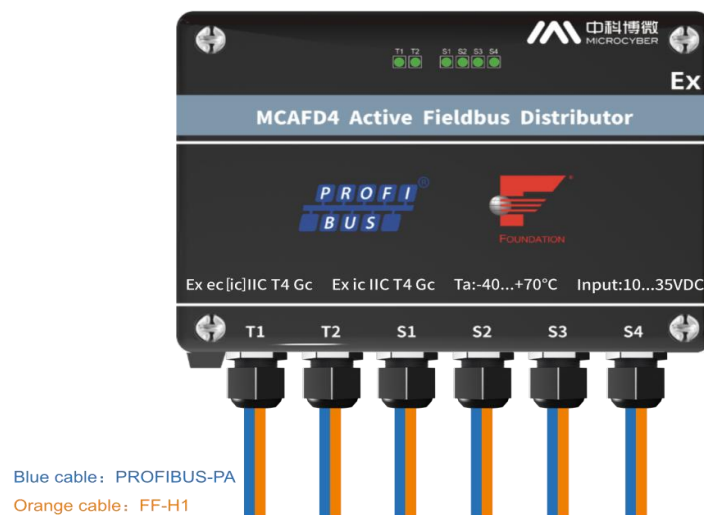
cover, and secure the cable to the corresponding terminal to ensure correct polarity of the wiring.

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

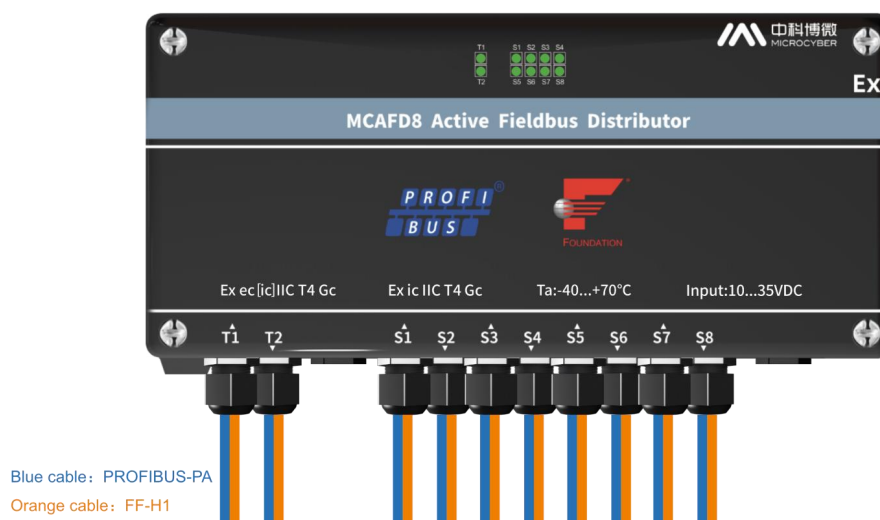
5. Use sealing plugs to seal unused cable entry glands to ensure IP67 protection level.

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.

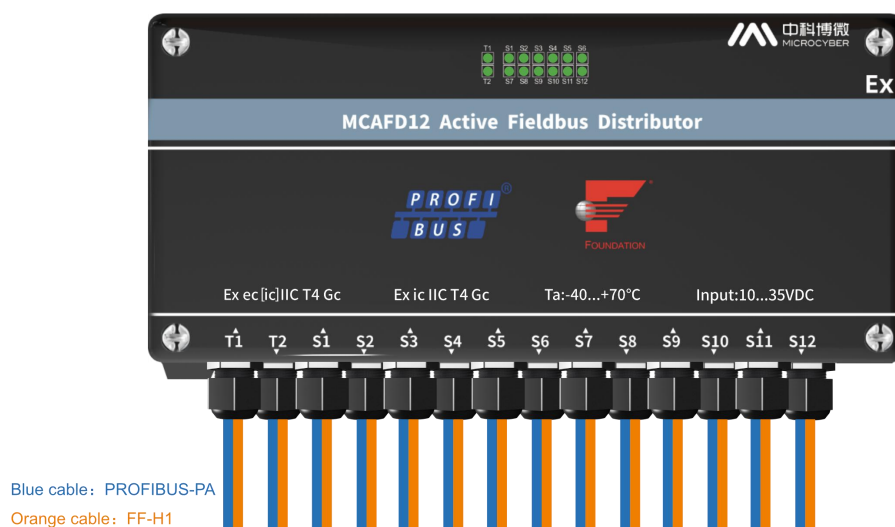
7. The connection of the bus distributor needs to be powered off before operation.



MCAFD4 connection diagram

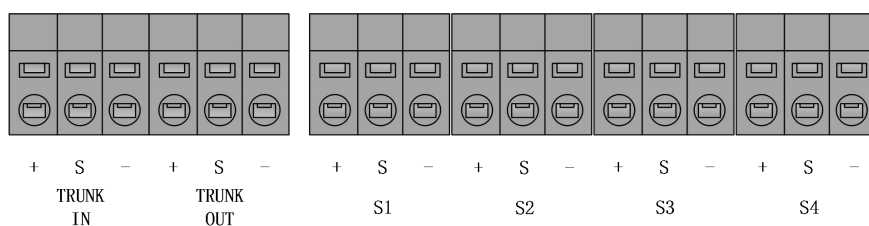


MCAFD8 connection diagram

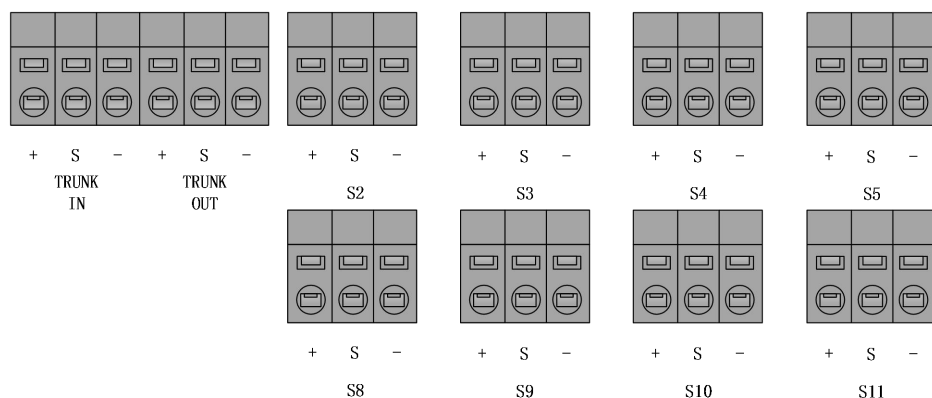


MCAFD12 connection diagram

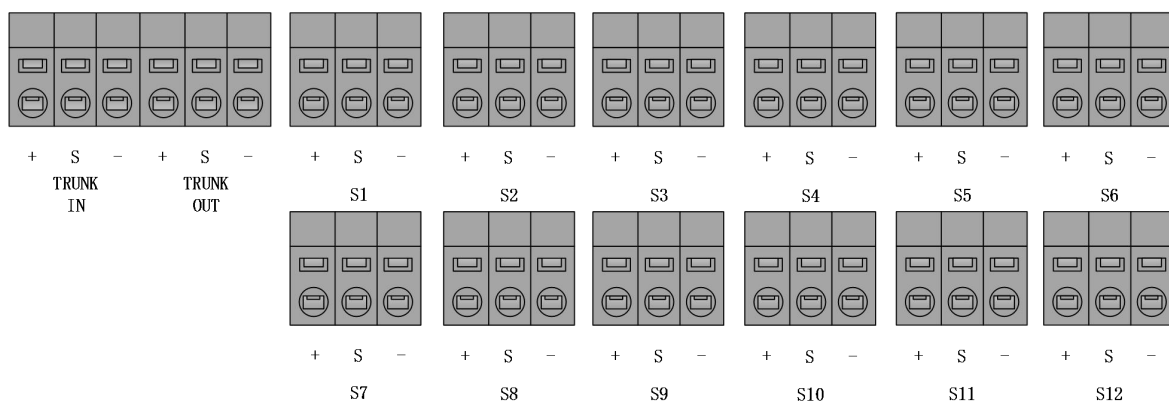
## 4.3 Terminal distribution



MCAFD4 terminal distribution



MCAFD8 terminal distribution

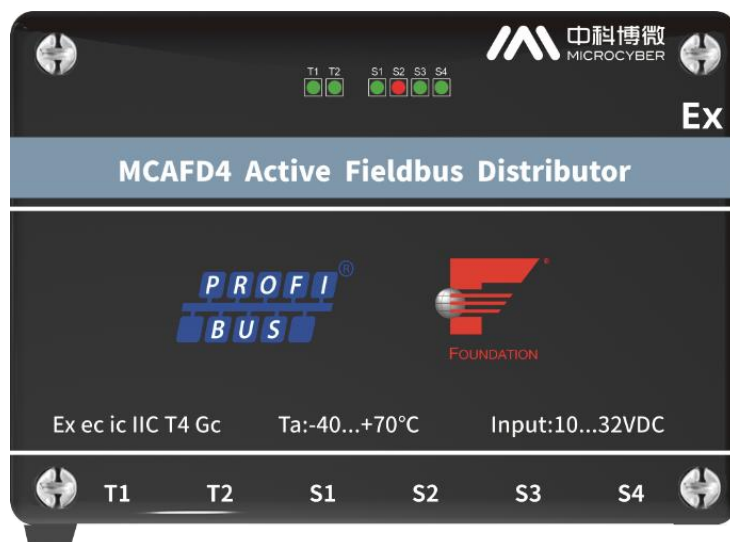


MCAFD12 terminal distribution

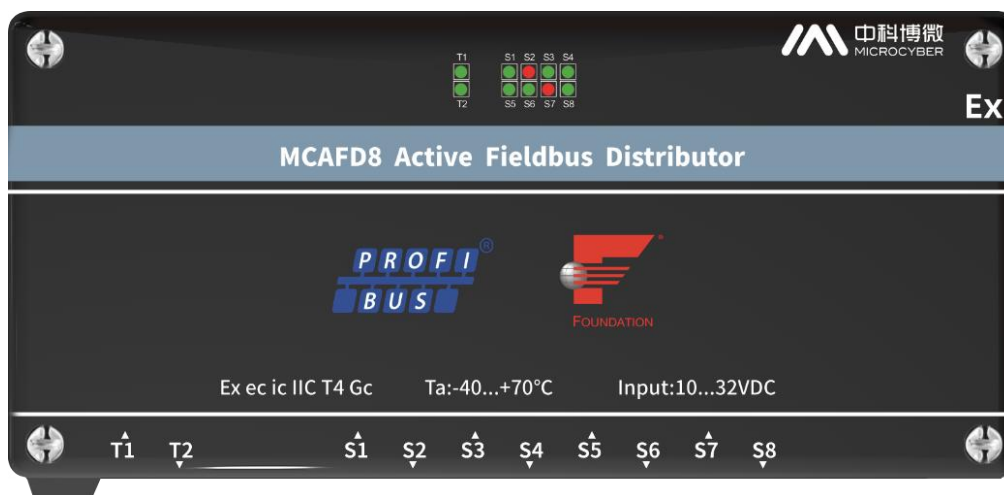
| Connection      |                          | Terminal | Distribution       |
|-----------------|--------------------------|----------|--------------------|
| TRUNK IN        | Main line                | +        | Data wire positive |
|                 |                          | S        | Shielding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

## 5 Maintenance

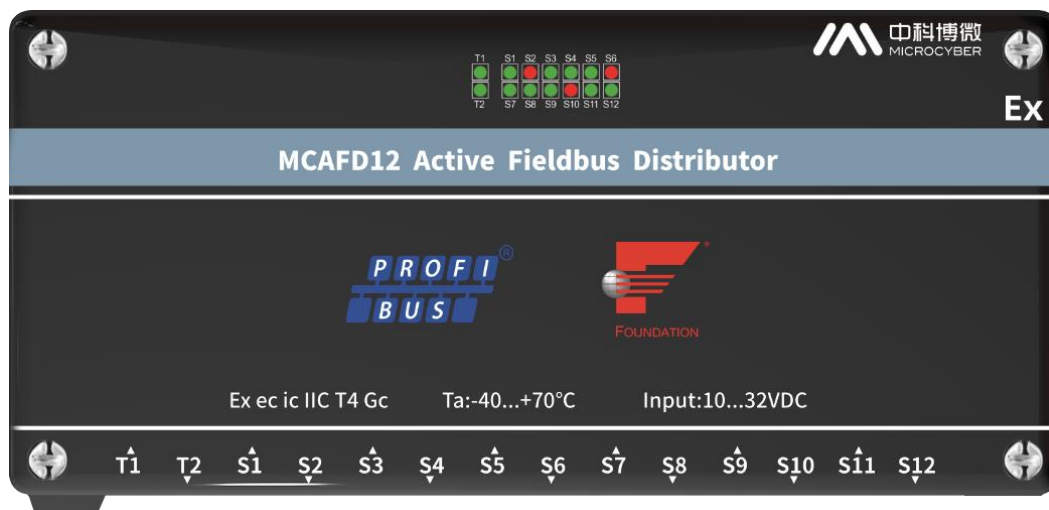
### 5.1 Indicator status



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<br>Bus terminal not active (T2 green)                            | —               |
|        | Red           | Main line short circuit fault (T2 flashing red)                                                 | Troubleshooting |
|        | Off           | Main line not connected<br>Main line connected but reversed<br>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<br>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 <sup>2</sup>                 |
| 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 <sup>2</sup>                 |
| 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                |
| <b>Environmental</b>                  |                    |
| Working temperature                   | -40°C~+70 °C       |
| Storage temperature                   | -40 °C~+85 °C      |
| Relative humidity                     | 5%RH~5%RH          |
| Protection level                      | IP67               |
| Ex                                    | Ex ec ic IIC T4 Gc |
| <b>Size and Weight</b>                |                    |
| Size (WxHxD) (mm)                     | 170x80x145         |
| Weight (kg)                           | 1.5                |

## 6.2 MCAFD8 specification

|                                   |                                        |
|-----------------------------------|----------------------------------------|
| <b>Power Consumption</b>          |                                        |
| No load current power consumption | <15mA                                  |
| Power consumption                 | <250mW                                 |
| <b>Interface</b>                  |                                        |
| <b>Interface</b>                  |                                        |
| PROFIBUS PA                       | √                                      |
| FOUNDATION Fieldbus H1            | √                                      |
| <b>Main Line</b>                  |                                        |
| 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 <sup>2</sup>                 |
| 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                       | √                                      |
| <b>Branch Line</b>                              |                                        |
| 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 <sup>2</sup>                 |
| 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                                    |
| <b>Environmental</b>                            |                                        |
| Working temperature                             | -40°C~+70 °C                           |
| Storage temperature                             | -40 °C~+85 °C                          |
| Relative humidity                               | 5%RH~95%RH                             |
| Protection level                                | IP67                                   |
| Ex                                              | Ex ec ic IIC T4 Gc                     |
| <b>Size and Weight</b>                          |                                        |
| Size (WxHxD) (mm)                               | 260x100x145                            |
| Weight (kg)                                     | 2.4                                    |

## 6.3 MCAFD12 specification

|                                   |        |
|-----------------------------------|--------|
| <b>Power Consumption</b>          |        |
| No load current power consumption | <20mA  |
| Power consumption                 | <350mW |
| <b>Interface</b>                  |        |
| PROFIBUS PA                       | √      |

|                                                 |                                        |
|-------------------------------------------------|----------------------------------------|
| FOUNDATION Fieldbus H1                          | √                                      |
| <b>Main Line</b>                                |                                        |
| 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 <sup>2</sup>                 |
| 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                       | √                                      |
| <b>Branch Line</b>                              |                                        |
| 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 <sup>2</sup>                 |
| 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                                    |
| <b>Environmental</b>                            |                                        |
| Working temperature                             | -40°C~+70 °C                           |
| Storage temperature                             | -40 °C~+85 °C                          |
| Relative humidity                               | 5%RH~95%RH                             |
| Protection level                                | IP67                                   |
| Ex                                              | Ex ec ic IIC T4 Gc                     |
| <b>Size and Weight</b>                          |                                        |

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



## MICROCYBER CORPORATION

<https://www.microcybers.com>

Add: 17-8 Wensu Street, Hunnan New District, Shenyang, China 110179

Tel: 0086-24-31217278 / 31217280

Fax: 0086-24-31217293

Email: [huang.xin@microcyber.cn](mailto:huang.xin@microcyber.cn)