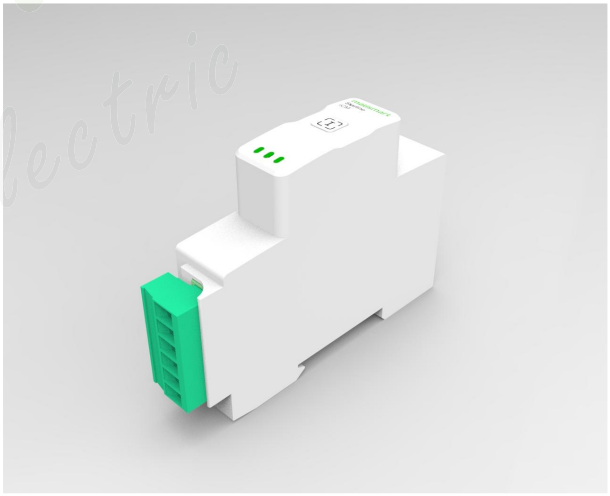
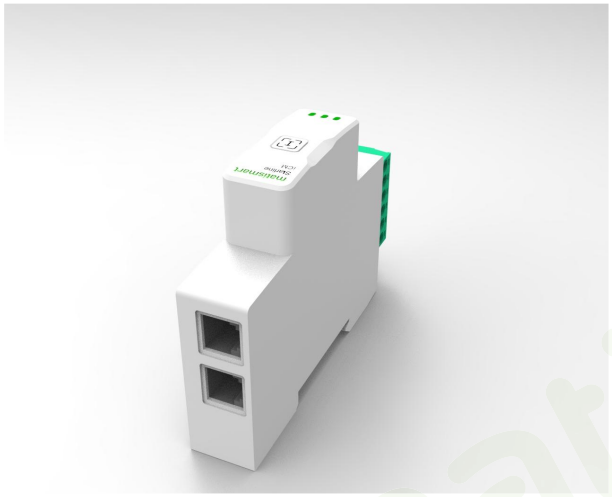
Energy Metering Module

Starline_IO

User Manual

08/2024





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1 Overview

1.1 Function Overview

Starline-IO modules significantly enhance the capabilities of measurement system through their multi-functional design.

Among them, the DIO-4/2 module is equipped with 4 digital inputs and 2 digital outputs for status monitoring and remote control.

Digital inputs can be used to monitor the status of protection devices and removable drawers (such as circuit breaker status, fault status, event counts), or to collect pulse data from multi-function meters;

Digital outputs are capable of sending binary control signals for remote operation of switchgear, while also supporting alarm configuration and assignment to digital outputs.

The AIO-2/2 module is equipped with 2 analog input interfaces and 2 digital output interfaces.

Analog input can collect analog signals of environmental parameters (such as pressure, humidity, temperature, etc.), significantly improving the monitoring capabilities of the system.

The analog output can convert the measured parameters into standard analog signals (4...20mA or 0...10V), which facilitates efficient management and control of external devices.

Through the platform and/or display unit, all information recorded by the DIO-4/2 and AIO-2/2 modules can be viewed in real time on the local display unit or platform, providing users with an efficient and convenient operating experience.

Models:

- Starline_DIO-4/2
- Starline_AIO-2/2

1.2 Main Features

Module Name	DIO-4/2	AIO-2/2
Application scenarios	Logical status monitoring - Alarm linkage - Signal counting	Environmental parameter monitoring (such as pressure, humidity, temperature, etc.) - Industrial equipment control
Inputs	4 digital inputs	2 analog inputs
Input signal type	- Dry contact input (passive signal)	- Supports 4-20mA current input - Programmable support for 0-10V voltage input
Input function	- Status monitoring: monitor the circuit breaker OF, SD or device status - Count and record the number of input pulses	Collect analog signals to achieve accurate environment and device monitoring
Outputs	2 transistor outputs	2 analog outputs
Output signal type	- Passive output - Support 48VDC/50mA or 24VAC/ 100mA output	- Support 4-20mA current output - Support 0-10V voltage output - Linear control signal output
Output function	- Remote logic control - Input events trigger alarm output	- Alarm linkage: triggering in association with input events (such as over limit, status change)
Shell width	18mm	18mm

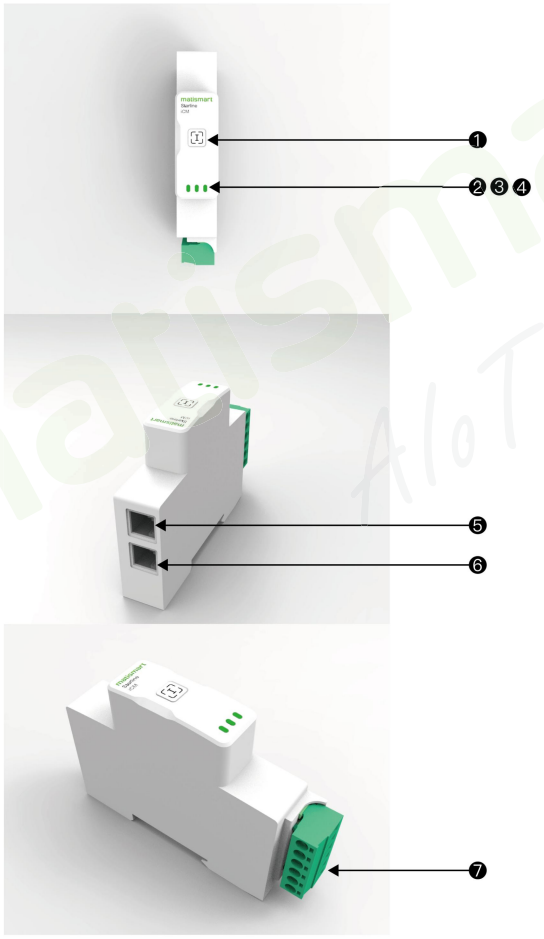
2 Product Advantages

2.1 Functions and Advantages

Functions	Advantages
Plug and Play	The IO module adopts a fast RJ12 interface design, which supports quick installation and can be easily integrated into existing measurement and control systems without complicated operations.
Multifunction	Through the flexible combination of voltage measurement modules, current measurement modules and IO modules, a comprehensive measurement and control solution is built to meet the needs of multiple scenarios.
Easy to connect	All data collected by the module can be seamlessly transmitted to the display unit or management platform, supporting centralized management and real-time monitoring.
Compact structure and flexible expansion	The modular design supports the quick connection of multiple IO modules (such as DIO-4/2 and AIO-2/2), which can expand system capacity and save installation space.

3 Description

3.1 IO Port Module



1. Configuration button

2. Device status LED

3. COM status LED

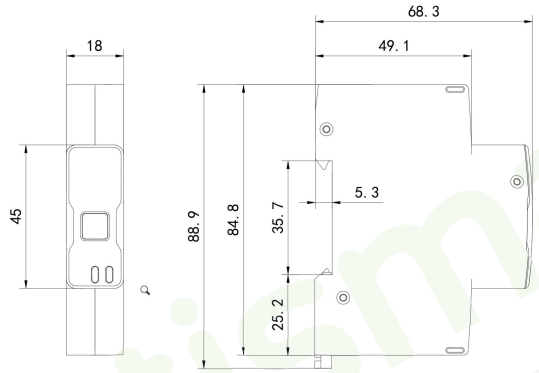
4. Fault indicator

5\6. RJ12 cascade interface

7. Terminal block

4 Hardware

4.1 Dimensions (mm)



5 Installation and Wiring

5.1 Wiring Diagram

6 LED Indicator

Running LED indicator

Name	LED indication	Status
RUN indicator (green, red)	Green light flashes (1 flash/second)	The device is running normally
	Red light is steady on	Communication fault
	Red light flashes (2 flashes/second)	Configuration issues

Communication LED indicator

Name	LED indication	Status
COM indicator (blue)	Blue light flashes (normal)	Serial data transmission or reception
	Blue light off	No data transmission or reception

7 Electrical Characteristics

7.1 Characteristics

Digital module DIO-4/2

Characteristics	Parameters
Inputs	4
Input type	Dry contact input (passive signal), supports logic status monitoring and high-speed pulse counting
Input voltage range	12-48VDC, built-in current limiting protection, maximum current 3mA
Input function	- Logical status monitoring: monitor device status (such as on/off, trip count) - High-speed pulse counting: support counting of signals below 100kHz
Outputs	2
Output type	Relay output, supports: - 48VDC/1.25A , - 24VAC/2.5A - 220VDC/250mA , - 277VAC/200mA
Output function	Remote logic control: realize remote operation of device - Alarm linkage: input event triggers output alarm signal
Reliability design	- The input end uses relays, which has strong anti-interference ability
Response speed optimization	- Input response time ≤10ms, meeting high-speed signal monitoring requirements - Output response time ≤20ms, achieving fast action
Extended functions	- Provide multi-channel support, for example, two modules can be expanded to 8 inputs/4 outputs

Analog module AIO-2/2

Characteristic	Parameter
Inputs	2
Input signal type	- Input 1, support 4-20mA current input - Output 2, support 0-20mA current input
Input impedance	Current input: <200Ω Voltage input: >10kΩ
Input function	Environmental monitoring: can connect pressure, humidity, temperature, flow and other sensors to achieve multi-dimensional parameter acquisition
Outputs	2
Output signal type	- Output 1, support 4-20mA current output - Output 2, support 4-20mA current output
Output function	- Linkage control: trigger output actions based on input events - Linear signal output: suitable for industrial control systems or alarm equipment
Compatibility design	High compatibility, support multiple sensor types and industrial equipment
Anti-interference design	- The input end adopts anti-interference design to suppress external noise interference - The output end has voltage and current stabilization protection to improve system stability
Responsiveness optimization	Input response time ≤15ms, output response time ≤20ms
Extended function	The output signal supports user programmable adjustment to meet the needs of complex control scenarios

7.2 Mechanical Characteristics

Characteristics	Parameters
Shell type	DIN rail or backplane mounting
Shell protection grade	IP20
Weight	g
Module power consumption	VA

7.3 Environmental Characteristics

Characteristics	Parameters
Operating temperature	-10 ~ 55 ℃
Storage temperature	-25 ~ 70 ℃
Relative humidity	5% ~ 95% (non-condensing)
Altitude	Below 2000 meters above sea level

7.4 Communication Specifications

Characteristics	Parameters
BUS Line	
Function	Connection between U, E modules and system interface
Cable type	Cable with Starline Bus (RJ12) connector
Protocol	MODBUS RTU on DC-PLC