KYIO-L Series Remote I/O
Operation Manual

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KYLAND

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Content

1 Product Overview

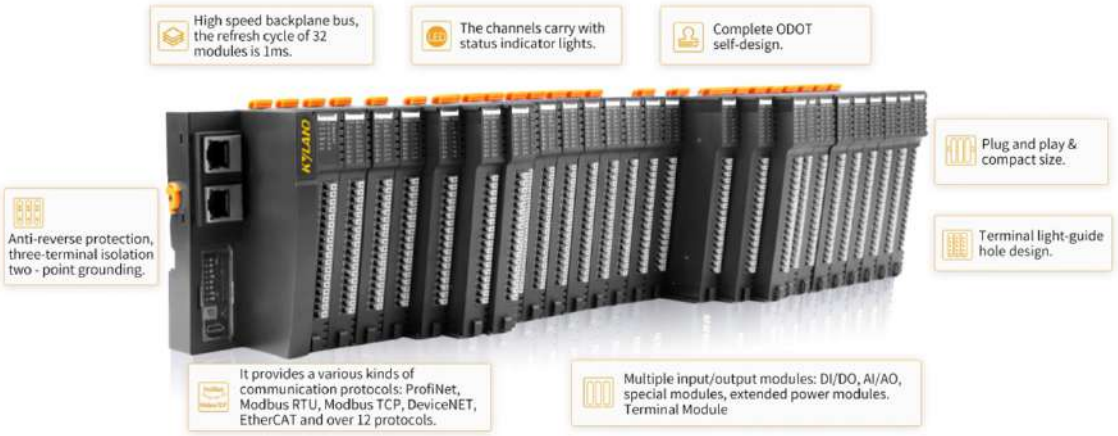
Remote IO system consists of network adapter module and extended IO module. The network adapter module controls fieldbus communication and it realizes communication link with host station controller or host computer software.

The extended IO module controls the connection with the input and output sensors in the field. At first the Input IO module collects the field signals and sends it to the network adapter through the internal bus. Secondly the controller reads and processing data from the adapter through the field bus, and it writes the output data into the network adapter, then the network adapter could write the output data into the output IO module via the internal bus, so the field equipment control could be realized.

According to the communication interface of the controller system, the network adapter could select the corresponding bus module and mainstream industrial communication protocols including Modbus, Profibus-DP, Profinet, EtherCAT, EtherNet/IP, CANsopen, CC-Link, PowerLink, etc. And there are 6 categories of extended IO modules such as: digital input module, digital output module, analog input module, analog output module, special module, hybrid IO module, etc.

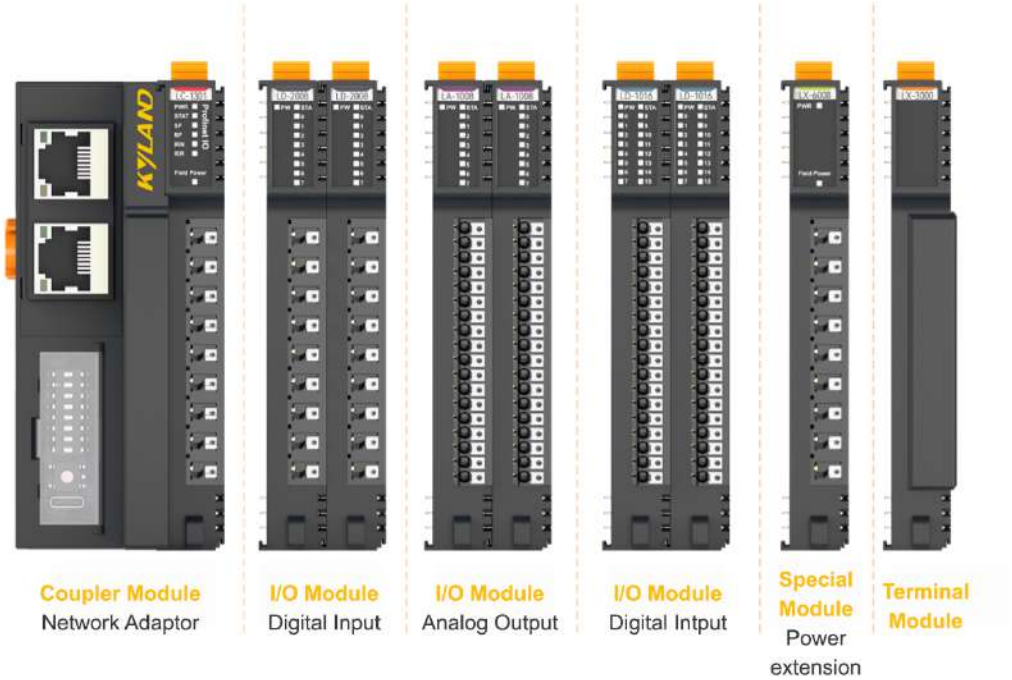
The network adapter and the extended IO module could be freely combined according to the field requirements, and it could achieve lower cost with the Remote IO module when the project requires more data points.

1.1 Module Feature



1.2 Module Layout

The ODOT-C series is a remote I/O module. The adapter module lies on the far left, and on the right are extended I/O modules.

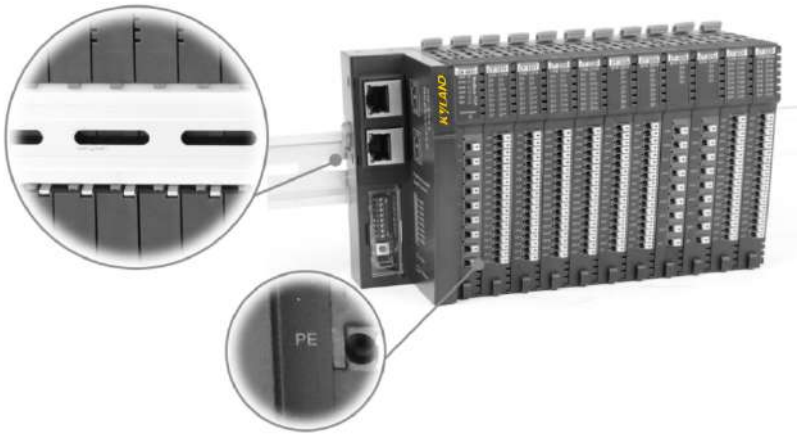


1.3 LED Indicators

The user can easily check the power state of adapter and I/O module, I/O module operating state, and the number of I/O channels though LED state. And the detailed indicator state should refer to the related adapter or IO modules.

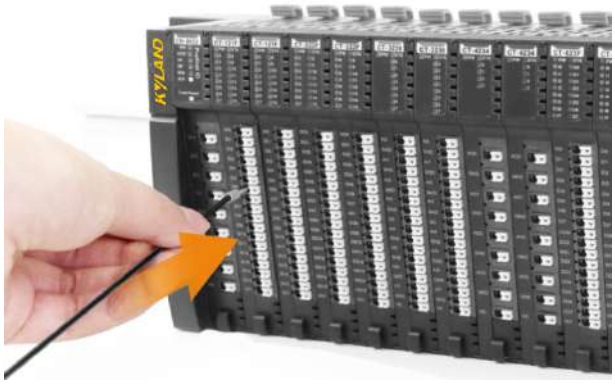
1.4 Ground Protection

There is one metal Spring sheet on the back of the module, which is used for effective grounding with the guide rail. The metal spring sheet and the adapter PE (protective earthing) are connected internally.

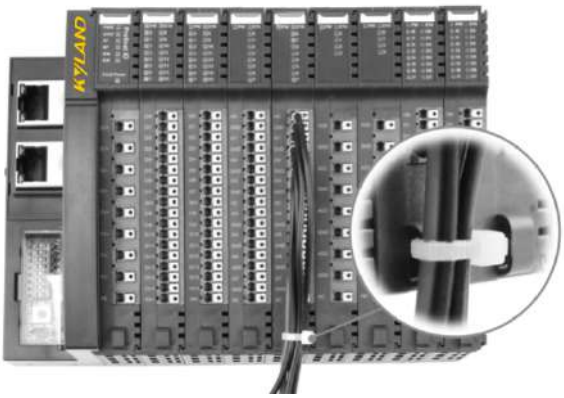


1.5 Wiring

Use push-in method to connect single-wire or crimp terminal wires without any other tools. Users can save wiring time and ensure a safe operation regardless of wiring experience.

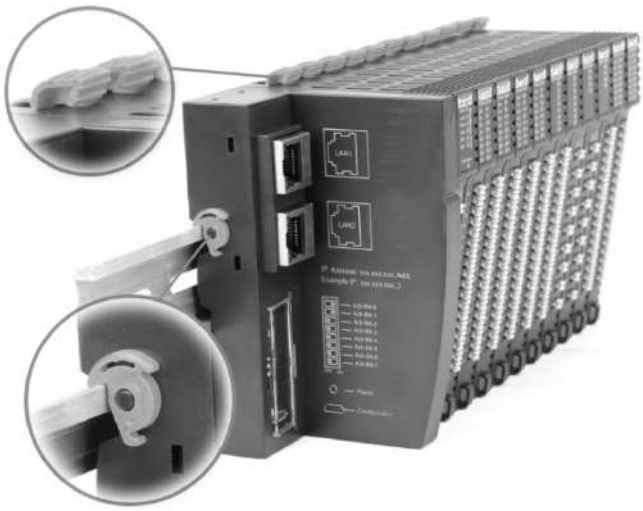


The module equips with a wiring fixed end for cable harness, which is used to fix the cable when the IO module is wired with multiple cables.

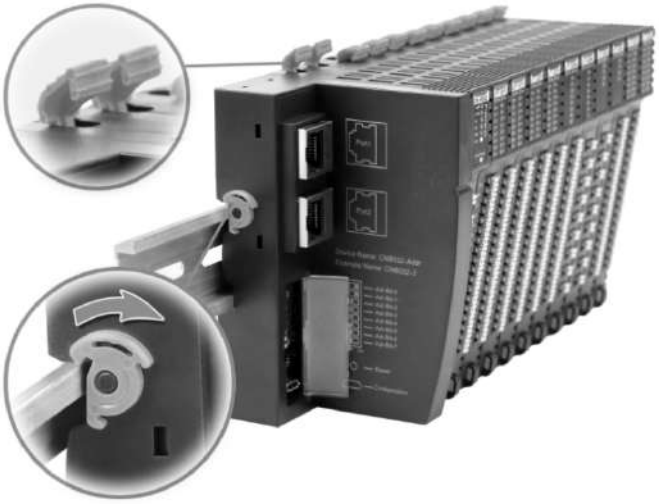


1.6 Installation and Removal

DIN-Rail Lock could be safely and reliably installed on 35 mm DIN-Rail. There is a manual closure buckle on the upper side of all modules for locking, and a manual buckle is on the left side of the adapter for locking the guide rail.



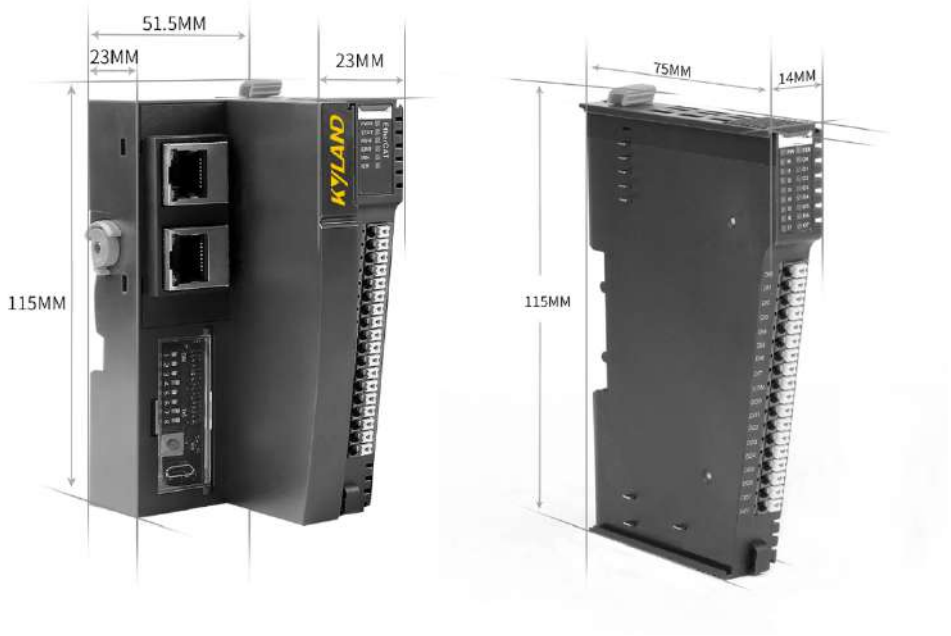
When the module is removed, it needs to manually unlock the guide rail on the upper side of the module. For the adapter module, you also need to unlock the left rail buckle counterclockwise.



1.7 Installation Size

Adapter size: 115*51.5*75mm

I/O module size: 115*14*75mm



2 BUS Adapter & Network Adapter

LC-1101 Modbus TCP Network Adapter

1 Module Overview

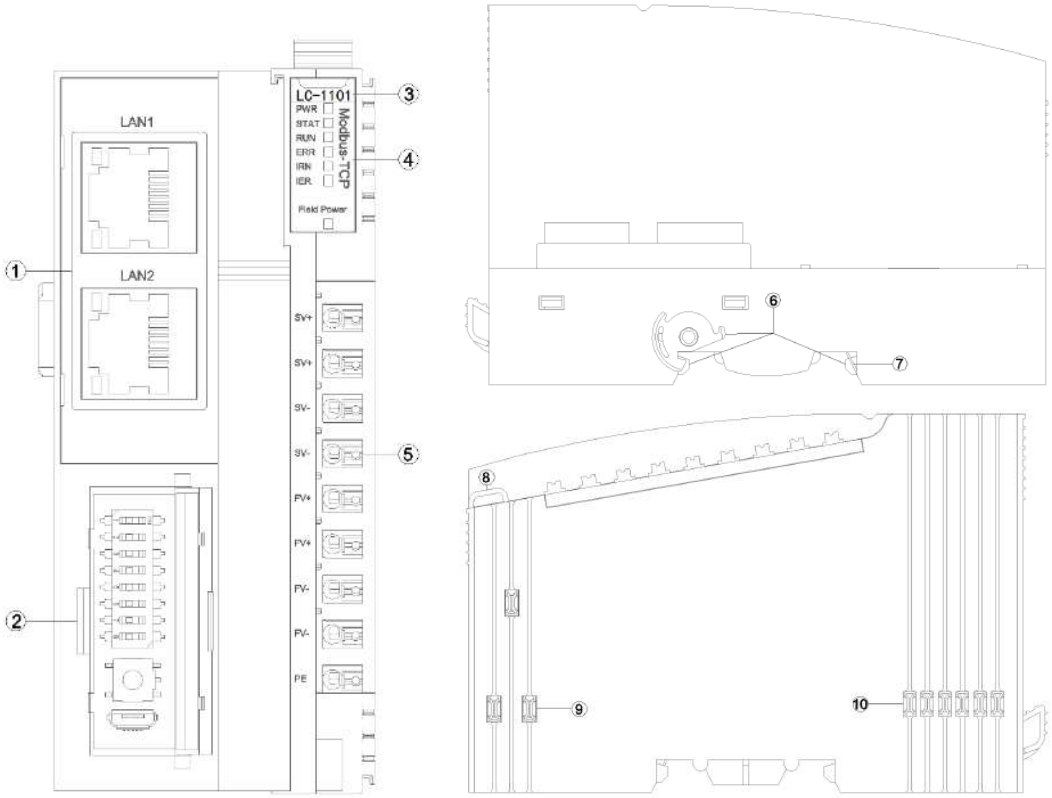
LC-1101 Modbus TCP Network Adapter supports the standard Modbus TCP Server Communication, and Ethernet supports the cascade function of dual-port switches. This adapter supports access to 5 Modbus TCP clients simultaneously, supports Modbus function code 01/02/03/04/05/06/15/16 /23, supports the Modbus application of watchdog, supports the process data maximum sum of input and output of 8192 bytes, and supports number of the extension IO module of 32. Module carries with the diagnostic function and it can monitor the communication state of IO module in real time.

2 Technical Parameters

Hardware Specification	
System Power	Nominal:24Vdc, Range: 9-36Vdc Reverse Protection: YES
Power Consumption	50mA@24Vdc
Current Output	Max.2.5A@5VDC
Isolation	System Power to Field Power Isolation
Field Power	Nominal:24Vdc, Range:22-28Vdc
Field Power Current	Max. 8A
IO Modules Supported	32 pcs
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*51.5*75mm
Weight	130g
Environment Specification	
Operation Temperature	-40~85℃
Operation Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Communication Interface Specification	
Protocol	Modbus-TCP
Process Data Area	Sum of input and output:8192 Byte
Diagnostic Function	Supported
Number of TCP	5 Clients
TCP Keepalive	YES
Modbus Watchdog	YES (Default: Enable, 30 Seconds)
Function Code	01/02/03/04/05/06/15/16/23

Network Interface	2*RJ45
Speed	10/100Mbps, MDI/MIDX, Full-Duplex
Distance	100m
IP Address	DIP switch set or IO-Config software set

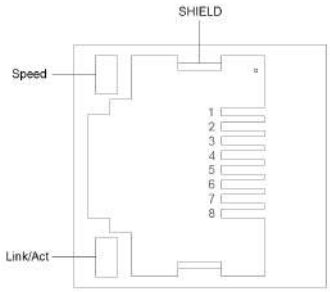
3 Hardware Interface



① Network Interface
② Config Interface
③ Module Type
④ LED Indicator
⑤ Wiring Terminal
⑥ Buckle
⑦ Grounding Spring Sheet
⑧ Fixed Wiring Harness
⑨ Field Power
⑩ Internal Bus

3.1 Network Interface

LAN1/LAN2 support switch function, 10Mbps and 100Mbps data rates, MDI/MID-X auto crossover.

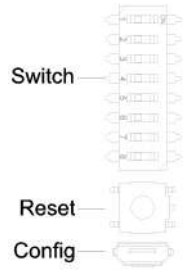


Speed: Network Speed (Green)
ON:100Mbps
OFF:10Mbps
Link/Act: Link State、Active State(Orange)
ON: Link UP
OFF: Link DOWN
Flash: Active
SHIELD: RJ45 Shield Interface

RJ45 Pin definition

Pin	Definition	Description
1	TD+	Transmitter Signal Positive
2	TD-	Transmitter Signal Negative
3	RD+	Receiver Signal Positive
4	--	--
5	--	--
6	RD-	Receiver Signal Negative
7	--	--
8	--	--

3.2 Configuration Interface

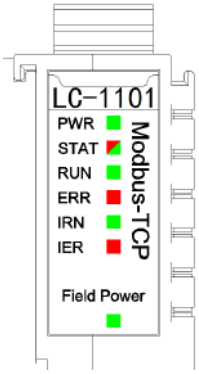


Switch: the DIP switch is used for setting the IP address (the default IP address is 192.168.1.100).
When the dial value is 0, all 4 bytes of the IP address are configured by the software or use the default IP address (192.168.1.100).
When the dial code value is not 0, the last byte of the IP address is determined by the dial code value, and the first three bytes could be configured by the software or use the default address(192.168.1).
The relationship between IP address and dial code value is shown in the following table:

Switch Bit Number (ON: 1, OFF: 0)								Switch Value	IP Address
1	2	3	4	5	6	7	8		
0	0	0	0	0	0	0	0	0	Configured by software
1	0	0	0	0	0	0	0	1	x.x.x.1
0	1	0	0	0	0	0	0	2	x.x.x.2
1	1	0	0	0	0	0	0	3	x.x.x.3
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
0	1	1	1	1	1	1	1	254	x.x.x.254
1	1	1	1	1	1	1	1	255	x.x.x.255
Notice: The default IP address after device reset is 192.168.1.100									

Reset: Module reset button, long pressing the button for more than 5 seconds and all parameters of the module will be restored to the default value. When the Reset button is activated, a green indicator will light up in the upper left corner of the button.
Config: Configure port, a standard Micro USB interface for configuring device parameters and firmware upgrades.

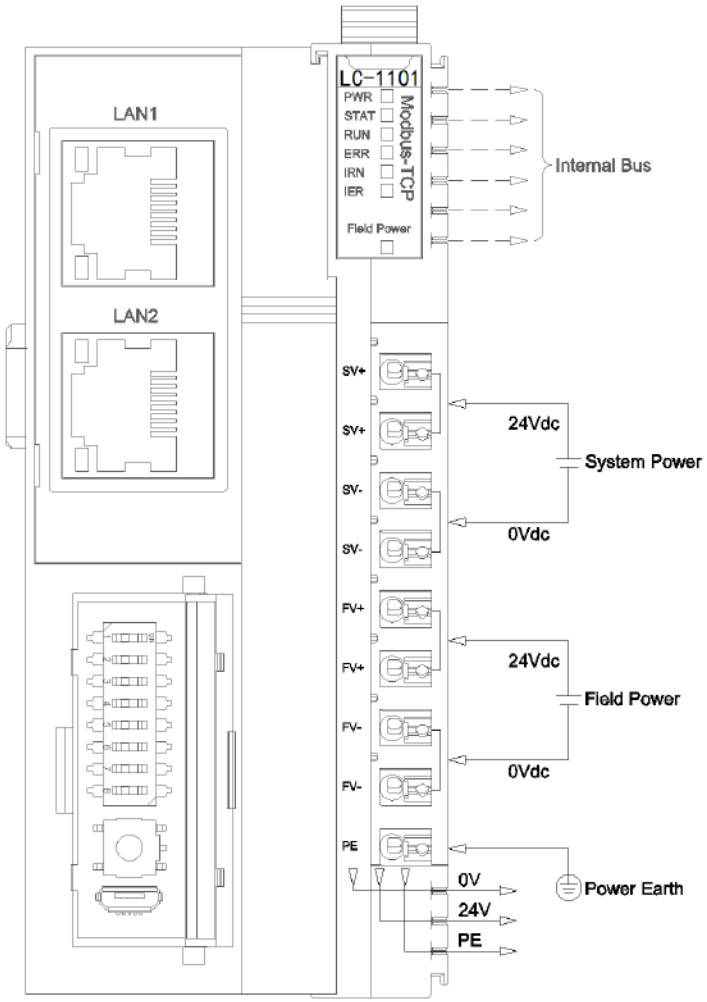
3.3 LED indicator



PWR Power State (GREEN)	Definition
ON	System Power Normal
OFF	System Power Failure
STAT Module State (RED/GREEN)	Definition
Double Flash (RED)	Module Soft Restarted by Hard-Fault
ON(GREEN)	Running
Single Flash (GREEN)	Stopping
Flash(2.5Hz) (RED/GREEN)	Boot Mode
Flash(10Hz) (RED/GREEN)	Firmware Updating
RUN Network State (GREEN)	Definition
ON	Modbus connected
OFF	Modbus disconnected
Flash	Modbus read-write
Quadruple Flash	Led test
Flash(10Hz)	MAC address error
ERR Network Error (RED)	Definition
Flash(2.5Hz)	LAN1 and LAN2 Link-Down
OFF	LAN1 or LAN2 Link-Up
Flash(10Hz)	MAC Address Error
IRN IO Run (GREEN)	Definition
ON	IO initialization normal
OFF	IO initialization failure
IER IO Error (RED)	Definition
OFF	IO communication normal
Double Flash	IO communication failure
Field Power State (GREEN)	Definition
ON	Field Power Normal
OFF	Field Power Failure

4 Wiring

Please note when wiring: for the internal construction, two terminals of SV+ have been short-connected, two terminals of SV- have been short-connected, two terminals of FV+ have been short-connected, and two terminals of FV- have been short-connected. For external it only needs to access one system power supply and one field power supply.



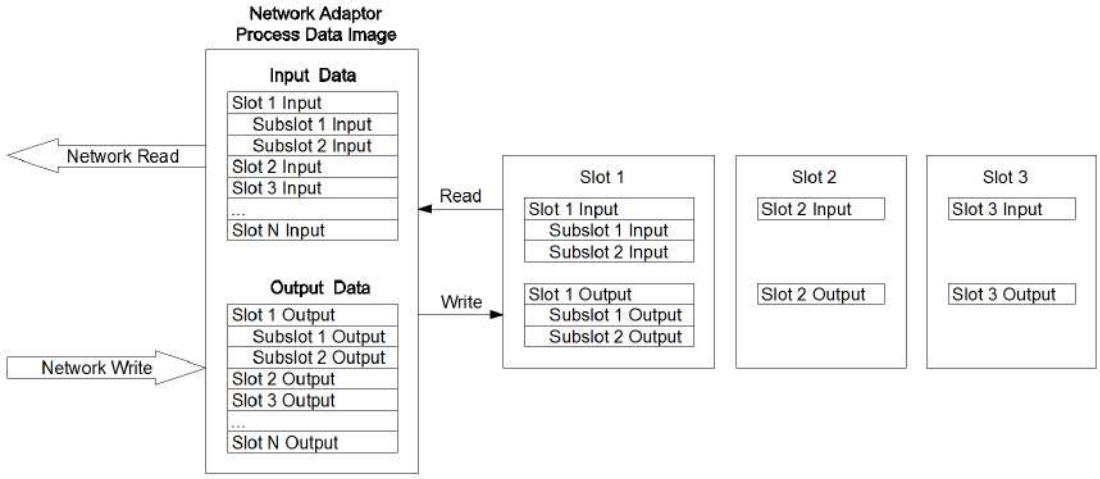
5 Process data definition

5.1 Adapter process data definition

Modbus-TCP adapter itself has no input-output process data.

5.2 IO Module process data mapping

The network adapter reads and writes input and output process data of IO module in real time through the internal bus, and its data mapping model is shown as follow:



Modbus address mapping table varies according to module combination, and the I/O module address mapping table carried by LC-1101 has two modes.
In the 1st mode, it could use the IOConfig configured software to check whether DI is mapped to area 1, DO is mapped to area 0, AI is mapped to area 3, and AO is mapped to area 4. For special module addresses, it could check the address table in the IOConfig configured software.
In another mode, DI, DO, AI, AO, and special module addresses are all mapped to area 4, and they are corresponding to different address ranges respectively. The addresses of special modules are sorted backwards in sequence referred to the address table in IOConfig. And the mapping address ranges are shown in the following table.

Module Type	Address Offset		Read/Write
	Hex	Decimal	
AO	0x0000	0	read & write
DO	0x3000	12288	read & write
AI	0x4000	16384	read only
DI	0x5000	20480	read only

6 Configuration Parameter Definition

Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 0	Reserved	Sniffer Port	Port Mirroring	Reserved	Fault Action for Input	Source of Config Data
Byte 1	MAC Address [0]					
Byte 2	MAC Address [1]					
Byte 3	MAC Address [2]					
Byte 4	MAC Address [3]					
Byte 5	MAC Address [4]					
Byte 6	MAC Address [5]					
Byte 7	IP Address [0]					
Byte 8	IP Address [1]					
Byte 9	IP Address [2]					
Byte 10	IP Address [3]					
Byte 11	Net Mask [0]					
Byte 12	Net Mask [1]					
Byte 13	Net Mask [2]					
Byte 14	Net Mask [3]					
Byte 15	Net Gateway [0]					
Byte 16	Net Gateway [1]					
Byte 17	Net Gateway [2]					
Byte 18	Net Gateway [3]					
Byte 19	Modbus Port					
Byte 20						
Byte 21	Reserved					Watch dog
Byte 22	Watchdog Time(s)					
Byte 23						

Data declaration:

Source of Config Data：Parameter configuration mode (Default: 0)

0：Configuration Software

Fault Action for Input：Input fault handling mode, when IO module is offline, the adapter will process IO module input data according to this mode.

0：Hold Last Input Value

1：Clear Input Value

Port Mirroring： The port mirroring function could mirror the message of adapter network data to LAN1 or LAN2 for output. (Default: 0)
0：Disable
1：Enable
Sniffer Port： Mirror port, which is used to monitor adapter network message data when port mirror function is enabled. (Default: 0)
0：LAN1
1：LAN2
MAC Address: MAC address, read-only property.
IP Address: Adapter IP address, when the value of the dial-code switch is not 0, the last byte of the IP address is replaced by the dial-code value.
Net Mask: Subnet mask.
Net Gateway: Gateway address.
Modbus Port: Modbus-TCP server port number. (Default: 502)
Watchdog: Modbus watchdog. (Default: 1)
0：Disable
1：Enable
Watchdog Time(s): Modbus application watchdog period, when the watchdog is enabled, if there is no Modbus data exchange on the TCP connection in this period, the TCP connection will be disconnected (other TCP connections with data exchange will be remained normally). (Default: 30)

7. System diagnostic area

System diagnostic area is divided into two parts.
The first part: "State input" storage area, address 0x2000 ~ 0x2068, a total of 105 Word.

No.	Storage Type	Description	Storage Capacity	Address Range	Read-write
1	3 Area	System diagnosis - Status input	105 Word	0x2000~0x2068	RO

Modbus client monitors the address area 0x2000~0x2068 by calling Modbus 04 function code to obtain the current working status and error code of the adapter and IO module, the data format is shown as below:

No.	Modbus Address (Decimalism)	Address (Hexadecimal)	Data Name	Description
1	8192	0x2000	Reset Mode	Reset State*
2	8193	0x2001	Reserve	
3	8194	0x2002	DIP switch value	

4	8195	0x2003	Running time - Second	
5	8196	0x2004	Running time - Minute	
6	8197	0x2005	Running time - Hour	
7	8198	0x2006	Running time - Day	
8	8199	0x2007	MAC	Current Device MAC
9	8200	0x2008		
10	8201	0x2009		
11	8202	0x200A	IP	Current Device IP
12	8203	0x200B		
13	8204	0x200C	MASK	Current Device MASK
14	8205	0x200D		
15	8206	0x200E	GATEWAY	Current Device GATEWAY
16	8207	0x200F		
17	8208	0x2010	DI-size	Discrete quantity input area data size
18	8209	0x2011	DO-size	Coil output area data size
19	8210	0x2012	AI-size	Input register area data size
20	8211	0x2013	AO-size	Holding register area data size
21	8212	0x2014	Config-Client-IP	Configured client IP
22	8213	0x2015		
23	8214	0x2016	Config-Client-Port	Configured client port
24	8215	0x2017	Modbus-Client-Number	Connected Modbus client number
25	8216	0x2018	Modbus-Client-1-IP	Client 1-IP
26	8217	0x2019		
27	8218	0x201A	Modbus-Client-1-Port	Client 1-Port
28	8219	0x201B	Modbus-Client-2-IP	Client 2-IP
29	8220	0x201C		
30	8221	0x201D	Modbus-Client-2-Port	Client 2-Port
31	8222	0x201E	Modbus-Client-3-IP	Client 3-IP
32	8223	0x201F		

33	8224	0x2020	Modbus-Client-3-Port	Client 3-Port
34	8225	0x2021	Modbus-Client-4-IP	Client 4-IP
35	8226	0x2022		
36	8227	0x2023	Modbus-Client-4-Port	Client 4-Port
37	8228	0x2024	Modbus-Client-5-IP	Client 5-IP
38	8229	0x2025		
39	8230	0x2026	Modbus-Client-5-Port	Client 5-Port
40	8231	0x2027	Module_Error[0]	Module 0 error code
41	8232	0x2028		
42	8233	0x2029	Module_Error[1]	Module 1 error code
43	8234	0x202A		
44	8235	0x202B	Module_Error[2]	Module 2 error code
45	8236	0x202C		
46	8237	0x202D	Module_Error[3]	Module 3 error code
47	8238	0x202E		
48	8239	0x202F	Module_Error[4]	Module 4 error code
49	8240	0x2030		
50	8241	0x2031	Module_Error[5]	Module 5 error code
51	8242	0x2032		
52	8243	0x2033	Module_Error[6]	Module 6 error code
53	8244	0x2034		
54	8245	0x2035	Module_Error[7]	Module 7 error code
55	8246	0x2036		
56	8247	0x2037	Module_Error[8]	Module 8 error code
57	8248	0x2038		
58	8249	0x2039	Module_Error[9]	Module 9 error code
59	8250	0x203A		
60	8251	0x203B	Module_Error[10]	Module 10 error code
61	8252	0x203C		
62	8253	0x203D	Module_Error[11]	Module 11 error code
63	8254	0x203E		
64	8255	0x203F	Module_Error[12]	Module 12 error code
65	8256	0x2040		
66	8257	0x2041	Module_Error[13]	Module 13 error code
67	8258	0x2042		
68	8259	0x2043	Module_Error[14]	Module 14 error code
69	8260	0x2044		
70	8261	0x2045	Module_Error[15]	

71	8262	0x2046		Module 15 error code
72	8263	0x2047	Module_Error[16]	Module 16 error code
73	8264	0x2048		
74	8265	0x2049	Module_Error[17]	Module 17 error code
75	8266	0x204A		
76	8267	0x204B	Module_Error[18]	Module 18 error code
77	8268	0x204C		
78	8269	0x204D	Module_Error[19]	Module 19 error code
79	8270	0x204E		
80	8271	0x204F	Module_Error[20]	Module 20 error code
81	8272	0x2050		
82	8273	0x2051	Module_Error[21]	Module 21 error code
83	8274	0x2052		
84	8275	0x2053	Module_Error[22]	Module 22 error code
85	8276	0x2054		
86	8277	0x2055	Module_Error[23]	Module 23 error code
87	8278	0x2056		
88	8279	0x2057	Module_Error[24]	Module 24 error code
89	8280	0x2058		
90	8281	0x2059	Module_Error[25]	Module 25 error code
91	8282	0x205A		
92	8283	0x205B	Module_Error[26]	Module 26 error code
93	8284	0x205C		
94	8285	0x205D	Module_Error[27]	Module 27 error code
95	8286	0x205E		
96	8287	0x205F	Module_Error[28]	Module 28 error code
97	8288	0x2060		
98	8289	0x2061	Module_Error[29]	Module 29 error code
99	8290	0x2062		
100	8291	0x2063	Module_Error[30]	Module 30 error code
101	8292	0x2064		
102	8293	0x2065	Module_Error[31]	Module 31 error code
103	8294	0x2066		
104	8295	0x2067	Module_Error[32]	Module 32 error code
105	8296	0x2068		

*Reset state Register 38193 address data format is shown as below:

Addres offset	Aaddress name	Description	Power on default value

Bit 0	Power_On_Reset	Power on reset	0/1
Bit 1-3	Reserved	Reserved	0
Bit 4	External_Reset	External Reset	0/1
Bit 5	Reserved	Reserved	0
Bit 6	Soft_Reset_Request	Soft Reset	0
Bit 7	Reserved	Reserved	0
Bit 8	HardFault	Hard Fault Reset	0
Bit 9	StackOver	Stack Over Reset	0
Bit 10	MemoryOver	Memory Over Reset	0
Bit 11-15	Reserved	Reserved	0

The second part："Control Output" storage area, address 0x2000, a total of 1 Word.

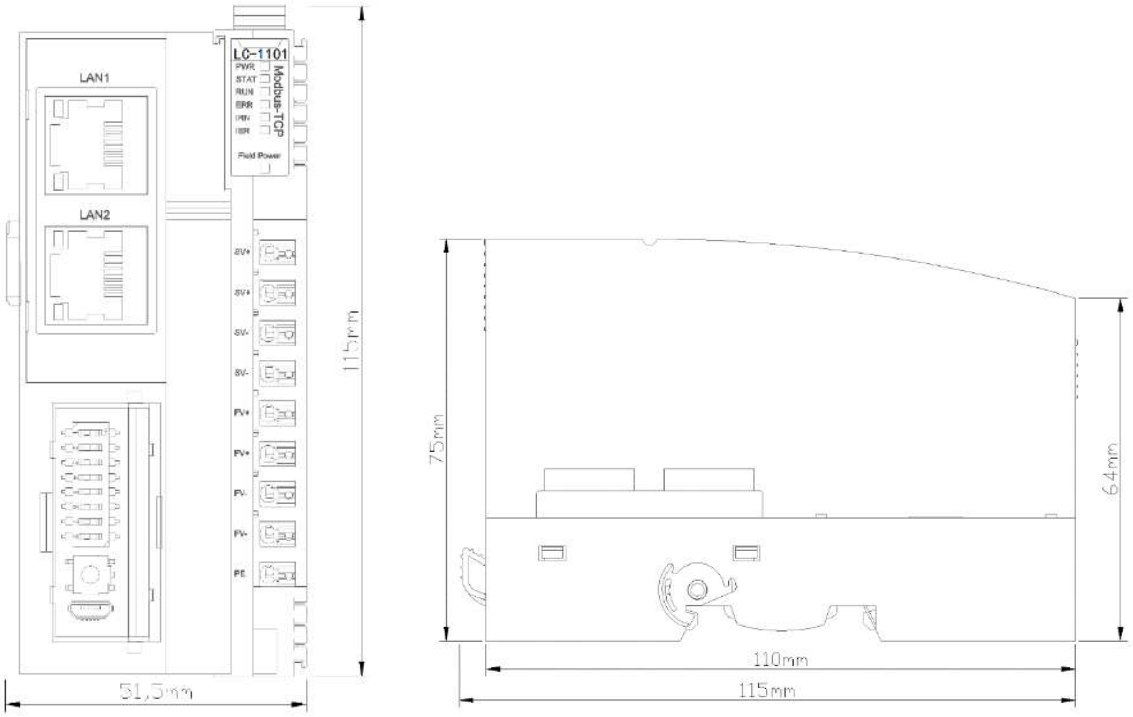
No.	Storage Type	Description	Storage Capacity	Address Range	Read-write
1	4 Area	System diagnosis - Control output	1 Word	0x2000	RW

The Modbus client controls the address 0x2000 by calling Modbus 06/16 function code to implement block reset or port mirroring control.

Register 408193 address data format is shown as below:

Addres offset	Address Name	Description	Value range	Default value
Bit 0	Restart	0->1 Rising edge triggering system reset	0-1	0
Bit1	Port_mirror	Port mirroring function enable 0: disabled 1: enable	0-1	0: disabled
Bit 2	Sniffer_port	Mirror port selection 0:LAN1 1:LAN2	0-1	0:LAN1
Bit 3-15	Reseived	Reserved	0	0

A Dimension Drawing



LC-1201 EtherCAT Network Coupler

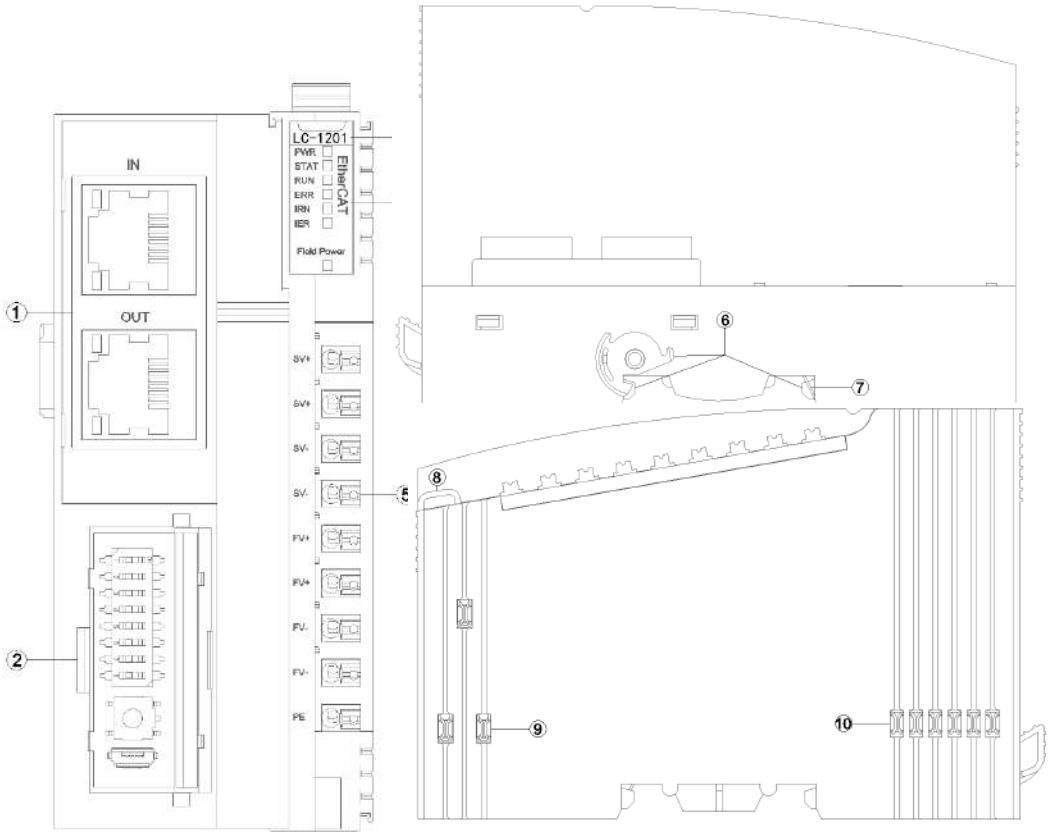
1 Module Overview

The LC-1201 EtherCAT I/O module supports standard EtherCAT protocol access. The coupler supports a maximum input of 1024 bytes and a maximum output of 1024 bytes. The number of supported expansion I/O modules is 32.

2 Technical Parameters

Hardware Specification	
System Power	Nominal:24Vdc, Range: 9-36Vdc Reverse Protection: YES
Power Consumption	50mA@24Vdc
Current Output	Max.2.5A@5VDC
Isolation	System Power to Field Power Isolation
Field Power	Nominal:24Vdc, Range:22-28Vdc
Field Power Current	Max. 8A
IO Modules Supported	32 pcs
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*51.5*75mm
Weight	130g
Environment Specification	
Operation Temperature	-40~85℃
Operation Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
EtherCAT Specification	
Protocol	EtherCAT
Process Data Area	Max input 1024 Byte，Max output 1024 Byte
Network Interface	2*RJ45
Speed	10/100Mbps, MDI/MIDX, Full-Duplex
Distance	100m

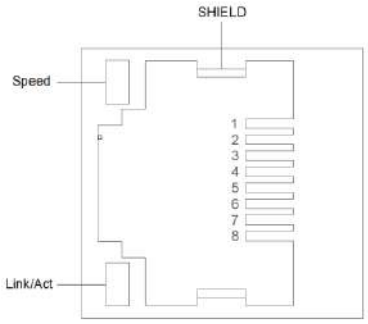
3 Hardware Interface



① Network Interface
② Config Interface
③ Module Type
④ LED Indicator
⑤ Wiring Terminal
⑥ Buckle
⑦ Grounding Spring Sheet
⑧ Fixed Wiring Harness
⑨ Field Power
⑩ Internal Bus

3.1 Network Interface

IN is the EtherCAT input port, OUT is the EtherCAT output port, with a 10M/100M adaptive rate.



Speed: Network speed indicator light (green)

ON:100M

OFF:10M

Link/Act: Link status indicator, Active activity indicator light (orange)

ON:Link UP

OFF:Link DOWN

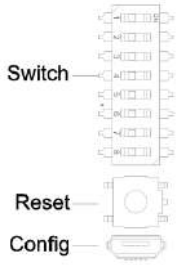
Flash:Active

SHIELD: RJ45 crystal head shield layer interface

RJ45 Interface Pin Definition

Pin	Definition	Description
1	TD+	Transmit+
2	TD-	Transmit-
3	RD+	Receive+
4	--	--
5	--	--
6	RD-	Receive-
7	--	--
8	--	--

3.2 Configuration Interface



Switch: Setting of Station Alias

When the dip switch value is not 0, the dip value is the station alias. The station alias will take effect only after a power-off reboot when the dip switch is set. When the dip switch value is 0, the station alias set by the PLC master station or stored in the EEPROM memory is used.

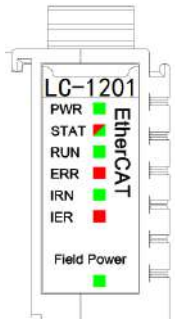
The relationship between the station alias and the dip switch value is shown in the following table:

Switch Bit Number (ON: 1, OFF: 0)								Switch Value	IP Address
1	2	3	4	5	6	7	8		
0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	1	1
0	1	0	0	0	0	0	0	2	2
.	.	.	.	.	.	.	.	.	.
0	1	0	1	0	0	0	0	10	10
.	.	.	.	.	.	.	.	.	.
0	1	1	1	1	1	1	1	254	254
1	1	1	1	1	1	1	1	255	255

Reset: Module reset button. Press and hold the button for more than 5 seconds, and all module parameters will be restored to default values.When the Reset is effective, a green indicator light will illuminate in the upper left corner of the button.

Config: Configuration port, standard MicroUSB interface, used for configuring device parameters and firmware upgrades.

3.3 LED indicator

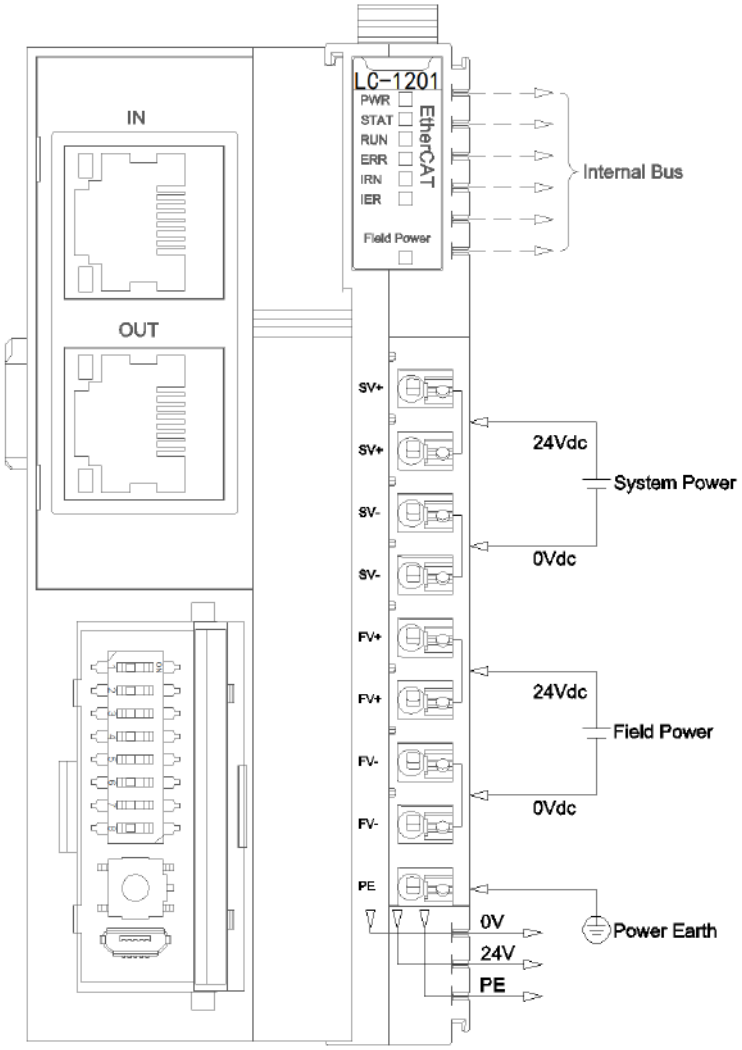


PWR Power State (GREEN)	Definition
ON	System Power Normal
OFF	System Power Failure
STAT Module State (RED/GREEN)	Definition
Double Flash (RED)	Module Soft Restarted by Hard-Fault
ON(GREEN)	Running
Single Flash (GREEN)	Stopping
Flash(2.5Hz) (RED/GREEN)	Boot Mode
Flash(10Hz) (RED/GREEN)	Firmware Updating
RUN Network State (GREEN)	Definition
ON	Operating Status
OFF	Initialization State
Flash(10Hz)	During startup or in BootStrap state
Flash (2.5Hz)	Pre-operational State
Flash	Safe Operating State
ERR Network Error (RED)	Definition
Flash(2.5Hz)	No Error
OFF	Application Control Failure
Flash(10Hz)	Startup Error
Flash (2.5Hz)	Invalid Configuration
Flash	Local Error, Unrequested State Transition
Double Flash	Watchdog Error
IRN IO Run (GREEN)	Definition
ON	IO initialization normal
OFF	IO initialization failure
IER IO Error (RED)	Definition
OFF	IO communication normal
Double Flash	IO communication failure
Field Power State (GREEN)	Definition

ON	Field Power Normal
OFF	Field Power Failure

4 Wiring

Please note during wiring: Internally, two terminals of SV+ are short-circuited, two terminals of SV- are short-circuited, two terminals of FV+ are short-circuited, and two terminals of FV- are short-circuited. Externally, it is only necessary to connect one system power supply and one field power supply.



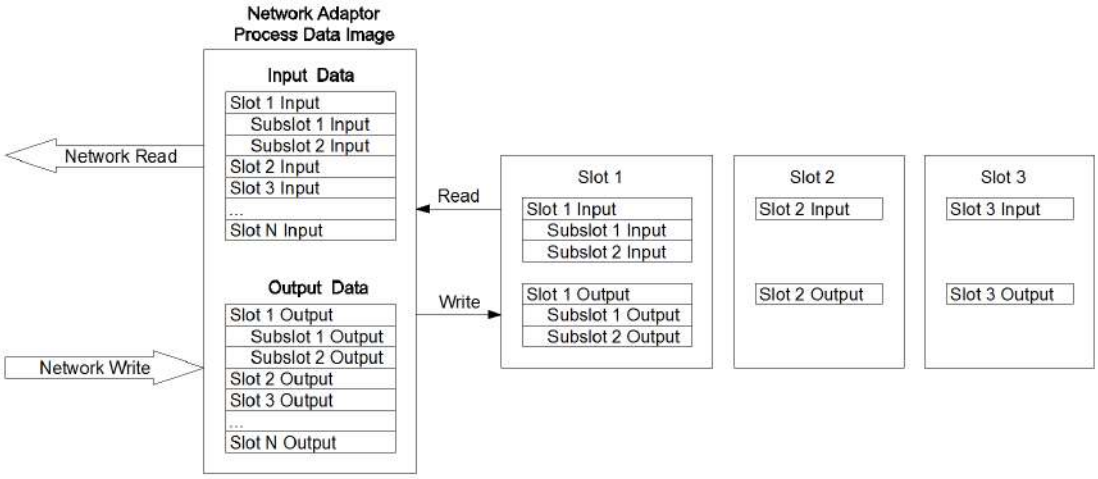
5 Process data definition

5.1 Adapter process data definition

N/A

5.2 IO Module process data mapping

The network coupler reads and writes the process data of the I/O module inputs and outputs in real time through the internal bus. The data mapping model is as shown in the following diagram:



The maximum input byte size of the EtherCAT network coupler is 1024 bytes, and the maximum output byte size is 1024 bytes.

6 Configuration Parameter Definition

Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved					Fault Action for Output	Fault Action for Input	Source of Config Data

Data Description:

Source of Config Data：Method of parameter configuration. (Default value: 0)

0: Configuration software settings

1: Fieldbus configuration

Fault Action for Input：Method of handling input faults. When an IO module goes offline, the coupler processes the input data of the IO module in this mode. (Default value: 0)

0: Maintain the last input value

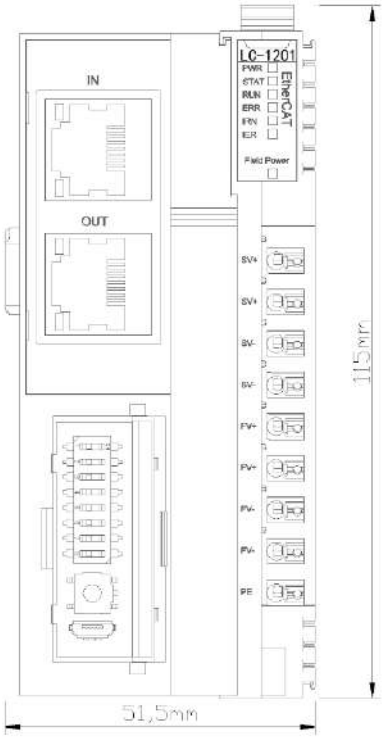
1: Clear the input value

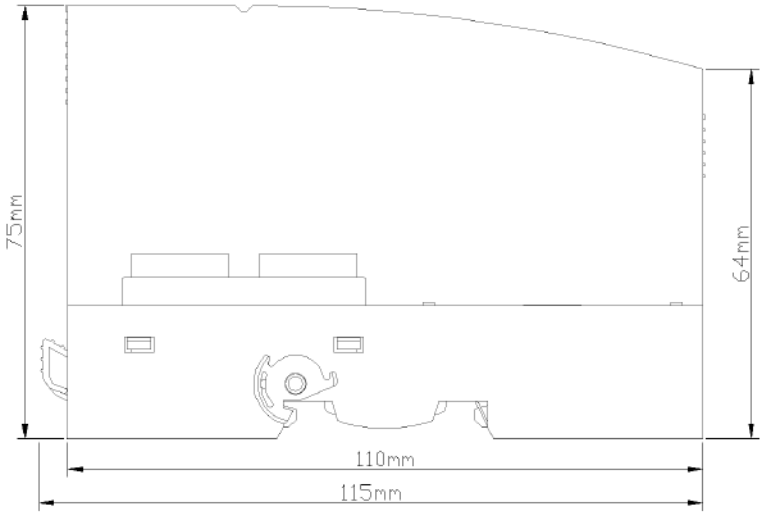
Fault Action for Output：Method of handling output faults. When the fieldbus goes offline, the coupler processes the output data of the IO module in this mode. (Default value: 0)

0: Maintain the last output value

1: Clear the output value

A Dimension Drawing





LC-1301 Profinet Network Adapter

1 The module overview

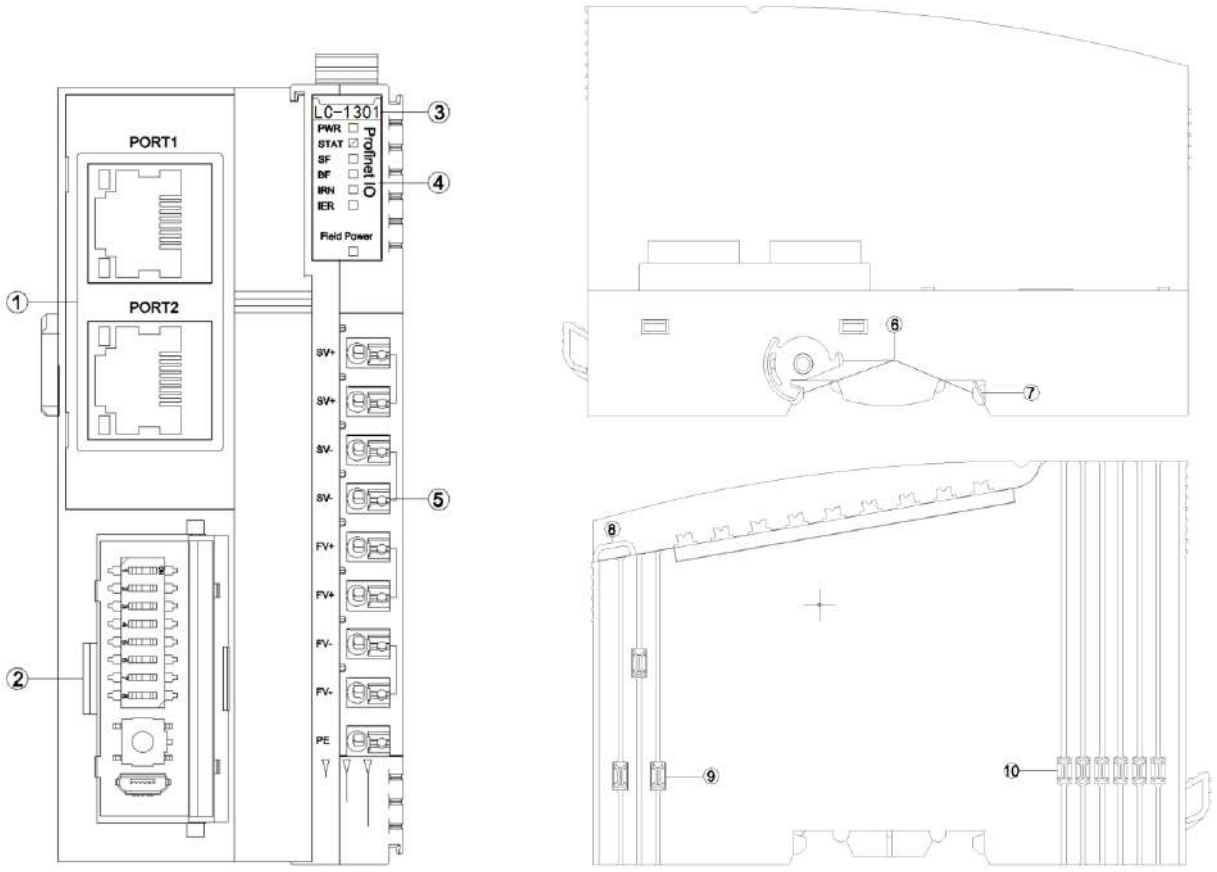
The LC-1301 Profinet network adapter supports standard Profinet IO Device Communication. The adapter supports MRP media redundancy, and it could realize ring network redundancy. And it supports RT/IRT real-time and synchronous communication mode, with its RT real-time communication minimum period of 1ms and IRT synchronous communication minimum period of 250us.The adapter supports a maximum input of 1440 bytes, a maximum output of 1440 bytes, and the number of the extended IO modules it supports is 32.

2 Technical Parameters

Hardware Specification	
System Power	Nominal: 24Vdc, Range: 9-36Vdc Protection: Overcurrent Protection, Reverse Protection: YES
Power Consumption	110mA@24Vdc
Current Output	Max:2A@5Vdc
Isolation	System Power to Field Power Isolation
Field Power	Nominal: 24Vdc, Range: 22-28Vdc
Field Power Current	Max DC 8A
IO Modules Supported	32 pcs
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*51.5*75mm
Weight	130g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Profinet Parameter	
Protocol	Profinet IO Device
I/O Data Size	Input Max 1440 Bytes, Output Max 1440 Bytes
RT	Supported，Min.1ms
IRT	Supported，Min.250us
MRP	Supported
MRPD	Not supported
Network Interface	2*RJ45
Speed	10/100Mbps, MDI/MIDX, Full-Duplex
Max bus distance	100m
Profinet Device Name	DIP switch setting or Profinet monitor modifying

Notice: The adapter does not support the MRPD (Media Redundancy for Planned Duplication) function, so the MRP and IRT functions cannot be used simultaneously.

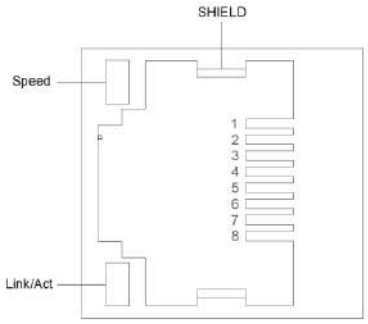
3 Hardware Interface



① Network Interface
② Config Interface
③ Module Type
④ LED Indicator
⑤ Wiring Terminal
⑥ Buckle
⑦ Grounding Spring Sheet
⑧ Fixed Wiring Harness
⑨ Field Power
⑩ Internal Bus

3.1 Network Interface

PORT1 and PORT2 are both Profinet communication port, and support switch function with 10Mbps and 100Mbps data rates, MDI/MID-X auto crossover.

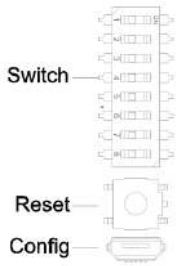


Speed: Network Speed LED (Green)
ON: 100Mbps
OFF: 10Mbps
Link/Act: Link State、Active State(Orange)
ON: Link UP
OFF: Link DOWN
Flash: Active
SHIELD: RJ45 Shield Interface

RJ45 Pin definition

Pin	Definition	Description
1	TD+	Transmitter Signal Positive
2	TD-	Transmitter Signal Negative
3	RD+	Receiver Signal Positive
4	--	--
5	--	--
6	RD-	Receiver Signal Negative
7	--	--
8	--	--

3.2 Configuration Interface



Switch: The DIP switch is used to set the name of Profinet device.
When the DIP switch value is 0, the device default name is cn8032-addr, and it could use Profinet monitor to set the device name online.

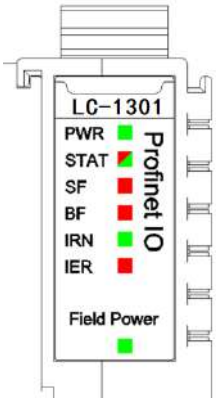
When the dial-code switch value is not 0, the device name is determined by the value of the DIP switch. The relationship between the device name and the dial value is shown in the following table:

Switch Bit Number(ON:1,OFF:0)								Switch Value	Profinet Deice Name
1	2	3	4	5	6	7	8		
0	0	0	0	0	0	0	0	0	Configured By Software (Default:cn8032-addr)
1	0	0	0	0	0	0	0	1	cn8032-1
0	1	0	0	0	0	0	0	2	cn8032-2
.	.	.	.	.	.	.	.	.	.
0	1	0	1	0	0	0	0	10	cn8032-10
.	.	.	.	.	.	.	.	.	.
0	1	1	1	1	1	1	1	254	cn8032-254
1	1	1	1	1	1	1	1	255	cn8032-255
Description: Factory default dial code value is 0, the device name is cn8032-addr.									

Reset: Module reset button. All parameters of the module will be restored to the default value after pressing the button for more than 5 seconds. When the Reset button is pressed, a green LED will light up in the upper left corner of the button.

Config: Configure port, a standard Micro USB interface for configuring device parameters and firmware upgrades.
Description: device parameters can be set in Profinet IO controller configuration software.

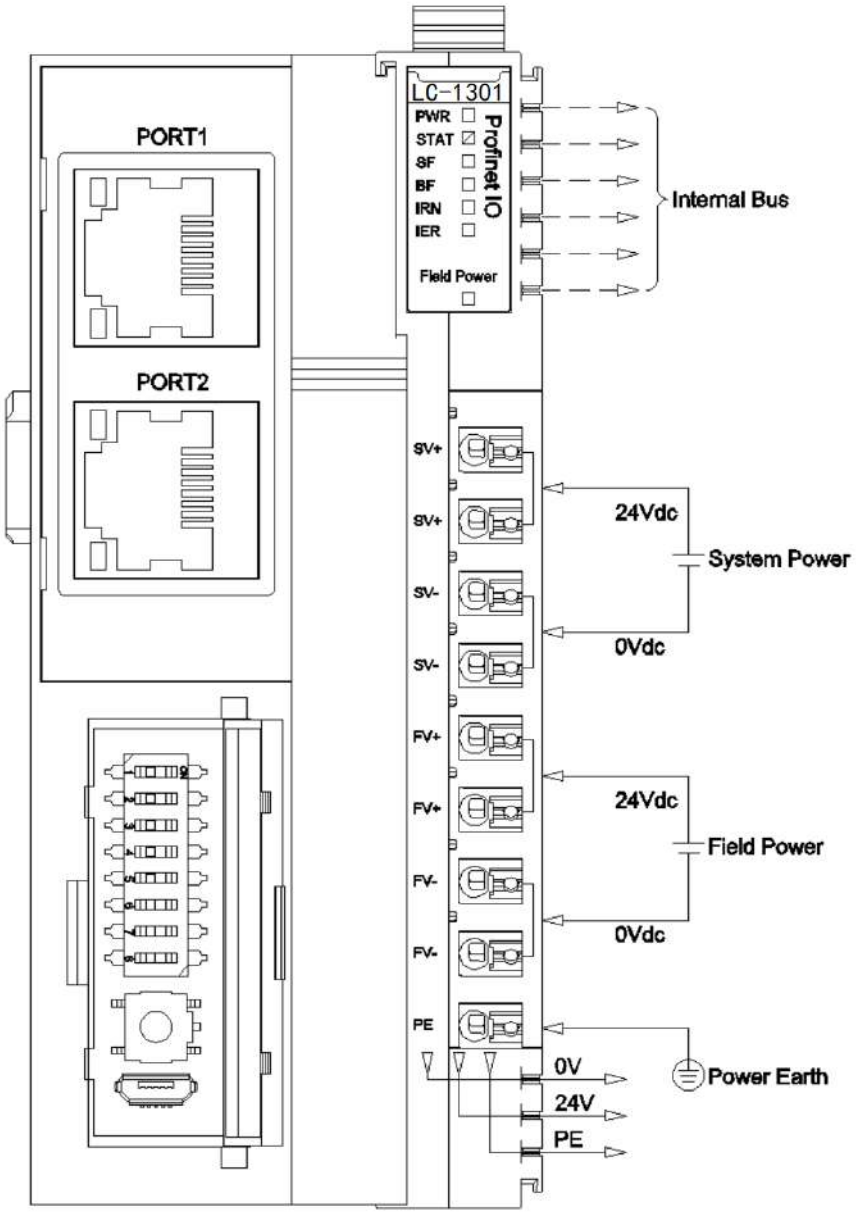
3.3 LED Indicators



PWR Power State (GREEN)	Definition
ON	System Power Normal
OFF	System Power Failure
STAT Module State (RED/GREEN)	Definition
Double Flash (RED)	Module Soft Restart by Hard-Fault
ON(GREEN)	Operating
Single Flash (GREEN)	Stopping
Flash(2.5Hz) (RED/GREEN)	Boot Mode
Flash(10Hz) (RED/GREEN)	Firmware Update
SF System Failure (RED)	Definition
OFF	Normal
ON	System Failure, Topology Error
Flash	Led light test
Flash(10Hz)	MAC address error
BF Bus Failure (RED)	Definition
ON	Port1 and Port2 Link-Down
Flash(2.5Hz)	Offline mode
OFF	Online mode
Flash(10Hz)	MAC address error
IRN IO RUN(GREEN)	Definition
ON	IO initialization normal
OFF	IO initialization failure
IER IO Error (RED)	Definition
OFF	IO communication normal
Double Flash	IO communication failure
Field Power State (GREEN)	Definition
ON	Field Power Normal
OFF	Field Power Failure

4 Wiring

Please note when wiring: for the internal construction, two terminals of SV+ have been short-connected, two terminals of SV- have been short-connected, two terminals of FV+ have been short-connected, and two terminals of FV- have been short-connected. For external it only needs to access one system power supply and one field power supply.



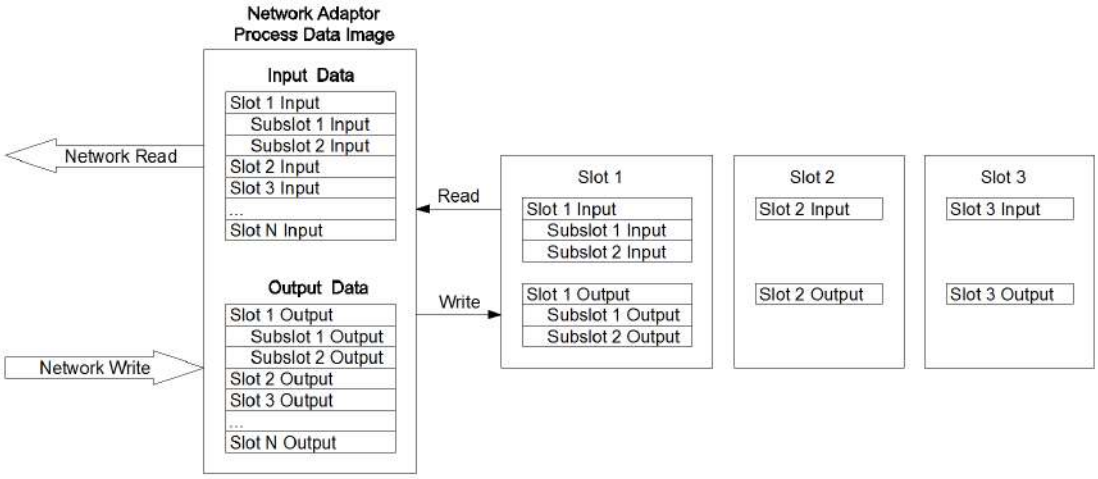
5 Process data definition

5.1 Adapter process data definition

Profinet adapter itself has no input-output process data.

5.2 IO module process data mapping

The network adapter reads and writes input and output process data of IO module in real time through the internal bus, and its data mapping model is shown as follow:



The maximum number of input bytes of the Profinet network adapter is 1440 bytes, and the maximum number of output bytes is 1440 bytes.

6 Configuration parameters definition

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved					Fault Action for Output	Fault Action for Input	Source of Config Data
Byte 1	MAC Address [0]							
Byte 2	MAC Address [1]							
Byte 3	MAC Address [2]							
Byte 4	MAC Address [3]							
Byte 5	MAC Address [4]							
Byte 6	MAC Address [5]							
Byte 7	IP Address [0]							
Byte 8	IP Address [1]							
Byte 9	IP Address [2]							
Byte 10	IP Address [3]							
Byte 11	Net Mask [0]							
Byte 12	Net Mask [1]							
Byte 13	Net Mask [2]							
Byte 14	Net Mask [3]							
Byte 15	Net Gateway [0]							
Byte 16	Net Gateway [1]							
Byte 17	Net Gateway [2]							
Byte 18	Net Gateway [3]							
Byte 19 ... Byte 82	Profinet Device Name							

Data description:

Source of Config Data：Parameter configuration mode (Default: 1)

0：Configure software

1：Field Bus

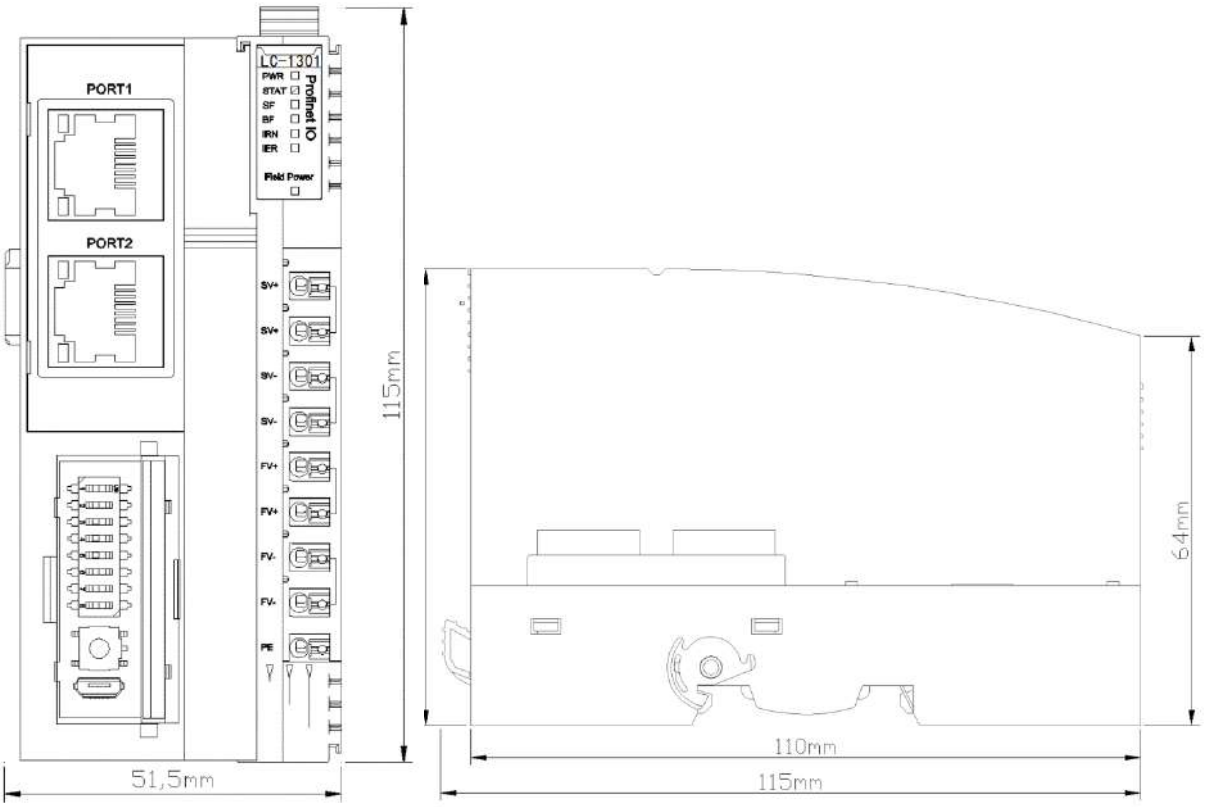
Fault Action for Input：Input fault handling mode, when IO module is offline, the adapter will process IO module input data according to this mode. (Default: 0)

0：Hold Last Input Value

1：Clearing Input Value

Fault Action for Output：Output fault handling mode，when the fieldbus is offline the adapter will process the IO module output data according to this mode. (Default: 1)
0：Hold Last Output Value
1：Clearing Output Value
MAC Address：MAC address, read-only attribute.
IP Address：IP address, read-only attribute.
Net Mask：Subnet mask, read-only attribute.
Net Gateway: Gateway address, read-only attribute.
Profinet Device Name: Profinet device name, read-only attribute. (Device name is determined by the DIP switch)

A Dimension drawing



LC-1401 Ethernet/IP Network Adapter

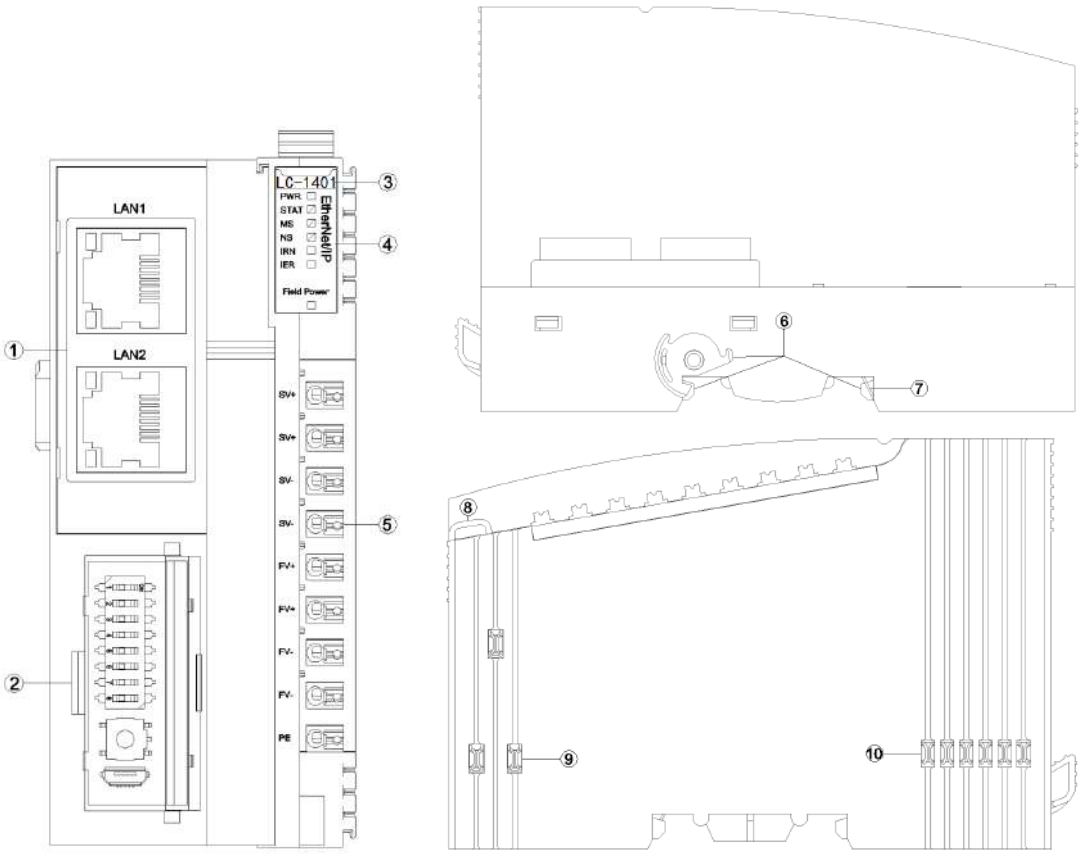
1 The module overview

The LC-1401 Ethernet/IP I/O module supports standard Ethernet/IP protocol access. The adapter supports a Max. input of 504 bytes and a Max. output of 504 bytes. It supports 32 pcs of extended IO modules.

2 Technical Parameters

Hardware Specification	
System Power	Nominal: 24Vdc, Range: 9-36Vdc Protection: Overcurrent Protection, Reverse Protection: YES
Power Consumption	110mA@24Vdc
Internal BUS Supply Current	Max.2A@5VDC
Isolation	System Power to Field Power Isolation
Field Power Supply	Power Supply：22~28V（Nominal 24VDC）
Field Power Supply Current	Max. DC 8A
I/O Modules supported	32 pcs
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm Size DIN-Rail
Size	115*51.5*75mm
Weight	130g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20
Ethernet/IP Parameter	
Protocol	Ethernet/IP
Max. input length	504 Bytes per assembly instance
Max. output length	504 Bytes per assembly instance
Max. no. of explicit message connections	10
Max. no. of implicit message connections	5
Max. no. of CIP connections	10
Network Interface	2*RJ45
Speed	10/100Mbps, MDI/MIDX, Full-Duplex
Max.Bus Legenth	100m

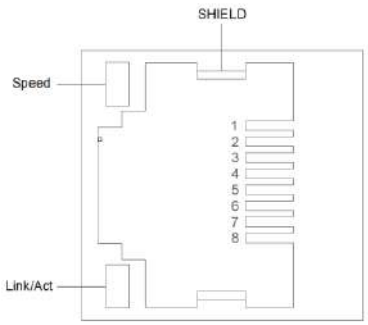
3 Hardware Interface



① Network Interface
② Config Interface
③ Module Type
④ LED Indicator
⑤ Wiring Terminal
⑥ Buckle
⑦ Grounding Spring Sheet
⑧ Fixed Wiring Harness
⑨ Field Power
⑩ Internal Bus

3.1 Network Interface

LAN1/LAN2 are the Ethernet/IP Ethernet port which support switch functions, 10Mbps and 100Mbps data rates, MDI/MID-X auto crossover.

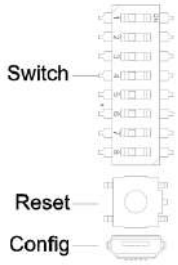


Speed: Network Speed LED Indicator (Green)
ON:100M
OFF:10M
Link/Act: Link State, Active State (Orange)
ON:Link UP
OFF:Link DOWN
Flash:Active
SHIELD: RJ45 Shield Interface

RJ45 Pin definition

Pin	Definition	Description
1	TD+	Transmitter Signal Positive
2	TD-	Transmitter Signal Negative
3	RD+	Receiver Signal Positive
4	--	--
5	--	--
6	RD-	Receiver Signal Positive
7	--	--
8	--	--

3.2 Configuration Interface



Switch: the DIP switch is used for setting the IP address (the default IP address is 192.168.1.200).

When the dial value is 0, all 4 bytes of the IP address are configured by the software or use the default IP address (192.168.1.200).

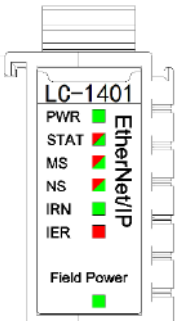
When the dial code value is not 0, the last byte of the IP address is determined by the dial code value, and the first three bytes could be configured by the software or use the default address(192.168.1).

The relationship between IP address and dial code value is shown as below:

Dial - code Switch Bit Number (ON: 1, OFF: 0)								Dial - code switch value	IP Address
1	2	3	4	5	6	7	8		
0	0	0	0	0	0	0	0	0	Configured by software (or default）
1	0	0	0	0	0	0	0	1	x.x.x.1
0	1	0	0	0	0	0	0	2	x.x.x.2
1	1	0	0	0	0	0	0	3	x.x.x.3
.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.
0	1	1	1	1	1	1	1	254	x.x.x.254
1	1	1	1	1	1	1	1	255	x.x.x.255
Note: The default IP address after device reset is 192.168.1.200									

Reset: Module reset button, long pressing the button for more than 5 seconds and all parameters of the module will be restored to the default value. When the Reset button is activated, a green indicator will light up in the upper left corner of the button.
Config: Configure port, a standard Micro USB interface for configuring device parameters and firmware upgrades.

3.3 LED indicator

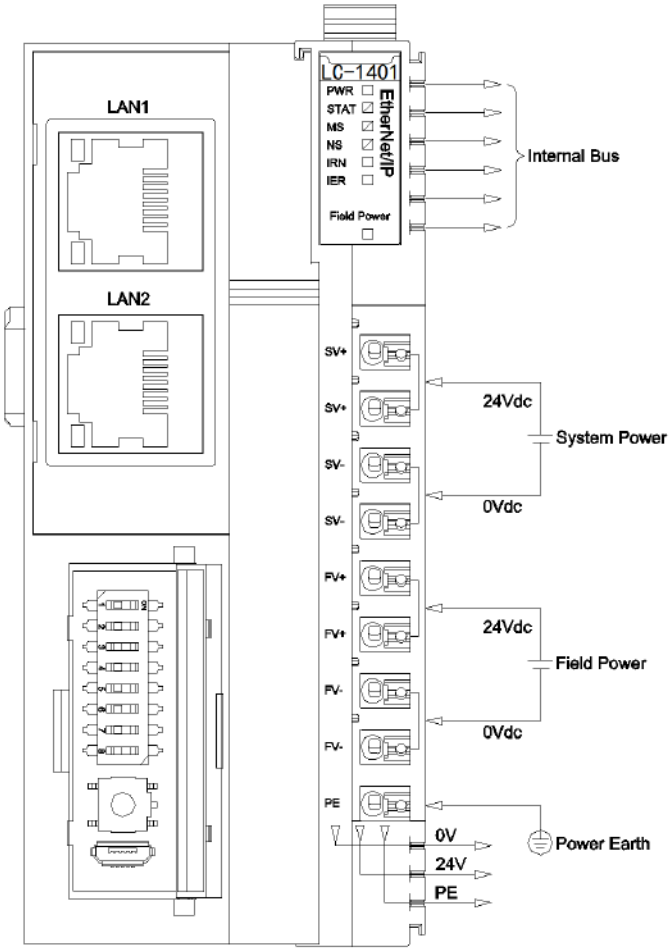


PWR Power State (RED)	Definition
ON	System Power Normal
OFF	System Power Failure
STAT Module State (RED/GREEN)	Definition
Double Flash (RED)	Module Soft Restarted by Hard-Fault
ON(GREEN)	Running
Single Flash (GREEN)	Stopping
Flash(2.5Hz) (RED/GREEN)	Boot Mode
Flash(10Hz) (RED/GREEN)	Firmware Updating
MS module state indicator	Definition
ON(GREEN)	Module running state correct
Flash(1Hz) (GREEN)	Module not configured
Flash(GREEN/RED/GREEN)	Module power on self-test state
Flash(1Hz) (RED)	The module detects a recoverable failure state
Red(GREEN)	The module detects an unrecoverable failure status
OFF	Module power off
NS network state indicator	Definition
ON(GREEN)	The connection has been established.IP address configuration completed, at least one CIP connection established, the master connection does not time out.
Flash(1Hz) (GREEN)	The connection not established.IP address configuration completed, CIP connection not established, the master connection does not time out.
Flash(GREEN/RED/OFF)	Module power on self-test state.
Flash(1Hz) (RED)	The connection times out, IP address configuration completed, the master connection times out.
ON(RED)	Duplicate IP, the IP addressis is already in use.
OFF	Not powered, no IP address.
IRN - IO RUN(GREEN)	Definition
ON	IO initialization normal
OFF	IO initialization failure
IER - IO Error (RED)	Definition

OFF	IO communication normal
Double flash	IO communication failure
Field Power - Indicator	Definition
ON	On-site power supply normal
OFF	On-site power supply abnormal

4 Wiring

Please note when wiring: for the internal construction, two terminals of SV+ have been short-connected, two terminals of SV- have been short-connected, two terminals of FV+ have been short-connected, and two terminals of FV- have been short-connected. For external it only needs to access one system power supply and one field power supply.



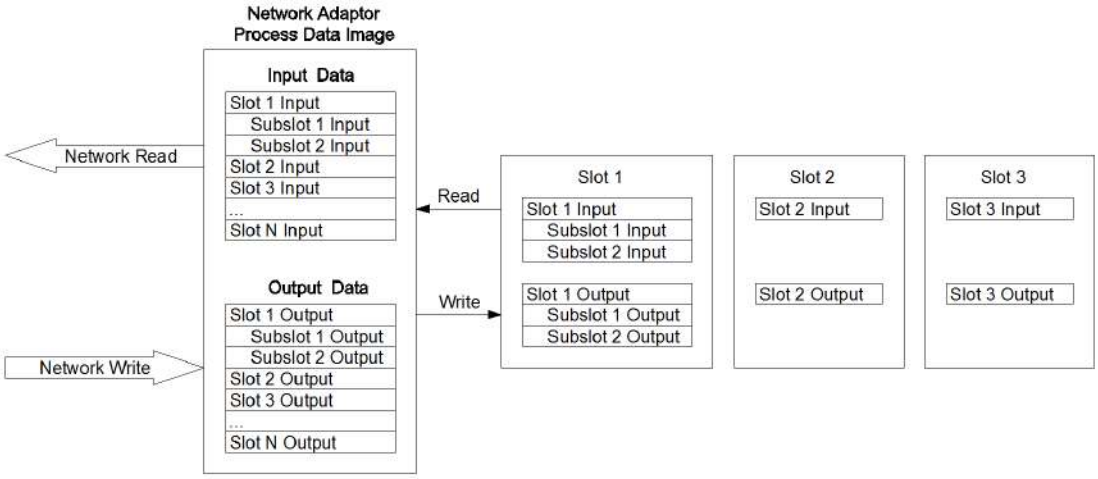
5 Process data definition

5.1 Adapter process data definition

Ethernet/IP adapter itself has no input/output process data.

5.2 IO module process data mapping

The network adapter reads and writes input and output process data of IO module in real time through the internal bus, and its data mapping model is shown as follow:



The maximum number of input bytes of the Ethernet/IP network adapter is 504 bytes, and the maximum number of output bytes is 504 bytes.

6 Configuration parameters definition

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved			O-->T Transfer Format	T-->O Transfer Format	Fault Action for Output	Fault Action for Input	Source of Config Data
Byte 1	MAC Address[0]							
Byte 2	MAC Address[1]							
Byte 3	MAC Address[2]							
Byte 4	MAC Address[3]							
Byte 5	MAC Address[4]							
Byte 6	MAC Address[5]							
Byte 7	IP Address[0]							
Byte 8	IP Address[1]							
Byte 9	IP Address[2]							
Byte 10	IP Address[3]							
Byte 11	Net Mask[0]							
Byte 12	Net Mask[1]							
Byte 13	Net Mask[2]							
Byte 14	Net Mask[3]							
Byte 15	Net Gateway[0]							
Byte 16	Net Gateway[1]							
Byte 17	Net Gateway[2]							
Byte 18	Net Gateway[3]							
Byte 19	T-->O Size (Bytes)							
Byte 20								
Byte 21	O-->T Size (Bytes)							
Byte 22								

Data description:

Source of Config Data：Parameter configuration mode (Default: 0)

0：Configured software configuration

1：Field Bus configuration

Fault Action for Input：Input fault handling mode, when IO module is offline, the adapter will process IO module input data according to this mode. (Default: 0)

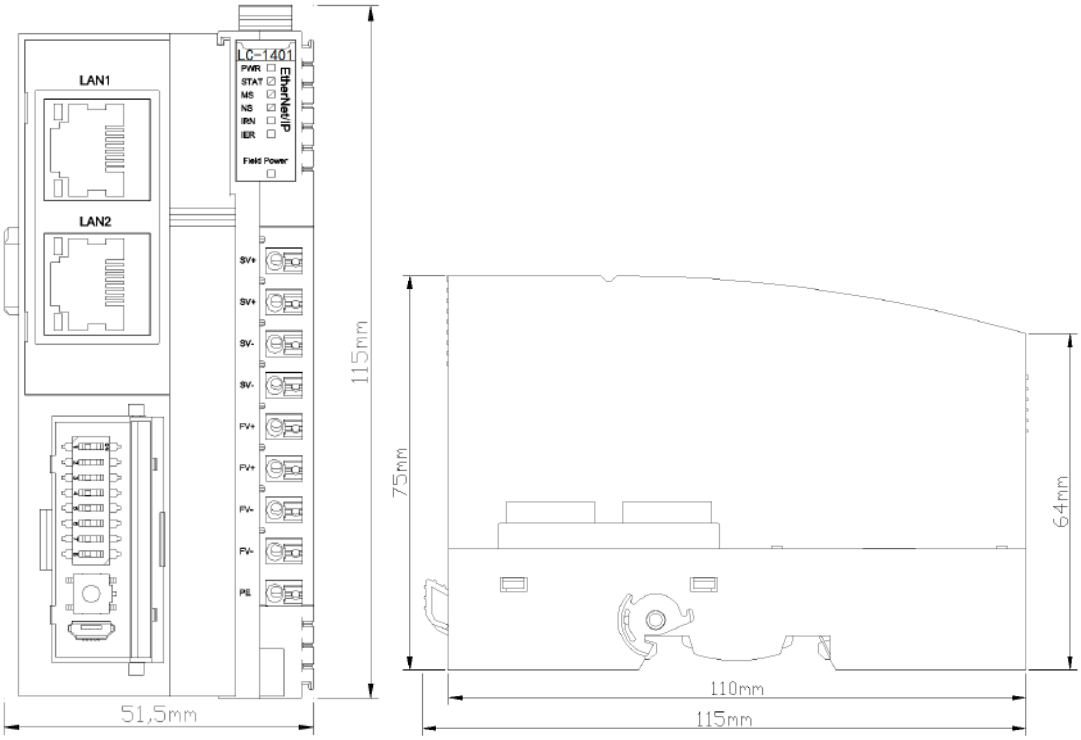
0：Hold Last Input Value

1：Clearing Input Value

Fault Action for Output：Output fault handling mode，when the fieldbus is offline

the adapter will process the IO module output data according to this mode. (Default: 0)
0：Hold Last Output Value
1：Clearing Output Value
T-->O Transfer Format：T-->O Input conversion format, read only.
O-->T Transfer Format：O-->T Output conversion format, read only.
MAC Address：MAC address, read only.
IP Address：IP Addess
Subnet Mask
Gateway Address
T-->O Size (Bytes)：O-->T length (Bytes) , read only.
O-->T Size (Bytes)：O-->T length (Bytes) , read only.

A Dimension drawing



LC-2101 Modbus-RTU Bus Adapter

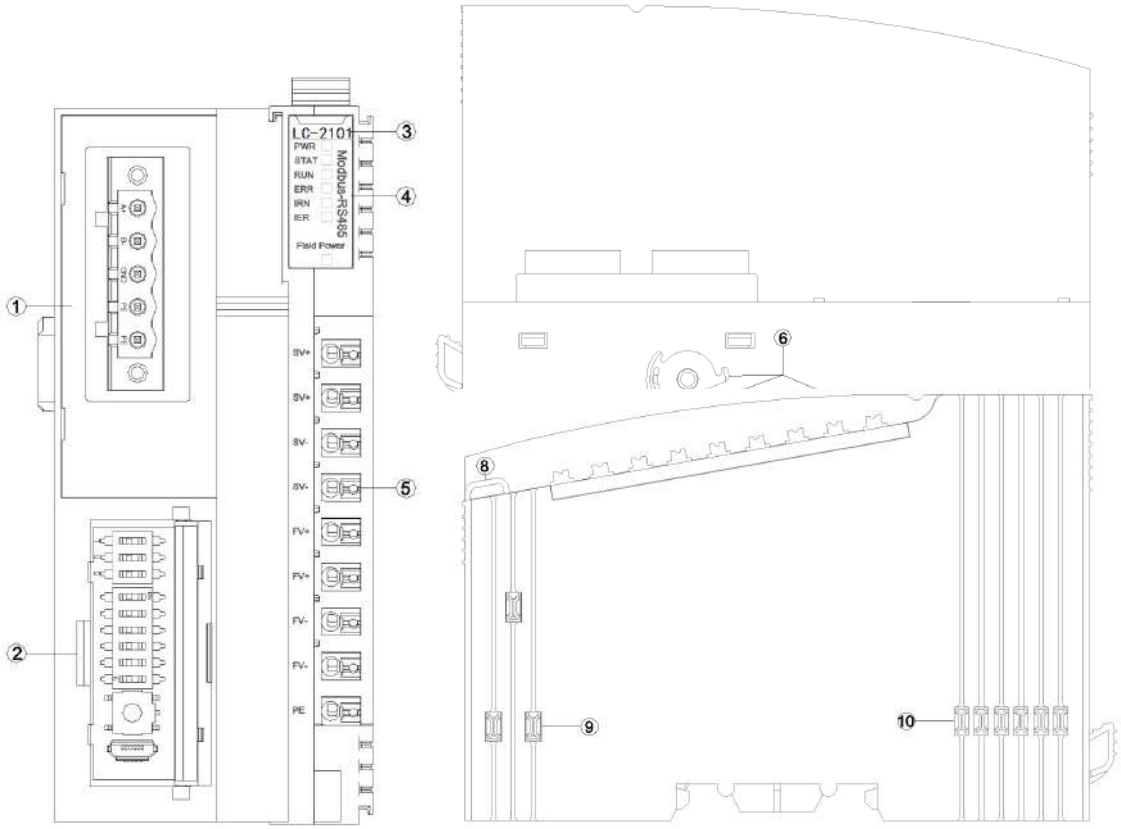
1 Module Overview

LC-2101 Modbus-RTU bus adapter supports standard Modbus-RTU communication, it supports function code of 01/02/03/04/05/06/15/16/23, and this device could monitor the IO module communication state in real time.

2 Technical Parameter

Adapter Hardware Parameter	
System Power	Nominal:24Vdc, Range: 9-36Vdc Reverse Protection: YES
Power Consumption	30mA@24Vdc
Internal Bus Supply Current	Max：2.5A@5VDC
Isolation	System Power to Field Power Isolation
Power Supply	Nominal:24Vdc, Range:22-28Vdc
Field Power Current	Max. DC 8A
IO Modules Supported	32 pcs
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*51.5*75mm
Weight	130g
Environment Specification	
Operation Temperature	-40~85℃
Operation Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Modbus-RTU Parameter	
Protocol	Modbus-RTU/ASCII
Function Code	01 / 02 / 03 / 04 / 05 / 06 / 15 / 16
Baud Rate	2400~115200bps
Station No.	1~63(Dial-code switchconfiguration), 64~247(Software configuration)
Interface	5 Pin screw terminal
Data Bits	7, 8
Parity Checking	None, Even, ODD
Stop Bit	1，2
Max. bus length	1200m（RS485，2400 baud rate）
Terminal resistance and offset resistance	DIP switch configuration

3 Hardware Interface



① RS485 port
② Config Interface
③ Module type
④ LED Indicator
⑤ Wiring Terminal
⑥ Buckle
⑦ Grounding Spring Sheet
⑧ Fixed Wiring Harness
⑨ Field Power
⑩ Internal Bus

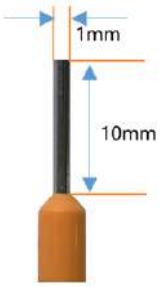
3.1 RS485 Interface

Modbus RS485 port is 5 Pin screw terminals and its Pin definition is as below:

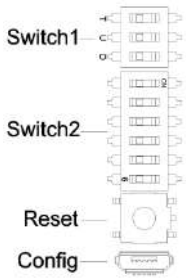
Pin	Definition	Description
1	A+	RS485 A+
2	B-	RS485 B-
3	SGND	Signal Grounded
4	Shield	Earthing of Shield
5	PE	Protect Earthing

It is recommended to use cables with cores smaller than 1mm².

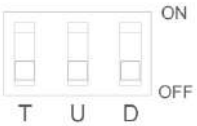
The cold-pressed terminal parameters are as follows:



3.2 Configuration Interface

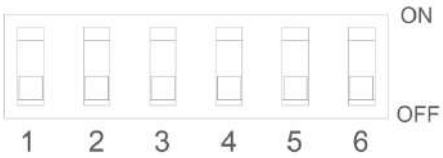


Switch1: DIP switch used to set the terminal resistance, pull up and down resistance.T: terminal resistance, U: pull up resistance, D: pull down resistance.



The Switch2: DIP switch used to set the adapter module address.It is set by an 8-bit binary hardware dial - code switch, and each Modbus adapter has a unique station address (1~63).

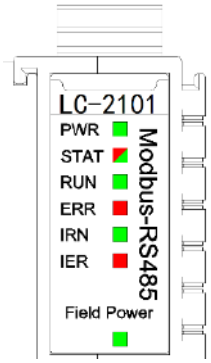
(Special note: When the address needs to be set beyond 63, the address should be dialed to set it to 0, and the station address should be set in IO Config software)



Reset: Module reset button, long pressing the button for more than 5 seconds and all parameters of the module will be restored to the default value. When the Reset button is activated, a green indicator will light up in the upper left corner of the button.

Config: configured ports, it is standard MicroUSB interface for configuring device parameters and firmware upgrades.

3.3 LED Indicator

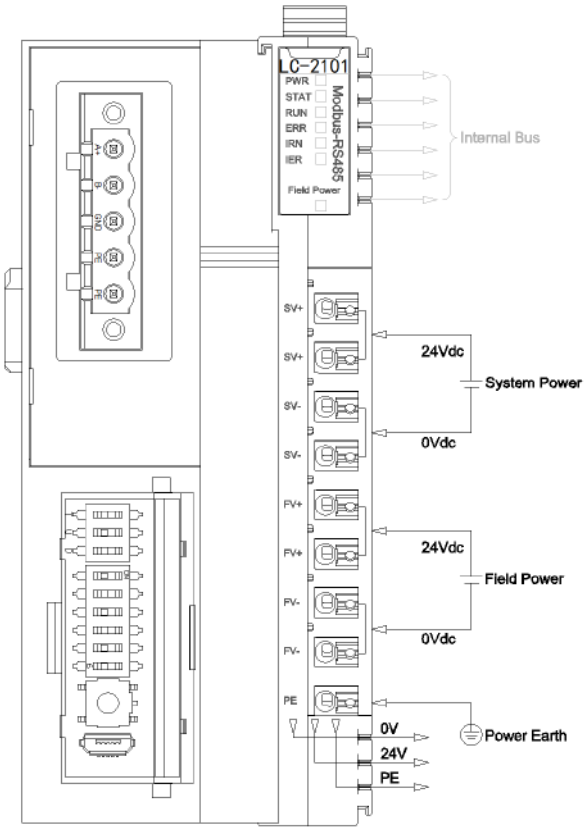


PWR Power State (GREEN)	Definition
ON	System Power Normal
OFF	System Power Failure
STAT Module State (RED/GREEN)	Definition
Double Flash (RED)	Module Soft Restarted by Hard-Fault
ON(GREEN)	Running
Single Flash (GREEN)	Stopping
Flash(2.5Hz) (RED/GREEN)	Boot Mode
Flash(10Hz) (RED/GREEN)	Firmware Updating
RUN Network State (GREEN)	Definition
OFF	No data exchanging.
Flash	Modbus data exchanging
ERR Network Error (RED)	Definition
OFF	Modbus data exchanging normal
ON	Modbus data exchanging failure
IRN IO Run (GREEN)	Definition
ON	IO initialization normal
OFF	IO initialization failure
IER IO Error (RED)	Definition

OFF	IO communication normal
Double Flash	IO communication failure
Field Power State (GREEN)	Definition
ON	Field Power Normal
OFF	Field Power Failure

4 Wiring

Please note when wiring: for the internal construction, two terminals of SV+ have been short-connected, two terminals of SV- have been short-connected, two terminals of FV+ have been short-connected, and two terminals of FV- have been short-connected. For external it only needs to access one system power supply and one field power supply.



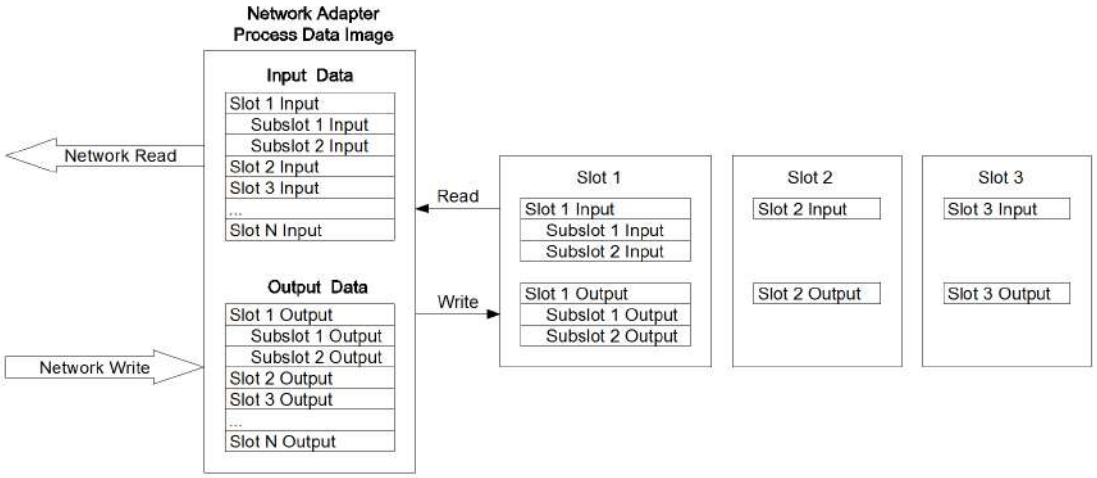
5 Process data definition

5.1 Adapter process data definition

Modbus-RTU Adapter itself has no input-output process data.

5.2 IO Module process data mapping

The network adapter reads and writes input and output process data of IO module in real time through the internal bus, and its data mapping model is shown as follow:



Modbus address mapping table varies according to module combination, and detailed address mapping table could be viewed through IO Config – the configuration software.

6 Configuration Parameter Definition

<table>
<tr><th colspan="9">Configuration Parameter</th></tr>
<tr><th>Bit No</th><th>Bit 7</th><th>Bit 6</th><th>Bit 5</th><th>Bit 4</th><th>Bit 3</th><th>Bit 2</th><th>Bit 1</th><th>Bit 0</th></tr>
<tr><td>Byte 0</td><td colspan="5"></td><td>Fault Action for Output</td><td>Fault Action for Input</td><td>Source of Configuration Data</td></tr>
<tr><td>Byte 1</td><td colspan="8">Slave ID</td></tr>
<tr><td>Byte 2</td><td colspan="8" rowspan="4">BaudRate</td></tr>
<tr><td>Byte 3</td></tr>
<tr><td>Byte 4</td></tr>
<tr><td>Byte 5</td></tr>
<tr><td>Byte 6</td><td colspan="2"></td><td>Serial Mode</td><td colspan="2">Stop Bits</td><td colspan="2">Parity Bits</td><td>Data Bits</td></tr>
<tr><td>Byte 7</td><td colspan="8">Char Pitch</td></tr>
<tr><td>Byte 8</td><td colspan="8" rowspan="2">Response Delay(ms)</td></tr>
<tr><td>Byte 9</td></tr>
</table>

Data declaration:

Source of Config Data：Parameter configuration mode (Default: 0)

0：Configuration Software

Fault Action for Input：Input fault handling mode, when IO module is offline, the adapter will process IO module input data according to this mode. (Default: 0, Hold Last Input Value)

0：Hold Last Input Value

1：Clear Input Value

Fault Action for Output： Output fault handling mode, when the IO module is offline, the adapter will process the IO module output data according to this mode. (Default: 1, Clearing Output Value)

0：Hold Last Output Value

1：Clearing Output Value

Slave ID：Modbus slave ID，hardware dial code or software configuration，1-247

Baud Rate：Serial port baud rate，(Default：2，9600bps)

0：2400bps

1：4800bps

2：9600bps

3：14400bps

4：19200bps

5：38400bps

6：57600bps

7：115200bps

Data Bits: data bits，(default：Bit 1, 8)

0：Bit 7

1：Bit 8
Parity Bits：Parity Checking，(default：0，no parity)
0：None
1：ODD
2：EVEN
Stop Bits：stop bits，(default：Bit 0，1)
0：Bit 1
1：Bit 2
Serial Mode：Serial port mode (default：0，RTU)
0：RTU
1：ASCII
Char Pitch: Character Pitch is the detection time of frame interval when receiving a message (T is the time of single character transmission, related to baud rate) (default: 2, 5 characters)
0：1.5 characters
1：3.5 characters
2：5 characters
3：10 characters
4：20 characters
5：50 characters
6：100 characters
7：200 characters
Response Delay(ms)：Reply delay time from Slave, self-defined, default 10ms, effective range: 0-65535.

7 System Diagnostic Area

Part One: 'Status Input' storage area, address 0x2000-0x2068, a total of 105 words.

S/N	Storage Type	Description	Storage Capacity	Address Range	Read/Write
1	Area 3	System Diagnostics - Status Input	105 Word	0x2000~0x2068	RO

The Modbus client monitors the address area 0x2000~0x2068 by calling the Modbus Function Code 04, which allows it to obtain the current working status and error codes of the coupler and IO modules. The data format is as shown in the following table:

S/N	Modbus Addr (decimal)	Modbus Addr (hexadecimal)	Data Name	Description
1	8192	0x2000	Reset Status	Reset Status* *
2	8193	0x2001	Reserved	
3	8194	0x2002	DIP Switch Value	
4	8195	0x2003	Operating Time - Seconds	
5	8196	0x2004	Operating Time - Minutes	
6	8197	0x2005	Operating Time - Hours	
7	8198	0x2006	Operating Time - Days	
8	8199	0x2007	Nil	Reserved
9	8200	0x2008		
10	8201	0x2009		
11	8202	0x200A	Nil	
12	8203	0x200B		
13	8204	0x200C	Nil	
14	8205	0x200D		
15	8206	0x200E	Nil	
16	8207	0x200F		
17	8208	0x2010	DI-size	Discrete Input Area Data Size

18	8209	0x2011	DO-size	Coil Output Area Data Size
19	8210	0x2012	AI-size	Input Register Area Data Size
20	8211	0x2013	AO-size	Holding Register Area Data Size
21	8212	0x2014	Nil	Reserved
22	8213	0x2015		
23	8214	0x2016	Nil	
24	8215	0x2017	Nil	
25	8216	0x2018	Nil	
26	8217	0x2019		
27	8218	0x201A	Nil	
28	8219	0x201B	Nil	
29	8220	0x201C		
30	8221	0x201D	Nil	
31	8222	0x201E	Nil	Reserved
32	8223	0x201F		
33	8224	0x2020	Nil	
34	8225	0x2021	Nil	
35	8226	0x2022		
36	8227	0x2023	Nil	
37	8228	0x2024	Nil	
38	8229	0x2025		
39	8230	0x2026	Nil	
40	8231	0x2027	Module_Error[0]	Module 0 Error Code
41	8232	0x2028		
42	8233	0x2029	Module_Error[1]	Module 1 Error Code
43	8234	0x202A		
44	8235	0x202B	Module_Error[2]	Module 2 Error Code
45	8236	0x202		

		C		
46	8237	0x202D	Module_Error[3]	Module 3 Error Code
47	8238	0x202E		
48	8239	0x202F	Module_Error[4]	Module 4 Error Code
49	8240	0x2030		
50	8241	0x2031	Module_Error[5]	Module 5 Error Code
51	8242	0x2032		
52	8243	0x2033	Module_Error[6]	Module 6 Error Code
53	8244	0x2034		
54	8245	0x2035	Module_Error[7]	Module 7 Error Code
55	8246	0x2036		
56	8247	0x2037	Module_Error[8]	Module 8 Error Code
57	8248	0x2038		
58	8249	0x2039	Module_Error[9]	Module 9 Error Code
59	8250	0x203A		
60	8251	0x203B	Module_Error[10]	Module 10 Error Code
61	8252	0x203C		
62	8253	0x203D	Module_Error[11]	Module 11 Error Code
63	8254	0x203E		
64	8255	0x203F	Module_Error[12]	Module 12 Error Code
65	8256	0x2040		
66	8257	0x2041	Module_Error[13]	Module 13 Error Code
67	8258	0x2042		
68	8259	0x2043	Module_Error[14]	Module 14 Error Code
69	8260	0x2044		
70	8261	0x2045	Module_Error[15]	Module 15 Error Code
71	8262	0x2046		
72	8263	0x2047	Module_Error[16]	Module 16 Error Code

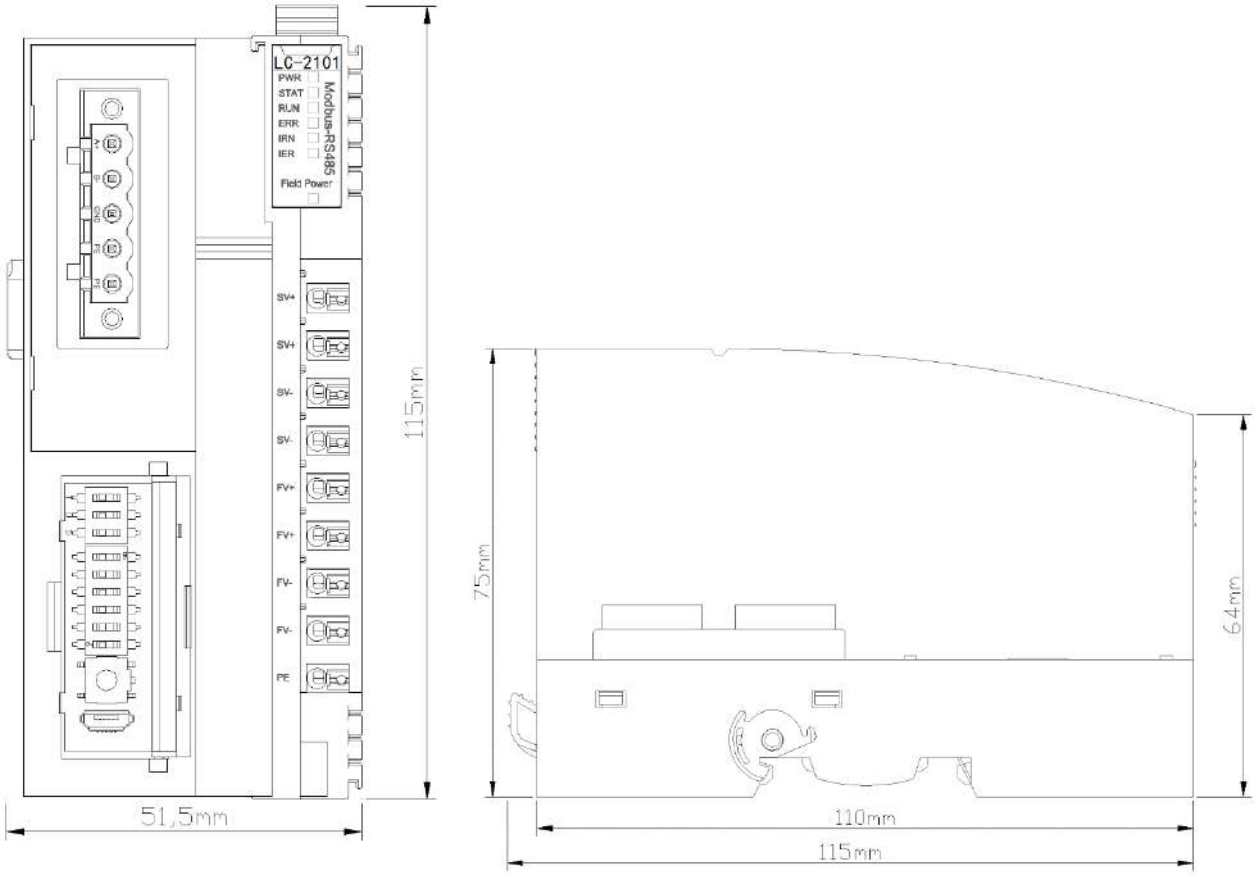
73	8264	0x2048		
74	8265	0x2049	Module_Error[17]	Module 17 Error Code
75	8266	0x204A		
76	8267	0x204B	Module_Error[18]	Module 18 Error Code
77	8268	0x204C		
78	8269	0x204D	Module_Error[19]	Module 19 Error Code
79	8270	0x204E		
80	8271	0x204F	Module_Error[20]	Module 20 Error Code
81	8272	0x2050		
82	8273	0x2051	Module_Error[21]	Module 21 Error Code
83	8274	0x2052		
84	8275	0x2053	Module_Error[22]	Module 22 Error Code
85	8276	0x2054		
86	8277	0x2055	Module_Error[23]	Module 23 Error Code
87	8278	0x2056		
88	8279	0x2057	Module_Error[24]	Module 24 Error Code
89	8280	0x2058		
90	8281	0x2059	Module_Error[25]	Module 25 Error Code
91	8282	0x205A		
92	8283	0x205B	Module_Error[26]	Module 26 Error Code
93	8284	0x205C		
94	8285	0x205D	Module_Error[27]	Module 27 Error Code
95	8286	0x205E		
96	8287	0x205F	Module_Error[28]	Module 28 Error Code
97	8288	0x2060		
98	8289	0x2061	Module_Error[29]	Module 29 Error Code
99	8290	0x2062		
100	8291	0x206	Module_Error[30]	Module 30 Error Code

		3		
101	8292	0x2064		
102	8293	0x2065	Module_Error[31]	Module 31 Error Code
103	8294	0x2066		
104	8295	0x2067	Module_Error[32]	Module 32 Error Code
105	8296	0x2068		

*Reset State: The data format for register 38193 bit address is as follows:

Bit Offset	Bit Name	Description	Power-on Default Value
Bit 0	Power_On_Reset	Power-on Reset Flag	0/1
Bit 1-3	Reserved	Reserved	0
Bit 4	External_Reset	External Reset Flag	0/1
Bit 5	Reserved	Reserved	0
Bit 6	Soft_Reset_Request	Software Reset Flag	0
Bit 7	Reserved	Reserved	0
Bit 8	HardFault	Hard Fault Reset	0
Bit 9	StackOver	Stack Overflow Reset	0
Bit 10	MemoryOver	Memory Overflow Reset	0
Bit 11-15	Reserved	Reserved	0

A Dimension drawing



LC-2201 Profibus-DP Bus Adapter

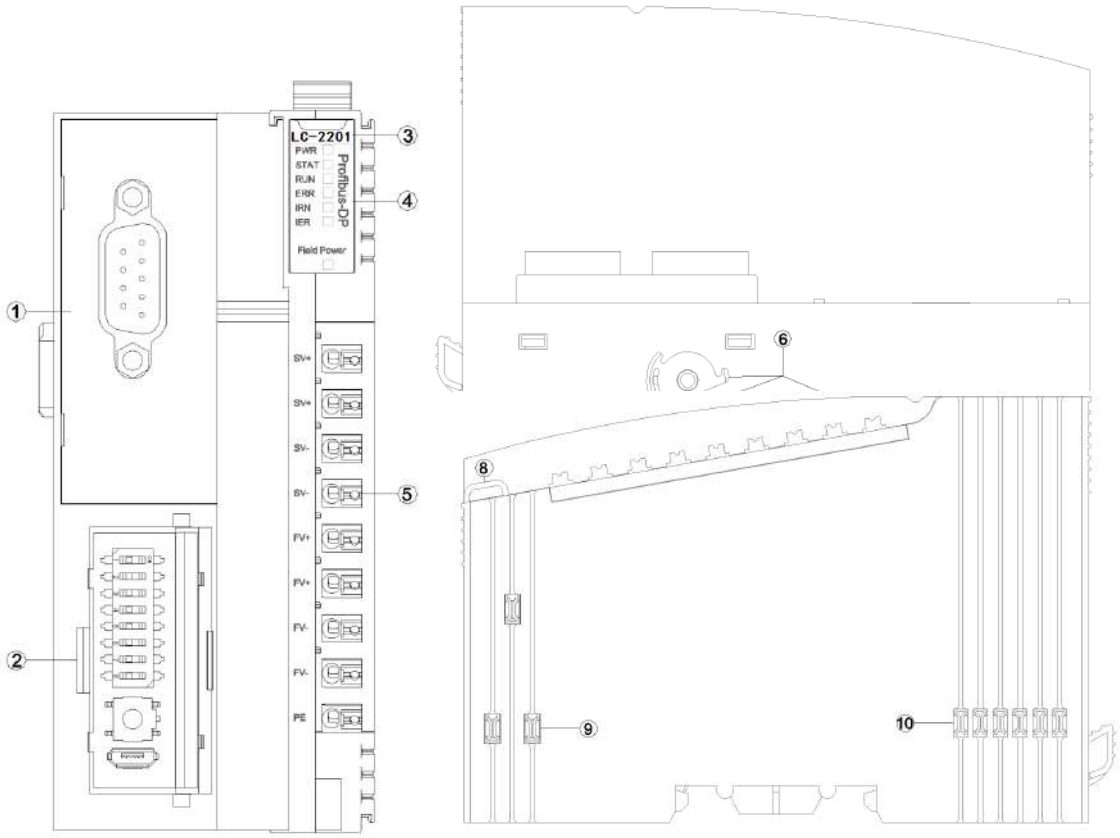
1 Module Overview

PROFIBUS-DP bus adapter supports access of standard PROFIBUS-DP, and the protocol version it supports is DPV0.

2 Technical Parameter

Adapter Hardware Parameter	
System Power	Nominal:24Vdc, Range: 9-36Vdc Reverse Protection: YES
Power Consumption	30mA@24Vdc
Internal Bus Supply Current	Max：2.5A@5VDC
Isolation	System Power to Field Power Isolation
Power Supply	Nominal:24Vdc, Range:22-28Vdc
Field Power Current	Max. DC 8A
IO Modules Supported	32 pcs
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*51.5*75mm
Weight	130g
Environment Specification	
Operation Temperature	-40~85℃
Operation Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Profibus-DP Parameter	
Protocol	PROFIBUS DPV0
Interface Type	DB9 female head
Station Type	PROFIBUS Slave
Station Address	Dial code switch configuration
Topology	Bus topology
Configuration Max. Length	232 bytes
IO data Max. Length	Input: Max. 244 bytes, Output: Max. 244 bytes, Sum of input and out put: Max. 288 bytes

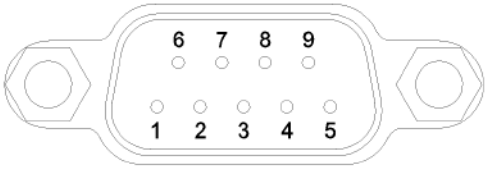
3 Hardware Interface



① Profibus-DP port
② Config Interface
③ Module type
④ LED Indicator
⑤ Wiring Terminal
⑥ Buckle
⑦ Grounding Spring Sheet
⑧ Fixed Wiring Harness
⑨ Field Power
⑩ Internal Bus

3.1 Profibus-DP Interface

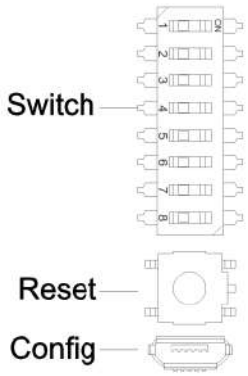
Profibus-DP port is 9 Pin terminals and its Pin definition is as below:



Interface Pin Definition

Pin	Definition	Description
1	Shield	Earthing of Shield
2	--	--
3	B	Data line B
4	CNTR-P	Direction control-P
5	DGND	Signal Grounded
6	VP(+)	+5v
7	--	--
8	A	Data lineA
9	CNTR-N	Direction control-N

3.2 Configuration Interface

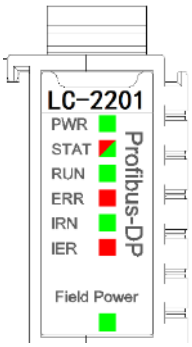


Switch: The station address of the Profibus DP adapter.It is set by an 8-bit binary hardware dial code switch, and each PROFIBUS adapter has a unique station address (1~127).

Reset: Module reset button, long pressing the button for more than 5 seconds and all parameters of the module will be restored to the default value. When the Reset button

is activated, a green indicator will light up in the upper left corner of the button.
Config: configured ports, it is standard MicroUSB interface for configuring device parameters and firmware upgrades.

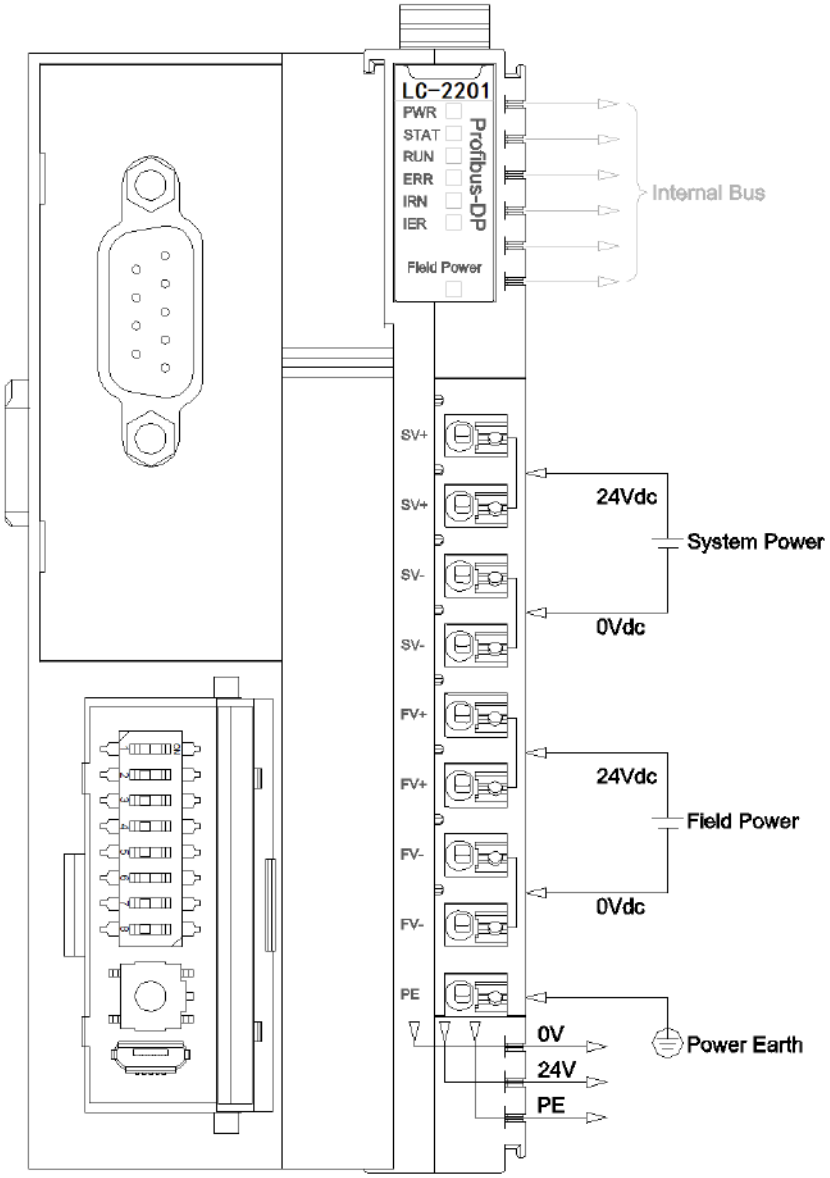
3.3 LED Indicator



PWR Power State (GREEN)	Definition
ON	System Power Normal
OFF	System Power Failure
STAT Module State (RED/GREEN)	Definition
Double Flash (RED)	Module Soft Restarted by Hard-Fault
ON(GREEN)	Running
Single Flash (GREEN)	Stopping
Flash(2.5Hz) (RED/GREEN)	Boot Mode
Flash(10Hz) (RED/GREEN)	Firmware Updating
RUN Network State (GREEN)	Definition
OFF	DP off-line mode
ON	DP data exchanging mode
ERR Network Error (RED)	Definition
Off	DP data exchanging mode
Flash	DP off-line mode
IRN IO Run (GREEN)	Definition
ON	IO initialization normal
OFF	IO initialization failure
IER IO Error (RED)	Definition
OFF	IO communication normal
Double Flash	IO communication failure
Field Power State (GREEN)	Definition
ON	Field Power Normal
OFF	Field Power Failure

4 Wiring

Please note when wiring: for the internal construction, two terminals of SV+ have been short-connected, two terminals of SV- have been short-connected, two terminals of FV+ have been short-connected, and two terminals of FV- have been short-connected. For external it only needs to access one system power supply and one field power supply.



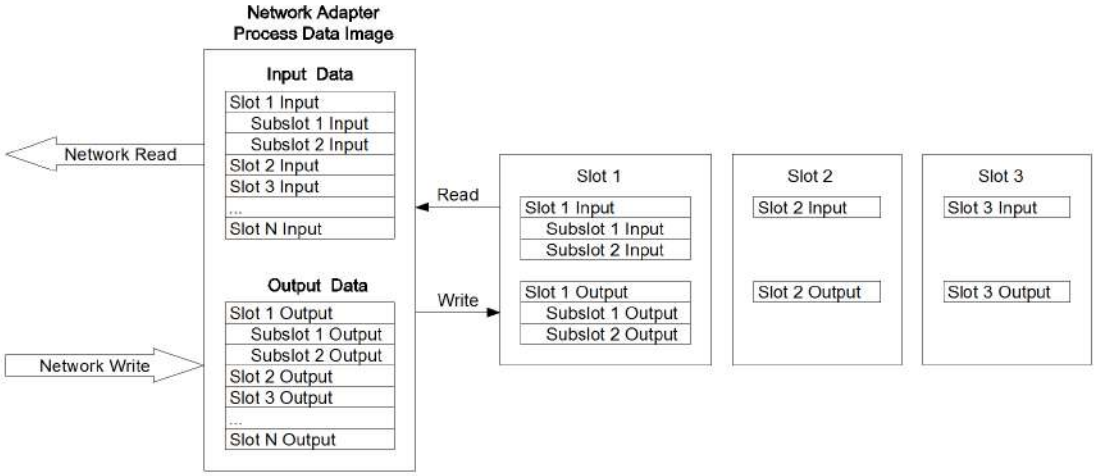
5 Process data definition

5.1 Adapter process data definition

Profibus-DP Adapter itself has no input-output process data.

5.2 IO Module process data mapping

The network adapter reads and writes input and output process data of IO module in real time through the internal bus, and its data mapping model is shown as follow:



Real-time data exchange is conducted between the network adapter and the extended IO module, and the data address table could be dynamically allocated according to the different modules inserted in the IO slot.

The actual mapping address should be added IO module manually in STEP 7, TIA or other configured software, and the address would be automatically mapped, so the actual mapping address could be checked.

6 Configuration Parameter Definition

Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0						Fault Action for Output	Fault Action for Input	Source of Configuration Data
Byte 1	DP Address							

Data declaration:

Source of Config Data：Parameter configuration mode (Default: 1, Field BUS configuration)

0：Configured software configuration

1：Field BUS configuration

Fault Action for Input：Input fault handling mode, when IO module is offline, the adapter will process IO module input data according to this mode. (Default: 0, Hold Last Input Value)

0：Hold Last Input Value

1：Clear Input Value

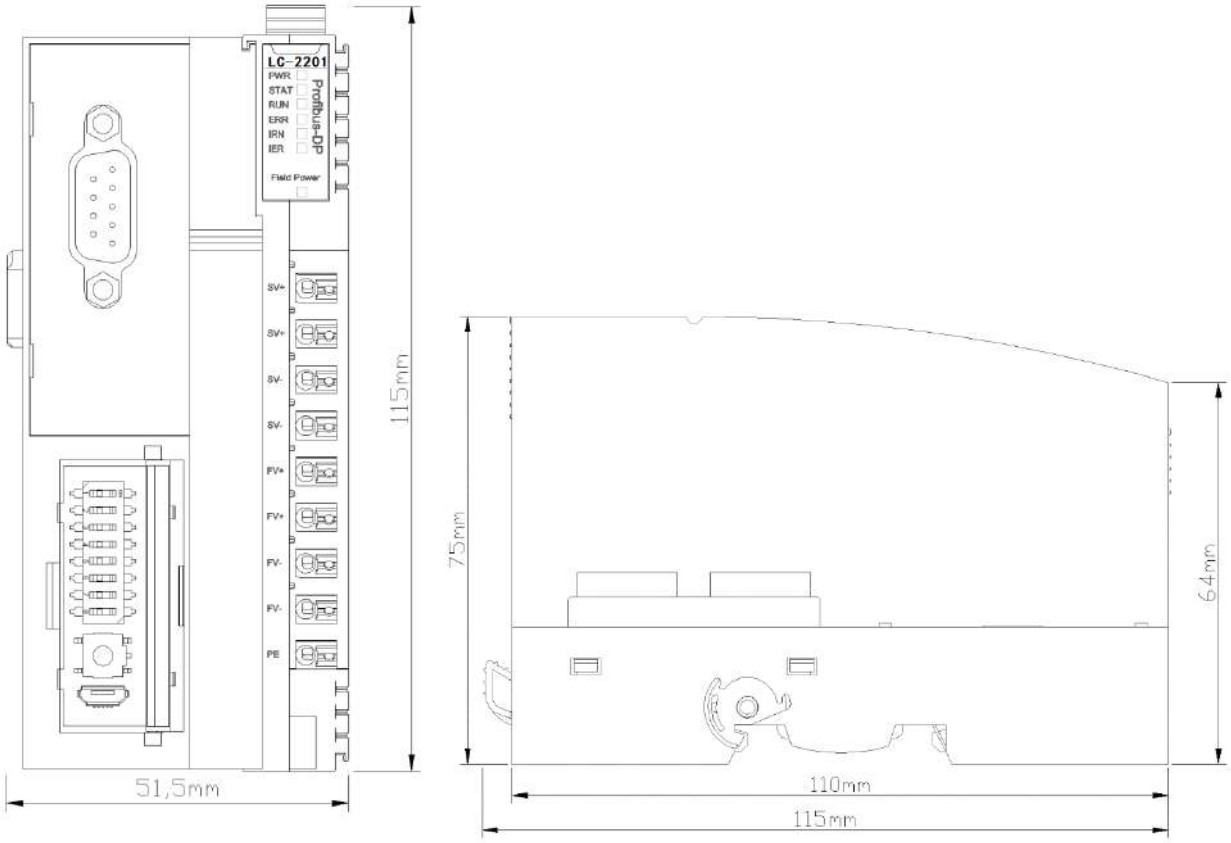
Fault Action for Output：Output fault handling mode, when the IO module is offline, the adapter will process the IO module output data according to this mode. (Default: 1, Clearing Output Value)

0：Hold Last Output Value

1：Clearing Output Value

DP Address：DP slave device no. (Read-only, displayed as the value of the dial code switch)

A Dimension drawing



LC-2501 CC-Link Bus Adapter

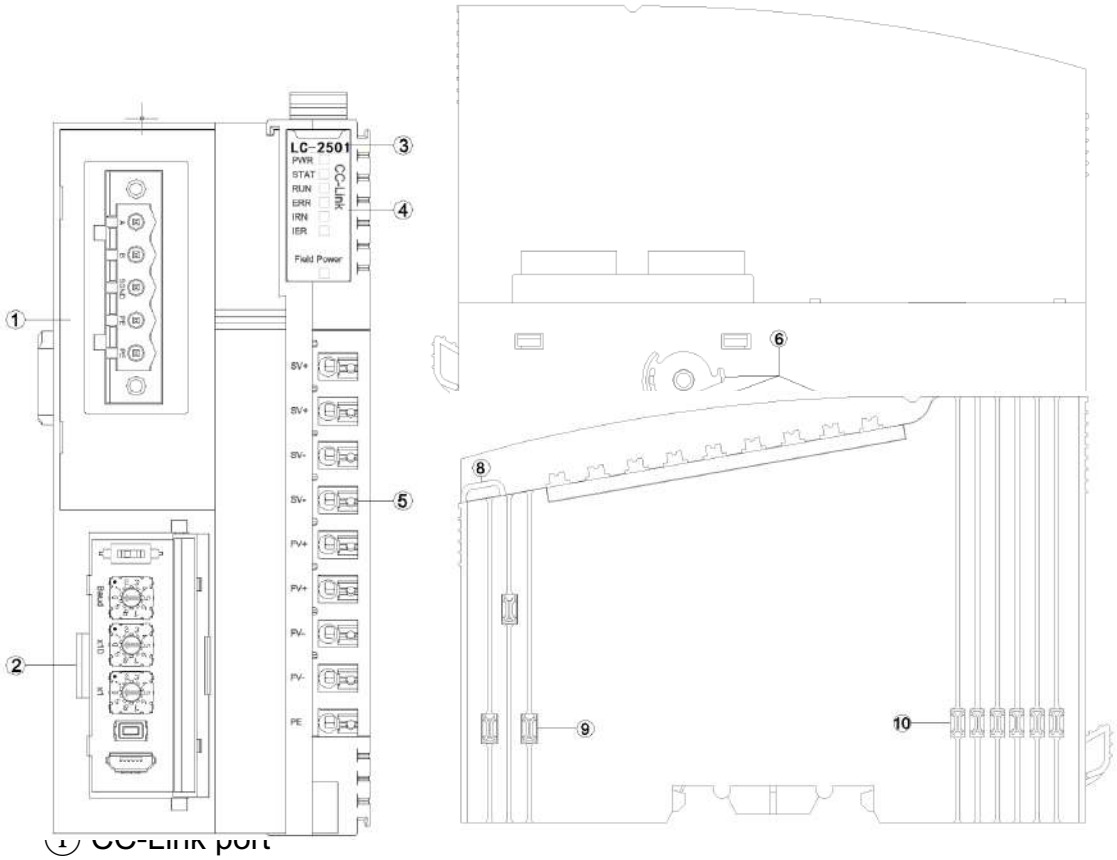
1 Module Overview

LC-2501 CC-Link bus adapter supports standard CC-Link Ver.2 communication and it could monitor the communication status of IO modules in real time.

2 Technical Parameter

Adapter Hardware Parameter	
System Power	Nominal:24Vdc, Range: 9-36Vdc Reverse Protection: YES
Power Consumption	110mA@24Vdc
Internal Bus Supply Current	Max：2.5A@5Vdc
Isolation	System Power to Field Power Isolation
Power Supply	Nominal:24Vdc, Range:22-28Vdc
Field Power Current	Max. DC 8A
IO Modules Supported	32pcs
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*51.5*75mm
Weight	130g
Environment Specification	
Operation Temperature	-40~85℃
Operation Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
CC-Link Parameter	
Protocol	CC-Link Ver.2
Station Type	Remote device station
Number of Logical Stations Occupied	1, 2, 3, 4
Extended Loop Setup	1 time, 2 times, 4 times, 8 times
I/O Data Capacity	RX/RY capacity（bit）max. 896 RWr/RWw capacity（word）max. 128
Baud Rate	156K/625K/2.5M/5M/10Mbps
Node Station (Station No.)	1~64(DIP switch configuration)，when DIP switch value is not 1~64, and the mandatory station number is 1.
Interface	5 Pin screw terminal
Max. bus length	1200m（156kbps）
Terminal resistance	120ohm

3 Hardware Interface



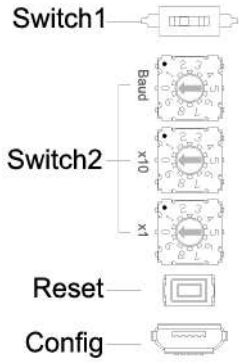
① CC-Link port
② Config Interface
③ Module type
④ LED Indicator
⑤ Wiring Terminal
⑥ Buckle
⑦ Grounding Spring Sheet
⑧ Fixed Wiring Harness
⑨ Field Power
⑩ Internal Bus

3.1 CC-Link Interface

Modbus RS485 port is 5 Pin screw terminals and its Pin definition is as below:

Pin	Definition	Description
1	DA	Signal DA
2	DB	Signal DB
3	DG	Signal Grounded
4	SLD	Earthing of Shield
5	FG	Protect Earthing

3.2 Configuration Interface



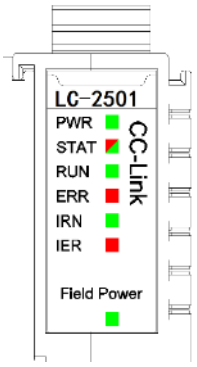
Switch1: DIP switch is used to set the terminal resistance.
The Switch2: DIP switch is used to set the adapter module node address (station number) and baud rate.
The node address is set by two hardware DIP switches of decimal number, and each CC-Link adapter has a unique node address (1~64).
(Please note: when the DIP switch value is not 1~64, the node address ie the station number is compelled to be 1.)
The corresponding relation between baud rate and dial code is:

Code configuration	Communication Rate (bps)
0	156k
1	625k
2	2.5M
3	5M
4	10M

Reset: Module reset button, long pressing the button for more than 5 seconds and all parameters of the module will be restored to the default value. When the Reset button is activated, a green indicator will light up in the upper left corner of the button.

Config: configured ports, it is standard MicroUSB interface for configuring device parameters and firmware upgrades.

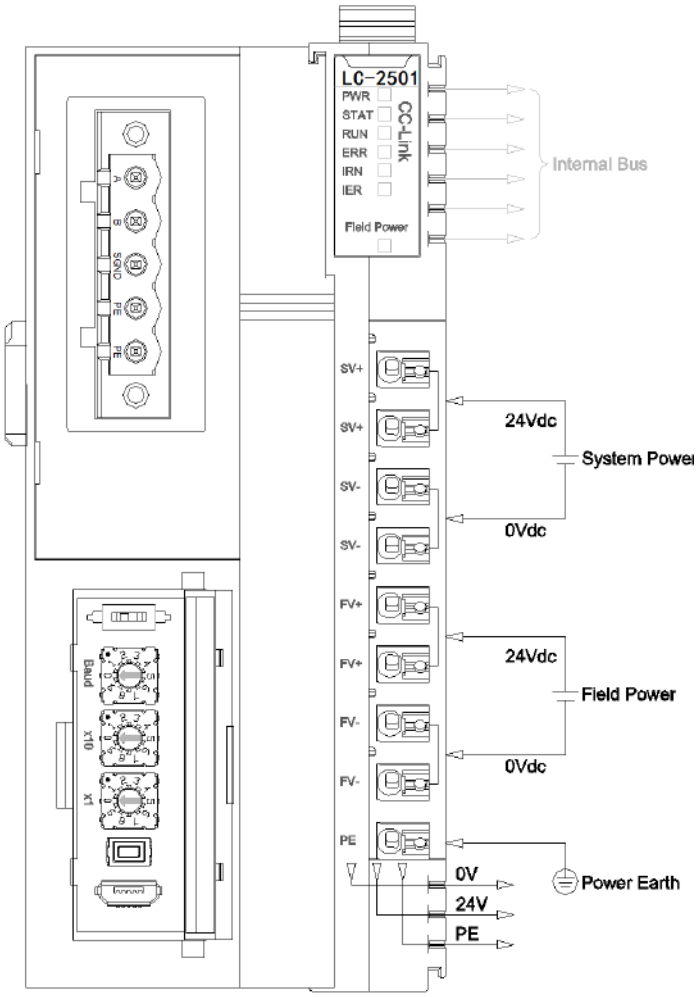
3.3 LED Indicator



PWR Power State (GREEN)	Definition
ON	System Power Normal
OFF	System Power Failure
STAT Module State (RED/GREEN)	Definition
Double Flash (RED)	Module Soft Restarted by Hard-Fault
ON(GREEN)	Running
Single Flash (GREEN)	Stopping
Flash(2.5Hz) (RED/GREEN)	Boot Mode
Flash(10Hz) (RED/GREEN)	Firmware Updating
RUN Network State (GREEN)	Definition
OFF	No data exchanging.
ON	CC-Link data exchanging
ERR Network Error (RED)	Definition
OFF	CC-Link data exchanging normal
ON	CC-Link data exchanging failure
Flash	When CC-Link communication normally functiones, the station number or baud rate will get changed
IRN IO Run (GREEN)	Definition
ON	IO initialization normal
OFF	IO initialization failure
IER IO Error (RED)	Definition
OFF	IO communication normal
Double Flash	IO communication failure
Field Power State (GREEN)	Definition
ON	Field Power Normal
OFF	Field Power Failure

4 Wiring

Please note when wiring: for the internal construction, two terminals of SV+ have been short-connected, two terminals of SV- have been short-connected, two terminals of FV+ have been short-connected, and two terminals of FV- have been short-connected. For external it only needs to access one system power supply and one field power supply.



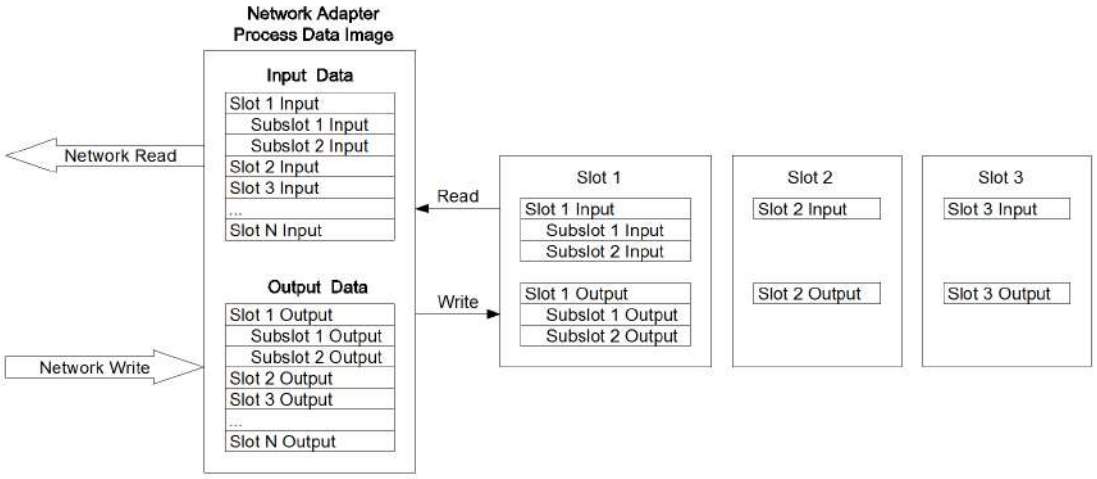
5 Process data definition

5.1 Adapter process data definition

CC-Link Adapter itself has no input-output process data.

5.2 IO Module process data mapping

The network adapter reads and writes input and output process data of IO module in real time through the internal bus, and its data mapping model is shown as follow:



6 Configuration Parameter Definition

Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0						Fault Action for Output	Fault Action for Input	Source of Configuration Data
Byte 1	Slave ID							
Byte 2	BaudRate							
Byte 3	Occupied Stations							
Byte 4	Extesion Cycles							
Byte 5	Auto Stations/Cycles							
Byte 6	RX/RY Size(Bits)							
Byte 7								
Byte 8	RWr/RWw Size(words)							
Byte 9								

Data declaration:

Source of Configuration Data：Parameter configuration mode (Default: 0)

0：Configuration Software

Fault Action for Input：Input fault handling mode, when IO module is offline, the adapter will process IO module input data according to this mode. (Default: 0, Hold Last Input Value)

0：Hold Last Input Value

1：Clear Input Value

Fault Action for Output： Output fault handling mode, when the IO module is offline, the adapter will process the IO module output data according to this mode. (Default: 1, Clearing Output Value)

0：Hold Last Output Value

1：Clearing Output Value

Slave ID：CC-Link slave ID number, hardware DIP switch setting, 1-64

Baud Rate：Serial port baud rate, (Default：0，156bps))

0：156Kbps

1：625Kbps

2：2.5Mbps

3：5Mbps

4：10Mbps

Occupied Stations：The number of logical stations occupied (Default：3，4 stations)

0：1 station
1：2 stations
2：3 stations
3：4 stations

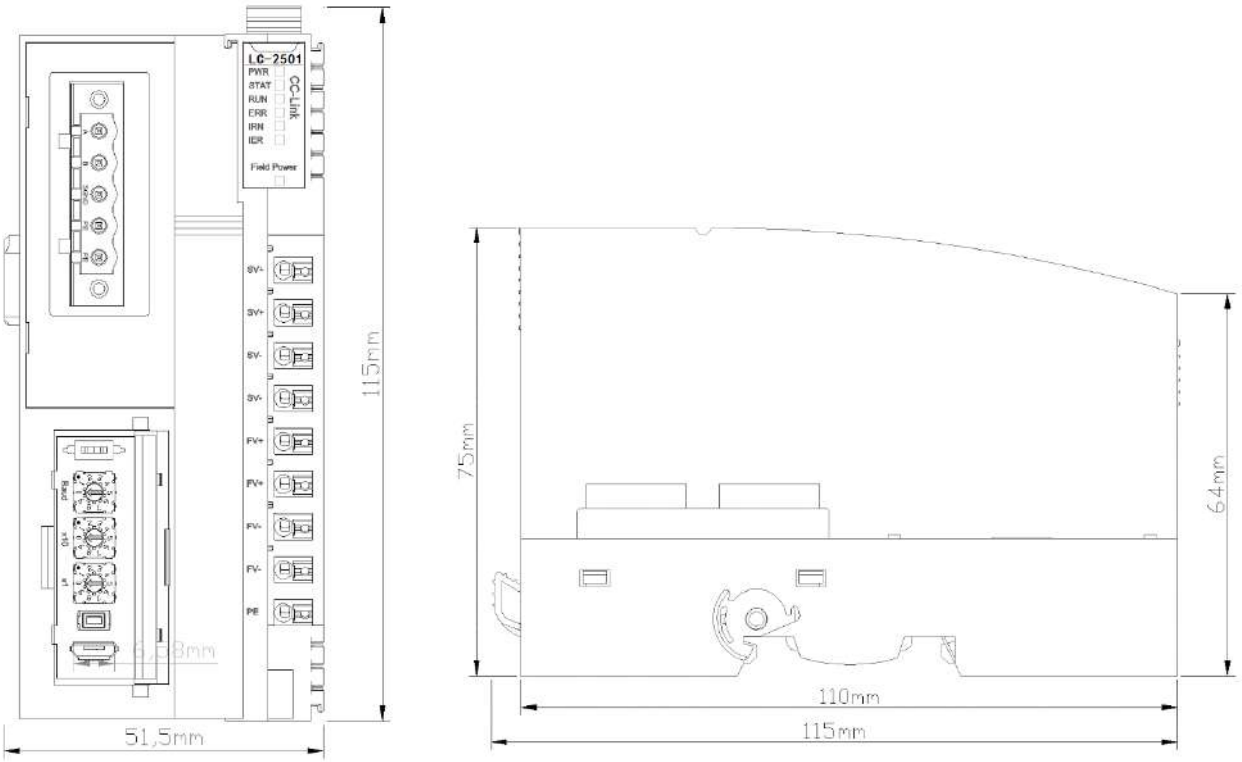
Extesion Cycles：Extended loop setup (Default：3，8 Times)
0：1 Time
1：2 Times
2：4 Times
3：8 Times

Auto Stations/Cycles：Automatic counting station number and extension cycle, disable, cycle optional. (Default: 0, disabled)
0：disabled
1：enabled

RX/RY Size(Bits)：RX/RY Capacity (Bits)

RWr/RWw Size(words)：RWr/RWw Capacity (Word)

A Dimension drawing



LC-3101 CANopen Bus Adapter

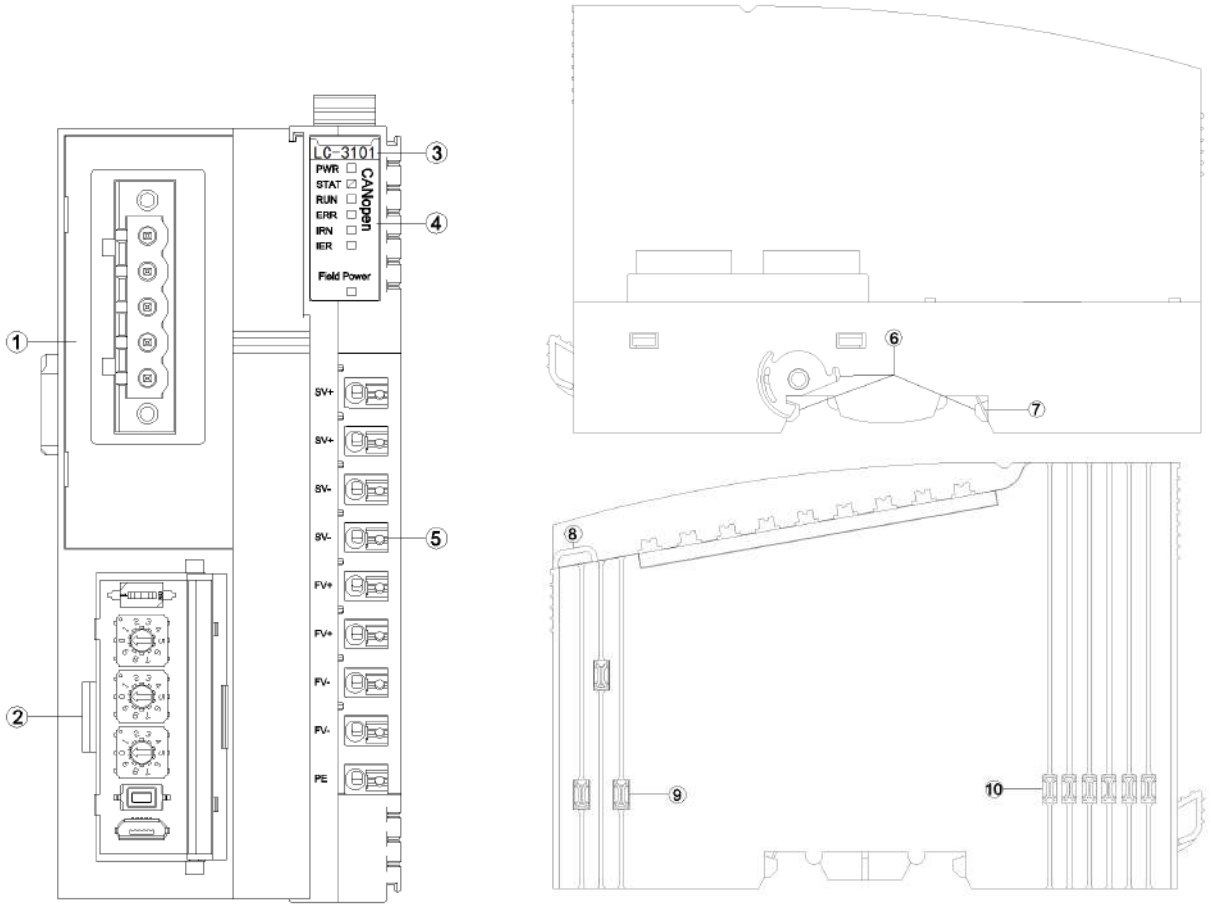
1 Module Overview

LC-3101 CANopen bus adapter supports standard CANopen communication and device specification DS401.

2 Technical Parameter

Adapter Hardware Parameter	
System Power	Nominal:24Vdc, Range: 9-36Vdc Reverse Protection: YES
Power Consumption	50mA@24Vdc
Internal Bus Supply Current	Max：2.5A@5VDC
Isolation	System Power to Field Power Isolation
Power Supply	Nominal:24Vdc, Range:22-28Vdc
Field Power Current	Max. DC 8A
IO Modules Supported	32 pcs
Wiring	Max.1.0mm² (AWG 17)
Size	115*51.5*75mm
Weight	130g
Environment Specification	
Operation Temperature	-40~85℃
Operation Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
CANOPEN Parameter	
Protocol	CANopen DS401
Connect the interface	5PIN terminal
Station Address	Dial code setting（1-127）
Process Data	Input Max. 512 Byte Output Max. 512 Byte
Configuration Interface	Type-C
Transmission Rate	10 kbit/s, 20 kbit/s, 50 kbit/s, 100 kbit/s, 125 kbit/s, 250 kbit/s, 500 kbit/s, 800 kbit/s,1000 kbit/s

3 Hardware Interface



① CANopen port
② Config Interface
③ Module type
④ LED Indicator
⑤ Wiring Terminal
⑥ Buckle
⑦ Grounding Spring Sheet
⑧ Fixed Wiring Harness
⑨ Field Power
⑩ Internal Bus

3.1 CANopen Interface

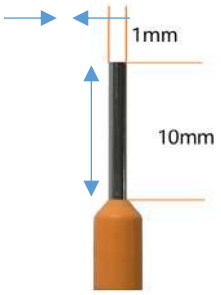
The device wiring adpots 5 Pin screw terminals and its Pin definition is as below:

CANopen interface pin definition

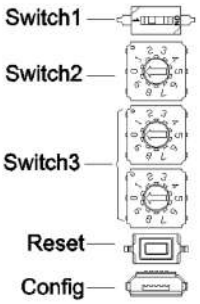
Pin	Definition	Description
1	NC	Empty
2	CANH	CAN_H signal bus line
3	PE	Protecting Earthing
4	CANL	CAN_L signal terminal bus line
5	GND	Signal Grounded

It is recommended to use cables with cores smaller than 1mm².

The cold-pressed terminal parameters are as follows:



3.2 Configuration Interface



Switch1: DIP switch is used to set the terminal resistance.

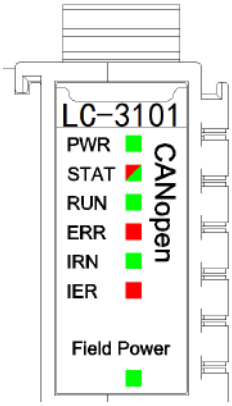
Switch2: DIP switch is used to set the communication baud rate

Switch3: DIP switch is used to set the address of the adapter module. It is set by a 2-bit decimal hardware DIP switch, and each CANopen adapter has a unique station address (1~99).

Reset：Module reset button, long pressing the button for more than 5 seconds and all parameters of the module will be restored to the default value. When the Reset button is activated, a green indicator will light up in the upper left corner of the button.

Config：configured ports, it is standard MicroUSB interface for configuring device parameters and firmware upgrades.

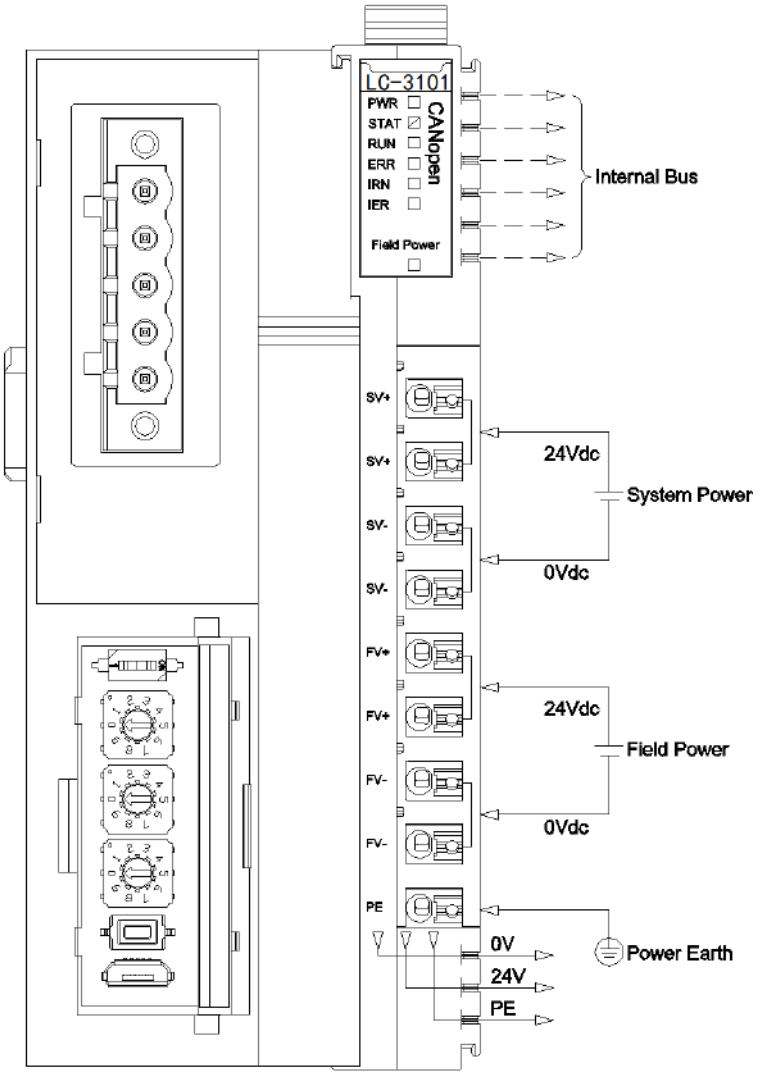
3.4 LED Indicator



PWR Power State (GREEN)	Definition
ON	System Power Normal
OFF	System Power Failure
STAT Module State (RED/GREEN)	Definition
Double Flash (RED)	Module Soft Restarted by Hard-Fault
ON(GREEN)	Running
Single Flash (GREEN)	Stopping
Flash(2.5Hz) (RED/GREEN)	Boot Mode
Flash(10Hz) (RED/GREEN)	Firmware Updating
RUN Network State (GREEN)	Definition
ON	CAN communication has been established
Flash	The CAN communication is not established
ERR Network Error (RED)	Definition
OFF	no error
Flash	error existing
IRN IO Run Indicator (GREEN)	Definition
ON	IO initialization normal
OFF	IO initialization failure
IER IO Error Indicator (RED)	Definition
OFF	IO communication normal
Double Flash	IO communication failure
Field Power State Indicator (GREEN)	Definition
ON	Field Power Normal
OFF	Field Power Failure

4 Wiring

Please note when wiring: for the internal construction, two terminals of SV+ have been short-connected, two terminals of SV- have been short-connected, two terminals of FV+ have been short-connected, and two terminals of FV- have been short-connected. For external it only needs to access one system power supply and one field power supply.



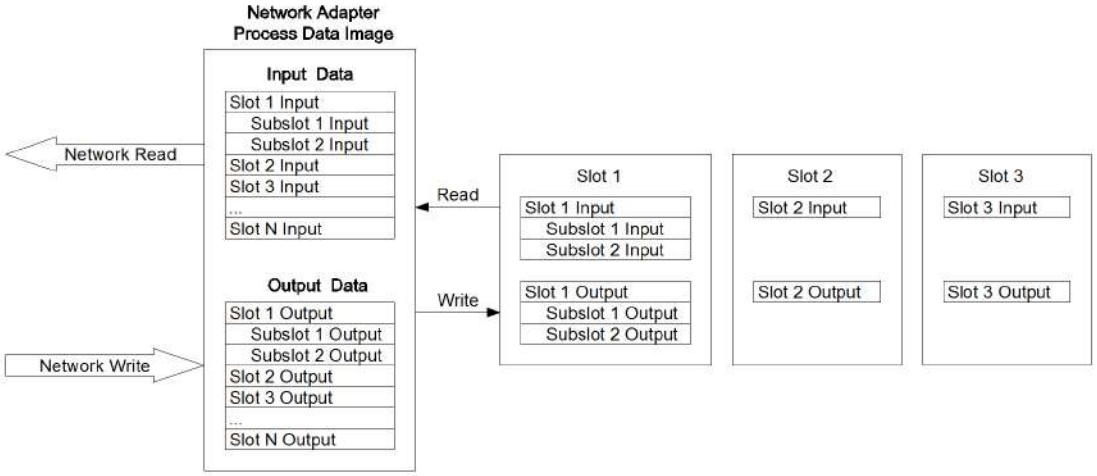
5 Process data definition

5.1 Adapter process data definition

CANopen Adapter itself has no input-output process data.

5.2 IO Module process data mapping

The network adapter reads and writes input and output process data of IO module in real time through the internal bus, and its data mapping model is shown as follow:



Input and output data of the IO module are mapped to objects 6000,6200, 6401,6411 based on data types. TPDO and RPDO both support variable PDO mapping.

6 Configuration Parameter Definition

Configuration Parameter				
No.	Description			
Byte 0	Reserved	Fault Action for Output	Fault Action for Input	Source of Configuration Data
Byte 1	CAN BaudRate			
Byte 2	CANopen Slave Address			
Byte 3	Reserved		Auto Start	Auto Generate PDO COB-ID
Byte 4				
Byte 5 ... Byte 19	Reserved			

Data declaration:

Source of Configuration Data：Parameter configuration mode (Default: 0)

0：Configured software configuration is valid

1：Fieldbus controller configuration is valid

Fault Action for Input：Input data handling mode when IO occurs fault (Default: 0)

0：Hold Last Input Value

1：Clear Input Value

Fault Action for Output: Output data handling mode when IO occurs fault (Default: 1)

0：Hold Last Output Value

1：Clear Output Value

CANopen Slave Address：CANopen slave device number (read only, default: 1)

CAN BaudRate：CAN bus baud rate Settings (default: 2)

0：1 MBit/sec

1：800 kBit/sec

2：500 kBit/sec

3：250 kBit/sec

4：125 kBit/sec

5：100 kBit/sec

6：50 kBit/sec

7：20 kBit/sec

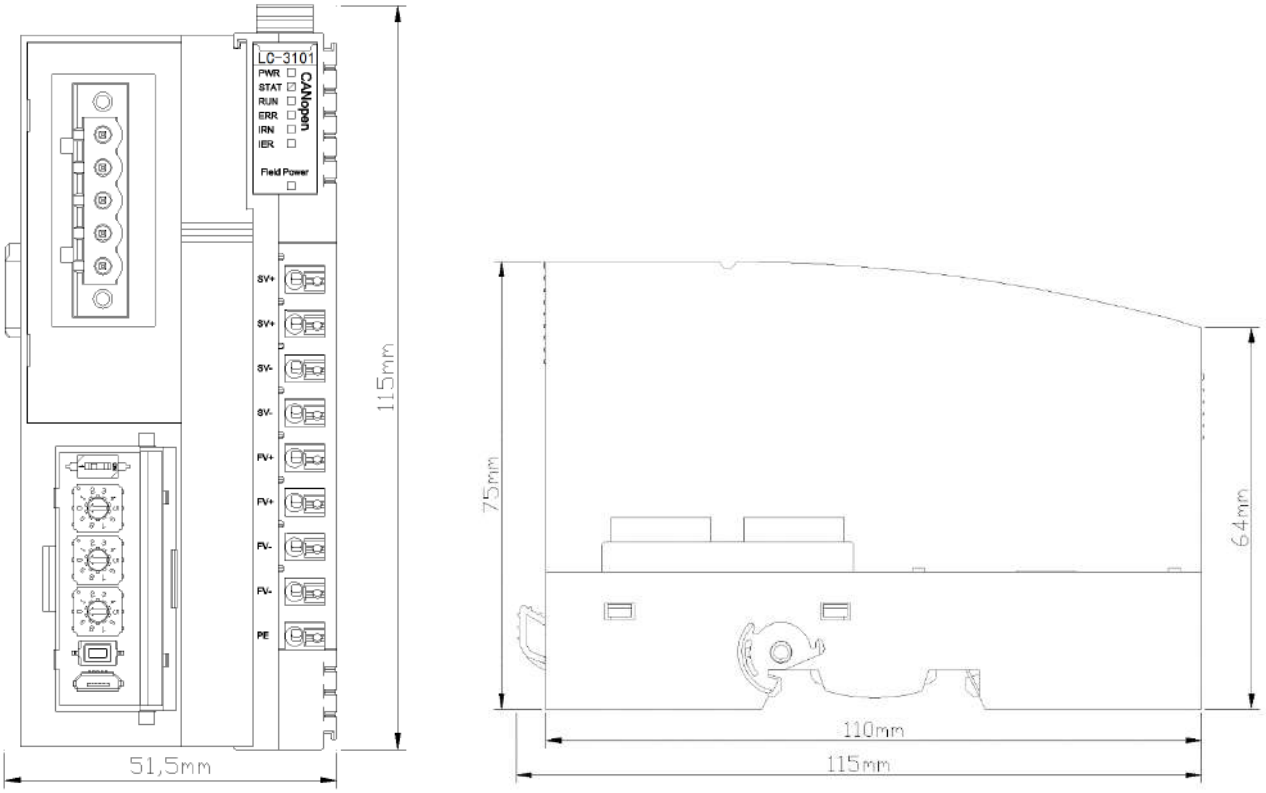
8：10 kBit/sec

Auto Generate PDO COB-ID：PDO identifiers can be automatically assigned, the Enable and the Disable is optional. After the PDO identifier is enabled, the PDO identifier could be automatically assigned to the I/O module. After the PDO identifier is disabled, only 4 predefined PDO are available, and more PDO need to be set by the

CANOPEN master. It is disabled by default.

Auto Start：The slave is automatically started. Enable and disable is optional. After this function is enabled, the site will proactively send a PDO message and uploads the message when there is data. It is disabled by default.

A Dimension drawing



3 Extended IO module

LD-0008 8-channel digital input

24VDC/ source or sink type & 8-channel digital output /24VDC/ source type

1 Module features

◆ The module supports 8-channel digital input, and supports source type and sink type two-way input. The input voltage is 0V/24VDC.

◆ The module supports 8-channel digital output, Output high level valid, and the output voltage is 24VDC.

◆ Module input channel can collect digital output signal of field equipment. (dry contact or active output)

◆ The module input channel can be connected to the 2-wire or 3-wire digital sensor.

◆ Module input channel supports 32-bit counter for each channel, the counting frequency < 200Hz.

◆ The input channel of the module supports the signal maintenance function, and the maintenance time can be set.

◆ The input channel of the module can set the digital signal input filtering time and the byte transfer order of the counter.

◆ The input channel of the module can set the counting mode and counting direction independently.

◆ Module output channel can drive field equipment .(relay, solenoid valve, etc.)

◆ The output channel of the module is equipped with short circuit, thermal shutdown and overvoltage protection functions.

◆ Module internal bus and field input and output , using Optocoupler isolation.

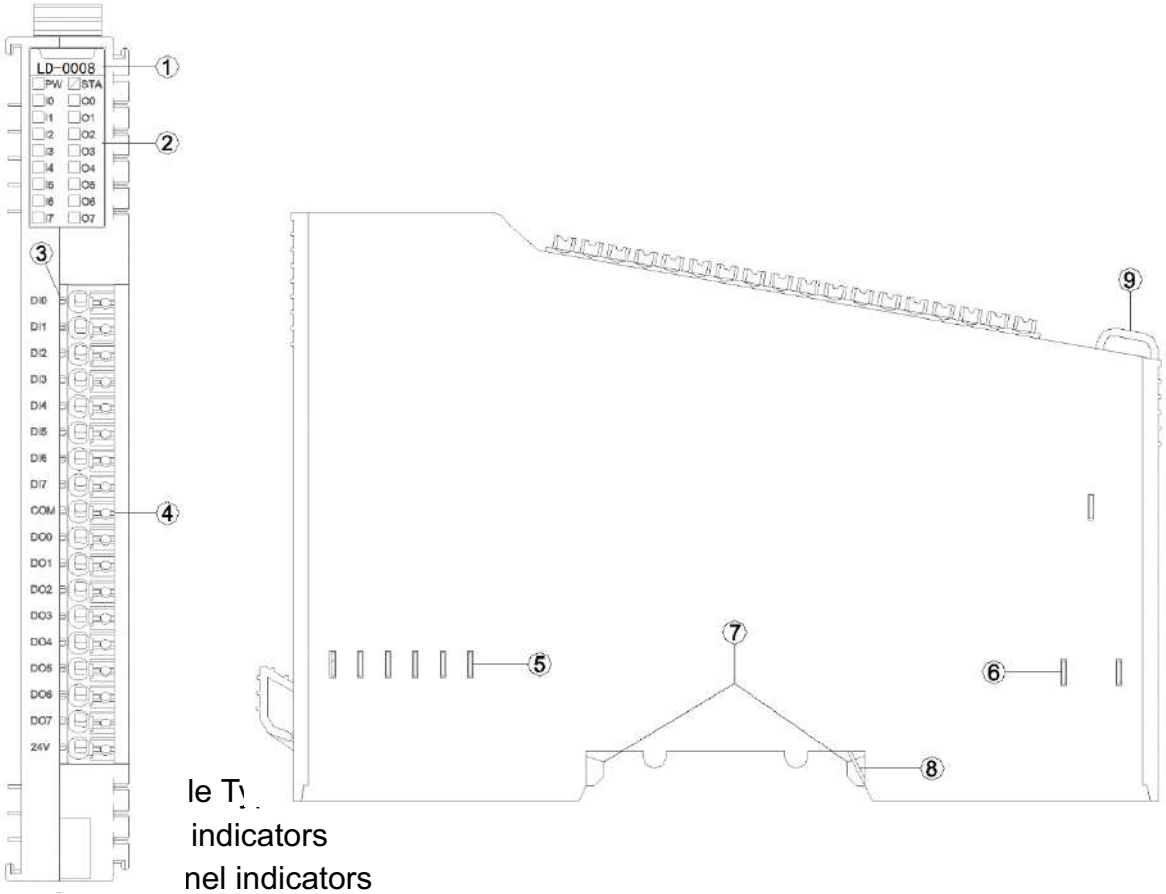
◆ Module has 16 digital input and output channel LED indicator light.

2 Technical parameters

General Parameters	
Power	Max.85mA@5.0Vdc
Isolation	I/O to internal bus: opto-coupler isolation (3KVrms)
Field Power	Nominal voltage: 24Vdc Input range: 22~28Vdc
Wiring	I/O wiring: Max.1.0mm² (AWG 17)
Installation	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Working temperature	-40~85℃
Environmental humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Environmental Parameters	
Channel Number	8-channel source/sink type input
Indicator	8 channel input indicators
Open voltage	High input: Min.10Vdc to Max.28Vdc (Common: 0Vdc) Low input: Min.0Vdc to Max.14Vdc (Common: 24Vdc)
Close voltage	High input: Max.5Vdc (Common: 0Vdc) Low input: Min.19Vdc (Common: 24Vdc)
Open current	Max.5mA/ channel @28V
Input impedance	>7.5kΩ
Input delay	OFF to ON: Max.3ms ON to OFF: Max.2ms
Prop filter	Default: 10ms
Sampling frequency	500Hz
Count frequency	<200Hz
Output parameter	
Channel Number	8 channel source type output
LED Indicator	8 channel output indicators
Rated current	Typical value:0.5A
Leakage current	Maximum value: 10uA
Output impedance	<200mΩ
Output delay	OFF to ON: Max.100us ON to OFF: Max.150us

Protection function	Temperature protection: typical value 135℃ Protection current: typical value 1.1A Short circuit protection support

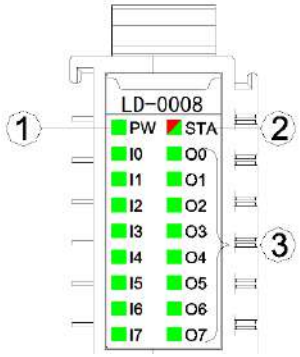
3 Hardware interfaces



le T
indicators
nel indicators

④ Wiring Terminal and Marking
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

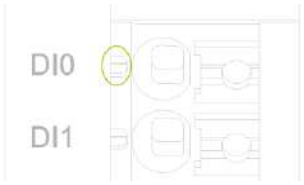
3.1 LED indicators Definition



① Power indicator (green)
② Module state indicator (red/green)
③ Input/output channel indicators (green)

PW power indicator	Definition
ON	Internal bus power supply normal
OFF	Internal bus power supply failure
STA module state indicator	Definition
Green slow flash (2.5hz)	The internal bus of the module is not started
Red slow flash (2.5hz)	Module internal bus offline
Green normally on	Module works normally
Flash(2.5Hz) (RED/GREEN)	Operating mode
Flash(10Hz) (RED/GREEN)	Firmware upgrading
Red flashes twice	Module exception has been soft-restarted
I0-I7 input channel indicators	Definition
ON	input signal valid
OFF	input signal invalid
O0-O7 output channel indicators	Definition
ON	Output signal valid
OFF	Output signal invalid

3.2 Field input channel LED indicator (red/green)



When the COM terminal is connected to a low level and the input channel signal is at a high level, the corresponding channel green indicator is on.
When the COM terminal is connected to a high level and the input channel signal is at a low level, the corresponding channel red indicator is on.

3.3 Field output channel LED indicator (green)

When the output signal of the output channel is valid, the corresponding channel indicator is on.

3.4 Terminal definition

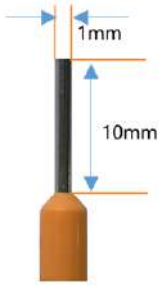
Terminal Number	Symbol	Instruction
1	DI0	Signal input
2	DI1	
3	DI2	
4	DI3	
5	DI4	
6	DI5	
7	DI6	
8	DI7	
9	COM	Input common terminal
10	DO0	Signal output
11	DO1	
12	DO2	
13	DO3	
14	DO4	
15	DO5	

16	DO6	
17	DO7	
18	24V	Power input (Note1)

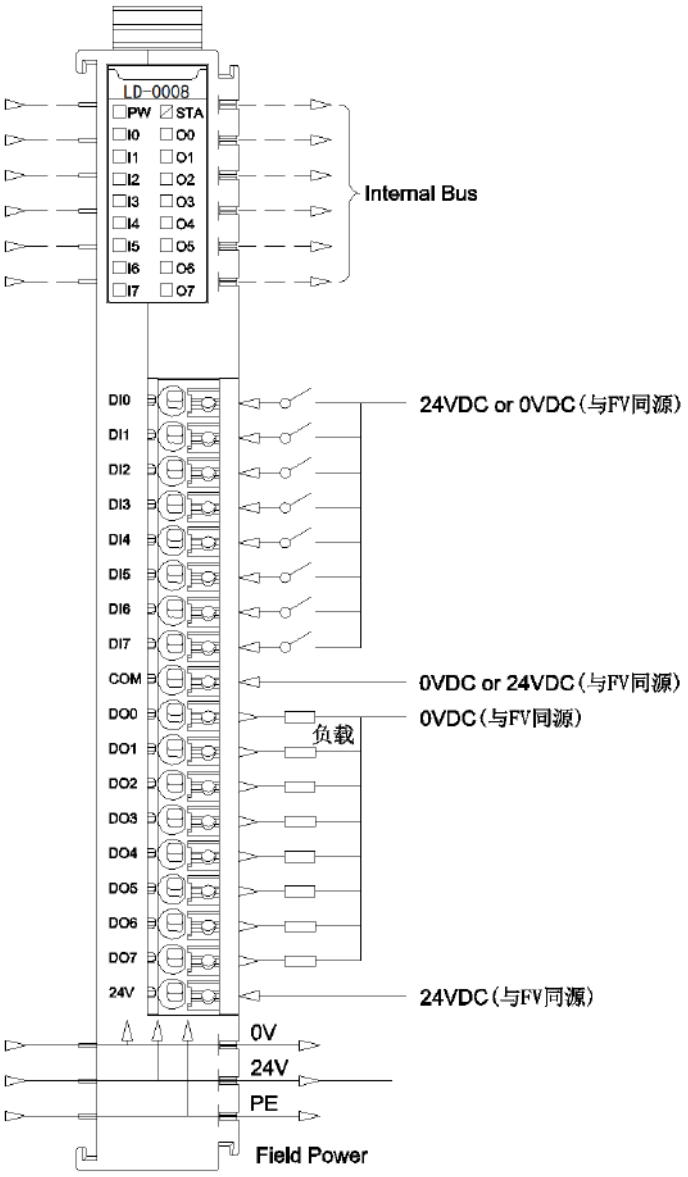
Note 1: when the red LED indicator beside the 24V wiring terminal lights up, it indicates that the fieldbus is powered on, then the maximum output current of each channel is 500mA, and the maximum sum of all output channel currents is 2A.

When the 24VDC power is supplied to the 24V wiring terminal separately, the sum of all the output channel currents is at the maximum of 4A (Whether the fieldbus is powered on or not, 24V wiring terminals can both be connected to 24VDC power supply).

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:



4 Wiring


LD-0008
PW
STA
I0
I1
I2
I3
I4
I5
I6
I7
O0
O1
O2
O3
O4
O5
O6
O7
Internal Bus
DI0
DI1
DI2
DI3
DI4
DI5
DI6
DI7
COM
DO0
DO1
DO2
DO3
DO4
DO5
DO6
DO7
24V
24VDC or 0VDC(与FV同源)
0VDC or 24VDC(与FV同源)
0VDC(与FV同源)
负载
24VDC(与FV同源)
0V
24V
PE
Field Power

5 Process data definition

<8DI&8DO IO State> Submodule procedure data definition

Input data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DI Ch#7	DI Ch#6	DI Ch#5	DI Ch#4	DI Ch#3	DI Ch#2	DI Ch#1	DI Ch#0
Output data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DO Ch#7	DO Ch#6	DO Ch#5	DO Ch#4	DO Ch#3	DO Ch#2	DO Ch#1	DO Ch#0

Data description:

DI Ch#(0-7)：When the corresponding channel input signal is valid, the bit is 1, and when the input is invalid, it is 0.

0: Input signal invalid

1: Input signal valid

DO Ch#(0-7)：when this bit is 1, the corresponding channel output signal is valid, the output is high level, and the output is invalid when it is 0.

0: Output signal invalid

1: Output signal valid

<8DI Counter Submodule> Submodule process data definition.

Input data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Counter Value Ch#0							
Byte 1								
Byte 2								
Byte 3								
Byte 4	Counter Value Ch#1							
Byte 5								
Byte 6								
Byte 7								
Byte 8	Counter Value Ch#2							
Byte 9								
Byte 10								
Byte 11								
Byte 12	Counter Value Ch#3							
Byte 13								
Byte 14								
Byte 15								
Byte 16	Counter Value Ch#4							

Byte 17	
Byte 18	
Byte 19	
Byte 20	Counter Value Ch#5
Byte 21	
Byte 22	
Byte 23	
Byte 24	Counter Value Ch#6
Byte 25	
Byte 26	
Byte 27	
Byte 28	Counter Value Ch#7
Byte 29	
Byte 30	
Byte 31	

Output data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Counter Reset Ch#7	Counter Reset Ch#6	Counter Reset Ch#5	Counter Reset Ch#4	Counter Reset Ch#3	Counter Reset Ch#2	Counter Reset Ch#1	Counter Reset Ch#0

Data description:

Counter Value Ch#(0-7)：count value, 32-bit unsigned integer, automatically zeroing after overflow.

Counter Reset Ch#(0-7)：when the data bit changes from 0 to 1 (rising edge), the input counter of the corresponding channel will be cleared.

Note: The maximum counting frequency of the input channel is 200Hz. When the input signal exceeds this frequency, the counting result may be inconsistent with the actual value.

6 Configuration parameter definition

<8DI&8DO IO State> Submodule configuration parameter definition

Configuration parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Input Filtering Time(ms)							
Byte 1								
Byte 2	Reserved					Input Holding Time(ms)		
Byte 3	Fault Action for Output Ch#7	Fault Action for Output Ch#6	Fault Action for Output Ch#5	Fault Action for Output Ch#4	Fault Action for Output Ch#3	Fault Action for Output Ch#2	Fault Action for Output Ch#1	Fault Action for Output Ch#0
Byte 4	Fault Value for Output Ch#7	Fault Value for Output Ch#6	Fault Value for Output Ch#5	Fault Value for Output Ch#4	Fault Value for Output Ch#3	Fault Value for Output Ch#2	Fault Value for Output Ch#1	Fault Value for Output Ch#0

Data description:

Input Filtering Time(ms)：Channel input filtering time，unit: ms. (Default: 10)

Input Holding Time(ms)：Channel input signal holding time, unit: ms. (Default: 0)

0：Disable

1：200ms

2：500ms

3：1000ms

4：1500ms

5：2000ms

6：3000ms

7：5000ms

Fault Action for Output Ch#(0-7)：Fault Output mode. When the IO module detects an internal bus exception and fails to communicate with the adapter, the module enters offline mode, the output data will be processed in this way. (Default: 0)

0: keep the last time output state.

1: output fault value.

Fault Value for Output Ch#(0-7)：When the fault output mode is 1, the bit sets the fault output value, which is output when the IO module internal bus is offline. (Default: 0)

0: output low level.

1: output high level.

<8DI Counter Submodule> Submodule configuration parameter definition

Configuration parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 0	Reserved				Storage Enable	Storage Function	32Bit Data Format	
Byte 1	Count Mode Ch#3		Count Mode Ch#2		Count Mode Ch#1		Count Mode Ch#0	
Byte 2	Count Mode Ch#7		Count Mode Ch#6		Count Mode Ch#5		Count Mode Ch#4	
Byte 3	Count Direction Ch#7	Count Direction Ch#6	Count Direction Ch#5	Count Direction Ch#4	Count Direction Ch#3	Count Direction Ch#2	Count Direction Ch#1	Count Direction Ch#0

Data description:

32Bit Data Format：Byte transmission order of channel count values (Default: 0).

0：AB-CD

1：BA-DC

2：CD-AB

3：DC-BA

Storage Function：storage Function is support or not, read only attribute, and this value is the actual value of the module when uploading device parameters.

0: storage is not support

1: storage is support

Storage Enable：Storage enable，when the Storage Function enables, the IO module will save the count value in real time to non-volatile memory, and load the last saved count value when it is powered on next time. (Default: 1)

0：Disabled

1：Enable

Count Mode Ch#(0-7)：Input channel count mode. (Default: 0)

0: Rising edge count

1: Falling edge count

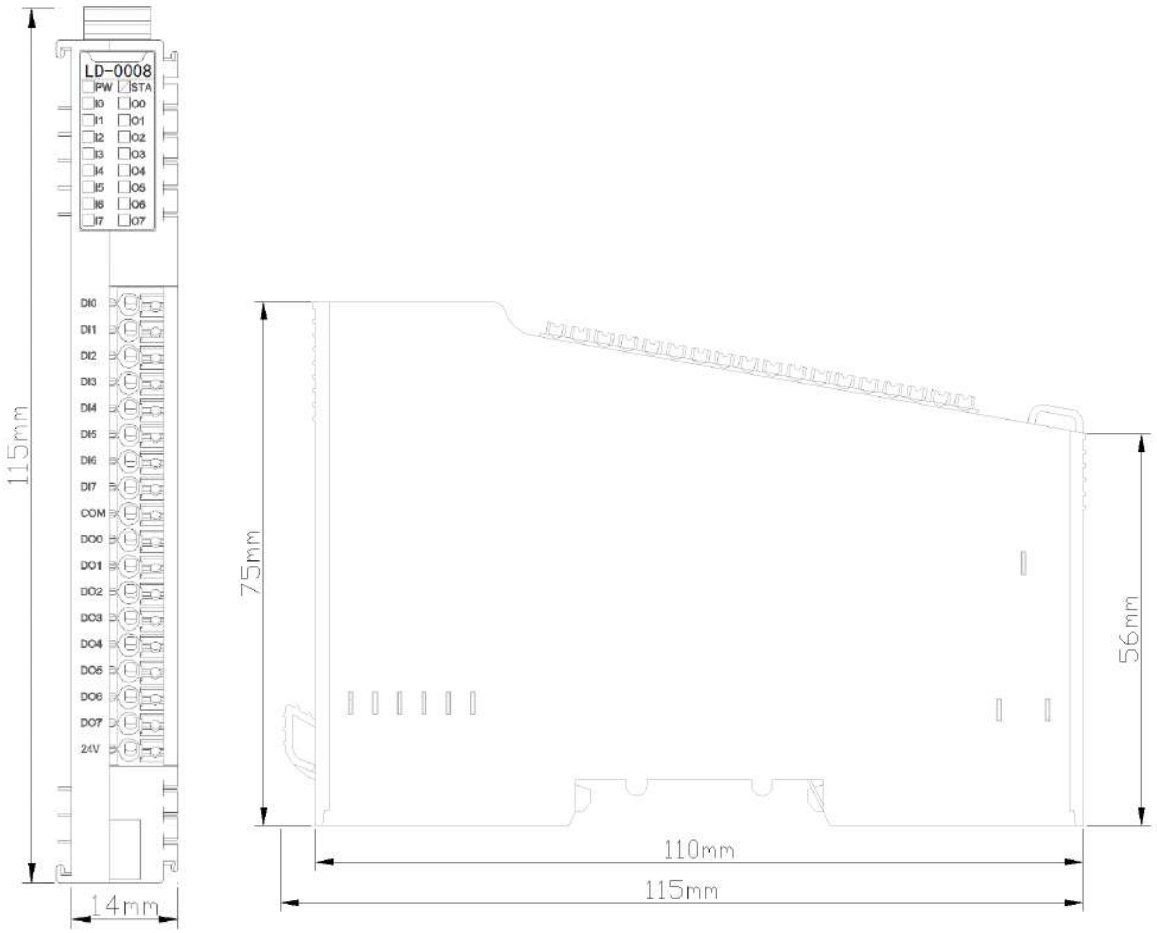
2: Double edge count

Count Direction Ch#(0-7)：The counting direction of the input channel. (Default: 0)

0: Count up

1: Count down

A Dimension drawing



LD-1308 8 channels digital input/24VDC/PNP

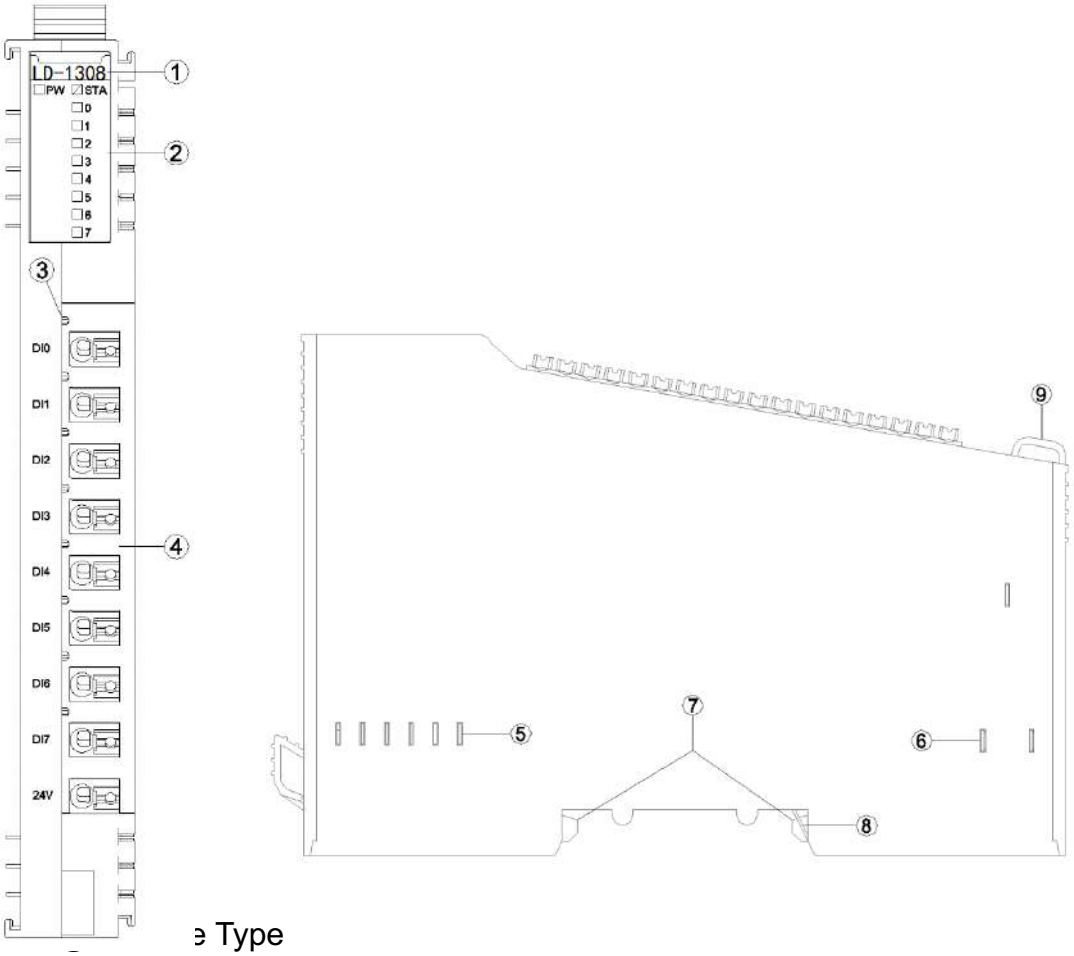
1 Module features

◆the module supports 8 channels digital input, supports sink input，and the input voltage is 24VDC and the input high level is valid. It could support PNP sensor.
◆the module could collect digital output signal of field equipment (dry contact or active output).
◆the module could be accessed to 2-wire or 3-wire digital sensor.
◆the internal bus and field input of the module use opto-isolator.
◆the module supports the input signal holding function, and the holding time can be set.
◆the module carries 8 digigtal input channels with LED indicator on each channel.
◆supports counting function after adding counting sub-module.
◆each input channel of the module supports a 32-bit counter with the counting frequency <200Hz.
◆the module could be set the digital signal input filtering time and the byte transmission order of the counter.
◆each channel of the module could be set the counting mode and counting direction independently.

2 Technical parameters

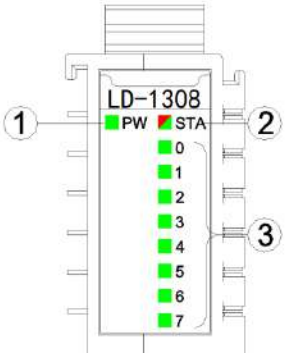
General parameters	
Power Consumption	Max.52mA@5.0Vdc
Isolation	I/O to internal bus: opto-couple isolation (3KVrms)
Field Power	Nominal:24Vdc, Range:22-28Vdc
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Input parameters	
Channel Number	8 channel sink input
LED Indicator	8 channel input LED indicator
Turn-on voltage	Min.10Vdc to Max.28Vdc
Turn-off Voltage	Max.5Vdc
Turn-on current	Max.5mA/channel@28V
Input impedance	>7.5kΩ
Input delay	OFF to ON: Max.3ms ON to OFF: Max.2ms
Filter time	Default 10ms
Sample frequency	500Hz
Counter frequency	<200Hz

3 Hardware interfaces



e Type
② State indicator
③ Channel indicator
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

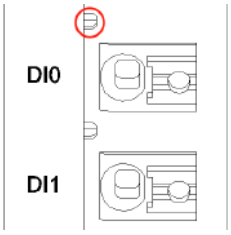
3.1 LED indicator definition



① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Input channel LED indicator (green)

PW Power State (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA Module State (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
0-7 channel LED indicator	Definition
ON	Input signal valid
OFF	Input signal invalid

3.2 Field channel LED indicator (Green)

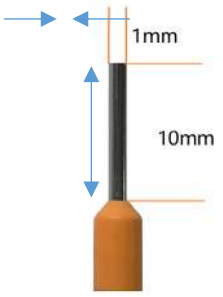


When input signal of input channel is valid, the corresponding field channel LED indicator is on.

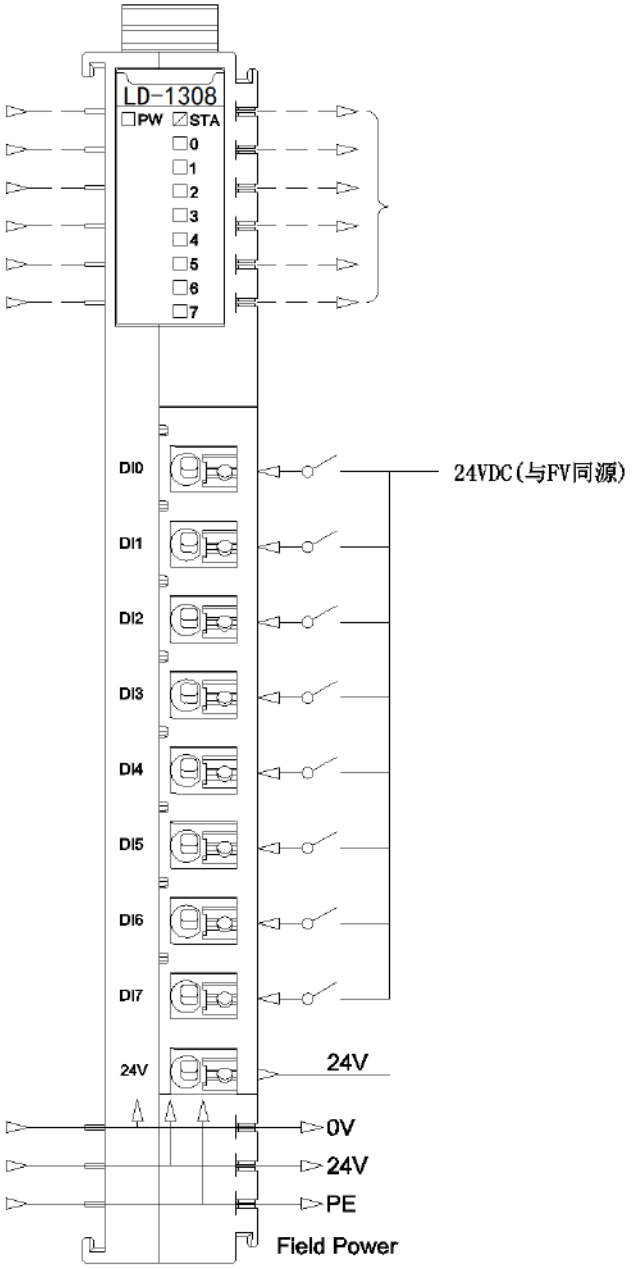
3.3 Terminal definition

Terminal Number	Symbol	Description
1	DI0	Signal input
2	DI1	
3	DI2	
4	DI3	
5	DI4	
6	DI5	
7	DI6	
8	DI7	
9	24V	Power output

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:



4 Wiring


LD-1308
PW
STA
0
1
2
3
4
5
6
7
DI0
DI1
DI2
DI3
DI4
DI5
DI6
DI7
24V
24VDC(与FV同源)
24V
0V
24V
PE
Field Power

5 Process data definition

<8DI Input Status> Submodule process data definition

Input data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DI Ch#7	DI Ch#6	DI Ch#5	DI Ch#4	DI Ch#3	DI Ch#2	DI Ch#1	DI Ch#0

Data description:

DI Ch#(0-7)：When the corresponding channel input signal is valid, the bit is 1, and when the input is invalid, it is 0.

0：Input signal invalid

1：Input signal valid

<8DI Counter Submodule> Submodule process data definition:

Input data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Counter Value Ch#0							
Byte 1								
Byte 2								
Byte 3								
Byte 4	Counter Value Ch#1							
Byte 5								
Byte 6								
Byte 7								
Byte 8	Counter Value Ch#2							
Byte 9								
Byte 10								
Byte 11								
Byte 12	Counter Value Ch#3							

Byte 13	
Byte 14	
Byte 15	
Byte 16	Counter Value Ch#4
Byte 17	
Byte 18	
Byte 19	
Byte 20	Counter Value Ch#5
Byte 21	
Byte 22	
Byte 23	
Byte 24	Counter Value Ch#6
Byte 25	
Byte 26	
Byte 27	
Byte 28	Counter Value Ch#7
Byte 29	
Byte 30	
Byte 31	

Output data

Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Counter Reset Ch#7	Counter Reset Ch#6	Counter Reset Ch#5	Counter Reset Ch#4	Counter Reset Ch#3	Counter Reset Ch#2	Counter Reset Ch#1	Counter Reset Ch#0

Data description:

Counter Value Ch#(0-7)：Count value, 32-bit unsigned integer, automatically zeroing after overflow.

Counter Reset Ch#(0-7)：When the data bit changes from 0 to 1 (rising edge), the input counter of the corresponding channel is cleared.

Note: the maximum counting frequency of the input channel is 200Hz. When the input signal exceeds this frequency, the counting result may be inconsistent with the actual value.

6 Configuration parameter definitions

<8DI Input Status> Submodule configuration parameter definition

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Input Filtering Time(ms)							
Byte 1								
Byte 2	Reserved					Input Holding Time(ms)		

Data description:

Input Filtering Time(ms)：Input filter time of Channel (ms) (Default: 10)

Input Holding Time(ms)： Signal input holding time of Channel (ms) (Default:0)

0：Disable

1：200ms

2：500ms

3：1000ms

4：1500ms

5：2000ms

6：3000ms

7：5000ms

<8DI Counter Submodule> Submodule configuration parameter definition

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved				Storage Enable	Storage Function	32Bit Data Format	
Byte 1	Count Mode Ch#3		Count Mode Ch#2		Count Mode Ch#1		Count Mode Ch#0	
Byte 2	Count Mode Ch#7		Count Mode Ch#6		Count Mode Ch#5		Count Mode Ch#4	
Byte 3	Count Direction Ch#7	Count Direction Ch#6	Count Direction Ch#5	Count Direction Ch#4	Count Direction Ch#3	Count Direction Ch#2	Count Direction Ch#1	Count Direction Ch#0

Data description:

32Bit Data Format: Byte transfer order of Channel count value (Default: 0)

0：AB-CD

1：BA-DC

2：CD-AB

3：DC-BA

Storage Function: Storage Function is supported or not, read only attribute, and this value is the actual value of the module when uploading device parameters.

0：storage is not supported

1：storage is supported

Storage Enable：Storage enable，when the Storage Function enables, the IO module will save the count value in real time to non-volatile memory, and load the last saved count value on the next power on. (Default: 1)

0：Disabled

1：Enable

Count Mode Ch# (0-7)：Count mode of the input channel. (Default: 0)

0: rising edge count

1: falling edge count

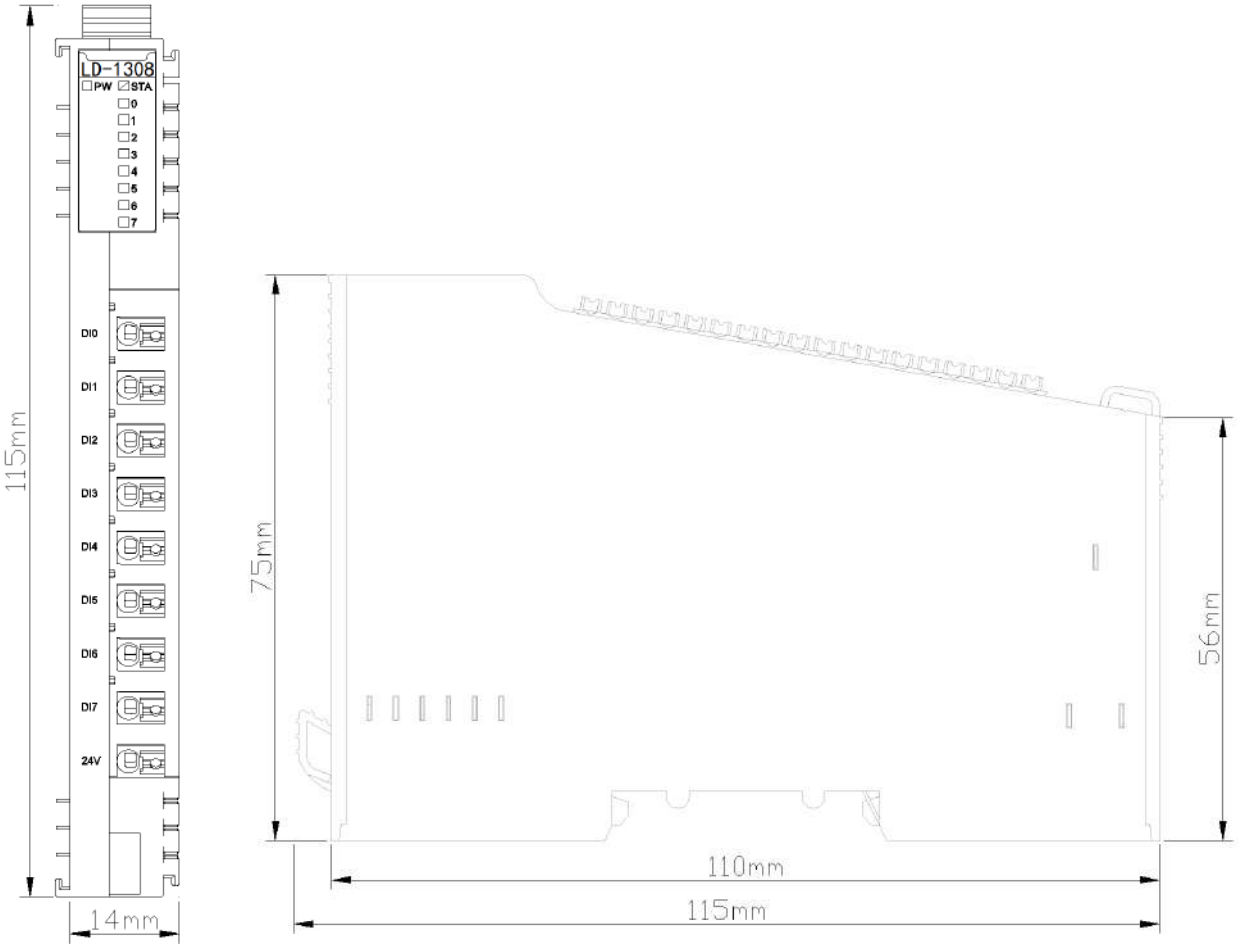
2: double edge count

Count Direction Ch# (0-7): The counting direction of the input channel. (Default: 0)

0: count up

1: count down

A Dimension drawing



LD-1016 16 channels digital input/24VDC/ PNP

1 Module features

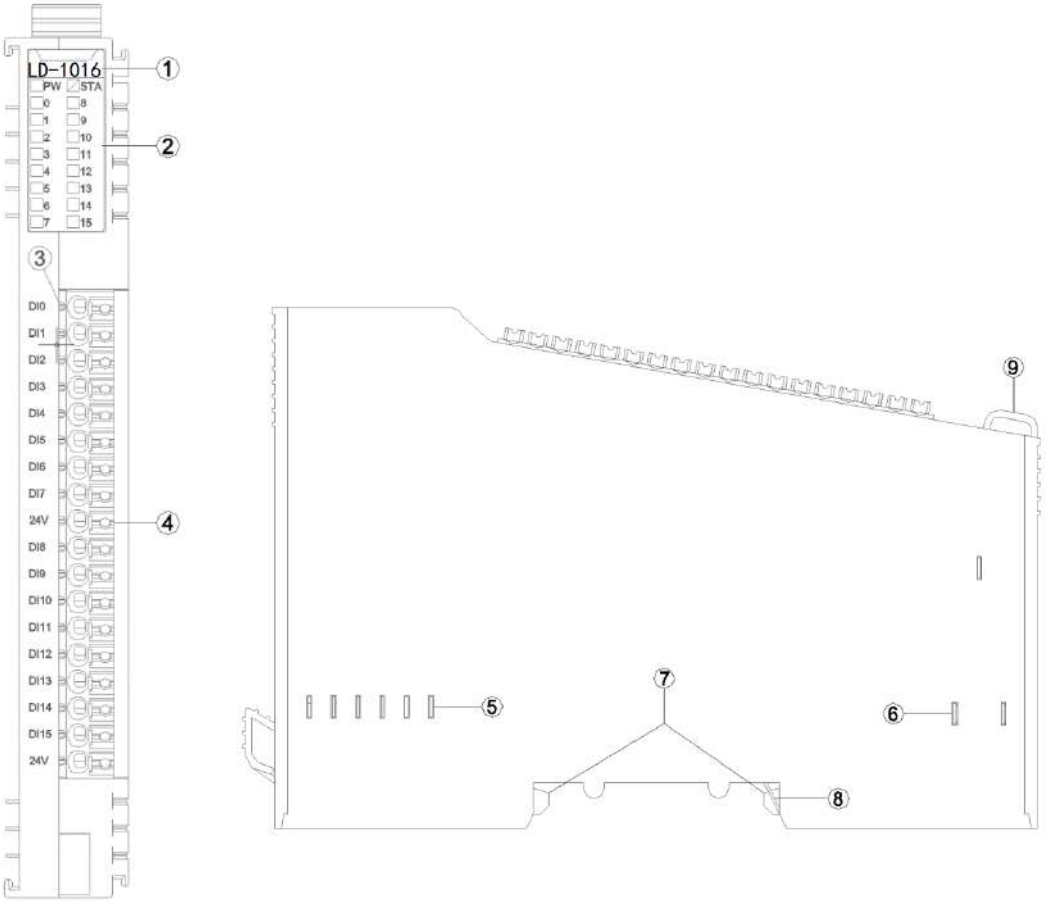
◆ the module supports 16 channels digital input, supports sink input， and the input voltage is 24VDC and the input high level is valid. It could support PNP sensor.
◆ the module could collect digital output signal of field equipment (dry contact or active output).
◆ the module could be accessed to 2-wire or 3-wire digital sensor.
◆ the internal bus and field input of the module use opto-isolator.
◆ the module supports the input signal holding function, and the holding time can be set.
◆the module carries 16 digigtal input channels with LED indicator on each channel.
◆ supports counting function after adding counting sub-module.
◆ each input channel of the module supports a 32-bit counter with the counting frequency <200Hz.
◆ the module could be set the digital signal input filtering time and the byte transmission order of the counter.
◆ each channel of the module could be set the counting mode and counting direction independently.

2 Technical parameters

General parameters	
Power Consumption	Max.60mA@5.0Vdc
Isolation	I/O to internal bus: opto-couple isolation (3KVrms)
Field Power	Nominal:24Vdc, Range:22-28Vdc
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Input parameters	
Channel Number	16 channel sink input
LED Indicator	16 channel input LED indicator
Turn-on voltage	Min.10Vdc to Max.28Vdc

Turn-off Voltage	Max.5Vdc
Turn-on current	Max.5mA/channel@28V
Input impedance	>7.5kΩ
Input delay	OFF to ON: Max.3ms ON to OFF: Max.2ms
Filter time	Default 10ms
Sample frequency	500Hz
Counter frequency	<200Hz

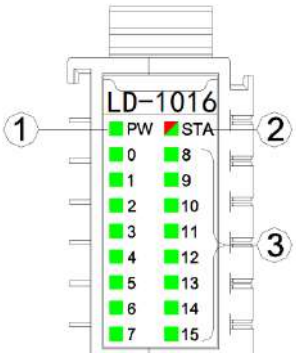
3 Hardware interfaces



① Module Type
② State indicator
③ Channel indicator
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle

⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

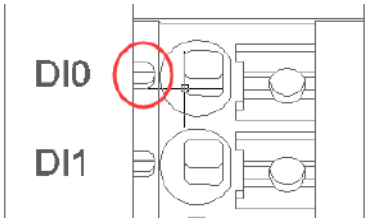
3.1 LED indicator definition



① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Input channel LED indicator (green)

PW Power State (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA Module State (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
0-15 channel indicator light	Definition
ON	Input signal valid
OFF	Input signal invalid

3.2 Field channel LED indicator (Green)



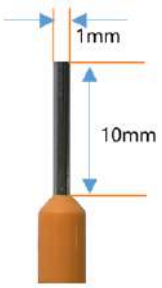
When input signal of input channel is valid, the corresponding field channel LED indicator is on.

3.3 Terminal definition

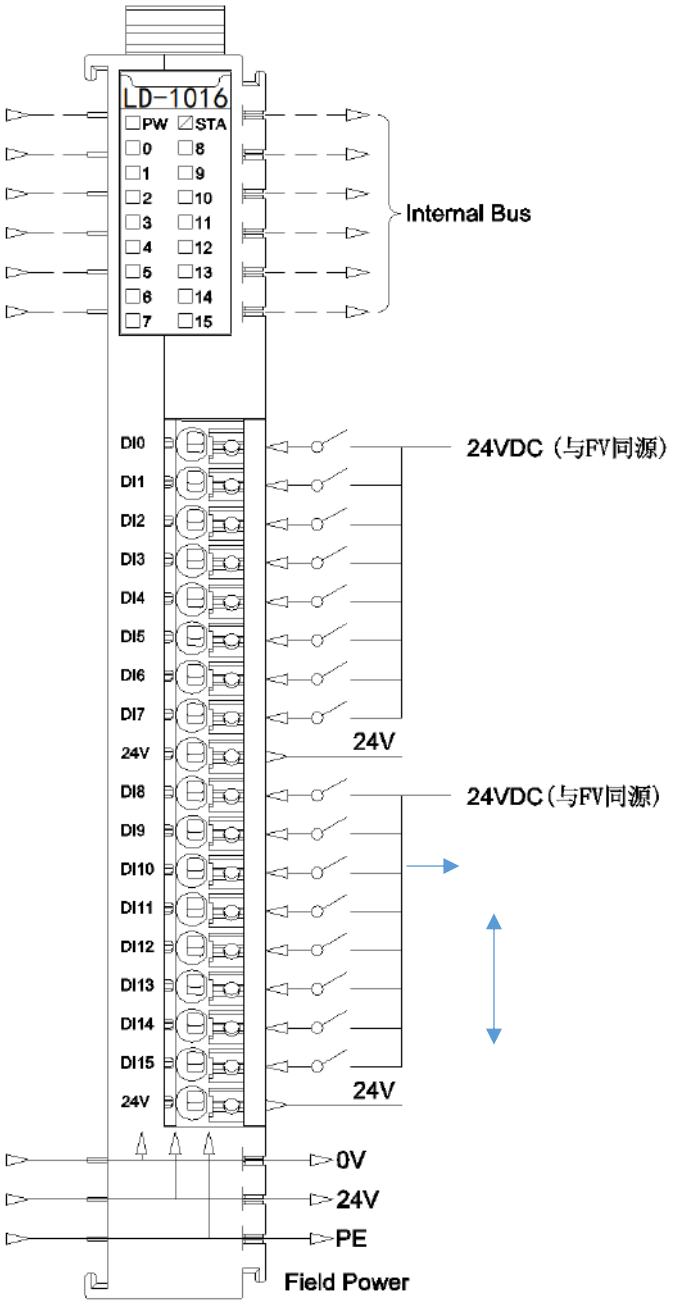
Terminal Number	Symbol	Description
1	DI0	Signal input
2	DI1	
3	DI2	
4	DI3	
5	DI4	
6	DI5	
7	DI6	
8	DI7	
9	24V	Power output
10	DI8	Signal input
11	DI9	
12	DI10	
13	DI11	
14	DI12	
15	DI13	
16	DI14	
17	DI15	
18	24V	Power output

It is recommended to use cables with cores smaller than 1mm².

The cold-pressed terminal parameters are as follows:



4 Wiring



5 Process data definition

<16DI Input State> Submodule process data definition

Input data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

Byte 0	DI Ch#7	DI Ch#6	DI Ch#5	DI Ch#4	DI Ch#3	DI Ch#2	DI Ch#1	DI Ch#0
Byte 1	DI Ch#15	DI Ch#14	DI Ch#13	DI Ch#12	DI Ch#11	DI Ch#10	DI Ch#9	DI Ch#8

Data description:

DI Ch#(0-15)：When the corresponding channel input signal is valid, the bit is 1, and when the input is invalid, it is 0.

0：Input signal invalid

1：Input signal valid

<16DI Counter Submodule> Submodule process data definition:

Input data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Counter Value Ch#0							
Byte 1								
Byte 2								
Byte 3								
Byte 4	Counter Value Ch#1							
Byte 5								
Byte 6								
Byte 7								
Byte 8	Counter Value Ch#2							
Byte 9								
Byte 10								
Byte 11								
Byte 12	Counter Value Ch#3							
Byte 13								
Byte 14								
Byte 15								
Byte 16	Counter Value Ch#4							
Byte 17								
Byte 18								
Byte 19								
Byte 20	Counter Value Ch#5							
Byte 21								
Byte 22								

Byte 23	
Byte 24	Counter Value Ch#6
Byte 25	
Byte 26	
Byte 27	
Byte 28	Counter Value Ch#7
Byte 29	
Byte 30	
Byte 31	
Byte 32	Counter Value Ch#8
Byte 33	
Byte 34	
Byte 35	
Byte 36	Counter Value Ch#9
Byte 37	
Byte 38	
Byte 39	
Byte 40	Counter Value Ch#10
Byte 41	
Byte 42	
Byte 43	
Byte 44	Counter Value Ch#11
Byte 45	
Byte 46	
Byte 47	
Byte 48	Counter Value Ch#12

Byte 49	
Byte 50	
Byte 51	
Byte 52	Counter Value Ch#13
Byte 53	
Byte 54	
Byte 55	
Byte 56	Counter Value Ch#14
Byte 57	
Byte 58	
Byte 59	
Byte 60	Counter Value Ch#15
Byte 61	
Byte 62	
Byte 63	

Output data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Counter Reset Ch#7	Counter Reset Ch#6	Counter Reset Ch#5	Counter Reset Ch#4	Counter Reset Ch#3	Counter Reset Ch#2	Counter Reset Ch#1	Counter Reset Ch#0
Byte 1	Counter Reset Ch#15	Counter Reset Ch#14	Counter Reset Ch#13	Counter Reset Ch#12	Counter Reset Ch#11	Counter Reset Ch#10	Counter Reset Ch#9	Counter Reset Ch#8

Data description:

Counter Value Ch#(0-15)：Count value, 32-bit unsigned integer, automatically zeroing after overflow.

Counter Reset Ch#(0-15)：When the data bit changes from 0 to 1 (rising edge), the input counter of the corresponding channel is cleared.

Note: the maximum counting frequency of the input channel is 200Hz. When the input signal exceeds this frequency, the counting result may be inconsistent with the actual

value.

6 Configuration parameter definitions

<16DI Input State> Submodule configuration parameter definition

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Input Filtering Time(ms)							
Byte 1								
Byte 2	Reserved					Input Holding Time(ms)		

Data description:

Input Filtering Time(ms): Input filter time of Channel (ms) (Default: 10)

Input Holding Time(ms): Signal input holding time of Channel (ms) (Default:0)

0：Disable

1：200ms

2：500ms

3：1000ms

4：1500ms

5：2000ms

6：3000ms

7：5000ms

<16DI Counter Submodule> Submodule configuration parameter definition

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved				Storage Enable	Storage Function	32Bit Data Format	
Byte 1	Count Mode Ch#3		Count Mode Ch#2		Count Mode Ch#1		Count Mode Ch#0	
Byte 2	Count Mode Ch#7		Count Mode Ch#6		Count Mode Ch#5		Count Mode Ch#4	
Byte 3	Count Mode Ch#11		Count Mode Ch#10		Count Mode Ch#9		Count Mode Ch#8	
Byte 4	Count Mode Ch#15		Count Mode Ch#14		Count Mode Ch#13		Count Mode Ch#12	
Byte 5	Count Direction Ch#7	Count Direction Ch#6	Count Direction Ch#5	Count Direction Ch#4	Count Direction Ch#3	Count Direction Ch#2	Count Direction Ch#1	Count Direction Ch#0

Byte 6	Count Direction Ch#15	Count Direction Ch#14	Count Direction Ch#13	Count Direction Ch#12	Count Direction Ch#11	Count Direction Ch#10	Count Direction Ch#9	Count Direction Ch#8

Data description:

32Bit Data Format: Byte transfer order of Channel count value (Default: 0)

0：AB-CD

1：BA-DC

2：CD-AB

3：DC-BA

Storage Function: Storage Function is supported or not, read only attribute, and this value is the actual value of the module when uploading device parameters.

0：storage is not supported

1：storage is supported

Storage Enable：Storage enable，when the Storage Function enables, the IO module will save the count value in real time to non-volatile memory, and load the last saved count value on the next power on. (Default: 1)

0：Disabled

1：Enable

Count Mode Ch# (0-15)：Count mode of the input channel. (Default: 0)

0: rising edge count

1: falling edge count

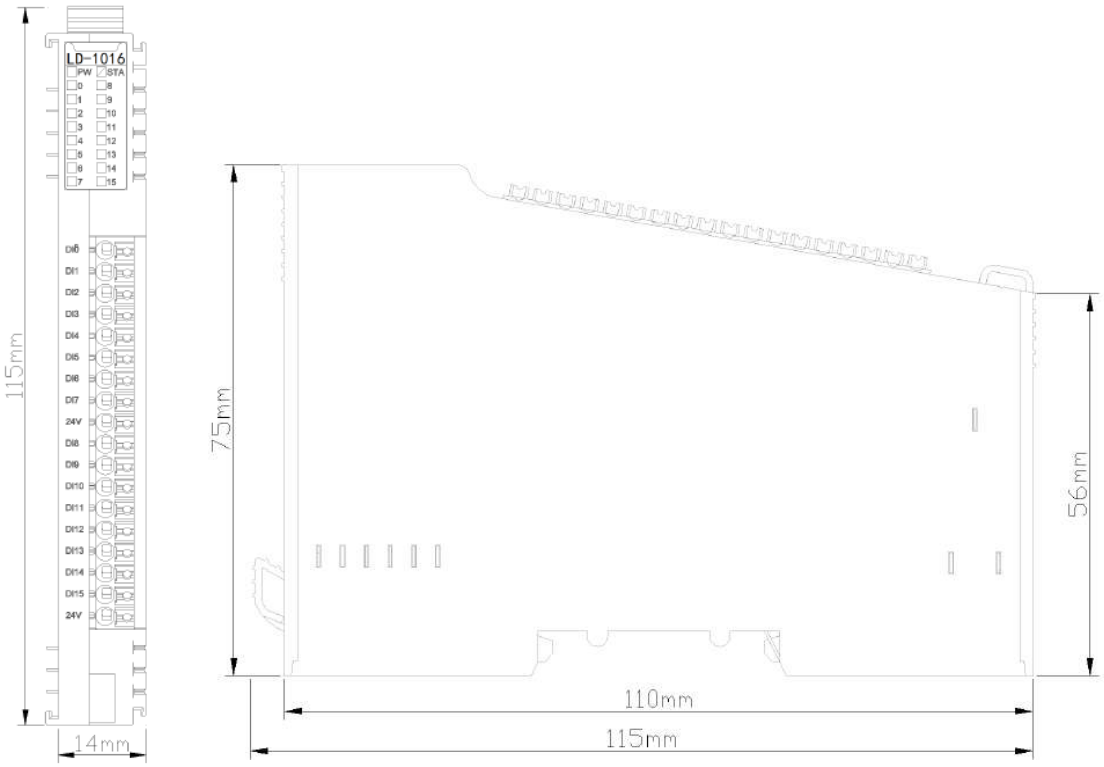
2: double edge count

Count Direction Ch# (0-15): The counting direction of the input channel. (Default: 0)

0: count up

1: count down

A Dimension drawing



LD-3108 8 channels digital input/24VDC/NPN

1 Module features

◆ the module supports 8 channels digital input, and the input low level is valid. It could support NPN sensor.

◆ the module could collect digital output signal of field equipment (dry contact or active output).

◆ the module could be accessed to 2-wire or 3-wire digital sensor.

◆ the internal bus and field input of the module use opto-isolator.

◆ the module supports the input signal holding function, and the holding time can be set.

◆ the module carries 8 digigtal input channels with LED indicator on each channel.

◆ supports counting function after adding counting sub-module.

◆ each input channel of the module supports a 32-bit counter with the counting frequency <200Hz.

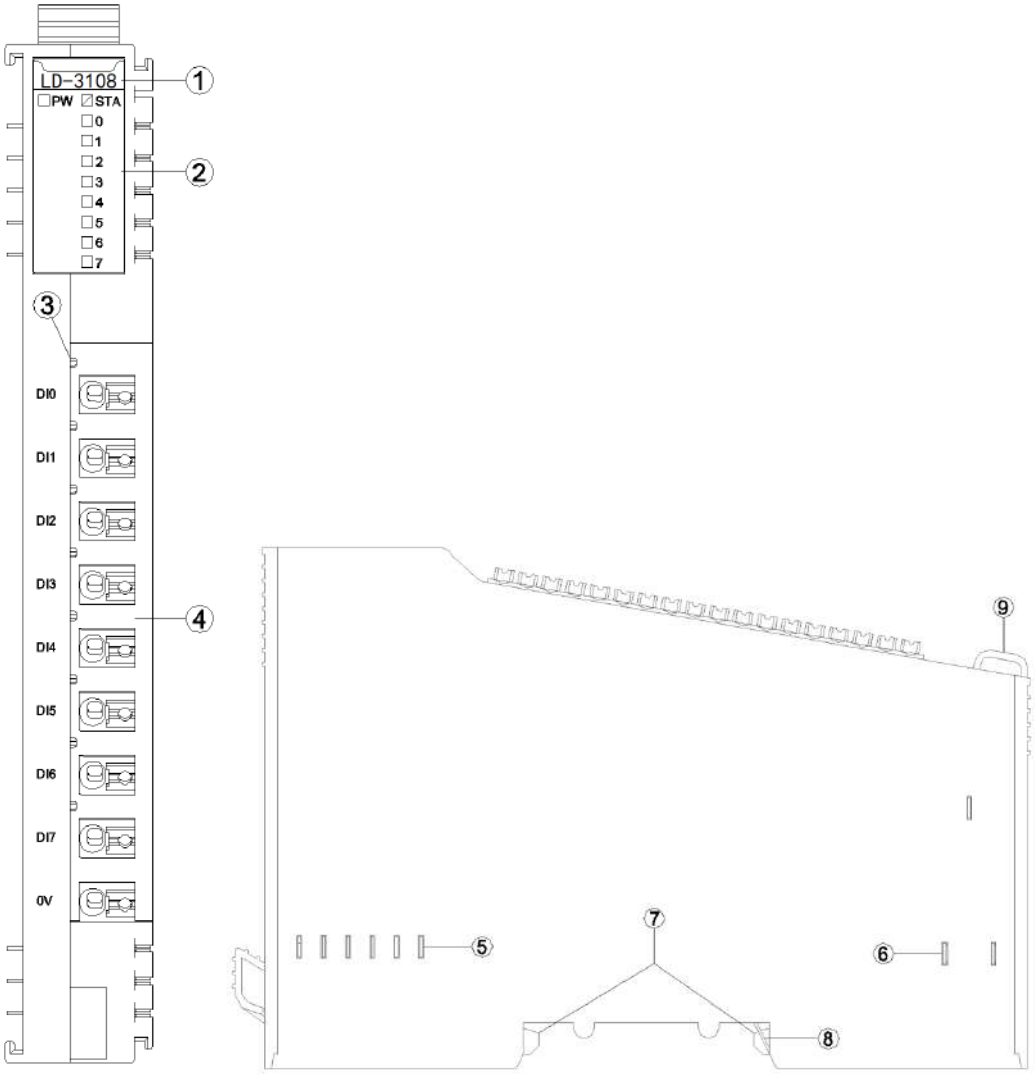
◆ the module could be set the digital signal input filtering time and the byte transmission order of the counter.

◆ each channel of the module could be set the counting mode and counting direction independently.

2 Technical parameters

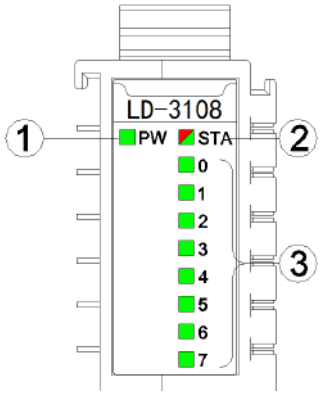
General parameters	
Power Consumption	Max.85mA@5.0Vdc
Isolation	I/O to internal bus: opto-couple isolation (3KVrms)
Field Power	Nominal:24Vdc, Range:22-28Vdc
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Input parameters	
Channel Number	8 channels input
LED Indicator	8 channels input LED indicator
Turn-on voltage	Min.10Vdc to Max.28Vdc
Turn-off Voltage	Max.5Vdc
Turn-on current	Max.5mA/channel@28V
Input impedance	>7.5kΩ
Input delay	OFF to ON: Max.3ms ON to OFF: Max.2ms
Filter time	Default 10ms
Sample frequency	500Hz
Counter frequency	<200Hz

3 Hardware interfaces



① Module Type
② State indicator
③ Channel indicator
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

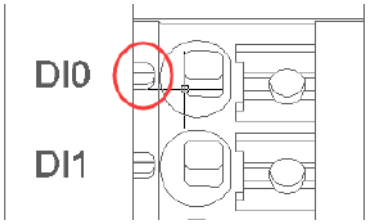
3.1 LED indicator definition



① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Input channel LED indicator (green)

PW Power State (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA Module State (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
0-7 channel LED indicator	Definition
ON	Input signal valid
OFF	Input signal invalid

3.2 Field channel LED indicator (Green)



When input signal of input channel is valid, the corresponding field channel LED indicator is on.

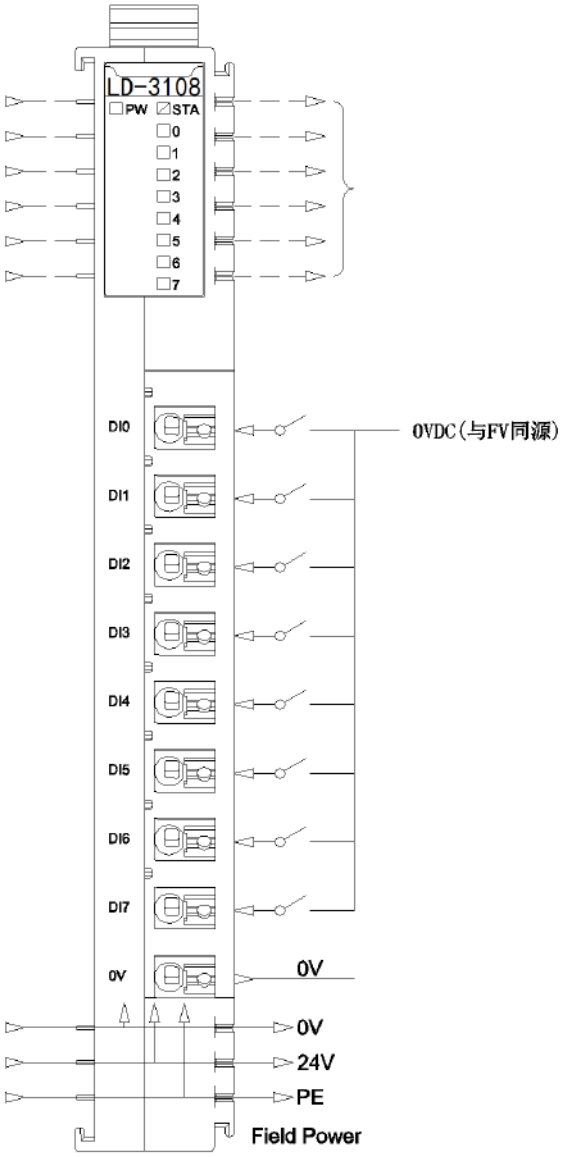
3.3 Terminal definition

Terminal Number	Symbol	Description
1	DI0	Signal input
2	DI1	
3	DI2	
4	DI3	
5	DI4	
6	DI5	
7	DI6	
8	DI7	
9	0V	Power V-

It is recommended to use cables with cores smaller than 1mm².

The cold-pressed terminal parameters are as follows:

4 Wiring


LD-3108
PW
STA
0
1
2
3
4
5
6
7
DI0
DI1
DI2
DI3
DI4
DI5
DI6
DI7
0V
0VDC（与FV同源）
0V
0V
24V
PE
Field Power

5 Process data definition

<8DI Input Status> Submodule process data definition

Input data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DI Ch#7	DI Ch#6	DI Ch#5	DI Ch#4	DI Ch#3	DI Ch#2	DI Ch#1	DI Ch#0

Data description:

DI Ch#(0-7)： When the corresponding channel input signal is valid, the bit is 1, and when the input is invalid, it is 0.

0：Input signal invalid

1：Input signal valid

<8DI Counter Submodule> Submodule process data definition:

Input data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Counter Value Ch#0							
Byte 1								
Byte 2								
Byte 3								
Byte 4	Counter Value Ch#1							
Byte 5								
Byte 6								
Byte 7								
Byte 8	Counter Value Ch#2							
Byte 9								
Byte 10								
Byte 11								
Byte 12	Counter Value Ch#3							
Byte 13								

Byte 14	
Byte 15	
Byte 16	Counter Value Ch#4
Byte 17	
Byte 18	
Byte 19	
Byte 20	Counter Value Ch#5
Byte 21	
Byte 22	
Byte 23	
Byte 24	Counter Value Ch#6
Byte 25	
Byte 26	
Byte 27	
Byte 28	Counter Value Ch#7
Byte 29	
Byte 30	
Byte 31	

Output data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Counter Reset Ch#7	Counter Reset Ch#6	Counter Reset Ch#5	Counter Reset Ch#4	Counter Reset Ch#3	Counter Reset Ch#2	Counter Reset Ch#1	Counter Reset Ch#0

Data description:

Counter Value Ch#(0-7)：Count value, 32-bit unsigned integer, automatically zeroing after overflow.

Counter Reset Ch#(0-7)：When the data bit changes from 0 to 1 (rising edge), the input counter of the corresponding channel is cleared.

Note: the maximum counting frequency of the input channel is 200Hz. When the input signal exceeds this frequency, the counting result may be inconsistent with the actual value.

6 Configuration parameter definitions

<8DI Input Status> Submodule configuration parameter definition

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Input Filtering Time(ms)							
Byte 1								
Byte 2	Reserved					Input Holding Time(ms)		

Data description:

Input Filtering Time(ms)：Input filter time of Channel (ms) (Default: 10)

Input Holding Time(ms)： Signal input holding time of Channel (ms) (Default:0)

0：Disable

1：200ms

2：500ms

3：1000ms

4：1500ms

5：2000ms

6：3000ms

7：5000ms

<8DI Counter Submodule> Submodule configuration parameter definition

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved				Storage Enable	Storage Function	32Bit Data Format	
Byte 1	Count Mode Ch#3		Count Mode Ch#2		Count Mode Ch#1		Count Mode Ch#0	
Byte 2	Count Mode Ch#7		Count Mode Ch#6		Count Mode Ch#5		Count Mode Ch#4	
Byte 3…4	Reserved							
Byte 5	Count Direction Ch#7	Count Direction Ch#6	Count Direction Ch#5	Count Direction Ch#4	Count Direction Ch#3	Count Direction Ch#2	Count Direction Ch#1	Count Direction Ch#0

Data description:

32Bit Data Format：Byte transfer order of Channel count value (Default: 0)

0：AB-CD

1：BA-DC

2：CD-AB
3：DC-BA

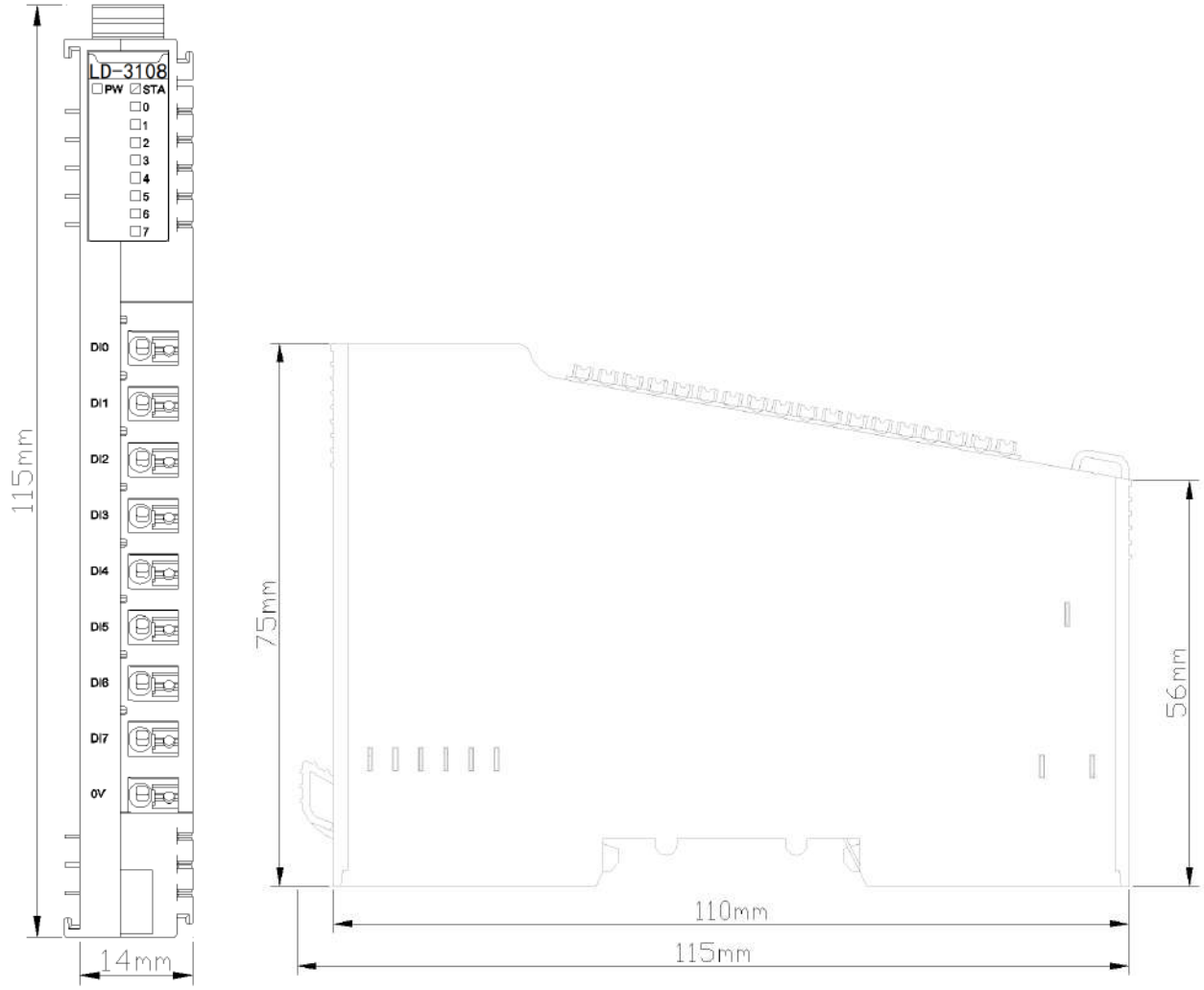
Storage Function：Storage Function is supported or not, read only attribute, and this value is the actual value of the module when uploading device parameters.
0：storage is not supported
1：storage is supported

Storage Enable：Storage enable，when the Storage Function enables, the IO module will save the count value in real time to non-volatile memory, and load the last saved count value on the next power on. (Default: 1)
0：Disabled
1：Enable

Count Mode Ch#(0-7)：Count mode of the input channel. (Default: 0)
0：rising edge count
1：falling edge count
2：double edge count

Count Direction Ch#(0-7)：The counting direction of the input channel. (Default: 0)
0：count up
1：count down

A Dimension drawing



LD-3016 16 channels digital input/24VDC/NPN

1 Module features

◆ the Module supports 16 channels digital input, supports source input, the input voltage is 0V and the input low level is valid.

◆ the module could collect the digital output signal of field equipment (dry contact or active output).

◆ the module could be connected to a 2-wire or 3-wire digital sensor.

◆ the internal bus of the module and field input are isolated by optocoupler.

◆ the module supports input signal holding function, holding time can be set.

◆ the module carries with 16 digital input channel LED indicator.

◆ after adding counting submodule, the counting function is effective.

◆ each input channel of the module supports 32-bit counter with counting frequency <200Hz.

◆ the module could be set the digital signal input filter time and counter byte transmission sequence.

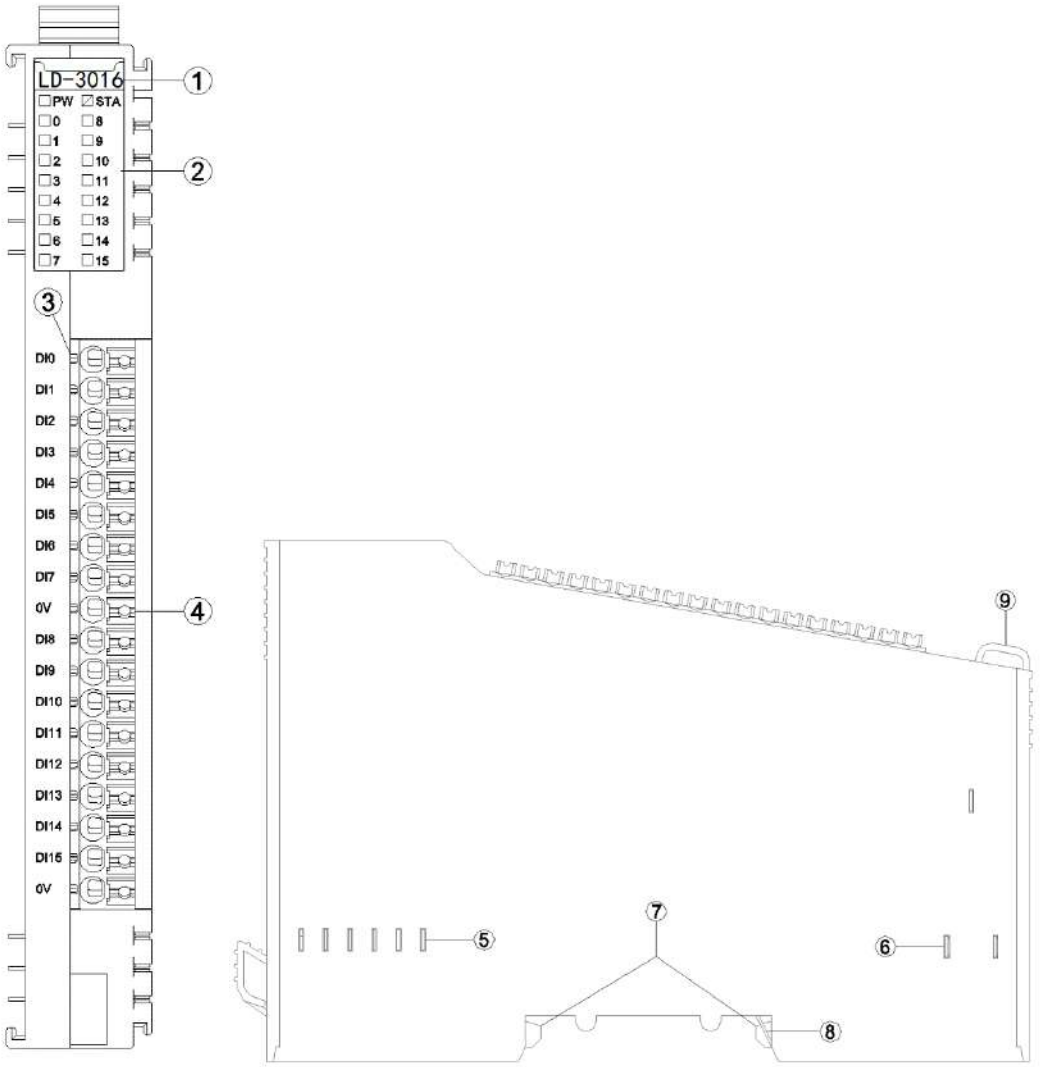
◆ each channel of the module could be set the counting mode and counting direction independently.

2 Technical parameters

General parameters	
Power Consumption	Max.60mA@5.0Vdc
Isolation	I/O to internal bus: opto-couple isolation (3KVrms)
Field Power	Nominal:24Vdc, Range:22-28Vdc
Wiring	I/O Wiring：Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Input parameters	
Channel Number	16 channels source input
LED Indicator	16 channels input LED indicator
Turn-on voltage	Min.10Vdc to Max.28Vdc
Turn-off Voltage	Max.5Vdc

Turn-on current	Max.5mA/channel@28V
Input impedance	>7.5kΩ
Input delay	OFF to ON :Max.3ms ON to OFF :Max.2ms
Filter time	Default 10ms
Sample frequency	500Hz
Counter frequency	<200Hz

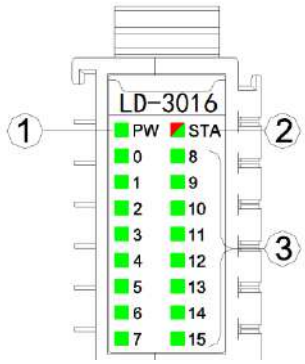
3 Hardware interfaces



① Module Type
② State indicator
③ Channel indicator
④ Wiring Terminal and identification

⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

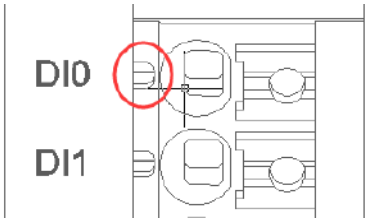
3.1 LED indicator definition



① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Input channel LED indicator (green)

PW Power State (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA Module State (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
0-15 channel indicator light	Definition
ON	Input signal valid
OFF	Input signal invalid

3.2 Field channel LED indicator (Green)

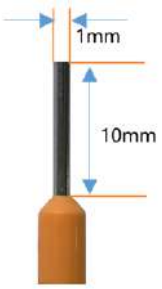


When input signal of input channel is valid, the corresponding field channel LED indicator is on.

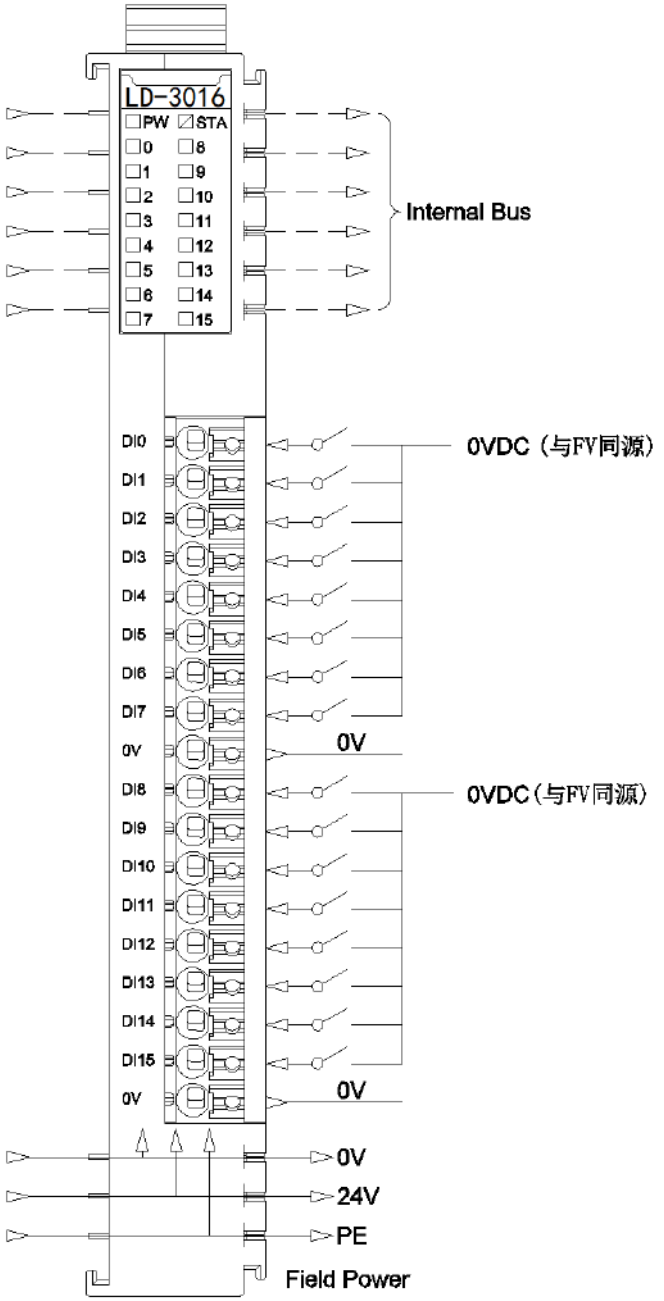
3.3 Terminal definition

Terminal Number	Symbol	Description
1	DI0	Signal input
2	DI1	
3	DI2	
4	DI3	
5	DI4	
6	DI5	
7	DI6	
8	DI7	
9	0V	Power V-
10	DI8	Signal input
11	DI9	
12	DI10	
13	DI11	
14	DI12	
15	DI13	
16	DI14	
17	DI15	
18	24V	Power output V-

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:



4 Wiring



5 Process data definition

<16DI Input State> Submodule process data definition

Input data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DI Ch#7	DI Ch#6	DI Ch#5	DI Ch#4	DI Ch#3	DI Ch#2	DI Ch#1	DI Ch#0

Byte 1	DI Ch#15	DI Ch#14	DI Ch#13	DI Ch#12	DI Ch#11	DI Ch#10	DI Ch#9	DI Ch#8

Data description:

DI Ch#(0-15)：When the corresponding channel input signal is valid, the bit is 1, and when the DI Ch#(0-15)input is invalid, it is 0.

0：Input signal invalid

1：Input signal valid

<16DI Counter Submodule> Submodule process data definition:

Input data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Counter Value Ch#0							
Byte 1								
Byte 2								
Byte 3								
Byte 4	Counter Value Ch#1							
Byte 5								
Byte 6								
Byte 7								
Byte 8	Counter Value Ch#2							
Byte 9								
Byte 10								
Byte 11								
Byte 12	Counter Value Ch#3							
Byte 13								
Byte 14								
Byte 15								

Byte 16	Counter Value Ch#4
Byte 17	
Byte 18	
Byte 19	
Byte 20	Counter Value Ch#5
Byte 21	
Byte 22	
Byte 23	
Byte 24	Counter Value Ch#6
Byte 25	
Byte 26	
Byte 27	
Byte 28	Counter Value Ch#7
Byte 29	
Byte 30	
Byte 31	
Byte 32	Counter Value Ch#8
Byte 33	
Byte 34	
Byte 35	
Byte 36	Counter Value Ch#9
Byte 37	
Byte 38	

Byte 39	
Byte 40	Counter Value Ch#10
Byte 41	
Byte 42	
Byte 43	
Byte 44	Counter Value Ch#11
Byte 45	
Byte 46	
Byte 47	
Byte 48	Counter Value Ch#12
Byte 49	
Byte 50	
Byte 51	
Byte 52	Counter Value Ch#13
Byte 53	
Byte 54	
Byte 55	
Byte 56	Counter Value Ch#14
Byte 57	
Byte 58	
Byte 59	
Byte 60	Counter Value Ch#15
Byte 61	

Byte 62								
Byte 63								
Output data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Counter Reset Ch#7	Counter Reset Ch#6	Counter Reset Ch#5	Counter Reset Ch#4	Counter Reset Ch#3	Counter Reset Ch#2	Counter Reset Ch#1	Counter Reset Ch#0
Byte 1	Counter Reset Ch#15	Counter Reset Ch#14	Counter Reset Ch#13	Counter Reset Ch#12	Counter Reset Ch#11	Counter Reset Ch#10	Counter Reset Ch#9	Counter Reset Ch#8

Data description:

Counter Value Ch#(0-15)：Count value, 32-bit unsigned integer, automatically zeroing after overflow.

Counter Reset Ch#(0-15)：When the data bit changes from 0 to 1 (rising edge), the input counter of the corresponding channel is cleared.

Note: the maximum counting frequency of the input channel is 200Hz. When the input signal exceeds this frequency, the counting result may be inconsistent with the actual value.

6 Configuration parameter definitions

<16DI Input State> Submodule configuration parameter definition

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Input Filtering Time(ms)							
Byte 1								
Byte 2	Reserved					Input Holding Time(ms)		

Data description:

Input Filtering Time(ms): Input filter time of Channel (ms) (Default: 10)

Input Holding Time(ms): Signal input holding time of Channel (ms) (Default:0)

0：Disable

1：200ms

2：500ms

3：1000ms

4：1500ms

5：2000ms

6：3000ms

7：5000ms

<16DI Counter Submodule> Submodule configuration parameter definition

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved				Storage Enable	Storage Function	32Bit Data Format	
Byte 1	Count Mode Ch#3		Count Mode Ch#2		Count Mode Ch#1		Count Mode Ch#0	
Byte 2	Count Mode Ch#7		Count Mode Ch#6		Count Mode Ch#5		Count Mode Ch#4	
Byte 3	Count Mode Ch#11		Count Mode Ch#10		Count Mode Ch#9		Count Mode Ch#8	
Byte 4	Count Mode Ch#15		Count Mode Ch#14		Count Mode Ch#13		Count Mode Ch#12	
Byte 5	Count Direction Ch#7	Count Direction Ch#6	Count Direction Ch#5	Count Direction Ch#4	Count Direction Ch#3	Count Direction Ch#2	Count Direction Ch#1	Count Direction Ch#0

Byte 6	Count Direction Ch#15	Count Direction Ch#14	Count Direction Ch#13	Count Direction Ch#12	Count Direction Ch#11	Count Direction Ch#10	Count Direction Ch#9	Count Direction Ch#8

Data description:

32Bit Data Format: Byte transfer order of Channel count value (Default: 0)

0：AB-CD

1：BA-DC

2：CD-AB

3：DC-BA

Storage Function: Storage Function is supported or not, read only attribute, and this value is the actual value of the module when uploading device parameters.

0：storage is not supported

1：storage is supported

Storage Enable：Storage enable，when the Storage Function enables, the IO module will save the count value in real time to non-volatile memory, and load the last saved count value on the next power on. (Default: 1)

0：Disabled

1：Enable

Count Mode Ch# (0-15)：Count mode of the input channel. (Default: 0)

0: rising edge count

1: falling edge count

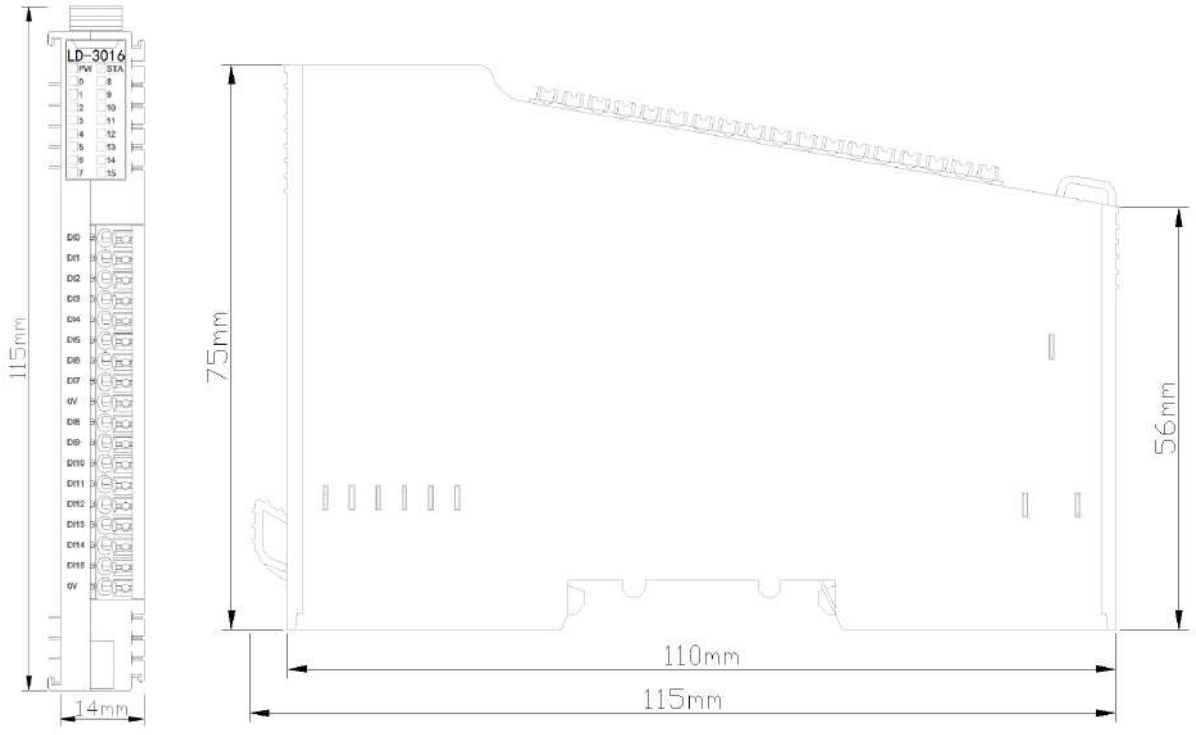
2: double edge count

Count Direction Ch# (0-15): The counting direction of the input channel. (Default: 0)

0: count up

1: count down

A Dimension drawing



LD-5032 32 channels digital input/24VDC/PNP or NPN

1 Module features

◆ the module supports 32 channels digital input, it supports sink input and the input high level is valid as it could support PNP sensor; it also supports source input and the input low level is valid as it could support NPN sensor.

◆ the module could collect the digital output signal of field equipment (dry contact or active output).

◆ the module could be connected to 2-wire or 3-wire digital sensor.

◆ the internal bus of the module and field input are isolated by optocoupler.

◆ the module supports input signal holding function, holding time can be set.

◆ after adding counting submodule, the counting function is effective.

◆ each input channel of the module supports 32-bit counter with counting frequency <200Hz.

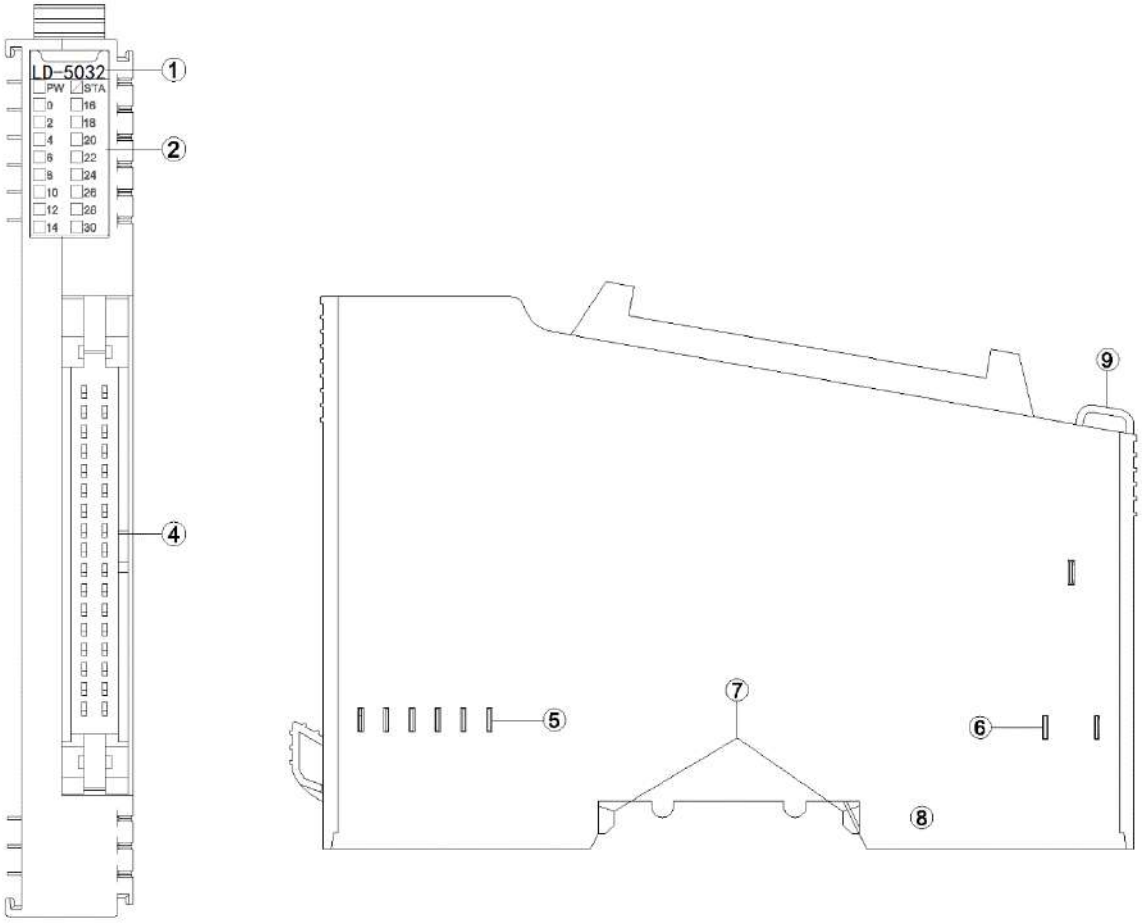
◆ the module could be set the digital signal input filter time and counter byte transmission sequence.

◆ each channel of the module could be set the counting mode and counting direction independently.

2 Technical parameters

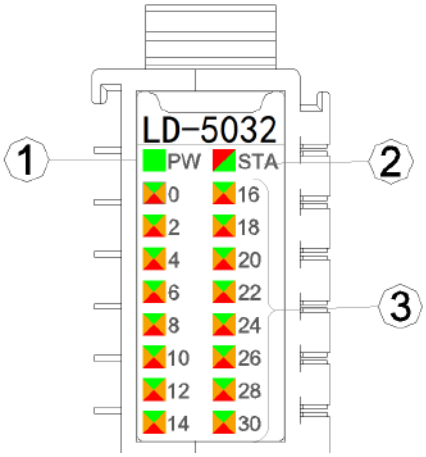
General parameters	
Power Consumption	Max.60mA@5.0Vdc
Isolation	I/O to internal bus: opto-couple isolation (3KVrms)
Field Power	Nominal:24Vdc, Range:22-28Vdc
Wiring	34P male connector 2.54mm Pin header
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Input parameters	
Channel Number	32 channels input
LED Indicator	32 channels input LED indicator
Turn-on voltage	High input: Min.10Vdc to Max.28Vdc (Common Terminal:0Vdc) Low input: Min.0Vdc to Max.14Vdc (Common Terminal:24Vdc)
Turn-off voltage	High input:Max.5Vdc (Common Terminal:0Vdc) Low input: Min.19Vdc (Common Terminal:24Vdc)
Turn-on current	Max.5mA/channel@28V
Input impedance	>7.5kΩ
Input delay	OFF to ON: Max.3ms ON to OFF: Max.2ms
Filter time	Default 10ms
Sample frequency	500Hz
Counter frequency	<200Hz

3 Hardware interfaces



① Module Type
② State indicator
④ 34P male connector
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition



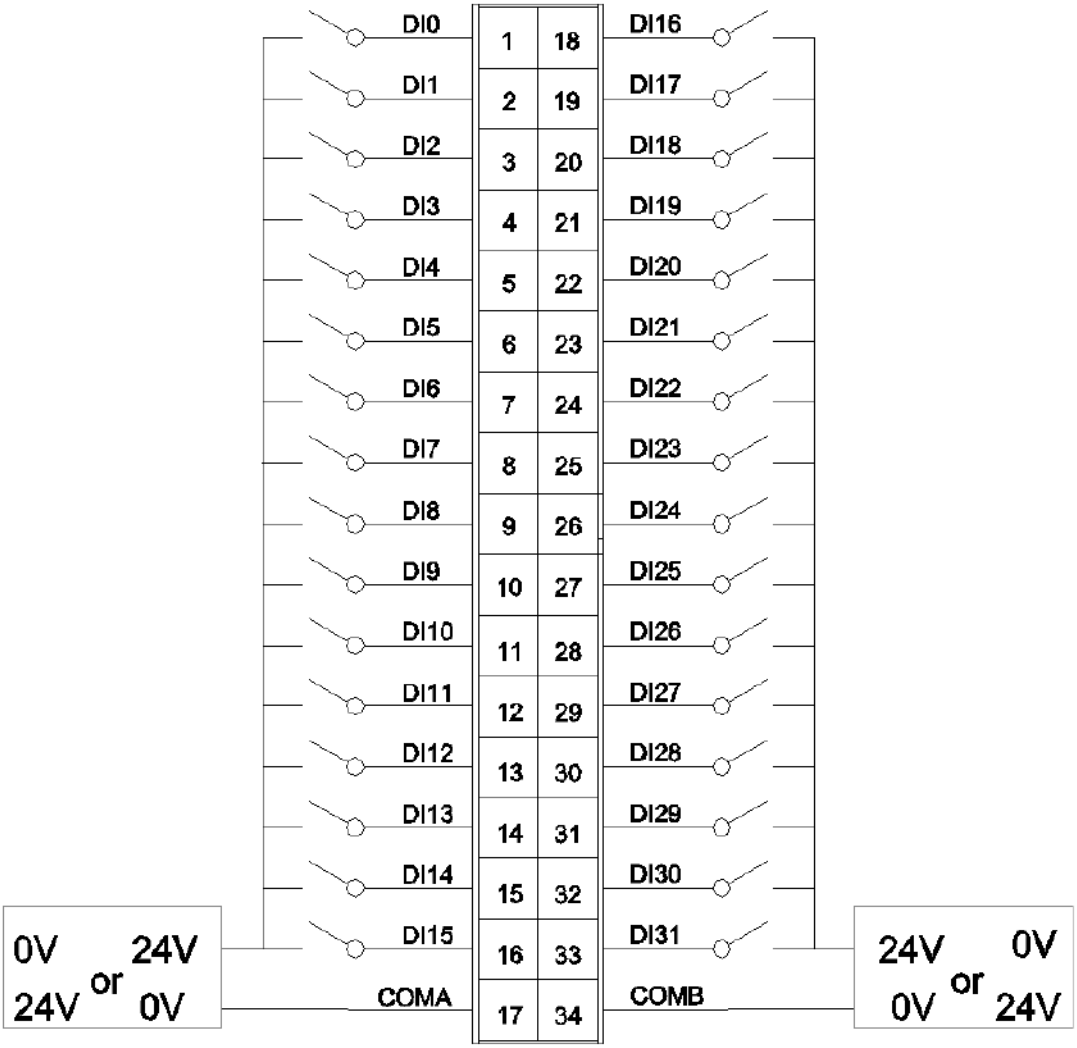
① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Input channel LED indicator (green/red/orange)

PW Power State	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA Module State Indicator	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz)(RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
0-31 channel indicator light	Definition
ON (GREEN)	Indicates that the input channel signal is valid
ON (RED)	Indicates that the input channel +1 signal is valid
ON (ORANGE)	Indicates that the input channel and channel +1 signal are valid
OFF	Input signal is invalid

3.2 Terminal definition

Description	Symbol	Terminal Number	Terminal Number	Symbol	Description
Signal input	DI0	1	18	DI16	Signal input
	DI1	2	19	DI17	
	DI2	3	20	DI18	
	DI3	4	21	DI19	
	DI4	5	22	DI20	
	DI5	6	23	DI21	
	DI6	7	24	DI22	
	DI7	8	25	DI23	
	DI8	9	26	DI24	
	DI9	10	27	DI25	
	DI10	11	28	DI26	
	DI11	12	29	DI27	
	DI12	13	30	DI28	
	DI13	14	31	DI29	
	DI14	15	32	DI30	
	DI15	16	33	DI31	
0V or 24V	COMA	17	34	COMB	0V or 24V

4 Wiring


DI0
DI1
DI2
DI3
DI4
DI5
DI6
DI7
DI8
DI9
DI10
DI11
DI12
DI13
DI14
DI15
COMA
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
DI16
DI17
DI18
DI19
DI20
DI21
DI22
DI23
DI24
DI25
DI26
DI27
DI28
DI29
DI30
DI31
COMB
0V 24V
24V or 0V
24V 0V
0V or 24V

5 Process data definition

<32DI Input Status> Submodule process data definition

Input data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DI Ch#7	DI Ch#6	DI Ch#5	DI Ch#4	DI Ch#3	DI Ch#2	DI Ch#1	DI Ch#0
Byte 1	DI Ch#15	DI Ch#14	DI Ch#13	DI Ch#12	DI Ch#11	DI Ch#10	DI Ch#9	DI Ch#8
Byte 2	DI Ch#23	DI Ch#22	DI Ch#21	DI Ch#20	DI Ch#19	DI Ch#18	DI Ch#17	DI Ch#16
Byte 3	DI Ch#31	DI Ch#30	DI Ch#29	DI Ch#28	DI Ch#27	DI Ch#26	DI Ch#25	DI Ch#24

Data description：

DI Ch#(0-31)：When the corresponding channel input signal is valid, the bit is 1, and when the input is invalid, it is 0.

0：Input signal invalid

1：Input signal valid

<16DI Counter Submodule> Submodule process data definition

Input data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Counter Value Ch#0							
Byte 1								
Byte 2								
Byte 3								
Byte 4	Counter Value Ch#1							
Byte 5								
Byte 6								
Byte 7								
Byte 8	Counter Value Ch#2							
Byte 9								
Byte 10								
Byte 11								
Byte 12	Counter Value Ch#3							
Byte 13								
Byte 14								
Byte 15								
Byte 16	Counter Value Ch#4							

Byte 17	
Byte 18	
Byte 19	
Byte 20	Counter Value Ch#5
Byte 21	
Byte 22	
Byte 23	
Byte 24	Counter Value Ch#6
Byte 25	
Byte 26	
Byte 27	
Byte 28	Counter Value Ch#7
Byte 29	
Byte 30	
Byte 31	
…	…
…	
…	
…	
…	…
…	
…	
…	
Byte 116	Counter Value Ch#29
Byte 117	
Byte 118	
Byte 119	
Byte 120	Counter Value Ch#30
Byte 121	

Byte 122								
Byte 123								
Byte 124	Counter Value Ch#31							
Byte 125								
Byte 126								
Byte 127								
Output data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Counter Reset Ch#7	Counter Reset Ch#6	Counter Reset Ch#5	Counter Reset Ch#4	Counter Reset Ch#3	Counter Reset Ch#2	Counter Reset Ch#1	Counter Reset Ch#0
Byte 1	Counter Reset Ch#15	Counter Reset Ch#14	Counter Reset Ch#13	Counter Reset Ch#12	Counter Reset Ch#11	Counter Reset Ch#10	Counter Reset Ch#9	Counter Reset Ch#8
Byte 2	Counter Reset Ch#23	Counter Reset Ch#22	Counter Reset Ch#21	Counter Reset Ch#20	Counter Reset Ch#19	Counter Reset Ch#18	Counter Reset Ch#17	Counter Reset Ch#16
Byte 3	Counter Reset Ch#31	Counter Reset Ch#30	Counter Reset Ch#29	Counter Reset Ch#28	Counter Reset Ch#27	Counter Reset Ch#26	Counter Reset Ch#25	Counter Reset Ch#24

Data description:

Counter Value Ch#(0-31)：Count value, 32-bit unsigned integer, automatically zeroing after overflow.

Counter Reset Ch#(0-31)：When the data bit changes from 0 to 1 (rising edge), the input counter of the corresponding channel is cleared.

Note: the maximum counting frequency of the input channel is 200Hz. When the input signal exceeds this frequency, the counting result may be inconsistent with the actual value.

6 Configuration parameter definitions

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Input Filtering Time(ms)							
Byte 1								
Byte 2	Reserved					Input Holding Time(ms)		

Data description：

Input Filtering Time(ms)：Input filter time of Channel (ms) (Default: 10)

Input Holding Time(ms)：Signal input holding time of Channel (ms) (Default:0)

0：Disable

1：200ms

2：500ms

3：1000ms

4：1500ms

5：2000ms

6：3000ms

7：5000ms

<32DI Counter Submodule>Submodule configuration parameter definition

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved				Storage Enable	Storage Function	32Bit Data Format	
Byte 1	Count Mode Ch#3		Count Mode Ch#2		Count Mode Ch#1		Count Mode Ch#0	
Byte 2	Count Mode Ch#7		Count Mode Ch#6		Count Mode Ch#5		Count Mode Ch#4	
Byte 3	Count Mode Ch#11		Count Mode Ch#10		Count Mode Ch#9		Count Mode Ch#8	
Byte 4	Count Mode Ch#15		Count Mode Ch#14		Count Mode Ch#13		Count Mode Ch#12	
Byte 5	Count Mode Ch#19		Count Mode Ch#18		Count Mode Ch#17		Count Mode Ch#16	
Byte 6	Count Mode Ch#23		Count Mode Ch#22		Count Mode Ch#21		Count Mode Ch#20	
Byte 7	Count Mode Ch#27		Count Mode Ch#26		Count Mode Ch#25		Count Mode Ch#24	
Byte 8	Count Mode Ch#31		Count Mode Ch#30		Count Mode Ch#29		Count Mode Ch#28	
Byte 9	Count Direction Ch#7	Count Direction Ch#6	Count Direction Ch#5	Count Direction Ch#4	Count Direction Ch#3	Count Direction Ch#2	Count Direction Ch#1	Count Direction Ch#0
Byte 10	Count Direction Ch#1	Count Direction Ch#1	Count Direction Ch#1	Count Direction Ch#1	Count Direction Ch#11	Count Direction Ch#10	Count Direction Ch#9	Count Direction Ch#8

	5	4	3	2				
Byte 11	Count Direction Ch#23	Count Direction Ch#22	Count Direction Ch#21	Count Direction Ch#20	Count Direction Ch#19	Count Direction Ch#18	Count Direction Ch#17	Count Direction Ch#16
Byte 12	Count Direction Ch#31	Count Direction Ch#30	Count Direction Ch#29	Count Direction Ch#28	Count Direction Ch#27	Count Direction Ch#26	Count Direction Ch#25	Count Direction Ch#24

Data description:

32Bit Data Format: Byte transfer order of Channel count value (Default: 0)

0：AB-CD

1：BA-DC

2：CD-AB

3DC-BAStorage Function: Storage Function is supported or not, read only attribute, and this value is the actual value of the module when uploading device parameters.

0：storage is not supported

1：storage is supported

Storage Enable：Storage enable，when the Storage Function enables, the IO module will save the count value in real time to non-volatile memory, and load the last saved count value on the next power on. (Default: 1)

0：Disabled

1：Enable

Count Mode Ch# (0- Count Direction Ch# (0-31): 31)：Count mode of the input channel. (Default: 0)

0: rising edge count

1: falling edge count

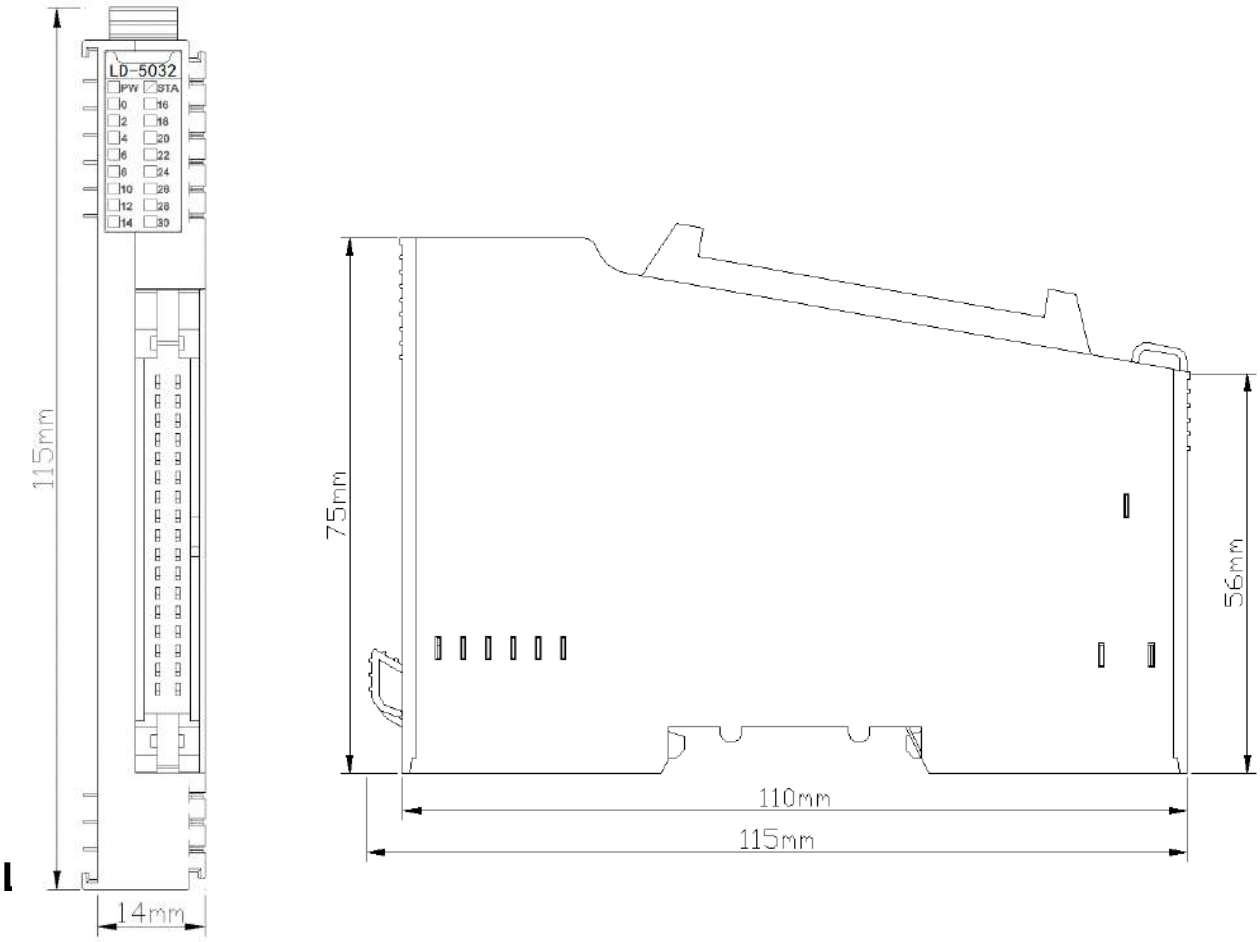
2: double edge count

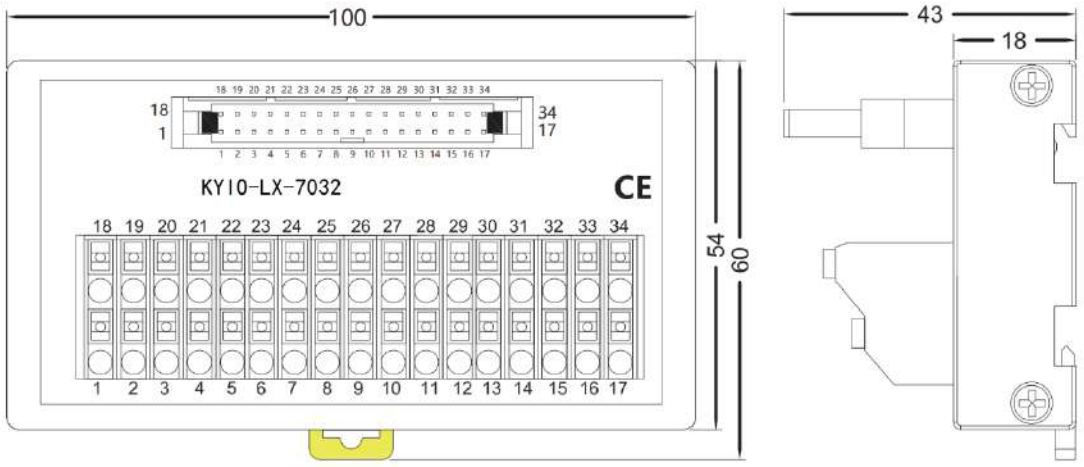
The counting direction of the input channel. (Default: 0)

0: count up

1: count down

A Dimension drawing





LD-2104: 4 channels digital output/24VDC/ PNP

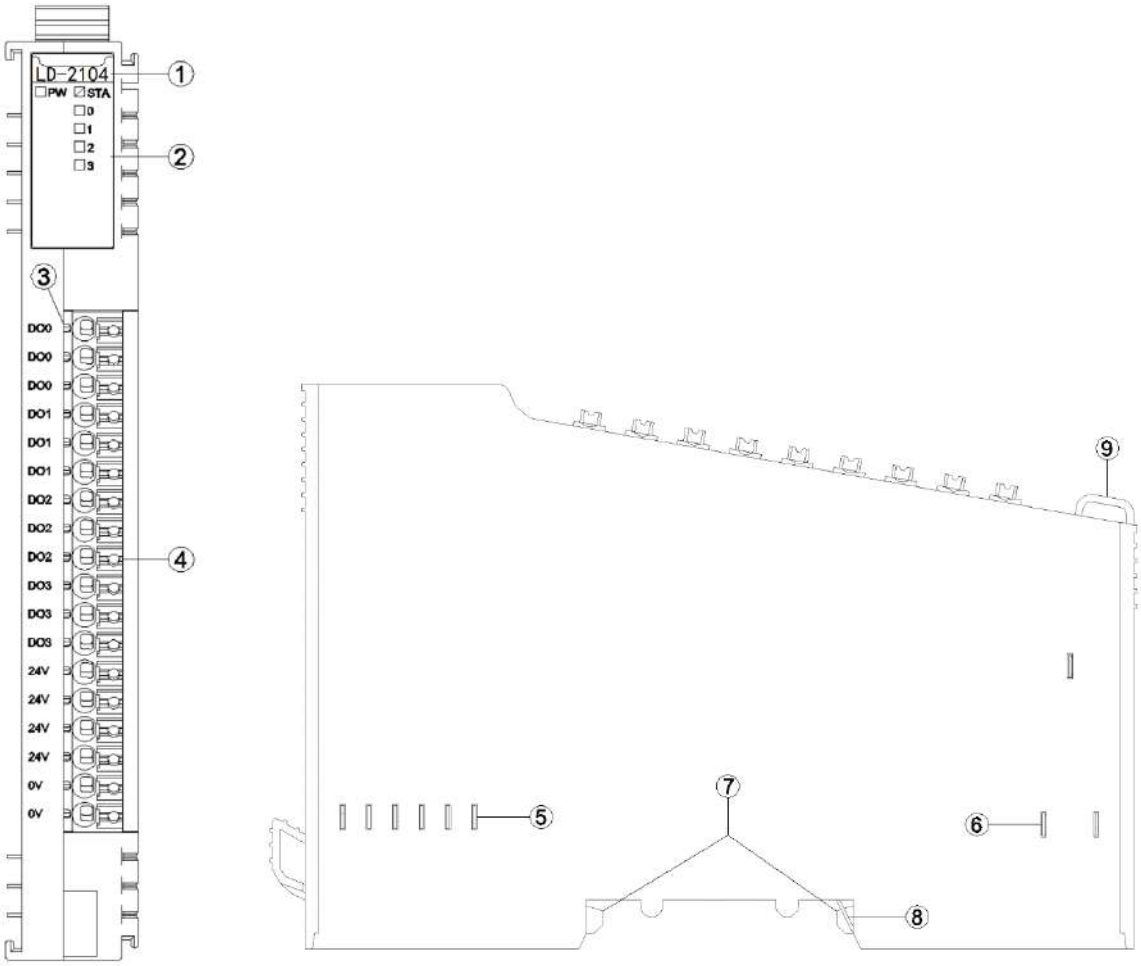
1 Module features

◆the module supports 4-channel digital output, the output voltage is 24VDC and the output high level is valid.
◆the max output current of DO single channel is 3.3 A.
◆the module could drive field equipment (relay, solenoid valve, etc.)
◆the module internal bus and field output are isolated by optocoupler
◆the module carries with 4 digital output channel LED indicator
◆the module has the functions of thermal shutdown and overcurrent protection
◆the module supports short circuit protection and overload protection

2 Technical Parameters

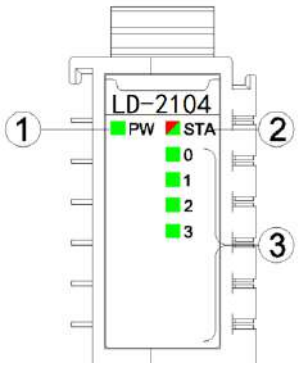
General parameters	
Power Consumption	Max.30mA@5.0Vdc
Isolation	I/O to internal bus: opto-couple isolation (3KVrms)
Field Power	Nominal:24Vdc, Range: 12~30Vdc
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20
Output parameters	
Channel Number	4 Channels
LED Indicator	4 Channels output LED Indicator
Rated Current	Typical value：2.2A
Leak Current	Max. value：10uA
Output Impedance	<90mΩ
Output Delay	OFF to ON:Max.5us ON to OFF:Max.200us
Protection Function	Over temperature turn-off: typical value 150℃ Overcurrent protection: typical value 12A

3 Hardware Interface



① Module Type
② State indicator
③ Channel indicator
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

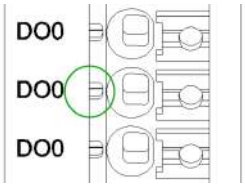
3.1 LED indicator definition



① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Output channel LED indicator (green)

PW Power State (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA Module State (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
0-3 channel LED indicator (GREEN)	Definition
ON	Output signal valid
OFF	Output signal invalid

3.2 Field channel LED indicator (Green)



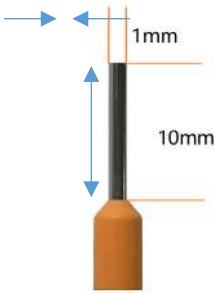
When the output signal of the output channel is valid, the corresponding field channel LED indicator is lit.

3.3 Terminal definition

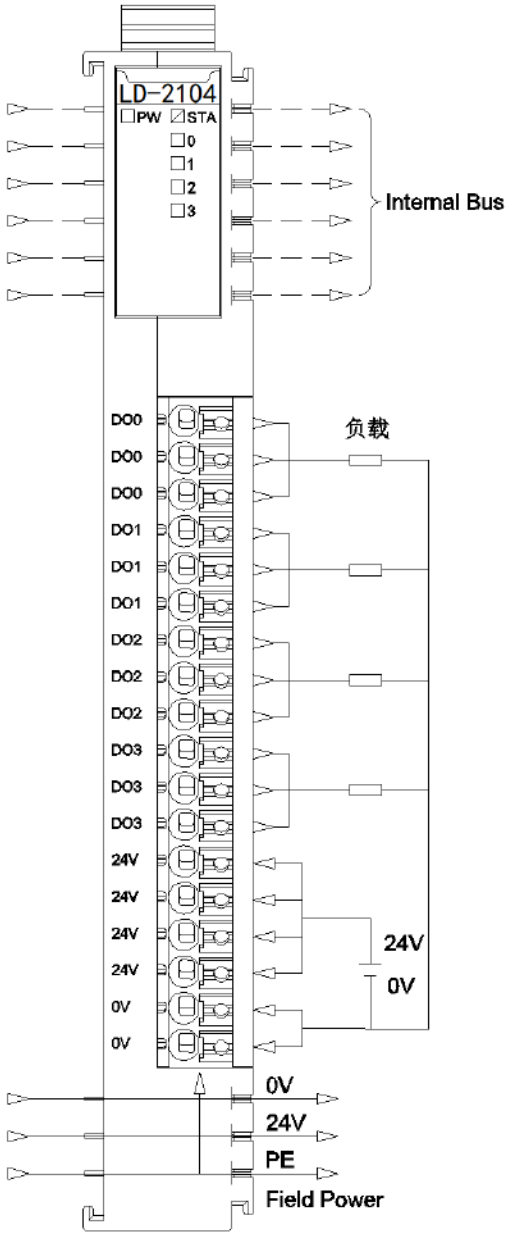
Terminal Number	Symbol	Description
1	DO0	Signal output
2	DO0	
3	DO0	
4	DO1	
5	DO1	
6	DO1	
7	DO2	
8	DO2	
9	DO2	
10	DO3	
11	DO3	
12	DO3	
13	24V	Power intput (Note1)
14	24V	
15	24V	
16	24V	
17	0V	
18	0V	

Note 1: The module must be connected to a 24V power supply. Otherwise, the module cannot work properly. The input power of the power supply must be greater than that of all channel loads.

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:



4 Wiring


LD-2104
PW
STA
0
1
2
3
Internal Bus
DO0
DO0
DO0
DO1
DO1
DO1
DO2
DO2
DO2
DO3
DO3
DO3
24V
24V
24V
24V
0V
0V
负载
24V
0V
0V
24V
PE
Field Power

5 Process data definition

Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserve				DO Ch#3	DO Ch#2	DO Ch#1	DO Ch#0

Data declaration：

DO Ch#(0-3)：When the bit is 1, the output signal of the corresponding channel is effective, the output is high level, and the output is invalid when it is 0.

0: The output signal is invalid

1: The output signal is valid

6 Configuration parameters definition

Configured Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserve				Fault Action for Output Ch#3	Fault Action for Output Ch#2	Fault Action for Output Ch#1	Fault Action for Output Ch#0
Byte 1	Reserve				Fault Value for Output Ch#3	Fault Value for Output Ch#2	Fault Value for Output Ch#1	Fault Value for Output Ch#0

Data description:

Fault Action for Output Ch#(0-3)：When IO module detects the internal bus communication is abnormal and enters offline mode, and output data will be processed in this mode. (Default: 0)

0：Hold Last Output State

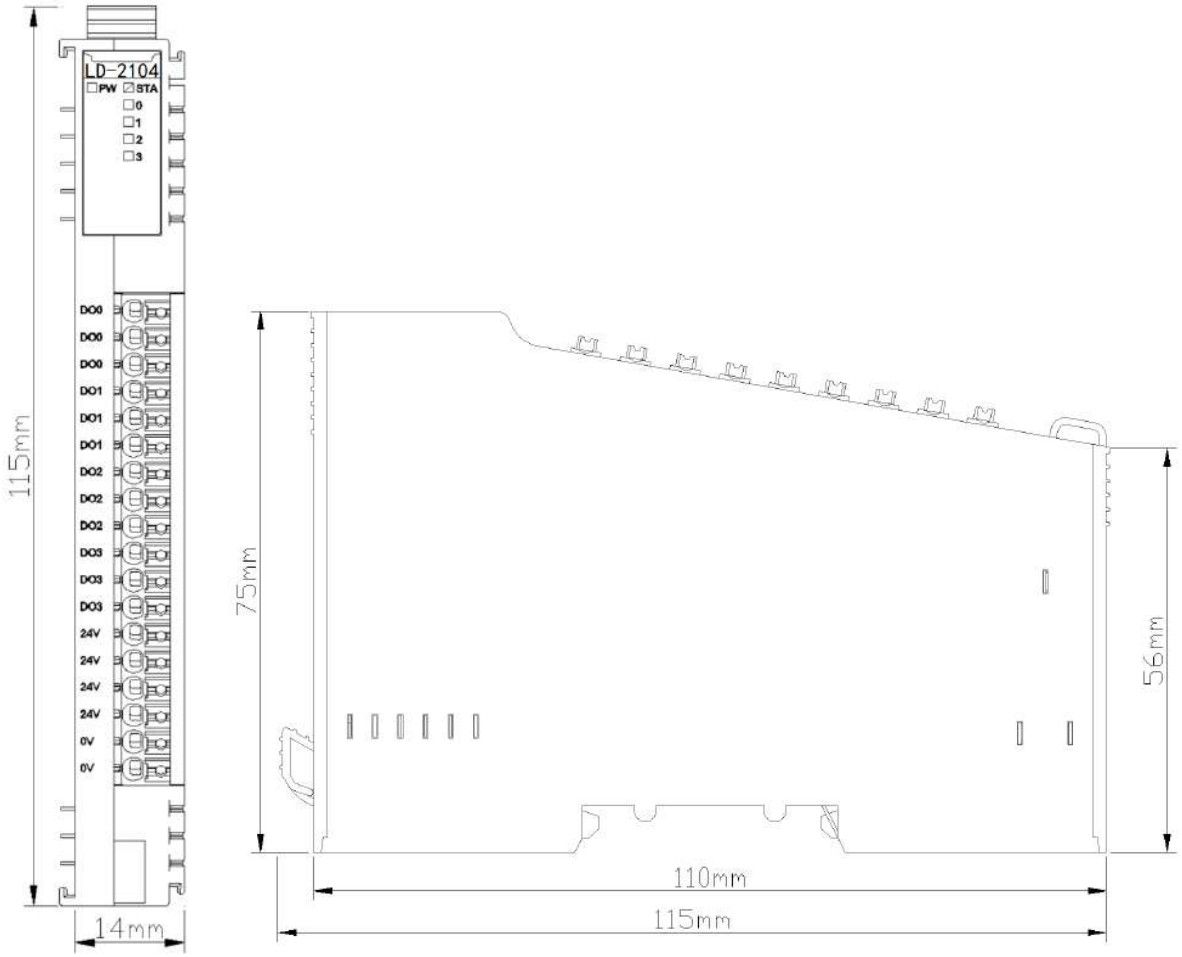
1：Output Fault Value

Fault Value for Output Ch#(0-3)：When the fault output mode is 1, this bit sets the fault output value, and when the internal bus of IO module is offline, this setting value will be output.(Default: 0)

0: Output low level.

1: Output high level.

A Dimension drawing



LD-2008: 8 channels digital output/24VDC/ PNP

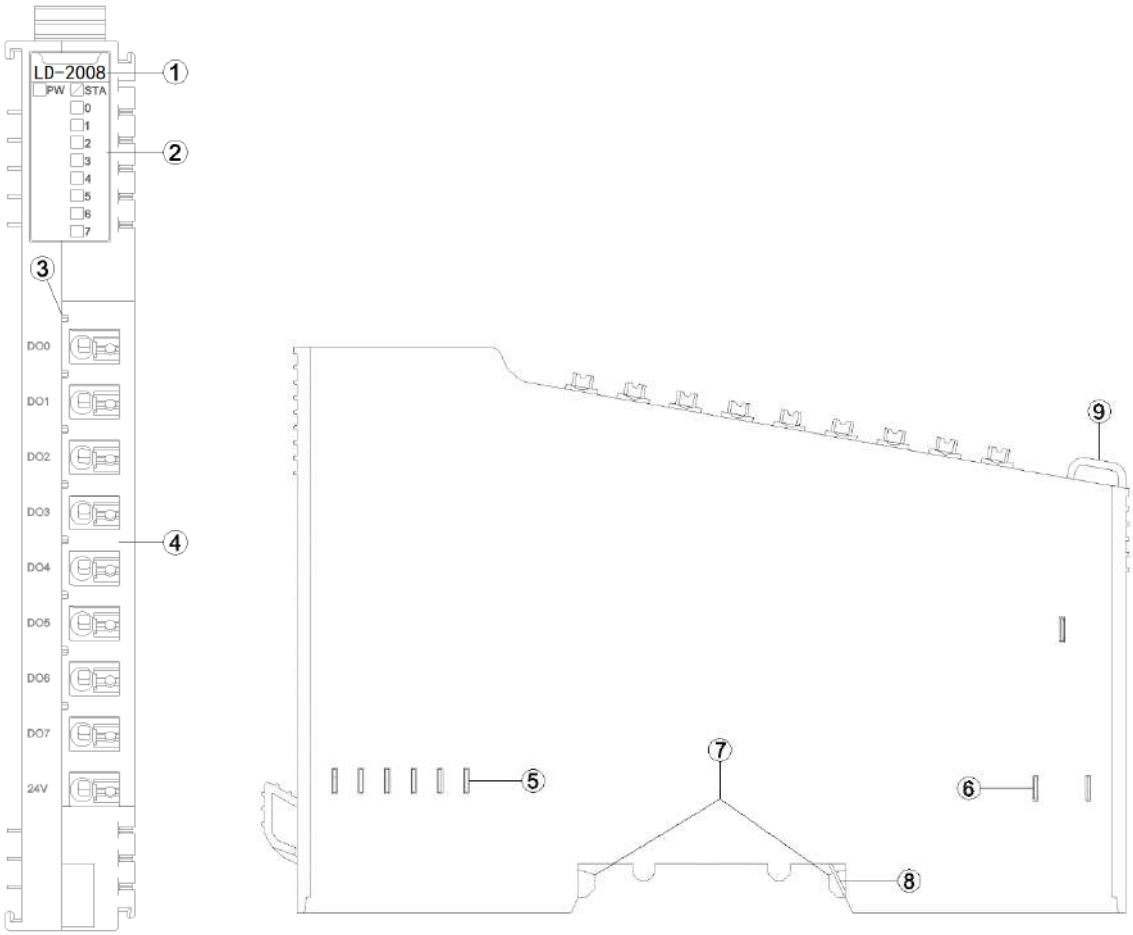
1 Module features

◆the module supports 8-channel digital output, the output voltage is 24VDC and the output high level is valid.
◆the module could drive field equipment (relay, solenoid valve, etc.)
◆the module internal bus and field output are isolated by optocoupler
◆the module carries with 8 digital output channel LED indicator
◆the module has the functions of thermal shutdown and overcurrent protection
◆the module supports short circuit protection and overload protection

2 Technical Parameters

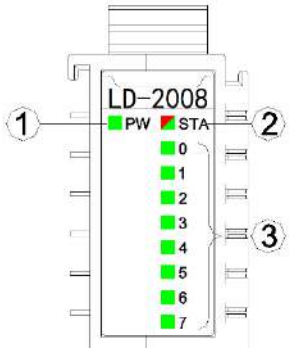
General parameters	
Power Consumption	Max.80mA@5.0Vdc
Isolation	I/O to internal bus: opto-couple isolation (3KVrms)
Field Power	Nominal:24Vdc, Range:22-28Vd
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20
Output parameters	
Channel Number	8 Channels
LED Indicator	8 Channels output LED Indicator
Rated Current	Typical value：500mA
Leak Current	Max. value：100uA
Output Impedance	<280mΩ
Output Delay	OFF to ON:Max.100us ON to OFF:Max.150us
Protection Function	Over temperature turn-off: typical 135℃ Overcurrent protection: typical value 1.1A

3 Hardware Interface



① Module Type
② State indicator
③ Channel indicator
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

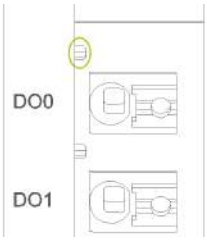
3.1 LED indicator definition



① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Output channel LED indicator (green)

PW Power State (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA Module State (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
0-7 channel LED indicator (GREEN)	Definition
ON	Output signal valid
OFF	Output signal invalid

3.2 Field channel LED indicator (Green)



When the output signal of the output channel is valid, the corresponding field channel LED indicator is lit.

3.3 Terminal definition

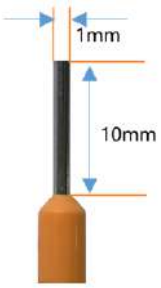
Terminal Number	Symbol	Description
1	DO0	Signal output
2	DO1	
3	DO2	
4	DO3	
5	DO4	
6	DO5	
7	DO6	
8	DO7	
9	24V	Power intput (Note1)

Note 1: When the red LED indicator beside the 24V terminals lights up, this is indicating that the module output has passed the field bus, so the 24V terminals could be disconnected. The max.output current of each channel is 500mA, and the max. sum of the current of all the output channels is 4A.When the total current exceeds 2A, and it is suggested to connect the power in the 24V terminal at the same time to avoid the on-site power current exceeding its limit.

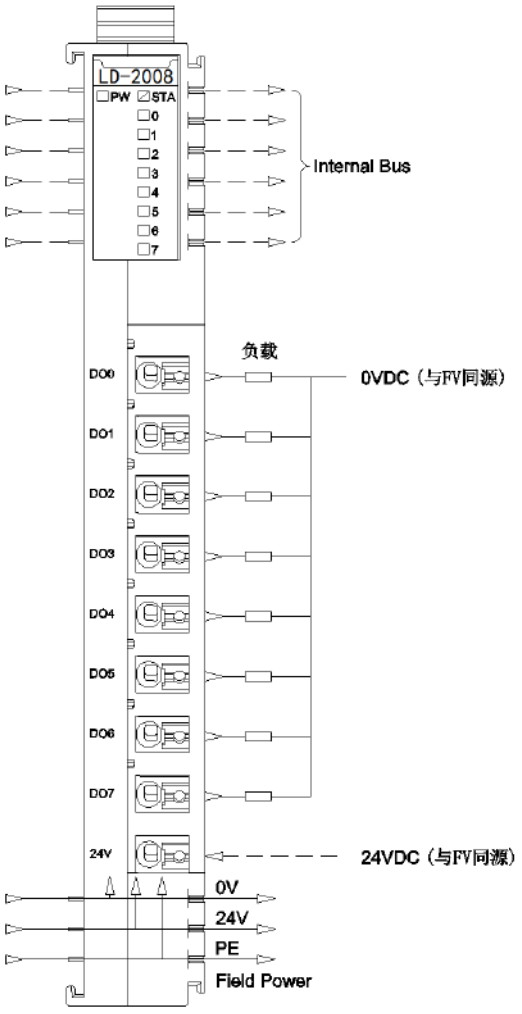
When the red LED indicator beside the 24V terminal goes off, it means that the module output is not powered. In this case, the power supply needs to be connected in the 24V terminal. At this point, the max. output current of each channel is 500mA, and the sum of all output channel currents is 4A.

It is recommended to use cables with cores smaller than 1mm².

The cold-pressed terminal parameters are as follows:



4 Wiring



5 Process data definition

Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DO Ch#7	DO Ch#6	DO Ch#5	DO Ch#4	DO Ch#3	DO Ch#2	DO Ch#1	DO Ch#0

Data declaration：

DO Ch#(0-7)：When the bit is 1, the output signal of the corresponding channel is effective, the output is high level, and the output is invalid when it is 0.

0: The output signal is invalid

1: The output signal is valid

6 Configuration parameters definition

Configured Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Fault Action for Output Ch#7	Fault Action for Output Ch#6	Fault Action for Output Ch#5	Fault Action for Output Ch#4	Fault Action for Output Ch#3	Fault Action for Output Ch#2	Fault Action for Output Ch#1	Fault Action for Output Ch#0
Byte 1	Fault Value for Output Ch#7	Fault Value for Output Ch#6	Fault Value for Output Ch#5	Fault Value for Output Ch#4	Fault Value for Output Ch#3	Fault Value for Output Ch#2	Fault Value for Output Ch#1	Fault Value for Output Ch#0

Data description:

Fault Action for Output Ch#(0-7)：When IO module detects the internal bus communication is abnormal and enters offline mode, and output data will be processed in this mode. (Default: 0)

0：Hold Last Output State

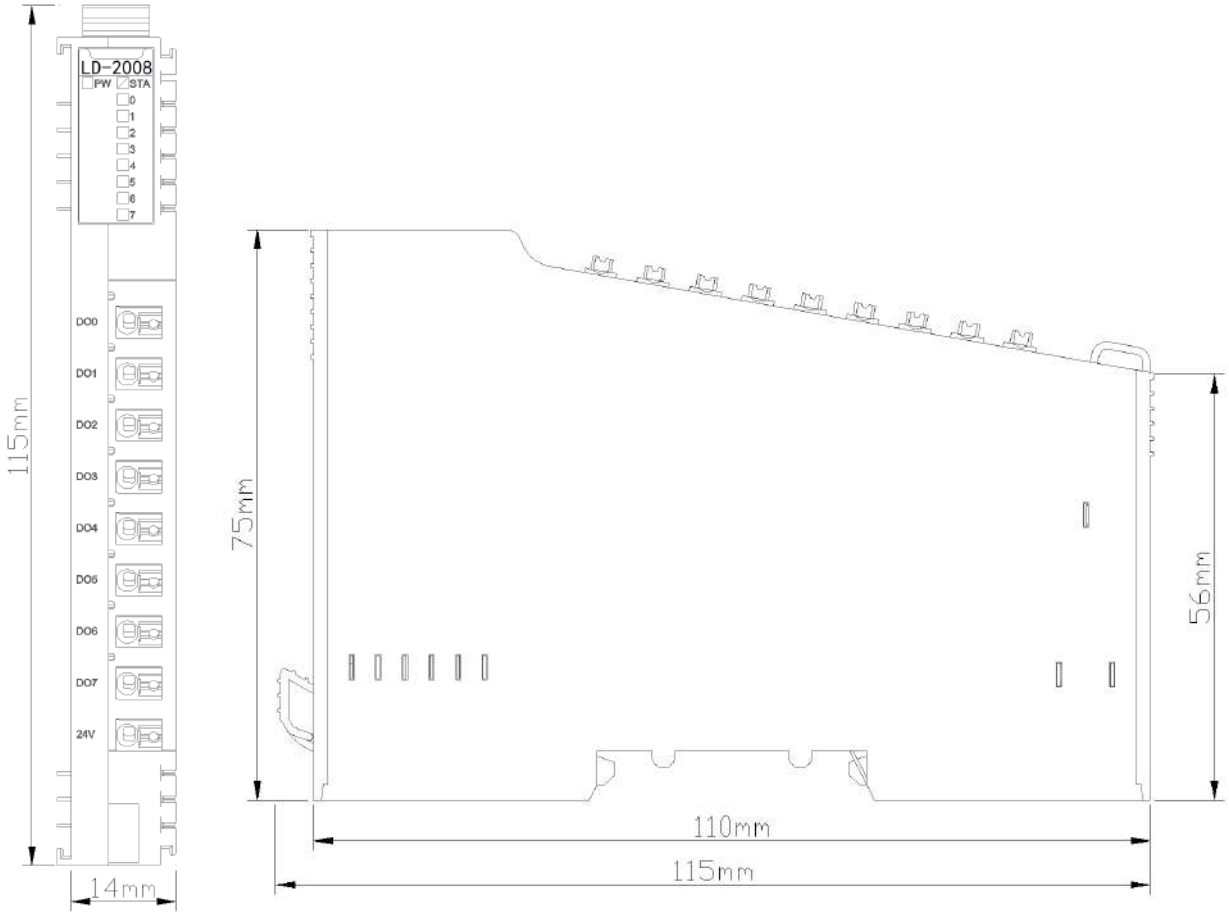
1：Output Fault Value

Fault Value for Output Ch#(0-7)：When the fault output mode is 1, this bit sets the fault output value, and when the internal bus of IO module is offline, this setting value will be output.(Default: 0)

0: Output low level.

1: Output high level.

A Dimension drawing



LD-2016 16 channels digital output/24VDC/PNP

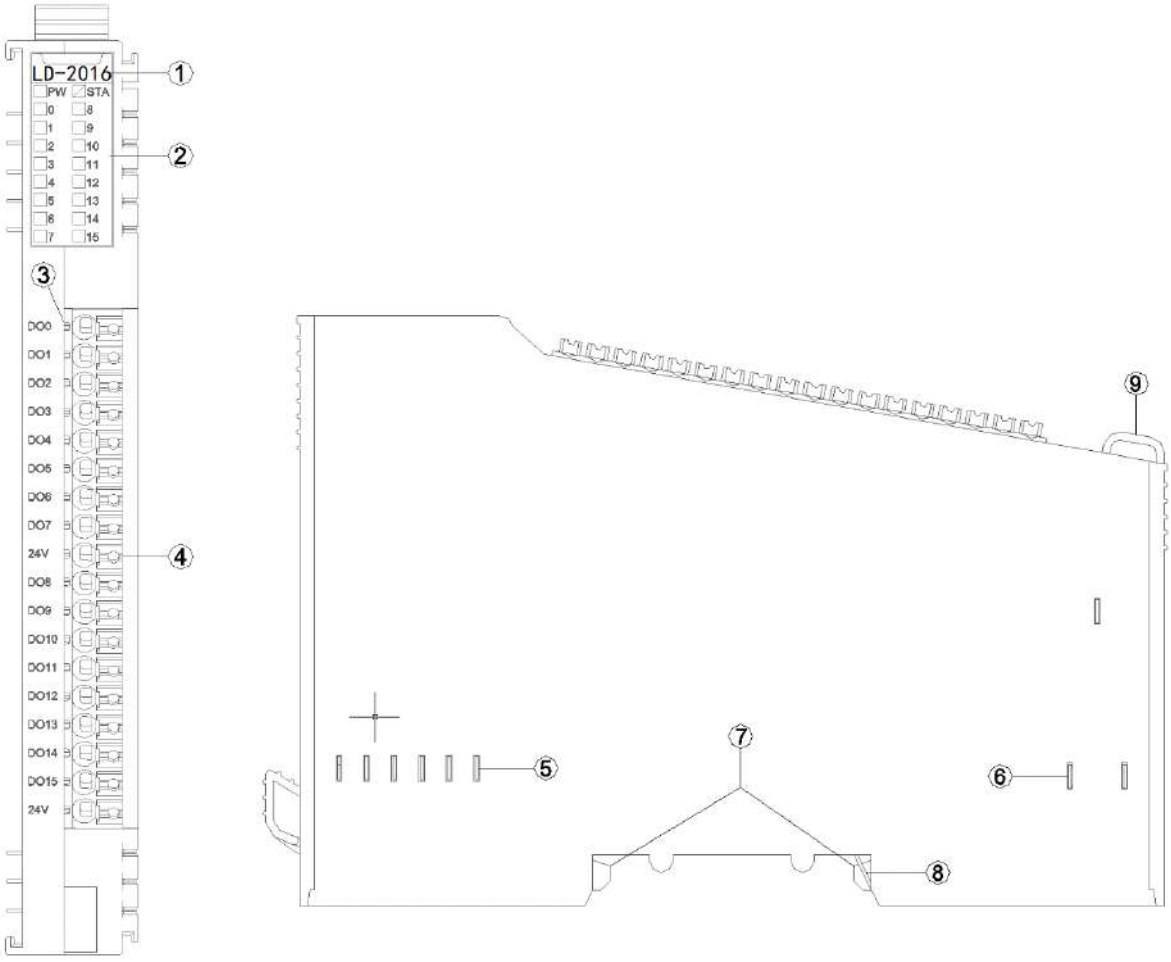
1 Module features

◆ the module supports 16 channels digital output, the output voltage is 24VDC and the output high level is valid.
◆ module can drive field equipment. (relay, solenoid valve, etc.)
◆ the internal bus of the module and field output are using opto-coupler.
◆ the module carries 16 digital output channel LED indicator light.
◆ the module has the functions of thermal shutdown and overcurrent protection.
◆ the module supports short circuit protection and overload protection.

2 Technical parameters

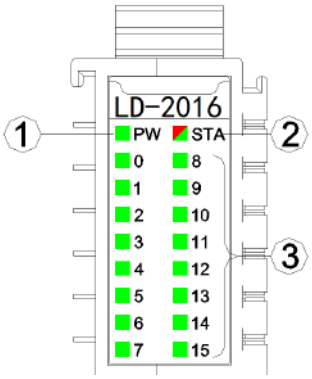
General Parameters	
Power	Max.175mA@5.0Vdc
Isolation	I/O to internal bus: opto-couple isolation (3KVrms)
Field Power	Nominal:24Vdc, Range:22-28Vdc
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Output Parameters	
Channel Number	16 channel source type output
LED Indicator	16 channel output LED indicator
Rated Current	Typical value: 500mA
Leakage Current	Max：10uA
Output Impedance	<200mΩ
Output Delay	OFF to ON: Max.100us ON to OFF: Max.150us
Protection	Overtemperature shutdown: typical value is 135℃ Overcurrent protection: typical value 1.1A Short circuit protection support

3 Hardware interfaces



① Module Type
② State indicator
③ Channel indicator
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

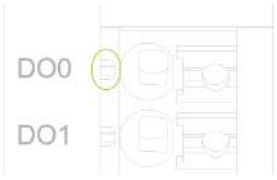
3.1 LED indicator definition



① Power LED indicator (green)
② Module State indicator LED (red/green)
③ Output channel indicator LED (green)

PW Power State	Definition
ON	Internal bus power supply normal
OFF	Internal bus power supply failure
STA Module State (RED/GREEN)	Definition
Green slow flash (2.5 Hz)	Module internal bus is not started
Red slow flash (2.5 Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash (2.5 Hz) (RED/GREEN)	updating mode
Flash (10 Hz) (RED/GREEN)	firmware update
Double Flash (RED)	Module exception has been soft-restarted
0-15 channel indicator LED	Definition
ON	Output signal valid
OFF	Output signal invalid

3.2 Field channel LED indicator (Green)



When output signal of output channel is valid, the corresponding field channel LED indicator is on.

3.3 Terminal definition

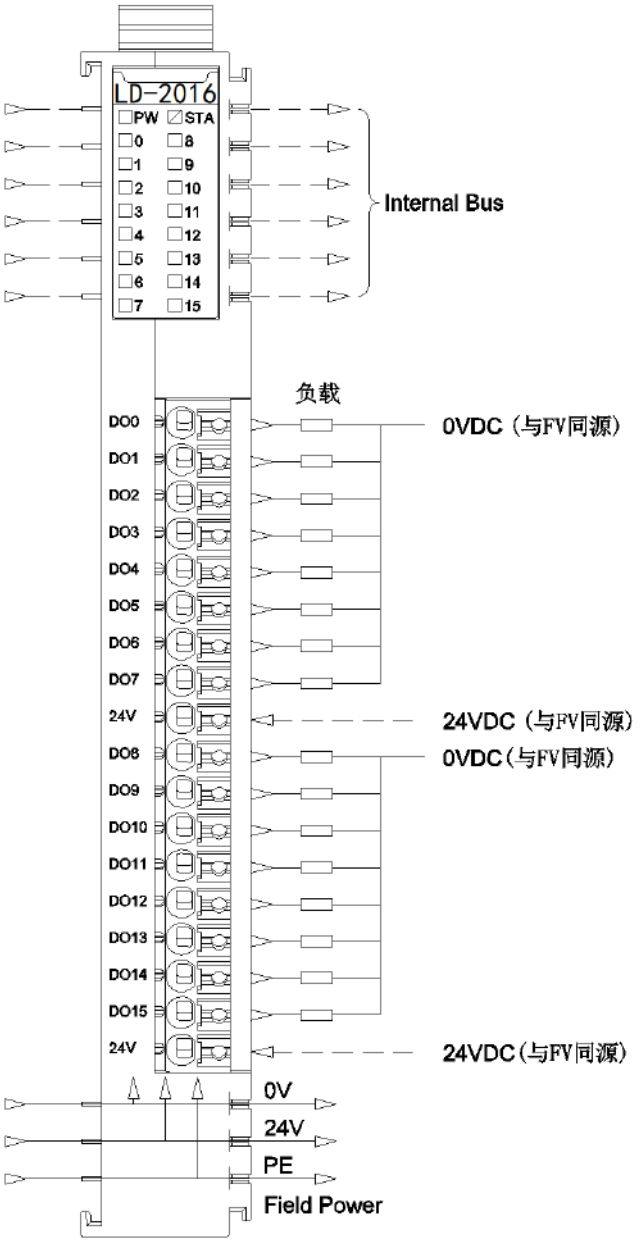
Terminal Number	Symbol	The Description
1	DO0	Signal output
2	DO1	
3	DO2	
4	DO3	
5	DO4	
6	DO5	
7	DO6	
8	DO7	
9	24V	Power input (note1)
10	DO8	Signal output
11	DO9	
12	DO10	
13	DO11	
14	DO12	
15	DO13	
16	DO14	
17	DO15	
18	24V	Power input(note1)

Note 1: when the red LED indicator beside the 24V wiring terminal is on, it indicates that the fieldbus is powered on, then the maximum output current of each channel is 500mA, and the maximum sum of all output channel currents is 4A.

When the 24VDC power is supplied to the 24V wiring terminal separately, the maximum sum of all the output channel currents is 8A (Regardless of whether the fieldbus is powered or not, 24V wiring terminals can be connected to 24VDC power supply).

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:

4 Wiring


LD-2016
PW
STA
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Internal Bus
负载
DO0
DO1
DO2
DO3
DO4
DO5
DO6
DO7
24V
DO8
DO9
DO10
DO11
DO12
DO13
DO14
DO15
24V
0VDC（与FV同源）
24VDC（与FV同源）
0VDC（与FV同源）
24VDC（与FV同源）
0V
24V
PE
Field Power

5 Process data definition

Output data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DO Ch#7	DO Ch#6	DO Ch#5	DO Ch#4	DO Ch#3	DO Ch#2	DO Ch#1	DO Ch#0
Byte 1	DO Ch#15	DO Ch#14	DO Ch#13	DO Ch#12	DO Ch#11	DO Ch#10	DO Ch#9	DO Ch#8

Data declaration:

DO Ch#(0-15)：when this bit is 1, the corresponding channel output signal is valid, the output is high level, and the output is invalid when it is 0.

0：Output signal is invalid

1：Output signal is valid

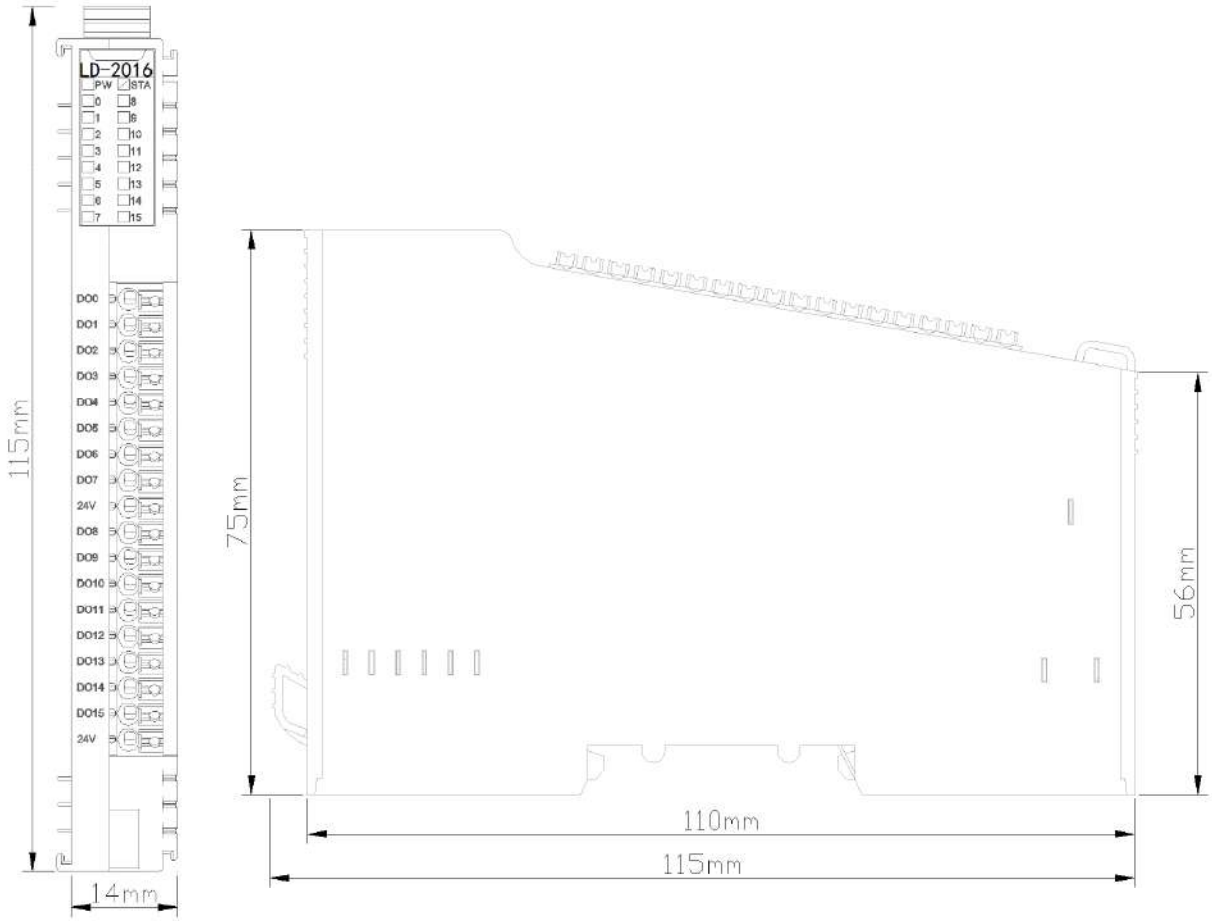
6 Configuration parameter definitions

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Fault Action for Output Ch#7	Fault Action for Output Ch#6	Fault Action for Output Ch#5	Fault Action for Output Ch#4	Fault Action for Output Ch#3	Fault Action for Output Ch#2	Fault Action for Output Ch#1	Fault Action for Output Ch#0
Byte 1	Fault Action for Output Ch#15	Fault Action for Output Ch#14	Fault Action for Output Ch#13	Fault Action for Output Ch#12	Fault Action for Output Ch#11	Fault Action for Output Ch#10	Fault Action for Output Ch#9	Fault Action for Output Ch#8
Byte 2	Fault Value for Output Ch#7	Fault Value for Output Ch#6	Fault Value for Output Ch#5	Fault Value for Output Ch#4	Fault Value for Output Ch#3	Fault Value for Output Ch#2	Fault Value for Output Ch#1	Fault Value for Output Ch#0
Byte 3	Fault Value for Output Ch#15	Fault Value for Output Ch#14	Fault Value for Output Ch#13	Fault Value for Output Ch#12	Fault Value for Output Ch#11	Fault Value for Output Ch#10	Fault Value for Output Ch#9	Fault Value for Output Ch#8

Data description:

Fault Action for Output Ch#(0-15)：Fault Output mode. When the IO module detects an internal bus exception and fails to communicate with the adapter. And the module will turn to offline mode, so the output data is processed in this way. (default: 0)
0: keep the last time output State.
1: output fault value.
Fault Value for Output Ch#(0-15)：when the Fault Output mode is 1, this bit sets the Fault Output Value, and this setting value will be outputted when the interal bus of IO module is offline. (default: 0)
0: Output low level.
1: Output high level.

A Dimension drawing



LD-2116 16-Channel Digital Output/24VDC/PNP

1 Module Features

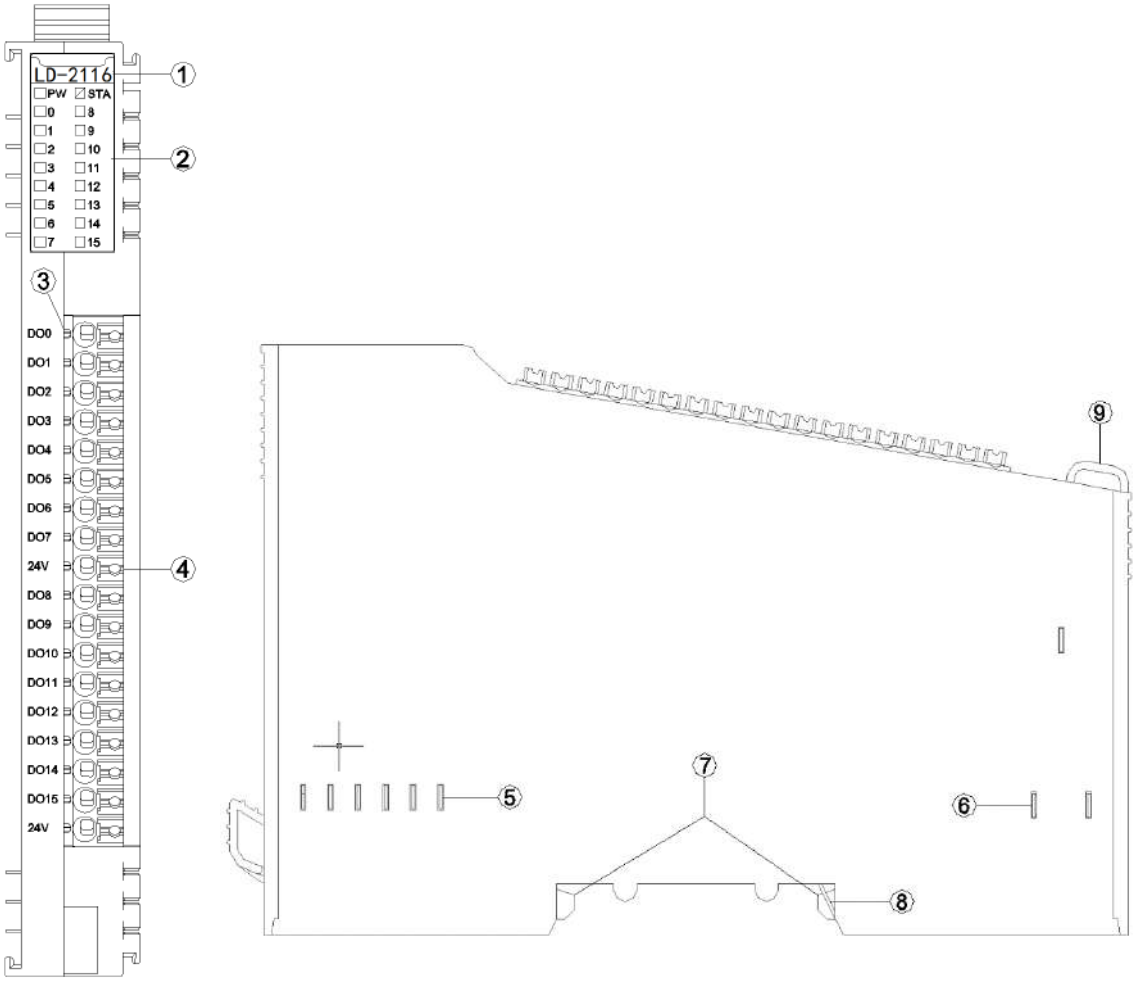
◆ The module supports 16 channels of digital output, with high-level output effective, outputting 24VDC.
◆ The module can drive field equipment (such as relays, solenoid valves, etc.).
◆ The module's internal bus and field outputs use optocoupler isolation.
◆ The module is equipped with 16 digital output channel LED indicators.
◆ The module has thermal shutdown and overcurrent protection functions.
◆ The module supports short-circuit and overload protection functions.
◆ The module's output channel loop power supply requires an external 24Vdc power supply."

2 Technical parameters

General parameters	
Power Consumption	Max.175mA@5.0Vdc
Isolation	I/O to internal bus: opto-couple isolation (3KVrms)
Field Power	Nominal:24Vdc, Range:22-28Vdc
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
	5%-95% (No Condensation)
Operational Humidity	IP20
Output parameters	
Channel Number	16 channel output PNP
LED Indicator	16 channel input LED indicator
Rated current	Typical value:0.5A
Rated current	Maximum value: 10uA
Rated current	<200mΩ
Rated current	OFF to ON :Max.100us ON to OFF :Max.150us

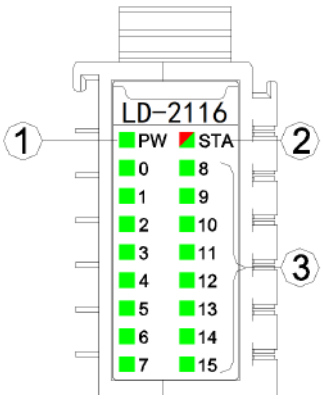
Protection function	Temperature protection: typical value 135℃ Protection current: typical value 1.1A Short circuit protection support

3 Hardware interfaces



① Module Type
② State indicators
③ Channel indicators
④ Wiring Terminal and Marking
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

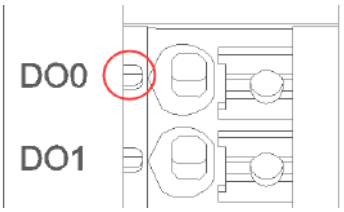
3.1 LED indicators Definition



① Power indicator (green)
② Module state indicator (red/green)
③ Input/output channel indicators (green)

PW power indicator	Definition
ON	Internal bus power supply normal
OFF	Internal bus power supply failure
STA module state indicator	Definition
Green slow flash (2.5hz)	The internal bus of the module is not started
Red slow flash (2.5hz)	Module internal bus offline
Green normally on	Module works normally
Flash(2.5Hz) (RED/GREEN)	Operating mode
Flash(10Hz) (RED/GREEN)	Firmware upgrading
Red flashes twice	Module exception has been soft-restarted
0-15 channel indicators	Definition
ON	input signal valid
OFF	input signal invalid

3.2 Field input channel LED indicator (green)



When the output signal of the output channel is valid, the corresponding field channel indicator light is illuminated.

3.3 Terminal definition

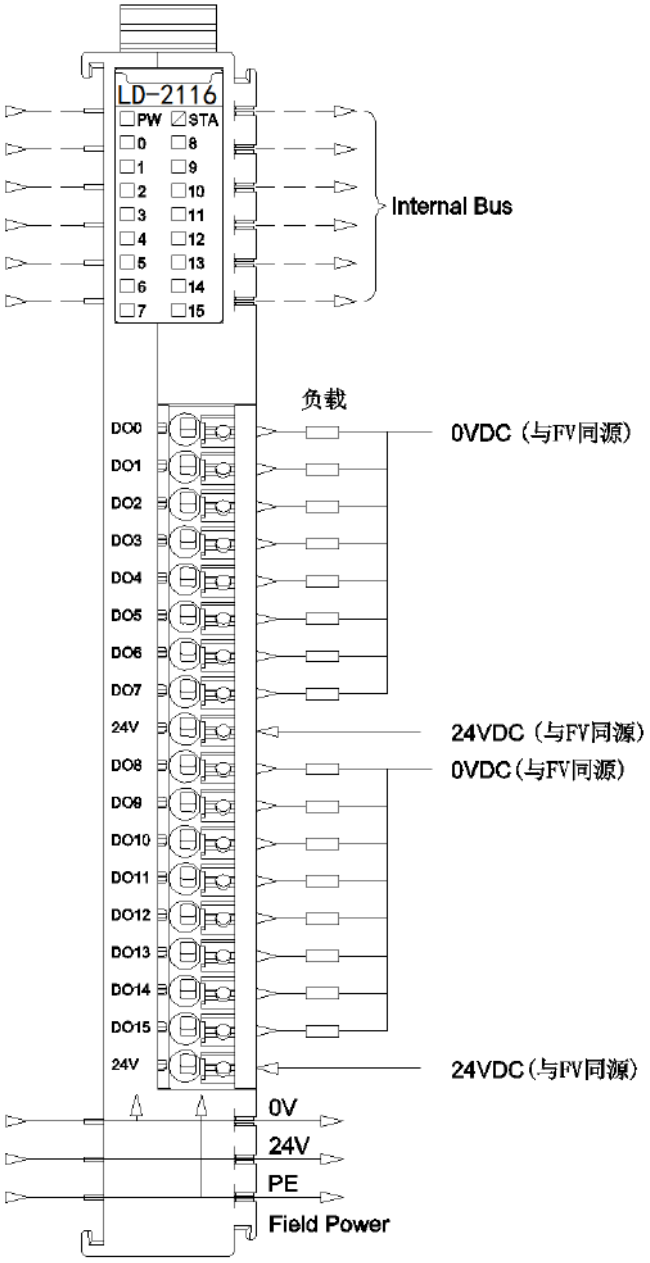
Terminal Number	Symbol	Instruction
1	DO0	Signal output
2	DO1	
3	DO2	
4	DO3	
5	DO4	
6	DO5	
7	DO6	
8	DO7	
9	24V	Power input (Note1)
10	DO8	Signal output
11	DO9	
12	DO10	
13	DO11	
14	DO12	
15	DO13	
16	DO14	
17	DO15	
18	24V	Power input (Note1)

Note 1: When power is supplied separately to the 24V terminal, the total current of all output channels should not exceed 8A.

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:


0.2mm² ≤线径≤1mm²
10mm

4 Wiring


LD-2116
PW
STA
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Internal Bus
负载
DO0
DO1
DO2
DO3
DO4
DO5
DO6
DO7
24V
DO8
DO9
DO10
DO11
DO12
DO13
DO14
DO15
24V
0VDC（与FV同源）
24VDC（与FV同源）
0VDC（与FV同源）
24VDC（与FV同源）
0V
24V
PE
Field Power

5 Process data definition

Output data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DO Ch#7	DO Ch#6	DO Ch#5	DO Ch#4	DO Ch#3	DO Ch#2	DO Ch#1	DO Ch#0
Byte 1	DO Ch#15	DO Ch#14	DO Ch#13	DO Ch#12	DO Ch#11	DO Ch#10	DO Ch#9	DO Ch#8

Data Description:

DO Ch#(0-15): When this bit is 1, the corresponding channel outputs a valid signal at high level; when it is 0, the output is invalid.

0: Output signal is invalid

1: Output signal is valid

6 Configuration parameter definition

Configuration parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Fault Action for Output Ch#7	Fault Action for Output Ch#6	Fault Action for Output Ch#5	Fault Action for Output Ch#4	Fault Action for Output Ch#3	Fault Action for Output Ch#2	Fault Action for Output Ch#1	Fault Action for Output Ch#0
Byte 1	Fault Action for Output Ch#15	Fault Action for Output Ch#14	Fault Action for Output Ch#13	Fault Action for Output Ch#12	Fault Action for Output Ch#11	Fault Action for Output Ch#10	Fault Action for Output Ch#9	Fault Action for Output Ch#8
Byte 2	Fault Value for Output Ch#7	Fault Value for Output Ch#6	Fault Value for Output Ch#5	Fault Value for Output Ch#4	Fault Value for Output Ch#3	Fault Value for Output Ch#2	Fault Value for Output Ch#1	Fault Value for Output Ch#0
Byte 3	Fault Value for Output Ch#1	Fault Value for Output Ch#1	Fault Value for Output Ch#1	Fault Value for Output Ch#1	Fault Value for Output Ch#1	Fault Value for Output Ch#1	Fault Value for Output Ch#9	Fault Value for Output Ch#8

	5	4	3	2	1	0		

Data Description:

Fault Action for Output Ch#(0-15): Fault output mode, when the IO module detects an internal bus anomaly and communication failure with the coupler, entering offline mode, the output data is processed in this way. (Default value: 0)

0: Maintain the last output state.

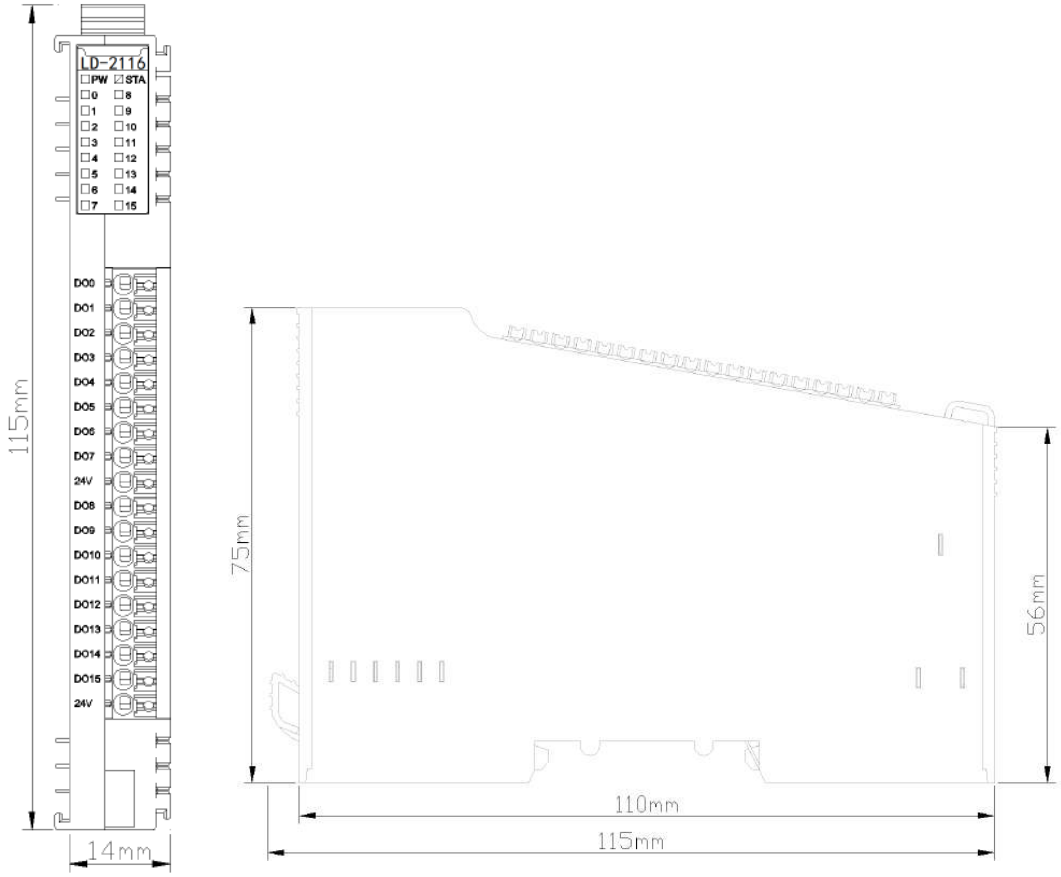
1: Output the fault value.

Fault Value for Output Ch#(0-15): When the fault output mode is set to 1, this bit sets the fault output value. When the IO module's internal bus goes offline, this set value is output. (Default value: 0)

0: Output low level.

1: Output high level.

A Dimension drawing



LD-2032 32 channels digital output/24VDC/PNP

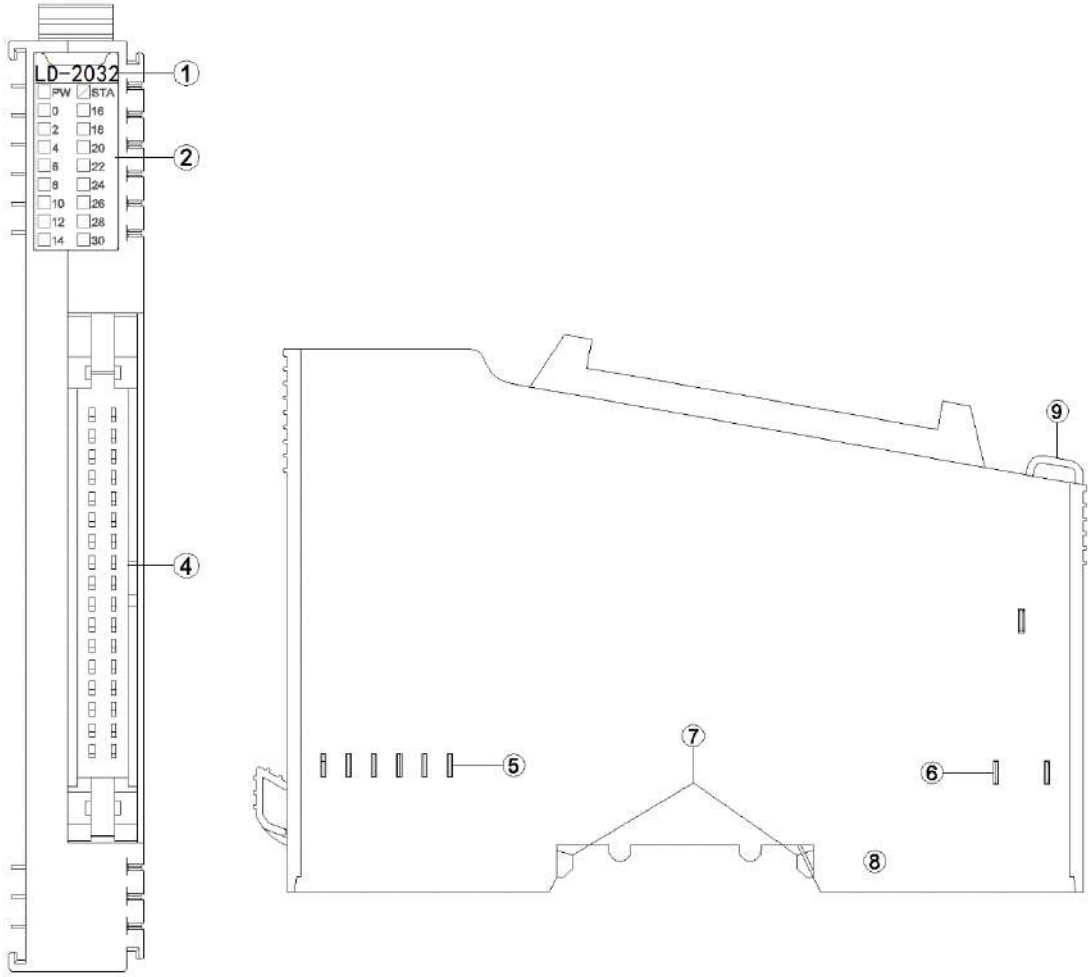
1 Module features

◆ the module supports 32 channels digital output; the output voltage is 24VDC and the output high level is valid.
◆ module can drive field equipment. (relay, solenoid valve, etc.)
◆ the internal bus of the module and field output are using opto-coupler.
◆ the module carries 32 digital output channel LED indicator light.
◆ the module has the functions of thermal shutdown and overcurrent protection.
◆ the module supports short circuit protection and overload protection.

2 Technical parameters

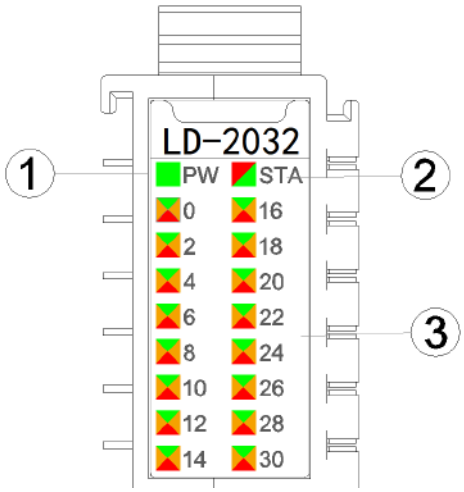
General Parameters	
Power	Max.175mA@5.0Vdc
Isolation	I/O to internal bus: opto-couple isolation (3KVrms)
Field Power	Nominal:24Vdc, Range:22-28Vdc
Wiring	34P male connector 2.54mm Pin header
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Output Parameters	
Channel Number	32 channels source type output
LED Indicator	32 channel output LED indicator
Rated Current	Typical value：300mA
Leakage Current	Max：10uA
Output Impedance	<200mΩ
Output Delay	OFF to ON: Max.100us ON to OFF: Max.150us
Protection	Overtemperature shutdown: typical value is 135℃ Overcurrent protection: typical value 1.1A Short circuit protection support

3 Hardware interfaces



① Module Type
② State indicator
④ 34P male connector
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition



① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Output channel LED indicator (green/red/orange)

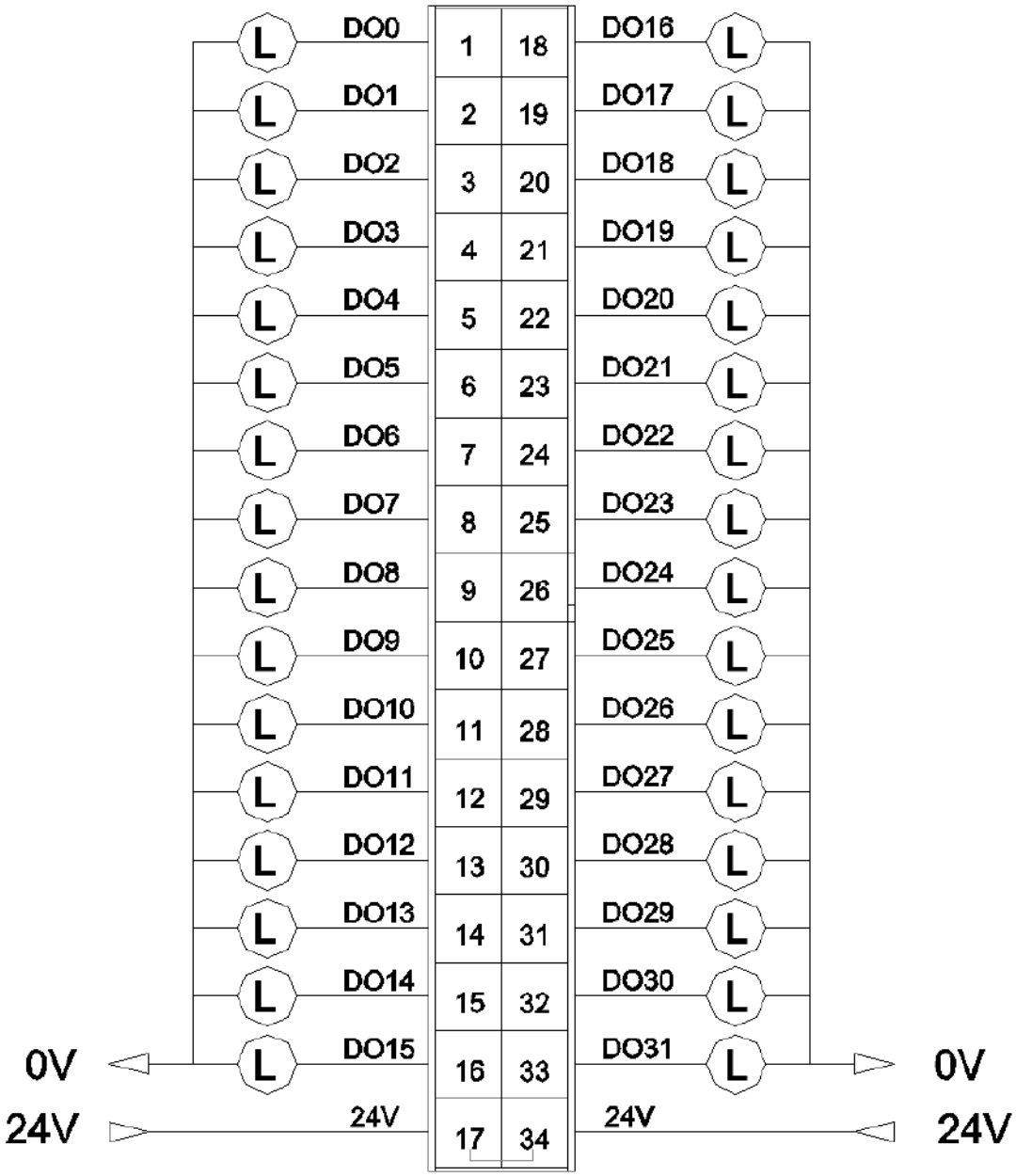
PW Power State	Definition
ON	Internal bus power supply normal
OFF	Internal bus power supply failure
STA Module State	Definition
Green slow flash (2.5 Hz)	Module internal bus is not started
Red slow flash (2.5 Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash (2.5 Hz) (RED/GREEN)	updating mode
Flash (10 Hz) (RED/GREEN)	firmware update
Double Flash (RED)	Module exception has been soft-restarted
0-31 channel indicator LED	Definition
ON (GREEN)	Indicates that the output channel signal is valid
ON (RED)	Indicates that the output channel +1 signal is valid
ON (ORANGE)	Indicates that the output channel and channel +1 signal are valid
OFF	Output signal is invalid

3.2 Terminal definition

Description	Symbol	Terminal Number	Terminal Number	Symbol	Description
Signal Output	DO0	1	18	DO16	Signal Output
	DO1	2	19	DO17	
	DO2	3	20	DO18	
	DO3	4	21	DO19	
	DO4	5	22	DO20	
	DO5	6	23	DO21	
	DO6	7	24	DO22	
	DO7	8	25	DO23	
	DO8	9	26	DO24	
	DO9	10	27	DO25	
	DO10	11	28	DO26	
	DO11	12	29	DO27	
	DO12	13	30	DO28	
	DO13	14	31	DO29	
	DO14	15	32	DO30	
	DO15	16	33	DO31	
24V	24V	17	34	24V	24V

Pins 17 and 34 are internally short-circuited.

4 Wiring



Terminals 17 and 34 are internally short-circuited

5 Process data definition

Output data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DO Ch#7	DO Ch#6	DO Ch#5	DO Ch#4	DO Ch#3	DO Ch#2	DO Ch#1	DO Ch#0
Byte 1	DO Ch#15	DO Ch#14	DO Ch#13	DO Ch#12	DO Ch#11	DO Ch#10	DO Ch#9	DO Ch#8
Byte 2	DO Ch#23	DO Ch#22	DO Ch#21	DO Ch#20	DO Ch#19	DO Ch#18	DO Ch#17	DO Ch#16
Byte 3	DO Ch#31	DO Ch#30	DO Ch#29	DO Ch#28	DO Ch#27	DO Ch#26	DO Ch#25	DO Ch#24

Data declaration:

DO Ch#(0-31)： when this bit is 1, the corresponding channel output signal is valid, the output is high level, and the output is invalid when it is 0.

0：Output signal is invalid

1：Output signal is valid

6 Configuration parameter definitions

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Fault Action for Output Ch#7	Fault Action for Output Ch#6	Fault Action for Output Ch#5	Fault Action for Output Ch#4	Fault Action for Output Ch#3	Fault Action for Output Ch#2	Fault Action for Output Ch#1	Fault Action for Output Ch#0
Byte 1	Fault Action for Output Ch#15	Fault Action for Output Ch#14	Fault Action for Output Ch#13	Fault Action for Output Ch#12	Fault Action for Output Ch#11	Fault Action for Output Ch#10	Fault Action for Output Ch#9	Fault Action for Output Ch#8
Byte 2	Fault Action for Output Ch#23	Fault Action for Output Ch#22	Fault Action for Output Ch#21	Fault Action for Output Ch#20	Fault Action for Output Ch#19	Fault Action for Output Ch#18	Fault Action for Output Ch#17	Fault Action for Output Ch#16
Byte 3	Fault Action for Output Ch#3	Fault Action for Output Ch#3	Fault Action for Output Ch#2	Fault Action for Output Ch#2	Fault Action for Output Ch#2	Fault Action for Output Ch#2	Fault Action for Output Ch#2	Fault Action for Output Ch#2

	1	0	9	8	7	6	5	4
Byte 4	Fault Value for Output Ch#7	Fault Value for Output Ch#6	Fault Value for Output Ch#5	Fault Value for Output Ch#4	Fault Value for Output Ch#3	Fault Value for Output Ch#2	Fault Value for Output Ch#1	Fault Value for Output Ch#0
Byte 5	Fault Value for Output Ch#15	Fault Value for Output Ch#14	Fault Value for Output Ch#13	Fault Value for Output Ch#12	Fault Value for Output Ch#11	Fault Value for Output Ch#10	Fault Value for Output Ch#9	Fault Value for Output Ch#8
Byte 6	Fault Value for Output Ch#23	Fault Value for Output Ch#22	Fault Value for Output Ch#21	Fault Value for Output Ch#20	Fault Value for Output Ch#19	Fault Value for Output Ch#18	Fault Value for Output Ch#17	Fault Value for Output Ch#16
Byte 7	Fault Value for Output Ch#31	Fault Value for Output Ch#30	Fault Value for Output Ch#29	Fault Value for Output Ch#28	Fault Value for Output Ch#27	Fault Value for Output Ch#26	Fault Value for Output Ch#25	Fault Value for Output Ch#24

Data description:

Fault Action for Output Ch#(0-31)：Fault Output mode. When the IO module detects an internal bus exception and fails to communicate with the adapter. And the module will turn to offline mode, so the output data is processed in this way. (default: 0)

0: keep the last time output State.

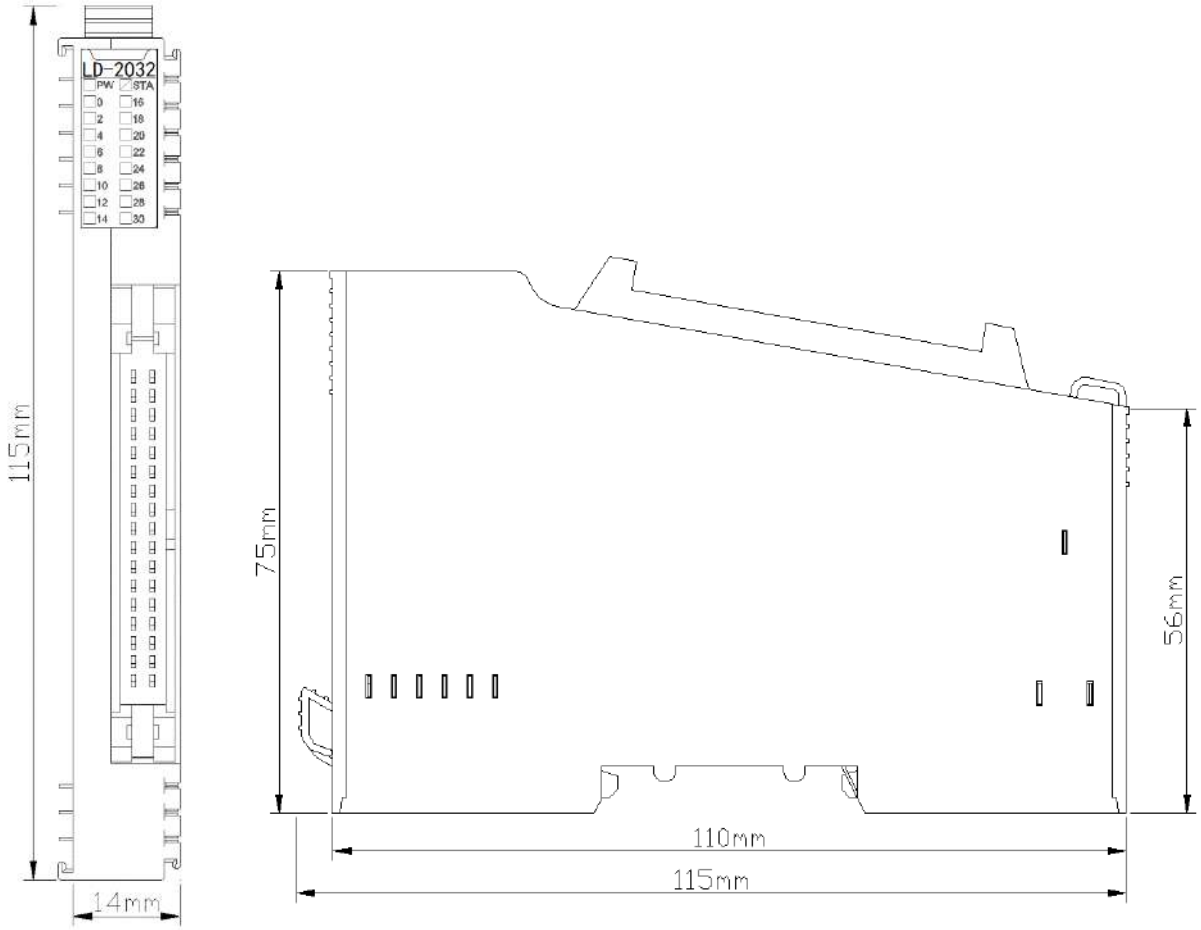
1: output fault value.

Fault Value for Output Ch#(0-31)：when the Fault Output mode is 1, this bit sets the Fault Output Value, and this setting value will be outputted when the interal bus of IO module is offline. (default: 0)

0: Output low level.

1: Output high level.

A Dimension drawing



LD-4016 16 channels digital output/24VDC/NPN

1 Module features

◆ the module supports 16 channels digital output, the output voltage is 0V and the output low level is valid.

◆ the module can drive field equipment (relay, solenoid valve, etc.)

◆ the internal bus and field output of the module both adopt electromagnetic isolation

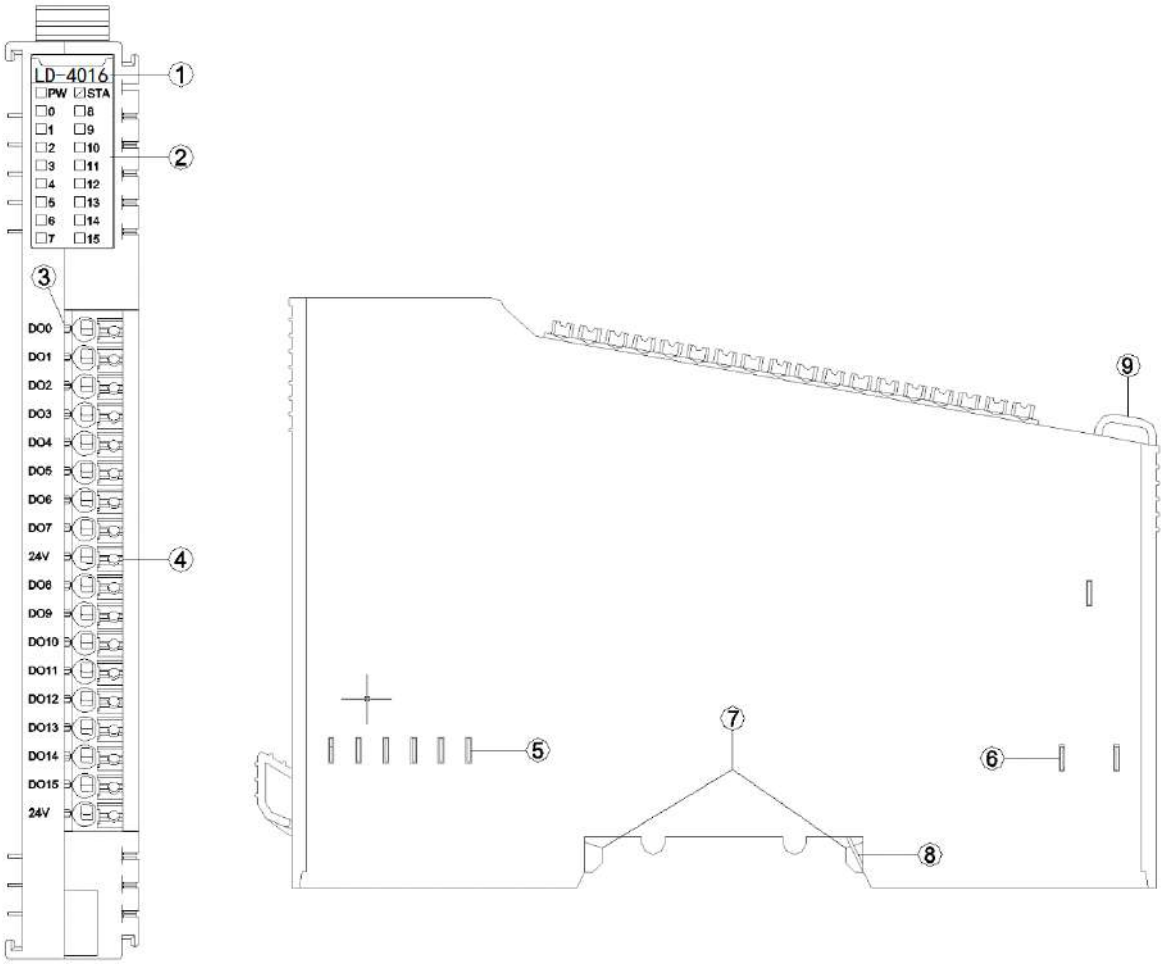
◆ the module carries 16 digital output channel LED indicator

◆ the module has the function of thermal shutdown and over current protection

2 Technical parameters

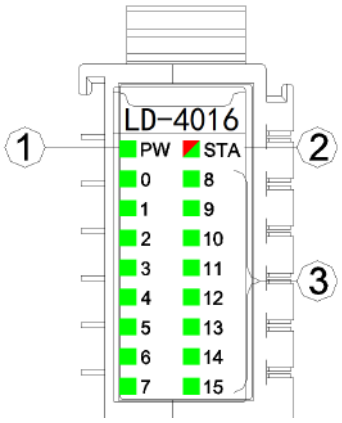
General Parameters	
Power	Max.140mA@5.0Vdc
Isolation	I/O to internal bus: opto-couple isolation (3KVrms)
Field Power	Nominal:24Vdc, Range:22-28Vdc
VCLAMP Voltage	Nominal:24Vdc, Input range:12-36Vdc
Wiring	I/O wiring：Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Output Parameters	
Channel Number	16 channel sink type output
LED Indicator	16 channel output LED indicator
Rated Current	single channel output：Max.1000mA simultaneously output：Max.500mA
Leakage Current	Max. 10uA
On Resistance	Typical value：500mΩ
Output Delay	OFF to ON: Max.100us ON to OFF: Max.150us
Protection Function	Over-temperature shut down: typical value 160℃ Overcurrent protection: typical value 1.8A Short circuit protection: supported

3 Hardware interfaces



① Module Type
② State indicator
③ Channel indicator
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

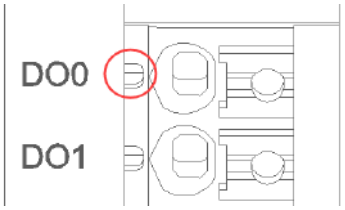
3.1 LED indicator definition



① Power LED indicator (green)
② Module State indicator LED (red/green)
③ Output channel indicator LED (green)

PW Power State	Definition
ON	Internal bus power supply normal
OFF	Internal bus power supply failure
STA Module State (RED/GREEN)	Definition
Green slow flash (2.5 Hz)	Module internal bus is not started
Red slow flash (2.5 Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash (2.5 Hz) (RED/GREEN)	updating mode
Flash (10 Hz) (RED/GREEN)	firmware update
Double Flash (RED)	Module exception has been soft-restarted
0-15 channel indicator LED	Definition
ON	Output signal valid
OFF	Output signal invalid

3.2 Field channel LED indicator (Green)



When output signal of output channel is valid, the corresponding field channel LED indicator is on.

3.3 Terminal definition

Terminal Number	Symbol	The Description
1	DO0	Signal output
2	DO1	
3	DO2	
4	DO3	
5	DO4	
6	DO5	
7	DO6	
8	DO7	
9	24V	Power input (note1)
10	DO8	Signal output
11	DO9	
12	DO10	
13	DO11	
14	DO12	
15	DO13	
16	DO14	
17	DO15	
18	24V	Power input(note1)

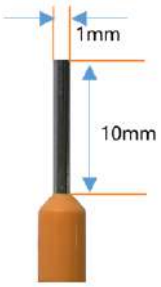
Note 1: There are two access methods for this power input port depending on the type of load.

A: When the load is ordinary resistive load, this port is the selected port.When the 24V power supply is connected, the output channel can output 0V normally, meanwhile the terminal channel indicator LED will be on.When the 24V power supply is not connected, the output channel can output 0V normally, but the terminal channel indicator LED will be off.

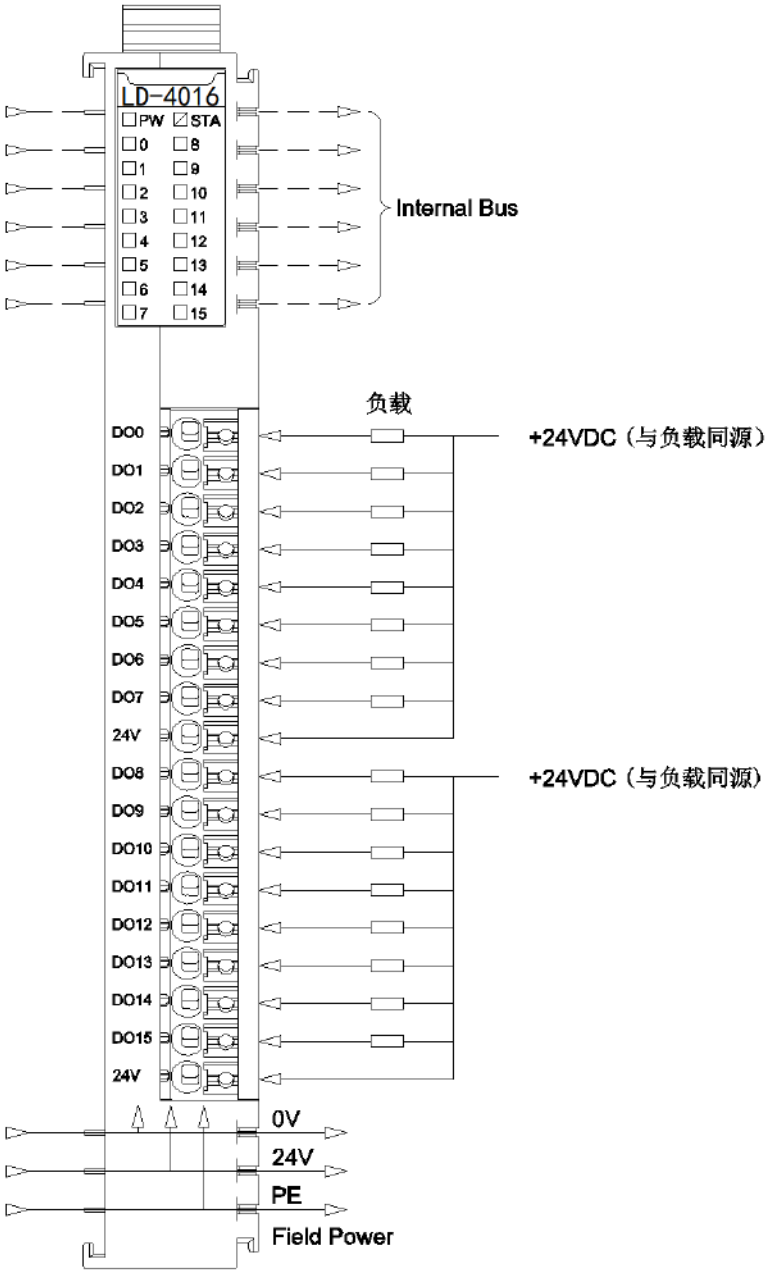
B: When the load is inductive loads such as coils, this port is the VCLAMP voltage clamp port. This port must be connected to the positive pole of the inductive load

power supply; it could provide a continuous current circuit when the inductive load disconnects.

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:



4 Wiring



5 Process data definition

Output data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DO Ch#7	DO Ch#6	DO Ch#5	DO Ch#4	DO Ch#3	DO Ch#2	DO Ch#1	DO Ch#0
Byte 1	DO Ch#15	DO Ch#14	DO Ch#13	DO Ch#12	DO Ch#11	DO Ch#10	DO Ch#9	DO Ch#8

Data declaration:

DO Ch#(0-15)： when this bit is 1, the corresponding channel output signal is valid, the output is low level, and the output is invalid when it is 0.

0：Output signal is invalid
1：Output signal is valid

6 Configuration parameter definitions

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Fault Action for Output Ch#7	Fault Action for Output Ch#6	Fault Action for Output Ch#5	Fault Action for Output Ch#4	Fault Action for Output Ch#3	Fault Action for Output Ch#2	Fault Action for Output Ch#1	Fault Action for Output Ch#0
Byte 1	Fault Action for Output Ch#15	Fault Action for Output Ch#14	Fault Action for Output Ch#13	Fault Action for Output Ch#12	Fault Action for Output Ch#11	Fault Action for Output Ch#10	Fault Action for Output Ch#9	Fault Action for Output Ch#8
Byte 2	Fault Value for Output Ch#7	Fault Value for Output Ch#6	Fault Value for Output Ch#5	Fault Value for Output Ch#4	Fault Value for Output Ch#3	Fault Value for Output Ch#2	Fault Value for Output Ch#1	Fault Value for Output Ch#0
Byte 3	Fault Value for Output Ch#15	Fault Value for Output Ch#14	Fault Value for Output Ch#13	Fault Value for Output Ch#12	Fault Value for Output Ch#11	Fault Value for Output Ch#10	Fault Value for Output Ch#9	Fault Value for Output Ch#8

Data description:

Fault Action for Output Ch#(0-15)：Fault Output mode. When the IO module detects an internal bus exception and fails to communicate with the adapter. And the module will turn to offline mode, so the output data is processed in this way. (default: 0)

0: keep the last time output State.

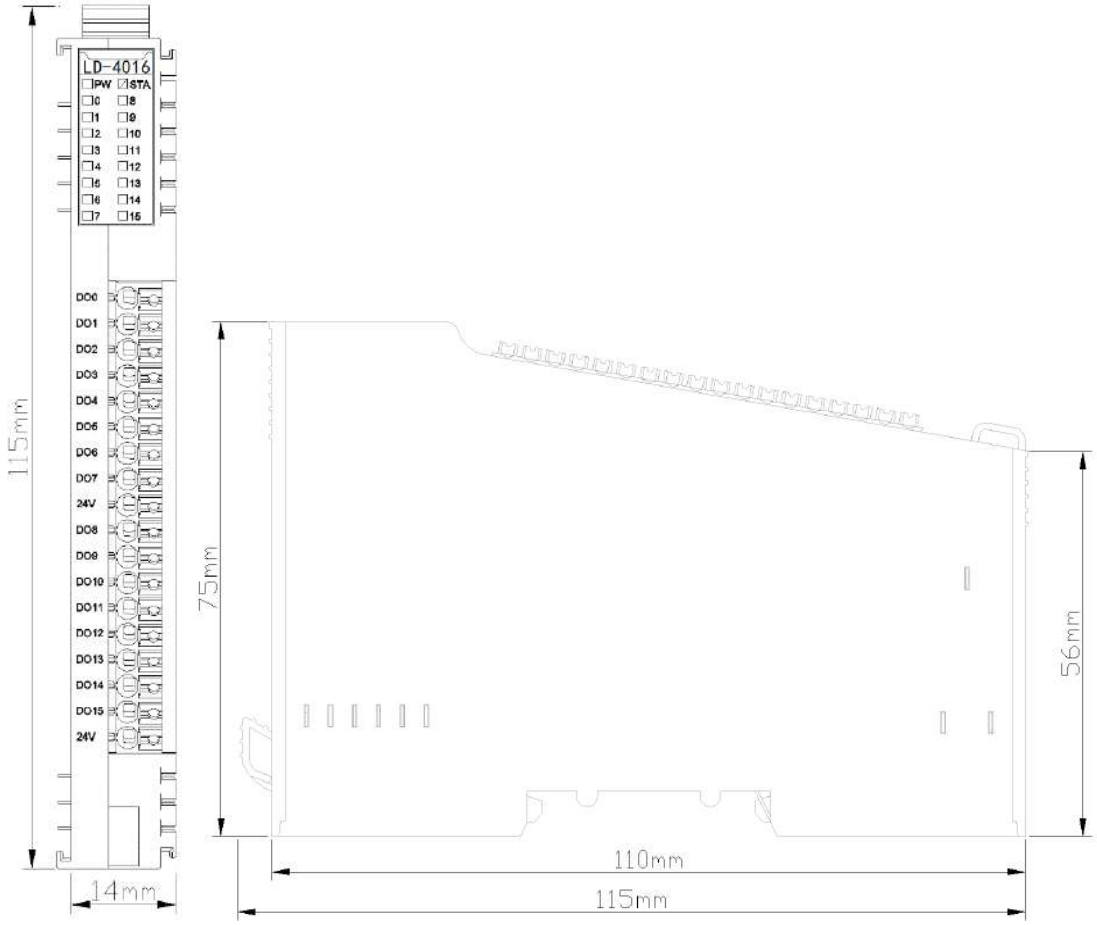
1: output fault value.

Fault Value for Output Ch#(0-15)：when the Fault Output mode is 1, this bit sets the Fault Output Value, and this setting value will be outputted when the interal bus of IO module is offline. (default: 0)

0: Output low level.

1: Output high level.

A Dimension drawing



LD-4032 32-Channel Digital Output / 24VDC / NPN

1 Module Features

◆ The module supports 32 channels of digital output, with active low output, and output voltage of 0V

◆ The module can drive field equipment (relays, solenoid valves, etc.)

◆ The module's internal bus and field outputs use electromagnetic isolation

◆ The module comes with LED indicators for 32 digital output channels

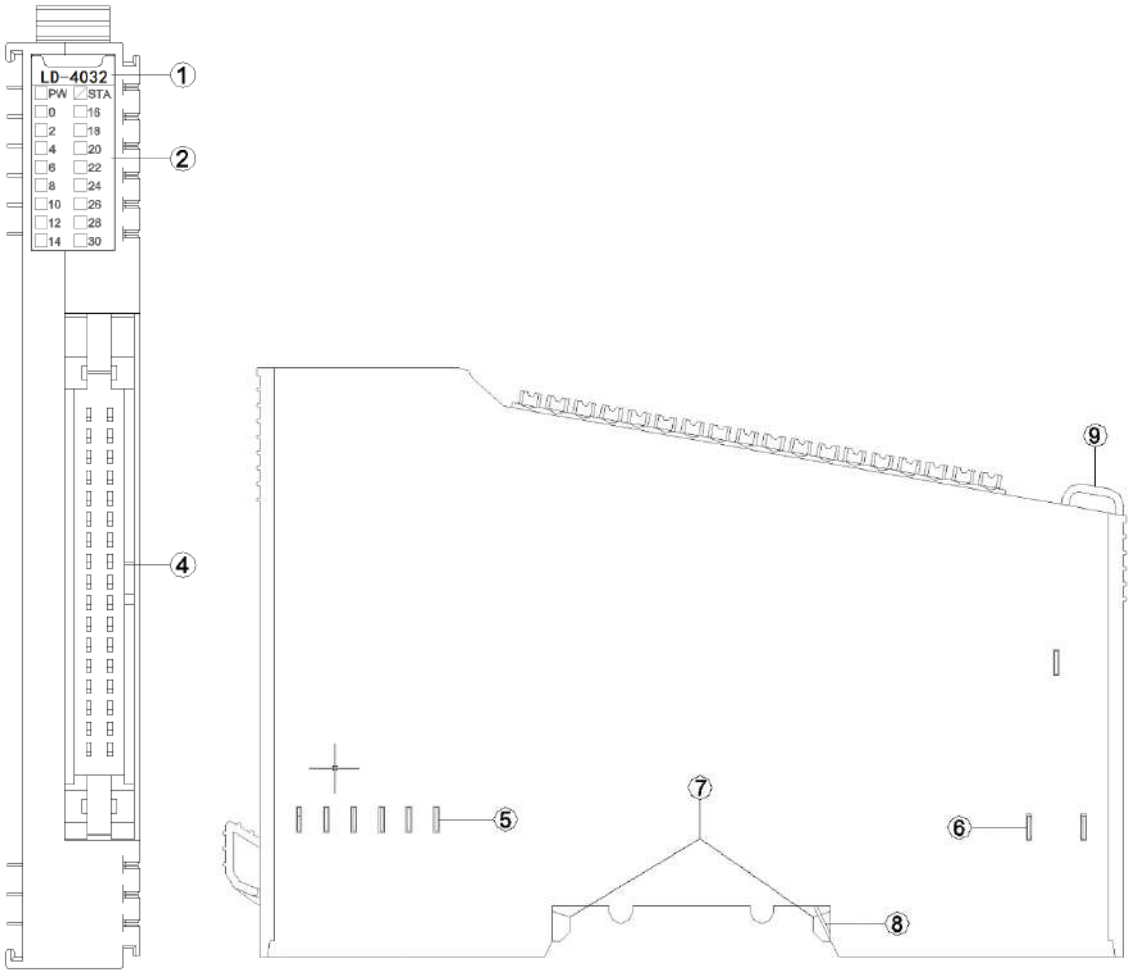
◆ The module has overcurrent protection and thermal shutdown functions

2 Technical Parameters

General Parameters	
System Power	Max.175mA@5.0Vdc
Isolation	I/O to internal bus: opto-coupler isolation (3KVrms)
Field Power	Nominal voltage: 24Vdc Input range: 22~28Vdc
VCLAMP Power	Nominal voltage：24Vdc Input range：12~36V
Wiring	I/O wiring：Max.1.0mm²(AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operation Temperature	-40~85℃
Operation Humidity	5%-95%(No Condensation)
Ingress Protection Rating	IP20
Output parameter	
Channel Number	32-channel output NPN
Indicator	32 channel output indicators
Rated current	Single-channel output：Max.1000mA 16 channels simultaneous output：Max.500mA 32 channels simultaneous output：Max.300mA
Leakage current	Maximum value：10uA
Output impedance	typical value：500mΩ

Output delay	OFF to ON :Max.100us ON to OFF :Max.150us
Protection function	Temperature protection：typical value 160℃ Protection current：typical value 1.8A Short circuit protection：support Associated protection: 4 channels per group

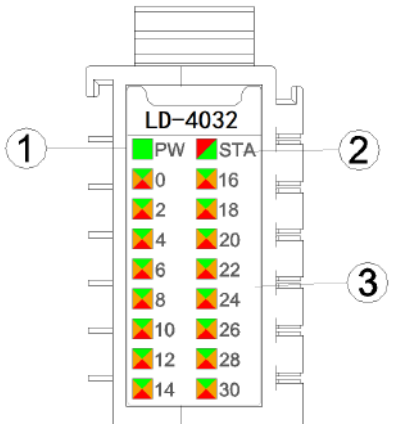
3 Hardware interfaces



① Module Type
② State indicators
③ -
④ Wiring Terminal and Marking
⑤ Internal Bus
⑥ Field Power
⑦ Buckle

⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicators Definition



④ Power indicator (green)
⑤ Module state indicator (red/green)
⑥ Input/output channel indicators (green)

PW power indicator	Definition
ON	Internal bus power supply normal
OFF	Internal bus power supply failure
STA module state indicator	Definition
Green slow flash (2.5hz)	The internal bus of the module is not started
Red slow flash (2.5hz)	Module internal bus offline
Green normally on	Module works normally
Flash(2.5Hz) (RED/GREEN)	Operating mode
Flash(10Hz) (RED/GREEN)	Firmware upgrading
Red flashes twice	Module exception has been soft-restarted
0-31 channel indicators	Definition
Green ON	Output signal valid
Red ON	Indicate output channel +1 signal valid
Orange ON	Indicate output channel and channel +1 signal valid
OFF	Output signal invalid

3.2

Terminal definition

Instruction	Symbol	Terminal Numb	Terminal Numb	Symbol	Instruction

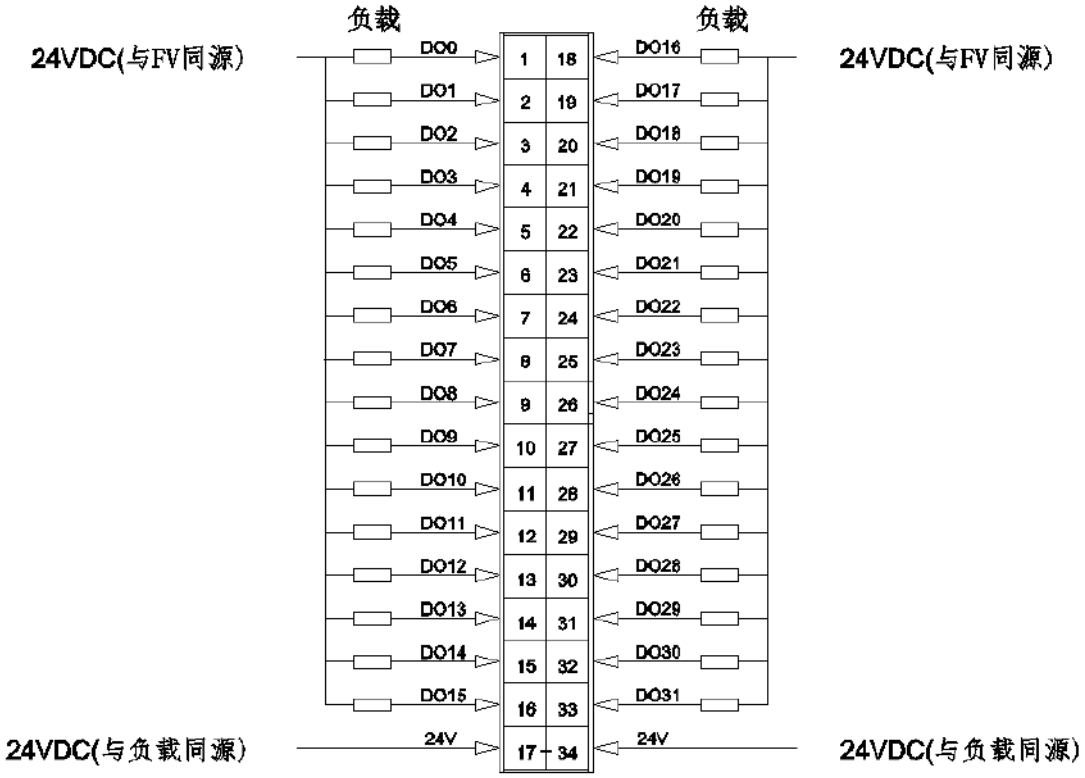
		er	er		
Signal output	DO0	1	18	DO16	Signal input
	DO1	2	19	DO17	
	DO2	3	20	DO18	
	DO3	4	21	DO19	
	DO4	5	22	DO20	
	DO5	6	23	DO21	
	DO6	7	24	DO22	
	DO7	8	25	DO23	
	DO8	9	26	DO24	
	DO9	10	27	DO25	
	DO10	11	28	DO26	
	DO11	12	29	DO27	
	DO12	13	30	DO28	
	DO13	14	31	DO29	
	DO14	15	32	DO30	
	DO15	16	33	DO31	
24VDC	24V	17	34	24V	24VDC

Pin 17 and pin 34 are internally shorted

3.3 External terminal block

Model	LX-7032
Name	Spring-type terminal block
Applicable cable wire	LX-8002
Rated current	1A
Rated Voltage	DC24V
Wire	Below 1.0mm²/AWG16

4 Wiring



端子17和34内部短接

Pin 17 and pin 34 are internally shorted

5 Process data definition

Output data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DO Ch#7	DO Ch#6	DO Ch#5	DO Ch#4	DO Ch#3	DO Ch#2	DO Ch#1	DO Ch#0
Byte 1	DO Ch#15	DO Ch#14	DO Ch#13	DO Ch#12	DO Ch#11	DO Ch#10	DO Ch#9	DO Ch#8
Byte 2	DO Ch#23	DO Ch#22	DO Ch#21	DO Ch#20	DO Ch#19	DO Ch#18	DO Ch#17	DO Ch#16
Byte 3	DO Ch#31	DO Ch#30	DO Ch#29	DO Ch#28	DO Ch#27	DO Ch#26	DO Ch#25	DO Ch#24

Data description:

When this bit is 1, the corresponding channel output signal is valid and outputs a low level; when it is 0, the output is invalid.

0: Output signal is invalid

1: Output signal is valid

6 Configuration parameter definition

Configuration parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Fault Action for Output Ch#7	Fault Action for Output Ch#6	Fault Action for Output Ch#5	Fault Action for Output Ch#4	Fault Action for Output Ch#3	Fault Action for Output Ch#2	Fault Action for Output Ch#1	Fault Action for Output Ch#0
Byte 1	Fault Action for Output Ch#15	Fault Action for Output Ch#14	Fault Action for Output Ch#13	Fault Action for Output Ch#12	Fault Action for Output Ch#11	Fault Action for Output Ch#10	Fault Action for Output Ch#9	Fault Action for Output Ch#8
Byte 2	Fault Action for Output Ch#2	Fault Action for Output Ch#2	Fault Action for Output Ch#2	Fault Action for Output Ch#2	Fault Action for Output Ch#1	Fault Action for Output Ch#1	Fault Action for Output Ch#1	Fault Action for Output Ch#1

	3	2	1	0	9	8	7	6
Byte 3	Fault Action for Output Ch#31	Fault Action for Output Ch#30	Fault Action for Output Ch#29	Fault Action for Output Ch#28	Fault Action for Output Ch#27	Fault Action for Output Ch#26	Fault Action for Output Ch#25	Fault Action for Output Ch#24
Byte 4	Fault Value for Output Ch#7	Fault Value for Output Ch#6	Fault Value for Output Ch#5	Fault Value for Output Ch#4	Fault Value for Output Ch#3	Fault Value for Output Ch#2	Fault Value for Output Ch#1	Fault Value for Output Ch#0
Byte 5	Fault Value for Output Ch#15	Fault Value for Output Ch#14	Fault Value for Output Ch#13	Fault Value for Output Ch#12	Fault Value for Output Ch#11	Fault Value for Output Ch#10	Fault Value for Output Ch#9	Fault Value for Output Ch#8
Byte 6	Fault Value for Output Ch#23	Fault Value for Output Ch#22	Fault Value for Output Ch#21	Fault Value for Output Ch#20	Fault Value for Output Ch#19	Fault Value for Output Ch#18	Fault Value for Output Ch#17	Fault Value for Output Ch#16
Byte 7	Fault Value for Output Ch#31	Fault Value for Output Ch#30	Fault Value for Output Ch#29	Fault Value for Output Ch#28	Fault Value for Output Ch#27	Fault Value for Output Ch#26	Fault Value for Output Ch#25	Fault Value for Output Ch#24

Data description：

Fault Action for Output Ch#(0-31): Fault output mode, when the IO module detects an internal bus abnormality and communication failure with the coupler, entering offline mode, the output data is processed in this manner. (Default value: 0)

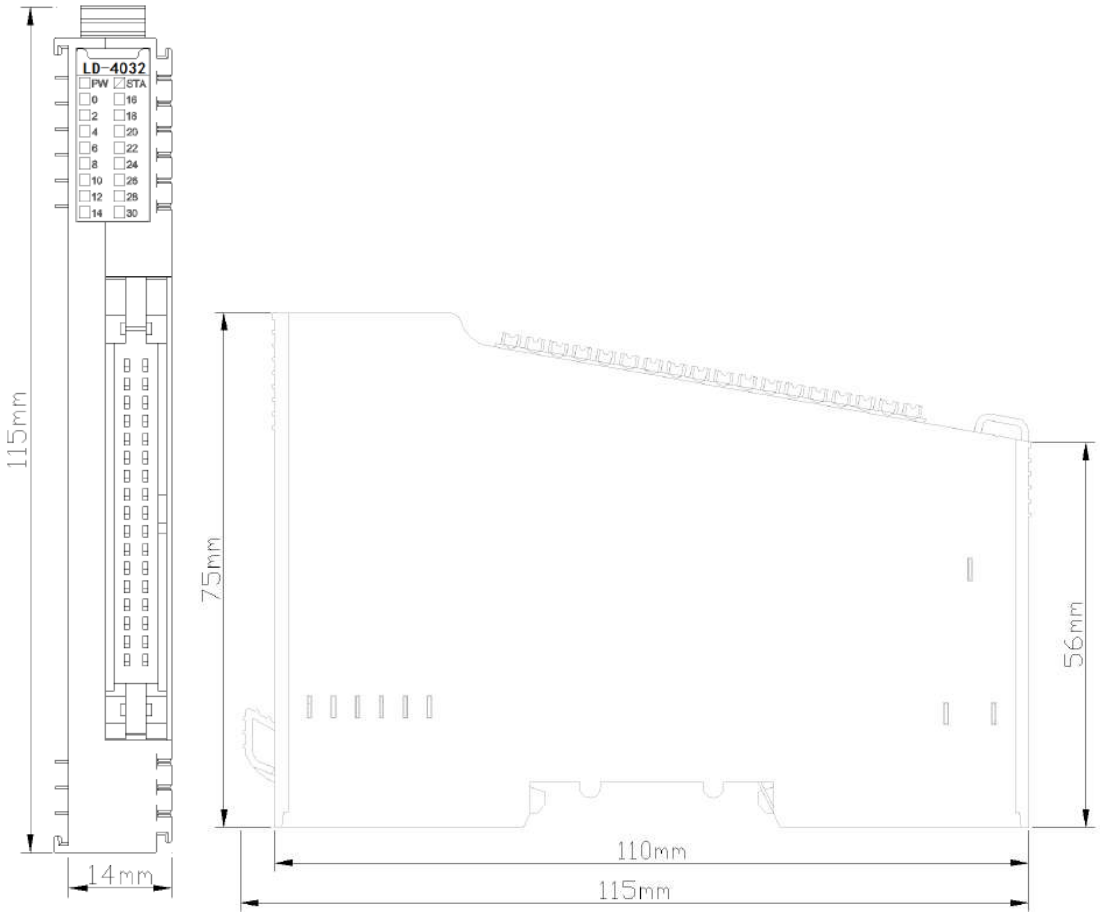
0: Maintain the last output state.

1: Output the fault value.

Fault Value for Output Ch#(0-31): When the fault output mode is set to 1, this bit sets the fault output value. When the IO module's internal bus goes offline, it outputs this set value. (Default value: 0)

0: Output low level.
1: Output high level.

A Dimension drawing



LD-8008: 8 channels relay output 2A/30VDC/60W

1 Module features

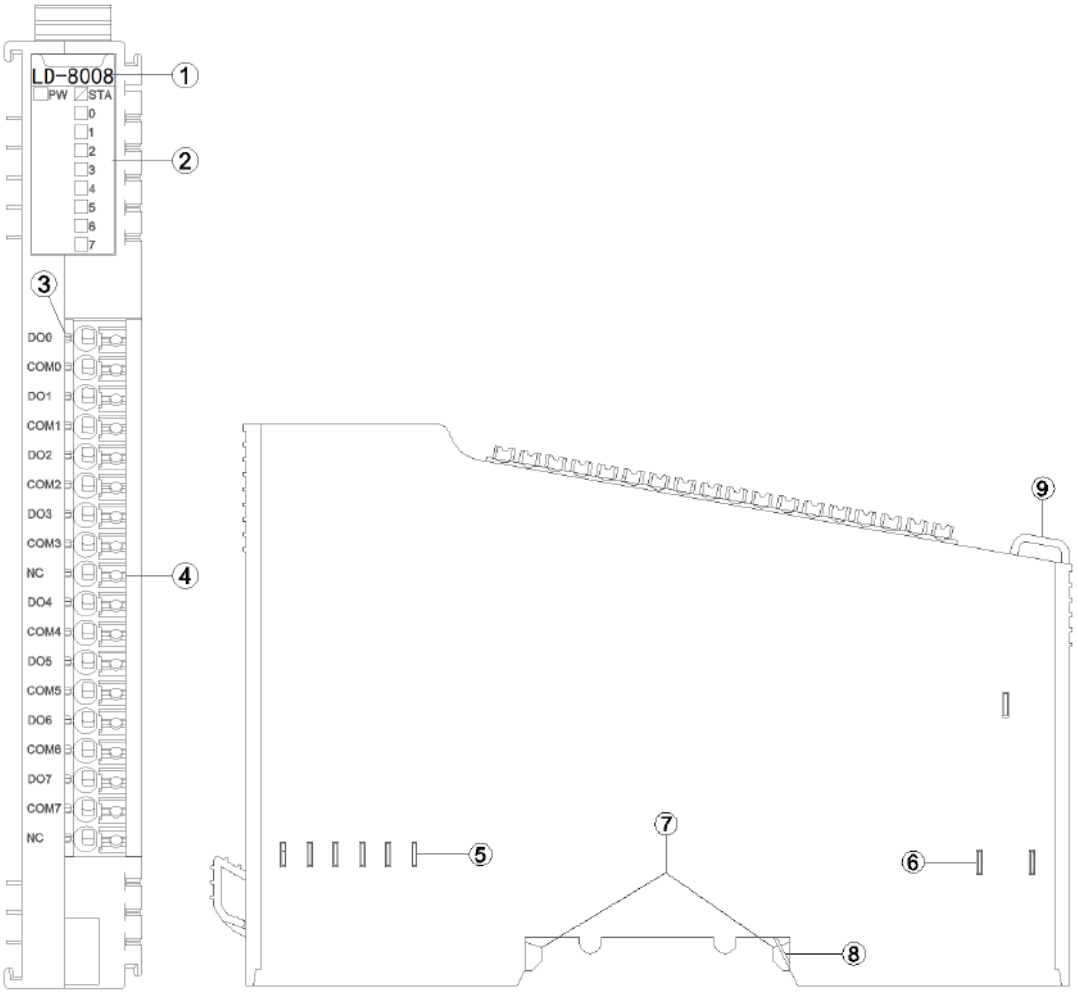
- ◆ 8-channel relay normally on output
- ◆ 8 LED channel indicators
- ◆ Low on resistance (≤100mΩ)
- ◆ 250VAC/220VDC the max. switch voltage is 250VAC/220VDC

2 Technical Parameters

General parameters	
Power Consumption	Max.280mA@5.0Vdc
Isolation	I/O to internal bus：coil isolation(1600VAC)
Field Power	Not used
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95%(No Condensation)
Ingress Protection Rating	IP20
Output Parameter	
Channel Number	8 channel relay normally on output
LED Indicator	8 channel output LED Indicator
Max. Switching Current	2A
Max. Switching Voltage	250VAC/220VDC
Max. Switching Power	62.5VA/60W
Contact Resistance	≤100mΩ
Output Delay	ON to OFF:Max.3ms OFF to ON:Max.3ms
Mechanical Endurance	$1x10^8$
Electricity Endurance	$1x10^5$
Vibration	10Hz~55Hz 3.3mm Double vibration amplitude

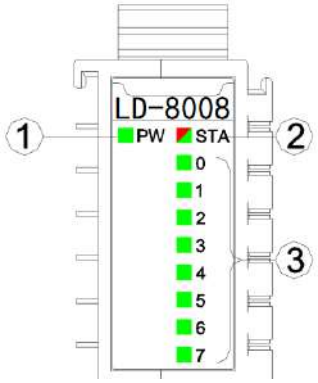
Impact	Stability：735m/s^2 Strength：980m/s^2

3 Hardware Interface



① Module Type
② State indicator
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition



① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Output channel LED indicator (green)

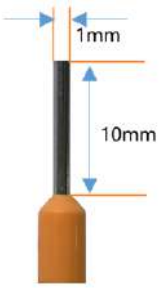
PW Power State (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA Module State (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
0-7 channel LED indicator (GREEN)	Definition
ON	Output signal valid
OFF	Output signal invalid

3.2 Terminal definition

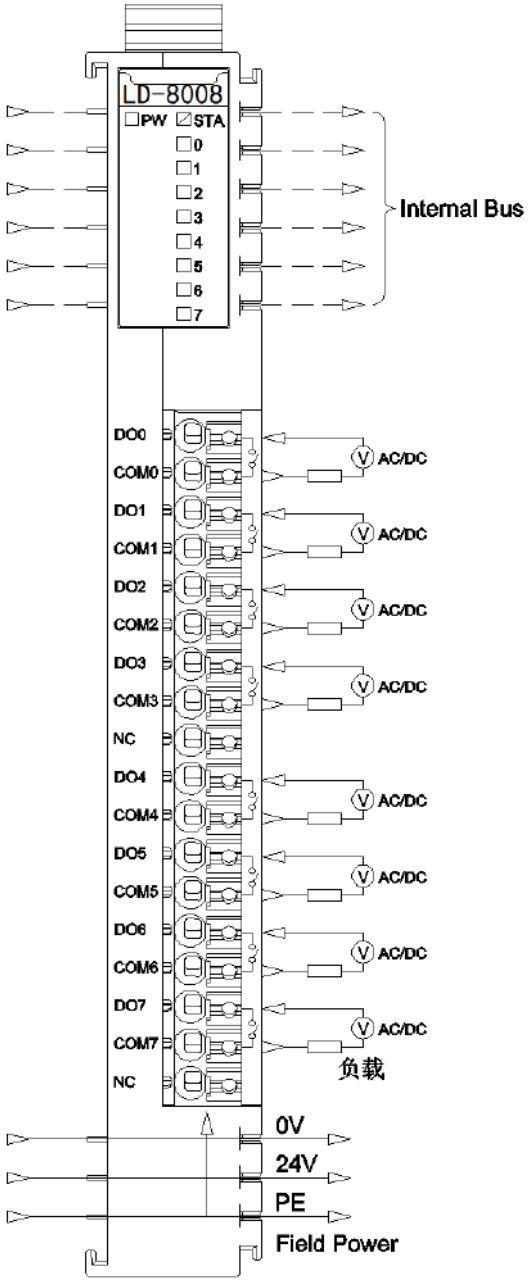
Terminal Number	Definition	Description
1	DO0	Channel 0 output
2	COM0	Channel 0 Common Port
3	DO1	Channel 1 output
4	COM1	Channel 1 Common Port
5	DO2	Channel 2 output
6	COM2	Channel 2 Common Port

7	DO3	Channel 3 output
8	COM3	Channel 3 Common Port
9	NC	Not Connected
10	DO4	Channel 4 output
11	COM4	Channel 4 Common Port
12	DO5	Channel 5 output
13	COM5	Channel 5 Common Port
14	DO6	Channel 6 output
15	COM6	Channel 6 Common Port
16	DO7	Channel 7 output
17	COM7	Channel 7 Common Port
18	NC	Not Connected

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:



4 Wiring


LD-8008
PW
STA
0
1
2
3
4
5
6
7
Internal Bus
DO0
COM0
DO1
COM1
DO2
COM2
DO3
COM3
NC
DO4
COM4
DO5
COM5
DO6
COM6
DO7
COM7
NC
AC/DC
负载
0V
24V
PE
Field Power

5 Process data definition

Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DO Ch#7	DO Ch#6	DO Ch#5	DO Ch#4	DO Ch#3	DO Ch#2	DO Ch#1	DO Ch#0

Data description：

DO Ch#(0-7)：When the bit is 1, the output signal of corresponding channel is effective and the output contact of relay is closed.When the bit is 0, the output is invalid and the relay contact is disconnected.

0: The output signal is invalid

1: The output signal is valid

6 Configuration parameters definition

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Fault Action for Output Ch#7	Fault Action for Output Ch#6	Fault Action for Output Ch#5	Fault Action for Output Ch#4	Fault Action for Output Ch#3	Fault Action for Output Ch#2	Fault Action for Output Ch#1	Fault Action for Output Ch#0
Byte 1	Fault Value for Output Ch#7	Fault Value for Output Ch#6	Fault Value for Output Ch#5	Fault Value for Output Ch#4	Fault Value for Output Ch#3	Fault Value for Output Ch#2	Fault Value for Output Ch#1	Fault Value for Output Ch#0

Data description：

Fault Action for Output Ch#(0-7)：Fault output mode. When IO module detects that internal bus communication is failed and enters offline mode, the output data will be processed in this mode. (Default: 0)

0: Hold the last output state.

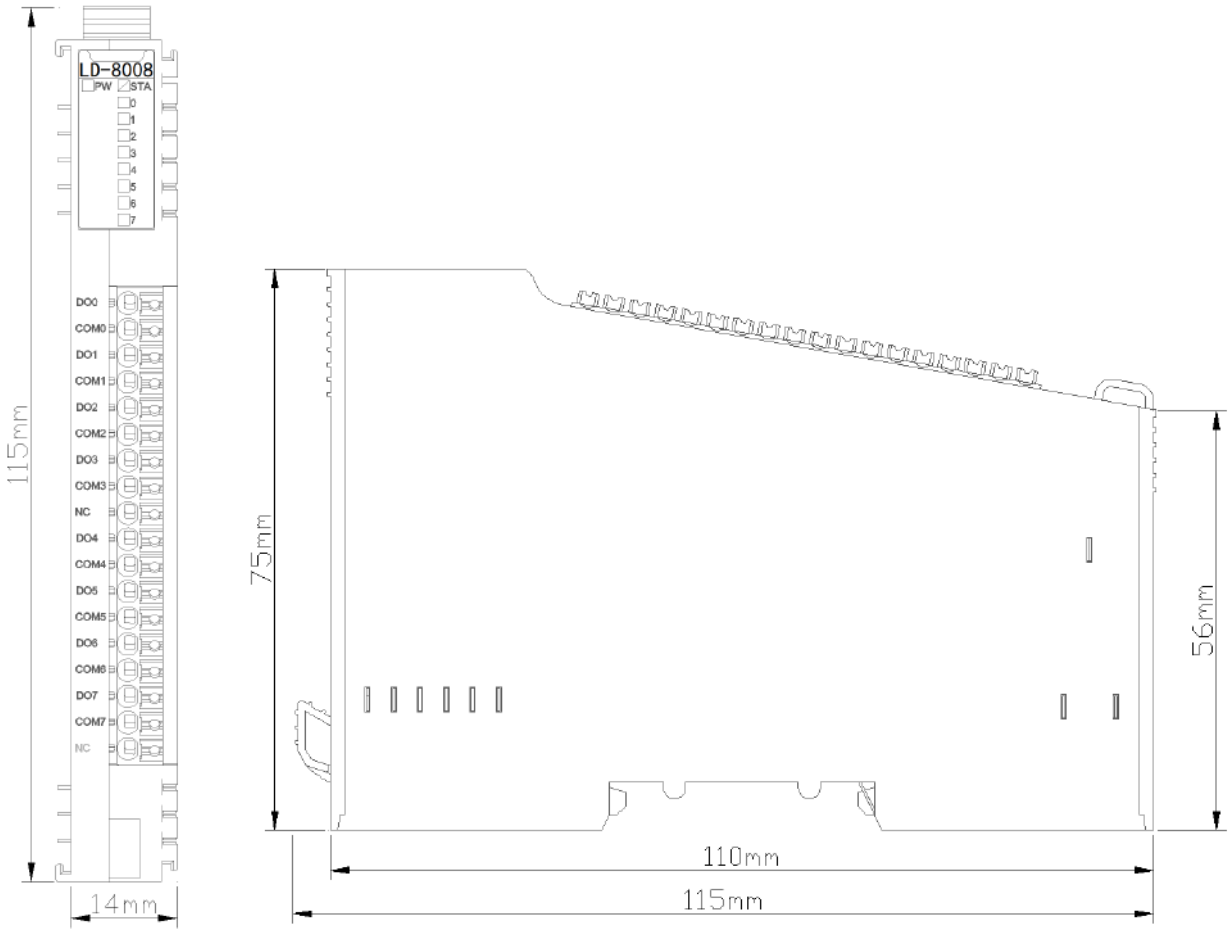
1: Output fault value

Fault Value for Output Ch#(0-7)：When the fault output mode is 1, this bit would set the fault output value, and when the internal bus of IO module is offline, this setting value will be output.(Default: 0)

0: Output low level.

1: Output high level.

A Dimension drawing



4 Analog Input/Output Module

LA-1004 4-Channel Analog Input

0 & 4-20mA / 15-bit Single-Ended

1 Module Features

◆ The module supports the collection of 4-channel current signals.

◆ The module can be configured to collect either 0-20mA or 4-20mA current signals.

◆ The module supports 2-wire (non-loop output, external power required) or 4-wire current sensor input.

◆ The module's internal bus and field input use magnetic isolation.

◆ The module's input channels connect to field active-type analog signal current output sensors.

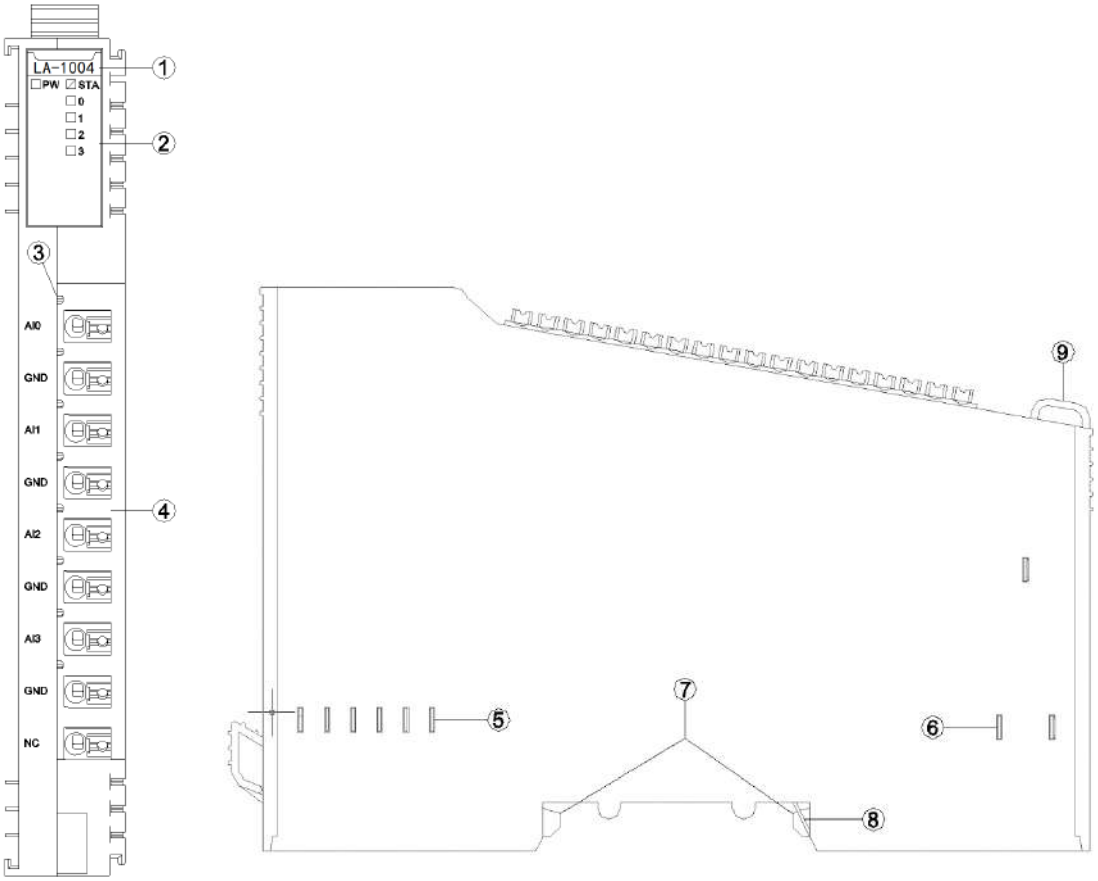
◆ The module channels are equipped with TVS overvoltage protection.

2 Technical parameters

General parameters	
Power Consumption	Max.65mA@5.0Vdc
Isolation	I/O to internal bus: opto-couple isolation (2.5KVrms) Power Isolation：DC-DC
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%-95% (No Condensation)
IP Rating	IP20
Input parameters	
Channel	4 Channel

Number	
LED Indicator	4 channel input LED indicator
Rated input	Range：0~20mA，Maximum：0~23.5mA
Resolution	15 Bit
Accuracy	±0.3%Max，@25℃
	±0.5%Max，@-20~70℃
Sample frequency	6ms/4 channel（Filtering Level 0）
Data format	16-bit signed integer

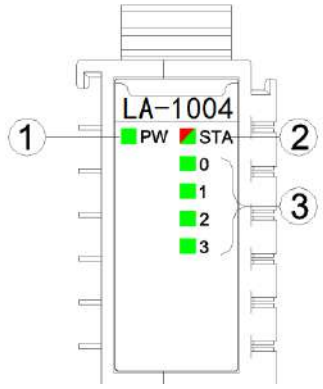
3 Hardware interfaces



① Module Type
② State indicator
③ Channel indicator
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle

⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition



① Power LED indicator (green)
② Module State LED indicator (red/green)

Power State (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA Module State (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
0-3 channel LED indicator	Definition
ON	Input signal >=1%range
OFF	Input signal <1%range

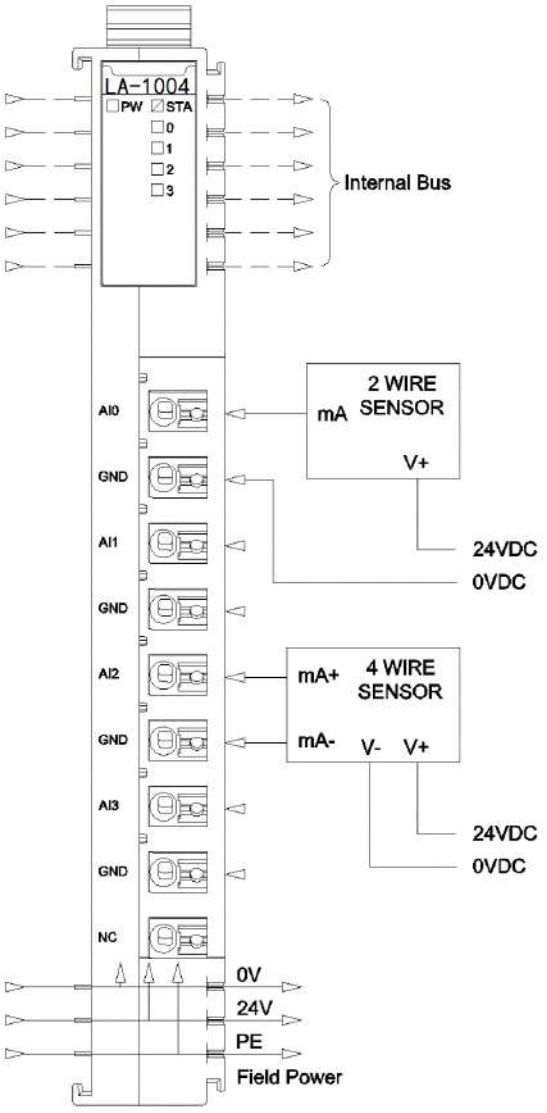
3.2 Terminal definition

Terminal Number	Symbol	Description
1	AI0	Current input CH0
2	GND	
3	AI1	Current input CH1
4	GND	
5	AI2	Current input CH2
6	GND	

7	AI3	Current input CH3
8	GND	
9	NC	Not Connected

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:

4 Wiring


LA-1004
PW
STA
0
1
2
3
Internal Bus
AI0
GND
AI1
GND
AI2
GND
AI3
GND
NC
2 WIRE
SENSOR
mA
V+
24VDC
0VDC
4 WIRE
SENSOR
mA+
mA-
V-
V+
24VDC
0VDC
0V
24V
PE
Field Power

5 Process data definition

Input data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Analog Input Data(CH 0)							
Byte 1								
Byte 2	Analog Input Data(CH 1)							
Byte 3								
Byte 4	Analog Input Data(CH 2)							
Byte 5								
Byte 6	Analog Input Data(CH 3)							
Byte 7								

Data Description:

Analog Input Data (CH0-3): Corresponding channel's analog signal input value.

Analog Input Data(LA-1008)				
Current (0-20mA)	Current (4-20mA)	Decimal	Hexadecimal	Position
>23.515	>22.810	32767	7FFF	Overflow
23.515	22.81	32511	7EFF	Exceeds Upper Limit
.	.	.	.	
.	.	.	.	
20.0007	20.0005	27649	6C01	
20	20	27648	6C00	Within Rated Range
.	.	.	.	
.	.	.	.	
0	4	0	0000	
<0.0	3.9995	-1	FFFF	Below Lower Limit
	.	.	.	
	.	.	.	
	1.1852	-4864	ED00	
	<1.1852	-32768	8000	Underflow

Note: ADC chip fault process data is 32765, disabled channel upload process data is -32367

6 Configuration parameter definitions

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved							16Bit Data Format
Byte 1	Reserved				Channel Enable Ch#3	Channel Enable Ch#2	Channel Enable Ch#1	Channel Enable Ch#0
Byte 2	Reserved				Current Type Ch#3	Current Type Ch#2	Current Type Ch#1	Current Type Ch#0
Byte 3	Ch#0 Filter Level							
Byte 4	Ch#1 Filter Level							
Byte 5	Ch#2 Filter Level							
Byte 6	Ch#3 Filter Level							
Byte 7 … Byte 10	Reserved							

Data Description:

16Bit Data Format: Format for storing analog data. (Default value: 0)

0: A-B

1: B-A

Channel Enable Ch#(0-3): Channel enablement. (Default value: 1)

0: Disable

1: Enable

Current Type Ch#(0-3): Type of input signal. (Default value: 1)

0: 0-20mA

1: 4-20mA

Filter Level Ch#(0-3): Filtering level. (Default value: 0)

0: Level 0

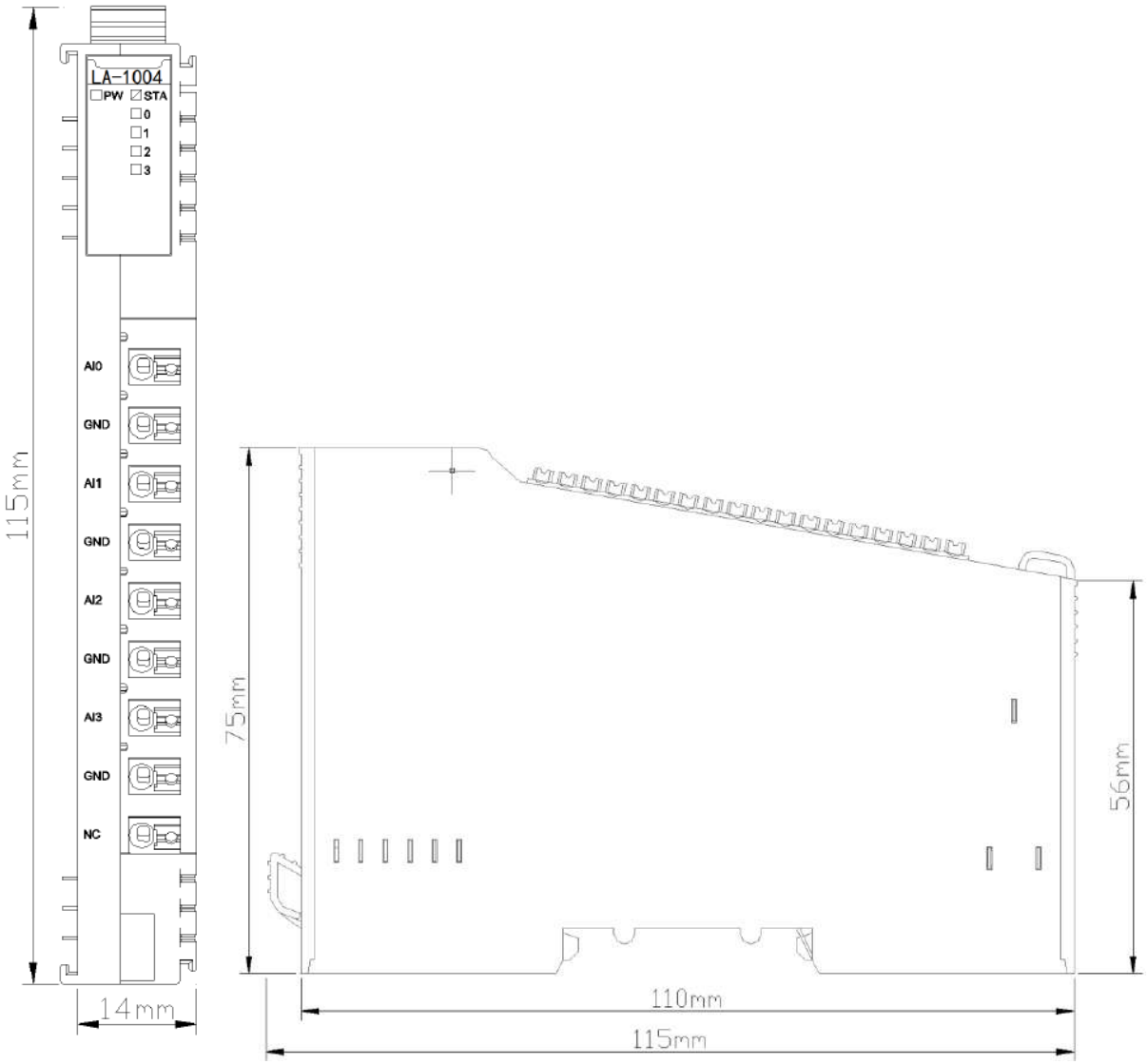
1: Level 1

2: Level 2

3: Level 3

4: Level 4
5: Level 5
6: Level 6
7: Level 7
8: Level 8
9: Level 9
10: Level 10

A Dimension drawing



LA-1008: 8 channels analog input /0&4-20mA/15-bit single-terminal

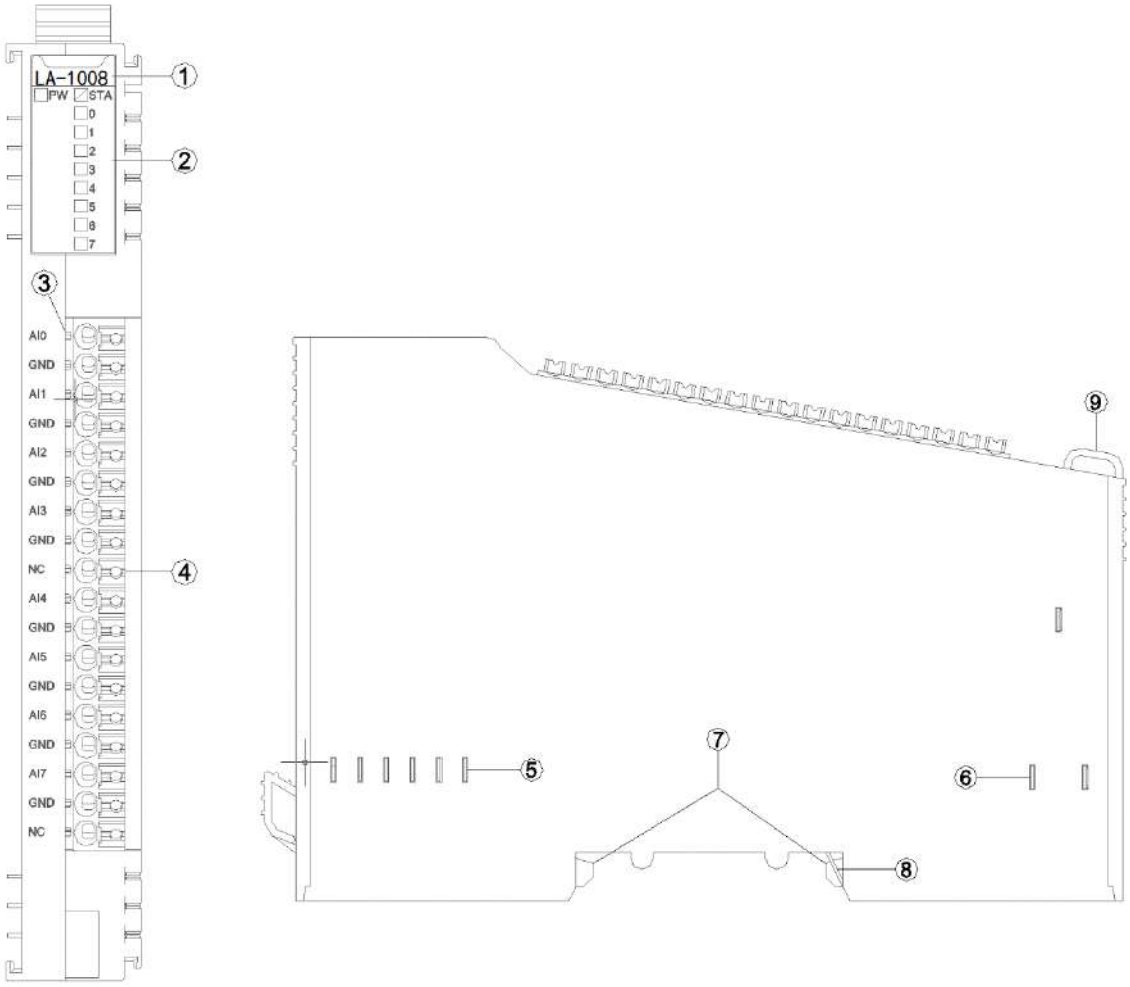
1 Module features

◆ the module supports 8-channel current signal acquisition.
◆ the module can be configured for 0-20mA or 4-20mA current signal acquisition.
◆ the module supports 2-wire (non-loop output, external power supply is required) or 4-wire current sensor input.
◆ the internal bus of the module and field input adopts magnetic insulation.
◆ the module input channel is connected to the field active analog signal current output sensor.
◆ the module channel equips with TVS overvoltage protection.

2 Technical parameters

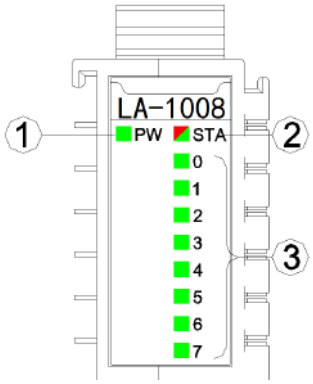
General parameters	
Power	Max.65mA@5.0Vdc
Isolation	I/O to internal bus: magnetic isolation (2.5KVrms) Power isolation: DC-DC
Wiring	Max.1.0mm² (AWG 17)
Installation	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environmental parameters	
Working temperature	-40~85℃
Environmental humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Input parameters	
Channel Number	8 channels
LED Indicator	8 LED channel state indicators
Input range	Maximum: 0 ~ 23.5 mA
Resolution ratio	15 Bit
Acquisition precision	±0.3% full range, @25℃
	±0.5% full range, @-20~70℃
Sampling rate	28 ms / 8 channels
Data format	16-bit signed integer

3 Hardware interfaces



① Module Type
② State indicator
③ (no field channel indicator)
④ Wiring Terminal and marking
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator lights



① Power indicator light (green)
② Module State indicator (red/green)
③ Input channel indicator light (green)

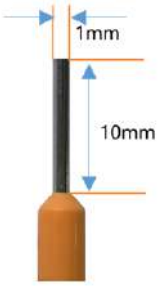
PW power indicator	Definition
ON	Internal bus power supply is normal
OFF	Internal bus power supply is failure
STA module State indicator	Definition
Green slow flash (2.5hz)	The internal bus of the module is not started
Red slow flash (2.5hz)	Module internal bus offline
Green on	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware upgrading
Red flashes twice	Module exception has been soft-restarted
0-7 channel indicator light	Definition
ON	Input signal >=1% range
OFF	Input signal <1% range

3.2 Terminal definition

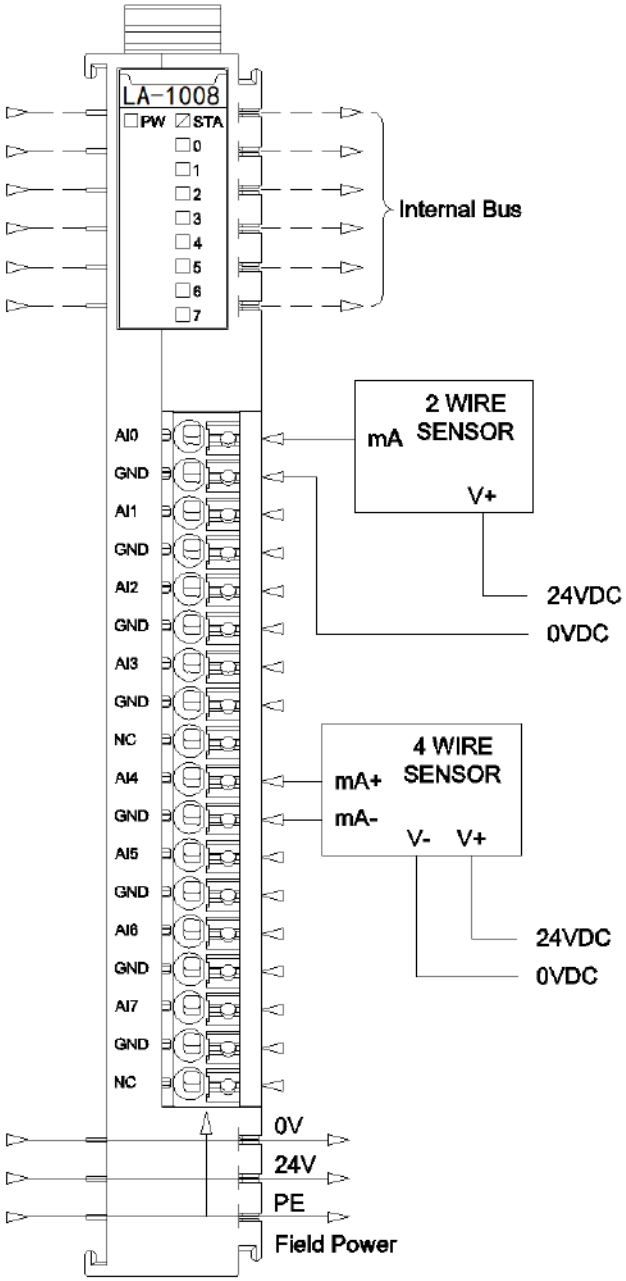
Terminal number	Definition	Description
1	AI0	Current input CH0
2	GND	
3	AI1	Current input CH1
4	GND	
5	AI2	Current input CH2
6	GND	
7	AI3	Current input CH3
8	GND	
9	NC	Not connected
10	AI4	Current input

11	GND	CH4
12	AI5	Current input CH5
13	GND	
14	AI6	Current input CH6
15	GND	
16	AI7	Current input CH7
17	GND	
18	NC	Not connected

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:



4 Wiring


LA-1008
PW
STA
0
1
2
3
4
5
6
7
Internal Bus
AI0
GND
AI1
GND
AI2
GND
AI3
GND
NC
AI4
GND
AI5
GND
AI6
GND
AI7
GND
NC
2 WIRE
SENSOR
mA
V+
24VDC
0VDC
4 WIRE
SENSOR
mA+
mA-
V-
V+
24VDC
0VDC
0V
24V
PE
Field Power

5 Process data definition

Input data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Analog Input Data (CH 0)							
Byte 1								
Byte 2	Analog Input Data (CH 1)							
Byte 3								
Byte 4	Analog Input Data (CH 2)							
Byte 5								
Byte 6	Analog Input Data (CH 3)							
Byte 7								
Byte 8	Analog Input Data (CH 4)							
Byte 9								
Byte 10	Analog Input Data (CH 5)							
Byte 11								
Byte 12	Analog Input Data (CH 6)							
Byte 13								
Byte 14	Analog Input Data (CH 7)							
Byte 15								

Data description:

Analog Input Data (CH0-7)：Analog signal Input value of corresponding channel.

Analog Input Data (LA-1008)				
Current (0-20mA)	Current (4-20mA)	Decimal	Hexadecimal	Location
>23.515	>22.810	32767	7FFF	Overflow
23.515	22.81	32511	7EFF	Exceed the upper limit
.	.	.	.	
.	.	.	.	
20.0007	20.0005	27649	6C01	
20	20	27648	6C00	Rated range
.	.	.	.	
.	.	.	.	
0	4	0	0000	
<0.0	3.9995	-1	FFFF	Exceed the lower limit
	.	.	.	
	.	.	.	
	1.1852	-4864	ED00	
	<1.1852	-32768	8000	Underflow

For example: AI0 input monitoring value of the LA-1008 is 16#3126=12582, if it

chooses the range of 4-20mA, then the theoretical input value of AI0 is: 12582/27648*16+4=11.28125mA.

For example: AI0 input monitoring value of the LA-1008 is 16#3126=12582, if it chooses the range of 0-20mA, then the theoretical input value of AI0 is: 12582/27648*16=7.28125mA

6 Configuration parameter definition

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	16Bit Data Format							
Byte 1	Current Type Ch#7	Current Type Ch#6	Current Type Ch#5	Current Type Ch#4	Current Type Ch#3	Current Type Ch#2	Current Type Ch#1	Current Type Ch#0

Data description:

16Bit Data Format：Analog data storage format. (default: 0)

0：A-B

1：B-A

Channel Enable Ch#(0-7): (default: 1)

0：Disable

1：Enable

Current Type Ch#(0-7)：Type of input signal. (default: 1)

0：0-20mA

1：4-20mA

Filter Level Ch#(0-7)：Filter Level (default: 0)

0：level 0

1：level 1

2：level 2

.

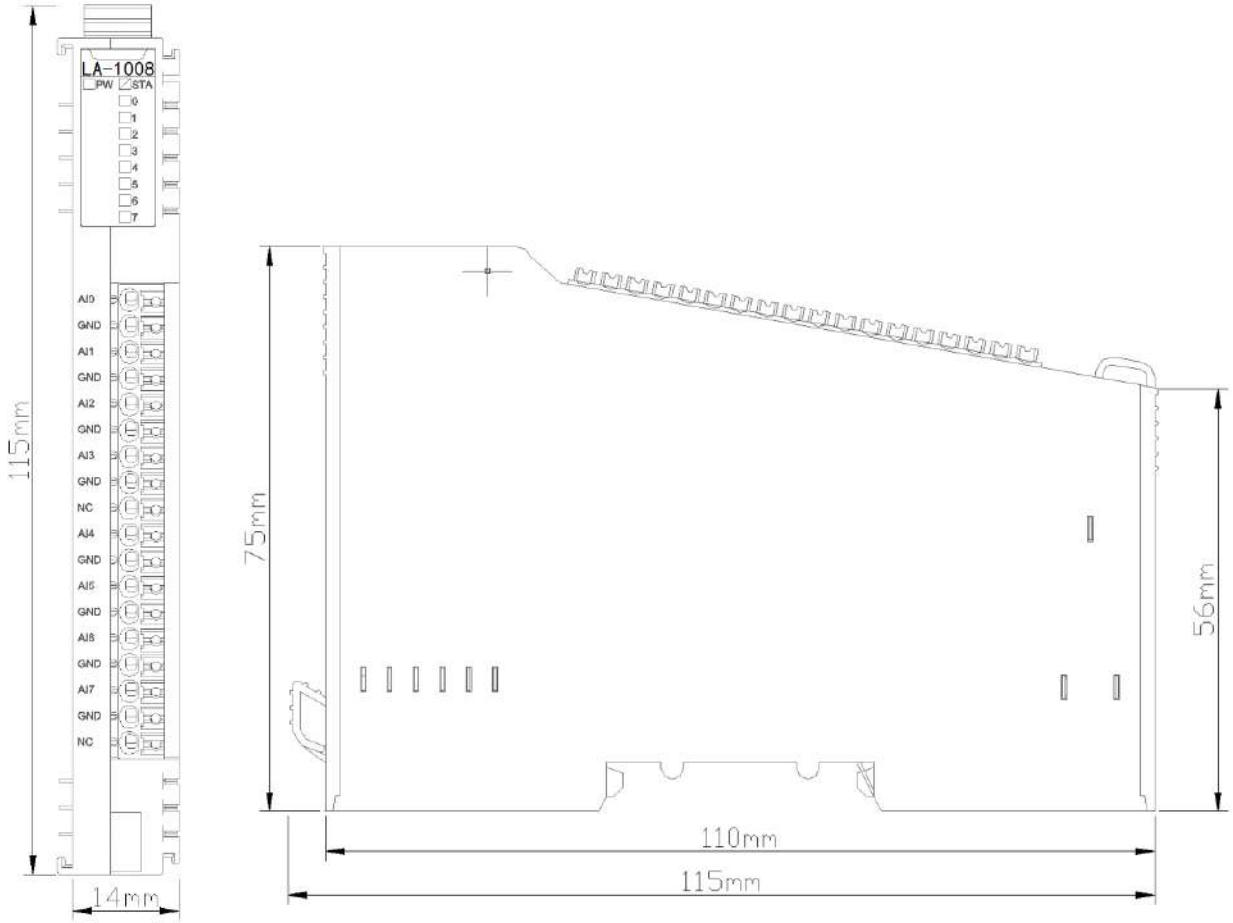
.

.

.

10：level 10

A Dimension drawing



LA-1108 8 channels analog input

0～20mA OR -20~0mA OR ±20mA /15bit Single-ended bipolar

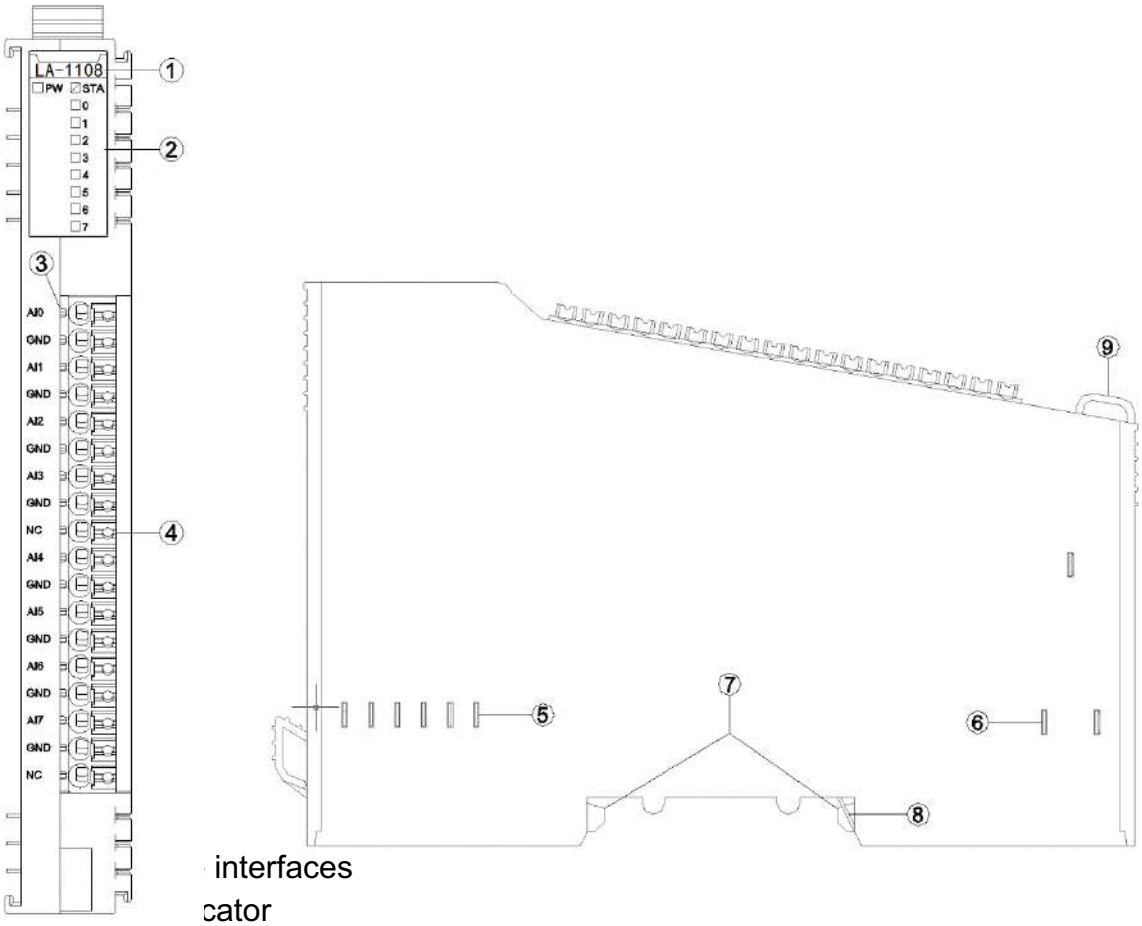
1 Module features

◆ the module supports 8-channel current signal acquisition.
◆ the module can be configured for 0~20mA OR -20~0mA OR ±20mA current signal acquisition.
◆ the module supports 2-wire (non-loop output, external power supply is required)
◆ the internal bus of the module and field input adopts magnetic insulation.
◆ the module input channel is to be connected to the field active analog signal current output sensor.
◆ the module channel equips with TVS overvoltage protection.

2 Technical parameters

General Parameters	
Power	Max.65mA@5.0Vdc
Isolation	I/O to internal bus: magnetic isolation (2.5KVrms) Power isolation: DC-DC
Wiring	Max.1.0mm² (AWG 17)
Installation	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environmental parameters	
Working temperature	-40~85℃
Environmental humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Input parameters	
Channel Number	8 channels
LED Indicator	8 LED channel state indicators
Input range	Maximum: 0~24mA
Resolution ratio	15 Bit
Acquisition precision	±0.3% full range，@25℃
	±0.5% full range，@-20~70℃
Sampling rate	28ms/8 channels
Data format	16-bit signed integer
Diagnostic function	Standard mode: Overflow 32767 Standard mode: Underflow -32768 Channel disabled: -32767

3 Hardware interfaces

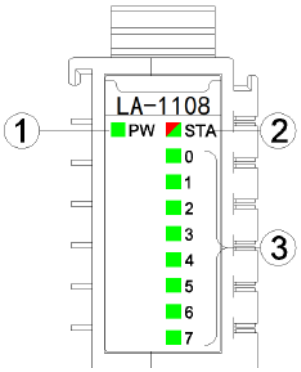


interfaces

cator

③ (non field channel indicator)
④ Wiring Terminal and marking
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator lights



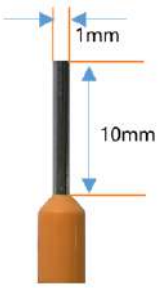
① Power indicator light (green)
② Module State indicator (red/green)
③ Input channel indicator light (green)

PW power indicator	Definition
ON	Internal bus power supply is normal
OFF	Internal bus power supply is failure
STA module State indicator	Definition
Green slow flash (2.5hz)	The internal bus of the module is not started
Red slow flash (2.5hz)	Module internal bus offline
Green on	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware upgrading
Red flashes twice	Module exception has been soft-restarted
0-7 channel indicator light	Definition
ON	Input signal >=1% range
OFF	Input signal <1% range

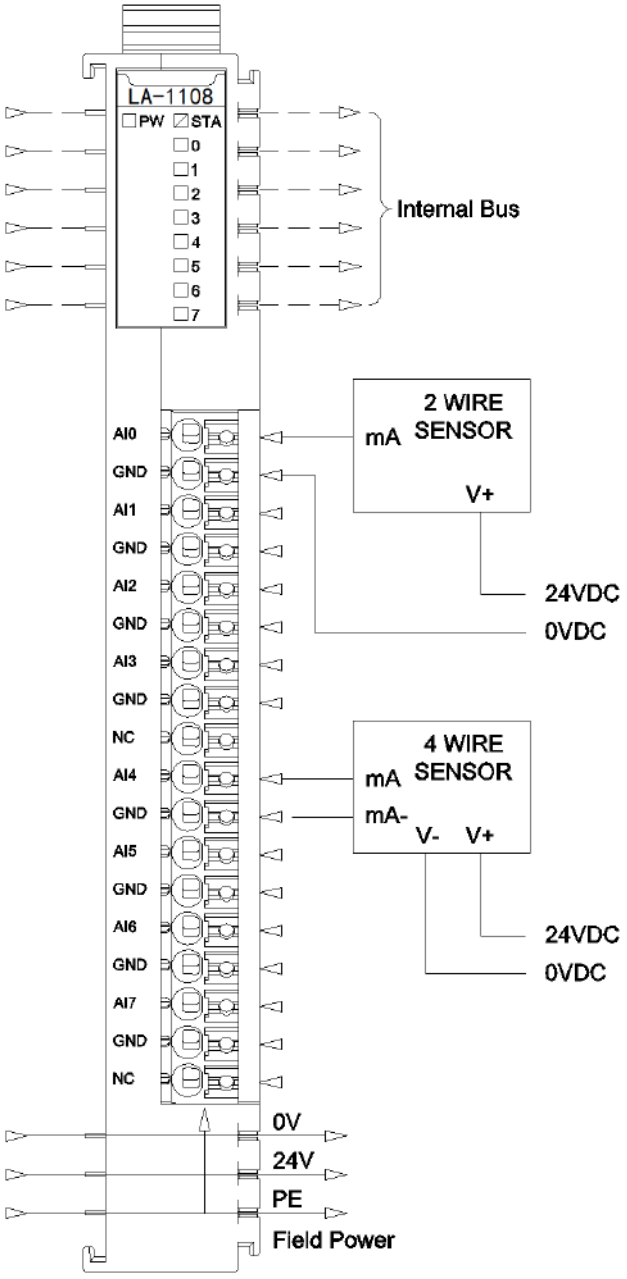
3.2 Terminal definition

Terminal number	Definition	Description
1	AI0	Current input CH0
2	GND	
3	AI1	Current input CH1
4	GND	
5	AI2	Current input CH2
6	GND	
7	AI3	Current input CH3
8	GND	
9	NC	Not connected
10	AI4	Current input CH4
11	GND	
12	AI5	Current input CH5
13	GND	
14	AI6	Current input CH6
15	GND	
16	AI7	Current input CH7
17	GND	
18	NC	Not connected

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:



4 Wiring


LA-1108
PW
STA
0
1
2
3
4
5
6
7
Internal Bus
AI0
GND
AI1
GND
AI2
GND
AI3
GND
NC
AI4
GND
AI5
GND
AI6
GND
AI7
GND
NC
2 WIRE
SENSOR
mA
V+
24VDC
0VDC
4 WIRE
SENSOR
mA
mA-
V-
V+
24VDC
0VDC
0V
24V
PE
Field Power

5 Process data definition

Input data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Analog Input Data(CH 0)							
Byte 1								
Byte 2	Analog Input Data(CH 1)							
Byte 3								
Byte 4	Analog Input Data(CH 2)							
Byte 5								
Byte 6	Analog Input Data(CH 3)							
Byte 7								
Byte 8	Analog Input Data(CH 4)							
Byte 9								
Byte 10	Analog Input Data(CH 5)							
Byte 11								
Byte 12	Analog Input Data(CH 6)							
Byte 13								
Byte 14	Analog Input Data(CH 7)							
Byte 15								

5.1 Process data definition (standard mode)

Data description:

Analog Input Data (CH0-7)：input value of the corresponding channel current signal.

Analog Input Data (LA-1108)			
Current (0-20mA)	Decimal	Hexadecimal	Remark
>23.52	32767	7FFF	Overflow
23.52	32511	7EFF	Exceed the upper limit
.	.	.	
>20	27649	6C01	
20	27648	6C00	Rated range
.	.	.	
10	13824	3600	
.	.	.	
0	0	0	
<0	0	0	Exceed the lower limit
	.	.	
-3.52	-4864	ED00	
<-3.52	-32768	8000	Underflow

Analog Input Data (LA-1108)			
Current (0-20mA)	Decimal	Hexadecimal	Remark
>3.52	32767	7FFF	Overflow
3.52	4864	1300	Exceed the upper limit
.	.	.	
>0	0	0	
0	0	0	Rated range
.	.	.	
-10	-13824	CA00	
.	.	.	
-20	-27648	9400	
<-20	-27949	93FF	Exceed the lower limit
.	.	.	
-23.52	-32511	8101	
<-23.52	-32768	8000	Underflow

Analog Input Data (LA-1108)			
Current (0-20mA)	Decimal	Hexadecimal	Remark
>23.52	32767	7FFF	Overflow
23.52	32511	7EFF	Exceed the upper limit
.	.	.	
>20	27649	6C01	
20	27648	6C00	Rated range
.	.	.	
10	13824	3600	
.	.	.	
0	0	0	
.	.	.	
-10	-13824	CA00	
.	.	.	
-20	-27648	9400	
<-20	-27949	93FF	Exceed the lower limit
.	.	.	
-23.52	-32511	8101	
<-23.52	-32768	8000	Underflow

5.2 Process data definition (special mode)

Data description:

Analog Input Data (CH0-7)：input value of the corresponding channel current signal.

Analog Input Data (LA-1108)					
Current (0-20mA)	Current (-20-0mA)	Current (±20mA)	Decimal	Hexadecimal	Remarks
20	.	20	32767	7FFF	Normal range
.	.	.	.	.	
10		10	13824	3600	
.	.	.	.	.	
0	0	0	0	0	
<0	.	.	.	.	
	.-10	-10	-13824	CA00	
	.	.	.	.	
	.-20	-20	-32768	8000	

6 Configuration parameter definition

Configuration parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	16Bit Data Format							
Byte 1	Current Type Ch#7	Current Type Ch#6	Current Type Ch#5	Current Type Ch#4	Current Type Ch#3	Current Type Ch#2	Current Type Ch#1	Current Type Ch#0

Data description:

16Bit Data Format：Analog data storage format. (default: 0)

0：A-B

1：B-A

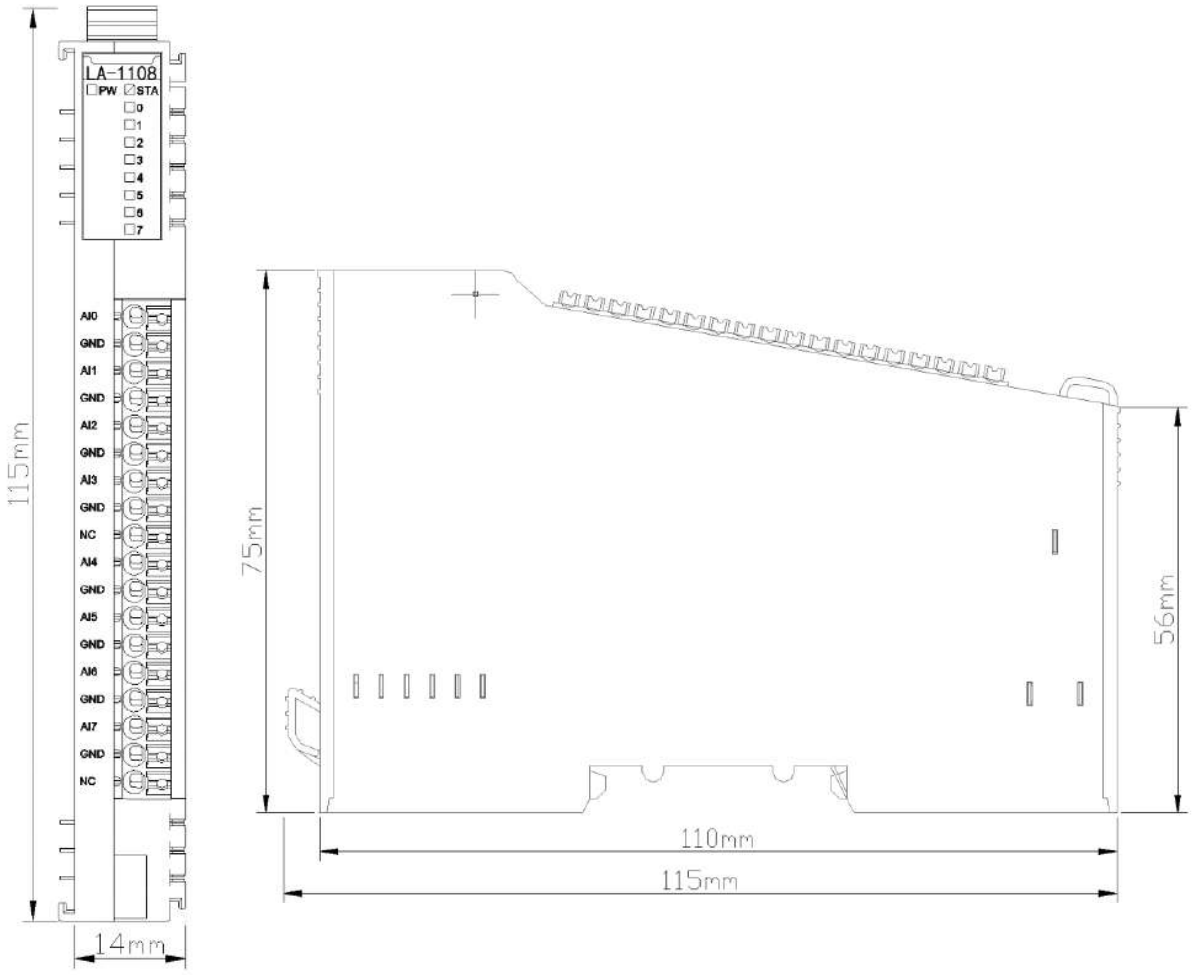
Current Type Ch#(0-7)：Type of input signal. (default: 1)

0：-20～0mA

1：0～20mA

2：-20～20mA

A Dimension drawing



LA-3008 8 channels Voltage Input

0~5/0~10/±5/±10VDC, 15Bit/16 Bit

1 Module features

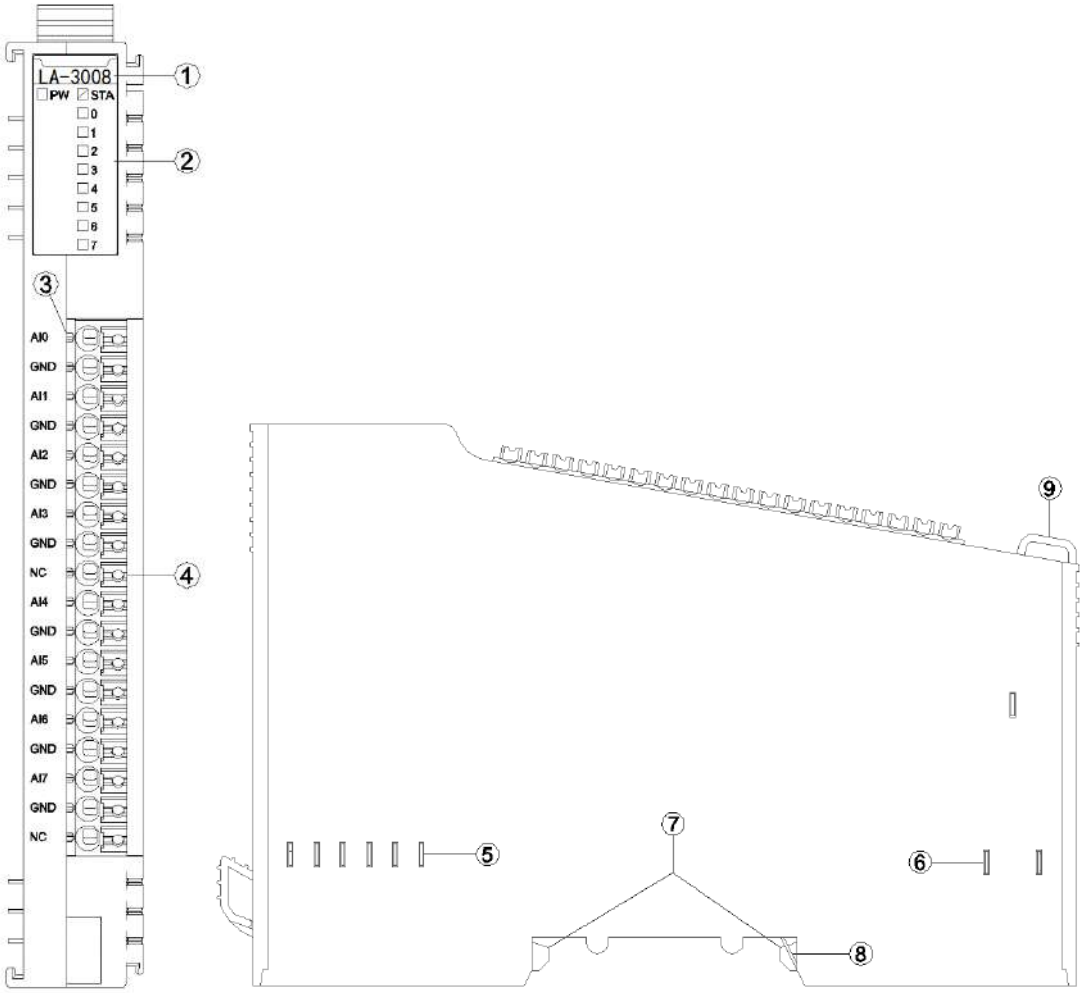
◆ the module supports 8 channels of voltage signal input
◆ the module could collect 0~5VDC, 0~10VDC, ±5VDC, ±10VDC, with a 15-bit or 16-bit resolution
◆ the module carries with 8 analog input channel LED indicator
◆ the module input signal is a single ended common grounding input
◆ filter time could be set
◆ channels could be disabled independently

2 Technical Parameters

General parameters	
Power	Max.100mA@5.0Vdc
Isolation	I/O to internal bus: opto-couple isolation (3KVrms)
Field Power	Not used
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mmDIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20
Input Parameter	
Channel Number	8 channel voltage input
LED Indicator	8 channel input indicators
Input Voltage Range	0~5VDC、0~10VDC、±5VDC、±10VDC
Resolution	15Bit/16Bit
Accuracy	±0.3%@25℃ ±0.5@-40~85℃
Sampling Speed	1ms/8 channels

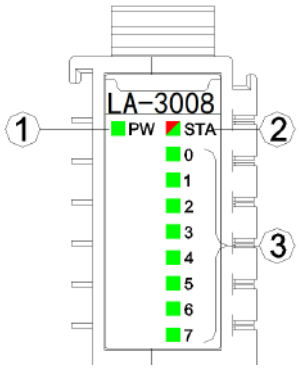
Output Impedance	1MΩ
Common Terminal	Common Grounding Input

3 Hardware Interface



① Module Type
② State indicator
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition



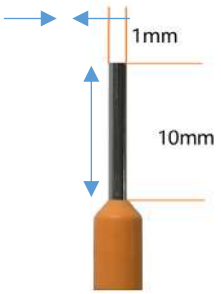
① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Intput channel LED indicator (green)

PW POWER STATE (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA MODULE STATE (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
0-7 channel LED indicator (GREEN)	Definition
ON	Input signal exceeds 0.15V or -0.15V
OFF	Invalid input signal

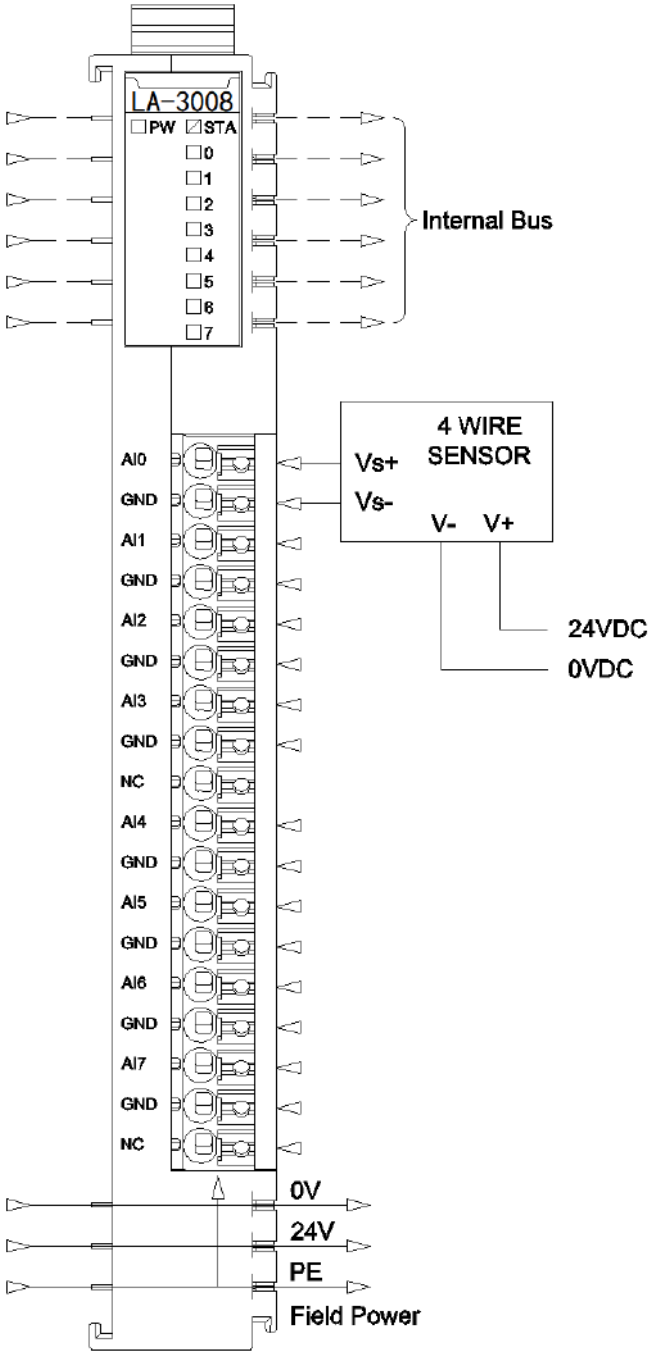
3.2 Terminal definition

Terminal Number	Definition	Description
1	AI0	Signal Input CH0
2	GND	
3	AI1	Signal Input CH1
4	GND	
5	AI2	Signal Input CH2
6	GND	
7	AI3	Signal Input CH3
8	GND	
9	NC	Not Connected
10	AI4	Signal Input CH4
11	GND	
12	AI5	Signal Input CH5
13	GND	
14	AI6	Signal Input CH6
15	GND	
16	AI7	Signal Input CH7
17	GND	
18	NC	Not Connected

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:



4 Wiring


LA-3008
PW
STA
0
1
2
3
4
5
6
7
Internal Bus
AI0
GND
AI1
GND
AI2
GND
AI3
GND
NC
AI4
GND
AI5
GND
AI6
GND
AI7
GND
NC
4 WIRE
SENSOR
Vs+
Vs-
V-
V+
24VDC
0VDC
0V
24V
PE
Field Power

5 Process data definition

Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Analog Input Data (CH 0)							
Byte 1								
Byte 2	Analog Input Data (CH 1)							
Byte 3								
Byte 4	Analog Input Data (CH 2)							
Byte 5								
Byte 6	Analog Input Data (CH 3)							
Byte 7								
Byte 8	Analog Input Data (CH 4)							
Byte 9								
Byte 10	Analog Input Data (CH 5)							
Byte 11								
Byte 12	Analog Input Data (CH 6)							
Byte 13								
Byte 14	Analog Input Data (CH 7)							
Byte 15								

5.1 Process data definition（standard mode）

Data Declaration：

Analog Input Data (CH0-7)：Voltage input data value

Process data definition (8AI)						
Voltage (0-5V)	Voltage (0-10V)	Voltage (±5V)	Voltage (±10V)	Decimal	Hex	Range
>5.06	>10.12	>5.06	>10.12	32767	0x7FFF	Overflow
5.06	10.12	5.06	10.12	27979	0x6D4B	Exceeds the upper limit
5V+0.1808mv	10V+0.3617mv	5V+0.1808mv	10V+0.3617mv	27649	0x6C01	
5	10	5	10	27648	0x6C00	Rated range
.	.	.	.	.	.	
.	.	.	.	.	.	
2.5	5	2.5	5	13824	0x3600	
.	.	.	.	.	.	
.	.	.	.	.	.	
0	0	0	0	0	0x0000	
/	/	.	.	.	.	
/	/	.	.	.	.	
/	/	-2.5	-5	-13824	0XCA00	
/	/	.	.	.	.	
/	/	.	.	.	.	
/	/	-5	-10	-27648	0x9400	
/	/	-5V-0.1808mv	-10V-0.3617mv	-27649	0x93FF	Exceeds the lower limit
/	/	-5.06	-10.12	-27979	0x92B5	
/	/	-5.06<	-10.12<	-32768	0x8000	Underflow

5.2 Process data definition（special mode）

Process data definition (8AI)					
Voltage (0-5V)	Voltage (0-10V)	Voltage (±5V)	Voltage (±10V)	Decimal	Hex
5	10	5	10	32767	0x7FFF
.	.	.	.	.	.
.	.	.	.	.	.
2.5	5	2.5	5	16383	0x3FFF
.	.	.	.	.	.
.	.	.	.	.	.
0	0	0	0	0	0x0000
/	/	.	.	.	.
/	/	.	.	.	.
/	/	-2.5	-5	-16384	0xC000
/	/	.	.	.	.
/	/	.	.	.	.
/	/	-5	-10	-32768	0x8000

6 Configuration parameters definition

Configuration Parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved						RangeMode	16Bit Data Format
Byte 1	Voltage Type (CH 1)				Voltage Type (CH 0)			
Byte 2	Voltage Type (CH 3)				Voltage Type (CH 2)			
Byte 3	Voltage Type (CH 5)				Voltage Type (CH 4)			
Byte 4	Voltage Type (CH 7)				Voltage Type (CH 6)			
Byte 5	Filtering Time (CH0)							
Byte 6								
Byte 7	Filtering Time (CH1)							
Byte 8								

Byte 9 Byte 10	Filtering Time (CH2)
Byte 11 Byte 12	Filtering Time (CH3)
Byte 13 Byte 14	Filtering Time (CH4)
Byte 15 Byte 16	Filtering Time (CH5)
Byte 17 Byte 18	Filtering Time (CH6)
Byte 19 Byte 20	Filtering Time (CH7)
Byte 21 … Byte 29	Reserved

Data Declaration：

16Bit Data Format：Sequence of 16-bit data byte transmission (Default:0)

0：A_B。

1：B_A。

Range_Mode：Process data mode (default: standard mode)

Voltage Type(CH 0-7)：Input voltage type (Default:3)

0：disabled

1：0~5Vdc

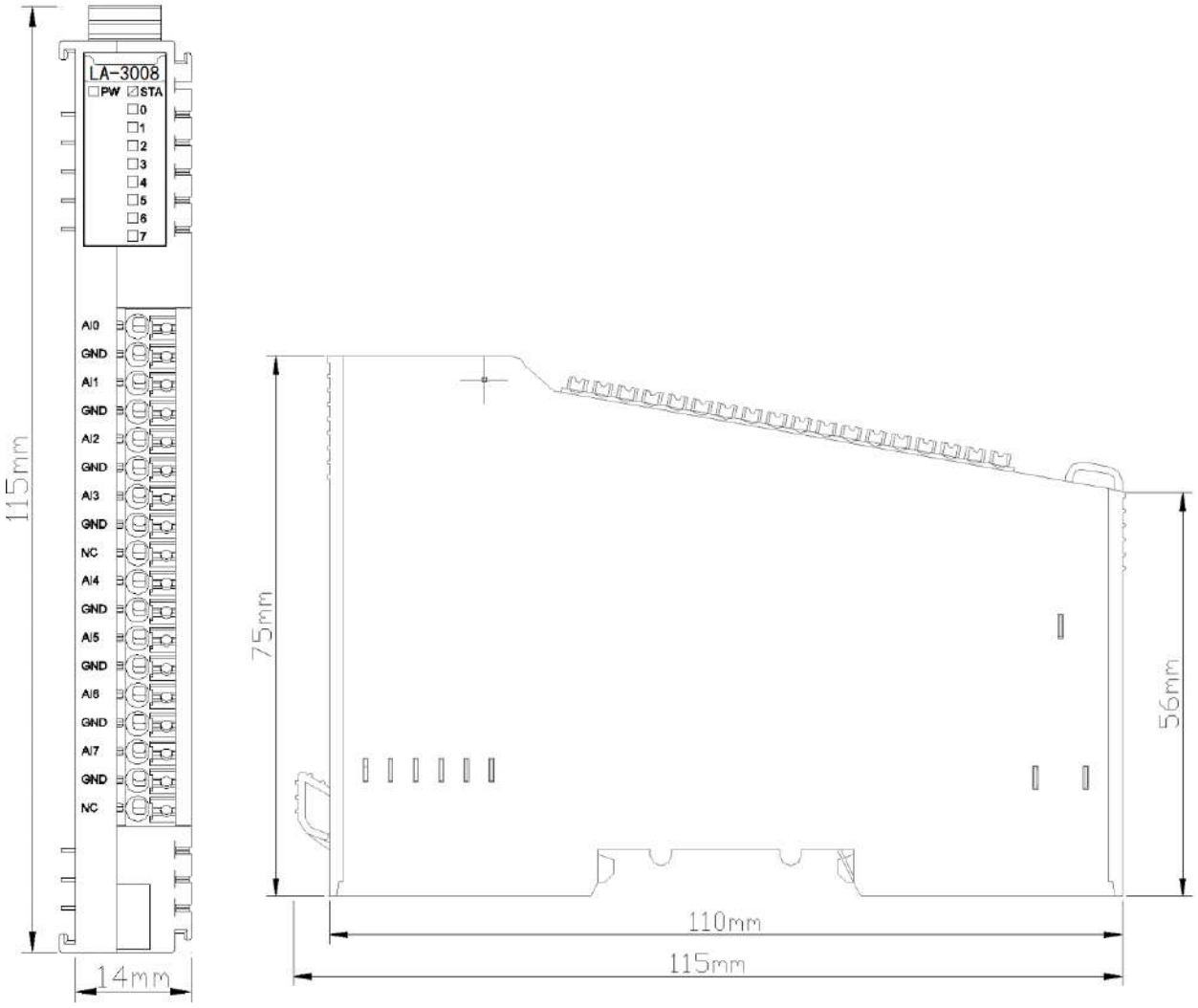
2：-5~5Vdc

3：0~10Vdc

4：-10~10Vdc

Filtering Time(CH0-CH7)：The input filtering time of the channel, in ms. (Default：10)

A Dimension drawing



LA-2004: 4 channels analog output

0&4-20mA/16-bit single-terminal

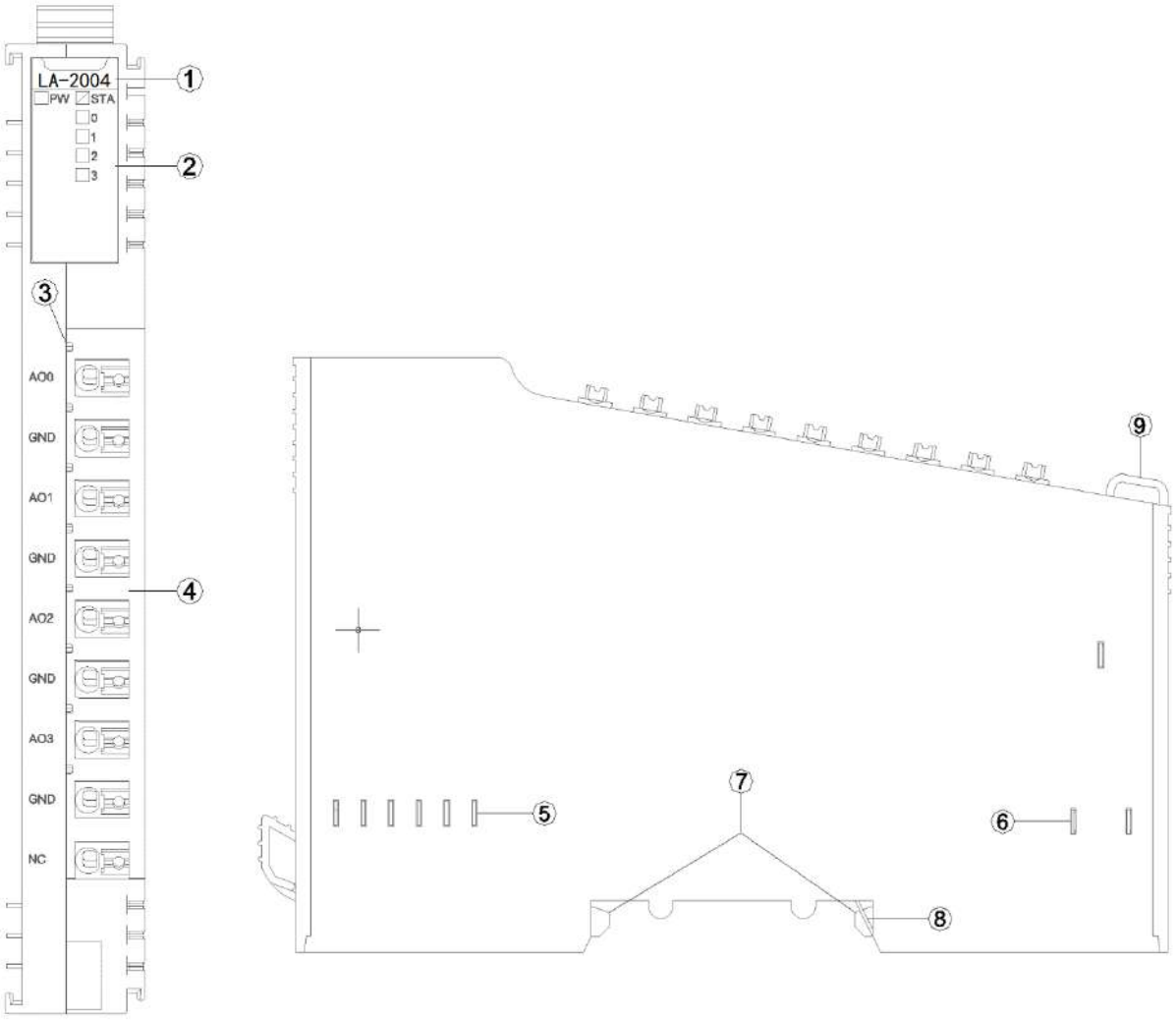
1 Module features

- 2 output ranges can be set(0-20mA、4-20mA)
- The module internal bus and field output adopts magnetic insulation
- Single-terminal grounded together output mode

2 Technical parameters

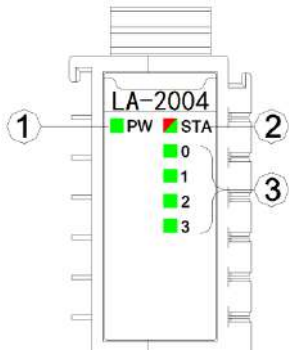
General parameters	
Power	Max.25mA@5.0Vdc
IO bus isolation	I/O to internal bus: magnetic isolation (2.5KVrms)
Wiring	I/O wiring: Max.1.0mm² (AWG 17)
Installation	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environmental parameters	
Working temperature	-40~85℃
Environmental humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Output parameters	
Channel Number	4 channels
Resolution ratio	16Bit
Output range	0-20mA/4-20mA
The output precision	>0.3%
Diagnostic function	Disconnection or overload, field power supply error
The common terminal	0V grounded together, channels are not isolated
Conversion time	2ms/ all channels
Load	Max.1KΩ

3 Hardware interfaces



① Module Type
② State Indicator
③ (non field channel indicator)
④ Wiring Terminal and Marking
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicators definition



① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Output channel LED indicator (green)

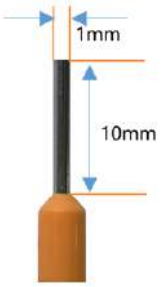
PW Power Indicator(GREEN)	Definition
ON	Internal bus power supply is normal
OFF	Internal bus power supply is failure
STA Module State Indicator(Red/Green)	Definition
Green Slow Flash (2.5hz)	The internal bus of the module is not started
Red Slow Flash (2.5hz)	Module internal bus offline
Green Normally On	Operation is normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware upgrading
Red Flashes Twice	Module exception has been soft-restarted
0-3 Channel Indicator Light	Definition
ON	Output signal >=1% range
OFF	Output signal <1% range

3.2 Terminal definition

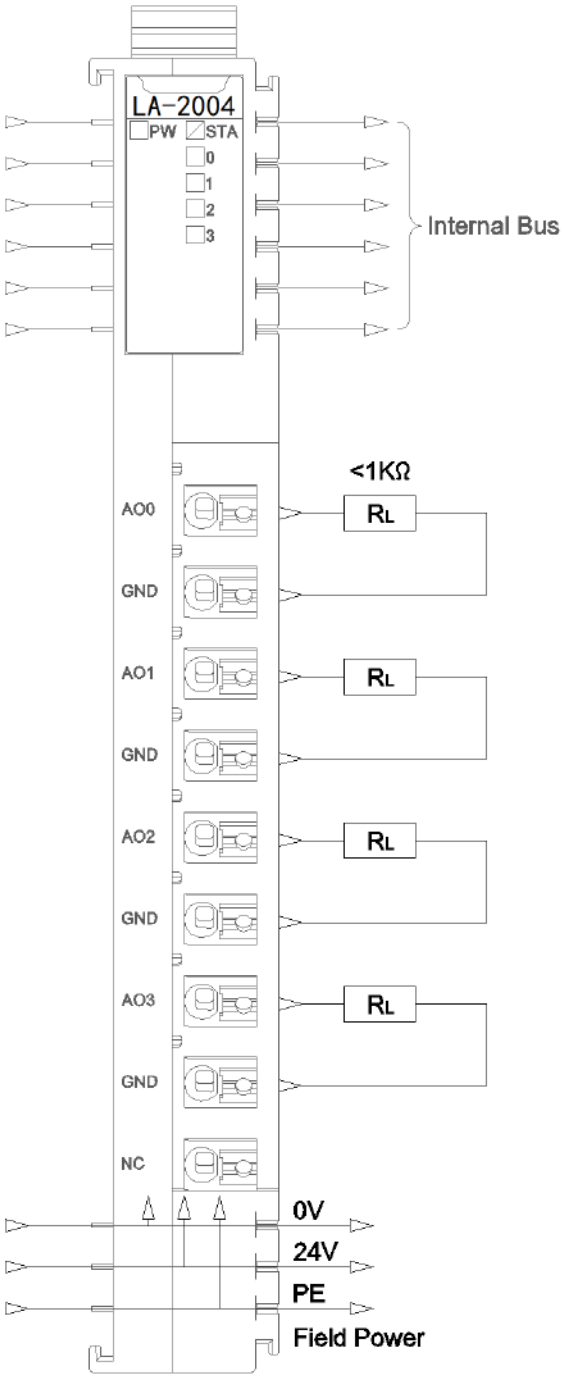
Terminal number	Definition	Instructions
1	AO0	Current output CH0
2	GND	
3	AO1	Current output CH1
4	GND	
5	AO2	Current output CH2
6	GND	
7	AO3	Current output CH3
8	GND	
9	NC	Disconnected

It is recommended to use cables with cores smaller than 1mm².

The cold-pressed terminal parameters are as follows:



4 Wiring


LA-2004
PW
STA
0
1
2
3
Internal Bus
<1KΩ
AO0
GND
AO1
GND
AO2
GND
AO3
GND
NC
RL
RL
RL
RL
0V
24V
PE
Field Power

5 Progress data definition

Input data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved		Field Power Error (CH0-3)	DAC Communication Error (CH0-3)	Output Opening or Overload (CH3)	Output Opening or Overload (CH2)	Output Opening or Overload (CH1)	Output Opening or Overload (CH0)
Output data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Analog Output Data (CH 0)							
Byte 1								
Byte 2	Analog Output Data (CH 1)							
Byte 3								
Byte 4	Analog Output Data (CH 2)							
Byte 5								
Byte 6	Analog Output Data (CH 3)							
Byte 7								

Data description:

Output Opening or Overload (CH0-3)：Current output diagnostic State, when the corresponding Output channel is open or overloaded, this bit is set to 1, and it will be automatically cleared when the load returns to normal.

0: normal is load

1: openload or overload

DAC Communication Error(CH0-3)：DAC converter Communication is Error. This Error will occur when the field power supply is disconnected or the DAC and isolator are damaged.

0: DAC communication is normal

1: DAC conversion failed

Field Power Error (CH0-3)：This Error will occur when the Field Power is not powered on.

0: field power access is normal

1: field power access is failure

Hexadecimal：Analog Output value, 16-bit unsigned integer.

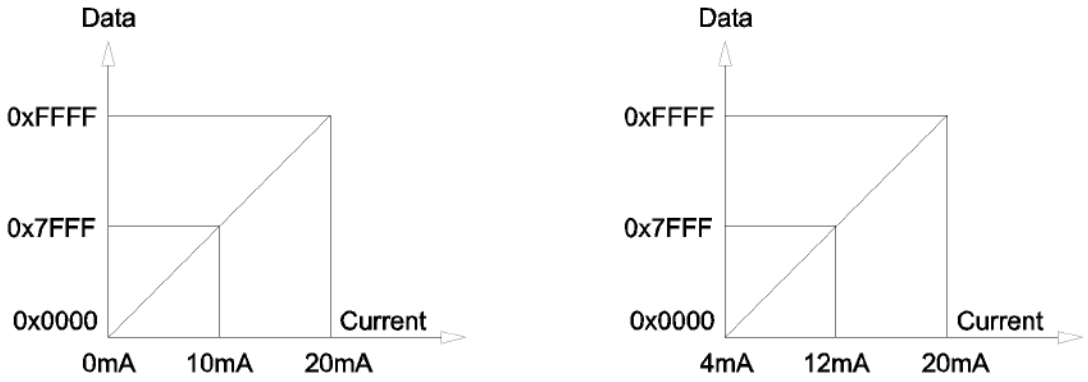
5.1 Process data definition（standard mode）

Analog Output Data(LA-2004) (0-20mA)			
Current (0-20mA)	Decimal	Hex	Range
21mA	32767	7FFF	Overflow
	29031	7167	
21mA	29030	7166	Exceeds the upper limit
20mA+723.4nA	27649	6C01	
20mA	27648	6C00	Rated range
15mA	20736	5100	
723.4nA	1	1	
0 mA	0	0	
0 mA	-1	FFFF	Underflow
	-32768	8000	

Analog Output Data(LA-2004) (4-20mA)			
Current (4-20mA)	Decimal	Hex	Range
21mA	32767	7FFF	Overflow
	29377	72C1	
21mA	29376	72C0	Exceeds the upper limit
20mA+578.7nA	27649	6C01	
20 mA	27648	6C00	Rated range
16 mA	19008	4A40	
4mA +578.7nA	1	1	
4mA	0	0	
3.9995mA	-1	FFFF	Exceeds the lower limit
3.6mA	-692	FD4C	
3.6mA	-693	FD4B	Underflow
	-32768	8000	

5.2 Process data definition（special mode）

Analog Output Data (LA-2004)			
Current (0 to 20 mA)	Current (4-20 mA)	Decimal 16 bits	Hexadecimal 16 bits
20	20	65535	0xFFFF
.	.	.	.
.	.	.	.
.	.	.	.
10	12	32767	0x7FFF
.	.	.	.
.	.	.	.
.	.	.	.
0	4	0	0x0000



16Bit Data/Current

6 Configuration parameter definition

Configuration parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved							16Bit Data Format
Byte 1	Reserved				Current Type CH3	Current Type CH2	Current Type CH1	Current Type CH0

Data description:

16Bit Data Format：Analog data storage format. (Default: 0)

0：A-B

1：B-A

Range_Mode：Process data mode (default: standard mode)

Standard mode: same with Siemens process data definition

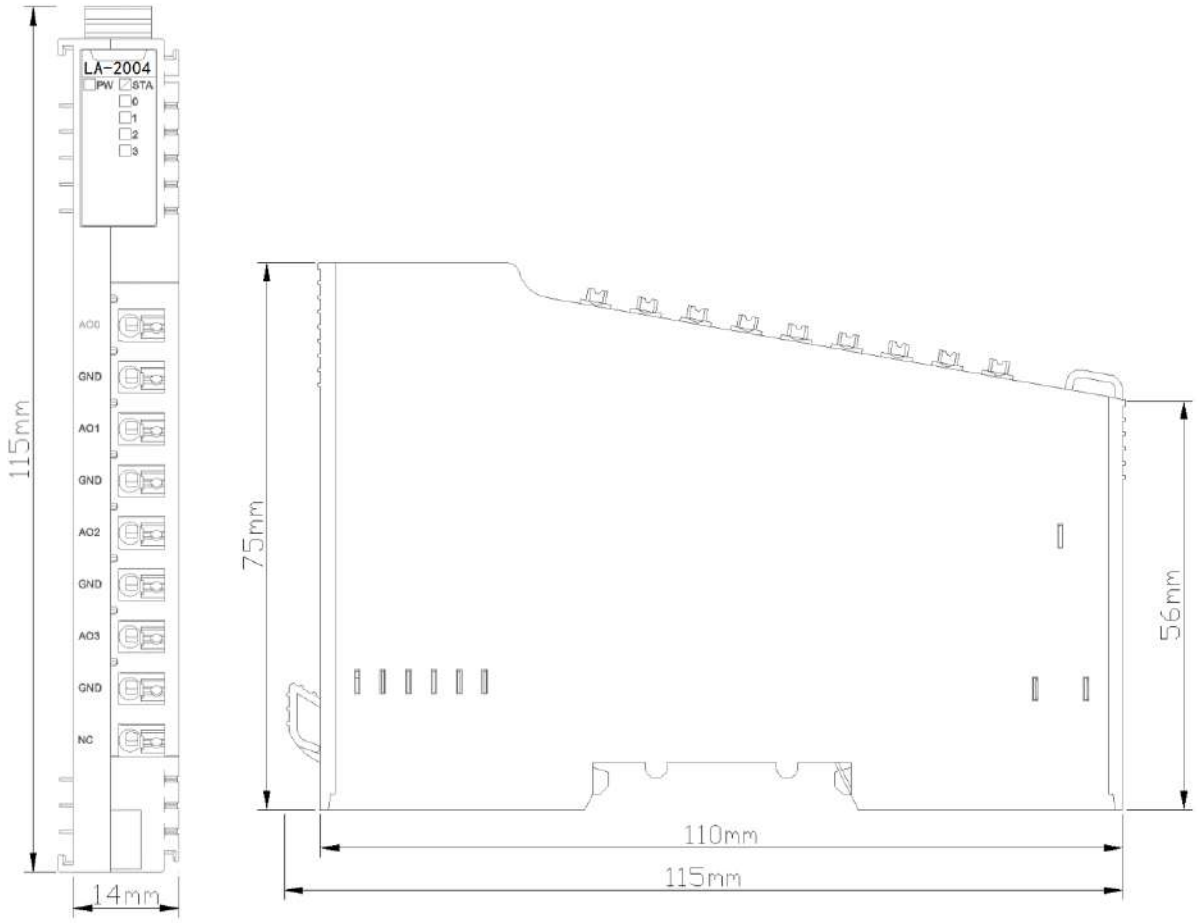
Special mode: max range of the hardware

Current Type(CH0-3)：Type of output current. (Default: 1)

0：0-20mA

1：4-20mA

A Dimension drawing



LA-4004 4 channels Voltage Output

0~5VDC/0~10VDC/±5VDC/±10VDC,16 bits

1 Module features

◆The module supports 4 channels voltage signal output

◆ Output range：0~5VDC, 0~10VDC, ±5VDC, ±10VDC, 16 bits

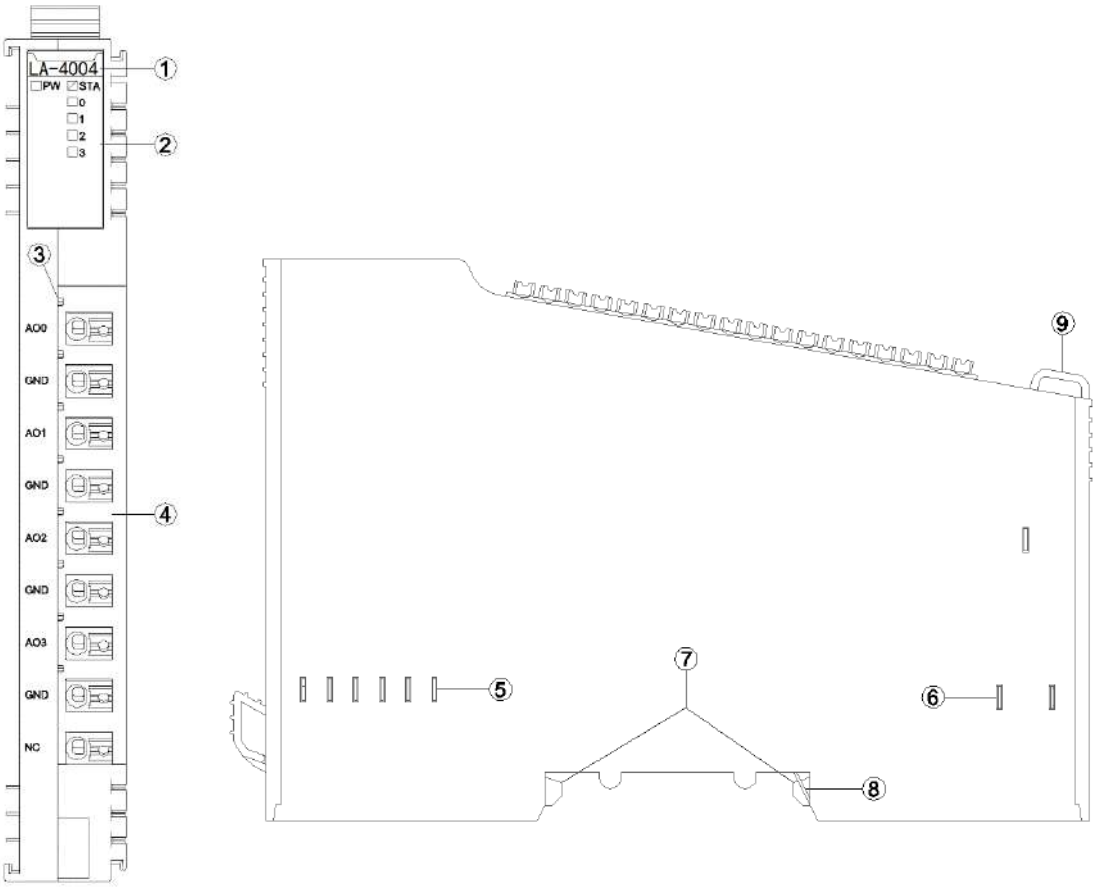
◆ The module carries with 4 analog output LED indicators

◆ Module output signal is single - ended common - grounded output

2 Technical Parameters

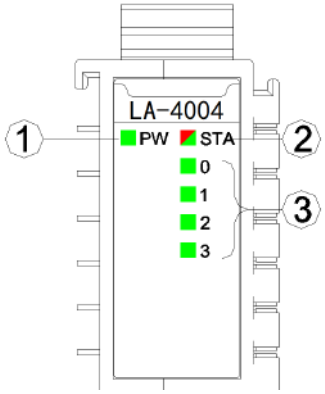
General parameters	
Power	Max.500mA@5.0Vdc
Isolation	I/O to internal bus: magnetic isolation (3KVrms)
Field Power	Not used
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mmDIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20
Output Parameter	
Channel Number	4 Channels voltage output
LED Indicator	4 Channels voltage output indicator
Output Voltage Range	0~5VDC、0~10VDC、±5VDC、±10VDC
Load Resistance	Max.5kΩ
Resolution	16 bits
Acquisition Accuracy	±0.1%(Full Scale)@25℃ ±0.3(Full Scale)@-40~85℃
Conversion Time	1 ms / all channels
Diagnose	Overtemperature/overcurrent status monitoring
Protection Current	20mA.
Common Port	Common grounded output

3 Hardware Interface



① Module Type
② State indicator
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition



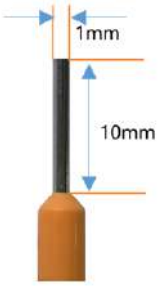
① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Output channel LED indicator (green)

PW POWER STATE (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA MODULE STATE (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
0-3 Channel Indicator	Definition
ON	The output value is not 0
OFF	The output value is 0

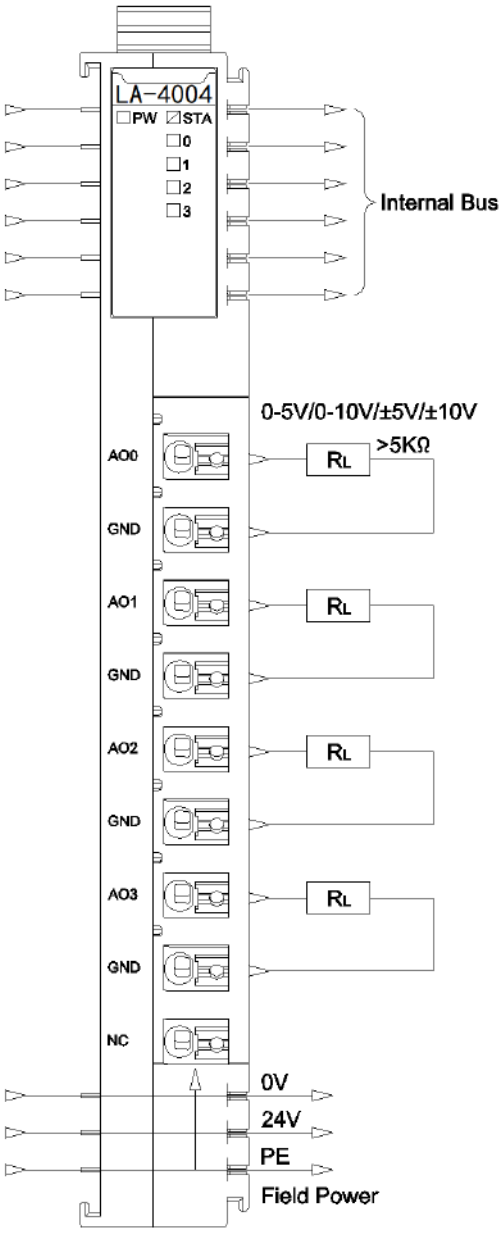
3.2 Terminal definition

Terminal Number	Definition	Description
1	AO0	Signal Output CH0
2	GND	
3	AO1	Signal Output CH1
4	GND	
5	AO2	Signal Output CH2
6	GND	
7	AO3	Signal Output CH3
8	GND	
NC	NC	Not Connected

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:



4 Wiring


LA-4004
PW
STA
0
1
2
3
Internal Bus
0-5V/0-10V/±5V/±10V
>5KΩ
AO0
GND
AO1
GND
AO2
GND
AO3
GND
NC
RL
0V
24V
PE
Field Power

5 Process data definition

Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved			Over temperature	Overcurrent (CH3)	Overcurrent (CH2)	Overcurrent (CH1)	Overcurrent (CH0)
Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Analog Output Data (CH 0)							
Byte 1								
Byte 2	Analog Output Data (CH 1)							
Byte 3								
Byte 4	Analog Output Data (CH 2)							
Byte 5								
Byte 6	Analog Output Data (CH 3)							
Byte 7								

5.1 Process data definition（standard mode）

Data Declaration：

Analog Output Data (CH0-3)：voltage output value

Unipolarity 0-5V/0-10V output value

Analog Output Data (LA-4004) (0-5V/0-10V)			
Voltage (0-5V)	Voltage (0-10V)	Decimal	Hex
5	10	27648	0x6C00
.	.	.	.

.	.	.	.
2.5	5	13824	0x3600
.	.	.	.
.	.	.	.
0	0	0	0x0000

Bipolar ±5V/±10V Output value

Analog Output Data (LA-4004) (±5V/±10V)			
Voltage (±5V)	Voltage (±10V)	Decimal	Hex
5	10	27648	0x6C00
.	.	.	.
.	.	.	.
2.5	5	13824	0x3600
.	.	.	.
.	.	.	.
0	0	0	0x0000
.	.	.	.
.	.	.	.
-2.5	-5	-13824	0xCA00
.	.	.	.
.	.	.	.
-5	-10	-27648	0x9400

5.2 Process data definition（special mode）

Data Declaration：

Analog Output Data (CH0-3)：voltage output value

Unipolarity 0-5V/0-10V output value

Analog Output Data (LA-4004) (0-5V/0-10V)			
Voltage (0-5V)	Voltage (0-10V)	Decimal	Hex
5	10	65535	0xFFFF
.	.	.	.

.	.	.	.
2.5	5	32767	0x7FFF
.	.	.	.
.	.	.	.
0	0	0	0x0000

Bipolar ±5V/±10V Output value

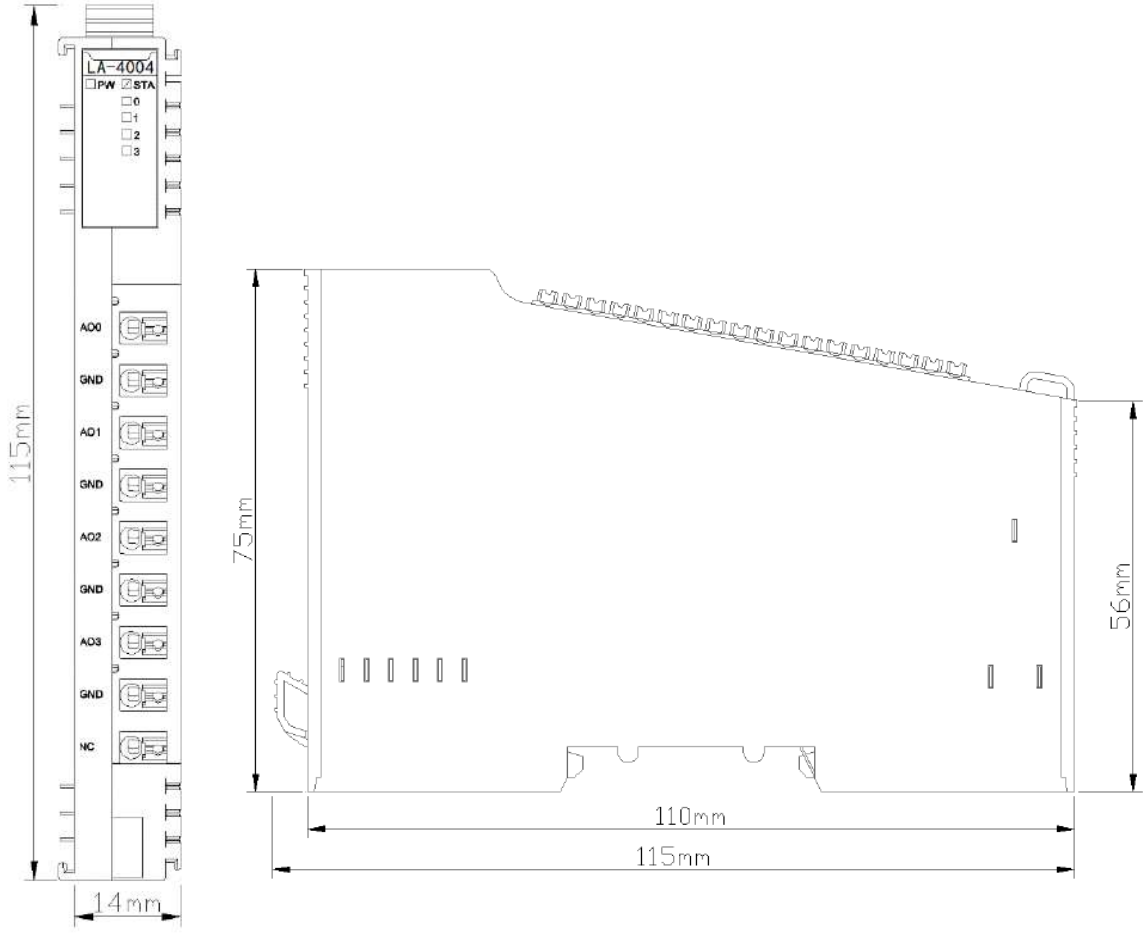
Analog Output Data (LA-4004) (±5V/±10V)			
Voltage (±5V)	Voltage (±10V)	Decimal	Hex
5	10	32767	0x7FFF
.	.	.	.
.	.	.	.
2.5	5	16383	0x3FFF
.	.	.	.
.	.	.	.
0	0	0	0x0000
.	.	.	.
.	.	.	.
-2.5	-5	-16384	0xC000
.	.	.	.
.	.	.	.
-5	-10	-32768	0x8000

6 Configuration parameters definition

Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved							16Bit Data Format
Byte 1	Voltage Type (CH 1)				Voltage Type (CH 0)			
Byte 2	Voltage Type (CH 3)				Voltage Type (CH 2)			

Data Declaration:
16Bit Data Format：16 bits data byte transmission sequence (default value: A_B)
A_B：Big-endian format transmission
B_A：Little-endian format transmission
Range_Mode：Process data mode (default: standard mode)
Standard mode: same with Siemens process data definition
Special mode: max range of the hardware
Voltage Type(CH 0-3)：Output voltage type (default value: 0~10Vdc)
Disable：Output disable
0~5Vdc：0~5V Direct-current output
0~10Vdc：0~10V Direct-current output
-5~5Vdc：-5~5V Direct-current output
-10~10Vdc：-10~10V Direct-current output

A Dimension drawing



LA-4008 8 channels Voltage Output

0~5VDC/0~10VDC/±5VDC/±10VDC,16bits

1 Module features

◆The module supports 8 channels voltage signal output

◆ Output range：0~5VDC, 0~10VDC, ±5VDC, ±10VDC，16 bits

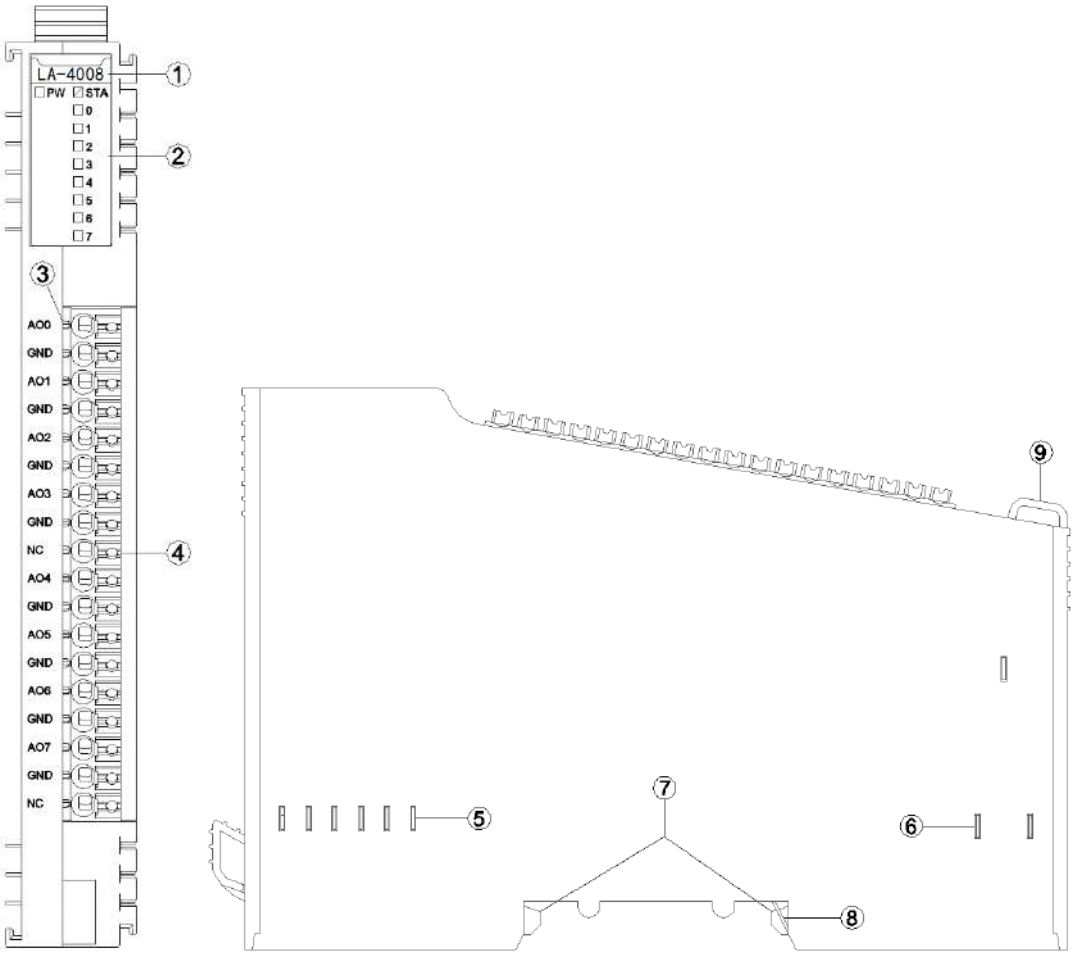
◆ The module carries with 8 analog output LED indicators

◆ Module output signal is single - ended common - grounded output

2 Technical Parameters

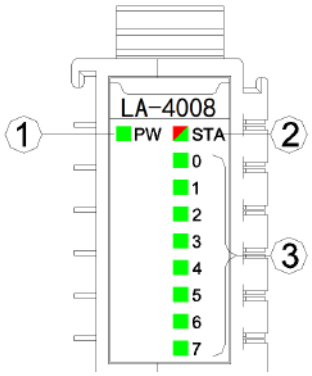
General parameters	
Power	Max.500mA@5.0Vdc
Isolation	I/O to internal bus: magnetic isolation (3KVrms)
Field Power	Not used
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mmDIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20
Output Parameter	
Channel Number	8Channels voltage output
LED Indicator	8 Channels voltage output indicator
Output Voltage Range	0~5VDC、0~10VDC、±5VDC、±10VDC
Load Resistance	Max.5kΩ
Resolution	16 bits
Acquisition Accuracy	±0.1%(Full Scale)@25℃ ±0.3(Full Scale)@-40~85℃
Conversion Time	1 ms / all channels
Diagnose	Overtemperature/overcurrent status monitoring
Protection Current	20mA.
Common Port	Common grounded output

3 Hardware Interface



① Module Type
② State indicator
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition



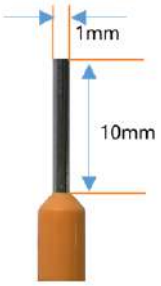
① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Output channel LED indicator (green)

PW POWER STATE (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA MODULE STATE (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
0-3 Channel Indicator	Definition
ON	The output value is not 0
OFF	The output value is 0

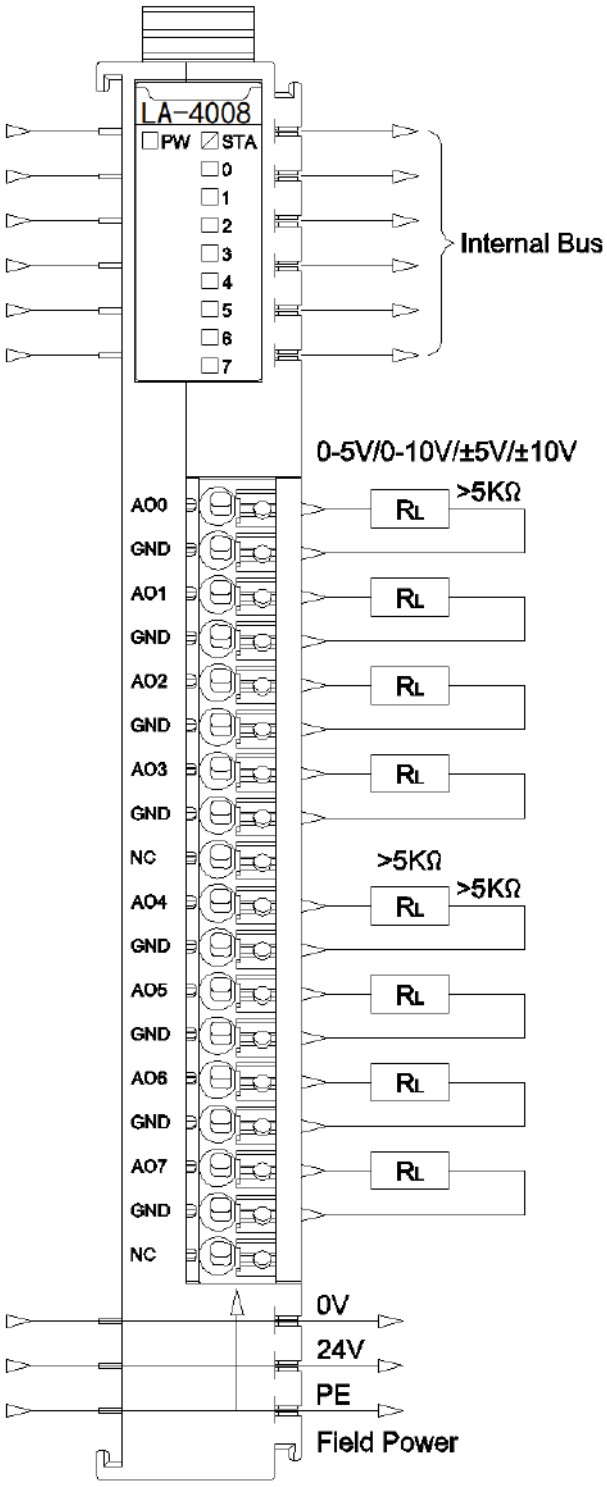
3.2 Terminal definition

Terminal Number	Definition	Description
1	AO0	Signal Output CH0
2	GND	
3	AO1	Signal Output CH1
4	GND	
5	AO2	Signal Output CH2
6	GND	
7	AO3	Signal Output CH3
8	GND	
9	NC	Not Connected
10	AO4	Signal Output CH4
11	GND	
12	AO5	Signal Output CH5
13	GND	
14	AO6	Signal Output CH6
15	GND	
16	AO7	Signal Output CH7
17	GND	
18	NC	Not Connected

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:



4 Wiring


LA-4008
PW
STA
0
1
2
3
4
5
6
7
Internal Bus
0-5V/0-10V/±5V/±10V
AO0
GND
AO1
GND
AO2
GND
AO3
GND
NC
AO4
GND
AO5
GND
AO6
GND
AO7
GND
NC
RL
>5KΩ
>5KΩ
0V
24V
PE
Field Power

5 Process data definition

Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved							Overtemperature
Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Analog Output Data (CH 0)							
Byte 1								
Byte 2	Analog Output Data (CH 1)							
Byte 3								
Byte 4	Analog Output Data (CH 2)							
Byte 5								
Byte 6	Analog Output Data (CH 3)							
Byte 7								
Byte 8	Analog Output Data (CH 4)							
Byte 9								
Byte 10	Analog Output Data (CH 5)							
Byte 11								
Byte 12	Analog Output Data (CH 6)							
Byte 13								
Byte 14	Analog Output Data (CH 7)							
Byte 15								

Data Declaration：

Analog Output Data (CH0-7)：voltage output value

Unipolarity 0-5V/0-10V output value

5.1 Process data definition（standard mode）

Data Declaration：
Analog Output Data (CH0-7)：voltage output value
Unipolarity 0-5V/0-10V output value

Analog Output Data (LA-4008) (0-5V/0-10V)			
Voltage (0-5V)	Voltage (0-10V)	Decimal	Hex
5	10	27648	0x6C00
.	.	.	.
.	.	.	.
2.5	5	13824	0x3600
.	.	.	.
.	.	.	.
0	0	0	0x0000

Bipolar ±5V/±10V Output value

Analog Output Data (LA-4008) (±5V/±10V)			
Voltage (±5V)	Voltage (±10V)	Decimal	Hex
5	10	27648	0x6C00
.	.	.	.
.	.	.	.
2.5	5	13824	0x3600
.	.	.	.
.	.	.	.
0	0	0	0x0000
.	.	.	.
.	.	.	.
-2.5	-5	-13824	0xCA00
.	.	.	.

.	.	.	.
-5	-10	-27648	0x9400

5.2 Process data definition（special mode）

Data Declaration：
Analog Output Data (CH0-7)：voltage output value
Unipolarity 0-5V/0-10V output value

Analog Output Data (LA-4008) (0-5V/0-10V)			
Voltage (0-5V)	Voltage (0-10V)	Decimal	Hex
5	10	65535	0xFFFF
.	.	.	.
.	.	.	.
2.5	5	32767	0x7FFF
.	.	.	.
.	.	.	.
0	0	0	0x0000

Bipolar ±5V/±10V Output value

Analog Output Data (LA-4008) (±5V/±10V)			
Voltage (±5V)	Voltage (±10V)	Decimal	Hex
5	10	32767	0x7FFF
.	.	.	.
.	.	.	.
2.5	5	16383	0x3FFF
.	.	.	.
.	.	.	.
0	0	0	0x0000
.	.	.	.
.	.	.	.

-2.5	-5	-16384	0xC000
.	.	.	.
.	.	.	.
-5	-10	-32768	0x8000

6 Configuration parameters definition

Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved							16Bit Data Format
Byte 1	Voltage Type (CH 1)				Voltage Type (CH 0)			
Byte 2	Voltage Type (CH 3)				Voltage Type (CH 2)			
Byte 3	Voltage Type (CH 5)				Voltage Type (CH 4)			
Byte 4	Voltage Type (CH 7)				Voltage Type (CH 6)			

Data Declaration:

16Bit Data Format：16 bits data byte transmission sequence (default value: A_B)

A_B：Big-endian format transmission

B_A：Little-endian format transmission

Range_Mode：Process data mode (default: standard mode)

Standard mode: same with Siemens process data definition

Special mode: max range of the hardware

Voltage Type(CH 0-7)：Output voltage type (default value: 0~10Vdc)

Disable：Output disable

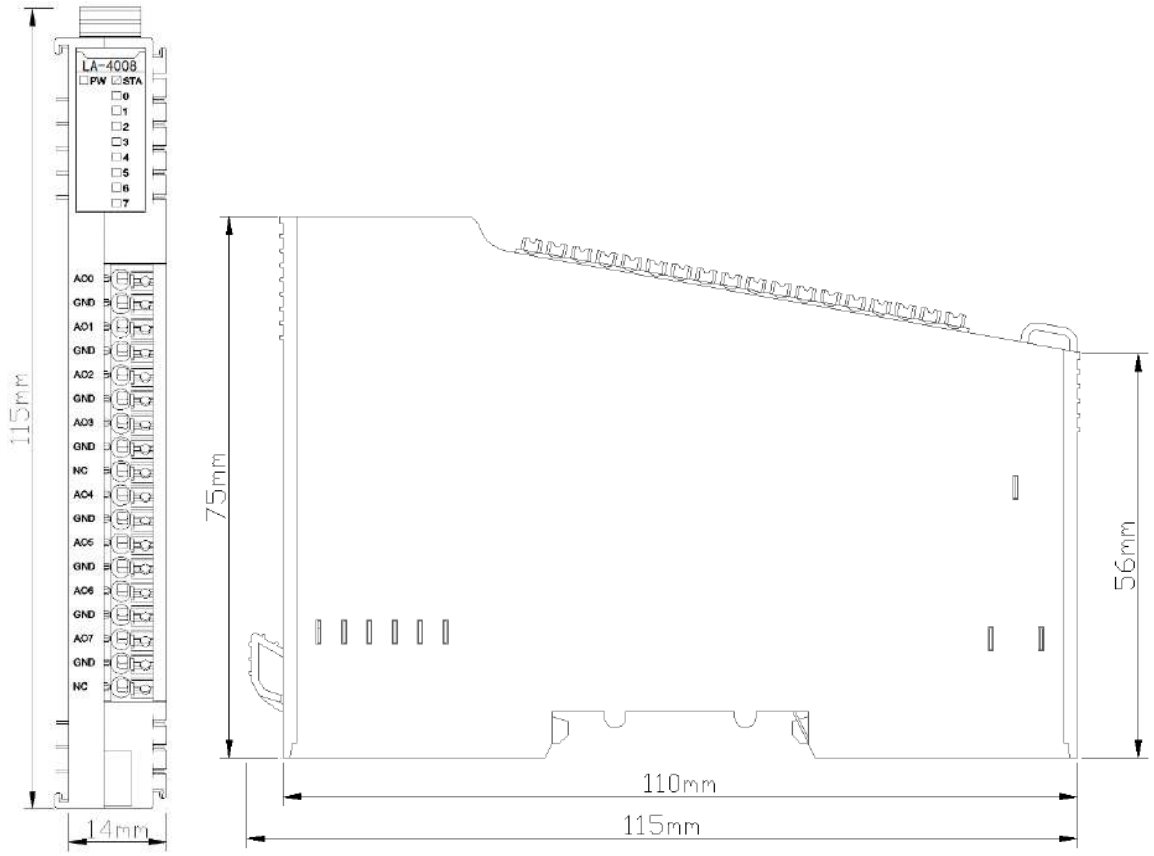
0~5Vdc：0~5V Direct-current output

0~10Vdc：0~10V Direct-current output

-5~5Vdc：-5~5V Direct-current output

-10~10Vdc：-10~10V Direct-current output

A Dimension drawing



5 Temperature Module

LA-7003: 3 channels RTD

PT100 temperature acquisition module

1 Module features

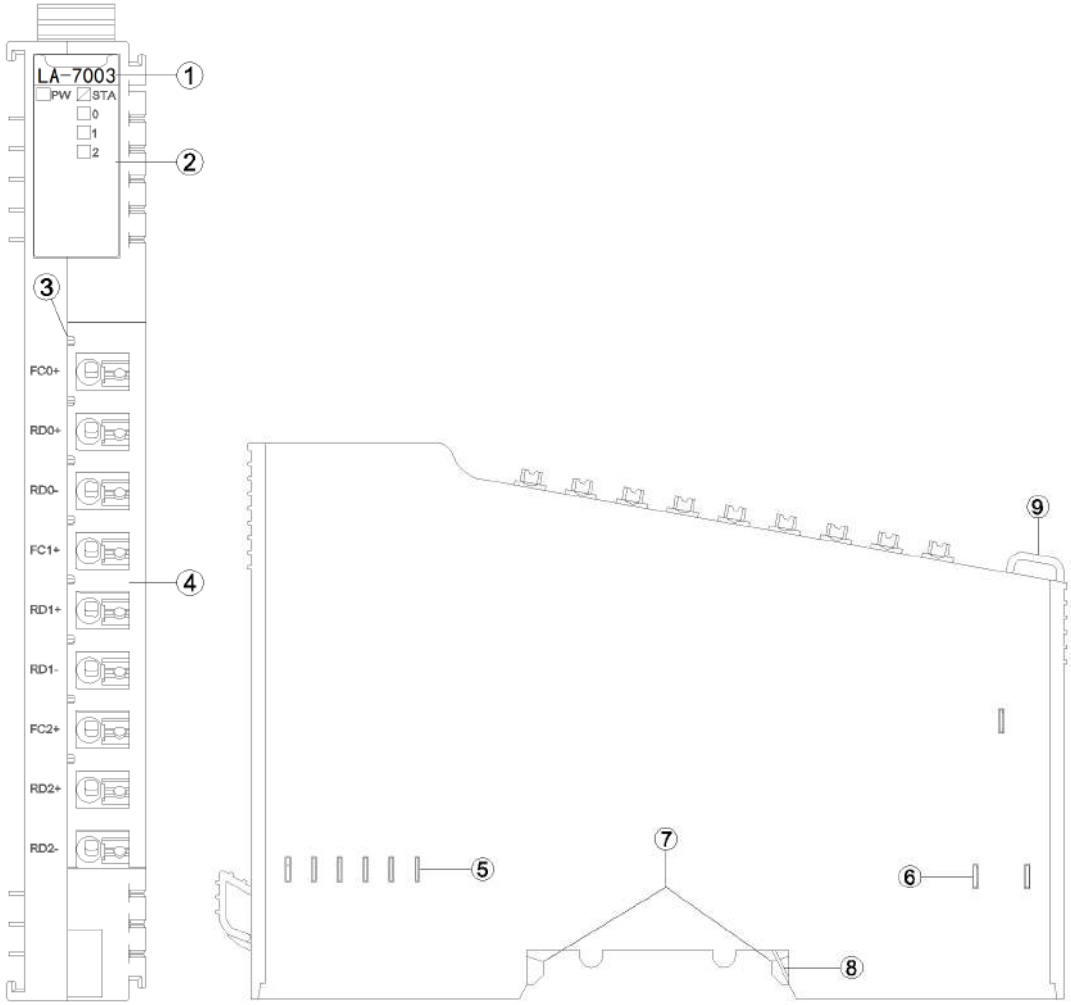
◆ The module supports 3-channel RTD thermal resistance (PT100) temperature acquisition
◆ The module could be connected to a 2-wire or 3-wire PT100 temperature sensor
◆ The internal bus of the module and field input adopts magnetic isolation
◆ The module carries with 3 analog input channel LED indicator
◆ 15-bit ADC resolution

2 Technical Parameters

General parameters	
Power	Max.35mA@5.0Vdc
Isolation	I/O to internal bus: magnetic isolation (2.5KVrms)
Field Power	Not used
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mmDIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20
Input Parameter	
Channel Number	3 Channels
LED Indicator	3 Green LED
Resolution	15 bit
Sensor Type	PT100

Measurement Range	-240~880℃
Measurement Accuracy	0.5℃
Conversion Rate	400ms/3 channels
Diagnostic Function	32766: Sensor is not connected or the cable is disconnected -32766: Short circuit 32765: The chip is faulty 32767: Temperature overflows -32768: The temperature underflows

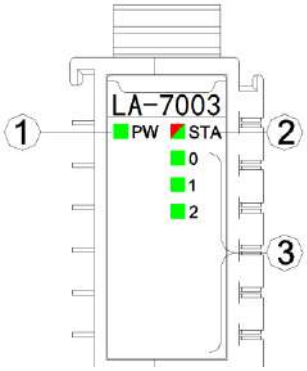
3 Hardware Interface



① Module Type
② State indicator
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus

⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition



① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Output channel LED indicator (green)

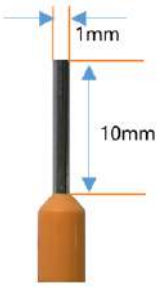
PW POWER STATE (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA MODULE STATE (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz)(RED/ GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
0-2 Channel Indicator	Definition
ON	The input signal exceeds 1% of the range

OFF	Invalid input signal

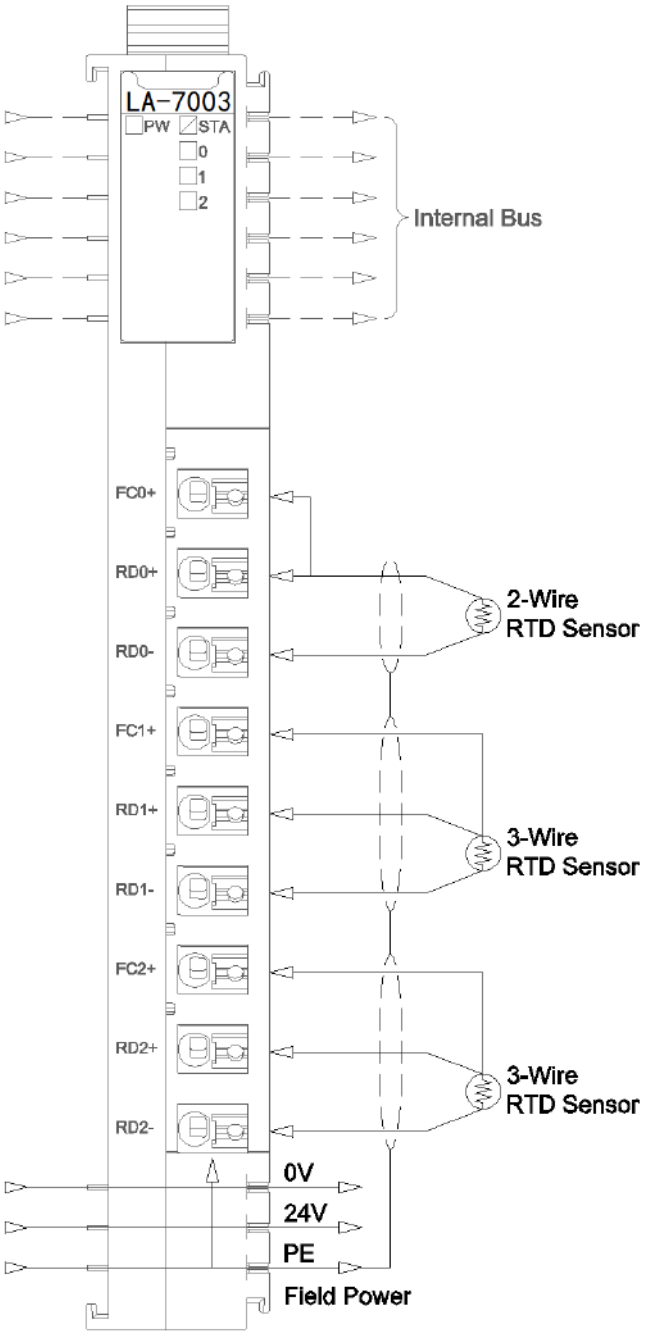
3.2 Terminal definition

Terminal Number	Definition	Description
1	FC0+	Signal Input CH0
2	RD0+	
3	RD0-	
4	FC1+	Signal Input CH1
5	RD1+	
6	RD1-	
7	FC2+	Signal Input CH2
8	RD2+	
9	RD2-	

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:



4 Wiring


LA-7003
PW
STA
0
1
2
Internal Bus
FC0+
RD0+
RD0-
FC1+
RD1+
RD1-
FC2+
RD2+
RD2-
2-Wire
RTD Sensor
3-Wire
RTD Sensor
3-Wire
RTD Sensor
0V
24V
PE
Field Power

5 Process data definition

Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Analog Input Data(CH 0)							
Byte 1								
Byte 2	Analog Input Data(CH 1)							
Byte 3								
Byte 4	Analog Input Data(CH 2)							
Byte 5								

Data Declaration：

Analog Input Data (CH0-2)：Analog channel input data values

Process Data Definition			
Temperature	Decimal	Hex	Location
>880.0	32767	7FFF	Overflow
880.0	8800	2260	Exceeds the upper limit
.	.	.	
.	.	.	
850.1	8501	2135	
850.0	8500	2134	Rated range
.	.	.	
.	.	.	
-200.0	-2000	F830	
-200.1	-2001	F82F	Exceeds the lower limit
.	.	.	
.	.	.	
-240.0	-2400	F6A0	
<-240.0	-32768	8000	Underflow

6 Configuration parameters definition

Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved							16Bit Data Format

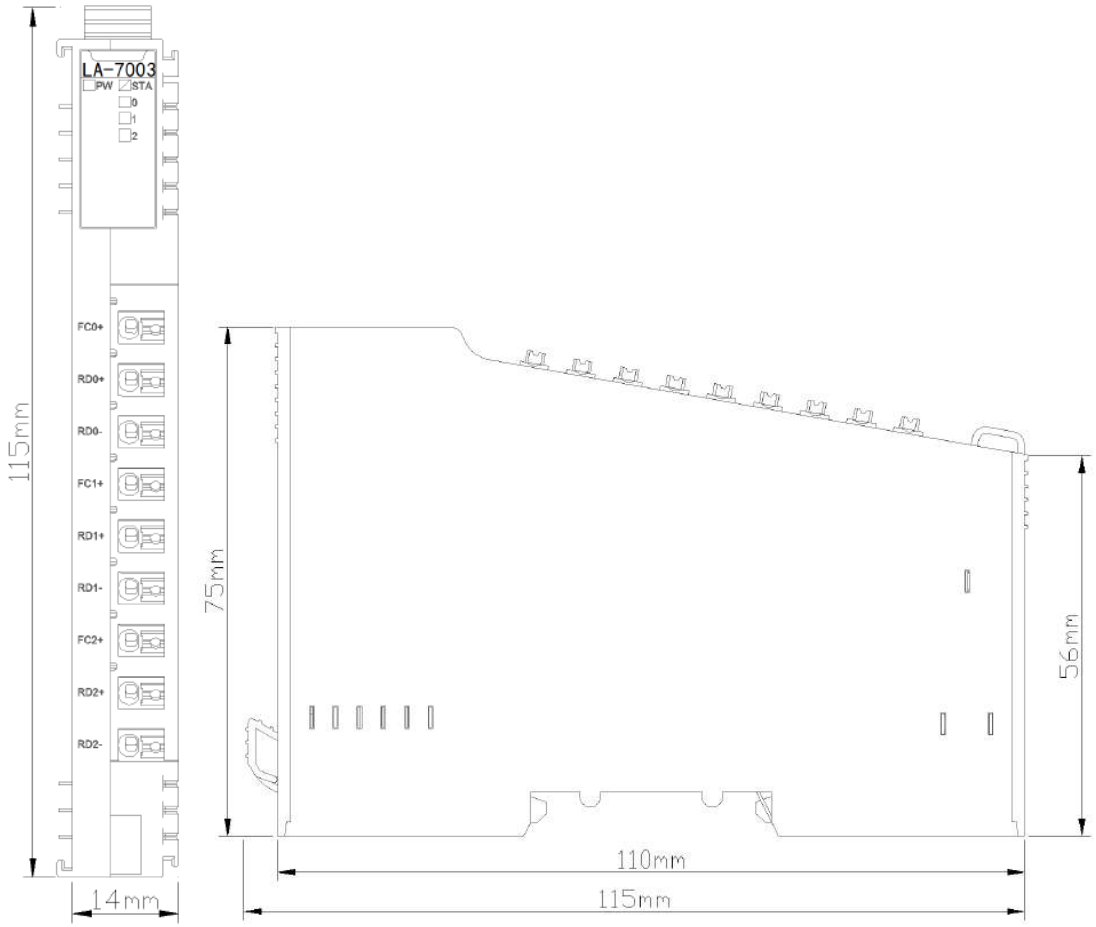
Data Declaration：

16Bit Data Format：Sequence of 16-bit data byte transmission (Default: 0)

0：A_B

1：B_A

A Dimension drawing



LA-7004 4 channels RTD-PT100 temperature acquisition module

1 Module features

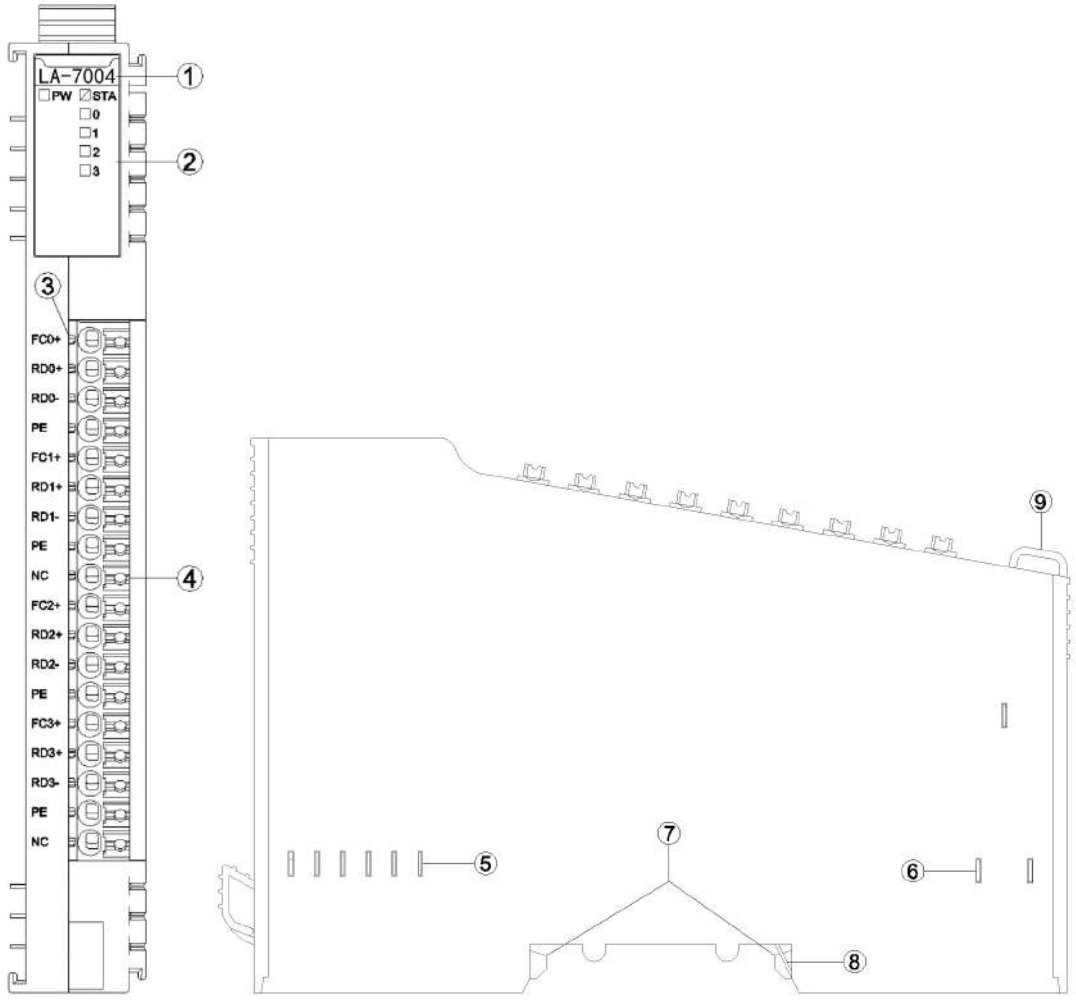
- ◆ The module supports 4-channel RTD (PT100) temperature data acquisition.
- ◆ Channels are isolated from each other, with an isolation voltage of 1500V.
- ◆ The module can connect to 2-wire or 3-wire PT100 temperature sensors.
- ◆ The module's internal bus and field input use magnetic isolation.
- ◆ The module is equipped with LED indicators for 4 analog input channels.
- ◆ 15-bit ADC resolution.

2 Technical Parameters

Parameters	
Power	Max.65mA@5.0Vdc
Isolation	I/O to internal bus: magnetic isolation (2.5KVrms)
Field Power	Not used
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mmDIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20
Input Parameter	
Channel Number	4 Channels
LED Indicator	4 Green LED
Resolution	15 bit
Sensor Type	PT100
Measurement Range	-240~880℃
Measurement Accuracy	0.5℃
Conversion Rate	400ms/3 channels
Diagnostic Function	32766: Sensor is not connected or the cable is disconnected -32766: Short circuit

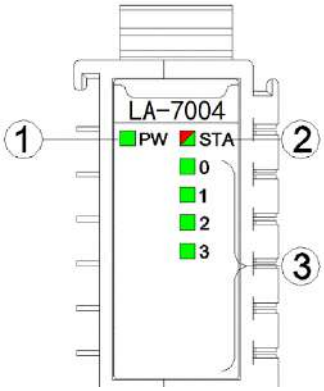
	32765: The chip is faulty 32767: Temperature overflows -32768: The temperature underflows

3 Hardware Interface



① Module Type
② State indicator
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition



① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Output channel LED indicator (green)

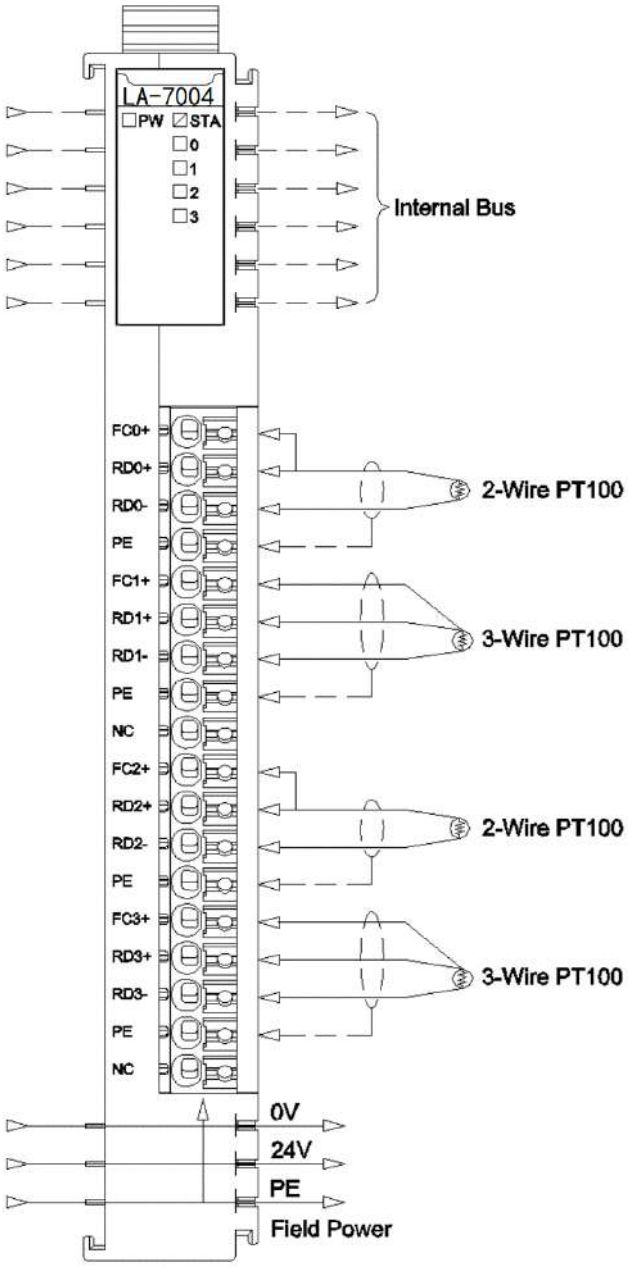
PW POWER STATE (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA MODULE STATE (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
0-3 Channel Indicator	Definition
ON	The input signal exceeds 1% of the range
OFF	Invalid input signal

3.2 Terminal definition

Terminal Number	Definition	Description
1	FC0+	Signal Input CH0
2	RD0+	
3	RD0-	
4	PE	
5	FC1+	Signal Input CH1
6	RD1+	
7	RD1-	
8	PE	
9	NC	Not connected
10	FC2+	Signal Input CH2
11	RD2+	
12	RD2-	
13	PE	
14	FC3+	Signal Input CH3
15	RD3+	
16	RD3-	
17	PE	
18	NC	Not connected

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:

4 Wiring


LA-7004
PW
STA
0
1
2
3
Internal Bus
FC0+
RD0+
RD0-
PE
FC1+
RD1+
RD1-
PE
NC
FC2+
RD2+
RD2-
PE
FC3+
RD3+
RD3-
PE
NC
2-Wire PT100
3-Wire PT100
2-Wire PT100
3-Wire PT100
0V
24V
PE
Field Power

5 Process data definition

Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Analog Input Data(CH 0)							
Byte 1								
Byte 2	Analog Input Data(CH 1)							
Byte 3								
Byte 4	Analog Input Data(CH 2)							
Byte 5								
Byte 6	Analog Input Data(CH 3)							
Byte 7								

Data Declaration：

Analog Input Data (CH0-2)：Analog channel input data values

Process Data Definition			
Temperature	Decimal	Hex	Location
>880.0	32767	7FFF	Overflow
880.0	8800	2260	Exceeds the upper limit
.	.	.	
.	.	.	
850.1	8501	2135	
850.0	8500	2134	Rated range
.	.	.	
.	.	.	
-200.0	-2000	F830	
-200.1	-2001	F82F	Exceeds the lower limit
.	.	.	
.	.	.	
-240.0	-2400	F6A0	
<-240.0	-32768	8000	Underflow

6 Configuration parameters definition

Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved							16Bit Data Format

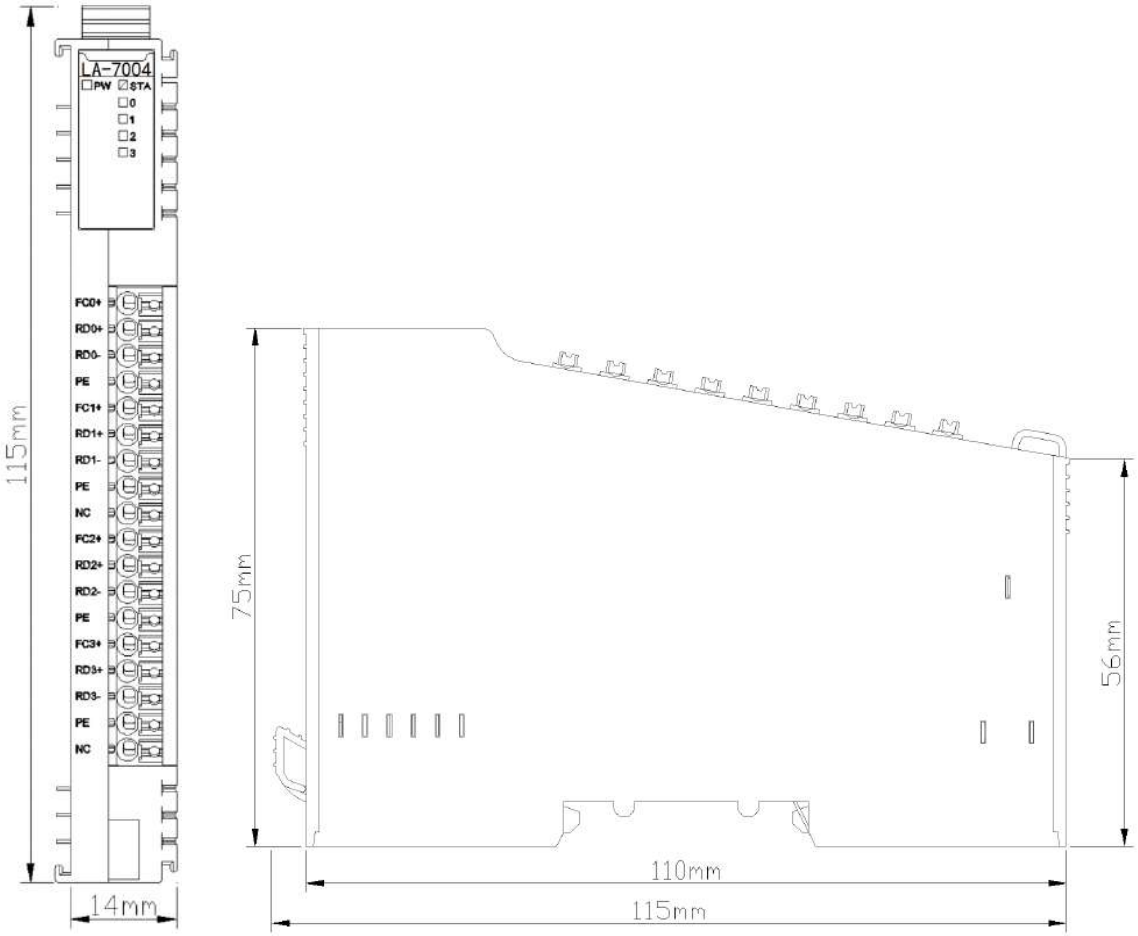
Data Declaration：

16Bit Data Format：Sequence of 16-bit data byte transmission (Default: 0)

0：A_B

1：B_A

A Dimension drawing



LA-9004: 4 channels Analog Input,Thermocouple

（ J type, K type, E type, T type, Stype, R type, B type, N type）

1 Module features

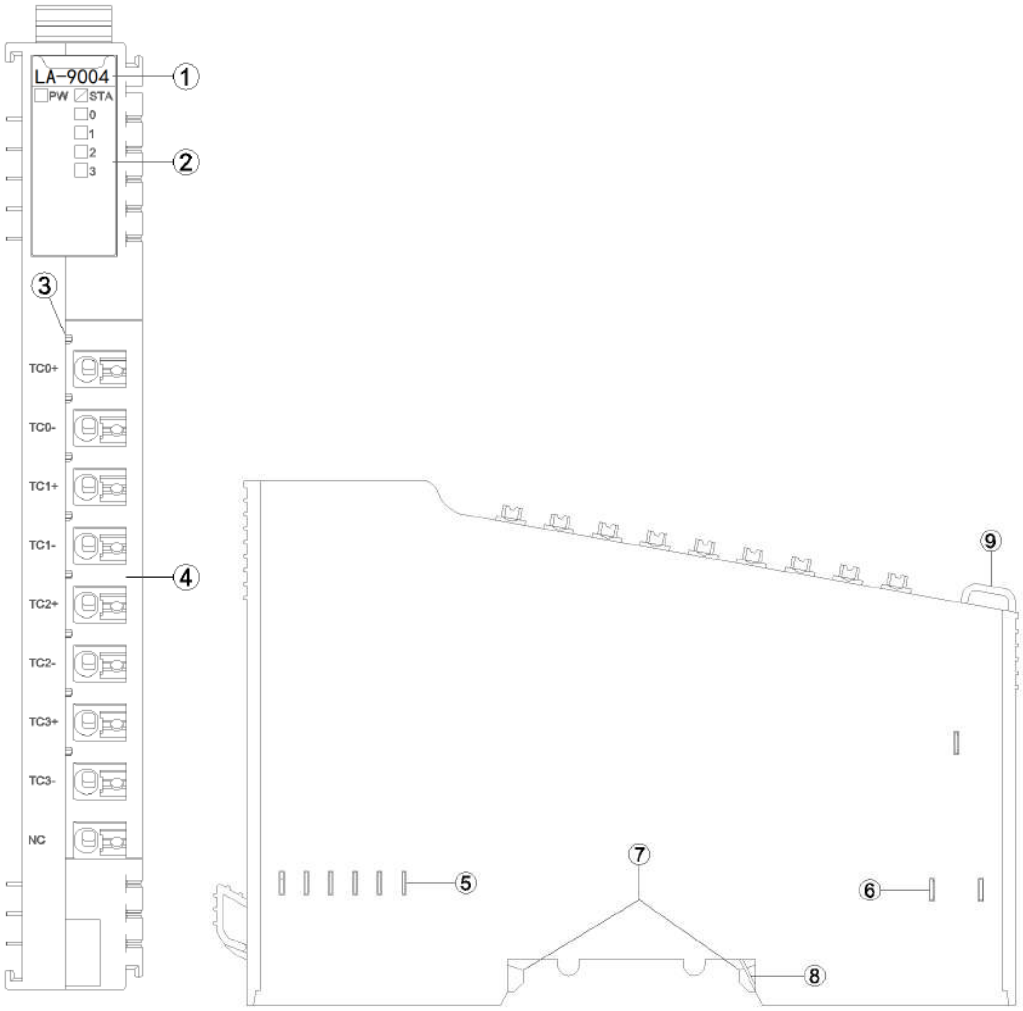
◆ The module supports 4-channel thermocouple signal acquisition
◆ The module carries with 4 analog LED indicators
◆ The module supports 9 kinds of conventional thermocouple temperature measurement type
◆ The internal bus of the module and field input adopts magnetic isolation
◆ The module input channel supports TVS overvoltage protection
◆ 24-bit ADC resolution (Σ-δ type)

2 Technical Parameters

General parameters		
Power		Max.50mA@5.0Vdc
Isolation		I/O to internal bus: magnetic isolation (2.5KVrms)
Field Power		Not used
Wiring		Max.1.0mm² (AWG 17)
Mounting Type		35mmDIN-Rail
Size		115*14*75mm
Weight		65g
Environment Specification		
Operational Temperature		-40~85℃
Operational Humidity		5%~95% RH(No Condensation)
Ingress Protection Rating		IP20
Input Parameter		
Channel Number		4 Channels
LED Indicator		4 Input LED Indicators
Sensor Type		J / K/ E / T / S / R / B / N type thermocouples
Acquisition Accuracy		±0.3% Full Scale，@25℃ ±0.5% Full Scale，@-40~85℃
Sampling Rate		70ms/4 channels
Measuring Range ℃	J Type	-210~1200℃
	K Type	-270~1370℃
	E Type	-270~1000℃
	T Type	-270~400℃
	S Type	-50~1760℃
	R Type	-50~1760℃
	B Type	0~1820℃

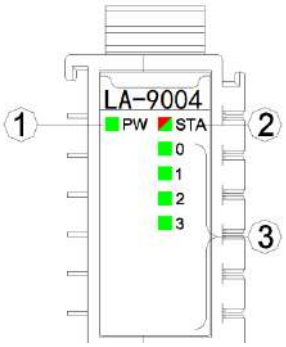
	N Type	-270~1300℃
	C Type	0~2320℃ (not available)
Data Format		16-Bit Signed Integer (Integer)
Diagnostic Function		-32767: No thermocouple model selected (that is, the channel is disabled) 32766：open circuit disconnection 32767：Temperature overflow -32768：Temperature underflow

3 Hardware Interface



① Module Type
② State indicator
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition



① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Output channel LED indicator (green)

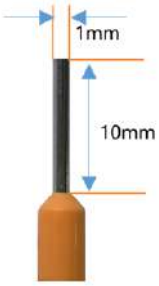
PW POWER STATE (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA MODULE STATE (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
0-3 Channel Indicator	Definition
ON	The input signal exceeds 1% of the range
OFF	Invalid output signal

3.2 Terminal definition

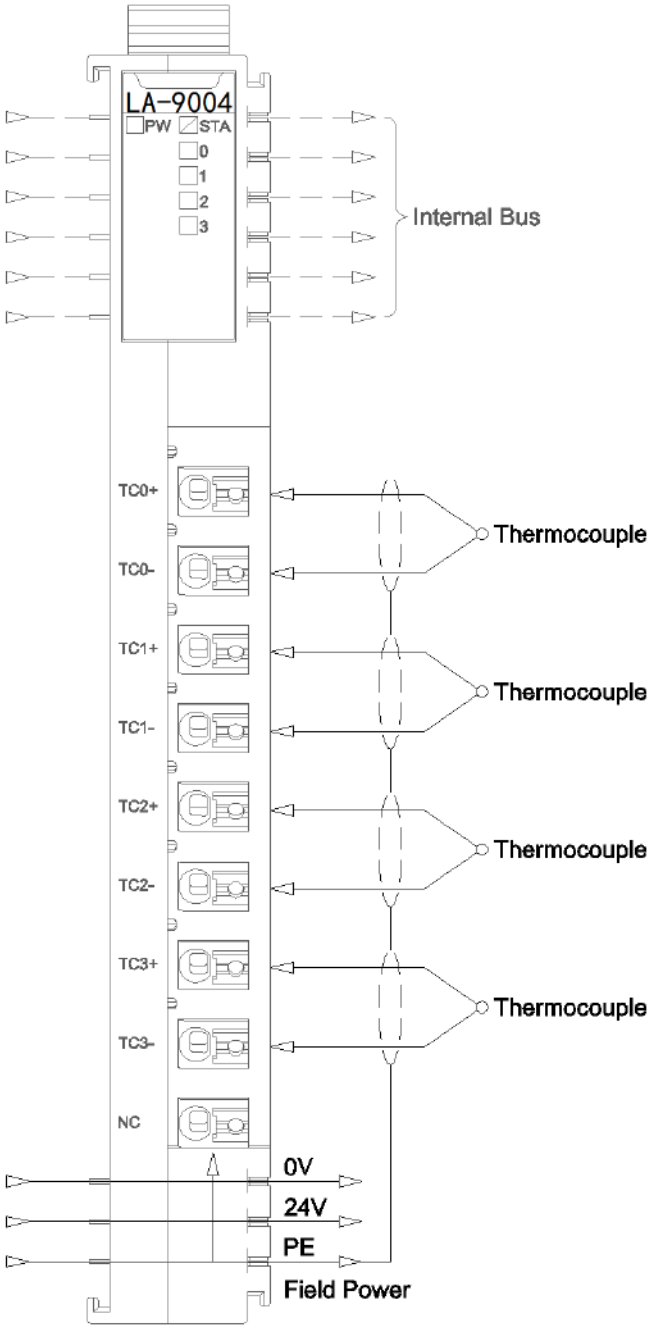
Terminal Number	Definition	Description
1	TC0+	Signal Input CH0
2	TC0-	
3	TC1+	Signal Input CH1
4	TC1-	
5	TC2+	Signal Input CH2
6	TC2-	
7	TC3+	Signal Input CH3
8	TC3-	
9	NC	Not Connected

It is recommended to use cables with cores smaller than 1mm².

The cold-pressed terminal parameters are as follows:



4 Wiring


LA-9004
PW
STA
0
1
2
3
Internal Bus
TC0+
TC0-
TC1+
TC1-
TC2+
TC2-
TC3+
TC3-
NC
Thermocouple
Thermocouple
Thermocouple
Thermocouple
0V
24V
PE
Field Power

5 Process data definition

Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Analog Input Data(CH 0)							
Byte 1								
Byte 2	Analog Input Data(CH 1)							
Byte 3								
Byte 4	Analog Input Data(CH 2)							
Byte 5								
Byte 6	Analog Input Data(CH 3)							
Byte 7								

Data Declaration：

Analog Input Data (CH0-3)：The current temperature acquisition value of the corresponding channel

Process Data Definition - J Type			
Temperature	Decimal	Hex	Location
>1360.0	32767	7FFF	Overflow
1360.0	13600	3520	Exceeds the upper limit
.	.	.	
.	.	.	
1200.1	12001	2EE1	
1200.0	12000	2EE0	Rated range
.	.	.	
.	.	.	
-210.0	-2100	F7CC	
<-210.0	-32768	8000	Underflow

Process Data Definition - K Type			
Temperature	Decimal	Hex	Location
>1622.0	32767	7FFF	Overflow
1622.0	16220	3F5C	

.	.	.	Exceeds the upper limit
.	.	.	
1372.1	13721	3599	
1372.0	13720	3598	Rated range
.	.	.	
.	.	.	
-270.0	-2700	F574	
<-270.0	-32768	8000	Underflow

Process Data Definition – E Type			
Temperature	Decimal	Hex	Location
>1200.0	32767	7FFF	Overflow
1200.0	12000	2EE0	Exceeds the upper limit
.	.	.	
.	.	.	
1000.1	10001	2711	
1000.0	10000	2710	Rated range
.	.	.	
.	.	.	
-270.0	-2700	F574	
<-270.0	-32768	8000	Underflow

Process Data Definition –T Type			
Temperature	Decimal	Hex	Location
>540.0	32767	7FFF	Overflow
540.0	5400	1518	Exceeds the upper limit
.	.	.	
.	.	.	
400.1	4001	FA1	
400.0	4000	FA0	Rated range
.	.	.	
.	.	.	
-270.0	-2700	F574	
<-270.0	-32768	8000	Underflow

Process Data Definition –S Type			
Temperature	Decimal	Hex	Location
>1850.0	32767	7FFF	Overflow
1850.0	18500	4844	Exceeds the upper limit
.	.	.	

.	.	.	
1769.1	17691	451B	
1769.0	17690	451A	Rated range
.	.	.	
.	.	.	
-50.0	-500	FE0C	
-50.1	-501	FE0B	Exceeds the lower limit
.	.	.	
.	.	.	
-170.0	-1700	F95C	
<-170.0	-32768	8000	Underflow

Process Data Definition – R Type			
Temperature	Decimal	Hex	Location
>2019.0	32767	7FFF	Overflow
2019.0	20190	4EDE	Exceeds the upper limit
.	.	.	
.	.	.	
1769.1	17691	451B	
1769.0	17690	451A	Rated range
.	.	.	
.	.	.	
-50.0	-500	FE0C	
-50.1	-501	FE0B	Exceeds the lower limit
.	.	.	
.	.	.	
-170.0	-1700	F95C	
<-170.0	-32768	8000	Underflow

Process Data Definition - B Type			
Temperature	Decimal	Hex	Location
>2070.0	32767	7FFF	Overflow
2070.0	20700	50DC	Exceeds the upper limit
.	.	.	
.	.	.	
1820.1	18201	4719	
1820.0	18200	4718	Rated range
.	.	.	
.	.	.	
0.0	0		

<0.0	-32768	8000	Underflow

Process Data Definition – N Type			
Temperature	Decimal	Hex	Location
>1550.0	32767	7FFF	Overflow
1550.0	15500	3C8C	Exceeds the upper limit
.	.	.	
.	.	.	
1300.1	13001	32C9	
1300.0	13000	32C8	Rated range
.	.	.	
.	.	.	
-270.0	-2700	F574	
<-270.0	-32768	8000	Underflow

Process Data Definition – C Type			
Temperature	Decimal	Hex	Location
>2320.0	32767	7FFF	Overflow
2320.0	23200	5AA0	Rated range
.	.	.	
.	.	.	
0.0	0		
<0.0	-32768	8000	Underflow

6 Configuration parameters definition

Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved							16Bit Data Format
Byte 1	TC Input Type (CH 1)				TC Input Type (CH 0)			
Byte 1	TC Input Type (CH 3)				TC Input Type (CH 2)			

Data Declaration:

16Bit Data Format：Big-endian and little-endian format of data upload:

0：A_B

1：B_A

TC Input Type(CH 0-3)：Sensor type of the channel：

0：Channel is disabled

1：J Type

2：K Type

3：E Type

4：T Type

5：S Type

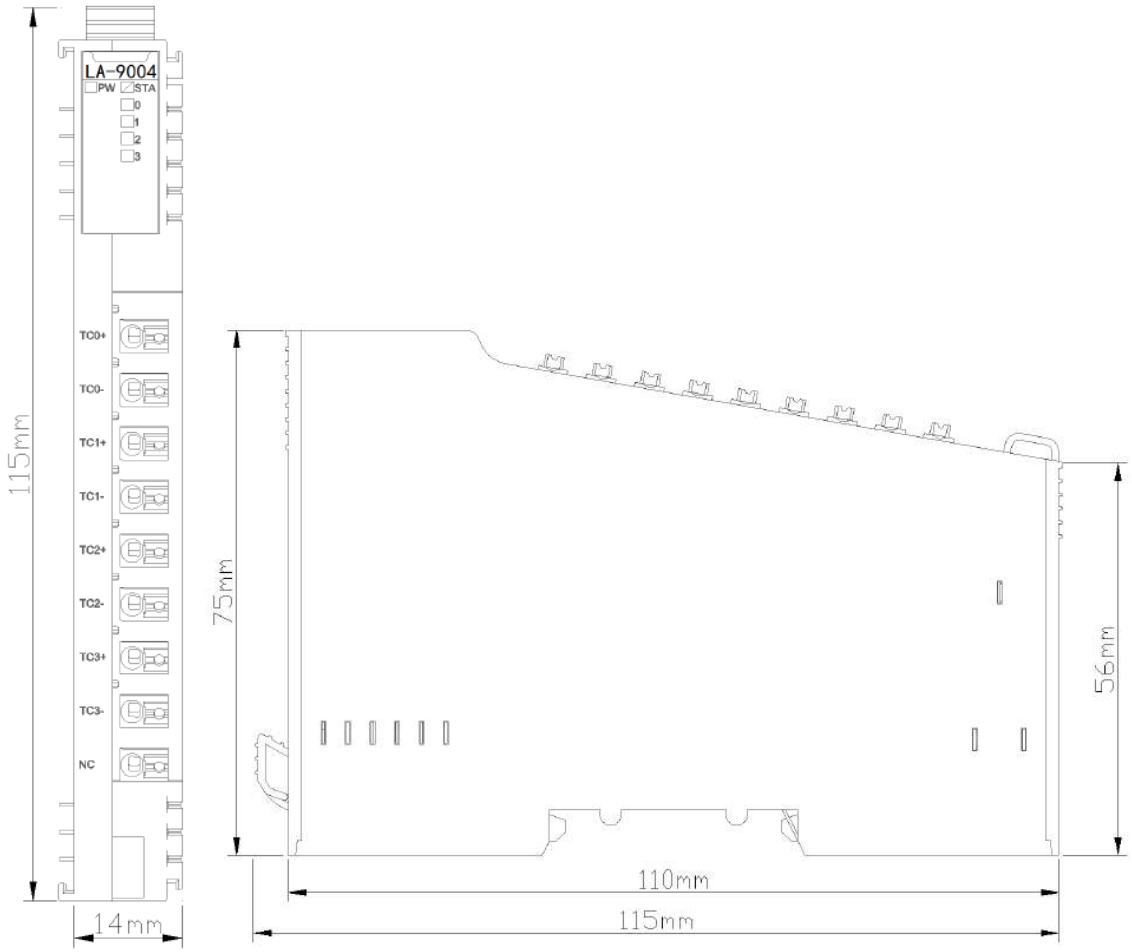
6：R Type

7：B Type

8：N Type

9：C Type

A Dimension drawing



LA-9008: 8 channels Analog Input

Thermocouple（ J type, K type, E type, T type, Stype, R type, B type, N type）

1 Module features

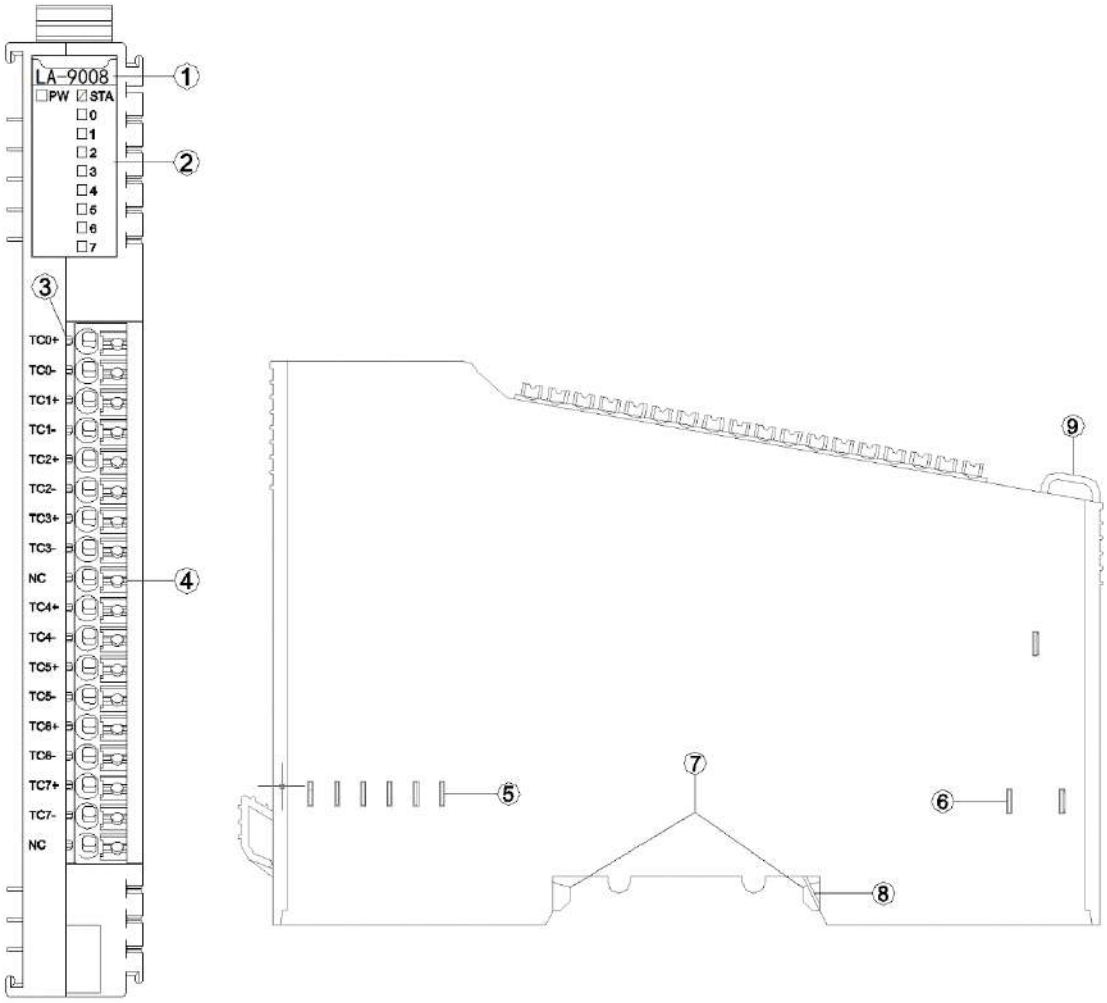
◆ The module supports 8-channel thermocouple signal acquisition
◆ The module carries 8 analog LED indicators
◆ The module supports 9 kinds of conventional thermocouple temperature measurement type
◆ The internal bus of the module and field input adopts magnetic isolation
◆ The module input channel supports TVS overvoltage protection
◆ 24-bit ADC resolution (Σ-δ type)

2 Technical parameters

General Parameters		
Power		Max.60mA@5.0Vdc
Isolation		I/O to internal bus: magnetic isolation (2.5KVrms)
Field Power		Not used
Wiring		I/O Wiring：Max.1.0mm² (AWG 17)
Mounting Type		35mmDIN-Rail
Size		115*14*75mm
Weight		65g
Environment Specification		
Operational Temperature		-40~85℃
Operational Humidity		5%~95% RH(No Condensation)
Ingress Protection Rating		IP20
Input Parameter		
Channel Number		8 Channels
LED Indicator		8 Input LED Indicators
Sensor Type		J / K/ E / T / S / R / B / N thermocouples
Acquisition Accuracy		±0.3% Full Scale，@25℃ ±0.5% Full Scale，@-40~85℃
Sampling Rate		70ms/4 channel
Measuring Range℃	J Type	-210~1200℃
	K Type	-270~1370℃

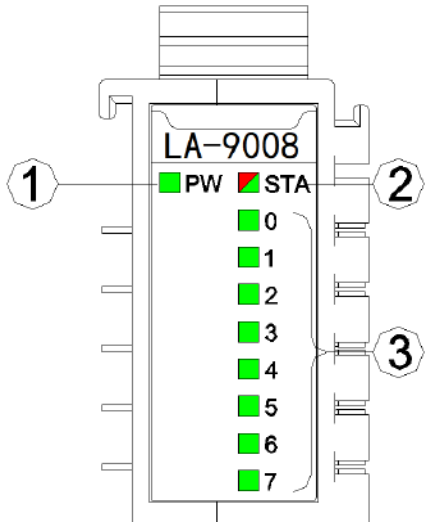
	E Type	-270~1000℃
	T Type	-270~400℃
	S Type	-50~1760℃
	R Type	-50~1760℃
	B Type	0~1820℃
	N Type	-270~1300℃
	C Type	0~2320℃ (not available)
Data Format		16-Bit Signed Integer (Integer)
Diagnostic Function		-32767: No thermocouple model selected (that is, the channel is disabled) 32766：open circuit disconnection 32767：Temperature overflow -32768：Temperature underflow

3 Hardware Interface



① Module Type
② State indicator
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition



① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Output channel LED indicator (green)

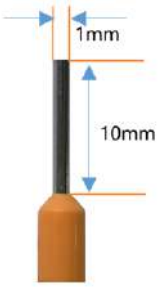
PW POWER STATE (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA MODULE STATE (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
0-7 Channel Indicator	Definition
ON	The input signal exceeds 1% of the range
OFF	Invalid output signal

3.2 Terminal definition

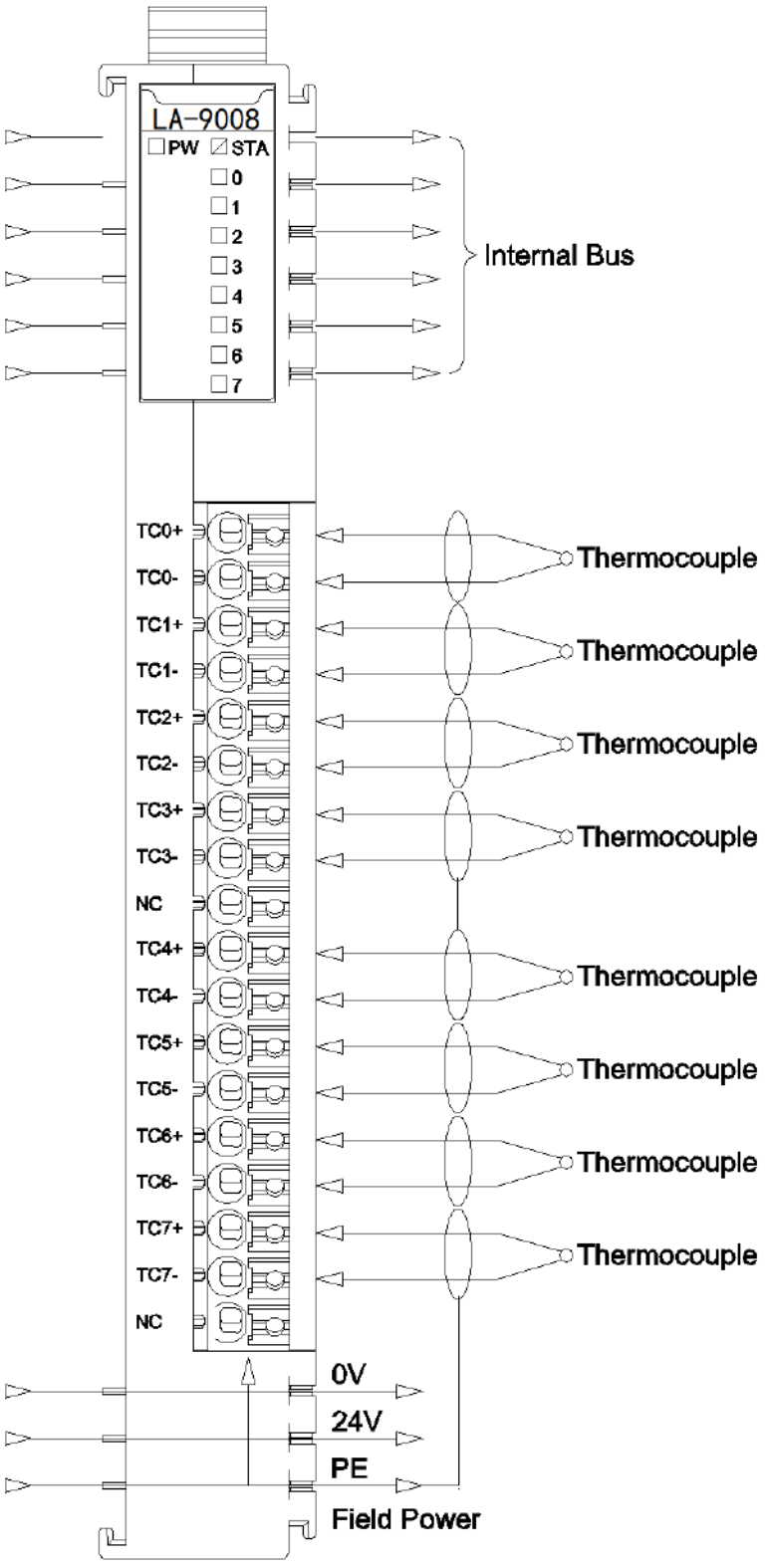
Terminal Number	Definition	Description
1	TC0+	Signal Input CH0
2	TC0-	
3	TC1+	Signal Input CH1
4	TC1-	
5	TC2+	Signal Input CH2
6	TC2-	
7	TC3+	Signal Input CH3
8	TC3-	
9	NC	Not Connected
10	TC4+	Signal Input CH4
11	TC4-	
12	TC5+	Signal Input CH5
13	TC5-	
14	TC6+	Signal Input CH6
15	TC6-	
16	TC7+	Signal Input CH7
17	TC7-	
18	NC	Not Connected

It is recommended to use cables with cores smaller than 1mm².

The cold-pressed terminal parameters are as follows:



4 Wiring


LA-9008
PW
STA
0
1
2
3
4
5
6
7
Internal Bus
TC0+
TC0-
TC1+
TC1-
TC2+
TC2-
TC3+
TC3-
NC
TC4+
TC4-
TC5+
TC5-
TC6+
TC6-
TC7+
TC7-
NC
Thermocouple
Thermocouple
Thermocouple
Thermocouple
Thermocouple
Thermocouple
Thermocouple
Thermocouple
0V
24V
PE
Field Power

5 Process data definition

Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Analog Input Data(CH 0)							
Byte 1								
Byte 2	Analog Input Data(CH 1)							
Byte 3								
Byte 4	Analog Input Data(CH 2)							
Byte 5								
Byte 6	Analog Input Data(CH 3)							
Byte 7								
Byte 8	Analog Input Data(CH 4)							
Byte 9								
Byte 10	Analog Input Data(CH 5)							
Byte 11								
Byte 12	Analog Input Data(CH 6)							
Byte 13								
Byte 14	Analog Input Data(CH 7)							
Byte 15								

Data Declaration：

Analog Input Data (CH0-3)：The current temperature acquisition value of the corresponding channel

Process Data Definition - J Type			
Temperature	Decimal	Hex	Location
>1360.0	32767	7FFF	Overflow
1360.0	13600	3520	Exceeds the upper limit
.	.	.	
.	.	.	
1200.1	12001	2EE1	
1200.0	12000	2EE0	Rated range
.	.	.	
.	.	.	
-210.0	-2100	F7CC	
<-210.0	-32768	8000	Underflow
Process Data Definition - K Type			
Temperature	Decimal	Hex	Location

>1622.0	32767	7FFF	Overflow
1622.0	16220	3F5C	Exceeds the upper limit
.	.	.	
.	.	.	
1372.1	13721	3599	
1372.0	13720	3598	Rated range
.	.	.	
.	.	.	
-270.0	-2700	F574	
<-270.0	-32768	8000	Underflow

Process Data Definition – E Type			
Temperature	Decimal	Hex	Location
>1200.0	32767	7FFF	Overflow
1200.0	12000	2EE0	Exceeds the upper limit
.	.	.	
.	.	.	
1000.1	10001	2711	
1000.0	10000	2710	Rated range
.	.	.	
.	.	.	
-270.0	-2700	F574	
<-270.0	-32768	8000	Underflow

Process Data Definition –T Type			
Temperature	Decimal	Hex	Location
>540.0	32767	7FFF	Overflow
540.0	5400	1518	Exceeds the upper limit
.	.	.	
.	.	.	
400.1	4001	FA1	
400.0	4000	FA0	Rated range
.	.	.	
.	.	.	
-270.0	-2700	F574	
<-270.0	-32768	8000	Underflow

Process Data Definition –S Type

Temperature	Decimal	Hex	Location
>1850.0	32767	7FFF	Overflow
1850.0	18500	4844	Exceeds the upper limit
.	.	.	
.	.	.	
1769.1	17691	451B	
1769.0	17690	451A	Rated range
.	.	.	
.	.	.	
-50.0	-500	FE0C	
-50.1	-501	FE0B	Exceeds the lower limit
.	.	.	
.	.	.	
-170.0	-1700	F95C	
<-170.0	-32768	8000	Underflow

Process Data Definition – R Type			
Temperature	Decimal	Hex	Location
>2019.0	32767	7FFF	Overflow
2019.0	20190	4EDE	Exceeds the upper limit
.	.	.	
.	.	.	
1769.1	17691	451B	
1769.0	17690	451A	Rated range
.	.	.	
.	.	.	
-50.0	-500	FE0C	
-50.1	-501	FE0B	Exceeds the lower limit
.	.	.	
.	.	.	
-170.0	-1700	F95C	
<-170.0	-32768	8000	Underflow

Process Data Definition - B Type			
Temperature	Decimal	Hex	Location
>2070.0	32767	7FFF	Overflow
2070.0	20700	50DC	Exceeds the upper limit
.	.	.	
.	.	.	

1820.1	18201	4719	
1820.0	18200	4718	Rated range
.	.	.	
.	.	.	
0.0	0		
<0.0	-32768	8000	Underflow

Process Data Definition – N Type			
Temperature	Decimal	Hex	Location
>1550.0	32767	7FFF	Overflow
1550.0	15500	3C8C	Exceeds the upper limit
.	.	.	
.	.	.	
1300.1	13001	32C9	
1300.0	13000	32C8	Rated range
.	.	.	
.	.	.	
-270.0	-2700	F574	
<-270.0	-32768	8000	Underflow

Process Data Definition – C Type			
Temperature	Decimal	Hex	Location
>2320.0	32767	7FFF	Overflow
2320.0	23200	5AA0	Rated range
.	.	.	
.	.	.	
0.0	0		
<0.0	-32768	8000	Underflow

6 Configuration parameters definition

Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved							16Bit Data Format
Byte 1	TC Input Type (CH 1)				TC Input Type (CH 0)			
Byte 1	TC Input Type (CH 3)				TC Input Type (CH 2)			

Data Declaration:

16Bit Data Format：Big-endian and little-endian format of data upload:

0：A_B

1：B_A

TC Input Type(CH 0-3)：Sensor type of the channel：

0：Channel is disabled

1：J Type

2：K Type

3：E Type

4：T Type

5：S Type

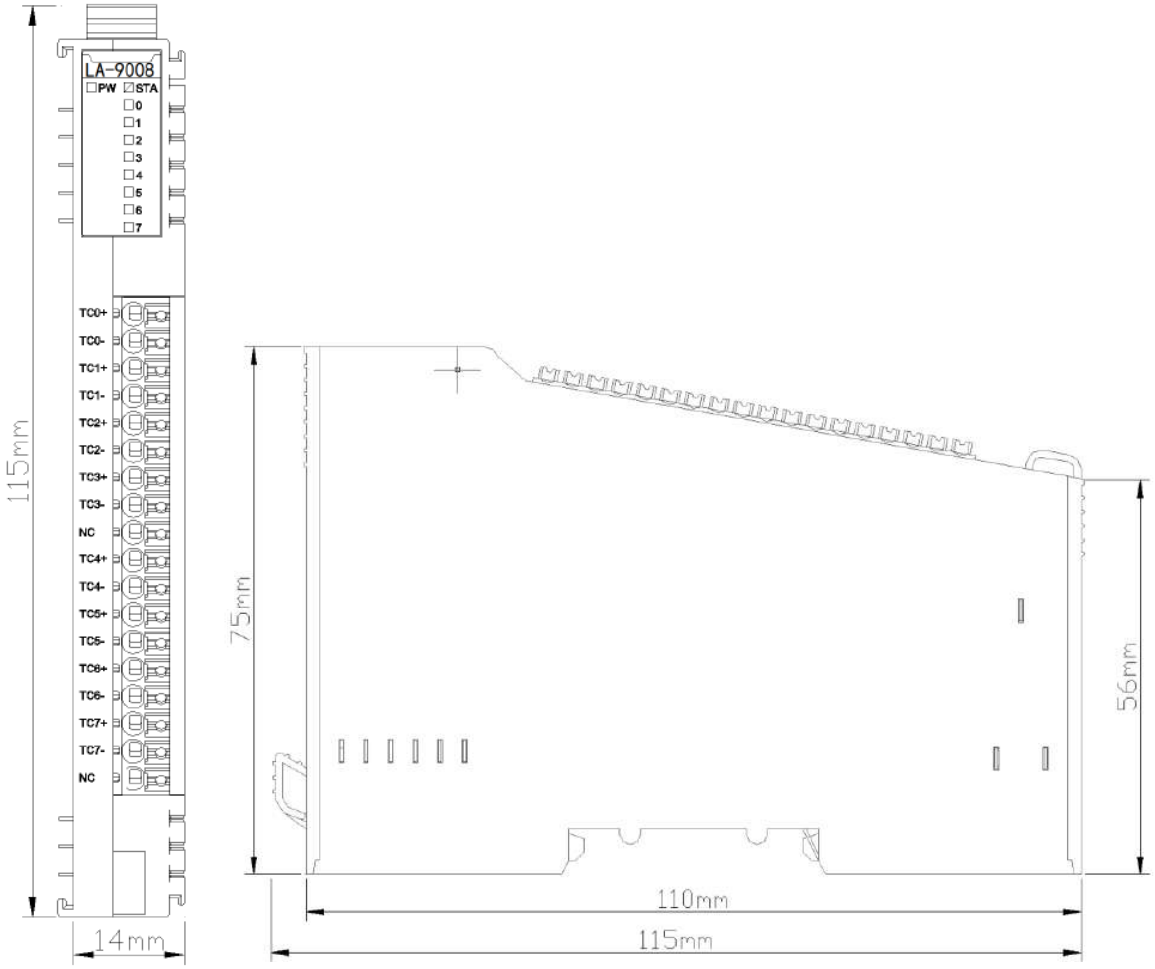
6：R Type

7：B Type

8：N Type

9：C Type

A Dimension drawing



6 Encoder Module

LP-1002 2-channel encoder input /5VDC

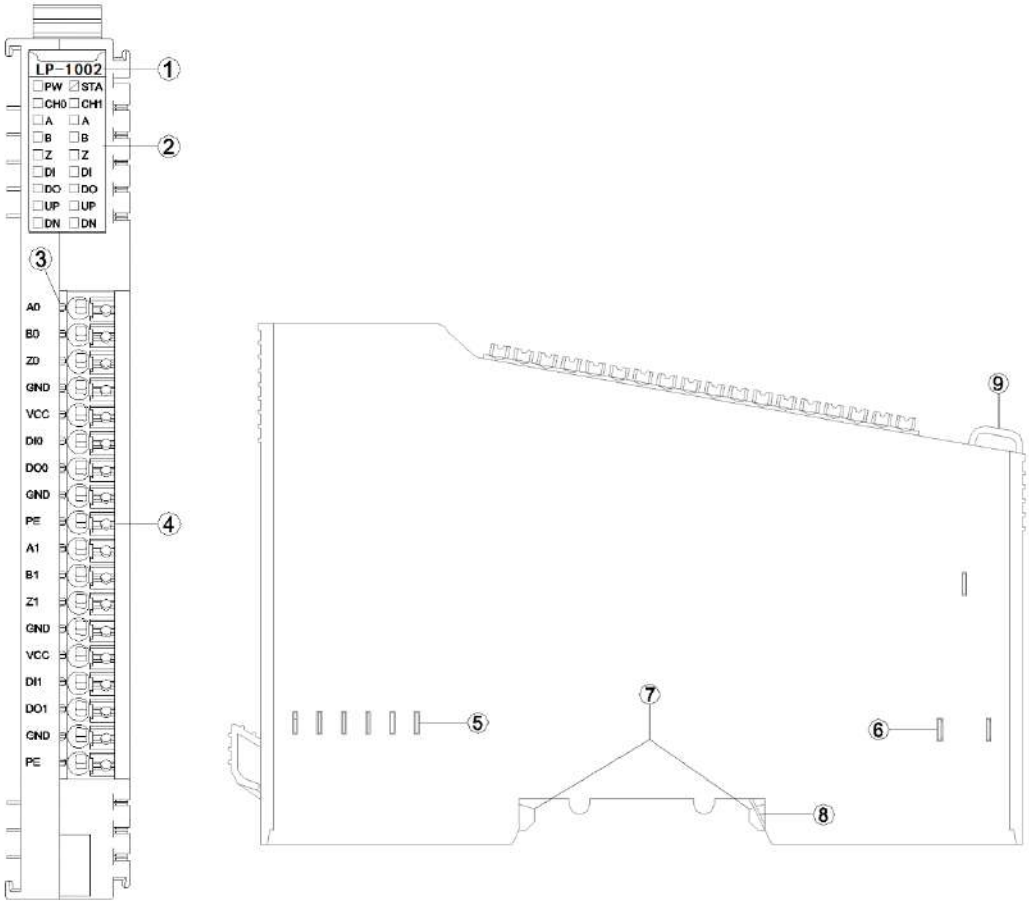
1 Module features

◆ the module supports two channels of encoder input.
◆ each encoder channel supports A/B incremental encoder or pulse-directional encoder input.
◆ each encoder channel supports orthogonal A/B signal input, input voltage 5V, and it supports source and sink input.
◆ the incremental encoder mode supports x1/ x2 / x4 frequency multiplication to be selectable.
◆ the pulse - direction mode supports nondirectional signal, pulse input only.
◆ each encoder channel supports 1 digital input signal with an input voltage of 5Vdc or 24Vdc.
◆ each encoder channel supports 1 digital output signal with an output voltage of 24Vdc.
◆ each encoder channel supports 1 way of 5V power output, which can be connected to the encoder for power supply.
◆ the module internal bus and field input adopt magnetic isolation.
◆ the module carries 16 LED indicators.
◆ the maximum input frequency of the encoder supported by the module is 1.5MHz.
◆ the module supports measurement function, it could detect the load speed or input signal frequency.

2 Technical parameters

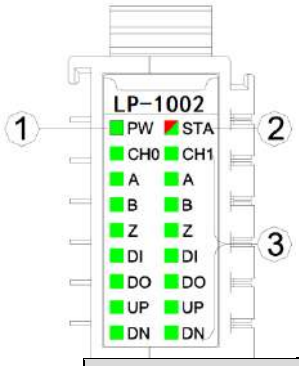
General Parameters	
Power	Max.60mA@5.0Vdc
Isolation	I/O to internal bus: magnetic isolation (3KVrms)
Field Power	Nominal:24Vdc, Range:20-28Vdc
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Input Parameters	
Channel Number	2-channel encoder
LED Indicator	16 channel input LED indicator
Encoder signal voltage range	ABZ input standard 5Vdc, range ±10%
Encoder input impedance	Internal pull-up or pull-down resistance 4.7K
Encoder filtering time	Could be set, the default value is 0.5 us
Encoder count frequency	<1.5MHz
Encoder frequency multiplication mode	x1/x2/x4
Encoder measurement function	Load speed or input signal frequency measurement
DI turn-on voltage	Min.5Vdc to Max.28Vdc
DI turn-off voltage	Max.2.7Vdc
DI turn-on current	Max.5mA/channel@28V
DI input impedance	>10.0kΩ
DI input delay	OFF to ON: Max.3ms ON to OFF: Max.2ms
DO output voltage	5V，range ±10%
DO output current	Max.500mA
DO output sink current	Max.5uA

3 Hardware interfaces



① Module Type
② State indicator
③ Channel indicator
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

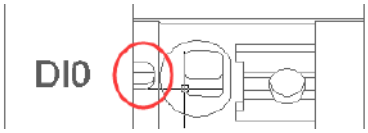
3.1 LED indicator definition



① Power LED indicator (green)
② Module State indicator LED (red/green)
③ Input channel indicator LED (green)

PW Power State	Definition
ON	Internal bus power supply normal
OFF	Internal bus power supply failure
STA Module State	Definition
Green slow flash (2.5 Hz)	Module internal bus is not started
Red slow flash (2.5 Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash (2.5 Hz) (RED/GREEN)	updating mode
Flash (10 Hz) (RED/GREEN)	firmware update
Double Flash (RED)	Module exception has been soft-restarted
CH0 CH1 channel indicator LED	Definition
ON	Channel enable
A B Z Encoder signal indicator	Definition
ON	Input signal valid
OFF	Input signal invalid
DI input indicator	Definition
ON	Input signal high level
OFF	Input signal invalid
DO output indicator	Definition
ON	Output signal high level
OFF	Output signal invalid
UP indicator	Definition
ON	Encoder in positive rotation
OFF	Encoder is stationary or in contrarotation
DN indicator	Definition
ON	Encoder in contrarotation
OFF	Encoder is stationary or in positive rotation

3.2 Field channel LED indicator (Green)

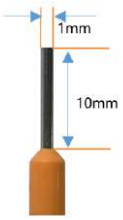


When the input signal of the input channel is valid, the corresponding field channel indicator is on (only the DI/DO/VCC wiring terminal of the encoder channel carries the indicator).

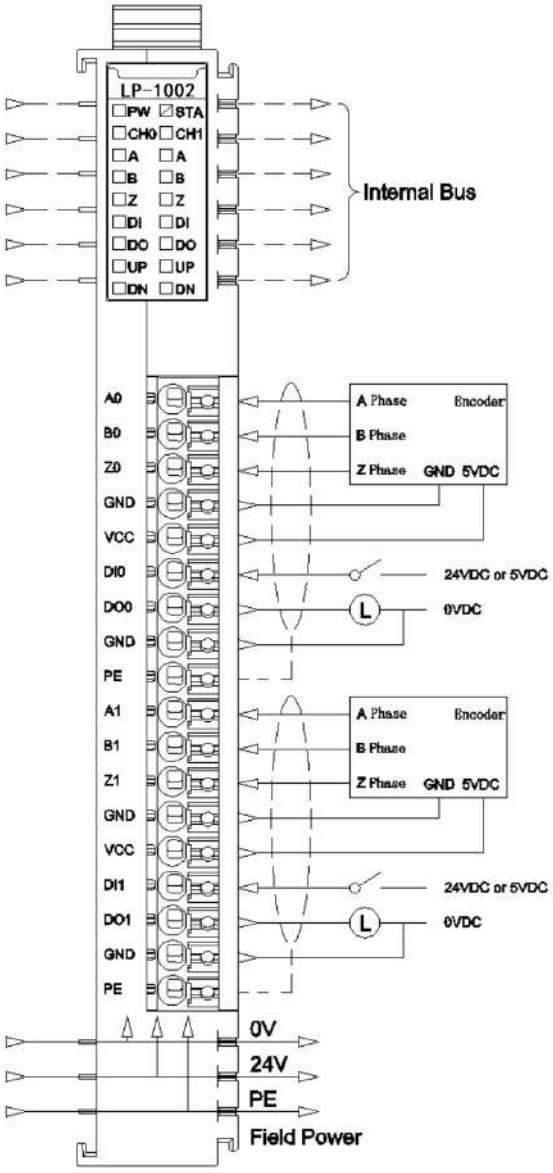
3.3 Terminal definition

Terminal Number	Symbol	Description
1	A0	CH0 encoder phase A input
2	B0	CH0 encoder phase B input
3	Z0	CH0 encoder phase Z input
4	GND	Signal ground
5	VCC	5V power output
6	DI0	CH0 digital signal input
7	DO0	CH0 digital signal output
8	GND	Signal ground
9	PE	Shield earthing
10	A1	CH1 encoder phase A input
11	B1	CH1 encoder phase B input
12	Z1	CH1 encoder phase Z input
13	GND	Signal ground
14	VCC	5V power output
15	DI1	CH1 digital signal input
16	DO1	CH1 digital signal output
17	GND	Signal ground
18	PE	Shield earthing

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:



4 Wiring


LP-1002
PW STA
CH0 CH1
A A
B B
Z Z
DI DI
DO DO
UP UP
DN DN
Internal Bus
A0
B0
Z0
GND
VCC
DI0
DO0
GND
PE
A1
B1
Z1
GND
VCC
DI1
DO1
GND
PE
A Phase
B Phase
Z Phase
Encoder
GND 5VDC
24VDC or 5VDC
0VDC
L
0V
24V
PE
Field Power

5 Process data definition

< 2 Analog Input (5V Encoder) > Submodule process data definition

Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Counter DOWN Ch#0	Counter UP Ch#0	Counter Underflow Ch#0	Counter Overflow Ch#0	DI Ch#0	Z Ch#0	B Ch#0	A Ch#0
Byte 1	Reserved							
Byte 2	Counter DOWN Ch#1	Counter UP Ch#1	Counter Underflow Ch#1	Counter Overflow Ch#1	DI Ch#1	Z Ch#1	B Ch#1	A Ch#1
Byte 3	Reserved							
Byte 4	Counter value Ch#0							
Byte 5								
Byte 6								
Byte 7								
Byte 8	Capture value Ch#0							
Byte 9								
Byte 10								
Byte 11								
Byte 12	Measurements 1 Ch#0							
Byte 13								
Byte 14								
Byte 15								
Byte 16	Measurements 2 Ch#0							
Byte 17								
Byte 18								
Byte 19								
Byte 20	Counter value Ch#1							
Byte 21								
Byte 22								
Byte 23								
Byte 24	Capture value Ch#1							

Byte 25								
Byte 26								
Byte 27								
Byte 28	Measurements 1 Ch#1							
Byte 29								
Byte 30								
Byte 31								
Byte 32	Measurements 2 Ch#1							
Byte 33								
Byte 34								
Byte 35								
Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved					Flow Clear Ch#0	Counter Set Trigger Ch#0	DO Ch#0
Byte 1	Reserved							
Byte 2	Reserved					Flow Clear Ch#1	Counter Set Trigger Ch#1	DO Ch#1
Byte 3	Reserved							
Byte 4	Set Value for Counter Ch#0							
Byte 5								
Byte 6								
Byte 7								
Byte 8	Set Value for Counter Ch#1							
Byte 9								
Byte 10								
Byte 11								

Data Declaration：

Input data definition:

A/B/Z Ch#(0-1)：The position is 1 when the corresponding channel A/B/Z input signal is valid, and 0 when the input is invalid.

DI Ch#(0-1)：Digital input signal status.

Counter Overflow Ch#(0-1)：Counter overflowed flag bit.
Counter Underflow Ch#(0-1)：Counter underflows flag bit.
Counter UP：Encoder positive rotation, counter up counting sign.
Counter DOWN：Encoder contrarotation, counter down count flag.
Counter Value Ch#(0-1)：Pulse count value, 32 - bit signed integer, automatically clear after overflow.
Capture value Ch#(0-1)：Pulse capture value, 32-bit signed integer, and when DI is set to capture, the pulse count value will be captured to the capture value at the selected edge.
Measurements 1 Ch#(0-1)：Measurement value 1, the measurement value will be output according to the measurement value type selected by the user (view the configuration parameter section of the module for optional measurement value)
Measurements 2 Ch#(0-1)：Measurement value 2, the measurement value will be output according to the measurement value type selected by the user (view the configuration parameter section of the module for optional measurement value)
Output data definition:
DO Ch#(0-1)：Digital output channel control.
Counter Set Trigger CH#(0-1)：Counter set trigger bit, rising edge trigger counter set, the output value Set Value for Counter will be updated to Counter Value, this function can be used to set the initial value of the counter.
Flow Clear CH#(0-1)：Overflow clear bit, the rising edge can clear the input Counter Overflow and Counter Underflow flag bits.
Set Value for Counter Ch#(0-1)：Counter set value.

6 Configuration parameters definition

<2 Analog Input(5V Encoder)> Submodule configuration parameter definition

Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved					16Bit Data Format	32Bit Data Format	
Byte 1	Reserved					Work Mode Ch#0		
Byte 2	Reserved						Frequency Multiplication Ch#0	
Byte 3	Reserved			Filtering Time Ch#0				
Byte 4	Reserved							Counter Storage Ch#0
Byte 5	Reserved						Encode Output Signal Type Ch#0	
Byte 6	Reserved							DI Function Selection Ch#0
Byte 7	Reserved						Capture Mode Ch#0	
Byte 8 … Byte 17	Reserved							
Byte 18	Reserved					Speed Measurement Time Ch#0		
Byte 19	Reserved		Measurements 2 Type Ch#0			Measurements 1 Type Ch#0		
Byte 20	Encoder Resolution Ch#0							
Byte 21								
Byte 22	Transmission Ratio Active Ch#0							
Byte 23								
Byte 24	Transmission Ratio Slave Ch#0							
Byte 25								

Byte 26 … Byte 33	Reserved							
Byte 34	Reserved							Work Mode Ch#1
Byte 35	Reserved						Frequency Multiplication Ch#1	
Byte 36	Reserved					Filtering Time Ch#1		
Byte 37	Reserved							Counter Storage Ch#1
Byte 38	Reserved						Encode Output Signal Type Ch#1	
Byte 39	Reserved							DI Function Selection Ch#1
Byte 40	Reserved						Capture Mode Ch#1	
Byte 41 … Byte 50	Reserved							
Byte 51	Reserved							Speed Measurement Time Ch#1
Byte 52	Reserved					Measurements 2 Type Ch#1		Measurements 1 Type Ch#1
Byte 53	Encoder Resolution Ch#1							
Byte 54								
Byte 55	Transmission Ratio Active Ch#1							
Byte 56								
Byte 57	Transmission Ratio Slave Ch#1							
Byte 58								
Byte 59 …	Reserved							

Byte 66	

Data Declaration：

16Bit Data Format：Byte transfer order of channel state. (Default: 0)

0：A-B

1：B-A

32Bit Data Format：The byte transfer order of a channel count value. (Default: 0)

0：AB-CD

1：BA-DC

2：CD-AB

3：DC-BA

Work Mode Ch#(0-1)：Working mode of encoder. (Default: 0)

0：Incremental encoder mode.

1：Count direction mode.

2：Count up mode.

3：Count down mode.

Frequency Multiplication Ch#(0-1)：Frequency multiplication number (available only in incremental encoder mode), according to this mode it could output pulse count value. (Default: 2)

0：frequency multiplication 1

1：frequency multiplication 2

2：frequency multiplication 4

Filtering Time Ch#(0-1)：Encoder input filter time (default: 5)

0：no filter

1：0.1uS

…

5：0.5 uS

…

31：3.1 uS

Counter Storage Ch#(0-1)：Enable storage. When the storage function is enabled, the IO module will save the count value to the non-volatile memory in real time, and load the last saved count value at the next power-on. (Default: 1)

0：Disable

1：Enable

Encoder Output Signal Type Ch#(0-1)：Encoder output type (default: 0)

0：Source

1：Sink

2：Push–pull

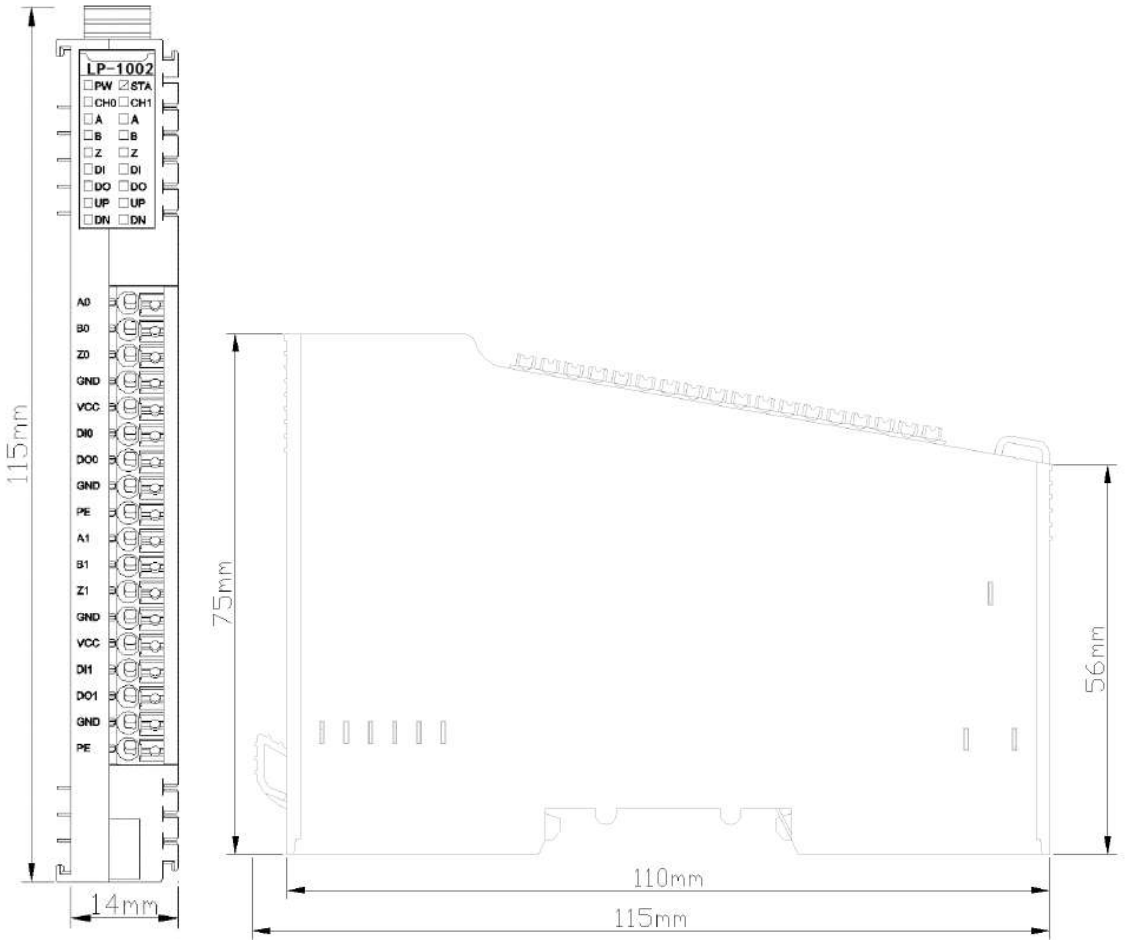
DI Function Selection Ch#(0-1)：DI function selection (Default: 0)

0：Normal DI function

1：Pulse capture function

Capture Mode Ch#(0-1)：Capture mode (default: 0)
0：Rising edge capture
1：Falling edge capture
2：Double edge capture
Speed Measurement Time Ch#(0-1)：Speed measurement period (Default: 6)
0：10mS
1：20mS
2：50mS
3：100mS
4：200mS
5：500mS
6：1000mS
7：2000mS
Measurements 1 Type Ch#(0-1)：Measurement value 1 Type selection (default: 0)
0：No measurements
1：Measuring speed (min/rotation)
2：Measuring frequency
Measurements 2 Type Ch#(0-1)：Measurement value 2 Type selection (default: 0)
0：No measurements
1：Measuring speed (min/ rotation)
2：Measuring frequency
Encoder Resolution Ch#(0-1)：Encoder resolution (default: 1)
Value range：1-65535
Transmission Ratio Active Ch#(0-1)：1）Transmission ratio (main) (Default: 1)
Value range：1-65535
Transmission Ratio Slave Ch#(0-1)：Transmission ratio (main) (Default: 1)
Value range：1-65535

A Dimension drawing



LP-3002 2-channel encoder input/24VDC

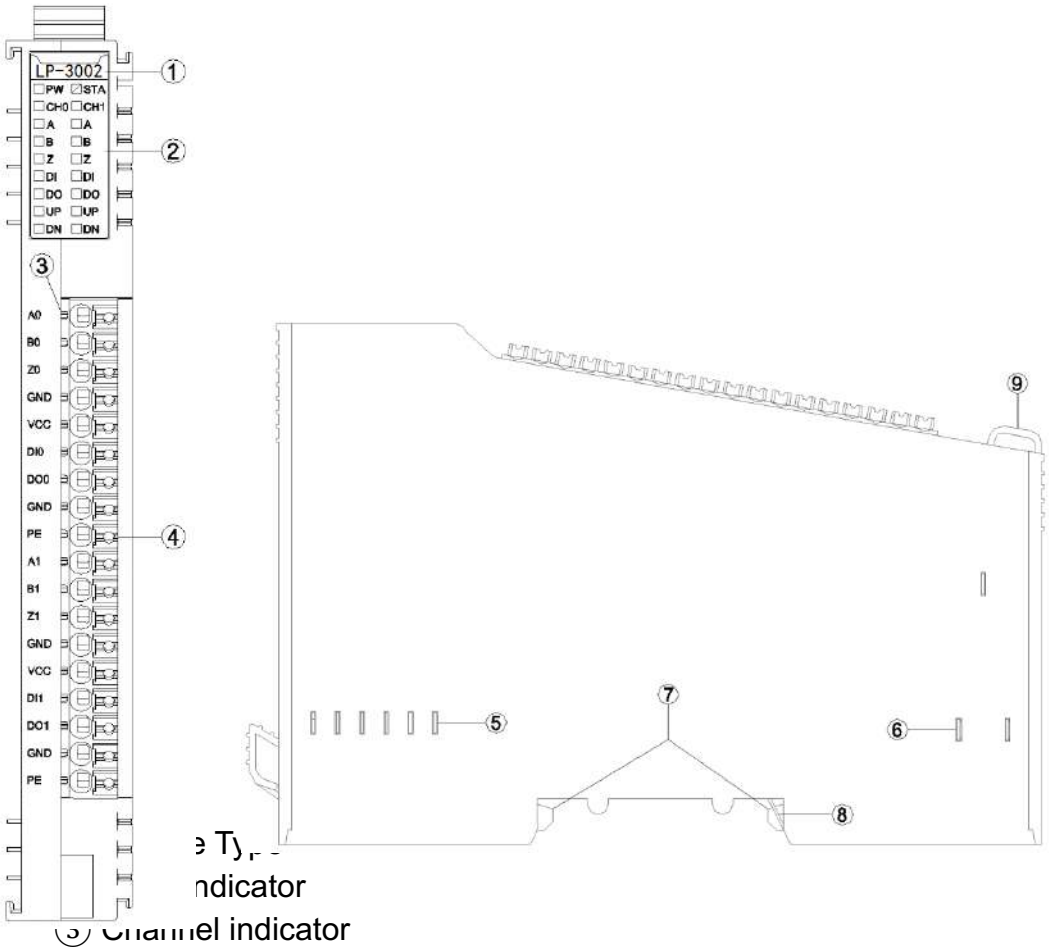
1 Module features

◆ the module supports two channels of encoder input.
◆ each encoder channel supports A/B incremental encoder or pulse-directional encoder input.
◆ each encoder channel supports orthogonal A/B signal input, input voltage 24V, and it supports source and sink input.
◆ the incremental encoder mode supports x1/ x2 / x4 frequency multiplication mode.
◆ the pulse - direction mode supports nondirectional signal, pulse input only.
◆ each encoder channel supports 1 digital input signal with an input voltage of 5Vdc or 24Vdc.
◆ each encoder channel supports 1 digital output signal with an output voltage of 24Vdc.
◆ each encoder channel supports 1 way of 24V power output, which can be connected to the encoder for power supply.
◆ the module internal bus and field input adopt magnetic isolation.
◆ the module carries 16 LED indicators.
◆ the maximum input frequency of the encoder supported by the module is 1.5MHz.
◆ the module supports measurement function, it could detect the load speed or input signal frequency.

2 Technical parameters

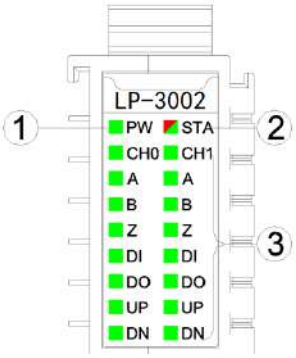
General Parameters	
Power	Max.60mA@5.0Vdc
Isolation	I/O to internal bus: magnetic isolation (3KVrms)
Field Power	Nominal:24Vdc, Range:20-28Vdc
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Input Parameters	
Channel Number	2-channel encoder
LED Indicator	16 channel input LED indicator
Encoder signal voltage range	ABZ input standard 24Vdc, range ±10%
Encoder input impedance	Internal pull-up or pull-down resistance 4.7K
Encoder filtering time	Could be set, the default value is 0.5 us
Encoder count frequency	<1.5MHz
Encoder frequency multiplication mode	x1/x2/x4
Encoder measurement function	Load speed or input signal frequency measurement
DI turn-on voltage	Min.5Vdc to Max.28Vdc
DI turn-off voltage	Max.2.7Vdc
DI turn-on current	Max.5mA/channel@28V
DI input impedance	>10.0kΩ
DI input delay	OFF to ON: Max.3ms ON to OFF: Max.2ms
DO output voltage	24V，range ±10%
DO output current	Max.500mA
DO output sink current	Max.5uA

3 Hardware interfaces



e Type
ndicator
③ Channel indicator
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

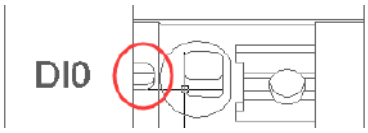
3.1 LED indicator definition



① Power LED indicator (green)
② Module State indicator LED (red/green)
③ Input channel indicator LED (green)

PW Power State	Definition
ON	Internal bus power supply normal
OFF	Internal bus power supply failure
STA Module State	Definition
Green slow flash (2.5 Hz)	Module internal bus is not started
Red slow flash (2.5 Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash (2.5 Hz) (RED/GREEN)	updating mode
Flash (10 Hz) (RED/GREEN)	firmware update
Double Flash (RED)	Module exception has been soft-restarted
CH0 CH1 channel indicator LED	Definition
ON	Channel enable
A B Z Encoder signal indicator	Definition
ON	Input signal valid
OFF	Input signal invalid
DI input indicator	Definition
ON	Input signal high level
OFF	Input signal invalid
DO output indicator	Definition
ON	Output signal high level
OFF	Output signal invalid
UP indicator	Definition
ON	Encoder in positive rotation
OFF	Encoder is stationary or in contrarotation
DN indicator	Definition
ON	Encoder in contrarotation
OFF	Encoder is stationary or in positive rotation

3.2 Field channel LED indicator (Green)

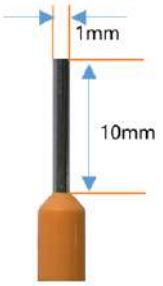


When the input signal of the input channel is valid, the corresponding field channel indicator is on (only the DI/DO/VCC wiring terminal of the encoder channel carries the indicator).

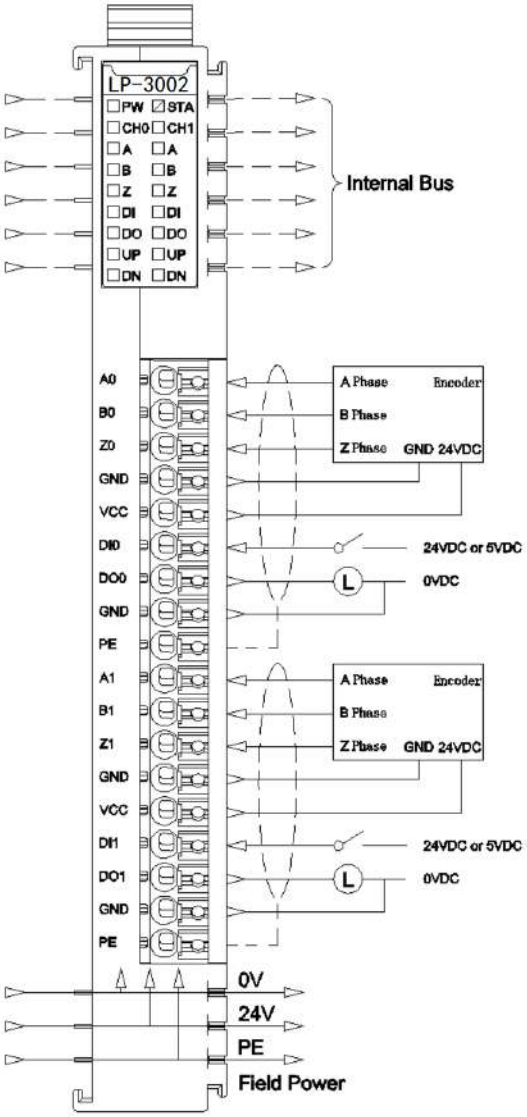
3.3 Terminal definition

Terminal Number	Symbol	Description
1	A0	CH0 encoder phase A input
2	B0	CH0 encoder phase B input
3	Z0	CH0 encoder phase Z input
4	GND	Signal ground
5	VCC	24V power output
6	DI0	CH0 digital signal input
7	DO0	CH0 digital signal output
8	GND	Signal ground
9	PE	Shield earthing
10	A1	CH1 encoder phase A input
11	B1	CH1 encoder phase B input
12	Z1	CH1 encoder phase Z input
13	GND	Signal ground
14	VCC	24V power output
15	DI1	CH1 digital signal input
16	DO1	CH1 digital signal output
17	GND	Signal ground
18	PE	Shield earthing

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:



4 Wiring


LP-3002
PW STA
CH0 CH1
A A
B B
Z Z
DI DI
DO DO
UP UP
DN DN
Internal Bus
A0
B0
Z0
GND
VCC
DI0
DO0
GND
PE
A1
B1
Z1
GND
VCC
DI1
DO1
GND
PE
A Phase
B Phase
Z Phase
Encoder
GND 24VDC
24VDC or 5VDC
0VDC
L
0V
24V
PE
Field Power

5 Process data definition

< 2 Analog Input(24V Encoder) > Submodule process data definition

Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Counter DOWN Ch#0	Counter UP Ch#0	Counter Underflow Ch#0	Counter Overflow Ch#0	DI Ch#0	Z Ch#0	B Ch#0	A Ch#0
Byte 1	Reserved							
Byte 2	Counter DOWN Ch#1	Counter UP Ch#1	Counter Underflow Ch#1	Counter Overflow Ch#1	DI Ch#1	Z Ch#1	B Ch#1	A Ch#1
Byte 3	Reserved							
Byte 4	Counter value Ch#0							
Byte 5								
Byte 6								
Byte 7								
Byte 8	Capture value Ch#0							
Byte 9								
Byte 10								
Byte 11								
Byte 12	Measurements 1 Ch#0							
Byte 13								
Byte 14								
Byte 15								
Byte 16	Measurements 2 Ch#0							
Byte 17								
Byte 18								
Byte 19								
Byte 20	Counter value Ch#1							
Byte 21								
Byte 22								
Byte 23								
Byte 24	Capture value Ch#1							

Byte 25								
Byte 26								
Byte 27								
Byte 28	Measurements 1 Ch#1							
Byte 29								
Byte 30								
Byte 31								
Byte 32	Measurements 2 Ch#1							
Byte 33								
Byte 34								
Byte 35								
Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved					Flow Clear Ch#0	Counter Set Trigger Ch#0	DO Ch#0
Byte 1	Reserved							
Byte 2	Reserved					Flow Clear Ch#1	Counter Set Trigger Ch#1	DO Ch#1
Byte 3	Reserved							
Byte 4	Set Value for Counter Ch#0							
Byte 5								
Byte 6								
Byte 7								
Byte 8	Set Value for Counter Ch#1							
Byte 9								
Byte 10								
Byte 11								

Data Declaration：

Input data definition:

A/B/Z Ch#(0-1)：The position is 1 when the corresponding channel A/B/Z input signal is valid, and 0 when the input is invalid.

DI Ch#(0-1)：Digital input signal status.

Counter Overflow Ch#(0-1)：Counter overflowed flag bit.
Counter Underflow Ch#(0-1)：Counter underflows flag bit.
Counter UP：Encoder positive rotation, counter up counting sign.
Counter DOWN：Encoder contrarotation, counter down count flag.
Counter Value Ch#(0-1)：Pulse count value, 32 - bit signed integer, automatically clear after overflow.
Capture value Ch#(0-1)：Pulse capture value, 32-bit signed integer, and when DI is set to capture, the pulse count value will be captured to the capture value at the selected edge.
Measurements 1 Ch#(0-1)：Measurement value 1, the measurement value will be output according to the measurement value type selected by the user (view the configuration parameter section of the module for optional measurement value)
Measurements 2 Ch#(0-1)：Measurement value 2, the measurement value will be output according to the measurement value type selected by the user (view the configuration parameter section of the module for optional measurement value)
Output data definition:
DO Ch#(0-1)：Digital output channel control.
Counter Set Trigger CH#(0-1)：Counter set trigger bit, rising edge trigger counter set, the output value Set Value for Counter will be updated to Counter Value, this function can be used to set the initial value of the counter.
Flow Clear CH#(0-1)：Overflow clear bit, the rising edge can clear the input Counter Overflow and Counter Underflow flag bits.
Set Value for Counter Ch#(0-1)：Counter set value.

6 Configuration parameters definition

<2 Analog Input(24V Encoder)> Submodule configuration parameter definition

Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved					16Bit Data Format	32Bit Data Format	
Byte 1	Reserved					Work Mode Ch#0		
Byte 2	Reserved						Frequency Multiplication Ch#0	
Byte 3	Reserved			Filtering Time Ch#0				
Byte 4	Reserved							Counter Storage Ch#0
Byte 5	Reserved						Encode Output Signal Type Ch#0	
Byte 6	Reserved							DI Function Selection Ch#0
Byte 7	Reserved						Capture Mode Ch#0	
Byte 8 … Byte 17	Reserved							
Byte 18	Reserved					Speed Measurement Time Ch#0		
Byte 19	Reserved		Measurements 2 Type Ch#0			Measurements 1 Type Ch#0		
Byte	Encoder Resolution Ch#0							

Byte 20 Byte 21								
Byte 22 Byte 23	Transmission Ratio Active Ch#0							
Byte 24 Byte 25	Transmission Ratio Slave Ch#0							
Byte 26 … Byte 33	Reserved							
Byte 34	Reserved						Work Mode Ch#1	
Byte 35	Reserved					Frequency Multiplication Ch#1		
Byte 36	Reserved		Filtering Time Ch#1					
Byte 37	Reserved							Counter Storage Ch#1
Byte 38	Reserved					Encode Output Signal Type Ch#1		
Byte 39	Reserved							DI Function Selection Ch#1
Byte 40	Reserved					Capture Mode Ch#1		
Byte 41 … Byte 50	Reserved							

Byte 51	Reserved		Speed Measurement Time Ch#1
Byte 52	Reserved	Measurements 2 Type Ch#1	Measurements 1 Type Ch#1
Byte 53	Encoder Resolution Ch#1		
Byte 54			
Byte 55	Transmission Ratio Active Ch#1		
Byte 56			
Byte 57	Transmission Ratio Slave Ch#1		
Byte 58			
Byte 59 … Byte 66	Reserved		

Data Declaration：

16Bit Data Format：Byte transfer order of channel state. (Default: 0)

0：A-B

1：B-A

32Bit Data Format：The byte transfer order of a channel count value. (Default: 0)

0：AB-CD

1：BA-DC

2：CD-AB

3：DC-BA

Work Mode Ch#(0-1)：Working mode of encoder. (Default: 0)

0：Incremental encoder mode.

1：Count direction mode.

2：Count up mode.

3：Count down mode.

Frequency Multiplication Ch#(0-1)：Frequency multiplication number (available only in incremental encoder mode), according to this mode it could output pulse count value. (Default: 2)

0：frequency multiplication 1

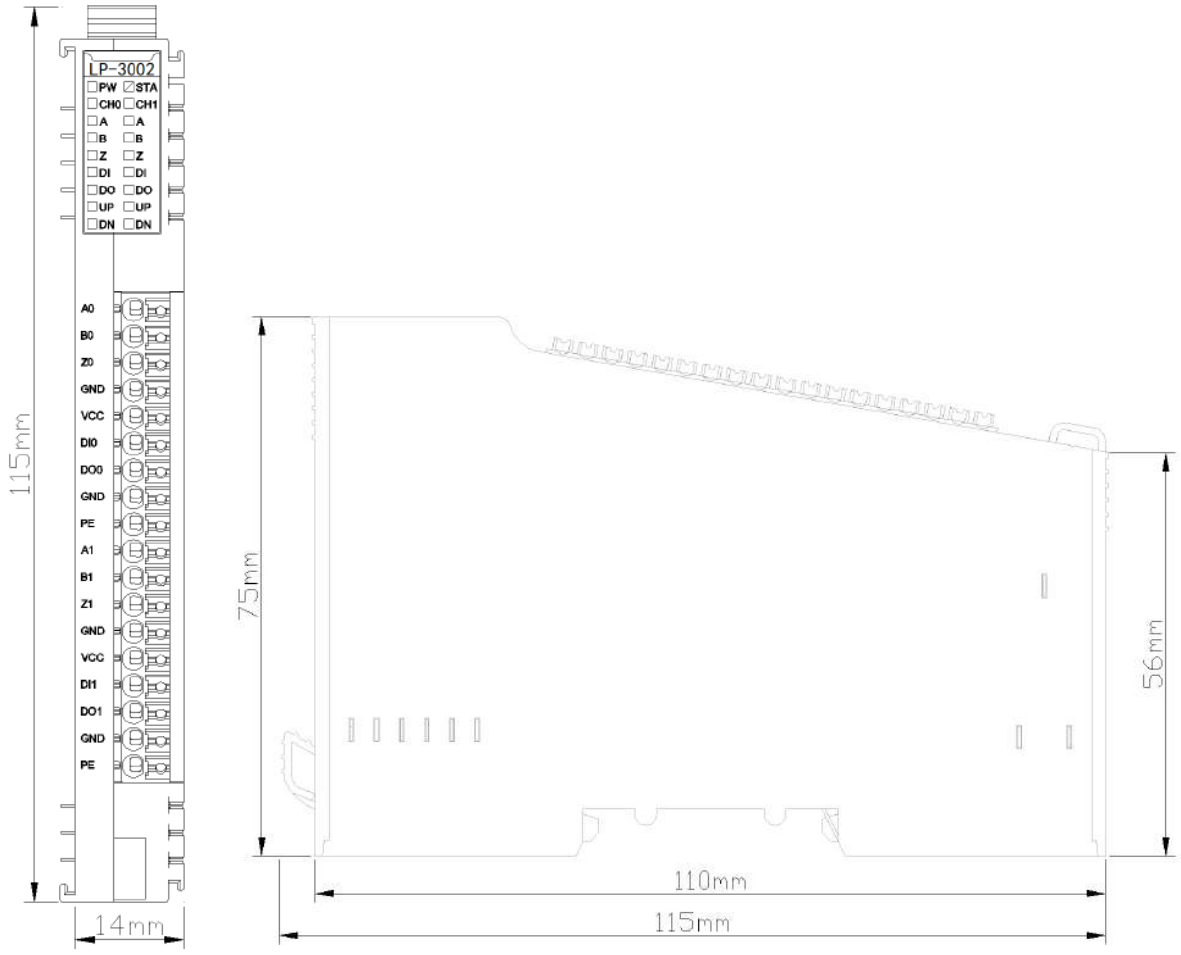
1：frequency multiplication 2

2：frequency multiplication 4

Filtering Time Ch#(0-1)：Encoder input filter time (default: 5)
0：no filter
1：0.1uS
…
5：0.5 uS
…
31：3.1 uS
Counter Storage Ch#(0-1)：Enable storage. When the storage function is enabled, the IO module will save the count value to the non-volatile memory in real time, and load the last saved count value at the next power-on. (Default: 1)
0：Disable
1：Enable
Encoder Output Signal Type Ch#(0-1)：Encoder output type (default: 0)
0：Source
1：Sink
2：Push–pull
DI Function Selection Ch#(0-1)：DI function selection (Default: 0)
0：Normal DI function
1：Pulse capture function
Capture Mode Ch#(0-1)：Capture mode (default: 0)
0：Rising edge capture
1：Falling edge capture
2：Double edge capture
Speed Measurement Time Ch#(0-1)：Speed measurement period (Default: 6)
0：10mS
1：20mS
2：50mS
3：100mS
4：200mS
5：500mS
6：1000mS
7：2000mS
Measurements 1 Type Ch#(0-1)：Measurement value 1 Type selection (default: 0)
0：No measurements
1：Measuring speed (min/rotation)
2：Measuring frequency
Measurements 2 Type Ch#(0-1)：Measurement value 2 Type selection (default: 0)
0：No measurements
1：Measuring speed (min/ rotation)
2：Measuring frequency

Encoder Resolution Ch#(0-1)：Encoder resolution (default: 1)
Value range：1-65535
Transmission Ratio Active Ch#(0-1)：1）Transmission ratio (main) (Default: 1)Value range：1-65535
Transmission Ratio Slave Ch#(0-1)：Transmission ratio (main) (Default: 1)
Value range：1-65535

A Dimension drawing



LP-5002 2-channel encoder/SSI input

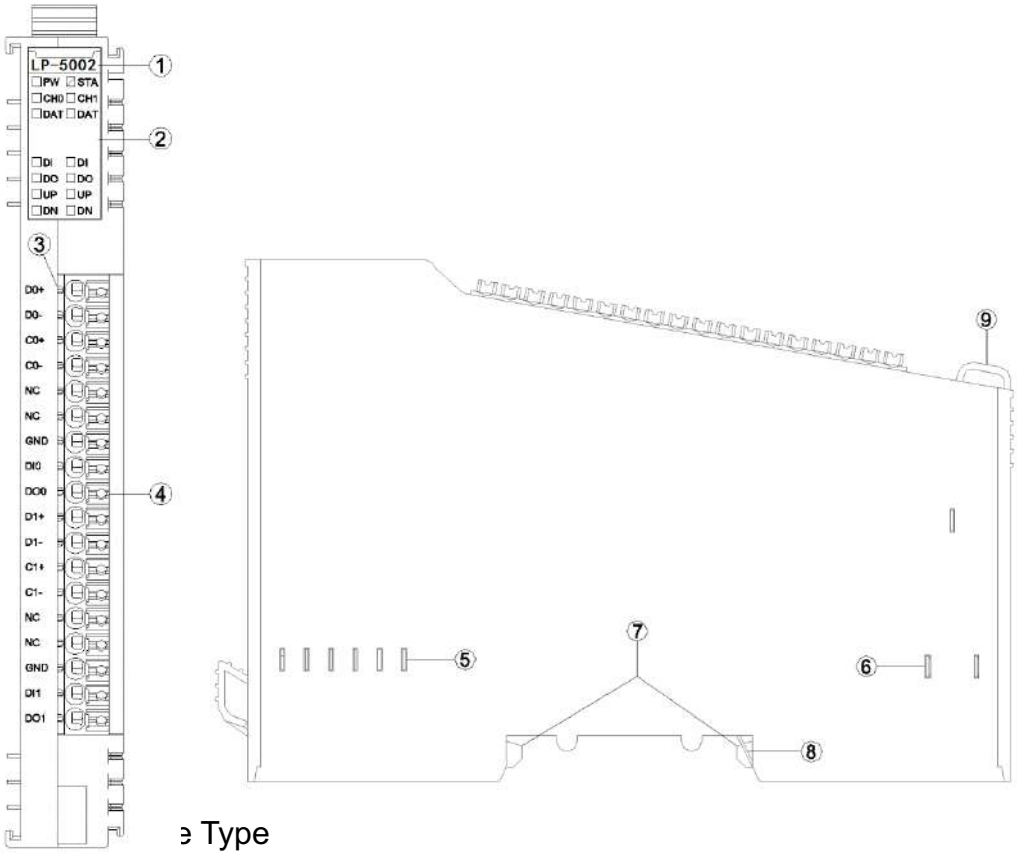
1 Module features

◆ the module supports two channels of SSI encoder input.
◆ each encoder channel supports SSI absolute encoder signal input.
◆ each encoder channel supports 1 digital input signal with an input voltage of 5Vdc or 24Vdc.
◆ each encoder channel supports 1 digital output signal with an output voltage of 5Vdc.
◆ the module internal bus and field input adopt magnetic isolation
◆ the module carries 16 LED indicators.
◆ the module supports the maximum clock frequency of 2MHz.
◆ the encoder reading interval time could be set.
◆ The data bit length and the start and end bit positions could be set.

2 Technical parameters

General Parameters	
Power	Max.60mA@5.0Vdc
Isolation	I/O to internal bus: magnetic isolation (3KVrms)
Field Power	Nominal:24Vdc, Range:20-28Vdc
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Input Parameters	
Channel Number	2-channel encoder
LED Indicator	16 channel input LED indicator
Encoder signal type	Differential signal, 5V
Data frame length	10-40 bit
Position value length	Maximun of 32 bit
Position value format	Supports gray code or binary
Location value LSB/MSB	Settable
SSI encoder clock frequency	≤2MHz
DI turn-on voltage	Min.5Vdc to Max.28Vdc
DI turn-off voltage	Max.2.7Vdc
DI turn-on current	Max.5mA/channel@28V
DI input impedance	>10.0kΩ
DI input delay	OFF to ON: Max.3ms ON to OFF: Max.2ms
DO output voltage	5V，range ±10%
DO output current	Max.500mA
DO output sink current	Max.5uA

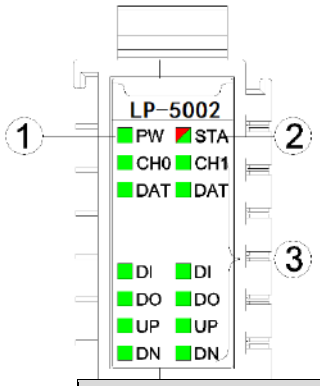
3 Hardware interfaces



ɜ Type

② State indicator
③ Channel indicator
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

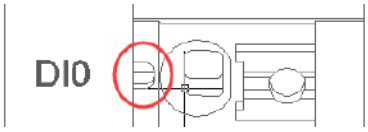
3.1 LED indicator definition



① Power LED indicator (green)
② Module State indicator LED (red/green)
③ Input channel indicator LED (green)

PW Power State	Definition
ON	Internal bus power supply normal
OFF	Internal bus power supply failure
STA Module State	Definition
Green slow flash (2.5 Hz)	Module internal bus is not started
Red slow flash (2.5 Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash (2.5 Hz) (RED/GREEN)	updating mode
Flash (10 Hz) (RED/GREEN)	firmware update
Double Flash (RED)	Module exception has been soft-restarted
CH0 CH1 channel indicator LED	Definition
ON	Channel enable
DAT channel indicator LED	Definition
ON	The input data line is at high level when idle
OFF	The input data line is at low level when idle
DI input indicator	Definition
ON	Input signal high level
OFF	Input signal invalid
DO output indicator	Definition
ON	Output signal high level
OFF	Output signal invalid
UP indicator	Definition
ON	Encoder in positive rotation
OFF	Encoder is stationary or in contrarotation
DN indicator	Definition
ON	Encoder in contrarotation
OFF	Encoder is stationary or in positive rotation

3.2 Field channel LED indicator (Green)

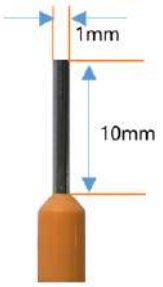


When the input signal of the input channel is valid, the corresponding field channel indicator is on (only the DI/DO wiring terminal of the encoder channel carries the indicator).

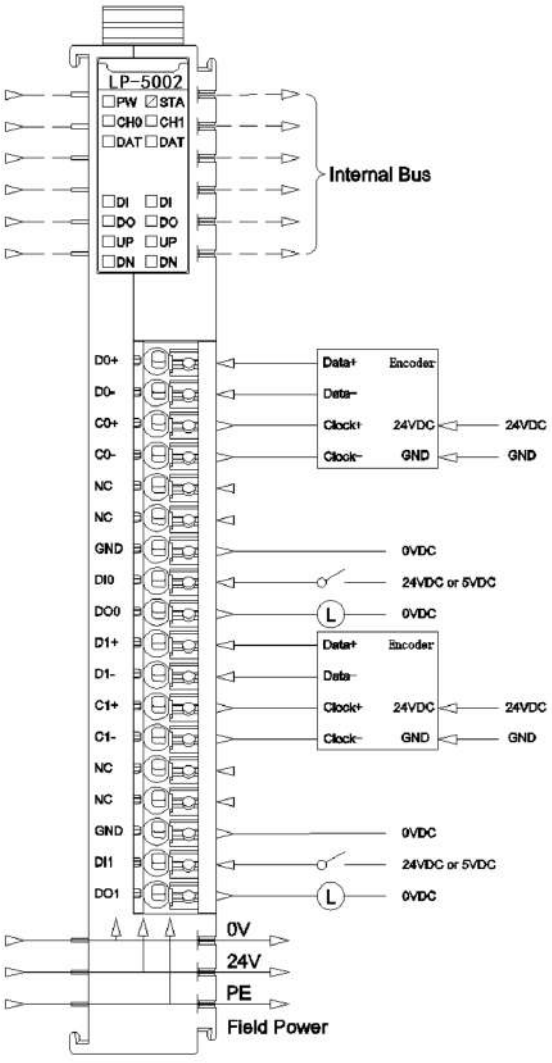
3.3 Terminal definition

Terminal Number	Symbol	Description
1	D0+	CH0 encoder data input +
2	D0-	CH0 encoder data input -
3	C0+	CH0 encoder clock output +
4	C0-	CH0 encoder clock output -
5	NC	Not connected
6	NC	Not connected
7	GND	Signal ground
8	DI0	CH0 digital signal input
9	DO0	CH0 digital signal output
10	D1+	CH1 encoder input +
11	D1-	CH1 encoder data input -
12	C1+	CH1 encoder clock output +
13	C1-	CH1 encoder clock output -
14	NC	Not connected
15	NC	Not connected
16	GND	Signal ground
17	DI1	CH1 digital signal input
18	DO1	CH1 digital signal output

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:


1mm
10mm

4 Wiring


LP-5002
PW STA
CH0 CH1
DAT DAT
DI DI
DO DO
UP UP
DN DN
Internal Bus
D0+
D0-
C0+
C0-
NC
NC
GND
DI0
DO0
D1+
D1-
C1+
C1-
NC
NC
GND
DI1
DO1
Data+ Encoder
Data-
Clock+ 24VDC
Clock- GND
24VDC
GND
0VDC
24VDC or 5VDC
0VDC
L
0V
24V
PE
Field Power

5 Process data definition

< 2 Analog Input(SSI Encoder) > Submodule process data definition

Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved				Encoder Count DOWN Ch#0	Encoder Count UP Ch#0	DI Ch#0	Data Line Status Ch#0
Byte 1	Reserved							
Byte 2	Reserved				Encoder Count DOWN Ch#1	Encoder Count UP Ch#1	DI Ch#1	Data Line Status Ch#1
Byte 3	Reserved							
Byte 4	Counter value Ch#0							
Byte 5								
Byte 6								
Byte 7								
Byte 8	Capture value Ch#0							
Byte 9								
Byte 10								
Byte 11								
Byte 12	Counter value Ch#1							
Byte 13								
Byte 14								
Byte 15								
Byte 16	Capture value Ch#1							
Byte 17								
Byte 18								
Byte 19								

Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved							DO Ch#0
Byte 1	Reserved							
Byte 2	Reserved							DO Ch#1
Byte 3	Reserved							

Data Declaration：

Data Line Status Ch#(0-1)：Indicates the idle status of the Data line of the corresponding channel（Normally, idle data is high level. If the value is 0, the polarity of the input signal is reversed, and the polarity of the input signal line needs to be switched）.

0： Data line level is low when idle

1： Data line level is high when idle

DI Ch#(0-1)：The position is 1 when the corresponding channel input signal is valid,

and 0 when the input is invalid.
0：Input signal invalid
1：Input signal valid
Encoder Count UP Ch#(0-1)：The encoder counts up and in positive rotation.
Encoder Count DOWN Ch#(0-1)：The encoder counts down and in contrarotation.
Counter Value Ch#(0-1)：Pulse count value, 32 - bit signed integer, automatically clear after overflow.
Capture value Ch#(0-1)：Pulse capture value, 32-bit signed integer, and when DI is set to capture, the pulse count value will be captured to the capture value at the selected edge.
DO Ch#(0-1)：The position is 1 when the corresponding channel output signal is valid, and 0 when the output is invalid.
0：Output signal invalid
1：Output signal valid

6 Configuration parameters definition

<2 Analog Input(SSI Encoder)> Submodule configuration parameter definition

Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved					16Bit Data Format	32Bit Data Format	
Byte 1	Reserved		Frame Bit Length Ch#0					
Byte 2	Reserved				SSI CLK Frequency Ch#0			
Byte 3	SSI Interval Time Ch#0							
Byte 4								
Byte 5	Reserved							Gray Conversion Ch#0
Byte 6	Reserved		LSB Bit of Position Value Ch#0					
Byte 7	Reserved		MSB Bit of Position Value Ch#0					
Byte 8	Reserved							Counter Storage Ch#0
Byte 9	Reserved							DI Function Selection Ch#0
Byte 10	Reserved						Capture Mode Ch#0	
Byte 11 … Byte 30	Reserved							
Byte 31	Reserved		Frame Bit Length Ch#1					
Byte 32	Reserved				SSI CLK Frequency Ch Ch#1			
Byte 33	SSI Interval Time Ch#1							
Byte 34								
Byte 35	Reserved							Gray Conversion Ch#1

Byte 36	Reserved						LSB Bit of Position Value Ch#1	
Byte 37	Reserved						MSB Bit of Position Value Ch#1	
Byte 38	Reserved							Counter Storage Ch#1
Byte 39	Reserved							DI Function Selection Ch#1
Byte 40	Reserved						Capture Mode Ch#1	
Byte 41 … Byte 60	Reserved							

Data Declaration：

16Bit Data Format：Byte transfer order of channel state. (Default: 0)

0：A-B

1：B-A

32Bit Data Format：The byte transfer order of a channel count value. (Default: 0)

0：AB-CD

1：BA-DC

2：CD-AB

3：DC-BA

Frame Bit Length Ch#(0-1)： SSI frame length of encoder. (Default value: 13) The value ranges from 10 to 40.

SSI CLK Frequency Ch#(0-1)：The clock frequency when data is read. (Default: 1)

0:125KHz

1: 250KHz

2: 500KH

3: 1.0MHz

4: 1.5MHz

5: 2.0MHz

SSI Interval Time Ch#(0-1)：Interval time (unit: 100us) the value range could be set 1 ~ 65535.

Gray Conversion Ch#(0-1)：Gray Code Conversion enabled (default: 1)

0：Disable

1：Enable

LSB Bit of Position Ch#(0-1)：LSB bit number of position value. The value range is 0 ~ 39 (default: 0)

MSB Bit of Position Ch#(0-1)：The MSB bit number of the position value. The value range is 1 ~ 40 (default: 12)

Counter Storage Ch#(0-1)：Enable storage. When the storage function is enabled, the IO module will save the count value to the non-volatile memory in real time, and load the last saved count value at the next power-on. (Default: 1)

0：Disable

1：Enable

DI Function Selection Ch#(0-1)：DI function selection (Default: 0)

0：Normal DI function

1：Pulse capture function

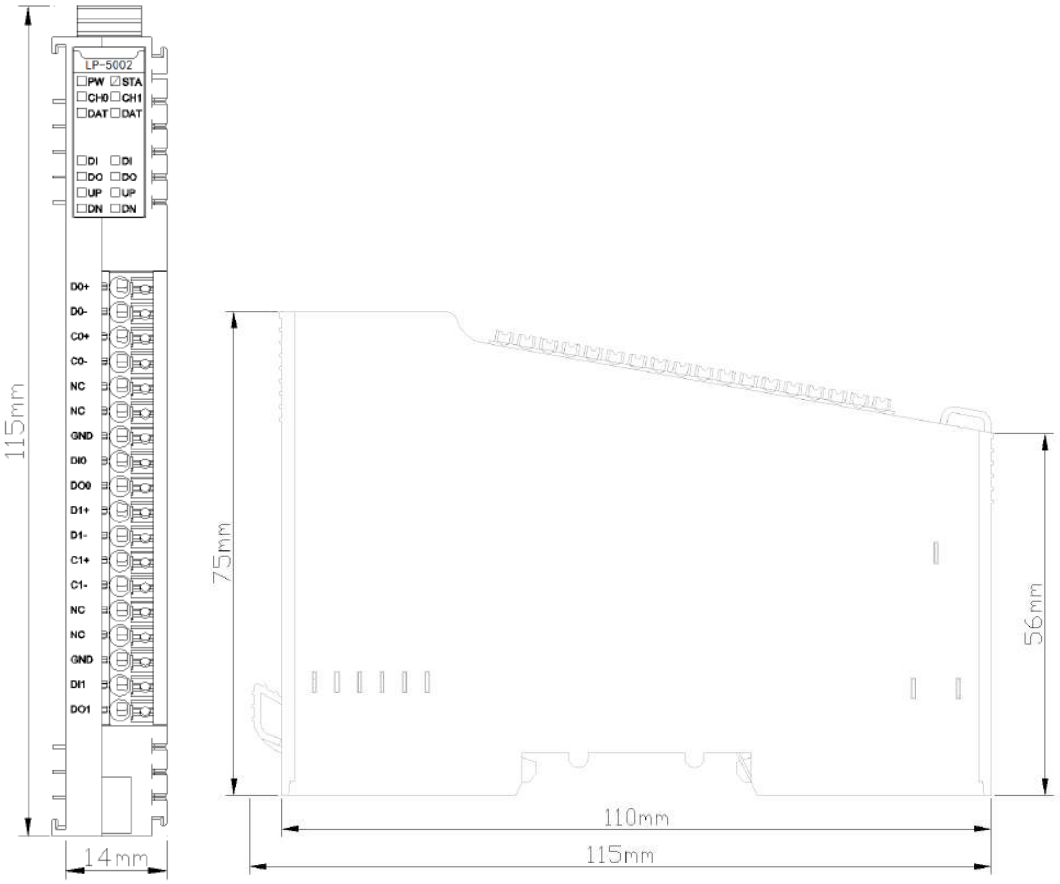
Capture Mode Ch#(0-1)：Capture mode (default: 0)

0：Rising edge capture

1：Falling edge capture

2：Double edge capture

A Dimension drawing



LP-7002 2-channel encoder /differential input

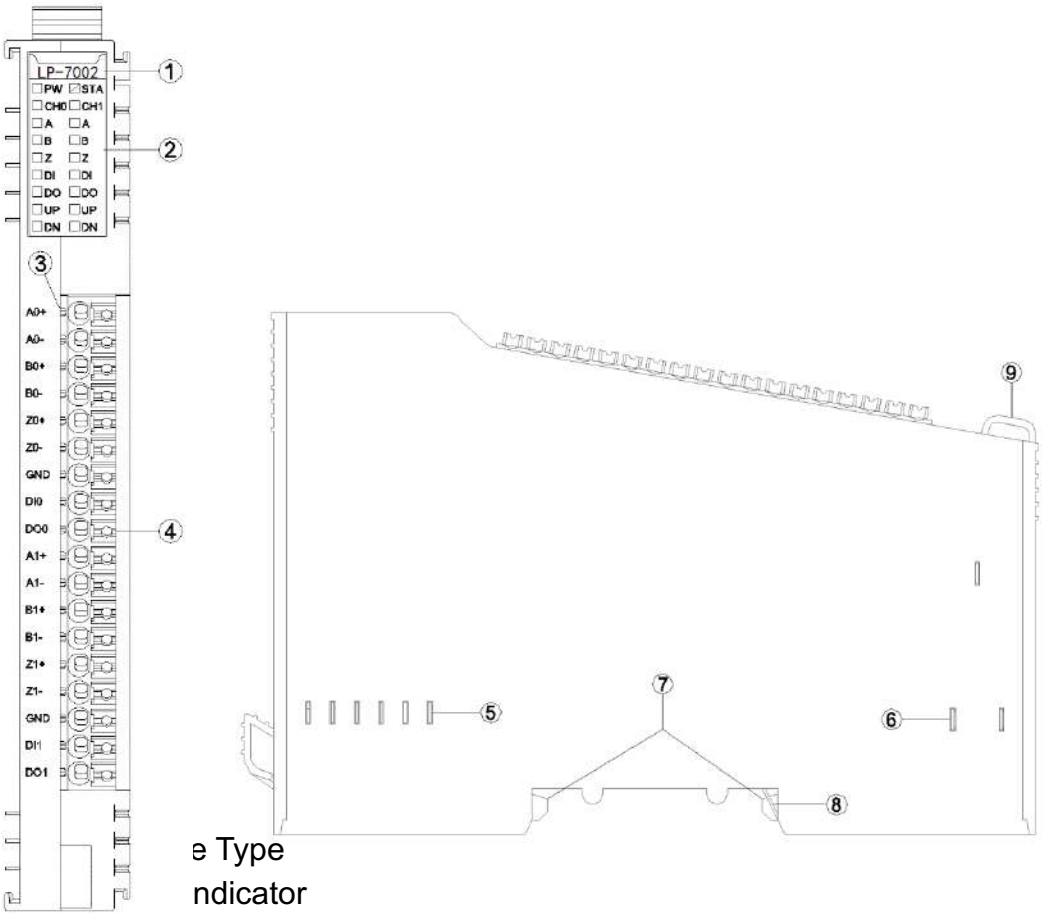
1 Module features

◆ the module supports two channels of encoder input.
◆ each encoder channel supports A/B incremental encoder or pulse-directional encoder input.
◆ each encoder channel supports orthogonal A/B differential signal input, voltage output range 0-5V.
◆ the incremental encoder mode supports x1/ x2 / x4 frequency multiplication mode.
◆ the pulse - direction mode supports nondirectional signal, pulse input only.
◆ each encoder channel supports 1 digital input signal with an input voltage of 5Vdc or 24Vdc.
◆ each encoder channel supports 1 digital output signal with an output voltage of 5Vdc.
◆ the module internal bus and field input adopt magnetic isolation.
◆ the module carries 16 LED indicators.
◆ the maximum input frequency of the encoder supported by the module is 10MHz.
◆ the module supports measurement function, it could detect the load speed or input signal frequency.

2 Technical parameters

General Parameters	
Power	Max.60mA@5.0Vdc
Isolation	I/O to internal bus: magnetic isolation (3KVrms)
Field Power	Nominal:24Vdc, Range:20-28Vdc
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20
Input Parameters	
Channel Number	2-channel encoder
LED Indicator	16 channel input LED indicator
Encoder signal type	Differential input, voltage output range of 0-5V
Encoder filtering time	Default 0.5us
Encoder count frequency	<10MHz
Encoder frequency multiplication mode	x1/x2/x4
Encoder measurement function	Load speed or input signal frequency measurement
DI turn-on voltage	Min.5Vdc to Max.28Vdc
DI turn-off voltage	Max.2.7Vdc
DI turn-on current	Max.5mA/ channel @28V
DI input impedance	>10.0kΩ
DI input delay	OFF to ON: Max.3ms ON to OFF: Max.2ms
DO output voltage	5V，range ±10%
DO output current	Max.500mA
DO output sink current	Max.5uA

3 Hardware interfaces

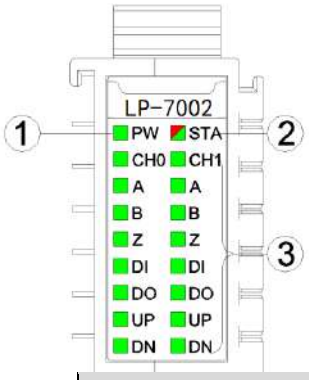


e Type

ndicator

③ Channel indicator
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

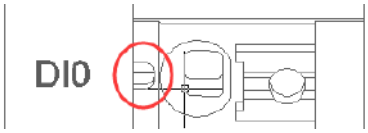
3.1 LED indicator definition



① Power LED indicator (green)
② Module State indicator LED (red/green)
③ Input channel indicator LED (green)

PW Power State	Definition
ON	Internal bus power supply normal
OFF	Internal bus power supply failure
STA Module State	Definition
Green slow flash (2.5 Hz)	Module internal bus is not started
Red slow flash (2.5 Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash (2.5 Hz) (RED/GREEN)	updating mode
Flash (10 Hz) (RED/GREEN)	firmware update
Double Flash (RED)	Module exception has been soft-restarted
CH0 CH1 channel indicator LED	Definition
ON	Channel enable
A B Z Encoder signal indicator	Definition
ON	Input signal valid
OFF	Input signal invalid
DI input indicator	Definition
ON	Input signal high level
OFF	Input signal invalid
DO output indicator	Definition
ON	Output signal high level
OFF	Output signal invalid
UP indicator	Definition
ON	Encoder in positive rotation
OFF	Encoder is stationary or in contrarotation
DN indicator	Definition
ON	Encoder in contrarotation
OFF	Encoder is stationary or in positive rotation

3.2 Field channel LED indicator (Green)



When the input signal of the input channel is valid, the corresponding field channel indicator is on (only the DI/DO wiring terminal of the encoder channel carries the indicator).

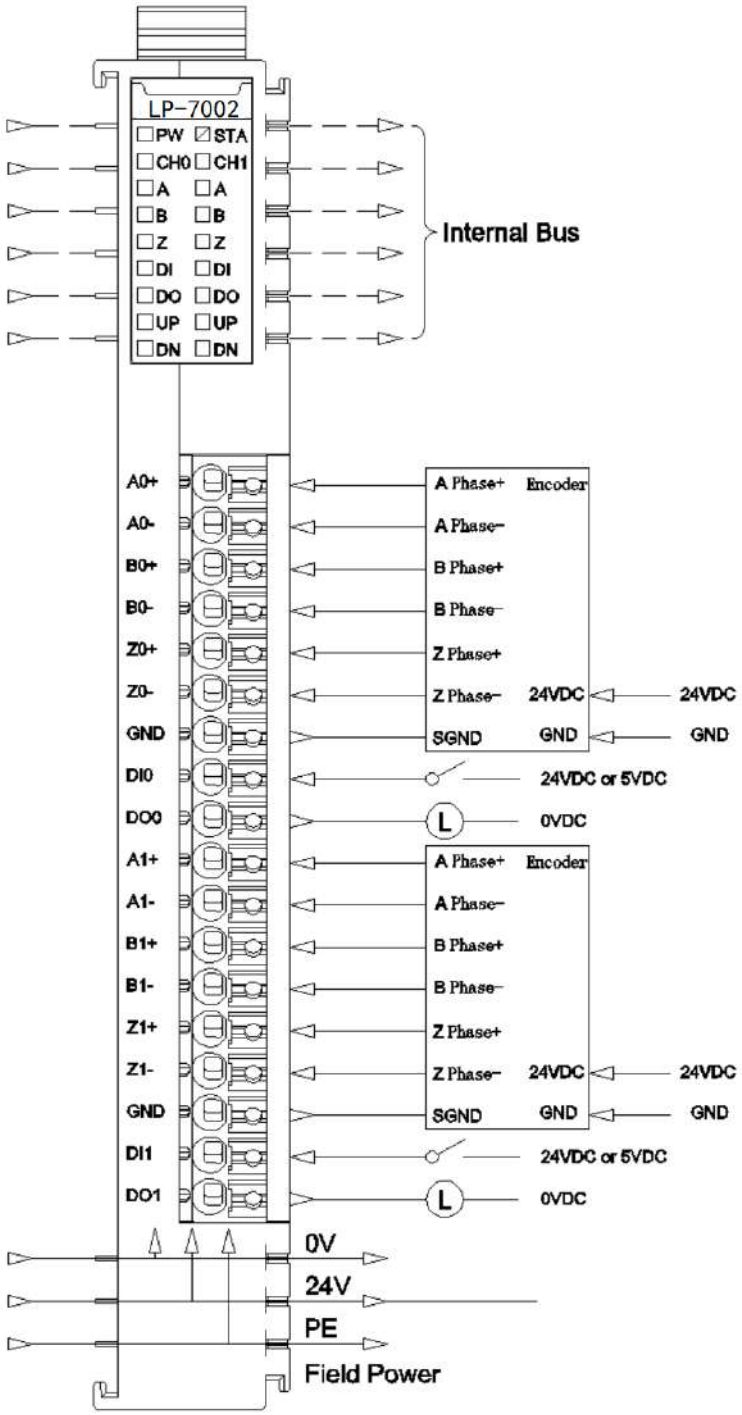
3.3 Terminal definition

Terminal Number	Symbol	Description
1	A0+	CH0 encoder phase A input +
2	A0-	CH0 encoder phase A input -
3	B0+	CH0 encoder phase B input +
4	B0-	CH0 encoder phase B input -
5	Z0+	CH0 encoder phase Z input +
6	Z0-	CH0 encoder phase Z input -
7	GND	Signal ground
8	DI0	CH0 digital signal input
9	DO0	CH0 digital signal output
10	A1+	CH1 encoder phase A input +
11	A1-	CH1 encoder phase A input -
12	B1+	CH1 encoder phase B input +
13	B1-	CH1 encoder phase B input -
14	Z1+	CH1 encoder phase Z input +
15	Z1-	CH1 encoder phase Z input-
16	GND	Signal ground
17	DI1	CH1 digital signal input
18	DO1	CH1 digital signal output

It is recommended to use cables with cores smaller than 1mm².

The cold-pressed terminal parameters are as follows:

4 Wiring


LP-7002
PW STA
CH0 CH1
A A
B B
Z Z
DI DI
DO DO
UP UP
DN DN
Internal Bus
A0+
A0-
B0+
B0-
Z0+
Z0-
GND
DI0
DO0
A1+
A1-
B1+
B1-
Z1+
Z1-
GND
DI1
DO1
A Phase+ Encoder
A Phase-
B Phase+
B Phase-
Z Phase+
Z Phase- 24VDC
SGND GND
24VDC
GND
24VDC or 5VDC
0VDC
0V
24V
PE
Field Power

5 Process data definition

< 2 Analog Input(Encoder) > Submodule process data definition

Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Counter DOWN Ch#0	Counter UP Ch#0	Counter Underflow Ch#0	Counter Overflow Ch#0	DI Ch#0	Z Ch#0	B Ch#0	A Ch#0
Byte 1	Reserved							
Byte 2	Counter DOWN Ch#1	Counter UP Ch#1	Counter Underflow Ch#1	Counter Overflow Ch#1	DI Ch#1	Z Ch#1	B Ch#1	A Ch#1
Byte 3	Reserved							
Byte 4	Counter value Ch#0							
Byte 5								
Byte 6								
Byte 7								
Byte 8	Capture value Ch#0							
Byte 9								
Byte 10								
Byte 11								
Byte 12	Measurements 1 Ch#0							
Byte 13								
Byte 14								
Byte 15								
Byte 16	Measurements 2 Ch#0							
Byte 17								
Byte 18								
Byte 19								
Byte 20	Counter value Ch#1							
Byte 21								
Byte 22								
Byte 23								
Byte 24	Capture value Ch#1							

Byte 25								
Byte 26								
Byte 27								
Byte 28	Measurements 1 Ch#1							
Byte 29								
Byte 30								
Byte 31								
Byte 32	Measurements 2 Ch#1							
Byte 33								
Byte 34								
Byte 35								
Output Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved					Flow Clear Ch#0	Counter Set Trigger Ch#0	DO Ch#0
Byte 1	Reserved							
Byte 2	Reserved					Flow Clear Ch#1	Counter Set Trigger Ch#1	DO Ch#1
Byte 3	Reserved							
Byte 4	Set Value for Counter Ch#0							
Byte 5								
Byte 6								
Byte 7								
Byte 8	Set Value for Counter Ch#1							
Byte 9								
Byte 10								
Byte 11								

Data Declaration：

Input data definition:

A/B/Z Ch#(0-1)：The position is 1 when the corresponding channel A/B/Z input signal is valid, and 0 when the input is invalid.

DI Ch#(0-1)：Digital input signal status.

Counter Overflow Ch#(0-1)：Counter overflowed flag bit.
Counter Underflow Ch#(0-1)：Counter underflows flag bit.
Counter UP：Encoder positive rotation, counter up counting sign.
Counter DOWN：Encoder contrarotation, counter down count flag.
Counter Value Ch#(0-1)：Pulse count value, 32 - bit signed integer, automatically clear after overflow.
Capture value Ch#(0-1)：Pulse capture value, 32-bit signed integer, and when DI is set to capture, the pulse count value will be captured to the capture value at the selected edge.
Measurements 1 Ch#(0-1)：Measurement value 1, the measurement value will be output according to the measurement value type selected by the user (view the configuration parameter section of the module for optional measurement value)
Measurements 2 Ch#(0-1)：Measurement value 2, the measurement value will be output according to the measurement value type selected by the user (view the configuration parameter section of the module for optional measurement value)
Output data definition:
DO Ch#(0-1)：Digital output channel control.
Counter Set Trigger CH#(0-1)：Counter set trigger bit, rising edge trigger counter set, the output value Set Value for Counter will be updated to Counter Value, this function can be used to set the initial value of the counter.
Flow Clear CH#(0-1)：Overflow clear bit, the rising edge can clear the input Counter Overflow and Counter Underflow flag bits.
Set Value for Counter Ch#(0-1)：Counter set value.

6 Configuration parameters definition

<2 Analog Input(Encoder) > Submodule configuration parameter definition

Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved					16Bit Data Format	32Bit Data Format	
Byte 1	Reserved					Work Mode Ch#0		
Byte 2	Reserved						Frequency Multiplication Ch#0	
Byte 3	Reserved			Filtering Time Ch#0				
Byte 4	Reserved							Counter Storage Ch#0
Byte 5	Reserved							DI Function Selection Ch#0
Byte 6	Reserved						Capture Mode Ch#0	
Byte 7 … Byte 16	Reserved							
Byte 17	Reserved					Speed Measurement Time Ch#0		
Byte 18	Reserved		Measurements 2 Type Ch#0			Measurements 1 Type Ch#0		
Byte 19	Encoder Resolution Ch#0							
Byte 20								
Byte 21	Transmission Ratio Active Ch#0							
Byte 22								
Byte 23	Transmission Ratio Slave Ch#0							
Byte 24								
Byte 25 … Byte	Reserved							

32								
Byte 33	Reserved						Work Mode Ch#1	
Byte 34	Reserved						Frequency Multiplication Ch#1	
Byte 35	Reserved					Filtering Time Ch#1		
Byte 36	Reserved							Counter Storage Ch#1
Byte 37	Reserved							DI Function Selection Ch#1
Byte 38	Reserved						Capture Mode Ch#1	
Byte 39 … Byte 48	Reserved							
Byte 49	Reserved						Speed Measurement Time Ch#1	
Byte 50	Reserved			Measurements 2 Type Ch#1			Measurements 1 Type Ch#1	
Byte 51	Encoder Resolution Ch#1							
Byte 52								
Byte 53	Transmission Ratio Active Ch#1							
Byte 54								
Byte 55	Transmission Ratio Slave Ch#1							
Byte 56								
Byte 57 … Byte 64	Reserved							

Data Declaration：

16Bit Data Format：Byte transfer order of channel state. (Default: 0)

0：A-B

1：B-A

32Bit Data Format：The byte transfer order of a channel count value. (Default: 0)

0：AB-CD

1：BA-DC

2：CD-AB

3：DC-BA

Work Mode Ch#(0-1)：Working mode of encoder. (Default: 0)

0：Incremental encoder mode.

1：Count direction mode.

2：Count up mode.

3：Count down mode.

Frequency Multiplication Ch#(0-1)：Frequency multiplication number (available only in incremental encoder mode), according to this mode it could output pulse count value. (Default: 2)

0：frequency multiplication 1

1：frequency multiplication 2

2：frequency multiplication 4

Filtering Time Ch#(0-1)：Encoder input filter time (default: 5)

0：no filter

1：0.1uS

…

5：0.5 uS

…

31：3.1 uS

Counter Storage Ch#(0-1)：Enable storage. When the storage function is enabled, the IO module will save the count value to the non-volatile memory in real time, and load the last saved count value at the next power-on. (Default: 1)

0：Disable

1：Enable

DI Function Selection Ch#(0-1)：DI function selection (Default: 0)

0：Normal DI function

1：Pulse capture function

Capture Mode Ch#(0-1)：Capture mode (default: 0)

0：Rising edge capture

1：Falling edge capture

2：Double edge capture

Speed Measurement Time Ch#(0-1)：Speed measurement period (Default: 6)

0：10mS

1：20mS

2：50mS

3：100mS

4：200mS
5：500mS
6：1000mS
7：2000mS

Measurements 1 Type Ch#(0-1)：Measurement value 1 Type selection (default: 0)
0：No measurements
1：Measuring speed (min/rotation)
2：Measuring frequency

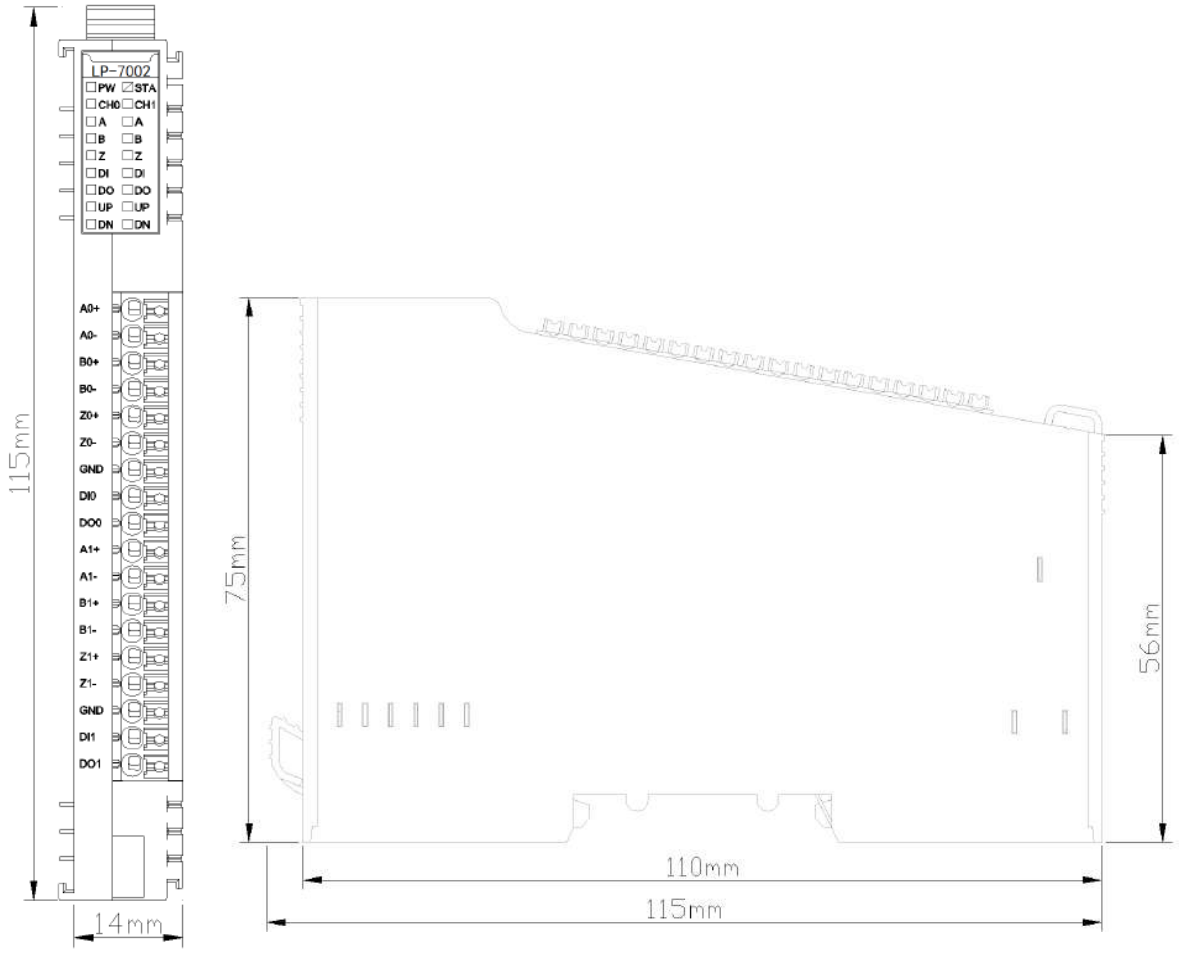
Measurements 2 Type Ch#(0-1)：Measurement value 2 Type selection (default: 0)
0：No measurements
1：Measuring speed (min/ rotation)
2：Measuring frequency

Encoder Resolution Ch#(0-1)：Encoder resolution (default: 1)
Value range：1-65535

Transmission Ratio Active Ch#(0-1)：1）Transmission ratio (main) (Default: 1)
Value range：1-65535

Transmission Ratio Slave Ch#(0-1)：Transmission ratio (main) (Default: 1)
Value range：1-65535

A Dimension drawing



7 Communication Module

LS-1111 CANopen Master Station Module

1 Module features

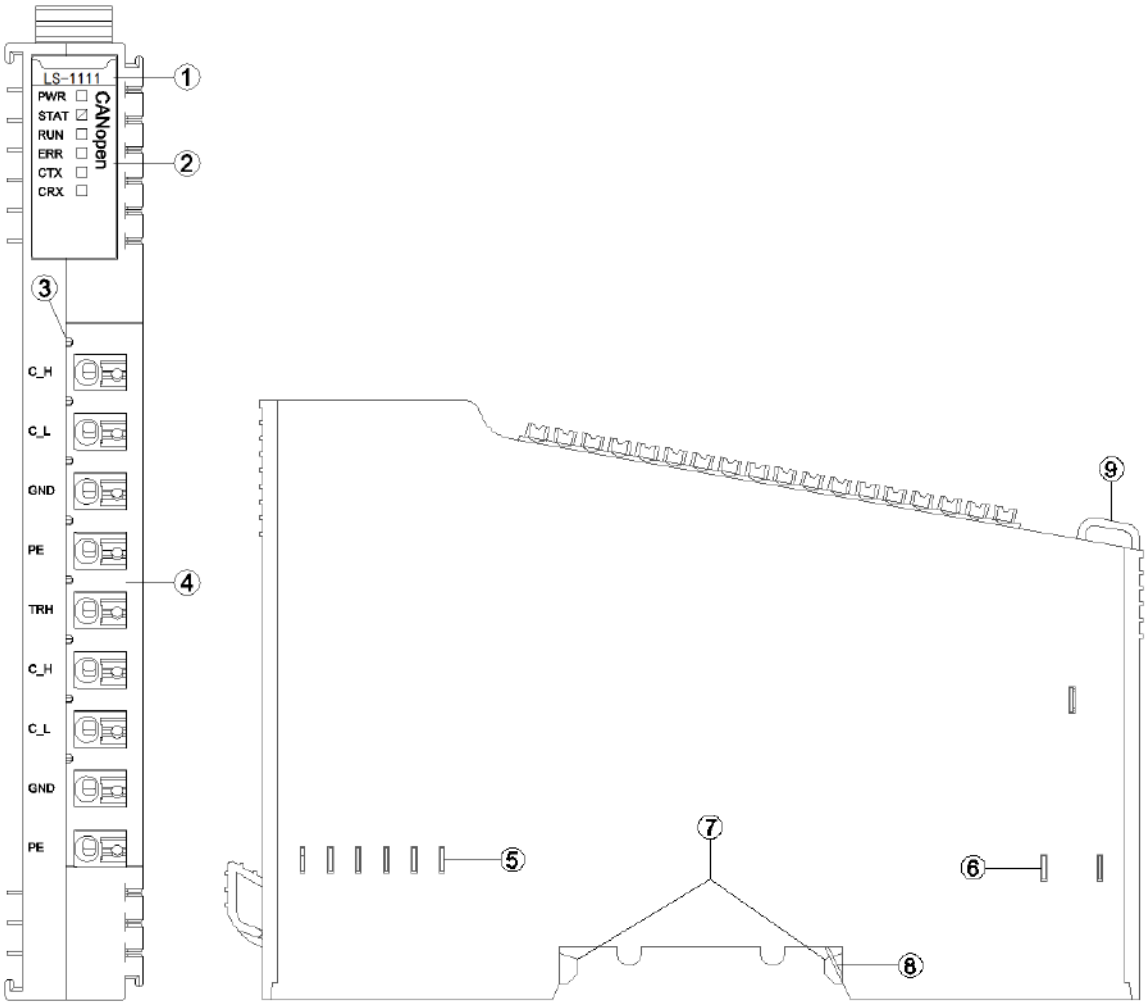
The CANopen master station module supports a single CAN interface and operates in CANopen master mode. Used in conjunction with a coupler module, it can convert the CANopen protocol to other protocols, such as Modbus TCP, Profinet, EtherCAT, Ethernet/IP, etc. The module needs to be configured through the IO Config software via its built-in Type-C interface for input and output commands.

All slave devices that support the CANopen protocol can use this module to interconnect with upper-level PLCs or host computers. This includes CANopen remote IO stations, various CANopen sensors, CANopen drivers, and more.

2 Technical Parameters

General parameters	
Power	Max.50mA@5.0Vdc
Isolation	I/O to internal bus: magnetic isolation (3KVrms)
Field Power	Rated voltage：24Vdc Input range：22~28Vdc
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mmDIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20
CAN Parameter	
Number of Channels	1channel
Interface	CAN
Protocol	CANopen Compliance DS301 V4.02
Operating Mode	CANopen Master Station
Supported Slave Stations	16stations
Baud Rate	10K~1Mbps
Supports	PDO、SDO、Heartbeat、NMT、 EMCY、Network Scanning
Supports	Automatic PDO mapping number assignment, default disabled
Supports	Automatic PDO COB-ID assignment, default disabled
Supports	One-click reset function, restore factory settings

3 Hardware Interface



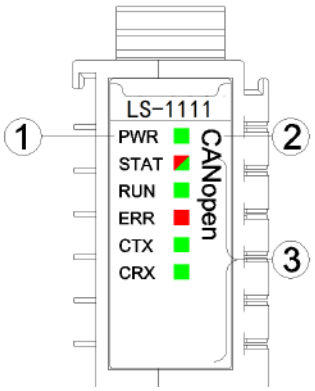
① Module Type
② State indicator
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 Terminal definition

Terminal Number	Position at the Beginning and End of CAN	Position in the Middle of CAN Bus
C_H	CAN_H Signal Line	CAN_H Signal Line
C_L	CAN_L Signal Line	CAN_L Signal Line
GND	CAN Signal Ground	CAN Signal Ground
PE	Ground Terminal	Ground Terminal
TRH	Built-in Terminal Resistor	
C_H		CAN_H Signal Line
C_L	Empty	CAN_L Signal Line
GND		CAN Signal Ground
PE		Ground Terminal

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:

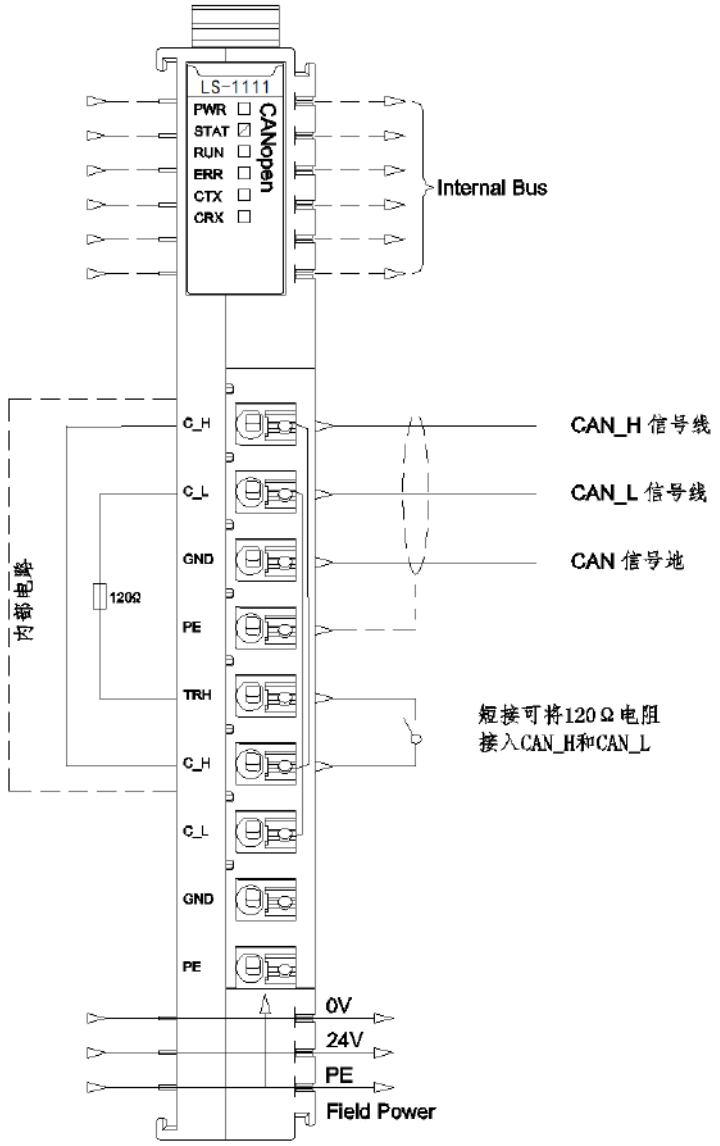
3.2 LED indicator definition



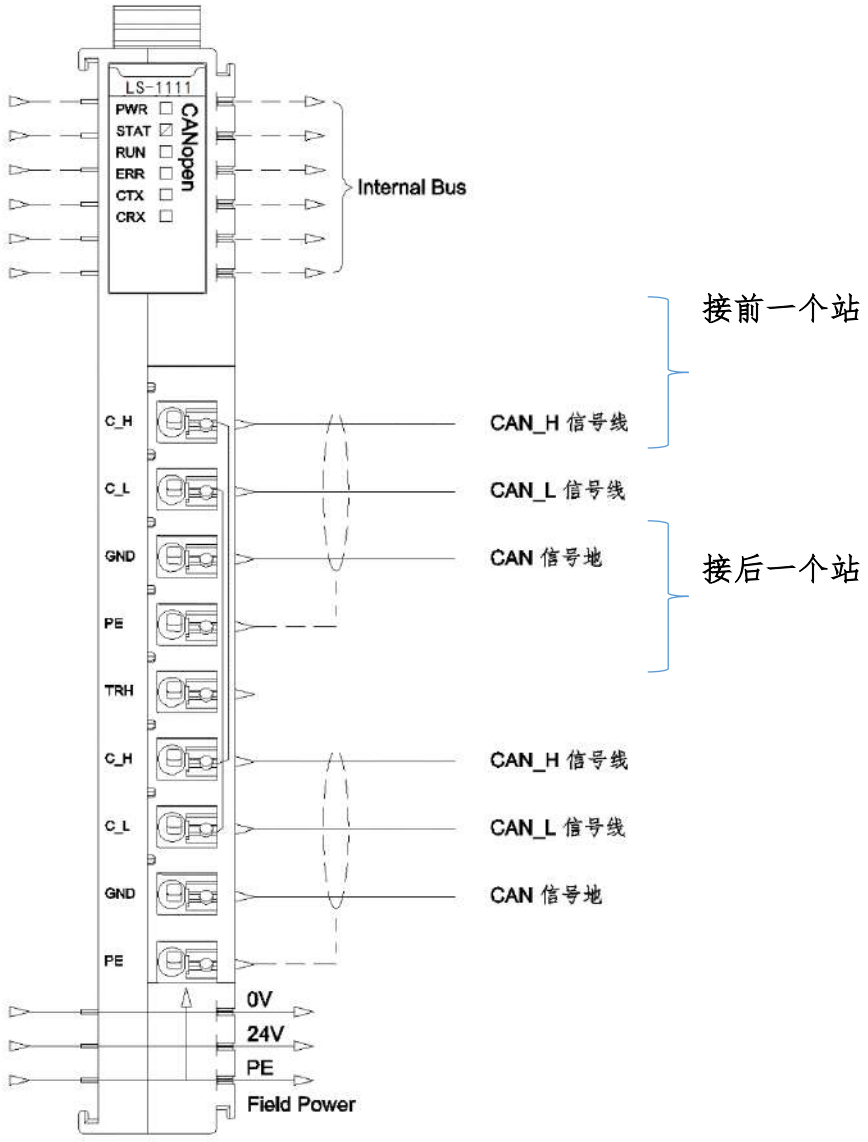
PWR Power State (RED)	Definition
ON	System Power Normal
OFF	System Power Failure
STAT Module State (RED/GREEN)	Definition
Double Flash (RED)	Module Soft Restarted by Hard-Fault
ON(GREEN)	Running
Flash(GREEN)	Stopping
Flash(2.5Hz) (RED/GREEN)	Boot Mode
Flash(10Hz) (RED/GREEN)	Firmware Updating
RUN Operation Status Indicator Light (Green Light)	Definition
Flash (2Hz)	Pre-operational state
Flash	Stopped state
ON	Operational state
ERR Error Status Indicator Light (Red Light)	Definition
Flash	CAN error frames reach warning level
Double Flash	Error control event
ON	Bus off
OFF	Bus normal
CTX CAN Transmit Indicator Light (Green Light)	Definition
Flash	CAN is transmitting data
OFF	CAN is not transmitting data
CRX CAN Receive Indicator Light (Green Light)	Definition
Flash	CAN is receiving data

OFF	CAN is not receiving data

4 Wiring



模块CT-5331接在CAN总线首、尾位置



模块CT-5331接在CAN总线中间位置

5 Process Data Definition

5.1 Module Process Data Definition

The LS-1111 module itself does not have input/output process data.

5.2 Submodule Process Data Mapping

The network coupler reads and writes the input/output process data of the LS-1111's submodules in real time through the internal bus.

6 Configuration Parameter Definition

6.1 LS-1111 Configuration Parameter Definition

Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
BYTE0					Auto COB-ID	Auto PDO Number	Auto Start	CAN Mode
BYTE1	Manager Node ID							
BYTE2					CAN Baud Rate			
BYTE3								SYNC ENABLE
BYTE4	SYNC COBID							
BYTE5								
BYTE6	SYNC Cycle							
BYTE7								
BYTE								

E8	
BYT E9	
BYT E10	SYNC Window Length
BYT E11	
BYT E12	
BYT E13	
BYT E14	Heartbeat time
BYT E15	
BYT E16	Consumer/Producer Heartbeat Ratio
BYT E17	
BYT E18	
BYT E19	
BYT E20	SDO timeout
BYT E21	

Working Mode: Module working mode. (Default value: CANopen Master)

Auto Start: Enabled by default

Auto Generate PDO Number: Automatically allocate PDO number, enable/disable option available, (Default value: Enabled)

Auto Generate PDO COB-ID: Automatically allocate PDO COB-ID, enable/disable option available, (Default value: Enabled)

Manager Node-ID: Manager node address (Default value: 127)

CAN BaudRate: CAN baud rate (Default value: 125KBit/sec)
0: 1MBit/sec
1: 800 KBit/sec

2: 500 KBit/sec
3: 250 KBit/sec
4: 125 KBit/sec
5: 100 KBit/sec
6: 50 KBit/sec
7: 20 KBit/sec
8: 10 KBit/sec
SYNC Enable: Synchronization enable (Default: Disabled)
0: Disabled
1: Enabled

SYNC COB-ID: Synchronization identifier (Default: 0x0800)
Communication Cycle Period (us): Synchronization cycle (us), unsigned 32-bit value can be set, (Default: 0)

Synchronous Windows Length (us): Synchronous window length (us), an unsigned 32-bit value can be set, (Default: 0)

Manager Producer Heartbeat Time (ms): Manager heartbeat cycle (ms) 065535 can be set (Default: 1000)

Consumer/Producer Heartbeat Ratio: Heartbeat consumer/producer time ratio, 1.510 can be set (Default 1.5)

SDO Response Timeout: SDO response timeout (ms): Time for the master to wait for a response from the slave after sending a command. 100~2000 can be set (Default 500).

6.2 LS-1111Submodule Parameter Definition

6.2.1 CANopen Slave

The LS-1111 module supports connecting up to 16 CANopen slave devices, each station defaulting to 4 RPDOs and 4 TPDOs.

6.2.1.1 CANopen Slave Configuration Parameters

Configuration Parameters								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
BYTE0	CAN Node ID							
BYTE1						State Machine Check	Auto Star	Error Control Protocol
BYTE2	Producer Heartbeat Time(ms)							
BYTE3								
BYTE4	Consumer Heartbeat Time Node ID							
BYTE5	Consumer/Producer Heartbeat Ratio							
BYTE6								
BYTE7								
BYTE8								
BYTE9	Guard Time(ms)							
BYTE10								
BYTE11	Life Time Factor							

CAN Node ID: Slave node address: configurable from 1 to 127, default is 1

Error Control Protocol: Error control protocol, heartbeat, node guarding optional, default is heartbeat

Auto Star: Automatic operation, enabled by default

State Machine Check: State machine check, enable/disable optional, default is enabled

Producer Heartbeat Time: Heartbeat producer cycle (ms), 16-bit unsigned data, default is 1000

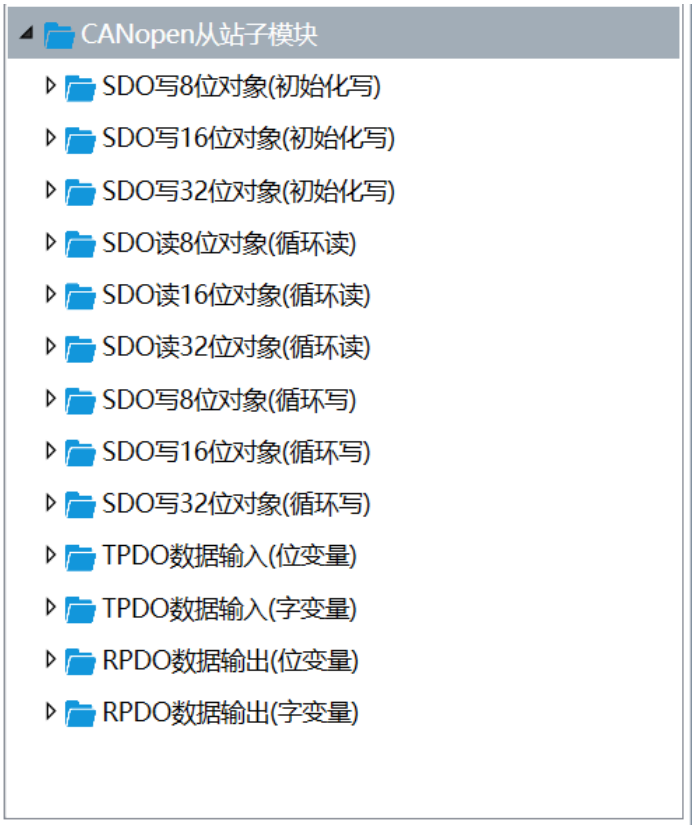
Consumer Heartbeat Time Node ID: Heartbeat consumer (node ID), configurable from 0 to 127, default is 127

Consumer/Producer Heartbeat Ratio: Heartbeat consumer/producer time ratio, configurable from 1.5 to 10, default is 1.5

Guard Time: Guard time (ms), 16-bit unsigned data, default is 1000

Life Time Factor: Lifetime factor, 8-bit unsigned data, default is 3

6.2.1.2 CANopen Slave Submodule



Includes:

- SDO Write 8-bit Object (Initial Write): Includes writing 1-8 eight-bit objects (Initial Write)
- SDO Write 16-bit Object (Initial Write): Includes writing 1-8 sixteen-bit objects (Initial Write)
- SDO Write 32-bit Object (Initial Write): Includes writing 1-8 thirty-two-bit objects (Initial Write)
- SDO Read 8-bit Object (Cyclic Read): Includes reading 1-8 eight-bit objects (Cyclic Read)
- SDO Read 16-bit Object (Cyclic Read): Includes reading 1-8 sixteen-bit objects (Cyclic Read)
- SDO Read 32-bit Object (Cyclic Read): Includes reading 1-8 thirty-two-bit objects (Cyclic Read)
- SDO Write 8-bit Object (Cyclic Write): Includes writing 1-8 eight-bit objects (Cyclic Write)
- SDO Write 16-bit Object (Cyclic Write): Includes writing 1-8 sixteen-bit objects (Cyclic Write)
- SDO Write 32-bit Object (Cyclic Write): Includes writing 1-8 thirty-two-bit objects

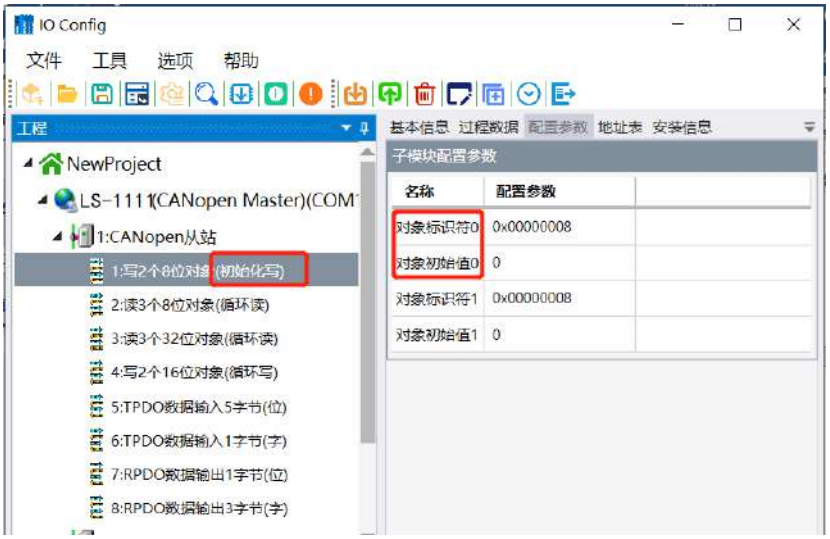
(Cyclic Write)

- TPDO Data Input (Bit Variable): Includes TPDO data input of 1-8 bytes (Bit)
- TPDO Data Input (Word Variable): Includes TPDO data input of 1-8 bytes (Word)
- TPDO Data Output (Bit Variable): Includes RPDO data input of 1-8 bytes (Bit)
- TPDO Data Output (Word Variable): Includes RPDO data input of 1-8 bytes (Word)

1. **SDO Initial Write Command Configuration Parameters include:** Object Identifier (Index + Subindex + Data Length) and Object Initial Value.

- **Object Identifier**: Object identifier, (Index + Subindex + Data Length)
- **Object Initial Value**: Object initial value

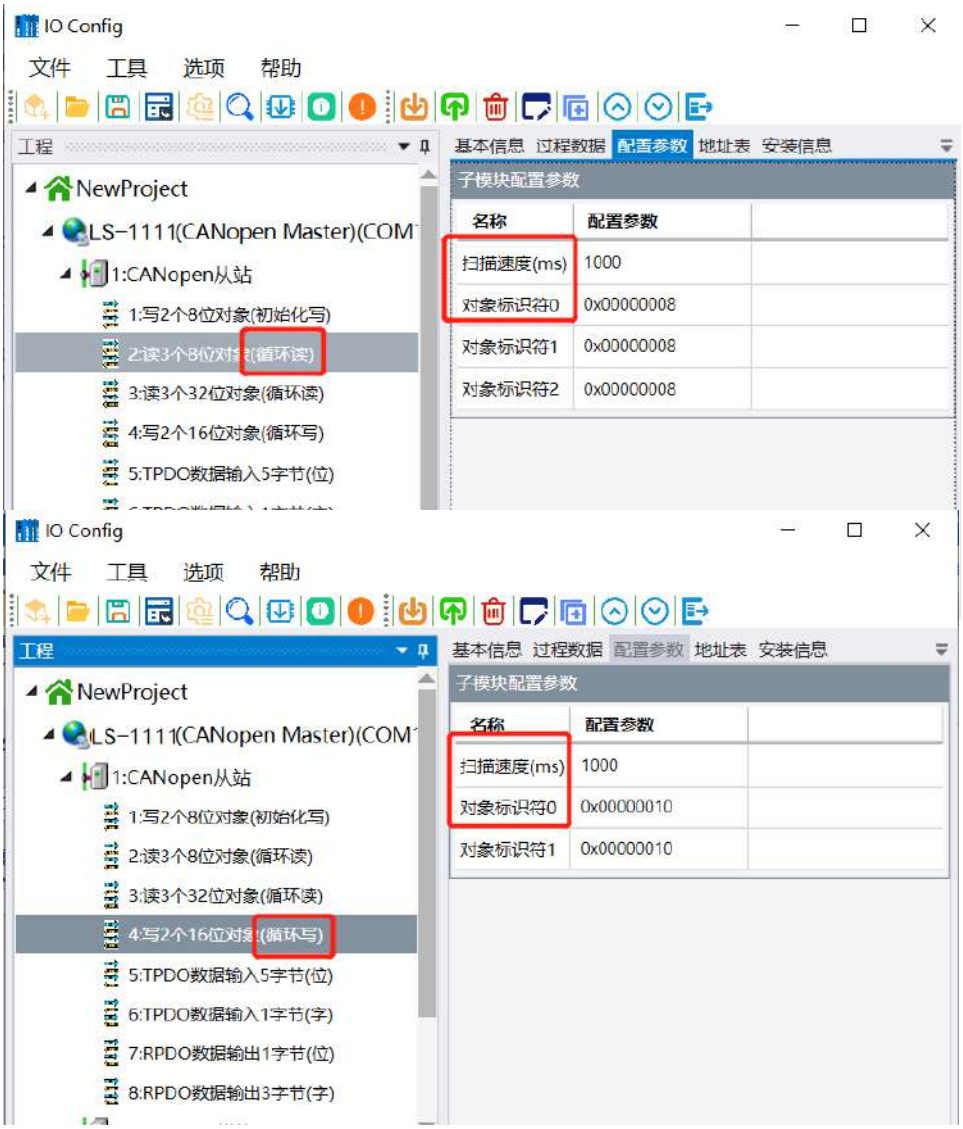
2. **SDO Read Cyclic**



Cyclic and Write Command

Configuration Parameters include: Scan Rate and Object Identifier (Index + Subindex + Data Length).

- **Scan Rate(ms):** Scan rate, default 1000ms
- **Object Identifier:** Object identifier, (Index + Subindex + Data Length)



3. **TPDO Data Input**

Configuration Parameters include：

Data Input Configuration Parameters include:

- **TPDO Number:** TPDO1, TPDO2, TPDO3... up to TPDO64
- **PDO Enable:** PDO enable, enable/disable can be set, default is enabled
- **COB-ID(HEX):** 16#0x180+Node_ID
- **Transmission Type:** Transmission type, options include synchronous (non-cyclic), **Object Identifier:** synchronous (cyclic), event-driven (vendor negotiation), event-driven (device sub-protocol specific), default: event-driven (device sub-protocol specific)
- **Transmission Rate:** Transmission rate, 8-bit unsigned data, default: 1
- **Inhibit Time(100us):** Inhibit time (100us), 16-bit unsigned data, default: 10
- **Event Timer:** Event timer (ms), 16-bit unsigned data, default: 1000
- Object identifier, (Index + Subindex + Data Length)

4. **RPDO Data Output Configuration Parameters include：**

- RPDO Number: RPDO1, RPDO2, RPDO3... up to RPDO64
- PDO Enable: PDO enable, enable/disable can be set, default is enabled
- COB-ID(HEX): 16#0x200+Node_ID
- Transmission Type: Transmission type, options include synchronous (non-cyclic), synchronous (cyclic), event-driven (vendor negotiation), event-driven (device sub-protocol specific), default: event-driven (device sub-protocol specific)
- Transmission Rate: Transmission rate, 8-bit unsigned data, default: 1
- Inhibit Time(100us): Inhibit time (100us), the minimum interval between two PDO transmissions, 16-bit unsigned data, default: 10
- Event Timer: Event timer (ms), 16-bit unsigned data, default: 1000
- Object Identifier: Object identifier, (Index + Subindex + Data Length)

6.2.2 EMCY Control Module

EMCY Control Module Configuration Parameters: EMCY overwrite disabled/enabled, optional, default: Disabled

Emergency messages are triggered by fatal errors occurring within the device and are sent to other devices with the highest priority by the relevant application device. This is suitable for interrupt-type error alarm signals.

An emergency message consists of 8 bytes, formatted as follows:

sender →receiver(s)

COB-ID	Byte 0-1	Byte2	Byte3-7

0x080+Node_ID	Error Code Error Register	Error Register (Object 0x1001)	Manufacturer-specific error field

Emergency error codes in hexadecimal are shown in the table below. The 'xx' part of the emergency error codes is defined by the respective device sub-protocol.

Table 3-5 Emergency Error Codes (Hexadecimal)

Emergency Error Code	Code Function Description
00xx	Error Reset or No Error
10xx	Generic Error
20xx	Current
21xx	Current，device input side
22xx	Current，inside the device
23xx	Current，device output side
30xx	Voltage
31xx	Mains voltage
32xx	Voltage inside the device
33xx	Output voltage
40xx	Temperature
41xx	Ambient temperature
42xx	Device tempearture
50xx	Device hardware
60xx	Device software
61xx	Internal software
62xx	User software
63xx	Data set
70xx	Additional modules
80xx	Monitoring
81xx	communication
8110	CAN overrun
8120	Error Passive
8130	Life Guard Error 或 Heartbeat Error
8140	Recovered from Bus-Off

82xx	Protocol Error
8210	PDO no processed Due to lenvgth error Due to length error
8220	Length exceedd
90xx	External error
F0xx	Additional functions
FFxx	Device specific

The Error Register (Error Register) is in the device's object dictionary (index 0x1001), and Table 3-6 explains the bit definitions of the error register. The device can map internal errors to this status byte and quickly view the current error.

For a complete translation, please provide the specific bit definitions as detailed in Table 3-6.

Bit	Error Type
0	Generic
1	Current
2	Voltage
3	Temperature
4	Communication
5	Device profile specific
6	Reserved(=0)
7	Manufacturer specific

The manufacturer-specific error field may contain other error information related to the device. Emergency messages are triggered by fatal errors occurring within the device and are sent to other devices with the highest priority by the relevant application device. This is suitable for interrupt-type error alarm signals.

The emergency alarm function is implemented by adding an EMCY control module submodule. The data address correspondence of the EMCY control module is as follows in the diagram:

字偏移	描述	高字节								低字节								
	位	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	数据说明
0	状态字	EMCYDATA_Reset	Counter_Reset	Overflow_Reset	NonEmpty_Reset	/		Overflow	NonEmpty	/	NodeID							
1	溢出计数	Overflow_Couter																
2	EMCY数据1	Error_Code																
3	EMCY数据2	Manufacture_Data_0								Error_Register								
4	EMCY数据3	Manufacture_Data_2								Manufacture_Data_1								
5	EMCY数据4	Manufacture_Data_4								Manufacture_Data_3								
0	扫描控制字	EMCYDATA_Reset	Counter_Reset	Overflow_Reset	NonEmpty_Reset	/				/ NodeID								

Note: Blue: Feedback; Green: Resettable

Control Process:

1. Wait for the input bit NonEmpty to be set to 1, indicating that one emergency message has been received.
2. Read the emergency message information NodeID, Error_Code, Error_Register, Manufacture_Data, and process the alarm information.
3. Control the rising edge of the output bit NonEmpty_Reset to clear the input NonEmpty flag.
4. If the input bit Overflow is set to 1, it indicates that current emergency messages have been discarded, and Overflow_Counter shows the number of discarded emergency messages.
5. Control the rising edge of the output bits Overflow_Reset and Counter_Reset to clear the input Overflow and Overflow_Counter.
6. The rising edge of the controllable output bit EMCYDATA_Reset can be used to clear the emergency message information NodeID, Error_Code, Error_Register, Manufacture_Data.

6.2.3 NMT Network Management

CANopen NMT (Network Management) functions can be implemented through read and write operations in the "System Control Area" of the NMT Control Field.
NMT Command Word is a network management control command, with valid command values as follows:

- 0x01: Start remote node.
- 0x02: Stop remote node.
- 0x80: Enter pre-operational state.
- 0x81: Reset node.
- 0x82: Reset communication.

Writing other NMT command values will be ignored. When the trigger bit changes from 0 to 1, an NMT command transmission will be initiated. The NMT slave address is the remote node address, with values from 1-127, and 0 represents the broadcast

address. NMT Status includes the current state of all slaves in the network (to obtain a valid slave status, the slave's error control function Node Guarding or Heartbeat must be activated). Slave status content is read-only; writing any value will be ignored. The status value corresponds to the states shown in "Table 7". The initialization state indicates that the master station has received the slave's Boot-up start message. When the master station queries the slave status timeout or receives the slave heartbeat packet timeout, it indicates the slave is offline. When receiving the slave's status information, it is in stop, operational, or pre-operational states. If no slave status information is received, it is an unknown state.

Table 7. Slave Status List

Status Value	Node Status
0x00	Initialization State
0x01	Offline State
0x04	Stop State
0x05	Operational State
0x7F	Pre-operational State

Control of slave states can be achieved by adding an NMT (Network Management) network management module submodule. The data address correspondence of the NMT network management module is as follows in the diagram:

数据方向	字偏移	描述	高字节								低字节							
		位	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
输入	0	NMT控制字	NMT命令字								0->1触发位	NodeID，0代表广播地址						
输出	0	NMT控制字	NMT命令字								0->1触发位	NodeID，0代表广播地址						

数据说明
输出的NMT控制字反馈
NMT控制字

Note: Blue color indicates data feedback

Control Process:

1. Assign the NodeID node address, representing the node ID to be operated, with 0 representing the broadcast address.
2. Assign the NMT command word.
3. A rising edge from 0 to 1 on the trigger bit initiates the sending of the NMT command.

6.2.3 SDOSDO Control Module

The online read and write functionality of SDO can be achieved through read and write operations in the SDO Control Field in the "System Control Area". The specific data encoding format is shown in "Table 9"

Table 9. SDO Control Register Encoding Format

描述	高字节								低字节								
位	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	数据说明
索引	Index																
节点ID/子索引	/	NodeID							SubIndex								
控制字	Abort_Code_Reset	Done_Reset	Error_Reset	/		SDO_Done	SDO_Error	SDO_Busy	/	Trigger	RW_Type	Byte_Len					
中止代码	Abort_Code_3								Abort_Code_2								
	Abort_Code_1								Abort_Code_0								
SDO数据1	SDO_Data_1																
.	.																
.	.																
SDO数据16	SDO_Data_16																
索引	Index																
节点ID/子索引	/	NodeID							SubIndex								
控制字	Abort_Code_Reset	Done_Reset	Error_Reset	/					/	Trigger	RW_Type	Byte_Len					
SDO数据1	SDO_Data_1																
.	.																
.	.																
SDO数据16	SDO_Data_16																

Note: Red indicates read-only; blue indicates feedback; orange indicates conditional feedback; green indicates resettable

Object Index Index, SubIndex SubIndex are the parameters of the object to be accessed. The valid address range for SDO server slave numbers is 1-127. The data type Data Type of the object dictionary is defined as shown in "Table 10".

Table 10. Object Dictionary Data Type

编号	数据类型
0x01	BOOLEAN
0x02	INTEGER8
0x03	INTEGER16
0x04	INTEGER32
0x05	UNSIGNED8
0x06	UNSIGNED16
0x07	UNSIGNED32
0x08	REAL32
0x09	VISIBLE STRING
0x0A	OCTET STRING
0x0B	UNICODE_STRING
0x0C	TIME_OF_DAY
0x0D	TIM_DIFFERENCE

Control Process: A: Read Process

1. Set the object index/subindex/node address information Index/SubIndex/NodeID.
2. Set RW_Type to 0, indicating SDO upload.
3. Trigger the start of SDO transmission by setting the Trigger bit to a rising edge; SDO_Busy bit is set to 1.
4. Wait for SDO_Done to complete and be set to 1.
5. If SDO transmission is normal, SDO_Error and Abort_Code are 0; Byte_Len stores the byte length of the read object data, and SDO_Data stores the value of the object, with the effective byte length being Byte_Len.
6. If SDO transmission fails, SDO_Error bit is set to 1; Abort_Code stores the abort code, indicating the reason for failure. Byte_Len and SDO_Data are cleared.
7. Control the rising edge of Done_Reset/Error_Reset to clear the SDO_Done/SDO_Error flags, ready for the next transmission.
8. Control the rising edge of Abort_Code_Reset to clear the Abort_Code error code.

B: Write Process

1. Set the object index/subindex/node address information Index/SubIndex/NodeID.
2. Set RW_Type to 1, indicating SDO download; set output data length and output data value Byte_Len/SDO_Data, the output value will be reflected in the corresponding input value.
3. Trigger the start of SDO transmission by setting the Trigger bit to a rising edge; SDO_Busy bit is set to 1.
4. Wait for SDO_Done to complete and be set to 1.

5. If SDO transmission is normal, SDO_Error and Abort_Code are 0.
6. If SDO transmission fails, SDO_Error bit is set to 1; Abort_Code stores the abort code, indicating the reason for failure.
7. Control the rising edge of Done_Reset/Error_Reset to clear the SDO_Done/SDO_Error flags, ready for the next transmission.
8. Control the rising edge of Abort_Code_Reset to clear the Abort_Code error code.

6.2.3 Network Scanning Module

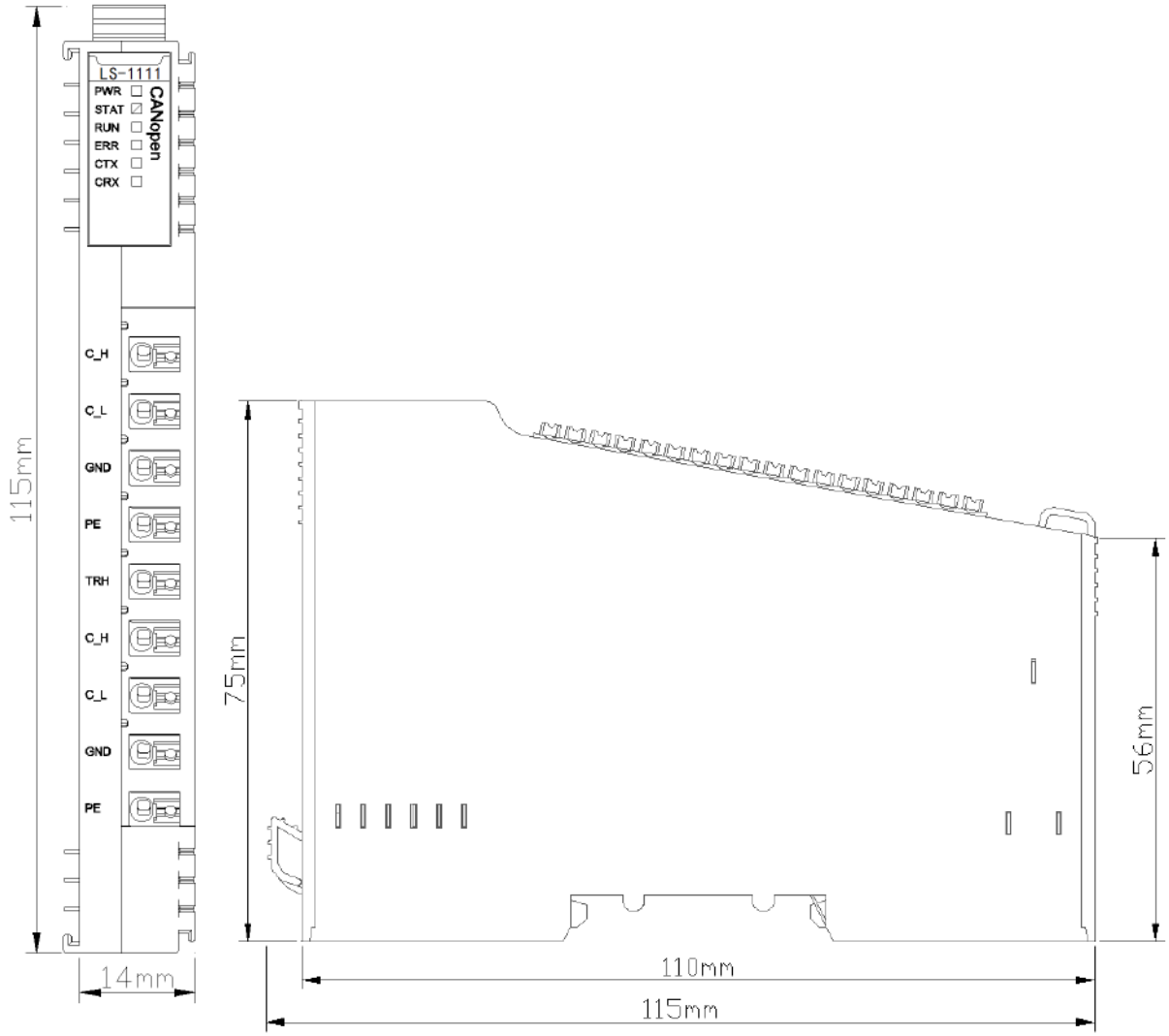
Supports scanning module node numbers including:

- Network Scanning Module 8 nodes
- Network Scanning Module 16 nodes
- Network Scanning Module 32 nodes
- Network Scanning Module 64 nodes
- Network Scanning Module 126 nodes

On a CANopen network with a maximum of 127 nodes, the gateway itself occupies one node address. The network scanning function can preliminarily scan the basic situation of slave devices on the CANopen network. Network scanning functionality is implemented by adding a network scanning module. The data address correspondence of the network scanning module is as follows in the diagram: Note: Green: Read-only; Blue: Feedback Control Process:

1. Trigger a scan by setting the output trigger bit from 0 to 1 on a rising edge.
2. The scanning status is set to 1, and the node count and module information are all reset to zero.
3. Wait for the scan to complete, and the scanning status bit is reset to zero.
4. The node count stores the total number of nodes scanned on the current network, and the module information stores node ID and node state machine information.

A Dimension drawing



LS-1211 Modbus Serial Communication Module

1 Module features

The Modbus serial port module supports 1 channel of RS485, RS232, or RS422 (choose one), supports Modbus RTU/ASCII protocol, and operates in master, slave, or transparent transmission modes.

Used in conjunction with the coupler module, it can convert Modbus protocol into other protocols, such as Modbus TCP, Profinet, EtherCAT, EtherNet/IP, etc. The module requires configuration of serial port parameters and Modbus commands in the IO Config software when in use.

RS485/RS232/RS422 interfaces supporting Modbus-RTU/ASCII protocol devices can use this product to interconnect with upper-level PLCs or PCs. This includes PLCs, DCS, distributed I/O, frequency converters, motor starting protection devices, intelligent high and low voltage electrical appliances, electrical measurement devices, intelligent field measurement equipment, and instruments, etc.

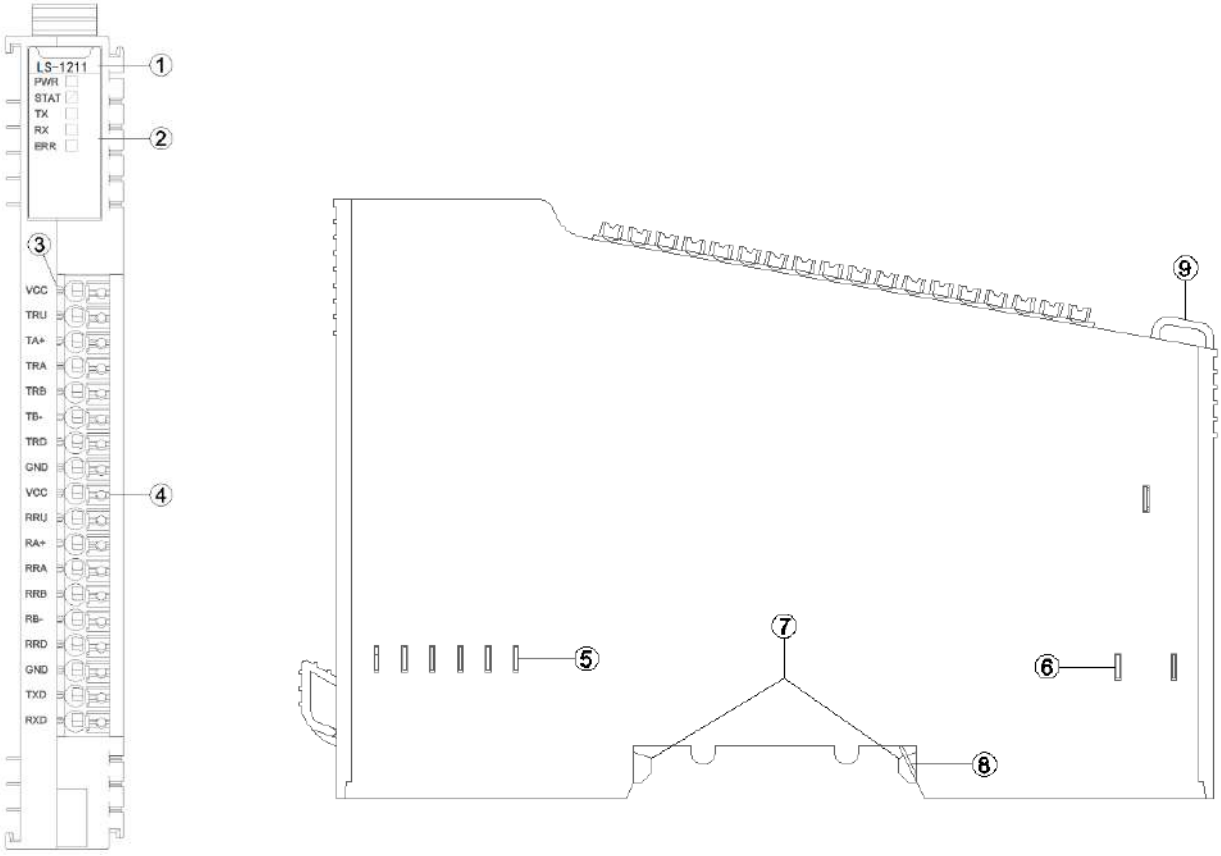
2 Technical Parameters

General parameters	
Power	Max.50mA@5.0Vdc
Isolation	I/O to internal bus: magnetic isolation (3KVrms)
Field Power	Rated voltage：24Vdc Input range：22~28Vdc
Wiring	Max.1.0mm² (AWG 17)
Mounting Type	35mmDIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20
Serial Port Parameters	
M/S/F: Channel Count	1 channel
M/S/F: Interface	RS485/RS232/RS422
M/S: Protocol	Modbus RTU/ASCII

M/S/F: Operating Mode	Modbus Master, Slave, Transparent Transmission
M/S/F: Baud	300bps-500Kbps
M/S/F: Data	7, 8 bits
M/S/F: Parity	None, Odd, Even
M/S/F: Stop Bits	1, 2 bits
M/S/F: Character Interval	1.5t-200t
F: Byte Order Conversion	Disable, Enable
M/F: Response Timeout	Customizable, default: 1000
M/F: Polling Timeout	Customizable, default: 100
M: Data Reading Handling	Maintain the last input value, Clear input value
M: Data Output Mode	Polling, Event Triggered (Data Change)
M: Module Control Enable	Disable, Enable
M: Module Control Mode	Level Trigger (Continuous Valid), Rising Edge Trigger (Single Valid)
M: Power-On Event Output	Enable, Disable
S: Slave ID	Customizable, default: 1
S: Response Time	Customizable, default: 50

Note: M: indicates parameters valid in master station mode, S: indicates parameters valid in slave station mode, F: indicates parameters valid in free transparent transmission mode.

3 Hardware Interface



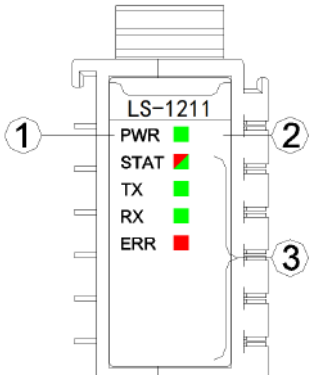
① Module Type
② State indicator
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 Terminal definition

Terminal	RS485	RS422	RS232
VCC	4.7K pull-up resistor shorted	4.7K pull-up resistor shorted (TX)	
TRU			
TA+	A+	TX+	
TRA	120R terminal resistor shorted	120R terminal resistor shorted (TX)	
TRB			
TB-	B-	TX-	
TRD	4.7K pull-down resistor shorted	4.7K pull-down resistor shorted (TX)	
GND			
VCC		4.7K pull-up resistor shorted (RX)	
RRU			
RA+		RX+	
RRA		120R terminal resistor shorted (RX)	
RRB			
RB-		RX-	
RRD		4.7K pull-down resistor shorted (RX)	
GND	GND		GND
TXD			TXD
RXD			RXD

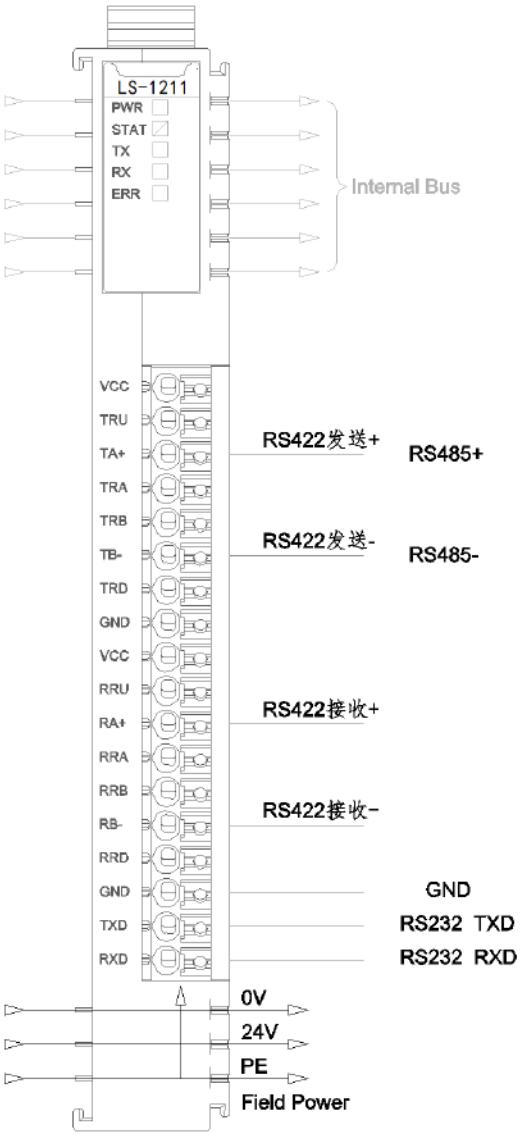
It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:

3.2 LED indicator definition



PWR Power State (RED)	Definition
ON	System Power Normal
OFF	System Power Failure
STAT Module State (RED/GREEN)	Definition
Double Flash (RED)	Module Soft Restarted by Hard-Fault
ON(GREEN)	Running
Flash(GREEN)	Stopping
Flash(2.5Hz) (RED/GREEN)	Boot Mode
Flash(10Hz) (RED/GREEN)	Firmware Updating
RUN Operation Status Indicator Light (Green Light)	Definition
Off	No data transmission
Flash	Serial port data transmission
RX Serial Port Receive Indicator Light	Meaning
Off	No data reception
Flash	Serial port data reception
ERR Operation Indicator Light	Meaning
Off	Configuration normal, communication normal
Single Flash	Communication abnormal
Flashing	Configuration error

4 Wiring


LS-1211
PWR
STAT
TX
RX
ERR
Internal Bus
VCC
TRU
TA+
TRA
TRB
TB-
TRD
GND
VCC
RRU
RA+
RRA
RRB
RB-
RRD
GND
TXD
RXD
RS422发送+
RS485+
RS422发送-
RS485-
RS422接收+
RS422接收-
GND
RS232 TXD
RS232 RXD
0V
24V
PE
Field Power

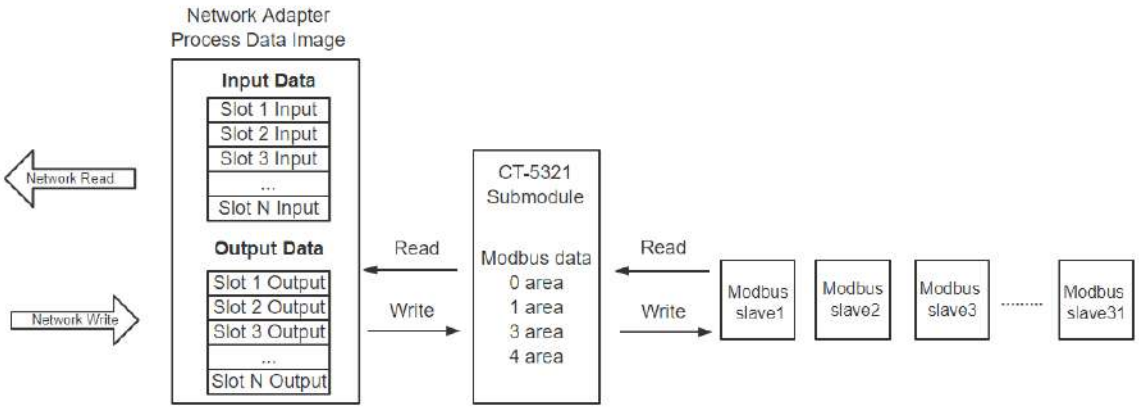
5 Process Data Definition

5.1 Module Process Data Definition

The LS-1211 module itself does not have input or output process data.

5.2 Submodule Process Data Mapping

The network coupler reads and writes the process data of the input and output of the LS-1211 submodules in real time through the internal bus. The data mapping model is as shown in the following diagram:



6 Configuration Parameter Definition

6.1 LS-1211 Configuration Parameter Definition

<table>
<tr><th colspan="9">Configuration Parameter</th></tr>
<tr><th>Bit No</th><th>Bit 7</th><th>Bit 6</th><th>Bit 5</th><th>Bit 4</th><th>Bit 3</th><th>Bit 2</th><th>Bit 1</th><th>Bit 0</th></tr>
<tr><td>Byte 0</td><td colspan="5"></td><td>Baud Rate Select</td><td colspan="2">Gateway Mode</td></tr>
<tr><td>Byte 1</td><td colspan="8" rowspan="4">Standard Baud Rate</td></tr>
<tr><td>Byte 2</td></tr>
<tr><td>Byte 3</td></tr>
<tr><td>Byte 4</td></tr>
<tr><td>Byte 5</td><td colspan="8" rowspan="4">Custom Baud Rate</td></tr>
<tr><td>Byte 6</td></tr>
<tr><td>Byte 7</td></tr>
<tr><td>Byte 8</td></tr>
<tr><td>Byte 9</td><td></td><td>Byte Swap</td><td>Serial Mode</td><td colspan="2">Stop Bits</td><td colspan="2">Parity Bits</td><td>Data Bits</td></tr>
<tr><td>Byte 10</td><td colspan="8">Char Pitch</td></tr>
<tr><td>Byte 11</td><td colspan="8" rowspan="2">Response Timeout(ms)</td></tr>
<tr><td>Byte 12</td></tr>
<tr><td>Byte 13</td><td colspan="8" rowspan="2">Delay Between Polls(ms)</td></tr>
<tr><td>Byte 14</td></tr>
<tr><td>Byte 15</td><td colspan="3"></td><td>First Output on Power-Up</td><td>Module Control Mode</td><td>Module Control Enable</td><td>Output Mode</td><td>Fault Action for Read Command</td></tr>
<tr><td>Byte 16</td><td colspan="8">Slave ID</td></tr>
<tr><td>Byte 17</td><td colspan="8" rowspan="2">Response Delay(ms)</td></tr>
<tr><td>Byte 18</td></tr>
</table>

M/S/F：Gateway Mode：Module operating mode. (Default value: Modbus Master)

0: Modbus Master
1: Modbus Slave
2: Free Port Communication Mode

M/S/F：BaudRate Select: Baud rate selection. (Default value: Standard Baud Rate)
0: Standard Baud Rate
1: Custom Baud Rate

M/S/F：Standard BaudRate: Standard baud rate (Default value: 9600bps)
0：300bps
1：600bps
2：1200bps
3：2400bps
4：4800bps
5：9600bps
6：14400bps
7：19200bps
8：38400bps
9：57600bps
10：115200bps
11：128000bps
12：230400bps
13：256000bps
14：384000bps
15：500000bps

M/S/F：Custom BaudRate: Custom baud rate: 300-500000bps adjustable, default 9600. Note: For some customers' equipment with non-standard baud rates, customization is possible.

M/S/F：Data Bits: Data Bits: Data bits, (Default value: 8 bits)
0: 7 bits
1: 8 bits

M/S/F：Parity Bits：Parity bits, (Default value: No parity)
0: No parity
1: Odd parity
2: Even parity

M/S/F：Stop Bits：Stop bits, (Default value: 1 bit)
0: 1 bit
1: 2 bits

M/S:Serial Mode: Serial mode. (Default value: RTU)
0：RTU
1：ASCII

F:Btye Swap: Serial mode. (Default value: RTU)

0: Disable

1: Enable

M/S/F:Char Pitch： Character interval: Frame interval detection time during message reception. (t is the time taken for a single character transmission, related to baud rate) (Default value: 5 characters)

0: 1.5 characters

1: 3.5 characters

2: 5 characters

3: 10 characters

4: 20 characters

5: 50 characters

6: 100 characters

7: 200 characters

M/F: Response Timeout:Response timeout (ms): Time for the master to wait for a response from the slave after sending a command. Adjustable from 1 to 65535, default 1000.

M/F:Delay Between Polls: Interval between sending Modbus commands (delay from receiving a response message from the slave to sending the next command), adjustable from 0 to 65535, default 100.

M:Fault Action for Read Command: Fault handling for read command: Data handling method after timeout in slave read data. (Default value: Maintain the last input value)

0: Maintain the last input value

1: Clear input value

M:Output Mode: Data output mode. In 'Polling mode', Modbus sends write messages periodically. In 'Event Triggered' mode, write commands are sent only when Modbus output data changes. (Default value: Polling)

0: Polling

1: Event Triggered (Data changes)

M:Module Control Enable: Module control enable. When control over Modbus read/write commands is required, select enable mode and control Modbus read/write commands through the value of 'Module Control Output'. (Default value: Disable)

0: Disable

1: Enable

M: Module Control Mode: Module control mode. This value is only effective in module control enable mode. (Default value: Level Trigger)

0: Level Trigger (Continuously valid)

1: Rising Edge Trigger (Single Trigger)

M:First Output on Power-on: Power-on event output. (Default value: Enable)

0: Disable
1: Enable

S:Slave ID: Adjustable from 1 to 247. This parameter is only effective in slave mode.

S: Respond Delay: Adjustable from 0 to 65535, default 50.

6.2 LS-1211 Submodule Parameter Definitions

6.2.1 Submodules in Master Mode

M: Diagnostic Module
M: Read Coils (0xxxx) supports 8128 bits, selectable
M: Read Discrete Inputs (1xxxx) supports 8128 bits, selectable
M: Read Input Registers (3xxxx) supports 116 words, selectable
M: Read Holding Registers (4xxxx) supports 116 words, selectable
M: Write Coils (0xxxx) supports single coil, 8128 bits, selectable
M: Write Holding Registers (4xxxx) supports single register, 116 words, selectable
M: Diagnostic Module: Includes module status input, module error code input, module control output, polling time input; commands from the drop-down menu need to be added to the first 8 rows of the slot.

Module Status Input: 8~48 channels selectable. Module status can monitor the working status of each data slot. When a fault occurs in a data slot, the corresponding status bit is set to 1 and is automatically cleared after fault recovery.

Module Error Code Input: 8-48 channels selectable. When a fault occurs in a data slot, the error code module can display the function code and specific error code of the faulty channel. Users can judge the cause of the fault based on the error code and then take corresponding adjustment measures. For detailed descriptions, refer to the "Modbus Error Code Table."

Module Control Output: 8~48 channels selectable. When the serial port parameter (M: Module Control) is in enable mode, the command's output control for read/write channels is valid.

Polling Time Input: Used to monitor the polling time of the serial port.

6.2.2 Submodules in Slave Mode

S: Diagnostic Module
S: Read Coils (0xxxx) supports 11024 Bytes, selectable
S: Read Holding Registers (4xxxx) supports 1512 words, selectable
S: Write Coils (0xxxx) supports 11024 Bytes, selectable
S: Write Discrete Inputs (1xxxx) supports 81024 Bytes, selectable
S: Write Input Registers (3xxxx) supports 1512 words, selectable

S: Write Holding Registers (4xxxx) supports 1512 words, selectable

S: Diagnostic Module

The slave module input status can monitor communication faults. Refer to the table below to check faults.

Modbus Error Codes Table

Error Codes	Fault Description	Troubleshooting Method
0x00	Working Normally	None
0x01	Illegal Function Code	The device does not support the current function code, please refer to the slave manual to select the corresponding function code module
0x02	Illegal Data Address	Data exceeds the device's address range, refer to the slave manual to modify the data start address or data length
0x03	Illegal Data Value	Data length error, data length exceeds the maximum allowable value of 125 (Word) or 2000 (Bit), modify the length
0x04	Data Processing Error	Check whether the data value range meets the requirements of the slave
0x05	Application Layer Length Mismatch	Increase the receive character interval, check the communication parameter settings
0x06	Protocol ID Error	Check the message from the sending end
0x07	Cache Address Error	Internal device error
0x08	Bit Offset Error	Internal device error
0x09	Slave ID Number Mismatch	Increase the timeout period, check the hardware connection status, check the communication parameter settings
0x0A	CRC Error	CRC error, check the communication line
0x0B	LRC Error	LRC error, check the communication line
0x0C	Response Function Code Mismatch	Check the hardware connection status
0x0D	Response Address Mismatch	Check the hardware connection status
0x0E	Response Data Length Mismatch	Check the hardware connection status
0x0F	Communication Timeout	Increase the timeout period, check the hardware connection status, check the communication parameter settings

0x10	ASCII Mode Start Character Error	':' colon start character error
0x11	ASCII Mode End Character Error	CR/LF carriage return/line feed end character error
0x12	ASCII Mode Non-character Data	Data contains non-hexadecimal ASCII characters
0x13	ASCII Mode Character Count Error	Incorrect response length from the slave

6.2.3 Submodules in Free Transparent Transmission Mode

F : Control and Status Module
F : Input and Output Data Modules support 1~512 words, selectable

Process Data Definition for Control and Status Module:

Data Direction	Data Name	Variable Name	Data Type	Byte Offset
Input Data	Output Control Word - Feedback	Control_Word_Feedback	uint16_t	0
	Send_Data_Len_Feedback	Send_Data_Len_Feedback	uint16_t	2
	COM_Status	COM_Status	uint16_t	4
	Error_Counter	Error_Counter	uint16_t	6
	Received_Counter	Received_Counter	uint16_t	8
	Received_Data_Len	Received_Data_Len	uint16_t	10
Output Data	Output Control Word	Control_Word	uint16_t	0
	Send_Data_Len	Send_Data_Len	uint16_t	2

Variable Definitio

变量名称	Bit 15-7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Control_Word_Feedback	Reseverd	Input Data Reset	Received Reset	Error Reset	Timeout Reset	Parity Reset	Done Reset	Trigger
Send_Data_Len_Feddback	Send Data Len							
COM_Status	Reseverd				Timeout Error	Parity Error	Done	Busy
Error_Counter	Error Counter							
Received_Counter	Received Counter							
Received_Data_Len	Received Data Len							
Control_Word	Reseverd	Input Data Reset	Received Reset	Error Reset	Timeout Reset	Parity Reset	Done Reset	Trigger
Send_Data_Len	Send Data Len							

Input Data Description:

1. **Control_Word_Feedback** is the feedback value of the output control word **Control_Word**. After the control word is refreshed to the module, it will be updated in the control word feedback.

2. **Send_Data_Len_Feedback** is the feedback value of the frame byte length **Send_Data_Len**. After the frame byte length is refreshed to the module, it will be updated in the frame byte length feedback.

3. In response mode, when serial data is sent, the **Busy** bit is set to 1.

3.1 If a response is received within the timeout period, the **Busy** bit is cleared, the **Done** completion bit is set to 1, the **Received_Counter** count is incremented by 1. If the received frame has parity errors, then the **Parity_Error** bit is set to 1, and the **Error_Counter** count is also incremented by 1. **Received_Data_Len** saves the byte count of the current received frame.

3.2 If no response is received within the timeout period, the **Busy** bit is cleared, the **Done** completion bit is set to 1, and the **Timeout_Error** is set to 1. The **Error_Counter** error count is incremented by 1, and the value of **Received_Data_Len** is cleared.

4. In active reporting mode, when the slave receives a data packet, the **Received_Counter** count is incremented by 1. If the received frame has parity errors, then the **Parity_Error** bit is set to 1, and the **Error_Counter** count is also incremented by 1.

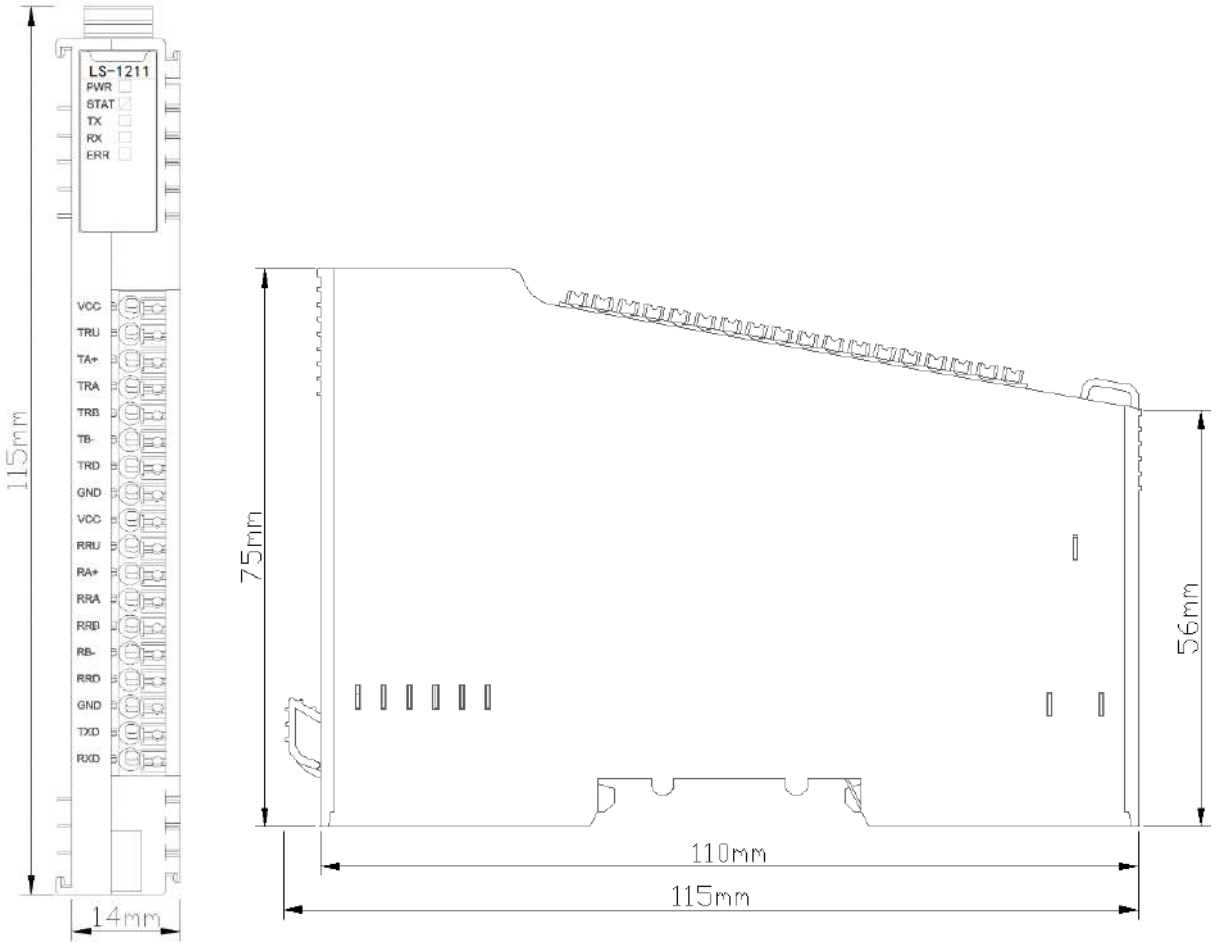
Output Data Description：

1. On the rising edge of **Received_Counter_Reset**, the received count **Received_Counter** is cleared. On the rising delay of **Error_Counter_Reset**, the error count **Error_Counter** is cleared. On the rising delay of **Timeout_Error_Reset**, **Timeout_Error** is cleared. On the rising delay of **Parity_Error_Reset**, **Parity_Error** is cleared. On the rising delay of **Done_Reset**, **Done** is cleared.

2. In active reporting mode, the **Trigger** bit is invalid, and **Send_Data_Len** is invalid.

3. In master-slave response mode, on the rising delay of **Trigger**, a serial data transmission is triggered once. The serial port will send a data packet according to the data length of **Send_Data_Len** and wait for a response for processing.

A Dimension drawing



8 Special Purpose Module

LX-1005 Bus extended master module

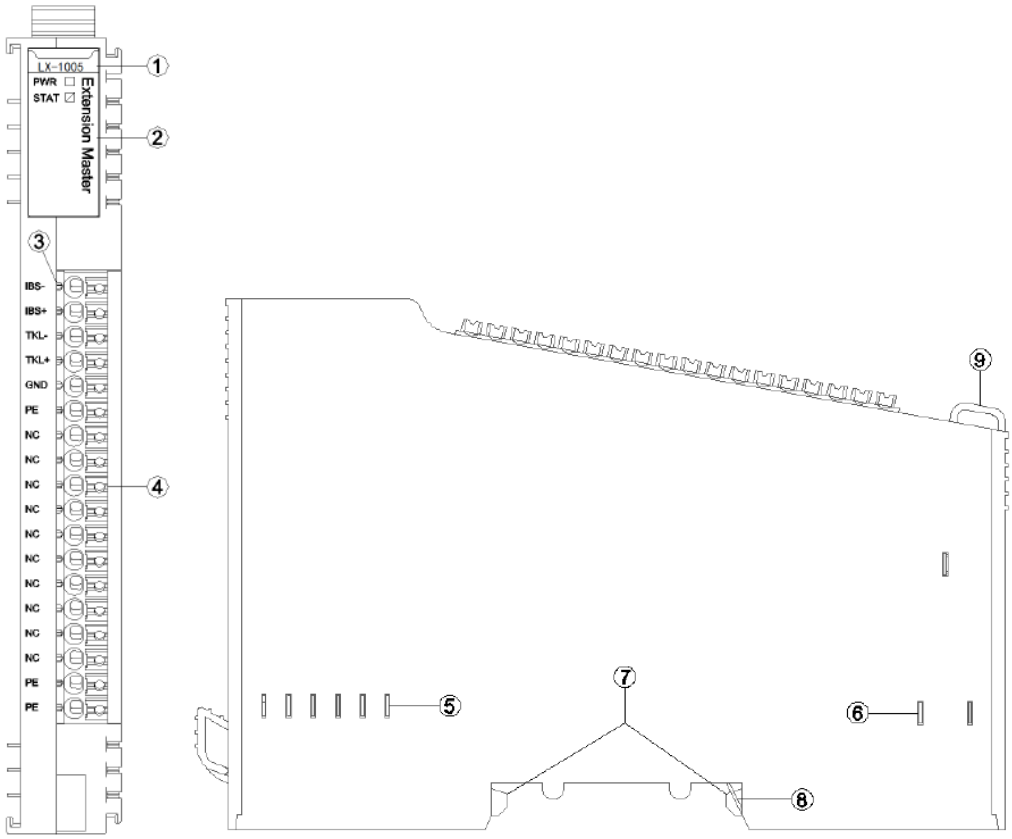
1 Module Description

The bus extened master module is used to extend the bus.The bus extended master module has no process data and configuration parameters.

2 Technical Parameters

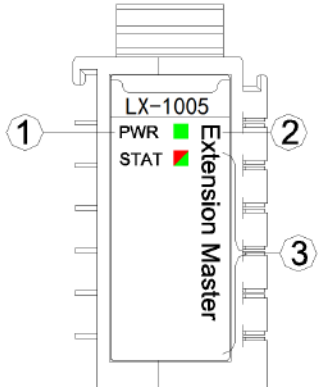
General parameters	
Power	Max.20mA@5.0Vdc
Mounting Type	35mmDIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20

3 Hardware Interface



① Module Type
② State indicator
③ Channel indicator (N/A)
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power (N/A)
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition

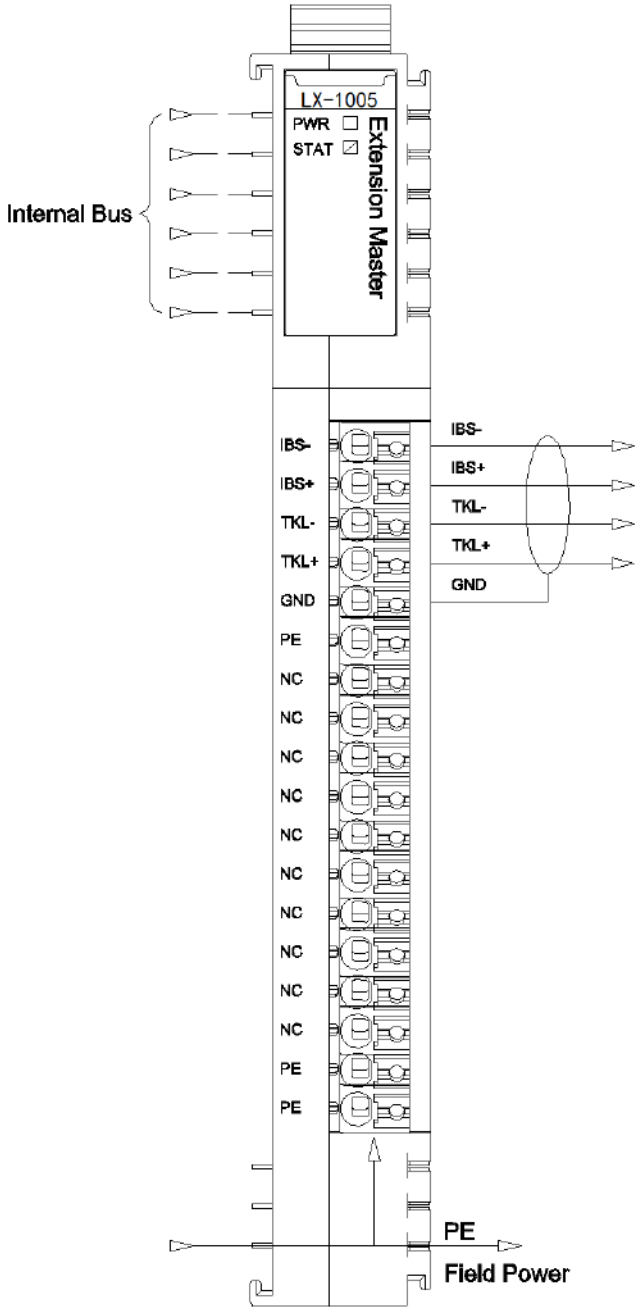


① System Power LED indicator (red)
② Bus State LED indicator (red/green)

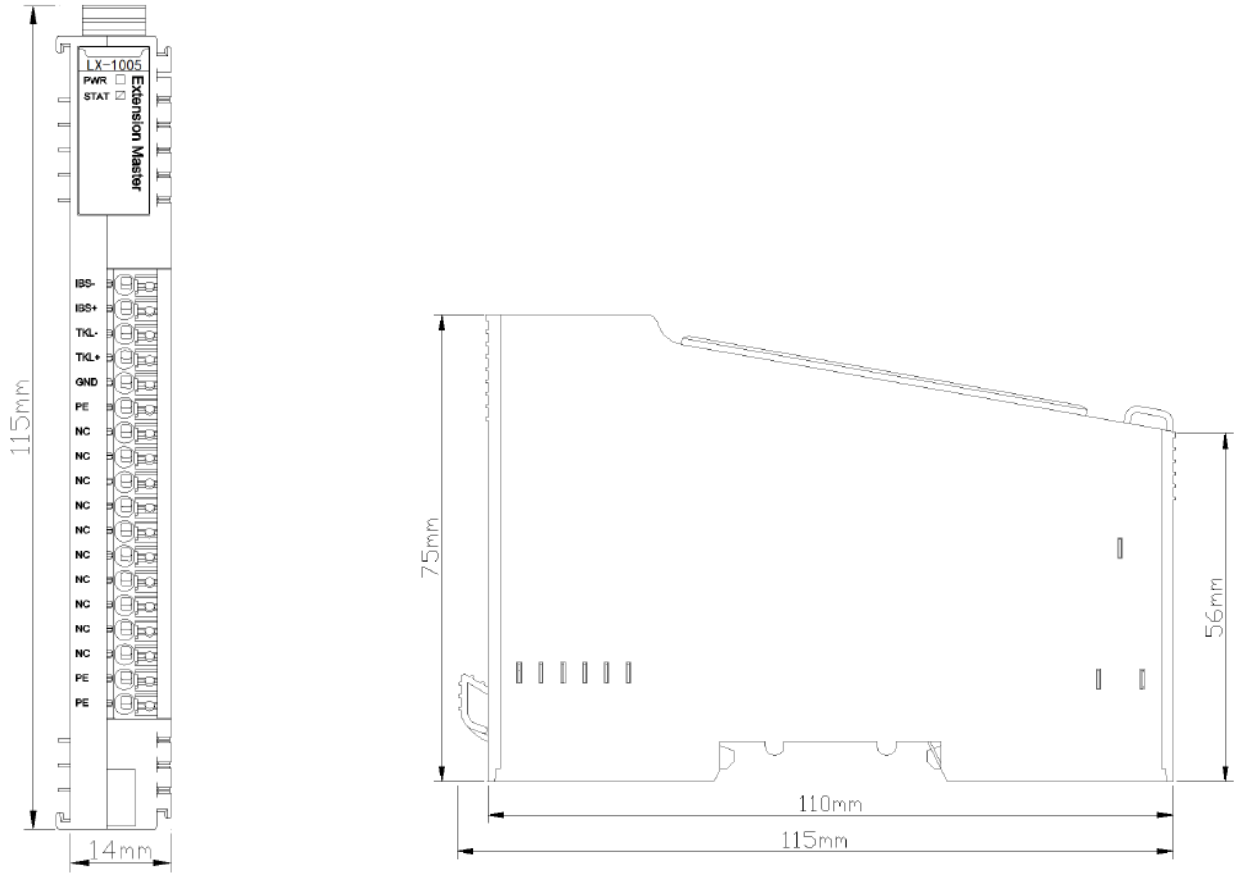
PWR POWER STATE (RED)	Definition
ON	System Power Normal
OFF	System Power Failure
STAT Bus STATE (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted

4 Wiring

Bus extended cable requires 5 core shielded cable, IBS+ and IBS- must use twisted pair. PE guarantees a reliable grounding and the total length of the bus extended cable should not exceed 10 meters.

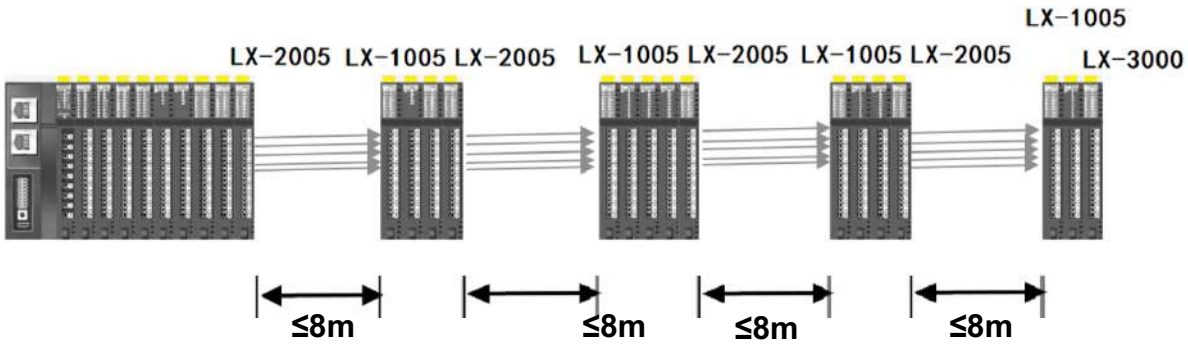


A Dimension drawing



4.1 Bus Expansion Topology Diagram

The backplane bus expansion length spacing should not be greater than 8 meters, the IO module expansion data should be less than 32 units, and it must be equipped with a terminal module LX-3000



LX-2005 Bus extended slave module

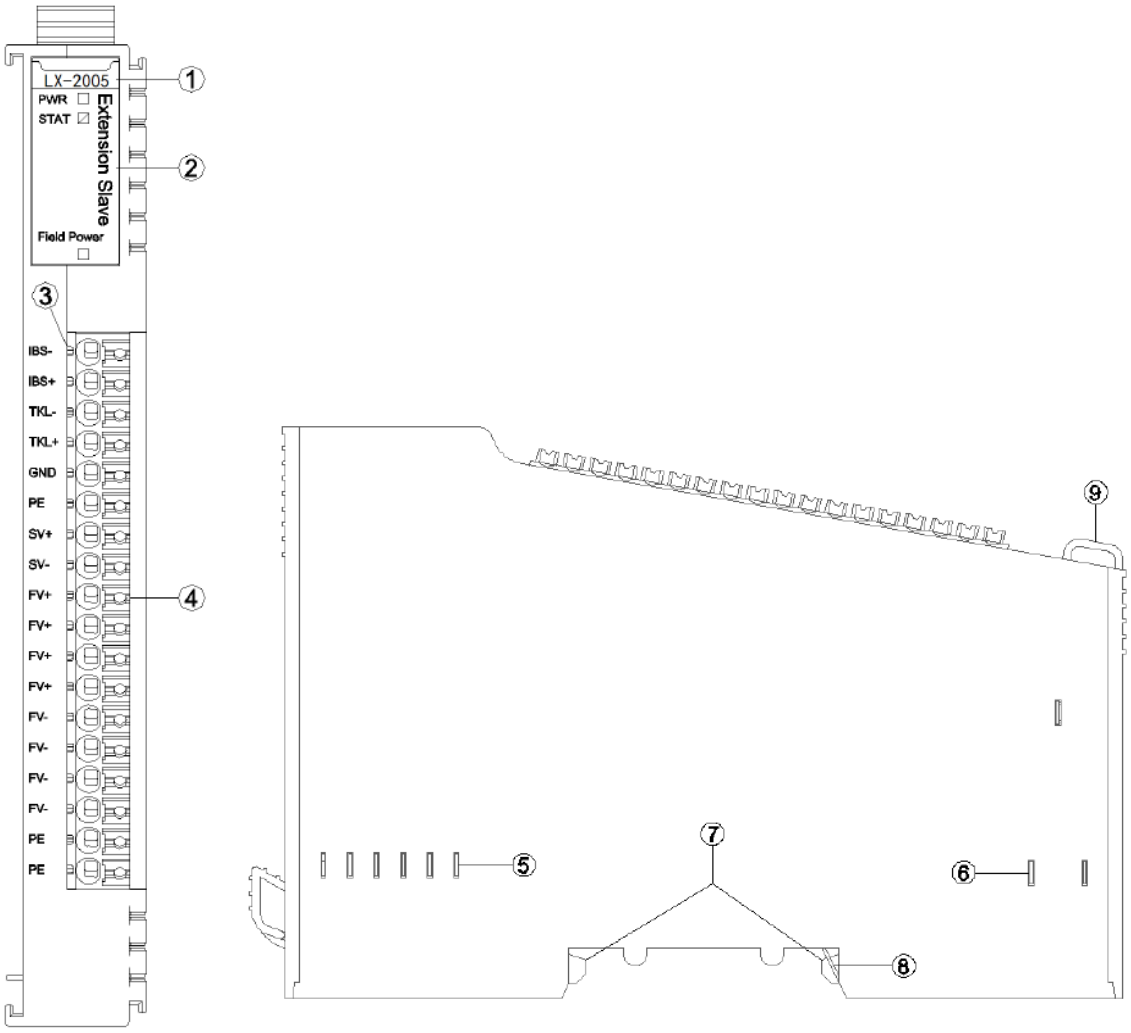
1 Module Description

The bus extened slave module is used to extend the bus.The bus extended slave module has no process data and configuration parameters.

2 Technical Parameters

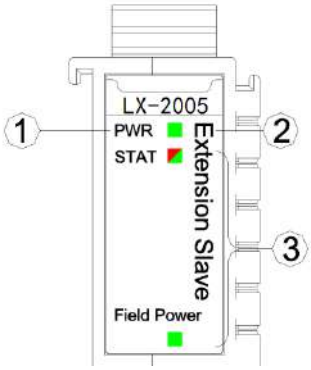
General parameters	
Power	Max.20mA@5.0Vdc
Mounting Type	35mmDIN-Rail
Size	115*14*75mm
Weight	65g
System Power	Nominal: 24Vdc, Range: 9-36Vdc Protection: Overcurrent Protection, Reverse Protection: YES
Internal BUS Supply Current	Max. 2.5A@5VDC
Isolation	System Power to Field Power Isolation
Field Power Supply	Power Supply：22~28V（Nominal 24VDC） Protection: Reverse Protection: YES
Field Power Supply Current	Max. DC 8A
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20

3 Hardware Interface



① Module Type
② State indicator
③ Channel indicator (N/A)
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition

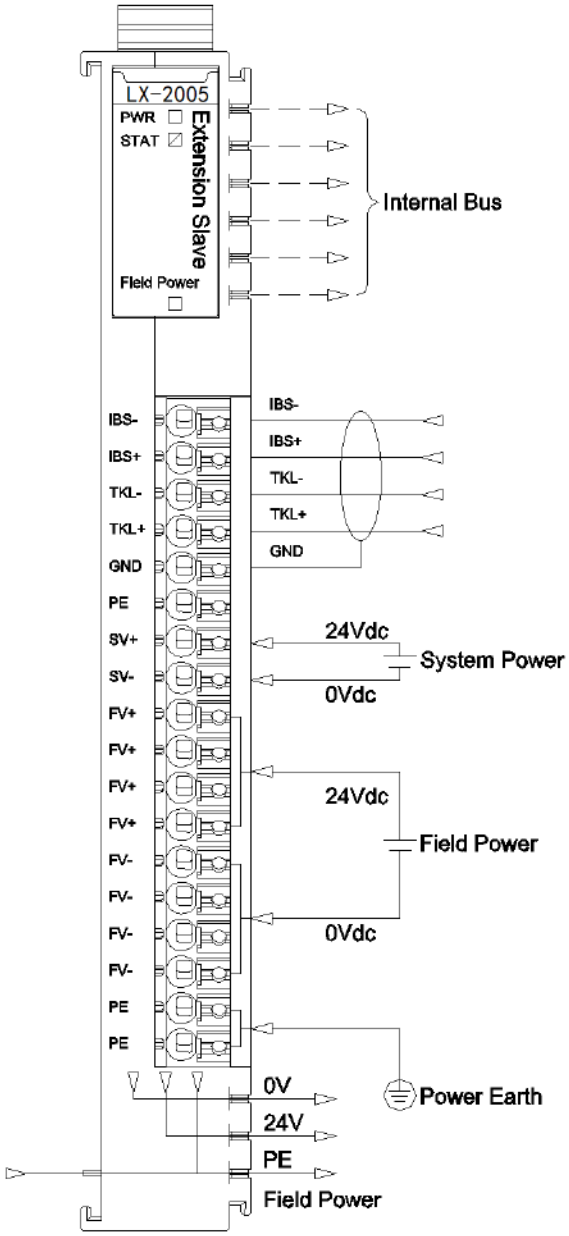


① System Power LED indicator (red)
② Bus State LED indicator (red/green)

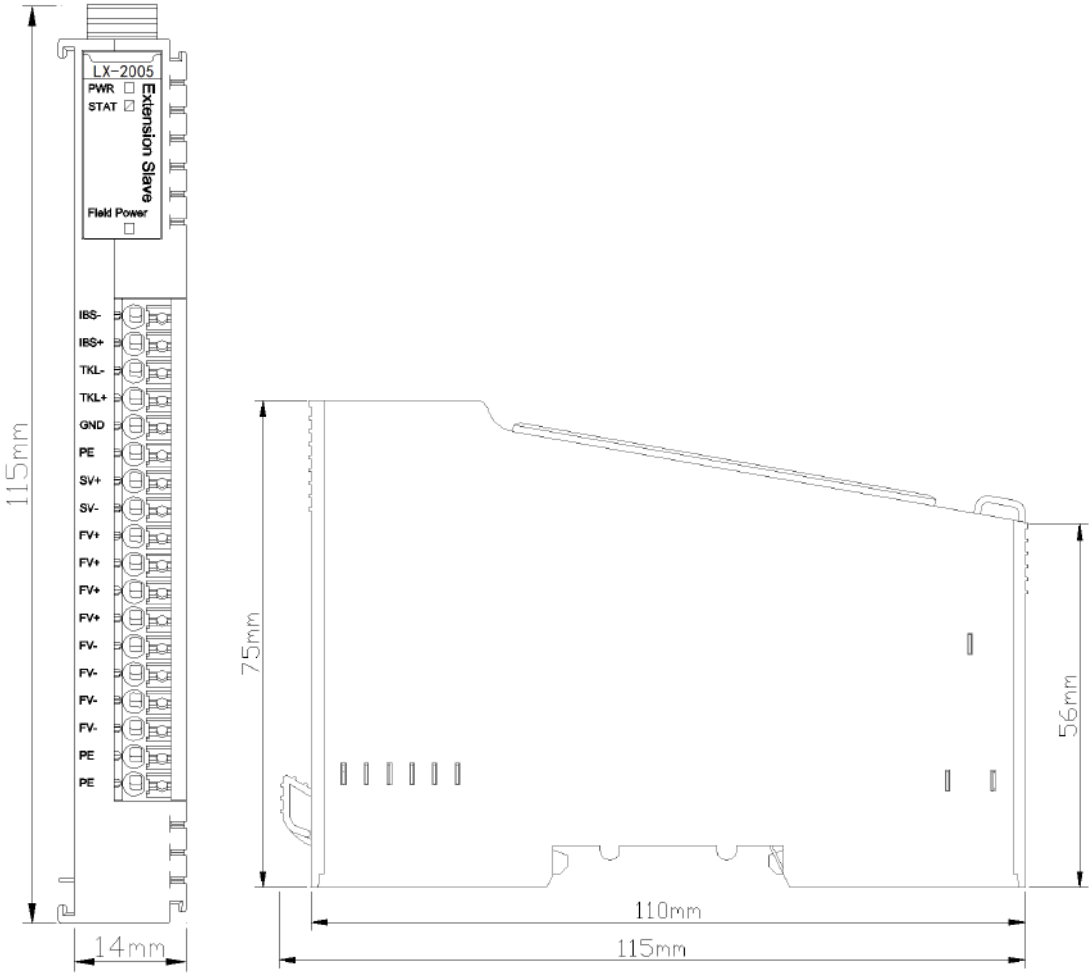
PWR POWER STATE (RED)	Definition
ON	System Power Normal
OFF	System Power Failure
STAT Bus STATE (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted

4 Wiring

Bus extended cable requires 5 core shielded cable, IBS+ and IBS- must use twisted pair. PE guarantees a reliable grounding and the total length of the bus extended cable should not exceed 10 meters.

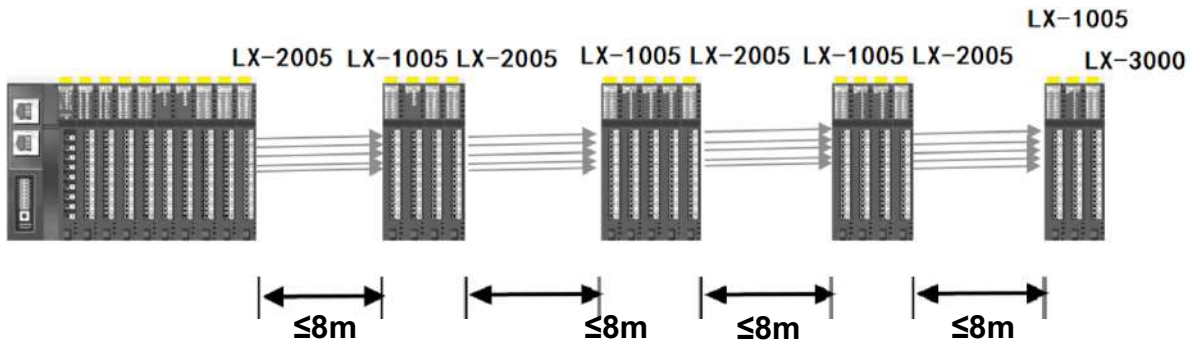


A Dimension drawing



4.1 Bus Expansion Topology Diagram

The backplane bus expansion length spacing should not be greater than 8 meters, the IO module expansion data should be less than 32 units, and it must be equipped with a terminal module LX-3000



LX-3000Terminal module（Required）

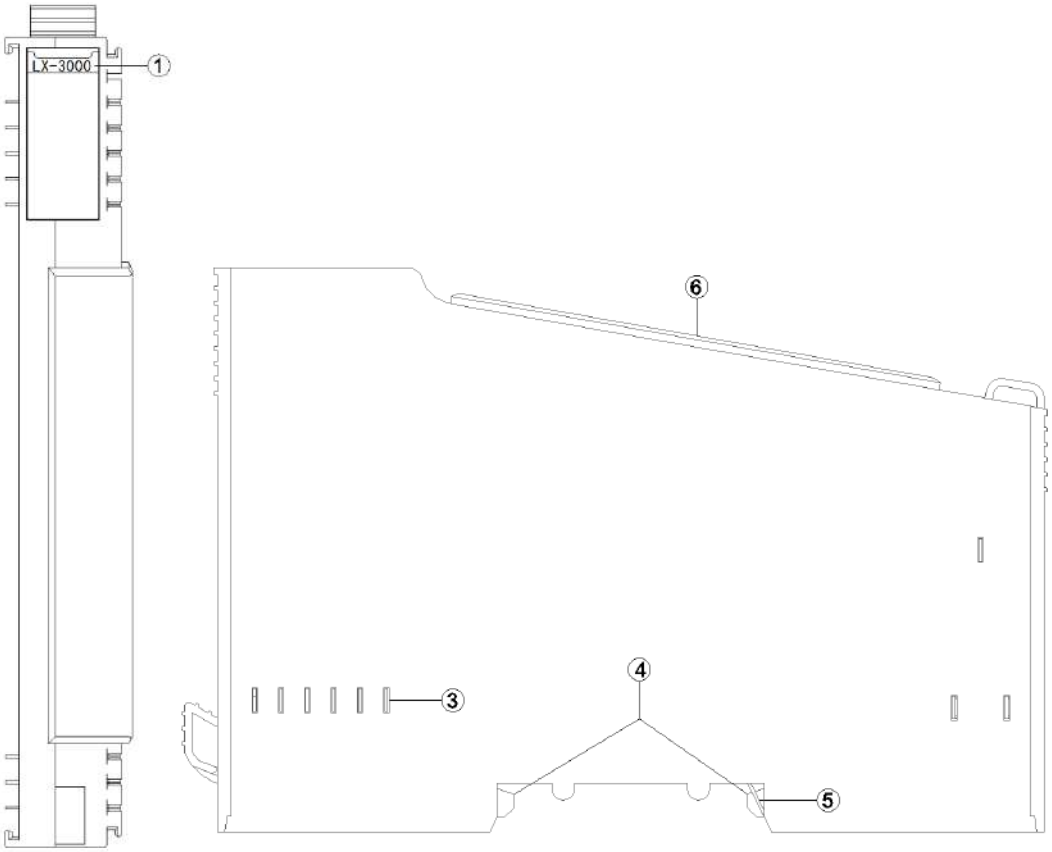
1 Module Description

The terminal module is used to stabilize internal bus communication and it is required.The terminal module LX-3000 has no process data and no configuration parameters.
LX-3000 requires no configuration and occupies no slot in configuration.

2 Technical Parameters

None

3 Hardware Interface



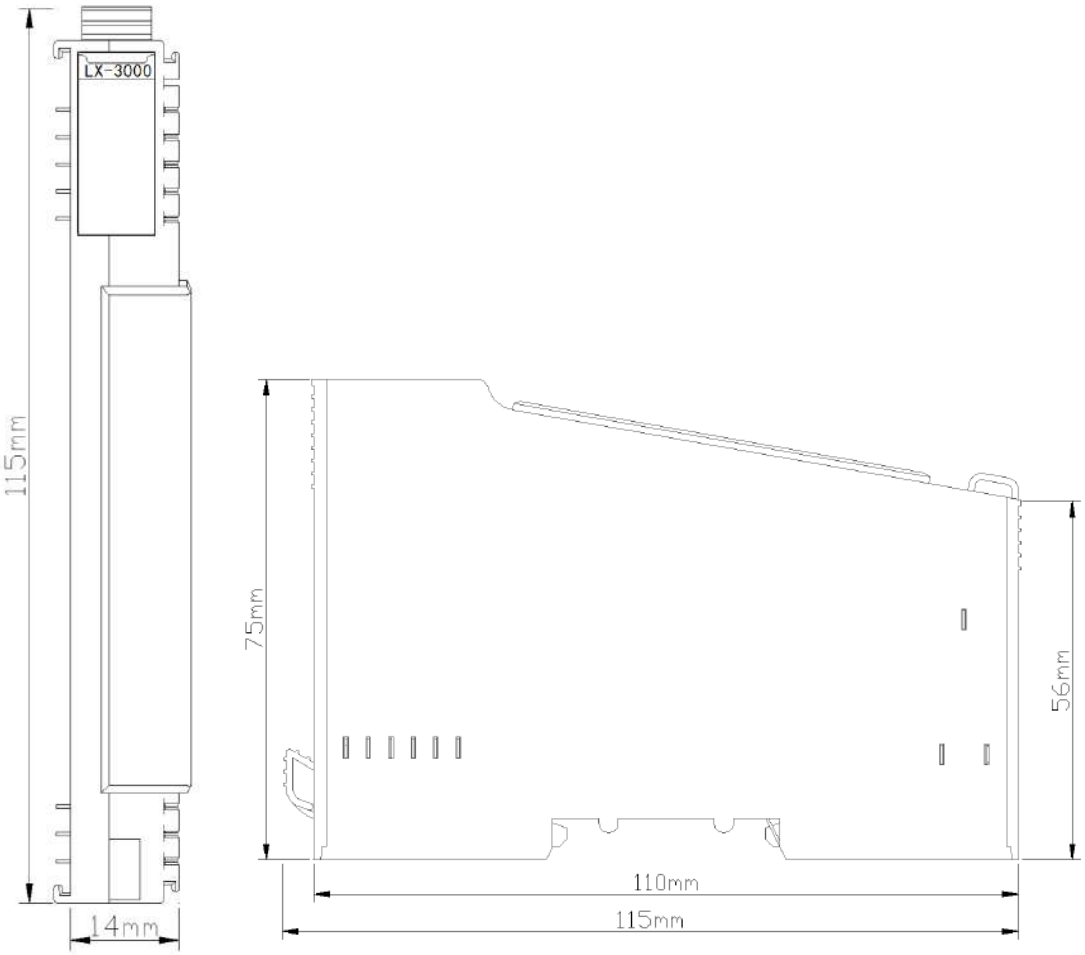
① Module Type
③ Internal Bus

④ Buckle
⑤ Grounding Spring Sheet
⑥ Terminal Cover

3.1 LED indicator definition

None

A Dimension drawing



LX-4108 Field Power Expansion Module 8A

(No Configuration Required)

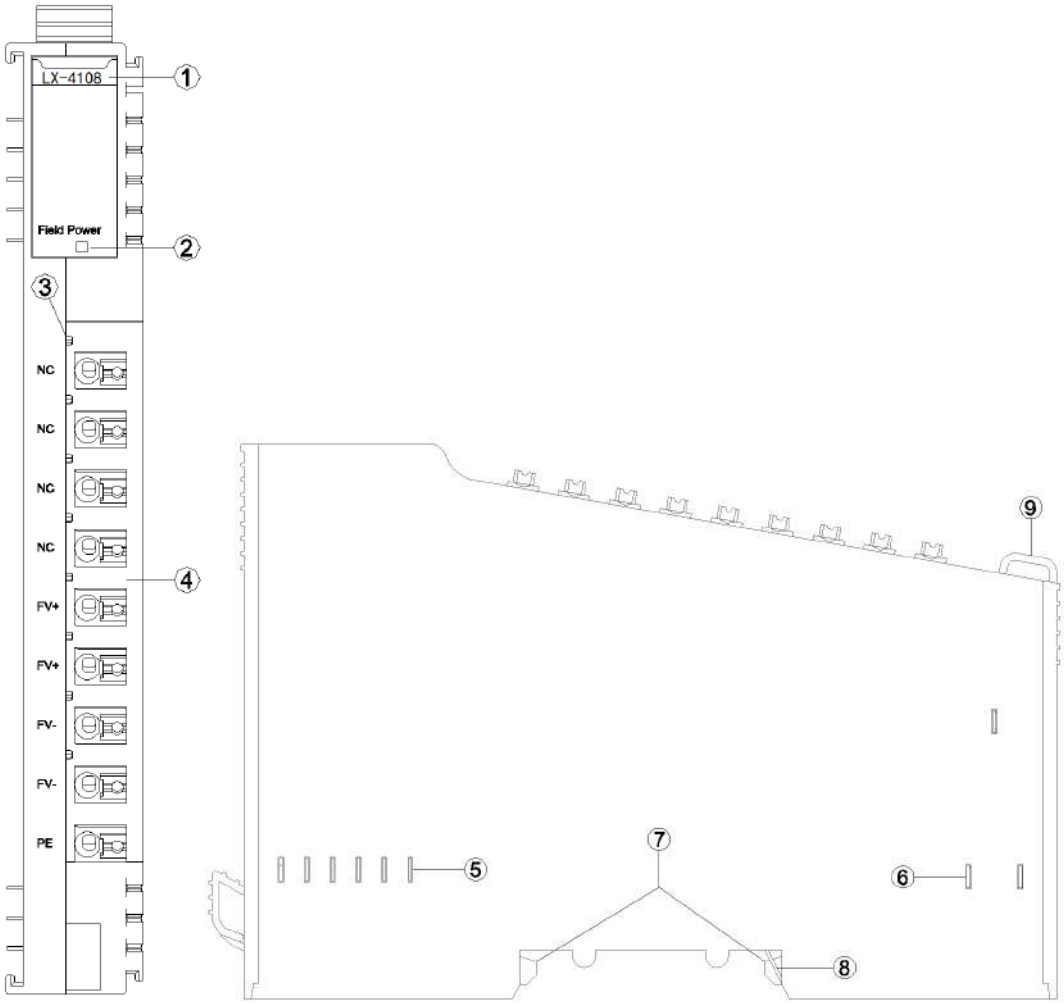
1 Module features

- ◆ Field Power Expansion
- ◆ Field Power Expansion with 8A Current
- ◆ No configuration required, does not occupy slot numbers

2 Technical parameters

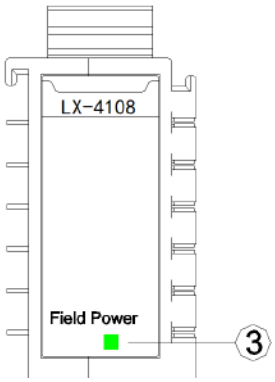
General parameters	
Field Power	Range：22~28V（Nominal 24VDC） Protection: Reverse Polarity Protection
Field Power Current	Max DC 8A
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%-95% (No Condensation)
Ingress Protection Rating	IP20

3 Hardware interfaces



① Module Type
② State indicator
③ N.A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition



③ Field Power Indicator Light (Green)

PW Power State (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure

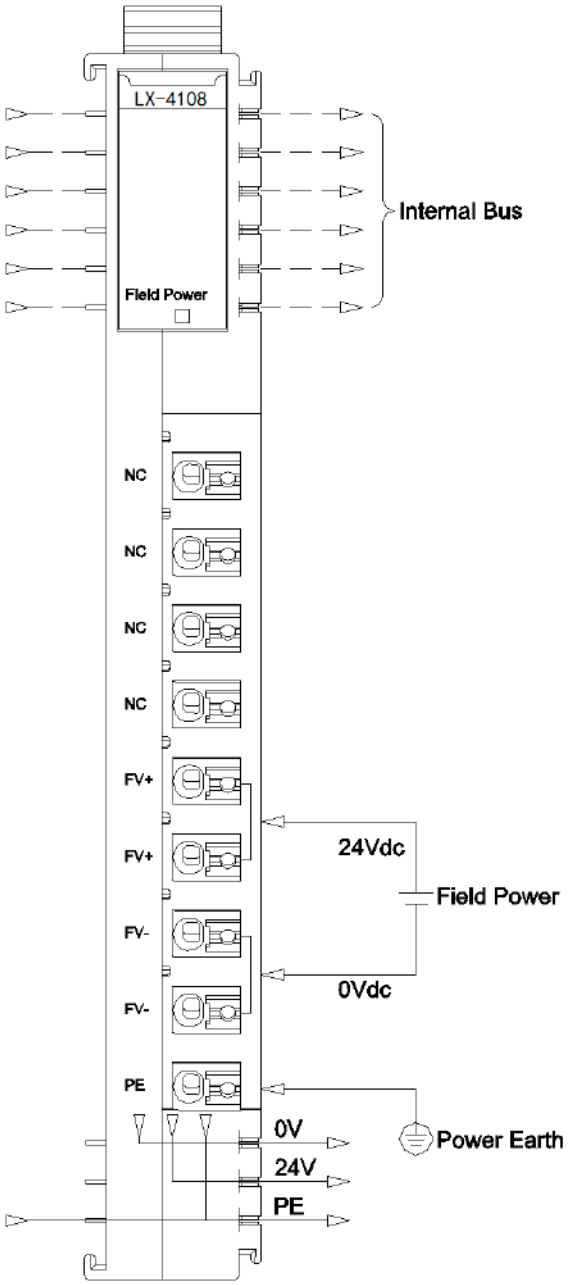
3.2 Terminal definition

Terminal Number	Symbol	Definition
1	NC	Idle
2	NC	
3	NC	
4	NC	
5	FV+	Field Power Positive
6	FV+	
7	FV-	Field Power Negative
8	FV-	
9	PE	System Ground

It is recommended to use cables with cores smaller than 1mm².

The cold-pressed terminal parameters are as follows:

4 Wiring


LX-4108
Field Power
Internal Bus
NC
NC
NC
NC
FV+
FV+
FV-
FV-
PE
24Vdc
Field Power
0Vdc
Power Earth
0V
24V
PE

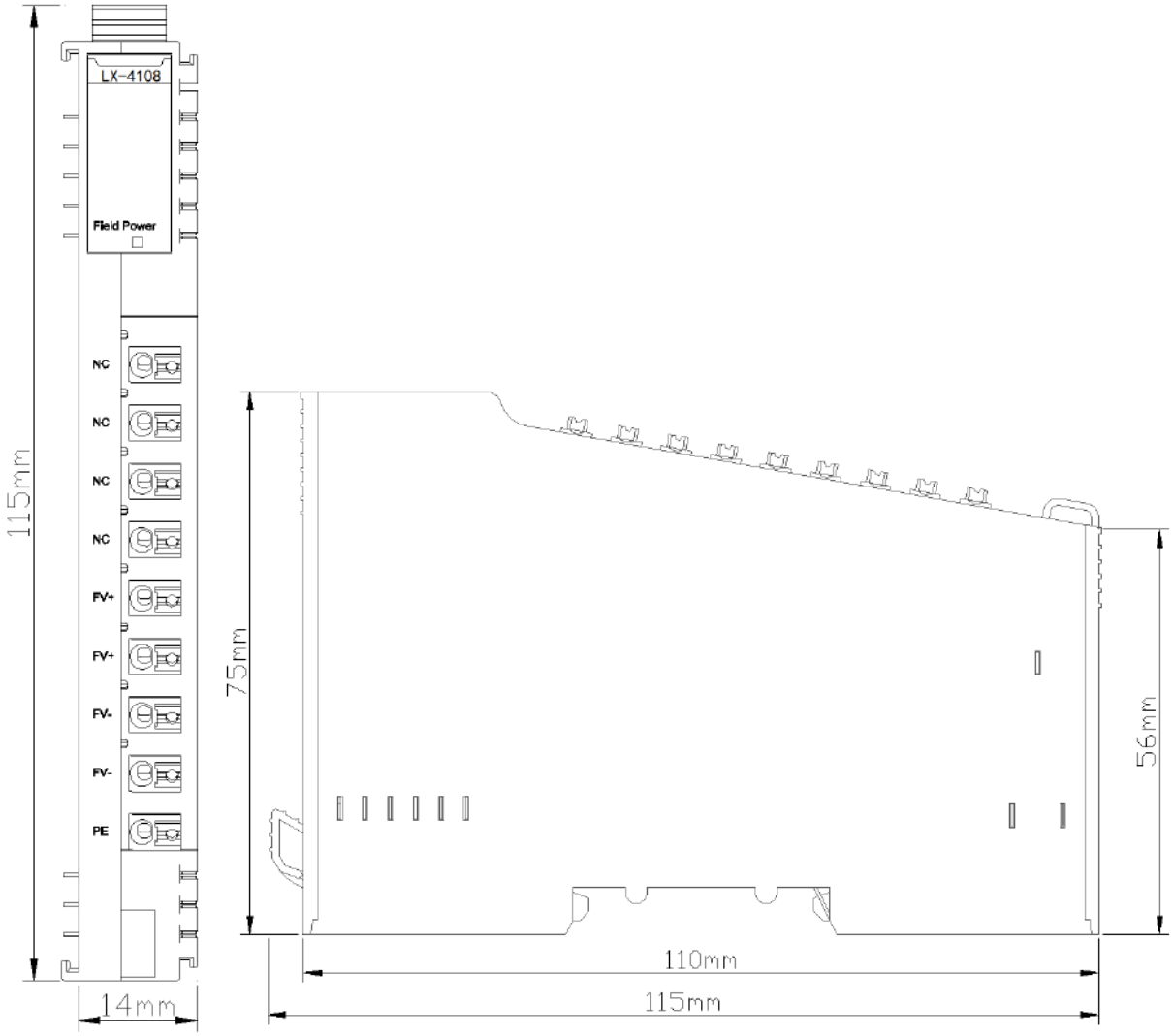
5 Process data definition

N.A

6 Configuration parameter definitions

N.A

A Dimension drawing



LX-4018 18-Channel Field Power Distribution Module (0Vdc)

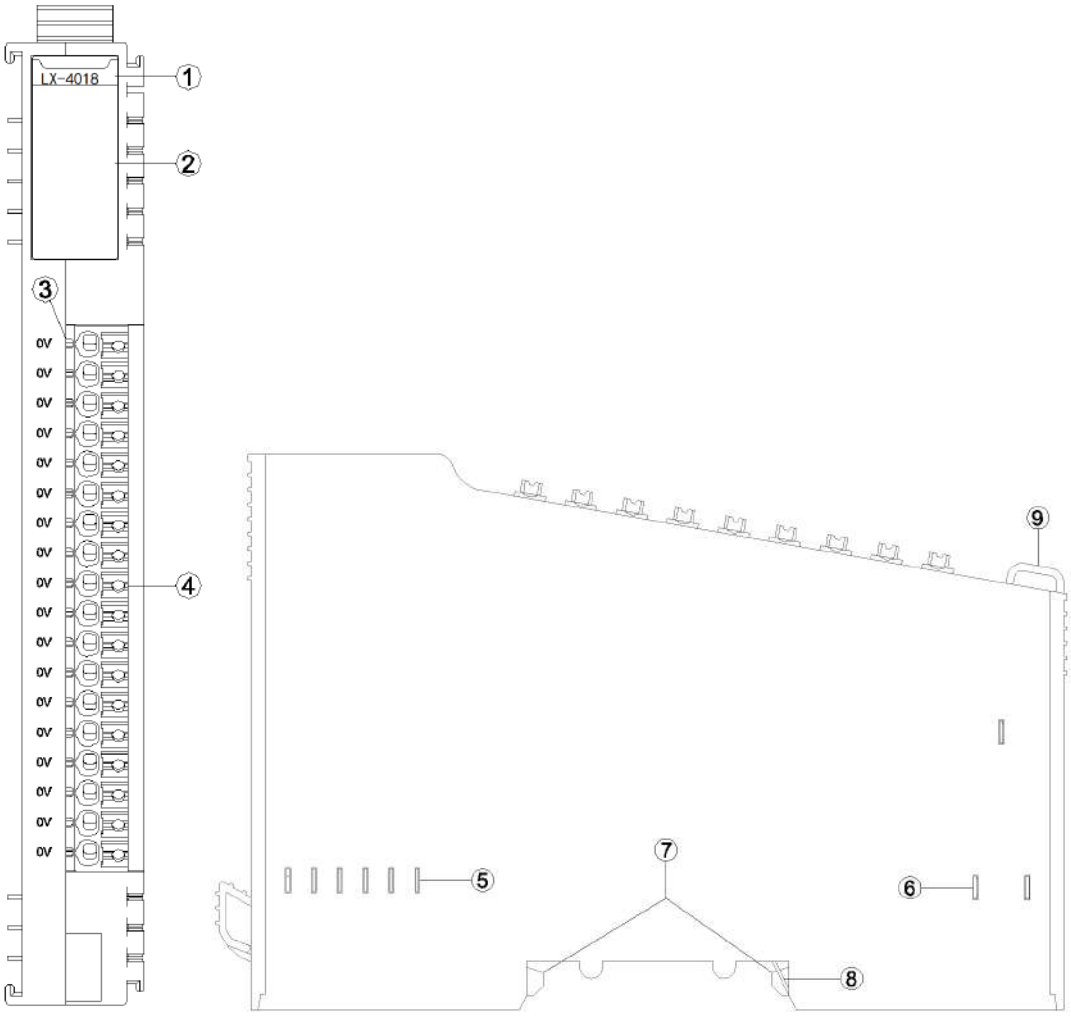
1 Module features

- ◆ Supports field power distribution, outputs 0Vdc
- ◆ Supports expansion of 18 channels
- ◆ No configuration required, does not occupy slot

2 Technical Parameters

General parameters	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20
Output Parameter	
Channel Number	18-Channel 0Vdc Potential Distribution Output

3 Hardware Interface



① Module Type
② N/A
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition

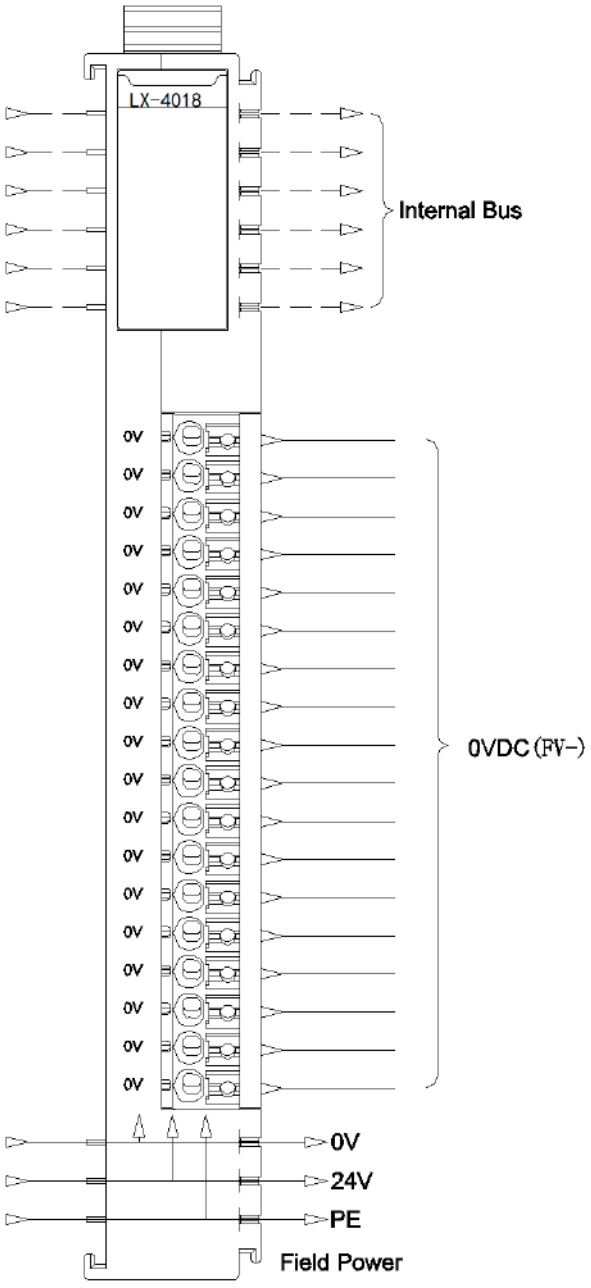
N/A

3.2 Terminal definition

Terminal Number	Definition	Description
1	0V	0Vdc output
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:

4 Wiring


LX-4018
Internal Bus
0V
0V
0V
0V
0V
0V
0V
0V
0V
0V
0V
0V
0V
0V
0V
0V
0V
0V
0VDC (PV-)
0V
24V
PE
Field Power

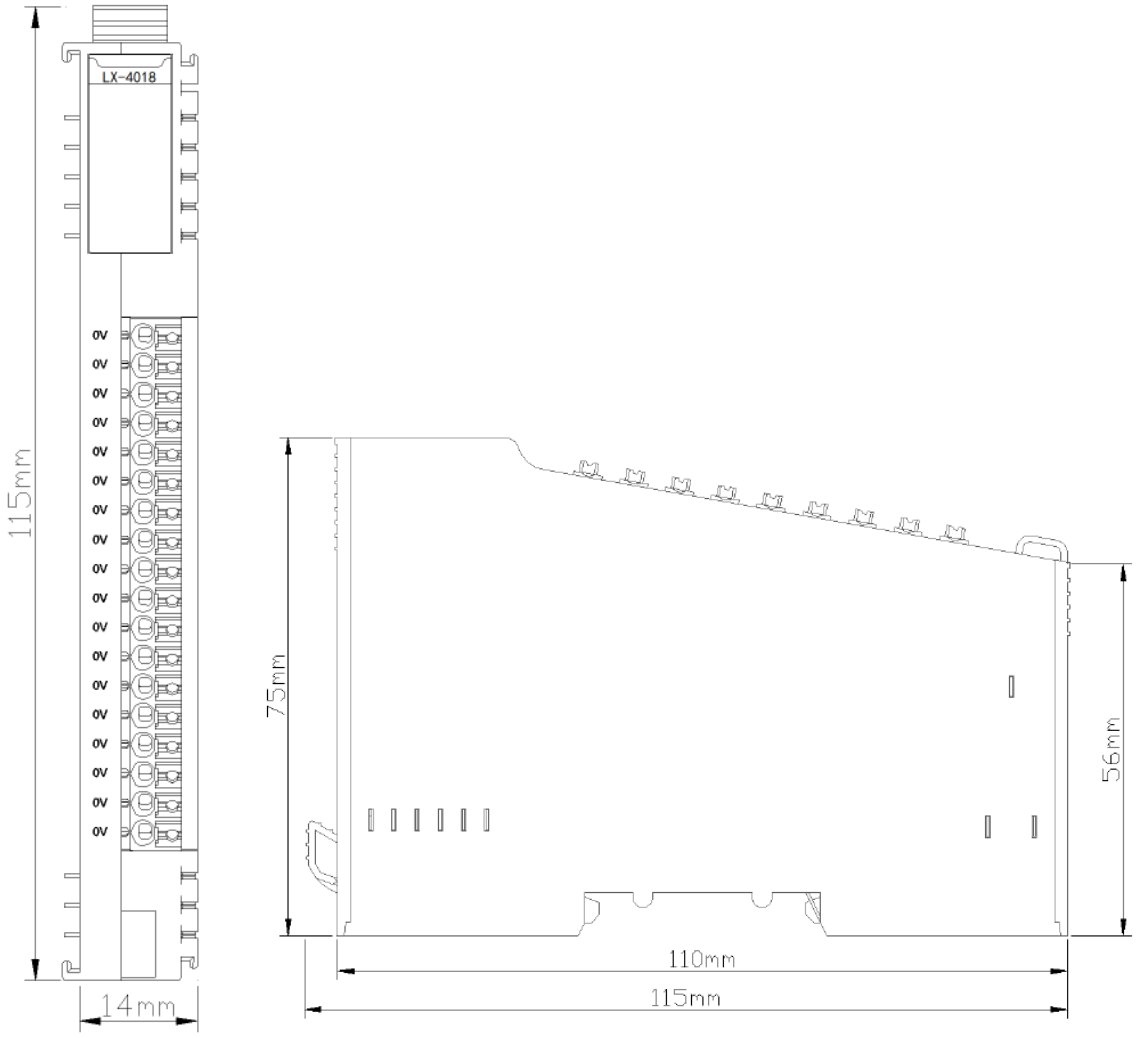
5 Process data definition

N/A

6 Configuration parameters definition

N/A

A Dimension drawing



LX-4118 18-Channel Field Power Distribution Module (24Vdc)

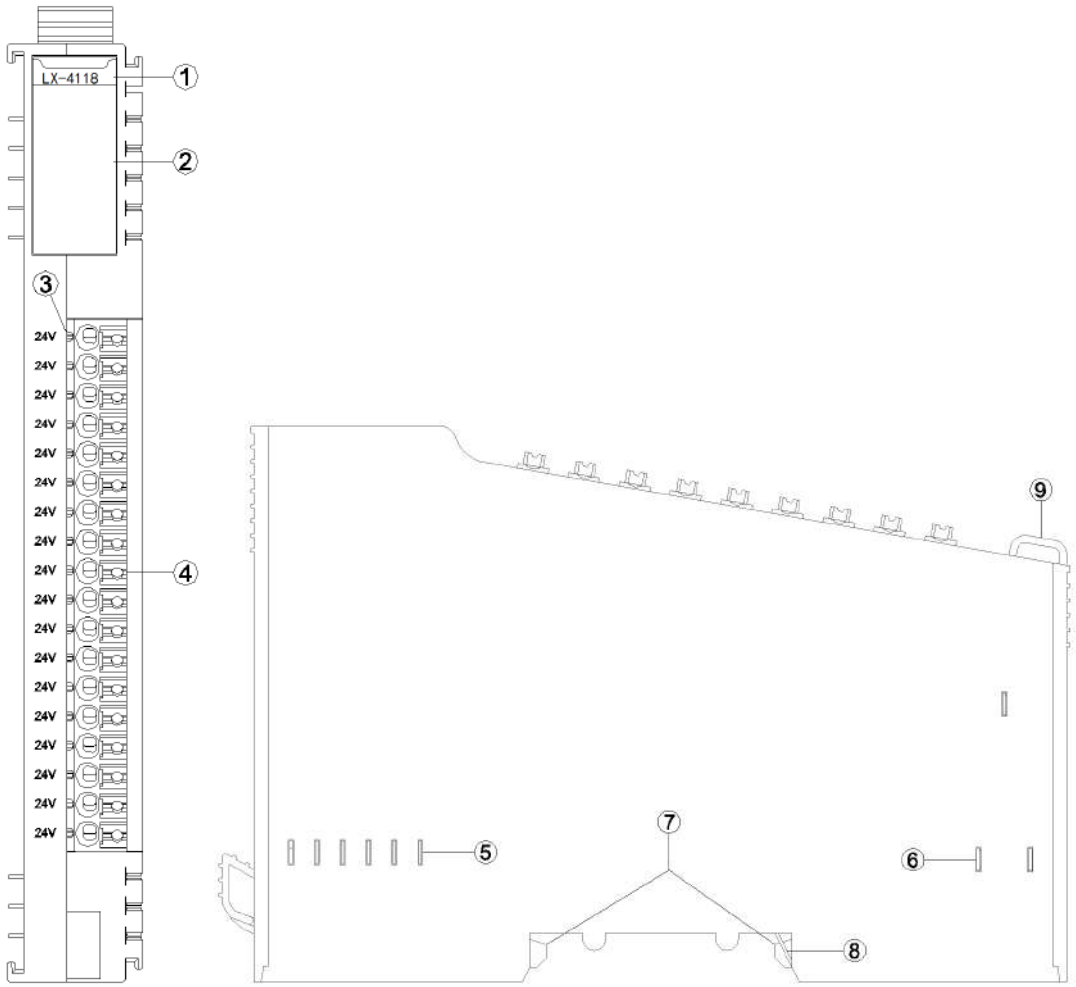
1 Module features

- ◆ Supports field power distribution, outputs 24Vdc
- ◆ Supports expansion of 18 channels
- ◆ No configuration required, does not occupy slot numbers

2 Technical Parameters

Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20
Output Parameter	
Channel Number	18-Channel 24Vdc Potential Distribution Output

3 Hardware Interface



① Module Type
② N/A
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition

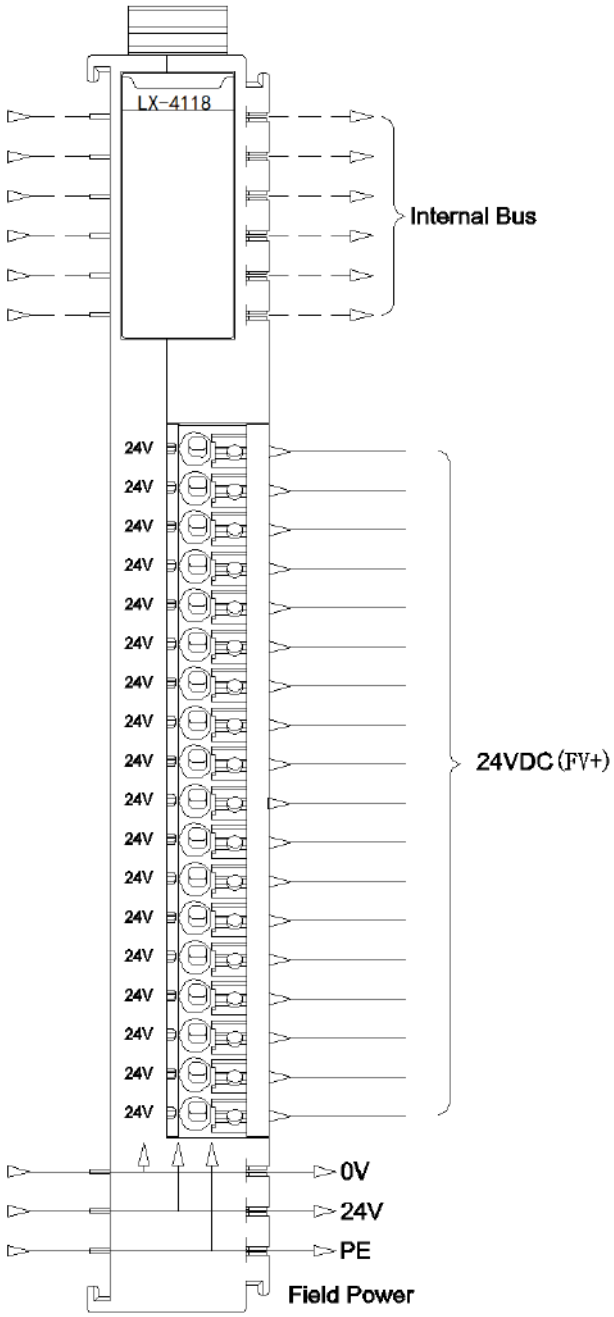
N/A

3.2 Terminal definition

Terminal Number	Definition	Description
1	24V	24Vdc Output
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:

4 Wiring


LX-4118
Internal Bus
24V
24V
24V
24V
24V
24V
24V
24V
24V
24V
24V
24V
24V
24V
24V
24V
24V
24V
24V
24VDC (FV+)
0V
24V
PE
Field Power

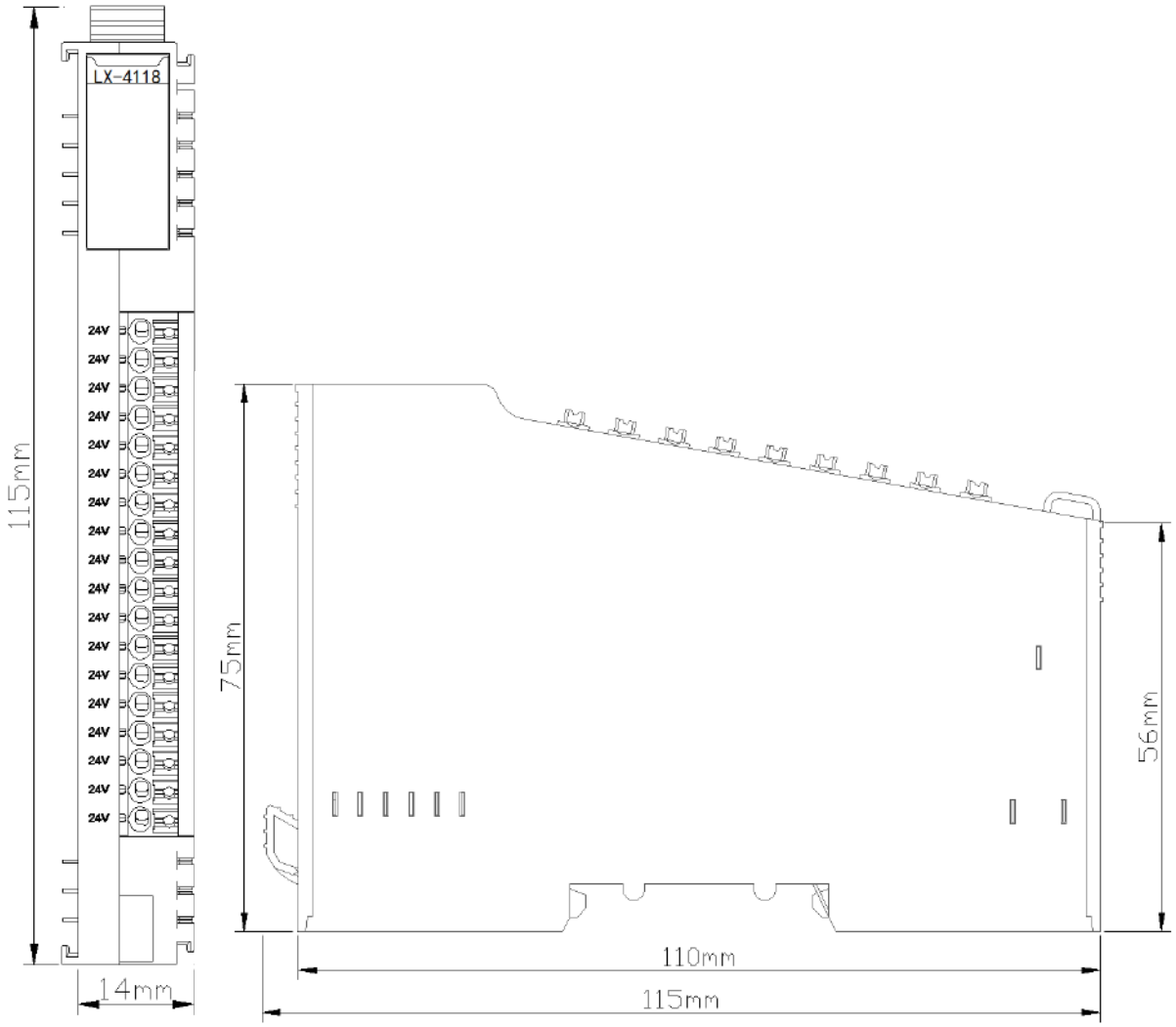
5 Process data definition

N/A

6 Configuration parameters definition

N/A

A Dimension drawing



LX-4218 18-Channel Field Power Distribution Module (PE)

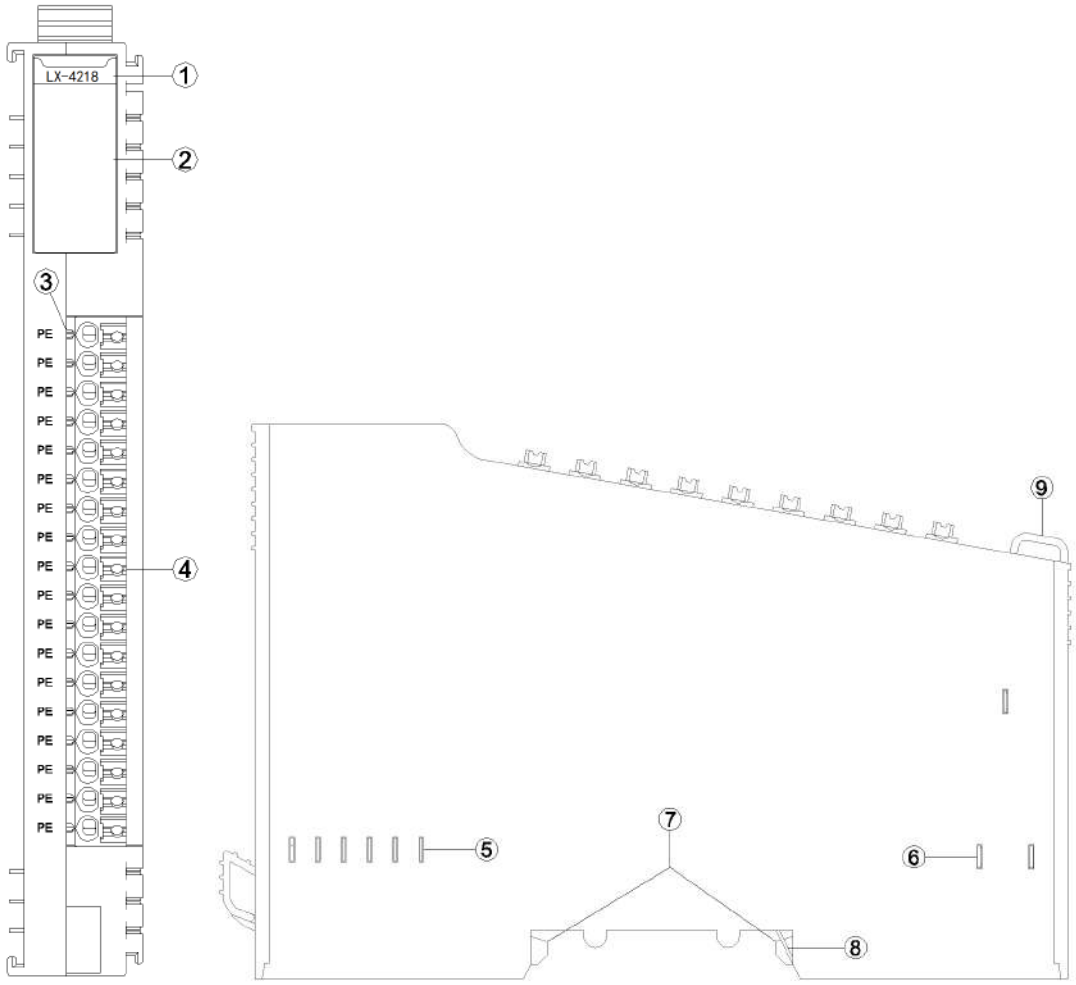
1 Module features

- ◆ Supports field power distribution, outputs PE
- ◆ Supports expansion of 18 channels
- ◆ No configuration required, does not occupy slot

2 Technical Parameters

Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20
Output Parameter	
Channel Number	18-Channel PE Potential Distribution Output

3 Hardware Interface



① Module Type
② N/A
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition

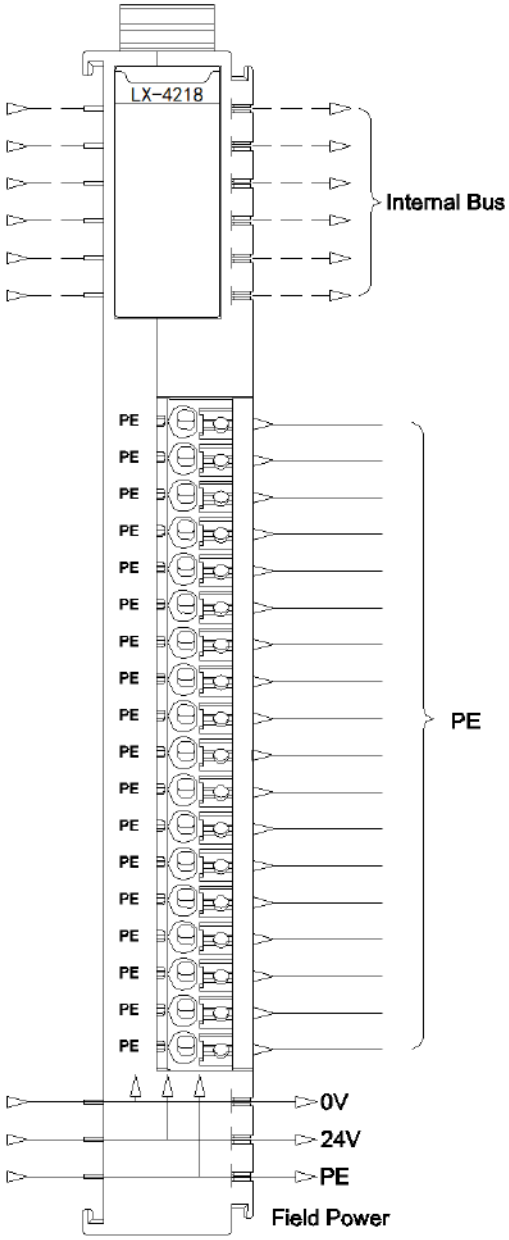
N/A

3.2 Terminal definition

Terminal Number	Definition	Description
1	PE	PE Output
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:

4 Wiring


LX-4218
Internal Bus
PE
PE
PE
PE
PE
PE
PE
PE
PE
PE
PE
PE
PE
PE
PE
PE
PE
PE
PE
PE
PE
0V
24V
PE
Field Power

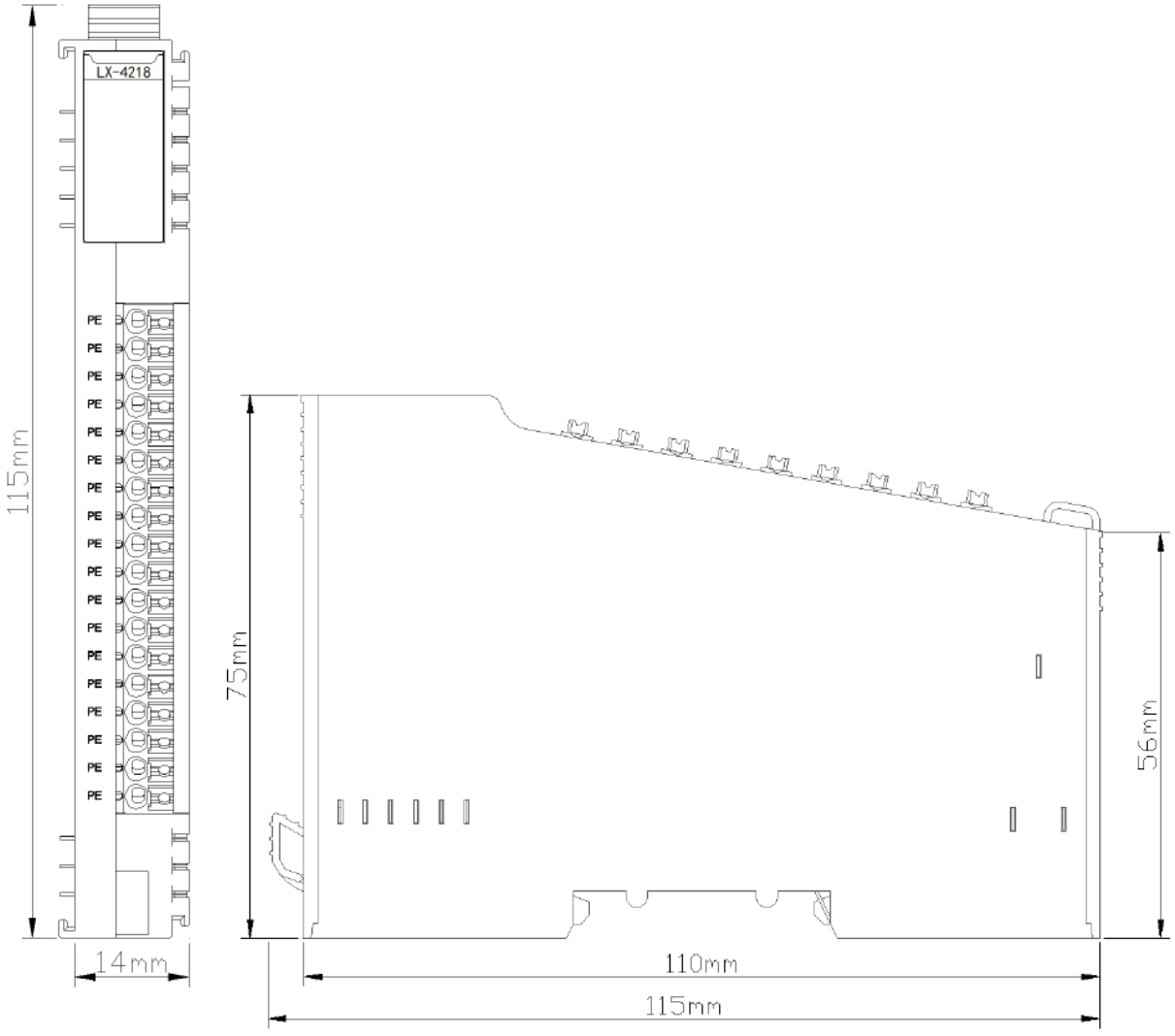
5 Process data definition

N/A

6 Configuration parameters definition

N/A

A Dimension drawing



LX-4009 18-Channel Field Power Distribution Module (24Vdc/0Vdc)

1 Module features

◆ Supports field power distribution, outputs 24Vdc/0Vdc

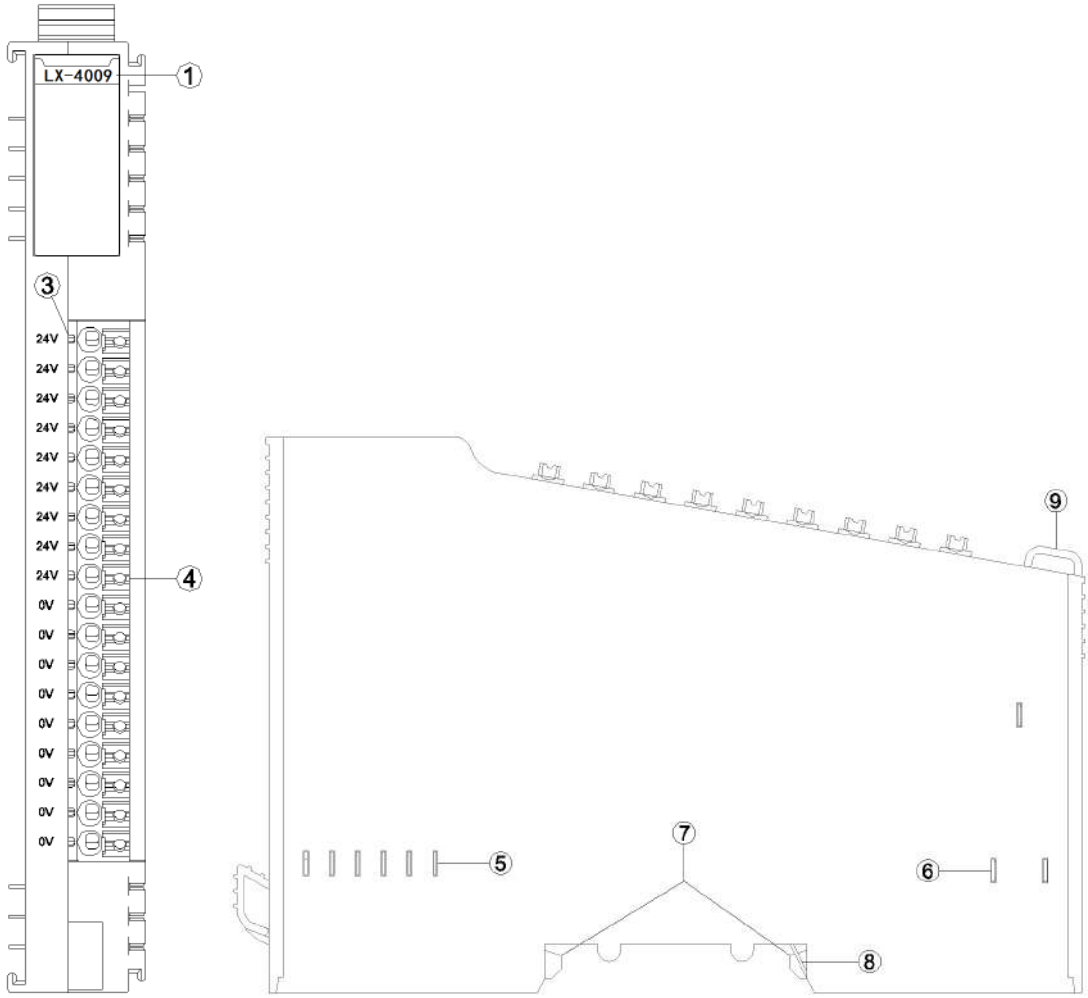
◆ Supports expansion of 18 channels, 9 channels for 24Vdc output, 9 channels for 0Vdc output

◆ No configuration required, does not occupy slot numbers

2 Technical Parameters

Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20
Output Parameter	
Channel Number	9-Channel 24Vdc Potential Distribution Output 9-Channel 0Vdc Potential Distribution Output

3 Hardware Interface



② Module Type
② N/A
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition

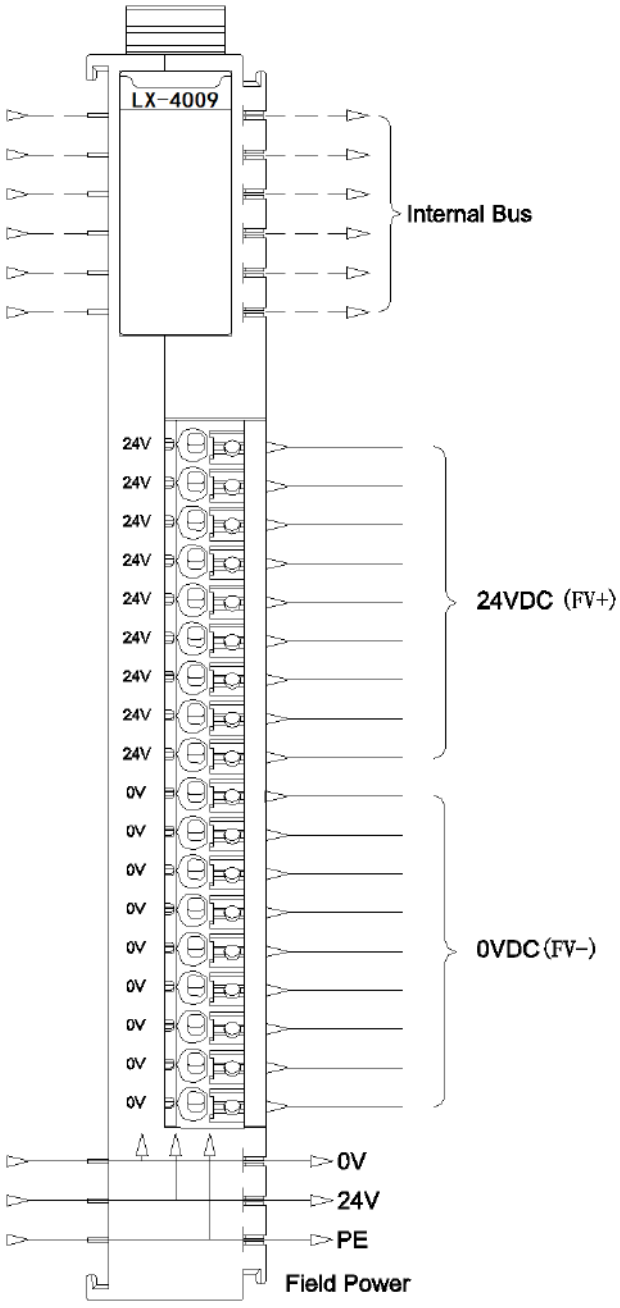
N/A

3.2 Terminal definition

Terminal Number	Definition	Description
1	24Vdc	24Vdc Output
2		
3		
4		
5		
6		
7		
8		
9		
10	0Vdc	0Vdc Output
11		
12		
13		
14		
15		
16		
17		
18		

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:

4 Wiring


LX-4009
Internal Bus
24V
24V
24V
24V
24V
24V
24V
24V
24V
24VDC (FV+)
0V
0V
0V
0V
0V
0V
0V
0V
0V
0VDC (FV-)
0V
24V
PE
Field Power

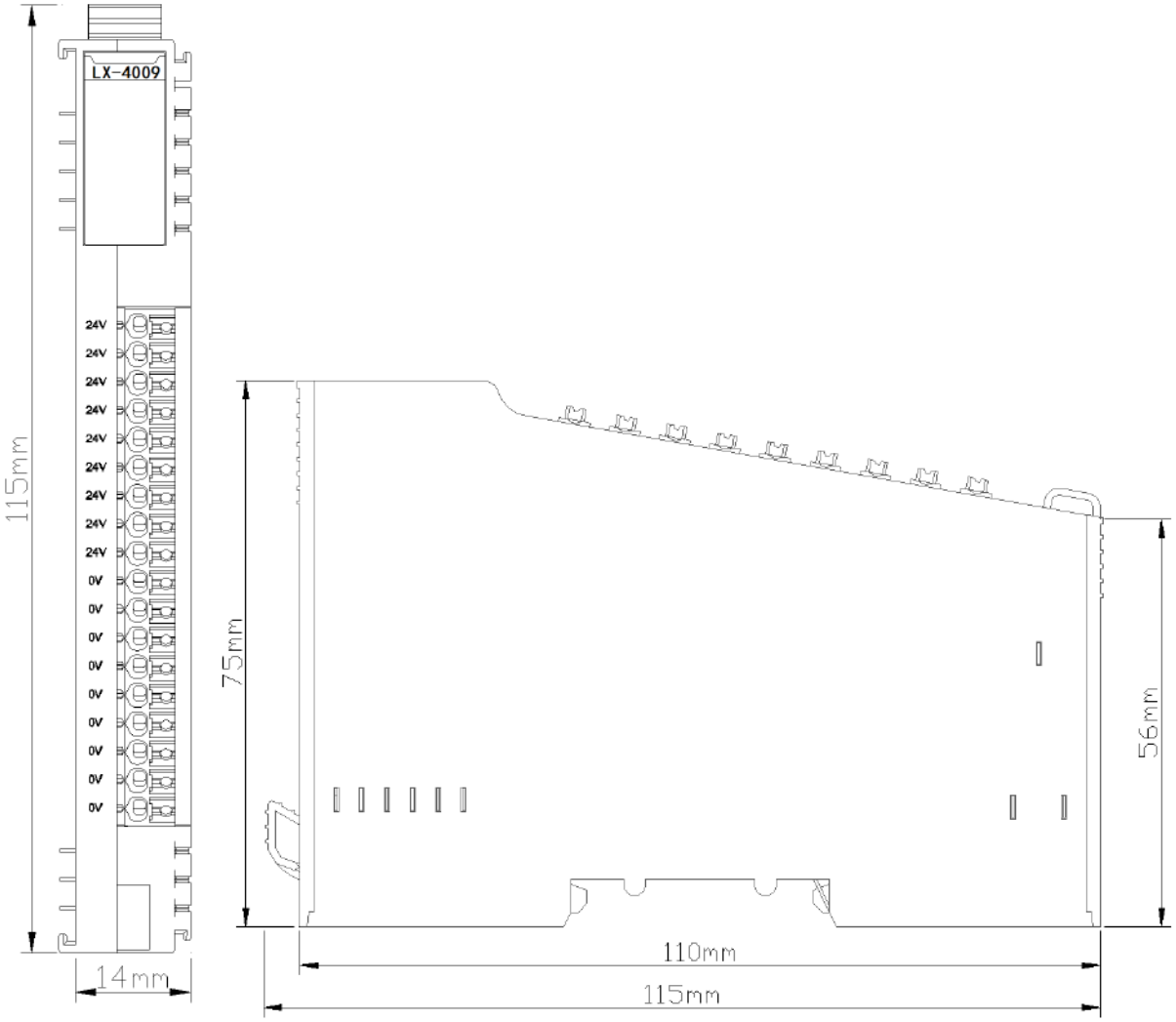
5 Process data definition

N/A

6 Configuration parameters definition

N/A

A Dimension drawing



LX-4006 18-Channel Field Power Distribution Module （24Vdc/0Vdc/PE）

1 Module features

◆ Supports field power distribution, outputs 24Vdc/0Vdc/PE

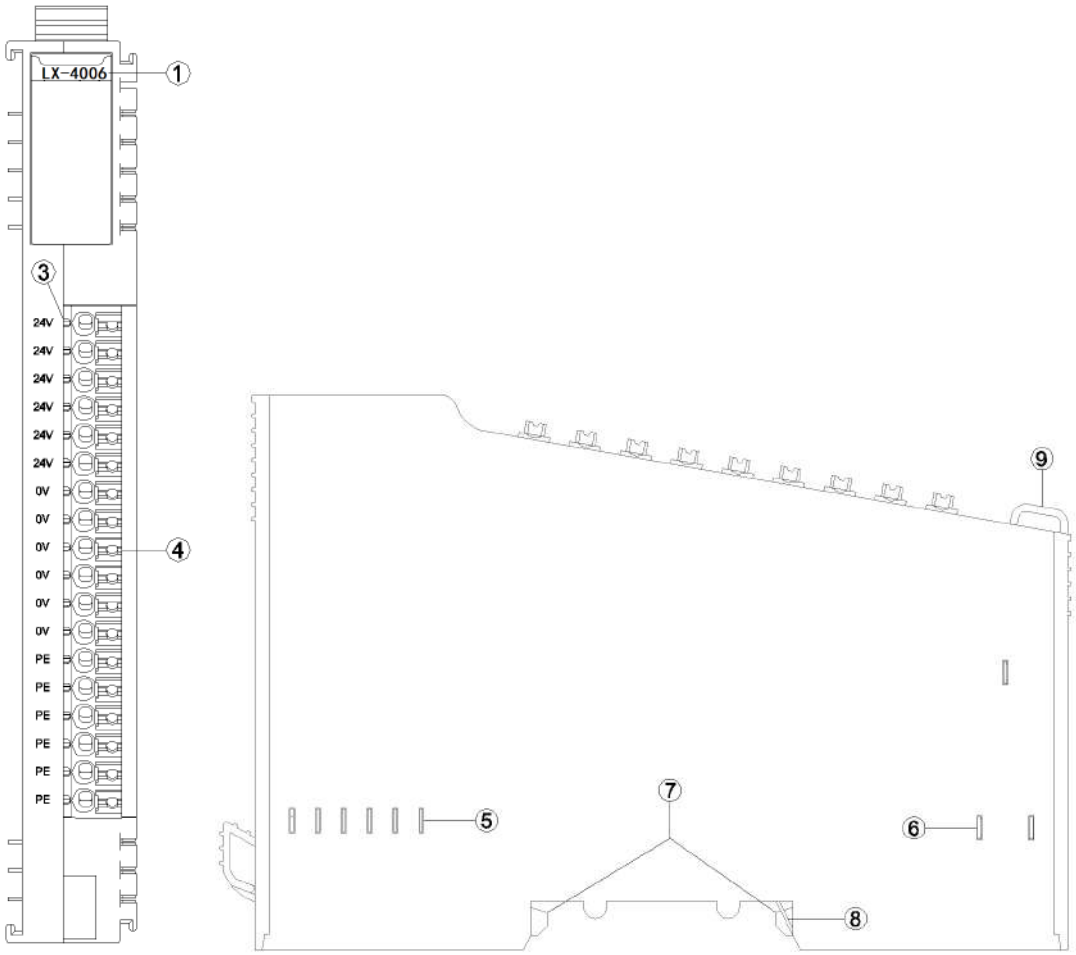
◆ Supports expansion of 18 channels, with 6 channels for 24Vdc output, 6 channels for 0Vdc output, and 6 channels for PE output

◆ No configuration required, does not occupy slot numbers

2 Technical parameters

Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20
Output Parameter	
Channel Number	6-Channel 24Vdc Potential Distribution Output 6-Channel 0Vdc Potential Distribution Output 6-Channel PE Potential Distribution Output

3 Hardware Interface



① Module Type
② N/A
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition

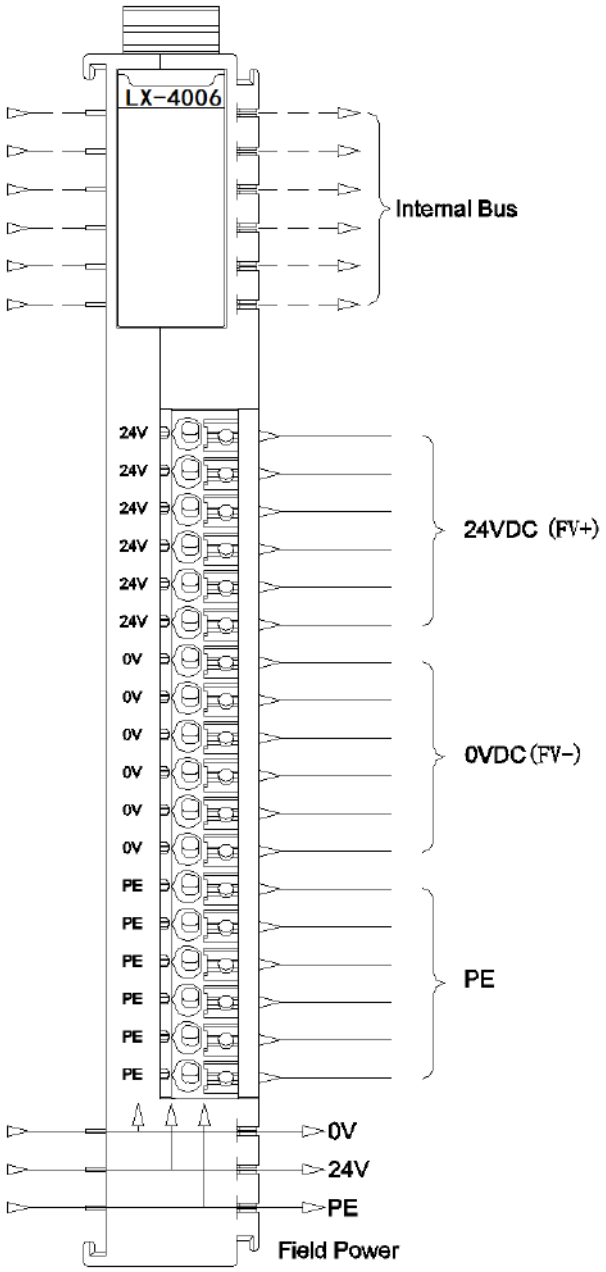
N/A

3.2 Terminal definition

Terminal Number	Definition	Description
1	24Vdc	24Vdc Output
2		
3		
4		
5		
6		
7	0Vdc	0Vdc Output
8		
9		
10		
11		
12		
13	PE	PE Output
14		
15		
16		
17		
18		

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:

4 Wiring


LX-4006
Internal Bus
24V
24V
24V
24V
24V
24V
24VDC (FV+)
0V
0V
0V
0V
0V
0V
0VDC (FV-)
PE
PE
PE
PE
PE
PE
PE
0V
24V
PE
Field Power

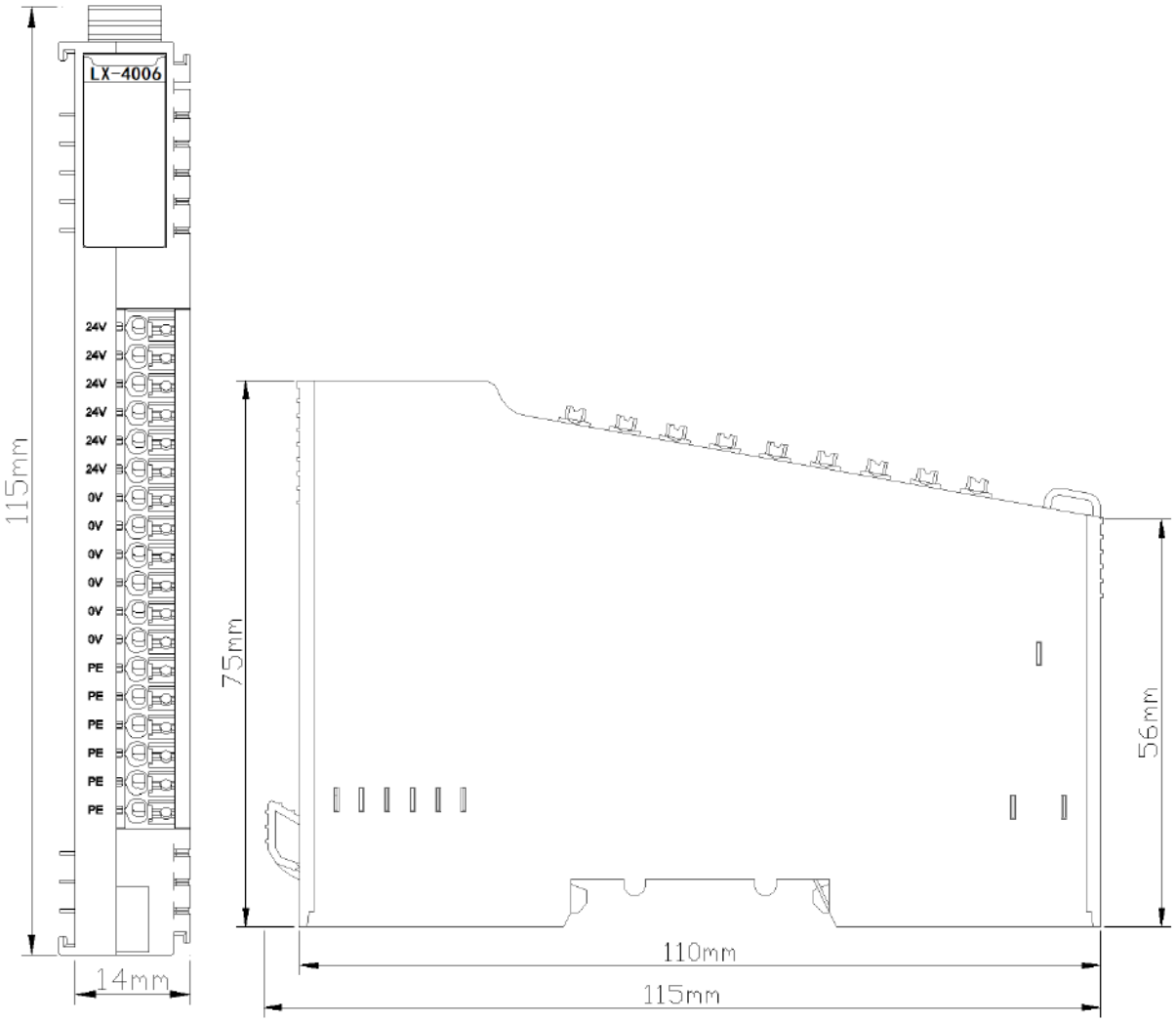
5 Process data definition

N/A

6 Configuration parameters definition

N/A

A Dimension drawing



LD-6008 Power Supply Extension Module 5V/2A (requires no configuration)

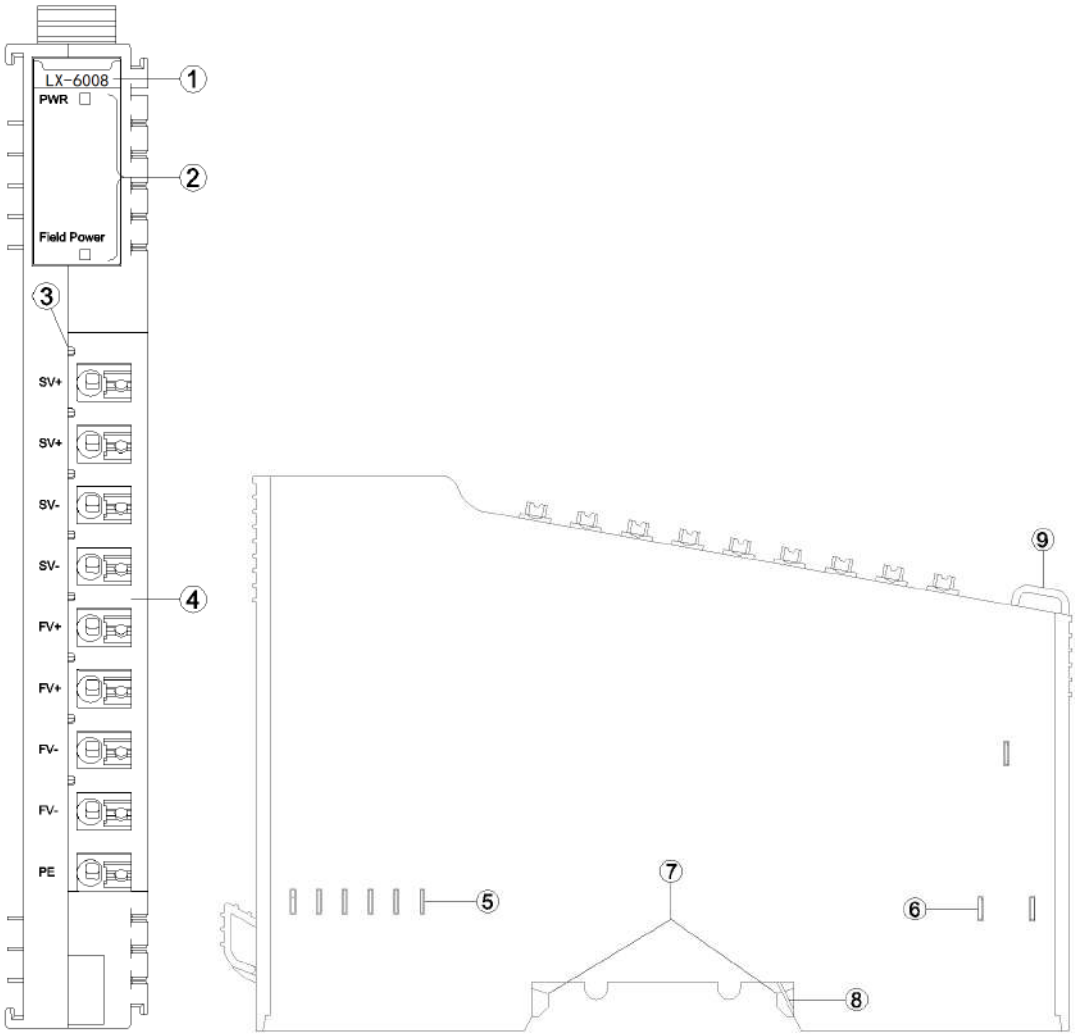
1 Module features

- ◆ System Power and Field Power Extension
- ◆ System Power Output 2A@5VDC
- ◆ Field Power Extension 8A Current
- ◆ Requires no configuration and occupies no slot in configuration.

2 Technical Parameters

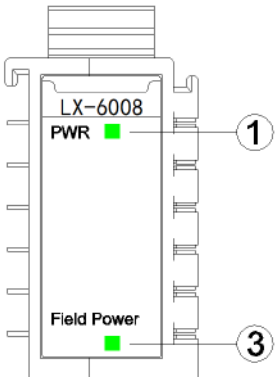
General parameters	
System Power	Nominal: 24Vdc, Range: 9-36Vdc Protection: overcurrent protection, anti-reverse connection protection
Internal Bus Supply Current	Max：2.0A@5VDC
Isolation	System Power to Field Power Isolation
Field Power	Power Supply：22~28V（Nominal: 24Vdc） Protection：anti-reverse connection protection
Field Power Supply Current	Max. DC 8A
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20

3 Hardware Interface



① Module Type
② State indicator
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition



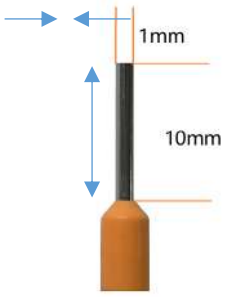
① System Power LED Indicator (green)
③ Field Power LED Indicator (green)

PWR Power LED Indicator (GREEN)	Definition
ON	The system power supply is normal.
OFF	The system power supply is failure.
Field Power LED Indicator (GREEN)	Definition
ON	The field power supply is normal.
OFF	The field power supply is failure.

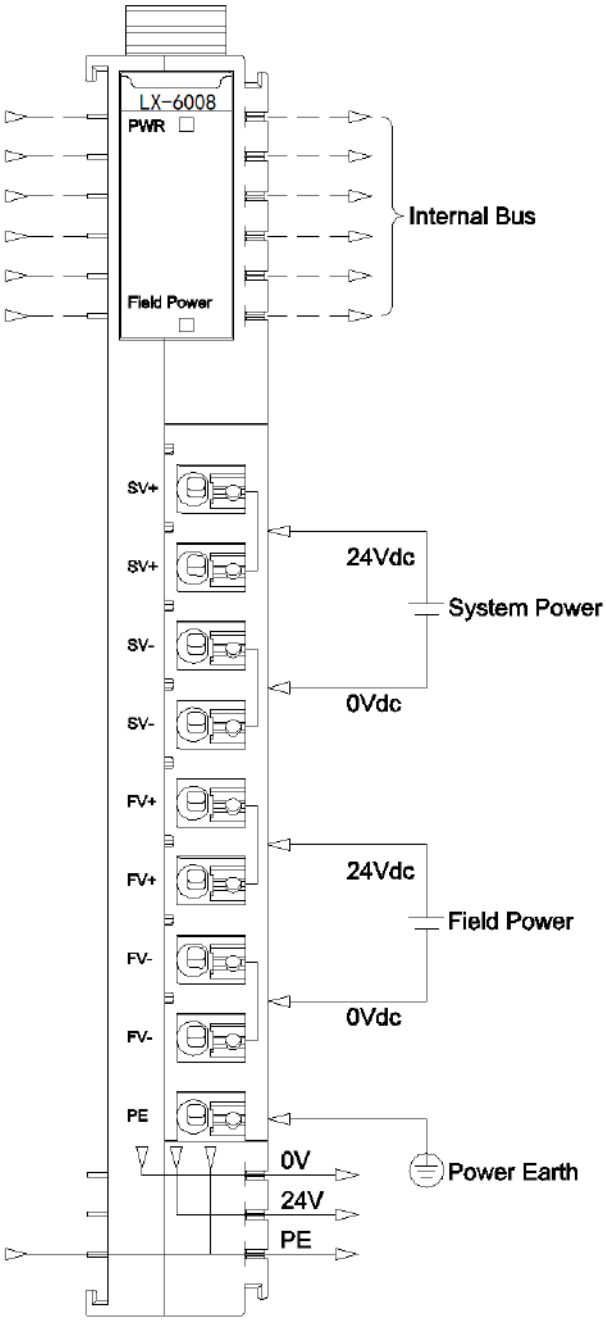
3.2 Terminal definition

Terminal Number	Definition	Description
1	SV+	System Power Positive Pole
2	SV+	
3	SV-	System Power Negative Pole
4	SV-	
5	FV+	Field Power Positive Pole
6	FV+	
7	FV-	Field Power Negative Pole
8	FV-	
9	PE	System Grounded

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:



4 Wiring


LX-6008
PWR
Field Power
Internal Bus
SV+
SV+
SV-
SV-
FV+
FV+
FV-
FV-
PE
24Vdc
System Power
0Vdc
24Vdc
Field Power
0Vdc
0V
24V
PE
Power Earth

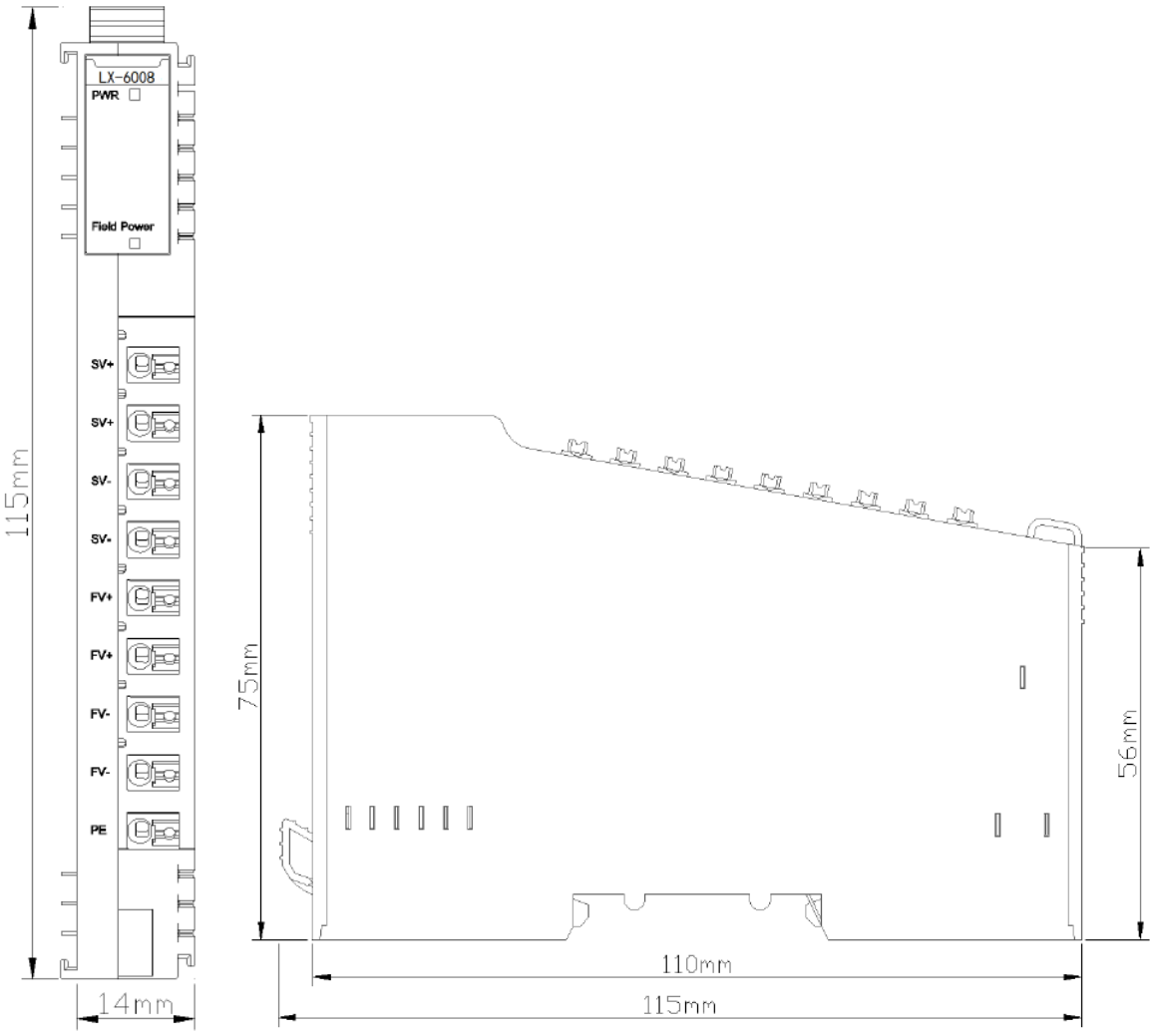
5 Process data definition

No process data.

6 Configuration parameters definition

No configuration parameter.

A DIMENSION



LX-6108 Power Expansion Module 5V/2A

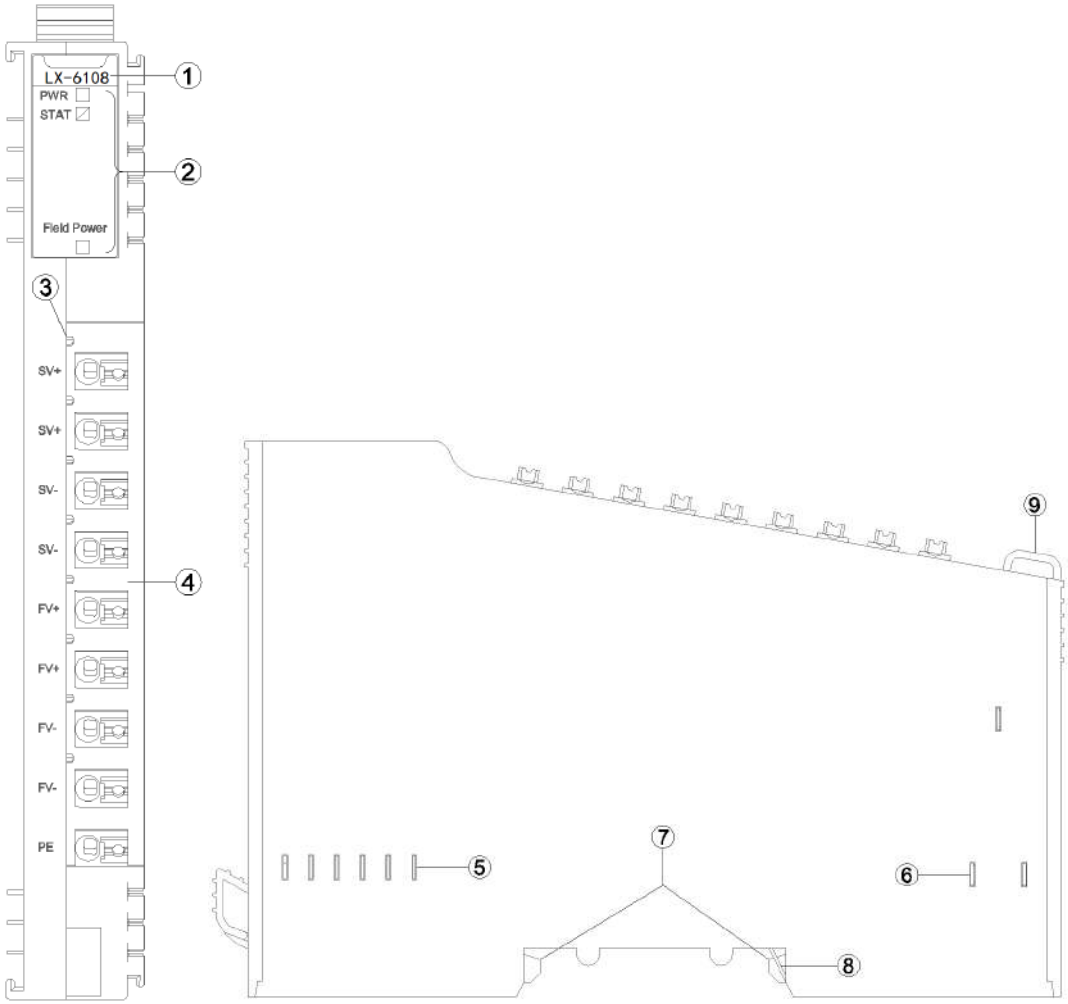
1 Module Description

- ◆ System Power and Field Power Expansion
- ◆ System Power Output 2A@5VDC
- ◆ Field Power Expansion 8A Current
- ◆ Requires Configuration, Occupies Slot Numbers

2 Technical Parameters

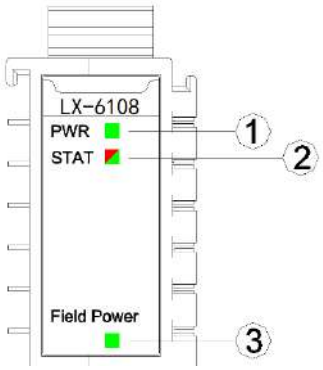
General parameters	
System Power Supply	Range：9~36VDC（Nominal 24VDC） Protection: Overcurrent protection, Reverse polarity protection
Module Internal Power Consumption	20mA@5VDC
Internal Bus Power Supply Current Max	Max：2.0A@5VDC
Isolation	System Power to Field Power: Isolation
Field Power Supply	Range：22~28V（Nominal 24VDC） Protection: Reverse polarity protection
Field Power	Field Power Current Max DC 8A
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%~95% RH(No Condensation)
Ingress Protection Rating	IP20

3 Hardware Interface



① Module Type
② State indicator
③ N/A
④ Wiring Terminal and identification
⑤ Internal Bus
⑥ Field Power
⑦ Buckle
⑧ Grounding Spring Sheet
⑨ Fixed Wiring Harness

3.1 LED indicator definition



① Power LED indicator (green)
② Module State LED indicator (red/green)
③ Output channel LED indicator (green)

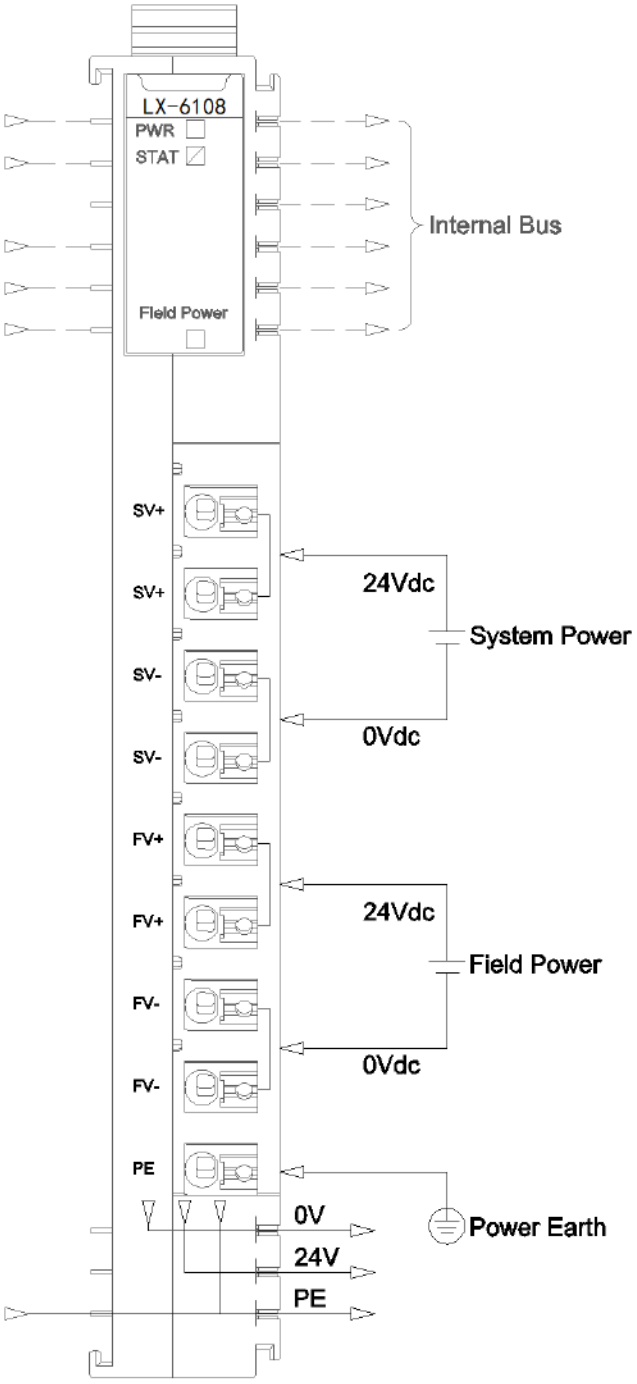
PW POWER STATE (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA MODULE STATE (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading mode
Flash(10Hz) (RED/GREEN)	Firmware Update
Double Flash (RED)	Module Exception has been soft-restarted
Field Power Indicator (Green)	Definition
ON	The output value is not 0
OFF	The output value is 0

3.2 Terminal definition

Terminal Number	Definition	Description
1	SV+	System Power Positive
2	SV+	
3	SV-	System Power Negative
4	SV-	
5	FV+	Field Power Positive
6	FV+	
7	FV-	Field Power Negative
8	FV-	
9	PE	System Ground

It is recommended to use cables with cores smaller than 1mm².
The cold-pressed terminal parameters are as follows:

4 Wiring


LX-6108
PWR
STAT
Field Power
Internal Bus
SV+
SV+
SV-
SV-
FV+
FV+
FV-
FV-
PE
24Vdc
System Power
0Vdc
24Vdc
Field Power
0Vdc
0V
24V
PE
Power Earth

5 Process data definition

N.A

6 Configuration parameters definition

N.A

A Dimension drawing