

CN-8038 BACnet/IP Network Adapter

1 Module Overview

The CN-8038 BACnet/IP network adapter supports standard BACnet/IP protocol communication, which can connect module data instantiation objects to the building automation system through the BACnet/IP protocol. The central monitoring station and controller that support the BACnet/IP protocol perform data reading functions on the extended I/O modules, and the number of extended IO modules supported is 32.

2 Technical Parameter

General Parameter	
System Power	Power supply: 19.2V~28.8V DC (Nominal 24V DC) Current: Max.2A@24V DC Protection: Overcurrent protection, Anti-reverse connection protection
Module Consumption	110mA@24VDC
Internal Bus Supply Current	Max: 2A@5VDC
Isolation	System power to field power: isolated
Filed Power	Power supply: 19.2V~28.8V DC (Nominal 24V DC)
Field Power Current	Max. DC 8A
The Maximum Number of Expansion Modules	32
Wirring Diameter	Max.1.0mm ² (AWG 18) Min.0.2mm ² (AWG 24)
Installation	35mm DIN-Rail
Dimension	115 mm *51.5 mm *75 mm
Weight	130g
Environment Parameters	
Horizontal Installation Operating Temperature	-35°C~70°C
Vertical Installation Operating Temperature	-35°C~60°C
Relative Humidity	5%~95%RH (No Condensation)
Storage Temperature	-40°C~85°C
Storage Humidity	5%~95%RH (No Condensation)
Manufacturing Test Temperature	-40°C~75°C
Ingress Protection Rating	IP20
Vibration Resistance	Comply with IEC 61131-2, IEC 60068-2-6
Impact Resistance	Comply with IEC 61131-2, IEC 60068-2-27
EMC Performance	Comply with IEC 61131-2, IEC 61000-4
BACnet/IP Parameter	
Protocol	BACnet/IP server
Communication Interface	2*RJ45, integrated switch function
Line Length	Maximum 100m (segment length) between 2 sites)
Transmission Rate	10/100 Mbit/s
Full Duplex	Support
Automatic Negotiation	Support
Automatic MDI/MDIX	Support
Maximum Number of Objects	AI: 256 AO: 256 BI: 256 BO: 256
Subscribe COV Services	Support
Communication Control Service	Support
Communication Watchdog	Support
IP Address Setting	DIP switch or configure software setting

Default IP Address	192.168.1.254
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THERE IS A RISK OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH.

Disconnect all devices from power, including connected devices, before removing any covers, or installing or removing any accessories, hardware, cables, or wires, except in specific circumstances specified in the appropriate hardware guidelines for this device.

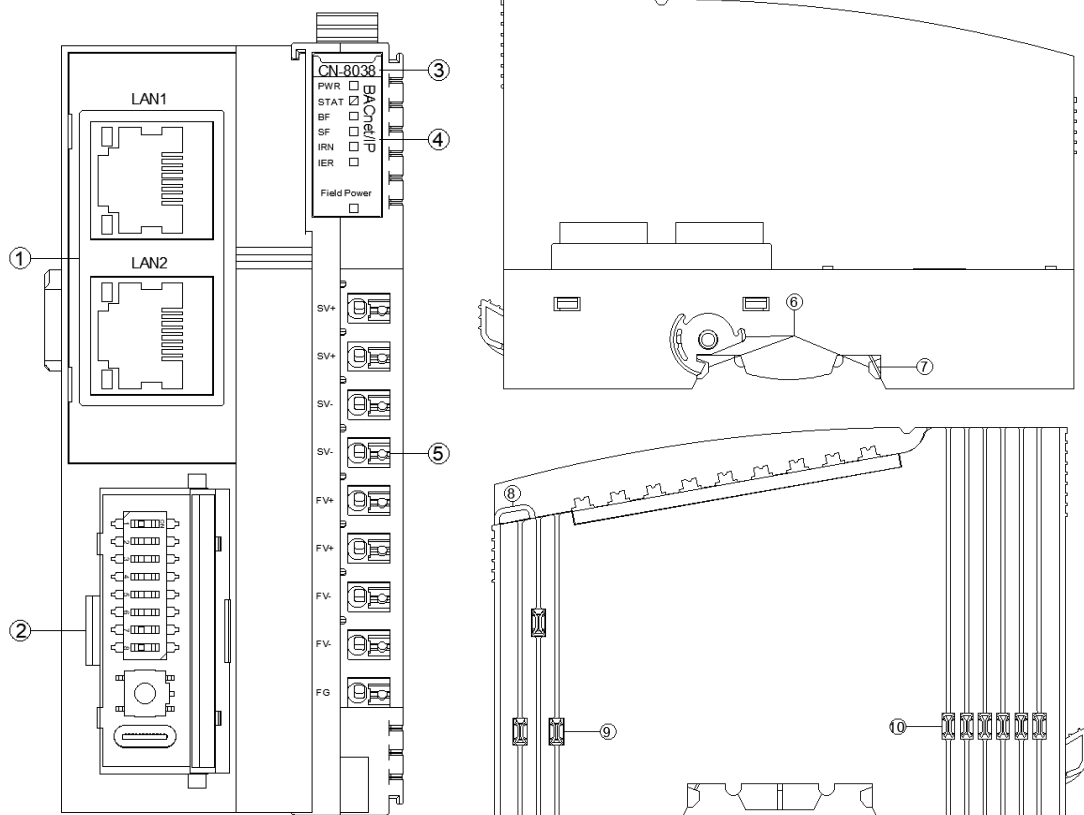
Always use a voltage sensing device with an appropriate rating to detect a power outage at the appropriate place and time, as instructed.

Replace and tighten all covers, accessories, hardware, cables, and wires, and confirm that the ground connection is correct before powering on the device.

When operating this equipment and related products, the specified voltage must be used.

Failure to follow instructions specified by the manufacturer may result in serious consequences such as death, personal injury, or damage to equipment since the protection provided by the equipment may be impaired.

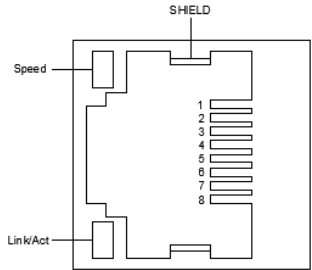
3 Hardware Interface



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

3.1 Ethernet Interface

LAN1 and LAN2 are POWERLINK communication ports, support, supports switch cascade function, transmission speed 100Mbps.



Speed: Network Speed (Green)

ON:100M

OFF:10M

Link/Act: Link State, Active State (Orange)

ON: Link UP

OFF: Link DOWN

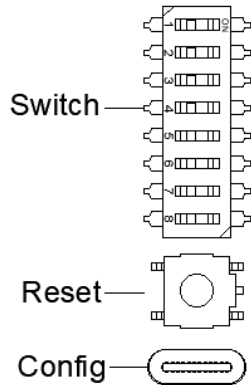
Flash: Active

SHIELD: RJ45 Shield Interface

RJ45 Pin definition

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

3.2 Configuration Interface



Switch: The DIP switch is used to set the IP address of the module (default IP address: 192.168.1.254).

When the switch value is 0, all 4 bytes of the IP address are configured by the software or the default IP address is used. When the switch is not 0, the last byte of the IP address is determined by the switch value, and the first 3 bytes can be configured by the software or the default 192.168.1 is used for the first 3 bytes.

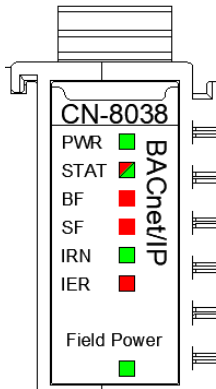
The relationship between the last byte of the IP address and the switch value is shown in the following table:

DIP switch pin number (ON:1, OFF:0)								Switch Value	IP last byte
1	2	3	4	5	6	7	8		
0	0	0	0	0	0	0	0	0	Software configuration (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
.	.	.	.	.	.	.	.	.	.
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

Reset: Module reset button, press and hold the button for more than 5 seconds All module parameters will return to their default values. When pressing Reset is effective, a green indicator light will light up in the upper left corner of the button

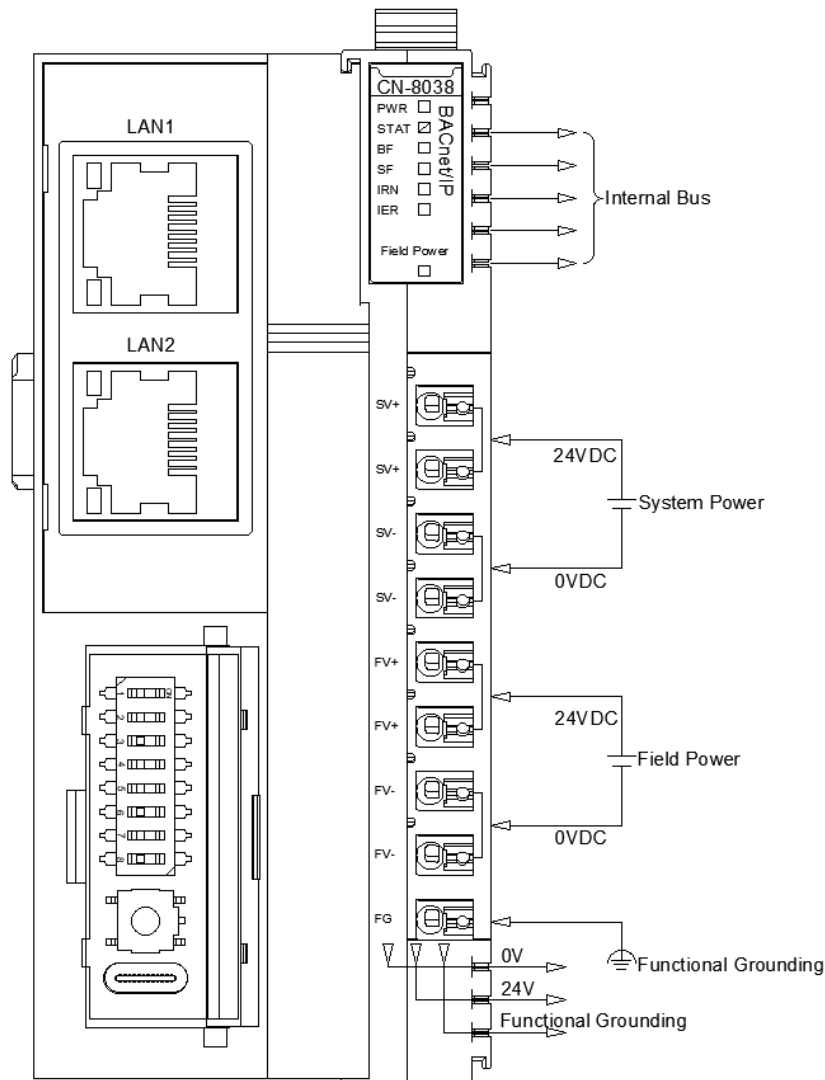
Config: Configuration port, standard Type-C interface, used to configure device parameters and firmware upgrades.

3.3 LED Indicator Definition



PWR Power Indicator (Green)	Definition
ON	The system power supply is normal
OFF	The system power supply is abnormal
STAT Module Status Indicator (Red/Green)	Definition
Double flash (Red)	Module Soft Restart by Hard-Fault
ON (Green)	Operation mode
Single flash (Green)	Stop mode
Slow flash (Red/Green)	Upgrading Mode
Fast flash (Red/Green)	Firmware Updating
BF Communication Status Indicator (Red)	Definition
Flash (2.5Hz)	The module detects a BACnet/IP network drop (watchdog on).
OFF	BACnet/IP network communication is normal (watchdog on) or watchdog is not enabled
SF System Status Indicator (Red)	Definition
Fast flash	The MAC address is illegal
OFF	The system is normal
IRN Running Indicator (Green)	Definition
ON	IO initialization is normal
OFF	IO initialization is error
IER Error Indicator (Red)	Definition
OFF	IO communication is normal
Flash 2 times	IO communication is error
Field Power Indicator (Green)	Definition
ON	The filed power supply is normal
OFF	The filed power supply is error

4 Wiring



NOTICE

UNEXPECTED DEVICE OPERATION

Inside the module, two terminal blocks SV+ have been shorted, two terminal blocks SV - have been shorted, two terminal blocks FV+ have been shorted, and two terminal blocks FV - have been shorted. Externally, only one system power supply and one field power supply need to be connected.

The wire should be copper wire with a core greater than 0.2mm^2 and less than 1mm^2 , and the impedance is less than 10Ω .

Failure to follow instructions specified by the manufacturer may result in serious consequences such as death, personal injury, or damage to equipment since the protection provided by the equipment may be impaired.

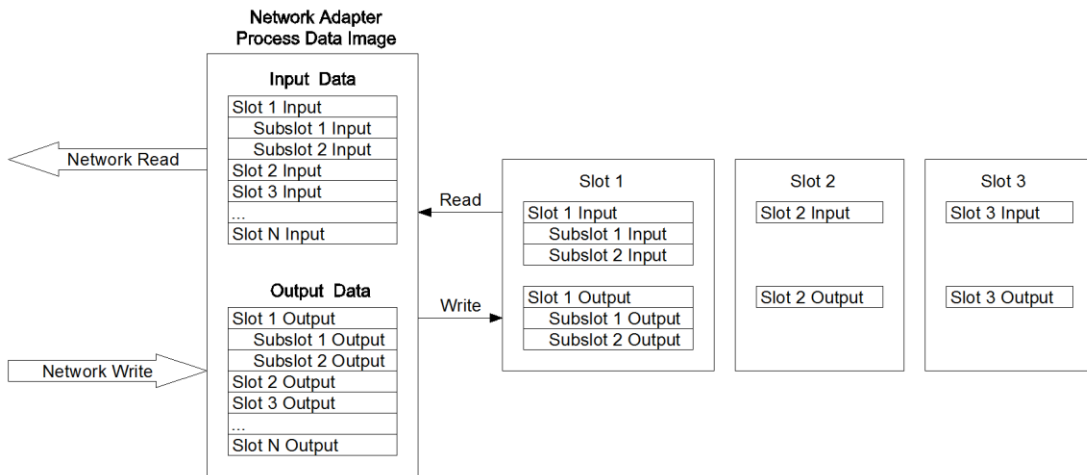
5 Process Data Definition

5.1 Adapter Process Data Definition

BACnet/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:



6 Configuration Parameter Definition

Adapter Configuration Parameter								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	Reserved				Communication Detection	Fault Action for Output	Fault Action for Input	Source of Config Data
Byte 1	Reserved							
Configuration Configuration Parameter								
Byte 2	Mac Address							
Byte 3								
Byte 4								
Byte 5								
Byte 6								
Byte 7								
Byte 8	IP Address							
Byte 9								
Byte 10								
Byte 11								
Byte 12	Net Mask							
Byte 13								
Byte 14								
Byte 15								
Byte 16	Net Gateway							
Byte 17								
Byte 18								
Byte 19								
Byte 20	BACnet Device number							
Byte 21								
Byte 22								
Byte 23								
Byte 24	BACnet IP Port							
Byte 25								
Byte 26	Watchdog Time(s)							
Byte 27	Reserved							Watchdog
Byte 28 Byte 28	Reserved							

Data description:

Source of Config Data: Parameter configuration method. (Default value: 0)

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: 1)

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

Communication Detection: Network communication connection interruption, special module fault handling. (Default value: 0)

0: Disable

1: Enable

MAC Address: MAC address, read-only attribute.

IP Address: IP address, read and write attributes.

Net Mask: Subnet masks, read and write attributes.

Net Gateway: Gateway address, read and write properties.

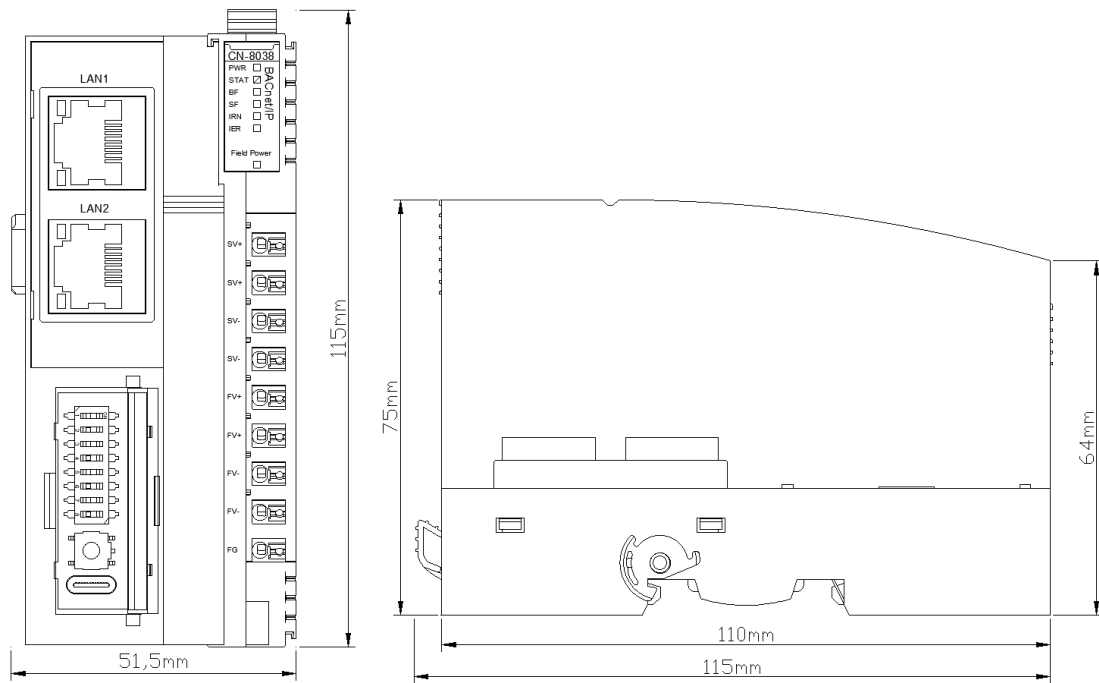
BACnet Device Number: The BACnet device number is an unsigned 32 type number with a range of 0-4194303 and a read/write attribute.

BACnet IP Port: The UDP port number accessed by the BACnet device is an unsigned 16 type number with a range of 0-65535 and a read/write attribute.

Watchdog Time(s): BACnet communication disconnection time is an unsigned 8 type number, ranging from 0-255, with read/write attributes.

Watchdog: BACnet communication drop detection function start switch, occupying 1bit size, range 0-1, attribute is read and write attribute.

A Dimension



3 Extended IO module

CT-1218 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 digital 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.33mA@5.0VDC
Isolation	I/O to internal bus: opto-couple isolation (3KVrms)
Field Power	Nominal:24VDC, Range: 19.2~28.8VDC
Wiring	Max.: AWG 18 Min.: AWG 24
Installation	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operating Temperature of Vertical Installation	-35°C~60°C
Operating Temperature of Horizontal Installation	-35°C~70°C
Relative Humidity	5~ 95%RH (No Condensation)
Storage Temperature	-40°C~85°C
Storage Humidity	5~ 95%RH (No Condensation)
Manufacturing Test Temperature	-40°C~75°C
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
Effective pulse width for counting	2.5ms

 WARNING

UNEXPECTED EQUIPMENT OPERATION

Do not exceed any of the ratings specified in the environmental and electrical characteristics table.

Failure to follow instructions specified by the manufacturer may result in serious consequences such as death, personal injury, or damage to equipment since the protection provided by the equipment may be impaired.

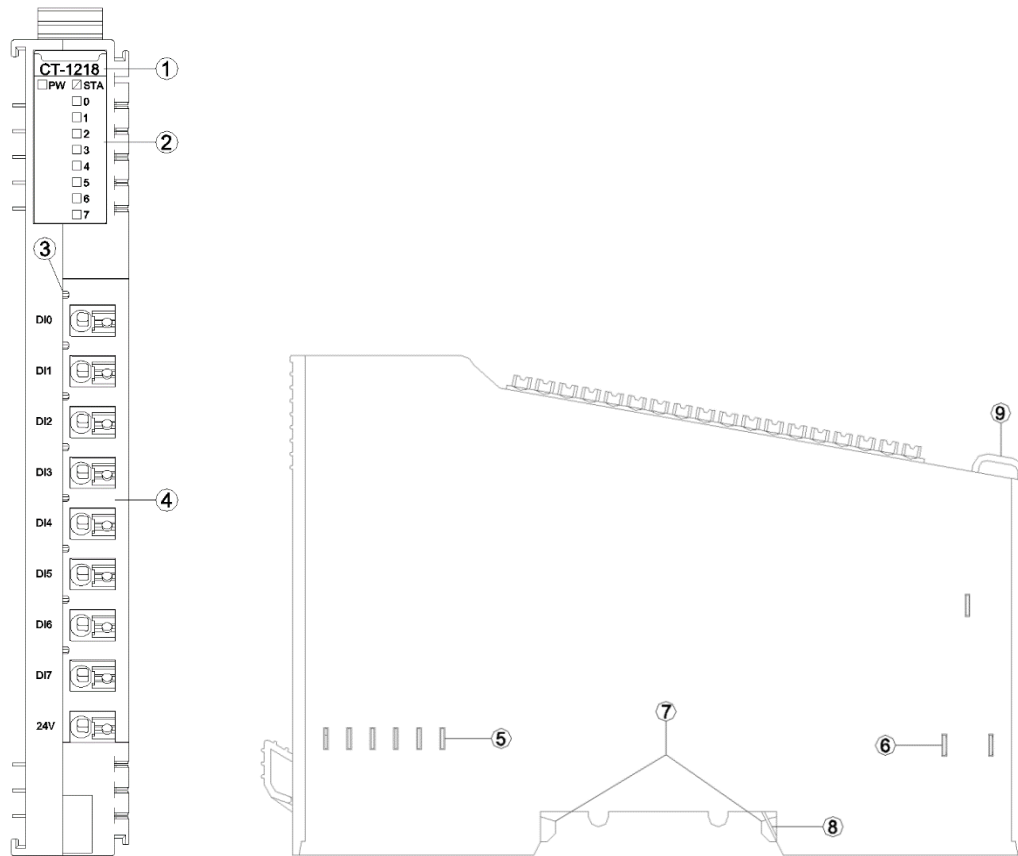
 AVERTISSEMENT

FONCTIONNEMENT INATTENDU DE L'EQUIPEMENT

Ne dépassez aucune évaluation spécifiée dans le tableau de caractéristiques environnementales et électriques.

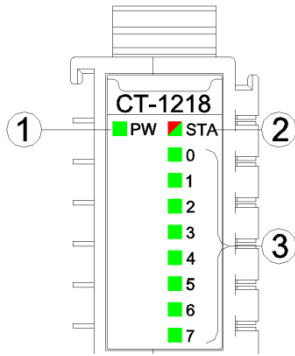
Le fait de ne pas suivre les instructions peut entraîner une défaillance de la protection fournie par l'équipement, ce qui peut entraîner des conséquences graves, comme des blessures ou des dommages à l'équipement.

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

WARNING

UNEXPECTED EQUIPMENT OPERATION

By viewing the PW indicator, could determine the power supply status of a module. If the PW is steady green, the power supply is normal. Otherwise, the module cannot work properly.

When the module is initially powered on, there will be 3S for the backplane bus connection. After the backplane bus is initialized, STA is in the green steady state. If STA is in the green blinking state, it indicates that the backplane bus has not been initialized, and it needs to be powered off and restarted for re-initialization.

STA abnormal working state occurs during the normal operation of the module, please check the firmware version information of all modules, and consult ODOT technical support for details.

If a module is upgraded, check that all modules are in the normal state after the upgrade. Otherwise, an exception may occur.

Failure to follow instructions specified by the manufacturer may result in serious consequences such as death, personal injury, or damage to equipment since the protection provided by the equipment may be impaired.

AVERTISSEMENT

FONCTIONNEMENT INATTENDU DE L'EQUIPEMENT

En regardant l'état de l'indicateur de PW, jugez l'état d'alimentation du module. Le feu vert PW reste allumé et l'alimentation est normale. Autrement, le module ne fonctionnera pas correctement.

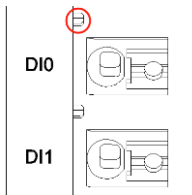
Lorsque le module est alimenté initialement, il y aura 3S pour la connexion de bus de backboard. STA est un état vert permanent après l'initialisation du bus de backboard. Si STA est en état de clignotement vert, cela signifie que l'initialisation du bus de backboard n'est pas passée et doit être redémarrée hors tension et réinitialisée.

L'état de fonctionnement anormal de STA se produit pendant le fonctionnement normal du module, veuillez vérifier les informations de version du firmware de tous les modules, et consulter le support technique ODOT pour plus de détails.

Si le module a une opération de mise à niveau, après l'achèvement de la mise à niveau, le besoin de vérifier que tous les modules sont dans l'état normal avant de courir, sinon il conduira à une exception.

Le fait de ne pas suivre les instructions peut entraîner une défaillance de la protection fournie par l'équipement, ce qui peut entraîner des conséquences graves, comme des blessures ou des dommages à l'équipement.

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

WARNING

UNEXPECTED EQUIPMENT OPERATION

The DI channel terminal provides reverse protection.

The FV power supply of the network adapter is normal. The 24V terminal on the DI module can be used for testing. Do not use the FV power supply to supply power to peripherals.

Failure to follow instructions specified by the manufacturer may result in serious consequences such as death, personal injury, or damage to equipment since the protection provided by the equipment may be impaired.

AVERTISSEMENT

FONCTIONNEMENT INATTENDU DE L'EQUIPEMENT

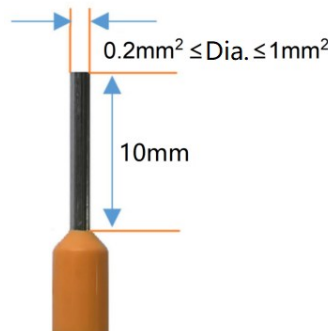
Le terminal de canal d'entrée numérique offre une protection inverse.

L'alimentation FV de l'adaptateur réseau est normale. Le terminal 24V du module DI peut être utilisé pour les tests. Ne pas utiliser l'alimentation FV pour alimenter les périphériques.

Le fait de ne pas suivre les instructions peut entraîner une défaillance de la protection fournie par l'équipement, ce qui peut entraîner des conséquences graves, comme des blessures ou des dommages à l'équipement.

When connecting a cold-pressed terminal, the terminal must be terminated and checked in strict accordance with the corresponding termination specifications or requirements, and connect the cold-pressed terminal according to the corresponding node serial number.

The conductor should use copper conductor and the conductor core should be larger than 0.2mm^2 and smaller than 1mm^2 (AWG18~AWG24). Cold-pressed terminal parameters are as follows:



! WARNING

UNEXPECTED EQUIPMENT OPERATION

Strip the length of the conductor insulation layer is greater than 10mm to ensure reliable signal connection.

The wire needs to use copper wire and the wire core is greater than or equal to 0.2mm^2 and less than or equal to 1mm^2 to ensure reliable signal connection.

When connecting a cold-press terminal, connect the cold-press terminal strictly in accordance with the corresponding termination specifications or requirements, and connect the cold-press terminal according to the corresponding node serial number.

Do not power on cold-press terminals until they are properly connected or fully locked.

Failure to follow instructions specified by the manufacturer may result in serious consequences such as death, personal injury, or damage to equipment since the protection provided by the equipment may be impaired.

! AVERTISSEMENT

FONCTIONNEMENT INATTENDU DE L'EQUIPEMENT

Dépouillez la longueur de la couche isolante du fil plus de 10mm pour assurer la connexion fiable du signal.

Le conducteur doit utiliser le fil de cuivre et le noyau de fil est supérieur ou égal à $0,2\text{ mm}^2$, inférieur ou égal à 1mm^2 , afin d'assurer la connexion fiable du signal.

Lorsque les terminaux de presse à froid sont terminés, ils doivent être terminés et visualisés en stricte conformité avec les spécifications ou les exigences correspondantes et terminés selon le numéro de série de noeud correspondant.

Il est interdit d'activer les bornes à froid avant qu'elles ne soient correctement articulées ou complètement verrouillées.

Le fait de ne pas suivre les instructions peut entraîner une défaillance de la protection fournie par l'équipement, ce qui peut entraîner des conséquences graves, comme des blessures ou des dommages à l'équipement.

DANGER

FIRE DANGER

Use the correct wiring rules only for the maximum current capacity of the I/O channel and power supply.

Failure to follow instructions specified by the manufacturer may result in serious consequences such as death, personal injury, or damage to equipment since the protection provided by the equipment may be impaired.

WARNING

UNEXPECTED EQUIPMENT OPERATION

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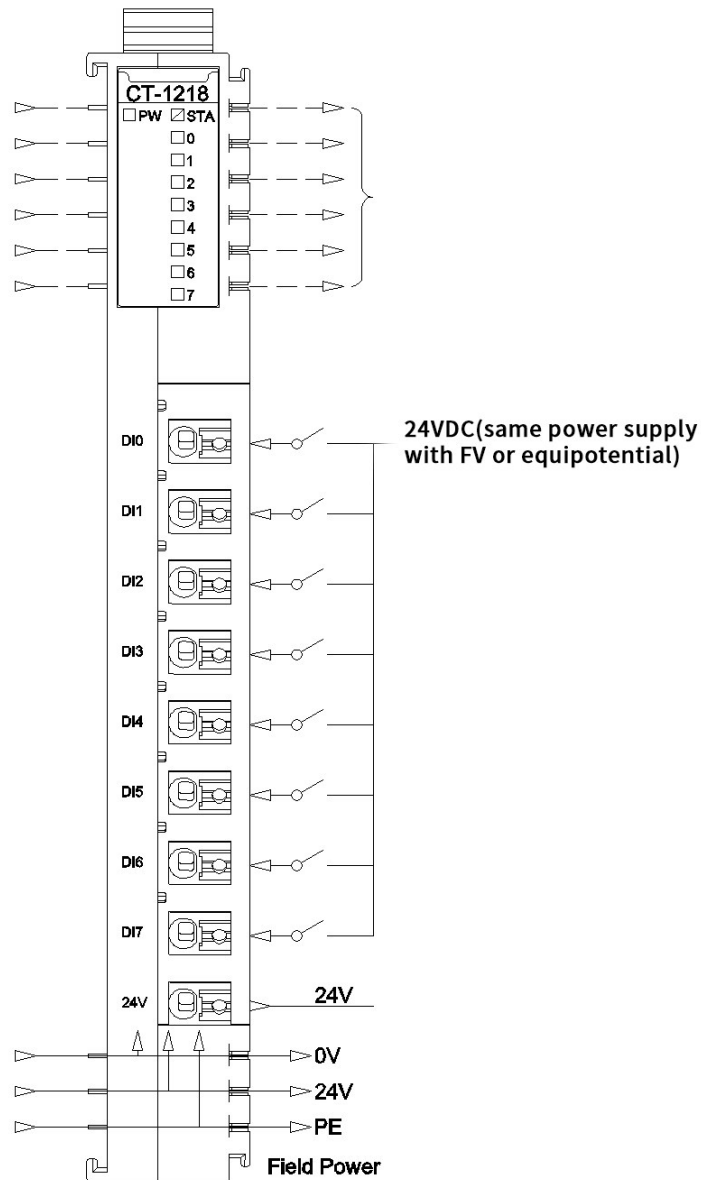
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4 Wiring



NOTICE

EQUIPMENT INOPERABLE

Do not crimp the spring terminal with more than the maximum pressure specified for the terminal. Otherwise, the resilience of the spring terminal may be damaged and the terminal rebound may be affected.

Do not press the spring terminal with a sharp tool when removing cable from the channel. Otherwise, the spring terminal will be damaged.

Failure to follow these instructions may result in equipment damage.

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	Counter Value Ch#7							
Byte 28								
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, 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

