

## 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.

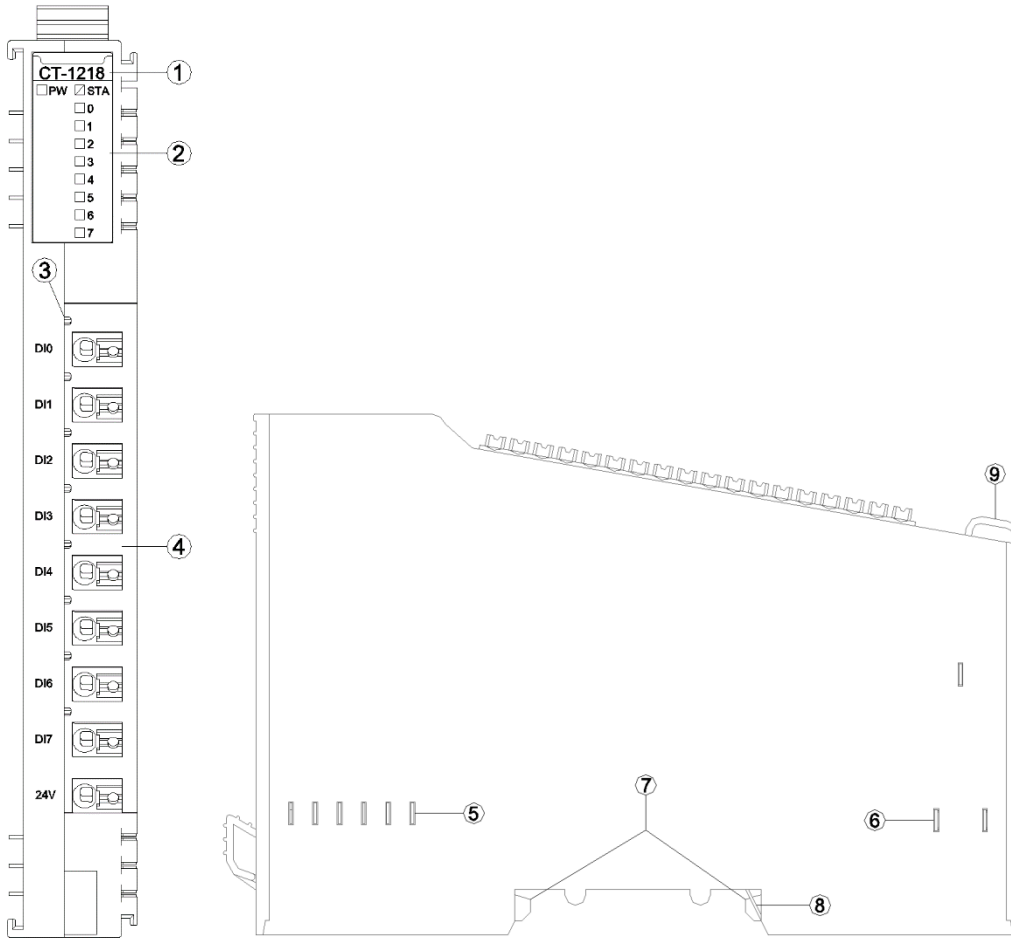
◆the module could be set the digital signal input filtering time and the byte transmission order of the counter.

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

## 2 Technical parameters

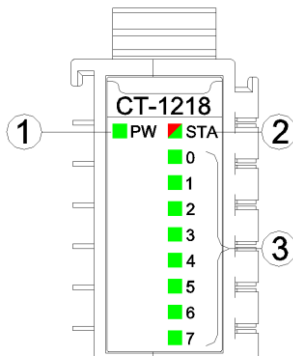
| General parameters        |   |
|---------------------------|---|
| Power Consumption         | Max.52mA@5.0Vdc                                     |
| Isolation                 | I/O to internal bus: opto-couple isolation (3KVrms) |
| Field Power               | Nominal:24Vdc, Range:22-28Vdc                       |
| Wiring                    | Max.1.0mm <sup>2</sup> (AWG 17)                     |
| Mounting Type             | 35mm DIN-Rail                                       |
| Size                      | 115*14*75mm   |
| Weight                    | 65g   |
| Environment Specification |   |
| Operational Temperature   | -40~85°C  |
| 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<br>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

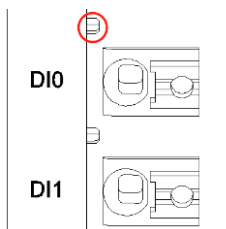
### 3.1 LED indicator definition



- 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)



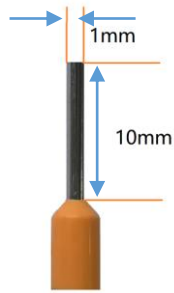
When input signal of input channel is valid, the corresponding field channel LED indicator is on.

### 3.3 Terminal definition

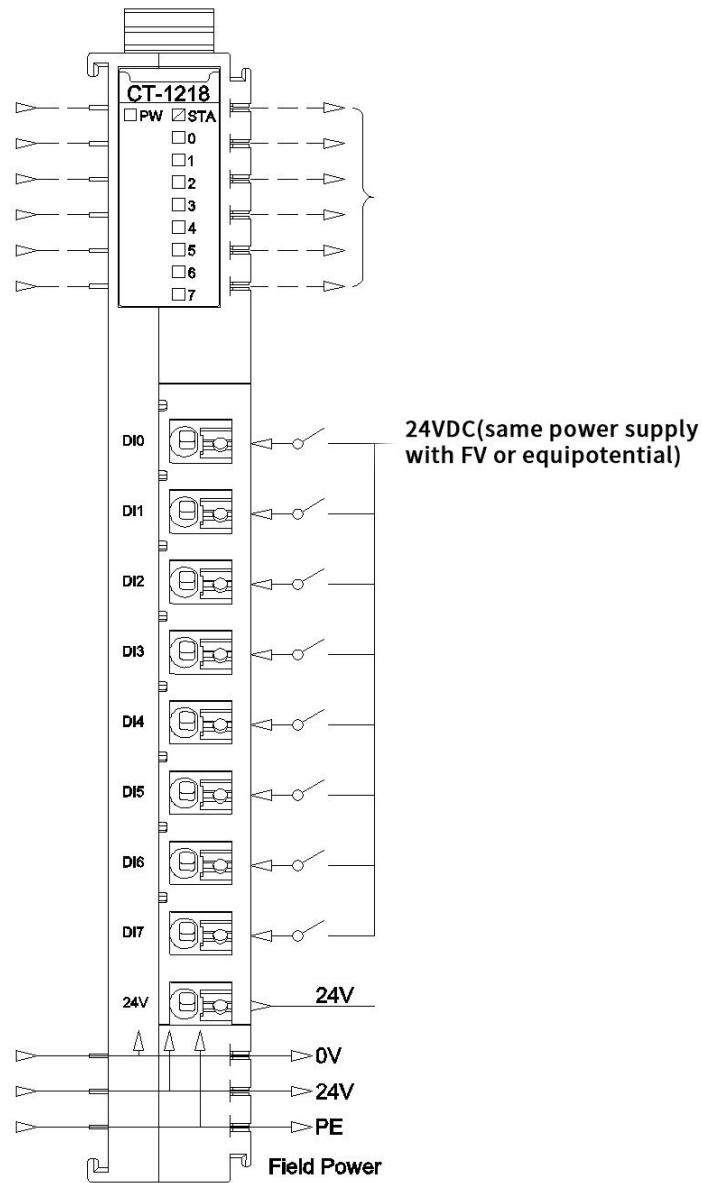
| Terminal Number | Symbol | Description  |
|-----------------|--------|--------------|
| 1               | DI0    | Signal input |
| 2               | DI1    |              |
| 3               | DI2    |              |
| 4               | DI3    |              |
| 5               | DI4    |        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

It is recommended to use cables with cores smaller than 1mm<sup>2</sup>.

The cold-pressed terminal parameters are as follows:



## 4 Wiring



## 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

