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CT-221F 16 channels digital output/24VDC/Sink type

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

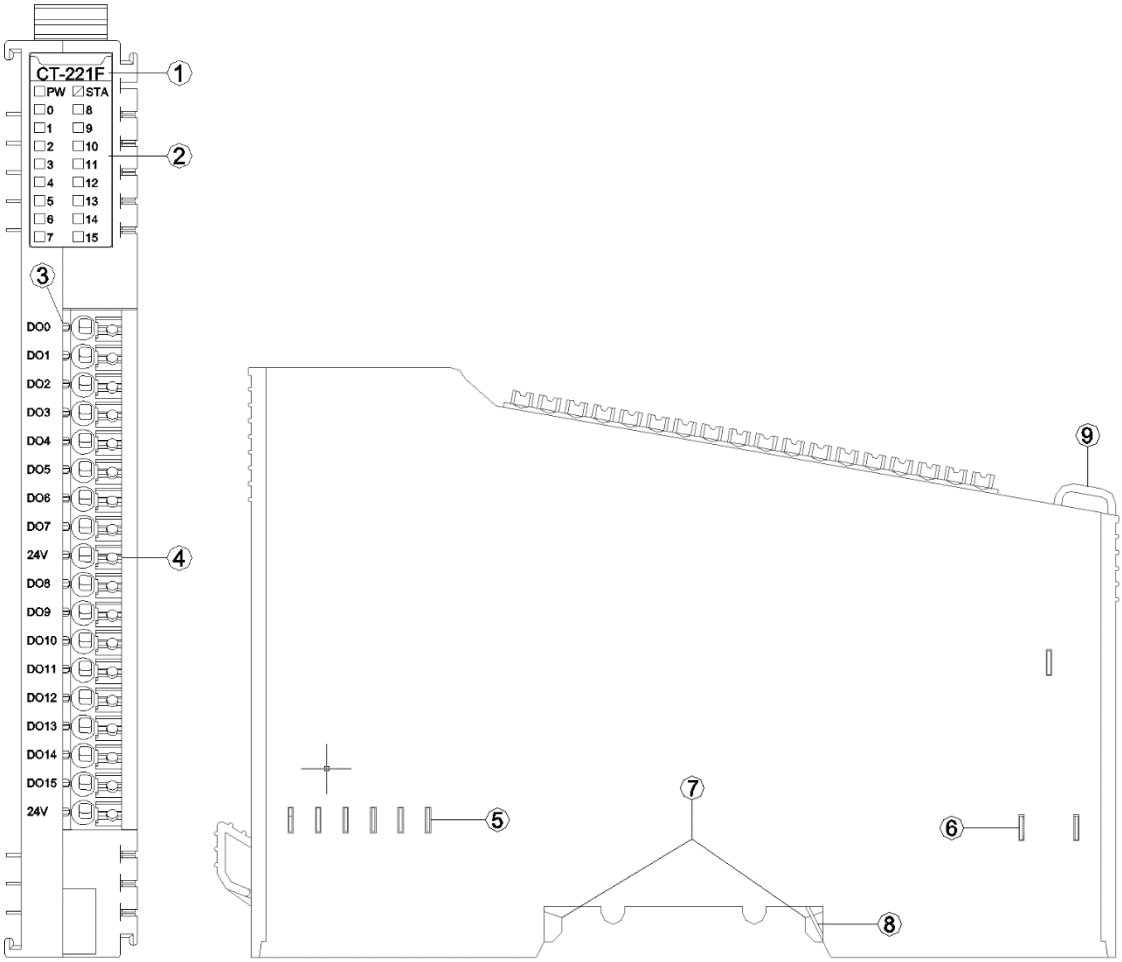
◆ the module has the function of thermal shutdown and over current protection

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.1.5mm²(AWG 16)
Mounting Type	35mm DIN-Rail
Size	115*14*75mm
Weight	65g
Environment Specification	
Operational Temperature	-40~85℃
Operational Humidity	5%-95% (No Condensation)
Protection Class	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

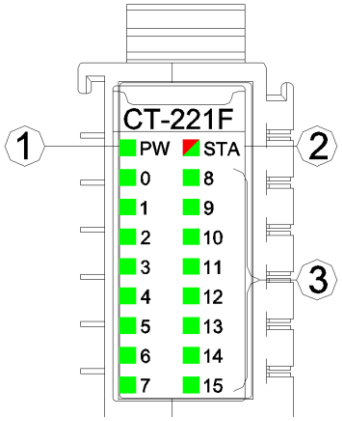
⑥ Field Power

⑦ Buckle

⑧ Grounding Resilient Sheet

⑨ Fixed Wiring Harness

3.1 LED indicator definition



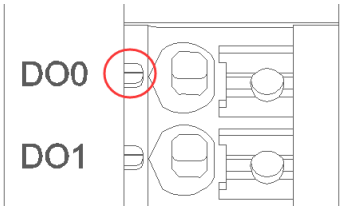
① Power LED indicator (green)

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.

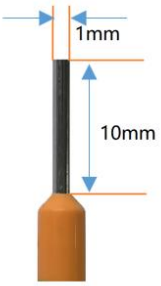
A: When the load is ordinary resistive load, this port is the selected port.When the 24V power supply is connected, the output channel can output 0V normally, meanwhile the terminal channel indicator LED will be on.When the 24V power supply is not connected, the output channel can output 0V normally,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

channel indicator LED will be off.

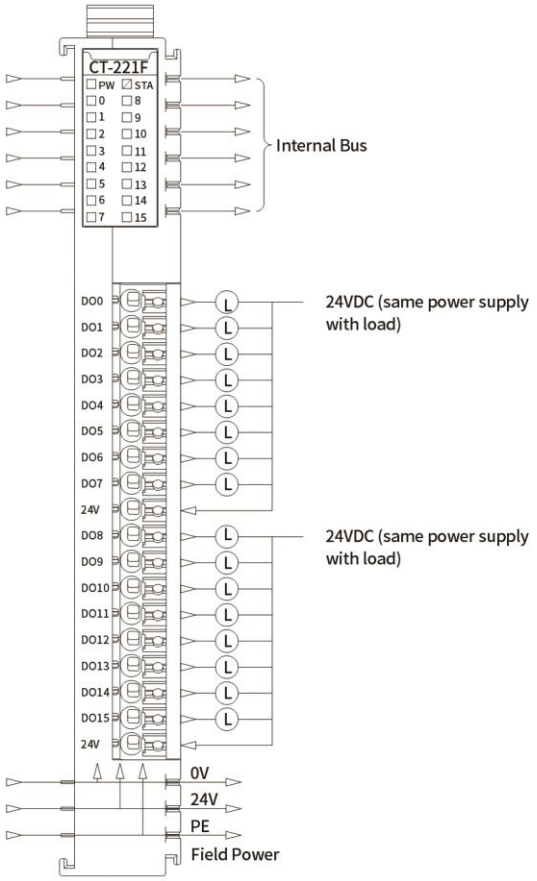
B: When the load is inductive loads such as coils, this port is the VCLAMP voltage clamp port. This port must be connected to the positive pole of the inductive load power supply; it could provide a continuous current circuit when the inductive load disconnects.

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:

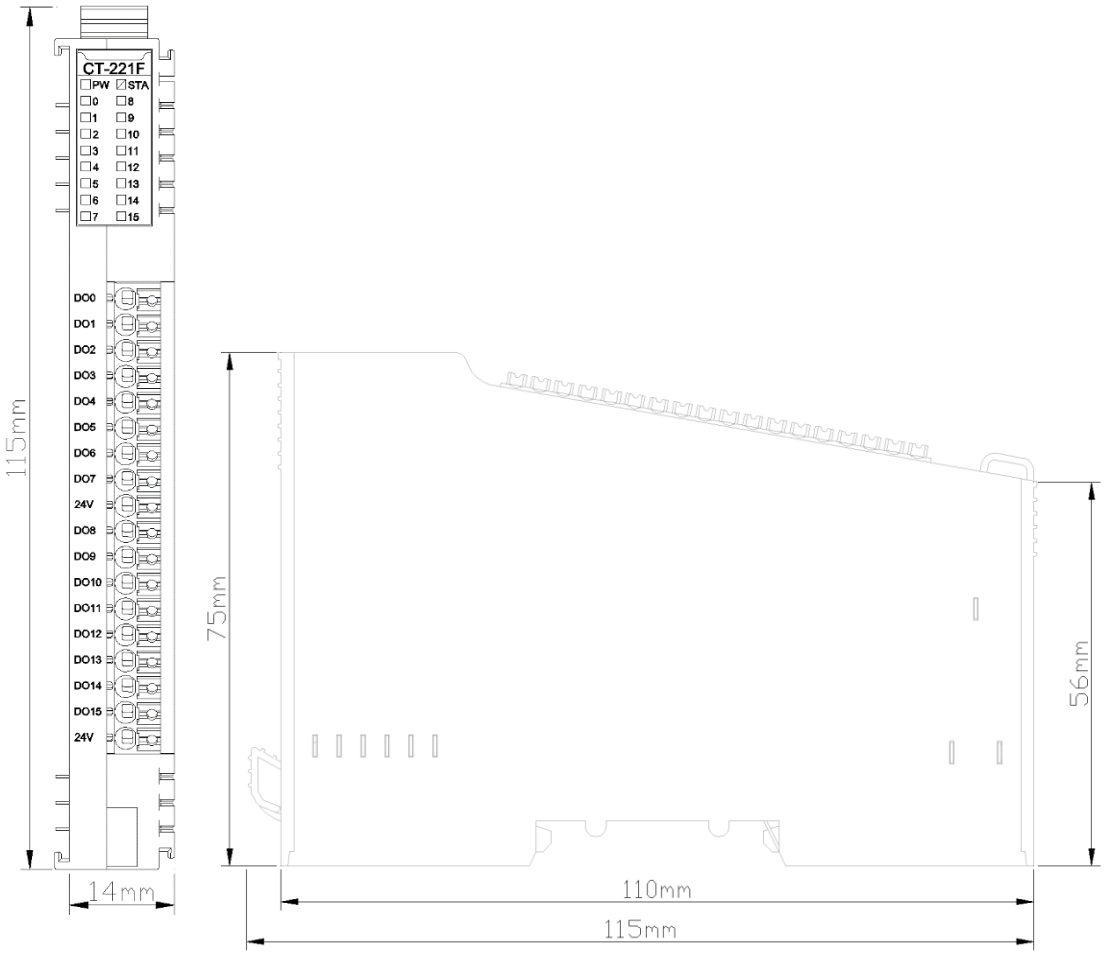
Fault Action for Output Ch#(0-15)：Fault Output mode. When the IO module detects an internal bus exception and fails to communicate with the adapter. And the module will turn to offline mode, so the output data is processed in this way. (default: 0)

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