CT-3848 8 channels Analog Input Thermocouple (TC-J/K/E/T/S/R/B/N) types (filter adjustable)

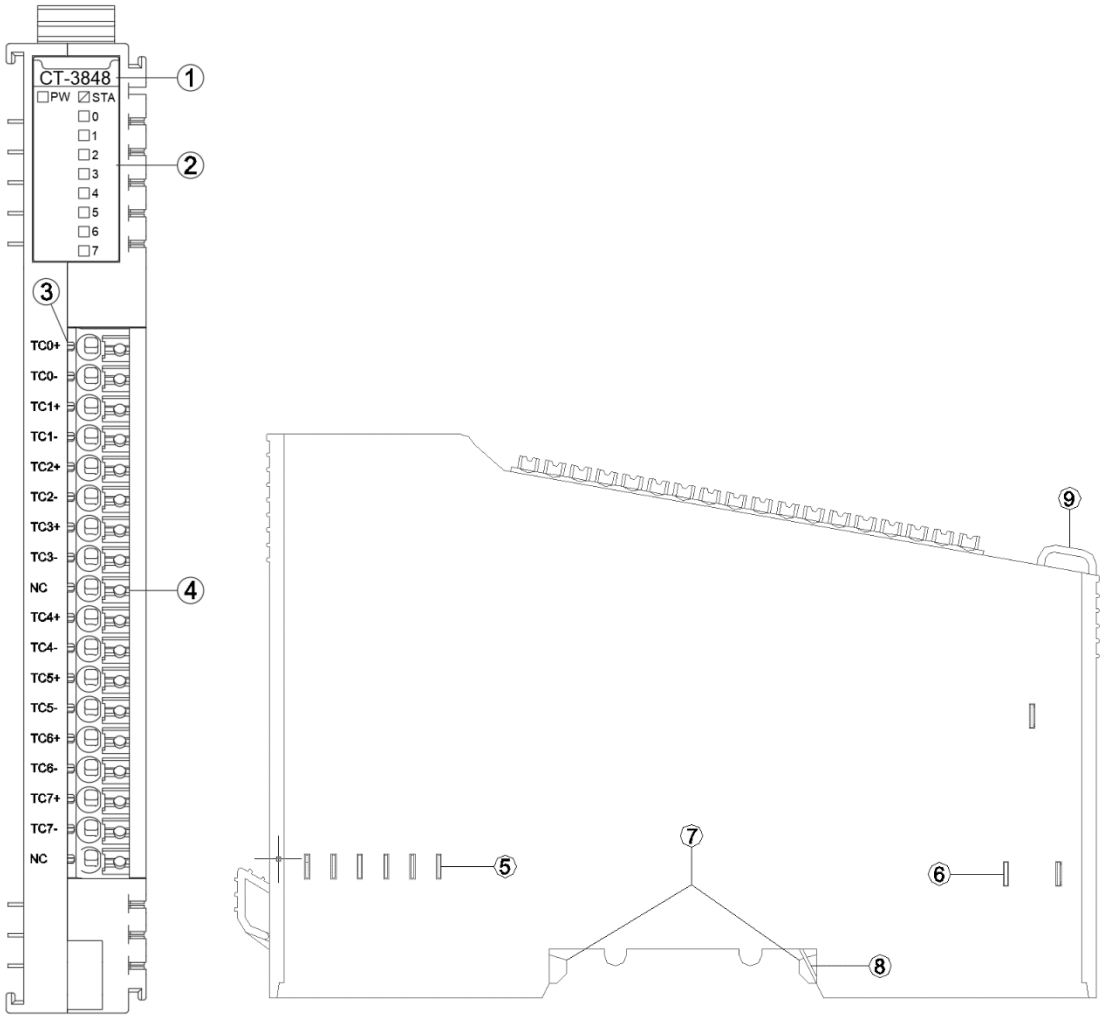
1 Module features

- The module supports 8-channel thermocouple signal acquisition
- The module carries with 8analog 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)
- The module supports adjustable filter parameters

2 Technical Parameters

CT-3848 General parameters		
Power		Max.60mA@5.0Vdc
Isolation		I/O to internal bus：magnetic isolation (2.5KVrms)
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		-40~70℃
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，@-40~70℃
Sampling Rate		70ms/4 channel
Filter Level		Adjustable
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℃
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 32765：The ADC chip fault 32764：Cold-junction compensation transform fault value

3 Hardware Interface



① Module Type

② State indicator

③ N/A

④ Wiring Terminal and identification

⑤ Internal Bus

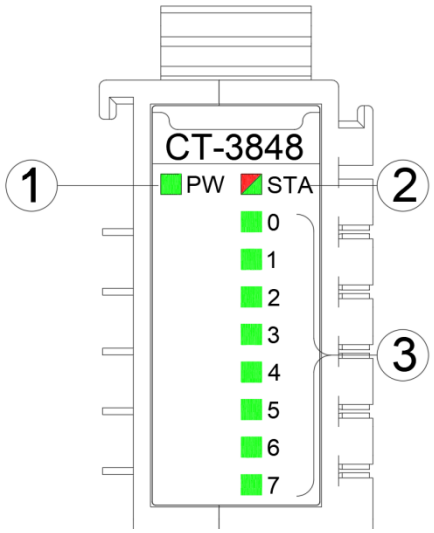
⑥ Field Power

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)

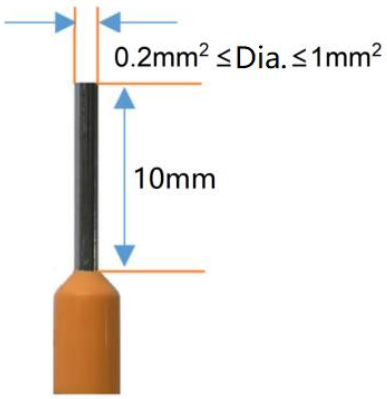
PW POWER STATE (GREEN)	Definition
ON	Internal bus Power Normal
OFF	Internal bus Power Failure
STA MODULE STATE (RED/GREEN)	Definition
Green slow flash (2.5Hz)	Module internal bus is not started
Red slow flash (2.5Hz)	Module internal bus offline
ON (GREEN)	Operation normal
Flash(2.5Hz) (RED/GREEN)	Upgrading 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

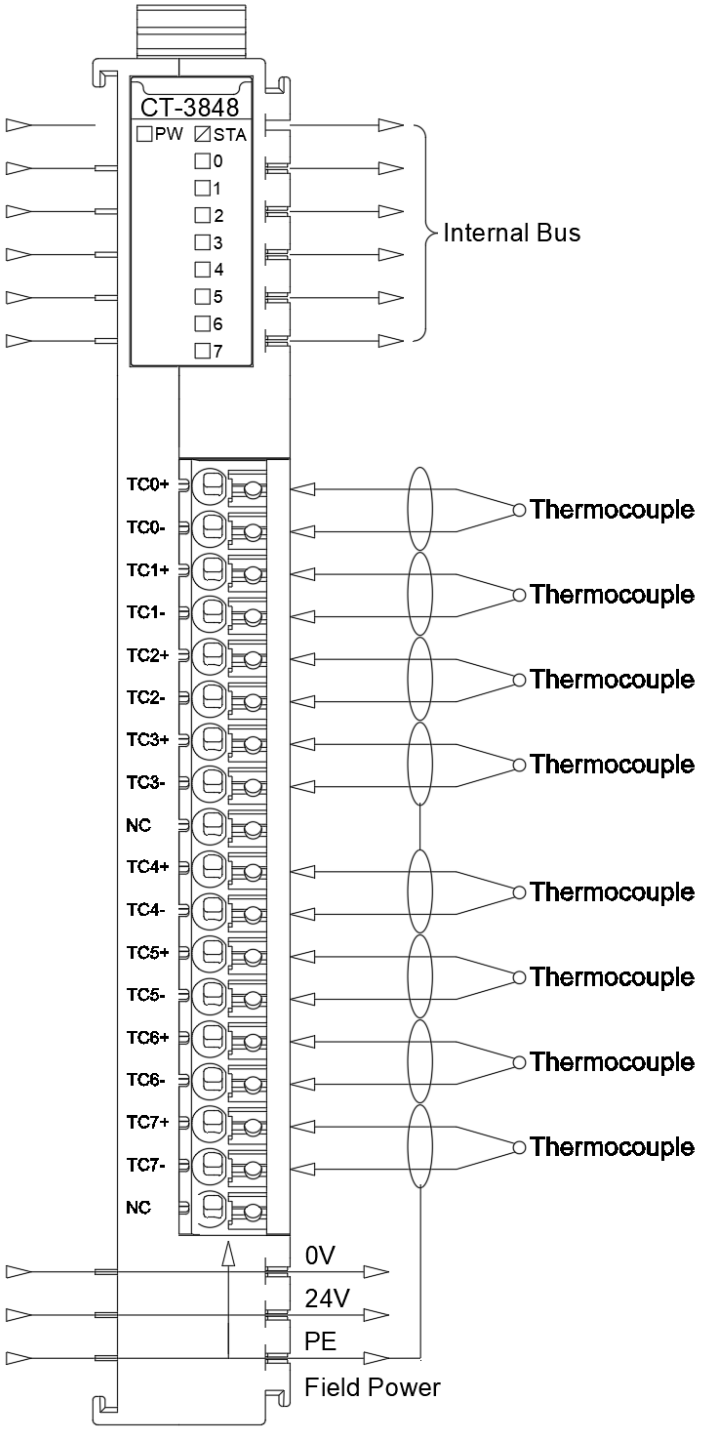
Terminal Number	Definition	Description
1	TC0+	Signal Input CH0
2	TC0-	
3	TC1+	Signal Input CH1
4	TC1-	
5	TC2+	Signal Input CH2
6	TC2-	
7	TC3+	Signal Input CH3
8	TC3-	
9	NC	Not connected
10	TC4+	Signal Input CH4
11	TC4-	
12	TC5+	Signal Input CH5
13	TC5-	
14	TC6+	Signal Input CH6
15	TC6-	
16	TC7+	Signal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

It is recommended to use cables with cores greater than 0.2mm² and smaller than 1mm². When connecting cables (terminals)with cores, need to check and connect them according to the corresponding node serial number.

The cold-pressed terminal parameters are as follows:



4 Wiring


CT-3848
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 description：

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
>500.0	32767	7FFF	Overflow
500	5000	1388	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
>1800.0	32767	7FFF	Overflow
1800	18000	4650	Exceeds the upper limit
.	.	.	
.	.	.	
1760.1	17601	44C1	
1760.0	17600	44C0	Rated range
.	.	.	
.	.	.	
-50.0	-500	FE0C	
-50.1	-501	FE0B	Exceeds the lower limit
.	.	.	
.	.	.	
-110	-1100	FBB4	
<-110.0	-32768	8000	Underflow

Process Data Definition – R Type			
Temperature	Decimal	Hex	Location
>1940.0	32767	7FFF	Overflow
1940	19400	4BC8	Exceeds the upper limit
.	.	.	
.	.	.	
1760.1	17601	44C1	
1760.0	17600	44C0	Rated range
.	.	.	
.	.	.	
-50.0	-500	FE0C	
-50.1	-501	FE0B	Exceeds the lower limit
.	.	.	
.	.	.	
-110	-1100	FBB4	

<-110.0	-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
.	.	.	
.	.	.	
100	1000	03C8	
<100.0	-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

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					Temperature Unit		16Bit Data Format
Byte 1	CJC Model (CH 3)		CJC Model (CH 2)		CJC Model (CH 1)		CJC Model (CH 0)	
Byte 2	CJC Model		CJC Model		CJC Model		CJC Model	

	(CH 7)	(CH 6)	(CH 5)	(CH 4)
Byte 3	TC Input Type (CH 1)		TC Input Type (CH 0)	
Byte 4	TC Input Type (CH 3)		TC Input Type (CH 2)	
Byte 5	TC Input Type (CH 5)		TC Input Type (CH 4)	
Byte 6	TC Input Type (CH 7)		TC Input Type (CH 6)	
Byte 7	Filtering Level (CH 1)		Filtering Level (CH 0)	
Byte 8	Filtering Level (CH 3)		Filtering Level (CH 2)	
Byte 9	Filtering Level (CH 5)		Filtering Level (CH 4)	
Byte 10	Filtering Level (CH 7)		Filtering Level (CH 6)	

Data description：

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

0：A_B

1：B_A

Temperature Unit：（Default：0）

0：Degrees Celsius℃

1：Fahrenheit℉

2：Kelvin (K-)

CJC Model(CH 0-7)：cold junction compensation mode（Default：0）

0：Internal reference junction

1：Fixed reference temperature. 0℃

TC Input Type(CH 0-7)：Sensor type of the channel（Default ：0：N/A）

0：N/A

1：J type

2：K type

3：E type

4：T type

5：S type

6：R type

7：B type

8：N type

Filtering Level Ch（0-7)：Filter Level (Default：4)

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

11：Level 11

12：Level 12

A Dimension drawing