

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 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)
- ◆ The module supports adjustable filter parameters

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		Max.: AWG 18
Mounting Type		35mm Din-Rail
Size		115*14*75mm
Weight		65g
Environment Specification		
Operating Temperature of Horizontal Installation		-35°C~70°C
Operating Temperature of Vertical Installation		-35°C~60°C
Relative Humidity		< 95%RH (No Condensation)
Storage Temperature		-40°C~85°C
Storage Humidity		< 95%RH (No Condensation)
Manufacturing Test Temperature		-40°C~75°C
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°C ±0.5% Full Scale, @-40~70°C
Sampling Rate		70ms/4 channel
Filter Level		Adjustable
Measuring Range °C	J type	-210~1200°C
	K type	-270~1370°C
	E type	-270~1000°C
	T type	-270~400°C
	S type	-50~1760°C
	R type	-50~1760°C
	B type	0~1820°C
	N type	-270~1300°C
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

 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.

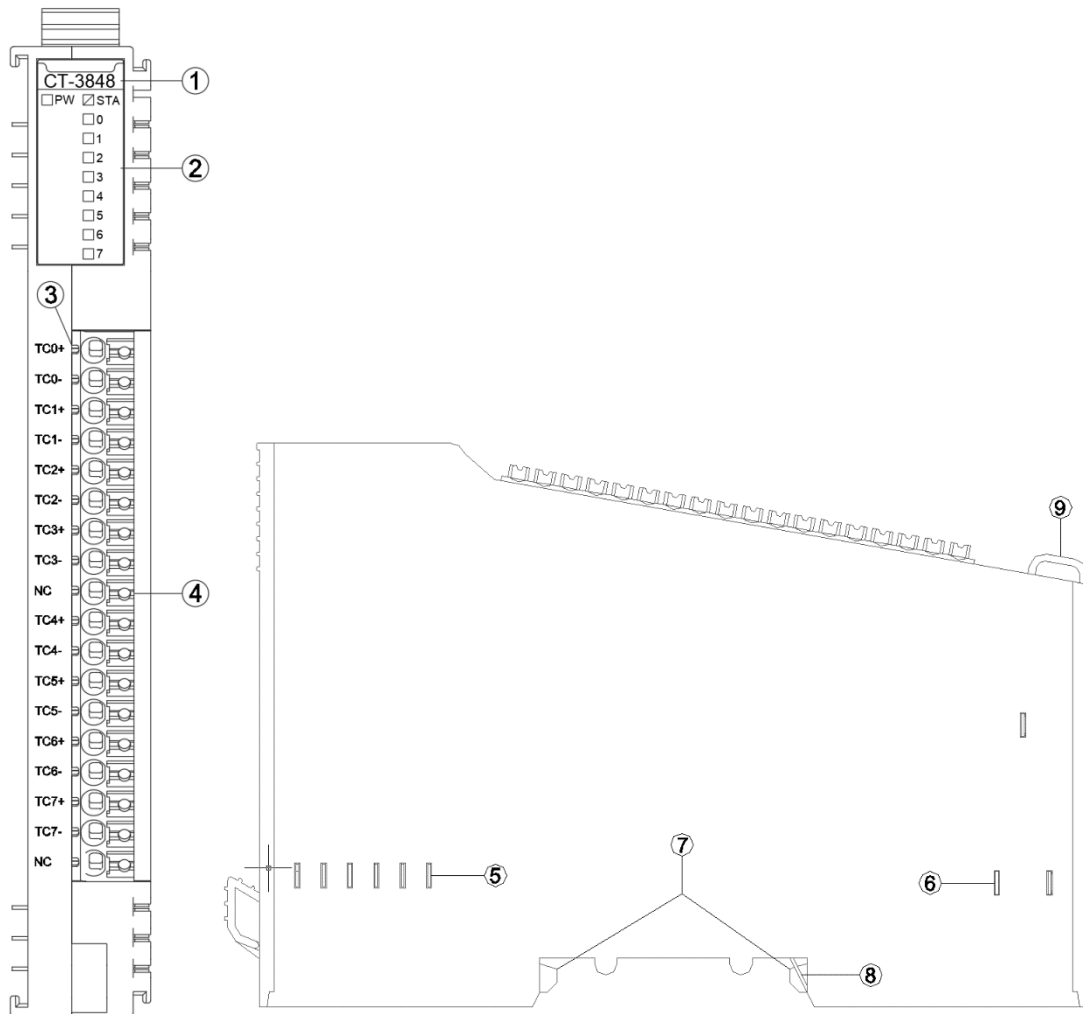
 AVERTISSEMENT

FONCTIONNEMENT INATTENDU DE L'EQUIPEMENT

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

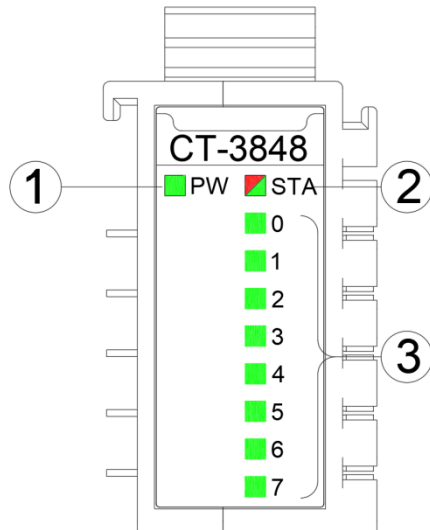
Le fait de ne pas suivre les instructions peut entraîner une défaillance de la protection fournie par l'équipement, ce qui peut entraîner des conséquences graves, comme des blessures ou des dommages à l'équipement.

3 Hardware 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 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 Indicator	Definition
ON	The input signal exceeds 1% of the range
OFF	Invalid output signal

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 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

WARNING

UNEXPECTED EQUIPMENT OPERATION

Calculate the maximum field power current consumption of a single module based on the actual field load. If the total field power current consumption of all I/O modules exceeds the power supply capacity of the field power supply, you must add an extra power expansion module. Otherwise, an output channel 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.

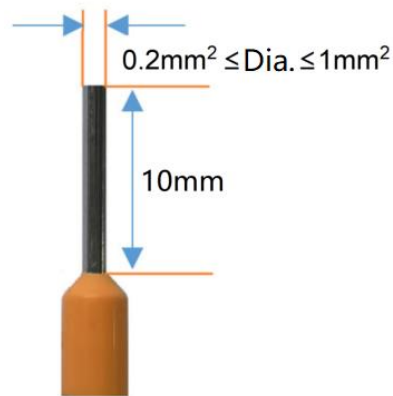
AVERTISSEMENT

FONCTIONNEMENT INATTENDU DE L'EQUIPEMENT

Calculez la consommation maximale de courant de champ d'un seul module en fonction de la charge de champ réelle. Si la consommation totale de courant de champ de tous les modules d'E/S dépasse la capacité d'alimentation de l'alimentation de champ, vous devez ajouter un module d'extension de puissance supplémentaire. Dans le cas contraire, une exception de canal de sortie peut se produire.

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

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.

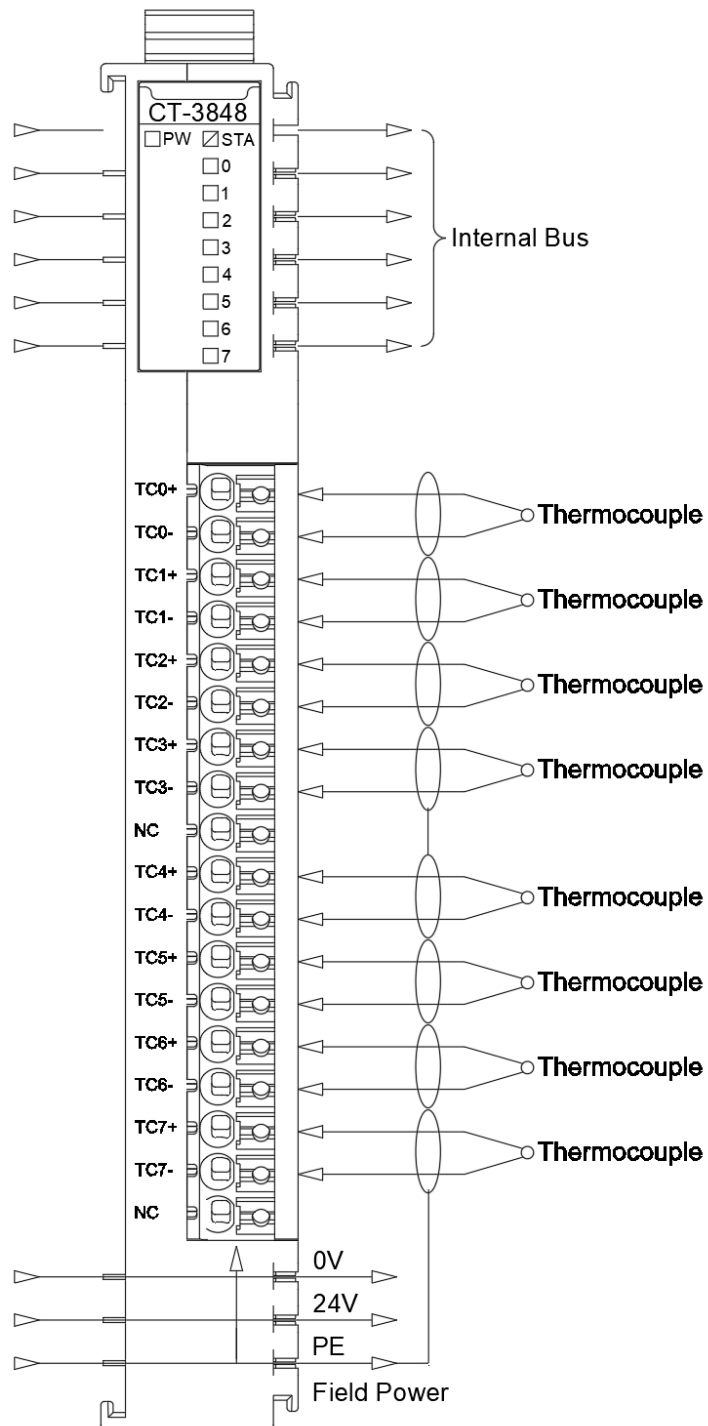
AVERTISSEMENT

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.

4 Wiring



WARNING

UNEXPECTED EQUIPMENT OPERATION

Do not link wires to unused terminals and/or terminals marked "NO CONNECTION (NC)".

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 liez pas les fils aux bornes inutilisées et/ou aux bornes marquées «NO CONNECTION (NC)».

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.

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

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	32766	7FFE	Break line
>1360.0	32765	7FFD	ADC chip fault
>1360.0	32764	7FFC	Module cold junction compensation sensor chip fault
>1360.0	32763	7FFB	Module cold junction compensation sensor abnormal work environment
1360.0	13600	3520	Exceeds the upper limit
.	.	.	
.	.	.	
1200.1	12001	2EE1	
1200.0	12000	2EE0	Rated range

.	.	.	
.	.	.	
-210.0	-2100	F7CC	
<-210.0	-32767	7FFF	Channel disabled
<-210.0	-32768	8000	Underflow

Process Data Definition - K Type			
Temperature	Decimal	Hex	Location
>1622.0	32767	7FFF	Overflow
>1622.0	32766	7FFE	Break line
>1622.0	32765	7FFD	ADC chip fault
>1622.0	32764	7FFC	Module cold junction compensation sensor chip fault
>1622.0	32763	7FFB	Module cold junction compensation sensor abnormal work environment
1622.0	16220	3F5C	Exceeds the upper limit
.	.	.	
.	.	.	
1372.1	13721	3599	
1372.0	13720	3598	Rated range
.	.	.	
.	.	.	
-270.0	-2700	F574	
<-270.0	-32767	7FFF	Channel disabled
<-270.0	-32768	8000	Underflow

Process Data Definition – E Type			
Temperature	Decimal	Hex	Location
>1200.0	32767	7FFF	Overflow
>1200.0	32766	7FFE	Break line
>1200.0	32765	7FFD	ADC chip fault
>1200.0	32764	7FFC	Module cold junction

			compensation sensor chip fault
>1200.0	32763	7FFB	Module cold junction compensation sensor abnormal work environment
1200.0	12000	2EE0	Exceeds the upper limit
.	.	.	
.	.	.	
1000.1	10001	2711	
1000.0	10000	2710	Rated range
.	.	.	
.	.	.	
-270.0	-2700	F574	
<-270.0	-32767	7FFF	Channel disabled
<-270.0	-32768	8000	Underflow

Process Data Definition –T Type			
Temperature	Decimal	Hex	Location
>540.0	32767	7FFF	Overflow
>540.0	32766	7FFE	Break line
>540.0	32765	7FFD	ADC chip fault
>540.0	32764	7FFC	Module cold junction compensation sensor chip fault
>540.0	32763	7FFB	Module cold junction compensation sensor abnormal work environment
540.0	5400	1518	Exceeds the upper limit
.	.	.	
.	.	.	
400.1	4001	FA1	
400.0	4000	FA0	Rated range
.	.	.	
.	.	.	

-270.0	-2700	F574	
<-270.0	-32767	7FFF	Channel disabled
<-270.0	-32768	8000	Underflow

Process Data Definition –S Type			
Temperature	Decimal	Hex	Location
>1800.0	32767	7FFF	Overflow
>1800.0	32766	7FFE	Break line
>1800.0	32765	7FFD	ADC chip fault
>1800.0	32764	7FFC	Module cold junction compensation sensor chip fault
>1800.0	32763	7FFB	Module cold junction compensation sensor abnormal work environment
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	-32767	7FFF	Channel disabled
<-170.0	-32768	8000	Underflow

Process Data Definition – R Type			
Temperature	Decimal	Hex	Location
>1940.0	32767	7FFF	Overflow
>1940.0	32766	7FFE	Break line
>1940.0	32765	7FFD	ADC chip fault
>1940.0	32764	7FFC	Module cold junction compensation sensor chip fault
>1940.0	32763	7FFB	Module cold junction compensation sensor abnormal work environment
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	
<-110.0	-32767	7FFF	Channel disabled
<-110.0	-32768	8000	Underflow

Process Data Definition - B Type			
Temperature	Decimal	Hex	Location
>2070.0	32767	7FFF	Overflow
>2070.0	32766	7FFE	Break line
>2070.0	32765	7FFD	ADC chip fault
>2070.0	32764	7FFC	Module cold junction compensation sensor chip fault
>2070.0	32763	7FFB	Module cold junction

			compensation sensor abnormal work environment
2070.0	20700	50DC	Exceeds the upper limit
.	.	.	
.	.	.	
1820.1	18201	4719	
1820.0	18200	4718	Rated range
.	.	.	
.	.	.	
0.0	0		
<100.0	-32767	7FFF	Channel disabled
<100.0	-32768	8000	Underflow

Process Data Definition – N Type			
Temperature	Decimal	Hex	Location
>1550.0	32767	7FFF	Overflow
>1550.0	32766	7FFE	Break line
>1550.0	32765	7FFD	ADC chip fault
>1550.0	32764	7FFC	Module cold junction compensation sensor chip fault
>1550.0	32763	7FFB	Module cold junction compensation sensor abnormal work environment
1550.0	15500	3C8C	Exceeds the upper limit
.	.	.	
.	.	.	
1300.1	13001	32C9	
1300.0	13000	32C8	Rated range
.	.	.	
.	.	.	
-270.0	-2700	F574	
<-270.0	-32767	7FFF	Channel disabled
<-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 (CH 7)		CJC Model (CH 6)		CJC Model (CH 5)		CJC Model (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°C

1: Fahrenheit°F

2: Kelvin (K-)

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

0: Internal reference junction

1: Fixed reference temperature. 0°C

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

 WARNING

UNEXPECTED EQUIPMENT OPERATION

The filtering parameters could be adjusted according to the field conditions. If the parameter settings are inappropriate, the signal will be lost.

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

Les paramètres de filtrage peuvent être ajustés en fonction des conditions du site. Si les paramètres ne sont pas réglés correctement, la perte de signal se produira.

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.

A Dimension drawing

