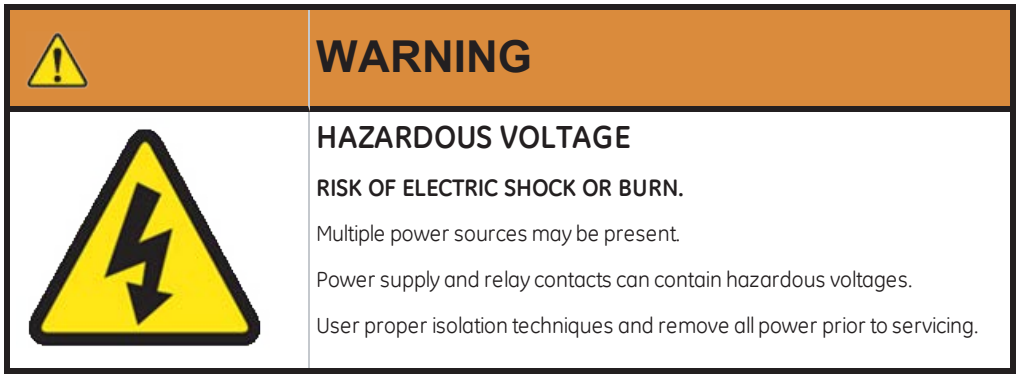
2300 Vibration Monitors Temperature Module Connections

Installation Guide

Bently Nevada* Asset Condition Monitoring

Safety



Reference

These instructions cannot claim all details of possible equipment variations, nor in particular can they provide for every possible example of installation, operation, or maintenance. Please review and understand the following additional documentation prior to beginning the installation process:

- Operation and Maintenance Manual (105M0341)

Description

The 2300 Vibration Monitors can provide the standard interface module inputs, and temperature module connection via isolated RTD input temperature transmitters or isolated thermocouple input temperature transmitters. All the interface modules connection can be applied to the two vibration input channels or the speed input channel.

Note: the sensor is required to be connected to the interface module input, but not connected to 2300 monitor directly.

Temperature module recommendation

The recommended temperature transmitters are OMEGA DRSL-RTD-ISO, PHOENIX CONTACT MINI MCR-2-RTD-UI, OMEGA DRSL-TC-ISO and PHOENIX CONTACT MINI MCR-2-TC-UI. Please refer to the manufacturer's datasheet for the detailed features about these transmitters.

Those 4 modules above have passed the test with 2300 monitor by Bently Nevada. Please refer to the manufacturer's manual & datasheet for the module interface detailed features.

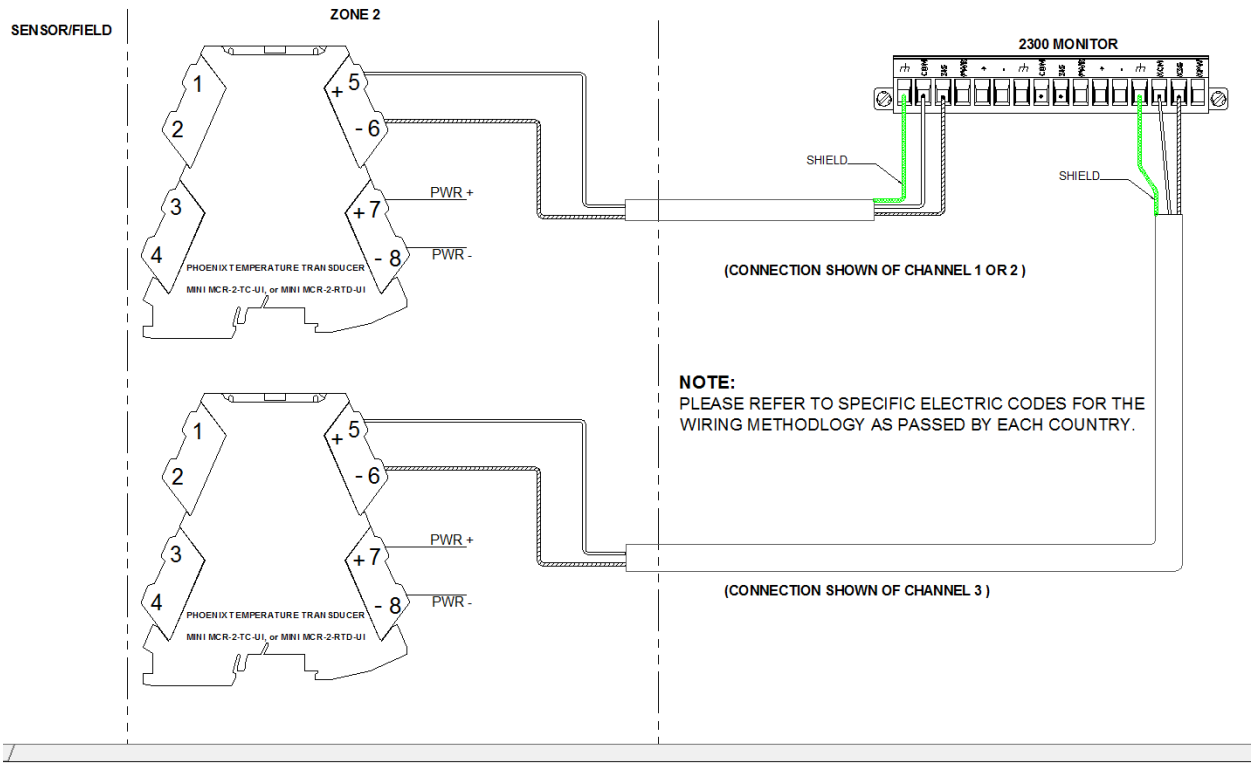
PHOENIX CONTACT MINI MCR-2-TC-UI

OMEGA DRSL-TC

PHOENIX CONTACT MINI MCR-2-RTD-UI

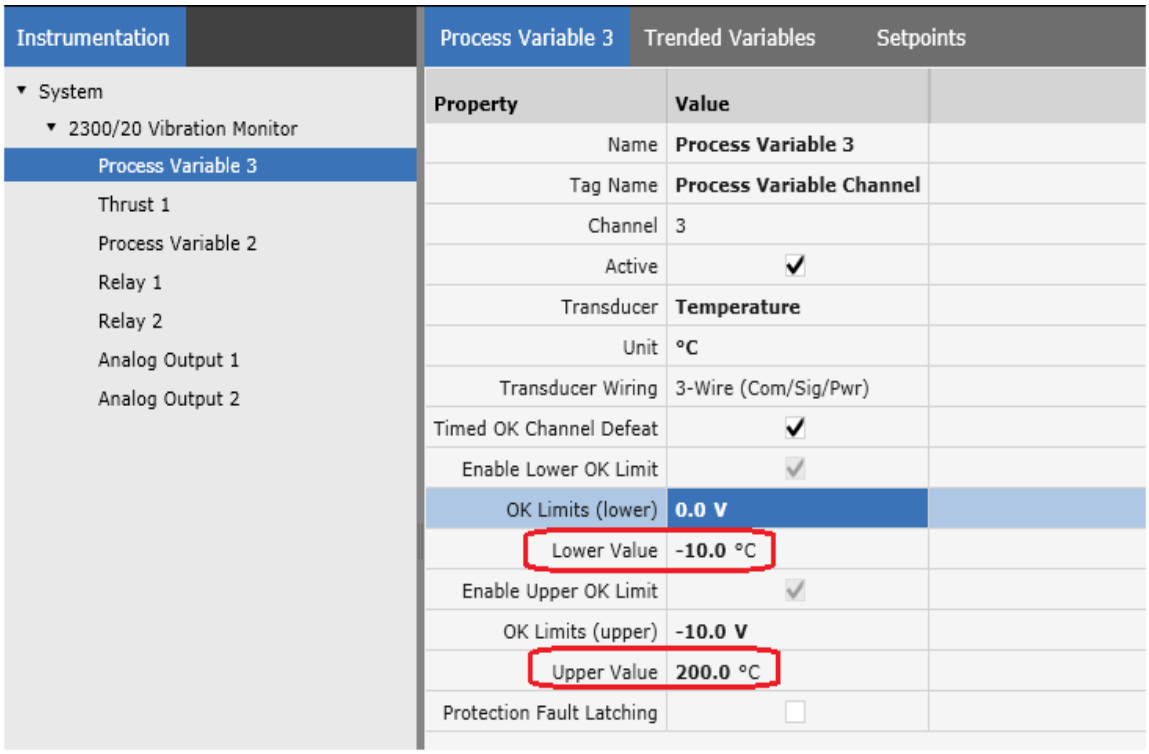
OMEGA DRSL-RTD

The modules from Phoenix can be installed in Zone 2, shown as below. Install the device in a suitable approved housing with IP54 protection when used in potentially explosive area. Please refer to Phoenix's datasheet for the detailed installation in zone 2 area.



Temperature interface module configuration

The transmitter of the temperature interface module is configured to voltage output via DIP switch, and a voltage range such as 0V ~ -10V, shown as below BNMC interface 'OK Limit'. And need to set the "Lower Value" and "Upper Value", such as the temperature -10°C ~ +200°C in BNMC, which matches with the setting of transmitter for the respective voltage value, shown as below.



The green LED of the module is on to shown the temperature module configuration is correct. For the detailed temperature module configuration, please refer to the vendor's datasheet.

Here is an example of the PHOENIX MCR-2-RTD-UI configured via DIP for the application: 2 wire, 0~10V for sensor Pt100, -100°C~+200°C temperature range, error evaluation A selected.

Configure the DIP switches according to the planned application to get the setting as below tables.

DIP S1							
Connection system		**Analog output**			**Start temperature**		
1	2	3	4	5	6	7	8
ON	OFF	OFF	OFF	ON	OFF	ON	ON

DIP S2									
End temperature						Error Evaluation			Sensor type
1	2	3	4	5	6	7	8	9	0
OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF

At delivery, all DIP switches are in the "OFF" position. You need to select the below highlighted to get the two DIP switches configuration for above settings.

		ON ≙ •	DIP S1							
			1	2	3	4	5	6	7	8
Connection system	Configuration via software									
	2-wire		•							
	3-wire			•						
	4-wire		•	•						
Analog OUT	0 ... 20 mA									
	20 ... 0 mA				•					
	4 ... 20 mA					•				
	20 ... 4 mA				•	•				
	0 ... 10 V						•			
	10 ... 0 V				•		•			
	0 ... 5 V					•	•			
	1 ... 5 V				•	•	•			
Start temperature	0 °C	≙ 32 °F								
	-10 °C	≙ 14 °F						•		
	-20 °C	≙ -4 °F							•	
	-30 °C	≙ -22 °F						•	•	
	-40 °C	≙ -40 °F								•
	-50 °C	≙ -58 °F						•		•
	-100 °C	≙ -148 °F							•	•
	-150 °C	≙ -238 °F						•	•	•

End temperature	DIP S2 1	2	3	4	5	6	ON ≙ •	DIP S2 1	2	3	4	5	6	7	8	9	0
0 °C ≙ 32 °F							160 °C ≙ 320 °F						•				
5 °C ≙ 41 °F	•						165 °C ≙ 329 °F	•					•				
10 °C ≙ 50 °F		•					170 °C ≙ 338 °F		•				•				
15 °C ≙ 59 °F	•	•					175 °C ≙ 347 °F	•	•				•				
20 °C ≙ 68 °F			•				180 °C ≙ 356 °F			•			•				
25 °C ≙ 77 °F	•		•				185 °C ≙ 365 °F	•		•			•				
30 °C ≙ 86 °F		•	•				190 °C ≙ 374 °F		•	•			•				
35 °C ≙ 95 °F	•	•	•				195 °C ≙ 383 °F	•	•	•			•				
40 °C ≙ 104 °F				•			200 °C ≙ 392 °F				•		•				
45 °C ≙ 113 °F	•			•			210 °C ≙ 410 °F	•			•		•				
50 °C ≙ 122 °F		•		•			220 °C ≙ 428 °F		•		•		•				
55 °C ≙ 131 °F	•	•		•			230 °C ≙ 446 °F	•	•		•		•				
60 °C ≙ 140 °F			•	•			240 °C ≙ 464 °F			•	•		•				
65 °C ≙ 149 °F	•		•	•			250 °C ≙ 482 °F	•		•	•		•				
70 °C ≙ 158 °F		•	•	•			260 °C ≙ 500 °F		•	•	•		•				
75 °C ≙ 167 °F	•	•	•	•			270 °C ≙ 518 °F	•	•	•	•		•				
80 °C ≙ 176 °F					•		280 °C ≙ 536 °F					•	•				
85 °C ≙ 185 °F	•				•		290 °C ≙ 554 °F	•				•	•				
90 °C ≙ 194 °F		•			•		300 °C ≙ 572 °F		•			•	•				
95 °C ≙ 203 °F	•	•			•		325 °C ≙ 617 °F	•	•			•	•				
100 °C ≙ 212 °F			•		•		350 °C ≙ 662 °F			•		•	•				
105 °C ≙ 221 °F	•		•		•		375 °C ≙ 707 °F	•		•		•	•				
110 °C ≙ 230 °F		•	•		•		400 °C ≙ 752 °F		•	•		•	•				
115 °C ≙ 239 °F	•	•	•		•		425 °C ≙ 797 °F	•	•	•		•	•				
120 °C ≙ 248 °F				•	•		450 °C ≙ 842 °F				•	•	•				
125 °C ≙ 257 °F	•			•	•		475 °C ≙ 887 °F	•			•	•	•				
130 °C ≙ 266 °F		•		•	•		500 °C ≙ 932 °F		•		•	•	•				
135 °C ≙ 275 °F	•	•		•	•		550 °C ≙ 1022 °F	•	•		•	•	•				
140 °C ≙ 284 °F			•	•	•		600 °C ≙ 1112 °F			•	•	•	•				
145 °C ≙ 293 °F	•		•	•	•		650 °C ≙ 1202 °F	•		•	•	•	•				
150 °C ≙ 302 °F		•	•	•	•		700 °C ≙ 1292 °F		•	•	•	•	•				
155 °C ≙ 311 °F	•	•	•	•	•		850 °C ≙ 1562 °F	•	•	•	•	•	•				

Error evaluation -		Analog OUT											
		0...20 mA	20...0 mA	4...20 mA	20...4 mA	0...10 V	10...0 V	0...5 V	1...5 V				
A	Line-break	21 mA	21 mA	21 mA	21 mA	10.5 V	10.5 V	5.25 V	5.25 V				
	Overrange	20.5 mA	20.5 mA	20.5 mA	20.5 mA	10.25 V	10.25 V	5.125 V	5.125 V				
	Underrange	0 mA	0 mA	4 mA	4 mA	0 V	0 V	0 V	1 V				
	Short-circuit	0 mA	0 mA	4 mA	4 mA	0 V	0 V	0 V	1 V				
B	Line-break	21 mA	21 mA	21 mA	21 mA	10.5 V	10.5 V	5.25 V	5.25 V				
	Overrange	20.5 mA	20.5 mA	20.5 mA	20.5 mA	10.25 V	10.25 V	5.125 V	5.125 V	•			
	Underrange	0 mA	0 mA	3.5 mA	3.5 mA	0 V	0 V	0 V	0.875 V				
	Short-circuit	0 mA	0 mA	3 mA	3 mA	0 V	0 V	0 V	0.75 V				
C	Line-break	21 mA	21 mA	21 mA	21 mA	10.5 V	10.5 V	5.25 V	5.25 V				
	Overrange	20 mA	20 mA	20 mA	20 mA	10 V	10 V	5 V	5 V		•		
	Underrange	0 mA	0 mA	4 mA	4 mA	0 V	0 V	0 V	1 V				
	Short-circuit	21 mA	21 mA	21 mA	21 mA	10.5 V	10.5 V	5.25 V	5.25 V				
D	Line-break	0 mA	0 mA	4 mA	4 mA	0 V	0 V	0 V	1 V				
	Overrange	20 mA	20 mA	20 mA	20 mA	10 V	10 V	5 V	5 V	•	•		
	Underrange	0 mA	0 mA	4 mA	4 mA	0 V	0 V	0 V	1 V				
	Short-circuit	0 mA	0 mA	4 mA	4 mA	0 V	0 V	0 V	1 V				

NE43	(only OUT = 4...20 mA or 20...4 mA)																
	Upscale	Line-break, overrange, underrange, short-circuit = 21.5 mA														•	
	Downscale	Line-break, overrange, underrange, short-circuit = 3.5 mA												•		•	
	0 mA	Line-break, overrange, underrange, short-circuit = 0 mA													•	•	
	Up-/Downscale	Line-break, short-circuit = 3.5 mA												•	•	•	
		Overrange, underrange = 21.5 mA															
Sensor type		Pt 100 (IEC 751)															
		Pt 1000 (IEC 751)															•

Module powering

The temperature module power supply voltage is 16.8~30 VDC and the maximum power dissipation is about 850mW, for each module. The installer needs to review the power supply requirements in the data sheets of the interface modules.

One option proposed is to power the temperature modules by the 2300 monitor's power supply which the part number (106M7607-01, 110M7102-01 or 106M6694-01) is specified in the document 105M0340. When three temperature modules are powered by one of those power supplies, the maximum 2300 monitor (powered by this power supply) quantity should decrease one, and please refer to the accessories section of the document 105M0340 for the detailed requirement.

Module wiring

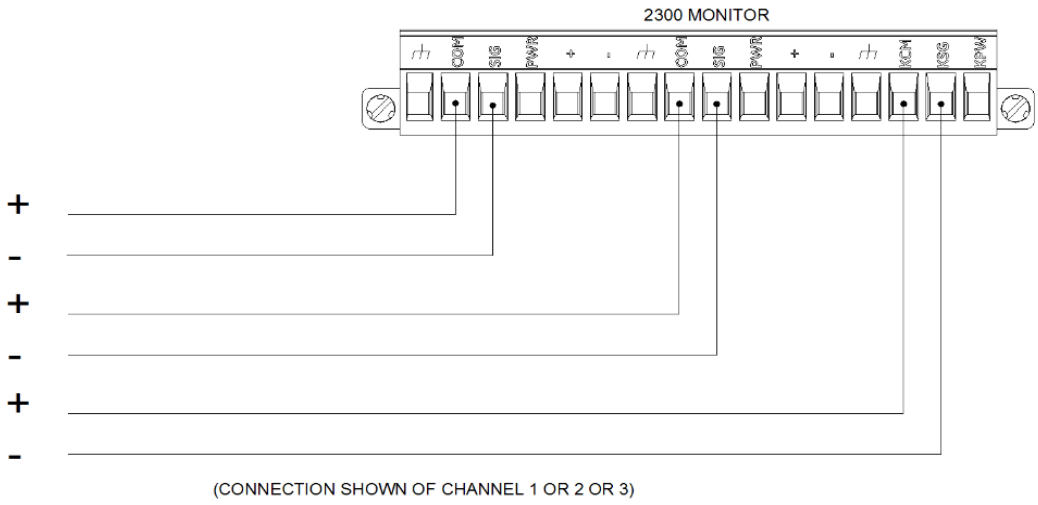
A standard interface module of 2300 channel 1, channel 2, or channel 3 (speed input) provides generic interface module input.

The RTD/TC temperature transmitters module provides an interface to connect RTD/TC signals to 2300 channel 1, channel 2, or channel 3 (speed input). These transmitters all are DIN rail mounting.

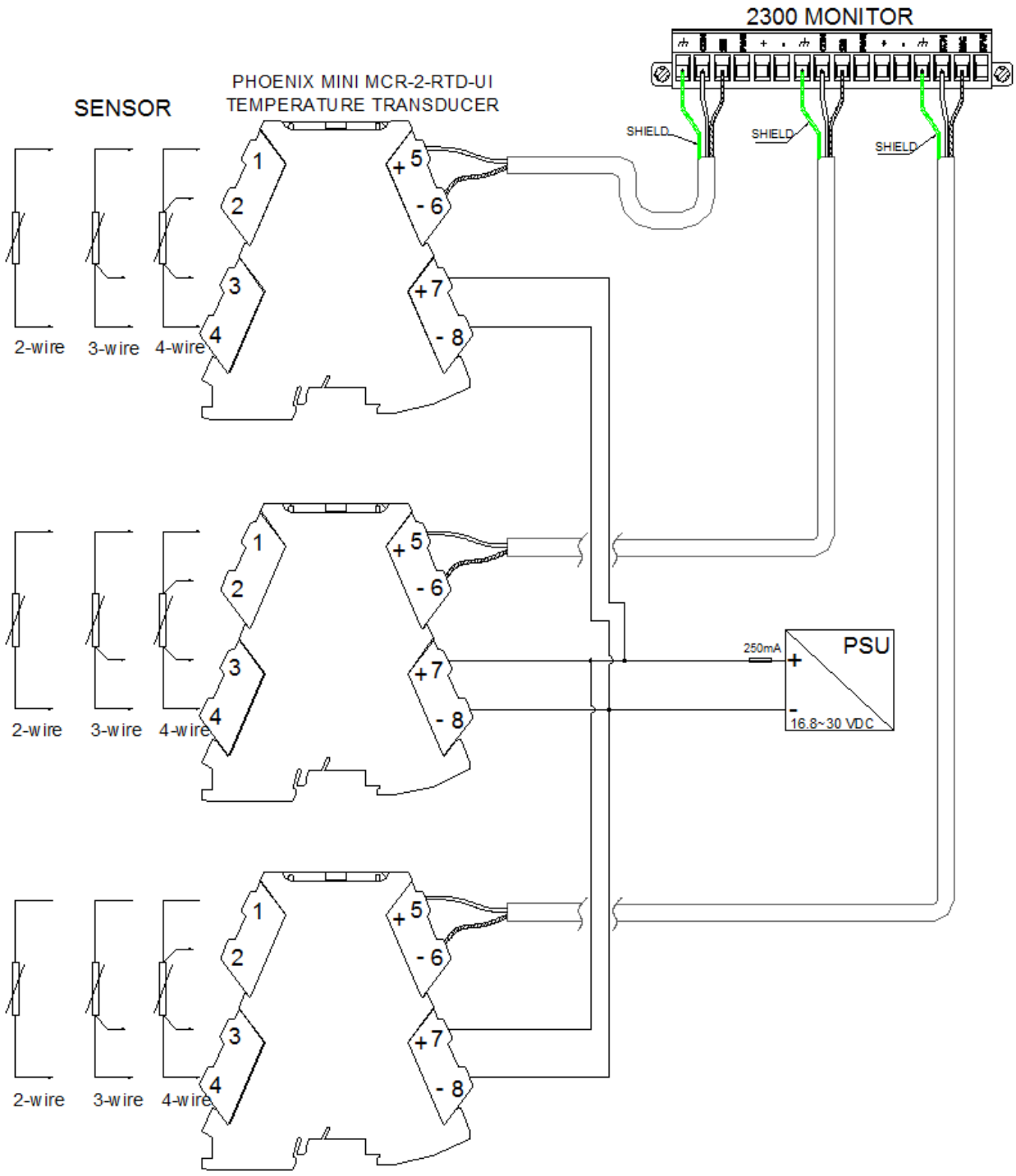
The transmitter offers 3-way isolation between input, output and power supply. The positive output of the transmitter is allowed to be wired to the common of the corresponding channel of 2300 monitor without special setting or wiring. About how to set voltage output, please refer to the vendor's datasheet.

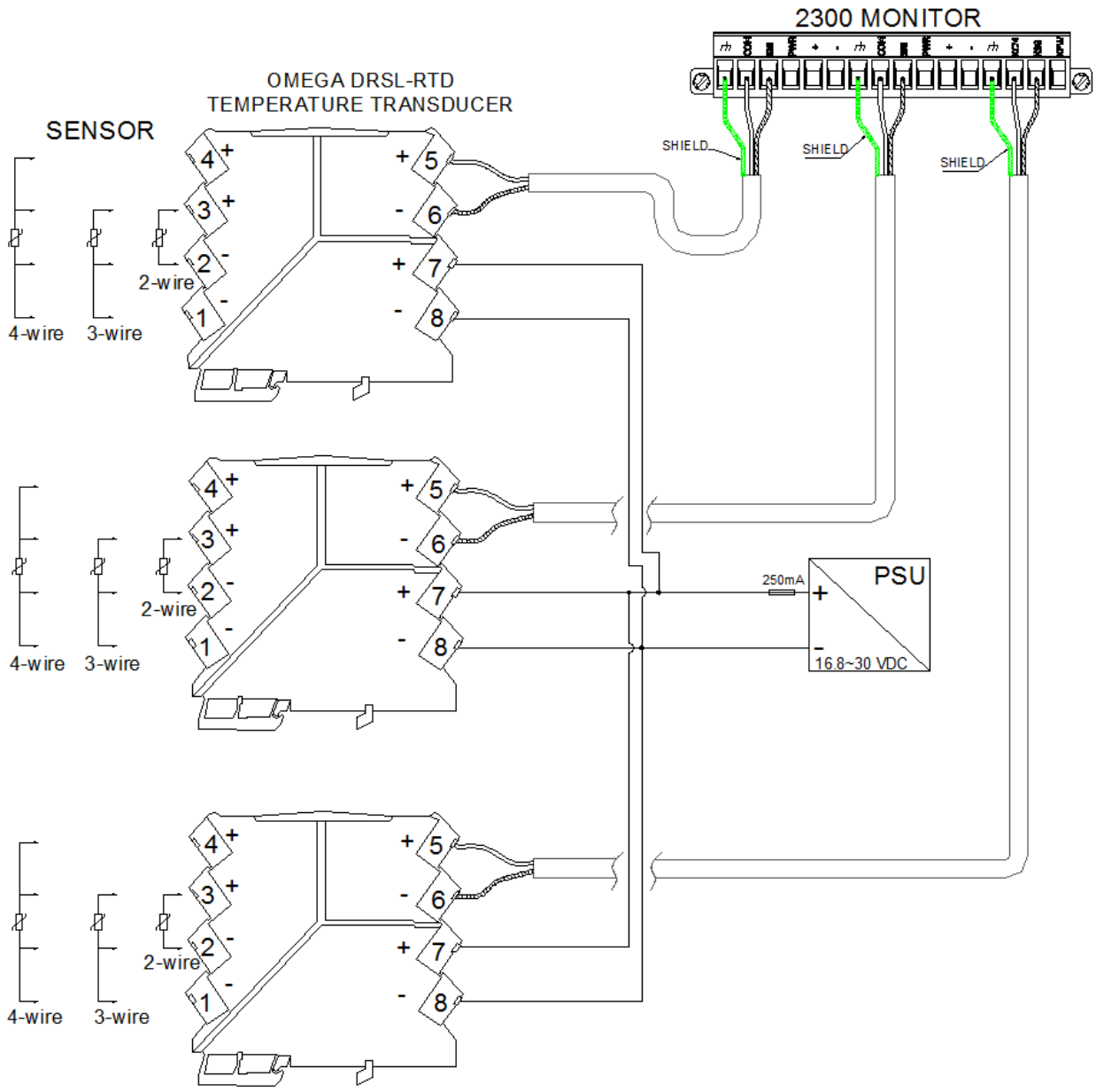
Please refer to the manufacturer's manual for the detailed module interface installation requirements.

1. Standard transducer interface module wiring

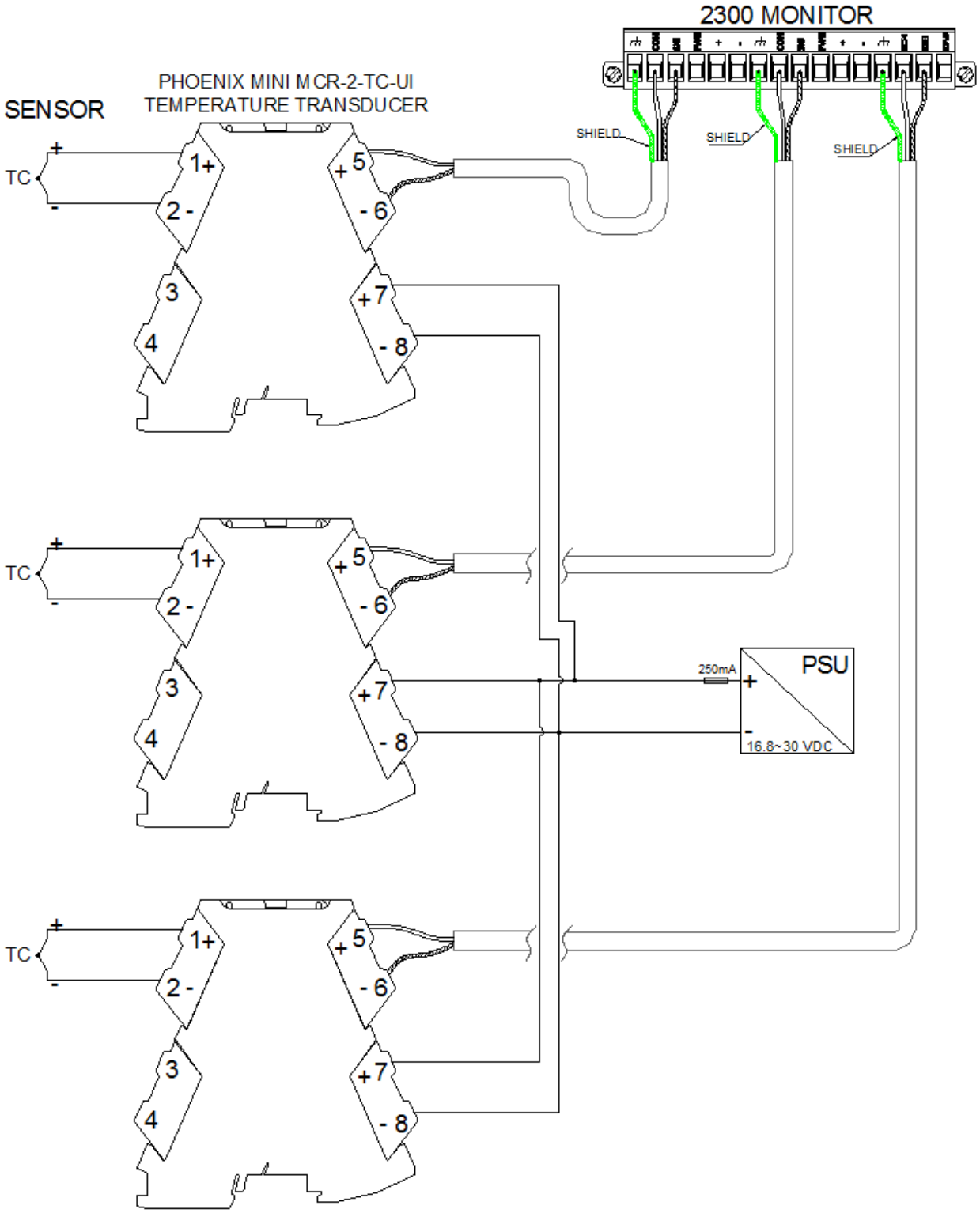


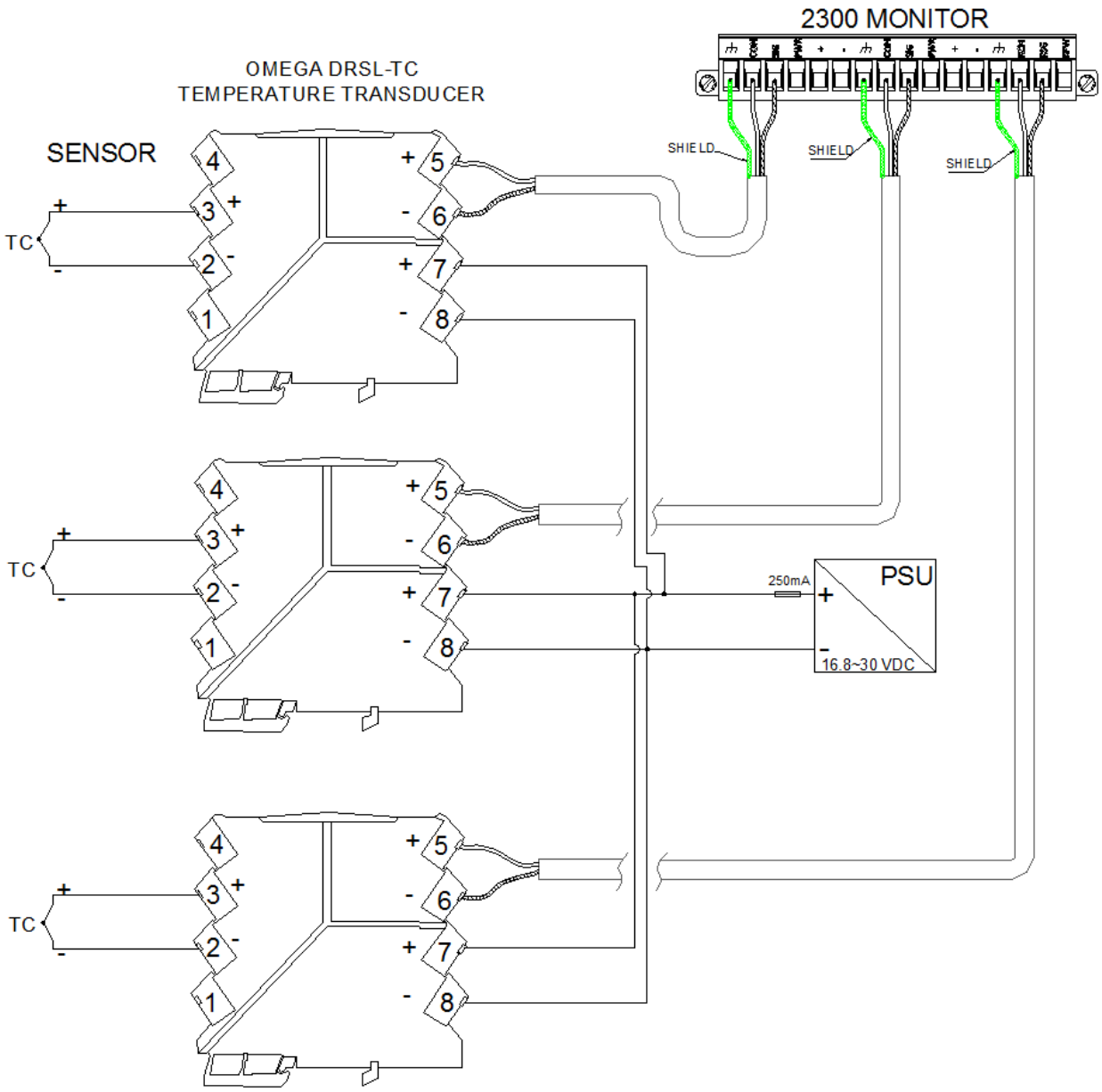
2. RTD temperature transmitters wiring




2300 MONITOR
OMEGA DRSL-RTD
TEMPERATURE TRANSDUCER
SENSOR
SHIELD
SHIELD
SHIELD
4-wire
3-wire
2-wire
4-wire
3-wire
2-wire
4-wire
3-wire
2-wire
250mA
PSU
16.8~30 VDC

3. TC temperature transmitters wiring



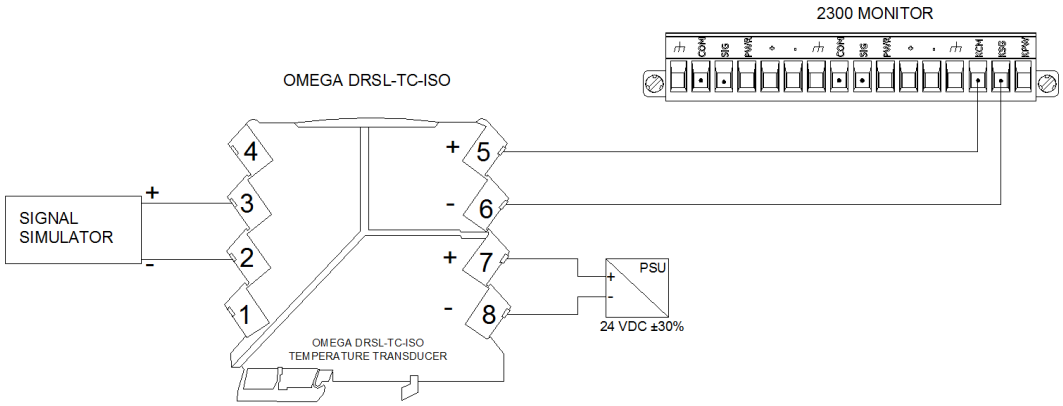


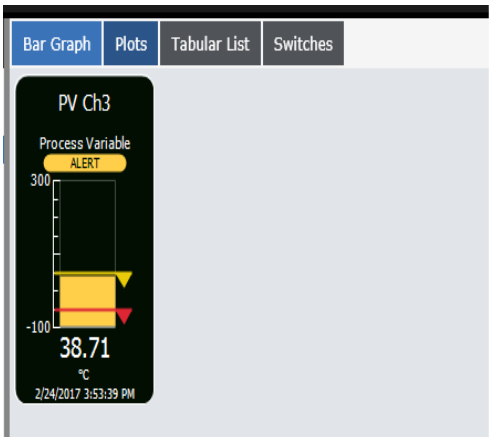
Verify Temperature Interface Module operation with 2300

After the properly hook up a temperature interface module to a 2300 monitor, the operation is ready to detect the temperature via sensor connected with the temperature interface module. The user may verify the measured temperature by, for example, a side by side comparison with a known temperature measurement.

Bently Nevada utilized an Omega model CL27 as a known thermometer to simulate a series of temperature points, then compare the Channel-3 PV value shows on 2300 monitor's LCD & the BNMC interface reading, thus verified the Omega DRSL-TC-ISO temperature interface module (K type TC sensor connected) to a 2300 monitor working correctly. Such as, one temperature point 40°C (simulated as the

actual measured temperature, in range -100°C to +300°C, by a known thermometer) detected, the module was set as 0 to 10V voltage output, then the BNMC interface reading showed 38.71°C and the 2300 monitor LCD PV value showed 38.71°C (There is about 3 minutes reading delay of 2300 monitor LCD), shown as below. The tolerance is about 1.5°C by comparison, it is acceptable.





The user can apply the similar method to verify the operation is accurate. At least two temperature points in the entire supported temperature range, for example the ambient temperature, to be measured by temperature interface module (sensor connected at input) with a 2300 monitor, and measured by a known available thermometer too, then the user may know the operation is right by comparing both values detected for a same temperature point if the deviation is not far.

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