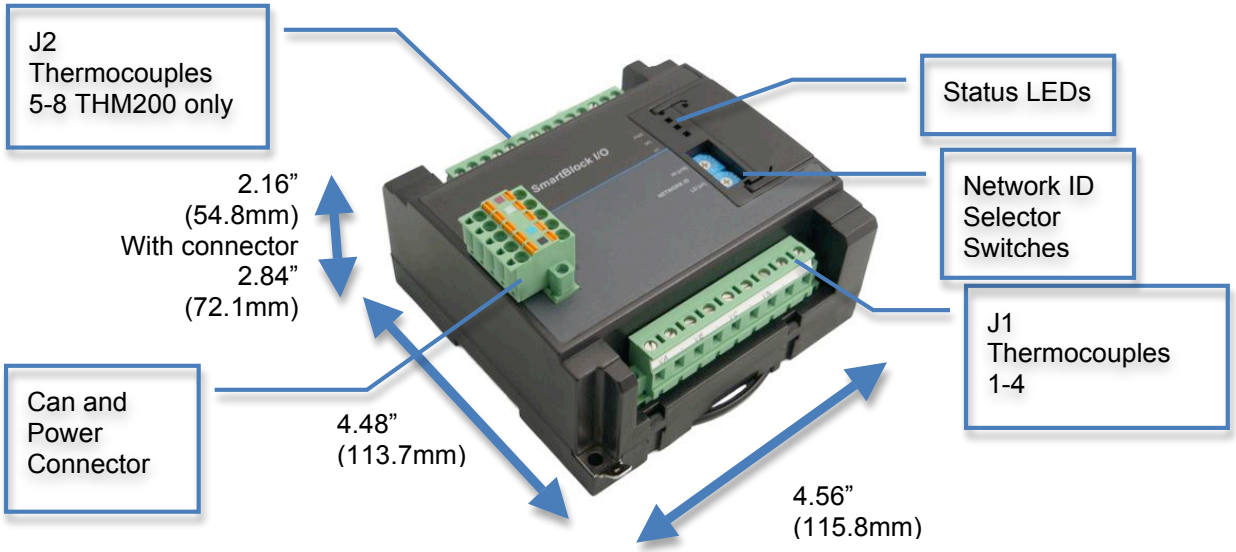
SmartBlock I/O Module
4-Channel HE579THM100
8-Channel HE579THM200

1 SPECIFICATIONS

Isolation Test Voltage	3KV	Isolation Leakage Resistance	100 MΩ
Continuous Isolation Working Voltage	565 Vpeak	Open Thermocouple Detect current	50 nA
Number of Channels	4 (THM100) 8 (THM200)	Analog Input Points Required	8
Thermocouple Resolution	0.1°C		
Differential Input Impedance	>20Meg Ohm clamped @ ±20VDC	Cold Junction Compensation	Internal per channel
A/D Conversion Type	24 bit Delta Sigma (ΔΣ)	Maximum Sustained Differential O/L	Limited by Common Mode Range
Required Power (Steady State)	TBDW (TBDmA @ 24VDC)	Open Thermocouple Response	High Temperature
Required Power (Inrush)	TBD		
Types Supported	J,K,N,T,E,C,R,S,B	Relative Humidity	5 to 95% Non-condensing
Millivolt Ranges	±25mv, ±50mv, ±100mv, ±200mv (16 bit Resolution)	Operating Temperature	0° to 60° Celsius
Millivolt Accuracy	0.1% Full Scale	Weight	12oz/340g
Common Mode Range (wrt field common)	± 10VDC Max.	**Accuracy** **Note:** Accuracy Specifications not guaranteed below -200°C	
		Types **J,K,T, E, N**	Type **C, B** / Types **R & S**
A/D Conversion Time	6 channels per second	±1.8° F (±1°C)	± 3.6° F (±2°C) / ± 3.6° F (±2°C)

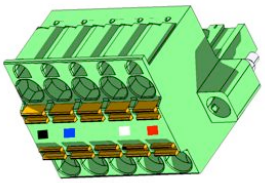
Thermocouple Type:	**J**	**K**	**N**	**T**	**E**
Input Range Temperature	-210°C to 1200°C (-346°F to 2192°F)	-270°C to 1372°C (-454°F to 2502°F)	-270°C to 1300°C (-454°F to 2372°F)	-270°C to 400 °C (-454°F to 752°F)	-270°C to 1000°C (-454°F to 1832°F)
	C	**R**	**S**	**B**	
	0°C to 2320°C (32°F to 4208°F)	0°C to 1768.1°C (32°F to 3215°F)	0°C to 1768.1°C (32°F to 3215°F)	0°C to 1820°C (32°F to 3308°F)	

2 DIMENSIONS AND INSTALLATION



CAN Network & Power Connector

Torque rating 4.5 – 7 Lb-In
(0.50 – 0.78 N-m)



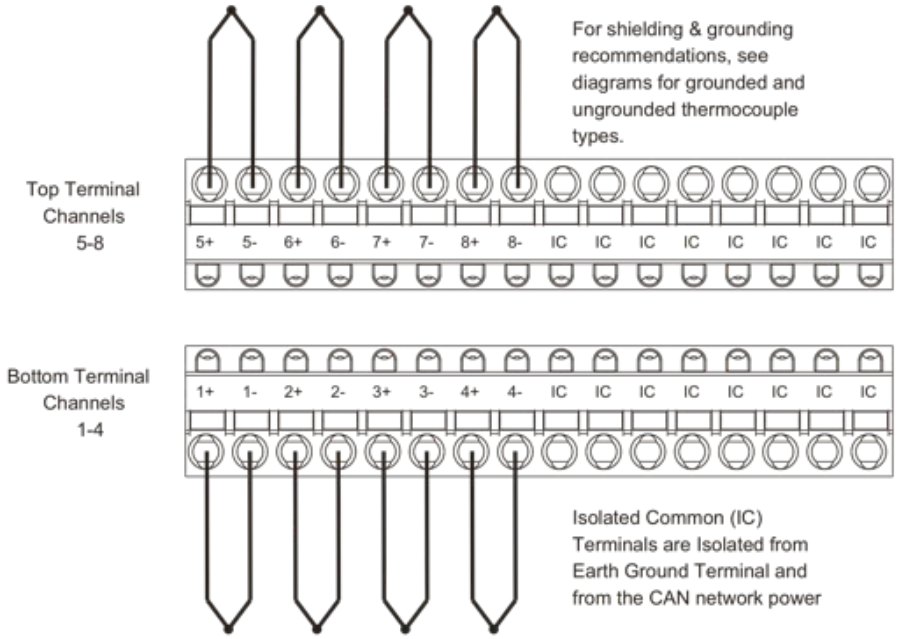
CAN Network & Power Port Pin Assignments			
Pin	**Signal**	**Signal Description**	**Direction**
1	V-	CAN and Device Ground - Black	–
2	CN_L	CAN Data Low - Blue	In/Out
3	SHLD	Shield Ground - None	–
4	CN_H	CAN Data High - White	In/Out
5	V+	Positive DC Voltage Input (10-30VDC) - Red	–

Network, Power and Grounding:
A single 5 pin connector is used to make both a network connection and power input. A quality class 2 power supply should be used for this product. If the power is run with the network cable, care must be taken such that the voltage does not drop below the lower supply limit on longer runs.

A quality earth ground is required for safe and proper operation. The best ground is achieved by screwing the lower left grounding location into a grounded back plate. Alternately a ground can be connected to the spade lug.

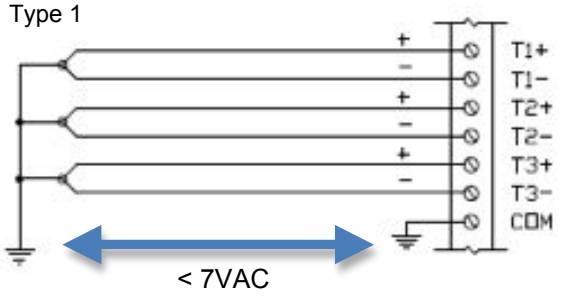
Please see Horner manual MAN0799 for details on CAN wiring.

3 WIRING

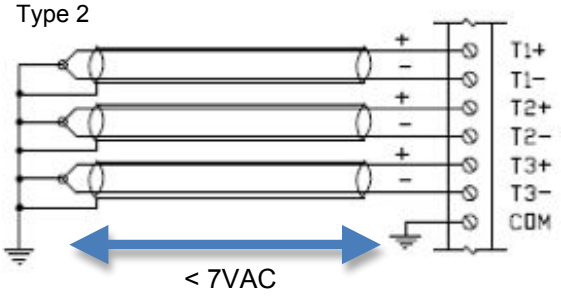


Grounded thermocouples wiring options

Type 1



Type 2

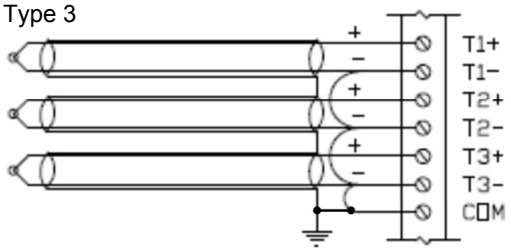


Field ground potential less than 7V AC. Shields connected at one end only may be used to reduce noise.

Grounded thermocouples may use type 3 or 4 shield connections if shield is not grounded at field end.

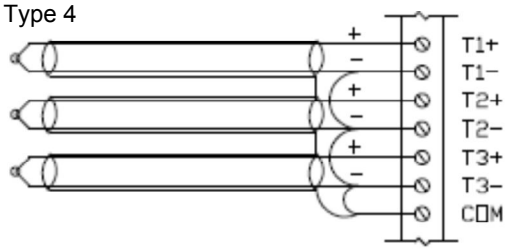
Ungrounded thermocouples wiring options

Type 3



Preferred shield connection

Type 4



Alternate shield connection

Ungrounded thermocouples should have one side tied to isolated common to reduce noise pickup.

4 NETWORK DATA

Consumed Digital Data – This data is sent from the controller to the SmartBlock. *For typical applications the I/O configuration setup in Cscape will automatically populate this data.* For more advanced applications you may use NetPut functions to write this data. Please see the advanced programming guide MAN0880 for more details.

Bit	Description		
12	0 = 0.1°C 1 = 0.1°F		
13-16	Filter	See programming Guide	
17-20	Thermocouple Type Channel 1	0 = J, -210°C to 1200°C 1 = K, -200° to 1372°C 2 = N, -200°C to 1300°C 3 = T, -200°C to 400°C 4 = E, -200°C to 1000°C 5 = R, -50°C to 1768°C 6 = S, -50°C to 1768°C 7 = B, 250°C to 1820°C	8 = C, 0°C to 2320°C 12 = 25mV 13 = 50mV 14 = 100mV 15 = 200mV
21-24	Thermocouple Type Channel 2		
25-28	Thermocouple Type Channel 3		
29-32	Thermocouple Type Channel 4		
65-68	Thermocouple Type Channel 5		
69-72	Thermocouple Type Channel 6		
73-80	Thermocouple Type Channel 7		
77-80	Thermocouple Type Channel 8		

Produced Analog Data – This data is sent from the SmartBlock to the controller. *Normally this data is mapped into specific registers in the I/O configuration in Cscape.* For advanced applications NetGet functions can be used to obtain this data. Since this data is broadcast to all controllers on the network additional controllers can use NetGet functions to obtain this data as well.

Word	Function	
Word 1	INT	Thermocouple Input 1
Word 2	INT	Thermocouple Input 2
Word 3	INT	Thermocouple Input 3
Word 4	INT	Thermocouple Input 4
Word 5	INT	Thermocouple Input 5 (THM200 Only)
Word 6	INT	Thermocouple Input 5 (THM200 Only)
Word 7	INT	Thermocouple Input 5 (THM200 Only)
Word 8	INT	Thermocouple Input 5 (THM200 Only)

5 INSTALLATION / SAFETY

Warning: Remove power from the OCS controller, CAN port, and any peripheral equipment connected to this local system before adding or replacing this or any module

a) All applicable codes and standards should be followed in the installation of this product.
b) Shielded, twisted-pair wiring should be used for best performance.
c) Shields are to be terminated to frame ground.
d) In severe applications, shields should be tied directly to the ground block within the panel.
e) Ungrounded thermocouple sensors are preferred due to their isolated electrical characteristics
f) Interposing terminal strips between the sensor and the module can cause errors due to cold junction effect.
g) If Interposing terminal strips must be used, use specially constructed terminal blocks, which match the material characteristics of the thermocouple sensor.
h) Horner thermocouple input modules use a high impedance differential circuit to support the use of grounded or ungrounded thermocouples. For grounded thermocouples, the specified **Common Mode Range** allows for ground potential differences between the machine ground and the PLC ground within that range. For ungrounded or floating thermocouples the high impedance inputs are subject to common mode noise pickup. For noisy environments it is recommended that one side of all ungrounded thermocouples be grounded near the PLC. This does not affect open thermocouple detection or measurement accuracy and reduces the effect of common mode noise if present. This PLC side ground connection must not be used with grounded thermocouples or accuracy will be affected. Any thermocouple should be grounded in one place at most.

When found on the product, the following symbols specify:

Warning: Consult user documentation.

Warning: Electrical Shock Hazard.

WARNING: To avoid the risk of electric shock or burns, always connect the safety (or earth) ground before making any other connections.

WARNING: To reduce the risk of fire, electrical shock, or physical injury it is strongly recommended to fuse the voltage measurement inputs. Be sure to locate fuses as close to the source as possible.

WARNING: Replace fuse with the same type and rating to provide protection against risk of fire and shock hazards.

WARNING: In the event of repeated failure, do not replace the fuse again as a repeated failure indicates a defective condition that will not clear by replacing the fuse.

WARNING: Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment. Read and understand this manual and other applicable manuals in their entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or loss of life.

- All applicable codes and standards need to be followed in the installation of this product.
- For I/O wiring (discrete), use the following wire type or equivalent: Belden 9918, 18 AWG or larger.

Adhere to the following safety precautions whenever any type of connection is made to the module.

- Connect the green safety (earth) ground first before making any other connections.
- When connecting to electric circuits or pulse-initiating equipment, open their related breakers. Do not make connections to live power lines.
- Make connections to the module first; then connect to the circuit to be monitored.
- Route power wires in a safe manner in accordance with good practice and local codes.
- Wear proper personal protective equipment including safety glasses and insulated gloves when making connections to power circuits.
- Ensure hands, shoes, and floor are dry before making any connection to a power line.
- Make sure the unit is turned OFF before making connection to terminals. Make sure all circuits are de-energized before making connections.
- Before each use, inspect all cables for breaks or cracks in the insulation. Replace immediately if defective.

2 TECHNICAL SUPPORT

North America:
Tel: 317 916-4274
Fax: 317 639-4279
Web: http://www.heapg.com
Email: techsppt@heapg.com

Europe:
Tel: +353-21-4321266
Fax: +353-21-4321826
Web: http://www.horner-apg.com
Email: tech.support@horner-apg.com