

SMARTSTACK DATASHEET

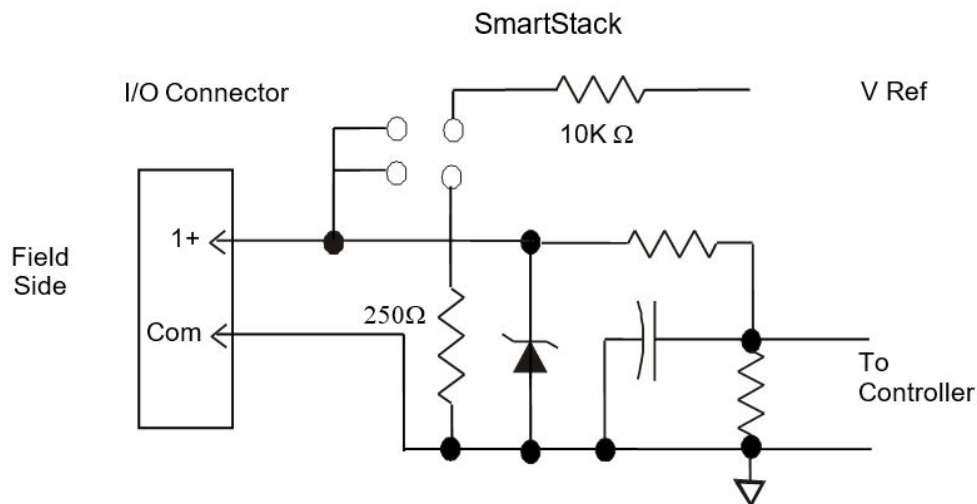
Thermistor / Current / Voltage Analog Input Module HE800ADC920 / HE-ADC920 (Plastic Case) 12-Bit Resolution

NOTE: This datasheet also covers products with IC300.

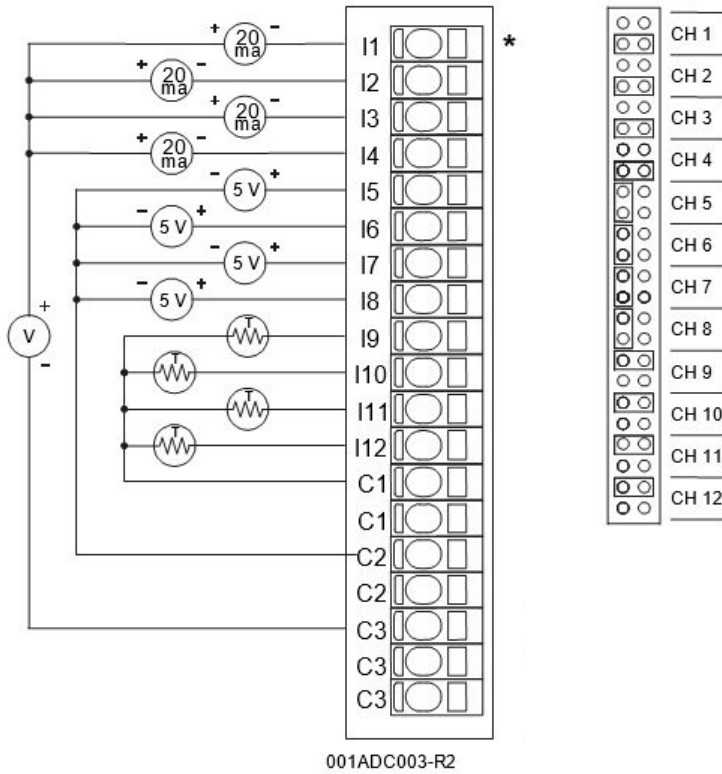
1 TECHNICAL SPECIFICATIONS

SPECIFICATIONS			
Number of Channels	12	Converter Type	Successive Approximation
Input Ranges (Including over-range)		Terminal Type	Spring Clamp Removable
Thermistor (1/10° resolution)	-37 - 115°C (-35 - 240°F)	Input Impedance	< 12 VDC, Clamped @ 12 VDC, 35mA Max, continuous
Current	0 - 20.47mA	Thermistor	10kΩ
Voltage	0 - 5.11VDC	Current	250Ω
		Voltage	1 MΩ
Resolution	12-Bit	Analog Points: Input Points Required	12
Maximum Error @ 25°C	0.1% Full Scale	Operating Temperature	0° to 60°C
Additional error for temperatures other than 25°C	0.01% / 25°C		
Conversion Time (PLC Update Rate)	Set by PLC Scan Time	Relative Humidity	5 to 95% Non-condensing
Required Power (Steady State)	0.19W (8mA @ 24VDC)	Weight	9 oz. (256g)
Required Power (Inrush)	Negligible	Certifications (CE)	
Maximum Overcurrent	35mA	USA: https://hornerautomation.com/certifications/	
External Power Supply	None	Europe: www.hornerautomation.eu	

2 INTERNAL CIRCUIT SCHEMATIC



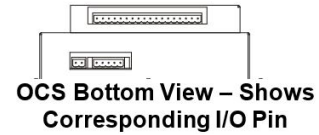
3 WIRING I/O



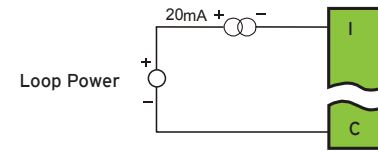
The jumper block indicates the correct jumper positions for the wiring shown.

For more information, refer to Section 4.2 (b), Hardware Configuration in this document.

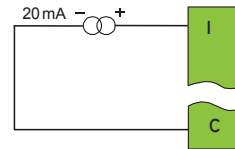
* Pin 1



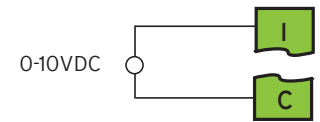
20mA Analog In - Not Self Powered



20mA Analog In - Self Powered



0-10VDC IN



Name	ADC920
I1*	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
I9	Input 9
I10	Input 10
I11	Input 11
I12	Input 12
C1	Thermistor Common
C1	
C2	0 - 5VDC Common
C2	
C3	20mA Common
C3	

4 CONFIGURATION

NOTE: The status of the I/O can be monitored in Cscape.

4.1 Software Configuration

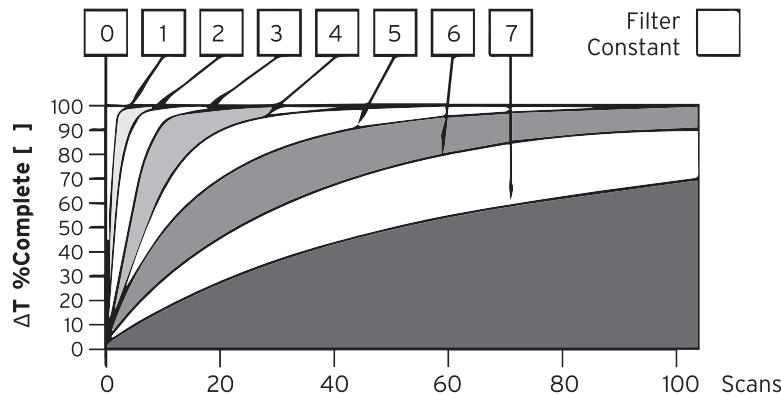
Preliminary configuration procedures that apply to SmartStack Modules are contained in the user manual of the controller, which can be found on the Horner Automation website.

I/O Map Tab

The I/O Map describes which I/O registers are assigned to a specific SmartStack Module and where the module is located in the point map. The I/O Map is determined by the model number and location within the SmartStack. The I/O Map is not edited by the user.

Module Setup Tab

- a) Input range for each channel may be selected independently.
- b) Filter Constant sets the level of digital filtering according to the following chart.
- c) In addition to configuring the module setup, the hardware must be jumpered to select the appropriate range for each channel.



Digital Filtering: The illustration above demonstrates the effect of digital filtering (set with Filter Constant) on module response to a temperature change.

4.2 Hardware Configuration

The inputs are referenced to the bus common. Each of the inputs can be jumper-selected for one of the three input types. Behind each of the input pins is a corresponding group of four jumper pins with a programming plug.

- a) To select 5V input: Connect the two pins nearest the connector.
- b) To select thermistor input: Connect the two pins nearest input 1.
- c) To select 20mA input: Connect the two pins nearest input 12.

NOTE: It is also necessary to specify the input channel type in Cscape along with the temperature format.

5 THERMISTOR INFORMATION

The ADC920 supports Kele Engineering Precon Type III, 10kΩ thermistors. It also directly supports the following: 10kΩ (Beta=3574) thermistors from Yellow Springs Instruments (YSI).

Part Numbers	
44006	46006
44106	46031
44406	46041
44031	44907
45006	44908

Thermistor Curve or PreCon Type III (Model 3)					
Temperature °F	Resistance	Temperature °F	Resistance	Temperature °F	Resistance
-35	203.6k	60	14.78k	155	2.098k
-30	173.6k	65	13.15k	160	1.920k
-25	148.3k	70	11.72k	165	1.759k
-20	127.1k	75	10.46k	170	1.614k
-15	109.2k	80	9.354k	175	1.482k
-10	94.07k	85	8.378k	180	1.362k
-5	81.23k	90	7.516k	185	1.254k
0	70.32k	95	6.754k	190	1.156k
5	61.02k	100	6.078k	195	1.066k
10	53.07k	105	5.479k	200	984.0
15	46.27k	110	4.947k	205	909.8
20	40.42k	115	4.472k	210	841.9
25	35.39k	120	4.049k	215	779.8
30	31.06k	125	3.671k	220	723.0
35	27.31k	130	3.333k	225	671.0
40	24.06	135	3.031k	230	623.3
45	21.24k	140	2.759k	235	579.5
50	18.79k	145	2.515k	240	539.4
55	16.65k	150	2.296k		

6 INPUT CONVERSION FACTOR

The following table describes how real-world inputs are scaled into the controller. Given a known input current, the data value is configured by using the conversion factor from the table.

The following formula is used: $\text{Data} = \text{Voltage In (Vin)} / \text{Conversion Factor}$

Example: The user selects a voltage range of 0 to +5VDC:

- 1) The known input voltage is 3 VDC.
- 2) Using the table, the conversion factor for the voltage range of 0 to +5 VDC is 0.00015625.
- 3) To determine the data value, the formula is used:
 $\text{Data} = \text{Vin} / \text{Conversion Factor}$
 $19200 = 3 \text{ VDC} / 0.00015625$

Conversion of Real-World Inputs into Controller			
Selected Voltage Range	Voltage In (Vin) VDC	Data Out	Conversion Factor
0 to +5.00VDC	+5.11	32704	0.00015625
	+5.00	32000	
	0	0	
	NA	NA	
	NA	NA	
0 to +20mA	+20.47	32736	0.000625
	+20.00	32000	
	0	0	
	NA	NA	
	NA	NA	
°C	+115	1150	0.1
	0	0	
	-37	-370	
°F	+240	2400	0.1
	0	0	
	-35	-350	

7 SAFETY

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.

- All applicable codes and standards should be followed in the installation of this product.
- Shielded, twisted-pair wiring should be used for best performance.
- In severe applications, shields should be tied directly to the ground block within the panel.
- Use the following wire type or equivalent: Belden 8441.

For detailed installation that covers panel box layout requirements and minimum clearances, refer to User Manual of controller.

WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

ATTENTION - RISQUE D'EXPLOSION - NE DÉBRANCHEZ PAS L'ÉQUIPEMENT SAUF SI L'ALIMENTATION A ÉTÉ COUPÉE OU SI LA ZONE N'EST PAS DANGEREUSE.

WARNING: Electrical Shock Hazard.

AVERTISSEMENT: Risque de choc électrique.

WARNINGS

1. To avoid the risk of electric shock or burns, always connect the safety (or earth) ground before making any other connections.
2. 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.
3. Replace fuse with the same type and rating to provide protection against risk of fire and shock hazards.
4. In the event of repeated failure, do NOT replace the fuse again as repeated failure indicates a defective condition that will NOT clear by replacing the fuse.
5. 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.

PRECAUTIONS

All applicable codes and standards need to be followed in the installation of this product. Adhere to the following safety precautions whenever any type of connection is made to the module:

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

8 PART NUMBERS

The global part numbers are HE800ADC920, HE-AD920 (plastic case).

9 TECHNICAL SUPPORT

For assistance and datasheet updates, contact Technical Support at the following locations:

North America

+1 (317) 916-4274
www.hornerautomation.com
techsppt@heapg.com

Europe

+353 (21) 4321-266
www.hornerautomation.eu
technical.support@horner-appg.com