Thermistor / Current / Voltage Analog Input Module

HE800ADC920 / HE820ADC920*

12-Bit Resolution

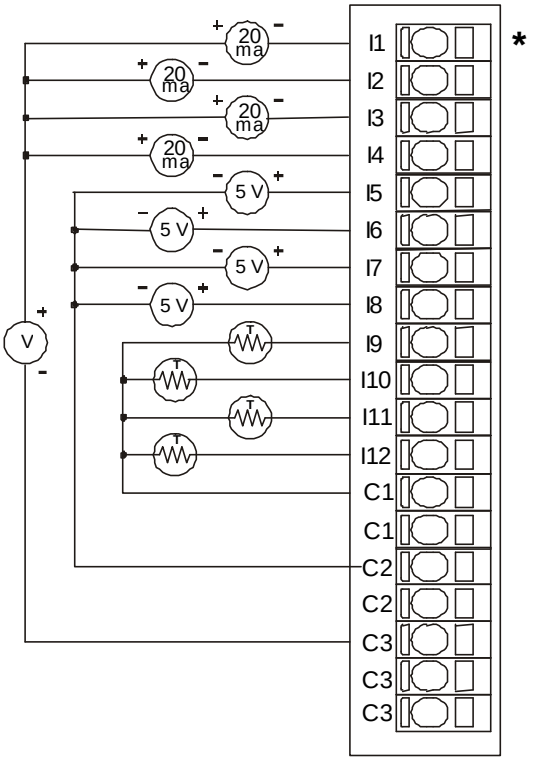
*** HE820 denotes plastic case.**

This datasheet also covers products starting with IC300 instead of HE800 or HE820.

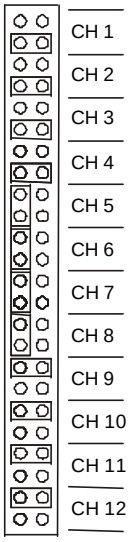
1 SPECIFICATIONS

	ADC920		ADC920
Number of Channels	12	Converter Type	Successive Approximation
Input Ranges (including over-range) *Thermistor* (1/10° resolution) *Current* *Voltage*	 -37 to 115°C -35 to 240°F 0-20.47mA 0-5.11 VDC	**Input Impedance** *Thermistor* *Current* *Voltage*	< 12VDC, Clamped @ 12VDC, 35mA Max. Continuous 10K ohms 250 ohms 1Megohm
Resolution	12-Bit	Terminal Type	Spring Clamp, Removable
Maximum Error at 25°C	0.1% Full Scale	Operating Temperature	0° to 60° Celsius
Conversion Time (PLC Update Rate)	Set by PLC Scan Time	Analog Inputs Input Points Required	12
Additional error for temperatures other than 25°C	0.01% / C°		
Required Power (Steady State)	0.19W (8mA @ 24VDC)	Relative Humidity	5 to 95% Non-condensing
Required Power (Inrush)	Negligible	Weight	9 oz. (256 g)
Maximum Over-Current	35mA		
External Power Supply	None		
CE UL	See Compliance Table at http://www.heapg.com/Support/compliance.htm		

2 WIRING

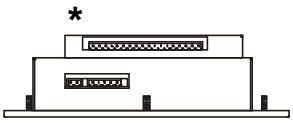


001ADC003-R2



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

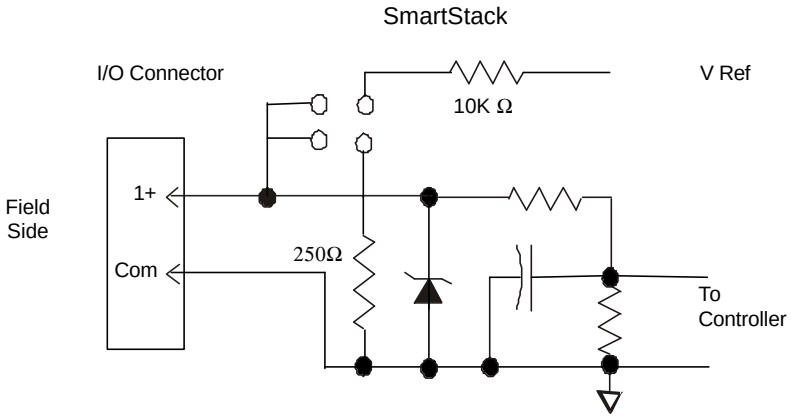
For more information, refer to *Section 4.2 (b), Hardware Configuration.*



OCS Bottom View – Shows Corresponding I/O Pin

Pin	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	
C3	

3 INTERNAL CIRCUIT SCHEMATIC



4 CONFIGURATION

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

4.1 Software Configuration

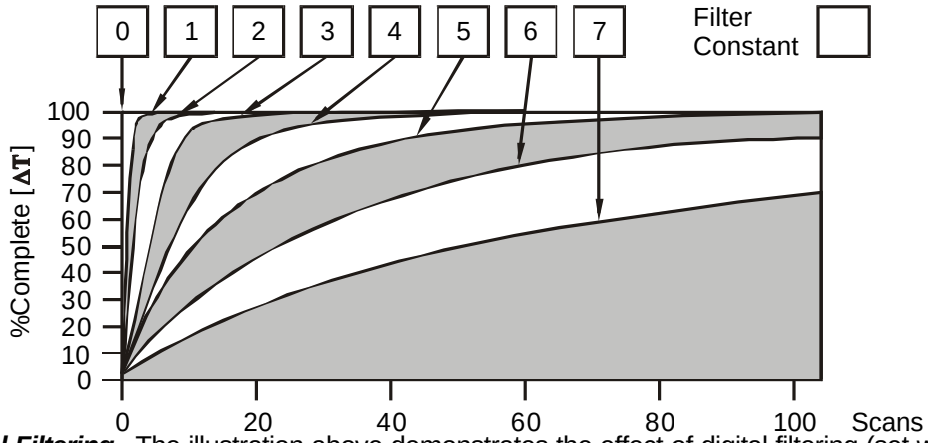
Preliminary configuration procedures that apply to SmartStack™ Modules are contained in the hardware manual of the controller you are using. Refer to the **Additional References** section in this data sheet for a listing of hardware manuals.

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

a. Inputs

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.

Thermistor Curve for 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	24.06K	**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		

b. Outputs

Each **output** can be independently programmed for 0-10 volts or 0-20mA. There are two jumpers to be set for each output. Six jumper pins in two rows of three are associated with each output. For voltage output, out of each group of six, the two pins nearest connector pin 1 (marked with *) in each row are to be jumpered. For current output, out of each group of six, the two pins in each row near connector pin 8 are to be jumpered. The mode for each output must also be specified in the module setup in Cscape.

5 INPUT CONVERSION FACTOR

The following table describes how real-world inputs are scaled into the controller. Given a known input voltage, the data value is configured by using the conversion factor from the table. The following formula is used: **Data = Voltage In (Vin) / Conversion Factor**

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

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:
   Data = Vin / Conversion Factor
   19200 = 3 VDC / 0.00015625

Conversion of Real-World Inputs into Controller			
Selected Voltage Range	**Voltage In (Vin) VDC**	**Data Out**	**Conversion Factor**
0 to +5.00 VDC	+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	

6 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 should be tied directly to the ground block within the panel.
d. Use the following wire type or equivalent: Belden 8441.

For detailed installation and a handy checklist that covers panel box layout requirements and minimum clearances, refer to the hardware manual of the controller you are using. (See the **Additional References** section in this document.)

When found on the product, the following symbols specify:

Warning: Consult user documentation.

Warning: Electrical Shock Hazard.

7 ADDITIONAL REFERENCES

For detailed installation, configuration and other information, refer to the hardware manual of the controller you are using. See the **Technical Support** section in this document for the web site address to download references and to obtain revised editions.

Additional References	
Controller	**Manual Number**
Operator Control Station Hardware (OCS, OCX) e.g., OCS1XX / 2XX; Graphic OCS250	MAN0227
Remote Control Station Hardware (RCS [except RCS116], RCX) e.g., RCS210, RCS250	
Color Touch OCS Hardware e.g., OCS300, OCS301,OCS350, OCS351 e.g., OCS451, OCS551, OCS651	MAN0465
OCS LX Series Hardware e.g., LX280 / LX300; RCS116	MAN0755
MiniOCS / MiniRCS / MiniOCX / MiniRCX Hardware e.g., HE500OCSxxx	MAN0305
Other Useful References	
Cscape Programming and Reference	MAN0313
DeviceNet™ Implementation	SUP0326
Wiring Accessories and Spare Parts Manual	MAN0347

8 TECHNICAL SUPPORT

For assistance and manual up-dates, contact Technical Support at the following locations:

North America:
(317) 916-4274
www.heapg.com

Europe:
(+) 353-21-4321-266
www.horner-apg.com