24VDC Bipolar Digital In
10-28VDC, 0.5A Sinking Digital Out
HE500OCS055 / HE500OCS085
HE500RCS085
4-20mA Analog In/Out

Mini OCS/RCS

1   SPECIFICATIONS

| ANALOG INPUT				
Number of Channels	4	Analog Inputs Input Points Required	4
Input Ranges (including over-range)	Nominal: 0-20.47mA	Conversion Time (PLC Update Rate)	Set by PLC Scan Time All channels updated to once per scan.
Resolution	12-Bit	Converter Type	Successive Approximation
Input Impedance	200 Ohms < 12VDC, Clamped @ 12VDC, 35mA Max. Continuous	Additional error for temperatures other than 25°C	0.01% / °C
Maximum Error at 25°C	0.1%	Maximum Over-Current	35mA
DIGITAL INPUT			
Inputs per Module	8	Input Characteristics	Bidirectional
Commons per Module	1	Input Impedance	10K Ohms
Input Voltage Range	12-24VDC	Minimum ON Current	1mA
Peak Voltage	35VDC Max.	Maximum OFF Current	200µA
Isolation (Channel to Common)	500VDC	OFF to ON Response	1ms.
ON Voltage Level	9VDC	ON to OFF Response	1ms.
OFF Voltage Level	3VDC		
ANALOG OUTPUT			
Number of Channels	2	Analog Outputs; Output Points Required	2
Output Ranges (including over-range)	0-20.47mA; Clamped @-0.5 - +33VDC Nominal	Additional error for temperatures other than 25°C	0.01% / °C
Resolution	12 Bits	Maximum Error at 25°C	0.1% (Note: Used 2% error under EMC testing.)
Output Voltage	4 - 30VDC		
DIGITAL OUTPUT			
Outputs per Module	8	Output Protection	Short Circuit
Commons per Module	1	Maximum Leakage Current	100µA
Operating Voltage	5 - 35VDC	Maximum Inrush Current	600mA. per channels
Output Type	Sinking / 10K Pull-Up	Minimum Load	None
Peak Voltage	35VDC Max.	OFF to ON Response	1ms.
Output Characteristics	Current Sinking	ON to OFF Response	1ms.
ON Voltage Level	1.5VDC Max.	Maximum Current per Channel	500mA
		Total Maximum Current	4A

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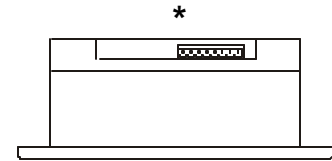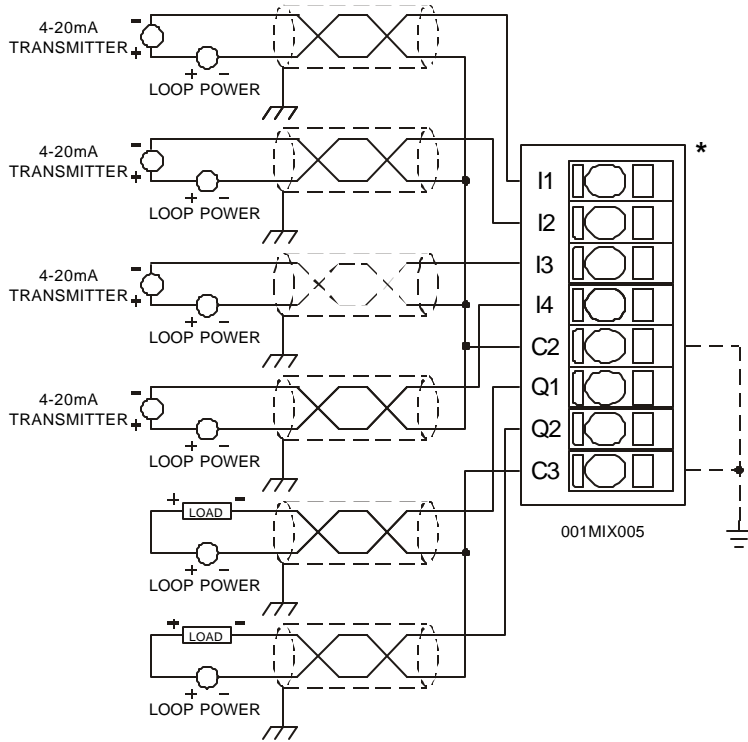| General Specifications			
Required Power (Steady State)	4.8W (200mA @ 24VDC)	Operating Temperature	0° to 50° Celsius
Required Power (Inrush)	900mA max. @ 24VDC for 1ms.	Terminal Type	Spring Clamp, Removable
Relative Humidity	5 to 95% Non-condensing	Weight	9.5 oz. (270 g)
UL	See Compliance Table at http://www.heapg.com/Support/compliance.htm		

2   WIRING

2.1   Digital Input / Output (P1)

Mini Bottom View – Shows corresponding I/O pin location
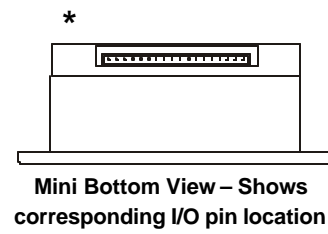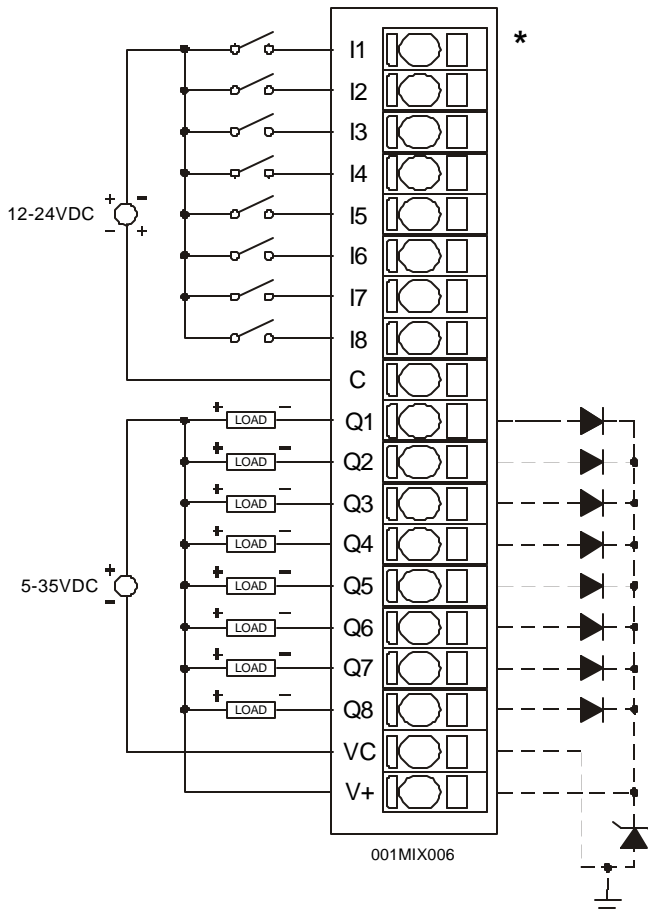
Pin	Digital Input / Output
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C	Common
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
VC	Common
V+	Load Voltage +

001MIX006

**Warning:** This is a negative logic device. Use of it may be considered an unsafe practice under CE directives.

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2.2   Analog Input / Output (P2)

Mini Top View – Shows corresponding I/O pin location

Pin	Analog In and Out
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
C2	Input Common
Q1	Output 1
Q2	Output 2
C3	Output Common

001MIX005

3   INTERNAL CIRCUIT SCHEMATIC
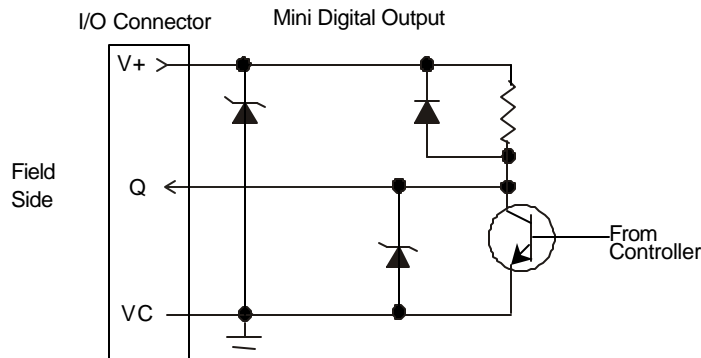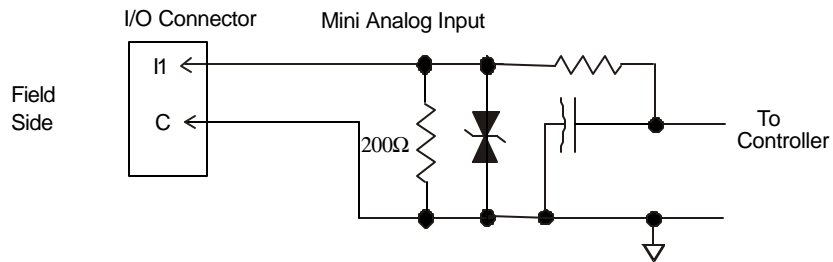
Specification for transient voltage suppressors (transorbs) used on output circuitry is 36VDC, 300 watts.
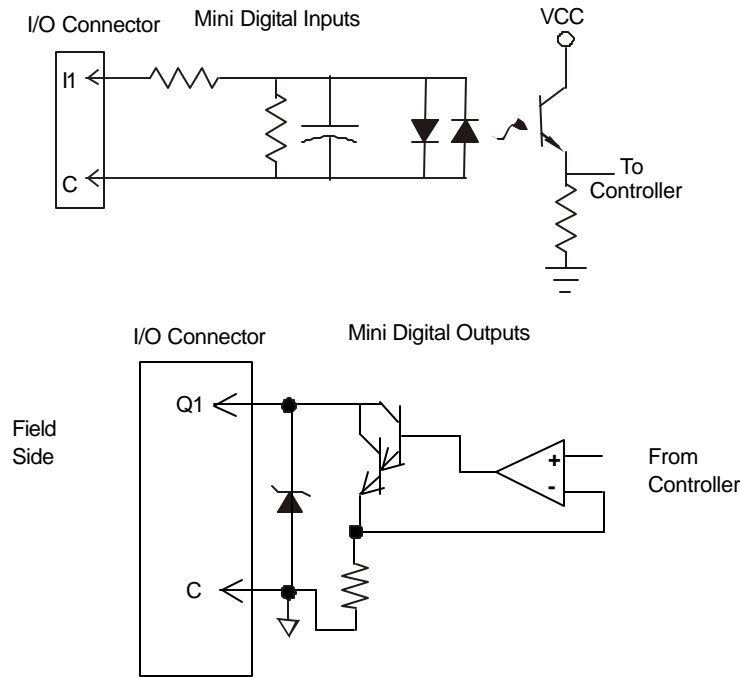
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I/O Connector   Mini Digital Inputs   VCC

Specification for transient voltage suppressors (transorbs) used on output circuitry is 30VDC, 300 watts.

4   CONFIGURATION

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

Module Setup Tab
The **Module Setup** is used in applications where it is necessary to change the default states or values of the outputs when the controller (e.g., OCS100) enters idle/stop mode.

1. For Digital Outputs: The default turns the outputs OFF when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to either turn ON, turn OFF or to hold the last state. Generally, most applications use the default settings.

   Warning: The default turns the digital outputs OFF when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default settings.

2. For Analog Outputs: The default sets the output values to zero when the controller enters idle/stop mode. By selecting the Module Setup tab, each output can be set to a specific value or hold the last value. Generally, most applications use the default settings.

   Warning: The default sets the output values to zero when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

3. For Analog Inputs:
Filter Constant sets the level of digital filtering according to the following chart.

I/O Map Tab
The I/O Map describes I/O registers. The I/O Map is not edited by the user.
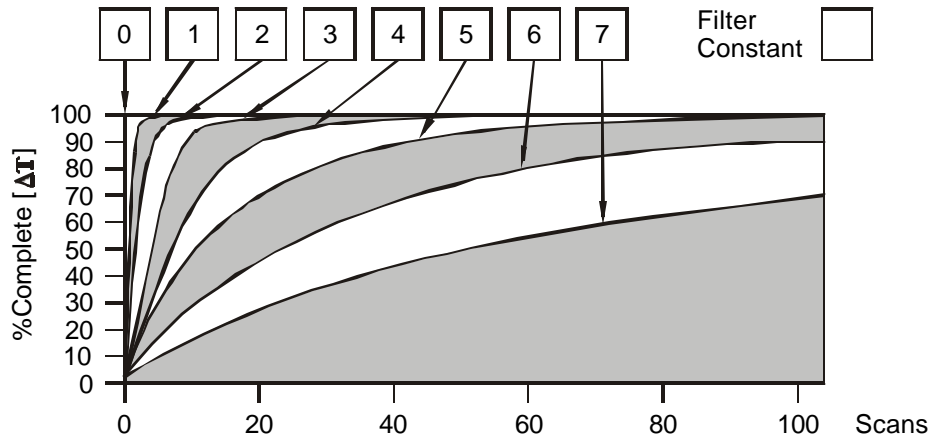
Digital Filtering. The illustration above demonstrates the effect of digital filtering (set with Fillter Constant) on module response to a temperature change.

5   ANALOG INPUT and OUTPUT CONVERSION FACTORS

5.1   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: **Data = Input Current (mA)   / Conversion Factor**

Example: The user selects a current range of 0 to +20mA:

1.   The known input current is 14mA.
2.   Using the table, the conversion factor for the current range of 0 to +20mA is 0.000625.
3.   To determine the data value, the formula is used:
                Data = Input Current (mA) / Conversion Factor
                22400 = 14mA / 0.000625

Conversion of Real-World Inputs into Controller			
Selected Current Range	**Input Current (mA)**	**Data**	**Conversion Factor**
0 to +20mA	+20.47	32752	0.000625
	+20.00	32000	
	0	0	

5.2   Output Conversion Factor

The following table describes how program data values are scaled to real-world analog voltage outputs by the module. Given a desired output current, the data value is converted by using the conversion factor from the table. The following formula is used: **Data = Output Current (mA) / Conversion Factor**

Example: The user selects a current range of +20mA:

1.   The desired output current is 12mA.
2.   Using the table, the conversion factor for the current range of +20 mA is 0.000625.
3.   To determine the data value, the formula is used:
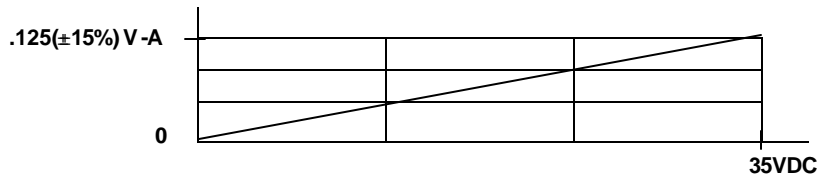   Data = Output Current (mA) / Conversion Factor
              19200 = 12mA / 0.000625

Conversion of Real-World Outputs into Controller			
Selected Current Range	**Output Current (mA)**	**Data**	**Conversion Factor**
0 to +20mA	+20.47	32752	0.000625
	+20.00	32000	
	0	0	

6   INPUT / OUTPUT CHARACTERISTICS

6.1   Digital Input

Digital Input Chart

6.2   Digital Output

Derating Output Chart

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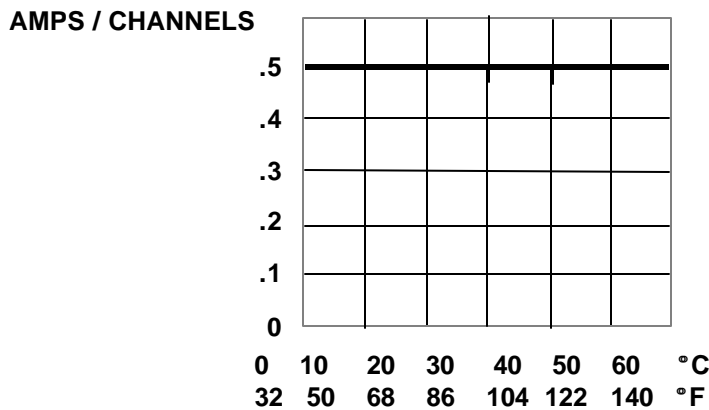
6.3   Operating Area
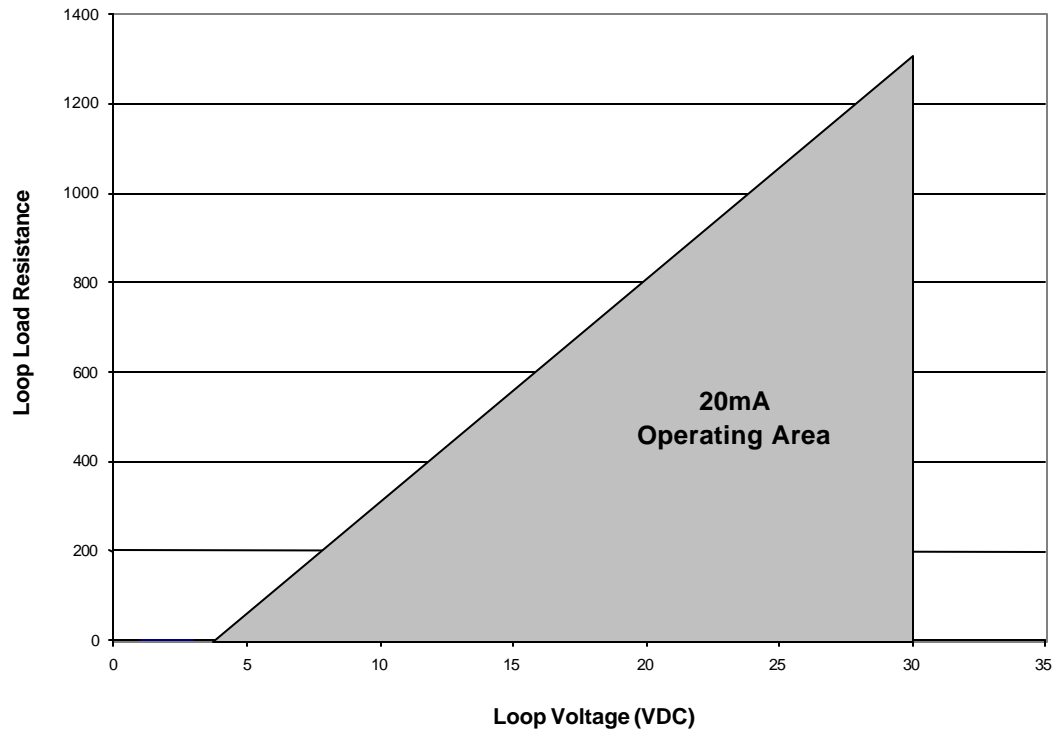
7   INSTALLATION / SAFETY

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 (Analog I/O).
c. Shields may be terminated at the module terminal strip.
d. In severe applications, shields should be tied directly to the ground block within the panel.
e.   Use the following wire type or equivalent: Belden 8917, 16 AWG or larger for digital I/O and Belden 8441 for Analog I/O.

For detailed installation information, refer to Mini Hardware Manual. A handy checklist is provided that covers panel box layout requirements and minimum clearances.

8   TECHNICAL ASSISTANCE

For assistance, contact Technical Support at the following locations:

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

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

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NOTES