24VDC Bipolar Digital In
10-28VDC, 0.5A Sourcing Digital Out
±10V, ±20mA Analog In/Out
HE500OCX404 /
HE500RCX404

Mini OCX/RCX

1   SPECIFICATIONS

ANALOG INPUT					
Number of Channels	4		Analog Inputs Input Points Required	4	
Input Ranges	±10 VDC ±20 mA		Conversion Time (PLC Update Rate)	Set by PLC Scan Time	
Resolution	12-Bit		Converter Type	Successive Approximation	
Input Impedance	±10 VDC 1 MΩ ±20 mA 100Ω , Clamped @ 12VDC, 35mA Max. Continuous		Additional error for temperatures other than 25°C	0.01% / °C	
Maximum Error at 25°C	0.3%		Maximum Over-Current	35mA	
DIGITAL INPUT					
Inputs per Module	16		Input Characteristics	Bidirectional	
Isolated Commons per Module	3		Input Impedance	10K Ohms	
Input Voltage Range	12-24VDC		Minimum ON Current	1mA	
Peak Voltage	35VDC Max.		Maximum OFF Current	200μA	
Isolation (Between isolated commons and Ground)	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	±10VDC ±20mA Sourcing Clamped @ 12VDC		Resolution	12 Bit	
			Additional error for temperatures other than 25°C	0.01% / °C	
Load limits	±10V: 2000Ω MIN ±20mA: 470Ω MAX		Maximum Error at 25°C	0.3%	
Output Compliance Voltage for ±20mA	±10VDC				
DIGITAL OUTPUT					
Outputs per Module	16		Maximum Inrush Current per channel	650mA	
Load Power Circuits per Module	2		Minimum Load Current	None	
Operating Voltage	10 - 30VDC		OFF to ON Response	1ms.	
Output Type	Sourcing / 10K Pull-Down		ON to OFF Response	1ms.	
Peak Voltage	30VDC Max.		Output Characteristics	Current Sourcing	
Maximum Load Current per Output	0.5A Max.		Output Protection	Short Circuit	

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| General Specifications			
Required Power (Steady State)	4.8W (200mA @24VDC)	Operating Temperature	0° to 50° Celsius
Required Power (Inrush)	30A @ 24VDC for 250µs.	Terminal Type	Spring Clamp, Removable
Relative Humidity	5 to 95% Non-condensing	Weight	21.5 oz. (610 g)

2 WIRING

2.1 Input I/O Connector
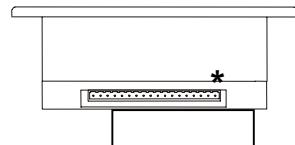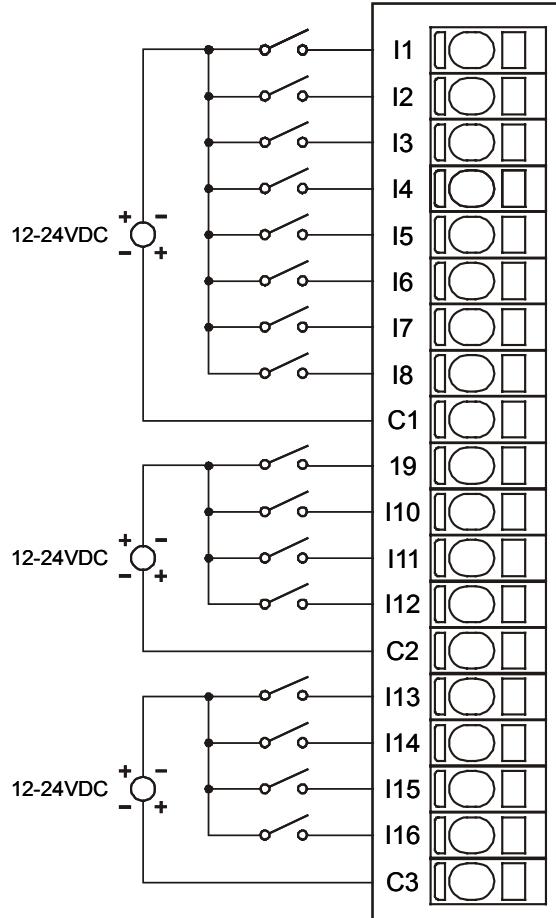
Mini Top View – Shows corresponding I/O pin location

Pin	Signal
	OCX404 INPUT
I1	Input 1
I2	Input 2
I3	Input 3
I4	Input 4
I5	Input 5
I6	Input 6
I7	Input 7
I8	Input 8
C1	Common 1 (Isolated)
I9	Input 9
I10	Input 10
I11	Input 11
I12	Input 12
C2	Common 2 (Isolated)
I13	Input 13
I14	Input 14
I15	Input 15
I16	Input 16
C3	Common 3 (Isolated)

001OCX004

2.2   Output
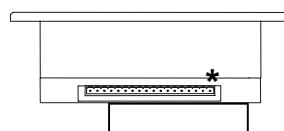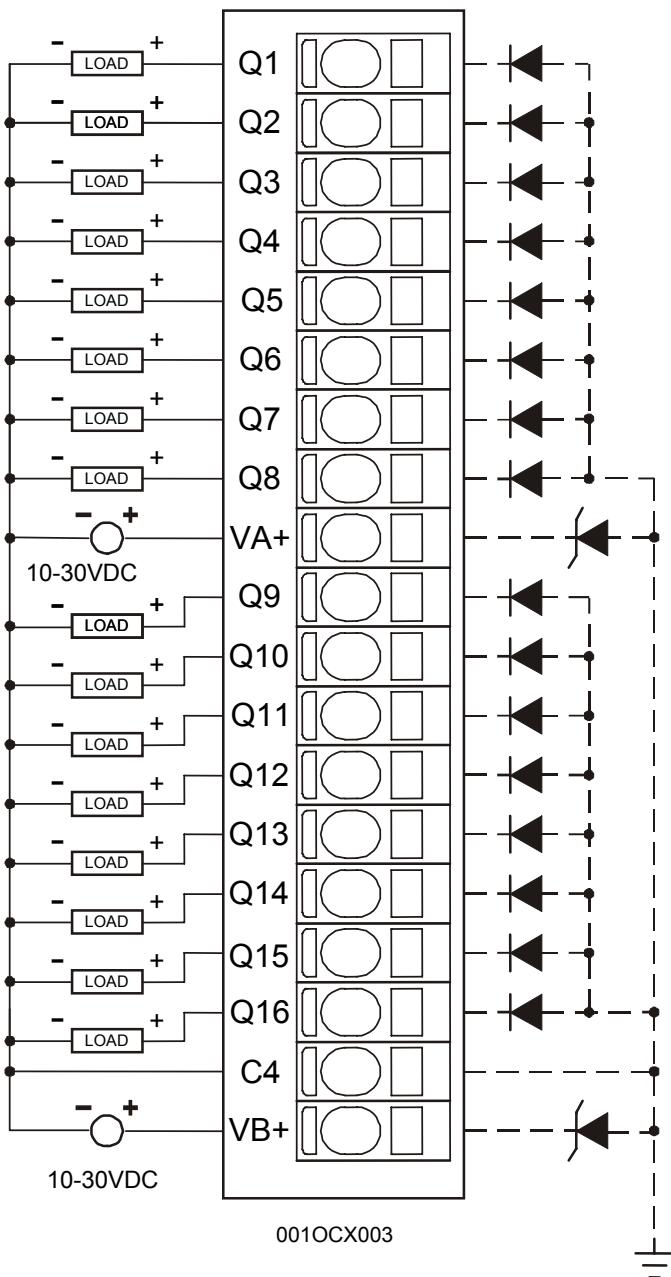
Mini Bottom View – Shows corresponding I/O pin location

Pin	Signal
	OCX404 Output
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
VA+	Load Power A
Q9	Output 9
Q10	Output 10
Q11	Output 11
Q12	Output 12
Q13	Output 13
Q14	Output 14
Q15	Output 15
Q16	Output 16
C4	Common
VB+	Load Power B

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2.3   Analog Input / Output

001OCX005
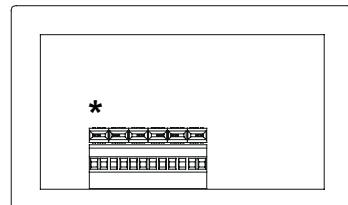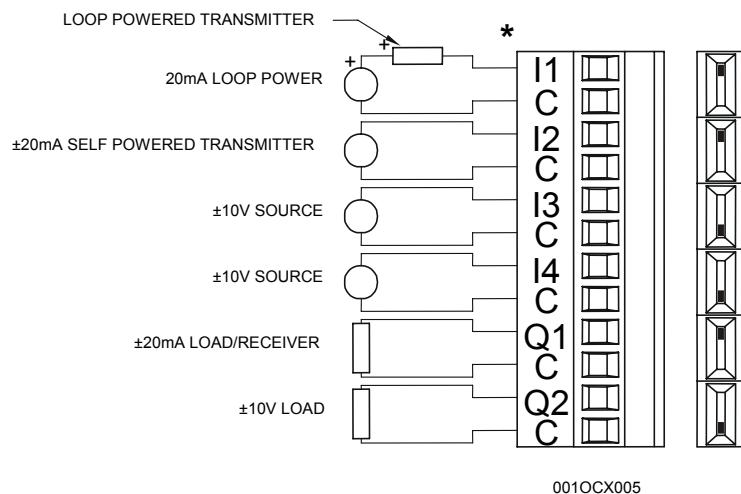
OCX Back View Connector – Shows corresponding I/O pin location

Pin	Signal
	OCX404 Analog In / Out
I1	Input 1
C	Common
I2	Input 2
C	Common
I3	Input 3
C	Common
I4	Input 4
C	Common
I5	Input 5
C	Common
I6	Input 6
C	Common

Note: The Voltage/Current mode switch is located directly above each input. Moving a switch towards Pin 1* selects ±20mA for the corresponding channel. Moving the switch towards Pin 12 selects ±10VDC. Each channel must be set up in Cscape for the desired mode in addition to the physical switch settings for proper signal scaling in the PLC registers.

3   INTERNAL SCHEMATIC
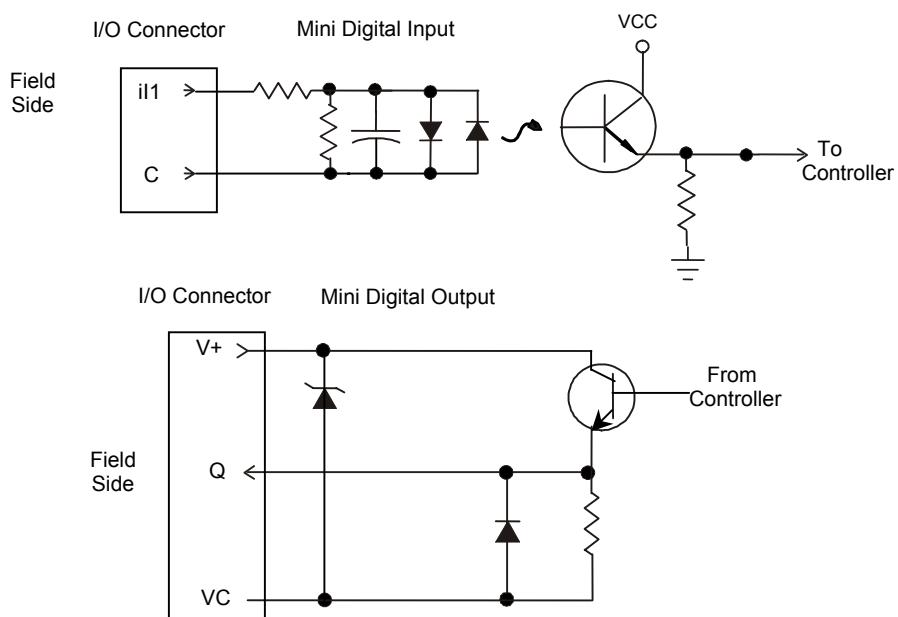
Specification for transient voltage suppressors used on digital output circuitry is 33V, 300W.
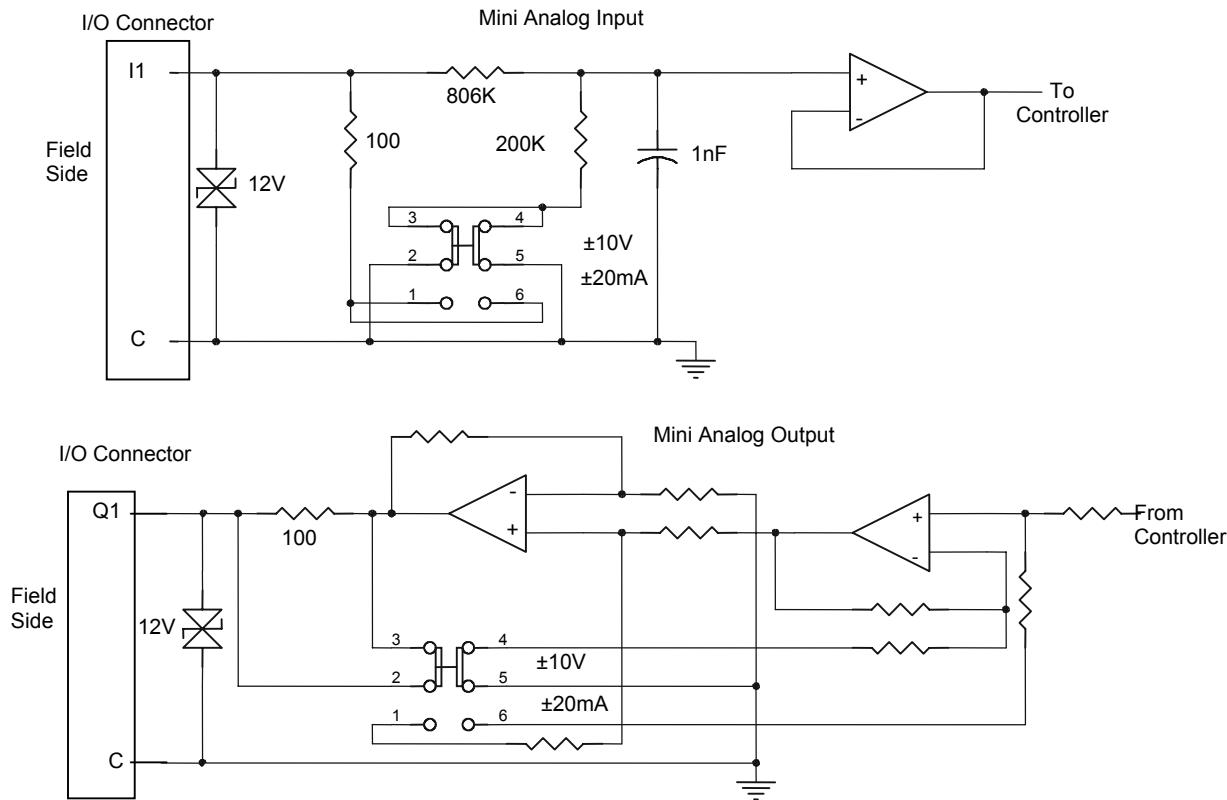
Specification for transient voltage suppressors (transorbs) used on output circuitry is 12VDC, 600 watts.

4   CONFIGURATION

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

Module Setup Tab
The **Module Setup** is used to configure the Analog Inputs and Analog Outputs ±10V and ±20mA modes and for 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:
Mode: ±10V or ±20mA must be set for each channel. The associated slide switch on the back of the module must match the Cscape setting for each channel.
Idle: 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: :
Mode: ±10V or ±20mA must be set for each channel. The associated slide switch on the back of the module must match the Cscape setting for each channel.
Filter Constant: Sets the level of digital filtering according to the following chart.

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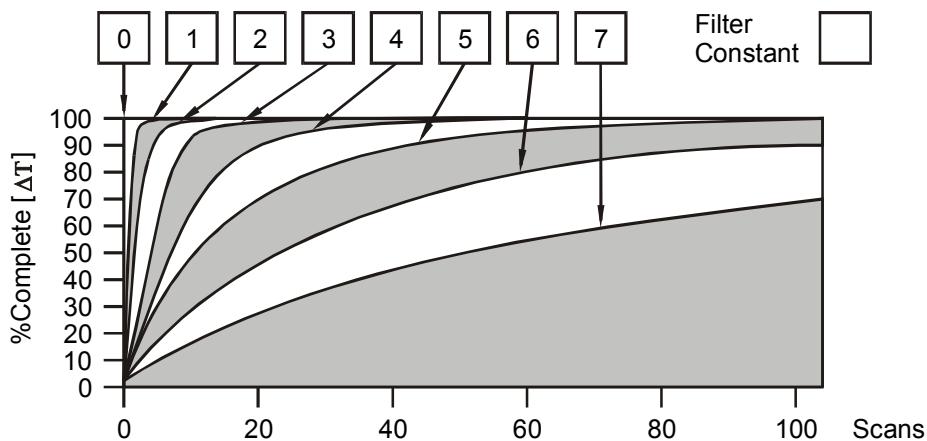
Digital Filtering. The illustration above demonstrates the effect of digital filtering (set with Fillter Constant) on module response to a temperature change.

5   ANALOG INPUT 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 ±20mA:

1.   The known input current is 14mA.
2.   Using the table, the conversion factor for the current range of ±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 Range	**Input**	**Register Data**	**Conversion Factor**
±20mA	+20.00	32000	0.000625
	0.00	0	
	-20.00	-32000	

±10 V	+10.00	32000	0.0003125
	0.00	0	
	-10.00	-32000	

6   ANALOG CONVERSION OUTPUT 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 Range	**Output**	**Register Data**	**Conversion Factor**
	+20.00	3200	
0 to +20mA	0.00	0	0.000625
	-20.00	-32000	

	+10.00	32000	
±10 V	0.00	0	0.0003125
	-10.00	-32000	

## 7   DIGITAL INPUT / OUTPUT CHARACTERISTICS

7.1   Digital Input

Digital Input Chart
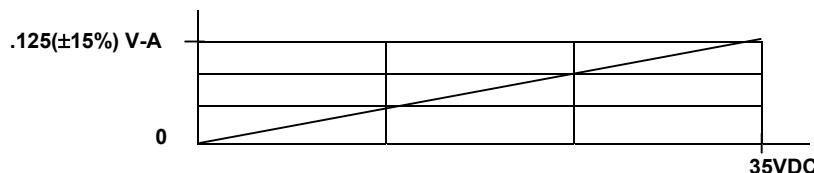
7.2   Digital Output

Derating Chart
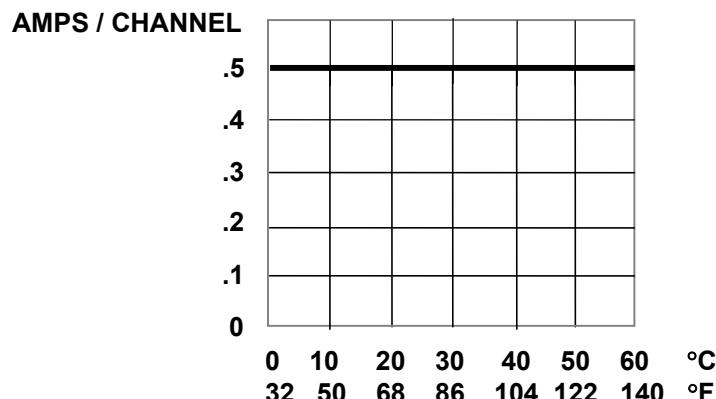
7   INSTALLATION / SAFETY

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