



**24VDC Bipolar Digital In**  
**10-28VDC, 0.5A Sourcing Digital Out**  
**HE500OCS052 / HE500OCS082 / HE500RCS082**  
**+/- 10V Analog In/Out**

*Mini OCS/RCS*

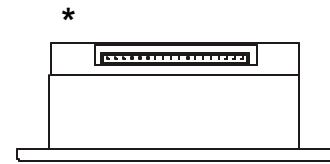
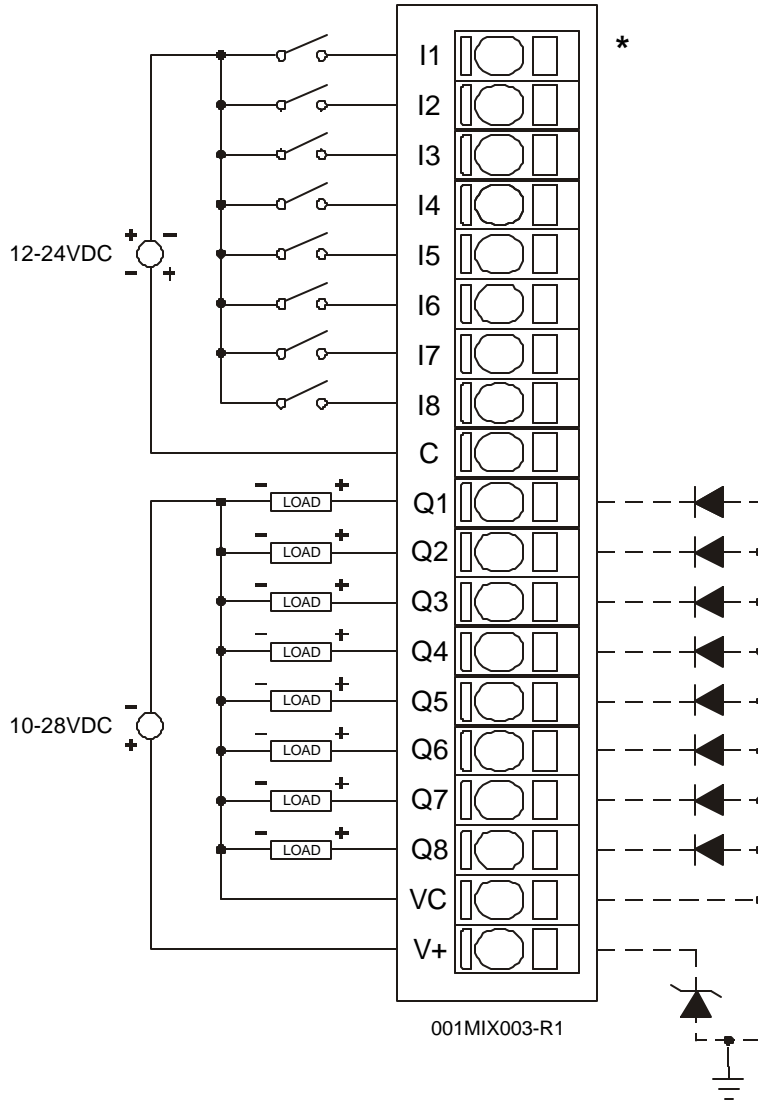
**1 SPECIFICATIONS**

ANALOG INPUT			
Number of Channels	4	Analog Inputs Input Points Required	4
Input Ranges (including over-range)	±10.23VDC	Usable Resolution	12- Bits
Resolution	12-Bit	Digital Filtering	Yes
Input Impedance	1Meg Ohm <12VDC or clamped @ 12VDC Nom.	Additional error for temperatures other than 25°C	0.01% / °C
Maximum Clamp Current	75mA.	Maximum Error at 25°C	0.1%
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 Bus)	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)	± 10.23V	Additional error for temperatures other than 25°C	0.01% / °C
Resolution	12-Bits	PLC Update Rate	Set by PLC Scan Time
Peak Output Voltage	10.23V	Conversion Settling Time	1ms.
Load Impedance	2K Ohms Min.	Voltage Output Resolution	12 Bits
Load Capacitance	.01µF MAX	Maximum Error at 25°C	0.1%
DIGITAL OUTPUT			
Outputs per Module	8	Maximum Inrush Current	650m A per channel
Commons per Module	1	Minimum Load	None
Operating Voltage	10 - 28VDC	OFF to ON Response	1ms.
Output Type	Sourcing / 10K Pull-Down	ON to OFF Response	1ms.
Peak Voltage	28VDC Max.	Output Characteristics	Current Sourcing
Maximum Load Current per Output	0.5A Max.	Output Protection	Short Circuit
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)
CE	See Compliance Table at <a href="http://www.heapg.com/Support/compliance.htm">http://www.heapg.com/Support/compliance.htm</a>		
UL	Operating Temperature Code T4A; See Compliance Table at <a href="http://www.heapg.com/Support/compliance.htm">http://www.heapg.com/Support/compliance.htm</a>		

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## 2 WIRING

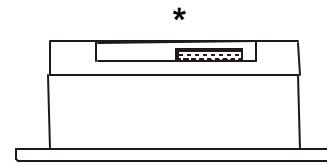
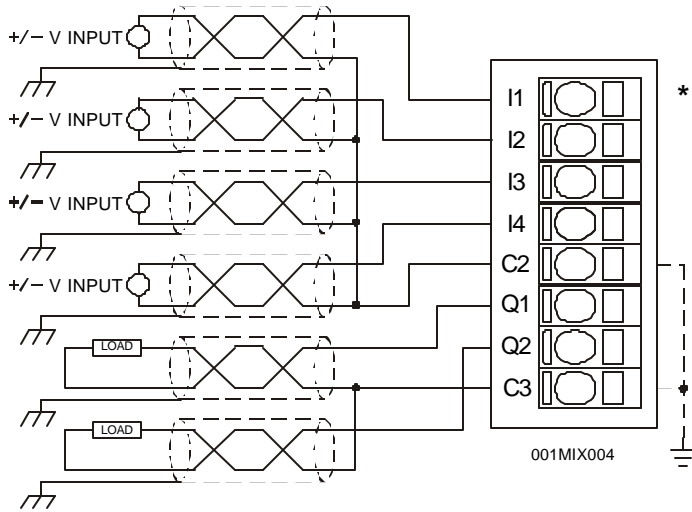
### 2.1 Digital Input / Output (P1)



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
C1	Common (Isolated)
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	Load Power Common
V+	Load Voltage +

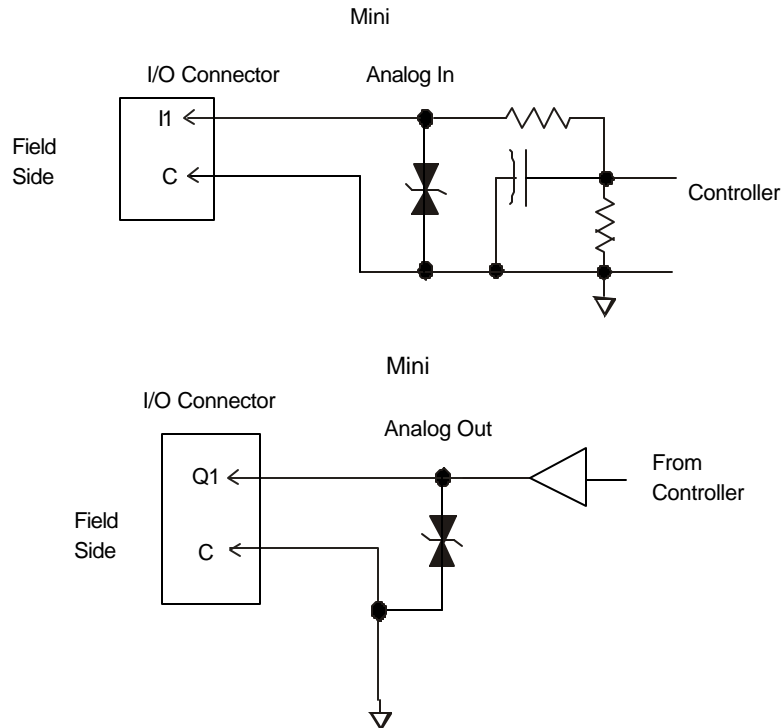
2.2 Analog Input / Output (P2)



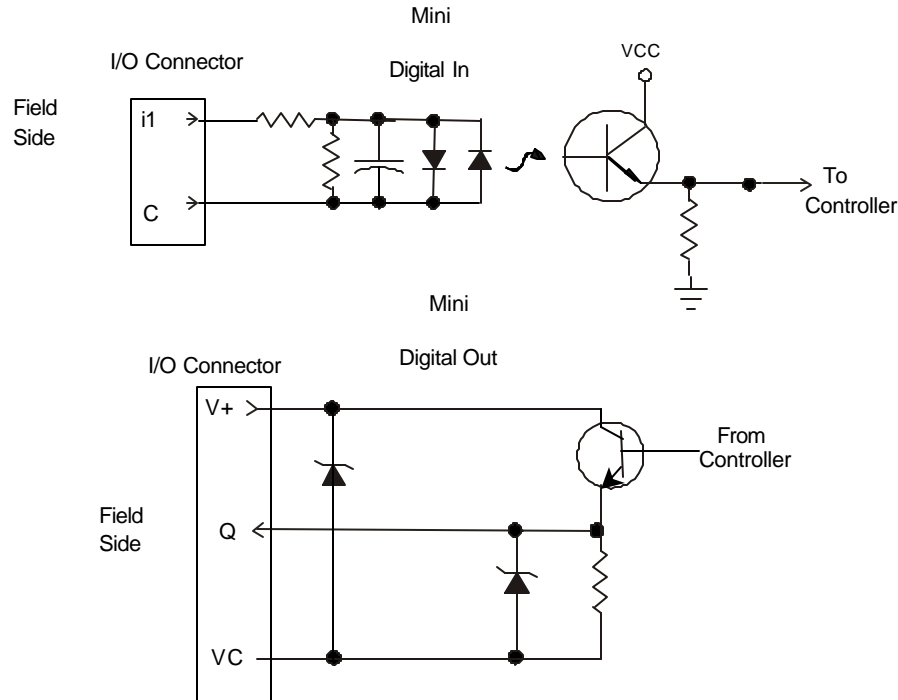
Mini Top View – Shows corresponding I/O pin location

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

INTERNAL CIRCUIT SCHEMATIC



Specification for transient voltage suppressors (transorbs) used on output circuitry is 12VDC, 600 watts.



Specification for transient voltage suppressors (transorbs) used on output circuitry is 33VDC, 300 watts.

Note: Electro-mechanical relays comply with IEC1131-2.

## 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.

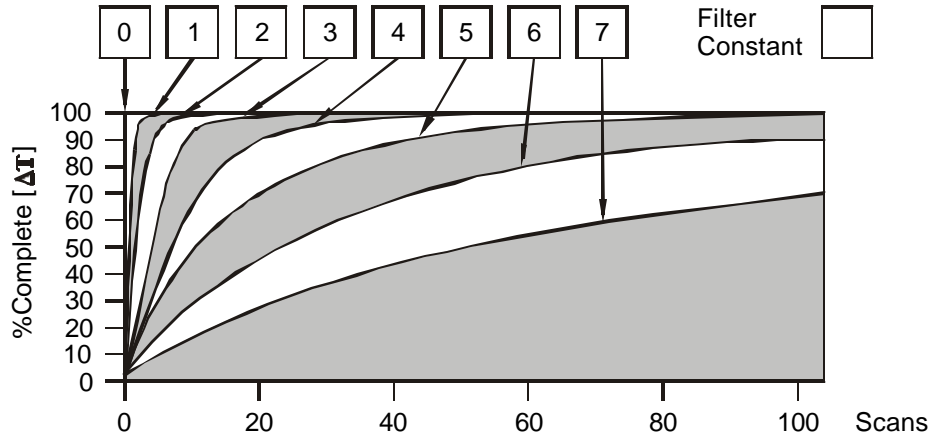
**Warning:** The default sets the output values to zero when the controller enters idle/stop mode. To avoid injury of personnel or damages to equipment, exercise extreme caution when changing the default setting using the **Module Setup** tab.

**3. For Analog Inputs:**

a. 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 and is determined by the model number. The I/O Map is not edited by the user.



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

## 5 ANALOG INPUT and OUTPUT CONVERSIONS

### 5.1 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 voltage range is +/-10VDC:

1. The known input voltage is 3 VDC.
2. Using the table, the conversion factor for the voltage range of +/-10VDC is 0.0003125.
3. To determine the data value, the formula is used:  

$$\text{Data} = \text{Vin} / \text{Conversion Factor}$$

$$9600 = 3 \text{ VDC} / 0.0003125$$

Conversion of Real-World Inputs into Controller			
Selected Voltage Range	Voltage In (Vin) VDC	Data Out	Conversion Factor
+/-10.00 VDC	+10.23	32736	0.0003125
	+10.00	32000	
	0	0	
	-10.00	-32000	
	-10.23	-32736	

### 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 voltage, the data value is converted by using the conversion factor from the table. The following formula is used: **Data = Voltage Out (V out) / Conversion Factor**

**Example:** The user selects ± 10 VDC output range:

1. The desired voltage is 3 VDC.
2. Using the table, the conversion factor for the voltage range of +/-10 VDC is 0.0003125
3. To determine the data value, the formula is used:  

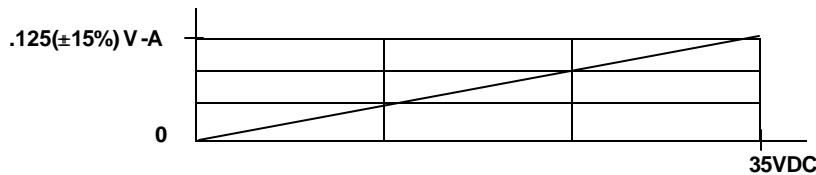
$$\text{Data} = \text{V out} / \text{Conversion Factor}$$

$$9600 = 3 \text{ VDC} / 0.0003125$$

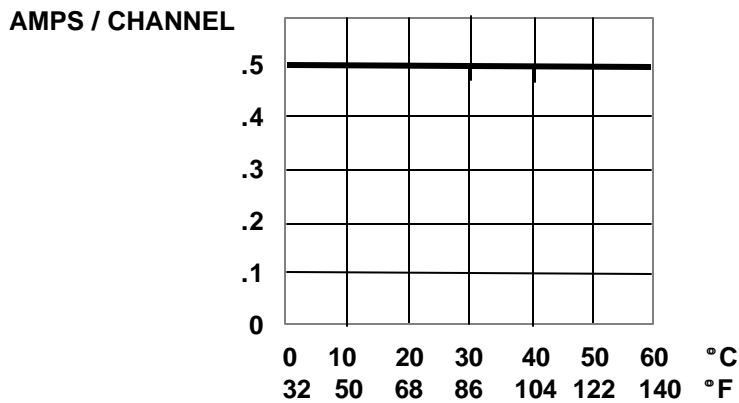
Conversion of Real-World Outputs into Controller			
Selected Voltage Output Range	Data	Voltage Out (V out) VDC	Conversion Factor
± 10 VDC Analog Out	+ 32736	+10.23	0.0003125
	+ 32000	+10.00	
	0	0.00	
	- 32000	-10.00	
	- 32736	-10.23	

## 6 DIGITAL INPUT / OUTPUT CHARACTERISTICS

Digital Input Chart



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.
- 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 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 or visit our website at [www.heapg.com](http://www.heapg.com).

**Europe:**

(+) 353-21-4321-266

NOTES