



# 0–10 V or 0–20 mA Analog Output Module

HE800DAC202 /  
HE-DAC202\*

**12-Bit Resolution**  
\* HE-denotes plastic case.

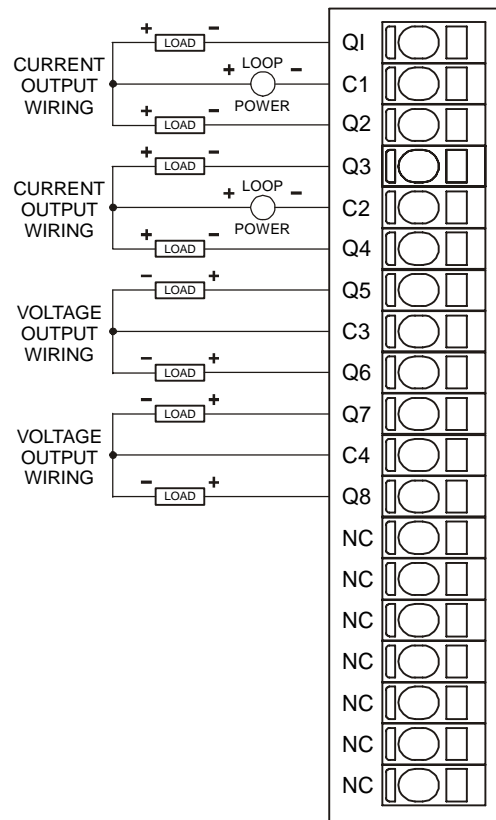


This datasheet also covers products starting with IC300.

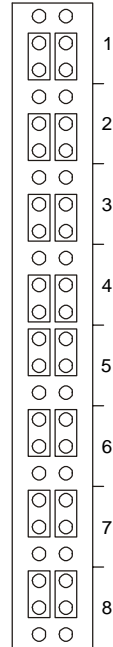
## 1 SPECIFICATIONS

	DAC202		DAC202
Number of Channels	8		Maximum Error at 25°C
Current Output Range (including over-range)	20.47 mA; Clamped @ -0.5 to +33 VDC Nominal		0.05% Full Scale
Peak Output Voltage	30 VDC Max.		PLC Update Rate
Current Output Voltage Compliance	4–30 VDC		Set by PLC Scan Rate
Voltage Output Range (including over-range)	0–10.23 V; Clamped @ -0.5 to +11 VDC Nominal		Resolution
External Power Supply (See Section 2 - Wiring Diagram for current loop power.)	None		12-Bits
Required Power (Steady State)	0.48 W (20 mA @ 24 VDC)		Additional error for temperatures other than 25°C
Required Power (Inrush)	Negligible		0.005% / °C
			Analog Outputs; Output Points Required
			8
			Operating Temperature
			0°–60° Celsius
			Terminal Type
			Spring Clamp, Removable
			Weight
			9.5 oz. (270 g)

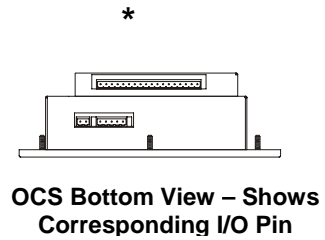
2 WIRING



001DAC003-R1



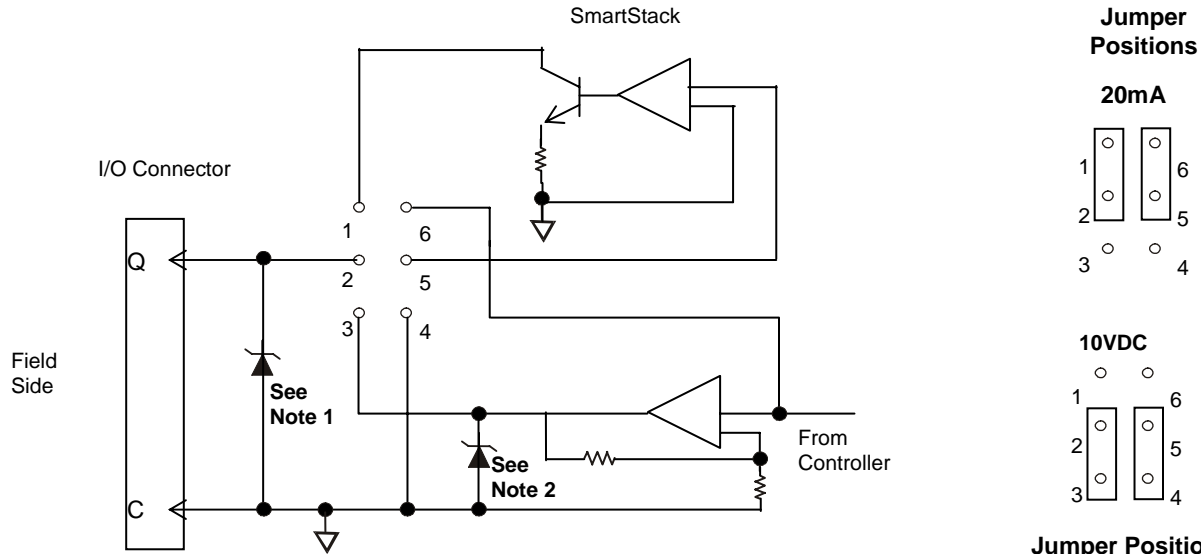
Jumper Block



DAC202 Signal	Pin
Output 1	Q1
Common 1	C1
Output 2	Q2
Output 3	Q3
Common 2	C2
Output 4	Q4
Output 5	Q5
Common 3	C3
Output 6	Q6
Output 7	Q7
Common 4	C4
Output 8	Q8
No Connection	NC
No Connection	NC
No Connection	NC
No Connection	NC
No Connection	NC
No Connection	NC
No Connection	NC

The jumper block indicates the correct jumper positions for the wiring shown above. Each output can be independently programmed for 0–10 V or 0–20 mA. 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 19 are to be jumpered. The mode for each output must also be specified in the module setup in Cscope.

### 3 INTERNAL CIRCUIT SCHEMATIC



**Jumper Positions**  
See Section 2 for physical location.

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**Note 1:** Specification for transient voltage suppressors (transorbs) used on output circuitry is 30 V, 300 W.

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**Note 2:** Specification for transient voltage suppressors (transorbs) used on output circuitry is 11 V, 400 W.

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## 4 CONFIGURATION

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

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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.

Selecting the **I/O Map** tab provides information about the I/O registers, which 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.

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

### **Module Setup Tab**

Output range for each channel may be selected independently.

<p><b>Warning:</b> 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 <b>Module Setup</b> tab.</p>
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## 5 OUTPUT CHARACTERISTICS

### 5.1 Output Conversion

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 +20 mA:

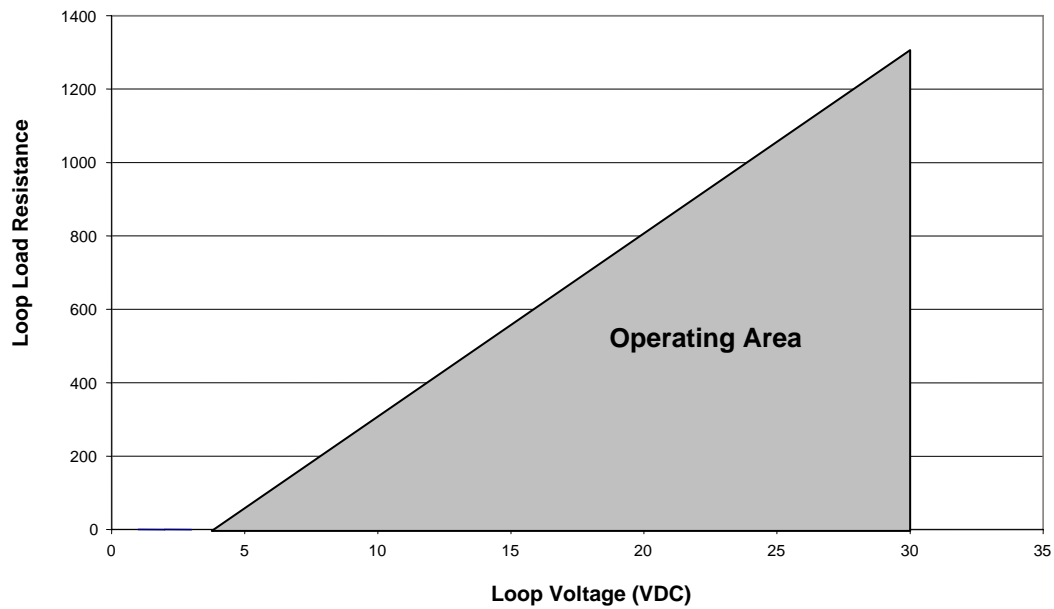
- 1) The desired output current is 12 mA.
- 2) Using the table, the conversion factor for the current range of +20 mA is 0.000625.
- 3) To determine the data value, the formula is used:  

$$\text{Data} = \text{Output Current (mA)} / \text{Conversion Factor}$$

$$19200 = 12 \text{ mA} / 0.000625$$

Conversion of Real-World Outputs into Controller			
Selected Current Range	Output Current (mA)	Data	Conversion Factor
0 to +20 mA	+20.47	32752	0.000625
	+20.00	32000	
	0	0	
Selected Voltage Range	Output Voltage (V)	Data	Conversion Factor
0 to +10 V	10.23	32736	0.0003125
	10.00	32000	
	0	0	

### 5.2 Operating Area



## 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 are to 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 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.

**WARNING:** To avoid the risk of electric shock or burns, always connect the safety (or earth) ground before making any other connections.

**WARNING:** 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.

**WARNING:** Replace fuse with the same type and rating to provide protection against risk of fire and shock hazards.

**WARNING:** In the event of repeated failure, do not replace the fuse again as a repeated failure indicates a defective condition that will not clear by replacing the fuse.

**WARNING:** 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.

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.):

- All applicable codes and standards need to be followed in the installation of this product.
- For I/O wiring (discrete), use the following wire type or equivalent: Belden 9918, 18 AWG or larger.

Adhere to the following safety precautions whenever any type of connection is made to the module.

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

## 7 ADDITIONAL REFERENCES

The following information serves as a *general* listing of Horner controller products and other references of interest and their corresponding manual numbers. Visit our website listed in the [Technical Support](#) section to obtain user documentation and updates.

<b>Note:</b> This list is <u>not</u> intended for users to determine which products are appropriate for their application; controller products differ in the features that they support. If assistance is required, see the <b>Technical Support</b> section in this document.	
Controller	Manual Number
XLE Series (e.g., HE-XExxx)	MAN0805
QX Series (e.g., HE-QXxxx)	MAN0798
NX Series (e.g., HE-NXxxx)	MAN0781
LX Series (e.g., LX-xxx; also covers RCS116)	MAN0755
Color Touch OCS (e.g., OCSxxx)	MAN0465
OCS (Operator Control Station) (e.g., OCS1xx / 2xx; Graphic OCS250)	MAN0227
Remote Control Station (e.g., RCS2x0)	
MiniOCS (e.g., HE500OCSxxx, HE500RCSxxx)	MAN0305
Other Useful References	
CAN Networks	MAN0799
Cscape Programming and Reference	MAN0313
Wiring Accessories and Spare Parts Manual	MAN0347
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](http://www.heapg.com)

### Europe:

(+) 353-21-4321-266

[www.horner-apg.com](http://www.horner-apg.com)