



Analog Output Module

HE559DAC207

8 Output Channels – load limited

0-5V / 0-10V / 4-20mA / 0-20mA

CsCAN

SmartStix

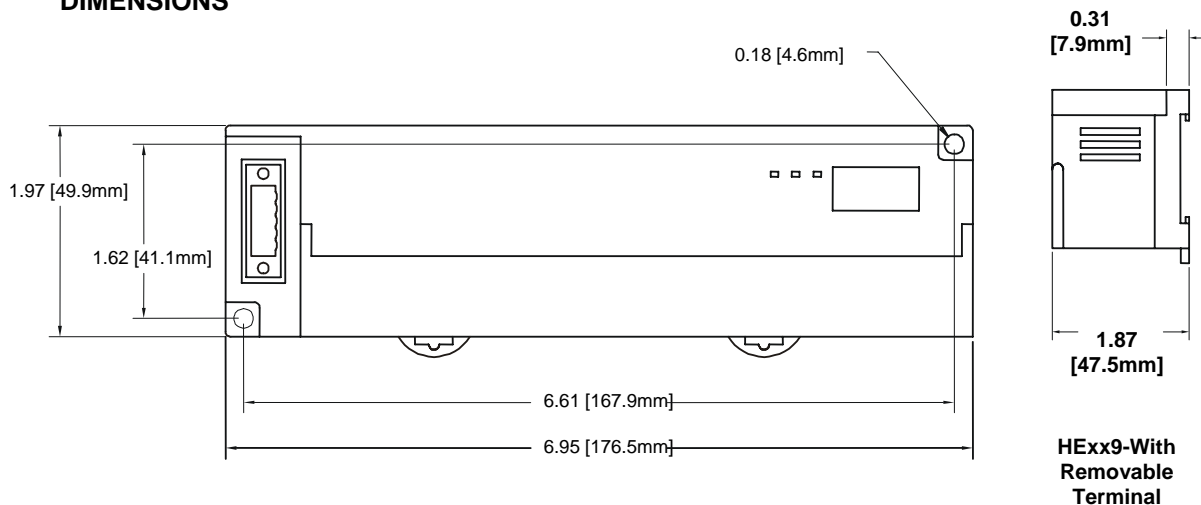
Refer to SmartStix Analog Programming Guide (MAN0703) at www.HornerOCS.com.

1 SPECIFICATIONS

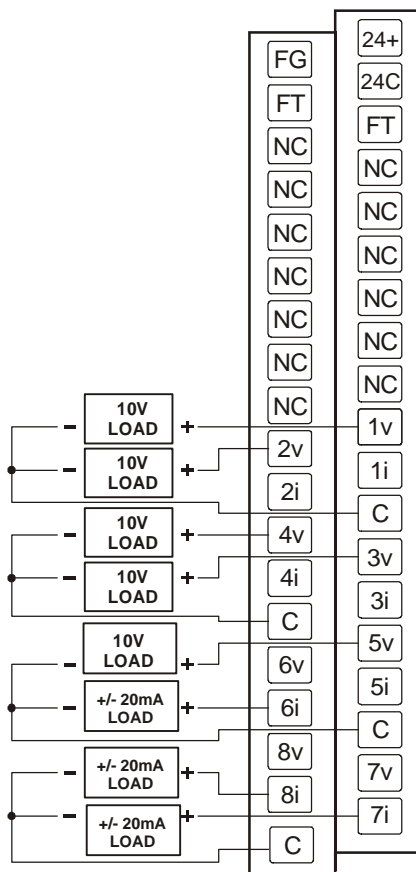
ANALOG OUT			
Number of output points	8	Max Output current, Voltage mode	8 channels driving 5mA max output loads
Output Ranges	0-5V, 0-10V DC 4-20mA, 0-20mA DC	Isolation	1000V DC IEC61010-1 300V RMS
Resolution	14 bits	Isolation Method	Magnetic
Accuracy, 25°C	0.1%	Output Clamp	±12V, 600Wpk
Load Resistance	V: 2k ohms Min mA: 500 ohms Max	Output Type	Sourcing
Max Output current, mA mode	3 channels driving 20mA max output loads	Register Value for Nominal Full Scale	32000
GENERAL			
Required Power (Steady State)	3.6W (150mA @ 24VDC)	Cooling method	Self-cooling
Required Power (Inrush)	8A @24VDC for 1ms	Operating and Storage Humidity	5 to 95% Non-condensing
Storage Temperature	-25° to 70° C	Altitude for use	Up to 2,000m
Operating Temperature	0° to 55° C	Pollution degree	2 or lower
Atmosphere	Free from corrosive gases and excessive dust	Weight	9 oz. (256g)

Vibration				
Occasional Vibration				
Frequency	Acceleration	Amplitude		Sweep Count
$10 \leq f < 57$ Hz	-	0.075 mm		10 times in each direction for X,Y,Z
$57 \leq f \leq 150$ Hz	$9.8 \text{ m/s}^2 \{1G\}$	-		
Continuous Vibration				
Frequency	Acceleration	Amplitude		Sweep Count
$10 \leq f < 57$ Hz	-	0.035 mm		10 times in each direction for X,Y,Z
$57 \leq f \leq 150$ Hz	$4.9 \text{ m/s}^2 \{0.5G\}$	-		
Shocks				
Maximum shock acceleration		147 $\text{m/s}^2 \{15G\}$		
Duration Time		11 ms.		
Pulse Wave		Half sine wave pulse (3 times in each of X, Y, Z directions)		
Noise Immunity				
Square wave impulse noise		AC: $\pm 1,500\text{VDC}$ DC: $\pm 900\text{VDC}$		
Electrostatic Discharge		Voltage: 4kV (contact discharge)		
Radiated electromagnetic field		27 – 500MHz, 10V/m		
Fast Transient Burst Noise	Severity level	All power modules	Digital I/Os ($U_e \geq 24\text{V}$)	Digital I/Os ($U_e < 24 \text{ V}$) Analog I/Os Communication I/Os
	Voltage	2 kV	1 kV	0.25 kV

2 DIMENSIONS



3 WIRING



006DAC002-R3

DAC207		DAC207	
2	FG	1	24+ *
4	FT	3	24C **
6	NC	5	FT
8	NC	7	NC
10	NC	9	NC
12	NC	11	NC
14	NC	13	NC
16	NC	15	NC
18	NC	17	NC
20	2v	19	1v
22	2i	21	1i
24	4v	23	C
26	4i	25	3v
28	C	27	3i
30	6v	29	5v
32	6i	31	5i
34	8v	33	C
36	8i	35	7v
38	C	37	7i

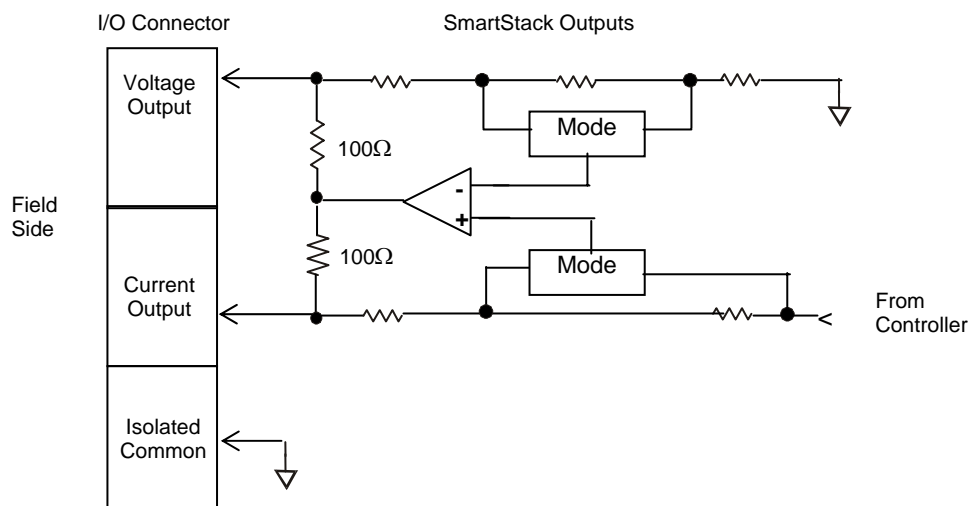
FT: Factory Test, Do Not Connect

C terminals are connected together internally but isolated from bus and power circuits.

* and ** For CsCAN and DeviceNet versions, module power is usually derived from the CAN connector. In that case, +24VDC and 24C are not connected.

WARNING: DUE TO A TOTAL CURRENT LIMIT OF 60mA – IT IS RECOMMENDED THAT NO MORE THAN 3 OUTPUT CHANNELS BE CONFIGURED FOR 0-20mA OR 4-20mA OPERATION

4 INTERNAL WIRING



5 OUTPUT MODE AND DEFAULT CONFIGURATION

Configuration Word from Network

The network supplies configuration information to the DAC207 in the Consumed Directed Digital Data Words sent to the DAC207. In the first word, the high 8 bits, 9 through 16, are channel mode bits. The high eight bits are used so that mode bits 9 through 12 match those of the DAC207. A low mode bit selects 0-10V and a high mode bit selects 0-20mA. In the second word, the high 8 bits are channel scale bits. A low scale bit selects 0 to 10V or 0 to 20mA for the corresponding channel. A high scale bit selects 0 to 5V or 4 to 20mA. The low eight bits of each word are unused.

Bit	Channel
9	AQ1
10	AQ2
11	AQ3
12	AQ4
13	AQ5
14	AQ6
15	AQ7
16	AQ8

Bits 9 through 16 of the 5th configuration word control the behavior of the analog outputs when network communication is lost. The bit to channel correspondence is the same as for the mode and scale bits. If the corresponding bit is set, the outputs hold the last state. If the corresponding bit is cleared, the outputs are set to the respective value supplied to the HE550DAC207 in the second eight words of the Consumed Directed Analog Data sent by the OCS. The other bits of the 5th configuration word are unused.

Refer to SmartStix Analog Programming Guide (MAN0702).

6 OUTPUT CONVERSION FACTOR

The following table describes how real-world outputs are scaled in the controller. Given a desired output voltage or current, the register data value may be calculated by using the conversion factor from the table. The following formula is used: **Data = Voltage or Current Out / Conversion Factor**

Example: The user selects a voltage range of 0 to 10V:

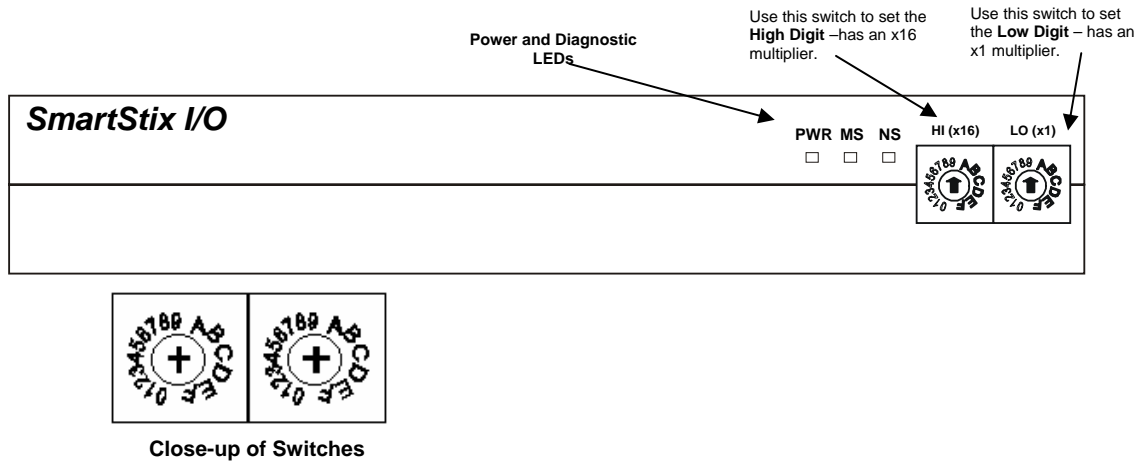
- The desired output voltage is 6 Volts.
- Using the table, the conversion factor for the voltage range of 0 to 10V is .0003125.
- To determine the data value, the formula is used: $\text{Data} = \text{Vout} / \text{Conversion Factor}$
 $19200 = 6 \text{ VDC} / 0.0003125$
- For the 4 to 20mA range, the offset, 4mA, must first be subtracted from the physical output value before dividing by the scale factor to yield the register value for the desired output.

Conversion from Register Values to Physical Values			
Selected Range	Output Volts / mA	Data	Conversion Factor
0-5 V	5.11	32767	0.00015625
	5.00	32000	
	0.00	0	
	0.00	-32000	
	0.00	-32768	
0-10 V	10.23	32767	0.0003125
	10.00	32000	
	0.00	0	
	0.00	-32000	
	0.00	-32768	
4-20 mA	20.37	32767	0.0005
	20.00	32000	
	4.00	0	
	0.00	-8000	
	0.00	-32768	
0-20 mA	20.47	32767	0.0006250
	20.00	32000	
	0	0	
	0.00	-32000	
	0.00	-32768	

7 SETTING ID SWITCHES

CsCAN Network IDs are set using the hexadecimal number system from 01 to FD. The decimal equivalent is 1-253. Refer to following Conversion Table, which shows the decimal equivalent of hexadecimal numbers. Set a unique Network ID by inserting a small Phillips screwdriver into the two *identical* switches.

Note: The CsCAN Baud Rate for SmartStix I/O is fixed at 125KBaud



Decimal (Dec) to Hexadecimal (Hex) Conversion																
Dec	Hex		Dec	Hex		Dec	Hex		Dec	Hex	Dec	Hex		Dec	Hex	
	HI	LO		HI	LO		HI	LO				HI	LO		HI	LO
			54	3	6	108	6	C	162	A	2	216	D	8		
1	0	1	55	3	7	109	6	D	163	A	3	217	D	9		
2	0	2	56	3	8	110	6	E	164	A	4	218	D	A		
3	0	3	57	3	9	111	6	F	165	A	5	219	D	B		
4	0	4	58	3	A	112	7	0	166	A	6	220	D	C		
5	0	5	59	3	B	113	7	1	167	A	7	221	D	D		
6	0	6	60	3	C	114	7	2	168	A	8	222	D	E		
7	0	7	61	3	D	115	7	3	169	A	9	223	D	F		
8	0	8	62	3	E	116	7	4	170	A	A	224	E	0		
9	0	9	63	3	F	117	7	5	171	A	B	225	E	1		
10	0	A	64	4	0	118	7	6	172	A	C	226	E	2		
11	0	B	65	4	1	119	7	7	173	A	D	227	E	3		
12	0	C	66	4	2	120	7	8	174	A	E	228	E	4		
13	0	D	67	4	3	121	7	9	175	A	F	229	E	5		
14	0	E	68	4	4	122	7	A	176	B	0	230	E	6		
15	0	F	69	4	5	123	7	B	177	B	1	231	E	7		
16	1	0	70	4	6	124	7	C	178	B	2	232	E	8		
17	1	1	71	4	7	125	7	D	179	B	3	233	E	9		
18	1	2	72	4	8	126	7	E	180	B	4	234	E	A		
19	1	3	73	4	9	127	7	F	181	B	5	235	E	B		
20	1	4	74	4	A	128	8	0	182	B	6	236	E	C		
21	1	5	75	4	B	129	8	1	183	B	7	237	E	D		
22	1	6	76	4	C	130	8	2	184	B	8	238	E	E		
23	1	7	77	4	D	131	8	3	185	B	9	239	E	F		
24	1	8	78	4	E	132	8	4	186	B	A	240	F	0		
25	1	9	79	4	F	133	8	5	187	B	B	241	F	1		
26	1	A	80	5	0	134	8	6	188	B	C	242	F	2		
27	1	B	81	5	1	135	8	7	189	B	D	243	F	3		
28	1	C	82	5	2	136	8	8	190	B	E	244	F	4		
29	1	D	83	5	3	137	8	9	191	B	F	245	F	5		
30	1	E	84	5	4	138	8	A	192	C	0	246	F	6		
31	1	F	85	5	5	139	8	B	193	C	1	247	F	7		
32	2	0	86	5	6	140	8	C	194	C	2	248	F	8		
33	2	1	87	5	7	141	8	D	195	C	3	249	F	9		
34	2	2	88	5	8	142	8	E	196	C	4	250	F	A		
35	2	3	89	5	9	143	8	F	197	C	5	251	F	B		
36	2	4	90	5	A	144	9	0	198	C	6	252	F	C		
37	2	5	91	5	B	145	9	1	199	C	7	253	F	D		
38	2	6	92	5	C	146	9	2	200	C	8					
39	2	7	93	5	D	147	9	3	201	C	9					
40	2	8	94	5	E	148	9	4	202	C	A					
41	2	9	95	5	F	149	9	5	203	C	B					
42	2	A	96	6	0	150	9	6	204	C	C					
43	2	B	97	6	1	151	9	7	205	C	D					
44	2	C	98	6	2	152	9	8	206	C	E					
45	2	D	99	6	3	153	9	9	207	C	F					
46	2	E	100	6	4	154	9	A	208	D	0					
47	2	F	101	6	5	155	9	B	209	D	1					
48	3	0	102	6	6	156	9	C	210	D	2					
49	3	1	103	6	7	157	9	D	211	D	3					
50	3	2	104	6	8	158	9	E	212	D	4					
51	3	3	105	6	9	159	9	F	213	D	5					
52	3	4	106	6	A	160	A	0	214	D	6					
53	3	5	107	6	B	161	A	1	215	D	7					

8 LEDS

SmartStix I/O Modules provide diagnostic and status LED indicators.

a. Diagnostic LED Indicators

Diagnostic LED	State	Meaning
MS (indicates fault status of the Module)	Solid Red	RAM or ROM test failed
	Blinking Red	I/O test failed
	Blinking Green	Module is in power-up state
	Solid Green	Module is running normally
NS (indicates fault status of the Network)	Solid Red	Network Ack or Dup ID test failed
	Blinking Red	Network ID test failed
	Blinking Green	Module is in Life Expectancy default state
	Solid Green	Network is running normally

b. Status LED Indicators

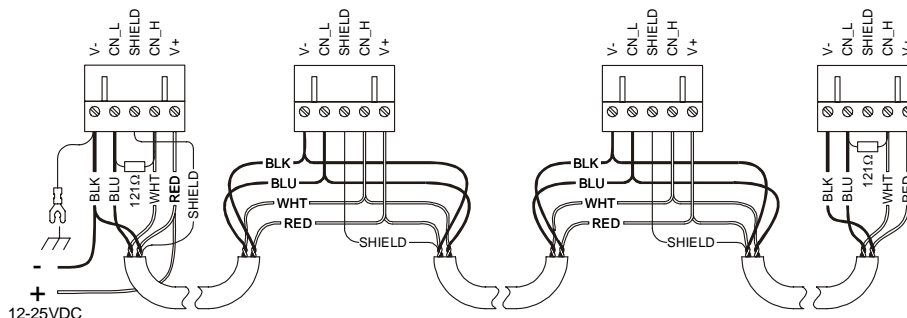
The Power Status LED illuminates Red when power is applied to the module. There are I/O Status LED indicators for each of the Digital I/O points, which illuminate Red when an I/O point is ON.

9 NETWORK CABLE

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.)

Pin	Description
1	V+
2	CAN_H
3	Shield
4	CAN_L
5	V-

Recommended Cable	
Thick: (Max Distance = 500m)	Belden 3082A
Thin: (Max Distance = 100m)	Belden 3084A



CAN Wiring

Note: 12 - 24VDC must be supplied to the network.

10 INSTALLATION / SAFETY

- a. All applicable codes and standards need to be followed in the installation of this product.
- b. For I/O wiring (discrete), use the following wire type or equivalent: Belden 8441 or equivalent.
- c. 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.)



Warning: Consult user documentation.



Warning: Electrical Shock Hazard.

11 ADDITIONAL REFERENCES

The following table indicates the hardware manual numbers for the controller you are using. Hardware manuals contain detailed installation, configuration and other pertinent information. See the **Technical Support** section in this document for the web site address to download references and obtain revised editions.

Additional References	
Controller	Manual Number
QX Series Hardware e.g. HE-QX451, HE-QX551, HE-QX651, HE-QX500	MAN0798
NX Series Hardware e.g. HE-NX220, HE-NX221, HE-NX250, HE-NX251	MAN0781
Operator Control Station Hardware (OCS, OCX) e.g., OCS1XX / 2XX; Graphic QCS250	MAN0227
Remote Control Station Hardware RCS (except RCS116), RCX (e.g., RCS210, RCS250)	
Color Touch QX Hardware e.g., OCS300, OCS 301, OCS 350, OCS 351 e.g., OCS 451, OCS 551, OCS 651	MAN0465
LX Series Hardware e.g., LX-280 / LX-300; RCS116	MAN0755
MiniQX / MiniRCS / MiniOCX / MiniRCX Hardware e.g., HE500QXxxx	MAN0305
Other Useful References	
CAN Networks	MAN0799
Cscape Programming and Reference	MAN0313
DeviceNet™ Implementation	SUP0326
Wiring Accessories and Spare Parts Manual	MAN0347

12 TECHNICAL SUPPORT

For assistance and manual updates, contact Technical Support at the following locations:

North America:

(317) 916-4274

www.heapg.com

email: techspt@heapg.com

Europe:

(+) 353-21-4321-266

www.horner-apg.com

email: techsupport@hornerirl.ie

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