

SmartStix™

User Manual for the CsCAN Versions (HE550 or HE559) of:

- DQM601 DQM606
- DQM701 DQM706
- DIM610 DIM710
- DIQ811 DIQ816
- DQM602

Remote I/O for the OCS/RCS Family

For Electronic Information, see www.HornerOCS.com.

30 August 2006

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1 Technical Support

For user manual updates and technical assistance, contact Technical Support:
North America: (317) 916-4274 **Europe:** (+) 353-21-4321-266
 or visit our website at www.heappg.com or visit our website at www.horner-apg.com.

2 Installation / Safety

- 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.
- For detailed installation and programming information, refer to the Control Station Hardware Manual.



Warning: Consult user documentation.



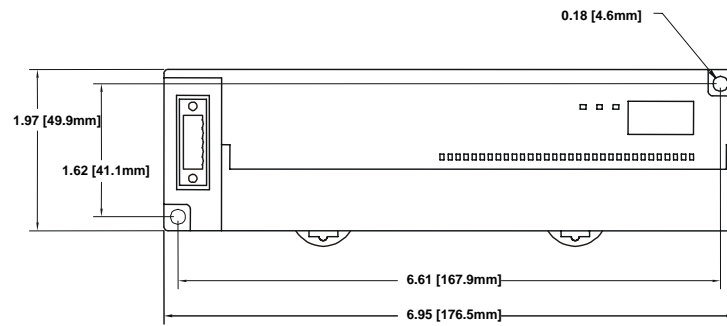
Warning: Electrical Shock Hazard.

3 Model Numbers

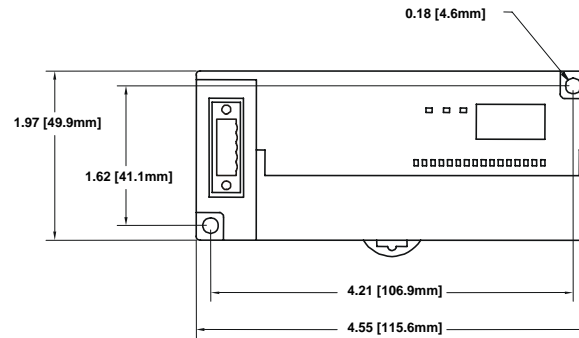
Model Prefix	Description
HE550	CsCAN model with non-removable terminal strip
HE559	CsCAN model with removable terminal strip
Long or Short Dimension	Description
DIM610 (Short)	16 DC Inputs (24VDC, positive/negative logic)
DIM710 (Long)	32 DC Inputs (24VDC, positive/negative logic)
DQM601 / 606* (Short)	16 DC Outputs (24VDC, negative logic, 0.5A) (Note: If using DQM601 with a non-removable terminal strip, the output rating is 0.1A.) (* DQM606 uses positive logic.)
DQM701 / 706** (Long)	32 DC Outputs (24VDC, negative logic, 0.5A) (Note: If using DQM701 with a non-removable terminal strip, the output rating is 0.1A.) (** DQM706 uses positive logic.)
DQM602 (Long)	16 Relay Outputs (250VAC, 30VDC, 2.0A)
DIQ811 / 816*** (Long)	16 DC Inputs (24VDC, positive/negative logic) 16 DC Outputs (24VDC, negative logic, 0.5A) (Note: If using DIQ811 with a non-removable terminal strip, the output rating is 0.1A.) (*** DIQ816 uses positive logic.)

4 Dimensions

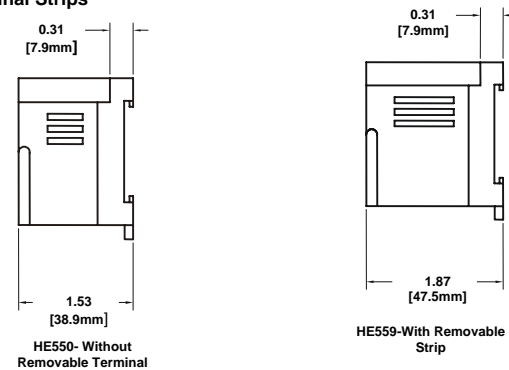
a. Long Dimensions
 SmartStix modules come in two sizes depending upon the model number. See Section 3 to determine if a module has long or short dimensions.



b. Short Dimensions



c. Terminal Strips



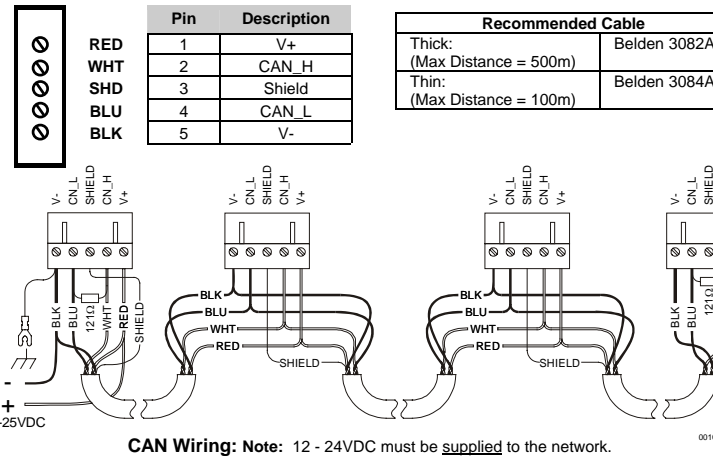
5 General Specifications

General Specifications			
Storage Temperature	-25° to 70° C	Operating and Storage Humidity	5 to 95% Non-condensing
Operating Temperature	0° to 55° C	Pollution degree	2 or lower
Atmosphere	Free from corrosive gases and excessive dust	Cooling method	Self-cooling
Vibration			
Occasional Vibration			
Frequency	Acceleration	Amplitude	Sweep Count
10 ≤ f < 57 Hz	-	0.075 mm	10 times in each direction for X,Y,Z
57 ≤ f ≤ 150 Hz	9.8 m/s ² (1G)	-	
Continuous Vibration			
Frequency	Acceleration	Amplitude	Sweep Count
10 ≤ f < 57 Hz	-	0.035 mm	10 times in each direction for X,Y,Z
57 ≤ f ≤ 150 Hz	4.9 m/s ² (0.5G)	-	

Shocks			
Maximum shock acceleration	147 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: ± 1,500VDC DC: ± 900VDC		
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 (Ue ≥ 24V)	Digital I/Os (Ue < 24 V) Analog I/Os Communication I/Os
Voltage	2 kV	1 kV	0.25 kV

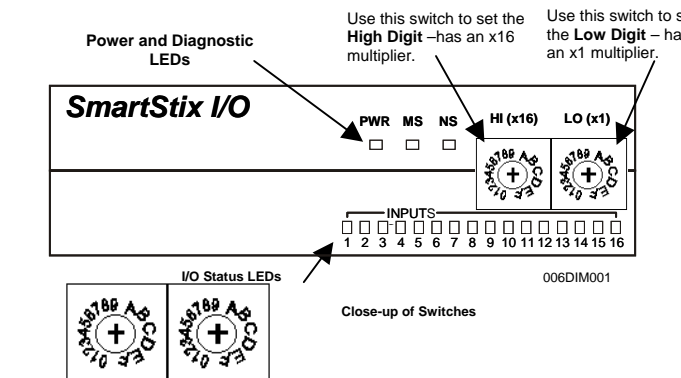
6 Network Cable

For detailed wiring information, refer to the Control Station Hardware Manual. A handy checklist is provided that covers panel box layout requirements and minimum clearances. See Section 1 for our web address.



7 ID Switches (Setting CsCAN Network Ids)

CsCAN Network IDs are set using the hexadecimal number system from 01 to FD. The decimal equivalent is 1-253. Refer to Section 10, 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



8 LEDs

a. Diagnostic LED Indicators

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

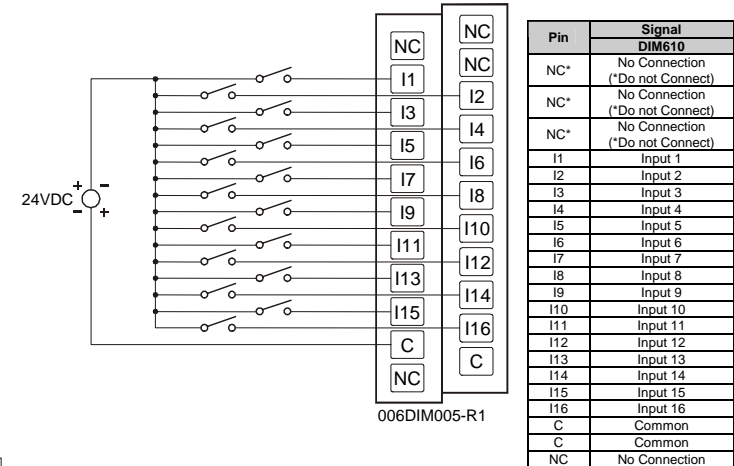
b. Status LED Indicators

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 SmartStix Modules

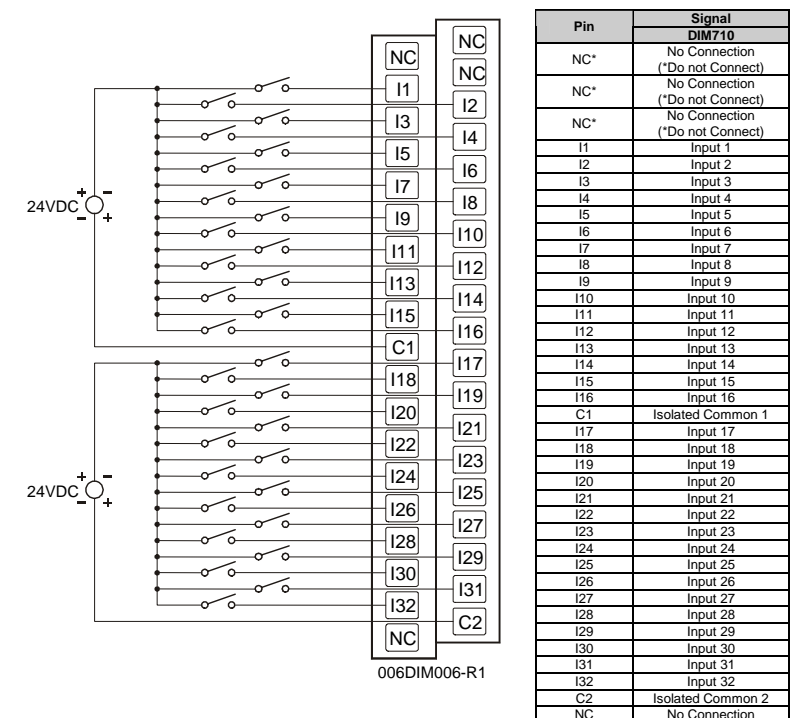
a. DIM610: 16 DC IN, Positive / Negative Logic

DIM610 Specifications			
Number of input points	16	OFF to ON Response	0 - 3ms. or less
Rated Input Current	7mA	ON to OFF Response	0 - 3ms. or less
ON Voltage Level	19VDC or less	Common Terminal	16 points / COM
OFF Voltage Level	6VDC or less	Operating Indicator	LED turns on during ON state of input
Input Characteristics	Bidirectional	External Connections	Terminal block connector (M3 x 6 screws)
Isolation Method	Photo Coupler		
Rated Voltage	11 – 25 VDC	Altitude for use	Up to 2,000m
Internal power Consumption (mA)	200mA	Weight	5.6 oz. (159 g)



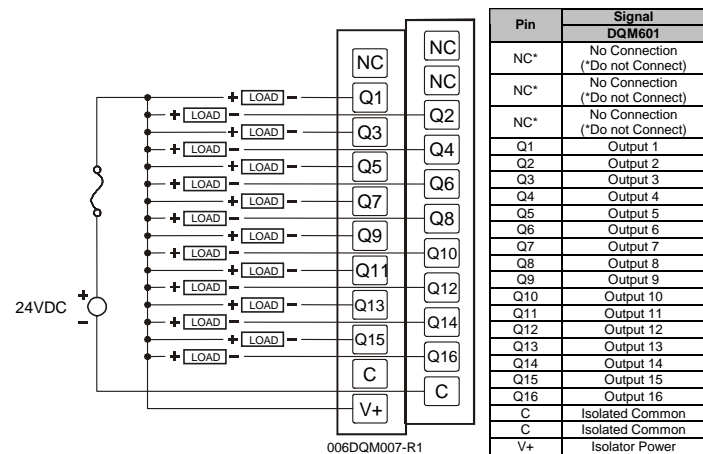
b. DIM710: 32VDC IN, Positive / Negative Logic

DIM710 INPUTS			
Number of input points	32	OFF to ON Response	0 - 3ms. or less
Rated Input Current	7mA	ON to OFF Response	0 - 3ms. or less
ON Voltage Level	19VDC or less	Common Terminal	16 points / COM
OFF Voltage Level	6VDC or less	Operating Indicator	LED turns on during ON state of input
Isolation Method	Photo Coupler	External Connections	Terminal block connector (M3 x 6 screws)
Input Characteristics	Bidirectional		
Rated Voltage	11 – 25 VDC	Weight	8.36oz. (237 g)
Internal power Consumption (mA)	300		

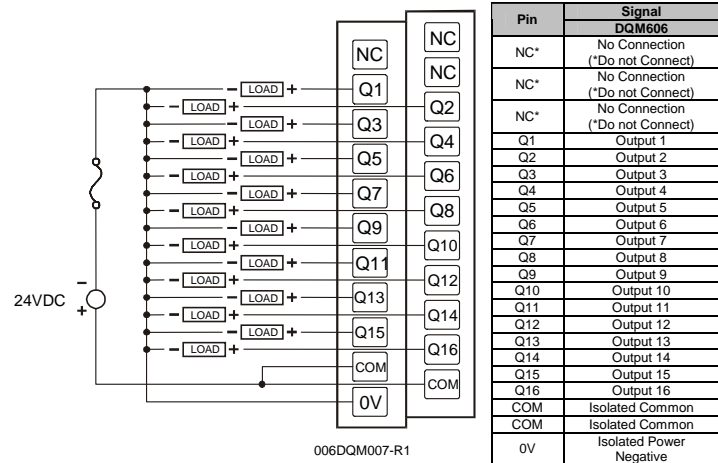


c. DQM601: 16 DC OUT, Negative Logic
DQM606: 16 DC OUT, Positive Logic

DQM601 / DQM606 Outputs		External Power Supply	Voltage	24VDC ± 10% (ripple voltage: 4Vp-p or less)
Number of output points	16			
Commons per Module	1	OFF to ON Response	Current	30mA (TYP, All points ON)
Operating Voltage	24VDC			
Rated Load Voltage	24VDC	ON to OFF Response		2ms.
Max. Load Current per channel	DQM 601A	Output Type	DQM 601	Sinking
	•DQM 601B •DQM 606			0.1A Max. per output 2A per common
OFF Leakage Current	0.1mA or less	Common Method	16 points / COM	LED turns on during ON state of output
Max. Inrush Current per channel	1A, 10ms	External connections	Terminal block connector (M3 x 6 screws)	LED turns on during ON state of output
Maximum Voltage Drop during ON circuit	1.5VDC(0.5A)	Isolation methods	Photo Coupler	Terminal block connector (M3 x 6 screws)
Rated Voltage	11 – 25 VDC			
Internal power Consumption (mA)	DQM 601	Weight	DQM 601	5.7 oz. (161g)
	DQM 606		280	DQM 606



006DQM007-R1



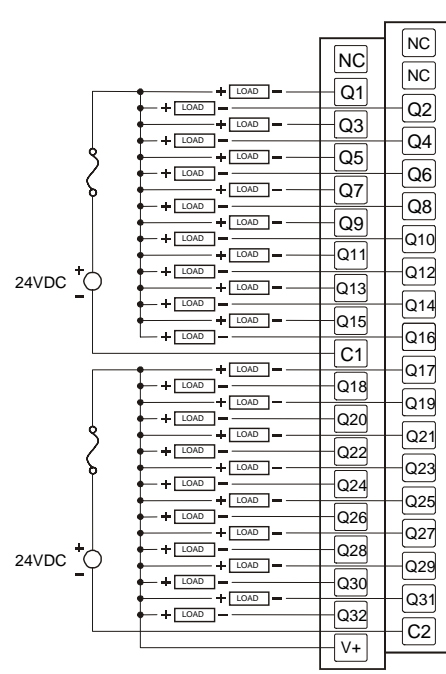
006DQM007-R1

Pin	Signal DQM601
NC*	No Connection ("Do not Connect")
NC*	No Connection ("Do not Connect")
NC*	No Connection ("Do not Connect")
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
Q9	Output 9
Q10	Output 10
Q11	Output 11
Q12	Output 12
Q13	Output 13
Q14	Output 14
Q15	Output 15
Q16	Output 16
C	Isolated Common
C	Isolated Common
V+	Isolator Power

Pin	Signal DQM606
NC*	No Connection ("Do not Connect")
NC*	No Connection ("Do not Connect")
NC*	No Connection ("Do not Connect")
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
Q9	Output 9
Q10	Output 10
Q11	Output 11
Q12	Output 12
Q13	Output 13
Q14	Output 14
Q15	Output 15
Q16	Output 16
COM	Isolated Common
COM	Isolated Common
0V	Isolated Power Negative

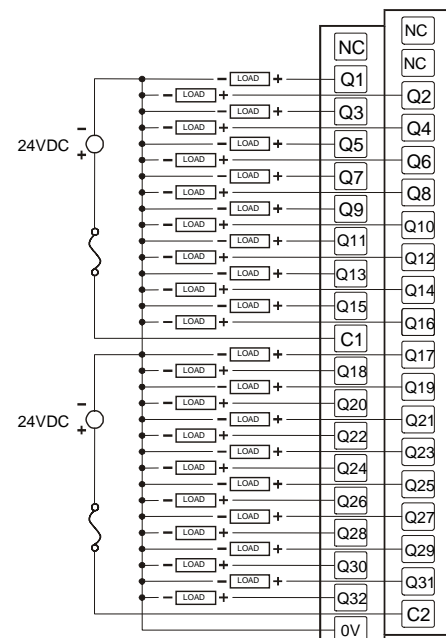
d. DQM701: 32 DC OUT, Negative Logic
DQM706: 32 DC OUT, Positive Logic

DQM701 / 706 Outputs		External Power Supply	Voltage	24VDC ± 10% (ripple voltage: 4Vp-p or less)
Number of output points	32			
Commons per Module	2	OFF to ON Response	Current	30mA (TYP, All points ON)
Operating Voltage	24VDC			
Rated Load Voltage	24VDC	ON to OFF Response		2ms.
Max. Load Current per channel	DQM 701	Output Type	DQM 701	Sinking
	DQM 706			0.1A Max. per output 2A per common
OFF Leakage Current	0.1mA or less	Common Method	16 points / COM	LED turns on during ON state of output
Max. Inrush Current per channel	1A, 10ms	External connections	Terminal block connector (M3 x 6 screws)	LED turns on during ON state of output
Maximum Voltage Drop during ON circuit	1.5VDC(0.5A)	Isolation methods	Photo Coupler	Terminal block connector (M3 x 6 screws)
Rated Voltage	11 – 25 VDC			
Internal power Consumption (mA)	DQM701	Weight	DQM701	8.47 (240g)
	DQM706		340	DQM706



Note: For proper operation, C1 and C2 must be tied together.

Pin	Signal DQM701
NC*	No Connection ("Do not Connect")
NC*	No Connection ("Do not Connect")
NC*	No Connection ("Do not Connect")
Q1	Output 1
Q2	Output 2
Q3	Output 3
Q4	Output 4
Q5	Output 5
Q6	Output 6
Q7	Output 7
Q8	Output 8
Q9	Output 9
Q10	Output 10
Q11	Output 11
Q12	Output 12
Q13	Output 13
Q14	Output 14
Q15	Output 15
Q16	Output 16
C1	Isolated Common 1
Q17	Output 17
Q18	Output 18
Q19	Output 19
Q20	Output 20
Q21	Output 21
Q22	Output 22
Q23	Output 23
Q24	Output 24
Q25	Output 25
Q26	Output 26
Q27	Output 27
Q28	Output 28
Q29	Output 29
Q30	Output 30
Q31	Output 31
Q32	Output 32
C2	Isolated Common 2
V+	Isolator Power

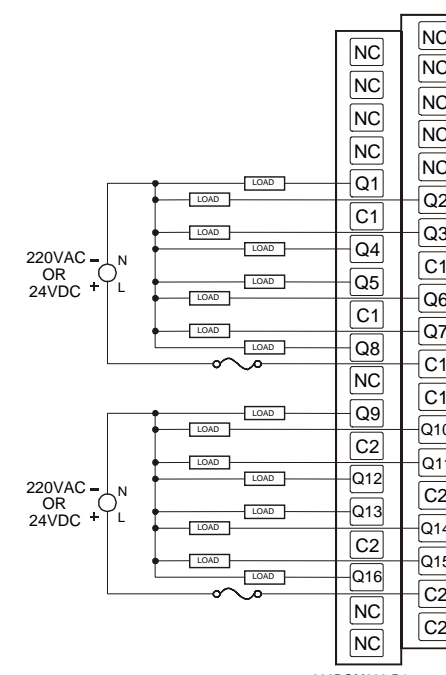


Note: If desired, C1 and C2 can use a single supply.

006DQM008-R2

e. DQM602: 16 RELAY OUTPUTS

DQM602 Relay Outputs		Minimum load voltage / current	5VDC / 1mA
Number of output points	16		
Commons per Module	2	Maximum Load Current (resistive)	2.0A per channel 5.0A per common
Rated Load Voltage	24VDC, 220VAC		
Rated Voltage	11 – 25 VDC	OFF to ON Response	10ms. Max.
		ON to OFF Response	12ms. Max.
Internal power Consumption (mA)	550mA	Output Type	N.O.
		Weight	9.91oz. (281 g)



006DQM008-R1

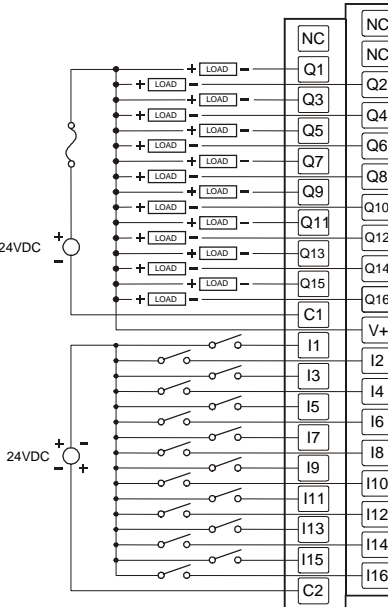
Warning: To protect the module and associated wiring from load faults, use external fuse (5 A) as shown.

Warning: Connecting high voltage to any I/O pin may cause high voltage to appear at other I/O pins.

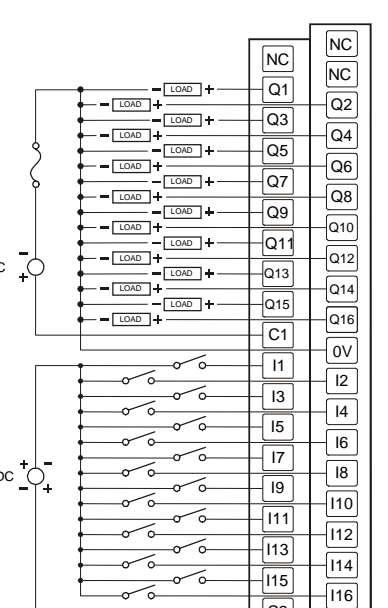
Warning: Wiring the line side of the AC source to loads connected to outputs 0 through 15 and the neutral side of the AC source to the output common(s) would create a Negative Logic condition, which may be considered an unsafe practice.

f. DIQ811: 16 DC IN, Positive/Negative / 16 DC OUT, Negative Logic
DIQ816: 16 DC IN, Positive / 16 DC OUT, Positive Logic

DIQ811 / 816 IN		External Power Supply	Voltage	24VDC ± 10% (ripple voltage: 4Vp-p or less)
Number of input points	16			
Rated Input Current	7mA	OFF to ON Response	Common Terminal	16 points / COM
ON Voltage Level	19VDC or less			
OFF Voltage Level	6VDC or less	Operating Indicator	LED turns on during ON state of input	
Input Characteristics	Bidirectional	External Connections	Terminal block connector (M3 x 6 screws)	
Isolation Method	Photo Coupler			
DIQ811 / 816 OUT		External Power Supply	Voltage	24VDC ± 10% (ripple voltage: 4Vp-p or less)
Number of output points	16			
Commons per Module	1	OFF to ON Response	Current	30mA (TYP, All points ON)
Operating Voltage	24VDC			
Rated Load Voltage	24VDC	ON to OFF Response		2ms.
OFF Leakage Current	0.1mA or less	Common Method	16 points / COM	LED turns on during ON state of output
Rated Voltage	11 – 25 VDC	Max. Inrush Current per channel	0.1A Max. per output 2A per common	0.5A Max. per output 3A per common
Internal power Consumption (mA)	DIQ811	Max. Load Current per channel	0.1A Max. per output 2A per common	0.5A Max. per output 3A per common
	300			
Common Method	16 points / COM	Output Type	Sinking	Sourcing



006DIQ003-R1

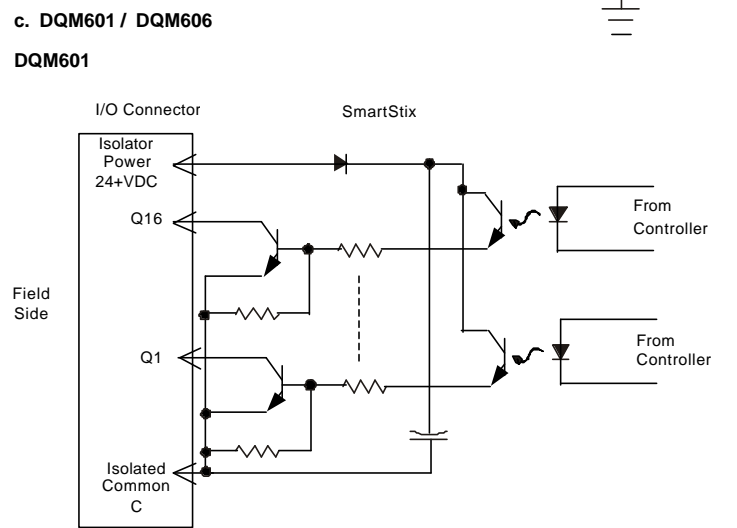
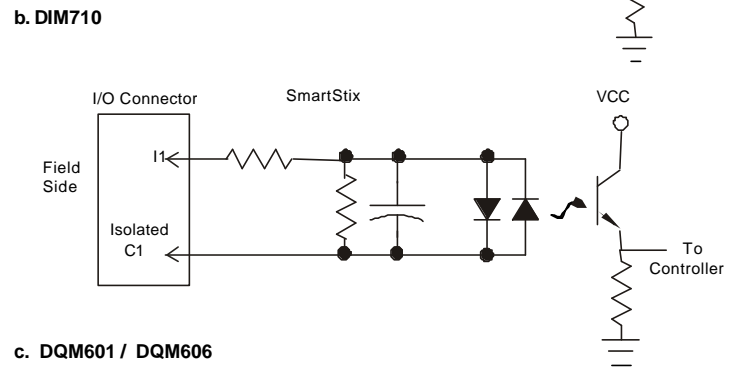
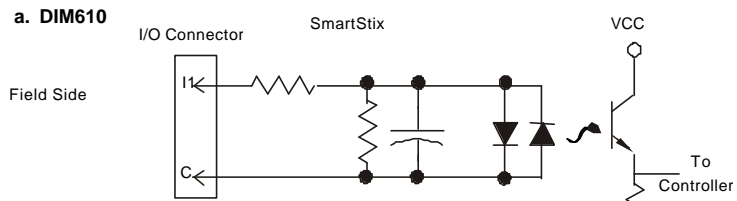


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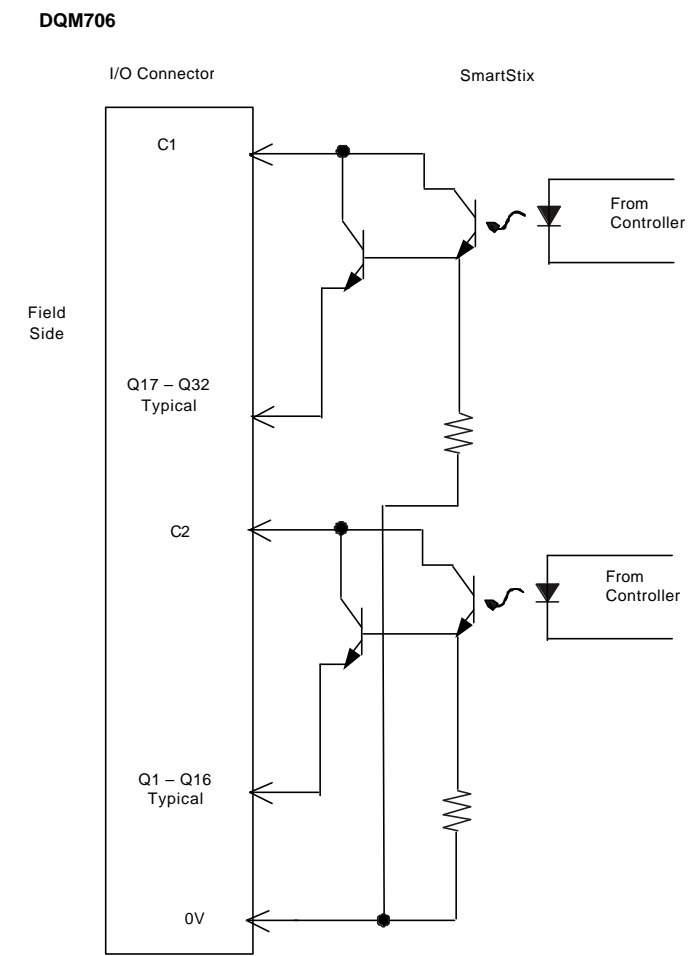
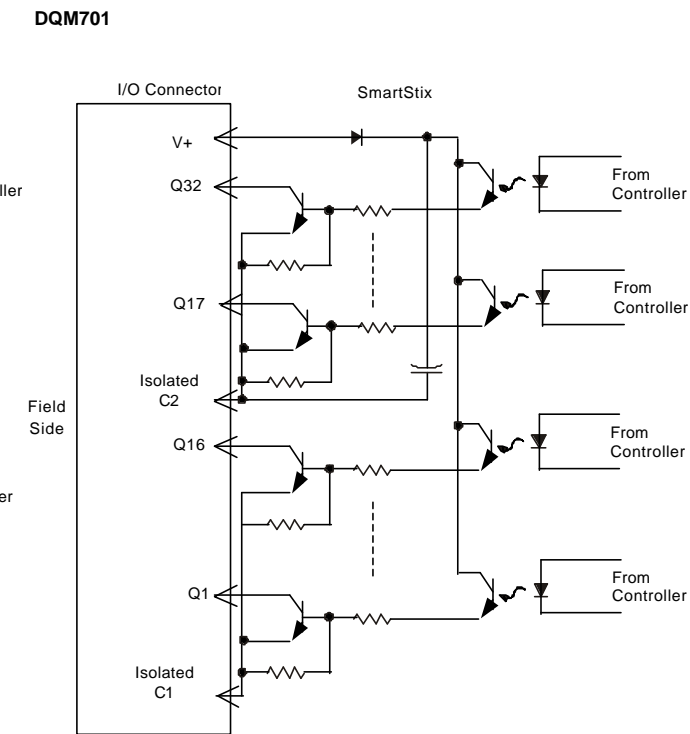
Pin	Signal DIQ811
NC*	No Connection ("Do not Connect")
NC*	No Connection ("Do not Connect")
Q1	Output 1
Q3	Output 3
Q5	Output 5
Q7	Output 7
Q9	Output 9
Q11	Output 11
Q13	Output 13
Q15	Output 15
C1	Isolated Common
I1	Input 1
I3	Input 3
I5	Input 5
I7	Input 7
I9	Input 9
I11	Input 11
I13	Input 13
I15	Input 15
C2	Isolated Common

Pin	Signal DIQ816
NC*	No Connection ("Do not Connect")
NC*	No Connection ("Do not Connect")
Q1	Output 1
Q3	Output 3
Q5	Output 5
Q7	Output 7
Q9	Output 9
Q11	Output 11
Q13	Output 13
Q15	Output 15
C1	Isolated Common Power
I1	Input 1
I3	Input 3
I5	Input 5
I7	Input 7
I9	Input 9
I11	Input 11
I13	Input 13
I15	Input 15
C2	Isolated Common

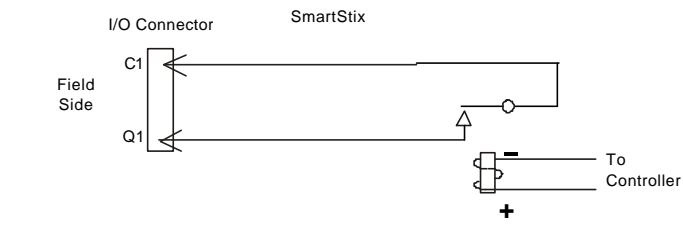
10 Internal Wiring



d. DQM701 / DQM706



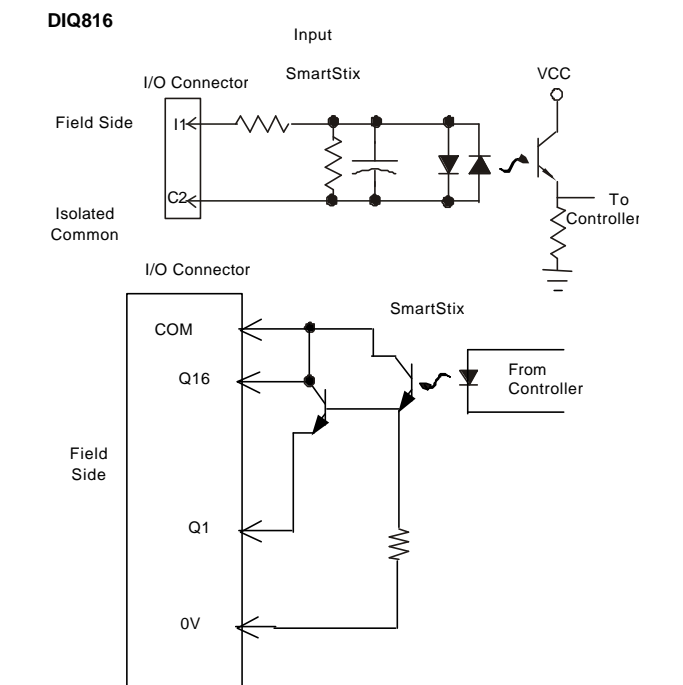
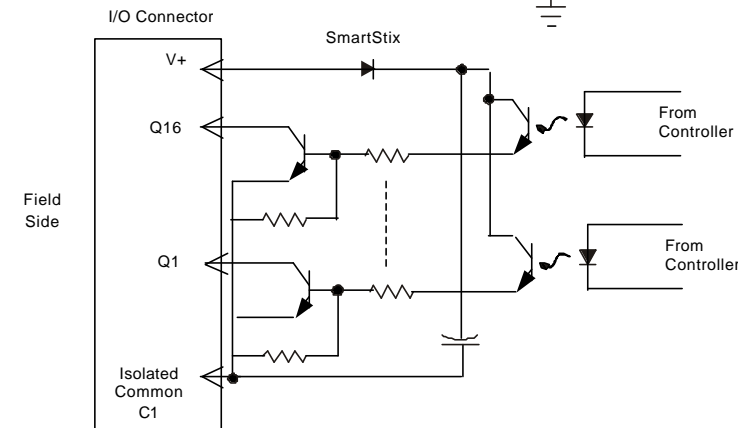
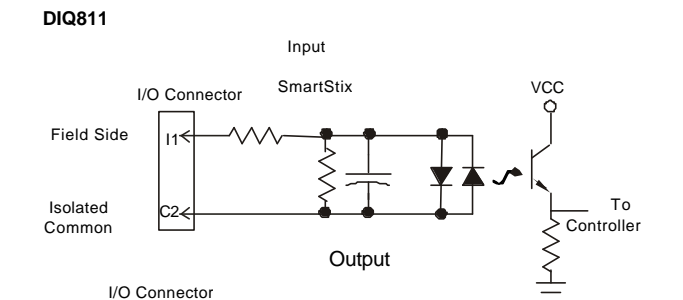
e. DQM602



Specification for transient voltage suppressors (transorbs) used on output circuitry is 400VDC, bi-directional 400 watts.

Electro-mechanical relays comply with IEC1131-2.

f. DIQ811 / DIQ816



Decimal (Dec) to Hexadecimal (Hex) Conversion Table

Dec	Hex		Dec	Hex		Dec	Hex	
	HI	LO		HI	LO		HI	LO
0	0	0	86	5	6	172	A	C
1	0	1	87	5	7	173	A	D
2	0	2	88	5	8	174	A	E
3	0	3	89	5	9	175	A	F
4	0	4	90	5	A	176	B	0
5	0	5	91	5	B	177	B	1
6	0	6	92	5	C	178	B	2
7	0	7	93	5	D	179	B	3
8	0	8	94	5	E	180	B	4
9	0	9	95	5	F	181	B	5
10	0	A	96	6	0	182	B	6
11	0	B	97	6	1	183	B	7
12	0	C	98	6	2	184	B	8
13	0	D	99	6	3	185	B	9
14	0	E	100	6	4	186	B	A
15	0	F	101	6	5	187	B	B
16	1	0	102	6	6	188	B	C
17	1	1	103	6	7	189	B	D
18	1	2	104	6	8	190	B	E
19	1	3	105	6	9	191	B	F
20	1	4	106	6	A	192	C	0
21	1	5	107	6	B	193	C	1
22	1	6	108	6	C	194	C	2
23	1	7	109	6	D	195	C	3
24	1	8	110	6	E	196	C	4
25	1	9	111	6	F	197	C	5
26	1	A	112	7	0	198	C	6
27	1	B	113	7	1	199	C	7
28	1	C	114	7	2	200	C	8
29	1	D	115	7	3	201	C	9
30	1	E	116	7	4	202	C	A
31	1	F	117	7	5	203	C	B
32	2	0	118	7	6	204	C	C
33	2	1	119	7	7	205	C	D
34	2	2	120	7	8	206	C	E
35	2	3	121	7	9	207	C	F
36	2	4	122	7	A	208	D	0
37	2	5	123	7	B	209	D	1
38	2	6	124	7	C	210	D	2
39	2	7	125	7	D	211	D	3
40	2	8	126	7	E	212	D	4
41	2	9	127	7	F	213	D	5
42	2	A	128	8	0	214	D	6
43	2	B	129	8	1	215	D	7
44	2	C	130	8	2	216	D	8
45	2	D	131	8	3	217	D	9
46	2	E	132	8	4	218	D	A
47	2	F	133	8	5	219	D	B
48	3	0	134	8	6	220	D	C
49	3	1	135	8	7	221	D	D
50	3	2	136	8	8	222	D	E
51	3	3	137	8	9	223	D	F
52	3	4	138	8	A	224	E	0
53	3	5	139	8	B	225	E	1
54	3	6	140	8	C	226	E	2
55	3	7	141	8	D	227	E	3
56	3	8	142	8	E	228	E	4
57	3	9	143	8	F	229	E	5
58	3	A	144	9	0	230	E	6
59	3	B	145	9	1	231	E	7
60	3	C	146	9	2	232	E	8
61	3	D	147	9	3	233	E	9
62	3	E	148	9	4	234	E	A
63	3	F	149	9	5	235	E	B
64	4	0	150	9	6	236	E	C
65	4	1	151	9	7	237	E	D
66	4	2	152	9	8	238	E	E
67	4	3	153	9	9	239	E	F
68	4	4	154	9	A	240	F	0
69	4	5	155	9	B	241	F	1
70	4	6	156	9	C	242	F	2
71	4	7	157	9	D	243	F	3
72	4	8	158	9	E	244	F	4
73	4	9	159	9	F	245	F	5
74	4	A	160	A	0	246	F	6
75	4	B	161	A	1	247	F	7
76	4	C	162	A	2	248	F	8
77	4	D	163	A	3	249	F	9
78	4	E	164	A	4	250	F	A
79	4	F	165	A	5	251	F	B
80	5	0	166	A	6	252	F	C
81	5	1	167	A	7	253	F	D
82	5	2	168	A	8	254	F	E
83	5	3	169	A	9	255	F	F
84	5	4	170	A	A			
85	5	5	171	A	B			