

SmartStix™

User Manual for the DeviceNet Versions (HE400 or HE409) of:

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

Remote I/O

For Electronic Information and EDS File, see www.SmartStix.com.

28 August 2006

MAN0522-08

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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.heapg.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 www.odva.org. This product has a Programmer's Reference (SUP0552).



Warning: Consult user documentation.



Warning: Electrical Shock Hazard.

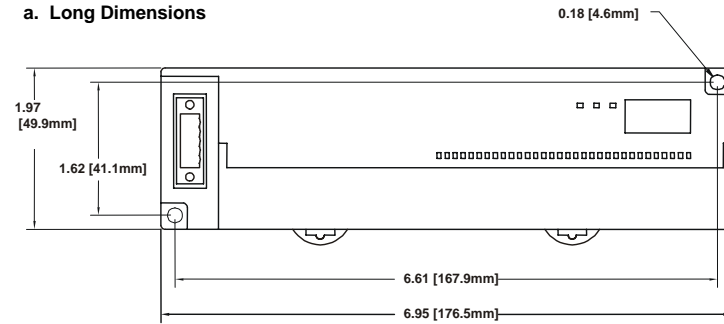
3 Model Numbers

Model Prefix	Description
HE400	DeviceNet model with non-removable terminal strip
HE409	DeviceNet 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.)

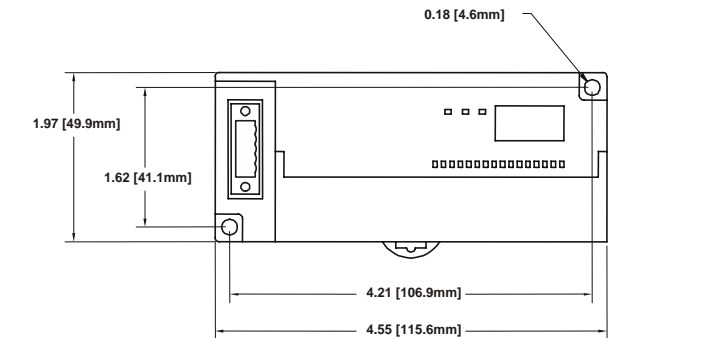
4 Dimensions

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

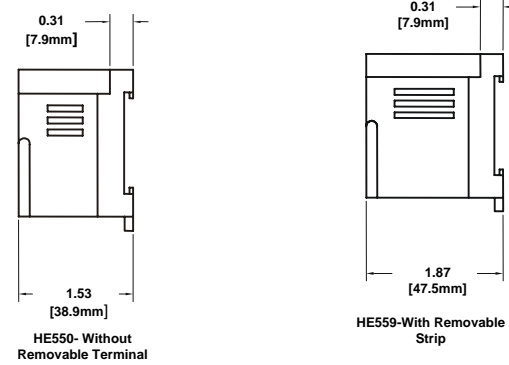
a. Long Dimensions



b. Short Dimensions



c. Terminal Strips



5 Electronic Data Sheet (ESD File)

The ESD file for the SmartStix DeviceNet I/O Block can be retrieved from the Internet at www.SmartStix.com.

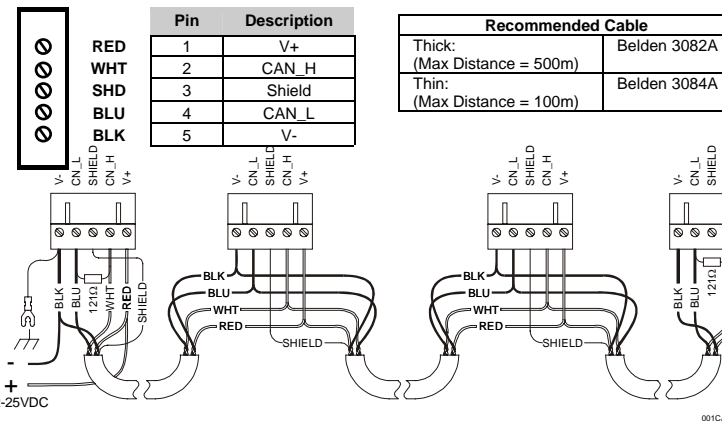
6 General Specifications

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

7 Network Cable

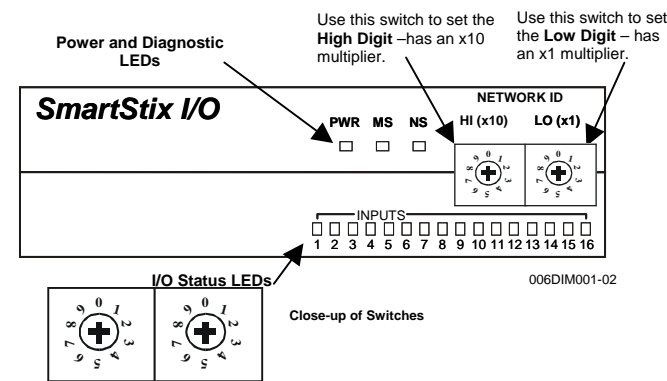
For detailed wiring information, refer to the Control Station Hardware Manual. A handy checklist is provided that covers panel box layout requirements and minimum clearances. See Section 1 for our web address.



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

8 ID Switches

DeviceNet MAC IDs are set using the decimal number system from 0 to 63. Set a unique ID by inserting a small Phillips screwdriver into the two identical switches.



9 LEDs

The Communication LEDs display the status of the communication module.

Communication LED	Meaning
PWR	Displays status of power
MS	Displays the status of interface between communication module and CPU module
NS	Displays the status of the network of communication module

10 DeviceNet Messaging

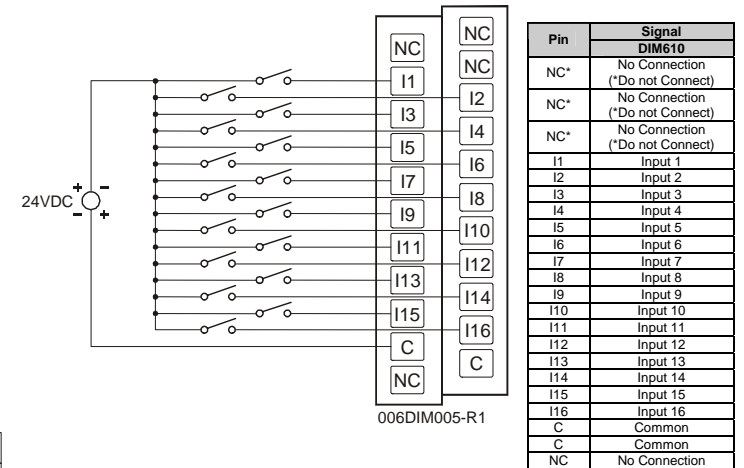
The SmartStix I/O block is considered a Group 2 Only device. It supports the Polled Connection and features an I/O Assembly of the following sizes:

	DIM610	DQM601	DIM710	DQM701	DQM602	DIQ811
Produced Bytes	2	0	4	0	0	2
Consumed Bytes	0	2	0	4	2	2

11 SmartStix Modules

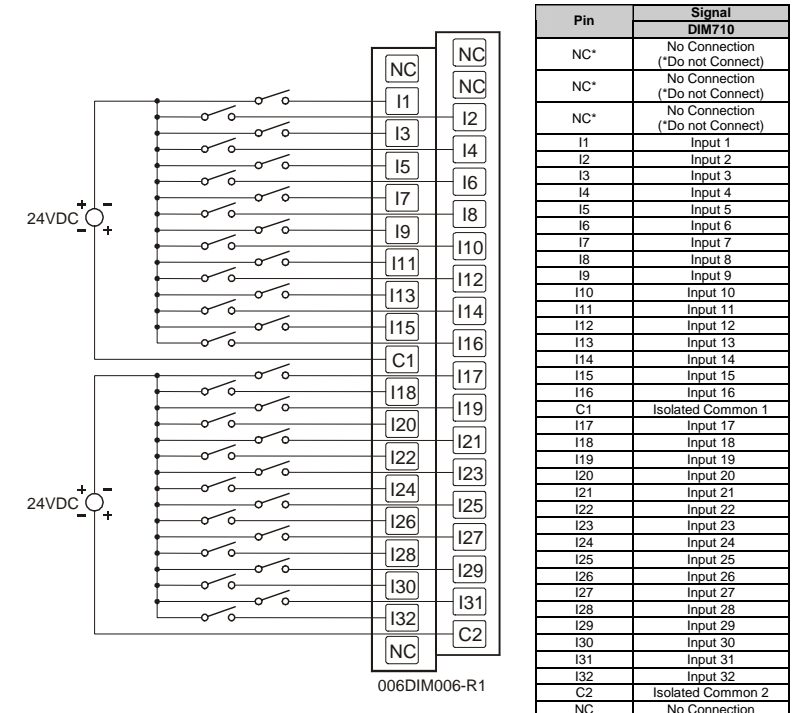
a. DIM610: 16 DC IN, Positive / Negative Logic

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
Rated Voltage	11 – 25 VDC	Altitude for use	Up to 2,000m
Internal power Consumption (mA)	200mA	Weight	5.6 oz. (159 g)



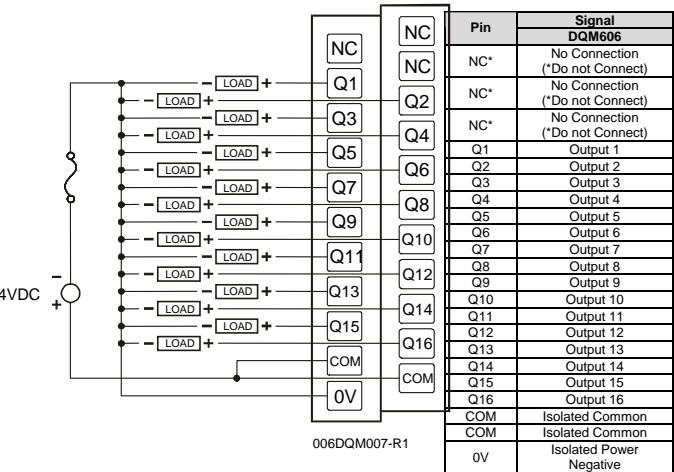
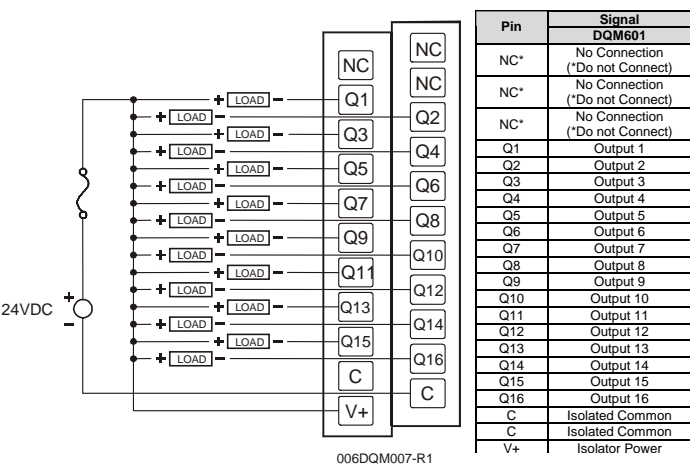
b. DIM710: 32VDC IN, Positive / Negative Logic

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
Rated Voltage	11 – 25 VDC	Internal power Consumption (mA)	300
Weight	8.36oz. (237 g)		



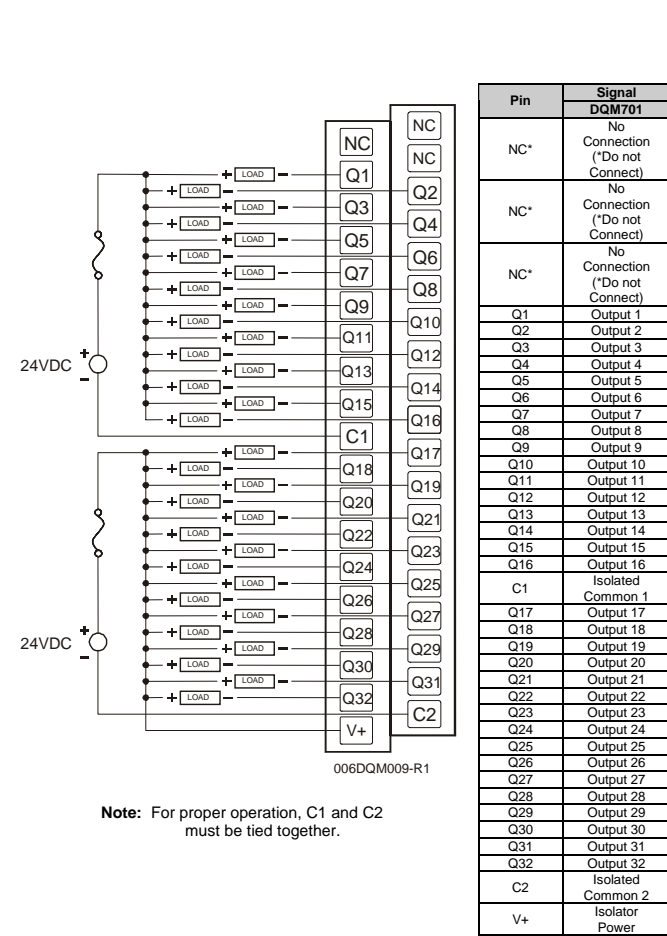
c. **DQM601: 16 DC OUT, Negative Logic**
DQM606: 16 DC OUT, Positive Logic

DQM601 / DQM606 Outputs				
Number of output points	16	External Power Supply	Voltage	24VDC ± 10% (ripple voltage: 4Vp-p or less)
Commons per Module	1		Current	30mA (TYP, All points ON)
Operating Voltage	24VDC	OFF to ON Response	2ms.	
Rated Load Voltage	24VDC	ON to OFF Response	2ms.	
Max. Load Current per channel	DQM 601A	Output Type	DQM 601	Sinking
	•DQM601B •DQM606		DQM 606	Sourcing
OFF Leakage Current	0.1mA or less	Common Method	16 points / COM	
Max. Inrush Current per channel	DQM 601	Operating Indicator	LED turns on during ON state of output	
	DQM 606		External connections	Terminal block connector (M3 x 6 screws)
Maximum Voltage Drop during ON circuit	1.5VDC (0.5A)	Isolation methods		Photo Coupler
Rated Voltage	11 – 25 V	Weight	DQM601	5.7 oz. (161g)
Internal power Consumption (mA)	280		DQM606	6.7 oz. (191g)

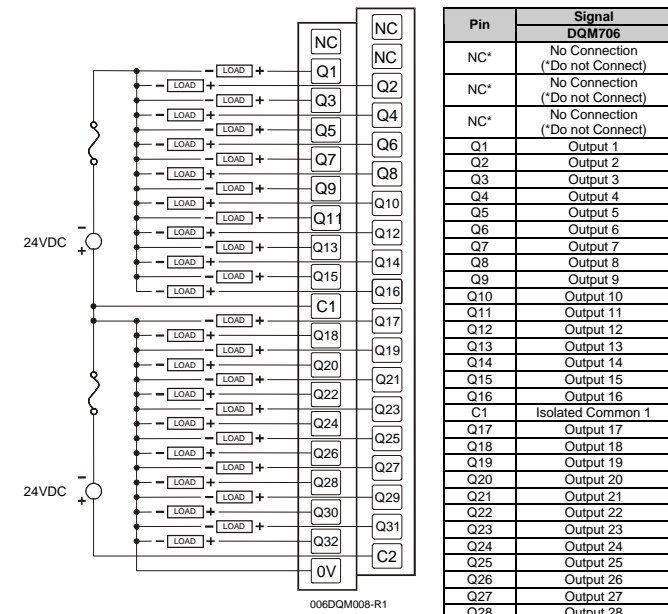


d. **DQM701: 32 DC OUT, Negative Logic**
DQM706: 32 DC OUT, Positive Logic

DQM701 / 706 Outputs						
Number of output points	32	External Power Supply	Voltage	24VDC ± 10% (ripple voltage: 4Vp-p or less)	Current	30mA (TYP, All points ON)
Commons per Module	2		OFF to ON Response	2ms.		
Operating Voltage	24VDC	ON to OFF Response	2ms.		Output Type	DQM 701
Rated Load Voltage	24VDC	ON to OFF Response	2ms.			DQM 706
Max. Load Current per channel	DQM 701	Output Type	DQM 701	Sinking		
	DQM 706		DQM 706	Sourcing		
OFF Leakage Current	0.1mA or less	Common Method	16 points / COM			
Max. Inrush Current per channel	DQM 701	Operating Indicator	LED turns on during ON state of output			
	DQM 706		External connections	Terminal block connector (M3 x 6 screws)		
Maximum Voltage Drop during ON circuit	1.5VDC (0.5A)	Isolation methods		Photo Coupler		
Rated Voltage	11 – 25 VDC	Weight	DQM701	380	DQM701	8.47 (240g)
Internal power Consumption (mA)	340		DQM706	340	DQM706	10.22 (290g)



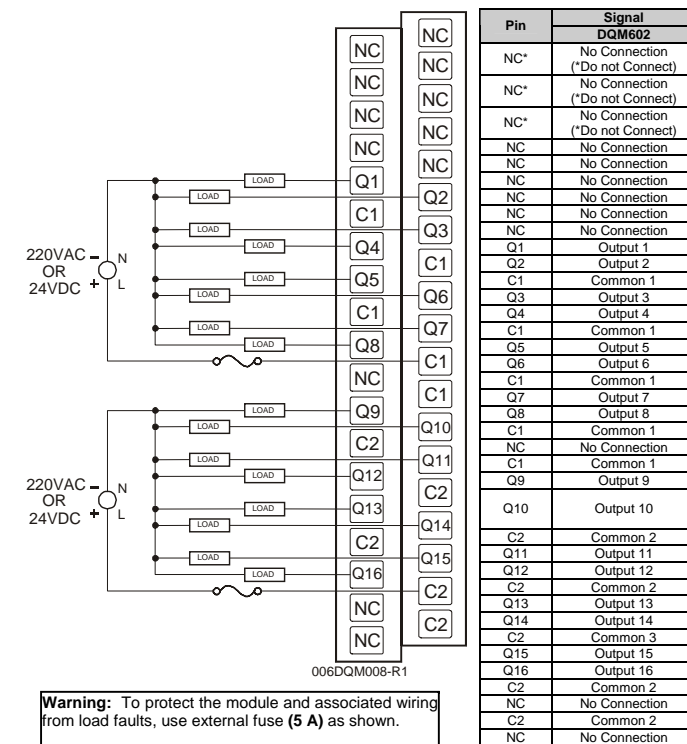
Note: For proper operation, C1 and C2 must be tied together.



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

e. **DQM602: 16 RELAY OUTPUTS**

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



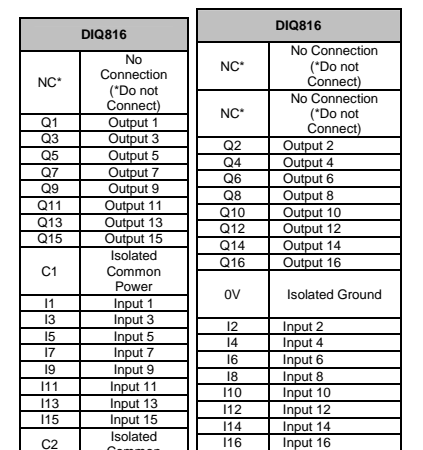
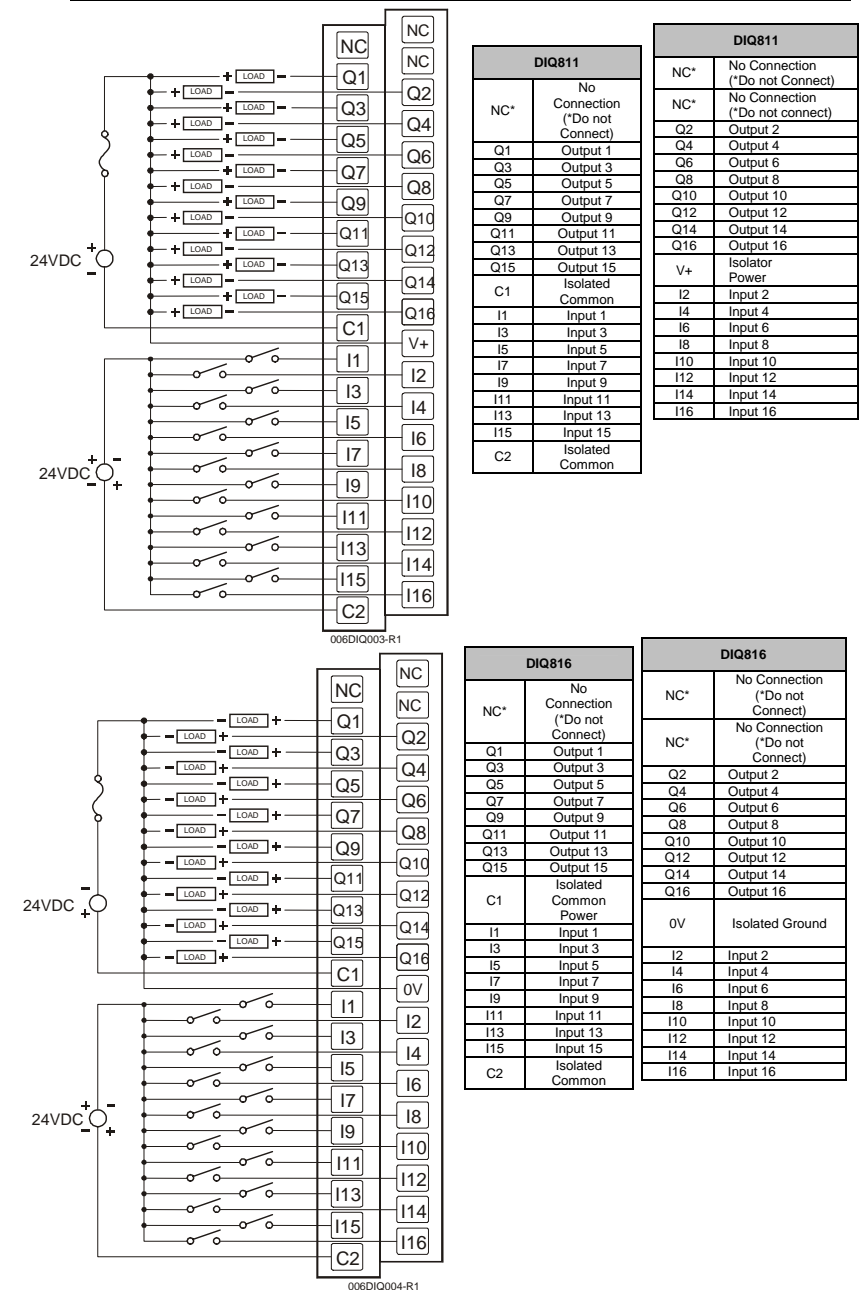
Warning: To protect the module and associated wiring from load faults, use external fuse (5 A) as shown.

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.

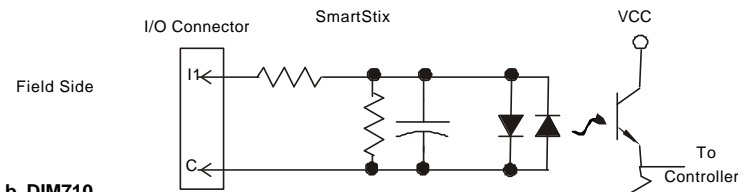
f. **DIQ811: 16 DC IN, Positive/Negative / 16 DC OUT, Negative Logic**
DIQ816: 16 DC IN, Positive / 16 DC OUT, Positive Logic

DIQ811 / 816 IN				
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			
DIQ811 / 816 OUT				
Number of output points	16	External Power Supply	Voltage	24VDC ± 10% (ripple voltage: 4Vp-p or less)
Commons per Module	1		Current	30mA (TYP, All points ON)
Operating Voltage	24VDC	OFF to ON Response	2ms.	
Rated Load Voltage	24VDC	ON to OFF Response	2ms.	
Max. Load Current per channel	Output Type	DIQ811	Sinking	
		DIQ816	Sourcing	
Max. Inrush Current per channel	DIQ816	DIQ811	0.4A, 10ms.	
		DIQ816	1A, 10ms	
OFF Leakage Current	0.1mA or less	Common Method	16 points / COM	
Rated Voltage	11 – 25 VDC	Weight	DIQ811	8.40 oz. (238 g)
Internal power Consumption (mA)	300		DIQ816	10.16 oz. (288 g)

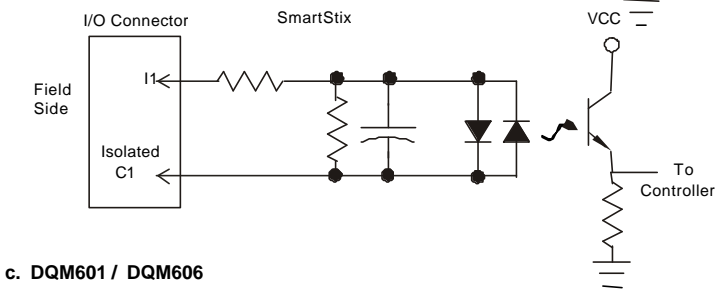


12 Internal Wiring

a. DIM610

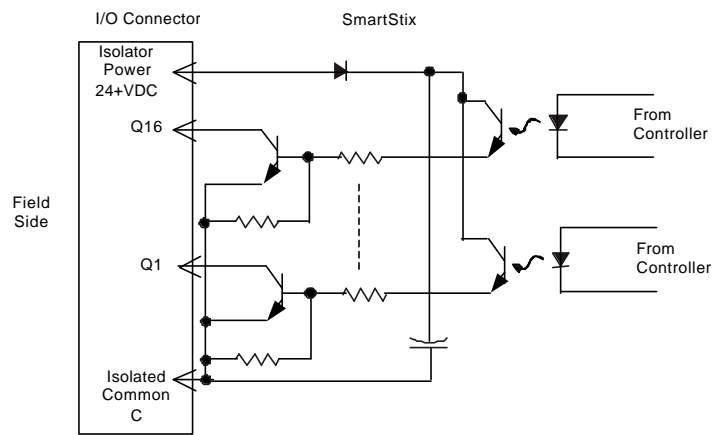


b. DIM710

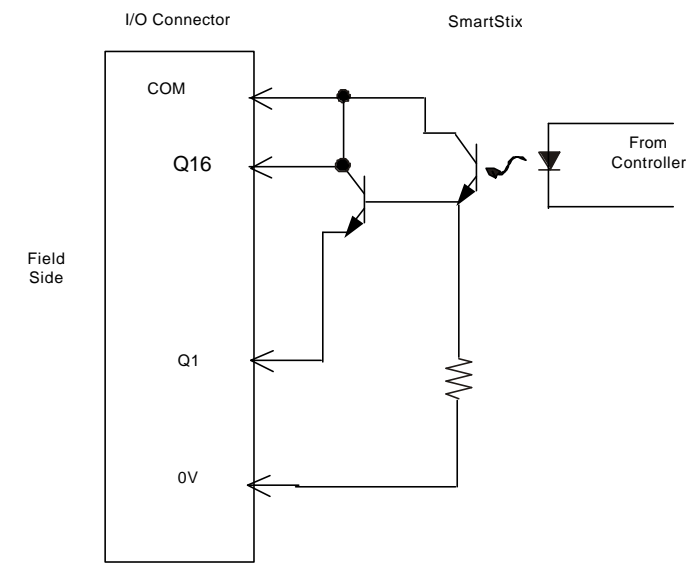


c. DQM601 / DQM606

DQM601

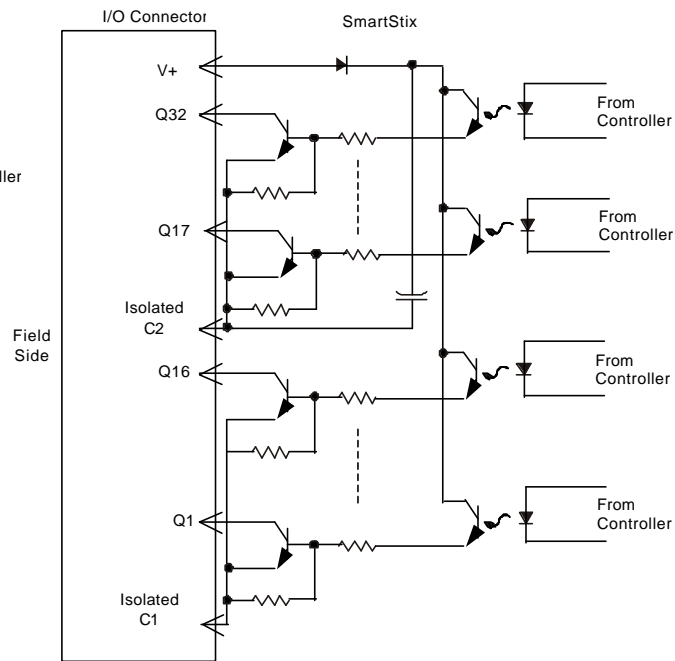


DQM606

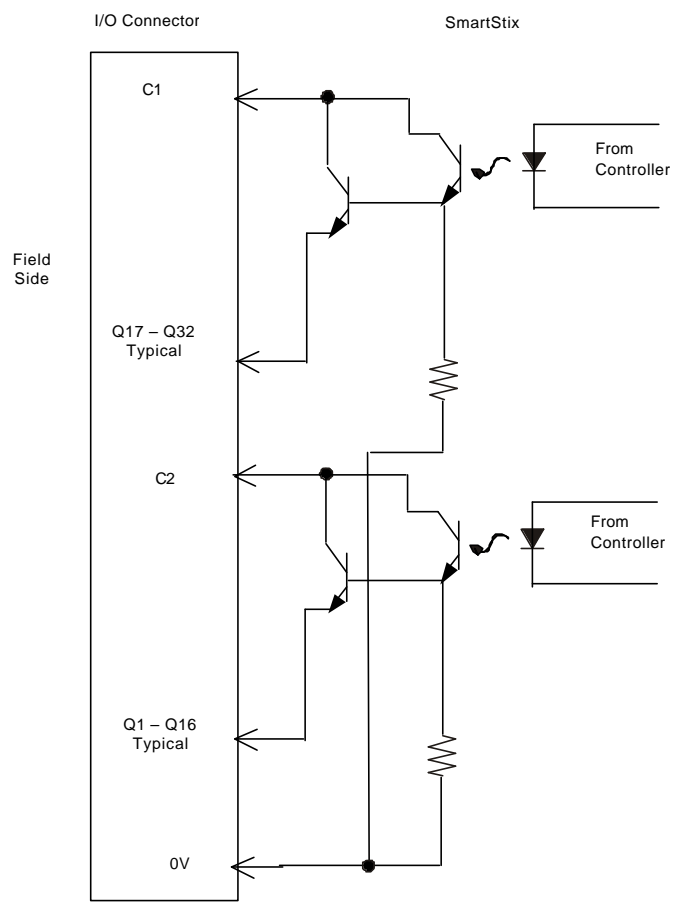


d. DQM701 / DQM706

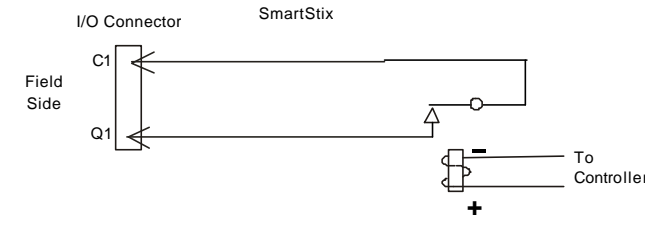
DQM701



DQM706



e. DQM602

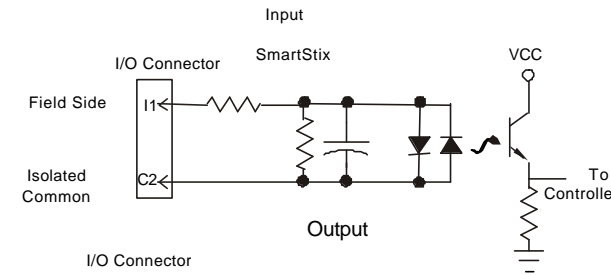


Specification for transient voltage suppressors (transorbs) used on output circuitry is 400VDC, bi-directional 400 watts.

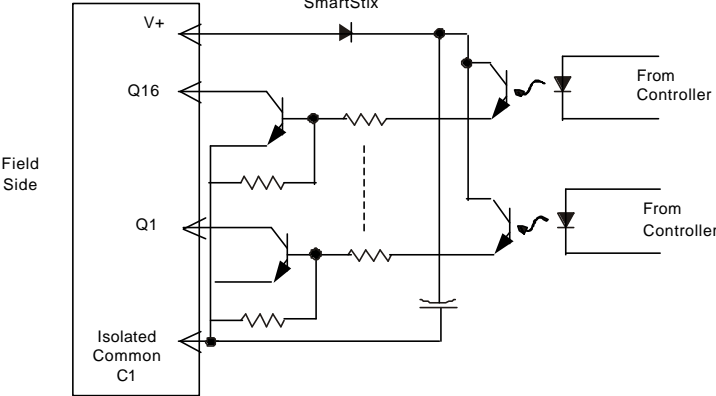
Electro-mechanical relays comply with IEC1131-2.

f. DIQ811 / DIQ816

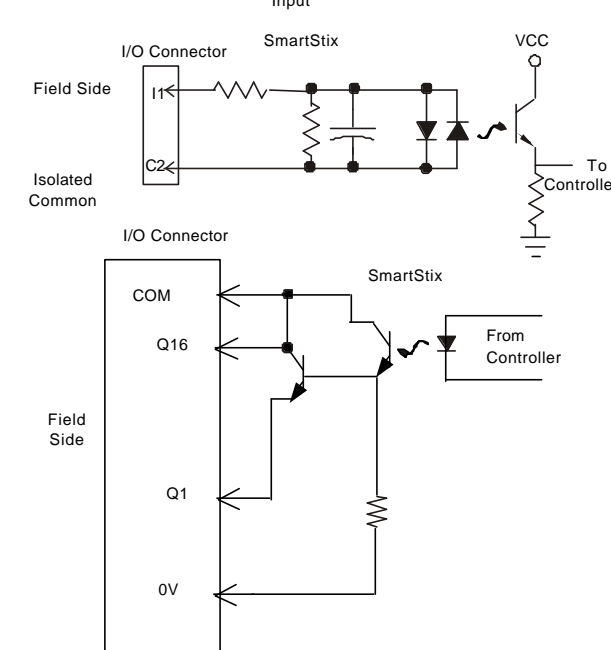
DIQ811



DIQ816



DIQ816



13. Decimal (Dec) to Hexadecimal (Hex) Conversion Table

Dec	Hex		Dec	Hex	
	HI	LO		HI	LO
0	0	0	33	2	1
1	0	1	34	2	2
2	0	2	35	2	3
3	0	3	36	2	4
4	0	4	37	2	5
5	0	5	38	2	6
6	0	6	39	2	7
7	0	7	40	2	8
8	0	8	41	2	9
9	0	9	42	2	A
10	0	A	43	2	B
11	0	B	44	2	C
12	0	C	45	2	D
13	0	D	46	2	E
14	0	E	47	2	F
15	0	F	48	3	0
16	1	0	49	3	1
17	1	1	50	3	2
18	1	2	51	3	3
19	1	3	52	3	4
20	1	4	53	3	5
21	1	5	54	3	6
22	1	6	55	3	7
23	1	7	56	3	8
24	1	8	57	3	9
25	1	9	58	3	A
26	1	A	59	3	B
27	1	B	60	3	C
28	1	C	61	3	D
29	1	D	62	3	E
30	1	E	63	3	F
31	1	F			
32	2	0			