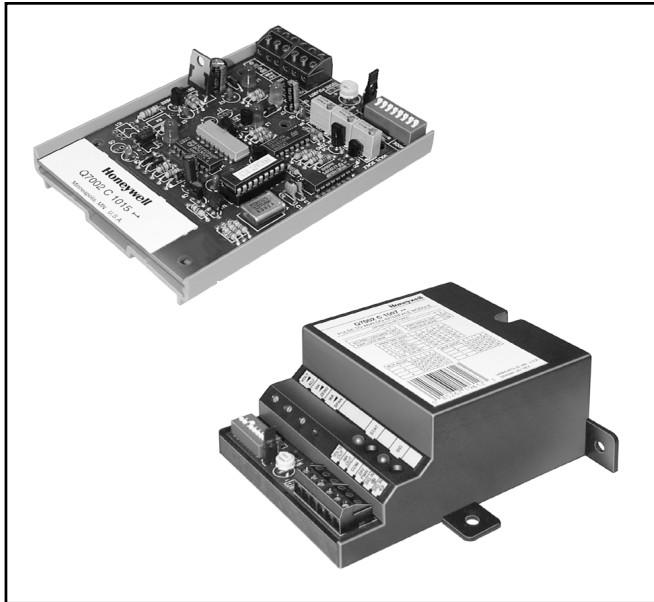


## Q7002A,B,C Interface Modules

### PRODUCT DATA



### FEATURES

- Available with either enclosure or snap-track mount.
- 24 Vac or 24 Vdc power.

#### Q7002A Economizer Interface Module

- Accepts the economizer signal from a W7100 or W973.
- Provides an spdt relay output to an Economizer Logic Module (for example: W6215, W7215, and W7460).
- Includes LED indication of relay status.

#### Q7002B Universal Analog Interface Module

- Accepts dc voltage, current, or resistive input.
- Provides either a voltage or current output for an actuator.
- Inputs and outputs are jumper-selectable and include adjustable zero and span.
- Output is jumper-selectable direct- or reverse-acting.
- Includes reference voltage and current to power an input device or sensor.

#### Q7002C Pulse-to-Analog Interface Module

- Accepts a pulse-width modulation (PWM) signal.
- User-selectable PWM time base.
- Positive or negative input reference.
- All ranges have 255-step resolution.
- Provides an analog output (either voltage or current) for an actuator.
- Six-hour memory.
- Multiplex mode enables one PWM signal from a Building Automation System (BAS) controller to address and control up to eight interface modules.
- Inputs and outputs are jumper-selectable and include adjustable zero and span.

### APPLICATION

The Q7002 Interface Modules allow controllers with an otherwise incompatible signal to control an Economizer Logic Module or Direct Coupled Actuator.

### Contents

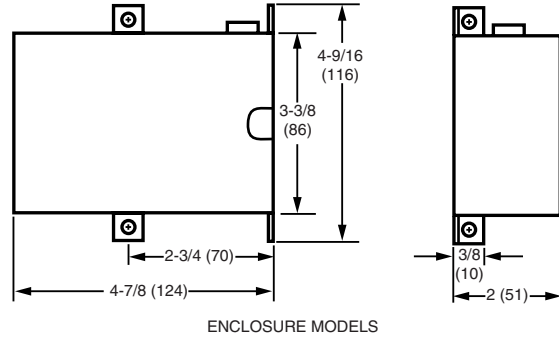
Application .....	1
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## SPECIFICATIONS

### Models:

- Economizer Interface Modules:
  - Q7002A1001 with enclosure.
  - Q7002A1019 with track mount.
- Universal Analog Interface Modules:
  - Q7002B1009 with enclosure.
  - Q7002B1017 with track mount.
- Pulse-to-Analog Interface Modules:
  - Q7002C1007 with enclosure.
  - Q7002C1015 with track mount.



### Dimensions:

See Fig. 1.

### Approval Ratings:

Enclosure Models: NEMA 1.

## Q7002A Economizer Interface Module

### Electrical Ratings:

- Supply Voltage:
  - 24 Vac  $\pm 10\%$ .
  - 24 Vdc  $\pm 10\%$ .
- Input Impedance: 10K ohm.
- Output: 30 Vac, 5A spdt relay.

### Signal Input:

W7100 or W973 Zone Control Panel economizer output.

### Accuracy:

$\pm 1\%$  of span.

### Relay Differential:

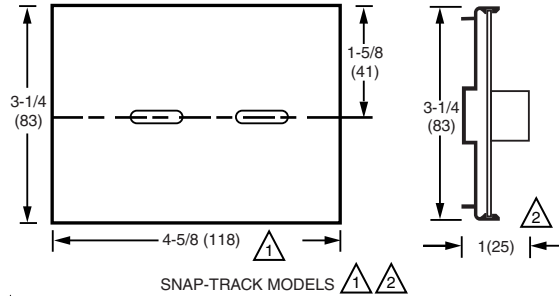
0.19 Vdc.

### Ambient Ratings:

- Temperature Range:  $-40^{\circ}\text{F}$  to  $158^{\circ}\text{F}$  ( $-40^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ ).
- Humidity Range: 5% to 95% RH (noncondensing).

### Weight:

6 oz (0.18 kg).



- 1 THE Q7002A SNAP-TRACK MEASURES 3-1/2 (89) ON THIS DIMENSION.
  - 2 THE Q7002A SNAP-TRACK MEASURES 1-3/8 (35) ON THIS DIMENSION.
- M13266

Fig. 1. Q7002 Interface Module dimensions in in. (mm).

## Q7002B Universal Analog Interface Module

### Electrical Ratings:

- Supply Voltage:
  - 24 Vac  $\pm 10\%$ .
  - 24 Vdc  $\pm 10\%$ .
- Input: See Table 1.
- Input Impedance: See Table 1.
- Output: 0-18 Vdc or 0-20 mA (adjustable).

### Accuracy:

$\pm 1\%$  of span.

## ORDERING INFORMATION

When purchasing replacement and modernization products from your TRADELINE® wholesaler or distributor, refer to the TRADELINE® Catalog or price sheets for complete ordering number.

If you have additional questions, need further information, or would like to comment on our products or services, please write or phone:

1. Your local Home and Building Control Sales Office (check white pages of your phone directory).
2. Home and Building Control Customer Logistics  
Honeywell, 1885 Douglas Drive North  
Minneapolis, Minnesota 55422-4386
3. [www.honeywell.com/building/components](http://www.honeywell.com/building/components)

In Canada—Honeywell Limited/Honeywell Limitée, 35 Dynamic Drive, Scarborough, Ontario M1V 4Z9.  
International Sales and Service Offices in all principal cities of the world. Manufacturing in Australia, Canada, Finland, France, Germany, Japan, Mexico, Netherlands, Spain, Taiwan, United Kingdom, U.S.A.

**Action:**  
Direct or reverse acting.

**Output Burden:**  
650 ohm maximum (4-20 mA).

**Ambient Ratings:**  
Temperature Range: 32°F to 158°F (-40°C to 70°C).  
Derated Output to: -40°F.  
Humidity Range: 5% to 95% RH (noncondensing).

NOTE: Both outputs (voltage and current) of the Q7002C are active simultaneously. Maximum current available from combined voltage and current outputs is 25 mA.

**Weight (Maximum):**  
13 oz (0.36 kg).

**Linearity:**  
<0.1% of span.

### Q7002C Pulse-to-Analog Interface Module

**Electrical Ratings:**  
Supply Voltage:  
24 Vac ±10%.  
24 Vdc ±10%.  
Input: See Table 2.  
Output:  
Factory Default: 4-20 mA and 1-5 Vdc.  
Adjustable: 0-20 mA and 0-18 Vdc.

**Ambient Ratings:**  
Temperature Range: -40°F to 158°F (-40°C to 70°C).  
Humidity Range: 5% to 95% RH (noncondensing).

**Weight (Maximum):**  
13 oz (0.36 kg).

Table 1. Acceptable Q7002B Inputs.

Signal Type	Range	Minimum Span <sup>a</sup>	Input Impedance	Reference Output	Jumper Positions			
					Input		Ref	
Voltage <sup>b</sup>	0-1.09 Vdc	55 mV	165K	N/A <sup>b</sup>	÷10	10V	V <sup>b</sup>	10 <sup>b</sup>
	0-10.9 Vdc	550 mV	ohms		X1	10V		
	0-2 Vdc	100 mV	301K		÷10	20V		
	0-20 Vdc <sup>b</sup>	1V <sup>b</sup>	ohms <sup>b</sup>		X1 <sup>b</sup>	20V <sup>b</sup>		
Current	0-4 mA	0.22 mA	250 ohms	÷10	MA			
	0-40 mA	2.2 mA		X1	MA			
Resistive <sup>c</sup>	0-10 K ohms 3-wire potentiometer	N/A	N/A	10V (834 ohm min)	X1	None	V	10
				5V (417 ohm min)	X1	None	V	5
				1.2V (100 ohm min)	X1	None	V	1.2
	0-5 K ohms 2-wire variable			10 mA (750 ohm max)	If (ref mA) x (max variable ohms) > 1.09V, use X1.	None	mA	10
				5 mA (1.5K ohm max)		None	mA	5
				1.2 mA (5K ohm max)	If (ref mA) x (max variable ohms) < 1.09V, use ÷10.	None	mA	1.2

<sup>a</sup> Minimum input span required to obtain full output span.

<sup>b</sup> Factory default setting.

<sup>c</sup> 100 ohm minimum element.

NOTE: All Q7002B inputs have adjustable zero and span.

**Table 2. Acceptable Q7002C Inputs and Dip Switch Settings.**

PWM Time Base (in seconds)	Dip Switch Settings		
	Switch 3	Switch 4	Switch 5
0.1-2.65	Off	Off	Off
0.1-5.2 <sup>a</sup>	Off <sup>a</sup>	Off <sup>a</sup>	On <sup>a</sup>
0.1-12.85	Off	On	Off
0.1-25.6	Off	On	On
0.59-2.93	On	Off	Off

<sup>a</sup> Factory default setting.

## INSTALLATION

### When Installing this Product...

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.



### CAUTION

**Electrical Shock or Equipment Damage Hazard.**  
Can shock individuals or short equipment circuitry.

Disconnect power supply before installation.



### CAUTION

**Equipment Damage Hazard.**  
Electrostatic discharge can short equipment circuitry.

Ensure that you are properly grounded before handling a powered unit.

### Location

Select a location that meets the ambient temperature ratings.

NOTE: Installing the device inside a control panel can help prevent damage.

### Mounting

#### Enclosure

Mount the Q7002 Enclosure models in any position. The enclosure models surface mount as follows:

1. Place the Q7002 in the desired location.
2. Attach the Q7002 to the mounting surface with two standard metal screws.

NOTE: If desired, remove unused tabs by simply breaking them off the housing. Once removed, they cannot be replaced.

#### Snap-Track

The Q7002 Snap-track models surface mount as follows:

1. Remove the printed circuit board (PCB) from the snap-track.
2. Attach the snap-track to the panel with standard metal screws.
3. Place one edge of the PCB into the track and snap the opposite edge into place.

### Wiring

Wire the device using Fig. 2 through 7.

#### IMPORTANT

*Comply with national and local codes when wiring the device.*

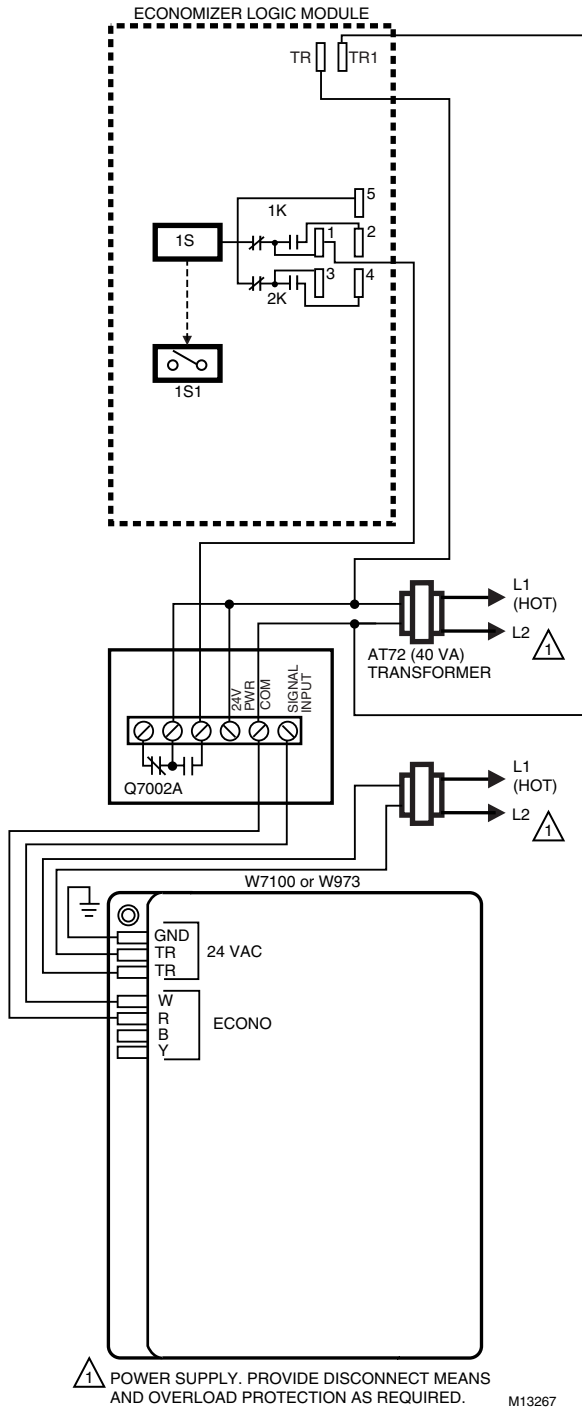


Fig. 2. Q7002A wiring.

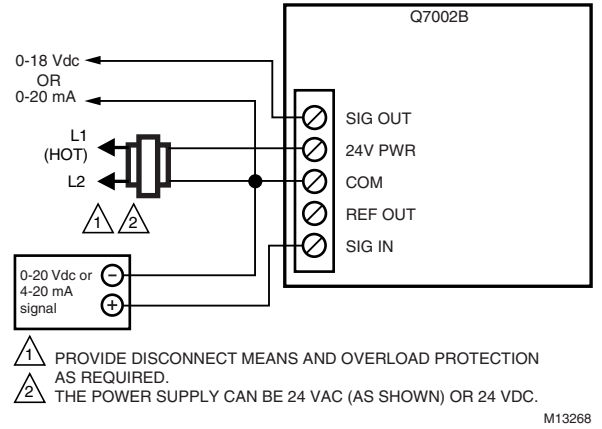


Fig. 3. Q7002B wiring with voltage or current input.

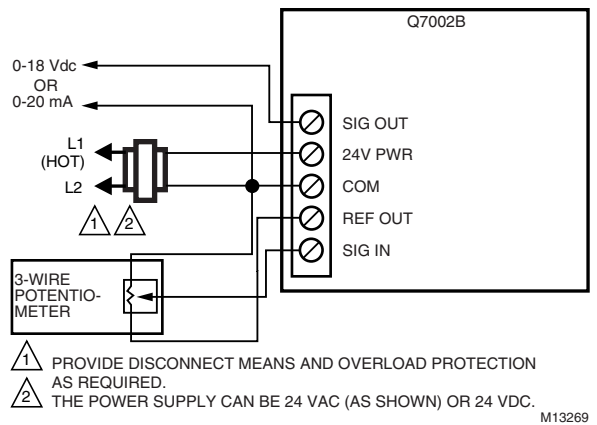


Fig. 4. Q7002B wiring with 3-wire potentiometer input.

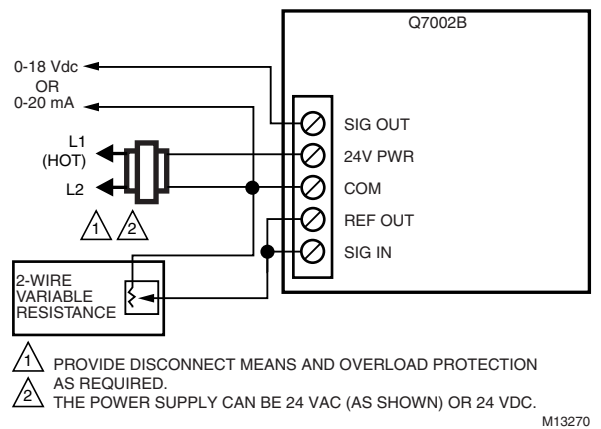
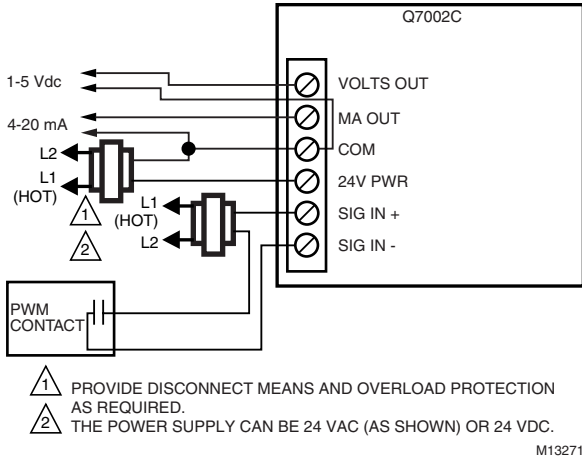
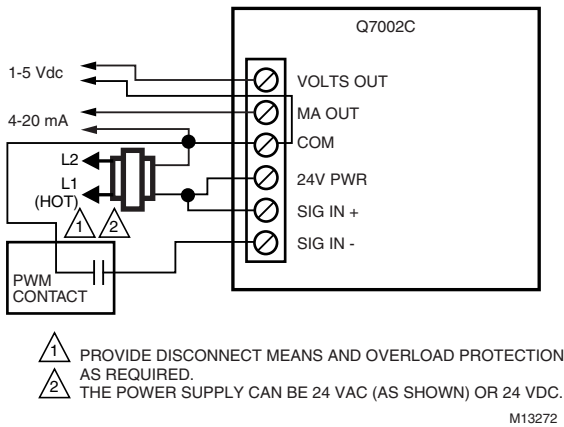


Fig. 5. Q7002B wiring with 2-wire variable resistance input.



**Fig. 6. Q7002C wiring with separate 24 Vac power supplies.**



**Fig. 7. Q7002C wiring with a common power supply.**

## SETTINGS AND ADJUSTMENTS


### Calibration

#### IMPORTANT

The Q7002A is not field-adjustable.

#### Q7002B

Calibrate the device as follows:

1. Set the output (OUT) jumper to voltage (V) or current (MA) to match desired output.
2. Set the INPUT and REF jumpers according to Table 1.
3. Verify ACT jumper is set to direct (D) or reverse (R). The device is shipped with the ACT jumper set to D.
4. Verify span jumper (SPN) is set to LO. The device is shipped with the SPN jumper set to LO.
5. Turn SPAN potentiometer clockwise  25 turns.
6. Remove and set aside both Z1 jumpers.

NOTE: The input signal does not affect the ZERO1 potentiometer adjustment.

7. Trim ZERO1 potentiometer to minimum desired output value.
8. Reinstall both Z1 jumpers.
9. Set Z2 jumper to LO. The device is shipped with the Z2 jumper set to LO.
10. Apply the minimum input signal.
11. Trim the ZERO2 potentiometer to the same value used in step 7.
12. If the desired value cannot be achieved, remove Z2 jumper and repeat step 11.

NOTE: If the desired value remains unachievable, place the Z2 jumper in the HI position and repeat step 11.

13. Apply the maximum input signal.
14. Trim the SPAN potentiometer to the maximum output value.
15. If the desired value cannot be reached, move the SPN jumper from LO to HI.
16. Return to step 10 and repeat steps until both the minimum and maximum output values are correct.

NOTE: Typically one repetition of steps 10 through 15 is sufficient.

17. Apply an input signal at the midpoint of the input span.
18. Verify that the output is at the midpoint of the output range.

#### Q7002C

##### Voltage Only Output

Calibrate the device as follows:

1. Determine the minimum and maximum voltage output required.
2. Determine the minimum mA calibration output with the following formula:

$$\text{Minimum Output (mA)} = 20 \text{ mA} \times (\text{Desired Minimum Volts}) / (\text{Desired Maximum Volts})$$

3. Apply minimum input pulse signal.
4. Set MA ZERO potentiometer to the value determined in step 2.
5. Using a signal generator, apply maximum input pulse signal.
6. Set MA SPAN potentiometer to 20 mA.
7. Set the VOLT ADJ potentiometer to the desired maximum voltage.

NOTE: The device calibrates the minimum voltage automatically according to the ratio of mA output extremes.

EXAMPLE: 4-20 mA signal produces a ratio of 5 to 1. As a result, with maximum voltage set to 10V, the device sets the minimum to 2V.

##### Current and Voltage Output or Current Only Output

Calibrate the device as follows:

1. Apply minimum input pulse signal.
2. Set MA ZERO potentiometer to the desired minimum mA output.
3. Apply maximum input pulse signal.
4. Set MA SPAN potentiometer to the desired maximum mA output.

5. If voltage output is required, proceed to step 6. Current output calibration is complete.
6. Set desired maximum voltage output with the VOLT ADJ potentiometer.

NOTE: The device calibrates the minimum voltage output automatically according to the ratio of mA output extremes.

### Multiplexing (Q7002C Only)

Multiplex control enables a single BAS control signal to control up to eight Q7002C Interface Modules. Wire the devices according to Fig. 8 or Fig. 9.

#### IMPORTANT

Before using a Q7002C with multiplex control, turn on dip switch two.

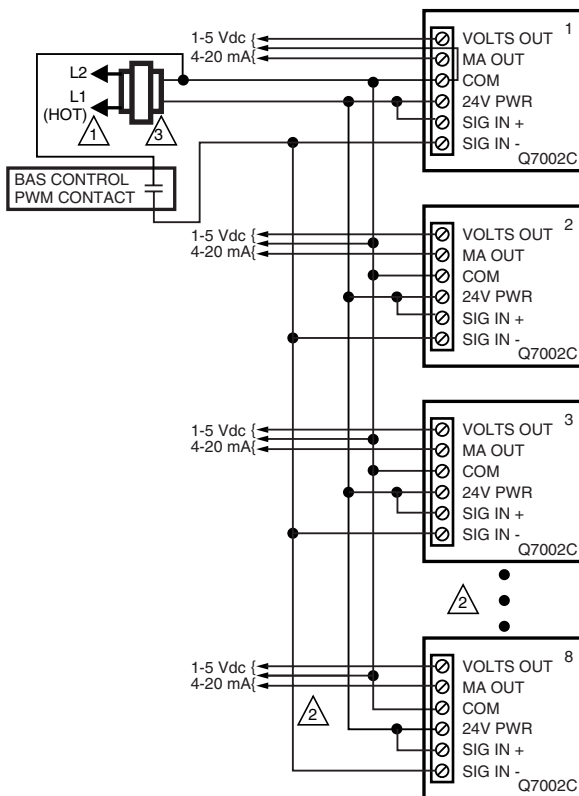
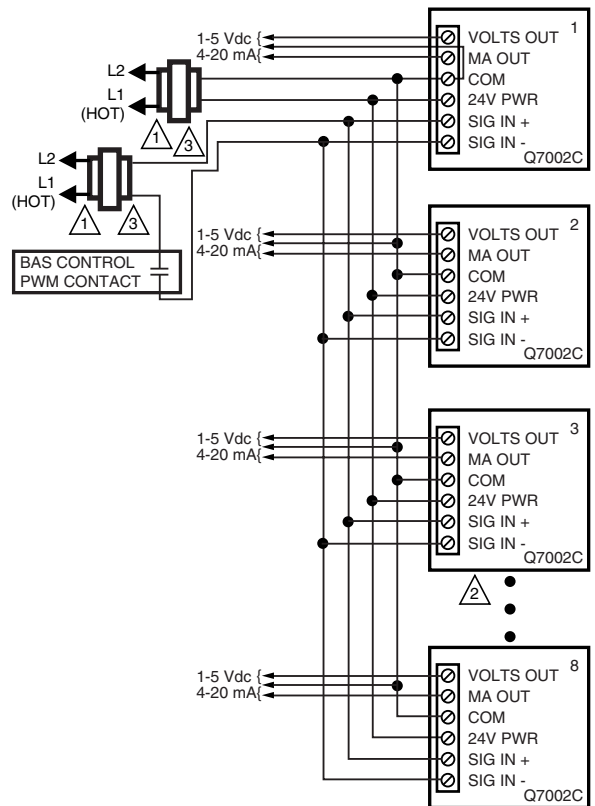


Fig. 8. Q7002C multiplex wiring with a common transformer.



1. THE POWER SUPPLY CAN BE 24 VAC (AS SHOWN) OR 24 VDC.
2. A MAXIMUM OF EIGHT Q7002C INTERFACE MODULES CAN BE MULTIPLEXED FROM ONE BAS CONTROLLER.
3. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

M13286

Fig. 9. Q7002C multiplex wiring with separate transformers.

All devices receive all pulse signals; however, only those devices set with a corresponding address react to the control portion of the signal. Each signal the BAS controller sends must include the following three pulses:

1. Attention.
2. Address.
3. Control.

#### Attention Pulse

The attention pulse initializes the interface modules, alerting them that a control pulse can follow. The attention pulse is one second longer than the existing time base.

**Address Pulse**

The address pulse signals the modules to either accept or ignore the control pulse. The address pulse matches one of the existing pulses (see Table 3). If the pulse does not match the address of a given module, that module ignores the control pulse and continues operating according to the most recent control pulse addressed to it.

**Control Pulse**

The control pulse carries the signal to adjust the control of the addressed module. Control is based in direct proportion to the control signal.

For Example:

A Q7002C operating with a 5.2 second time base that received a 6.2 second attention pulse and the proper address pulse receives a 5.2 second control pulse. This results in module output of 100 percent. If the same module were to receive a 2.6 second control pulse, it would adjust the output to 50 percent.

**Table 3. Q7002C Multiplex Dip Switch Settings and Corresponding Pulse Times.**

Multiplex Address	Dip Switch Settings			Address Pulse			
	Switch 6	Switch 7	Switch 8	2.65 second Time Base <sup>a</sup>	5.2 second Time Base	12.85 second Time Base	25.6 second Time Base
1 <sup>b</sup>	Off	Off	Off	0.2	0.4	0.9	1.6
2	Off	Off	On	0.6	1.0	2.5	4.8
3	Off	On	Off	0.9	1.7	4.1	8.0
4	Off	On	On	1.2	2.3	5.7	11.2
5	On	Off	Off	1.5	3.0	7.3	14.4
6	On	Off	On	1.9	3.6	8.9	17.6
7	On	On	Off	2.2	4.3	10.5	20.9
8	On	On	On	2.5	4.9	12.1	24.0

<sup>a</sup> The 2.65-second time base is appropriate only for multiplex operation when the BAS controller guarantees PWM output accuracy of 0.05 second or better.

<sup>b</sup> When shipped from the factory, the device is set to Multiplex Address 1. This is also the setting used with only one Q7002 connected to a controller (no multiplexing).

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