



## PQ-1001 Damper Position Indicator

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# Introduction

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## *Application Details*

The PQ-1001 is used to electrically indicate the relative position of a damper in a duct. The indicator can be mounted on the inside or outside of a duct and used with the D-1200, D-1300 and DCP/DCO Series Dampers.

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## *Theory of Operation*

The PQ-1001 consists of a potentiometer (5k ohms, 2 watts) mounted in a standard handi-box, supplied with mounting hardware and linkage assembly. Two models are available:

- The PQ-1001-3 is designed for mounting to the outside of the duct using a damper blade pin extension kit.
- The PQ-1001-4 is designed for mounting directly to the damper frame, inside the duct.

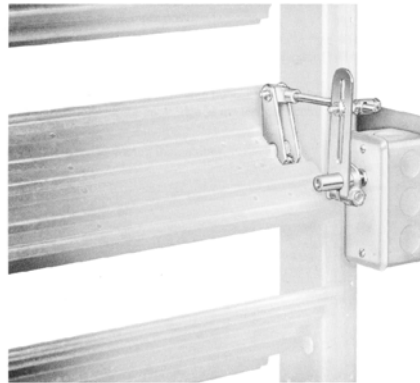


Figure 1: PQ-1001-4 Damper Position Indicator



# Installation Procedures

## Mounting Information

To mount the **PQ-1001-4** inside the duct:

1. Use two of the 12-24 x 1/2 in. self-tapping screws to attach the leaf connection to the damper at the preferred driving blade (as identified by the label on the blade).
2. Secure the damper position indicator to the damper frame by using the two remaining screws to attach the bracket (with the handi-box attached) to the damper frame alongside the preferred driving blade. Do NOT attach the linkage.
3. Turn the shaft on the damper position indicator full clockwise when looking down the shaft toward the handi-box. Rotate the shaft back counterclockwise approximately 10 degrees.
4. Close the damper blades and attach the connection rod end of the linkage to the leaf connector and the crank arm end of the linkage to the shaft on the damper position indicator.
5. Position and adjust the ball joint to provide more than 90 angular degrees of rotation at the damper position indicator (140 angular degrees maximum).

Note: This is most easily achieved by making sure the crank arm is parallel with the back edge of the leaf connector as shown in Figure 2.

6. Proceed to the Wiring Instructions.

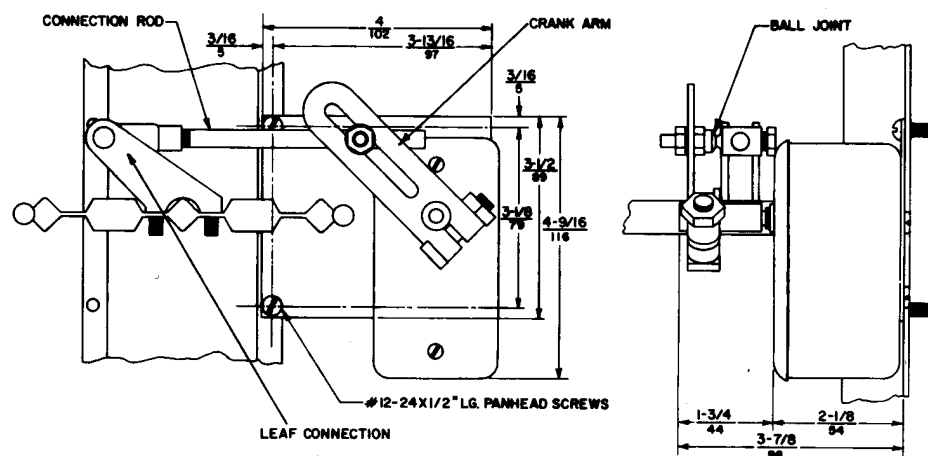


Figure 2: PQ-1001-4 Dimensions  
for Inside the Duct Mounting  $\left(\frac{\text{in.}}{\text{mm}}\right)$

To mount the **PQ-1001-3** outside the duct:

1. If the damper shaft is not already extending from the side of the duct, attach the D-9999-134 Damper Blade Pin Extension to the preferred driving blade as instructed in the packing slip furnished with the D-9999-134 or provided with the damper.
2. Loosely attach the crank arm included with the PQ-1001-3 to the damper shaft extending from the duct.
3. Secure the damper position indicator in place using the two #12-24 x 1/2 in. self-tapping screws to attach the bracket (with the handi-box attached) to the duct near the extended damper shaft as shown in Figure 3. Do NOT attach the linkage.
4. Turn the shaft on the damper position indicator full clockwise when looking down the shaft toward the handi-box. Rotate the shaft counterclockwise approximately 10 degrees.
5. Close the damper blades and loosely attach the connection rod end of the linkage to the crank arm on the damper shaft and the crank arm end of the linkage to the shaft on the damper position indicator.
6. Position and adjust the linkage to provide more than 90 angular degrees of rotation at the damper position indicator (140 angular degrees maximum).

Note This is most easily achieved by making sure the two crank arms are parallel to each other as shown in Figure 3.

7. Proceed to the Wiring Instructions.

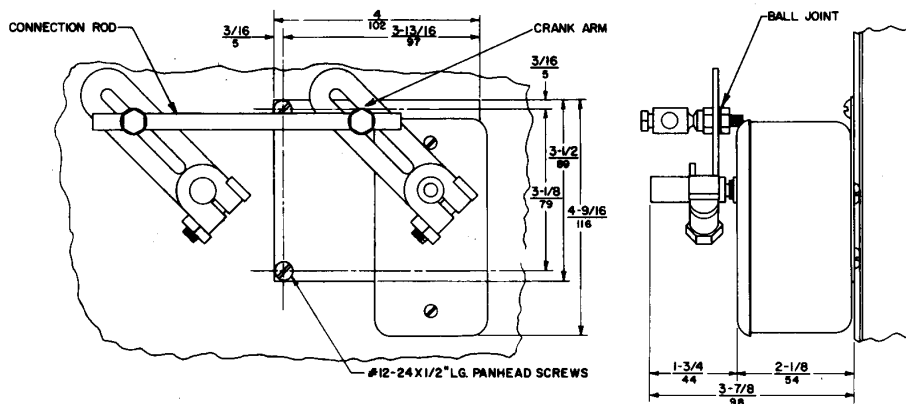


Figure 3: PQ-1001-3 Dimensions for Outside the Duct Mounting ( $\frac{\text{in.}}{\text{mm}}$ )

## Wiring Instructions

- The PQ-1001 is supplied with 6 in. (152 mm) pigtail leads of color coded wire. When wiring into a system, refer to Figure 4 below:

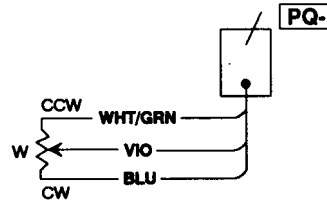


Figure 4: PQ-1001 Wire Designations



**CAUTION:** Always turn off power to the system before wiring the PQ-1001.

- Wire nuts or other approved connectors must be used to wire the PQ-1001 into a system.
- All wiring must be in accordance with applicable electrical code requirements.

Table 1: Controller Connections\*

PQ-1001 WIRE COLOR	GQ-4100 TERMINAL DESIGNATIONS	JC/80 TERMINAL DESIGNATIONS	JC/85 TERMINAL DESIGNATIONS	METASYS IUN TERMINAL DESIGNATIONS
WHT/GRN	2	1	FT-3	TBF-4
VIOLET	3	2	FT-2	TBF-1
BLUE	1	3	FT-1	TBF-2

\*For detailed wiring drawings, refer to the PQ-1001 Product Bulletin.

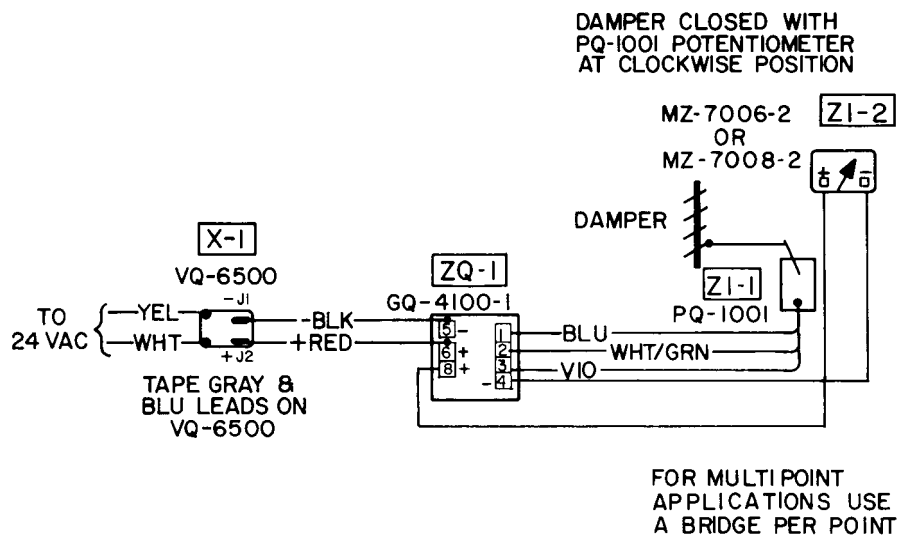


Figure 5: Wiring the PQ-1001 into a Typical GQ-4100 Indication System





# Commissioning Procedures

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## *Field Adjustments*

### **When used with the GQ-4100 Indication System:**

1. Connect the PQ-1001 to the associated GQ-4100-1 bridge according to the wiring designations in Figure 5.
2. Rotate the zero adjustment on the GQ-4100-1 bridge until the MZ-7006-2 or MZ-7008-2 meter indicates zero. If the meter will not indicate zero, readjust the linkage according to the instructions in the *Mounting Information* section of this bulletin.
3. Open the damper blades to the fully open position, and rotate the span adjustment on the GQ-4100-1 bridge until the meter indicates that the damper is 100% open.
4. Readjust the linkage to provide a wider rotation at the damper position indicator shaft, if the MZ-7006-2 or MZ-7008-2 meter will not adjust to the full 100% open indication point. Refer to the *Troubleshooting* section of this bulletin.

### **When used with the JC/80 Building Automation System:**

1. Connect the PQ-1001 to the JC/80 Terminal Board (TM/1) as designated in Table 1.
2. Use procedures outlined for *Analog System Calibration* in the *Commissioning* section of the *JC/80 Field Support Manual*.
3. Perform the checkout procedure as instructed in the *JC/80 Field Support Manual*.

### **When used with the JC/85 Building Automation System:**

1. Connect the PQ-1001 to the JC/85 FPU Terminal Board as designated in Table 1.
2. Use procedures outlined in the *Field Processing* section of the *JC/85/40 Hardware Data Book*.
3. Perform the checkout procedure as instructed in the JC/85/40 commissioning documentation also found in the *JC/85/40 Hardware Data Book*.

### **When used with the Metasys Facility Management System:**

1. Connect the PQ-1001 to the FM-IUN-101 Field Terminal Board (TBF) as designated in Table 1.

2. Use procedures and diagrams outlined in the *Input Universal Function Module Engineering Bulletin* in *Volume II* of the *Metasys Network Technical Manual*.
3. Perform the system checkout procedure as instructed in the *Metasys FM-IUN Commissioning Bulletin* also found in *Volume II* of the *Metasys Network Technical Manual*.

# Troubleshooting Procedures

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## *Troubleshooting*

In the event that the unit is not functioning properly, use the following procedure to identify the problem and determine a solution:

- **Verify that the system is receiving power.**
  - Check all supply voltage connections. Refer to the wiring diagrams for the control system as needed.
  - Check the power supply and transformer where appropriate.
- **Verify that the PQ-1001 is wired correctly.**
  - Check that the wiring is not reversed: the full clockwise damper position is indicated by the blue wire and the full counterclockwise damper position is indicated by the white/green wire. Refer to Figure 4 on page 5 as needed.
  - Check that the PQ-1001 is wired to the correct terminals at the controller. Refer to Table 1 on page 5 as needed.
- **Verify that the PQ-1001 is installed correctly.**
  - Check that the linkage is adjusted to give full range of motion. The damper should move from full open to full closed by turning the shaft on the PQ-1001 all the way to the stop. Refer to the *Installation Procedures* on pages 3 and 4 to make adjustments to the travel range.
  - Check that the PQ-1001 is firmly mounted to the damper. A loose bracket can put stress on the linkage, causing misalignment and malfunction over time.
- **Verify that the PQ-1001 is being applied properly.**
  - The PQ-1001 is recommended for use only with controllers/meters that can handle the signal from a 5k ohm potentiometer. Many controllers (including the Metasys ASC family) require a 2k ohm potentiometer.
  - Wiring drawings showing typical application of the PQ-1001 with recommended JCI control systems can be found in the *PQ-1001 Product Bulletin*.

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## *Repairs and Relacement*

Field repairs must not be made. For a replacement PQ-1001 Damper Position Indicator, contact your local Johnson Controls branch or distributor office.

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## Notes



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