JOHNSON CONTROLS

S91PT Auxiliary Potentiometer for the M100 Series Motor Actuator

The S91PT houses a 1000-ohm feedback potentiometer. Three screw terminals and 1/4 in. male quick-connect terminals allow easy connection to the potentiometer. The wiper arm on the potentiometer strokes across the entire 1000-ohm band over 300 degrees of rotational travel. The zero point on the potentiometer is adjustable. The span of 1000 ohms for 300 degrees of travel is fixed.

Figure 1: S91PT Auxiliary Potentiometer Mounted to an M100 Non-spring Return Motor Actuator

Dimensions

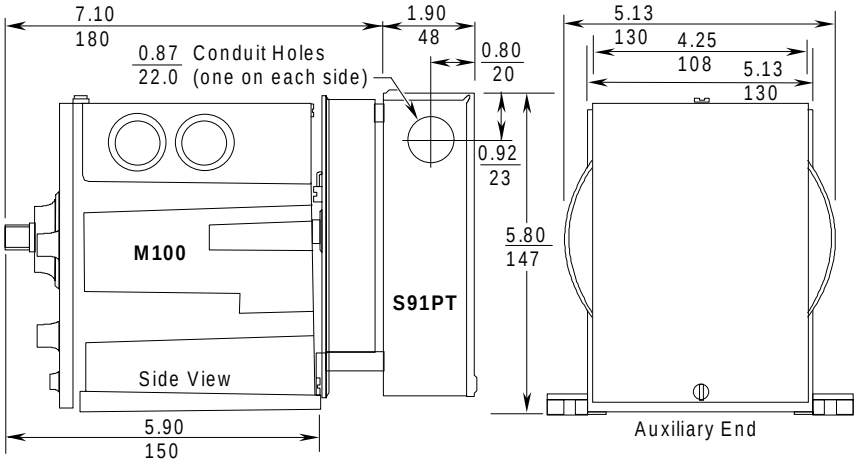

Figure 2: S91PT Dimensions with an M100 Spring Return Motor Actuator, in. (mm)

Product Overview

The S91PT Auxiliary Potentiometer mounts on the auxiliary end of the M100 Series motor actuator to provide position feedback or an economical method of slaving additional actuators. The potentiometer is used in heating, refrigeration, air conditioning, and industrial applications.

The S91PT can be used in an M100 floating control application to provide position feedback into an energy management system.

Application

IMPORTANT: All S91PT Auxiliary Potentiometers are designed for use only in conjunction with operating controls. Where an operating control failure would result in personal injury and/or loss of property, it is the responsibility of the installer to add safety devices or alarm systems that protect against, and/or warn of, control failure.

Part No. 34-403-10, Rev. A
Code No. LIT-125625

Terminal 1 on the S91PT is the wiper arm. Terminals 2 and 3 are the ends of the potentiometer. The wiper arm is located at Terminal 2 when the actuator is at its Counterclockwise (CCW) limit as viewed from the load end. With the S91PT mounted on the auxiliary end of the motor actuator, the wiper arm moves toward Terminal 3 when the actuator rotates Clockwise (CW) as viewed from the load end.

Installation

Parts Included

- S91PT-1 Auxiliary Potentiometer
- Spacers (3)
- No. 6-32 x 1 1/4 in. round-head machine screws (3)

Tools Required

- 1/16 in. hex Allen wrench
- 3/16 in. flat-blade screwdriver

Mounting to an M110 or M130 Spring Return Motor Actuator

Refer to Figure 3 for each of the steps that follow.

1. Place a spacer on each of the three machine screws.

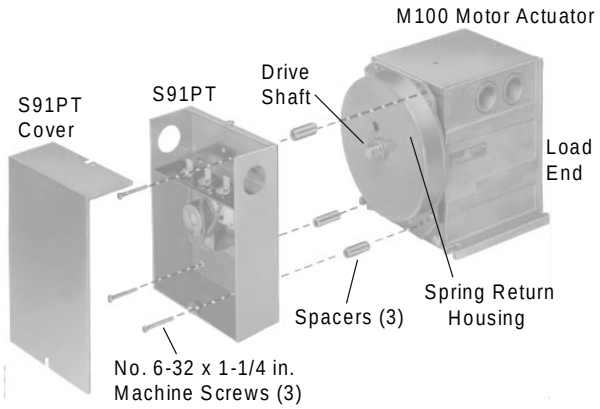

Figure 3: Mounting the S91PT to an M110 or M130 Motor Actuator

2. Install the screws with the spacers into the three holes located in the spring return housing of the motor actuator.

Note: Do not tighten the screws. Leave enough space to fit the S91PT between the screw heads and the spacers.

3. Loosen the cover screws with a 3/16 in. flat-blade screwdriver, and remove the cover from the S91PT.
4. Remove the uppermost captive mounting screw on the inside of the S91PT case. (The two remaining captive mounting screws can be left in the case or removed.)
5. Place the cam driver bracket, located in the back of the S91PT, onto the actuator's drive shaft.
6. Rotate the case of the S91PT CW until the mounting holes fit over the three machine screws installed in the actuator.
7. Tighten the machine screws to secure the S91PT to the actuator.

Mounting to an M120, M140, or M150 Non-Spring Return Motor Actuator

Refer to Figure 4 for each of the steps that follow.

1. Remove the three screws from the actuator cover located on the actuator's auxiliary end without removing it.

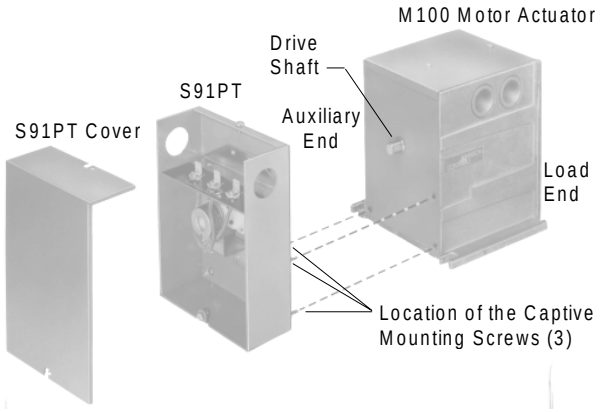

Figure 4: Mounting the S91PT to a M120, M140, or M150 Motor Actuator

2. Loosen the cover screws, and remove the cover from the S91PT.
3. Place the cam driver bracket, located in the back of the S91PT, onto the actuator's drive shaft.
4. Attach the S91PT to the motor actuator using the three captive mounting screws located on the back of the case.
5. Complete the installation of the M100, following the instructions supplied with the actuator.

Adjustments

Refer to Figure 5 for the steps that follow.

1. Loosen the two Allen-head set screws that secure the cam driver to the stem of the S91PT using a 1/16 in. hex Allen wrench.
2. Position the motor actuator to its full CCW position (load end) by either applying a zero signal to a non-spring return actuator, or disconnecting power from a spring return actuator.

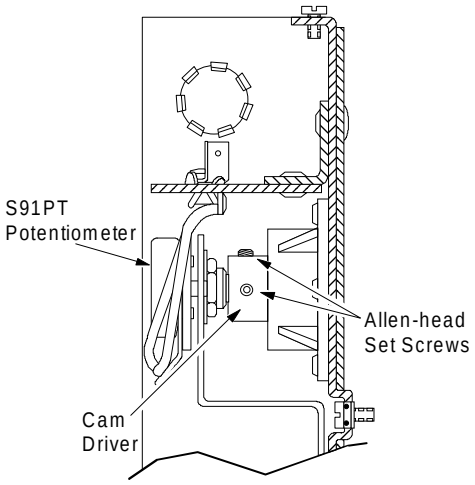

Figure 5: Location of the Set Screws on the Cam Driver

3. Rotate the S91PT potentiometer fully CW using a 3/16 in. flat-blade screwdriver.
4. Retighten the Allen-head set screws using a 1/16 in. hex Allen wrench.

> CAUTION: **Equipment Damage Hazard.** If the set screws are tightened with the S91PT potentiometer in the wrong position, damage may occur if the potentiometer strokes beyond its travel limits.

Wiring

> IMPORTANT: Make all wiring connections using only copper conductors and in accordance with the National Electrical Code and all local regulations.

See Figure 6 for the wiring connections.

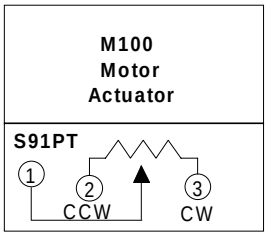

Figure 6: Wiring the S91PT on an M100 Actuator

Checkout Procedures

1. Run the motor actuator through a complete cycle, making sure that the S91PT does not bind. As the motor rotates, measure the change in the resistance across Terminals 1 and 2.
2. Observe at least three complete operating cycles to be sure that all components are functioning properly.
3. Reinstall the S91PT cover if not already done.

Slaving an M100G from an M100A or an M100E Master Actuator

Because the S91PT has a fixed span of 300 degrees, only the M100G with an adjustable zero and span should be used as a slave actuator.

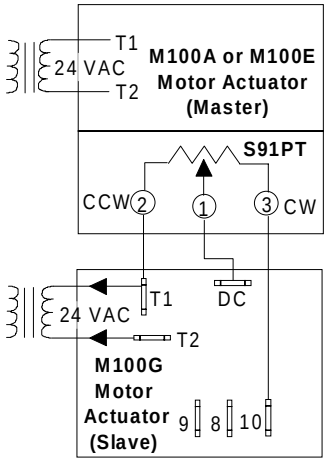

Figure 7: Slaving an M100G to an M100A or an M100E

The slave circuit works as a voltage divider. There is a +12 VDC potential between Terminals 2 and 3 on the S91PT. As the motor rotates CW, looking at the load end, the wiper arm moves toward Terminal 3. The voltage between T1 and the DC input will vary between 0 and a voltage dependent on the actual stroke of the M100A or M100E master actuator.

Note: This voltage is equal to the angular rotation of the M100A or M100E master actuator divided by 25. For example: 90° rotation of the M100A or M100E will result in a voltage signal of 0 to 3.6 volts (i.e., 90 ÷ 25 = 3.6 volts).

1. Set the travel adjustment on the M100G slave actuator to its minimum travel position.
2. Jumper Terminals 8 and 9 on the M100G, and slowly increase the travel adjustment until the desired travel is obtained.
3. Remove the jumper.
4. Override the M100A master actuator to its full CCW position to set the zero setting by jumpering Terminals CCW and COM.

   or

   Override the M100E master actuator to its full CCW position to set the zero setting by jumpering Terminals 8 and 10.

IMPORTANT: This must be done under power. Do not use the spring return position or damage could result to the actuator.

5. Set the span potentiometer on the M100G slave actuator to minimum, and slowly decrease the zero potentiometer until the M100G just begins to move CW.
6. Slowly increase the zero potentiometer until the M100G reaches its CCW limit.

Note: The zero potentiometer will be at minimum on most applications.

7. Override the M100A master actuator to its full CW position by jumpering Terminals COM and CW.

   or

   Override the M100E master actuator to its full CW position by jumpering Terminals 8 and T1.
8. Slowly increase the M100G span potentiometer until the M100G slave actuator begins to drive CCW.
9. Decrease the span potentiometer until the M100G slave actuator returns to its CW limit.
10. Cycle the M100A master actuator, and watch the M100G slave actuator follow for at least three complete cycles.

Repairs and Replacements

Field repairs must not be made. To order, contact the nearest Johnson Controls representative.

Ordering Information

Specify Product Code No. S91PT-1 for a replacement.

Specifications

Product	S91PT Auxiliary Potentiometer for M100 Series Motor Actuators
Feedback	1000 ohms ±30% over 300° travel
Wattage Rating	1/3 W
Ambient Temperatures	+10° to 130°F (-12° to 55°C)
Enclosure	NEMA 1 general purpose
Material	Case: 0.062 in. (1.6 mm) cold rolled steel Cover: 0.040 in. (1.0 mm) cold rolled steel
Dimensions (H x W x D)	5.80 x 4.38 x 1.90 in. (147 x 111 x 48 mm)
Shipping Weight	1.6 lb (0.68 kg)
Agency Compliance	File E27734, Guide XAPX for Class 2 operation CSA No. LR948 Certified, Class 481302 for Class 2 operation

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

JOHNSON CONTROLS

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