JOHNSON CONTROLS

D-9502 Pneumatic Damper Actuator Positioner

The D-9502 Pneumatic Damper Actuator Positioners are precision relay devices used to adjust and maintain damper actuators in exact positions on those applications requiring precise or otherwise special damper positioning. Refer to Table 1 for models available.

The basic positioner provides dynamic stabilization and/or sequential control of damper actuators. It is available factory installed on most D-3000 Series Damper Actuators. Refer to the appropriate actuator product data literature for more details. On D-3153 Series Actuators, a special positioner mounting kit (D-9502-9) is available for changing basic D-9502 positioner control to two-stage operation. Refer to Installation Data D-9502-A.1.

Depending on the size of the actuator used, up to three additional actuators may be controlled by a single positioner/actuator assembly; for example, multiple actuators modulating large or coupled dampers.

Operation

Feedback from the actuator shaft (through the positioner spring and lever arm assembly) activates the positioner to compensate for external forces at the shaft and holds the actuator at the position dictated by the controller.

Supply air enters the control chamber of the relay and is admitted to the actuator when the control pressure in the pilot chamber exceeds the established starting point. This pressure causes the actuator shaft to move. Movement of the shaft is fed back to the relay

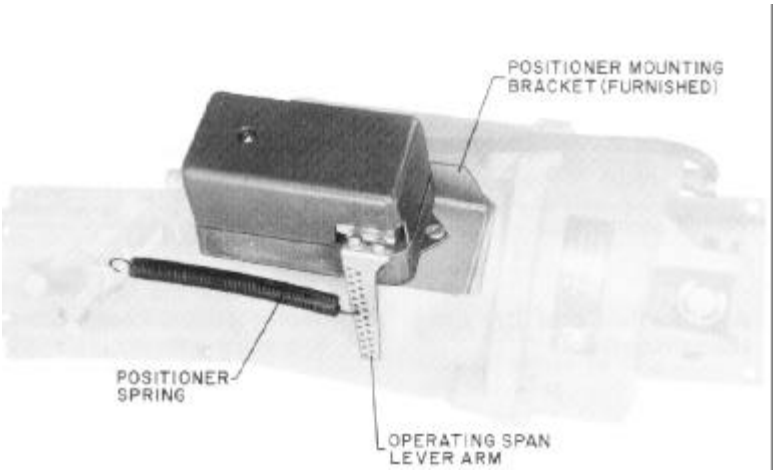

Fig. 1: D-9502 Positioner Installed on D-3153 Series Actuator with Universal Mounting Bracket

Specifications

Product			D-9502 Pneumatic Damper Actuator Positioner
Models			See Table 1
Starting Point			Adjustable from 2 to 12 PSIG (14 to 84 kPa)
Operating Span			Adjustable from 3 to 13 PSI (21 to 91 kPa)
Maximum Supply Pressure*		**D-9502-13**	20 PSIG (140 kPa)
		All Other Models	25 PSIG (175 kPa)
Air Consumption			5 SCIM (1.4 mL/s)
Output Flow Capacity		**D-9502-13**	1600 SCIM (437 mL/s) Minimum
		All Other Models	1000 SCIM (273 mL/s)
Air Connections		**D-9502-13**	Supply "S" and Pilot "P": Barbed Fittings for 5/32 or 1/4 in. O.D. Polytubing; Output "O": Compression Fitting for 1/4 in. O.D. Copper Tubing
		All Other Models	Barbed Fittings for 5/32 or 1/4 in. O.D. Polytubing
Ambient Operating Temp Limits		**D-9502-13**	-20 to 250°F** (-29 to 121°C)
		All Other Models	-20 to 150°F (-29 to 66°C)
Materials	**Body**		Die Cast Aluminum with Iridite Finish
	Cover	**D-9502-13**	Die Cast Zinc
		All Other Models	Noryl
	Diaphragm		Fabric Reinforced Rubber
Mounting			Directly to Actuator using Bracket Furnished
Shipping Weight			2.0 lb (.91 kg)

*** Air supply must be clean, dry, and oil free.**

**** This temperature rating is based on Underwriters Laboratories' testing for 30 minutes and should not be considered for continuous 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.

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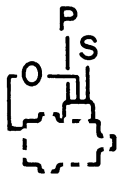
through the positioner spring and lever arm to impose a balancing force against the control pressure. When all forces are in balance, the positioner will not allow supply air to pass through to the actuator. The actuator will establish a position proportional to the value of the pressure from the controller. Any change in shaft position will inbalance the relay, causing air pressure in the actuator to increase or be exhausted to reestablish a balance at the desired shaft position.

Application and Drawing Identification



Operating Range

The operating range is determined by the span and starting point adjustments of the positioner. The lower value of the range is the control signal pressure at which the actuator begins to stroke. The upper value is the control signal pressure at which the actuator reaches its maximum stroke. The difference between the upper and lower values of the control signal pressure is the operating span.

Operation Span

The operating span of the D-9502 Positioner is adjustable from 3 to 13 PSI (21 to 91 kPA) and is determined by the location of the spring in the positioner spring arm (see Fig. 3). When attached to the hole closest to the positioner cover, the spring allows a span of 3 PSI. When attached to the hole furthest from the cover, the spring allows a span of 13 PSI.

Table 1: Models

D-9502 Kit	Where Used
D-9502-1	D-251 No. 3 Actuator*
D-9502-2	D-251 No. 4 Actuator*
D-9502-3	D-251 No. 6 Actuator*
D-9502-5	D-251 No. 5*, D-3244, or D-3246** Actuators
D-9502-8	D-3153 Actuator
D-9502-9	D-3153 Actuator Where Two-Stage Control is Required
D-9502-12	D-3073 Actuator
D-9502-13	D-3153-40 or D-3153-41 Actuators for Smoke Control Applications

*** These actuators are no longer available as standard equipment.**
**** Also order spring D-265-603 and positioner spring bracket D-9502-100.**

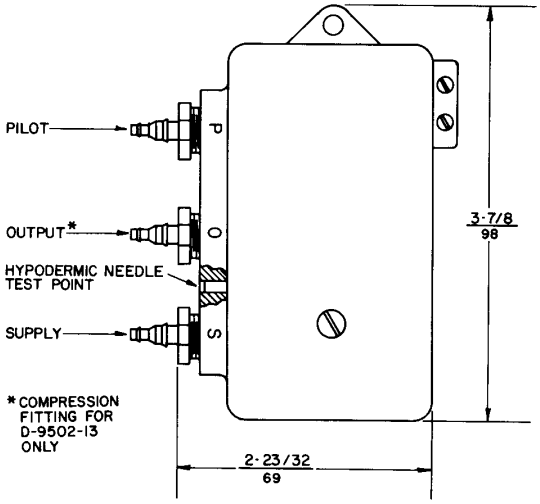


Fig. 2: Dimensions $\frac{\text{in.}}{\text{mm}}$

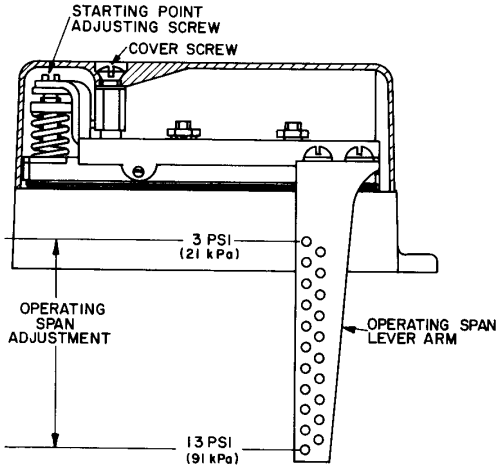


Fig. 3: D-9502 Adjustment Points

Starting Point

The starting point is the point at which the actuator begins to stroke. It is adjustable form 2 to 12 PSIG (14 to 84 kPa) using the starting point adjusting screw located under the cover (see Fig. 3). Turning the screw counterclockwise will increase the starting point and clockwise will decrease the starting point.

Note: The sum of the starting point pressure and the operating span must not exceed the supply air pressure to the positioner. A typical supply pressure is usually between 20 and 25 PSIG (140 and 175 kPa). Maintain a starting point pressure and corresponding operating span accordingly.

Mounting

The D-9502 Positioner is furnished with a mounting bracket for attachment directly onto the actuator body. When mounting the assembly, allow space for removal of the cover and adjustment of the relay.

When a D-3000 Series Damper Actuator is ordered with a positioner, the positioner is factory installed on the actuator (see the appropriate actuator product data literature for more details).

Calibration

The following is a typical example of how a D-9502 Positioner is used to adjust the operating range and change the span of a damper actuator.

Assume an actuator has a spring range of 8 to 13 PSIG (56 to 91 kPa) resulting in a span of 5 PSI (35 kPa), and that it is desirable to use a D-9502 Positioner to obtain an operating range of 6 to 13 PSIG (42 to 91 kPa) resulting in a span of 7 PSI (49 kPa). To make the adjustment, refer to Fig. 3 and proceed as follows:

1. Attach one end of the positioner spring to the hole in the lever arm which corresponds to a 7 PSI span. The other end of the positioner spring must be relocated to make the spring perpendicular to the lever arm.
2. Apply a controller output pressure of 6 PSIG to the positioner.
3. Remove the positioner cover and turn the starting point adjusting screw clockwise until the actuator just begins to stroke. **Note: The output pressure reading can be taken either using a pressure gage in the output line or at the hypodermic needle test point on the positioner body.**
4. Increase the controller output to 13 PSIG. At this point, the actuator should be fully stroked.

Note: In some cases, adjusting the starting point will affect the operating span and a different hole in the lever arm will need to be selected.

The D-9502 will now position the damper actuator over a range of 6 to 13 PSIG.

--Repair Parts Listed on Next Page--

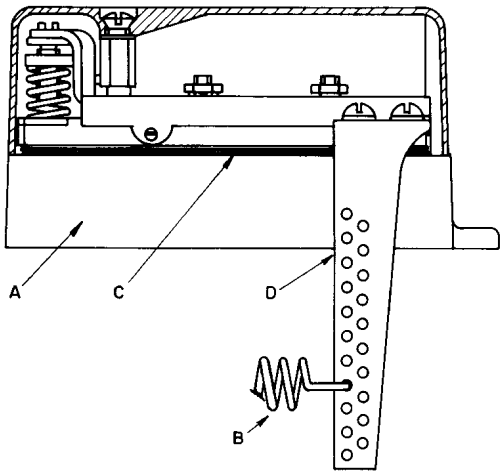


Fig. 4: D-9502 Pneumatic Damper Actuator Positioner

Table 2: Repair Parts

Item	Description		Acceptable For Smoke Control Applications	Shipping Weight lb*	Code Number
A	Positioner Movement Complete Less Items "B" and "D"		No	1.5	C-9506-1
B	Springs: Actuator Size	Inside Length			
	D-251 No. 2	4-1/8 in. (105 mm)	No	.06	D-265-600
	D-251 No. 3	4-17/32 in. (115 mm)	No	.06	D-265-601
	D-251 No. 4 w/D-265 Positioner (Brass body positioner)	4-23/32 in. (120 mm)	No	.06	D-265-602
	D-251 No. 4 w/D-9502 Positioner	5-17/32 in. (140 mm)	No	.06	D-9502-602
	D-251 No. 5 or D-3244	5-1/4 in. (133 mm)	No	.06	D-9502-610
	D-251 No. 6 or D-3246	5-7/8 in. (149 mm)	No	.06	D-265-603
	D-3073	4-11/64 in. (106 mm)	No	.06	D-9502-609
	D-3153	4-11/64 in. (106 mm)	Yes	.06	D-9502-609
C	Diaphragm Assembly: Includes Diaphragm, Six Diaphragm Reinforcements, One Seat, Three Nuts, One Spring, Two Metal Balls, One Ball Retainer, Two Screws, and One Gasket		Yes	.03	V-9502-600
D	Operating Span Lever Arm Assembly		Yes	.01	D-9502-604

***lb x 0.454 = kg**

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