

D-3153 Pneumatic Actuator

Product Bulletin

D-3153-xxxx Series

Code No. LIT-2681054P

Issued March 12, 2015

The D-3153 Pneumatic Actuator is a multipurpose positioning device used primarily for operating ventilating dampers in response to the output signals of a pneumatic controller or electro-pneumatic transducer.

The D-3153 Pneumatic Actuator is used with dampers up to a maximum area of 16 ft² (1.5 m²) for proportional volume control, and 25 ft² (2.3 m²) for 2-position actuation (provided that the torque requirements are compatible with the specific application).

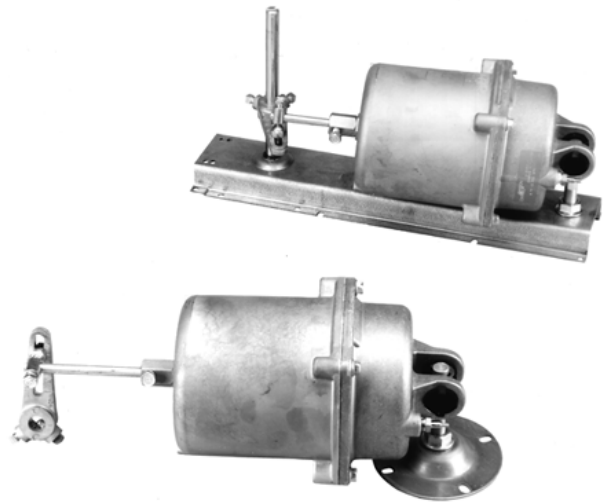


Figure 1: D-3153 Pneumatic Actuator

Table 1: Features and Benefits

| Features | Benefits |
|-------------------------------|---|
| All-Aluminum Housing | Creates a lightweight, non-combustible actuator |
| Telescoping Linkage | Provides fast, flexible installation |
| Long Life and Reliable Design | Places over a million actuators now in service |
| 2-way Swivel Head | Ensures full power delivery |

Application

When used with proportional control, the damper size is limited to 16 ft² (1.5 m²) maximum. As a 2-position control, damper size is limited to 25 ft² (2.3 m²).

Three nominal spring ranges are available:

- 3 to 7 psi (21 to 49 kPa), D-3153-7
- 5 to 10 psi (35 to 70 kPa), D-3153-3 and -6
- 8 to 13 psi (56 to 91 kPa), D-3153-1, -2, -4, -5, and -18

The control air pressure for normal HVAC operation is 0-20 psig (0-138 kPa). The minimum control pressure for safety damper functions is 20 psig (138 kPa) with the maximum pressure of 30 psig (207 kPa). When used for both proportional and safety applications, provide a separate air signal to override normal HVAC operation and cause safety damper functions.

The D-3153 Pneumatic Actuator incorporates several internal and external features that add functional flexibility. A 2-way swivel connection on the actuator cylinder head provides non-binding movement.

All actuators have a telescoping piston rod for easy linkage of the damper for attachment points up to 8-3/4 in. (222 mm) away from the face of the actuator. A swivel ball joint and slotted crank arm connector are furnished on all actuators for optional methods of linkage to the damper.

The D-3153 Pneumatic Actuators, with universal and auxiliary mounting brackets, are specifically designed for use with Johnson Controls® safety dampers up to 250°F (121°C).

Operation

Air pressure from a pneumatic controller is applied to the diaphragm of the actuator, which moves the piston against the forces of the internal spring and the load. The external load force shifts the operating range from the nominal spring range. The piston moves to a position where the applied force and the spring, plus external forces, are in equilibrium. However, with a pilot positioner added, the piston moves to a position proportional to the control signal regardless of the load.

Installation

Two standard mounting packages are available with the D-3153 Pneumatic Actuator. The models with universal mounting bracket assemblies provide all of the parts and instructions required for applying the actuator to Johnson Controls D-1300 damper applications: duct (wall) mounting or frame mounting, either normally open or normally closed.

The auxiliary mounting bracket assembly facilitates applying the D-3153 Pneumatic Actuator to allied equipment manufacturer's products, and non Johnson Controls installations for actuator conversions. These assemblies are furnished with a crank arm linkage and pedestal style bracket. Two positions are provided on the pivot post for attaching the actuator to the mounting bracket so that force can be more directly applied to linkage points that are neither perpendicular nor parallel to the actuator mounting plane.

A stop screw kit is available for special applications to limit the power stroke of the actuator when required. A 4 ft (122 cm) linkage rod is also available for special applications to reach extended linkage when required.

Where precision sequential operation is desired, or additional positioning power is necessary, use a D-9502 positioner. Up to four more D-3153 Pneumatic Actuators may be slaved from one pilot for coupled dampers. A D-9502 kit is also available to enable 2-stage actuator control for providing minimum outdoor air during occupation (refer to the *D-9502 Pneumatic Damper Actuator Positioner Product Bulletin [LIT-1628399P]*).

Refer to the *D-3153 with Universal Mounting Bracket Installation Bulletin (Part No. 34-188-18)* and the *D-3153 with Auxiliary Mounting Bracket Installation Bulletin (Part No. 34-154-19)* for more details.

Repair Information

Do not make field repairs. If the D-3153 Pneumatic Actuator fails to operate within its specifications, replace the unit. For a replacement actuator, contact the nearest Johnson Controls representative.

Table 2: Force Values at 20 psig (140 kPa) Supply

| Spring Range, psig (kPa) | Stroke | Force, lb (Newton) | Torque Output for 90° Rotation |
|-------------------------------------|--------|--------------------|--------------------------------|
| 8 to 13 (56 to 91) | Power | 105 (467) | 158 in·lb (18 N·m) |
| | Return | 120 (534) | 180 in·lb (20 N·m) |
| 5 to 10 (35 to 70) | Power | 150 (667) | 225 in·lb (25 N·m) |
| | Return | 75 (334) | 113 in·lb (13 N·m) |
| 3 to 7 (21 to 49) | Power | 195 (867) | 293 in·lb (33 N·m) |
| | Return | 45 (200) | 68 in·lb (8 N·m) |

Dimensions

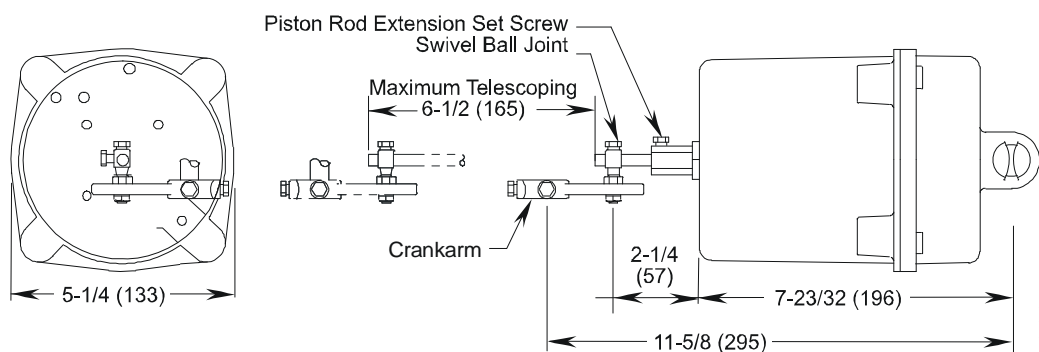


Figure 2: D-3153 Pneumatic Actuator Dimensions, in. (mm)

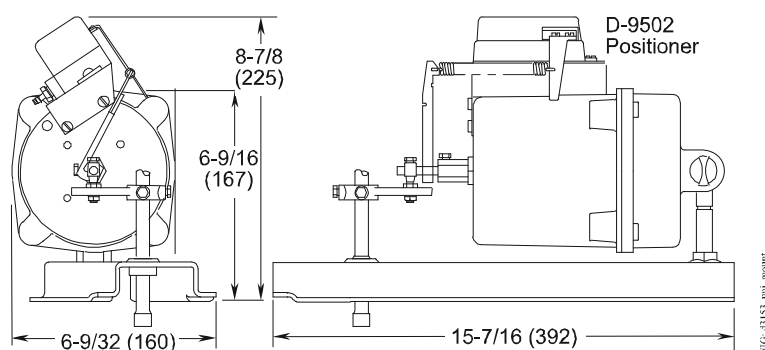


Figure 3: D-3153 Pneumatic Actuator with Universal Mounting Bracket Dimensions, in. (mm)

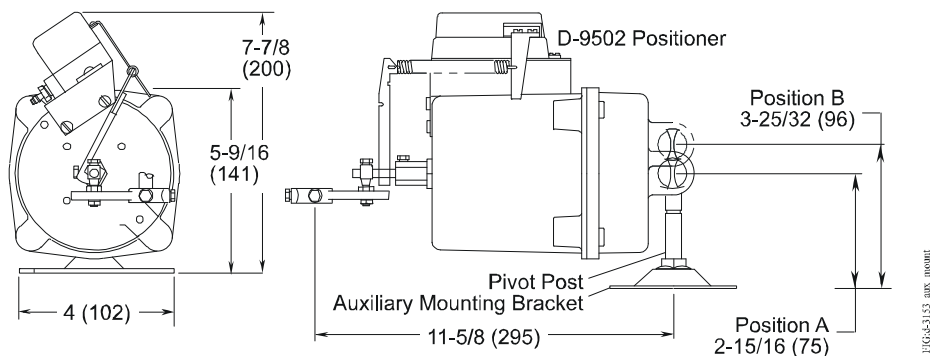


Figure 4: D-3153 Pneumatic Actuator with Auxiliary Mounting Bracket Dimensions, in. (mm)

Table 3: Ordering Information

| Nominal Spring Range, psig (kPa) | With Universal Mounting Bracket | With Auxiliary Mounting Bracket | Body Only |
|--|---------------------------------|---------------------------------|-------------|
| 8 to 13 (56 to 91) | D-3153-2 | D-3153-5 | D-3153-6003 |
| 8 to 13 (56 to 91) with D-9502 | D-3153-1 | D-3153-4 | — |
| 0 to 3 (0 to 21) and 9 to 13 (63 to 91) with 2-stage Pilot | — | D-3153-18 | — |
| 5 to 10 (35 to 70) | D-3153-3 | D-3153-6 | D-3153-6002 |
| 3 to 7 (21 to 49) | — | D-3153-7 | D-3153-6001 |

Table 4: Accessories (Order Separately)

| Description | Shipping Weight, lb (kg) | Code Number |
|--|--------------------------|-------------|
| Rubber Boot Kit | 0.2 (0.09) | D-3073-100 |
| Ball Joint, weather resistant | 0.3 (0.11) | D-3073-604 |
| Blade Arm Kit | 1.0 (0.45) | D-9999-100 |
| Crank Arm, 1/2 in. adjustable to 2-3/4 in. radius | 0.5 (0.23) | D-3153-101 |
| Crank Arm, 3/8 in. adjustable to 2-3/4 in. radius | 0.5 (0.23) | D-3153-108 |
| Crank Arm, 7/16 in. adjustable to 2-3/4 in. radius | 0.5 (0.23) | D-3153-109 |
| Linkage Rod, 4 ft (122 cm) | 2.0 (0.91) | D-3153-102 |
| Linkage Rod, replacement | 1.0 (0.45) | D-3153-103 |
| Stop Screw Kit, 1/4 – 24 x 3 in. | 0.5 (0.23) | D-3153-104 |
| Proportional Pilot Positioner Kit ¹ | 2.0 (0.91) | D-9502-8 |
| Ball Joint | 0.5 (0.23) | D-9999-104 |
| Pivot Post, 5 per kit | 0.5 (0.23) | D-3153-110 |
| E-rings for Pivot Post, 10 per kit | 0.5 (0.23) | D-3153-111 |
| Mounting Nuts for Pivot Post, 10 per kit | 0.5 (0.23) | D-3153-112 |
| Universal Mounting Bracket | 3.5 (1.13) | D-3153-105 |
| Auxiliary Mounting Bracket | 1.0 (0.45) | D-3153-106 |
| 2-stage Positioner Kit ¹ | 2.0 (0.91) | D-9502-9 |

1. Positioner kit includes positioner, mounting plate, spring, and mounting hardware.

Technical Specifications

D-3153 Pneumatic Actuator

| | | | | |
|-------------------------------------|--|----------------------------|---------------------------|-----------------------------|
| Product | D-3153 Pneumatic Actuators | | | |
| Stroke | 3 in. (76 mm) | | | |
| Control Air Pressure | 0-20 psig (0-138 kPa) for HVAC 20 psig (138 kPa) minimum for safety damper functions 30 psig (207 kPa) maximum without pilot | | | |
| Air Connections | 1/8 in. NPT straight barbed fitting for 5/32 in. or 1/4 in. O.D. polytubing (furnished) compression fitting for 1/4 in. O.D. copper tubing (optional) | | | |
| Ambient Operating Conditions | -20 to 150°F (-29 to 66°C) | | | |
| Effective Diaphragm Area | 15 in. ² (97 cm ²) | | | |
| Materials | Body: Die-cast Aluminum; Diaphragm: Synthetic elastomer | | | |
| Dimensions (H x W x D) | See Figure 2, Figure 3, and Figure 4 | | | |
| Shipping Weight, lb (Kg) | D-3153-1 11.5 (5.2) | D-3153-3 10.0 (4.5) | D-3153-5 8.5 (3.9) | D-3153-7 8.5 (3.9) |
| | D-3153-2 10.0 (4.5) | D-3153-4 10.5 (4.8) | D-3153-6 8.5 (3.9) | D-3153-18 10.5 (4.8) |

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.



Building Efficiency

507 E. Michigan Street, Milwaukee, WI 53202

Metasys® and Johnson Controls® are registered trademarks of Johnson Controls, Inc.
All other marks herein are the marks of their respective owners. © 2015 Johnson Controls, Inc.