

# D-3153 Pneumatic Actuator

## Product Bulletin

D-3153-xxxx Series

Code No. LIT-2681054P

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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 ft<sup>2</sup> (1.5 m<sup>2</sup>) for proportional volume control, and 25 ft<sup>2</sup> (2.3 m<sup>2</sup>) for 2-position actuation (provided that the torque requirements are compatible with the specific application).

The D-3153 Pneumatic Actuator component is recognized by Underwriters Laboratories Inc.® (UL) for use on UL classified 555/555S smoke and combination fire/smoke dampers which have been tested and approved to a degradation temperature of 250°F (121°C).

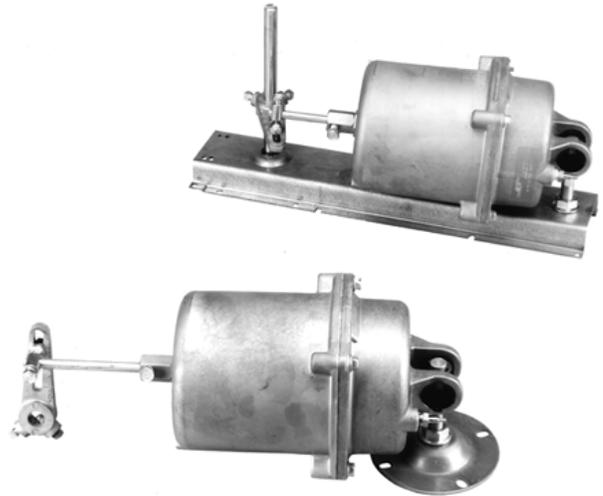


Figure 1: D-3153 Pneumatic Actuator

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
Agency Recognition	Provides a UL recognized component for fire and smoke applications to 250°F (121°C)

### Application

When used with proportional control, the damper size is limited to 16 ft<sup>2</sup> (1.5 m<sup>2</sup>) maximum. As a 2-position control, damper size is limited to 25 ft<sup>2</sup> (2.3 m<sup>2</sup>).

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 Heating, Ventilating, and Air Conditioning (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 UL recognized component 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.

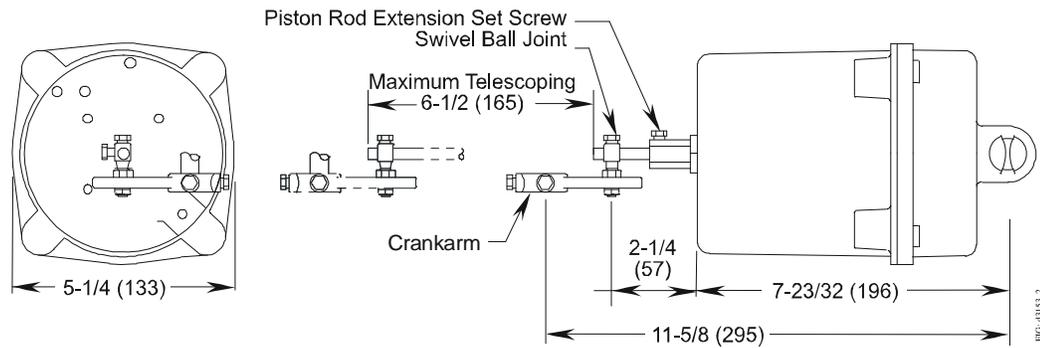
### Repair Information

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.

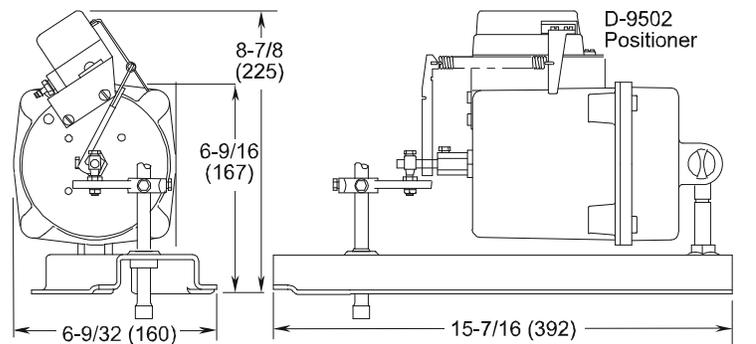
**Table 2: Force Values at 20 psig (140 kPa) Supply**

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

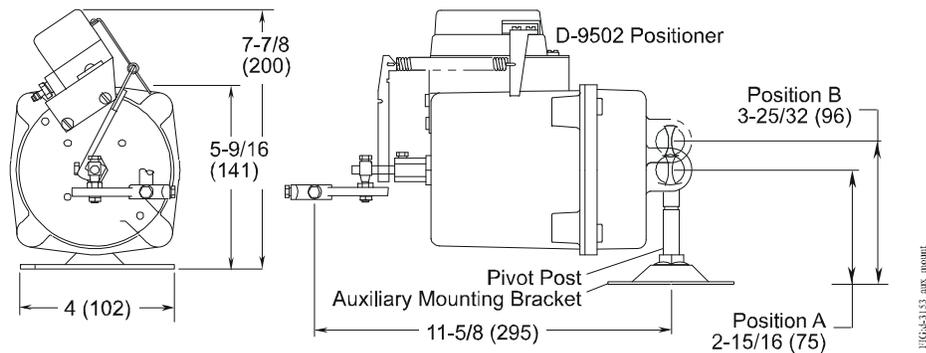
## Dimensions



**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 <sup>1</sup>	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 <sup>1</sup>	2.0 (0.91)	D-9502-9

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

## Technical Specifications

### D-3153 Pneumatic Actuator

<b>Product</b>	D-3153 Pneumatic Actuators
<b>Stroke</b>	3 in. (76 mm)
<b>Control Air Pressure</b>	0-20 psig (0-138 kPa) for HVAC 20 psig (138 kPa) minimum for safety damper functions 30 psig (207 kPa) maximum without pilot
<b>Air Connections</b>	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)
<b>Ambient Operating Conditions</b>	-20 to 150°F (-29 to 66°C)
<b>Effective Diaphragm Area</b>	15 in. <sup>2</sup> (97 cm <sup>2</sup> )
<b>Materials</b>	Body: Die-cast Aluminum; Diaphragm: Synthetic elastomer
<b>Dimensions (H x W x D)</b>	See Figure 2, Figure 3, and Figure 4
<b>Shipping Weight, lb (Kg)</b>	<b>D-3153-1</b> 11.5 (5.2) <b>D-3153-3</b> 10.0 (4.5) <b>D-3153-5</b> 8.5 (3.9) <b>D-3153-7</b> 8.5 (3.9) <b>D-3153-2</b> 10.0 (4.5) <b>D-3153-4</b> 10.5 (4.8) <b>D-3153-6</b> 8.5 (3.9) <b>D-3153-18</b> 10.5 (4.8)
<b>Compliance</b>	UL recognized component to 250°F (121°C) with compression fitting for copper tubing, File No. R15581, D-3153-42 and D-3153-43 ULC Listed

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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