

**Field<sup>IT</sup>**  
**Actuators & Positioners**  
**Linear Piston Actuators**  
Type "LP"



- High resolution, sensitivity, and fast response with proven AV and TZID-C Positioners
- Cylinders available with Buna-N or Viton seals
- Temperature range up to 250°F with AV15, 185°F with TZID-C
- Easy adaptability to air dampers and louvers via clevis and pivot pin mounting
- Drop in replacement for many "older" piston actuators
- Available with built-in 4 to 20mA. position feedback
- Digital features/benefits available with TZID-C positioner, including HART
- The TZID-C200 Positioner option is explosion-proof.



**4 x 4 Cylinder with AV1 Positioner**



**2.5 x 5 Cylinder with TZID-C Positioner**

**Simple Cylinder Actuators**  
**From 2-1/2" dia. x 5" Stroke**  
**To 10" dia. x 16" Stroke**

## LINEAR PISTON ACTUATORS - TYPE "LP"

### Simple Cylinder Actuators From 2-1/2" dia. x 5" Stroke to 10" dia. x 16" Stroke

LP linear piston actuators are typically used to control the position of airflow regulating dampers, butterfly valves, and other similar process regulating devices on furnaces, boilers and air distribution systems. They are most often used on windbox dampers in NOx reduction control systems. When directly connected to a lever on the damper shaft, these actuators provide accurate positioning control at minimum.

The LP air cylinders are available with either Buna-N nitrile rubber seals or with Viton seals. The Buna-N seals offer lower internal friction, somewhat longer life, and are suitable over a wider temperature range from -40°F to 185°F. Viton seals, while excellent at temperatures up to and exceeding 250°F, are not suitable for temperature below freezing.

LP Actuators can be supplied with either conventional Type AV pneumatic positioners, or TZID-C digital "Smart" positioners. The AV positioners with 3 to 15 psi or 3 to 27 psi control input signals can be supplied with Viton o-rings and Fluoro-silicon diaphragms, making them suitable for operating temperatures up to 250°F. This same positioner can also be supplied with Buna-N seals suitable for up to 185°F. The 4 to 20 ma. input AV and the TZID-C positioner are also available in an Explosion-proof variation. These variations are selectable in the Nomenclature. Note that adding a 4 to 20 ma. position feedback transmitter option limits the operating temperature to 185°F.

The LP cylinder sizes range from 2.5" diameter x 5" stroke to 10" diameter x 16" stroke. The most common sizes, 2-1/2" x 5" and the 4" x 4", are typically available from stock or on short turn-around.

### TZID-C Digital Features and Benefits

Microprocessor-based  
Highest operating accuracy  
Local keypad, two line LCD and position indicator  
Easy local configuration operation  
Digital communication via HART, Foundation  
Fieldbus, and Profibus  
Remote configuration and monitoring  
Configurable operating parameters  
Easy set-up of direct/reverse action, limit stops, etc.

Integrated position feedback  
Analog and / or digital feedback without additional external devices to calibrate and maintain  
Diagnostics and self-monitoring capabilities  
Easy trouble-shooting and preventive maintenance  
Immunity to shock and vibration  
Installation in high vibration areas

### Thrust Ratings:

The basic thrust rating of a pneumatic piston is equal to the area of the piston times the supply pressure. The minimum supply pressure for both the TZID-C and the AV1 is 20 psi.

The maximum supply pressure for the TZID-C is 90 psi and 125 psi for the AV positioner.

The area of the piston is  $A = \pi D^2/4$ . Subtract about 10% for friction losses and because the rod side of the piston has less area. Then multiply this area by supply pressure in psi. An example is given below for an 80 psi air supply

Notes:

To find the lever length for 90° rotation, multiply the cylinder stroke length by 0.707.

Torque equals thrust (lbs) times the lever radius (ft.).

Operating Torque/Thrust Characteristic	Actuator Type						
	LP10	LP20	LP30	LP32	LP40	LP50	LP60
Area-Retracting (Rod Side)	4.71 in. <sup>2</sup>	11.2 in. <sup>2</sup>	26.8 in. <sup>2</sup>	26.8 in. <sup>2</sup>	48.8 in. <sup>2</sup>	48.8 in. <sup>2</sup>	76.1 in. <sup>2</sup>
Area-Extending (other side)	4.91 in. <sup>2</sup>	11.94 in. <sup>2</sup>	28.3 in. <sup>2</sup>	28.3 in. <sup>2</sup>	50.3 in. <sup>2</sup>	50.3 in. <sup>2</sup>	78.5 in. <sup>2</sup>
Force out @ 80 psi <sup>1</sup>	339 lbs.	806 lbs	1932 lbs.	1932 lbs.	3512 lbs.	3512 lbs.	5479 lbs.
Lever Length for 90° Rotation	3.54 in.	2.83 in.	5.66 in.	11.32 in.	5.66 in.	11.32 in.	11.32 in.
Operating Torque @ 80 psi <sup>2</sup>	71 ft. lbs.	135 ft. lbs.	911 ft. lbs.	1400 ft. lbs.	1657 ft. lbs	2342 ft. lbs.	3654 ft. lbs.

Note 1: Use the rod side area x psi to calculate force. Subtract 10% for friction loss.

Note 2: Torque at mid-stroke is 1.4x torque at +/- 45°

## Ordering Information:

"Simple Cylinder" type Linear pneumatic piston actuators are supplied with either type AV conventional or type TZID-C intelligent positioners mounted on the cylinder. Cylinders are supplied with a threaded clevis on the rod end. Base mounting pivots can be ordered as an accuracy. A protective boot is optional.

The cylinders can be supplied with either Buna-N nitrile rubber seals suitable for 200°F operation or Viton seals suitable for 300°F operation. The Buna-N seals have a lower breakaway pressure, offering smoother modulating control.

The operating temperature for the AV15 & AV16 is 250°F. All other positioners have a 185°F maximum ambient. Buna-N seals are recommended unless temperatures > 200°F dictate Viton. The TZID-C200 is for Explosion Proof application Class 1 Div 1 Gr C-G. Refer to the AV or TZID-C positioner specifications for positioner details and specifications.

The maximum supply pressure with type TZID positioners is 90 psi. The maximum supply pressure with type AV positioners is 125 psi.

## Linear Pneumatic Piston Actuators Ordering Information

Type "LP"	01	02	03	04	05	06	07	08	09	10	11
Cylinder Size:											
2-1/2" d. x 5" stroke .....		LP10									
4" d. x 4" stroke .....		LP20									
6" d. x 8" stroke .....		LP30									
6" d. x 16" stroke .....		LP32									
8" d. x 8" stroke .....		LP40									
8" d x 16" stroke .....		LP50									
10" d x 16" stroke .....		LP60									
Cylinder Seals:											
Buna-N cylinder seals (-40° to 185°F) .....					B						
Viton cylinder seals (30 to 250°F) .....					V						
Positioner Type											
AV15, 3-15 psi in. 250°F .....						1	0		0		
AV16, 3-27 psi in. 250°F .....						2	0		0		
AV232__00, 4-20 mA in. 185°F .....						3					
AV11, 3-15 psi in. 185°F .....						4					
AV12, 3-27 psi in. 185°F .....						5					
TZID-C, 4-20 mA in. 185°F, fail safe .....						A					
TZID-C, 4-20 mA in. 185°F, fail in place .....						B					
TZID-C200, 4-20 mA in. 185°F, fail safe .....						C					
TZID-C200, 4-20 mA in. 185°F, fail in place .....						D					
Position Feedback											
No Position Feedback .....							0				
With 4-20 mA Position Feedback (185°F max. see note 1) .....							1				
Travel Switches											
No Travel Switches .....								0			
With 2 digital switches TZID-C only (with FM/CSA approval) .....								1			
With 2 micro switches TZID-C only (no FM/CSA approval) <sup>2</sup> .....								2			
Manifold											
Without Manifold .....									0		
Manifold w/Bypass valve & gage ports (See note 1) .....									1		
Mounting											
Standard clevis and pivot (with example dwgs) .....										0	
Standard clevis and pivot tab with boot .....										1	
Tubing											
Tubing with brass fittings (std) <sup>3</sup> .....											0
Stainless steel tubing with stainless steel fittings .....											S
Instruction Manual (one copy is supplied with order)											
											PN25008

Note (1): Not in combination with AV15 or AV16. Due to 185°F max. temperature rating.

Note (2): Microswitch rating is 24 V and cannot be used in process that require FM/CSA but can be used with TZID-C200 for CI 1 Div 1 Explosionproof, (refer to TZID-C200 data sheet)

Note (3): All LP10/20 supplied with copper tubing as standard larger sizes up to LP60 supplied with TBG-Nylon tubing.

## "LP" Actuator Accessories:

1. Base Mounting Pivot Brackets,  
Type MP, including pivot pin and hairpin clip.

Actuator	Pivot Bracket p/n
LP 10	CB500/PC500
LP 20	CB500/CP500
LP 3_	EB1000/CP1000
LP40	CF
LP50	EB1000XX/CP875C-X
LP60	EB1375/CP1375

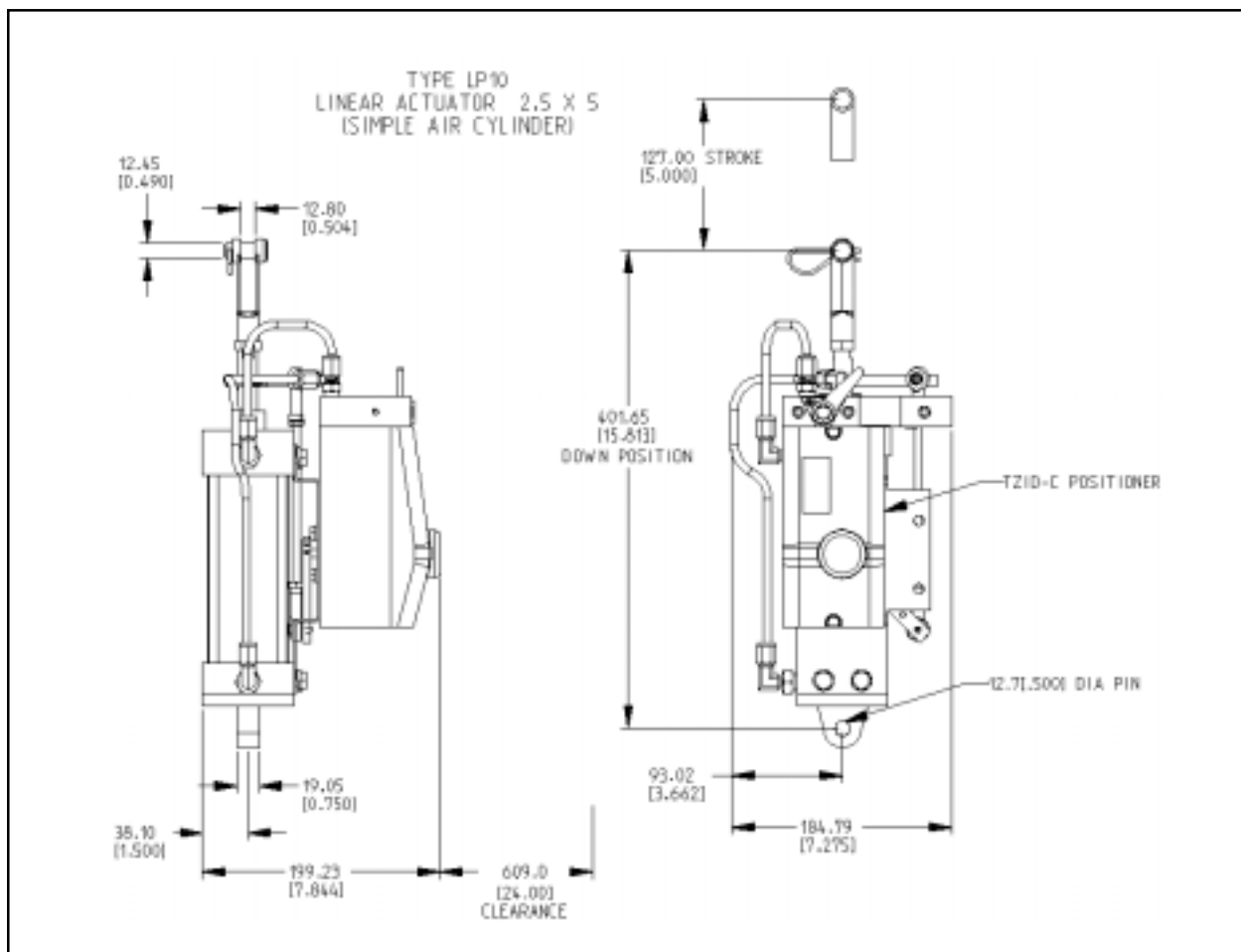
2. Pressure Gages  
Instrument: 0-30 psig range 5326605A4  
Supply: 0-160 psig range 5326605A5  
Output: 0-160 psig range 5326605A6

3. Supply Air Filters and Regulators for LP10-LP40:  
Supply Air Coalescing Filter, 250 psi max  
1/4 - 18 NPT 5328563\_2  
(Parker 11F16EC)

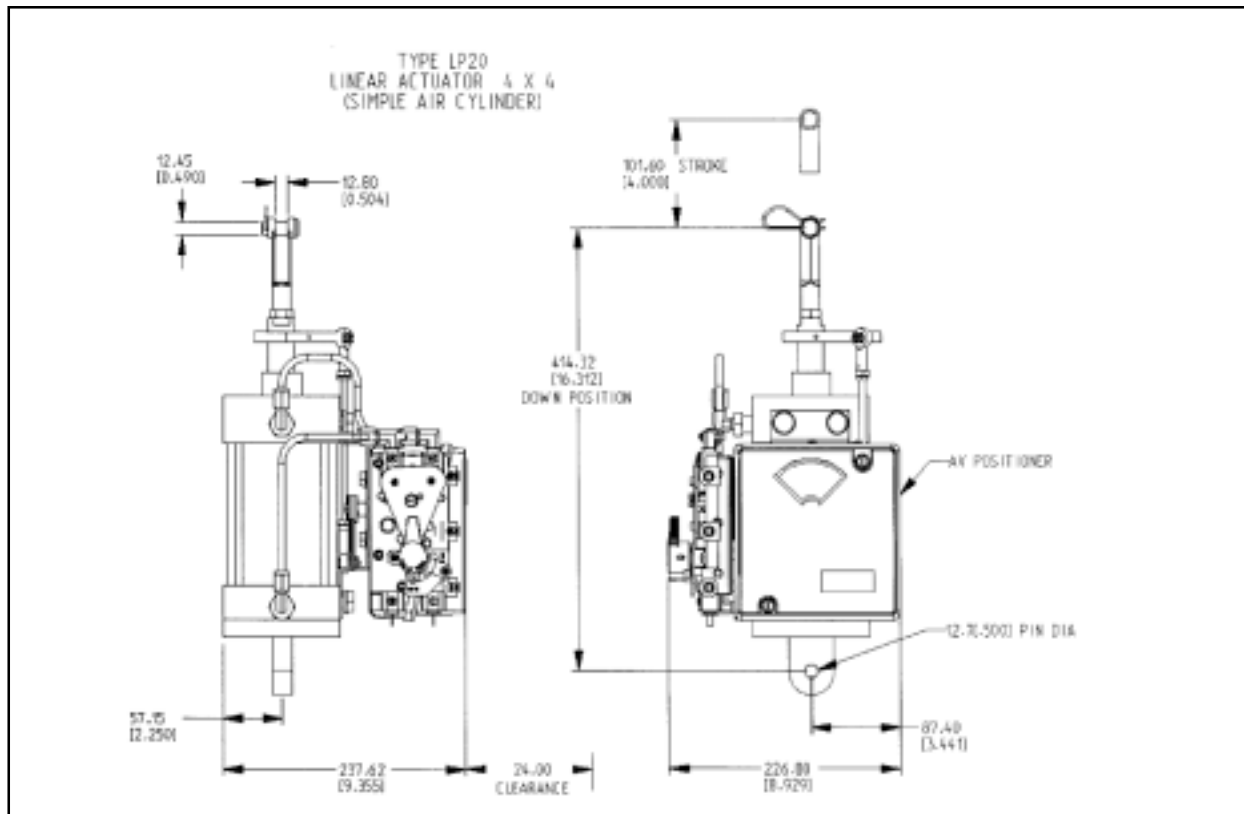
Supply Air Regulator with gage  
250 psi, max, 1/4 - 18 NPT 1951029\_5  
(Parker 06R118AC)

Supply Air Coalescing Filter-Regulator for  
LP50-LP60  
250 psi max., 1/2 NPT,  
40 SCFM 1951439\_1  
(Parker 12E37H18AA/PS807P)

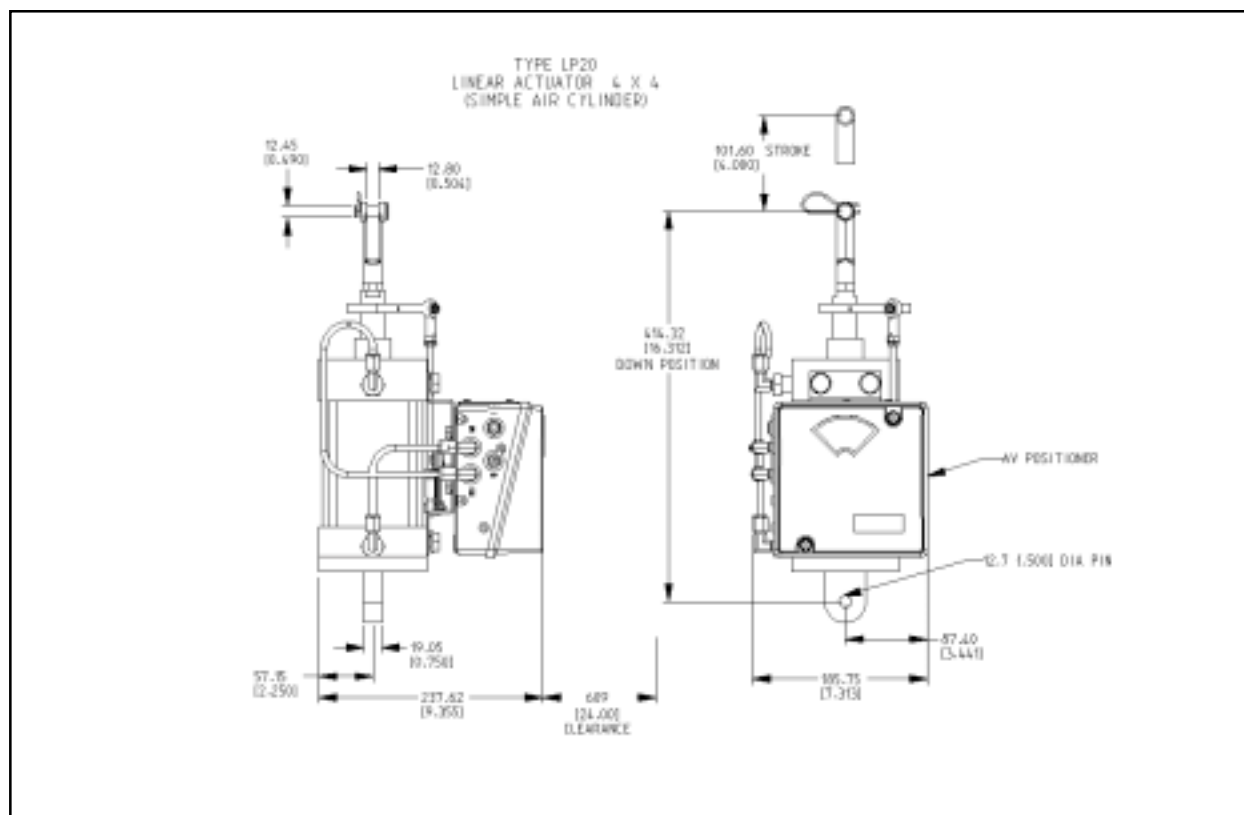
4. Supply Pressure Alarm  
Switch (adjustable 0-100psi) 1941099\_1  
(rated 13 amps AC, 0.5 amps DC)



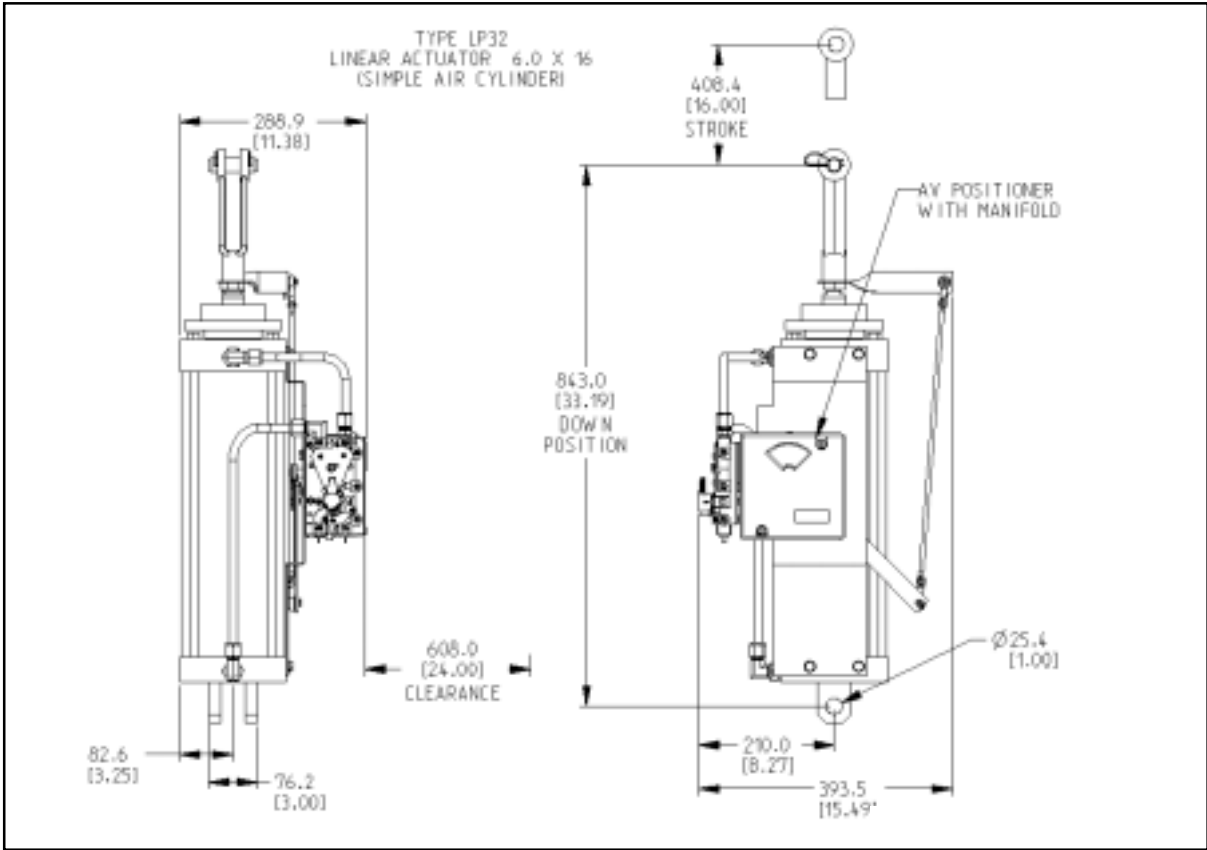
LP-10 TZID-C Positioner with Manifold



LP 20 AV Positioner with Manifold



LP 20 AV Positioner without Manifold



Type LP 32 / AV Positioner with Manifold

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