Fisher® 585CLS Long Stroke Piston Actuators

The 585CLS linear piston actuator is a powerful, double-acting actuator that provides accurate throttling or on-off operation for sliding-stem control valves.

The 585CLS piston actuator is available with travel capabilities exceeding 203 mm (8 inches) up through 610 mm (24 inches). It can be used with switching valves for on-off control, or with the DVC6200 digital valve controller for throttling applications.

The 585CLS has a wide-range of supply pressure capabilities, up to 150 psig. As the 585CLS is double-acting, the positioner supplies air to both sides of the piston, resulting in stiff, precise movement and control.

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Fisher 585CLS Piston Actuator

Features

- **High Thrust Capability--** With standard air supply, the Fisher 585CLS can produce up to 103,000 Newtons (23,000 lbs) of force.
- **Wide Range of Sizes--** The 585CLS family of actuators offers a wide range of sizes, with piston areas of 154 sq cm (17 sq in) up to 993 sq cm (154 sq in).
- **Rugged Construction--** The 585CLS standard yoke material is structural steel, resulting in robust construction and increased thrust capability.
- **Broad Travel Capability--** The 585CLS is capable of travels exceeding 203 mm (8 inches) up through 610 mm (24 inches).
- **High-Performance Instrumentation--** 585CLS actuators are available with a variety of positioners and accessories, including the FIELDVUE™ DVC6200 Digital Valve Controller. The 377 trip valve and tank system are also available for fail-safe action.

Specifications

Operating Pressure(1)

Minimum Recommended: For valves with low thrust requirements—2.4 bar (35 psig); for all other valves—3.4 bar (50 psig)
Maximum Allowable: 127 mm (5-inch) to 305 mm (12-inch) diameter cylinders—17.2 bar (250 psig) unless limited by maximum allowable supply pressure of positioner or switching devices; 356 mm (14-inch) diameter cylinder—13.8 bar (200 psig) unless limited by maximum allowable supply pressure of positioner or switching device

Travel Information

All Types: 229 mm (9 inches) through 610 mm (24 inches) in 25 mm (1-inch) increments as shown in figure 1.
Travel Ratio for Handwheel Construction: 10 complete revolutions of wheel moves stem 25 mm (1 inch)

Thrust Information

See table 3

Operative Ambient Temperature(1)

Standard:
-23 to 74°C (-10 to 165°F)
Optional:
Low Temperature: -46 to 66°C (-50 to 150°F)
High Temperature: -23 to 121°C (-10 to 250°F)

Piston Diameters and Areas

See table 3

Yoke Boss and Valve Stem Diameters

See table 2

Pressure Connections

Standard is 1/4 NPT. For larger sizes, consult your Emerson Process Management sales office

Construction Materials

Part	Material
Cylinder Body: 127 mm through 356 mm (5-inch through 14-inch)	Steel, chrome plated
Piston Rod	Steel, chrome plated
Yoke	Structural Steel

Options

■ 377 trip valves to fail actuator up, down, or lock in last position, ■ Limit switches, ■ Side-mounted handwheel

Dimensions

See figure 1

1. The pressure/temperature limits in this bulletin and any applicable standard or code limitation for valve should not be exceeded.

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Features and Advantages

Table 1. Features and Advantages

Features	Advantages
High thrust capability	With air supply capability of up to 150 psig, the 585CLS can produce up to 99600 Newtons (22400 pounds) thrust to overcome high valve unbalance.
Long stroke	Depending on size, strokes of 229 mm (9 inches) through 610 mm (24 inches) are available.
Wide range of sizes	The 585CLS is available in piston sizes from 127 mm (5 inches) through 356 mm (14 inches).
Valve mounting capability	Depending on size, the 585CLS can be mounted to yoke boss diameters of 127 mm (5H inches) and 178 mm (7 inches), and valve stem diameters of 31.8 mm (1-1/4 inch) to 50.8 mm (2 inch).
High frequency response	The double-acting construction allows quick response to instrument signals.
Stiff construction	Pressure on both sides of the piston, plus the relatively small volume of air within the cylinder, results in stiff, precise positioning.
Handwheels	585CLS is available with a side-mounted handwheel.

Principle of Operation

The 585CLS piston actuator uses a piston that moves inside the actuator cylinder.

From an equilibrium state, the actuator reacts to a force unbalance that is created by increasing supply pressure on one side of the piston,and decreasing it on the other. This moves the piston up or down, and results in a repositioning of the valve control element.

Instrument and Accessory Selection

An excellent selection of sensitive and accurate instruments and accessories is available for 585CLS piston actuators. These include FIELDVUE DVC6200 digital valve controllers, 3600 pneumatic (P/P) and electro-pneumatic (I/P) positioners, TopWorx™ DXP M21GNEB electrical valve stem position switch, 377 trip valve, 4200 electronic position transmitter, and limit switches. They are described in separate publications. Contact your Emerson Process Management sales office for details.

Installation

The actuator may be installed in any orientation but normal installation is with the actuator vertical above the valve. Actuator and positioner dimensions are shown in figure 1.

If the supply source is capable of exceeding the maximum actuator operating pressure or instrument supply pressure, appropriate steps must be taken during installation to protect the instrument and all connected equipment against overpressure.

Actuator Data

See table 2 for yoke boss and valve stem diameters, and table 3 for actuator thrust capabilities.

Table 2. Yoke Boss and Valve Stem Diameters

ACTUATOR SIZE	YOKE BOSS DIAMETER		VALVE STEM DIAMETER	
	mm	Inches	mm	Inches
All	127 178	5H[1] 7	25.4 or 31.8 50.8	1 or 1-1/4 2

1. Heavy actuator to bonnet bolting.

Table 3. Thrust

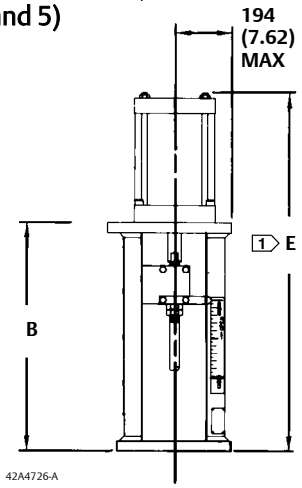
PISTON DIAMETER	STROKE	PISTON ROD SIZE	PISTON AREA	TOTAL THRUST(1)						
				Operating Pressure, bar						
				2.8	4.1	5.5	6.9	8.3	9.7	10.3
mm		mm	cm^2	Force, Newtons						
127	Push	---	127	3500	5250	6980	8720	10500	12200	13100
152			182	5030	7560	10100	12600	15100	17600	18900
203			323	8940	13400	17900	22400	26800	31300	33500
254			507	14000	21000	27900	34900	41900	48900	52500
305			730	20100	30200	40300	50300	60500	70300	75600
356			993	27400	41100	54700	68500	82300	96100	103000
127	Pull	44.5	111	3060	4580	6140	7650	9210	10700	11500
152			167	4580	6890	9210	11500	13800	16100	17300
203			309	8500	12800	17000	21300	25500	29800	31900
254			491	13600	20300	27100	33900	40700	47600	50700
203	Pull	63.5	293(2)	8050	12100	16100	20200	24200	28200	30200
254			475(3)	13100	19700	26200	32700	39300	45800	48900
305			698	19300	28900	38500	48000	57800	67200	72100
356			961	26500	39800	52900	66300	79600	93000	99600
PISTON DIAMETER	STROKE	PISTON ROD SIZE	PISTON AREA	Operating Pressure, psig						
				40	60	80	100	120	140	150
Inches		Inches	$Inches^2$	Force, Pounds						
5	Push	---	19.6	786	1180	1570	1960	2360	2750	2950
6			28.3	1130	1700	2260	2830	3390	3960	4240
8			50.3	2010	3020	4020	5030	6030	7040	7540
10			78.5	3140	4710	6280	7850	9420	11000	11800
12			113.1	4520	6790	9050	11300	13600	15800	17000
14			153.9	6160	9240	12300	15400	18500	21600	23100
5	Pull	1-3/4	17.2	689	1030	1380	1720	2070	2410	2580
6			25.9	1030	1550	2070	2590	3100	3620	3880
8			47.9	1910	2870	3830	4790	5740	6700	7180
10			76.1	3050	4570	6090	7610	9140	10700	11400
8	Pull	2-1/2	45.4(2)	1810	2720	3630	4540	5440	6350	6800
10			73.6(3)	2950	4420	5890	7360	8840	10300	11000
12			108.2	4330	6490	8660	10800	13000	15100	16200
14			149.0	5960	8940	11900	14900	17900	20900	22400

1. For operating pressures above 10.3 bar (150 psig), consult your Emerson Process Management sales office.
2. For travels greater than 406 mm (16 inches) with 10.3 to 17.3 bar (150 to 250 psig) operating pressure.
3. For travels greater than 406mm (16 inches).

Table 4. Dimensions (Fabricated Yoke)

TRAVEL		DIMENSION					
		B		E (w/o Handwheel)		E (w/ Handwheel)	
mm	In.	mm	In.	mm	In.	mm	In.
229	9	762	30	1217	47.9	1722	67.8
254	10	762	30	1242	48.9	1748	68.8
279	11	762	30	1267	49.9	1773	69.8
305	12	762	30	1293	50.9	1798	70.8
330	13	864	34	1420	55.9	2027	79.8
356	14	864	34	1445	56.9	2052	80.8
381	15	864	34	1471	57.9	2078	81.8
406	16	864	34	1496	58.9	2103	82.8
432	17	965	38	1623	63.9	2332	91.8
457	18	965	38	1648	64.9	2357	92.8
483	19	965	38	1674	65.9	2383	93.8
508	20	965	38	1699	66.9	2408	94.8
533	21	1067	42	1826	71.9	2637	103.8
559	22	1067	42	1852	72.9	2662	104.8
584	23	1067	42	1877	73.9	2687	105.8
610	24	1067	42	1902	74.9	2713	106.8

Figure 1. Dimensions for Constructions without Handwheels (Fabricated Yoke) (also see tables 4 and 5)



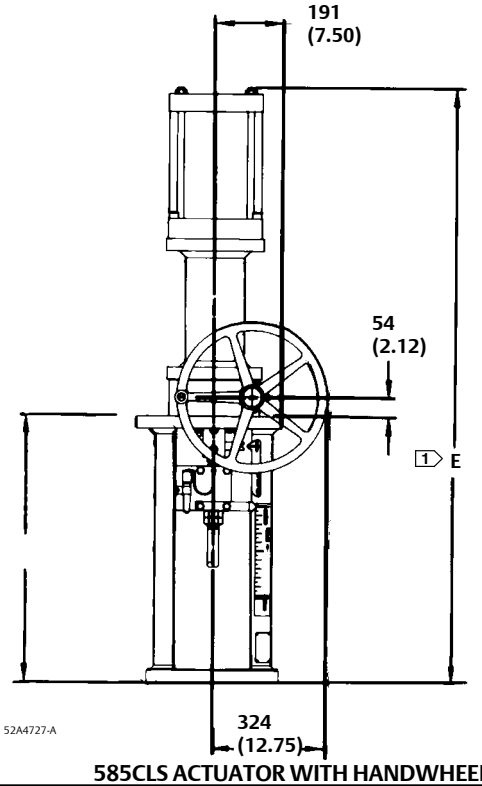
585CLS ACTUATOR

Note:
1 The E dimensions shown are for a 356 mm (14-inch) diameter piston. The E dimension for smaller pistons will be slightly less. Subtract the following value from the E dimension for smaller cylinders.

Table 5. Dimension E Correction Factor (Fabricated Yoke)

Cylinder Diameter mm (Inch)	127 (5)	152 (6)	203 (8)	254 (10)	305 (12)	356 (14)
E Dimension Correction Factor mm (Inch)	84 (3.3)	69 (2.7)	82 (3.2)	46 (1.8)	33 (1.3)	0 (0)

Figure 2. Dimensions for Constructions with Handwheels (Fabricated Yoke) (also see tables 4 and 5)



585CLS ACTUATOR WITH HANDWHEEL

Note:
1 The E dimensions shown are for a 356 mm (14-inch) diameter piston. The E dimension for smaller pistons will be slightly less. Subtract the value located in table 5 from the E dimension for smaller cylinders.

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