

CVS Controls Series 491 High Thrust Actuator

The CVS Series 491 Pneumatic Actuator is a high thrust, long travel actuator suitable for globe and angle, large capacity valves.

Available in 12 and 14 Inch cylinder diameter, for thrust requirements up to 30,800lbs (137,000 Newton)

For applications which require travel requirements up to 24 Inches (610mm)

The CVS Series 491 actuator is direct or reverse action, and is field reversible, without the need for any additional parts.

Suitable for on/off service where the action of the cylinder is loaded and unloaded by operation of a pneumatic switching valve, solenoid or similar.

The CVS Series 491 is also available with a handwheel for manual operation if required (CVS Series 491-5).



CVS Series 491 Actuator

Specifications

Cylinder Pressure:

- Minimum cylinder pressure required for valves with low torque applications is 35psi (2.4 bar)
- Maximum allowable cylinder pressure for 12" diameter cylinder is 250 psi (17.2 bar)*
- Maximum allowable cylinder pressure for 14" diameter cylinder is 200 psi (13.8 bar)*

*Unless limited due to maximum allowable supply pressure of switching device or positioner.

Maximum Supply Source Consumption – Dependant upon cylinder volume and supply pressure.

Travel:

Travel increments of 1 inch (25mm) ranging from 9 inch (229mm) through 24 inches (610mm)
Series 491-5 Handwheel – 10 full rotations of the handwheel will move stem 1 inch (25mm).
Handwheel rim force is 53lb (236 N), producing an handwheel output force of 8490 in/lbs (959 Nm)

Operating Ambient Temperature range: -29°C to 81°C (-20°F to 180°F).

Yoke and Valve Stem Diameters: CVS Series 491 and 491-5 have a 5 inch (127mm) Yoke Boss for a 1 or 1-1/4" Stem Diameter (25.4 or 31.8mm).

Standard Pressure Connection: 1" NPT

Materials – Standard:

Cylinder – 12 and 14 Inch – Steel, chrome plated

Stroking Speed:

12 Inch (305mm) – 0.45 Inches/Second (11mm/Second)

14 Inch (356mm) – 0.33 Inches/Second (8mm/Second)

Effective Piston Area – In²

Stroke	Piston Rod Size (in)	Piston Diameter (in)	
		12	14
Push		113.10	153.94
Pull	1-3/4		

CVS Series 491 Actuator – Operation and Installation

CVS Series 491: The CVS Series 491 is a pneumatic piston actuator, with a yoke mounted air cylinder suitable for high thrust long stroke applications.

CVS Series 491-5: The CVS Series 491-5 is the same as a Series 491 with the exception of having a handwheel.

Actuator Installation:

The typical installation is vertical and above the valve, however, installation may be in any position. **Always follow proper safety procedures prior to any installation or maintenance.** Inspect the actuator for any signs of damage which may have occurred in transit. Follow proper piping procedures and ensure the valve and connecting pipelines are free from any debris or foreign material.

If the CVS Series 491 Actuator has been purchased separately for a field installation, mount the actuator on the valve and secure to the bonnet using the 8 bolts. Stem connections may be made to clamp the actuator stem and valve stem together to provide proper valve travel. Refer to “making stem connections” for more information if required.

Maintenance:

Note: Ensure proper Safety and Lockout procedures are followed prior to inspection.

Relieve all pressure to the actuator and disconnect air supply line to avoid sudden open or close action of the valve.

Shut off process to the valve or use bypass to isolate and relieve process from both sides of the valve installation.

1. Disconnect cylinder tubing from the cylinder and positioner as required.
2. Release the stem connection by backing off the Stem Locknuts, and remove the four cap screws from the stem connector. Feedback arm and travel indicator may be removed as required by removing four cap screws. The complete actuator assembly may be uninstalled by removing the 8 Actuator to Bonnet Bolts.
3. If service or maintenance requires removal of the Cylinder Assembly, remove four cap screws that fasten the Cylinder Assembly to the Yoke.

CVS Series 491 Actuator - Maintenance

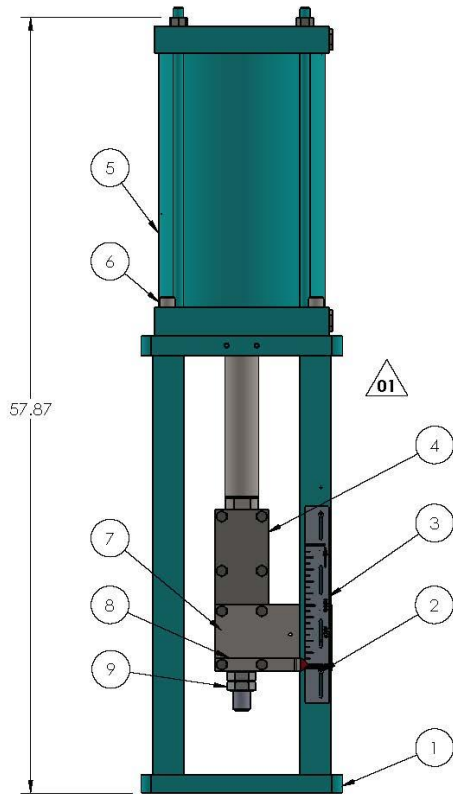
Cylinder Assembly Maintenance:

The CVS 491 Cylinder Assembly components are easily field serviceable. To inspect piston seals the cylinder assembly may be left installed on the actuator yoke. Remove 4 Hex nuts securing the Cylinder top Flange and remove components to inspect or replace as required.

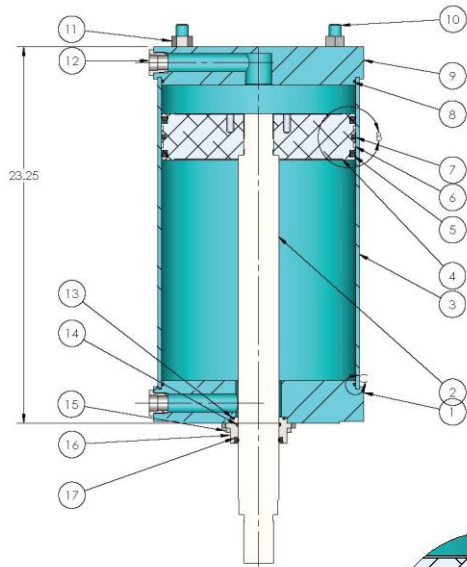
Stem Connections:

1. Once the control valve is installed and the actuator mounted, start with the valve in the closed position. Thread the two Stem Locknuts all the way onto the stem thread.
2. Fully retract the cylinder, then manually or with air extend the Piston Rod to the desired valve travel.
3. Attach the Stem Connector using the supplied hex bolts securing the Piston Rod Extension to the valve stem. Attach feedback arm and travel indicator as required.
4. Cycle the actuator, checking for desired total travel, and confirm that the valve plug seats before the cylinder reaches the end of the stroke.
5. Adjustments may be made as needed by loosening the Stem Connector slightly, tighten the Stem Locknuts together, and with the valve plug off the seat: screw the stem into or out of as needed using a wrench on the Stem Locknuts.
6. Once valve travel is confirmed, tighten the Stem Connector, lock the Stem Locknuts against the Stem Connector. Adjust the Travel Indicator Scale on the yoke to reflect the correct valve position.
7. Use a gauge if necessary, to measure pressure to the actuator.

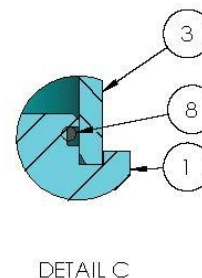
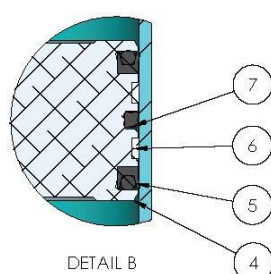
CVS Series 491 Actuator – Assembly – 12 Inch Cylinder



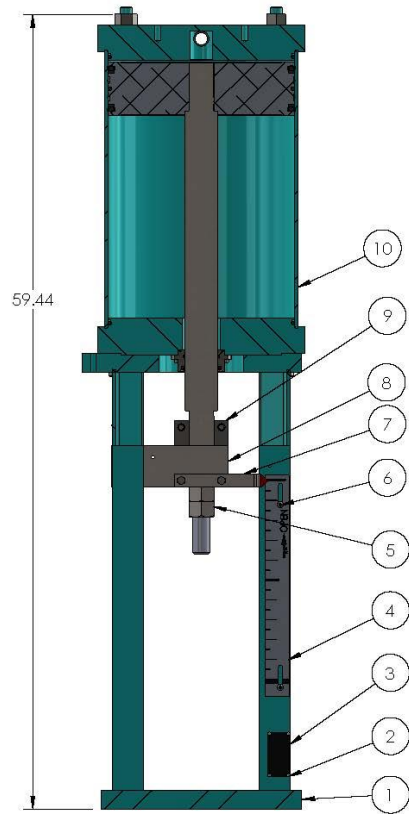
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CVS 41A7093X012	YOKE	1
2	CVS 1A343128982	SCREW, 10-24, 1/2" LONG	2
3	CVS 31A7168X012	TRAVEL SCALE, 8 7/8" TRAVEL	1
4	CVS 21A7157X012	STEM CONNECTOR	1
5	CVS 491AC12-000	AIR CYLINDER ASSEMBLY	1
6	CVS 1P3708285982	CAP SCREW	4
7	CVS 22A5882X012	FEEDBACK ARM	1
8	CVS 11A7158X012	TRAVEL INDICATOR	1
9	CVS 0W073524122	HEX NUT, 1 1/4-12UNF	2



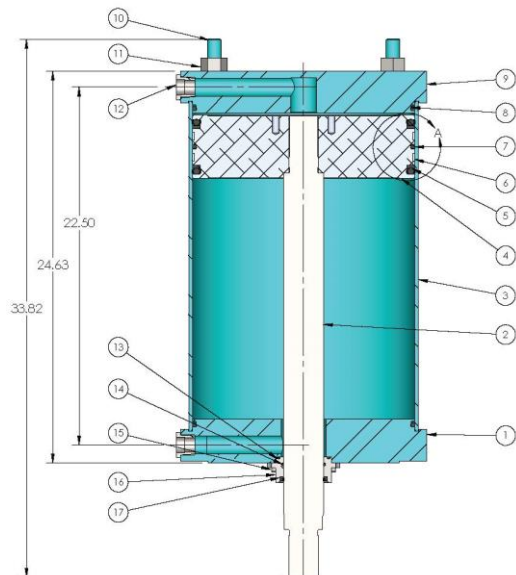
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CVS 491AC12-001	AIR CYLINDER BOTTOM FLANGE	1
2	CVS 491AC12-002	PISTON ROD	1
3	CVS 491AC12-003	PISTON CYLINDER	1
4	CVS 491AC12-004	PISTON	1
5	CVS 491AC12-005	PISTON SEAL, LUC375011250	2
6	CVS 491AC12-006	WEAR STRIP, .375(W)x.125(T)x37.7(L)	2
7	CVS 491AC12-007	QUAD O-RING, #4452	1
8	CVS 491AC12-008	O-RING, #277	2
9	CVS 491AC12-009	AIR CYLINDER TOP FLANGE	1
10	CVS 491AC12-010	AIR CYLINDER STAY ROD	4
11	CVS 491AC12-011	3/4-16UNF, HEX NUT	4
12	CVS 491AC12-012	BUSHING, 1" TO 3/4"	2
13	CVS 491AC12-013	O-RING, #234	1
14	CVS 491AC12-014	O-RING, #230	1
15	CVS 491AC12-015	SOCKET HEAD CAP SCREW, 1/4-28, 3/4" LONG	8
16	CVS 491AC12-016	ROD SEAL GLAND	1
17	CVS 491AC12-017	WIPER, WC25003000250	1



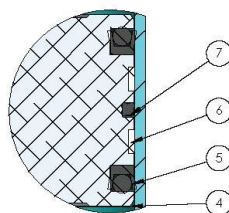
CVS Series 491 Actuator – Assembly – 14 Inch Cylinder



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CVS 41A7097X012	YOKE	1
2	CVS 1A368228982	3/32 RIVET PIN	4
3	CVS 12B6508X0A2	NAME PLATE	1
4	CVS 31A7169X012	TRAVEL SCALE, 14-7/8" VALVE TRAVEL	1
5	CVS 0W073524122	NUT, 1 1/4-12UNF	2
6	CVS 1A851728982	SCREW, 1/4-20, .63" LONG	2
7	CVS 11A7158X012	TRAVEL INDICATOR	1
8	CVS 22A5882X012	ANTI-ROTATOR	1
9	CVS 21A7156X012	STEM CONNECTOR	1
10	CVS 491AC14-000	AIR CYLINDER ASSEMBLY	1
11	CVS 11A7203X012	RH SOCKET SCREW, 7/8-9, 3.75" LONG	4

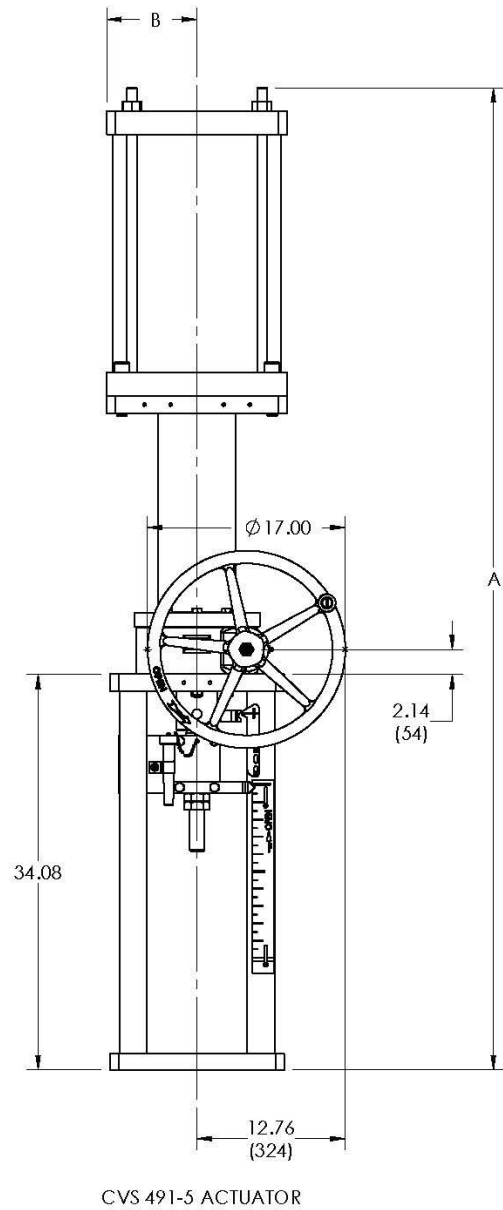
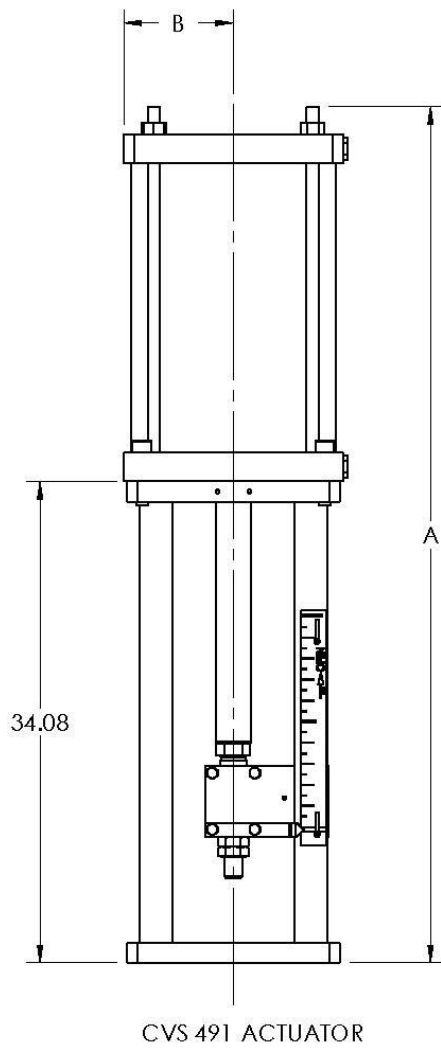


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CVS 491AC14-001	AIR CYLINDER BOTTOM FLANGE	1
2	CVS 491AC14-002	PISTON ROD	1
3	CVS 491AC14-003	PISTON CYLINDER	1
4	CVS 491AC14-004	PISTON	1
5	CVS 491AC14-005	PISTON SEAL, LUC500013000	2
6	CVS 491AC14-006	WEAR STRIP, .500(W)x.125(T)x43.9(L)	2
7	CVS 491AC14-007	QUAD O-RING, #4456	1
8	CVS 491AC14-008	O-RING, #456	2
9	CVS 491AC14-009	AIR CYLINDER TOP FLANGE	1
10	CVS 491AC14-010	AIR CYLINDER STAY ROD	4
11	CVS 491AC14-011	7/8-14UNF, HEX NUT	4
12	CVS 491AC12-012	BUSHING, 1" TO 3/4"	2
13	CVS 491AC12-013	O-RING, #234	1
14	CVS 491AC12-014	O-RING, #230	1
15	CVS 491AC12-015	SOCKET HEAD CAP SCREW, 1/4-28, 3/4" LONG	8
16	CVS 491AC12-016	ROD SEAL GLAND	1
17	CVS 491AC12-017	WIPER, WC25003000250	1



DETAIL A

CVS Series 491 Actuator – Dimensions



Yoke Boss Diameter		Stem Diameter	
In	mm	In	mm
5H	127	1-1/4	31.8

Cylinder Diameter		Dimension					
		A – CVS 491		A – CVS 491-5		B	
In	mm	In	mm	In	mm	In	mm
12	305	58.60	1488	85.56	2097	7.50	191
14	+356	60.60	1539	84.56	2148	7.75	197