



MODEL 520

TOTAL TFE, ANGLE-PATTERN CONTROL VALVE BODY

SECTION I

I. DESCRIPTION AND SCOPE

The Model 520 is a bellows sealed, angle-style control valve fabricated from a tee-block of isostatically compacted virgin TFE. Sizes are 1/2", 1" and 2" (DN15, 25 and 50). The split body jacket is CF8 (304 SST) material. All wetted internal parts are of isostatically compacted TFE material. The standard stem is of 316 SST material; two optional Hastelloy C-276 stem constructions are available.

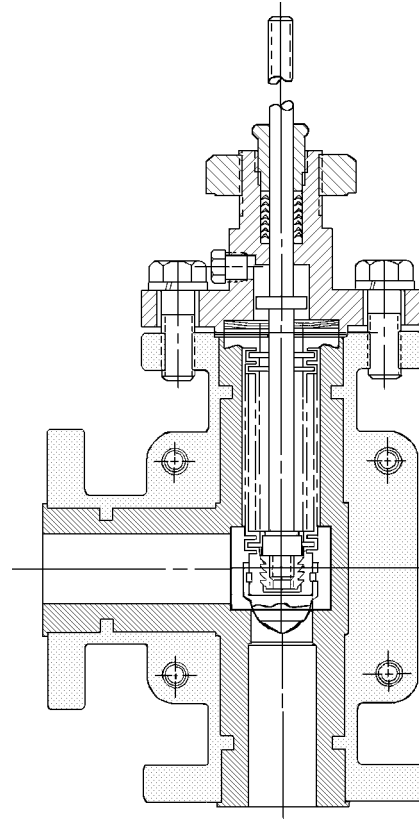
Available with 150# flanged end connections. Each flange is drilled and tapped to receive stud bolting only.

The valve is designed for chemical service with fluids that are normally corrosive to metallic materials.

The Model 520 is a companion product to the Model 521. Though the body sub-assembly and plug are unique to the Model 520, all other parts of the body assembly within and above are the same as for the Model 521.

Only that portion of technical information unique to the Model 520 and different from corresponding instruction for Model 521, is indicated herein.

Actuators that may be mounted to a Model 520 body are Cashco Models 30D or 30R (field reversible), or Models 55D, 55R, 75D, 75R, 115D or 115R (non-field reversible).



Model 520 Body

SECTION II

II. REFERENCES

Refer to Technical Bulletin 520-TB for complete technical specifications of a Model 520 coupled with any of the Cashco Models 30, 55, 75 or 115 actuators.

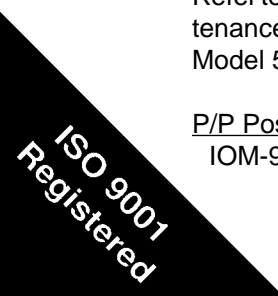
Refer to IOM-521 for detailed instructions of Model 520 along with these specific excerpts.

Refer to the following Installation, Operation and Maintenance Manuals (IOM's) for devices mounted to a Model 520 body or its actuator:

P/P Positioner	I/P Positioner	Actuators
IOM-9540L	IOM-9520L	IOM-30 or IOM-55/75/115

ABBREVIATIONS

ATO-FC ...	Air-to-Open, Fail Closed
ATC-FO ...	Air-to-Close, Fail Open
CCW	Counter-Clockwise
CW	Clockwise
D	Direct Acting
DIR	Direct Acting
HC	Wrought Hastelloy C-276
IAS	Instrument Air Supply
IOM	Installation, Operation & Maintenance Manual
LOAD	Positioner Output Air Pressure
R	Reverse Acting
REV	Reverse Acting
SIG	Output Signal from Instrument
SST	Cast or Wrought Stainless Steel
V	Vent



SECTION III

III. INSTALLATION

A. Orientation

1. Recommended orientation when installed is in a horizontal pipeline with the stem vertical. Valves may be installed in a vertical or horizontal pipeline with the stem between vertical and horizontal for all sizes, except when a Model 115D or 115R actuator is utilized. All valves with 115D/115R actuators must be installed with a vertical stem orientation.
2. Outdoors, all installations may be oriented at any angle from horizontal-to-vertical, except as limited in III.A.1. above. Orient actuator vent cap, if supplied, to not collect rainwater that might freeze.
3. Model 520 valves should not be installed with the stem oriented below horizontal/downwards.
4. In no case is additional weight to be applied to the actuator sub-assembly when installed in an orientation other than vertical.



WARNING!!

The valve/actuator unit should not be used as a "step" to support personnel. Failure to comply may cause leakage at the bonnet/body joint, allowing possible contact with harmful fluids.

B. Piping System:

1. It is recommended that the control valve unit be installed with a double-block and bypass as indicated in Figure 1. This arrangement is

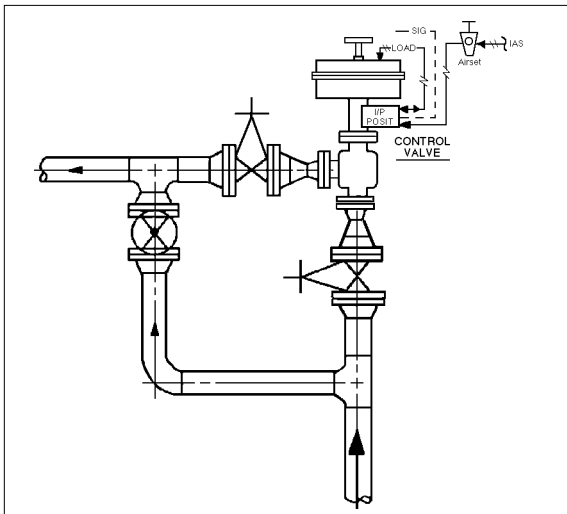


Figure 1: Typical Control Valve Station

recommended especially where maintenance will be done on the valve body while still installed in the pipeline.

2. If pipe reducers are located before and/or after the valve body, keep the reducers as close as practical to the valve body; this is especially important where the reducers are more than one line size larger than the valve body size, which is common in gaseous service.
3. Clean the piping of all foreign debris, including chips, weld scale, weld splatter, oil, grease, sand or dirt prior to installing the control valve; THIS IS AN ABSOLUTE REQUIREMENT.
4. Field hydrostatic testing the completed piping system, including the Model 520, to 1-1/2 x CWP indicated on Model 520 nameplate is acceptable. If hydro test pressure exceeds the 1-1/2 x CWP limit, the 520 must be removed for such testing. Before pressurization, the valve plug should be lifted from the seat if of reverse, ATO-FC action.
5. Flow Direction: Install so the flow direction matches the arrow cast on the valve body.
6. Valves are not to be direct buried underground.
7. Insulation may be applied as indicated in Figure 2. Drainage from the packing area must be assured when fully installed, sealed and lagged for outdoors installation. Vented pipe plug (12) should not be covered.

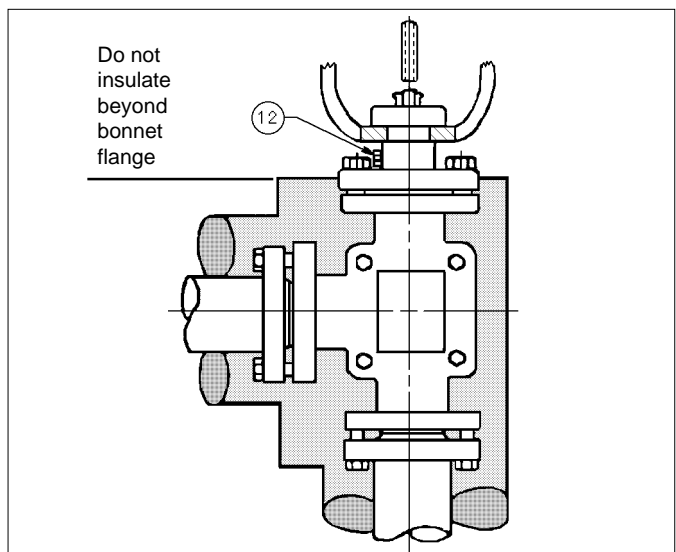


Figure 2: Body Insulation

8. Undue piping stress/strain or bending torques may not be transmitted thru the control valve

body. One pipe (inlet or outlet) should be anchored rigidly for piping that is "hot" or "cold" with respect to ambient temperature; the remaining pipe (inlet or outlet) should be supported and guided to assure unidirectional expansion/contraction. Properly align prior to installing valve with required flange bolting.

9. The Model 520 is designed for a flanged connection that is gasketless. The raised face portion of end connection flange serves as the gasket.
10. Flange bolting must be of the stud-type. Each flange is drilled and tapped to accept studs. The studs should be of a length to penetrate the full depth of the bolt hole thru the flange; **DO NOT USE STUDS/BOLTS THAT ARE TOO SHORT IN LENGTH.** See Table 1 for stud size/thread/length requirements.

TABLE 1

Body Size in. (DN)	150# End Connection Flange Bolting
1/2" (15)	1/2"Ø - 1-3/4" 13 UNC-2B
1" (25)	1/2"Ø - 2" 13 UNC-2B
2" (50)	5/8"Ø - 2-1/2" 11 UNC-2B
No. Bolt Holes	4

11. Tighten flange stud nuts uniformly in a crossing pattern. Assure flange facing alignment. Do not use flange bolting to "pull" flanges into alignment. Tighten flange bolting to torque levels of Table 2 in increments of 1/2 revolution to assure uniform loading of valve's raised facing.

TABLE 2

Body Size in (DN)	End Connection Flange Bolting Torque
	ANSI-150
1/2" (15)	10–12 ft-#
1" (25)	10–12 ft-#
2" (50)	35–40 ft-#

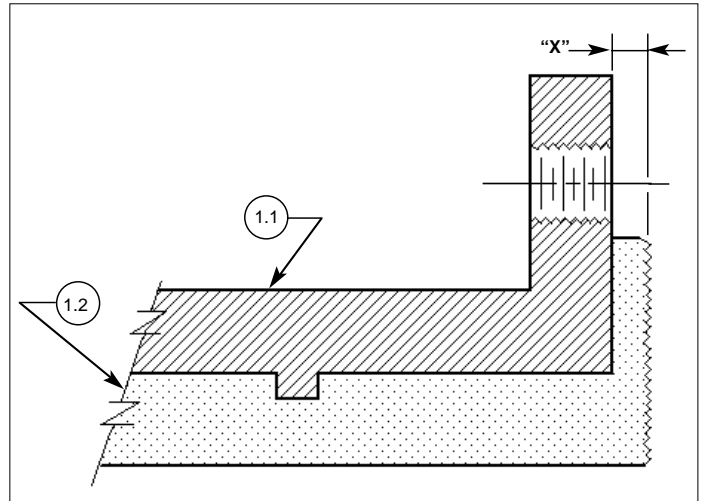


Figure 3: End Connection - Partial Section

NOTE: If the installed Model 520 has had the flange bolting over-torqued, distortion of TFE core (1.2) will occur. If dimension "X" in Figure 3 is 0.040" (1 mm) or less, a gasket is recommended upon reinstallation. If dimension "X" is less than 0.020" (0.5 mm), body replacement is recommended.

C. Auxiliary Detection:

1. When a fluid is known to permeate TFE over a finite time period and the fluid is lethal or is subject to stringent limits of fugitive emissions, the vented pipe plug (12) should be removed and one of, or a combination of, the following methods should be considered to monitor the integrity of the internal primary stem (9) seal – the bellows sub-assembly (8):
 - a. gas detector with alarm
 - b. pressure indicating gauge
 - c. pressure switch with alarm
 - d. inert gas, constant flow purge.

PLEASE NOTE:

Sections IV, V, VI, VII and VIII regarding Maintenance, Calibration, startup, Trouple-Shooting and Parts Ordering with included Figures, Graphs and Tables are IDENTICAL to the Model 521-IOM with the following exceptions:

SECTION IV, Figure 5, pg. 4. Please use the following replacement drawing, Figure 4.

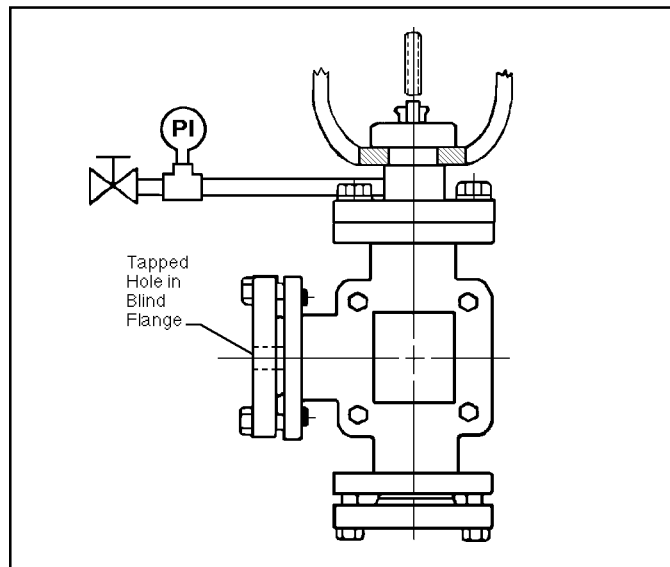


Figure 4

SECTION VIII, Figure 12, pg. 18. Please use the following replacement drawing, Figure 5.

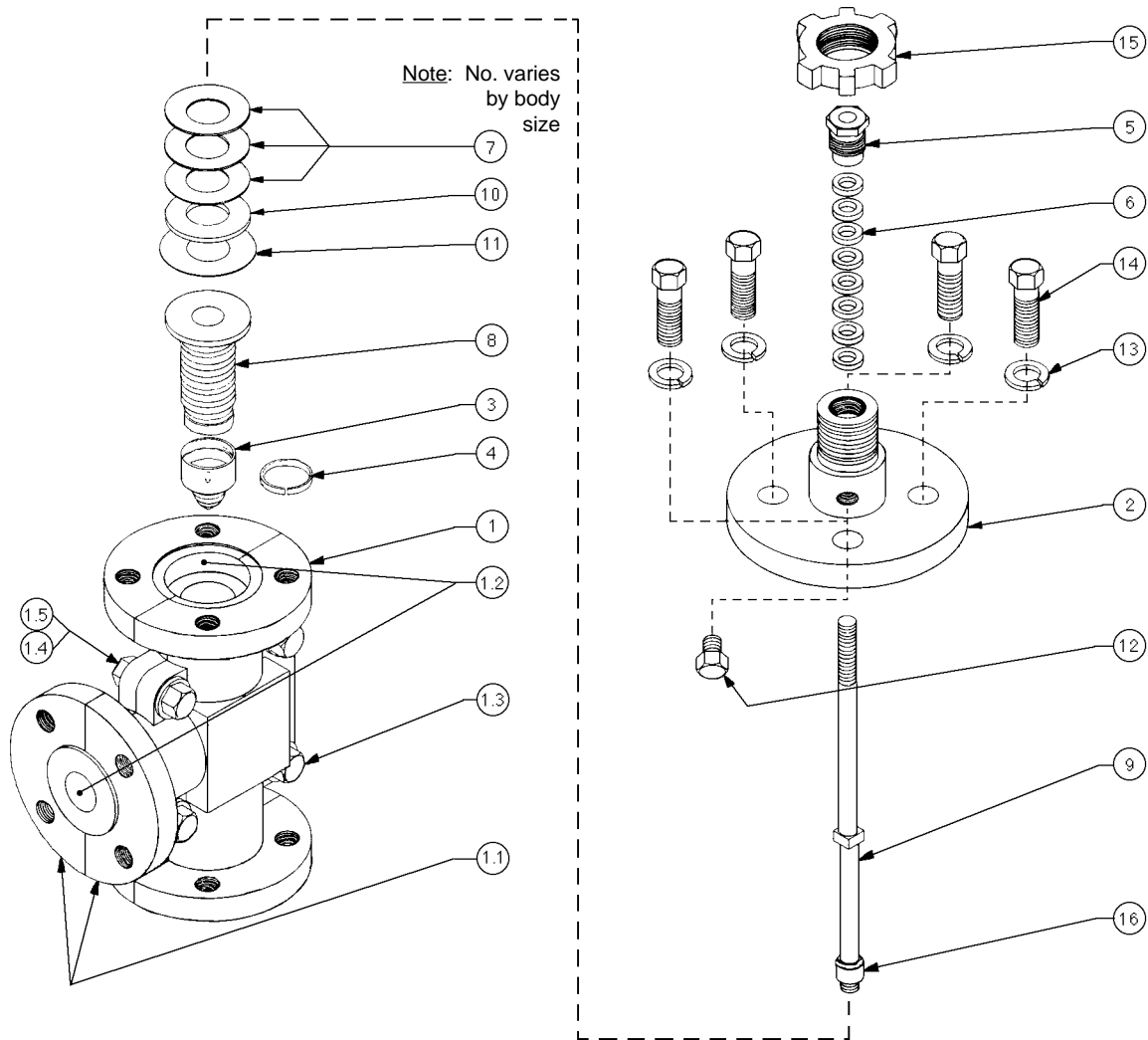


Figure 5
Model "520" Control Valve Internals

ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION
1	Body Sub-Assembly	7	Belleville Spring Washer
1.1	* Half Shell	8	Bellows Sub-Assembly
1.2	* TFE Core	9	Stem Sub-Assembly
1.3	* Cap Screw	10	Spacer Washer
1.4	* Nut	11	Bonnet Gasket
1.5	* Lockwasher	12	Vented Pipe Plug
2	Bonnet	13	Lockwasher
3	Plug Head	14	Hex Hd. Cap Screw
4	Plug Retainer Strip	15	Yoke Nut
5	Packing Gland Nut	16	Adapter (2" size only)
6	Packing Set		

* Sub-level parts that make up the body sub-assembly; **NOTE: DO NOT DISASSEMBLE THE PARTS OF THE BODY SUB-ASSEMBLY (1)!** The valve body (1) is machined after the shell halves (1.1) have been bolted (1.3, 1.4, 1.5) around the TFE core (1.2). Disassembly of the body sub-assembly (1) will create alignment problems upon completed reassembly. The TFE core (1.2) is not replaceable, except as a body sub-assembly (1).

SECTION VIII, Parts Ordering Information, page 19 and 20:

The Model 520 TFE VALVE BODY uses the same kit numbers as the Model 521 (TABLE 4, pg. 19). To order new Plug(s) for the 520, refer to the following TABLE 3 for correct part number(s).

TABLE 3
PLUG HEAD PART NUMBERS

Body Size in (mm)	Orifice Size in (mm)	Cv	Plug Part Number (640-89-4-_____ - __)		
			Basic No.	Equal %	Linear
1/2" (DN15)	.250 (6.35)	.10	640-89-4-	60155-00	60152-00
		.16	640-89-4-	60157-00	60156-00
		.25	640-89-4-	60159-00	60158-00
		.40	640-89-4-	60161-00	60160-00
		.63	640-89-4-	60163-00	60162-00
	.438 (11.12)	1.0	640-89-4-	60166-00	60165-00
		1.6	640-89-4-	60168-00	60167-00
		2.5	640-89-4-	60170-00	60169-00
		4.0	640-89-4-	60172-00	60171-00
		1" (DN25)	.250 (6.35)	.10	640-89-4-
.16	640-89-4-			60112-00	60111-00
.25	640-89-4-			60114-00	60113-00
.40	640-89-4-			60116-00	60115-00
.63	640-89-4-			60118-00	60117-00
.562 (14.27)	1.0		640-89-4-	60121-00	60120-00
	1.6		640-89-4-	60123-00	60122-00
	2.5		640-89-4-	60125-00	60124-00
	4.0		640-89-4-	60127-00	60126-00
	5.0		640-89-4-	60129-00	60128-00
.938 (23.82)	6.3		640-89-4-	60132-00	60131-00
	7.5		640-89-4-	60134-00	60133-00
	10.0		640-89-4-	60136-00	60135-00
	16.0		640-89-4-	60138-00	60137-00
	2" (DN50)		1.50 (38.10)	15.0	640-89-4-
25.0		640-89-4-		60143-00	60142-00
2.00 (50.80)		35.0	640-89-4-	60146-00	60145-00
		50.0	640-89-4-	60148-00	60147-00

(Place double-sided tape here to attach separate BOM sheets)

SECTION VIII, Figure 13, pg. 23. Please use the following replacement drawing, Figure 6.

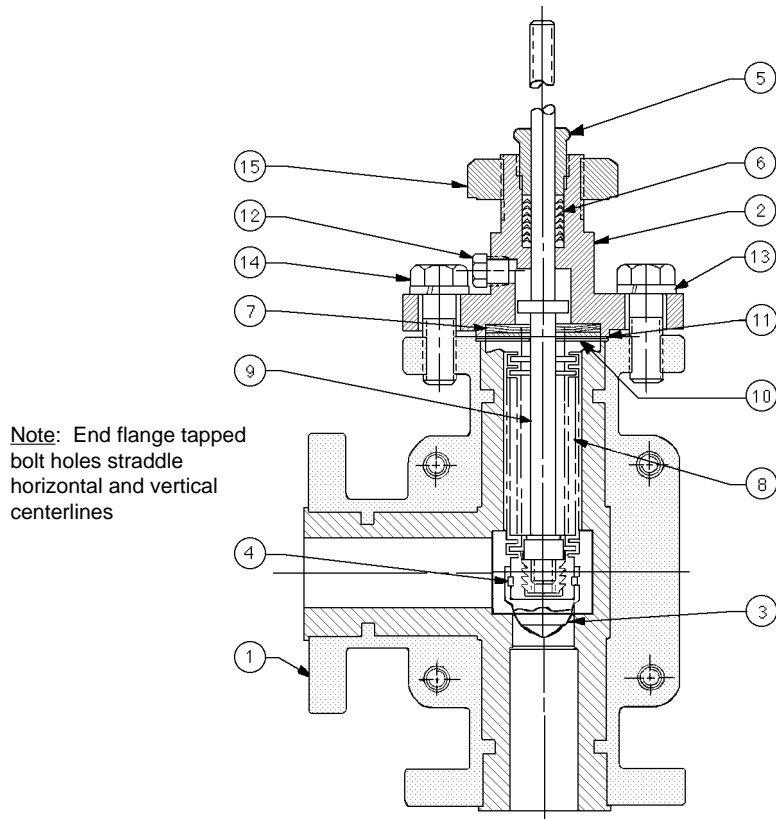


Figure 6
Model 520 Body Assembly (BA)

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>ITEM NO.</u>	<u>DESCRIPTION</u>
1	Body Sub-Assembly	9	Stem Sub-Assembly
2	Bonnet	10	Spacer Washer
3	Plug Head	11	Bonnet Gasket
4	Plug Retainer Strip	12	Vented Pipe Plug
5	Packing Gland Nut	13	Lockwasher
6	Packing Set	14	Hex Head Cap Screw
7	Belleville Spring Washer	15	Yoke Nut
8	Bellows Sub-Assembly	16	Adapter (2" size only - NOT SHOWN)

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