MODEL 987

ALL SIZES

GLOBE-STYLE PNEUMATIC CONTROL VALVE *BODY*

SECTION I

I. DESCRIPTION AND SCOPE

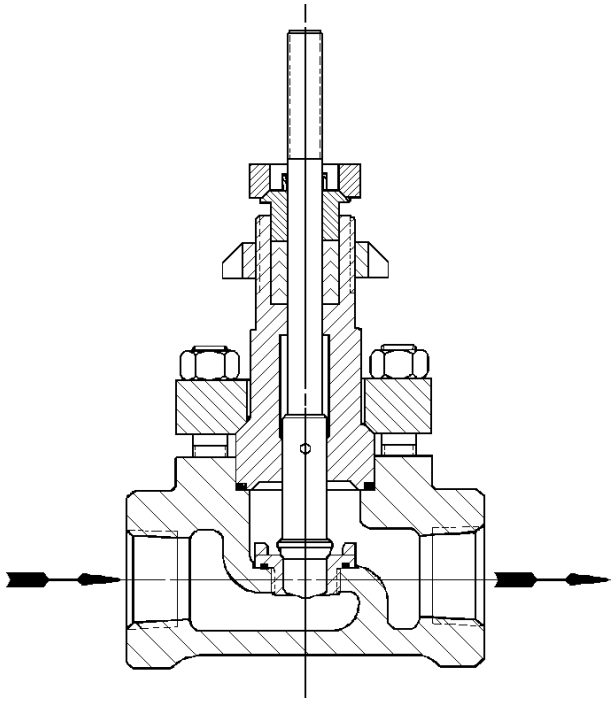
The Model 987 (formerly identified as "Chemical Valve") is a pneumatically actuated, globe-style control valve with investment cast body. It is available in sizes 1/2" - 1" (DN15 - 25), and utilizes Model 25D/R actuator. Internal design is a “push down to close” arrangement. Failure position is determined by actuator.

The valve is designed primarily for moderate to severe corrosive applications, but may be applied as general service control valve. Body materials available are standard CF3M (316L SST), M-35-1 (Monel), CN7M (Alloy 20), or CW-12MW (Hastelloy C).

End connections available are a function of body materials.

Body Material	NPT	Flangeless	Opt-30 Weld on Flgs	Opt-32 Ext.Pipe Nips.
CF3M	X	X	X	X
CN7M	X	X	N/A	N/A
M-35-1	X	X	N/A	N/A
CW-12MW	X	X	N/A	N/A

N/A = "Not Available"



1" Model 987 Body

SECTION II

II. REFERENCES

Refer to Technical Bulletin 987-TB for technical specifications of a Model 987 Control Valve.

Refer to the following IOM's for actuators or accessory devices mounted to a Model 987 Control Valve:

ACTUATORS
Cashco – IOM-25

POSITIONERS
Cashco – IOM-9520L (I/P)
Cashco – IOM-9540L (P/P)

ABBREVIATIONS

ATC–FO	–	Air–to–Close, Fail Open
ATO–FC	–	Air–to–Open, Fail Close
CCW	–	Counter Clockwise
CW	–	Clockwise
D	–	Direct Acting
DIR	–	Direct Acting
IAS	–	Instrument Air Supply
IOM	–	Installation, Operation, and 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 in a horizontal pipeline is with the stem vertical. Valves may also be installed in vertical pipelines with stems horizontal.

2. Outdoors, all installations may be oriented any angle from horizontal-to-vertical.

3. Model 987 valves are not recommended for installation with the actuator oriented downwards.

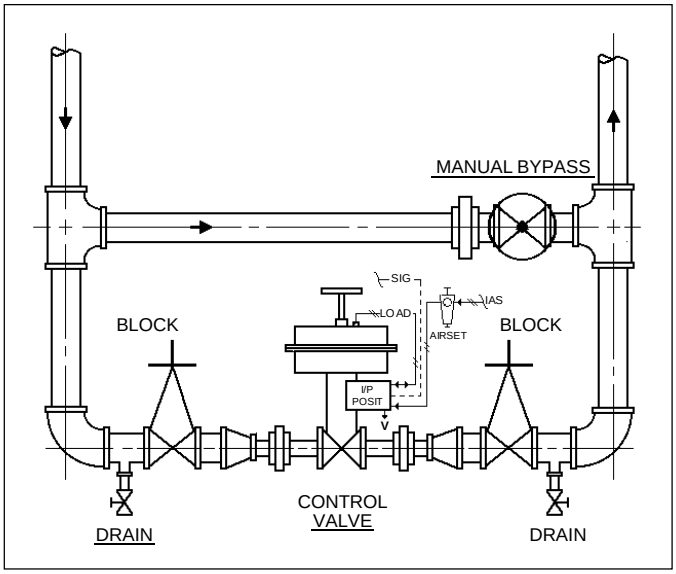


Figure 1: Typical Control Valve Station

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

2. Pipe unions are recommended for NPT screwed installations to allow complete removal from system.

3. 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.

4. For flangeless installation, body (1) must be machined with serrations on each end of body.

⚠ WARNING

Do NOT attempt to install a body machined for NPT end connections as a flangeless installation. Failure to heed could cause fluid leakage.

Model 987 bodies with flangeless end machining may be installed as below:

TABLE 1
PIPING FLANGES & FLANGELESS VALVE CONNECTIONS

Basic Flange Size	Flange Pressure Class		
	150#	300#	600#
1/2"	N/A	N/A	N/A
3/4"	N/A	√	√
1"	√	√	√
1" x 1/2" Reducing	√	√	√
1" x 3/4" Reducing	√	√	√

√ Available

5. Opt-32 Extended Pipe Nipples should be used for socket welding or butt welding. Standard end preparation is for socket welding. If butt welding is desired, weld end preparations must be done in field with suitable tools.

6. Clean the piping of all foreign debris, including chips, weld scale, weld spatter, oil, grease, sand or dirt prior to installing the control valve. This is an absolute requirement for valves supplied with composition soft seats. System start-up strainers, for removal shortly after initial start-up, are recommended.

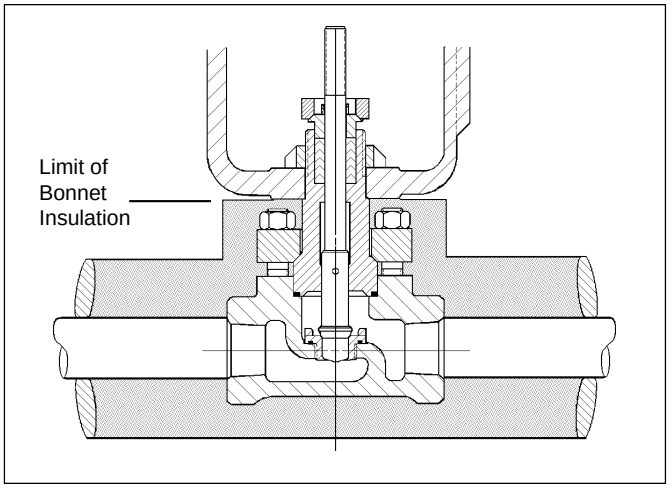


Figure 2: Body Insulation

7. Field hydrostatic testing the completed piping system to 1-1/2 x CWP in psig indicated on the nameplate, including the 987 is acceptable. If hydro test pressure exceeds the 1-1/2 x CWP limit, the 987 must be removed for such testing. Before pressurization, the valve plug should be lifted from the seat if of ATO-FC action. Tighten packing as required.

8. In placing thread sealant on pipe ends prior to engagement, ensure that excess material is removed and not allowed to enter the valve upon start-up.

9. Flow Direction: Install so the flow direction matches the arrow marked on the valve body. Model 987's are flow-to-open direction.

10. For best performance, install in well drained horizontal pipe, properly trapped if a steam service application.

11. Valves are not to be direct buried underground.

12. Insulation may be applied as indicated in Figure 2. Drainage away from the packing area must be ensured when fully installed, sealed and lagged for outdoors installation.

13. Undue piping stress/strain or bending torques may not be transmitted through 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 ensure unidirectional expansion/contraction.

SECTION IV

IV. MAINTENANCE

⚠ WARNING

SYSTEM UNDER PRESSURE. Prior to performing any maintenance, isolate the valve/actuator from the system and relieve all pressures. Failure to do so could result in personal injury.

A. General:

1. **Maintenance procedures hereinafter are based upon removal of the valve/actuator unit from the pipeline where installed.**

2. Owner should refer to Owner's procedures for removal, handling and cleaning of nonreusable parts, i.e. gaskets, suitable solvents, etc.

3. Valves supplied from the factory use a gasket sealant, Federal Process Company, PLS2, or equal. Owner may use such aids provided the aids are compatible with the Owner's fluid. (See following for "oxygen cleaned" valves.)

4. Valves originally supplied in accordance with Option-55 require special cleaning procedures. Refer to Cashco Specification No. S-1134 for details. When in compliance with Spec. #S-1134, the valve is suitable for oxygen service. Sealants and lubricants used in reassembly of a valve unit for use in oxygen service MUST be suitable O2 service. Cleaned parts to be reused MUST be suitably cleaned for O_2 service similar to requirements of Cashco Cleaning Spec. #S-1134. All sealants and anti-seize specified herein are for non-O2 service only.

5. All indicated Item Numbers that are with respect to the actuator portion of a Model 987 are in parenthesis and underscored; i.e. (20). All Item Numbers that are with respect to the body portion of a Model 987 are not underscored; i.e. (32).

6. ***Special care must be exhibited when rotating the stem (4) of the valve to not mar that portion of the surface of the stem (4) where it contacts with the packing (10).*** To rotate the stem (4), use soft-jawed pliers.

7. Place matchmarks between lower case/yoke (2) for all sizes with Model 25 actuator and body (1), bonnet (2) and bonnet flange (7) to assist in final orientation when the body is disassembled and/or the actuator removed.

B. Actuator Removal and Replacement:

1. Reference the actuator's IOM to remove actuator subassembly (AA) from body subassembly (BA):

   All Sizes – IOM-25

2. Reference same to reinstall actuator subassembly (AA).

C. Trim/Packing Removal and Replacement:

NOTE: *This Subsection assumes that the actuator subassembly (AA) has been already removed per Subsection B. previous. See Figure 6.*

1. Secure body subassembly (BA) in a vise with the valve stem (4) pointing upwards. Place matchmarks between the body (1), bonnet (2), and bonnet flange (7).

2. Loosen all four bonnet flange nuts (9) and remove.

CAUTION

It sometimes occurs that the stem (4) will "stick" within the bonnet (2), and pull out with parts of this step above. DO NOT ALLOW STEM (4) TO DROP and do personal injury or damage stem (4)!

3. Wiggle and lift the bonnet (2) upwards to removal. As the plug/stem subassembly (4) should come along with the removed bonnet (2), take care to prevent the plug/stem subassembly (4) from dropping out of the bonnet (2) and doing personal injury or damaging the plug/stem subassembly (4). Lay the removed group of parts (2,4,7,10,11) on a flat work surface horizontally, ensuring that the bonnet (2) will not "roll".

4. Remove bonnet flange (7) off of bonnet (2).

5. Remove packing follower (11) over threaded end of stem (4).

6. Push stem (4) threaded-end into bonnet (2) as far as possible using fingers while holding bonnet (2) with other hand. Grasp plug-end of plug/stem subassembly (4) and withdraw from the bonnet (2) and thru the packing rings (10). Set plug/stem subassembly (4) aside.

7. Place bonnet (2) into a leaded-jaw vise with packing-end upwards. Using a pick-type tool, remove the five packing rings (10). Inspect rings (10) and then discard.

8. Place all bonnet-area removed parts (2,4,7,11) into a suitable cleaning solvent.

9. Remove bonnet O-ring seal (6) from body (1). Inspect O-ring (6) for signs of failure to seal, then discard.

10. If body (1) includes a screwed-in seat ring (3), use a sufficiently wide piece of 1/4" thick steel bar to remove the seat ring (3) by rotating seat ring (3) CCW (viewed from above) to removal.

11. Remove seat ring O-ring seal (5) from seat ring (3). Inspect O-ring (5) for signs of failure to seal, then discard.

12. Remove body (1) from vise and place body (1) and seat ring (3) into a suitable cleaning solvent.

13. For valves equipped with Opt-27 Viscous Service Bonnet, ensure that the two equalizing passageways located in bonnet (2) are fully opened.

14. For valves equipped with a composition seat as a part of the plug/stem subassembly (4), the parts are mechanically pressed together such that the composition seat is non-replaceable. A plug/stem subassembly (4) must be supplied in order to replace the composition seat.

15. For valves equipped with a stellite guide bushing (2.2) in the bonnet (2.1), the parts are mechanically pressed together such that the guide bushing is non-replaceable. A bonnet subassembly (2) must be supplied in order to replace the guide bushing (2.2).

16. After soaking, remove all parts (1,2,3,4,7,11) and inspect for any signs of wear or corrosion; replace all worn parts with new parts. Bonnet (2) packing box and stem (4) sealing zones must be finished to a $16R_a$ surface or better.

17. Place body (1) into a vise with bonnet-zone on topside.

18 Place a new O-ring seal (5) onto the seat ring (3). Reinstall the seat ring (3) into the body (1) by rotating the seat ring (3) CW (viewed from above). Using the steel bar tool, firmly tighten the seat ring (3). ***Note****: Do not over-tighten the seat ring (3) to prevent galling of threads.*

19. Place a new O-ring seal (6) into the bonnet's (2) recess in the body (1).

20. Place TFE sealant tape over threaded-end of stem (4), covering all the peaks.

21. Place plug/stem subassembly (4) with the plug-end into the seat ring (3), and the threaded-end directed upwards. Place lower end of bonnet (2) over threaded end of stem (4) and fully lower bonnet (2) until properly aligned in body (1) recess.

22. Place bonnet flange (7) over bonnet (2) and down over the bonnet studs (8) with matchmarks aligned.

23. Install bonnet flange nuts (9) and finger-tighten.

24. See Figure 9. Place a lower adapter packing ring (10.1) over the stem-end (4) and press it into the bonnet (2) packing box using the packing follower (11). Repeat for the three middle packing v-rings (10.2). Press upper adapter ring (10.3) into the box; leave the packing follower (11) in position.

25. Wiggle stem (4) around to align parts (2,3,4,7,10) as much as possible. Wrench-tighten bonnet flange nuts (9) in a 1/4 revolution, alternating, cross-pattern. Using a torgue wrench, tighten the nuts (9) to 25 - 30 ft-lbs (33.8 - 40.6 N•m).

26. Remove TFE tape from threaded end of stem (4).

27. Reinstall the Model 25 actuator (AA) per IOM-25, including packing flange (23) and finger-tighten packing stud nuts (21).

28. Tighten packing stud nuts (21) in an alternating cross-pattern in 1/4 revolution increments. Final tighten nuts (21) with a torgue wrench to 25 - 30 in-lbs (2.8 - 3.4 N•m).

29. Leak test by pressurizing the inlet and outlet portions of the valve body subassembly (BA).

SECTION V

V. CALIBRATION – All Body Sizes with Model 25 Actuator

A. General:

1. This section covers calibration of Model 987 control valve units with Model 25 actuators. Calibration consists of adjusting stroke length only. To change bench range setting requires that the actuator assembly (AA) be partially disassembled and calibrated as indicated in IOM-25.

2. Positioner, if installed, requires reference to the specific positioner model IOM for proper calibration procedure.

3. All indicated Item Numbers that are with respect to IOM-987 and are part of the "body" will be in single parenthesis; i.e. (2). Those that are part of the actuator IOM will be in single parenthesis and underscored; i.e. (2). Those that are part of the positioner IOM will be in double parenthesis; i.e. ((AP)).

4. Following procedures assume assembled valve unit has been removed from the pipeline where installed and all maintenance has been completed per instructions of Section IV preceding.

5. This procedure only accounts for setting proper combined stem (4, 19) stroke length. IT ASSUMES THAT THE ACTUATOR ASSEMBLY (AA) HAS BEEN PROPERLY AJDUSTED FOR -
    a. bench set range.
    b. uptravel stop.

6. Place body (1) in a vise with actuator (AA) directed upwards.

7. Connect a temporary air supply with an in-line adjustable airset regulator with gauge to the actuator (AA) topworks connection.

B. Procedure — Reverse Action, ATO-FC:

1. Grasp valve stem (4) just below threaded portion of upper end with soft-jawed locking pliers. Loosen lower jam nut (17) by rotating CCW (viewed from plug-end) downwards to the root of the threads of the valve stem (4). Loosen upper jam nut (17) down to lower jam nut (17). DO NOT ROTATE STEM (4) WHILE PLUG (4) IS PUSHING AGAINST SEAT RING (3).

2. Loosen position indicator screws (22) and position the indicator plate (21) at "CLOSE"; tighten screws (22) to secure indicator plate (21). ***NOTE:*** *Set the indicator plate (21) at the flat horizontal edge of the actuator stem (19) that is painted red.*

3. Reference the nameplate (18) attached to the actuator's (AA) upper case (1) or handwheel bonnet (29). Determine the bench setting of the installed range spring (24) from the nameplate (18); i.e. 5-15 psig (.34-1.03 Barg), or 11-30 psig (.76-2.07 Barg).

4. Pressurize the actuator (AA) to a pressure that equals the upper pressure level of the bench set range; i.e. for 5-15 psig (.34-1.03 Barg), pressurize to 15 psig (1.03 Barg); i.e. for 11-30 psig (.76-2.07 Barg), pressurize to

30 psig (2.07 Barg). Observe the position on the indicator plate (21) of the actuator stem (19). The following can be concluded from the indication:

a. Travel Short of Full "OPEN". Combined stem (4, 19) is too long; rotate valve stem (4) into actuator stem (19) a distance approximately the distance of undertravel of the stem (19) away from the "OPEN" position.

b. Travel Beyond Full "OPEN". Combined stem (4, 19) is too short; disengage valve stem (4) from actuator stem (19) a distance approximately the distance of overtravel of the stem (19) away from the "OPEN" position.

c. Travel at Full "OPEN". This indicates that combined stem (4, 19) length is acceptable.

5. Repeat procedure of articles 2. thru 4., until combined stem (4, 19) length is correct.

6. Tighten upper jam nut (17) to actuator stem (19); repeat for lower jam nut (17).

7. Test the bench set range performance. For ATO-FC units, the lower value of the bench set range must be equal or greater than the lower value given on the nameplate (18). If the actual lower value is less than the stated lower value, it would be necessary to disassemble the actuator (AA) and properly adjust the bench set range and uptravel stop.

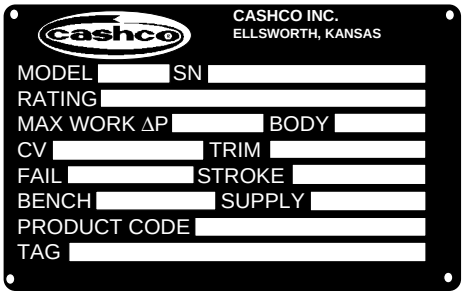
8. Remove unit from vise.

C. Procedure — Direct Action, ATC-FO:

1. Loosen lower jam nut (17) by rotating CCW (viewed from plug end) downwards to the root of threads of the valve stem (4). Loosen upper jam nut (17) down to lower jam nut (17).

2. Loosen position indicator screws (22) and position the indicator plate (21) at "OPEN"; tighten screws (22) to secure indicator plate (21). ***NOTE****: Set the indicator plate (21) at the flat horizontal edge of the actuator stem (19) that is painted red.*

3. Reference the nameplate (18) attached to the actuator's (AA) upper case (1) or handwheel bonnet (29). Determine the bench setting of the installed range spring (24) from the nameplate (18); i.e. 3-13 psig (0.21-0.90 Barg), or 6-25 psig (0.41-1.72 Barg).



4. ***NOTE****: DO NOT ROTATE STEM (4) WHILE PLUG (4) IS PUSHING AGAINST THE SEAT RING.* Pressurize the actuator (AA) to a pressure that equals the upper pressure level of the bench set range; i.e. for 3-13 psig (0.21-0.90 Barg), pressurize to 13 psig (0.90 Barg); i.e. for 6-25 psig (0.41-1.72 Barg), pressurize to 25 psig (1.72 Barg). Observe the position on the indicator plate (21) of the actuator stem (19). The following can be concluded from the indication:

a. Travel *Short* of Full "Close". Combined stem (4, 19) is too long. Measure amount of undertravel. Release pressure in actuator to about mid-stroke (50% travel). Engage valve stem (4) into actuator stem (19) approximately the same distance as the measured amount of undertravel.

b. Travel *Beyond* Full "Close". Combined stem (4, 19) is too short. Measure amount of overtravel. Release pressure in actuator to about mid-stroke (50% travel). Disengage valve stem (4) from actuator stem (19) approximately the same distance as the measured amount of overtravel.

c. Travel at Full "Close". This indicates that combined stem (4, 19) length is acceptable.

5. Repeat procedure of articles 2. thru 4., until combined stem (4, 19) length is correct.

6. Tighten upper jam nut (17) to actuator stem (19); repeat for lower jam nut (17).

7. Test the bench set range performance. For ATC-FO units, the upper value of the bench set range must be at least equal or slightly greater than the upper value given on the nameplate (18). If the actual upper value is less than the stated upper value, it would be necessary to disassemble the actuator (AA) and properly adjust the bench set range and uptravel stop.

8. Remove unit from vise.

VI. STARTUP

A. General:

1. Ensure that the Model 987 unit has been properly adjusted and calibrated, including the positioner if installed.

2. Recommend startup to be in a "manual" mode. This procedure assumes double block (isolation) and bypass valves for the "control valve station". See Figure 1.

3. Start with either of the two block valves closed, with the other open. The bypass valve should be closed. Pressurize system if possible/practical.

4. Back out the airset's adjusting screw until loose.

5. Turn on air supply pressure.

6. Adjust the air supply airset (filter-regulator) to the proper level as indicated in IOM-25 or the technical bulletin 987-TB.

   DO NOT STROKE THE CONTROL VALVE WITH AN AIR SUPPLY PRESSURE SETTING GREATER THAN RECOMMENDED MAXIMUM PRESSURE!

7. Place loop controller into "manual" mode. Vary setting from minimum – mid-range – maximum SIG output. Observe response of control valve unit to these changes of input SIG. The valve should fully stroke at the variation from minimum SIG to maximuSIG; the mid-range SIG should have the valve stem travel at/near 1/2 open.

8. Confirm the action of controller and positioner – direct or reverse – are producing the desired response in the control unit. Confirm that the control valve "fail" position is as required.

⚠ CAUTION

Do not walk away and leave a manually controlled control valve unattended!

9. *Hereafter, the procedure assumes that actual fluid flow may be established. This may not be practical/possible in all cases; if so, vary procedure as required.*

   Always "heat" or "cool" down the system piping SLOWLY by opening the control valve station bypass valve in small increments.

10. With one of the control valve station block valves still closed, and the loop controller still in "manual" mode, open bypass valve and vary flow rate manually to observe the response of the controller and control valve unit together.

11. Attempt to develop manual control of the loop by opening/closing the manual bypass as required, or by manually controlling mainstream flow as required.

12. When the control valve is partially open, crack open slowly the closed block valve while simultaneously closing the bypass valve. Continue this procedure until the bypass is closed and the block valves are both fully open. The system is still under "manual" mode control, but all flow is passing thru the control valve.

13. Vary controller "manual" SIG output until matching the "automatic" SIG output, then change the mode of the controller over to "automatic", and the loop will experience a minimum of upset conditions, and will be in automatic control.

SECTION VII

VII. TROUBLE-SHOOTING GUIDE:

1. Valve is “jumpy” in stroking.

Possible Cause	Remedy
A. Excess packing friction.	A1. Realign body–stem–actuator. A2. Packing follower too tight. A3. Install positioner. A4. Increase bench set by changing to stiffer actuator range spring. Will require positioner if not installed. May require different airset.
B. Installed backwards.	B. Install per flow arrow.

2. Valve makes “screeching” noise.

Possible Cause	Remedy
A. Excess pressure drop.	A. Bring pressure drop within design limits.
B. Lower guide bushing wear.	B. Replace bonnet and stem.
C. Misalignment.	C. Realign body–stem–actuator.

3. Valve exhibits “excess” vibration.

Possible Causes	Remedy
A. Excess pressure drop.	A. Bring pressure drop within design limits.
B. Lower guide bushing wear.	B. Replace bonnnet and stem.
C. Excessive cavitation in liquid service.	C1. Change operation parameters to relieve causes of cavitation. C2. Replace valve with valve equipped for cavitation control.
D. High outlet velocity.	D1. Reduce flow rate and/or pressure drop. D2. Use multiple valves in series or parallel. D3. Increase outlet pipe size.

4. Valve exhibits “excess” seat leakage.

Possible Cause	Remedy
A. Excess pressure drop.	A1. Reduce pressure drop conditions. A2. Convert to reduced trim.
B. Improper actuator bench setting.	B1. Calibrate actuator-to-valve. B2. Assure proper engagement of actuator stem-to-valve stem. Adjust as calibration dictates.
C. Metal seat design instead of composition seat design.	C. Convert valve to composition seat design.
D. Excess wear.	D1. Oversized valve operating too close to seat; go to reduced trim. D2. Remove particulate. D3. Possible excess cavitation in liquid service. Change operation parameters. D4. Re-lap plug-seat surface.
E. Misalignment.	E. Realign body–stem–actuator.
F. Composition seat failure	F1. Replace stem subassembly. F2. Remove “dirty” portion of fluid causing failure.
G. Seat ring gasket failure.	G. Replace seat O-ring seal.

5. Premature packing leakage.

Possible Cause	Remedy
A. Over-temperature.	A1. Bring process temperature to 400°F (205°C) or less. A2. Remove insulation along bonnet; allow direct contact with ambient air. A3. Consider use of Model 988/989
B. Misalignment.	B. Realign body–stem–actuator.
C. Wear.	C1. Remove dirt/grit from fluid. C2. Reduce cyclic travel.
D. Corrosion of stem.	D. Consider use of Model 988/989.

6. Bonnet gasket leaking.

Possible Cause	Remedy
A. Improper bonnet bolting draw down.	A. Replace gasket and draw down bolting evenly in a cross-pattern. Torque bolting.
B. Corrosion.	B. Consider use of higher grade material.
C. Over-temperature.	C. Bring process temperature to 400°F (205°C) or less.

SECTION VIII

IX. PARTS ORDERING INFORMATION:

There are three methods to obtain parts ordering information/numbers. These methods are listed below, in order of ease of entering. The least expensive method is to utilize parts in kits where possible.

METHOD A – USE OF PRODUCT CODE.

Step 1. If available, obtain the 18 character product code number from the Bill of Materials sheet attached herein.

□□□-□□□7-□□□□□□□□□□

Step 2. Identify which kits or parts are desired from the Bill of Materials sheet or refer to the cross-sectional drawings.
NOTE: Kit "A" contains packing, seals and gasket(s). Kit "B" contains trim replacement parts plus packing, seals and gasket(s).

Step 3. Contact your local Cashco, Inc., Sales Representative and specify the product code number and any part numbers not included in desired kits. Costs of required parts can be given by the Sales Representative.

METHOD B – NO PRODUCT CODE AVAILABLE – DISASSEMBLED VALVE.

Step 1. Determine all available information from valve's metal tag.
a. Serial number.
b. Valve "Type" or "Model" number.
c. Size (may have to observe body tap).
d. Body material.
e. Fail position.
f. Trim designation number (if available).
g. Cv or port size
h. Bench set.

Step 2. Determine construction of trim (metal or composition (soft) seat).

Step 3. With the information from Steps 1 and 2 above, contact your local Cashco, Inc., Sales Representative.

Step 4. Sales Representative will contact the factory to determine the original internal construction. Factory will relay information to the Sales Representative.

Step 5. Await the Sales Representative's return contact with the proper part numbers and cost.

METHOD C – NO PRODUCT CODE AVAILABLE – ASSEMBLED VALVE IN SERVICE.

Step 1. Determine all available information from valve tag using Step 1, Method B.

Step 2. Contact your local Cashco, Inc., Sales Rep with the above information.

Step 3. Sales Representative will contact the factory to determine the original internal construction. Factory will relay information to the Sales Representative.

Step 4. Await the Sales Representative's return contact with the proper part numbers and cost.

MODEL 987 316L SST
PARTS KIT NUMBERS
(Kit Nos. Shaded)

Body Size	Trim	Max Cv	Kit Abbr	Code
All	S1L,S1LS S3L, S3LS	All	A	CH4-800K-0AA
1"	S1L, S1LS	6.95	B	CH4-80AK-0BA
	S3L, S3LS	6.70	B	CH4-80GK-0BA
3/4" & 1"	S1L, S1LS	4.13	B	CH4-80BK-0BA
	S3L, S3LS	4.13	B	CH4-80HK-0BA
All	S1, S1LS	2.75	B	CH4-80CK-0BA
		1.10	B	CH4-80DK-0BA
		0.443	B	CH4-80EK-0BA
		0.276	B	CH4-80FK-0BA
	S3L, S3LS	2.60	B	CH4-80JK-0BA

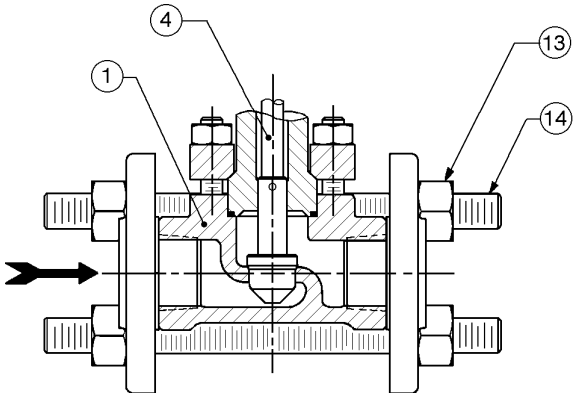


Figure 3
Integral Seat
Body Line Bolting

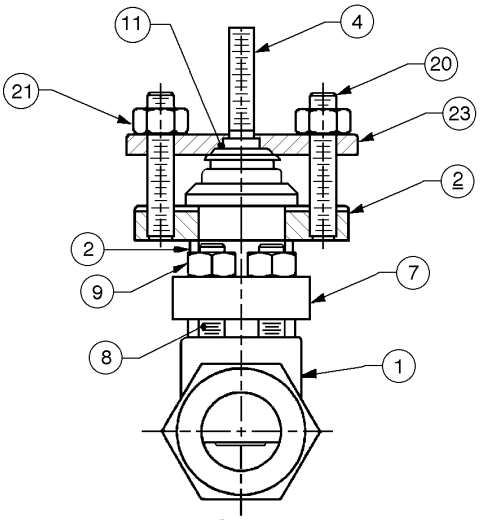


Figure 7
Body Assembly
Side View

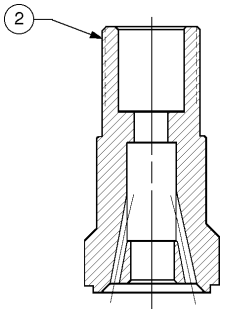


Figure 4
Bonnet
Viscous Service

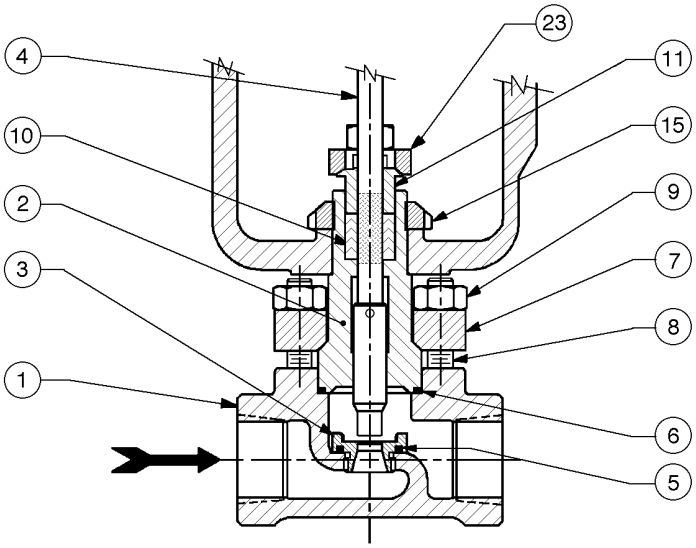


Figure6
Body Assembly
Front View

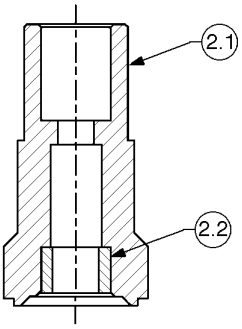


Figure 8
Bonnet
With Bushing

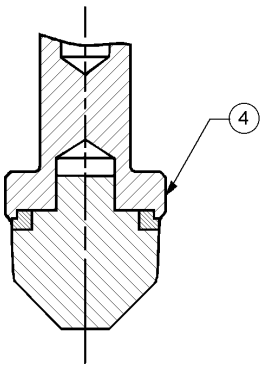


Figure 5
Composition Seat

Critical Finish Zone

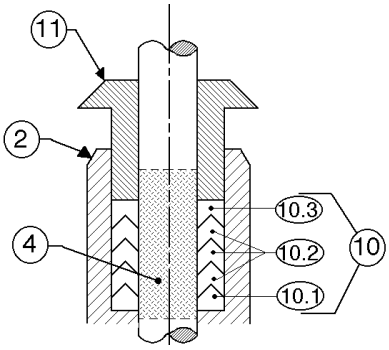


Figure 9
Packing Arrangement

Item No.	Description
1	Body
2	Bonnet/Bonnet Subassembly
2.1	Bonnet
2.2	Guide Bushing
3	Seat Ring
4	Plug & Stem Subassembly
5	O-ring - Seat Ring
6	O-ring - Bonnet
7	Bonnet Flange
8	Bonnet Stud
9	Bonnet Flange Nut
10	Packing
10.1	Lower Adapter Packing Ring
10.2	Middle Packing Rings
10.3	Upper Adapter Packing Ring
11	Packing Follower
13	Nut (Line Bolting)
14	Stud (Line Bolting)
15	Yoke Nut
20	Packing Stud
21	Packing Stud Nut
23	Packing Flange
2	Yoke/Lower Case

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