RCV
Research Control® | ReCo® Valves

Sanitary Control Valves

SCV 85, 89 and 95

Badger Meter

RCV-UM-00571-EN-02 (August 2015)

User Manual

CONTENTS

SAFETY PRECAUTIONS

Neither Badger Meter nor any Badger Meter affiliated entities assumes responsibility for the selection, use, and maintenance of any products. Responsibility for the selection, use and maintenance remains with the purchaser and end-user.

⚠WARNING

- ***PERSONAL INJURY OR PROPERTY DAMAGE CAUSED BY SUDDEN RELEASE OF PRESSURE OR BURSTING OF PRESSURE RETAINING PARTS MAY RESULT IF SERVICE CONDITIONS EXCEED THOSE FOR WHICH THE PRODUCT WAS INTENDED. TO AVOID INJURY OR DAMAGE, PROVIDE RELIEF VALVE OVER PRESSURE PROTECTION AS REQUIRED BY GOVERNMENT OR ACCEPTED INDUSTRY CODES.***
- ***ALWAYS WEAR PROTECTIVE GLOVES, CLOTHING, AND EYE WEAR WHEN PERFORMING ANY INSTALLATION OPERATIONS TO AVOID PERSONAL INJURIES.***
- ***THIS VALVE IS INTENDED FOR A SPECIFIC RANGE OF TEMPERATURES AND PRESSURES. APPLICATION OF DIFFERENT TEMPERATURES THAN THOSE SPECIFIED COULD RESULT IN PARTS DAMAGE, VALVE MALFUNCTION, OR LOSS OF CONTROL OF THE PROCESS.***
- ***DO NOT REMOVE THE ACTUATOR FROM THE VALVE WHILE THE VALVE IS STILL PRESSURIZED.***
- ***DISCONNECT ANY OPERATING LINES PROVIDING AIR PRESSURE, ELECTRIC POWER, OR CONTROL SIGNAL TO THE ACTUATOR OR ACCESSORIES.***
- ***USE BYPASS VALVES OR COMPLETELY SHUT OFF THE PROCESS LINE TO ISOLATE THE VALVE FROM PROCESS PRESSURE. RELIEVE PROCESS PRESSURE AND DRAIN PROCESS MEDIA FROM BOTH SIDES OF THE VALVE.***
- ***CONSULT A TRAINED SAFETY ENGINEER FOR ANY ADDITIONAL MEASURES THAT MUST BE TAKEN TO PROTECT AGAINST PROCESS MEDIA.***

INSTALLATION

Orientation

Standard orientation is with the valve stem and actuator in a vertical plane and the process fluid entering the valve from the bottom and discharging through the side in a horizontal plane.

The valve body must be installed such that the outlet connection flow is horizontal or slightly tilted down, away from the valve body. Failure to properly install the valve will result in improper draining.

Other orientations may be chosen if internal drainage is not critical.

Actuator Support

Due to the weight of the actuator, external support is required for the valve. The actuator must be supported with external brackets and must be mounted to a suitable surface for total valve weight support.

⚠WARNING

PERSONAL INJURY OR PROPERTY DAMAGE MAY OCCUR IF THE VALVE IS NOT PROPERLY MOUNTED AND SUPPORTED.

Valve Installation Procedure

The Badger Meter Research Control® SCV-85, SCV-89 and SCV-95 are designed for simple mounting into processing lines using the appropriate sized end connections. The actuator uses standard NPT connections for the air lines making the installation process simple.

1. Shut off the process line flow. Remove the existing actuator if necessary.
2. Mount the actuator to the proper bracket and support surface and secure with the proper mechanism.
3. Align the inlet port to the process line and secure with the properly sized clamps.
4. Align the outlet port to the process line and secure with properly sized clamps.
5. If required and available, install an alarm or vent port system to the vent port on the bonnet of the valve.

TO AVOID PERSONAL INJURY OR PROPERTY DAMAGE, THE VALVE SHOULD NOT BE SERVICED WHILE THE SYSTEM IS IN OPERATION. ALL HAZARDOUS FLUIDS MUST BE DRAINED PROPERLY BEFORE THE VALVE IS SERVICED.

Air Piping

A range of actuators exists that fit on the various sanitary valves. Badger Meter offers a 1/4", 1/2" and a 35" actuator for this product line in both Epoxy Coated Aluminum and 316 Stainless Steel. Refer to the appropriate actuator manual when working on your valve assembly.

The 35" is field-reversible. Please confirm mode of operation before piping air to the actuator.

- For an air-to-open (air to retract) operation, the air pressure line should be connected to the 1/4" NPT opening on the lower shell, below the diaphragm. For air-to-close (air to extend) operation, the air line should be connected to the 1/4" NPT opening on the upper shell, above the diaphragm.
- All instrument and supply air should be clean, dry and free of oil and debris. Contaminates can greatly reduce the life of the actuator.

Valve Positioner

To maximize the accuracy of the valve, Badger Meter recommends the valve be used with an external positioner. If pre-configured with a positioner, the positioner will be properly installed and tested on the valve before being shipped from the factory.

Connect the instrument signal and supply air line to the positioner input and supply port using a small amount of paste type thread sealant. DO NOT use TFE tape.

NOTE: Appropriate supply air pressure is 25…35 psig. If the valve does not achieve the required travel, the supply pressure can be raised until full travel is achieved. The maximum recommend pressure is 60 psig.

If a positioner is selected after receiving the valve from Badger Meter, consult the user manual from the positioner manufacturer.

CLEAN IN PLACE (CIP) AND SANITIZE IN PLACE (SIP)

The Badger Meter Research Control SCV-85, SCV-89 and SCV-95 are designed to accommodate CIP and SIP processes. Use a site-approved CIP and/or SIP process as directed by the Process Engineer.

- Control Valve must be in proper orientation to assure self-draining.
- Cleaning fluid may flow in either direction.
- Cleaning fluid must be compatible with wetted materials.
- Cleaning fluid pressure must not exceed 75 PSIG.
- Cleaning fluid temperature must not exceed 300º F.
- Class I elastomers used.

CIP Recommended Process

- Cycle the valve from full open to full closed a minimum of two times during the 60-second pre-rinse cycle; allow the valve to maintain full closed for two to four seconds before opening.
- Cycle the valve from full open to full closed a minimum 10 times during the 10 minute detergent cycle, again allow the valve to maintain full closed for two to four seconds before opening.
- Cycle the valve from full open to full closed a minimum of two times during the 60-second post-rinse cycle; allow the valve to maintain full closed for two to four seconds before opening.
- Apply 15 psig (the same compressed air pressure as was applied during the soiling process) to the actuator.
- Temperature of exposure to chemical solutions used in cleaning and bacterial treatment up to 180º F.

SIP Recommended Process

- The orientation is same as CIP recommendations.
- The control valve must be in the full-open position during cleaning.
- Steam may flow in either direction.
- Suitable for sterilization temperatures up to 300º F.
- Maximum: 30 psig at SAT.

⚠WARNING

- ***VALVE MAINTENANCE AND SERVICE SHOULD ONLY BE PERFORMED BY QUALIFIED PERSONNEL.***
- ***PERSONAL INJURY AND PROPERTY DAMAGE MAY OCCUR IF SPECIFIC PROCEDURES ARE NOT FOLLOWED.***
- ***THE SYSTEM MUST BE SHUT OFF BEFORE ANY WORK IS DONE ON THE VALVE.***
- ***RELIEVE ALL PRESSURE FROM VALVE AND ACTUATOR.***

Removing the Valve from Service

1. Ensure the system has been shut off and the valve has been properly drained.
2. Bring the actuator to the rest position. Shut off air supply to the actuator or positioner.
3. Make sure the system pressure is fully relieved on both ends of the valve before proceeding to step 4.
4. Release the clamp from both the inlet and outlet lines to free the valve from the process lines.
5. While securely holding the valve, release the mounting brackets holding the valve to the mounting surface.

Separating the Valve from the Actuator

1. Loosen the upper stem nut.
2. Remove the pointer.
3. Loosen the union nut securing the innervalve and the upper connector nuts.
4. Remove the union nut connecting the innervalve and the upper connector nuts.
5. Pull the innervalve out of the seat.
6. Unscrew the yoke locknut to free the valve from the actuator.
7. Remove the actuator assembly for valve maintenance.

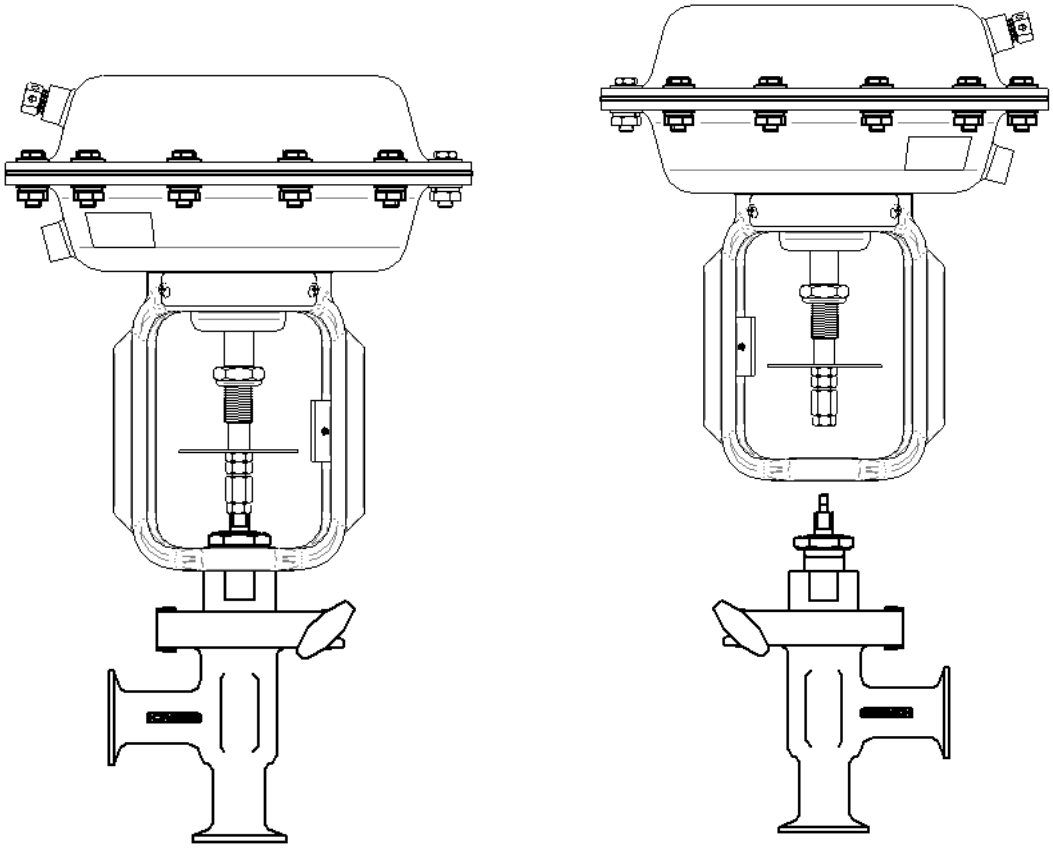


Figure 1: Valve-Actuator Separation

Valve Disassembly

Once the actuator has been separated from the valve, you can disassemble the valve.

1. Loosen the sanitary clamp holding the bonnet to the body by rotating the wing nut counterclockwise.
2. Remove the bonnet and trim subassembly from the body.
3. Remove the union nut from the innervalve.
4. Slide the valve stem and trim assembly out of the bonnet.
5. Remove trim through the bottom of the bonnet.

Inspect the following:

- Valve Body Bonnet Gasket: Remove gasket and inspect for excessive wear, over tightening or other damage which could cause improper sealing.
- Valve Stem and Seat: Examine for excessive wear on the trim and seat (scratches, residue or nicks could cause improper sealing).
- O-ring: Inspect for abrasions or other damage that which could cause improper sealing.

Valve Reassembly

1. Inspect the O-ring on stem to ensure proper position and sealing.
2. Insert the trim through the bottom of the bonnet.
3. Attach the union nut to the innervalve.
4. Inspect the sanitary gasket to ensure proper position and sealing.
5. Install the bonnet and trim subassembly into the body.
6. Tighten the sanitary clamp, holding the bonnet to the body by rotating the wing nut clockwise.

Actuator Reattachment

1. Screw the yoke locknut onto the body securing the body and the actuator together.
2. Pull the innervalve out of seat.
3. Connect the union nut with the innervalve and the upper connector nuts.
4. Tighten the upper stem nut so that the pointer can be slid in between the two nuts.
5. Tighten the union nut to actuator stem.

SPARE PARTS

This manual encompasses the SCV-85, the SCV-89 and the SCV-95. Each of these valves functions similarly but are available in different sizes with various elastomers. The serial number tag on the actuator indicates a cross-reference number. The serial number assists the customer service representative in providing the proper factory authorized parts.

Recommended spare parts are:

- O-ring on stem
- Body Bonnet Gasket

For actuator repair parts, please refer to the Actuator literature or contact the factory.

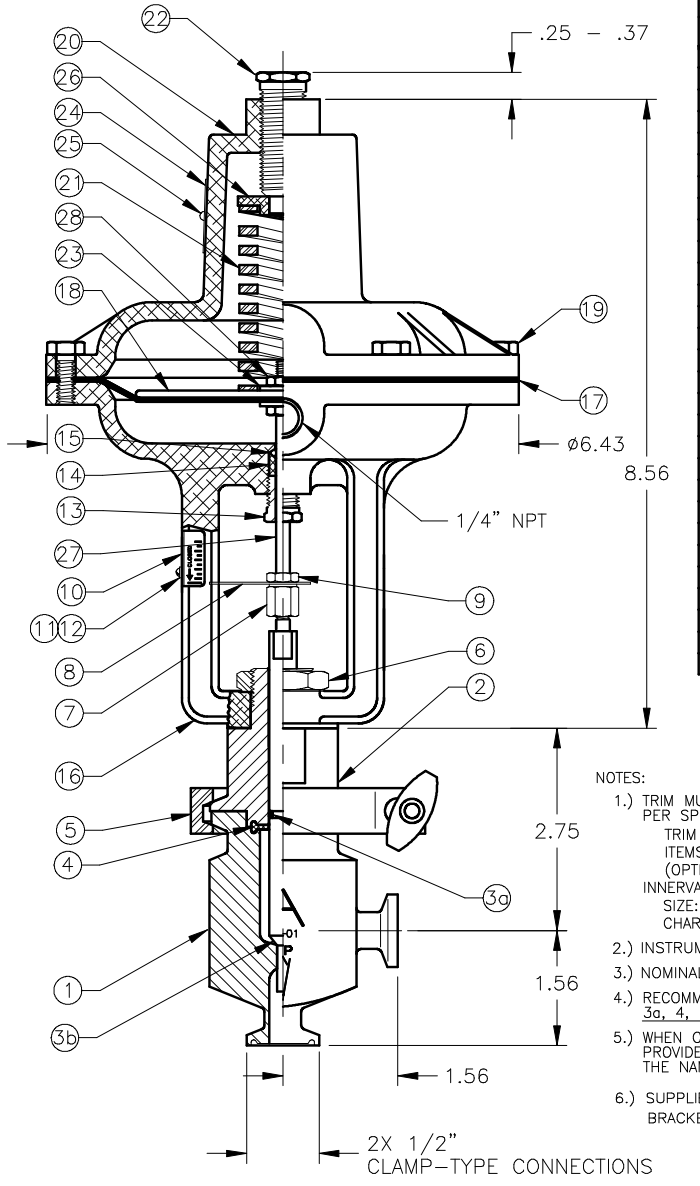
Valve Type	SCV-85				SCV-89		SCV-95
Valve Size	1/2"	3/4"	1"	1-1/2"	1"	1 -1/2"	2"
O-ring (Viton)	490001	490001	490001	490001	490001	490001	490001
Gasket (Viton)	501094	501094	501094	501094	501094	501094	501475
Trim	*Contact Badger Meter Technical Support Services*						
Body							

Trim and Seat Replacement:

The trim assembly has an integrated seat within the valve body. Replace the trim if excessive wear exists. Also change the body to provide a new seat for a positive sealing surface for the trim.

SCV-85 Parts

DWG NO.	ISSUE	ISS	CHANGE	BY	DATE	UNLESS OTHERWISE SPECIFIED	ALL PROPRIETARY RIGHTS IN THE SUBJECT MATTER
CD–952816	01.01	01.01	SO 457632	DGD	03–05–02	DIMENSIONS FOR REFERENCE ONLY LENGTH UNITS ARE INCHES	SHOWN ON THIS DRAWING ARE THE EXCLUSIVE PROPERTY OF BADGER METER INCORPORATED.



PARTS & MATERIAL LIST

QUANTITIES ARE FOR ONE (1) UNIT ONLY

ITEM NO.	PART NO.	QTY	DESCRIPTION	MATERIAL
1	525269–00	1	BODY	
2	525267–00	1	BONNET	
3a	490001–00	1	O–RING	
3b	SEE NOTE 1	1	INNERVALVE	
4	501094–00	1	GASKET	
5	501099–0002	1	CLAMP	316 SST
6	520749	1	LOCK NUT	303 SST
7	520391	1	CONNECTOR	303 SST
8	510157	1	TRAVEL POINTER	300 SER SST
9	410011	1	STEM NUT	300 SER SST
10	520985–0002	1	TRAVEL SCALE	300 SER SST
11	400001–0072	1	SCREW	300 SER SST
12	430002–0022	1	FLAT WASHER	300 SER SST
13	525026–0001	1	O–RING GLAND	316 SST
14	522768	1	O–RING FOLLOWER	TFE
15	490002–0001	1	O–RING	SILICONE RUBBER
16	520987–0002	1	PRESS. CASE & YOKE	ALUMINUM
17	510154–0003	1	DIAPHRAGM	BUNA/ NYLON
18	520386–0002	1	DIAPHRAGM PLATE	STEEL/ ZINC PL
19	400029–0001	6	HEX HD.RIM SCREW	300 SER SST
20	520988–0002	1	SPRING CASE	ALUMINUM
21	510031–0107	1	SPRING	STEEL
22	520390–0003	1	SPRING ADJUSTOR	300 SER SST
23	430002–0020	2	WASHER	300 SER SST
24	512416–0002	1	NAMEPLATE	300 SER SST
25	400018–0012	2	DRIVE SCREW	300 SER SST
26	520388–0001	1	SPRING SEAT	ALUMINUM
27	520993	1	TOPWORKS STEM	316 SST
28	410030–0002	2	LOCKNUT	300 SER SST

NOTES:

1.) TRIM MUST COMPLY WITH 3A SANITARY CRITERIA PER SPECIFICATION 941266.
TRIM ASSEMBLY NUMBER: _____
ITEMS 3a & 3b SOLD AS A SINGLE TRIM SET (OPTIONAL SPARE PART).
INNERVALVE DESCRIPTION
SIZE: _____ Cv: _____
CHARACTERISTIC: _____

2.) INSTRUMENT SIGNAL RANGE: _____

3.) NOMINAL STROKE: .562

4.) RECOMMENDED SPARE PARTS ARE ITEMS 3a, 4, 15, 17, & 21

5.) WHEN ORDERING SPARE OR REPLACEMENT PARTS, PROVIDE FACTORY THE VALVE SERIAL NUMBER FROM THE NAMEPLATE ON THE ACTUATOR.

6.) SUPPLIED WITH CONOFLOW GT–210 I/P TRANSDUCER BRACKET MOUNTED WITH BRASS FITTINGS.

CERTIFIED FOR: _____
P.O. : _____
LOCATION: _____
SERIAL NO.: _____
TAG NUMBER: _____
PREPARED BY: _____ DATE: _____

APPROVALS	DATE
DRAWN: D. DOSSER	03–05–02
CHECKED: W. HALL	03–11–02
ENGINEER: M.A. LOBO	03–26–02

BADGER METER
RESEARCH CONTROL® VALVES
C

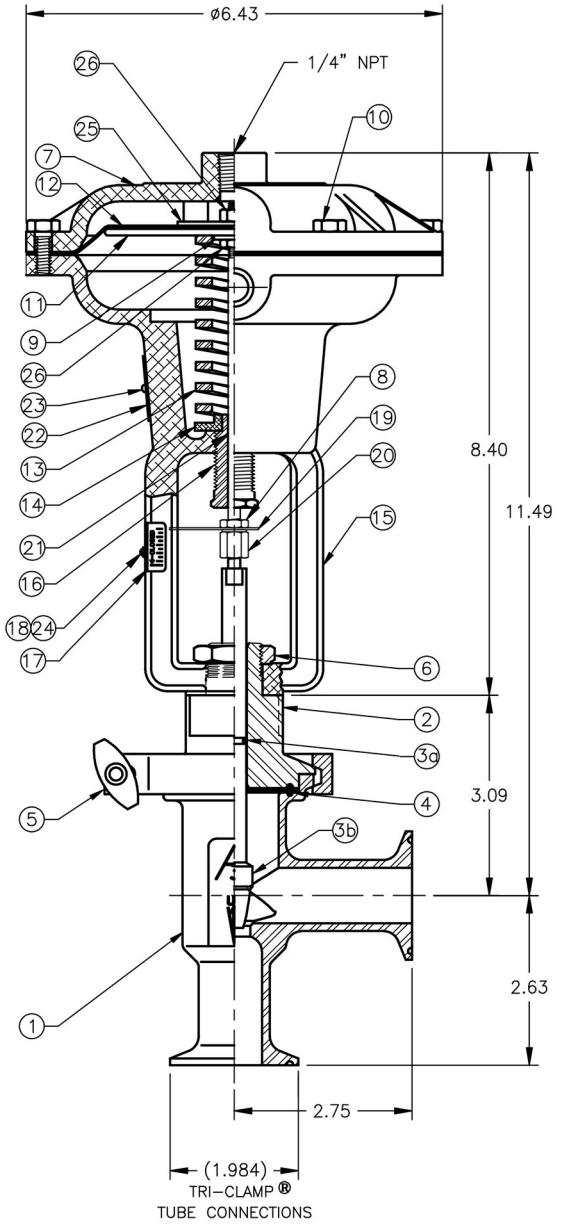
1/2" ANGLE BODY – 3A SANITARY CLAMP–TYPE CONNECTIONS, SANITARY BONNET, 1/2" ATO ACTUATOR
REF: CD–950903 & CD–950754

SIZE	SCALE	DWG. NO.	ISSUE
A	1/2	CD–952816	01.01

SCV-89 Parts

DWG NO.	ISSUE	ISS	CHANGE	BY	DATE
CD–951880	01.02	1.1	904970	DPD	11–11–94
		01.02	CD–V & 3A NOTE, (SO 447717)	DGD	04–20–01

UNLESS OTHERWISE SPECIFIED DIMENSIONS FOR REFERENCE ONLY LENGTH UNITS ARE INCHES



PARTS & MATERIAL LIST

QUANTITIES ARE FOR ONE (1) UNIT ONLY

ITEM NO.	PART NO.	QTY	DESCRIPTION	MATERIAL
1	525960–00	1	BODY	
2	525162–00	1	BONNET	
3a		1	O–RING	
3b	SEE NOTE 1	1	INNERVALVE	
4	501094–00	1	GASKET	
5	501099–0001	1	CLAMP	300 SER SST
6	520749	1	LOCKNUT	300 SER SST
7	521004–0002	1	PRESSURE CASE	ALUMINUM
8	410011	1	STEM NUT	300 SER SST
9	430002–0020	1	WASHER	300 SER SST
10	400029–0001	6	HEX HD. RIM SCREW	300 SER SST
11	520386–0002	1	DIAPHRAGM PLATE	STEEL/ ZINC PL
12	510154–0003	1	DIAPHRAGM	BUNA/ NYLON
13	510031–0107	1	SPRING	STEEL
14	520388–0001	1	SPRING SEAT	ALUMINUM
15	521003–0002	1	SPRING CASE & YOKE	ALUMINUM
16	521002–0002	1	SPRING ADJUSTOR	300 SER SST
17	520985–0002	1	TRAVEL SCALE	300 SER SST
18	400001–0072	1	SCREW	300 SER SST
19	510157	1	TRAVEL POINTER	300 SER SST
20	520391	1	CONNECTOR	300 SER SST
21	523027	1	TOPWORKS STEM	316 SST
22	512416–0002	1	NAMEPLATE	300 SER SST
23	400018–0012	2	DRIVE SCREW	300 SER SST
24	430002–0022	1	FLAT WASHER	300 SER SST
25	521006	1	UP STOP PLATE	ALUMINUM
26	410030–0002	2	LOCKNUT	300 SER SST

TRI–CLAMP® IS A TRADEMARK OF TRI–CLOVER, INC.

CERTIFIED FOR: _____

P.O. : _____

LOCATION: _____

SERIAL NO.: _____

TAG NUMBER: _____

PREPARED BY: _____ DATE: _____

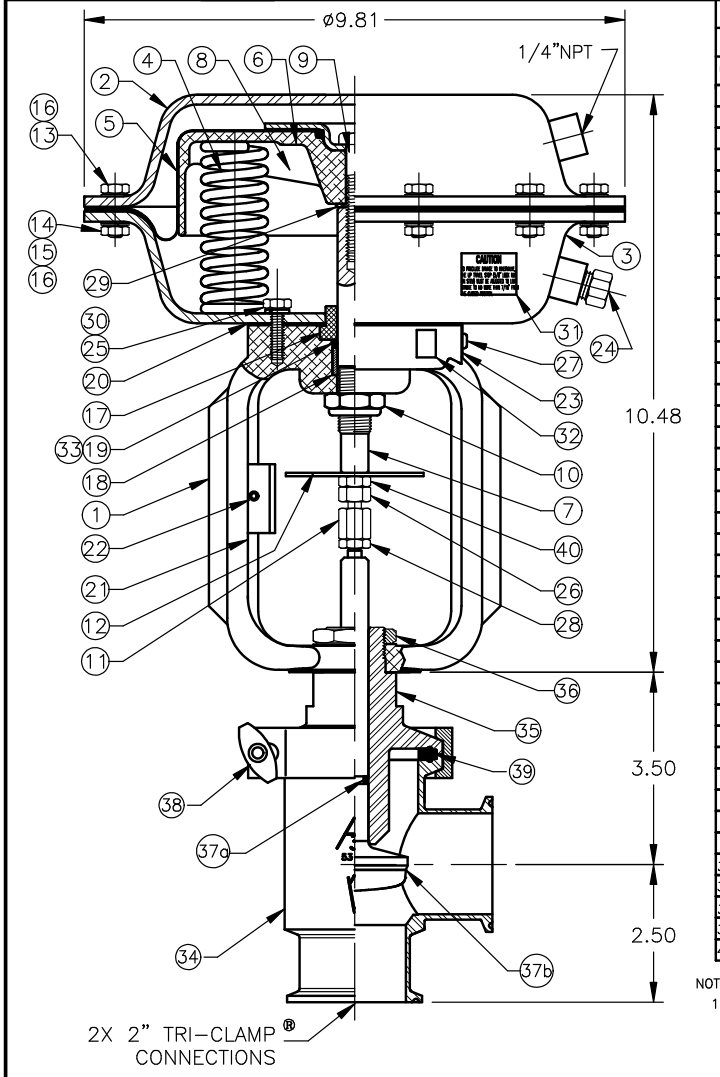
BADGER METER
RESEARCH CONTROL® VALVES

1" 3A ANGLE SANITARY BODY, 1" SANITARY TRI–CLAMP® BONNET, 1/2" ATC ACTUATOR
REF: CD–950940 & CD–950755

SIZE	SCALE	DWG. NO.	ISSUE
A	7/16	CD–951880	01.02

SCV-95 Parts

DWG NO.	ISSUE	ISS	CHANGE	BY	DATE	UNLESS OTHERWISE SPECIFIED	ALL PROPRIETARY RIGHTS IN THE SUBJECT MATTER
CD–952841	01.01	01.01	460572	GAP	07–16–02	DIMENSIONS FOR REFERENCE ONLY LENGTH UNITS ARE INCHES	SHOWN ON THIS DRAWING ARE THE EXCLUSIVE PROPERTY OF BADGER METER INCORPORATED.



PARTS & MATERIAL LIST

QUANTITIES ARE FOR ONE (1) UNIT ONLY

ITEM NO.	PART NO.	QTY	DESCRIPTION	MATERIAL
1	527247–00	1	YOKE	
2	526041–00	1	SPRING CASE	
3	526042–00	1	PRESSURE CASE	
4	510031–0		SPRING	17–7 PH SST
5	512698–0002	1	DIAPHRAGM	NITRILE/POLYESTER
6	512883–0001	1	DIAPH. RETAINER	C–STL, ZN/PL
7	527448–0001	1	STEM	316 SST
8	512882–0001	1	PISTON	A380 ALUM.
9	400013–0085	1	SCR. GR.8	STL, ZN PL
10	526147–0001	1	LOCKNUT	300 SER SST
11	525992–0001	1	CONNECTOR	316 SST
12	512879–0003	1	TRAVEL POINTER	NYLON
13	400013–0002	12	RIM SCREW	300 SER SST
14	430004–0021	12	LOCK WASHER	300 SER SST
15	410001–0060	12	RIM NUT	300 SER SST
16	430002–0107	24	WASHER	300 SER SST
17	512880–0001	1	UPR BUSHING	NYLATRON
18	460019–0001	1	LWR BUSHING	POLYMER
19	490018–0003	1	O–RING	ELF NITRILE
20	512712–0001	1	YOKE GASKET	CARBON/NITRILE
21	527233–00	1	TRAVEL SCALE	ALUMINUM
22	400006–0056	1	SET SCREW	300 SER SST
23	512923–0001	1	NAMEPLATE	300 SER SST
24	526037–0001	1	VENT PLUG	PLASTIC
25	526119–0002	6	SCREW	STEEL/FLUORO
26	410001–0056	1	LOCKNUT	316 SST
27	400001–0013	2	SCREW	300 SER SST
28	410001–0062	1	NUT	300 SER SST
29	527432–0001	1	THRUST WASHER	STEEL/SILVER
30	430004–0014	6	LOCK WASHER	300 SER SST
31	512717–0001	1	CAUTION DECAL	MYLAR
32	512914–00	1	DECAL	VINYL/MYLAR
33	500458–0025	–	GREASE	–––––––
34	501473–0001	1	BODY	316 SST
35	526784–0001	1	BONNET	316/316L SST
36	525944–0001	1	LOCK NUT	316 SST
37a		1	O–RING	
37b	SEE NOTE 1	1	INNERVALVE	
38	501474–0001	1	CLAMP	SST
39	501475–00	1	GASKET	
40	410001–0058	1	NUT	316 SST

NOTES:

1.) TRIM MUST COMPLY WITH 3A SANITARY CRITERIA PER SPECIFICATION 941266.
TRIM ASSEMBLY NUMBER: _____
ITEMS 37a & 37b SOLD AS A SINGLE TRIM SET (OPTIONAL SPARE PART).
INNERVALVE DESCRIPTION
SIZE: _____ Cv: _____
CHARACTERISTIC: _____

2.) INSTRUMENT SIGNAL RANGE: _____

3.) NOMINAL STROKE: _____

4.) RECOMMENDED SPARE PARTS ARE ITEMS 4, 5, 17, 19, 37a, 39

5.) WHEN ORDERING SPARE OR REPLACEMENT PARTS, PROVIDE FACTORY THE VALVE SERIAL NUMBER FROM THE NAMEPLATE ON THE ACTUATOR.

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TRI–CLAMP® IS A TRADEMARK OF TRI–CLOVER, INC.

MYLAR® IS A TRADEMARK OF E.I. DUPONT DE NEMOURS & CO.

CERTIFIED FOR: _____
P.O. : _____
LOCATION: _____
SERIAL NO.: _____
TAG NUMBER: _____
PREPARED BY: _____ DATE: _____

APPROVALS	DATE
DRAWN: G. PRICE	07–16–02
CHECKED: W. HALL	7–17–02
ENGINEER: JOHN MADLOCK	7–19–02

BADGER METER
RESEARCH CONTROL® VALVES

2", ANGLE SANITARY BODY, 3A SANITARY TRI–CLAMP® BONNET, 35 SQ. IN. ATC ACTUATOR
REF: CD–951803 & CD–952306

SIZE	SCALE	DWG. NO.	ISSUE
A	3/8	CD–952841	01.01

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