

Note: This document is to be used in conjunction with WellMark Catalog Document, Section 10.1, Series 3535 Back Pressure Valve Pages 1-4

WARNING!

Over-pressure of this valve or installation of the valve in applications which may see pressure levels beyond those for which the valve is designed may result in leakage and/or catastrophic failure. This failure could result in leaking gas, or produced liquid, damage to surrounding equipment and/or environment, personal injury or death.

Suitable pressure-relieving devices, as recommended by appropriate codes or standards, should be installed in your system to assure the maximum rated pressures are not exceeded.

Prior to installation of the 3535 valve, system must be isolated from pressure. Failure to do so may result in personal injury, environmental spill concerns and/or damage to equipment.

Specifications

Sizes _____ 1" & 2" Threaded
_____ 2" Flanged (Cl. 150)

Configuration _____ Globe Body

Working Pressures _____ Dictated by Spring Range

Spring Ranges _____ 0-30lbs to 20-150 lbs

Temperature _____ -20°F to +250°F

Size Topworks _____ #10 and #20

(Cv) Flow Coefficient _____ 1"=11 2"=25

Materials

Body _____ Ductile Iron

Topworks _____ #20 Pressed Steel, #10 WCB

Diaphragm _____ Molded Nylon-Reinforced Buna-N
(Viton Available)

Stem _____ 316 Stainless Steel

Packing _____ Molythane or Cotton-reinforced Nitrile

Trim _____ 303 Stainless Steel Molded Buna-N
(Viton Available)

Application

The Series 3535 Back Pressure Valve's primary application is to maintain back pressure on separators, treaters, Lact units and other accumulators where upstream pressure is required to be kept at a preset range. However, this valve may also be used as a differential valve by utilizing secondary signal pressure, along with

spring force on top of the diaphragm to oppose flow pressure applied to the bottom of the diaphragm.

Installation

Insure that threaded connections or flanges on both the valve and the vessel are clean, free of debris and undamaged prior to installing. Install the valve into appropriately-sized mating male threaded connections or flanges with flow direction as indicated by arrow on body. For threaded connections utilize a suitable thread sealant to assure leak-tight makeup and to avoid thread calling. For flanged connections, utilize proper gaskets as required for the specific flange configuration.

CAUTION

Maximum allowable working pressure for this valve is determined by the Spring Range. Although flanged connections are Class 150 by design, the valve does not carry the full rated working pressure of the flange. Refer to the following chart for Spring Range availability.

Spring Ranges, Model and Part Numbers, CV Ratings for #10 Topworks

Size	Model No.	Ends Connection	Spring Range	C _v	Wt.	Part No.
1"	110-DSG-B-I	1" NPT	0-60 lbs	11	40#	03031-0007
	110-DSG-B-I		20-150 lbs			03031-0015
2"	210-DSG-B-I	2" NPT	0-60 lbs	25	44#	03032-0030
	210-DSG-B-I		20-150 lbs			03032-0048
	210-DGG-B-I	2" GROOVED	0-60 lbs	25	41#	03032-0063
	210-DGG-B-I		20-150 lbs			03032-0071
	210-DFG-B-I	2"ANSI 150 RF	0-60 lbs	25	60#	03032-0121
	210-DFG-B-I		20-150 lbs			03032-0139
	210-DFG-B-I	2"ANSI 300 RF	0-60 lbs	25	64#	03032-0154
	210-DFG-B-I		20-150 lbs			03032-0162
	210-DFG-B-I	2"ANSI 600 RF	0-60 lbs	25	68#	03032-0188
	210-DFG-B-I		20-150 lbs			03032-0196

Spring Ranges, Model and Part Numbers, CV Ratings for #20 Topworks

Size	Model No.	Ends Connection	Spring Range	C _v	Wt.	Part No.
1"	120-DSG-B-I	1" NPT	0-30 lbs	11	32#	03027-0003
	120-DSG-B-I		10-80 lbs			03027-0011
2"	220-DSG-B-I	2" NPT	0-30 lbs	25	38#	03001-0086
	220-DSG-B-I		10-80 lbs			03001-0094
	220-DSG-B-I		50-100 lbs			03001-0177
	220-DSG-B-I		0-30 lbs			03001-0037
	220-DGG-B-I	2" GROOVED	10-80 lbs	25	35#	03001-0052
	220-DGG-B-I		50-100 lbs			03001-0011
	220-DFG-B-I	2"ANSI 150 RF	0-30 lbs	25	46#	03001-0144
	220-DFG-B-I		10-80 lbs			03001-0151
	220-DFG-B-I		50-100 lbs			03001-0193
	220-DFG-B-I		50-100 lbs			03001-0193

The adjustment screw (27) and jam nut (28) may be shipped loose. If so, apply a light coating of general-purpose grease to the adjustment screw and thread the Jam Nut onto the adjusting screw, running it down close to the top of the upper case. Thread the adjusting screw into upper case (29).

Operation

The valve design communicates upstream pressure to the lower side of the diaphragm. Interaction between the spring pre-load and the upstream pressure working on the diaphragm causes the valve to open as necessary to maintain an upstream back-pressure as set with the adjustment screw. A pressure gauge (not included) should be employed upstream to validate pressure adjustments.

Adjustment

Loosen the Lock Nut (28) to allow movement of adjusting screw (27)

To INCREASE SET POINT PRESSURE:

Looking down on the top of the adjusting screw, turn **CLOCKWISE** to increase spring pre-load and therefore set point pressure

To DECREASE SET POINT PRESSURE:

Looking down on the top of the adjusting screw, turn **COUNTER-CLOCKWISE** to decrease spring pre-load and therefore set point pressure.

Maintenance

Normal operating conditions will result in wear of the valve components. A routine and maintenance program should be initiated, with frequency of inspection and replacement of parts dictated by the severity of the service.

WARNING!

Leakage of fluid from the valve indicates that service is required. Failure to remedy worn components may result in an unsafe condition. Prior to attempting maintenance, valve must be isolated from pressure and all pressure must be released from valve interior. Failure to do so may result in personal injury, environmental spill concerns and/or damage to equipment.

Once the valve is isolated from system pressure, most maintenance can be conducted without removing the valve body from line.

Isolate the valve from system. If used as differential valve, shut off supply pressure to topworks. Assure that any residual supply pressure has been fully vented from the diaphragm. Disconnect the supply line from topworks.

Loosen the lock nut (28) on the adjustment screw (27) on top of the upper case (14 #20, 29 #10). Turn the adjustment screw **COUNTER-CLOCKWISE** until all pre-load is relieved.

#10 Topworks Disassembly (see sch 1)

Remove cap screws (30) and hex nuts (31) from upper case (29) and diaphragm support (4). Remove the upper case, spring (26) and upper guide (24).

Remove nyloc nut (21) and lock washer (20) from the top of the stem (6). Remove the lower guide (25), diaphragm plate (22), thread seal (15), diaphragm (23) and remaining diaphragm plate.

Remove the diaphragm support by first loosening and removing the brass compression nut on the connector (14) located on the bottom of the large upper diaphragm support flange, then remove the four hex head cap screws (8). Lift the diaphragm support off of the stem (6) and from the body (1). Remove the gasket (3).

Using a pair of internal spring clip pliers, remove the tru-arc ring (16). Remove the delrin spacer (18), polypak seal (19) and delrin stem guide (17). Inspect for wear and set aside.

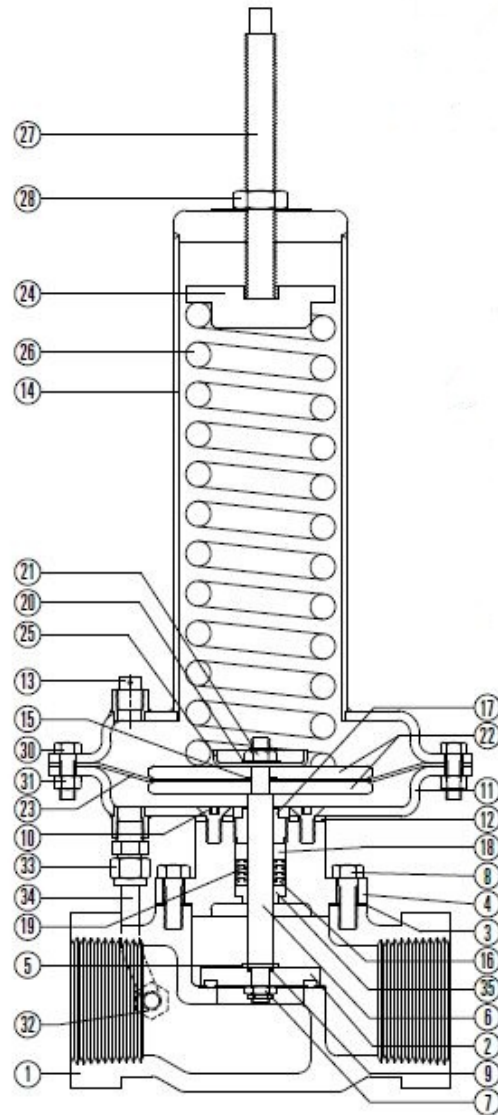
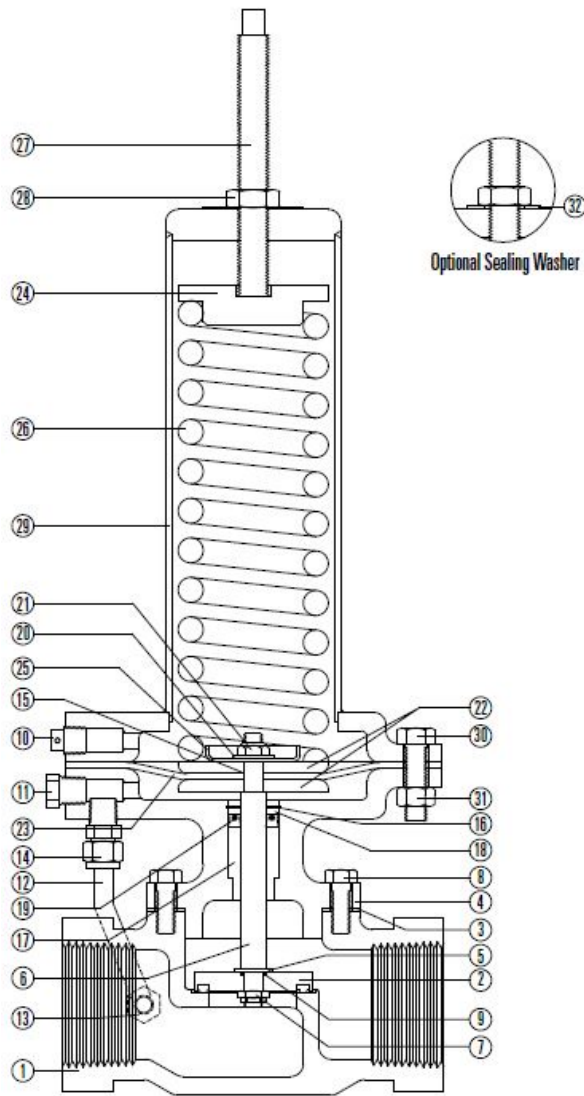
#20 Topworks Disassembly (see sch 2)

Remove cap screws (30) and hex nuts (31) from upper case (14) and lower case (11). Remove the upper case, spring (26) and upper guide (24).

Remove nyloc nut (21) and lock washer (20) from the top of the stem (6). Remove the lower guide (25), diaphragm plate (22), thread seal (15), diaphragm (23) and remaining diaphragm plate.

Sch 1 - #10 Topworks Valve Parts

Sch 2 - #20 Topworks Valve Parts



Remove the lower case by first loosening and removing the brass compression nut on the connector (33) located on the bottom of the large upper diaphragm support flange, then remove the four flat head screws (10). Remove the lower case from the diaphragm support (4). Remove the gasket (12).

Loosen the packing adjuster (17), removing it from the stem (6). Remove four hex head cap screws (8) and left the diaphragm support from body (1). Remove the gasket (3). The spacer (18) and

and stem packing (19 & 16) may now be removed from the top side of the diaphragm support. Use a hook-shaped tool to engage the spacer and packing rings and remove them from the diaphragm support, **exercising caution to assure that the sealing area in the diaphragm support is not scratched or scored.** Note packing ring orientation. Inspect packing components and set aside.

Stem and Plug Removal

The stem/plug assembly may now be lifted up and out of the body. Inspect the plug (2) for wear or damage and replace, if necessary, as follow:

Loosen and remove the flex-loc nut (7) from the bottom of stem. Slide the plug off of stem being careful not to lose the washer (5). Replace the plug and reassemble the washer and flex-loc nut in place and tighten firmly.

Inspect the stem for wear, assuring there are no undue scratches or gouges in the packing seal area. Dress any scratches with fine emery or replace.

Inspect the seat surfaces (machined into the body) for wear. Any minor blemishes should be dressed with fine emery cloth. **NOTE: Excessive wear may render the body unusable so proceed slowly and with caution.**

Inspect Diaphragm (23) and packing (16) for wear and replace if necessary. Inspect the bottom of surface of the diaphragm plates to assure there are no burrs or flows that might result in damage to the diaphragm.

Re-Assembly

Inspect all gasket surfaces to assure they are clean and that no undue scratches are present, which might keep gaskets from sealing properly.

Coat the stem and internal seal area of the diaphragm support liberally with general-purpose grease and install the stem/plug assembly into the body. Position a new gasket (3) in place on the top flange of the body and lower the diaphragm support in place, taking care not to damage the sealing surface of the stem as you guide in through the diaphragm support. Install and tighten four hex head cap screws (8) in cross-tightening fashion, snugging them up firmly.

#10 Topworks Packing Installation

Slide the delrin stem guide (17), new polypak seal (19) and delrin spacer (18) over the stem and into position with the diaphragm support. Re-install the tru-arc ring (16) into its groove above the previously installed items. Re-attach copper tubing (12) by snugly tightening the brass compression nut on the connector (14).

#20 Topworks Packing and Case Installation

Coat the packing set and spacer with a light coating of grease and install them by carefully sliding them down the stem and into the packing area in the diaphragm support pressing them firmly in place.

IMPORTANT!

Exercise care to assure that the threaded areas of the linkage and the internal threads in the diaphragm support do not damage the lips of the packing during insertion. Damage to these components may result in leakage of flow media into the diaphragm area. Install packing rings with cup-side up.

Coat the packing adjuster with grease and thread it into the top of the diaphragm support. Using a wrench, tighten the packing adjuster down firmly and then back it off ¼ turn. Tap on the side of the stem and observe for looseness. If loose, retighten until side-to-side looseness is removed. Do not over-tighten.

Make sure top surface of diaphragm support and bottom surface of the lower case are free of dirt and debris. Position a new gasket (12) in place on top of the diaphragm support. Align the lower case on the gasket and secure with four flat head screws (10). Re-attach copper tubing (34) by snugly tightening the brass compression nut on the connector (33).

Assembly of Diaphragm, Case and Spring

Install the lower diaphragm plate (22), diaphragm (23), thread seal (15), upper diaphragm plate (22) and lower guide (25). Install the lock washer (20) and ny-loc nut (21), tightening it snugly.

Position the spring (26) atop the lower guide, the upper guide (24) atop the spring and install the upper case (Item 29 on #10 topworks, item 14 on #20 topworks) down over it, aligning the flange holes with gasket and lower case (or diaphragm support on #10 topworks). Install hex head cap screws (30) and hex nuts (31), tightening them snugly in a cross-tightening method. Apply a light coating of grease to the adjusting screw (27) and install in the top of the upper case until it just touches the upper guide. Finally, install the jam nut (28). Re-adjust adjustment screw for proper operation and tighten jam nut.

#10 Topworks Parts List

Item	Description	Qty.	Part No.
1	BODY, 1" NPT ANGLE, DUCTILE IRON	1	05011-8397
	BODY, 2" NPT, DUCTILE IRON	1	05011-8256
	BODY, 2" GROOVED, DUCTILE IRON	1	05010-4678
	BODY, 2" ANSI 150RF, STEEL WCB	1	06500-3345
	BODY, 2" ANSI 300RF, STEEL WCB	1	06500-3352
	BODY, 2" ANSI 600RF, STEEL WCB	1	06500-3360
2"	PLUG, 1" VALVES, 303 S.S. MOLDED BUNA-N	1	05011-1251
	PLUG, 2" VALVES, 303 S.S. MOLDED BUNA-N	1	05010-4561
3"	GASKET, MOLDED BUNA-N	1	05011-0816
4	DIA. SUPPORT, STEEL WCB	1	05010-8596
	DIA. SUPPORT, ANSI 300/600 FLG.	1	05011-8298
5	WASHER, 304 STAINLESS STEEL	1	05010-4116
6	STEM, ASTM A-276 TY.316	1	05010-9222
7	FLEX-LOC NUT, STAINLESS STEEL	1	05000-1817
8	CAP SCREW, ASTM A-307 GR.B	4**	05000-1874
9"	O-RING, BUNA-N	1	05000-0066
10	BREATHER, HPE	1	05011-1640
11	PIPE PLUG, STEEL	1	06000-0478
12	TUBING, COPPER	1	06000-0437
13	ELBOW CONN., BRASS	1	06000-0445
14	CONNECTOR, BRASS	1	06000-0429
15"	THREAD SEAL, STEEL/BUNA-N	1	06000-0395
16	TRU-ARC RING, STAINLESS STEEL	1	06000-0452
17	STEM GUIDE, DELRIN®	1	05010-8638
18	SPACER, DELRIN®	1	05010-8646
19"	POLYPAK, MOLYTHANE	1	06000-0353
20	LOCK WASHER, STEEL	1	06000-0403
21	NY-LOC NUT, ASTM A-307 GR.B	1	05000-2997
22	DIAPH. PLATE, ASTM A-569	2	05010-8786
23"	DIAPHRAGM, NYLON RENF. NITRILE	1	05010-8612
24	UPPER GUIDE, ASTM A-108GR.1213	1	05010-1906
25	LOWER GUIDE, ASTM A-366	1	05010-1914
26	SPRING 0-60#, ASTM A-401	1	05010-1344
	SPRING 20-150#, ASTM A-401	1	05010-6293
27	ADJ. SCREW, ASTM A-307 GR.B	1	05010-7820
28	JAM NUT, ASTM A-307 GR.B	1	05000-2070
29	UPPER CASE, ASTM A-216 GR.WCB	1	06500-0986
30	CAP SCREW, ASTM A-307 GR.B	8	05000-1890
31	HEX NUT, ASTM A-307 GR.B	8	05000-2104
32	SEAL WASHER, STEEL PLATED	1	06000-0460

*Recommended Spare Part

#20 Topworks Parts List

Item	Description	Qty.	Part No.
1	BODY, 1" NPT, DUCTILE IRON	1	05011-8397
	BODY, 2" NPT, DUCTILE IRON	1	05011-8256
	BODY, 2" GROOVED, DUCTILE IRON	1	05011-8207
	BODY, 2" ANSI 150RF, STEEL WCB	1	06500-3345
2"	PLUG, 1" VALVES, 303 S.S. MOLDED BUNA-N	1	05011-1251
	PLUG, 2" VALVES, 303 S.S. MOLDED BUNA-N	1	05010-4561
3"	GASKET, MOLDED BUNA-N	1	05011-0816
4	DIA. SUPPORT, ASTM A-108GR.1018	1	05010-4363
5	WASHER, 304 STAINLESS STEEL	1	05010-4116
6	STEM, ASTM A-276 TY.316	1	05010-4587
7	FLEX-LOC NUT, STAINLESS STEEL	1	05000-1817
8	CAP SCREW, ASTM A-307 GR.B	4	05000-1858
9	O-RING, BUNA-N	1	05000-0066
10	FLAT HD. SCREW, STAINLESS STEEL	4	05000-1759
11	LOWER CASE, ASTM A-569	1	06500-0572
12	GASKET, MOLDED BUNA-N	1	05010-3662
13	BREATHER, HPE	1	05011-1640
14	UPPER CASE, ASTM A-569	1	06500-1059
15"	THREAD SEAL, STEEL/BUNA-N	1	06000-0395
16"	PACKING, FLAT, COTTON REIN. NITRILE	1	06000-0528
17	PACKING ADJ., ASTM B-16	1	05010-3639
18	SPACER, DELRIN®	1	05010-4322
19"	PACKING, COTTON REIN. NITRILE	3	06000-0387
20	LOCK WASHER, STEEL	1	06000-0403
21	NY-LOC NUT, ASTM A-307 GR.B	1	05000-2997
22	DIAPHRAGM PLATE, ASTM A-569	2	05010-1922
23"	DIAPHRAGM 0-30#, NYLON RENF. NITRILE	1	06000-0056
	DIAPHRAGM 30-100#, NYLON RENF. NITRILE	1	06000-0064
24	UPPER GUIDE, ASTM A-108GR.1213	1	05010-1906
	UPPER GUIDE 50-100#, ASTM A-108GR.1213	1	05010-5071
25	LOWER GUIDE, ASTM A-366	1	05010-1914
	LOWER GUIDE 50-100#, ASTM A-366	1	05010-5089
26	SPRING 0-30#, ASTM A-401	1	05010-1344
	SPRING 10-80#, ASTM A-401	1	05010-6293
27	ADJ. SCREW, ASTM A-307 GR.B	1	05010-7820
28	JAM NUT, ASTM A-307 GR.B	1	05000-2070
29	SPRING, ASTM A-401, INNER	1	05010-5055
30	CAP SCREW, ASTM A-307 GR.B	12	05000-1742
31	HEX NUT, ASTM A-307 GR.B	12	05000-1726
32	ELBOW, CONN., BRASS	1	06000-0445
33	CONNECTOR, BRASS	1	06000-0429
34	TUBING, COPPER	1	06000-0437
35	STEM GUIDE, DELRIN®	1	05010-4231

*Recommended Spare Part