

VALVCEQ BACKFLOW PREVENTERS

FIGURE RP03

Reduce pressure zone device suitable for high and medium hazard rated applications
Flanged end connections



FEATURES

- Compact simple design.
- In-line and on-site serviceable.
- No special tools required for servicing.
- Lifting lugs to assist with installation.
- Designed and manufactured in accordance with AS/NZS 2845.1.
- FBE coated to AS/NZS 4158.
- Straight through flow path for maximum flow co-efficient.
- Top entry allows parts to be accessed easily.
- Stainless steel internals for superior corrosion resistance.
- Fully restrained check valve assemblies for unrivalled safety.
- Ductile iron body for high strength and impact resistance.
- Every valve is bench tested and tracked with unique serial number.
- All internal components are repairable or replaceable.
- All internal and external bolting is stainless steel.
- Conforms to testing requirements of AS/NZS 2845.3.
- Anti-tamper test taps.
- Design conforms to all major international standards.
- Recommended for horizontal installation only.

GENERAL APPLICATION

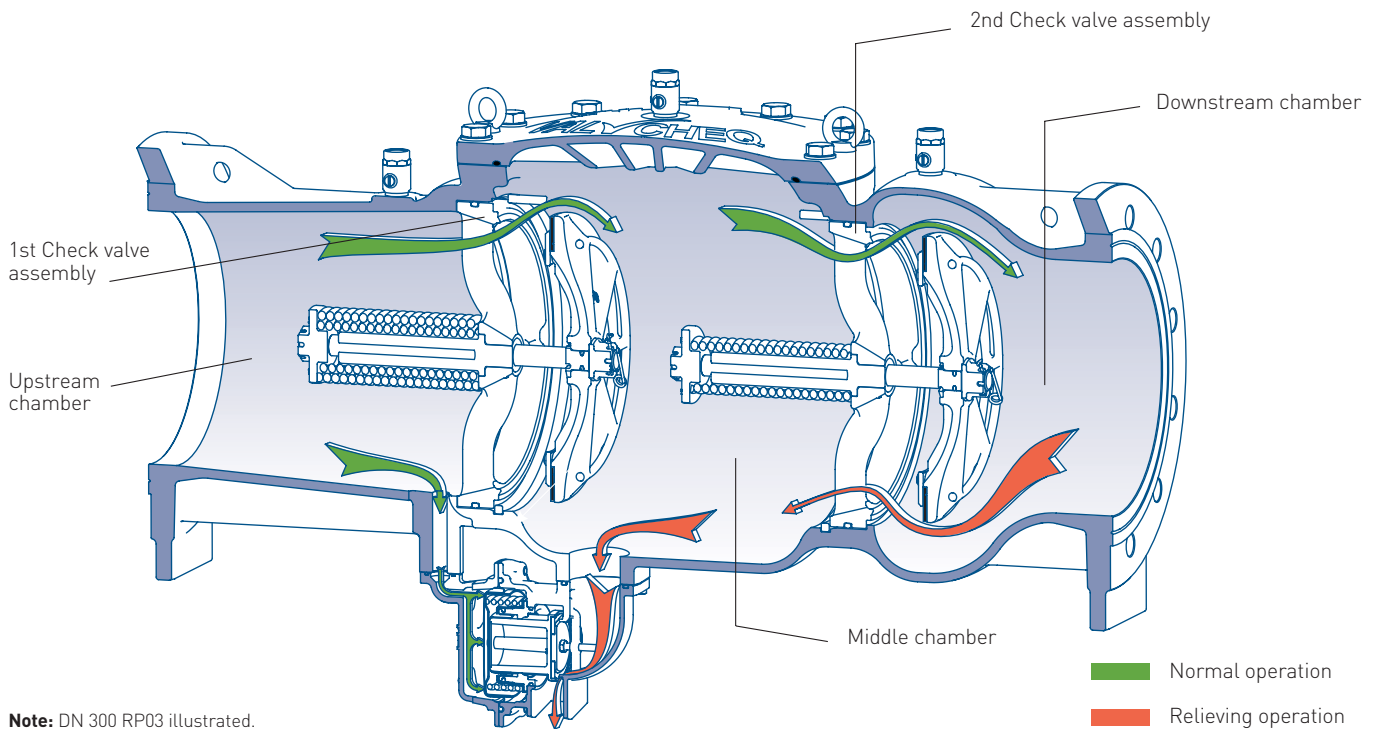
The RP03 provides protection from both backsiphonage and backpressure of the potable water supply from contamination in high and medium hazard applications.

TECHNICAL DATA

Size range: DN 200 - 300
 Temperature rating: 1 °C to 60 °C
 Working pressure: PN16
 End connections: Flanged AS 2129
 Alternative flange drillings may be available on request

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FIGURE RP03



PRINCIPLE OF OPERATION

Reduced pressure zone device consists of two independently acting non-return valves in series. They are arranged to be force-loaded in the closed position. A relief valve is positioned between them and is designed to be pressure energized to vent to atmosphere when the pressure differential across the upstream non-return valve reduces to 14 kPa.

Under normal dynamic flow conditions:

Water enters the upstream chamber before the 1st check valve assembly and flows down through the relief sensor port. When sufficient water pressure is achieved (minimum of 14 kPa) the diaphragm and relief spring are energized and push the relief seal holder across the relief port to relief sealing edge closing it off from atmosphere.

Once relief port is closed, pressure builds up in the upstream chamber before the 1st check valve assembly. When this pressure is sufficient (minimum of 35 kPa) 1st check valve assembly will open allowing flow into and fill the reduced pressure zone.

The 2nd check valve assembly will open after the reduced pressure zone is full and pressurized sufficiently (minimum 7 kPa) allowing flow through the downstream chamber.

Under backpressure condition:

(Premises pressure is greater than supply pressure)

Water pressure in the downstream chamber and spring pressure force the 2nd check valve assembly closed. If the 2nd check valve assembly is fouled by debris in the open position, the backpressure with the aid of relief spring pushes the relief seal holder open.

The relief port opens and allows all liquid contained in the reduced pressure zone to be relieved to atmosphere. The relief port will continue to discharge until backpressure dissipates or 2nd check valve assembly is cleared of debris.

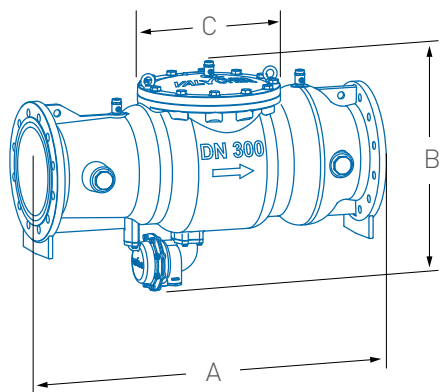
Under backsiphonage condition:

(Negative/low pressure in mains supply)

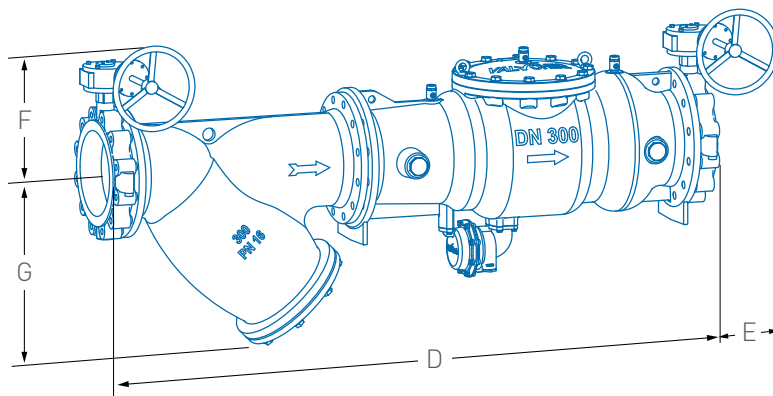
The 1st check valve assembly will close under spring pressure. Water pressure in the upstream chamber before the 1st check valve assembly and relief sensor port will dissipate. This will result in the relief spring opening the relief port and allowing all liquid contained in the reduced pressure zone to be relieved to atmosphere.

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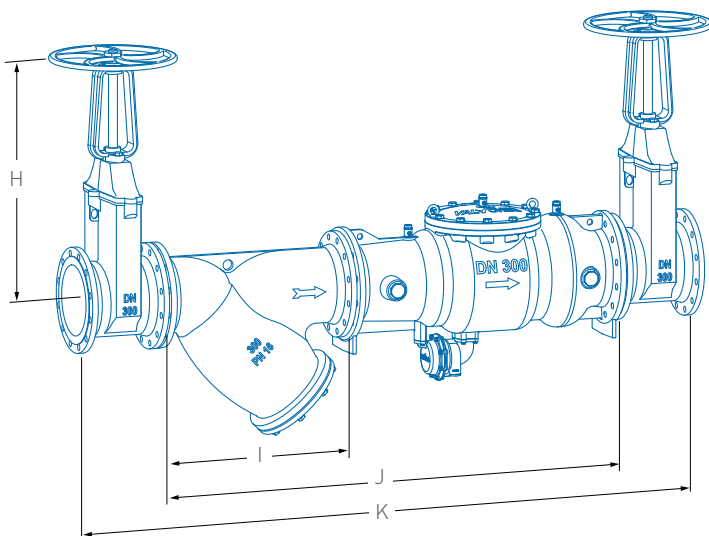
FIGURE RP03



Note: valve only (VO) illustrated.



Note: butterfly valve (BFV) arrangement illustrated.



Note: resilient seated gate valve (RSGV) arrangement illustrated.

DIMENSIONS (mm)

Valve size												Mass (kg)		
DN	A	B	C	D	E	F	G	H	I	J	K	VO	BFV	RSGV
200	860	648	385	1525	356	272	380	930	543	1405	1992	146	274	404
250	1070	725	445	1868	356	325	480	1200	660	1732	2395	230	470	653
300	1220	793	495	2140	356	360	550	1390	762	1984	2699	335	714	966

NOTE

Dimensions are nominal to ± 1 mm.

Butterfly valve actuators come standard on valves sizes DN 200 - 300.

Lockable actuators available on request.

VO = Mass of valve only.

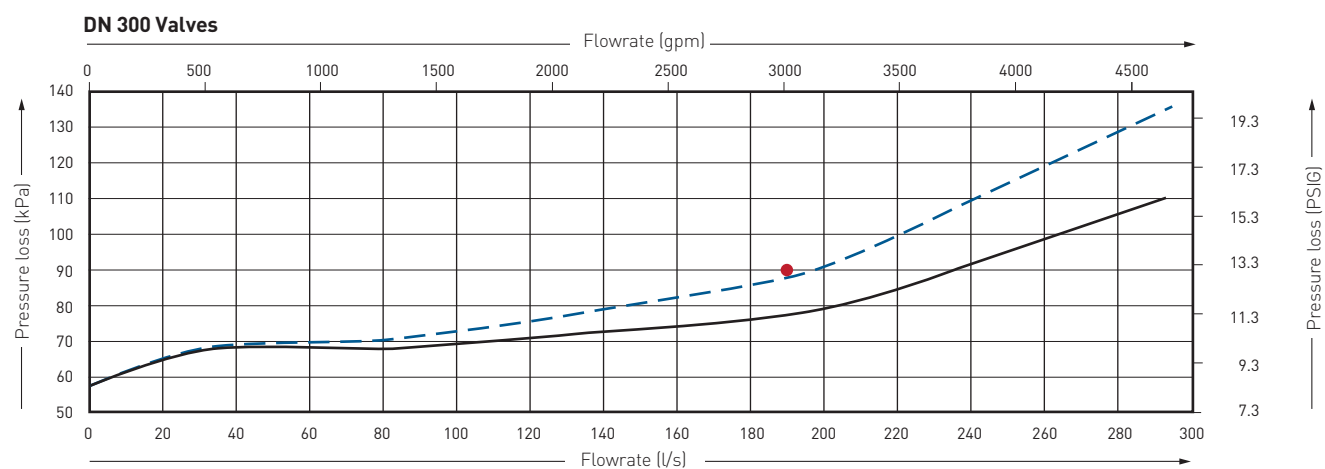
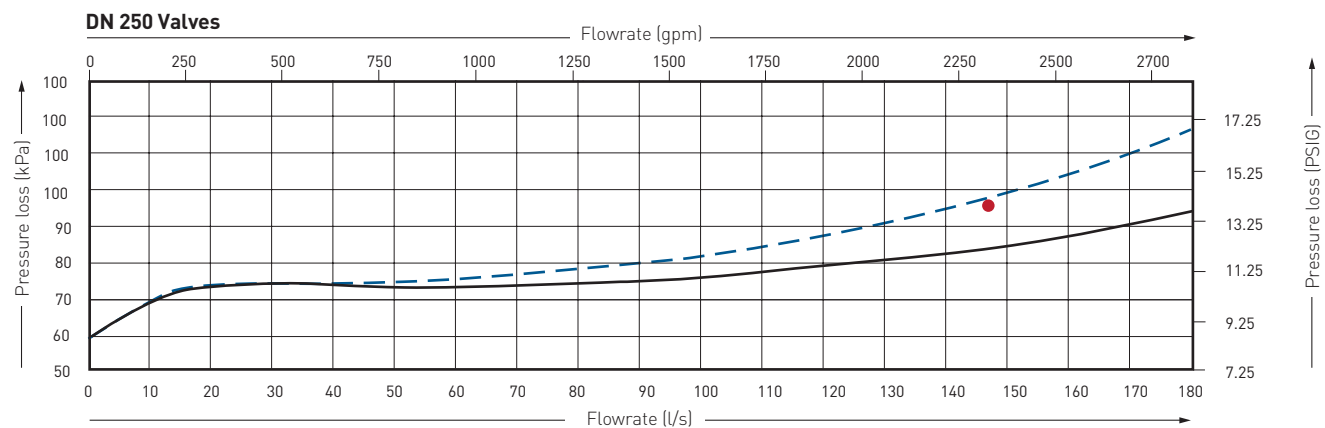
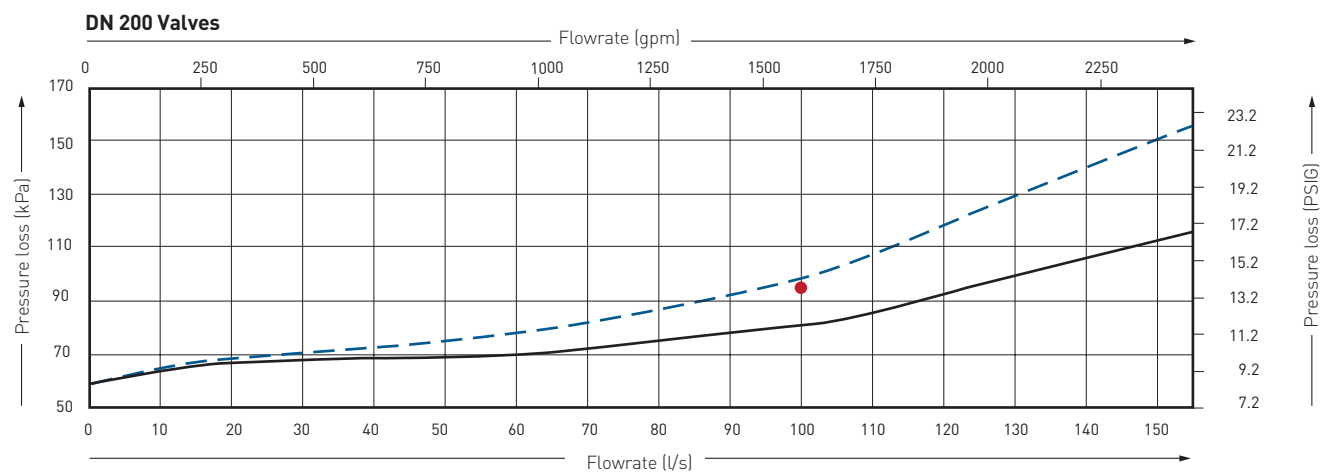
BFV = Mass of complete arrangement with butterfly valves.

RSGV = Mass of complete arrangement with resilient seated gate valves.

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FIGURE RP03

TYPICAL FLOW CHARACTERISTIC GRAPHS



NOTE

- C/W Y Strainer
- DN 300 RPO3
- Australian Standard AS 2845.1

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FIGURE RP03

SELECTION GUIDE

Example:	200	RP03	E	CO	BF
Valve size (DN)					
Figure no.					
End connections					
E	AS 2129 Table E Alternative drilling may be available on request				
Assembly					
VO	Valve only				
CO	Complete with isolation valves and FBE coated strainer				
FS	Fire service (supplied without strainer)				
Isolation					
BF	Butterfly valves				
BF G/Op	Butterfly valves gear actuated				
BF G/Op L	Butterfly valves gear actuated lockable				
RSGV	Resilient seating gate valves				

NOTE

All Emerson isolation valves come with the provision for locking.
Butterfly valve actuators come standard on valve sizes DN 200 - 300.

TROUBLESHOOTING

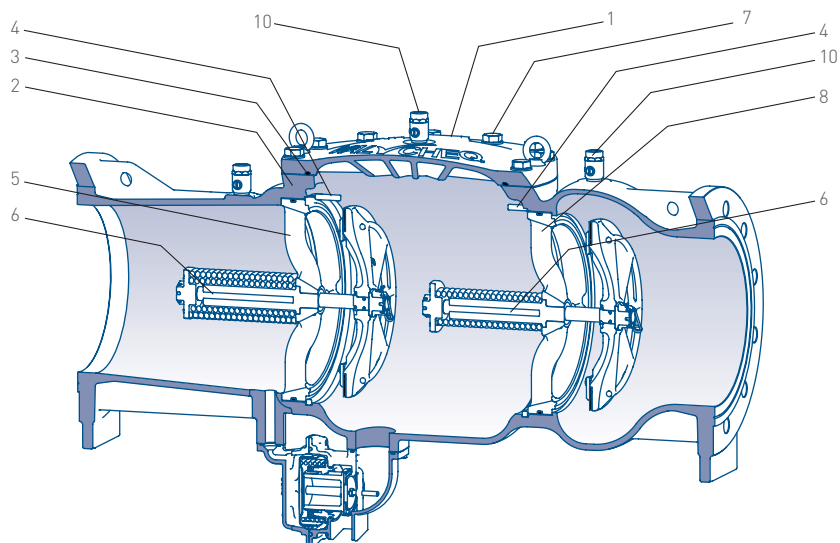
Symptom	Cause	Remedy
First check valve not holding tight (reading approaches zero without holding)	<ol style="list-style-type: none"> 1. Debris fouling the check valve seal 2. Check valve seal damaged or perished 3. Check valve O-ring damaged 4. Check valve stem O-ring damaged 5. Check valve seal ring damaged 	<ol style="list-style-type: none"> 1. Inspect, clean, reverse or replace check seal 2. Inspect and replace check valve seal 3. Inspect and replace O-ring 4. Inspect and replace O-ring 5. Replace first check valve assembly
First check valve drops below 35 kPa and remains steady	<ol style="list-style-type: none"> 1. Debris fouling the check valve seal 2. Check valve seal damaged or perished 3. Check valve spring memory loss or damaged 4. Check valve stem O-ring damaged 	<ol style="list-style-type: none"> 1. Inspect, clean, reverse or replace check seal 2. Inspect and replace check valve seal 3. Replace first check valve assembly 4. Inspect and replace O-ring
Continuous discharge from relief port	<ol style="list-style-type: none"> 1. Debris fouling 1st check valve seal (static flow) 2. Debris fouling relief valve seal 3. Relief seal guide outer O-ring damaged 4. Relief seal guide inner O-ring damaged 5. Diaphragm damaged 6. Debris fouling 2nd check valve seal (static flow) (Backpressure condition) 	<ol style="list-style-type: none"> 1. Clean check valve seal 2. Clean relief valve seal 3. Replace O-ring 4. Replace O-ring 5. Replace diaphragm 6. Clean check valve seal
Second check valve not holding tight	<ol style="list-style-type: none"> 1. Debris fouling the check valve seal 2. Check valve seal damaged or perished 3. Check valve O-ring damaged 4. Check valve stem O-ring damaged 5. Check valve seal ring damaged 	<ol style="list-style-type: none"> 1. Inspect, clean, reverse or replace check seal 2. Inspect and replace check valve seal 3. Inspect and replace O-ring 4. Inspect and replace O-ring 5. Replace second check valve assembly
Relief port not opening before 14 kPa	<ol style="list-style-type: none"> 1. Diaphragm damaged 2. Relief spring memory loss 3. Relief seal holder jammed 	<ol style="list-style-type: none"> 1. Replace diaphragm 2. Replace spring 3. Inspect and clean seal holder

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FIGURE RP03

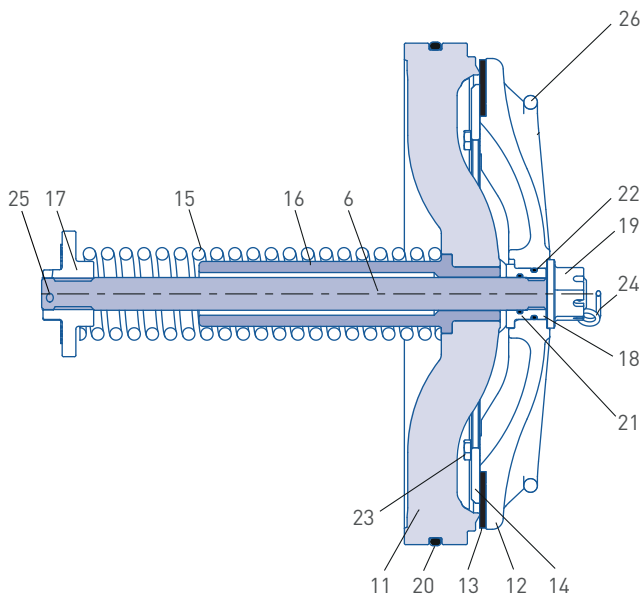
PARTS LIST

No.	Description (main valve)
1	Top cover
2	Body
3	Top cover o-ring
4	Check valve circlip
5	1st check assembly
6	Check valve stem
7	Top Cover Bolts
8	2nd check assembly
10	Test Taps



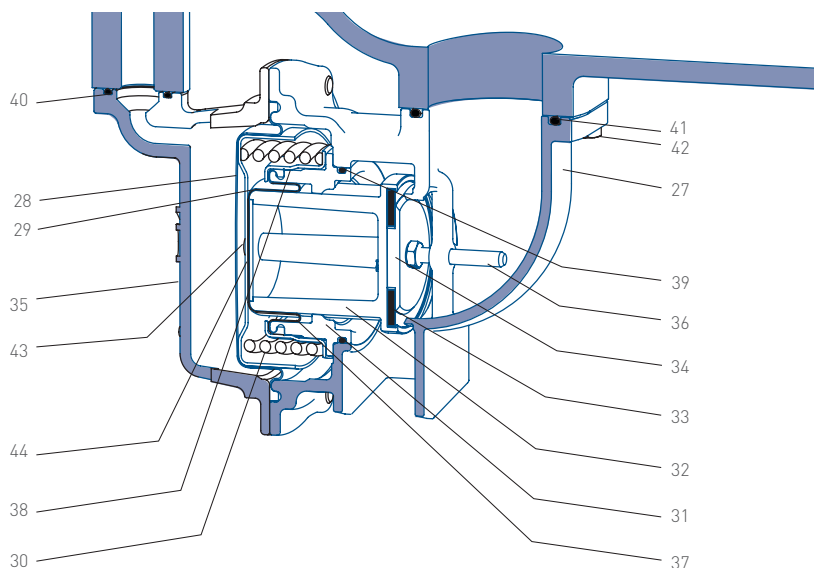
VALVE CHECK ASSEMBLY

No.	Description (check assembly)
11	Check seal ring
12	Check disc
13	Check seal
14	Check seal retainer
15	Check valve spring
16	Check stem bush
17	Check stem retainer
18	Check disc retainer hub
19	Check disc retainer nut
20	Check seal O-ring
21	Check stem O-ring
22	Check hub O-ring
23	Check seal retainer bolt
24	Diaper pin
25	Solid pin
26	Check disc grip ring



VALVE RELIEF ASSEMBLY

No.	Description (relief assembly)
27	Relief body
28	Relief diaphragm
29	Relief diaphragm retainer
30	Relief spring
31	Relief seal guide
32	Relief seal holder
33	Relief seal
34	Relief seal retainer
35	Relief body cover
36	Relief guide rod
37	Relief guide diaphragm
38	Relief guide diaphragm retainer
39	O-ring relief guide seal
40	O-ring sensor seal
41	O-ring vent seal
42	Relief assembly bolts
43	Relief retainer bolt
44	Relief retainer washer



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FIGURE RP03

Complete safety and maintenance instructions for DN 200 - 300 high hazard devices

MAINTENANCE AND TESTING REQUIREMENTS

Test after initial installation and annually for the life of the valve or service. Maintain in a working order and inspect for operational function at intervals not exceeding twelve months. The functions are to be carried out by authorized licensed backflow testers.

DISASSEMBLY INSTRUCTIONS

Main valve

As per safety precautions slowly close isolation valves and then open all three test taps (10) to release mains pressure. Remove top cover bolts (7) and washers. Remove top cover (1) and top cover O-ring (3). To remove check valve circlips (4) utilize circlip prongs, squeeze together and pull out the circlips. To remove 2nd check assembly (8) pull check valve stem (6) out and then up bringing the check assembly through the top entry of the valve.

WARNING

Check assemblies are of the following weights: DN 200 18 kg, DN 250 25 kg, DN 300 35 kg.

To remove 1st check assembly (5) take hold of the check disc grip ring (26) and pull out then up bringing the check assembly through the top entry of the valve. Or close 1st test tap and slowly crack open inlet isolating valve and allow the water pressure to push the check assembly into the main valve body. Shut off inlet isolating valve and remove the valve through the top entry of the valve. This procedure could damage coating.

Both check assemblies are mechanically the same so the same procedure can be used for both assemblies.

CAUTION

Check assembly springs are under high compression. DO NOT remove Solid Pin (25) or Check Stem Retainer (17) or Check Disc Retainer Hub (18) from check assemblies. Springs are factory set NO requirement for removal.

Remove diaper pin (24) from check disc retaining nut (19). Fit spanner to check stem retaining nut (17) and to check disc retaining nut (19) turn retaining nut (19) anti-clockwise and remove. Take hold of check disc grip ring (26) and pull away from check stem (6) so both are disengaged from each other. Turn over so check disc grip ring (26) is facing downwards and fit spanner to check seal retainer bolts (23) and remove check seal retainer (14) to expose check valve seal (13) for servicing or replacement.

NOTE

When assembly takes place:

- Lubricate all O-rings with approved lubricant.
 - Lubricate all bolts with a smear of anti-seize lubricant.
1. Clean and check seal ring sealing edge (11) valve seal (13) must be clean, free of any greases, moisture and debris upon assembly for a positive seal.
 2. Locate check seal retainer (14) to check disc (12)
 3. Tighten all 8 retaining bolts (23) evenly and firmly all around.
 4. Clean and lubricate, or replace all O-rings.
 5. Turn clockwise check disc retaining nut (19) fully until stop then undo nut until 1st of 4 diaper pin (24) locations line up.
 6. Secure diaper pin (24) through location hole. Use little anti seize lubricant on check seal retainer nut (19)

Relief assembly

Remove relief assembly bolts (42) connecting relief assembly to RP03 main body (2) with 17 mm spanner.

Remove relief assembly from RP03 and secure sensor O-ring (40) and vent O-ring (41). Do not lose.

Remove relief body cover bolts (42) with 17 mm spanner.

Separate relief body cover (35) from relief body (27).

Check main relief diaphragm (28) for debris or damage, clean or replace.

CAUTION

Do not damage or bend relief guide rod (36) when removing relief module. Take hold of main relief diaphragm retainer (29) and pull straight out to remove relief module from relief body (27).

Remove relief guide rod (36) with 13 mm spanner and put in a safe place.

Remove relief seal retainer (34) exposing relief seal (33), check seal for debris and damage, clean or replace.

SAFETY PRECAUTIONS

In every instance of installation or removal from the pipeline, ensure the line is not pressurized and any hazardous liquid is drained away.

Slowly close both isolating valves and then open test taps (10) to drain relief port.

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FIGURE RP03

Inspect relief guide o-ring (39) and clean or replace.
Turn relief module so relief seal guide (31) is facing down on a clean soft surface.

CAUTION

Main relief diaphragm retainer is under loaded spring pressure of 10 kg.

With relief diaphragm retainer retaining bolt (43) face up remove bolt with 5 mm allen key. Check and inspect retaining bolt washer O-ring (44) for damage or debris, clean or replace. During assembly lightly grease washer O-ring with approved lubricant. Remove main relief diaphragm retainer (29) and relief spring (30). Take hold of inner relief diaphragm retainer (38) lift up separating from relief seal holder (32), place seal holder to one side. Separate by hand or with flat face screw driver relief seal guide (31) from inner relief diaphragm retainer (38) exposing inner relief diaphragm (37). Remove inner relief diaphragm (37) from relief seal guide (31) and inspect for damage or debris, clean or replace. During assembly lightly grease extreme outer edge of diaphragm with approved lubricant. Inspect inside face of relief seal guide (31) and clean any debris or build found. In reverse order assemble the relief assembly.

NOTE

When assembly takes place:

- When bolting relief assembly to RP03 main body (2) have the assembly flush and square against the body then tighten relief assembly bolts (42) bolts equally.
- Lubricate all O-rings with approved lubricant.
- Lubricate all bolts with a smear of anti-seize lubricant.
- Relief seal (33) must be clean, free of any greases, moisture and debris upon assembly for a positive seal.
- Restore line pressure slowly

Specifications for reduce pressure zone device suitable for high and medium hazard rated applications

- Main valve shall be manufactured in accordance with AS/NZS 2845.1.
- Main valve shall be constructed from ductile iron and FBE coated to AS/NZS 4158.
- All internals shall be constructed from stainless steel and to have pressure rating of PN16 and a temperature rating of 60 °C.
- Main valve body shall not form part of the wetted check valve sealing area or mechanism.
- Internal parts and elastomers are to be accessible through a top entry point of the main valve to allow in-line maintenance. Valveconnection shall be flanged to AS 2129.
- Valve shall also be fitted with test points with BSPT threads to allow testing to AS/NZS 2845.3.



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