



Defender Filter Technik — Manual



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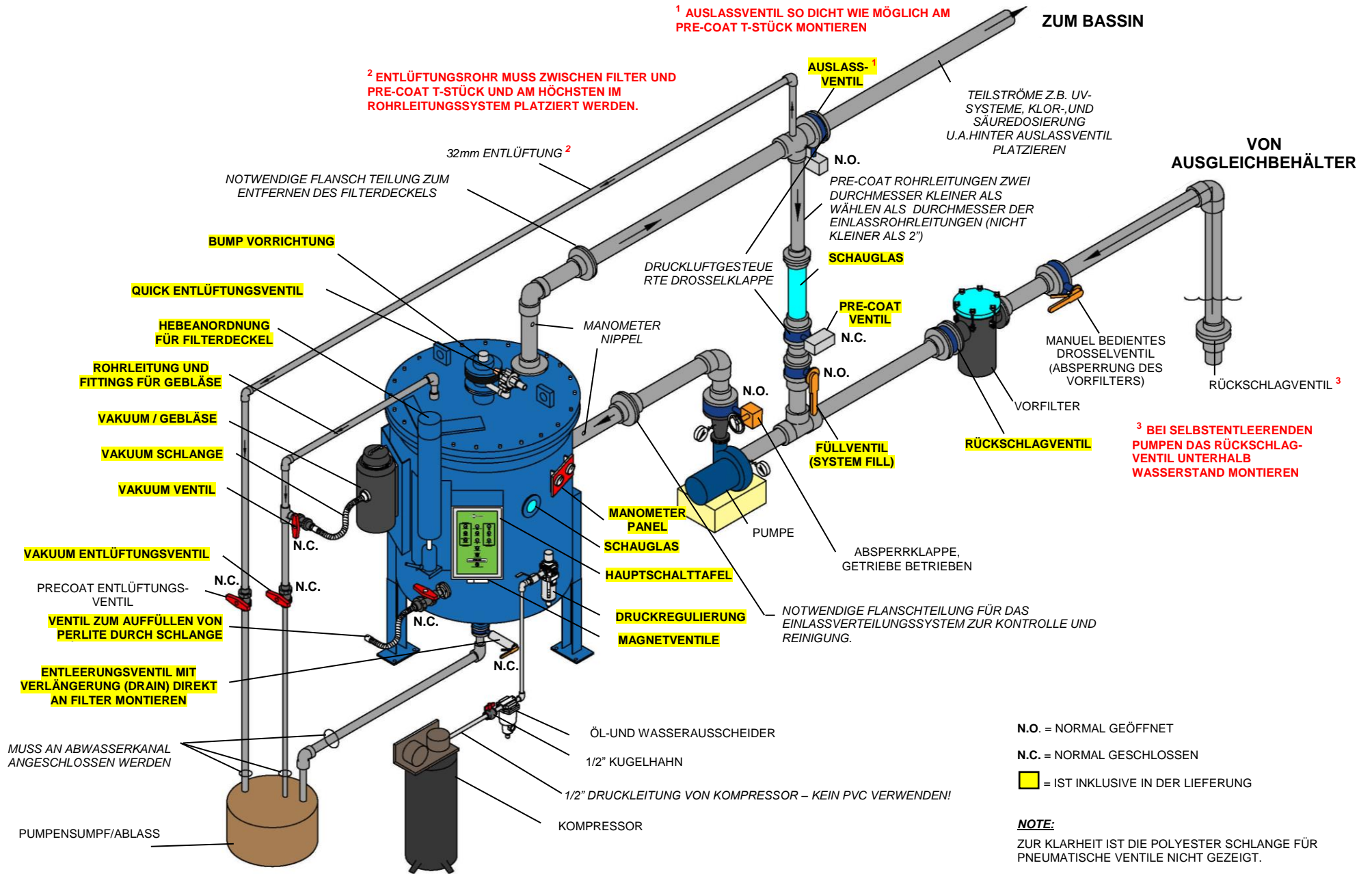
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TRANSPORT AND SETTING

CAUTION

DO NOT store or install filter piping or internals in locations subject to temperatures beyond the limits of the materials. For outdoor installations, keep in mind that temperatures inside the filter can vary greatly from the actual outside temperature. Filter tanks should not be exposed to direct sunlight or heat beyond ambient temperatures during storage, or when the system is shut down for extended periods. Contact Defender Europe A/S for any questions regarding storage or installation procedures for tanks and piping.

GENERAL

Verify suitability and quantity of all items. Refer to the Bill of Materials on filter drawing(s) and Packing list.

Positioning and installation of tanks:

1. The Filter contains internal parts that are vertically deployed. The filter must be transported and handled in an upright position at all times.

NOTE:

If the filter needs to be positioned horizontally for access reasons, the bump mechanism MUST BE PRESSURIZED to a minimum of 75 P.S.I. (517.1 kpa) prior to tilting tank. (See Figure 1)



Figure 1

Failure to pressurize bump mechanism can damage the lift shaft and render the filter inoperable.

RETURN FILTER TO THE VERTICAL POSITION ASAP!

Do not leave or store in the horizontal position.

After tank is set in final vertical position, bump the unit 5-6 times to verify operation.

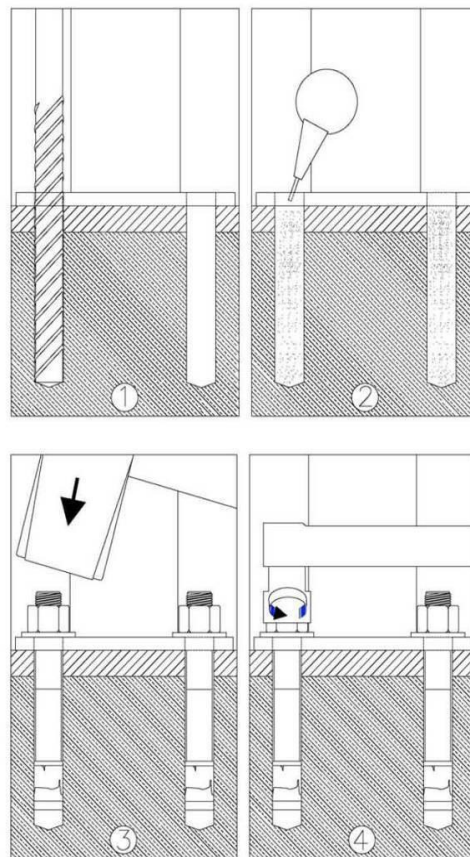
2. The filter shall be hoisted only by the lifting 'padeye' (see Figure 1) lugs located on the top of filter vessel.
3. Keeping the vessel in the vertical position on the hoist, (if an SP-49-48-1548 or an SP-55-48-2076 remove shipping legs & attach regular legs) extend legs from collapsed position to the extended position.
4. The filter shall be installed level. Contractor to shim and grout the leg base pad as required leveling the filter. Holes are provided in the pads to anchor each leg to the concrete floor.

TANK LEG ANCHOR INSTALLATION

CAUTION

THIS FILTER HAS BEEN PROVIDED WITH MOUNTING ANCHORS TO SECURE TO THE FLOOR. ANCHORS MUST BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS BEFORE ATTEMPTING TO LIFT THE FILTER HEAD (TOP PLATE).

FAILURE TO PROPERLY BOLT THE FILTER TO THE FLOOR WILL CAUSE BODILY INJURY AND EQUIPMENT DAMAGE.



1. With filter tank in its installed location, use a $\frac{1}{2}$ " (12.7mm) concrete drill bit and drill a $3\frac{3}{4}$ " (95.25mm) deep hole in the floor (4" (101.6mm) depth total from the top of leg plate)
2. Remove all concrete dust from the holes.
3. Place washers and nuts on anchor. Insert anchor through the floor plate into the hole. Pound anchor into the hole as far as it will go, be careful not to damage the threads.
4. Tighten the bolts to 120 FT.LBS (162.69 n.m).

INSTALLATION

MOUNTING ACCESSORY COMPONENTS

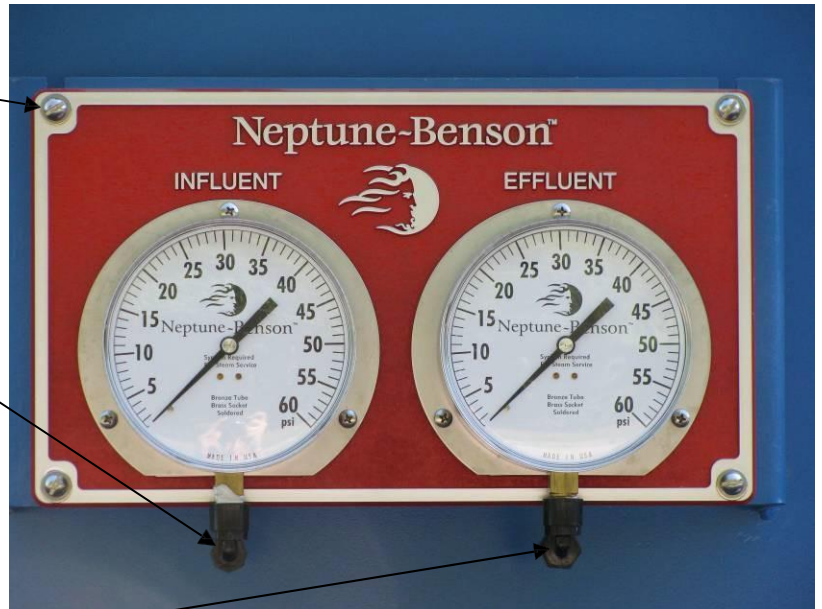
The Defender® Filter ships with all accessory components loose.

GAUGE PANEL

Bolt Gauge Panel to mounting plate as shown. 1/4" x 1" long screw, washer & nut included.

Connect Influent tubing to gauge here

Connect Effluent tubing to gauge here

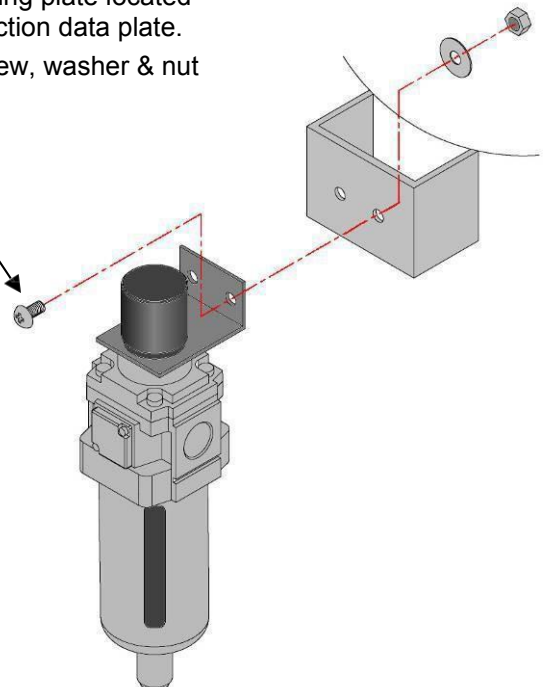
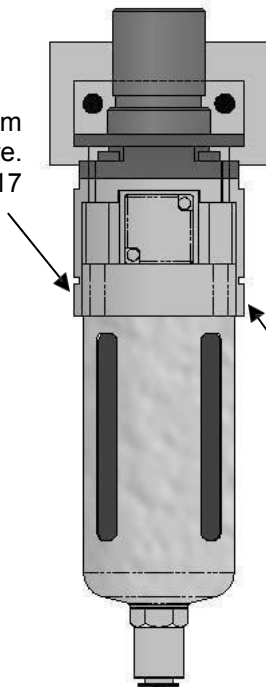


AIR-REGULATOR

Connect line from compressor here. See page 17

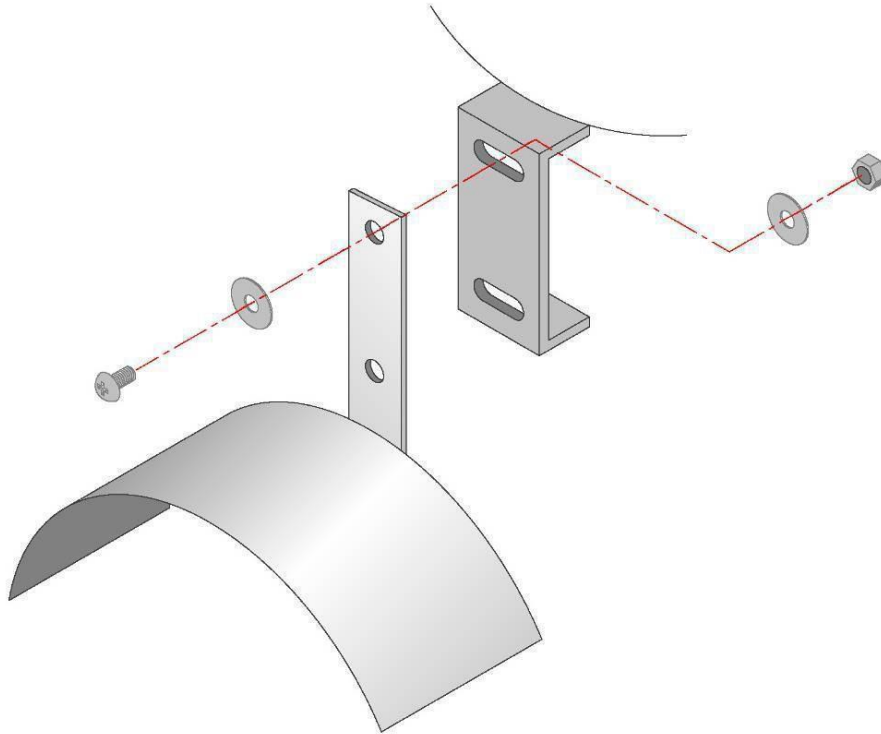
Bolt to the mounting plate located under filter instruction data plate. 1/4" x 1" long screw, washer & nut included.

Connect to Solenoid, located under control box



VACUUM HOSE BRACKET

Bolt to the mounting location with the 1/4" x 1" long screws, washer & nuts included.



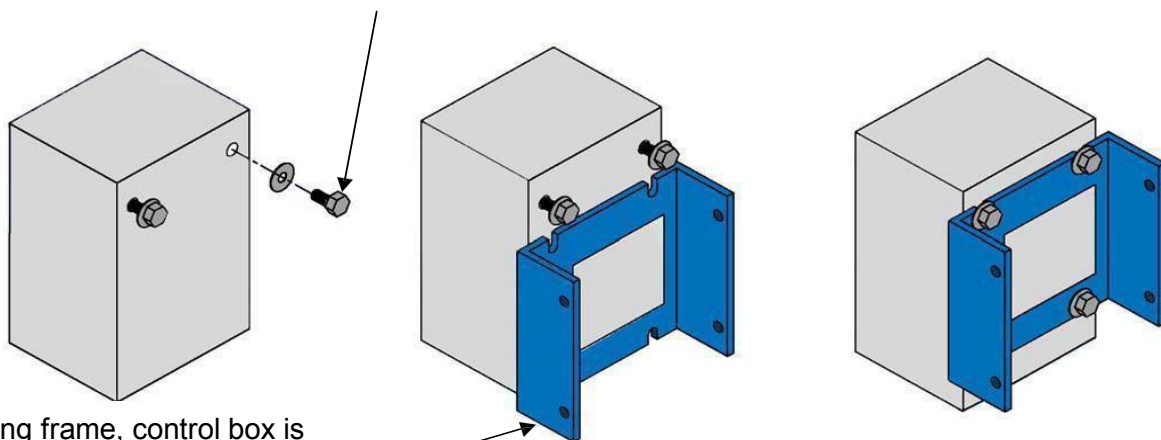
NOTE:

Your Defender® filter and most of its accessories are acceptable for unprotected installations exposed to the elements. The vacuum transfer blower and the compressor manufacturer prohibit exposure to the elements. Defender Europe recommends a minimum enclosure of an open shelter with a roof to provide protection from direct exposure to rain and snow.

DEFENDER SMARTSCREEN / RMF CONTROLBOX - MOUNTING ON FILTER

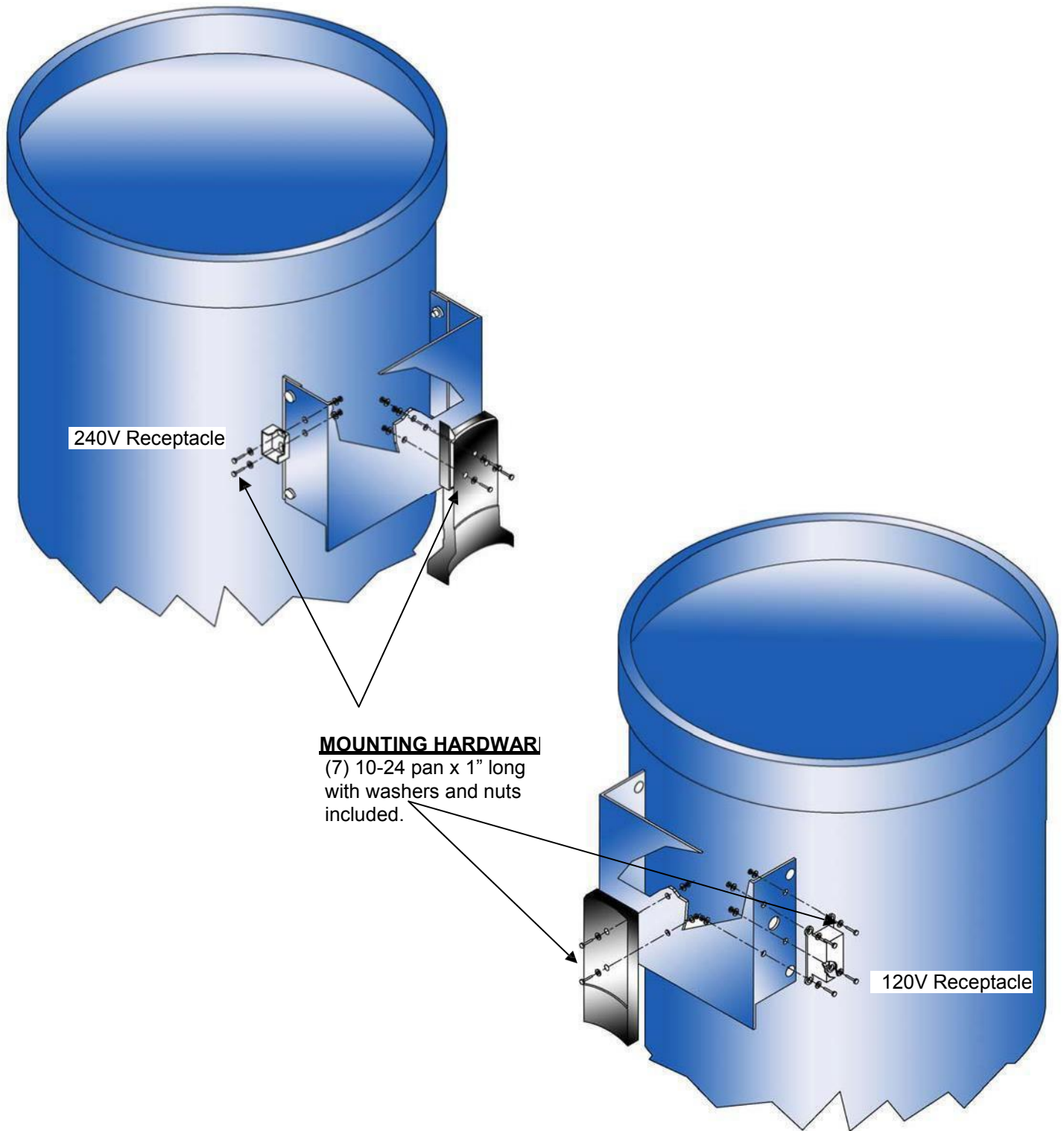
1. Loosely thread bolt with washer to top holes of programmer.
2. Slide into slots on bracket.
3. Install bottom hardware.

#10-32 Hex Head Bolt x 3/4" long with washer, included.



Mounting frame, control box is mounted from back of this frame.

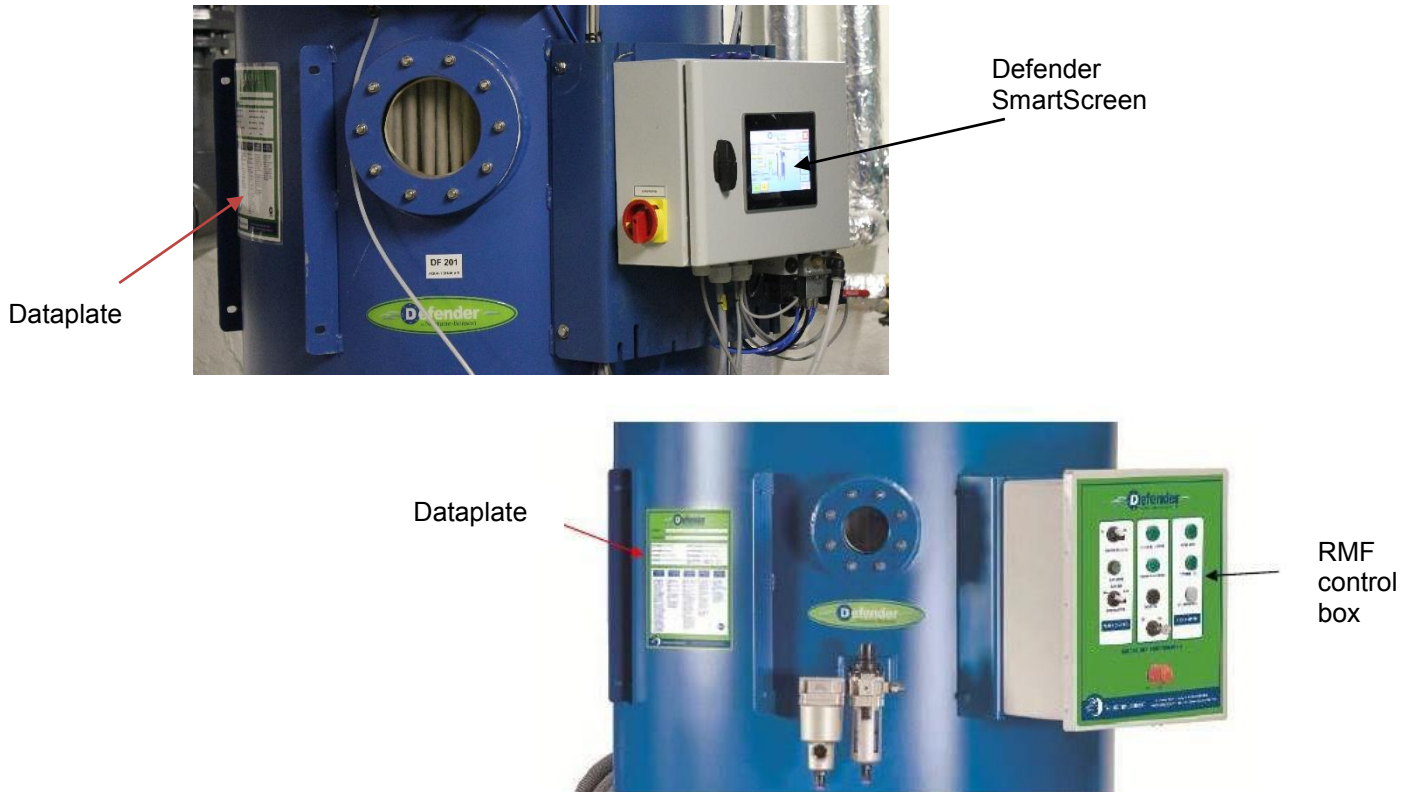
VACUUM TRANSFER UNIT

**NOTE:**

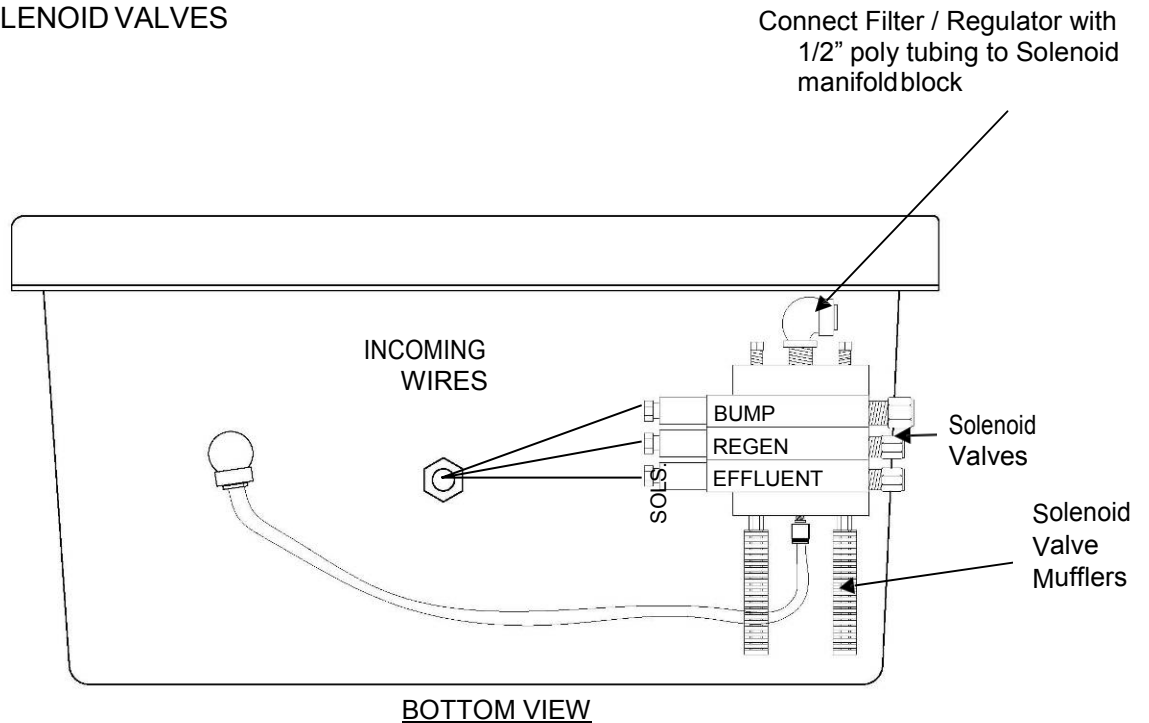
Your Defender Filter® and most of its accessories are acceptable for unprotected installations exposed to the elements. The vacuum transfer blower and the compressor manufacturer prohibit exposure to the elements. Defender Europe A/S recommends a minimum enclosure of an open shelter with a roof to provide protection from direct exposure to rain and snow.

DEFENDER SMARTSCREEN / RMF CONTROLBOX

The newest Defender models are equipped with Defender SmartScreen – the filter’s own intelligent and thoroughly tested PLC based management with touch screen, which can be controlled and monitored via smartphone, tablet and PC. Defender SmartScreen is future-oriented with possibility for modbus-connection.



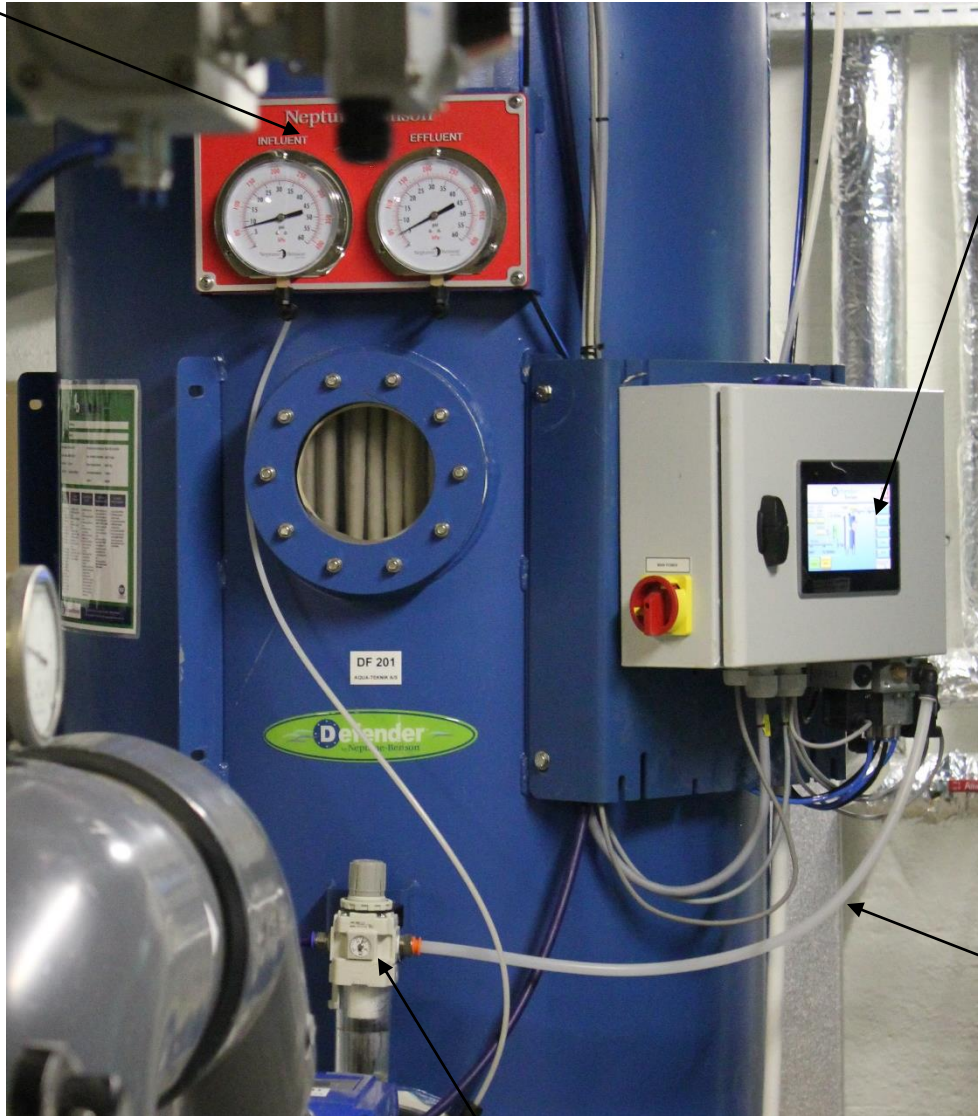
PNEUMATIC SOLENOID VALVES



AIR-REGULATOR

GAUGE PANEL

**DEFENDER
SMARTSCREEN**



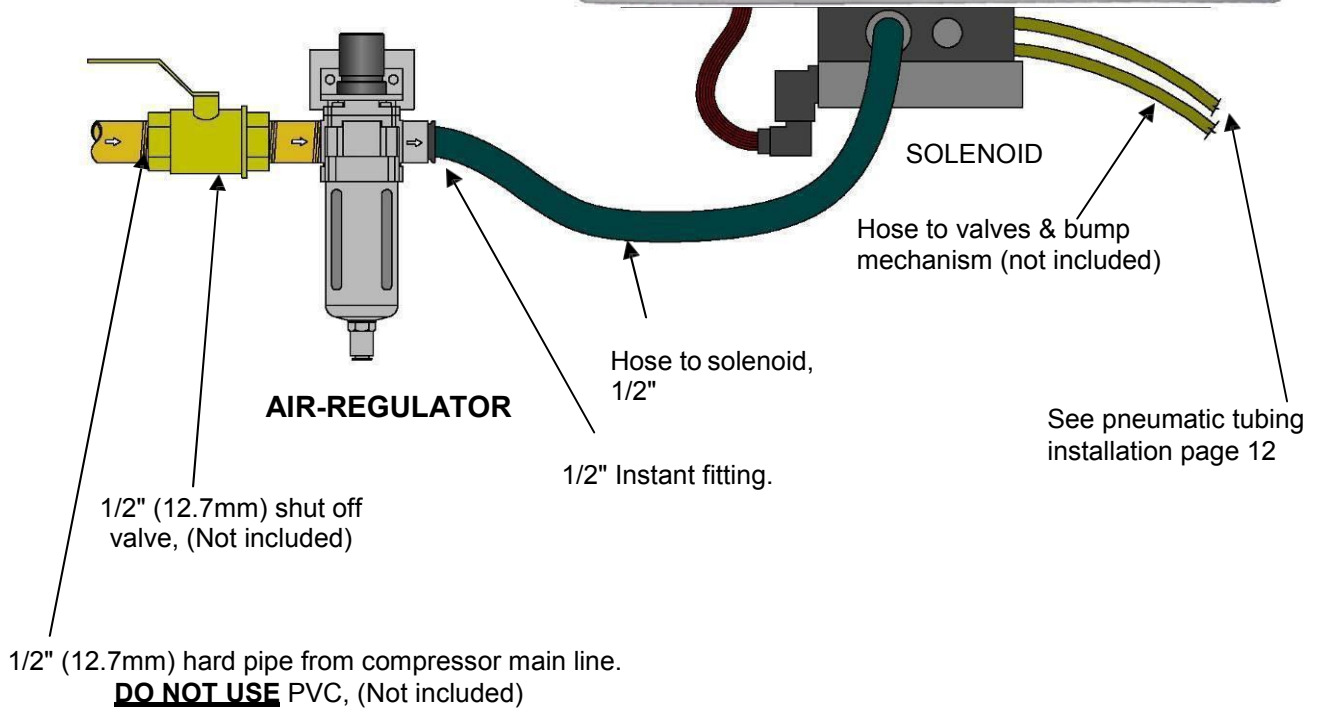
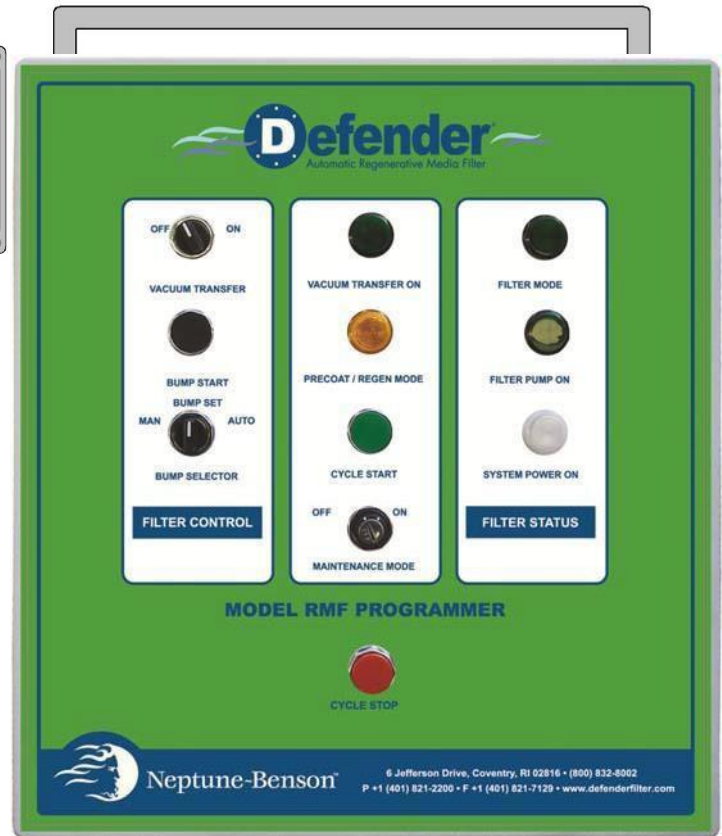
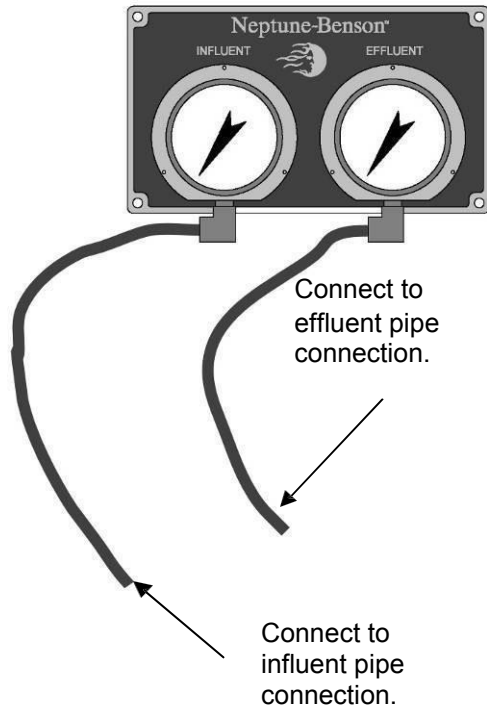
**HOSE TO
SOLENOID
VALVE
BLOCK**

AIR-REGULATOR

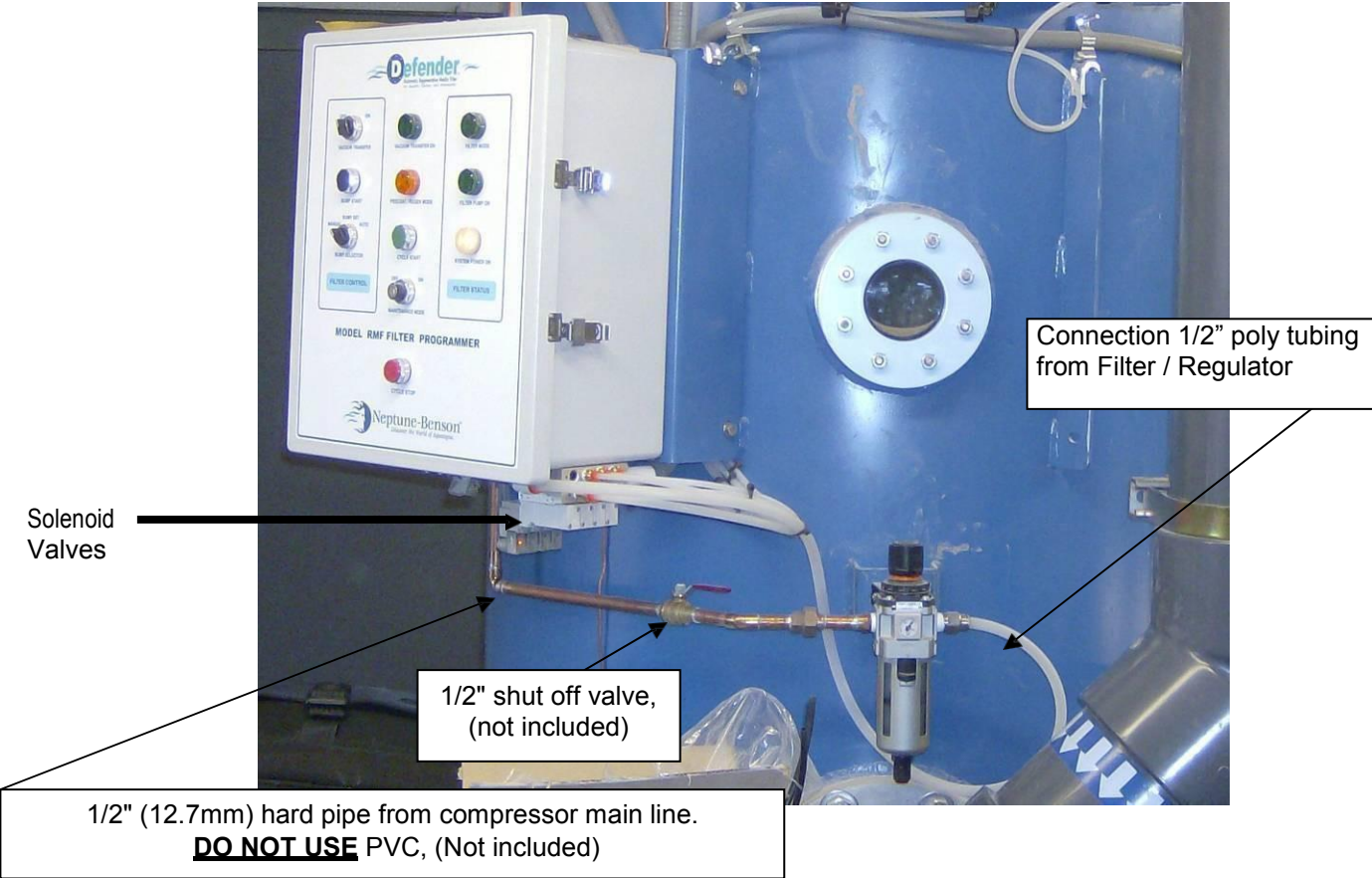
Defender SmartScreen is connected to the airregulator at the same way as the RMF control box is connected to the airregulator, visualized on the following page (page 9).

GAUGE PANEL

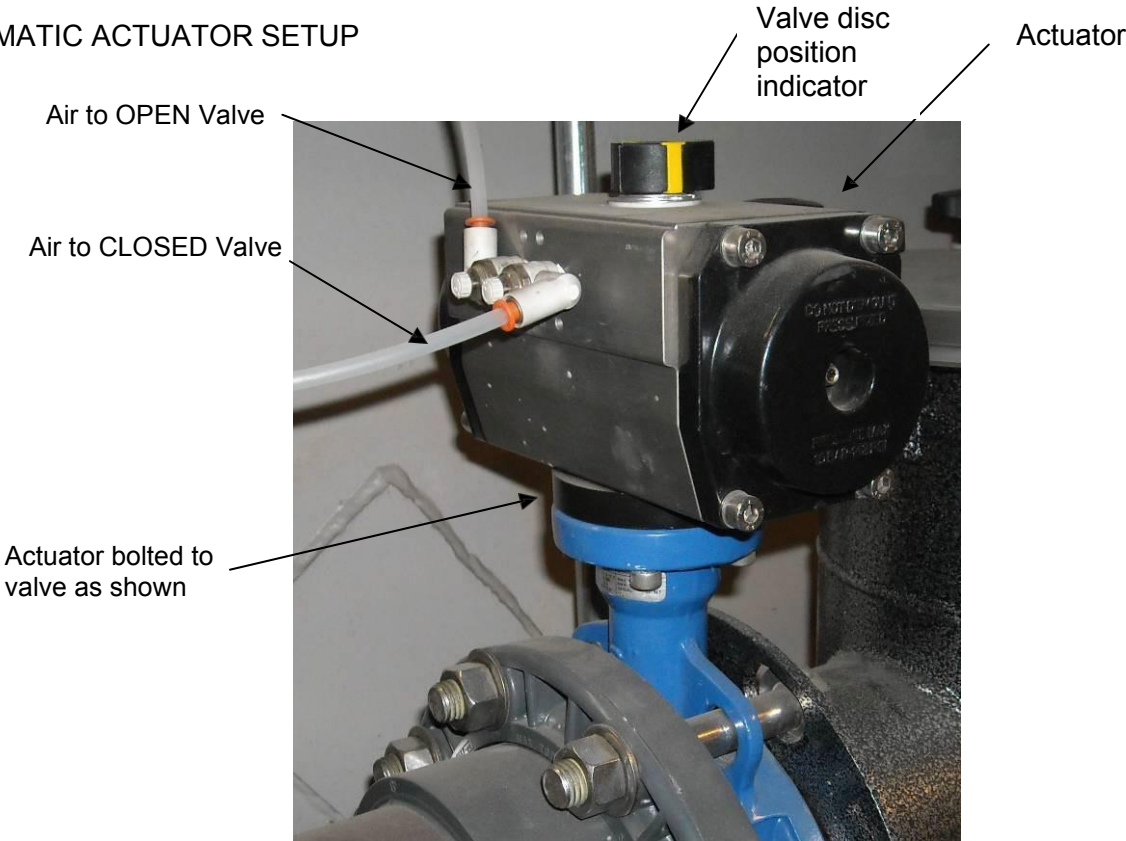
RMF CONTROL BOX



PNEUMATIC SOLENOID VALVE CONNECTIONS



PNEUMATIC ACTUATOR SETUP



ROTATION ADJUSTMENT

Rotation adjustment of actuators is made by the manufacturer. For further Adjustment, follow these instructions.

WARNING!!

Do not attempt to adjust / disassemble actuators until air pressure is shut off.

Adjustment in CLOSING – 0°

1. Unscrew counter-bolt and regulation dowel on both covers.
2. Connect air feeding into port “A” (left port) to have actuator’s opening.
3. Regulate the rotation of the actuator in opening (90°) on one side, by adjusting piston’s travel through its regulation dowel.
4. When reaching the wanted point of opening, keep regulation dowel in position and tighten counter-bolt. Repeat this operation on the other side of the actuator.
5. Connect pneumatic/electrical feeding and verify correct operating position.

Adjustment in OPENING – 90°

1. Take off covers by loosening screws as per indicated numeration; pull out springs, if any, from piston seats.
2. Unscrew counter-bolt and dowel for regulation of the piston’s travel from both sides of actuator.
3. Keep the stem slightly in tension, (by fix key for ball valves and by special dynamometrical key for butterfly valves) and regulate rotation of the actuator in closing (0°) on one side, adjusting piston’s travel through the regulation dowel.
4. When reaching the wanted point of closure, keep the regulation dowel in position and tighten the counter-bolt. Repeat this operation on the other side of the actuator.
5. Re-assembly springs, if any, and covers tightening screws a little at a time following the numeration.
6. Connect pneumatic/electrical feeding and verify correct operation.

NOTE:

If actuator is mounted in the “preferred” orientation, the opening adjustment is on the inside and the closing adjustment is on the outside.

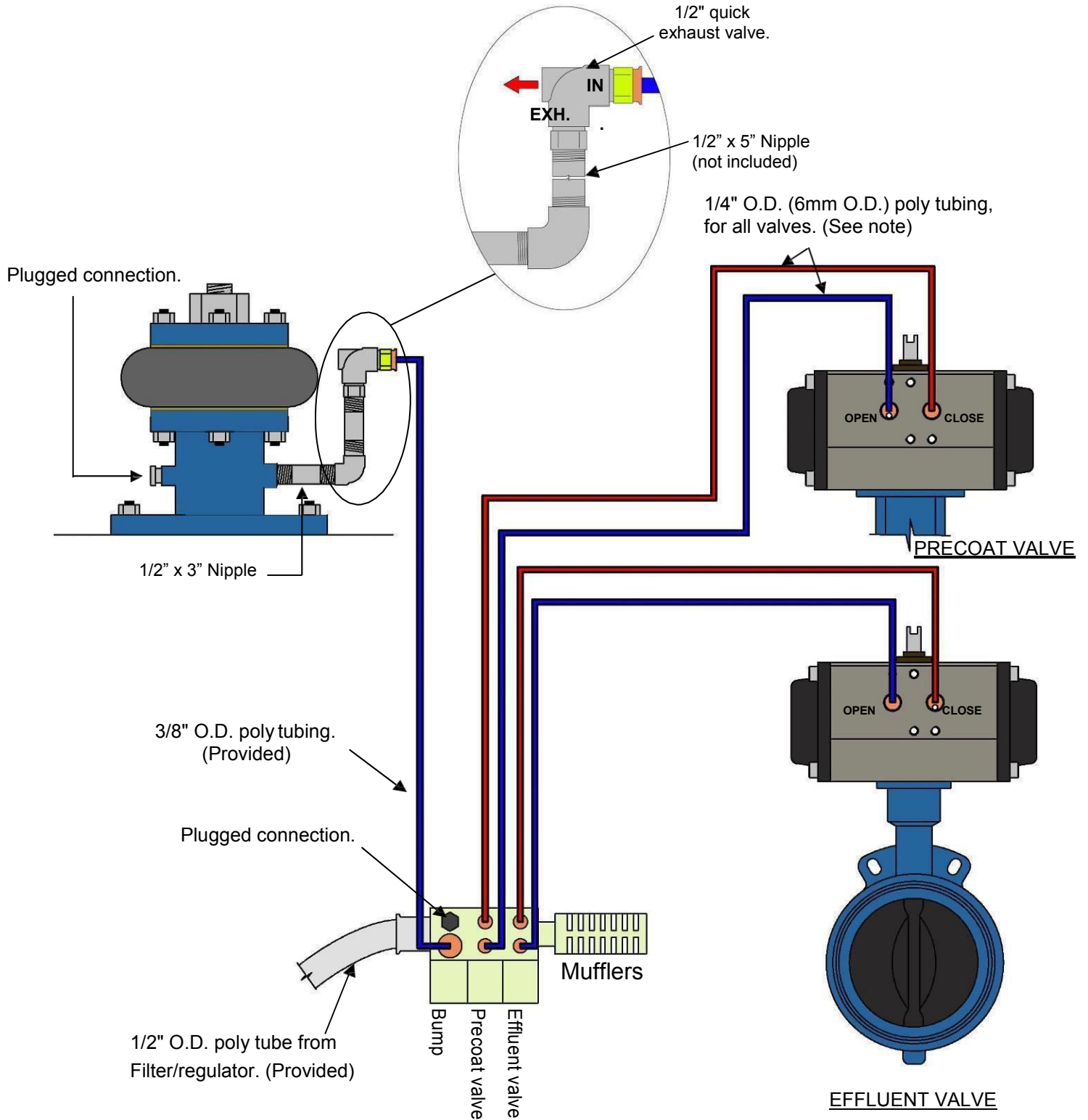
TOOL SIZES FOR ADJUSTMENT OF DEFENDER PNEUMATIC ACTUATORS LIMIT STOPS:

ACTUATOR MODEL NO.	<u>ALLEN WRENCH / DEEP SOCKET</u>
CH75	4 mm ALLEN WRENCH / 13 mm DEEP SOCKET
CH85	4 mm ALLEN WRENCH / 13 mm DEEP SOCKET
CH100	5 mm ALLEN WRENCH / 17 mm DEEP SOCKET
CH125	6 mm ALLEN WRENCH / 19 mm DEEP SOCKET

CYLINDER ENDS:

ACTUATOR MODEL NO.	ALLEN WRENCH
CH75	5 mm
CH85	6 mm
CH100	6 mm
CH125	8 mm

PNEUMATIC TUBING INSTALLATION



SOLENOID TUBING CONNECTIONS

PNEUMATIC ACTUATOR ADJUSTMENTS

If the actuator is mounted “perpendicular” to piping, follow the instructions below:

1. “Opening” adjustment is made on the inside
2. “Closing” adjustment is made on the outside.

COUNTERCLOCKWISE rotation to close

NOTE!

Air in on left (when facing side of pneumatic actuator with flow control valves) the valve opens and air in on right closes the valve.

Actuator mounted “parallel” with the piping (optional)

1. “Opening” adjustment is made on the outside
2. “Closing” adjustment is made on the inside.

CLOCKWISE rotation to close.

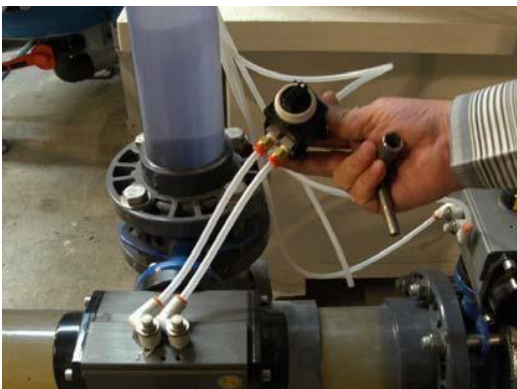
NOTE!

Air in on right (when facing side of pneumatic actuator with flow control valves) opens the valve and air in on left closes the valve.

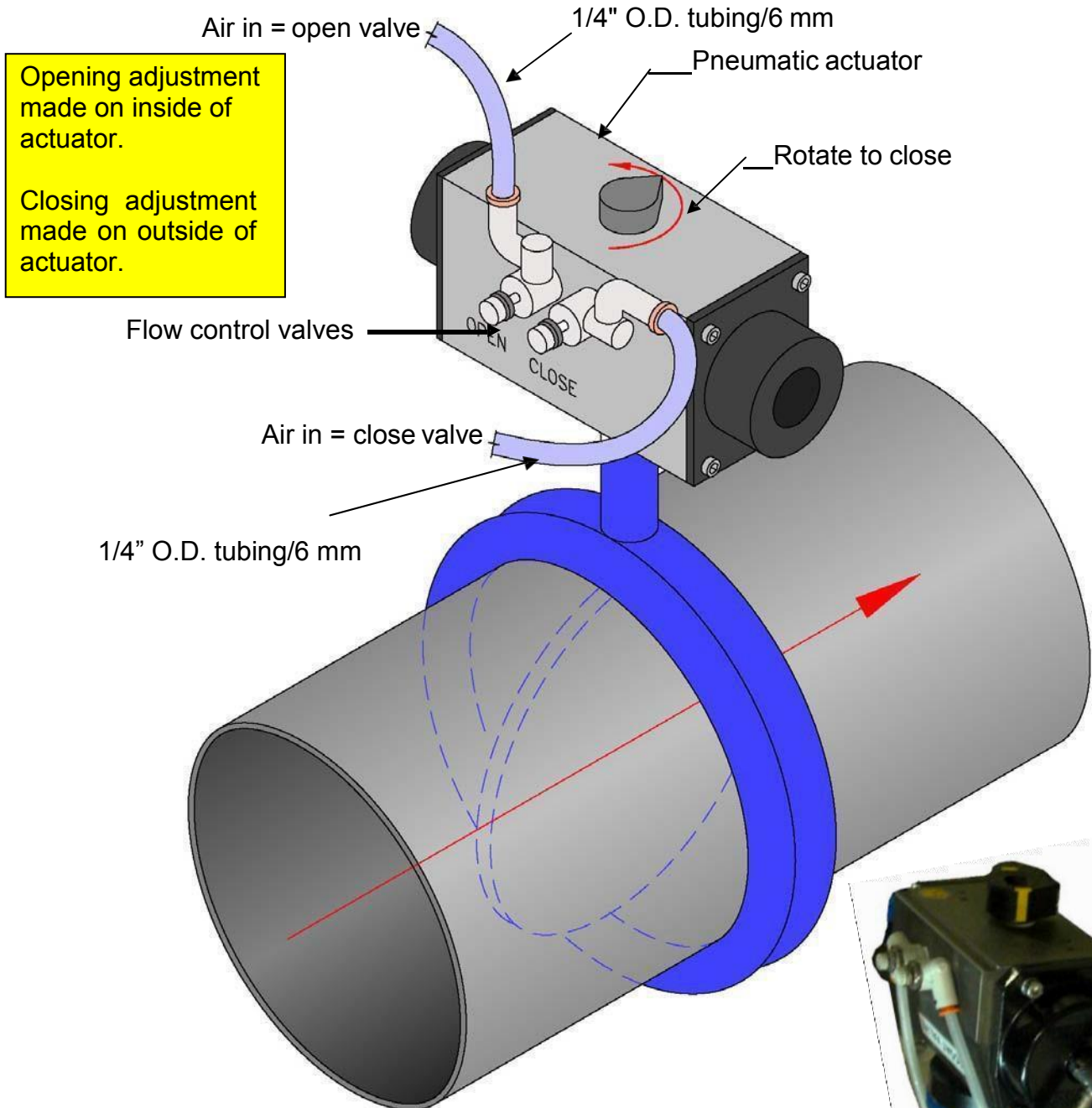
FLOW (SPEED) CONTROL VALVES

The pneumatic actuators are provided with flow control valves. These are used to regulate the speed of the butterfly valve operation.

1. Shut off air supply.
2. Remove the tubing from the “closed” port of the pneumatic actuator (as illustrated below) and connect to “Air supply in” on the air switch.
3. Remove the tubing from the “open” port of the pneumatic actuator.
4. Connect the tubing from the air switch to both ports of the pneumatic actuator. Open air supply.
5. Move the switch back and forth to check the open & closed operation of the valve.
6. To adjust, loosen the lock nut and close (clockwise) the control valves.
7. Open (counter clockwise) 1.5 turns each.
8. The control valve on the “Closed” port regulates the butterfly valve “Opening” speed. The control valve on the “Open” port regulates the butterfly valve “Closing” speed.
9. Closing the valves slows the speed of the butterfly valve. Opening the valves increases the speed of the butterfly valve.
10. Adjust as necessary to allow smooth operation.



PNEUMATIC ACTUATOR ADJUSTMENTS – PERPENDICULAR MOUNTING



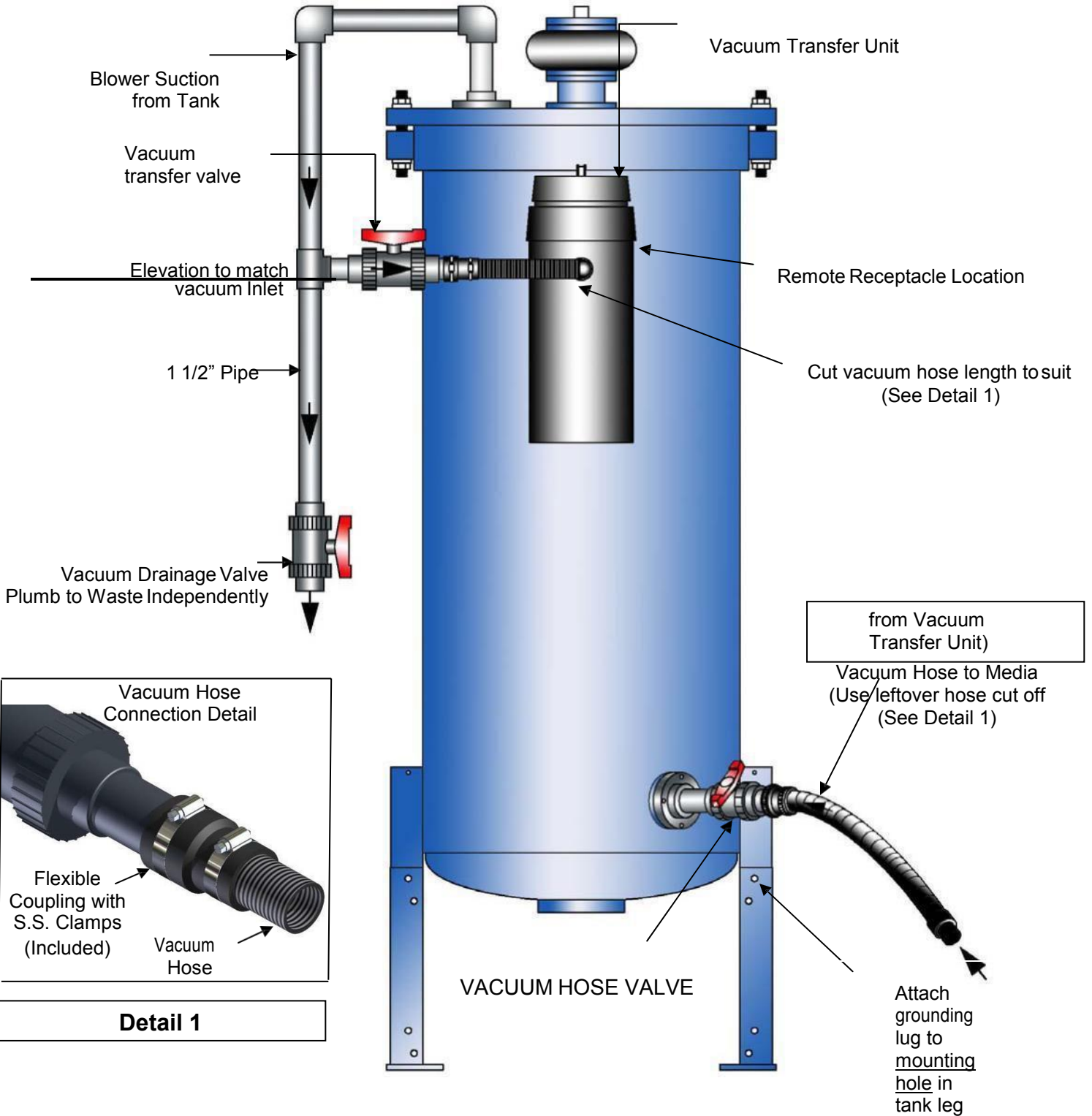
Opening adjustment made on inside of actuator.

Closing adjustment made on outside of actuator.

NOTE:
RECOMMENDED MOUNTING



VACUUM TRANSFER SYSTEM

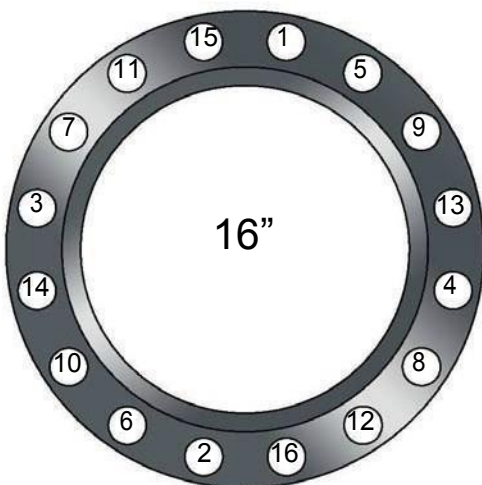
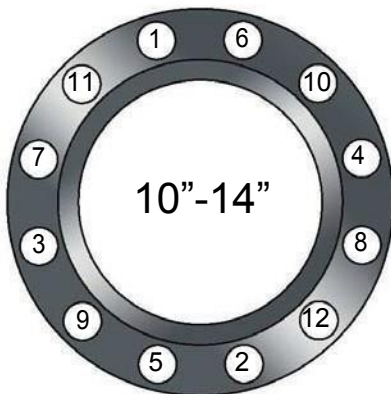
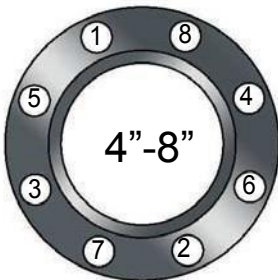


NOTE!
ALL FITTINGS, VALVES AND HARDWARE AS SHOWN IS SCH 80 PVC AND ARE SUPPLIED BY DEFENDER EUROPE.

Filter MUST be grounded to help slow corrosion due to stray current.

PVC FLANGE INSTALLATION DATA - STANDARD

1. Follow illustrated bolt-tightening sequence.
2. Recommended gaskets: full face, 1/8" thick, elastomeric, 50-70 shore a hardness.
3. Bolt threads should be well lubricated.
4. Always use full size flat washers with bolts and nuts.
5. Use primer and heavy-bodied PVC cement.



All Dimensions are in inches			
Piping Size	Bolt Circle Diameter	Bolt Size	Recommended Torque (FT./LBS.)
1/2	2 3/8	1/2-13 UNC	15 - 20
3/4	2 3/4	1/2-13 UNC	15 - 20
1	3 1/8	1/2-13 UNC	15 - 20
1 1/4	3 1/2	1/2-13 UNC	15 - 20
1 1/2	3 7/8	1/2-13 UNC	15 - 20
2	4 3/4	5/8-11 UNC	20 - 30
2 1/2	5 1/2	5/8-11 UNC	20 - 30
3	6	5/8-11 UNC	20 - 30
4	7 1/2	5/8-11 UNC	20 - 30
5	8 1/2	5/8-11 UNC	25 - 35
6	9 1/2	3/4-10 UNC	33 - 50
8	11 3/4	3/4-10 UNC	33 - 50
10	14 1/4	7/8-9 UNC	53 - 75
12	17	7/8-9 UNC	53 - 75
14	18 3/4	1-8 UNC	100 - 110
16	21 1/4	1-8 UNC	100 - 110

NOTE!
Flanges conform to ANSI B16.5, class 150.

PVC FLANGE INSTALLATION DATA - METRIC

1. Follow illustrated bolt-tightening sequence.
2. Recommended gaskets: full face, 1/8" (3.175 mm) thick, elastomeric, 50-70 shore a hardness.
3. Bolt threads should be well lubricated.
4. Always use full size flat washers with bolts and nuts.
5. Use primer and heavy-bodied PVC cement.



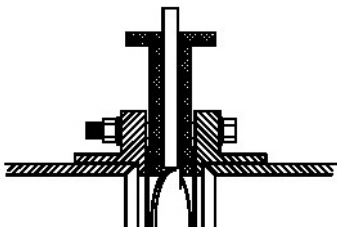
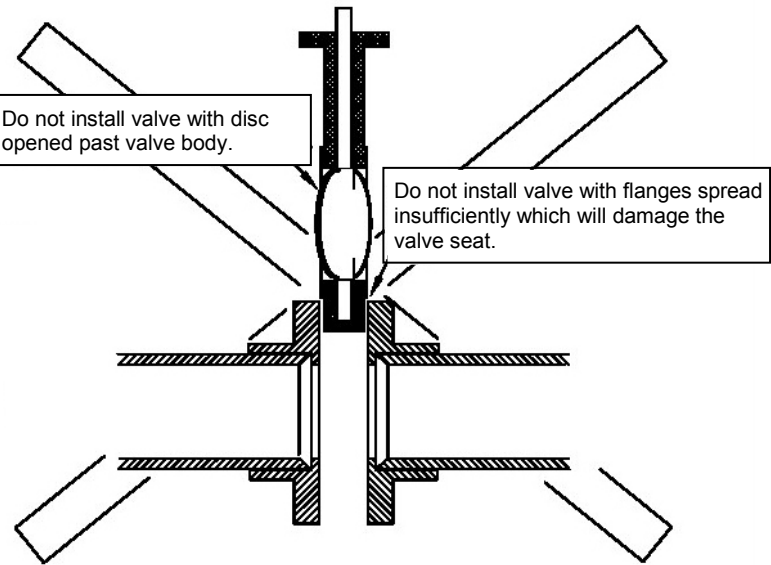
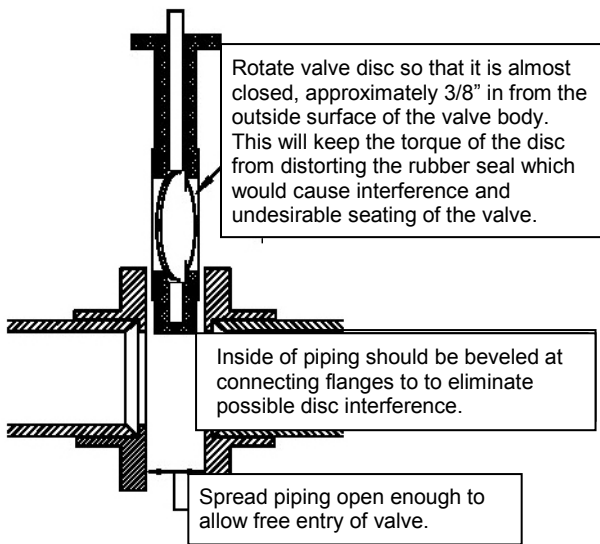
All Dimensions are in millimeters			
Piping Size (DN)	Bolt Circle Diameter	Bolt Size Diameter (mm) 65M12	Recommended Torque (Nm)
15	65	M12	20 – 27
20	75	M12	20 – 27
25	85	M12	20 – 27
32	100	M16	20 – 27
40	110	M16	20 – 27
50	125	M16	27 – 41
65	145	M16	27 – 41
80	160	M16	27 – 41
100	190	M20	27 – 41
125	220	M24	34 – 47
150	250	M24	48 – 68
200	310	M24	48 – 68
250	370	M27	72 – 102
300	430	M27	72 – 102
350	490	M30	136 – 149

OVERVIEW OF CONNECTIONS ON DEFENDER FILTER

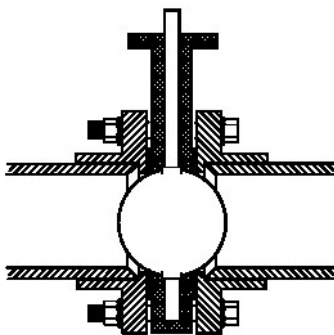
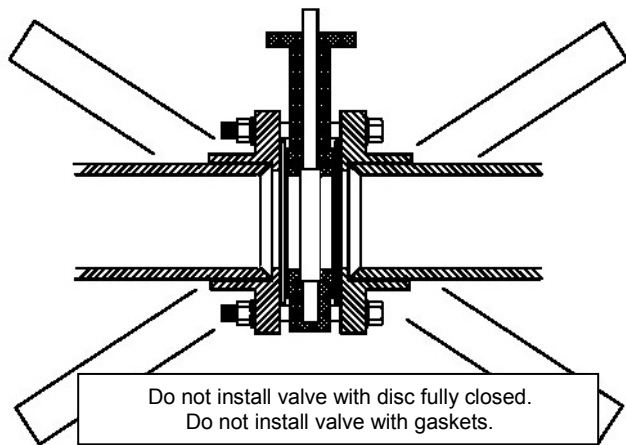
	SP-24	SP-27	SP-33	SP-41	SP-49	SP-55
Inlet	8 pcs.	8 pcs.	8 pcs.	8 pcs.	12 pcs.	12 pcs.
Flange DN	100	150	200	200	250	300
Flange mm	110	160	225	225	250	315
Flange inches	4"	6"	8"	8"	10"	12"
Bolt mm	M16	M20	M20	M20	M20	M20
Bolt inches	-	-	-	-	-	-
Outlet	8 pcs.	8 pcs.	8 pcs.	8 pcs.	12 pcs.	12 pcs.
Flange DN	100	150	200	200	250	300
Flange mm	110	160	225	225	250	315
Flange inches	4"	6"	8"	8"	10"	12"
Bolt mm	M16	M20	M20	M20	M20	M20
Bolt inches	5/8-11 UNC	3/4-10 UNC	3/4-10 UNC	3/4-10 UNC	7/8-9 UNC	7/8-9 UNC
Drain	4 pcs.	4 pcs.	4 pcs.	8 pcs.	8 pcs.	8 pcs.
Flange DN	80	80	80	100	100	100
Flange mm	90	90	90	110	110	110
Flange inches	3"	3"	3"	4"	4"	4"
Bolt mm	M16	M16	M16	M16	M16	M16
Bolt inches	5/8-11 UNC	5/8-11 UNC	5/8-11 UNC	5/8-11 UNC	5/8-11 UNC	5/8-11 UNC
Vacuum	4 pcs.	4 pcs.	4 pcs.	4 pcs.	4 pcs.	4 pcs.
Flange DN	40	40	40	40	40	40
Flange mm	50	50	50	50	50	50
Flange inches	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
Flange mm	M16	M16	M16	M16	M16	M16
Flange inches	1/2-13 UNC	1/2-13 UNC	1/2-13 UNC	1/2-13 UNC	1/2-13 UNC	1/2-13 UNC

Bolts with inch-thread should be used only if the filter is supplied exclusively with inch-thread for the connections.

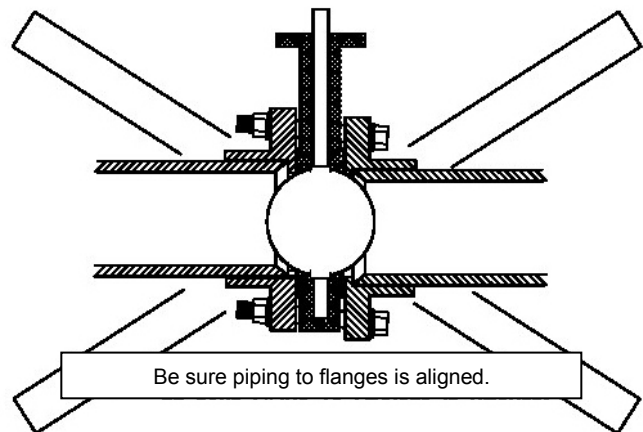
INSTALLATION OF BUTTERFLYVALVES



Insert the valve between the flanges and assemble the valve to the flanges with all the required bolts. **Do not use gaskets** with butterfly valves. Do not fully tighten bolts at this time.



Turn the disc to the fully open position and center the valve within the flanges and hand tighten the bolts. Slowly close the valve to check for adequate disc clearance. Return the disc to the fully open position and fully tighten all bolts.



BUTTERFLY VALVES

Standard butterfly valves are Dominion™ with nylon coated cast aluminum body, nylon coated ductile iron disc with stainless steel stems.

Butterfly valves have bushings around the handle shaft to keep the water from leaking out of the shaft. As the valve ages, the bushing tends to dry out. The dryness, combined with dust and dirt, inhibits valve operation and increases the force required to turn the valve handle. This is not a great problem when the valves are individually operated until the situation gets progressively worse and too great a force is required to turn the valve handle. If the valve resistance is too great, an actuator can develop enough torque to shear the valve stem.

Routine preventive maintenance for these valves, without removing the valves, is to lubricate the stem and bushing with a food grade, silicone base, penetrating lubricant. The pneumatic operator will have to be removed to expose the shaft and bushing.

The valves are highly corrosion resistant and should provide satisfactory service for many years. It is possible, however, for these valves to become coated with foreign material due to an imbalance of the water chemistry, hair, lint or other material, which can wrap itself around the valve stems.

If you are inspecting a valve, it will be necessary to remove most of the securing bolts at that valve. The resilient lining provides the seal between the valve and the flanges so that no gaskets are required. The flanges must be opened or spread slightly so the valve may slide out of position. Be sure the valve disc is in the closed position before attempting removal.

The valve shaft is round with two flat surfaces that have a scribe mark. If the scribe marks run in the same direction of the piping (parallel) the disc is in the open position. If the scribe marks are perpendicular to the piping, the disc is closed. Remember that the disc need not be 100% closed for shut-off purposes.

The resilient lining of the valve provides a seal between the process water and the stainless steel shaft. If the position of the lining is altered due to coating or buildup of scale, etc., this seal could be broken. If the valve resists turning after cleaning, lubricate the shaft ends from the inside and outside. If your service schedule includes removal of the valves for inspection, the resilient lining should be coated with the same lubricant.

If the valve disc does not move freely with normal pressure after treating with the lubricant, you should consider replacing the valve. Replacement valves are not expensive and usually cost less than the labor and replacement parts required to repair an existing valve.

PRESSURE GAUGES

All gauges supplied by Defender Europe are designed with dampening orifice openings to minimize possible damage due to surges or quick changes in pressure. The small opening is therefore subject to clogging, especially those gauges located before the filter.

If a gauge reacts slowly to changes in pressure or has tendency to remain at an elevated pressure while the system is shut down, remove the gauge for inspection. The opening or orifice is located within the center inside the nozzle connection. If you cannot observe an opening somewhat smaller than a pinhead, the gauge should be cleaned or replaced.

Switching the positions of gauges will verify operation of a gauge and should indicate if any gauge requires repair or replacement. All gauges are provided with 1/4" npt connections. It is recommended that a gauge cock be installed at each gauge.

Remember that the gauges in your system provide you with the best data relative to the operation and efficiency of items of equipment. If you keep them in good order, they will help make your daily chores less troublesome.

Do not disregard them when the break down for replacement gauges are inexpensive and easy to replace.

BEDIENUNGSANLEITUNG

PRÜFUNG VOR INBETRIEBNAHME

1. Der Start der Umwälzpumpe erfordert die Anwendung eines VDF (Variable Frequenz Drive) oder einen Sanft- Anlasser-Motor um eventuelle schädliche Druckstöße zu verhindern.
 - Start-Rampe zwischen 10 – 30 Sekunden einstellen.
 - Wichtig! Stopp-Rampe auf „0“ stellen um restlichen Druck im Filter zu verhindern.
2. Zwischen Kompressor und Filter/Regler (auf dem Defender Tank montiert) nur Eisen oder verzinktes Rohr (kein PVC) verwenden. Ventil hinzufügen zur Abgrenzung kurz vor dem Filter.
3. Alle Rohr-und Ventilanschlüsse müssen nach Defender ® „Regenerative Schematische Filtertestsysteme“ installiert werden. (Siehe Seite 1). Ein Wasser-Abscheider mit automatischer Entleerung muss installiert werden, wie auf Seite 1 gezeigt. Das Modell AMG350-N04D wird empfohlen.
4. Ablauf zur Prüfung von kritischen Elementen vor Inbetriebsetzung:
 - Schalten Sie alle Systemkomponenten:
 - A. Kompressor
 - B. RMF Programm
 - C. Vakuum Transfer-Motor
 - Einstellung von Druckregler auf 90 PSI.

TROCKENTEST

Rohranschlüsse auf Dichte prüfen. Wenn Leckagen auftreten, Kompressor abschalten. Rohre entfernen und prüfen, ob Rohr gerade geschnitten ist. Eventuelle Mängel bei den Rohren korrigieren. Rohr wieder einsetzen und sicherndass alles ganz dicht ist. Am Rohr ziehen um sicher zu sein, dass alles richtig angeschlossen ist. Wenn immer noch Leckagen auftreten, kann es sein dass die Rohre einen falschen OD (Außendurchmesser) haben. Alle Rohrleitungen müssen dem britischen Standard von .25 ", .375" und .50 " OD entsprechen wie auf der Zeichnung dargestellt.

- Rotation des Motors der Umwälzpumpe kontrollieren. (aus dem T-Stück muss merkbar Luft strömen)
- Den Motor Starter auf „OFF“ schalten.
- Eine Brücke zwischen # 4 - & # 11A auf der Klemmleiste installieren. (um den Betrieb der Pumpe zu simulieren).
- Sichern, dass die Bump-Funktion auf manuell eingestellt ist und die Wartung auf „OFF“ Position.
- Auf Cycle Start (Zyklusstart) drücken, sodass die Precoat-Lampe leuchtet. Das Precoat-Ventil öffnet nun im Laufe von 60 Sekunden.
- Nach 10 Minuten leuchtet die Filter Lampe und das Rückschlagventil (influent) öffnet. Das Precoat-Ventil schließt und das System ist in Filter-Zustand. Sichern dass der Timer in der Steuertafel auf 10 Minuten eingestellt ist.

BEACHTEN:

Nach Trockentest, Brücke zwischen #4- and #11A.entfernen

BEACHTEN:

. Achten Sie darauf, Regulierung der Verdrahtung vom Filterpumpen Motorstarter (Sanftanlasser-oder VFD) auszuführen, damit zusätzlicher Kontakt zu 4 und 11A die Lauffunktion bestätigen

SCHNELLSTART ANLEITUNG

Sobald die ersten Vorbereitungen abgeschlossen sind, ist der Filter für den Start bereit. Für einen korrekten Start - Anlauf, muss das System vollständig abgeschaltet sein, wo alle Pumpen und Filter-Operationen gesperrt sind.

Voraussetzungen:

- Entsprechende Menge an Medien
- Spezielle Filter Anforderungen sind auf dem Typenschild in der Nähe der Filter Steuertafel angegeben.
- Wasserversorgung
- Luftzufuhr
- Luftdruck sollte mindestens 90 PSI betragen.

BEACHTEN:

Defender Filter sind so konstruiert, dass sie mit Aqualite oder Diatomeenerde funktionieren.
Bei Gebrauch von anderen Produkten funktioniert der Filter nicht optimal.

BEACHTEN:

Der Filtertank muss leer sein

LADEN DES MEDIUMS IN DAS SYSTEM – VAKUUM

BEACHTEN:

Nicht den Vakuum Transfer umschalten bevor der Filter entleert ist.

1. Die entsprechende Menge Medium ist auf dem Typenschild des Filters neben der Steuertafel angegeben.
2. Vakuum Ablass/Entlüftungsventil öffnen, damit sich kein Wasser in den Vakuum Transfer Rohrleitung befindet.
3. Vakuum Ablassventil schließen, Vakuum Transfer Ventil und Vakuumschlauch Ventil öffnen.
Überprüfen ob Tankablass- und System Ventile geschlossen sind.
4. Pumpenauslass Drosselventil (Wartungsventil) schließen.
5. Den Wahlschalter der Bump-Vorrichtung auf „Bump“ einstellen.
6. Vakuumtransfer Schalter auf „ON“ stellen, und die erforderliche Menge an Medium in den Filtertank saugen.
7. Vakuumtransfer Schalter auf „OFF“ umschalten, Vakuumschlauch Ventil und Vakuum-Transfer Ventil schließen, dann Precoat Entlüftungsleitung und Vakuum Ablassleitung öffnen.
8. Den Wahlschalter der Bump-Vorrichtung auf „Manuel“ einstellen.
9. Drosselventilventil schließen. Zyklus Start Taste drücken und Drosselventil langsam öffnen um den Tank mit Wasser zu füllen.
10. Ist der Filter voll und vollständig entlüftet, die Ventile der Precoat Entlüftungsleitung und der Vakuum Ablassleitung schließen.
Der Filter geht automatisch nach dem Pre-coat in den Filter Betriebszustand (Zyklusstart).

BEACHTEN:

Nachdem der Vakuumtransfer des Mediums abgeschlossen ist und der Zyklus Schalter gestartet ist, hat das Precoat Ventil 60 Sekunden Verzögerung zum Öffnen. Das gibt dem System die Möglichkeit gefangene Luft zu entleeren. Bei einem normalen Bump-Zyklus, hat das Precoat Ventil 5 Sekunden Verzögerung unmittelbar nach dem Pump.

BEACHTEN:

Beim ersten Auffahren des Filters, das Medium Ablassen und wieder einfüllen sobald das Bassin Wasser klar ist. Dieses ist notwendig um Produktionsreste zu entfernen. Den Prozess wiederholen, wenn das Bassin-Zusatz

ZYKLUS START

1. Cycle Stop drücken.
2. Den Bump-Wahlschalter auf manuell oder automatisch drehen und dann die Cycle Start Taste drücken.
3. Der erste Schritt des Filtrationszyklus ist der Precoat-Zustand, das System wird diesen Zyklus für zehn 10 Minuten fortsetzen. Sichtglas überprüfen um zu sehen wie lange es dauert, bis das Sichtglas klar ist. Dieses ergibt die notwendige Precoat Zeitspanne des Systems.
4. Sobald der Precoat-Zustand abgeschlossen ist, geht der Filter in den Betriebszustand (filtrieren). Das Ablass Ventil (effluent) zum Pool öffnet und danach schließt das Precoat Ventil. Der Filter bekommt nun Wasser aus dem Bassin, behandelt es im Filtersystem und führt es zurück in das Bassin.

- An diesem Punkt sollte der Filterdruck erneut geprüft und notiert werden. Dieser sollte dem ursprünglichen Differenzdruck entsprechen.

5. Der Filter bleibt im Betriebszustand im vorprogrammierten Intervall (siehe Seite 52- Programmierung des Timers), oder wenn er im manuellen Betrieb steht setzt sich der Betrieb fort bis der Bump-Start Schalter gedrückt wird. Abhängig von der Badebelastung im Bassin wird empfohlen, einmal täglich einen Bump auszuführen.
6. Sobald der Bump-Schalter betätigt wurde oder durch den Timer in Gang gesetzt, geht der Filterbetrieb in Regenerierungszustand. Die automatische Überwachungsanlage stoppt die Pumpe und schließt das Ablassventil (effluent) und das Rückschlagventil (influent).
7. An diesem Punkt wird der Bump-Mechanismus aktiviert. Der Bump stößt 10-mal rauf und runter. Dadurch wird das Medium von den Schlangen entfernt.
8. Das System wird dann automatisch in den Precoat-Zustand versetzt und wie oben beschrieben, beginnt der Zyklus erneut.

WIEDERAUFLADEN DES MEDIUMS

1. Es gibt mehrere Hinweise darauf, wann es Zeit ist das Medium wieder aufzuladen:
Abhängig von der Badebelastung, kann der Bedarf des Wiederaufladens des Mediums zwischen 3 Wochen und 2-3 Monaten liegen.
Beim Bedienen des Systems, wird es offensichtlich, wann eine Wiederauffüllung des Mediums erforderlich ist:

- **Wenn die Druckdifferenz etwas nach dem Bump stoßen auf 10 bis 12 PSI bleibt.**
- **Wenn die Strömungsgeschwindigkeit des Systems nicht eingehalten werden kann.**
- **Wenn das Medium sich nicht auflöst und immer noch klumpig ist.**

VORSICHT

Der maximale differentiale Betriebsdruck darf 15 PSI nicht überschreiten. Überschreitung des Drucks kann Ursache für Beschädigungen sein.

2. Vor der Schaltung Cycle-Stop, das Entleerungsventil teilweise öffnen um eventuelle Ablagerungen im Rohr zu entfernen.
 - A. Vorausgesetzt, das oben erwähnte ist erfolgt, die Zyklus-Stopp-Taste drücken. Die Pumpe stoppt, und die Ventile zu schließen.
 - B. Zum Wieder Aufladen des Mediums, den Bump-Schalter drehen und auf Bump setzen.
 - C. Bump den Filter etwa fünf 5 Mal durch manuelles Drücken der Bump-Taste. Dadurch werden Filterablagerungen aus den Schlangen entfernt.
 - D. Das Entleerungsventils am Boden des Filters öffnen.
 - E. Das Vakuumventil öffnen. (Um Entleerungs-Durchfluss zu erhöhen)
 - F. Sobald der Tank vollständig entleert ist, den Vakuum Transfer Schalter auf ON und dann OFF schalten. Dadurch stellt sich das Precoat Ventil wieder auf die standardmäßige Verzögerungs-Funktion von 60 Sekunden.
 - G. Den Tank wieder mit Wasser füllen und die Schritte C, D & E wiederholen.
 - H. Zurück auf Quick-Start (siehe Instruktion auf Seite 33), um den Filter wieder in Betrieb zu nehmen.

Zurück zum Betriebszustand gehen, falls die Umwälzpumpe stoppt.

1. Cycle Stop drücken.
2. Cycle Start drücken - System ist standardmäßig auf Precoat.

WARTUNG

GENERELL

Ihr Defender Filter ist weitgehend instandhaltungsfrei. Wie bei jedem Stahltank sind Flecken durch Berührung nicht zu verhindern. Alle Schläuche und Verbindungen müssen auf eventuelle Zeichen von Abnutzung kontrolliert werden. Eventuell abgenutzte Schläuche austauschen..

- Kopfschrauben, jeden 3. Monat kontrollieren und wenn notwendig nachziehen.
- Filter des Vakuum Gebläses: nach jedem Mediumwechsel die Patrone kontrollieren und säubern wenn notwendig.
- Gebläse: Für eine detaillierte Beschreibung siehe Manual des Herstellers.
- Filter / Regler: Für eine detaillierte Beschreibung siehe Manual des Herstellers.
- Für Auswechseln vom Airline-Filter Element, siehe SMC Corporation part # AF40P-060S.

Reinigung von flexiblen Schläuchen – Die flexiblen Schläuche vom Inneren des Filters müssen nach Bedarf gereinigt werden abhängig von der Badebelastung im Bassin. Je mehr Öl und andere verunreinigenden Stoffe im Filter sind, desto öfter ist die Reinigung notwendig. Es ist erforderlich die flexiblen Schläuche zu reinigen, wenn der Systemdruck INFLUENT im Laufe von einer Stunde nach Auffüllen des neuen Mediums ansteigt.

HALLENBÄDER:

- Freizeitbäder, Schwimmhallen und Sportzentren – zwei Mal jährlich.
- Wettkampfbecken / Bassiner für Schwimmbahnen / Tauchbecken usw. - ein Mal jährlich.

FREIBÄDER:

- Betrieb bis zu 4 Monaten – Bei Saisonschluss.
- Betrieb bis zu 9 Monaten – Inmitten der Saison und bei Saisonschluss.
- Ganzjähriger Betrieb – drei Mal jährlich in gleichen Zeitabschnitten.

ZWISCHEN CHEMISCHER REINIGUNG:

Um das Optimale Ihres Defender Filters zwischen chemischer Reinigung zu erreichen, folgen Sie diesem Verfahren:

1. Ablassen (drän) und Reinigen nach Anweisung.
2. Luftzuführung schliessen, "Bump" Regler auf „Bump set“ drehen.
3. Bumpknopf betätigen bis Luft entleert ist.
4. Sichtglas öffnen.
5. Einen Hochdruckreiniger anwenden mit breiter Streuung oder einen Gartenschlauch mit Spritzdüse und die Schläuche vorsichtig durch das Sichtglas reinigen.
6. Es ist wichtig alle Schläuche zu ergreifen und zu drehen für totales Abwaschen. Dieses geschieht durch das Sichtglas hindurch. Fortsetzen bis alle Schläuche gereinigt sind.
Sichtglas wieder einsetzen, Luftzuführung öffnen und den Aweisungen für Wiederaufladen des Mediums folgen.

DAS ENTFERNEN DES FILTERDECKELS

Viele Defender Filter sind mit einer Hebeanordnung für den Filterdeckel ausgestattet. Diese ist am Filterkopf montiert und wegen dem seltenen Gebrauch muss die Halterung for Gebrauch geschmiert werden.

FILTERKOPFDICHTUNG

Die Kopfdichtung muss nach jedem Entfernen des Deckels erneuert werden, um zu sichern das die Dichtung immer dicht ist.

5-JÄHRIGE WARTUNG

Nach einem Filterbetrieb von 5 Jahren, müssen die "Bump" Teile überprüft werden um eine korekte Funktion zu sichern.

1. Inspizieren Sie (1) Bump Mechanismus Dichtung
2. Inspizieren Sie (2) Lagerblock Dichtungsringe
3. Inspicer (3) Hebeanordnung Dichtungsringe
4. Inspicer (1) Lagerblock Sprengring
5. Lagerblock auf Abnutzung überprüfenfor und wenn notwendig auswechseln.

10-JÄHRIGE WARTUNG

Nach einem 10 jährigen Betrieb des Filters, müssen alle Schläuche überprüft werden um korekte Funktion zu sichern. Dann ist es wieder Zeit für eine 5-Jahres Wartung.

Kontaktieren Sie bitte Defender Europe A/S hinsichtlich Anweisungen und Werkzeug für die 5- oder 10jährliche Wartung.

REINIGUNG VON FLEXIBLEN SCHLÄUCHEN

Anwendung eines Entfettungs-/Entkalkungsmittels wie z.B. "Filter Cleanse".

BEACHTEN!

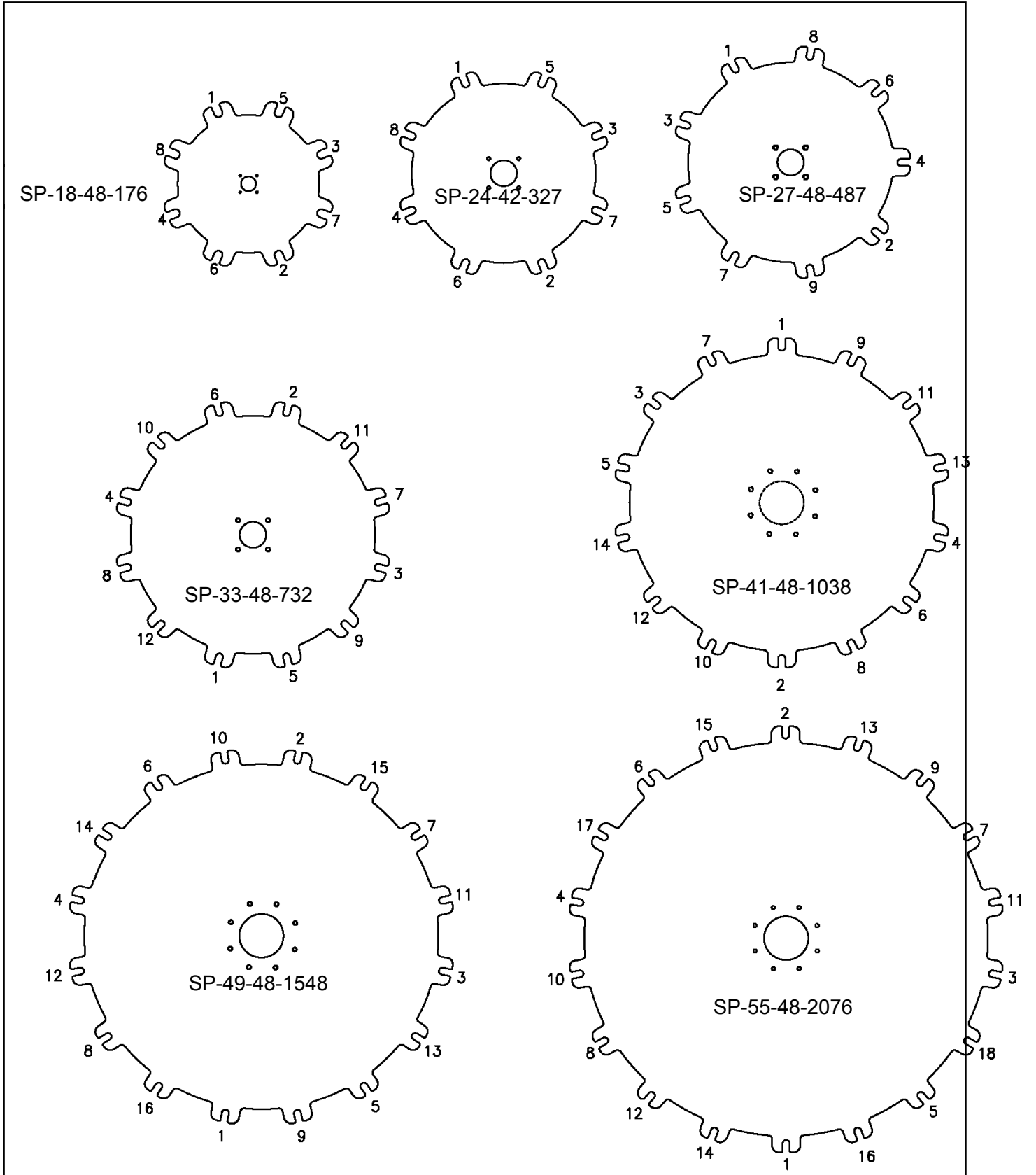
Es ist vorgeschrieben die flexiblen Schläuche mindestens einmal jährlich zu reinigen.

Vorschlag kg Reinigungsprodukt pro Filter:

Defender Model	Volume (Gal.)	Volume (Liter)	Vorschlag (lbs.) Reiniger	Vorschlag (kg) Reiniger
SP-24-42-327	128	484.8	26	11.8
SP-27-48-487	159	601.9	32	14.5
SP-33-48-732	250	946.4	50	22.7
SP-41-48-1038	441	1669.4	88	39.9
SP-49-48-1548	615	2328	123	55.8
SP-55-48-2076	841	3183.5	168	76.2
SP-24-30-327	102	386.1	20	9.1
SP-24-38-327	102	386.1	20	9.1
SP-30-30-595	161	609.5	32	14.5
SP-30-38-595	161	609.5	32	14.5
SP-30-42-595	198	749.5	40	18.1
SP-36-30-756	236	893.4	47	21.3
SP-36-38-756	236	893.4	47	21.3
SP-36-42-756	289	1093.9	58	26.3
SP-42-30-1080	326	1234	65	29.5
SP-42-38-1080	326	1234	65	29.5
SP-42-42-1080	398	1506.6	80	36.3
SP-48-30-1452	433	1639.1	87	39.5
SP-48-38-1452	433	1639.1	87	39.5
SP-48-42-1452	527	1994.9	105	47.6
SP-54-30-1996	556	2104.7	111	50.3
SP-54-38-1996	556	2104.7	111	50.3
SP-54-42-1996	675	2555.2	135	61.2
SP-60-30-2460	697	2638.4	139	63
SP-60-38-2460	697	2638.4	139	63
SP-60-42-2460	844	3194.9	169	76.7

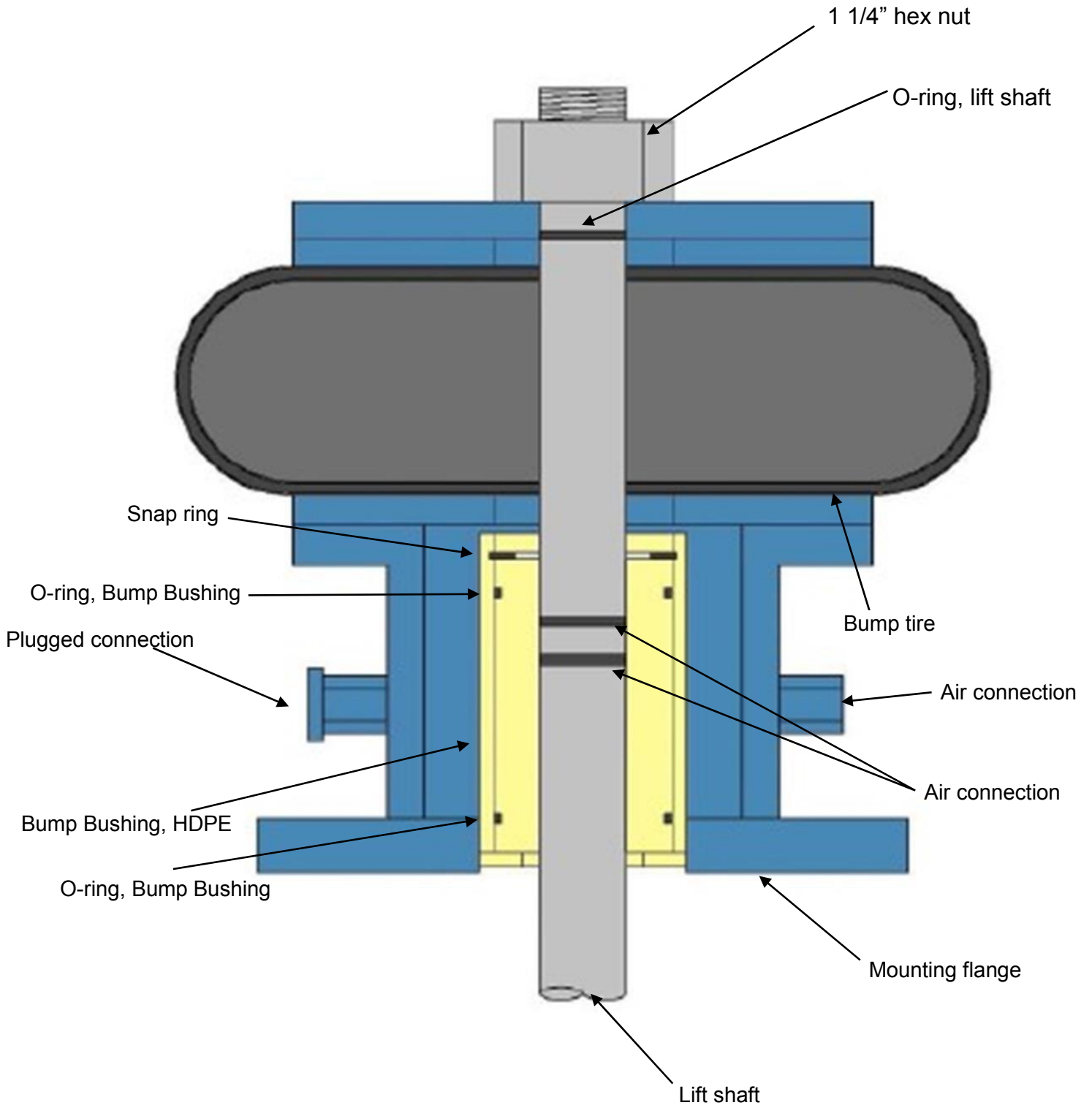
1. Vakuum Ansaugung der vorgeschlagenen Mänge Chemikalie in den Tank.
2. Den Tank voll tanken.
3. Eine Minute In Precoat Betrieb fahren.
4. Den Regler auf "maintenance mode" oder "element cleaning mode" drehen.
5. Der Filter geht automatisch in die Bump Funktion 6 Mal jede viertel Stunde.
6. 12 Stunden einweichen, empfohlen werden 24-36 Stunden.
7. Den Tank mindestens zweimal dränen und füllen um alle Chenikalien zu entfernen.
8. Nun nach Vorschrift vorgehen: "Aufladen des Mediums in das System – Vacuum Transfer"

HEAD TORQUE



Head bolts to be tightened down in (3) stages.
 Stage (1 & 2) is to be (70) foot lbs each, stage (3) is to be 60 foot lbs for a total of 200 foot lbs.

BUMP ASSEMBLY



AIR-REGULATOR AND SOLENOID VALVE - SPECIFICATIONS

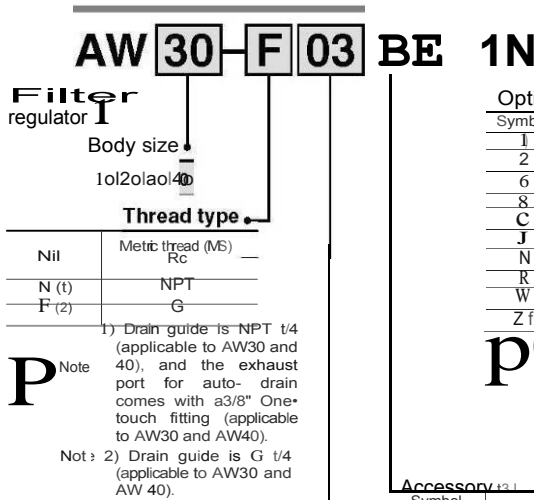
Integrated filter and regulator units save space and require less piping.

Direct operated, relieving type

JIS Symbol



How to Order



Option

Symbol	Description	Applicable model
1	0.02 to 0.2 MPa setting	AW10 to 40
2	Metal bowl	AW10 to 40
6	Nylon bowl	AW10 to 40
8	Metal bowl with level gauge	AW30/40
C	With bowl guard	AW20
J	Drain guide 1/4	AW30/40
N	Non-relieving	AW10 to 40
R	Flow direction: Right ... Left	AW10 to 40
W	Drain cock with barb fitting: 06 x 04 nylon tubing	AW30/40
Z/J	Name plate, calibration plate or barbed pressure gauge in imperial units (PSI, 'F)	AW10 to 40

P When more than one specification is required, indicate in alphanumeric order.

Note 5) The only difference from the standard specifications is the adjusting spring for the regulator. It does not restrict the setting of 0.2 MPa or more.

Note 6) Without a valve function.

Note 7) For M5 and NPT thread types. This product is for overseas use only according to

the new Measurement Law. (The SI unit type is provided for use in Japan.)

Symbol	Description	Applicable model
Nil	—	—
B	With bracket	AW10 to 40
C	Float type auto-drain (N.C.) (4)	AW 10 to 40
O	Float type auto-drain (N.O.) (4)	AW30/40
E	With square embedded type pressure gauge (With limit indicator)	AW20 to 40
G	With round pressure gauge (Without limit indicator)	AW10
H	With round pressure gauge (With limit indicator)	AW20 to 40
H	With set nut (For panel mount)	AW10 to 40

P Note 3) Optional parts are not assembled and are supplied loose at the time of shipment (except Note 4) Applicable tubing O.D for auto drain connection should be 0318" in case NPT thread port is chosen.

Port size					
Symbol	Port size	Body size			
		10	20	30	40
MS	M5	●	—	—	—
01	1/8	●	●	—	—
02	1/4	—	—	●	—
03	3/8	—	—	—	●
04	1/2	—	—	—	●
06	3/4	—	—	—	●

Accessory/Optional Specifications Combinations

©: Combination available

D: Combination not available

O: Varies depending on the model

/: Available only with NPT thread

Combination	Accessory	Optional specifications												Applicable filter regulator			
		1	2	6	8	C	J	N	R	W	Z	AW10	AW20	AW30 to 40			
Accessory/Optional specifications	<1/ B	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©
With bracket (With set nut)	B	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©
Float type auto-drain (N.C.)	C	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©
Float type auto-drain (N.O.)	O	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©
Square embedded type pressure gauge	E	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©
Round pressure gauge	G	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©
With set nut (For panel mount)	H	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©
0.02 to 0.2 MPa setting	-1	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©
Metal bowl	-2	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©
Nylon bowl	-6	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©
Metal bowl with level gauge	-8	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©
With bowl guard	-C	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©
Drain guide 1/4	.J	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©
Non-relieving type	-N	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©
Flow direction: Right -> Left	-R	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©
Drain cock with barb fitting: 06 x 04 nylon tubing	-W	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©
PSI 'F and pressure	-Z	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©	©

Standard Specifications

Model	AW10	AW20	AW30	AW4(J)	AW4(J-D6)
Port sizes	M5 x 0.8	1/8, 1/4	1/4, 3/8	1/4, 3/8, 1/2	3/4
Fluid	Air				
Proof pressure	1.5MPa				
Maximum operating pressure	1.0MPa				
Set pressure range	0.05 to 0.7MPa		0.05 to 0.85 MPa		
Pressure gauge port size (1)	Rc 1/16 (2)	Rc, NPT, G 1/8	Rc, NPT, G 1/8	Rc, NPT, G 1/4	Rc, NPT, G 1/4
Relief pressure	Set pressure+ 0.05 MPa (3) (at relief flow rate of 0.1 e/min (ANR))				
Ambient and fluid temperature	-5 to 60°C (With no freezing)				
Nominal filtration rating	5 l'm				
Drain capacity (cm3)	2.5	8	25	45	45
Bowl material	Polycarbonate				
Bowl guard	—	J Option	J	Standard	
Construction	Relieving type				
Weight (kg)	0.09	0.32	0.40	0.72	0.75

Note 1) Pressure gauge connection threads are not required for regulators with square embedded type pressure gauge (AW20 to AW40).

Note 2) Use a bushing (part no: 131368) when connecting R 1/8 pressure gauge to R 1/16 gauge port.

Note 3) Not applicable to AW10.

Accessory Part No.

el		AW10	AW20	AW30	AW40	AW40-06
Bracket assembly P II		AR10P-270AS	AW20P-270AS	AR30P-270AS	AR40P-270AS	AR40P-270AS
Set nut		ARIOP-2608	AR20P-260S	AR30P-260S	AR40P-260S	AR40P-260S
Pressure gauge (2)	1.0 MPa	Round Type G27-10-R1	Round Type G36-10-D01	Round Type G36-10-D01	Round Type G46-10-D02	Round Type G46-10-D02
	0.2 MPa	Square embedded type (1)	—	GC3-10AS	GC3-10AS	GC3-10AS
		Round Type G27-10-R1*	—	G36-2-D01	G36-2-D01	G46-2-D02
Float type auto-drain (5)	Square embedded type (1)	—	GC3-2AS	GC3-2AS	GC3-2AS	GC3-2AS
	N.O.	—	—	AD38j AD38Ni (6)	AD48j AD48N1*1	AD48 j AD48N1*1
	N.C.	AD17	AD27	AD37I AD37Nc*J	AD47I AD47Ni (6)	AD47I AD47N (6)

Note 1) Assembly includes a bracket and set nuts.

Note 2) D in part numbers for a round pressure gauge indicates a type of connection thread. No indication is necessary for R; however, indicate N for NPT. Please contact SMC regarding the connection thread NPT and supply of the pressure gauge for PSI unit specifications.

Note 3) For 1 MPa.

Note 4) Includes one O-ring and 2 mounting screws.

Note 5) Minimum operating pressure: N.O. type--D.1 MPa; N.C. type--0.1 MPa (AD17/27) and 0.15 MPa (AD37/47). Please contact SMC regarding the specifications for PSI unit and "F".

Note 6) When "N" is specified in the end of part number of auto-drain, applicable tubing O.D should be 3/8".

& Precautions

Be sure to read before handling. Refer to pages 14-21-3 to 14-21-4 for Safety Instructions and Common Precautions.

Selection

Mounting & Adjustment

& Warning

- Residual pressure release (outlet pressure release) is not completed by releasing inlet pressure. To release residual pressure, use a filter regulator with a back flow mechanism.

Maintenance

& Warning

- Replace the element every 2 years or when the pressure drop becomes 0.1 MPa, whichever comes first, to prevent damage to the element.

& Warning

- Set the regulator while checking the displayed values of the inlet and outlet pressure gauges. Turning the knob excessively can cause damage to the internal parts.
- The pressure gauge indicated with regulators for 0.02 to 0.2 MPa setting is for 0.2 MPa use only. Exceeding 0.2 MPa of pressure can damage the gauge.
- Do not use tools on the pressure regulator knob as this may cause damage. It must be operated manually.

& Caution

- Be sure to unlock the knob before adjusting the pressure and lock it after setting the pressure. Failure to follow this procedure can cause damage to the knob and the outlet pressure may fluctuate.

- Pull the pressure regulator knob to unlock. (You can visually verify this with the "orange mark" that appears in the gap.)
- Push the pressure regulator knob to lock. When the knob is not easily locked, turn it left and right a little and then push it (when the knob is locked, the "orange mark" will disappear).

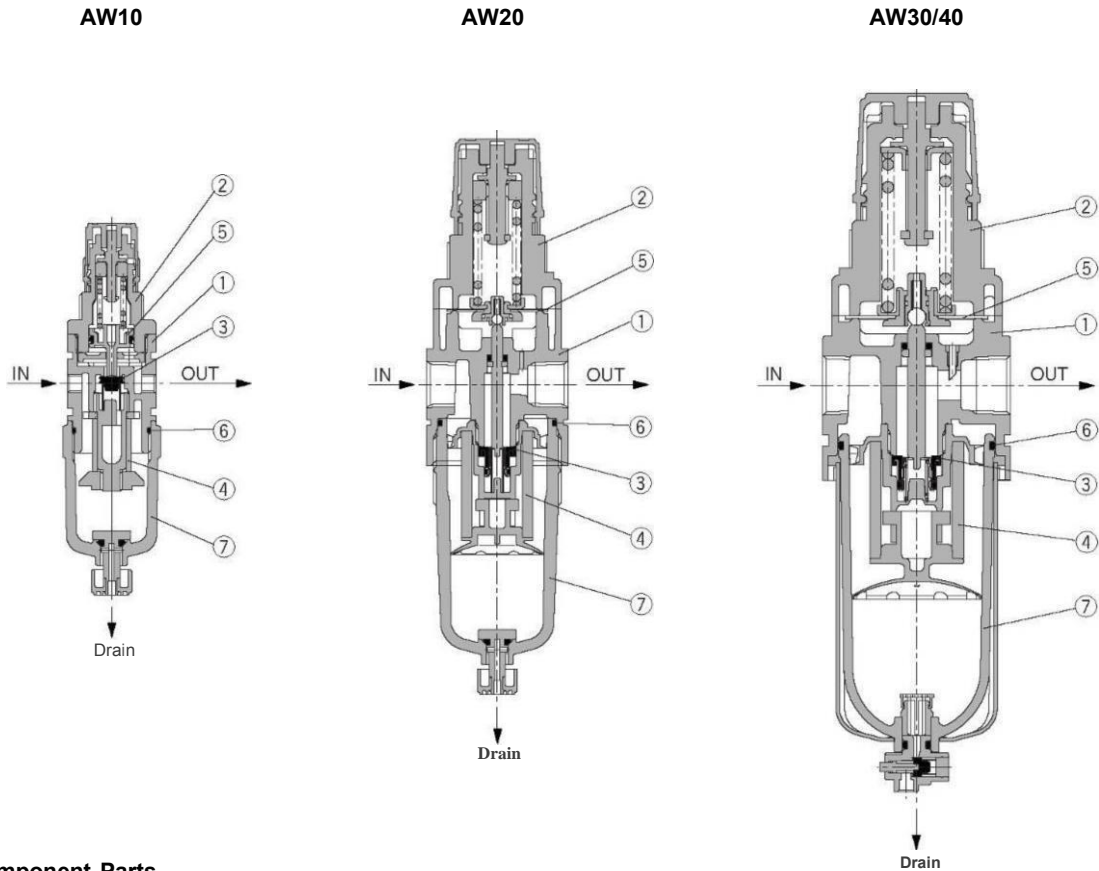


Orange mark

- A knob cover is available to prevent careless operation of the knob. Refer to page 14-2-6 for details.

Construction

JIS Symbol



Component Parts

No.	Description	Material			Note
		AW10/20	AW30	AW40/40-06	
Ⓞ	Body	Zinc die-casted	Aluminum die-casted		Platinum silver
∅	Bennet		Polycetal		Black

Replacement Parts

No.	Description	Material	Part no.				
			AW10	AW20	AW30	AW40	AW40-06
Ⓚ	Valve assembly	Stainless steel Brass, HNBR	AR10P-090S	AW20P-360AS ⁽⁴⁾	AW30P-360AS ⁽⁴⁾	AW40P-360AS ⁽⁴⁾	AW40P-380AS ⁽⁴⁾
Ⓞ	Filter element	Non-woven fabric	AF10P-060S	AF20P-060S	AF30P-060S	AF40P-060S	AF40P-060S
Ⓢ	Diaphragm assembly	Weatherability NBR	AR10P-150AS ⁽¹⁾	AR20P-150AS	AR30P-150AS	AR40P-150AS	AR40P-150AS
Ⓡ	Bowl O-ring	NBR	C1SFP-260S	C2SFP-260S	C3SFP-260S	C4SFP-260S	C4SFP-260S
∅	Bowl assembly ⁽²⁾	PC	C1SF	C2SF	C3SF ⁽³⁾	C4SF ⁽³⁾	C4SF ⁽³⁾

Note 1) AW10 is a piston and a gasket (KSY-P-13) type assembly.

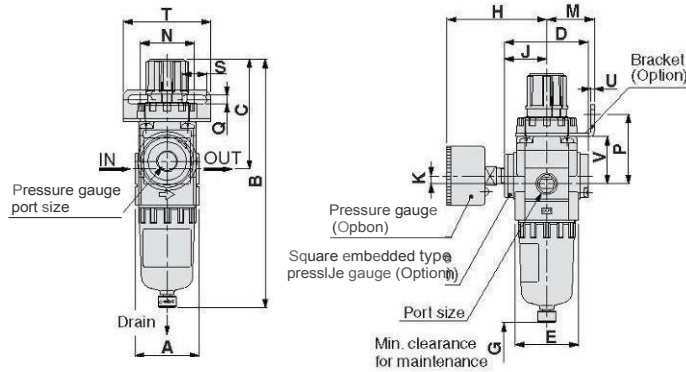
Note 2) Including O-ring. Please contact SMC regarding the bowl assembly supply for PSI and °F un specifications.

Note 3) Bowl assembly includes a bowl guard (steel band material).

Note 4) Assembly includes valve assembly valve spring and stem assembly.

Dimensions

AW10/20

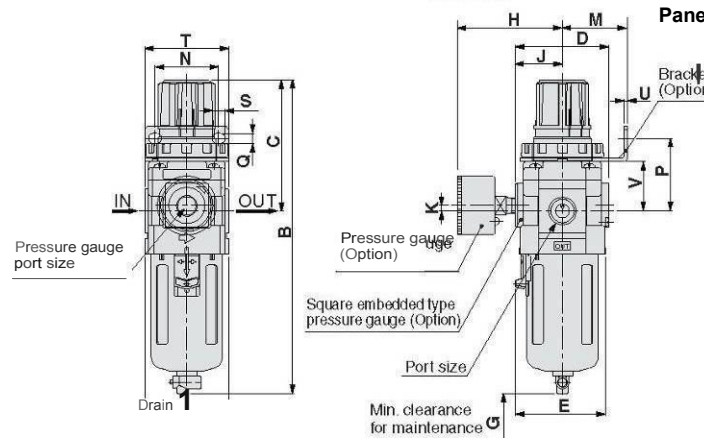


Panel fitting dimension
y

III..Q..U..T

Plate thickness
AW10, AW20: Max. 3.5

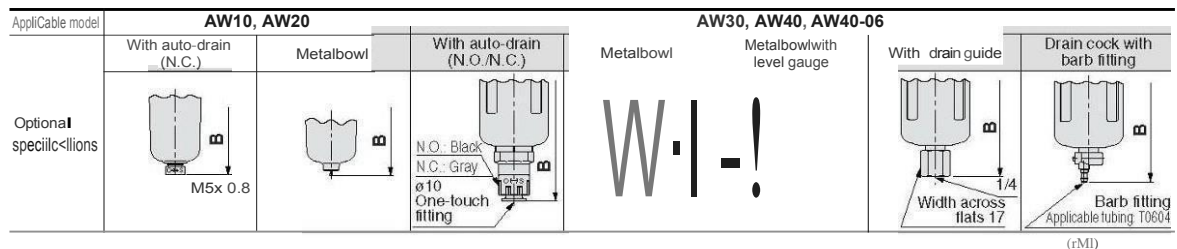
AW30/40



Panel fitting dimension
y

III..Q..U..T

Plate thickness
AW30: Max. 3.5
AW40: Max. 5.0



Model	Port size	Standard specifications																Accessory specifications									
																With pressure gauge		Bracket mounting size						Panel mount			With auto-drain
		A	B	C	D	E	G	H	J	K	M	N	p	Q	S	T	U	V	W	y	Z	B					
AW10	M5 x 0.8	25	108	48	25	28	25	26	—	0	25	28	30	4.5	6.5	40	2	18	18.5	—	—	125					
AW20	1/8, 1/4	40	160	73	52	40	40	63	27	5	30	34	44	5.4	15.4	55	2.3	30	28.5	14	6	177					
AW30	1/4, 3/8	53	201	86	59	57	55	66	30.5	3.5	41	40	46	6.5	8	53	2.3	31	38.5	19	7	242					
AW40	1/4, 3/8, 1/2	70	239	92	75	73	80	76	38.5	1.5	50	54	54	8.5	10.5	70	2.3	35.5	42.5	21	7	278					
AW40-06	3/4	75	242	93	75	73	80	76	38.5	1.2	50	54	56	8.5	10.5	70	2.3	37	42.5	21	7	281					

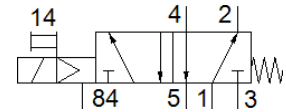
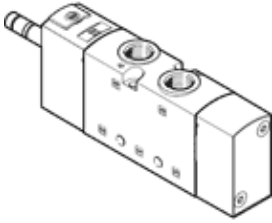
Model	Optional specifications			
	With barb fitting	With drain glide	Metal bowl	Metal bowl With level gauge
	B	B	B	B
AW10	—	—	107	—
AW20	—	—	160	—
AW30	209	208	214	234
AW40	247	246	252	272
AW40-06	250	249	255	275

SOLENOID VALVE SPECIFICATIONS

Solenoid valve

VUVS-L20-M52-MD-G18-F7

Part number: 575250



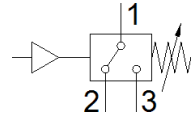
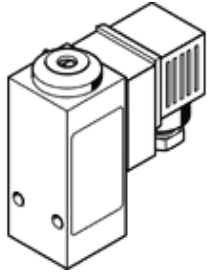
Feature	Value
Valve function	5/2 monostable
Type of actuation	electrical
Valve size	21 mm
Standard nominal flow rate	700 l/min
Operating pressure	2,5 ... 10 bar
Design structure	Piston slide
Type of reset	mechanical spring
Authorisation	c UL us - Recognized (OL)
Nominal size	5,7 mm
Exhaust-air function	throttleable
Sealing principle	soft
Assembly position	Any
Manual override	detenting Pushing
Type of piloting	Piloted
Pilot air supply	Internal
Flow direction	non reversible
Freedom from overlap	Yes
b value	0,35
C value	2,9 l/sbar
Switching time off	44 ms

Switching time on	12 ms
Max. positive test pulse with logic 0	1.900 μ s
Max. negative test pulse with logic 1	2.700 μ s
Operating medium	Compressed air in accordance with ISO8573-1:2010 [7:4:4]
Note on operating and pilot medium	Lubricated operation possible (subsequently required for further operation)
Vibration resistance	Transport application test at severity level 2 in accordance with FN 942017-4 and EN 60068-2-6
Shock resistance	Shock test with severity level 2 in accordance with FN 942017-5 and EN 60068-2-27
Corrosion resistance classification CRC	2 - Moderate corrosion stress
Medium temperature	-10 ... 60 °C
Pilot medium	Compressed air in accordance with ISO8573-1:2010 [7:4:4]
Ambient temperature	-10 ... 60 °C
Product weight	183 g
Mounting type	Optional on manifold rail with through hole
Scavenging orifice connection	Non-ducted
Pilot exhaust port 84	M5
Pneumatic connection, port 1	G1/8
Pneumatic connection, port 2	G1/8
Pneumatic connection, port 3	G1/8
Pneumatic connection, port 4	G1/8
Pneumatic connection, port 5	G1/8

Pressure switch

PEV-1/4-B

Part number: 10773



Feature	Value
Conforms to standard	EN 60947-5-1
Authorisation	CCC
CE mark (see declaration of conformity)	to EU directive low-voltage devices
Materials note	Conforms to RoHS
Measured variable	Relative pressure
Measurement method	Pneu./elect. pressure transducer
Operating pressure	1 ... 12 bar
Operating medium	Compressed air in accordance with ISO8573-1:2010 [7:-:-] Water
Note on operating and pilot medium	Lubricated operation possible (subsequently required for further operation)
Medium temperature	-20 ... 80 °C
Ambient temperature	-20 ... 80 °C
Switching element function	Changeover switch
Max. switching frequency	3 Hz
Max. switching output voltage AC	250 V
Max. switching output voltage DC	125 V
Max. output current	5.000 mA

Minimum load current	1 mA at 24 V 10 mA at 10 V 100 mA at 5V
Utilisation category for inductive load	AC-14 DC-13
Utilisation category for ohmic load	AC-12 DC-12
Electrical connection	Plug Cubic design to DIN 43650 Design A
Mounting type	with through hole
Assembly position	Any
Pneumatic connection	G1/4
Product weight	194 g
Materials information, housing	Aluminium die cast
Material information, switch contact	silver
Threshold setting range	1 ... 12 bar
Protection class	IP65
Corrosion resistance classification CRC	2 - Moderate corrosion stress

INSTRUCTIONS FOR ANY EVENT THAT CAUSES THE DEFENDER[®] FILTER TO SHUT DOWN (other than hitting the CYCLE STOP button)

1. Check that there is electrical power to the compressor and that it is functional.
2. Check that the pressure regulator on the Defender[®] Filter is reading 90 PSI.
3. Check that there is electrical power to the RMF panel (the white indicator light for SYSTEM POWER is ON). If not, you may want to check that the (2) circuit breakers (CB1 & CB2) inside the panel are ON.
- 4.) Check that all of the switches on the RMF panel are in the correct position (just in case somebody came in and moved things when the power loss occurred). Bump Selector Switch on either MANUAL or AUTO position (not BUMP SET), Vacuum Transfer switch is OFF, the “keyed” Maintenance Mode switch is in the OFF position, and the PRECOAT timer (inside RMF panel) is set to 10 minutes.
- 5.) Check that the pneumatic actuated valves (EFFLUENT, & PRECOAT) are in the CLOSED position (the system is designed to close all valves when the pump is shut off, which would occur when you lose power). There is a yellow indicator, on the black disc located top of the actuators that represents the position of the disc in the valve. If any of the valves are NOT in the closed position, you need to check out why they are not (is valve physically stuck in the open position, is there compressed air getting out to the valve to close it, are there any loose wires on the underside of the terminal strip for the solenoid valves that send air to the actuators are wired in, etc.)
- 6.) Once all valves are determined to be in the CLOSED position, then you want to press the CYCLE STOP button and then press the CYCLE START button. NOTE: If you want to double check that everything is okay BEFORE you actually start the filter system, then turn OFF the power to the pump and put a jumper wire between terminal #4- & 11A on the terminal strip inside the RMF panel. This will “simulate” that the pump is running (this is the run confirm circuit) so the programmer will operate and go through its cycle. Now when you press the CYCLE START button the actuators will open and close as they should, but no water will be going through the filter because the pump is not running. Remember to remove the jumper wire and put power back on to the pump after doing this.
- 7.) The filter system should now start in the REGENERATION mode and then go to FILTER mode.

DEFENDER TROUBLESHOOTING TIPS

COMPONENT	PROBLEM	CORRECTOIN
VACUUM TRANSFER UNIT	<ol style="list-style-type: none"> 1. No vacuum at the vacuum hose. 2. Motor does not turn on. 3. Breaker CB1 trips when Vacuum Transfer switch is turned on. 4. Bump solenoid trips and bump activates. 	<ol style="list-style-type: none"> 1a. Confirm drain valve and vacuum transfer valve is closed. 1b. Remove pneumatic actuators from system valves to confirm they are closed. 2a. Confirm unit is plugged in to the receptacle. 2b. Confirm switch on vacuum is in the "on" position. 2c. Confirm bump selector switch is in "Bump Set" position. 2d. Confirm wiring connections. 3. 120V power to RMF wired incorrectly. Hot Leg must be on L1. 4. Voltage drop with vacuum transfer start up. Increase wire gauge for 120V incoming power.
RMF PROGRAMMER/ DEFENDER SMARTSCREEN	<ol style="list-style-type: none"> 1. Starts precoat mode, then stops to only "system power" on light. 2. Starts to precoat then goes into filter prematurely. 3. Pneumatic valves not cycling correctly. 4. RMF does not operate system. Power light not on. 	<ol style="list-style-type: none"> 1a. Pump run confirm not wired to terminals 4- & 11 or 11A if your programmer has a low pressure cut off switch – wire or add temporary jumper for testing. 1b. Confirm 90 PSI of air pressure at the regulator mounted on the Defender®. 1c. Confirm pressure switch is set to 50 PSI. 2. Precoat timer set incorrectly. Confirm mode "A" scale "0-30" range "min" set to 10 minutes. 3. Confirm tubing connections from solenoid valves are routed to correct valve actuator on the bottom of each solenoid. There is a label indicating which valve it operates "influent, regen/precoat, effluent". Hit cycle stop on RMF. Each solenoid on the bottom has a manual button (blue) to activate. Use a pencil or such to push in button. Hold in position and confirm labeled valve opens. If not, swap tubing connections at programmer to correct valves. 4a. Confirm circuit breakers in RMF are on (up position). 4b. Check incoming I2OV power.

	<p>5. Programmer cycling from precoat, filter, then precoat for duration of precoat timer.</p> <p>6. Motors do not turn on after bumping or pressing cycle start.</p> <p>7. "Cycle Start" button not working.</p>	<p>5. Precoat timer in mode "C", change to mode "A".</p> <p>6a. Check interface wiring RMF terminals 4-, 11, 11a & 39, 40.</p> <p>6b. Check programming of motor starter. Reprogram if necessary.</p> <p>7a. Press "Cycle Stop" button to reset. Then press "Cycle Start".</p> <p>7b. Confirm "Bump Set" button is in manual or auto position.</p>
<p>PNEUMATIC ACTUATORS</p>	<p>1. Valve actuators not cycling correctly</p> <p>2. Valve actuators not operating</p> <p>3. Valve actuators moving too quickly</p> <p>4. Valve disc sticking in closed position momentarily</p>	<p>1. See RMF programmer item No. 3</p> <p>2a. Check air pressure. Confirm filter/regulator is set to 90 PSI.</p> <p>2b. Check air line tubing is attached correctly. Check for leaks in air lines.</p> <p>2c. If air line leaks at connections, remove tubing and re-cut square and reinsert.</p> <p>2d. Confirm flow control valves on actuators are open at least 1.5 turns. Open more if valve does not move.</p> <p>3. Shut off air. Disconnect the air line from the actuator and connect the line from the right side port into the single port on the air switch (included with the tool kit). Connect 1/4" O.D. tubing into the dual ports of the air switch and connect to actuator ports. Moving the switch back and forth will operate the actuator. Adjust the flow control valves as necessary to regulate the valve speed for smooth open/closing.</p> <p>4a. Try adjusting flow control valves as described in 3 above.</p> <p>4b. Adjust the limits stops for closing to "angle seat the disc". Angle seating is defined as the closed position in which the disc does not leak, but less than 100% closed. See directions for limit stop adjustment using the tool kit provided.</p> <p>4c. Be sure pressure regulator is set to 90 PSI.</p>

FILTER TANK	1. Tank draining slowly	1a. With system filtering, open drain valve to send pressurized water to the drain line. 1b. Open vacuum drain valve
BUMP MECHANISM	1. Not bumping. Stuck in up position	1a. Confirm quick exhaust valve installed correctly. 1b. Open tank drain valve to relieve pressure. Move bump selector switch to "bump set". Press bump button 5-10 times. System should bump correctly to the next cycle.