

INSTRUCTIONS FOR USE – SCT-0817 – Adjustable Bench Air Supply

SCOPE:

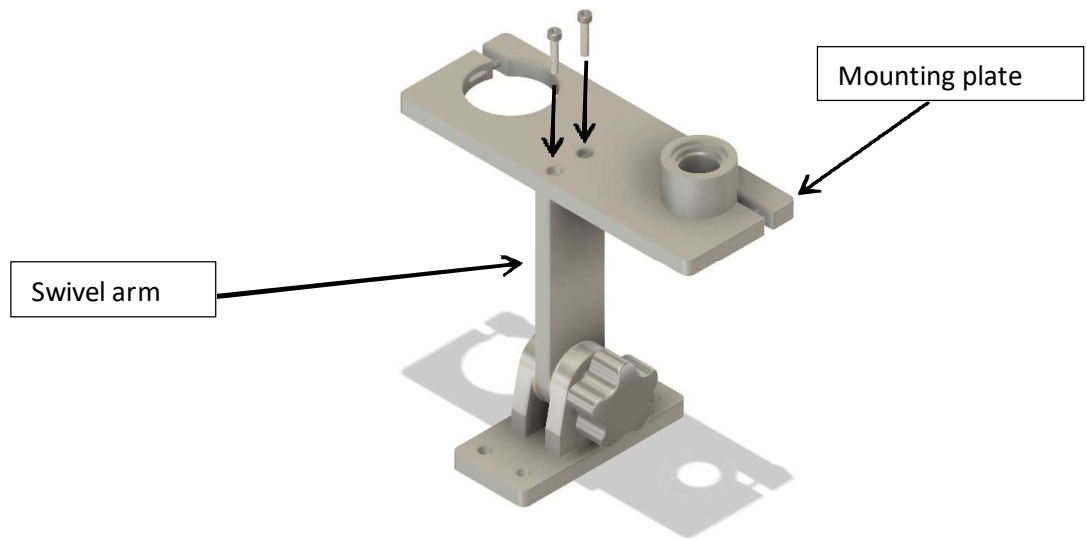
This piece of equipment is great addition for professional scuba repair center as it allows the technician to adjust the output pressure of the bench air supply (the supply pressure to the first stage regulator) to suit his or her needs during testing and set up of a regulator. This function simulates various stages of supply air pressure (cylinder pressures) as would be encountered during a dive.

FEATURES:

- Pressure Reducer: Aqua Environment 0-6000 PSI inlet and out pressure, self-venting with inlet fitting 1/4" NPT (on the left hand side of the pressure reducer).
- Fitted with 2x 0-6000 PSI pressure gauges (reading in both bar and PSI).
- Valve: Thermo, rated 230 bar with removable DIN insert to be compatible with both DIN and yoke first stages.
- Can be connected to an air bank or a scuba tank with maximum input pressure of 6000 PSI.
- The components are connected on a plate installed on a swivel arm allowing for the option of wall-mount or bench-mount.
- The swivel arm comes with a knob (for flexible piping). However, if rigid piping is required, it can be replaced by a nut (included) for fixation.
- A fitting 1/4" NPT male to 6 mm pipe is included.
- Panel and swivel arm is made from aluminum with tumbled finish.
- The mounting plate is designed to accept M8 hardware.

INSTRUCTIONS FOR USE:

The unit delivered comes in 2 sub-assemblies: the swivel arm and the mounting plate containing the pressure reducer and cylinder valve. Connect the swivel arm to the mounting plate using the 2 x M5 socket cap screws provided. Do not over tighten the screws.

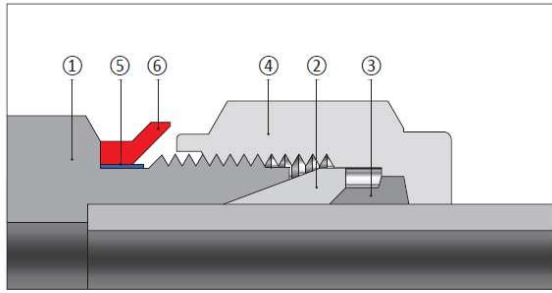


The inlet port of the pressure reducer is located on the left hand side. The female connection on the pressure reducer is $\frac{1}{4}$ " NPT. Any fittings screwed into the pressure reducer have to be of the $\frac{1}{4}$ " male NPT type.

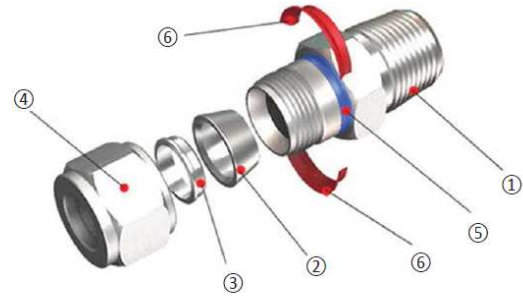


A high pressure air supply of up to 6000 PSI has to be connected to the inlet port. This can either be achieved by connecting an air bank or a diving cylinder with appropriate piping. The connection can be made by rigid or flexible piping. Ensure the pressure rating is a match for the supply pressure to the regulator.

Included in the package is a $\frac{1}{4}$ " male NPT connector suitable for 6mm high pressure piping. To install this fitting, follow the instructions below:



① Body
④ Nut
② Front Ferrule
⑤ Identification Bend*

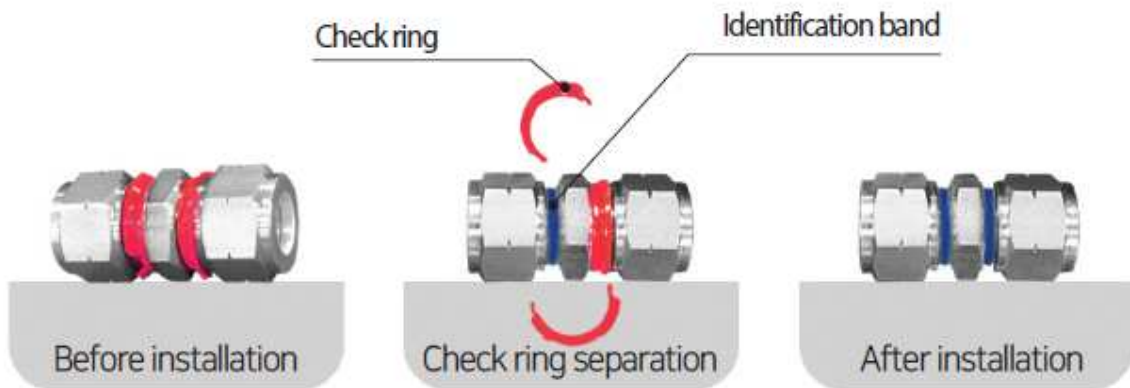
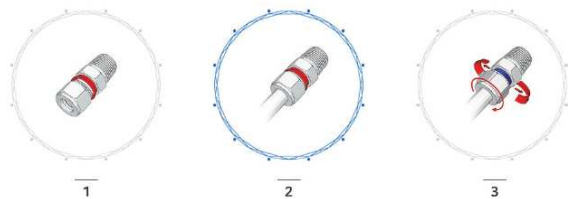


③ Back Ferrule
⑥ Check Ring**

* Identification band: Blue for fractional (inch), Green for metric (mm)

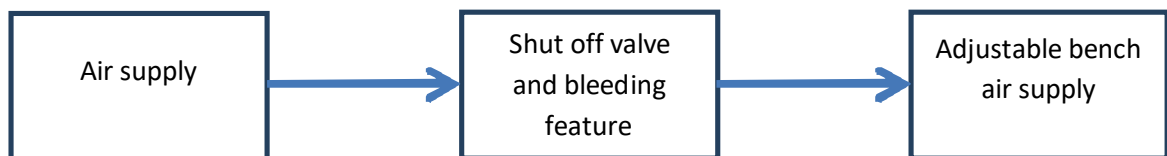
** Check Ring: Red for fractional (inch), Yellow for metric (mm)

- (1) Prepare for i-Fitting® consisting of body, nut, front/back ferrule, and check ring.
- (2) Fully insert the tube into i-Fitting® and against the shoulder; rotate the nut finger-tight until the tube will not turn by hand.
- (3) While holding the fitting body steady, tighten the nut until the check ring separates from the body. This separation of the check ring indicates the completion of installation.



If rigid piping is used, we recommend removing the plastic knob and install the M8 nyloc nut so the unit is securely installed without putting any stress onto the pipework.

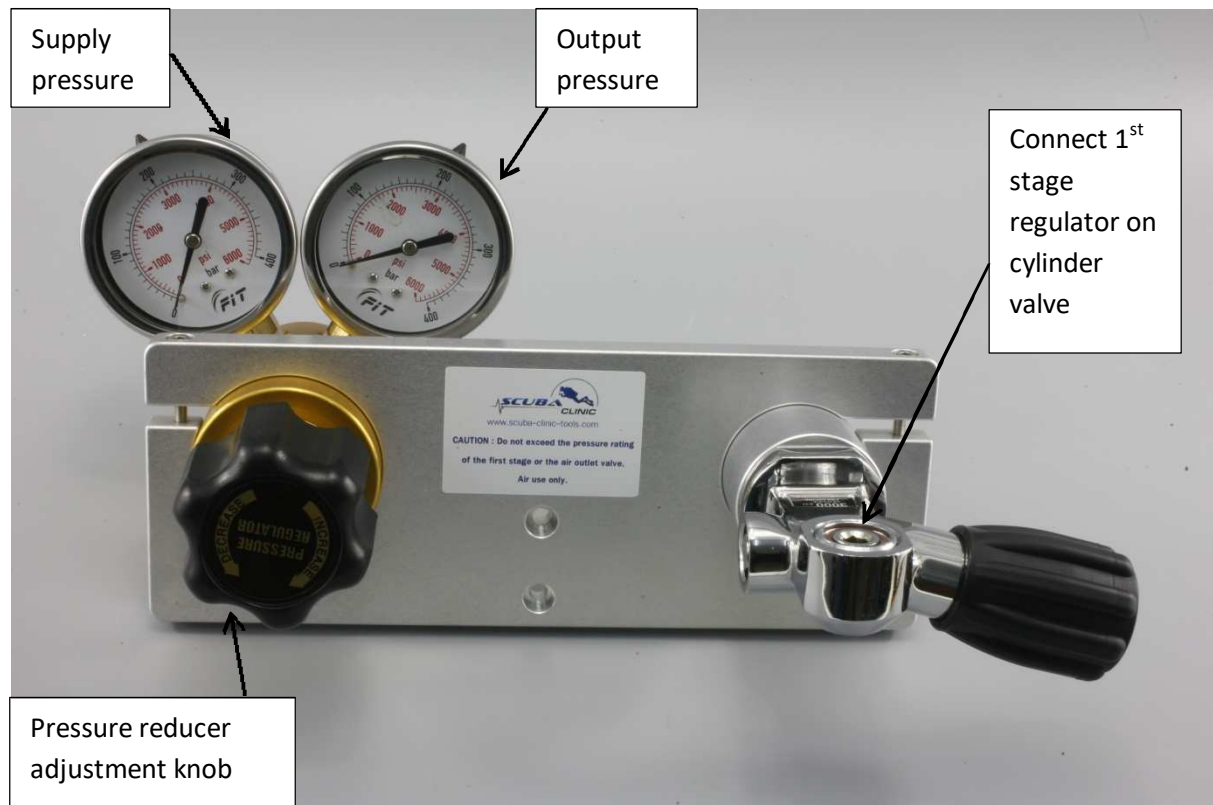
It is considered good engineering practice to install a supply pressure shut-off valve and bleeding feature in the supply pressure line prior to connecting the airline to the pressure reducer.



The outlet pressure of the pressure reducer can be increased by turning the knob clockwise or decreased by turning the knob anti-clockwise. The unit is self-venting, meaning that if the pressure is reduced an audible rush of air will be heard as the pressure diminishes.

The supply pressure is displayed on the left hand pressure gauge and the output pressure is displayed on the right hand pressure gauge.

To connect a DIN first stage regulator the insert has to be removed from the cylinder valve using an appropriate hex key.



SAFETY WARNINGS:

If the following safety warnings are not observed, serious injury or death could occur.

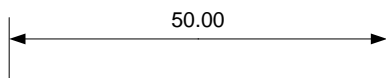
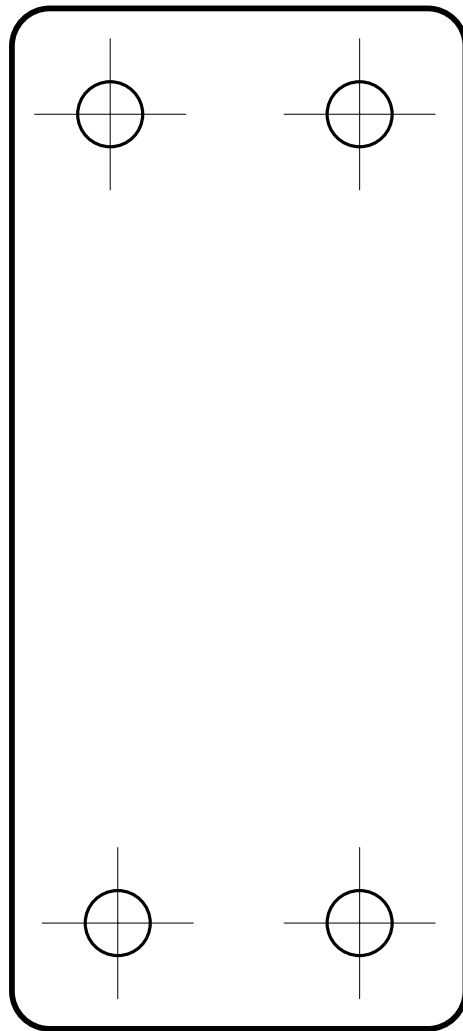
- Customer installed piping has to be matched to the appropriate supply pressure and components are to be installed in line with local regulations.
- Never exceed the pressure rating of the installed cylinder valve.
- Never exceed the pressure rating of the first stage regulator under test. If in doubt, please contact the regulator manufacturer.
- The components of this assembly are suitable for AIR use only, they are not suitable for Nitrox or Oxygen use.



The base of the swivel arm accepts M8 bolts. We recommend drilling holes with a diameter of 8.5mm to allow for some clearance.

Use the diagram / drill template to transfer the hole centers onto the surface where the valve stand is to be mounted.

Ensure the drawing is printed without scaling, you can use the 50mm test marking to verify the scaling.



OPERATION AND MAINTENANCE MODEL 415 REGULATORS

980122 01019;030418D;090519;
090805PS; 091112PS

GENERAL

The model 415 is a piston type, hand load regulator available in outlet pressure ranges of 6000, 5000, 1500, and 400 PSI. It uses an unbalanced poppet design for ruggedness and simplicity. There is a small variation of control pressure with changing inlet pressure as noted in the specifications. A 30 micron filter in the poppet cartridge helps prevent damage by contaminants.

SPECIFICATIONS

Max inlet pressure	6000 PSI
Outlet pressure	50 to 6000 PSI
Body ports	1/4" NPT - inlet and outlet opposite each other plus inlet and outlet gauge ports at 60 degree spacing
Flow coefficient (Cv)	.06 (equals .07" orifice)
Materials	anodized aluminum body, brass and stainless interiors viton & KEL-F seals
Outlet pressure variation with inlet pressure (outlet rise/ inlet drop in PSI)	70/1000 for -5000&6000 22/1000 for -1500 6 /1000 for -400
Model 415B series	brass wetted surfaces see note 7

ASSEMBLY PROCEDURE

1. Refer to drawing 415 cross section and assemble in clean dry area.
2. Blow all parts clean.
3. Inspect sealing area of vent seat item 3 with 10X magnification and remove any particles.
4. Install O ring 13 on piston 4.
5. Completely pack area between piston housing 5 and piston 4 with Cristo lub MCG 121 or 111 or equivalent. Sufficient grease should be used so it takes pressure to extrude grease out as piston is inserted into housing. Wipe off excess.
6. Install O ring 14 with Cristolub 121 or 111 grease and install seat item 3.
7. Apply Slick 50 or equivalent EP grease to bearings 10 and 11, screw 8 and threads in housing 7.
8. Install spring guide 6, bearings 10 and 11, and spring 12 as shown.
9. Install preassembled poppet cartridge item 2, preassembled piston housing and O ring 15 as shown. Lubricate O rings and threads with Cristolub 121 or 111 grease or equivalent.
10. Holding cap downward, assemble cap and body. Torque to 20 to 30 ft lbs.
11. Install adjusting screw and knob with Slick 50 grease on threads.

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3100 Kerner Blvd., Ste N, San Rafael, CA 94901 (415) 453 8157

INSTALLATION

Use a suitable pipe thread sealant such as Teflon tape on inlet and outlet threads. Avoid over torquing pipe thread. Normal torque applied with a 6 or 8 inch long wrench is ample. Use ample Teflon tape - 3 or 4 turns, not 1 or 2 turns. The inlet is on the left when facing the adjusting knob with the two gage ports upward. An optional panel mounting ring is available (part no. 657). The ring clamps to the cap portion of the regulator at any desired location and orientation. The ring has two threaded holes parallel to the regulator spaced 2.8" apart. The regulator is NOT shipped oxygen clean and should NOT be used for oxygen service as provided. Consult the factory for details on oxygen service. **AS WITH ANY REGULATOR, A RELIEF VALVE SET SLIGHTLY ABOVE THE MAXIMUM DESIRED CONTROL PRESSURE SHOULD BE INSTALLED ON THE OUTLET SIDE.**

MAINTENANCE & REPAIR

CAUTION -As with any regulator or valve, particulates or moisture can plug or freeze the internal filter or valve seat. This can occur when up-stream dryers are not changed or remain unused for long periods allowing corrosion materials to accumulate. In critical applications where it is important not to lose flow, a larger particulate filter should be used upstream. Also an orifice such as the Aqua model 796 should be used downstream. This reduces the tendency to freeze when moisture is present. Consult factory for details. The user should establish time intervals for changing the valve cartridge, filter and upstream dryers based on experience and service conditions. No representation is made herein concerning such time intervals as each use is unique. Back-up systems should be used in very critical applications since field maintenance is hard to insure. The poppet cartridge 832 is a factory assembled item and should be replaced if required and not disassembled unless absolutely necessary. Spare cartridges are available at a nominal cost and should be kept on hand if rapid repairs are required. **IN ALL CASES THE UNIT CAN BE RETURNED TO THE FACTORY OR DEALER FOR REPAIR UNDER WARRANTY IF APPLICABLE OR AT A NOMINAL CHARGE.** Maintenance or repairs should only be done by qualified personnel in a clean environment by following the drawings herein.

ASSEMBLY AND DISASSEMBLY

Assembly and disassembly can be done using the following drawings and parts list.

PARTS LIST - 415 REGULATOR

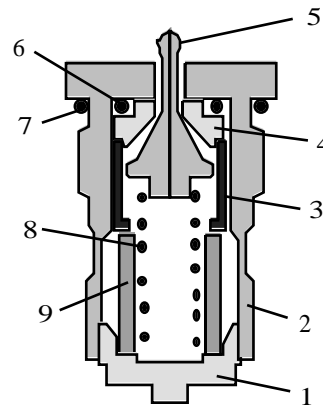
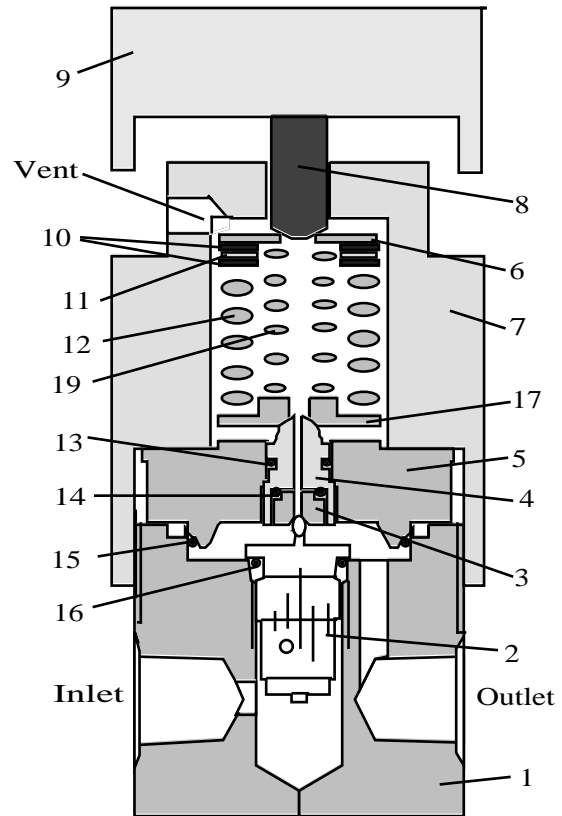
ITEM	QTY	PART NO.	DESCRIPTION
1	1	407	body
2	1	832	poppet cartridge
3	1	726-1	vent seat
		1062-1	non-venting seat (optional)
4	1	848	piston for - 5000 & 6000 PSI outlet
	1	947	piston for - 1500 PSI
	1	744	piston for - 400 PSI
5	1	833	piston housing for - 5000 & 6000 PSI outlet version
	1	745	piston housing for - 1500
	1	746	piston housing for - 400 see note 1
6	1	410	spring guide - see note 2
7	1	474	cap
8	1	378-2	adjusting screw
9	1	379-30	knob
10	2	379-37	bearing plate
11	1	379-38	thrust bearing
12	1	379-5	spring
13	1	2-010 -90V	seal for -5000 PSI model
	1	2-015 - 90V	seal for -1500 PSI
	1	2-122 - 75V	seal for - 400 PSI
14	1	2-010 - 90V	seal
15	1	2-028 - 90V	seal for -400 and -1500 only
	1	2-026 - 90V	seal for -5000 (do not use 2-028)
16	1	2-013 - 90V	seal ref.
17	1	849	spring guide, lower
18			not used
19	1	753-19	spring - used only for 6000 PSI outlet version

PARTS LIST - 832 POPPET CARTRIDGE

ITEM	QTY	PART NO.	DESCRIPTION
1	1	808	retainer nut
2	1	8016	poppet housing
3	1	809	sleeve
4	1	807	seat
5	1	741	poppet
6	1	2-009 - 90V	seal
7	1	2-013 - 90V	seal
8	1	832-8	spring
9	1	832-9	filter

NOTES

1. Mount piston housing 746 with smoother side downward against seal.
2. mount spring guide 410 with bevel side toward adjusting screw.
3. On 415-400 model mount piston hsg 746 with smooth side toward O ring.
4. Part number 839 -xxxx repair kit includes; 1 ea. 832 cartridge, 1 ea. 2-010 O ring, 1 ea. 2-028 O ring, 1 ea. 726 vent seat, 1 ea. piston and piston O ring. For the -5000 piston hsg 833 is included.
5. Model 415-XXXXNA (non adjustable) - delete items 8 & 9 and replace with 3/8-24 x 1/4" lg. hex head plated bolt and jam nut.
6. Non-vented is 415-XXXXNV and uses p/n1062 as item 3
7. brass version 415B-xxxx items 1,4,& 5 are brass



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REPAIR KIT FOR 415 REGULATOR

For all models

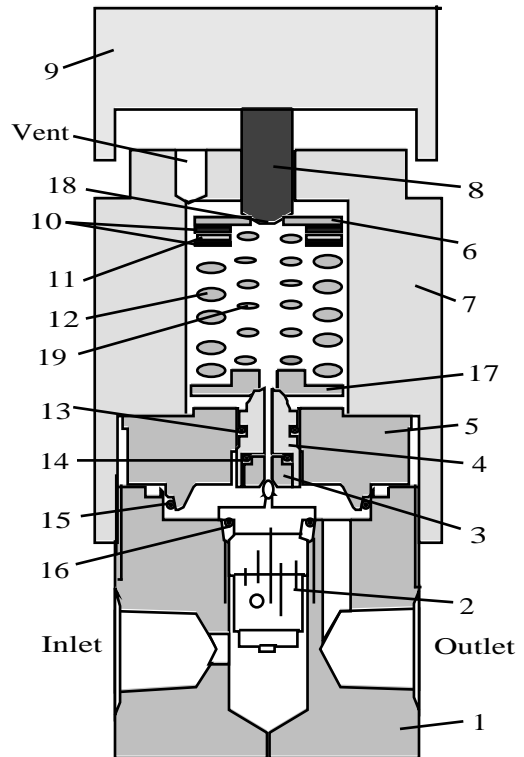
1. Back off adjusting screw and remove cap from body using strap wrench.
2. Remove old poppet cartridge item 2 and install new one. Torque to 40 to 60 inch pounds. Use Dow 111 grease or special purpose lub on seals and threads.

For -400 and 1500 only

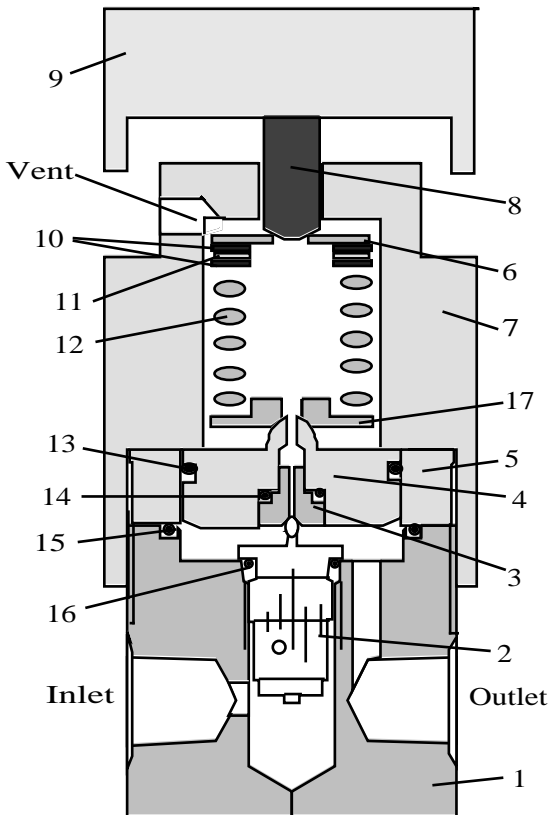
3. Install 2-028 body O ring and piston O ring item 13 as shown.

For - 5000 only

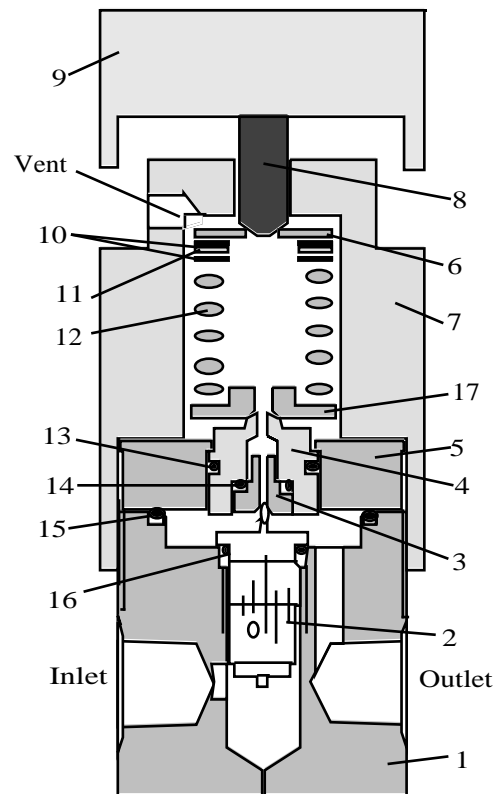
3. Install 2-026 O ring in body recess as shown. Replace piston item 4 and piston housing item 5 with new preassembled, prelubricated unit. **Do not use larger 2-028 O ring.**



415-5000/415-6000



415-400



415-1500

REGULATOR FLOW CHARTS

The regulator flow charts below give the maximum regulator flow rates for the Aqua Environment Inc. 415 and 873 series regulators. These flows result in a 10% pressure drop below the zero or low flow setting. If more accurate regulation of outlet pressure is required (2 to 3% pressure drop) use one half the maximum flow values given below.

Examples of how to use the charts are given by the dashed lines on the 415 series flow chart.

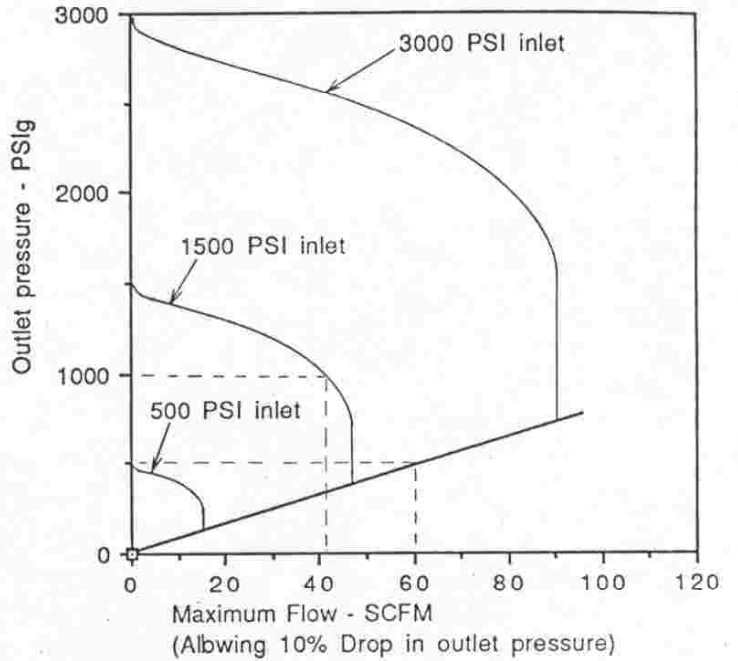
Example 1 - 1000 PSI outlet pressure
1500 PSI inlet pressure
from the chart maximum flow is 41 SCFM
Here flow is limited by the inlet pressure.

Example 2 - 500 PSI outlet pressure
2000 PSI or more inlet pressure
from the chart maximum flow is 60 SCFM
Here there is ample inlet pressure and flow is limited by the outlet pressure.

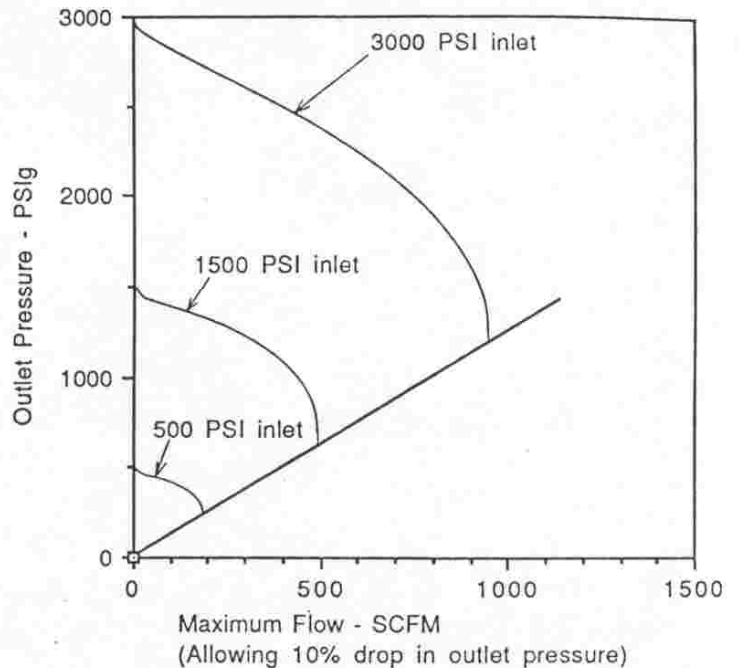
The charts are for air or any nitrogen/oxygen mix at or near room temperature. For helium multiply the flow rate by 2.7.

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MODEL 415 SERIES FLOW CHART



MODEL 873 SERIES FLOW CHART





6000 PSI REDUCING REGULATOR MODEL 415A

GENERAL INFORMATION

The model 415A is an economical, piston type, hand load regulator. It is available in three standard outlet pressure ranges of 0 to 400 PSI, 0 to 1500 PSI, and 0 to 5000 PSI. Other pressure ranges and a dome loading version are available on special order. Maximum inlet pressure for all ranges is 6000 PSI. The regulator seats are protected by a 20 micron filter. The regulator seat, poppet assembly and filter are contained in an easily replaced valve cartridge assembly pictured in the section drawing to the right. The low cost valve cartridge is factory preassembled. This cartridge assembly permits very easy and fast in-field servicing. All units are self venting. Unvented units can be provided on special order. An optional mounting bracket (part number 657) permits panel mounting in any orientation or extension from the panel surface. The unit is exceptionally rugged and insensitive to inlet contaminants. This, in addition to its low cost has resulted in its extensive use in field applications such as air and gas fill stations.

TECHNICAL SPECIFICATIONS

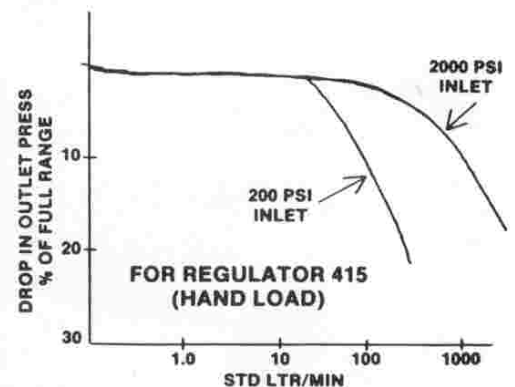
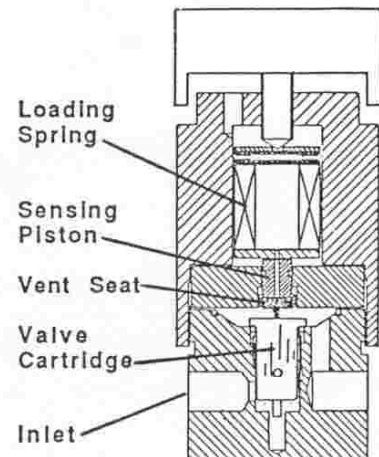
- Maximum inlet pressure ----- 6000 PSI (40 MPa)
- Outlet pressure
 - Model 415A- 400 --- 0 to 400 PSI
 - 415A- 1500 --- 0 to 1500 PSI
 - 415A- 5000 --- 0 to 5000 PSI
- Flow coefficient ----- $C_v = .03$ (.08" orifice size)
- Materials ----- body and cap - anodized aluminum
internals ----- brass, stainless steel
seals ----- Viton, KEL-F
- Size ----- 2.25" dia. x 5.5" high

TYPICAL APPLICATIONS

- Component testing
- Air tank fill stations
- Fire fighting air systems
- Instrumentation and calibration panels
- Process industry control
- Shipboard and off shore air and gas control
- Aircraft service equipment
- Electronic industry rare gas flow
- Vehicle CNG stations

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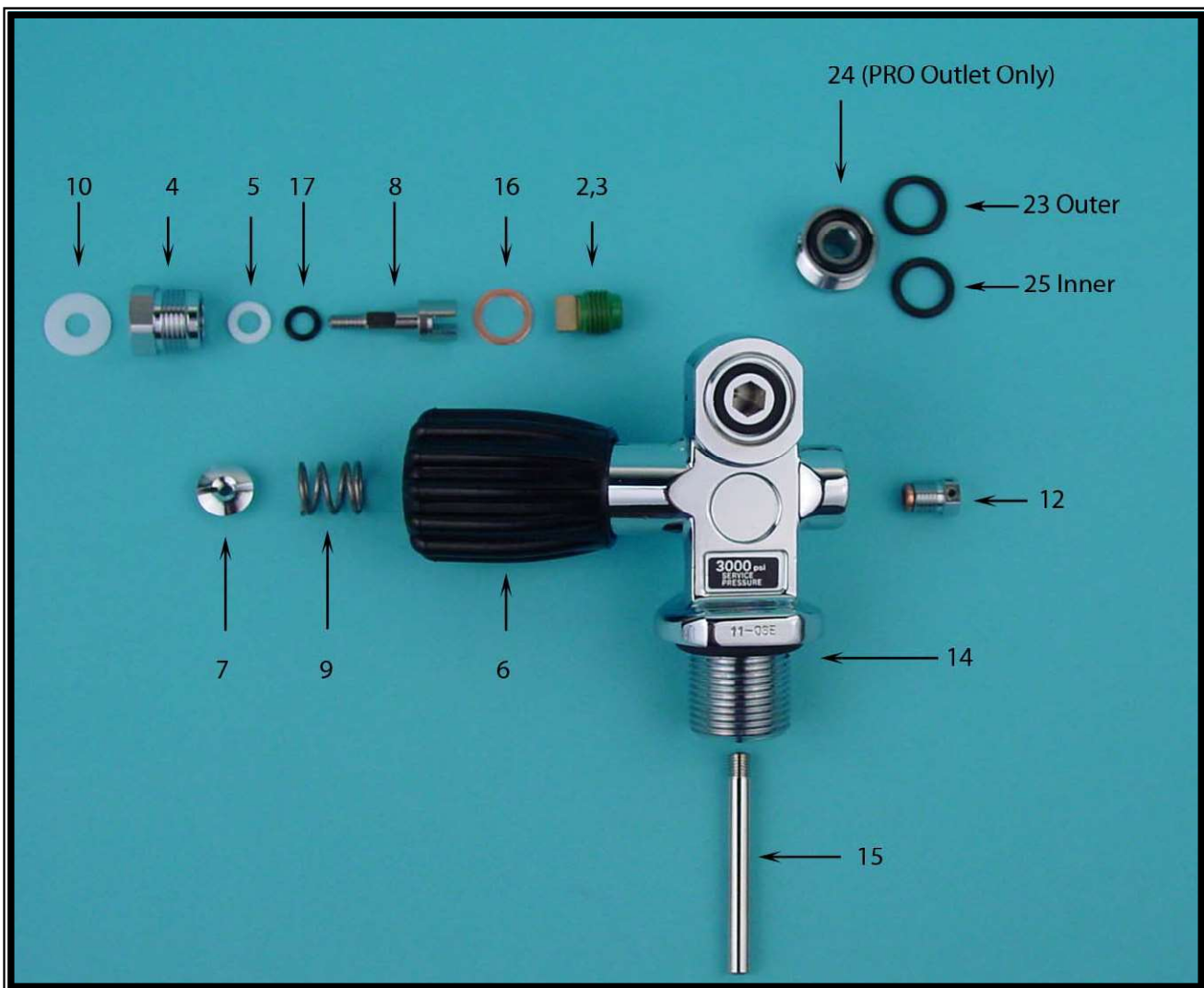
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EXPLODED VIEW

THERMO PRO, THERMO DIN



FOR 5651, 5654, 5262 & 5282 SERIES

See Parts Index for Part Numbers

**See additional warnings and instructions at end of catalogue!*



PARTS INDEX

2,3	5270-20N	PLUG & SEAT ASSEMBLY, KEL-F	EAN READY
	5240-20N	PLUG & SEAT ASSEMBLY, NYLON	EAN READY
4	5270-4PN	BONNET NUT, PLATED	EAN READY
5	5270-5N	PACKING	EAN READY
6	5240-6A	HANDWHEEL, EASY GRIP, BLACK	EAN READY/AIR
	5270-6AN	HANDWHEEL, EASY GRIP, GREEN	EAN READY
7	5203-7P	HANDWHEEL NUT	EAN READY
8	5270-8PN	STEM, PLATED	EAN READY
9	5240-9	SPRING	EAN READY
10	5240-10	HANDWHEEL WASHER	EAN READY
12	3990-3358N	SAFETY ASSEMBLY, 3358 PSI BURST PRESSURE	EAN READY
	3990-3692	SAFETY ASSEMBLY, 3692 PSI BURST PRESSURE	AIR
	3990-3750	SAFETY ASSEMBLY, 3750 PSI BURST PRESSURE	AIR
	3990-4000N	SAFETY ASSEMBLY, 4000 PSI BURST PRESSURE	EAN READY
	3990-4550N	SAFETY ASSEMBLY, 4550 PSI BURST PRESSURE	EAN READY
	3990-5000N	SAFETY ASSEMBLY, 5000 PSI BURST PRESSURE	EAN READY
	3990-5500N	SAFETY ASSEMBLY, 5500 PSI BURST PRESSURE	EAN READY
	3990-7250N	SAFETY ASSEMBLY, 7250 PSI BURST PRESSURE	AIR
14	5240-14	O-RING, INLET, 3/4-14 NPSM	AIR
	5240-14EP	O-RING, INLET, 3/4-14 NPSM, EPDM	EAN READY
	5280-14	O-RING, INLET, 7/8-14 UNF	AIR
	5280-14EP	O-RING, INLET, 7/8-14 UNF, EPDM	EAN READY



PARTS INDEX

15	5270-15N	TUBE, PLATED	EAN READY
16	5270-16N	BONNET GASKET	EAN READY
17	3100-9	O-RING, STEM	AIR
	3100-9EP	O-RING, STEM, EPDM	EAN READY
19	5240-12	O-RING, K OUTLET	AIR
23	5440-23	O-RING, DIN/K OUTLET ADAPTOR, OUTER	AIR
	5440-23EP	O-RING, DIN/K OUTLET ADAPTOR, OUTER, EPDM	EAN READY
	5240-12EP	O-RING, DIN/K OUTLET ADAPTOR, OUTER, EPDM (PRO EP SERIES)	EAN READY
24	5440-23 ADAPTOR	PRO DIN/K OUTLET ADAPTOR	AIR
	5440-23N	PRO DIN/K OUTLET ADAPTOR	EAN READY
	5444-EP ADAPTOR	PRO DIN/K OUTLET ADAPTOR (PRO EP SERIES)	EAN READY
25	5440-23	O-RING, DIN/K OUTLET ADAPTOR, INNER	AIR
	5440-23EP	O-RING, DIN/K OUTLET ADAPTOR, INNER	EAN READY
26	5440-21(LH)	LEFT HAND MODULAR VALVE SIDE PLUG	AIR
27	5440-21(RH)	RIGHT HAND MODULAR VALVE SIDE PLUG	AIR
28	5440-250	O-RING, SIDE PLUG	AIR
	5440-250EP	O-RING, SIDE PLUG	EAN READY



SPECIFICATIONS

TIGHTENING TORQUES

<u>Item</u>	<u>Newton Meters</u>	<u>Inch Lbs./Ft. Lbs.</u>
Bonnet Nut (Item 4)	50 +/- 3	35-40 Ft. Lbs.
Safety Assembly (Item 11)	10 +/- 1	80-100 Inch Lbs.
Side Connector Nut	5 +/- 0.5	40-50 Inch Lbs.
PRO Outlet Adaptor	5 +/- 0.5	40-50 Inch Lbs.
Side Plug (Item 26 or 27)	5 +/- 0.5	40-50 Inch Lbs.

STEM O-RING GREASE

Manufacturer: Lubrication Technology, Inc.

Brand Name: Christo-Lube

Article Number: MCG111