

DX_i INTEGRATED FIRST STAGE

TROUBLE SHOOTING		
SYMPTOM	POSSIBLE CAUSE	TREATMENT
* Restricted airflow and inhalation resistance through complete system.	<ol style="list-style-type: none"> 1. Cylinder valve not completely opened. 2. Cylinder valve requires service. 3. Cone filter(4,13) is contaminated. 	<ol style="list-style-type: none"> 1. Open valve completely. 2. Connect regulator to a different cylinder. 3. Replace with new and perform a complete service.
* Air leakage detected from beneath the adjustment cup, inside the end cap.	<ol style="list-style-type: none"> 1. End cap(32,37) is loose. 2. Diaphragm(30) is worn or damaged. 3. Seating surface inside body(28) is damaged. 	<ol style="list-style-type: none"> 1. Tighten end cap onto body, using prescribed torque value in reassembly procedure. 2. Replace with new. 3. Replace body with new.
* Air leakage detected from receiver.	<ol style="list-style-type: none"> 1. Transmitter o-ring(23, 24) is damaged or worn. 2. Seating surface inside the body(28) is damaged. 3. Seating surface on the transmitter(22) is damaged. 	<ol style="list-style-type: none"> 1. Replace with new. 2. Replace with new. 3. Replace with new.
* Insufficient intermediate pressure.	<ol style="list-style-type: none"> 1. End cap(32,37) is loose. 2. First stage improperly adjusted. 3. Ambient spring(33) is weakened or damaged. 4. Seating surface of body(28) beneath diaphragm is damaged. 	<ol style="list-style-type: none"> 1. Tighten end cap onto body, using prescribed torque value in reassembly procedure. 2. Readjust according to procedure specified in final adjustment procedure. 3. Replace with new. 4. Replace body with new.
* Excessive intermediate pressure/Intermediate pressure creeps.	<ol style="list-style-type: none"> 1. First stage improperly adjusted. 2. HP seat(27) is damaged or worn. 3. HP seat o-ring(25) is damaged or worn. 4. Seating surface of HP seat(27), or transmitter(22), or main body orifice cone, or body(28) is damaged. 5. Seat spring(26) is weakened or damaged. 	<ol style="list-style-type: none"> 1. Readjust according to final adjustment procedure. 2. Replace with new. 3. Replace with new. 4. Replace with new. 5. Replace with new.

DISASSEMBLY PROCEDURE

△ NOTE: Be sure to check and record the intermediate pressure and perform the Leak Detection Test outlined in the Initial Inspection Procedures prior to disassembling the regulator. Review the troubleshooting section to gain a better idea of which internal parts may be worn, and to better advise your customer of the service that is needed.

1. Before disassembling the first stage, remove the low pressure second stage hoses with a 9/16" open end wrench, the high pressure hose(s) with a 5/8" open end wrench, and the low pressure inflator hose with either a 9/16" or 1/2" open end wrench.
2. Remove and inspect the o-rings now visible on all these items for any signs of decay. Discard if found.

△ NOTE: It is important to remove the transmitter(22) end components first to avoid damage of the HP seat cone located inside the main body.

3. Secure the first stage in a soft-jawed or well padded vise and apply a 3/8" socket drive wrench with a DX Spanner(40.6536) to the Transmitter assembly(22). Turn the Transmitter assembly in a counter clockwise direction to remove it from the body (28). (Fig. 1)

! CAUTION: Tighten the vise only as needed to hold the first stage secure, and DO NOT overtighten. Doing so will result in permanent damage, rendering it inoperable.

4. Remove the HP seat(27) from the transmitter(22). Discard the HP seat, regardless of condition, and DO NOT attempt to reuse.
5. Remove the HP seat spring(26). Using a magnifier, closely examine the spring(26) for any signs of corrosion, cracks, or other damage. Discard if found and DO NOT attempt to reuse.
6. Using care not to scratch or damage the transmitter assembly, remove the HP seat o-ring(25) from inside the transmitter assembly(22). Discard, regardless of condition, and DO NOT attempt to reuse. (Fig. 2)
7. Remove and inspect the transmitter o-rings(23, 24) for any signs of decay. Discard if found.
8. With the use of a penlight and a magnifier, closely examine the seating surface of the orifice cone inside the main body for any signs of damage. If found, discard the main body and DO NOT attempt to repair or reuse. (Fig. 3)

△ NOTE: Perform step 9 only if an Environmental Protection Kit has been installed.



Fig. 1



Fig. 2



Fig. 3

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9. Environmental Protection Kit Disassembly:

A. Turn the plastic environmental cap(40) counter clockwise by hand to loosen and remove.

B. Gently peel the lip of the environmental diaphragm(39) away from the rim of the end cap(37) and lift out to remove. (Fig.4) Examine the condition of the diaphragm, checking for any signs of wear, distortion, corrosion, or perforation. Discard if found.

C. Turn the first stage diaphragm side down and remove the transfer piston(38). Check for any signs of wear, distortion, or corrosion. Discard if found.

NOTE: Perform step 10 if an Environmental Protection Kit has not been installed.

10. Lift the end cap boot(36) away from the end cap(32) using your fingers. DO NOT use tools.

11. Using a 5/16" hex key, turn the adjustment cup(35), counter clockwise to remove. (Fig. 5)

12. Remove the spring washer(34) and spring(33). Inspect the washer(34) for any signs of wear or distortion. Discard if found.

13. Using a magnifier, closely inspect the spring(33) for any signs of corrosion, cracks, or other damage. Discard if found and DO NOT attempt to reuse.

14. Secure the first stage in a soft-jawed or well padded vise and apply a 3/8" socket drive wrench with CDx Spanner to the end cap(32 or 37). Turn the end cap counter clockwise to remove from the main body(28). (Fig. 6) Lift out the spring pad(31), and inspect for signs of wear or distortion. Discard if found.

CAUTION: Tighten the vise only as needed to hold the first stage secure, and DO NOT overtighten. Doing so will result in permanent damage, rendering it inoperable.

15. Using a 5/32" hex key, install HP port plugs(18) into the open HP ports, and LP port plugs(20) into all but one of the LP ports. Check to ensure that 1 of the 4 LP ports is open, and all other ports are sealed. Tighten the yoke screw to ensure that the protector cap(8) is securely sealed over the yoke retainer(6). For DIN models, place the protector cap(8) securely over the filter retainer(10) and DIN coupler wheel(12).

CAUTION: DO NOT attempt to remove the diaphragm(30) with the use of a metallic instrument. Doing so will seriously damage the brass seating surface of the body.



Fig. 4



Fig. 5



Fig. 6

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16. Remove the diaphragm(30) from the main body(28) by covering the transmitter opening in the body with the palm of your hand and directing short blasts of low pressure air through the open LP port. (Fig.7) Lift the diaphragm out carefully and discard, regardless of its condition, and DO NOT attempt to reuse.
17. Remove the button-pin(29) and inspect for signs of wear or distortion. Discard if found.
18. Remove all port plugs(18 & 20) with a 5/32" hex key. Remove and inspect the port plug o-rings(19 & 21) for any signs of decay. Discard if found.

△ NOTE: For units received with Yoke connectors perform step 19Y, for units received with DIN connectors perform step 19D.

19Y. Yoke connector disassembly:

- A. Remove the knob assembly(1) from the yoke(2)
- B. Secure the first stage body(28) in a soft jawed or well padded vise and apply a thin wall, or modified, 1" box wrench to the yoke retainer(6). Using firm steady force, turn the yoke retainer counter clockwise to remove. DO NOT use impact to loosen.

△ NOTE: It is important that the wrench is properly seated over the entire hex portion of the yoke retainer to prevent any damage to the part. (Fig. 8)

⚠ CAUTION: Tighten the vise only as needed to hold the first stage secure, and DO NOT overtighten. Doing so will result in permanent damage, rendering it inoperable.

- C. After removing the yoke retainer(6), remove the yoke(2) protector cap(8), and saddle(17) and set these aside. Remove and discard the yoke retainer o-ring(7). DO NOT attempt to reuse.

- D. Using Internal Circlip Pliers, remove the retaining clip(3) that retains the cone filter(4). The cone filter should drop out freely into your hand. Discard, and DO NOT attempt to reuse. Remove and inspect the filter o-ring(5) for any signs of decay. Discard if found

19D. DIN connector disassembly:

- A. Secure the first stage in a soft-jawed or well padded vise, with the DIN connector facing up. Apply a 1/4" hex key to the filter retainer(10) and loosen in a counter clockwise direction to remove. (Fig. 9) Remove the DIN face o-ring(9) and filter retainer o-ring(11) and inspect for any signs of decay. Discard if found.

⚠ CAUTION: Tighten the vise only as needed to hold the first stage secure, and DO NOT overtighten. Doing so will result in permanent damage, rendering it inoperable.



Fig. 7



Fig. 8



Fig. 9

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B. Lift the coupler wheel(12) straight off the filter housing(15) and set aside. Remove the protector cap(8) and set aside. Apply a 13\16" open end wrench to the flange at the base of the filter housing(15). (Fig. 10) Using firm, steady force, loosen in a counter clockwise direction to remove. DO NOT use impact to loosen.

△ NOTE: It is important that the wrench is deep enough to seat entirely over the flange to avoid any damage to the seating surface.

C. After removing the filter housing(15) from the main body(28), turn it over and tap lightly to drop out the conical filter(13). Discard the filter and DO NOT attempt to reuse. Remove and inspect the filter o-ring(14) for any signs of decay. Discard if found. Remove and discard DIN filter housing o-ring(16). DO NOT attempt to reuse.

20. Inspect the saddle(17), checking for any signs of damage or distortion. Discard if found.



Fig. 10

REASSEMBLY PROCEDURE

△ NOTE: Prior to reassembly, it is necessary to inspect all parts, both new and those that are being reused. Check to ensure that o-rings are clean and supple, and that every part and component has been thoroughly cleaned.

△ WARNING: Use only genuine Oceanic parts, subassemblies, and components whenever assembling Oceanic products. DO NOT attempt to substitute an Oceanic part with another manufacturer's, regardless of any similarity in shape, size, or appearance. Doing so may render the product unsafe, and could result in serious injury or death of the user.

△ NOTE: For units received with Yoke connectors perform step 1Y, for units received with DIN connectors perform step 1D.

1Y. Yoke connector reassembly:

A. Install the filter o-ring(5) into the yoke retainer(6), at the base of the filter cavity in the body. (Fig. 11)

B. Install the conical filter(4) into the yoke retainer(6) and install the retaining clip(3) into the groove above it, using Internal Circlip Pliers. (Fig. 12)

△ NOTE: Close examination of the retaining clip will show that one side is slightly rounded and the other is flat. Install with the flat side facing out of the yoke retainer to ensure greater holding strength.

C. Lubricate and install the yoke retainer o-ring(7) into the groove on the end.

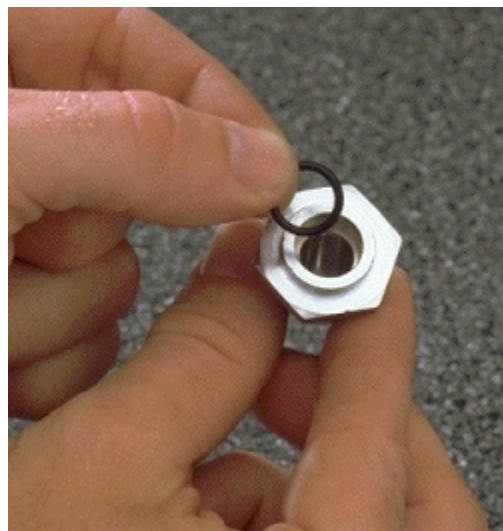


Fig. 11



Fig. 12

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D. Insert the threaded end of the yoke retainer(6) through the yoke(2), facing opposite the end which holds the knob assembly(1). Place the protector cap(8) and the saddle(17) onto the yoke retainer(6), with the flat side mating to the base of the yoke.(Fig. 13)

E. Secure the first stage body in a soft jawed or well padded vise, with the threaded HP inlet bore facing straight up.

⚠ CAUTION: Tighten the vise only as needed to hold the first stage secure, and DO NOT overtighten. Doing so will result in permanent damage, rendering it inoperable.

F. Holding the yoke retainer, yoke, dust cap, and saddle together between thumb and forefinger, mate the yoke retainer into the main body, so that the threads seat properly. Hand tighten in a clockwise direction until secure. (Fig. 14) Using a thin-wall, or modified, 1" crow's foot wrench that is properly seated over the entire hex portion of the retainer, tighten **to a torque of 16-18 ft-lbs.**

G. Install the knob assembly(1) into the yoke(2).

1D. DIN connector reassembly:

A. Lubricate and install the DIN filter housing o-ring(16) into the groove on the end of the DIN filter housing(15).

B. Insert the threaded end of the filter housing(15) through the flat side of the saddle(17).

C. Secure the first stage body in a soft jawed or well padded vise, with the threaded HP inlet bore facing straight up.

⚠ CAUTION: Tighten the vise only as needed to hold the first stage secure, and DO NOT overtighten. Doing so will result in permanent damage, rendering it inoperable.

D. Install the filter housing(15) into the main body(28) so that the threads seat properly, and hand tighten in a clockwise direction until secure. Using a thin-wall, or modified 13/16" crows foot wrench that is properly seated over the entire seating surface of the filter housing flange, tighten **to a torque of 16-18 ft-lbs.** (Fig. 15)

E. Lubricate and install the conical filter o-ring(14) into the filter housing(15), at the base of the filter cavity. Install the conical filter(13) into the filter housing.

F. Install the protector cap(8) and the coupler wheel(12) down over the stem of the filter housing(15), with the threaded end facing up.

G. Lubricate and install the DIN face o-ring(9) and filter retainer o-ring(11) onto the filter retainer(10).



Fig. 13



Fig. 14



Fig. 15

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H. Insert the threaded end of the filter retainer(10) through the coupler wheel(12), into the filter housing(15), and tighten until secure. Apply a 1/4" hex socket and tighten **to a torque of 120-140 in-lbs.**

2. Place the stem of the button-pin(29) directly into the center hole in the body(28), ensuring that it enters without any restriction. (Fig. 16)
3. Position the diaphragm(30) flat, directly over the opening of the body(28). Gently push the edges of the diaphragm down inside the internal threads of the body, one thread at a time. Rotate the body while doing this, to facilitate an even seating of the diaphragm, and closely inspect to ensure it is well seated at the base of the threads. (Fig. 17)

⚠ CAUTION: DO NOT force the diaphragm(30) into the body(28) in a manner that will damage either the lip or surface of the diaphragm, or the threads of the body. The use of a sharp instrument, such as a screwdriver, is to be strictly avoided.

4. Lay the spring pad(31) onto the center of the diaphragm(30), with its flat surface against the diaphragm(30).
5. Thread the end cap(32 or 37), into the body(28), turning clockwise by hand until secure.
6. Secure the first stage body in a soft jawed or well padded vise, and using CDx Spanner and a foot-pounds torque wrench, tighten the end cap(32 or 37), into the body **to a torque of 30-38 ft-lbs.** (Fig. 18)

⚠ CAUTION: Tighten the vise only as needed to hold the first stage secure, and DO NOT overtighten. Doing so will result in permanent damage, rendering it inoperable.

7. Apply a very light film of lubricant (Christo- Lube MCG #111) to both ends of the diaphragm spring(33), and place it on the spring pad(31).
8. Place the spring washer(34) directly onto the upper end of the spring(33) and install the adjustment cup(35) into the end cap(32 or 37). Using a 5/16" hex key, turn the adjustment cup(35) clockwise until only two threads are showing.
9. Lightly lubricate and install the transmitter o-rings(23, 24) onto the transmitter(22) and the HP seat o-ring(25) into the inner bore of the transmitter. Lightly lubricate the threads of the transmitter(22).
10. Apply a very light film of lubricant to both ends of the HP seat spring(26) and the lower 1/4" of the HP seat shaft(27). Install the HP seat spring(26) onto the end of the transmitter(22).



Fig. 16



Fig. 17



Fig. 18

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11. Carefully guide the shaft of the HP seat(27) so that it passes through the spring(26) and into the seat o-ring(25) in the inner bore of the transmitter(22). (Fig. 19)
12. Hold the body(28) at a slight angle, so that you may see the stem end of the button-pin(29) protruding through the center of the machined orifice cone. Insert the transmitter/hp seat assembly directly into the center of the opening in the body(28) and carefully guide the center opening of the HP seat(27) onto the button pin(29). Ensure the button-pin(29) enters directly into the opening of the HP seat(27) without any restriction.(Fig. 20)

⚠ CAUTION: Improper alignment of the button-pin(29) and the HP seat(27) during installation will result in damage to the seating surface of the HP seat(27), requiring its replacement.

13. While holding the body (28) secure, turn the Transmitter/HP seat assembly clockwise while exerting continuous inward force to overcome spring pressure and engage the threads. Continue tightening by hand until secure.
14. Secure the first stage body in a soft jawed or well padded vise. Using a CDx Spanner on an inch-pounds torque wrench, tighten the Transmitter assembly(22) into the body **to a torque of 80 to 100 in-lbs.** (Fig. 21)

⚠ CAUTION: Tighten the vise only as needed to hold the first stage secure, and DO NOT overtighten. Doing so will result in permanent damage, rendering it inoperable.

15. Lubricate and install port plug o-rings(19 & 21) onto the port plugs(18 & 20) and install the port plugs into the body(28), tightening clockwise with a 5/32" hex key socket **to a torque of 35-40 in-lbs.**
16. Lubricate and install all hose o-rings onto hoses and install the hoses into the body(28). Tighten the low pressure second stage hose(s) clockwise with a 9/16" crows foot wrench, the high pressure hose(s) with a 5/8" crows foot wrench, and the low pressure inflator hose(s) with either a 9/16" or 1/2" crows foot wrench, **to a torque of 35-40 in-lbs.**

⚠ CAUTION: Be certain not to install any low pressure hose into a high pressure port via an adaptor.

⚠ NOTE: Perform step 17 only if an Environmental Protection Kit has NOT been installed.

17. Ensuring proper alignment and secure placement, install the end cap boot(36) onto the end cap(32).



Fig. 19



Fig. 20



Fig. 21

FINAL ADJUSTMENT

1. Connect a recently calibrated low pressure test gauge to a low pressure hose, and connect the first stage with second stage and low pressure test gauge to a pure breathing gas source of 3000 PSI. Slowly open the supply valve to pressurize the regulator, and purge the second stage several times.
2. Adjust the intermediate pressure, if necessary, to read 142-148 PSI by turning the adjustment cup(35) clockwise to increase the pressure or counter clockwise to decrease it. (Fig. 22)

△ NOTE: Turn the adjustment cup no more than 1/8 of a turn at a time, pausing to purge the second stage several times to gain an accurate reading of the intermediate pressure before adjusting further.

△ NOTE: Ensure that the intermediate pressure holds stable at 142-148PSI, and does not creep or fluctuate after the second stage has been purged several times. If creeping is detected, refer to the troubleshooting section to determine possible cause and treatment.

△ NOTE: Perform the following steps only if an Environmental Protection Kit is being installed.

ENVIRONMENTAL KIT REASSEMBLY

1. Insert the transfer piston(38) into the environmental end cap(37). (Fig. 23)
2. Turn the air supply off and bleed off intermediate pressure. Insert the environmental diaphragm(39) over the top of the end cap(37) with the thin perimeter seal facing down. Ensure that the thin perimeter seal is seated completely into the circular groove in the environmental end cap(37). (Fig. 24)
3. Thread the plastic environmental cap(40) onto the end cap(37), being very careful to avoid cross threading, and tighten clockwise by hand until secure. DO NOT use tools to tighten.
4. Turn on the air supply and purge the second stage several times, and check once more to ensure proper intermediate pressure of 142-148 psi.



Fig. 22



Fig. 23



Fig. 24

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SPECIFICATIONS

Torques

P/N 6564	Yoke Retainer	16 to 18 ft-lbs
P/N 4544	DIN Filter Retainer	120 to 140 in-lbs
P/N 6565	DIN Filter Housing	16 to 18 ft-lbs
P/N 3462	HP Port Plug	35 to 40 in-lbs
P/N 3463	LP Port Plug	35 to 40 in-lbs
P/N 6580	End cap	30 to 38 ft-lbs
P/N 6583	Environ. End Cap	30 to 38 ft-lbs
P/N 6586	Transmitter Asm	80 to 100 in-lbs
	HP Hose into First Stage Body	35 to 40 in-lbs
	LP Hose into First Stage Body	35 to 40 in-lbs
	Inflator Hose into First Stage Body	35 to 40 in-lbs

Specialty Tools

P/N 40.2302	Christo-Lube MCG111 - 2 oz
P/N 40.6536	3/8" socket drive CDx Spanner
P/N 40.9311	Filter Circlip Pliers
P/N 40.9313	5/32" Allen Key
P/N 40.9314	5/16" Allen Key
P/N 40.9315	Intermediate Press. Gauge
P/N 40.9320	1/4" Allen Key (for DIN model)
P/N 40.9520	O-ring Tool Kit

Intermediate Pressure

Preferred	142 to 148 psi
Acceptable	139 to 151 psi

REGULATORS

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Dia.
No. Part # Description

Yoke Version

1c	6307.07	Knob Assembly (Black)
	6307.21	Knob Assembly (Nitrox)
2c	6562	Yoke (satin finish)
3c	3530	Clip - Retaining
4a	3545	Filter - Conical
5a	2.013	O-ring - Filter
	2.013V	O-ring - Filter Viton (Nitrox)
6c	6564	Retainer - Yoke
7a	2.011	O-ring - Retainer
	2.011V	O-ring - Retainer Viton (Nitrox)
8c	6560	Cap - Protector (Black)

DIN Version

9a•	6374	O-ring - DIN Face Urethane (Nitrox)
10c	4544	Retainer - DIN Filter
11a•	2.012	O-ring - Retainer
	2.012V	O-ring - Retainer Viton (Nitrox)
12c	6559	Wheel - DIN Coupler
13a•	4546	Filter - DIN Conical
14a•	2.011	O-ring - Filter
	2.011V	O-ring - Filter Viton (Nitrox)
15c	6565	Housing - DIN Filter
16a•	2.011	O-ring - Filter Hsg
	2.011V	O-ring - Filter Hsg Viton (Nitrox)

Yoke & DIN Versions

17c	6585	Saddle
18c	3462	Plug - HP Port
19c	3.904	O-ring - HP Port Plug
	3.904V	O-ring - HP Port Plug Viton (Nitrox)
20c	3463	Plug - LP Port
21c	3.903	O-ring - LP Port Plug
22c	6586	Assembly - Transmitter
23c	2.112	O-ring - Transmitter, Outer
24c	2.015	O-ring - Transmitter, Inner
	6508	O-ring - Transmitter Urethane (Nitrox)
25a	6498	O-ring - Seat Urethane (Nitrox)
26c	6512	Spring - Seat
27a	6490	Seat - HP
28c	6575	Body (satin finish)
29c	6576	Button Pin Assembly
30a	6574	Diaphragm
31c	6577	Pad - Spring
32c	6580	Cap - End
33c	6513	Spring - Diaphragm
34b	6524	Washer - Spring
35c	6518	Cup - Adjustment (polished)
36c	6581.02	Boot - End cap

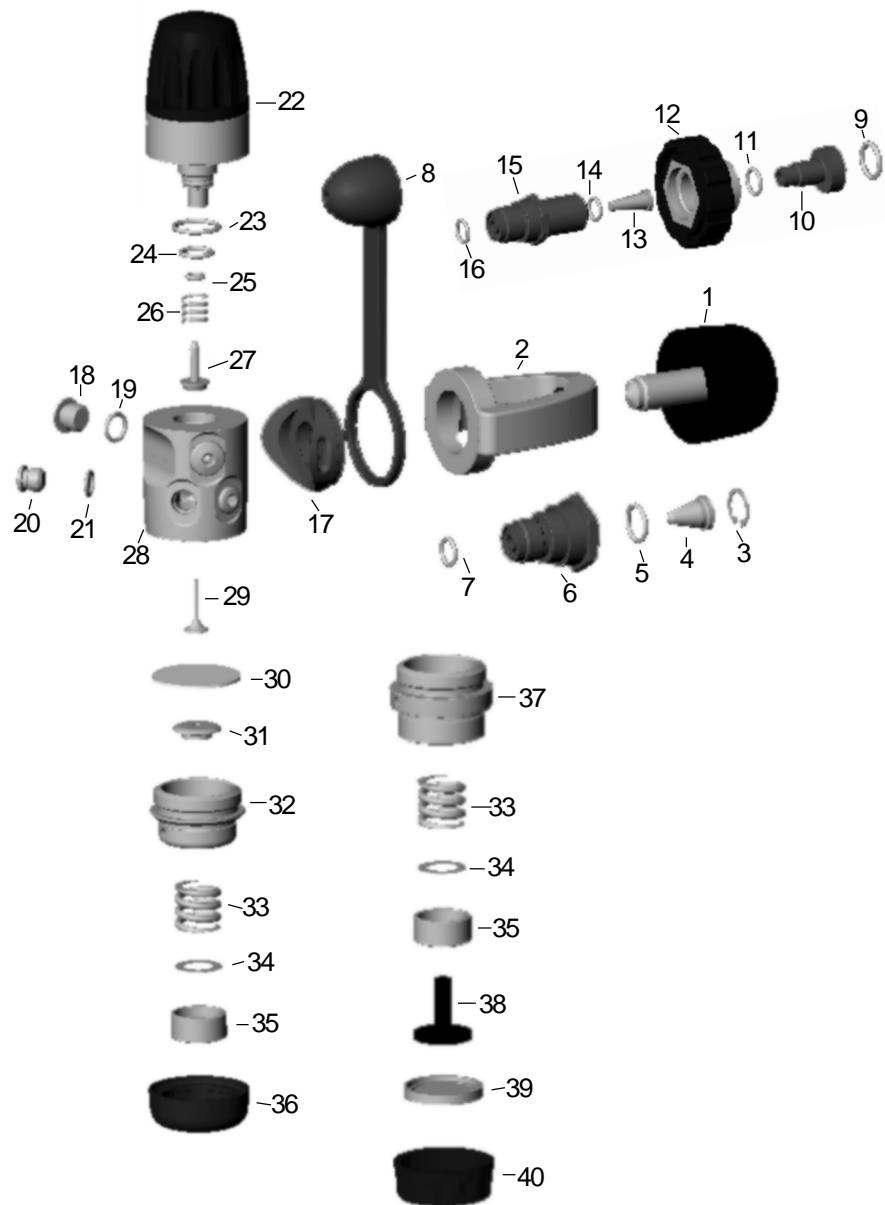
Dia.
No. Part # Description

Environmental Kit Version (P/N 40.4045.99.1)

37c	6583	Cap - End, Environmental
38c	6516	Piston - Transfer
39c	6511	Diaphragm - Environmental
40c	6584	Cap - Environmental

ANNUAL SERVICE PARTS KITS

40.6170	Service Kit - Regulator (Includes all Bold items.)
40.6180	Nitrox Conversion/Service Kit
40.6144	Service Kit - DIN assembly (Nitrox compatible) (Includes all • items)



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