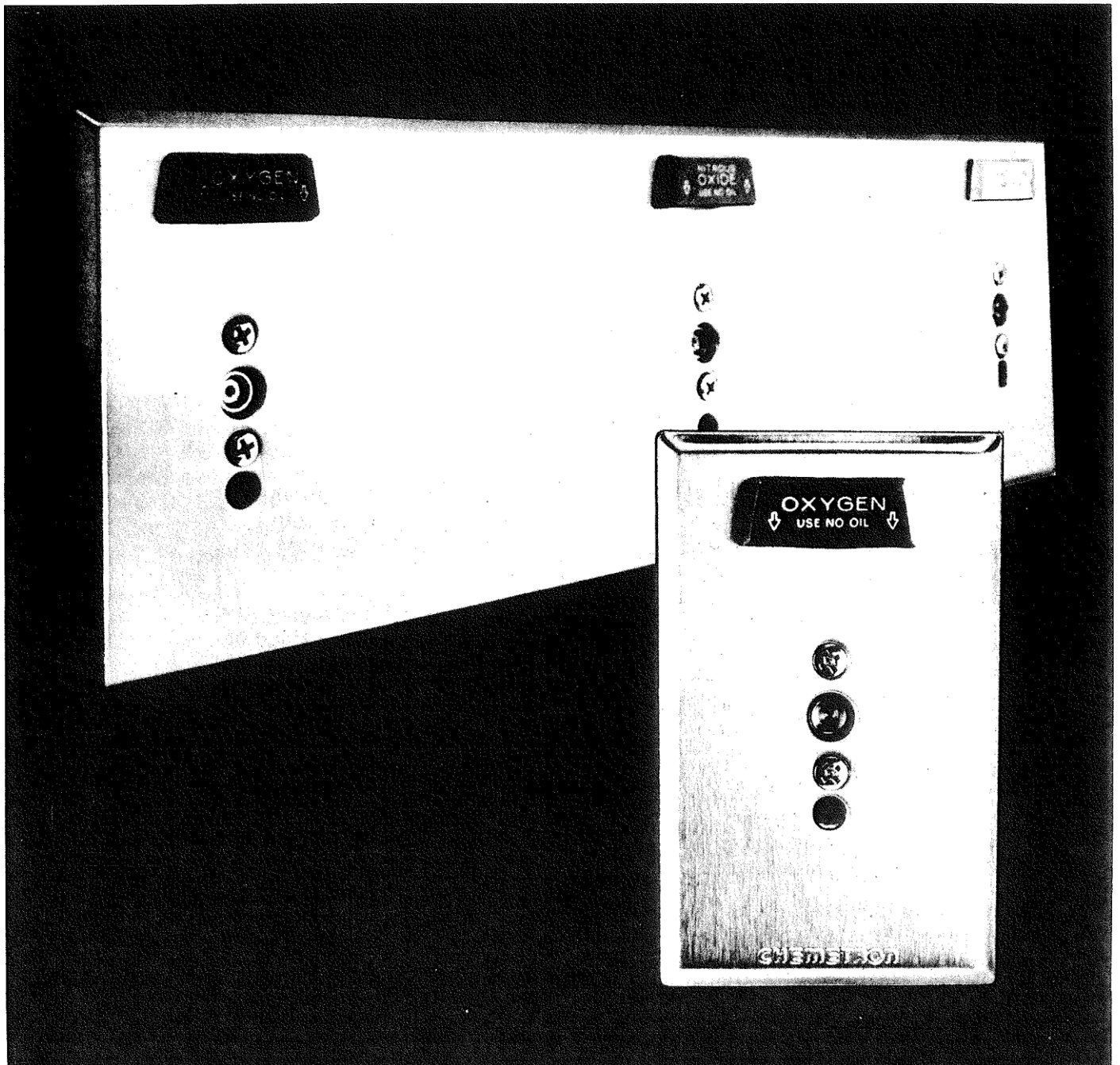


OPERATION, MAINTENANCE
AND REPAIR MANUAL
**MEDICAL GAS
OUTLET STATIONS**

**Allied Healthcare
Products, Inc.**
CHEMETRON Medical Division



NCG®

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Introduction

CHEMETRON MEDICAL GAS OUTLET STATIONS are designed to provide immediate supply of medical gases and vacuum at such points of use as hospital operating rooms, emergency rooms, intensive care and patient rooms, as well as non-hospital based facilities where a convenient source of medical gases and other services is needed.

The medical gases include, but are not limited to, oxygen, nitrous oxide, compressed air, nitrogen, carbon dioxide, helium and mixtures of such gases used for medical purposes.

Medical Gas Pipeline equipment must be kept in dependable operating condition at all times, and demands an effective, conscientiously followed program of periodic inspection, cleaning, maintenance and repair.

For such a program, this manual is a concise, thorough, step-by-step guide for use by responsible maintenance

personnel in hospitals or other installations where Chemetron Medical Gas Outlet Stations are installed.

Read this manual thoroughly, and follow it closely at each stage of cleaning, maintenance and repair procedures.

It is the responsibility of the user to maintain efficient performance of Chemetron Medical Gas Outlet Stations. Allied Healthcare Products, Inc. assumes no liability for accidents or other irregularities arising from failure to observe recommended maintenance procedures or follow cleaning, maintenance and repair practices as presented in this manual.

Instructions are applicable to the following series of outlet stations: 400, 378, 349 and 348 quick-connect units; and 460, 376, 346 and 347 D.I.S.S. (Diameter Index Safety System) units.

General Mechanical Principles

Quick-Connect Outlet Stations

CHEMETRON OUTLET STATION DESIGN

Chemetron outlets are designed internally and externally to help assure safety and reliability in the delivery of medical gases and vacuum services. A carefully engineered system of safety keying is used between back box, face plate, adapter. An oxygen adapter, for instance, cannot be inserted into a vacuum outlet station. An air face plate cannot be attached to an oxygen back box.

Though not illustrated, Chemetron D.I.S.S.* outlet stations are designed with most of the same features as Chemetron Quick Connect outlet stations with the exception of the primary valve body assembly (see component parts pp. 4 & 5). For example, an installed system of Chemetron (NCG) D.I.S.S. outlets may be changed to a Chemetron Quick Connect system by changing the primary valve body assembly and faceplate. This is true for all series Chemetron (NCG) outlets of quick connect or D.I.S.S. design. For Series 238, 248, 148, 236, 246, and 146 outlet stations see Modernization Kits, Form 49-00-0001.

* Diameter Index Safety System. Ref. Compressed Gas Association, Inc., 500 Fifth Avenue, N.Y., N.Y. 10036, Pamphlet V-5.

OPERATION

Pressure gas systems are normally designed to deliver 50-55 psig to all station outlets, with the exception of Nitrogen normally being 150-180 psig. Vacuum systems should be maintained at minimum 12-15" Hg at the outlet station farthest away from the vacuum pumps.

When not in use, gas is in a non-flowing state within the outlet station, sealed by O-rings in the poppet (A) and valve body (C) - Figure 1. O-ring (B) seals the valve body within the outlet base housing - Figure 3.

Inserting the adapter pushes poppet inward, permitting gas to flow through the adapter. Leakage is prevented by the O-ring (C) encircling adapter (D) - Figure 2.

When primary valve body is removed for inspection and servicing, line gas pressure forces secondary check valve (E) tight against seat, sealing gas against loss during period of maintenance - Figure 3.

Vacuum outlet stations do not incorporate secondary check valves. A flat object such as a quarter may be used to seal the vacuum flow during service of the primary valve body.

FIGURE 1

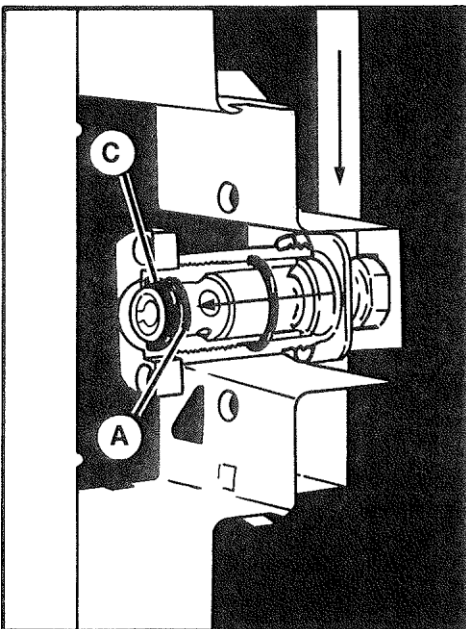


FIGURE 2

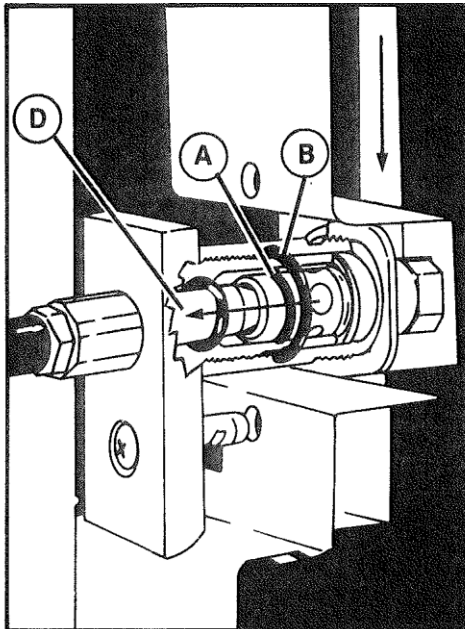
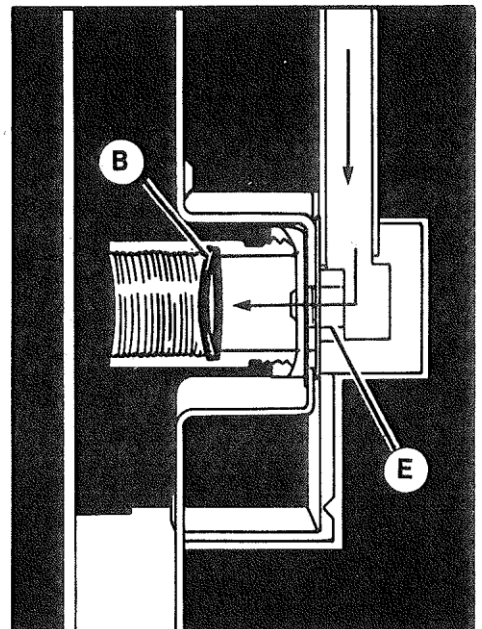


FIGURE 3



Materials Of Construction

Drawings on Page 5 illustrate the component design of Chemetron Medical Gas Outlet Stations. These units are engineered for operating and maintenance simplicity, easy disassembly for parts replacement, and safety-designed to conform to NFPA and CSA requirements.

Each component is identified by description, and replacement parts have part numbers for fast selection and ordering. Many of the numbered items are contained in the Chemetron Medical Gas Outlet Station Repair Kit (See Form No. 64-00-2005 for more information).

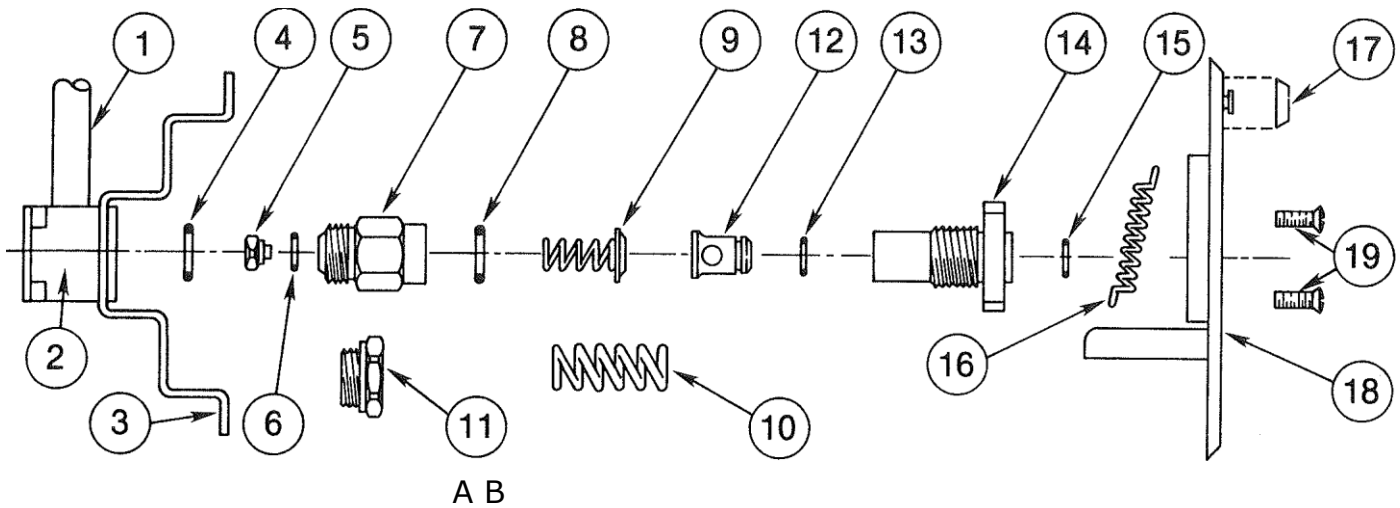
ITEM DESCRIPTION	CATALOG NO.
1. 6" Copper tube, for connection to gas or vacuum supply line	
2. Mounting block	
3. Back box (Field replacement of items 1, 2 and 3 are not feasible)	
4. Mounting block O-ring	64-90-0185
5. Secondary check valve	64-90-0151"
6. Secondary check O-ring	64-90-0107
7. Housing	64-90-0002
8. Housing O-ring	64-90-0185
9. Secondary check spring	64-90-0151
10. Vacuum spring	64-90-0034
11. A. Test Plug (Plastic)	64-90-0001
B. Metal Test Plug, for HP N ₂ (Dynagen)	64-90-0170
12. Poppet	98-90-0017
13. Poppet O-ring	64-90-0097
14. Valve body, Quick-connect	64-90-0039 (pressure, <u>without</u> poppet)
Valve body, Quick-connect	64-90-0040 (vacuum, <u>without</u> poppet)
Valve body assembly, Quick-connect	64-90-0180 (pressure, with poppet)
Valve body assembly, Quick-connect	64-90-0181 (vacuum, <u>with</u> poppet)
15. Valve body O-ring	64-90-0186

ITEM DESCRIPTION	CATALOG NO.
16. Face plate springs	64-90-0096
17. Latch button	64-90-0003 (oxygen) 64-90-0004 (vacuum) 64-90-0005 (air) 64-90-0006 (nitrous oxide)
18. Face plate	See Form No. 64-00-2000
19. Face plate screws	64-90-0096
20. Poppet (oxygen and vacuum)	64-90-0028
21. Poppet (N ₂ , Air, CO ₂)	64-90-0029
22. Poppet O-ring, D.I.S.S.	34-90-0026
23. Valve body	64-90-0157 (oxygen) 64-90-0078 (vacuum) 64-90-0079 (nitrous oxide) 64-90-0080 (air)
24. Face plate	See Form No. 64-00-2001
25. Latch button	64-90-0020 (oxygen) 64-90-0021 (vacuum) 64-90-0022 (air) 64-90-0023 (nitrous oxide)
26. Face plate screws	64-90-0030
27. Dust cap and chain	1218-A for O ₂ 1218-T for all other gases

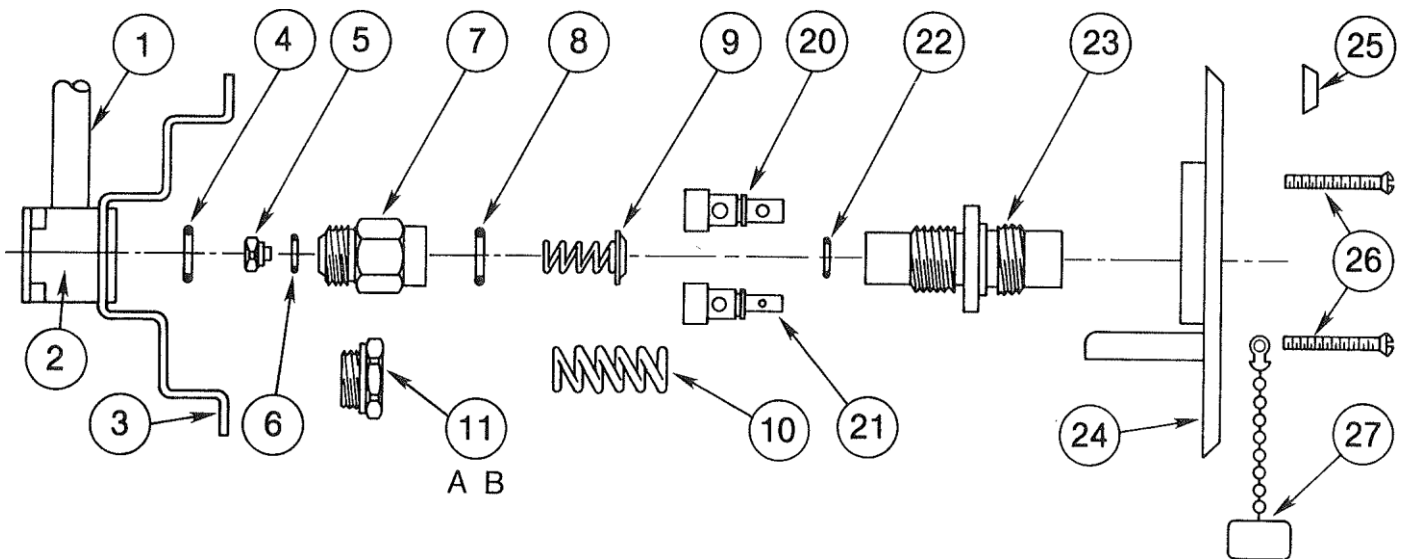
*Chemetron Outlet Stations manufactured with rear entry of pigtail (1) use Secondary Check Valve Catalog No. 64-90-0152.

Component Parts For Quick-Connect And D.I.S.S. Outlet Stations

Quick-Connect



D.I.S.S.



Inspection Maintenance And Repair Procedures For Chemetron Quick-Connect Outlet Stations

Following is a step-by-step method of inspection, maintenance and repair for the Chemetron Medical Gas Outlet Station, series 400, 378, 349 and 348 Quick-Connect units. Purpose is to determine if parts are broken, missing, worn, distorted or contaminated, or if the unit is malfunctioning from any other possible causes. This program should be followed at intervals of not more than six months and more often in areas of greater use, such as operating rooms and intensive care units.

PERIODIC INSPECTION

1. Clean all exposed parts. **WARNING: DO NOT USE OIL OR GREASE ON OR NEAR OUTLETS.** Clean face plates and other exposed areas with a cloth dampened with water and/or common hospital disinfectants.
1. Nettoyer toutes les pieces exposees. **MISE EN GARDE: NE PAS UTILISER D'HUILE OU DE GRAISSE SUR OU A PROXIMITE DES SORTIES.** Nettoyer les plaques avant et les autres surfaces exposees a l'aide de chiffons humectes d'eau et/ou de desinfectants normalement employes dans les hopitaux.
2. Insert adapter (figure 2, page 3) into face plate, unlatch and withdraw several times to determine if binding, looseness or other malfunction is present. See troubleshooting chart (page 10) for possible causes of malfunction, and methods of correction.

DISASSEMBLY (Reference Page 5)

3. Remove the two Philliphead face plate screws (19) and take off the face plate.
4. Examine face plate latch springs (16) and replace if loose.
5. Examine face plate (18) and replace if bent or distorted. Consult the factory and provide the following information: Outlet Series, center line distance between gas service, and/or console make and model number. See also Form No. 64-00-2000 Replacement Parts for Quick Connect Outlets.
6. Remove valve body (14) by turning counterclockwise until separated from housing. When valve body is removed from pressure gas services, secondary check deflator spring (9) is released, and line pressure forces secondary check valve (5) against seat, sealing gas or air from escape during inspection and maintenance. Inspect secondary check valve (5) for proper seating. If seating is incomplete, reinstall valve body and repeat removal process. Also, examine valve body for signs of distortion or wear at entry port, or for worn, uneven screw threads. Replace if necessary. Otherwise, replace valve body O-ring (15) and use new O-ring which has been lubricated lightly with Chemetron O-ring lubricant (Part #64-90-2111).

or contamination. Replace if necessary. Otherwise, replace poppet O-ring (13), first lubricating it lightly with Chemetron O-ring lubricant (Part #64-90-2111).

8. Inspect secondary check spring (9) or vacuum spring (10) and replace if necessary. Set this spring aside until reassembly.
9. Remove and replace housing O-ring (8) lubricating lightly as indicated above.
10. Remove housing (7) with a 3/4" thinwall socket wrench, to gain access to secondary check valve and mounting block O-ring. **WARNING: BEFORE REMOVAL OF HOUSING, SHUT DOWN GAS FLOW FOR SERVICE INVOLVED AT NEAREST ZONE VALVE. BE SURE TO CHECK WITH OTHER DEPARTMENTS ON THE SUPPLY LINE, SO THAT IN-SERVICE OPERATIONS ARE NOT INTERRUPTED.** **MISE EN GARDE: AVANT D'ENLEVER LE BOITIER, COUPER L'ECOULEMENT DE GAZ POUR LE SERVICE A LA SOUPE DE LA ZONE LA PLUS PROCHE. S'ASSURER DE VERIFIER AVEC LES AUTRES DEPARTEMENTS SUR LA LIGNE D'ALIMENTATION DE MANIERE A CE QUE LES OPERATIONS EN SERVICE NE SOIENT PAS INTERROMPUES.**
11. Replace mounting block O-ring (4), lubricating lightly as indicated above.
12. Examine secondary check valve (5) and O-ring (6). Replace one or both if necessary. Lightly lubricate replacement O-ring before reassembly.
13. Reinstall secondary check valve into the block with O-ring (6) facing out.
14. Reassemble all components in reverse order of disassembly. Make sure O-rings are seating, and unit is satisfactorily assembled at each stage. When reinstalling valve body, turn the body past the housing O-ring (8), rather than pushing it, to assure that the O-ring is not unseated. Turn valve body clockwise into housing until the valve body projects about 1/8" from the finished wall. The valve body may be turned outward to compensate for up to 3/8" variation in wall thickness.
15. If gas or other service has been turned off, be sure it is restored after unit has been serviced. **CAUTION: Before putting the system back into service, the flow of gas from each outlet station for oxygen, mixed gases containing oxygen and compressed air should be tested with an oxygen analyzer per NFPA 99, paras. 542 and 543.**
ATTENTION: avant de remettre le systeme en service, recoulement de gaz a partir de la station de chaque sortie pour oxygene, gaz mixtes contenant oxygene et air comprime, doit etre verifie avec un analyseur d'oxygene conformement a NFPA 99, paragraphes 542 et 543.

7. Remove poppet (12) and examine for wear, distortion

Inspection Maintenance And Repair Procedures For Chemetron Diameter Index Safety System (D.I.S.S.) Outlet Stations

Following is a step-by-step method of inspection, maintenance and repair for Chemetron Medical Gas Outlet Stations, series 460, 376, 346 and 347 D.I.S.S. units.

PERIODIC INSPECTION

1. Clean all exposed parts. **WARNING: DO NOT USE OIL OR GREASE ON OR NEAR OUTLETS.** Clean face plates and other exposed areas with a cloth dampened with water and/or common hospital disinfectants.
1. Nettoyer toutes les pieces exposées. **MISE EN GARDE: NE PAS UTILISER D'HUILE OU DE GRAISSE SUR OU À PROXIMITÉ DES SORTIES.** Nettoyer les plaques avant et les autres surfaces exposées à l'aide de chiffons humectés d'eau et/ou de désinfectants normalement employés dans les hopitaux.
2. Using a female D.I.S.S. adapter for the medical gas outlet being inspected, determine proper mating of the threads. Be certain the female D.I.S.S. adapter nipple contains an O-ring that is in good repair. Female adapters for pressure gases should be connected to a device containing a shut-off valve to avoid uncontrolled gas flow from the outlet.
3. Audibly test for leakage around the mated threads.
4. Visually inspect the male threads of the station outlet without the female adapter to determine that no threads are crossed, worn, distorted, discolored, or otherwise indicating needed replacement of the valve body (Item #23 Page 5).

DISASSEMBLY (Reference Page 5)

5. Remove the two oval head face plate screws (26) and take off the face plate.
6. Examine face plate and replace if bent or distorted. Consult the factory and provide the following information: Outlet Series, center line distance between gas services and/or console make and model number.
7. Remove valve body (23) by turning counterclockwise until separated from housing. When valve body is removed, secondary check valve will seal air or gas against escape. Examine valve body for worn or defective threads, and replace if necessary. Remove poppet (20 & 21) and examine for wear, distortion or contamination. Replace if necessary. Otherwise, replace poppet O-ring (22) lubricating it lightly with Chemetron O-ring lubricant. (Part #64-90-2111)

(For balance of disassembly and repair, follow procedures as explained for quick-connect units, steps 8 through 15).

REMEMBER ALSO THAT CHEMETRON MEDICAL GAS OUTLET STATIONS SHOULD BE CHECKED THOROUGHLY AFTER

- Initial installation is complete,
- Medical gas and vacuum lines are extended or otherwise altered,
- Major overhaul is performed in the general area of medical services and supply,
- Time prescribed by local or national standards and codes. Refer to NFPA 99 and/or CSA Z305.1 standards for Non-flammable Medical Gas Systems.

Operating Instruction For The Chemetron O-Ring Service Tool

The Chemetron Outlet Station O-Ring Service Tool aids in rapid removal and replacement of the valve body O-ring (15) without disassembly or removal of the face plate. The Chemetron O-ring Service Tool can be used on Chemetron/NCG quick-connect outlet station series 238, 248, 148, 348, 349, 378 and 400 for oxygen, compressed air, vacuum, nitrous oxide and carbon dioxide service.

The O-ring Service Tool is attached to the outlet station latch mechanism which holds the tool in place. A poppet depressor rod pushes the poppet back and exposes the valve body O-ring without allowing gas to flow. After removal of the old O-ring, a push of the O-ring installer containing a new O-ring seats the replacement O-ring. Following is a step by step procedure for using the Chemetron O-ring Service Tool.

VALVE BODY O-RING (15) REPLACEMENT

1. Holding the O-ring service tool in one hand, adjust the poppet depressor rod until the forward tip is even with the forward edge of the black barrel. Figure 1.

Lubricate, very lightly, one O-ring (Catalog No. 64.90-0186) using Chemetron Medical Gas Outlet O-ring Lubricant (Catalog No. 64-90-2111) and insert the O-ring in the installer assembly. Figure 1.

2. Insert the tool in the outlet station latch opening. See Figure 2. If it does not catch, adjust the latch striker (lower) knob counterclockwise and insert again. Turn the latch striker knob clockwise until the tool is held

snug against the face plate. CAUTION: Do not over-tighten or damage to the latch mechanism could result.

3. Center the rod tip on the poppet by moving the rod bracket up or down. Turn the poppet depressor rod (upper) knob clockwise. This advances the rod toward the poppet.
4. Advance the poppet depressor rod until the old O-ring is exposed. (Approximately 7 turns clockwise) See Figure 2. The large edge of the cone on the depressor rod should be just beyond the O-ring groove. You should not hear or feel gas flowing. If you do, you have depressed the poppet too far.
5. Using the O-ring pick (Catalog No. 64-90-2072), extract the old O-ring. Cut or snip the extracted O-ring away from the rod. Inspect the O-ring groove and be certain it is clear of debris or foreign material.
6. Slide the O-ring installer forward. Holding the rear portion of the installer (behind the spring), push forward until the installer spring is compressed. Pull the installer back.
7. If, by visual examination, the O-ring is not properly seated, repeat Step No. 6 a few times in rapid succession.
8. If the O-ring is properly seated, the tool may be removed by first, retracting the poppet depressor, then loosening the lower latch knob (turn counterclockwise) and releasing the outlet latch mechanism. The poppet should return to the normally closed position.

O-Ring Service Tool Troubleshooting Chart

PROBLEM

O-ring partially seats, difficult to compress installer.

O-ring knots or comes back out, difficult to compress installer.

O-ring twists or appears seated but comes back out, installer compresses normally.

Tool fails to latch or remain latched.

POSSIBLE REASON

Poppet depressed insufficiently, or failure to lubricate O-ring.

Poppet depressed insufficiently, or failure to lubricate O-ring.

Poppet depressed too far.

Worn or distorted outlet latch. (See also "Recommendations", page 11, for older outlets).

Figure 1 — Initial Setting

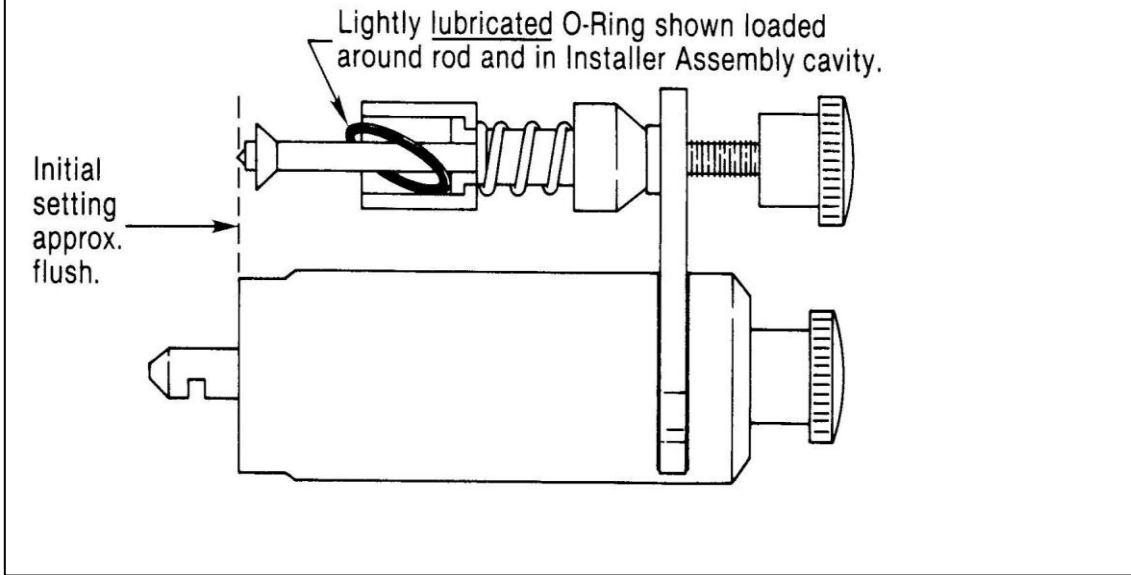
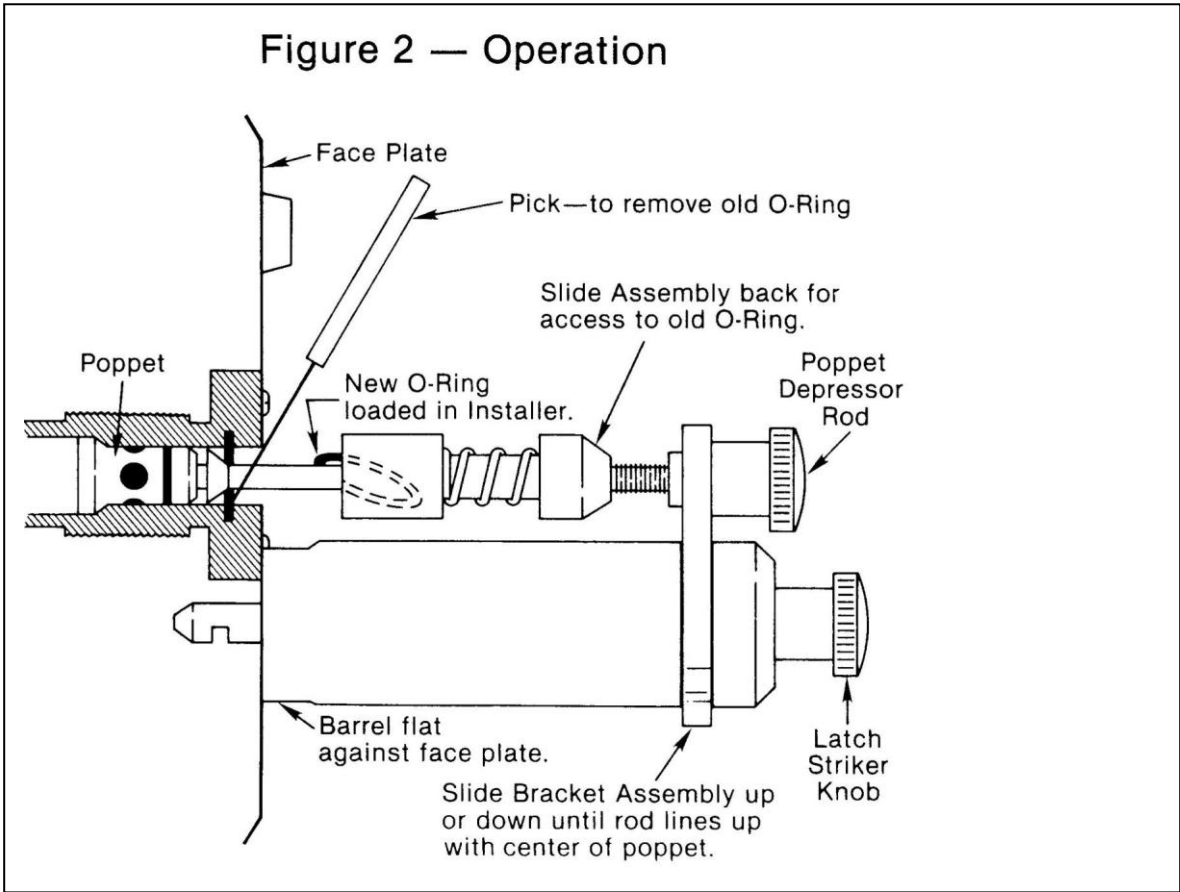


Figure 2 — Operation



Chemetron Quick Connect Outlet Stations Series 348, 378 AND 400

Troubleshooting Chart

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
Difficult To Insert/Extract Adapter	Using incorrect gas service adapter	Check for correct gas service adapter
	Valve body O-ring is dried out or defective	Lubricate O-ring (Part #64-90-0186) with Chemetron O-ring lubricant Catalog #64-90-2111 or replace O-ring. See also "O-Ring Service Tool", Catalog #64-90-2060, page 9
	Face plate or latch is binding, bent or damaged	Remove face plate, adjust valve body outward with valve body face 1/8" beyond finished wall line; or replace face plate
Leak With Adapter Inserted	Failure or inability to release latch	Push latch button down; or apply slight inward pressure on adapter before depressing latch button
	Faulty primary valve body O-ring	Replace O-ring, Part #64-90-0186. See also O-ring Service Tool, Catalog #64-90-2060, page 9.
Leak Through Without Adapter Inserted	Primary valve body is worn or distorted	Replace primary valve body, see Item #14, page 4
	Failure of poppet O-ring to seal	Replace O-ring, Part #64-90-0097, Item #13, page 4
Leak Around Valve Body	Poppet worn or distorted	Replace poppet, Part #98-90-0017 Item #12, page 4
	Failure of base housing O-ring to seal	Lubricate or replace O-ring, Part #64-90-0185, Item #8, page 4
Reduced Flow	Foreign matter lodged in the outlet station (e.g., scale from brazing, suctioned material, etc.)	Disassemble, clean* and/or blow clear. (Caution: Use protective eyewear when purging any pressure service)
	Face plate screws are loose	Tighten face plate screws
	Valve body is not installed flush to cover plate	Remove face plate and adjust valve body (Item #14, page 4) outward until flush with face plate

* When cleaning metal parts, adhere to NFPA 99, chapter 5, para 511. "The use of organic solvents, for example, carbon tetrachloride, is prohibited."

Recommendations

SERIES 238, 248, AND 148 QUICK CONNECT OUTLET STATIONS SERIES 236, 246, AND 146 D.I.S.S. OUTLET STATIONS

See MODERNIZATION KITS, FORM NO. 49-00-0001. This Operating and Maintenance Manual shall apply to all MODERNIZED Chemetron outlet stations with the exception of the secondary check valve assembly. Chemetron Medical Division urges the installation of Modernization Kits in all of the Outlet Station Series indicated above. The benefits of modernizing are:

- Improved-appearance
- Current production latching mechanisms
- Readily available repair parts
- Compliance with NFPA 99, para. 433 and CSA Z305.1, para. 12 requirements

Additional Product Information

FORM NO.	DESCRIPTION
10-00.0001	Chemetron Medical Gas Piping Systems
64-00-2000	Replacement Parts For Chemetron (NCG) Quick-Connect Medical Gas Outlets
64-00-2001	Replacement Parts For Chemetron (NCG) D.I.S.S. Medical Gas Outlets
64-00-2002	Operating, Maintenance and Repair Instruction — Nitrogen Station Outlet (Dyna-Con)
49-00-0001	Modernization Kits
64-00-2005	Chemetron Medical Gas Outlet Repair Kit
11-00-0001	Adapters/Couplers/Fittings
11-00-2000	Vacuum Bottle Holder Adapters and OR Couplers Parts List

The seller makes no warranties, express or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose, except as expressly stated in seller's sales contract or sales acknowledgement form.

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