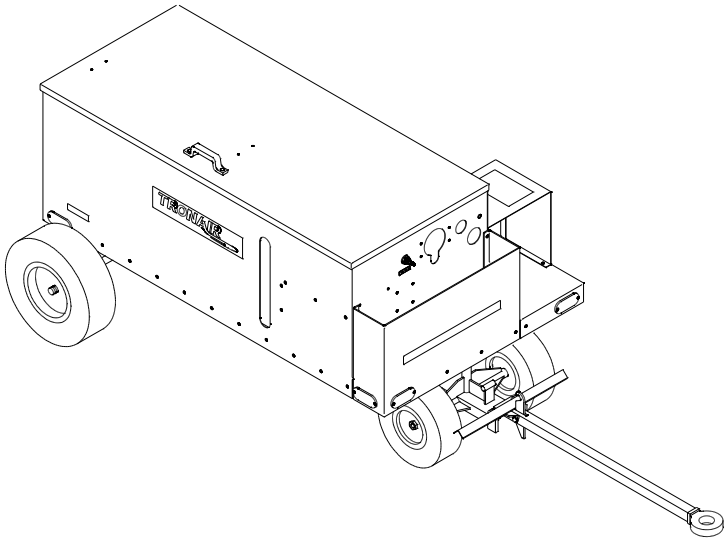
Operation & Service Manual



Models: 06-5036-8610 Series
Reservoir Servicing Unit

06/2014 – Rev. 11

Includes Illustrated Parts List

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REVISION	DATE	TEXT AFFECTED
10	03/2009	Modified APPENDIX IV
11	06/2014	Modified Parts List

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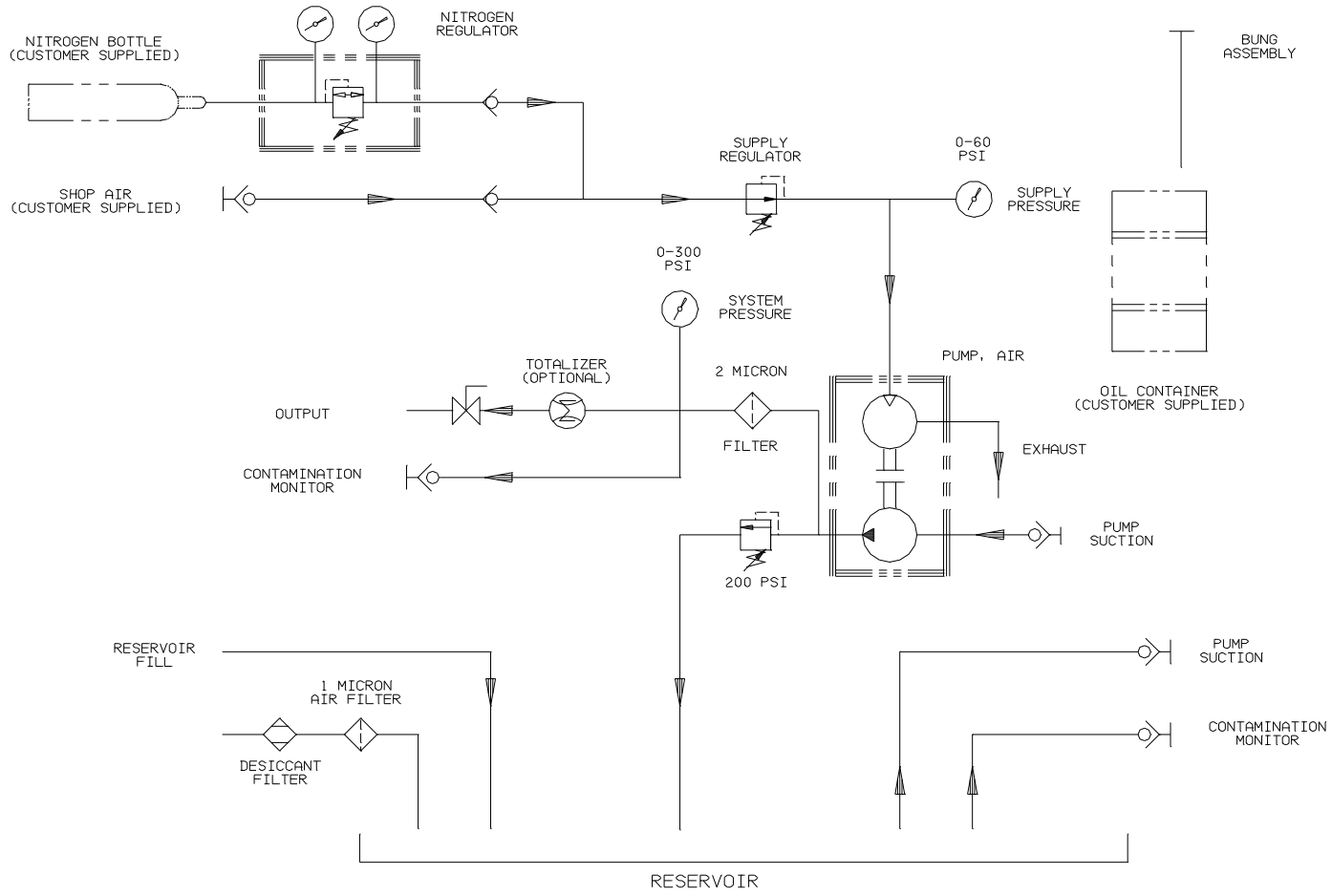
Hydraulic Schematic



This product can not be modified without the written approval of Tronair, Inc. Any modifications done without written approval voids all warranties and releases Tronair, Inc., its suppliers, distributors, employees, or financial institutions from any liability from consequences that may occur. Only Tronair OEM replacement parts shall be used.

1.0 GENERAL DESCRIPTION

The Tronair Reservoir Service Unit is a compact unit primarily designed to provide a source of clean fluid for filling reservoirs. It is not intended to perform any pressure testing tasks.

2.0 SPECIFICATIONS

Fluid:		Phosphate Ester
Maximum Pressure:		200 psi
Filter:		2 micron
Dimensions:	Wide	50 in (127 cm)
	Long	73 in (185.4 cm)
	High	50 in (127 cm)
Weight:		390 lbs
Pump Displacement:		10.0 gpm @ 100 psi. (Displacement will decrease with increase in back pressure)

3.0 FEATURES

- Model ***06T5036-8610*** includes Totalizer (See Section 9.1)
- Model ***06Q5036-8610*** includes Bulkhead Quick Disconnect Option (See Section 9.2)
- Model ***06B5036-8610*** includes Totalizer and Bulkhead Quick Disconnect Options (See Section 9.3)
- 15 foot Output Hose
- 2 micron Main Filter
- Adjustable Pressure Regulator
- 68 gallon Fluid Reservoir
- Hose Compartment
- Pneumatic Tires
- Parking Brake
- Easy loading of Nitrogen bottle
- Pneumatic Pump driven by Customer supplied 230 cubic foot Nitrogen Bottle or Shop Air.
- Reservoir filling

4.0 PREPARATION FOR USE

CAUTION!

Maximum towing speed is 10 mph.

The unit is shipped fully assembled, and only the following steps are required to make it operational:

1. Install standard 230 cubic foot Nitrogen bottle onto unit (See 5.0 Nitrogen Bottle Installation).
2. Fill 68 gallon fluid tank with desired Phosphate Ester hydraulic fluid.
3. Pump one quart of fluid prior to use to rinse hoses.

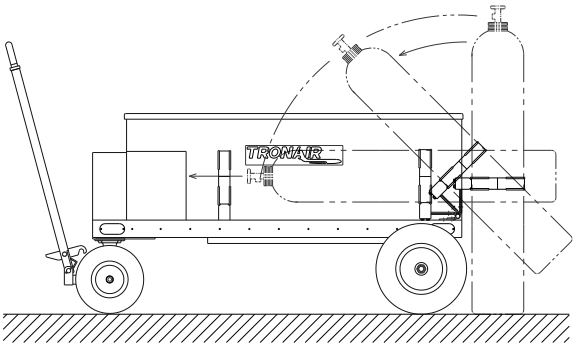
CAUTION!

Only use the type of fluid for which the unit is designed.

Using other fluids will cause contamination and seal deterioration.

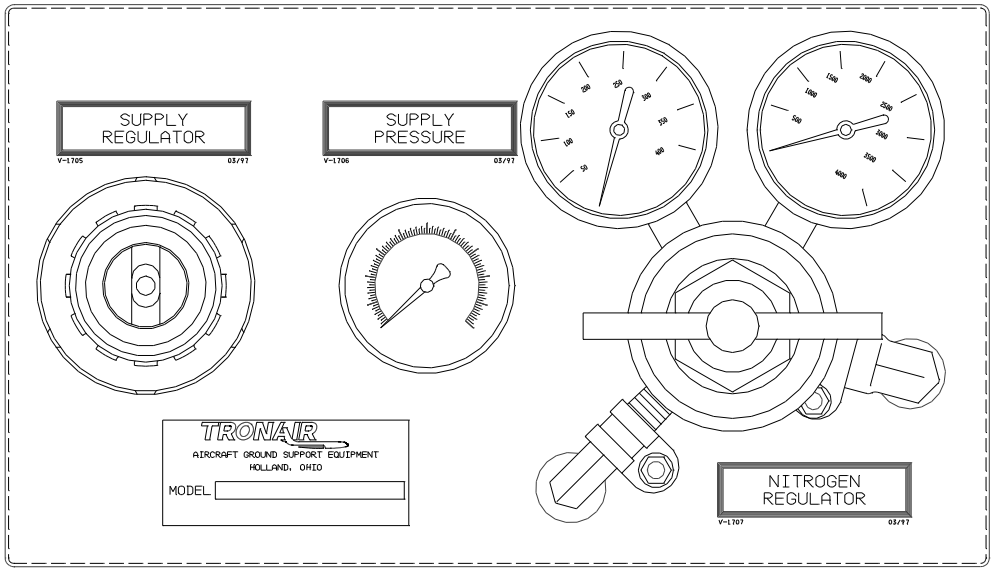
5.0 NITROGEN BOTTLE INSTALLATION

1. Position Nitrogen bottle in front of bottle clamp. ***Reference illustration.***
2. Position bottle stop away from bottle clamp.
3. Rotate bottle clamp to vertical position and clamp securely around standard 230 cubic foot Nitrogen bottle.
4. Rotate bottle to horizontal position on bottle supports.
5. Relieve clamp pressure and slide nitrogen bottle toward front of cart until bottle rests against the front stop. Rotate bottle until output valve is in line with cart nitrogen input line.
6. Re-secure bottle clamp.



Nitrogen Bottle Installation

6.0 RESERVOIR FILLING PROCEDURE



Front Panel

1. Ensure ball valve at aircraft end of output hose is closed.
2. Remove bung fitting assembly from underside of lid.
3. Remove dust cap on the end of the 120 inch long hose connected to the pump and install the bung fitting assembly to hose.
4. Secure the bung fitting assembly into container of desired clean hydraulic fluid.
5. Connect aircraft end of output hose to customer supplied bulkhead on front panel of cart.
6. Open nitrogen bottle valve and set low pressure gauge on nitrogen regulator to same pressure as shop air (approximately 80 – 100 psi) and leave regulator at this setting. Connect shop air.
7. Set supply regulator until supply pressure gauge reads 25 psi for recommended input pressure. Do not exceed 30 psi maximum.
8. Open ball valve at aircraft end of output hose to fill the reservoir.
9. Decrease input pressure regulator as reservoir becomes filled.
10. Close ball valve at aircraft end of output hose when the reservoir is full.
11. Close Nitrogen bottle valve (Do not disturb Nitrogen Regulator). Disconnect shop air.
12. Remove Bung Fitting Assembly from hydraulic fluid source and wipe clean.
13. Replace bung fitting assembly to holder under the lid.
14. Disconnect aircraft end of output hose from customer supplied bulkhead on front panel of cart.
15. Connect the 120 inch long hose to the mating quick disconnect fitting on top of the reservoir.

7.0 OPERATION

Aircraft Fill Procedure:

1. Make sure ball valve at aircraft end of output hose is closed.
2. Connect output hose to aircraft reservoir.
3. Open nitrogen bottle valve. If required, set low pressure gauge on Nitrogen regulator to same pressure as shop air (80 – 100 psi). Connect shop air.
4. If required, adjust supply regulator until supply pressure gauge reads 25 psi for recommended input pressure. Do not exceed 30 psi maximum.
5. Open ball valve at aircraft end of output hose to fill the aircraft reservoir.
6. Close ball valve when aircraft reservoir is full.
7. Close Nitrogen bottle valve (Do not disturb Nitrogen Regulator) disconnect or shut off shop air.
8. Slowly disconnect output hose and remove from aircraft reservoir.

8.0 MAINTENANCE

General Maintenance: Maintain 45 – 50 psi tire pressure and grease wheel bearings quarterly.

8.1 FILTERS

The 2 micron hydraulic fluid filter is non-bypass. This means that, if the filter becomes clogged, no fluid will pass through it to the output hose. If this happens, service the filters. **DO NOT** increase the input pressure as damage to components could result.

The main filter is replaceable and should be serviced annually or as necessary based on existing operating environment.

8.2 FLUID IN RESERVOIR

Connect aircraft end of output hose to customer supplied bulkhead on front panel of cart while 120 inch long hose is still connected to top of the reservoir, and cycle the pump for about 10 to 15 minutes. Ensure ball valve is open and does not exceed 30 psi on the supply pressure gauge.

9.0 OPTIONS

The following Options are available on 06-5036-8610 Series Reservoir Service Units. Refer to the appropriate option description for operation information.

9.1 TOTALIZER (MODEL 06T5036-8610)

The Totalizer indicates amount of fluid dispersed. After each use, the pointer must be reset to zero for an accurate reading during next use. Refer to Parts List for replacement parts.

9.2 BULKHEAD QUICK DISCONNECT (MODEL 06Q5036-8610)

Self Cleanup Loop: Connect aircraft end of output hose to bulkhead on front panel of cart while 120 inch long hose is still connected to top of the reservoir, and cycle the pump for about 10 to 15 minutes. Ensure ball valve is open and not to exceed 30 psi on the supply pressure gauge.

9.3 TOTALIZER & BULKHEAD QUICK DISCONNECT (MODEL 06B5036-8610)

This model contains Options described in Sections 9.1 and 9.2.

10.0 PARTS LIST

Reference following pages for ordering information of Replacement Parts and Kits.

11.0 GUARANTEES/LIMITATION OF LIABILITY

Tronair products are warranted to be free of manufacturing or material defects for a period of one year after shipment to the original customer. This is solely limited to the repair or replacement of defective components. This warranty does not cover the following items:

a) Parts required for normal maintenance
b) Parts covered by a component manufacturers warranty
c) Replacement parts have a 90-day warranty from date of shipment

If you have a problem that may require service, contact Tronair immediately. Do not attempt to repair or disassemble a product without first contacting Tronair, any action may affect warranty coverage. When you contact Tronair be prepared to provide the following information:

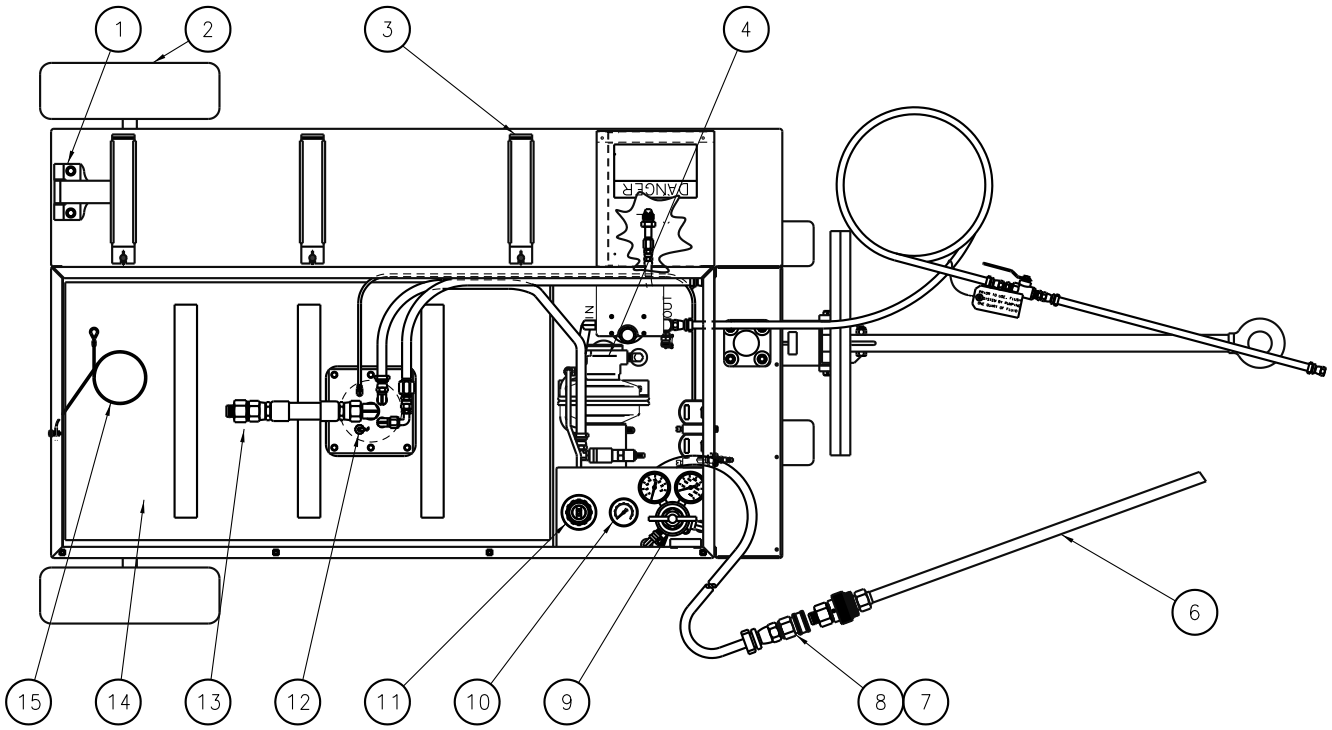
a) Product Model Number
b) Product Serial Number
c) Description of the problem

If warranty coverage is approved, either replacement parts will be sent or the product will have to be returned to Tronair for repairs. If the product is to be returned, a Return Material Authorization (RMA) number will be issued for reference purposes on any shipping documents. Failure to obtain a RMA in advance of returning an item will result in a service fee. A decision on the extent of warranty coverage on returned products is reserved pending inspection at Tronair. Any shipments to Tronair must be shipped freight prepaid. Freight costs on shipments to customers will be paid by Tronair on any warranty claims only. Any unauthorized modification of the Tronair products or use of the Tronair products in violation of cautions and warnings in any manual (including updates) or safety bulletins published or delivered by Tronair will immediately void any warranty, express or implied.

The obligations of Tronair expressly stated herein are in lieu of all other warranties or conditions expressed or implied. **Any unauthorized modification of the Tronair products or use of the Tronair products in violations of cautions and warnings in any manual (including updates) or safety bulletins published or delivered by Tronair will immediately *void any warranty, express or implied* and Tronair *disclaims any and all liability for injury (WITHOUT LIMITATION and including DEATH), loss or damage arising from or relating to such misuse*.**

Parts List

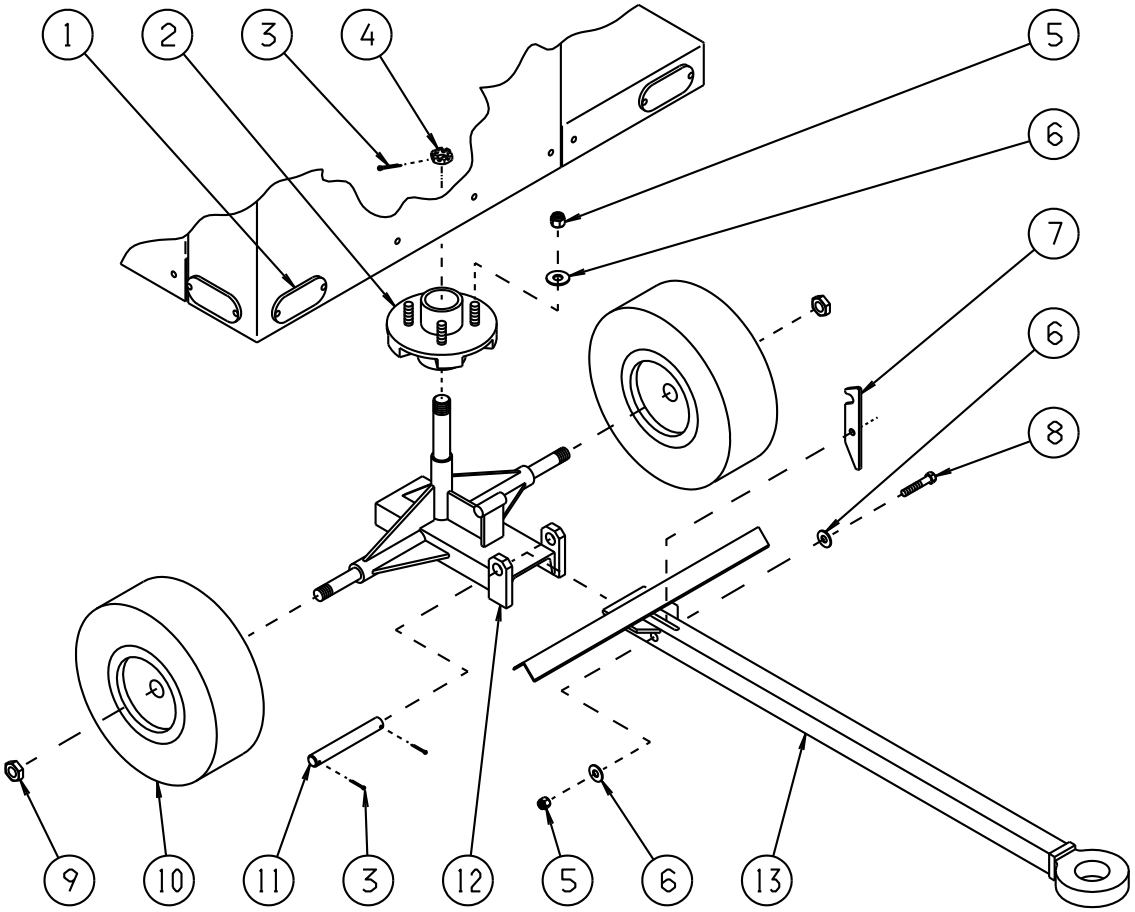
When ordering Replacement Parts/Kits, please specify Model, Color & Serial Number of your unit.



Item	Part Number	Description	Qty
2	Z-1217	Assembly, Tire Wheel & Bearing	2
3	H-2359	Clamp, Bottle	1
4	PC-1070	Pump, Air (12 gpm, 650 psi)	1
5	HC-1622	Gauge, Pressure 2.5 x 300 psi	1
6	Z-3653-02	Assembly, Bung Fitting **(EPR)**	1
7	N-2438-04	Plug, Dust 1.0 Quick Disconnect	1
8	N-2430-1616	Coupling, Q.D. #16 JIC * 1.0 **(Phosphate Ester)**	1
9	H-1677	Regulator	1
10	HC-1444	Gauge, Pressure	1
11	PC-1071	Regulator, Air, 3/8 NPT	1
12	N-2429-1616	Nipple, Q.D. #16 JIC * 1.0 **(Phosphate Ester)**	1
13	N-2620-02	Coupling, Quick Disconnect **(Phosphate Ester)**	1
14	H-2147	Tank, Machined RSU (68 gallon)	1
15	Z-3016	Assembly, Cable	1
Not Shown	G-1100-105010	Bolt, Hex Head, Grade 5, ¼-20 x 1" long	2
Not Shown	G-1100-106520	Bolt, Hex Head, Grade 5, 5/16-24 x 2" long	2
Not Shown	G-1202-1065	Stopnut, 5/16 Elastic	2
Not Shown	G-1203-1050	Jamnut, ¼-20 Elastic	4
Not Shown	G-1250-1050N	Flatwasher, ¼ Narrow	4
Not Shown	G-1250-1060N	Flatwasher, 5/16 Narrow	2
Not Shown	G-1254-09	Washer, ¼ Fender	4
Not Shown	G-1432-23	Wellnut, ¼-20 x 1.051" long	8
1	**K-4933**	**Kit, Locking Lid Replacement**; includes mounting hardware	1

Parts List

When ordering Replacement Parts/Kits, please specify Model, Color & Serial Number of your unit.

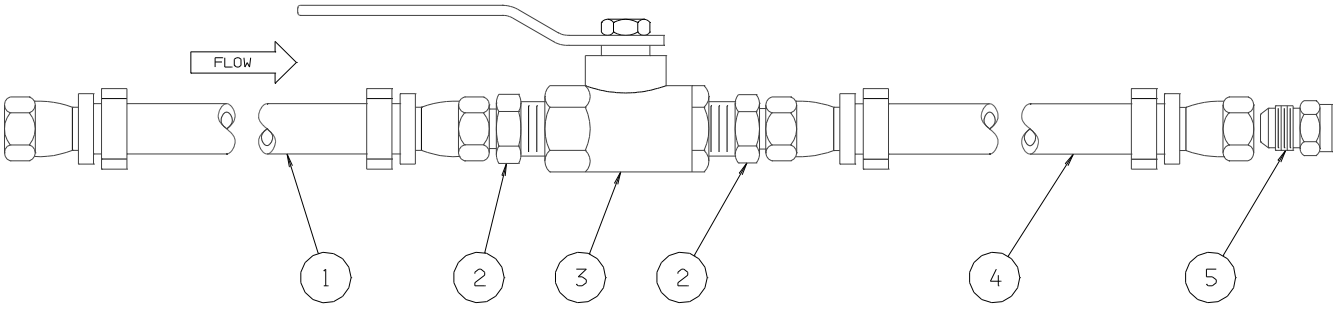


Item	Part Number	Description	Qty
1	H-1427-02	Reflector, Amber	1
2	H-1335	Hub, Idler	1
3	G-1301-03	Pin, 1/8 x 1½" long, Cotter	3
4	G-1230-01	Nut, Axle (1"-14 UNS Thread)	1
5	G-1202-1095	Stopnut, ½-20 Elastic	5
6	G-1250-1090N	Flatwasher, ½ Narrow	5
7	J-1626	Lever	1
8	G-1100-109522	Bolt, Hex Head, Grade 5, ½-20 x 2¼" long	1
9	G-1203-1115	Stopnut, ¾-16 Elastic	1
10	U-1041	Wheel, Pneumatic	1
11	R-1122	Pin	1
12	Z-2449-02	Weldment, Steering Axle	1
13	Z-2451-02	Weldment, Tongue	1
Not Shown	H-1427-01	Reflector, Red	1
Not Shown	G-1352-17	Rivet	*2 required per Reflector*

Internal/External Hoses

Part Number	Location
TF-1041-09*60.0	Reservoir to Valve
TF-1041-21*48.0	Reservoir to Front Panel
TF-1041-09*18.0	Pump to Filter
TF-1041-05*16.0	Filter to Pressure Gauge
TF-1016-02*30.0	Air Regulator to Pump
TF-1016-02*14.0	Air Regulator to Pressure Gauge
TF-1016-02*06.0	Pump Exhaust
TF-1041-01*10.0	Reservoir to Pump Suction Hose
TF-1041-01*120	Pump Suction Hose
TF-1041-09*180	Front Panel to Ball Valve (Output Hose)
TF-1041-09*24.0	Ball Valve to Test (Output Hose)
TF-1041-05*36.0	Nitrogen Regulator to Nitrogen Bottle

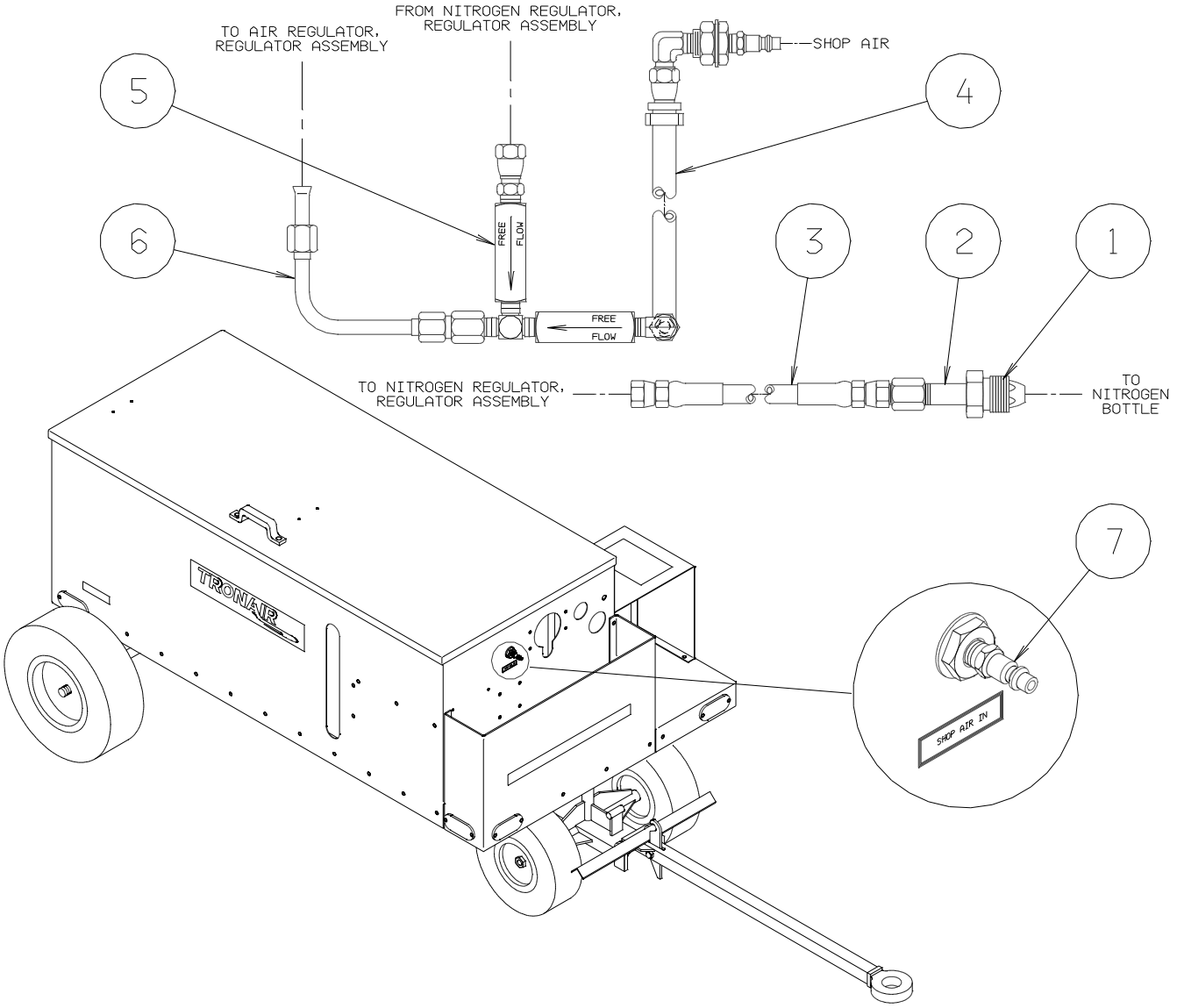
Z-2952 - Output Hose Assembly



Item	Part Number	Description	Qty
1	TF-1041-09*180	Assembly, Hose, ½" diameter x 180" long	1
2	N-2009-14-S	Connector, Male #8 JIC x ½ NPT	2
3	HC-1425-03	Valve, Ball, ½ NPT	1
4	TF-1041-09*24.0	Assembly, Hose, ½" diameter x 24" long	1
5	N-2052-07	Reducer, Tube End #8 x #6 JIC	1

Z-2844 - Check Valve Assembly

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.

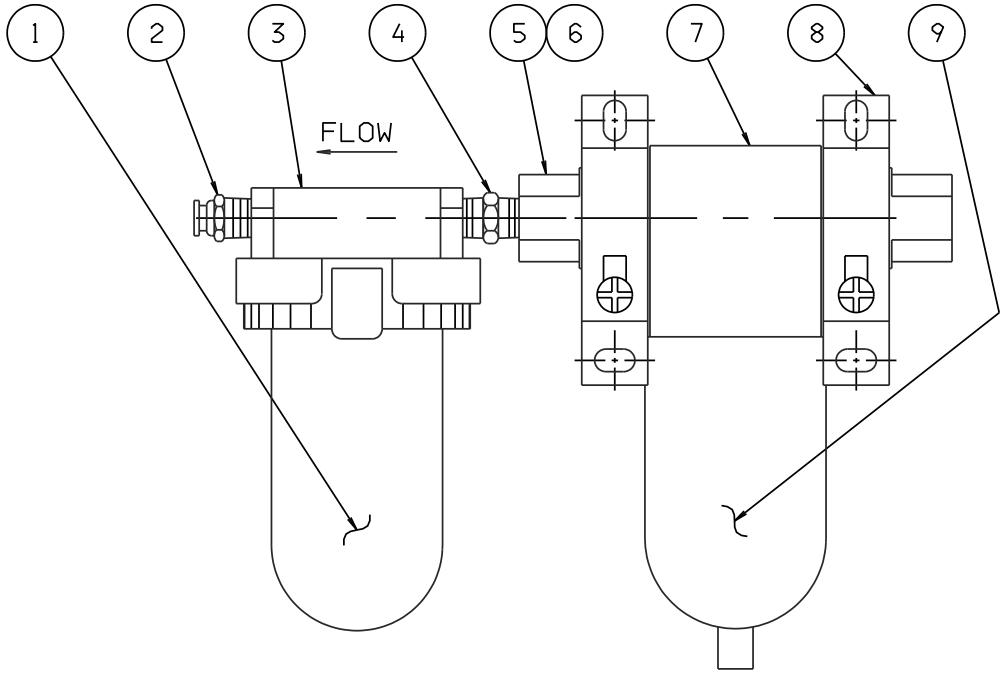


Fluid: Phosphate Ester

Item	Part Number	Description	Qty
1	PC-1001	Nut	1
2	PC-1000	Nipple	1
3	TF-1041-05*36.0	Assembly, Hose, #4 JIC x 36" long	1
4	HC-1080	Check Valve	2
5	TF-1067-01*30.0	Assembly, Hose, #6 JIC x 30" long	1
6	Z-3787	Assembly, Tube	1
7	PC-1058	Fitting, Air Quick Disconnect	1

Z-2949 - Desiccant Filter Assembly

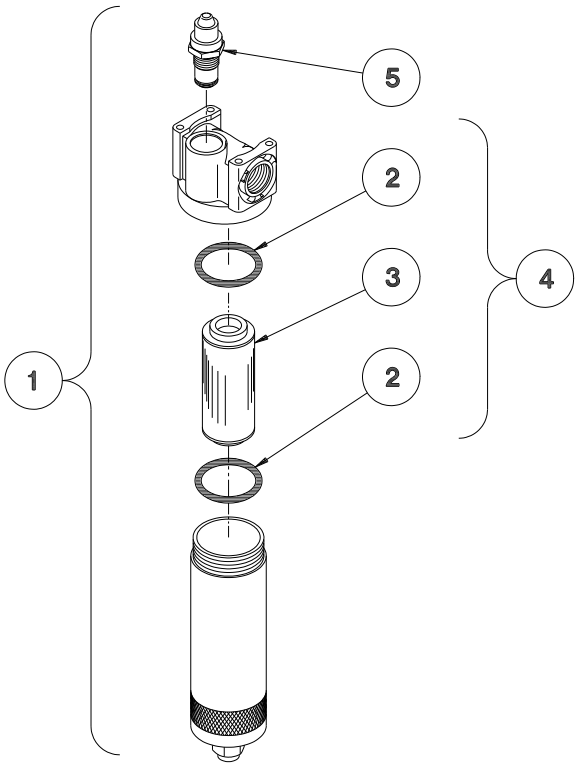
When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



Item	Part Number	Description	Qty
1	PC-1056	Desiccant, (3) ¼ lb bags	1
2	N-2443-08	Connector, Male	1
3	PC-1053	Dryer, Desiccant	1
4	N-2203-04-B	Nipple, Pipe	1
5	PC-1055	Block, End (Set of 2)	1
6	HC-2007-021	O-ring, Viton	2
7	PC-1052	Filter, Air	1
8	PC-1054	Bracket, Mount	2
9	PC-1059	Element, Filter	1

Pressure Filter

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.

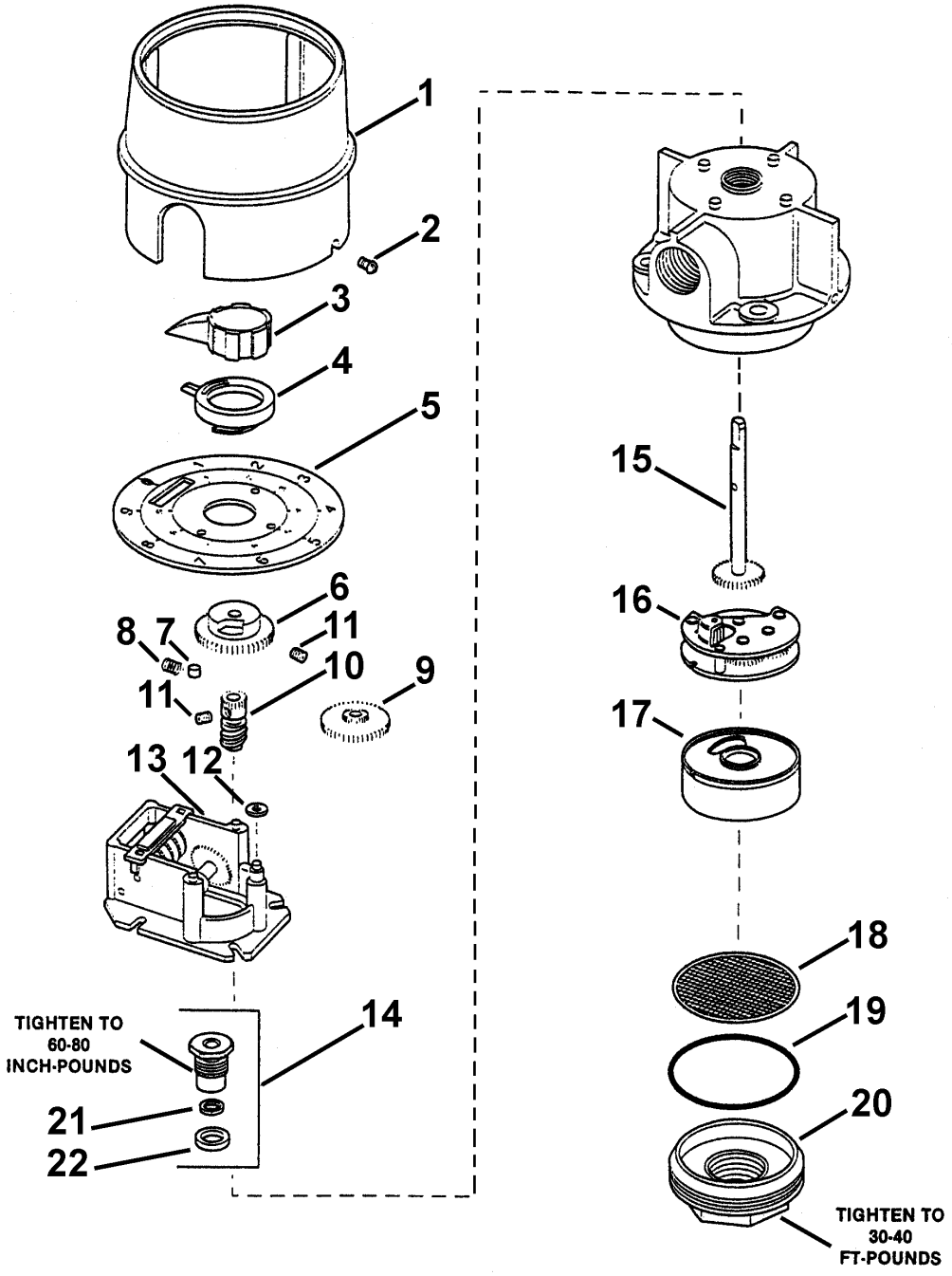


Item	Part Number	Description	Qty
1	HC-1756	Filter, #12 * 800 PSI **(Phosphate Ester)**	1
♦ 2	HC-2006-142	O-Ring, Series 2 **(EPR)**	2
♦ 3	HC-1885	Filter Element **(Phosphate Ester)**	1
5	HC-1851	Indicator, Clogging **(Phosphate Ester)**	1
6	K-3241	Kit, Filter Element **(Phosphate Ester)**	1
Not Shown	K-1510	Kit, O-ring/Clogging Indicator **(Phosphate Ester)**	1

♦ ***Item 4 consists of Items 2 and 3.***

Totalizer Option

When ordering Replacement Parts/Kits, please specify Model & Serial Number of your product.



Totalizer Option

Item		Part Number	Description	Qty
1	N/A	66871-13	Shroud	1
2	N/A	66871-5	Screw (2)	2
3	N/A	242912	Knob Assembly	3
4	N/A	66871-53	Pointer	4
5	N/A	68410-26	Dial Assembly	5
6	N/A	66871-50	Cam	6
7	N/A	66871-4	Clutch Roller	7
8	N/A	66871-3	Spring	8
9	N/A	66871-17	Gear	9
10	N/A	66871-54	Worm	10
11	N/A	50541	Set Screw (2)	11
12	N/A	69304-23	Spacer	12
13	N/A	69795-3	Totalizer	13
14	Phosphate Ester	N/A	*See Items 21 & 22*	14
15	N/A	66871-111	Spindle	15
16	N/A	66871-136	Gear Train Assembly	16
17	N/A	66871-25	Chamber Assembly	17
18	N/A	66871-92	Screen	18
19	Phosphate Ester	HC-2006-223	O-ring	19
20	N/A	41204	Housing Cap	20
21	Phosphate Ester	HC-2006-008	O-ring	21

TRONAIR®

APPENDIX I

Wilkerson
Manual Desiccant Dryer
Installation and Maintenance
Data
&
MSDS: Desiccant Gel

WILKERSON CORPORATION

INSTALLATION AND MAINTENANCE SHEET

Manual Desiccant Dryer Models X06, X03, X04 AND X25 With Variations and Accessories

⚠ WARNING ⚠

Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

Description

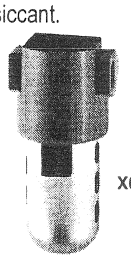
Wilkerson manual dryers are intended to remove water vapor from the compressed air system. Atmospheric dew points as low as -100°F (-73°C) are achievable when operated within rated unit specifications.

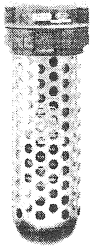
General Safety Information

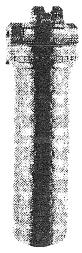
⚠
- **RELEASE ALL AIR PRESSURE FROM INTENDED AIRLINE BEFORE INSTALLATION.**
- Install unit in air line before opening desiccant container. After unit installation, add desiccant following steps in desiccant replacement instructions on page 2.
- Always make sure bowl, bowl guard, and clamp ring are in place and the clamp ring is securely locked before pressurization.
- DO NOT exceed the pressure and temperature ratings as shown in the specifications.
- Follow all local, state and federal EPA, OSHA, and similar codes regarding disposal of old desiccant.

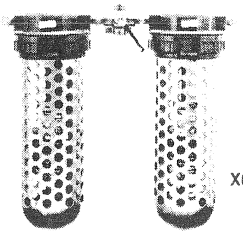
Installation

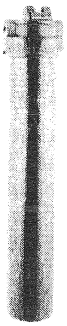
1. **Refer to warning** *(on page 6).*
2. Install as close as possible to the point where the air is being used.
3. Install unit with the airflow going in the direction of the arrow. For the X04, install with airflow entering at the bottom center port of the 4-way valve and exiting at the center port of the shuttle valve.
4. Install unit on air line before opening desiccant container. After installation, add desiccant. Shake and tap bowl while filling to settle desiccant. Fill Model X25 and X03/X04 to 1/8" below inner shoulder of bowl. Fill Model X06 bowl to within 1/2" of top.
5. Replace bowl and bowl guard, or metal bowl, and clamp ring onto the unit. Be sure clamp ring is securely locked in place before pressurizing unit.
6. Most manual desiccant dryer users will achieve optimal results when installing the dryer as close to the equipment or process being protected as possible in the compressed air system. Most users, especially those with high quality air requirements, should protect their system and the manual dryer with one or more of the following types of components: **Please see page 4 for exact model recommendations.**
   - **Liquid Separator:** Should be used prior to the manual desiccant dryer in any system where large slugs of liquid water are anticipated. The manual desiccant dryer silica gel or mole sieve can be destroyed by large amounts of liquid moisture. Most systems which have an aftercooler and separator, and/or a refrigerated air dryer, will not require a liquid separator. An alternative is to use a particulate filter/separator, described on page 2.


X06


X03 with plastic bowl


X03 with metal bowl


X04


X25 with metal bowl

Specifications	X06	X03 plastic bowl	X03 metal bowl	X04	X25 metal bowl
Maximum Pressure	150 psig (10,3 bar)	150 psig (10,3 bar)	150 psig (10,3 bar)	150 psig (10,3 bar)	150 psig (10,3 bar)
Maximum Temperature	125°F (52°C)	125°F (52°C)	150°F (66°C)	125°F (52°C)	150°F (66°C)
Atmospheric Dewpoint* 000 Model: Silica Gel	000 Model: -45°F (-43°C)	000 Model: -45°F (-43°C)	M00 Model: -45°F (-43°C)	000 Model: -45°F (-43°C)	000 Model: -45°F (-43°C)
U00 Model: 4A Molecular Seive	U00 Model: -100°F (-73°C)	U00 Model: -100°F (-73°C)	MU0 Model: -100°F (-73°C)	U00 Model: -100°F (-73°C)	U00 Model: -100°F (-73°C)
Maximum Continuous Airflow*	5 scfm (2,3 dm^3/s)	10 scfm (4,7 dm^3/s)	10 scfm (4,7 dm^3/s)	10 scfm (4,7 dm^3/s)	25 scfm (11,8 dm^3/s)
Total Airflow*	600 scf (283 dm^3)	4400 scf (2076 dm^3)	4400 scf (2076 dm^3)	4400x2 scf (2076x2 dm^3)	11,000 scf (5191 dm^3)
Total Min. of Operation @ Max Continuous Airflow	120 min.	440 min.	440 min.	880 min.	440 min.
Unit Weight With Desiccant	1.13 lbs. (0,51 kg)	7.4 lbs. (3,4 kg)	6.8 lbs. (3,1 kg)	15.0 lbs. (6,8 kg)	11.2 lbs. (5,1 kg)
Desiccant Weight (Alone)	0.25 lbs. (0,11 kg)	1.8 lbs. (0,8 kg)	1.8 lbs. (0,8 kg)	35 lbs. (3,6 kg)	4.4 lbs. (2,0 kg)
Pipe Connections	1/4" NPT (BSPP)	1/4", 1/2" NPT (BSPP)	1/4", 1/2" NPT (BSPP)	1/4", 1/2" NPT (BSPP)	1/2" NPT (BSPP)

*With Dry Desiccant at 100 psig (7 bar) and 70°F (21°C)

83-050-000 2/98
Printed in the U.S.A

MODELS X06, X03, X04, AND X25

- **Particulate Filter/Separator:** Should be used prior to the manual desiccant dryer in any system where significant amounts of dirt, pipe scale, etc, and/or liquid water, is present , in order to prevent clogging the manual dryer or harming the desiccant. A particulate filter/separator should be used prior to a coalescing filter to extend the life of the coalescing element.
- **Coalescing Filter:** Should be used prior to the manual desiccant dryer in any lubricated compressor system which does not utilize a system coalescing filter. The coalescing filter removes oil from the compressed air, which prevents the oil from coating the silica gel or mole sieve and destroying its ability to dry the air. Oil contaminated desiccant must be replaced and disposed of properly, as it cannot be regenerated.
- **Afterfilter:** Should be used after the manual desiccant dryer in any system where any amount of desiccant dust, however insignificant, is undesirable. The afterfilter prevents the very slight desiccant dusting, which occurs over time, from proceeding downstream into the compressed air system.
- **Pre-Dryers:** Both the silica gel and mole sieve manual desiccant dryers can have their drying lives extended through the use of a pre-dryer. The silica gel ("000"/"M00") models will typically last over three times as long if a refrigerated air dryer is placed in the compressed air system prior to it. (A plant air system refrigerated dryer will provide the same extended life.) The mole sieve ("U00"/"MU0") models will typically last three times as long if a silica gel ("000"/"M00") model dryer installed prior to the mole sieve dryer. (A plant air system desiccant dryer will provide the same extended life.) Users of either type of manual desiccant dryer who expect a high air flow demand may wish to consider using a pre-dryer. **Please see page 4 for exact model recommendations.**

Operation

1. The silica gel desiccant, when visible through the clear polycarbonate plastic bowl, contains a color indicator. It changes from Blue (meaning dry) to Pink (meaning wet) to indicate the need to replace or regenerate the desiccant. (An X05-02-000 moisture indicator can be used with 4A molecular sieve units to perform the same function.) On units with metal bowls, a moisture indicator mounted on the cover performs the same color changing function.
2. The 4 A molecular sieve does not change color. For moisture indication an X05-02-000 is recommended. See page 4.
3. By installing two or more units in parallel, higher dry airflows can be achieved.

Maintenance

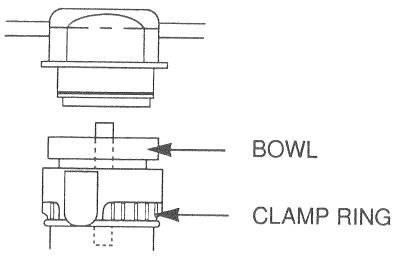
1. The only servicing required for silica gel units is when the desiccant color or moisture indicator has changed from Blue (meaning dry) to Pink (meaning wet). Should this color change occur:

⚠ **a. Turn off and depressurize the line containing the dryer unit.**

   b. Loosen the clamp ring and remove the bowl from the top housing. (Fig. 1) Proceed to step 2 or 3, as required.

2. Desiccant replacement:
   a. Pour out used desiccant.
   b. Open new container and refill bowl. (Fig. 2)
   c. Shake or tap bowl to settle desiccant. Add or remove sufficient quantity to fill Model X03 and X25 unit bowl to 1/8" below inner step, and for Model X06 fill bowl to within 1/2" of the top. (Fig. 3)
   d. See replacement parts list for specifics on kit numbers for replacement desiccant.
3. Desiccant regeneration:
   a. — **For silica gel ("000") units: Pour out used Pink desiccant onto flat pan. Place Pink desiccant in 350°F (176°C) oven for approximately three hours or until the desiccant color has changed back to Blue.**
      — **For 13x molecular sieve ("X00") units cannot be regenerated. See page 5 for replacement kits.**
      — **For 4A molecular sieve ("U00") units: Pour out used desiccant onto flat pan. Place desiccant in 600°F (316°C) oven for up to a maximum of 3 hours.**
   b. Remove desiccant from oven and allow to cool down to ambient temperature.
   c. Pour desiccant back into unit bowl, periodically shaking and tapping to settle the desiccant.
4. Replace bowl and bowl guard, or metal bowl, and clamp ring onto the unit. Be sure clamp ring is securely locked in place before repressurizing the unit.

Fig. 1



X03/X04/X25

Fig. 2

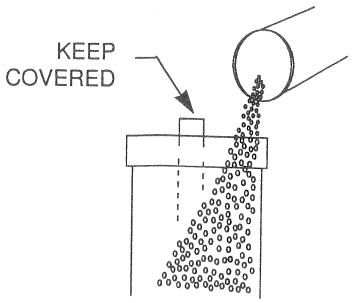
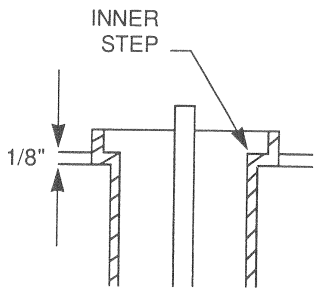
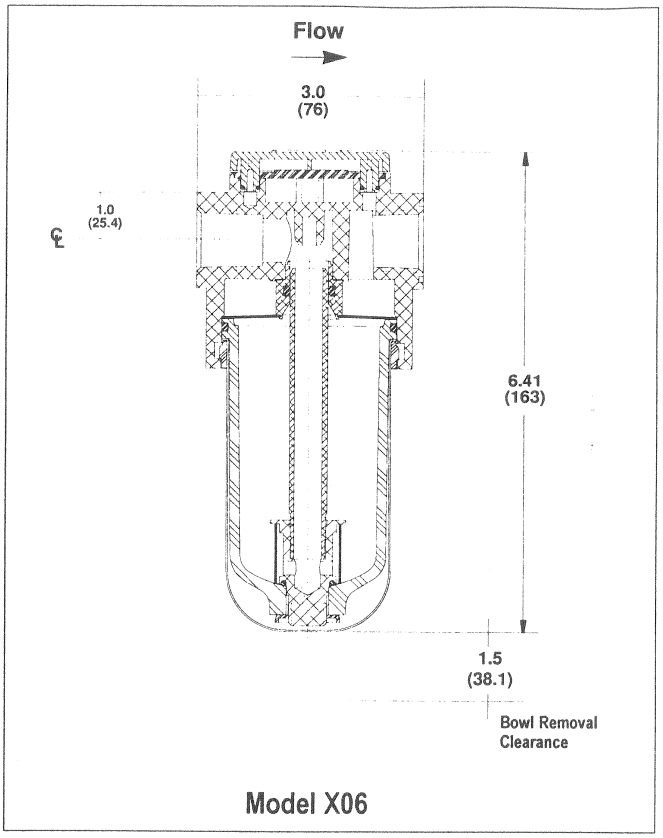


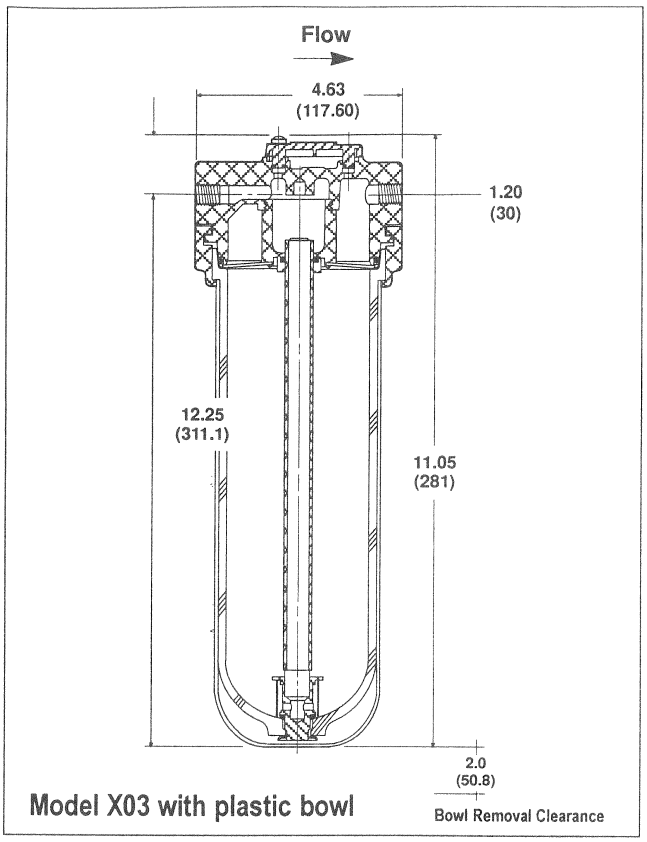
Fig. 3



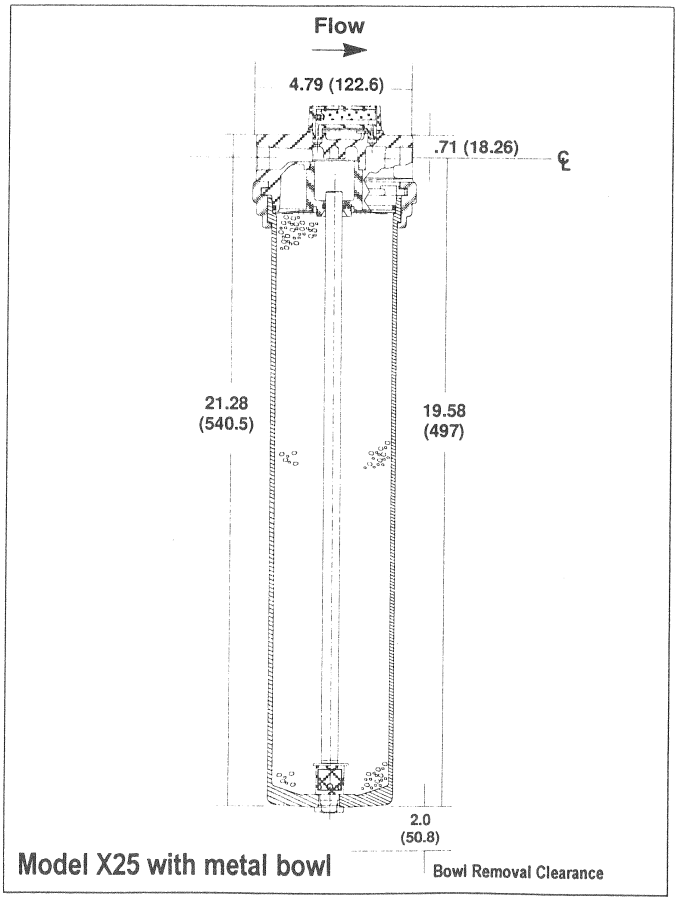
X03/X04/X25



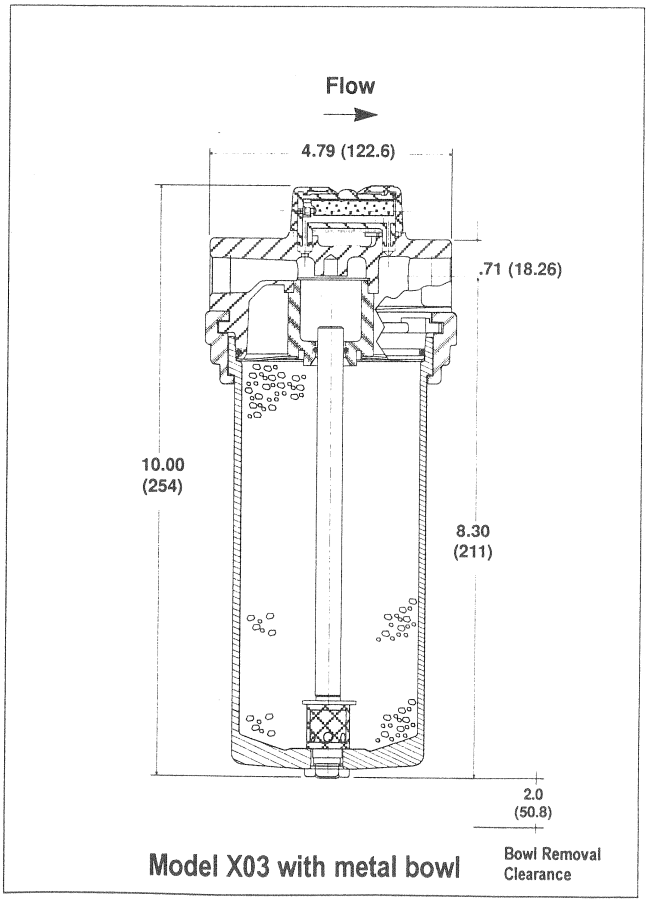
Model X06



Model X03 with plastic bowl



Model X25 with metal bowl



Model X03 with metal bowl

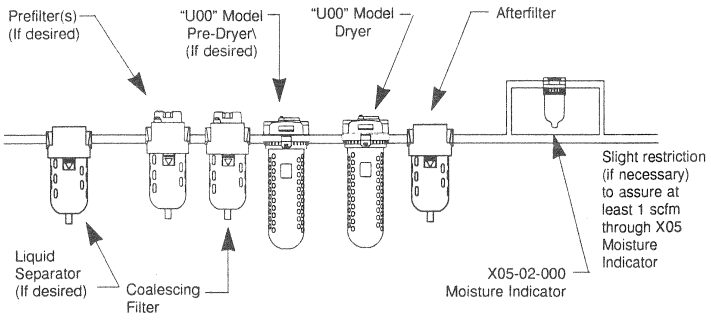
Recommended Liquid Separators, Filters and Pre-Dryers

(use as necessary for specific system requirements)

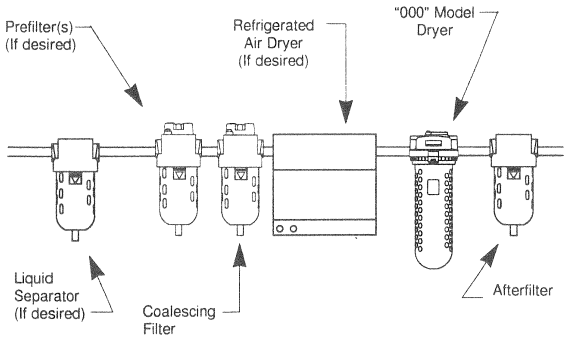
Manual Desiccant Dryer Model Used	Liquid Separator	Particulate Filter/Separator (5 micron)	Coalescing Filter (0.5 micron)	Afterfilter (0.5 micron)	Pre-Drying Manual Desiccant or Refrigerated Air Dryer, For Extended Life	Total Desiccant Life if Pre-Drying Dryer Used
Silica Gel For -45°F (-42°C) Atmospheric Dewpoint:						
X06-02-000	WSA-02-FM0	F16-02-F00	M16-02-FS0	AF1-02-S00	WRA-0010	2200 SCF
X03-XX-000/M00	WSA-XX-FM0	F16-XX-F00/M00	M16-XX-FS0/MS0	AF1-XX-S00	WRA-0010	16,000 SCF
X04-02-000	WSA-02-FM0	F16-02-F00	M16-02-FS0	AF1-02-S00	WRA-0010	32,000 SCF (16,000x2)
X25-04-000	WSA-04-FM0	F26-04-FM0	M26-04-FMS	AF2-04-S00	WRA-0025	40,000 SCF
Type 4A Molecular Model Sieve For -100°F (-73°C) Atmospheric Dewpoint:						
X06-02-U00	WSA-02-FM0	F16-02-F00	M16-02-FS0	AF1-02-S00	X06-02-000	1800 SCF
X03-XX-U00/MU0	WSA-XX-FM0	F16-XX-F00/M00	M16-XX-FS0/MS0	AF1-XX-S00	X03-XX-000/M00	13,200 SCF
X04-02-U00	WSA-02-FM0	F16-02-F00	M16-02-FS0	AF1-02-S00	X04-02-000	26,400 SCF (13,200x2)
X25-04-U00	WSA-04-FM0	F26-04-FM0	M26-04-FMS	AF2-04-S00	X25-04-000	33,000 SCF

Typical Installation Arrangement For Manual Dryers

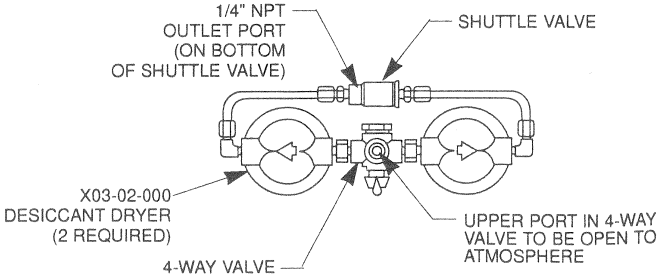
"U00"/"MU0" Models:

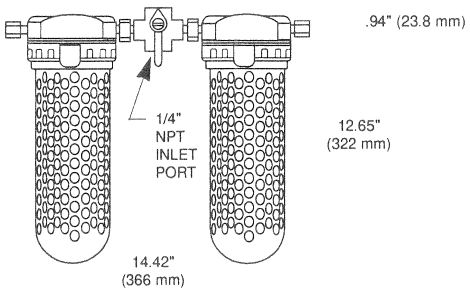


"000"/"M00" Models:



X04-02-000 DRYER

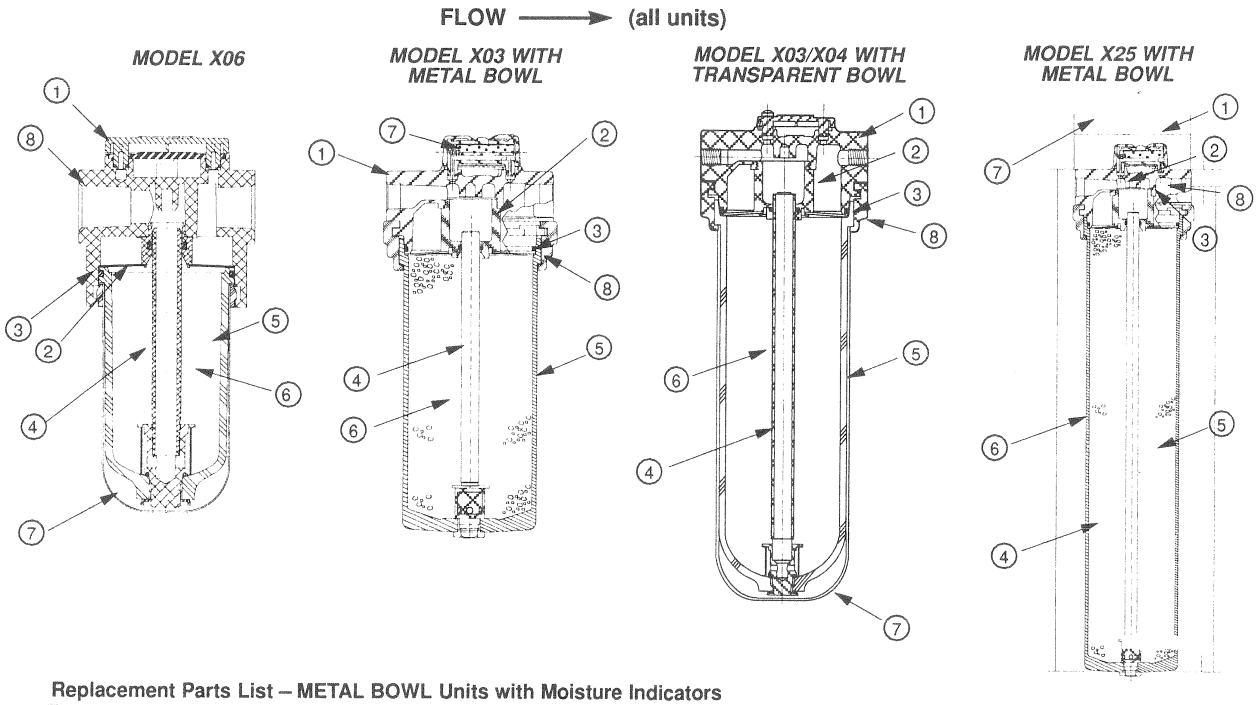




Replacement Parts List — TRANSPARENT BOWL Units with Bowl Guards

	Description	Part No. X06	Qty.	Part No.	X03 Qty.	X04 Qty.
1	Cover	NNR	–	NNR	–	–
2	Screen Assembly	NNR	–	NNR	1	2
3	Bowl O-Ring	GRP 95-259	1	GRP-95-256	1	2
4	Tube Assembly w/screen	N/A	1	DRP-96-435	1	2
5	Transparent Bowl	N/A	1	GRP 95-871	1	2
6	Silica Gel (000)	DRP-95-303	3 Charges[1]	DRP-85-059	4 Charges[1]	2 Charges[1]
	4A Molecular Sieve (U00)	DRP-95-304	3 Charges[1]	DRP-85-060	4 Charges[1]	2 Charges[1]
	13x Molecular Sieve (X00)	DRP-95-305	3 Charges[1]	DRP-85-061	4 Charges[1]	2 Charges[1]
7	Bowl Guard	GRP-95-846	1	DRP-95-810	1	2
8	Clamp Ring	NNR	–	GRP-96-404	1	2

[1] **Note: One charge equals one refill of desiccant for unit specified.**



Replacement Parts List – METAL BOWL Units with Moisture Indicators

	Description	Part No. X03	Qty.	Part No. X25	Qty.
1	Cover	NNR	–	NNR	–
2	Screen Assembly	GRP-96-434	1	GRP-96-434	1
3	Bowl O-Ring	GRP 95-256	1	GRP-95-256	1
4	Tube Assembly w/Screen	DRP-96-451	1	DRP-95-622	1
5	Metal Bowl	DRP-96-450	1	NNR	–
6	Silica Gel (000)	DRP-85-059	4 Charges[1]	DRP-85-280	3 Charges[1]
	4A Molecular Sieve (U00)	DRP-95-060	4 Charges[1]	DRP-95-624	3 Charges[1]
	13x Molecular Sieve (X00)	DRP-95-061	4 Charges[1]	N/A	–
7	Moisture Indicator **	DRP-95-623	1	DRP-95-623	1
8	Clamp Ring	GRP-96-404	1	GRP-96-404	1

[1] **Note: One charge equals one refill of desiccant for unit specified.**

NNR: Not normally replaced

** The moisture indicator contains a weep orifice to provide an air sample to the moisture indicating paper. Air leakage from this indicator is necessary and normal.

Wilkerson Warranty

Wilkerson products are warranted to be free from defects in material and workmanship, under proper use, installation, application and maintenance in accordance with Wilkerson's written recommendations and specification for a period of one year from the date of shipment from the factory (refrigerated dryers are warranted for 2 years). Wilkerson's obligation under this warranty is limited to, and the sole remedy for any such defect shall be, the repair or replacement (at Wilkerson's option) of unaltered products returned to Wilkerson and proven to have such defect, provided such defect is promptly reported to Wilkerson within said one-year period.

This is the only authorized Wilkerson Warranty and is in lieu of all other express or implied warranties or representations, including any implied warranties of merchantability or fitness, or of any other obligations on the part of Wilkerson.

Warranty claims must be submitted and shall be processed in accordance with Wilkerson's established warranty claim procedure. In no event will Wilkerson be liable for business interruptions, loss of profits, personal injury, costs of delay or for any other special, indirect, incidental or consequential losses, cost or damages.

Warning: Use Limitations

Wilkerson's warranties are void, and Wilkerson assumes no responsibility for any resulting cost, loss, injury or any other damages whatsoever, with respect to any plastic bowl unit for which a bowl guard is standard equipment if the unit is placed in service without the bowl guard and, except as otherwise specified in writing by Wilkerson, with respect to any Wilkerson products which are used in other than compressed air service. Specific warnings with respect to these and other use limitations appear elsewhere in this catalog.

Wilkerson maintains a policy of ongoing product development and improvement. We therefore reserve the right to change dimensions specification and design without notice.

Do not place plastic bowl unit in service without bowl guard installed

Plastic bowl units are sold only with bowl guards with the exception to miniature units (C04, F00, L00, & M00). To minimize the danger of flying fragments in the event of plastic bowl failure, the bowl guards should not be removed. If the unit is in service without the bowl guard installed, manufacturer's warranties are void, and the manufacturer assumes no responsibility for any resulting loss.

If the unit has been in service and does not have a bowl guard, order one and install before placing back in service.

Caution

Certain compressor oils, chemicals, household cleaners, solvents, paints and fumes will attack plastic bowls and can cause bowl failure. Do not use near these materials. When bowl becomes dirty replace bowl or wipe only with a clean, dry cloth. Reinstall bowl guard or buy and install a bowl guard. Immediately replace any crazed, cracked, damaged or deteriorated plastic bowl with a bowl or a new plastic bowl and bowl guard.

Caution

Except as otherwise specified by the manufacturer, this product is specifically designed for compressed air service, and use with any other fluid (liquid or gas) is a misapplication. For example, use with or injection of certain hazardous liquids or gases in the system (such as alcohol or liquid petroleum gas) could be harmful to the unit or result in a combustible condition or hazardous external leakage. Before using with fluids other than air, or for non-industrial applications, or for life support systems, consult Wilkerson Corporation for written approval.

Some of the materials that will attack polycarbonate plastic bowls.

Acetaldehyde	Chlorobenzene	Methylene chloride
Acetic acid (conc.)	Chloroform	Methylene salicylate
Acetone	Cresol	Milk of lime (CaOH)
Acrylonitrile	Cyclohexanol	Nitric acid (conc.)
Ammonia	Cyclohexanone	Nitrobenzene
Ammonium flouride	Cyclohexene	Nitrocellulose lacquer
Ammonium hydroxide	Dimethyl formamide	Phenol
Ammonium sulfide	Diozane	Phosphorous hydroxy chloride
Anaerobic adhesives and sealants	Ethgane tetrachloride	Phosphorous trichloride
Antifreeze	Ethyl acetate	Propionic acid
Benzene	Ethyl ether	Pyridine
Benzoic acid	Ethylamine	Sodium hydroxide
Benzyl alcohol	Ethylene chlorohydrin	Sodium sulfide
Brake fluids	Ethylene dichloride	Styrene
Bromobenzene	Ethylene glycol	Sufuric acid (conc.)
Butyric acid	Formic acid (conc.)	Sulphural chloride
Carbolic acid	Freon (refrig. & Propell.)	Tetrahydronaphthalene
Carbon disulfide	Gasoline (high aromatic)	Tiophene
Carbon tetrachloride	Hydrazine	Toluene
Caustic potash solution	Hydrochloric acid (conc.)	Turpentine
Caustic soda solution	Lacquer thinner	Xylene
	Methyl alcohol	Perchlorethylene & Others

Trade names of some compressor oils, rubber compounds and other materials that will attack polycarbonate plastic bowls.

Atlas "Perma-Guard"	National Compound #N11
Buna N	"Nylock" VC-3
Cellulube #150 and #220	Parco #1306 Neoprene
Crylex #5 cement	*Permabond 910
*Eastman 910	Petron PD287
Garlock #98403 (polyurethane)	Prestone
Haskel #568-023	Pydraul AC
Hilgard Co.'s hil phene	Sears Regular Motor Oil
Houghton & Co. oil #1120, #1130 & #1055	Sinclair oil "Lily White"
Houtosafe 1000	Stauffer Chemical FYRQUEL #150
Kano Kroil	Stillman #SR 269-75 (polyurethane)
Keystone penetrating oil #2	Stillman #SR 513-70 (neoprene)
*Loctite 271	Tannergas
*Locite 290	Telar
*Loctite 601	Tenneco anderol #495 & #500 oils
*Loctite Teflon-Sealant	Titon
Marvel Mystery Oil	*Vibra-tite
Minn. Rubber 366Y	Zerex

***When in raw liquid form.**

We cannot possibly list all harmful substances, so check with Mobay or the General Electric office for further information on polycarbonate plastic.

Wilkerson products are protected by the following U.S. patent and patents in other countries, additional patents are pending.

3,631,878	3,667,493	3,762,224	4,215,790
4,215,790	3,793,803	4,718,245	3,793,803
3,858,403	D-292-310	D-229-629	4,215,790
4,289,335	4,352,511	4,559,065	4,631,073
4,689,969	4,696,320	3,889,484	3,945,465
4,631.073	D-234-848		

WILKERSON® CORPORATION

For further assistance contact:
1201 W. Mansfield Ave.
Englewood, CO 80110

Phone (303) 761-7601
Fax (303) 783-2300
Sales Support (888) 223-5126
Applications Engineering (888) 223-5146

GRACE Davison

W.R. Grace & Co.-Conn.
P.O. Box 2117
Baltimore, Maryland 21203
(410) 659-9000

MATERIAL SAFETY DATA SHEET

SAFETY DATA

REF. No. 5008

PRODUCT: DAVISON BLUE INDICATING GEL Wilkerson Corporation
DATE: June 15, 1995 Part # DRP-85-059

Emergency Contact:

J.H. Convey, Manager, Environment Control **Telephone No.** (Home) 410-874-2009
(Office) 410-659-9058

The following information includes safety data required by OSHA. The recipient of this safety data is responsible for passing the safety information on so that it reaches the ultimate user who may come in contact with the material.

TRADE NAME: DAVISON BLUE INDICATING GEL
GRADES 13, 42, 43, 44 & 45

CHEMICAL NAME FAMILY: Synthetic Amorphous

SYNONYMS: Amorphous Silicon Dioxide, Silica Gel, Silicic Acid
TEL-TALE® Indicating Gel

CHEMICAL NOTATION OR STRUCTURE: SiO_2, xH_2O + $CoCl_2$

INGREDIENTS: Amorphous Silica, Cobalt Chloride (CoCl2)

Synthetic amorphous silica, not to be confused with crystalline silica such as quartz, crisobalite or tridymite or with diatomaceous earth or other naturally occurring forms of amorphous silica that frequently contain crystalline forms

CAS REGISTRY NO: Silica Gel: 63231-67-4 (Revised 1990 SiO_2: 112926-00-8)
Cobalt Chloride: 7646-79-9

RTECS NO: VV7322000 (Silica Gel)
GF9800000 (Cobalt Chloride)

[redacted]

HEALTH INFORMATION

PRECAUTIONS IN USE:

Avoid prolonged breathing of the dust or contact of dust with the skin. The drying action of this material can cause irritation of the mucous membranes of the nose and throat and irritation of the skin. If its use requires manual handling, wear long sleeves and close-weave cotton gloves with tight-fitting wristlets. If dusty conditions prevail, use of an approved NIOSH/MSHA dust mask is recommended.

When pouring into a container of flammable liquid, ground both containers electrically to prevent a static electric spark.

FIRST AID:

EYES: Immediately wash from eyes with large amounts of water, occasionally lifting upper & lower eye lids. If irritation occurs and persists, seek medical attention.
SKIN: Wash with soap & water.
INGESTION: Material will pass through body normally.
INHALATION: Remove to fresh air.

TOXICOLOGY

ANIMAL TOXICOLOGY

TESTS FOR DOT HAZARD CLASSIFICATION:

48-hour oral LD_{50} (rat)est. > 31,600 mg/kg

48-hour dermal LD_{50} (rabbit) est. > 2,000 mg/kg

Not considered an ocular irritant.

TESTS FOR FDA APPROVAL FOR USE IN FOODS: Not a food-grade product.

Cobalt chloride is considered GRAS (generally recognized as safe) as a trace mineral added to animal feeds (approximately 10 PPM) by FDA

HUMAN TOXICOLOGY:

Silica gel is a synthetic amorphous silica not to be confused with crystalline silica. Epidemiological studies indicate low potential for adverse health effects. Silica gel is considered by Davison to be a nuisance dust. In the activated form, silica gel acts as a desiccantand can cause a drying irritation of the mucous membranes and skin in cases of severe exposure. Cobalt chloride can cause dermatitis and irritation of nasal passages and lungs. Davison knows of no medical conditions abnormally aggravated by exposure to this product. The primary route of entry is inhalation.

[redacted]

ENVIRONMENTAL DATA

Not known to have any adverse effect on the aquatic environment. The silica base is insoluble and nontoxic. Cobalt chloride may leach away if contacted with water.

TYPICAL CHEMICAL & PHYSICAL INFORMATION

APPEARANCE:	Clear blue granules
pH IN 5% SLURRY:	Approximately 6.5 -7.5
ODOR:	None
SPECIFIC GRAVITY:	2.1
BULK DENSITY:	Approximately 47-48 lbs/ft.^{3}
SOLUBILITY IN WATER:	Silica gel base insoluble Cobalt chloride may leach out.
APPROXIMATE ANALYSIS:	SiO_2 (Ignited Basis) - 99.7 ($CoCl_2$ sublimes) LOI @ 1760 F - 6.5% Crystalline Silica - Not detectable Cobalt Chloride - 0.9%
STABILITY:	Stable
REACTIVITY:	Reacts with HF
FIRE & EXPLOSION DATA:	Non-flammable

[redacted]

REGULATORY STATUS

OSHA-	Silica gel - PEL = 6 mg/m³ Cobalt chloride - PEL = not listed in 29 CFR 1910.1000.
NIOSH-	Silica Gel - Animal tests conducted in 1976-78. 18 month exposure at 15 mg/m³ showed silica deposition in respiratory macrophages and lymph nodes, minimis lung function impairment, and no silicosis.
EPA-	This product contains no toxic chemicals in excess of the applicable de minimis concentration as specified under § 313 of Title III SARA.
ACGIH-	Silica Gel - TLV = 10 mg/m³ (Silica gel); Cobalt Chloride - TLV = not listed.
USDA-	Not applicable
FDA-	Not a food-grade product. For food or pharmaceutical use, FP grades of Syloid should be specified.
DOT-	Not classified as a hazardous material.

HANDLING INFORMATION

STORAGE AND TRANSPORTATION:	Keep containers tightly sealed to protect product quality.
DISPOSAL:	Dispose in an approved landfill according to federal, state and local regulations. Cover promptly to avoid blowing of dust.
SPILLAGE AND CLEANUP:	Sweep or vacuum up.
CONTAINERS:	Drums, cans.

SPECIAL INFORMATION

TRONAIR®

APPENDIX II

MSDS:
Phosphate Ester Fluid

Solutia Inc.

Material Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: SKYDROL® LD4 Fire resistant hydraulic fluid

Reference Number: 000000000183 Date: 03/18/2003

Company Information:

United States:
Solutia Inc.
575 Maryville Center Drive, P.O. Box 66760
St. Louis, MO 63166-6760
Emergency telephone: Chemtrec: 1-800-424-9300
Non-Emergency telephone: 1-314-674-6661

Canada:
Solutia Canada Inc.
6800 St. Patrick Street
LaSalle, PQ H8N 2H3
Emergency telephone: CANUTEC: 1-613-996-6666
Non-Emergency telephone: 1-314-674-6661

Mexico:
Solutia MEXICO, S. DE R.L. DE C.V.
Blvd. Manuel Avila Camacho No. 40 Piso 12 Colonia Lomas de Chapultepec
Edificio Torre Esmeralda11000 Mexico, D.F.
Emergency telephone: SETIQ: (in Mexico) 01-800-002-1400
Non-Emergency telephone: (in Mexico) 555-202-5600

Brazil:
Solutia Brazil Ltd.
Avenue Jorge Bei Maluf, 2105
CEP 08686-000 Suzano, SP
Emergency telephone: 0800 193-190
Non-Emergency telephone: 5511 4745-8569

2. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS No.	Average concentration	Concentration range	Units
tributyl phosphate	126-73-8	58.2		%
dibutyl phenyl phosphate	2528-36-1		30.0 - 60.0	%
butyl diphenyl phosphate	2752-95-6		5.0 - 10.0	%
2,6-di-tert-butyl-p-cresol	128-37-0		1.0 - 5.0	%
2-ethylhexyl 7-oxabicyclo[4.1.0] heptane-3-carboxylate	62256-00-2		<=10.0	%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Form: oily, liquid
Colour: clear to purple
Odour: odourless

WARNING STATEMENTS

WARNING!
Causes eye irritation
Causes skin irritation
Causes respiratory tract irritation
Contains material which may cause urinary bladder damage based on animal data

POTENTIAL HEALTH EFFECTS

Likely routes of exposure:	eye and skin contact inhalation
Eye contact:	Highly irritating to eyes.
Skin contact:	Highly irritating to skin. No more than slightly toxic if absorbed. Repeated contact may cause a drying, solvent like action on the skin.
Inhalation:	Severely irritating if inhaled. No more than slightly toxic if inhaled. Significant adverse health effects are not expected to develop under normal conditions of exposure.
Ingestion:	No more than slightly toxic if swallowed. Significant adverse health effects are not expected to develop if only small amounts (less than a mouthful) are swallowed.
Signs and symptoms of overexposure:	coughing sneezing headache nausea/vomiting
Target organs/systems:	Contains material which may cause urinary bladder damage based on animal data

Refer to Section 11 for toxicological information.

4. FIRST AID MEASURES

If in eyes: If on skin:	Immediately flush the area with plenty of water. Remove contaminated clothing. Wash skin gently with soap as soon as it is available. Get medical attention. Wash clothing before reuse.
If inhaled:	Remove patient to fresh air. If not breathing, give artificial respiration. If breathing is difficult give oxygen. Remove material from eyes, skin and clothing.
If swallowed:	Immediate first aid is not likely to be required. A physician or Poison Control Center can be contacted for advice. Wash heavily contaminated clothing before reuse.

Notes to physicians: After flushing eyes for at least 15 minutes, opthalmic preparations of sterile mineral or castor oil may be instilled one time in the exposed eye for relief of pain.

5. FIRE FIGHTING MEASURES

Flash point:	160 C	Cleveland Open Cup
Fire point:	176 C	ASTM D-2155
Autoignition temperature:	398 C	ASTM D-2155

Hazardous products of combustion: None known;

Extinguishing media: Water spray, foam, dry chemical, or carbon dioxide

Unusual fire and explosion hazards: None known

Fire fighting equipment: Firefighters, and others exposed, wear self-contained breathing apparatus. Equipment should be thoroughly decontaminated after use.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Use personal protection recommended in section 8.

Environmental precautions: Keep out of drains and water courses.

Methods for cleaning up: Contain large spills with dikes and transfer the material to appropriate containers for reclamation or disposal. Absorb remaining material or small spills with an inert material and then place in a chemical waste container. Flush spill area with water.

Refer to Section 13 for disposal information and Sections 14 and 15 for reportable quantity information.

7. HANDLING AND STORAGE

Handling
Avoid breathing vapour or mist.
Avoid contact with eyes, skin and clothing.
Use with adequate ventilation.
Keep container closed.
Wash thoroughly after handling.

Emptied containers retain vapour and product residue. Observe all recommended safety precautions until container is cleaned, reconditioned or destroyed. Do not reuse this container.

Storage
General: Stable under normal conditions of handling and storage.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye protection: Wear chemical goggles.
Have eye flushing equipment available.

Hand protection:	Wear chemical resistant gloves. Consult the glove/clothing manufacturer to determine the appropriate type glove/clothing for a given application. See Solutia Glove Facts for permeation data.
Body protection:	Wear suitable protective clothing. Wear full protective clothing if exposed to splashes. Consult the glove/clothing manufacturer to determine the appropriate type glove/clothing for a given application. Wash contaminated skin promptly. Launder contaminated clothing and clean protective equipment before reuse. Have safety shower available at locations where skin contact can occur. Wash thoroughly after handling.
Respiratory protection:	Avoid breathing vapour or mist. Use approved respiratory protection equipment (full facepiece recommended) when airborne exposure limits are exceeded. If used, full facepiece replaces the need for face shield and/or chemical goggles. Consult the respirator manufacturer to determine the appropriate type of equipment for a given application. See Solutia Respirator Facts. Observe respirator use limitations specified by the manufacturer.
Ventilation:	Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits. If practical, use local mechanical exhaust ventilation at sources of air contamination such as processing equipment.
Airborne exposure limits:	(ml/m3 = ppm)
SKYDROL® LD4	No specific occupational exposure limit has been established.
tributyl phosphate	ACGIH TLV: 0.2 ml/m3 ; 2.2 mg/m3 ; ; 8-hr TWA OSHA PEL: 5 mg/m3 ; ; 8-hr TWA Mexican OEL: 0.2 ml/m3 ; 2.5 mg/m3 ; ; 8-hr TWA Mexican OEL: 0.4 ml/m3 ; 5 mg/m3 ; ; 15-min STEL
dibutyl phenyl phosphate	ACGIH TLV: 0.3 ml/m3 ; 3.5 mg/m3 ; skin * ; 8-hr TWA * skin absorption of this material may add to the overall exposure.
2,6-di-tert-butyl-p-cresol	ACGIH TLV: 2 mg/m3 ; ; 8-hr TWA Mexican OEL: 10 mg/m3 ; ; 8-hr TWA Mexican OEL: 20 mg/m3 ; ; 15-min STEL

Components referred to herein may be regulated by specific Canadian provincial legislation. Please refer to exposure limits legislated for the province in which the substance will be used.

9. PHYSICAL AND CHEMICAL PROPERTIES

Specific gravity:	1.004 - 1.014 @ 25 C
Viscosity :	10.8 - 11.6 mPa.s @ 38 C

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

10. STABILITY AND REACTIVITY

Conditions to avoid:	Elevated temperatures
Materials to avoid - Hazardous reactions:	Contact with strong oxidizing agents. Hazardous polymerization does not occur.
Hazardous decomposition products:	phosphorus oxides (PxOy); carbon monoxide (CO); carbon dioxide

11. TOXICOLOGICAL INFORMATION

This product has been tested for toxicity. Results from Solutia sponsored studies or from the available public literature are described below.

Acute animal toxicity data

Oral:	LD50 , rat, 2,100 mg/kg , Slightly toxic following oral administration.
Dermal:	LD50 , rabbit, > 3,160 mg/kg , Practically nontoxic after skin application in animal studies.
Inhalation:	LC50 , rat, > 5.8 mg/l , , No mortality or signs of toxicity at the highest level achievable.
Eye irritation:	rabbit , Slightly irritating to eyes (rabbit)., 24 h
Skin irritation:	rabbit , Moderately irritating to skin., 24 h
Skin sensitization:	Human experience , Predictive patch testing on human volunteers did not produce dermal sensitization.
Repeat dose toxicity:	rat, inhalation, 28 days, Repeated exposure produced eye irritation in animal models. Repeated exposure produced respiratory tract irritation in animal models. Produced effects on body weight, serum enzymes and/or organ weights in repeat dose studies.
Neurotoxicity:	chicken, gavage, acute, Brain cholinesterase inhibition.
Mutagenicity:	No genetic effects were observed in standard tests using bacterial and animal cells.

Components

Data from Solutia studies and/or the available scientific literature on the components of this material which have been identified as hazardous chemicals under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200) or the Canadian Hazardous Products Act are discussed below.

tributyl phosphate	Slightly toxic following oral administration. Practically nontoxic after skin application in animal studies.

	Slightly irritating to eyes (rabbit). Highly irritating to skin (rabbit). Produced no dermal sensitization (guinea pigs). Repeated oral administration produced multiple systemic effects. No delayed neurotoxicity was observed in animal models. This material produced tumours in laboratory animals at dose levels that exceed the maximum tolerated dose. The weight of the evidence indicates that this material is not mutagenic in in-vitro assays.
dibutyl phenyl phosphate	Slightly toxic following oral administration. Practically nontoxic after skin application in animal studies. Practically non irritating to eyes (rabbit). Practically non irritating to skin (rabbit). Produced no dermal sensitization (guinea pigs). Repeated skin exposure produced irritation in animal studies. Produced effects on body weight, serum enzymes and/or organ weights in repeat dose studies. Repeated oral administration produced multiple organ effects. No delayed neurotoxicity was observed in animal models. No birth defects were noted in rats given the active ingredient orally during pregnancy. This material had no effect on reproduction or fertility. Produced developmental toxicity. The weight of the evidence indicates that this material is not mutagenic in in-vitro assays.
2,6-di-tert-butyl-p-cresol	Slightly irritating to skin, eyes and respiratory system in animal models. Produced effects on body weight, serum enzymes and/or organ weights in repeat dose studies. Both positive and negative responses observed in standard tests for genetic changes.
2-ethylhexyl 7-oxabicyclo[4.1.0] heptane-3-carboxylate	Slightly toxic following oral administration. Practically nontoxic after skin application in animal studies. Practically non irritating to eyes (rabbit). Slightly irritating to skin (rabbit). No mortality or signs of toxicity at the highest level tested. Produced dermal sensitization (guinea pigs). The weight of the evidence indicates that this material is not mutagenic in in-vitro assays. The weight of the evidence indicates that this material is mutagenic in in-vivo assays.

12. ECOLOGICAL INFORMATION

Environmental Toxicity:

Invertebrates	48 h, EC50	Water flea (Daphnia magna)	5.8 mg/l
Fish:	96 h, EC50	Rainbow trout (Oncorhynchus mykiss)	5.2 mg/l
	96 h, EC50	Fathead minnow (Pimephales promelas)	4.8 mg/l
Algae:	96 h, EC50	Algae (Selenastrum capricornutum)	10 mg/l

Environmental fate

Biodegradation

Readily biodegradable.

13. DISPOSAL CONSIDERATIONS

US EPA RCRA Status: This material when discarded is not a hazardous waste as that term is defined by the Resource, Conservation and Recovery Act (RCRA), 40 CFR 261.

Disposal considerations: Incineration
Recycle

Miscellaneous advice: This product meets the criteria for a synthetic used oil under the U.S. EPA Standards for the Management of Used Oil (40 CFR 279). Those standards govern recycling and disposal in lieu of 40 CFR 260 -272 of the Federal hazardous waste program in states that have adopted these used oil regulations. Consult your attorney or appropriate regulatory official to be sure these standards have been adopted in your state. Recycle or burn in accordance with the applicable standards.
Local, state, provincial, and national disposal regulations may be more or less stringent. This product should not be dumped, spilled, rinsed or washed into sewers or public waterways.

14. TRANSPORT INFORMATION

The data provided in this section is for information only. Please apply the appropriate regulations to properly classify your shipment for transportation.

US DOT
Other: Not regulated for transport.

Canadian TDG
Other: Not regulated for transport.

15. REGULATORY INFORMATION

All components are in compliance with the following inventories: U.S. TSCA, EU EINECS, Canadian DSL, Australian AICS, Korean, Japanese ENCS, Chinese

Canadian WHMIS classification: D2(B) - Materials Causing Other Toxic Effects

SARA Hazard Notification:

Hazard Categories Under Title III Rules (40 CFR 370): Immediate
Delayed

Section 302 Extremely Hazardous Substances:

Section 313 Toxic Chemical(s):

CERCLA Reportable Quantity:

Not applicable

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulation and the MSDS contains all the information required by the Canadian Controlled Products Regulation.

Refer to Section 11 for OSHA/HPA Hazardous Chemical(s) and Section 13 for RCRA classification.

Safety data sheet also created in accordance with Brazilian law NBR 14725

16. OTHER INFORMATION

Product use: Hydraulic fluids and additives

Reason for revision: Significant changes to the following section(s):, Section 2, Section 8, Section 15

	Health	Fire	Reactivity	Additional Information
Suggested NFPA Rating	2	1	0	
Suggested HMIS Rating:	2	1	0	G

Prepared by the Solutia Hazard Communication Group. Please consult Solutia @ 314-674-6661 if further information is needed.

TRONAIR®

APPENDIX III

Harris
Regulator
Instruction Manual

HARRIS®

Instruction Manual
Manuel d' Instruction
Manual de Instrucciones

Industrial Single Stage & Multi-Stage® Compressed Gas Regulators
Reguladores Industriales de Gas Comprimido de Una Etapa y de Etapas Múltiples®
Détendeur industriel de gaz comprimé à un étage et à plusieurs étages®

IMPORTANT

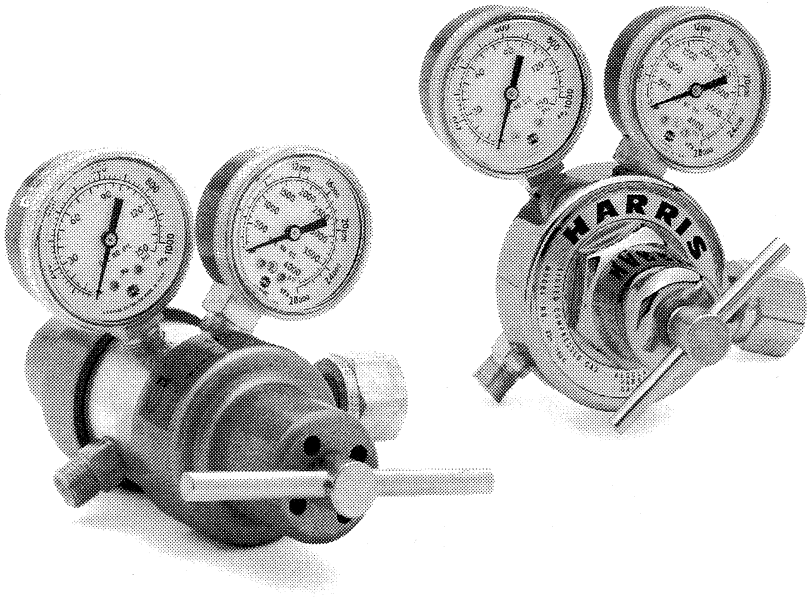
For your own safety, read these instructions. Failure to do so could lead to serious injury.

IMPORTANT

Pour votre propre sécurité, veillez à lire ces instructions. Omettre de les lire peut entraîner des blessures graves.

IMPORTANTE

Por su propia seguridad lea estas instrucciones. El no seguir estas instrucciones podría resultar en lesiones severas.



HARRIS®

LINCOLN® ELECTRIC

Introduction

These instructions are for experienced operators. It is essential that you keep your equipment free of oils, greases, and flammable materials. For further information, refer to the following publications:

AWS C-4.2-78 "Operator Manual for Oxy-Fuel Gas Cutting" American Welding Society, 550 N.W. LeJeune Rd., Miami, FL 33126

ANSI Z49.1 "Safety in Welding and Cutting" American National Standards Institute, 1430 Broadway, New York, NY 10018

Compressed Gas Association (CGA), 1235 Jefferson-Davis Highway, Arlington, VA 22202

- **Safety Bulletin SB-8** - "Use of Oxy-Fuel Gas Welding and Cutting Apparatus"
- **Pamphlet E-1** - "Standard Connections for Regulator Outlets"
- **CGA Standard V-1** - "Compressed Cylinder Valve Inlet and Outlet Connections"

Description

Note: Each type of regulator is designed and assembled for specific gases and for definite inlet and delivery pressure ranges.

Multi-Stage Regulators

Multi-stage regulators are two regulators in series using a common body. The first stage (high pressure) reduces the inlet pressure approximately 90% and is preset at the factory. The second stage (low pressure) is adjustable to the desired delivery pressure.

Single-Stage Regulator

A cylinder regulator reduces the cylinder pressure to the delivery pressure and maintains a constant pressure to assure an accurate flow rate.

Pipeline Regulator

A pipeline regulator operates from a source of lower pressure, usually 200 PSI or less; and normally has only one gauge, which indicates the outlet pressure. Pipeline regulators must not be used on or with high pressure gas cylinders.

Gaugeless Regulators

Gaugeless regulators are used where rough use and gauge damage are a problem. The cylinder (inlet) pressure is shown by the piston-type indicator. The delivery pressure is set by the adjusting knob and shown by the calibrations marked on the bonnet.

Clockwise rotation of the adjusting knob (or key) increases the delivery pressure. Counterclockwise rotation decreases the delivery pressure.

The regulator inlet connections are designed for the gas to be used in accordance with CGA Standard V-11. The threaded outlet connections are 9/16"-18 male CGA Standard 022 (R.H.) and 023 (L.H.) (formerly Class B)2. Fuel gas threads are left hand.
1 CGA Standard V-1 "Compressed Gas Cylinder Valve Inlet and Outlet Connections"
2 CGA Pamphlet E-1 "Standard Connections for Regulator Outlets"

Safety Instructions

1. Handle cylinder with care. Chain or otherwise secure cylinders to a permanent fixture. Take care when moving. To transport cylinders (except when in cylinder carts), remove regulators and replace with valve cap. Never use any cylinder in other than an upright position.
2. Use "good housekeeping" in work areas. Keep sparks and flame away from combustibles. Prepare your work area before welding or cutting.
3. Do not oil or grease equipment. The equipment does not require lubrication. Oil or grease is easily ignited and burns violently with oxygen.
4. "Crack" cylinder valve before installing regulator. Open valve slightly and then close. This will clear valve of dust or dirt which may be carried to the regulator and cause damage or accident. Do not discharge flow of gas at any person or flammable material.
5. Be sure all connections are tight. Don't force connections. Never test for leaks with a flame. Use a soapy water solution to check for leaks.
6. Use recommended pressure settings. Improper pressures are wasteful. Extreme pressure build up in regulators is a warning they need repair.
7. Do not work with damaged or leaking equipment. Use soapy water when checking for leaks. Do not use frayed or damaged hose.
8. Handle equipment with care. Its continued good service and your safety depend upon it.

9. Keep work area well ventilated. Flammable materials burn violently in an oxygen atmosphere. Flames and glowing materials (tobacco smoking) must be avoided.
10. When working with acetylene, never use at pressures over 15 PSIG (Pounds Per Square Inch Gauge).
11. DO NOT FORCE connectors and threads. The differences are intentional for the various gases.

NOTE: SAVE THESE INSTRUCTIONS

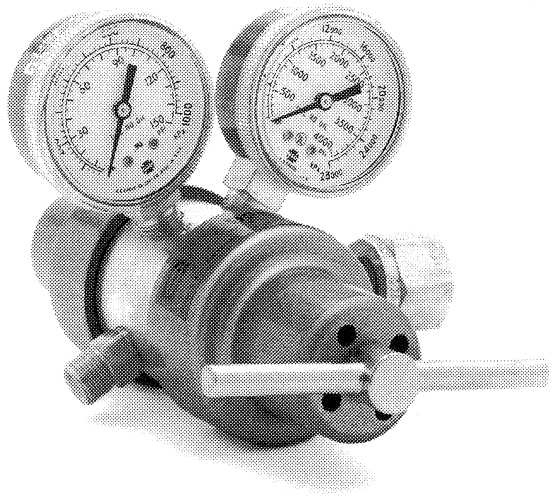
Set-Up Instructions

1. Secure gas cylinder in a vertical position; valve end up.
2. Remove cylinder valve cap.
3. Open cylinder valve momentarily to blow out any dust and dirt. Do not discharge flow of gas at any person, flames or flammable material.
4. Attach regulator to cylinder using proper CGA connection.
5. Properly connect equipment to outlet connection of regulator.
6. Close off all valves downstream of the regulator.
7. Turn the pressure adjusting knob (or key) counterclockwise until it feels free. The regulator outlet is now closed.
8. Slowly open the supply valve. When full inlet pressure is indicated, open line valve or non-flammable cylinder valve wide. Fuel gas cylinder valves should not be opened more than one turn. Hand wheels or valve wrenches should be kept on the valve to permit quick emergency shutdown.
9. Slowly turn the regulator adjusting knob (or key) clockwise to obtain the desired delivery pressure.
10. Tests for gas leakage should be made at this time. Use a soapy water solution at all connections and check for bubbles. Tighten connections as required and wipe off the soap solution.

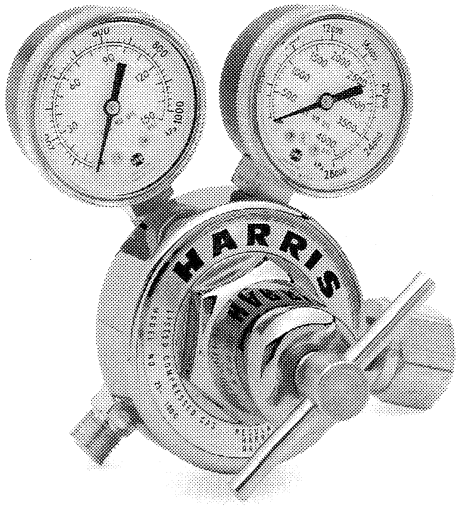
Functional Test of Regulator

An internal leak may be detected as follows:

1. Close the regulator by turning the adjusting key counterclockwise.
2. Close cylinder valve.



Multi-Stage™ Regulator



Single Stage Regulator

3. Drain downstream line.
4. The low pressure gauge will indicate zero. The cylinder (high pressure) gauge will read full pressure. Any pressure drop will indicate leakage. Repair before use, or replace with a properly functioning unit.
5. A gauge should read zero when all the pressure is removed. If it does not, it may be damaged. Locate and correct the cause of the damage and replace the gauge.

Shutdown

1. Close downstream valves.
2. Close supply valve on the cylinder or line.
3. Bleed off gases - oxygen first, then close down stream valves.
4. Turn pressure adjusting key counterclockwise until free.
5. Remove regulator from cylinder.

Maintenance Instructions

1. When not in use, store the regulator in a clean and safe place.
2. Inspect and test at least every 6 months after first use.
3. Have only qualified repairmen service, test and clean the regulator.
4. The gauge lenses are made of Lexan1. Use only soapy water to clean, then wipe dry using soft cloths. DO NOT USE SOLVENTS.
5. Use thread sealants that are compatible with the gas being used.

1A General Electric Polycarbonate

Repair

Have only qualified repairmen service, test and clean the equipment.

Extra Copies

Extra copies of these instructions are available. Call your distributor or contact Harris Calorific.

Introduction

Les consignes suivantes sont à l'attention des utilisateurs expérimentés. Il est essentiel que vous conserviez votre équipement exempt d'huile, de graisse ou de tout élément inflammable. Pour de plus amples informations, veuillez consulter les ouvrages suivants :

AWS C-4.2-78 « Operator Manual for Oxy-Fuel Gas Cutting » (Manuel de l'opérateur pour l'oxycoupage) - American Welding Society, 550 N.W. LeJeune Rd., Miami, Florida, 33126

ANSI Z49.1 - « Safety in Welding and Cutting » (Sécurité en soudage et découpage) - American National Standards Institute, 1430 Broadway, New York, NY 10018

Compressed Gas Association (CGA), 1235 Jefferson-Davis Highway, Arlington, VA 22202

- Safety Bulletin SB-8 - « Use of Oxy-Fuel Gas Welding and Cutting Apparatus » (Utilisation de matériel d'oxycoupage et de soudage aux gaz)
- Brochure CGA E-1 - « Standard Connections for Regulator Outlets » (Raccords standards pour sorties de détendeurs)
- Norme CGA V-1 - « Compressed Cylinder Valve Inlet and Outlet Connections » (Raccords d'entrée et de sortie pour robinets de bouteilles de gaz comprimé)

Description

REMARQUE : Chaque type de détendeur est conçu et assemblé pour des gaz définis ainsi que pour des amplitudes précises de pressions d'alimentation et de détente.

Détendeurs à plusieurs étages

Les détendeurs à plusieurs étages sont faits de deux détendeurs en série montés sur un même corps. Le premier étage (haute pression) réduit la pression d'alimentation d'approximativement 90% et est réglé en usine. Le deuxième étage (basse pression) est réglable selon le niveau de pression désiré.

Détendeur à un étage

Un détendeur réduit la pression d'alimentation à la pression de détente et maintient une pression constante afin d'assurer un débit précis.

Détendeur de canalisation

Un détendeur de canalisation fonctionne à partir d'une source de faible pression, généralement inférieure ou égale à 200 PSI (livres par pouce carré) et ne dispose normalement que d'une jauge indiquant le niveau de pression de détente. Les détendeurs de canalisation ne doivent pas être utilisés sur ou en combinaison avec des bouteilles de gaz à haute pression.

Détendeurs sans jauge

Les détendeurs sans jauge sont utilisés dans les cas où une utilisation brutale et les dégâts qu'elle inflige aux jauges représente un problème. La pression d'alimentation (en amont) est indiquée par le témoin à pistons. La pression de détente est établie en réglant le bouton poignée. Elle est indiquée par l'étalonnage figurant sur le capuchon.

Une rotation du bouton poignée (ou clef) dans le sens des aiguilles d'une montre augmente la pression de détente. Sa rotation dans le sens inverse des aiguilles d'une montre diminue la pression de détente.

Les arrivées de gaz du détendeur sont conçues pour les gaz qu'il est prescrit d'utiliser conformément à la Norme V-1 de la CGA. Les raccords de détente filetés sont de 9/16 " - 18 mâles Norme CGA 022 (R.H.) et 023 (L.H.) (anciennement Classe B) . Les filets de gaz de combustion sont inversés.

Consignes de sécurité

1. Manipulez la bouteille avec soin. Enchaînez ou assurez l'ancrage des bouteilles à un élément fixe. Déplacez avec précaution. Lors du transport des bouteilles (exception faite des chariots à bouteilles), ôtez les détendeurs et remplacez-les par des chapeaux de valve. Utilisez toujours les bouteilles en position verticale.

2. Veillez à ce que les zones de travail soient en bon ordre et en bon état d'entretien. Protégez les combustibles de toute étincelle ou flamme. Préparez votre zone de travail avant de souder ou de découper.

3. Ne huilez pas et ne graissez pas le matériel. Ce matériel ne nécessite aucune lubrification. Huile et graisse prennent feu rapidement et flambent vio lemment au contact de l'oxygène.

4. Entrouvrez le robinet de la bouteille avant d'installer le détendeur. Ouvrez le robinet légèrement et fermez-le aussitôt. Cette opération débarrassera le robinet des poussières ou saletés qui pourraient être acheminées jusqu'au détendeur et causer ainsi dégâts et accidents. Ne dirigez pas le

débit de gaz vers une personne ou un objet incandescent.

5. Assurez-vous que tous les raccords sont bien serrés. Ne forcez pas le serrage de ces raccords. Ne recherchez jamais les fuites à l'aide d'une flamme. Utilisez une solution savonneuse pour détecter les fuites éventuelles.

6. Utilisez les réglages de pression recommandés. Les pressions incorrectes sont sources de gaspillages. Des accumulations de pressions extrêmes dans les détendeurs indiquent que leur réparation s'impose.

7. Ne travaillez pas avec un équipement endommagé ou non étanche. Utilisez de l'eau savonneuse pour détecter les fuites éventuelles. N'utilisez pas de tuyaux éraillés ou endommagés.

8. Manipulez le matériel avec soin. Sa longévité et votre sécurité en dépendent.

9. Assurez-vous de la bonne ventilation de la zone de travail. Les éléments inflammables flambent violemment dans une atmosphère oxygénée. Flammes et objets incandescents (tabac en combustion) doivent être proscrits.

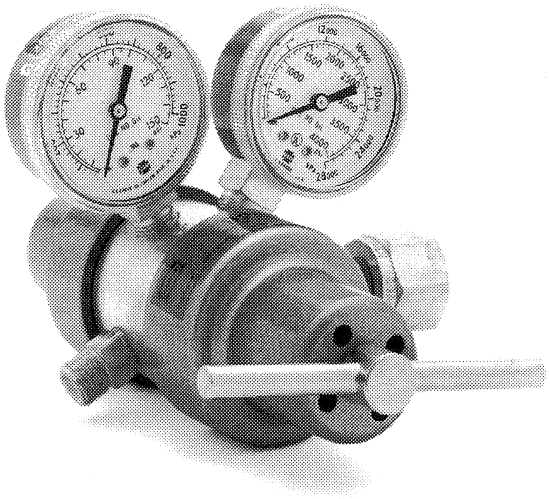
10. Lors de travaux avec de l'acétylène, n'opérez pas à des pressions supérieurs à 15 PSIG (Livres par pouce carré/jauge).

11. Ne forcez pas les raccords et filets. Les diférences sont spécifiques à chaque gaz.

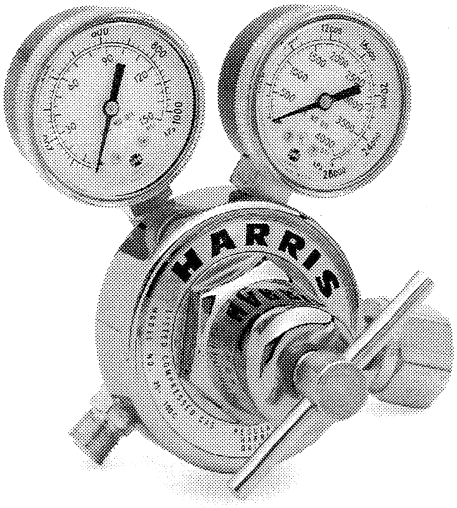
REMARQUE: CONSERVEZ CES CONSIGNES

Consignes d'installation

1. Assurez la position verticale de la bouteille de gaz; le robinet au sommet.
2. Ôtez le chapeau de valve de la bouteille.
3. Ouvrez brièvement la valve de la bouteille afin de chasser poussières et saletés éventuelles. Ne dirigez pas le débit de gaz vers une personne, une flamme ou une matière inflammable.
4. Attachez le détendeur à la bouteille au moyen du raccord CGA approprié.
5. Raccordez correctement le matériel au raccord de détente du détendeur.



Détendeur de gaz comprimé à plusieurs étages.



Détendeur de gaz comprimé à un étage

6. Fermez tous les robinets en aval du détendeur.
7. Tournez le bouton poignée (ou clef) de réglage de pression dans le sens inverse des aiguilles d'une montre jusqu'à ce qu'il tourne librement. La sortie du détendeur est actuellement fermée.
8. Ouvrez lentement le robinet d'admission. Lorsque la pleine pression d'admission est indiquée, ouvrez à fond le robinet du conduit ou de la bouteille inin flammable. Les robinets de la bouteille de gaz combustible ne devraient pas être ouverts au-delà d'un tour. Des volants de manœuvre ou des clés de robinet devraient être maintenus sur le robinet pour permettre de le fermer rapidement en cas d'urgence.
9. Tournez lentement le bouton poignée (ou clef) de réglage du détendeur dans le sens des aiguilles d'une montre pour obtenir le débit de sortie souhaité.
10. La détection de fuites devrait être effectuée à ce moment. Utilisez une solution d'eau savonneuse sur tous les raccords et voyez si des bulles appa raissent. Resserrez les raccords au besoin et essuyez la solution de savon.

Essai de fonctionnement du détendeur

Un fuite interne peut être détectée de la manière suivante:

1. Fermez le détendeur en tournant la clef de réglage dans le sens inverse des aiguilles d'une montre.
2. Fermez le robinet de la bouteille.
3. Purgez les conduits en aval.
4. La jauge de basse pression indiquera zéro. La jauge de la bouteille (haute pression) indiquera pleine pression. Toute chute de pression signifiera une fuite. Réparez avant usage ou remplacez par une unité en bon état de marche.
5. Toute jauge devrait indiquer zéro lorsque toute la pression est évacuée. Si tel n'est pas le cas, il est possible qu'elle soit endommagée. Localisez et corrigez la cause de ces dégâts et remplacez la jauge.

Fermeture

1. Fermez les robinets en aval.
2. Fermez le robinet d'alimentation sur la bouteille ou le conduit.
3. Purgez les gaz - l'oxygène en premier - avant de fermer les robinets en aval.
4. Tournez la clef de réglage de pression dans le sens contraire des aiguilles d'une montre jusqu'à ce qu'elle tourne librement.
5. Ôtez le détendeur de la bouteille.

Consignes d'entretien

1. Lorsque le détendeur n'est pas utilisé, conservez-le dans un endroit propre et sûr.
2. Inspectez et vérifiez au moins tous les 6 mois après la première utilisation.
3. Ne faites appel qu'à des techniciens qualifiés pour entretenir, tester et nettoyer le détendeur.
4. Le verre des jauge est fait de Lexan. Ne le net toyez qu'au moyen d'eau savonneuse avant de l'es suyer convenablement avec un chiffon doux. N'U TILISEZ PAS DE SOLVANTS.
5. N'utilisez que des agents d'étanchéité de raccord compatibles avec les gaz utilisés.

Réparation

Ne faites appel qu'à des techniciens qualifiés pour entretenir, tester et nettoyer ce matériel.

Copies supplémentaires

Des exemplaires supplémentaires de ces consignes sont disponibles. Appelez votre distributeur ou contactez Harris Calorific.

FAITES EN SORTE QUE CHAQUE OPÉRATEUR LISE ET COMPRENNE CES CONSIGNES. OMETTRE DE SUIVRE CES CONSIGNES PEUT ENTRAÎNER DES BLESSURES CORPORELLES GRAVES.

Introducción

Estas instrucciones son para operadores con experiencia. Es importante que mantenga su equipo limpio; sin aceites, grasas ni otros materiales inflamables. Para mayor información, refiérase a las publicaciones siguientes:

AWS C-4.2-78 "Manual del Operador para Cortaduras con Oxígeno-Gas combustible" - Sociedad Americana de Soldadores , 550 N.W. Le-Jeune Rd., Miami, Florida, 33126

ANSI Z49.1 - "Seguridad en Soldaduras y Cortaduras" - Instituto Americano de Estándares Nacionales", 1430 Broadway, Nueva York, NY 10018.

Asociación de Gas Comprimido (CGA), 1235 Jefferson-Davis Highway, Arlington, VA 22202

- **Boletín de Seguridad SB-8 -** "Uso de Equipo para Soldadura y Cortadura con Oxígeno-Gas combustible".
- **Folleto E-1 -** "Conexiones Estándares para Salidas de Reguladores".
- **CGA Estándar V-1 -** "Conexiones de Entradas y Salidas de Válvula del Cilindro de Gas Comprimido".

Descripción

NOTA: Los reguladores están diseñados y ensamblados, según su tipo, para gases específicos y para límites definidos de presión de entrega y de entrada.

Reguladores de Etapas Múltiples

Los reguladores de etapas múltiples son dos reguladores en serie usando un cuerpo común. La primera etapa (presión alta) reduce la presión de entrada en aproximadamente 90% y es pre-ajustada en la fábrica. La segunda etapa (presión baja) se ajusta a la presión de entrega deseada.

Reguladores de Una Etapa

Un regulador de cilindro reduce la presión del cilindro a la presión de entrega y mantiene una presión constante para asegurar un gasto de flujo exacto.

Reguladores de Gasoducto

Un regulador de gasoducto funciona desde una fuente de presión baja, comúnmente de 200 PSI o menos y normalmente sólo tiene un manómetro que indica la presión de salida. Los reguladores de gasoductos no deben usarse sobre ni con cilindros de gas de presión alta.

Reguladores Sin Manómetro

Los reguladores sin manómetro son utilizados cuando el uso de manómetros no es conveniente ya que pueden dañarse fácilmente. La presión del cilindro (de entrada) se muestra por medio del indicador de tipo de pistón. La presión de entrega se ajusta por medio de la manija y se muestra por medio de las calibraciones marcadas en el casquete.

La presión de entrega aumenta al girar la manija de ajuste (o llave) en el sentido de rotación de las manecillas del reloj. La presión de entrega disminuye al girar la manija de ajuste en el sentido de rotación contrario al de las manecillas del reloj.

Las conexiones de entrada del regulador han sido diseñadas de acuerdo al gas a ser usado, según el CGA Estándar V-11. Las conexiones roscadas de la salida son de 9/16" - 1B macho CGA estándar 022 (a la derecha) y 023 (a la izquierda) (anteriormente clase B)2 . Las roscas del gas combustible son a la izquierda.

1 CGA Estándar V-1 "Conexiones de Entradas y Salidas de Válvula del Cilindro de Gas Comprimido".

2 CGA Folleto E-1 "Conexiones Estándares para Salidas de Reguladores".

Instrucciones de Seguridad

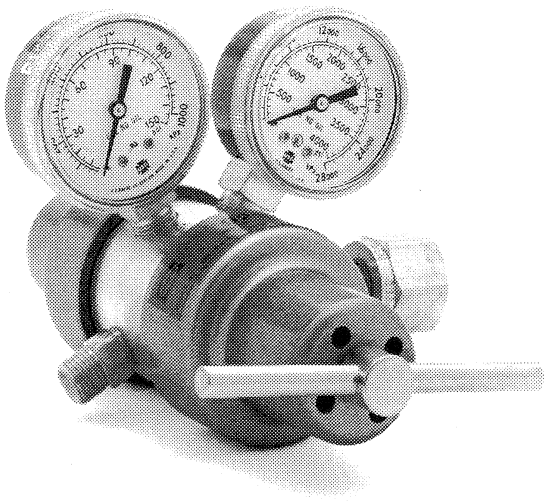
1. Manipule el cilindro con cuidado. Coloque una cadena alrededor de los cilindros o asegúrelos a un accesorio permanente. Tenga cuidado al mover los. Cuando transporte cilindros (excepto cuando sea en un carro para cilindros), quite los reguladores y reemplácelos por tapas de válvulas. Los cilindros deben usarse solamente en posición vertical.
2. Practique sus "Hábitos de Limpieza" en las áreas de trabajo. Mantenga chispas y llamas alejadas de los combustibles. Antes de comenzar a soldar o cortar prepare el área de trabajo.
3. No engrase ni aceite el equipo. El equipo no nece sita de lubricación. El aceite y la grasa son inflamables y se encienden violentamente con el oxígeno.
4. Antes de instalar el regulador, "abra" la válvula del cilindro. Abra la válvula lentamente y luego ciérrela. Esto limpiará la válvula de polvo o suciedad que pueda haber llegado al regulador y que pueda causar cualquier daño o accidente. No descargue el flujo de gas en una persona o material inflamable.

5. Asegúrese que todas las conexiones estén apretadas. No fuerce las conexiones. Nunca use llama para revisar si hay fugas de gas. Use una solución de agua con jabón para revisar si hay alguna fuga de gas.
6. Use los ajustes de presión recomendados. Las presiones inapropiadas causan gastos innecesarios. El aumento en extremo de la presión en los reguladores indica que deben ser reparados.
7. No trabaje con equipo dañado o que tenga fugas. Use agua jabonosa para revisar si hay fugas. No use mangueras raídas o estropeadas.
8. Manipule el equipo con cuidado. El servicio continuo adecuado y su seguridad dependen de ello.
9. Mantenga el área de trabajo bien ventilada. Los materiales inflamables se encienden violenta mente en una atmósfera de oxígeno. Deben evitarse las llamas y los materiales incandescentes (fumar).
10. Cuando trabaje con acetileno, nunca lo use a presiones mayores de 15 PSIG (Libras sobre pulgadas cuadradas leídas en el manómetro).
11. No fuerce los conectores ni las roscas. Las diferencias son intencionales para los diversos gases.

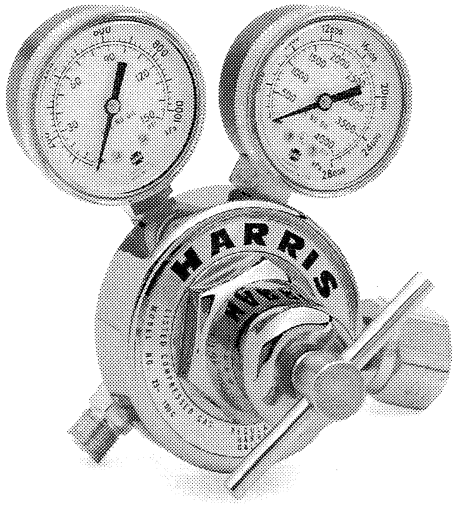
NOTA: GUARDE ESTAS INSTRUCCIONES

Instrucciones para la Instalación

1. Asegure el cilindro del gas en posición vertical; el extremo de la válvula hacia arriba.
2. Quite la tapa de la válvula del cilindro.
3. Abra, por un momento, la válvula del cilindro para permitir escapar cualquier partícula de polvo o suciedad. No descargue el flujo de gas sobre una persona, llamas o material inflamable.
4. Coloque el regulador en el cilindro utilizando la conexión recomendada por CGA.
5. Conecte apropiadamente el equipo a la conexión de salida del regulador.
6. Cierre todas las válvulas corriente abajo del regulador.
7. Gire la manija de ajuste de presión (o llave) en el sentido de rotación contrario al de las manecillas del reloj hasta que la manija se sienta libre. La sali



Regulador de Gas Comprimido de Etapas Múltiples



Regulador de Gas Comprimido de Una Etapa

da del regulador está ahora cerrada.

8. Abra lentamente la válvula de suministro. Cuando se indique que la presión de entrada está al máximo, abra ampliamente la válvula del conducto o la válvula del cilindro no-inflamable. Las válvulas del cilindro de gas combustible no deben abrirse más de una vuelta. Los volantes o llaves para válvula deben mantenerse en la válvula para permitir su cierre inmediato en caso de emergencia.
9. Gire lentamente la manija (o llave) de ajuste del regulador en el sentido de rotación de las manecillas del reloj para obtener la presión de entrega deseada.
10. La inspección para averiguar si hay o no fugas de gas debe realizarse en este momento. Aplique una solución de agua y jabón en todas las conexiones y vea si hay burbujas. Apriete las conexiones apropiadamente y seque la solución jabonosa.

Prueba Funcional del Regulador

Una fuga interna puede ser descubierta de la siguiente manera:

1. Cierre el regulador girando la llave de ajuste en el sentido de rotación contrario al de las manecillas del reloj.
2. Cierre la válvula del cilindro.
3. Purgue el conducto de corriente abajo.
4. El manómetro de presión baja debe indicar cero. El manómetro del cilindro (de presión alta) indicará que la presión está al máximo. Cualquier caída de presión indicará que hay fuga de gas. Repare antes de usar, o reemplace por un equipo que funcione apropiadamente.
5. Cuando no hay presión, el manómetro debe indicar cero. Si no marca cero, podría estar averiado. Encuentre y corrija la causa de la avería y reemplace el manómetro.

Suspensión del Trabajo

1. Cierre las válvulas de corriente hacia abajo.
2. Cierre la válvula de suministro en el cilindro o el conducto.
3. Purgue los gases, comenzando por el oxígeno, luego cierre las válvulas de corriente hacia abajo.
4. Gire la llave de ajuste de presión en el sentido de rotación contrario al de las manecillas del reloj, hasta que esté libre.
5. Quite el regulador del cilindro.

Instrucciones de Mantenimiento

1. Cuando no use el regulador guárdelo en un lugar limpio y seguro.
2. Inspeccione y pruebe el regulador por lo menos cada 6 meses después de usarlo por primera vez.
3. El servicio de mantenimiento, las pruebas y la limpieza del regulador debe asignarlo solamente a personas calificadas para ello.
4. Los lentes del manómetro son elaborados de Lexán1 . Para limpiarlos use solamente agua y abón, luego séquelos con un paño suave. NO USE SOLVENTES.
5. Use selladores para rosca que sean compatibles con el gas que se esté usando.

1 Policarbonato de la General Electric.

Reparación

El servicio de mantenimiento, las pruebas y la limpieza del regulador debe asignarlo solamente a personas calificadas para ello.

Copias Extras

Si necesita copias extras de estas instrucciones, llame a su distribuidor o comuníquese con la división Harris Calorific.

ASEGURESE QUE TODO OPERADOR LEA Y ENTIENDA ESTAS INSTRUCCIONES. NO SEGUIR ESTAS INSTRUCCIONES PODRIA RESULTAR EN LESIONES PERSONALES SEVERAS.

TRONAIR®

APPENDIX IV

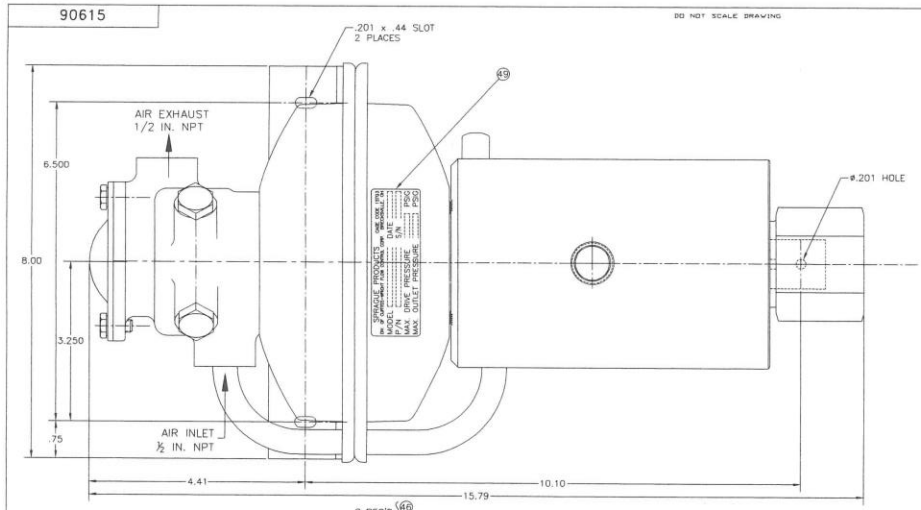
Teledyne Sprague Pump Parts List

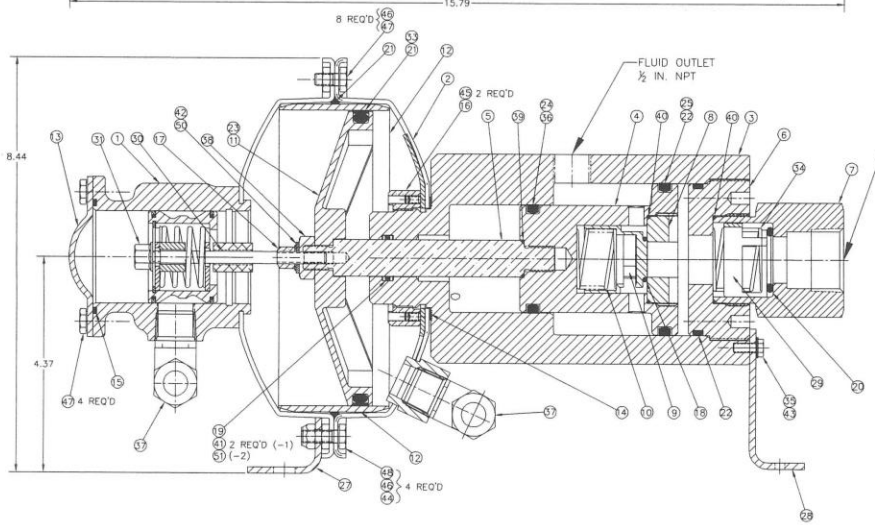
Manufactured Item : 90809-14 KIT, OVERHAUL, EPR..... Unit: ea
Revision : B-1 Drawing Number : NONE

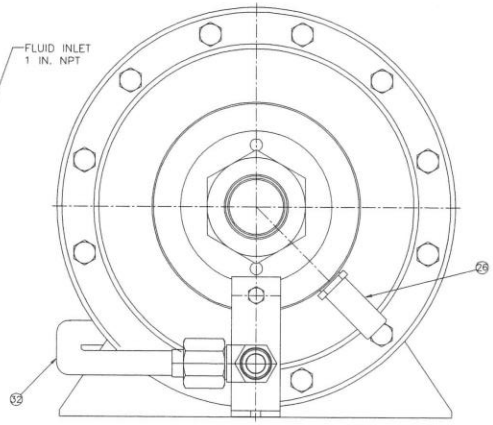
Level	Position	Item		Drawing	Revision	Effect. Date	Expiry Date	Net Quantity	Un.	Scp [%]	St
1	10/ 1	MS28782-14	BACKUP RING TEFLON 0.750 /.088			01/01/95		2.0000	ea	0	
1	20/ 1	S-216-29	GASKET, COVER .062 CORK/BUNA N	(B) S-216-29	E	01/01/95		1.0000	ea	0	
1	30/ 1	S-291	SPRING, COMP 1.281 OD x 1.13 L			01/01/95		1.0000	ea	0	
1	40/ 1	79550-13-28	O-RING EPR 80SH 0.674 x .103..	A-79550	P	01/01/95		1.0000	ea	0	
1	50/ 1	79550-14-1	O-RING NIT 90SH 0.737 x .103..	A-79550	P	01/01/95		1.0000	ea	0	
1	60/ 1	79550-17-28	O-RING EPR 80SH 0.859 x .139..	A-79550	P	01/01/95		1.0000	ea	0	
1	70/ 1	79550-60	O-RING NIT 70SH 5.475 x .275..	A-79550	P	01/01/95		1.0000	ea	0	
1	80/ 1	79552-5	O-RING NIT 70SH 0.414 x .072..	A-79552	P	01/01/95		4.0000	ea	0	
1	90/ 2	8265	IPB S-216-JDN-6.8, (90809)....			10/27/08		1.0000	ea	0	
1	100/ 2	8274	HANDBOOK, S-216-Jxx-( ) SERIES	NONE	N/C	10/27/08		1.0000	ea	0	
1	110/ 1	82871	PIN, DETENT.....	C-82871	K	01/01/95		4.0000	ea	0	
1	120/ 1	88525-327-17	SEAL FLUOROTREL SMS5036.....	C-88525	U	01/01/95		1.0000	ea	0	
1	130/ 1	88525-334-18	SEAL FLUOROTREL SMS5035.....	C-88525	U	01/01/95		1.0000	ea	0	
1	140/ 1	90523	ROD, CONNECTOR 1/4-28, 3.88 LG	B-90523	D	01/01/95		1.0000	ea	0	
1	150/ 1	90524	SEAL RING, AIR VALVE SHUTTLE..	B-90524	F	01/01/95		2.0000	ea	0	
1	160/ 1	90625-1	SPRING COMP 1.219 OD x .067 SS	B-90625	B	01/01/95		1.0000	ea	0	
1	170/ 1	90686	NUT HEX LOCK DEFORM FLG 1/4-28	A-90686	D	01/01/95		1.0000	ea	0	
1	180/ 1	91417-029	O-RING NIT 70SH 1.489 x .070..	A-91417	P	01/01/95		2.0000	ea	0	
1	190/ 2	91417-030-26	O-RING EPR 70SH 1.614 x .070..	A-91417	P	10/27/08		2.0000	ea	0	
1	200/ 1	91417-138	O-RING NIT 70SH 2.112 x .103..	A-91417	P	01/01/95		1.0000	ea	0	
1	210/ 1	91417-225-21	O-RING EPR 70SH 1.859 x .139..	A-91417	P	01/01/95		1.0000	ea	0	
1	220/ 1	91417-232-21	O-RING EPR 70SH 2.734 x .139..	A-91417	P	01/01/95		2.0000	ea	0	
1	230/ 1	92508	SEAL SYSTEM ASSY, NON-LUBE 6.0	C-92508	D	01/01/95		1.0000	ea	0	
.2	10/ 1	91417-431	O-RING NIT 70SH 5.225 x .275..	A-91417	P	01/01/95		1.0000	ea	0	
.2	20/ 1	92508-1	SEAL RING, NON-LUBE, BRNZ/TFE.	C-92508	D	01/01/95		1.0000	ea	0	

90615

DO NOT SCALE DRAWING







LET	DATE	CHANGES	BY	CHK
		SEE SHEET 1 FOR REVISIONS		

GEOMETRIC SYMBOLS per ANSI Y14.5M-1982

TOLERANCE: UNLESS OTHERWISE NOTED
DIMENSIONS ARE IN INCHES
FRACTIONS ± 1/32"
2 PLC DECIMALS ± .03"
3 PLC DECIMALS ± .010"
ANGLES ± 1/2 DEGREE, SURFACE 125 RMS

MATERIAL | FINISH

HEAT TREAT

WT | STOCK SIZE | SCALE NONE

DR BY	DATE	CHK	DATE	APP	DATE
AVR	6/21/82			HWM	6/24/82

PUMP ASSEMBLY
S-216-JD-6.8
S-216-JDN-6.8

SPRAGUE PRODUCTS
DIV. OF CURTISS-WRIGHT FLOW CONTROL CORP.
BRECKSVILLE, OHIO

SIZE	DRG. NO.	SHEET 2 OF 2	REVISED
D	90615		L

90615

DO NOT SCALE DRAWING

TABLE 1 – SEAL COMPOUNDS

90615–X1 INDICATES STD NITRILE SEALS

90615–X2 INDICATES NEOPRENE SEALS
ITEM 20 USE 79550–17–24 90 SHORE
18 USE 79550–13–24 90 SHORE
40 USE 91417–030–11 70 SHORE
22 USE 91417–232–11 70 SHORE
36 USE 91417–225–11 70 SHORE

90615–X3 INDICATES VITON SEALS
ITEM 20 USE 79550–17–18 90 SHORE
18 USE 79550–13–18 90 SHORE
40 USE 91417–030–17 70 SHORE
22 USE 91417–232–17 70 SHORE
36 USE 91417–225–17 70 SHORE

90615–X4 INDICATES EPR SEALS
ITEM 20 USE 79550–17–28 90 SHORE
18 USE 79550–13–28 90 SHORE
40 USE 91417–030–26 70 SHORE
22 USE 91417–232–21 70 SHORE
36 USE 91417–225–21 70 SHORE

(L) 90615–X5 INDICATES FLOUROSILICONE SEALS
ITEM 20 USE 79550–17–40 80 SHORE
18 USE 79550–13–40 80 SHORE
40 USE 91417–030–23 70 SHORE
22 USE 91417–232–23 70 SHORE
36 USE 91417–225–23 70 SHORE

TABLE II
SPECIAL CONFIGURATION

90615–XXXX1 INDICATES EPOXY PAINT
PRIME & PAINT ENTIRE UNIT WITH
WHITE EPOXY PAINT

90615–21XX2 – USE 90524–1 SEAL RING (SHUTTLE, QTY 2)
USE P/N 90596 CYLINDER (ITEM 12)
USE P/N 90597 SEAL SYSTEM (ITEM 33)

LUBRICATE SEAL RINGS, DETENTS AND CYLINDER
BORE LIGHTLY WITH DOW CORNING MOLYKOTE 55M.

TABLE III

PART NO.	MODEL NO.
90615–1	S–216–JD 6.8
90615–2	S–216–JDN 6.8

NOTES: UNLESS OTHERWISE SPECIFIED.
1. COML EQUIVALENT MAY BE SUBSTITUTED.
2. DIMENSIONS ARE FOR REFERENCE ONLY.
3. ASSEMBLE –2 ASSY WITHOUT LUBRICATION IN AIR SECTION.
4. RATIO: 6.8 TO 1.0
   DISPLACEMENT PER CYCLE: 9.72 CU. IN.
5. PROOF PRESSURE 200 PSI DRIVING AIR.
6. OVERALL KIT
   FOR ASSY 90615–1 USE 90807
   FOR ASSY 90615–2 USE 90809
7. TEST PER SP15–149

ASSY PART NO. DESCRIPTION

90615–XXXXX
- SPECIAL CONFIGURATION (TABLE II)
- SPECIAL SEALS (SECOND DASH NO. FROM DRAWING 88525)
- SEAL COMPOUND (TABLE I)
- ASSY DASH NO. (TABLE III)

NOTE	QTY	QTY	PART NO.	DESCRIPTION	ITEM
	1	–	88525–116–1	SEAL	51
1	1	1	MS27183–10	WASHER, FLAT	50
	1	1	80063–2	NAMEPLATE	49
1	4	4	MS90725–7	SCREW, CAP, HEX, HD	48
	12	12	MS90725–3	SCREW, CAP, HEX, HD	47
	12	12	MS51967–2	NUT, PLAIN, HEX	46
	2	2	MS51964–49	SETSCREW	45
	4	4	MS51922–1	NUT, SELF–LOCKING, HEX	44
	1	1	MS35338–43	WASHER, LOCK, HELICAL	43
1	1	1	MS35335–33	WASHER, LOCK, FLAT–EXT TOOTH	42
	–	2	MS28782–14	BACK–UP RING	41
	2	2	91417–030	O–RING	40
	1	1	91417–016	O–RING	39
	1	1	93776–1	NUT, TUBE	38
1	2	2	MS20822–8–8D	ELBOW	37
	1	1	91417–225	O–RING	36
1	1	1	AN3–4A	SCREW, CAP, HEX	35
	1	1	S–291	SPRING, COMPRESSION (CENTURY SPRING) SST	34
	1	–	92508	SEAL SYSTEM	33
	1	1	90687–2	TUBE ASSY	32
	1	1	90686	NUT, SELF LOCKING, HEX	31
	1	1	90523	CONNECTING ROD	30
	1	1	90257	POPPET – CHECK VALVE	29
	1	1	89961–2	SUPPORT	28
	1	1	89958	BRACKET	27
	1	1	89853–1	MUFFLER	26
	1	1	88525–334–18	SEAL	25
	1	1	88525–327–17	SEAL	24
	1	–	88084–1	PISTON	23
	2	2	91417–232	O–RING	22
	1	2	79550–60	O–RING	21
	1	1	79550–17–1	O–RING	20
	1	1	79550–14–1	O–RING	19
	1	1	79550–13–1	O–RING	18
	1	1	78259	NUT	17
	1	1	S–216–31	NUT	16
	1	1	91417–138	O–RING	15
	1	1	S–216–20	GASKET	14
	1	1	S–216–17–1	COVER	13
	1	1	S–216–13	CYLINDER	12
	–	1	S–216–4	PISTON	11
	1	1	90625–1	SPRING, SST	10
	1	1	90624	POPPET	9
	1	1	90622	SEAT, CHECK VALVE	8
	1	1	90621	BODY, CHECK VALVE	7
	1	1	90620	END PLATE	6
	1	1	90619	ROD, PISTON	5
	1	1	90618	PISTON	4
	1	1	90617	BODY	3
	1	1	90616–1	HOUSING ASSY	2
	1	1	90535–2	AIR VALVE AND HOUSING ASSY	1
	–2	–1	90615	ASSEMBLY	
	QTY	QTY	PART NO.	DESCRIPTION	ITEM

LET	DATE	CHANGES	BY	CHK
A	7/7/82	1) ADDED XXXX1 EPOXY PAINT. 2) ADDED IN AIR SECTION TO NOTE 3. 3) ITEM 42 WAS 1 REQ'D. 4) ADDED ITEM 50, 51.	BP	HWM
B	11/10/82	1) ADDED STN. STL. TO ITEM 34. 2) ITEM 39 WAS AMP568-017. 3) ADDED ITEM 52.	RSP	HWM
C	1/17/85	ITEM 10 WAS 90625 (STL).	TAS	LBS
D	5/6/85	1) ITEM 37 QTY WAS 1. 2) DELETE ITEM 36.	KJ	TAS
E	4/25/86	1) ITEM 32 WAS 90687. 2) ITEMS 39 & 40 WERE AMP 568-(). 3) UPDATED TABLE I. 4) ADDED ITEMS 36, 53.	KJ	–
F	3/23/87	1) ITEM 22 WAS 79551-10, QTY 1. 2) DELETED ITEM 53. 3) DELETED ITEM 52. 4) ADDED TABLE III. 5) ADDED SPECIAL CONFIG. –21XX2. 6) –X4 ITEM 36 WAS 91417-225-17.	KJ	JK
G	6/20/88	1) ITEM 13 WAS P/N S-216-17. 2) ITEM 15 WAS P/N S-216-29X3. 3) REVISED AIR VALVE.	BGN	JK
J	2/14/91	ECR A213. 1) ITEM 33 P/N WAS 24G06088A46. 2) ADDED NOTE 6.	BGN	JK
K	10/9/91	ECR A391. TABLE I. 90615-X4: FOR ITEM 20 "USE" P/N WAS 79550-17-22; FOR ITEM 18 "USE" P/N WAS 79550-13-22.	BGN	JK
L	4/21/98	EO 27109. ADDED 90615-X5.	–	GC
	4/30/08	REDRAWN.	TFK	BWS

GEOMETRIC SYMBOLS per ANSI Y14.5M–1982

TOLERANCE: UNLESS OTHERWISE NOTED
DIMENSIONS ARE IN INCHES
FRACTIONS: ± 1/32"
2 PLC. DECIMALS: ± .03"
3 PLC. DECIMALS: ± .010"
ANGLES: ± 1/2 DEGREE, SURFACE 125 RMS

MATERIAL	FINISH
HEAT TREAT	

WT.	STOCK SIZE				SCALE NONE
DR. BY AVR	DATE 6/21/82	CHK.	DATE	APP. HWM	DATE 6/24/82

PUMP ASSEMBLY
S–216–JD–6.8
S–216–JDN–6.8

SPRAGUE PRODUCTS
DIV. OF CURTISS-WRIGHT FLOW CONTROL CORP.
BRECKSVILLE, OHIO

SIZE	DRG. NO.	REVISED
D	SHEET 1 OF 2 90615	L