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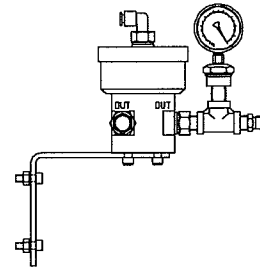
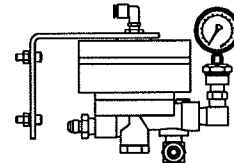
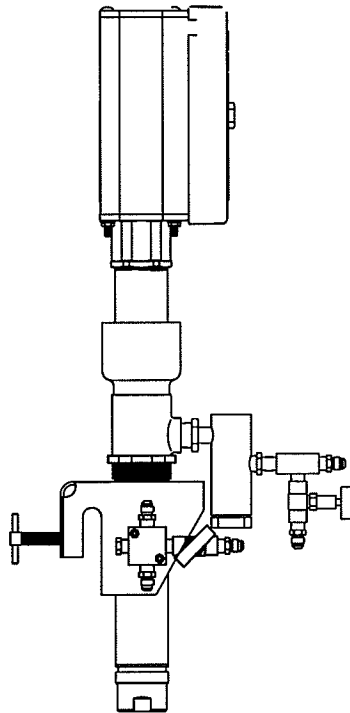
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REFERENCE MANUAL
Manual #10-16
Revised 2/1/11



Adhesive Application Solutions ISO 9001 Certified

2:1 & 5:1 PISTON PUMP KIT REFERENCE MANUAL



IMPORTANT ! - READ ALL INSTRUCTIONS BEFORE OPERATING THIS EQUIPMENT

It is the customer's responsibility to have all operators and service personnel read and understand this information. Contact your ITW Dynatec customer service representative for additional copies.

NOTICE! Please be sure to include the serial number of your application system each time you order replacement parts and/or supplies. This will enable us to send you the correct items that you need.

ITW Dynatec Service Parts Direct Dial: 1-800-538-9540
ITW Dynatec Technical Service Direct Dial: 1-800-654-6711

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Chapter 1 SAFETY

AIR OPERATED INDUSTRIAL PISTON PUMPS



**READ THIS MANUAL CAREFULLY BEFORE INSTALLING,
OPERATING OR SERVICING THIS EQUIPMENT.**

It is the responsibility of the employer to place this information into the hands of the operator.

PLACING INTO SERVICE

⚠ WARNING = Hazards or unsafe practices which could result in severe personal injury, death or substantial property damage.

⚠ CAUTION = Hazards or unsafe practices which could result in minor personal injury, product or property damage.

NOTICE = Important installation, operation or maintenance information.

AIR AND LUBE REQUIREMENTS

⚠ WARNING **EXCESSIVE AIR PRESSURE.** Can cause personal injury, pump damage or property damage. Do not exceed maximum inlet air pressure as stated on air motor plate.

- Filtered and oiled air will allow the pump to operate more efficiently and yield a longer life to operating parts and mechanisms.
- Use an air regulator on the air supply to control the pump cycle rate. This will help to prolong the life of the pump.
- Supply the air lubricator with a good grade of SAE 90 wt. non-detergent oil and set the lubricator to a rate not to exceed one drop per minute.

TRANSPORT AND STORAGE

- Store in a dry place, do not remove product from box during storage.
- Do not remove protection caps from inlet and outlet prior to installation.
- Do not drop or damage box, handle with care.

INSTALLATION

- Mount the pump as required for the application. (For example: Wall mount, floor mount, ram etc.)
- Exhaust silencer kits are available for these pumps. Mount exhaust silencers or pipe exhaust away as required to a safe location.
- Install a ground wire to the air motor ground lug.
- Connect fluid hose to pump outlet. In most cases, a pipe sealant should be used on thread connections. Tighten all fittings.

FLUSHING

NOTICE Flush the pump with a solvent compatible with the material to be pumped.

1. Turn air regulator pressure control knob to "0" pressure setting.
2. Immerse lower pump end or fluid inlet hose into a bucket of solvent.
3. Turn air regulator pressure control knob and allow pump to cycle.
4. Circulate solvent through pump until it is thoroughly cleaned.

OPERATION

START-UP

1. Turn air regulator pressure control knob until motor starts to cycle.
 2. Allow pump to cycle slowly until it is primed and all air is purged from the fluid hose or dispensing device.
 3. Turn off dispensing device and allow pump to stall. Re-check the fittings and tighten if necessary.
 4. Open dispensing device and allow pump to re-start.
 5. Adjust the air regulator as required to obtain desired operating pressure and flow.
- Keep the solvent cup filled with a compatible solvent. This will keep the material from drying on the piston rod, which could drag through the packings, ruin them and eventually scour the piston rod. Use Aro Part No. 637153-B Wet-Sol "Plus" Kit to remove dirty or contaminated solvent and replenish with new solvent.

SHUTDOWN

- It is good practice to periodically flush entire pump system with a solvent that is compatible with the material being pumped, especially if the material being pumped is subject to "settling-out" when not in use for a period of time.
- Disconnect the air supply from the pump if it is to be inactive for a few hours.

SERVICE

- Keep good records of service activity and include pump in preventive maintenance program.
- Check the material and air hoses for any weakness, and replace if necessary.
- USE ONLY GENUINE ARO REPLACEMENT PARTS TO ASSURE PERFORMANCE AND PRESSURE RATING.
- Contact your local authorized ARO Service Center for parts and customer service information. Refer to page 2.

OPERATING AND SAFETY PRECAUTIONS

READ, UNDERSTAND, AND FOLLOW THIS INFORMATION TO AVOID INJURY AND PROPERTY DAMAGE.



EXCESSIVE INLET AIR PRESSURE
STATIC SPARK
EXPLOSION HAZARD



HAZARDOUS MATERIALS
HAZARDOUS PRESSURE



INJECTION HAZARD

⚠ WARNING EXCESSIVE INLET AIR PRESSURE. Can cause severe injury or death.

- Do not exceed the maximum inlet air pressure as stated on the pump model plate.
- Be sure material hoses and other components are able to withstand fluid pressures developed by this pump. Check all hoses for damage or wear. Be certain dispensing device is clean and in proper working condition.

⚠ WARNING STATIC SPARK. Can cause explosion resulting in severe injury or death. Ground pump and pumping system.

- Sparks can ignite flammable material and vapors.
- The pumping system and object being sprayed must be grounded when it is pumping, flushing, recirculating or spraying flammable materials such as paints, solvents, lacquers, etc. or used in a location where surrounding atmosphere is conducive to spontaneous combustion. Ground the dispensing valve or device, containers, hoses and any object to which material is being pumped.
- Use the pump grounding lug provided on metallic pumps for connection of a ground wire to a good earth ground source. Use Aro Part No. 66885-1 Ground Kit or a suitable Ground wire (12 ga. min.).
- Secure pump, connections and all contact points to avoid vibration and generation of contact or static spark.
- Consult local building codes and electrical codes for specific grounding requirements.
- After grounding, periodically verify continuity of electrical path to ground. Test with an ohmmeter from each component (e.g., hoses, pump, clamps, container, spray gun, etc.) to ground to insure continuity. Ohmmeter should show 100 ohms or less.
- Submerge the outlet hose end, dispensing valve or device in the material being dispensed if possible. (Avoid free streaming of material being dispensed.)
- Use hoses incorporating a static wire.
- Use proper ventilation.
- Keep inflammables away from heat, open flames and sparks.
- Keep containers closed when not in use.

⚠ WARNING HAZARDOUS PRESSURE. Can result in serious injury or property damage. Do not service or clean pump, hoses or dispensing valve while the system is pressurized.

- Disconnect air supply line and relieve pressure from the system by opening dispensing valve or device and / or carefully and slowly loosening and removing outlet hose or piping from pump.

⚠ WARNING INJECTION HAZARD. Any material injected into flesh can cause severe injury or death. If an injection occurs immediately contact a doctor.

- Do not grab front end of dispensing device.
- Do not aim dispensing device at anyone or any part of the body.

⚠ WARNING HAZARDOUS MATERIALS. Can cause serious injury or property damage. Do not attempt to return a pump to the factory or service center that contains hazardous material. Safe handling practices must comply with local and national laws and safety code requirements.

- Obtain Material Safety Data Sheets on all materials from the supplier for proper handling instructions.

⚠ WARNING EXPLOSION HAZARD. Models containing aluminum wetted parts cannot be used with Ill.-Trichloroethane, Methylene Chloride or other Halogenated Hydrocarbon solvents which may react and explode.

- Check the pump wetted parts for compatibility before using with solvents of this type.

⚠ CAUTION Verify the chemical compatibility of the pump wetted parts and the substance being pumped, flushed or recirculated. Chemical compatibility may change with temperature and concentration of the chemical(s) within the substances being pumped, flushed or circulated. Consult ARO Form No. 8677-P, Fluid Compatibility Guide, for information on chemical compatibility.

⚠ CAUTION Maximum temperatures are based on mechanical stress only. Certain chemicals will significantly reduce maximum safe operating temperature. Consult Fluid Compatibility Guide for chemical compatibility and temperature limits.

⚠ CAUTION Be certain all operators of this equipment have been trained for safe working practices, understand it's limitations, and wear safety goggles / equipment when required.

⚠ CAUTION Do not use the pump for the structural support of the piping system. Be certain the system components are properly supported to prevent stress on the pump parts.

- Suction and discharge connections should be flexible connections (such as hose), not rigid piped, and should be compatible with the substance being pumped.

⚠ CAUTION Prevent unnecessary damage to the pump. Do not allow pump to operate when out of material for long periods of time.

- Disconnect air line from pump when system sits idle for long periods of time.

Chapter 2 DESCRIPTION

The ITW Dynatec 2:1 and 5:1 piston pump kits are designed for use with mono- or co-polymer synthetic resin adhesives with viscosities to 6000 centipoise. Higher viscosity materials may be usable, but this would have to be determined on a case-by-case basis. Fluid application pressures may range from 0 to 200 psi (0 to 13.6 bar) for the 2:1 systems and 0 to 400 psi (0 to 27 bar) for the 5:1 systems. Contact your ITW Dynatec representative for assistance if your adhesive application requirements do not meet the above criteria.

Common accessories for this equipment include:

Part Number	Description
108255	Piston Pump Suction Kit
108385	Piston Pump Cart Assembly
105814	Adhesive Level Sensor Control
105798	5 Gallon Pail Sensor/Bracket Assembly for Level Sensor
105797	55 Gallon Drum Sensor/Bracket Assembly for Level Sensor

Contact your ITW Dynatec sales person or our Service Parts Department (800-538-9540) for more information concerning these products.

ITW Dynatec c. 2001

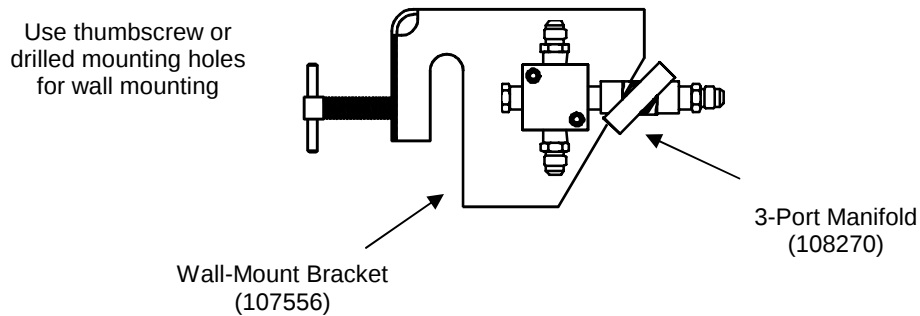
Chapter 3 INSTALLATION

Pump Wall-Mounting Bracket

The pump and filter portion of the fluid delivery system is designed for wall mounting. A bracket for this purpose (P/N 107556) is supplied as a part of this kit. Enough hydraulic hose is supplied to separate the pump and fluid regulator assemblies by nine feet (3 meters). The fluid regulator should be mounted as close to the glue applicators as is practical. Keep these factors in mind when deciding where to locate the pump wall-mounting bracket.

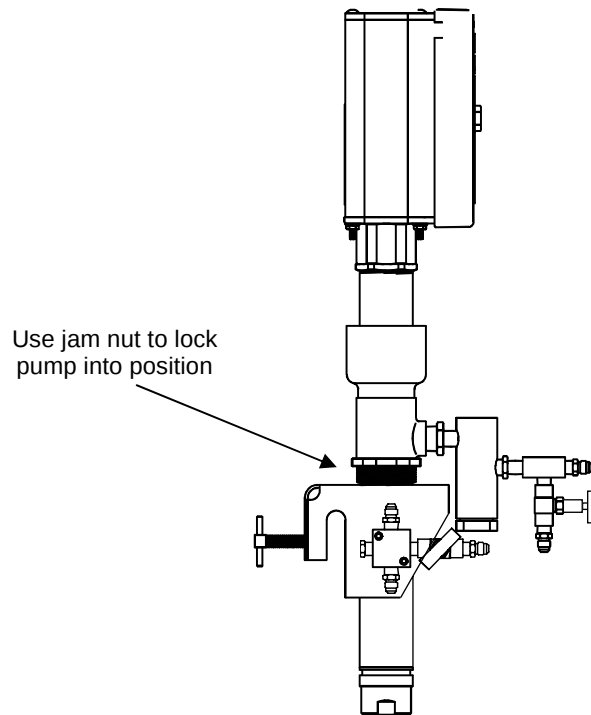
Return/ Bypass Manifold Assembly

Install Return/Bypass Manifold on the right or left side of the wall-mounting bracket. Mark and drill two Ø0.201" through holes in the bracket. Use the two supplied 10-24 x 1.75" screws with lock washers and nuts to mount the manifold to the bracket.



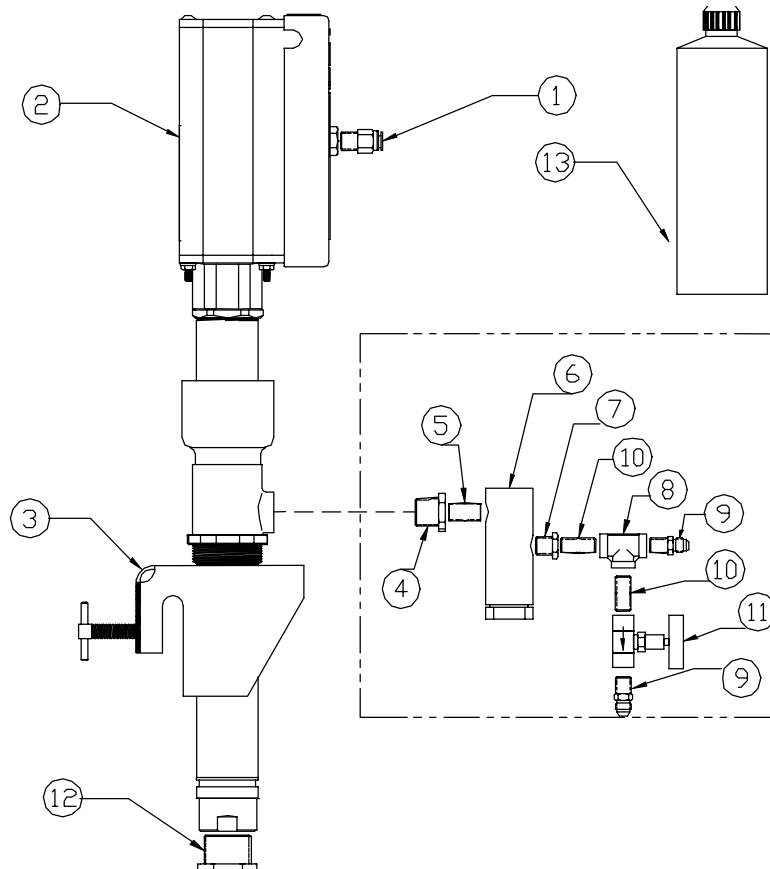
4:1 Piston Pump

Install the 4:1 Piston Pump (107555) by screwing it into the wall-mounting bracket (107556). Use the jam nut on the pump to lock it into position on the bracket.



Fluid Output Fittings and Filter Installation

Several fittings along with the fluid filter must be installed to complete the pump assembly. These items are not factory installed to avoid possible damage during shipment. Use the below diagram as a guide for proper installation. Your fittings may vary, see Appendix A of this manual for additional information on specific pump assemblies. It is very important that all fittings are tightly assembled and that thread sealant is used to assure an airtight assembly.



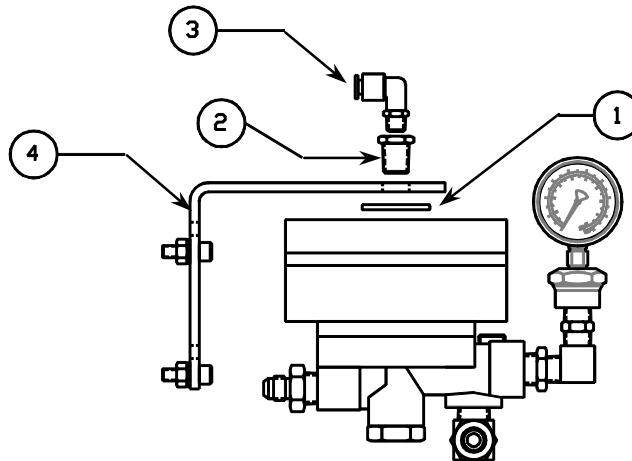
Item	Part #	Description	Qty
1	N06434	Fitting, 3/8 Tube x 1/4 NPT	1
2	107555	Piston Pump, 4:1	1
3	107556	Bracket Assembly, Piston Pump	1
4	108073	Reducer, 3/4 x 3/8NPT, SST	1
5	108103	Nipple, Close, 3/8NPT, SST	1
6	107577	Fluid Filter Assembly, 50 Mesh	1
7	108072	Reducer, 3/8NPT x 1/4NPT, SST	1
8	108271	Tee, Female, 1/4NPT, SST	1
9	108070	Nipple, 1/4NPTx 5/16JIC, SST	2
10	108106	Nipple, Close, 1/4NPT, SST	1
11	108069	Needle Valve, 1/4NPT, SST	2
12	107559	Reducer, 1.25NPS x 3/4NPS, SST	1
13	107565	Lubricant, Pump	1

Fluid Regulator Assembly and Bracket

The Fluid Regulator Assembly and Bracket (107542) should be mounted as close to the glue applicators as is practical. This is done to minimize the fluid pressure drop in the hoses once the adhesive exits the fluid regulator on its way to the applicators. Two ¼-28 x ¾” screws with lock washers and nuts are provided for mounting the bracket to a flat surface.

2:1 Fluid Regulator Assembly

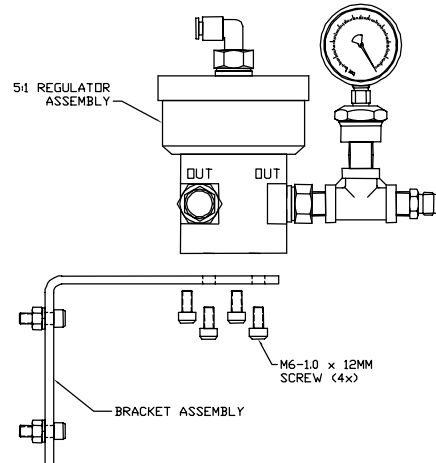
The 2:1 Fluid Regulator (107548) is mounted to the bracket by using the supplied flat washer (107554), bushing (066X017) and tube fitting (N06436) as per the below drawing. Use thread sealant on all fittings to assure an air-tight connection.



Item	Part #	Description	Qty
1	107554	Washer, Flat 1/2"	1
2	066X017	Bushing, 1/4 NPT x 1/8NPT, Brass	1
3	N06436	Fitting, 1/4 Tube x 1/8NPT, Elbow	1
4	107542	Bracket Assembly, Fluid Regulator	1

5:1 Fluid Regulator Assembly

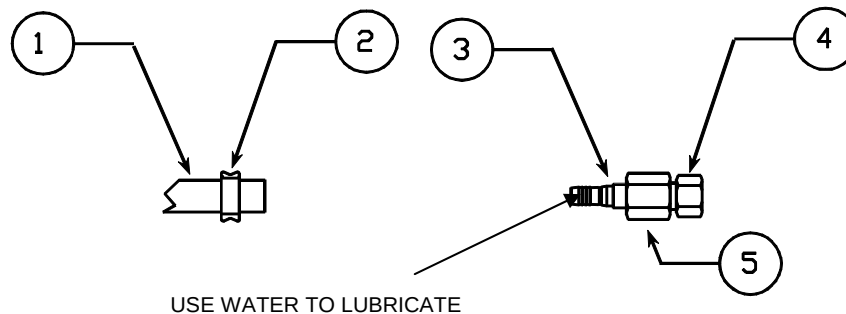
The 5:1 Fluid Regulator (30.00000.701) is mounted to the bracket (107542) by using the supplied 4 x M6-1.0 x 12mm screws as shown below.



Hydraulic Hose Assembly

The hydraulic hose and fittings are provided in kit form for on-site assembly. This allows the cutting of the hose material to lengths appropriate for your installation. The following procedure should be used to correctly assemble the connector fittings to the hose:

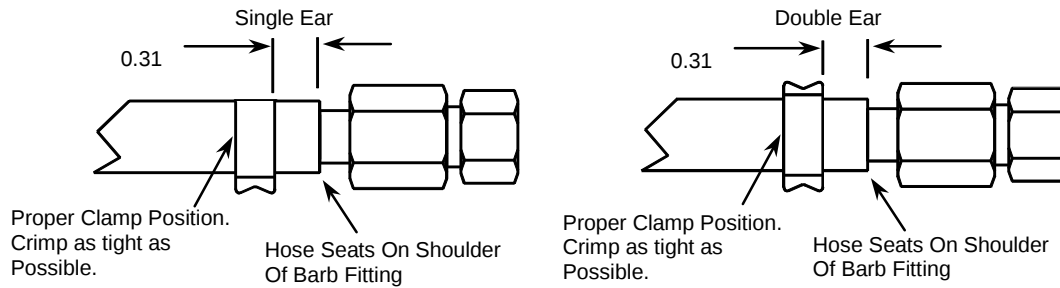
1. Cut the end of the Hydraulic Hose so it is straight and square.
2. Place the Hose Clamp over the end of the Hydraulic Hose.
3. Slide the Hose Barb Fitting into the Hose Nut.
4. Use wrenches to tighten the Hose Fitting Plug into the Hose Nut.



Item	Description
1	Hose, Hydraulic
2	Clamp, Hydraulic Hose
3	Barb, SST
4	Plug, Hose Fitting
5	Hose Nut, STL

5. Lubricate the end of the Barb Fitting with water to ease its assembly into the Hydraulic Hose.

6. Push the Hydraulic Hose and Hose Clamp over the Barb Fitting until the end of the hose butts against the shoulder of the Barb Fitting.

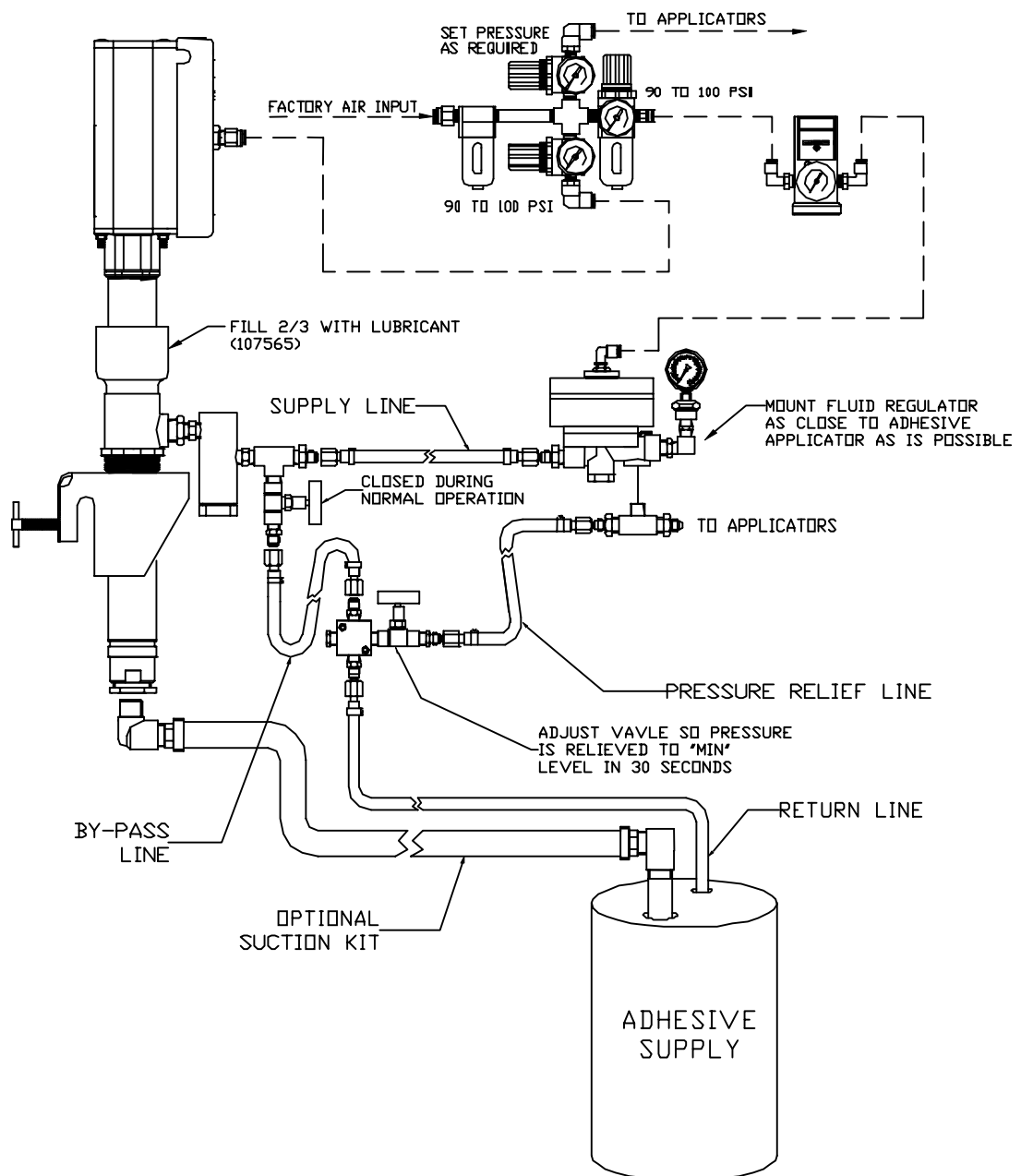


7. Position the Hose Clamp 5/16" (8mm) back from the end of the hose.
8. Tighten the clamp as tightly as possible around the hose using the provided Crimp Tool (107571).
9. Remove the Hose Fitting Plug from the Hose Nut.
10. Repeat steps #1 through #9 for installation of each set of hose connection fittings.

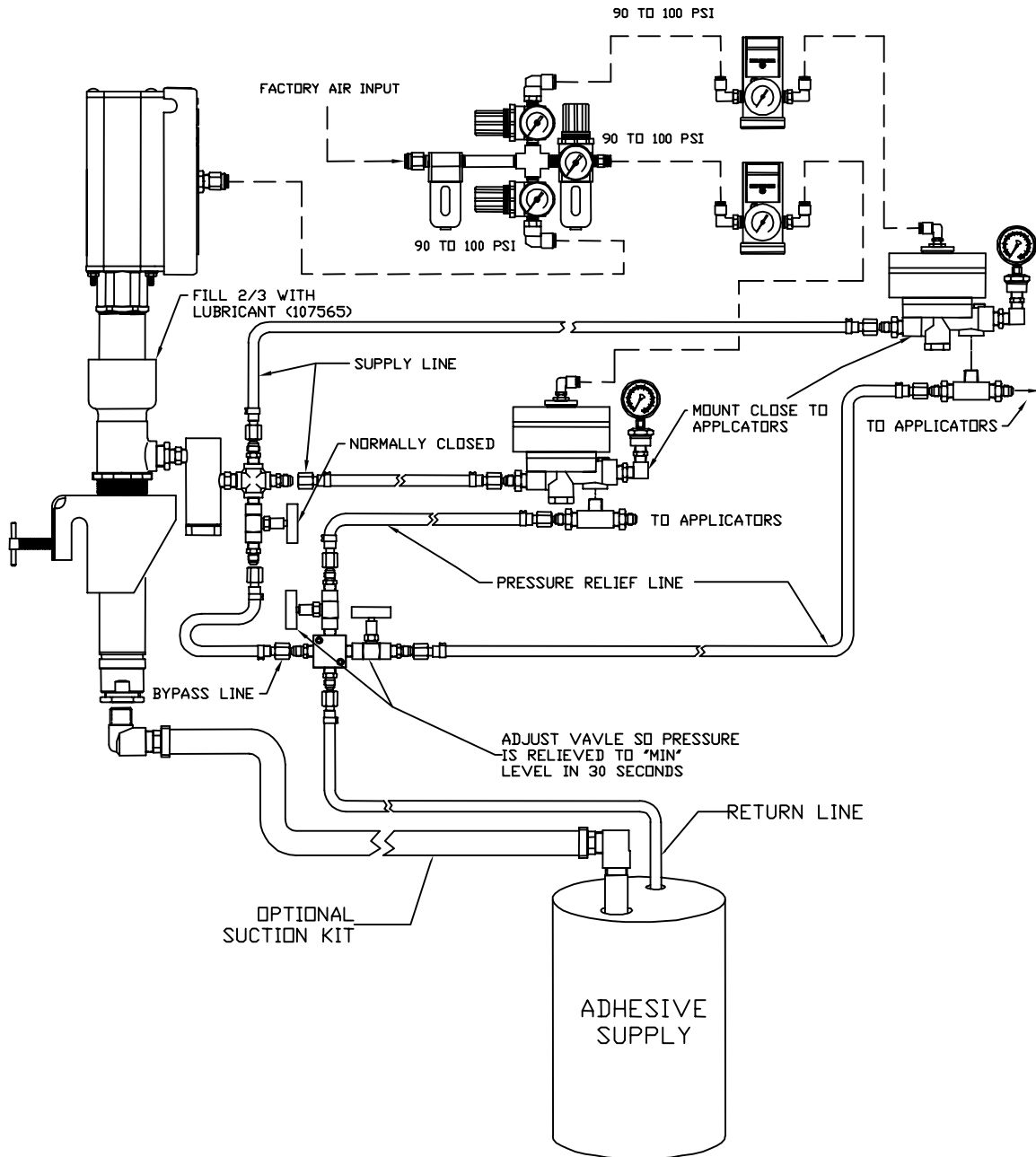
Fluid and Air Line Interconnection

Below is a generic guide to the proper fluid and air line interconnection of the subassemblies within the Pump Kit. Use this for reference purposes only, your particular installation may vary.

Fluid and Air Interconnection Diagram for Single Fluid Regulator



Fluid and Air Interconnection Diagram for Dual Fluid Regulators



Upper Packing Lubricant

Provided with the Piston Pump Assembly is a bottle of Upper Packing Lubricant (107565). The pump wet cup, at the base of the upper portion of the piston pump (see drawing on previous page), should be filled approximately 2/3 full with this lubricant prior to operation. The fluid level in the cup should be checked once each week and filled when necessary as part of the normal fluid delivery system maintenance routine.

Air Pressure Settings

A minimum factory air pressure of 80PSI (5.5Bar) is recommended for proper system operation. Ideally, factory air pressure should be 90 to 100PSI (6 to 7Bar). Air regulator settings should be as follows:

- **Pump Pressure:** 75 to 90 PSI (5 to 6 Bar)
- **Transducer Pressure:** 90 to 100 PSI (6 to 7 Bar)
- **Applicator Pressure*:** As required by pneumatic applicators (see applicator manual)

** Applicator pressure only applies to pneumatic applicators or pneumatically controlled shutter devices.*

Shut-Off Valve Adjustment During Normal Operation

There exist two shut-off valves in the fluid delivery system. Adjust them as follows for normal system operation.

By Pass Control Valve: This valve is located at the output of the pump in a “T” off the Fluid Filter Assembly. Completely close this valve during normal operations. See Chapter 4 (Changing the Adhesive Reservoir) for information on the use of this valve.

Pressure Relief Valve: This valve is located on the Return/ Bypass Manifold Assembly. Adjust it to allow a slow relief of built-up line pressure upon parent machine shutdown. Ideally, the valve should be adjusted to take approximately 30 seconds for fluid pressure to be relieved, as judged from the gauge at the output of the Fluid Regulator Assembly.

IMPORTANT: Having this valve open too wide will starve the adhesive pressure to the applicators, causing unsatisfactory system performance.

EXAMPLE: The adhesive system is programmed for a minimum pressure of 50 PSI and a maximum pressure of 180 PSI. The parent machine is shut down when the application pressure is at 180 PSI. Proper adjustment of the Pressure Relief Valve would result in the reduction of fluid pressure from the maximum value of 180 PSI to the minimum value of 50 PSI in approximately 30 seconds.

Shut-Off Valve Adjustment During Initial System Purge

Proper adjustment of the shut-off valves during an initial system purge will allow the procedure to be accomplished more quickly and produce an overall better result. An initial system purge occurs when the fluid delivery system is first installed or after the system has been flushed with water and/or vinegar and there is no glue in the system. See Chapter 5 (Routine Maintenance) of this manual for more information concerning the use of water and/or vinegar to flush the fluid delivery system.

Adjust the shut-off valves as follows during an initial system purge.

Prior to beginning this operation, take the output end of the Return Line Hose (see Fluid and Air Interconnection Diagram earlier in this chapter) from the adhesive reservoir and place it into a bucket so the material can be easily discarded.

By Pass Control Valve: This valve is located at the output of the pump in a “T” off the fluid filter assembly. This valve should be opened for a brief period of time (20 to 30 seconds) to purge any remaining air from the fluid delivery system. Completely close this valve prior to normal operations.

Pressure Relief Valve: This shut-off valve is located on the Return/ Bypass Manifold Assembly.

1. Connect all air and fluid lines and adjust input air pressures to recommended levels.
2. Completely close the Pressure Relief Valve.
3. Disconnect all drive output cables from either the control unit or the applicator(s).
4. Activate the PURGE function of the control unit. This should bring the fluid pressure at the output of the fluid regulator to a higher level than during a normal machine stop condition.

5. SLOWLY open the Pressure Relief Valve. The adhesive should begin to flow through the Return Line into the waste bucket. Allow this flow to continue until a continuous stream of adhesive is observed at the output of the Return Line.
6. Stop the PURGE process at the Control Unit and completely close the Pressure Relief Valve.
7. Reconnect all drive output cables to the Control Unit.
8. Conduct a normal purge of each applicator until a continuous stream of adhesive is produced with no air being mixed with the fluid.
9. Adjust the Pressure Relief Valve for normal operation as described in the previous section.

Chapter 4

CHANGING THE ADHESIVE SUPPLY

The following procedure should be followed when changing the adhesive supply (i.e. 5 gallon pail, 55 gallon drum, etc.). The same basic procedure is used if the existing reservoir is continually refilled, however this reservoir should be thoroughly cleaned at least once each week to prevent the buildup of dried adhesive on the inner walls of the reservoir.

NOTE: The adhesive supply should be changed before the pump runs “dry” (i.e. adhesive supply reservoir runs empty) to avoid “run-away” pump operation and the introduction of air into the fluid delivery system. Follow the procedures in Chapter 3 for Initial System Purge if the pump runs dry prior to changing the adhesive supply.

1. Remove the input air pressure to the pump assembly.
2. Assure that both the Pressure Relief and By-Pass Valves are completely closed.
3. Remove the pump Suction Kit and the Return Line hose from the old adhesive supply container.
4. Use a clean, wet rag to wipe the built-up adhesive from the outside walls of the Suction Kit pipe and the Return Line hose.
5. Place the Suction Kit pipe and Return Line hose in the new adhesive reservoir.
6. Replace the input air pressure to the pump assembly.
7. SLOWLY open the By-Pass Valve located at the output of the pump in a “T” off the Fluid Filter Assembly. This will allow the adhesive to bypass the normal flow through the fluid regulator and instead circulate back into the adhesive reservoir.
8. Allow the pump to operate for a few minutes to purge all air that entered the Suction Kit.
9. Completely close the By-Pass Valve once all air has been purged from the system.
10. Properly adjust the Pressure Relief Valve for normal operations as per instructions provided in Chapter 3 of this manual.

The system is now ready to operate.

Chapter 5 ROUTINE MAINTENANCE

The following procedures should be performed on a regular basis to help ensure proper fluid delivery system operation.

Once Each Week

1. **Filter Screen:** Wash the filter screen with warm (not hot) water. Inspect for corrosion or clogging in the mesh material. Replace filter screens as necessary.

NOTE: The filter assembly is designed with the Cap Nut (551-119) down. This is done so any debris that accumulates in the filter body is flushed from the system when the Cap Nut is removed. Inverting the Filter Body (551-117) so the Cap Nut is on the top is not recommended.

2. **Purge Unused Applicators:** Purge for approximately one minute each applicator that has not been used during the week. This helps ensure that the adhesive does not thicken inside the nozzle and impede operation when the applicator is required for use.
3. **Reused Adhesive Reservoir:** Wash a reused adhesive reservoir with warm (not hot) water until all dried adhesive is removed. Completely dry the container prior to filling with new adhesive. Follow the directions Chapter 4 (Changing the Adhesive Supply) prior to placing the system back into operation.
4. **Upper Packing Lubricant:** Check the pump wet cup for adequate lubricant. See page 3-9 of this manual for details.

Once Each 3 Months or Upon Changing Adhesive Products

1. Remove the Suction Kit and Return Line from its adhesive reservoir.
2. Clean the reservoir if it is to be reused.
3. Place warm (not hot) water in a clean reservoir and purge the entire adhesive supply system, inclusive of applicators, until the water flows clean.
4. Remove any water from the reservoir.
5. Place between one and two gallons (depending upon number of applicators in the system) of distilled white vinegar (standard household table vinegar, not cider vinegar) in the reservoir.
6. Completely purge the system by running an equal amount of vinegar through each applicator.
7. Remove any remaining vinegar from the reservoir.

8. Place between one and two gallons (depending upon the number of applicators in the system) of warm water in the reservoir.
9. Completely purge the system by running an equal amount of water through each applicator in an effort to thoroughly remove all vinegar from the system.
10. Remove any water from the reservoir and completely dry the inside if it is going to be used as the adhesive reservoir.
11. Place fresh adhesive in the reservoir (or provide a new reservoir with fresh adhesive) and purge the system until all water and air have been removed.
12. Follow the instructions in Chapter 3 of this manual for adjusting the Needle Valves for an initial system purge and for normal operation.

Appendix A PARTS AND REPAIR INFORMATION

Repair Kits

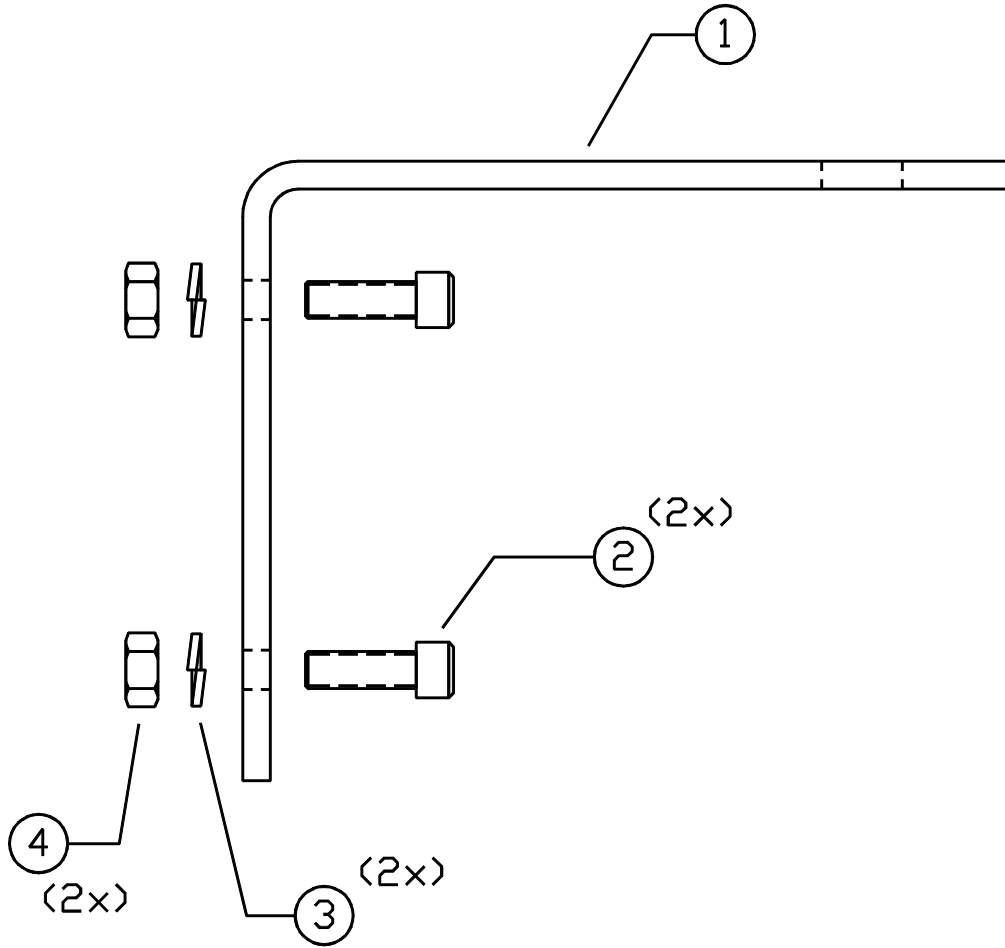
Part #	Description
108275	Service Kit for PN 107548, 2:1 Fluid Regulator
108274	Air Motor Service Kit for PN 107555 Piston Pump
108273	Ball Check Service Kit for PN 107555 Piston Pump
108272	Lower End Service Kit for PN 107555 Piston Pump
551-118	Filter Screen, 100 Mesh
551-112	Filter Screen, 50 Mesh (Standard)
107565	Lubricant, Pump
107571	Crimp Tool, Hose Clamp

Pump Suction Kits

Part #	Description	Qty
108088	2:1 Piston Pump Kit With Suction Kit	
108255	Suction Kit	1
108083	2:1 Piston Pump Kit	1
108200	2:1 Piston Pump Kit (No Bypass) With Suction Kit	
108089	4:1 Piston Pump Kit, No Bypass	1
108255	Suction Kit	1
108182	2:1 Regulator Assembly, No Bypass	1
107542	Fluid Regulator Bracket Assembly	1
108091	Hose Connector Kit	1
107566	1/4" Hydraulic Hose	10'
108497	2:1 Pump Kit (No Bypass), Dual Output	
108484	4:1 Pump Assembly, Dual, No Bypass	1
108255	Suction Kit	1
108182	2:1 Regulator Assembly, No Bypass	2
107542	Fluid Regulator Bracket Assembly	2
108091	Hose Connector Kit	2
107566	1/4" Hydraulic Hose	20'

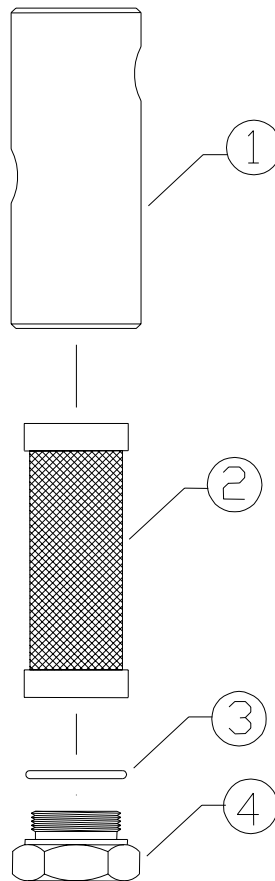
108633 108632 108255	2:1 Piston High Flow Pump Kit And Suction Kit 2:1 Piston Pump Kit, High Flow Suction Kit	 1 1
108736 108735 108255	2:1 Pump/ Suction Kit With Dual Regulators 2:1 Piston Pump Kit, Dual Regulators Suction Kit	 1 1
109660 109659 108255	5:1 Pump/ Suction Kit 5:1 Piston Pump Kit Suction Kit	 1 1
109661 109645 108255	5:1 Pump/ Suction Kit, Dual 5:1 Piston Pump Kit, Dual Regulators Suction Kit	 1 1

107542 Fluid Regulator Bracket Assembly



Item	Part #	Description	Qty
1	107540	Fluid Regulator Bracket	1
2	107543	1/4-28x 3/4", SHC Screw STL	2
3	078C011	Washer, 1/4" Split Lock, STL	2
4	078D031	Nut, Hex, 1/4-28, STL	2
5	048J008	Cable Tie, 6" (Not Shown)	1

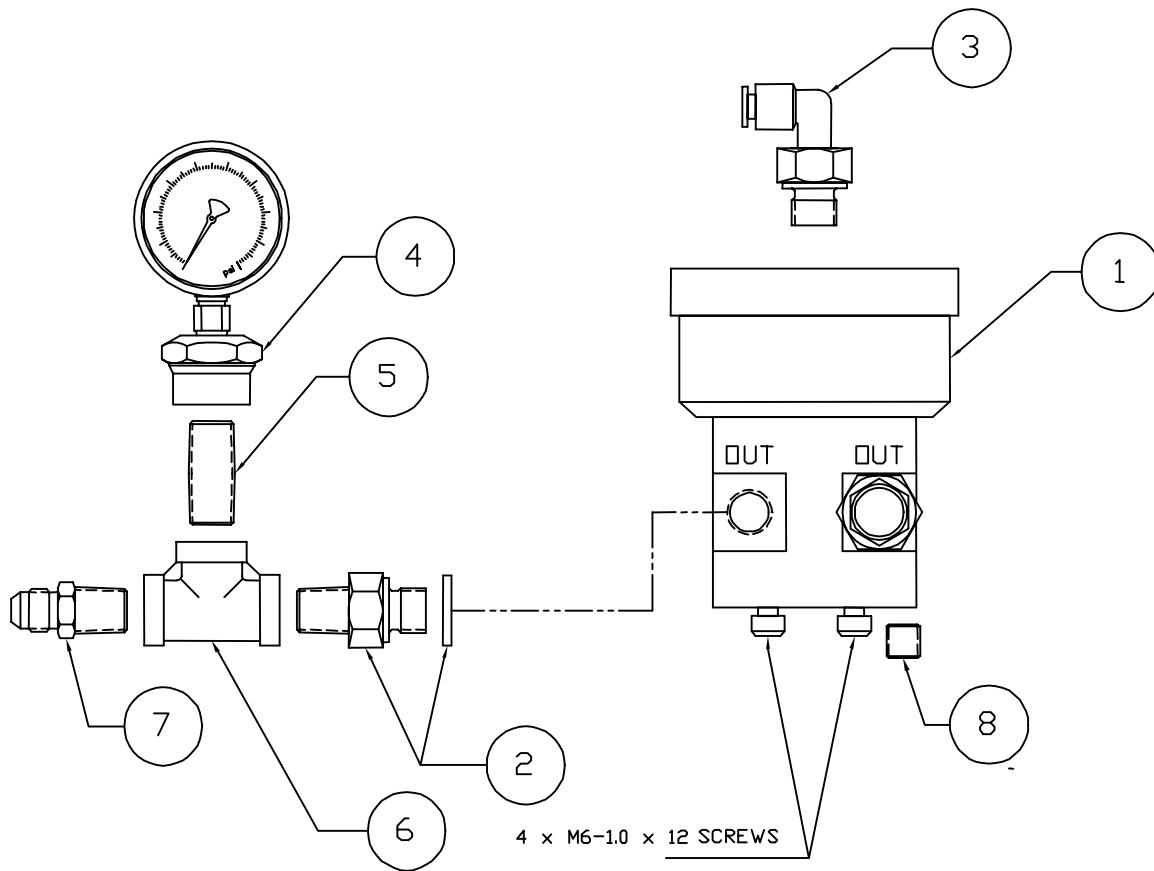
107577 Fluid Filter Assembly



Item	Part #	Description	Qty
1	551-117	Filter Body, SST	1
2	551-112	Filter Screen, 50 Mesh	1
3	551-120	O-ring	1
4	551-119	Cap, Filter Body, SST	1

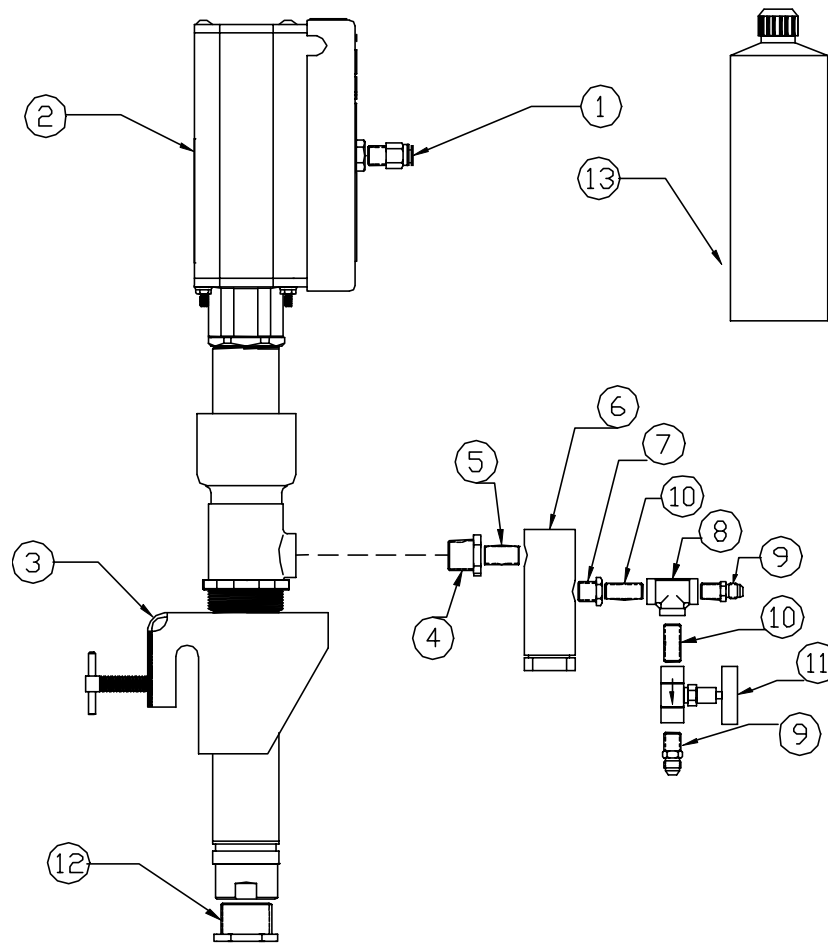
Note: 100 mesh Filter Screen (Replaces Item #2) PN 551-118

108013 5:1 Fluid Regulator Assembly



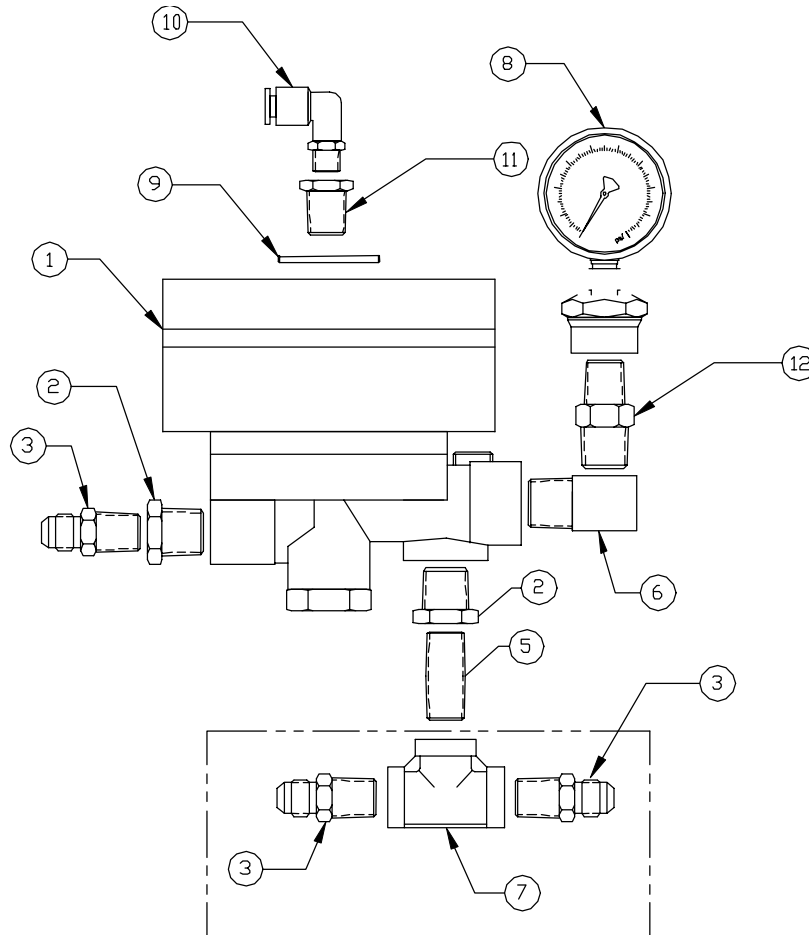
Item	Part #	Description	Qty
1	30.00000.701	Fluid Regulator	1
2	106858	Fitting, Nipple, 1/4 BSPP x 1/4 NPT	2
3	109643	Fitting 90 Deg, 1/4 BSPP x 1/4 Tube	1
4	101174	Pressure Gauge With Seal, 1000 PSI	1
5	108106	Fitting Close Nipple, 1/4 NPT, SST	1
6	108271	Fitting, Tee, 1/4 NPT, SST	1
7	108070	Fitting, Nipple, 5/16JIC x 1/4 NPT, SST	1
8	109590	Screw, SHC, M10-1.5 x 10, SST	1

108068 4:1 Piston Pump Assembly



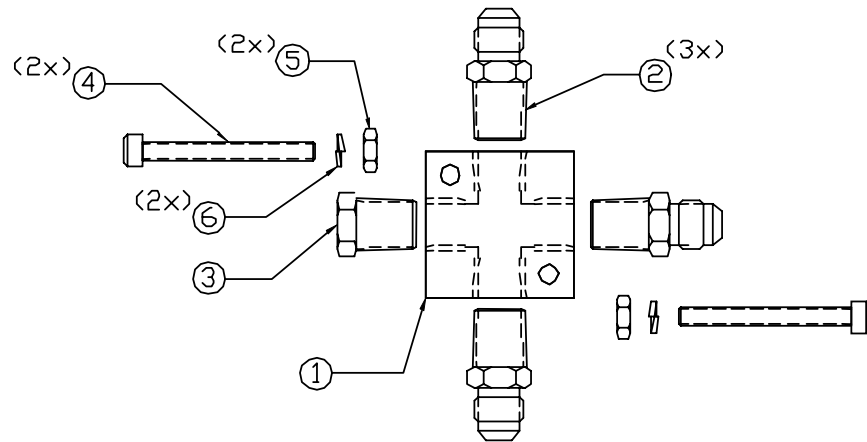
Item	Part #	Description	Qty
1	N06434	Fitting, 3/8 Tube x 1/4 NPT	1
2	107555	Piston Pump, 4:1	1
3	107556	Bracket Assembly, Piston Pump	1
4	108073	Reducer, 3/4NPT x 3/8NPT, SST	1
5	108103	Nipple, Close, 3/8NPT, SST	1
6	107577	Fluid Filter Assembly, 50 Mesh	1
7	108072	Reducer, 3/8NPT x 1/4NPT, SST	1
8	108271	Tee, Female, 1/4NPT, SST	1
9	108070	Nipple, 1/4NPT x 5/16JIC, SST	2
10	108106	Nipple, Close, 1/4NPT, SST	2
11	108069	Needle Valve, 1/4NPT, SST	1
12	107559	Reducer, 1.25NPS x 3/4NPS, SST	1
13	107565	Lubricant, Pump	1

108074 2:1 Fluid Regulator Bracket Assembly



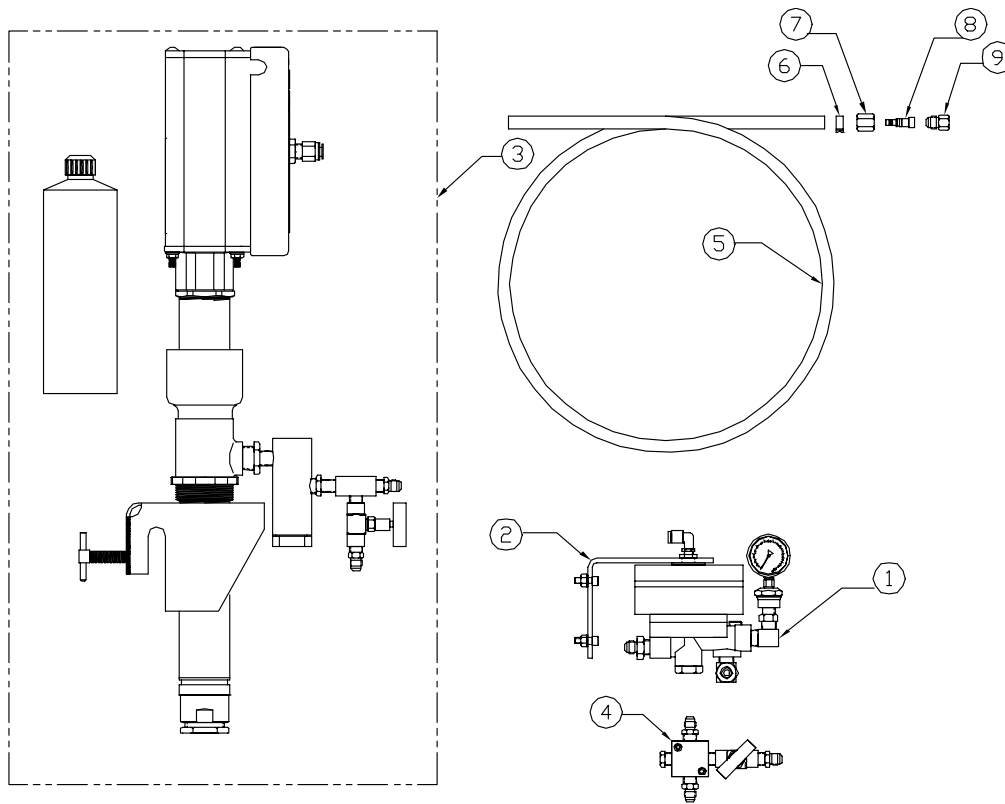
Item	Part #	Description	Qty
1	107548	Fluid Regulator 200 PSI	1
2	108072	Reducer, 3/8NPT x 1/4NPT, SST	2
3	108070	Nipple, 1/4NPT x 5/16JIC, SST	3
4	048J008	Cable Tie, Not Shown	1
5	108106	Nipple, Close, 1/4NPT, SST	1
6	108076	Street Elbow, 3/8NPT, SST	1
7	108271	Tee, Female, 1/4NPT SST	1
8	107864	Pressure Gauge w/Seal, 200PSI	1
9	107554	Flat Washer, 1/2, STL	1
10	N06436	Fitting, 1/4 Tube x 1/8NPT, Elbow	1
11	066X017	Bushing, 1/4NPT x 1/8NPT, Brass	1
12	108075	Nipple, Hex, 3/8 x 1/4 NPT, SST	1

108077 3 Port Stainless Steel Manifold Assembly



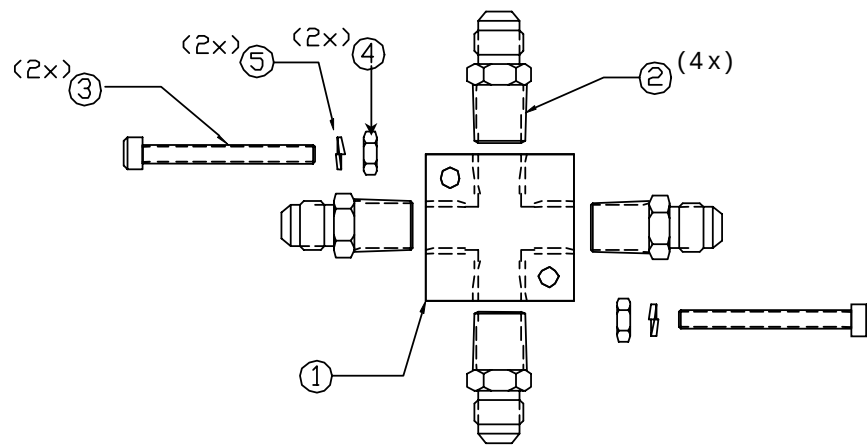
Item	Part #	Description	Qty
1	108033	Manifold Block, 4-Port, SST	1
2	108070	Nipple , 1/4NPT x 5/16JIC, SST	3
3	108078	Plug, Hex, 1/4NPT, SST	1
4	078A120	10-24 x 1.75 SHC Screw	2
5	078D004	Nut, Hex, 10-24 STL	2
6	N00695	Washer, #10 Split Lock, STL	2

108083 2:1 Piston Pump Kit



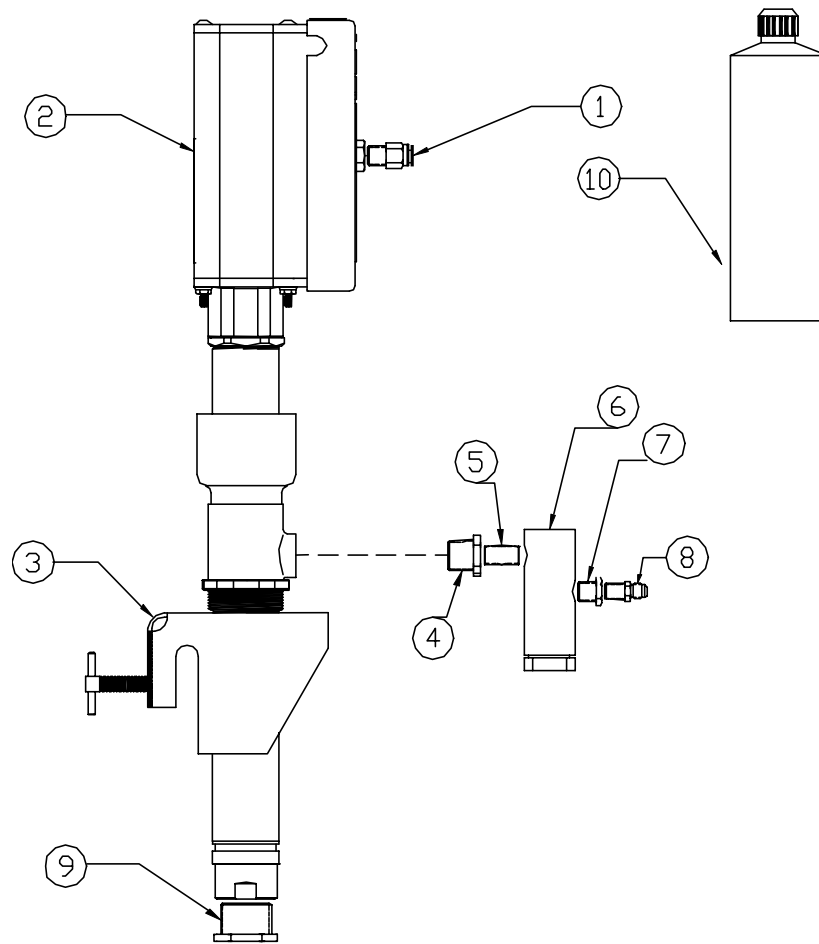
Item	Part #	Description	Qty
1	108074	Fluid Regulator Assembly, 200 PSI	1
2	107542	Bracket Assembly, Fluid Regulator	1
3	108068	4:1 Piston Pump Assembly	1
4	108270	3-Port Manifold Assembly With Valve	1
5	107566	Hose, Hydraulic, 1/4 "	25'
6	107567	Clamp, 1/4" Hydraulic Hose	9
7	107568	Hose Nut, 5/16JIC, STL	7
8	108082	Stem, 5/16JIC x 1/4Hose, SST	7
9	107570	Plug, 5/16JIC Hose Fitting	1
10	107571	Tool, Crimp (Not Shown)	1

108084 4 Port Stainless Steel Manifold Assembly



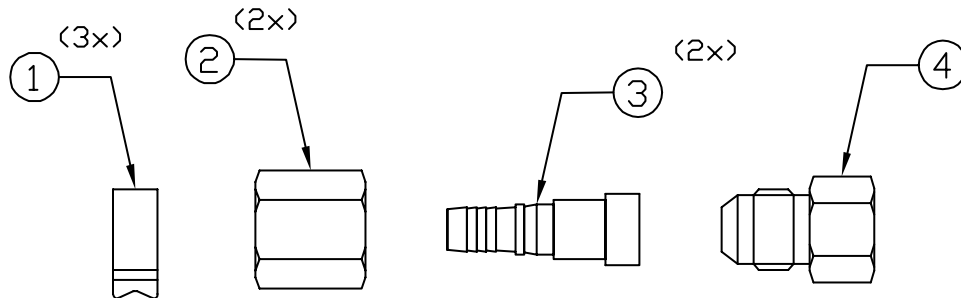
Item	Part #	Description	Qty
1	108033	Manifold Block, 4-Port, SST	1
2	108070	Nipple , 1/4NPT x 5/16JIC, SST	4
3	078A120	10-24 x 1.75 SHC Screw	2
4	078D004	Nut, Hex, 10-24 STL	2
5	N00695	Washer, #10 Split Lock, STL	2

108089 4:1 Piston Pump Assembly, Without Bypass

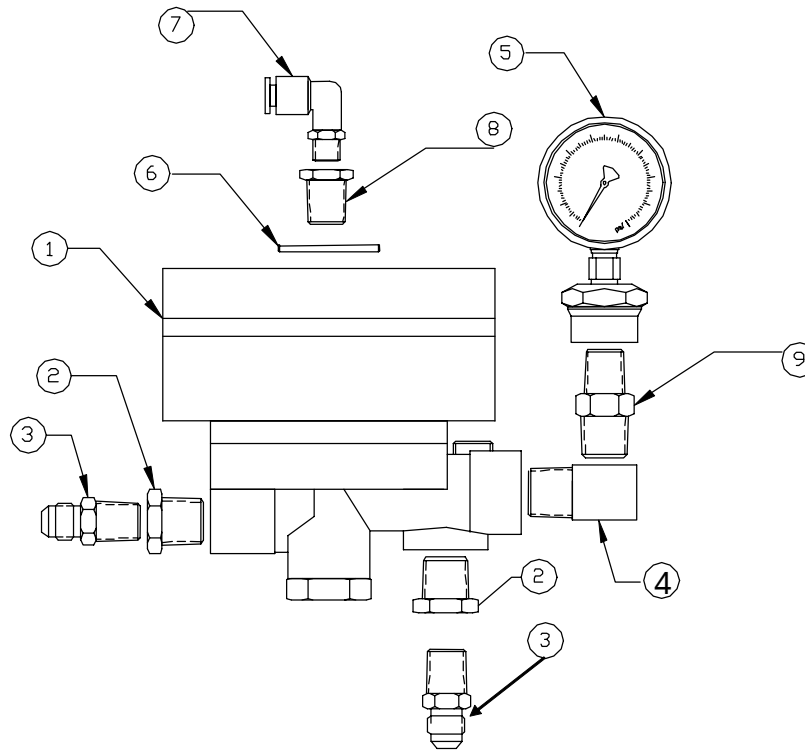


Item	Part #	Description	Qty
1	N06434	Fitting, 3/8 Tube x 1/4 NPT	1
2	107555	Piston Pump, 4:1	1
3	107556	Bracket Assembly, Piston Pump	1
4	108073	Reducer, 3/4NPT x 3/8NPT, SST	1
5	108103	Nipple, Close, 3/8NPT, SST	1
6	107577	Fluid Filter Assembly, 50 Mesh	1
7	108072	Reducer, 3/8NPT x 1/4NPT, SST	1
8	108070	Nipple, 1/4NPT x 5/16JIC, SST	1
9	107559	Reducer, 1.25NPS x 3/4NPS, SST	1
10	107565	Lubricant, Pump	1
11	107571	Tool, Crimp (Not Shown)	1

108091 5/16 JIC x 1/4" Hose Connector Kit

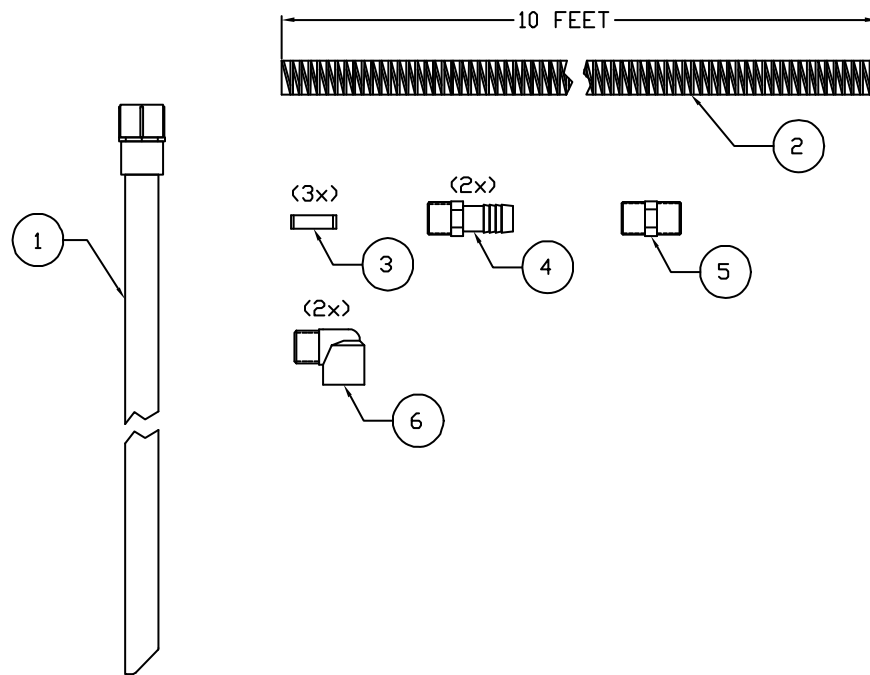


Item	Part #	Description	Qty
1	107567	Clamp, 1/4" Hose	3
2	107568	Nut, Hose Adapter	2
3	108082	Stem Fitting, 5/16 JIC x 1/4" Hose	2
4	107570	Plug, 5/16 JIC Hose	1

108182 2:1 Fluid Regulator Assembly, With No Bypass, 200 PSI

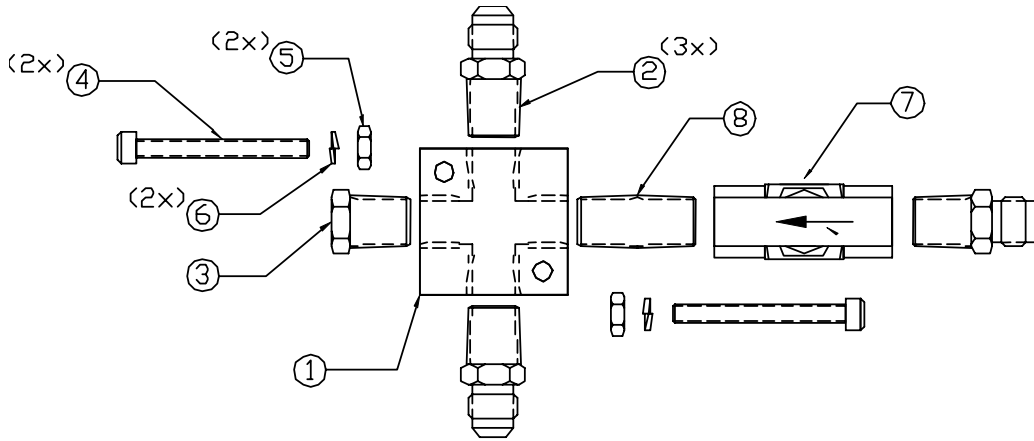
Item	Part #	Description	Qty
1	107548	Fluid Regulator 200 PSI	1
2	108072	Reducer, 3/8NPT x 1/4NPT, SST	2
3	108070	Nipple, 1/4NPT x 5/16JIC, SST	2
4	108076	Street Elbow, 3/8 NPT, SST	1
5	107864	Pressure Gauge w/Seal, 200 PSI	1
6	107554	Washer Flat, 1/2"	1
7	N06436	Fitting, 1/4 Tube x 1/8NPT, Elbow	1
8	066X017	Bushing, 1/4NPT x 1/8NPT, Brass	1
9	108075	Nipple, Hex, 3/8 x 1/4 NPT, SST	1

108255 4:1 Suction Kit



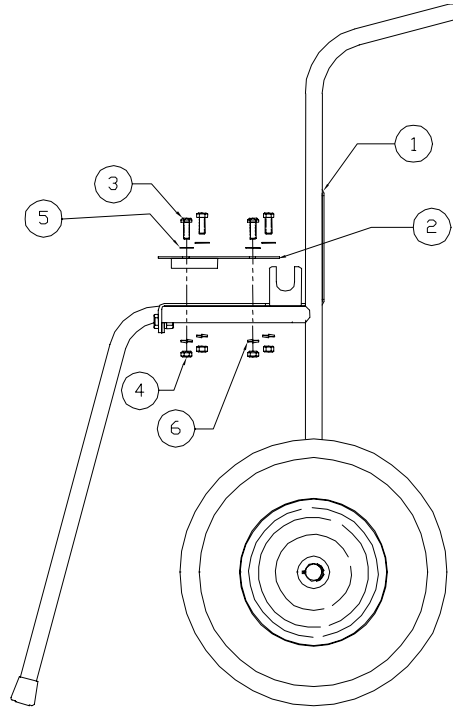
Item	Part #	Description	Qty
1	108253	3/4" Suction Pipe Assembly, 46"	1
2	108249	3/4" Polyvac Hose, PVC,	10'
3	108250	Double Ear Hose Clamp	3
4	108251	3/4NPT x 3/4 Hose Barb, PP	2
5	108254	Nipple, 3/4NPT, Polypropylene	1
6	108252	Street Elbow, 3/4NPT, PVC	2

108270 Return/ Bypass Manifold Assembly



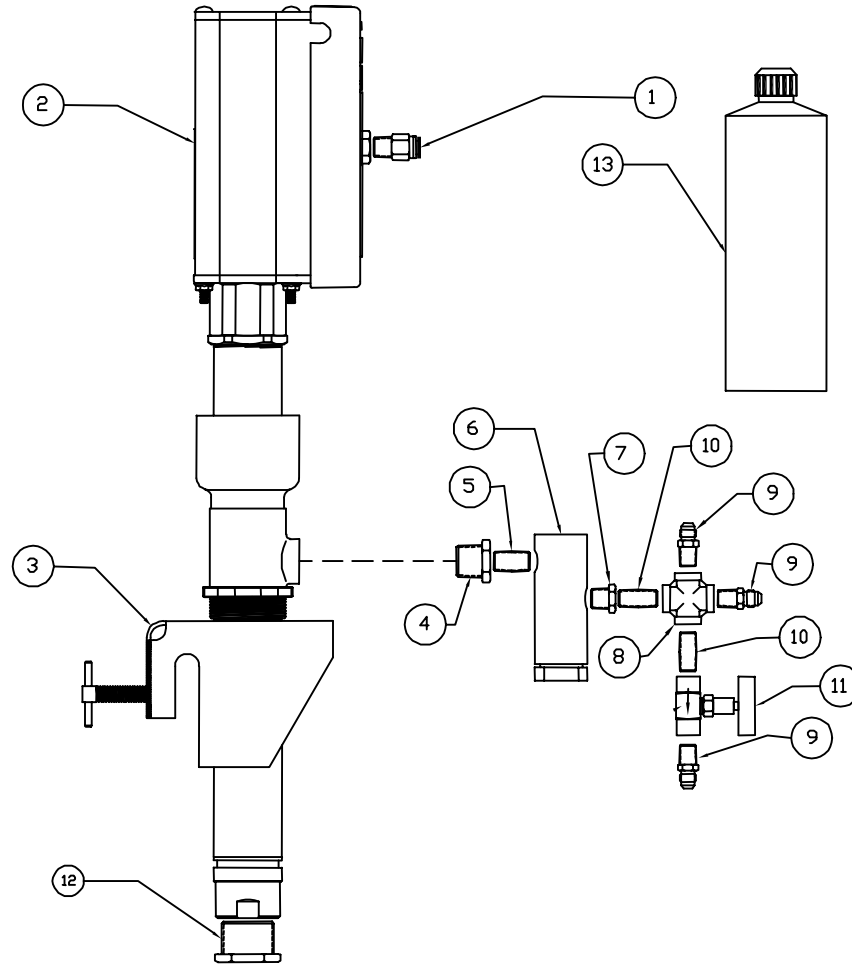
Item	Part #	Description	Qty
1	108033	Manifold Block, 4-Port, SST	1
2	108070	Nipple , 1/4NPT x 5/16JIC, SST	3
3	108078	Plug, Hex, 1/4NPT, SST	1
4	078A120	10-24 x 1.75 SHC Screw	2
5	078D004	Nut, Hex, 10-24 STL	2
6	N00695	Washer, #10 Split Lock, STL	2
7	108069	Needle Valve, 1/4 NPT, SST	1
8	108106	Nipple Close, 1/4 NPT, SST	1

108385 4:1 Piston Pump Cart Assembly



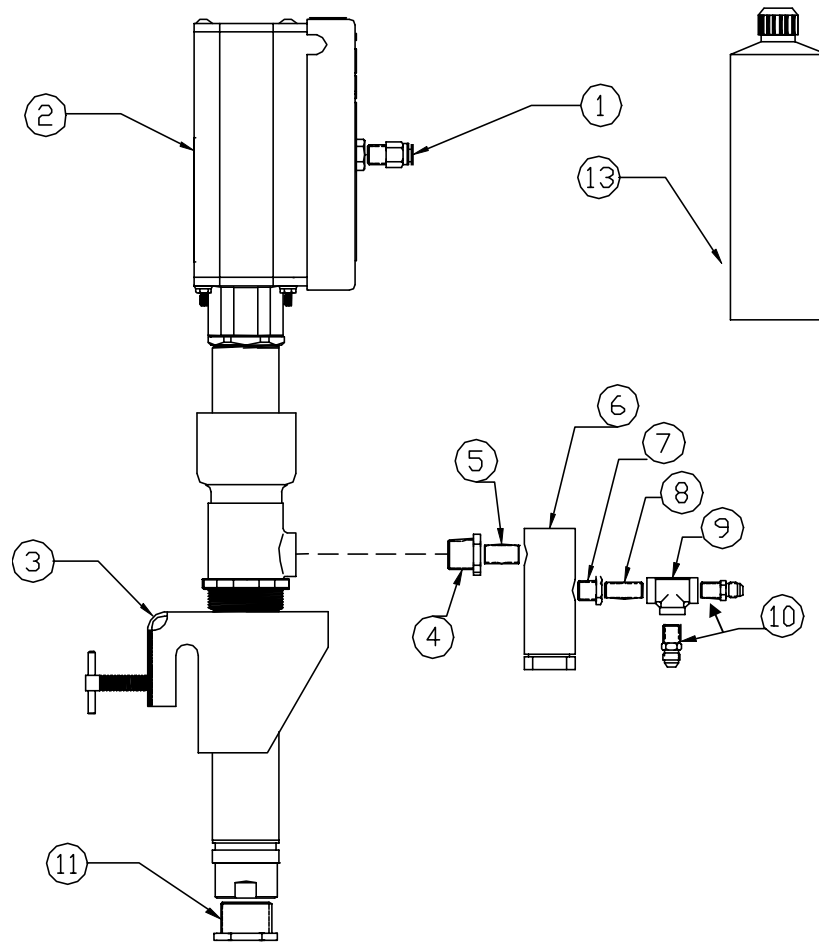
Item	Part #	Description	Qty
1	108384	Pump Cart	1
2	108383	Mounting Plate Assembly	1
3	N01090	Screw, HHC, 3/8-16 x 1"	4
4	N00715	Nut, Hex, 3/8-16, STL	4
5	078C013	Washer, 3/8 Flat, STL	4
6	N00698	Washer , Lock, 3/8, STL	4

108483 4:1 Piston Pump Assembly, Dual Outputs



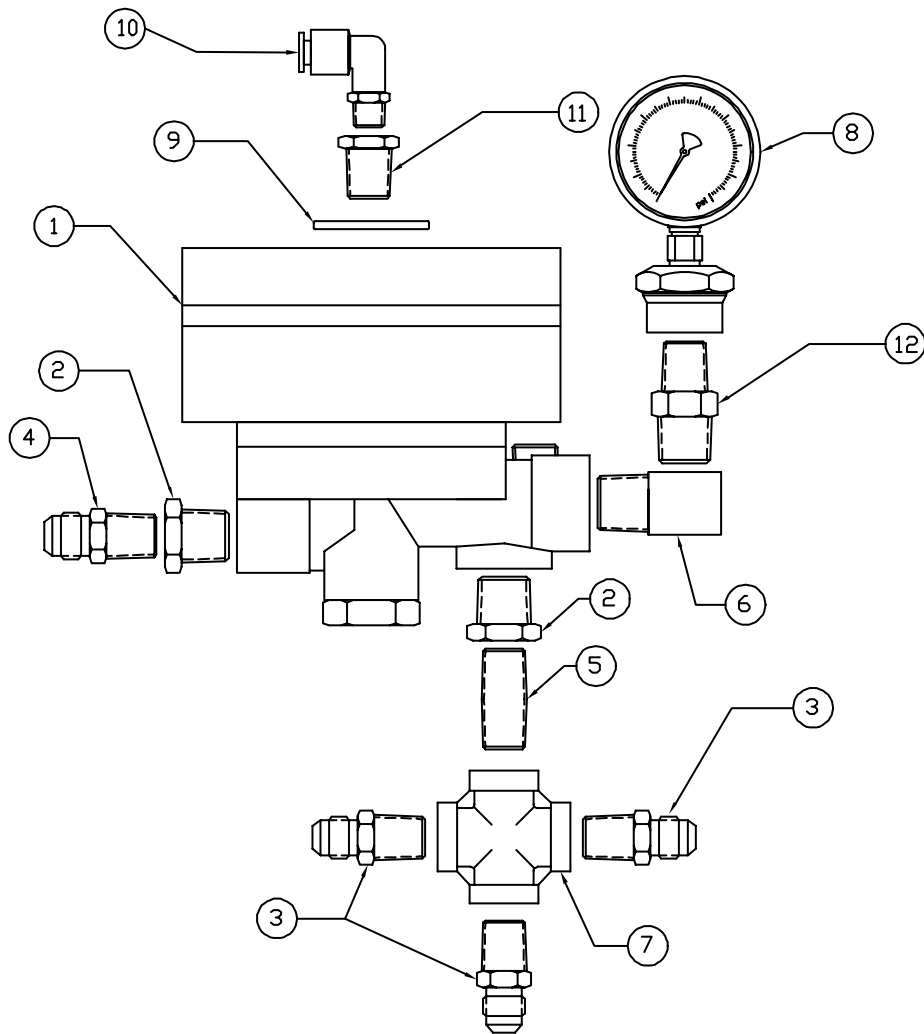
Item	Part #	Description	Qty
1	N06434	Fitting, 3/8 Tube x 1/4 NPT	1
2	107555	Piston Pump, 4:1	1
3	108073	Reducer, 3/4NPT x 3/8NPT, SST	1
5	108103	Nipple, Close, 3/8NPT, SST	1
6	107577	Fluid Filter Assembly, 50 Mesh	1
7	108482	Cross, Female, 1/4NPT, SST	1
9	108070	Nipple, 1/4NPT x 5/16JIC, SST	3
10	108106	Nipple, Close, 1/4NPT, SST	2
11	108069	Needle Valve, 1/4NPT, SST	1
12	107559	Reducer, 1.25NPS x 3/4NPS, SST	1
13	107565	Lubricant, Pump	1

108484 4:1 Piston Pump Assembly, Without Bypass, Dual Outputs



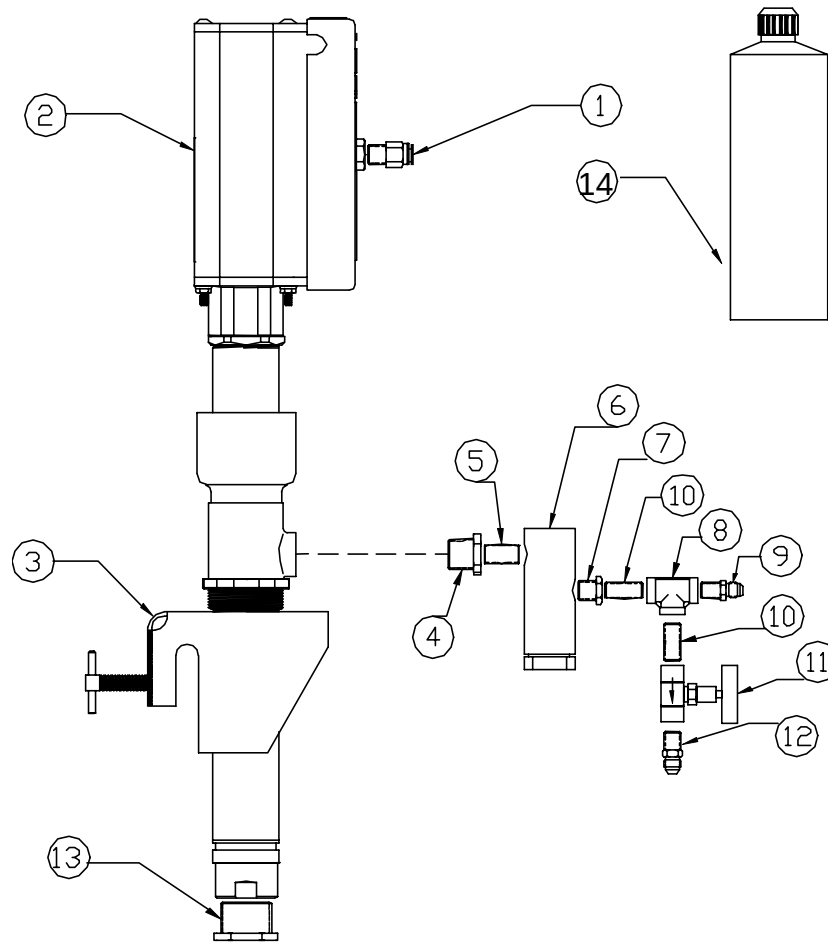
Item	Part #	Description	Qty
1	N06434	Fitting, 3/8 Tube x 1/4 NPT	1
2	107555	Piston Pump, 4:1	1
3	107556	Bracket Assembly, Piston Pump	1
4	108073	Reducer, 3/4NPT x 3/8NPT, SST	1
5	108103	Nipple, Close, 3/8NPT, SST	1
6	107577	Fluid Filter Assembly, 50 Mesh	1
7	108072	Reducer, 3/8NPT x 1/4NPT, SST	1
8	108106	Nipple, Close, 1/4NPT, SST	1
9	108271	Tee, Female, 1/4NPT, SST	1
10	108070	Nipple, 1/4NPT x 5/16JIC, SST	2
11	107559	Reducer, 1.25NPS x 3/4 NPS, SST	1
12	107571	Tool Crimp (Not Shown)	1
13	107565	Lubricant, Pump	1

108628 Fluid Regulator Assembly, Dual Outputs, 200PSI



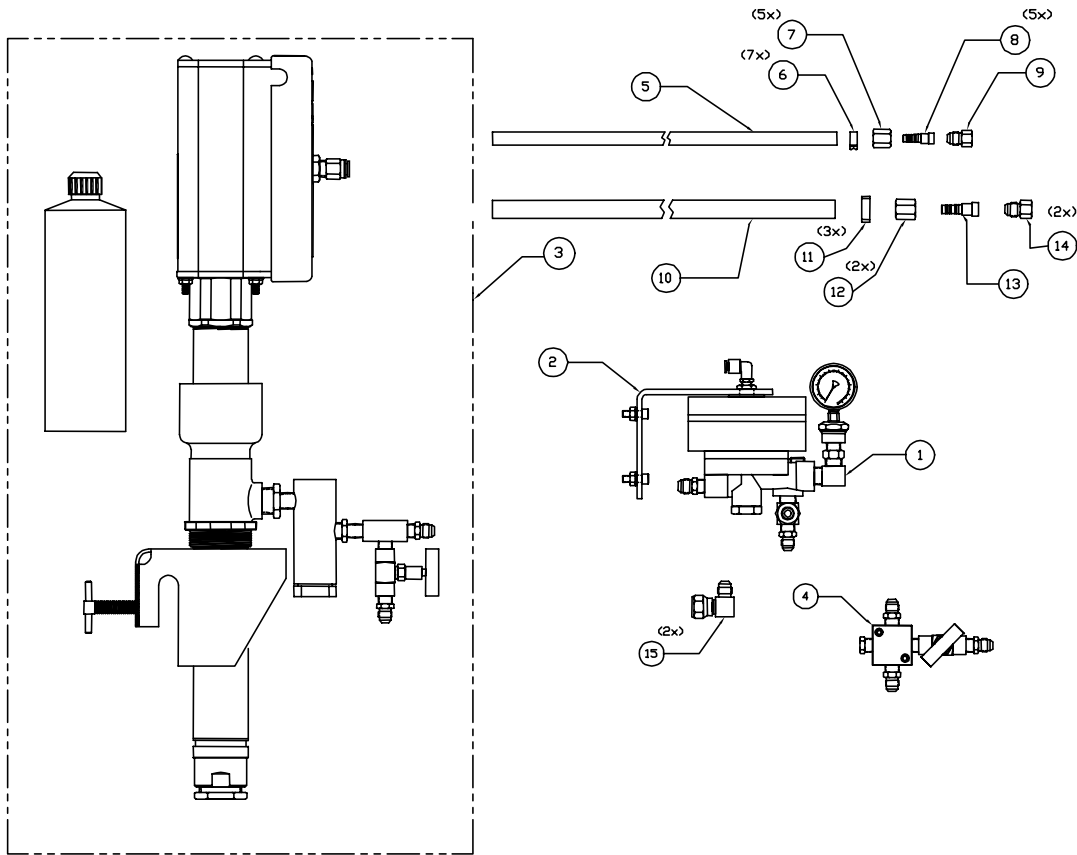
Item	Part #	Description	Qty
1	107548	Fluid Regulator 200 PSI	1
2	108072	Reducer, 3/8NPT x 1/4NPT, SST	2
3	108070	Nipple, 1/4NPT x 5/16JIC, SST	3
4	108623	Nipple, 1/4 NPT x 3/8 JIC, SST	1
5	108106	Nipple, Close, 1/4NPT, SST	1
6	108076	Street Elbow, 3/8NPT, SST	1
7	108482	Cross, Female, 1/4NPT SST	1
8	107864	Pressure Gauge w/Seal, 200PSI	1
9	107554	Flat Washer, 1/2, STL	1
10	N06436	Fitting, 1/4 Tube x 1/8NPT, Elbow	1
11	066X017	Bushing, 1/4NPT x 1/8NPT, Brass	1
12	108075	Nipple, Hex, 3/8 x 1/4 NPT, SST	1

108629 4:1 High Flow Piston Pump Assembly



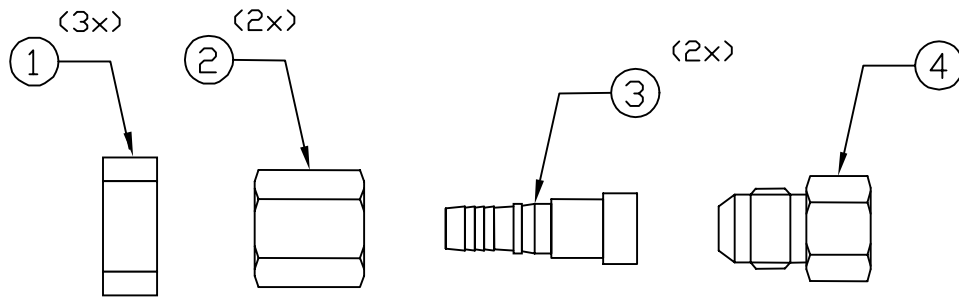
Item	Part #	Description	Qty
1	N06434	Fitting, 3/8 Tube x 1/4 NPT	1
2	107555	Piston Pump, 4:1	1
3	107556	Bracket Assembly, Piston Pump	1
4	108073	Reducer, 3/4NPT x 3/8NPT, SST	1
5	108103	Nipple, Close, 3/8NPT, SST	1
6	107577	Fluid Filter Assembly, 50 Mesh	1
7	108072	Reducer, 3/8NPT x 1/4NPT, SST	1
8	108271	Tee, Female, 1/4NPT, SST	1
9	108623	Nipple, 1/4NPT x 3/8 JIC, SST	1
10	108106	Nipple, Close, 1/4NPT, SST	2
11	108069	Needle Valve, 1/4NPT, SST	1
9	108070	Nipple, 1/4NPT x 5/16JIC, SST	1
12	107559	Reducer, 1.25NPS x 3/4NPS, SST	1
13	107565	Lubricant, Pump	1

108632 2:1 High Flow Piston Pump Kit



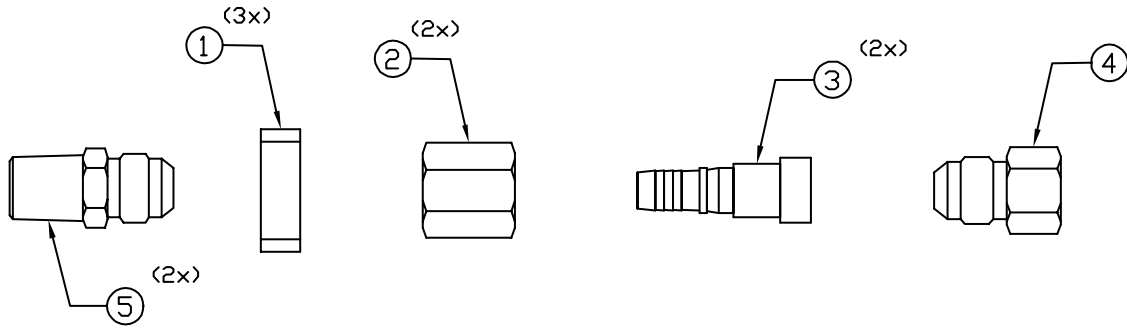
Item	Part #	Description	Qty
1	108628	Fluid Regulator Assembly, Dual Output	1
2	107542	Bracket Assembly, Fluid Regulator	1
3	108629	4:1 Piston Pump Assembly, Hi Flow	1
4	108270	3-Port Manifold Assembly With Valve	1
5	107566	Hose, Hydraulic, 1/4"	15'
6	107567	Clamp, 1/4" Hydraulic Hose	7
7	107568	Hose Nut, 5/16JIC, STL	5
8	108082	Stem, 5/16JIC x 1/4Hose, SST	5
9	107570	Plug, 5/16JIC Hose Fitting	1
10	108630	Hose, Hydraulic, 3/8"	10'
11	108625	Clamp, 3/8", Hydraulic Hose	3
12	108626	Hose Nut, 3/8 JIC, SST	2
13	108624	Stem, 3/8JIC x 3/8" Hose, SST	2
14	108627	Plug, 3/8 JIC Hose Fitting	1
15	108631	Elbow, 90deg,3/8JIC, SST	2
16	107571	Tool, Crimp (Not Shown)	1

108634 3/8 JIC x 3/8" Hose Connector Kit



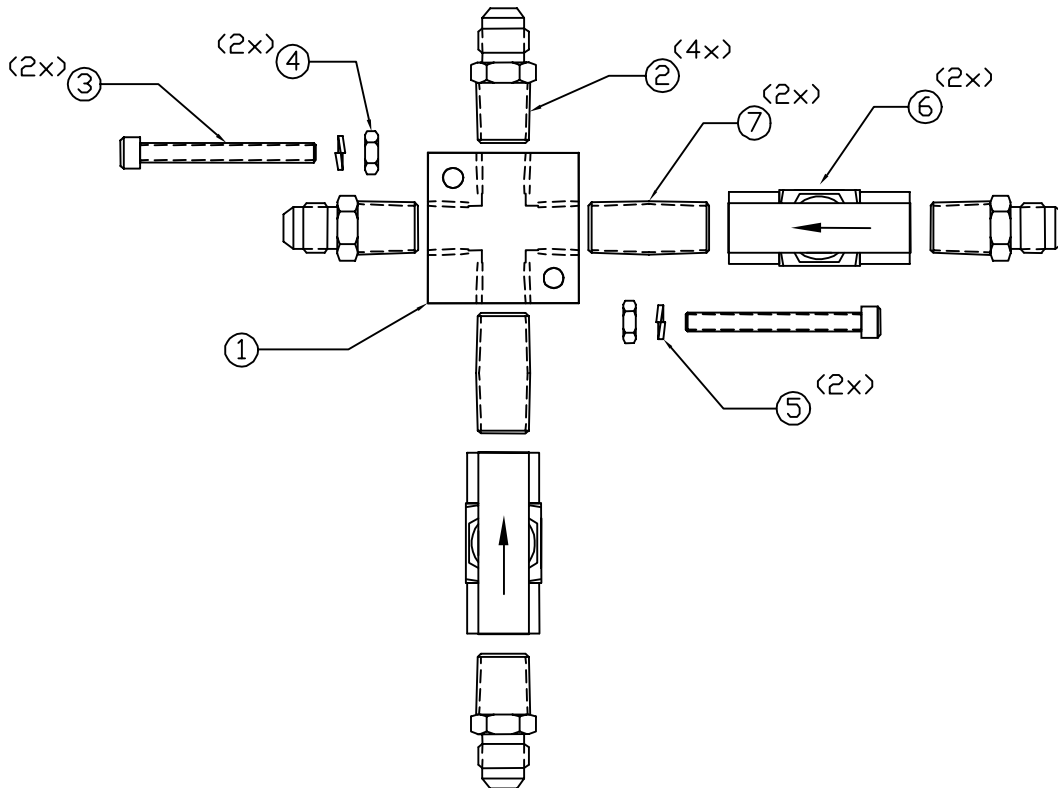
Item	Part #	Description	Qty
1	108625	Clamp, 3/8" Hose	3
2	108626	Nut, Hose Adapter	2
3	108624	Stem Fitting, 3/8 JIC x 3/8" Hose	2
4	108627	Plug, 3/8 JIC Hose	1

108681 3/8 JIC x 3/8" Hose Modification Kit



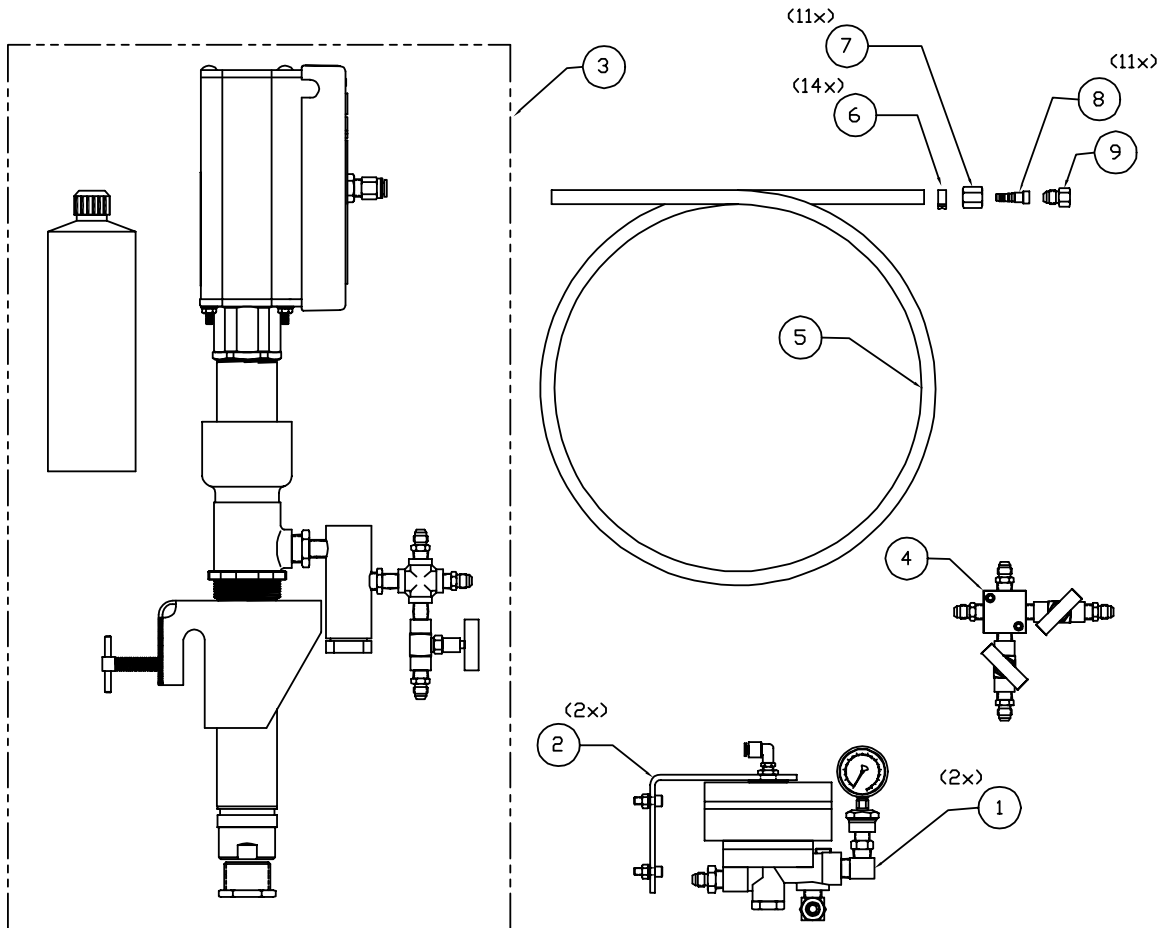
Item	Part #	Description	Qty
1	108625	Clamp, 3/8" Hose	3
2	108626	Nut, Hose Adapter	2
3	108624	Stem Fitting, 3/8 JIC x 3/8" Hose	2
4	108627	Plug, 3/8 JIC Hose	1
5	108623	Nipple, 1/4NPT x 3/8JIC, SST	2

108734 4 Port Stainless Steel Manifold Assembly With Valves



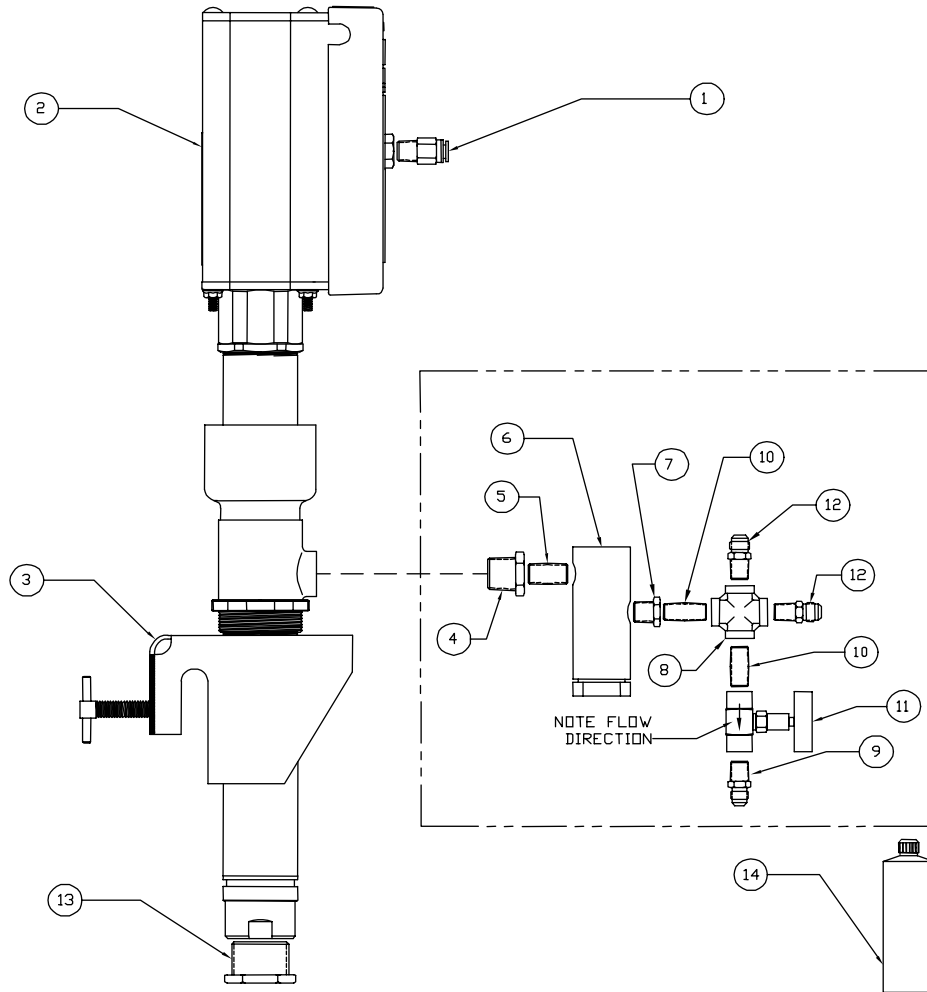
Item	Part #	Description	Qty
1	108033	Manifold Block, 4-Port, SST	1
2	108070	Nipple , 1/4NPT x 5/16JIC, SST	4
3	078A120	10-24 x 1.75 SHC Screw	2
4	078D004	Nut, Hex, 10-24 STL	2
5	N00695	Washer, #10 Split Lock, STL	2
6	108069	Needle Valve, 1/4NPT, SST	2
7	108106	Nipple, Close, 1/4NPT,SST	2

108735 2:1 Piston Pump Kit, With Dual Regulators

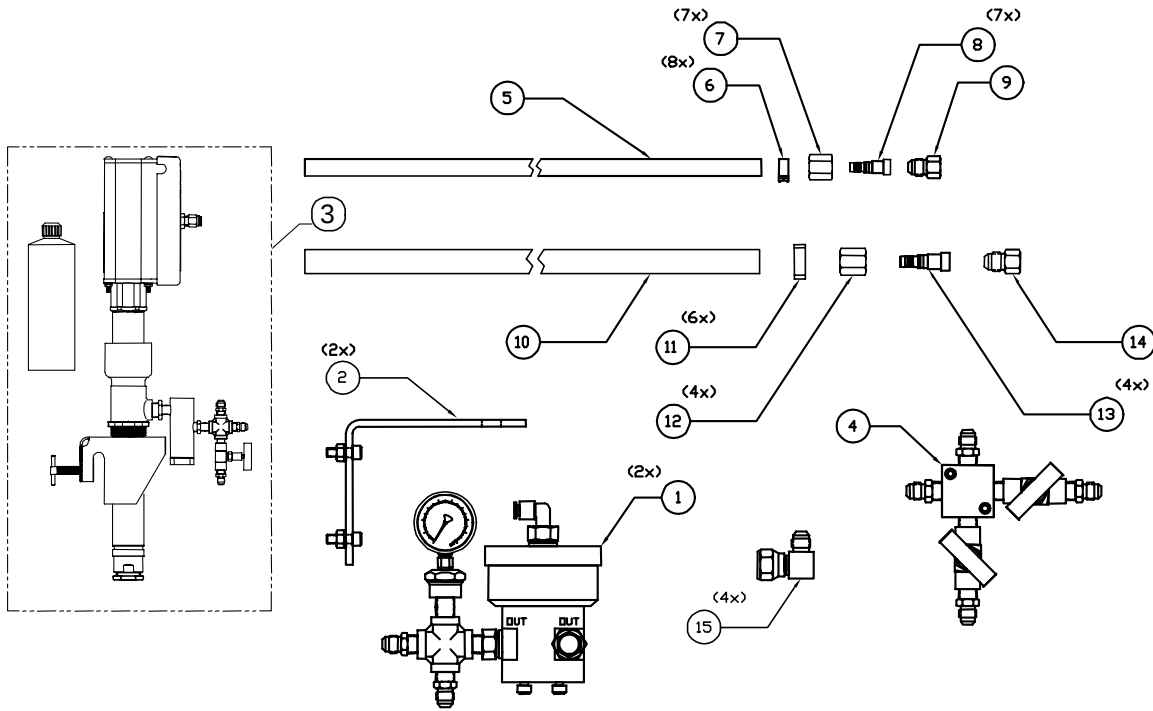


Item	Part #	Description	Qty
1	108074	Fluid Regulator Assembly, 200 PSI	2
2	107542	Bracket Assembly, Fluid Regulator	2
3	108483	4:1 Piston Pump Assembly, Dual Output	1
4	108734	4-Port Manifold Assembly With Valve	1
5	107566	Hose, Hydraulic, 1/4"	50'
6	107567	Clamp, 1/4" Hydraulic Hose	14
7	107568	Hose Nut, 5/16JIC, STL	11
8	108082	Stem, 5/16JIC x 1/4Hose, SST	11
9	107570	Plug, 5/16JIC Hose Fitting	1
10	107571	Tool, Crimp (Not Shown)	1

109644 4:1 Piston Pump Assembly, 2 x 3/8 JIC Outputs

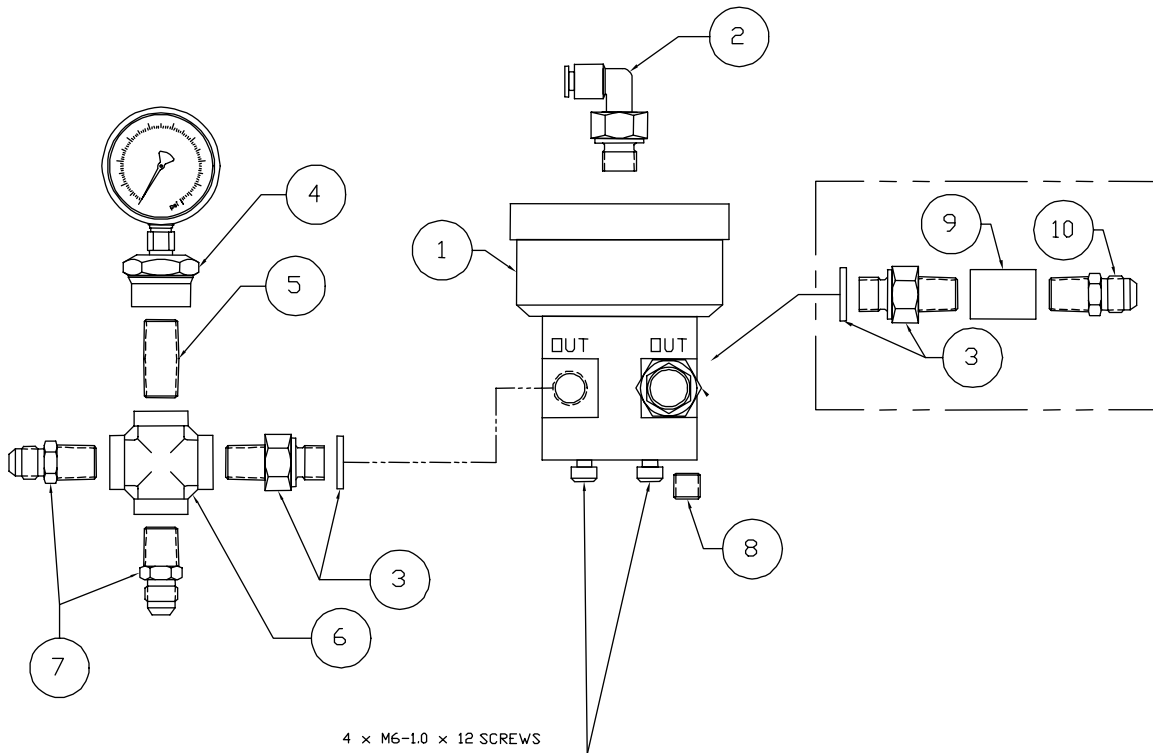


Item	Part #	Description	Qty
1	N06434	Fitting 3/8 Tube x 1/4 NPT	1
2	107555	Piston Pump, 4:1	1
3	107556	Bracket Assembly	1
4	108073	Reducer, 3/4 x 3/8 NPT, SST	1
5	108103	Nipple, Close, 3/8 NPT SST	1
6	107577	Fluid Filter Assembly, 50 Mesh	1
7	108072	Reducer, 3/8 NPT x 1/4 NPT, SST	1
8	108482	Cross, Female, 1/4 NPT, SST	1
9	108070	Nipple, 1/4 NPT x 5/16 JIC, SST	1
10	108106	Nipple Close, 1/4 NPT, SST	2
11	108069	Needle Valve, 1/4 NPT, SST	1
12	108623	Nipple, 1/4 NPT x 3/8 JIC, SST	2
13	107559	Reducer, 1.25 NPS x 3/4 NPS, SST	1
14	107565	Lubricant, Pump	1

109645 5:1 Dual Regulator Piston Pump Kit

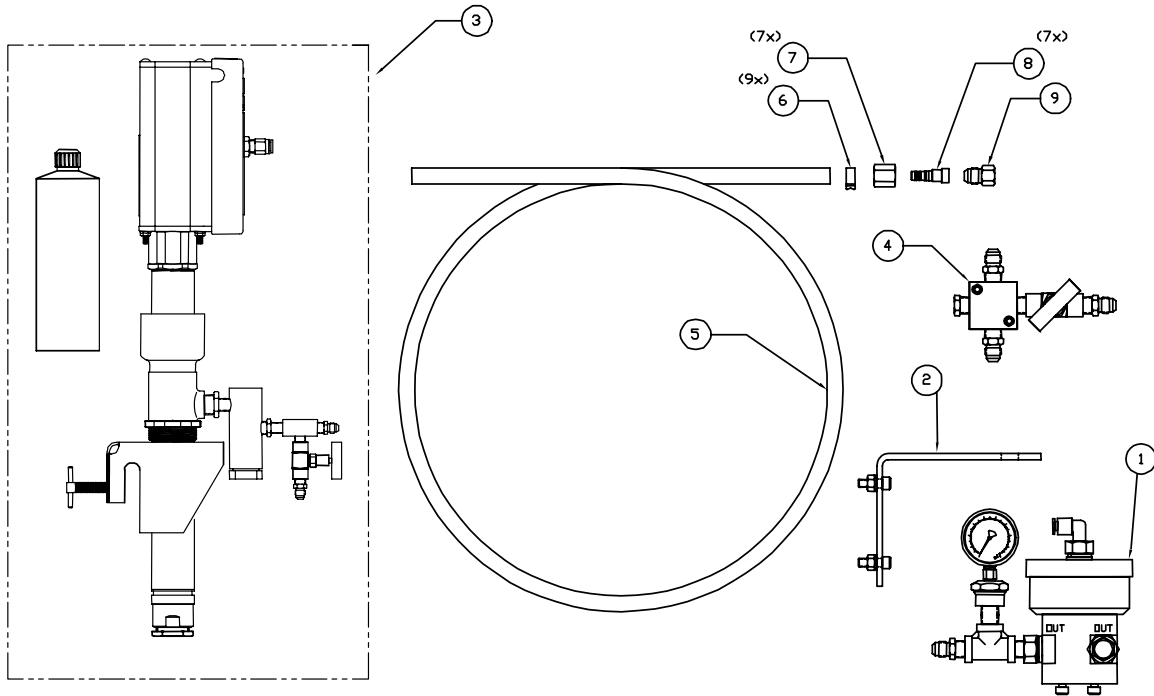
Item	Part #	Description	Qty
1	109646	Fluid Regulator Assembly, 5:1, Dual Hi Flow	2
2	107542	Bracket Assembly, Fluid Regulator	2
3	109644	4:1 Pump Assembly, 2 x 3/8 JIC Output	1
4	108734	4-Port Manifold Assembly With Valve	1
5	107566	Hose, Hydraulic, 1/4"	30'
6	107567	Clamp, 1/4" Hydraulic Hose	8
7	107568	Hose Nut, 5/16 JIC, SST	7
8	108082	Stem, 5/16 JIC x 1/4" Hose, SST	7
9	107570	Plug, 5/16 JIC Hose Fitting	1
10	108630	Hose, Hydraulic, 3/8"	30'
11	108625	Clamp, 3/8" Hydraulic Hose	6
12	108626	Hose Nut, 3/8 JIC, SST	4
13	108624	Stem, 3/8 JIC x 3/8" Hose, SST	4
14	108627	Plug, 3/8 JIC Hose Fitting	1
15	108631	Elbow, 90 deg, 3/8 JIC, SST	4
16	107571	Tool, Crimp (Not Shown)	1

109646 Hi Flow 5:1 Fluid Regulator Assembly



Item	Part #	Description	Qty
1	30.00000.701	Fluid Regulator, 5:1, SST	1
2	109643	Fitting, 90 Deg., 1/4 BSPP x 1/4 Tube	1
3	106858	Fitting, Nipple, 1/4 BSPP x 1/4 NPT	2
4	101174	Pressure gauge With Seal, 1000 PSI	1
5	108106	Fitting, Close Nipple, 1/4 NPT, SST	1
6	108482	Fitting, Cross, 1/4 NPT, SST	1
7	108070	Fitting, Nipple, 5/16 JIC x 1/4 NPT, SST	2
8	109590	Screw, SHC, M10-1/5 x 10mm, SST	1
9	109583	Coupling, 1/4 NPT, SST	1
10	108623	Fitting, Nipple, 3/8 JIC x 1/4 NPT, SST	1

109659 5:1 Piston Pump Kit



Item	Part #	Description	Qty
1	108013	Fluid Regulator Assembly, 5:1	1
2	107542	Bracket Assembly, Fluid Regulator	1
3	108068	4:1 Piston Pump Assembly	1
4	108270	3-Port Manifold Assembly With Valve	1
5	107566	Hose Hydraulic, 1/4"	25'
6	107567	Clamp, 1/4" Hydraulic Hose	9
7	107568	Hose Nut, 5/16 JIC, STL	7
8	108082	Stem, 5/16 JIC x 1/4" Hose, SST	7
9	107570	Plug, 5/16 JIC Hose Fitting	1
10	107571	Crimp Tool (not shown)	1

OPERATOR'S MANUAL

NM2304B-X-X

INCLUDING: SPECIFICATIONS, SERVICE KITS, GENERAL INFORMATION, TROUBLESHOOTING.
INCLUDE MANUALS: 65106-X Lower Pump End (pn 97999-578), 6691X Air Motor (pn 97999-748) & S-632
General Information Manual (pn 97999-624).

RELEASED: 10-17-97
REVISED: 6-1-10
(REV. G)

3" AIR MOTOR
4:1 RATIO
3" STROKE

NM2304B-X1-X1X TWO-BALL PUMP SERIES Stainless Steel



**READ THIS MANUAL CAREFULLY BEFORE INSTALLING,
OPERATING OR SERVICING THIS EQUIPMENT.**

It is the responsibility of the employer to place this information in the hands of the operator. Keep for future reference.

SERVICE KITS

- Use only genuine ARO® replacement parts to assure compatible pressure rating and longest service life.
- **637316** for repair of air motor section.
- **637010** for repair of 65106, 65108 and 65108-5 lower pump ends.
- **637010-4** for repair of 65106-4, 65108-4 and 65108-6 lower pump ends.
- **637010-6** for repair of 65108-8 lower pump ends.
- **637011** for replacement of lower ball check

SPECIFICATIONS

Model Series (refer to option chart)	NM2304B-X1-X1X
Pump Type	Air Operated, Two-Ball
Ratio	4:1
Air Motor	66913
Motor Repair Kit	637316
Motor Diameter	3" (7.62 cm)
Stroke (double acting)	3" (7.62 cm)
Air Inlet (female)	1/4 - 18 N.P.T.F. - 1
Lower Pump End Series	
NM2304B-11-C11	65108-4
NM2304B-11-C1B	65108-6
NM2304B-11-W11	65108-8
NM2304B-11-311	65108
NM2304B-11-31B	65108-5
NM2304B-41-C11	65106-4
NM2304B-41-311	65106
Lower Pump Repair Kit	637010-X
Material Inlet (female)	1-1/4 - 11-1/2 N.P.S.M.
Material Outlet (female)	3/4 - 14 N.P.T.F.

PUMP PERFORMANCE

Air Inlet Pressure Range	0 - 150 p.s.i.g. (0 - 10.3 bar)
Fluid Pressure Range	0 - 600 p.s.i.g. (0 - 41.4 bar)
Maximum Rec'd Cycles / Minute	120
Displacement In.³ Per Cycle	8.2
Volume / Cycle	4.54 oz. (134.3 ml)
Cycles Per Gallon	28.2
Flow @ 60 Cycles / Minute	2.13 g.p.m. (8.062 l.p.m.)
Noise Level @ 100 p.s.i.	85.0 db(A)①
Accessories Available	61113 Wall Mount Bracket 66073-1 Air Line Connection Kit

① The pump sound pressure level has been updated to an Equivalent Continuous Sound Level (LAeq) to meet the intent of ANSI S1.13-1971, CAGI-PNEUROP S5.1 using four microphone locations.

PUMP DATA

MODEL NM2304B-X1-X1X

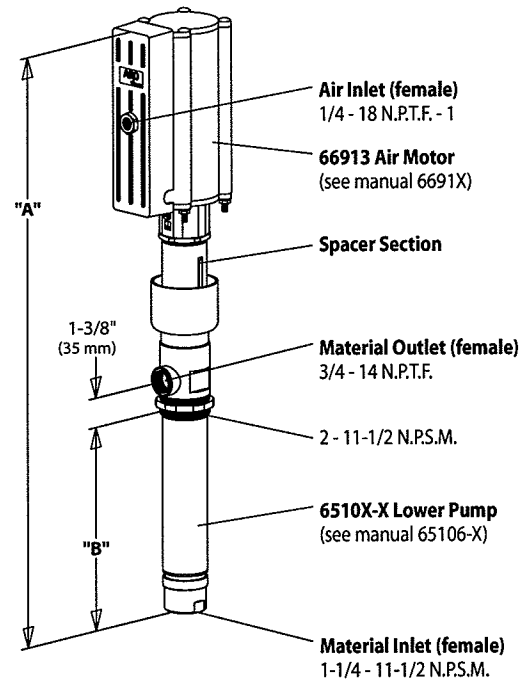


Figure 1

NOTE: Dimensions are shown in inches and (mm) and are supplied for reference only.

Model Number	"A" (mm)	"B" (mm)	Weight (kg)
NM2304B-11-X1X	28-1/8" (714.4)	9-23/32" (246.8)	32.0 (14.5)
NM2304B-41-X1X	51-21/32" (1312.1)	33-1/4" (844.6)	46.0 (20.9)

IMPORTANT

This is one of four documents which support the pump. Replacement copies of these forms are available upon request.

- ☒ **NM2304B-X-X** Model Operator's Manual (pn 97999-750)
- ☐ **S-632** General Information - Industrial Piston Pumps (pn 97999-624)
- ☐ **65106-X** Lower Pump End Operator's Manual (pn 97999-578)
- ☐ **6691X** Air Motor Operator's Manual (pn 97999-748)

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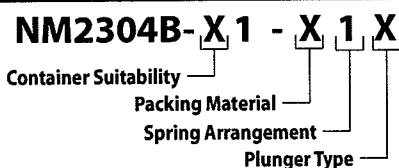
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PUMP OPTION DESCRIPTION CHART



CONTAINER SUITABILITY

1 - Universal (stub)
4 - 55 Gallon

PACKING MATERIAL

C - UHMW-PE (upper and lower)
W - Viton® (upper) / Virgin PTFE (lower)
3 - Virgin PTFE (upper and lower)

SPRING ARRANGEMENT

1 - Coil

PLUNGER TYPE

1 - Standard (300 series stainless steel)
B - Ceramic

GENERAL DESCRIPTION

The two-ball design provides for easy priming of the lower foot valve. The double acting feature is standard in all ARO industrial pumps. Material is delivered to the pump discharge outlet on both the up and down stroke.

The motor is connected to the lower pump end with a spacer tube and solvent cup. This allows for lubrication of the upper packing gland and to prevent air motor contamination because of normal wear and eventual leakage through the material packing gland.

⚠ WARNING HAZARDOUS PRESSURE. Do not exceed maximum operating pressure of 600 p.s.i. (41.4 bar) at 150 p.s.i. (10.3 bar) inlet air pressure.

**Pump Ratio X = Maximum Pump
Inlet Pressure to Pump Motor Fluid Pressure**

Pump ratio is an expression of the relationship between the pump motor area and the lower pump end area. **EXAMPLE:** When 150 p.s.i. (10.3 bar) inlet pressure is supplied to the motor of a 4:1 ratio pump, it will develop a maximum of 600 p.s.i. (41.4 bar) fluid pressure (at no flow) - as the fluid control is opened, the flow rate will increase as the motor cycle rate increases to keep up with the demand.

⚠ WARNING Refer to general information sheet for additional safety precautions and important information.

NOTICE: Thermal expansion can occur when the fluid in the material lines is exposed to elevated temperatures. Example: Material lines located in a non-insulated roof area can warm due to sunlight. Install a pressure relief valve in the pumping system.

Replacement warning label (pn 94520) is available upon request.

TROUBLE SHOOTING

Pump problems can occur in either the air motor section or the lower pump end section. Use these basic guidelines to help determine which section is affected. Be sure to eliminate any possible non-pump problems before suspecting pump malfunction.

Pump will not cycle.

- No pressure to the motor. See motor manual.
- Restricted return lines. Clean obstruction.
- Damaged motor. Service the motor.

No material at the outlet (pump continually cycles).

- Check the material supply, disconnect or shut off the air supply and replenish the material, reconnect.

Material on one stroke only (fast downstroke).

- The lower check may not be seating in the foot valve (see lower pump disassembly). Remove the check from the foot valve, clean and inspect the valve seat area. If the check or foot valve are damaged, replace.

Material on one stroke only (fast upstroke).

- The middle packings may be worn (see lower pump disassembly). Replace the seals as necessary.

Material leakage out of the solvent cup or material appears on the pump plunger rod.

- Tighten the solvent cup until leakage discontinues. If this procedure does not aid in stopping the leakage problem, the upper packings may be worn (see lower pump disassembly). Replace the seals as necessary.

PUMP CONNECTION - UPPER / LOWER

NOTE: All threads are right hand.

1. Loosen (90606) lock nut and unscrew the entire pump from the air motor. This will expose (94445) adapter (see figure 2).
2. Unscrew (94445) adapter to remove pump assembly from the air motor.
3. Remove the (Y15-21) cotter pin and (94048) clevis pin to remove (94445) adapter.

PUMP CONNECTION DETAIL

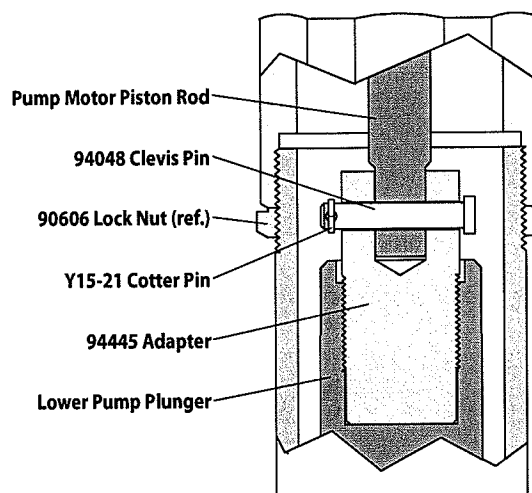


Figure 2

REASSEMBLY

1. Assemble (94445) adapter to the air motor rod, aligning the through holes.
2. Assemble (94048) clevis pin through hole, securing adapter.
3. Assemble (Y15-21) cotter pin through the hole in the clevis pin.
4. Apply Loctite® 242 to threads of (94445) adapter and screw (94445) adapter into (90615-X) plunger.
5. Screw the lower pump assembly to the air motor.
6. Screw (90606) lock nut against the air motor base and tighten to 50 - 60 ft. lbs (67.8 - 81.3 Nm).

OPERATOR'S MANUAL

INCLUDING: SERVICE KITS, DISASSEMBLY / REASSEMBLY, PARTS, TROUBLESHOOTING

65106-X, 65108-X and 66496-X LOWER PUMP END

ALSO COVERS SERVICE KITS 637010, 637010-4, 637010-5, 637010-6 AND 637011

65106-X

65108-X

66496-X

RELEASED / LIBERADO / DECHARGE: 4-28-93
REVISED / REVISADO / REVISE: 6-2-10
(REV. N)

LOWER PUMP END DISASSEMBLY

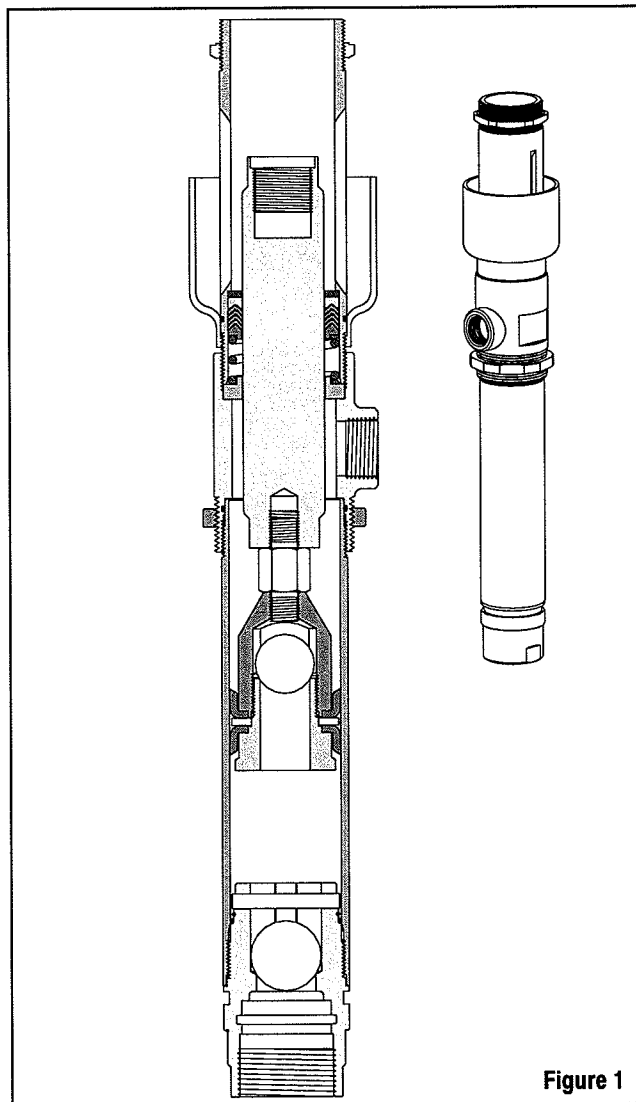
NOTE: All threads are right hand.

1. Secure the lower pump assembly in a vise, clamping on flats of (12) pump body.
2. Securely hold (21) suction tube with a strap wrench and unthread and remove (26) foot valve body.
3. Remove (25) dowel pin, (24) ball, (22) snap ring and (23) "O" ring.
4. Using a strap wrench, unthread and remove (21) suction tube and (19) "O" ring seal from (12) pump body.
5. Loosen (3) spacer tube and push (1) plunger and components out thru the bottom end of (12) pump body. NOTE: Be careful not to damage the finish on (1) plunger.
6. Unthread and remove (18) inner check seat, releasing (17) ball, (16) flat washer and two (15) cups.
7. Unthread and remove (3) spacer tube and (5) solvent cup from (12) pump body, releasing (11) gasket, (10) spring, (9) male packing washer, (8) "V" packings, (7) female packing washer and (6) washer.
8. Unthread and remove (5) solvent cup from (3) spacer tube and remove (4) "O" ring.
9. Unthread and remove (13) connector rod from (1) plunger.
10. Unthread and remove (14) cup follower from (13) connector rod.

LOWER PUMP END ASSEMBLY

NOTE: Thoroughly clean and lubricate all seals. Replace all soft parts with new ones included in the repair kit. Note: Refer to the illustration (figure 2, page 2) for "V" packing lip direction.

1. Assemble (4) "O" ring to groove in (3) spacer tube and assemble (5) solvent cup to (3) spacer tube.
2. Assemble (6) washer, (7) female packing washer, (8) "V" packings, (9) male packing washer and (10) spring into (3) spacer tube.
3. Assemble (11) gasket and (3) spacer tube and components into (12) pump body. NOTE: Do not tighten at this time.
4. Slide (1) plunger into (3) spacer tube and (12) pump body, being careful not to damage (8) "V" packings.
5. Assemble (13) connector rod and (14) cup follower to (1) plunger. NOTE: Apply Loctite nickel anti-seize to threads of connector rod and tighten to 50 ft lbs (67.8 Nm).
6. Assemble (15) cup, (16) flat washer, (15) cup and (17) ball to (14) cup follower, securing with (18) inner check seat. NOTE: Apply Loctite nickel anti-seize to threads and tighten to 65 - 70 ft lbs (88.1 - 94.8 Nm).
7. Assemble (19) "O" ring seal onto (21) suction tube.
8. Apply Loctite nickel anti-seize to threads of (21) suction tube and assemble to (12) pump body, being careful not to damage (15) cups. NOTE: Tighten to 125 - 150 ft lbs (169.5 - 203.4 Nm). NOTE: (15) cups can be rolled on a clean flat surface or ARO tool #637403 is available for easier insertion into (21) suction tube.
9. Tighten (3) spacer tube to 125 - 150 ft lbs (169.5 - 203.4 Nm).
10. Assemble (24) ball, (23) "O" ring seal, (22) snap ring and (25) dowel pin to (26) foot valve body.
11. Apply Loctite nickel anti-seize to threads of (26) foot valve body and assemble body and components to (21) suction tube. NOTE: Tighten to 125 - 150 ft lbs (169.5 - 203.4 Nm).



TROUBLE SHOOTING

Material leakage out of solvent cup.

- Worn packings. Replace (8) packings.

Material on one stroke only (fast upstroke).

- (17) ball may not be seating on (18) inner check seat. Remove ball from assembly, clean and inspect the ball seat area. If either the ball or the inner check seat is damaged, replace.

Material on one stroke only (fast downstroke).

- (24) ball may not be seating on (26) foot valve body. Remove ball from foot valve, clean and inspect the ball and seat area. If either the ball or the foot valve body is damaged, replace. Also, restriction on the suction inlet will cause fast downstroke (collapsed hose).

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PARTS LIST

Item	Description (size)	Qty	Part No.	Mtl
1	Plunger (66496-X)	(1)	91075	[SH]
	(65106-X, 65108, 65108-4, 65108-8, 65108-9)	(1)	90615	[SS]
	(65108-5, 65108-6, 65108-7)	(1)	90615-2	[CSS]
2	Lock Nut	(1)	90606	[SS]
3	Spacer Tube	(1)	90614	[SS]
4	"O" Ring (1/16" x 2" o.d.)	(1)	Y325-32	[B]
5	Solvent Cup	(1)	93273	[SS]
6	Washer	(1)	77432	[SS]
▲ 7	Female Packing Washer	(1)	77327	[D]
▲ 8	"V" Packing (65108-7, 65108-8, 65108-9)	(4)	90578-5	[V]
	(65106, 65108, 65108-5, 66496)	(4)	90578-3	[T]
	(65106-4, 65108-4, 65108-6, 66496-4)	(4)	90578-4	[UH]
▲ 9	Male Packing Washer	(1)	91349	[D]
10	Spring	(1)	90602	[SS]
▲ 11	Gasket	(1)	76748	[Ny]
12	Pump Body	(1)	65793-2	[SS]
13	Connector Rod (65106-X)	(1)	93943	[SS]
	(65108-X, 66496-X)	(1)	92874	[SS]
14	Cup Follower	(1)	90601	[SS]
▲ 15	Cup (65106, 65108, 65108-5, 66496, 65108-8)	(2)	73919	[T]
	(65106-4, 65108-4, 65108-6, 65108-7, 65108-9, 66496-4)	(2)	92867-1	[UH]
16	Flat Washer	(1)	90610	[SS]
17	Ball (1" o.d.)	(1)	90948	[SS]
18	Inner Check Seat	(1)	90600	[SS]
▲ 19	"O" Ring Seal (0.070" x 2.129" o.d.)	(1)	90607	[T]
20	Lock Nut	(1)	76248	[SS]
21	Suction Tube (65106-X)	(1)	90569	[SS]
	(65108, 65108-4, 65108-8, 66496-X)	(1)	90621	[SS]
	(65108-5, 65108-6, 65108-7, 65108-9)	(1)	90621-2	[CSS]
▲ 22	Snap Ring	(1)	90616	[SS]
▲ 23	"O" Ring Seal (0.070" x 1.879" o.d.)	(1)	90617	[T]
24	Ball (1-3/16" o.d.)	(1)	90949	[SS]
25	Dowel Pin (1/4" o.d. x 1.828")	(1)	90620	[SS]
26	Foot Valve Body	(1)	90619	[SS]
✓	Service Kit (65106, 65108, 65108-5, 66496)		637010	
★	Service Kit (65106-4, 65108-4, 65108-6, 66496-4)		637010-4	
☐	Service Kit (65108-7, 65108-9)		637010-5	
▲	Service Kit (65108-8)		637010-6	
☐	Service Kit (lower ball check)		637011	

MATERIAL CODE

[B] = Nitrile
[CSS] = Ceramic Coated Stainless Steel
[D] = Acetal
[Ny] = Nylon
[SH] = Hard Stainless Steel
[SS] = Stainless Steel
[T] = PTFE
[UH] = UHMW-PE
[V] = Viton

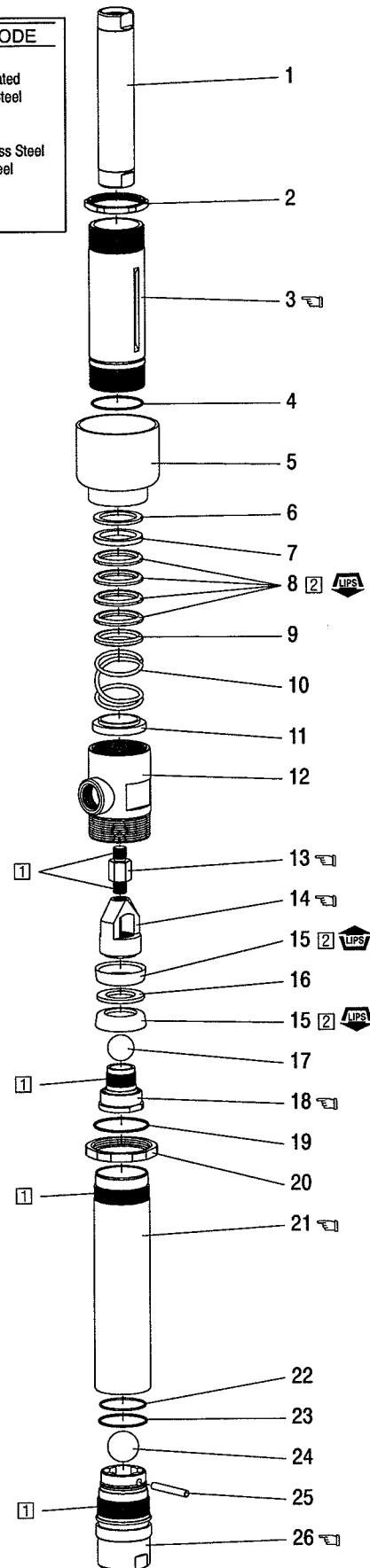


Figure 2

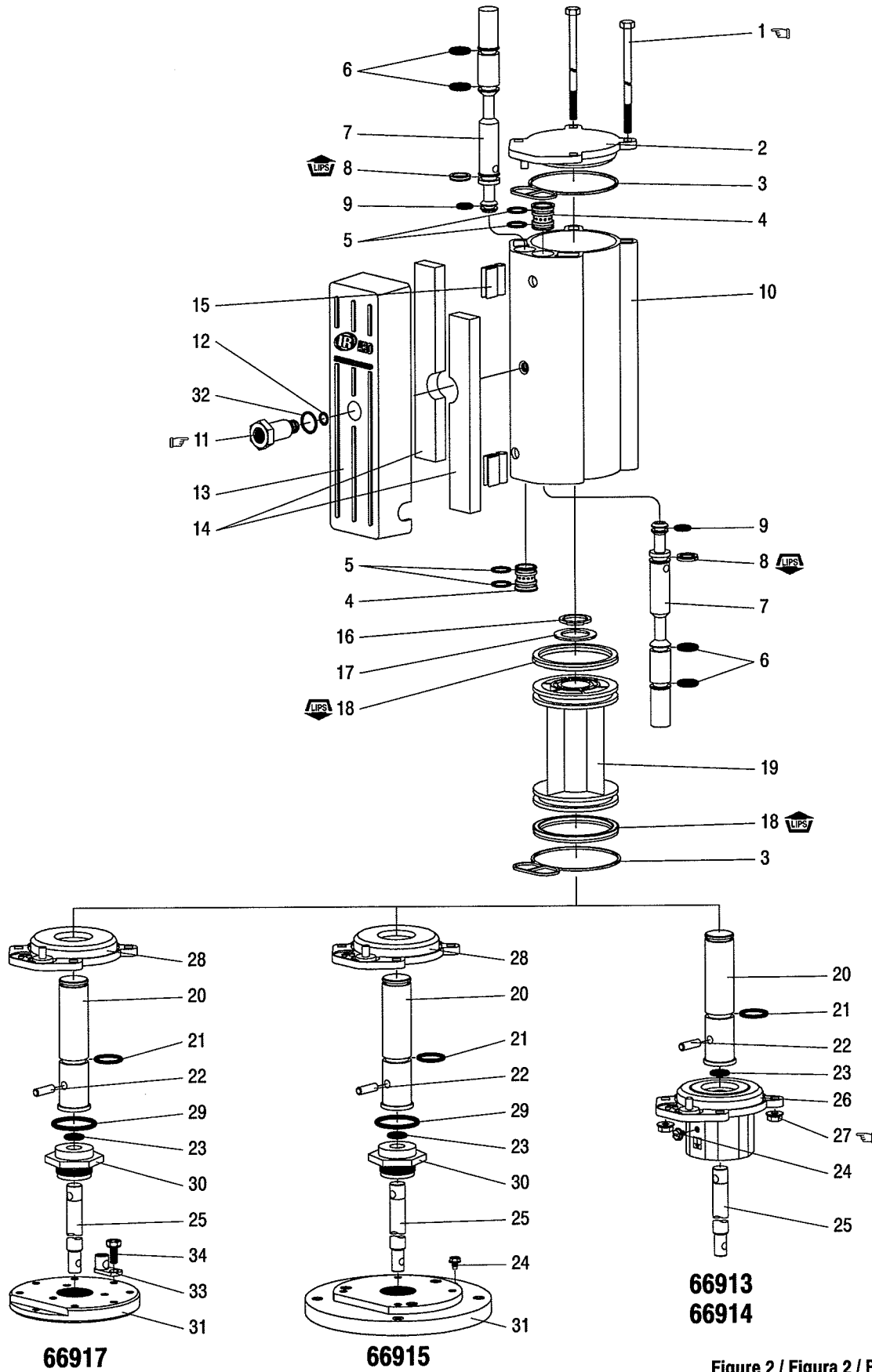
TORQUE REQUIREMENTS

NOTE: DO NOT OVERTIGHTEN COMPONENTS

(3) spacer tube, (21) suction tube and (26) foot valve body
125 - 150 ft lbs (169.5 - 203.4 Nm).
(13) connector rod and (14) cup follower 50 ft lbs (67.8 Nm).
(18) inner check seat 65 - 70 ft lbs (88.1 - 94.9 Nm).

LUBRICATION / SEALANTS

- 1 Apply Loctite nickel anti-seize to threads.
- 2 Lubricate packings with Wet Sol upon assembly.



OPERATOR'S MANUAL

65179X-XXX-B

INCLUDING: SERVICE KITS, TROUBLESHOOTING, PARTS LIST,
DISASSEMBLY & REASSEMBLY.

RELEASED: 6-18-92
REVISED: 2-23-09
(REV. K)

LOW PRESSURE MATERIAL REGULATOR



**READ THIS MANUAL CAREFULLY BEFORE INSTALLING,
OPERATING OR SERVICING THIS EQUIPMENT.**

It is the responsibility of the employer to place this information in the hands of the operator. Keep for future reference.
The original language of this manual is English.

SERVICE KITS

- Use only genuine ARO® replacement parts to assure compatible pressure rating and longest service life.
- Order 637219-XXX-B rebuild kit (see chart below) for general repair of the regulator. This includes a diaphragm kit and a valve kit.
- Fluid diaphragm kit 62173 can be ordered separately (see page 4).
- Valve kit can be ordered separately (see page 4).

REBUILD KIT DESCRIPTION CHART

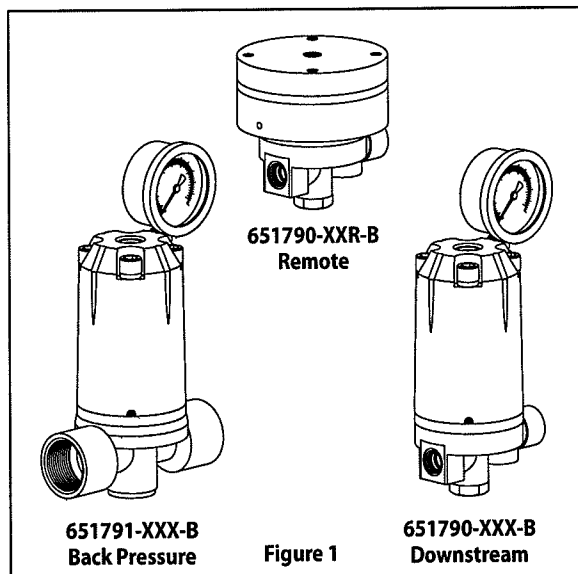
637219 - XXX - B	
Type	
2 - Downstream	
3 - Back Pressure	
Ball Size	
A - 0.1875"	
B - 0.250"	
C - 0.500"	
Ball & Seat Material	
1 - Tungsten Carbide	
2 - 400 Series Stainless Steel	
4 - 300 Series Stainless Steel	
Rebuild Kit Selection	
Example: Model # 651790-A1D-B Rebuild Kit # 637219-2A1-B	

SPECIFICATIONS

Model Series.....	65179X-XXX-B
Type	651790-XXX-B..... Downstream 651791-XXX-B..... Back Pressure
Material Inlet	see model chart
Material Outlet	see model chart
Dimensional Data.....	see figure 10

PERFORMANCE DATA

Regulated Pressure Range.....	see model chart
Maximum Regulated Pressure.....	see model chart
Maximum Inlet Pressure	
651790-A4X-B, -B4D-B, -BXR-B.....	500 p.s.i. (34.5 bar)
651790-A1X-B, -A3X-B, -B1C-B.....	750 p.s.i. (51.7 bar)
651790-B1D-B, -B3D-B, -BXE-B.....	1250 p.s.i. (86.2 bar)
651791-BXD-B, -B3C-B, -CXD-B.....	200 p.s.i. (13.8 bar)
651791-BXE-B.....	800 p.s.i. (55.2 bar)
Maximum Temperature Limits.....	0° to 200° F (-18° to 93° C)



MODEL DESCRIPTION CHART

65179X - XXX - B	
Type	
0 - Downstream	
1 - Back Pressure	
Port Size, (Ball Size)	
A - 3/8 - 18 NPTF (0.1875")	
B - 3/8 - 18 NPTF (0.250")	
C - 1-1/4 - 11-1/2 NPTF (0.500")	
Body Material, (Seat, Stem Material)	
1 - Zinc (Tungsten Carbide, Tungsten Carbide)	
2 - Stainless SteelⓈ (Stainless SteelⓈ, Stainless SteelⓈ)	
3 - Stainless SteelⓈ (Tungsten Carbide, Tungsten Carbide)	
4 - Stainless SteelⓈ (Stainless SteelⓈ, Stainless SteelⓈ)	
5 - Stainless SteelⓈ (Stainless SteelⓈ, Tungsten Carbide)	
Regulated / Maximum Pressure Range	
B - 5 - 30 p.s.i. (0.3 - 2.1 bar) Downstream models	
C - 20 - 60 p.s.i. (1.4 - 4.1 bar) Downstream models	
20 - 60 p.s.i. (1.4 - 4.1 bar) Back Pressure models	
D - 50 - 200 p.s.i. (3.4 - 13.8 bar) -AXD Downstream models	
-30 - 200 p.s.i. (2.1 - 13.8 bar) -BXD Downstream models	
-0 - 200 p.s.i. (0 - 13.8 bar) Back Pressure models	
E - 100 - 800 p.s.i. (6.9 - 55.2 bar) Downstream models	
-0 - 800 p.s.i. (0 - 55.2 bar) Back Pressure models	
R - 30 - 200 p.s.i. (2.1 - 13.8 bar) Remote models	
Ⓢ 300 series stainless steel	
Ⓢ 400 series stainless steel	

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OPERATING AND SAFETY PRECAUTIONS



- Read and heed all warnings, cautions and safety precautions before operation of this unit.
- Be certain anyone operating this equipment or fluid system has been trained to use it safely.

WARNING HIGH PRESSURE DEVICE. Improper usage of this equipment could result in serious injury. The possibility of injection into the flesh is a potential hazard. Wear approved safety glasses or face shield and other equipment as needed to prevent injury. Never allow any part of the human body to come in front of, or in contact with, the material outlet, the tip, or the material outlet of the dispensing device. An injection injury can be serious. If an injection accident should occur, it is very important that you contact a qualified physician for immediate treatment.

WARNING MISAPPLICATION HAZARD. Do not use the regulator when the fluid inlet pressure is too high for the designed operating range. Excessive inlet pressure can cause a lock-out situation. Lock-out occurs when the inlet pressure is beyond the regulator's spring capacity. The valve will not open. Attempts to disassemble components while in a lock-out condition may result in injury.

WARNING COMPONENT RUPTURE. Do not operate regulator at an inlet pressure greater than specified. To avoid possible damage or personal injury, do not operate this unit at pressure higher than the stated operating range as it appears on the model plate.

WARNING DISASSEMBLY HAZARD. Do not disassemble this regulator when it is under pressure. Relieve pressure in the pumping system before attempting service or disassembly procedures. Disconnect air lines and carefully bleed pressure off the system. Be certain the system is not maintaining pressure due to a material restriction in the hose, line, dispensing device, or the spray or extrusion tip. Failure to relieve pressure, both up stream and downstream, may result in an injury upon disassembly.

WARNING BONNET REMOVAL HAZARD. Do not attempt to remove the four bonnet retaining bolts without first relieving the tension on the main spring. Failure to relieve tension could result in an accident upon disassembly.

WARNING PREVENT FIRES. Keep solvents away from heat, sparks or open flame. Keep containers closed when not in use. When pumping, flushing or recirculating volatile solvents, be certain the area is adequately ventilated.

CAUTION FLUSH SUPPLY LINE. Before installing fluid regulator, blow the supply lines clear and flush to remove contaminants.

WARNING = Hazards or unsafe practices which could result in severe personal injury, death or substantial property damage.

CAUTION = Hazards or unsafe practices which could result in minor personal injury, product or property damage.

NOTICE = Important installation, operation or maintenance information.

INSTALLATION

- Refer to the typical installation view which best applies.
- Locate the regulator as close as possible to the spray gun or dispensing device for best pressure control.
- Identify the regulator INLET / OUTLET (flow direction). The regulator is marked with an arrow on the body base.
- Flush supply line before installing regulator.
- Remote models require maximum 100 p.s.i. (6.9 bar) signal pressure. Start with a signal pressure as low as possible and adjust upward until proper flow is reached.

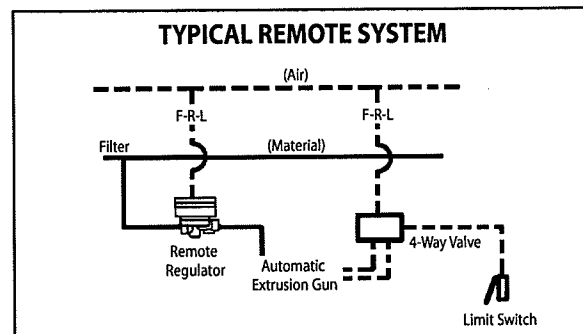
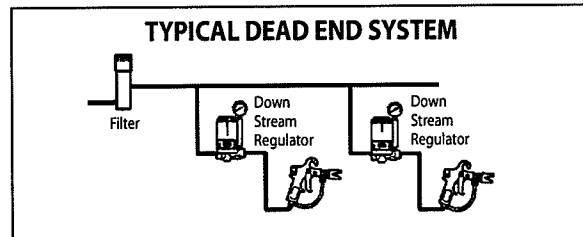
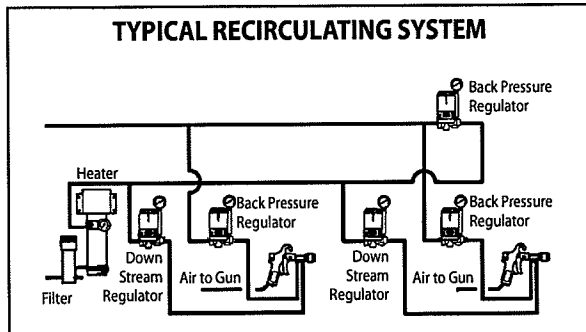


Figure 2

OPERATING INSTRUCTIONS

Refer to pages 4 and 5 for parts reference.

- To **INCREASE** outlet pressure, turn the (6) adjusting screw **CLOCKWISE** (see figure 3).
- To **DECREASE** outlet pressure, turn the (6) adjusting screw **COUNTERCLOCKWISE** (see figure 3).

NOTE: Part Y106-109 Allen wrench is included to make necessary pressure adjustments.

FLUSH-OUT FEATURE FOR DOWNSTREAM MODELS ONLY.

See figure 4.

- Flush the regulator periodically. The interval may vary depending on the amount and type of material used.
- By using a wrench and "flush-out" plug (provided), the operator is able to move the entire spindle downward and force the ball off the seat which should purge the regulator of particle build-up.

NOTE: The flush-out procedure temporarily overrides the adjusted pressure. It will not, however, affect the regulator setting when flushing operation is completed.

FLUSH-OUT PROCEDURE

1. Remove spray gun or dispensing device, this will allow any particles to clear from the system.
2. Insert (21) flush-out plug and turn clockwise until it touches the (4) washer (see view on page 5).
3. Turn up to two turns maximum. This will allow the ball to unseat and pass material at free flow (unregulated). **DO NOT** attempt to turn further to avoid damage.
4. Turn the plug back to its original position.

SEAT PLUG FEATURE

The (47) plug, located at the base of the regulator, can be removed for access to the ball and seat assembly for cleaning and inspection for wear. With this feature, the regulator does not have to be unthreaded from the pumping system. Be certain to relieve system pressure (See "WARNING: DISASSEMBLY HAZARD").

MAINTENANCE

- Disassembly should be done on a clean work bench and use clean cloths.
- If replacement parts are necessary, refer to the parts list and drawings on pages 4 and 5.
- Upon reassembly, lubricate parts and use Loctite where indicated. Follow the torque specifications as shown.
- Service kits are available, which include parts typically needed for an overhaul.
- Keep good records of service activity and include the regulator in a preventive maintenance program.
- Certain "Smart Parts" are indicated with a "❶" in the parts list, these parts should be available for fast repair and reduction of down time.

View of Spring Adjustment Procedure.

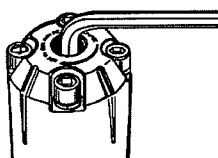


Figure 3

View of Flush-Out Plug.

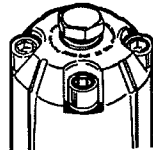


Figure 4

TROUBLE SHOOTING

No fluid pressure.

- Check for damaged or worn diaphragms.
- Look for possible obstruction by hardened material or foreign matter, periodically use the regulator "flush-out" feature (downstream models only). Use a fluid filter upstream from the regulator.

Pressure creeps above the setting when system is dead ended and in a static (no flow) mode.

- Check for dirty seat and clean as appropriate.
- Check for worn or damaged seat and replace if necessary.

Outlet pressure drops below setting.

- Check pump for proper operation and check for possible leakage problems.
- Look for a clogged supply line problem, flush the supply line.

Fluid leakage from spring housing.

- Check the bonnet hold-down screws and the plate hold down screws and re-torque as needed.
- Check for damaged diaphragm, replace as needed.

Regulator will not function, even when dispensing device is opened.

- Check for possible obstruction in the fluid line.
- Inlet pressure is too high, causing a "lock-out" situation. Read "WARNING: MISAPPLICATION HAZARD" found on page 2.

Typical Back Pressure Regulator Cross Section View Showing Major Components.

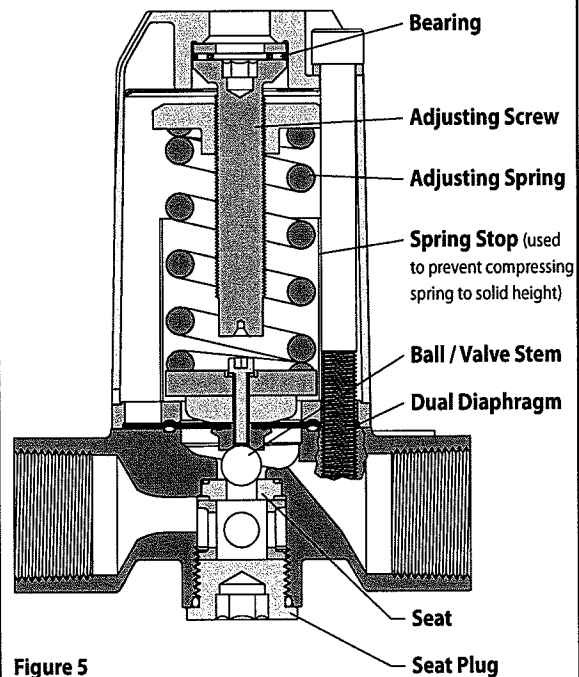


Figure 5

PARTS LIST / 65179X-XXX-B

65179X-XXX-B COMMON PARTS

Item	Description (size)	Qty	Part No.	[Mtl]
1	Housing - 651790-XXX-B (downstream)	(1)	93534-1	[A]
	651791-XXX-B (back pressure)	(1)	93534-2	[A]
2	Bolt (7/16" - 20 x 5")	(4)	93487-2	[C]
3	Washer (7/16" i.d.)	(4)	Y79-716	[C]
4	Washer (1.162" o.d. x 0.125" thick)	(1)	93485-1	[C]
5	Thrust Bearing (1.173" o.d.)	(1)	93484-1	[C]
6	Adjusting Screw (5/8" - 24, left hand)	(1)	93486-1	[C]
7	Plate	(1)	93818	[SS]
8	Adjusting Nut	(1)	93481-1	[C]
9	Spring - 65179X-XXB-B (green, 10 - 30 in. lbs)	(1)	93636-1	[C]
	65179X-XXC-B (orange, 20 - 60 in. lbs)	(1)	93637-1	[C]
	65179X-XXD-B (gray, 50 - 200 in. lbs)	(1)	93638-1	[C]
	65179X-XXE-B (red, 100 - 800 in. lbs)	(1)	93639-1	[C]
10	Screw (#10 - 32 x 7/8")	(1)	Y191-107	[C]
11	Lockwasher (0.196" i.d.)	(1)	Y14-10	[C]
13	Small Plate	(1)	93893	[C]
14	Button	(1)	93889	[A]
15	Plate	(1)	93633-2	[C]
16	Diaphragm (0.062" thick, black)	(1)	93883	[N]
17	Diaphragm (0.020" thick, white)	(1)	93630-1	[T]
18	"O" Ring (3/32" x 1-7/8" o.d.)	(1)	Y328-131	[T]
20	3/8" Allen Wrench	(1)	Y106-109	[C]
21	Flush-Out Plug (used on models 651790-XXX-B only)	(1)	93819	[C]

Item	Description (size)	Qty	Part No.	[Mtl]
22	Spring Stop - 651790-XXB-B (1.597" long)	(1)	96348-1	[SS]
	651790-XXC-B (2.265" long)	(1)	96348-2	[SS]
	651790-XXD-B (2.125" long)	(1)	96348-3	[SS]
	651790-XXE-B (2.359" long)	(1)	96348-4	[SS]
23	Long Nipple (1/4 - 18 NPT x 4")	(1)	Y44-15-S	[SS]
24	Coupling (1/4 - 18 NPT x 1-3/8")	(1)	Y43-242-S	[SS]
25	Gauge - models 65179X-X1B-B and -X1C-B (0 - 60 p.s.i. / 0 - 4 bar)	(1)	93656-1	[Br/Bz]
	models 65179X-X1D-B (0 - 300 p.s.i. / 0 - 20 bar)	(1)	93887	[Br/Bz]
	models 65179X-X1E-B (0 - 1000 p.s.i. / 0 - 70 bar)	(1)	93503-1	[Br/Bz]
	models 65179X-X3B-B, -X3C-B, -X4B-B and -X4C-B (0 - 60 p.s.i. / 0 - 4 bar)	(1)	93657-1	[SS]
	models 65179X-X3D-B and -X4D-B (0 - 300 p.s.i. / 0 - 20 bar)	(1)	93888	[SS]
26	models 65179X-X2E-B, -X3E-B and -X4E-B (0 - 1000 p.s.i. / 0 - 70 bar)	(1)	93504-1	[SS]
26	Stud (7/16" - 20 x 4") models 651790-B5R-B	(2)	92987	[C]
	all models except 651790-B5R-B	(1)	92987	[C]
27	Nut (7/16" - 20) models 651790-B5R-B	(4)	Y11-7-C	[C]
	all models except 651790-B5R-B	(2)	Y11-7-C	[C]
28	Lock Washer (7/16") models 651790-B5R-B	(2)	Y14-716	[C]
	all models except 651790-B5R-B	(1)	Y14-716	[C]
29	Indicates parts included in the diaphragm service kit		62173	

651790-XXX-B DOWNSTREAM REGULATORS

Flow / Size	-XXX	Port Size NPTF	Ball Size	Rebuild Kit	Valve Stem (40)	Valve Kit (41, 42, 43, 44) (see below)	Flow Tube (45)	"O" Ring (46)	Base Plug Assy (47) ⑥	Base (48)	Pipe Plug (52)
Standard	-A1X	3/8	0.1875"	637219-2A1-B	92989	62169	93489-1	93492-1	62168	93650-1	Y17-52-N
	-A3X	3/8	0.1875"	637219-2A1-B	92989	62169	93489-1	93492-1	62168	93651-1	Y17-52-S
	-A4X	3/8	0.1875"	637219-2A4-B	93640-1	62171	93489-1	93492-1	62168	93651-1	Y17-52-S
Hi-Flow	-B1X	3/8	0.250"	637219-2B1-B	92989	62237	93489-1	93492-1	62168	93650-1	Y17-52-N
	-B2X	3/8	0.250"	637219-2B2-B	93640-1	62238	93489-1	93492-1	62168	93651-1	Y17-52-S
	-B3X	3/8	0.250"	637219-2B1-B	92989	62237	93489-1	93492-1	62168	93651-1	Y17-52-S
	-B4X	3/8	0.250"	637219-2B4-B	93640-1	62239	93489-1	93492-1	62168	93651-1	Y17-51-S
	-B5X	3/8	0.250"	637219-2B4-B	92989	62239	93489-1	93492-1	62168	93651-1	Y17-51-S

651791-XXX-B BACK PRESSURE REGULATORS

Flow / Size	-XXX	Port Size NPTF	Ball Size	Rebuild Kit	Valve Stem (40)	Valve Kit (41, 42) (see below)	Flow Tube (45)	"O" Ring (46)	Base Plug Assy (47) ⑥	Base (48)	Pipe Plug (52)
Hi-Flow	-B1X	3/8	0.250"	637219-3B1-B	93641-1	61985-1	93489-1	93492-1	62168	93650-1	Y17-51-N
	-B3X	3/8	0.250"	637219-3B1-B	93641-1	61985-1	93489-1	93492-1	62168	93651-1	Y17-51-S
	-B4X	3/8	0.250"	637219-3B4-B	98576-1	66881-1	93489-1	93492-1	62168	93651-1	Y17-51-S
System Flow	-C3D	1-1/4	0.500"	637219-3C1-B	93645-1	61967-1	93490-1	93491-1	61957-1	93648-1	-----
	-C4D	1-1/4	0.500"	637219-3C4-B	98577-1	66868-1	93490-1	93491-1	61957-1	93648-1	-----

DOWNSTREAM VALVE KITS

Valve Kit	(41) "O" Ring	(42) Seat	(43) Ball	(44) Spring
62169	Y328-14	93885	93508-1	93881
62171	Y328-14	93882	98575-1	93881
62237	Y328-14	93558-1	93561-1	93881
62238	Y328-14	93557-1	93560-1	93881
62239	Y328-14	98571-1	98574-1	93881

BACK PRESSURE VALVE KITS

Valve Kit	(41) "O" Ring	(42) Seat
61967-1	Y328-19	93522-1
61985-1	Y328-14	93558-1
66868-1	Y328-19	98570-1
66881-1	Y328-14	98571-1

① "Smart parts", keep these items on hand in addition to the service kits for fast repair and reduction of down time.

② Items not shown.

③ Except models 651790-XXR-B.

④ Includes item 46.

⑤ NOTE: 637219-XXX-B rebuild kits include both 62173 diaphragm service kit and valve kit shown in the chart.

ASSEMBLY TORQUE REQUIREMENTS

NOTE: DO NOT OVERTIGHTEN FASTENERS.

(2) Torque alternately.

1.) Snug.

2.) 20 - 25 ft lbs. (27.1 - 33.9 Nm).

(10) 65 - 75 in. lbs. (7.3 - 8.5 Nm).

LUBRICATION / SEALANTS

① Apply Perma-Lok® LH150 anaerobic pipe sealant to threads.

② Apply Loctite® nickel anti-seize to threads.

③ Apply 40036 grease to threads.

④ Apply Loctite nickel anti-seize to threads (except on models 65179X-X1X-B).

MATERIAL CODE

[A] = Aluminum
[Br] = Brass
[Bz] = Bronze
[C] = Carbon Steel
[N] = Neoprene
[SS] = Stainless Steel
[T] = PTFE

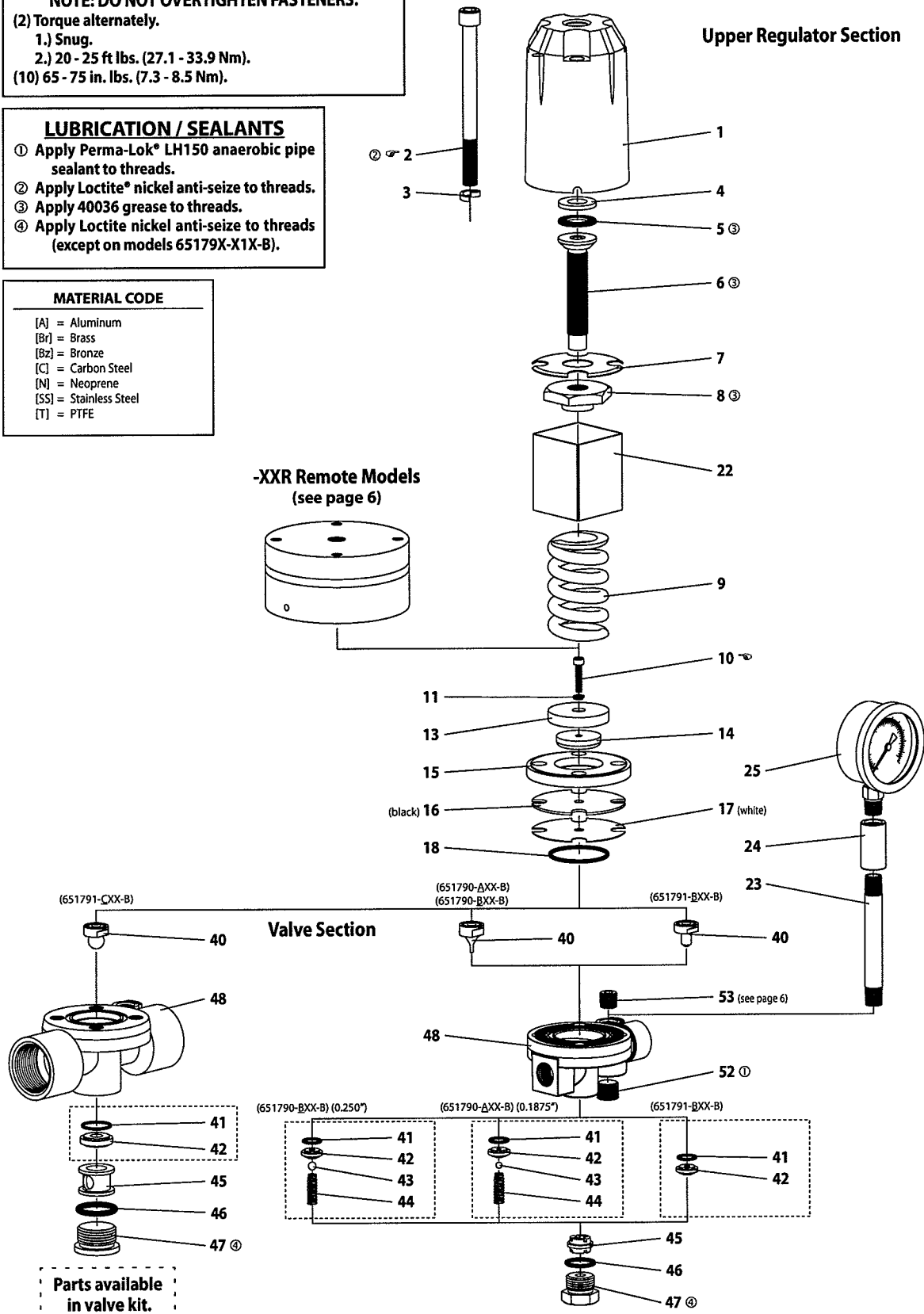


Figure 6

PARTS LIST

651790-XXR-B REMOTE MODELS

Item	Description (size)	(Qty)	Part No.	[Mtl]
30	Air Cap	(1)	93794	[A]
❶ 31	Diaphragm	(1)	93798	[B]
32	Spacer	(1)	93795	[A]
33	Rivet	(1)	Y193-64	[A]
34	Washer	(1)	90559	[C]
❶ 35	Piston	(1)	93796	[C]
36	Cap Screw (7/16" - 20 x 1-1/2")	(4)	Y157-74	[C]
37	Adapter	(1)	93752-1	[A]
38	Cap Screw (M8 x 1.25 - 6g x 40 mm)	(4)	93800-2	[C]
53	Pipe Plug (1/4 - 18 NPT) (see page 5)			
	models 651790-X1R-B only	(1)	Y17-51-N	[C]
	models 651790-A3R-B, -A4R-B, -B4R-B and -B5R-B	(1)	Y17-51-S	[SS]

⚙️ ASSEMBLY TORQUE REQUIREMENTS ⚙️

NOTE: DO NOT OVERTIGHTEN FASTENERS.

(36) Torque alternately.

- 1.) Snug.
- 2.) 20 - 25 ft lbs (27.1 - 33.9 Nm).

(38) Torque alternately.

- 1.) Snug.
- 2.) 10 ft lbs (13.6 Nm).

LUBRICATION / SEALANTS

❶ Apply Loctite 242® to threads.

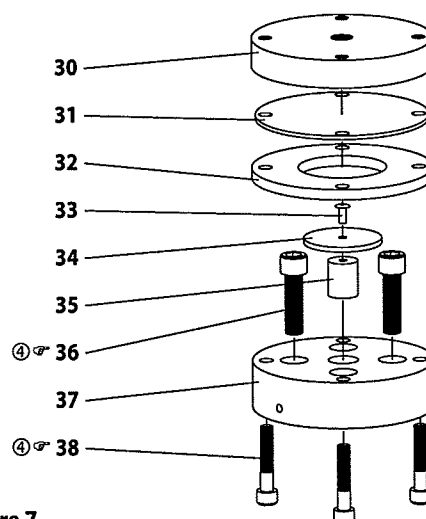


Figure 7

MATERIAL CODE

[A] = Aluminum	[C] = Carbon Steel
[B] = Nitrile	[SS] = Stainless Steel

❶ "Smart parts", keep these items on hand in addition to the service kits for fast repair and reduction of down time.

REGULATOR DISASSEMBLY

(refer to pages 4 and 5)

FOR "WARNINGS", REFER TO "OPERATING AND SAFETY PRECAUTIONS" ON PAGE 2 FOR DETAILS.

BEFORE SERVICING, READ "WARNING: DISASSEMBLY HAZARD:" FOUND ON PAGE 2.

TOOLS REQUIRED: Small bench vise, 3/8" Allen wrench (Y106-109 is included), 5/32" Allen wrench, a 9/16" Allen wrench for -CXX-B models, torque wrench and Loctite 242.

NOTE: It is not always necessary to remove the regulator from the fluid line to service or inspect only the valve section.

BEFORE DOING ANY IN-LINE SERVICE, ALL FLUID PRESSURE MUST BE RELIEVED. HEED ALL WARNINGS FOUND ON PAGE 2.

ALLEN WRENCH NOTE: The Y106-109 (3/8") Allen wrench is included and can be used for several functions including: Regulator adjustment (spring type models), removal and assembly of the long bonnet bolts and the short plate bolts.

VALVE SEAT NOTE: Before deciding to order a general repair kit to service the whole regulator, check the easiest things first. Remove and inspect the valve seat for dirt, foreign matter, damage or wear (steps 1 - 3).

DOWNSTREAM STYLE MODELS

1. Remove the (46 / 47) base plug / "O" ring assembly, which will allow removal of the (44) spring, (43) ball, (45) flow tube, (42) seat and (41) "O" ring.

BACK PRESSURE STYLE MODELS

2. Remove the (46 / 47) base plug / "O" ring assembly, which will allow the removal of the (45) flow tube, (42) seat and (41) "O" ring.
 3. Inspect the (42) seat for dirt, damage or wear.
READ "WARNING: BONNET REMOVAL HAZARD" FOUND ON PAGE 2.
 4. Remove the four (2) long bolts to allow removal of the bonnet / adjusting screw assembly.
- NOTE:** The (6) adjusting screw, (5) thrust bearing and (4) washer are retained by (7) plate, which is pressed into place. It should not be necessary to disassemble these parts during normal service.
5. Remove the (9) regulator spring and (22) spring stop.
 6. Remove the (15) plate.
 7. Remove the stem / diaphragm and piston assembly.
 8. Place the stem in a vise, locate and secure on the stem flats provided.
 9. Using a 5/32" hex Allen wrench, remove the (10) screw.
 10. Remove the (11) lockwasher, (13) small plate, two (16, 17) diaphragms and (18) "O" ring from the (40) valve stem.

REMOTE MODELS (Refer to figure 7)

1. Remove four (38) screws from (30) air cap and separate the diaphragm assembly from the (37) adapter.
2. Separate the two halves to allow inspection of the (31) diaphragm and replace, if necessary.
3. Remove the four (36) screws, releasing (37) adapter from the base.
4. Reassemble in reverse order.

REGULATOR REASSEMBLY

Also refer to parts list and views on pages 4 and 5.

1. Place the (10) screw and (11) lockwasher through the (13) plate and into the (14) button.

NOTE: Be certain the radius faces the (16) diaphragm.

2. Locate the (15) plate over the (14) button.
3. Position the (16) black diaphragm on the (10) screw.
4. Position the (17) white colored diaphragm in the same manner.
5. Thread the (40) valve stem onto the small screw and snug hand tight.
6. Flip the assembly over and place in a vise, locating on the valve stem flats. Use one of the (2) long bolts to align the diaphragms and the plate. The bolt is to help maintain alignment of the diaphragms only at this point (see figure 8).
7. Hold the plate in this position and tighten the (10) small screw into the stem. NOTE: Torque to 65 - 75 in. lbs (7.3 - 8.5 Nm).
8. Remove the stem / diaphragm assembly from the vise.
9. Place the (18) "O" ring into the base groove.
10. Place the stem / diaphragm assembly on the base and align the bolt holes.
11. Place the (9) spring and (22) spring stop on the plate.
NOTE: Spring references do not apply to "-XXR" remote models.
12. Assemble the (1) housing to the (48) base, aligning the four bolt holes.
13. Retain the housing using four (3) lockwashers and four (2) long bolts. NOTE: Tighten alternately until snug, then torque to 20 - 25 ft lbs (27.1 - 33.9 Nm).
14. Turn the regulator over and vise on flats.

DOWNSTREAM MODELS

- Install (41) "O" ring.
- Install (42) seat.
- Install the (45) flow tube.
- Install the (43) ball.
- Install the (44) spring with the narrow end against the ball.
- Install the (47) valve plug and "O" ring assembly.
- Tighten until snug.

BACK PRESSURE MODELS

- Install (41) "O" ring.
- Install (42) seat.
- Install the (45) flow tube.
- Install the (47) valve plug and "O" ring assembly.
- Tighten until snug.

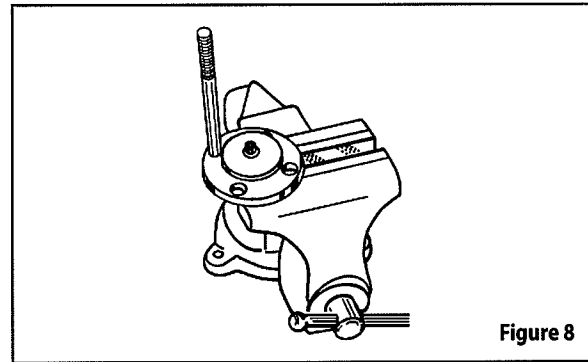


Figure 8

PERFORMANCE DATA

Downstream Low Pressure Regulator Models Test Media 55 Centipoise

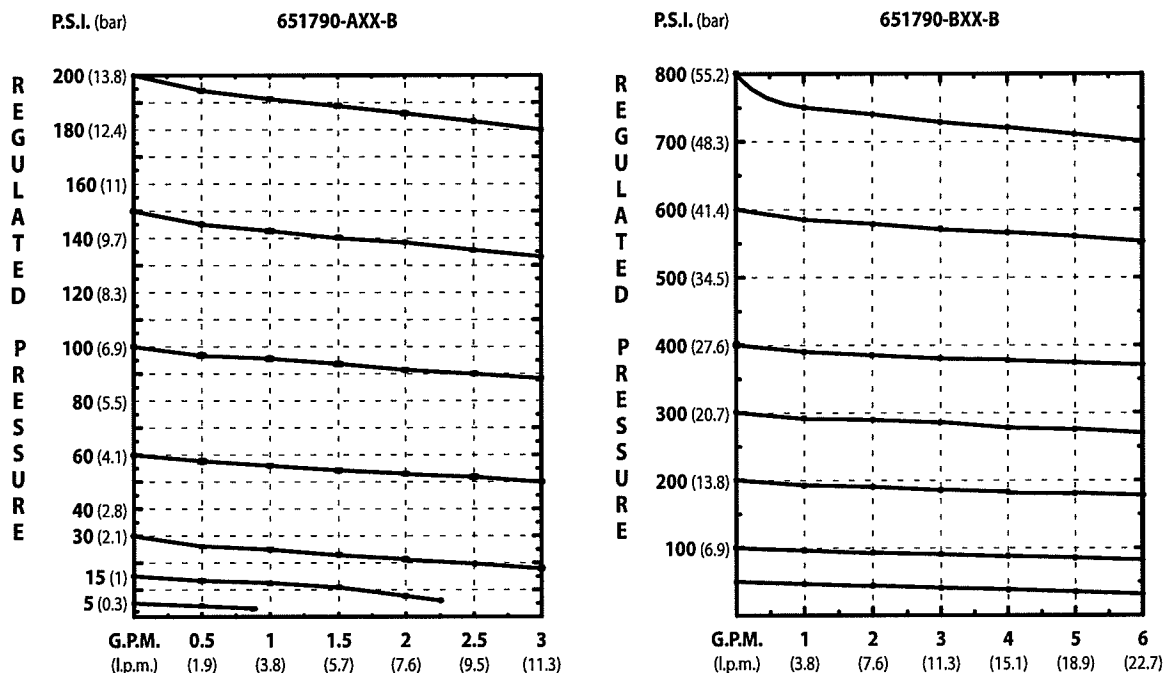
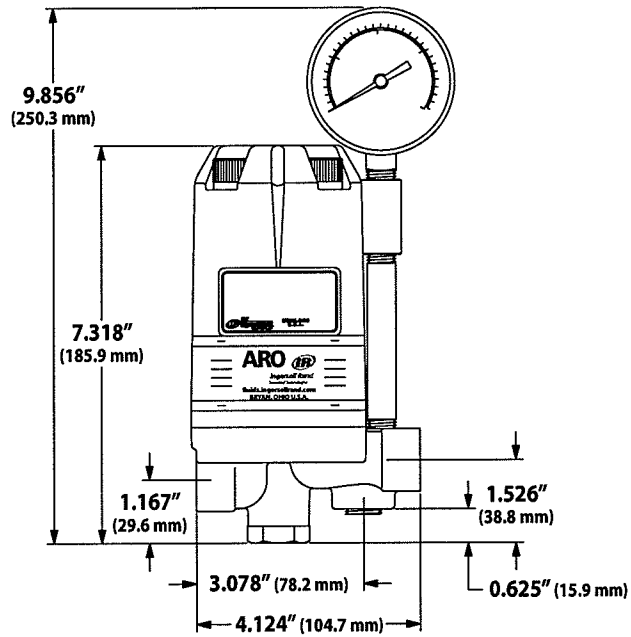


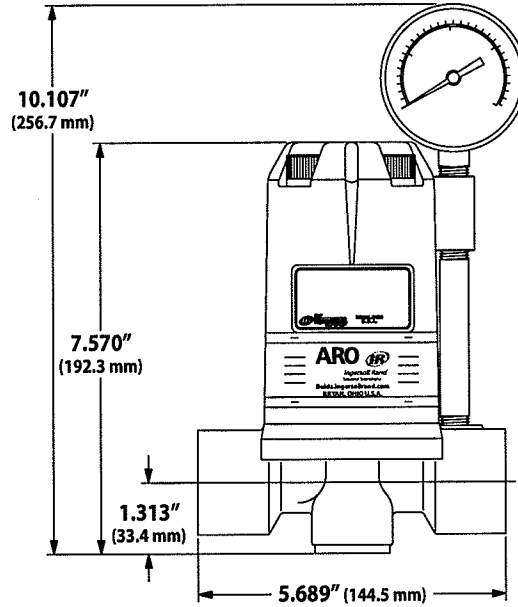
Figure 9

DIMENSIONAL DATA

65179X-AXX-B 65179X-BXX-B Models



651791-CXD-B Back Pressure Models



651790-XXR-B Remote Models

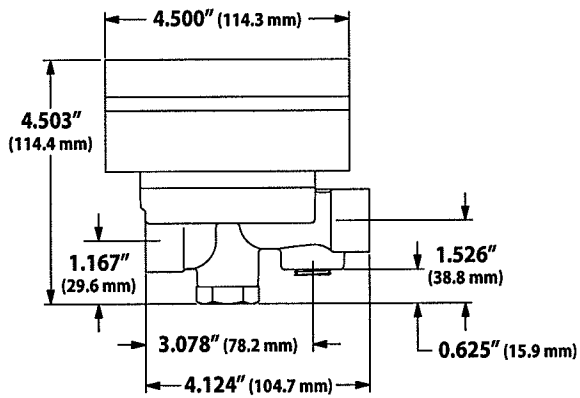


Figure 10

OPERATOR'S MANUAL

6691X

INCLUDING: SERVICE KITS, DISASSEMBLY / REASSEMBLY, PARTS, TROUBLESHOOTING

Released / Liberado / Decharge: 10-22-97
Revised / Revisado / Revise: 8-27-04
(Rev. D)

66913, 66914, 66915 and 66917 AIR MOTOR

ALSO COVERS 637316 SERVICE KITS

AIR MOTOR DISASSEMBLY

NOTE: All threads are right hand. Carefully remove the parts, inspect for damage, nicks or excessive wear and determine if any parts will need replacement.

1. Using a 7/8" wrench, unthread and remove (11) adapter and (12 and 32) "O" rings, releasing (13) muffler housing.
2. Models 66913 and 66914: Using a 7/16" wrench, remove (27) nuts. Models 66915 and 66917: Using a 7/16" wrench, unthread (1) bolts.
3. Remove four (1) bolts, (2) upper cap and (3) track gasket.
4. Remove (10) cylinder, containing (4) sleeves and (7) spools.
5. Using (1) bolt, push (7) spools and (4) sleeves out "sleeve" end of (10) cylinder.
6. Remove (16) retaining ring, (17) washer and (19) piston.
7. Remove (22) dowel pin, releasing (20) piston adapter.
8. Remove (3) track gasket and (26) base assembly or (28) lower cap.

AIR MOTOR REASSEMBLY

NOTE: Thoroughly clean and lubricate all seals. Replace all soft parts with new ones included in the repair kit. Note: Refer to the illustration (figure 2, page 5) for "U" cup lip seal direction.

1. Models 66913 and 66914: Assemble (23) "O" ring to (26) base assembly. Models 66915 and 66917: Assemble (23 and 29) "O" rings to (30) bushing and assemble to (31) plate. Assemble to (28) lower cap.
2. Assemble (25) piston rod up thru (26) base assembly or (30) bushing.
3. Assemble (3) track gasket to (26) base assembly or (28) lower cap.
4. Assemble (21) "O" ring to (20) piston adapter and assemble (20) piston adapter to (25) piston rod, securing with (22) dowel pin.
5. Replace (18) "U" cups on (19) piston and assemble (19) piston onto (20) piston adapter, securing with (17) washer and (16) retaining ring.
6. Replace (5) "O" rings on (4) sleeves and assemble (4) sleeves into (10) cylinder. NOTE: Assemble each sleeve into the end of the cylinder nearest the exhaust hole.
7. Replace (6 and 9) "O" rings and (8) "U" cups on (7) spools and assemble (7) spools into (10) cylinder from the opposite end as the (4) sleeve went in.
8. Assemble (10) cylinder to (26) base assembly or (28) lower cap, being careful when sliding over the lips of (18) "U" cups. NOTE: Be sure (3) track gasket is seated properly.
9. Replace (3) track gasket on (2) upper cap and assemble (2) upper cap to (10) cylinder.

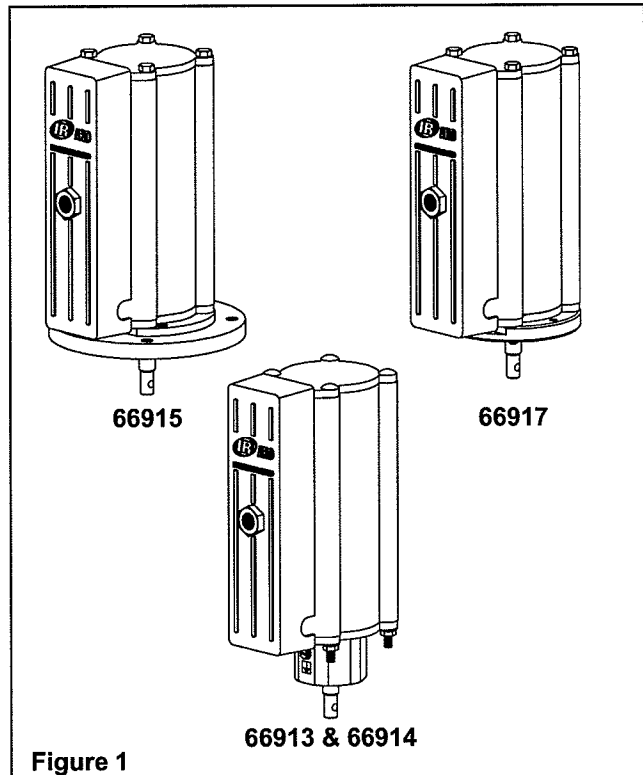


Figure 1

10. Models 66913 and 66914: Assemble (1) bolts to air motor, securing with (27) nuts. NOTE: Torque to 80 - 90 in. lbs (9.0 - 10.2 Nm). Models 66915 and 66917: Assemble (1) bolts to air motor and tighten to 80 - 90 in. lbs (9.0 - 10.2 Nm).
11. Replace (12 and 32) "O" rings on (11) adapter.
12. Assemble (14) foam liners and (15) edge trims to (13) muffler housing.
13. Assemble (13) muffler housing to (10) cylinder, securing with (11) adapter. NOTE: Torque (11) adapter to 70 - 80 in. lbs (7.9 - 9.0 Nm).

TROUBLE SHOOTING

If the pump will not cycle or will not deliver material.

- Be certain to check for non-pump problems including kinked, restrictive or plugged inlet / outlet hose or dispensing device. Depressurize the pump system and clean out any obstructions in the inlet / outlet material lines.
- Check all seals, including track gaskets.
- Check the direction of "U" cup lips.

INGERSOLL-RAND COMPANY

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PARTS LIST / LISTA DE PIEZAS / LISTE DES PIECES

Item Elem. Art.	Description (size) Descripción (tamaño) Description (taille)	Qty Cant Quan	Part No. Número Numero	Mtl
1	Bolt (1/4" - 20 x 9") (66913, 66914)	(4)	94333	[C]
	(66915, 66917)	(4)	94423	[C]
2	Upper Cap	(1)	94390	[Z]
✓ 3	Track Gasket	(2)	94392	[B]
4	Sleeve	(2)	94316	[Br]
✓ 5	"O" Ring (1/16" x 11/16" o.d.)	(4)	Y325-15	[B]
✓ 6	"O" Ring (1/8" x 3/4" o.d.)	(4)	Y325-206	[B]
7	Spool	(2)	94310	[D]
✓ 8	"U" Cup (1/8" x 3/4" o.d.)	(2)	Y240-7	[B]
✓ 9	"O" Ring (0.106" x 0.587" o.d.)	(2)	15066-PM	[B]
10	Cylinder	(1)	94306	[A]
11	Adapter	(1)	94384	[C]
✓ 12	"O" Ring (1/16" x 7/16" o.d.)	(1)	Y325-11	[B]
13	Muffler Housing	(1)	94443	[A]
14	Foam Liner	(2)	94402	
15	Edge Trim	(2)	94378-1	[N]
16	Retaining Ring	(1)	94406	[C]
17	Washer	(1)	94515	[C]
✓ 18	"U" Cup (3/16" x 3" o.d.)	(2)	94518	[B]
19	Piston	(1)	94403	[D]

Item Elem. Art.	Description (size) Descripción (tamaño) Description (taille)	Qty Cant Quan	Part No. Número Numero	Mtl
20	Piston Adapter	(1)	94388	[C]
✓ 21	"O" Ring (3/32" x 1" o.d.)	(1)	Y325-117	[B]
22	Dowel Pin (1/4" o.d. x 7/8" long)	(1)	Y148-37	[C]
✓ 23	"O" Ring (3/32" x 11/16" o.d.)	(1)	Y325-112	[B]
24	Ground Screw (#10 - 32 x 1/4")	(1)	93005	[C]
25	Piston Rod (66917)	(1)	95502	[C]
	(66913, 66914, 66915)	(1)	94385	[C]
26	Base Assembly (66913)	(1)	67148	[C/Z]
	(66914)	(1)	67149	[C/Z]
27	Nut (1/4" - 20)	(4)	93828	[SS]
28	Lower Cap	(1)	94391	[Z]
✓ 29	"O" Ring (1/8" x 1-9/16" o.d.)	(1)	Y325-219	[B]
30	Bushing	(1)	94374	[C]
31	Plate (66915)	(1)	94404	[A]
	(66917)	(1)	95360	[A]
✓ 32	"O" Ring (1/16" x 3/4" o.d.)	(1)	Y325-16	[B]
33	Ground Lug	(1)	93004	[Co]
34	Screw (1/4" - 20 x 5/8")	(1)	93860	[C]
✓	Darina "EP" 2 Grease Packet	(1)	94833	
✓	Service Kit		637316	

☞ TORQUE REQUIREMENTS ☞ ☞ REQUISITOS DEL PAR DE TORSIÓN ☞ ☞ CONDITIONS DE COUPLE ☞

NOTE: DO NOT OVERTIGHTEN COMPONENTS.
NOTA: NO APRIETE DEMASIADO LOS ASEGURADORES.
REMARQUE: NE PAS TROP SERRER LES ELEMENTS D'ASSEMBLAGE.
(1) bolt / perno / boulon 80 - 90 in. lbs (9.0 - 10.2 Nm).
(11) adapter / adaptador / l'adaptateur 70 - 80 in. lbs (7.9 - 9.0 Nm).
(27) nut / tuerca / écrou 80 - 90 in. lbs (9.0 - 10.2 Nm).

MATERIAL CODE / CÓDIGO DEL MATERIAL / CODE DE MATERIAU

[A] = Aluminum / Aluminio / Aluminium
[B] = Nitrile / Nitrile / Nitrile
[Br] = Brass / Latón / Laiton
[C] = Carbon Steel / Acero al Carbón / Acier au Carbone
[Co] = Copper / Cobre / Cuivre
[D] = Acetal / Acetal / Acétal
[N] = Neoprene / Neoprene / Neoprene
[SS] = Stainless Steel / Acero inoxidable / Acier inoxydable
[Z] = Zinc / Zinc / Zinc

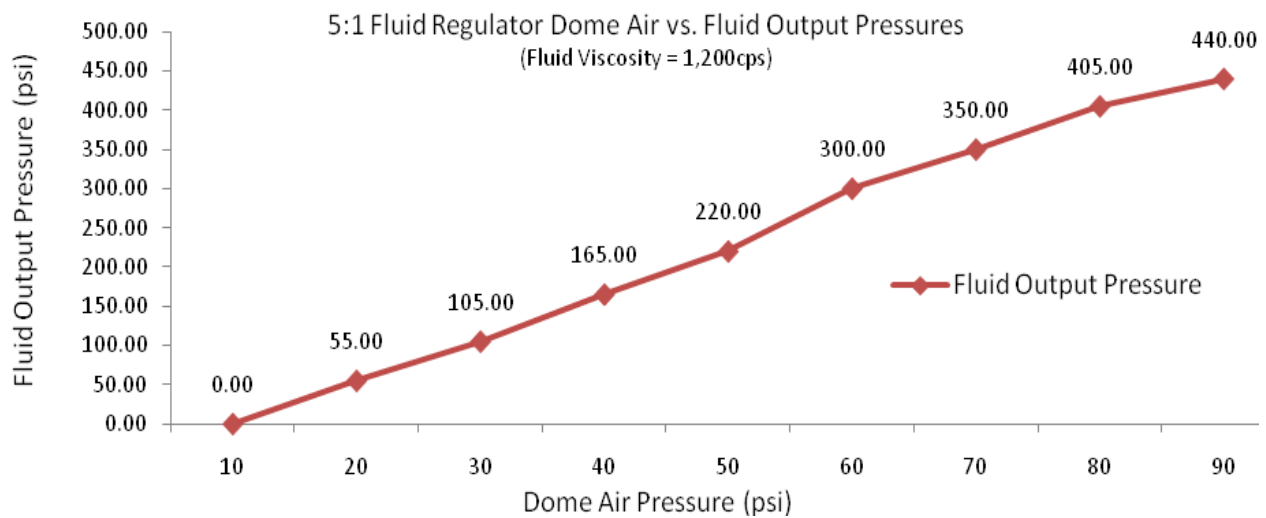
PN 116185 5:1 Dome-Loaded, Downstream, Fluid Pressure Regulator OPERATING AND MAINTENANCE INSTRUCTIONS

Description

The part number 116185, 5:1 Fluid Pressure Regulator, is a single-stage, piston-sensed, dome-loaded device designed for the regulation of downstream fluid pressures using compressed air.

Specifications

Maximum Inlet Pressure	1,500psi (100 bar)
Outlet Control Range	0 to 500psi (0 to 35 bar)
O-Ring Material	Viton
Body Material (wetted parts)	316 Stainless Steel
Seat Material	Peek
Seat Diameter	.20" (5mm)
Fluid Inlet Fitting	1 x ¼" NPT Tap
Fluid Outlet Fitting	3 x ¼" NPT Tap
Dome Air Fitting	1 x 1/8" NPT Tap
Mounting Holes	2 x M6-1.0 Tap, 10mm Deep
Dimensions	Ø2.8" (Ø71mm) x 3.7" (93mm) H
Weight	5.0lbs (2.3kg)



Maintenance

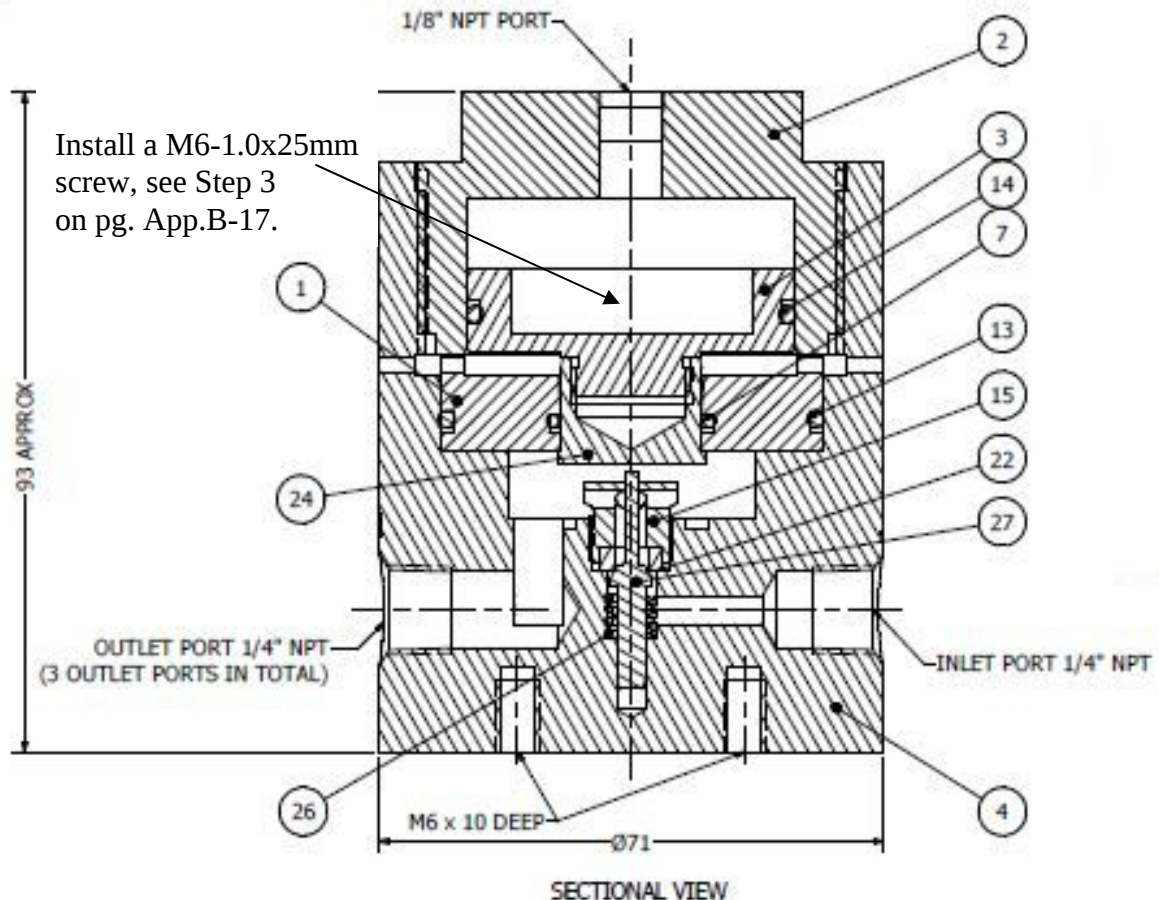
Flush the regulator periodically with water or an appropriate solvent material. The interval may vary, depending upon the amount and type of fluid used in the regulator. Apply appropriate dome air pressure to the regulator to efficiently accomplish the flushing without undue splashing of the solvent fluids.

Repair

Assure the following procedure is undertaken on a clean work surface. It is strongly recommended that the regulator be thoroughly flushed with water/solvent prior to disassembly to assure the cleanliness of all parts and facilitate the repair process.

Required tools

- 5:1 Fluid Regulator Repair Kit (ITW PN 116301)
- Krytox Lubricant (ITW PN 108700)
- Bench Vise
- 21mm and 48mm Open-End Box Wrench (or Adjustable Wrench)
- 1 x M6-1.0x25mm Bolt
- 13mm Socket Wrench
- 4 to 51 ft-lb (6 to 70Nm) Torque Wrench (recommended)



Parts List

Item	Description
1	Sensor Holder
2	Dome Cap
3	Ratio Loaded Plate (46mm Dia.)
4	Body, ¼" NPT- 'C' Porting
*7	O-Ring, Viton
*13	O-Ring, Viton
*14	O-Ring Viton
15	Seat Retainer
*22	Seat
24	20mm Sensor
*26	Main Valve Spring
*27	Main Valve
* Denotes components of Fluid Regulator Repair Kit (PN 116301)	

Procedure

1. Firmly clamp the flats of the regulator body in a vice with the brass Dome Cap (2) facing upward.
2. Use a 48mm wrench to remove the Dome Cap (2) from the regulator body.
3. Screw a M6-1.0x25mm bolt into the tapped hole in the Ratio Loaded Plate (3) until it bottoms in the hole.
4. Remove the sub-assembly, consisting of the Ratio Loaded Plate (3), O-ring (14), Sensor Holder (1), Sensor (24) and O-rings (7 & 13), from the regulator body. Use the M6-1.0x25mm bolt as an aid to pull this sub-assembly from the body.
5. Disassemble this sub-assembly by placing the flats of the Ratio Loaded Plate (3) in the vice. Ensure the sensor (24) is pointed upward. Take care to not damage the outer diameter of this sub-assembly.
6. Use a 21mm wrench on the flats of the sensor, turning counter-clockwise, to separate the sub-assembly.
7. Inspect/replace O-rings (7, 13 & 14), lubricating them with Krytox.
8. Re-assemble the sub-assembly.
9. Place the flats at the bottom of the fluid regulator body in the vice. Use a 13mm socket, turning the Seat Retainer (15) counter-clockwise to remove the Retainer (15), Seat (22), Valve (27) and Spring (26) from the body.
10. Inspect/ replace the Seat, Valve and Spring
11. Reassemble the parts in reverse order from Step 8, above. Special care should be taken when inserting the Seat Retaining Nut (15) by pushing down the Main Valve (27) as the Seat Retaining Nut is tightened into the regulator body. Tighten the Retaining Nut to a torque of 4.4 ft-lb (6Nm).

12. Insert the sub-assembly from Step 7 above into the Dome Cap (2), assuring the Ratio Loaded Plate (3) is inserted first into the Cap.
13. Install the Dome Cap (2) to the regulator body, tightening to a torque of 51 ft-lb (70Nm).

Troubleshooting

- No fluid pressure
 - Check to assure sufficient dome air pressure is present.
 - Disassemble the fluid regulator and check for hardened material or foreign matter. Also look for any damaged/missing parts.
- Pressure creeps above the setting when system is dead ended in a static (no flow) mode.
 - Check for a dirty or damaged seat (22) or main valve (27).
 - Assure the spring (26) is properly installed and not damaged.
- Outlet pressure drops below setting
 - Check the pump for proper operation/leaks.
 - Disassemble the fluid regulator and check for hardened material or foreign matter. Also look for any damaged/missing parts.
- Fluid leakage from “weep hole” in side of regulator body.
 - a. Assure inlet fluid pressure does not exceed specified maximum.
 - b. Disassemble the regulator and check for damaged/missing O-ring seals.