



Welker Jet Insert Model Control Valve

Model

***WJ-1N, WJ-2N, WJ-4N,
WJ-6N, & WJ-8N***

The information in this manual has been carefully checked for accuracy and is intended to be used as a guide for the installation, operation, and maintenance of the Welker equipment described above. Correct operating and/or installation techniques, however, are the responsibility of the end user. Welker reserves the right to make changes to this and all products in order to improve performance and reliability.

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SPECIFICATIONS

1. GENERAL

1.1 INTRODUCTION

We appreciate your business and your choice of Welker products. The installation, operation, and maintenance liability for this product becomes that of the purchaser at the time of receipt. Reading the applicable *Installation, Operation, and Maintenance (IOM) Manual* prior to installation and operation of this equipment is required for a full understanding of its application and performance prior to use.*

If you have any questions, please call 1-800-776-7267 in the USA or 1-281-491-2331.

Notes, Warnings, and Cautions



NOTE

Notes emphasize information or set it off from the surrounding text.



CAUTION

Caution messages appear before procedures that, if not observed, could result in damage to equipment.



WARNING

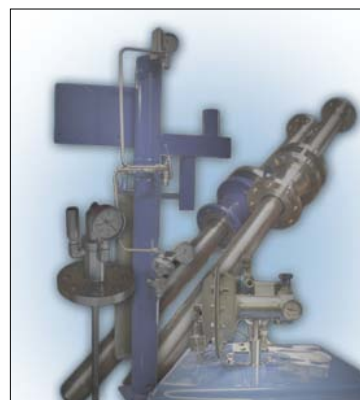
Warnings alert users to a specific procedure or practice that, if not followed correctly, could cause personal injury.

The following procedures have been written for use with standard Welker parts and equipment. Assemblies that have been modified may have additional requirements and specifications that are not listed in this manual.

1.2 DESCRIPTION OF PRODUCT

In 1958, R.H. Welker designed the first rubber plug type control valve to meet the demands of the gas industry for a quiet, versatile control valve. The many refinements and improvements made since that time have been incorporated into the current line of Welker JetControl Valves.

The basic design consists of a rubber plug that is expanded by a hydraulically operated piston and cylinder system. As the hydraulic force on the plug increases, it expands radially until it seals. Hydraulic pressure is provided by a pneumatically operated diaphragm motor.



SPECIFICATIONS

1.3 SPECIFICATIONS

Table 1

Welker Jet Control Valve Specifications	
Medium	Natural Gas – Typical Transmission/Distribution Quality
Materials of Construction	Casting/Forging A350 LF2 Carbon Steel, 1045 Carbon Steel, Aluminum 7075-T6 Bar
Size	1, 2, 4, 6, 8, 10, and 12 inch
Flange Rating	150, 300 and 600 ANSI RF
Pressure Rating	1,440 psig (100 BarG)
Temperature Range	-20° F to 122° F (-29° C to 50° C)
Maximum Line Pressure	1,480 psi (102.1 bar) ANSI 600
Inner Valve Material	Proprietary Nitrile (Buna Rubber) – Compatible with Natural Gas
Hydraulic Fluid	Texaco Aircraft Hydraulic Oil #5606 H or equivalent
Area Classification	Can be used in hazardous areas

Table 2

Utilities Required for Diaphragm Motor	
1" & 2" Valves	39 psi (2.68 bar)
4" Valve	50 psi (3.44 bar)
6" Valve	90 psi (6.21 bar)
8" Valve	70 psi (4.83 bar)

INSTALLATION & OPERATIONS

2. INSTALLATION & OPERATION INSTRUCTIONS

2.1 GENERAL

After unpacking the unit, check it for compliance and for any damages that may have occurred during shipment.

N NOTE

Claims for damages caused during shipping must be initiated by the receiver and directed to the shipping carrier. Welker is not responsible for any damages caused from mishandling by the shipping company.

N NOTE

When sealing fittings with PTFE tape, refer to the proper sealing instructions for the tape used.

2.2 INSTALLATION INSTRUCTIONS (*Refer to Figure 1 on page 5*)

N NOTE

If you have determined that you need a capacity control spacer plate for your installation, but your control valve is not so equipped, the needed item should be installed before proceeding.

N NOTE

Insert Welker Jet Control Valves are normally installed in pipe one size larger than the control valve. Listed below are the insert models and the pipe they are normally fitted to.

WJ-1N	2" pipe or larger
WJ-2N	4" pipe or larger
WJ-4N	6" pipe or larger
WJ-6N	8" pipe or larger
WJ-8N	10" pipe or larger

Insert style control valves are also available to fit pipe larger than that listed. For example, a WJ-4N can be ordered to fit 8" pipe, or a WJ-8NF can be ordered to fit 12" pipe.

1. To install the insert, the line into that it will be placed must have the inspection spool removed or rolled. The insert is then positioned into the upstream pipe with the nose pointing into the line. It is important to be certain the nose of the insert control valve points upstream, and that the correct gaskets between the pipe flanges and the insert flange are properly installed.
2. The fitting extending from the control valve flange should be positioned vertically (pointing up). This is to allow proper filling of the hydraulic system.
3. The inspection spool should now be replaced, with the correct gaskets in position, and the bolts should be properly fastened. Stainless steel tubing, 3/8" or larger, rated for 3,000 psi or higher, should now be run from the fitting on the control valve to the larger valve on the master system.
4. Mount the master system as close to the valve as possible.

INSTALLATION & OPERATIONS

2.2 INSTALLATION INSTRUCTIONS (*Continued*)

5. Using small diameter stainless steel tubing, connect the large valve on the master system to the side port of the control valve insert.

N NOTE

The tubing should either be sloped or level, with no vertical drops that will prevent a direct flow of the hydraulic oil.

6. When longer runs of tubing are used, an oil fill pot is recommended in filling the hydraulic system. (See Section 2.3 pages 6-10 for more information.)
7. Proceed to Section 2.3, filing the hydraulic system.

2.3 FILLING THE HYDRAULIC SYSTEM

Option 1

N NOTE

Before beginning the filling procedure, depressurize the diaphragm actuator motor.

1. Welker Jet Control Valves should be installed into the pipeline already filled with hydraulic fluid. New control valves and motors are shipped pre-filled from the factory. When reinstalling a control valve after maintenance, the control valve should be pre-filled according to the disassembly and reassembly procedure outlined in the inspection procedure.
2. The hydraulic system operates best when a minimum of air is trapped within it. There are two ways to fill the hydraulic system in a manner that traps little or no air. The first method is intended for systems with relatively short runs of level or downward sloping hydraulic tubing.

OPTION 1 (*See Figure 1*)

- Valves “A” and “B” should be securely closed.
- Position the indicator-locking device on the motor underneath the indicator rod (Figure 10). This is to lock the rod in the up position. Secure indicator locking device with hex socket cap screws.

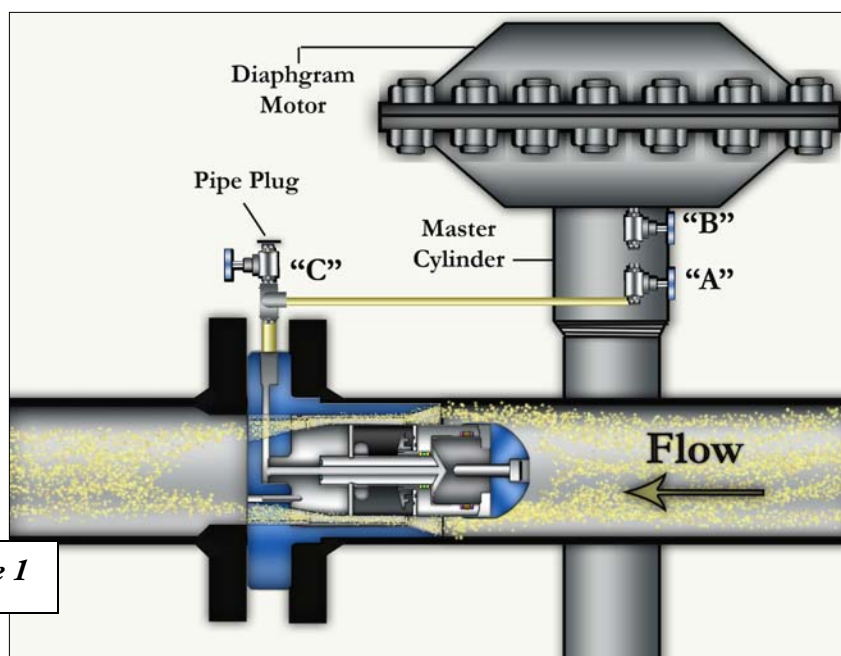


Figure 1

INSTALLATION & OPERATIONS

2.3 FILLING THE HYDRAULIC SYSTEM (*Continued*)

- Remove the diaphragm motor. The motor comes off the master cylinder in one piece by turning it counterclockwise. It will be necessary to use a back-up on the master cylinder when removing the diaphragm motor. It also might be necessary to remove the pipe plug from the bleed valve (“B”) and slightly open the valve to relieve vacuum in the cylinder and allow the piston to be removed.
- Remove the pipe plug from valve “C” attached to the control valve body and open valve “C”.
- Open valve “A” fully. The oil in the master cylinder will drain into the tubing.
- If the motor is positioned higher than the control valve, you will need to do the following:
 - Pour hydraulic oil into the control valve master cylinder slowly, until the fluid starts to flow out of valve “C” at the control valve body.
 - Close valve “C” and replace the pipe plug securely, using PTFE tape or pipe dope to seal the threads and fill the master cylinder to slightly below the crown seal (approximately ¼” (6mm)).
 - Tightly secure the motor assembly to the master cylinder and move the indicator-locking device away from the indicator rod.

N NOTE

When replacing diaphragm motor, do not build pressure on the master cylinder.

- When screwing down the motor, crack valve “B” slightly to allow excess oil to escape. The excess oil will escape instantly. Close valve “B” and secure with a plug. Valve “A” remains fully open.

OPTION 2 (*See Figure 2*)

N NOTE

Before beginning the filling procedure, depressurize the diaphragm actuator motor.

3. Another method of filling the hydraulic system involves the use of an oil fill pot. This method is useful when the run of tubing from the master cylinder to the control valve is relatively long (no more than 8-10 feet (2.5 to 3 meters)) or when it is not practical to remove the diaphragm motor assembly from the master cylinder. With this method, the diaphragm motor assembly remains attached to the master cylinder.
 - Make sure all valves are closed.
 - Open the oil pot and fill two-thirds full with unused aircraft hydraulic oil.
 - Remove pipe plug from valve “F” and connect pressure line, preferably pipeline pressure, to valve “E.”
 - Open valve “E” fully.
 - Run high-pressure tubing from valve “D” to valve “B”, connecting the tubing only at valve “D”. Do not connect tubing to valve “B” at this time. NOTE: Valve “B” is the smaller of the two valves on the master cylinder.
 - Purge tubing between the oil pot and master cylinder by slightly cracking open valve “D”. When hydraulic fluid emerges from open end of tubing, close valve “D”.

INSTALLATION & OPERATIONS

2.3 FILLING THE HYDRAULIC SYSTEM (*Continued*)

- Attach tubing to valve “B”.
- Remove the pipe plug from port “C” and open valve “C” then open valves “A” and “B”.
- Slightly open valve “D”. When fluid flows from port “C” with no air bubbles, close valve “D”.
- Using instrument output, stroke the master cylinder down fully – fluid will come out of valve “C.” Prepare to catch fluid in a pan or tube to a “catch can.” Then, depressurize the instrument output to the diaphragm motor.
- Close valve “A”.
- Slightly open valve “D”. The pressure in the oil pot will force the master cylinder piston up. Close valve “D” securely when the master cylinder piston reaches top of its travel.
- Reopen valve “A”.
- Repeat steps 10 through 13 several times (check oil in oil pot periodically for fluid level).
- Close valve “C” and replace pipe plug in valve “C”. Use PTFE tape or pipe dope to seal the threads.
- Securely close valve “B”.
- Open valve “A” fully. Open valve “D”.
- Close valve “F” securely and vent pressure in the oil pot through the vent valve “E”. The oil pot assembly may be removed if desired. Disconnect tubing from valve “B”.
- Slightly open valve “B” to allow excess oil pressure to escape. This pressure will escape immediately when the valve is opened. Do not allow indicator rod to lower onto the diaphragm case.
- Securely close valve “B”. A pipe plug should be installed into the outlet of valve “B” to ensure against leaks.
- Reattach instrument supply to the top of the motor.

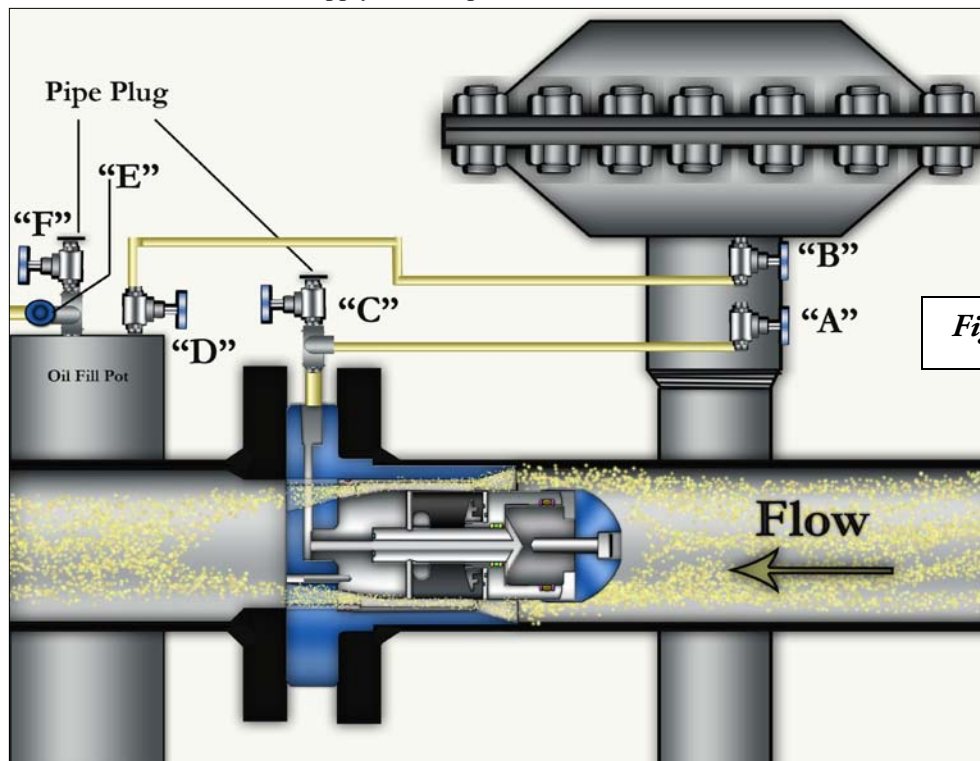


Figure 2

INSTALLATION & OPERATIONS

2.4 PLACING THE WELKER JET VALVE IN SERVICE

1. The procedure for placing the control valve in service involves interruption of the gas flow and fluctuation of downstream pressure. All necessary precautions should be taken before starting. Downstream piping should be protected against overpressuring. The downstream relief should be properly adjusted before the system is brought into service. The door on the pneumatic controller will be open while adjustments are being made. If using gas as the supply pressure, be aware that the controller vents gas into the enclosure.



WARNING

DO NOT SMOKE. KEEP OPEN FLAMES, SPARKS AND ALL SOURCES OF IGNITION AWAY.

Before the system can be placed in service, all sense lines and hydraulic lines must be hooked up. Pressure sensing points should be located well downstream of the control valve and away from reducers, tees, elbows and other sources of turbulence. The hydraulic system should be properly filled.

Adjusting Supply Pressure

2. First- and second-stage regulators are used to regulate the supply to the controller. The first stage should be set at 100 psig. This provides a regulated supply for output relays if needed.
3. The second stage regulator takes the 100 psi and regulates it down to the pressure to be supplied to the controller, up to 30 psi for the 6-30 psi output range controller or 20 psi for the 3-15 psi output range controller
4. Pressure to the controller should be adjusted according to the pressure needed to achieve shut-off of the control valve under maximum expected load conditions. If possible, a test should be made to determine shut-off pressure. This would be done by supplying pressure to the control valve motor, temporarily bringing the line into service and adjusting the pressure to determine where shut-off occurs.
5. To determine the setting of the second-stage regulator, take the pressure required to achieve shut-off and add 3 to 4 psig. If the setting is determined with maximum differential pressure, add only 2 psig.
6. If the pressure required is between 30 psi and 60 psi, a 1:2 amplifying output relay should be used and the second-stage regulator should be set to a pressure determined by taking the initial shut-off pressure, adding 4 and dividing by 2.

INSTALLATION & OPERATIONS

2.4 PLACING THE WELKER JET VALVE IN SERVICE (*Continued*)

With a 1:2 amplifying output relay:

$$\frac{\text{Initial shut-off pressure} + 4}{2} = \text{pressure setting for second stage regulator}$$

EXAMPLE:

$$\frac{32\# \text{ Initial shut-off pressure} + 4}{2} = 18 \text{ psig pressure setting for second-stage regulator}$$

7. If the pressure required is above 60 psi, a 1:3 amplifying output relay should be used and the second stage regulator should be set to a pressure determined by taking the initial shut-off pressure, adding 4 and dividing by 3.

With a 1:3 amplifying output relay:

$$\frac{\text{Initial shut-off pressure} + 4}{3} = \text{pressure setting for second-stage regulator}$$

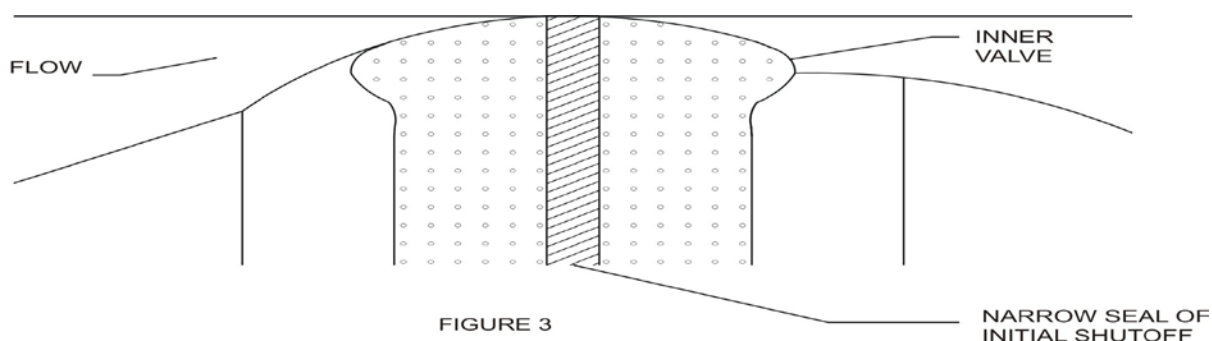
EXAMPLE:

$$\frac{62\# \text{ Initial shut-off pressure} + 4}{3} = 22 \text{ psig pressure setting for second-stage regulator}$$

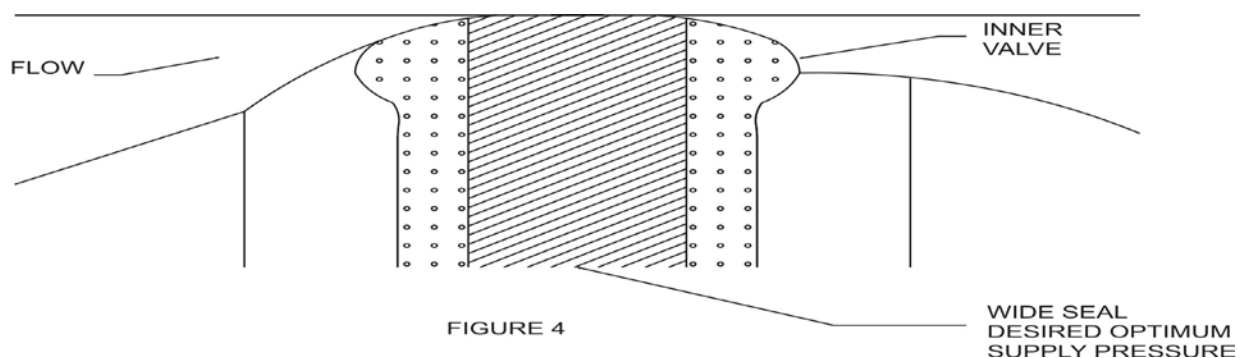
INSTALLATION & OPERATIONS

2.5 SETTING THE CORRECT INSTRUMENT SUPPLY FOR OPERATION

1. Care should be taken when setting instrument supply gas to the controller. It is best not to arbitrarily use a 20 or 30 psi supply because in some cases this might be twice the pressure required for the “wide seal” positive shut-off. Therefore, it will cause higher stresses in the inner valve and hydraulic system than is necessary for operation. The correct method for setting instrument supply is to raise this pressure until there is an initial shut-off with the maximum operating pressure drop. The initial shut-off is a narrow seal as shown below (Figure 3).



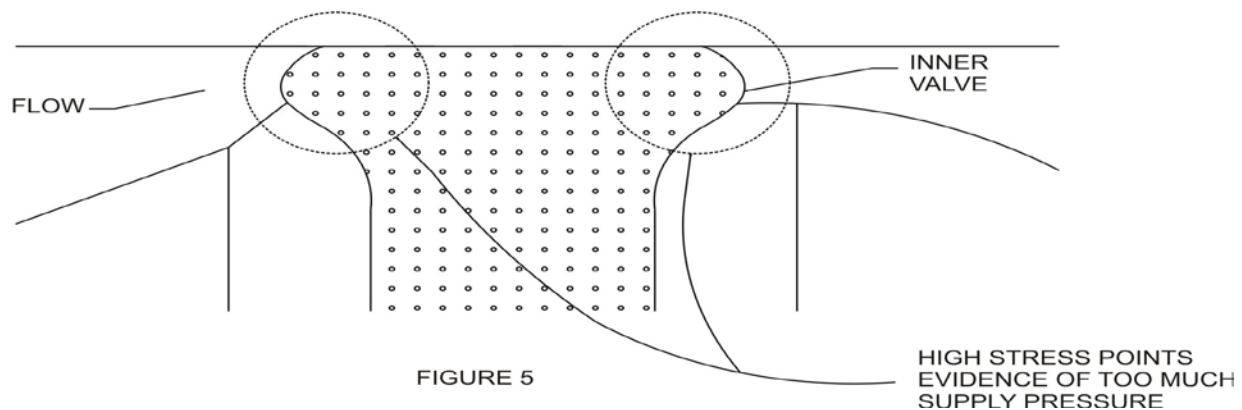
2. The narrow seal (above) does not insure a positive shut-off if the inner valve must seal off around welding slag, etc. Therefore, it is recommended that 3-4 psi be added to the supply pressure so that the inner valve will give a “wide seal” type shut-off, as shown below.



INSTALLATION & OPERATIONS

2.5 SETTING THE CORRECT INSTRUMENT SUPPLY FOR OPERATION (*Continued*)

3. An example is shown below of what happens to the inner valve when considerably more instrument supply is put into the instrument than necessary (for the wide seal).



- It is recommended that each Welker Jet installation be set up with that specific station's pressure conditions in mind.
- In some cases the Welker Jet may be put into service when the pressure drop is less than the maximum expected. An estimated supply should be used that is capable of handling all pressure conditions. It can be adjusted at a later date if necessary.
- 6- and 8-inch Welker Jet instruments could require instrument supplies above 30 psi depending on the pressure drop. In these cases the Amplifying Pressure Relays are used. When using an Amplifying Pressure Relay, adjust your instrument pressures so that you supply the diaphragm motor with only the pressures required to insure a positive shut-off.

Example: If the control valve requires 55 psig (3.79 Barg) to achieve positive shut-off +2 psig (.14 Barg), you will have 29 psig (1.99 Barg) from the output of the controller to a 1:2 Amplifying Relay. Limit the inlet supply to the Amplifying Relay to 57 psig (3.93 Barg) – not the 60 psig (4.13 Barg) that one might expect with a 30 PSI (2.06 Barg) Controller. This will eliminate the possibility of excessive supply pressure on the inner valve.

MAINTENANCE

3. MAINTENANCE

3.1 GENERAL

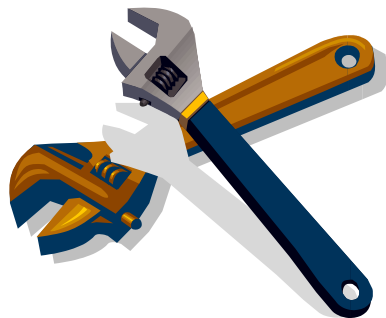
Prior to maintenance or disassembly of the unit, it is advisable to have a repair kit handy for the system in case of unexpected wear or faulty seals. All maintenance and cleaning of the unit should be done on a smooth, clean surface.

N NOTE

We recommend that the unit have annual maintenance under normal operating conditions. In the case of severe service, dirty conditions, excessive cycling usage, or other unique applications that may subject the equipment to unpredictable circumstances, a more frequent maintenance schedule may be appropriate.

Recommended Tools

It would be advisable to have the following tools available for installation of the unit. However, tools used will vary depending on cylinder model and connectors used.



- (2) adjustable wrenches
- Allen® wrench
- 600-grit sandpaper
- Hammer
- 14"-16" adjustable wrench

N NOTE

New seals supplied in spare parts kits are not lubricated. They should be lightly coated with lubrication grease (silicone grease or other) before they are installed into the equipment. This helps in the installation of the seals while reducing the risk of damage when positioning them on the parts. After the seals are installed, some additional lubrication can be applied to shafts or cylinder inner diameters to allow smooth transition of parts.

MAINTENANCE

3.2 WELKER JET CONTROL VALVE INSPECTION & DISASSEMBLY

When inspecting a Welker Jet Control Valve system, both the control valve and the motor should be disassembled.

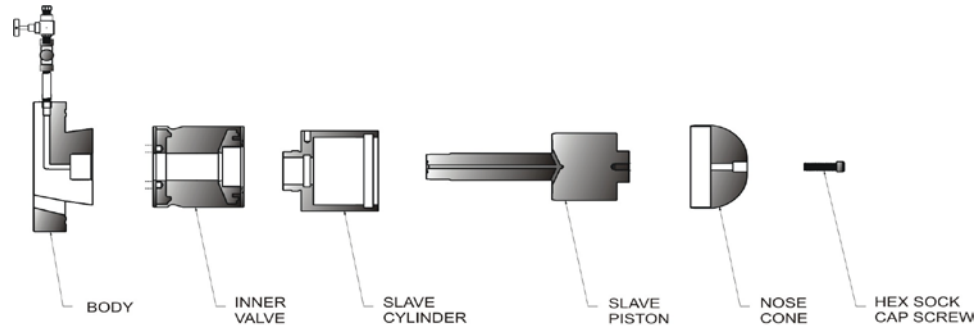


FIGURE 6

1. Isolate and depressurize the piping in that the control valve is installed.
2. Disconnect the instrument air supply from the top of the diaphragm motor and depressurize the control valve hydraulic system.
3. Close the connecting valve on the master cylinder. This is the valve in the line leading from the master cylinder to the control valve body (valve "A" in Figure 1).
4. Disconnect the hydraulic line from the control valve.
5. Remove the control valve from the pipeline. On insert models, the control valve is removed by rolling the inspection spool down or if no inspection spool is used, removing the entire control valve spool.
6. Using an Allen wrench, remove the nose cone. This will expose the upstream face of the slave piston, identifiable by flats to that a wrench can be fitted.
7. With a wrench on the flat, turn the slave piston counterclockwise. The inner valve and slave cylinder should turn with the slave piston. Do not allow the cylinder and inner valve to unscrew from each other. If they will not both turn while unscrewing the slave piston, they should both be held stationary. The 6" and 8" models have holes drilled into the side of the cylinder to assist in holding while turning the slave piston. Completely unscrew the slave piston from the body.
8. Remove the piston from the cylinder. Inspect the piston for wear and smoothness. If any roughness is detected, use 600-grit sandpaper and polish the rough area. Clean the piston before reassembly.

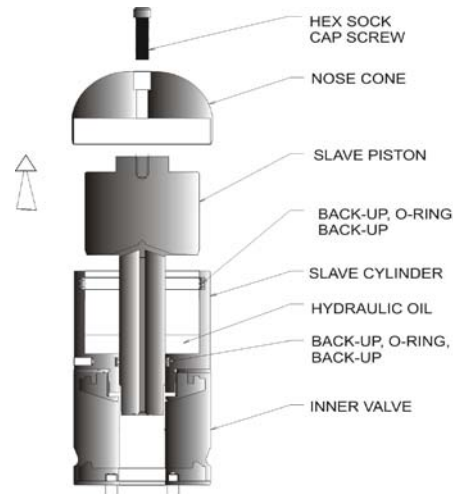


FIGURE 7

MAINTENANCE

3.2 WELKER JET CONTROL VALVE INSPECTION & DISASSEMBLY

(Continued)

9. Inspect the inner valve. If replacement appears necessary, unscrew the inner valve from the slave cylinder and screw the new inner valve along with replacing the spacer rings back onto the cylinder.
10. Inspect O-rings/crown seals and sealing surfaces. O-ring/crown seals and back-up rings are inexpensive parts. For this reason, replacement of these parts is recommended. Care must be taken to place the new O-rings/crown seals and back-up rings in the proper positions. Lubricate the new seals when replacing. Refer to the drawings in the Parts List for a cutaway drawing of the control valve being serviced.

N NOTE

At this point the control valve is completely disassembled. The parts should be kept as clean as possible. Allowing dirt into the control valve could have an adverse effect on the control valve's operation.

3.3 WELKER JET CONTROL VALVE REASSEMBLY

N NOTE

If a new inner valve is used, screw the entire inner valve back onto the slave cylinder. (See #9 Section 3.2.)

1. Lubricate the slave piston and shaft.
2. With the large opening of the slave cylinder facing up, carefully place the smaller threaded diameter of the slave piston into the smaller hole of the slave cylinder until the piston shaft makes contact with the seal in the slave cylinder. You will have to raise the cylinder up off the bench to do this properly. Once the piston shaft has made contact with the slave cylinder seal, push it into the cylinder until the shaft has made full contact with the seal (about one inch). This process is rather easy on the 1", 2" and 4"; it may require a bit of force on the 6" and 8".
3. Simply turn the whole assembly over so the slave cylinder opening is pointing down and tap it evenly until the cylinder slides over the small end of the piston and the seal has made full contact (Figure 9).

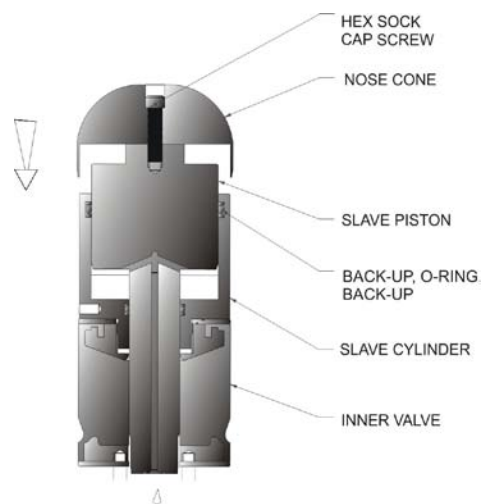


FIGURE 8

MAINTENANCE

3.3 WELKER JET CONTROL VALVE REASSEMBLY (Continued)

4. Before pushing the large end of the piston into the cylinder, hold the assembly in a vertical position and fill the cylinder about one-fourth full of aircraft grade hydraulic oil.
5. While still holding vertically, push the piston into the cylinder until oil starts to run out of the end of the piston shaft and the threaded end of the piston shaft extends past the inner valve. Do not push the piston in all the way.
6. Be certain the proper O-ring or the face seal ring is in position and well lubricated to hold it in position on the end of the slave piston as shown (Figure 9).
7. Fasten the complete assembly into the body by turning the piston clockwise (exact reversal of disassembly). Hydraulic oil may be displaced out of the body as the slave piston is tightened.
8. When the slave system is properly tightened, it should be possible to feel a solid stopping point. Tighten firmly and use a hammer and wrench (if necessary) to ensure that the slave piston is rigidly tightened to the control valve body. Refer to Torque Chart below.
9. Replace the nose cone using the socket head fastener.
10. On flanged models, replace the O-ring seal on the spool flange and secure control valve into control valve spool using the socket head cap screws.
11. Reinstall control valve in pipeline. Use new pipe flange gaskets where needed. Be certain the hydraulic inlet is vertical and the control valve is properly oriented for correct flow direction.
12. Reconnect hydraulic line. Remove pipe plug on the fitting attached to the control valve body and carefully top off the hydraulic system with unused aircraft hydraulic oil. Refer to Filling the Hydraulic System.

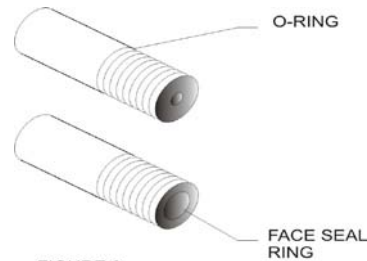


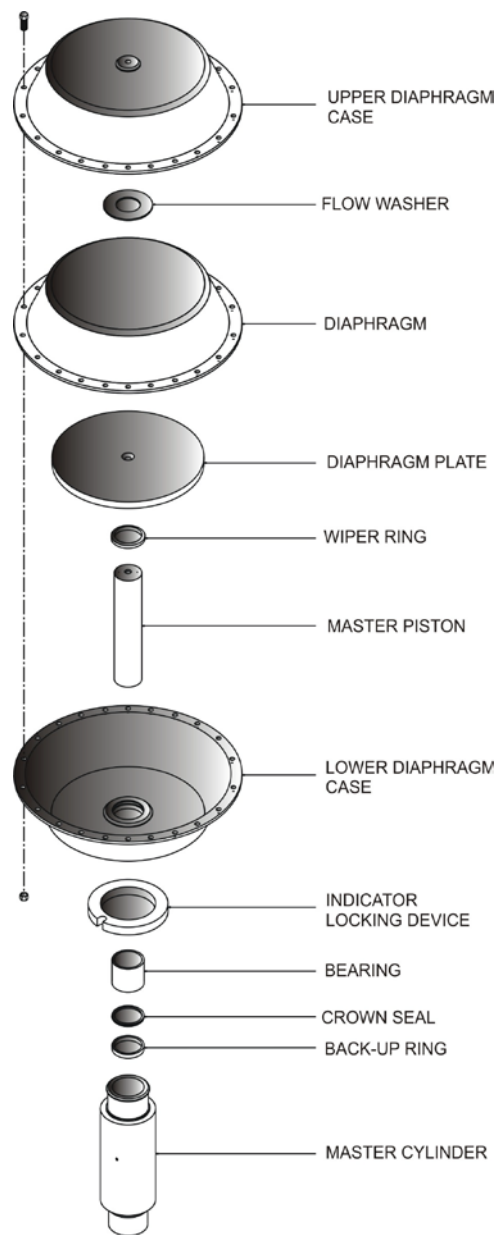
FIGURE 9

Torque Chart		
The torque values for the 1", 2", 4" and 6" WELKER JET instruments		are
as follows:		
1".....	15ft/lbs	
2".....	100ft/lbs	
4".....	150ft/lbs	
6".....	285ft/lbs	
8".....	*	
Additionally, it is recommended that these pistons be impacted with a small hand sledge-hammer as shown below:		
1"	1-pound hammer	2 easy raps on a 8" crescent wrench
2"	3-pound hammer	2 firm raps on a 10" crescent wrench
4"	3-pound hammer	2 firm raps on a 12" crescent wrench
6"	10-pound hammer	3 firm raps on a 18" crescent wrench
8"	10-pound hammer	3 firm raps on a 24" crescent wrench
*This size has no torque specs and will require the impacting after a metal to metal make-up is achieved between the slave piston and regulator body.		

MAINTENANCE

3.4 MOTOR INSPECTION & DISASSEMBLY

1. Disconnect the instrument air supply from the top of the diaphragm motor.
2. Position the raised part of the indicator-locking device on the master cylinder directly under the indicator rod. This is to lock the diaphragm motor in the raised position. For single diaphragm motor units, proceed to step 7.
3. On tandem diaphragm motors, disconnect the instrument air line from the lower diaphragm motor, remove all bolts that hold the two halves of the top motor together and remove the top half and diaphragm of the top motor.
4. Open the bleed valve to relieve any pressure.
5. On tandem diaphragm motors, lift out the diaphragm plate and the connected drive shaft. Inspect the drive shaft for wear and roughness. Use 600-grit sandpaper to polish the rough areas and leave the piston clean. A set of back-up rings and a crown seal in the midsection will be exposed. These should be inspected and replaced if necessary. Care must be taken to place the new crown seal and back-up rings in the proper positions. Refer to the cutaway drawing of the tandem diaphragm motor in the parts list. Also, care should be taken to keep all parts clean.
6. On tandem diaphragm motors, lubricate the master piston with silicone grease and place the diaphragm plate and drive shaft assembly back in proper position. Reattach the diaphragm and top cover and securely bolt the two halves together. Reattach the instrument air supply line to the bottom diaphragm motor.
7. Make sure the connecting valve between the master cylinder and the control valve motor is closed, then firmly grip and unscrew the diaphragm motor assembly from the master cylinder (a back-up on the master cylinder will be required). It may be necessary to remove the pipe plug from the bleed valve and slightly open the valve to relieve the vacuum in the cylinder and allow the piston to be removed. After the motor is removed, close the bleed valve but do not yet replace the pipe plug. Loosen the indicator-locking device, allowing the master piston to drop down. Inspect the master piston for wear and roughness. Use 600-grit sandpaper to polish the rough areas and leave the piston clean.
8. Lift the bearing out of the master cylinder. A solid back-up ring and O-ring or crown seal will be exposed. These should be replaced. Refer to the drawings of control valve motors in the Parts List for the proper placement of the crown seal and back-up. Care should be taken to keep all parts as clean as absolutely possible.
9. After replacing the crown seal and back-up ring, reinsert the bearing and fill the master cylinder slightly below the crown seal with unused aircraft hydraulic oil.



MAINTENANCE

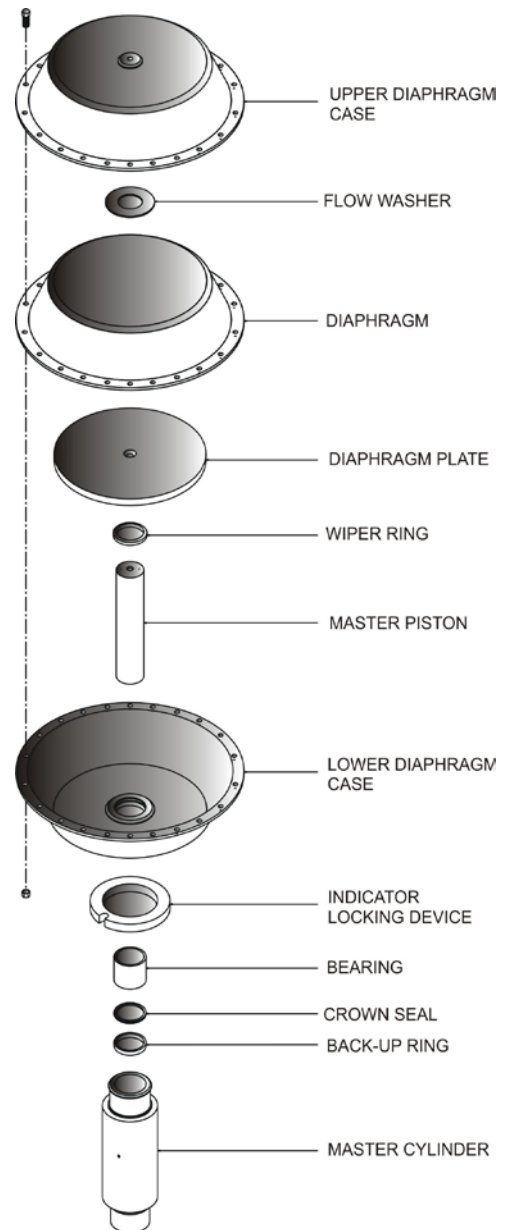
N NOTE

If air has been inadvertently introduced into the hydraulic system, remove the used oil and refer for filling the Hydraulic System.

3.5 MOTOR REASSEMBLY

1. Lubricate the piston with a film of silicone grease and push motor piston back into diaphragm motor. Retighten indicator-locking device. Slowly screw the diaphragm motor assembly down firmly on the master cylinder. Refer to Filling the Hydraulic System.
2. Retighten the diaphragm motor assembly on the master cylinder.
3. Move the indicator locking device out of the way of the indicator rod.
4. Reconnect the instrument air supply to the top of the diaphragm motor.
5. Open the valve on the bottom of the slave system. (See Figure 1 Valve A).

The inspection and reassembly procedure is now complete.





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