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Technical Bulletin

1405F/DF Switching Valve Maintenance
NEW DESIGN 56-011934

Bulletin # TS0062 **Rev 05/2016**

The purpose of this Technical Bulletin is to inform our customers when & why they should service the switching valve in the FDMS TEOMS and how is that performed?

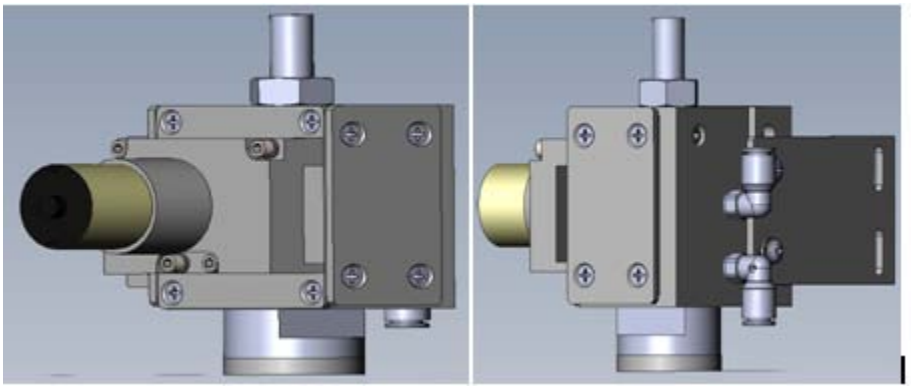
Switching Valve Assembly Primary Function:

• Divert the particulate laden air flow to the chiller assembly during the 'reference' phase of the instrument cycle

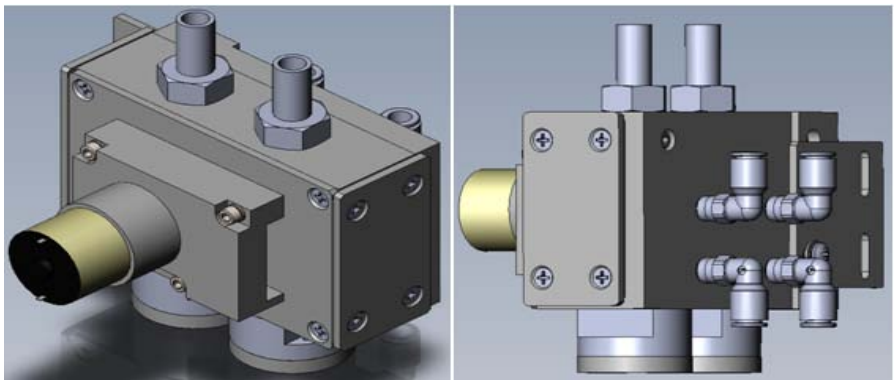
• Allow the particulate laden air flow to pass directly to the sample filter on the TEOM during the 'base' phase of the instrument cycle

Switching Valve Maintenance

1405F: Assy PN: 56-011933(New Design)



1405DF: Assy PN: 56-011934(New Design)



The Switching Valve Maintenance is best performed at the time of the dryer replacement and cooler cleaning process to minimize downtime and to maximize the performance of a complete maintenance schedule.

Parts required per assembly

New Design

	56-011933	56-011934
• 22-008946 V seal	6per unit	12 per unit
• 30-011488 Coupling seal	1 per unit	2 per unit
• 30-011925 Strip Tape: Ports	3 per unit	30-011909 3 per unit
• 30-011911 Strip Tape: Motor	2 per unit	30-011927 2 per unit

Valve Alignment Tool

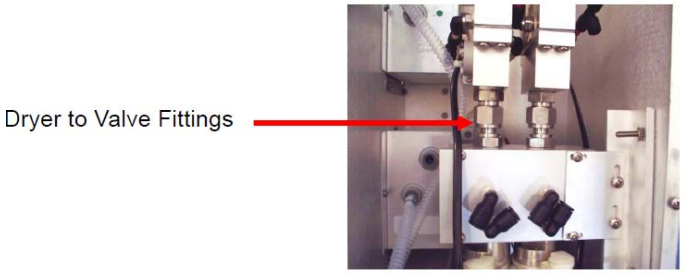
• Spacer 44-011999 Qty: 1

• Clamp 44-012000 Qty: 1 for the 1405F and 2 for the DF

Power unit off and remove front panel from tower

• Disconnect instrument from extended sample lines

• Loosen the fittings at the bottom of the dryer assemblies to the top of the Valve

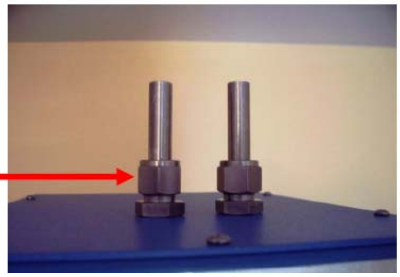


Loosen the fittings at the top of the tower assembly

• Slide the Dryer assemblies off the top of the valve and secure by tightening the tower fittings to hold dryers above the valve.

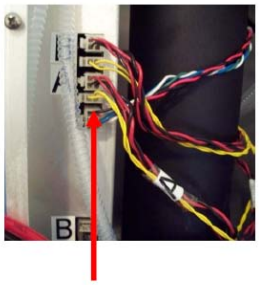
• If you are performing the dryer exchange you may remove the dryers per the dryer replacement instruction.

Tower Fittings

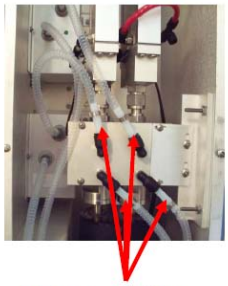


• Disconnect valve power

• Disconnect the valve to chiller tubing from the front of the switching valve Assembly



Valve Power

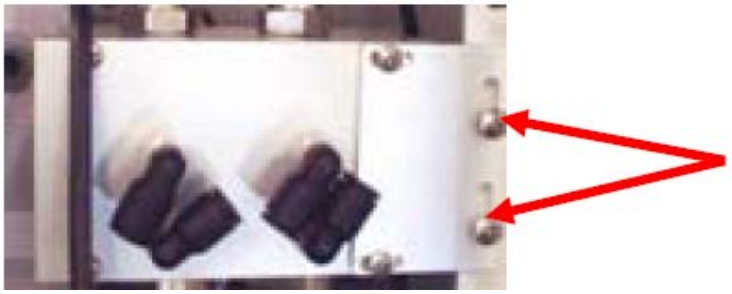


Valve to Chiller Tubing

Valve Front With No Tubing

• Loosen and remove the two screws securing the valve to the tower support bracket.

• Carefully slide valve off the top of the air tube assembly

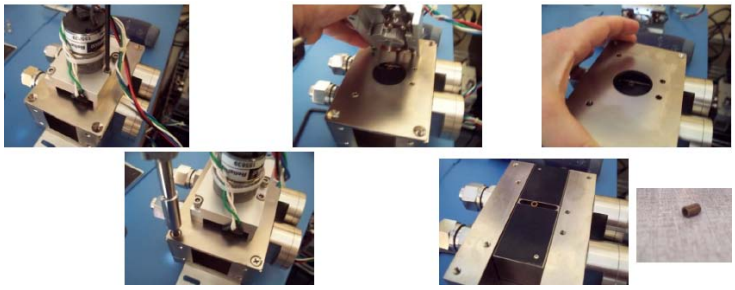


Screws Securing Valve to Tower Bracket

New Switching Valve Maintenance

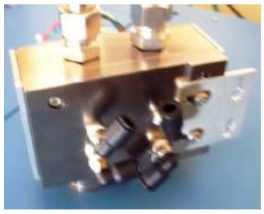
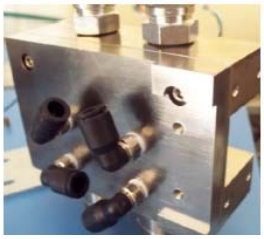
- Remove the left and right cover plates by loosening and removing the four screws.
- Use a thin prying tool to remove the plate from the valve.

- Remove the four hex head screws securing the motor plate to the back of assembly.
- Remove the four screws securing face plate to back of assembly.
- Carefully remove the motor plate from assembly, watch for the shaft bearing.



New Switching Valve Maintenance

- Remove the front bracket plate
- Loosen the top two hex screws holding the top rail to the bottom plate assembly
- Remove the diverter block set aside
- Clean all surfaces with a soft lint free cloth. Mild soap solution can be used for ground in debris. Rinse with de-ionized water


- Remove the old 'V'-seals from the diverter block.
- Carefully wipe the surface of the block with a soft lint free cloth. Do not damage the Teflon coating.
- Clean the openings with a nylon brush or soft lint free cloth

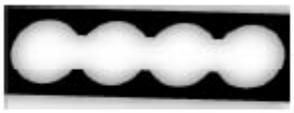
1405DF


Top


Front


Bottom

- Examine the Strip Tapes for wear or damage and replace as needed.
- Do not remove with abrasive tool or damage the metal surface.

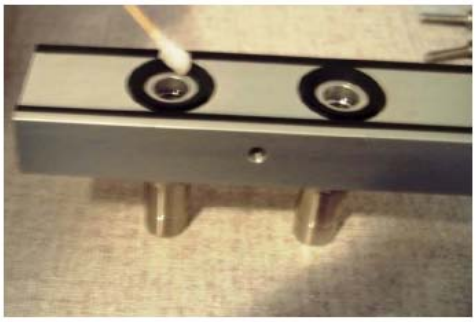


Switching Valve Maintenance

Apply grease to V-seals and O-rings and install

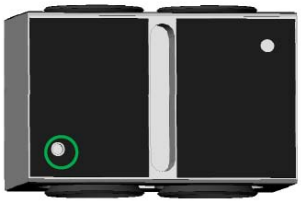
- Using an applicator (cotton swab, finger, etc.) apply a THIN film of silicone grease to the replacement V-seals and O-rings.
- Install the new V-seals and O-rings and slide the Bronze bushing back on the motor cam post.

- When installing new 'V' seals be certain the 'V' portion of the seal is upwards and the flat back is inserted into the block groove



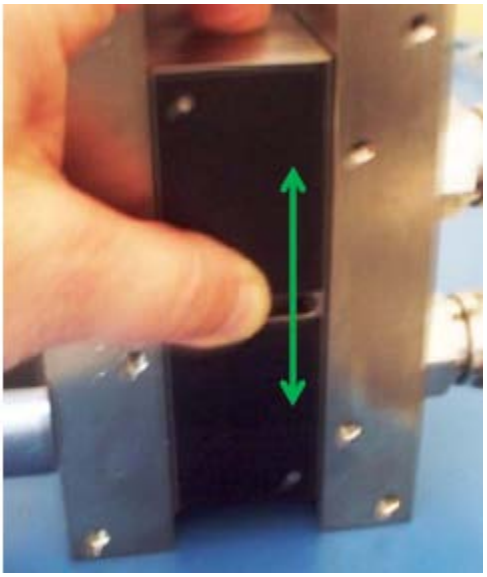
• Place diverter block on bottom rail assembly; top side of the diverter block upward. The bearing slot should face the rear. Recessed dot should be in lower left corner of assembly.

• Place top rail on top of diverter block and secure with two hex screws to front facing



• Check the glide of the diverter block by sliding it inside the body without extending past the ends.

• The movement should be smooth without any jumps; check for fold in a seal or debris if not smooth.

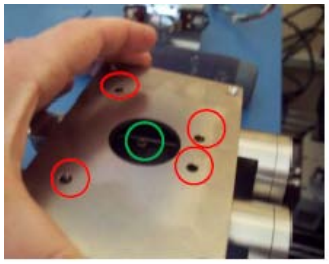


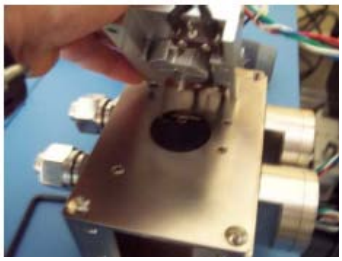
• Rest assembly on front and place the back face plate over assembly secure with four screws removed in disassembly step. Be sure the motor plate holes are properly aligned ‘Red’ circles.

• Place the shaft bearing in the back of the diverter block slot ‘Green’ circle.

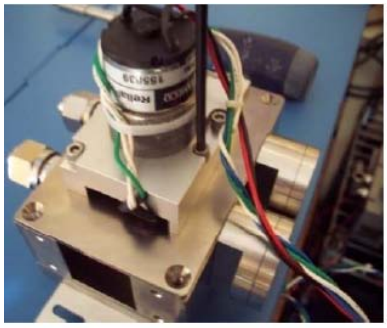
• The motor plate assembly can only fit one way, align the shaft to the bearing and if necessary slide the diverter block in the direction needed

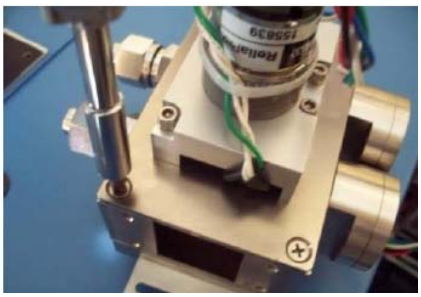
to align mounting holes. Secure with hex screws removed in disassembly.





• Recheck all screws to ensure properly tightened.

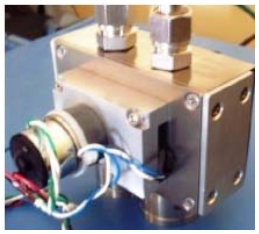




• Check the diverter alignment for base and reference by peering down the top ports of the assembly. Flush to the 'right' is base and flush to the 'left' is reference.

• Replace the left and right covers on valve. Keeps debris out of the track where the diverter block glides; important to replace for expected performance of valve.





•Remove three screws holding top half of coupling fitting to bottom

•Place new seal into fitting with bevel facing outward, flat side down.

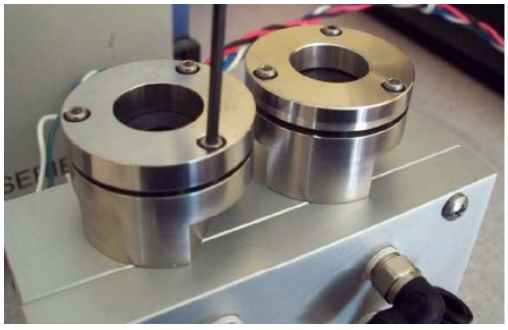





Bottom side Top side

• Center the top coupler fitting over the new seal

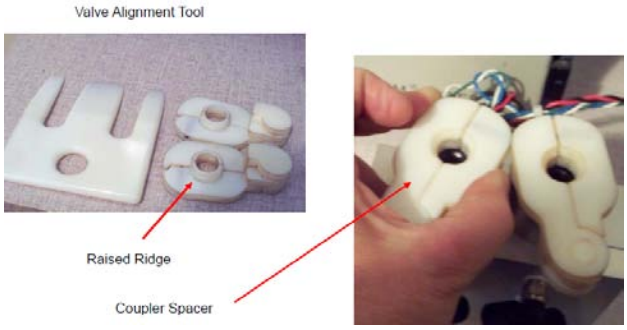
• Insert three screws and tighten evenly in a crossing pattern until top coupler fitting is flush to base




• Apply a small amount of grease to the inside edge of the coupler seal with a swab. This will facilitate the installation in the coming steps.

• Installing the valve in the unit is best performed with a ‘new’ alignment tool

• Install the coupler alignment spacers onto the coupler fittings with the raise ridge inserted into the coupler



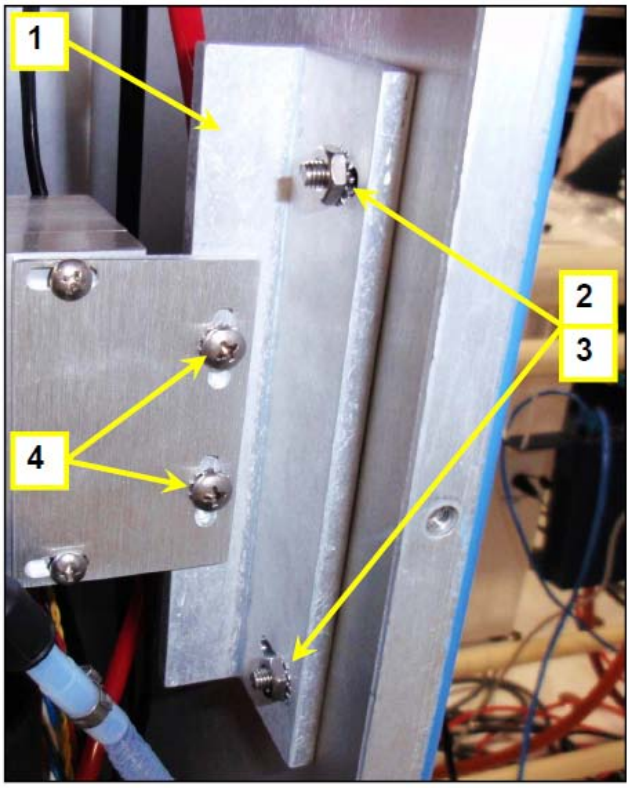
• Center the coupler spacers over the top of the air tubes

• Slide the valve evenly onto the air tube slowly and insert the valve assembly spacer between the coupler spacers and the top of the air tube weldment

• Allow the valve to rest on top of the weldment and spacers

FIND	PART NO.	DESCRIPTION	QTY
1	36-011492	BRACKET	1
2	21-003727 -0010	SCREW, 10-32 x 5/8 PHIL PAN	2
3	21-004545	NUT, #10 KEP	2
4	21-005035 -0008	SCREW, 10-32 x 1/2 SEMS	2

INSTALL HARDWARE FINGER-TIGHT.



- Loosen the top tower fitting and gently slide the dryer assembly down and onto the valve adapter tube
- Tighten the fittings between the valve and dryer assembly 1-1/4 turns past finger tight
- Tighten the top tower fittings ½ turn past finger tight
- Check the tightness of the fitting at the top of the dryer assembly
- After the dryers and valve are secure remove the valve assembly spacer
- Do not remove the coupler spacers yet. This will provide stability until the valve is secured to the tower bracket. • Loosen the top tower fitting and gently slide the dryer assembly down and onto the valve adapter tube
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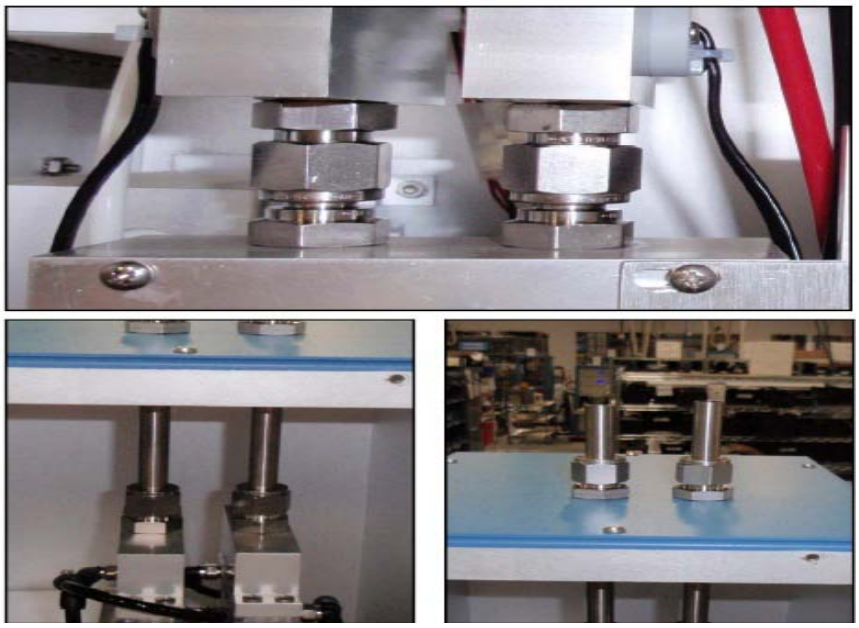

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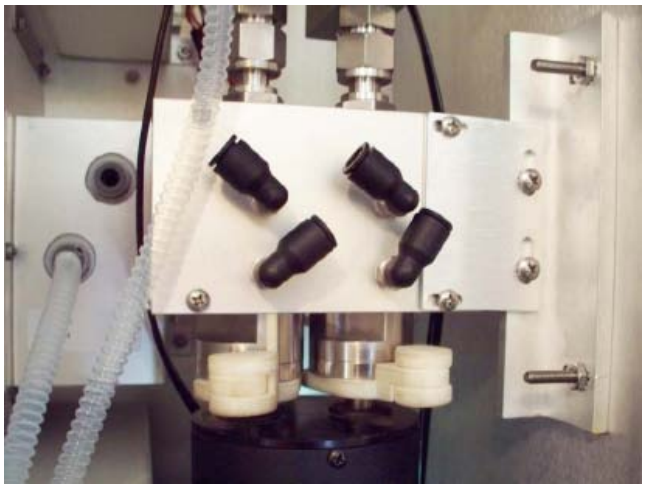
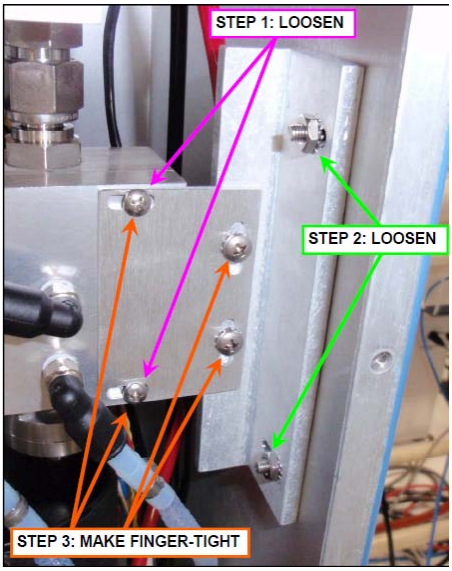


NOTE: FOLLOW THIS TIGHTENING SEQUENCE CAREFULLY.

STEP 1: LOOSEN THE TWO SCREWSON THE VALVE ASSY (Violet).

STEP 2: MAKE SURE THE TWO ENCLOSURE SCREWS (Green) ARE LOOSEN QUITE LOOSE AND THE BRACKET CAN SLIDE BACK AND FORTH.

STEP 3: SLIDETHE VALVE PLATE START THE TWO SCREWS SECURING THE VALVE PLATE TO THE TOWERBRACKET.WITHOUT MOVING THE VALVE, MAKE THE FOUR FRONT SCREWS (Orange) FINGER-TIGHT.

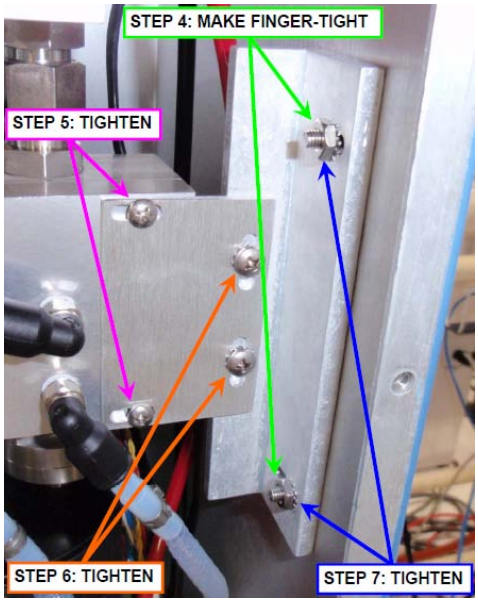


STEP 4: MAKE THE TWO ENCLOSURE SCREWS FINGERTIGHT (Green).

STEP 5: TIGHTEN THE TWO VALVE SCREWS (Violet).

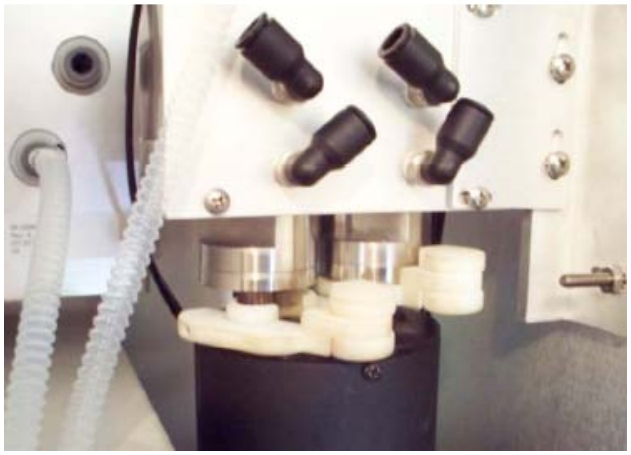
STEP 6: TIGHTEN THE PLATE TO BRACKET SCREWS (Orange).

STEP 7: FINALLY, TIGHTEN THE TWO ENCLOSURE SCREWS (Blue)

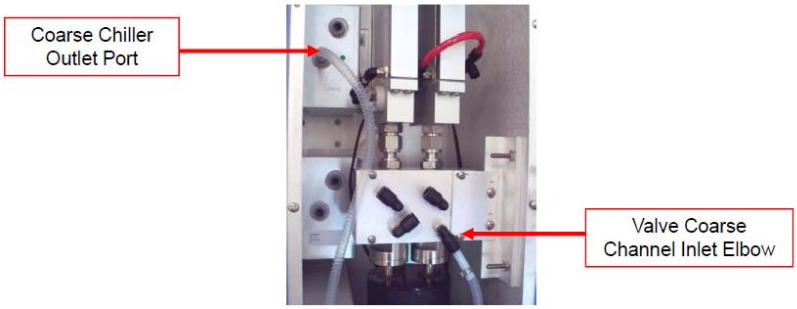


• Remove the coupler spacers by squeezing in and pulling down away from coupler.

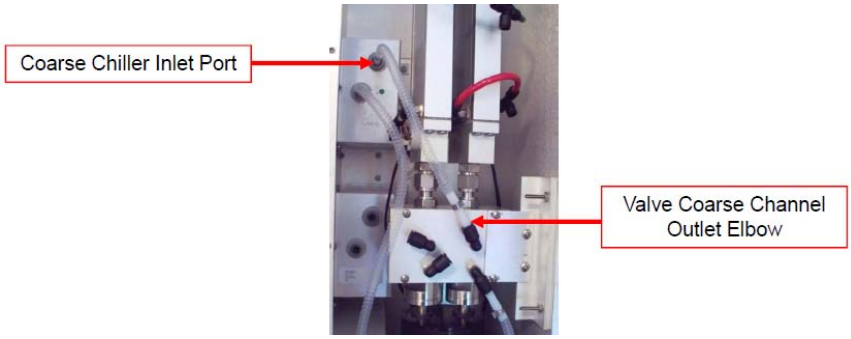
• Swivel one leg of the coupler spacing to allow removal past the air tube.



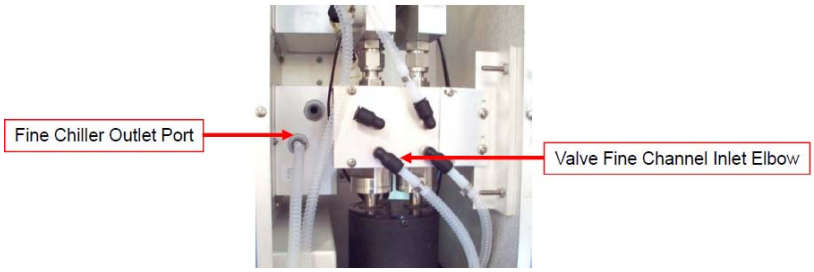
• Connect the Coarse Chiller tube from the Outlet Port of the chiller to the Coarse Channel Inlet Elbow fitting on the valve with the 48 inch long convoluted tube. Be sure to push the end on the tubing into the fitting until you feel it hit the shoulder of the inside portion of the connector.



• Connect the Coarse Chiller tube from the Inlet Port of the chiller to the Coarse Channel Outlet Elbow fitting on the valve with the 10 inch long convoluted tube. Be sure to push the end on the tubing into the fitting until you feel it hit the shoulder of the inside portion of the connector.



• Connect the Fine Chiller tube from the Outlet Port of the chiller to the Fine Channel Inlet Elbow fitting on the valve with the 48 inch long convoluted tube. Be sure to push the end on the tubing into the fitting until you feel it hit the shoulder of the inside portion of the connector.



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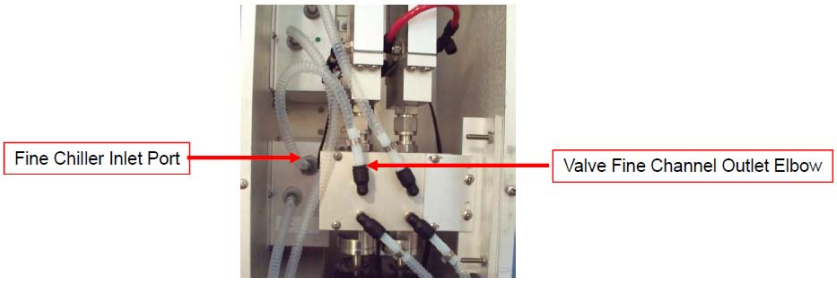

• The Switching Valve Maintenance is complete, prior to putting unit back into operation a leak check of the complete system should be performed to ensure all connections and valve are leak free.