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DOUBLE 1 ¼" BALL VALVE ASSEMBLY & OPERATION INSTRUCTIONS

REFERENCED DOCUMENTS:

This assembly and operation instruction set will reference two drawings, which should be found attached to this document. The first reference document is "Double Ball Valve Color Cross Sectional Line Drawing" (with major component/parts list) for the complete double ball valve assembly. Note that this line drawing contains the conventional ASTI 9X31 & 9X41 series valve retractable sensor inside the ball valve. The second reference document is the "SAFETY HOT TAP MODEL 6142 / 6342 / 6442 ASSY". This is the new generation sensor assembly that is inserted through the double ball valve assembly. The assembly is capable of holding any 6X12, 6X32 or 6X42 sensor. Please see the pertinent specification sheets for exact sensor dimensions. This sensor assembly may also be used for insertion through a single ball valve assembly to gain the benefit of lower replacement sensor cost.

DEFINITIONS, REFERENCED COMPONENTS AND SUBASSEMBLY DESCRIPTIONS:

1. **Traditional Valve Retractable Sensor Assembly**: Model 9X31 & 9X41 1.0" O.D. Valve Retractable Sensor with Front end Blowout Protection (oversized lip to catch against 1.0" compression fitting assembly). Standard Length is 17.75 inches with extension available in 6 & 12 inch increments. A Traditional Valve Retractable Sensor with six inch extension is shown on the "Double Ball Valve Color Cross Sectional Line Drawing". The ½" MNPT X 1 ½" SS Nipple machined for safety harness (Item #6 from the "Double Ball Valve Color Cross Sectional Line Drawing") is attached to rear portion of the traditional valve retractable sensor (Models 9X31 & 9X41).

CAUTION: Sensors may not be used beyond the pH, Temperature and Pressure ratings indicated on the 9X31 & 9X41 ASTI Sensor Specification Sheets. ASTI makes no guarantees of system performance beyond the indicated specifications. The specifications given for the Sensors may supersede the specifications for the Double Ball Valve Assembly. ASTI will only warranty mechanical and operation if any Sensor other than ASTI Sensors is used.

2. **SAFETY HOT TAP 6142 / 6342 / 6442 ASSY**: This is a "SAFETY HOT TAP Sensor Assembly" which is composed of two components: 1) an insertion pipe with sensor holder, & blowout protection harness and 2) a model 6X12, 6X32 or 6X42 sensor which is threaded into component #1. The sensor (component #2) is secured into the pipe insertion and sensor holder assembly (component #1) by pulling the cable through the center of the pipe and fastening the sensor into the threaded sensor holder with Teflon tape or a suitable non-galvanizing sealant. The blowout protection/safety harness must still be installed into component #1 and properly attached to the appropriate ball valve before this sensor assembly can be used.

CAUTION: Sensors may not be used beyond the pH, Temperature and Pressure ratings indicated on the 6X12, 6X32 & 6X42 ASTI Sensor Specification Sheets. ASTI makes no guarantees of system performance beyond the indicated specifications. The specifications given for the Sensors may supersede the specifications for the Double Ball Valve Assembly. ASTI will only warranty mechanical and operation if any Sensor other than ASTI Sensors is used.

3. **Wire Rope Safety/Blowout Protection Harness**: This item is used on both the single and double ball valve assembly. The safety/blowout protection harness can also be used on either the Traditional Valve Retractable Sensors or the HOT TAP Sensor Assembly. The wire rope safety harness is threaded through item # 6 on the "Double Ball Valve Color Cross Sectional Line Drawing", and then the two loops are placed under the handle of Ball Valve # 2 (on the Double Ball Valve Assembly). When using the "SAFETY HOT TAP Sensor Assembly" the wire rope safety harness is threaded into the hole on the back side of the insertion pipe and then double looped for added security.

4. **Reducer/Compression Fitting Assembly:** This assembly is used for both the single and double ball valve assembly. This is only portion of any ball valve assembly that is intended to be removed during ordinary servicing of the ball valve assembly and removal/insertion of the sensor. Please reference Item # 4 & # 5 on the "Double Ball Valve Color Cross Sectional Line Drawing". These two items together constitute the Reducer/Compression Fitting Assembly. These two units should never be separated unless for cleaning purposes. The SS Tube Union at the end of Ball Valve #2 has been modified internally to accept a size 214 O-Ring (Item #5). The O-Ring is a wiper, intended to help contain process fluid when the tubing union nut is loosened so

as to allow the sensor to be withdrawn from the process. The tube union is the only part of this assembly that is designed to be removed during servicing of the sensor. It should always be re-installed with either Teflon Thread Tape or other non-galling compound. This O-Ring will need to be lubricated intermittently to ensure proper operation. There is also a pair of Teflon ferrules which are used to lock down and immobilize either the Traditional Valve Retractable Sensor or the SAFETY HOT TAP Sensor Assembly.

5. **1 ¼" Full Port Double Ball Valve Assembly:** Please refer to the "Double Ball Valve Color Cross Sectional Line Drawing" for a complete component listing of the Double Ball Valve Assembly and the Items which referenced in this definition. There are two Item # 3 components found in the Double Ball Valve Assembly (the full port ball valves). The Item # 3 (Full Port 316 SS Ball Valve with Teflon Seats) which is closest to item # 8 (1 ¼" X 2" SS Nipple) shall be referred to as Ball Valve #1. This is the ball valve closest to the process line. Item # 3 which is closest to Items # 4 & # 5 (jointly referred to as the reducer/compression fitting assembly) shall be called Ball Valve # 2. The Item # 8 (1 ¼" MNPT X 2" SS Nipple) shall be call the "Process Nipple Connection". The Item # 2, #9 & # 10 (1 ¼" MNPT X 4" SS Nipple, Weld-O-Let Fitting with Vent Valve) shall jointly be referred to as the "Connecting Nipple for Ball Valves with Purge/Vent Valve Assembly". This Assembly has multiple purposes, which will be discussed in the instruction set below including, pressure bleeding/relief to aid the removal of valve retractable sensor or SAFETY HOT TAP Sensor Assembly. In addition, this assembly can be used to purge the ball valve (when in the closed position) to clean any build up or residue from the process with chemicals or steam. Finally, this "Connecting Nipple for Ball Valves with Purge/Vent Valve Assembly" can be used to store a sensor for a prolonged period of time as may be required for shut-down or period purging of the lines with vacuum, solvents or steam.

VALVE INSTALLATION INTO PROCESS:

IT IS RECOMMENDED THAT WHENEVER POSSIBLE, THE DOUBLE BALL VALVE ASSEMBLY IS INSTALLED AT AN ANGLE OF 30 TO 90 DEGREES WITH RESPECT TO THE HORIZONTAL. IF ASSEMBLY IS INSTALLED WITH AN ANGLE OF LESS THAN 30 DEGREES TO THE HORIZONTAL, A POSITION INSENSITIVE SENSOR MUST BE PURCHASED (SPECIAL ORDER ITEM).

Make sure that Ball Valve # 1, Ball Valve # 2 and the Vent Valve are all in the fully closed position before installing the Double Ball Valve Assembly into the process. The Double Ball Valve assembly will be threaded into a 1 ¼" FNPT process port. The application of a good thread sealant, or Teflon tape, to the 1-1/4" nipple threads (Item # 8) is required. At this time, of course, the process will be shut down. Note that the "Latch Lock" handle allows use of a padlock or other security device to insure process security. At this point, the Double Ball Valve assembly becomes a permanent part of the process piping/equipment.

INSTALLATION OF SENSOR INTO PROCESS:

1. Check that either the "Traditional Valve Retractable Sensor Assembly" or the "SAFETY HOT TAP Sensor Assembly" has been assembled per the description given in the previous section (depending upon which assembly is to used for a given process line). This unit is now ready to have the "Reducer Compression Fitting Assembly" installed onto it. Make sure that the O-Ring in the Reducer/Compression Fitting Assembly has been properly lubricated or it may be cut during installation. The Reducer/Compression Fitting Assembly must be slid onto either the "Traditional Valve Retractable Sensor Assembly" or the "SAFETY HOT TAP Sensor Assembly" from back to front, ensuring that the Reducer (Item # 4) is facing the front of the sensor. The Reducer/Compression Fitting Assembly should be approximately two inches from the front of the sensor (or welded sensor holder). The tubing nut (Item #5) should be tightened until the sensor cannot move easily across the O-Ring (Item # 7). Double check that the safety/blowout protection harness is installed on either the "Traditional Valve Retractable Sensor Assembly" or the "SAFETY HOT TAP Sensor Assembly" as described in the previous sections.

2. Open Ball Valve # 2 and the Vent Valve (Item # 10). After there is no noticeable change in pressure, close the Vent Valve. Ball Valve # 1 should still be closed at this time. Thread the Reducer/Compression Fitting Assembly (now locked onto the outside of the sensor) into Ball Valve #2. The use of Teflon tape or a non-galling sealant is required. The reducer should be hand tightened plus ½ to ¾ turns with a wrench. Slowly slide the Sensor through the Compression Fitting Assembly until it is past Ball Valve # 2. The tubing nut (Item #5) should now be tightened until the sensor can barely be pushed across the O-Ring. Before starting to push the sensor further into the assembly, move the handle of the #2 Ball Valve slightly toward the closed position, just enough to

allow the loops of the safety bridle to slip under the tip of the valve handle stop. Once the bridle is secured, move the handle back to the full open position.

CAUTION: Whenever possible it is recommended that process pressure be reduced or shut down when installing or removing sensors.

3. Double check that the safety harness is secure. Open Ball Valve #1 slightly, just enough to allow the process pressure to very gradually enter the valve body. Maintaining a firm grip on the sensor body at all times; the sensor must be pushed through and into the process soon as the valve is fully open. It may be necessary to loosen the tube nut slightly to allow the sensor to slide through the valve. Once the sensor is positioned in the process (sensor tip is completely submersed into process solution), the tubing nut should be re-tightened hand tight plus ½ to ¾ turns with a wrench. REMEMBER that you are in effect pushing a piston into a pressurized container. The internal pressure will try to push the piston out. This is the reason we again caution that it is desirable whenever possible to reduce or shut down process pressure for the very short time required to service the sensor.

REMOVAL OF THE SENSOR FOR SERVICE

If the system is under pressure, connect a piece of tubing to the vent valve and direct the potential discharge to a safe place. Double check that the safety harness is secure. Open the vent valve slightly to bleed excess pressure. Loosen the Tubing Union Nut (Item #5) at the end of Ball Valve #2 while maintaining a firm grip on the sensor body until the sensor can be moved with force across the internal O-Ring (Item #7). DO NOT STAND DIRECTLY BEHIND THE SENSOR ASSEMBLY. Slowly pull the sensor from the process until it is possible to close Ball Valve #1. Closing Ball Valve #1 isolates the entire assembly and the sensor from process pressure. At this point, close the Vent Valve and unthread the reducer/compression fitting assembly. The sensor can now be cleaned and/or calibrated. If the operator wishes to do so, the sensor assembly can be completely disassembled at this point if a new sensor must be installed. Remember to disconnect the safety harness from the old sensor assembly. If the sensor will be removed for a prolonged period of time, it is recommended that Ball Valve # 2 also be closed for added safety.

STORAGE OF SENSOR IN CONNECTING NIPPLE FOR BALL VALVES W/ PURGE/VENT ASSEMBLY

IF ASSEMBLY IS INSTALLED WITH AN ANGLE OF LESS THAN 30 DEGREES TO THE HORIZONTAL, SENSOR CANOT BE STORED IN CONNECTING NIPPLE. ONCE AGAIN, IT IS RECOMMENDED THAT WHENEVER POSSIBLE, THE DOUBLE BALL VALVE ASSEMBLY IS INSTALLED AT AN ANGLE OF 30 TO 90 DEGREES WITH RESPECT TO THE HORIZONTAL

1. It may be necessary to store the sensor during plant shut down or during intermittent flashing, solvent or high temperature cleaning of process lines. First complete all procedures in the *REMOVAL OF THE SENSOR FOR SERVICE* portion of instruction set before proceeding to store the sensor in the nipple. Add a solution composed of pH 4 buffer diluted 1:1 with tap water. Add this solution so that it fills the nipple connecting Ball Valve #1 & # 2 but does not overflow into Ball Valve # 2. Allow a small amount of the solution to bleed out of the vent valve and then close this valve. Close the Vent Valve. Ensure that there is ample room for the sensor to be installed into the conditioning solution without overflowing into Ball Valve #2.

2. Check that either the “Traditional Valve Retractable Sensor Assembly” or the “SAFETY HOT TAP Sensor Assembly” has been assembled per the description given in the previous section (depending upon which assembly is to BE used for a given process line). This unit is now ready to have the “Reducer Compression Fitting Assembly” installed onto it. Make sure that the O-Ring in the Reducer/Compression Fitting Assembly has been properly lubricated or it may be cut during installation. The Reducer/Compression Fitting Assembly must be slid onto either the “Traditional Valve Retractable Sensor Assembly” or the “SAFETY HOT TAP Sensor Assembly” from back to front, ensuring that the Reducer (Item # 4) is facing the front of the sensor. The Reducer/Compression Fitting Assembly should be approximately two inches from the front of the sensor (or welded sensor holder). The tubing nut (Item #5) should be tightened until the sensor cannot move easily across the O-Ring (Item # 7). Double check that the safety/blowout protection harness is installed on either the “Traditional Valve Retractable Sensor Assembly” or the “SAFETY HOT TAP Sensor Assembly” as described in the previous sections.

3. Ball Valve # 1 should still be closed at this time. Thread the Reducer/Compression Fitting Assembly (now locked onto the outside of the sensor) into Ball Valve #2. The use of Teflon tape or a non-galling sealant is required. The reducer should be hand tight plus ½ to ¾ turns with a wrench. Slightly open the Vent Valve. Slowly slide the Sensor through the Compression Fitting Assembly until it is past Ball Valve # 2 and fully immersed into the conditioning solution. Some conditioning solution should overflow through the Vent Valve. Close the Vent Valve. The tubing nut (Item #5) should now be tightened until the sensor can be barely be pushed across the O-Ring. Move the handle of the #2 Ball Valve slightly toward closed, just enough to allow the loops of the safety bridle to slip under the tip of the valve handle stop. Once the bridle is secured, move the handle back to the full open position. The tubing nut (on Item # 5) should be re-tightened hand tight plus ½ to ¾ turns with a wrench. The sensor may now be stored for a prolonged period of time inside the Ball Valve Assembly and installed back into the process per instructions given in *INSTALLATION OF SENSOR INTO PROCESS*. Remember to bleed out all condition solution before proceeding to install, calibrate or replace the sensor.