

Valtek ChannelStream Control Valves

GENERAL INSTRUCTIONS

The following instructions are designed to assist in the disassembly, reassembly and troubleshooting of ChannelStream® valves. Product users and maintenance personnel should thoroughly review this bulletin in conjunction with Installation, Operation, Maintenance Instructions 1 (Mark One and Mark Two Control Valves) before installing, operating or performing any maintenance on the valve.

To avoid possible injury to personnel or damage to valve parts, WARNING and CAUTION notes must be strictly followed. Modifying this product, substituting nonfactory parts, or inferior parts or using maintenance procedures other than outlined could drastically affect performance and be hazardous to personnel and equipment.

This publication does not contain information on installing, maintaining, troubleshooting, calibrating and operating Valtek® positioners. Refer to the appropriate Flowserve Installation, Operation, Maintenance Instructions when this information is required.

ChannelStream trim is designed to eliminate cavitation and to reduce hydrodynamic noise in automatic control valves through staged pressure reduction and high frictional losses. Both unbalanced and pressure-balanced designs are available.

Installation

Standard unpacking and installation instructions are outlined in Installation, Operation, Maintenance Instructions 1. Regardless of the air-action, it is imperative that valves equipped with ChannelStream trim be **installed in the line with the flow direction over the plug. It is also strongly suggested that during start-up, a strainer be placed in line before the valve to catch debris prior to it reaching the ChannelStream.**

CAUTION: Improper installation will result in excessive cavitation, noise and galling or sticking of the

plug (if installed in dirty service conditions), causing possible damage to valve parts or injury to personnel.

DISASSEMBLY AND REASSEMBLY

Disassembly of Unbalanced ChannelStream

Refer to Figure 1 and proceed as follows:

WARNING: Depressurize line to atmospheric pressure and drain all fluids before working on the valve. Failure to do so can cause serious injury.

1. Fully retract plug until the stem clamp indicator is pointing to the open position of actuator stroke plate.
2. Remove the bonnet flange bolting and lift the actuator, bonnet and plug assembly out of the valve body. Remove the bonnet gasket.

CAUTION: A hoist may be necessary for large actuators (size 50 and larger). Care must be taken to lift the actuator and plug straight out of the valve body. Any scraping of parts while removing the actuator may damage valve parts. Lift the actuator by using lifting straps around the yoke legs.

3. With the actuator, bonnet and plug removed, the cartridge can be lifted out of the valve body. In larger sizes, the cartridge may be too heavy to lift without a hoist. Therefore, tapped holes are machined into the top of the cartridge for installation of lifting rings.
4. Remove the seat ring and seat ring gasket.
5. The cartridge may now be cleaned according to established industry methods. If a degreasing solvent is used, make sure it will not dissolve metal and increase clearances between stages. Contact factory if uncertain about which methods to use with a particular ChannelStream cartridge and application.

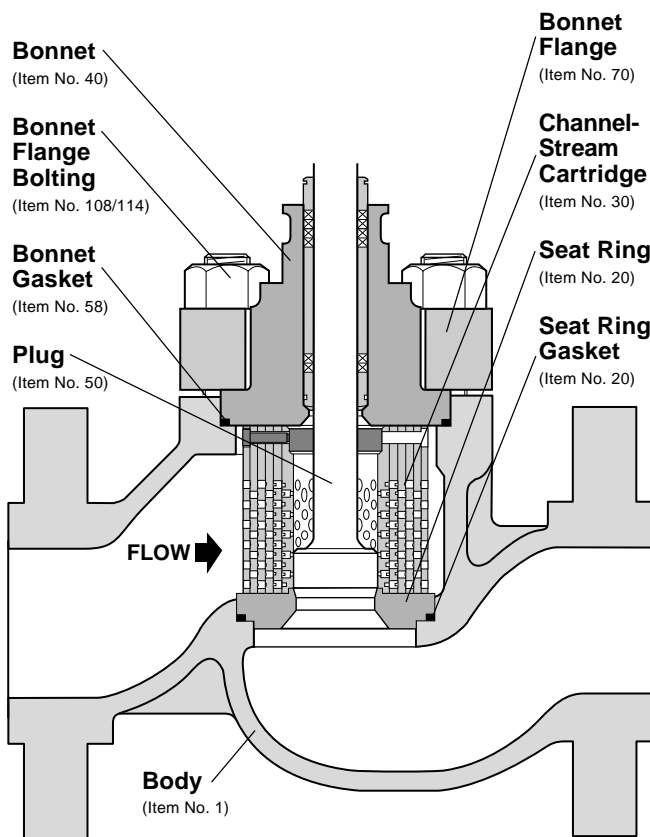


Figure 1: Unbalanced Trim

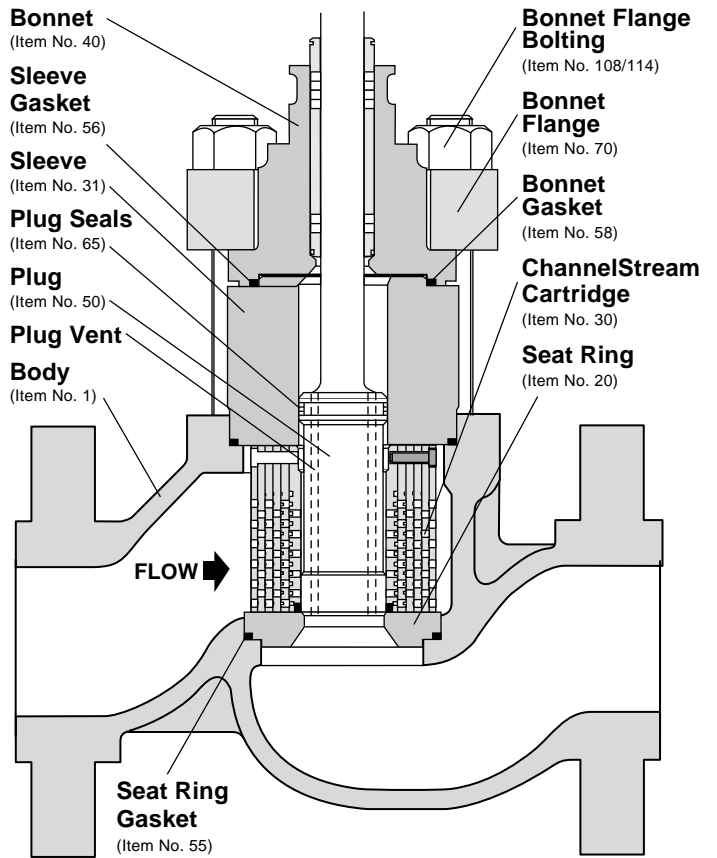


Figure 2: Pressure-balanced Trim

NOTE: Item numbers refer to the valve's bill of material. Refer to it for specific part numbers.

NOTE: If cartridge must be disassembled to clean individual channels and expansion holes, carefully grind away the small bead welds located near the top of the cartridge. This will loosen pins located in counter-drilled holes. The pins can now be removed and the stages separated.

WARNING: To avoid personal injury, use eye and face protection when grinding or using solvents.

Reassembly of Unbalanced ChannelStream

Refer to Figure 1 and proceed as follows:

1. If the cartridge has been disassembled for cleaning, realign vent holes at the top of retainer and replace pins. Pins should be placed 180 degrees from each other and tack welded using a 1/8-inch bead weld to retain the pin.

Caution: Do not weld any more than the approved 1/2 inch. Excessive heat from bead welds that are too large can disturb critical plug / cartridge tolerances. Use an appropriate weld rod which is compatible with the cartridge material (if uncertain, contact factory).

2. Install a new seat ring gasket and reinstall seat ring.
NOTE: Bonnet and seat ring gaskets should be replaced every time the valve is disassembled.

3. Install the cleaned cartridge, making sure the end with pins is at the top (toward the bonnet). Visually position the cartridge concentric with seat ring bore.

4. Install a new bonnet gasket.

5. Fully retract plug (stem clamp indicator pointing to the open position) and lower actuator, bonnet and plug squarely into body and cartridge.

WARNING: Failure to return plug to mid-stroke position on mechanical / hydraulic actuators will cause damage to actuator and / or valve during bonnet tightening sequence. This is due to the inability of most mechanical / hydraulic actuators to accommodate the 1/16-inch back-driving during tightening sequence.

CAUTION: The bonnet aligns closely to the body and the plug aligns closely with the cartridge; therefore, caution should be used to make sure they are installed squarely.

6. Once bonnet is resting on the body, tighten bonnet flange bolting to finger-tightness.

7. Seat the plug two or three times to center the seat ring. This is done by applying air to the actuator.

NOTE: Step 8 applies only to valves with pneumatic actuators. If a hydraulic or mechanical operator is used, leave the plug in mid-stroke and proceed to step 9.

8. With plug in the extended (or closed) position, begin tightening bonnet flange bolting (keep the bonnet square with the valve). Tighten the first bolt $\frac{1}{8}$ turn, then tighten the bolt directly opposite $\frac{1}{8}$ turn.
9. Continue tightening all bolts until the bonnet is firmly seated, metal-to-metal, in the body. This can easily be felt through the wrench.
10. Slowly stroke the plug up and down to check the alignment of the plug with the cartridge.

CAUTION: If erratic jerking of stroke indicator or scraping is detected, stop stroking the valve immediately. This may indicate misalignment. Remove the bonnet and actuator and realign the cartridge by repeating steps 3 through 10 of this section. If either or both the plug or cartridge bore are damaged, consult factory.

Disassembly of Pressure-balanced ChannelStream

Refer to Figure 2 and proceed as follows:

WARNING: Depressurize line to atmospheric pressure and drain all fluids before working on the valve. Failure to do so can cause serious injury.

1. Fully retract plug until stem clamp indicator is pointing to open position.
2. Remove bonnet flange bolting and lift actuator, bonnet and plug out of valve body. A hoist may be necessary for larger valves.
WARNING: Danger exists in removing actuator, bonnet and plug – especially if PTFE pressure-balanced seals are used. The pressure-balanced sleeve may stick to the plug and fall during disassembly, causing possible serious injury and / or damage to the valve or nearby equipment. Steps 3 through 6 should be consulted before attempting to remove the plug from the sleeve.
3. If the sleeve is observed sticking to the plug during removal, do not attempt to lift plug and sleeve out of the body.
4. Fully extend the plug, allowing the bonnet to rise above the body.
5. Place equally thick, wooden blocks in at least three places between the sleeve and bonnet. Retract plug until seals are freed from sleeve.
6. Lift actuator, bonnet and plug assembly from body, taking care not to damage sleeve bore of plug head.
7. Remove the sleeve, cartridge, seat ring and gaskets from body. In larger sizes, the cartridge or sleeve may be too heavy to lift without a hoist. Therefore, tapped holes are machined into the top of cartridge and sleeve for installation of lifting rings.
8. The cartridge may now be cleaned according to established industry methods. If a degreasing

solvent is used, make sure it will not dissolve metal and increase the tolerances between stages. Contact the factory if uncertain about which methods to use with a particular ChannelStream cartridge and application.

NOTE: If the cartridge must be disassembled to clean the individual channels and expansion holes, carefully grind away small bead welds located near the top of the cartridge. This will loosen pins located in counter-drilled holes. The pins can now be removed and the stages separated.

Reassembly of Pressure-balanced ChannelStream

Refer to Figure 2 and proceed as follows:

1. If the cartridge has been disassembled for cleaning, realign vent holes at top of retainer and replace pins. Pins should be placed 180 degrees from each other. The pins must then be tack welded using a $\frac{1}{8}$ -inch bead weld to retain the pin.

CAUTION: Do not weld any more than the approved $\frac{1}{8}$ inch. Excessive heat from bead welds that are too large can disturb critical plug / cartridge tolerances. Use an appropriate weld rod which is compatible with the cartridge material (if uncertain, contact factory).

2. Install new seat gasket and reinstall seat ring.
NOTE: All gaskets should be replaced whenever the valve is disassembled.
3. Install new bonnet and sleeve gaskets. Install cartridge and sleeve. Use lifting rings and hoist when installing cartridges and sleeves machined with tapped holes.
4. Lower actuator, bonnet and plug assembly squarely into sleeve bore. If PTFE seals are used, the plug may remain retracted. Care should be taken with PTFE seals to avoid scoring or galling sealing surfaces while fitting the plug into the sleeve bore. With metal piston ring seals, the plug must be extended a few inches to allow the use of a ring compressor on metal rings. A suitable sized screw-type hose clamp will also serve to compress the rings for reassembly.
WARNING: Failure to return plug to mid-stroke position on mechanical / hydraulic actuators will cause damage to actuator and / or valve during the bonnet tightening sequence. This is due to the inability of most mechanical / hydraulic actuators to accommodate the $\frac{1}{16}$ -inch back-driving during tightening sequence.
5. Once the bonnet is resting on the body, reinstall and tighten bonnet flange bolting to finger-tightness.
6. Seat the plug two or three times to center the seat ring. This can be done using the actuator.

NOTE: Step 7 applies only to valves with pneumatic actuators. If a hydraulic or mechanical operator is used, leave plug in mid-stroke and proceed to step 8.

7. With the plug in the extended (or closed) position, begin tightening bonnet flange bolting. (Keep the bonnet square with the valve.) Tighten the first bolt 1/6 turn, then tighten the bolt directly opposite 1/6 turn.
8. Continue tightening all bolting until bonnet is firmly seated, metal to metal, in the body.

9. Slowly stroke the plug up and down to check alignment of plug with the cartridge.

CAUTION: If erratic jerking of the stroke indicator is detected, stop stroking the valve immediately. This may indicate misalignment. Remove bonnet and actuator and realign the cartridge by repeating steps 3 through 10 of this section. If either or both the plug or cartridge bore are damaged, consult factory.

Troubleshooting ChannelStream Control Valves

Problem	Probable Cause	Corrective Action
Jerky stem travel	<ol style="list-style-type: none"> 1. Galling or scoring between plug and pressure-balanced sleeve or cartridge 2. Overtightened packing 3. Service temperature exceeds operating parameter of trim design 4. Inadequate air supply 5. Malfunctioning positioner 	<ol style="list-style-type: none"> 1. Make sure flow direction is over the plug to avoid debris being trapped between plug and sleeve or cartridge; superficial scoring or galling may be removed with a light application of emery cloth (if more serious damage exists, contact factory) CAUTION: Trim parts are machined to close tolerances which are essential for correct valve function; attempting to remove deep scratches could result in high leakage rates or improper functioning of valve 2. Adjust the packing box nuts to slightly over finger-tight (over-tightening will cause excessive packing wear and high stem friction) 3. Reconfirm service conditions and contact factory 4. Check for leaks in air supply system; tighten any loose connections and replace any leaky lines 5. Refer to positioner installation, operation, maintenance instructions
Excessive leakage	<ol style="list-style-type: none"> 1. Insufficiently tightened bonnet flange bolting 2. Worn or damaged seat ring 3. Worn or damaged plug seals 4. Worn or damaged gaskets 5. Inadequate actuator thrust 6. Incorrectly adjusted plug 7. Gasket or seat materials incorrect for service conditions 	<ol style="list-style-type: none"> 1. Refer to "Reassembly" section for correct tightening procedure 2. Disassemble and replace or repair seat ring (for correct procedure on remachining the seat, see installation, operation, maintenance Instructions 1) 3. Disassemble and replace plug seals 4. Disassemble and replace gaskets 5. Check for adequate air supply to the actuator; if supply is OK, reconfirm service conditions and contact factory 6. Refer to installation, operation maintenance Instructions 1 for correct plug adjustment 7. Check service conditions and contact factory
Restricted flow	<ol style="list-style-type: none"> 1. Dirty cartridge 2. Incorrectly adjusted limit stop or handwheel 	<ol style="list-style-type: none"> 1. Disassemble and clean cartridge, using established industry cleaning methods 2. Check stroke limiting device and correct
Excessive noise	<ol style="list-style-type: none"> 1. Improper flow direction 2. Excessive pressure drop 3. Jerky or improper stem travel 4. Throttling too close to the seat 5. Loose parts 	<ol style="list-style-type: none"> 1. Flow for ChannelStream must be over the seat; reinstall, if necessary 2. Check design service conditions 3. See corrective action under "Jerky stem travel" 4. Recommended minimum throttling is restricted to 5 percent or more open 5. Check all external bolts and nuts for tightness; if noise is internal, disassemble and check for damaged or scored parts or missing (or incorrect) seat gasket

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