

IMPORTANT

Start-up Note:

It is not uncommon to experience a problem with tempering valve operation upon start-up. This is particularly true in new systems which are not properly piped or were not properly flushed. Check the piping to verify that the hot water recirculation can reach both the Cold connection of the Holby Valve as well as the hot water heater or storage tank. Flush the system before flowing water through the Tempering valve to prevent debris such as rust, scale, solder, etc., from becoming lodged in the tempering valve and causing the Piston to stick in a fixed position. To flush the system, follow these steps:

1. Isolate the Tempering valve at the Outlet, Hot Inlet and Cold Inlet. Always close the hot first.
2. Remove the Bonnet from the valve body. (Refer to Diagram on Page 3). Carefully remove the Bonnet so the Piston does not drop out and become damaged.
3. Once the Bonnet is removed, three (3) components must be removed from the valve, the Thermostat, Piston and Spring. (The Thermostat is the long $\frac{3}{4}$ " diameter sensor).
4. To flush, place a 5-gallon pail under the bonnet-end of the valve and flush through the Hot port by carefully opening the hot isolation valve. Close the hot isolation valve.
5. Next flush through the Cold port by opening the cold isolation valve. Close the cold valve.
6. Replace the Piston, Thermostat and Spring. Check that the Piston moves freely in the bore. Re-install the Bonnet. Be sure that the Bonnet gasket is intact. Refer to Adjusting Instructions on Page 2.



CAUTION



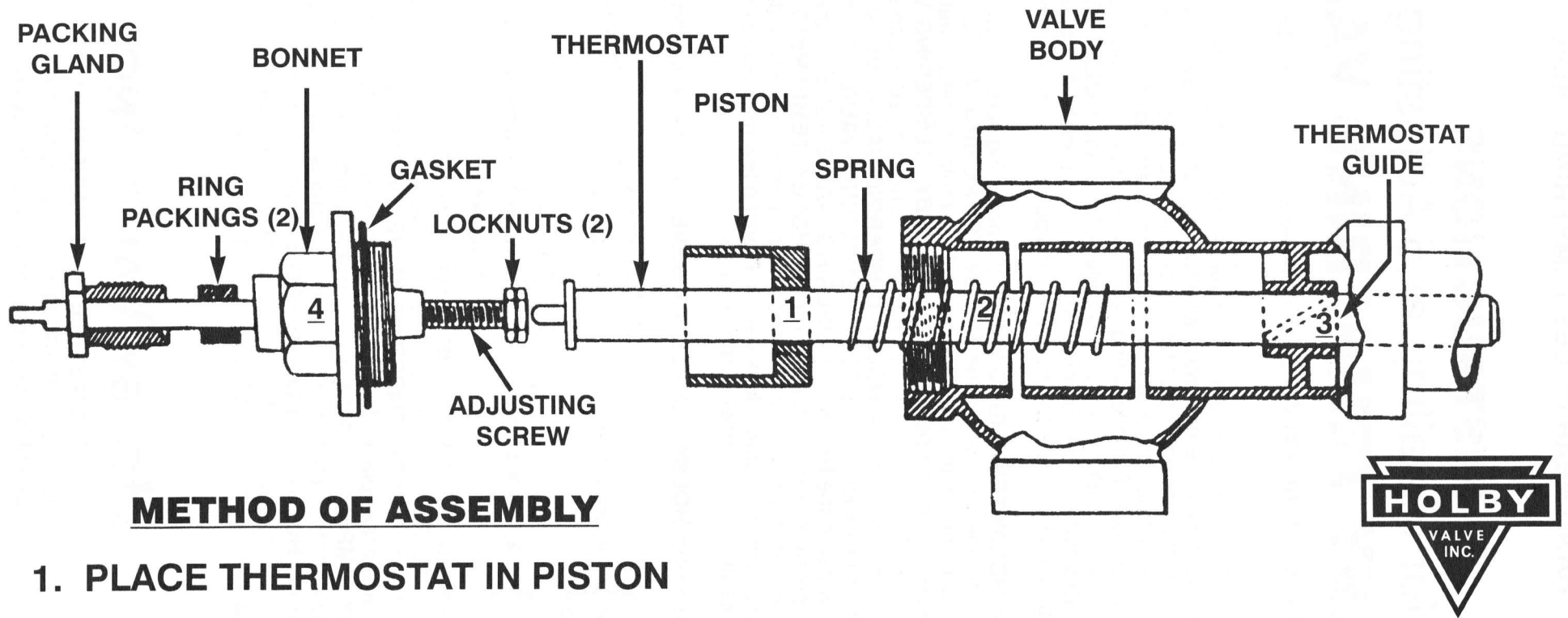
NOTICE TO INSTALLING CONTRACTORS, OWNERS AND
MAINTENANCE PERSONNEL.

**Water Temperatures above 110° F may cause SCALDING, SEVERE
INJURY or DEATH.**

This tempering valve must be adjusted when installed. The valve can be adjusted to deliver water at temperatures above 110 degrees F. After installation the installer must check the outlet water temperature and adjust as necessary to verify delivery of safe water temperatures.

Contact Holby Valve for Technical Support at 973-465-7400

INSTRUCTIONS FOR ASSEMBLING THE HOLBY TEMPERING VALVE



METHOD OF ASSEMBLY

1. PLACE THERMOSTAT IN PISTON
2. SLIDE SPRING ONTO THERMOSTAT
3. INSERT ASSEMBLY INTO THERMOSTAT GUIDE
4. SCREW BONNET ONTO VALVE BODY

IMPORTANT: PISTON MUST SLIDE SMOOTHLY
IN BORE OF VALVE BODY. TO CLEAN PISTON
USE FINE EMERY CLOTH.

FORM H18A ASSEM
PARTS CUT-A-WAY
9/12

FOR INSTALLING and ADJUSTING
INSTRUCTIONS, SEE OTHER SIDE

HOLBY VALVE INC.

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HANG NEAR HOLBY TEMPERING VALVE

INSTRUCTIONS

for Installing and Adjusting

HOLBY TEMPERING VALVE

SINCE
1930

The **HOLBY TEMPERING VALVE** can be installed and will operate satisfactorily in any position.

The cold water line should have a **MINIMUM 27" THERMAL LOOP** on it before it enters the tankless water heater, storage tank or any other vessel or source of hot water, to prevent the backing up of hot water during periods when no tempered water is being used, (this measurement should be taken end of pipe to end of pipe **NOT** center to center). The circulating return line should be installed in such a manner that it can return to the cold water inlet of the **HOLBY TEMPERING VALVE** and also back to the source of the hot water supply. A circulating pump should also be installed on this return line and the pump should run continuously.

To adjust the HOLBY TEMPERING VALVE, the adjusting screw should be turned all the way into the bonnet of the **HOLBY TEMPERING VALVE**. Check the circulating return line, if the temperature of the circulating return water is hotter than the desired outlet temperature of the **HOLBY TEMPERING VALVE**, the return line should be shut off until it has sufficiently cooled. Open a hot water faucet being supplied from the **HOLBY TEMPERING VALVE**, and allow the hot water to run while adjusting the **HOLBY TEMPERING VALVE**. If possible, turn on the cold water to the **HOLBY TEMPERING VALVE** first, then the hot water. Note the temperature of the water leaving the **HOLBY TEMPERING VALVE** on the thermometer installed a short distance away from the valve's outlet, turn the adjusting screw left or counter clockwise, and wait a few minutes to note results. Repeat until a satisfactory temperature is obtained.

When adjusting the **HOLBY TEMPERING VALVE**, turn the adjusting screw:

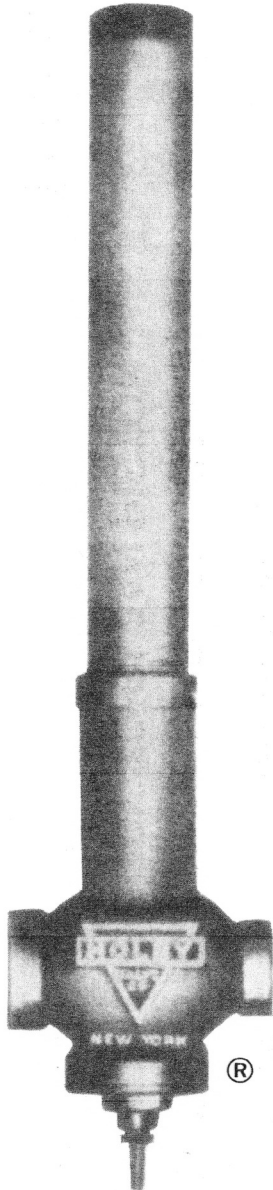
1/2" valve }
3/4" valve } 1/4 turn at a time
1" valve }

1 1/2" valve }
2" valve } 1 to 2 turns at a time

1 1/4" valve } 1/2 turn at a time

2 1/2" valve }
3" valve } 3 turns at a time
4" valve }

An adequate supply of hot water must be supplied to the hot inlet of the **HOLBY TEMPERING VALVE** and the temperature of this water is to be at least 20 degrees higher than what the **HOLBY TEMPERING VALVE** is to be set at, otherwise proper regulation may not take place. Do not turn off the valve on the cold water feed to the **HOLBY TEMPERING VALVE** at night or at any other time in order to increase the temperature at the outlet of the valve. If the water is not hot enough the cold water port in the **HOLBY TEMPERING VALVE** automatically closes. If the cold water feed valve is closed partly or entirely, proper regulation by the **HOLBY TEMPERING VALVE** is impossible and its more sensitive parts are unduly strained.



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HOLBY TEMPERING VALVE SERVICING INSTRUCTIONS

***Always use Eye Protection When Servicing Holby Tempering Valves**

1. To Service the Holby Tempering Valve, isolate and drain the Hot Inlet, Cold Inlet and Mixed Outlet. **IMPORTANT:** Always close the Hot isolation valve first.
2. Shut down and isolate the hot water return line.
3. **CAUTION: DRAIN HOT WATER BEFORE OPENING VALVE**
4. Open the valve by removing the Bonnet. Three components must be removed from the valve to perform servicing: the Thermal Element, Piston and Spring.
5. Clean the Piston with fine (320 grit) waterproof sandpaper.
6. Clean the inside of the valve bore to remove all scale so that Piston can move freely. This can be done using 320 grit waterproof sandpaper or "Scotch Bright" material. For difficult deposits and hard to reach cleaning, we recommend using a Flex-Hone tool as available in the Holby Valve Cleaning Tool Kit.
7. To use the Flex-Hone Tool, (Holby Item No. CT200 for 2" Valve), Dip the Flex-Hone tool into clean water before inserting into the valve.
8. Do not use any type of oil or solvents for honing/cleaning Holby Tempering Valves.
9. Use the Flex-Hone Tool with battery operated drill only.
10. Have the Flex-Hone Tool rotating upon entry and removal of the valve bore.
11. Recommended RPM range for the Flex-Hone Tool and ½" to 2-1/2" Valves is 500-1200 RPM. Recommended RPM range for the Flex-Hone Tool and 3" and 4" Valves is 500-800 RPM.
12. Cleaning/honing time should be 10-20 seconds
13. Flush and clean valve bore after using the Flex-Hone tool. Carefully flush the "HOT" passageways of the valve by very briefly opening & closing the hot water isolation valve. Next flush the "COLD" passageways. After flushing use a clean damp rag to wipe out the inside bore of the Holby Tempering Valve.
14. Test to verify that the valve and piston can operate freely by inserting the Piston only and move it into the body so that the cold port is exposed. (The cold port is the machined opening around the perimeter of the bore closest to the bonnet end of the bore). Remove the Piston.
15. Reinstall the Piston, Thermostat and Spring. (Refer to Exploded Parts View for proper Piston orientation).
16. Re-install the bonnet. Take care to insure that the extended end of the thermostat is positioned into the end of the Bonnet Adjusting Screw. After tightening the bonnet, turn the adjusting screw clockwise to move the Piston into the Cold position. Always start the valve adjustment process from the Cold position.
17. Slowly open the Cold isolation valve first, then the Outlet valve followed by the Hot valve. Create hot water demand by running several sinks or tubs.
18. Open the Return hot water isolation valve and start the hot water return pump. Insure that the return water temperature is at least 5 degrees below the desired mixed temperature. If not, operate the Holby valve with Cold water only to cool down the system temperature until the return water temperature is 5 degrees below the required mixed temperature.
19. Begin adjusting the valve by turning the adjusting screw counter-clockwise. Refer to Holby Adjusting Instructions attached.

HOLBY VALVE TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	REMEDY/COMMENTS
1. Mixed Water Too Hot	<p>1.1. <i>Thermostat has failed</i> (See "Testing a Thermostat")</p> <p>1.2. <i>Valve not properly adjusted</i></p> <p>1.2. <i>Different Pressures</i></p> <p>1.3. <i>Improper installation</i></p> <p>1.4. <i>Not enough Cold Water to Valve</i></p> <p>1.5. <i>Stripped Adjusting Screw</i></p> <p>1.6. <i>Someone Tampering with Adjustment</i></p> <p>1.7. <i>Cold water flow restricted</i></p>	<p>1.1.1. Replace Thermostat.</p> <p>1.2.1. The adjusting screw should be turned clockwise (into the bonnet) to achieve lower temperatures. Do not force screw. (Refer to Adjusting Instructions).</p> <p>1.2.1. There should not be more than a 10% difference between the hot & cold inlet pressures. Use pressure regulating valves where pressure are not within 10%.</p> <p>1.3.1. Check all piping. Verify that the piping is in accordance with Holby piping details. Verify that recirculating return line(s) are properly tied into the system. (See "Instructions for Installing a Holby Tempering Valve"). Hot water recirculation must be able to flow to the COLD inlet of the Holby valve and to the heat source. Also see Section 5.3 below.</p> <p>1.4.1. Check for pressure drops during high demand periods.</p> <p>1.5.1. Replace adjusting screw. (Remove lock nuts and back the screw out of the bonnet. Female threads in bonnet may be stripped which would require a new bonnet assembly).</p> <p>1.6.1. See "Clogged Coil" under "Water Temperature Fluctuates"</p> <p>1.7.1. Check cold piping for blockage and check Holby Cold inlet area (between the connection to the valve and the outside of the valve bore) for blockage.</p>
2. Mixed Water Not Hot Enough	<p>2.1. <i>Coils Not Delivering Enough Hot Water</i></p> <p>2.2. <i>Valve not properly adjusted</i></p> <p>2.3. <i>Hot water shut off</i></p> <p>2.4. <i>Pressure Difference</i></p> <p>2.5. <i>Stuck Piston</i></p> <p>2.6. <i>Piston in backwards</i></p>	<p>2.1.1. Coils could have internal scaling, thereby preventing proper heat transfer. The coil could also have an obstruction or there could be an obstruction in the piping. (Also see 3.1.1)</p> <p>2.2.1. The adjusting screw should be turned counter-clockwise (backing it out of the bonnet) to achieve higher temperatures. Do not force screw. (Refer to Adjusting Instructions).</p> <p>2.3.1. Make sure there is hot water going to the hot water inlet side of the Holby Tempering Valve.</p> <p>2.4.1. Make sure there is not more than a 10% difference in pressure between the hot and cold inlets. If it is greater, pressure regulating valves may be required.</p> <p>2.5.1. If the thermostat has failed and has not been replaced over a period of time, the piston may freeze in the inside bore of the Holby Tempering Valve (HTV), not allowing any cold water to blend with the hot water to allow proper mixture. (See "Removing a Seized Piston")</p> <p>2.6.1. Check assembly of parts. When bonnet is removed, you should see the open end of the piston first, then the guide bar of the piston. (See Exploded Parts Sheet)</p>

HOLBY VALVE TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	REMEDY/COMMENTS
2. Water not hot enough (Cont.)	2.7. <i>Recommended Maintenance</i>	2.7.1. We recommend that the Holby Tempering Valve should be opened and serviced at least once per year, depending on the local water quality. If the valve bore becomes fouled, the piston may stick in the "Cold" position. Remove piston, carefully clean the piston with 320 grit wet/dry paper taking care to leave the corners of the piston "sharp". The valve bore must also be cleaned. Use a wire brush, 320 grit wet/dry paper or a Holby Cleaning Tool. Flush the valve and re-assemble valve components. (See Holby Tempering Valve Servicing Instructions).
3. Outlet Temperature Fluctuates.	<p>3.1. <i>Coils not delivering enough hot water</i></p> <p>3.2. <i>Sticking Piston</i></p> <p>3.3. <i>Blockage in valve Hot Inlet Chamber</i></p> <p>3.4. <i>Unequal Pressures</i></p> <p>3.5. <i>No Hot Water Recirculation, Intermittant Recirculation or Improper Recirculation Piping</i></p>	<p>3.1.1. If the hot water source has insufficient heating capacity at high demand (perhaps due to scaled-up coils), the outlet temperature of the Holby valve may decrease. If the valve is adjusted to increase the outlet temperature when the hot water temperature to the valve is too low, the hot port opens more, thereby pulling the water through the coil faster and in doing so may continue to decrease the temperature leaving the coil. Later when the demand is decreased and the hot water is being drawn at a slower rate, it has more time to be heated and the temperature of the water leaving the Holby Valve is then too hot. The coil should be cleaned or replaced. Always verify the hot water temperature supplied to the Holby Valve.</p> <p>3.2.1. When heated, the thermostat develops considerable force to move the piston towards the cold position. A thermostat experiencing a cooling condition however releases the piston and allows the spring to return the piston to a hotter position. Occasionally the piston will stick momentarily then drop to the hot position with a "thud" or dull clicking sound. Likewise, the piston may stick in the "Cold" position indefinitely. Open valve, clean piston and valve bore.</p> <p>3.3.1 Remove inlet piping and inspect to verify that there is no blockage on the piping side of the hot port.</p> <p>3.4.1. There should not be more than a 10% difference between the hot and cold inlets. If there is a greater difference, pressure regulating valves should be installed.</p> <p>3.5.1 Hot Water Recirculation must be able to reach both the COLD inlet of the Holby Valve as well as the heat source. During periods of no demand, the hot water connection to the Holby Valve will cause the valve body to approach the hot water supply temperature. As the valve temperature rises, the thermostat will open the COLD port inside the valve however when there is no demand, no cold water is available. The recirculation flow will enter the cold port (if properly piped) and as the flow travels through the valve some of the excess heat from the valve body is transferred to the recirculating water which allows the valve to maintain proper temperature.</p>

HOLBY VALVE TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	REMEDY/COMMENTS
3. Outlet Temperature Fluctuates. (Cont.)	<p>3.6. <i>Failed Thermostat due to no Hot Water Recirculation or Intermittant Recirculation</i></p> <p>3.7. <i>Failed Thermostat</i></p>	<p>3.6.1. Each time the Holby valve experiences no demand and no recirculation, the body and internal components overheat. When the thermostat overheats several times a day the components become stressed and internal components fail prematurely, typically in a matter of months. If the Hot Water Recirculation pump is controlled by an aqua-stat, the aqua-stat must be turned all the way up, so that the pump runs continuously.</p> <p>3.7.1. It is possible that the Holby Valve Piston is positioned within the valve body to provide some mixing however if the thermostat is inoperative, the piston remains stationary regardless of the changes in mixed water temperature. During periods of no demand or low demand, the valve may appear to be mixing properly however as the demand increases, the mixed temperature will drop. Service the valve, replace thermostat, remove and clean piston and bore. Verify that Bonnet Adjusting Screw turns properly.</p>
4. Water Too Cold.	<p>4.1. <i>Stuck Piston</i></p> <p>4.2. <i>Piston in backwards</i></p> <p>4.3. <i>Hot water shut off</i></p>	<p>4.1.1. A piston could be stuck in the bore of the HTV, not allowing any or only allowing very little hot water to pass into the valve. Remove piston and clean with fine emery cloth until it moves freely. If out of round, replace.</p> <p>4.2.1. Check assembly of parts. When bonnet is removed, you should see the open end of the piston first, then the guide bar of the piston. (See Assembly Sheet)</p> <p>4.3.1. Make sure there is hot water going to the hot water inlet side of the Holby Tempering Valve.</p>
5. Water Temperature Fluctuates	<p>5.1. <i>Unequal or Unstable Pressures</i></p> <p>5.2. <i>High Temperature Laundry or Kitchen</i></p> <p>5.3. <i>High Temperature Recirculation flow reaching low temperature Holby Valve</i></p>	<p>5.1.1. There should not be more than a 10% difference between the hot and cold inlets. If there is a greater difference, pressure regulating valves should be installed.</p> <p>5.2.1. Check if there is a direct (non-tempered) hot water line feeding a laundry room. Often a direct hot water line draws too much water and drops the pressure at the HOT inlet to the Holby Tempering Valve.</p> <p>5.3.1. Check if there is a high temperature hot water recirculation line tied into the low temperature recirculation system. If the system has a separate high temperature hot water recirculation pump check that it is properly piped and recirculation flow from this pump cannot reach the low temperature Holby Tempering Valve.</p>
6. Piston Stuck in Valve	<p>6.1. <i>Overheated Valve</i></p> <p>6.2. <i>Debris in valve</i></p>	<p>6.1.1 An overheated thermostat will drive the piston further into the valve than normal. Since this area of the bore does not normally see piston travel, there may be accumulated sediment which can jam the piston causing it to stick. - Remove Piston with "Piston Removal Tool" (see below).</p> <p>6.2.1. Isolate valve and remove bonnet. Remove the thermostat, piston and spring. If the piston is stuck in the valve use piston removal tool. (See below). After removing piston, clean piston and interior of valve bore. (See 2.7 - Recommended Maintenance).</p>

HOLBY VALVE TROUBLESHOOTING GUIDE

PROBLEM	POSSIBLE CAUSE	REMEDY/COMMENTS
7. Removing a Stuck Piston	7.1. <i>Use Piston Removal Tool (See Attached)</i>	7.1.1 Insert the notched end of the nipple into the valve from the bonnet opening. Locate the "notches" around the piston cross-bar. Using largest available pipe wrench rotate the notched nipple to free the piston.
8. Testing a Thermostat	8.1 <i>Field Test, Standard Temperature Thermostat</i> 8.2 <i>Field Test, Low Temperature Thermostat</i>	8.1.1 A standard temperature thermostat begins to respond at a temperature of approximately 118 Deg F. Remove the thermostat from the valve, allow to cool to room temperature. Measure the length of the "Pin" extension on the "Flanged" end of the thermostat. The pin will be slightly springy when depressed with thumb pressure. Carefully immerse the thermostat in hot water (at least 120 deg F) The Pin should extend slightly (perhaps 1/8") and become "Rock-hard" when depressed with thumb pressure. If the pin length does not change and remains "Springy" to thumb pressure, the thermostat has most likely lost its charge due to overheating, repeated temperature cycling or simply fatigue due to length of service. 8.2.1 A low temperature thermostat begins to respond at a temperature of approximately 70 Deg F. Remove the thermostat from the valve, allow to cool to room temperature. Measure the length of the "Pin" extension on the "Flanged" end of the thermostat. The pin may be slightly springy when depressed with thumb pressure or it could be rock hard, depending on the temperature of the thermostat. Carefully immerse the thermostat in hot water (at least 80 deg F, but not more than 120 deg) The Pin should extend slightly (perhaps 1/8") and become "Rock-hard" when depressed with thumb pressure. If the pin length does not change and remains "Springy" to thumb pressure, the thermostat has most likely lost its charge due to overheating, repeated temperature cycling or simply fatigue due to length of service.
9. Additional Support	9.1 <i>Available by e-mail or phone</i>	9.1.1 For additional support complete the attached Project Data Sheet and e-mail to info@holby.com. Be sure to include the valve Serial Number which is located on a "Raised Plate" at the outlet of the valve. This is a hand-stamped Serial Number which begins with a letter. The Serial Number is not cast into the valve. Any type of system sketch is helpful and will allow us to help you more quickly. The sketch should show how the cold water line feeds the Holby Valve and the hot water heater or storage tank. Also show where the hot water recirculation pump discharge line ties back into the system. E-mail the Data Sheet and System Sketch to info@holby.com and call 973-465-7400.

HOLBY VALVE PISTON REMOVAL TOOL

A piston removal tool can be fabricated by cutting two notches in a long pipe nipple. For most valve sizes, the nipple should be one pipe-size smaller than the nominal valve size. (See Table below)

The pipe nipple notches will interlock on the piston "cross-bars". The other end of the pipe nipple will remain exposed allowing the contractor to use a pipe wrench to rotate the pipe nipple and free the piston. Note: Do not hammer the piston out of the valve. Keep "working" the bonnet by rotating until it becomes free enough that it can be "worked" out of the valve body. Slight downward pressure on the wrench may be required to help the piston advance towards the valve opening while turning the piston.

After removing the piston, clean with fine emery cloth and clean the inside of the valve with a "Scotch Bright" pad or a wire brush. Inspect the piston carefully. If there are any dents or "nicks" in the piston it may not slide properly in the valve. The bore of the valve may also require cleaning. The piston must move freely in the bore of the valve when re-assembled. For best results we suggest using a Holby Cleaning Tool with a battery operated drill.

HOLBY VALVE SIZE	Pipe Dia.	Pipe Length (inches)	Width of Notch	Depth of Notch
1/2", 3/4", 1"	1"	7"	1/2"	1/2"
1-1/4"	1"	7"	1/2"	1/2"
1-1/2"	1"	7"	1/2"	1/2"
2"	1-1/2"	7"	1/2"	1/2"
2-1/2"	2"	9"	3/4"	3/4"
3"	2-1/2"	9"	3/4"	3/4"
4"	3"	9"	3/4"	3/4"

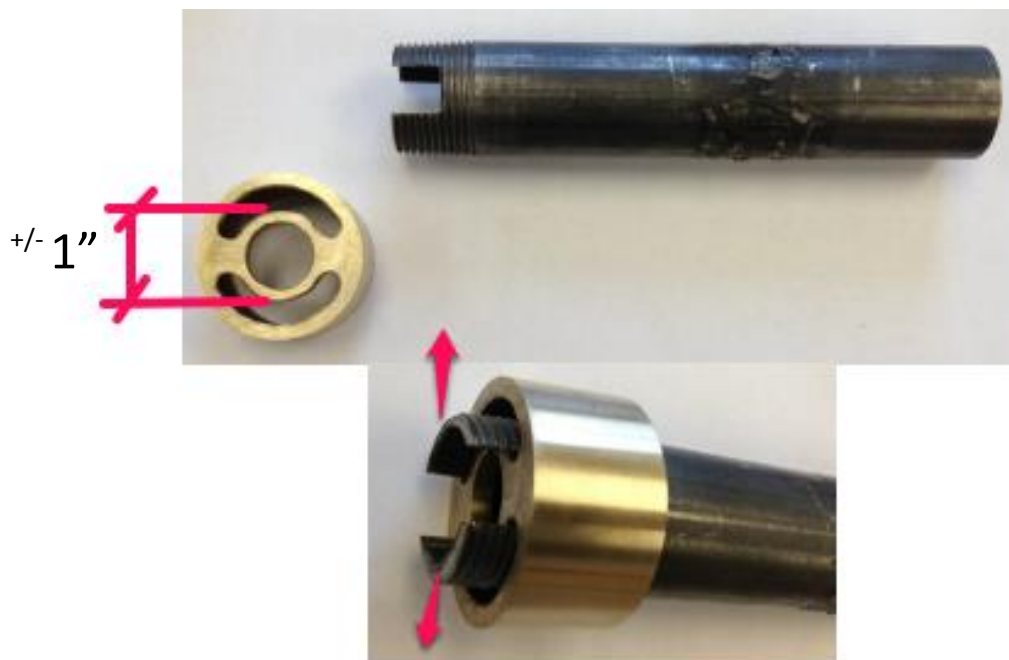


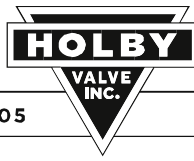
Notes regarding the Holby Piston Removal Tool

There is one Piston Removal Tool fabricated from a 1" Long pipe nipple. This tool fits the following Holby Valve sizes:

- 1/2" Valves, (HTV050 and HTV050-LT)
- 3/4" Valves, (HTV075 and HTV075-LT)
- 1" Valves, (HTV100 and HTV100-LT)
- 1-1/4" Valves, (HTV125 and HTV125-LT)
- 1-1/2" Valves, (HTV150 and HTV150-LT)

The inside diameter of the 1" pipe nipple is approximately 1". The center part of the Holby Pistons for the above valves has an outside diameter of approximately 1". As a result, it is not uncommon that the pipe nipple inside diameter (at the notched end) must be enlarged slightly so that it fits over the center "hub" of the "cross-bar" at the end of the piston allowing the two notches to interlock with the cross-bar as shown below. This can be accomplished by reaming the end of the pipe nipple before cutting the notches and by carefully spreading the two longer ends of the nipple.





PROJECT DATA SHEET

Contact Name: _____ e-mail: _____ Date: _____

Phone: _____ Company: _____

Role:(Circle one) Owner/Property Manager/Installing Contractor/ Service Contractor/ Other _____

Building address: _____ Building Use: (Apt Bldg, Nursing Home, School, etc.)

Holby Valve Size: Size: _____

On the valve outlet "Hand Stamped" into a small raised flat area is the Valve S/N, It is either facing front or in the back against the wall. Valve Serial No.: _____

Serial numbers start with a letter, and contain 4 to 5 digits. (A=1", B=1.25" C=1.5" D=2" E=2.5" F=3' G=4" H=3/4" J=1/2")

Is this a new system installation? Yes/No. Approximately how long has the valve been installed? _____

When was the last time the valve was serviced? _____ What was done to the valve when it was serviced?

What is the desired mixed water temperature? _____

Hot water temperature supplied to valve from hot water heater or storage tank? _____

Location of thermometer showing mixed hot water temperature? _____ Is the pipe thermometer sensing bulb actually in the flow of water? _____ Hot water temperature measured at a sink with a thermometer? _____

State the hot water system problem. (Too hot, too cold, fluctuating temperatures, etc) _____

When did it start happening? _____ Does it does happen at certain times? (Mornings, periods of high demand, periods of low demand, etc.) _____

Does the problem change with demand? _____

Does the problem change during the night? _____

System Type:

- Steam Boiler w/Submerged Coil
- Steam Fired HX - No Storage
- Steam Fired HX with Storage
- Hot water heater w/Remote Storage
- Storage-type HW Heater

Provide sketch of the domestic hot water system. Start with the Cold Water line as it enters the room. Show how the cold water line connects to the Holby Valve and the hot water heater, boiler or storage tank. Show where the discharge piping from the hot water recirculation pump ties into the system. Show any check valves in the cold water line. (See Sample Sketch attached)

Does the recirculating pump run continuously? _____ Is there an Aqua-stat controlling the pump? _____

What is the approximate exposed length of the Holby Valve Adjusting Screw? _____ (Measure from the end of the adjusting screw to the face of the large hex casting of the bonnet).

Sample Sketch

