

Technical Instructions

⚠ WARNING



Read this Manual **BEFORE** using this equipment. Failure to read and follow all safety and use information can result in death, serious personal injury, property damage, or damage to the equipment.



Keep this Manual for future reference.

⚠ WARNING

FAILURE TO COMPLY WITH PROPER INSTALLATION AND MAINTENANCE INSTRUCTIONS COULD CONTRIBUTE TO THE VALVE FAILURE.

This Hot Water Master Tempering Valves cannot be used for tempering water temperature at fixtures. Severe bodily injury (i.e., scalding or chilling) and/or death may result depending upon system water pressure changes and/or supply water temperature changes. ASSE standard 1016, 1069 or 1070 listed devices should be used at fixtures to prevent possible injury.

These Hot Water Tempering Valves are designed to be installed at or near the boiler or water heater. They are not designed to compensate for system pressure fluctuations and should not be used where ASSE standard 1016, 1069 or 1070 devices are required. These valves should never be used to provide "anti-scald" or "anti-chill" service.

The components of the system must be of materials with a construction capable of withstanding the high limit output temperatures of the water heating source.

⚠ WARNING

Need for Periodic Inspection and Yearly Maintenance:

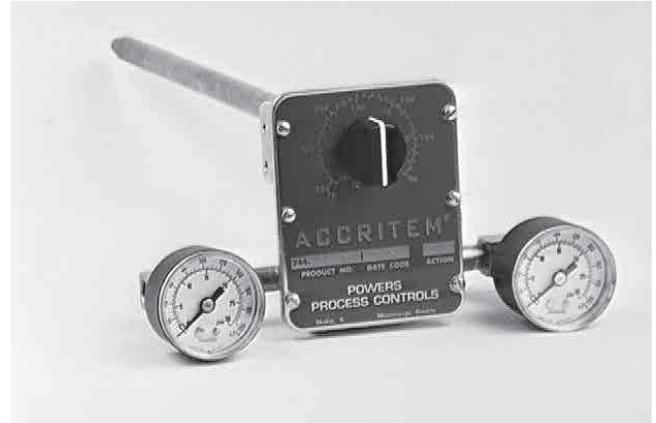
Periodic inspection and yearly maintenance by a licensed contractor is required. Corrosive water conditions and/or unauthorized adjustments or repair could render the valve ineffective for service intended. Regular checking and cleaning of the valve's internal components and check stops helps assure maximum life and proper product function. Frequency of cleaning and inspection depends upon local water conditions.

⚠ WARNING

You are required to consult the local building and plumbing codes prior to installation. If the information in this manual is not consistent with local building or plumbing codes, the local codes should be followed. Inquire with governing authorities for additional local requirements.

⚠ WARNING

Flush all pipes thoroughly before installation. Installation and field adjustment are the responsibility of the installer.



AIR OPERATED:

Rigid Stainless Bulb

Direct Action 744-1270
Reverse Action 744-1271

WATER OPERATED:

Rigid Stainless Bulb

Direct Action 744-1217
Reverse Action 744-1218

Rigid Copper Bulb

Direct Action 744-1213
Reverse Action 744-1214

Specifications ■

Operation	Direct or Reverse Acting
Adjustment Dial Range—Standard	50 to 350°F (10 to 177°C)
Maximum Supply Pressure (air or water) at Room Temperature	35 psi (241.3 kPa)
Air Consumption (max.)	218 cm ³ /s (800 SCIM)
Maximum Operating Pressure	1724 kPa (250 psi)
Maximum Operating Temperature	400°F(204°C)
Temperature Response	0.5°F(0.3°C)
Mounting	1/2" NPT
Air or Water Connections	1/8" NPT
Drain Connection (water only)	1/4" NPT
Shipping Weight	4 lbs. (1.8 kg)
Sensitivity (adjustable)	3.1 to 27.9 kPa/C (1/4 to 2-1/4 psi/F)
Maximum Pressure on Wells	
Stainless Steel no. 744-082	1125 psi (7756 kPa)
Copper no. 744-111	525 psi (3619 kPa)
Well Dimensions	See page 6

Operation Instructions ■

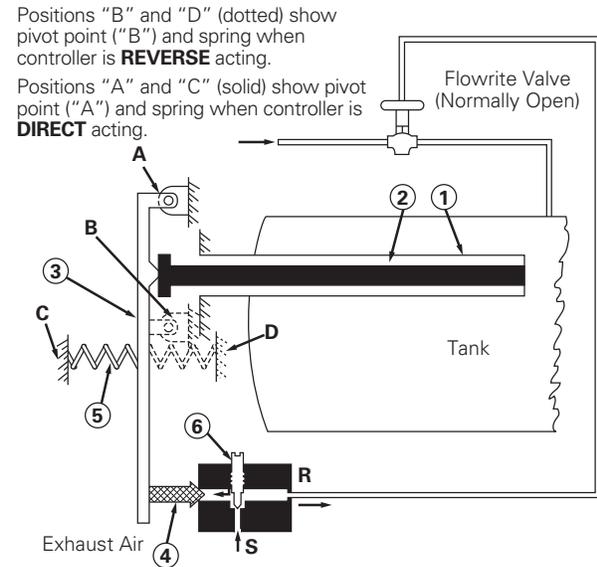
Direct Action Controller

A temperature change in the medium being controlled creates a change in length of the sensitive tube ①. An increase in temperature lengthens the sensitive tube ① and moves the Invar rod ② away from the lever ③. The lever ③, which pivots at Point A, is moved to open the exhaust valve ④ by spring ⑤. This permits the supply (air or water) (S) to increase the pressure in the control line (R) and close the normally-open valve. A decrease in temperature shortens the sensitive tube ① and moves the Invar rod against the lever ③. The lever ③ moves against the pressure spring ⑤, to open the exhaust valve ④. This exhausts the pressure in the control line and opens the valve.

The sensitivity adjustment screw ⑥ regulates the rate of flow of the supply air (or water) to the controller to a change in temperature. Turning the screw clockwise increases the sensitivity by reducing the flow and increasing the response time. Turning the screw counterclockwise decreases the sensitivity by increasing the flow and reducing the response time.

Also see Figure 8 on page 7.

Figure 1



Sensitivity ■

The sensitivity of the Accritem controller is adjusted by turning the restriction screw (Figure 2). (The restriction screw is factory-set for air operation.) For water operation, the restriction screw should be opened a minimum of 1/2 turn and controller recalibrated. Restriction screw must never be fully closed. Make

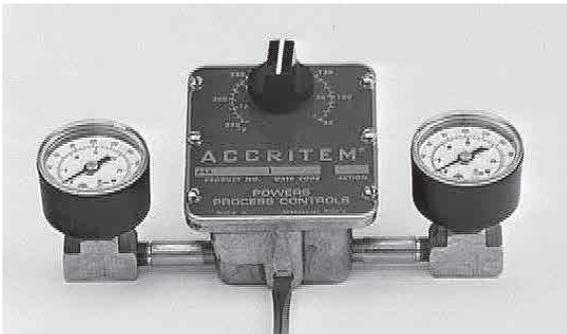
adjustments slowly, allowing about two (2) minutes after each adjustment for the controller to balance.

NOTICE

If sensitivity is changed, controller must be recalibrated.

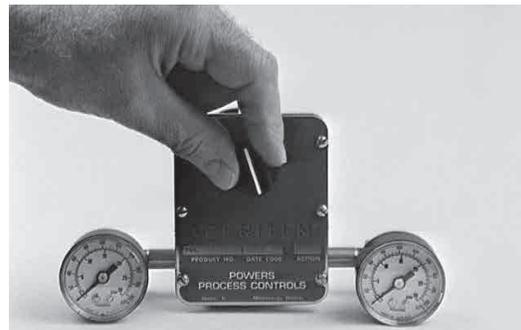
Calibration ■

Figure 2



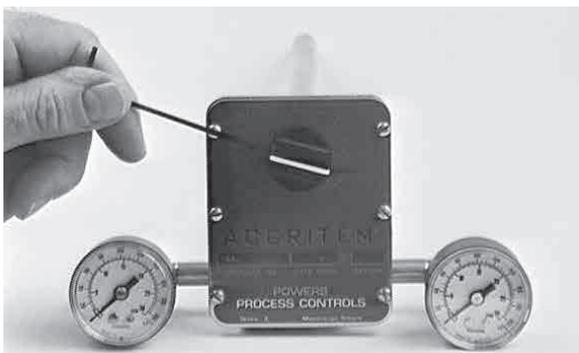
Loosen set screw and turn adjusting knob to indicate temperature at bulb. Tighten set screw. Set controller for desired control temperature.

Figure 3



Turn adjusting knob until 52 kPa (7-1/2 psi) control pressure shows on gauge. Read temperature at bulb with an accurate thermometer.

Figure 4

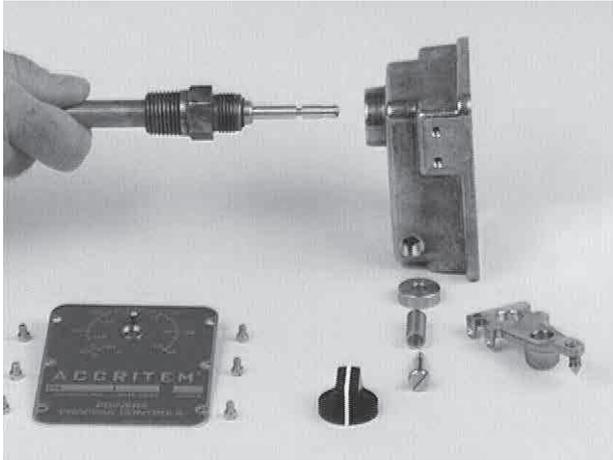


Set restriction screw for desired sensitivity. Air: 1/8 turn from closed (minimum). Water: 1/2 turn from closed (minimum).

Installation Instructions ■

General Instructions

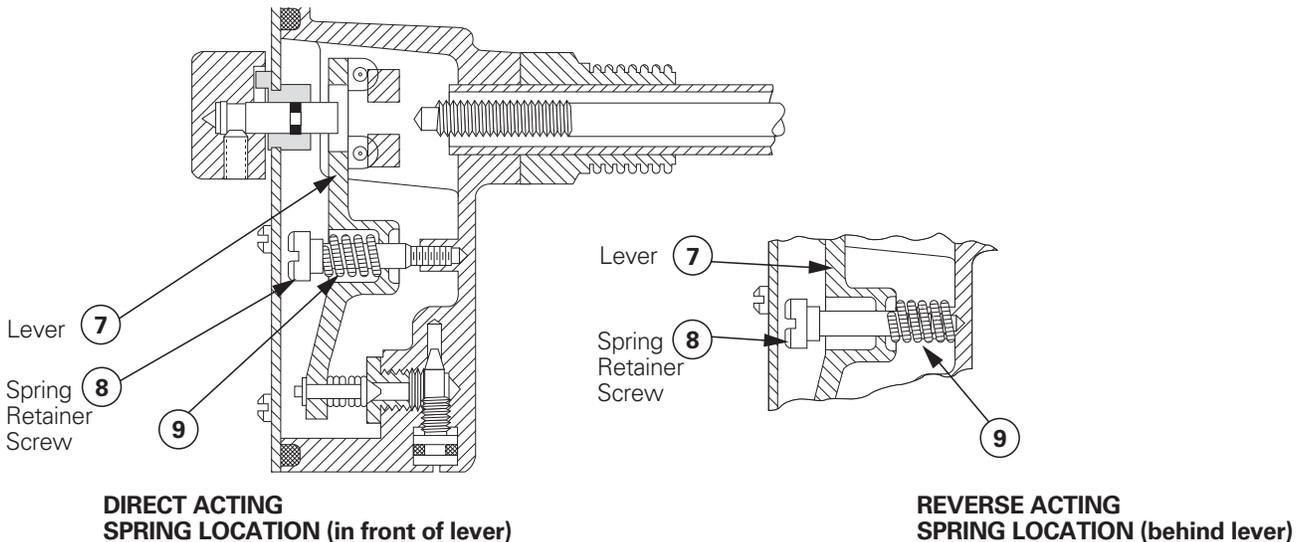
Figure 5.



To disassemble and replace sensitive tube assembly:

The Accritem Controller requires a clean, reliable supply of compressed air or cold water at room temperature and 15 to 20 pounds of pressure. Other fluids may be used, such as gas, oil, etc., providing provision is made for safe disposal.

Figure 6



The parts in Figure 7 are identified by letter in order of disassembly. For item number reference, see Parts Drawing: A (item 3) adjusting knob with set screw, B (item 10) cover screws, C (item 2) cover plate, D (item 8) spring retainer screw, E (item 9) lever spring, F (item 21) lever pivot, G (item 7) lever.

Always locate the controller as close as possible to the controlled device. The piping between the controller and controlled device (valve or damper motor) should be 1/8" NPT brass pipe or 6.4 mm (1/4") OD copper tubing.

Difference in height between Accritem controller and controlled device should be kept to a minimum. When controller is **below** controlled device, elevation cannot exceed 3 m (10") with 104 kPa (15 psi) supply pressure. If controller is **above** controlled device, adjust springs on valve or damper motor to compensate for static head pressure.

Select sensitive element location with care to insure satisfactory results. Bulb must project entirely into the liquid or air being controlled.

Flush or blow out all lines before making final connections. Put supply pressure through all control lines and check for leaks.

INSTALLATION FOR AIR OPERATION

Controller should normally be installed in horizontal position; however, other positions may be used if the supply and control connections are parallel with the ground and calibration is checked after installation.

INSTALLATION FOR WATER OPERATION

Controller should normally be installed in horizontal position with drain connection at bottom. For positive drainage at all times, drain piping should be 3/8" minimum.

TO CHANGE CONTROLLER ACTION

(See Figures 6 and 7)

1. Turn adjusting knob clockwise to remove tension.
2. Remove adjusting knob and cover.
3. Remove lever spring retainer (D) and spring (E).
4. Relocate lever pivots (F).
5. Turn lever pivots to be snug without binding.
6. Replace lever spring retainer (D) and spring (E).
7. Replace cover and adjusting knob.
8. Recalibrate.

Pressure Controller for Use with Water

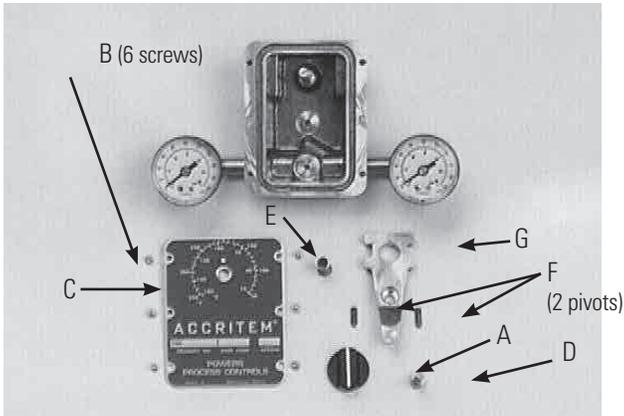
Set pressure at 104–138 kPa (15–20 psi) when water is flowing. Clean strainer at regular intervals.

Both Air and Water Controllers

To disassemble (Refer to Parts Drawing and Figure 5):

1. Remove knob ③ after loosening its set screw.
2. Remove cover plate ②.
3. Remove spring retainer screw ⑧ and lever spring ⑨.
4. Back out one lever pivot ⑩ and remove lever ⑦.
5. Unscrew sensitive tube assembly ⑪ from body ①.

Figure 7



To reassemble:

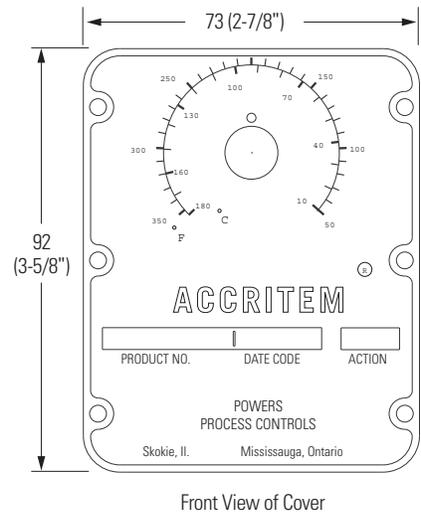
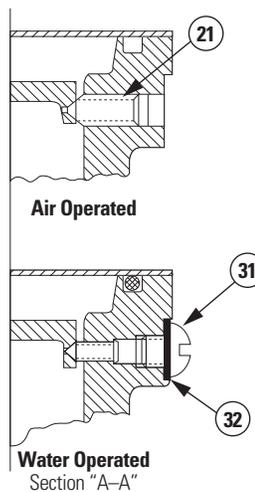
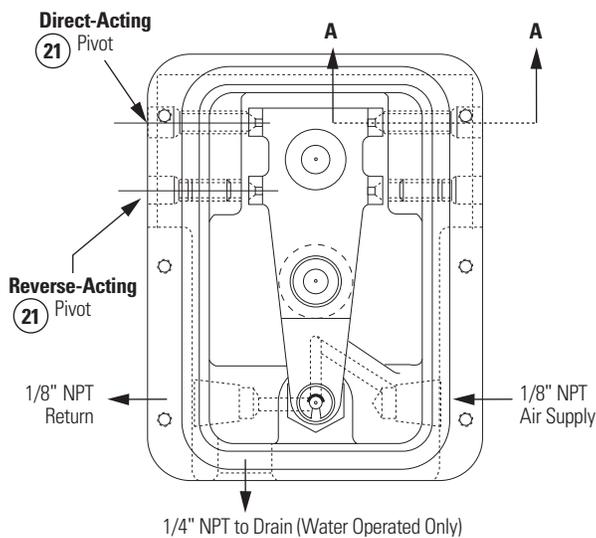
1. Install new sensitive tube assembly (19) to body (1) .
2. Install lever (7) . Tighten the lever pivot screws (21) as required. The lever must be in the exact center of the body and must move freely but without side play.
3. Install screws (31) and gaskets (32) on water-operated controller.
4. Install parts (8) and (9) . (Note relationship for direct and reverse acting. See Figure 6.)
5. Back out adjustment screw (5) until collar (19) touches the pivots on the lever (7) .

6. Install cover plate (2) .
7. Install adjustment knob with set screw (3) . The knob indicator (white line on side of knob) should be opposite the dial marking corresponding to the room temperature. Tighten the knob set screw very firmly.
8. Turn the adjusting knob to the desired control temperature for approximate calibration.
9. Recalibrate as required after the controller is installed and connected to the supply and control lines.

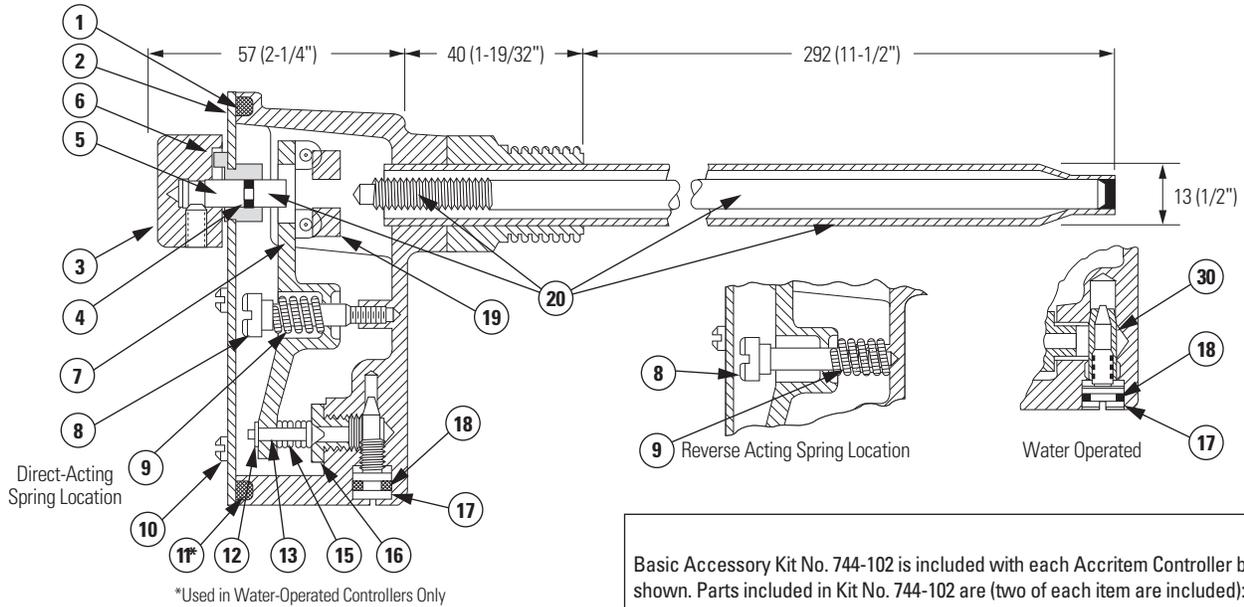
NOTICE

On units with a date code of 3L48 and later: When replacing a knob (744-036) or cover plate (744-170), a new knob (744-234) and cover plate (744-170D) must be ordered.

Parts ■



Parts ■



Basic Accessory Kit No. 744-102 is included with each Accritem Controller but is not shown. Parts included in Kit No. 744-102 are (two of each item are included):

1/8" NPT x 1-1/2" (38mm) lg. brass nipple..... Part No. 042-513
 1-1/2" (38mm) pressure gauge 0-30 psi Part No. 142-0373
 1/8" NPT brass tee..... Part No. 043-351

Parts List ■

Item	Part Name	Part Numbers		No. Req'd	Material	Item	Part Name	Part Numbers		No. Req'd	Material
		Air or Gas	Water					Air or Gas	Water		
1	Body	—	—	1	Brass	12	Retaining Ring	100-124*	100-124**	1	Phos. Bronze
2	Cover Plate	744-170D	744-170D	1	—	13	Valve	744-155*	744-163**	1	Phos. Bronze
3	Adjusting Knob w/ Set Screw	744-234	744-234	1	—	15	Valve Spring	744-075*	744-075**	1	Phos. Bronze
4	Quad Ring	—	047-043	1	—	16	Valve Seat	744-063*	744-131**s	1	Phos. Bronze
5	Adjustment Screw	744-175	744-175	1	Brass	17	Restriction Screw†	744-072	744-134s	Brass	
6	Stop Pin	744-061	744-061	1	Brass	18	O-Ring	047-049†	047-045	1	Buna-N
7	Lever	—	—	1	Brass	19	Thrust Collar	—	—	1	Brass
8	Spring Retainer Screw	744-124	744-124	1	Brass	20	Sensitive Tube Assembly	744-191	744-191	1	Stainless Steel
9	Lever Spring	225-073	430-021u	1	Stainless Steel	744-172	744-172	1	Sensitivity Tube		
10	Cover Screw	030-041	030-041	6	Brass	21	Lever Pivot	744-154	744-154	2	Stainless Steel
11	O-Ring	Not used	047-050	1	Silicone Rubber	30	Insert	—	—	1	Stainless Steel
						31	Sealing Screw	—	030-895	4	Stainless Steel
						32	Gasket	—	744-083	4	Rubber

- u (Pkg. of 10)
- † Also order O-ring (see item 18).
- s Material is Stainless Steel
- l Material is Silicone Rubber

- * Included in Valve and Seat Kit for Model 3 (Air-Operated Accritem) No. 744-168—parts are not available separately.
- ** Included in Valve and Seat Kit for Model 3 (Water-Operated Accritem) No. 744-169—parts are not available separately.
- Valve and Seat Kit for Model 3 (Air-Operated Accritem)..... 744-168
- Valve and Seat Kit for Model 3 (Water-Operated Accritem)..... 744-169

Accessories ■

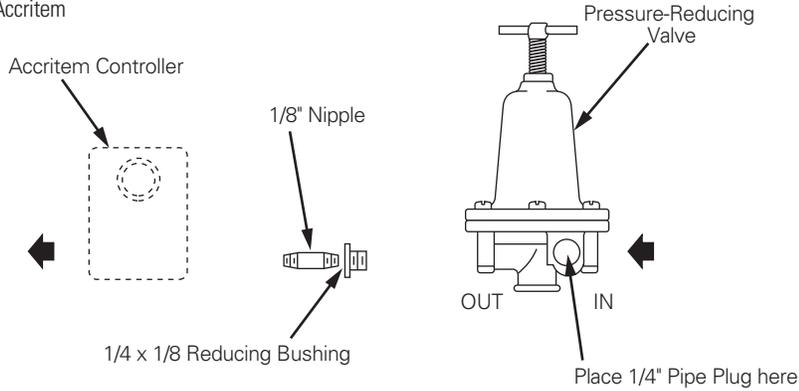
Dimensions: Millimeters (Inches)

AIR

Accessory Kit No. 744-107

(Dotted line item not included)

Provides materials necessary to reduce the incoming air supply pressure to within the supply pressure range of the Accritem

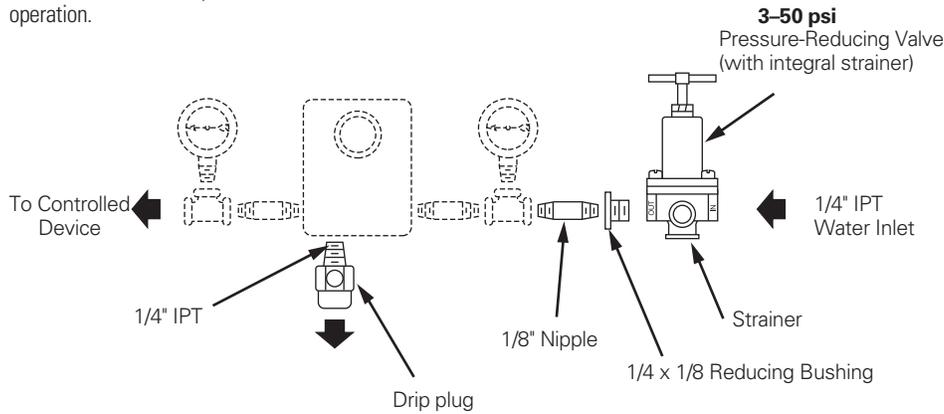


WATER

Accessory Kit No. 744-180

(Dotted line items not included)

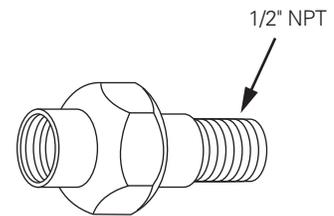
Kit provides materials necessary to convert the Accritem **from** air operation **to** water operation.



Supply gauge may also be installed in extra outlet of PRV.

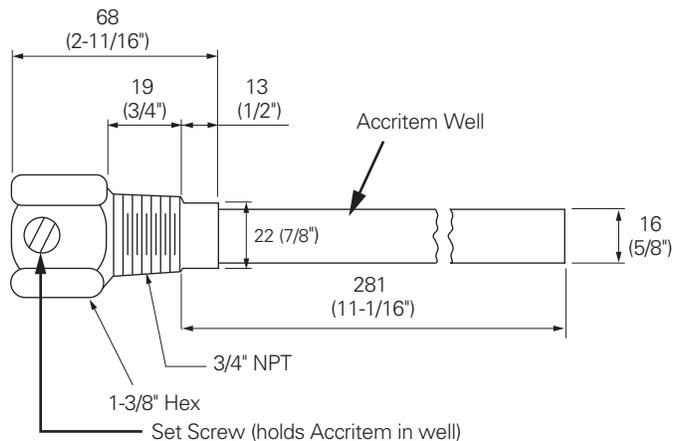
Brass Union Assembly No. 744-106

Provides pressure-tight connection for installing Accritem in pipe or tank where space does not permit rotation of Accritem body.



Well Dimensions

mm (inches)



Operation ■

Continued

Figure 8. Additional information on controller action and applications.

	APPLICATION		
	HEATING	COOLING	MIXING
ACTION: DIRECT Acting	Normally OPEN valve Valve OPENS on air failure	Normally CLOSED valve Valve CLOSES on air failure	Hot piped to Normally OPEN port of valve Valve opens to HOT flow on air failure
REVERSE Acting	Normally CLOSED valve Valve CLOSES on air failure	Normally OPEN valve Valve OPENS on air failure	Hot piped to Normally CLOSED port of valve Valve opens to COLD flow on air failure

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.
For more information: www.watts.com/prop65

Warranty ■

The Seller warrants that the equipment manufactured by it and covered by this order or contract is free from defects in material and workmanship and, without charge, equipment found to be defective in material or workmanship will be repaired, or at Seller's option replaced F.O.B. original point of shipment, if written notice of failure is received by Seller within one (1) year after date of shipment (unless specifically noted elsewhere), provided said equipment has been properly installed, operated in accordance with the Seller's instructions, and provided such defects are not due to abuse or decomposition by chemical or galvanic action. THIS EXPRESS WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, GUARANTEES, OR REPRESENTATIONS, EXPRESS OR IMPLIED. THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE. The Seller assumes no responsibility for repairs made on the Seller's equipment unless done by the Seller's authorized personnel, or by written authority from the Seller. The Seller makes no guarantee with respect to material not manufactured by it.

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