

# POWERS

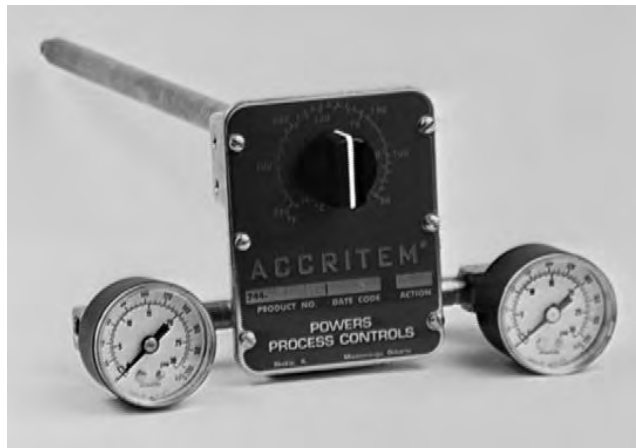
A WATTS INDUSTRIES CO.

## TECHNICAL INSTRUCTIONS

Accritem Controller  
Model 3

### SPECIFICATIONS

<b>Operation</b> .....	Direct or Reverse Acting
<b>Adjustment Dial Range</b> —Standard	50 to 350°F (10 to 177°C)
<b>Maximum Supply Pressure</b> (air or water)	
<b>at Room Temperature</b> .....	35 psi (241.3 kPa)
<b>Air Consumption</b> (max.) .....	218 cm <sup>3</sup> /s (800 SCIM)
<b>Maximum Operating Pressure</b> .....	1724 kPa (250 psi)
<b>Maximum Operating Temperature</b> .....	400°F(204°C)
<b>Temperature Response</b> .....	0.5°F(0.3°C)
<b>Mounting</b> .....	1/2" NPT
<b>Air or Water Connections</b> .....	1/8" NPT
<b>Drain Connection</b> (water only) .....	1/4" NPT
<b>Shipping Weight</b> .....	4 lbs. (1.8 kg)
<b>Sensitivity</b> (adjustable) .....	3.1 to 27.9 kPa/C (1/4 to 2-1/4 psi/F)
<b>Maximum Pressure on Wells</b>	
Stainless Steel no. 744-082 .....	1125 psi (7756 kPa)
Copper no. 744-111 .....	525 psi (3619 kPa)
<b>Well Dimensions</b> .....	See page 5



### AIR OPERATED:

<b>Rigid Stainless Bulb</b>	
Direct Action	744-1270
Reverse Action	744-1271
<b>Rigid Copper Bulb</b>	
Direct Action	744-1213
Reverse Action	744-1214

### WATER OPERATED:

<b>Rigid Stainless Bulb</b>	
Direct Action	744-1217
Reverse Action	744-1218

### OPERATION (Direct Acting 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 close 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 6.

Positions "B" and "D" (dotted) show pivot point ("B") and spring when controller is **REVERSE** acting.

Positions "A" and "C" (solid) show pivot point ("A") and spring when controller is **DIRECT** acting.

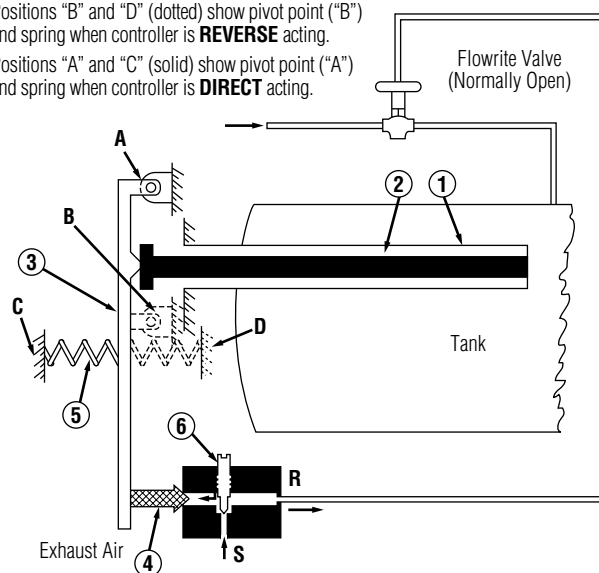


Figure 1.

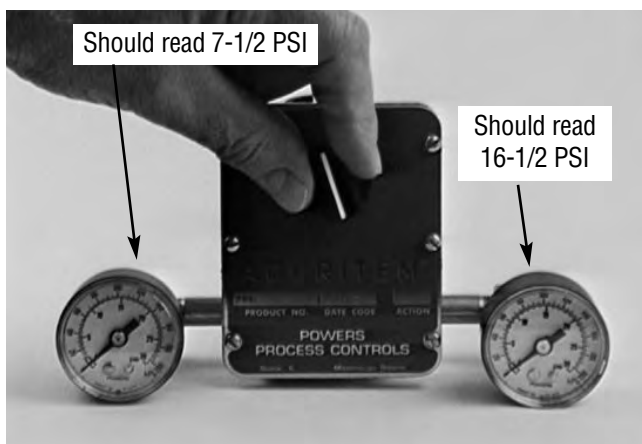
### SENSITIVITY

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 con-

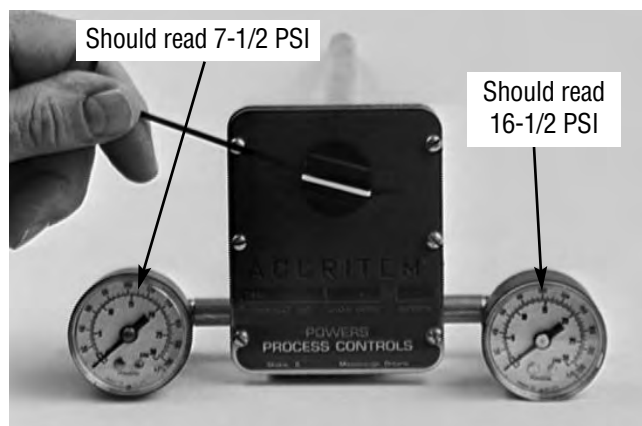
troller recalibrated. Restriction screw must **never** be fully closed. Make adjustments slowly, allowing about two (2) minutes after each adjustment for the controller to balance. NOTE: If sensitivity is changed, controller must be recalibrated.

**CALIBRATION**

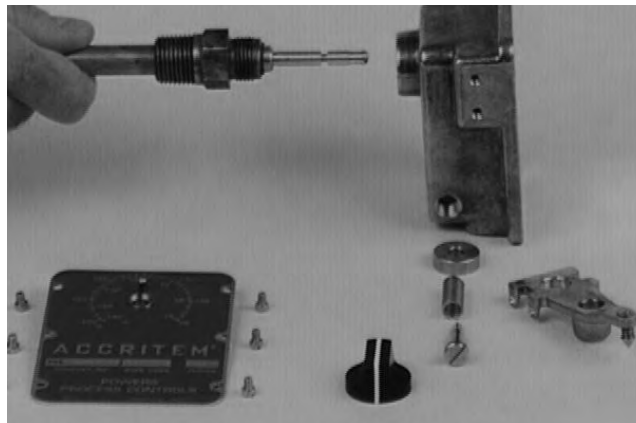
**Figure 2.** Set restriction screw for desired sensitivity. Air: 1/8 turn from closed (minimum). Water: 1/2 turn from closed (minimum).



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

**INSTALLATION (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.

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.

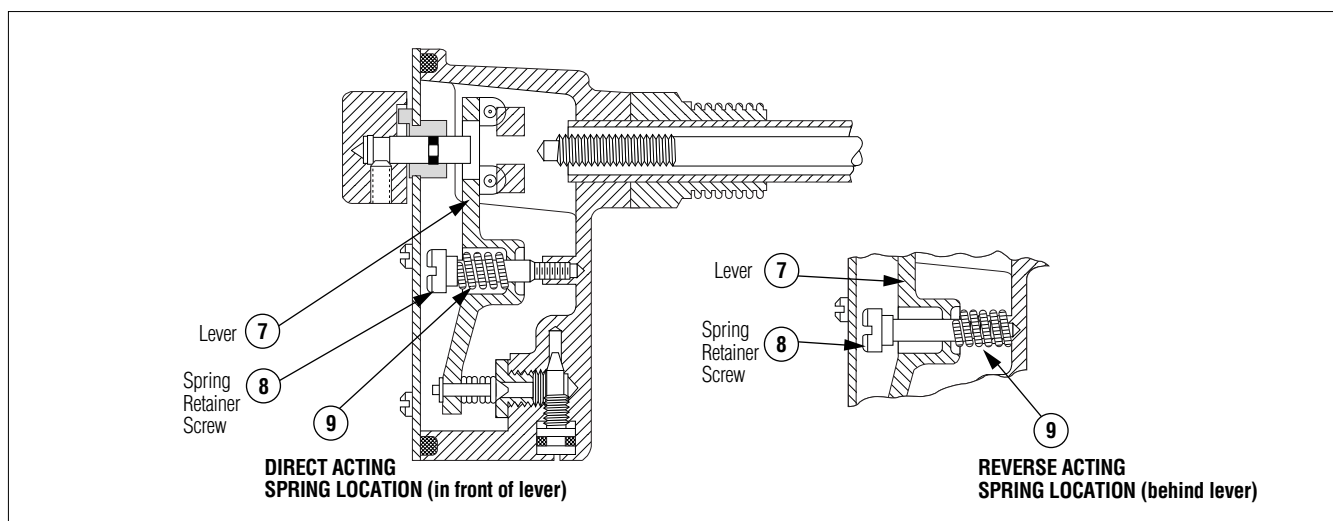


Figure 6.

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.

#### 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 (21) and remove lever (7).
5. Unscrew sensitive tube assembly (20) from body (1).

#### To reassemble:

1. Install new sensitive tube assembly (20) 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.

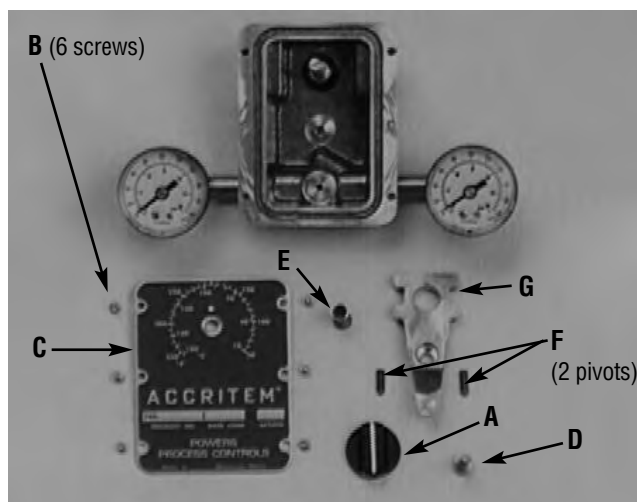


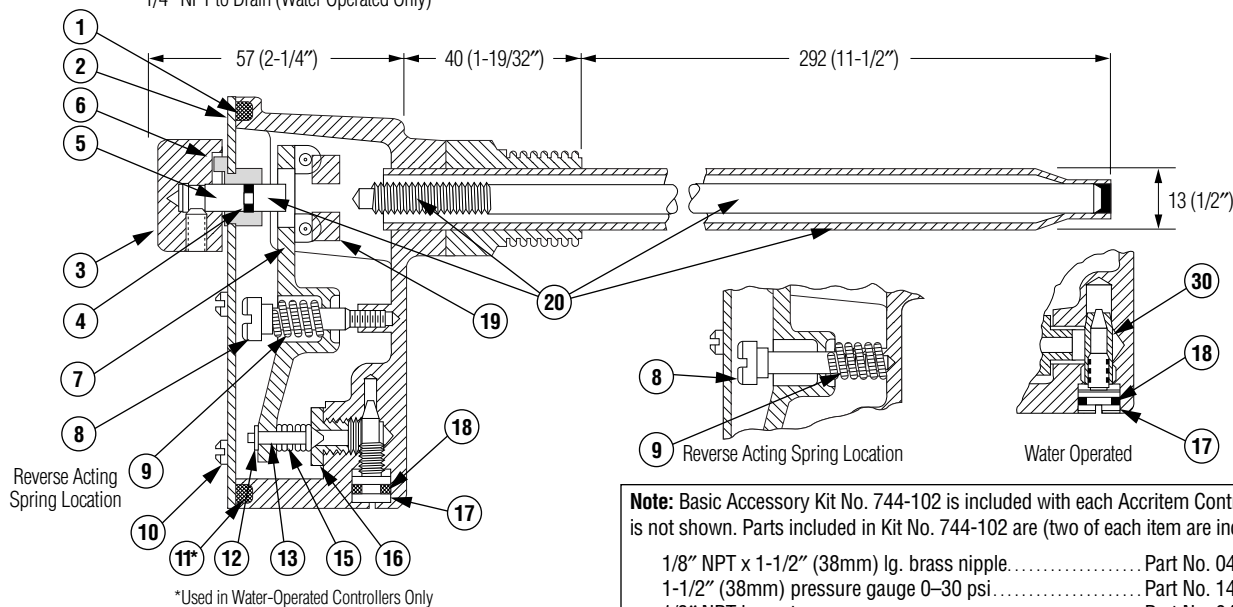
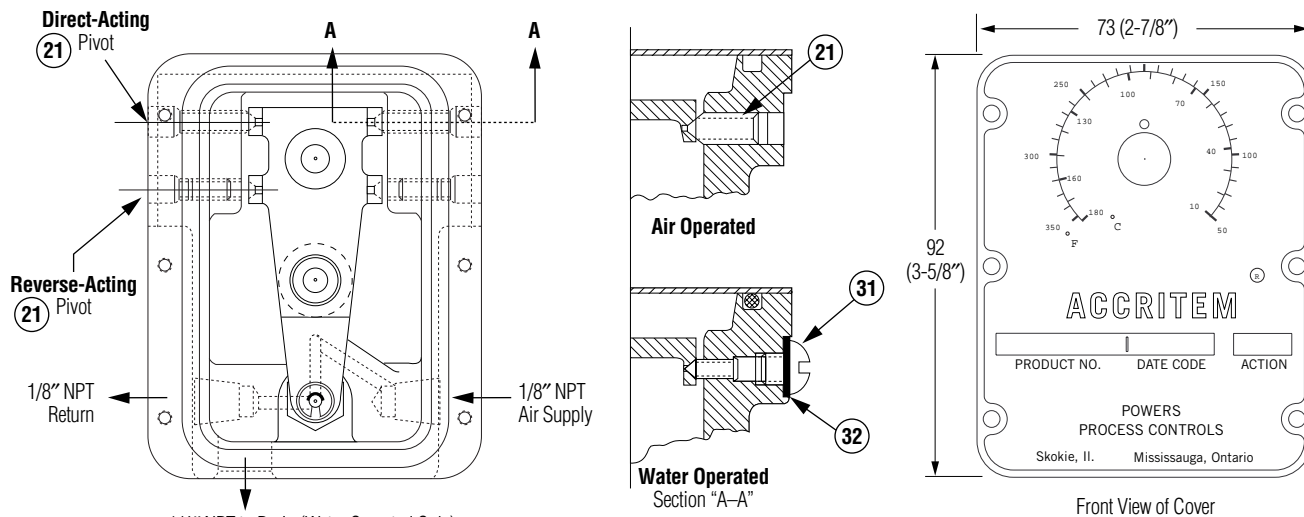
Figure 7.

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.

NOTE: 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**

Dimensions: Millimeters (Inches)



**Note:** 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. 142-0308
- 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**	1	Phos. Bronze
5	Adjustment Screw	744-175	744-175	1	Brass	17	Restriction Screw†	744-072	744-134▲	1	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	744-172	744-172	1	—
9	Lever Spring	225-073	430-021◆	1	Stainless Steel	21	Lever Pivot	744-154	744-154	2	Stainless Steel
10	Cover Screw	030-041	030-041	6	Brass	30	Insert	—	—	1	Stainless Steel
11	O-Ring	Not used	047-050	1	Silicone Rubber	31	Sealing Screw	—	030-895	4	Stainless Steel
						32	Gasket	—	744-083	4	Rubber

- ◆ (Pkg. of 10)
- † Also order O-ring (see item 18).
- ▲ Material is Stainless Steel
- 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**

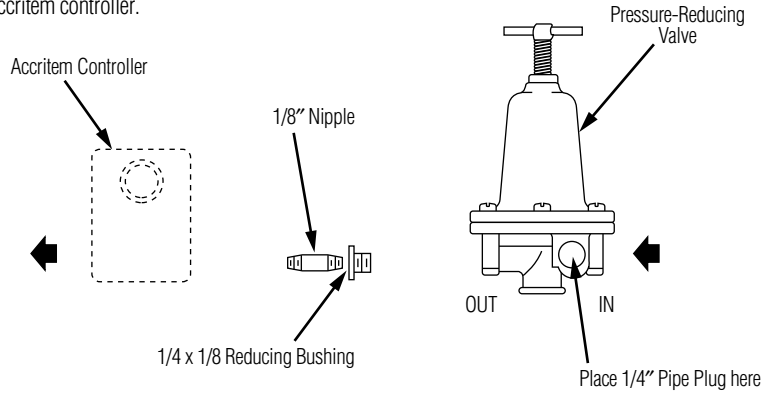
Dimensions: Millimeters (Inches)

**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 controller.

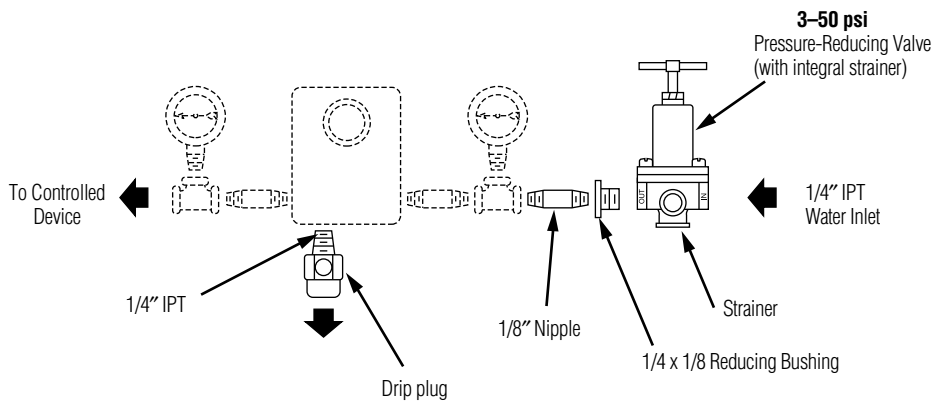


**WATER**

**Accessory Kit No. 744-180**

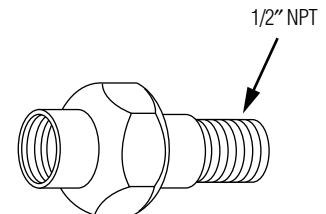
(Dotted line items not included)

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



**Brass Union Assembly No. 744-106**

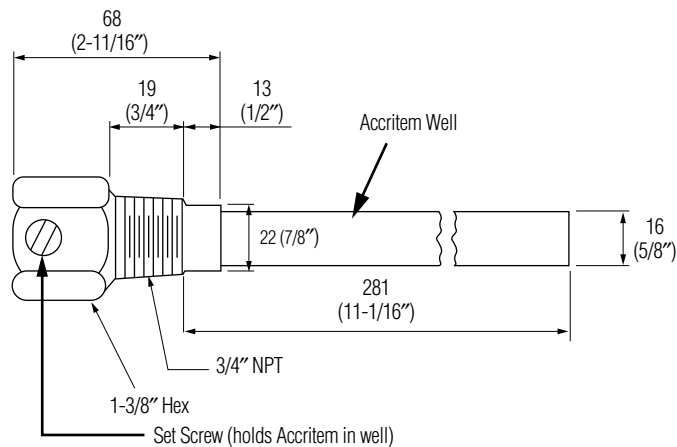
Provides pressure-tight connection for installing Accritem in pipe or tank where space does not permit rotation of Accritem body.



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

**Well Dimensions**

mm (inches)



**OPERATION (continued)**

**Figure 8.** Additional information on controller action and applications.

	<b>APPLICATION</b>		
	<b>HEATING</b>	<b>COOLING</b>	<b>MIXING</b>
<b>ACTION:</b> <b>DIRECT Acting</b>	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
<b>REVERSE Acting</b>	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