POWERS™

TECHNICAL INSTRUCTIONS

Accritem II Controller
Remote Bulb

TI TC744-2

SPECIFICATIONS

Operation ..... Direct and Reverse Acting

Adjustment Dial Range — Standard 0 to 300°F (-20 to 100°C)

Maximum Supply Pressure at Room Temperature ..... 20-30psi (138-207 kPa)

Air Consumption (max.) ..... 54.6 cm 3/s (200 SCIM)

Maximum Operating Pressure ..... 1,724 kPa (250psi)

Maximum Operating Temperature ..... 350°F(177°C)

Air Connective ..... 1/8″ NPT

Shipping Weight ..... 2 lbs. (0.9 kg)

Sensitivity (adjustable) ..... 4.3 to 24.8 kPa/°C (0.35 to 2psi/°F)

Maximum Pressure on Wells

Stainless Steel no. 744-082	1000psi (6,890 kPa)
Copper no. 744-111	400psi (2,756 kPa)

DESCRIPTION

The Accritem II non-indicating temperature controller is a pneumatically operated instrument recommended for exact control of temperature in industrial, heating and air conditioning processes. The controller features a liquid filled thermal system with a remote bulb to sense temperature.

The calibrated dial of the Accritem II has a Fahrenheit range on one side and a Celsius range on the other. The dial plate need only be unscrewed and flipped over.

The action of the Accritem II and control valve must be coordinated for the system to work. See Figure 1.

APPLICATION

The Accritem II is an extremely versatile instrument recommended for simple, economical temperature control and dependable, maintenance-free operation. The compact size and remote bulb makes it ideally suited for process vats and ovens, engine cooling systems, instantaneous and large volume water tanks, chemical process equipment, etc. The Accritem II can also be used in air handling systems, humidifier, and in many other applications.

ACCRITEM Type	APPLICATION		
	HEATING	COOLING	MIXING
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

Figure 1

INSTALLATION

Case: Mount the Accritem II body in any position as close as possible to the valve being controlled. Use the mounting bracket attached to the back of the Accritem II. Fasten bracket to any flat surface using any suitable screws in the 2 slotted holes about 3″ (76 mm) apart.

Thermal: Thermal bulb must be located within 48″ (122 cm) of the Accritem II. Thread the well or tank bushing into the pipeline or tank. Choose a location which is representative of the average process temperature. If air temperature is being controlled, use a duct mounting flange and support the bulb inside the duct. Carefully uncoil capillary and insert the bulb into the well, bushing, or flange. Do not cut or crimp the capillary - protect it from mechanical damage.

Air Connection: Use 1/4″ (6.4 mm) O.D. copper or plastic tubing with suitable fittings for the 1/8″ NPT threaded “S” and “R” connections in the Accritem II body.
Set pressure Reducing Valve to supply 20 to 30psi (138 to 207 kPa) air to Accritem II.

OPERATION

Non-Relay Model: Direct Acting (See Figure 2)

A temperature change in the control medium creates a change in the liquid filled temperatures sensor (1) which causes the bellows (2) to expand and push the lever arm (3). The lever moves to close the exhaust valve (4). This permits the supply air to increase the pressure in the control line and close the normally open valve (5). A decrease in temperature lowers the pressure within the bellows allowing the pressure spring to push on the lever, opening the exhaust valve. This lowers the pressure in the control line and opens the valve.

Relay Model:

In the relay equipped controllers, as the temperature increases and the lever moves to close off the exhaust valve, the restricted supply air moves through the control line to the pilot relay (6). As the pressure increases in the upper air chamber (7), the diaphragm assembly moves to open the supply valves (8) thereby allowing a greater volume of supply air through the control line to the valve (5).

A decrease in temperature causes the lever to open the exhaust valve, venting air from the upper air chamber. Diaphragm assembly assumes its normal position thereby allowing the spring to close the supply valve. Control line pressure is relieved through the exhaust port (9).

SENSITIVITY ADJUSTMENT

The sensitivity of the Accritem II is adjusted by turning the restriction screw which is located on the bottom of the controller, (see Figure 3). The Restriction screw must ***never*** be tightly closed. Factory setting is about 1/4 turn open. Turning the screw counter-clockwise decreases sensitivity, reducing the response time. Make adjustments slowly, allowing about two minutes after each adjustment for the controller to balance.

NOTE: *When sensitivity is changed, the controller dial and knob should be re-calibrated.*

DIAL CALIBRATION

The Accritem II must be calibrated to match the required output pressure. *For example:* a valve with 3 to 13psi (21 to 90 kPa) range and a midpoint of 8psi (55 kPa) will require the Accritem to pass 8psi (55 kPa) control pressure, (see Figure 4), when the knob points to a dial temperature that is the same as the bulb temperature. To calibrate the instrument, set the adjustment screw for desired sensitivity. Turn adjustment knob on controller until required pressure shows on control gauge and process temperature has enough time to stabilize. Then take a recording of temperature at the bulb location with an accurate thermometer. Loosen set screw and turn adjusting knob to indicate temperature at bulb, (see Figure 5). Tighten set screw. Set Controller for the desired process temperature.

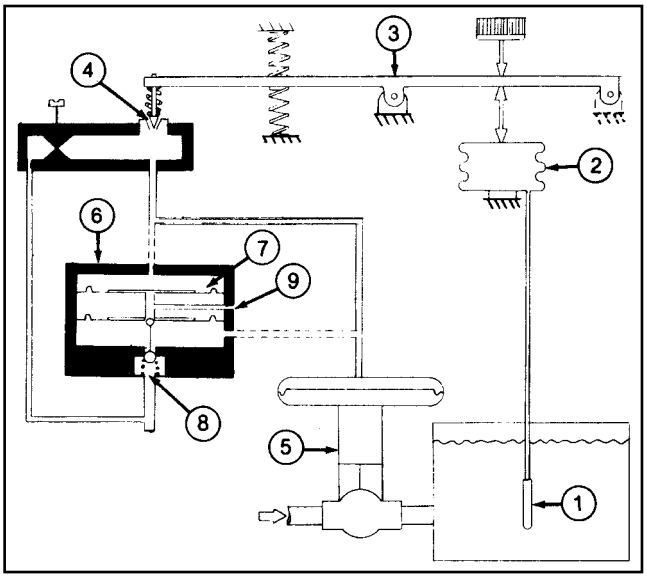


Figure 2

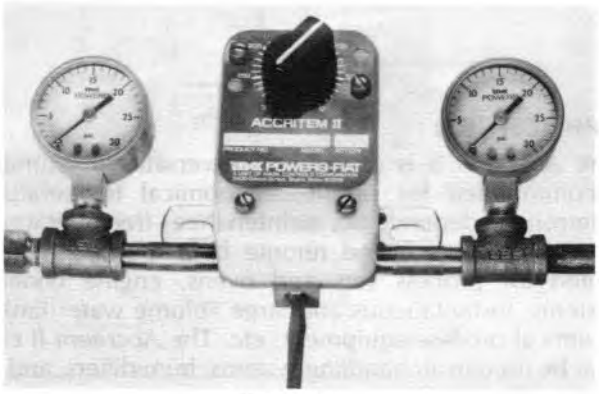


Figure 3

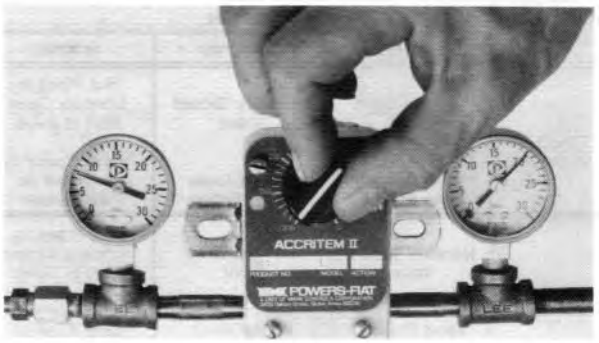


Figure 4

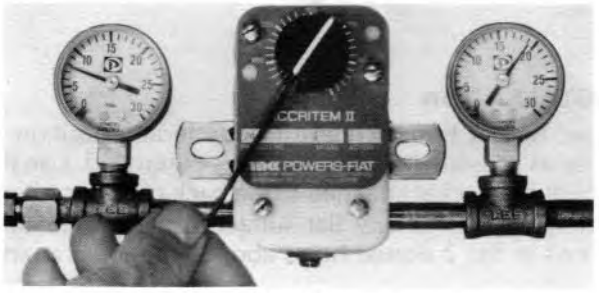


Figure 5

CHANGE THERMAL SYSTEM

Disassemble (See Figure 6)

1. Loosen knob set screw and remove knob (A).
2. Remove cover (61, make sure not to lose valve spring (C).
3. Remove mounting bracket (D) and capillary tube washer (E).
4. Remove power element cap (F)
5. Remove sensing element (G).

Reassemble

1. Install new sensing element, make sure sensing element follows (H) is in correct position.
2. Replace power element cap.
3. Carefully wrap capillary tubing around post one full turn and replace tube holder washer and screw.
4. Replace valve spring, cover, and adjustment knob.
5. Recalibrate as required after the controller is installed and connected to the supply and control lines.

To Change Controller Action (See Figure 7)

1. Turn adjustment knob counter-clockwise to remove tension.
2. Remove adjustment knob (A) and cover (B) be careful not to loose valve spring (C).
3. Remove lever spring retainer (D) and spring (E).
4. Relocate lever pivot screws (F). See Figure 9 for location. Screws should be snug, but not binding.
5. Replace lever spring and retainer, see Figure 9 for location.
6. Replace valve spring, cover, and adjustment knob.
7. Recalibrate.

Diaphragm Replacement for Relay Model Only (See Figure 8)

1. Remove relay cover screws (A) and cover (B).
2. Remove both diaphragms and diaphragm spacer.
3. Replace inner diaphragm assembly (C). Make sure supply valve ball (D) fits into exhaust valve cup and all holes of the diaphragm align with holes in body.
4. Replace spacer (E) and outer diaphragm (F), again make sure holes align.
5. Replace cover and screws. Be careful not to over tighten screws.

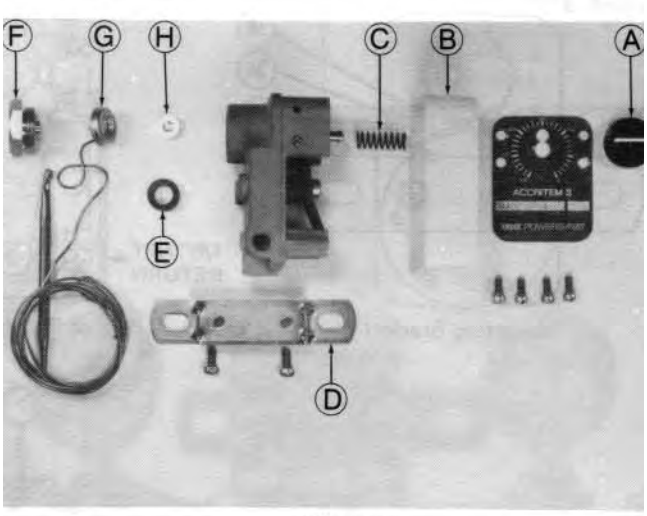


Figure 6

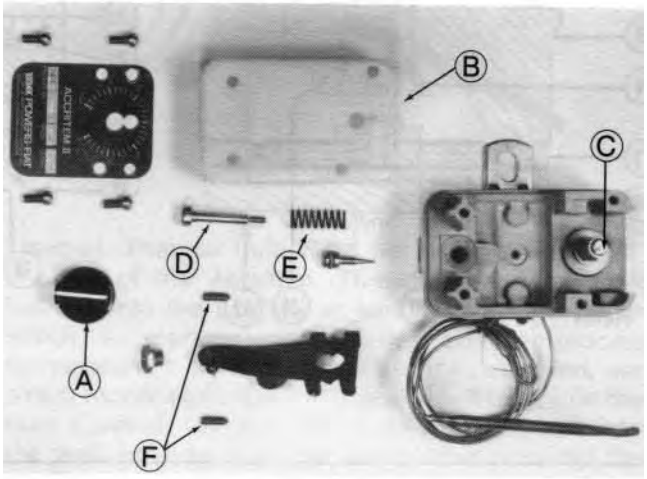


Figure 7

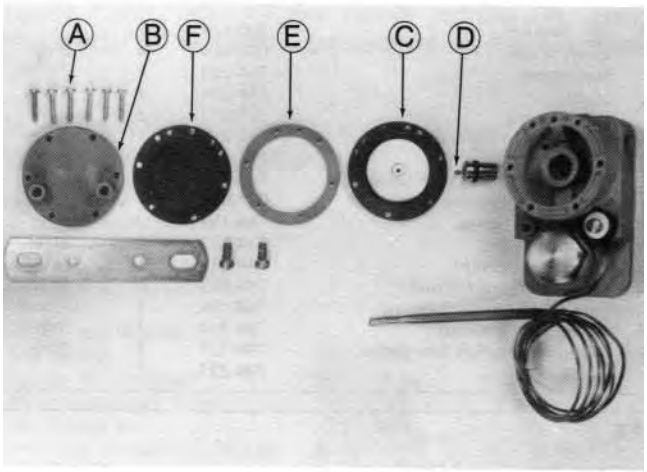


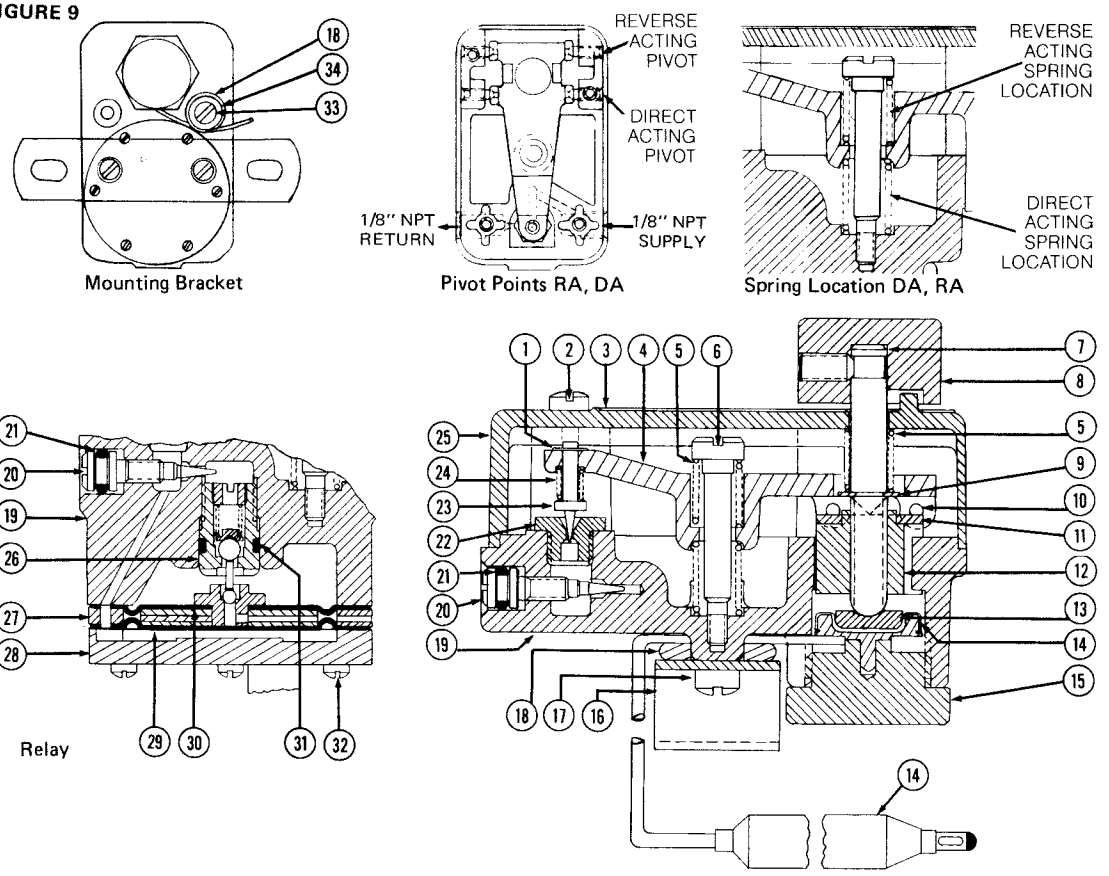
Figure 8

CALIFORNIA PROPOSITION 65 WARNING

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. (California law requires this warning to be given to customers in the State of California.)

For more information: www.watts.com/prop65

CONSTRUCTION FIGURE 9



PARTS

	Name	Part No.	Quantity	Material
1.	"C" Washer	100-124	1	
2.	Cover Screw	030-064	4	Brass
3.	Nameplate	744-223	1	
4.	Lever	744-204	1	Brass
5.	Valve Spring	225-073	2	St. Stl.
6.	Spring Retaining Screw	744-215	1	Brass
7.	Adjustment Stem	744-216	1	Brass
8.	Adjustment Knob with Set Screw	744-234	1	
9.	Type "E" Retaining Ring	047-056	1	Berylein Cop.
10.	Lever Pivot Screw	744-154	2	
11.	Piston Washer	744-217	1	Steel
12.	Adjustment Piston	744-210	1	Noryl
13.	Power Element Follower	744-212	1	Brass
14.	Sensing Element	744-235	1	Copper
15.	Power Element Cap	744-211	1	Brass
16.	Mounting Bracket Non-Relay	744-221	1	Steel
	Relay	744-233	1	
17.	Mounting Bracket Screw	030-104	2	Brass
18.	Capillary Tubing Washer	744-219	1	Buna N
19.	Body Non-Relay	744-202	1	Noryl
	Relay	744-226	1	
20.	Restriction Screw	744-218	1	Brass
21.	"O" Ring	047-049	1	Rubber
22.	Valve Seat	744-213	1	Phos. Brz.
23.	Valve	744-214	1	St. Stl.
24.	Helical Compression Ring	744-075	1	Phos. Brz.
25.	Cover	744-205	1	Delrin
26.	Supply Valve Assembly	*	1	
27.	Diaphragm Spacer	*	1	Noryl
28.	Relay Cover	*	1	Noryl
29.	Diaphragm	*	1	Neoprene
30.	Exhaust Valve & Diaphragm Assembly	*	1	Brass
31.	"O" Ring (5/16"x7/16"x1/16")	*	1	Buna N
32.	Relay Cover Screw	*	6	Brass
33.	Capillary Holder Screw	030-062	1	Brass
34.	Washer	046-108	1	Brass

KITS

Stainless Steal Well	184-119
Copper Well	184-118
Mounting Tube Kit	744-199
Duct Flange	808-517
Basic Accessory Kit No.	744-102
includes 2 of each	
1/8" x 1-1/2" lg. Brass nipple	
1/8" Brass Tee	
1-1/2" Pressure Gauge 0-30psi (138 to 207 kPa)	

Air Accessory Kit	744-107
includes:	
Reducing Valve	
1/4" piping plug	
1/8" nipple	
*Relay Repair Kit	744-260
includes items: 26-32	

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