

Instructions For Installation and Operation

STANDARD MOUNTING

RT-210

RT-212

RT-214

OPTIONAL MOUNTING

RT-213

These instructions also apply to earlier model numbers of the regulator series. The table below contains all such corresponding numbers.

Catalog Numbers	Corresponding Model Numbers
RT-210	1041-A, 928-D1, 928
RT-212	1041-C, 928-F1, 928-2
RT-213	1041-D, 928-F2, 928-2
RT-214	1041-E, 928-G1, 928-3

Note To Installer: After installing the regulator, give this instruction folder to operating personnel or see that it is filed for future reference.

<p><i>Robertshaw</i> Industrial Products Division 1602 Mustang Drive Maryville, Tennessee 37801 Phone: (865) 981-3100 Fax: (865) 981-3168</p>	<p>INSTRUCTION MANUAL NUMBER</p> <p>P-2045</p> <p>Rev. A</p>
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GENERAL INSTRUCTIONS

No regulator can be satisfactory if improperly installed. Read these instructions carefully before beginning the installation and follow them as outlined below.

While making the installation, handle the regulator with care. Avoid bending the flexible tubing on a radius less than 1½". Do not kink or mash the tubing. Do not lift the regulator in a way that strain will be put on the flexible tubing.

These regulators are suitable for installations where the temperatures to be controlled are not in excess of 170°F. and the steam pressures do not exceed limits stated below under "Pressure Limits."

OPERATING PRINCIPLE

This type of regulator automatically controls flow of steam passing through its valve in response to temperature changes affecting the bulb of the regulator.

The bulb contains a thermo-sensitive liquid which expands when heated and passes through the connecting tubing to the bellows chamber in the valve body. This bellows chamber, being surrounded by steam in the valve, is always hot; and, as the liquid from the thermostat enters the bellows, the liquid quickly vaporizes creating pressure to force the valve poppet toward closed position; thus, the valve will throttle (open or close) just enough to pass the required amount of steam in response to slight temperature changes affecting the bulb.

PRESSURE LIMITS

The RT-210 regulator is suitable for steam pressures up to 15 lbs., RT-212, RT-213, and RT-214, up to 75 lbs. if pressure is reasonably constant. Only the RT-214 regulator has balanced poppet construction.

VALVE INSTALLATION

Regulating valves are sized in accordance with the demand of the heater or other unit to be controlled. Valve sizes 1½" and less may be installed in either a horizontal or vertical run of pipe but horizontal position is preferable. Install valve with bonnet up or to one side of line — never below the line — and so the steam flow is in direction indicated by arrow on valve body. Typical installations shown on page 4.

Installation of a "Y" strainer ahead of the valve is recommended.

Provision should be made to drain the coil or other condenser through a steam trap of adequate capacity, and if possible, with a good fall to the trap and no back pressure. Best control is obtained where coil or condenser is kept dry.

If the regulator is used to control a heater connected with a trap to gravity return system, a vacuum breaker must be installed between the valve and the heater, otherwise, water hammer will occur. A quick-vent valve of suitable venting capacity, or a check valve installed to open with steam flow, may be used.

BULB INSTALLATION

The correct location of the regulator bulb is the most important detail of regulator installation. The regulator is responsive to temperature changes affecting the bulb and proportions the steam supply in accordance with these temperature changes. If the bulb is situated where it will not properly contact the medium being heated by the steam or where other temperatures may affect it, proper control cannot be obtained. When installed in a hot water storage tank, the bulb must not be placed where cold inlet water will flow directly over it. The bulb must be placed over the heating coil — not below or to the side of it — and not closer to the coil than 4".

RT-210, RT-212 and RT-214 — these regulators have a tubular bulb and are used to control temperature of liquids. In many vessels an opening is provided for a temperature regulator bulb; in others, a suitable opening must be provided. The bulb may be installed either horizontally or vertically. To install bulb, loosen union plug "C." Be sure the gasket is in place between bulb bushing "B" and plug "C."

RT-213 — these regulators have bulb and adjustment separately mounted. Install bulb as above and mount the adjustment at a convenient location. The adjustment should be located where it will not be subjected to large variations in temperature.

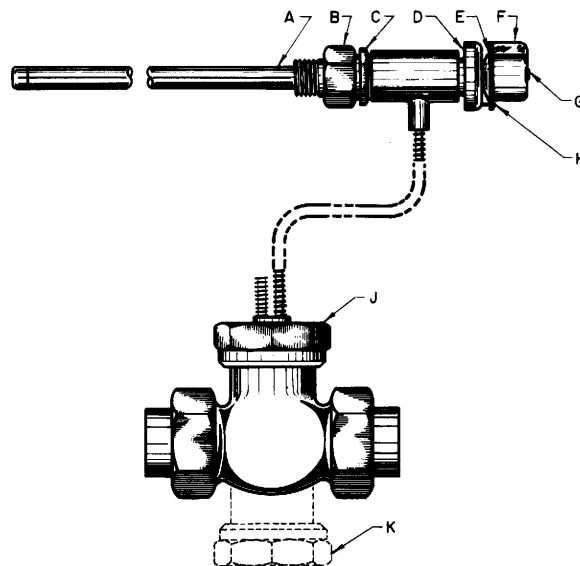


Fig. 1

FLEXIBLE TUBING

Flexible tubing must not be cut, kinked, mashed or unduly twisted. It may be bent on a 1½" radius or larger. Should this tubing be injured to the extent the thermostatic charge is lost, the regulator must be returned to the factory for repairs.

Tubing should be permanently fastened to a rigid location where it is not subject to rubbing or excessive vibration. It should not be fastened to steam pipes or other locations where subject to extreme temperatures. If the tubing is located in space subject to wide variations in temperature, the regulator will not function properly.

A small loop (about 5" dia.) of tubing next to the valve is recommended to absorb vibration occurring in pipe line.

TEMPERATURE ADJUSTMENT

To raise or lower control point of regulating valve, turn knob "F" (Fig. 1) in direction indicated on dial plate. After putting regulator in operation or after any change of thermostatic setting, allow at least 5 minutes for regulator to assume control. In correcting settings, pointer on knob "F" should be moved only about 1 or 2 degrees at a time and then wait to observe effect. Each division on dial equals 1° F. The regulator is adjustable between the limits of the temperature range.

The temperature adjustment may be locked in position to retain a certain setting and only the person with the proper key to fit the screw "G" (Fig. 1), can change it. To lock the adjustment, remove screw "G" with wrench provided and lift off knob "F." Leave stem in set position, lift locking ring "E" and replace on splined stem with locking lug on "E" between prongs "H." Replace knob and tighten screw "G."

CHECKING, OPERATION & SERVICING

In ordinary checking of the regulator operation, make observations, if possible, with a thermometer placed near the regulator bulb and in the medium being heated.

When convenient, a quick way of checking valve operation is to listen for changes in steam flow at the valve. By turning the adjusting knob from one extreme to the other, the flow of steam can be heard to start and stop as the valve opens and closes, providing the regulator is functioning properly. If sufficient time is allowed for steam to condense fully in coils, a sharp point of adjustment setting can be found at which valve opens and closes with slight movement of knob. This is the setting for the temperature existing at the thermostat at the time.

To further check operation, remove the regulator bulb and submerge it alternately in water whose temperature is above and below that of the temperature adjustment setting and listen at the valve for steam flow. With bulb submerged in water above the temperature setting, the valve should be closed.

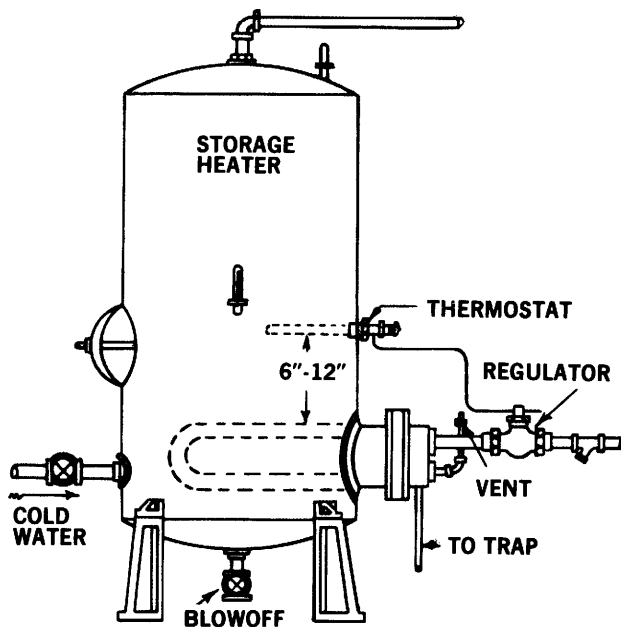


Fig. 2

If no heat or inadequate heat is obtained with highest adjustment setting, note whether return line is hot. If not, investigate for stoppage or dirt in trap, strainers, or in steam coils. Then, if necessary, remove cap nut "J" (see "Replacing Thermostatic Motor Unit" below) of regulator valve and investigate for stuck poppet.

If excessive heat is obtained with minimum setting, note first whether return line is cool, which would indicate that excess may come from another source. If steam seems to continue to flow, remove cap nut "J" of regulator valve and investigate seats for dirt. If leakage through dirt on the seat is not located, it is possible that thermostatic system is damaged and not functioning, in which case replacement or repair is necessary. Failure of temperature regulator would normally produce excess heat since the valve usually fails in open position.

MAINTENANCE & REPAIRS

This regulator should require very little attention or maintenance, but every piece of mechanical equipment deserves some care. The supply line should be kept clear by blowing the line strainer occasionally and cleaning return traps. Valve seats may be cleaned or polished if there are indications of dirt, as above. If serious trouble develops, communicate with our nearest representative.

REPLACING THERMOSTATIC MOTOR UNIT

The thermostatic motor unit (valve sizes up to 1 1/2") can be removed from regulators RT-210, RT-212 or RT-213, by simply loosening cap nut "J" (Fig. 1) and lifting out bellows assembly. When replacing, put a small amount of lubricant on threads and sealing surface to prevent galling when cap nut is tightened.

To remove thermostatic motor unit (valve sizes 1 1/4" and 1 1/2") from regulator RT-214, remove cap nut "K" and remove balancing bellows assembly by turning counter-clockwise (right-hand thread). Loosen cap nut "J" and lift out bellows assembly as described above for RT-210.

IDENTIFICATION OF REPLACEMENTS

The serial number, tube length, operating temperature, poppet and steam pressure are located on a slipring located on top of bonnet "J" (See Fig. 1). In making replacements, these numbers should be checked with those on the replacement parts.

Replacement seat inserts may be identified by comparing port diameters or by fitting to the valve poppet.

CAPACITIES

Regulator Number & Valve Size	Capacities (Pounds per hour)							Percent Maximum Flow for Temperature Changes on Bulb.						
	Steam Pressure (Pounds per square inch)							Degrees F.						
	2	5	6	10	15	25	75	1°	2°	3°	4°	5°	7°	11°
RT-210														
1/2".....	100	—	150	190	240	—	—	44	84	95	100	—	—	—
3/4".....	145	—	225	290	370	—	—	39	71	90	97	100	—	—
1".....	160	—	250	320	410	—	—	39	70	87	96	100	—	—
1 1/4".....	275	—	435	550	690	—	—	27	55	72	84	93	100	—
1 1/2".....	305	—	485	610	770	—	—	25	54	71	81	89	100	—
RT-212,														
RT-213														
1/2" thru 1"	—	135	—	195	—	320	495	25	48	68	84	94	—	—
RT-214														
1 1/4".....	—	270	—	500	—	940	2000	10	21	30	—	51	68	100
1 1/2".....	—	280	—	510	—	960	2100	10	21	31	—	52	69	100

TYPICAL INSTALLATIONS

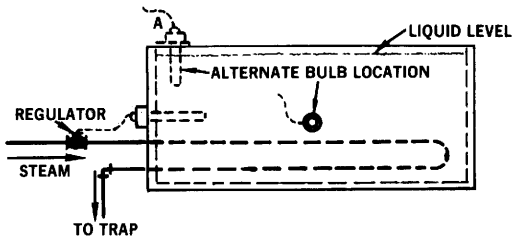


Fig. 3 — Showing regulator installed on open type tank. If bulb is to be installed as shown at "A," an extension type should be used in order to have the active part of the bulb completely submerged.

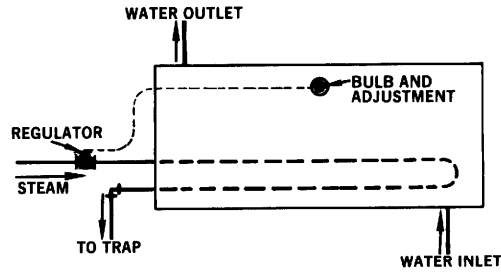
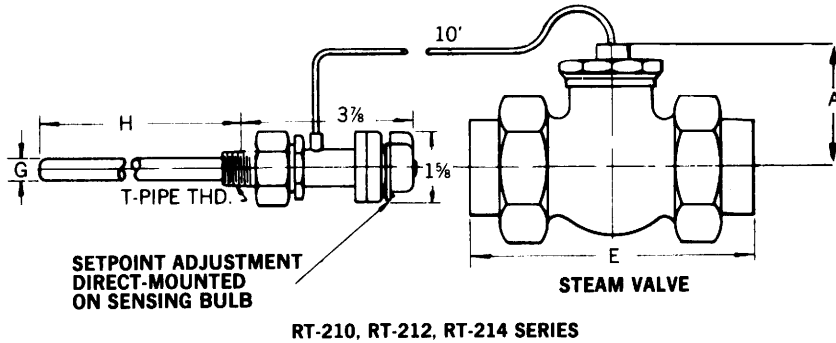
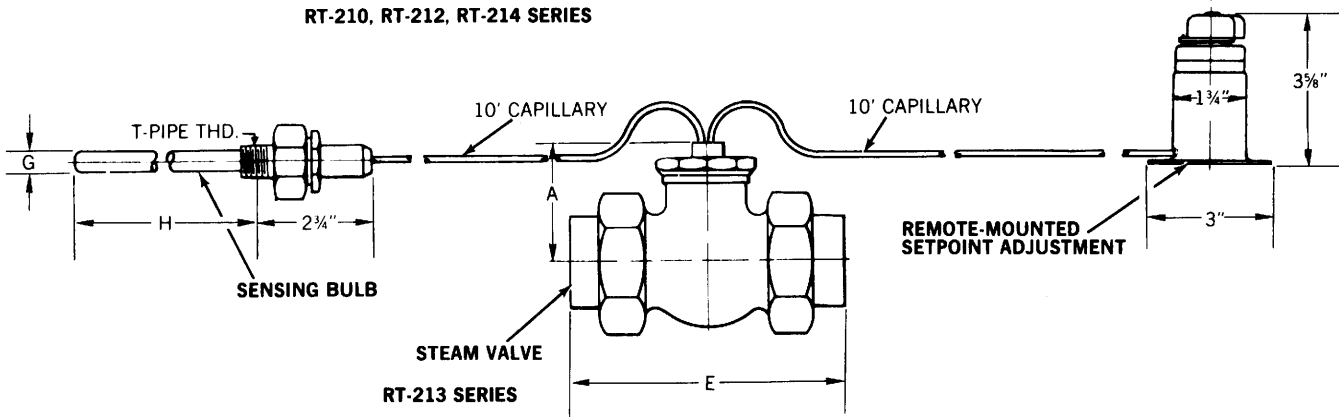


Fig. 4 — This drawing shows a regulator controlling steam supply to a closed tank or storage type water heater. Instantaneous type heater could be controlled by placing bulb in hot water outlet line and close up to heater.

DIMENSIONS



Valve Size, Inches		1/2	3/4	1	1 1/4	1 1/2
Shipping Wt., Lbs.		14	14	15	17	20
Regulator Nos.	RT-210	A 2-7/8 E 6-3/16 G 1/2 H 1/2 T 1/2	2-7/8 6-7/16 1/2 1/2	2-7/8 6-1/8 1/2 1/2	2-7/8 6-1/4 1/2 1/2	2-7/8 7-1/16 1/2 1/2
	RT-212	A 4 E 6 G 1/2 H 1/2 T 1/2	4 6-9/16 1/2 1/2	4 6 1/2 1/2	— — — —	— — — —
	RT-213	A — E — G — H — T —	— — — —	— — — —	— — — —	— — — —
RT-214	A — E — G — H — T —	— — — —	— — — —	— — — —	3-3/4 6-7/16 1/2 1/2	3-3/4 6-15/16 1/2 1/2



Robertshaw

Industrial Products Division

U.S.A and Canada

Robertshaw Industrial Products Division

1602 Mustang Drive

Maryville, Tennessee 37801

Telephone: (865) 981-3100 Fax: (865) 981-3168

<http://www.robertshaw.thomasregister.com>

<http://www.robertshawindustrial.com>

Exports

Invensys Appliance Controls

2809 Emerywood Parkway

P.O. Box 26544

Richmond, Virginia 23261-6544

Telephone: (804) 756-6500 Fax: (804) 756-6561



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