



Self-Actuated Temperature Regulator RT-1004-AI Series

FEATURES

1. Extra large two-ply, seamless bellows used for greater operating power and closer control.
2. Chevron "Lifetime" stem packing made of Teflon* or EPT Rubber U-Cup for water service.
3. Quick-detach valve stem construction permits easy valve change.
4. Sturdy construction with cast iron frame.
5. Variety of sensing bulb forms and materials. (See page 2).
6. Valves in wide range of sizes, actions, styles, materials, etc. for many services. (see page 3).
7. Capillary selection (see page 2).
8. Setpoint adjustment wheel.

*Registered trade name of DuPont Company.

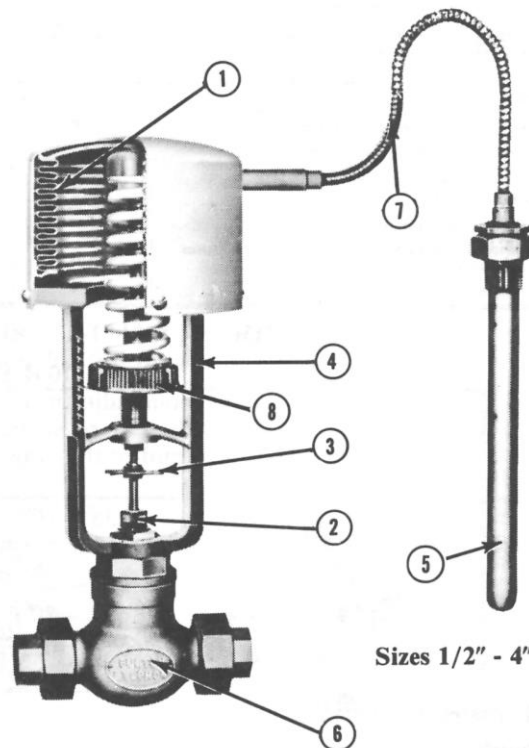
GENERAL

Without need for external power, Robertshaw Self-Actuated Temperature Regulators (SATR) offer final control of the temperature of a liquid, an air space or flow, or gas flow for domestic, equipment, process, space, etc. on heating or cooling service.

The SATR sensing bulb is installed in the medium being controlled while the SATR valve is located on the supply line of the medium used as the heating (steam, hot water) or cooling (water, ethylene glycol, brine) agent. The SATR regulates the heating or cooling medium flow to maintain the desired temperature at the sensing bulb location. Robertshaw SATR are usually cataloged to detail the two-way direct acting (close on temperature rise) type valves for heating service. Two-way reverse-acting (open on temperature rise) and three-way valves are equally available for cooling service.

The Robertshaw SATR series offers a selection of: **Throttling bands, Temperature Indication, Fail-safe** to prevent overheating, **Manual Positioning** in addition to automatic control, **Corrosive atmosphere resistant type, Small overall size** and **instantaneous heat exchanger service.**

Most cataloged Robertshaw SATR specifications are starting points from which many alternates to cataloged capillary, sensing bulb, separable well and valve may be **FURNISHED TO MEET YOUR SPECIFIC** application's needs.



*Extra power with
 Narrow Throttling Band*

HOW TO ORDER

1. Quantity
2. Size
3. Series Number
4. Setpoint and/or setpoint range
5. Capillary specs.
6. Sensing bulb specs.
7. Valve type, action, ends, etc.
8. Other features
9. Shipping & invoicing instructions.

RT-1004-AI SERIES

The RT-1004-AI series is a non-indicating design suited to heating and cooling applications. The narrow throttling band means that the RT-1004-AI series is very sensitive to temperature changes at the large sensing bulb. It is particularly applicable where the storage capacity of medium

to be heated is great while the heating surface is relatively small. The extra large bellows develops power for more positive action on higher pressure drops on valve sizes above two inches.

For cataloging and pricing purposes, the RT-1004-AI series is detailed with direct-acting valves for heating service, 8 ft. capillary (copper with brass armor), 12B type (threaded

bushing) copper sensing bulb, cast iron frame and other non-listed parts of non-ferrous metals. Alternate specifications are available.

Valve size, Inches	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4	
Valve Type, Direct-acting (closes with rising temperature at bulb)	Single Seated, Unbalanced	Single Seated, Balanced					Double Seated, Semi-Balanced			
	A	MA	MA	MA	MA	MA	FA	FA	RA	
End Connections	Screwed Brass Unions					Flanged (Class 125 ANSI)				
Valve Trim (poppet and seats), material	S.S.	S.S.	S.S.	S.S.	S.S.	S.S.	S.S.	S.S.	S.S.	
Valve Stem (highly finished), material	S.S.	S.S.	S.S.	S.S.	S.S.	S.S.	S.S.	S.S.	S.S.	
Stem Packing (spring loaded chevrons)	Teflon	Teflon	Teflon	Teflon	Teflon	Teflon	Teflon	Teflon	Teflon	
Body Material	Bronze	Bronze	Bronze	Bronze	Bronze	Cast Iron	Cast Iron	Cast Iron	Cast Iron	
Body Rating, Pounds	225	250	250	250	250	175	175	175	175	
Pressure Drop Limit, psi (For higher pressures consult our representative)	125	250	250	250	250	100	100	90	70	
Full open Cv	2.1	9.5	13.0	18.6	25.0	45.0	82.5	130.0	226.0	

The RT-1004 Series is available with any of the setpoint adjustment ranges listed below. The range should be selected so that the setpoint falls within the upper third of the range span.

0° - 35°F	110° - 150°F	220° - 255°F
20° - 60°F	145° - 190°F	240° - 275°F
45° - 80°F	160° - 195°F	255° - 295°F
65° - 105°F	185° - 220°F	
95° - 140°F	190° - 225°F	

Alternates include:

Capillary:

- Length*1 ft. to 50 ft. or more
- Materials* Copper tube with brass armor (standard) or 304 stainless steel tube with SS braid

Sensing Bulbs:

- Type 12B*Copper (standard)
- Type 12BP* 316 stainless steel
- Type 12B or 12BP* with dead extension
- Type 54*Copper, externally finned, plain (54A),
Copper, externally finned, bushed (54J),
Copper, externally finned, flanged (54K)
- Type 6*Plain for open vessels,
Copper with copper tube and brass armor (6A),
316 SS with 304 SS tube and no braid (6AP)

Separable Wells (For sensing bulb protection or ease of removal):

- Material* 316 SS
- Type GA or GA with lagging extension*
(Mounting thread one size larger than bulb size)
NOTE: Bulb diameter on lagging extension type is 1-1/4" maximum.
- Type GB* (Mounting thread same size as bulb size);
for bulb sizes up to 1-1/4" diameter.

Valves: Types A, FA, MA, MAS, WA, WBI, WD as illustrated.

VALVE SIZING

Valve sizing is critical to control and life of regulator. Use Robertshaw's "Flo-Rule" Valve Sizing Slide Rule and Cv chart or contact our representative or factory. The application requirement can frequently be satisfied by one or two sizes smaller valve than the supply pipeline size.

NOTE 1 - **IMPORTANT** - If valve seat leakage can cause a problem or a hazard, the following should be taken into account. Maximum leakage of new valves: single-seated Types A, WA - 0.05% of full open valve capacity; single-seated balanced Types MA, MAS - 0.01% of full open valve capacity; Single seated Type WD – 1% of full open valve capacity; double-seated Types FA, WBI - 0.5% of full open valve capacity; This leakage will usually increase somewhat as the valve seats wear in service.

NOTE 2 - **IMPORTANT** - Damage to or failure of the thermal element with loss of charge will ordinarily result in the regulator going to the "cold" position. The stem moves "up" (toward the bellows) - thus a "direct-acting" valve will fully open, a "reverse-acting" valve will close, and a 3-way valve will fully open the bypass port(s).

DIMENSIONS, SHIPPING WEIGHTS AND SENSING BULB SIZES

Valve Size, Inches	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4
Direct-Acting Valve, Type	A	MA	MA	MA	MA	MA	FA	FA	FA
Shipping Wt., Lbs.	35	37	40	45	50	85	105	130	160
A	13-5/16	15-3/16	15-3/16	15-3/8	15-7/8	16-11/16	16-1/2	16-1/2	17-9/16
B	11-3/4	11-3/4	11-3/4	11-3/4	11-3/4	11-3/4	11-3/4	11-3/4	11-3/4
D	1-9/16	3-7/16	3-7/16	3-5/8	4-1/8	4-15/16	4-3/4	4-3/4	5-13/16
E	4-3/4	5-15/16	7-1/8	7-1/2	8-1/2	7	7-3/4	8-5/8	10-1/4

Standard bulb for temperature ranges beginning at 120° F. or above.

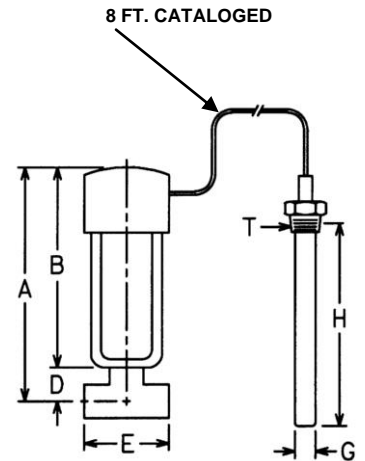
G	1	1	1-1/4	1-1/4	1-1/4	1-1/4	1-1/4	1-1/4	1-1/4
H	18	18	18	18	18	24	18	18	24
T*	1	1	1-1/4	1-1/4	1-1/4	1-1/4	1-1/4	1-1/4	1-1/4

**Standard bulb for temperature ranges beginning below 120° F.

G	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
H	24	24	28	28	28	32	28	28	32
T*	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2

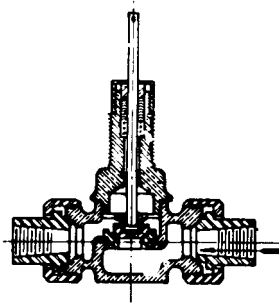
* Standard pipe thread.

** Bulb sizes for ranges beginning below 120° F. are necessary to provide "cross-ambient" charge. This assures operation with ambient temperature either above or below the control setting. Under some conditions, smaller bulbs may be used with lower ranges. If the larger bulb cannot be used, consult the factory or nearest representative.



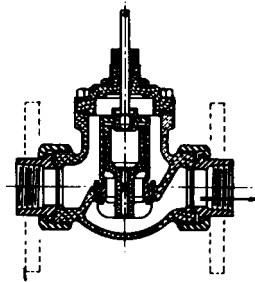
SATR VALVES FOR RT-1004-AI SERIES (See Valve Spec. Sheet for full details)

TWO WAY



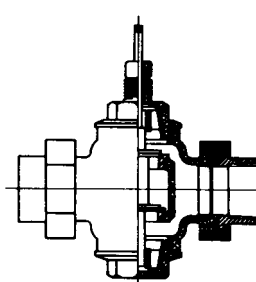
Style A

Union Ends
Single Seated
Unbalanced
Bronze Body
SS Trim
Direct Acting
Sizes 1/2" - 1"
Reverse Acting
Sizes 1/2" - 1-1/2"



Style MA & MAS

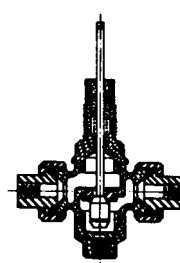
Single Seated
Fully Balanced
Direct Acting only
SS Trim
MA Sizes 3/4" - 1-1/2"
Union Ends
Bronze Body
MA Size 2"
Flanged
Bronze or C.I. Body
MAS Sizes 1" - 2"
Flanged
Steel Body
MAS Sizes 3/4" - 1-1/2"
Threaded Ends
Steel Body



Style FA

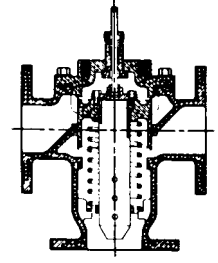
Double Seated
Semi-Balanced
Reverse Acting: 3/4" - 1-1/2"
Bronze Unions
Bronze Body
Bronze or Monel Trim
Reverse Acting: 2"
Flanged
Bronze Body
Bronze or Monel Trim
Reverse Acting: 2"
Flanged
Cast Iron Body
Bronze or SS Trim
Reverse Acting: 2-1/2" - 4"
Flanged
Bronze Body
Monel Trim
Reverse Acting: 2-1/2" - 4"
Flanged
Cast Iron Body
SS Trim
Direct Acting: 2-1/2" - 4"
Flanged
Cast Iron Body
SS Trim

THREE WAY



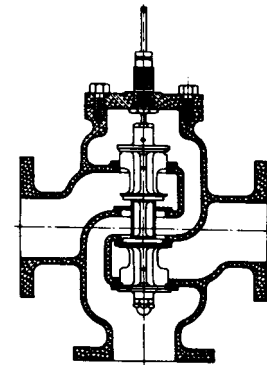
Style WA

Union Ends (2)
Threaded End (Bottom)
Unbalanced
Sizes 1/2" - 1-1/2"
Bronze Body
SS Trim



Style WD

Balanced
Sizes 2" - 3"
Flanged
Bronze Body
Bronze Trim



Style WBI

Double Seated
Semi-Balanced
Size: 3"
Flanged
Cast Iron Body
Bronze Trim



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