

SELF-ACTUATED TEMPERATURE REGULATOR

Selection Guide With Compatible Valve Data

Robertshaw

Industrial Products Division

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February 2003

NOTES

SELECTION DATA

HOT CHAMBER TYPE SATR

Hot Chamber type Self-Actuated Temperature Regulators are designed for heating service with steam. The three different sensing bulbs [room (wall mount), line (bushing), air or gas sensing (flanged)] allow for a great number of heating applications, from space heating to steam tables, etc. They are highly sensitive, compact, and generally the least expensive type of SATR. However, applications are limited to steam.

MODEL	BULB STYLE	SIZES	MAX. PRESS.
RT-208	ROOM (DIRECT ADJ.)	1/2, 3/4, 1"	75 PSI
RT-212	LINE (DIRECT ADJ.)	1/2, 3/4, 1"	75 PSI
RT-213	LINE (REMOTE ADJ.)	1/2, 3/4, 1"	75 PSI
RT-214	LINE (DIRECT ADJ.)	1-1/4, 1-1/2"	75 PSI
RT-222	AIR or GAS (DIRECT ADJ.)	1/2, 3/4, 1"	75 PSI
RT-223	AIR or GAS (REMOTE ADJ.)	1/2, 3/4, 1"	75 PSI
RT-224	AIR or GAS (DIRECT ADJ.)	1-1/4, 1-1/2"	75 PSI

VAPOR-PRESSURE TYPE

The Vapor-Pressure type Self-Actuated Temperature Regulators can handle a wide range of applications for self-actuated temperature control including heating, cooling, mixing, or diverting service. Also, the vapor-pressure type can handle larger valves with longer strokes and higher pressure drops. The wide variety of features available make it possible to custom fit these SATRs to meet the customer's application.

MODEL	THROTTLE-BAND	SET-POINT RANGES	TEMP GAGE	MAX. STROKE	SPECIAL FEATURES
RT921A1	WIDE	50° F SPANS 10° TO 300° F	N	5/16"	SMALL SIZE
RT921B1	WIDE	50° F SPANS 10° TO 300° F	Y	5/16"	SMALL SIZE
RT1001B1	WIDE	60° F SPANS 15° TO 480° F	N	9/16"	NONE
RT1001C1	WIDE	60° F SPANS 15° TO 480° F	Y	9/16"	NONE
RT1001P,Q,R,S	WIDE	60° F SPANS 6 RANGES	OPT	9/16"	"QUICK SHIP"
RT1001T2	WIDE	60° F SPANS 40° TO 480° F	N	9/16"	HEATER/TREATER
RT1003D1	MEDIUM	50° F SPANS 10° TO 455° F	N	9/16"	NONE
RT1003E1	MEDIUM	50° F SPANS 10° TO 455° F	Y	9/16"	NONE
RT1003F1	MEDIUM	50° F SPANS 10° TO 455° F	Y	9/16"	REMOTE TEMP GAGE
RT1004A1	NARROW	30° F SPANS 0° TO 425° F	N	11/16"	NONE
RT1006B1	WIDE	30° F SPANS -50° TO 325° F	N	5/16"	"FAIL-SAFE"
RT1007A1	WIDE	30° F SPANS -50° TO 325° F	N	9/16"	"FAIL-SAFE"
RT1009A1	MEDIUM	40° F SPANS 5° TO 430° F	N	9/16"	MANUAL OVERRIDE
RT1009B1	MEDIUM	40° F SPANS 5° TO 430° F	Y	9/16"	MANUAL OVERRIDE
RT1009C1	MEDIUM	40° F SPANS 5° TO 430° F	Y	9/16"	MAN. OVERRIDE REMOTE GAGE
RT1010A1* 3"	NARROW	25° F SPANS 5° TO 405° F	N	11/16"	MANUAL OVERRIDE
RT1010A2* 4"	NARROW	25° F SPANS 5° TO 405° F	N	11/16"	MANUAL OVERRIDE
RT1010A3* 5" & 6"	NARROW	25° F SPANS 10° TO 410° F	N	1-1/32"	MANUAL OVERRIDE
RT1011B1	MEDIUM	50° F SPANS 10° TO 455° F	N	9/16"	SS UPPERWORKS

* RT1010s available only with 3-WAY Style WD valve.

VALVE BODY SELECTION DATA

INTRODUCTION

Robertshaw valve assemblies for use with SATRs are available in many size, material, ANSI rating, and trim configuration options. The purpose of this valve body selection data is to provide overview information to use in making a PRELIMINARY selection of the valve body assembly and actuator. Further reference must be made to individual product specification sheets before making final selection.

Pressure drop ratings shown on this summary are the maximum for valve type and may be reduced for individual actuation. See actuator specification sheets for specific application.

Particular attention should be given to choice of trim material, maximum actuator stroke, and combined pressure-temperature rating of the body.

TABLE I - 2 WAY VALVES

VALVE TYPE	PORT SIZE	ACTION	BODY MATL	TRIM MATL	ENDS	MAX. TEMP	STROKE	MAX. ΔP	BAL/ UNBAL
A*	1/4 – 1/2"	DIR/REV	BZ	SS	UNION	400° F	1/8 – 3/16"	125	UN
A	3/4"	DIR/REV	BZ	SS	UNION	400° F	1/4"	100	UN
A	1"	DIR/REV	BZ	SS	UNION	400° F	5/16"	75	UN
A	1-1/4, 1-1/2"	REV	BZ	SS	UNION	400° F	3/8 – 7/16"	50	UN
CSS	1/4 – 1"	DIR/REV	SS	SS	THREAD	450° F	3/8"	100	UN
MA*	3/4 – 1-1/2"	DIR	BZ	SS	UNION	400° F	1/4 – 7/16"	250	BAL
MA*	2"	DIR	FE	SS	125 FLG	353° F	9/16"	150	BAL
MA	2"	DIR	BZ	SS	150 FLG	450° F	9/16"	150	BAL
MAS	3/4 – 1-1/2"	DIR	ST	SS	THREAD	450° F	1/4 – 7/16"	250	BAL
MAS	1-1/2"	DIR	ST	SS	150 FLG	300° F	7/16"	250	BAL
MAS	2"	DIR	ST	SS	150 FLG	300° F	9/16"	150	BAL
MAS	1, 1-1/2"	DIR	ST	SS	300 FLG	450° F	5/16 – 7/16"	250	BAL
MAS	2"	DIR	ST	SS	300 FLG	450° F	9/16"	150	BAL
MASS	1-1/2"	DIR	SS	SS	THREAD, 150/300 FLG	450° F	7/16"	250	BAL
MASS	2"	DIR	SS	SS	150/300 FLG	450° F	9/16"	150	BAL
FA*	3/4 – 1-1/2"	REV	BZ	BZ	UNION	400° F	5/32 – 1/4"	50	SEMI-
FA	3/4 – 1-1/2"	REV	BZ	MONEL	UNION	400° F	5/32 – 1/4"	125	SEMI-
FA	2"	REV	BZ	BZ	150 FLG	400° F	5/16"	50	SEMI-
FA	2"	REV	BZ	MONEL	150 FLG	400° F	5/16"	125	SEMI-
FA	2"	REV	FE	BZ	125 FLG	350° F	5/16"	50	SEMI-
FA*	2"	REV	FE	SS	125 FLG	350° F	5/16"	100	SEMI-
FA	2-1/2 – 4"	DIR/REV	BZ	MONEL	150 FLG	400° F	3/8 – 9/16"	125	SEMI-
FA*	2-1/2 – 4"	DIR/REV	FE	SS	125 FLG	350° F	3/8 – 9/16"	100	SEMI-

* Standard model for valve type/action SS = Stainless Steel BZ = Bronze/Brass FE = Cast Iron ST = Steel

TABLE II - 3 WAY VALVES

VALVE TYPE	PORT SIZE	ACTION	BODY MATL	TRIM MATL	ENDS	MAX. TEMP	STROKE	MAX. ΔP	BAL/ UNBAL
WA	1/2 – 3/4"	3-WAY	BZ	SS	UNION	400° F	3/16 – 1/4"	100	UN
WA	1"	3-WAY	BZ	SS	UNION	400° F	5/16"	75	UN
WA	1-1/4 – 1-1/2"	3-WAY	BZ	SS	UNION	400° F	3/8 – 7/16"	50	UN
WBI	3"	3-WAY	FE	BZ	125 FLG	350° F	1/2"	50	BAL
WCSS	1/2 – 1"	3-WAY	SS	SS	THREAD	350° F	3/8"	40	UN
WD	2 – 2-1/2"	3-WAY	BZ	BZ	150 FLG	200° F	5/16 – 7/16"	40	BAL
WD	3 – 6"*	3-WAY	BZ	BZ	150 FLG	200° F	5/8 – 1-1/32"	40	BAL
WDS**	3 – 6"*	3-WAY	ST	BZ	150 FLG	250° F	5/8 – 1-1/32"	40	BAL

* 3" TO 6" WD Valves are the standard valves for the RT1010A Series. RT1010As are the only actuators capable of stroking large WD valves.

** Contact factory for availability of steel body WD valves.

SS = Stainless Steel BZ = Bronze/Brass FE = Cast Iron ST = Steel

DEFINITIONS

- Cv:** Used in valve sizing. Cv is defined as the amount of water in gpm @ 60° F which will flow through the valve in its wide open position at 1 psig pressure drop (ΔP).
- ΔP:** Pressure drop. Inlet pressure minus outlet pressure in psig units.
- Direct-Acting Valve:** Valve stem moves down to close the valve.
- Reverse-Acting Valve:** Valve stem moves down to open the valve.
- Ends:** Type of valve connection (unions, threaded, or flanged).
- Trim:** Term used to describe valve internals; includes plug and stem and seat ring(s).
- Stroke:** Actuator or valve stem travel expressed in inches.
- Throttling Band:** The throttling band of a SATR unit is defined as the number of degrees temperature change required at the sensing bulb to drive the valve through full stroke.
- Unbalanced Valve:** Requires extra force from the actuator to overcome the static effects of the line pressure acting against the unbalanced area of the poppet and stem. This requires consideration as to maximum pressure drop that the valve/actuator combination can handle. For example, a 1-1/2" Type A valve will handle a maximum 50 psig pressure drop, **but** is limited to a 7 psig drop when used with a RT1001 series SATR. Refer to Sales Manual Letter L-160-8 for maximum allowable pressure drop for valve/actuator combinations, or refer to individual valve product specification sheets.
- Balanced valve:** Due to internal configuration, the effects of the static line pressure are cancelled. The limiting factor then becomes the pressure drop rating of the valve only and the actuator does not have to be considered.

NOTES

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Q-4127 (2/03)

Printed in U.S.A.