

Temperature Regulator 91000 Series

"The Self-Op"



91400 pictured

Self-Operating Design

Indicating, Non-Indicating or Safety Models Available

Heavy Duty Die Cast Aluminum Housing

1/2" thru 6" Valve Sizes

The Series 91000 Self-Operating Temperature Regulator is the preferred choice of original equipment manufacturers, mechanical contractors and specifying engineers. This regulator requires no external power source and is ideal for regulating the temperature of tanks, process streams and various industrial equipment. The actuator is noted for its rugged, die cast aluminum housing. The Model 91400 is furnished with an adjustable dial thermometer to allow the operator to verify the process temperature. The Model 91600 Fail-Safe Actuator is designed to cause the valve to fail in the safe control position (open in a cooling application, closed in a heating application) should accidental damage to the thermal system occur, resulting in loss of the pressure charge.

For optimal performance, the service conditions (medium, flow, temperature, inlet and outlet pressures) of the application must be considered when selecting a valve. Please refer to the Valve Selection Section of this catalog. For applications where the process media may be corrosive or contained under pressure, the use of a thermowell is required to prevent damage to the regulator bulb and facilitate its removal from the process. Improper application may cause failure of the valve, resulting in possible personal injury or property damage.

Temperature Regulators

Specifications

<p>Models 91000 (Non-Indicating) 91400 (Indicating) 91600 (Fail-Safe)</p> <p>Power Requirements Fully self-contained – no external power required.</p> <p>Dial Thermometer 3 1/2" dial, stainless steel case, swivel and angle adjustment (Model 91400 only)</p>	<p>Housing Die cast aluminum, epoxy powder coated blue finish</p> <p>Set Point Scale Integral to housing</p> <p>Bellows High pressure brass, corrosion resistant, tin plated finish</p> <p>Adjustment Screw Brass</p>	<p>Adjustment Screw Bushing Lubricant impregnated sintered bronze</p> <p>Range Adjustment Spring Cadmium plated</p> <p>Overrange Protection Upper range limit +100°F for temporary situations (not available for Model 91600)</p>	<p>Approximate Shipping Weight</p> <p>Actuator – 91000: 6.0 lbs [2.70 kg] 91400: 6.6 lbs [2.97 kg] 91600: 9.5 lbs [4.32 kg]</p> <p>Valve – See Valve Selection tables.</p>
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How to Order

Sample Order Number: 91400CR0608B01-A26

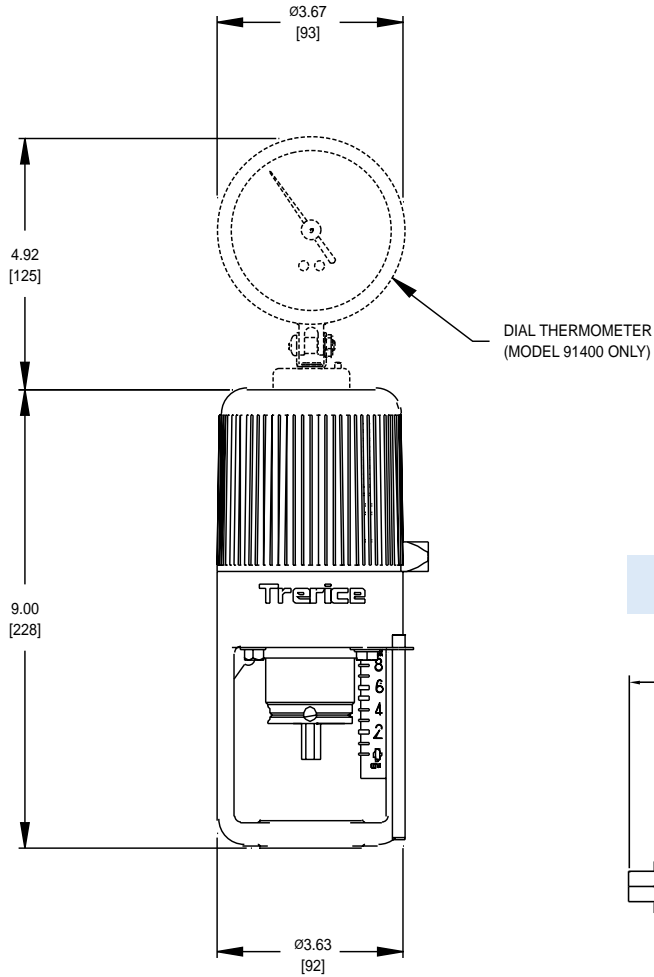
Model	Level of Assembly	Range	Capillary Length	Thermal System	Thermowell	Valve
91000	Non-Indicating	A Actuator only	See Standard	08 8 Feet	See Thermal	W01 Brass
91400	Indicating	C Complete	Available Ranges	12 12 Feet	System Selection	W02 Steel
91600	Fail-Safe	Regulator	(page 11)	16 16 Feet	(page 12)	W04 316SS
				20 20 Feet		Omit if none
						For 91000/91400 see pages 15-22
						For 91600 see page 23
						Omit if Actuator Only

Other: Specify Length in Feet (52' maximum)

Temperature Regulator 91000 Series

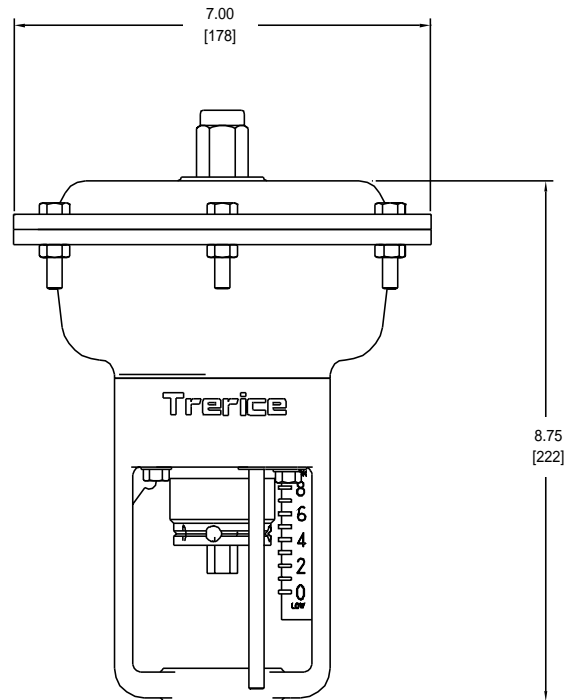
"The Trerice Self-Op"

91000 / 94000



All dimensions are nominal.
Dimensions in [] are in millimeters.

91600



Temperature Regulator 91000 Series

"The Trerice Self-Op"

Standard Available Ranges

91000 & 91400 Compact Actuators

Range Code	Nominal Range	Recommended Working Span		Dial Thermometer Range (Model 91400 only)
		Single Seat, In-To-Close Valves Double Seat, In-To-Close Valves Double Seat, In-To-Open Valves All 3-Way Valves	Single Seat, In-To-Open Valves	
R01*	20° to 70°F & -10° to 20°C	40° to 65°F & 5° to 20°C	N/A	30° to 115°F & C
R02*	40° to 90°F & 5° to 30°C	65° to 85°F & 20° to 30°C	N/A	50° to 140°F & C
R03	30° to 115°F & 0° to 45°C	85° to 110°F & 30° to 45°C	50° to 80°F & 10° to 25°C	30° to 115°F & C
R04	50° to 140°F & 10° to 60°C	110° to 135°F & 45° to 60°C	80° to 105°F & 25° to 45°C	50° to 140°F & C
R05	75° to 165°F & 25° to 70°C	135° to 160°F & 60° to 70°C	105° to 130°F & 40° to 50°C	75° to 165°F & C
R06	105° to 195°F & 40° to 90°C	160° to 190°F & 70° to 90°C	130° to 155°F & 50° to 65°C	105° to 195°F & C
R07	125° to 215°F & 55° to 100°C	190° to 210°F & 90° to 100°C	155° to 180°F & 65° to 80°C	125° to 215°F & C
R09	155° to 250°F & 70° to 120°C	210° to 245°F & 100° to 120°C	200° to 215°F & 95° to 100°C	155° to 250°F & C
R10	200° to 280°F & 95° to 135°C	245° to 275°F & 120° to 135°C	215° to 245°F & 100° to 120°C	200° to 280°F & C
R11	225° to 315°F & 110° to 155°C	275° to 310°F & 135° to 155°C	245° to 280°F & 120° to 140°C	225° to 315°F & C
R12	255° to 370°F & 125° to 185°C	305° to 365°F & 155° to 185°C	275° to 335°F & 135° to 165°C	255° to 370°F & C
R13	295° to 420°F & 145° to 215°C	365° to 415°F & 185° to 215°C	335° to 385°F & 165° to 195°C	295° to 420°F & C
R14	310° to 440°F & 155° to 225°C	415° to 435°F & 215° to 225°C	385° to 405°F & 195° to 205°C	310° to 440°F & C

*Not recommended for single seated valves.

The recommended working span typically falls within the upper third of the nominal range. Single Seat In-To-Close, all Double Seat, and all 3-Way valves have a recommended working span in this part of the nominal range. However, due to differing thrust requirements, Single Seat In-To-Open valves have a recommended working span in the middle one-third of the nominal range.

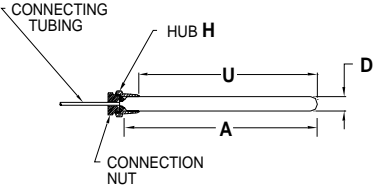
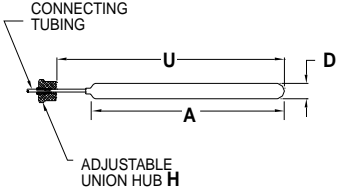
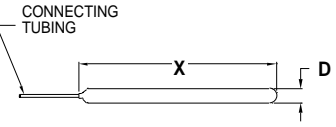
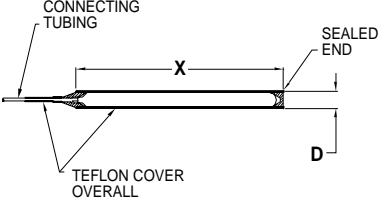
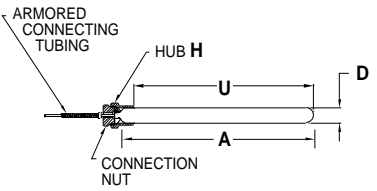
Standard Available Ranges

91600 Safety Actuator

Range Code	Nominal Range and Recommended Working Span	Range Code	Nominal Range and Recommended Working Span
R81	40° to 65°F & 5° to 20°C	R90	170° to 195°F & 80° to 90°C
R82	55° to 80°F & 15° to 25°C	R91	190° to 210°F & 85° to 100°C
R83	65° to 90°F & 20° to 30°C	R92	205° to 225°F & 95° to 105°C
R84	80° to 110°F & 25° to 40°C	R93	215° to 250°F & 100° to 120°C
R85	90° to 115°F & 30° to 45°C	R94	230° to 265°F & 110° to 130°C
R86	110° to 140°F & 40° to 60°C	R95	245° to 280°F & 120° to 135°C
R89	140° to 175°F & 60° to 80°C	R96	270° to 300°F & 135° to 150°C

Temperature Regulators

Thermal System Selection

Bulb and Capillary Style	Order Code	Connection Style & Material	Bulb Material	Capillary Tubing Material
Union Connection 	B01	Brass Union Hub	Copper	Copper
	B10	Stainless Steel Union Hub	Stainless Steel	Stainless Steel
Adjustable Union Connection 	B02	Brass Union Hub	Adjustable over entire capillary length	
	B04	Stainless Steel Union Hub	Stainless Steel	Stainless Steel
Plain Bulb 	B05	None	Copper	Copper
	B06	None	Stainless Steel	Stainless Steel
Teflon Covered Bulb 	B08	None	Copper with Teflon Covering	Copper with Teflon Covering
	B07	None	Stainless Steel with Teflon Covering	Stainless Steel with Teflon Covering
Union Connection with Spiral Armor 	B15	Brass Union Hub	Copper	Copper with Stainless Steel Spiral Armor
	B16	Stainless Steel Union Hub	Stainless Steel	Stainless Steel with Stainless Steel Spiral Armor

Bulb Pressure Limits: Copper = 250 psi, Stainless Steel = 500 psi

Bulb Dimensions & Minimum Insertion Lengths

Standard Bulb						Special "Small" Bulb			
Dim.	91000 / 91400 Capillary Length				91600 Capillary Length 8 Feet*	91000 / 91400		91600 All	
	8 to 16 Feet	20 Feet	24 to 36 Feet	40 to 52 Feet		Order Code	All		
A	13"	16"	20"	24"	16"	SB01	9"	12"	
U	12.25"	15.25"	19.25"	23.25"	15.25"		8.25"	11.25"	
D	1"	1"	1"	1"	1"		3/4"	3/4"	
H	1 NPT	1 NPT	1 NPT	1 NPT	1 NPT		3/4 NPT	3/4 NPT	
A	13"	16"	20"	24"	16"	SB10	9"	12"	
U	12.25"	15.25"	19.25"	23.25"	15.25"		8.25"	11.25"	
D	1"	1"	1"	1"	1"		3/4"	3/4"	
H	1 NPT	1 NPT	1 NPT	1 NPT	1 NPT		3/4 NPT	3/4 NPT	
A	13"	16"	20"	24"	16"	<p>Note: This bulb is available for applications where space considerations exist, and may only be used when the temperature of the actuator housing will always remain lower than that of the sensing bulb. If the temperature of the actuator housing rises above the sensing bulb temperature, the unit will not operate properly. The temperature of the actuator housing is dependent upon both the surrounding environment and the temperature of the flow medium and may easily reach 150°F on steam service.</p> <p>This bulb is only available on union connected thermal systems.</p> <p>Always use the Standard Bulb unless special requirements exist and full details of the application are known, consult factory.</p>	9"	12"	
U	12.25"	15.25"	19.25"	23.25"	15.25"		8.25"	11.25"	
D	1"	1"	1"	1"	1"		3/4"	3/4"	
H	1 NPT	1 NPT	1 NPT	1 NPT	1 NPT		3/4 NPT	3/4 NPT	
X	13"	16"	20"	24"	16"		SB15	9"	12"
D	1"	1"	1"	1"	1"			8.25"	11.25"
X	13"	16"	20"	24"	16"		SB16	9"	12"
D	1"	1"	1"	1"	1"			8.25"	11.25"
X	15"	18"	22"	26"	18"		SB15	9"	12"
D	1.16"	1.16"	1.16"	1.16"	1.16"			8.25"	11.25"
X	15"	18"	22"	26"	18"	SB16	9"	12"	
D	1.16"	1.16"	1.16"	1.16"	1.16"		8.25"	11.25"	
A	13"	16"	20"	24"	16"	SB15	9"	12"	
U	12.25"	15.25"	19.25"	23.25"	15.25"		8.25"	11.25"	
D	1"	1"	1"	1"	1"		3/4"	3/4"	
H	1 NPT	1 NPT	1 NPT	1 NPT	1 NPT		3/4 NPT	3/4 NPT	
A	13"	16"	20"	24"	16"	SB16	9"	12"	
U	12.25"	15.25"	19.25"	23.25"	15.25"		8.25"	11.25"	
D	1"	1"	1"	1"	1"		3/4"	3/4"	
H	1 NPT	1 NPT	1 NPT	1 NPT	1 NPT		3/4 NPT	3/4 NPT	

*On Model 91600, Minimum Insertion Length increases by 1" for each additional 4 ft. capillary increment.

Temperature Regulators

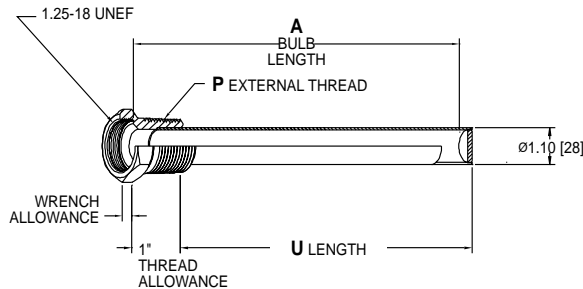
Temperature Regulators

Thermowells

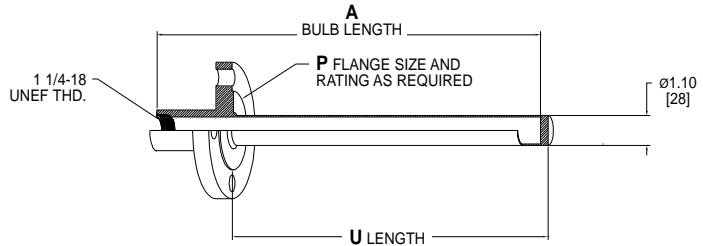
to fit Standard Bulb

All dimensions are nominal.
Dimensions in [] are in millimeters.

Threaded Thermowell



Flanged Thermowell



Lengths

A Bulb Length	Thermowell U Length
13"	12.25 [311]
16"	15.25 [387]
20"	19.25 [489]
24"	23.25 [591]

How to Order

Sample Order Number: 53-6S6

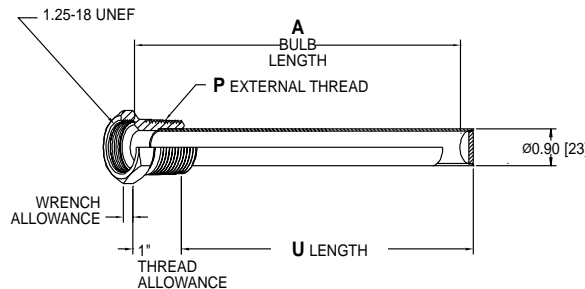
Thermowell Style	External Connection (P)	Bulb Length (A)	Material
53 Temperature Regulator	6 1 1/4 NPT	S 13" Bulb	2 Brass (500 psi max.)
	71 1 1/2" 150# RFF	Ve 16" Bulb	3 Steel (500 psi max.)
	81 2" 150# RFF	We 20" Bulb	6 316SS (1000 psi max.)
	181 3" 150# RFF	Wk 24" Bulb	

Other connections and lengths may be available, consult factory.

Selection of the proper thermowell is the sole responsibility of the user. Pressure limitations must be considered. Improper application may cause failure of the thermowell, resulting in possible personal injury or property damage.

to fit Special "Small" Bulb

All dimensions are nominal.
Dimensions in [] are in millimeters.



Lengths

A Bulb Length	Thermowell U Length
9"	8.25 [210]
12"	11.25 [286]

How to Order

Sample Order Number: 53-5M2

Thermowell Style	External Thread (P)	Bulb Length (A)	Material
53 Temperature Regulator	5 1 NPT	M 9" Bulb	2 Brass (500 psi max.)
		R 12" Bulb	3 Steel (500 psi max.)
			6 316SS (1000 psi max.)