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.

Specifications

Models
91000 (Non-Indicating)
91400 (Indicating)
91600 (Fail-Safe)

Power Requirements
Fully self-contained – no external power required.

Dial Thermometer
3 1/2" dial, stainless steel case, swivel and angle adjustment (Model 91400 only)

Housing
Die cast aluminum, epoxy powder coated blue finish

Set Point Scale
Integral to housing

Bellows
High pressure brass, corrosion resistant, tin plated finish

Adjustment Screw
Brass

Adjustment Screw Bushing
Lubricant impregnated sintered bronze

Range Adjustment Spring
Cadmium plated

Overrange Protection
Upper range limit +100°F for temporary situations (not available for Model 91600)

Approximate Shipping Weight

Actuator –
91000: 6.0 lbs [2.70 kg]
91400: 6.6 lbs [2.97 kg]
91600: 9.5 lbs [4.32 kg]

Valve –
See Valve Selection tables.

How to Order

Sample Order Number: 91400CR0608B01-A26

91400	*C*	*R06*	*08*	*B01*		*A26*
Model	**Level of Assembly**	**Range**	**Capillary Length**	**Thermal System**	**Thermowell**	**– Valve**
91000 Non-Indicating **91400** Indicating **91600** Fail-Safe	**A** Actuator only **C** Complete Regulator	See Standard Available Ranges (page 11)	**08** 8 Feet **12** 12 Feet **16** 16 Feet **20** 20 Feet	See Thermal System Selection (page 12)	**W01** Brass **W02** Steel **W04** 316SS Omit if none	For 91000/91400 see pages 15-22 For 91600 see page 23 Omit if Actuator Only

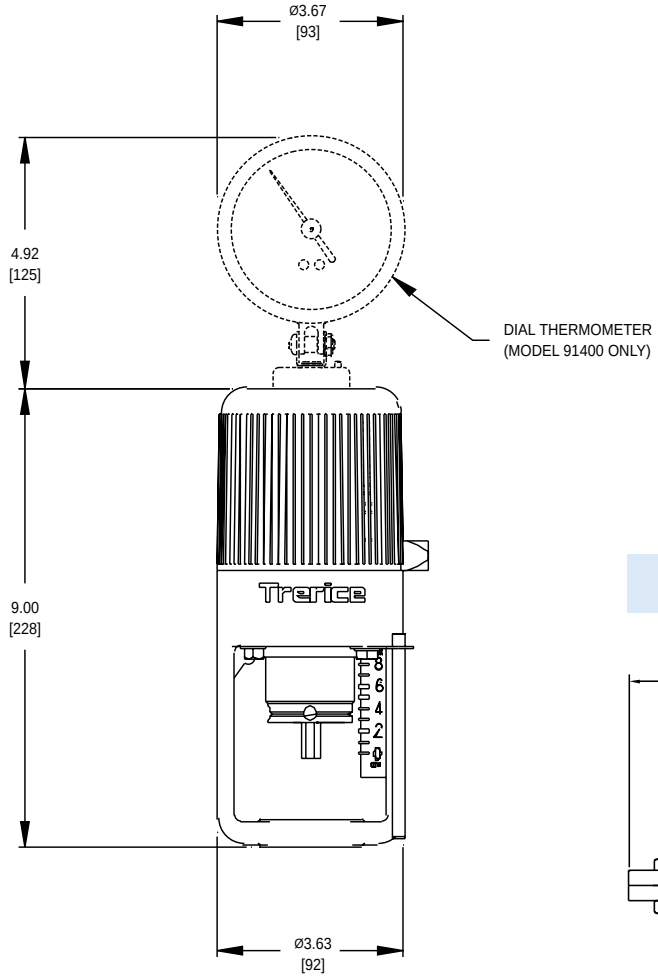
Other: Specify Length in Feet (52' maximum)

Temperature Regulator 91000 Series

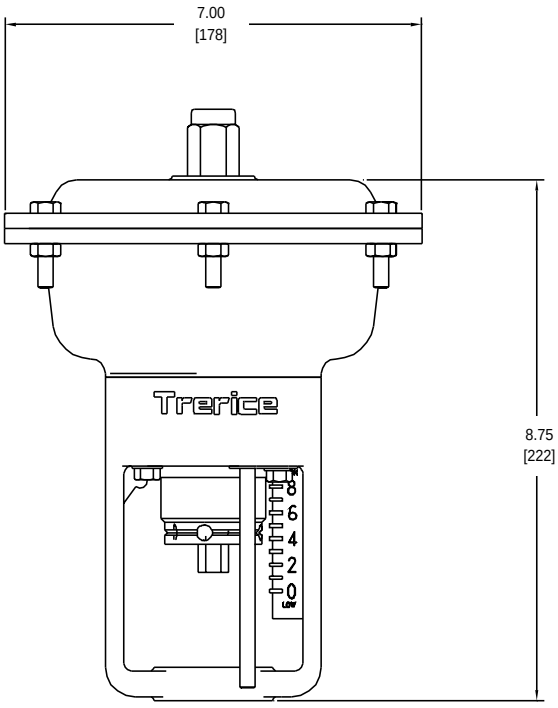
"The Trerice Self-Op"

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

91000 / 94000



91600



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Temperature Regulator 91000 Series

"The Trerice Self-Op"

Standard Available Ranges

91000 & 91400 Compact Actuators

Range Code	Nominal Range	Recommended Working Span: Single Seat, In-To-Close Valves; Double Seat, In-To-Close Valves; Double Seat, In-To-Open Valves; All 3-Way Valves	Recommended Working Span: Single Seat, In-To-Open Valves	Dial Thermometer Range (Model 91400 only)
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.

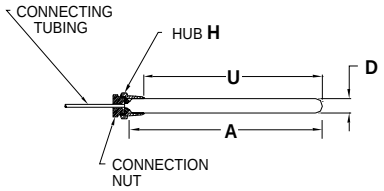
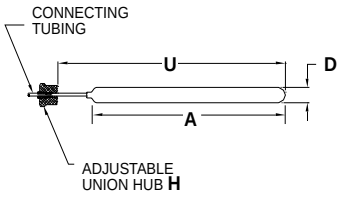
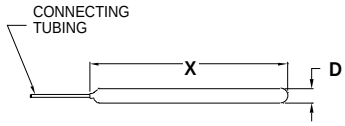
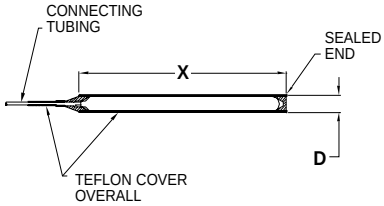
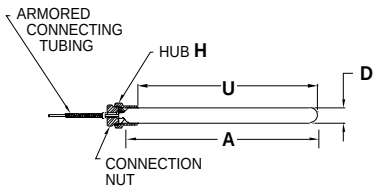
Standard Available Ranges

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	Copper	Copper
		Adjustable over entire capillary length		
	B04	Stainless Steel Union Hub	Stainless Steel	Stainless Steel
		Adjustable over entire capillary length		
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
		450°F (232°C) Maximum Temperature		
	B07	None	Stainless Steel with Teflon Covering	Stainless Steel with Teflon Covering
		450°F (232°C) Maximum Temperature		
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

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Bulb Dimensions & Minimum Insertion Lengths

Dim.	91000 / 91400 Capillary Length 8 to 16 Feet	20 Feet	24 to 36 Feet	40 to 52 Feet	91600 Capillary Length 8 Feet*	Special "Small" Bulb 91000 / 91400 Order Code	91000 / 91400 All	91600 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"			
U	12.25"	15.25"	19.25"	23.25"	15.25"			
D	1"	1"	1"	1"	1"			
H	1 NPT	1 NPT	1 NPT	1 NPT	1 NPT			
A	13"	16"	20"	24"	16"			
U	12.25"	15.25"	19.25"	23.25"	15.25"			
D	1"	1"	1"	1"	1"			
H	1 NPT	1 NPT	1 NPT	1 NPT	1 NPT			
X	13"	16"	20"	24"	16"			
D	1"	1"	1"	1"	1"			
X	13"	16"	20"	24"	16"			
D	1"	1"	1"	1"	1"			
X	15"	18"	22"	26"	18"			
D	1.16"	1.16"	1.16"	1.16"	1.16"			
X	15"	18"	22"	26"	18"			
D	1.16"	1.16"	1.16"	1.16"	1.16"			
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

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.

This bulb is only available on union connected thermal systems.

Always use the Standard Bulb unless special requirements exist and full details of the application are known, consult factory.

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

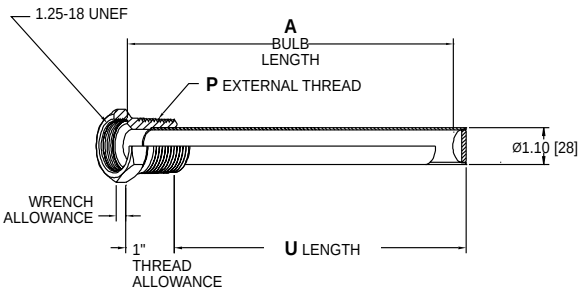
Temperature Regulators

Thermowells

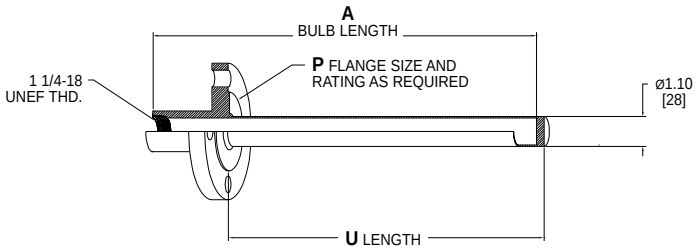
All dimensions are nominal.
Dimensions in [ ] are in millimeters.

to fit Standard Bulb

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

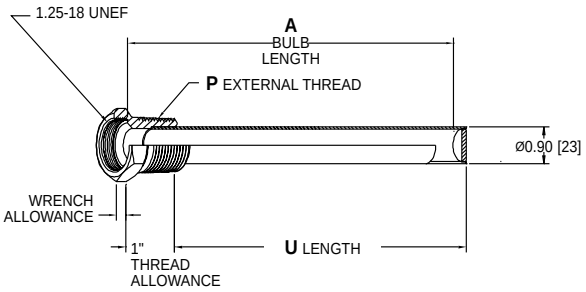
53		*6*	*S*	*6*
Thermowell Style	–	**External Connection (P)**	**Bulb Length (A)**	**Material**
53 Temperature Regulator		**6** 1¼ NPT	**S** 13" Bulb	**2** Brass (500 psi max.)
		71 1½" 150# RFF	**Ve** 16" Bulb	**3** Steel (500 psi max.)
		81 2" 150# RFF	**We** 20" Bulb	**6** 316SS (1000 psi max.)
		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.

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

to fit Special "Small" Bulb



Lengths

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

How to Order

Sample Order Number: 53-5M2

53		*5*	*M*	*2*
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.)