

For Steam

Armstrong's OB-2000 is a high performance externally piloted temperature regulator for large capacity applications such as heat exchangers, steam coils, steam dryers, plating tanks and parts washers. Self-actuated and requiring no external energy source, the OB-2000 comes with pilot valve

and tubing pre-assembled. Capillary units mount in any position and can be easily disconnected and interchanged, offering easy installation and maximum application flexibility. Available in sizes 1/2" through 4" with six temperature ranges and three capillary lengths.

OB-2000 Specifications

Application	Inlet Pressure psig (bar)	Minimum Differential Pressure psig (bar)	Temperature Ranges °F (°C)	Temperature Accuracy °F (°C)	Capillary Lengths feet (meters)
Steam	NPT 10 - 300 (.69 - 21)	7 (.48)	18 - 59 (-8 - 15) 50 - 97 (10 - 36) 86 - 144 (30 - 62) 131 - 201 (55 - 94) 176 - 260 (80 - 127) 239 - 361 (115 - 183)	±2 (±1) From Set Point	*6-1/2 (2) 9-1/2 (3) 16-1/2 (5)
	150 lb Flg. 10 - 185 (.69 - 13)				
	300 lb Flg. 10 - 300 (.69 - 21)				

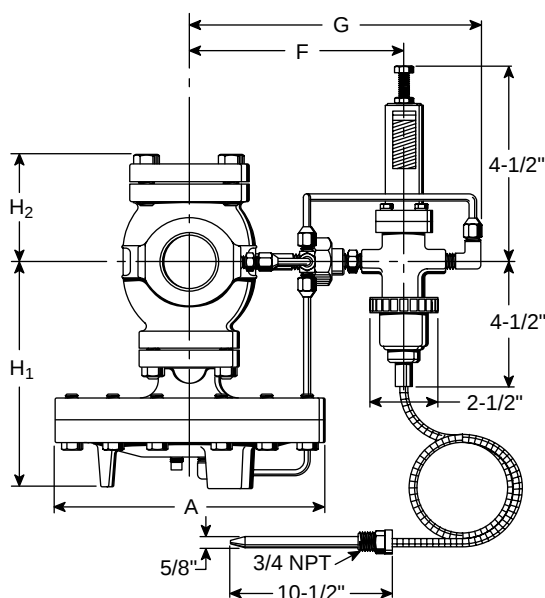
*Standard length.

NOTE: If desired set temperature is in temperature range overlap, select lower range.

OB-2000 Dimensions and Weights

Size		Face-to-Face						H ₁		H ₂		A		F		G		Weight						C _v
		NPT		150#		300#												NPT		150#		300#		
in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg	lb	kg	lb	kg	
1/2	15	5-7/8	150	—	—	—	—	6-3/4	170	2-15/16	74	7-7/8	200	6-5/8	169	8-3/4	222	31	15	—	—	—	—	5.0
3/4	20	5-7/8	150	—	—	—	—	6-3/4	170	2-15/16	74	7-7/8	200	6-5/8	169	8-3/4	222	31	15	—	—	—	—	7.2
1	25	6-1/4	160	—	—	—	—	7	175	3-1/16	76	8-7/8	226	6-7/8	174	8-7/8	226	39	19	—	—	—	—	10.9
1-1/4	32	7-1/8	180	—	—	—	—	7-5/8	192	3-9/16	90	8-7/8	226	7-1/8	182	9-1/4	235	47	22	—	—	—	—	14.3
1-1/2	40	7-1/8	180	—	—	—	—	7-5/8	192	3-9/16	90	8-7/8	226	7-1/8	182	9-1/4	235	47	22	—	—	—	—	18.8
2	50	9	230	8-1/2	218	9-1/8	232	8-5/8	216	4-1/16	103	10-7/8	276	7-7/16	189	9-1/2	242	71	33	77	36	78	36	32
2-1/2	65	—	—	10-7/8	278	11-1/2	292	10-1/2	266	4-7/8	122	13-7/8	352	8-1/8	206	10-1/8	259	—	—	138	63	140	64	60
3	80	—	—	11-3/4	298	12-1/2	316	11-1/8	282	5-3/8	135	13-7/8	352	8-9/16	217	10-5/8	270	—	—	149	69	155	71	78
4	100	—	—	13-1/2	343	14-1/8	358	13-5/8	345	6-9/16	167	15-7/8	401	9-1/4	234	11-1/4	287	—	—	234	107	243	110	120

NOTE: For 6" (150 mm) consult factory.



All dimensions and weights are approximate. Use certified print for exact dimensions. Design and materials are subject to change without notice.

For Steam

OB-2000 Sensor and Accessory Specifications					
Capillary Material	Capillary Temperature Ranges °F (°C)	Bulb Material	Bulb Connection	Thermal Well Material	Thermal Well Connection
Copper Capillary Tube With 304 Stainless Steel Armor Shield	18 - 59 (-8 - 15) 50 - 97 (10 - 36) 86 - 144 (30 - 62) 131 - 201 (55 - 94) 176 - 260 (80 - 127) 239 - 361 (115 - 183)	Nickel Plated Copper Bulb	3/4" (20 mm) NPT	Brass* 304 Stainless Steel*	1" (25 mm) NPT

*Standard. Other material available upon request. See page [PTC-43](#) for dimensional information.

NOTE: Capillary can withstand a maximum of 36°F (2.2°C) above rated range.

NOTE: If desired set temperature is in temperature range overlap, select lower range.

OB-2000 Materials					
OB-2000	Body Material	Seat Type & Material	Valve Material	Connection	Maximum Temperature °F (°C)
Main Valve	Ductile Iron ASTM A536	Single Seat Stainless Steel AISI 420	Stainless Steel AISI 420	NPT 150 lb Flg 300 lb Flg	450 (232)
Temperature Pilot Valve	Bronze ASTM B584			1/4" (1 mm) NPT	

Valve Sizing
Proper valve selection requires the following information
• Steam capacity required for application
• Supply pressure of steam
• Allowable pressure drop across valve*

*Where it is not possible to calculate pressure drop, 35% - 40% of gauge supply pressure can be used as a reasonable approximation.

Temperature Regulator Selection Example

Parameters:

Fluid Steam
 Maximum inlet pressure 100 psi
 Outlet pressure 75 psi
 Maximum flow rate 1,500 lbs/hr
 Temperature required 180°F
 Distance from regulator to sensing point 5'

To Locate Proper Model:

Enter inlet column at 100 psi
 Move to outlet pressure of 75 psi
 Locate capacity of
 1,500 lbs/hr under 1" connection size
 Find capillary temp. range 131-201°F
 Select capillary length 6-1/2'

Application Will Require:

**OB-2000, 1" with 131-201°F Temp. Range,
 Capillary Length 6-1/2'**

For Steam Service

The OB-2000PT is a diaphragm-operated externally piloted pressure/temperature combination regulator. It is used in applications where maximum pressure should be limited and the temperature of the heated medium is controlled using a

single seated main valve. Temperature pilot and capillary unit disconnect, making repairs or temperature range changes quick and easy. Available in sizes 1/2" through 4" and with a choice of four spring ranges, six temperature ranges and three capillary lengths.

OB-2000PT Specifications

Application	Inlet Pressure psig (bar)	Minimum Differ. Pressure psig (bar)	Reduced Pressure & Spring Color psig (bar)	Temperature Ranges °F (°C)	Temperature Accuracy °F (°C)	Capillary Lengths feet (meters)
Steam	NPT 15 - 300 (1 - 21)	7 (.48)	1.5 - 3 (.10 - .21) Yellow 3 - 15 (.21 - 1.0) Yellow 15 - 200 (1.0 - 13.8) Green	18 - 59 (-8 - 15) 50 - 97 (10 - 36) 86 - 144 (30 - 62) 131 - 201 (55 - 94) 176 - 260 (80 - 127) 239 - 361 (115 - 183)	±2 (±1) From Set Point	6-1/2 (2)* 9-1/2 (3) 16-1/2 (5)
	150 lb Flg 15 - 185 (1 - 13)					
	300 lb Flg 15 - 300 (1 - 21)					

*Standard length.

OB-2000PT Sensor and Accessory Specifications

Capillary Material	Capillary Temperature Ranges °F (°C)	Bulb Material	Bulb Connection	Thermal Well Material	Thermal Well Connection
Copper Capillary Tube With 304 Stainless Steel Armor Shield	18 - 59 (-8 - 15) 50 - 97 (10 - 36) 86 - 144 (30 - 62) 131 - 201 (55 - 94) 176 - 260 (80 - 127) 239 - 361 (115 - 183)	Nickel Plated Copper Bulb	3/4" (20 mm) NPT	Brass* 304 Stainless Steel*	1" (25 mm) NPT

*Standard. Other material available upon request. See page PTC-43 for additional dimensional information.

NOTES: Capillary can withstand a maximum of 36°F (2.2°C) above rated range. If desired set temperature is in temperature range overlap, select lower range.

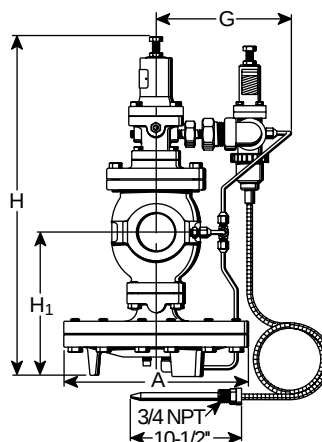
OB-2000PT Dimensions and Weights

Size		Face-to-Face						H		H ₁		A		G		Weights						C _v
		NPT		150#		300#										NPT		150#		300#		
in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg	lb	kg	lb	kg	
1/2	15	5-7/8	150	—	—	—	—	17-3/8	398	6-3/4	170	7-7/8	200	6-1/2	166	47	22	—	—	—	—	5.0
3/4	20	5-7/8	150	—	—	—	—	17-3/8	398	6-3/4	170	7-7/8	200	6-1/2	166	47	22	—	—	—	—	7.2
1	25	6-1/4	160	—	—	—	—	17-3/4	404	6-15/16	175	8-7/8	226	7	178	57	26	—	—	—	—	10.9
1-1/4	32	7-1/8	180	—	—	—	—	18-7/8	434	7-5/8	192	8-7/8	226	7-1/4	185	67	31	—	—	—	—	14.3
1-1/2	40	7-1/8	180	—	—	—	—	18-7/8	434	7-5/8	192	8-7/8	226	7-1/4	185	67	31	—	—	—	—	18.8
2	50	9	230	8-1/2	218	9-1/8	222	21-3/8	498	8-1/2	216	10-7/8	276	6-1/2	166	89	41	94	43	100	46	32
2-1/2	65	—	—	10-7/8	278	11-1/2	282	23-7/8	552	9-13/16	251	13-7/8	352	6-1/2	166	—	—	158	72	167	76	60
3	80	—	—	11-3/4	294	12-1/2	302	23-7/8	575	10-7/16	264	13-7/8	352	6-1/2	166	—	—	171	78	183	83	78
4	100	—	—	13-1/2	330	14-1/8	342	28-3/8	658	12-5/8	321	15-7/8	401	6-1/2	166	—	—	263	120	281	128	120

NOTE: For 6" (150 mm), consult factory.

OB-2000PT Materials

OB-2000PT	Body Material	Valve & Seat Material	Maximum Temperature °F (°C)
Main Valve	Ductile Iron ASTM A536	Stainless Steel AISI 420	450 (232)
Temperature Pilot Valve	Bronze ASTM B584		
Pressure Pilot	Ductile Iron ASTM A536		



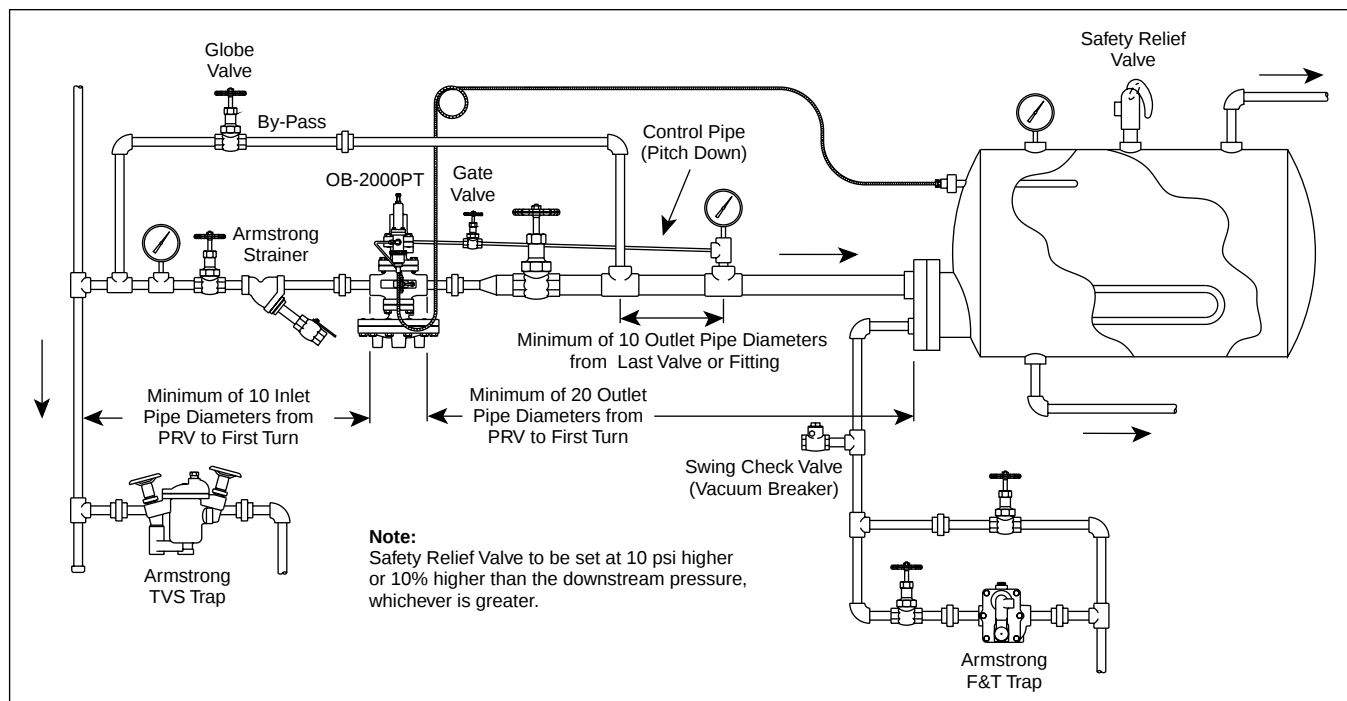
OB-30, OB-2000, OB-2000PT

For Steam Service

Points to Remember When Installing

- Drain condensate at inlet of pressure/temperature regulator with inverted bucket steam trap.
- Protect temperature regulating valve from dirt and scale by installing strainer with 100 mesh screen at inlet of valve.
- Install shutoff valves on either side of the regulating valve along with a by-pass line for maintenance purposes.
- Install vacuum breaker after the outlet of equipment and before the steam trap.
- Install sensor so it is fully immersed in the fluid being heated.
- If temperature well is used, apply heat transfer medium to sensor before insertion into well.
- Place thermometer into system in close proximity to temperature sensor for accurate valve adjustment.
- If possible, do not elevate condensate after steam trap.
- Determine pressure setting before temperature setting (OB-2000PT only).

Typical Installation—OB-30, OB-2000



Load Calculations

Heating oil with steam

$$\text{lb/hr steam} = \frac{\text{GPM} \times \Delta T \times 1.1}{4}$$

Heating water with steam

$$\text{lb/hr steam} = \frac{\text{GPM} \times \Delta T \times 1.1}{2}$$

Heating air with steam

$$\text{lb/hr steam} = \frac{\text{CFM} \times \Delta T \times 1.1}{900}$$

Jacketed kettles or tanks

$$\text{lb/hr steam} = \frac{\text{Gal} \times \text{SG} \times \text{Cp} \times \Delta T \times 8.3}{\text{Lat} \times T}$$

Where:

- GPM = Gallons per minute
 ΔT = Temperature rise (°F)
 CFM = Cubic feet per minute
 Cp = Specific heat of liquids (Btu/lb-°F)
 T = Time (hours)
 Lat = Latent heat of steam (Btu/lb)
 Gal = Gallons of liquid to be heated
 SG = Specific gravity
 1.1 = Safety factor