

**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.

**Table PTC-274-1. OB-2000 Specifications**

Application	Inlet Pressure (barg)	Minimum Differential Pressure (barg)	Temperature Ranges (°C)	Temperature Accuracy (°C)	Capillary Length (m)
Steam	0,5 - 20	0,5	-8 - 15	± 1 °C From Set Point	2 3 5*
			10 - 36		
			30 - 62		
			55 - 94		
			80 - 127		
			115 - 183		

\* Standard length.

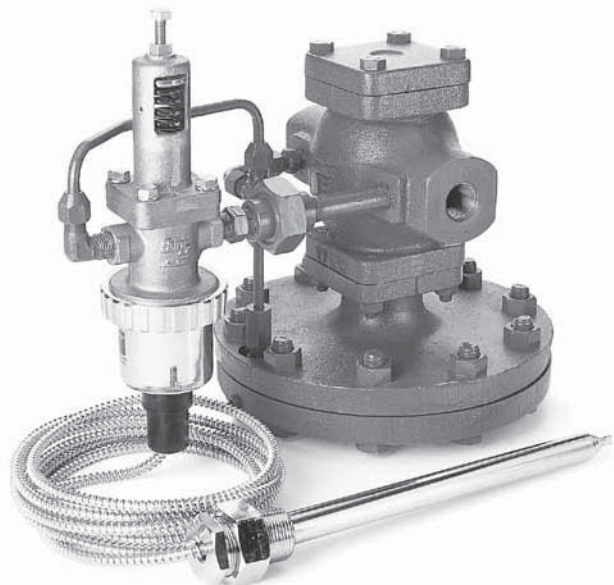
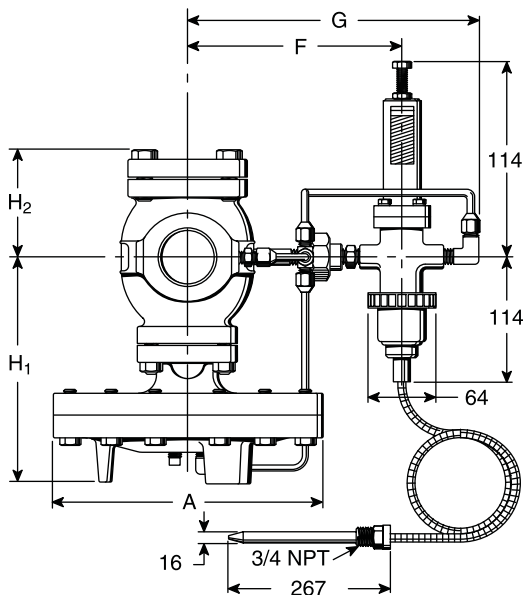
**Note:** If desired set temperature is in temperature range overlap, select lower range.

**Table PTC-274-2. OB-2000 Dimensions and Weights**

Size	Face-to-Face		H <sub>1</sub>	H <sub>2</sub>	A	F	G	Weight		Cv
	BSPT	PN 25/40						kg	kg	
	mm	mm								
15 - 1/2"	150	150	170	74	200	169	222	14	15,4	5,0
20 - 3/4"	150	150	170	74	200	169	222	14	16,1	7,2
25 - 1"	160	160	175	76	226	174	227	18	20,6	10,9
32 - 1 1/4"	180	180	192	90	226	182	235	22	24,4	14,3
40 - 1 1/2"	180	200	192	90	226	182	235	22	25,3	18,8
50 - 2"	230	230	216	103	276	189	242	33	37,0	32,0
65 - 2 1/2"	—	290	251	122	352	206	259	—	66,5	60,0
80 - 3"	—	310	264	135	352	217	270	—	71,8	78,0
100 - 4"	—	350	321	167	401	234	287	—	113,3	120,0

Shade indicates products that are CE Marked according to the PED (2014/68/UE). All the other sizes comply with the Article 4.3 of the same directive.

**Note:** DN150 valve is available on request, but is not CE Marked.



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

Table PTC-275-1. Sensor and Accessory Specifications					
CAPILLARY		BULB		THERMAL WELL	
Material	Temperature Range (°C)	Material	Connection	Material	Connection
Copper Capillary Tube with 304 Stainless Steel Armor Shield	-8 - 15	Nickel Plated Copper	3/4" NPT	Brass or 304 Stainless Steel*	1" BSPT
	10 - 36				
	30 - 62				
	55 - 94				
	80 - 127				
115 - 183					

\* Standard. Other material available upon request. See page PTC-272 for dimensional information.  
**Note:** Capillary can withstand a maximum of 20°C above rated range. If desired set temperature is in temperature range overlap, select lower range.

Table PTC-275-2. OB-2000 Materials					
OB-2000	Body	Seat	Valve	Connection	Maximum Temperature
Main Valve	Ductile Iron ASTM A536	Single Seat Stainless Steel AISI 420	Stainless Steel AISI 420	BSPT or Flanged PN 25/40	232°C
Temperature Pilot Valve	Bronze ASTM B584			1/4" 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.  
 For capacities see page PTC-277.

### Temperature Regulator Selection Example

#### Parameters:

Fluid ..... Steam  
 Maximum inlet pressure.....7 bar  
 Outlet pressure ..... 6 bar  
 Maximum flow rate ..... 678 kg/h  
 Temperature required ..... 82°C  
 Distance from regulator to sensing point.....1,5 m

#### To Locate Proper Model:

Enter inlet column at .....7 bar  
 Move to outlet pressure of .....6 bar  
 Locate capacity of 678 kg/h under .....1"  
 Find capillary temperature range .....55 - 94°C  
 Select capillary length .....2 m or standard 5 m

#### Application Will Require:

**OB-2000, 1" with 55 - 94°C Temperature Range, Capillary Length 5 m**

Pressure and Temperature Controls

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## 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.

**Table PTC-276-1. OB-2000PT Specifications**

Application	Inlet Pressure (barg)	Minimum Differential (barg)	Reduced Pressure (barg) Spring Color	Temperature Ranges (°C)	Temperature Accuracy (°C)	Capillary Length (m)
Steam	1 - 20	0,5	0,1 - 0,2 (yellow)* 0,2 - 1,4 (yellow) 1,0 - 14 (green)	-8 - 15	± 1°C From Set Point	2 3 5**
				10 - 36		
				30 - 62		
				55 - 94		
				80 - 127		
				115 - 183		

\* When using this spring range, remove one (1) pilot diaphragm. Capacities are reduced by 1/2 of capacity chart when this spring is being used.

\*\* Standard length

**Table PTC-276-2. OB-2000PT Sensor and Accessory Specifications**

CAPILLARY		BULB		THERMAL WELL	
Material	Temperature Range (°C)	Material	Connection	Material	Connection
Copper Capillary Tube with 304 Stainless Steel Armor Shield	-8 - 15	Nickel Plated Copper	3/4" NPT	Brass or 304 Stainless Steel*	1" BSPT
	10 - 36				
	30 - 62				
	55 - 94				
	80 - 127				
	115 - 183				

\* Standard. Other material available upon request. See page PTC-272 for dimensional information.

**Note:** Capillary can withstand a maximum of 20°C above rated range. If desired set temperature is in temperature range overlap, select lower range.

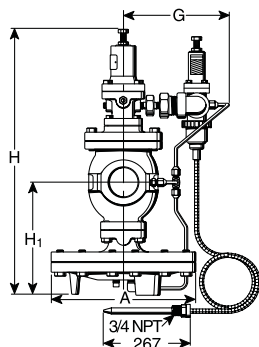
**Table PTC-276-3. OB-2000PT Dimensions and Weights**

Size	Face-to-Face		H	H <sub>1</sub>	A	G	Weight		Cv
	BSPT	PN 25/40					BSPT	PN 25/40	
	mm	mm					kg	kg	
15 - 1/2"	150	150	398	170	200	166	18	20	5,0
20 - 3/4"	150	150	398	170	200	166	18	21	7,2
25 - 1"	160	160	404	175	226	178	22	25	10,9
32 - 1 1/4"	180	180	434	192	226	185	26	29	14,3
40 - 1 1/2"	180	200	434	192	226	185	26	30	18,8
50 - 2"	230	230	498	216	276	166	37	42	32,0
65 - 2 1/2"	—	290	552	251	352	166	—	70	60,0
80 - 3"	—	310	575	264	352	166	—	77	78,0
100 - 4"	—	350	658	321	401	166	—	118	120,0

Shade indicates products that are CE Marked according to the PED (2014/68/UE). All the other sizes comply with the Article 4.3 of the same directive.

**Note:** DN150 valve is available on request, but is **not CE Marked**.

For capacities see page PTC-277.



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# OB-2000, OB-2000PT



**Table PTC-277-1. OB-2000, OB-2000PT Capacities for Steam**

Inlet (barg)	Outlet (barg)	Connection Size								
		1/2" - 15	3/4" - 20	1" - 25	1 1/4" - 32	1 1/2" - 40	2" - 50	2 1/2" - 65	3" - 80	4" - 100
0,7*	0 - 0,2	96	138	209	274	360	613	1 150	1 495	2 300
1,4	0,9	99	143	217	284	374	637	1 195	1 554	2 390
	0,7	115	167	253	332	437	743	1 393	1 812	2 788
	0,0	142	205	310	406	535	910	1 707	2 219	3 414
1,7	1,2	107	154	233	307	403	686	1 286	1 672	2 573
	0 - 0,3	153	222	335	440	579	986	2 080	2 889	4 446
2,1	1,6	114	164	248	327	430	731	1 372	1 784	2 746
	0 - 0,5	173	249	278	496	652	1 109	2 080	2 889	4 446
2,8	2,3	127	183	277	364	479	816	1 530	1 966	3 060
	1,7	179	258	391	512	673	1 147	2 151	2 796	4 302
	0 - 0,8	212	305	462	607	798	1 811	2 546	3 536	5 441
3,5	2,9	148	213	323	424	558	945	1 781	2 343	3 563
	2,1	222	320	485	637	837	1 426	2 673	3 475	5 348
	0 - 1,2	251	362	547	717	944	1 606	3 011	4 183	6 435
4,0	3,5	169	243	369	484	636	1 083	2 031	2 641	4 064
	3,1	213	307	465	611	803	1 368	2 566	3 336	5 133
	2,4	265	382	579	759	998	1 700	3 188	4 144	6 376
	0 - 1,5	290	417	631	829	1 089	1 854	3 468	4 830	7 430
5,0	4,3	213	307	465	610	798	1 366	2 562	3 330	5 124
	3,7	268	387	586	769	1 011	1 720	3 227	4 196	6 455
	3,1	318	459	695	912	1 199	2 040	3 827	4 975	7 654
	0 - 2,1	348	501	758	995	1 308	2 226	4 175	5 426	8 348
7,0	7,3	269	388	588	772	1 015	1 015	1 728	4 214	6 487
	6,8	340	490	742	973	1 280	2 179	4 086	6 312	8 172
	5,1	414	567	903	1 185	1 558	2 653	4 975	6 468	9 952
	0 - 3,7	445	640	970	1 272	1 672	2 847	5 704	7 416	11 409
8,5	7,3	335	482	730	958	1 259	2 144	4 020	5 227	8 042
	6,8	379	546	828	1 086	1 428	2 431	4 558	5 926	9 105
	5,1	509	734	1 112	1 459	1 918	3 265	6 122	7 959	12 242
	0 - 3,7	541	780	1 181	1 549	2 037	3 468	6 947	9 032	13 897
10,5	8,7	399	571	871	1 143	1 503	2 559	4 799	6 238	9 598
	6,8	563	810	1 223	1 610	2 117	3 603	6 756	8 784	13 513
	0 - 4,6	638	920	1 392	1 827	2 402	4 089	8 191	10 648	16 382
12,0	10,1	464	668	1 012	1 328	1 747	2 973	5 576	7 249	11 152
	8,6	611	880	1 332	1 748	2 298	3 912	7 336	9 537	14 677
	6,8	719	1 036	1 568	2 056	2 706	4 606	8 637	11 229	17 275
	0 - 5,5	735	1 059	1 605	2 104	2 766	4 709	9 434	12 265	18 870
14,0	11,7	521	750	1 136	1 490	1 960	3 337	6 257	8 134	12 515
	10,3	656	944	1 430	1 876	2 466	4 199	7 873	10 235	15 747
	8,6	776	1 118	1 692	2 220	2 920	4 970	9 320	12 116	18 640
	0 - 6,3	833	1 199	1 815	2 382	3 131	5 330	10 678	13 881	21 357
15,5	13,1	586	843	1 277	1 676	2 204	3 751	6 828	9 145	14 069
	12,0	697	1 005	1 521	1 996	2 624	4 466	8 376	10 889	16 753
	10,3	829	1 194	1 808	2 372	3 119	5 309	9 955	12 942	19 912
	0 - 7,2	929	1 339	2 027	2 659	3 405	5 950	11 921	15 498	23 844
17,0	13,8	737	1 061	1 607	2 109	2 773	4 719	8 850	11 505	17 701
	12,0	879	1 266	1 917	2 514	3 304	5 628	10 553	13 719	21 107
	10,3	986	1 421	2 151	2 823	3 711	6 318	11 846	15 400	23 692
	0 - 8,0	1 026	1 478	2 238	2 936	3 861	6 571	13 165	17 114	26 331
19,0	13,8	1 096	1 578	2 389	3 135	4 121	7 015	13 153	17 099	22 238
	12,0	1 166	1 722	2 607	3 421	4 497	7 656	14 354	18 661	25 034
	10,3	1 277	1 840	2 785	3 653	4 803	8 176	15 330	19 929	27 250
	0 - 9,0	1 221	1 758	2 661	3 491	4 617	7 813	14 649	19 044	28 341
20,0	13,8	1 096	1 578	2 389	3 135	4 121	7 015	13 153	17 099	26 307
	12,0	1 166	1 722	2 607	3 421	4 497	7 656	14 354	18 661	28 709
	10,3	1 277	1 840	2 785	3 653	4 803	8 176	15 330	19 929	30 660
	0 - 9,8	1 221	1 758	2 661	3 491	4 617	7 813	14 649	19 044	29 754

\* Minimum inlet pressure for OB-2000PT is 1 barg because of the pressure pilot.

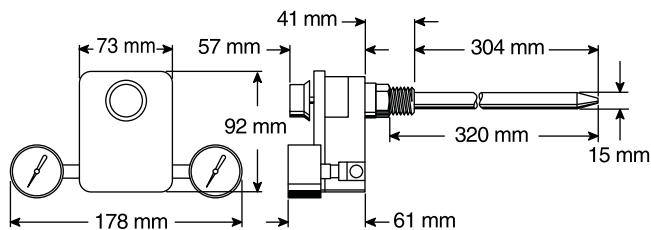
Pressure and Temperature Controls

## Pneumatic Temperature Pilot

A compact pneumatic temperature pilot with broad temperature ranges, the OBK-2000 can be remotely located away from the regulator valve, an advantage not available with a conventional capillary system.

Typical applications include instantaneous or storage tank water heaters, air make-up units and manufacturing process operations such as parts washing, die casting and plastic molding.

Capable of reverse or direct-acting operation, the OBK-2000 features a simple design with fewer moving parts for trouble free operation. Other features include supply and control pressure gauges, a rugged cast brass housing, and precise and rapid response to temperature changes. Brass, stainless steel bulbs and separate wells are available.



**OBK-2000**

**Table PTC-278-1. OBK-2000 Materials**

Name of Part	Material
Body	Brass
O-rings	Silicone Rubber/Buna "N"
Valve	Phosphor Bronze
Valve Seat	Phosphor Bronze

**Note:** Thermal wells available (see page PTC-272). 304 stainless steel or brass are standard materials. Other materials available upon request.

**Table PTC-278-2. OBK-2000 Specifications**

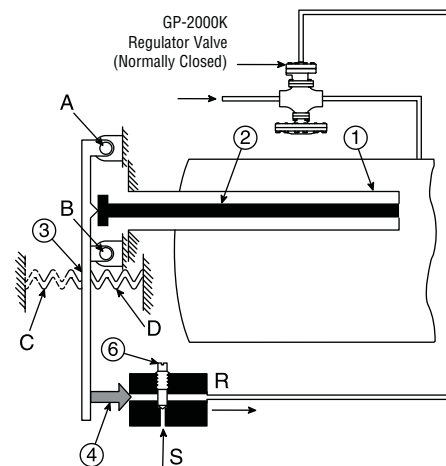
Dial adjustment range (°C)	Standard - 10 to 177
Maximum supply air pressure @ room temperature (barg)	2
Maximum air consumption (cm/s)	218 - 3
Maximum operating pressure (barg)	17
Maximum operating temperature (°C)	204
Temperature response (°C)	0,3
Mounting (mm)	15
Air connections (mm)	3
Shipping weight (kg)	1,8
Adjustable sensitivity (barg)	0,02 to 0,16
Maximum pressure on wells	
Stainless steel (barg)	79
Copper (barg)	36

## Reverse-Acting Operation - For Heating

During operation, a temperature change in the medium being controlled creates a change in the length of the sensitivity tube. An increase in temperature lengthens the sensitivity tube (1) and moves the invar rod (2) from the lever (3). The lever pivots at point B and is moved so the exhaust valve (4) is opened by the spring at (D). This lever action decreases the supply air at point (S) in the control line at point (R) and closes the regulator valve. A decrease in temperature shortens the sensitivity tube at point (1) and moves the invar rod against the lever point (3). The lever at this point moves against the spring at point (D) to close the exhaust valve at point (4). This lever action increases the pressure in the control line at point (R) and opens the valve.

The sensitivity adjustment screw at point (6) regulates the rate of flow of the supply air to the controller to a change in temperature. Turning the screw clockwise increases the sensitivity by reducing the flow and increasing the response time. Turning the screw counterclockwise decreases the sensitivity by increasing flow and reducing the response time. Valve closes on air failure, making it fail-safe.

## Operation Reverse Acting - For Heating



Positions A and C show pivot point A and spring C when controller is direct acting.

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

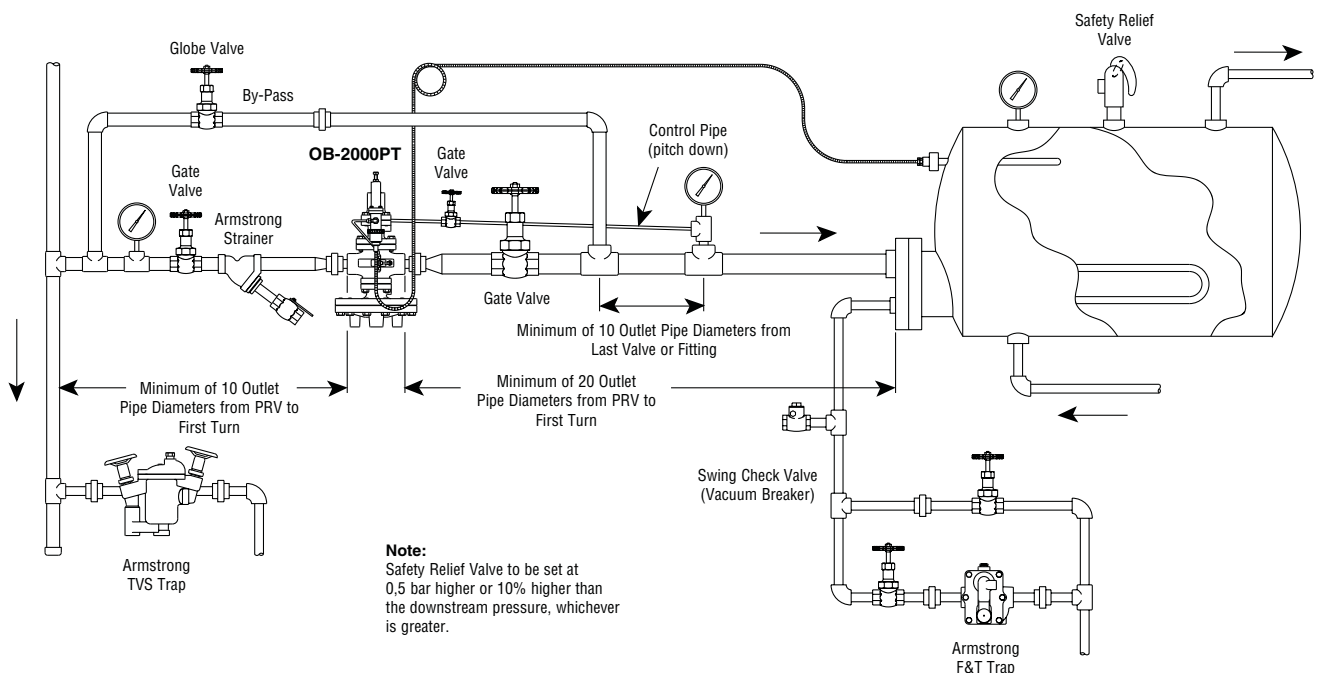
## For Steam Service

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 and OB-2000PT



Pressure and Temperature Controls

## Steam Load Calculations

The calculation formulas for the steam load according to the application can be found in the Condensate Guidelines chapter.