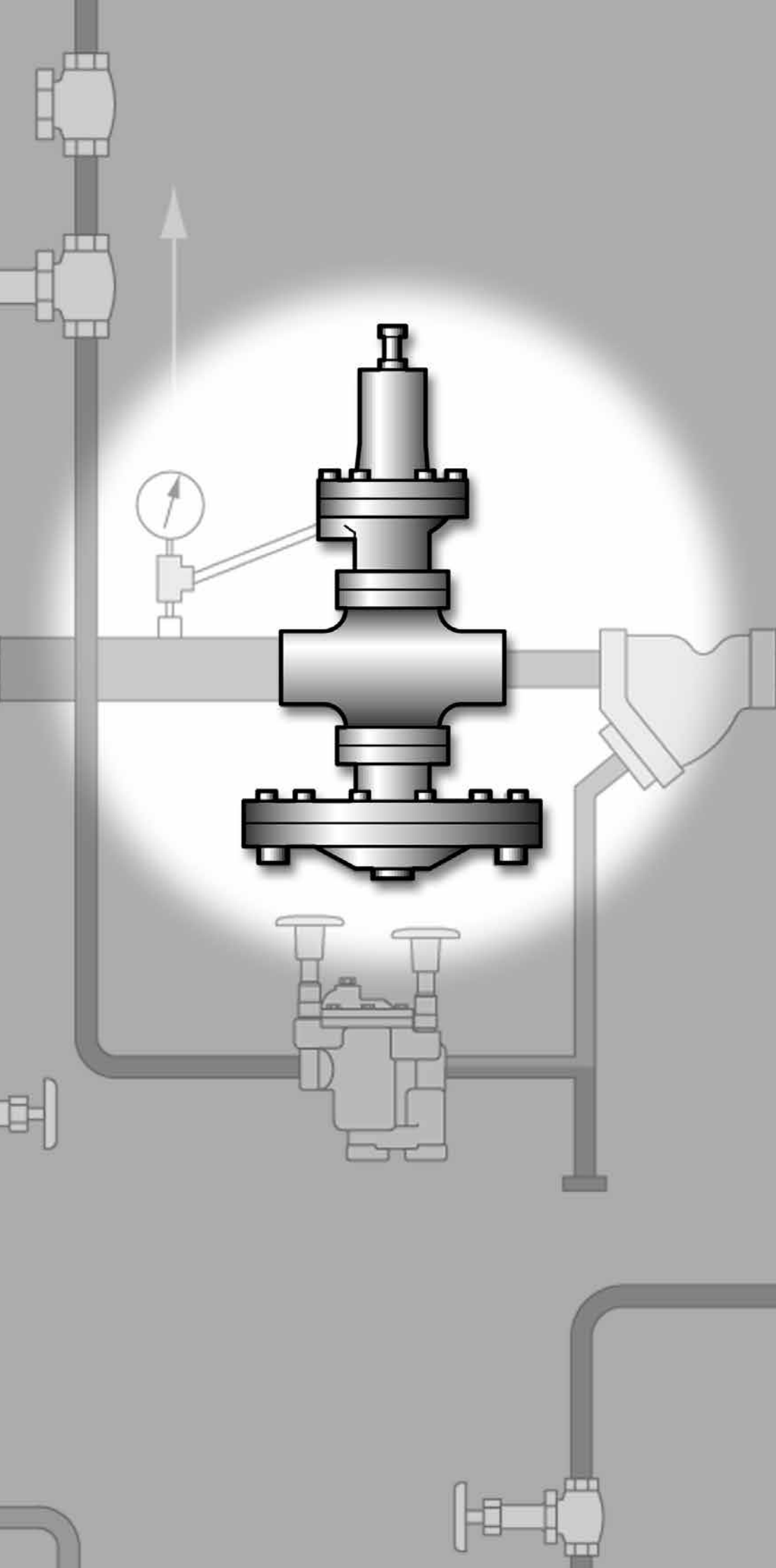


# Pressure and Temperature Control





## Pressure and Temperature Controls

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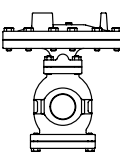
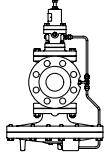
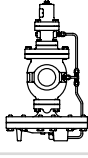
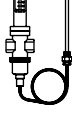
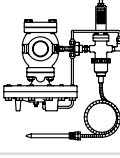
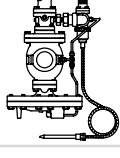
Armstrong pressure reducing valves (PRVs) and temperature regulators help you manage steam, air and liquid systems safely and efficiently. They assure also uninterrupted productivity - by maintaining constant pressure or temperature for process control. In short, Armstrong regulators make using resources safe and productive... as well as environmentally sound.

For decades, Armstrong has devoted itself to learning - and sharing - all it can about energy conservation as it relates to steam equipment. As part of our product/service network, PRVs and temperature regulators represent expanded options for a reliable Armstrong solution.

Pressure and Temperature Controls



# Pressure and Temperature Control ID Charts

Table PTC-263-1. Armstrong Pressure and Temperature Control Equipment										
Illustration	Type	Fluid	Connection Type	Maximum Allowed Pressure (barg)	TMA (°C)	Body Material	Model	Maximum Operating Pressure (barg)	Connection Size	Page
	GD-30 Direct Acting	Steam, Air, Non-Corrosive Gases	BSPT	17	210	Cast Bronze ASTM B584	GD-30	17	1/2" 3/4" 1" 1 1/2" 2"	PTC-266
			Flanged PN25/40							
	GD-30S Direct Acting	Steam, Air, Non-Corrosive Gases	BSPT	20	220	Stainless Steel AISI 304	GD-30S	20	1/2" 3/4" 1"	PTC-266
			Flanged PN25/40							
	GD-2000K Direct Acting, Dia- phragm Operated	Steam	BSPT	20	232	Ductile Iron ASTM A536	GD-2000K	20	1/2", 3/4", 1", 1 1/4", 1 1/2", 2"	PTC-268
			Flanged PN25/40						15, 20, 25, 32, 40, 50, 65, 80, 100	
	GP-2000 External Pilot, Dia- phragm Operated	Steam	BSPT	20	232	Ductile Iron ASTM A536	GP-2000	20	1/2" , 3/4", 1", 1 1/4", 1 1/2", 2"	PTC-271
			Flanged PN25/40						15, 20, 25, 32, 40, 50, 65, 80, 100,150	
	GP-2000R Back Pressure, External Pilot	Steam	BSPT	14	232	Ductile Iron ASTM A536	GP-2000R	14	1/2", 3/4", 1", 1 1/4", 1 1/2", 2"	PTC-272
			Flanged PN25/40						15, 20, 25, 32, 40, 50, 65, 80, 100,150	
	OB-30/31 Direct Acting Tem- perature Regulator	Steam, Water and Non-Corrosive Liquids	BSPT	10	185	Bronze ASTM B584	OB-30 Heating	10 (steam)	1/2" 3/4" 1"	PTC-280
				17				OB-31 Cooling		
	OB-2000 Piloted Dia- phragm Operated Temperature Regulator	Steam	BSPT	20	232	Pilot: Bronze ASTM B584 Body: Ductile Iron ASTM A536	OB-2000	20	1/2", 3/4", 1", 1 1/4", 1 1/2", 2"	PTC-282
			Flanged PN25/40						15, 20, 25, 32, 40, 50, 65, 80, 100	
	OB-2000PT Piloted Pressure / Temperature Regulator	Steam	BSPT	20	232	Temp. Pilot: Bronze ASTM 8584 Body: Ductile Iron ASTM A536	OB-2000PT	20	1/2", 3/4", 1", 1 1/4", 1 1/2", 2"	PTC-284
			Flanged PN25/40						15, 20, 25, 32, 40, 50, 65, 80, 100	

All models comply with the Pressure Equipment Directive PED 2014/68/UE. For details, see specific product page or Armstrong PED Certificate.

Pressure and Temperature Controls

## PRV Types

Steam, liquids and gases usually flow at high pressures to the points of final use. At these points, a pressure reducing valve lowers the pressure for safety and efficiency and to match the requirements of the application. There are two types of pressure reducing valves offered by Armstrong:

**Direct Acting.** The simplest of PRVs, the direct acting type operates with convoluted bellows. Since it is self-contained, it does not need an external sensing line downstream to operate. It is the smallest and most economical of the two types and is designed for low to moderate flows. Accuracy of direct acting PRVs is typically  $\pm 10\%$  of the downstream set point.

**Externally Piloted.** This type of PRV incorporates two valves - a pilot and a main valve - in one unit. The pilot valve has a design similar to the direct acting valve. The discharge from the pilot valve acts on a set of double diaphragms, which controls through a piston the opening of the main valve. This high diaphragm area can open a larger main valve, allowing a greater capacity per line size than the direct acting regulators. In addition, the diaphragms are more sensitive to pressure changes, and that means accuracy of  $\pm 1\%$ . This greater accuracy is also due to the location of the sensing line outside of the valve, where there is less turbulence. This valve also offers the flexibility to use different types of pilot valves: pressure, temperature, air loaded, solenoid or combinations.

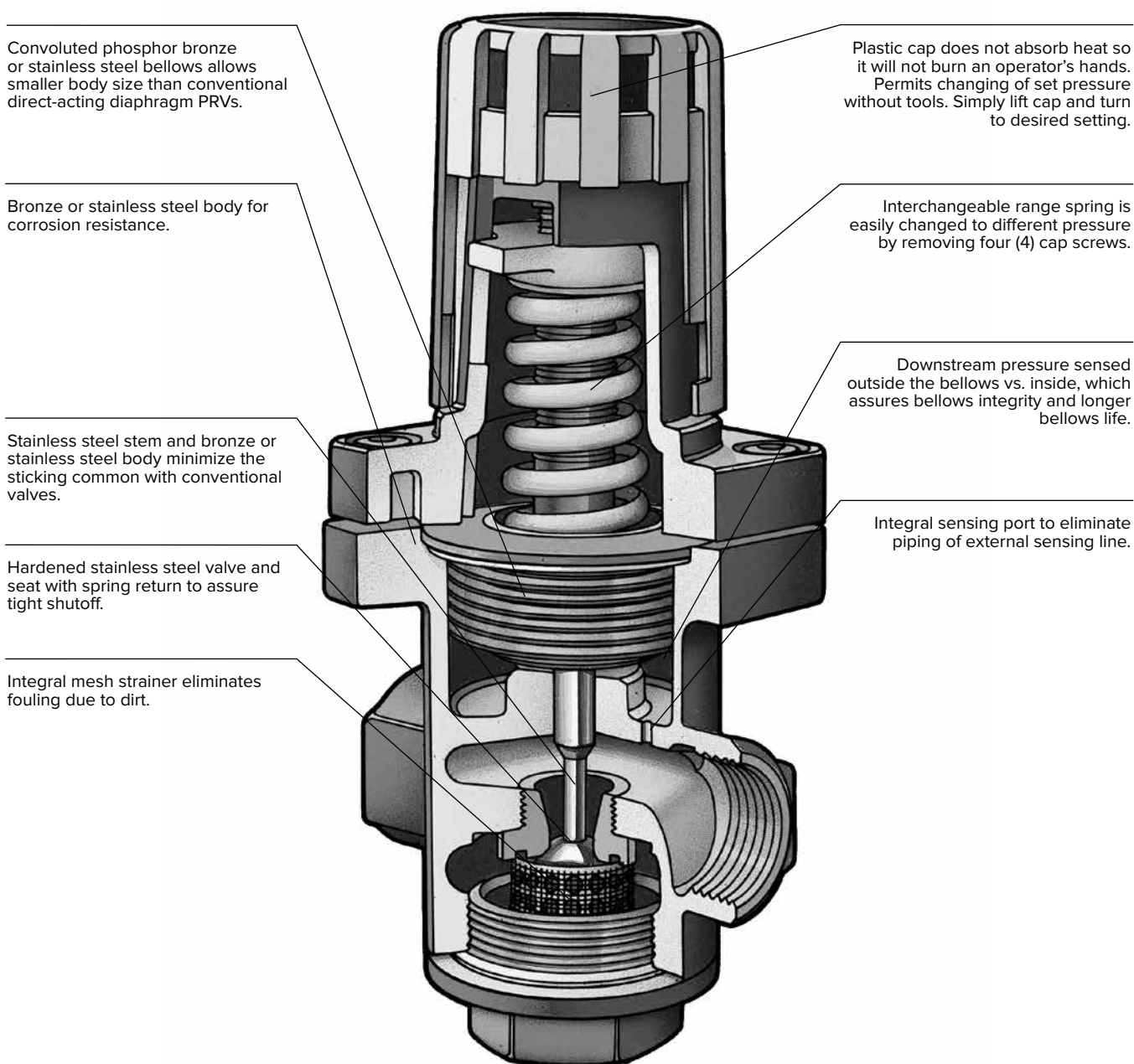


## Direct Acting

### For Steam, Air and Non-Corrosive Gas Service

The simplest of all pressure reducing valves, the direct acting type operates with convoluted bellows. Since it is self-contained, it does not need an external sensing line downstream to operate.

It is the smallest and most economical of the two types and is designed for low to moderate flows. Accuracy of direct acting PRVs is typically  $\pm 10\%$ .



**For Steam, Air and Non-Corrosive Gases**

The GD-30 is a compact, high performance direct acting valve. Economical to buy and use, it's ideal for those low to moderate flow applications where accuracy of  $\pm 10\%$  is acceptable.

The GD-30 is well suited for laundry and dry cleaning equipment, hospital equipment, tire molds, humidifiers, small heaters and applications in food processing. It provides tight shutoff for dead-end service on steam.

**Table PTC-266-1. GD-30 Specifications**

Application	Inlet Pressure (barg)	Reduced Pressure (barg)	Spring color	Minimum Differential (barg)	Maximum Temperature (°C)	Materials		
						Body	Valve/Seat	Bellows
Steam Air Non-corrosive gases	1 - 17	0,2 - 1,0	Yellow	0,5	210	Cast Bronze ASTM B584	Stainless Steel AISI 440/304	Phosphor Bronze*
		0,5 - 4,0	Blue					
		3,5 - 10,0	Green					

\* Stainless steel optional.

**Table PTC-266-2. GD-30/30S Dimensions and Weights**

Connection Size	1/2" - 15	3/4" - 20	1" - 25	1 1/2" - 40	2" - 50
L	80	85	95	140	150
L1	150	150	160	272	288
H1	47	47	47	77	77
H	190	190	190	307	307
Weight BSPT (kg)	1,9	1,9	2,0	8,1	8,5
Weight Flanged (kg)	3,5	4,0	4,5	12,8	15,1
Cv	1,3	1,5	2,5	5,6	8,5

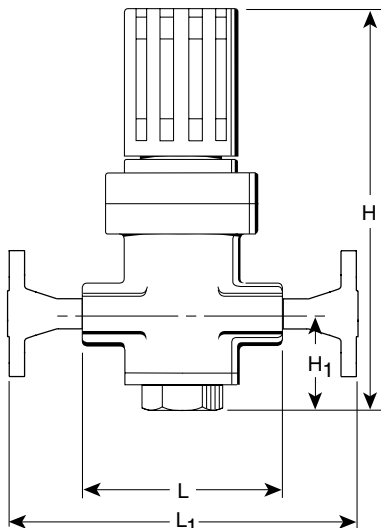
**Note:** GD-30 capacities cannot be determined with a formula - consult capacity tables. Reference note inside of table PTC-277-1.

\* GD-30S available in 1/2", 3/4" and 1" only.

All sizes comply with the article 4.3 of the PED (2014/68/UE).

**Table PTC-266-3. GD-30S Specifications**

Application	Inlet Pressure (barg)	Reduced Pressure (barg)	Spring color	Minimum Differential (barg)	Maximum Temperature (°C)	Materials		
						Body	Valve/Seat	Bellows
Steam	1 - 21	0,2 - 1,0	Yellow	0,5	220	Stainless Steel AISI 316L	Stainless Steel AISI 440/304	Stainless Steel AISI 316L
		0,5 - 4,0	Blue					
		3,6 - 10,0	Green					



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

Table PTC-267-1. GD-30/30S Capacities - Steam											
Inlet Pressure	Outlet Pressure	Steam load (kg/h)									
		Connection Size									
bar		1/2"	DN15	3/4"	DN20	1"	DN25	1 1/2"	DN40	2"	DN50
1	0,5	22		25		42		90		135	
1,5	0,9	24		28		48		98		150	
	0,5	19		25		35		82		120	
2	1,6	28		32		51		110		185	
	1,4	24		27		46		95		140	
	0,2	15		18		27		63		98	
3	2,2	45		55		85		185		280	
	1,4	36		44		72		150		235	
	0,3	18		25		35		72		120	
3,5	2,8	59		65		110		245		380	
	1,4	45		52		85		185		285	
	0,3	22		28		40		88		135	
4	3,3	62		70		120		265		408	
	2,8	68		75		131		280		440	
	1,2	41		47		77		170		265	
	0,4	25		33		45		100		150	
5,5	4,4	80		93		155		335		530	
	3,7	85		102		160		355		545	
	1,6	55		62		100		222		340	
	0,5	27		35		49		105		165	
7	5,5	92		110		180		392		615	
	4,5	102		119		198		435		665	
	2,8	90		105		170		380		580	
	0,7	31		36		60		135		215	
8,5	6,6	105		125		205		450		690	
	4,8	125		141		235		530		825	
	3,1	109		121		204		445		685	
	0,8	50		55		90		210		320	
10,5	8,3	130		151		250		550		845	
	5,9	165		191		320		695		1 075	
	3,8	135		160		270		580		910	
	1,0	60		75		115		255		385	
12,5	9,7	185		220		360		780		1 215	
	8,0	195		230		390		830		1 285	
	4,8	175		195		335		735		1 135	
	1,2	75		85		140		310		470	
14	9,7	209		235		395		900		1 390	
	8,0	215		245		410		910		1 400	
	5,9	195		225		375		825		1 275	
	1,6	95		110		175		385		590	
15,5	9,7	220		260		430		935		1 450	
	8,0	225		265		436		940		1 455	
	5,9	210		245		410		900		1 390	
	1,6	115		135		225		490		760	
17	9,7	238		275		460		1 010		1 560	
	8,3	250		265		471		1 020		1 575	
	4,8	210		240		405		880		1 360	
	1,7	125		145		240		520		815	
GD-30S Only 19	9,7	240		278		464					
	8,3	240		278		464					
	4,8	213		246		409					
	1,9	134		156		255					
GD-30S Only 21	9,7	240		278		464					
	6,9	240		278		464					
	4,8	217		250		420					
	2,7	140		163		270					

**Note :** For air capacities in Nm<sup>3</sup>/h, multiply steam capacities by 1,2.  
 Maximum pressure reduction ratio 10:1.  
 Shade indicates capacities available with bronze GD-30 only.

Pressure and Temperature Controls

**Air Loaded Valves for Steam**

The GD-2000K is an ideal choice when set point changes are frequent, access to the valve is difficult and steam quality is poor. The GD-2000K comes with either BSPT or flanged connections for quick, easy installation.

It also comes with a durable ductile iron body and features double stainless steel diaphragms and hardened stainless working parts, renewable in-line. High Cv and 10:1 turndown ratio. Single seated for dead-end service.

**Table PTC-268-1. GD-2000K Specifications**

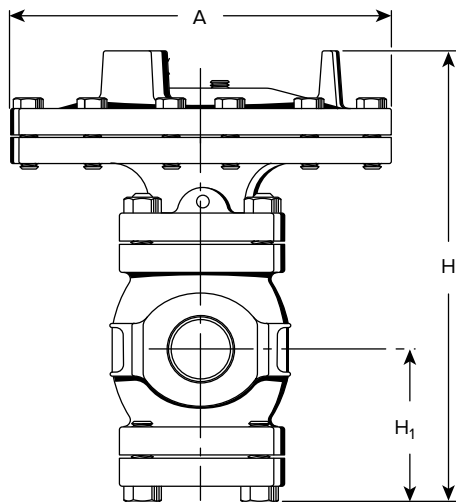
Application	Inlet Pressure (barg)	Reduced Pressure (barg)	Maximum Temperature (°C)	Minimum Differential (barg)	Materials			
					Body	Main Valve / Seat	Diaphragm	Color
Steam	1 - 20*	0,5 - 14 (Additional Air Pressure required)	232	0,5	Ductile Iron ASTM A536	Stainless Steel AISI 420	Stainless Steel AISI 301	Dark Gray

**Table PTC-268-2. GD-2000K Dimensions and Weights**

Size	Face-to-Face		H1	H	A	Weight		Cv
	BSPT	PN 25/40				BSPT	PN 25/40	
	mm	mm				kg	kg	
15 - 1/2"	150	150	74	244	200	13	14	5,0
20 - 3/4"	150	150	74	244	200	13	15	7,2
25 - 1"	160	160	76	251	226	17	19	10,9
32 - 1 1/4"	180	180	90	282	226	20	23	14,3
40 - 1 1/2"	180	200	90	282	226	20	23	18,8
50 - 2"	230	230	103	319	276	31	35	32,0
65 - 2 1/2"	—	290	122	373	352	—	64	60,0
80 - 3"	—	310	135	399	352	—	71	78,0
100 - 4"	—	350	167	488	401	—	112	120,0

\* All sizes comply with the article 4.3 of the PED (2014/68/UE), but PMA for DN65 is 15 bar, for DN80: 12,5 bar and for DN100: 10 bar. For capacities see page PTC-273.

External Sensing Line is not included as standard, but could be delivered on request. Internal Sensing Kit is also available.


**GD-2000K**


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





# Notes

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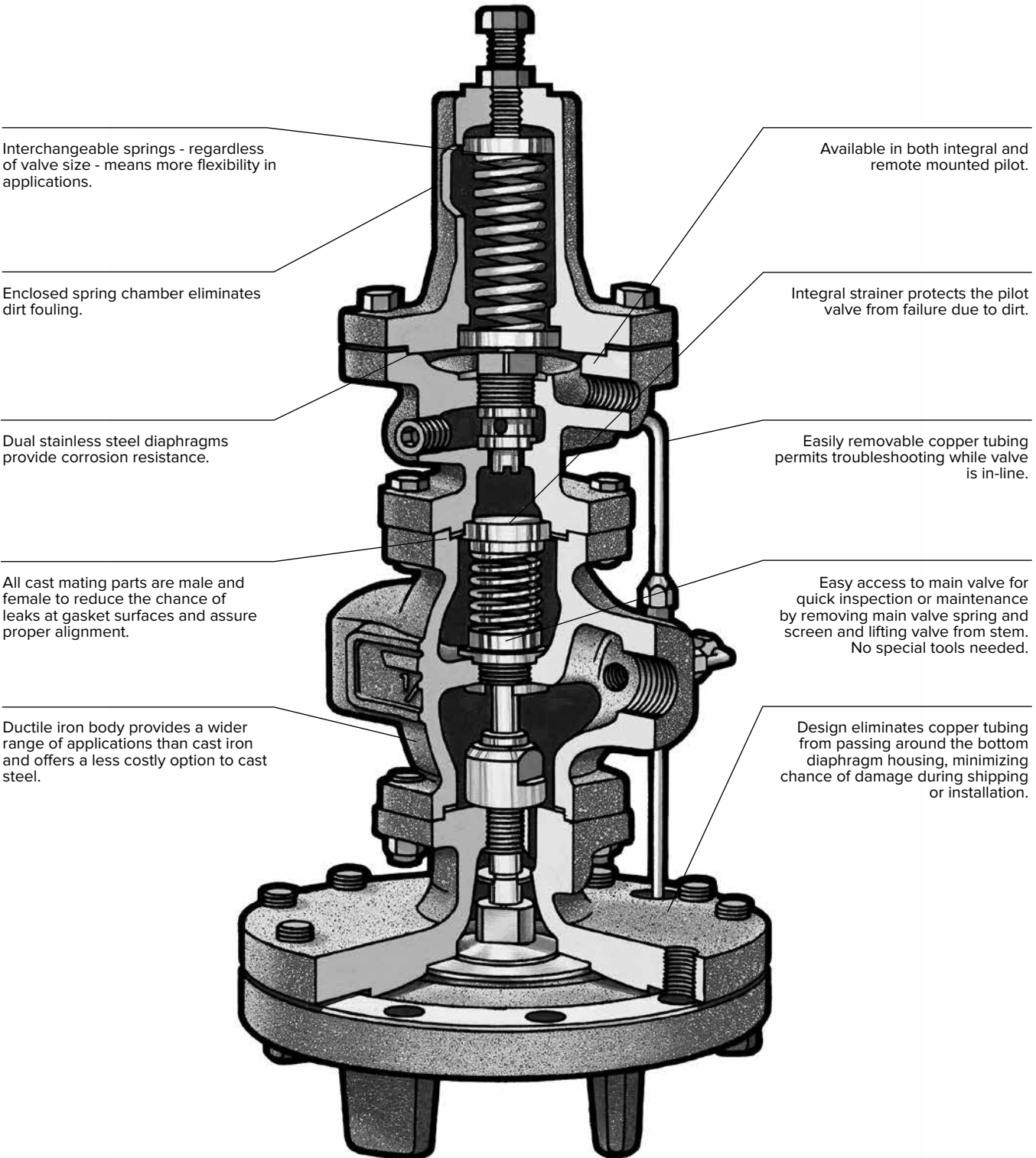
Pressure and Temperature Controls

### For Steam Service

This type of PRV incorporates two valves - a pilot and a main valve - in one unit. The pilot valve has a design similar to the direct acting valve. The discharge from the pilot valve acts on a set of double diaphragms, which controls through a piston the opening of the main valve. This increased diaphragm area can open a larger main valve, allowing a greater capacity per line size than the internally piloted piston-operated valve.

In addition, the diaphragms are more sensitive to pressure changes, which results in accuracy of  $\pm 1\%$ . This greater accuracy is due also to the positioning of the sensing line downstream, where there is less turbulence. This valve also offers the flexibility to use different types of pilot valves: pressure, temperature, air loaded, solenoid or combination.

Pressure and Temperature Controls



Interchangeable springs - regardless of valve size - means more flexibility in applications.

Enclosed spring chamber eliminates dirt fouling.

Dual stainless steel diaphragms provide corrosion resistance.

All cast mating parts are male and female to reduce the chance of leaks at gasket surfaces and assure proper alignment.

Ductile iron body provides a wider range of applications than cast iron and offers a less costly option to cast steel.

Available in both integral and remote mounted pilot.

Integral strainer protects the pilot valve from failure due to dirt.

Easily removable copper tubing permits troubleshooting while valve is in-line.

Easy access to main valve for quick inspection or maintenance by removing main valve spring and screen and lifting valve from stem. No special tools needed.

Design eliminates copper tubing from passing around the bottom diaphragm housing, minimizing chance of damage during shipping or installation.

### For Steam Service

The GP-2000 is a high performance, externally piloted reducing valve for large capacity requirements. Typical use is on intermittent service, including applications such as heat exchangers, steam coils, rotating dryers, process equipment and heating systems.

With a 20:1 rangeability and high Cv, the GP-2000 is reliable and accurate ( $\pm 1\%$  of pressure set point from 5% to 100% of flow) over a long, trouble-free service life. Hardened stainless steel working parts are renewable in-line. Single seated for dead-end service. Available with both BSPT (1/2" - 2") and flanged connections in DN15 - DN150 sizes.

**Table PTC-271-1. GP-2000 Specifications**

Application	Inlet Pressure (barg)	Reduced Pressure (barg)	Spring Color	Maximum Temperature (°C)	Minimum Differential (barg)	Materials				
						Body	Main Valve /Seat	Pilot Valve / Seat	Diaphragm	Color
Steam	1 - 20	0,1 - 0,2*	Yellow	232	0,5	Ductile Iron ASTM A536	Stainless Steel AISI 420	Stainless Steel AISI 301	Dark Gray	
		0,2 - 1,5	Yellow							
		1 - 14	Green							

\* Note: 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.

**Table PTC-271-2. GP-2000 Dimensions and Weights**

Size	Face-to-Face (L)		A	F	H Integral	H Remote	H1	H2	Weight		Cv
	BSPT	PN 25/40							BSPT	PN 25/40	
	mm	mm									
15 - 1/2"	150	150	200	176	398	362	170	244	14	16	5,0
20 - 3/4"	150	150	200	176	398	362	170	244	14	17	7,2
25 - 1"	160	160	226	180	404	367	175	254	19	23	10,9
32 - 1 1/4"	180	180	226	180	434	384	192	283	22	26	14,3
40 - 1 1/2"	180	200	226	180	434	384	192	283	22	26	18,8
50 - 2"	230	230	276	197	498	406	216	321	33	38	32,0
65 - 2 1/2"	—	290	352	211	552	440	251	375	—	67	60,0
80 - 3"	—	310	352	222	575	456	264	400	—	73	78,00
100 - 4"	—	350	401	240	658	511	321	489	—	114	120,0
150 - 6"	—	480	502	—	806	—	414	673	—	252	250,0

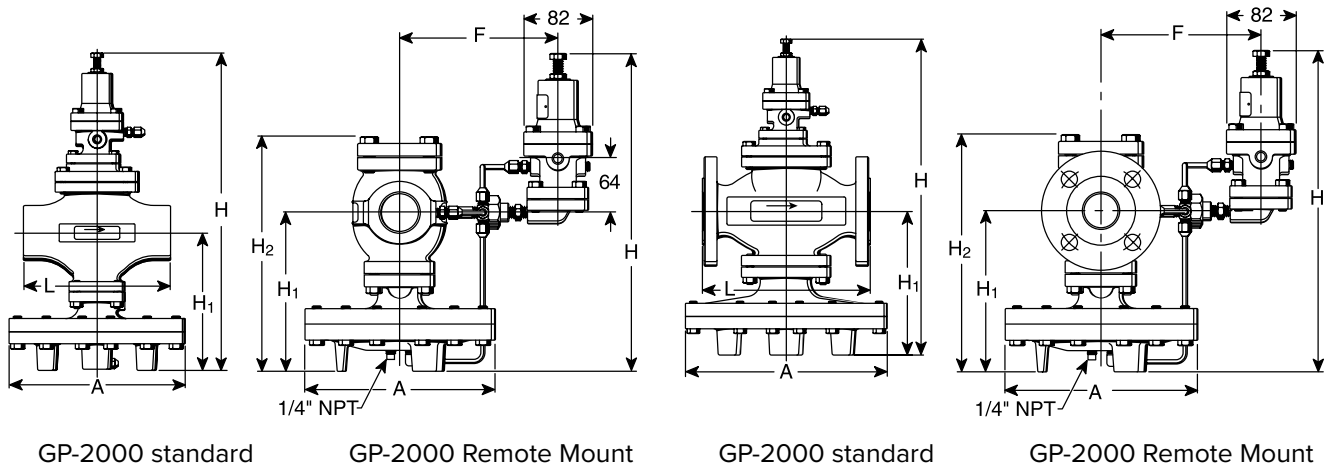
Shade indicates products that are CE Marked according to the PED (2014/68/UE). All the other sizes comply with the Article 4.3 of the same directive.

Note: DN150 valve is available in integral version only.

For capacities see page PTC-273.

External Sensing Line is not included as standard, but could be delivered on request. Internal Sensing Kit is also available.

Pressure sensing line size: 1/4"



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

**For Steam Back Pressure Regulation**

The GP-2000R is a high performance externally piloted throttling back pressure valve for large capacity applications. Typical applications would include those systems utilizing flash steam for low pressure heating or processes.

The GP-2000R valves will function to maintain a constant upstream pressure. This valve is not a safety valve and should not be used for that purpose.

**Table PTC-272-1. GP-2000R Specifications**

Application	Inlet Pressure (barg)	Reduced Pressure (barg)	Spring Color	Maximum Temperature (°C)	Minimum Differential (barg)	Materials				
						Body	Main Valve / Seat	Pilot Valve / Seat	Diaphragm	Color
Steam	1 - 14	*0,2 - 1,4	Yellow	232	0,2	Ductile Iron ASTM A536	Stainless Steel AISI 420	Stainless Steel AISI 301	Dark Gray	
		1,4 - 11,0	Green							
		10,0 - 13,8	Brown							

**Note:** 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.

**Table PTC-272-2. GP-2000R Dimensions and Weights**

Size	Face-to-Face (L)		A	F	H Integral	H Remote	H1	H2	Weight		Cv
	BSPT	PN 25/40							BSPT	PN 25/40	
	mm	mm									
15 – 1/2"	150	150	200	176	398	362	170	244	14	16	5,0
20 – 3/4"	150	150	200	176	398	362	170	244	14	17	7,2
25 – 1"	160	160	226	180	404	367	175	254	19	23	10,9
32 – 1 1/4"	180	180	226	180	434	384	192	283	22	26	14,3
40 – 1 1/2"	180	200	226	180	434	384	192	283	22	26	18,8
50 – 2"	230	230	276	197	498	406	216	321	33	38	32,0
65 – 2 1/2"	—	290	352	211	552	440	251	275	—	67	60,0
80 – 3"	—	310	352	222	575	456	264	400	—	73	78,0
100 – 4"	—	350	401	240	658	511	321	489	—	114	120,0
150 – 6"	—	480	502	—	806	—	692	405	—	252	250,0

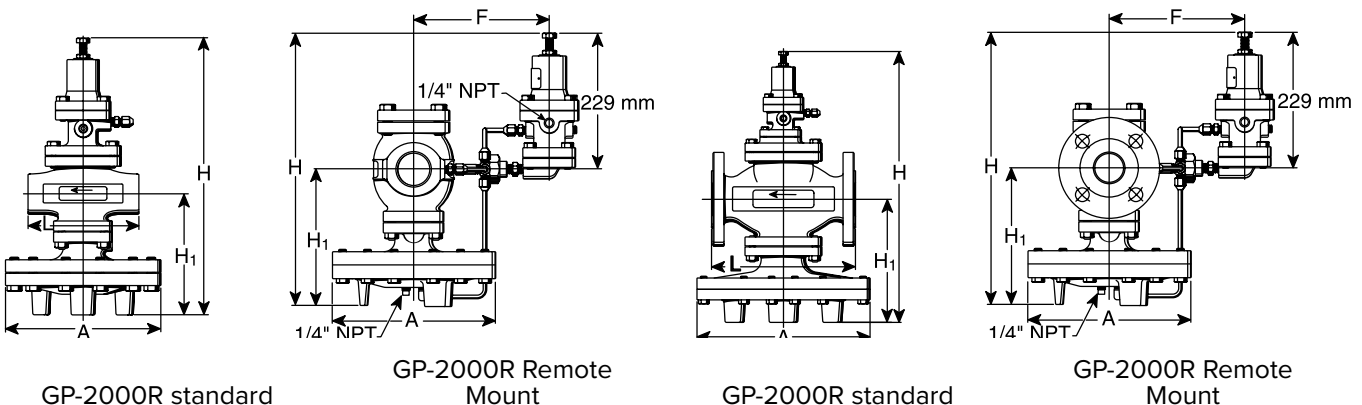
Shade indicates products that are CE Marked according to the PED (2014/68/UE). All the other sizes comply with the Article 4.3 of the same directive.

**Note:** DN150 valve is available in integral version only, but **is not CE Marked**.

For capacities see page PTC-273.-

External Sensing Line is not included as standard, but could be delivered on request. Internal Sensing Kit is also available.

Pressure sensing line size: 1/4"



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

# GP-2000, GP-2000K-1, 3 & 6, GD-2000K, GP-2000R



## Capacities for Steam

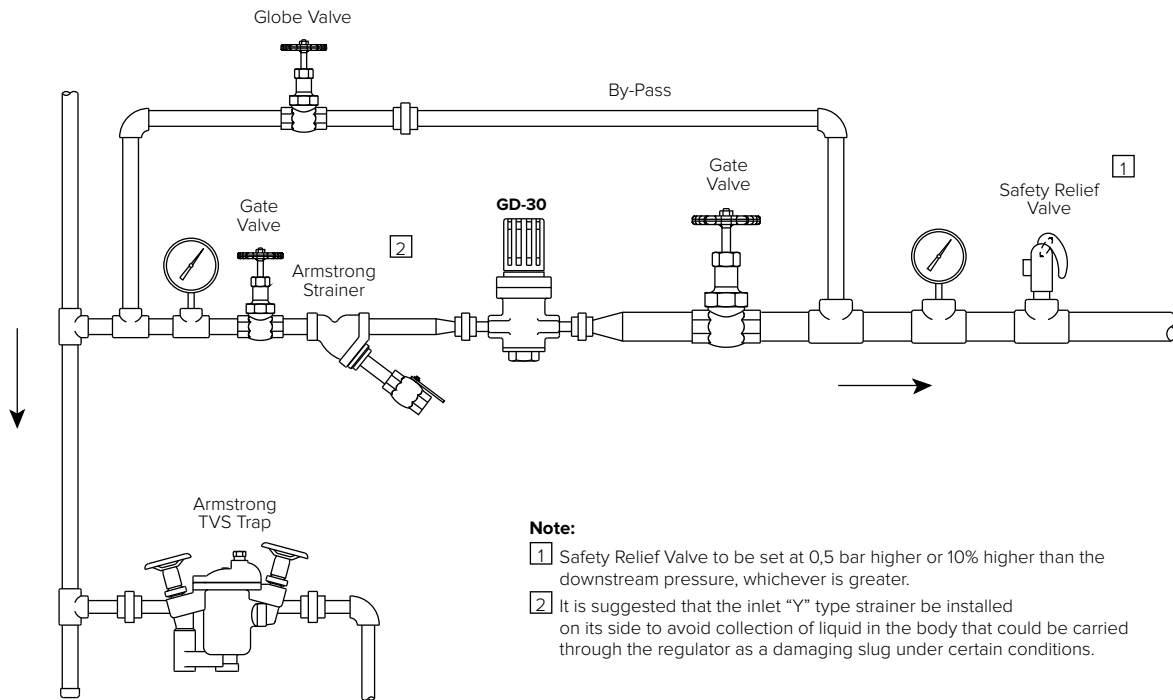
**Table PTC-273-1. GP-2000, GP2000K-1, GP2000K-3, GP2000K-6, GD-2000K, GP-2000R Capacities for Steam (kg/h)**

Inlet Pressure (barg)	Outlet Pressure (barg)	Connection Size (inches or mm)									
		1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"
		15	20	25	32	40	50	65	80	100	150
1	0,5	89	128	194	255	335	571	1 071	1 392	2 142	4 465
	1	101	145	220	289	380	648	1 215	1 580	2 430	5 063
1,5	0,2	146	210	318	418	549	936	1 755	2 282	3 510	7 313
	1,5	111	161	243	320	420	716	1 343	1 745	2 686	5 597
2	0,2 - 0,5	175	252	382	501	659	1 123	2 105	2 737	4 210	8 769
	2,5	130	188	284	373	491	836	1 568	2 038	3 136	6 536
3	0,2 - 1,0	234	336	510	669	879	1 497	2 808	3 651	5 616	11 691
	3	202	291	441	579	761	1 296	2 430	3 159	4 860	10 125
4	0,2 - 1,5	292	421	637	836	1 099	1 872	3 510	4 563	7 020	14 614
	4	223	322	487	640	841	1 432	2 685	3 493	5 370	11 194
5	3	301	434	658	863	1 134	1 931	3 621	4 709	7 242	15 093
	0,5 - 2	351	505	765	1 003	1 319	2 246	4 211	5 475	8 422	17 537
	5	243	350	530	695	914	1 557	2 919	3 795	5 838	12 169
6	3,5	361	521	788	1 035	1 360	2 316	4 342	5 645	8 684	18 096
	0,5 - 2,5	409	589	892	1 171	1 539	2 620	4 913	6 386	9 826	20 460
	5,5	314	453	686	900	1 183	2 014	3 776	4 909	7 552	15 740
7	4	421	606	918	1 205	1 584	2 697	5 059	6 574	10 118	21 077
	0,5 - 3,0	468	673	1 020	1 338	1 759	2 995	5 615	7 300	11 230	23 383
	6,5	335	483	732	960	1 262	2 149	4 030	5 238	8 060	16 790
8	5	452	652	987	1 295	1 702	2 897	5 434	7 062	10 868	22 640
	0,5 - 3,5	526	758	1 147	1 505	1 979	3 369	6 319	8 214	12 638	26 306
	8,5	374	538	815	1 070	1 407	2 395	4 493	5 840	8 986	18 715
10	7	509	733	1 110	1 457	1 916	3 261	6 114	7 949	12 228	25 481
	0,5 - 4,5	643	926	1 402	1 840	2 419	4 118	7 721	10 038	15 442	32 151
	10	467	673	1 019	1 337	1 758	2 992	5 612	7 295	11 224	23 383
12	8	633	911	1 380	1 810	2 380	4 052	7 597	9 877	15 194	31 660
	1,0 - 5,5	760	1 095	1 657	2 175	2 859	4 867	9 126	11 863	18 252	37 997
	11,5	559	805	1 220	1 600	2 104	3 581	6 714	8 731	13 428	27 984
14	9	754	1 086	1 645	2 158	2 837	4 829	9 056	11 771	18 112	37 734
	1,0 - 6,5	877	1 263	1 912	2 509	3 299	5 616	10 530	13 689	21 060	43 843
	12,5	579	834	1 263	1 657	2 179	3 709	6 956	9 043	13 912	28 984
15	10	784	1 129	1 709	2 242	2 948	5 019	9 441	12 233	18 822	39 214
	1,0 - 7,0	936	1 347	2 040	2 676	3 519	5 990	11 231	14 600	22 462	46 765
	14	730	1 052	1 593	2 090	2 748	4 677	8 771	11 403	17 542	36 545
17,5	12	888	1 279	1 936	2 540	3 340	5 686	10 661	13 860	21 322	44 423
	1,0 - 8,0	1 082	1 558	2 359	3 095	4 069	6 926	12 986	16 882	25 972	54 113
	14	992	1 428	2 162	2 837	3 729	6 348	11 904	15 476	23 808	49 602
20	12	1 113	1 603	2 426	3 183	4 185	7 124	13 358	17 365	26 716	55 662
	1,0 - 9,5	1 228	1 769	2 678	3 513	4 619	7 862	14 741	19 164	29 482	61 380

**Note:** Maximum pressure reduction 20:1, except for GD-2000K (10:1).  
Minimum pressure reduction is 85% of inlet pressure.

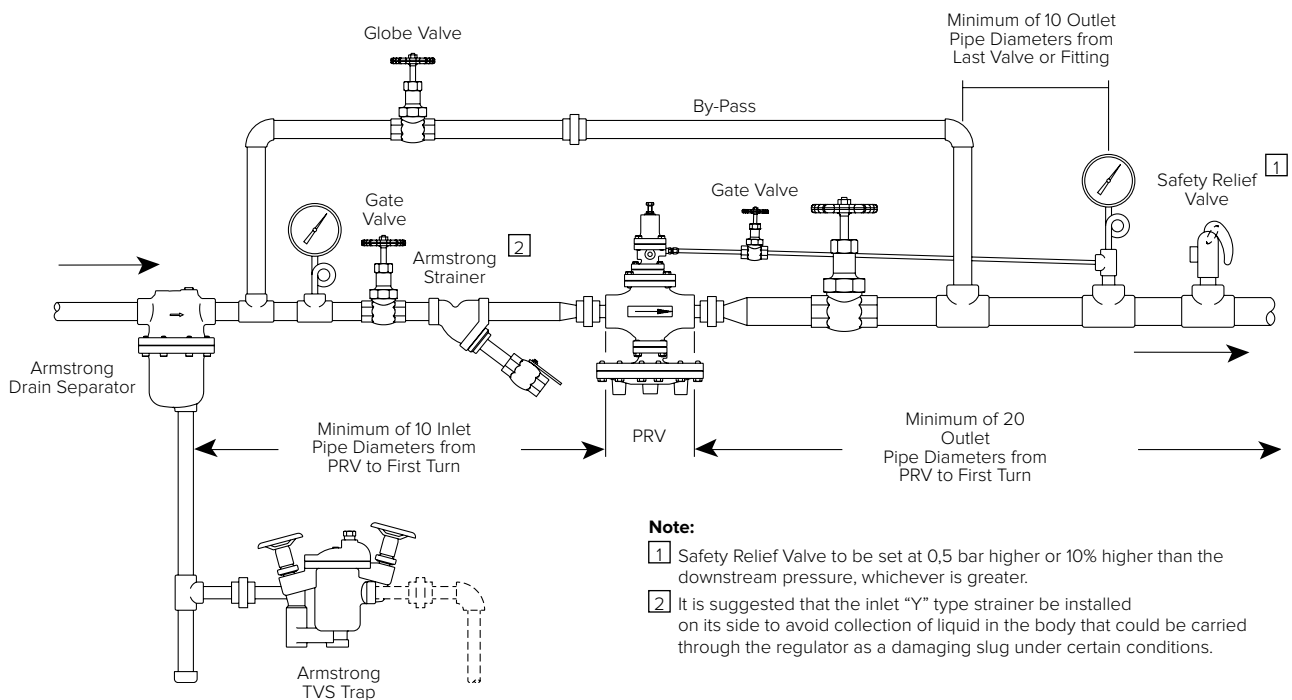
Pressure and Temperature Controls

## Direct Acting Single Stage Reduction



Typical Direct Acting PRV Installation

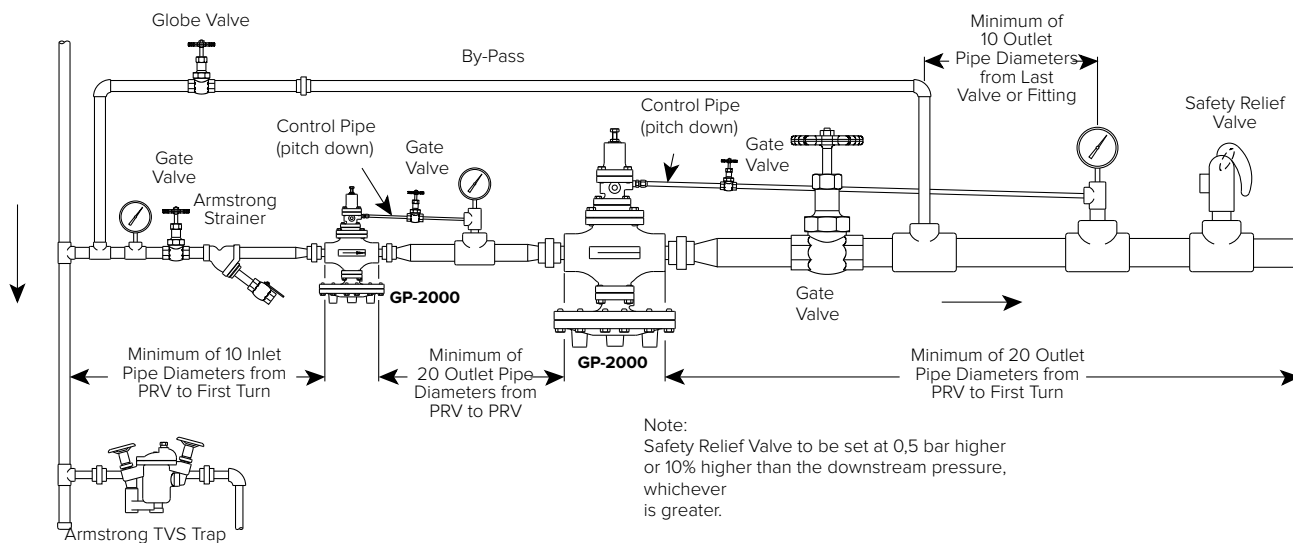
## External Pressure Pilot Single Stage Reduction



Typical External Pressure Pilot PRV Installation

# Application Data - Pressure Reducing Valves

## External Pressure Pilot Two Stage Reduction



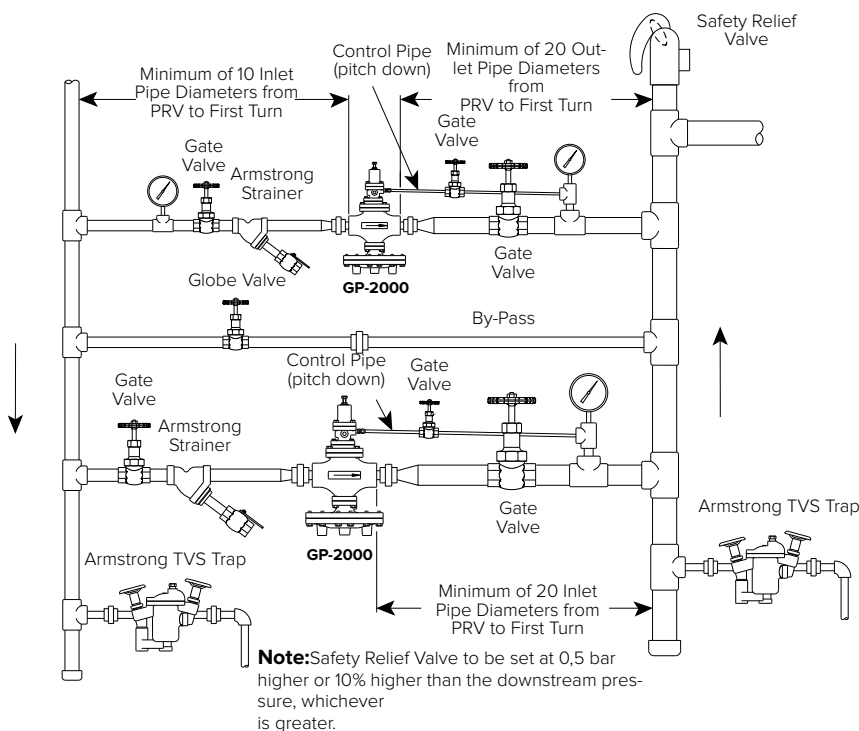
This piping application is used when the pressure turndown ratio is greater than that of a single valve. Pressure reduction is accomplished by using two valves in series to reduce the pressure in stages. Depending on the volume of fluid required and pressure reduction, the second stage valve typically will be larger in size than the first stage valve.

Unless a specific intermediate pressure of the fluid is required, this intermediate pressure is typically selected so as to keep the pressure turndown ratios of both valves as similar as possible. This will help equalize and maximize the service life of both valves.

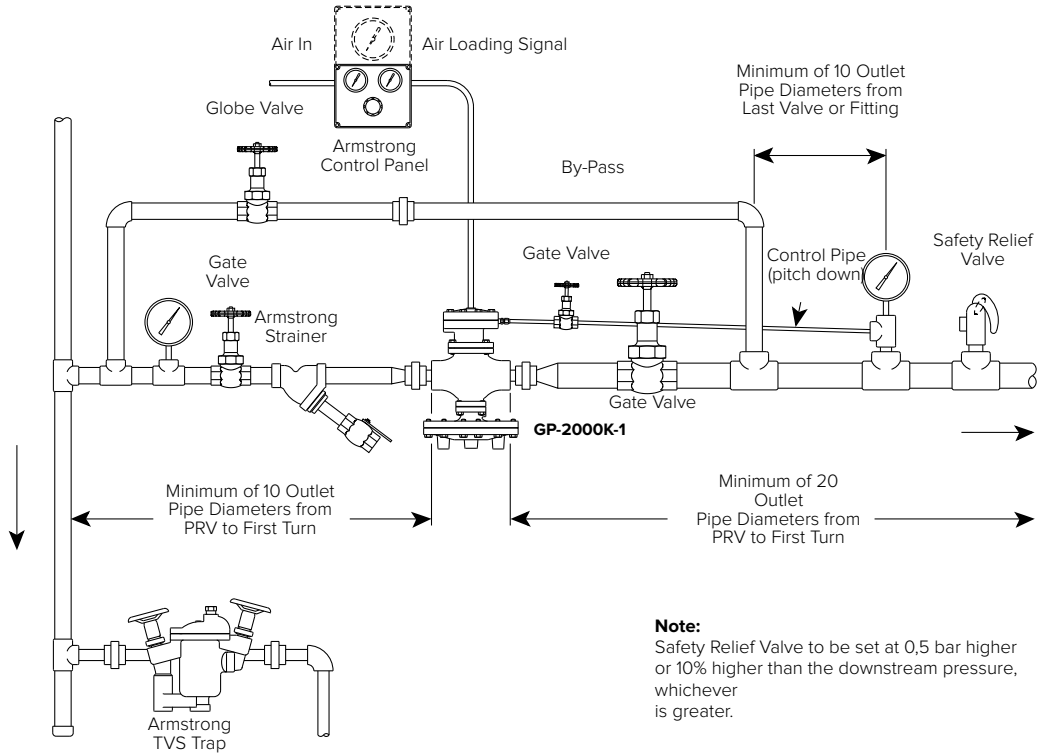
Pressure and Temperature Controls

## External Pressure Pilot One-Third to Two-Third Reduction Station

This piping application is used when the flow rangeability is greater than that of a single valve. Better control is achieved by piping two valves in parallel and sizing one to handle 1/3 the maximum load and the other 2/3 the maximum load. These two valves are staged by offsetting their pressure set points by 0,2 barg. The smaller valve is usually the lead valve and would have a pressure set point at the desired pressure. The larger valve is usually the lag valve and would have a pressure set point of 0,2 barg below the lead valve. This offset of set points will stage the valves so that the lag valve will remain closed until the lead valve can no longer pass the required flow and is wide open. This lack of flow will cause the set pressure to drop slightly until the lag valve opens and regulates at the higher demands of flow.

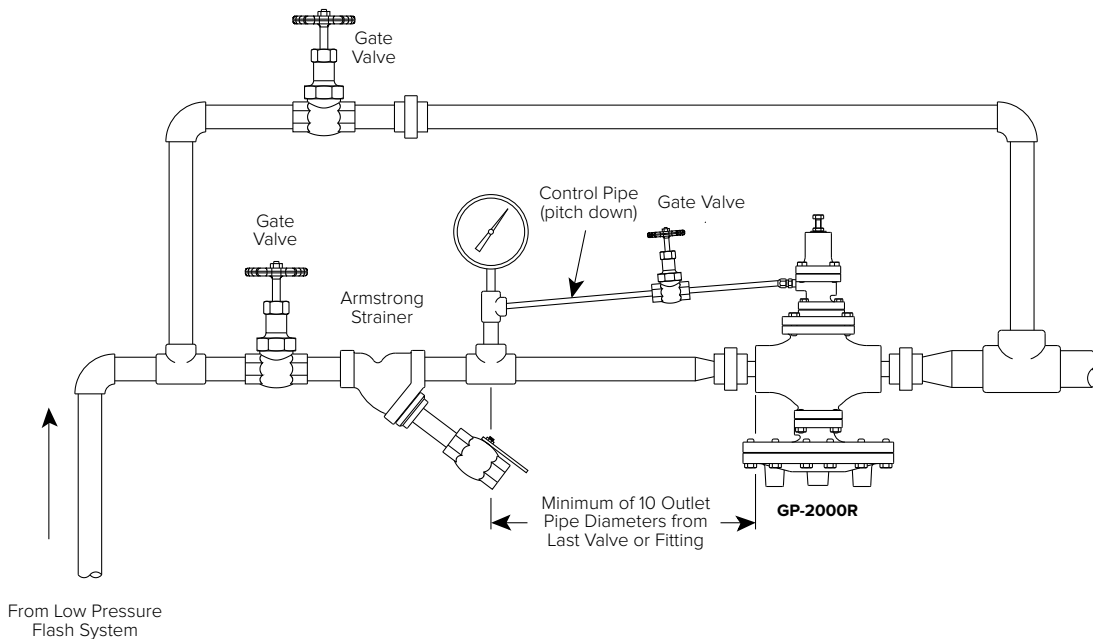


## Air Loaded External Pilot Single Stage Reduction



Typical Air Loaded External Pilot Reduction Station. Complete with remote located air loading control panel.

## External Back Pressure Pilot Installation



Typical External Pilot Back Pressure Installation. Used to maintain a constant upstream pressure in the piping system.



## Sizing Data

Table PTC-277-1. Selection Formulas	
C <sub>V</sub> Value and Calculation	K <sub>V</sub> Value and Calculation (K <sub>V</sub> = 0,86 C <sub>V</sub> )
1. For Saturated Steam / Q = kg/h, P = bar (a) When $P_2 > \frac{P_1}{2}$ $Q = C_V 13,5 \sqrt{\Delta P (P_1 + P_2)}$ When* $P_2 < \frac{P_1}{2}$ $Q = C_V 11,7 P_1$  2. For Liquid / Q = m <sup>3</sup> /h, ΔP = bar, G = kg/dm <sup>3</sup> $Q = 0,86 C_V \frac{\sqrt{\Delta P}}{\sqrt{G}}$  3. For Air / Q = Nm <sup>3</sup> /h, P = bar (a) When $P_2 > \frac{P_1}{2}$ $Q = C_V 22,4 \sqrt{\Delta P \times P_2}$ When* $P_2 < \frac{P_1}{2}$ $Q = C_V 11,2 P_1$  P <sub>1</sub> = Inlet pressure in bar (a) P <sub>2</sub> = Outlet pressure in bar (a) ΔP = Differential Pressure (P <sub>1</sub> - P <sub>2</sub> ) Q = Maximum flow capacity G = Specific gravity C <sub>V</sub> = Valve flow coefficient	1. For Saturated Steam / Q = kg/h, P = bar (a) When $P_2 > \frac{P_1}{2}$ $Q = K_V 15,88 \sqrt{\Delta P (P_1 + P_2)}$ When* $P_2 < \frac{P_1}{2}$ $Q = K_V 13,76 P_1$  2. For Liquid / Q = m <sup>3</sup> /h, ΔP = bar, G = kg/dm <sup>3</sup> $Q = K_V \frac{\sqrt{\Delta P}}{\sqrt{G}}$  3. For Air / Q = Nm <sup>3</sup> /h, P = bar (a) When $P_2 > \frac{P_1}{2}$ $Q = K_V 26,36 \sqrt{\Delta P \times P_2}$ When* $P_2 < \frac{P_1}{2}$ $Q = K_V 13,18 P_1$  * Formula applies to <b>piloted valves only</b> . With direct acting valves, at critical flow or sonic flow, capacities decrease with greater differential pressure.

## Ordering Information

Table PTC-277-2. Cv Values															
Model	Connection Size														
	8	10	15	20	25	32	40	50	65	80	100	125	150	200	250
GD-30	—	—	1,3	1,5	2,5	—	5,6*	8,5*	—	—	—	—	—	—	—
GD-2000K	—	—	5,0	7,2	10,9	14,3	18,8	32,0	60,0	78,0	120,0	—	—	—	—
GP-2000 series	—	—	5,0	7,2	10,9	14,3	18,8	32,0	60,0	78,0	120,0	—	250,0	—	—

**Note:** 50% reduced ports are available for all 2000 Series - capacities and Cv are reduced by 50%

\* GD-30 only

### When ordering please specify:

1. Model number
2. Connection size and type
3. Quantity
4. Service fluid
5. Specific gravity (if other than steam, air, water)
6. Fluid temperature
7. Maximum inlet pressure
8. Desired reduced pressure or controlled temperature
9. Flow rate
10. Special conditions (if any)



## Temperature Regulators

### Temperature Regulators Types

Armstrong self-actuated temperature regulators are compact, high performance units that are simple in design and operation and suitable for a wide variety of applications. Features including flexible mounting positions, interchangeable capillaries and several temperature ranges make installation, adjustment and maintenance quick and easy.

There are three types of temperature regulators in Armstrong product range:

**Low capacity** : our **OB-30/31** temperature regulators are suitable for variety of heating or cooling applications. They can be used for steam, water and non-corrosive liquids. Available with connections up to 1", they can handle up to 750 kg/h of steam or 16 m<sup>3</sup>/h of water.

**High capacity** : our **OB-2000** temperature regulators are high capacity valves for steam applications. Used for heating only, they are able to handle up to 30 000 kg/h of steam.

**Pressure and Temperature Regulators** : our **OB-2000PT** temperature regulators have both pressure and temperature pilots, giving them higher accuracy. Being able to control as well outlet steam pressure as the temperature of the heated fluid, they can handle up to 30 000 kg/h of steam.

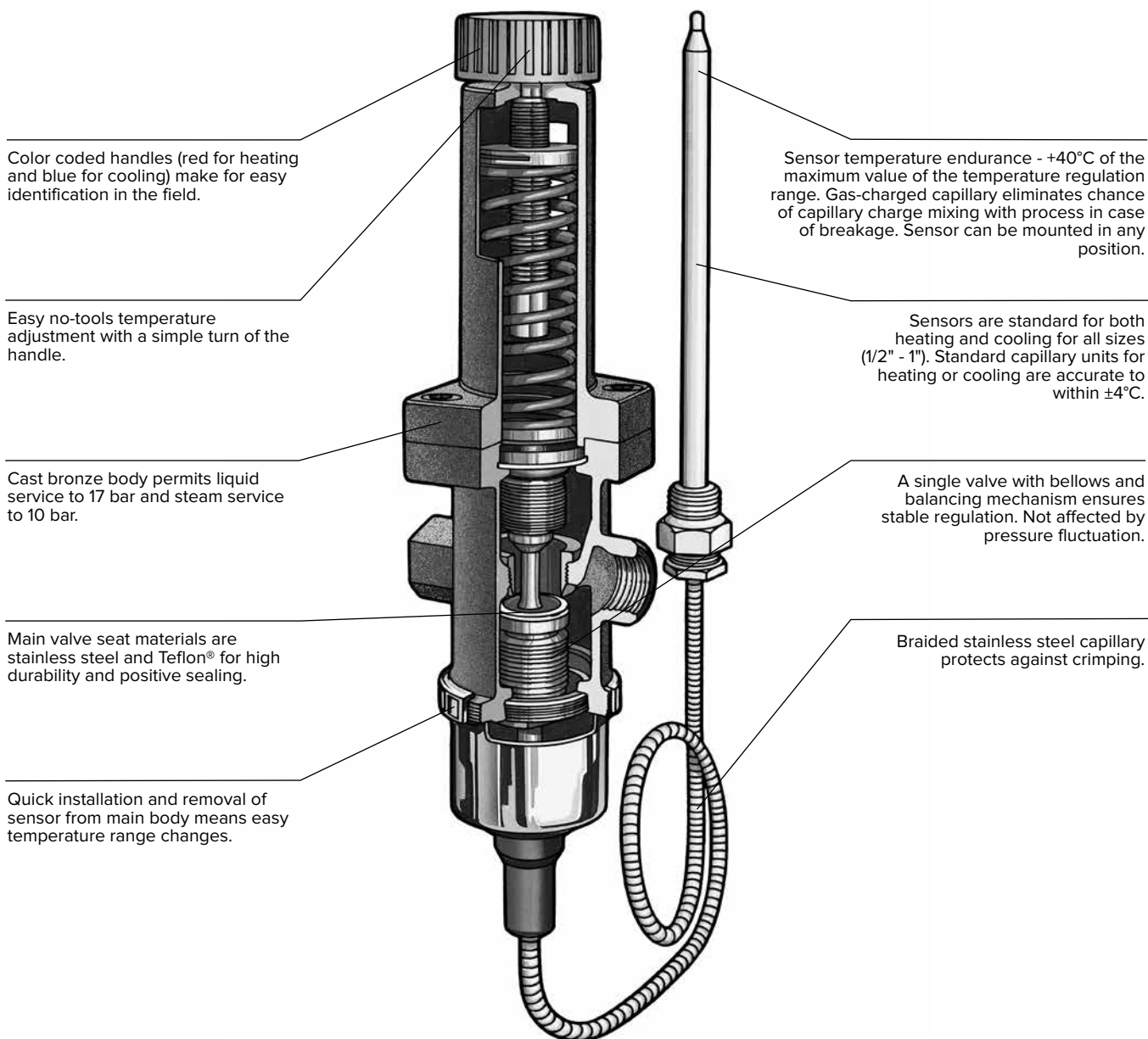


# Temperature Regulators

## For Steam, Water and Non-Corrosive Liquid Service

Armstrong self-actuated externally piloted temperature regulators are compact, high performance units that are simple in design and operation - and suitable for a wide variety of applications.

Features including flexible mounting positions of the sensor, interchangeable capillaries and varied temperature ranges make installation, adjustment and maintenance quick and easy.



**Table PTC-279-1. Temperature Regulator Valve Selection**

If the Service is	If the Inlet Pressure is	Type of Control	Temperature Ratings (°C)	Temperature Accuracy (°C)	If Maximum Capacity is Less Than	Look for Model	Find on Page
Heating	1 - 10 barg	Self-Contained Direct Acting	0 - 150°C (5 ranges)	± 3°C	792 kg/h	OB-30	PTC-280
	0,5 - 20 barg	Self-Contained Pilot Operated	-8 - 183°C (6 ranges)	± 1°C	29 754 kg/h	OB-2000 OB-2000PT	PTC-282 PTC-284
Cooling	0,34 - 17 barg	Self-Contained Reverse Acting	0 - 150°C (5 ranges)	± 3°C	16 m³/h	OB-31	PTC-280

**For Steam, Water and Non-Corrosive Liquids**

The Armstrong OB-30/31 is a direct acting temperature regulator that requires no external source for operation. Simple and compact, the unit is suitable for a wide variety of heating/cooling applications. Installing, adjusting or maintaining the OB-30/31 is quick and easy because interchangeable capillaries mount in any position and

disconnect by simply loosening the union nut. No stem packing so there's no leakage. Single composition seat for tight shutoff. The OB-30/31 comes in 1/2", 3/4" or 1" sizes and is available with a choice of five temperature ranges and three capillary lengths.

**Table PTC-280-1. OB-30/31 Specifications**

Model	Application	Service	Maximum Inlet Pressure (barg)	Maximum Differential (barg)	Temperature Ranges (°C)	Maximum Temperature (°C)	Temperature Accuracy (°C)	Capillary Lengths (m)
OB-30	Heating	Steam, Water	Steam: 10 barg	10	0 - 35	185	± 3 From Set Point	2
					25 - 70			3
					40 - 100			5*
OB-31	Cooling	Water, Non-Corrosive Liquids	Liquid: 17 barg		60 - 130			
					70 - 150			

\* Standard length.

**Note:** Capillary can withstand a maximum of 40°C above rated range. If desired set temperature is in temperature range overlap, select lower range.

**Table PTC-280-2. OB-30/31 Materials**

Body	Seat	Valve	Capillary	Bulb	Thermal Well
Bronze ASTM B584	Single Seat 304 Stainless Steel	Teflon	Armor Shielded 304 Stainless Steel	Copper-Nickel Plated	304 Stainless Steel or Brass*

\* Other materials available upon request

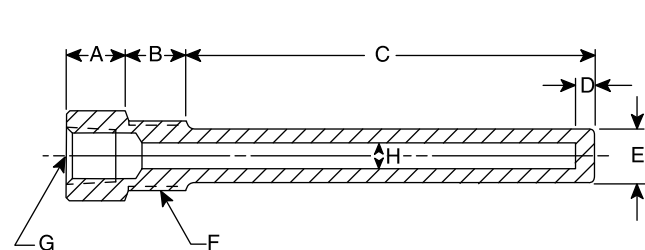
**Table PTC-280-3. OB-30/31 Dimensions and Weights**

Size	L (mm)	H <sub>1</sub> (mm)	H (mm)	T (mm)	K (mm)	R (inch)	Weight (kg)	Cv
15 - 1/2"	75	130	320	10	203	1/2"	2,7	3,7
20 - 3/4"	80	130	320	10	203	1/2"	2,8	4,6
25 - 1"	90	130	320	10	203	1/2"	3,0	5,8

All sizes comply with the article 4.3 of the PED (2014/68/UE).

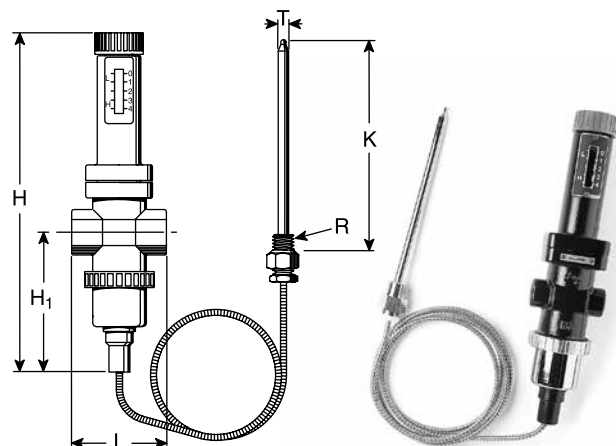
**Table PTC-280-4. Thermal Well Dimensions**

Model	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (inch)	H (mm)
OB-30/31	13	20	199	7	14	1/2"	1/2"	11
OB-2000/2000PT	16	20	231	7	22	3/4"	3/4"	17.5
OBK-2000	25	20	320	6	20	3/4"	1/2"	13

**OB-30/31, OBK-2000 and OB-2000/2000PT Thermal Well**


**Standard Material: 304 stainless steel or brass. Other materials available upon request.**

**Note:** When inserting sensor into thermal well, for best results, it is recommended that heat transfer medium be applied to sensor before installation.



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

**Table PTC-281-1. OB-30/31 Capacities for steam in kg/h**

Inlet Pressure (barg)	Outlet Pressure (barg)	Connection Size		
		1/2"	3/4"	1"
		15	20	25
0,35	0,20	30	38	48
	0,14	37	45	58
	0,00	46	57	72
0,7	0,55	34	43	54
	0,41	47	59	75
	0,28	57	70	89
	0,00	70	87	110
1,0	0,83	46	57	72
	0,62	63	78	99
	0,41	75	93	118
	0 - 0,35	91	113	143
1,4	1,00	63	79	99
	0,70	82	107	135
	0,35	100	125	158
	0 - 0,14	106	132	167
1,7	1,38	68	85	106
	1,00	93	115	145
	0,70	110	136	172
	0 - 0,35	122	151	191
2,0	1,72	72	90	114
	1,00	117	146	185
	0 - 0,48	137	170	215
2,8	2,00	111	138	175
	1,38	149	185	234
	0 - 0,83	168	209	263
3,5	2,76	122	151	191
	2,00	174	205	259
	0 - 1,2	199	247	311
4,0	3,45	132	164	206
	2,76	180	223	281
	0 - 1,5	229	285	360
4,8	4,00	141	175	221
	3,45	149	193	302
	2,76	228	284	358
	0 - 1,9	260	323	408
5,5	4,83	150	186	280
	4,00	205	255	322
	3,45	244	304	383
	0 - 2,2	291	361	456
6,0	5,52	157	196	247
	4,83	217	315	340
	4,00	259	322	406
	3,45	290	361	455
6,9	0 - 2,6	321	400	504
	6,00	165	205	259
	5,52	228	284	358
	4,83	273	340	428
8,6	4,00	307	382	482
	0 - 2,9	353	438	552
	7,59	222	276	349
	6,90	281	350	441
10,0	5,52	363	451	568
	4,83	392	488	615
	0 - 3,8	429	534	673
	8,97	278	345	435
10,0	8,28	335	416	525
	6,90	417	519	654
	0 - 4,3	506	629	793

**Note:** 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	7 bar
Outlet pressure	6 bar
Maximum flow rate	227 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 227 kg/h under connection size	1"
Find capillary temperature range	25-70°C
Select capillary length	5 m

**Application Will Require:**

**OB-30, 1" with 25-70°C Temperature Range, Capillary Length 5m**

**Table PTC-281-2. OB-30/31 Capacities for water in l/mn**

Differential Pressure (bar)	Connection Size		
	1/2"	3/4"	1"
	15	20	25
0,35	30	38	47
0,70	45	55	70
1,00	55	67	83
1,40	63	78	100
1,70	70	83	107
2,00	77	97	120
3,50	100	127	157
5,00	123	150	187
7,00	143	175	217
8,50	160	197	248
10,00	175	217	267

**Table PTC-281-3. Capillary Temperature Ranges (°C)**

0 - 35
25 - 70
40 - 100
60 - 130
70 - 150

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

**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-282-1. 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.

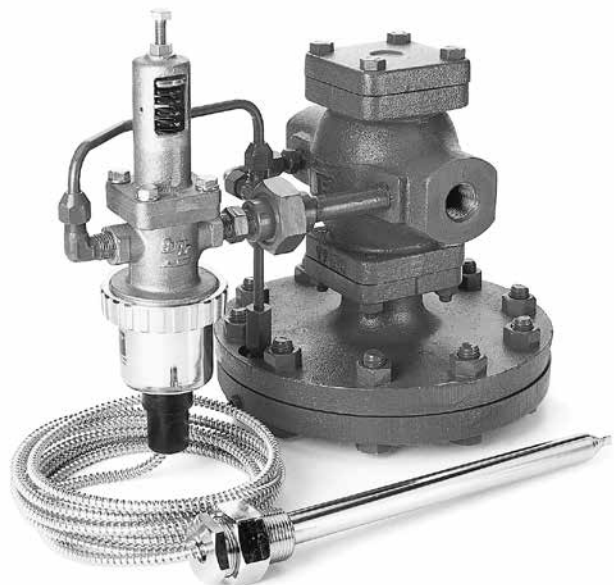
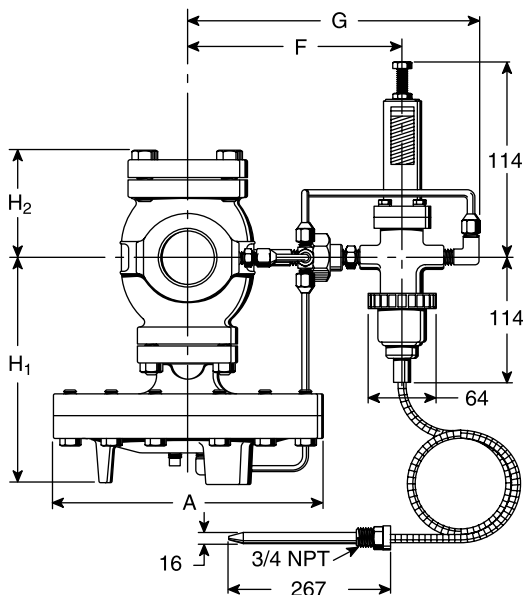
**Note:** If desired set temperature is in temperature range overlap, select lower range.

**Table PTC-282-2. 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						BSPT	PN 25/40	
	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-283-1. 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-280 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-283-2. 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-285.

**Temperature Regulator Selection Example**

<b>Parameters:</b>	
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

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

**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-284-1. 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-284-2. 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-280 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.

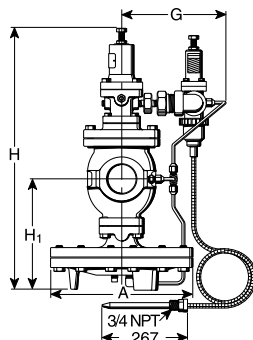
**Table PTC-284-3. OB-2000PT Dimensions and Weights**

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-285.



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



Table PTC-285-1. 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.

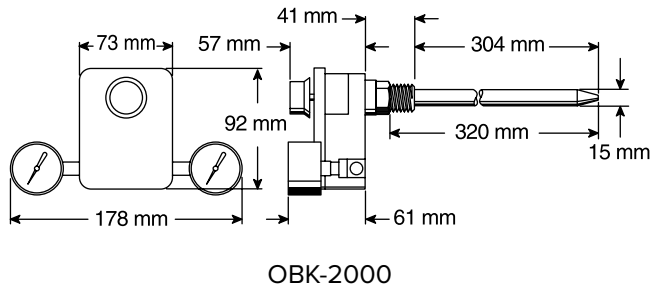
Pressure and Temperature Controls

### 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-286-1. 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-280). 304 stainless steel or brass are standard materials. Other materials available upon request.

**Table PTC-286-2. OBK-2000 Specifications**

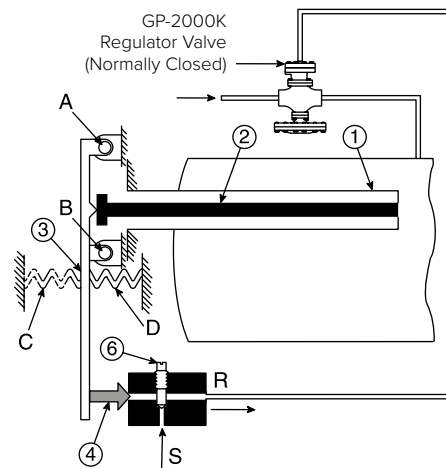
Dial adjustment range (°C)	Standard - 10 to 177
Maximum supply air pressure @ room temperature (barg)	2
Maximum air consumption (cm <sup>3</sup> /s)	218 - 3
Maximum operating pressure (barg)	17
Maximum operating temperature (°C)	204
Temperature response (°C)	0,3
Mounting (mm)	15
Air connections (mm)	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.

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

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

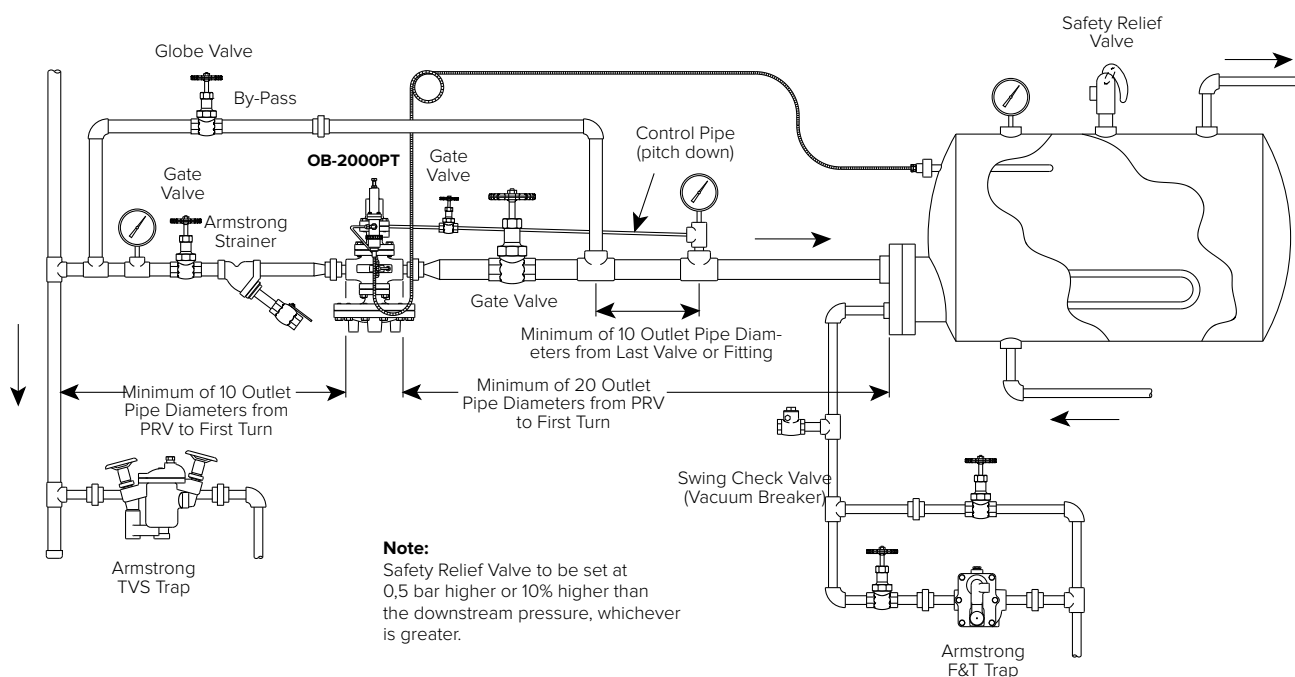
### For Steam Service

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



### Steam Load Calculations

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

