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TA-950

Direct Action Pressure Regulator

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TA-950 FAMILY

The TA950 series pressure regulators are direct acting spring loaded regulator type, controlled by a diaphragm and counter spring. The balanced valve design ensures constant pressure setting when upstream pressure varies.

Designed to deliver high regulation accuracy, these devices are suitable for use with non-corrosive gases, previously filtered. The TA950 series pressure regulators are “top entry” design, which allows an easy maintenance without removing the body from the pipeline.

The TA950+SSV version is with incorporated safety shut off device (SSV or Upso-Opso) against over and under outlet pressure.

The regulator is CE marked and approved by Bureau Veritas under the Pressure Equipment Directive (PED) 2014/68/EU according with EN 334 / EN 14382.



APPLICATION

The TA950 series of pressure regulators are designed to reduce and accurately control the downstream system pressure in natural gas and LPG gases in industrial and commercial applications where rapid changes in flow rate can occur (burners, industrial ovens, boilers, etc.).

They are suitable for low, medium and high pressure.

FEATURES

- Low/medium/high pressure versions
- High regulation accuracy
- High flow rate
- Spring loaded
- Fully balanced valve design
- Integral strength
- EN 334 / EN 14382 compliance
- Threaded and flanged connections
- Compact design
- Easy maintenance
- SSV (UPSO/OPSO) safety device (option)
- Incorporated relief valve
- Internal sensing line (ISL) and external sensing line (ESL) versions are available (TA950-1 only ESL).

TECHNICAL SPECIFICATIONS TA-950/+SSV

Inlet pressure range	0.5 ÷ 12 bar (LP-MP) 0.5 ÷ 20 bar (HP)		
Outlet pressure range Wd	15 ÷ 4000 mbar (using three different sizes of diaphragm casing and various springs)		
Nominal width and CG value	950 DN 25x25 (1"x1") CG=170		
	950 DN 25x40 (1"x1½") CG=250		
	950 DN 40x40 (1½"x1½") CG=330		
	950-1 DN 40x40 (1½"x1½") CG=670		
	950 DN 50x50 (2"x2") CG=790		
Type of connection	Threaded EN 10226 or NPT - Flanged UNI (PN) or ANSI		
Accuracy class	AG 5%, 10% according to maximum flow rate required		
Closing pressure category	SG up to 20%		
Outlet pressure range Wd	up to 1% depending on size and pressure range		
	TA-950 LP	15 -160 mbar	
	TA-950 MP	150 ÷ 400 mbar	
	TA-950 HP	380 ÷ 4000 mbar	
Lock Up pressure category	SZ 2.5 %		
Safety Shutoff Device		Wdo	Wdu
	LP	40-180 mbar	6-60 mbar
	MP	140-450 mbar	60-240 mbar
	HP	250-5800 mbar	100-4000 mbar
Closing time ta	0.1-0.5 s		
Operational temperature range	-20 °C to +60 °C (-40°C to +60°C available on request)		
Operation and strength according to	EN 334, EN 14382, PED 2014/68/EU		
CE mark according to PED	CE 1370		
EX protection	Since the device is not fitted with potential ignition sources of its own, it is not subject to ATEX 95 regulations (all used electronic accessories meet ATEX requirements).		
On Request	Monitor version / up to 10 bar inlet pressure for LP/MP type		

MATERIALS

Body	Spheroidal graphite cast iron GJS400-18 EN1563
Covers	Aluminium cast alloys Al Si11 Cu2 (Fe) EN AC 46100
Valve	Brass CuZn39Pb3 EN12164
Valve Seat	Aluminium UNI EN 573 EN AW 2011
Diaphragm	Synthetic rubber with canvas
Balanced diaphragm	Nitrile (NBR) or flouroelastomer (FKM)
Reinforced gasket	Vulcanized rubber
Seals	Nitrile rubber O-rings NBR
Springs	EN 10270 zinc plated carbon steel

TA-950 SERIES

TA-950 Regulator

	Code	Setting range	
		Min [mbar]	Max [mbar]
LP	0000000001137	15	28
	0000000001138	28	45
	0000000001139	40	60
	0000000001140	60	80
	0000000001141	80	120
	0000000001142	120	160
MP	0000000001143	150	200
	0000000001144	200	300
	0000000001145	280	400
HP	0000000001144	380	520
	0000000001145	520	750
	0000000001148	750	1100
	0000000001149	1100	1600
	0000000001150	1600	2200
	0000000001151	2200	3000
	0000000001152	3000	4000

TA-950-1 Regulator

	Code	Setting range	
		Min [mbar]	Max [mbar]
LP	0000000001153	15	25
	0000000001154	25	40
	0000000001155	40	60
	0000000001156	60	80
	0000000001157	80	120
	0000000001158	120	160
MP	0000000001159	150	200
	0000000001160	200	300
	0000000001161	280	400
HP	0000000001160	380	520
	0000000001161	520	750
	0000000001164	750	1100
	0000000001165	1100	1600
	0000000001166	1600	2200
	0000000001167	2200	3000
	0000000001168	3000	4000

TA-950 SSV Over pressure shut off protection (OPCO)

	Code	Setting range OPSO	
		Min [mbar]	Max [mbar]
LP	0000000001169	40	80
	0000000001170	80	180
MP	0000000001171	140	350
	0000000001172	350	450
HP	0000000001170	250	400
	0000000001171	400	800
	0000000001172	700	1200
	0000000001176	1200	2500
	0000000001177	2500	4000
	0000000001178	4000	5800

TA-950 SSV Under pressure shut off protection (UPCO)

	Code	Setting range UPSO	
		Min [mbar]	Max [mbar]
LP	0000000001179	6	60
MP	0000000001180	60	240
HP	0000000001179	100	150
	0000000001180	150	500
	0000000001183	500	1300
	0000000001184	1300	3000
	0000000001185	2000	4000

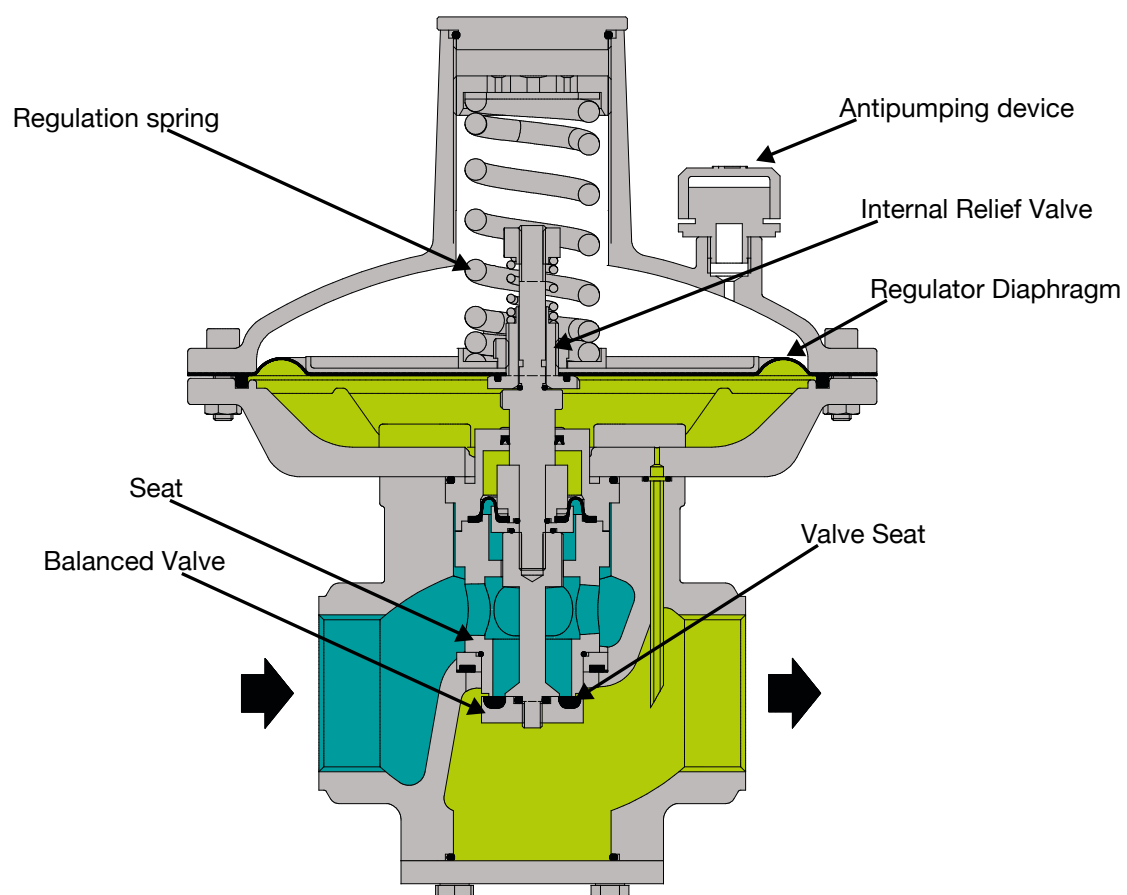
TA-950 OPERATING PRINCIPLE

The TA 950 series of pressure regulators control of downstream pressure by monitoring its changes by an internal or external sensing line. Under no pressure conditions the valve is OPEN.

The downstream pressure is controlled by comparing the loading force of the spring above the regulator diaphragm and the force of the downstream pressure below the diaphragm. The movement of the diaphragm (due to changes in pressure across the diaphragm) is transmitted by the spindle to the regulator valve. The change in the valve position controls the flow of gas downstream and thus the control of the regulator outlet pressure. The valve has a rubber seating which allows it to give a perfect 100% seal when it closes.

If the downstream pressure reduces (as the demand for gas increases or the upstream pressure decreases), the valve opens and giving an increased gas flow. This increases the outlet pressure until it reaches the preset regulator pressure. The regulator closes maintaining the required flow and outlet pressure.

Conversely, when the downstream pressure increases (as the requirement for gas reduces or the upstream pressure increases) above the required outlet pressure setting - the valve closes, reducing the flow until the pressure in the downstream system reaches the required outlet pressure level.



TA-950+SSV DOUBLE FUNCTION

Configuration for a regulator fitted with an integral Safety Shut-off Valve (SSV) suitable for High and Low pressure protection of the downstream system. The Safety Shut-off Valve (SSV) operates totally independently from the regulator.

The Safety Shut-off Valve (SSV) uses a spring loaded valve that is normally maintained in the open position.

The pressure switch may be equipped with one or more of the following control modes:

- minimum outlet pressure shut-off control (UPCO);
- maximum outlet pressure shut-off control (OPCO);
- minimum and maximum outlet pressure shut-off control (UPCO-OPCO);
- manual control (local button);
- remote control with 3-way solenoid valve (optional).

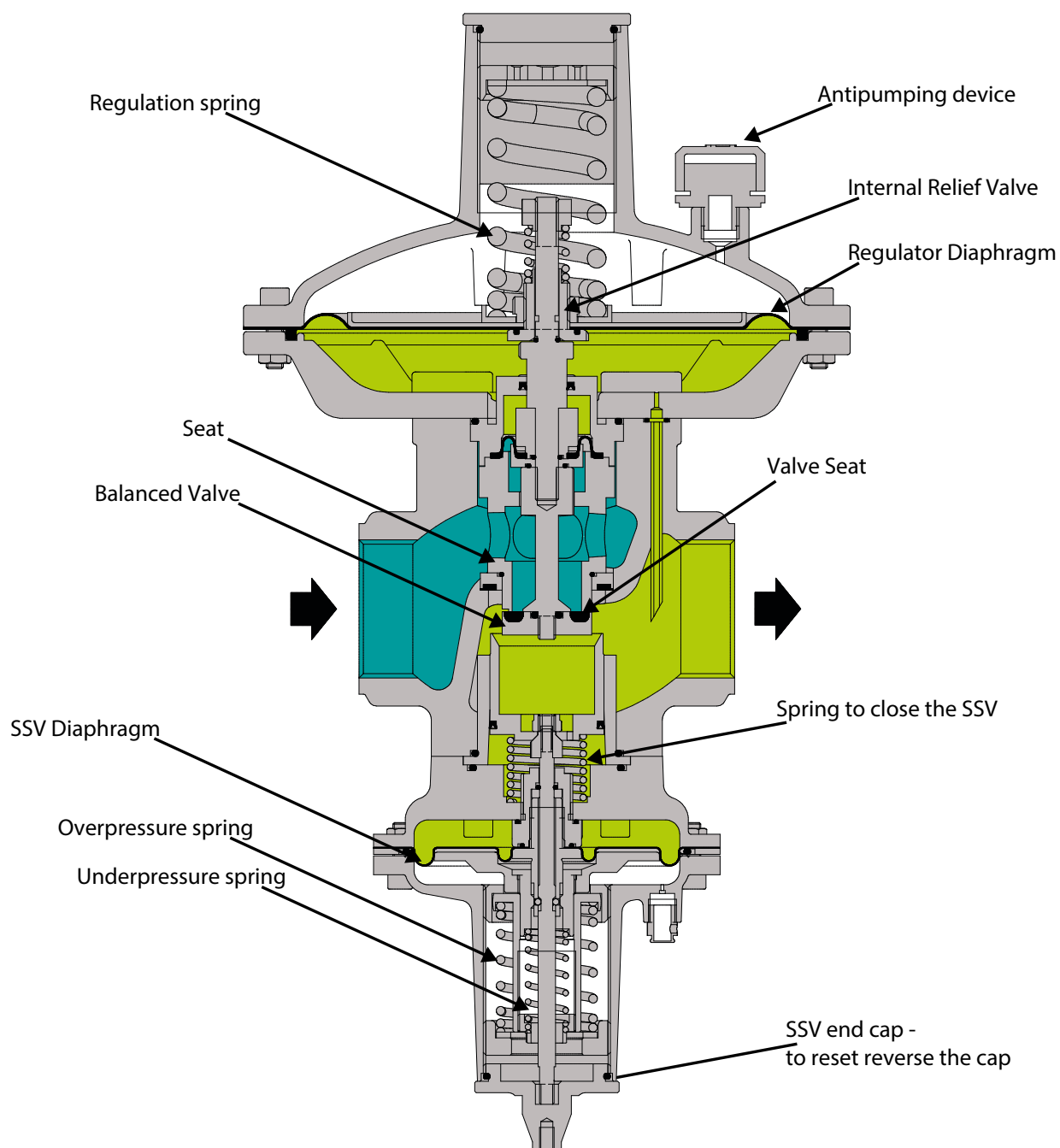
The operation for minimum and maximum pressure Safety Shut-off Valve (SSV) settings is totally independent.

If the set point for operation of the SSV is reached the pressure switch releases the latching mechanism, and this closes the valve. In the fully closed position the valve sealing is also supported by the differential pressure across the SSV valve head.

The system may be re-latched to the open position only when the pressure conditions allow and only by manual operation. The latching mechanism is re-latched to the open position by use of the spring cap (reversed).

Remote operation is possible by installing an optional solenoid valve - that in normal conditions would maintain the connection of the pressure switch head to the monitored downstream pressure line. When the valve is remotely tripped (operated) it will connect the pressure switch head to atmosphere therefore venting the pressure entrained in the switch head and generating a minimum pressure trip.

The SSV can be always closed by using the local manual release button. This button must be used only by qualified personnel during normal maintenance operations or during emergencies.



MONITOR USE

The TA-950 is classified as PED Category IV as a stand-alone safety accessory According to Pressure Equipment Directive (PED) 2014/68/EU. This means that a stand-alone TA950 is capable not only of regulating downstream pressure, but also protecting downstream piping from high pressure.

The TA950 may be used in Active-Monitor configuration. In this case the Monitor regulator differs from the active. This is due to the need of keeping the monitor fully open when there is no differential pressure across it. Since the monitor is sensing the pressure downstream of the Active regulator the balancing diaphragm is subject to a differential pressure that is not the same acting across the seat, so a secondary balancing diaphragm needs to be connected to the regulator stem taking pressure from downstream of Active regulator. In this way the two diaphragms are in equilibrium with each other and the regulator may stay in the fully open position until is requested to take service.

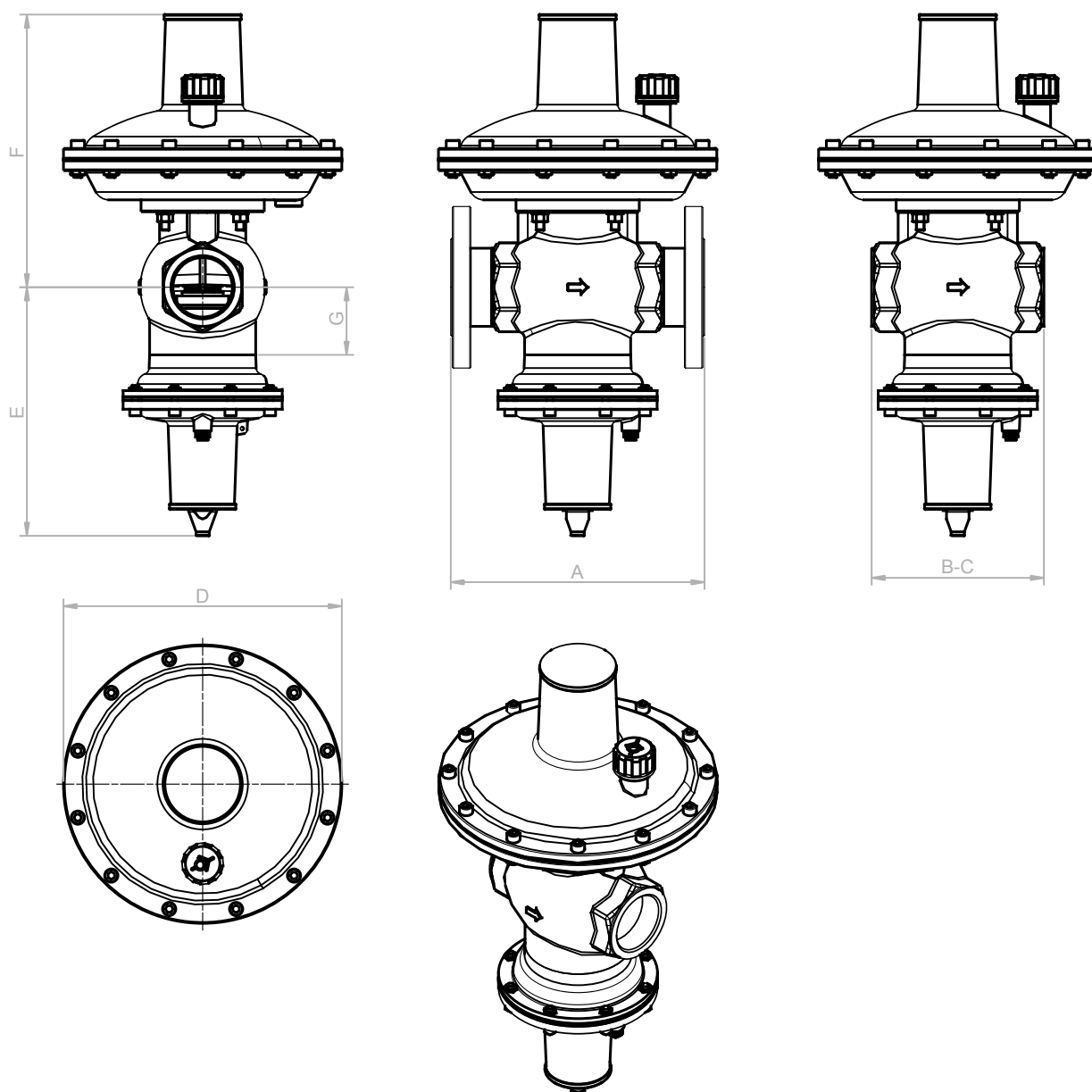
INTERNAL LIMITED CAPACITY RELIEF VALVE (OPTIONAL)

The TA-950 series of regulators are fitted with an optional internal limited capacity relief valve. Its function is to avoid the unnecessary operation of the safety shut-off valve (SSV) or at least to delay its operation if there is a short over-pressure of the downstream network caused by rapid changes in flow requirements causing a sudden peak in outlet pressure. This is normally associated with use on boilers, burners etc. that can have rapidly changing outlet pressures to suit application flow requirements.



DIMENSIONS

TA-950



DIMENSIONS [mm] & WEIGHT [kg]

Models	Connections		A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	Weight TA-950 [kg]	Weight TA-950 +SSV [kg]
TA-950/ +SSV DN25X25	Flanged	DN25xDN25	183	-	-	210	180	200	55	8	9,5
	Threaded ANSI/ASME B1.20.1	NPTF 1" x 1"	-	156	-					5,5	7
	Threaded EN 10226	Rp 1" x 1"	-	-	100					5	6,5
TA-950/ +SSV DN25X40	Flanged	DN25xDN40	218	-	-	210	190	210	65	10	11,5
	Threaded ANSI/ASME B1.20.1	NPTF 1" x 1 1/2"	-	186	-					6,5	8
	Threaded EN 10226	Rp 1" x 1 1/2"	-	-	130					6	7,5
TA-950/ +SSV DN40X40	Flanged	DN40xDN40	223	-	-	210	190	210	65	11	12,5
	Threaded ANSI/ASME B1.20.1	NPTF 1 1/2" x 1 1/2"	-	186	-					7	8,5
	Threaded EN 10226	Rp 1 1/2" x 1 1/2"	-	-	130					6	7,5
TA-950- 1/ +SSV DN40x40 & DN50X50	Flanged	DN40xDN40	223	-	-	300	215	330	75	17,5	19
	Threaded ANSI/ASME B1.20.1	NPTF 1 1/2" x 1 1/2"	-	236	-					14	15,5
	Threaded EN 10226	Rp 1 1/2" x 1 1/2"	-	-	180					13	14,5
	Flanged	DN50xDN50	254	-	-	300	215	330	75	19,5	21
	Threaded ANSI/ASME B1.20.1	NPTF 2" x 2"	-	254	-					14,5	16
	Threaded EN 10226	Rp 2" x 2"	-	-	180					12,5	14

TA950 DN 25X25

TA950LP / TA950LP+SSV: 15-160 mbar

Inlet pressure Pu		Capacity Q [stm3/h] External / Internal Sensing Line											
		Pd = 20 [mbar]		Pd = 50 [mbar]		Pd = 80 [mbar]		Pd = 100 [mbar]		Pd = 120 [mbar]		Pd = 150 [mbar]	
		ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL
500	mbar	106	106	103	103	101	101	100	100	98	98	95	95
750	mbar	132	132	131	131	129	129	128	128	127	127	126	126
1	bar	156	136	155	140	154	145	154	147	153	150	152	152
1,5	bar	202	136	202	140	202	145	202	147	202	150	202	154
2	bar	242	136	242	140	242	145	242	147	242	150	242	154
2,5	bar	280	136	283	140	283	145	283	147	283	150	283	154
3 - 10	bar	280	136	290	140	300	145	300	147	300	150	310	154

TA950MP / TA950MP+SSV: 150-400 mbar

Inlet pressure Pu		Capacity Q [stm3/h] External / Internal Sensing Line											
		Pd = 180 [mbar]		Pd = 200 [mbar]		Pd = 250 [mbar]		Pd = 300 [mbar]		Pd = 350 [mbar]		Pd = 400 [mbar]	
		ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL
500	mbar	92	92	90	90	84	84	76	76	67	67	56	56
750	mbar	124	124	122	122	119	119	115	115	110	110	105	105
1	bar	150	150	149	149	147	147	144	144	141	141	138	138
1,5	bar	202	158	202	160	196	167	194	174	193	181	191	187
2	bar	242	158	242	160	242	167	242	174	242	181	242	187
2,5	bar	283	158	283	160	283	167	283	174	283	181	283	187
3	bar	323	158	323	160	323	167	323	174	323	181	323	187
4 - 10	bar	325	158	330	160	340	167	350	174	370	181	380	187

TA950HP / TA950HP+SSV: 380-4000 mbar

Inlet pressure Pu		Capacity Q [stm3/h] External / Internal Sensing Line											
		Pd = 500 [mbar]		Pd = 1000 [mbar]		Pd = 1500 [mbar]		Pd = 2000 [mbar]		Pd = 3000 [mbar]		Pd = 4000 [mbar]	
		ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL
750	mbar	92	92	-	-	-	-	-	-	-	-	-	-
1	bar	130	130	-	-	-	-	-	-	-	-	-	-
1,5	bar	187	187	149	149	-	-	-	-	-	-	-	-
2	bar	235	201	213	213	167	167	-	-	-	-	-	-
2,5	bar	283	201	265	265	237	237	183	183	-	-	-	-
3	bar	323	201	312	268	293	293	259	259	-	-	-	-
4	bar	403	201	403	268	390	335	372	372	298	298	-	-
5	bar	410	201	484	268	484	335	468	402	425	425	333	333
7	bar	410	201	540	268	645	335	645	402	624	537	586	586
10	bar	410	201	540	268	675	335	810	402	886	537	886	673
15	bar	410	201	540	268	675	335	810	402	1080	537	1289	673

Note: The above tables give the maximum flow capacity - in m3/h at standard conditions of absolute pressure of 1.013 bar and 15°C temperature with AC 10% - SG 20% and external sensing line. Please contact us for specific application details.

TA950 DN25x40

TA950LP / TA950LP+SSV: 15-160 mbar

Inlet pressure Pu		Capacity Q [stm3/h] External / Internal Sensing Line											
		Pd = 20 [mbar]		Pd = 50 [mbar]		Pd = 80 [mbar]		Pd = 100 [mbar]		Pd = 120 [mbar]		Pd = 150 [mbar]	
		ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL
500	mbar	155	155	152	152	149	149	146	146	144	144	140	140
750	mbar	194	194	192	192	190	190	189	189	187	187	185	185
1	bar	230	230	228	228	227	227	226	226	225	225	223	223
1,5	bar	297	297	297	297	297	297	297	297	297	297	297	297
2	bar	357	357	357	357	357	357	357	357	357	357	357	357
2,5	bar	416	416	416	416	416	416	416	416	416	416	416	416
3	bar	475	426	475	438	475	451	475	459	475	467	475	475
4	bar	593	426	593	438	593	451	593	459	593	467	593	480
5	bar	660	426	675	438	690	451	710	459	712	467	712	480
7-10	bar	660	426	675	438	690	451	710	459	720	467	740	480

TA950MP / TA950MP+SSV: 150-400 mbar

Inlet pressure Pu		Capacity Q [stm3/h] External / Internal Sensing Line											
		Pd = 180 [mbar]		Pd = 200 [mbar]		Pd = 250 [mbar]		Pd = 300 [mbar]		Pd = 350 [mbar]		Pd = 400 [mbar]	
		ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL
500	mbar	135	135	132	132	123	123	112	112	99	99	83	83
750	mbar	182	182	180	180	175	175	169	169	162	162	154	154
1	bar	221	221	220	220	216	216	212	212	208	208	203	203
1,5	bar	297	297	297	297	288	288	286	286	283	283	281	281
2	bar	357	357	357	357	357	357	357	357	357	357	357	357
2,5	bar	416	416	416	416	416	416	416	416	416	416	416	416
3	bar	475	475	475	475	475	475	475	475	475	475	475	475
4	bar	593	492	593	501	593	522	593	542	593	563	593	584
5	bar	712	492	712	501	712	522	712	542	712	563	712	584
7 - 10	bar	760	492	750	501	800	522	830	542	870	563	900	584

TA950HP / TA950HP+SSV: 380-4000 mbar

Inlet pressure Pu		Capacity Q [stm3/h] External / Internal Sensing Line											
		Pd = 500 [mbar]		Pd = 1000 [mbar]		Pd = 1500 [mbar]		Pd = 2000 [mbar]		Pd = 3000 [mbar]		Pd = 4000 [mbar]	
		ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL
750	mbar	135	135	-	-	-	-	-	-	-	-	-	-
1	bar	191	191	-	-	-	-	-	-	-	-	-	-
1,5	bar	274	274	220	220	-	-	-	-	-	-	-	-
2	bar	345	345	313	313	245	245	-	-	-	-	-	-
2,5	bar	416	416	390	390	348	348	269	269	-	-	-	-
3	bar	475	475	459	459	431	431	381	381	-	-	-	-
4	bar	593	593	593	593	574	574	548	548	439	439	-	-
5	bar	712	626	712	712	712	712	689	689	626	626	490	490
7	bar	948	626	948	836	948	948	948	948	918	918	862	862
10	bar	948	626	1290	836	1303	1045	1303	1256	1303	1303	1303	1303
15	bar	948	626	1290	836	1600	1045	1895	1256	1895	1677	1895	1895

Note: The above tables give the maximum flow capacity - in m3/h at standard conditions of absolute pressure of 1.013 bar and 15°C temperature with AC 10% - SG 20% and external sensing line. Please contact us for specific application details.

TA950 DN40x40

TA950LP / TA950LP+SSV: 15-160 mbar

Inlet pressure Pu		Capacity Q [stm3/h] External / Internal Sensing Line											
		Pd = 20 [mbar]		Pd = 50 [mbar]		Pd = 80 [mbar]		Pd = 100 [mbar]		Pd = 120 [mbar]		Pd = 150 [mbar]	
		ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL
500	mbar	205	205	201	201	196	196	193	193	190	190	185	185
750	mbar	257	257	254	254	251	251	249	249	247	247	244	244
1	bar	303	303	301	301	299	299	298	298	297	297	294	294
1,5	bar	393	393	393	393	393	393	393	393	393	393	393	393
2	bar	471	445	471	458	471	471	471	471	471	471	471	471
2,5	bar	549	445	549	458	549	472	549	480	549	490	549	502
3	bar	627	445	627	458	627	472	627	480	627	490	627	502
4 - 10	bar	660	445	675	458	690	472	710	480	720	490	740	502

TA950MP / TA950MP+SSV : 150-400 mbar

Inlet pressure Pu		Capacity Q [stm3/h] External / Internal Sensing Line											
		Pd = 180 [mbar]		Pd = 200 [mbar]		Pd = 250 [mbar]		Pd = 300 [mbar]		Pd = 350 [mbar]		Pd = 400 [mbar]	
		ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL
500	mbar	179	179	174	174	162	162	148	148	131	131	109	109
750	mbar	240	240	238	238	231	231	223	223	214	214	203	203
1	bar	292	292	290	290	285	285	280	280	274	274	267	267
1,5	bar	393	393	393	393	380	380	377	377	374	374	370	370
2	bar	471	471	471	471	471	471	471	471	471	471	471	471
2,5	bar	549	515	549	525	549	545	549	549	549	549	549	549
3	bar	627	515	627	525	627	545	627	568	627	590	627	610
4	bar	760	515	750	525	783	545	783	568	783	590	783	610
5 - 10	bar	760	515	750	525	800	545	830	568	870	590	900	610

TA950HP / TA950HP+SSV: 380-4000 mbar

Inlet pressure Pu		Capacity Q [stm3/h] External / Internal Pulse											
		Pd = 500 [mbar]		Pd = 1000 [mbar]		Pd = 1500 [mbar]		Pd = 2000 [mbar]		Pd = 3000 [mbar]		Pd = 4000 [mbar]	
		Ext	Int	Ext	Int	Ext	Int	Ext	Int	Ext	Int	Ext	Int
750	mbar	178	178	-	-	-	-	-	-	-	-	-	-
1	bar	252	252	-	-	-	-	-	-	-	-	-	-
1,5	bar	362	362	290	290	-	-	-	-	-	-	-	-
2	bar	455	455	414	414	324	324	-	-	-	-	-	-
2,5	bar	549	549	515	515	460	460	355	355	-	-	-	-
3	bar	627	627	607	607	569	569	502	502	-	-	-	-
4	bar	783	655	783	783	758	758	723	723	579	579	-	-
5	bar	939	655	939	875	939	939	909	909	826	826	647	647
7	bar	950	655	1252	875	1252	1095	1252	1252	1211	1211	1137	1137
10	bar	950	655	1290	875	1600	1095	1720	1315	1720	1720	1720	1720
15	bar	950	655	1290	875	1600	1095	1900	1315	2502	1755	2502	2198

Note: The above tables give the maximum flow capacity - in m3/h at standard conditions of absolute pressure of 1.013 bar and 15°C temperature with AC 10% - SG 20% and external sensing line. Please contact us for specific application details.

TA950-1 DN40x40

TA950LP / TA950LP+SSV: 15-160 mbar

Inlet pressure Pu		Capacity Q [stm3/h] External / Internal Sensing Line											
		Pd = 20 [mbar]		Pd = 50 [mbar]		Pd = 80 [mbar]		Pd = 100 [mbar]		Pd = 120 [mbar]		Pd = 150 [mbar]	
		ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL
500	mbar	416	416	408	408	399	399	393	393	386	386	375	375
750	mbar	521	460	516	475	510	487	506	495	502	502	495	495
1	bar	615	460	612	475	608	487	605	495	602	505	597	520
1,5	bar	797	460	797	475	797	487	797	495	797	505	797	520
2	bar	956	460	956	475	956	487	956	495	956	505	956	520
2,5	bar	1080	460	1114	475	1114	487	1114	495	1114	505	1114	520
3-10	bar	1080	460	1115	475	1145	487	1170	495	1190	505	1220	520

TA950MP / TA950MP+SSV: 150-400 mbar

Inlet pressure Pu		Capacity Q [stm3/h] External / Internal Sensing Line											
		Pd = 180 [mbar]		Pd = 200 [mbar]		Pd = 250 [mbar]		Pd = 300 [mbar]		Pd = 350 [mbar]		Pd = 400 [mbar]	
		ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL
500	mbar	363	363	354	354	330	330	301	301	266	266	221	221
750	mbar	488	488	482	482	468	468	452	452	434	434	413	413
1	bar	592	532	589	540	579	565	569	569	557	557	543	543
1,5	bar	797	532	797	540	771	565	765	587	759	610	752	632
2	bar	956	532	956	540	956	565	956	587	956	610	956	632
2,5	bar	1114	532	1114	540	1114	565	1114	587	1114	610	1114	632
3	bar	1250	532	1270	540	1270	565	1270	587	1270	610	1270	632
4-10	bar	1250	532	1270	540	1325	565	1380	587	1430	610	1485	632

TA950HP / TA950HP+SSV: 380-4000 mbar

Inlet pressure Pu		Capacity Q [stm3/h] External / Internal Sensing Line											
		Pd = 500 [mbar]		Pd = 1000 [mbar]		Pd = 1500 [mbar]		Pd = 2000 [mbar]		Pd = 3000 [mbar]		Pd = 4000 [mbar]	
		ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL
750	mbar	361	361	-	-	-	-	-	-	-	-	-	-
1	bar	511	511	-	-	-	-	-	-	-	-	-	-
1,5	bar	735	677	589	589	-	-	-	-	-	-	-	-
2	bar	924	677	840	840	658	658	-	-	-	-	-	-
2,5	bar	1114	677	1045	903	934	934	720	720	-	-	-	-
3	bar	1270	677	1231	903	1156	1130	1020	1020	-	-	-	-
4	bar	1590	677	1590	903	1538	1130	1468	1358	1175	1175	-	-
5	bar	1590	677	1907	903	1907	1130	1845	1358	1677	1677	1313	1313
7	bar	1590	677	2115	903	2542	1130	2542	1358	2460	1815	2309	2272
10	bar	1590	677	2115	903	2640	1130	3165	1358	3493	1815	3493	2272
15	bar	1590	677	2115	903	2640	1130	3165	1358	4220	1815	5079	2272

Note: The above tables give the maximum flow capacity - in m3/h at standard conditions of absolute pressure of 1.013 bar and 15°C temperature with AC 10% - SG 20% and external sensing line. Please contact us for specific application details.

TA950 DN50x50

TA950LP / TA950LP+SSV : 15-160 mbar

Inlet pressure Pu		Capacity Q [stm3/h] External / Internal Sensing Line											
		Pd = 20 [mbar]		Pd = 50 [mbar]		Pd = 80 [mbar]		Pd = 100 [mbar]		Pd = 120 [mbar]		Pd = 150 [mbar]	
		ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL
500	mbar	491	491	481	481	470	470	463	463	455	455	442	442
750	mbar	614	614	608	608	601	601	597	597	592	592	584	584
1	bar	725	715	721	721	717	717	713	713	710	710	704	704
1,5	bar	940	715	940	735	940	757	940	770	940	785	940	805
2	bar	1080	715	1115	735	1127	757	1127	770	1127	785	1127	805
2,5-10	bar	1080	715	1115	735	1145	757	1170	770	1190	785	1220	805

TA950MP / TA950MP+SSV : 150-400 mbar

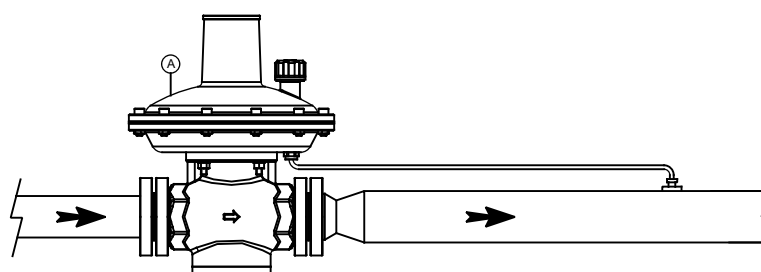
Inlet pressure Pu		Capacity Q [stm3/h] External / Internal Sensing Line											
		Pd = 180 [mbar]		Pd = 200 [mbar]		Pd = 250 [mbar]		Pd = 300 [mbar]		Pd = 350 [mbar]		Pd = 400 [mbar]	
		ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL
500	mbar	428	428	417	417	389	389	355	355	313	313	261	261
750	mbar	575	575	569	569	552	552	533	533	511	511	487	487
1	bar	699	699	694	694	683	683	670	670	656	656	640	640
1,5	bar	940	828	940	842	909	877	902	902	895	895	887	887
2	bar	1127	828	1127	842	1127	877	1127	912	1127	947	1127	982
2,5	bar	1250	828	1270	842	1314	877	1314	912	1314	947	1314	982
3-10	bar	1250	828	1270	842	1325	877	1380	912	1430	947	1485	982

TA950HP / TA950HP+SSV : 380-4000 mbar

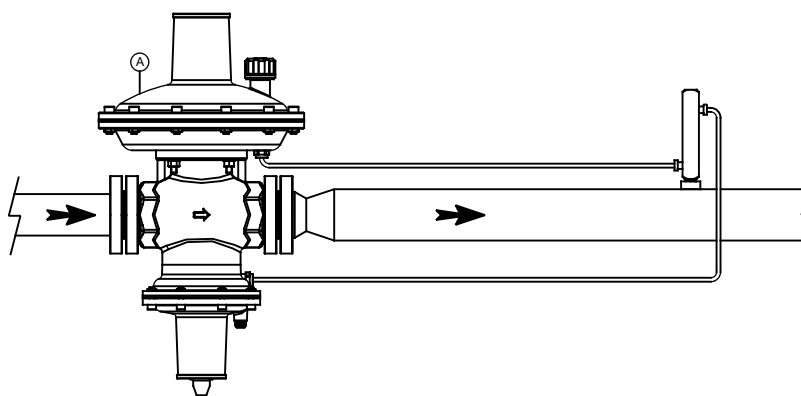
Inlet pressure Pu		Capacity Q [stm3/h] External / Internal Sensing Line											
		Pd = 500 [mbar]		Pd = 1000 [mbar]		Pd = 1500 [mbar]		Pd = 2000 [mbar]		Pd = 3000 [mbar]		Pd = 4000 [mbar]	
		ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL	ESL	ISL
750	mbar	425	425	-	-	-	-	-	-	-	-	-	-
1	bar	603	603	-	-	-	-	-	-	-	-	-	-
1,5	bar	867	867	694	694	-	-	-	-	-	-	-	-
2	bar	1090	1052	990	990	775	775	-	-	-	-	-	-
2,5	bar	1314	1052	1233	1233	1101	1101	849	849	-	-	-	-
3	bar	1501	1052	1452	1405	1363	1363	1203	1203	-	-	-	-
4	bar	1590	1052	1875	1405	1814	1757	1731	1731	1386	1386	-	-
5	bar	1590	1052	2115	1405	2249	1757	2176	2110	1977	1977	1549	1549
7	bar	1590	1052	2115	1405	2640	1757	2997	2110	2900	2820	2723	2723
10	bar	1590	1052	2115	1405	2640	1757	3165	2110	4119	2820	4119	3532
15	bar	1590	1052	2115	1405	2640	1757	3165	2110	4220	2820	5270	3532

Note: The above tables give the maximum flow capacity - in m3/h at standard conditions of absolute pressure of 1.013 bar and 15°C temperature with AC 10% - SG 20% and external sensing line. Please contact us for specific application details.

INSTALLATION SCHEMATICS

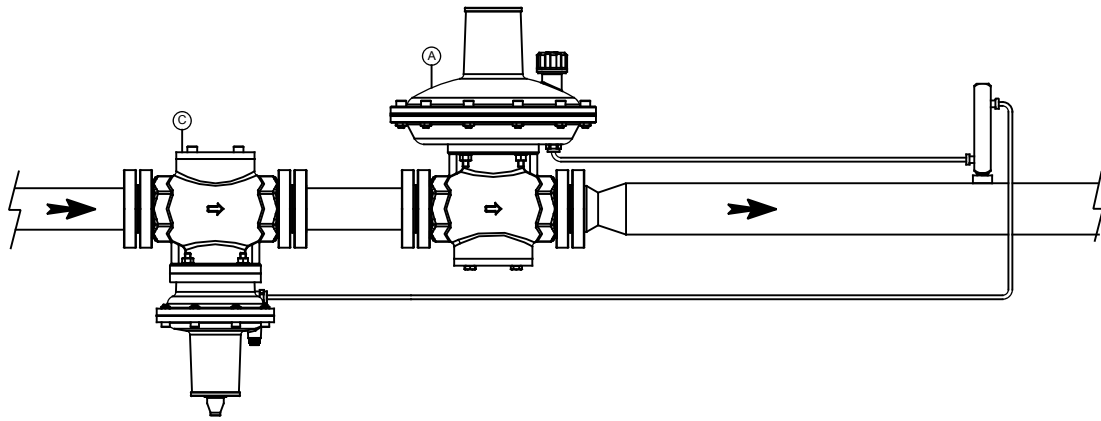


A - TA950 REGULATOR

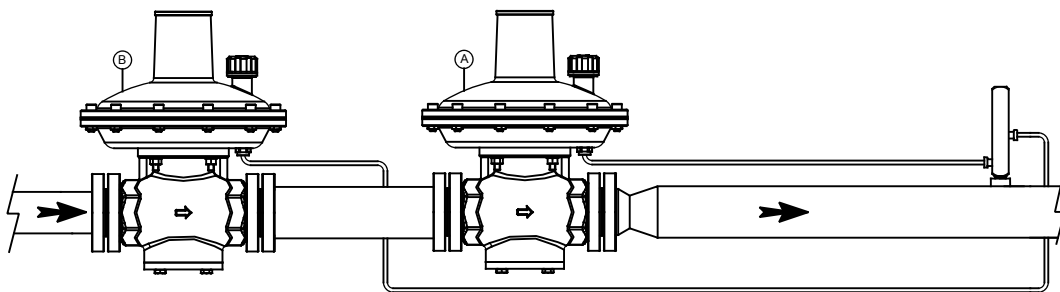


A - TA950+SSV DUOBLE FUNCTION REGULATOR

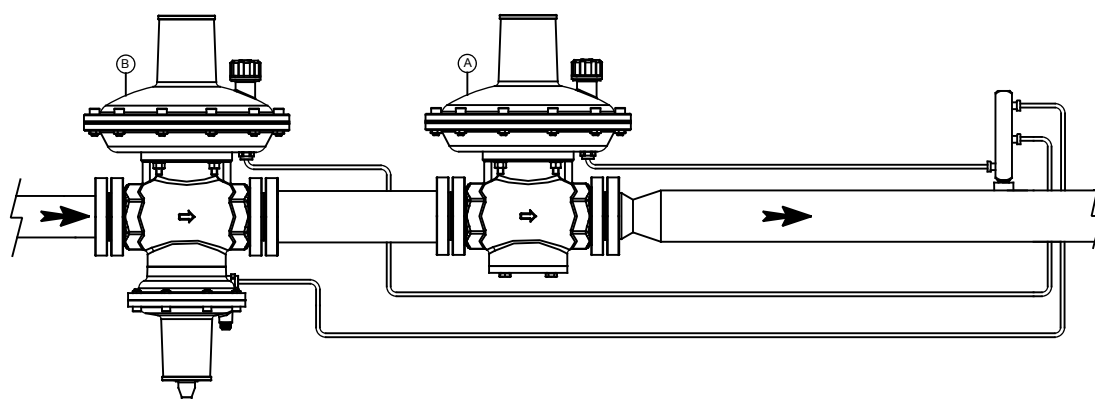
Note: The regulators shown are with External Control Line (ECL) connections. Regulators can also be supplied with Internal control Line (ICL) control.



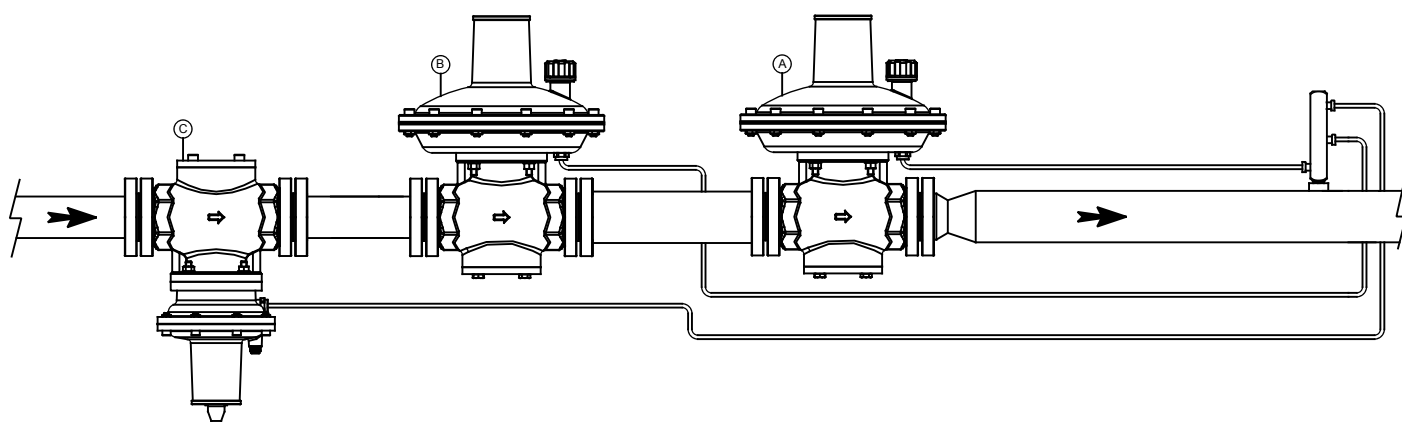
A - TA950 REGULATOR
C - TA950 SSV SAFETY SHUTOFF VALVE



A - TA950 ACTIVE REGULATOR
B - TA950 MONITOR



A - TA950 ACTIVE REGULATOR
B - TA950+SSV MONITOR



A - TA950 ACTIVE REGULATOR
B - TA950 MONITOR
C - TA950 SSV SAFETY SHUTOFF VALVE

SIZING

Sizing of gas pressure regulator involves establishing if the installed C_g is higher than the required C_g and if the outlet velocity of gas at regulator outlet flange is within the required limits.

The following units shall be used in the below formulas:

- Q = Flow Rate [Sm^3/h] (Reference conditions $T=15^\circ\text{C}$, $P=1$ barg)
- P_u = Upstream Pressure [bar g]
- P_d = Downstream (Controlled) Pressure [bar g]
- P_b = Atmospheric Pressure [bar]
- d = Gas Density Relative to Air
- t_u = Upstream Temperature [$^\circ\text{C}$]
- DN = Regulator Outlet Nominal Diameter [mm]
- v = Gas Velocity at Outlet Flange [m/s]

According to the ratio of inlet to outlet pressure there are two cases using different formulas.

a) Sub Critical Flow Conditions

$$(P_u - P_d) \leq 0.5 (P_u + P_b)$$

Required C_g is calculated with the following formula.

$$C_g = \frac{Q}{13.57} \sqrt{\frac{d(t_u + 273)}{(P_d + P_b)(P_u - P_d)}}$$

b) Critical Flow Conditions

$$(P_u - P_d) > 0.5 (P_u + P_b)$$

Required C_g is calculated with the following formula.

$$C_g = \frac{2Q}{13.57 (P_u + P_b)} \sqrt{d(t_u + 273)}$$

CG TA-950

Class	950 1"x1"	950 1"x1½"	950 1½"x1½"	950-1 1½"x1½"	950 2"x2"
CG	170	250	330	670	790

In case of gases different from d=0.61 Natural Gas a correction factor F shall be used in the value of the Flow Rate Q used in the above formulas.

The Flow Rate to be used shall be $Q' = Q/F$.

F is taken from the following table.

Gas conversion table

Gas	Relative Density [d]	Coefficient [f]
Air	1	0.78
City Gas	0.44	1.17
Butane	2.01	0.55
Propane	1.53	0.63
Nitrogen	0.97	0.79
Carbon Dioxide	1.52	0.63
Hydrogen	0.07	3

Velocity of gas at regulator outlet flange shall be calculated using the following formula:

$$v = \frac{345.92 Q (1 - 0.002 P_d)}{DN^2(P_d + P_b)}$$

Allowable velocity for regulators with internal sensing line

Downstream Pressure P_d [bar g]	Maximum Allowable Velocity v [m/s]
$P_d \leq 0,04$	$4 \div 5$
$0,04 < P_d \leq 0,5$	$10 \div 15$
$0,5 < P_d \leq 5$	$20 \div 25$

Allowable velocity for regulators with external sensing line

For regulators with external sensing line it is recommended that the speed flow does not exceed 150 m/s on outlet in order to limit noise emission.

TA950 PART NUMBERING FOR

Progressive Part Numbering

FIXED			MODEL	CLASS/FLANGES	SIZE	MATERIALS	Continue
1	2	3	4	5	6	7	...
9	5	0					...

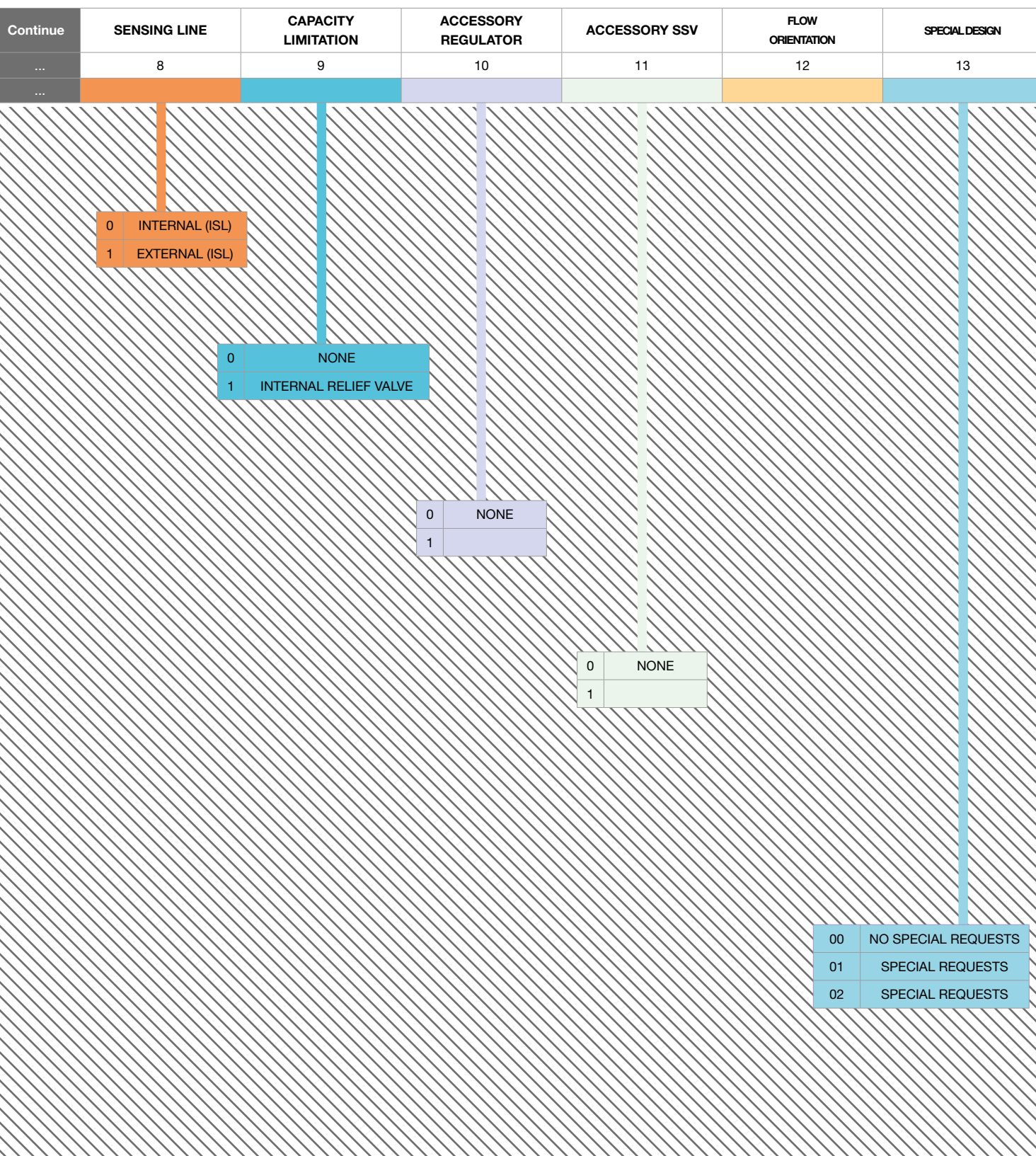
A	TA950LP
B	TA950MP
C	TA950HP
D	TA950LP+SSV
E	TA950MP+SSV
F	TA950HP+SSV
G	TA950-1LP
H	TA950-1MP
I	TA950-1HP
J	TA950-1LP+SSV
K	TA950-1MP+SSV
L	TA950-1HP+SSV
M	TA950LPM
N	TA950MPM
O	TA950HPM
P	TA950LPM+SSV
Q	TA950MPM+SSV
R	TA950HPM+SSV
S	TA950-1LPM
T	TA950-1MPM
U	TA950-1HPM
V	TA950-1LPM+SSV
X	TA950-1MPM+SSV
Y	TA950-1HPM+SSV
Z	TA950SSV-LP
0	TA950SSV-MP
1	TA950SSV-HP

INLET x OUTLET	
1	25x25
2	25x40
3	40x40
4	50x50

0	TRHEADED G
B	TRHEADED NPT
1	FLANGED ANSI 150 RF
7	FLANGED PN 16

1	Standard Temperature Range -20/+60°C
2	Low Temperature Steel Survival -40/+60°C
3	Low Temperature Steel Operating -40/+60 °C

ASSEMBLED UNITS



EMEA - ASEA



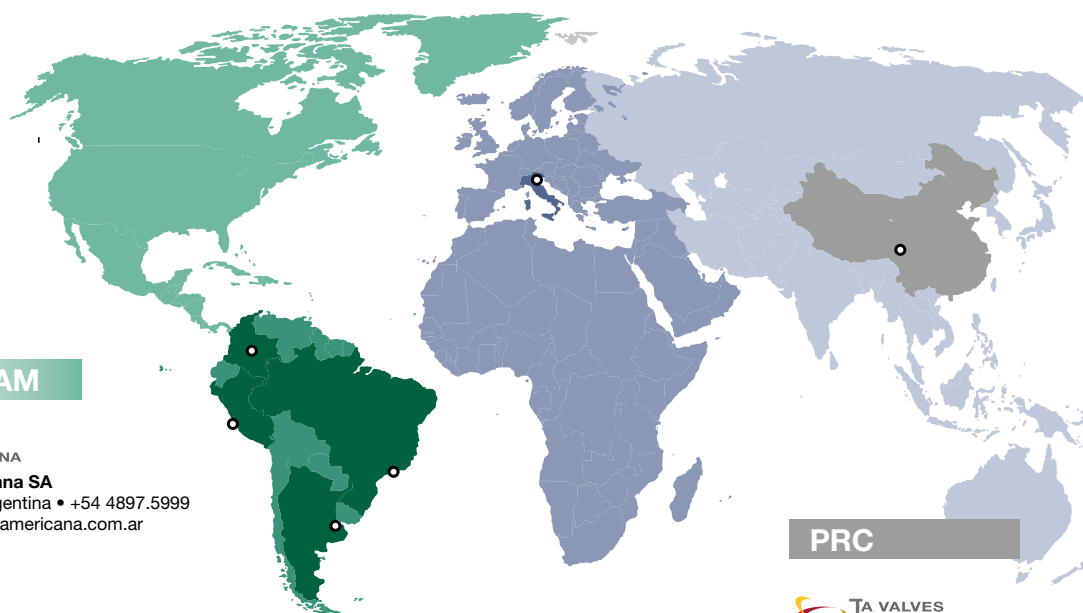
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