Reguatori pritiska
133 i 233

- Veliki spektar izmenljivih otvora
- Mogu biti instalisani u bilo kojoj poziciji
- Posebna konstrukcija omogućava jednostavno izvlačenje jedinice bez uklanjanja kućišta iz cevovoda
- Odgovara uslovima sa visokim temperaturama

PRIMENA

133 i 233 regulatori su dizajnirani za kućnu i industrijsu upotrebu kao što su fabrike, toplane, ali kao i sve instalacije gde se zahtevaju tačna kontrola pritiska, fino podešavanje i kratko vreme reakcije kao što su gorionici, industrijske peći, bojleri itd.

OPIS

133 i 233 regulatori su povratni regulatori sa oprugama i integrisanim sigurnosnim uređajem za isključivanje. Veliki izbor veličina otvora omogućava perfektno usklađivanje različitih vrednosti protoka i ulaznog pritiska. Sistem poluga obezbeđuje tačnu vrednost izlaznog pritiska i brzu rekaciju ako vrednost protoka počne da varira. 133 regulatori i verzije 233 regulatora sa zatvaračem su premljeni sa ugrađenim filterima (stepen filtracije 0.5 mm)

Tehničke osobine

Maksimalni ulazni pritisak	8.0 (10) bar
Izlazni pritisak	10 mbar - 0.7 bar
Preciznost i blokirajući pritisak	do AC 5 / da SG 10
Radna temeperatura	gas: -20℃ do +60℃
Prihvatljivi gasovi	prirodni gas, propan, butan, vazdu, azot i nekorozivni gasovi
Sigurosni uređaji	Opcionalni ugrađeni sigurnosni ventil: -OPSO: isključivanje pri povišenom pritisku -UPSO: isključivanje pri sniženom pritisku
Opcije	Sigurnosna memebrana Sigurnosni isusni ventil

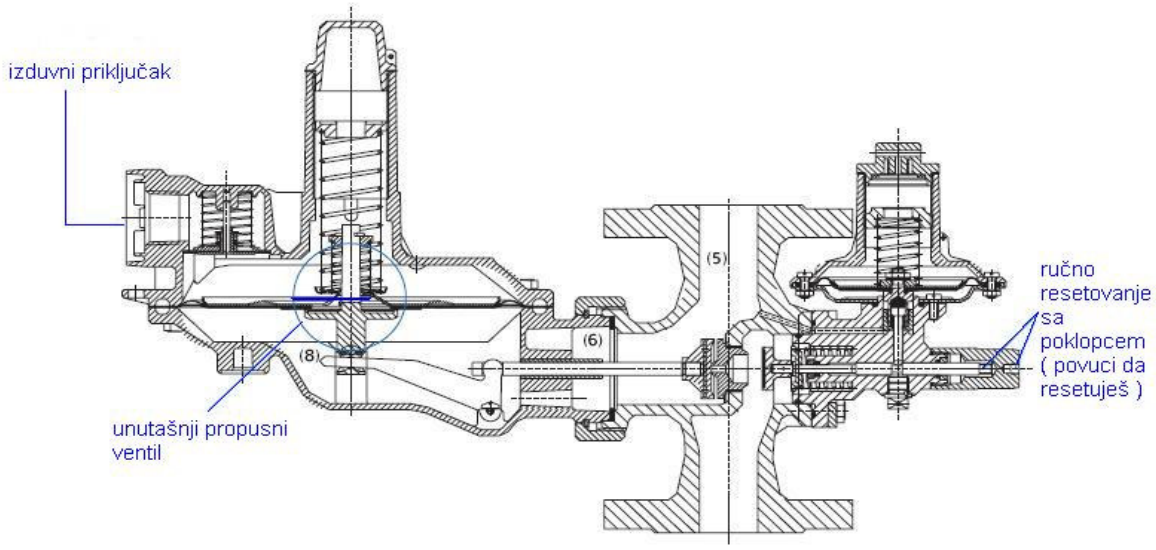
Veze

Veličine	DN25, DN40 i DN 50
Dimenzije	Pogledaj tabelu na strani 3
Ivice	PN16, ANSI 150
Navoj	G 3/4", G1", G1 1/2" ISO 228/1, Rp, NPT i BSPT

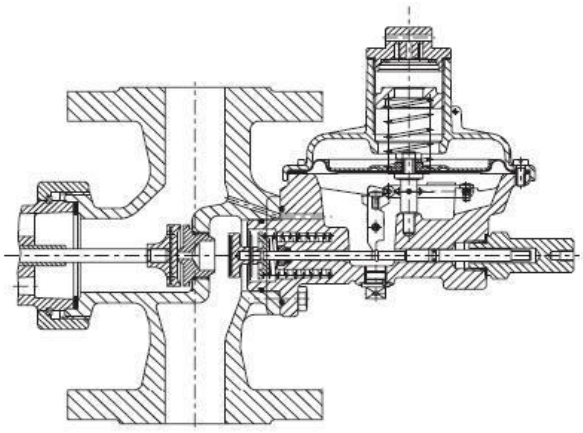
Materijeali

Kućište	GGG40, DIN 1693
Aktuator	liveni aluminijum GD-Al Si 12, DIN 1725
SSV aktuator	tučeni čelik
Unutrašnji delovi	tučeni čelik, čelik pocinovani

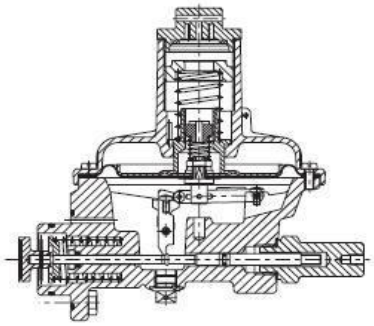
Dihtunzi	NBR guma / viton
Membrana	NBR guma / NBR guma fabrički ojačana



sl.1: 133 regilator pritiska sa sigurnosnim ventiom 033 (pso) i unutrašnjim propusnim ventilom



sl. 2: sigurnosni ventil tip I (pso) - Detalji



sl. 3. sigurnosni ventil tip II (psu i pso) - detalji

Body Sizes & Actuator Type

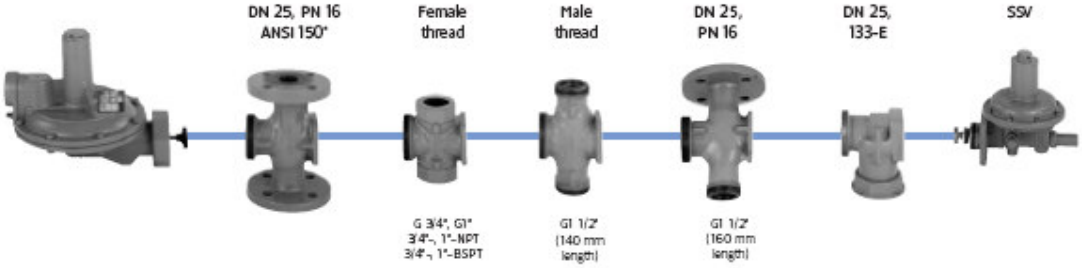
Selecting the actuator

Regulator Type	Actuator Type	Set Range (W_h)
133		8 - 210 mbar
	-HP	140 - 420 mbar
233	-12	8 - 210 mbar
	-8	30 - 450 mbar
	-8HP	420 - 700 mbar

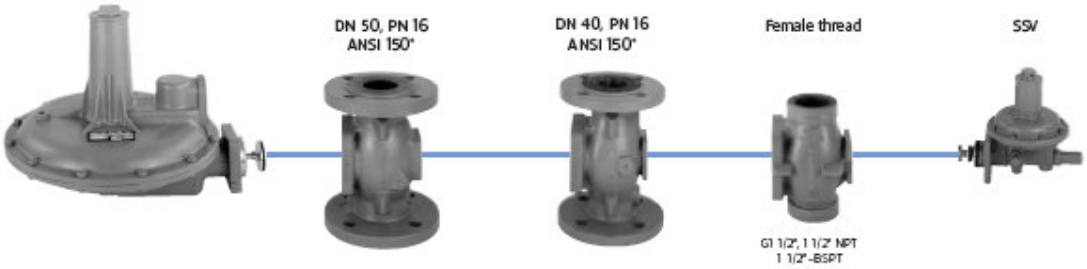
133 and 233 are differential strength regulators. The design pressure of the actuators is lower than 8 bar, but not less than the maximum pressure reached in the event of a failure.

Body Sizes

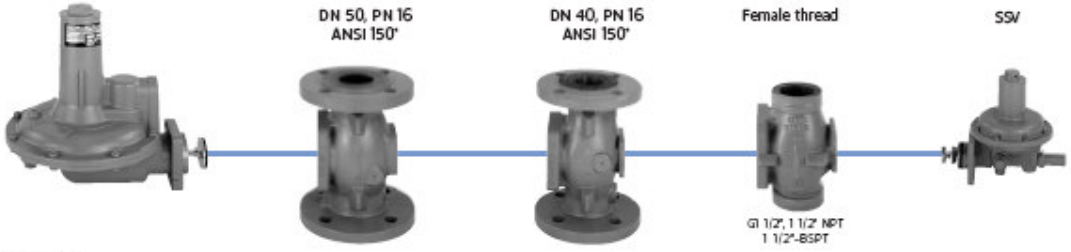
Type 133



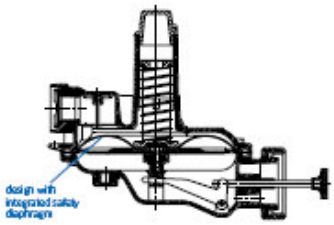
Type 233-12



Type 233-8



* by request



Special Features

- Gas loss protection: this feature is available on the 133 regulator, where it replaces advantageously the UPSO function. In case the outlet pressure drops (around 50% of the set value), the protection valve closes and interrupts the gas flow. A minimum bleed continues to feed the outlet installation. The protection valve is automatically reset when outlet installations are closed and outlet pressure increases back to set value.
  Outlet pressure might accidentally drop due to inlet pressure dropping below specifications, or gas demand exceeding the regulator capacity.
  Gas loss protection should not be used when inlet pressure exceeds 1 bar.
- Safety diaphragm: this feature offers a protection in case of rupture or leak at the main diaphragm. It limits the gas flow rate coming out through the breather connection to around 30 l/h. When the safety diaphragm is pressurized by a large gas leak from the main diaphragm, the outlet pressure increases by around 50%, and thus triggers the safety shutoff valve (OPSO).
  Safety diaphragm should not be used when inlet pressure exceeds 1 bar.
- External control line: 133 and 233 regulators are supplied with an internal control line that optimizes the regulator function due to the Venturi effect around the valve disc. However an external control line is recommended in case of inlet pressure exceeding 4 bar. In this case, the internal control is removed.

Relief valve setting:
The standard relief spring setting is 30 mbar above the outlet setting, with an accuracy of 10 %.

Safety Shutoff Valve

Selecting the SSV

Type	Max. operating pressure	Function	Range	
			W_{ho}	W_{hu}
033	Differential strength	OPSO	40 mbar to 0.45 bar	-
I	Differential strength	OPSO	20 mbar to 1.0 bar	-
II	Differential strength	OPSO & UPSO	20 mbar to 1.0 bar	8 to 50 mbar

Note that OPSO and UPSO settings are adjustable **separately**.

Fire resistance:
Every shutoff valve is equipped with a temperature fuse that triggers the valve in case of high temperature (around 180 to 200°C).

DVGW recommendations on safety:
Regulators 133 and 233 are approved by the German DVGW under specific conditions related to the German regulations on safety and gas installations:

- Inlet pressure below 6 bar
- OPSO and UPSO safety shutoff valve requested when inlet pressure exceeds 5 bar.

▶ Pressure Regulator 133

Outlet Pressure Range

Regulator

Regulator Type	Spring code	Spring color	Spring range
133	955-200-08	red	9 - 15 mbar
with gas loss protection	955-200-09	blue	14 - 20 mbar
	955-201-06	silver	18 - 26 mbar
	955-202-98	yellow	24 - 40 mbar
	955-200-11	orange	38 - 53 mbar
133	955-200-08	red	8 – 16 mbar
	955-200-09	blue	12 – 20 mbar
	955-200-10	green	15 – 35 mbar
	955-200-11	orange	30 – 70 mbar
	955-200-12	black-white	50 – 140 mbar
	955-200-83	silver	100 – 210 mbar
133 HP	955-200-84	black	140 – 420 mbar
233-12	955-200-13	red	8 – 16 mbar
	955-200-14	blue	12 – 20 mbar
	955-200-15	green	15 – 35 mbar
	955-200-16	orange	30 – 70 mbar
	955-200-17	black	70 – 140 mbar
	955-200-18	metal blank	100 – 210 mbar
233-8	955-200-15	green	30 – 70 mbar
	955-200-16	orange	70 – 140 mbar
	955-200-17	black	140 - 300 mbar
	955-200-18	metal blank	210 - 450 mbar
233-8 HP	955-200-69 955-200-18	silver+metal blank tandem springs	420 – 700 mbar

Accuracy class (AC), lock-up pressure class (SG) and lock-up pressure zone (SZ) :

- 8 – 20 mbar: AC 20 / SG 30
- 20 – 50 mbar: AC 10 / SG 20
- 50 – 700 mbar: AC 5 / SG 10

The typical lock-up pressure zone is SZ 5.

Outlet Pressure Range (cont'd)

Safety shutoff valves

SSV 033

Overpressure shutoff (OPSO)	Spring code	Spring color	Spring range
	955-200-22	red	40 – 70 mbar
	955-200-23	blue	50 – 150 mbar
	955-200-24	green	140 – 450 mbar

Accuracy class (AG):

- OPSO: AG 10
- Minimal difference between regulator and SSV settings (ΔP_w): 20 mbar to OPSO

SSV I and II

SSV I and II Overpressure shutoff (OPSO)	Spring code	Spring color	Spring range
	955-200-22	red	20 – 60 mbar
	955-200-23	blue	50 – 120 mbar
	955-200-24	green	100 – 400 mbar
	955-200-52	brown	300 – 600 mbar
	955-202-42	silver	400 – 1000 mbar

SSV II Underpressure shutoff (UPSO)	Spring code	Spring color	Spring range
	955-200-32	red	8 - 50 mbar

Accuracy class (AG):

- OPSO:
  - 20 – 400 mbar: AG 10
  - 0.4 – 1 bar: AG 5
- UPSO:
  - 8 – 20 mbar: AG 30
  - 20 – 50 mbar: AG 10
- Minimal difference between regulator and SSV settings (ΔP_w):
  - 14 mbar to UPSO
  - 20 mbar to OPSO

Flow Capacity

Regulator Type 133, DN 25

Outlet Pressure setting	Inlet Pressure (bar)	Capacities in standard conditions (m³/h) Orifice size					
		12.5 mm (1/2")	10 mm (3/8")	8 mm (5/16")	6.3 mm (1/4")	4.7 mm (3/16")	3 mm (1/8")
20 mbar	0.1 bar	24	17	16	9	■	■
	0.3 bar	40	36	29	22	12	6
	0.5 bar	48	46	40	30	17	8
	1.0 bar	61	56	53	41	25	12
	1.5 bar	■	63	61	56	33	14
	2.0 bar	■	**64**	**63**	57	38	18
	3.0 bar	■	■	■	59	51	24
	4.0 bar	■	■	■	**64**	52	31
	5.0 bar	■	■	■	■	53	35
	6.0 bar	■	■	■	■	**54**	40
	8.0 bar	■	■	■	■	**60**	**50**
50 mbar	0.1 bar	14	13	11	■	■	■
	0.3 bar	31	29	22	16	12	4
	0.5 bar	44	42	37	24	15	8
	1.0 bar	58	52	46	40	24	11
	1.5 bar	■	59	57	54	30	14
	2.0 bar	■	**61**	**60**	56	35	16
	3.0 bar	■	■	■	60	48	22
	4.0 bar	■	■	■	**65**	53	27
	5.0 bar	■	■	■	■	54	30
	6.0 ba	■	■	■	■	**56**	36
	8.0 bar	■	■	■	■	**66**	**50**
100 mbar	0.2 bar	22	18	14	12	8	3
	0.3 bar	33	28	18	16	11	4
	0.5 bar	50	35	28	24	12	8
	1.0 bar	60	52	48	39	23	12
	1.5 bar	■	58	56	52	29	13
	2.0 bar	■	**60**	**59**	55	34	16
	3.0 bar	■	■	■	60	48	21
	4.0 bar	■	■	■	**63**	52	25
	5.0 bar	■	■	■	■	60	31
	6.0 bar	■	■	■	■	65	35
	8.0 bar	■	■	■	■	**70**	50
140 mbar	0.1 bar	■	■	■	■	■	■
	0.3 bar	18	15	12	10	7	3
	0.5 bar	25	21	17	14	10	6
	1.0 bar	44	36	29	22	17	10
	1.5 bar	■	46	38	28	24	13
	2.0 bar	■	**53**	43	35	29	16
	3.0 bar	■	■	**56**	47	39	22
	4.0 bar	■	■	■	**59**	49	26
	5.0 bar	■	■	■	■	55	31
	6.0 bar	■	■	■	■	65	35
	8.0 bar	■	■	■	■	**79**	46

The volumes marked in bold are not regulated with the accuracy indicated.

Do not operate orifice in inlet pressure area marked with ■.

Standard conditions:

- Absolute pressure of 1.013 bar
- Temperature of 15°C

Correction factor for non-natural gas applications:

The flow rates are indicated or a 0.6 specific gravity gas.

To determine the volumetric flow rate for gases other than natural gas, the values in the capacity tables should be multiplied or calculated using the sizing equations with a correction factor.

The table below lists the correction factors for some common gases:

Gas type	*Specific gravity*	*Correction factor*
Air	1.00	0.77
Butane	2.01	0.55
Carbon dioxide (dry)	1.52	0.63
Carbon monoxide (dry)	0.97	0.79
Natural gas	0.60	1.00
Nitrogen	0.97	0.79
Propane	1.53	0.63
Propane-Air mix	1.20	0.71

Specific gravity or relative density (air = 1, non-dimensional value)

To calculate the correction factor for gases not listed above, the specific gravity (d) of the gas should be taken and used in the following formula:

$$\text{Correction factor} = \sqrt{\frac{0.6}{d}}$$

Flow Capacity (cont'd)

Regulator Type 133, DN 25 (continued)

Outlet Pressure setting	Inlet Pressure (bar)	Capacities in standard conditions (m³/h) Orifice size 12.5 mm (1/2")	10 mm (3/8")	8 mm (5/16")	6.3 mm (1/4")	4.7 mm (3/16")	3 mm (1/8")16
300 mbar	0.5	18	15	11	8	6	■
	1.0	35	29	23	16	13	9
	1.5	■	38	33	25	18	12
	2.0	■	46	40	33	25	15
	3.0	■	■	53	43	38	21
	4.0	■	■	66	51	46	26
	5.0	■	■	■	■	55	31
	6.0	■	■	■	■	65	35
	8.0	■	■	■	■	79	42
400 mbar	0.7	26	22	17	12	10	6
	1.0	33	28	21	17	12	8
	1.5	■	37	31	26	16	10
	2.0	■	44	38	31	23	12
	3.0	■	■	50	41	36	18
	4.0	■	■	64	49	44	24
	5.0	■	■	■	■	53	29
	6.0	■	■	■	■	63	33
	8.0	■	■	■	■	77	40

Flow capacity (cont'd)

Regulator Type 133-E, DN 25

Outlet pressure setting	Inlet Pressure (bar)	Capacities in standard conditions (m³/h) Orifice size 12.5 mm (1/2")	10 mm (3/8")	8 mm (5/16")	6.3 mm (1/4")	4.7 mm (3/16")	3 mm (1/8")
20 mbar	0.1 bar	16	15	12	11	7	3
	0.3 bar	27	26	18	14	12	6
	0.5 bar	32	28	19	17	15	8
	1.0 bar	38	37	20	20	19	11
50 mbar	0.1 bar	■	■	■	■	■	■
	0.3 bar	20	16	12	10	7	5
	0.5 bar	24	20	14	12	10	6
	1.0 bar	29	26	17	16	14	10
100 mbar	0.1 bar	■	■	■	■	■	■
	0.3 bar	21	18	12	10	9	4
	0.5 bar	28	23	16	12	10	6
	1.0 bar	40	38	23	19	16	10

Regulator Type 133, DN 25 with gas loss protection

Outlet pressure setting	Inlet Pressure	Capacities in standard conditions (m³/h) Orifice size Ø 12,5 mm
20 mbar	0.1 bar	13
	0.3 bar	20
	0.5 bar	25
	1.0 bar	32
50 mbar	0.15 bar	14
	0.3 bar	22
	0.5 bar	27
	1.0 bar	34

Flow capacity (cont'd)

Regulator Type 233-12, DN 40

Outlet Pressure Setting	Inlet Pressure (bar)	Capacities in standard conditions (m^3/h) Orifice size & Valve disk angle				
		25 mm (1") 30°	20 mm (3.4") 10°	12.5 mm (1/2") 10°	10 mm (3/8") 10°	6.3 mm (1/4") 10°
20 mbar	0.1	75	58	40	24	12
	0.3	142	114	82	48	23
	0.5	188	149	110	64	32
	1.0	250	208	158	98	47
	1.5	**280**	241	195	125	57
	2.0	■	260	215	147	68
	3.0	■	300	266	190	92
	4.0	■	**310**	300	210	113
	5.0	■	■	300	210	113
	6.0	■	■	300	250	130
	8.0	■	■	■	**250**	160
50 mbar	0.1	51	43	26	20	■
	0.3	125	95	62	43	21
	0.5	169	130	88	58	29
	1.0	250	190	140	95	46
	1.5	**286**	228	180	120	57
	2.0	■	254	210	140	68
	3.0	■	295	250	190	90
	4.0	■	**315**	280	220	110
	5.0	■	■	300	230	122
	6.0	■	■	300	250	130
	8.0	■	■	■	**250**	160
100 mbar	0.2	73	52	38	25	15
	0.3	110	81	54	36	20
	0.5	160	119	79	53	30
	1.0	237	183	136	90	44
	1.5	**266**	221	168	119	57
	2.0	■	258	204	142	65
	3.0	■	290	248	191	87
	4.0	■	**319**	277	230	109
	5.0	■	■	300	240	124
	6.0	■	■	300	250	130
	8.0	■	■	■	**250**	160
200 mbar	0.4	140	107	70	45	22
	0.5	175	134	90	56	27
	1.0	304	224	156	98	43
	1.5	**355**	272	207	127	57
	2.0	■	291	230	142	64
	3.0	■	350	287	190	86
	4.0	■	**376**	310	230	110
	5.0	■	■	320	250	125
	6.0	■	■	330	260	130
	8.0	■	■	■	**260**	160

Flow capacity (cont'd)

Regulator Type 233-8, DN 40

Outlet Pressure Setting	Inlet Pressure (bar)	Capacities in standard conditions(in m³/h) Orifice size & Valve disk angle				
		25 mm (1") 30°	20 mm (3.4") 10°	12.5 mm (1/2") 10°	10 mm (3/8") 10°	6.3 mm (1/4") 10°
50 mbar	0.2	75	56	30	19	14
	0.3	105	78	47	30	18
	0.5	142	115	68	46	26
	1.0	235	189	132	90	46
	1.5	**262**	223	166	118	55
	2.0	■	255	200	147	68
	3.0	■	■	243	190	90
	4.0	■	■	278	232	112
	5.0	■	■	**293**	254	126
	6.0	■	■	**304**	270	138
	8.0	■	■	■	■	**170**
100 mbar	0.3	93	73	41	26	18
	0.5	136	106	65	42	26
	1.0	220	170	114	79	41
	1.5	**261**	205	149	102	55
	2.0	■	236	180	126	66
	3.0	■	■	231	186	87
	4.0	■	■	263	225	109
	5.0	■	■	**285**	248	128
	6.0	■	■	**300**	275	146
	8.0	■	■	■	■	**178**
200 mbar	0.4	124	96	63	42	23
	0.5	148	118	79	52	27
	1.0	260	198	127	90	46
	1.5	**298**	252	152	117	58
	2.0	■	296	190	143	70
	3.0	■	■	266	197	89
	4.0	■	■	300	240	112
	5.0	■	■	**312**	256	131
	6.0	■	■	**324**	279	146
	8.0	■	■	■	■	**178**
400 mbar	0.7	152	126	86	61	32
	1.0	220	175	118	80	46
	1.5	**277**	214	142	107	54
	2.0	■	256	172	130	66
	3.0	■	■	223	167	86
	4.0	■	■	241	176	108
	5.0	■	■	**266**	206	127
	6.0	■	■	**281**	217	142
	8.0	■	■	■	■	**172**

Flow capacity (cont'd)

Regulator Type 233-12, DN 50

Outlet Pressure setting	Inlet Pressure (bar)	Capacities in standard conditions (m^3/h) Orifice size & valve disk angle					
		25 mm (1") 30°	20 mm (3/4") 30°	20 mm (3/4") 10°	12.5 mm (1/2") 10°	10 mm (3/8") 10°	6.3 mm (1/4") 10°
20 mbar	0.1	97	74	66	41	25	12
	0.3	214	180	142	79	50	23
	0.5	288	250	187	119	69	30
	1.0	385	360	267	182	106	46
	1.5	**425**	400	292	230	128	57
	2.0	■	410	317	255	153	68
	3.0	■	■	362	324	205	86
	4.0	■	■	**394**	340	240	105
	5.0	■	■	■	**350**	264	118
	6.0	■	■	■	**362**	288	130
	8.0	■	■	■	■	**305**	150
50 mbar	0.1	66	52	45	31	20	■
	0.3	165	130	110	65	43	22
	0.5	245	200	157	97	60	29
	1.0	387	320	240	163	98	45
	1.5	**421**	390	287	219	127	55
	2.0	■	410	317	255	152	66
	3.0	■	■	365	312	205	89
	4.0	■	■	**394**	340	240	110
	5.0	■	■	■	**350**	264	123
	6.0	■	■	■	**362**	288	214
	8.0	■	■	■	■	**305**	160
100 mbar	0.2	95	65	60	40	30	14
	0.3	160	117	105	65	44	21
	0.5	241	178	155	97	62	29
	1.0	380	307	260	162	98	45
	1.5	**446**	379	326	216	126	57
	2.0	■	410	376	255	153	69
	3.0	■	■	420	320	205	91
	4.0	■	■	**430**	375	240	110
	5.0	■	■	■	**390**	270	125
	6.0	■	■	■	**405**	300	140
	8.0	■	■	■	■	**310**	160
200 mbar	0.4	165	125	110	70	45	25
	0.5	204	150	133	83	55	30
	1.0	320	248	221	149	97	45
	1.5	**371**	310	267	198	126	57
	2.0	■	360	305	230	152	71
	3.0	■	■	360	200	205	91
	4.0	■	■	**400**	320	240	110
	5.0	■	■	■	**330**	265	125
	6.0	■	■	■	**350**	300	140
	8.0	■	■	■	■	**310**	16

Flow capacity (cont'd)

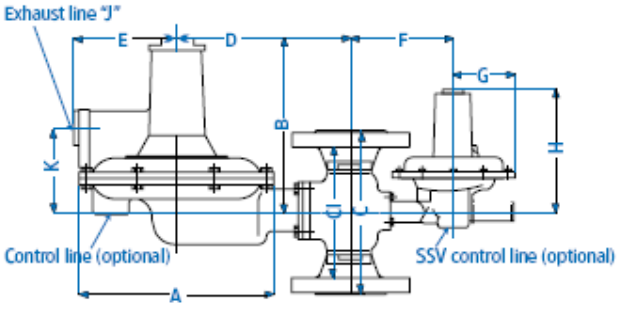
Regulator Type 233-8, DN 50

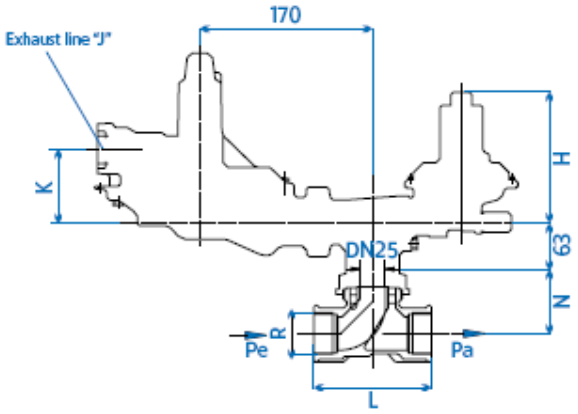
Outlet Pressure setting	Inlet Pressure (bar)	Capacities in standard conditions (m³/h) Orifice size & Valve disk angle					
		25 mm (1") 30°	20 mm (3/4") 30°	20 mm (3/4") 10°	12.5 mm (1/2") 10°	10 mm (3/8") 10°	6.3 mm (1/4") 10°
50 mbar	0.2	75	60	48	34	22	14
	0.3	122	83	71	52	33	20
	0.5	187	148	117	74	49	28
	1.0	321	266	208	151	104	45
	1.5	**352**	320	240	190	129	55
	2.0	■	370	270	231	155	66
	3.0	■	■	■	300	208	94
	4.0	■	■	■	340	236	117
	5.0	■	■	■	**349**	259	130
	6.0	■	■	■	**358**	281	141
	8.0	■	■	■	■	■	**168**
100 mbar	0.3	94	78	75	45	28	20
	0.5	137	116	108	70	42	28
	1.0	**293**	241	189	122	83	46
	2.0	**342**	401	270	208	134	66
	3.0	■	■	■	281	189	92
	4.0	■	■	■	317	237	113
	5.0	■	■	■	**340**	251	131
	6.0	■	■	■	**356**	270	146
	8.0	■	■	■	■	■	**172**
	10.0	■	■	■	■	■	**198***
200 mbar	0.4	115	95	88	55	38	22
	0.5	154	120	116	69	48	27
	1.0	293	241	198	127	93	45
	1.5	**363**	343	252	181	121	57
	2.0	■	414	296	228	147	69
	3.0	■	■	■	304	199	95
	4.0	■	■	■	350	231	117
	5.0	■	■	■	**378**	262	139
	6.0	■	■	■	**392**	284	150
	8.0	■	■	■	■	■	**181**
	10.0	■	■	■	■	■	**205***
400 mbar	0.7	160	123	110	81	62	29
	1.0	221	165	153	113	82	40
	1.5	**294**	216	191	142	110	54
	2.0	■	274	231	170	128	66
	3.0	■	■	■	226	167	91
	4.0	■	■	■	252	200	112
	5.0	■	■	■	**278**	232	133
	6.0	■	■	■	**295**	255	150
	8.0	■	■	■	■	■	**183**
	10.0	■	■	■	■	■	**208***

Dimensions (mm)

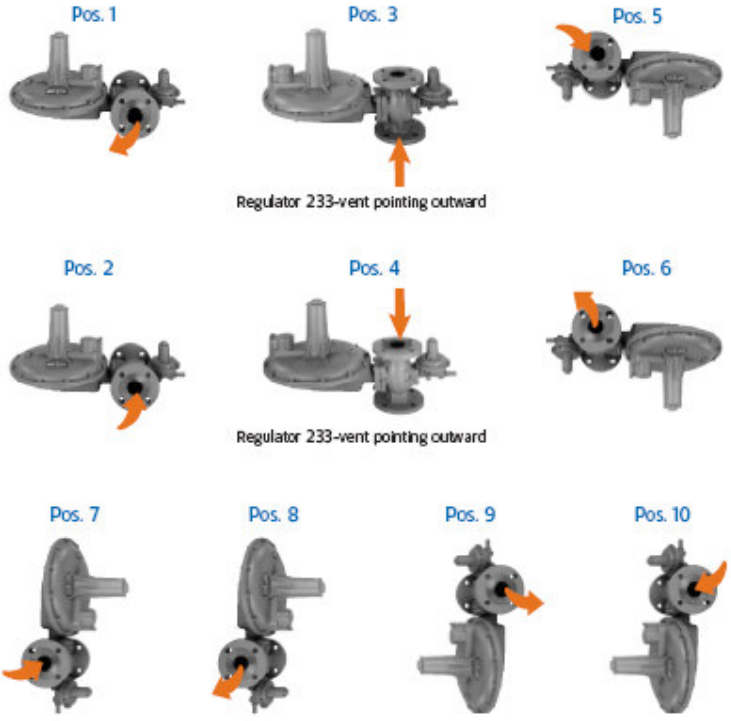
Model Type	Thread Size (1)	Flange (2)	A	B	C'	C	D	E	F	G	H	J Exhaust Connection	K	Weight in kg (approx.) (1)	(2)
133-	3/4"/1"	DN 25	190	155	100	160	170	100	100	75	120	Rp 3/4	74	4	6
233-12	1"1/2	DN 40	350	250	150	200	265	155	115	75	120	Rp 1	110	11	15
233-12	•	DN 50	350	250	•	200	265	155	115	75	120	Rp 1	110	•	16
233-8	1"1/2	DN 40	260	250	150	200	220	125	115	75	120	Rp 1	105	9	13
233-8	•	DN 50	260	250	•	200	220	125	115	75	120	Rp 1	105	•	14

Dimension, Type 133-E		
R	L	N
Rp 1	110	41
Rp 1" 1/2	140	50





Assembly Position



Installation

- Diaphragm casing can be mounted in any position relative to the body through a full 360° angle.
- For OUTDOORS installation, position the vent so that rain, snow, moisture, or foreign particles cannot enter the vent opening. Note: Actaris recommends that the vent be positioned to face downward to avoid entry of water or other matter interfering with the proper operation of the regulator. The vent should be located away from building eaves, window openings, building air intakes, and above the expected snow level at the site. The vent opening should be inspected periodically to ensure that it does not become blocked by foreign material.
- For INDOOR installation, pipe the vent to the outside atmosphere using the shortest length of pipe, the least number of elbows with a pipe diameter as follows: up to 3 m length: DN 20 – up to 5 m length: DN 25 – above 5 m length: at least DN 40. The outlet end of the pipe must be protected form moisture and the entrance of foreign particles.
- German DVGW rules allow not to pipe the vent, in case of indoor installation, when the regulator is fitted with a safety diaphragm and the inlet pressure does not exceed 1 bar.