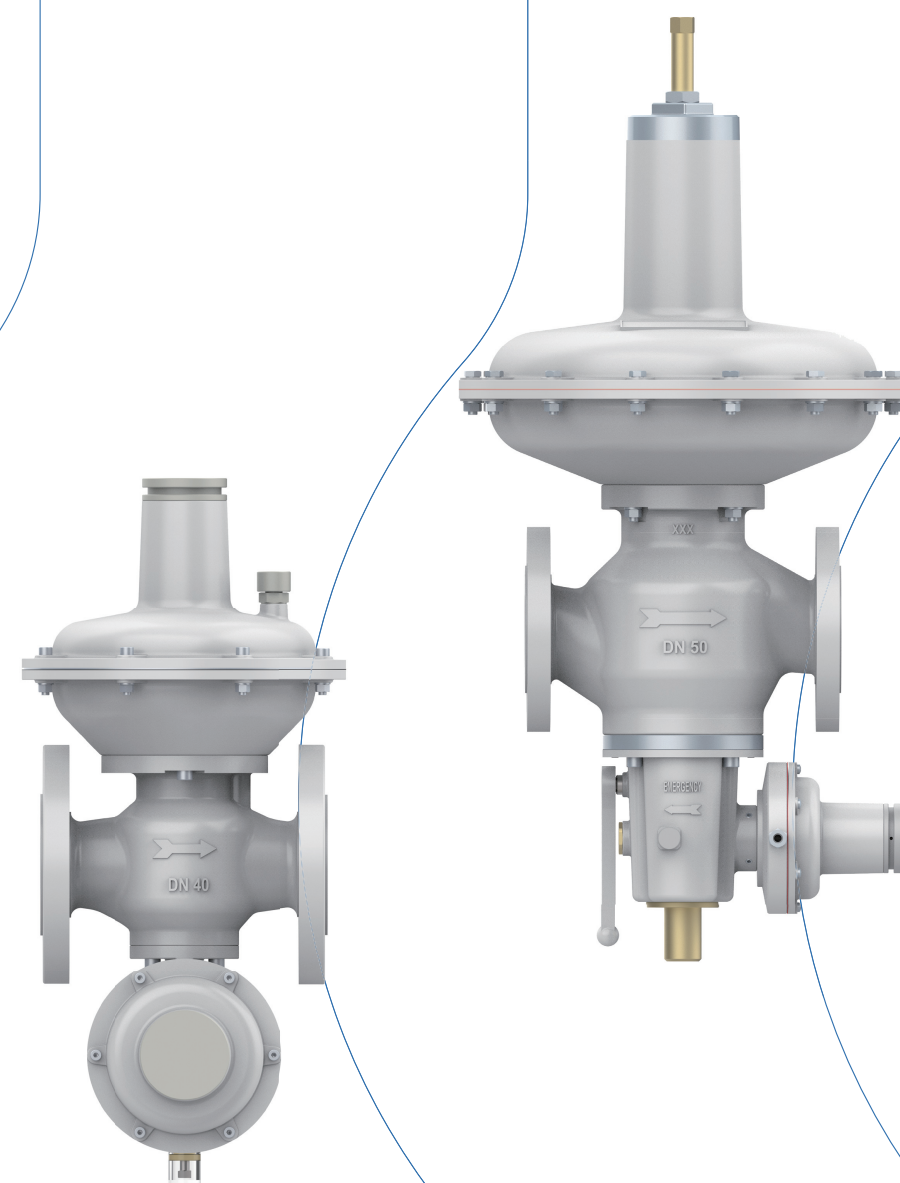




Regulator **V Series**



Address: Unit 133, 7121-104 Avenue SE, Calgary, Alberta, Canada

Website: www.dgreg.com

Tel: +1 5878920168

Email: sales@dgreg.com / info@dgreg.com

V Series

DESCRIPTION

The V series pressure regulator, equipped with loaded spring, controlling diaphragm and balanced valve, is suitable for low and medium pressure.

The regulators are widely used in both commercial and industrial installations using Natural Gas, LPG and other non-corrosive gases.



FEATURES

- High accuracy, fast response, large flow rate
- Vertical Symmetrical Lever Structure, low lock-up pressure, zero leakage
- Standard balanced valve, unaffected by inlet pressure fluctuations
- Fail to open
- Modular structure enables partial repairs without removing the entire unit from the pipeline
- Optional built-in relief valve
- Optional SD100/400 series shut-off sensor

PARAMETERS

Operating Parameters

- Maximum inlet pressure:
5 bar for diaphragm balanced valve
20 bar for piston balanced valve
- Outlet pressure regulation range: from 15 to 4000 mbar
- Accuracy class AC: up to 5
- Lock-up pressure class SG: up to 10
- Working temperature: -20°C - +60°C

Flow Coefficient (Cg)

V200	V400	V800	V1600
290	530	900	1500

Connection Parameters

Model	V200	V400	V800	V1600
Connecting size	DN40	DN50	DN50	DN50
Pressure rating	PN16/25 / Class150			
Flange standard*	PN according to EN 1092-2 / Class according to ASME B16.5			

* Other flange connection standards available upon request

Materials

Valve Body	Covers	Diaphragm	Seat	O-ring
Ductile Cast Iron (GJS 400-18-LT EN1563) Optional: Cast steel (ASTM A216 WCB)	Aluminum alloy ASTM A380	Reinforced fiber rubber	Brass Stainless steel	Nitrile rubber

MODEL INTRODUCTION

Model	Description
V	V Series Pressure Regulator
2	Indicates flow rate
4	
8	
16	
1	With shut-off valve
2	Without shut-off valve
1	P1 ≤ 5bar, 15mbar ≤ P2 ≤ 150mbar, With diaphragm balanced valve*
2	P1 ≤ 5bar, 0.1bar ≤ P2 ≤ 0.5bar, With diaphragm balanced valve
3	P1 ≤ 5bar, 0.4bar ≤ P2 ≤ 1.5bar, With diaphragm balanced valve
3TR	P1 ≤ 5bar, 1.5bar ≤ P2 ≤ 4bar, With diaphragm balanced valve
4	P1 ≤ 20bar, 0.4bar ≤ P2 ≤ 1.5bar, With piston balanced valve
4TR	P1 ≤ 20bar, 1.5bar ≤ P2 ≤ 4bar, With piston balanced valve
-R	Equipped with built-in relief,omitted if not equipped

*P1: Inlet pressure, P2: Outlet pressure

Model	Description
SD	Series SD Shut-off sensor
1	Type 100 Shut-off sensor
4	Type 400 Shut-off sensor
1	With over pressure and under pressure shut-off
2	With over pressure shut-off
1	27mbar ≤ OPSO ≤ 240mbar,10mbar ≤ UPSO ≤ 110mbar*
2	185mbar ≤ OPSO ≤ 900mbar.100mbar ≤ UPSO ≤ 300mbar
3	550mbar ≤ OPSO ≤ 5000mbar , 235mbar ≤ UPSO ≤ 2000mbar

*OPSO: Over pressure shut-off value / UPSO: Under pressure shut-off value

SPRING

Pressure range of the regulator spring

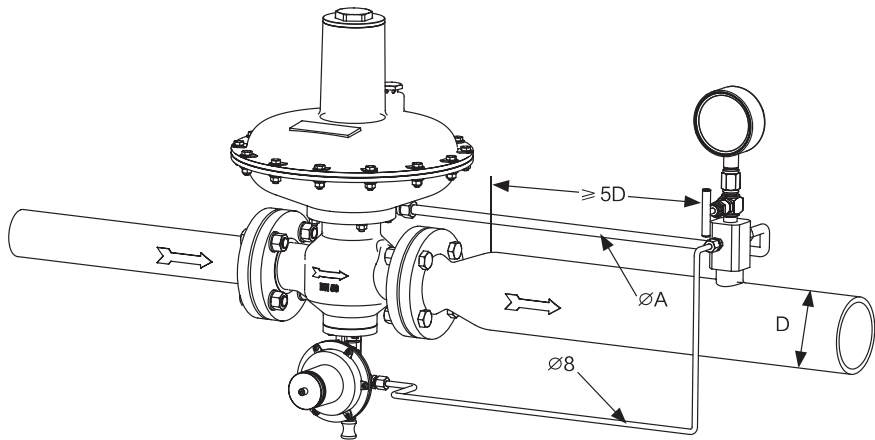
Model	Version	Outlet pressure range(mbar)	Part number	Color
V200	V201	18-24	19010802081	White
		20-34	19010204121	White
		29-48	19010802082	Yellow
		40-61	19010802083	Green
		61-92	19010802084	Blue
		73-115	190108020813	White
		96-180	19010803159	Green
	V202	140-190	19010803159	Green
		165-340	19010802086	Black
		250-560	19010204122	Yellow
	V203 / V204	300-650	19010802086	Black
		400-1100	19010204122	Yellow
		800-1650	19010204123	Green
		1620-2600	19010204124	Blue
	V203TR / V204TR	1620-2600	19010204124	Blue
		2200-3600	190108020811	Red
		3000-4200	19010204125	Red
V400	V401	18-32	19010805233	Green
		24-40	19010805234	Blue
		30-55	19010805235	Red
		40-70	19010805236	Black
		60-100	19010805238	Yellow
		85-180	190108052310	Blue
		120-220	190108052311	Red
	V402	180-320	190108052312	Black
		300-550	190108052313	White
		450-1100	19010204391	White
	V403 / V404	1000-2300	19010204392	Yellow
		2000-3400	19010204393	Green
	V403TR / V404TR	2800-4500	19010204394	Blue

Model	Version	Outlet pressure range(mbar)	Part number	Color
V800	V801	20-32	19010804172	Yellow
		30-44	19010804173	Green
		42-68	19010804174	Blue
		64-105	19010804175	Red
		100-165	19010804176	Black
	V802	145-230	19010804177	White
		215-330	19010804178	Yellow
		320-520	19010804179	Green
	V803 / V804	500-800	190108200411	Red
		650-1200	190108200412	Black
		1000-1600	190108200413	White
	V803TR / V804TR	1500-2500	190108200414	Yellow
		2200-3400	190108200415	Green
		3000-4200	190108200416	Blue
V1600	V1601	17-26	19010820041	White
		25-38	19010820042	Yellow
		37-59	19010820043	Green
		56-88	19010820044	Blue
		85-140	19010820045	Red
		130-210	19010820046	Black
	V1602	120-200	19010820046	Black
		165-250	19010820047	White
		230-370	19010820048	Yellow
		340-450	19010820049	Green
		410-600	190108200410	Blue
	V1603 / V1604	500-800	190108200411	Red
		650-1200	190108200412	Black
		1000-1600	190108200413	White
	V1603TR / V1604TR	1500-2500	190108200414	Yellow
		2200-3400	190108200415	Green
		3000-4200	190108200416	Blue

Pressure range of the shut-off spring

Model	Version	Shut-off pressure range(mbar)	Part number	Color
Over pressure shut-off	SD101 / SD401	27-65	19010801658	Yellow
		45-110	19010801651	White
		90-240	19010801652	Yellow
		185-460	19010801653	Green
	SD102 / SD402	330-650	19010801654	Blue
		450-900	19010801655	Red
		550-1000	19010801652	Yellow
	SD103 / SD403	850-1600	19010801653	Green
		1560-3400	19010801654	Blue
		3260-5000	19010801656	Black
Under pressure shut-off	SD101 / SD401	5-18	19010700311	White
		16-54	19010700312	Yellow
		50-110	19010700313	Green
	SD102 / SD402	100-190	19010700314	Blue
		170-300	19010700315	Red
		235-435	19010700313	Green
	SD103 / SD403	405-930	19010700314	Blue
		900-2000	19010700316	Black

INSTALLATION



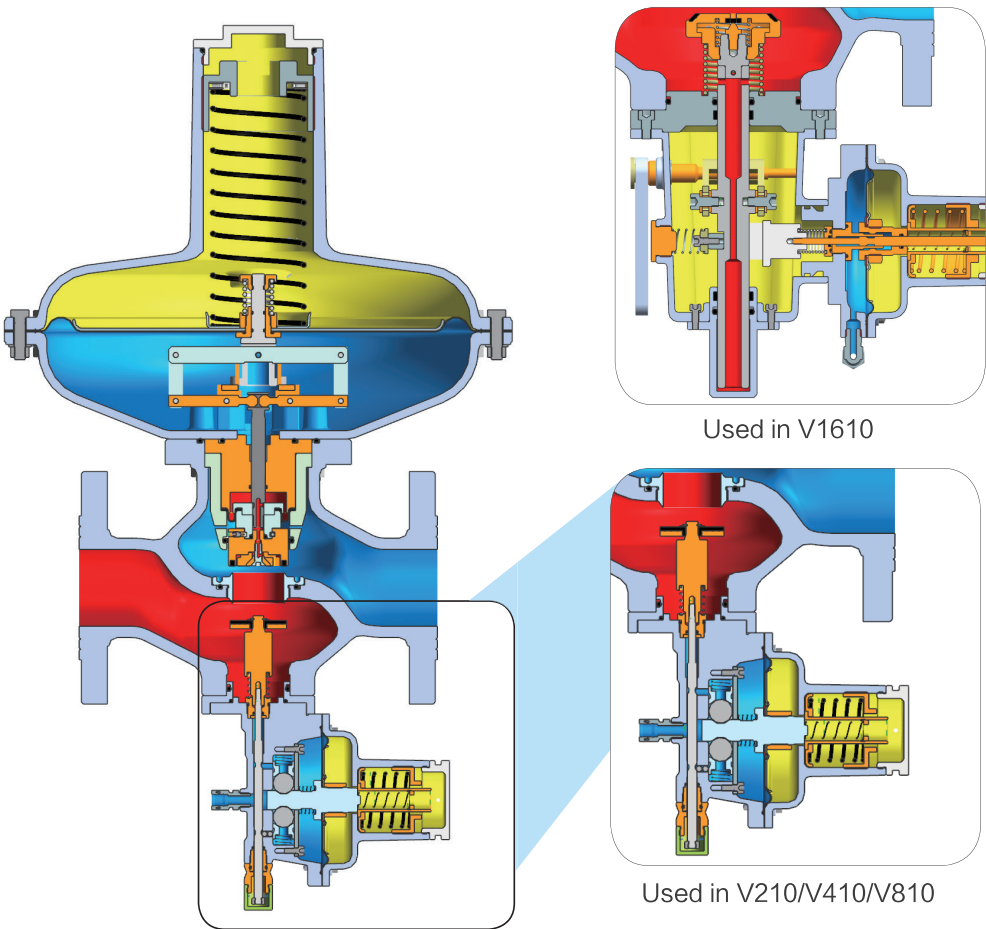
Model	V200	V400	V800	V1600
ΦA	10	10	14	14

OPERATING PRINCIPLE

The V series regulator is a direct-acting regulator that provides pressure feedback through internal or internal-external sensing.

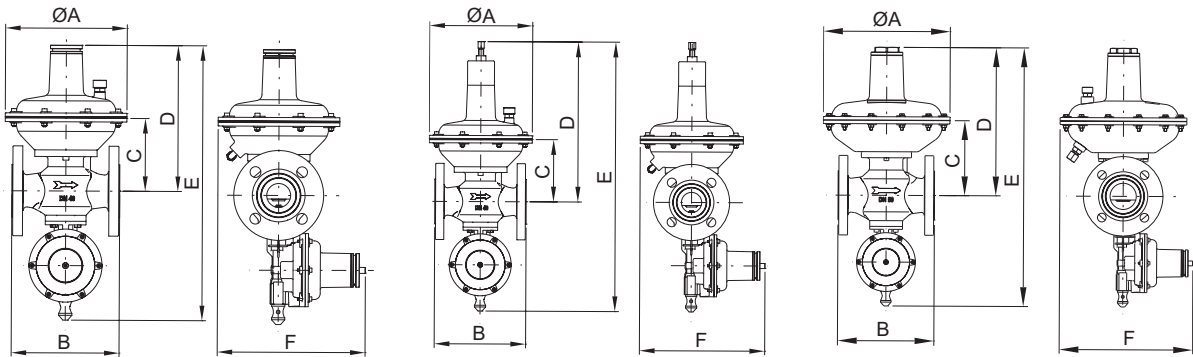
When the downstream flow demand decreases, the pressure under the diaphragm increases, which overcomes the load of the loaded spring and causes the diaphragm to move upward. The movement of the diaphragm is transmitted to the balanced valve through the lever system, and the valve seat approaches the valve orifice. The valve seat is vulcanized on the seat (part of the balanced valve).

When the downstream flow demand increases, the pressure under the diaphragm decreases, which is less than the load of the loaded spring, causing the diaphragm to move downward and the valve seat to move away from the valve orifice until the flow demand decreases.



Atmospheric pressure
 Inlet pressure
 Outlet pressure

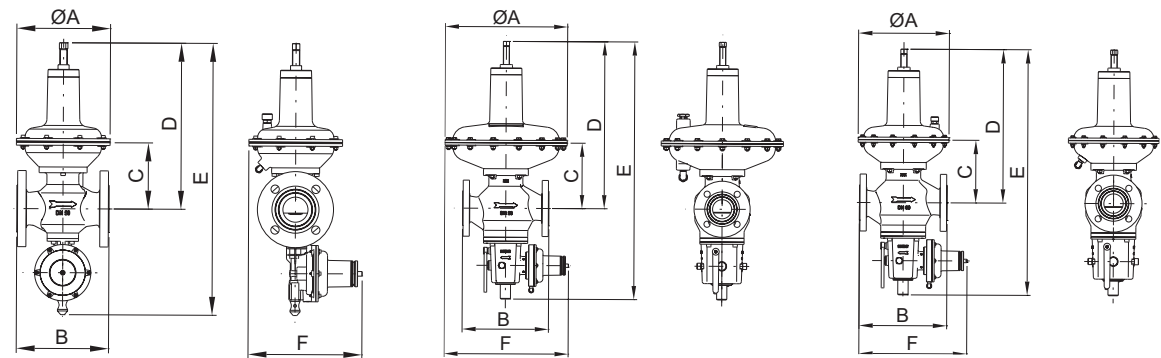
DIMENSIONS



V211, V212, V213, V214

V213TR, V214TR

V411, V412, V811, V812



V413/V413TR, V414/V414TR
V813/V813TR, V814/V814TR

V1611, V1612

V1613/V1613TR, V1614/V1614TR

Unit: mm

Model	A	B	C	D	E	F	Weight(Kg)
V211/V212/V213/V214	203	180	122	242	460	237	10.2
V213TR/V214TR				332	551		11.0
V411/V412	263	200	155.5	308	520	267	15.9
V413/V413TR/ V414/V414TR	203		143.5	375.5	612	239	14.6
V811/V812	360	254	181.5	398.8	645.3	315	24.2
V813/V813TR/ V814/V814TR	263		170.5	475	721	269	22.6
V1611/V1612	360	254	193	533	800	365	32.1
V1613/V1613TR/V1614/V1614TR	263		181.5	486	753	318	30.5

FLOW CAPACITY

The size of the regulator is usually selected based on the flow coefficient Cg. Under the reference condition (15℃), the maximum flow rate of a natural gas regulator when fully open is calculated using the following formula:

1) Sub-critical state [When (P₁- P₂) ≤ 0.5 (P₁+P_a)]

$$Q=0.526*C_g*(P_1+P_a)*Sin\left[K_1*\sqrt{\frac{P_1-P_2}{P_1+P_a}}\right]deg$$

2) Critical state [When (P₁- P₂) > 0.5 (P₁+P_a)]

$$Q=0.526*C_g* (P_1+P_a)$$

Q — Flow rate (m³/h) ;

P₁ — Inlet pressure (bar) ;

P_a — Atmospheric pressure (bar) ;

C_g — Flow coefficient;

P₂ — Outlet pressure (bar) ;

K₁ — valve shape coefficient , 105.6 in this formula;

When the relative density d of the gas used differs from 0.61 (natural gas) or the gas temperature is not 15 ℃ , the flow rate should be multiplied by the correction factor F obtained using the following formula:

$$F=\sqrt{\frac{0.61*288}{d*(t+273)}}$$

F — Correction factor;

d — Relative density d of the gas;

t — Gas temperature (℃) ;

The following is the gas relative density d and correction factor F of commonly used gases at the gas temperature of 15 ℃ :

Gas type	Relative density d	Factor F
Air	1	0.78
Coal gas	0.44	1.18
Methane	0.55	1.05
Ethane	1.05	0.76
Propane	1.53	0.63
Butane	2.01	0.55
Nitrogen	0.97	0.79
Carbon dioxide	1.52	0.63

AC10, Capacity in Nm³/h, Natural gas											
Inlet pressure (bar)	Outlet pressure (bar)										
	0.025	0.03	0.05	0.1	0.2	0.3	0.5	1	2	3	4
V200	0.5	130	150	150	150	140	140	–	–	–	–
	0.7	140	160	160	180	200	180	160	–	–	–
	1	200	210	220	240	250	270	285	–	–	–
	1.5	280	340	320	340	400	360	360	270	–	–
	2	360	420	440	420	400	450	430	400	–	–
	3	550	650	620	650	650	600	625	585	415	–
	4	450	800	800	850	880	780	790	725	650	600
	5	400	850	850	900	900	900	850	750	800	700
	6	–	–	–	–	–	–	1000	950	1000	900
	8	–	–	–	–	–	–	1500	1540	1410	1460
	10	–	–	–	–	–	–	1820	1800	1840	1820
	12	–	–	–	–	–	–	2160	2100	2100	2180
	14	–	–	–	–	–	–	2300	2540	2440	2500
	16	–	–	–	–	–	–	2800	2800	2750	3220
	16	2875									
V400	0.5	150	170	185	240	300	230	–	–	–	–
	0.7	200	260	280	260	230	210	180	–	–	–
	1	240	300	350	380	420	400	380	–	–	–
	1.5	430	485	425	550	545	500	510	470	–	–
	2	450	500	550	750	700	700	650	620	–	–
	3	650	800	850	1000	950	950	950	985	710	–
	4	1000	1000	1100	1360	1280	1250	1290	1300	1100	900
	5	1200	1200	1300	1400	1400	1400	1500	1500	1400	1400
	6	–	–	–	–	–	–	1800	1700	1700	1700
	8	–	–	–	–	–	–	1920	1940	1900	2300
	10	–	–	–	–	–	–	2400	2540	2500	2800
	12	–	–	–	–	–	–	2500	2900	2900	3450
	14	–	–	–	–	–	–	3300	3300	3550	4000
	16	–	–	–	–	–	–	2800	3650	3900	4500
	16	3800									

AC10, Capacity in Nm³/h, Natural gas											
Inlet pressure (bar)	Outlet pressure (bar)										
	0.025	0.03	0.05	0.1	0.2	0.3	0.5	1	2	3	4
V800	0.5	400	400	430	420	450	440	–	–	–	–
	0.7	500	500	520	500	520	480	450	–	–	–
	1	600	650	700	750	800	760	800	–	–	–
	1.5	700	800	900	1100	1100	1050	1100	–	–	–
	2	1000	1000	1000	1200	1400	1350	1400	1000	–	–
	3	1300	1400	1500	1700	1700	1800	2000	1500	1200	–
	4	1600	1600	1800	2200	2200	2100	2500	2200	2000	1600
	5	1800	1800	2200	2400	2500	2500	2800	2400	2000	1800
	6	–	–	–	–	–	–	3000	2500	2600	2200
	8	–	–	–	–	–	–	3800	3800	3200	3200
	10	–	–	–	–	–	–	4600	4200	4000	4200
	12	–	–	–	–	–	–	5000	5000	5000	5000
	14	–	–	–	–	–	–	5500	6000	5700	5700
	16	–	–	–	–	–	–	7000	6500	6500	6500
	16	6500									
V1600	0.5	550	600	600	650	650	600	–	–	–	–
	0.7	700	800	800	800	800	800	750	–	–	–
	1	1000	1000	1100	1100	1200	1100	850	–	–	–
	1.5	1100	1200	1300	1300	1500	1600	1200	–	–	–
	2	1300	1400	1500	1600	1800	2000	2100	1800	–	–
	3	2000	2000	1900	2000	2700	2800	2900	2600	2400	–
	4	2200	2300	2200	2600	3600	3600	3600	3600	3200	2700
	5	2600	2800	2800	3200	4200	4200	4200	4800	4600	4600
	6	–	–	–	–	–	–	5000	5800	5700	5500
	8	–	–	–	–	–	–	6000	8000	8000	8000
	10	–	–	–	–	–	–	6000	9000	10000	9500
	12	–	–	–	–	–	–	6500	11000	12000	11000
	14	–	–	–	–	–	–	6000	12000	13000	13000
	16	–	–	–	–	–	–	6000	14000	15000	15000
	16	15000									