Regulator

D Series

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D Series

DESCRIPTION

The D 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
- 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
- Standard SD300 series shut-off sensor

PARAMETERS

Operating Parameters

- Maximum inlet pressure: 5 bar
- Outlet pressure regulation range: from 15 to 500 mbar
- Accuracy class AC: up to 5
- Lock-up pressure class SG: up to 10
- Working temperature: -20℃ ~ +60℃

Flow Coefficient (Cg)

D50	D75	D100
110	130	200

Connection Parameters

Model	D50	D75	D100
Connection size	1"	1"	1"x1-1/2"
Thread standard*	Internal thread in line with ISO 7-1		

* Other connection standards can be provided upon request

Materials

Valve Body	Covers	Diaphragm	Seat	O-ring
Ductile cast iron (GJS400-18-LT EN1563) Optional: Cast steel (ASTM A216 WCB)	Aluminum alloy ASTM A380	Reinforced fiber rubber	Brass	Nitrile rubber

MODEL INTRODUCTION

Model			Description
D			D Series Pressure Regulator
	50		Indicates flow rate
	75		
	100		
		LP	P1 ⩽ 5bar, 15mbar ⩽ P2 ⩽ 150mbar*
		MP	P1 ⩽ 5bar, 100mbar ⩽ P2 ⩽ 500mbar
		-R	Equipped with built-in relief, omitted if not equipped

*P1: Inlet pressure, P2: Outlet pressure

Model			Description
SD			SD Series Shut-off sensor
	3		Type 300 Shut-off sensor
		1	With over pressure and under pressure shut-off
		2	With over pressure shut-off
		1	28mbar ⩽ OPSO ⩽ 210mbar,20mbar ⩽ UPSO ⩽ 140mbar*
		2	180mbar ⩽ OPSO ⩽ 800mbar,125mbar ⩽ OPSO ⩽ 350mbar

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

SPRING

Pressure range of the regulator spring

Model	Outlet pressure range (mbar)	Part number	Color
D50/75	15-30	19010807041	White
	25-45	19010807042	Yellow
	40-75	19010807043	Green
	70-130	19010807044	Blue
	120-230	19010807045	Red
	220-450	19010807046	Black
	400-550	19010807047	White

Model	Outlet pressure range (mbar)	Part number	Color
D100	17–26	19010803152	Yellow
	23–35	19010803153	Green
	30–50	19010803154	Blue
	45–70	19010803155	Red
	60–90	19010803156	Black
	85–150	19010803157	White
	145–200	19010803158	Yellow
	190–270	19010803159	Green
	260–360	190108031510	Blue
	330–470	190108031511	Red
	460–570	190108031512	Black

Pressure range of the shut–off spring

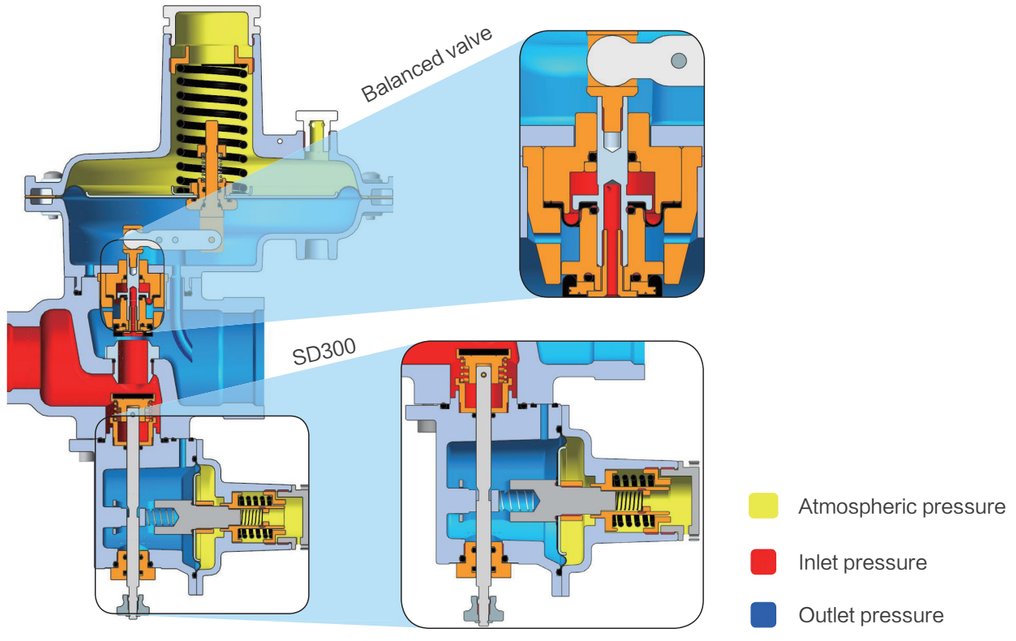
	Model	Shut–off pressure range (mbar)	Part number	Color
Over pressure shut–off	SD301	27–50	19010803917	Brown
		40–70	19010803911	White
		65–100	19010803919	Orange
		90–135	19010803912	Yellow
		130–210	19010803913	Green
	SD302	180–270	19010803914	Blue
		230–400	19010803918	Purple
		340–600	19010803915	Red
		570–800	19010803916	Black
Under pressure shut–off	SD301	20–51	19010803921	White
		35–78	19010803922	Yellow
		60–140	19010803923	Green
	SD302	125–245	19010803924	Blue
		200–350	19010803925	Red

OPERATING PRINCIPLE

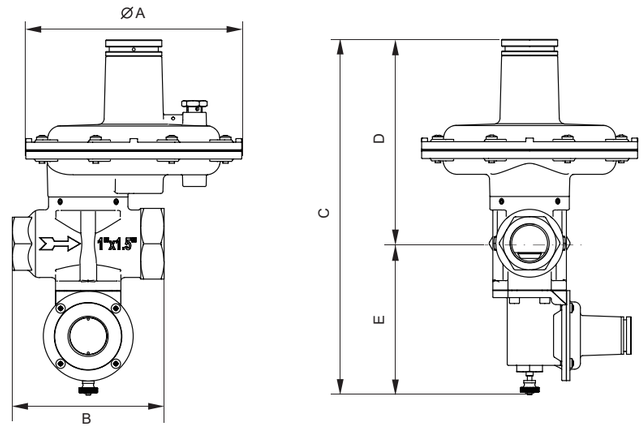
The D series regulator is a direct–acting regulator that provides pressure feedback through internal sensing.

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.



DIMENSIONS

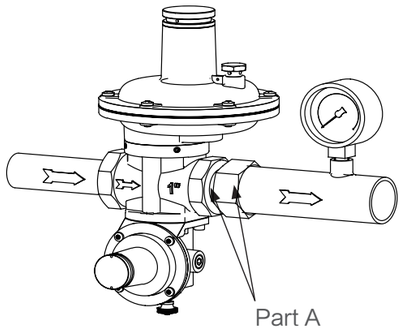


Unit: mm

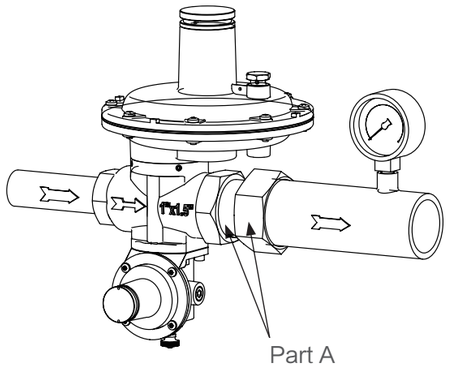
Model	A	B	C	D	E	Weight ((Kg)
D50	145	100	282	162	120	2.6
D75						2.64
D100	185	130	302	174	127	2.8

INSTALLATION

D50/75



D100



The product can be equipped with part A when leaving the factory to ensure the optimal performance.

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 $(P_1-P_2) \leq 0.5(P_1+P_a)$]

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

2) Critical state [When $(P_1-P_2) > 0.5(P_1+P_a)$]

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

Q — Flow rate (m^3/h);
C_g — Flow coefficient;
P_1 — Inlet pressure (bar);
P_2 — Outlet pressure (bar);
P_a — Atmospheric pressure (bar);
K_1 — valve shape coefficient, 94.7 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 Nm^3/h, Natural gas

Inlet pressure (bar)		Outlet pressure (bar)							
		0.025	0.03	0.05	0.1	0.15	0.2	0.3	0.5
D50	0.5	22	25	20	40	38	40	36	–
	0.7	45	55	55	55	50	50	50	40
	1	52	68	60	60	65	65	60	60
	1.5	58	60	70	70	68	75	65	70
	2	60	55	80	80	75	80	70	75
	3	55	56	70	80	80	90	80	85
	4	65	65	75	90	90	100	90	95
	5	70	70	80	100	100	100	100	100
D75	0.5	25	25	25	38	40	50	35	–
	0.7	40	45	45	50	45	60	50	40
	1	75	90	85	80	80	90	75	75
	1.5	76	90	100	110	100	110	100	90
	2	75	80	100	120	110	110	100	95
	3	77	85	95	110	95	100	110	100
	4	80	77	85	100	120	120	135	130
	5	85	85	95	110	130	130	150	150
D100	0.5	80	80	85	100	90	90	90	–
	0.7	95	100	110	130	120	110	120	100
	1	110	110	150	140	150	140	140	130
	1.5	140	150	200	150	170	180	170	170
	2	170	170	200	190	200	210	190	200
	3	110	130	220	230	240	230	230	240
	4	100	110	170	240	250	240	240	250
	5	100	110	180	260	270	270	270	280