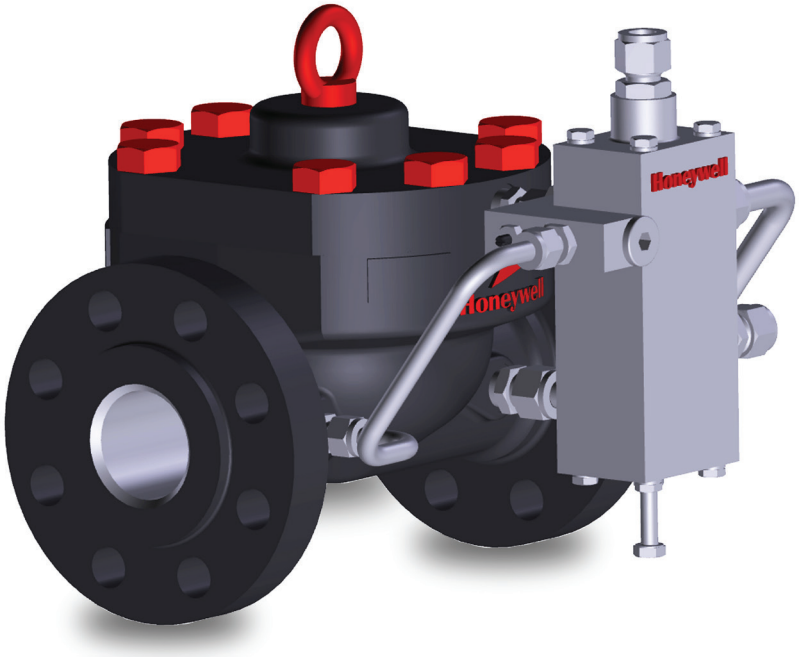
GAS PRESSURE REGULATOR HON 5020



Honeywell

Reliability and accuracy

The HON 5020 provides outstanding control accuracy over a large working area as well as quick reaction times for highly dynamic requirements in the public gas supply industry or industrial applications.

The HON 5020 gas pressure regulator meets the demands of modern control technology:

- *Reduced operating costs*
- *Increased efficiency*
- *Meets specific operational needs*
- *Improved reliability in all situations*

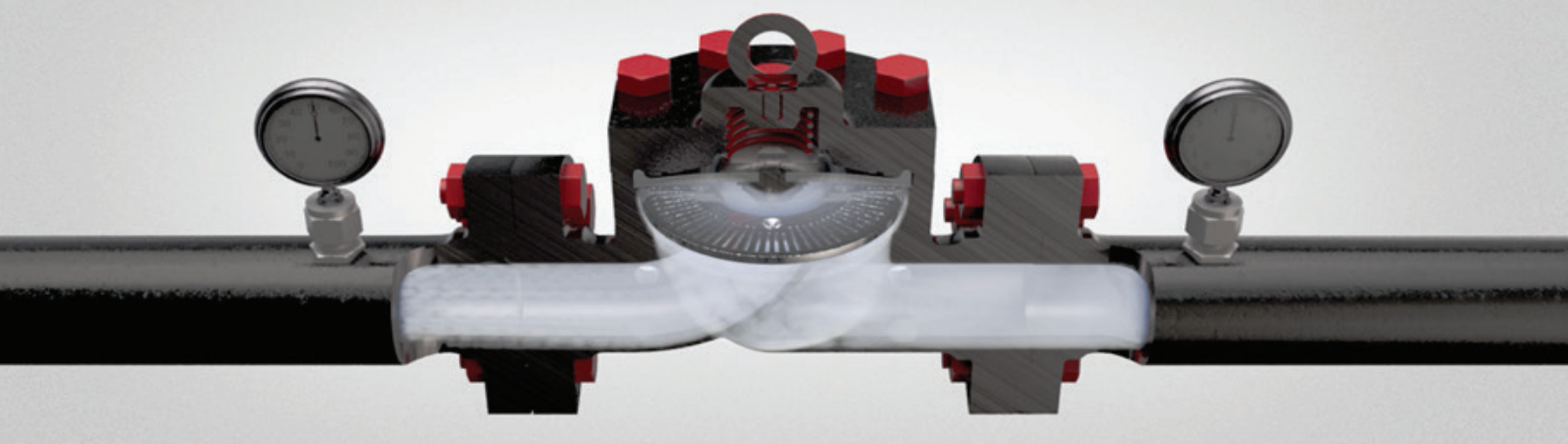
Process optimization plays an increasingly important role in today's gas industry. To reduce operating costs, gas pressure regulators and safety shut-off valves need to provide reliability, longer lifespans and lower maintenance costs. This compact device is the ideal solution for all types of control tasks that require reliability, precision and easy maintenance.

Benefit from:

- Optimized design for lower maintenance costs
- Small number of moving parts
- Modular design
- High response and control accuracy
- Reduced noise
- High flow rate
- Low differential pressure requirements

SERVICE CONDITIONS					
Maximum Intet	Up to 102 bar			Up to 1480 psi	
Connection type	Class 150, Class 300 and Class 600 according to ANSI 16.5				
Min Operating Differential	0.5 bar recommended > 1.5 Bar (4 bar for Size 1")			7 psi recommended > 22 psi (58 psi for size 1")	
Max Operating Differential	Class 150: 19 bar, Class 300: 51 bar Class 600: 70 bar			Class 150: 275 psi , Class 300: 725 psi Class 600: 1015 psi	
Temperture Min/ Max	-29°C to 66°C -40°C to 79°C			-20°F to 150°F -40°F to 175°F	
Throttle plates	100% 75%, 50%, 25% Capacity				
Noise Reduction	Up to 20 dB (A). (Size 1" and 2" -10% of stated Cg value, Size 3".4" &6"-25% of Stated Cg value)				
Certification	CSA B51-0.9 ASME Section VIII etc CE registration acc to PED EN334 depending on pilot version				
Accuracy Class	up to AC 1				
Lock-up Pressure Class SG	Up to SG 5				
Strength tightness and function	EN334 and EN14382 standards				
CAPACITY					
HON 5020 with Inlet =Outlet (Without Expansion)	Without SSV in Kg	With SSV in Kg		Without SSV in Cg	With SSV in Cg
DN 25 / 1"	450	500		410	456
DN50 / 2"	1800	2000		1500	1667
DN 80 / 3"	4690	5200		3700	4102
DN 100 / 4"	7900	8770		5500	6106
DN 150 /6"	16400	18200		11500	12762
Applications					
Application	Pilot Model	Max Inlet			
		Bar	Psi	Bar	Psi
Pressure Reducing	HON 600	25 Bar	363 psi	0.015 to 8.0 bar	0.22 to 116 psi
	HON 625	25 Bar	363 psi	0.02 to 5.0 bar	0.3 to 73 psi
	HON 630	100 Bar	1450 psi	0.03 to 90 bar	0.4 to 1305 psi
	HON 630-1	100 Bar	1450 psi	0.03 to 90 bar	0.4 to 1305 psi
	HON 640a	100 Bar	1450 psi	0.5 to 90 bar	7 to 1305 psi
	S60	100 Bar	1450 psi	0.2 to 62 bar	3 to 900 psi
Back Pressure	HON 642a	100 Br	1450 psi	0.5 to 40 bar	7 to 580 psi
Applications					
OPSO & UPSO	HON K1a	OPSO		0.05 to 1.50 bar	0.70 to 22 psi
		UPSO		0.010 to 0.015 bar	0.14 to 1.74 psi
	HON K2a/1	OPSO		0.40 to 4.50 bar	6 to 65 psi
		UPSO		0.060 to 0.400	0.87 to 5.80 psi
	HON K2a/2	OPSO		2.50 to 8 bar	36 to 116 psi
		UPSO		0.800 to 2.200 bar	12 t o 32 psi
	K10a	OPSO		0.05 to 1.50 bar	0.70 to 22 psi
		UPSO		0.010 to 0.015 bar	0.14 to 1.76 psi
	K11a/1	OPSO		0.40 to 4.50 bar	6 to 65 psi
		UPSO		0.060 to 1.000 bar	0.87 to 14 psi
	K11a/2	OPSO		2.50 to 8 bar	36 to 116 psi
		UPSO		0.800 to 2.200 bar	12 t o 32 psi
	K 16	OPSO		0.80 to 40 bar	12 to 580 psi
	K 17	UPSO		2 to 40 bar	29 to 145 psi
	K 18	OPSO		20 to 90 bar	290 to 1305 psi
	K 19	UPSO		20 to 90 bar	290 to 1305 psi

TECHNICAL DATA				
Pilot Model	Spring no	Wire-Ø in mm	Colour Code	Specific range Wds in Psi
HON 625 LP measuring	1	2,50	Cream White	0.29 to 0.87
	2	3,50	Green	0.58 to 2.61
	3	4,00	Red	1.01 to 5.22
	4	5,00	Blue	4.35 to 7.25
HON 625 HP m measuring	5	4,00	Red	4.35 to 14
	6	5,00	Blue	7.25 to 29
	7	5,50	No Colour	14 to 51
	8	6,00	Silver	29 to 72
HON 630 (external pilot 2 stage design)	0	4,50	Black	4.35 to 14
	1	3,60	Blue	7.25 to 29
	2	5,60	Yellow	14 to 72
	3	6,30	Brown	29 to 145
	4	7,00	Red	72 to 290
	5	8,00	Green	145 to 580
Load Limiting stage	5	8,00	Green	72 to 217 (Automatic via Pd)
HON 630-1 (external pilot, one-stage design, suitable fo input pressure fluctuations < 217 psi)	0	4,50	Black	4.35 to 14
	1	3,60	Blue	7.25 to 29
	2	5,60	Yellow	14 to 72
	3	6,30	Brown	29 to 145
	4	7,00	Red	72 to 290
	5	8,00	Green	145 to 580
	6	9,00	White	290 to 1305
HON 640a (external pilot , one stage design)	1	3,60	Blue	7.25 to 29
	2	4,50	Black	14 to 22
	3	5,00	Grey	29 to 145
	4	6,40	Brown	72 to 290
	5	7,00	Red	145 to 580
S 60	1	Red		3 to 30
	2	Blue		10 to 75
	3	Black		25 to 150
	4	Green		100 to 325
	5	Brown		250 to 450
	6	White		400 to 900
HON 642a	1	3,60	Blue	7.25 to 29
	2	4,50	Black	14 to 72
	3	5,00	Grey	29 to 145
	4	6,40	Brown	72 to 290
	5	7,00	Red	145 to 580



SETTING RANGES OF SSV CONTROL MACHINES FOR FINAL CONTROLLING DEVICES WITH AN INTEGRATED SSV								
	Setpoint Spring			Upper Response pressure pdo		Lower Response Pressure pdu		
Control Device	No	Colour	Wire- Ø in mm	Specific adjustment range Wdso(psi)	Smallest diff Pressure -Delta pwo(psi)	Specific adjustment range Wdsu(psi)	Smallest diff Pressure -Delta pwu(psi)	Response Pressure Category AG
K1a***	1	Yellow	2,50	0.72 to 1.45	0,43			10 / 5
	2	Light red	3,20	1.16 to 3.62	0,72			10 / 5
	3	Dark red	3,60	2.90 to 7.25	1,45			5 / 2.5
	4	White	4,75	5.80 to 22	3,62			5 / 2.5
	5	Light Blue	1,10			0.14 to 0.22	0,17	20
	6	White	1,20			0.20 to 0.58	0,43	10 / 5
	7	Black	1,40			0.51 to 1.74	0,87	5
K2a/1***	1	Light red	3,20	5.80 to 11.60	1,45			10 / 5
	2	Dark red	3,60	8.70 to 23	2,90			10 / 5
	3	White	4,75	22 to 65	4,35			5 / 2.5
	4	Light Blue	1,10			0.87 to 2.17	0,72	10 / 5
	5	Black	1,40			1.74 to 5.80	1,16	5
K2a/2***	1	White	4,75	36 to 116	7,25			10 / 5
	2	Red	2,25			12 to 32	5,80	10 / 5
K10a	1	Yellow	2,50	0.72 to 1.45	0,43			10 / 5
	2	Light red	3,20	1.16 to 3.62	0,72			10 / 5
	3	Dark red	3,60	2.90 to 7.25	1,45			5 / 2.5
	4	White	4,80	5.80 to 22	3,62			5 / 2.5
	5	Light blue	1,20			0.14 to 0.22	0,17	20
	6	White	1,40			0.20 to 0.58	0,43	20 / 5
	7	Black				0.51 to 1.74	0,87	5
K11a/1	1	Light red	3,20	5.80 to 11.60	1,45			10 / 5
	2	Dark red	3,60	8.70 to 23	2,90			10 / 5
	3	White	4,75	22 to 65	4,35			5 / 2.5
	4	Light Blue	1,10			0.87 to 2.17	0,72	20 / 5
	5	Black	1,40			1.74 to 5.80	1,16	5
	6	Flame red	2,25			5.07 to 14	1,45	5
K11a/2	1	White	4,75	36 to 116	7,25			10 / 5
	2	Red	2,25			12 to 32	5,80	10 / 5
K16[1]	0	***Blue	3,20	12 to 22	1,45			2.5
	1	Black	4,50	14 to 72	2,90			2.5 / 1
	2	Grey	5,00	29 to 145	5,80			1
	3	Brown	6,30	72 to 290	12			1
	4	Red	7,00	145 to 580	17			1
K17[1]	1	Grey				29 to 145	5,8	1
	2	Brown				72 to 290	12	1
	3	Red				145 to 580	17	1
K 18[1]	1	No Color	9,00	290 to 1305	22			1
K19[1]	1	No Color	9,00			290 to 1305	22	1

Please note: If control devices are used for upper and lower response pressures at the same time , the difference between the nominal vlaues p_{do} and p_{du} must be at least 10% larger than the sum of the values of Δp_{wo} and Δp_{wu}.

$p_{dso} - p_{dsu} \geq 1.1 \times (\Delta p_{wo} + \Delta p_{wu})$

**)The higher AG Category applies for the first half of the adjustment range and the lower AG Category applies to the second half.

***) Only applies to size DN 25 / 1"

[1]) The control devices K16/K17 or K18/K19 can also be used together

Formulas

C_g (IMPERIAL)	KG (EN 334 METRIC)
a) For sub-critical flow (sine function reaches 90 deg): $Q_{scfh} = \sqrt{\frac{520}{GT}} * C_g * p_u * \sin\left[\frac{3417}{C_1}\sqrt{\frac{p_u - p_d}{p_u}}\right]\text{deg}$	a) For sub-critical flow (p_u-p_d) ≤ 0.5* p_u: $Q = K_G * \sqrt{(p_d * (p_u - p_d))}$
b) For critical flow (sine function equals unity): $Q_{scfh} = \sqrt{\frac{520}{GT}} * C_g * p_u$	b) For critical flow (p_u-p_d) > 0.5* p_u: $Q = K_G * \frac{p_u}{2}$

	SYMBOLS	IMPERIAL UNITS/ FACTORS	METRIC UNITS/ FACTORS	COMMENT
Flow Volume	Q	ft³/h	m³/h	
Inlet-Pressure	p_u	psia	bara	Absolute
Outlet-Pressure	p_u	psia	bara	Absolute
Temperature	T	°Rankine	Kelvin	Kelvin=°Celsius + 273.15 °Rankine=°Fahrenheit + 459.67
Density	d	relative density to air [dimensionless]		
Body shape factor	C_1			
Flow coefficient	C_g	flow coefficient at 520°Ra and density d=1		
Flow coefficient	$K_{G\ (DIN\ EN\ 334)}$	flow coefficient at 288.15K and density d=0.64		

TYPE OF GAS	d
air	1
natural gas (EU)	0.64
natural gas (US)	0.61
propane	1.53
butane	2.00
nitrogen	0.97
oxygen	1.14
carbon dioxide	1.52

Wherever you are, you can count on Honeywell's commitment to product quality, reliability, safety and performance.

Materials of Construction and Dimensions

MATERIALS OF CONSTRUCTION*)	
Main Regulator	
Body	Cast Steel: ASTM-A352 Grade LCC
Top Cover	Carbon Steel Plate
Grid Plate	Stainless Steel
Main Spring	Stainless Steel/Carbon Spring Steel
Top Diaphragm Plate	Stainless Steel
Bottom Diaphragm Plate	Stainless Steel
Diaphragm	Nitrile/ECO
Seals	Nitrile or Viton
Connection Pipes	Steel or Stainless Steel
Pilots—HON 600/625/630/635/638/640a/642	
Housing	Aluminum
Diaphragm	Nitrile
Seals	Nitrile or Viton

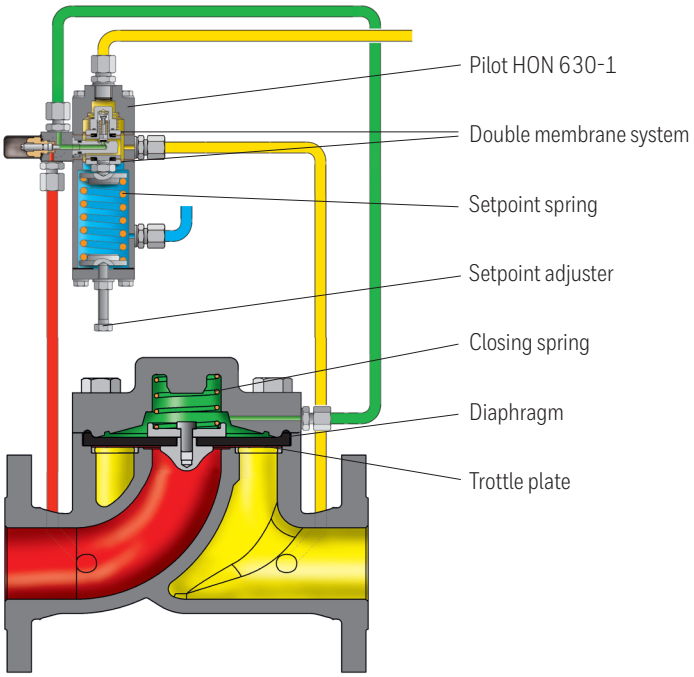
*) NACE compliant versions available on customer request.

Design and operation

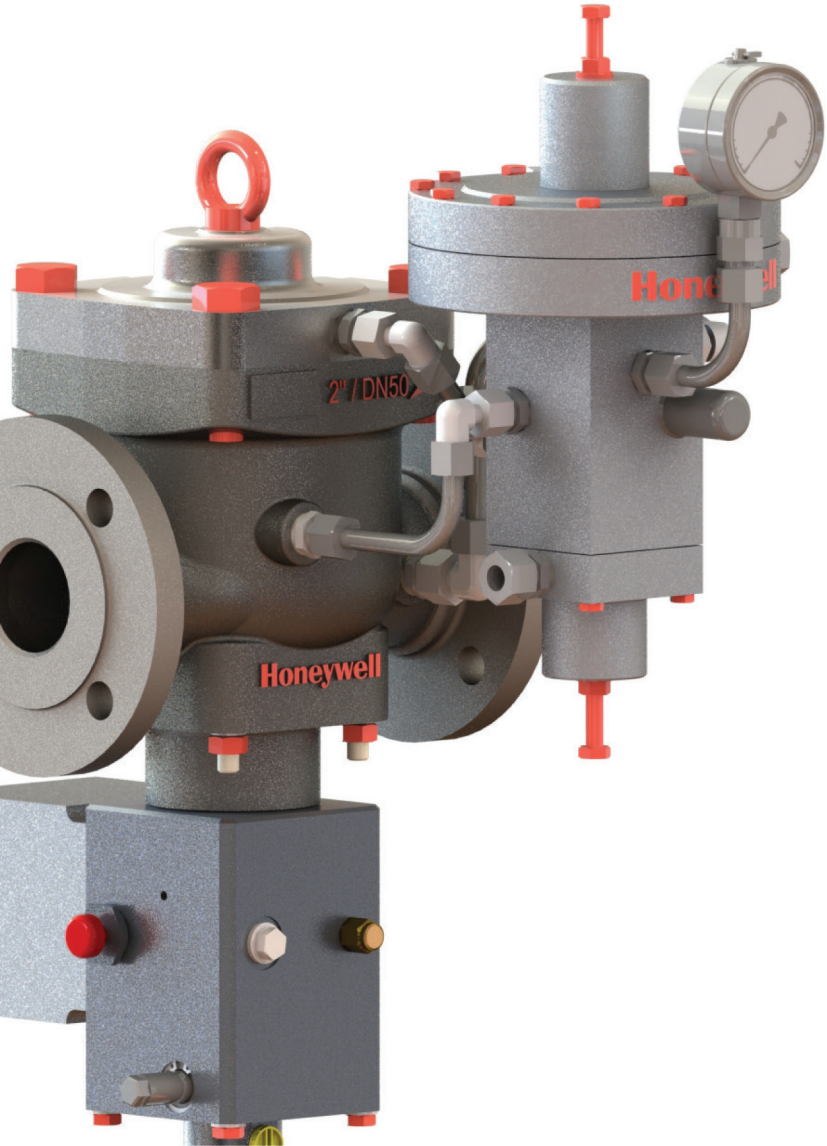
The HON 5020 gas pressure regulator keeps the outlet pressure of a gaseous medium in a controlled system constant, regardless of variables such as input pressure and/or flow rate.

The HON 5020 consists of the main valve, the pilot, and if included, the integrated safety shut-off valve (SSV). The external pilots of the 600er series (e.g. HON 630/HON 625) are connected to the main appliance via control lines. A fine filter prevents the pilot from becoming contaminated.

The actuator consists of only a small number of parts and is therefore easy to maintain. The top of the housing can be easily removed to check the throttle diaphragm (the only wear part in the final controlling device) without disconnecting the actuator housing.

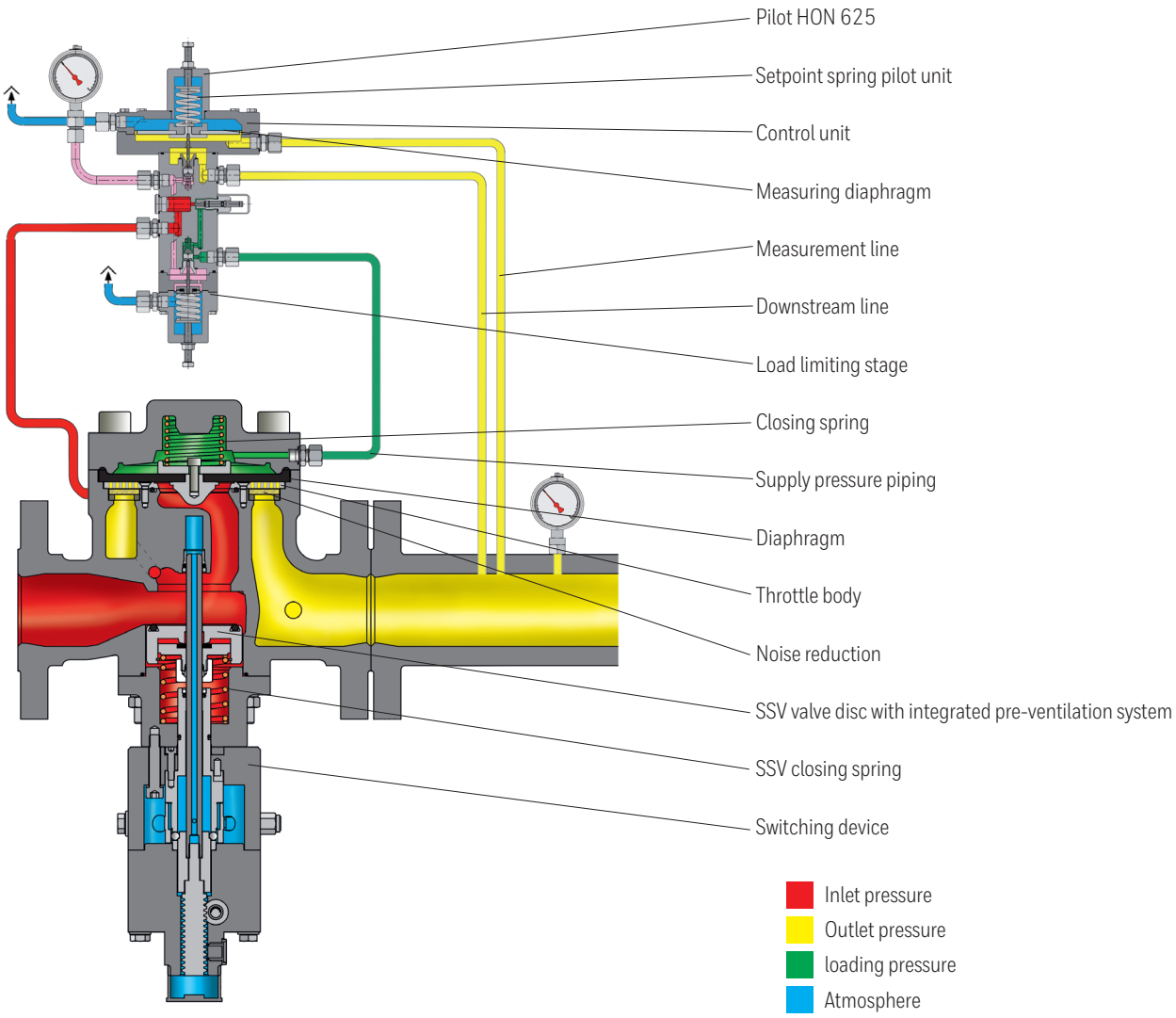


Example HON 5020 without SSV with pilot HON 630-1



In case the regulator is equipped with a safety valve, the SSV function unit can also be removed from the actuator housing by loosening the corresponding screws. The actuator is designed as a diaphragm valve. The diaphragm rests on the throttle valve with its orifices. The seal is located next to these orifices. A closing spring generates the closing force required for zero flow.

A metal foam ring can be placed under the throttle valve to reduce noise.



Example HON 5020 with integrated SSV and pilot HON 625

The outlet pressure is sent to the Pilot via the measurement line. The load limiting stage provides a constant pressure to the control unit. The diaphragm system in the control unit measures the actual value of the outlet pressure as a force on the measuring diaphragm and compares it with the force of setpoint spring. If the two values are not the same, the opening position of the throttle diaphragm is changed by adjusting the loading pressure (the outlet pressure adjusts to the target value). By using a diaphragm constructions as an actuator, the HON 5020 remains stable even at very low flow rates.
The device seals automatically when there is no load.

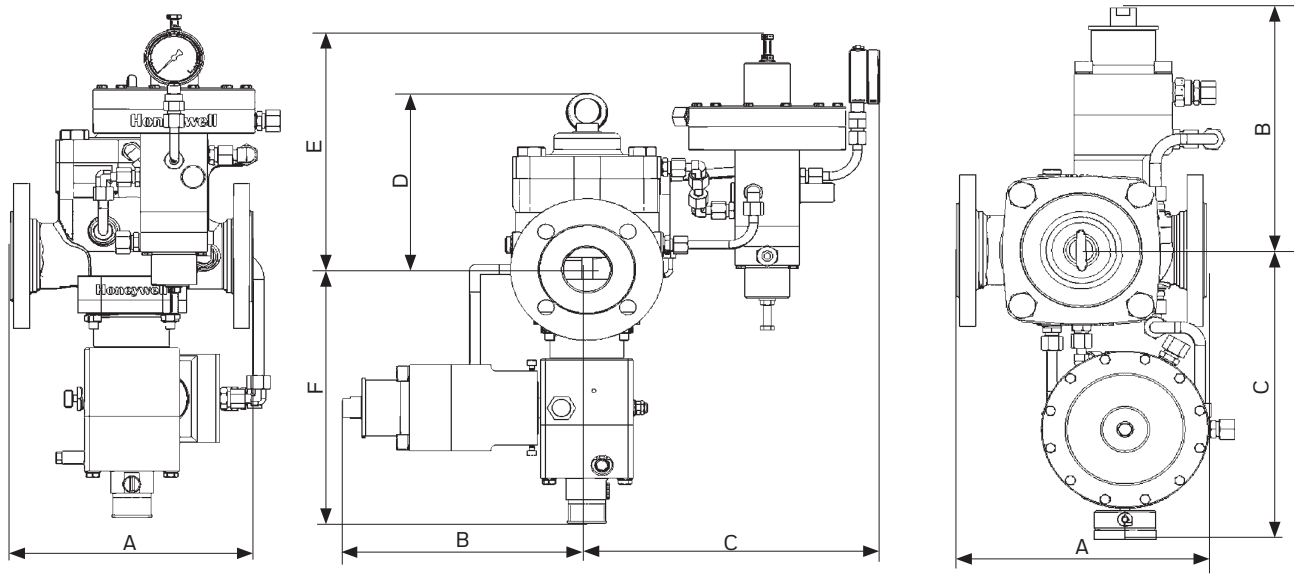
The SSV consists of an actuator with a built-in pressure compensation valve, a switching device and a control unit.

The control units have spring-loaded comparators that can be adjusted for upper and lower cut-off pressures. The safety shut-off valve (SSV) on the input side closes automatically when the pressure exceeds or falls below the set response pressure.

A description of the functions, configurations and re-engagement procedures can be found in the brochures of the SSV control devices.

Throttle body with 100%, 75%, 50% and 25% flow rate.

DIMENSIONS AND WEIGHTS HON 5020 WITH SSV

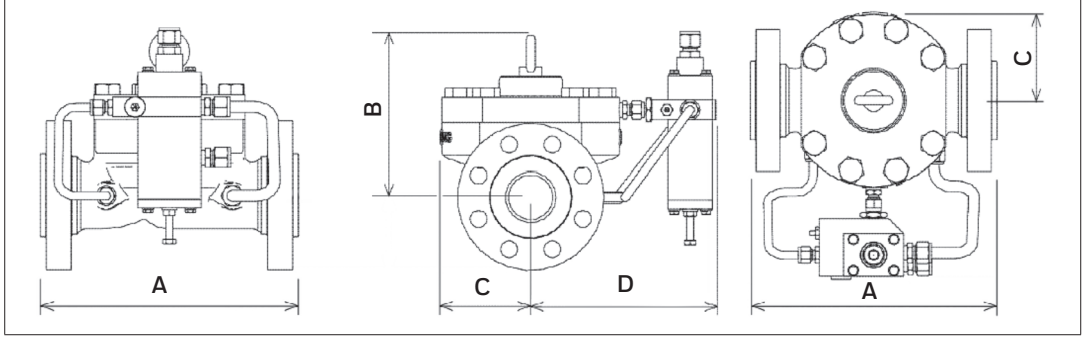


HON 5020 DIMENSIONS AND WEIGHTS (WITH SSV)

Nominal diameter	Pressure rating	A	B	C*	D	E	F	Weight Max. kg
DN 25	PN16	184	200	250	164	300	130	25
	PN25	197	200	250	164	300	130	26
	PN40	197	200	250	164	300	130	26
	cl150	184	200	250	164	300	130	26
	cl300	197	200	250	164	300	130	26
	cl600	210	200	250	164	300	130	28
DN 50	PN16	254	265	315	182	280	300	42
	PN25	267	265	315	182	280	300	43
	PN40	267	265	315	182	280	300	43
	cl150	254	265	315	182	280	300	43
	cl300	267	265	315	182	280	300	43
	cl600	286	265	315	182	280	300	48
DN 80	PN16	298	265	315	230	260	320	66
	PN25	317	265	315	230	260	320	67
	PN40	317	265	315	230	260	320	68
	cl150	298	265	315	230	260	320	64
	cl300	317	265	315	230	260	320	67
	cl600	337	265	315	230	260	320	74
DN 100	PN16	352	265	390	270	300	300	84
	PN25	368	265	390	270	300	300	88
	PN40	368	265	390	270	300	300	88
	cl150	352	265	390	270	300	300	87
	cl300	368	265	390	270	300	300	95
	cl600	394	265	390	270	300	300	107
DN 150	PN16	451	510	430	301	640	205	278
	PN25	473	510	430	297	640	205	281
	PN40	473	510	430	297	640	205	281
	cl150	451	510	430	301	640	205	280
	cl300	473	510	430	297	640	205	282
	cl600	508	510	430	302	640	205	286

*) Dimensions depend on pilot system

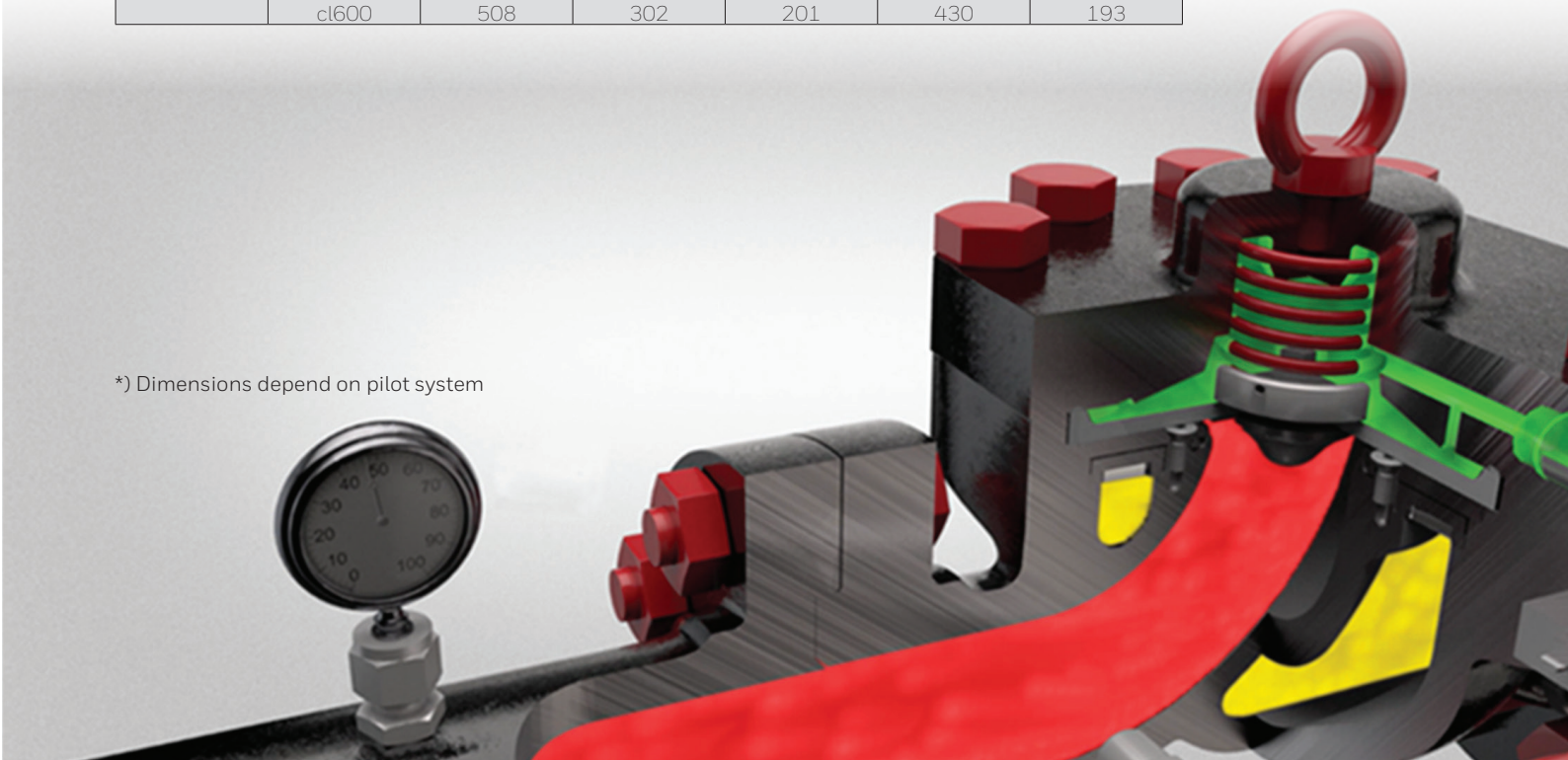
HON 5020 DIMENSIONS AND WEIGHT (WITHOUT SSV)



HON 5020 DIMENSIONS AND WEIGHT (WITHOUT SSV)

Nominal diameter	Pressure rating	A	B	C	D*	Weight Max. kg
DN 25	PN16	184	164	72	250	14
	PN25	197	164	72	250	15
	PN40	197	164	72	250	15
	cl150	184	164	72	250	15
	cl300	197	164	72	250	15
	cl600	210	164	72	250	15
DN 50	PN16	254	190	83	315	22
	PN25	267	190	83	315	24
	PN40	267	190	83	315	24
	cl150	254	190	83	315	22
	cl300	267	190	83	315	24
	cl600	286	190	83	315	29
DN 80	PN16	298	240	100	315	43
	PN25	317	240	100	315	48
	PN40	317	240	100	315	48
	cl150	298	240	100	315	43
	cl300	317	240	100	315	48
	cl600	337	240	100	315	67
DN 100	PN16	352	270	145	390	69
	PN25	368	270	145	390	77
	PN40	368	270	145	390	77
	cl150	352	270	145	390	69
	cl300	368	270	145	390	77
	cl600	394	270	145	390	93
DN 150	PN16	451	301	192	430	130
	PN25	473	297	192	430	147
	PN40	473	297	192	430	147
	cl150	451	301	192	430	130
	cl300	473	297	192	430	147
	cl600	508	302	201	430	193

*) Dimensions depend on pilot system



For more information

To learn more about Honeywell's Advanced Gas Solutions, visit www.honeywellprocess.com or contact your Honeywell account manager.

Honeywell Process Solutions

Honeywell Gas Technologies GmbH
Osterholzstrasse 45
34123 Kassel, Germany
Phone: +49 (0)561 5007-0

1250 West Sam Houston Parkway South
Houston, TX 77042
Phone: 1-602-293-1866 Option 4

Emaar Business Park, Building 2
Sheikh Zayed Road, PO Box 232362
Dubai, United Arab Emirates
Phone: +971 4 4505800

1st Floor, Block B, No. 10, Jalan Bersaru 13/4
46200, Petaling Jaya Selangor DE, Malaysia
Phone: +603 7626 5700

A1 Building, C&W Industry Zone
No. 14, Jiuxianqiao Rd., Chaoyang District
Beijing, P.R. China 100015
Phone: +86 10-56696001
www.honeywellprocess.com

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