HUG knowledge 2017 Honeywell Users Group

MOVING THINGS AROUND - LATEST TRENDS IN HONEYWELL FLAGSHIP REGULATORS

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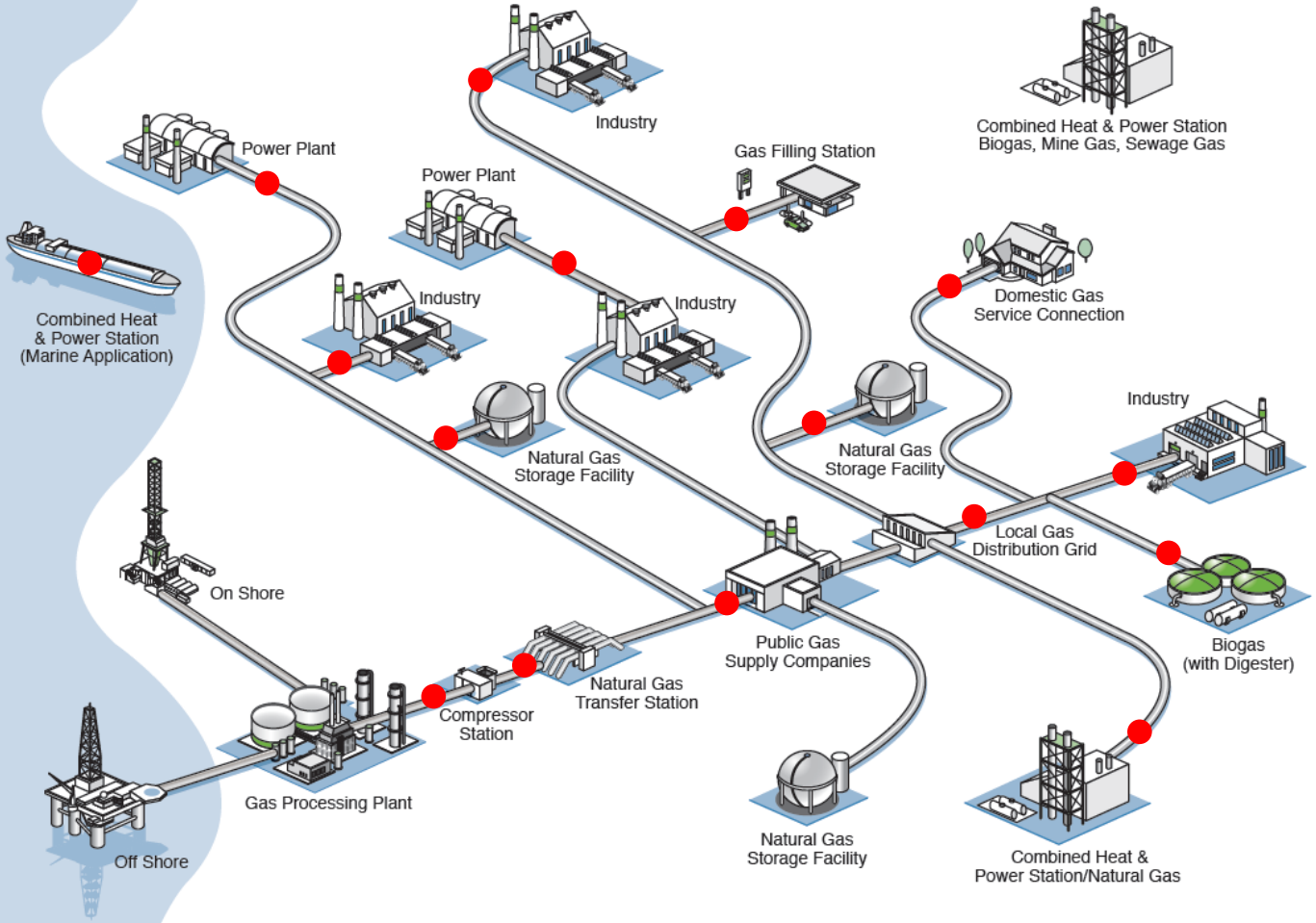
Agenda

- What do we sell?
- Flagship Products
- HON 5020
- HON R100 NG
- HON 512, class 150
- Q&A

Where Do Honeywell Gas Regulators Play In The Gas Value Chain?



Application	Product										
	HON 512	HON R100	HON 530	HON C210S	HON 711	HON HSV086	HON 5020	HON 502/3	HON 402	HON 370/372	GAS TRAINS
Compressor Stations			●	●	●	●					
Gas Pressure Reducing Skids	●	●		●	●	●	●	●			
Gas Storage			●	●	●	●					
Gas Power Stations (on Transmission Network)	●	●			●	●	●	●			
Industrial & Commercial (on Transmission Network)	●	●			●	●	●	●			
City/Regional Gas Suppliers	●	●			●	●	●	●			
Local Distribution Stations									●	●	
Industrial & Commercial Utilization									●	●	
CHP Station Marine									●		●
CHP Station Land (Natural Gas)									●		●
CHP Station Land (Biogas, Mine Gas, Sewage Gas)									●		●

Complete Regulator Portfolio

Sub Verticals

covering the whole natural gas value chain

Transmission

Distribution

Power generation

Commercial/ Industrial Utilization

Pressure Classes

From High to Low

High

350 bar/5000 psi

20 bar/300 psi

Medium

1 bar/15 psi

Low

0.1 bar/1.5 psi

Designs

covering all possible customer needs

Axial

Globe

Membrane

Axial/Membrane

Pilot operated

Direct

Offerings

from products, productized solutions to engineered solutions*)

Single product

Gas Train

Buried Modules

Regulator Stations

Automation

*) *Implementation of gas solution projects is handled by Process Advanced Solutions (PAS)*

Global Regulator Supplier Across the Gas Value Chain

Flagship Products

***Flagship Portfolio**: a selection of products from the Honeywell gas regulator portfolio which covers the majority of the applications*

Pressure Range		High Pressure (from 20 Bar/300 psi up to 100 Bar/1500 psi)										Medium (up to 20 Bar/300 psi)	
Application		Transmission, Storage, Distribution, Power, Industrial							Distribution, Industrial			Distribution	
Product Category		Regulator			Flow Control Valve		Safety Shutoff Valve		Regulator with option of integrated SSV			Regulator - Direct and with Pilot	Underground module
Product	**Picture**												
	Name	HON 512	HON R100	AFV	HON 530-E	HON C210	HON 711	HON HSV086	HON 5020	HON 502/3	HON 402	HON 370/2	Orpheus
	Type	Axial	Globe	Axial	Globe/Axial	Globe	Axial	Globe	Membrane	Membrane	Membrane	Globe	Axial

Advantages of the *Flagship portfolio*:

- **Easier to understand** for customers, **easier to sell** for (new) sales teams/channel partners
- Allows to **optimize sales process** for these products (sales collaterals, cost optimization, delivery times etc.)
- Focus on fewer products **lowers the cost-to-serve** – this will allow **more competitive pricing** for flagships

The remaining portfolio remains and constitutes one of the key strengths of PMC gas. The ability to address the most diverse customer needs by having a complete offering and will continue to be sold in home markets.

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New Products

Honeywell HON 5020 Gas Pressure Regulator

Product Overview

- Honeywell HON 5020 Gas Pressure Regulator is a device for the most demanding gas regulation applications.
- It is designed to address today's customer challenges - reduce total cost of ownership and to achieve more efficiency in operations while meeting individual operational requirements.
- The HON 5020 is used as a regulator in standard or monitor/active setup or in a back pressure relief application.
- Target applications are distribution and industrial pressure reducing stations up to a max. operation pressure of 1500 psi.
- As a pilot operated regulator the HON 5020 provides excellent regulating accuracy.
- Thanks to the top entry design and reduced number of internal parts the regulator is easy to maintain thus safes time and money for the operator.

Save Time and Money

Honeywell’s unique gas pressure regulator:

- Includes a small number of parts, ensuring quiet operation and easy maintenance.
- Offers top entry access to all internal parts

Click here to see the full clip: www.honkassel.de/hon5020

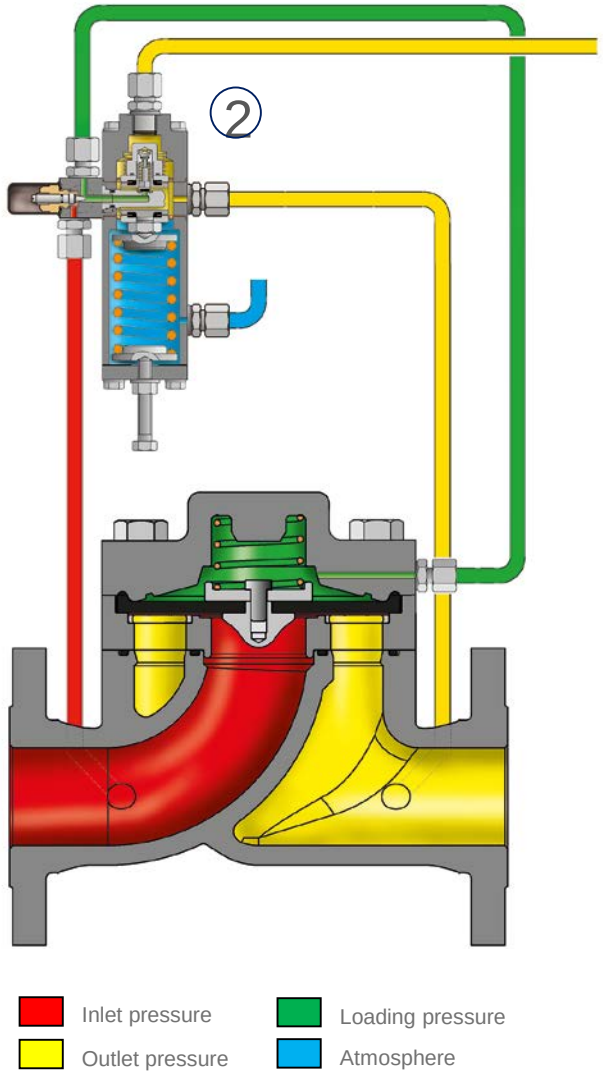
Honeywell HON 5020

Mode of Operation

- The HON 5020 is composed of the main valve (1) unit and the pilot (2). A fine filter is located in front of the pilot to protect it against dirt.
- The main valves only wearing part, the diaphragm (3), can be subjected to a quick inspection or service by simply removing the upper part of the housing; it is not needed to remove the actuator housing from the controlled system. The diaphragm supports itself on a grid plate. An all-around sealing edge is located in front of the slots of the grid plate. A closing spring generates the necessary sealing force for zero shut-off.
- The pilot operating as the „brain“ of the system is controlling the loading pressure to open or close the main valve.

Click to **close**

Click to **open**



Honeywell HON 5020

Typical Applications

Honeywell’s gas pressure regulator HON 5020 is designed for use in gas pressure reduction service in municipal distribution, gas transmission and industrial power plant applications. Featuring state-of-the-art external pilot operation for safe and accurate control of outlet pressure, It set the standard for precision and reliability.

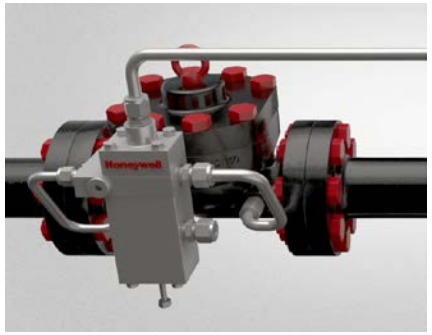
- Gas distribution and transmission
- City gate/municipal distribution
- Gas-fired power plants
- Gas processing plants
- Commercial/industrial service

Honeywell HON 5020

Typical Applications

Pressure Reducing valve

The outlet pressure is kept on a constant level independent of demand changes or inlet pressure deviations. The pilot is connected to the downstream pipe to sense outlet pressure deviation from the set point of
the pilot and thereupon adjusting position of the main valve.

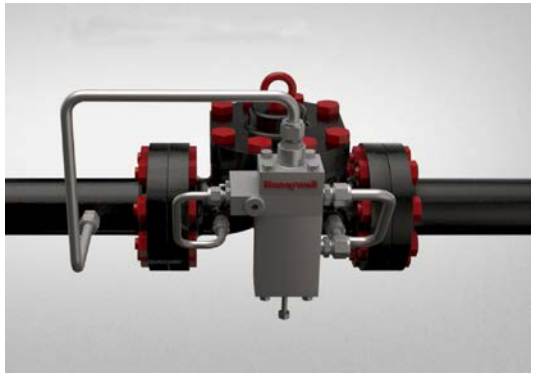


Monitor Active System

Two HON 5020 regulators are installed in a serial setup. Under normal conditions the active regulator (2nd valve) is controlling the downstream pressure while the monitor regulator is fully opened in standby mode. In case the active regulator fails, the monitor regulator will take over operation
at a slightly higher pressure.

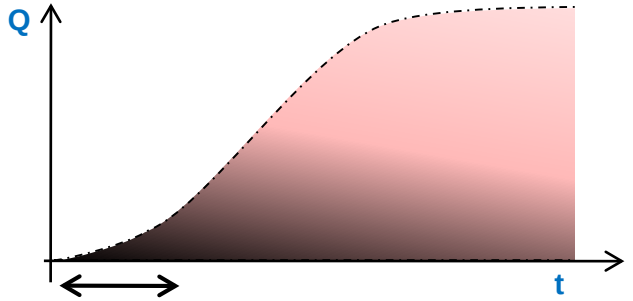
Back Pressure Valve

In a back pressure application the pilot is connected to the upstream pipe. It opens in case the upstream pressure reaches the adjusted set point and closes automatically if the upstream pressure is less than the set point. For this application a similar pilot is used with reverse functionality.



A Superior Technology

- Honeywell's HON 5020 gas pressure regulator provides accurate and reliable pressure reduction for a wide range of gas industry operations. This innovative regulator improves upon existing technologies with its precision grid plate design.
- A reliable and precise outlet pressure regulation is ensured even at low flow and during start up phase.
- The diaphragm valve/grid plate design is also available with reduced flow options to be able to address changing customer requirements.



Smooth opening characteristic thanks to optimized grid plate design

Trial Runs Confirmed Honeywell's Best in Class Technology

One of the largest US gas distribution companies replaced a high pressure regulator from his number 1 supplier with a HON 5020

These were his findings:

- Easy swap-out of the HON 5020 against the competition product and very easy installation and commissioning
- The HON 5020 passed successfully a long time field without any glitch! Customer was pleasantly surprised by the extraordinary low noise emission of the HON 5020 compared to competition!
- The HON 5020 had excellent regulating performance
- A high sulfur content which caused malfunction of the regulator from the competition led to multiple on-site emergency services. The sulfur content did not influence the Honeywell regulator which will lead to less downtime and reliable operation

Gas Pressure Regulator HON 5020

Technical Data

• Sizes:	1“ - 6“
• Pressure classes:	PN16, PN25, PN40, CL150, CL300, CL600
• Flange connection:	ASME and DIN
• Outlet pressure range:	0-100 bar
• Temperature range:	-20°C to 60°C
• Accuracy class:	up to AC1
• Lock up pressure class:	up to SG5

HON 5020 at a Glance

- Top entry design reduces maintenance time
- In line maintenance with minimal parts (membrane) reduces maintenance time and cost
- Slotted grid plate design for optimal accuracy during low flows and reduced noise emissions
- Compact size and lifting hook for easy installation
- Completely pre mounted pilot/filter – ready for installation
- Easy operation - Independent operation side (pilot mounting on both sides)
- High flow capacity due to optimized flow characteristics and body design
- Less downtime
  - High stability and functionality at low temperatures
  - High accuracy and tight lock up pressure
  - No emissions
- Low differential pressure required for max flow capacity
- Integrated noise reduction available

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HON R100 NG

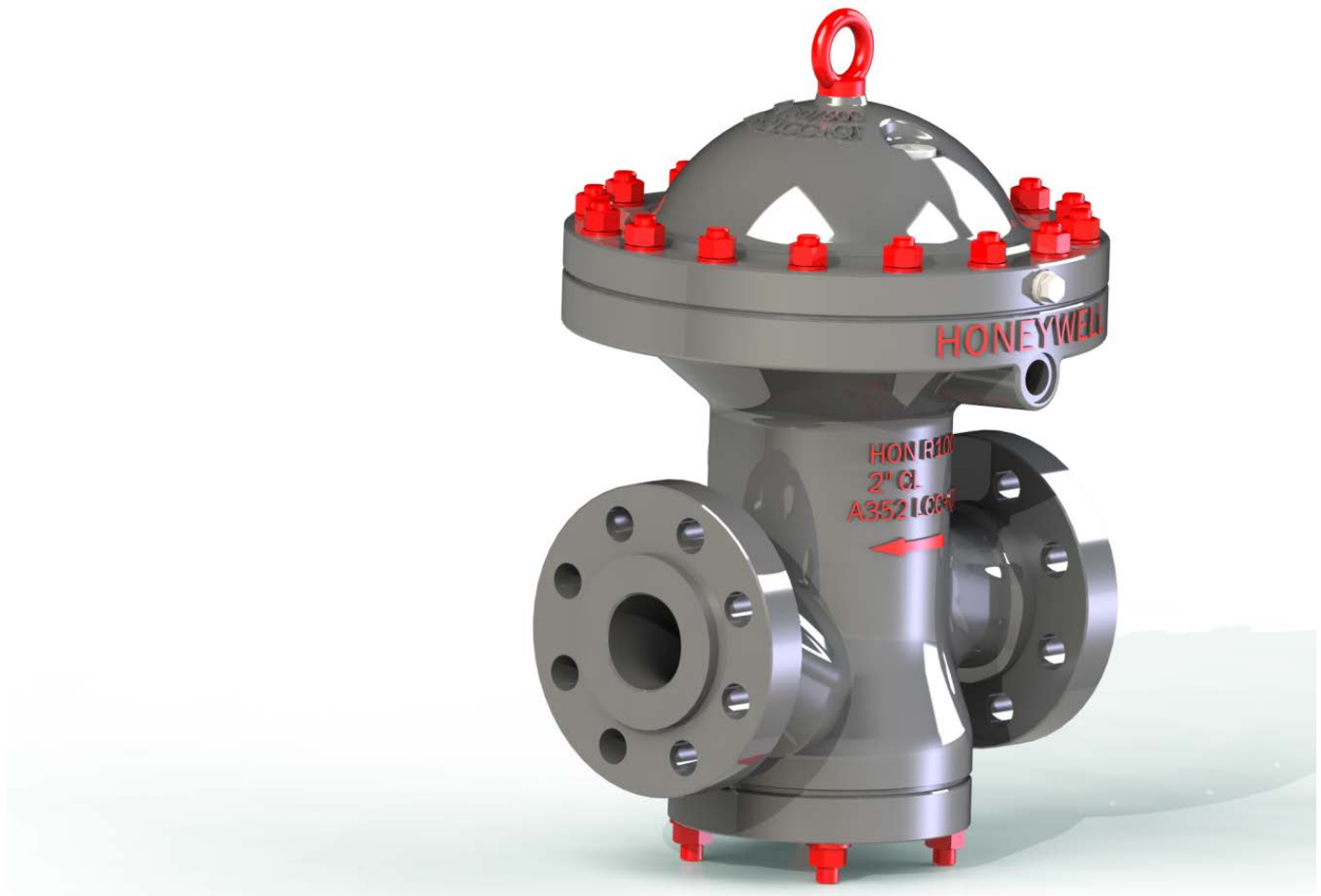
Gas Pressure Regulator R100 Next Generation

R100 NG

- Launch date: Q1 2018

Scope

- Improved performance
- More functionality
- Better maintainability
- NACE option
- Size 1“ to 8“
- Class 150; 300; 600



Target Applications

- Transmission
- Sub-transmission
- Distribution
- Power plants

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Gas Pressure Regulator R100 Next Generation

R100 NG

Available in three versions

- Standard Regulator (fail close)
- Active Regulator (fail open)
- Monitor Regulator (fail close) with pressurized valve plate

Gas Pressure Regulator R100 Next Generation

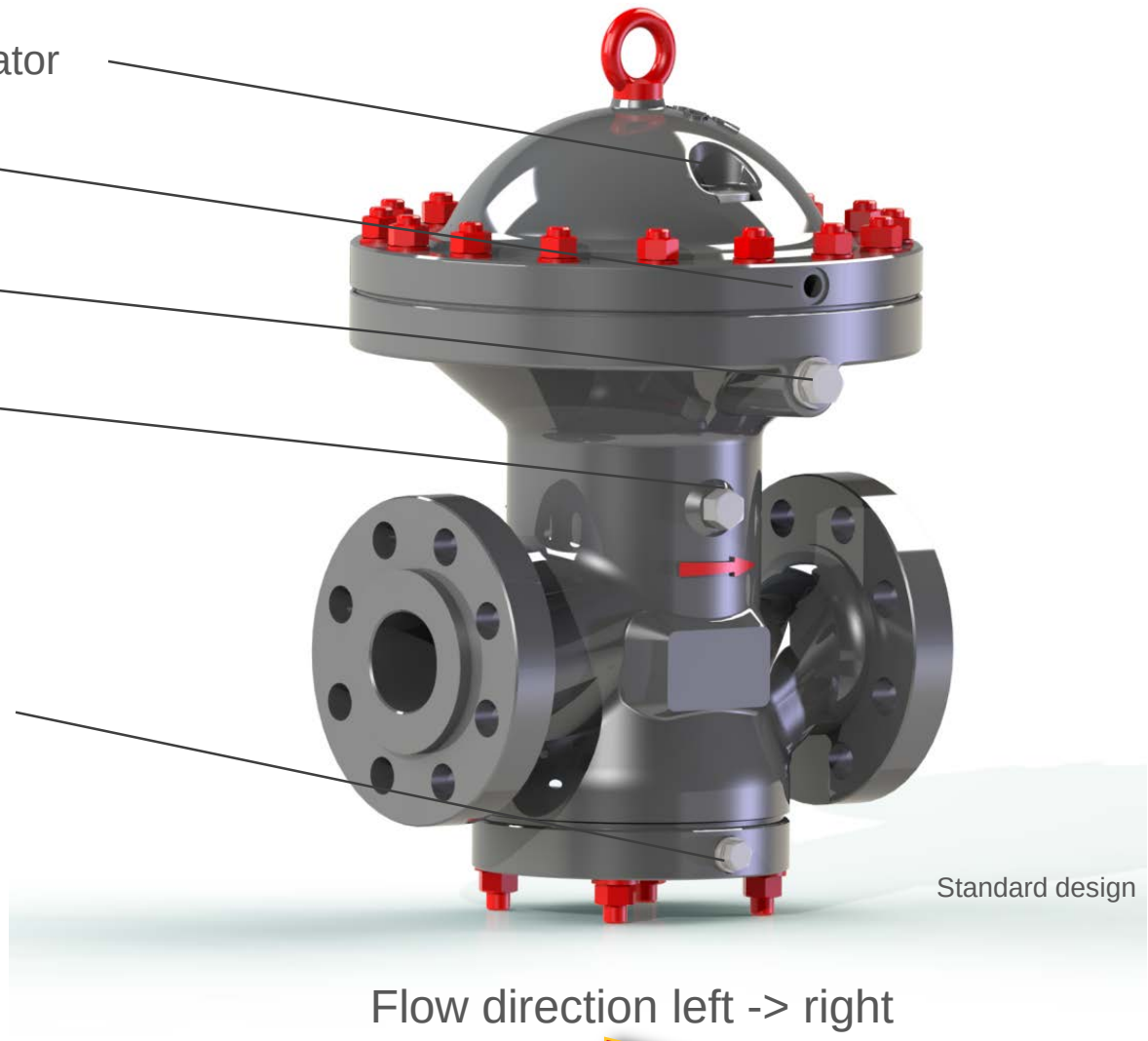
Optional optical position indicator

Loading pressure connection

Return line connection

Maintenance plug

Pressure connection used in monitor installations and SO



Standard design

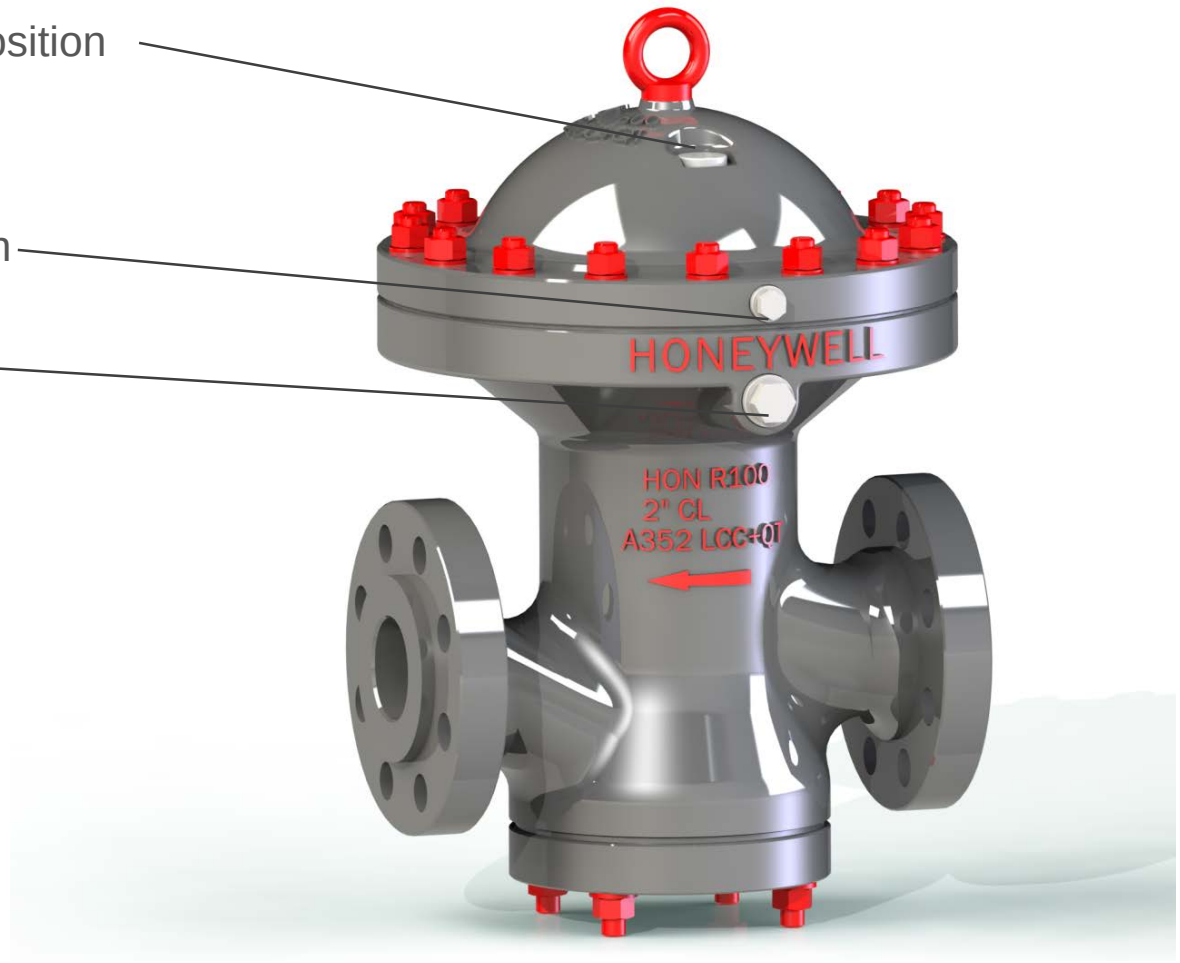
Flow direction left -> right

Gas Pressure Regulator R100 Next Generation

Optional electrical remote position indicator

Loading pressure connection

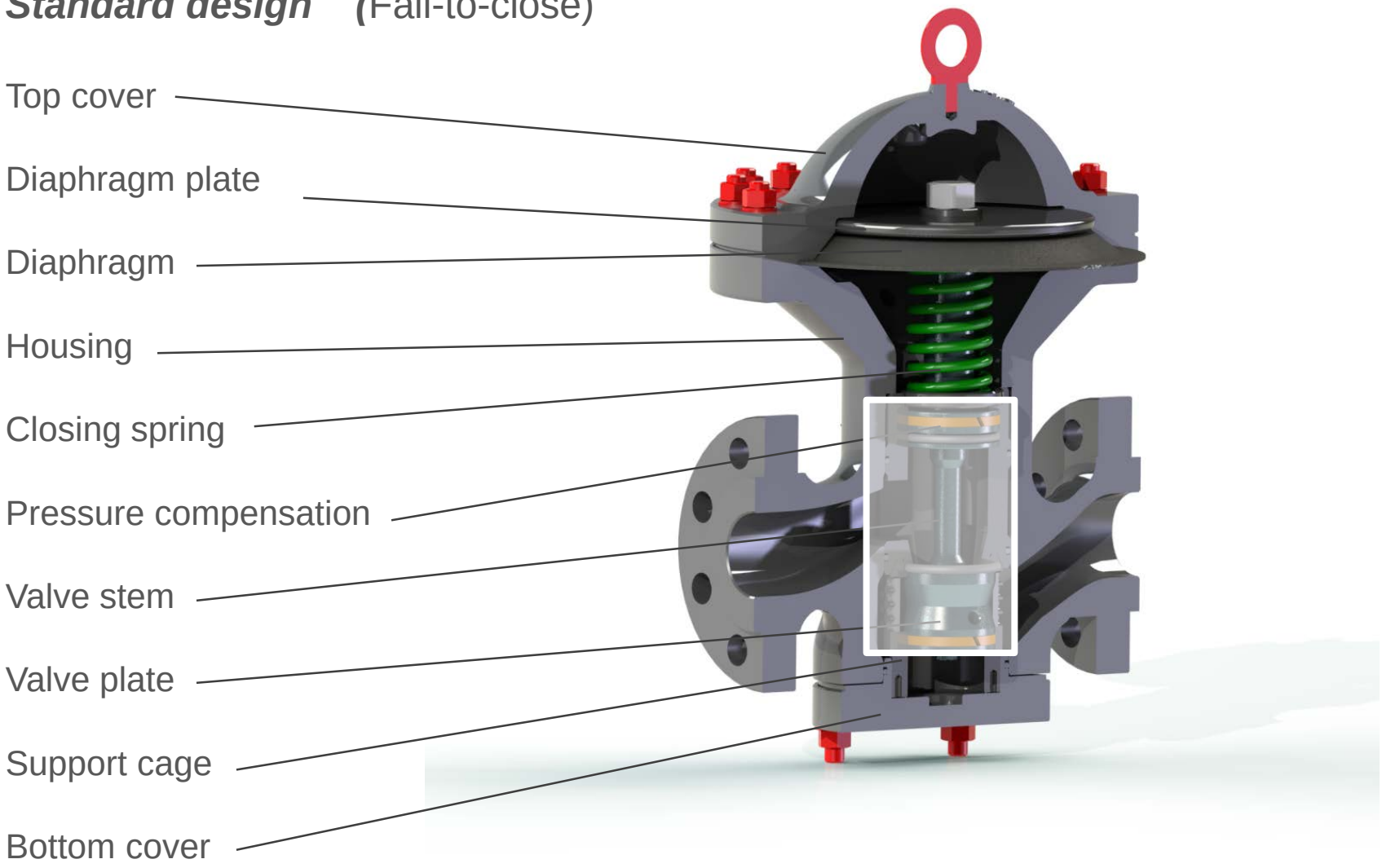
Return line connection



Flow direction right -> left

Gas Pressure Regulator R100 Next Generation

Standard design ***(***Fail-to-close)



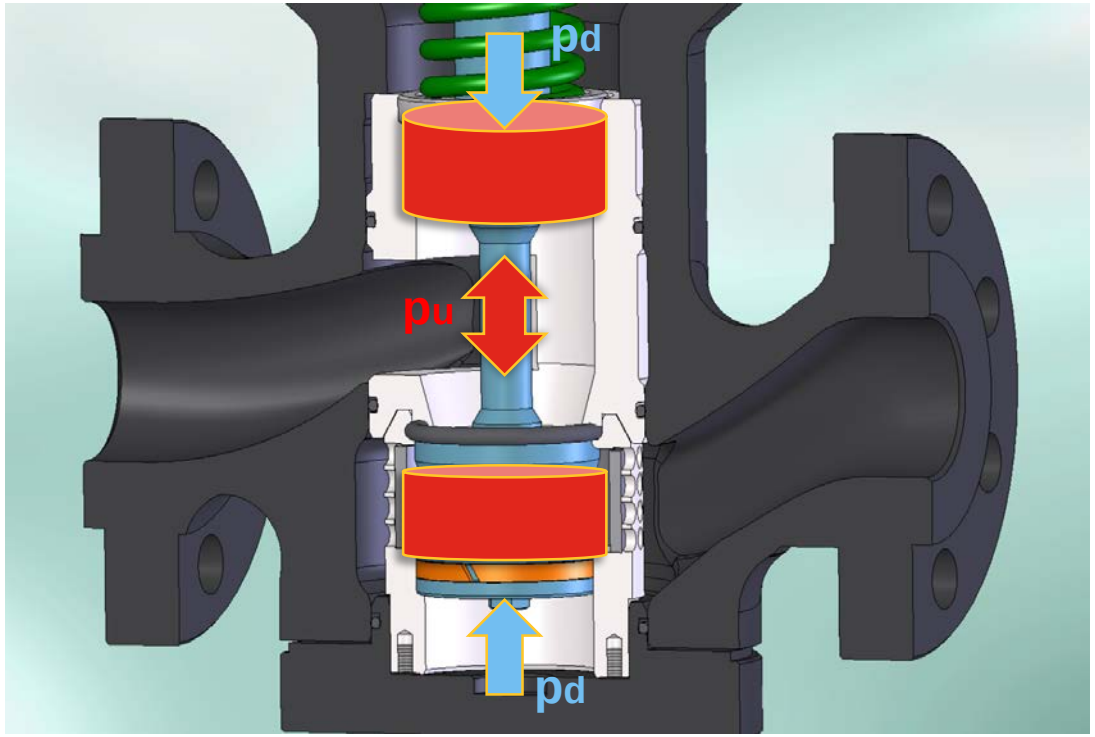
Gas Pressure Regulator R100 Next Generation

Standard design ***(***Fail-to-close)

Valve details

Fully pressure compensated

Inlet pressure deviations
do not influence
the accuracy



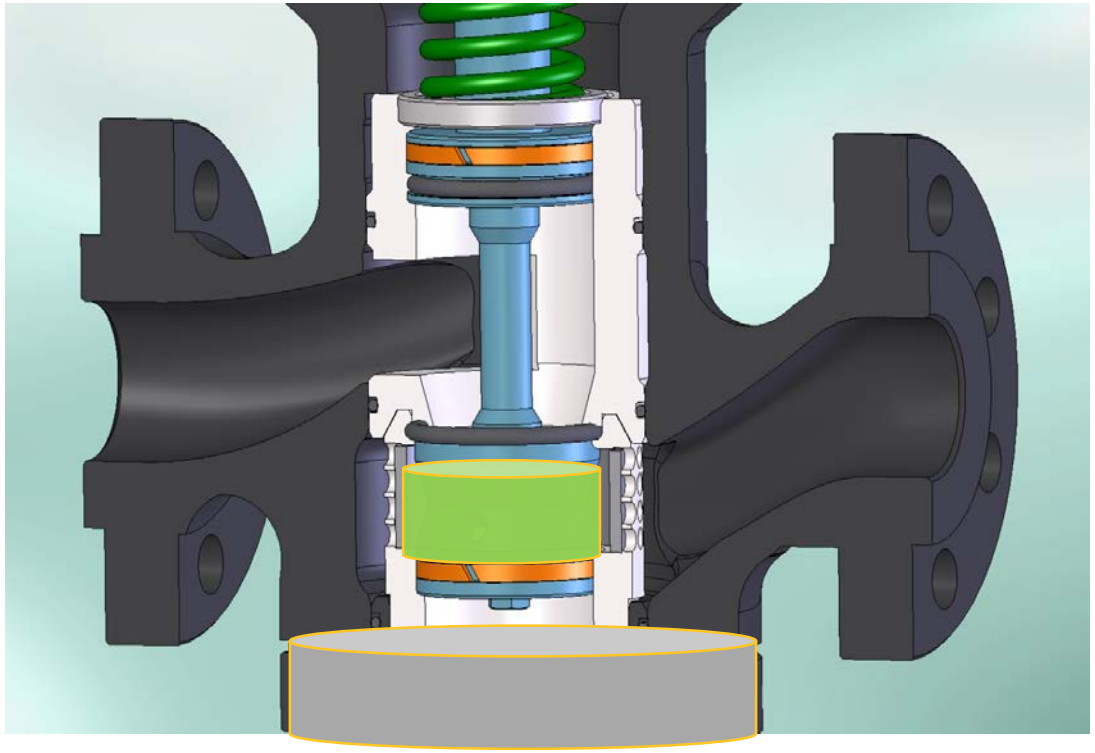
Gas Pressure Regulator R100 Next Generation

Standard design ***(***Fail-to-close)

Valve details

Optimized maintenance

- Valve plate and valve seat can be easily accessed removing the bottom cover
- Valve seat can be Inspected & maintained w/o dismantling the whole regulator



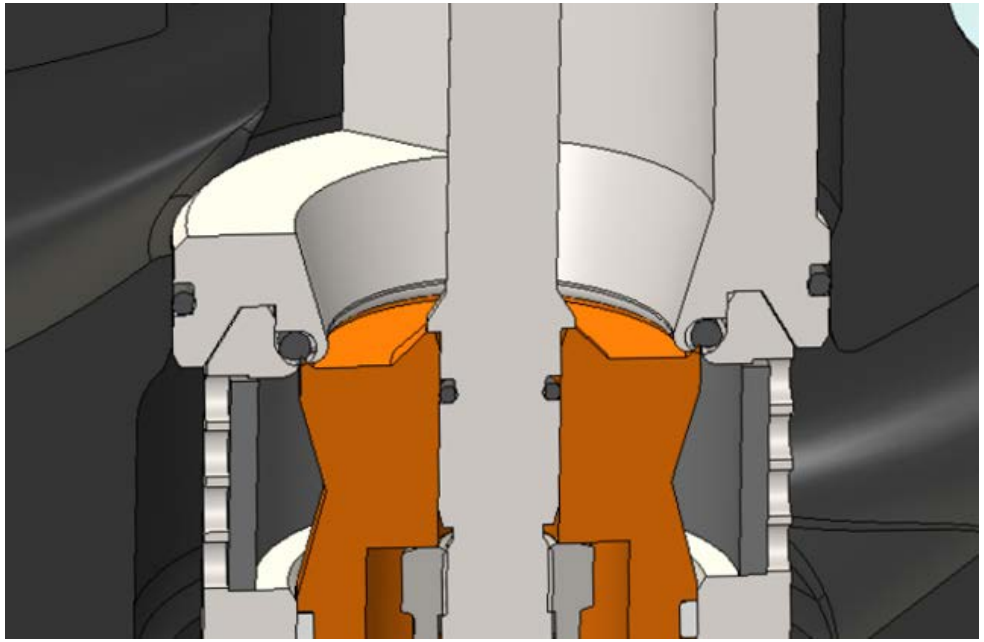
Easy Accessability of Wear and Tear Parts Reduces Maintenance Time

Gas Pressure Regulator R100 Next Generation

Valve details

Optimized maintenance

- Long maintenance interval due to the erosion-free enclosure of the valve seat sealing - Sealing outside of flow

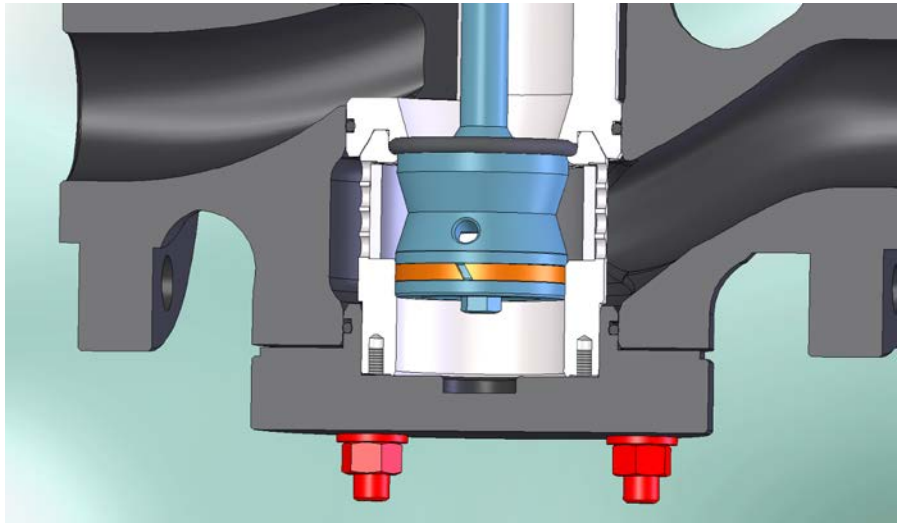


Less Downtime and Tight Lock-Up Pressure Due to Special Valve Seat Design

Gas Pressure Regulator R100 Next Generation

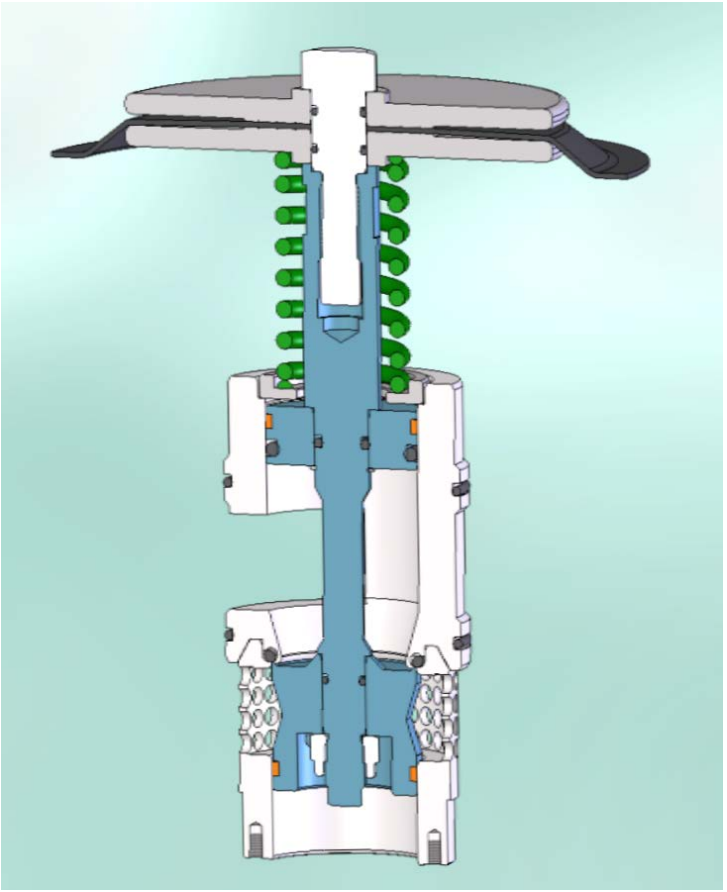
Standard Design

Fail-to-Close



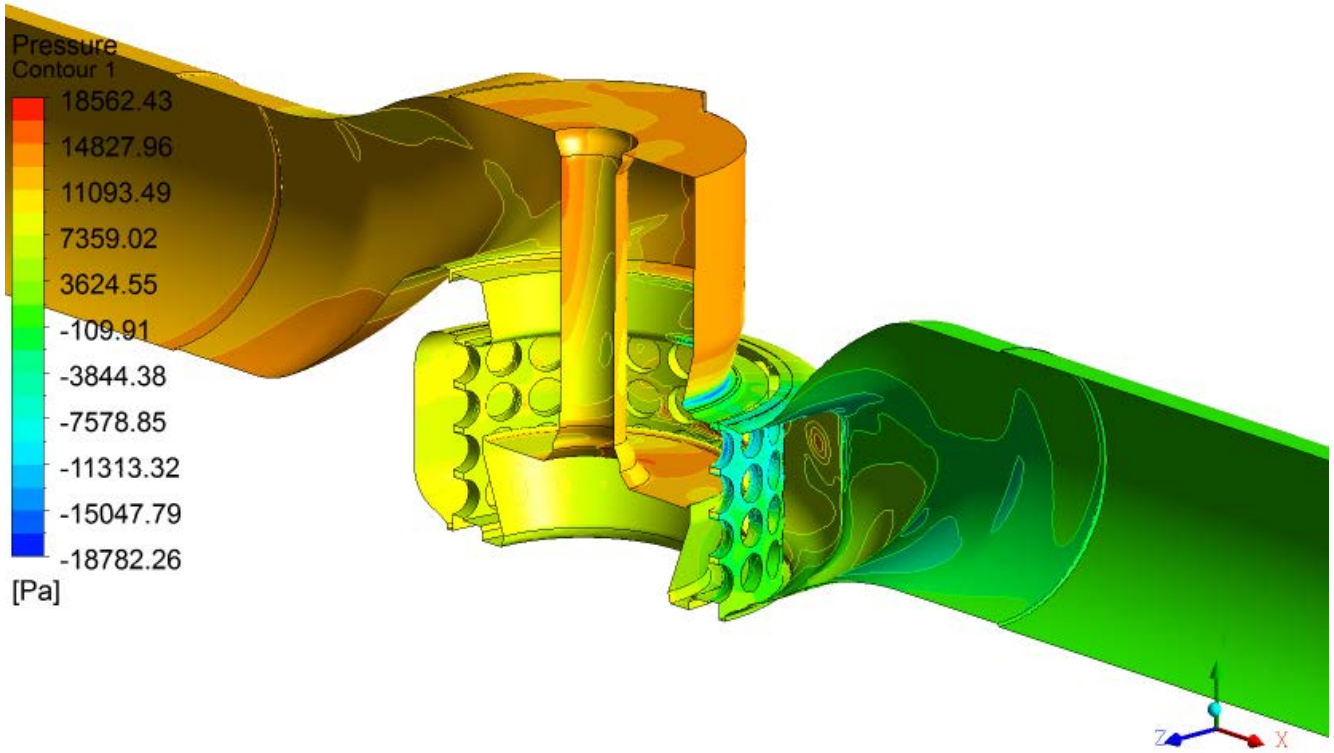
Standard Design

Internal Parts

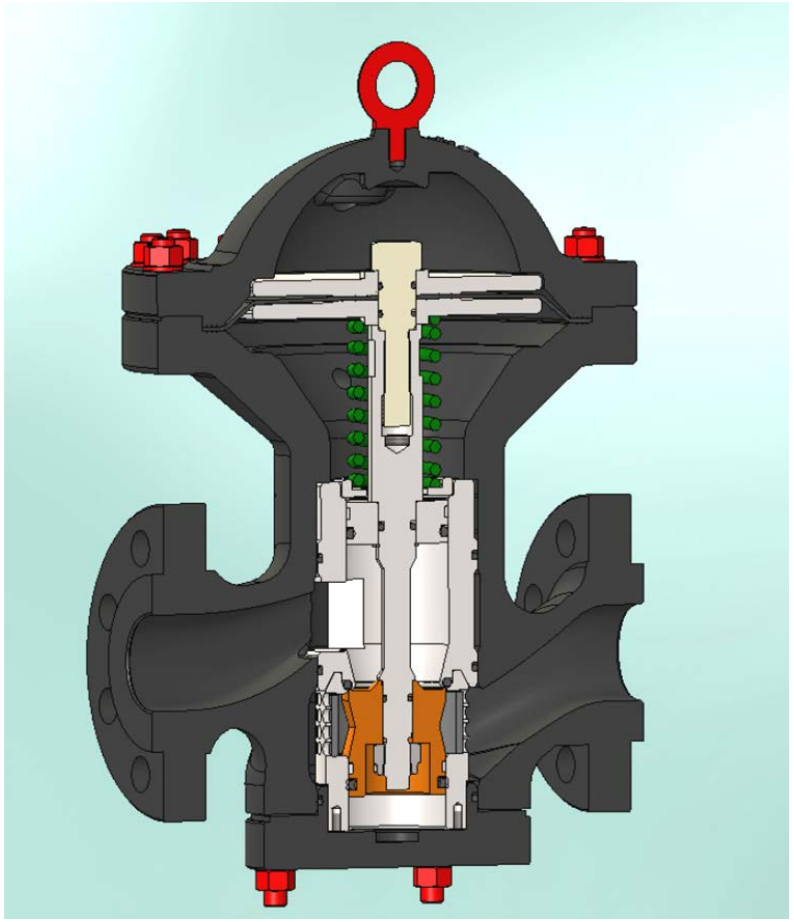


CFD (*Computational Fluid Dynamics)* – Simulation

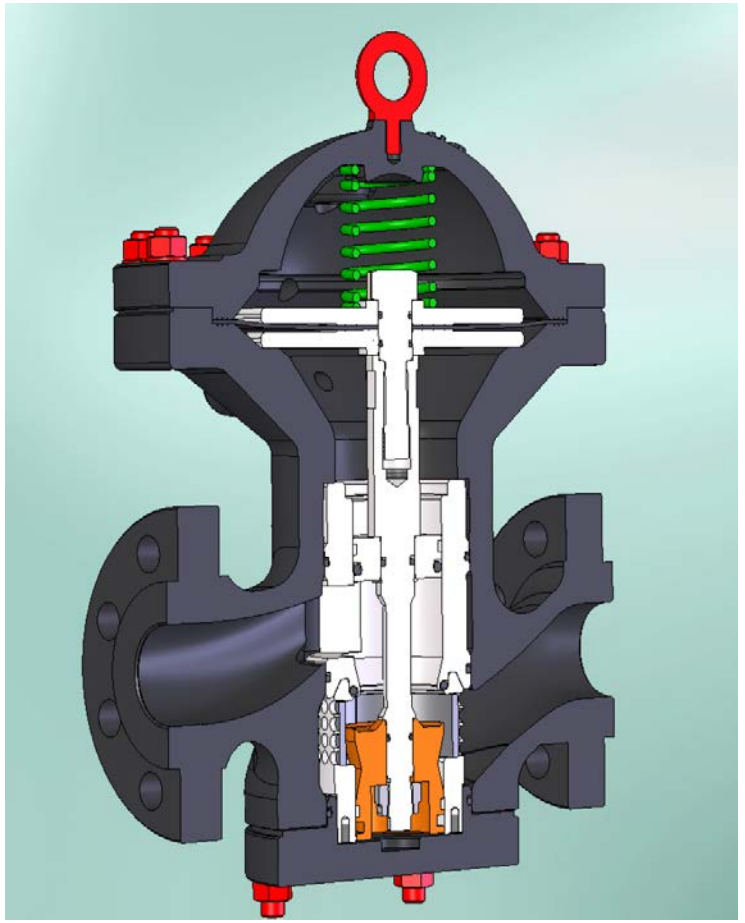
KG-Value				
	Old design		New design	
size	w/o silencer	with silencer	w/o silencer	with silencer
2“ DN50	1850	1140	1900	1500



Gas Pressure Regulator R100 Next Generation

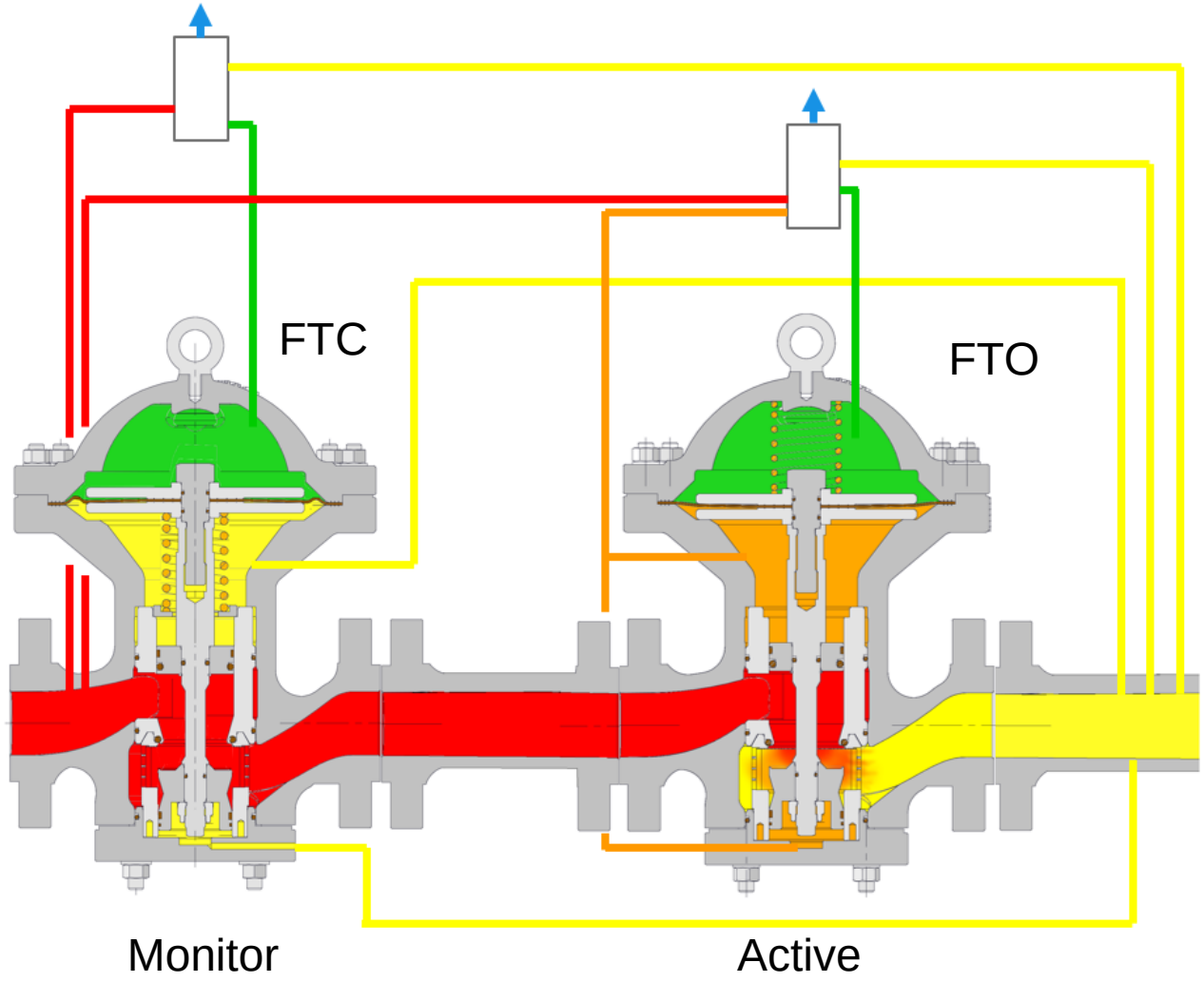


R100 NG Monitor Regulator
Fail-to-close



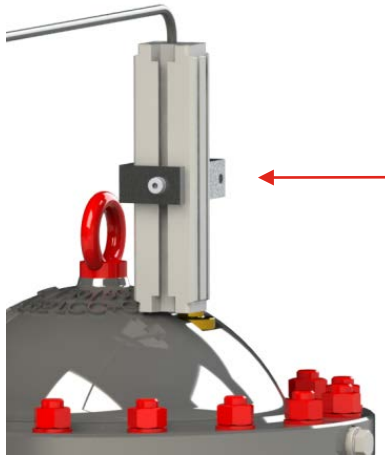
R100 NG Active Regulator
Fail-to-open

Monitor/Active Configuration



Fully open Monitor configuration

Gas Pressure Regulator R100 Next Generation

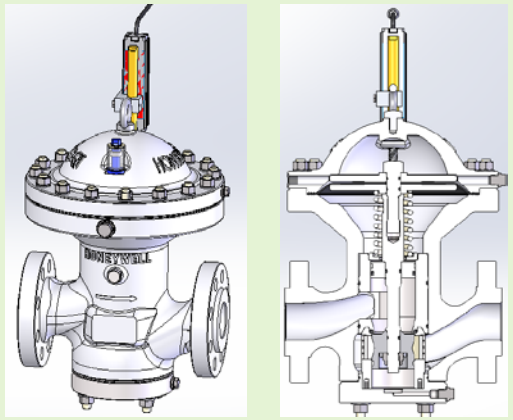


Electric remote position indicator

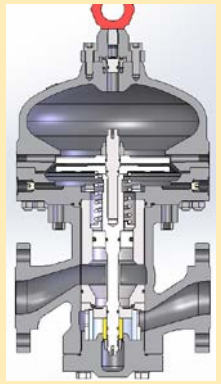
Optical local position indicator

HON R100 New Design - Overview

NEW



OLD



Customer Benefits

- Weight reduced by approximately 45% - easier to ship/install/handle/maintain
- More Compact – Height reduction by approximately 25%
- Fewer parts – quicker/easier maintenance
- Easier to access – quicker/easier maintenance
- Improved capacity – typically 10%
- Improved regulating behaviour
- Simplified, more compact design position indicator

	Drilling Parts Quantity	Casting Parts Quantity	Fastening Elements Quantity	Sealing Elements Quantity	Height (without PI) mm	Weight (2") Kg
OLD	13	4	45	10	590	106
New	10	2	22	8	455	60
Reduction(%)	**23%**	**50%**	**51%**	**20%**	**23%**	**43%**

Simplified Design – Easier to Install, Easier to Maintain, Improved Characteristics

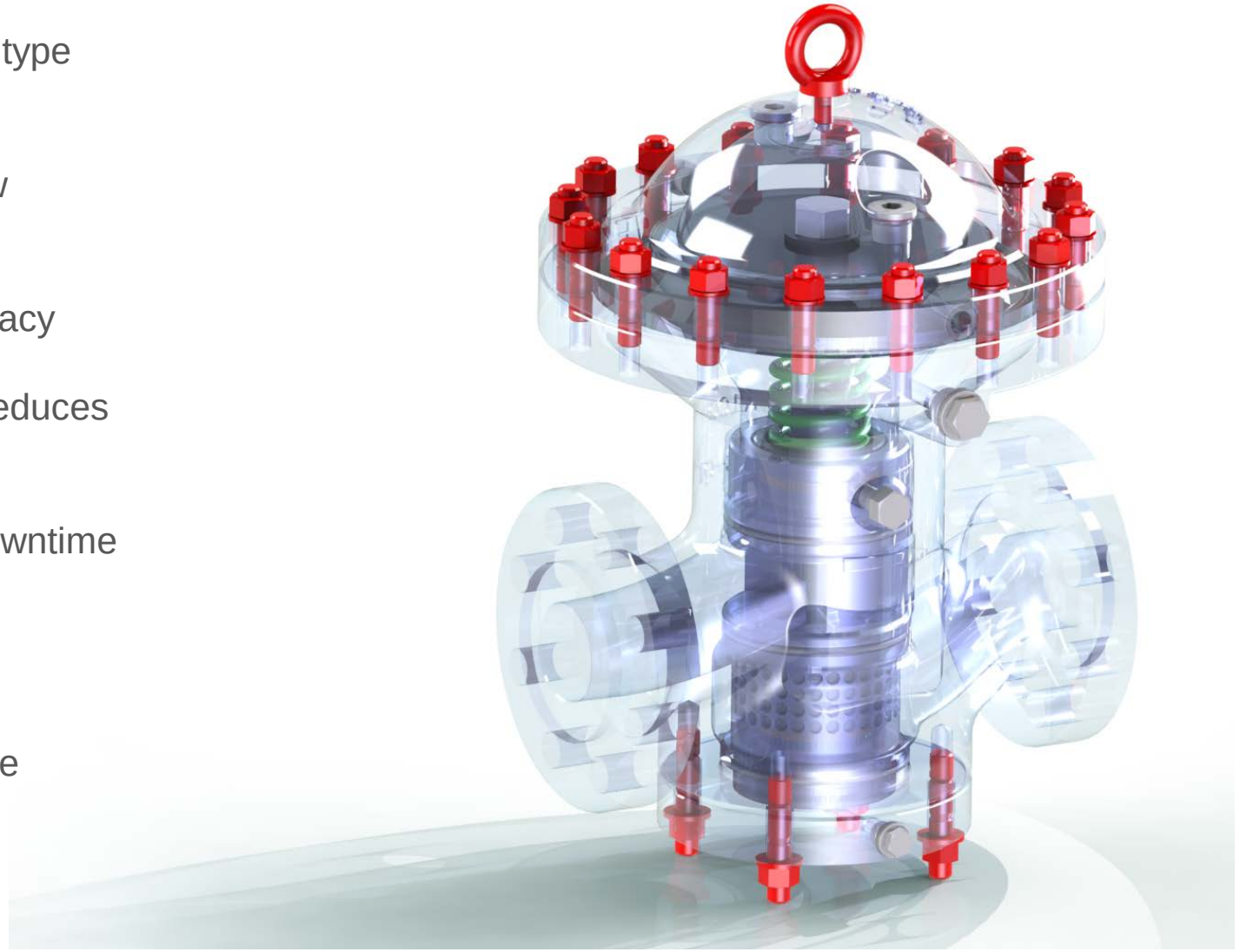
Gas Pressure Regulator R100 Next Generation

Technical Data

- Sizes: 1“-8“ (NG design), 10“- 16“ (classic dome type design)
- Pressure classes: CL150, CL300, CL600
- Outlet pressure range: 0-100 bar
- Operation mode: fail open / fail close in monitor or active design
- Temperature range: -20°C to 60°C or -20°C to 100°C
- Pilot: P095 (pneumatic or remote controlled)

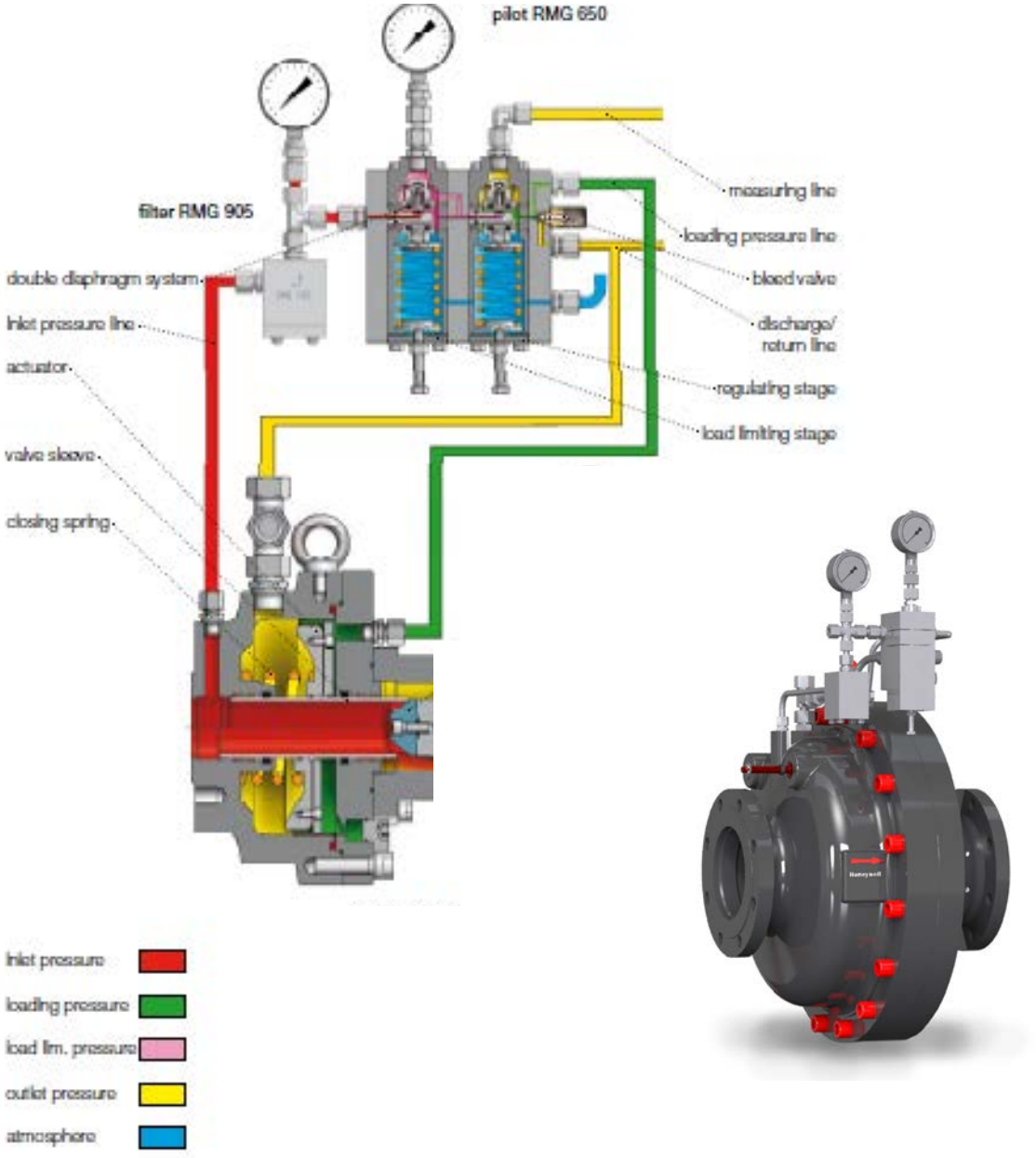
R100 NG at a Glance

- In-line maintenance due to globe type design
- Flow optimized design – high flow capacity
- Balanced valve seat – high accuracy
- Maintenance optimized design- reduces time/money
- Long life seat design- reduces downtime and tight lock-up
- Low noise – internal silencer
- Monitor/Active ; fail-open/fail-close
- SIL 2 certification
- Optional NACE version



HON 512 class 150

HON 512, Class 150 Gas Pressure Regulator



Product Overview

- Inlet pressure up to 20 bar
- Flanges according to PN 16, ANSI 150
- KG-value up to 55,000 m3/(h * bar)
- Accuracy class AC1
- Sizes DN 25, 50, 80, 100, 150, 200, 250
- Pilot operated – modular set of pilots available
- Available with internal noise reducing features
- PED and EAC certified
- SIL 3 certified

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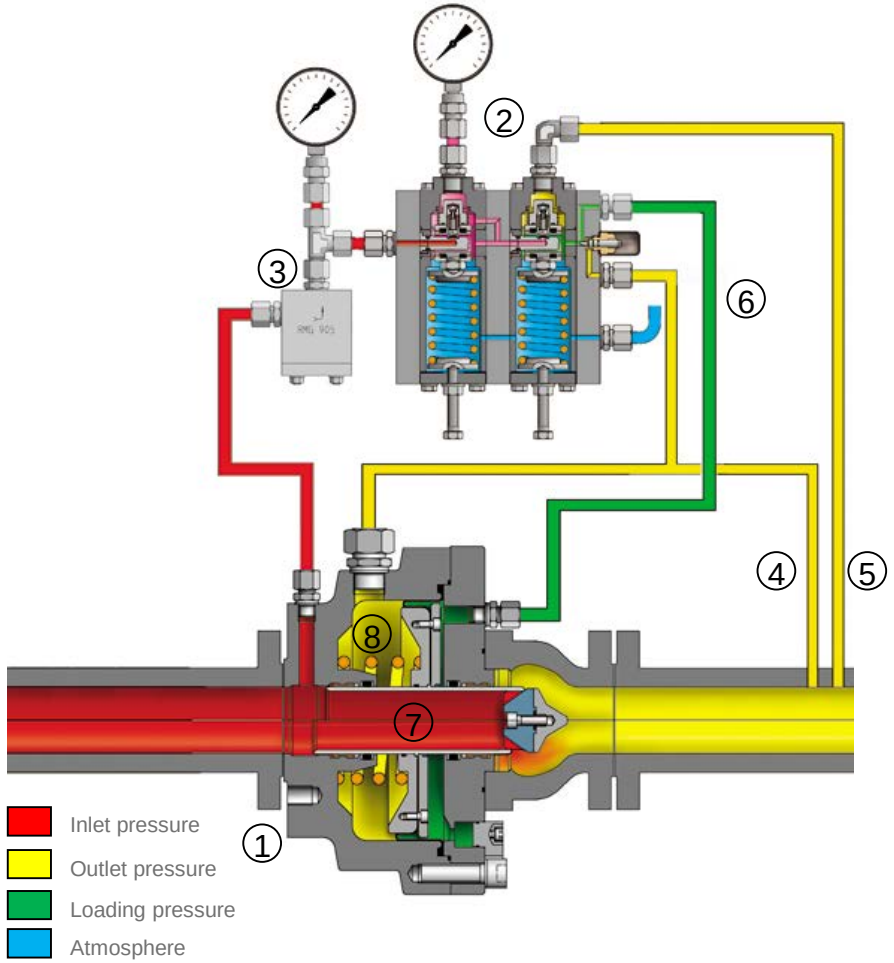
Honeywell HON512

The elements of the Regulator



① Main valve HON512

② Pilot HON650

③ Fine filter

④ Return line

⑤ Measuring line

⑥ Loading pressure line

⑦ Valve sleeve

⑧ Closing spring

Maximum Flexibility

Pilots HON 650 series

Pneumatic control

Electric setpoint adjustment (automation system)

Outlet pressure control and differential pressure control for e.g. meter protection

Electro-pneumatic control for complex automation tasks

Can be combined with a modular system of pilots

Honeywell HON512

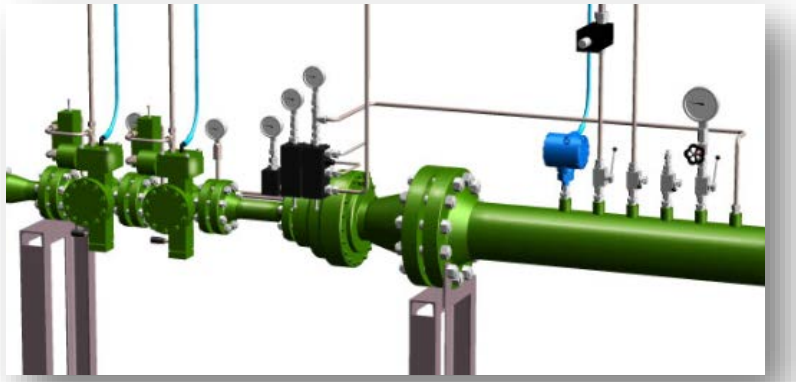
Typical Applications

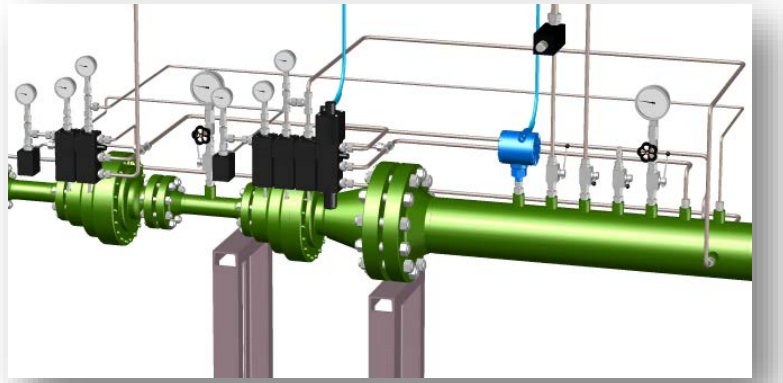
- Pressure Reducing valve

  The outlet pressure is kept on a constant level independent of demand changes or inlet pressure deviations. The pilot is connected to the downstream pipe to sense outlet pressure deviation from the set point of the pilot and thereupon adjusting position of the main valve. Depending on local laws and standards one or two safety valves are installed in front of the regulator.

- Monitor Active System

  Two HON512 regulators are installed in a serial setup. Under normal conditions the active regulator (2nd valve) is controlling the downstream pressure while the monitor regulator is fully opened in standby mode. In case the active regulator fails, the monitor regulator will take over operation at a slightly higher pressure. Due to the axial flow design the pressure drop can be kept at a minimum even in this serial set up.





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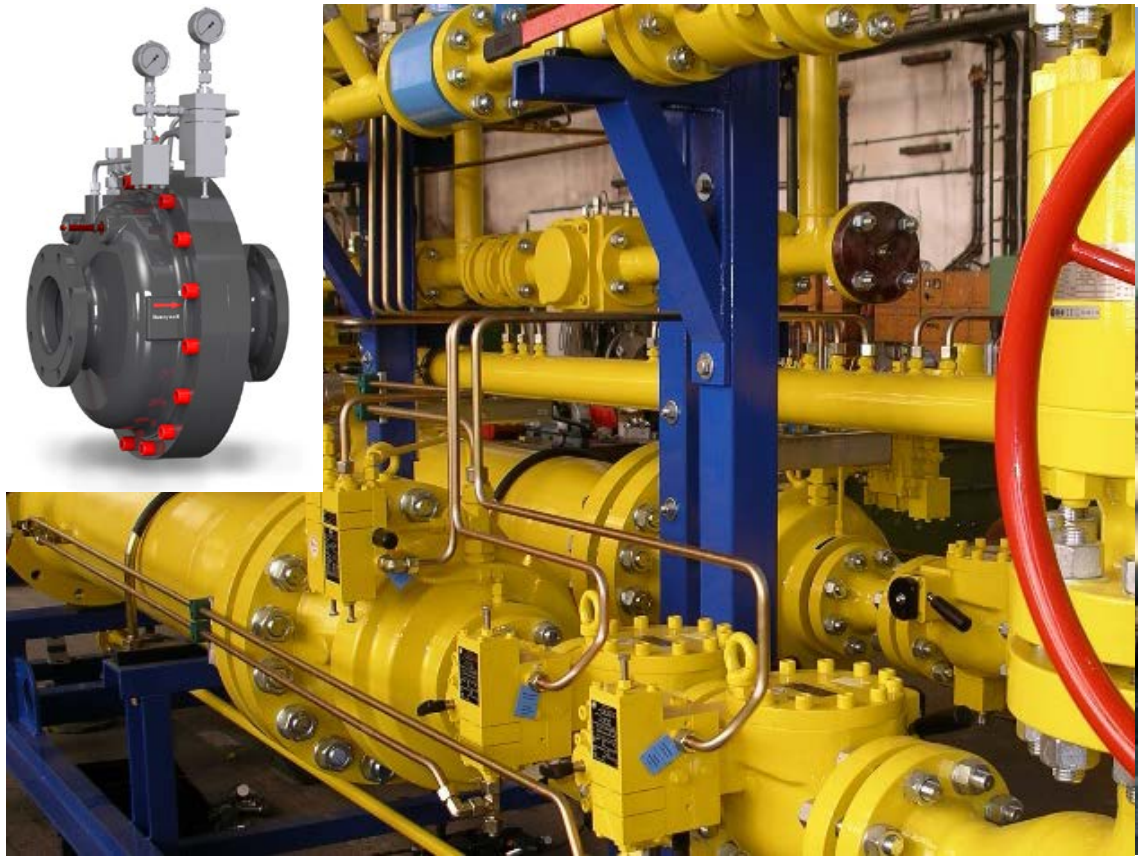
HON 512, Class 150 Gas Pressure Regulator



Applications

- High pressure applications in distribution, industrial and gas power industry

Benefits

- Compact and robust design
- Simple construction; few internal moving parts
- Installation in any position; horizontal, vertical or other
- Several functions available by just changing the pilot; even years after first installation in the field
- Lower noise - flow turbulences are lower in an axial design
- Complete size range
- Faster response time (a key advantage for turbine designs)
- Higher capacity per size over Globe Type, reducing installation cost
- Quick response time due to Return Line

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HON 512, Class 150 at a Glance

Features

- Max inlet pressure 20 bar/300 psi
- Flanges PN and ANSI,
- Standard with Pilot 650-1.

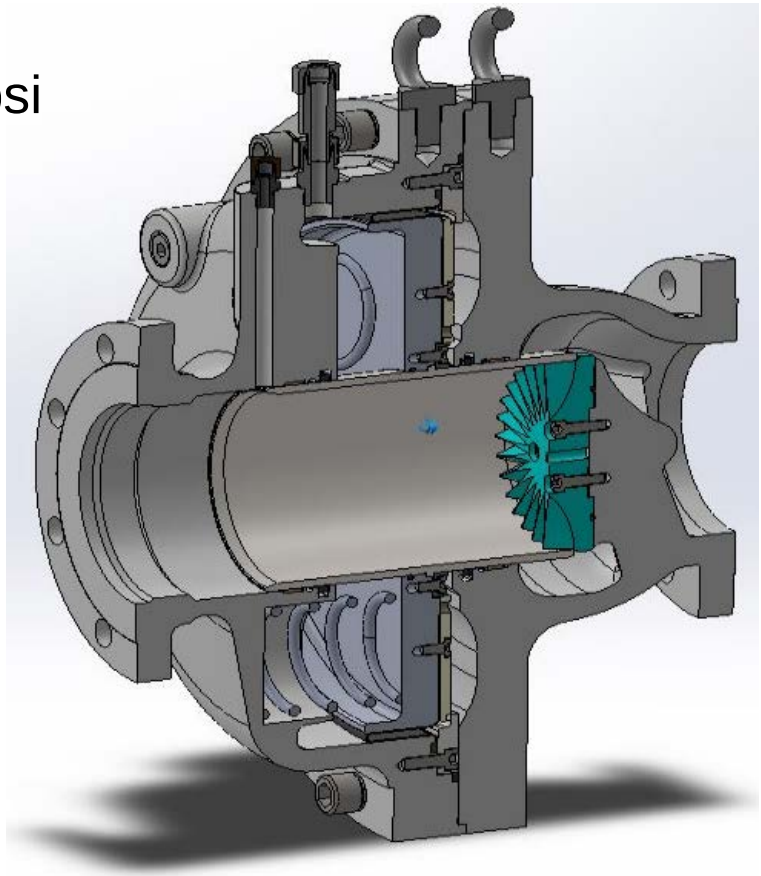
Certification

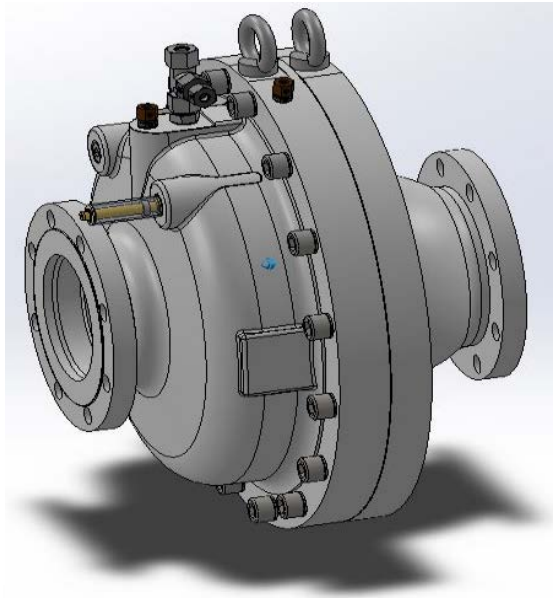
- EAC
- PED

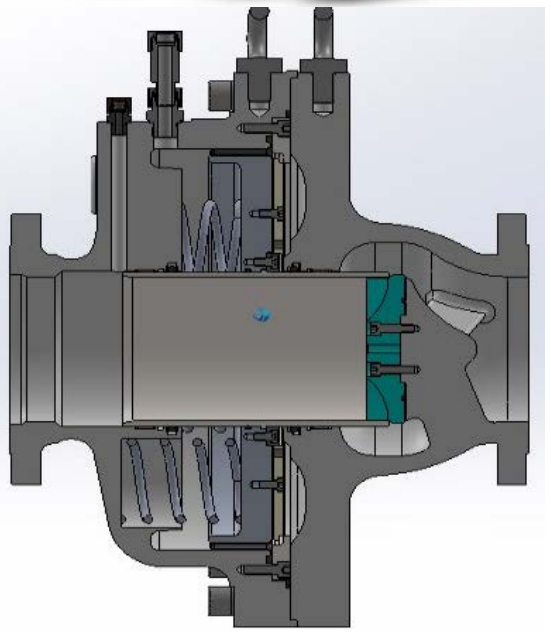
Body Sizes

- 1 - 10“

35-40% lighter than Class 600







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Hon 512 at a Glance

HON512 (Axial Flow Regulator) vs globe type

- Compact and robust design
- Smaller overall dimensions
- Lower profile (good relevant to space restrictions)
- Simpler construction; few internal moving parts
- Installation in any position; horizontal, vertical or other
- Several functions available by just changing the pilot; even years after first installation in the field
- Lower noise; in the axial flow regulator - flow turbulences are lower
- Complete size range
- High rangeability
- Higher capacity per size over Globe Type, reducing installation cost
- Quick response time due to Return Line (a key advantage for turbine designs)