

Operating instructions for dome pressure regulators from 1/2 up to 2 inches



Dome pressure regulator D and DH from 1/2 up to 2 inches

Operating instructions for dome pressure regulators from 1/2 up to 2 inches



Content

1. Introduction	3
1.1 general agreement	3
1.2 Description of the line-pressure-regulator series from brass or stainless steel	3
1.3 Intended use	4
1.4 Personal requirement	5
2. for your safety	5
2.1 Used symbols	5
2.2 Basic safety instructions	5
2.3 Safety device	6
3. Description	9
3.1 Illustration	9
3.2 Part List	9
3.3 Identification/type plate	10
3.4 Functional description	10
3.5 Technical Dates	10
3.6 Connection options	10
3.7 Start of operation of the Dome-pressure-regulator D/DH	11
4. Handling	14
4.1 Identification	14
4.2 Assembling	14
4.3 Short-term decommissioning or Interruption	14
5. Disturbance	15
6. Maintenance, cleaning and repair	15
6.1 Regular visual inspections and maintenance work	15
6.2 Regular cleaning	16
6.3 Repair notes	16
6.4 Returns	16
7. Manufacturer Certification	17

Operating instructions for dome pressure regulators from ½ up to 2 inches



1. Introduction

1.1 general agreement

Validity

This instruction shall apply to the following types of pressure regulators:

D - DH

in Size NPT ½ to 1 inch and G ½ to 2 inches

Manufacturer

Hornung GmbH

Rathenaustraße 55

63263 Neu-Isenburg

Deutschland / Germany

Date of issue

December 2023

Storage and completeness

- These operating instructions are a part of the above-mentioned pressure regulators and must be available for inspection by the authorized group of persons at any time.
- Chapters from these instructions may not be removed at any time. A missing instruction manual or missing pages - in particular the chapter for your safety"; - must be replaced immediately in case of loss

Copyright

This manual contains copyright-protected information's. It may not be photocopied, duplicated, translated or recorded on data carriers without prior permission, either in full in excerpts. We reserve all other rights.

Modification service

This instruction manual is subject to the change service by Hornung GmbH. Changes in this instruction manual can be made at any time without further notice by the construction

1.2 Description of the line-pressure-regulator series from brass or stainless steel

The type series are able for flammable; toxic; corrosive and non-flammable gases.

The dome-series from brass and Stainless steel are available with corrosive gases to.

Furthermore, the design of the different DOM pressure regulator is differentiated according to different construction types of DOM pressure regulator, DOM pressure regulators without or with integrated or external pilot pressure regulator, DOM pressure regulator and line pressure regulator in the sizes of ½ to 2 inches. An upstream fine filter with max. 40µ. Depending on the materials used, the DOM pressure regulator can be used for gases and liquids. To regulate the pressure of liquids, the DOM is externally controlled by compressed air. Fill nitrogen with the internal or external pilot pressure regulator.

Operating instructions for dome pressure regulators from ½ up to 2 inches



1. Introduction

Another advantage is the possibility of dynamic pressure control by means of an integrated Needle valve in the DOM of the pressure regulator (only for versions with pilot). By letting the control medium leak slightly into the process gas line, the pilot continuously feeds in the control medium. As a result, a high pressure-consistency is achieved in the dome of the pressure regulator even in the event of temperature fluctuations and changes in the flow rate.

The balanced poppet ensures an almost constant output pressure over the entire input pressure range (from full"; gas cylinder to almost empty"; gas cylinder).

1.3 Intended use

Intended use

The described DOM pressure regulators in brass design are intended for the use of non-corrosive gases. The stainless steel DOM pressure regulator are also suitable for corrosive gases. The gases and pressure ranges approved for them are indicated on the type plate. DOM pressure regulators are used to reduce a variable input pressure to a constant outlet pressure as possible. Printing is initiated exclusively via the respective input side. Pressure discharge via the outlet pipe system into the pressure regulator outlet must be prevented by appropriate measures.

DOM pressure regulators without electrical components (e. g. Contact pressure gauges or pressure transmitters) may be used in the EX range, as they do not have their own potential ignition source (assessment of the ignition risk in accordance with DIN EN 13463-1)

DOM pressure regulator with electrical components, need to be considered with regard to the ignition risk. This shall be assessed on the basis of the documentation of the respective electrical components in connection with the integration of these into the overall system in full compliance with Directive 94/9/EC ("ATEX 95";) and 1999/92/EC (ATEX 137).

Predictable misapplications

The following operation conditions are classified as misapplication:

- Operate with gases not indicated on the type plate
- The use with gases in the liquid phase
- Operate outside of the permissible technical limits
- The non-observance and complain with local legal regulations and other regulation terms
- Failure to comply with these construction
- Non-implementation of inspection and maintenance work
- Failure to comply with the information on the type plate and the product datasheet
- The outlet pressure application (contrary to the normally flow direction)

1. Introduction

1.4 Personal requirement

Definition „authorized person “

A person shall be considered an authorized person if he/she has received technical training and has been technically instructed and educated in the overall system and the associated hazards -- gas cylinder - gas type - gas cylinder valve - pressure regulator - and has successfully completed training in the field of “supply of pressurized gases”.

Tasks of the operator

Operators shall be required to: Detect and eliminate irregularities - as far as possible and permissible.

Operator requirements

In order to perform the tasks, the operator must comply with the following requirements:

- The operator must have been instructed by an authorized person to operate the DOM pressure regulators and must have read and understood the instructions in full.

2. for your safety

2.1 Used symbols



Direction



Attention!



Warning!



Risk of
death!



No smoking!



No open
fire!



Free from
oil and
grease



Danger!

This symbol indicates that dangers to life “threat to life”; and People's health exists.

2.2 Basic safety instructions



Instruction!

The following safety instructions are to be understood as a supplement to the already applicable national accident prevention regulations and laws. Existing accident prevention regulations and laws must be complied with in any case. Various laws, regulations, rules and guidelines are decisive for the handling of compressed gases, which have to be observed depending on the type of gas. The following list does not claim to be exhaustive; it represents only a selection of essential writings:

2. for your safety

- Pressure equipment directive 2014/68/EU
- EU-Directive 2009/1004/EG (recommended working equipment practice guideline)
- EU-Directive 1999/922/EG (ATEX 137)
- EU-Directive 98/24/EEG (Hazardous Substances Directive)
- EU-Directive 2014/34/EU
- Industrial Safety Ordinance (Implementation of Directive 2009/104/EC and 1999/92/EC into German law) Gefahrstoffverordnung (Umsetzung der RL 98/24/EG in deutsches Recht)
- Series TRBS (Technical Rules for Operational Safety) Schriftenreihe TRGS (Technische Regeln für Gefahrstoffe)
- Series TRAS (Technical Rules for Plant Safety)
- BGV A1 Principles of Prevention
- BGR 104 explosion protection rules
- BGR 132 Avoidance of ignition hazards due to electrostatic charges
- BGR 500 2. 26 Welding, cutting and related working methods
- BGR 500 2.31 Work on gas pipelines
- BGR 500 2.32 Operation of oxygen systems
- BGR 500 2.33 Operation of equipment for the handling of gases
- Data sheet M034 of BG RCI
- EIGA documents
- Safety data sheet of the used gases

2.3 Safety device

The DOM pressure regulator can optionally be equipped with an output safety valve to protect the valve.



Attention!

In order to protect downstream valves, pressure vessels and pipelines from overpressure in the event of a failure of the pressure regulator, a safety device corresponding to the operator's instructions must be installed.











Danger!

In case of combustible, toxic, corrosive and other gases which are harmful to health or the environment, an exhaust pipe must be connected to the safety device in order to ensure safe discharge. The factory setting must not be changed!





Operating instructions for dome pressure regulators from 1/2 up to 2 inches

2. for your safety

	Possible danger	Prevention measures
	Risk of death! If compressed oxygen comes into contact with oil or grease, there is a risk that a chemical reaction will cause a fire.	Keep all parts that come into contact with oxygen oil- and grease-free.
	Risk of death! Outflowing gas into the ambient air can ignite, there is fire or fire. Explosion risk.	Smoking and open fire are strictly prohibited in the vicinity of gas supply facilities
	Risk of death! The supply station can be damaged by arbitrary modifications or conversions, so that it does not function as intended. There is a risk of malfunction, fire or damage to the system.	No changes or alterations may be made without the written permission of technically authorized persons of the manufacturer.
	Risk of death! If pressure regulator are used that are not suitable for the appropriate gases and pressure range, there is a risk that a chemical reaction will cause a fire or explosion. Pressure regulators of sizes 1/2 to 2 inches may not be used for unstable gases! For example: ACETYLEN	The pressure regulator must be compatible with the respective gas and suitable for the available pressure ranges. Use only for gases for which a label is available. If a pressure regulator does not have a gas type marking, the applicability for the respective gas must be requested from the manufacturer. In no case the pressure regulator be put into operation without this information
	Risk of death! If the pressure regulator is operated with flammable, toxic or corrosive gases, the respective gas can enter the environment when the optional blow-off valve is responded.	<u>Optional blow-off valves for flammable, toxic or corrosive gases must be fitted with a pipeline which transports the outgoing gases to a safe and proper disposal station.</u>
	Risk of death! Gas emitted uncontrollably in closed rooms can reduce the oxygen content in a life-threatening way.	As a matter of principle, lead the optional blow-off line of systems that are operated in enclosed rooms outdoors. In the case of toxic, corrosive or otherwise polluting gases, dispose of the discharged gas in accordance with the applicable regulations.
	Risk of death! Uncontrolled outflow of oxygen in enclosed spaces can lead to a dangerous increase in the oxygen content of the air and thus to an increase in the tendency to inflammation of clothing and objects.	Optional drainage of oxygen systems operating in enclosed spaces outdoors, and do not handle fire. Please refer to the EIGA document NL 79/04/D for further information.
	Risk of death! If components are connected that are not suitable for the pressure range of the pressure regulator, the pressure load can lead to the bursting of these components.	Accessories to be connected (glands, pipes, fittings, etc.) be suitable for the pressure range indicated on the type plate of the pressure regulator.

Operating instructions for dome pressure regulators from 1/2 up to 2 inches

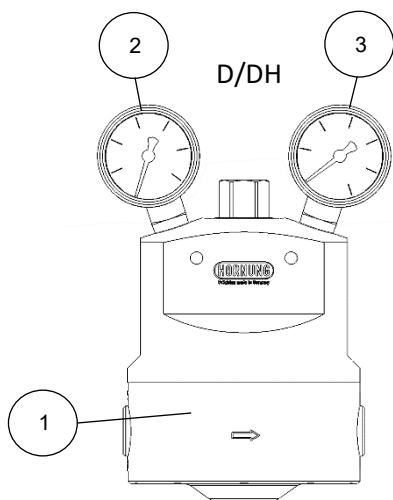
2. for your safety

	If the pressure regulator is used outside the specified ambient temperatures, there is a risk of malfunction, fire or damage to the system.	Do not use in ambient temperatures below -40°C and above +130°C.
	If dirt particles get into the pressure regulators, malfunctions and damage to the device can be the result.	It must be ensured that no dirt particles can get into the pressure regulator. For this reason, it is recommended to use a filter in the inlet.
	In the event of improper handling, the risks to the user and other persons as well as damage to the equipment may occur.	Use and treat the Pressure regulator only as described in this instruction manual.
	If the connection surfaces or seals on the pressure regulator or connection valves are damaged or missing completely, there is a risk of gas escaping uncontrollably.	Check the connection surfaces for damage, do not install if the connection surfaces are damaged or seals are missing.

Operating instructions for dome pressure regulators from 1/2 up to 2 inches

3. Description

3.1 Illustration



3.2 Part List

Pos.	Description	Function
1	D/DH DOME-pressure regulator	Regulates the variable inlet pressure to a set outlet pressure level.
2	Inlet-gauge	Displays the current incoming pressure.
3	Outlet-gauge	Displays the current pending output pressure.

3. Description

3.3 Identification/type plate

Glue The
Gas type plate
on the body



Type
P₂: outlet pressure
P_s: max. Inlet pressure

Temperature range
Art.no.
Date of manufacture/
Serial-no.
manufacturer

3.4 Functional description

The DOM pressure regulator reduces any input pressure within certain limits to an output pressure required on the output side. This pressure reduction is carried out on the DOM pressure regulator in operation.

DOM pressure regulators are characterized by an exact control accuracy and a high throughput. The DOM pressure regulator works according to the principle of pressure equilibrium between DOM pressure and outlet pressure. The exact function description can be found in the following type description.



Advice!

Optionally, the DOM pressure regulator can be equipped with contact pressure gauges. These emit a switching signal if an adjustable limit pressure is not reached or exceeded. Pressure transmitters emit a continuously changing current (4-20mA) with the pressure. The switching signal or the changing electrical current can be processed via connected controllers and e. g. For example, trigger a gas deficiency alarm. When using these contact pressure gauges or pressure gauges, the pressure transmitters in fire or explosive atmospheres require special measures in accordance with Directive 95/9/EEC (ATEX 95) and Directive 1999/92/EC (ATEX 137).

3.5 Technical Dates



Advice!

The technical data can be taken from the Hornung data sheet for the respective product. Maximum input and output pressures and the type of gas are shown on the type plate noted.

3.6 Connection options

- Inlet connection: NPT ½ up to 1 inch, G ½ up to 2 inch – female thread
- Outlet connection: NPT ½ up to 1 inch, G ½ up to 2 inch – female thread

Operating instructions for dome pressure regulators from 1/2 up to 2 inches

3. Description

3.7 Start of operation of the Dome-pressure-regulator D/DH



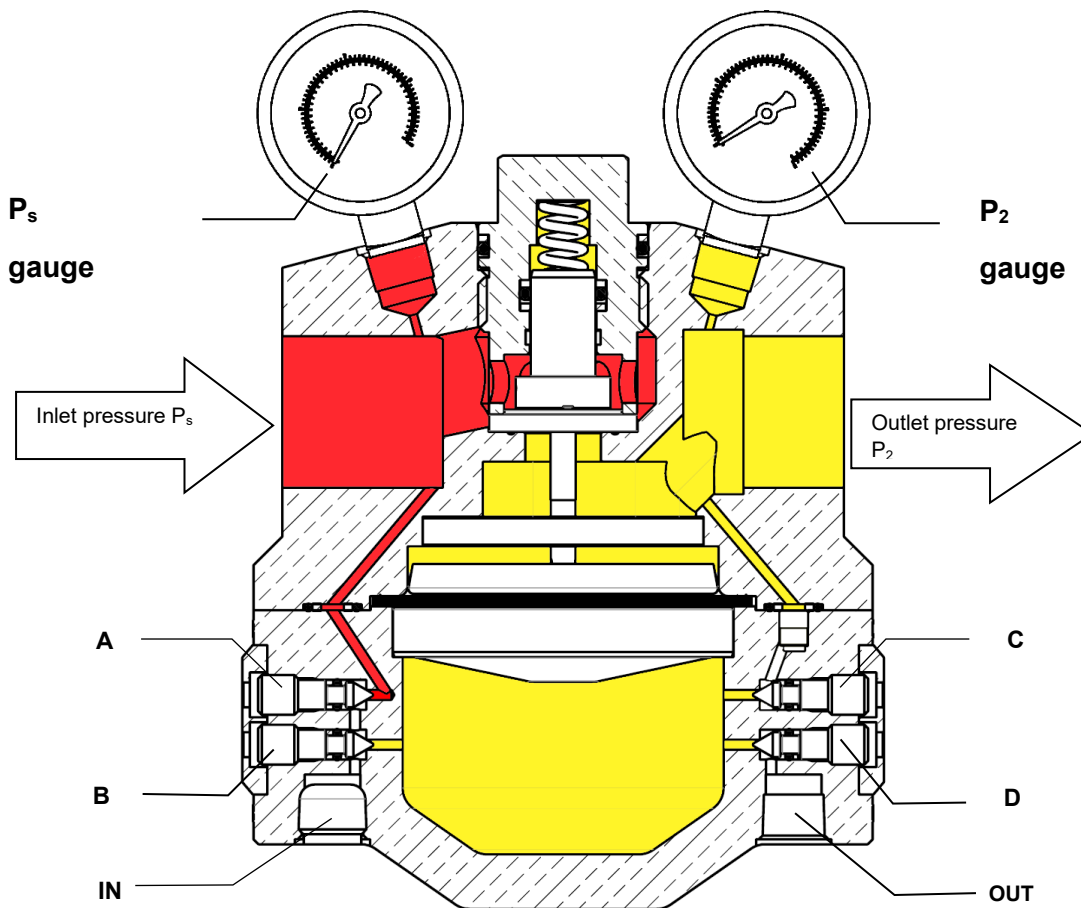
Advice!

The installation of a fine filter (e. g. Fine filter F1 or IF1) immediately before the pressure regulator is recommended to avoid contamination of the valve piston, which may generally occur in a pressure regulator. Shut-off valves must be installed in front of and behind the pressure regulator.



Attention!

Quick-circuit valves (switching cycle below 2s) must not be used.



3.7.1 Initial state before start of operation

- Inlet pipe **P_s** is closed
- All needle valves **A**, **B**, **C** and **D** shut off
- slowly open Inlet pipe **P_s**
 - **P_s** - Pressure gauge indicates the inlet pressure

3. Description



Advice!

Testing the tightness of the valve seat:

- Needle screw **A** and **B** are closed
- Open the needle-screw **C**
- Close the outlet pipe **P₂**, **P₂** - Pressure gauge must not indicate any increase in pressure



*Valve seat in the dome pressure regulator is tight when no pressure **P₂** is displayed, then the needle screw **C** must be closed again.*

3.7.2 Fill the dome / adjust the desired outlet pressure **P₂**

*(Initial condition: all needle screws and **P₂** are closed)*

- Input line **P_s** is open, **P_s** - pressure gauge indicates the input pressure
- Open needle-screw **A** by turning out approx. half a turn
- Unscrew needle screw **B** very slowly to fill the dome and set the desired static back pressure **P₂**
- The seat opens and with the **P₂** line locked off, the backpressure **P₂** increases
- After the desired static outlet pressure **P₂** is reached, immediately close needle screw **B** again. **Dynamic pressure control is not possible!**
- Now open **P₂** line to let the medium flow
- The dynamic pressure can be read at the **P₂** pressure gauge
- Possibly the dynamic pressure at the **P₂** pressure gauge must be corrected by very slowly opening the needle screw **B**.
- this can occur if overfilled
P₂ - downstream pressure is diverted with the needle screw **C** via line **P₂**, for this an extraction must take place, or **D/OUT** into the atmosphere
- To finish of the adjustment procedure, close the needle screws **A**, **B**, **C** and **D** by hand



Attention!

- In the case of **D/OUT**, ensure that aggressive, flammable or toxic media are discharged via a trigger or an optional **OUT** line
- In the case of liquids as process medium, the dome pressure (external gas B/IN) may only be slowly relieved via the needle screw **D/OUT**. The needle screw **A** and **C** must always remain closed!

3. Description

3.7.3 Venting the dome / reducing the outlet pressure P2

- If the outlet pressure **P2** has been set too high or if a lower P2 pressure is required, slowly turn out the needle screw C in order to reduce the dome pressure via the P2, this must be removed
- Alternatively, the needle screw **D/OUT** is to be opened, whereby the medium enters the atmosphere
- When reaching the output pressure **P2** or complete dome relief
- at **0 bar**, needle screw slowly **D or C** close again



Attention!

- In case of **OUT**, ensure that aggressive, flammable or toxic gases get derived by an drain or optionally an pipe with an shut-off valve instead of an relief valve.
- By fluids as a process medium, the dome pressure (external gas **IN**) must only relief at the relief valve **OUT**.
- The needle screw **A** and **C** must always remain closed!

3.7.4 Placing out of operation

- Close inlet **Ps**
- release pressure **P2** until both pressure gauges show a pressure of **0 bar**
- Open needle screw **C** slowly by turning out, to relieve the dome via the **P2** line
- Alternatively, the needle screw **D** is to be opened, whereby the medium enters the atmosphere
- The dome pressure regulator is now completely pressure free and can be dismantled or maintained



Attention!

- In the case of D/OUT, ensure that aggressive, flammable or toxic media are discharged via a trigger or an optional OUT line
- In the case of liquids as process medium, the dome pressure (external gas B/IN) may only be slowly relieved via the needle screw D/OUT. The needle screw A and C must always remain closed!

4. Handling

4.1 Identification

Example of identification

Nitrogen (N₂), Ps: 300bar, P2: 60bar



Note!

The Dome-pressure-, Back-pressure- and Line-pressure- regulator must be marked according to the type of gas!

If the type of gas not indicated on the type plate, the gas must be identified by means of an adhesive gas type label before commissioning.



Attention!

The Dome-pressure-, Back-pressure- and Line-pressure- regulator must only use for the labeled type of gas, for which it also ordered.

4.2 Assembling



Note!

Information for installation of the Dome-, Back pressure- and line pressure- regulator can be taken of the assembly information.

4.3 Short-term decommissioning or Interruption



Attention!

By a short-term of intermission of work it is enough to close the shut-off valve.

Shut down for a while or rather brake

step	task
1	Close cylinder Valve.
2	Relive the pipe. The pressure regulator must be depressurized by draining the gas over the consumer, by venting valves or needle valves. Care must be taken to ensure that the pointers of all manometers are at zero [0] – visual control! When operating with corrosive or toxic gases, the entire pressure reducer has to be rinsed with inert gas.
3	Close ball-valve and shut-off valve.

5. Disturbance

Malfunctions / Cause	Rectification
The pressure regulator makes noise. This indicates a defect in the control insert.	Close all valves immediately. Have the pressure regulator checked immediately by the manufacturer or an authorized specialist company
The pressure regulator is freezing. These indicates too much sampling	Reduce the withdrawal quantity or switch a gas warmer ahead, when it is technical; chemical or physical possible.
Leakage occurs. This indicates a defect in a component of the pressure regulator	Close all the valves right away. Have the pressure regulator checked immediately by the manufacturer or an authorized specialist company.
The pressure level is unstable deviates from the used range of fluctuation. This indicates withdrawn are too high	Reduce the withdrawal quantity. Contamination of the inlet filter is also possible. In this case the pressure reducer must be checked by the manufacturer or an authorized specialist company.

6. Maintenance, cleaning an repair

6.1 Regular visual inspections and maintenance work

Regular inspection and maintenance

In order to guarantee a faultless function and constant operational safety, it is recommended that the pressure regulator and the gas supply stations are subjected to an annual leak and function test by a specialist. If the station remains stationary, it must be checked every six months.

Every 3 years a maintenance should be carried out by a specialist, during which all screens should be cleaned or replaced. Sealants and elastomers must also be renewed, for which the manufacturer offers model-specific spare parts kits.

6. Maintenance, cleaning and repair

Regular visual inspection

Visually inspect all parts for	Intervall
<ul style="list-style-type: none">• damage• function• tightness• mounting• corrosion	Regular inspections at 12-month intervals and additionally before each commissioning contribute essentially to the economic efficiency and value retention of the valves.



Note!

If you notice a defect during the visual inspection, do not start the pressure regulator! Have the pressure regulator checked immediately by the manufacturer or an authorized specialist company.

6.2 Regular cleaning



Caution!

Detergents or disinfectants can attack and destroy seals inside the armatures. Do not use any cleaning agents or disinfectants for cleaning! Heavy soiling can lead to operating faults! If necessary clean the pressure regulator with a damp lint-free cloth.

6.3 Repair notes



Attention!

Repairs may only be carried out by qualified persons in authorized repair shops. Only with the use of original spare parts the perfect function and safety are guaranteed.



Note!

In the case of own-initiative repairs or modifications by the user or third parties without the express written consent of the manufacturer, the liability for the resulting consequences shall be waived.

6.4 Returns

If the pressure regulator is returned to the manufacturer for inspection, maintenance or repair, and if it has previously been in contact with corrosive or toxic gases, the pressure regulator must be purged with inert gas.

Operating instructions for dome pressure regulators from 1/2 up to 2 inches



7. Manufacturer Certification

Products: Pressure regulators and attaching parts

Article marking: Dome and line pressure regulators from brass and stainless steel

Field of application: This explanation applies only for pressure regulators,

Which the company **Hornung GmbH** has manufactured.

From Hornung manufactured pressure regulation armatures are pressure equipment in the sense of the EU guideline across pressure equipment (directive 2014/68/EU from 14.05.2014) and are classified by Hornung as Pressure-maintain equipment according to appendix II (diagram 6/ DN<25)

Applied directive: **2014/68/EU Pressure equipment directive**

According to the conformity assessment, procedures that we have carried out, we declare that Hornung pressure regulators and cylinder stations when used in accordance with the requirements of the directive (2014/68/EU).

The pressure equipment is covered by article 4 passage 3 (good engineer practice)

They may not be CE marked.

Applied directive: **2014/34/EU (ATEX) equipment and protective systems intended for use potentially explosive atmospheres.**

According to the conformity assessment procedures carried out by us, we declare that pressure regulators and cylinder stations do not have their own ignition source when use as directed and are therefore not covered by directive 2014/34/EU.

Equipment and components outside of the scope of the guideline may not be marked with a CE-mark.

Hornung pressure regulators and cylinder stations are manufactured in conformity with the generally national and international standards and guidance.

This manufacturer declaration is created automatically and doesn't bear any signature

This manufacture's declaration doesn't absolve the further processing of the products from its quality responsibility.
