Air Liquide

Line regulators for industrial gases

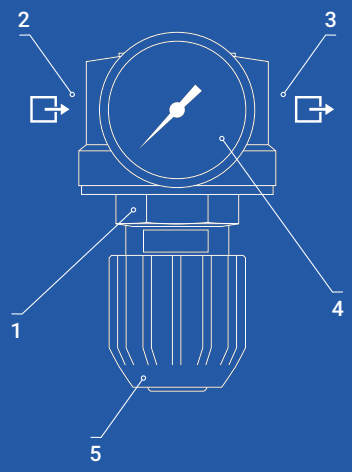
Operating manual

OP 210

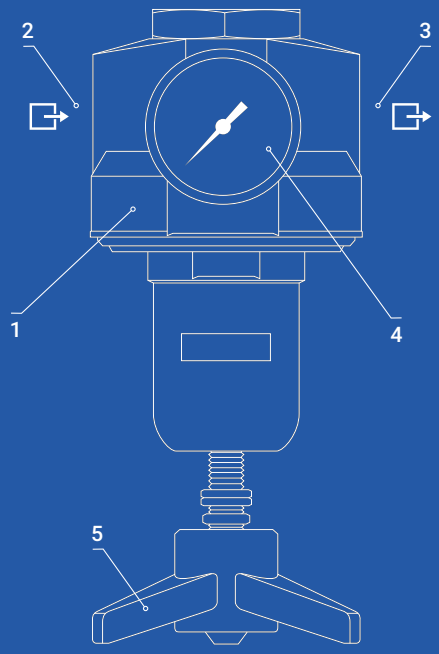
Line regulators for industrial gases

Content

DCn 100
DCn 300
DCn Flamal 300
DCn 300 C_2H_2
DCn 300 FOOD



DCn 500
DCn 800
DCn Flamal 800
DCn 800 C_2H_2
DCn 800 FOOD
DCn 1500
DCn 1500 FOOD



1. Regulator body
2. Inlet
3. Outlet
4. Pressure manometer gauge
5. Regulator handwheel

1 Preliminary notes

According to the legislator, the operator is responsible for the safety and health of his employees. He must also provide employees with the necessary work equipment to prevent hazards from arising. In addition, must regularly monitor and document the safety-related systems document this.

This operating manual is intended to help that a small part of these requirements can be met.

Our pressure control panels comply with the actual rules of regulation and are design according to the state of the art.

1.1 AIR LIQUIDE Commitments

1.1.1 Conformity

AIR LIQUIDE certifies that the equipment is manufactured, tested and controlled, in accordance with state of the art and AIR LIQUIDE rules.
It is the responsibility of the end user to ensure that such equipment is installed and used in accordance with the current regulations

1.1.2 PED Directive 2014/68/EC: Pressurized equipment

Technical requirements of Article 4 § 3 indicates that Pressure equipment and assemblies below or equal to the limits set out in points (a), (b) and (c) of paragraph 1 and in paragraph 2 respectively shall be designed and manufactured in accordance with the sound engineering practice of a Member State in order to ensure safe use.

Without prejudice to other applicable Union harmonisation legislation providing for its affixing, such equipment or assemblies shall not bear the CE marking referred to in Article 18.
By design, these equipment may integrate pressure relief valves or burst disks. In this case, those ones shall neither be CE marked according to paragraph 2 of annex II.
In all other cases, pressure relief valves and burst disks shall be CE marked.

1.1.3 ATEX Directive 2014/34/EC

The equipment is not in the scope defined in points a), b) et c) of the article of the ATEX Directive: consequently, they shall not wear the CE marking.
The equipment is not capable of causing an explosion through their own potential sources of ignition: then, they can be installed in ATEX zone 1 or 2, as far as respecting up to date regulations, rules, operating instructions, in accordance with the sound engineering practice are followed during installation and use.
Reminder: it belongs to the end user to define the ATEX zone.

1.1.4 REACH regulation (EC) n°1907/2006

The pressure reducers are made of brass parts, essentially the body, which is a copper alloy with a lead content between 1 % and 4 % w/w.
As requested by art. 33 of REACH Regulation (Registration, Evaluation and Authorisation of Chemicals) and with reference to current list of SVHC (substances of very high concern) available on ECHA website, we inform that lead may be present in a concentration above 0,1 % w/w in our products made of brass.
Lead inclusion in the SVHC list in June 2018 does not modify the use conditions described in operating instructions.
Lead will not be released to the surrounding environment or the gas used during normal use.
After product end of life, the pressure reducers must be scrapped by an authorized metal recycler.

1.1.5 FOOD regulation (EC) n°1935/2004

The AL equipment enhancing the term “FOOD” in their designation are specifically designed for use with food gases used for food and beverage applications. They are compliant with Regulation EC 1935/2004 which requires that packaging and articles intended to be in contact with foodstuffs are to be manufactured in compliance with good manufacturing practices and standard operating procedures.
Thus, under normal or foreseeable conditions of use, no transfer of contaminants, eg, metal elements, to food in quantities that could endanger human health, modify food composition or deteriorate organoleptic characteristics is expected.
Nevertheless, the end-user must check the compliance with an eventual national regulation.
Articles for food usage has a Food logo marking.
For traceability purposes, the batch number is written on each article and AL can perform a batch recall, as requested by its Quality management system.

1.2 Cleaning

Each equipment is subject to a grease removal and a high quality cleaning to preserve the purity of gas in the equipment as well as for use with oxygen for compatible equipment.
A suitable packaging protects the equipment against exterior pollutants during storage and transport.
Take care to avoid polluting the equipment during installation.

1.3 Warranty

Our “General Terms and Conditions of Sale and Terms of Delivery” apply. These are available to the operator at the latest upon conclusion of the contract. Warranty and liability claims for personal injury and property damage are excluded if they are attributable to one or more of the following causes:

- Improper use of the equipment.
- Improper installation, commissioning, operation and maintenance of the pressure and maintenance of the equipment.
- Operation of the pressure equipment with defective safety devices or improperly installed or or non-functioning safety and protective devices.
- Failure to observe the instructions in the operating manual regarding transport, storage, assembly, commissioning, operation, maintenance and set-up of the pressure equipment.
- Unauthorized structural modifications to the pressure equipment.
- Unauthorized alteration of the cylinder connections for the use of other types of gas, exceeding the permissible inlet

pressure permissible inlet pressures, the use of foreign or non-original seals.
- Inadequate monitoring of equipment, screwed connections and sealing parts that are subject to wear.
- Improperly performed repairs.
- Exceeding or falling below the temperature range specified in the data sheet during operation or during storage.
- Catastrophic events due to the effects of foreign bodies and higher force majeure.

The warranty period of this equipment supplied by AIR LIQUIDE is one year, including spare parts and repair, excluding postage and packing costs. Excluded from the warranty are gaskets, these parts are subject to natural wear.

For further information please refer to the General Terms and Conditions of AIR LIQUIDE.

2 Field of usage

2.1 Functions

The line regulators allow you to :
- to reduce the pressure in a piping system,
- to regulate and maintain stability of outlet pressure,
- to preserve the gas purity.

The line regulators are designed for implementation of industrial gases.

Specific regulators which are dedicated to Food and beverage applications have a specific “Food” indication on their designation and a Food logo marking.

The Line Regulators are used on the pipe network, to regulate the pressure and flow of the gas to the max. allowable pressure and flow.

The max. allowable pressure and the compatibility with the gas can be seen in the Appendix or in the Datasheet. Further technical information can be found in the Datasheet.

The line regulators shall not be used as shut-off valves.

2.2 Intended Use

As the line regulators are designed to control the pressure in an installation, the handwheel is not supposed to be operated as often as a pressure reducer for gas cylinders.

Usually, the pressure is set at the start up and may be adjusted only if the pressure has changed, that is to say quite rarely.
If the frequency of handwheel operating is higher, a dedicated pressure reducer should be selected.

Operating temperature : See Datasheet

3 Assembly – Activation

3.1 Safety

First of all, it is essential to read and respect the safety instructions described in the document "General Safety Instructions" delivered with the product.

NEVER dismantle a component of the regulator in the High Pressure part, especially the cylinder inlet fitting.

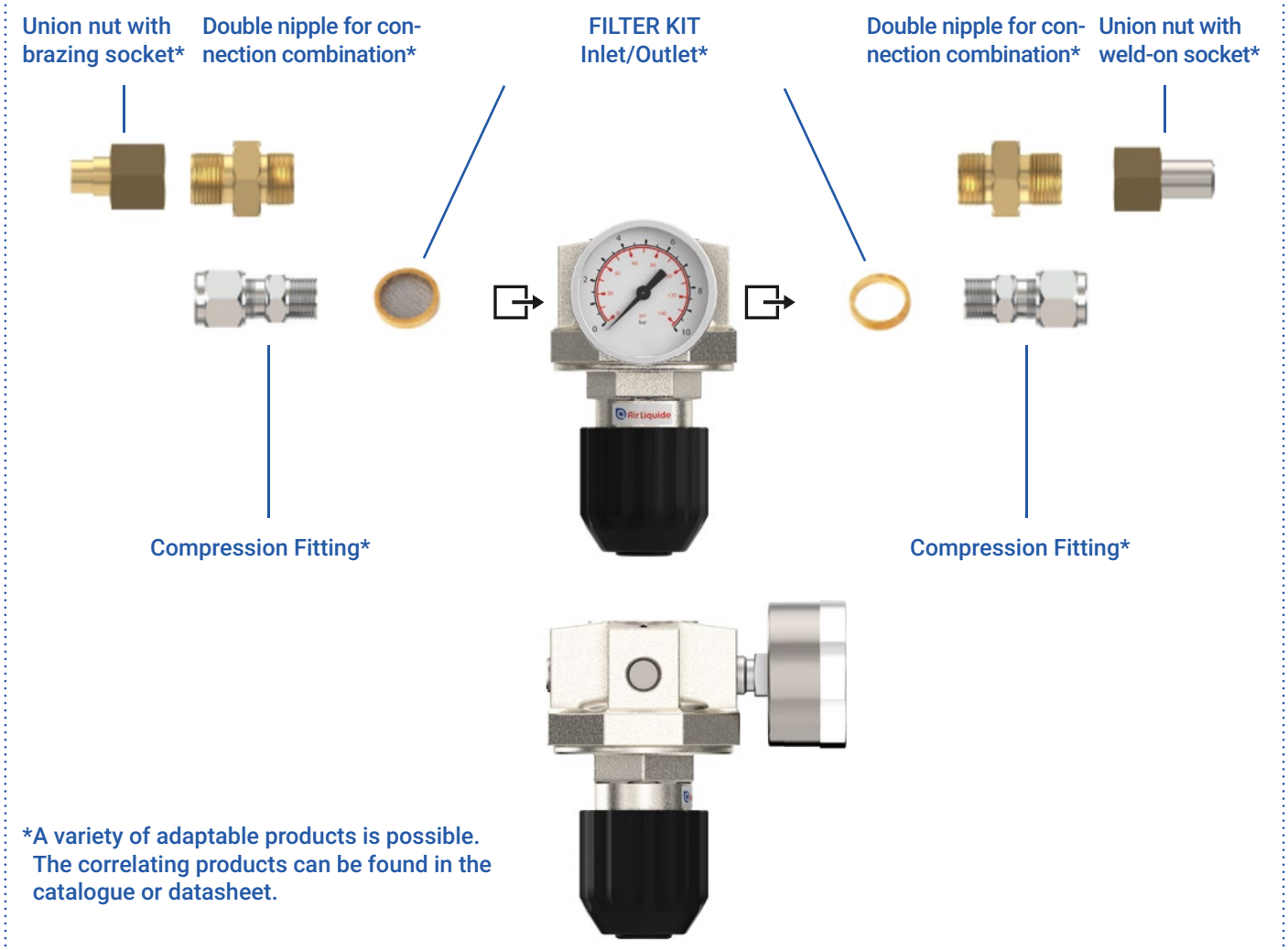
3.2 Precautions before assembly

After opening the packaging, check that the equipment is not damaged and that the contents correspond to the accompanying delivery notes.

- During assembly, it is important to take extreme care to ensure cleanliness and avoid contamination.
- To install the equipment, select a ventilated area, protected from the effects of bad weather.

3.3 Assembly on pipe

- Check the cleanliness of the inlet and outlet ports and the suitability of the selected connections with the pipe.
- Check the presence of the filter (including ring and filter) at the inlet and seal (ring) at the outlet
- Unless your filter consists of a complete set (crimped sieve), make sure that the filter is in the right position.
- Respect the direction of the flow shown by arrows.
- We recommend ensuring the gas tightness of the inlet/ outlet connection with the seal and the filter supplied (tightening torque required between 30 and 50 Nm).
- Depending of the preferred connection either, compression fitting or doublenipple to assemble an brazing or welding fitting, you need to ensure that the assembled items correlate to the maximum allowable working pressure used in your application.
- If the Fittings from the doublenipple don't connect with the seal filter / seal ring, the O-Ring of the double nipple should be used to ensure the tightness of the system. To tighten the O-Ring a torque between 30 and 50 Nm would not be required. Good engineering practice should be applied.



*A variety of adaptable products is possible. The correlating products can be found in the catalogue or datasheet.

3.4 Wall Mounting

The drilling diameter is indicated in Appendix.

a) DCn100 / Dcn300 Series:

- Take the grey plastic cap out of the top of the handwheel.
- Unscrew the fastening screw of the handwheel by means of a screwdriver.

Be careful not to lose the washer.

- Remove the handwheel.
- Place the regulator on the panel.
- Fasten the regulator by means of the lock nut.
- -Screw again the handwheel.

NB: The DCn100 and DCn300 can also be mounted on a panel thanks to the 3 inlet threads located in the body.

b) DCn500 / DCn800 Series:

- Unscrew the lock nut of the handwheel.
- Unscrew the handwheel.
- Place the regulator on the panel.
- Fasten the regulator by means of the lock nut.
- Screw again the handwheel into position.

In order to fix the regulators to a panel without any float, the thickness of the panel must be:

- at least 1,5mm thick for the DCn100 et DCn300,
- and at least 2mm thick for the DCn500, DCn500TBP, DCn800.

c) DCn500 / DCn800 / DCn1500 Series

- use wall bracket for wall assembly
- For DCn500 and DCn800 Series as option in the Datasheet or Catalogue available
- For DCn1500 in the scope of delivery

4 Marking

4.1 Type plate

On the body of the line pressure regulator there is a type plate with information about:Type designation, date of manufacture, approved upstream pressure (P1), device-specific downstream pressure (P2) and flow rate (Q1). Furthermore, the permissible temperature range and the symbol of freedom from oil and grease (for the use of oxygen) listed.The manufacturer‘s name and a QR code for scanning the operating instructions in the desired language are printed on the body of the regulator.

4.2 CE marking

The regulator has been designed and manufactured in accordance with the Pressure Equipment Directive (PED), Article 4, Paragraph 3, in accordance with „good engineering practice“, a CE marking may not be applied.

5 Maintenance

5.1 Defaults – Remedies

Default	Cause	Remedy
Mounting impossible	Connections can not be mounted	Check inlet and outlet fittings and thread.
	Damaged connections	Replace the regulator.
Insufficient flow rate	Cross section of passage limited by a valve	Open the valve.
	Under-dimensional equipment	Contact Air Liquide.
	Downstream device not operational	Change the device.
Gas leak	Tightness default	Change the device.
Rise of the outlet pressure	Leakage at the poppet	
Unstable outlet pressure or frosting	Working temperature too low	Close the gas source. Bring back the equipment temperature above 0 °C.
	Gas used is argon (Ar), carbon dioxide (CO_2) or nitrous oxide (N_2O	Respect the max. flow rate of the regulator. Limit the flow by a valve or a calibrated orifice.
	Flow rate to high	
Vibrations	Flow rate is too high, or upstream pressure too low	
	Presence of valve with quick opening on the downstream pipe	Slow down the valve opening.
Handwheel jamming	Excessive frequency of operation	Replace the line regulator by an adapted regulator for high frequency operation.

5.2 Maintenance

Air Liquide recommends annual periodic inspections of the pressure regulator by competent, authorized personnel. The frequency of this test depends mainly on the use of the device (intensive,moderate, occasional).
Faults that occur can have many causes. For your own safety, avoid tampering or making repairs on your own.

In normal condition of use, discarding after 10 years in working.

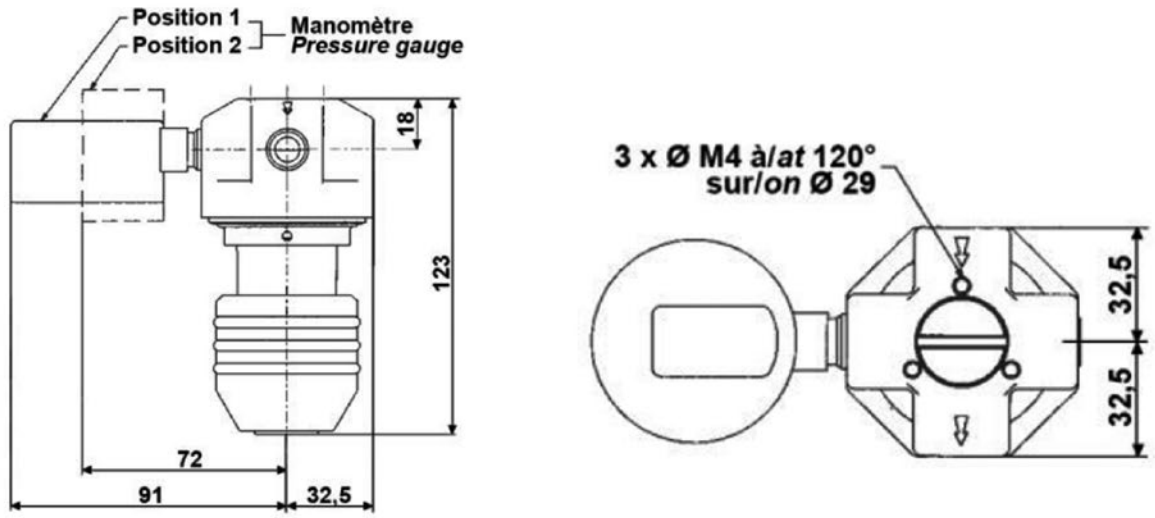
5.3 Disposal and recycling

At the end of the equipment's useful life or when it is impossible to repair it, it is essential to respect the local regulations for recycling / disposal of our equipment
To prevent reuse, these products must be unsuitable for use.
In accordance with EU Directive 2018/851 on waste, the owner of the equipment ensures that when recovery is not carried out in accordance with article 10, the waste will be subjected to safe disposal operations that comply with the provisions of article 13 on the protection of human health and the environment.
The licensee must take steps to promote high quality recycling and, to this end, must establish separate waste collections when technically, environmentally and economically feasible and adequate to meet the quality standards required by the relevant recycling sectors.

6 Appendix

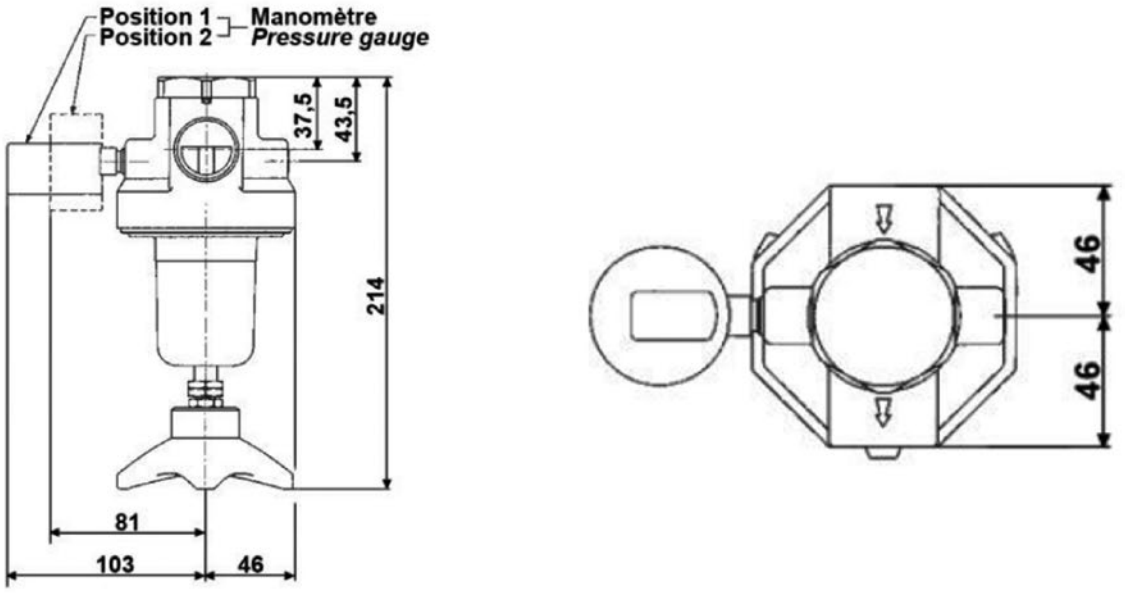
6.1 Dimensions

6.1.1 Drawings DCn100 and DCn300 Series



Models	ØA	B	C	D	E	F	G	ØH	Ø Drilling
DCn100	G 1/4"	27,5	88,5	27,5	16,5	47	109	27	33
DCn300	G 1/2"	32,5	91	32,5	18	59	123	29	

6.1.2 Drawings DCn500 and DCn800 Series



Models	ØA	B	C	D	E	F	G	ØH	Ø Drilling
DCn500	G 3/4"	46	103	46	37,5	–	214	–	51
DCn800	G 1"	46	103	46	37,5	–	214	–	

6.2 Gas compatibility

		DCn100 AG 50-2,6-30	DCn100 AG 50-6-57	DCn100 AG 50-18-125	DCn300 AG 50-2,6-80	DCn300 AG 50-6-150	DCn300 AG 50-18-400	DCn300 AG 50-40-600	DCn C_2H_2 1,5-1,4-12	DCn300 Flamal 50-7-50	DCn300 AG 50-2,6-80 FOOD	DCn300 AG 50-6-150 FOOD	DCn300 AG 50-18-400 FOOD	DCn500 AG 50-6-450	DCn500 AG 50-12-750	DCn800 AG 50-6-600	DCn800 AG 50-12-900	DCn800 C_2H_2 1,5-1,4-32	DCn800 Flamal 50-7-400	DCn800 AG 50-6-600 FOOD	DCn800 AG 50-12-900 FOOD	DCn1500 50-10-1500	DCn1500 50-10-1500 FOOD
Main gases	Ammonia	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
	Methane	50	50	50	50	50	50	50	▲	50	▲	▲	▲	50	50	50	50	▲	50	▲	▲	50	▲
	Ethylene	▲	▲	▲	▲	▲	▲	▲	▲	50	▲	▲	▲	▲	▲	▲	▲	▲	50	▲	▲	▲	▲
	Propylene	▲	▲	▲	▲	▲	▲	▲	▲	10	▲	▲	▲	▲	▲	▲	▲	▲	10	▲	▲	▲	▲
	Propane	▲	▲	▲	▲	▲	▲	▲	▲	10	▲	▲	▲	▲	▲	▲	▲	▲	10	▲	▲	▲	▲
	Acetylen	▲	▲	▲	▲	▲	▲	▲	1,5	▲	▲	▲	▲	▲	▲	▲	▲	1,5	▲	▲	▲	▲	▲
	Hydrogen	50	50	50	50	50	50	50	▲	▲	▲	▲	▲	50	50	50	50	▲	▲	▲	▲	50	▲
	Nitrogen monoxide	50	50	50	50	50	50	50	▲	▲	▲	▲	▲	50	50	50	50	▲	▲	▲	▲	50	▲
	Oxygen	50	50	50	50	50	50	50	▲	▲	50	50	50	50	50	50	50	▲	▲	50	50	30	30
	Compressed air (non breathable)	50	50	50	50	50	50	50	▲	▲	▲	▲	▲	50	50	50	50	▲	▲	▲	▲	30	▲
	Compressed air (breathable)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
	Carbon monoxide	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
	Carbon dioxide	50	50	50	50	50	50	50	▲	▲	50	50	50	50	50	50	50	▲	▲	50	50	50	50
	Argon, Argon/CO_2	50	50	50	50	50	50	50	▲	▲	50	50	50	50	50	50	50	▲	▲	50	50	50	50
	Inert Gases*, Nitrogen	50	50	50	50	50	50	50	▲	▲	50	50	50	50	50	50	50	▲	▲	50	50	50	50
Parameters	Nominal flow rate N_2 (m³/h)	30	57	125	80	150	400	600	12	50	80	150	400	450	750	600	900	32	400	600	900	1500	1500
	Adjustable back pressures (bar)	0,5 – 2,6	0,8 – 6	1 – 18	0,5 – 2,6	0,8 – 6	1 – 18	2 – 40	0,2 – 1,4	0,8 – 7	0,5 – 2,6	0,8 – 6	1 – 18	0,8 – 6	4 – 12	0,8 – 6	4 – 12	0,2 – 1,4	0,8 – 7	0,8 – 6	4 – 12	0 – 10	0 – 10
	Max. allowable inlet pressure (bar)	50							25									25	50				
	Item number	153719	153720	153718	153732	153734	153721	153733	18121	149385	193965	193966	193967	153737	153735	153739	153740	18136	149386	193962	193963	205812	205813

Column heading group: Pressure Regulators

(300) Suitable up to an operating pressure of… ▲ Not suitable

* Inert gases = nitrogen, argon, helium and other compressed noble gases

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