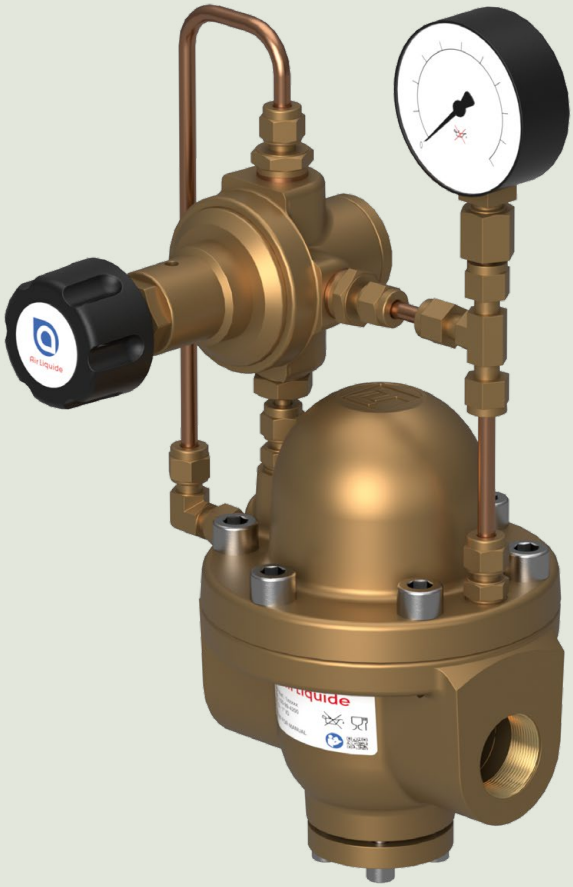
Dome Pressure regulator for industrial gases

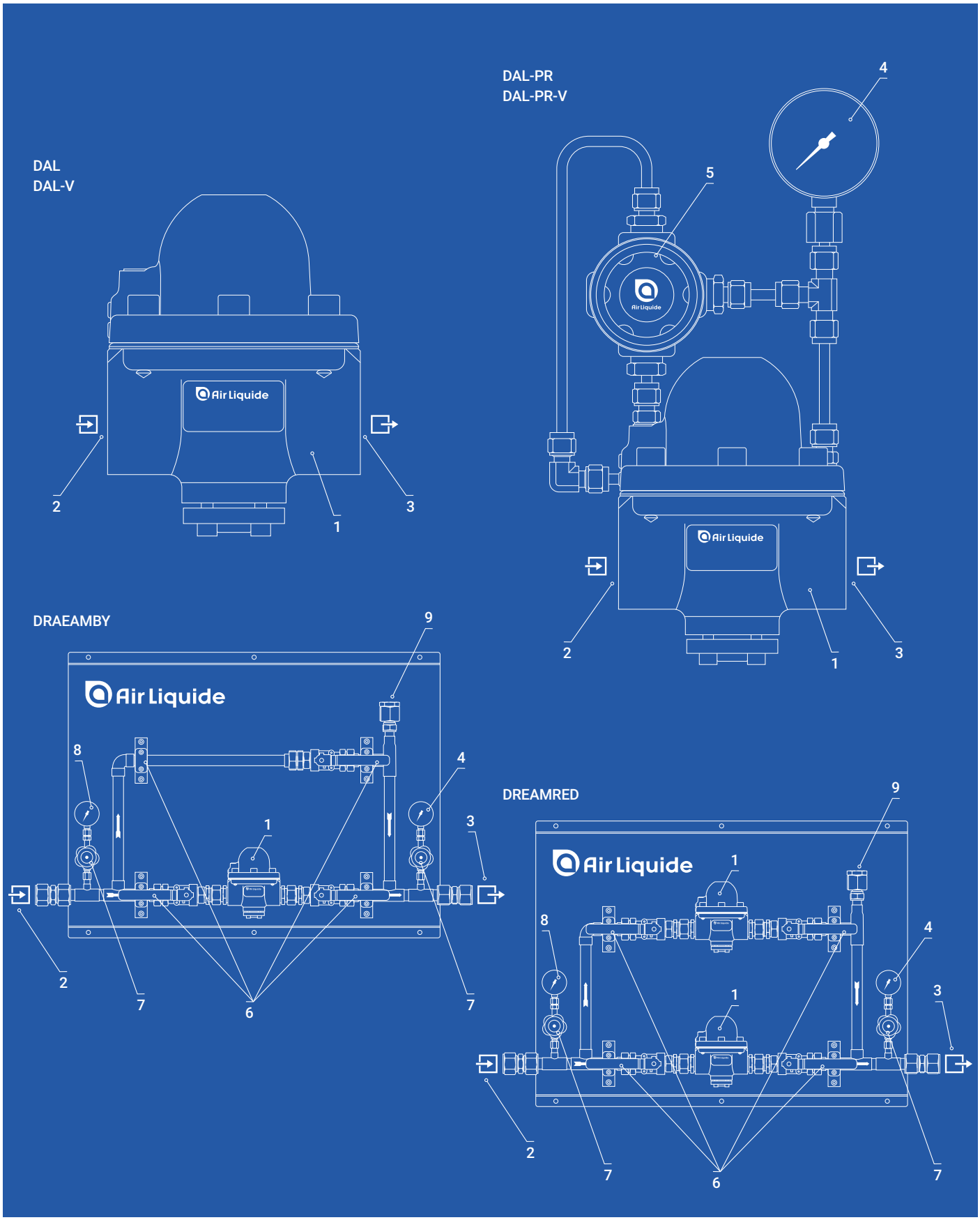
Operating manual



OP 240

Dome Pressure regulator for industrial gases

Content



1. Regulator body
2. Inlet
3. Outlet
4. Back pressure gauge
5. Pressure regulator handle
6. Ball valve
7. Pressure gauge Shut-off valve
8. Inlet pressure gauge
9. Connection - safety valve

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.
Nethertheless, 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.

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2 Field of usage

2.1 Functions

DAL dome pressure regulators are designed for the following applications:

- Pressure reduction/regulation in a pipeline
- Regulation and stabilisation of the outlet pressure
- Maintaining gas purity

The dome pressure 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.

2.2 Intended Use

The line pressure regulators are used in the pipeline network to regulate the pressure and flow of the gas up to the maximum permissible pressure and flow.

For the maximum permissible pressure and gas compatibility, please refer to the appendix or the data sheet. For more technical information, please refer to the data sheet.

The regulators are not designed, like cylinder pressure regulators, to make frequent adjustments in the negative pressure range. Normally, the pressure is set at start-up and should only be adjusted if the downstream pressure has changed. This happens relatively rarely.

Dome pressure regulators must not be used as shut-off valves.

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

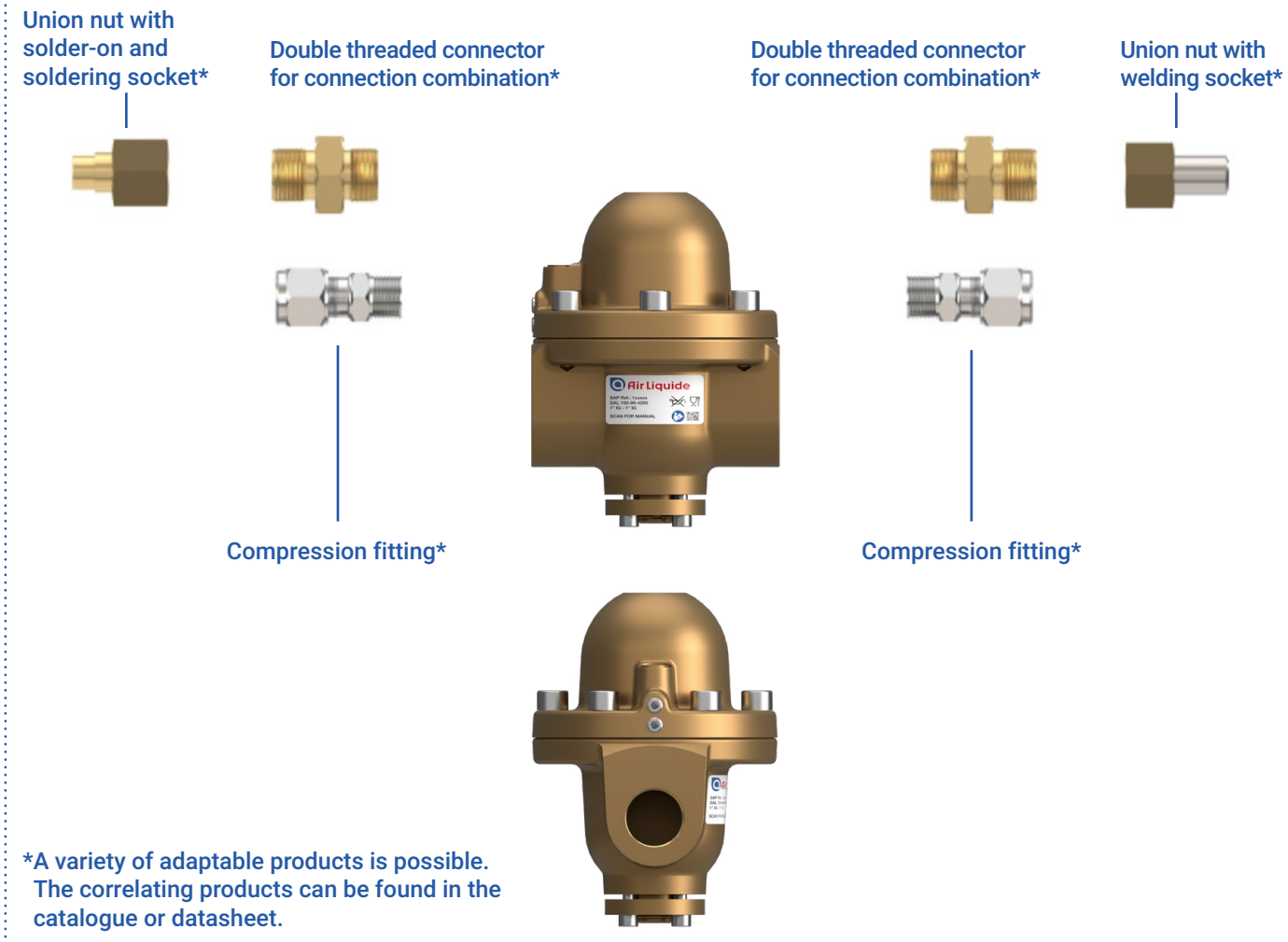
After opening the packaging, check that the equipment is not damaged and that the contents correspond to the accompanying delivery notes.

- 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

3.3.1 Pipe and wall installation

- The DAL should be attached to a stable surface using clamps or brackets (weight approx. 6 kg).
- Pay attention to flow direction. These are marked by arrows on the regulator housing.
- The gas pipes are connected using compression or screw connections (see example).
- When used in oxygen, special attention must be paid to the absence of oil and grease, but also to the cleanliness of the screw connections and piping.
- Before and during commissioning, the connection points must be checked for leak.



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

3.3.2 Installation instructions for control system

- Fasten the console of the control system through the intended bores on the panel.
- Pay attention to the direction of gas flow.. These are indicated by arrows on the regulator housing and piping.
- The gas lines are connected using connection fittings. Fittings are within the scope of delivery
- When used with oxygen, make sure that there the connection fitting and pipes are clean of oil and grease.
- Before and during commissioning, the connection fittings must be checked for leaks.

3.3.3 Installation instructions for control unit

The retrofit kit for the DAL consists, among other things, of components 1 to 5.

a) On the input side of the DAL, remove the lower of the two grub screws with a 4 mm Allen key.

b) At this point, mount the pipe socket (1) with the two O-rings (TX 20).

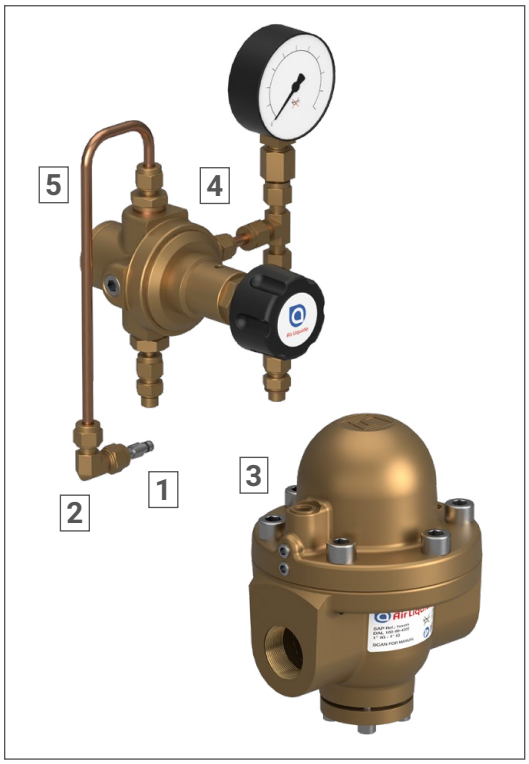
c) Place the angle (2) clamping ring on this pipe socket and tighten the nut (internal clamping ring) hand-tight.

d) Remove the locking screw of the dome chamber (above the grub screws) and replace it with the clamping ring screw connection including the sealing ring (3).

e) Now place the pre-assembled control pressure regulator (4) with the pipe socket on the screw connection mounted under d).

f) Then place the pipe bend (5) in the angle (2) and the control pressure regulator (4).

g) Tighten all nuts firmly with a size 14 open-end wrench **(Important: lock!).** This completes the installation of the control unit for operating.



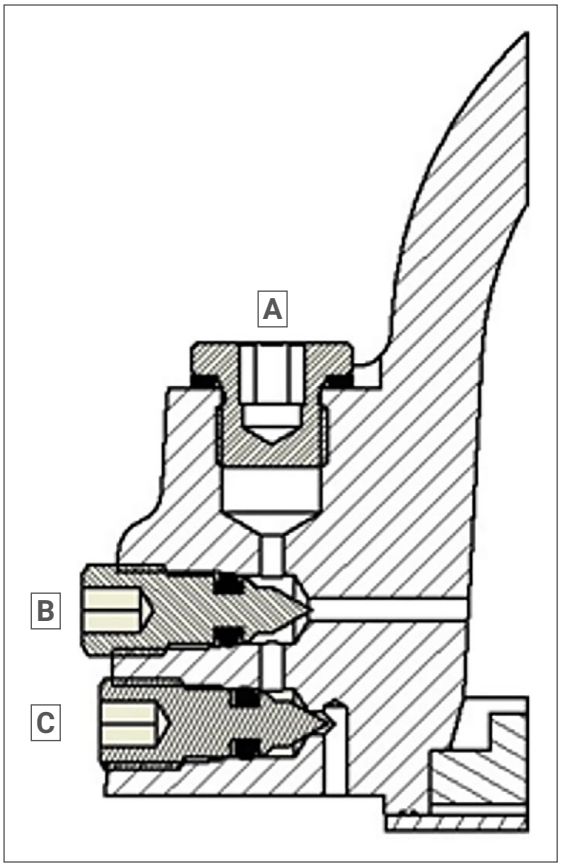
3.4 Without pilot pressure regulator

3.4.1 Firstly, loosen the screw plug A and the needle valve B (see illustration below) so that any gas pressure trapped in the dome pressure can escape and the dome is depressurised. Subsequently, close A and B again, but B only hand-tight. In a closed condition, meaning when depressurized, the DAL must not show any leakage. To check for leakages, open the shut-off valves at inlet and outlet (not included in scope of supply).

3.4.2 Open needle valve C by approx. half a turn and then needle valve B slowly, to allow pilot gas to flow into the dome. Now process gas starts flowing and builds up pressure at the outlet pipe. This can be observed on a pressure gauge (not included in scope of supply). Continue filling the dome until the desired outlet pressure is reached. Then close needle valves B and C again, both hand-tight only.

3.4.3 If the outlet pressure is too high, depressurize the dome as explained under 3.4.1. Subsequently, repeat 3.4.2. Now the DAL is configured and ready for operation.

3.4.4 If outlet pressure drops, readjust the pilot pressure inside the dome. To this effect, repeat 3.4.2.



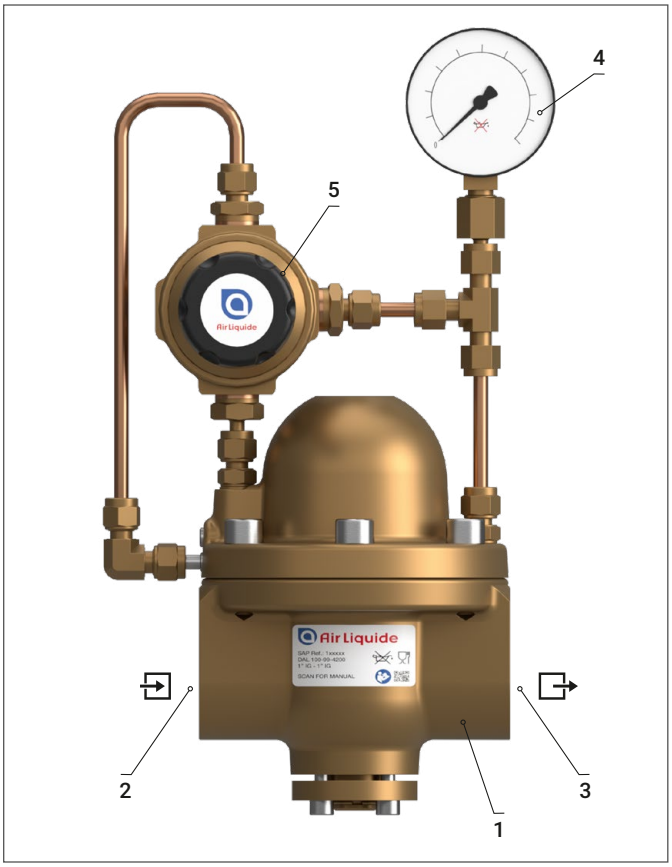
3.5 Commissioning with pilot pressure regulator

3.5.1 Turn handle on pilot pressure regulator counter clockwise to allow potentially encapsuled gas inside the dome to escape at type 1 to 4, so the dome chamber is depressurized. Additionally open the outlet pipe because the dome chamber will be depressurized over the outlet pipe. In a closed condition, meaning when depressurized, the DAL must not show any leakage. To check for leakages, open the shut-off valves at inlet and outlet (not included in scope of supply).

3.5.2 Turn handle on pilot pressure regulator **slowly** clockwise, to allow pilot gas to flow into the dome. Now process gas starts flowing and builds up pressure at the outlet pipe. This can be observed on a pressure gauge. Continue filling the dome until the desired outlet pressure is reached.

3.5.3 If the outlet pressure is too high, depressurize the dome as explained under 3.5.1 Subsequently repeat 3.5.2. Now the DAL is configured and ready for operation.

3.5.4 If outlet pressure drops, re-adjust the pilot pressure inside the dome. To this effect repeat 3.5.2.



1. Regulator body
2. Inlet
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4. Back pressure gauge
5. Pressure regulator handle

4 Marking

4.1 Type plate

On the base plate of the pressure control panels there is a type plate with details of Manufacturer, date of manufacture, type designation, approved inlet pressure (P1), device-specific outlet pressure or mean closing pressure pressure (P2), maximum flow rate and article number.

4.2 CE marking

As the station has been designed in accordance with the Pressure Equipment Directive Article 4 Para. 3, has been designed and manufactured in accordance with “good engineering practice”, CE labelling is not permitted. The manufacturer’s labelling is affixed to the rating plate.

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	Valve seat cross-section limits the flow rate.	Open the valve.
	Under-dimensional equipment.	Contact Air Liquide.
	Downstream device not operational.	Check downstream fittings.
Rise of the outlet pressure	Leakage at the valve cone.	Replace the controller.
Vibrations	Flow rate is too high, or inlet pressure too low.	Limitation of the flow rate by means of a valve or a calibrated orifice. Ensure sufficient inlet pressure.
	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 use, the device must be disposed of after 10 years.

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.

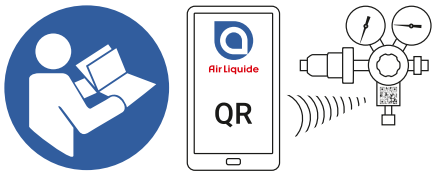
6 Appendix

6.1 Gas Compatibility

Designation	Parameters			The most important gases – gas purity < or = 4.8														
	Item number	Adjustable back pressures (bar)	Nominal flow rate N_2 (m^3/h)**	Inerte Gases*/***	Argon, Argon/CO_2	Carbon dioxide	Carbon monoxide	Compressed air (breathable)	Compressed air (non breathable)	Oxygen***	Nitrogen monoxide	Hydrogen	Acetylen	Propane	Propylene	Ethylene	Methane	Ammonia
DAL 100-99-4200 1"IG-1"IG	214852	0 – 99	4200	100	100	100	◀	◀	100	◀	◀	100	◀	◀	◀	◀	◀	◀
DAL-V 100-99-4200 1"IG-1"IG	214853	0 – 99	4200	100	◀	◀	◀	◀	100	40	40	100	◀	10	10	70	100	◀
DAL-PR 50-49-200 1"IG-1"IG	214854	3 – 49	200	50	50	50	◀	◀	50	◀	◀	50	◀	◀	◀	◀	◀	◀
DAL-PR-V 40-39-200 1"IG-1"IG	214855	3 – 39	200	40	◀	◀	◀	◀	40	40	40	40	◀	10	10	40	40	◀
DAL-V DREAMBY 40-39-940	215589	3 – 39	940	40	◀	◀	◀	◀	40	25	40	40	◀	10	10	40	40	◀
DAL-V DREAMRED 40-39-1880	215590	3 – 39	1880****	40	◀	◀	◀	◀	40	25	40	40	◀	10	10	40	40	◀
DAL DREAMBY 40-39-940	215591	3 – 39	940	40	40	40	◀	◀	40	◀	◀	40	◀	◀	◀	◀	◀	◀
DAL DREAMRED 40-39-1880	215602	3 – 39	1880****	40	40	40	◀	◀	40	◀	◀	40	◀	◀	◀	◀	◀	◀

300 Suitable up to an operating pressure of ... ◀ Not suitable

* Inert gases = nitrogen, argon, helium and other compressed noble gases
** According to DIN ISO 2503, inlet pressure = 2x outlet pressure + 1 bar
*** For LASAL gases
**** Capacity: Max. 1.880 Nm³/h (without redundancy); 940 Nm³/h (fully redundant)



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Gebrauchsanleitung / Operating Instructions / Manuel d'utilisation / Istruzioni per l'uso

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