

Instructions.

REDLINE<sup>®</sup> pressure regulators  
for GENIE<sup>®</sup> cylinders.



# Operating instructions for cylinder pressure regulators.

Linde reserves the right to change product specifications or other reasons subsequent to publication.

## 1. Scope

These operating instructions only apply to pressure regulators from Linde. These regulators are clearly identified – they feature nameplates on the regulator and the name Linde on operating and pressure-regulating parts. These pressure regulators can also be integrated into gas supply systems. In this case, the operating instructions that apply to the gas supply system components should also be observed. It is the responsibility of each product manufacturer to issue operating instructions and product labels for the products or components sold or distributed by that manufacturer.

## 2. Basic safety advice

### 2.1 Management precautions

It is the responsibility of the coordinator/manager to ensure that the regulator is only operated by staff members who are familiar with the basic regulations on safety at work and accident prevention, have permanent access to these regulations, have read and understood

the chapter on safety and the warning notices in these operating instructions and have been professionally trained to use pressure regulators. Safety awareness among personnel must be checked at regular intervals. The responsibilities for assembly, start-up and operation are to be clearly defined. Personnel in training may only operate pressure regulators under the supervision of an experienced person. Management must ensure that all safety and warning notices are clearly legible in a readily accessible place. All repairs to the pressure regulator must be carried out by Linde to ensure its continued safety and performance.

### 2.2 Operator precautions

It is the responsibility of all persons who work with pressure regulators to comply with the basic rules and regulations on safety at work and accident prevention, and to familiarise themselves with the safety regulations for the gas being used.

### 2.3 Intended purpose

The pressure regulator is to be used exclusively to withdraw gas from pressurised containers. Any



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other use or application beyond this purpose is in violation of these operating instructions. Correct use includes observing all notices in the operating instructions, complying with the service and maintenance work required and paying attention to the nameplates and the data sheets.

The chromium-plated brass version of the regulator is intended for use with pure gases (other than corrosive gases), acetylene and carbon monoxide (CO). This regulator is approved for specialty gases and is not intended for any other installation or purpose. If the operator has any questions regarding the intended purpose or correct use, he or she should call +49.89.7446-1661.

Any non-approved use or application and/or any non-approved modification of the regulator or use of the modified regulator may result in serious accident or personal injury. Linde is not responsible for any non-approved use or incorrect applications.

## 2.4 Warranty and liability

As a basic rule, our "General Terms and Conditions of Sale" apply. These are available to the operator at the latest on conclusion of the contract. Warranty and liability claims in cases of personal injury or damage to property are excluded if they are due to one or more of the following causes:

- The pressure regulator is used in a way that does not conform with the intended purpose.
- The pressure regulator is incorrectly assembled, started up, operated or maintained.
- The pressure regulator is operated in conjunction with safety equipment that is defective or incorrectly installed or is operated with malfunctioning safety and protection devices.
- The operator does not observe notices in the operating instructions regarding transport, storage, assembly, start-up, operation, maintenance and equipping the pressure regulator with valves, inlet or outlet connections, etc.
- The operator has made unauthorised design changes to the pressure regulator.

- The operator has made unauthorised changes to the cylinder connections, is using non-approved gases, is exceeding the permitted input pressures or is using third-party or non-original gaskets.
- The operator has not diligently monitored equipment, screw connections and sealing components which are subject to wear and tear.
- Improper repairs have been carried out.
- The operator has undershot or exceeded the temperature range specified on the data sheet during operation or during storage.
- Disaster situations resulting from the effects of foreign bodies and force majeure.

This equipment is sold by Linde under the guarantee set forth in the following paragraphs. This guarantee only applies to equipment purchased directly from Linde or its authorised agents as new merchandise, and only applies to the first buyer thereof and not to devices that have been resold.

For a period of one (1) year from the date of original delivery (90 days in corrosive service) to the buyer, this equipment is guaranteed to be free from functional defects in material and workmanship and to conform to the description contained in this manual and any accompanying labels and/or inserts, provided that the same is properly operated under conditions of normal use and further that regular periodic maintenance and service are performed or replacements made in accordance with the instructions provided. Replaceable parts for this equipment are guaranteed to be free from functional defects in material and workmanship at the time of

original delivery and to conform at such time to the description contained in this manual and accompanying labels and inserts. The foregoing guarantee shall not apply if the equipment has been repaired by anyone other than Linde or a designated service facility, or in accordance with written instructions provided by Linde, or if it has been altered by anyone other than Linde, or if the equipment has been subject to abuse, misuse, negligence or accident. Linde's sole and exclusive obligations and the buyer's sole and exclusive remedies under the above guarantee are limited to the free-of-charge repair or replacement, at Linde's discretion, of the equipment or part which is reported to Linde's authorised agent from whom it was purchased, and returned with a statement of the observed deficiency and proof of purchase of equipment or part not later than seven (7) days after the expiration date of the applicable guarantee, to the nearest designated service facility during normal business hours, transportation charges prepaid, and which, upon examination, is found not to comply with the above guarantee. Return trip transportation charges for the equipment or part shall be paid by the buyer.

**Linde shall not be otherwise liable for any damages including but not limited to incidental damages, consequential damages or special damages, whether such damages result from negligence, breach of guarantee or otherwise. There is no express or implied guarantee which extends beyond the guarantee outlined here. Linde makes no guarantee of merchantability or fitness for a particular purpose with respect to the equipment or parts covered under this warranty. Furthermore, what is stated under the paragraph "guarantee" in the general conditions**

**for the supply of plant and machinery for export, ECE188, shall also apply.**

Linde retains full intellectual property rights to all products, design and utility models, and documents in general delivered to its customers. This instruction manual is an integral part of the contract and general terms of sale that have been accepted.

## 2.5 Explanation of warning notices

The following warning notices are used in these operating instructions:

- **Danger!** This notice means an immediate threat of danger to the life and health of people. Failure to observe this notice can result in serious health-damaging effects, including life-threatening injuries.
- **Warning!** This notice means a possible threat of danger to the life and health of people. Failure to observe this notice can result in serious health-damaging effects, including life-threatening injuries.
- **Caution!** This notice warns of a possibly dangerous situation. Failure to observe this notice can result in minor injuries or damage to property.
- **Notice!** This notice provides important information on the correct handling of the pressure regulator in the form of application tips and useful advice. Failure to observe this notice can result in malfunction of the pressure regulator or disturbance in the vicinity of use. It can also invalidate the warranty. Application tips are intended to help you to make optimal use of all the functions on your pressure regulator.

## 2.6 Organisational measures

The required personal protective equipment for operators is to be provided by the coordinator/manager. All safety equipment must be checked at regular intervals. If there is not enough oxygen or an excessively high concentration of harmful substances, self-contained breathing apparatus is required.

## 2.7 Safety equipment

Before starting work with the regulator, all safety equipment must be correctly installed and functional. Protective devices and safety equipment may only be removed after the pressure regulator or equipment has been shut down and measures have been taken to secure against restarting. On delivery of spare or replacement parts, the safety equipment is to be installed by the operator in compliance with regulations.

## 2.8 Safety measures in normal operation

Before starting the pressure regulator, ensure that no-one will be endangered by the starting-up procedure.

## 2.9 Danger through pressure

Release pressure from the gas supply system before commencing repair work. External influences such as high temperatures, thermal radiation or thrust can cause the pressurised gas cylinders or pressurised parts of the equipment to become very hot or burst. Please take the necessary precautions and safety measures.

## 2.10 Particular danger of leakage

By using very hazardous, hazardous or slightly hazardous gases, dangers to life and limb for the operator can occur if there is a leakage. This is

why safety notices with information for a doctor should be kept in an appropriate place. The operators are to be informed of the particular dangers of the gas and advised of personal and other protection measures.

### 2.11 Information on special types of gas

All parts which come into contact with oxygen must be completely free of oil and grease to avoid the danger of ignition and explosion! Only use greases that are proven to be compatible with oxygen.

### 2.12 Leakage of harmful gases and vapours

Open pressure relief valves and/or check valve malfunctions can cause harmful gases and vapours to escape.

Ensure sufficient ventilation or evacuation. For hazardous media, take particular safety precautions. In particular, the exits of the pressure relief and purge valves are to be released through secure tubing and the materials are to be disposed of safely and in an environmentally friendly manner. Optional connectable safety relief valves are available.

### 2.13 Design changes on the pressure regulator

Without written permission from Linde, no changes, extensions or redesigns are to be carried out on the pressure regulator or the equipment.

### 2.14 Cleaning the gas device and disposal of the residue

Do not contaminate the equipment with oily rags or grease. Do not clean with solvents.

## 3. Storage, transport

All parts must be cleanly packed and stored in a dust-free, dry and well-sealed environment. Correct packaging must be used. Do not use any cleaning agents containing solvents! Before returning to the manufacturer, it is imperative that all components that have been in contact with corrosive or toxic gases are first purged with inert gas.

- Transport, storage and handling operations must be carried out by qualified personnel, using appropriate facilities.
- Pressure regulators must be transported and stored in their original packaging; any deterioration of the packaging can affect the operation and safety of the product.
- Pressure regulators must be stored in a room protected from dust and humidity, at a temperature of between 40 and +70 C; do not expose the unprotected pressure regulator to harsh weather conditions.
- Never transport the cylinder by carrying it by the valve or by the pressure regulator assembly.
- Always remove the pressure regulator from the cylinder for transport, when not in use.
- Keep out of the reach of children.

## 4. Technical data

### 4.1 Data sheets

All technical data is contained in the product-specific data sheets. These are valid along with the general operating instructions. The technical data specifies the following in particular: permissible operating pressure, working range



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of the pressure regulator, materials, installation, external dimensions, leak-tightness, electrical operating conditions and permissible temperature ranges. Various metals, plastics, adhesives and lubricants are used in these pressure regulators. The inlet includes a sintered filter. If you plan to use the regulator for applications/specifications beyond those outlined in the data sheet, please contact Linde for confirmation that these metals, plastics, adhesives, lubricants and filters are compatible with your intended use scenario.

### 4.2 GENIE® C300 pressure regulator series

Four inlet and outlet ports with three NPT 1/4" and one NPT 1/8" (pressure gauge) internal threads.

### 4.3 GENIE C300 cylinder regulator

Cylinder regulators are designed to be connected directly to gas cylinders to lower the pressure of the gas exiting the cylinder to that required at the point of use. Please note that the cylinder



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connections have different threads depending on the gas.

### 4.4 Valves

#### Shut-off valve

An easy-to-operate 90° shut-off valve simply clicks into position. The open/closed position is clearly visible. Arrow on the hand wheel parallel to gas line – valve open. Arrow on the hand wheel at a right angle to the gas line – valve closed.

#### Regulating valve




Regulating valve to set (max. 5 turns) the desired flow. Please note: only shut-off valves guarantee secure closing of the gas flow.

### 4.5 Accessories

The GENIE C300 series comes with a comprehensive range of accessories such as tube fittings, shut-off valve, metering valve, hose nipples, contact pressure gauges and flame arrestors. To order, please contact your local Linde

representative. It is essential that assembly and installation instructions for these components are followed. Please ensure that undamaged gaskets with the correct dimensions are used and check that no threads are damaged, no leaks are present and that everything is functional when assembly is completed. Please also pay attention to the information under "Connection" and "Start-up".

## 5. Marking

bars	Pressure (1 bar = 100 kPa)
psig	Pressure (1 psig = 6.9 kPa)
"mm-yy"	Month – year of manufacture
- → +	Direction of increasing pressure
 or LP	Low pressure gate
MP	Medium pressure gate
 or HP	High pressure gate
	Safety valve

## 6. Connection

- Ensure your hands are clean before installing or handling the pressure regulator.
- Connect the pressure regulator to the gas supply system.
- Unscrew the hand wheel of the pressure regulator and check that the downstream system is closed.
- Slowly open the shut-off valve. Check the pressure on the supply pressure indicator.

- Slowly screw in the hand wheel of the pressure regulator until the flow is established.
- Check the sealing of the complete assembly, particularly the adapters. **Caution:** Never attempt to tighten a union which is under gas pressure.
- Close the supply valve. Bleed the unit. Unscrew the hand wheel of the pressure regulator.

### Cylinder regulator

**Danger!** Thread on cylinder valve and swivel nut must be undamaged.

**Warning!** Only ever use new gaskets. Gaskets must not be deformed and must not show traces of dirt or metal shavings.

**Warning!** Do not use any spanner extensions as otherwise the thread and the gasket could be damaged. This can lead to leakage, uncontrolled release of gas or the entire contents of the cylinder pouring out.

**Caution!** Before connecting, use the nameplate to check whether the equipment to be used is suitable for the intended purpose (type of gas, pressure, etc.). Refer to information on "marking".

### Preparation

Only use regulators with cylinder connections which correspond to the type of gas and the valid national standards for cylinder connections.

### Connecting to gas cylinder

Screw the swivel nut onto the valve connection on the cylinder by hand. Pay attention to right-handed and left-handed threads! Align the pressure regulator. When mounting do not tilt!

**Warning!** Do not use a spanner extension as otherwise the gasket and the thread could be damaged. This can lead to leakage and uncontrolled release of the cylinder contents (or even complete loss of gas!).

### Connecting the outlet tubes

Tubes are usually connected with compression fittings. Assembly is carried out by completely inserting the tube into the compression fitting. Then screw on the swivel nut by hand and tighten with a fork spanner (2/4 turn below 6 mm; 1 1/4 turn from 6 mm). Please pay attention to information provided by the manufacturer and verify the suitability of the materials for certain gases and pressure ranges.

## 7. Start-up

**Danger!** Before starting operation, use the nameplate to check whether the pressure regulator to be used is suitable for intended purpose (type of gas, pressure, material, etc.).

**Warning!** Before switching on the pressure regulator, ensure that no-one can be endangered by the start-up procedure.

### Preparation

Ensure that the gas tubes are properly connected. Turn the hand wheel of the regulator in an anti-clockwise direction as far as it will go – this means that the gas flow is now stopped. Close all valves.

### Process gas extraction

Slowly open the cylinder valve (shut-off valve on the pressurised gas container). Watch the inlet pressure gauge. Adjust the required outlet pressure by turning the regulator hand wheel clockwise. Adjust the required flow on the regulating valve (if applicable).

## 8. Cylinder change

**Danger!** When changing cylinders with toxic, corrosive gases, the appropriate protection measures must be taken to protect personnel (breathing apparatus, eye protection and protective clothing). Maximum permissible workplace concentration values must be observed and the correct breathing protection filters must be available.

### Preparation

Tightly close the cylinder valve (on the pressurised gas container). Close the inlet valve. Completely empty the regulator. The pointers of the inlet pressure and outlet pressure gauges must both be at "0". Turn the hand wheel of the regulator to the left until it comes to a stop (flow closed). Close the outlet valve.

## 9. Shutting down operations

**Caution!** When dismantling, release pressure from the regulator and tubing by venting the gas via the downstream equipment. The pointers of the inlet and outlet pressure gauges must point exactly at "0".

### 9.1 Cylinder regulator

For short interruptions of the gas flow, it is sufficient to close the shut-off valve on the regulator. For longer interruptions, close the cylinder valve, let the regulator discharge the pressure via the downstream equipment and close the regulator by turning the hand wheel anti-clockwise.

## 10. Maintenance and malfunctions

### 10.1 Maintenance

When unpacking or installing the pressure regulator, make sure that everything is in order (all items present, correct condition of the indicators, appropriate connectors, etc.).

The pressure regulator must not be subjected to any violent shocks: a damaged pressure regulator must not be used. In such cases, have the unit overhauled or replaced.

- Only use equipment which is in perfect condition and ensure that it is compatible with the type of gas used and with the required pressures and flow rates.
- Keep the unit and its accessories clean during handling (no dust, water or grease, etc.).
- The pressure regulator is designed to be connected to appropriate accessories. The assembly of such accessories must be carried out by qualified personnel.

The pressure regulator should be examined regularly to make sure it is working correctly

and to check for leaks. When carrying out maintenance and service work, inform the operating personnel and users before starting work. The power supply for all associated operating equipment must be disconnected before undertaking service and maintenance work, and the main switch must be secured against unexpectedly being turned back on. Check fittings which have come undone for correct positioning. After completing maintenance work, make sure that the safety equipment is functional again.

**Danger!** For safety reasons, repair and maintenance work should only be carried out by authorised Linde service representatives.

### 10.2 Malfunctions

Experience has shown that these regulators have a high level of reliability. Should any of the following malfunctions nevertheless occur, you should exchange the regulator and have the defective equipment repaired:

- Gas release at the outlet of the regulator when the hand wheel is completely closed.
- Display of increasing pressure on the outlet pressure gauge when the valve is closed or no gas is flowing.
- Gas release at the regulator cover.
- Gas release at a gasket.
- Too high pressure drop with normal flow.
- Gas release at the pressure relief valve.
- Gas release at the pressure gauge.
- Pointer of a pressure gauge does not return to "0".
- Faulty pressure display.

Failure	Cause	Remedy
Insufficient gas flow	Valve closed or not fully open	Open the cylinder valve
	Cylinder empty or not sufficiently full	Change the cylinder
	Non-operational valve	Change the cylinder
	Non-operational pressure regulator	Call Linde
	Non-operational downstream equipment	Replace the equipment
Assembly impossible	Non-compatible adapters	Check the compatibility of the gas and the pressure regulator
	Damaged adapters	Call Linde
Gas leaks from the valve	Leak from seat disk holder of pressure regulator	Close the cylinder valve and call Linde
Icing	Excessively low operating temperature	Close the cylinder valve bring the unit back to ambient temperature
	Excessive flow rate	Return to utilisation at nominal flow rate

## 11. Returning pressurised equipment

**Danger!** Pressurised equipment can only be returned if it is completely free of fluids and has been purged. The packaging must be sealed gas-tight.

**Danger!** Comply with local rules and legislation with regards to transport and storage of hazardous goods and materials.

## 12. Manufacture

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