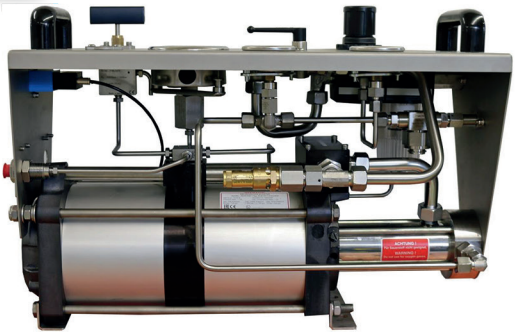
Booster Station

Operating Instructions

Picture Courtesy of the Petroleum Engineering Department
at the Colorado School of Mines, Golden, CO USA



PVT Instrumentation

The Leutert Booster Station is used to compress nitrogen into the sample chambers of the one phase™ samplers and cylinders to a pressure rate above the well pressure.

Contents

1 Basic Information

1.1 Information about the Instructions

These instructions describe how to use the system safely and appropriately. The safety information and instructions, as stated, must be complied with. In addition, local occupational safety provisions and general safety regulations apply to the area in which the system is used.

1.2 Other Applicable Documents

Components from other manufacturers are installed in the system. These purchased assemblies have been subjected to a risk analysis by the manufacturers. The manufacturers of the components have declared that the designs are consistent with applicable European and national regulations.

1.3 Warranty and Liability

In principle, the "General Terms and Conditions of Sale and Delivery" submitted to the operating company by the manufacturer shall apply. Any warranty and liability claims in the event of personal injury or material damage are precluded if they are due to one or more of the following causes:

- Improper use of the system.
- Incorrect commissioning, operation and maintenance of the system.
- Modifications of the system without the manufacturer's prior agreement.
- Operating the system with defective safety equipment or improperly installed safety and protective equipment.
- Failure to comply with the information in these instructions in respect of assembly, commissioning, operation and maintenance.
- Inadequate monitoring of system parts that are subject to wear and tear.
- Improper repair work on the system or system parts.

1.4 Explanation of Symbols 1

Important safety information is marked by means of symbols in these instructions. This information must be observed in order to avoid personal injuries and material damage.

WARNING! Injury hazard or life-threatening hazard!
This symbol identifies information which, if not observed, may result in an impairment of health, injuries, permanent physical harm or even death and/or material damage.

WARNING! Electric shock hazard!
This symbol draws attention to hazardous situations caused by electric currents. If the safety information is not observed, there is a risk of serious injuries or death. Any work to be performed may be carried out only by an instructed qualified electrician.

WARNING! Hazardous substances!
This symbol indicates environmental pollution or health risks associated with the use of hazardous substances.

WARNING! Explosion hazard!
This symbol indicates a risk in the event of use in explosive atmospheres.

WARNING! Toxic substances!
This symbol indicates a health hazard due to toxic substances or accumulations of gases / vapours that may lead to unconsciousness or adverse health effects.

WARNING! Flying particle hazard!
This symbol indicates a hazard due to flying particles.

NOTE about wearing personal protective equipment!
This symbol indicates a situation in which wearing appropriate protective equipment is necessary.

NOTE about reading the documentation and data sheets!
This symbol indicates that the enclosed documents must be read.

Reference to additional information!
This symbol refers to useful additional information.

1.5 Explanation of Symbols 2

Important safety information is marked by means of symbols in these instructions. This information must be observed in order to avoid personal injuries and material damage.

Warning: Suspended load!
This symbol identifies a risk which, if not observed, may result in an impairment of health, injuries, permanent physical harm or even death and/or material damage.

Prohibition sign: No anchor points!
This symbol identifies a prohibited action which, if not observed, may result in an impairment of health, injuries, permanent physical harm or even death and/or material damage.

Observe advice about anchor points!
This symbol identifies information which, if not observed, may result in an impairment of health, injuries, permanent physical harm or even death and/or material damage.

Note: Use a stacker!
This symbol identifies information which, if not observed, may result in an impairment of health, injuries, permanent physical harm or even death and/or material damage.

2 Basic Safety Information

2.1 Standards and Directives

The system has been built in accordance with the current state of the art and generally accepted safety rules. In designing the system, basic safety requirements, as well as standards and directives, have been applied in accordance with the declaration of conformity. All safety information is based on currently applicable regulations issued by the European Union. Apart from the safety information provided in these instructions, the generally accepted rules of accident prevention and environmental protection have been observed and complied with.

2.2 Intended Use

The Booster Station is used for boosting pressure in gas systems up to max. 1,300 bar and is intended for the following fluid: Nitrogen (N2)

It is solely designed for assembly with other machines to create a complete machine. Operational safety is guaranteed only if the system is used appropriately.

Appropriate use also includes compliance with the operating conditions, as well as the information contained in these instructions.

2.3 Foreseeable Misuse

The system is designed for operating fluids according to the intended use. Compliance with these instructions must be taken into account. Using other fluids without first consulting the manufacturer is prohibited and may cause personal injury and material damage.

Drive pressure > 10 bar, max. 20°C (PL)

Falling below or exceeding the operating temperatures -20 °C to 60°C

2.4 Personal Protective Equipment

In line with the risk assessment, the following protective clothing must be worn:

- Gloves and protective goggles when carrying out maintenance activities
- Protective goggles during initial start-up and re-start operations due to possible leaks
- Wear a helmet when lifting loads

2.5 Hazards that may emanate from the System

The following section lists residual risks that may emanate from the system even if it is used as intended.

Symbol	Event	Cause	Note
	Starting	No restart protection available	In the event of returning drive energy (drive pressure), the pressure generator starts to pump and build up pressure depending on the system configuration.
	Energy supply fault		
	Normal stopping	Primary pressure present, or in the case of more than one pressure generator, the "second stage" continues even though the "first stage" has been switched off.	Depending on system configuration, the line pressure of a mains-side fluid supply may be present at the outlet even after a pressure generator has been switched off. Likewise, pressure generators can operate in parallel, resulting in pressure continuing to be built up after one pressure generator has been switched off.
	Completeness of machinery	Partly completed machinery, no interface for emergency-stop circuit exists.	
	Noise	No noise protection measures present; must be analyzed during incorporation into the system as a whole (if necessary, wear hearing protectors).	
	Vibrations	Vibrations may occur; this must be analyzed during incorporation into the system as a whole.	
	Emission of hazardous materials and substances	Some hazardous substances are present; this must be analyzed during incorporation into the system as a whole.	Hazardous substances can also be pumped depending on the unit configuration.
	Isolation of energy sources	Primary pressure still present	Pressure may be present at the unit's inlet, depending on configuration.
	Explosion	Implementation according to ATEX	Only systems with corresponding labelling and with an enclosed declaration of conformity in compliance with the ATEX Directive have been implemented appropriately.

Symbol	Note
   	**Pneumatic and hydraulic energy can cause serious injuries.** If individual components are damaged, highly pressurized fluids may escape and result in physical injury and/or material damage: • Depressurize the system before beginning any work. • Do not remove, modify or deactivate safety equipment. • Do not modify pressure settings beyond the max. values indicated.
	**Flying particle hazard!** The system can be used to generate very high pressures. Therefore only use attachment parts (adapters, hoses etc.) that have been approved for these pressure ranges.
	**Asphyxiation hazard!** Nitrogen as a drive fluid displaces oxygen! When using nitrogen, ensure that there is sufficient ventilation.

2.6 Basic Safety Measures

The following basic safety measures must be complied with:

- The system may be used only as intended.
- All safety information contained in these instructions and in all other documentation must be observed and complied with.
- The system may be assembled, operated and serviced only by trained and instructed specialist personnel. The specialist personnel must have read and understood the instructions. This includes, in particular, knowledge about how to avert risks of injury to the operator and third parties.
- No unauthorized persons may have access to the system.
- All safety information contained in these operating instructions and in all other documentation must be observed and complied with.
- Outages and adverse environmental impact due to incorrect handling must be precluded.
- Basic specific protection measures for handling hazardous or environmentally harmful fluids must be observed.
- The operating company must take steps to ensure compliance with the occupational safety provisions in terms of oil and grease content in released compressed air / drive fluid.
- All work on the system must be carried out carefully and with safety in mind.
- The relevant regulations on occupational safety and environmental protection must be observed during transportation, assembly and dismantling, operation, maintenance and service work.
- Spare parts must always be obtained from LEUTERT. LEUTERT accepts no liability for damage resulting from the use of spare parts supplied by other manufacturers.

2.7 Requirements on Specialist Personnel

Prior to commencement of work, any hazards involved in using the system must be pointed out to specialist personnel.

The system may pose injury hazards if not operated by trained and qualified personnel.

Any specialist personnel instructed to commission, service or repair the system must have read and understood the instructions in their entirety. This also applies if the specialist personnel in question have already operated, or received training for, the system.

The instructions must be available to the specialist personnel at all times. We recommend that you obtain written confirmation from the specialist personnel that they are familiar with the contents of the instructions.

The operating company or authorized specialist personnel that handle the system in accordance with their operational duties are responsible for ensuring accident-free operation.

To ensure safe handling of the system, specialist personnel are obliged to observe the following instructions:

- Personnel are not permitted to work on the system if they are overtired or under the influence of alcohol or medication.
- Specialist personnel must not have any physical limitations that diminish their attentiveness or judgment, either temporarily or permanently.
- Specialist personnel must wear protective clothing suited to the task at hand.
- All safety information contained in these instructions and in all other documents must be fully observed and complied with at all times.
- If hazards that might result in personal injury are identified, the system must be shut.

Specialist personnel must have sound knowledge of the following operational processes, regulations and practices:

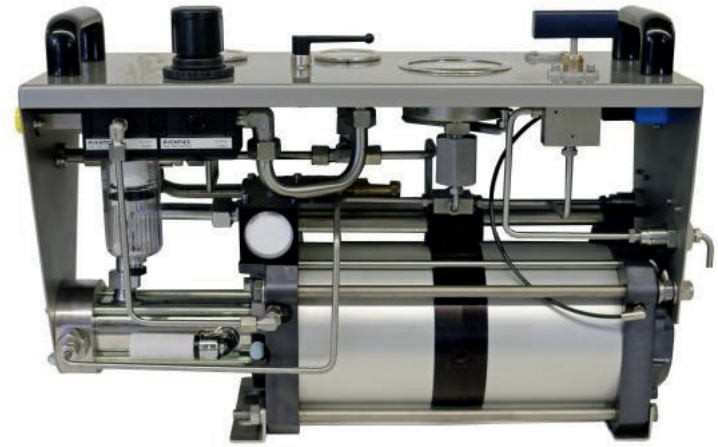
- Operational system processes
- Danger zone demarcations, safeguards and markings
- Procedures to be followed and measures to be taken in the event of danger

3 Technical Data

3.1 Features

- easy to operate
- compact construction style
- pneumatic drive
- automatic stop at endpressure
- automatic restart after pressure drop
- no electric energie required
- stationary

3.2 Specifications Booster Station



Type	:	DLE 75-1-2-GU-614 (4H)
Pressure ratio	:	1:150
Outlet Pressure max.	:	1,050 bar
Process fluid	:	Nitrogen
Flow max.	:	depending on application
Air pressure drive	:	min. 1 bar / max. 7 bar
Max. drive pressure PS	:	10 bar
Max. operating pressure PS	:	1,300 bar
Operating temperature TS	:	-20 °C to 60 °C
Dimension (W x D x H)	:	650 mm x 260 mm x 410 mm
Weight	:	34 kg

Connection values

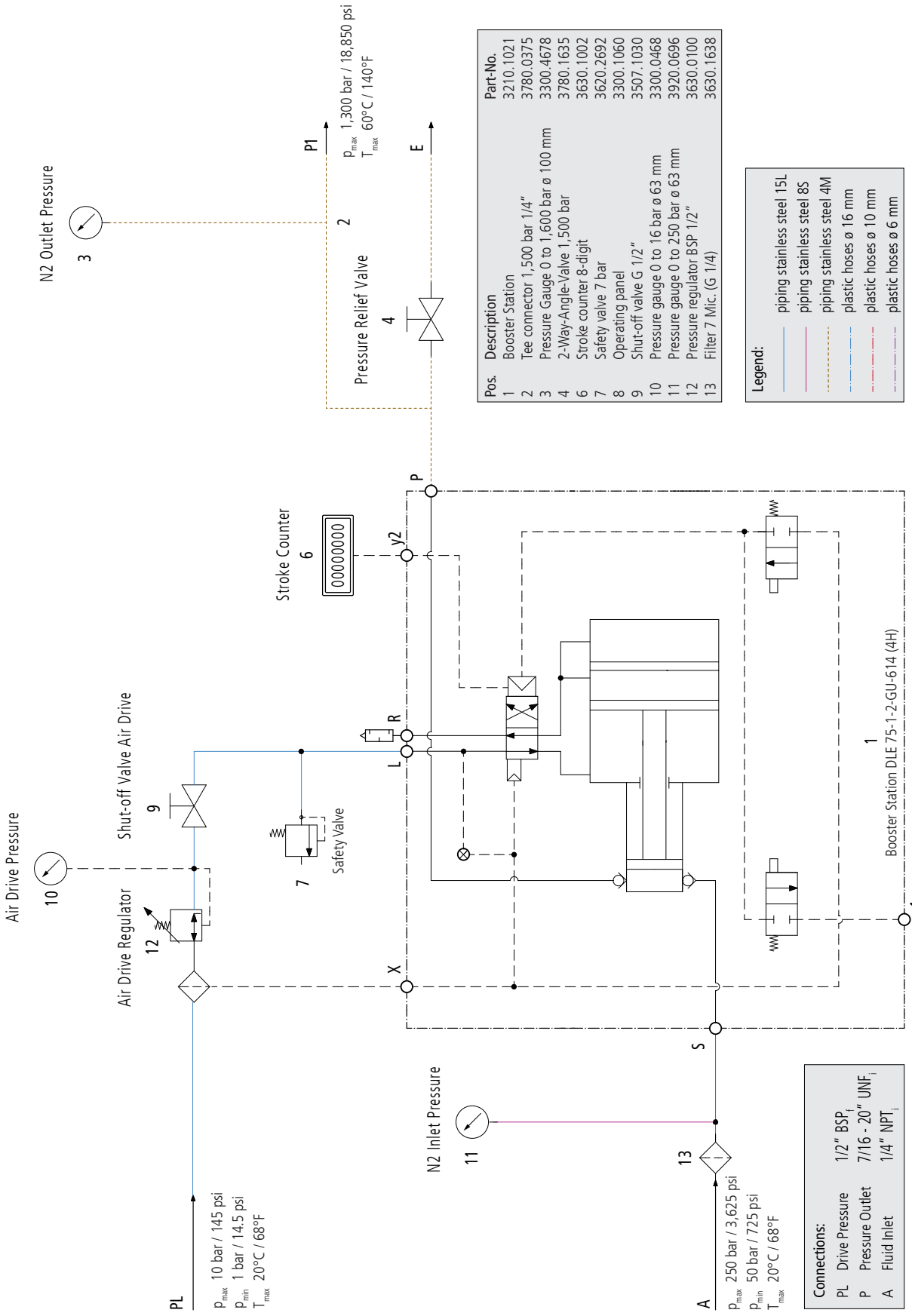
Drive fluid inlet (PL)	:	1/2" G / BSP_f
Primary pressure inlet (A)	:	1/4" NPT_i
Pressure outlet (P)	:	7/16 - 20 UNF_i

Airborne noise emission
Must be analyzed in the system as a whole.

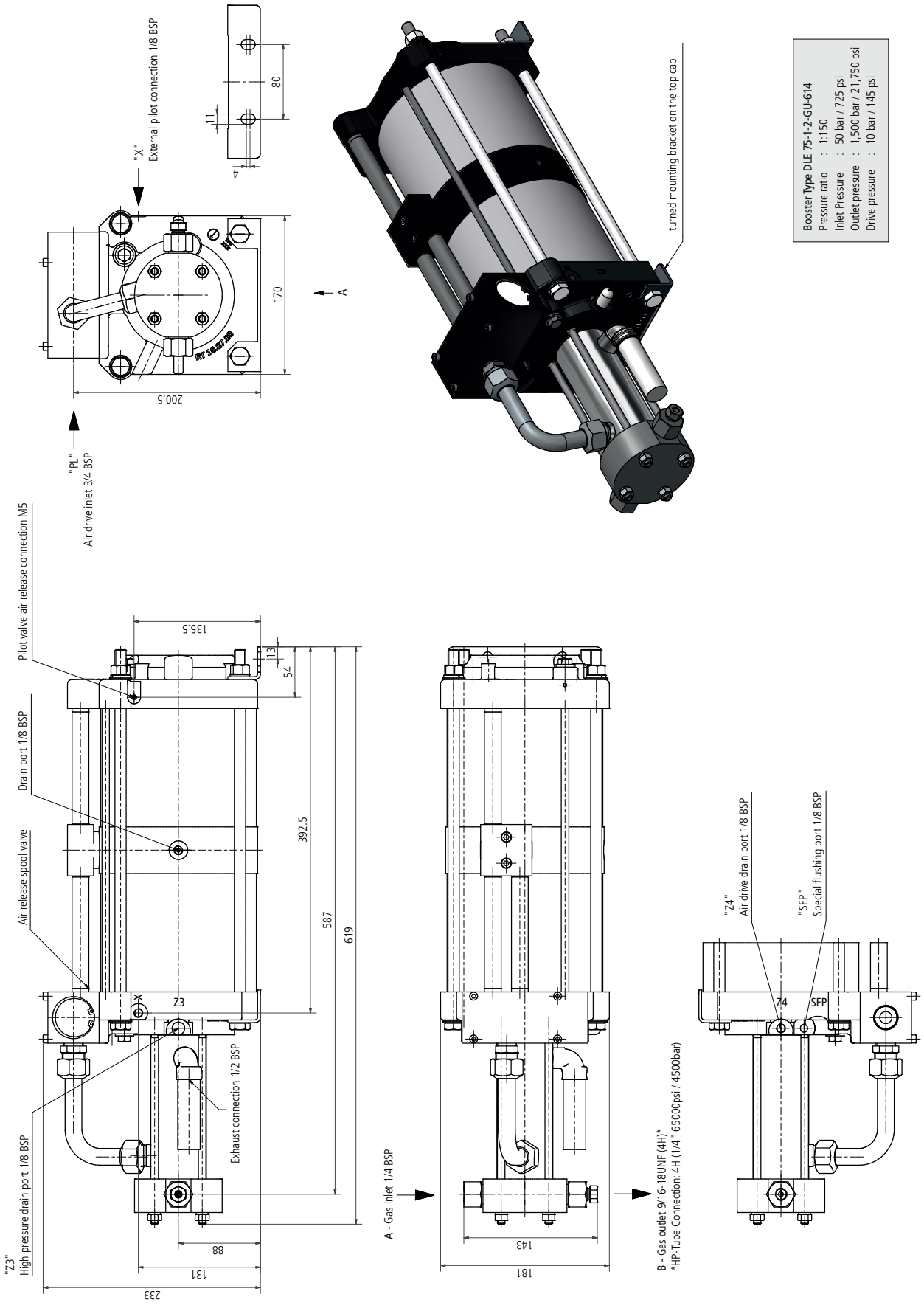
3.3 Specifications Gas Booster

Air drive pressure pL	:	1 to 10 bar / 14.5 to 145 psi
Pressure ratio	:	1:150
Compression ratio	:	1:20
Min. suction pressure pA	:	50 bar
Max. suction pressure pA	:	1,500 bar
Max. outlet pressure pB	:	1,500 bar
Displacement volume/double stroke	:	25 cm^3
Max. cycles	:	120 / min
Stall pressure	:	PB = i * pL
Max. operating temperature	:	100°C
Dimension (W x D x H)	:	448 mm x 181 mm x 275 mm
Net weight	:	20 kg

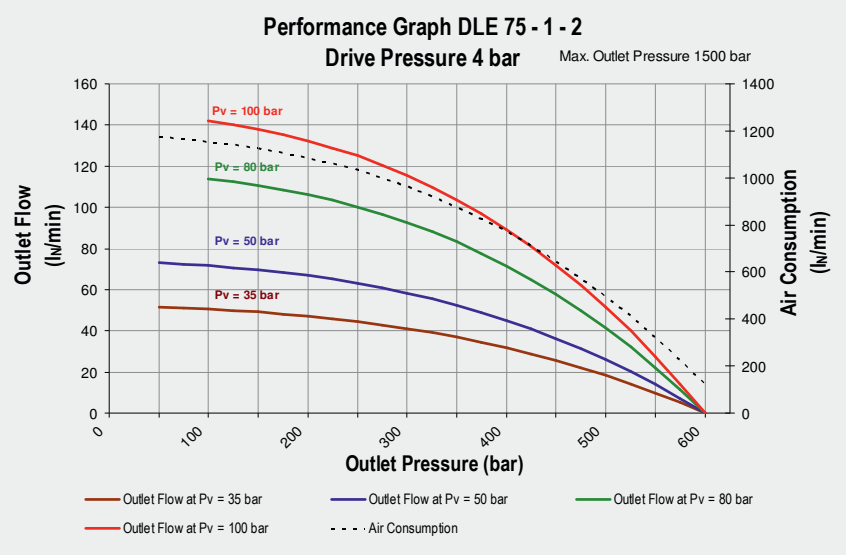
3.4 Fluid Diagram

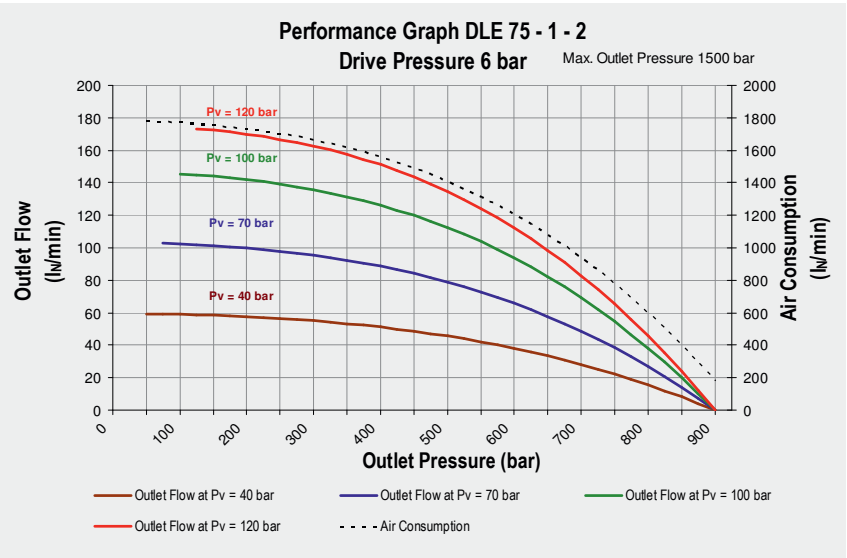


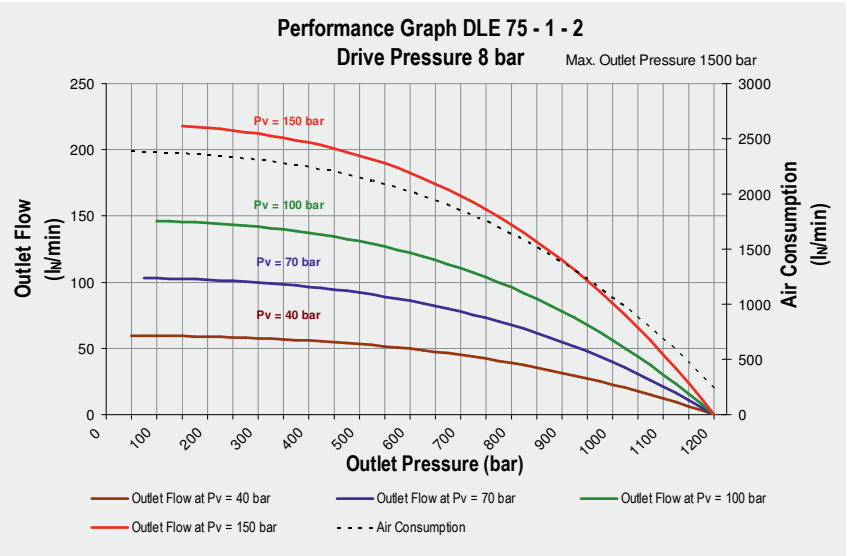
3.5 Dimension Drawing



3.6 Performance Graph







4 Commissioning the System

4.1 Safety Guidelines

Check that components are complete and in perfect technical condition and read the instructions as well as connection diagram and data sheets before setting the system up and installing it.

Only personnel with the relevant qualifications may assemble and install the system.

General accident prevention measures should be borne in mind before commissioning and filling the system; personal protective equipment (PPE) comprising protective goggles and gloves should also be worn.

Only use materials that have been approved for the fluid used and the pressure range in line with these instructions, connection diagram and intended use.

Damaged or unsuitable materials may cause serious physical injury and/or material damage!

4.2 Requirements on the Installation Location

The system can be installed both inside and outside buildings (protected from the weather).

Steps must be taken to ensure adequate ventilation or monitoring at the installation site, in particular with respect to systems for hazardous or environmentally harmful fluids. Steps must be taken to ensure safe discharge of leak and relief lines.

The installation surface must be flat and free of contamination and have sufficient stability or load capacity. The system is designed for use in the following atmospheric conditions:

Temperature range	:	5 °C to 40 °C
Relative humidity	:	max. 60 %
Ambient pressure range	:	min. 1 bar less than the drive pressure

4.3 Minimum clearance

For operation and maintenance purposes, the system must be installed with sufficient clearance from walls, ceilings and other devices. Free access to the system must be possible at all times. For guide values for premises, see DIN EN547-1 and DIN EN547-3.

4.4 Supply lines

Install the supply lines required to operate the system in accordance with the applicable provisions and safety regulations.

Remove the factory sealing caps before connecting the supply lines. For the required connection dimensions, see the enclosed fluid diagram and section 3 “Technical Data“ in these instructions.

Supply lines on site need to be equipped with shutoff fittings to facilitate service and maintenance activities. Furthermore, steps need to be taken on site to ensure that the pumping rates of upstream pressure generators do not exceed the maximum discharge rate of installed safety valves.

Connections for safety valves need to be connected and implemented on site in accordance with AD2000.

4.5 Operating materials

Compressed air and the fluid to be boosted as defined in the system specification are required to operate the system.

These operating materials must be provided on-site by the operating company.

4.5.1 Drive Fluid

The drive air should exhibit the following quality classes as defined in ISO 8573-1:

Solids:	class 6:	max. particle size: 5 µm
Max. particle concentration:		5 mg/m³
Pressure dew point:	class 7:	10 °C water content of max. 5 g/m³
Oil content:	class 4:	≤ 5 mg/m³

4.5.2 Gas Quality

Solids:	max. particle size: 10 µm
Max. inlet temperature:	20 °C

The specified fluid quality ensures that seals and guide elements have an optimum lifetime.

4.6 Valve adjustment

Prior to initial start-up, check the adjustment of the shut-off valves and set them to the closed position, if necessary.

When the system is delivered, relief valves are always open and need to be closed for commissioning!

4.7 Initial start-up and re-start / operation

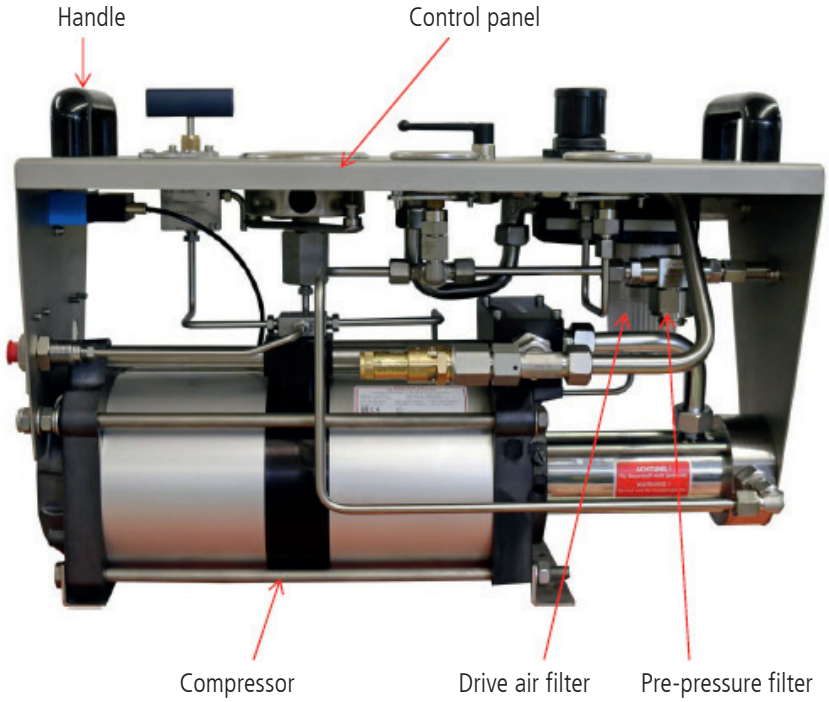
When starting up and re-starting the system after an extended standstill, take particular care to ensure that it is started up slowly. To ensure this, you will need to increase the drive pressure slowly.

The pressure generators should carry out several strokes with the relief valve open and with low drive and/or primary pressure.

5 Technical Description

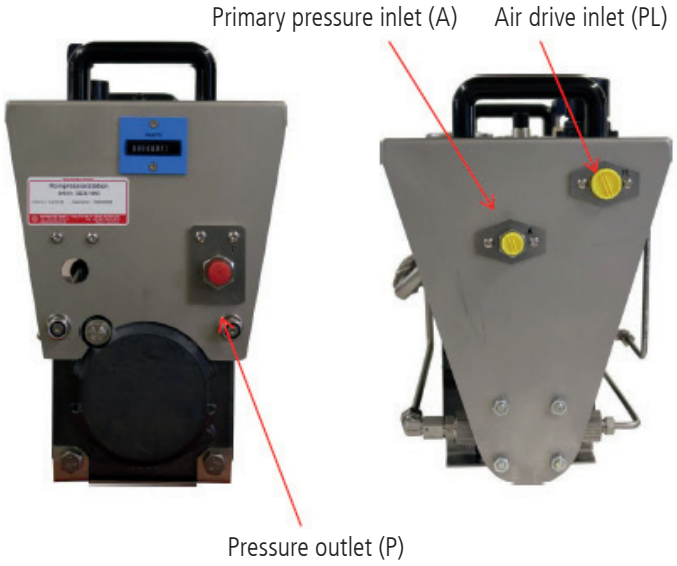
5.1 Essential Components

The item information/designations in these instructions are consistent with those in the fluid diagram.



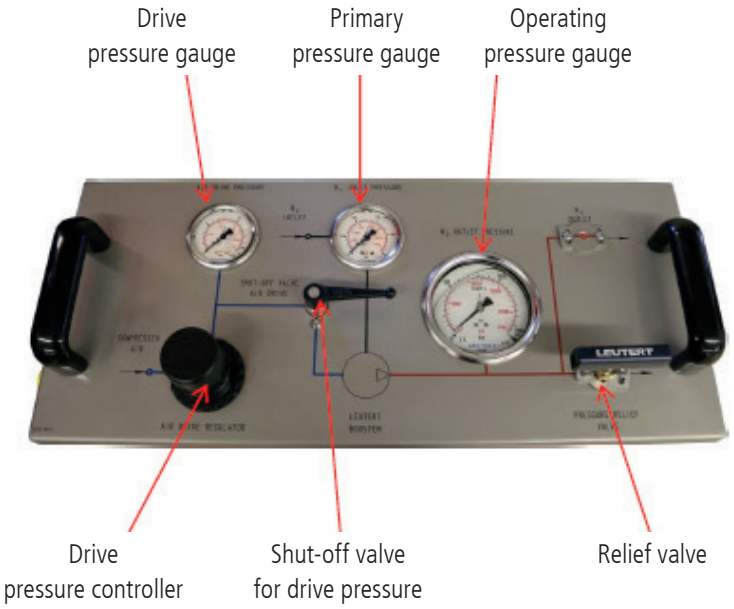
5.2 Connections

The item information/designations in these instructions are consistent with those in the fluid diagram.



5.3 Operator Panel

The item information/designations in these instructions are consistent with those in the fluid diagram.



5.4 Functional Description

All connections must be connected securely and all valves or controllers must be set/turned to “Closed” before commissioning!

5.4.1 Drive Pressure Supply

To operate the system, an adequate supply of compressed air is required as the drive for the pressure generator and the valves.

The supply is connected at port (PL) and must not exceed a maximum pressure of 10 bar. If a drive pressure of min. 1 bar is present, the pressure generator starts to compress the input fluid in accordance with the transmission ratio (see the enclosed booster documentation). The drive pressure regulated on the drive pressure controller can be read off from the corresponding drive pressure gauge. The release for starting and stopping the pressure generator is provided via the shut-off valve for the drive pressure.

5.4.2 Fluid Supply / Gas Supply

Cylinders, cylinder racks or a ring line with N2 can be used as the gas supply. The minimum gas pressure on the gas inlet side must be 50 bar, while the maximum gas pressure must not exceed 250 bar. A filter in the high-pressure pipe filters the gas. To ensure that the filter has an adequate lifetime, the gas should contain only particles < 10 µm.

The primary pressure (max. 250 bar) is supplied at port (A) and displayed at the primary pressure gauge. Opening the shut-off valve on the pressure source causes the primary pressure to flow through the pressure generator.

Attention: The primary pressure is present at the pressure outlet (P) and relief outlet (E) and/or shut-off (relief) valve even when the pressure generator is switched off!

5.4.3 Pressure Generation

The Booster Station generates the required operating pressure of max. 1,300 bar at the pressure outlet (P), taking the available primary pressure and the regulated drive pressure into account.

Increasing the drive pressure on the controller and opening the shut-off valve for the drive pressure causes the pressure generator to start to compress the input gas in accordance with the transmission ratio (see the enclosed booster documentation). The regulated drive pressure is displayed on the pressure gauge. The outlet pressure generated can be read off from the operating pressure gauge.

5.4.4 Discharging

Pressure is discharged via the relief port (E). Opening the shut-off (relief) valve discharges the operating pressure and the preliminary pressure.

Attention: The primary pressure is still present at port (A) and, due to the design, flows through the booster. This means that the primary pressure is still present at the pressure outlet (P) / relief outlet (E)!

Closing the pressure source interrupts the primary pressure. To prevent any further pressure build-up, the shut-off valve for the drive pressure must be closed.

In the event of pressure discharge, the valves must be opened slowly. Sudden opening of the valves may cause serious physical injury and/or material damage.

Asphyxiation hazard!
Escape of N2 into the environment. N2 displaces oxygen! When using N2, ensure that there is sufficient ventilation.

6 Service and Maintenance

6.1 Safety Information, Maintenance and Repair

Operating faults brought about by inadequate or incorrect maintenance pose an imminent risk to the life and limb of personnel and may also cause substantial repair costs and long system downtimes. The manufacturer accepts no liability for damage caused by improper maintenance or care! The recommended maintenance intervals are stated in section 6.2 “Maintenance Intervals”.

Please note the following:

- Maintenance and repair work on the system may be carried out only by the manufacturer’s service team or by specially trained and instructed specialist personnel.
- Any maintenance and repair work on the system may, in principle, be performed only when it is switched off and depressurized.
- Prevent inadvertent system restart!
- During maintenance and repair work, some of the protective equipment is made inoperative. This equipment must be properly re-installed and its function tested immediately after completion of the maintenance and repair work!

6.2 Maintenance Intervals

Position	Scope	Interval
Filter element	Change of filter element	Depending on use / fluid quality or every 6 months
	Condensate drain	Depending on use / fluid quality or every month
Complete system	Leak test	On commissioning / daily during use
	Function test if not used	Once every 3 months
	Pressure holding test with safe fluids	Once a year
	Pressure holding test for dangerous or environmentally harmful fluids	150-200 operating hours (weekly)
Pressure generator	Wear parts	As required or after 1,000 operating hours, 2,000,000 strokes or every 18 months

The maintenance intervals are recommendations by the manufacturer and depend heavily on the quality of the fluid and conditions of use. Operation-related divergences must be identified by the operating company.

In the case of systems designed to use hazardous or environmentally harmful fluids, a weekly pressure holding test is recommended to determine the state of the seals and to replace them in case of leaks.

Please note! The possibility of the process fluid escaping through the drive pressure silencer cannot be ruled out in the event of inadequate maintenance. We recommend discharging the drive air in the case of continuous processes without regular pressure tests.

Annual cleaning and maintenance by the manufacturer's specialist personnel is recommended for oxygen or breathing gas systems or if hazardous or environmentally harmful fluids are used.

7 Faults

7.1 Safety Guidelines

Incorrect fault removal may cause serious personal injury and/or material damage. Faults may therefore be removed only by authorized, instructed personnel familiar with the system's mode of operation, in accordance with all safety regulations!

Only specialist personnel may carry out work on the electrical equipment in accordance with the safety regulations!

7.2 What to do in the Event of a Fault

The following always applies:

1. Immediately stop the system in the event of faults that pose a direct risk to persons, material assets and/or operational safety.

2. In addition, disconnect the system from the energy supply and fluid supply and secure it against inadvertent reconnection.

3. Immediately inform the on-site manager about the fault.

4. Have an authorized specialist ascertain the nature, extent and cause of the fault and remove it.

7.3 What to do once the Fault has been removed

Before reconnecting the system, check that:

- the fault and the cause of the fault have been appropriately removed,
- all safety equipment has been fitted in accordance with the regulations and is in perfect technical working order,
- no one is in the danger zone of the system.

7.4 Faults, Causes and Remedies

Fault	Scope	Remedy
The control system cannot be switched on	Compressed air < 2 bar available	Check compressed air
Gas pressure too low or no gas pressure	Not enough gas primary pressure	Check gas primary pressure
	Compressed air pressure too low	Adjust the pressure governor on the booster
	Shut-off valves closed Relief valves open	Check the valve settings
	Leak on the pressure generator	Carry out a pressure test

7.4.1 Pressure Holding Test

For a pressure holding test, it is necessary to generate pressure within the system or, if possible, in individual areas and to lock it in.

It is advisable to close all pressure ports and relief valves and to operate the pressure generator until the static end pressure is reached (the point at which the forces in the pressure generator offset one another).

1. Next, shut off the drive pressure supply on the pressure generator or the primary pressure at the inlet and allow the system to cool down for 5 minutes.
2. Build up the pressure again and allow the system to cool down for 5 minutes.
3. Then observe the pressure drop, over a period of 10 minutes, on the pressure gauges that are part of the system.

If the pressure drop is > 5%, it can be assumed that there is a leak and appropriate action must be taken.

8 Spare Parts

8.1 Ordering Spare Parts

Please always provide the following information when ordering spare parts:

- Type designation (AH/AP….)
- Article number (xxxx.xxxx)
- Year of construction
- Parts number
- Quantity
- Planned measures

Please see the nameplate or fluid diagram for details.

Specification of the requested shipping method (post, freight, sea, air, express) and the shipping address.

Orders for spare parts without the above information cannot be processed. If the shipping method is not indicated, spare parts will be shipped at the discretion of the manufacturer / supplier.

8.2 Returns / Complaints

Alternatively, you can also send your system / components in to LEUTERT for repair.

Please send consignments for repair to:

Friedrich Leutert GmbH & Co. KG
Schillerstraße 14
D-21365 Adendorf

9 Transport, Packaging and Storage

Always observe the following safety information:

- Only pack, store and transport the system in a depressurized and empty state.
- Only use suitable sling and lifting gear with sufficient load capacity.
- Only use designated sling points.
- Never lift loads above a person's head.
- Always move system components with the utmost care and caution.
- Transport the station only when it has been secured.
- Observe the centre of gravity during transportation (topple hazard).
- System components may be fastened only at the designated hold points.
- Lifting gear must be equipped with safety hooks.
- No damaged lifting gear may be used.
- Ropes and straps must not be knotted or damaged.
- Ropes and straps must not rest against sharp edges; use edge protectors!
- Avoid mechanical shocks.
- In the event of overseas transportation, the system must be packaged tightly and protected against corrosion (drying agents).

9.1 Transportation

The system is supplied fully assembled. It must always be depressurized and emptied before being transported.

The system must be secured accordingly when transported by vehicles. Take care to ensure that no components are damaged by sling points.

Any sling points that partly exist are intended only for the one-off installation of the system and must be removed after installation.

The system may be moved by means of a pallet truck when fixed to a pallet, by means of a fork-lift truck or other suitable transportation equipment.

The applicable safety regulations must always be observed!

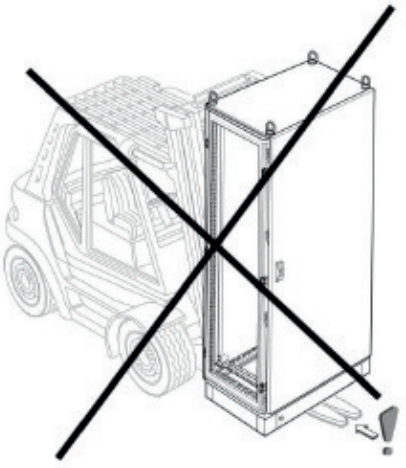
Depending on the model, LEUTERT systems may only be transported in a cabinet or box frame using a stacker or lift truck.

Systems may only be lifted using a cross beam or approved anchor equipment taking the relevant anchor points into account.

Cable angle

A pulley angle of 60° must be observed for cabinet combinations!

Single cabinets must be lifted with a cross beam, otherwise there is a risk of the cabinet/frame becoming distorted.



9.2 Packing Materials

If no return agreement with regard to the disposable packaging has been entered into, separate the materials according to type and size, and reuse or recycle them.

Always dispose of the packaging materials in an environmentally friendly manner and in accordance with the applicable local disposal regulations. If necessary, engage recycling companies.

Packaging materials are valuable raw materials and, in many cases, can be further used or appropriately processed and reused.

9.3 Storage

Keep packages sealed until assembly and store them in accordance with the positioning and storage markings affixed on the outside.

Unless otherwise indicated, store packages only under the following conditions:

- Do not store outdoors
- Store in a dry and dust-free environment
- Do not expose to aggressive fluids
- Protect against sunlight
- Avoid mechanical shocks
- Storage temperature: 15 to 25°C
- Relative humidity: max. 60%
- If the equipment is stored for extended periods (longer than 3 months), inspect the general condition of all parts and packaging on a regular basis. It may be necessary in some cases to refresh or renew the corrosion protection.

10 Dismantling and Disposal

10.1 Dismantling

At the end of the system's service life, it must be dismantled and disposed of in an environmentally friendly manner.

Injury hazard in the event of incorrect dismantling! Stored residual energy, sharp components, pointed tips and corners on or in the system or on the required tools may cause injuries.

- Ensure that there is sufficient space before starting work
- Shut off all operating fluids to the system
- Make sure that the workplace is clean and tidy! Components and tools lying loosely on top of each other or lying about are a source of accidents
- Consult the manufacturer in the event of any uncertainty

10.2 Waste Disposal

If no return or disposal agreement has been entered into, recycle the disassembled components.

- Scrap metals
- Recycle plastic elements
- Sort and dispose of other components according to their material properties

Environmental hazard due to incorrect disposal! Have electronic scrap, electronic components, lubrication and other auxiliary materials disposed of by approved specialist companies.

If in doubt, obtain information about environmentally friendly disposal from the local municipal authority or special disposal companies.

11 Declaration of Conformity

INSTRUMENTS
CONTROL
AUTOMATION

LEUTERT
SINCE 1941

EC Declaration of Conformity

CE

The Manufacturer:

Friedrich Leutert GmbH & Co. KG
Schillerstrasse 14, 21365 Adendorf, Germany

declares within the meaning of the Machinery Directive 2006/42/EG that the product:

Description	Boooster station
Design No.	3230.xxxx
Type designation	DLE-/MPL-/SPLV-/GPLV-/RNB-/ROB-station
Model year	2018

is a partly completed machine according to article 2g and exclusively intended for installation in, or assembly with, another machine or piece of equipment.

The following harmonized standards have been applied:

DIN EN ISO 12100:2011-03	Safety of machinery, General principle of design, Risk assessment and risk reduction
DIN EN ISO 13849-1:2016-06	Safety of machines, Safety-related parts of control systems, Part 1: General principles

The partly completed machinery may only be taken into operation once it has been established that the machine in which the partly completed machinery is to be installed corresponds with the Machinery Directive 2006/42/EC.

The special technical documentation according to appendix VII B have been prepared and transmitted to the responsible national authority in electronic form on request.

Adendorf,

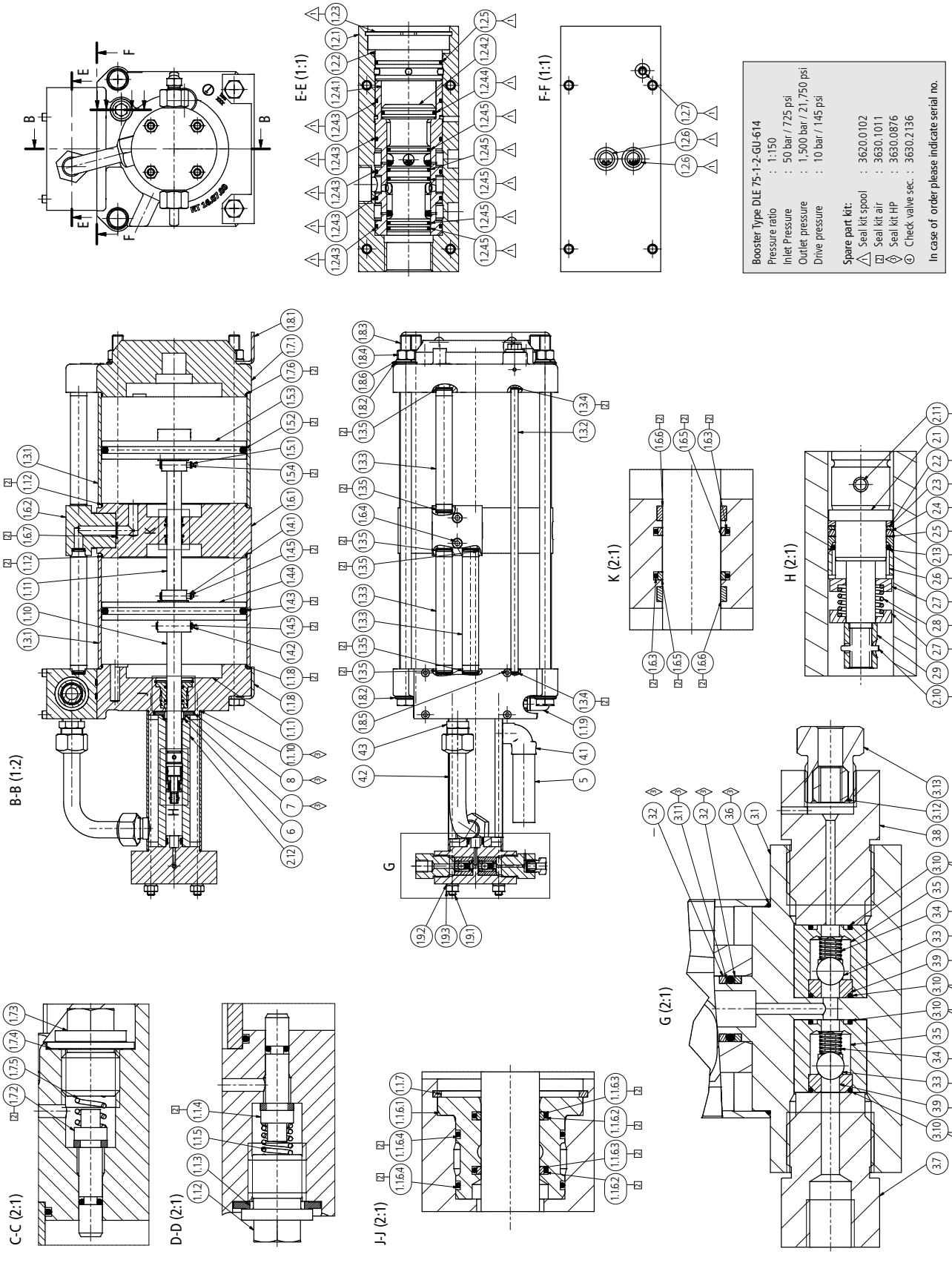
Ort, Datum
place, date

Beauftragter der Geschäftsleitung für Konformitätserklärungen
Representative of executive management for declarations of conformity

QUALITY ASSURANCE - INSPECTED BY LEUTERT

Friedrich Leutert GmbH & Co. KG, Schillerstrasse 14, 21365 Adendorf / Germany, tel +49-4131-959-0, www.leutert.com, info@leutert.com

12 Parts List



Item	Qty.	Description	Order no.
1	1	Air drive section compl.	3630.1476
1.1	1	Top cap compl.	3630.3414
1.1.1	1	Top cap	3630.1561
1.1.2	1	Pilot valve screw	3620.0129
1.1.3	1	Gasket	3620.0131
1.1.4	1	Pilot valve tappet compl.	3620.4103
1.1.5	1	Spring	3620.0132
1.1.6	1	Seal housing compl.	3630.0126
1.1.6.1	1	Seal housing	3630.0395
1.1.6.2	2	O-Ring 2-017 NBR 70	3660.0112
1.1.6.3	2	Glide ring	3630.0406
1.1.6.4	2	O-Ring 2-022 NBR 70	3660.0118
1.1.7	1	Snap ring	3630.0407
1.1.8	1	O-Ring 155x2 NBR 70	3660.0181
1.1.9	1	Muffler	3610.1457
1.1.10	1	O-Ring 55x1,5 NBR 70	3660.0217
1.2	1	Spool valve compl. DLE.../2	3630.0594
1.2.1	1	Spool housing	3630.0549
1.2.2	1	Spool plug	3620.0108
1.2.3	1	Snap ring	3620.0113
1.2.4	1	Spool valve housing compl.	3620.4467
1.2.4.1	1	Spool valve sleeve	3620.0103
1.2.4.2	1	Spool valve G / DLE	3620.0104
1.2.4.3	5	O-Ring 2-026 NBR 70	3660.0122
1.2.4.4	1	O-Ring 2-023 NBR 70	3660.0119
1.2.4.5	5	O-Ring 9-222 NBR 80	3660.0519
1.2.5	1	O-Ring 2-026 NBR 70	3660.0122
1.2.6	2	O-Ring 2-012 NBR 70	3660.0107
1.2.7	1	O-Ring 2-008 NBR 70	3660.0103
1.3	1	Air part compl.	3630.0595
1.3.1	2	Air cylinder	3630.0174
1.3.2	1	Pressure tube	3630.0552
1.3.3	3	Air tube	3630.0290
1.3.4	2	O-Ring 2-009 NBR 70	3660.0104
1.3.5	6	O-Ring 9-161 NBR 70	3660.0184
1.4	1	Air piston compl.	3630.0274
1.4.1	1	Pin	3630.0191
1.4.2	1	Pin	3630.0192
1.4.3	1	O-Ring 2-437 NBR 70	3660.0216
1.4.4	1	Air piston with holder	3630.0167
1.4.5	2	Cotter pin	3630.0193
1.5	1	Air piston compl.	3630.0273
1.5.1	1	Pin	3630.0191
1.5.2	1	O-Ring 2-437 NBR 70	3660.0216
1.5.3	1	Air piston with holder	3630.0167
1.5.4	1	Cotter pin	3630.0193
1.6	1	Air separation cap compl.	3630.3470
1.6.1	1	Air separation cap	3630.3456
1.6.2	1	Air block	3630.3457
1.6.3	2	O-Ring 2-017 NBR 70	3660.0112
1.6.4	2	Cylinder head screw	3504.1424
1.6.5	2	Glide ring	3630.0406
1.6.6	2	Glide ring	3440.0969
1.6.7	2	O-Ring 2-017 NBR 70	3660.0112
1.7	1	Bottom cap compl.	3630.0301
1.7.1	1	Bottom cap	3630.1548

Item	Qty.	Description	Order no.
1.7.2	1	Pilot valve tappet compl.	3620.4103
1.7.3	1	Pilot valve screw	3620.0129
1.7.4	1	Gasket	3620.0131
1.7.5	1	Spring	3620.0132
1.7.6	1	O-Ring 155x2 NBR 70	3660.0181
1.8	1	Mounting compl.	3630.0598
1.8.1	2	Mounting bracket	3620.4230
1.8.2	4	Washer	3620.0275
1.8.3	4	Tie rod	3620.0743
1.8.4	4	Hexagon nut	3620.0274
1.8.5	4	Cap screw	3620.0111
1.8.6	4	Spring washer	3620.0276
1.9	1	Mounting compl.	3630.0322
1.9.1	4	Tie rod	3630.0294
1.9.2	4	Spring washer	3630.0298
1.9.3	4	Hexagon nut	3630.0307
1.10	1	Piston rod	3630.0244
1.11	1	Piston rod	3630.0551
1.12	2	O-Ring 155x2 NBR 70	3660.0181
2	1	HP plunger	3630.1450
2.1	1	HP piston	3630.0265
2.2	1	Back-up ring	3630.0254
2.3	1	Seal	3630.0255
2.4	1	Back-up ring	3630.0256
2.5	1	Seal DLE 75	3630.0257
2.6	1	Spacer	3630.0258
2.7	2	Washer DLE 75	3630.1449
2.8	1	Spring	3920.2304
2.9	1	Castle nut	3630.0570
2.10	1	Cotter pin	3630.0271
2.11	1	Roll pin	1700.1315
2.12	1	Inlet housing DLE 75 (17-4PH)	3630.0349
2.13	1	O-Ring 2-015 FPM 90	3660.0531
3	1	Check body compl.	3630.2554
3.1	1	Check body	3630.0867
3.2	2	Back-up ring	3630.0352
3.3	2	Ball	3630.0872
3.4	2	Spring	3610.1186
3.5	2	Valve body	3630.0801
3.6	1	O-Ring 55x1,5 NBR 70	3660.0217
3.7	1	Connection gland	3630.0800
3.8	1	Connection gland 9/16"-18 UNF	3630.0824
3.9	2	Check seat	3610.4357
3.10	4	O-Ring 9-083 FKM 80	3660.0616
3.11	1	O-Ring 2-113 FPM 90	3660.0534
3.12	1	Collar 4H	3780.0306
3.13	1	Gland 4H	3780.0312
4	1	Cooling compl.	3630.1010
4.1	1	Cooling barrel compl.	3630.0334
4.2	1	Air barrel	3630.0377
4.3	1	Adapter	3630.0371
5	1	Muffler 1/2" BSP	3630.0104
6	1	Distance washer	3630.1444
7	1	O-Ring 2-021 FPM 70	3660.0263
8	1	O-Ring 2-029 FKM 70	3660.0280

– Original edition, manuals in other languages on request –

Subject to change without notice
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