Power Units
Modular design

Power unit with electric control (example)

Table of contents

1 Description of the product

General information

The power units of this series consist of individual modules that are selected depending on the application and are assembled to a power unit ready for use.

Modules:
- basic power unit (reservoir size V=11 l / 27 l / 40 l / 63 l)
- basic functions (oil control, filter, unpressurised cycle, etc.)
- valve block (divers directional control valves, pressure switch, intermediate plates, etc.)
- E-technology (terminal box, electric control, switch, etc.).

1.1 Basic power unit

Operating modes:

The power units can be operated in two different operating modes:

- In intermittent cycle mode, the electric motor (pump) will be switched off as soon as the preset operating pressure is reached.
- In unpressurised cycle mode, the valve switches the flow rate of the pump to pressureless to the reservoir as soon as the preset operating pressure is reached. The electric motor continues running.

If the operating pressure drops by more than 10% or a cylinder movement shall take place, the electric motor (pump) must be switched on or the valve has to be activated for the unpressurised cycle.

NOTE

The power units must not be operated in continuous operation against the operating pressure.

Pressure generators with gear or piston pump

The power units generate a constant flow rate that is limited to an adjustable pressure (see technical characteristics).

Pressure generators with two-stage pump

The two-stage pump consists of a piston pump and a gear pump which are screwed together.
The power units generate a constant flow rate which is limited to an adjustable pressure.
In case of the two-stage pump the gear pump is switched to unpressurised cycles by the integrated idling control valve as soon as a pressure of 80 bar is exceeded; thereby the flow rate will be reduced correspondingly (see technical characteristics).

1.2 Basic functions

With the part number code, the following basic functions can be selected:

- Pressure gauge
- Electronic system pressure switch
- Valve for unpressurised cycles
- Temperature and oil level switch
- Pressure filter, return filter
- Filter controls

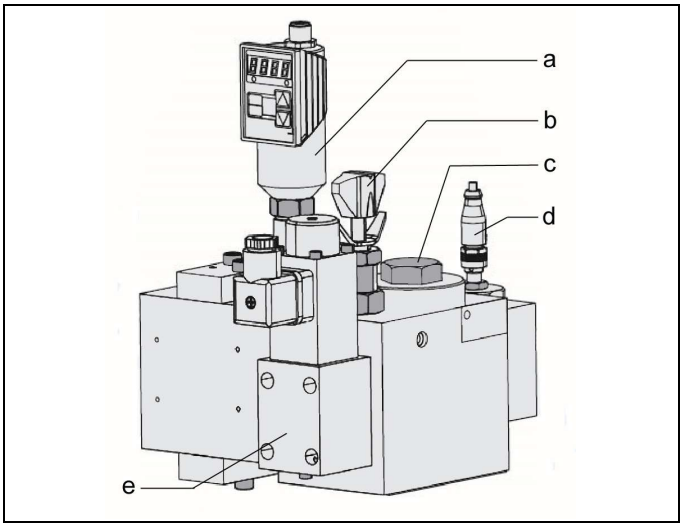


Fig. 1: Electronic system pressure switch (a), pressure relief valve (b), pressure filter (c), pressure filter control (d), valve for unpressurised cycles (e)

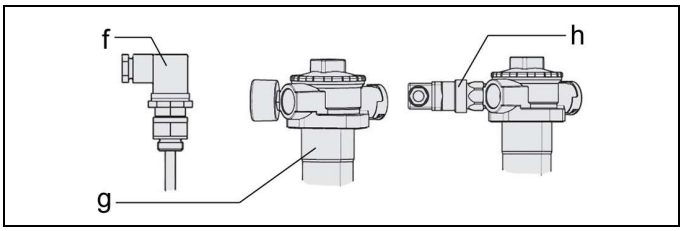


Fig. 1: Oil control(f), return filter (g), return filter with filter control (h)

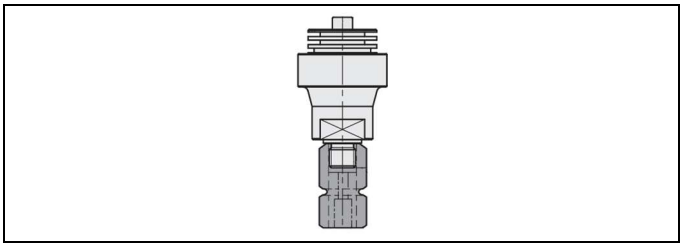


Fig. 1: Hydraulic Accumulator 13ccm

The equipment, installation and operation of hydraulic accumulators are regulated differently in different countries. In the Federal Republic of Germany, for example, this is regulated by the Ordinance on Industrial Safety and Health and DIN EN 14359:2017.
The hydraulic accumulator contained in the pump unit falls under PED 2014/68/EU Art. 4 para. 1 letter a point ii, because the product of pressure and volume is not greater than 200. This means that the classification of the hydraulic accumulator is below category 1 (Annex II conformity assessment diagrams) and is therefore not a system requiring monitoring within the meaning of the Ordinance on Industrial Safety and Health, i.e. the section ‘Special provisions for systems requiring monitoring’ does not apply. Therefore, no maximum periods for recurring inspections are prescribed in accordance with Section 15 of the Ordinance on Industrial Safety and Health. However, hydraulic accumulators are work equipment and must be inspected as such. The type, scope and deadlines must be determined by the employer.

1.3 Valve block

With the part number code, four control circuits can be configured. Consisting of:

- Control valve
- Pressure switch
- Flow control valve
- Pressure valve
- Check valve
- Switch

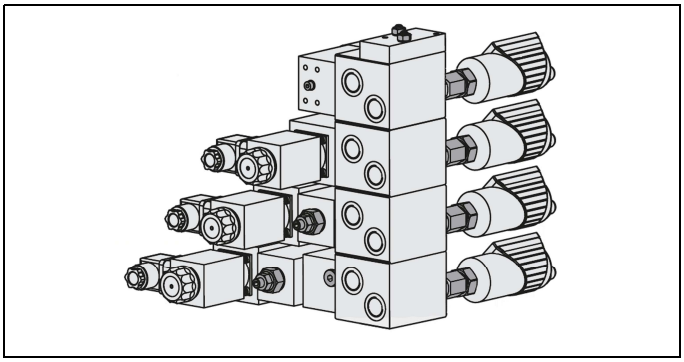


Fig. 1: Valve block for four control circuits (V1-V4)

NOTE

Further information

- For valves, pressure switches and functions of the control circuits, please refer to data sheet D8.026

1.4 Electronics

With the part number code, the following electrical equipment can be selected:

- Without terminal box, without electric control
- With terminal box
- With electric control
  - without switch
  - with switch

2 Validity of the documentation

Power units in modular design of data sheet D 8.026, from the part number ranges:

- 8456 000 - 100 (V = 11 L)
- 8456 500 - 900 (V = 11 L)
- 8456 9001 - 9700 (V = 11 L)
- 8457 000 - 100 (V = 27 L)
- 8457 9001 - 9700 (V = 27 L)
- 8458 000 - 100 (V = 40 L)
- 8458 9001 - 9700 (V = 40 L)
- 8459 000 - 100 (V = 63 L)
- 8459 9001 - 9700 (V = 63 L)

3 Target group of this document

3.1 Operator

Tasks:
Operation in setting or automatic mode.

Qualification
No special requests, introduction on the basis of the operating instructions, danger instruction, minimum age 18 years.

3.2 Qualified personnel

Tasks:
Transport, installation, start up, setting mode, trouble shooting, putting out of service, checks, maintenance works.

- Specialists, fitters and set-up men of machines and installations with hydraulic expert knowledge.

- Specialists, fitters and set-up men of machines and installations with expert knowledge in electrical engineering.

Qualification of the personnel
Expert knowledge means that the personnel must
- be in the position to read and completely understand technical specifications such as circuit diagrams and product-specific drawing documents,
- have expert knowledge (electric, hydraulic, pneumatic knowledge, etc.) of function and design of the corresponding components.

An **expert** is somebody who has due to its professional education and experiences sufficient knowledge and is familiar with the relevant regulations so that he
- can judge the entrusted works,
- can recognize the possible dangers,
- can take the required measures to eliminate dangers,
- knows the acknowledged standards, rules and guidelines of the technology.
- has the required knowledge for repair and mounting.

3.3 Expert / qualified person

Tasks:
Maintenance and test of safety equipments.

Qualification
The specifications in the operating safety regulations (BetrSichV) after professional training and prompt professional activity are as follows:
- Technical professional training, e. g. as skilled worker,
- At least two years work experience,
- After classification of the dangerousness corresponding tests passed,
- Regular further training,
- Knowledge of relevant rules and standards (regulations, standards),
- Involvement in the handling of the corresponding products and regular test activities.

An expert / qualified person is a person who has sufficient knowledge in design, control and applications due to their professional education and experience:
- Safety devices as:
  - Two-hand control,
  - Safety light curtains and light grids
  - Separating safety devices,
  - etc.
- Hydraulic components as:
  - Safety-related parts of controls,
  - Hydraulic hoses,
  - Accumulators,
  - etc.
- Electric components as:
  - Safety-related parts of controls,
  - etc.
- Technical professional training, e. g. as skilled worker,
- etc.

and is familiar with the respective national work safety regulations, accident prevention directions, guidelines and generally accepted technical rules and regulations (e. g.
DIN standards, VDE regulations, technical rules of other EC member states) so that he is in the position to judge the working safety and to carry out the delegated tasks.

4 Symbols and signal words

⚠ DANGER

Danger of life / heavy health damages
Stands for an imminent danger.
If it is not avoided, death or very severe injuries will result.

⚠ WARNING

Person damage
Stands for a possibly dangerous situation.
If it is not avoided, death or very severe injuries will result.

⚠ CAUTION

Easy injuries / property damage
Stands for a possibly dangerous situation.
If it is not avoided, minor injuries or material damages will result.

Hazardous to the environment
The symbol stands for important information for the proper handling with materials that are hazardous to the environment.
Ignoring these notes can lead to heavy damages to the environment.

Mandatory sign!
The symbol stands for important information, necessary protection equipment, etc.

NOTE

This symbol stands for tips for users or especially useful information. This is no signal word for a dangerous or harmful situation.

5 For your safety

5.1 Basic information

The operating instructions serve to information and avoidance of dangers for transport, operation and maintenance.
Only in strict compliance with these operating instructions, accidents and property damages can be avoided as well as trouble-free operation of the product can be guaranteed.
Furthermore, the consideration of the operating instructions will result in:

- avoid injuries
- reduced down times and repair costs,
- increased service life of the products.

5.2 Safety instructions

The product was manufactured in accordance with the generally accepted rules of the technology.
Observe the safety instructions and the operating instructions given in this manual, in order to avoid personal damage or material damage.

- Read these operating instructions thoroughly and completely, before you work with the product.
- Keep these operating instructions so that they are accessible to all users at any time.
- Pay attention to the current safety regulations, regulations for accident prevention and environmental protection of the country in which the product will be used.
- Use the ROEMHELD product only in perfect technical condition.
- Observe all notes on the product.
- Use only accessories and spare parts approved by the manufacturer in order to exclude danger to persons because of not suited spare parts.
- Respect the intended use.
- You only may start up the product, when it has been found that the incomplete machine or machine, in which the product shall be mounted, corresponds to the country-specific provisions, safety regulations and standards.
- Perform a risk analysis for the incomplete machine, or the machine.
  Due to the interactions between the product and the machine/fixture or the environment, risks may arise that only can be determined and minimized by the user, e.g. :
  - generated forces,
  - generated movements,
  - Influence of hydraulic and electrical control,
  - etc.
- For all work steps, pay attention to the use of personal protective equipment.

5.3 Personal protective equipment

For works at and with the product, wear safety goggles!

For works at and with the product, wear safety shoes!

For all works at the product, the operator has to make sure that the necessary protection equipment will be worn.

For works with operating fluids, pay attention to the safety data sheets!

6 Application

6.1 Intended use

The products are used to generate hydraulic pressure for industrial/commercial applications for bending or clamping workpieces and/or operating fixtures or hydraulic drives inside enclosed, low-dust rooms.

In addition, use in compliance with the intended purpose includes:

- Use within the capacity limits specified in the technical data (see data sheet).
- Use as described in this operating manual.
- Compliance with maintenance intervals.
- Qualified and trained personnel for the corresponding activities.
- Mounting of spare parts only with the same specifications as the original part.

6.2 Misapplication

⚠ WARNING

Injuries, material damages or malfunctions!

Modifications can lead to weakening of the components, reduction in strength or malfunctions.

- Do not modify the product!

The use of the products is not authorised:
- For domestic use.
- For use at fairgrounds and amusement parks.
- In food processing or in areas with special hygiene regulations.
- In mines.
- In ATEX areas (in explosive and aggressive environments, e.g. explosive gases and dusts).
- If physical effects (welding currents, vibrations or others) or chemically acting media damage the seals (resistance of the seal material) or components and this can lead to functional failure or premature failure.

7 Transport

⚠ DANGER

Danger due to inappropriate fixation of the product!

By inappropriate fixation, the product may detach during transport or be damaged.

- Transport the product according to the instructions in this operating manual.
- Use exclusively the described slings for lifting.
- The used transport belts must correspond to the weight of the manipulator.

⚠ WARNING

Injury due to overturning product!

Overturning product due to inappropriate means of transportation.

- Do not stand below the load during lifting and lowering, stay outside the danger zone.
- Use suitable means of transportation.
- Pay attention to the weight of the equipment.
- Pay attention that the product is safely located (centre of gravity see instruction sign).
- Wear suitable protective equipment (e.g. safety helmet, safety shoes).

Injury by falling products!

- Do not lift the product on the motor.

The product is secured and delivered on a pallet for transport.
The product fixed on the pallet for transport may only be transported to the place of installation by means of a corresponding conveyor (pay attention to the min. lifting force).
Pay attention that the product is safely located on the hand-lift truck or fork lift truck.
The pallet must be lifted from the pallet by means of a conveyor. It is important to pay attention to the centre of gravity of the product

⚠ CAUTION

Risk of injury during transport

Improper transport of the product can cause property damage or can injure people.

- Displace the product at the provided fixing points only with appropriate lifting equipment.

For works at and with the product, wear safety shoes!

7.1 Slings

When using slings, the product has to be lifted on all slings by an admissible crane pendant. Then the slings can be removed.

The following picture shows the position of the slings.

- Power units V27/ V40/ V63

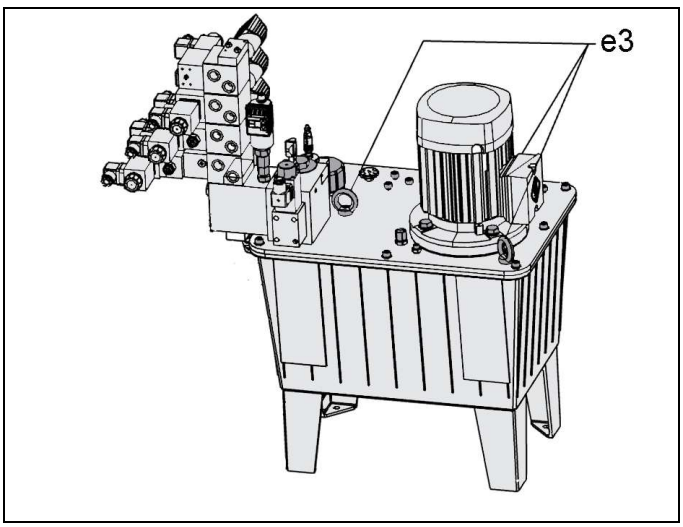


Fig. 1: e3 slings V27/ V40/ V63

8 Installation

⚠ WARNING

Injury due to overturning product!

- Overturning product due to inappropriate means of transportation.
- Do not stand below the load during lifting and lowering, stay outside the danger zone.
- Use suitable means of transportation.
- Pay attention to the weight of the equipment.
- Pay attention that the product is safely located (centre of gravity see instruction sign).

For works at and with the product, wear suitable protection equipment!

For works at and with the product, wear safety shoes!

⚠ CAUTION

Malfunctions!

Chips, coolants and cutting fluids can cause malfunctions.

- Protect the power units against penetration of chips, coolants and cutting fluids!

The power unit has to be mounted in upright position, if possible above the installation or fixture.
If the power unit will be installed below the fixture, an air bleeding possibility has to be provided at the highest point of the installation.

- Install the power unit at an appropriate place.
- If required mount at the provided holes / plates at the bottom of the reservoir (see chapter Overview of components).

Place of installation

Select the place of installation so that for the required cleaning and maintenance, all around a clearance of at least 700 mm is maintained.

The ideal location should be

- good visible,
- ventilated,
- clean,
- and dry.

Environment conditions at the place of installation

In an environment with high risk of contamination, for example

- dust
- swarf
- coolants
- humidity (see environment)
- or the like

a protective housing has to be provided.

8.1 Overview of components

8.1.1 Power units with a reservoir volume V = 11 litres

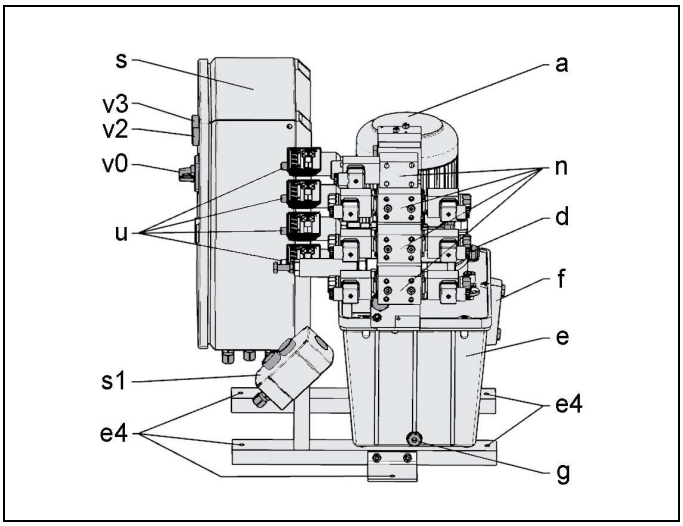


Figure 2: power unit V11, with electric control

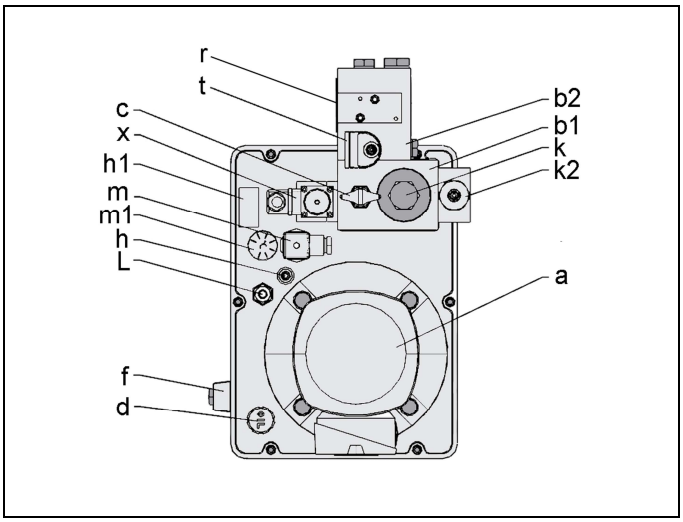


Figure 3: cover of power unit V11

a Electric motor b1 Connecting block with pressure relief valve and pressure filter (on pump side) b2 Connecting block with pressure switch and system check valve (structure of control valves) c Pressure relief valve system pressure d Filling and air filter e Oil reservoir e4 Mounting holes f Oil level gauge, sight glass g Drain plug h Bleeding screw M6 for piston pump h1 Instruction sign - bleeding of piston pump k Pressure filter with screw cap k2 Filter control	m Oil level and oil temperature control m1 Dial thermometer n Directional control valve for cylinder control r Name plate s Electric control, terminal box s1 Manual switch t Electronic system pressure switch with digital display u Pressure switch for machine tool interlock v0 Main switch / emergency stop v2 Pilot light “oil control” v3 Pilot light "Control ON" x Directional control valve Y0 for unpressurised cycle L Port Ø10L for leakage

8.1.2 Power units with a reservoir volume V = 27/40/63 litres

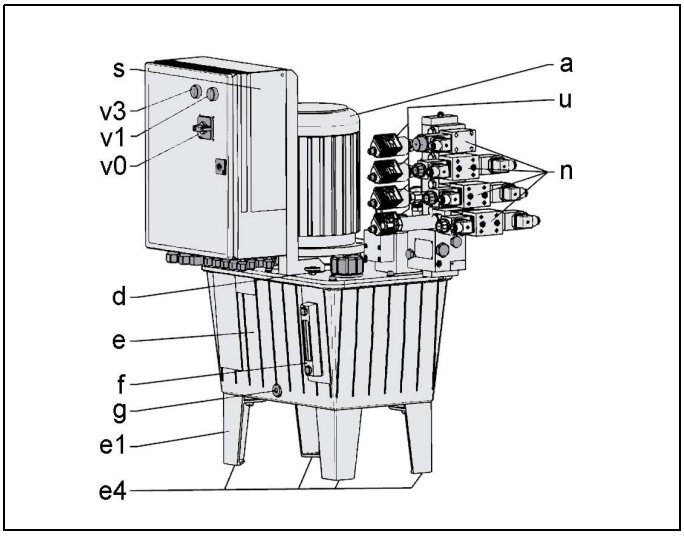


Figure 4: power unit V27/V40/V63, with electric control

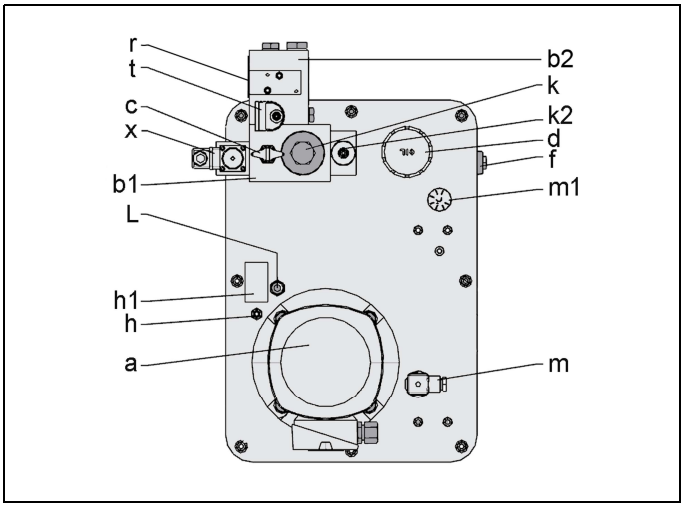


Figure 5: cover or power unit V27/V40/V63

a Electric motor b1 Connecting block with pressure relief valve and pressure filter (on pump side) b2 Connecting block with pressure switch and system check valve (structure of control valves) c Pressure relief valve system pressure d Filling and air filter e Oil reservoir e1 Oil reservoir foot e4 Mounting holes f Oil level gauge, sight glass g Drain plug h Bleeding screw M6 for piston pump h1 Instruction sign - bleeding of piston pump	k Pressure filter with screw cap k2 Filter control m Oil level and oil temperature control m1 Dial thermometer n Directional control valve for cylinder control r Name plate s Electric control, terminal box t Electronic system pressure switch with digital display u Pressure switch for machine tool interlock v0 Main switch / emergency stop v1 Pilot light “oil control” v3 Pilot light "Control ON" x Directional control valve Y0 for unpressurised cycle L Leakage port Ø10L

8.2 Basic functions and cylinder ports

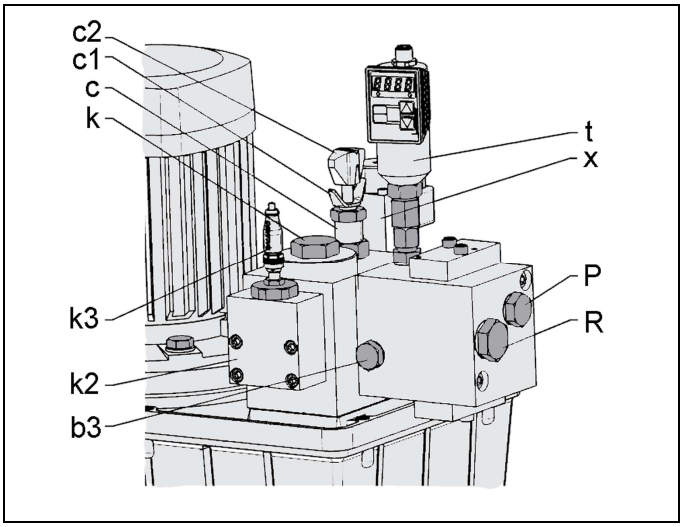


Figure 6: Figure - Connecting block

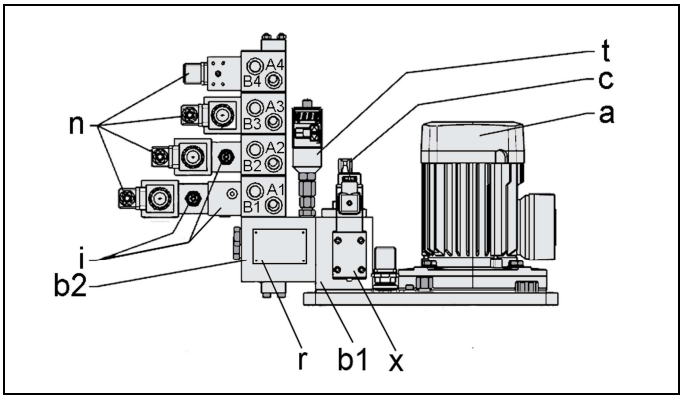


Figure 7: Figure - Valve block

a Electric motor b1 Connecting block with pressure relief valve and pressure filter (on pump side) b2 Connecting block with pressure switch and system check valve b3 System check valve c Pressure relief valve system pressure c1 Lock nut c2 Adjustment screw for adjustment of the system pressure i Additional function as intermediate plates	k Pressure filter with screw cap k2 Filter control k3 Screw-in sensor n Directional control valve for cylinder control r Name plate t Electronic pressure switch with digital display for the system pressure x Directional control valve Y0 for unpressurised cycle

Connection	Function
A1…A4	Port for consumer element G3/8
B1…B4	Port for consumer element G3/8
P	Port for system pressure G3/8
R	Port for return line (reservoir) G1/2

8.3 Valves and additional functions in intermediate plate design

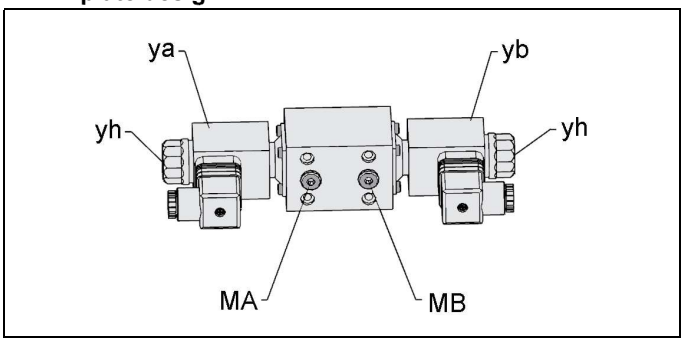


Figure 8: 4/3 directional control poppet valve (pmax. 250 / 500 bar)

Characteristics: see technical characteristics

ya Electromagnet a yb Electromagnet b yh Emergency stop	MA Port for pressure gauge G1/8 MB Port for pressure gauge G1/8

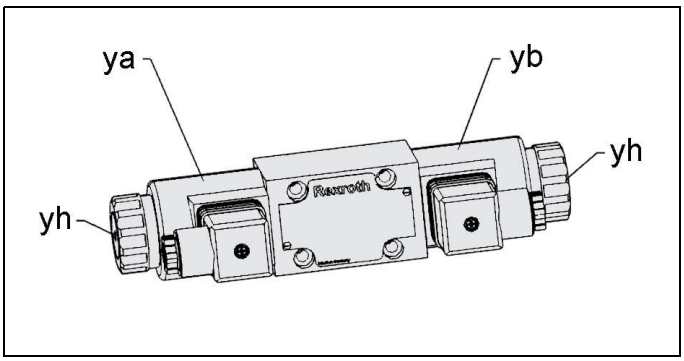


Figure 9: 4/3 directional control spool valve (pmax. 315 bar)
Characteristics: see technical data

ya Electromagnet a yb Electromagnet b	yh Emergency stop

8.4 Function triggering (switch variants)

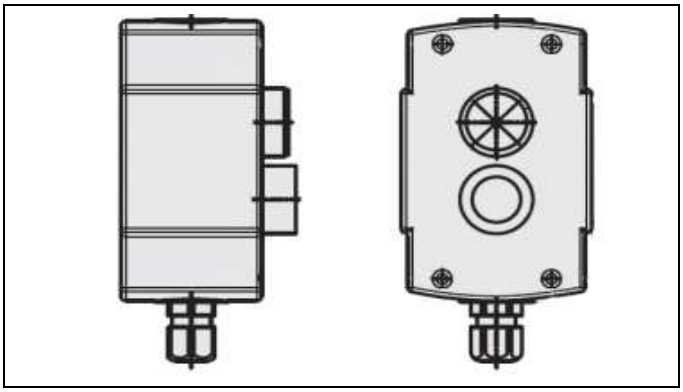


Figure 10: Manual switch with push-button with detent and pilot light green

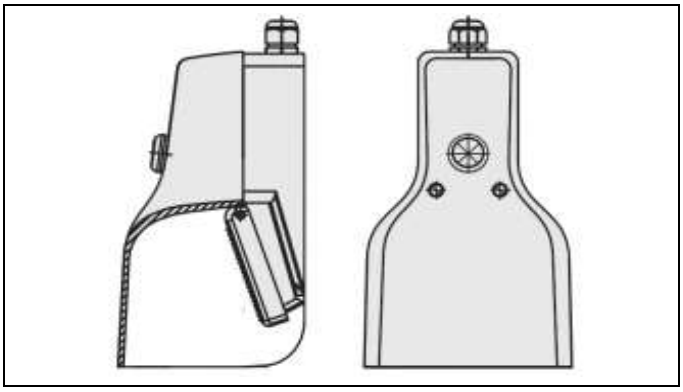


Figure 11: Foot switch with pilot light green

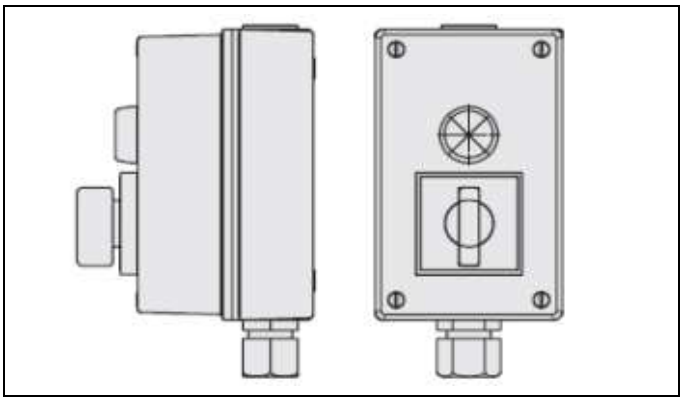


Figure 12: 3-way selector switch with pilot light green

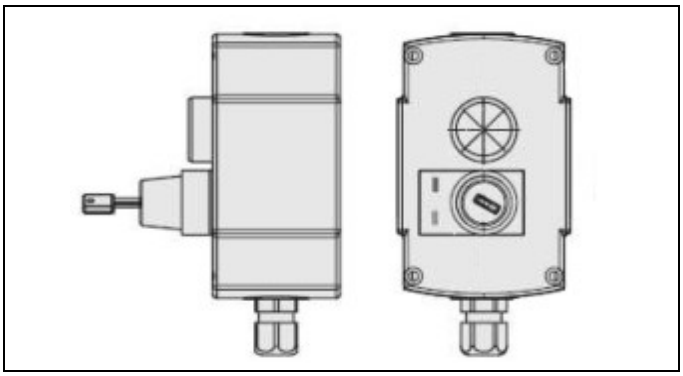


Figure 13: Key switch with pilot light green

8.5 Fixing of the product

The following figures show the fixing points for floor mounting.
There are 2 different types:

- Power units V11 (reservoir volume 11 litres)
- Power units V27/ V40/ V63 (reservoir volume 27,40 and 63 litres)

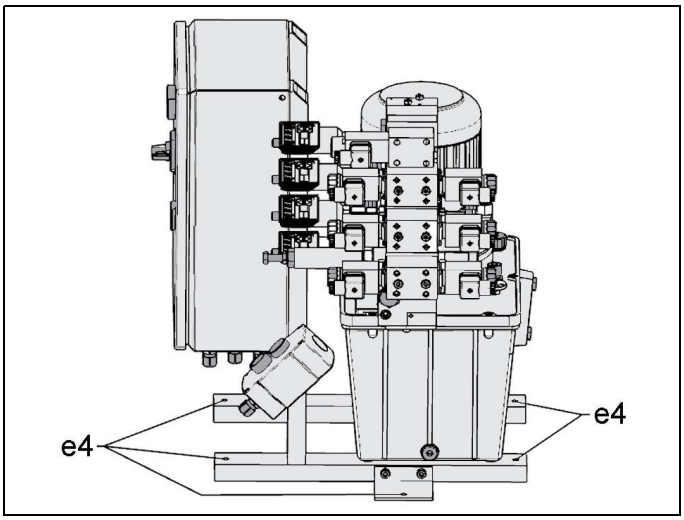


Figure 14: Power unit V11, with electric control

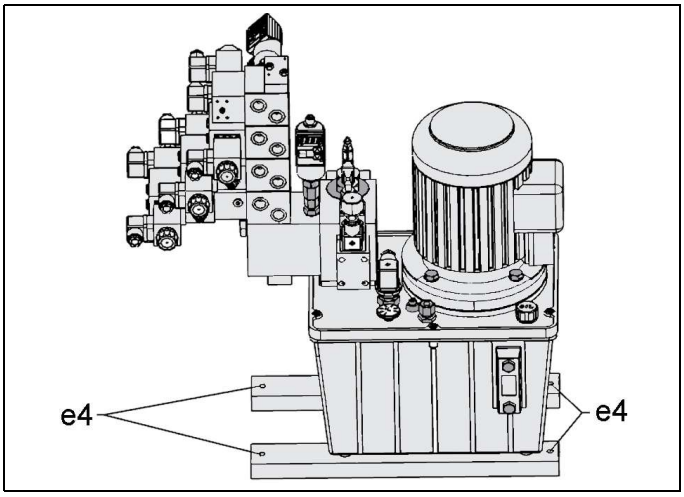


Figure 15: Power unit V11, without electric control

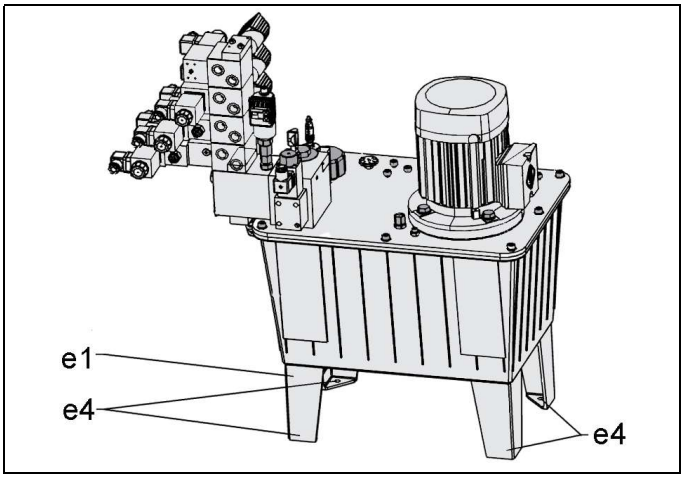


Figure 16: Power unit V27 / V40 / V63, without electric control

e1 Oil reservoir foot	e4 Mounting holes

8.6 Connection of the hydraulic equipment

⚠ CAUTION

Work by qualified personnel
- Works only to be effected by authorised personnel.

NOTE

Screwed Plug
- Use only fittings "screwed plug B and E" as per DIN 3852 (ISO 1179).

Hydraulic connection
- Do not use sealing tape, copper rings or coned fittings.

Pressure fluids
- Use hydraulic oil as per ROEMHELD data sheet A 0.100.

Connection of the hydraulic

Further connection data, plans or similar (e. g. hydraulic, electric circuit diagrams or electrical parameters) see enclosures!

8.7 Electric connection

⚠ WARNING

Injury / burning due to contact with energized parts!
- Before working on electric equipment, the energized parts must be de-energized and secured.
- Do not open protection covers at electric parts.
- All electrical works must only be realised by electricians.

⚠ CAUTION

Work by qualified personnel
- Works only to be effected by authorised personnel.

Connect the mains cable

When connecting, the technical data of the electric circuit or terminal diagram are to be considered.
Cable cross-section, cable type and type of installation must be selected according to the applicable guidelines
Degree and type of protection are indicated below the technical data.

Procedure:

1. Check if the electric connection is in accordance with the operating voltage of the motor (see name plate).
2. In case of power units with electric control put the main switch to "0".
3. Open the cover of the terminal box or the electric control.

4a. For power units with electric control:
Insert the mains connecting line into the provided screwed cable gland and connect it to the terminals L1, L2, L3 and PE.

4b. For power units with terminal box:
Insert the mains connecting line into the provided motor supply line and connect it to the terminals 1, 2, 3 and PE.
Insert the control line into the provided screwed cable gland and connect it to the corresponding terminals and PE.

5. Fix the screwed cable gland and make sure that the cables are strain-relieved.
6. Close the cover of the terminal box or the electric control.

Sense of rotation of the electric motor

The following senses of rotation must be kept:
- for radial piston pump any direction,
- for gear pump clockwise,
- for two-stage pump counterclockwise,

(viewed from above onto drive shaft, see arrow at the electric motor)

NOTE

Attention!
The sense of rotation of the motor must be observed according to the direction of the arrow on the motor.

⚠ CAUTION

Hydraulic power unit can be damaged!
- Stick absolutely to the indicated direction of the rotary field.

Wrong sense of rotation

In the case of wrong sense of rotation of the electric motor, the pump may be destroyed.

8.8 Version without electric control and terminal box

Please note the following circuit diagrams, if the electrical devices are directly connected to a machine or to a primary electric control.

8.8.1 Electronic pressure switch

The pressure switches are provided with 2 switching contacts. While contact 1 is a switching output, contact 2 can be selected as an analogue output, switching output or alarm output.
By means of the membrane keyboard, the switching points and reverse switching points, the output logic as well as time delays can be entered and saved:

- by the “Teach-In” function (see operating manual BA_F9734_EN).
- by programming of the values (see operating manual BA_F9734_EN).

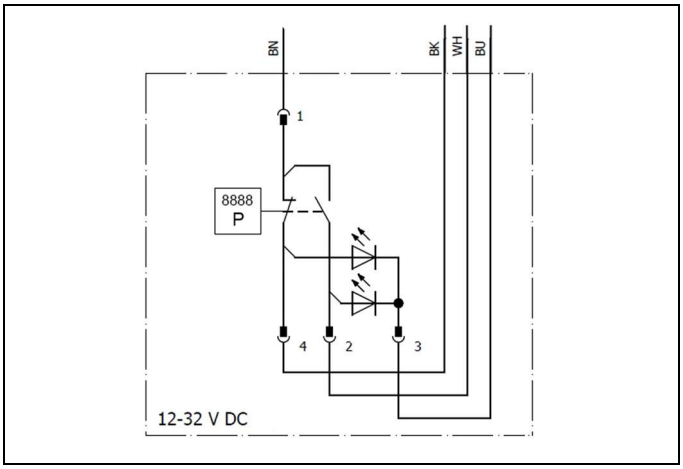


Figure 17: Circuit diagram of the electronic pressure switches

Pin	Function
1/BN/brown	12-32 V
2/WH/white	SP2 / switching output 2 or analogue output
3/BU/blue	0 V
4/BK/black	SP1 / switching output 1

8.8.2 Mechanical pressure switch

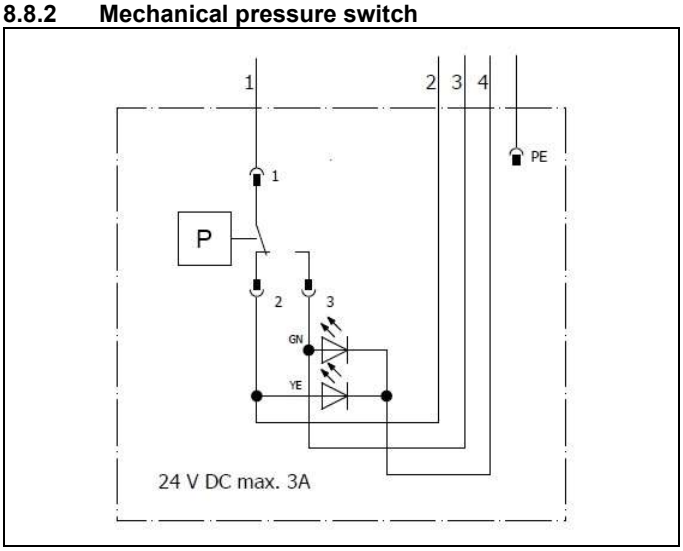


Figure 18: Circuit diagram, luminous plug for mechanical pressure switch

Pin	Function
1	24 V DC
2	Closing when the pressure drops, LED = yellow
3	Closing when the pressure increases, LED = green
4	0 V (plugs without LEDs do not have Pin 4)

8.8.3 Valve connector

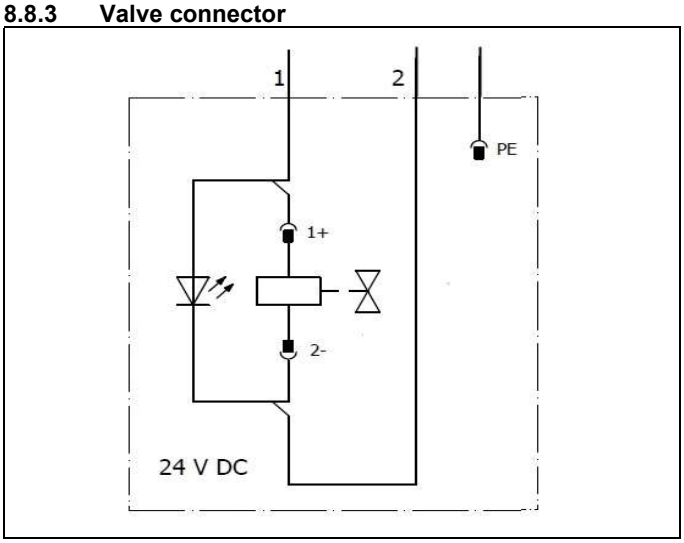


Figure 19: Circuit diagram, luminous plug for valves

Pin	Function
1	24 V DC, LED = yellow
2	0 V

8.8.4 Oil level and oil temperature control

For the oil control, a combined oil level and oil temperature control is installed in the reservoir.
The motor should be switched off in case of too low oil level or too high oil temperature.
The contact of the temperature switch opens at 60°C and has a reset value of 35 - 40°C.

Fig. 1: Oil control switch and oil thermometer

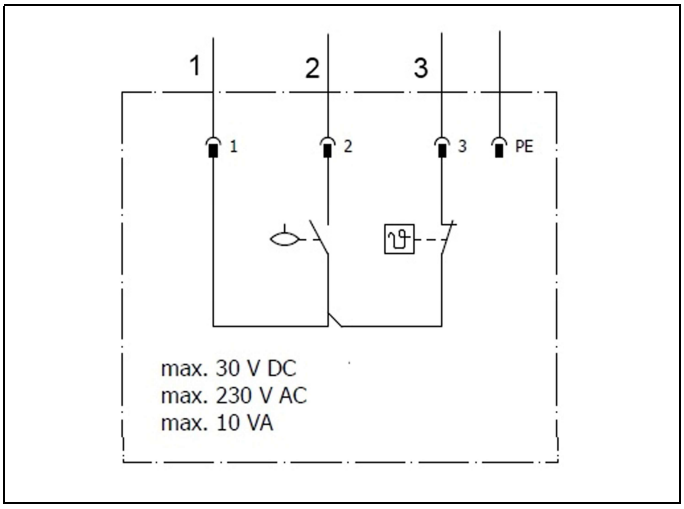


Figure 20: Circuit diagram, oil level and oil temperature control

Pin	Function
1	24 V
2	Oil level contact (decreasing opening)
3	Oil temperature contact (increasing opening)

8.8.5 Pressure filter control

For electrical signalling of the filter status. If the pressure filter is OK, a yellow LED lights up in the plug and a switching contact is closed. The pressure in front of the filter element increases when the oil flows through as well as with increasing contamination. If the dynamic pressure exceeds the limit value, the yellow LED goes out and the switching contact opens.
If the flow does not pass through the filter, OK is displayed.

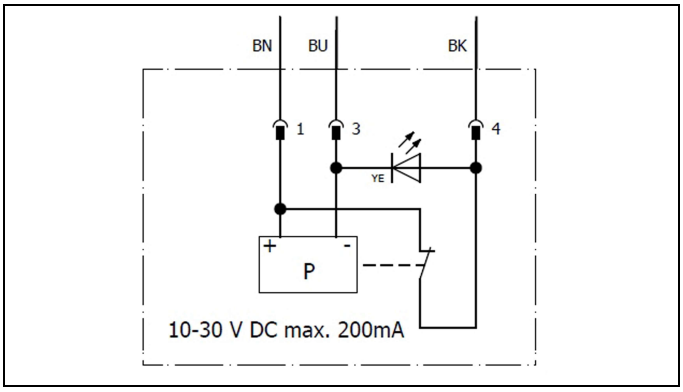


Figure 21: Circuit diagram, pressure filter control (option)

Pin	Function
1/BN/brown	10-30 V
3/BU/blue	0 V
4/BK/black	Switching output (opening) LED = 0

8.8.6 Return filter control

For electrical signalling of the filter status. The transparent socket has 2 luminous diodes. After the operating voltage has been switched on, a green LED lights up. As soon as dynamic pressure of 2 bar is reached, also a yellow LED lights up.
A filter element only must be replaced, when the yellow LED lights up permanently.

Fig. 1: Return filter control

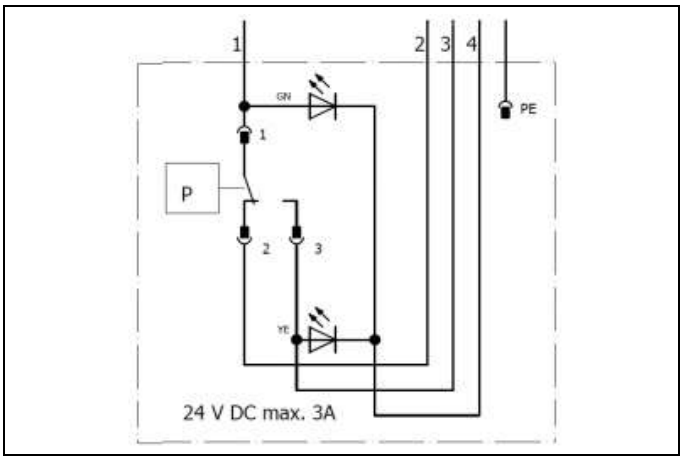


Figure 22: Circuit diagram, return filter control (option)

Pin	Function
1	24 V, green LED
2	Opening in the event of contamination
3	Closing in the event of contamination, yellow LED
4	0 V

9 Start up

9.1 Charging with hydraulic oil

⚠ WARNING

Poisoning due to contact with hydraulic oil!

- For handling with hydraulic oil consider the material safety data sheet.
- Wear protection equipment.

For works with operating fluids, pay attention to the safety data sheets!

For works at and with the product, wear suitable protection equipment!

NOTE

The pressure generator is delivered without oil filling.

- Filling must only be made when the connected hydraulic actuators and accumulators are in off-position.
- Accumulated oil volume in actuators or accumulators can lead to overflowing of the oil reservoir!

Hydraulic fluids

Operation of the products with hydraulic fluids that do not correspond to the specifications is inadmissible. See technical characteristics:

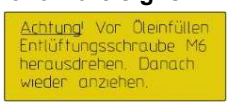
Pressure medium

- Use hydraulic oil according to the information on the hydraulic circuit diagram.

Impurities in the oil reservoir to avoid!

No impurities must enter into the oil reservoir.
Use clean filter cloth!

Follow the signs



Attention!
Before filling the oil unscrew bleeding screw M6. Screw in again after filling. (Used for piston pumps or combinations)

Note
Fill with oil here.

Filtration and cleanliness level of the hydraulic fluid

Pay attention to the indication for filtration and purity class of the hydraulic fluid (see technical characteristics).

Recommendation for piston pumps
Use hydraulic oil as per DIN 51524-2 HLP 22.

Recommendation for gear and piston pumps as well as combinations
Use hydraulic oil as per DIN 51524-2 HLP 32.

Recommendation for gear pumps
Use hydraulic oil as per DIN 51524-2 HLP 46.

For oil filling proceed as follows:

5. Make sure that all hydraulic drives (hydro-cylinders, etc.) are retracted in off-position!
6. Switch off main switch at the electric control, switching position "0", or disconnect from the mains.
7. Depressurise the system e.g. by pressing the emergency stop at the valves (depending on the type).
8. Unscrew the cover for oil filling at the return filter or the filling and air filter.
   - Use venting and filling element (d)!
   - Return filter, remove filter cartridge!
9. Unscrew bleeding screw M6.

   - Bleeding M6 (h) only necessary for piston pumps!
10. Insert clean funnel with filter or filter cloth (see chapter "Maintenance and check of the hydraulic fluid") in the oil filler neck (d).
11. Filling of hydraulic oil until hydraulic oil can be seen between the two markings at the oil level gauge (f).
12. Screw in cover.
13. Operate the fixture several times.
    (For the first start up, pay attention to the chapter "Bleeding of the hydraulic system".)
14. Check oil level at the oil level gauge (f) and refill hydraulic oil, if necessary.
15. Screw in the venting screw after 15 min.

    - Bleeding M6 (h) only necessary for piston pumps!

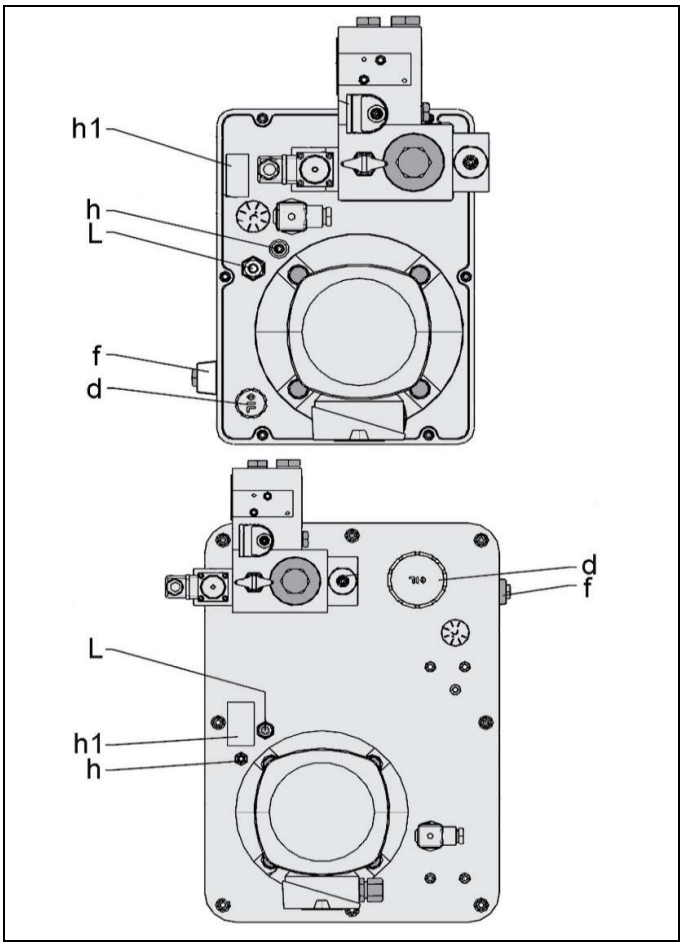


Figure 23: Figure on cover of power unit V11/27/40/63

h1 Instruction sign - bleeding of piston pump	L Port Ø10L for leakage

9.2 Switch on electric control

Electric control

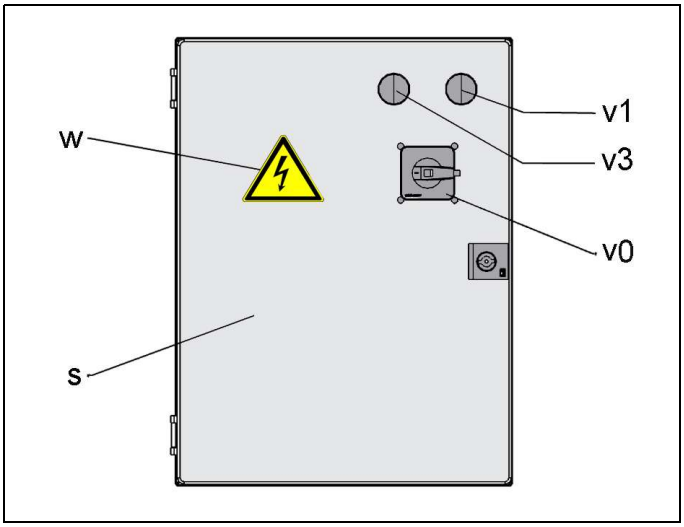


Figure 24: control box door with operating elements

s Electric control v0 Main switch / emergency stop v1 Malfunction light oil temperature too high / oil level too low	v3 Luminous push-button control on w Danger sign

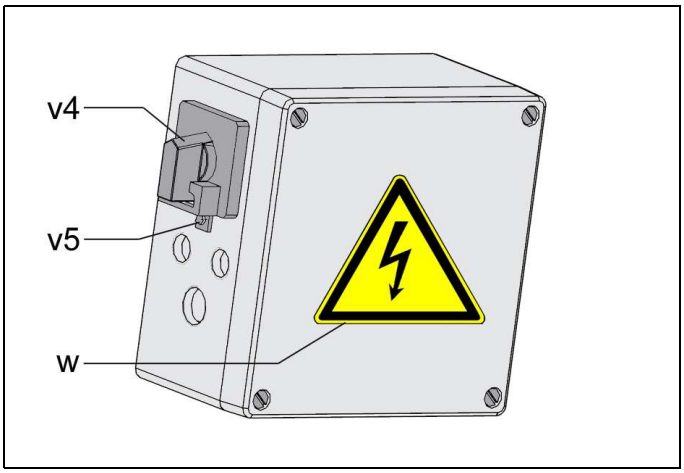


Figure 25: Compact control with operating elements

v4 Main switch v5 Malfunction light oil temperature too high / oil level too low	w Danger sign

Start up of control:

1. Switch on main switch
2. Press push-button control on
   (luminous push-button must be lit)
   (Point 2 is omitted for compact control)

9.3 Bleeding of the hydraulic system

Only for piston pumps

⚠ CAUTION

Malfunction caused by air in the system

Before filling the oil, unscrew bleeding screw M6.
Screw in again bleeding screw after filling.

Piston pumps must be bled:

1. Before filling the oil, unscrew bleeding screw M6.
2. Fill with oil.
3. Screw in again bleeding screw approx. 15 minutes after filling.

For all pumps

After filling the hydraulic oil there is still air in the internal and external pipes and the hydraulic drives (hydraulic cylinders, etc).

Air in hydraulic systems has among other things the following undesirable effects:

- prolongation of the extending and retracting times of consumer elements
- short cycling
- accelerated ageing of the oil.
- increased wear at seals and pump.

To avoid these undesirable effects the whole hydraulic system (power unit, valves, drives and piping) have to be bled by suitable measures!

Procedure:

1. For bleeding the oil pressure has to be reduced to a very low value!
2. Adjust pressure relief valve to the lowest possible value by screwing counterclockwise.
3. Pressurise clamping line.
4. Loosen carefully a bleeding screw or a fitting at the highest or remotest point of the fixture.
5. Pump until bubble free oil comes out.
6. Close bleeding point.
7. If double-acting elements are used, bleeding has to be effected also for the unclamping line.
8. Refill lost oil.

NOTE

Carry out function test.

- The operating direction of the control units must be obvious to the direction of motion of the plant.

9.4 Adjust operating pressure

⚠ WARNING

Injury due to movement of the connected drives!

- Connected drives can carry out a movement.
- Secure the working area of the drives.

Injuries caused by missing safety devices!

- To avoid injuries appropriate safety devices must be provided by the customer.

Injuries due to misuse, incorrect operation or abuse!

Injuries can occur if the product is not used within the intended use and the technical performance data.

- Before start up, read the operating instructions!

Injury due to pressure intensification due to incorrectly actuated valves!

Valves are represented in off-position (de-energised).
When connecting double-acting hydraulic elements to two identical valves, these must be actuated alternately!
Unequal valves must be activated together!

Burning due to hot surface!

During operation, surface temperatures on the product can exceed 70°C.

- Maintenance and repair work should only be performed in a cooled down condition and/or with protective gloves.

Burning due to hot solenoid valves!

Hot solenoids may cause burns on parts of the body.

- Depending on the duty cycle, high temperatures can occur at the solenoids during operation.
- Maintenance and repair work should only be performed in a cooled down condition and/or with protective gloves.

⚠ CAUTION

Work by qualified personnel

- Works only to be effected by authorised personnel.

Performance of the product!

The admissible performance data of the product, see chapter "Technical characteristics", may not be exceeded.

Hydraulic power unit can be damaged!

- Stick absolutely to the indicated direction of the rotary field.

Pressure relief valve for system pressure
The pressure relief valve (DBV) is used to adjust the desired system pressure and to limit the pump pressure. It protects the system against overpressure generated by the pump.
The pressure relief valve is manually adjusted with the plastic wing screw.

The system pressure in a hydraulic system corresponds to the linkage of pump, motor and pressure relief valve.
Hydraulic systems must be secured against overpressure.
The pressure relief valve (DBV) limits the pump pressure in the system to a set value.
When this value is reached, the complete flow rate of the pump is drained to the reservoir via the pressure relief valve.
This leads to a strong and very fast heating of the oil.

Depending on the operating mode, the following measures are imperative after the pressure build-up:
(see chapter Description / operating modes)
- switch off the pump motor in intermittent cycle mode.
- in unpressurised cycle mode, switch the pump to unpressurised cycle.

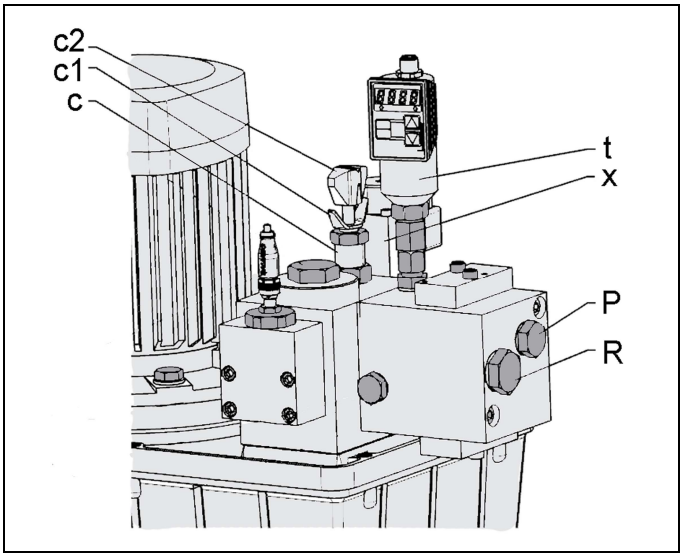


Figure 26: Components at the pressure relief valve

c	Pressure relief valve system pressure	x	Directional control valve for unpressurised cycle
c1	Lock nut	P	Connecting possibility to system pressure G3/8
c2	Adjustment screw for adjustment of the system pressure	R	Connecting possibility to return line (reservoir) G1/2
t	Electronic pressure switch with digital display for the system pressure		

Further notes to the pressure switch in the corresponding operating instructions.

If a separate pressure switch is available for machine tool interlock (see hydraulic circuit diagram) the following procedure is required:
- first adjust machine tool interlock (see section "Adjust machine tool interlock (optional)“,
- then adjust the operating pressure.

9.4.1 Operating mode intermittent cycle

Pressure increase
- Turn out the adjusting screw (c2) at the pressure relief valve (DBV) (c) by some counterclockwise turns
- Switch on the operating voltage.
- The electronic pressure switch with digital display (t) is automatically in RUN mode. The current pressure is displayed.
- Simultaneously actuate the push-buttons ▲ and ▼ (Reset/Esc) at the pressure switch for at least 3 seconds (see operating manual of the electronic pressure switch).
- Thus, the TEACH mode is activated. The digital display extinguishes cyclically in TEACH mode.
- The pump motor runs in continuous operation against pressure. The pressure will be displayed on the digital display.
- Adjust at the pressure relief valve (c) the desired higher pressure by clockwise turning of the adjusting screw (c2). Control by digital display.
- Tighten lock nut (c1).
  The pressure will be displayed on the digital display.
- Actuate the push-button (t) Enter/Set at the electronic pressure switch.
- The pump motor switches off.

In the case of a pressure drop of 10% (return switching point of the pressure switch) the pump motor is switched on again and the pump delivers again.

Pressure reduction
For a pressure reduction, turn out the adjusting screw (c2) at the pressure relief valve (DBV) (c) by some counterclockwise turns after activation of the TEACH mode.
- Operate any control valve for the pressure relief of the system.
- Then proceed as for a pressure increase.

9.4.2 Operating mode unpressurised cycle

Pressure increase
- Turn out the adjusting screw (c2) at the pressure relief valve (DBV) (c) by some counterclockwise turns
- Switch on the operating voltage.
- The motor runs in continuous operation.
- The electronic pressure switch with digital display (t) is automatically in RUN mode. The current pressure is displayed.
- Simultaneously actuate the push-buttons ▲ and ▼ (Reset/Esc) at the pressure switch for at least 3 seconds (see operating manual of the Teach-In pressure switch).
- Thus, the TEACH mode is activated. The digital display extinguishes cyclically in TEACH mode.
- The valve must respond for the unpressurised cycle (x). The pump generates the adjusted pressure. The pressure will be displayed on the digital display.
- Adjust at the pressure relief valve (c) the desired higher pressure by clockwise turning of the adjusting screw (c2). Control by digital display.
- Tighten lock nut (c1).
- The pressure will be displayed on the digital display.
- Actuate the push-button (t) Enter/Set at the electronic pressure switch.
- The valve must release for the unpressurised cycle (x). The pump delivers without pressure and is discharged (clearly audible).

In the case of a pressure drop of 10% (return switching point of the pressure switch) the valve for unpressurised cycle is switched on again and the pump delivers again.

Pressure reduction
Proceed as described in the chapter "Intermittent cycle".

Figure 27: Design of the pressure switch with Teach-In function

NOTE

Check the adjustments and readjust, if required, in warm operating mode.

9.4.3 Brief instruction for the Teach-In function

For teaching, the switching as well as reverse switching points are calculated and saved by pressing the Enter/Set key of the system.
There with the adjustment of the pressure switch is completed and the pressure switch is ready for operation (RUN mode).

1. Connect operating voltage.
   The device is now automatically in RUN mode

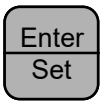
2.

Press the key Reset / Esc for at least 3 s. → Activation of the TEACH mode (Press arrow key up and arrow key down at the same time.	

The device is now in TEACH mode (display extinguishes cyclically).

3. Now the pressure can be adjusted at the pressure generator and can be checked at the display of the pressure switch.

4.

Shortly press Enter/Set key.	

The device is now again automatically in RUN mode, the switching points were newly calculated and saved.

NOTE

System pressure
If the system pressure is reduced, a pressure relief must be planned at the side of the consumer elements!
This is required to relieve the integrated check valve, otherwise the function is impaired.

9.4.4 Adjustment of machine tool interlock (MB) with mechanical pressure switch

The pressure switch is adjusted to approx. 80% of the operating pressure or the pressure indicated on the hydraulic circuit diagram.
For use as machine release, it is electrically interlinked with the control of the machining machine.
So the machine tool interlock can only start if the fixture is clamped.
On the other hand, the machine tool is immediately switched off if the pressure in the system drops by more than 20%.

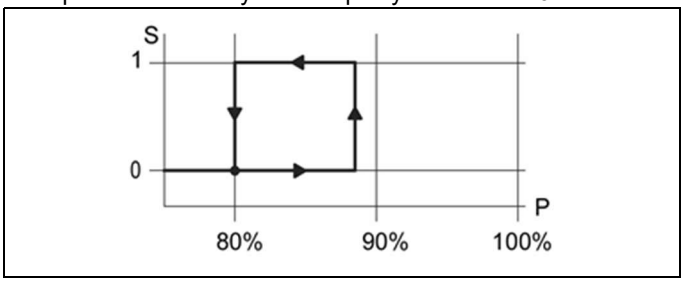


Figure 28: Switching points for machine tool interlock

S Switching output	P Operating pressure

Procedure for adjustment:

- Adjust the pressure relief valve (system pressure) to 80% of the operating pressure. For this purpose, adjust the pressure switch to switch off the pump motor to the max. setting value (“Reset”- function for Teach-In pressure switches). The pump motor must permanently run against pressure.
- Perform the following adjustment procedure as far as possible without interruption, as the oil is now strongly heated.
- Operate the corresponding control valve for pressurising the pressure switch to be adjusted.
- Turn the pressure switch **counterclockwise** until the switching point is obtained (LED illuminates green) (see chapter “Electrical connection”/”Mechanical pressure switch”)
- Turn the pressure switch **counterclockwise** until the switching point is obtained (LED illuminates yellow)

After the adjustment of the pressure switch (MB), the operating pressure has to be set again.
The pump motor must be correctly switched off or the pump must be relieved by an "unpressurised cycle".

NOTE

Loosen the locking screw
The adjusting cap is secured against adjustment with the locking screw.
To carry out another adjustment, loosen the locking screw (hexagon socket SW2)
After adjustment, the adjusting cap must be secured again.

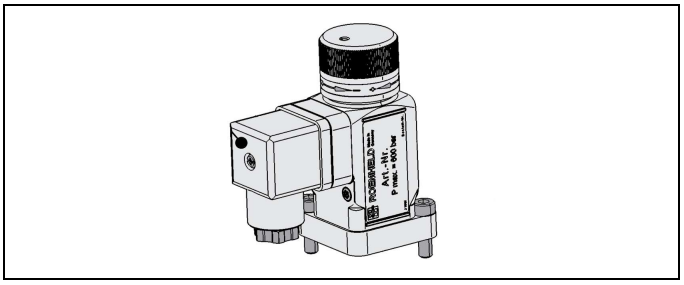


Figure 29: Version of the mechanical pressure switch

9.5 Adjust twin flow control valve

Flow control valves influence the flow rate in a hydraulic line.
Throttling is made only in one direction.
In opposite direction, the flow rate will not be throttled by the flow control valve.

The continuous adjustment of the flow rate is made by turning the adjusting screws (b).
The protection cap (a) protects against exterior influences.

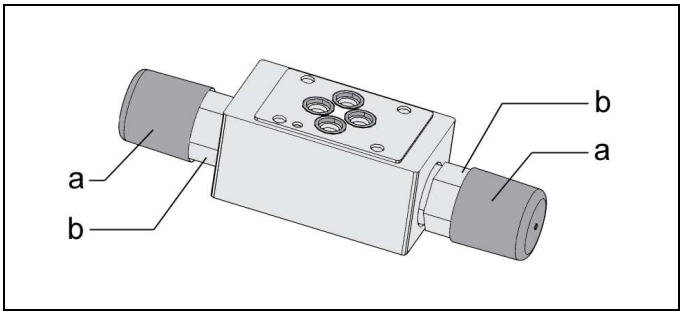


Figure 30: Twin flow control valve (function in A+B line)

For adjustment, proceed as follows:

- Remove protection cap (a).
- Set throttle with adjusting screw (b) to min. flow rate (clockwise to the stop).
- Set the control valve so that the hydraulic line to be adjusted will be pressurised.
- Open the throttle with adjusting screw (b) until the flow rate has the desired speed at the consumer element.
- Lock the adjusting screw.
- Check the adjustment. Switch the control valve so that the hydraulic line will be relieved and then change again.
- Put on the protection cap

Repeat the procedure for other hydraulic lines (if available).

9.6 Adjust pressure reducing valve

Pressure reducing valves reduce the system pressure in a part of the hydraulic system to a lower value.
In front of the valve there is the system pressure, the output pressure has the adjusted value.

The continuous adjustment of the output pressure is obtained by turning the adjusting screw (b).

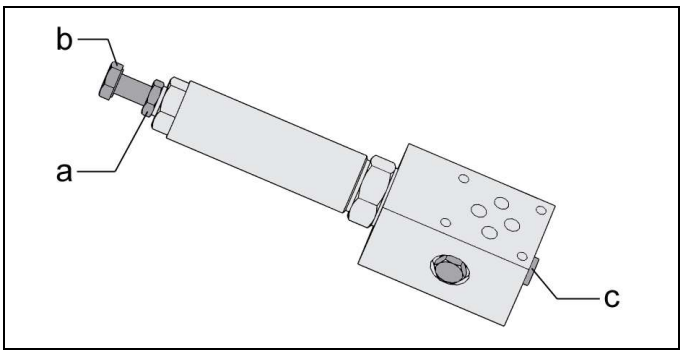


Figure 31: Pressure reducing valve (intermediate plate design)

For adjustment proceed as follows:

- Set pressure relief valve with adjusting screw (b) to min. pressure (counterclockwise to the stop).
- Mount a pressure gauge with appropriate measuring range to port (c) (if not available).
- Set the control valve so that the hydraulic line to be adjusted will be pressurised.
- Adjust pressure reducing valve with adjusting screw (b) until the desired pressure will be displayed on the pressure gauge.
- Lock the adjusting screw (a).
- Check the adjustment. Switch the control valve so that the hydraulic line will be relieved and then change again.

9.7 Adjust pressure relief valve in A + B

Pressure reducing valves (DBV) in the valve outputs A + B offer an additional protection against exceeding the maximum admissible pressure of a consumer element.
For this purpose, these pressure reducing valves are adjusted to the system pressure +20 bar or to the max. admissible operating pressure of the connected consumer elements.

The continuous adjustment of the pressure is obtained by turning the adjusting screw (b).

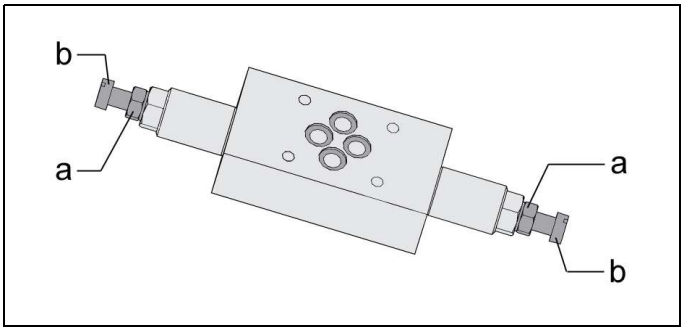


Figure 32: Pressure relief valve (intermediate plate design)

For adjustment, proceed as follows:

- Set pressure reducing valve with adjusting screw (b) to min. pressure (counterclockwise to the stop).
- During adjustment it is necessary that the pump motor is running in continuous operation and that the valve is activated for the unpressurised cycle (if available).
- Set the pressure relief valve for the system pressure to max. pressure (clockwise to the stop) (see chapter “Adjust operating pressure”).
- Monitor the pressure on the pressure gauge for the system pressure or on the digital display of the pressure switch.
- Set the control valve so that the hydraulic line to be adjusted will be pressurised.
- Adjust pressure relief valve with adjusting screw (b) until the desired pressure will be displayed on the pressure gauge.
- Lock the adjusting screw (a).
- Check the adjustment. Switch the control valve so that the hydraulic line will be relieved and then change again.
- Repeat the procedure for other hydraulic lines (if available).
- Adjust the hydraulic system to system pressure. (see chapter "Adjust operating pressure").

10 Operation

⚠ DANGER

Injury due to movement of the connected drives!

- The pump motor starts running again after the clamping process and a pressure drop of 10% to maintain the clamping pressure!
- Connected drives can carry out a movement!
- Secure the working area of the drives!

⚠ WARNING

Injury due to pressure intensification due to incorrectly actuated valves!

Valves are represented in off-position (de-energised).
When connecting double-acting hydraulic elements to two identical valves, these must be actuated alternately!
Unequal valves must be activated together!

Burning due to hot surface!

During operation, surface temperatures on the product can exceed 70°C.

- Maintenance and repair work should only be performed in a cooled down condition and/or with protective gloves.

Burning due to hot solenoid valves!

Hot solenoids may cause burns on parts of the body.

- Depending on the duty cycle, high temperatures can occur at the solenoids during operation.
- Maintenance and repair work should only be performed in a cooled down condition and/or with protective gloves.

⚠ CAUTION

Avoid overheating of the system

In order to avoid overheating of the system the maximum running time (relative duty cycle) must not be exceeded.

For works at and with the product, wear protective gloves!

For works at and with the product, wear suitable protection equipment!

Duty cycle of the electric motor (ED)

The relative duty cycle of the electric motor (ED) depends on the operating mode of the power unit.
This applies to the operating mode intermittent cycle S3 or the unpressurised cycle S6:

- in intermittent cycle mode, the electric motor will be switched off as soon as the preset operating pressure is reached.
- in unpressurised cycle mode, the valve switches the flow rate of the pump to pressureless to the reservoir, the electric motor is running in continuous operation.

Calculate duty cycle

The calculation of the relative duty cycle of the electric motor is based on a cycle time (tS) of 10 minutes. With 40% ED, e.g. the maximum load (tB) within the cycle should not exceed 4 minutes. During the remaining time (tSt), the motor is switched off (S3) or is continuously running in operating mode S6 with a capacity of less than 50%.
for more information see chapter Technical characteristics and data sheet D8.026.

NOTE

Duty cycle (ED)

The reachable duty cycle refers only to the electric motor.
The running time of the pump at max. pressure depends on the occurring power losses.
The oil is led by the pressure relief valve to the oil reservoir, if the power unit is operated with 100% duty cycle and no consumer elements are operated. The oil warms up.
Pay attention that the oil temperature does not exceed 63°C.

The relative duty cycle (%ED) can be calculated as follows:

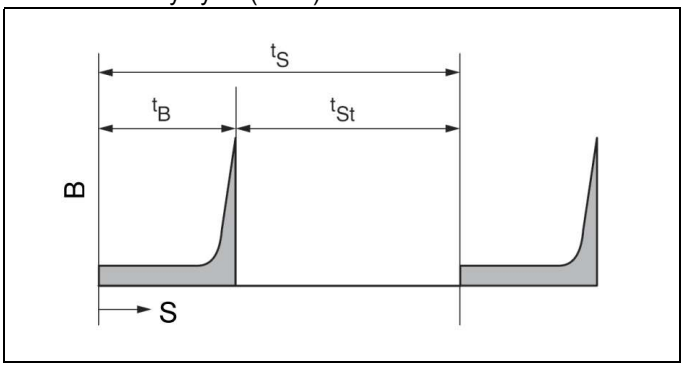


Figure 33: Diagram relative duty cycle

B Load (pressure) S Start tB Time elapsed from motor start to motor cut off (running time)	tS Cycle time (minutes) tSt Downtime or time of unpressurised cycle

$$\%\,ED = \frac{t_B}{t_B + t_{St}} \cdot 100 = \frac{t_B}{t_S} \cdot 100$$

Different motor running and idle times are simply added.

11 Maintenance

⚠ WARNING

Injury due to improper maintenance!

- Maintenance work may only be carried out when the power unit is de-energised and depressurised.
- Secure working areas.

Injury due to pressure intensification due to incorrectly actuated valves!

Valves are represented in off-position (de-energised).
When connecting double-acting hydraulic elements to two identical valves, these must be actuated alternately!
Unequal valves must be activated together!

Burning due to hot oil!

- In operating conditions oil temperatures up to 70 °C can appear due to environment influences.
- All works must only be made in cool mode!

Burning due to hot surface!

During operation, surface temperatures on the product can exceed 70°C.

- Maintenance and repair work should only be performed in a cooled down condition and/or with protective gloves.

Burning due to hot solenoid valves!

Hot solenoids may cause burns on parts of the body.

- Depending on the duty cycle, high temperatures can occur at the solenoids during operation.
- Maintenance and repair work should only be performed in a cooled down condition and/or with protective gloves.

⚠ CAUTION

Work by qualified personnel

- Works only to be effected by authorised personnel.

For works at and with the product, wear suitable protection equipment!

NOTE

Operating instructions

- Further operating instructions for individual components are available on the internet (www.ROEMHELD.com) or on request!

11.1 Plan for maintenance

Maintenance works	Interval	Realisation
Cleaning	As required	Operator
Check	daily	Operator
Checking of hydraulic system and components	yearly	Qualified personnel
Exchange of the hydraulic fluid after start up	after 250 operating hours or 3 months	Qualified personnel
Check the hydraulic fluids, if required, exchange the hydraulic fluid and the filter	after 1250 operating hours or 6 months	Qualified personnel
Change the hydraulic fluid and the filter	After 2500 operating hours, at the latest after 24 months, or in case of damage	Qualified personnel
Repair		ROEMHELD service personnel

NOTE

Rest period

- Observe the rest period of at least 1 hour after changing the hydraulic fluid!

11.1.1 Regular checks

Checks by the operator have to be effected as follows:

11.1.2 Daily checks

- Check all fixing screws, retighten if required.
- Check all cable fixings and fittings, retighten if required.
- Check if hydraulic hoses, pipes and cables are damaged, or have chafe marks, etc.).
- Check hydraulic components for external leakage - retighten fittings, if required.
- Hydraulic hoses must not get in contact with substances which can cause a damage (acids, lys, solvents, ...).
- Check the oil level of the hydraulic power unit (see chapter Charging of the hydraulic power unit with oil) - if required refill oil (specifications see chapter Technical characteristics).
- Check safety devices as per chapter Safety devices.

11.1.3 Yearly checks

Hydraulic system, hydraulic hoses

An expert has to check all hydraulic components at least once a year if they are still work-proof. Assessed damages have to be repaired immediately.

The following checks and works have to be effected:

- An expert has to check all hydraulic hoses at least once a year if they are still work-proof. Assessed damages have to be repaired immediately.
- The hydraulic hoses of the device have to be exchanged as per BGR 237 at least after 6 years by new ones.

11.2 Cleaning

⚠ WARNING

Burning due to hot surface!

During operation, surface temperatures on the product can exceed 70°C.

- Maintenance and repair work should only be performed in a cooled down condition and/or with protective gloves.

Burning due to hot solenoid valves!

Hot solenoids may cause burns on parts of the body.

- Depending on the duty cycle, high temperatures can occur at the solenoids during operation.
- Maintenance and repair work should only be performed in a cooled down condition and/or with protective gloves.

Injury by flying out components or oil!

- For cleaning works always wear safety goggles, protective shoes and safety gloves.

⚠ CAUTION

Material damage, damage or functional failure

Aggressive cleaning agents can cause damage, especially to seals.

The product must not be cleaned with:

- corrosive or caustic substances or
- organic, solvents such as halogenated or aromatic hydrocarbons and ketones (cellulose thinner, acetone, etc.).

The following cleaning works have to be effected daily at the mechanical components:

- Clean the product only with cleaning clothes.
- Afterwards lubricate slightly movable components (piston rods, guides etc.) and not coated steel components.

11.3 Maintenance and check of the hydraulic fluid

Important factors that influence the degree of contamination of the hydraulics fluid are:

- Contamination of the surroundings
- Size of the hydraulic system
- Design of the hydraulic system as specified
- Number of consumer elements,
- Cycle time,
- Number of fluid circulations through the filter per time unit,
- Implementation of the maintenance schedules,
- Training of the maintenance personnel.

They change the operating characteristics of hydraulic fluids and lead to their ageing.

The monitoring of the condition and a filtration adapted to the requirements of the application (if necessary, draining and degasification) are indispensable for the maintenance of the operating characteristics and guarantee of a long service life of hydraulic fluids and components.

The hydraulic fluid must be regularly exchanged or examined by the lubricant manufacturer and/or qualified staff.

A reference investigation according to the maintenance schedule with analysis as per ISO 4406 or mass of impurities with analysis as per E 12662 is recommended

Note

For guarantee, liability and warranty claims, maintenance proofs and/or the results of analysis of the hydraulic fluids have to be submitted to us.

Purity of the hydraulic fluids

The admissible contamination (unsolved impurities in the hydraulic fluid) depends on the component of the hydraulic system that is most sensitive to dirt. The indicated purity class is the maximally admissible value that should not be exceeded, with regard to the operating safety (clogging of gaps, orifices as well as the locking of the control piston) and the service life (wear reduction).

Application	Minimum purity as per NAS 1638	Minimum purity as per ISO 4406	attainable with filter fineness *
Radial piston and gear pumps, valves and cylinders	8 (recommended: 5 up to 7)	20 / 17 / 13	≤ 20 µm
Proportional pressure and flow control valves	7 (recommended: 5 up to 6)	18 / 16 / 13	≤ 10 µm

* Important influential factors see chapter: "Maintenance and check of the hydraulic fluid"

Note

Please note that a new hydraulic fluid "on tap" does not meet the requirements of cleanness. If necessary, use cleaned oil.

Note

Mixing of different types of hydraulic fluid can lead to unintended chemical reactions with mud formation resinification or similar.

Therefore, the respective manufacturers should be consulted for a change between different hydraulic fluids.

In any case, the entire hydraulic system is to be rinsed thoroughly.

11.4 Oil change

Hazardous to the environment
Due to possible environmental pollution, the individual components must be disposed only by an authorised expert company.

⚠ WARNING

Injury due to improper maintenance!
- Maintenance work may only be carried out when the power unit is de-energised and depressurised.
- Secure working areas.

Poisoning due to contact with hydraulic oil!
- For handling with hydraulic oil consider the material safety data sheet.
- Wear protection equipment.

Burning due to hot oil!
- In operating conditions oil temperatures up to 70 °C can appear due to environment influences.
- All works must only be made in cool mode!

Burning due to hot surface!
During operation, surface temperatures on the product can exceed 70°C.
- Maintenance and repair work should only be performed in a cooled down condition and/or with protective gloves.

Burning due to hot solenoid valves!
Hot solenoids may cause burns on parts of the body.
- Depending on the duty cycle, high temperatures can occur at the solenoids during operation.
- Maintenance and repair work should only be performed in a cooled down condition and/or with protective gloves.

For works with operating fluids, pay attention to the safety data sheets!

NOTE

- Oil changes must only be made in depressurised mode.

Hydraulic oil use according sign
Use hydraulic oil as per sign at the oil filler neck (see also technical characteristics).

Filtration and cleanliness level of the hydraulic fluid
Pay attention to the indication for filtration and purity class of the hydraulic fluid (see technical characteristics).

Only for piston pumps

⚠ CAUTION

Malfunction caused by air in the system
Before filling the oil, unscrew bleeding screw M6.
Screw in again bleeding screw after filling.

Piston pumps must be bled:
1. Before filling the oil, unscrew bleeding screw M6.
2. Fill with oil.
3. Screw in again bleeding screw approx. 15 minutes after filling.

To change the oil proceed as follows:

4. Make sure that all hydraulic drives (hydro-cylinders, etc.) are retracted in off-position!
5. Switch off main switch at the electric control, switching position "0", or disconnect from the mains.
6. Depressurise the system e.g. by pressing the emergency stop at the valves (depending on the type).
7. Unscrew oil drain plug.
8. Drain oil completely.
9. Apply oil drain plug - if required screw in new screw (see spare parts list).
10. Unscrew the cover for oil filling at the return filter or the filling and air filter.
    - Use venting and filling element (d)!
    - Return filter, remove filter cartridge!
11. Unscrew bleeding screw M6.
    - Bleeding M6 (h) only necessary for piston pumps!
12. Insert clean funnel with filter or filter cloth (see chapter "Maintenance and check of the hydraulic fluid") in the oil filler neck (d).
13. Filling of hydraulic oil until hydraulic oil can be seen between the two markings at the oil level gauge (f).
14. Screw in cover.
15. Operate the fixture several times.
    (For the first start up, pay attention to the chapter "Bleeding of the hydraulic system".)
16. Check oil level at the oil level gauge (f) and refill hydraulic oil, if necessary.
17. Screw in the venting screw after 15 min.
    - Bleeding M6 (h) only necessary for piston pumps!

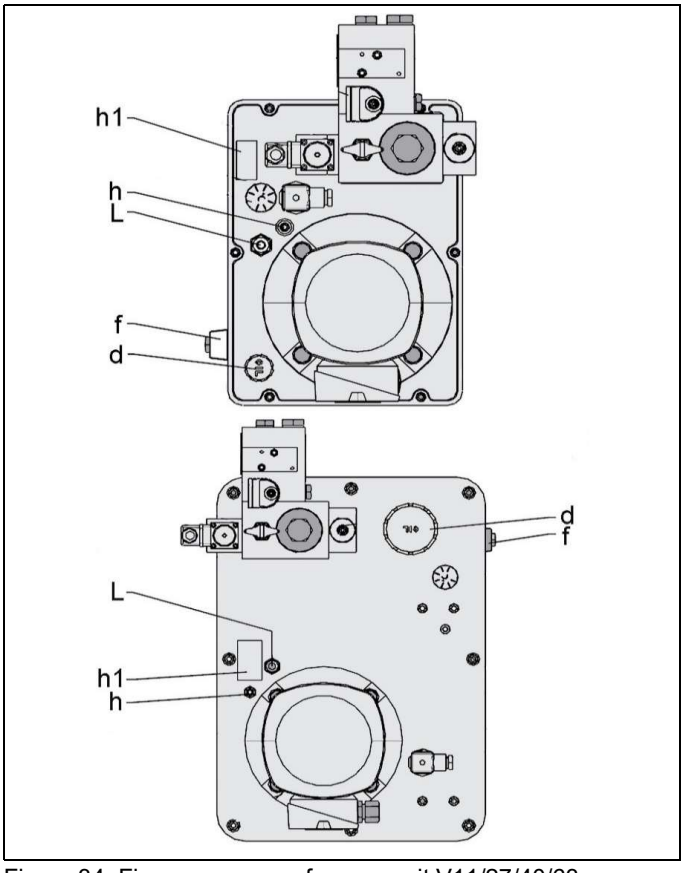


Figure 34: Figure on cover of power unit V11/27/40/63

h1 Instruction sign - bleeding of piston pump	L Port Ø10L for leakage

NOTE

Component overview
- Pay attention to chapter "Overview of components"!

Oil change
It is recommended to exchange always the oil filter when changing the oil.

Rest period
- Observe the rest period of at least 1 hour after changing the hydraulic fluid!

11.4.1 Exchange oil filter (pressure filter)

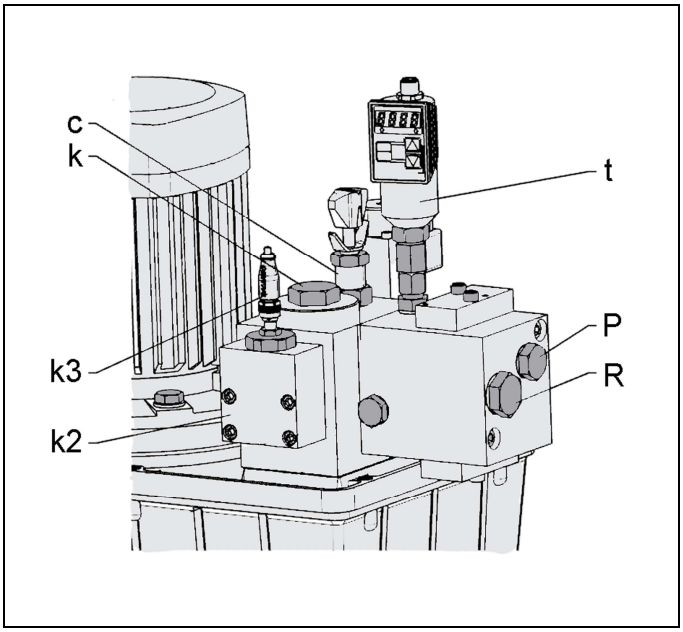


Figure 35: Connector block with high-pressure filter and screw cap of the oil filter (k)

c Pressure relief valve	k3 Screw-in sensor
k High-pressure filter with screw cap	t Electronic system pressure switch with digital display
k2 Filter control	

11.4.2 High-pressure filter

1. Switch power unit to voltage-free mode.
2. Depressurise the system e.g. by pressing the emergency stop at the valves.
3. Unscrew screw cap of the oil filter with a fork spanner.

NOTE

- For tight connection of a new pressure filter also O-ring and back-up ring have to be exchanged (included in the exchange kit pressure filter).

4. Clean the magnetic disk.
5. Insert filter cartridge.
6. Screw on screw cap.

Spare parts

Spare part	Part no.
Exchange kit pressure filter	3887-107

11.4.3 Return filter

1. Switch power unit to voltage-free mode.
2. Depressurise the system e.g. by pressing the emergency stop at the valves.
3. Unscrew screw cap of the oil filter with a fork spanner.
4. Check filter cartridge if it is contaminated, replace it, if required.
5. Screw screw cap of the oil filter with a fork spanner.

When using a contamination indicator, the date for filter maintenance is indicated and thus an optimum use of filter lifetime is obtained.

Filter elements
Flow from the outside inwards. Result of the star folding of the filter material:
- large filter surfaces
- low pressure losses
- high dirt capacities
- especially long maintenance intervals

Spare parts

Filter cartridge for the delivery of the pump	Part no.
≤ 12 l/min	3887-109 (16ym)
> 12 l/min	3887-111 (16ym)

11.4.4 Clean oil screens (if available)

Note

The screen disks are in the hydraulic ports.

In case of strong contamination, the screen disks must be cleaned.

1. Remove fittings at the hydraulic ports.
2. Unscrew the screen disk with a pointed tool (scriber).
3. Clean the disk and refit.
4. Screw in fitting.

Spare parts

Spare parts	Part no.
Screen disk G1/4	3887 009 (0.63mm)
Screen disk G3/8	3300 097 (0.63mm)
Screen disk G1/2	3887 120 (0.63mm)

12 Trouble shooting

Trouble	Cause	Remedy
Power unit does not start:	Safety fuse defect	Check and exchange, if required
	Pressure switch misaligned	Adjustment (see "Adjust operating pressure")
	Electric control is not o.k., e.g. overload current, parting of cable	⚠ **Caution ! Works only to be effected by authorised personnel.** Reset protection switch
	Oil level too low or oil temperature too high, the light in the door of the control box or at the main switch is lit	Refill oil or let cool oil
Motor does not switch off after reaching operating pressure	Pressure switch misaligned	Adjustment (see "Adjust operating pressure")
	Pressure switch defect	Exchange pressure switch

⚠ WARNING

Injury due to unexpected start

In the event of a malfunction due to the oil control and the subsequent falling below the switching temperature of the oil level and temperature switch, the power unit can start automatically.

- Secure the working area of the actuator/consumer in the case of a malfunction
- Switch off the power unit at the main switch.
- Control the oil level and oil temperature
- Refill oil or wait until the oil temperature falls below 38°C.

⚠ CAUTION

Work by qualified personnel

- Works only to be effected by authorised personnel.

NOTE

After the exchange or the repair of hydraulic components, their function must be tested.

Trouble	Cause	Remedy
Operating pressure will not be obtained	Pressure relief valve adjusted too low	Adjustment (see section "Adjust operating pressure")
	External leakage	Eliminate leak, e.g. by tightening fittings or replacing pipes or hoses.
	Solenoid valves are leaky	Replace solenoid valve(s)
	Pump defect	Exchange pump or return power unit for repair
	Leckage of a hydraulic drive	Check which drive is leaky.
	Pressure switch misaligned	Adjustment (see section "Adjust operating pressure")

Trouble	Cause	Remedy
Pump motor will be switched on and off in short intervals in position "Clamping" and "Unclamping":	Check valve System pressure in the connecting block below the electronic pressure switch leaking	Remove G1/4 screw plug (M1), replace check valve (tightening torque 15 Nm)
	Leakage at the cylinder (clamping element/ cylinder or similar)	Squeeze pressure line to locate the leakage, exchange seal or element.
	Fittings are leaky	Retighten fittings
	Pump not bled (only for piston pumps)	Drain off completely the oil and refill (see section "Oil filling")
	Solenoid valve(s) are leaky (internal leakage)	Replace solenoid valves
Pump does not deliver:	Oil level is too low	Refill oil
	Pump not bled (only for piston pumps)	Drain off completely the oil and refill (see section "Oil filling")
	Direction of rotation incorrect (for gear pumps and two-stage pumps)	Check electrical connection, see arrows of direction of rotation on the ventilator cowl of the electric motor

13 Technical characteristics

Technical data see hydraulic or electric circuit diagram:

NOTE

Further information

- For further technical data see ROEMHELD data sheet. D8026

13.1 Technical characteristics

Hydraulics

Operating pressures [bar]	see hydraulic circuit diagram and data sheet D8.026
Flow rates [l/min]	See hydraulic circuit diagram
Reservoir volume/ Filling quantity	8456-xxx 11 litres 8457-xxx 27 litres 8458-xxx 40 litres 8459-xxx 63 litres See hydraulic circuit diagram
Usable oil volume with max. filling	8456-xxx 6 litres 8457-xxx 13 litres 8458-xxx 20 litres 8459-xxx 30 litres
Max. oil temperature	60 °C
Hydraulic oil	See hydraulic circuit diagram HLP 22/HLP32/HLP46, grade of contamination ISO 4406:1999 18/16/13 as per DIN 51 524
	⚠ Important! Not suited for fluids of the type HF-A, HF-C and HF-D.

Electricity

Operating voltage	see hydraulic / electric circuit diagram
Type	Asynchronous motor
Isolation class	see name plate of the motor
code class	IP 54
Relative duty cycle (ED)	See section "Operation" and data sheet D8.026

Electric control (if available)

Control voltage for the valves	24 V DC
Fuse	See name plate of the electric control or electric circuit diagram
Connection, supply line	See electric circuit diagram

Environment

Ambient temperature	+5°C up to + 35°C
Noise level	max. 80 dB (A) (in 1 m distance and height above the floor)

Hydraulic and electrical characteristics

Poppet valves ND6

Part no.	**2363-3xx**
Type	Poppet valve (hermetically sealed)
Max. operating pressure	250 bar / 500 bar
Max. flow rate	up to 400 bar = 20 l/min from 400 bar = 6 l/min
Direction of flow	in the direction of the arrow as per symbol
Hydraulic oil	HLP 22 / HLP 32 as per DIN 51524
Nominal voltage +5%-10%	24 V DC
Pick up and holding power	26 /30 watt (250/500 bar)
Make time	60 ms
Brake time	60 ms
Max. cycles	2000/h
Duty cycle	100% ED
Code class	IP 65
Electric connection	Cable socket as per DIN EN 175 301-803 and ISO 4400

Spool valves ND6

Part no.	**245x-xxx**
All sizes and data	See data sheet C2.530

Pressure switch 9730-xxx

Part no.	**9730-500/501/502**
All sizes and data	See data sheet F9.732

Pressure switch 9740-xxx

Part no.	**9740-050(A)**
All sizes and data	See operating manual BA_F9734_EN
Part no.	**9740-049(A)**
All sizes and data	See operating manual BA_F9734_EN

NOTE

Information on the name plate

For further information see name plate as well as supplied documents.

Characteristics

Characteristics for fittings, pipe clamps and hydraulic high-pressure hoses see ROEMHELD data sheets.

Valve control

Proposals for valve control see ROEMHELD data sheet.

Screwed Plug

- Use only fittings "screwed plug B and E" as per DIN 3852 (ISO 1179).

Pressure fluids

- Use hydraulic oil as per ROEMHELD data sheet A 0.100.

14 Disposal

Hazardous to the environment
Due to possible environmental pollution, the individual components must be disposed only by an authorised expert company.

The individual materials have to be disposed as per the existing regulations and directives as well as the environmental conditions.
Special attention has to be drawn to the disposal of components with residual portions of hydraulic fluids. The instructions for the disposal at the material safety data sheet have to be considered.
For the disposal of electrical and electronic components (e.g. stroke measuring systems, proximity switches, etc.) country-specific legal regulations and specifications have to be kept.

15 Declaration of incorporation

Manufacturer

Römheld GmbH Friedrichshütte
Römheldstraße 1-5
35321 Laubach, Germany
Tel.: +49 (0) 64 05 / 89-0
Fax: +49 (0) 64 05 / 89-211
E-mail: info@roemheld.de
www.roemheld.com

Responsible person for the documentation:
Dipl.-Ing. (FH) Jürgen Niesner, Tel.: +49(0)6405 89-0.

This declaration of incorporation applies to the following products:

Power units in modular design of data sheet D 8.026, from the part number ranges:

- 8456 000 - 100 (V = 11 L)
- 8456 500 - 900 (V = 11 L)
- 8456 9001 - 9700 (V = 11 L)
- 8457 000 - 100 (V = 27 L)
- 8457 9001 - 9700 (V = 27 L)
- 8458 000 - 100 (V = 40 L)
- 8458 9001 - 9700 (V = 40 L)
- 8459 000 - 100 (V = 63 L)
- 8459 9001 - 9700 (V = 63 L)

The listed products are designed and manufactured in line with the relevant versions of the directives **2006/42/CE** (EC-MSRL) and in compliance with the valid technical rules and standards. In accordance with EC-MSRL, these products are not yet ready for use and are exclusively designed for the installation in a machine, a fixture or a plant.

The following additional EU directives were applied:

- **2006/42/EC,** Machinery directive [www.eur-lex.europa.eu]

The following harmonised standards have been applied:

DIN EN ISO 12100, 2011-03, Safety of machinery; Basic concepts, General principles for design (replacement for part 1 and 2)

DIN EN ISO 4413, 2011-04, Hydraulic fluid power - General rules and safety requirements for systems and their components

The products may only be put into operation after it was assessed that the machine, in which the product shall be installed, corresponds to the machinery directives (2006/42/EC).

The manufacturer commits to transmit the special documents of the products to state authorities on request.
The technical documentation as per appendix VII part B was prepared for the products.

i. A. Eugen Rot

Eugen Rot
Team leader and Product Manager Hydraulic Power Units

Römheld GmbH
Friedrichshütte

Laubach, 03.03.2025

16 Declaration of incorporation

UK

Importer
Roemheld (UK) Limited
28 Knowl Piece, Wilbury Way,
SG4 0TY Hitchin

E-Mail: sales@roemheld.co.uk
www.roemheld.co.uk

Authorised person to compile the technical documentation:
Darren Rowell, 28 Knowl Piece, Wilbury Way, SG4 0TY Hitchin.

This declaration of incorporation applies to the following products:

Power units in modular design of data sheet D 8.026, from the part number ranges:

- 8456 000 - 100 (V = 11 L)
- 8456 500 - 900 (V = 11 L)
- 8456 9001 - 9700 (V = 11 L)
- 8457 000 - 100 (V = 27 L)
- 8457 9001 - 9700 (V = 27 L)
- 8458 000 - 100 (V = 40 L)
- 8458 9001 - 9700 (V = 40 L)
- 8459 000 - 100 (V = 63 L)
- 8459 9001 - 9700 (V = 63 L)

We hereby declare that the machine described in its design and construction as well as in the version we have placed on the market complies with the essential health and safety requirements according to the following UKCA directives.

The following additional UKCA directives were applied:

- **Directive 2008 No. 1597**, Health and Safety

The following harmonised standards have been applied:

DIN EN ISO 12100, 2011-03, Safety of machinery; Basic concepts, General principles for design (replacement for part 1 and 2)

DIN EN ISO 4413, 2011-04, Hydraulic fluid power - General rules and safety requirements for systems and their components

The products may only be put into operation after it was assessed that the machine, in which the product shall be installed, corresponds to the Supply of Machinery (Safety) Regulations 2008, 2008 No. 1597.

The manufacturer commits to transmit the special documents of the products to state authorities on request.
The technical documentation as per appendix VII part B was prepared for the products.

SG4 0TY Hitchin, 03.03.2025

Darren Rowell
Managing Director,

Roemheld UK Ltd