RINGSPANN®
Power Transmission

User information for hydraulic power unit HKA 291

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IMPORTANT

Please read these user information carefully before installing and operating the product. Your particular attention is drawn to the notes on safety.

These user information are valid on condition that the product meets the selection criteria for its proper use. Selection and design of the product is not the subject of these user information.

The manufacturer's documentation is enclosed with the delivery. The manufacturer's documentation is legally binding. If the manufacturer's commissioning and maintenance instructions are disregarded or misinterpreted, any product liability and warranty on the part of the manufacturer shall lapse; The same applies if the product is dismantled or modified.

These user information should be kept in a safe place and should accompany the product if it is passed on to others – either on its own or as part of a machine – to make it accessible to the user.

Safety Notice

- Installation and operation of this product should only be carried out by skilled personnel.
- Repairs may only be carried out by the manufacturer or accredited RINGSPANN agents.
- If a malfunction is indicated, the product or the machine into which it is installed, should be stopped immediately and either the manufacturer or an accredited representative should be informed.
- Switch off the power supply before commencing work on electrical components.
- Rotating machine elements must be protected by the purchaser to prevent accidental contact.
- Supplies abroad are subject to the safety laws prevailing in those countries.

This is a translation of the German original version!

In case of inconsistencies between the German and English version of this user information, the German version shall prevail.

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1. General notes

1.1 General safety instructions

Please read theses user information carefully before installing and operating the hydraulic power unit. Please refer to the drawings in the various sections.

Safety must be given the highest priority during all work performed on the hydraulic power unit.

Switch off the drive unit before performing work on the hydraulic power unit.

1.2 Special safety instructions

Life-threatening danger!

When assembling, operating and maintaining the hydraulic power unit it is to be ensured that the entire drive train is secured against being switched on unintentionally. Moving parts can cause severe injury. Rotating parts (e.g. brake disc) must be secured by the operator against unintentional touching.

When installing, operating and maintaining the hydraulic power unit, ensure that it is secured against accidental activation.

2. Design and function/ parts list

2.1 Function

The high-pressure hydraulic unit is used with RINGSPANN brake calipers and calipers which are

- hydraulically actuated and released with spring force
  (The braking force is generated by hydraulic pressure, the brake is released by spring force.)

  or

- spring-applied and hydraulically released
  (The braking force is generated by spring force, the brake is released by hydraulic pressure)
  can be used.

The power unit's integrated redundant valves control is specially designed for brake applications.

2.2 Markings

These installation and operating instructions apply to:

- the HKA 291 version
- for mounting on RINGSPANN brakes
- for the version with and without control unit
- for mounting the hydraulic units on various brackets. There is a type plate on the hydraulic power unit with a 16-digit part number. The exact design of the hydraulic power unit is defined by this article number only.

For these instructions, please observe the manufacturer's commissioning and maintenance instructions, the catalog data for the hydraulic power unit at www.RINGSPANN.de and the drawings in the individual sections.

2.3 Drawings and Parts Lists

Hydraulic power unit HKA 291

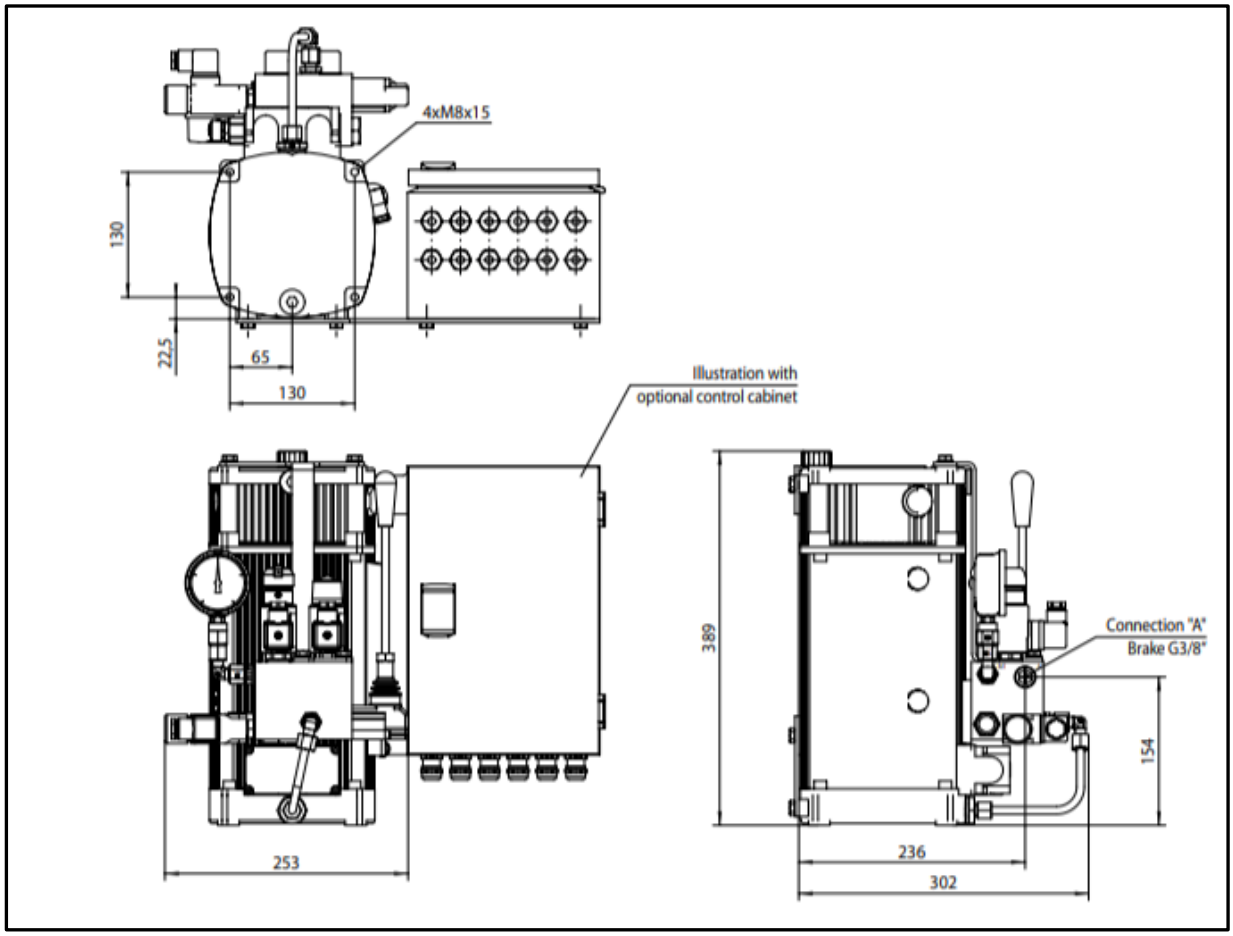


Fig. 2.1

Hydraulic circuit diagram details on other versions in the appendix

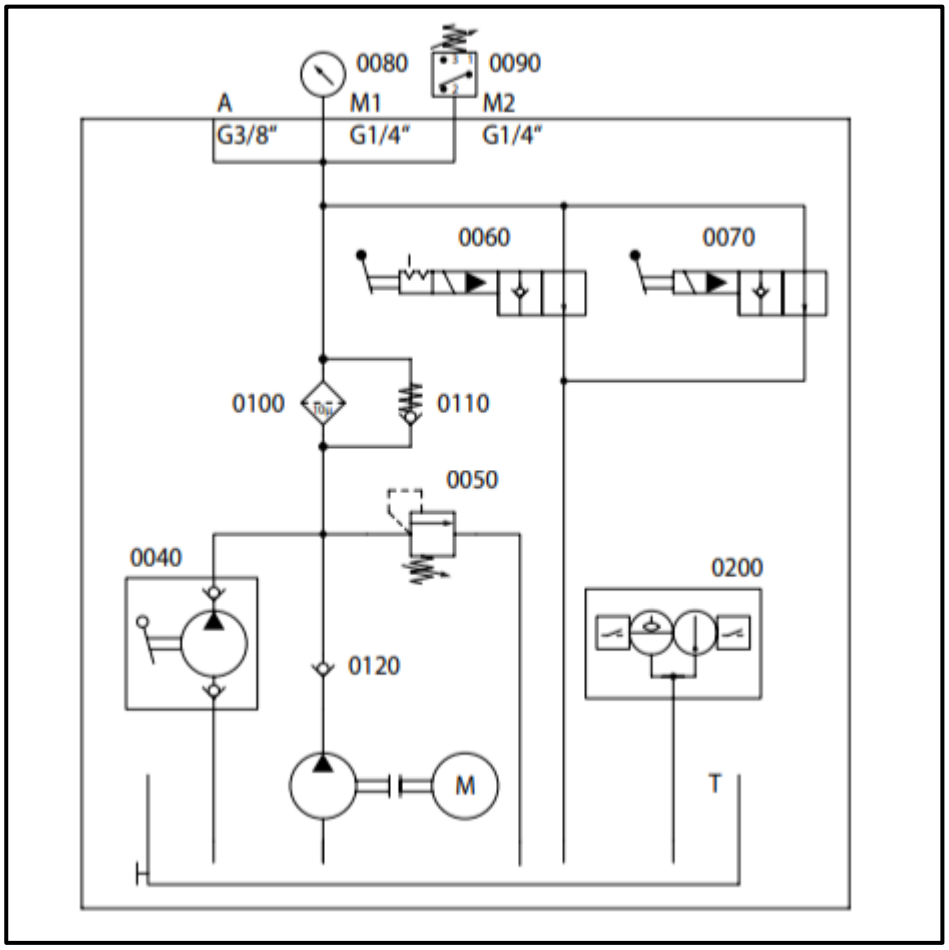


Fig. 2.2

Hydraulic circuit diagram

0040	Hand pump
0050	Pressure limiting valve
0060	Directional seated valve with handlocking
0070	Directional seated valve
0080	Pressure gauge Ø63
0090	Pressure switch
0100	Filter
0110	Check valve
0120	Check valve
0200	Oil level indicator and Thermal switch
A	Connection G3/8”

3. Intended use

The hydraulic unit may only be set up to the maximum permissible pressure range of the brake. The hydraulic unit is designed for a maximum number of cycles of 2000 cycles/hour with short actuation.

Attention!

The maximum permissible operating pressure of the connected brake calliper or brake caliper must be observed!

The hydraulic unit has been designed for use as an actuating element for RINGSPANN brake callipers and brake calipers.

Other uses are improper and incompatible with the specified purpose. The risk is assumed by the user alone.

4. Impermissible use

Operating the hydraulic power unit under higher pressure than that specified in the technical data or with other media is prohibited. Unauthorized constructive modifications of the brake caliper are similarly prohibited. The risk is assumed by the user alone.

5. Condition as delivered

The hydraulic power unit is delivered tested by the manufacturer. The hydraulic power unit is partly completed machinery in accordance with Article 2g and is intended exclusively for installation in or assembly with other machinery or equipment.

It is delivered as a ready-to-install element with the operating pressure (range) set accordingly. The pressure setting is checked on delivery from the manufacturer and should not be changed. If necessary, the customer can change the pressure setting up to the max. permissible pressure, see catalog sheet Hydraulic Power Units HKA 291 or Appendix A. The setting is made using the adjusting screw on the pressure sensor 0050 on the hydraulic power unit.

Attention!

Delivery is made as a ready-to-install element with the operating pressure (range) set accordingly. The pressure setting is checked on delivery from the manufacturer and should not be changed.

Attention!

The hydraulic power unit is delivered tested by the manufacturer. The hydraulic power unit is partly completed machinery in accordance with Article 2g and is intended exclusively for installation in or assembly with other machinery or equipment.

We assume that the equipment supplied is intended for installation in a machine. Commissioning is prohibited until it has been established that the machine into which our products are to be installed complies with the provisions of the EC Machinery Directive as amended in 2006/42/EC

6. Handling and storage

The hydraulic power unit is delivered packaged and can be stored in a closed, dry place for 12 months. Care must be taken to ensure that no condensation occurs. Damp storage rooms are unsuitable. If the hydraulic power unit is stored for longer than 12 months, as well as after each transport, the hydraulic power unit must be filled with oil and operated to test the correct function of the hydraulic power unit.

The dimensions and technical data of the modular hydraulic power units can be found in the individual catalog data sheets.

7. Technical Any other use is considered improper use.

Fastening the hydraulic unit to stable and low-vibration machine parts ensures trouble-free operation.

The recommended fixing 1 of the hydraulic unit to the machine parts are 4 damping elements Ø40x30/M8 (65Shore)

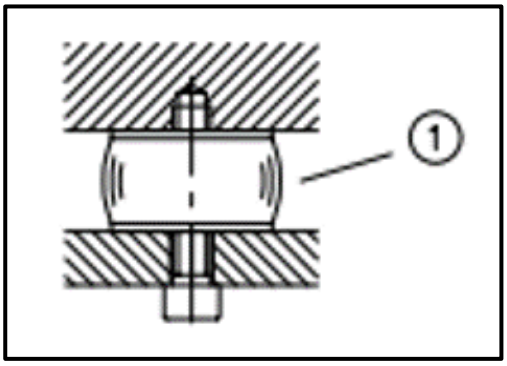


Fig. 7.1

8. Installation the RINGSPANN brake

8.1 General instructions for assembly and installation

Caution!

For safety reasons, do not loosen any pipe fittings, connections or devices while the system is under pressure!

Caution!

There is an increased risk of accidents if hydraulic fluid escapes. Slipping or falling can occur on oily surfaces. External leaks must therefore be prevented. Any leaking hydraulic fluid must be completely absorbed or removed. There is an increased risk of injury when working with oily hands!

Caution!

Hydraulic fluid can cause illness on contact with the skin. It should therefore be avoided by wearing suitable protective gloves or using skin protection cream!

Caution!

Hydraulic fluid generally represents a potential fire hazard due to its flammability. For this reason, leaks must be immediately and completely
suitable means and wetted flammable materials such as cardboard must be disposed of immediately. Materials that have come into contact with hydraulic fluid are hazardous waste!

Ignition sources in the vicinity must be prohibited!

8.2 Brake actuation

Depending on the version, the hydraulic unit can be ordered with or without brake control. If no brake control is supplied, the following control sequence should be provided for correct actuation on the hydraulic unit.

The first step is to energize valve (NO) 0060 and valve (NO) 0070 to close the valves. The second step is to energize the motor. The hydraulic pressure builds up, the brake is applied and the pressure switch 0090 on the block marked M2 gives a signal as soon as the set pressure is reached. When the signal comes from pressure switch 0090, the motor should be switched off immediately. Valve (NO) 0060 and valve (NO) 0070 remain energized and maintain the pressure in the hydraulic unit.

The brake remains hydraulically active or spring-applied and hydraulically released. If the pressure drops, pressure switch 0090 sends a signal and the motor must be switched on until pressure switch 0090 signals that the set pressure has been reached.

To switch off the brake, valves (NO) 0060 and valve (NO) 0070 are de-energized.

The control sequence only applies if valves (NO) are fitted if other valve types are fitted, the respective status (NC) normally closed or (NO) normally open must be noted on the respective switching symbol. This ensures that hydraulic pressure can build up when the motor is energized and the pump delivers and that the pump does not deliver into the tank via the valves.

On the HKA 291 hydraulic power unit, valve (NO) 0060 can also be hold manually closed. Various circuits can be implemented, please refer to the hydraulic circuit diagram of the selected hydraulic power unit.

The hydraulic unit can also be actuated via a hand pump 0040, the valves must also be closed to allow hydraulic pressure to build up. The valve (NO) 0060 can be manually closed and the valve (NO) 0070 must be manually hold in the closed position with the lever so that hydraulic pressure can be built up via the hand pump 0040. Valve (NO) 0060 must be switched back to its original position after use to ensure correct operation.

Information!

Different switching positions can be implemented for the hydraulic power packs, please refer to the hydraulic circuit diagram of the selected hydraulic power unit.

8.3 Installation description

Caution!

The hydraulic power unit must not be subjected to hydraulic pressure during installation.

The installation position is vertical with the hydraulic block facing downwards; a horizontal version is not possible.

Before installation, check that the mounting surface is even and clean. The fixing screws must be tightened to the prescribed tightening torque in accordance with VDI 2230, depending on the friction values present in the individual case.

Ensure the correct installation position and the permissible ambient temperature.
Permissible temperature range Standard: min. -20 ºC; max. +50 ºC.

The operating voltage, especially that of the valves, must be observed.

Information

Some valves are equipped with a rectifier plug.

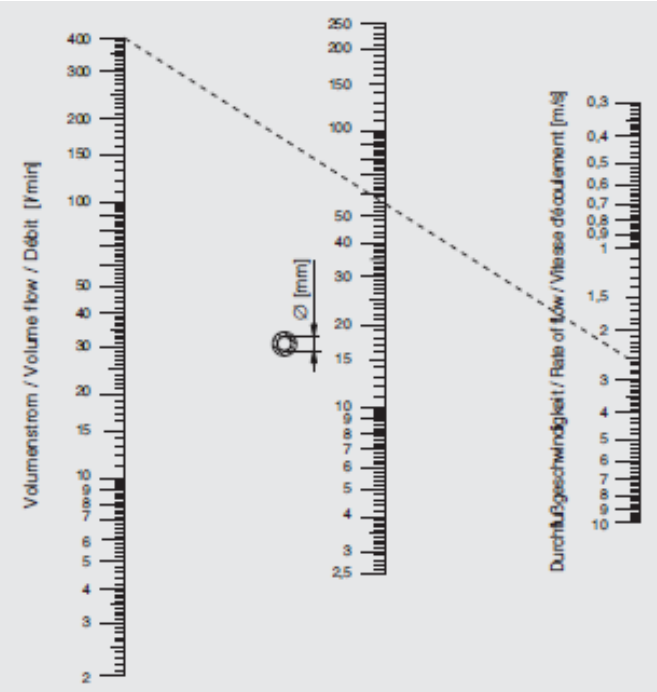
Valves must be installed stress-free to prevent the spool from jamming.

Step bores must be perfectly aligned to prevent housing stresses.

Cable installation

The brake must be connected to the marked connection A with a connection thread of G3/8”.

When selecting pipes, hoses and attachments, ensure that the wall thickness is sufficient and that the correct material is used. Only use seamless precision steel pipe of sufficient dimensions. The following diagram is useful for determining the internal diameter of the pipe.



Recommended oil speeds
Suction lines 0.5 ... 0.8 m/s
Return lines 2 ... 4 m/s
Pressure lines up to 100 bar 2 ... 4 m/s
Pressure lines up to 315 bar 3 ... 12

Pipes must be cleaned of scale, sand, dirt, swarf, etc. before installation: welded pipes must be pickled and rinsed.

Pipes must be laid stress-free so that no vibrations are transmitted.

Hydraulic hoses must be monted without torsion, with a sufficient bending radius and always with slack.

The pipe connections and the thread depths are designed so that both screw connections with a sealing edge and elastomer seals can be used.

Caution!

Under no circumstances should hemp or mastic be used for sealing.

Caution!

The thread must not touch the bottom of the hole.

Union nuts must be tightened sufficiently. The following applies:
After a noticeable increase in force, the union nut must be tightened another 1/4 turn (metal-sealing) or 1/2 turn (elastomer-sealing).

9. Start-up

Once the system has been properly installed, it can be commissioned. The following things must be checked beforehand:

- Has the tank been cleaned?
- Are the pipes clean and tidy? (Pipe and hoses if necessary)
- Are the screw connections and flanges tightened to the specified tightening torque?
- Are the cables and electrical wiring connected correctly according to the installation drawing or circuit diagram? For solenoid valves, ensure correct voltage and correct connection. Voltage fluctuations of ± 5 % of the operating voltage should not be exceeded.
- Has the prescribed oil been filled up to the upper oil level mark?

Carry out the following steps in sequence for commissioning:

- Set the recirculation valve - if present - to the recirculation position.
- Open the pump suction valve, if present.
- Start the pump and listen for noises.
- Switch the circulation valve - if present.
- Vent the system at the highest point of the consumer lines. Actuate directional valves. Slowly increase the load. Increase the pressure valve settings. Venting is ensured if there are no jerky movements at the consumer and no abnormal noises.
- Check function by operating the system manually without load.
- Once the operating temperature has been reached, check the system under load.
- Increase pressure slowly
- Monitor control and measuring devices
- Listen for noises
- Check oil level, top up if necessary
- Check for leaks
- Switch off the drive
- Tighten all screw connections - even if they are tight.

Caution!

Only retighten the screw connections when the system is depressurized.

Full functional testing of the system. Compare measured values with the permissible or required data (pressure).

Information!

Jerky movements indicate, among other things, air pockets that are still present. The system is fully vented when all functions run smoothly and without jerks.

The insulation of the drive motor corresponds to insulation class F in accordance with IEC34-1 or VDE regulation 0530. The permissible ambient temperature is -20°C to +50 ºC.

10. Disassembling the hydraulic power unit

Life-threatening danger!

When disassembling the power unit it is essential to ensure that the entire drive train is secured against inadvertent activation.
Rotating components can cause severe injuries. Therefore, rotating components (e.g. brake discs) must be secured against accidental contact.

Secure the drive train against accidental activation. Before reassembly, check that there is no hydraulic pressure or voltage. Make a precise note of the electrical and hydraulic connection for reassembly. Remove the electrical and hydraulic connections on the hydraulic unit, observing the general safety regulations and remove any leaking oil immediately. The hydraulic unit is attached to the underside with 4 screws. As soon as the screws are removed, the hydraulic unit can be removed from the mounting surface.

11. Maintenance

11.1 General maintenance

Liquid level

If the pressure fluid level (and thus the fluid volume) falls below the required level, the operating temperature will rise and air will accumulate, which can cause the pump to fail due to cavitation.

Caution!

The hydraulic fluid level must be checked every day of operation.

Temperature

The temperature range of -20 ºC to +70 ºC recommended for the pressure medium should be adhered to as far as possible. Irrespective of this, an oil temperature of +70 ºC should not be exceeded. To ensure a consistent response, it is advisable to keep the oil temperature constant within a range of ± 5%. If the temperature suddenly rises sharply, switch off the system immediately and determine the cause of the temperature increase.

Ageing degree

The following table provides information on the condition of the hydraulic fluid by simple visual assessment.

Findings	Contamination	Possible cause
Dark coloration	Oxidation products	Overheating; missed oil change (possible ingress of tramp oil)
Milky turbidity	Water or foam	Water ingress; air ingress
Water separation	Water or foam	Water ingress, e.g. coolant
Air bubbles	Air	Air ingress, e.g. due to lack of oil, leaking suction line
Floating or settled impurities	Solid foreign matter	Abrasion, dirt, ageing products
Odor of burnt oil	Ageing products	Overheating

Changing the hydraulic fluid

The first oil change must be carried out immediately after commissioning. Assuming normal operating conditions and regular filter changes, oil changes are necessary after 4000 - 8000 operating hours.

11.2 Filter

Filters without a clogging indicator must be changed for the first time after commissioning. After that, they must be checked every 250 operating hours and replaced if necessary.
Filters with a clogging indicator must be checked daily after reaching operating temperature.
When replacing or changing the pressure fluid, always replace the existing filtration (use of the pressure and/or return filter) at the same time.

11.3 Hose pipe

Hose lines must be checked at least once a year by an expert to ensure that they are in a safe working condition. The period of use of hose lines should not exceed
6 years, as they are subject to natural ageing even when subjected to permissible loads and stored properly.
Hose assemblies must be protected from external influences such as strong UV radiation, contact with solvents and cleaning agents, fuels and lubricants or high ozone exposure.
Hose lines must be replaced by an expert at the end of their service life.

11.4 Pump

The pump is self-lubricated by the hydraulic oil used and is therefore maintenance-free.
Maintenance is limited to keeping the hydraulic oil clean.

If excessive noise occurs during operation, the following should be done to determine the cause:

- Check the drive motor
- Check the suction and pressure lines
- Check the pump for wear, clean the filter or replace the cartridge if necessary
- Check the liquid level in the tank (too low?)
- Vent any air pockets that may be present

12. Oil types

HLP hydraulic oils in accordance with DIN 51524 Part 2 must be used under normal operating conditions to ensure smooth functioning, service life, operational safety and economy. The oils listed in the table below meet these requirements.

Label according to DIN 51502	HLP 46
Panolin[1]	HLP Synth 46
Eni (Agip)	Agip OSO-46 Agip ARNICA-46 Agip PRECIS HLP 46
ARAL	ARAL Vitam GF 46*
BP	BP Energol HLP-HM 46 BP Energol HLP-D 46 BP Bartran 46*
Castrol	Hyspin AWS 46 Hyspin ZZ 46* Tribol 943 AW-46*
ESSO	NUTO H 46
FINA	FINA HYDRAN 46 FINA HYDRAN HLP-D 46
FUCHS-DEA	RENOLIN MR15 VG 46 RENOLIN B 15 VG 46 RENOLIN ZAF B 46 HT*
Mobil	Mobil DTE 25 Mobil SHC 525
SHELL	Shell Tellus S2 M 46 Shell Tellus S3 M 46*
Chevron (TEXACO)	Rando HD 46 Clarity Hydraulic oil AW 46*
Valvoline	Ultramax HLP-46
TOTAL	Azolla ZS 46 Azolla AF 46*

[1] Biologically degradable * free of heavy metals

13. Troubleschooting

Nature	Verification	Solution
The brake is not applied	Power supply to the motor Oil level Supply to the solenoid valves Checking the clutch pressure on the pressure gauge or the sensors	Correct connection Correct oil level Correct connection Pressure values in the control unit correct
The brake changes its operating state automatically without being actuated	Tightness of hydraulic unit / pipelines / connections / cylinders / pistons Cylinders / pistons Supply of the solenoid valves	Replace defective part; Reseal connections Correct connection
The motor does not stop despite pressure being applied	Check pressure values in the control unit Checking the pressure sensor Tightness of hydraulic unit / pipelines / connections / cylinders / pistons	Pressure values in the control unit correct Readjust pressure sensor Replace defective pressure sensors Replace defective part; Reseal connections
The unit starts too often	Tightness of hydraulic unit / pipelines / connections / cylinders / pistons cylinders / pistons Oil leakage due to impurities	Replace defective parts; Re-seal connections Carry out oil and filter change maintenance
The brake opens and closes only slowly	There could be air in the circuit	Carry out a venting process

14. Appendix

14.1 Appendix A - Dimensions and technical data, standard and special versions

RINGSPANN Material: 3515-000057-000000

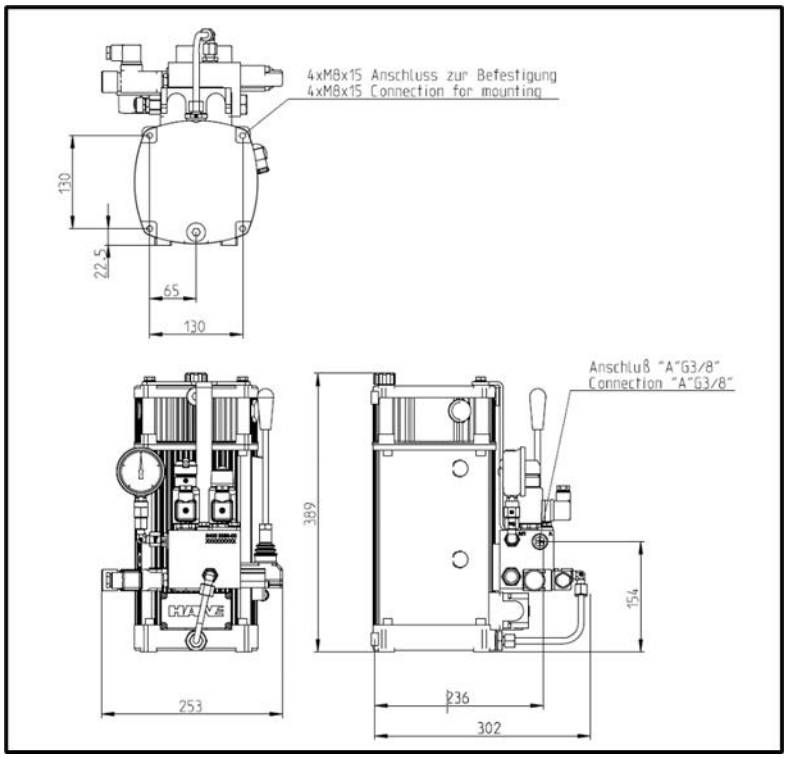
RINGSPANN Code: HKA 291 SKDT/H 4,14 PB1 150-160bar DBV 175 bar

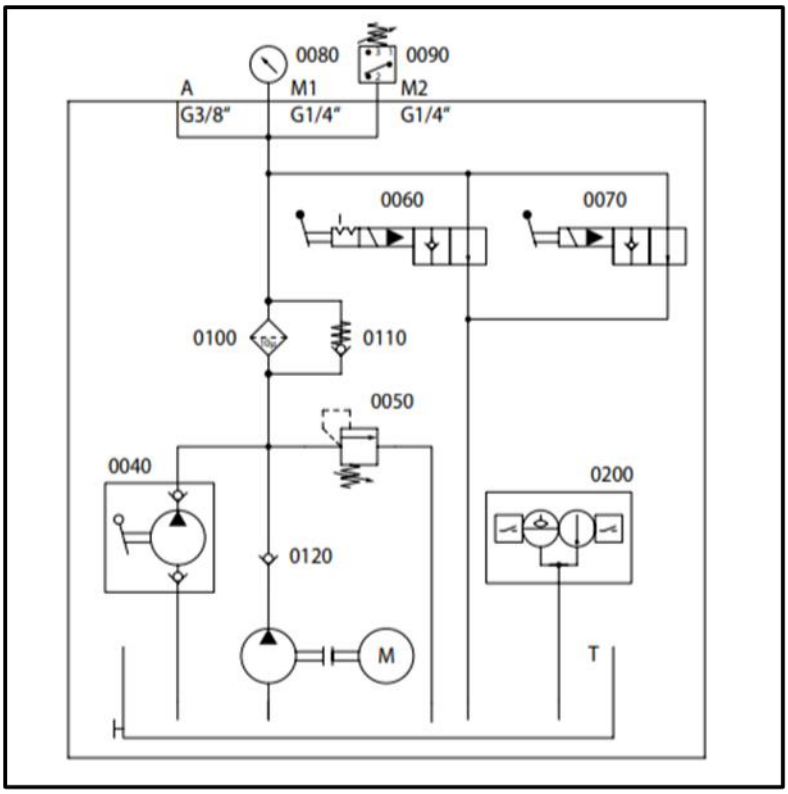
Manufacturer: HAWE

For details on version and code, see manufacturer catalog data

Version:	H	Hydraulic power unit redundant valves
	KA	Hydraulic power unit type KA
	29	Three-phase motor 3x400 V 50 Hz 3x460 V 60 Hz
	1	Filling volume 5.0 l Usable volume upright 2.7 l Indicator 1
	KD	Level indicator with float switch (NC), switching function for falling level.
	T	Temperature switch (switching point 80°C)
	/	
	H	Delivery volume: 4.3 l/min

Motor	Motor power:	1.6kW speed 1390rpm
	Protection class:	IP55
Pump	speed n:	1390 rpm
	Delivery volume:	4.3 l/min
DBV 0050	Pressure pmax.:	175 bar
Pressure sensor 0090	max.:	160 bar
	min.:	150 bar (switching distance 10 bar)
Valve (NO) 0060	Voltage U:	24 V/DC
Valve (NO) 0070	Voltage U:	24 V/DC





Hydraulic circuit diagram:

0040 Hand pump
0050 Pressure relief valve
0060 Directional seat valve with manual detent
0070 Directional seat valve
0080 Pressure gauge
0090 Pressure switch
0100 Filter unit
0110 Non-return valve
0120 Non-return valve
0200 Oil level indicator and thermal switch
A Hydraulic connection G3/8"

Notes: