



COMPETENT PROFESSIONAL RELIABLE

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**GENERAL
OPERATING
INSTRUCTIONS
FOR
HYDRAULIC SYSTEM
OF
GRIBI HYDRAULICS AG**

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0. General information

0.0 Basic information

0.0.1 Conventions - Table

	This sign refers to supporting information.
	This sign refers to a possible danger, which may cause slight but also more severe injuries or damage to property, respectively.
	This sign refers to a threatening danger, which may cause very severe injuries or lead to death, if it is not avoided.
	This sign refers to a threatening danger, which leads directly to very severe injuries or to death, if it is not avoided.

0.0.2 Standards / Directives / Definitions

This hydraulic system has been produced in accordance with Directive 2006/42/EC (EC-MSRL) in the actually valid version and the technical rules valid with it.

According to EC-MSRL and EN 982, this hydraulic system is a system not ready for use and exclusively destined to be built in a machine.

Definition according to EN 1070

Hydraulic(s) (fluid technology)	Transmission, control and distribution of energy and signals using a liquid medium under pressure.
System	Arrangement of linked components to transmit and control fluid-technical energies.
Component	An individual unit (e.g. valve, motor, cylinder etc.), comprising one or several parts, as functional part of hydraulic systems.
Drive	Component converting the energy of the pressure medium in mechanical energy (e.g. cylinder, motor etc.)
Line system	All combinations of fittings, couplings or connection points with conduits, hoses or pipes allowing the pressure medium to circulate between the components.
Max. working pressure	The highest pressure with which the system or parts of the system can be operated under steady conditions.

0.0.3 Information to these operating instructions



These operating instructions contain important regulations and notes for a safe and proper operation of the unit.

It should also help the operating and servicing personnel to avoid dangers, to reduce cost of repairs and downtimes, and to essentially increase the reliability and life of the unit.

Therefore it is important to assure at any time the access for any person entrusted with the servicing of the unit.

Only when strictly complying with these Operating Instructions accidents and damage to property can be avoided as well as an operation without faults can be guaranteed.



Warnung

These Operating Instructions do not take the place of the Operating Instructions for the entire machine

When building in the hydraulic system in the associated machine ***changes of the danger potentials*** will result due to the interaction of the hydraulic system with the associated machine. This will require a danger analysis and operating instructions for the associated machine

0.0.4 Intended use

This hydraulic system is designed and constructed to generate and control oil volume currents in hydraulic drives for machines.

The product-specific definitions are contained in the offer, confirmation of order, list of parts, hydraulic diagram, assembly drawing and possibly in test certificates and production test certificates.

In the hydraulic diagram possibly represented hydraulic drives serve only for understanding the hydraulic control, but they are not a constituent part of these Operating Instructions.

0.1 Basic safety-technical notes

0.1.1 Electrical power

Works at the electrical components of the unit must be done only by a SKILLED ELECTRICAL SPECIALIST or conducted by such a person, and in accordance with the ELECTROTECHNICAL RULES. Inspect electrical connections and cables at regular intervals.



Warnung

Clear all faults immediately!

Voltage has to be switched off from all machine and system parts, at which inspection, maintenance and repair works are to be carried out (with the exception of control voltages < 24 V). Check whether these parts are really dead, connect them to ground, short-circuit them as well as cover neighbored, live parts. If works at live parts are necessary, call in a second person to actuate the emergency or main switch with voltage release in case of emergency. Close off the working zone by a red-white safety chain and a warning sign. Only use voltage-insulated tools.

0.1.2 Hydraulic components

Inspect all lines, hoses and screwed joints for leaks and externally detectable damages! Remove all damages immediately!



Oil spurting out may cause fires and injuries.

For reasons of **safety** no screwed pipe-line joints, connections and devices must be loosened as long as the system is under pressure. Prior to all works reduce loads, switch off pumps and unload pressure accumulators. Do not work with oily hands. When working always set great store by **cleanliness**, dirt is the enemy of any hydraulic system. Before loosening screwed joints clean the outside vicinity. Close all openings with protective caps so that no dirt can penetrate into the system. When exchanging hydraulic pipes and hoses, observe that the pressure step of hoses and fittings is correct, the hose length is sufficient, installation and laying are professional and observe the notes to avoid confusions of connections. When cleaning oil reservoirs **never** use **cleaning wool**.

0.1.3 Hydraulic oil



Fill up unit only through filter (filter fineness 10 – 20 µm)

When handling chemical substances and oils, observe the safety rules described on the packing or in the operating and servicing instructions. In particular we point out that some of the operating media are toxic and possibly pyrotic (protective goggles). Caution when handling hot working material, danger of burning!

0.1.4 General notes

Direct the personnel, that at least safety-relevant changes at the machine or its behavior are reported!



Never make changes or conversions at the unit, which could adversely affect the safety, without prior consultation of the manufacturer!

Spare parts must meet the technical requirements as laid down by the manufacturer. This is guaranteed e.g. by **genuine spare parts**. Exchange hydraulic hose lines in appropriate time intervals, even if no safety-relevant defects are discernible.

In particular also meet the prescribed deadlines for recurring checks.

0.2. Guarantee – Extent and exclusions of guarantee

See General Conditions of Delivery according to **GOP** (Association for Fluid-technology Switzerland)

0.3. Qualifications of personnel

Only employ reliable, trained or instructed personnel, clearly fix the competence of the personnel.

Only a skilled electrical specialist or a person conducted by such a specialist in accordance with the electrotechnical rules must carry out works at electric components of the unit.

Charge only personnel with special knowledge and experiences in hydraulics with works at hydraulic equipment!

0.4. Waste disposal - Conservation

The disposal of the exchanged parts such as seals, filter cartridges and in particular hydraulic oil, must comply with the local waste disposal regulations as well as the environmental laws of the country of application.

Depending on degree of contamination and deterioration the mineral oils recommended by us can be recycled. See also specifications of the manufacturer.

1.1 Transport, storage - Preservation

Transport

Always without operating medium.

On pallets protected against slipping, by rail or trucked.

In the case of an open transport cover the unit to protect it from a possible contamination.

For a sea transport protect the unit additionally by an appropriate seaproof packing.

Storing – Preservation

Storing site preferably dustfree and dry; if these conditions are complied with, no preservation measures are necessary.

1.2 Safety measures - Transport

Depending of customer's equipment, the unit is unloaded from the external transport means by a hall crane/automobile crane or fork lift truck and brought **secured** to the planned assembly site.



Vorsicht

The care according to regulations when handling loads is presupposed.

1.3 Assembly site

1.3.1 Environment influences

When planning the placement, be careful that no dirt, solid parts or water can fall on the unit!



Ideal ambient temperature : from + 10° C to max. + 30° C

If the ambient temperature is too low possibly a heating must be installed as an option (viscous operating medium = starting difficulties, cavitation); on the other hand, if the temperature is too high, an oil cooler must be installed. (Prevents the natural reradiation of lost energy (heat) = overheating the hydraulic oil.)

Air humidity

If the relative air humidity is permanently too high, a dehumidification filter can be installed as an option instead of the fan.

1.3.2 Supply connections

For the power supply of the electric motors (see list of parts and diagram) check that the fusing is appropriate and according to the regulations.

Control voltage for electromagnetic valves (see list of parts)

Cooling medium if necessary.

1.3.3 Notes for conservation

When planning the site of the unit, in particular be careful that in case of major leaks such as that in case of a pipe break etc. no operating medium escapes into the waste water, roof water or soil zone den (permeable floor covering, discharge etc.). For this purpose observe the local construction and conservation regulations too.



Possibly an oil collection pan has to be provided as an option.

1.4 Erection

Erect the unit so that there is a free air circulation around it. Therefore it is also important that there is sufficient clearance above the electric motor fan take in cooling air. For a good accessibility for inspection and maintenance, a sufficient clearance must be planned on the operator's side.

After transport to the final assembly site, the unit is, if necessary, is leveled and fixed with the appropriate fixing means. In a next step the connection points are prepared.



Hydraulic system: Remove plug from connection threads in the control block.

Electric system: Open terminal box of motor.

1.5 Connections

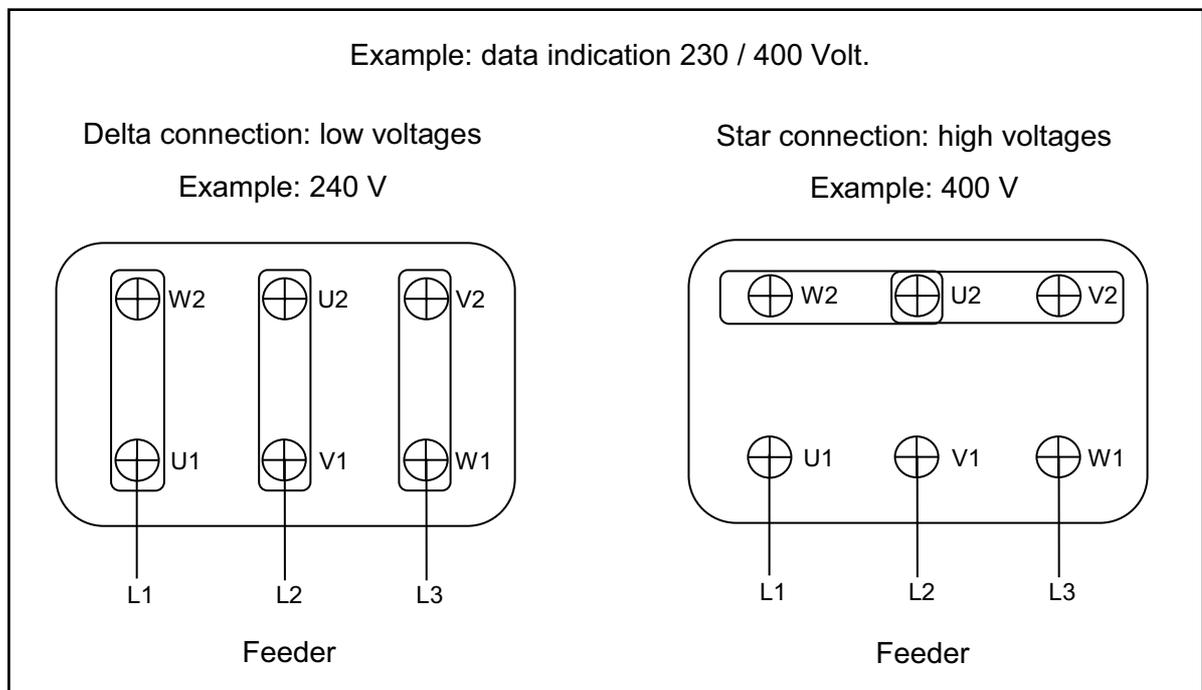
Electric system



Vorsicht

The connections must be made only by a specialist in consideration of the safety regulations.

When connecting the electric motor to the mains, pay attention to the data of the nameplate and compare them with the annexed diagram. As a standard there is a terminal board with 6 terminals installed in the terminal box (see "Example").



For a star-delta start no links are required on the motor terminal board!

The sense of rotation of the motors can be changed in interchanging two feed wires. Standard sense of rotation is clockwise (right-hand rotation seen to fan hood), see also arrow marking on fan hood of motor. If star-delta start of motor is wanted, no links are required on the terminal board. However supposition is that delta connection is planned for the service voltage of the motor (specified on nameplate). In this case the hydraulic unit must start without load.



The protective conductor connection must be made in conformity with VDE 0100.

Connect the external grounding screw for Ex and VIK motors in accordance with the regulations. Dimension the feeding conductor cross section so that the voltage drop does not exceed 5 % with full load. Observe the regulations of the competent utility company.

Hydraulic system

Preferably realize the screwed connections by steel cutting ring threaded joints, the screwed plug sealing alternatively with conical nipple, sealing edge or elastic seal on the countersinking of the thread.

For example: **EO GE10LRED**

Extension pipes \varnothing 10x1,5 or similar hoses. Note that in the case of long distances to the consumer a worse result is obtained with hoses (elastic volume).

2.1 Instructions for first putting into operation

2.1.1 Measures before first putting into operation

- ✓ Check completeness of technical documentation (hydraulic system - diagram, list of pieces and operating instructions).
- ✓ Familiarize yourself with the system with the help of the documentation.
- ✓ Check kind of current (AC or DC) and voltages.
- ✓ Visual inspection for transport damages and soiling.
- ✓ Check system whether the mounting instructions are adhered to, in particular for flow-advantageous laying and appropriate fixing of pipe lines. Rinse pipes and hoses. Pickle welded pipes. Inspect for inadmissible torsions and kinks of hoses.
- ✓ Connections of hydraulic consumers in the machine according to hydraulic diagram.
- ✓ Check cleanliness of oil reservoir before replenishing with pressure liquid, possibly clean (do not use cleaning wool).
- ✓ Check tightness of hydraulic oil reservoir e.g. at covers, pipe openings, flanges etc..
- ✓ Prepare prescribed pressure liquid (quality, viscosity). It must be exempt of water and dirt!
- ✓ Observe special regulations when using hardly inflammable pressure liquids.
- ✓ Before replenishing inspect cleanliness of oil filling hole and filter.
- ✓ Replenishing with pressure liquid through extra-fine filter - e.g. using a mobile filtering device.
- ✓ Inspect oil level after replenishing and close filling hole.
- ✓ Note in operating instructions under service date and servicing notes the filled in pressure liquid brand and quality with date of replenishing!
- ✓ In the case of existing manufacturer's regulations replenish hydropumps / motors before starting.
- ✓ Check and possibly retighten all screwed joints.
- ✓ If a pressure accumulator is installed, bring this accumulator to the prescribed prefilling pressure (if not already done in factory.)

- ✓ Before starting, set all valves in system to free circulation and the pressure limit valve according to instructions.
- ✓ In the case of very low start temperatures, heat up pressure liquid to obtain the prescribed start viscosity.
- ✓ In the case of dirt-sensitive systems with servovalves and proportional valves, first rinse the respective circuit with the help of rinsing plates and line filters.

**Vorsicht**

Check sense of rotation of pumps! (Start power supply for a short time – seen from top the paddles must rotate in the sense of rotation as marked on the hood of the electric motor)

Before loading make a rinsing or test run without pressure, pay attention to possible unusual pump noise.

Monitor continuously level of pressure liquid and replenish, if necessary. Possibly find cause of excessive consumption. A continuous monitoring of temperature is important during the putting into operation phase.

Deaerate system carefully! Deaerate as far as possible at the highest point of the system (unit, consumer and consumer feeders, we recommend to install a Minimes measuring connection at the respective points). Operate way valves and extend and retract consumers several times. Increase load slowly. Increase setting values at pressure valves and pressure controllers, respectively. Deaeration is assured if there are no oil foam in the reservoir, no jerks at the consumer and no abnormal noises.

Check functions of way valves and consumers.

Check components for external leaks. (Never retighten leaking screwed joints under pressure, but only after relief from pressure.)

Fix conduits and hoses making uncontrolled motions.

Set valves to prescribed values (in particular pressure limitations / pressure reductions)

After having attained the working pressure, check all functions of the system (pressures, oil level, temperature, speeds, motion sequences path / time).

If there are accumulators in the system, check their filling pressure. See also under Operating Mediums - Section 2.2.4 Nitrogen.

After having attained the steady condition of the system, check temperatures of all components for admissible values.

Repeated check of oil filling condition of system or unit, respectively, because for the connected consumers, conduits, hoses and pipework in general an additional quantity of oil is required. Moreover note that changes of the oil level are possible as a result of oscillating volume produced by connected consumers such as cylinders etc.



Record all settings made as well as faults found in the inspection certificate!

Exchange filter cartridge at least 50 working hours after putting into operation!

2.2 Operating mediums

2.2.1 Pressure liquids



A responsibility in connection with the pressure liquids specified in this table cannot be assumed.

Brand	Temperature range	
	+10 to +55°C	+20 to +65°C
	Quality	
	HLP according to DIN 51524, Part 2 ISO-VG 32 (32 mm ² /s at 40°C)	HLP according to DIN 51524, Part 2 ISO-VG 46 (46 mm ² /s at 40°C)
AGIP	AGIP OSO 35	AGIP OSO 45
ARAL	ARAL Vitam HF 32 ARAL Vitam DE 32	ARAL Vitam HF 46 ARAL Vitam DE 46
AVIA	AVILUB RSL 32 AVILUB HVI 32	AVILUB RSL 32 AVILUB HVI 32
MOTOREX	COREX EP 300	COREX EP 450
BP	BP Energol HLP 32 BP Energol HLP-D 32	BP Energol HLP 46 BP Energol HLP-D 46
CASTROL	CARTROL HYPIN AWS 32	CARTROL HYPIN AWS 46
ELF	ELF Acantis 32	ELF Acantis 46 Hydrelf 46
ESSO	NUTO H 32	NUTO H 46
MOBIL	Mobil D.T.E. 24	Mobil D.T.E. 25
SHELL	SHELL Tellus 32	SHELL Tellus 46
PANOLIN	PANOLIN HLP Universal 21	PANOLIN HLP Universal 37

Hydraulic oils of other manufacturing companies can be used too. Condition is that these pressure liquids are equally good as the specified products.

When using biologically decomposable or hardly inflammable pressure liquids in GRIBI products, a foregoing consultation with us is necessary.

2.2.2 Lubricating greases



A responsibility in connection with the lubricating greases specified in this table cannot be assumed.

Base: Lithium base saponified, type K k3 According to DIN 51825, consistency No. 3	
Manufacturer	Product signification
BP	Engrease LS – 3
CASTROL	Speerol AP3
ESSO	Beacon 3
GULF	Gulfcrown Grease 3
MOBIL	Mobilux Grease 3
SHELL	Alvania Grease 3

2.2.3 Cooling mediums

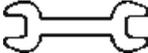
Normal clean tap water or internally conditioned cooling water.

2.2.4 Nitrogen / Accumulator – Gas pretension

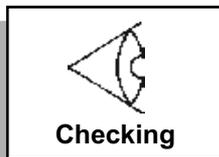
Test procedure

- a) Switch off hydraulic group when working pressure (hydraulic diagram) is attained.
- b) Open discharge cock a little.
- c) Watch pressure gauge indication closely.
- d) The pointer of the pressure gauge at the accumulator drops slowly, and then suddenly falls to zero when the filling pressure is attained.

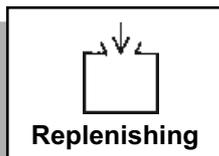
3.1 Table of maintenance interval

INTERVAL	 CHECKING	 REPLENISHING	 LUBRICATING	 RETIGHTENING	 EXCHANGING
DAILY / 8h	PRESSURE				
	TEMPERATURE				
	OIL LEVEL	IF NECESSARY			
	NOISE				
50 h AFTER PUTTING INTO OPERATION					FILTER CARTRIDGE
EVERY MONTH / 200 h	LEAK			IF NECESSARY	POSSIBLY SEAL
EVERY YEAR/1500 h S.SYSTEMS/L.SYSTEMS				ALL SCREWED JOINTS	
					FILTER CARTRIDGE
1500 / 3000 h		CHANGING OIL			
FOR HIGH-POWERED MOTORS WITH LUBRICATION POSSIBILITIES			APPROX 10'000 h		

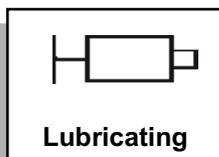
3.1.1 General notes to the symbols according to DIN 30600



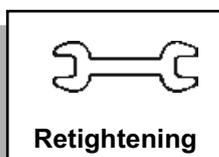
If there are deviations of values found as compared with the set value indications of the hydraulic diagram, if changes of noise, oscillations at the motor or pump are perceived, please contact us.



When replenishing or changing the hydraulic oil be careful that one of the mineral oils from Section 2.2.1 Pressure Liquids is used. Oil change: Put group out of operation, drain off hydraulic oil completely through draining connection and clean reservoir. See also Sections 0.1.2 and 0.1.3. Replenishing and filling only through filter (fineness 10 µm)



For lubricating grease qualities see Section 2.2.2 Lubricating Greases. Observe the prescriptions of the actual motor manufacturers.



For screwed joints use the necessary wrench set. For electric motors, pumps, valves, filter cartridges etc. use the appropriate torque wrench and tighten according to the data sheet.



Employ only specially trained personnel to exchange parts of the group and this only within the scope of the spare parts as proposed by us. Parts not proposed as spare parts should be exchanged at the supplier.

4.1 Endangerment potentials

4.1.1 Water endangering substances

The operation with water endangering substances (hydraulic pressure liquids) causes a special danger for waters.

If nothing else has been specified, the hydraulic systems are intended for an operation with mineral oil according to DIN 51524, Part 2. In general these mineral oils are classified in water endangering class 2.

GRIBI Hydraulics AG recommend to the responsible persons to make the respective clearings up.

4.1.2 Hazardous environment

Hydraulic systems of GRIBI AG must be used in hazardous environment only if they are designed for such an environment and if this is well documented in the product-specific part of the documentation.



The Directive 94/9/EC, (also known as ATEX 95) regulates the use of devices and protective systems in a hazardous environment.

4.1.3 Inadmissible use



The operation of the system:

- ***with pressures higher than the defined working pressures***
- ***with pressure liquids with data deviating from the specified data***
- ***under operation and ambient conditions other than the specified ones is inadmissible.***

4.1.4 Residual risks of hydraulic system

Residual risks of hydraulic system	Dangers	Protective measures
Penetration of pressure liquid under pressure	Conduits and hoses	Eliminate all leaks immediately.
	Components of hydraulic system (pumps, valves, cylinders etc.)	Depressurize hydraulic system and carry out works.
	Hydraulic accumulator	Unload accumulator by all means.
Penetrating pressure liquid ignites near ignition sources	Ignition sources with a surface temperature > ignition point of the pressure liquid used	Appropriate screen.
Water or soil contamination by leak of hydraulic system	Hydraulic reservoir; components and conduits outside the hydraulic reservoir	Prepare appropriate collection device for penetrating liquids.
Uncontrolled motions of a broken pressure pipe	Hydraulic hose pipes	Check time intervals for the exchange of pipes and possibly reduce them. If necessary secure hose with a fixing device.
Dangerous motions of drives. Unauthorized actuation	Manual emergency stop actuation of valves. Manually actuated valves	Must be accessible only for specialized personnel. The operator is self-responsible for safe motion sequences and building up of pressure.
Danger of burns by surface temperatures > 80°C	Surfaces of components and pipes of the hydraulic system	Before beginning works, let system cool down. Use protective clothes.
Noise, continuous sound level > 85 dB(A)	Direct surroundings	Use protective sound insulation cover. Use appropriate ear protection.
Basic endangerment	All components by repair	Only tested components of identical construction must be used or replaced. Components must be disassembled for repairs only in a limited way.
Electric shock	Electric operating material	Maintenance only by trained special personnel.



The necessary protective measures result from the previously listed residual risks and the risk evaluation of the entire machine.

