

Technical Product Information No. 1290 EN

Hydraulic control unit series 0086-372-01

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About this Technical Product Information (TPI)

Who is this TPI directed at?

This TPI is directed at qualified personnel who

- are entrusted with the assembly, commissioning and operation of the product and who
- have obtained the necessary qualifications by reading and understanding the instructions by training or instruction

It is intended for

- Fitters at the manufacturer of the machine / plant
- Maintenance fitters at the machine users.

What will you find in the TPI?

The TPI provides all the necessary information for the assembly and maintenance of the product described on the title page

Notes on the symbols used in the text

On the pages which follow, important sections of text are highlighted with the following symbols.



This symbol means:

There is a risk of injury during the activity described or in operational running!



This symbol means:

There is a risk of material damage during the activity described or in operational running!



This symbol indicates sections of text to which particular attention must be paid.

The Ortlinghaus numbering system

Example: 0 111 - 222 - 33 - 444 555

0 = Code for products	_____		_____		_____		_____		_____
Code number for the model range	_____		_____		_____		_____		_____
Code number for design features	_____		_____		_____		_____		_____
Size	_____		_____		_____		_____		_____
Sequential number	_____		_____		_____		_____		_____
Other design features	_____		_____		_____		_____		_____



Pass this TPI on to your customers ! You can either order further copies of this TPI from us or you are free to make copies, for use by your customers.

About the product

Purpose and function of the hydraulic control unit (HSE) 0086-372-01-

A hydraulic control unit incorporates all components which are required for quick actuation of a hydraulic clutch / brake and which need to be positioned in the immediate vicinity of the clutch and brake. The main area of application is the actuation of hydraulic press clutches / brakes.



Fig. 1: Hydraulic control unit

Function

When the clutch hydraulics is switched on, the electrical accumulator relief is closed and the working pressure builds up at Port P. Here the pressure accumulator is filled against the gas pressure in the internal gasbag.

To switch on the clutch / brake, the switching valve (press safety valve) is excited, making the connection from Port P to Port A. The gas pre-load in the accumulator ensures a fast filling process at the clutch, with the inlet speed being limited by an orifice. When switching off, the connection between ports A and T is made by the switching valve being released.

Components of the hydraulic control unit

The components of a hydraulic control unit are on:

- **Switching valve.**

In addition to the press safety valves (PSV 12 and PSV 16) mainly used, a directional control valve can also be used on the available hole pattern NG 10.

- **Diaphragm**

The orifice required to safely avoid pressure peaks is fitted into Port P of the switching valve in the form of a push fit aperture. The diameter of the orifice bore depends on the clutch size.

- **Accumulator**

For quick filling of the clutch / brake, pressure accumulators are fitted on a common base block in the immediate vicinity of the switching valve. In accordance with the safety regulations an accumulator safety block, with among other things an electrical relief, is fitted on the base block.

- **Non return valve**

A non-return valve is piped into Port T and prevents the line to the clutch / brake from running empty during standstills.

- **Brackets.**

The hydraulic control unit has Z shaped brackets which allow variable fixing on the machine body, and ensure accessibility to all components

List of parts 0086-372-01-011401

(see sectional drawings)

Item	Individual part	Drawing No.
1	accumulator	0086-028-02-000000
2	safety and shut-off block	0086-056-02-000000
3	diaphragm ø3,2mm	0086-043-08-004000
4	non return valve	0086-033-03-001000
5	press safety valve	0086-096-15-010000
6	hydraulic block	1086-588-00-030000
7	pressure gauge	0086-032-00-006000
8	pressure sensor	0086-047-00-032000

Drawing 0086-372-01-011401

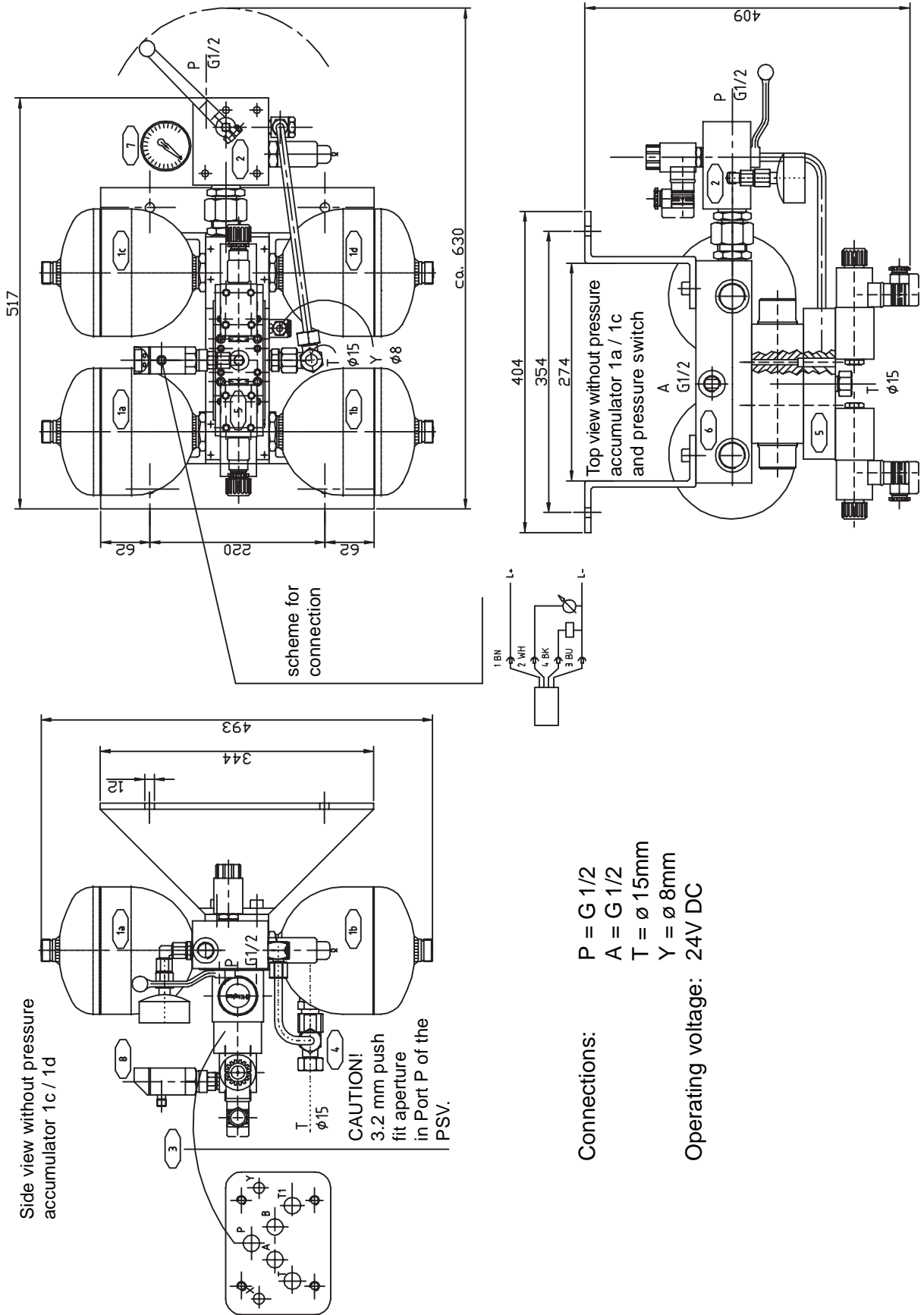


Fig. 3: drawing

Safety Instructions

When dealing with hydraulic units always observe the following rules:

Dealing with oil.

Be aware that oil is highly flammable and in some circumstances can have a toxic effect. Apart from this oil must not be allowed to get into the soil or into the ground water.



Thus, you should always observe the following precautionary measures:

- Keep suitable solvents ready!
- Do not have anything to do with open flames!
- Avoid lengthy contact with the skin!
- Change contaminated clothing!
- If necessary put up suitable hazard instructions!
- Catch any oil which escapes e.g. with a tray under the hydraulic unit.

Waste disposal.



Oil must not be allowed to get into the environment, so only dispose of waste oil, used filter inserts and cleaning fluids contaminated with oil, through the disposal points provided.

Interaction of hydraulic fluids with other components.



Insufficient compatibility with sealing materials, diaphragms, painted surfaces etc. can impair the functioning capability or lead to hazards.

So:

- Only use the hydraulic fluids recommended by us. Before using other media, or for unusual operating conditions, talk to us first.

Staying in the operating area:



If there are faults in the controller, or in individual structural components, hazards can occur e.g. due to uncontrolled movements or jets of fluid escaping.

It is possible to be scalded by hot hydraulic fluid.

So:

- Avoid proximity with parts that get hot.
- Always ensure there is adequate cooling or screening if necessary.
- Set up the controller so that if it fails no hazardous movements are possible or,
- Where this is not possible, install suitable guards.
- If necessary fit a hazard notice to the machine.

What you must pay particular attention to on hydraulic accumulators.

Hydraulic accumulators are subject to the Pressure Vessel Regulations (TRB).

In accordance with these rules and depending on the accumulator data on pressure and volume, various stages of test are compulsory before putting into service and during operation. The pressure accumulators used on the hydraulic control units 0086-372-01-... .. fall into Test Group II. Here acceptance by an expert is adequate. See also the Appendix below, "Hydraulic Accumulators - Safety Requirements".

Design Safeguards.



Energy is stored in the hydraulic accumulator, so after failure of the pressure supply hazardous movements are still possible. You should therefore ensure that if the pressure supply fails, the system is depressurised. There is also a relevant information plate on the hydraulic control unit.

Repairs.



Before repairs, the supply hydraulics has to be switched off and the accumulator depressurised. For this open the oil drain valve using the red lever. Neither welding nor soldering nor any kind of mechanical machining may be carried out on the accumulator container.

Gas filling.



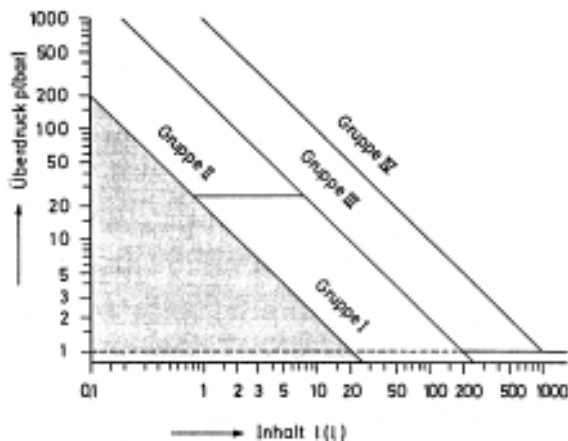
For charging the accumulator only use nitrogen, not oxygen (risk of explosion)! When emptying accumulators filled with nitrogen there is a risk of displacing the oxygen, so ensure adequate ventilation.

Hydraulic accumulator safety requirements.

As pressure vessels, hydraulic accumulators are subject to the Pressure Vessel Regulations (DruckbehV) Dated 27.2.1980 in the version dated 21.4.1989. Testing before putting into service, recurring tests and operation are the most important points, which are also further, regulated by the "Technical Rules - Pressure Vessels" (TRB).

Classifying hydraulic accumulators into test groups (§ 8)*

Initial remark: for the term "Pressure Vessel", the term "Hydraulic Accumulator" can also be used in the same sense. Hydraulic accumulators fall into the following Test Groups.



- Group I: $p = 25 \text{ bar}$ $p \cdot I = 200$
- Group II: $p > 25 \text{ bar}$ $p \cdot I = 200$
- Group III: $p > 1 \text{ bar}$ $200 < p \cdot I = 1000$
- Group IV: $p > 1 \text{ bar}$ $p \cdot I > 1000$

p = permissible working pressure in bar.
I = volumetric capacity in litres.

Pressure vessels with a capacity of not more than 100 cm³ and pressure vessels with a pressure capacity product of not more than 200 are excluded from DruckbehV.

Fig. 4: Allocation to groups.

Depending on the group allocated certain tests are prescribed:

Group	Test before putting into operation (§9)		Recurring tests (§10)
	At the Manufacturer's	At the User's	
I	For flammable, corrosive or toxic gases, vapours or fluids as Group II		
II	Pressure test, Manufacturer's certification on proper manufacture and pressure test carried out without complaints.	Acceptance by expert, certification by the expert that the hydraulic accumulator corresponds to the requirements placed on it.	Intervals are to be specified by the user. Pressure and internal tests are to be carried out by an expert.
III	Build sample acceptance with pressure test and applicable certification or first time testing (Pretesting, Construction Testing and Pressure Testing) by an expert.	Acceptance by an expert.	As for Group II.
IV	As for Group III.	As for Group III.	Internal test every 10 years for non-corrosive fluids, otherwise at least every five years. Pressure testing: at least every 10 years.

* §§ always refer to the Pressure Vessel Regulations (DruckbehV), extracts from the Technical Rules for Pressure Vessels are identified with "TRB".

Before putting into service

Preparation

When transporting and setting up the hydraulic control unit, a few rules need to be observed in order to avoid damage and to ensure trouble free operation.



N.B.: The prescribed acceptance check, in accordance with the Pressure Vessel Regulations, must be carried out before putting the equipment into service.

Check from the circuit diagrams, equipment list and rating plates, whether the hydraulic control unit delivered corresponds with the purchase order! For this compare e.g. the equipment and electrical connection data.

Transport and set up.

Only transport the hydraulic control unit by the base plate or the brackets. During transport protect the fitted units from contact with chains and ropes. The hydraulic control unit must never be lifted by the pipe-work (risk of leakage)!

The hydraulic control unit must only be built up with the directional control valve (PSV) in a horizontal position. Ensure good accessibility and ventilation.

Protect the hydraulic control unit from dirt, moisture and extreme temperatures (below 0 ° C, above 60 ° C).

The floor below the installation site must be sealed to prevent seepage of hydraulic fluid. If this is not possible a catcher tray must be provided.



N.B.! When piping up do not use any liquid sealants

Connecting.

Connect the equipment in the following order:

1. Connect all hydraulic lines.
2. Make all electrical connections.
3. Carry out the acceptance check for the hydraulic accumulator.



N.B.: all electrical installations must only be carried out by a specialist in accordance with the valid electrical circuit diagram. Ensure particularly that the voltage, type of current and polarity are correct.

Connecting the hydraulic lines:

- Only use adequately dimensioned pressure pipes or high-pressure hoses for the hydraulic connections. These must be compatible with the hydraulic fluid used!
- Only work with pipes and hoses in a clean condition (deburred and flushed out).
- Return lines and leakage lines must be unpressurised and of adequate cross section.
- Keep piping free of vibrations, stresses and mechanical loading.



Hydraulic fluid

N.B.: only use hydraulic oils that correspond to the OW approved oils list. For the ISO Viscosity Groups (VG) the following working temperatures are permissible

ISO-VG-Class.	22	32	46
Working temperature	5°C bis 40°C	25°C bis 50°C	35°C bis 60°C

Synthetic fluids must be compatible with the sealing materials, diaphragms and gas bags used and must possess adequate lubrication properties. Ask us about the use of synthetic fluids and whether these can be used without risk.

Filling.

- Filling with hydraulic fluid - **only** fill with **filtered** oil from a drum.
- Fill the oil reservoir up to the "**maximum**" mark on the level indicator



N.B.: pump the hydraulic fluid using a pump and filter complying with Purity Class 16/13 (to ISO 4406), this purity class can be achieved with a filter fineness of $\beta_{10}=75$.

Commissioning

- When putting into service for the first time, open the drain cock on the accumulator safety block. Allow the oil to circulate in this way. This will flush and filter out the basic dirt from the piping to the tank
- After about 30 min. close the drain cock and check all piping and connections for leakage, if necessary re-tighten the fixing screws or threaded connectors.

Maintenance

The following jobs are part of the regular maintenance:

- Visual check for leakage
- Re-tightening threaded connectors if necessary
- Checking the gas charge of the accumulators

Gas charge.



A gas charge which complies with the regulations is important for the function of the hydraulic accumulator, so in the initial period check the gas charge often (weekly). Later you can extend the period between the checks to suit your operational experience (at least every six months).

Here too the maintenance periods depend on the application conditions. The higher the operating temperature, the greater will be the gas losses. With small hydraulic accumulators the gas charge will fall more quickly than with large ones.



N.B. when it is necessary to correct the gas charge you must only top up with technically pure nitrogen! Topping up with air is not permissible and is dangerous (risk of explosion).



N.B. never release filling valves or gas filler screws without a filling device! If released quickly there is a danger of injury due to parts flying.



N.B. if the permissible working pressure of the nitrogen bottle used is higher than the permissible working pressure of the hydraulic accumulator, fit a pressure reduction valve between the hydraulic accumulator and the bottle fitting, to prevent the permissible working pressure of the hydraulic accumulator from being exceeded.

There are two ways of determining the existing gas charge: firstly from the liquid side and secondly directly using a commercial filling device.

Checking the gas charge from the liquid side:

- Run the equipment up to working pressure,
- Stop the pump motor,
- Open the oil drain valve slightly until the pressure falls slowly,
- Watch the pressure gauge. When the "gas charge pressure" is reached the pressure will drop suddenly.
- Close the oil drain valve again.

Checking with a filling device.

- Switch-off the pump motor,
- Depressurise the hydraulic system by opening the oil drain valve,
- Screw the filler device for the hydraulic accumulator onto the gas connection.
- Open the filling screw or valve. The pressure gauge on the filling device will indicate the gas charge pressure.

Increasing or decreasing the nitrogen charge.

If the checks described previously show that the nitrogen charge needs to be altered, install a nitrogen bottle, the filler device and, if necessary, a pressure reduction valve.

- To let out nitrogen, open the filling screw on the hydraulic accumulator and the outlet valve of the filler device.
- If necessary top up with **nitrogen** until the prescribed charge pressure is reached.
- Close the filling screw or valve.
- Unscrew the filler device,
- Close the oil drain valve.