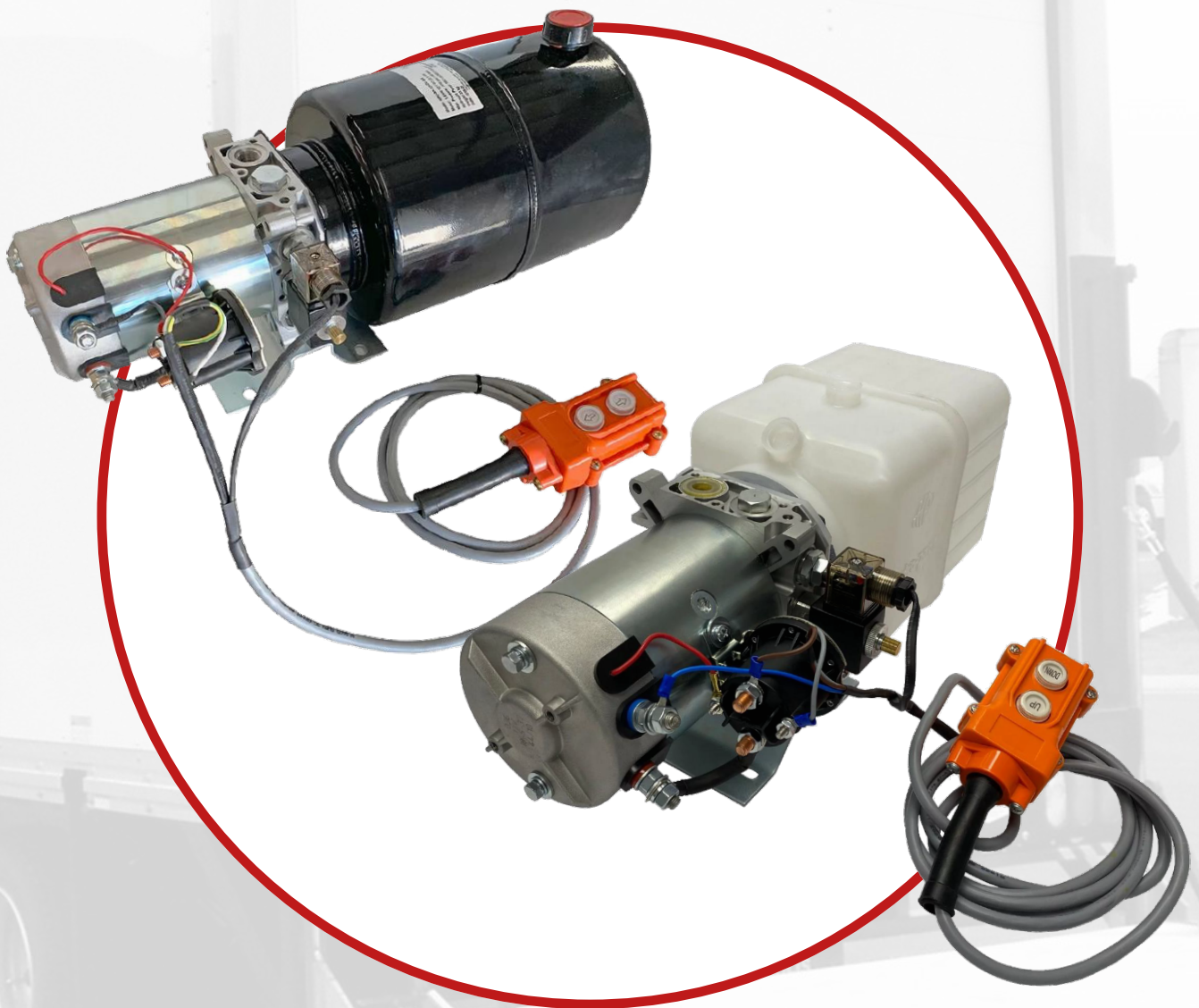


HYDRAULIC POWER UNIT

MANUAL



ATTENTION! Before operating the hydraulic power unit, it is essential to read and understand all the recommendations provided in this manual. The manufacturer is not responsible for any damage resulting from improper operation of the hydraulic power unit or from unauthorized modifications.

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A2 INTRODUCTION

This manual is a complete guide designed for Hydraulic Power Units (HPUs) with the specific models HPU-SR-12VDC-DA/SA and HPU-PR-12VDC-DA/SA. In these pages, you'll find lots of useful information about General Information, Safety Guidelines, What HPUs Are and How They Work, Putting Together the Power Unit, and Taking Care of the HPUs.

This manual assists you in installation, safety, maintenance, production, etc. We strongly suggest reviewing Section B Safety Technics carefully. Trained or authorized experts should perform any job that requires the unit or its electrical parts to be removed or taken apart. Please do not try to fix or change the unit or its parts if they are not discussed in this manual. Any alterations, modifications, or repairs will void our 1-year warranty, which covers manufacturing defects only.

A3 PRODUCT CLAIMS

If you experience a technical issue, please contact the Magister Hydraulics technical department at **info@magisterhyd.com**. When reaching out via email or phone regarding your claim, please provide the following details to help us assist you more effectively:

- Power unit code (you'll find it on the label)
- The voltage and frequency of the current you're using
- The pressure at which the unit is working
- Pump displacement
- Production date
- A detailed explanation of the problem you're facing
- Number of hours the unit has been in operation
- Order Number
- Video of unit operating demonstrating the issue
- Photos of the equipment and connection

A4 LABELING

Technical information about the power unit (such as motor power, pump displacement, oil tank size, etc.) can be found on the label. The label is located on the oil tank.

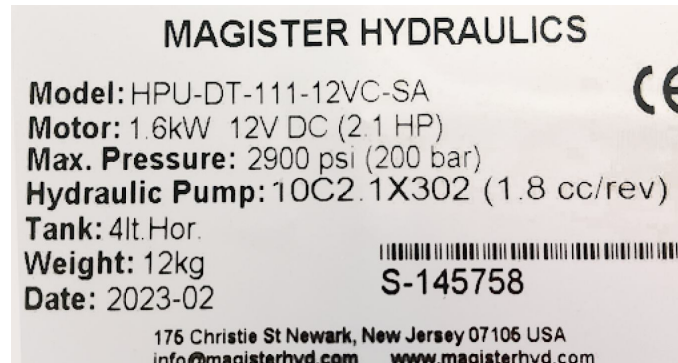


Photo 1. Power Unit Label

A5 APPLICATIONS



The hydraulic power unit is designed to fit into hydraulic systems in construction equipment, transportation machines, cars, and manual lifting tools.

It works for systems that move in one direction or both. This includes things like tippers, car lifts, dock levelers, tailgates, wheelchair lifts, snowplows, forklifts, and industrial automation setups.

A6 OPERATION REQUIREMENTS

You can use the hydraulic power unit indoors or outdoors, where the temperature is between -13°F and 122°F. It works well even when the air is a bit damp, with humidity up to 80%.

A7 TECHNICAL SPECIFICATION

HYDRAULIC POWER UNIT HPU-SR-12VDC/HPU-PR-12VDC	
SPECIFICATION	DETAILS
Action	Single Acting / Double Acting
Max Flow	1.1 GPM
Max Pressure	2600 PSI
Max RPM	2500
Pump Displacement	0.10 CI/REV
Reservoir Capacity	4 / 6 / 8 / 10 / 12 / 16 qts
Tank Material	Steel / Plastic
Voltage	12 V
Current	Direct
Motor Power	1.6 kW
Port Size	SAE 8
Mounting	Horizontal
Length	17 / 20 / 24 / 33 / 36 in
Width	8 / 12 / 13 in
Height	8 / 12 / 13 in
Weight	31 / 32 / 34 / 35 lbs
Country of Origin	Bulgaria, European Union

A8 NOISE SPECIFICATIONS

The hydraulic power unit doesn't make noise louder than 85 dB, following the EN 60034-9 standard.

A9 OPERATING FLUID

Use a new, clean mineral-based ISO 6743/4 fluid to fill the oil tank. Choose hydraulic oil with a thickness between 15 and 68 cST at a temperature of 104°F. Remember, the type of hydraulic fluid may need to change based on where you're working. Don't use motor oil, diesel oil, or water in the system. Aim for a filtration class of -9 NAS 1638.

You should replace the hydraulic fluid every 6 months or 1 year, depending on how much you use it. Also, make sure to clean the suction filter. If you notice the fluid level going down, just add more oil.

B1 SAFETY GUIDELINES

Only personnel who understand the rules for handling electrical and pressurized equipment should operate the power unit.

For safe operation of the hydraulic power unit, follow these guidelines:

- Don't start the power unit if the motor's terminal connecting box cap is changed or if connectors on solenoid valves differ from the ones the power unit comes with.
- An expert electrician should make the connections, ensuring the electric motor turns the right way (the arrow on the motor cover shows the correct rotation direction).
- Be careful with hydraulic connections. Letters on the main manifold indicate P for pump line (pressure) and T for tank line (return).
- Use pipes that match the system's pressure and flow rate. Make sure tube connectors are secure and don't leak. Use proper seals.
- Don't replace the air breather with a plug.
- Don't adjust the pressure relief valve to higher pressure.
- Secure the power unit to a stable base or frame.
- Don't use the power unit in explosive or flammable environments.
- Keep enough oil to avoid damaging the hydraulic pump.
- Close the covers of both single-phase and three-phase AC motor terminal boxes.
- The AC motor's right rotation is seen from the fan side. The hydraulic pump rotates clockwise from the shaft view.
- Use insulated cables for connections.
- Don't assemble the power unit in a wet environment.
- Prevent the + and - poles of the DC motor from touching.
- Insulate DC motor cable ends.
- DC motor must always have a starter assembled.
- Don't put blind plugs on the red-colored breathers of oil tanks.
- Ensure hose diameters aren't too small.

C1 MAIN PARTS

The power unit consists of the following main components:

- Electric motor
- Central manifold (made from die-cast aluminum alloy)
- Hydraulic gear pump
- Oil tank
- Suction filter

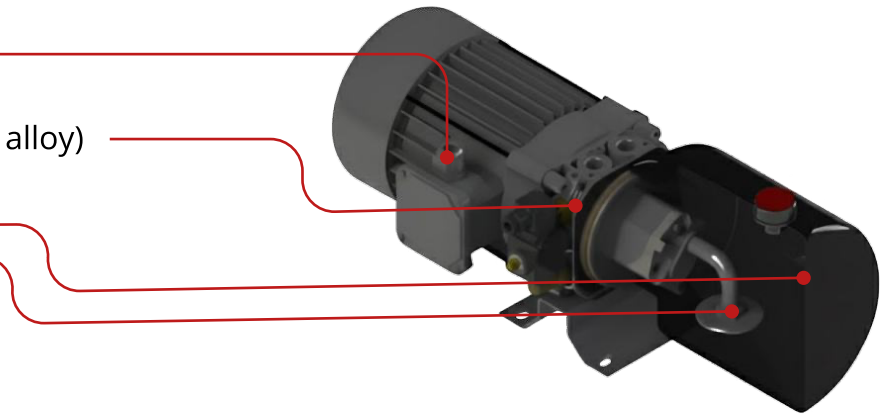
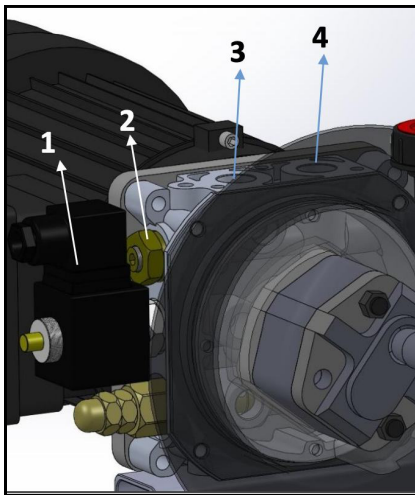


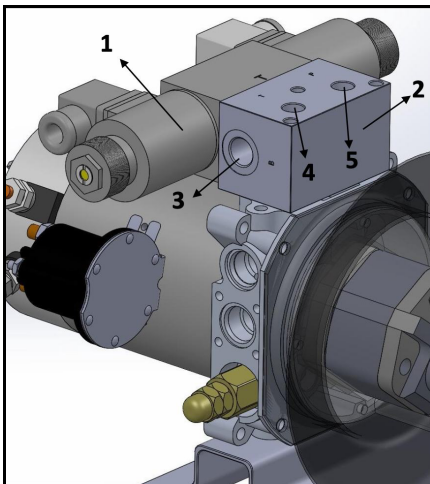
Photo 2. Main components of mini power unit

Single acting power unit



No	Description	Notes
1	2/2 poppet valve	2/2 SAE8, solenoid operated cartridge valve. Normally closed, normally open options, manual poppet is also available.
2	Flow control valve	It is used to adjust the return speed of the cylinder. Standard and pressure compensated options
3	Tank port	Plugged (G 3/8")
4	Pressure port	Outlet port to connect single acting cylinder (G 3/8")

Double acting power unit



No	Description	Notes
1	4/3 solenoid operated directional control valve	NG6 solenoid operated directional control valve. Different spool options are available
2	Subplate for solenoid valve	Subplate in order to assemble NG6 valves Two options, with double checks and without checks
3	Outlet ports	Two outlet ports to connect double acting cylinder (G 3/8")
4	Tank port	Plugged (G 1/4")
5	Pressure port	Plugged, can be used to assemble manometer (G 1/4")

When switching on the power of the electric motor, it drives the gear pump. The pump sucks the working liquid from the tank and directs it to the valve block and from there to the implementing components of the power unit. The pressure in the system is regulated by the pressure relief valve which is built in the main block. Other hydraulic blocks can be assembled to the power unit according to customer's demand.

When you turn on the electric motor, it makes the gear pump work. The pump pulls the working liquid from the tank and sends it to the valve block. Then it moves on to the parts of the power unit that actually do the work. The pressure relief valve, which is part of the main block, controls the pressure in the system. If needed, other hydraulic blocks can be added to the power unit.

C2 ELECTRICAL PARTS

The hydraulic power unit is put together with these parts:

- Electric motor
- Starter (Only used for DC motors)
- Solenoid valves (Optional)

The electric motor can be three-phase or single-phase for AC power. For DC motors, the standard working voltages are 12 or 24 volts.

The solenoid elements are of the cartridge type. Their coils can work with voltages of 12, 24, 110, or 220 volts. The connectors follow the DIN 43650 standard.

SECTION D: ASSEMBLY OF THE POWER UNIT

D1 WORK AREA REQUIREMENTS

If there's no mounting bracket, attach the power unit using M10 holes. Keep the area around the power unit clear, so you can easily reach the oil filler, valves, and unloading throttle. Make sure the power unit is in an open space so it doesn't get too hot. Also, avoid putting it near vibrating or noisy parts.

The power unit's job depends on the machine it's connected to. When using the power unit, there shouldn't be any leaks of the working fluid on the outside. The power unit turns on when the motor gets the right voltage. The control happens by correctly combining the motor and solenoid valves and switching them on.

D2 TRANSPORTING OF THE HYDRAULIC POWER UNIT

You can use any covered transport to move the power unit. Follow the instructions on the box while transporting. If there's oil in the tank, either replace the air breather with a blind plug or empty the oil before moving it.

D3 POWER UNIT PROTECTION

Take the hydraulic power unit out of the box. Remove the plastic wrap from it. Replace the safety plugs on the supply ports.

D4 CONNECTION PORTS

On the main manifold, you'll see two letters that stand for the pump (pressure) and tank lines. P stands for the pump line, and T stands for the tank line. Both ports are 3/4 - 16UNF (SAE 8) or 9/16 - 18UNF (SAE 6) by default. The maximum tightness for fittings is 65 Nm.

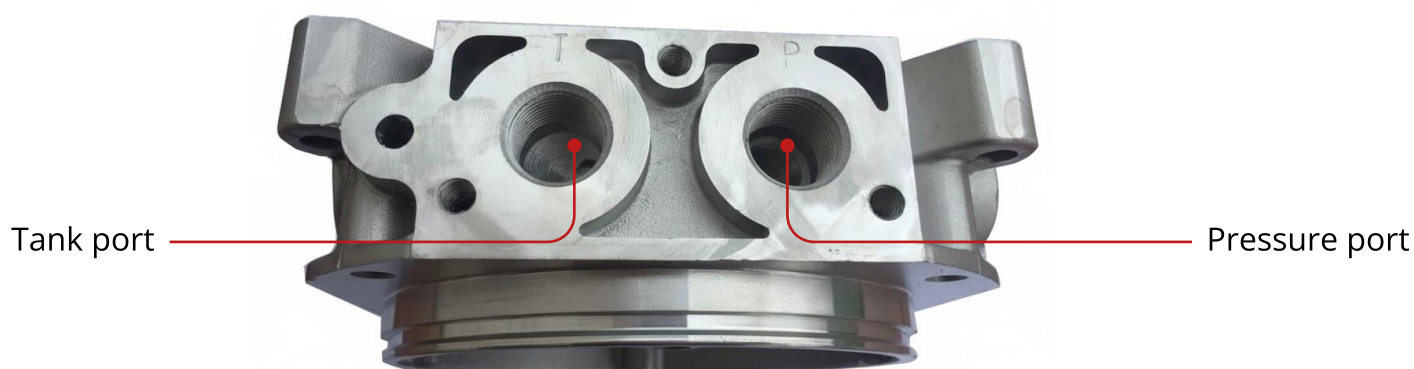


Photo 5. Connection ports on central manifold

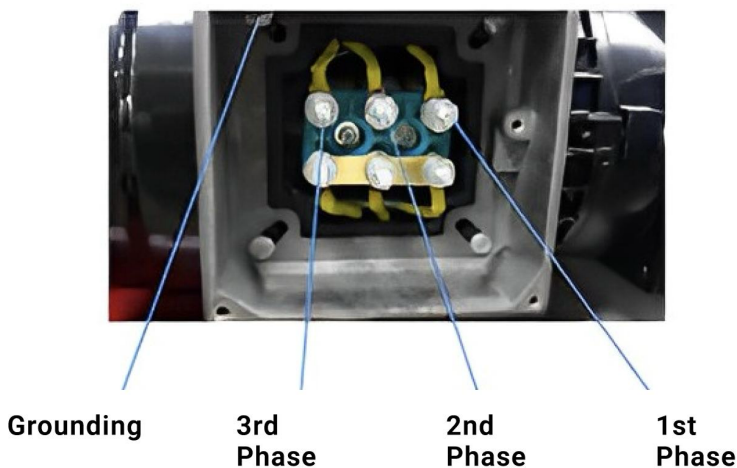
D5 HYDRAULIC SYSTEM CONNECTION

Connect the HYDRAULIC HOSE ASSEMBLIES from the power unit to the machine's parts that make it work. You can find the hydraulic circuit and technical details in the technical drawing. Once you've finished setting up the power unit, add clean working liquid to the tank up to the marked level.

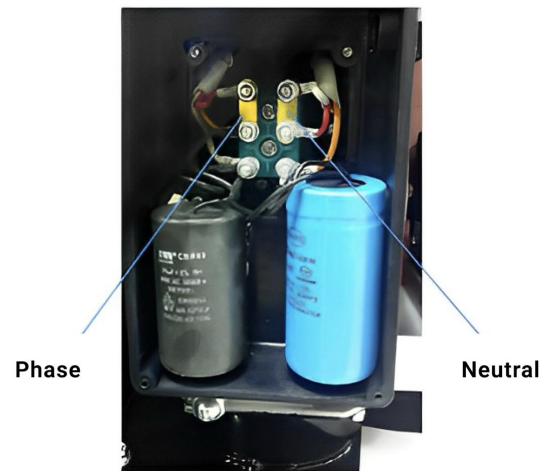
D6 HYDRAULIC SYSTEM CONNECTION

Start by removing the cap from the motor's terminal connecting box. Unscrew the nuts from the terminals and attach the cable shoes to them. Once connected, securely tighten the nuts. Ensure the motor is not running. Place the cap back on the terminal box. Connect the coils of the solenoid valves in a similar way.

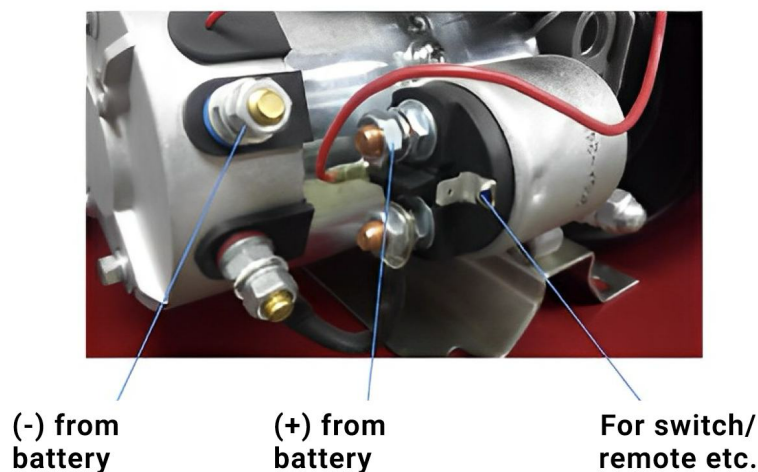
Carefully check the motor's rotation to make sure it's correct. When it comes to connecting the power unit to the electrical system, it's best to have a certified electrician do it. They're familiar with safety rules for working with electrical equipment. Refer to the manufacturer's instructions for the electrical layout. For safe motor operation, use a current relay (100 mA), a thermic relay, and a main circuit cutoff switch. After all the electrical connections are made, test the motor's rotation by briefly giving short pulses of right rotation (from the fan side), each lasting no more than 1 second.



Connection on 380 V AC three phase motors



Connection on 220 V AC monophase motors



Connection on DC motor

E1 POWER UNIT CLEANING

To clean the power unit, use a cloth made of fabric, without any cleaning liquids or chemicals. The cloth should not leave any threads on the surfaces you're cleaning. Once a year, it's important to change the oil in the tank and clean it. Here's how you do it:

- Release the pressure in the system.
- Turn off the power unit in the electric setup.
- Take apart the pipes. Unscrew the screws holding the power unit to the base.
- Stand the power unit upright on the tank. Unscrew the fixing screws and replace the tank brackets.
- Move the electric motor, central manifold, and pump away. Empty out the old oil and clean the inside of the tank. Clean the suction filter too.
- After cleaning, put the electric motor and central manifold back on the tank. Screw in the fixing screws and brackets. Put the assembled power unit back in its usual spot.
- Fill the tank with the working liquid up to the level indicated on the stick. Make sure to close the air breather tightly.
- Put the pipes back together. Connect the power unit to the electrical system as needed for its use.

Remember, using dirty oil will shorten the life expectancy of the unit.

E2 PRESSURE ADJUSTMENT

To adjust the pressure in the hydraulic power unit, you use a pressure relief valve found on the main manifold. Here's how you do it:

- First, attach a pressure gauge at port "P."
- Unlock the nut of the adjusting screw.
- Unscrew the adjusting screw until it's all the way out.

Turn on the hydraulic power. Now, turn the adjusting screw (turn it clockwise to increase, and counter-clockwise to decrease) until you reach the pressure you want. Once it's right, lock the nut.



Pressure relief valve

Important: Do not exceed the maximum working pressure shown on the technical drawing!

E3 TROUBLESHOOTING

PROBLEM	REASONS	METHOD OF ELIMINATION
Not sufficient pressure	<ul style="list-style-type: none"> • Lack of oil inside the tank • Damaged pressure relief valve • Damaged solenoid operated valve • Damaged Hydraulic pump • Filter pipe type is incorrect • Filter is blocked • Air on suction line • Contamination 	<ul style="list-style-type: none"> • The oil is filled up • Readjustment of the relief valve • Replacement • Replacement • Replacement • Replacement • Elimination of the air
No pressure	<ul style="list-style-type: none"> • Gear pump doesn't operate properly • Electric motor rotation is wrong • Electric wiring is wrong • If the manifold has normally closed 2/2 valve it has been open 	<ul style="list-style-type: none"> • Repair or replacement • Make sure correct rotation • Check wiring • Turn the manual override screw anti-clockwise
Electric motor runs but no pressure	<ul style="list-style-type: none"> • Gear pump doesn't prime 	Disassemble pressure relief valve, run the unit for a few seconds until oil comes from the port, re-assemble the pressure relief valve
Non-performance of the function	<ul style="list-style-type: none"> • Damaged solenoid valve • Damaged check valve • Damaged pressure relief valve • Damaged hydraulic pump 	Replacement
Load doesn't stay in place	<ul style="list-style-type: none"> • Check valve problem • Cylinder internal leak 	<ul style="list-style-type: none"> • Disassemble check valve clean the cavity with brake cleaner and use air pressure to remove contaminants/debris and replace check valve • Repair/inspect the cylinder/seals

ALL POWER UNITS ARE TESTED TO 100% BEFORE DELIVERY TO THE CUSTOMER.

The manufacturer ensures that the product meets the standard and technical specifications. It should work properly when operated as explained in this manual.

Please don't remove the product label from the oil tank while the warranty is valid. The warranty lasts for 12 months from the Order date.

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