

MANUAL

WHEELCHAIR LIFT POWER UNIT

MAGISTER
HYDRAULICS

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GENERAL DATA

A1. MANUFACTURER

MAGISTER HYDRAULICS



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A2. INTRODUCTION

This manual contains information about the wheelchair lift power unit. It contains the necessary information for assembling, starting up, maintaining, and safely operating the hydraulic power units. It's especially important to follow our safety instructions when using the machine.

Qualified and authorized specialists should handle any operations involving the disassembly and assembly of the Power Unit and its electrical components. Do not attempt any repairs or adjustments not covered in this manual.

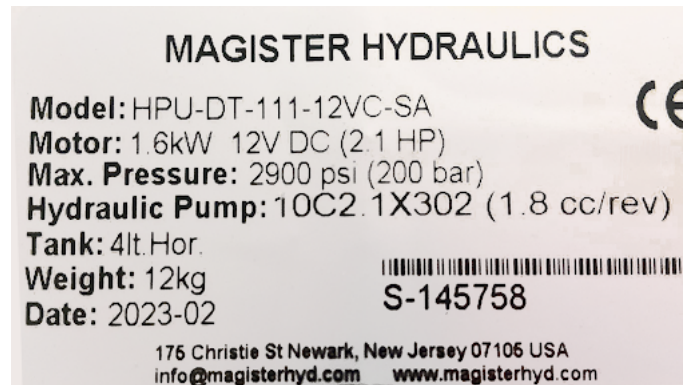
A3. CORRESPONDENCE

If you encounter any technical issues, do not hesitate to contact our technical department at info@magisterhyd.com. Please include the following information so we can assist you effectively.

- ▶ Power unit code (you'll find it on the label located on the oil tank)
- ▶ Operating voltage and frequency
- ▶ Operating pressure
- ▶ Pump displacement
- ▶ Production date
- ▶ A detailed description of the issue
- ▶ Power unit's working hours
- ▶ Order Number
- ▶ Video of unit operating demonstrates the issue
- ▶ Photos of the equipment and connection

A4. LABEL

The unit's specifications, such as motor power, pump displacement, and tank size, can be found on the label located on the tank.



Label of power unit

A5. APPLICATIONS

The hydraulic Power Unit is designed to be part of a hydraulic system for wheelchair lift units. Its main purpose is to supply hydraulic power for lifting and lowering the platform. This unit can also be employed for tasks that require one-way movement.

For unloading, there's a 2/2 carriage valve that remains closed by default. If there's an electricity issue, there's a built-in hand pump for lifting.

To control the speed of the return movement, a flow control valve with pressure compensation is included. The unit also includes a check valve and a pressure relief valve as part of the manifold.

A6. OPERATIONS REQUIREMENTS

The hydraulic Power Unit is meant for use in indoor spaces and outdoor areas where the temperature ranges from -13°F to +122°F. It can handle air humidity of up to 80%.

A7. TECHNICAL CHARACTERISTICS

POWER UNIT FOR WHEELCHAIR LIFT	HPU-WC-12VDC
Action:	Single Acting
Max Flow:	0.45 GPM
Max Pressure:	3200 PSI
Max RPM:	3500
Pump Displacement:	0.03 CI/REV
Reservoir Capacity:	1.5 qts
Tank Material:	Plastic
Voltage:	12 V
Current:	Direct
Motor power:	0.8 kW
Port Size:	SAE 8
Mounting:	Horizontal
Dimensions(LxWxH):	24x10x10 in
Weight:	17 lbs
Country of Origin	Bulgaria, European Union

A8. NOISE CHARACTERISTICS

The hydraulic Power Unit produces noise levels that stay below 85 dB, as outlined by EN 60034-9 standards.

A9. WORKING FLUID

The oil tank must be filled with new, filtered mineral-based ISO 6743/4 fluid. You should use hydraulic oils with a mineral or synthetic base and a thickness of 15 to 68 cST at a temperature of 104°F. Remember, the type of hydraulic fluid may vary based on the climate you're working in. Avoid using motor oil, diesel oil, or water in the system. The filtration class should be -9 NAS 1638.

It's a good idea to change the hydraulic fluid every 6 months to 1 year, depending on how much you use it. (After the first 100 hours of operation, approximately every 3000 hours is recommended.) Make sure to also clean the suction filter. If you notice the fluid level dropping, add more oil.

SAFETY

B1. RULES FOR TECHNICAL SAFETY

Only personnel familiar with the rules for operating electrical and pressurized equipment should handle the Power Unit. To ensure safe operation of the hydraulic Power Unit, follow these guidelines:

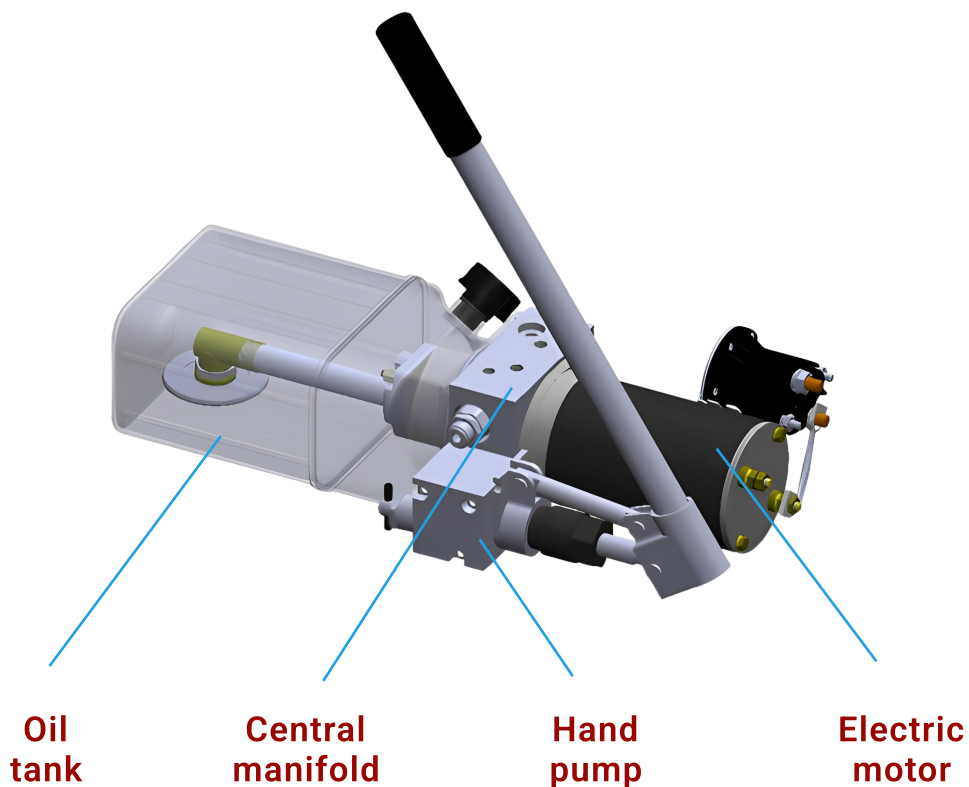
- ▶ Never activate the Power Unit with a different motor terminal cap or connectors that don't match the unit's type.
- ▶ Electrical connections should be made by a qualified electrician. Make sure the motor's rotation direction (viewed from the shaft) is counterclockwise.
- ▶ Be careful when connecting hydraulics. One outlet port on the manifold should link to the actuator in your system.
- ▶ Pick pipelines that match the system's pressure and flow rate. Ensure tight connections without any fluid leaks, and use proper sealing elements.
- ▶ Do not replace the air breather with a plug.
- ▶ Do not readjust the pressure relief valve to a higher pressure.
- ▶ Secure the Power Unit to a stable base or frame.
- ▶ Never use the Power Unit in explosive or combustible environments.
- ▶ Always maintain sufficient oil levels to prevent hydraulic pump damage.
- ▶ Use insulated cables for connections.
- ▶ Avoid assembling the Power Unit in wet environments.
- ▶ Prevent contact between the positive (+) and negative (-) poles of the DC motor.
- ▶ Insulate the cable ends of the DC motor.

- ▶ Do not operate the DC motor without an assembled starter.
- ▶ Avoid using blind plugs on breathers with red coloring on oil tanks.
- ▶ Use appropriately sized hose diameters; avoid using hoses that are too small.

DESCRIPTION OF THE WHEELCHAIR LIFT POWER UNIT

C1. MAIN COMPONENTS

THE POWER UNIT CONSISTS OF THE FOLLOWING MAIN
ELEMENTS:



Main components of wheelchair lift unit Power Unit

- ▶ Electric motor
- ▶ Central manifold
- ▶ Hydraulic gear pump
- ▶ Pressure relief valve
- ▶ Normally closed 2/2 cartridge valve
- ▶ Oil tank
- ▶ Filter
- ▶ Hand pump and unloading valve
- ▶ Pressure compensated flow control valve

When the electric motor is turned on, it sets the gear pump in motion. This pump draws the operational fluid from the tank and channels it to the central manifold, which then sends it to the system's actuators. Make sure the outlet port is linked to the actuator. When the electric motor is off and the normally closed 2/2 valve coil is activated, the oil will flow back into the reservoir.

C2. ELECTRICAL COMPONENTS

The hydraulic Power Unit includes:

- ▶ An electric motor
- ▶ A 2/2 cartridge solenoid valve

The electric motor options are 0.5 kW or 0.8 kW, with a voltage of 12–24 V DC. The solenoid components are cartridge-style and can function at 12, 24, or 220 V. The connectors follow DIN 43650 standards.

When the electric motor is powered on, it drives the gear pump. This pump pulls the operational fluid from the tank and directs it through the central manifold to the system's actuators. Make sure to connect the outlet port to the actuator. When the electric motor is turned off and the normally closed 2/2 valve coil is energized, the oil will flow back into the reservoir.

POWER UNIT ASSEMBLY

D1. REQUIREMENT OF THE WORKING AREA

Secure the power unit using M10 holes. Keep the area around the power unit clear, allowing easy access to the oil filler, valves, and unloading throttle. Avoid installing the power units in confined spaces that could hinder cooling. Make sure the power unit doesn't come into contact with vibrating parts or surfaces that might amplify noise.

The Power Unit's function depends on the machine it's connected to. While the power unit is in operation, there shouldn't be any leaks of the operational fluid on the external surfaces. The Power Unit turns on when the motor gets the required power. The control happens by correctly coordinating the motor and solenoid valves' activation.

D2. TRANSPORTATION OF THE HYDRAULIC POWER UNIT

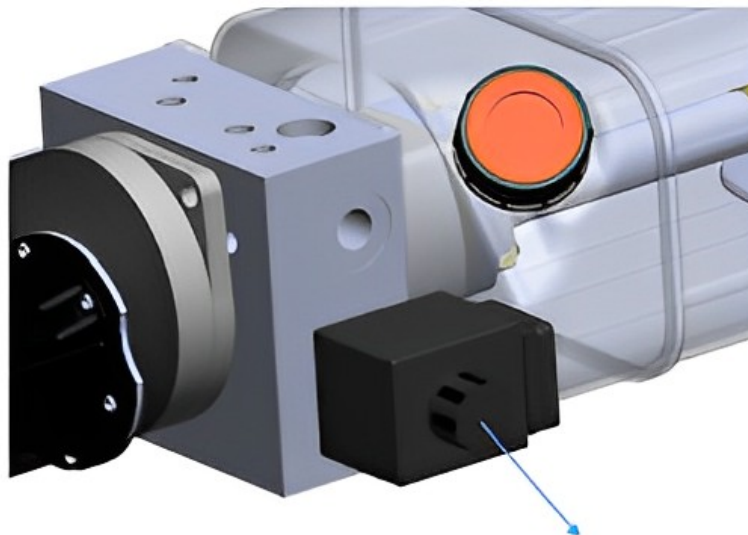
You can use any enclosed vehicle for transporting the power unit. Follow the instructions on the packaging during transport. If there's oil inside the tank while moving, either replace the air breather with a plug or empty the oil before transporting.

D3. POWER UNIT PROTECTION

Remove the hydraulic power unit from the box. Take off the polyethylene wrapping. Swap the safety plugs with the ones on the supply ports.

D4. CONNECTING PORTS

There's a port (P) on the central manifold that you'll connect to the actuator. The thread size for the port is 9/16 - 18UNF (SAE 6) as a standard. Just remember not to tighten the fitting too much; use a maximum torque of 50 Nm.



2/2 normally closed cartridge valve

Connection port (pressure port) on central manifold

D5. TRANSPORTATION OF THE HYDRAULIC POWER UNIT

Connect the pipelines from the Power Unit to the system's actuators. You'll find the hydraulic layout and technical details in the technical drawing.

Once the Power Unit is securely installed, add clean operational fluid to the tank, filling it to the marked level. Make sure to clean all related hydraulic parts before assembling. Also, remember to inspect the oil level in the tank after the first use.

D6. CONNECTION TO ELECTRICAL SYSTEM

Magister Hydraulics power units come with a starter relay that's already on the DC motor. Connect the cables from the battery to the spots on the DC motor where the wires attach. A certified electrician should be the one to connect the power unit to the electrical system, because it's important to follow safety guidelines when working with electrical stuff. If you use too little power, it might hurt the motor. Remember, it's not a good idea to let the DC motor run for a really long time without stopping.



For switch/remote

(+) from battery

(-) from battery

Connection on DC motor

MAINTENANCE OF THE HYDRAULIC POWER UNIT

E1. CLEANING OF THE POWER UNIT

To clean the power unit, use a cloth without any cleaning stuff or liquids. The cloth should not leave any fibers on the surfaces. Once a year, you should change the oil and clean the tank. Here's how you do the oil change:

- ▶ Release the pressure in the system.
- ▶ Turn off the power unit from the electricity.
- ▶ Take apart the pipelines. Unscrew the screws holding the power unit to the base.
- ▶ Stand the power unit upright on the tank and unscrew the securing screws.
- ▶ Take the electric motor, central manifold, and pump outside. Pour out the old oil and clean the inside of the tank. Clean the suction filter too.

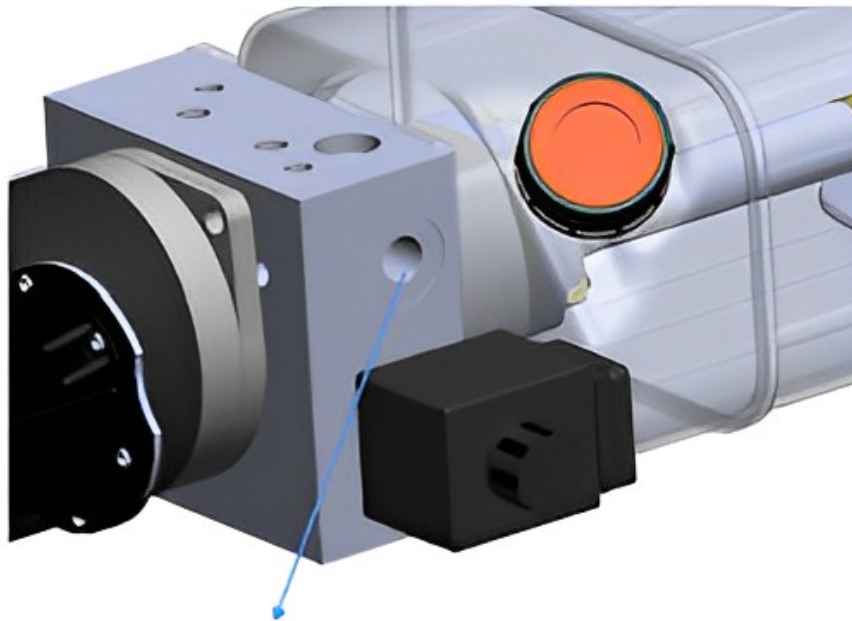
After cleaning, put the electric motor and central manifold back on the tank. Screw in the securing screws and the bracket. Put the assembled power unit back in its working spot. Fill the tank with operational fluid up to the marked level. Close the air breather tightly. Connect the pipelines and hook up the power unit to the electrical system based on how it's used.

Dirty oil can really shorten the power unit's lifespan.

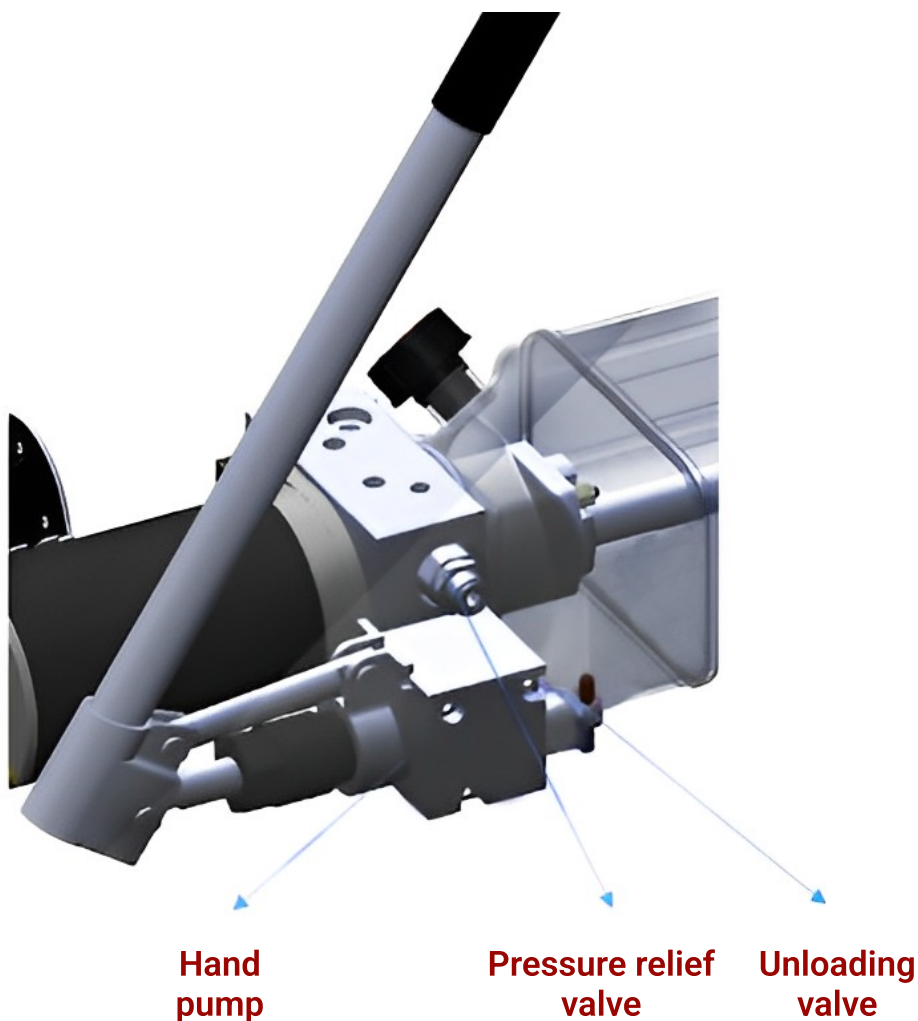
E2. PRESSURE ADJUSTMENT

You adjust the pressure in the hydraulic power unit using a pressure relief valve built into the main manifold. Here's how you do it:

- ▶ Put a pressure gauge on port "P."
- ▶ Loosen the nut on the adjusting screw and turn the screw counterclockwise until it's all the way out.
- ▶ Turn on the hydraulic power and turn the adjusting screw (clockwise to raise pressure, counterclockwise to lower pressure) until you reach the pressure you want. Then lock the nut.



Outlet port(9)



Hand pump, pressure relief valve and unloading valve

The power units are usually set up right at the factory to work well for most situations. But if you need to change the settings on the manifold, be careful. First, loosen the lock nut on the pressure relief valve. Then, turn the adjusting screw clockwise to make the pressure setting higher or counterclockwise to make it lower.

E3. PROBLEM SOLVING

PROBLEM	REASONS	METHOD OF ELIMINATION
Motor isn't working	<ul style="list-style-type: none"> ▶ Wiring might be wrong ▶ There could be an issue with the starter relay 	<ul style="list-style-type: none"> ▶ Check and fix the wiring ▶ Check the starter relay
Starter relay clicks but motor doesn't turn	<ul style="list-style-type: none"> ▶ Wire might be loose from relay to motor ▶ The cable size from battery to motor could be wrong ▶ Starter relay housing could be cracked 	<ul style="list-style-type: none"> ▶ Check the wiring ▶ Change to the right cable size ▶ Replace the starter relay
Cylinder can't hold	<ul style="list-style-type: none"> ▶ The check valve might have a problem 	<ul style="list-style-type: none"> ▶ Disassemble the check valve, clean with brake cleaner and air gun, then put it back together

PROBLEM	REASONS	METHOD OF ELIMINATION
Cylinder won't retract	<ul style="list-style-type: none"> ▶ The 2/2 cartridge coil might not be energized ▶ The cartridge valve might be damaged 	<ul style="list-style-type: none"> ▶ Check and fix the wiring ▶ Replace the cartridge valve
Not enough pressure	<ul style="list-style-type: none"> ▶ The tank might not have enough oil ▶ The pressure relief valve might be damaged ▶ The hydraulic pump might be damaged ▶ Air might be in the system 	<ul style="list-style-type: none"> ▶ Fill up the oil ▶ Readjust the relief valve ▶ Replace the damaged pump ▶ Remove the air
Overheating	<ul style="list-style-type: none"> ▶ There could be an issue with the electrical grounding ▶ The battery might be defective 	<ul style="list-style-type: none"> ▶ The DC motor might have a problem ▶ Check the electrical connection

PROBLEM	REASONS	METHOD OF ELIMINATION
Overheating	<ul style="list-style-type: none">▶ The pressure relief valve setting could be wrong▶ Something might be stuck on the relief valve▶ The DC motor might have a problem	<ul style="list-style-type: none">▶ Check the battery performance▶ Clean the relief valve with brake cleaner and air gun to remove anything stuck, then put it back together▶ Replace the DC motor

All power units are tested 100% before delivery to the customer.

WARRANTY

F. WARRANTY

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.