

# Brief operating manual for hydraulic power pack type MPN



acc. to pamphlet D 7207

**Attention:** The compact hydraulic power pack has to be installed and connected by a qualified technician, who is familiar with and works according to the generally accepted engineering standards and the latest legal regulations and standards.

The data apply to radial piston and gear pumps

Electr. connection	Versions with plug Co. HARTING via cable 1,5 mm <sup>2</sup> Versions with integrated terminal box a cable gland M 20x1,5 is to be customer furnished
Protection class	IP 54 conf. DIN EN 60529 / IEC 60529, apply to the complete hydraulic power pack (as a reference protection class to pure electrical machinery)
Safety class	DIN VDE 0100 Safety class 1
Insulation	Design conf. DIN VDE 0110 <ul style="list-style-type: none"> <li>• for mains with 4 or 3 conductors L1~L2-L3~PE (3~phase mains) with grounded neutral point up to 500 V AC nom. phase voltage conductor - conductor</li> <li>• for mains with 4 or 3 conductors L1~L2-L3 (3~phase mains) without grounded neutral point up to 300 V AC nom. phase voltage conductor - conductor</li> <li>• for 1~phase mains with 2 conductors L-N up to 300 V AC nom. voltage.</li> </ul>

## 1. Motor versions

Type	Nom. voltage and circuitry U <sub>N</sub> (V)	Mains frequency f (Hz)	Nominal power P <sub>N</sub> (kW)	Speed n <sub>N</sub> (rpm)	Nom. current I <sub>N</sub> (A)	Start current ratio I <sub>A</sub> / I <sub>N</sub>	Power factor cos φ	Insulation material class
<b>MPN 42</b>	400/230 YΔ	50	2.1	2785	4.9/8.4	4.8	0.87	B
	460/265 YΔ	60	2.5	3380	4.8/8.3	5.4	0.88	
<b>MPN 44</b>	400/230 YΔ	50	2.1	1360	4.9/8.5	4.1	0.86	B
	460/265 YΔ	60	2.4	1632	4.6/8.0	4.6	0.86	
<b>MPN 46</b>	400/230 YΔ	50	3.0	2815	6.4/11.0	5.7	0.88	B
	460/265 YΔ	60	3.6	3410	6.3/11.3	6.2	0.89	
<b>MPN 48</b>	400/230 YΔ	50	3.0	1370	6.7/11.5	4.2	0.84	B
	460/265 YΔ	60	3.6	1665	6.6/11.3	4.7	0.85	
<b>MPN 404</b>	400/230 YΔ	50	4.2	1370	9.2/16.0	5.0	0.88	B
	460/265 YΔ	60	5.0	1660	6.6/11.3	5.6	0.89	
<b>MPNW 42</b> <sup>1)</sup>	230 ⊥	50	1.5	2800	10.5	3.3	0.94	B
<b>MPNW 44</b> <sup>1)</sup>	230 ⊥	50	1.5	1375	10.1	3.3	0.94	B

<sup>1)</sup> The capacity of the operating capacitor (C<sub>B</sub>) should be reduced by approx. 30%, when less than 75% of the hydraulic work (p<sub>max</sub> · V<sub>G</sub>) is employed.

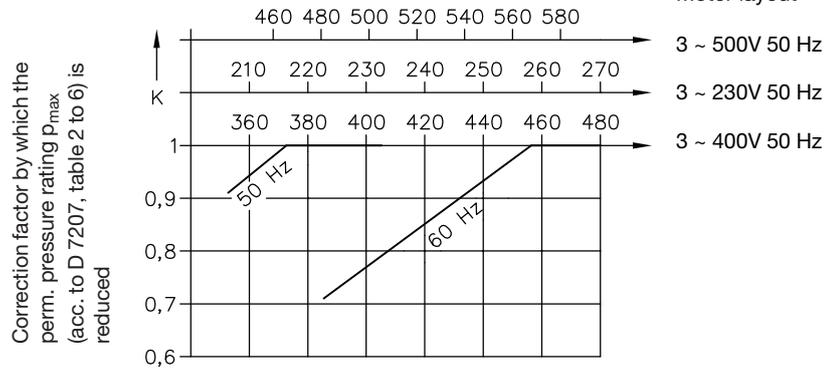
An operating capacitor is mandatory for the operation of type MPNW - not scope of delivery.

C <sub>B</sub>	1 ~ 230V 50 Hz	1 ~ 110V 60 Hz
MPNW 42 <sup>1)</sup>	40 μF	180 μF
MPNW 44 <sup>1)</sup>	60 μF	250 μF

Voltage ranges Operation with reduced supply voltage is possible, but see "Performance restrictions" on page 2!	Nom. voltage		Perm. mains voltage tolerances 50 Hz
	Standard		
	3 ~ 400V 50 Hz		± 10%
	3 ~ 230V 50 Hz		
	1 ~ 230V 50 Hz		
	1 ~ 110V 60 Hz		
	3 ~ 460V 60 Hz		± 5%

**Performance restrictions**

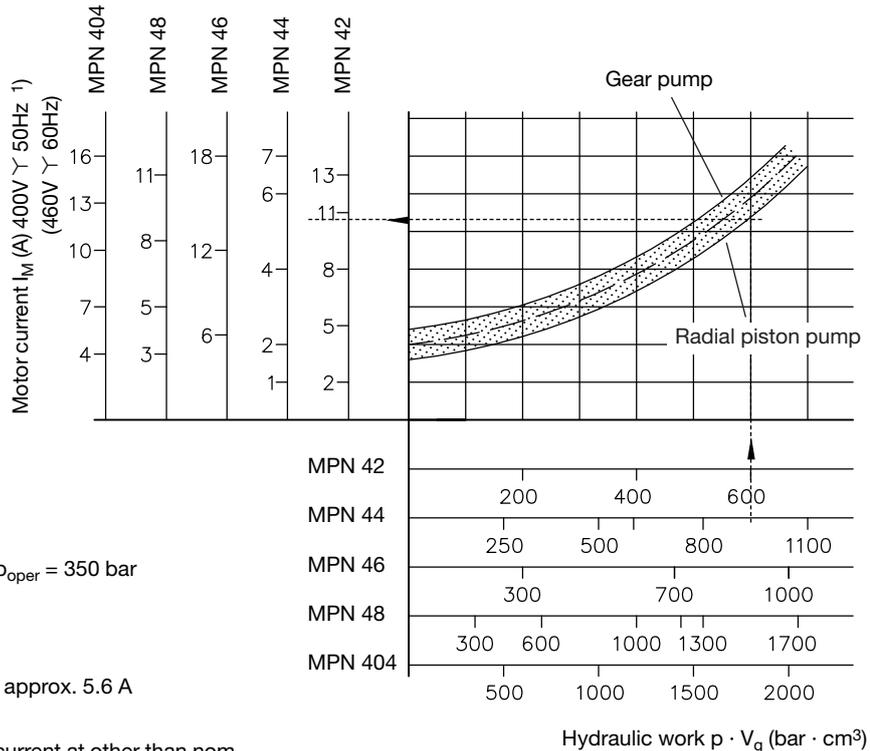
The table shows correction factors for reduced mains supply voltage. Take the correction factor for the lowest voltage anticipated.



**2. Current consumption**

The curves below are one a guideline. They serve to evaluate the current consumption to adjust the motor protective switch (safeguarding overload) and the heat generation to be anticipated.

**Version for 3-phase mains**



Example:

Selected pump MPN 44 - H 3,6

Operating pressure of the system  $p_{oper} = 350$  bar

$V_g = 2.58 \text{ cm}^3/\text{rev.}$

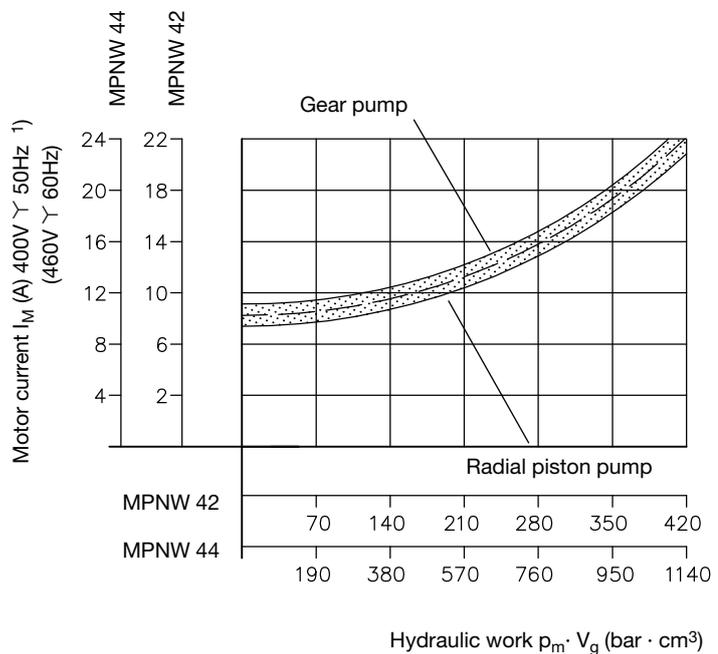
$p \cdot V_g = 903 \text{ bar} \cdot \text{cm}^3$

this results in a motor current  $I_M$  of approx. 5.6 A

1) Guideline values for the motor current at other than nom. voltage can be easily calculated e.g.:

Mains 230V 50Hz:  $I_{230V} \approx I_{400V} \cdot \frac{400V}{230V}$

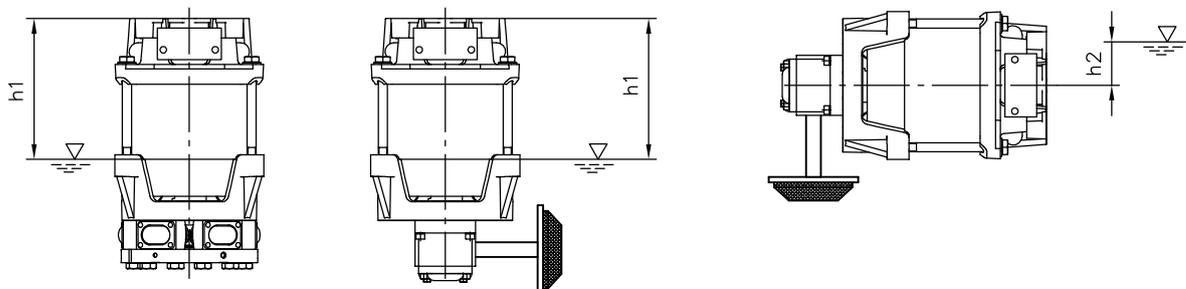
Mains 500V 50Hz:  $I_{500V} \approx I_{400V} \cdot \frac{400V}{500V}$



### 3. Notes for general lay-out and initial operation

#### 3.1 Installation in customer furnished tanks

The dimensions of a customer furnished tank should be selected in such a way that it is ensured that the motor is always immersed even when the max. required fluid volume is removed. This way the performance rating of the power pack can be completely exploited. The perm. performance is reduced if the motor contour is partially or completely above the fluid level. When more than ¼ of the motor is above the fluid level a no-load operation is no longer permissible but on/off service can be still provided. The thermal balance of the motor has to be checked (via resistance measurement acc. to VDE 0530) if the fluid level drops even further. This temperature (resistance) check has to be undertaken several times until no more temperature rise can be detected; always after a load sequence when the pump has performed some operation cycles. The perm. fluid temperature is approx. 80°C, the perm. winding temperature is approx. 130°C (isolation class B).



The installed position of the pump is arbitrary, as long as the winding head is immersed below the fluid level  $h_1$ .

The installed position of the pump is arbitrary, as long as all suction parts are immersed below the fluid level.

$h_2$  = Dependent on size, gear pump and chosen suction part  
(see dimensional drawings in D 7207, sect. 4 and 6)

	MPN 42 MPNW 42	MPN 44	MPN 46	MPN 48 MPNW 44	MPN 404
$h_1$ (mm)	105	113	124	132	163
$h_2$ (mm)	127	127	127	152	152

#### 3.2 Direction of rotation

It is not necessary to observe the direction of rotation with type MPN...-H..., (flow direction will not change) whereas a certain direction of rotation is absolutely required for types MPN...-H...-Z and MPN...-Z. The rotation direction can't be detected in installed state (hydraulic power packs), but via checking the delivery flow. Procedure (gear pumps only): Direct the flow from port P (double pumps feature two ports P!) via a translucent hose back into the tank; Switch on/off the pump several times. When a flow is visible the direction is o.k. otherwise it has to be reversed by interchanging the connection of two of the three main wires of the motor (reversing the rotation direction). Try again! The pumps type MPN...-H...-Z and MPN...-Z rotate anti-clockwise (facing the drive shaft) in delivery state.

#### 3.3 Filling up with hydraulic oil

The pressure fluid to top-up the power pack should have passed a system filter or be fed via a screen filter unit  $\leq 0,4$  mesh width). Only hydraulic fluids listed in pamphlet D 5488/1 are approved for use.

Pressure fluid    Hydraulic oil conf. DIN 51 524 part 1 to 3, ISO VG 10 to 68 conf. DIN 51 519

Viscosity range min. approx. 4; max. approx. 1500 mm<sup>2</sup>/s

Opt. service: approx. 10 ... 500 mm<sup>2</sup>/s

Also suitable are biologically degradable pressure fluids type HEES (synth. Ester) at service temperature up to approx. +70 °C. Electrically hazardous: Any fluid types containing water (HEPG, HETG etc.) must not be used (short-cut)!

#### 3.4 Initial operation and bleeding

The three pump cylinders will be bled automatically if the pump runs or is switched on and off several times and the connected directional valves are switched into a switching position where idle circulation is provided, if possible with your circuitry.

Another way is to install a pipe fitting with a short piece of pipe and prolonged by a translucent tube. The other end of the tube should be put into the filler neck, held firmly and sealed with a non-fluffing cloth. Now switch on the pump and let it run until no more bubbles are visible. Next after the pump cylinders are bled any air dragged into the system should be removed by opening the bleeder screws at the consumers (if provided) until no more bubble are detected or by operating all functions of the circuitry without load until all cylinders, motors, etc. move steadily and without any hesitation.

### 3.5 Adjustment of the protective motor switch

The protective motor switch has to be adjusted in such a manner, that too early triggering is avoided during undisturbed operation and operation cycles permanently succeeding one another. Whereas it should safeguard the motor against over heating in case of stand-still due to a pressure limiting valve being adjusted to high, malfunction of a pressure switch which should trigger a stop signal etc. This means the protective switch should be set that it responds even before the perm. winding temperature is reached. Guideline for proper setting of the protective switch:  $I_E$  should be  $0.7 I_M$  in general,  $0.65 I_M$  for operation in the range of  $p_{max}$  and  $0.8 I_M$  for low loads.

### 3.6 Additional functions

#### Temperature switch

Technical data:

Bimetallic switch Co. MICROTHERM

T10V 80°C ±5K U112 P102 L510-NC-contact

AC: 250 V 50/60 Hz 3.5 A; DC: 42 V 1 A



Signaling takes place at

80°C ± 5K (Kelvin)

Max. voltage

250V 50/60 Hz

Nom. current (cos φ ~ 0.6)

1.6 A

Max. current at 24V DC

1.5 A

Connection – in the terminal box / plug Co. HARTING

**Note:** The temperature switch is integrated in the winding at 1~phase motors i.e. winding protective switch

#### Float switch

Technical data:

Switching performance DC/AC

60 W/ 60 VA

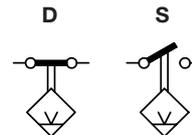
max. current DC/AC

0.8 A (cos φ =1)

max. voltage

230 V 50/60 Hz

A protective circuitry is mandatory at inductive loads



Connection via separate plug (DIN 43650-C, 8 mm)

For electr. connection, see sect. 4

### 3.7 Servicing

The hydraulic power packs type MP and the valves being directly mounted onto the hydraulic power pack are almost maintenance free. Only the fluid level should be checked regularly depending on operation conditions. The fluid should be exchanged every year as a general rule, but more frequently if tests show aging or contamination.

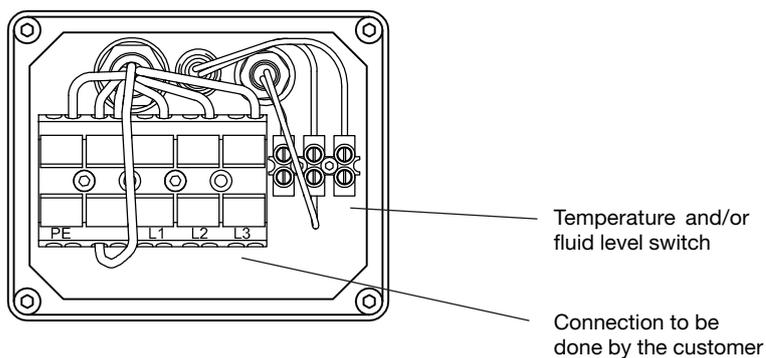
### 3.8 Spare parts

Repairs (replacing service items) are possible by competent craftsmen. The motor can't be repaired or replaced by the customer. Therefore if the motor is defect, the complete pump should be returned to our facilities for an overhaul. There are spare parts lists available, pls. state your pump type acc. to the type plate either on the pump or on the cover plate.

## 4. Electrical connection

### Electric

Terminal box



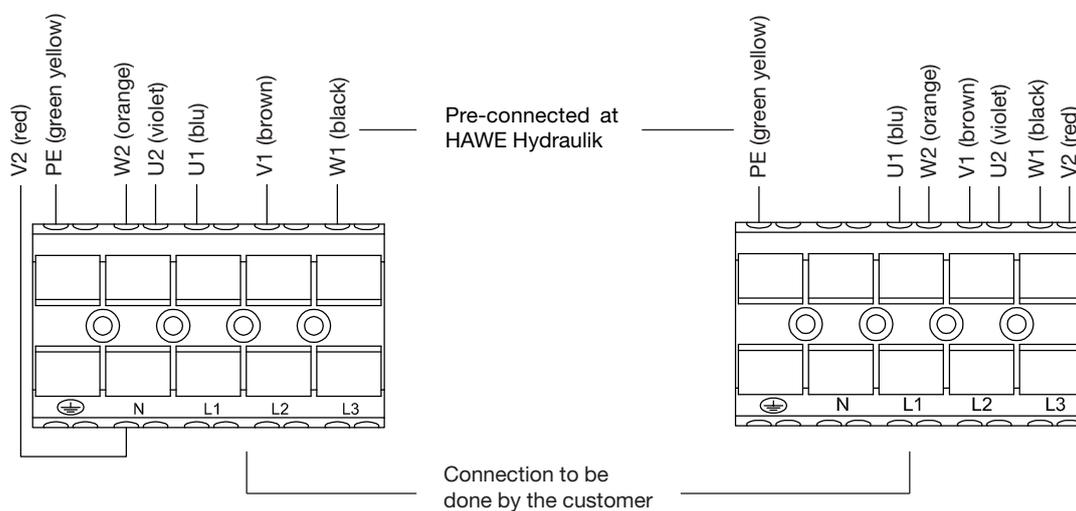
Version for 3~phase mains

3~phase motor

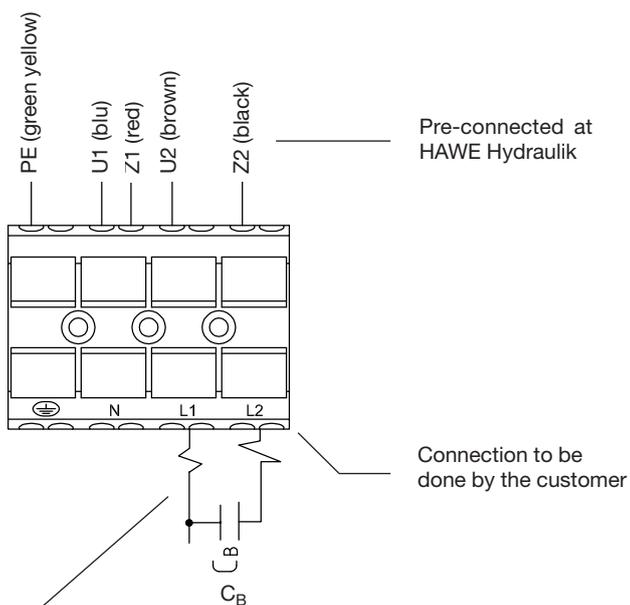
The power supply has to be connected by the customer via leads L1, L2 and L3, and protective conductor PE. The genuine circuitry has to be altered when converting from  $\Upsilon$  to  $\Delta$  -circuitry.

$\Upsilon$ -3~phase motor

$\Delta$ -3~phase motor



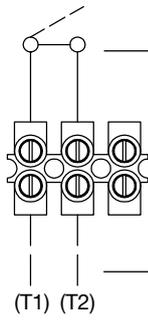
Version for 1~phase mains



An operating capacitor is mandatory for the operation of type MPNW  
- not scope of delivery.

Temperature or fluid level switch

**D(S) or T**

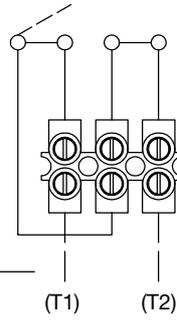


Pre-connected at HAWE Hydraulik

Connection to be done by the customer

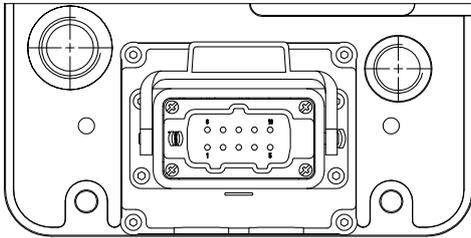
Temperature or fluid level switch

**D(S)T**



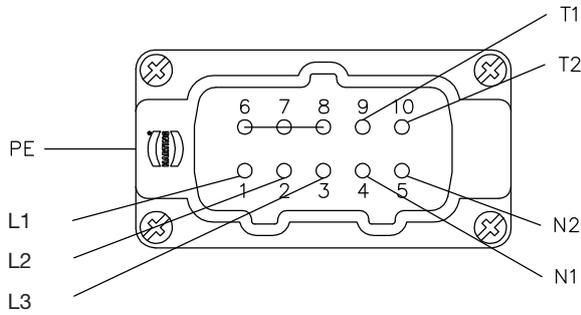
**Plug Co. HARTING**

Terminal box

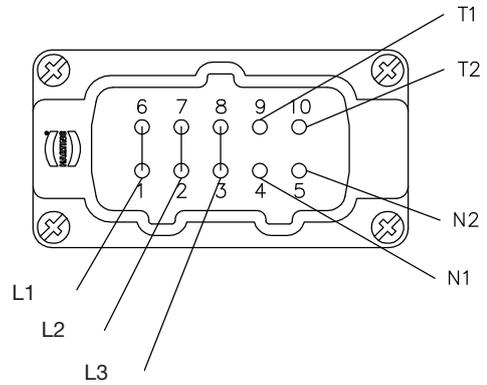


Y-3-phase motor

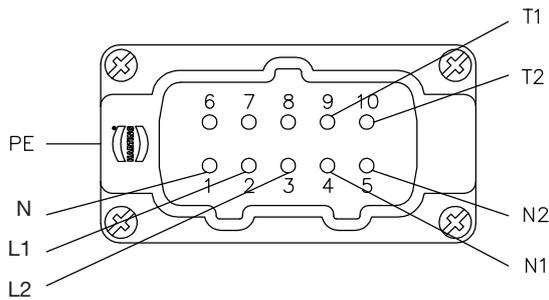
Y-3-phase motor



Δ-3-phase motor



Version for 1-phase mains



München, 01.11.2011

**Declaration of Incorporation within the meaning of the  
Machinery Directive 2006/42/ EC,  
appendix II, No.1 B****Compact hydraulic power pack type MPN and MPNW  
acc. to our pamphlet D 7207  
(latest release)**

is an incomplete machine (acc. to article 2g), which is exclusively intended for installation or assembly of another machinery or equipment.

The specific technical documents, necessary acc. to appendix VII B, were prepared and are transmitted in electronic form to the responsible national authority on request.

Risk assesment and analysis are implemented according to appendix I of the Machinery Directive.

The dept. MARKETING is authorized to compile the specific technical documents necessary acc. to appendix VII B

HAWE Hydraulik SE  
Dept. MARKETING  
Streitfeldstraße 25  
D-81673 München

The following basic safety and health protection requests acc. to appendix 1 of below guideline do apply and are complied with:

*DIN EN ISO 4413:2010*

*"Hydraulic fluid power – General rules and safety requirements for systems and their components"*

We assume that the delivered equipment is intended for the installation into a machine.

Putting in operation is forbidden until it has been verified that the machine, where our products shall be installed, is complying with the Machinery Directive 2006/42/ EC.

This Declaration of Incorporation is void, when our product has been modified without our written approval.

HAWE Hydraulik SE



i.A. Dipl.-Ing. A. Nocker (Produktmanagement)