Brief operation manual
for compact hydraulic power packs type MP

acc. to pamphlet D 7200 and D 7200 H

CE

Attention: The power pack has to be connected to the system and main by a craftsman who knows and observers all relevant industrial standards.

1. Electrical data

Coding and size		Version with 3-phase motor								
	New version	MP 14 A	MP 12 A	MP 24 A	MP 22 A	MP 34 A	MP 32 A	MP 44 A	MP 42 A	MP 54 A
	Old version	MP 14	MP 12	MP 24	MP 22	MP 34	MP 32	MP 44	MP 42	MP 54
Nominal power	P_N (kW)	0.25	0.37	0.55	0.75	1.1	1.5	2.2	3	4
Nominal speed	n_N (rpm)	1320	2810	1390	2830	1380	2820	1400	2860	1430
Nominal voltage [1]	New version	MP 14 A to MP 54 A: 3 ~ 230/400V 50 Hz (265/460V 60Hz), 3 ~ 500V 50 Hz [2]								
	Old version	MP 14 to MP 32: 3 ~ 400V 50 Hz, 3 ~ 230V 50 Hz, 3 ~ 500V 50 Hz [2] MP 44, MP 42, MP 54: 3 ~ 400/690V 50 Hz, 3 ~ 500V 50 Hz [2]								
Permissible voltage ranges [1]		Mains 50Hz: ±10% U_N (according to IEC 38) Mains 60Hz: ±5% U_N								
Nominal current [3] I_N (A)	400V	0.89	1.0	1.6	2.0	2.6	3.4	6.1	7.0	10.5
	230V	1.55	1.73	2.8	3.5	4.5	5.9	10.1	12.1	---
	500V [2]	0.65	0.80	1.22	1.48	2.2	2.66	4.26	5.1	8.35
Start current ratio	I_A/I_N	2.8	5.7	4.0	5.0	3.7	5.9	4.5	6.3	6.5
Power factor	cos φ	0.70	0.80	0.78	0.82	0.82	0.85	0.71	0.77	0.83

Coding and size		Version with AC-motor 1 ~ 230V 50 Hz [1]						
		MPW 14	MPW 24	MPW 34	MPW 44	MPW 12	MPW 22	MPW 32
Nominal power	P_N (kW)	0.18	0.37	0.75	1.5	0.25	0.55	1.1
Nominal speed	n_N (rpm)	1390	1380	1350	1370	2700	2720	2750
Nominal voltage [3]	I_N (A)	1.85	3.0	7.0	9.9	2.2	4.1	7.6
Operation capacitor	C_B (µF)	8	16	40	60	12	16	30
Start current ratio	I_A/I_N	2.6	2.5	2.5	3.3	2.5	2.8	3.4
Power factor	cos φ	0.86	0.95	0.99	0.97	0.95	0.96	0.96

Connection leads 2 m 1.5 mm²	7-leads (optional cable length 7m)
Isolation class	B (winding)
Comparison protection class	IEC 70 (Co) 13, pump complete with motor IP 00

Attention: Do not connect radial piston pumps with 2-pole motors (MP 12 A - H.., MP 22 A - H..) to mains 60Hz. The high speed (approx. 3400 rpm) can cause strong running noise and lead to irregular delivery flow with small piston diameters.

Electrical connection	see sect. 4

Production class 1: It is recommanded to use a RCCB (residual current circuit breaker)

Mains voltage range / pow performance restrictions

The motors can be used also below these range limits, but with the drawback of reduced performance (Reduction of the max. pressure).

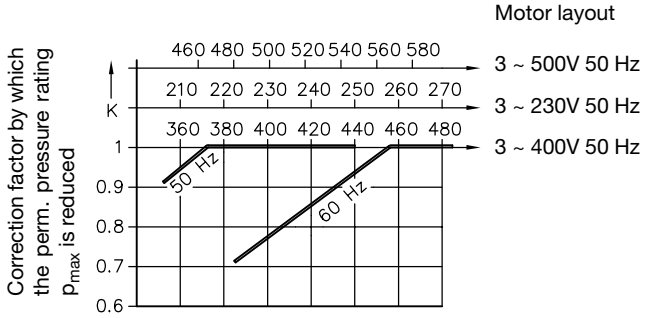
Example: Motor nom. voltage 230/400V 50Hz (265/460V 60Hz)

Actual mains voltage 400V 60Hz

Selected pump type MP 24 A - H 0,81 ($p_{k(W)}$ = 570 bar)

$$p_{max} \approx \frac{U_{tats}}{1{,}1\,U_N} \cdot p_{k(w)}$$

$$p_{max} \approx \frac{400\,V}{1{,}1 \cdot 460\,V} \cdot 570\,bar \qquad p_{max} \approx 450\,bar$$



[1] Motors for other mains voltages or nom. frequency 60 Hz on inquiry

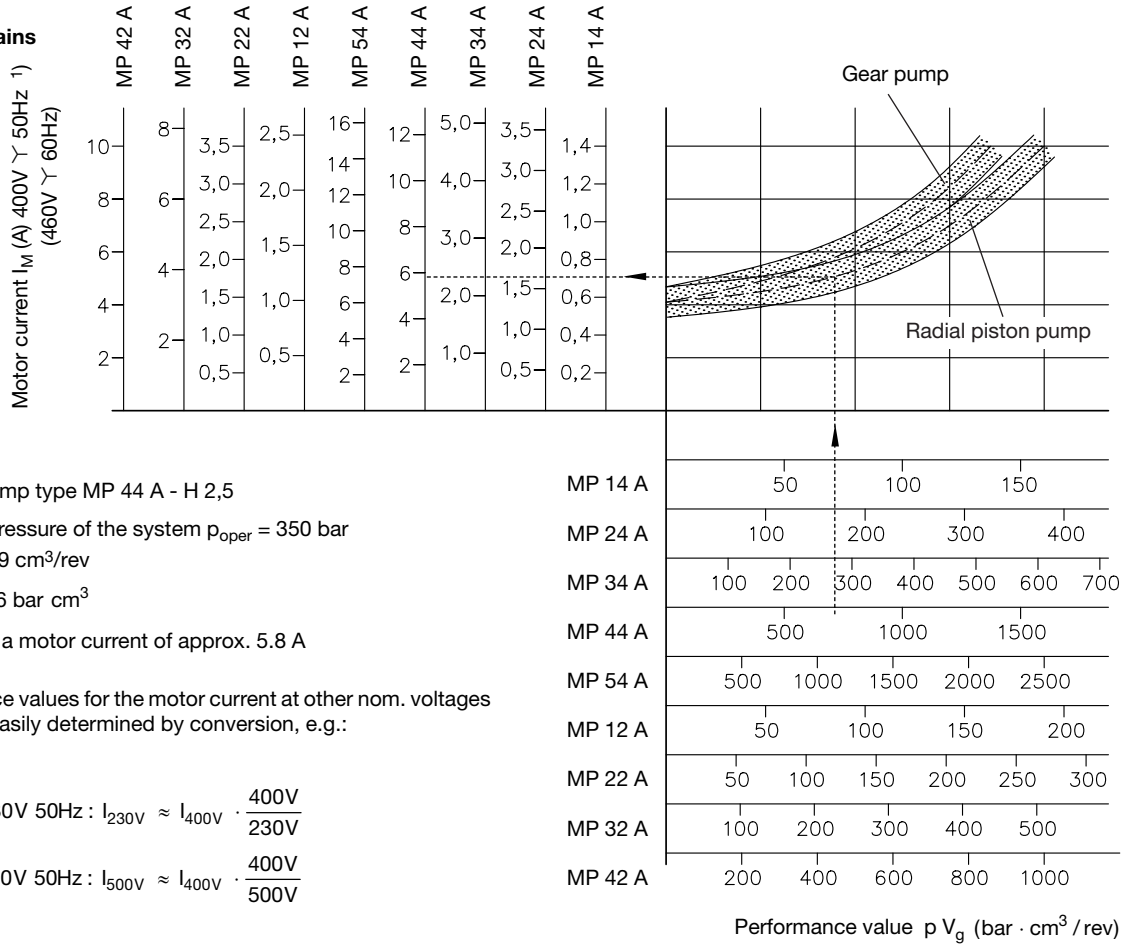
[2] The greatest, constantly permissible load is 500 V + 15% acc. to the cable manufacturer. MP1., MP2., MP3., (4-leads), MP4.; MP5. △-connection (7-leads)

[3] For actual current consumption, see section 2

2. Current consumption

The following characteristics are reference values. They help to find out the expected heat built-up (see D 7200, sect. 5.5) and the proper setting of the protective motor switch (overload safeguard).

Version for 3-phase mains



Example:

Selected pump type MP 44 A - H 2,5

Operation pressure of the system p_{oper} = 350 bar

V_g = 1.79 cm³/rev

$p \cdot V_g$ = 626 bar cm³

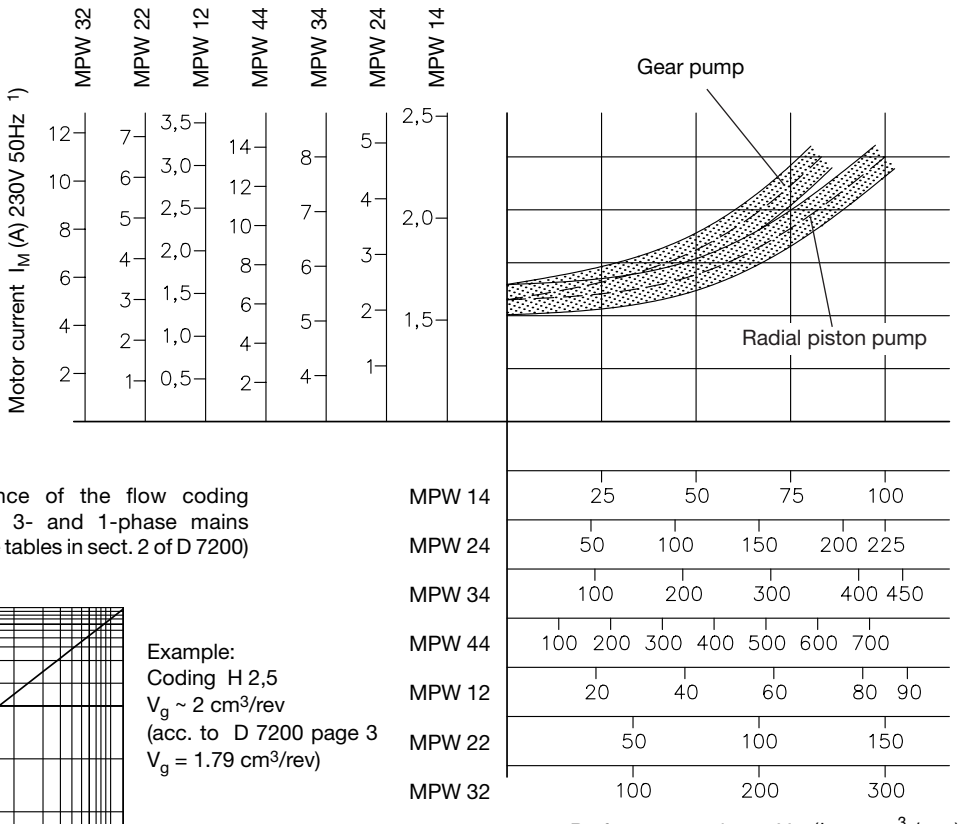
Resulting in a motor current of approx. 5.8 A

1) Reference values for the motor current at other nom. voltages can be easily determined by conversion, e.g.:

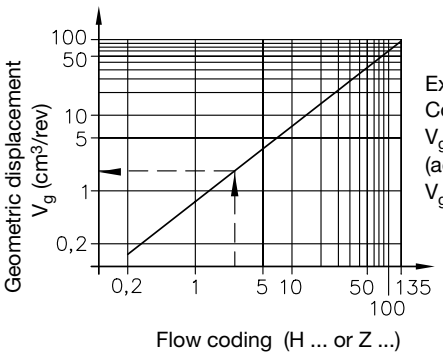
$$\text{Mains 230V 50Hz}: I_{230V} \approx I_{400V} \cdot \frac{400V}{230V}$$

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

Version for 1-phase mains



Displacement in dependence of the flow coding (reference value), valid for 3- and 1-phase mains supply. For detailed data, see tables in sect. 2 of D 7200)



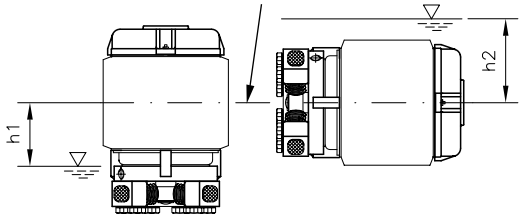
Example:
Coding H 2,5
V_g ~ 2 cm³/rev
(acc. to D 7200 page 3
V_g = 1.79 cm³/rev)

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 oil 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 1/4 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 permissible fluid temperature is approx. 80°C, the permissible winding temperature is approx. 130°C (isolation class B). See also D 7200 sect. 5.5.

Center line, see dimensional drawing

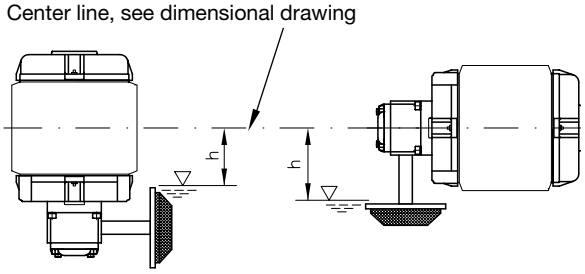


Type	h_1	h_2
MP 1..	65	80
MP 2..	70	90
MP 3..	80	100
MP 4..	95	105
MP 5..	110	110

Type MP...-H...

The installed position of the pump is arbitrary, as long as the pump is immersed below the fluid level by h_1, h_2.

Center line, see dimensional drawing



Type MP...-Z...

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

h = Dependent on size, gear pump and chosen suction part (see dimensional drawings in D 7200, sect. 6)

3.2 Direction of rotation

It is not necessary to observe the direction of rotation with type MP..-H..., whereas a certain direction of rotation is absolutely required for types MP...-H...-Z, MP...-Z, and MP...-Z...-Z. The rotation direction can't be detected in installed state (hydraulic power packs), but via checking the delivery flow. Procedure: 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. The pumps type MP...-Z... rotate anti-clockwise (facing the drive shaft) in delivery state, with double pumps type MP...-Z...-Z... the upper, secondary pumps is rotating clockwise. See also dimensional drawings in D 7200 where arrows indicate the rotation direction.

3.3 Filling up with hydraulic fluid

Use a funnel with screen filter (max. mesh width 0.4 mm) to fill up the tank. The permissible filling resp. usable volumes of hydraulic power packs from HAWE are listed in D 7200 H, sect. 2.

Only proprietary fluids should be used, pamphlet D 5488/1 lists approved fluids.
Hydraulic oil conforming DIN 51514 part 1 to 2: ISO VG 10 to 68 conform. DIN 51519 or synthetic ester (HEES) conform. VDMA 24568 and 24569.

Viscosity for opt. service: Approx. 10 ... 500 mm^2/s during start min. approx. 4; max. approx. 1500 mm^2/s
Hydraulic oil ISO VG 22, 32 and 46 cover the widest temperature range within the operation viscosity range.

Attention: The hydraulic power packs type MP are not suited for use with fire inhibiting fluids type HFA(B), HFC , HFD. conforming VDMA 24317 and biologically degradable pressure fluids based on polyglycole (HEPG).

Electrically hazardous: Any fluid types containing water must not be used (danger of short-cut).
Any fluids based on seed oil are not suited as the permanent contact with the hot motor winding (fluid immersed motor) would cause rapid aging of them.

3.4 Initial operation and bleeding

The pump cylinders will be bled automatically if the pump runs or is switched on and off several times and the 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 hose. The other end of the hose 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 bubbles 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 Setting 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. 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. Pamphlet D 7200, sect. 5.5 features curves where the motor current I_M can be read for various pressure settings.

3.6 Additional functions

Additional functions

Nom. voltage U_N	250V ~ 50 and 60Hz
Nom. current I_N	1.6A (cos φ = 0.6)
Switch type	NC-contact
Switching temperature	90°C + approx. 10%
Cable connection	2 x 0.75 mm approx. 2 m; external ∅ 6 mm, led through the cover plate via cable gland Pg 7

Float switch

Float switch	Made of PA
Float	Made of NBR
Switching performance	230V DC/AC 0.5A 30VA
Device socket	acc. to DIN 43 650 - C (8 mm) (cable gland Pg 7)

3.7 Servicing

The hydraulic power packs type MP and directly mounted valves are almost maintenance free. Only the fluid level and the insulation resistance of the motor winding 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 (E 7200..), pls. state your pump type acc. to the type plate either on the pump or on the cover plate.

4. Electrical data

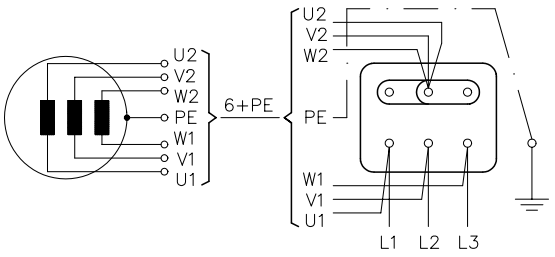
3-phase motor

New version
MP 14 A, MP 12 A
MP 24 A, MP 22 A
MP 34 A, MP 32 A
MP 44 A, MP 42 A
MP 54 A

3 ~ 400V ⅄50 Hz

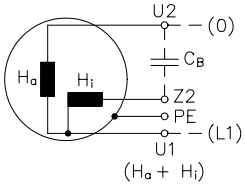
3 ~ 230V △50 Hz (all sizes)
3 ~ 500V △50 Hz (MP44 A, MP42 A, MP54 A)

Circuitry within the terminal box



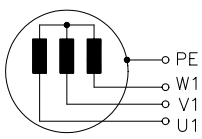
1-phase motor

1 ~ 230V 50 Hz



Old version
MP 14, MP 12
MP 24, MP 22
MP 34, MP 32

3 ~ 400V ⅄50 Hz

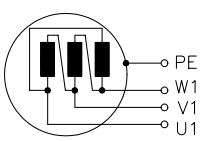


New version
MP 14 A, MP 12 A
MP 24 A, MP 22 A
MP 34 A, MP 32 A

3 ~ 500V ⅄50 Hz

Old version
MP 14, MP 12
MP 24, MP 22
MP 34, MP 32

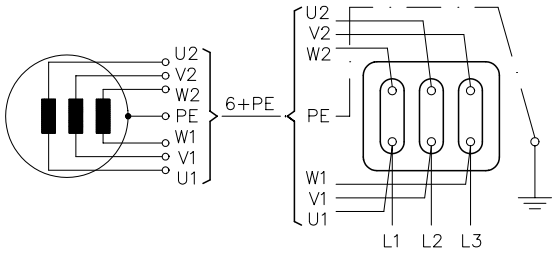
3 ~ 230V △50 Hz



Old version
MP 44, MP 42
MP 54

3 ~ 400V △50 Hz
3 ~ 500V △50 Hz

Circuitry within the terminal box



HAWE Hydraulik SE

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München, 01.08.2012

Declaration of Incorporation within the meaning of the Machinery Directive 2006/42/ EC, appendix II, No.1 B

Compact hydraulic power pack type MP and MPW
acc. to our pamphlet **D 7200 and D 7200 H**
(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

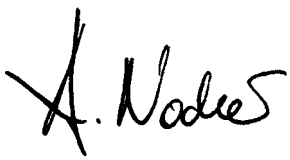
The following basic safety and health protection requests acc. to appendix 1 of below guideline do apply and are complied with:

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)