

# Brief operation manual for compact hydraulic power packs type HK 34 and HK 33

acc. to pamphlet D 7600-3



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

## 1. Electrical connection

Type of pump		HK 34 and HK 348		HK 33 and HK 338	
Motor		For 3-phase mains, 4-poles, stator shrunk into the pump housing			
Nom. voltage	(V)	400/230 YΔ	460/265 YΔ	400/230 YΔ	460/265 YΔ
Mains frequency	(Hz)	50	60	50	60
Rev. rating	(min <sup>-1</sup> )	1410	1720	1340	1610
Output	(kW)	1.1	1.6	0.8	1.3
Current	(A)	2.7 / 4.7	2.4 / 4.2	2.0 / 3.5	1.7 / 2.9
Start current ratio	(I <sub>A</sub> /I <sub>N</sub> )	5.4	5.0	4.2	4.0
Power factor	(cos φ)	0.81	0.8	0.91	0.9
Protection classification		IP54	IP54	IP54	IP54

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

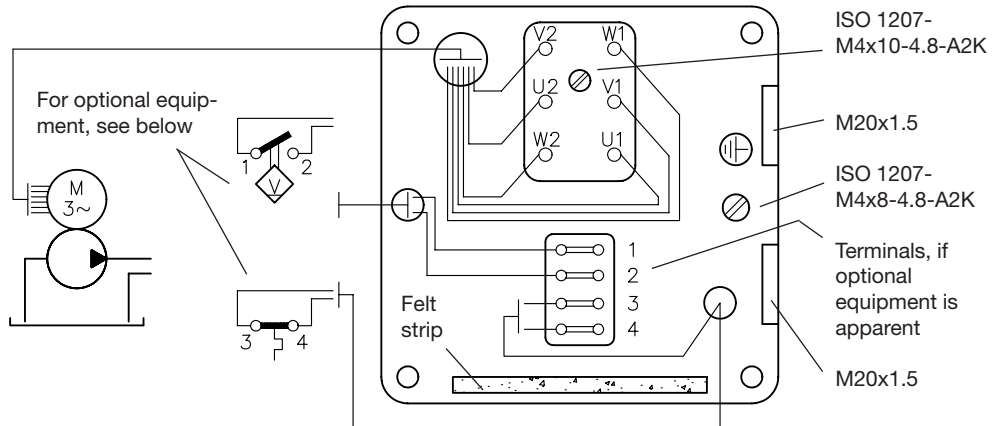
Permissible voltage ranges  
 Mains 50 Hz: ±10% U<sub>N</sub> (conforming IEC 38)  
 Mains 60 Hz: ±5% U<sub>N</sub>

Reduced supply voltage will cause a performance drop (Δ reduced p<sub>max.</sub>).

Guideline:  $p_{\text{oper.max.}} \approx 0,85 p_{\text{max.}} \cdot \frac{U_{\text{actual}}}{U_N}$

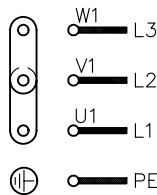
Example:  $U_{\text{actual}} = 400\text{V } 60\text{Hz}$   
 $U_N = 460\text{V } 60\text{Hz}$   
 $p_{\text{oper.max.}} = 0,85 p_{\text{max.}} \cdot \frac{400\text{V}}{460\text{V}} \approx 0,7 p_{\text{max.}}$

Circuitry ex-works  
 Terminal box at the pump housing

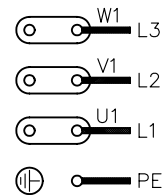


Circuitry customer furnished

Mains 3 ~ 400V  
 Y-connection  
 (state of delivery)



Mains 3 ~ 230V  
 Δ-circuitry

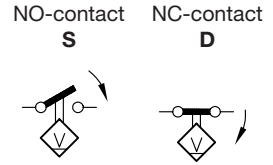


For notes concerning the rotation direction, see sect. 6!

Optional equipment

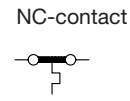
**Float switch:**

Signaling takes place, if approx. 1 l (HK 34(33)..) or 3.6 l (HK 348(338)..) are removed.  
 Switching performance DC/AC ..... 60 W / 60 VA  
 Permissible current DC and AC ..... 0.8 A (cos φ = 1)  
 Max. voltage ..... 230V 50 and 60 Hz  
 Temperature range ..... approx. -10 ... +80°C  
 A protective circuit should be employed with inductive load.



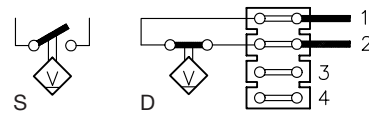
**Temperature switch:**

Signaling takes place at a housing temperature of approx. 80°C.  
 Max. voltage ..... 250V 50 and 60 Hz  
 Nom. current (cos φ ~ 0.6) ..... 1.6 A  
 Max. voltage with 6 ... 24V DC ..... 1.5 A (cos φ = 1)

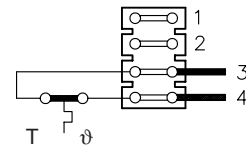


**Electr. connection:**

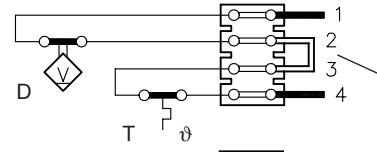
HK 34(33) **S** or HK 34(33) **D**  
 The float switch S or D is always connected to 1-2



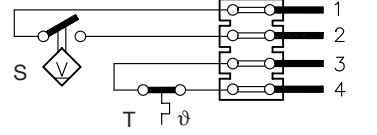
HK 34(33) **T**  
 The temperature switch T is always connected to 3-4



HK 34(33) **DT**  
 Both switches D and T are connected in series via bridge 2-3 ex-works and shall be attached by 1-4. This bridge is to be removed if they should be used individually.



HK 34(33) **ST**  
 Float switch S is connected to 1-2  
 The temperature switch T is connected to 3-4



Attention:  
 The temperature switch may also be retrofitted.  
 The float switch can't be retrofitted (only available ex-works).

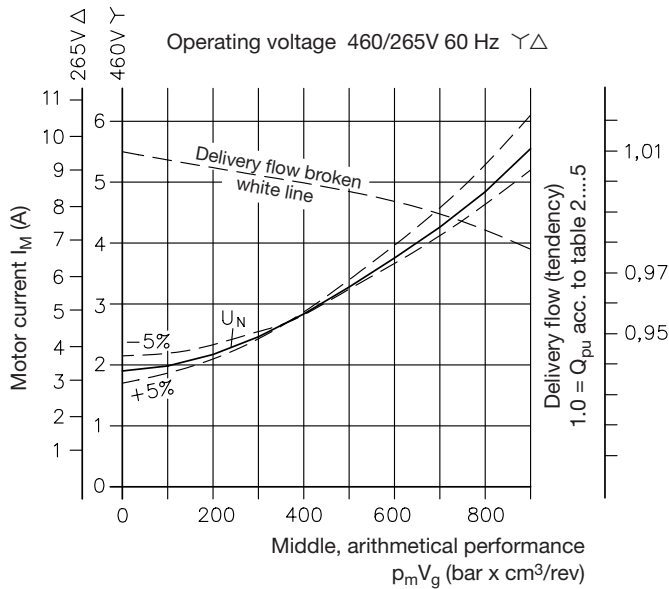
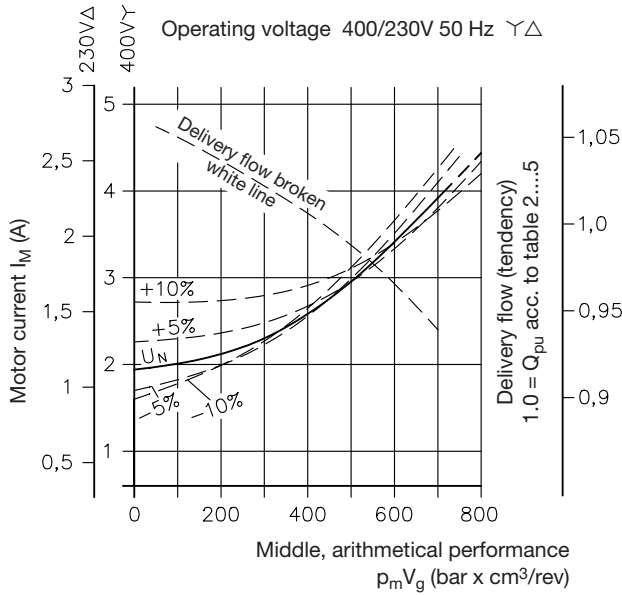
Bridge 1.5<sup>2</sup>

**2. Protective motor switches and temperature monitoring**

Protective motor switch:	Guideline for set current permanent operation S 1	$I_E \sim (0.85 \dots 0.9) I_M$ ( $I_M$ = motor current for set pressure of the pressure limiting valve, see curve in sect. 3 )
	intermittent operation S 6	$I_E \sim (0.85 \dots 0.9) I_N$ ( $I_N$ = nom. current)
Temperature switch (Type HK 3..T/..):	Cut-off temperature approx. 90 to 100°C (intended as overload protection if protective motor switch fails)	

### 3. Motor current (guideline)

#### HK 34 and HK 348



Delivery flow coding	Flow (guideline) $Q_{pu}$ (lpm)		geometric displacement $V_g$ (cm <sup>3</sup> )
	50 Hz	60 Hz	

#### Radial piston pump

<b>H 0,9</b>	0.88	1.06	0.64
<b>H 1,25</b>	1.21	1.45	0.88
<b>H 1,5</b>	1.56	1.87	1.15
<b>H 2,5</b>	2.45	2.94	1.79
<b>H 3,6</b>	3.54	4.25	2.58
<b>H 4,3</b>	4.1	4.9	3.03
<b>H 5,1</b>	4.8	5.76	3.51
<b>H 5,6</b>	5.5	6.6	4.03
<b>H 6,5</b>	6.3	7.56	4.58

#### Gear pump

<b>Z 2,0</b>	1.9	2.28	1.4
<b>Z 2,7</b>	2.6	3.12	1.9
<b>Z 3,5</b>	3.3	3.96	2.4
<b>Z 4,5</b>	4.2	5.04	3.1
<b>Z 5,2</b>	5	6	3.6
<b>Z 6,9</b>	6.6	7.92	4.8

$p_m$  = Middle operating pressure (bar)

$V_g$  = Geometric displacement (cm<sup>3</sup>)  
(according to flow codings)

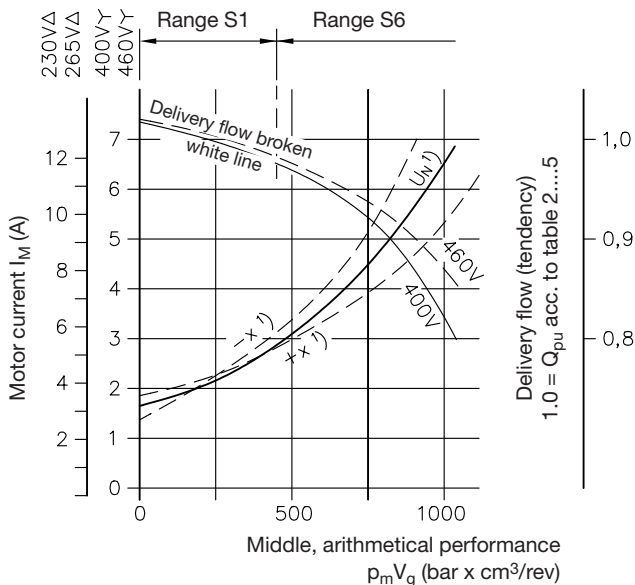
1)  $U_N$  = 400/230V 50Hz  
460/265V 60Hz

x	U, f
-10%	360/210V 50 Hz
-5%	440/250V 60 Hz
+10%	440/250V 50 Hz
+5%	480/280V 60 Hz

Note: When undertaking load test with the completed hydraulic system (power supply by means of a voltage regulating transformer and a frequency changer set), it is important to maintain the supply voltage for the motor constant by readjusting the voltage regulating transformer.

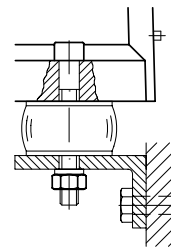
#### HK 33 and HK 338

Operating voltage 400/230V 50 Hz  $\Upsilon \Delta$   
460/265V 60 Hz  $\Upsilon \Delta$



## 4. Mounting

Rigid mounting on a surface capable of resonance (e.g. welded or thin-wall machine stands) may significantly amplify or conduct the operation noise level. It is therefore recommend to mount the compact hydraulic power pack via silentblocs e.g. Ø40x30, 65 Shore but any other devices with similar damping abilities are suited as well.



## 5. Filling up with hydraulic fluid

Filling volume: HK 34 (33) = approx. 4.65 l  
 HK 34 (33)8 = approx. 6.1 l

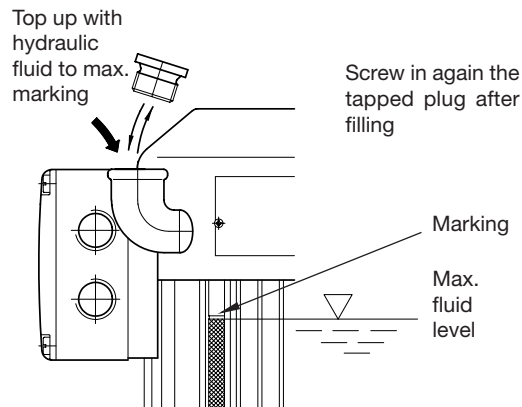
Only proprietary fluids should be used, pamphlet D 5488 lists approved fluids.

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<sup>2</sup>/s during start min. approx. 4; max. approx. 1500 mm<sup>2</sup>/s

Hydraulic oil ISO VG 22, 32 and 46 cover the widest temperature range within the operation viscosity range.

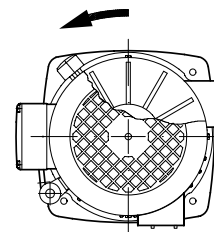
Attention: The compact hydraulic power packs type HK are not suited for use with fire inhibiting fluids type HFA(B), HFC, HFD.. conforming VDMA 24317 and biologically degradable pressure fluids based on polyglycole (HEPG).  
 Electrically hazardous: Any fluid types containing water must not be used (danger of short circuits).  
 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.



Cleanliness is a must during filling! The filler neck of the pump features a strainer (gap width 0.4 mm) to prevent any coarse contamination being flushed in from the barrel. Nevertheless a funnel with screen (similar gap width) is recommended.

## 6. Initial operation

Direction of rotation	Arbitrary for radial piston pumps (version HK 34..H.. and HK 33..H..)	with type HK 34(8) - H.. HK 33(8) - H..
	Acc. to the arrow on the shroud. The fan wheel has to rotate anti clockwise after starting the motor when looking through the perforation of the fan shroud.	with type HK 34(8) ... - Z HK 33(8) ... - Z
	The connection of two of the three main wires has to be interchanged at the terminal strip, if the direction of rotation is wrong.	



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 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 nomore bubbles are detected or by operating all functions of the circuitry without load until all cylinders, motors, etc. move steadily and without any hesitation.

## 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.

## 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 7600..), pls. state your pump type acc. to the type plate either on the pump.