

Additional technical information:

- Compact hydraulic power packs type KA and KAW size 2 D 8010
- Compact hydraulic power packs type KA and KAW size 4 D 8010-4

1. Notes regarding installation

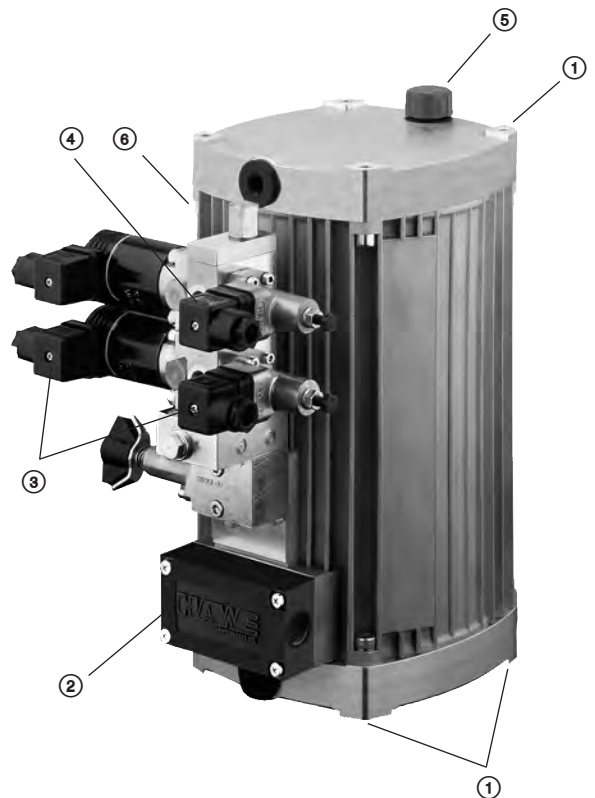
It is important that you analyze all aspects of your application and review all information concerning this product (see also D 8010) before you select or use any product or system. Due to the variety of operating conditions and applications for these products, the user, through his own analysis and testing, is solely responsible for making the final selection of the products and assuring that all functionality and safety requirements of his application are met. Installation, adjustments, maintenances, and repairs have to be performed by authorized, trained, and instructed staff only.

The use of this product beyond the specified performance limits, with not approved fluids, and/or when non-genuine spare parts installed will lead to an expiration of the guarantee.

⚠ The hydraulic power pack can become hot during operation → Risk of injury!

The following guidelines and standards have to be taken additionally into account:

- VDI 3027 "Initial operation and maintenance of hydraulic systems"
- DIN 24 346 "Hydraulic systems"
- ISO 4413 "Hydraulic fluid power - General rules relating to systems"
- D 5488/1 Pressure fluids - notes for selection
- B 5488 General operating manual for the assembly, initial operation and maintenance of hydraulic components and systems



- ① Means of fastening the power pack
- ② Electrical connection of motor and supervision elements (temperature and fluid level switch)
- ③ Electrical connection of valves and supervision elements (e.g. pressure switch)
- ④ Ports for hydraulic connection of consumers
- ⑤ Oil filler and breather filter
- ⑥ Type plate for hydraulic power pack and electric motor

Declaration of conformity

CE Letter of conformity acc. to EC directive 2006/95/EC

"Electrical equipment designed for use within certain voltage limits"

The compact power packs are manufactured in conformity with EN 60 034 (IEC 34 – VDE 0530) and VDE 0110.

Notes: Conforming EC directive machinery safety 2006/42/EC, appendix II, section 1 B:

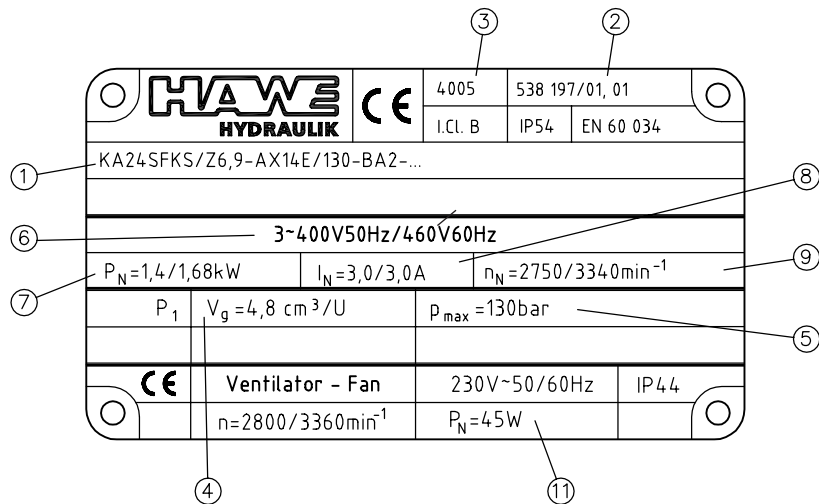
The partly completed machinery are produced conforming the harmonized standards EN 982 and DIN 24 346. The setting in operation is forbidden until it is verified that the machine where the partly completed machinery is utilized fulfils the requirements in safety of Machinery Directive incl. appendix.

Declaration of incorporation

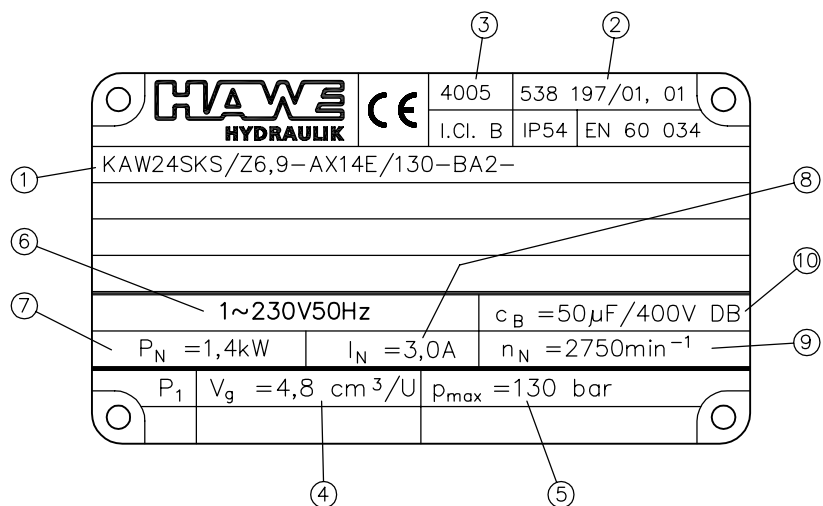
see page 20

2. Coding

Type plate for hydraulic power pack with 3-phase motor



Type plate for hydraulic power pack with 1-phase motor



- ① Complete type coding
- ② Commission number
- ③ Production date: Week/Year
- ④ Geometric delivery flow of the pump, flow Q (lpm) = $V_g \cdot n / 1000$
- ⑤ max. perm. operating pressure
- ⑥ Nom. voltage and mains frequency according to circuitry (Y, Δ, ⊥)
Voltage ranges (Y, Δ, ⊥), where the rated performance is available:
- 50 Hz: ±10% (IEC 38)
- 60 Hz: ±5%
- ⑦ Nom. power according to mains frequency (50 Hz, 60 Hz)
⚠ The actual power consumption can be higher than the nom. power!
- ⑧ Nom. current
⚠ The actual current consumption can be higher than the nom. current!
- ⑨ Nom. speed
- ⑩ Operating capacitor
⚠ Not in scope of supply!
- ⑪ Data of the auxiliary blower (when apparent)
Nom. voltage, nom. speed, nom. power

2.1 Type coding

Order examples:

KA 24 1 S KS

E/H1,81 - A 1/280 - 3x400V 50 Hz

KA 28 22 L1 KTF

P/HZ 0,59/8,8-...- 3x400V 50 Hz/24V DC - G 1/2 x 300

Electrical port
(table 1e)

Motor voltage

Motor voltage of the auxiliary
blower (see table 1d)

Fluid drain hose
(table 1f)

Options
(table 1d)

Pump version:

H ... - Single circuit pump (radial piston pump)

Z ... - Single circuit pump (gear pump)

HH ... / ... - Dual circuit pump (radial piston pump - radial piston pump)

HZ ... / ... - Dual circuit pump (radial piston pump - gear pump)

Table 1a-2: Basic type and drive power

Tank size
table 1c










| | Coding | For additional motor data, see type plate | | |
|------------|---------------|---|---------------|-------------------------------|
| | | | Power (kW) | Speed (min ⁻¹) |
| Basic type | KA 21 | 3~phase motor | 0.55 0.66 | 2790 (50 Hz) 3350 (60 Hz) |
| | KA 22 | 3~phase motor | 1.1 1.32 | 2790 (50 Hz) 3350 (60 Hz) |
| | KA 23 | 3~phase motor | 0.37 0.44 | 1360 (50 Hz) 1650 (60 Hz) |
| | KA 24 | 3~phase motor | 0.75 0.9 | 1360 (50 Hz) 1650 (60 Hz) |
| | KA 26 | 3~phase motor | 1.4 1.68 | 2790 (50 Hz) 3340 (60 Hz) |
| | KA 28 | 3~phase motor | 1.0 1.2 | 1370 (50 Hz) 1660 (60 Hz) |
| | KAW 21 | 1~phase motor | 0.37 | 2770 (50 Hz) 3340 (60 Hz) |
| | KAW 22 | 1~phase motor | 0.75 | 2810 (50 Hz) 3400 (60 Hz) |
| | KAW 23 | 1~phase motor | 0.25 | 1380 (50 Hz) 1650 (60 Hz) |
| | KAW 24 | 1~phase motor | 0.50 | 1390 (50 Hz) 1680 (60 Hz) |
| | KAW 26 | 1~phase motor | 1.10 | 2770 (50 Hz) 3340 (60 Hz) |
| | KAW 28 | 1~phase motor | 0.7 | 1370 (50 Hz) 1650 (60 Hz) |

Note:

A actual power consumption is load dependent and can be up to 1.8 x nominal power.

Table 1b-2: Tank size

① Connection pedestal, valve assembly, terminal box, options

| | Coding | Combination | Filling volume V _{fill} (l) | Usable filling volume vertically V _{usable} (l) | Usable filling volume horizontal V _{usable} (l) |
|-----------|-----------|---|---|---|---|
| Tank size | no coding |  | 3.9 | 1.85 | 1.5 |
| | 1 |  | 5.0 | 2.7 | 2.0 |
| | 01 |  | 5.0 | 1.85 | 2.0 |
| | 11 |  | 6.1 | 2.95 | 2.5 |
| | 2 |  | 7.5 | 5.45 | 3.15 |
| | 02 |  | 7.5 | - | 3.15 |
| | 21 |  | 8.6 | 5.45 | 3.65 |
| | 22 |  | 11.1 | - | 4.8 |
| | 3 |  | 11.1 | 8.95 | 4.8 |

Order examples:

KA 44 S KS E/H5,1 - A 1/280 - 3x400V 50 Hz - 2,2 kW**KA 404 22 L1 KTF P/Z 8,8 -... - 3x400V 50 Hz - 0,75 kW /24V DC - G 1/2 x 300**Electrical port
(table 1e)Pump version
pos. 2.2Motor voltage of the aux-
iliary blower (see table 1d)Fluid drain hose
(table 1f)

Options (table 1d)

Motor voltage
and power**Table 1a-4:** Basic type and drive power

| Tank size table 1c | Coding | For additional motor data, see type plate | | |
|-----------------------|----------------|---|--------------|------------------------------|
| | | | Power (kW) | Speed (min ⁻¹) |
| Basic type | KA 42 | 3~phase motor (2-pin) | 2.4 2.88 | 2790 (50 Hz) 3340 (60 Hz) |
| | KA 44 | 3~phase motor (4-pin) | 1.5 1.8 | 1360 (50 Hz) 1650 (60 Hz) |
| | | | 2.2 2.64 | 1360 (50 Hz) 1650 (60 Hz) |
| | | | 3.0 3.6 | 1360 (50 Hz) 1650 (60 Hz) |
| | | | 4.0 4.8 | 1360 (50 kW) 1650 (60 kW) |
| | | | 5.6 6.72 | 1360 (50 kW) 1650 (60 kW) |
| | KA 402 | 3~phase motor (2-pin) | 0.55 0.66 | 2790 (50 Hz) 3350 (60 Hz) |
| | KA 402 | 3~phase motor (2-pin) | 1.1 1.32 | 2790 (50 Hz) 3350 (60 Hz) |
| | KA 404 | 3~phase motor (4-pin) | 0.37 0.44 | 1360 (50 Hz) 1650 (60 Hz) |
| | KA 404 | 3~phase motor (4-pin) | 0.75 0.9 | 1360 (50 Hz) 1650 (60 Hz) |
| | KA 402 | 3~phase motor (2-pin) | 1.4 1.68 | 2790 (50 Hz) 3340 (60 Hz) |
| | KA 404 | 3~phase motor (4-pin) | 1.0 1.2 | 1370 (50 Hz) 1660 (60 Hz) |
| | KAW 402 | 1~phase motor (2-pin) | 0.37 | 2770 (50 Hz) 3340 (60 Hz) |
| | KAW 402 | 1~phase motor (2-pin) | 0.75 | 2810 (50 Hz) 3400 (60 Hz) |
| | KAW 404 | 1~phase motor (4-pin) | 0.25 | 1380 (50 Hz) 1650 (60 Hz) |
| | KAW 404 | 1~phase motor (4-pin) | 0.50 | 1390 (50 Hz) 1680 (60 Hz) |
| | KAW 402 | 1~phase motor (2-pin) | 1.10 | 2770 (50 Hz) 3340 (60 Hz) |
| | KAW 404 | 1~phase motor (4-pin) | 0.7 | 1370 (50 Hz) 1650 (60 Hz) |

Note:
A actual power consumption is load dependent and can be up to 1.8 x nominal power.

Table 1b-4: Tank size

① Connection pedestal, valve assembly, terminal box, options


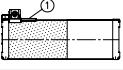
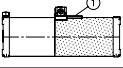
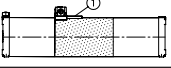
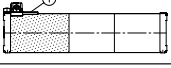
| | Coding | Combination | Filling volume V _{fill} (l) | Usable filling volume vertically V _{usable} (l) | Usable filling volume horizontal V _{usable} (l) |
|-----------|-----------|---|---|---|---|
| Tank size | no coding |  | 13 | 5 | 6 |
| | 2 |  | 22 | 15 | 11 |
| | 02 |  | 22 | - | 11 |
| | 22 |  | 31 | - | 16 |
| | 3 |  | 31 | 25 | 16 |

Table 1c: Installation position

① Connection pedestal, valve assembly, terminal box, ② Filler neck with breather filter, ③ Fluid level gauge









| vertically | | | | horizontal | | | |
|---|--|---|---|---|---|---|---|
| S | S14 | S25 | S26 | L | L1 | L4 | L14 |
| Standard  | Top and bottom end cover off-set by 90°  | Top and bottom end cover off-set by 180°  | Top and bottom end cover off-set by 270°  | Standard  | Connection pedestal off-set by 90°  | Type plate and fluid level gauge ③ "rear side"  | Combination L1 plus L4  |
| Note: <ul style="list-style-type: none"> - The horizontal version can be also installed vertically. - The vertical version utilizing a radial piston pump (coding H, HH and HZ acc. to sect. 2.1) must not be installed horizontally - Regarding ① : For details about the connection block and valve assembly, see sect. 5.1 | | | | | | | |

Table 1d: Options

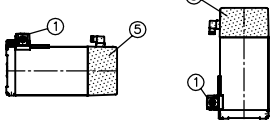
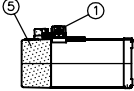
| | Coding | Note | vertically | horizontal |
|---------|------------|---|------------|------------|
| Options | no coding | without optional equipments | ● | ● |
| | K | Fluid level gauge / Fluid level gauge | ● | ● |
| | KS | Fluid level gauge with float switch (NO-contact) | ● | - |
| | KD | Fluid level gauge with float switch (NC-contact) | ● | - |
| | S | Float switch (NO-contact) | - | ● |
| | D | Float switch (NC-contact) | - | ● |
| | T | Temperature switch (switch point 80°C), standard with type KA | ● | ● |
| | T60 | Temperature switch (switch point 60°C), only with type KA | ● | ● |
| | G | Silica gel filter (instead of std. breather filter) not available for versions with auxiliary blower coding F, F1 | ● | - |
| | F | Auxiliary blower ⑤ For motor voltage and additional data, see the type plate  | ● | ● |
| | F1 | Auxiliary blower ⑤ like coding F, but on the opposite side  | - | ● |

Table 1e: Electrical connection

| | Coding | Note |
|--------------------------------|---------------|--|
| Means of electrical connection | no coding | Standard (Terminal box) |
| | P | Plug Co. HARTING |
| | P, PM1 | with additional connector M12x1 on right or left side for temperature and/or float |
| | E, PE | Electrical connection with additional interference suppression at the terminal box or at the plug Co. HARTING, only with type KA |

Table 1f: Fluid drain hose

| Coding KA 2, KAW 2 | Coding KA 4, KAW 4 | Description |
|-----------------------|-----------------------|--|
| no coding | no coding | Tapped plug G 1/2* (KA 2) G 3/4* (KA 4) |
| G 1/2* x 300 | G 1/2* x 300 | Fluid drain hose approx. 300 mm with ball cock |
| G 1/2* x 500 | G 1/2* x 500 | Fluid drain hose approx. 500 mm with ball cock |
| G 1/2* W x 300 | G 1/2* W x 300 | Fluid drain hose approx. 300 mm with elbow and ball cock |
| G 1/2* W x 500 | G 1/2* W x 500 | Fluid drain hose approx. 500 mm with elbow and ball cock |

* BSPP

3. Additional parameters

3.1 General

| | |
|-----------------------|---|
| Nomenclature | Constant delivery pump |
| Design | Valve controlled radial piston pump or gear pump |
| Direction of rotation | Radial piston pump - any Gear pump - counterclockwise (Direction of rotation can only be detected by checking the delivery flow - the connection of 2 of the 3 leads have to be changed at 3-phase versions, when there is no flow) |
| Speed rangen | Radial piston pump H: 200 ... 3500 min ⁻¹ Gear pump Z 1,1 ... Z 6,9: 700 ... 4000 min ⁻¹ Z 8,8 ... Z 11,3: 500 ... 1800 min ⁻¹ |
| Installed position | Vertically (KA...S) or horizontally (KA...L) |
| Mounting | Tapped holed M8, see dimensional drawings |

Mass (weight) kg
(without fluid)

| KA 2, KAW 2 | | | | |
|------------------|------------|------------|------|------|
| | H (3 cyl.) | H (6 cyl.) | Z | HZ |
| KA 21, 23 | 10.9 | 11.5 | 12.7 | 13.2 |
| KA 22, 24 | 13.2 | 13.6 | 15.0 | 15.5 |
| KA 26, 28 | 14.7 | 15.1 | 16.5 | 17.0 |
| Tank size 01, 1 | +0.7 kg | | | |
| Tank size 02, 2 | +2.2 kg | | | |
| Tank size 11 | +1.4 kg | | | |
| Tank size 21 | +2.9 kg | | | |
| Tank size 22, 3 | +4.4 kg | | | |
| Auxiliary blower | +2.1 kg | | | |

| KA 4, KAW 4 | | | | |
|------------------|------------|------------|------|------|
| | H (3 cyl.) | H (6 cyl.) | Z | HZ |
| KA 4 | 29 | 29.6 | 30.8 | 31.5 |
| Tank size 02, 2 | +2.2 kg | | | |
| Tank size 22, 3 | +8.8 kg | | | |
| Auxiliary blower | +2.7 kg | | | |

For mass (weight) of the connection blocks and valve banks
Hydraulic connection

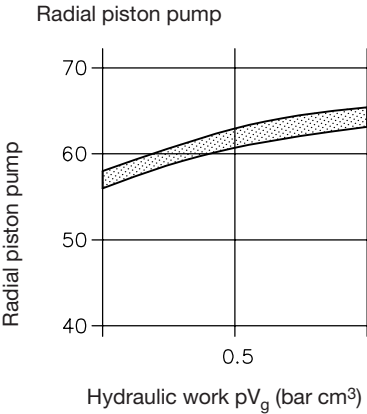
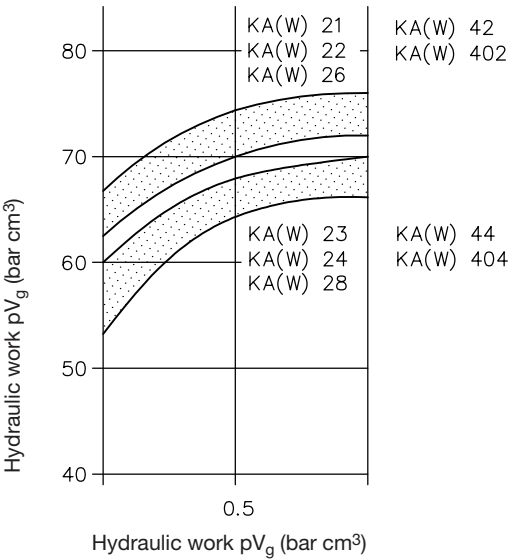
see the respective pamphlets
via directly mounted connection blocks, see table in sect. 5.1
Basic pump: For connection hole pattern, see sect. 4.3

Silica gel filter

Filtering surface 26.6 cm²
Content 136 g
Absorbance capacity 29.6 ml
Filtration 3 µm
Temperature range -30°C ... +90°C
Note: Observe maintenance notes in sect. 5.3 !

Running noise

Radial piston pump



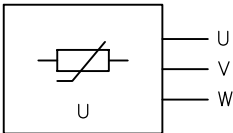
3.2 Hydraulic

| | |
|---------------------------|---|
| Pressure | Delivery side (outlet ports P) depending on pump design and delivery flow, see type plate Suction side (inside the tank): ambient pressure. Not suitable for charging. |
| Starting against pressure | Versions with 3~phase motor will start-up against pressure p_{max} ! Whereas versions with 1~phase motor will start-up only against slight pressure! |
| Pressure fluid | Hydraulic oil conforming DIN 51 524 part 1 to 3; ISO VG 10 to 68 conforming DIN 51 519 Opt. operation range: Radial piston pump H: 10 ... 500 mm ² /s Gear pump Z: 20 ... 100 mm ² /s Viscosity range: min. approx. 4; max. approx. 800 mm ² /s Also suitable are biologically degradable pressure fluids type HEES (Synth. Ester) at service temperatures up to approx. +70°C. Electrically hazardous: Any fluid types containing water must not be used (short-cut). |
| Temperature | Ambient: approx. -40 ... +80°C; Fluid: -25 ... +80°C. Note the viscosity range! Permissible temperature during start: -40°C (observe start-viscosity!), as long as the service temperature is at least 20K higher for the following operation. Biologically degradable pressure fluids: Observe manufacturer's specifications. By consideration of the compatibility with seal material not over +70°C. |
| Filling and usable volume | See tank size in sect. 2.1, table 1b |

3.3 Electrical

The following data apply to radial piston and to gear pumps.
The drive motor is part of the pump and can not be removed, see description in sect. 1.

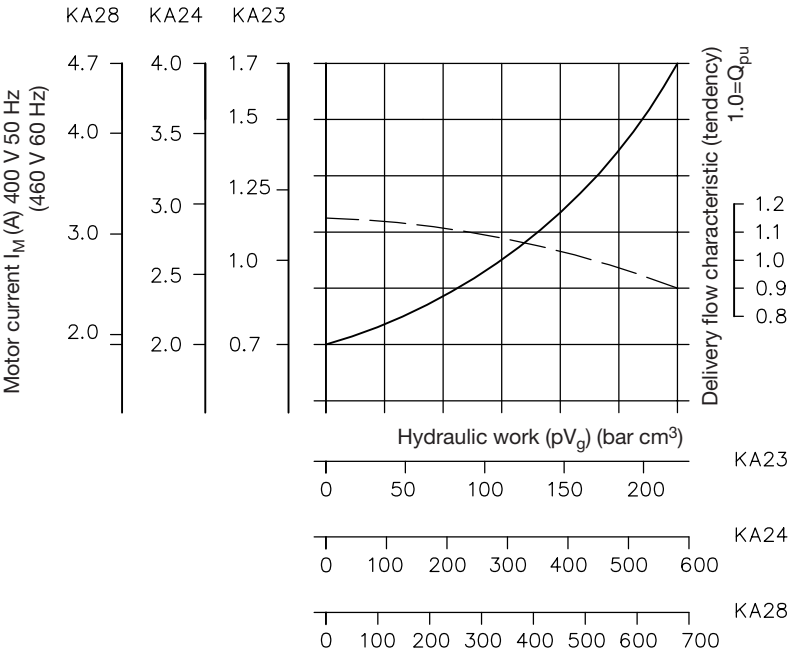
| | |
|------------------|---|
| Connection | Versions with plug Co. HARTING: cable 1.5 mm ² Versions with integrated terminal box: Blade type plugs 6.3 Co. AMP Cable gland M20x1.5 or connector. M12x1.5 (option PM) are not scope of delivery. |
| Protection class | IP 65 conf. IEC 60529 Note: The breather filter has to be protected from migrating moisture. |
| Safety class | DIN VDE 0100 safety class 1 |
| Insulation | Lay-out conf. EN 60 664-1 ● up to 500 V AC nom. phase voltage (wire - wire) for 4-wire AC-mains L1-L2-L3-PE (3-phase mains) with earthed star connection point. ● up to 300 V AC nom. phase voltage (wire - wire) for 3-wire AC-mains L1-L2-L3 (3-phase mains) without earthed star connection point. ● for 1~phase mains with 2 conductors L-N up to 300 V AC nom. voltage. |
| Suppressor | Type RC3R |
| Coding E, PE | Oper. voltage 3x575 V AC Frequency 10 ... 400 Hz Max. power 4.0 kW |



Current consumption KA 2

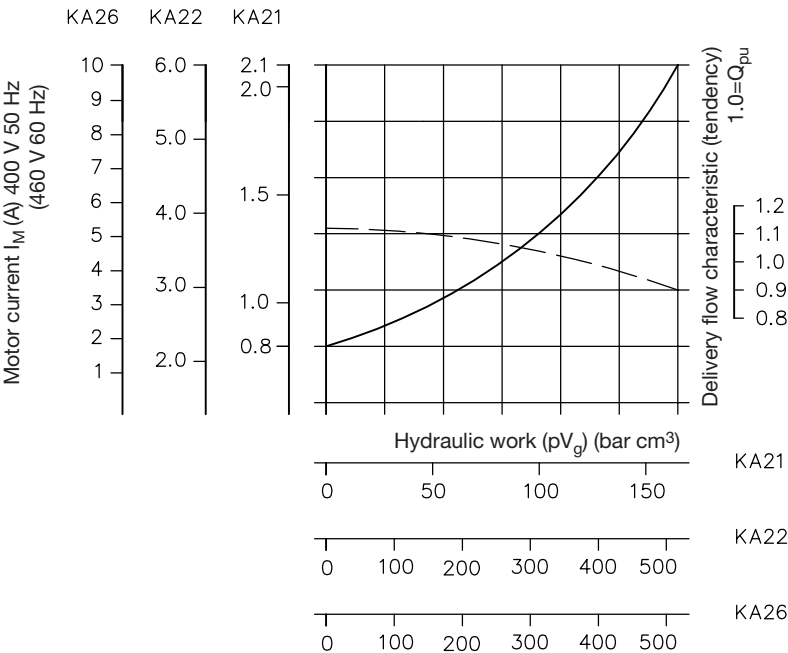
KA 23
KA 24
KA 28

Oper. voltage 3 x 400/230V 50 Hz $\text{Y}\Delta$
 3 x 460/265V 60 Hz $\text{Y}\Delta$



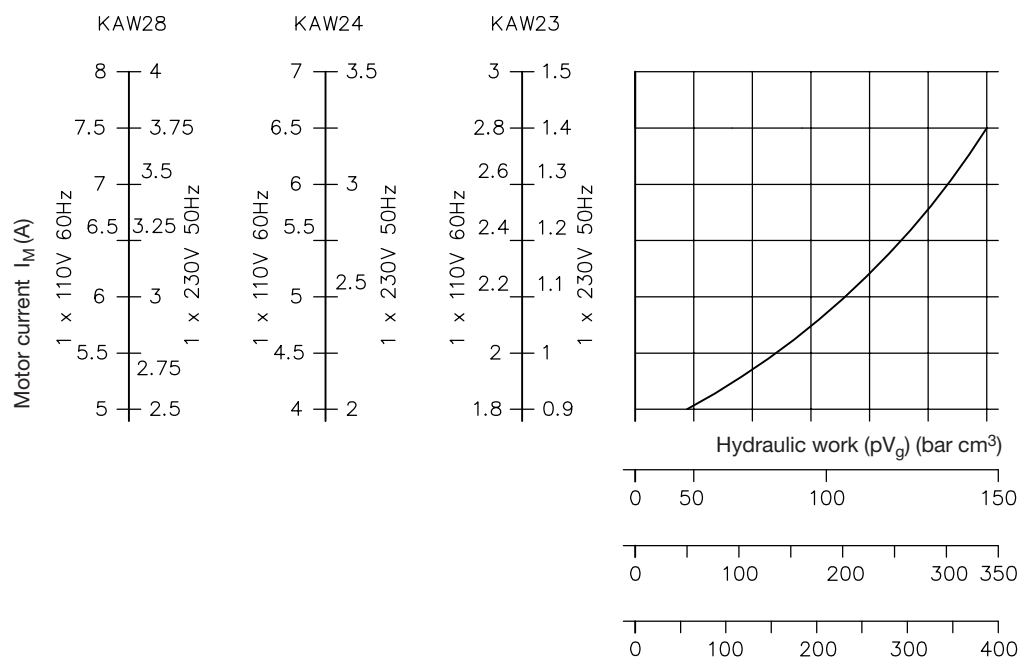
KA 21
KA 22
KA 26

Oper. voltage 3 x 400/230V 50 Hz $\text{Y}\Delta$
 3 x 460/265V 60 Hz $\text{Y}\Delta$

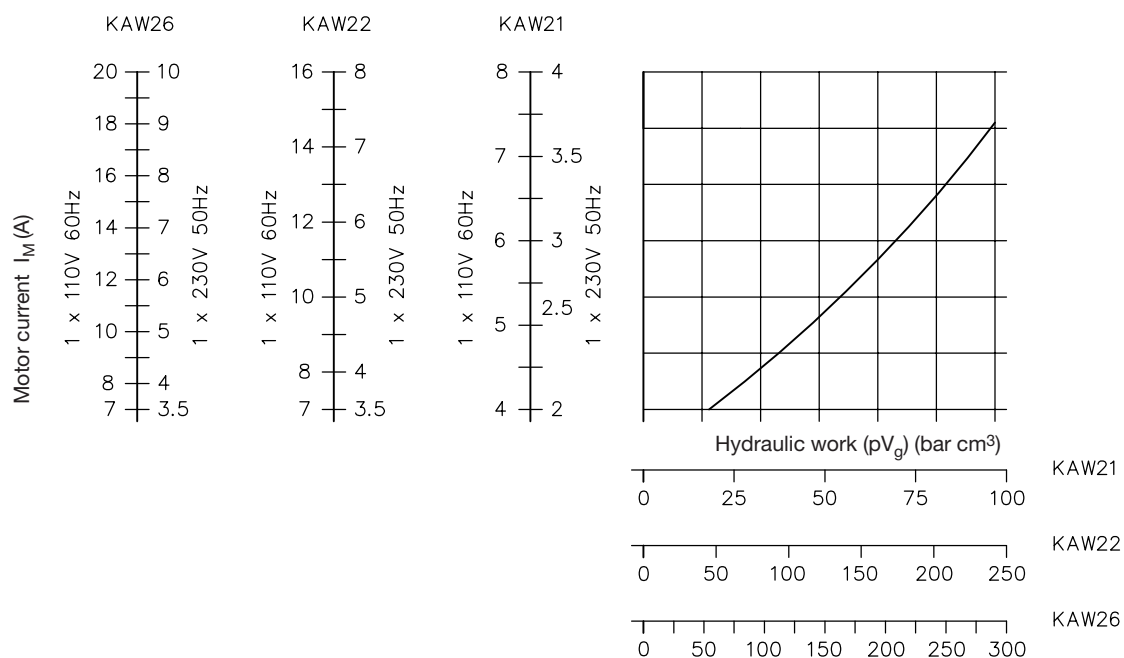


KAW 23**KAW 24****KAW 28**

Oper. voltage 1 x 230V 50 Hz
1 x 110V 60 Hz

**KAW 21****KAW 22****KAW 26**

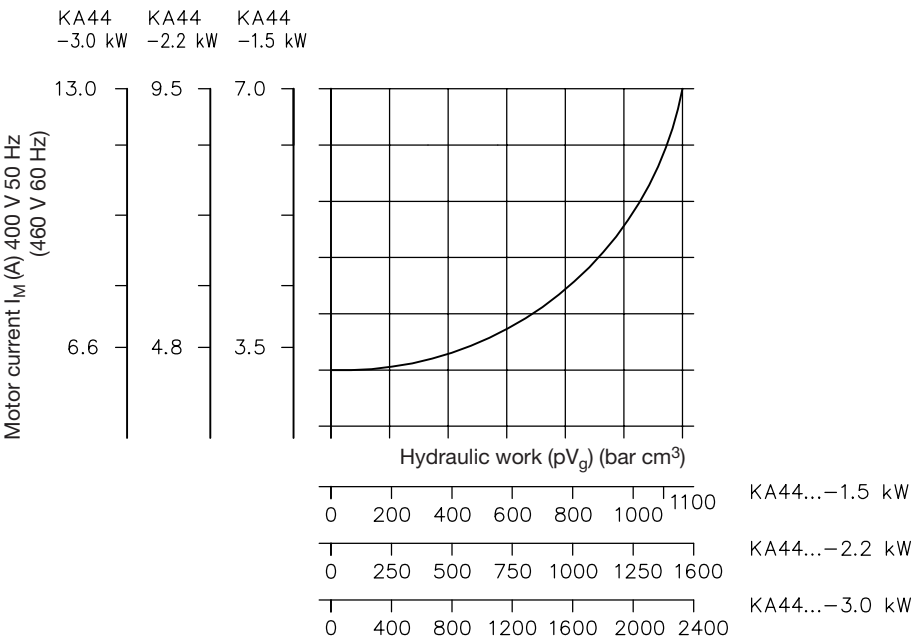
Oper. voltage 1 x 230V 50 Hz
1 x 110V 60 Hz



Current consumption KA 4

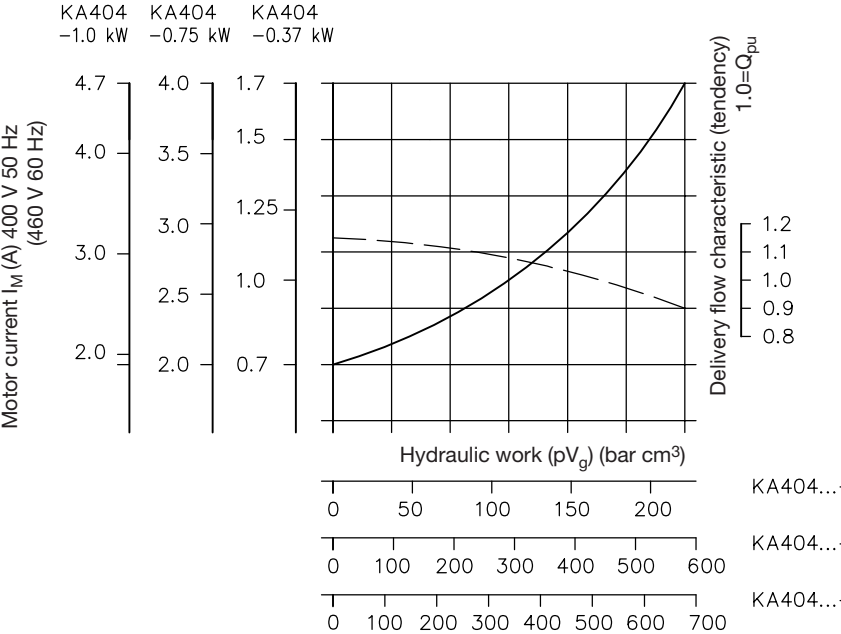
KA 44

Oper. voltage
3 x 400/230V 50 Hz $\Upsilon\Delta$
3 x 460/265V 60 Hz $\Upsilon\Delta$



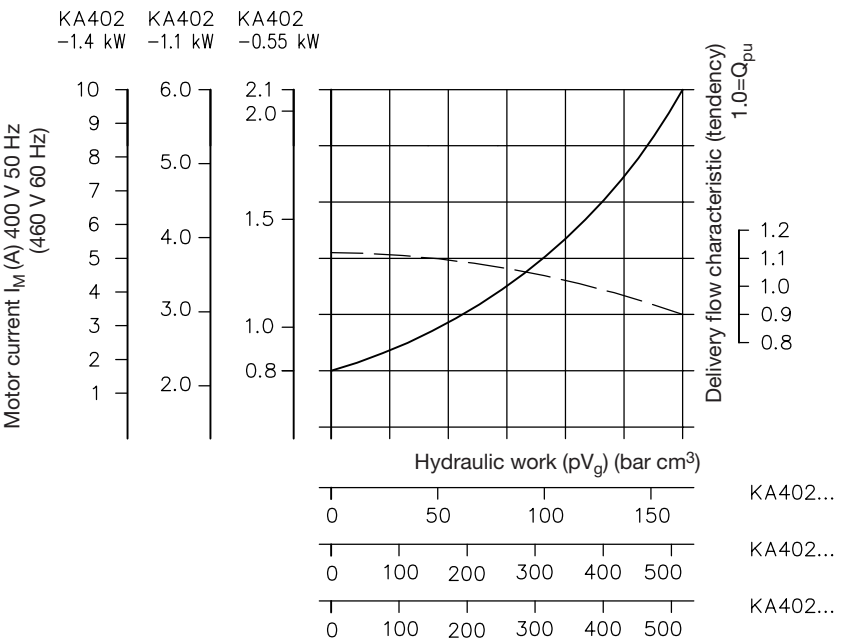
KA 404

Oper. voltage
3 x 400/230V 50 Hz $\Upsilon\Delta$
3 x 460/265V 60 Hz $\Upsilon\Delta$



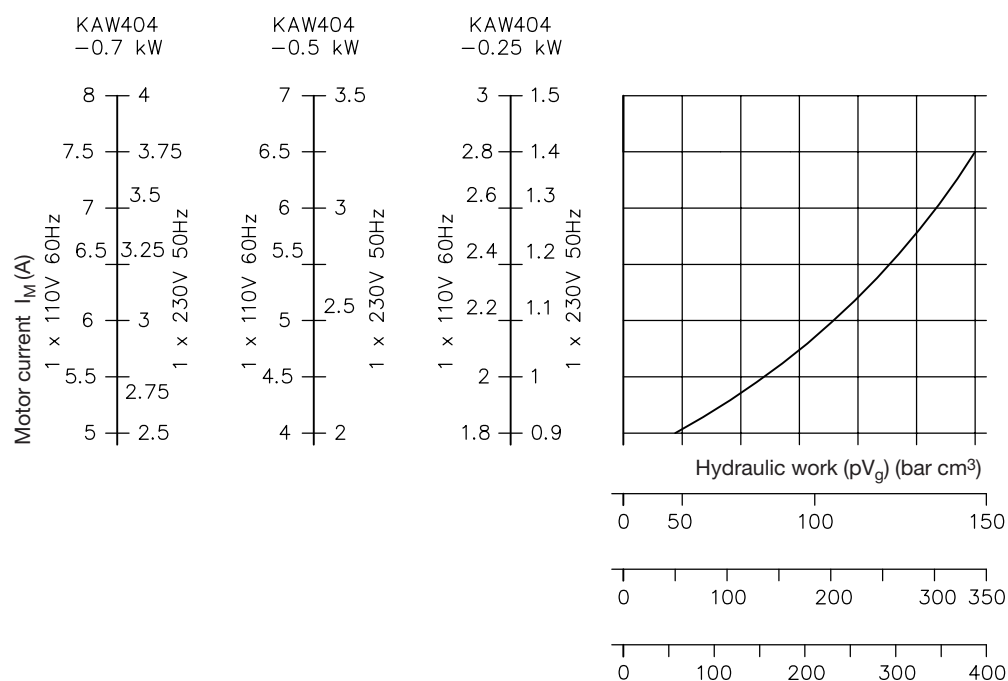
KA 402

Oper. voltage
3 x 400/230V 50 Hz $\Upsilon\Delta$
3 x 460/265V 60 Hz $\Upsilon\Delta$



KAW 404

Oper. voltage
1 x 230V 50 Hz
1 x 110V 60 Hz



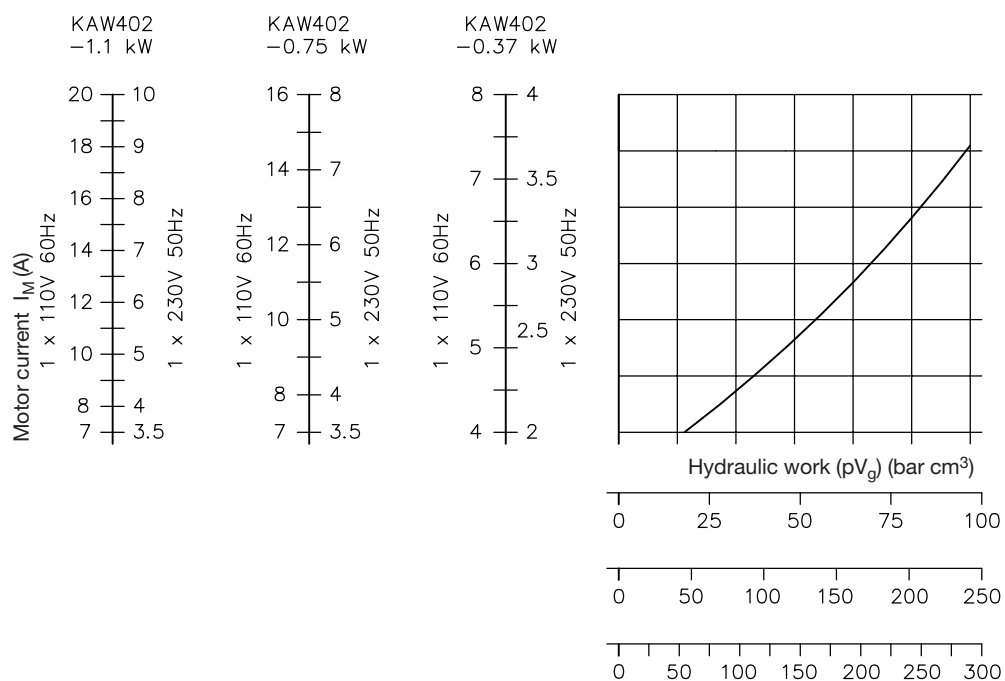
KAW404...-0.25 kW

KAW404...-0.5 kW

KAW404...-0.7 kW

KAW 402

Oper. voltage
1 x 230V 50 Hz
1 x 110V 60 Hz



KAW402...-0.37 kW

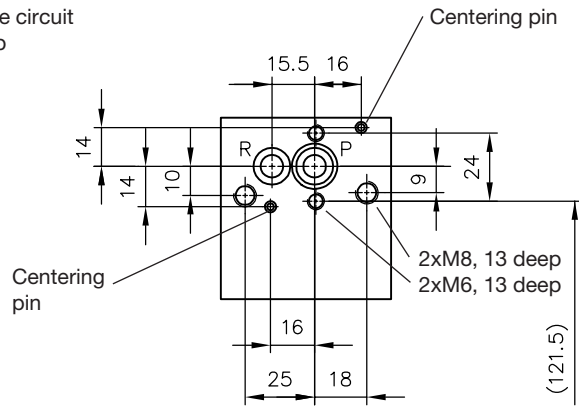
KAW402...-0.75 kW

KAW402...-1.1 kW

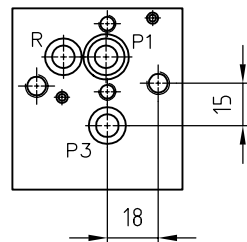
3.4 Electrical and hydraulic connections

Hydraulic

Single circuit pump

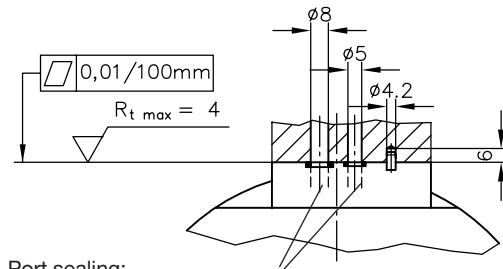


Dual circuit pump with joint connection pedestal



For missing dimensions, see above !

Hole dimensions for customer furnished connection block



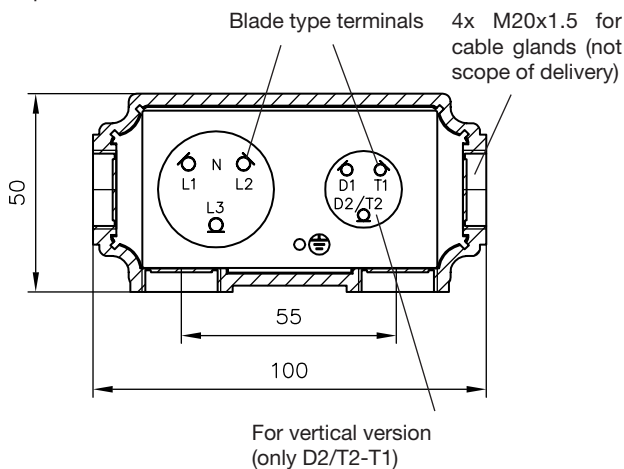
Port sealing:

P, P1, P3, R = 8x2 NBR 90 Sh

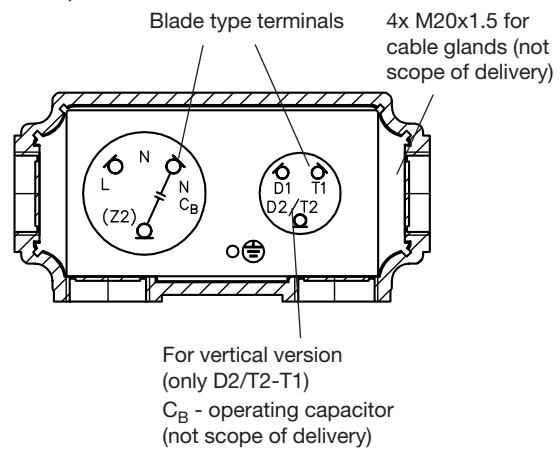
Electrical

Terminal box KA 2

3-phase motor

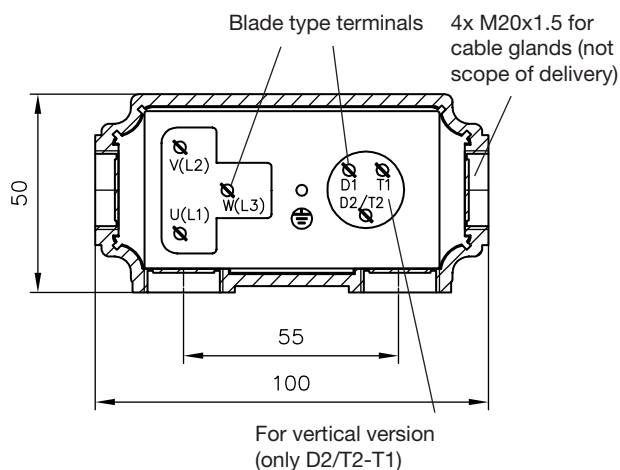


1-phase motor

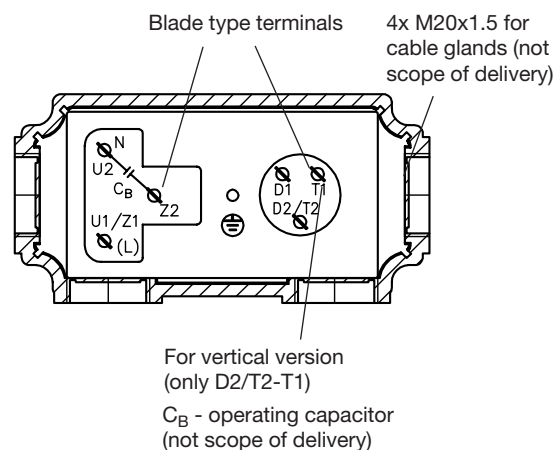


Temperature switch KA 4

3-phase motor

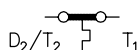


1-phase motor

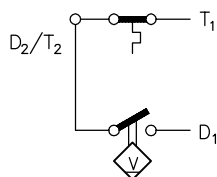


Temperatur switch

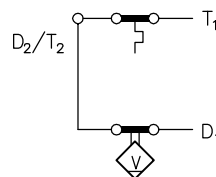
Coding **T**
(Terminal box)

**Float switch (horizontal version)**

Coding **ST**
(Terminal box)



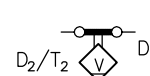
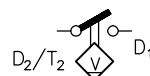
Coding **DT**
(Terminal box)



Coding **S, D**

S (NO-contact)

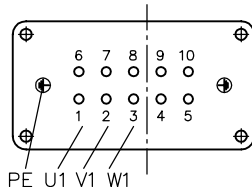
D (NC-contact)



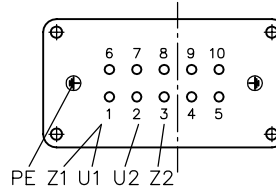
Coding **P**

Plug Co. HARTING HAN 10 E

3~phase motor

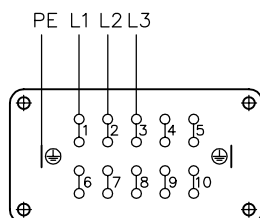


1~phase motor

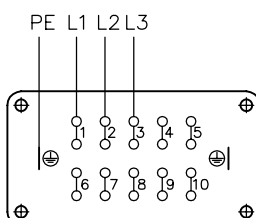


Electr. connection feed-in side (plug)

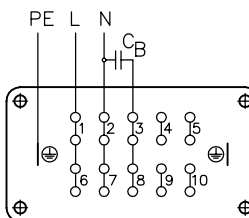
3~phase motor Υ



3~phase motor Δ

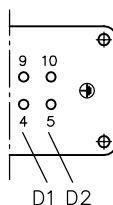


1~phase motor

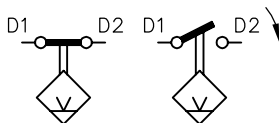


C_B - operating capacitor
(not scope of delivery)

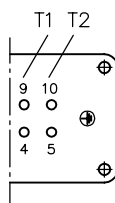
Coding **D, S**



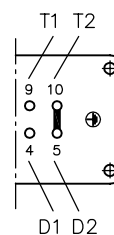
D (NC-contact) **S** (NO-contact)



Coding **T**

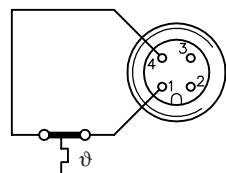


Coding **DT, ST**



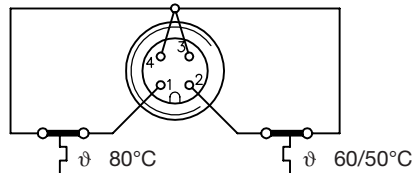
Coding **T**

One temperature switch:



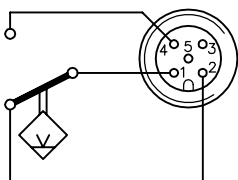
Coding **TT60**

Two temperatur switches:



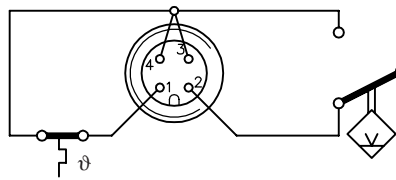
Coding **S**

For vertical version with fluid level gauge and float switch:



Coding **ST**

For horizontal version with one temperature switch and one float switch:



Float switch (vertical version)
Coding **KS, KD**



Plug conf.
DIN EN 175 301-803 C
(8 mm)

KS (NO-contact)



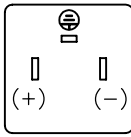
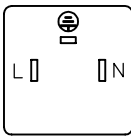
KD (NC-contact)



Auxiliary blower
Coding **F, F1**

24 V DC

1x230 V 50/60 Hz
1x110 V 60 Hz



Auxiliary blower
Coding **F, F1**

| Motor data | KA 2, KAW 3 | | | KA 4, KAW 4 | | |
|------------------|-------------|-------------------------------------|-------------|-------------|-------------------------------------|-------------|
| | $P_N(W)$ | Revolutions (min ⁻¹) | Protections | $P_N(W)$ | Revolutions (min ⁻¹) | Protections |
| 1x230 50/60 Hz ⊥ | 45 | 2800/3250 | IP 44 | 64 | 2600/2900 | IP 44 |
| 1x110 60 Hz ⊥ | 38 | 3250 | IP 44 | 64 | 2900 | IP 44 |
| 24V DC | 12 | 2800/3250 | IP 20 | 55 | 2950 | IP 42 |

Temperature range -30°C ... +50°C
Electrical connection Plug conf. DIN EN 175 301-803 A

Temperature switch
Coding **T**

Technical data:
Bimetallic switch
winding protective switch
separately mounted
Temperature switch
Trigger point

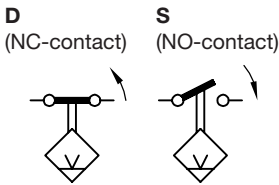
KAW
KA



Max. voltage 250 V 50/60 Hz
Nom. current (cos φ ~0.6) 1.6 A
Max. current at 24 V (cos φ = 1) 1.5 A
Electrical connection Terminal box / plug Co. HARTING

Float switch
Coding **D, S** (horizontal)

Technical data:
Max. switched power DC/AC 60 W/ 60 VA
Max. current DC/AC 0.8 A (cos φ =1)
Max. voltage 230 V 50/60 Hz



Coding **KD, KS** (vertically)

Max. switched power DC/AC 10 W
Max. current DC/AC 1 A
Max. voltage 150 V 50/60 Hz
200V DC

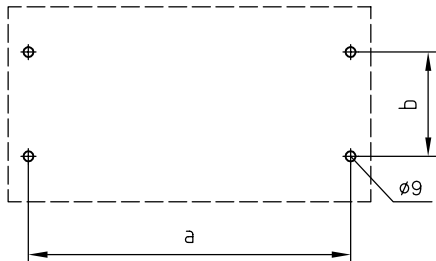
A protective circuitry has to be employed at inductive loads!

4. Dimensions

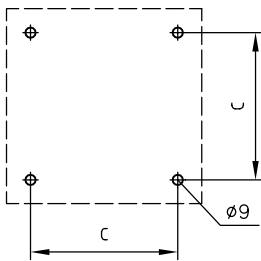
All dimensions in mm, subject to change without notice!

4.1 Mounting hole pattern

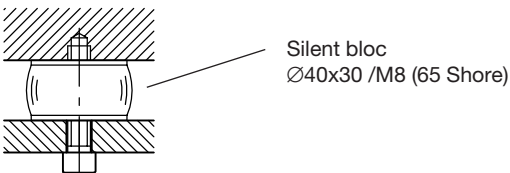
Horizontal version coding **L**



Vertical version coding **S**



Recommended mounting



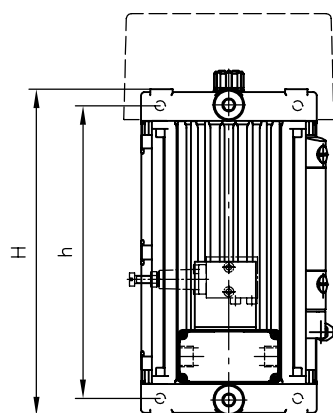
| Coding Tank size | KA 2, KAW 2 | | | KA 4, KAW 4 | | |
|---------------------|-------------|----|-----|-------------|-----|-----|
| | a | b | c | a | b | c |
| - | 284 | 92 | 130 | 375 | 140 | 160 |
| 01, 1 | 336 | 92 | 130 | - | - | - |
| 11 | 388 | 92 | 130 | - | - | - |
| 02, 2 | 484 | 92 | 130 | 625 | 140 | 160 |
| 22, 3 | 684 | 92 | 130 | 875 | 140 | 160 |

4.2 Basic pump

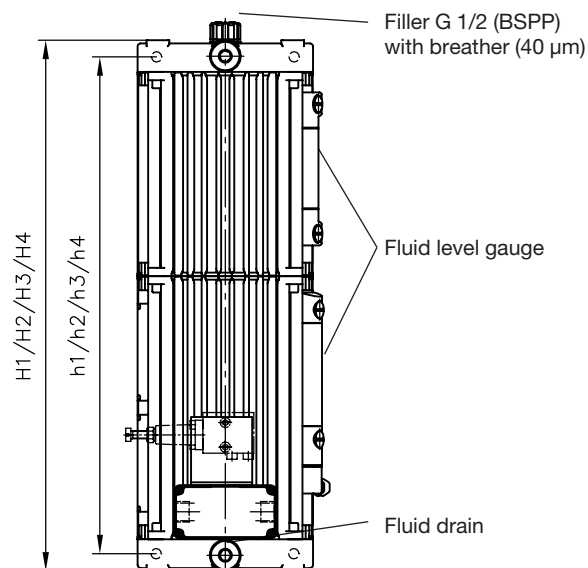
Vertical version

Tank size
without coding

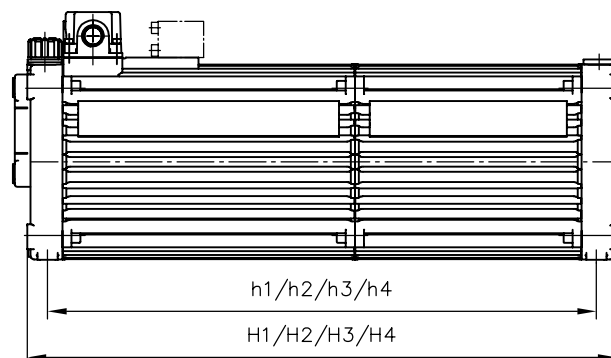
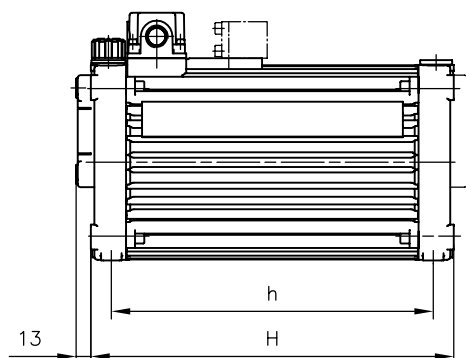
Auxilliary blower (optional, suited
for retrofitting)



Extension coding 01, 1 / 11 / 02, 2 / 22, 3

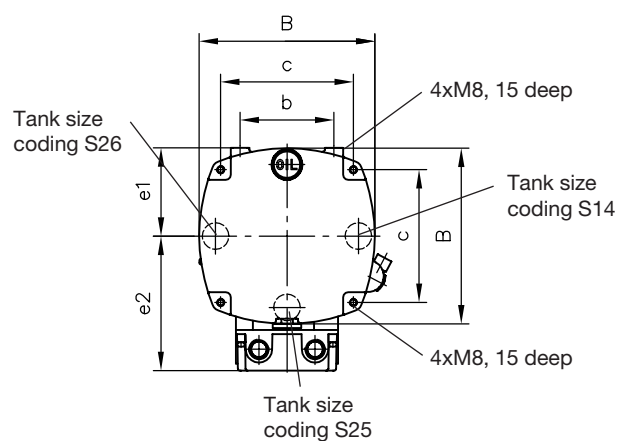


Horizontal version

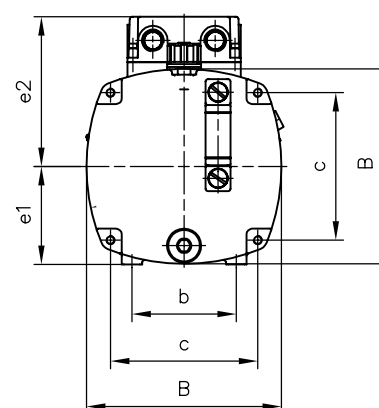


Note: In case a version intended for horizontal use is installed vertically the breather has to be positioned on top and the pump at the bottom.

Vertical version

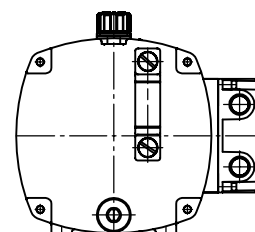


Horizontal version



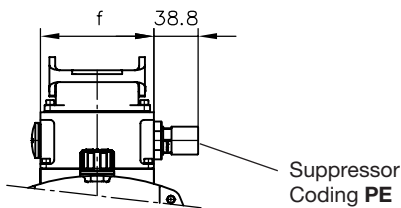
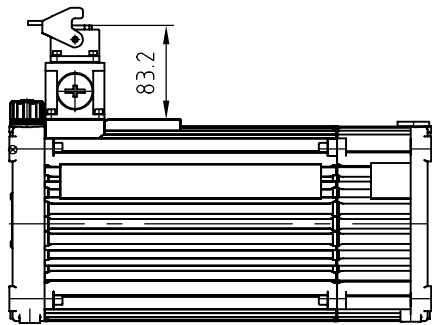
| Basic type | B | H | H1 | H2 | H3 | H4 | e1 | e2 |
|-------------|-----|-----|-----|-----|-----|-----|------|-----|
| KA 2, KAW 2 | 172 | 320 | 372 | 424 | 520 | 720 | 87,5 | 132 |
| KA 4, KAW 4 | 43 | 425 | - | - | 675 | 925 | 124 | 175 |

| Grundtyp | c | b | h | h1 | h2 | h3 | h4 |
|-------------|-----|-----|-----|-----|-----|-----|-----|
| KA 2, KAW 2 | 130 | 92 | 284 | 336 | 388 | 484 | 684 |
| KA 4, KAW 4 | 160 | 140 | 375 | - | - | 625 | 875 |



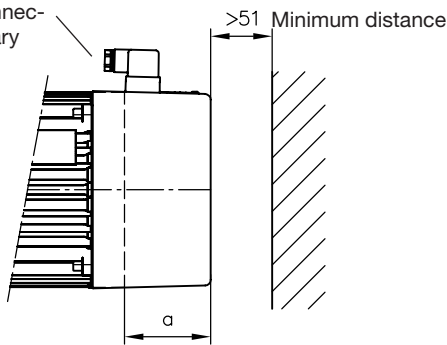
Options

Terminal box
Coding **P**

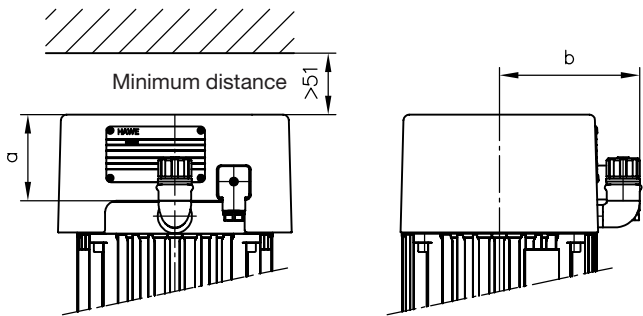


Auxiliary blower
Coding **F, F1**
horizontal version

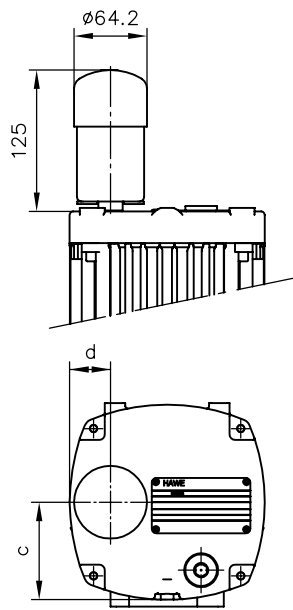
Electr. connection
auxiliary
blower



vertical version



Silica gel filter
Coding **G**

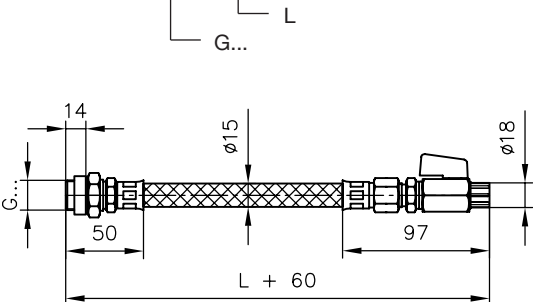


| | a | b | c | d | f |
|-------------|----|-----|-------|------|-----|
| KA 2, KAW 2 | 76 | 124 | 86 | 36 | 100 |
| KA 4, KAW 4 | 90 | 162 | 144.5 | 99.5 | 129 |

Fluid drain hose

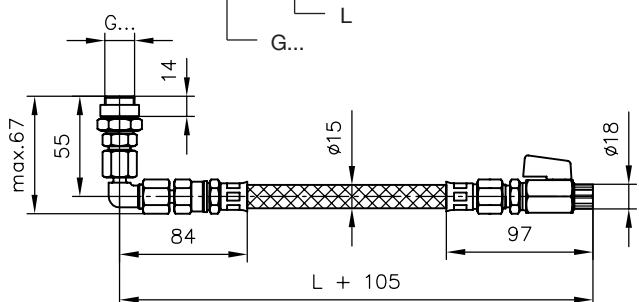
Coding

G 1/2 x 300
G 1/2 x 500
G 3/4 x 300
G 3/4 x 500



Coding

G 1/2 W x 300
G 1/2 W x 500
G 3/4 W x 300
G 3/4 W x 500



5. Appendix

5.1 Notes regarding selection

Procedure for selection and system lay-out of compact power packs with directly mounted valves is detailed in D 8010.

Technical description of the connection blocks

A connection block is mandatory for the hydraulic connection of the hydraulic power pack.

| Type | Description | Pamphlet |
|----------------------------------|--|------------|
| A, AL, AM, AK, AS, AV, AP | For single circuit pumps with pressure limiting valve and the possibility for direct mounting of directional valve banks Optional: - pressure resistant filter or return filter - idle circulation valve - accumulator charging valve - prop. pressure limiting valve | D 6905 A/1 |
| AN, AL, NA, C30, SS, VV | For dual circuit pumps with pressure limiting valve and where directional valve banks can be directly mounted in some cases Optional: - accumulator charging valve - two stage valve - idle circulation valve | D 6905 A/1 |
| AX | For single circuit pumps with pressure limiting valve (type approved) and the possibility for direct mounting of directional valve banks for use at accumulator charged systems Optional: - pressure resistant filter or return filter - idle circulation valve | D 6905 TÜV |
| B | For single circuit pumps for actuating single acting cylinders with pressure limiting valve and drain valve Optional: - throttle valve | D 6905 B |
| C | For single circuit pumps with ports P and R for direct piping | D 6905 C |

Technical description of the directional valve banks

The direct mounting of directional valves to the connection blocks type A enables creation of compact hydraulic units without additional piping.

| Type | Description | Pamphlet |
|-----------------|--|----------------|
| VB | Directional seated valves up to 700 bar | D 7302 |
| BWN, BWH | Directional seated valves up to 450 bar | D 7470 B/1 |
| BVZP | Directional seated valves up to 450 bar | D 7785 B |
| SWR, SWS | Directional spool valves up to 315 bar | D 7451, D 7951 |
| BA | Valve bank for the combination of different directional valves with connection hole pattern NG 6 acc. to DIN 24 340-A6 | D 7788 |
| BVH | Valve bank with directional seated valves up to 400 bar | D 7788 BV |
| NBVP | Directional seated valves | D 7765 N |
| NSWP | Directional spool valves | D 7451 N |
| NSMD | Clamping modules (directional spool valve with pressure reducing valve and feedback signal) | D 7787 |
| NZP | Intermediate plate with connection hole pattern Ng 6 acc. to DIN 24 340-A6 | D 7788 Z |

5.2 Assembly and installation notes

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 following guidelines and standards have to be taken into account:

- VDI 3027 "Initial operation and maintenance of hydraulic systems"
- DIN 24346 "Hydraulic systems"
- ISO 4413 "Hydraulic fluid power -- General rules relating to systems"
- D 5488/1 Pressure fluids - notes for selection
- B 5488 General operating manual for the assembly, initial operation and maintenance of hydraulic components and systems

a) Identification

see type plate or selection table in section 2

b) Installation and mounting

● Installation

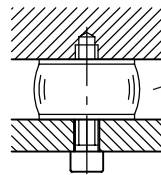


The hydraulic power pack incl. the solenoids of the directional valves can become hot during operation → Risk of injury!

Care has to be taken that fresh air can be drawn in and the warm air can escape.

Modifications of any kind (mechanical, welding or soldering works) must not be performed.

- Installation position dep. on version, see sect. 2.1, table 1c
- For dimensions, see sect. 4.2
- For mounting hole pattern, see sect. 4.1
- Recommended mounting



Silent bloc Ø40x30 /M8 (65 Shore)

- For mass (weight) of the connection blocks and valve banks see the respective pamphlets

| | KA 2, K AW 2 | | | |
|------------------|--------------|------------|------|------|
| | H (3 cyl.) | H (6 cyl.) | Z | HZ |
| KA 21, 23 | 10.9 | 11.5 | 12.7 | 13.2 |
| KA 22, 24 | 13.2 | 13.6 | 15.0 | 15.5 |
| KA 26, 28 | 14.7 | 15.1 | 16.5 | 17.0 |
| Tanke size 01, 1 | +0.7 kg | | | |
| Tanke size 02, 2 | +2.2 kg | | | |
| Tanke size 11 | +1.4 kg | | | |
| Tanke size 21 | +2.9 kg | | | |
| Tanke size 22, 3 | +4.4 kg | | | |
| Auxiliary blower | +2.1 kg | | | |

| | KA 4, KAW 4 | | | |
|------------------|-------------|------------|------|------|
| | H (3 cyl.) | H (6 cyl.) | Z | HZ |
| KA 4 | 29 | 29.6 | 30.8 | 31.5 |
| Tanke size 02, 2 | +2.2 kg | | | |
| Tanke size 22, 3 | +8.8 kg | | | |
| Auxiliary blower | +2.7 kg | | | |

c) Electrical connection and setting of the protective motor switch

- For connection of the electric motor, see sect. 4.3
- For connection of the float and fluid level switch, see sect. 4.3

Note: The temperature switch will trigger at a fluid temperature of approx. 95°C.

Note: The signal has to be delayed sufficiently (time lag relay) if the lay-out of the system features an operation cycle where the pump is emptied below the min. level and replenished by the reflow from the consumer within one cycle.

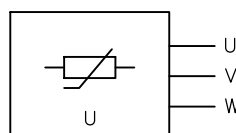
- Adjustment of the protective motor switch

- In most cases it is sufficient, to set the response current to approx. (0.85...0.9) of I_N . This makes sure that on one hand the bimetallic switch does not trigger too early during normal operation but on the other hand the oil temperature doesn't rise too high due to a prolonged response time after the pressure limiting valve is in action.
- Test the setting of the motor protective switch during a test run. Temperature switches, float switches and pressure switches are further safety measures against malfunctions.

d) Notes to ensure EMC (Electromagnetic compatibility)

No impermissible spikes are emitted (EN 60034-1 sect. 19) when hydraulic power packs (inductive motor acc. to EN 60034-1 sect. 12.1.2.1) are connected to a system (e.g. power supply acc. to EN 60034-1 sect. 6). Tests regarding the conformity with EN 60034-1 sect. 12.1.2.1 and/or VDE 0530-1 are not required. Electro-magnetic fields may be generated during switching the motor ON/OFF. This effect can be minimized by means of a filter e.g. type 23140, 3 · 400V AC 4 kW 50-60 Hz (Co. MURR-ELEKTRONIK, D-71570 Oppenweiler)

There is an optional suppressor (coding E or PE, see sect. 2.1, table 1e) available for type KA, which can be directly mounted either at the terminal box or at the plug Co. HARTING



e) Putting into operation

- Check, whether the compact hydraulic power pack is professionally connected.
 - Electrically: Power supply, controls
 - Hydraulically: Piping, hoses, cylinders, motors
 - Mechanically: Fastening at the machine, the frame, and the rack
- A protective motor switch should be employed to safeguard the electric motor.
For current setting, see sect. 5.2 c
- The pressure fluid to top-up the power pack should have passed the system filter or be fed via a filter unit always. Only mineral oils conforming DIN 51524 part 1 to 3, type HL or HLP, with a viscosity of ISO VG 10 to 68 acc. to DIN 51519 are suited for use with this power pack. The water content must not exceed 0.1% (Danger of short-cut!)
Also suitable are biologically degradable pressure fluids type HEES (Synth. Ester) at service temperatures up to approx. +70°C.
Electrically hazardous: Any fluid types containing water must not be used (short-cut) i.e. fluids type HEPG and HETG are not suitable! The compact hydraulic power pack has to be topped-up to the max. marking of the fluid level gauge/dip-stick.

| Coding | KA 2, KAW 2 | | | KA 4, KAW 4 | | |
|--------|--|---|---|--|---|---|
| | Filling volume V_{filling} (l) | Usable filling volume vertically V_{usable} (l) | Usable filling volume horizontal V_{usable} (l) | Filling volume V_{filling} (l) | Usable filling volume vertically V_{usable} (l) | Usable filling volume horizontal V_{usable} (l) |
| -- | 3.9 | 1.85 | 1.5 | 13 | 5 | 6 |
| 1 | 5.0 | 2.7 | 2.0 | - | - | - |
| 01 | 5.0 | 2.7 | 2.0 | - | - | - |
| 11 | 6.1 | 3.55 | 2.5 | - | - | - |
| 2 | 7.5 | 5.45 | 3.15 | 22 | 15 | 11 |
| 02 | 7.5 | - | 3.15 | 22 | - | 11 |
| 21 | 8.6 | 5.45 | 3.65 | - | - | - |
| 22 | 11.1 | - | 4.8 | 31 | - | 16 |
| 3 | 11.1 | 8.95 | 4.8 | 31 | 25 | 16 |

- Direction of rotation
 - Radial piston pump - any
 - Gear pump - counterclockwise
 - (Direction of rotation can only be detected by checking the delivery flow - the connection of 2 of the 3 leads have to be changed at 3-phase versions, when there is no flow)
- Initial operation and bleeding
The pump cylinders will be bled automatically if the pump is switched on and off several times while the connected directional valves are switched into a switching position where idle circulation is provided, if possible with your circuitry (see circuit diagram). 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 (breather removed), 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.
- Pressure limitation and pressure reducing valves
Do not make any changes of the pressure setting without simultaneously checking the pressure with a pressure gauge!
- Directional valves
Solenoid valves apparent are to be connected to the controls according to the hydraulic wiring diagram and functional diagram.
- Accumulator charged systems
Accumulators have to be filled with appropriate equipment according to the pressure specifications of the hydraulic wiring diagram. The respective operating manuals have to be taken into account.

5.3 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 replaced every year as a general rule, but more frequently if tests show aging or contamination, filters (pressure or return) have to be replaced accordingly.

Silica gel filters,

- when apparent, have to be checked visually for a colour change every 6 month
- Used silica gel filter have to be disposed as hazardous waste!



Silica gel filter grain
blue = Ok
red = Replacement is indicated

- Attention:** Prior to maintenance and repair works the system has to be:
- depressurized (hydraulic side). This applies especially to systems with hydraulic accumulators
 - cut-off or deenergized

Repairs and spare parts

- Repairs (replacing service items) are possible by competent craftsmen. The motor can't be repaired or replaced by the customer. 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.

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 KA and KAW
acc. to our pamphlet D 8010 and D 8010-4
(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

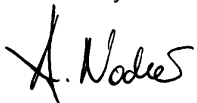
"Hydraulic fluid power – General rules and safety requirements for systems and their components"

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)