

# Compact hydraulic power pack type CPU

## Product documentation



for short period operation and standby mode (S2 and S3)

Operating pressure  $p_{\max}$ : 350 bar

Geometric displacement  $V_g$ : 7.9 cm<sup>3</sup>/rev

Usable volume  $V_{\text{use}}$ : Max. 12.6 l



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Compact hydraulic power packs are a type of hydraulic power pack. They are characterised by a highly compact design, since the motor shaft of the electric motor also acts as the pump shaft.

The compact hydraulic power pack CPU is suited for nominal operating modes S2 (short period operation) and S2 (intermittent operation).

**Features and benefits:**

- Excellent price-performance ratio
- Resource-saving due to small oil filling volume
- Vertical and horizontal installation possible

**Intended applications:**

- Machine tools
- Handling systems
- Wind turbines
- Solar systems



*Compact hydraulic power pack type CPU*

## 2 Available versions, main data

Order coding example:

CPU 34	1	S	KDT	/H 0,91	- 3 x 400 V 50 Hz	- 0,37 kW
CPU 34	5	L	S	/Z 5,2	- 3 x 400 V 50 Hz	- 0,75 kW

Motor voltage and motor power [Table 8 Motor data](#)

Pump version Pump version [See Chapter 2.2, "Pump"](#)

Additional options [Table 4 Additional options](#)

Installation position [Table 3 Installation position](#)

Tank size [Table 2 Tank size](#)

Basic type [Table 1 Basic type](#)

### 2.1 Motor and container

**Table 1 Basic type**

Basic type	Motor voltage
	Nominal voltage
CPU 34	3x400 V 50 Hz 3x460 V 60 Hz

**i NOTE**

The actual power consumption depends on the load and can be up to 1.8 x nominal power.

**Table 2 Tank size**

Coding	CPU 34 - 0.37 kW			CPU 34 - 0.75 kW			CPU 34 - 1.5 kW		
	Fill volume $V_{\text{fill}}$ (l)	Usable volume $V_{\text{usable}}$ (l)		Fill volume $V_{\text{usable}}$ (l)	Usable volume $V_{\text{usable}}$ (l)		Fill volume $V_{\text{usable}}$ (l)	Usable volume $V_{\text{usable}}$ (l)	
		Vertical	Horizontal		Vertical	Horizontal		Vertical	Horizontal
0	6.5	3.0	4.3	6.0	2.5	3.0	---	---	---
1	7.8	4.3	5.0	7.0	3.5	3.5	6.4	2.9	3.2
2	10.5	7.0	5.3	9.8	6.3	5.2	9.2	5.8	4.7
3	12	8.5	6.3	11.1	7.7	5.5	10.6	7.2	5.6
4	14.0	10.5	7.3	13.2	9.8	6.7	12.7	9.3	6.4
5	16.1	12.6	8.5	15.2	11.8	7.7	14.8	11.3	7.5

**Table 3 Installation position**

Coding	Comment
S	Vertical
L	Horizontal

**i NOTE**

- The horizontal version can be incorporated vertically.
- The vertical version within radial piston design (coding H) cannot be inserted horizontally.

**Table 4 Additional options**

Coding	Comment	Vertical	Horizontal
K	Oil level gauge (series)	●	●
S	Level switch (N/O contact)	-	●
D	Level switch (N/C contact)	-	●
KS/KD	Fixed combination coding K with coding D/S	●	-
T	Temperature switch (switching point 80°C)	●	●

**i NOTE**

Coding S and D cannot be combined together.

## 2.2 Pump

### **i** NOTE

- The delivery flow  $Q_{\max}$  relates to the rated speed and varies depending on the load.
- In pump version **Z**, the max. hydraulic work value  $(pV_g)_{\max}$  is to be reduced by 10%.

### Radial piston pump H

#### Installed pump elements type MPE

Delivery flow coding		H 0.33	H 0.47	H 0.59	H 0.66	H 0.91	H 0.93	
Piston diameter (mm)		4	5	4	6	7	5	
Number of pump elements		3	3	6	3	3	6	
Displacement volume $V_g$ (cm <sup>3</sup> /rev)		0.23	0.35	0.45	0.51	0.69	0.71	
CPU 34 - 0.37 kW	Permissible pressure $p_{\max}$ (bar)	350	350	350	350	315	310	
	Delivery flow $Q_{\max}$ (lpm)	50 Hz	0.31	0.48	0.62	0.69	0.94	0.96
		60 Hz	0.37	0.58	0.75	0.48	1.14	1.17
CPU 34 - 0.75 kW	Permissible pressure $p_{\max}$ (bar)	350	350	350	350	350	350	
	Delivery flow $Q_{\max}$ (lpm)	50 Hz	0.31	0.48	0.62	0.69	0.94	0.96
		60 Hz	0.37	0.58	0.75	0.48	1.14	1.17
CPU 34 - 1.5 kW	Permissible pressure $p_{\max}$ (bar)	350	350	350	350	350	350	
	Delivery flow $Q_{\max}$ (lpm)	50 Hz	0.31	0.48	0.62	0.69	0.94	0.96
		60 Hz	0.37	0.58	0.75	0.84	1.14	1.17

Delivery flow coding		H 1.18	H 1.33	H 1.51	H 1.81	H 2.36	H 2.99	
Piston diameter (mm)		8	6	9	7	8	9	
Number of pump elements		3	6	3	6	6	6	
Displacement volume $V_g$ (cm <sup>3</sup> /rev)		0.91	1.02	1.15	1.39	1.81	2.29	
<b>CPU 34 - 0.37 kW</b>	Permissible pressure $p_{max}$ (bar)	240	215	190	155	120	95	
	Delivery flow $Q_{max}$ (lpm)	50 Hz	1.23	1.38	1.56	1.88	2.46	3.11
		60 Hz	1.49	1.68	1.98	2.29	2.99	3.78
<b>CPU 34 - 0.75 kW</b>	Permissible pressure $p_{max}$ (bar)	350	350	350	350	325	255	
	Delivery flow $Q_{max}$ (lpm)	50 Hz	1.23	1.38	1.56	1.88	2.46	3.11
		60 Hz	1.49	1.68	1.98	2.29	2.99	3.78
<b>CPU 34 - 1.5 kW</b>	Permissible pressure $p_{max}$ (bar)	350	350	350	350	350	350	
	Delivery flow $Q_{max}$ (lpm)	50 Hz	1.23	1.38	1.56	1.88	2.46	3.11
		60 Hz	1.49	1.68	1.89	2.29	2.99	3.78

#### Installed pump elements type PE

Delivery flow coding		H 1.84	H 2.66	H 3.12	H 3.61	H 4.14	H 4.72	
Piston diameter (mm)		10	12	13	14	15	16	
Number of pump elements		3	3	3	3	3	3	
Displacement volume $V_g$ (cm <sup>3</sup> /rev)		1.41	2.04	2.39	2.77	3.18	3.62	
<b>CPU 34 - 0.75 kW</b>	Permissible pressure $p_{max}$ (bar)	350	285	245	210	185	160	
	Delivery flow $Q_{max}$ (lpm)	50 Hz	1.91	2.76	3.23	3.74	4.30	4.89
		60 Hz	2.31	3.34	3.91	4.54	5.21	5.93
<b>CPU 34 - 1.5 kW</b>	Permissible pressure $p_{max}$ (bar)	350	350	330	290	250	220	
	Delivery flow $Q_{max}$ (lpm)	50 Hz	1.91	2.76	3.23	3.74	4.30	4.89
		60 Hz	2.31	3.34	3.91	4.54	5.21	5.93

**Gear pump Z**

Delivery flow coding	Z 1.1	Z 1.7	Z 2.0	Z 2.7	Z 3.5	Z 4.5
Size	1	1	1	1	1	1
Displacement volume $V_g$ (cm <sup>3</sup> /rev)	0.8	1.1	1.4	1.9	2.4	3.1

<b>CPU 34 - 0.75 kW</b>	Permissible pressure $p_{max}$ (bar)		200	200	200	200	200	160
	Delivery flow $Q_{max}$ (lpm)	50 Hz	1.09	1.5	1.90	2.58	3.26	4.22
		60 Hz	1.32	1.82	2.31	3.14	3.96	5.12
<b>CPU 34 - 1.5 kW</b>	Permissible pressure $p_{max}$ (bar)		200	200	200	200	200	160
	Delivery flow $Q_{max}$ (lpm)	50 Hz	1.09	1.5	1.90	2.58	3.26	4.22
		60 Hz	1.32	1.82	2.31	3.14	3.96	5.12

Delivery flow coding	Z 5.2	Z 6.4	Z 6.9	Z 8.8	Z 9.8	Z 11.3
Size	1	1	1	1	1	1
Displacement volume $V_g$ (cm <sup>3</sup> /rev)	3.61	4.39	4.79	6.21	7.01	7.89

<b>CPU 34 - 0.75 kW</b>	Permissible pressure $p_{max}$ (bar)		145	120	110	85	75	65
	Delivery flow $Q_{max}$ (lpm)	50 Hz	4.90	5.98	6.53	8.30	9.52	10.74
		60 Hz	5.94	7.26	7.92	10.07	11.55	13.04
<b>CPU 34 - 1.5 kW</b>	Permissible pressure $p_{max}$ (bar)		200	175	160	125	110	95
	Delivery flow $Q_{max}$ (lpm)	50 Hz	4.90	5.98	6.53	8.30	9.52	10.74
		60 Hz	5.94	7.26	7.92	10.07	11.55	13.04

### 3.1 General

#### General information

<b>Conformity</b>	<ul style="list-style-type: none"> <li>▪ Declaration of incorporation according to Machinery Directive 2006/42/EC, see <a href="#">Chapter 6.2, "Explanations"</a></li> <li>▪ Declaration of conformity according to Low-Voltage Directive 2006/95/EC, see <a href="#">Chapter 6.2, "Explanations"</a></li> </ul>
<b>Designation</b>	Hydraulic power pack
<b>Design</b>	Valve-controlled radial piston pump or gear pump
<b>Model</b>	Compact hydraulic power pack (closed unit with a pump, electric drive and tank)
<b>Material</b>	Housing: Aluminium
<b>Attachment</b>	M8 threaded holes, see dimensioned drawings
<b>Installation position</b>	Vertical (CPU...S) or horizontal (CPU...L) Take note of the installation instructions for horizontal positioning in section 4.2.
<b>Rotation direction</b>	Radial piston pump – any Gear pump – anticlockwise (Rotation direction only ascertainable from check of delivery flow; if there is no delivery flow in the three-phase version, replace two of the three main conductors)
<b>Speed range</b>	Radial piston pump H:            100 ... 3500 rpm  Gear pump Z 1.1 ... Z 2.7:                    800 to 4000 rpm Z 3.5 ... Z 8.4:                    500 ... 3800 rpm Z 8.8 ... Z 11.3:                  500 ... 3500 rpm
<b>Line connection</b>	only via bolted-on connection blocks, connection drilling pattern <a href="#">See Chapter 4.3, "Electrical and hydraulic connections"</a>

<b>Hydraulic fluid</b>	Hydraulic oil: according to DIN 51 524 Part 1 to 3; ISO VG 10 to 68 according to DIN 51 519 Viscosity range: min. approx. 4; max. approx. 800 mm <sup>2</sup> /s Optimal operating range: approx. 10 ... 500 mm <sup>2</sup> /s Also suitable for biologically degradable pressure fluids type HEPG (polyalkylene glycol) and HEES (synthetic ester) at operating temperatures up to approx. +70°C.
<b>Cleanliness level</b>	<b>ISO 4406</b> 21/18/15...19/17/13
<b>Temperature</b>	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.

## Weight

### More possible additional weight per

- Tank size
- Pump type

Weight per motor size		Additional weight per tank size	
Type		Tank size	
<b>CPU 34 - 0.37 kW</b>	16.6 kg	0	--
<b>CPU 34 - 0.75 kW</b>	12.5 kg	1	+ 0.6 kg
<b>CPU 34 - 1.5 kW</b>	24.4 kg	2	+ 2.0 kg
		3	+ 2.8 kg
		4	+ 3.8 kg
		5	+ 4.9 kg

### Additional weight per pump type

H		Z	
<b>3 x MPE</b>	--	<b>Z 2.0...Z 4.5</b>	+ 1.2 kg
<b>6 x MPE</b>	+ 0.3 kg	<b>Z 5.2</b>	+ 1.3 kg
<b>3 x PE</b>	+ 0.6 kg	<b>Z 6.9...Z 9.8</b>	+ 1.4 kg
		<b>Z 11.3</b>	+ 1.5 kg

## 3.2 Electrical

Data applies to radial piston pumps and gear pumps

The drive motor forms a closed, inseparable unit with the pump, see description [Chapter 1, "Overview of compact hydraulic power pack type CPU"](#).

Port	Version with integrated terminal box, flat plug sleeve 6.3 AMP cable fitting M20 x 1.5 not part of the delivery
Protection class	IP 65 according to IEC 60529
Protection class	VDE 0100 Protection class 1
Insulation	designed in accordance with EN 60664-1

**Table 8 Motor data**

### 3-phase motor

Type	Nominal voltage and power frequency $U_N$ (V), f (Hz)	Nominal power $P_N$ (kW)	Rated speed $n_N$ (rpm)	Nominal current $I_N$ (A)	Starting current ratio $I_A / I_N$	Power factor $\cos \varphi$	Hydraulic work value ( $pV_g$ ) max (bar cm <sup>3</sup> )
CPU 34 - 0.37 kW	3x400 V 50 Hz	0.37	1360	1.86	4.0	0.69	220
	3x460 V 60 Hz	0.44	1700	1.07	5.0	0.70	220
CPU 34 - 0.75 kW	3x400 V 50 Hz	0.75	1380	1.93	6.0	0.76	590
	3x460 V 60 Hz	0.86	1655	1.93	5.6	0.75	590
CPU 34 - 1.5 kW	3x400 V 50 Hz	1.5	1390	3.8	6.5	0.73	1150
	3x460 V 60 Hz	1.8	1665	3.8	6.0	0.73	1150

### Temperature switch

Electrical connection [See Chapter 4.3](#)

Technical data:  
Bimetallic-element switch



Coding **T**

Contact N/C contact

Switching point  $80 \pm 5^\circ\text{C}$

Max. voltage

Nominal current 1.6 A

Max. current at 24 V 1.5 A

### Level switch

Electrical connection [See Chapter 4.3](#)

Coding **D, S** (horizontal)

Max. DC/AC switching capacity 30 VA

Max. DC/AC current 10.5 A ( $\cos \varphi = 1$ )

Max. voltage 230 V DC/AC

Coding **D, S** (vertical)

#### Coding

Max. DC/AC switching capacity

**D**

**S**

5 W

10 W

Max. DC/AC current

0.25 A

Max. voltage

50 V DC/AC

**D (N/C contact)**



**S (N/O contact)**

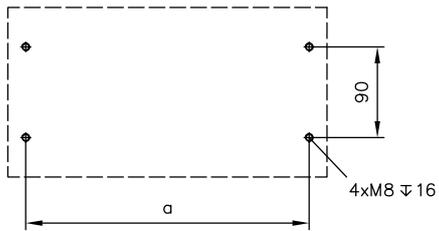


## 4 Dimensions

All dimensions in mm, subject to change.

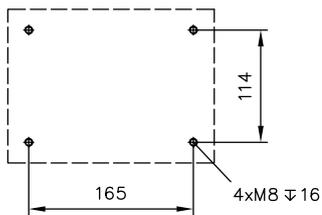
### 4.1 Mounting hole pattern

Horizontal version coding L

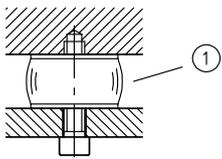


Tank size	a
CPU...0	328
CPU...1	378
CPU...2	484
CPU...3	538
CPU...4	618
CPU...5	698

Vertical version coding S



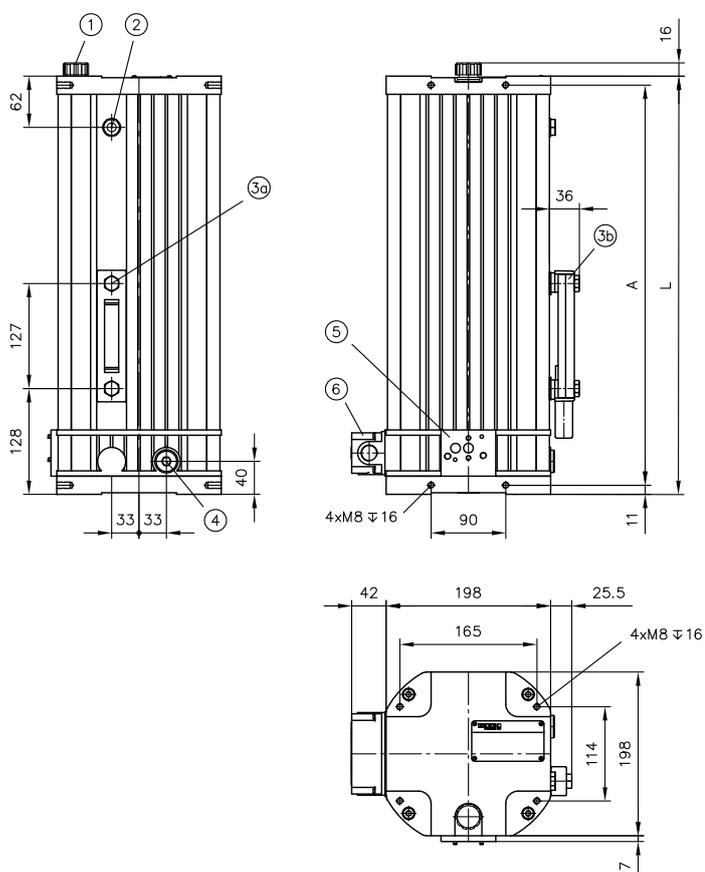
Recommended attachment



1 Damping element  $\varnothing 40 \times 30 / M8$  (65 Shore)

## 4.2 Basic pump

### Vertical version



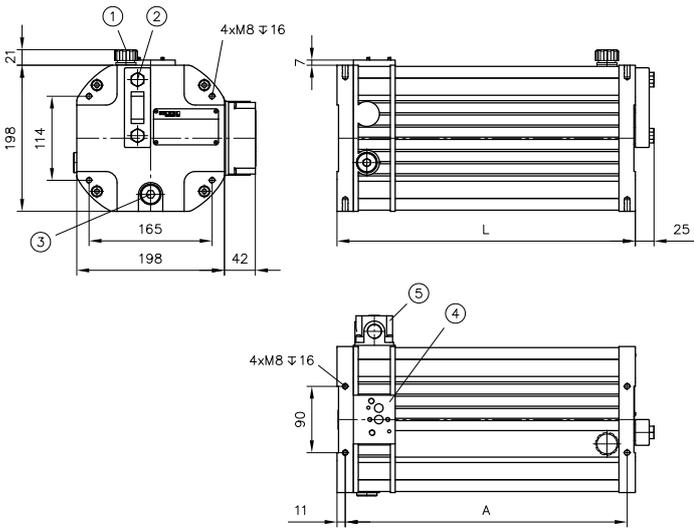
Coding	L	A
0	350	328
1	400	378
2	506	484
3	560	538
4	640	618
5	720	698

- 1 Bleeding (G 1/2) 10  $\mu$ m
- 2 Oil level gauge (K) - round
- 3a Oil level gauge (pipe) without level switch
- 3b Oil level gauge (pipe) with level switch
- 4 Oil drain (G 1/2)
- 5 Hydraulic connection
- 6 Electrical connection

**i NOTE**

If a horizontal version is used in a vertical position, ensure that the vent is on top and the built-in internal pump is at the bottom.

Horizontal version



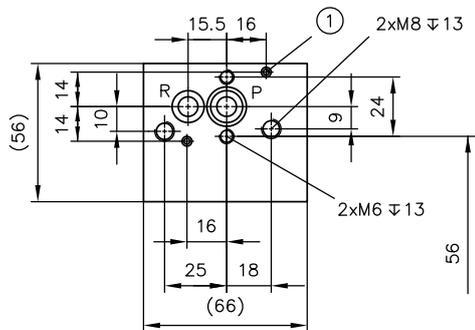
- 1 Bleeding (G 1/2) 10  $\mu$ m
- 2 Oil level gauge (K)
- 3 Oil drain (G 1/2)
- 4 Hydraulic connection
- 5 Electrical connection

Coding	L	A
0	350	328
1	400	378
2	506	484
3	560	538
4	640	618
5	720	698

## 4.3 Electrical and hydraulic connections

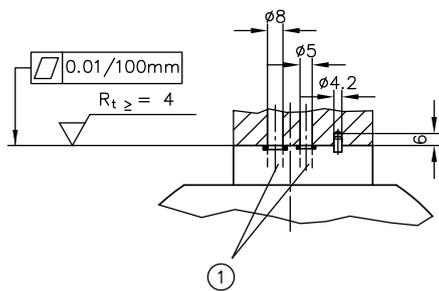
### Hydraulic

#### Pump



- 1 Centring pin

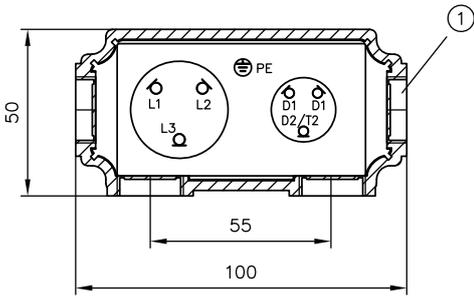
#### Hole for self-made connection block



- 1 Sealing of the connections:  
P, P1, P3 = 8x2 NBR 90 Sh  
R = 10.5x1.4x1.9 NBR (Kantseal)

**Electrical**

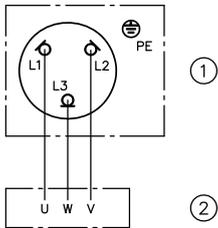
**Terminal box**



1 4 x M 20 x 1.5; cable fitting / cable gland (not part of the delivery)

**Motor connection**

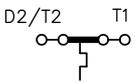
3 x 400/460V 50/60 Hz, Y



1 Connection box  
2 CPU motor

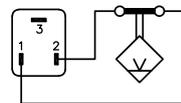
**Temperature switch**

Coding **T**  
(Terminal box)

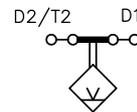


Coding **D, S**

**CPU...S**  
(Connection ISO 6952)



**CPU...L**  
Terminal box



## 5 Assembly, operation and maintenance recommendations

### 5.1 Intended use

These hydraulic components is intended exclusively for hydraulic applications (fluid technology).

The user must observe the safety measures and warnings in this documentation.

#### Essential requirements for the product to function correctly and safely:

- All information in this documentation must be observed. This applies in particular to all safety measures and warnings.
- The product must only be assembled and put into operation by qualified personnel.
- The product must only be operated within the specified technical parameters. The technical parameters are described in detail in this documentation.
- The operating and maintenance manual of the components, assemblies and the specific complete system must also always be observed.

#### If the product can no longer be operated safely:

1. Remove the product from operation and mark it accordingly.
- ✓ It is then not permitted to continue using or operating the product.

### 5.2 Assembly information

The product must only be installed in the complete system with standard and compliant connection components (screw fittings, hoses, pipes, fixtures etc.).

The product must be shut down correctly prior to dismantling (in particular in combination with hydraulic accumulators).



#### **DANGER**

##### **Risk to life caused by sudden movement of the hydraulic drives when dismantled incorrectly!**

Risk of serious injury or death.

- Depressurise the hydraulic system.
- Perform safety measures in preparation for maintenance.



#### **NOTE**

The pump unit may only be installed and connected by a qualified specialist who is familiar with and adheres to general engineering principles and relevant applicable regulations and standards.

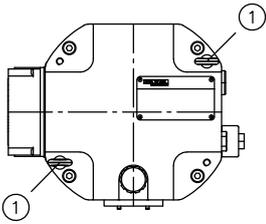
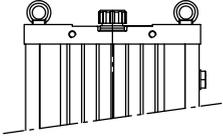
The electrical connection is to be carried out by a qualified specialist who has received appropriate training.

The following directives and standards must be observed:

- ISO 4413      Hydraulic fluid power – general rules for application
- [D 5488/1](#)      Oil recommendations
- [B 5488](#)        General operating and maintenance manual

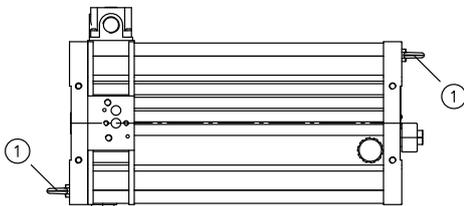
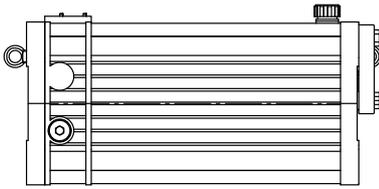
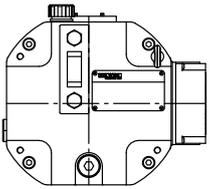
## 5.2.1 Transport notes

### Vertical version



1 Eye-bolt screw-in points

### Horizontal version



1 Eye-bolt screw-in points

The eye-bolts are contained in the scope of delivery of the CPU hydraulic power pack.

Material number 6016 1203-00

Eye-bolt ISO 3266 M8 x 13

## 5.2.2 Identification

See type plate or option table

### 5.2.3 Setting up and attaching

- Set-up

#### DANGER

**Risk of injury due to hot compact hydraulic power pack and hot directional valve solenoids during operation.**

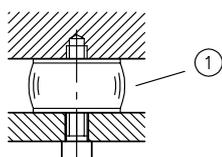
Danger of burning.

- Do not touch the compact hydraulic power pack or directional valve solenoids during operation.
- Allow the compact hydraulic power pack and directional valve solenoids to cool down before any work.
- Wear protective gloves.

#### NOTE

If surface temperatures  $>60^{\circ}\text{C}$  occur during operation, isolating safety devices are to be provided. Ensure that fresh air can be drawn in and that warm air can escape. No changes of any kind (mechanical, welding or soldering work) may be made.

- Installation position in accordance with version, see [Chapter 2.1, "Motor and container"](#), Table 1c
- For dimensions, see [Chapter 4.2, "Basic pump"](#)
- For mounting hole pattern, see [Chapter 4.1, "Mounting hole pattern"](#)
- Recommended attachment



1 Damping element  $\varnothing 40 \times 30 / \text{M8}$  (65 Shore)

- Weight (for the basic power pack, without valve mounting and oil filling)  
See [Chapter 3.1, "General"](#), weight

## 5.2.4 Electrical connection and selection of the motor protection circuit-breaker

- Connecting the electric drive (see [Chapter 3.2, "Electrical"](#))
- Connecting the float and level gauge (see [Chapter 3.2, "Electrical"](#))

**i NOTE**

Response temperature in accordance with the built-in temperature switch (see [Chapter 2.1, "Motor and container"](#), Table 1d and [Chapter 3.2, "Electrical"](#)).

**i NOTE**

If the amount of oil removed during each operating cycle causes the oil level to fall below the monitoring level of the level switch, then suitable electrical measures are to be taken in order to ignore the signal until the oil level rises above the monitoring level once again as a result of the oil flowing back in at the end of the operating cycle.

- Setting the motor protection circuit breaker
  - The motor protection circuit is set to approximately  $(0.85 \dots 0.9) I_N$  (see motor current [Chapter 3.2, "Electrical"](#)). This ensures that the motor protection circuit breaker is not triggered prematurely during normal operation, but that the response of the pressure-limiting valve before switch-off is not so long that the max. permissible oil temperature is exceeded.
  - The settings of the motor protection circuit breaker must be checked during the test run. Temperature switches, level switches and pressure switches are further safety measures against malfunctions.

## 5.2.5 Information on ensuring EMC (electromagnetic compatibility)

If compact hydraulic power packs (induction machine in accordance with EN 60034-1 Section 12.1.2.1) are connected to a system (for example, power supply in accordance with EN 60034-1 Section 6), they do not generate any impermissible fault signals (EN 60034-1 Section 19). Tests of immunity to interference to verify compliance with the standards EN 60034-1 Section 12.1.2.1 and VDE 0530-1 are not required. Any brief and potentially disruptive electromagnetic fields generated when switching the motor on and off can be weakened, for example, using suppressor type 23140, 3x400 V AC 4 kW 50-60 Hz, made by Murr-Elektronik, D-71570 Oppenweiler, Germany.

## 5.3 Operating instructions

### Note product configuration and pressure / flow rate

The statements and technical parameters in this documentation must be strictly observed.  
The instructions for the complete technical system must also always be followed.

#### **i** NOTE

- Read the documentation carefully before usage.
- The documentation must be accessible to the operating and maintenance staff at all times.
- Keep documentation up to date after every addition or update.

#### **⚠** CAUTION

##### **Risk of injury on overloading components due to incorrect pressure settings!**

Risk of minor injury.

- Always monitor the pressure gauge when setting and changing the pressure.

### Purity and filtering of the hydraulic fluid

Fine contamination can significantly impair the function of the hydraulic component. Contamination can cause irreparable damage.

#### Examples of fine contamination include:

- Metal chips
- Rubber particles from hoses and seals
- Dirt due to assembly and maintenance
- Mechanical debris
- Chemical ageing of the hydraulic fluid

#### **i** NOTE

Fresh hydraulic fluid from the drum does not always have the necessary degree of purity.  
When pouring in hydraulic fluid, filter it.

Pay attention to the cleanliness level of the hydraulic fluid to maintain faultless operation.  
(See also cleanliness level in [Chapter 3, "Parameters"](#))

Additionally applicable document: [D 5488/1](#) Oil recommendations

Always fill the hydraulic fluid via the system filter or a mobile filter station.

**Check for correct connection**

- Electrical: power supply, control
- Hydraulic: piping, hoses, cylinders, motors
- Mechanical: attachment to the machine, the frame and the base

**Motor protection**

- The electric drive must be protected with a motor protection circuit.

**Fill volume and usable volume**

Coding	CPU 34 - 0.37 kW			CPU 34 - 0.75 kW			CPU 34 - 1.5 kW		
	Fill volume V <sub>fill</sub> (l)	Usable volume V <sub>usable</sub> (l)		Fill volume V <sub>usable</sub> (l)	Usable volume V <sub>usable</sub> (l)		Fill volume V <sub>usable</sub> (l)	Usable volume V <sub>usable</sub> (l)	
		Vertical	Horizontal		Vertical	Horizontal		Vertical	Horizontal
0	6.5	3.0	4.3	6.0	2.5	3.0	---	---	---
1	7.8	4.3	5.0	7.0	3.5	3.5	6.4	2.9	3.2
2	10.5	7.0	5.3	9.8	6.3	5.2	9.2	5.8	4.7
3	12	8.5	6.3	11.1	7.7	5.5	10.6	7.2	5.6
4	14.0	10.5	7.3	13.2	9.8	6.7	12.7	9.3	6.4
5	16.1	12.6	8.5	15.2	11.8	7.7	14.8	11.3	7.5

**Rotation direction**

- Radial piston pump – any
- Gear pump – anticlockwise

### Start and bleeding

- Directional valve is in switching position in which the depressurised circulation of the pump is possible.
  1. Switch the pump on and off several times so that the pump cylinders bleed automatically.
- If the controller is not designed for this,
  2. a pipe screw connection with a short pipe bracket and a transparent plastic tube can be attached to connection P.
  3. Insert the other end into the opening for the oil filler (unscrew the air filter).
- ✓ When the oil flow is free of bubbles, the pump has been bled.
- 4. Then move the consumer(s) back and forth several times until the air is largely removed there too and the movement is smooth.
- 5. If the consumers have bleed points, loosen the locking elements and only tighten them once bubble-free oil emerges.

### Directional valves

- Any solenoid valves must be connected to the controller in accordance with the hydraulic schematic and function diagram.

### Accumulator systems

- Accumulators should be filled using designated equipment in accordance with the pressure specifications of the hydraulic schematic. The relevant operating and maintenance manuals must be followed.



#### **CAUTION**

##### **Risk of injury due to incorrect transportation.**

Risk of minor injury.

- Comply with the regulations on transportation and safety.
- Wear protective equipment.

## 5.4 Maintenance information

Conduct a visual inspection at regular intervals, but at least once per year, to check if the hydraulic connections are damaged. If external leakages are found, shut down and repair the system.

Clean the device surface of dust deposits and dirt at regular intervals, but at least once per year.

**i** **NOTE**

Before starting maintenance or repair work:

- Depressurise the system on the fluid side. This applies in particular for systems with hydraulic accumulators.
- Switch off or interrupt the power supply.

Repairs and spare parts

- Repairs (replacement of wearing parts) can be carried out by trained specialists themselves. A spare parts list is available on request. The electric drive cannot be replaced.

### 5.4.1 Disposal information

- Valve control
  - Mixed scrap
- Pump housing with motor
  - Electronic waste
- Tank or hydraulic accumulator, as applicable (depressurised on the gas side)
  - Scrap iron
- Hydraulic fluid
  - Waste oil

## 6 Other information

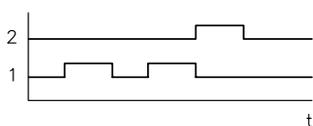
### 6.1 Planning information

#### 6.1.1 Selection advice

The procedure for the selection and design of compact hydraulic power packs with a valve attachment is described below. In order to find the ideal solution, several iterative steps generally have to be carried out.

##### a) Setting up a function diagram

The required or desired (hydraulically activated) functions form the basis for the function diagram.



##### b) Definition of pressures and flow rates

- Dimensioning and selection of actuators on the basis of the reaction forces arising
- Calculation of the individual flow rates on the basis of the required velocity profiles

#### **i** NOTE

Take note of the reset times for spring-loaded clamping cylinders.

In the case of time-linked clamping devices, the release of spring-loaded clamping cylinders may often have a greater influence over the time interval than clamping. The return stroke times are determined exclusively by the forces of the reset springs. They drive the cylinder pistons ahead, against the flow resistance from directional valves and pipelines. This must be noted in the dimensions of pipelines or hose lines, as well as valves.

- Calculation of the individual operation pressures required
- Determination of the maximum (pump) delivery flow required – Q (lpm)
- Determination of the (system) operating pressure –  $p_{\max}$  (bar)

Q - flow rate

p - pressure

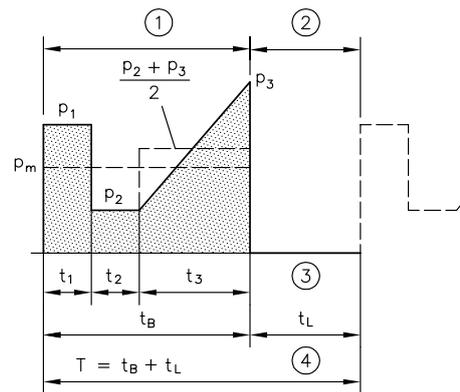
A - Area

v - Velocity

F - Force

$$Q \left( l/min \right) = 0.06 \cdot A \left( mm^2 \right) \cdot v \left( \frac{m}{s} \right)$$

$$p \left( bar \right) = \frac{10 \cdot F \left( N \right)}{A \left( mm^2 \right)}$$



- 1 Load time
- 2 No-load time
- 3 No load
- 4 One working cycle

### c) Preparation of the hydraulic schematic

- Criteria:
  - single circuit system
  - Accumulator charging mode
  - Dual-circuit systems with two separately operating hydraulics circuits
  - Dual-circuit systems with a shared hydraulics circuit (for instance, in presses or hydraulic tools as high-pressure systems / low-pressure systems, in handling systems with velocity control/rapid feed/creep)
  - Use of an accumulator for the short-term support of the pump delivery flow

### d) Setting up a time/load diagram on the basis of a function diagram

- Deriving the mode for the compact hydraulic power pack
  - Calculation of the relative ON-time %ED
  - S1 – continuous operation (not suitable for compact hydraulic power packs )
  - S2 – short period operation
  - S3 – standby mode

### e) Selection of a compact hydraulic power pack

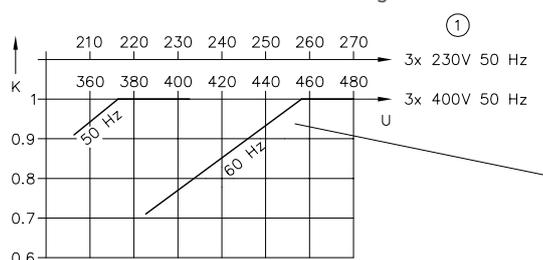
- Definition of the basic type on the basis of the power supply
  - Three-phase current
- Motor selection
  - Voltage tolerances:  $\pm 10\%$  (IEC 38), at 3x460/265 V 60 Hz  $\pm 5\%$
  - A 3-phase motor 400 V 50 Hz can be used without restrictions in 460 V 60 Hz supply networks. Single-phase-motors can only be used in supply networks at the nominal voltage and nominal frequency.
  - It can be operated at undervoltage. Bear in mind that this will involve performance restrictions.

$$p_{\max \text{ red}} = p_{\max} * k$$

$p_{\max}$  (bar) – max. operating pressure in accordance with the selection tables

$p_{\max \text{ red}}$  (bar) – reduced max. available operating pressure

\* k – correction factor from the diagram



U supply voltage (V); K correction factor



#### NOTE

Pump delivery flow 1.2 x greater than at 50 Hz operation!

1 Motor design

- Selection of the pump type (radial piston pump, gear pump pump combination)
- Selection of the key figure for the pump delivery flow with due regard for the maximum permissible pressure and definition of the basic type with the motor size
- Estimation of the noise level from the diagrams in [Chapter 3, "Parameters"](#)

### f) Calculation of the hydraulic work value

- Calculation of the average pressure
- Calculation of the average hydraulic work value (average pressure x output volume)
- Calculation of the maximum hydraulic work value (maximum operating pressure x output volume)

$p_m$  (bar) = calculated average pressure per cycle during the load time

$$t_B = t_1 + t_2 + t_3 + \dots$$

$$p_m = \frac{1}{t_B} \left( p_1 \cdot t_1 + p_2 \cdot t_2 + \frac{p_2 + p_3}{2} \cdot t_3 + \dots \right)$$

$p_m V_g$  = average hydraulic work value

$V_g$  = geometric displacement volume in accordance with the tables [Chapter 2.2, "Pump"](#)

$$pV_{g \text{ max}} (\text{bar cm}^3) = p_{\max} * V_g$$

**EU- Konformitätserklärung - Original**  
*EU Declaration of conformity - original*Hersteller:  
*Manufacturer:*HAWE Hydraulik SE  
Einsteinring 17  
DE-85609 Aschheim/MünchenDie alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.  
*This declaration of conformity is issued under the sole responsibility of the manufacturer.*Produkt:  
*Product:***Typ CPU nach unserer Dok. D 8010 CPU**  
*Type CPU acc. to our documentation D 8010 CPU*Gegenstand der Erklärung:  
*Object of the declaration:*Unterölmotor des Hydraulikaggregates  
*Immersed Motor of hydraulic power pack*Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften der EU:  
*The object of the declaration described above is in conformity with the relevant European Union harmonization legislation:***2014/35/EU**Es wurden folgende harmonisierte Normen oder andere technische Spezifikationen zugrunde gelegt:  
*The following harmonized standards or other technical specifications have been applied:***DIN EN 60204-1 VDE0113-1:2019-06**

Aschheim, 2022-09-29

  
Axel Schwerdtfeger, CTO  
Dogan Basöz, Product Manager

**Einbauerklärung einer unvollständigen Maschine - Original**

nach Maschinenrichtlinie 2006/42/EG, Anhang II B

**Declaration of incorporation of partly completed machinery – original**  
according to machinery directive 2006/42/EC, Annex II BHersteller:  
Manufacturer:HAWE Hydraulik SE  
Einsteinring 17  
DE-85609 Aschheim/MünchenDie alleinige Verantwortung für die Ausstellung dieser Einbauerklärung trägt der Hersteller.  
*This declaration of incorporation is issued under the sole responsibility of the manufacturer.*Unvollständige Maschine:  
*Partly completed machinery:***Typ CPU nach unserer Dok. D 8010 CPU**  
*Type CPU according to our documentation D 8010 CPU*Die folgenden grundlegenden Sicherheits- und Gesundheitsschutzanforderung der Richtlinie 2006/42/EG kommen zur Anwendung:  
*The following essential health and safety requirements of Directive 2006/42/EC apply:***Abschnitte (chapters) 1.1.2, 1.1.3, 1.1.5, 1.2 komplett (complete), 1.3.1, 1.3.2, 1.3.4, 1.3.6, 1.3.7, 1.5.1, 1.5.2, 1.5.3, 1.5.4, 1.5.5, 1.5.6, 1.5.8, 1.5.9, 1.5.16, 1.6.3, 1.7.1, 1.7.3, 1.7.4 und 1.7.4.3.**

Es wurden folgende harmonisierte Normen oder andere technische Spezifikationen zugrunde gelegt:

*The following harmonized standards or other technical specifications have been applied:***DIN EN ISO 12100:2011-03**Dokumentationsbevollmächtigter:  
*Person authorised to compile the technical file:*HAWE Hydraulik SE  
Abt. Produktmanagement  
Einsteinring 17  
D-85609 Aschheim/MünchenDie speziellen technischen Unterlagen nach Anhang VII Teil B wurden erstellt.  
*The relevant technical documentation is compiled in accordance with part B of Annex VII.*

Der Hersteller verpflichtet sich, die speziellen technischen Unterlagen zur unvollständigen Maschine einzelstaatlichen Stellen auf Verlangen elektronisch zu übermitteln.

*The manufacturer undertakes to electronically transmit the special technical documents on the partly completed machinery to national authorities on request.*

Die unvollständige Maschine darf erst dann in Betrieb genommen werden, wenn festgestellt wurde, dass die Maschine, in die die unvollständige Maschine eingebaut werden soll, den Bestimmungen der Richtlinie 2006/42/EG entspricht.

*The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the directive 2006/42/EG.*

Aschheim, 2022-09-29

  
Axel Schwerdtfeger, CTO  
Dogan Basöz, Produkt Manager

**Declaration of incorporation of partly completed machinery – original**

according to Supply of Machinery (Safety) Regulations 2008, 2008 No. 1597, annex II B

**Einbauerklärung einer unvollständigen Maschine - Original**

nach Supply of Machinery (Safety) Regulations 2008, 2008 No. 1597, Anhang II B

Manufacturer:  
Hersteller:HAWE Hydraulik SE  
Einsteinring 17  
DE-85609 Aschheim/MünchenThis declaration of incorporation is issued under the sole responsibility of the manufacturer.  
*Die alleinige Verantwortung für die Ausstellung dieser Einbauerklärung trägt der Hersteller.*Partly completed machinery:  
Unvollständige Maschine:**Type CPU according to our doc. D 8010 CPU**  
Typ CPU nach unserer Dokumentation D 8010 CPUThe following essential health and safety requirements of Directive 2008 No. 1597 apply:  
*Die folgenden grundlegenden Sicherheits- und Gesundheitsschutzanforderung der Richtlinie 2008 No. 1597 kommen zur Anwendung:***Chapters (Abschnitte) 1.1.2, 1.1.3, 1.1.5, 1.2 complete (komplett), 1.3.1, 1.3.2, 1.3.4, 1.3.6, 1.3.7, 1.5.1, 1.5.2, 1.5.3, 1.5.4, 1.5.5, 1.5.6, 1.5.8, 1.5.9, 1.5.16, 1.6.3, 1.7.1, 1.7.3, 1.7.4 and 1.7.4.3.**The following designated standards or other technical specifications have been applied:  
*Es wurden folgende harmonisierte Normen oder andere technische Spezifikationen zugrunde gelegt:***DIN EN ISO 12100:2011-03**Person authorised to compile the technical file:  
Dokumentationsbevollmächtigter:Koppen & Lethem Ltd  
3 Glenholm Park, Brunel Drive  
Newark | Nottinghamshire | NG24 2EG  
United KingdomThe relevant technical documentation is compiled in accordance with part B of Annex VII.  
*Die speziellen technischen Unterlagen nach Anhang VII Teil B wurden erstellt.*The manufacturer undertakes to electronically transmit the special technical documents on the partly completed machinery to national authorities on request.  
*Der Hersteller verpflichtet sich, die speziellen technischen Unterlagen zur unvollständigen Maschine einzelstaatlichen Stellen auf Verlangen elektronisch zu übermitteln.*The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the directive 2008 No. 1597.  
*Die unvollständige Maschine darf erst dann in Betrieb genommen werden, wenn festgestellt wurde, dass die Maschine, in die die unvollständige Maschine eingebaut werden soll, den Bestimmungen der Richtlinie 2008 No. 1597.*

Aschheim, 2022-09-29

  
Axel Schwerdtfeger, CTO  
Dogan Basöz, Product ManagerHAWE Hydraulik SE . Einsteinring 17 . D-85609 Aschheim/München . info@hawe.de . Tel. +49 89 379100-1000 . Fax +49 89 379100-91000  
Europäische Aktiengesellschaft (SE) . Sitz der Gesellschaft: München . USt ID Nr: DE180016108 . Registergericht München HRB 174760  
Vorstand: Robert Schullan, Axel Schwerdtfeger, Wolfgang Sochor, Markus Unterstein, Jiang Ye  
Vorsitzender des Aufsichtsrats: Karl Haeusgen  
Hypo-Vereinsbank München, 1780008454 (BLZ 700 202 70), IBAN DE53 7002 0270 1780 0084 54, BIC HYVEDEMMXXX  
Commerzbank München, 150623700 (BLZ 700 400 41), IBAN DE56 7004 0041 0150 6237 00, BIC COBADEFFXXX  
Baden-Württembergische Bank, 2368049 (BLZ 600 501 01), IBAN DE90 6005 0101 0002 3680 49, BIC SOLADEST  
Bayerische Landesbank, 203693428 (BLZ 700 500 00), IBAN DE86 7005 0000 0203 6934 28, BIC BYLADEMMXXX

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ISO 9001  
ISO 14001  
ISO 50001  
ISO 45001[www.hawe.com](http://www.hawe.com)

**UKCA-Declaration of conformity - original**  
**UKCA Konformitätserklärung - Original**Manufacturer:  
*Hersteller:*HAWE Hydraulik SE  
Einsteinring 17  
DE-85609 Aschheim/MünchenThis declaration of conformity is issued under the sole responsibility of the manufacturer.  
*Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.*Product:  
*Produkt:***Type CPU acc. to our documentation D 8010 CPU**  
*Typ CPU nach unserer Dokumentation D 8010 CPU*Object of the declaration:  
*Gegenstand der Erklärung*Immersed Motor of hydraulic power pack  
*Unterölmotor des Hydraulikaggregates*The object of the declaration described above complies with the relevant designated standards of the United Kingdom:  
*Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen Harmonisierungsrechtsvorschriften des UK:***Electrical Equipment (Safety) Regulations 2016**  
**No. 1101**The following designated standards or other technical specifications have been applied:  
*Es wurden folgende harmonisierte Normen oder andere technische Spezifikationen zugrunde gelegt:***EN 60204-1:2018**Person authorised to compile the technical file:  
*Dokumentationsbevollmächtigter:*Koppen & Lethem Ltd  
3 Glenholm Park, Brunel Drive  
Newark | Nottinghamshire | NG24 2EG  
United Kingdom

Aschheim, 2022-09-29

  
Axel Schwerdtfeger, CTO  
Dogan Basöz, Product Manager

## Further information

### Additional versions

- Hydraulic power pack type FXU: D 6020
- Compact hydraulic power packs type KA and KAW size 4: D 8010-4
- Compact hydraulic power pack type KA and KAW size 2: D 8010
- Compact hydraulic power pack type MPN and MPNW: D 7207
- Compact hydraulic power pack type HK 2: D 7600-2
- Compact hydraulic power pack type HK 3: D 7600-3
- Compact hydraulic power pack type HKL and HKLW: D 7600-3L
- Compact hydraulic power pack type HK 4: D 7600-4
- Compact hydraulic power pack type HC and HCW: D 7900
- Compact hydraulic power pack type NPC: D 7940
- Connection blocks type A for hydraulic power packs: D 6905 A/1
- Connection block type AX, with unit approval: D 6905 TUV
- Connection blocks type B for hydraulic power packs: D 6905 B
- Connection block type C 5 and C 6: D 6905 C
- Valve bank (directional seated valve) type VB: D 7302
- Valve bank (directional seated valve) type BWN and BWH: D 7470 B/1
- Directional spool valve type SW: D 7451
- Directional spool valve bank type SWS: D 7951
- Valve bank (nominal size 6) type BA: D 7788
- Valve bank (directional seated valve) type BVH: D 7788 BV
- Directional seated valve type NBVP 16: D 7765 N
- Directional spool valve type NSWP 2: D 7451 N
- Clamping module type NSMD: D 7787
- Intermediate plate type NZP: D 7788 Z
- Fitting type X 84: D 7077
- Diaphragm accumulator type AC: D 7969
- Miniature hydraulic accumulators, type AC: D 7571