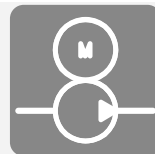


Motor pump and compact hydraulic power pack type MPN, MPNW

Product documentation



For Short period operation (S2), Periodic intermittent operation (S3)

Operating pressure $p_{\max}$:	700 bar
Displacement volume $V_{\max}$:	61.0 cm ³ /rev
Usable volume V_{use} :	58.5 l



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1 Overview of motor pump and compact hydraulic power pack type MPN, MPNW

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. Compact hydraulic power packs are used to supply hydraulic oil in hydraulic systems.

The compact hydraulic power pack type MPN and MPNW consists of the tank, the motor and the radial piston or gear pump directly attached to the motor shaft. Single-circuit or dual-circuit systems can be assembled. Type MPN includes a 3-phase motor, while type MPNW has a single-phase motor.

The hydraulic pump of type MPN or MPNW is available as a single motor pump, as a cover plate version or as a hydraulic power pack with different tank sizes. Compatible, ready-for-connection, complete solutions can be assembled easily using a wide range of connection blocks and the valve banks that can be combined with them. The cover plate version is intended for the use of tanks provided by the customer.

Features and advantages

- Long service life and high reliability
- Low noise when using an internal gear pump
- Optimum efficiency thanks to submersible motor cooling

Intended applications

- Machine tools
- Test stands and testing machinery
- Small presses
- Hydroelectric plants



Compact hydraulic power pack type MPN, MPNW

2.1 Motor and container

2.1.1 Basic type and motor power

Type	Nominal power (kW)	Rated speed at 50 Hz (min ⁻¹)	Rated speed at 60 Hz (min ⁻¹)
3-phase motor			
MPN 42	2.1	2785	3380
MPN 44 MPN 44 V *	2.1	1360	1632
MPN 46	3.0	2815	3410
MPN 48	3.0	1370	1665
MPN 404	4.2	1370	1660
Single-phase motor			
MPNW 42	1.5	2800	--
MPNW 44	1.5	1375	--

* V = Encased motor

see Chapter 3.6, "Motor data"

2.1.2 Pump

Coding	Comment
H	Radial piston pump
Z	Gear pump
IZ	Internal gear pump
HZ	Dual-stage pump
HH	Dual-circuit pump

2.1.3 Tank version, cover plate version

Coding		Description	Fill volume V _{fill} (l)	Usable volume V _{use} (l)	
Tank	Cover plate			Option 1	Option 2
B 10	D 10	Vertical version	17	4	7
B 25	D 25		37	13.5	20
B 55	D 55		75	29.5	42.5
B 110	D 55		100	50.5	58.5
B 25 L	D 25 L	Horizontal version			
B 55 L	D 55 L				

i INFORMATION

Definition of option 1 and 2:

- **B10:** Option 1 with MPN(W) 42, MPN 44, MPN 46, MPN 48 with gear pump size 1. Otherwise, option 2.
- **B25, B 55:** Option 1 with MPN 404 with gear pump size 1; MPN(W) with gear pump size 2 or 3; MPN 44, MPN 48, MPN 404 with radial piston pump (type H) with 6 pump elements. Otherwise, option 2.
- **B110:** Option 1 with MPN 46, MPN 48, MPNW 44, MPN 404, MPNW 44 with gear pump size 3; MPN(W) with HZ pump (radial piston pumps together with gear pump size 1 or 2); MPN 42, MPN 44, MPNW 42 with HZ pump (radial piston pumps together with gear pump size 3). Otherwise, option 2.

Allocation of motor, tank and pump

Type	Tank or cover plate	Connection base	Pump version				
			H HH	Z	IZ	HZ with Z Size 1, 2	HZ with Z Size 3
MPN 42 MPNW 42	B 10, D 10	20	●	to Z 9.8			
	B 25, D 25	20, 80, 90	●	to Z 45	●	●	
	B 55, D 55	20, 80, 90, 160	●	●	●	●	
	B 110, D 110	20, 80, 90, 160	●	●	●	●	●
MPN 44 MPNW 44 MPN 46 MPN 48	B 10, D 10	20	●	to Z 21			
	B 25, D 25	20, 80, 90, 160	●	●	●	●	
	B 55, D 55	20, 80, 90, 160	●	●	●	●	
	B 110, D 110	20, 80, 90, 160	●	●	●	●	●
MPN 404	B 10, D 10	20	●				
	B 25, D 25	20, 80, 90, 160	●	●	●		
	B 55, D 55	20, 80, 90, 160	●	●	●		
	B 110, D 110	20, 80, 90, 160	●	●	●	●	●

2.1.4 Connection base

Coding	Flow rate Q _{max} (l/min)	Tank or cover plate version			
		B10, D10 *	B25, D25	B55, D55	B110, D55
20	20	●	●	●	●
80	80		●	●	●
90	90		●	●	●
160	160			●	●

* For B 10, D 10: Coding 20 is not listed in the order coding.

Selection of connection base

- 20**
 - Attachment of all connection blocks in accordance with [D 6905 AB](#), [D 6905 B](#), [D 6905 C](#) possible
- 80, 160**
 - Attachment of connection blocks in accordance with [Sk 6906 C](#) possible
- 90**
 - Only in combination with dual-stage pumps and for the installation of valves of type CR 4 in accordance with [D 7150](#) and type NE 70 in accordance with [D 7161](#)

i INFORMATION

For max. flow rate, also take into account the specification of the attached valves!

2.1.5 Additional elements

Coding	Comment
Without coding	Without additional equipment
K, K1, K3	Level gauge, positions, see Chapter 4.3, "Tank and cover plate versions"
S	Level switch (N/O contact)
D	Level switch (N/C contact)
T	Temperature switch (switching point of 80°C), series in the MPNW model
T 60	Temperature switch (switching point of 60°C), only in the MPN model
T 50	Temperature switch (switching point of 50°C), only in the MPN model

2.1.6 Additional return port

Coding	Port	Tank or cover plate version			
		B10, D10	B25, D25	B55, D55	B110, D55
Without coding	Without port				
R	G 1/2	●			
	G 3/4		●		
	G 1			●	●

2.1.7 Electrical connection

Coding	Comment
Without coding	Series (terminal box)
P	Harting plug (not for motor pump)

2.2 Single-circuit pumps

2.2.1 High-pressure pumps

2.2.1.1 Single-circuit radial piston pump (H) with 3-phase motor

Ordering example

MPN 48 -H 3,8 -3x400/230 V 50 Hz

Single-circuit radial piston pump (H) with 3-phase motor

i INFORMATION

Re the following points see Chapter 3.6, "Motor data":

- The flow rate $Q_{\max}$ relates to the rated speed and varies depending on the load.
- Notes on pressures $p_{\max}$ (see Chapter 3.6, "Motor data").
- The permitted pressures $p_{\max}$ apply to a version with a 3x400 V 50 Hz/460 V 60 Hz or 3x230 V 50 Hz/265 V 60 Hz motor.
- Be aware of different motor power ratings and resulting permissible maximum pressures $p_{\max} = (pV_g)_{\max} / V_g$, at other nominal voltages and power frequencies $(pV_g)_{\max}$.

Radial piston pump H

Type	Delivery flow coding		H 0.6	H 0.83	H 0.9	H 1.0	H 1.25	H 1.5
	Piston diameter (mm)		6	7	6	8	7	8
	Number of pump elements		2	2	3	2	3	3
	Displacement volume V_g (cm ³)		0.43	0.58	0.64	0.76	0.88	1.15
MPN 42	Permissible pressure $p_{\max}$ (bar)		700	700	700	700	700	590
	Flow rate $Q_{\max}$ (l/min)	50 Hz	1.17	1.58	1.75	2.07	2.40	3.14
		60 Hz	1.42	1.92	2.12	2.52	2.91	3.81
MPN 44	Permissible pressure $p_{\max}$ (bar)		700	700	700	700	700	700
	Flow rate $Q_{\max}$ (l/min)	50 Hz	0.57	0.77	0.85	1.01	1.17	1.53
		60 Hz	0.69	0.93	1.02	1.22	1.41	1.84
MPN 46	Permissible pressure $p_{\max}$ (bar)		700	700	700	700	700	700
	Flow rate $Q_{\max}$ (l/min)	50 Hz	1.19	1.60	1.77	2.10	2.43	3.17
		60 Hz	1.44	1.94	2.14	2.54	2.94	3.84
MPN 48	Permissible pressure $p_{\max}$ (bar)		700	700	700	700	700	700
	Flow rate $Q_{\max}$ (l/min)	50 Hz	0.58	0.78	0.86	1.02	1.18	1.54
		60 Hz	0.70	0.95	1.04	1.24	1.44	1.88
MPN 404	Permissible pressure $p_{\max}$ (bar)		700	700	700	700	700	700
	Flow rate $Q_{\max}$ (l/min)	50 Hz	0.58	0.78	0.86	1.02	1.18	1.54
		60 Hz	0.70	0.94	1.04	1.24	1.43	1.87

Radial piston pump H

Type	Delivery flow coding		H 1.6	H 1.83	H 2.4	H 2.45	H 2.5	H 2.8
	Piston diameter (mm)		10	6	12	7	10	13
	Number of pump elements		2	6	2	6	3	2
	Displacement volume V _g (cm ³)		1.19	1.29	1.72	1.75	1.79	2.02
MPN 42	Permissible pressure p _{max} (bar)		560	525	390	385	380	330
	Flow rate Q _{max} (l/min)	50 Hz	3.25	3.52	4.69	4.78	4.89	5.51
		60 Hz	3.94	4.27	5.70	5.80	5.93	6.69
MPN 44	Permissible pressure p _{max} (bar)		600	700	420	650	600	360
	Flow rate Q _{max} (l/min)	50 Hz	1.59	1.72	2.29	2.33	2.39	2.69
		60 Hz	1.90	2.06	2.75	2.80	2.86	3.23
MPN 46	Permissible pressure p _{max} (bar)		600	700	420	590	580	360
	Flow rate Q _{max} (l/min)	50 Hz	3.28	3.56	4.74	4.83	4.94	5.57
		60 Hz	3.98	4.31	5.75	5.85	5.98	6.75
MPN 48	Permissible pressure p _{max} (bar)		600	700	420	700	600	360
	Flow rate Q _{max} (l/min)	50 Hz	1.60	1.73	2.31	2.35	2.40	2.71
		60 Hz	1.94	2.10	2.81	2.86	2.92	3.30
MPN 404	Permissible pressure p _{max} (bar)		600	700	420	700	600	360
	Flow rate Q _{max} (l/min)	50 Hz	1.60	1.73	2.31	2.35	2.40	2.71
		60 Hz	1.94	2.10	2.80	2.85	2.91	3.29

Radial piston pump H

Type	Delivery flow coding		H 3.2	H 3.3	H 3.6	H 3.8	H 4.3	H 4.4
	Piston diameter (mm)		8	14	12	15	13	16
	Number of pump elements		6	2	3	2	3	2
	Displacement volume V _g (cm ³)		2.29	2.34	2.58	2.69	3.03	3.06
MPN 42	Permissible pressure p _{max} (bar)		295	290	260	250	220	220
	Flow rate Q _{max} (l/min)	50 Hz	6.25	6.39	7.04	7.34	8.27	8.35
		60 Hz	7.59	7.75	8.55	8.91	10.04	10.14
MPN 44	Permissible pressure p _{max} (bar)		500	310	420	270	360	240
	Flow rate Q _{max} (l/min)	50 Hz	3.05	3.12	3.44	3.59	4.04	4.08
		60 Hz	3.66	3.74	4.13	4.30	4.85	4.89
MPN 46	Permissible pressure p _{max} (bar)		450	310	400	270	340	240
	Flow rate Q _{max} (l/min)	50 Hz	6.32	6.46	7.12	7.42	8.36	8.44
		60 Hz	7.65	7.82	8.62	8.99	10.13	10.23
MPN 48	Permissible pressure p _{max} (bar)		700	310	420	270	360	240
	Flow rate Q _{max} (l/min)	50 Hz	3.07	3.14	3.46	3.61	4.07	4.11
		60 Hz	3.74	3.82	4.21	4.39	4.94	4.99
MPN 404	Permissible pressure p _{max} (bar)		700	310	420	270	360	240
	Flow rate Q _{max} (l/min)	50 Hz	3.07	3.14	3.46	3.61	4.07	4.11
		60 Hz	3.73	3.81	4.20	4.38	4.93	4.98

Radial piston pump H

Type	Delivery flow coding		H 5.0	H 5.1	H 5.6	H 6.5	H 7.2	H 8.6
	Piston diameter (mm)		10	14	15	16	12	13
	Number of pump elements		6	3	3	3	6	6
	Displacement volume V _g (cm ³)		3.58	3.51	4.03	4.58	5.16	6.05
MPN 42	Permissible pressure p _{max} (bar)		190	190	165	145	130	110
	Flow rate Q _{max} (l/min)	50 Hz	9.77	9.58	11.00	12.50	14.08	16.51
		60 Hz	11.86	11.63	13.35	15.17	17.09	20.04
MPN 44	Permissible pressure p _{max} (bar)		320	310	270	240	220	190
	Flow rate Q _{max} (l/min)	50 Hz	4.77	4.68	5.37	6.10	6.88	8.06
		60 Hz	5.73	5.61	6.45	7.33	8.25	9.68
MPN 46	Permissible pressure p _{max} (bar)		290	290	250	225	200	170
	Flow rate Q _{max} (l/min)	50 Hz	9.88	9.68	11.12	12.63	14.23	16.69
		60 Hz	11.96	11.73	13.47	15.31	17.24	20.22
MPN 48	Permissible pressure p _{max} (bar)		480	310	270	240	335	285
	Flow rate Q _{max} (l/min)	50 Hz	4.81	4.71	5.41	6.15	6.93	8.12
		60 Hz	5.84	5.73	6.58	7.47	8.42	9.87
MPN 404	Permissible pressure p _{max} (bar)		560	310	270	240	420	360
	Flow rate Q _{max} (l/min)	50 Hz	4.81	4.71	5.41	6.15	6.93	8.12
		60 Hz	5.82	5.71	6.56	7.45	8.39	9.84

Radial piston pump H

Type	Delivery flow coding		H 9.9	H 11.5	H 13.1
	Piston diameter (mm)		14	15	16
	Number of pump elements		6	6	6
	Displacement volume V _g (cm ³ /rev)		7.02	8.06	9.17
MPN 42	Permissible pressure p _{max} (bar)		95	80	70
	Flow rate Q _{max} (l/min)	50 Hz	19.16	22.00	25.03
		60 Hz	23.25	26.70	30.37
MPN 44	Permissible pressure p _{max} (bar)		165	140	120
	Flow rate Q _{max} (l/min)	50 Hz	9.36	10.74	12.22
		60 Hz	11.23	12.89	14.67
MPN 46	Permissible pressure p _{max} (bar)		145	125	110
	Flow rate Q _{max} (l/min)	50 Hz	19.37	22.24	25.30
		60 Hz	23.46	26.93	30.64
MPN 48	Permissible pressure p _{max} (bar)		245	215	185
	Flow rate Q _{max} (l/min)	50 Hz	9.43	10.82	12.31
		60 Hz	11.45	13.15	14.96
MPN 404	Permissible pressure p _{max} (bar)		310	270	240
	Flow rate Q _{max} (l/min)	50 Hz	9.43	10.82	12.31
		60 Hz	11.42	13.11	14.92

2.2.1.2 Single-circuit radial piston pump (H) with single-phase motor

Ordering example

MPNW 44 -H 3,8 -1x230 V 50 Hz

Single-circuit radial piston pump (H) with single-phase motor

i INFORMATION

Re the following points see Chapter 3.6, "Motor data":

- The flow rate Q_{max} relates to the rated speed and varies depending on the load.
- Notes on pressures p_{max} (see Chapter 3.6, "Motor data").
- The permissible pressures p_{max} relate to a version with a 1x230 V 50 Hz motor.
- Be aware of different motor power ratings and resulting permissible maximum pressures $p_{max} = (pV_g)_{max} / V_g$. at other nominal voltages and power frequencies $(pV_g)_{max}$.
- It cannot be started up directly against the effects of pressure.

! NOTICE

- An operating capacitor is required in order to operate an AC motor.
- The operating capacitor is not included in the scope of delivery.

Radial piston pump H

Type	Delivery flow coding	H 0.6	H 0.83	H 0.9	H 1.0	H 1.25	H 1.5
	Piston diameter (mm)	6	7	6	8	7	8
	Number of pump elements	2	2	3	2	3	6
	Displacement volume V_g (cm ³ /rev)	0.43	0.58	0.64	0.76	0.88	1.15
MPNW 42	Permissible pressure p_{max} (bar)	700	670	610	515	445	340
	Flow rate Q_{max} (l/min) 50 Hz	1.18	1.59	1.76	2.19	2.41	3.16
MPNW 44	Permissible pressure p_{max} (bar)	700	700	700	700	700	700
	Flow rate Q_{max} (l/min) 50 Hz	0.58	0.78	0.86	1.02	1.19	1.55

Radial piston pump H

Type	Delivery flow coding	H 1.6	H 1.8	H 2.4	H 2.45	H 2.5	H 2.8
	Piston diameter (mm)	10	6	12	7	10	13
	Number of pump elements	2	6	2	6	3	2
	Displacement volume V_g (cm ³)	1.19	1.29	1.72	1.75	1.79	2.02
MPNW 42	Permissible pressure p_{max} (bar)	330	305	225	225	220	195
	Flow rate Q_{max} (l/min) 50 Hz	3.27	3.54	4.72	4.80	4.91	5.54
MPNW 44	Permissible pressure p_{max} (bar)	700	700	490	550	545	415
	Flow rate Q_{max} (l/min) 50 Hz	1.60	1.74	2.32	2.36	2.41	2.72

Radial piston pump H

Type	Delivery flow coding	H 3.2	H 3.3	H 3.6	H 3.8	H 4.3	H 4.4
	Piston diameter (mm)	8	14	12	15	13	16
	Number of pump elements	6	2	3	2	3	2
	Displacement volume V_g (cm ³)	2.29	2.34	2.58	2.69	3.03	3.06
MPNW 42	Permissible pressure p_{max} (bar)	170	165	150	145	130	125
	Flow rate Q_{max} (l/min) 50 Hz	6.28	6.42	7.08	7.38	8.31	8.40
MPNW 44	Permissible pressure p_{max} (bar)	425	360	330	315	320	275
	Flow rate Q_{max} (l/min) 50 Hz	3.09	3.15	3.48	3.62	4.08	4.12

Radial piston pump H

Type	Delivery flow coding		H 5.0	H 5.1	H 5.6	H 6.5	H 7.2	H 8.6
	Piston diameter (mm)		10	14	15	16	12	13
	Number of pump elements		6	3	3	3	6	6
	Displacement volume V _g (cm ³)		3.58	3.51	4.03	4.58	5.16	6.05
MPNW 42	Permissible pressure p _{max} (bar)		110	110	95	85	75	65
	Flow rate Q _{max} (l/min)	50 Hz	9.82	9.63	11.06	12.57	14.16	16.60
MPNW 44	Permissible pressure p _{max} (bar)		270	280	240	210	190	160
	Flow rate Q _{max} (l/min)	50 Hz	4.82	4.73	5.43	6.17	6.95	8.15

Radial piston pump H

Type	Delivery flow coding		H 9.9	H 11.5	H 13.1
	Piston diameter (mm)		14	15	16
	Number of pump elements		6	6	6
	Displacement volume V _g (cm ³)		7.02	8.06	9.17
MPNW 42	Permissible pressure p _{max} (bar)		55	45	40
	Flow rate Q _{max} (l/min)	50 Hz	19.26	22.12	25.16
MPNW 44	Permissible pressure p _{max} (bar)		140	120	100
	Flow rate Q _{max} (l/min)	50 Hz	9.46	10.86	12.36

2.2.2 Gear pumps

2.2.2.1 Single-circuit gear pump (Z) with 3-phase motor

Ordering example

MPN 48 **-Z 9** -3x400/230 V 50 Hz

Single-circuit gear pump (Z) with 3-phase motor

i INFORMATION

Re the following points see Chapter 3.6, "Motor data":

- The flow rate $Q_{\max}$ relates to the rated speed and varies depending on the load.
- Notes on pressures $p_{\max}$ (see Chapter 3.6, "Motor data").
- The permitted pressures $p_{\max}$ apply to a version with a 3x400 V 50 Hz/460 V 60 Hz or 3x230 V 50 Hz/265 V 60 Hz motor.
- Be aware of different motor power ratings and resulting permissible maximum pressures $p_{\max} = (pV_g)_{\max} / V_g$, at other nominal voltages and power frequencies $(pV_g)_{\max}$.

i INFORMATION

For the pump version **Z**, the maximum hydraulic work value $(pV_g)_{\max}$ is 10% lower.

Gear pump Z

Type	Delivery flow coding		Z 2.0	Z 2.7	Z 3.5	Z 4.5	Z 5.2	Z 6.5
	Displacement volume V _g (cm ³)		1.5	2.0	2.5	3.1	4.0	4.5
	Size		1	1	1	1	1	2
MPN 42	Permissible pressure p _{max} (bar)		200	200	200	220	170	150
	Flow rate Q _{max} (l/min)	50 Hz	4.09	5.46	6.82	8.46	10.92	12.28
		60 Hz	4.97	6.62	8.28	10.27	13.25	14.91
MPN 44	Permissible pressure p _{max} (bar)		200	200	200	200	200	200
	Flow rate Q _{max} (l/min)	50 Hz	2.00	2.67	3.33	4.13	5.33	6.00
		60 Hz	2.40	3.20	4.00	4.96	6.40	7.20
MPN 46	Permissible pressure p _{max} (bar)		200	200	200	200	200	200
	Flow rate Q _{max} (l/min)	50 Hz	4.14	5.52	6.90	8.55	11.03	12.41
		60 Hz	5.01	6.68	8.35	10.36	13.37	15.04
MPN 48	Permissible pressure p _{max} (bar)		220	220	220	220	200	210
	Flow rate Q _{max} (l/min)	50 Hz	2.01	2.69	3.36	4.16	5.37	6.04
		60 Hz	2.45	3.26	4.08	5.06	6.53	7.34
MPN 404	Permissible pressure p _{max} (bar)		220	220	200	200	200	210
	Flow rate Q _{max} (l/min)	50 Hz	2.01	2.69	3.36	4.16	5.37	6.04
		60 Hz	2.44	3.25	4.07	5.04	6.51	7.32

Gear pump Z

Type	Delivery flow coding		Z 6.9	Z 8.8	Z 9.0	Z 9.8	Z 11.3	Z 12.3
	Displacement volume V _g (cm ³)		4.9	6.2	6.0	6.5	7.9	8.5
	Size		1	1	2	1	1	2
MPN 42	Permissible pressure p _{max} (bar)		135	110	110	105	85	80
	Flow rate Q _{max} (l/min)	50 Hz	13.37	16.92	16.38	17.74	21.56	23.20
		60 Hz	16.23	20.54	19.87	21.53	26.17	28.16
MPN 44	Permissible pressure p _{max} (bar)		200	185	190	175	145	135
	Flow rate Q _{max} (l/min)	50 Hz	6.53	8.26	8.00	8.66	10.53	11.33
		60 Hz	7.84	9.92	9.60	10.40	12.63	13.59
MPN 46	Permissible pressure p _{max} (bar)		200	165	170	160	130	120
	Flow rate Q _{max} (l/min)	50 Hz	13.52	17.10	16.55	17.93	21.79	23.45
		60 Hz	16.37	20.72	20.05	21.72	26.40	28.41
MPN 48	Permissible pressure p _{max} (bar)		200	200	210	200	200	195
	Flow rate Q _{max} (l/min)	50 Hz	6.58	8.32	8.06	8.73	10.61	11.41
		60 Hz	8.00	10.12	9.79	10.61	12.89	13.87
MPN 404	Permissible pressure p _{max} (bar)		200	200	210	200	200	210
	Flow rate Q _{max} (l/min)	50 Hz	6.58	8.32	8.06	8.73	10.61	11.41
		60 Hz	7.97	10.09	9.76	10.57	12.85	13.83

Gear pump Z

Type	Delivery flow coding		Z 14.4	Z 16	Z 21	Z 24	Z 28	Z 37
	Displacement volume V _g (cm ³)		9.9	11.0	14.5	17.0	19.5	26.0
	Size		1	2	2	2	2	2
MPN 42	Permissible pressure p _{max} (bar)		65	60	45	40	35	25
	Flow rate Q _{max} (l/min)	50 Hz	27.02	30.02	39.57	46.40	53.22	70.96
		60 Hz	32.79	36.44	48.03	56.31	64.59	86.12
MPN 44	Permissible pressure p _{max} (bar)		115	100	80	65	55	40
	Flow rate Q _{max} (l/min)	50 Hz	13.19	14.66	19.33	22.66	25.99	34.65
		60 Hz	15.83	17.59	23.19	27.19	31.19	41.58
MPN 46	Permissible pressure p _{max} (bar)		105	95	70	60	50	40
	Flow rate Q _{max} (l/min)	50 Hz	27.31	30.35	40.00	46.90	53.79	71.73
		60 Hz	33.08	36.76	48.46	56.81	65.17	86.89
MPN 48	Permissible pressure p _{max} (bar)		170	150	115	95	85	60
	Flow rate Q _{max} (l/min)	50 Hz	13.29	14.77	19.47	22.82	26.18	34.91
		60 Hz	16.15	17.95	23.66	27.74	31.82	42.42
MPN 404	Permissible pressure p _{max} (bar)		200	205	180	150	130	100
	Flow rate Q _{max} (l/min)	50 Hz	13.29	14.77	19.47	22.82	26.18	34.91
		60 Hz	16.11	17.89	23.59	27.66	31.72	42.30

Gear pump Z

Type	Delivery flow coding		Z 45	Z 59	Z 75	Z 87
	Displacement volume V _g (cm ³)		30.2	41.8	50.4	61.0
	Size		3	3	3	3
MPN 42	Permissible pressure p _{max} (bar)		--	--	--	--
	Flow rate Q _{max} (l/min)	50 Hz	--	--	--	--
		60 Hz	--	--	--	--
MPN 44	Permissible pressure p _{max} (bar)		35	25	--	--
	Flow rate Q _{max} (l/min)	50 Hz	40.25	55.71	--	--
		60 Hz	48.30	66.85	--	--
MPN 46	Permissible pressure p _{max} (bar)		30	25	20	--
	Flow rate Q _{max} (l/min)	50 Hz	83.31	115.31	139.04	--
		60 Hz	100.92	139.69	168.43	--
MPN 48	Permissible pressure p _{max} (bar)		50	40	30	25
	Flow rate Q _{max} (l/min)	50 Hz	40.55	56.12	67.67	81.90
		60 Hz	49.28	68.21	88.24	99.53
MPN 404	Permissible pressure p _{max} (bar)		80	60	50	40
	Flow rate Q _{max} (l/min)	50 Hz	40.55	56.12	67.67	81.90
		60 Hz	49.13	68.00	81.99	99.23

2.2.2.2 Single-circuit gear pump (Z) with single-phase motor

Ordering example

MPNW 44 -Z 9 -1x230 V 50 Hz

Single-circuit gear pump (Z) with single-phase motor

i INFORMATION

Re the following points [see Chapter 3.6, "Motor data"](#):

- The flow rate $Q_{\max}$ relates to the rated speed and varies depending on the load.
- Notes on pressures $p_{\max}$ ([see Chapter 3.6, "Motor data"](#)).
- The permissible pressures $p_{\max}$ relate to a version with a 1x230 V 50 Hz motor.
- Be aware of different motor power ratings and resulting permissible maximum pressures $p_{\max} = (pV_g)_{\max} / V_g$, at other nominal voltages and power frequencies $(pV_g)_{\max}$.
- It cannot be started up directly against the effects of pressure.

i INFORMATION

For the pump version **Z**, the maximum hydraulic work value $(pV_g)_{\max}$ is 10% lower.

! NOTICE

- An operating capacitor is required in order to operate an AC motor.
- The operating capacitor is not included in the scope of delivery.

Gear pump Z

Type	Delivery flow coding		Z 2.0	Z 2.7	Z 3.5	Z 4.5	Z 5.2	Z 6.5
	Displacement volume V_g (cm ³)		1.5	2.0	2.5	3.1	4.0	4.5
	Size		1	1	1	1	1	2
MPNW 42	Permissible pressure $p_{\max}$ (bar)		200	195	155	125	95	85
	Flow rate $Q_{\max}$ (l/min)	50 Hz	4.12	5.49	6.86	8.51	10.98	12.35
MPNW 44	Permissible pressure $p_{\max}$ (bar)		200	200	200	200	200	200
	Flow rate $Q_{\max}$ (l/min)	50 Hz	2.02	2.70	3.37	4.18	5.39	6.06

Gear pump Z

Type	Delivery flow coding		Z 6.9	Z 8.8	Z 9.0	Z 9.8	Z 11.3	Z 12.3
	Displacement volume V_g (cm ³)		4.9	6.2	6.0	6.5	7.9	8.5
	Size		1	1	2	1	1	2
MPNW 42	Permissible pressure $p_{\max}$ (bar)		80	60	65	60	50	45
	Flow rate $Q_{\max}$ (l/min)	50 Hz	13.45	17.01	16.46	17.84	21.68	23.32
MPNW 44	Permissible pressure $p_{\max}$ (bar)		190	155	160	150	120	115
	Flow rate $Q_{\max}$ (l/min)	50 Hz	6.60	8.35	8.09	8.76	10.65	11.45

Gear pump Z

Type	Delivery flow coding		Z 14.4	Z 16	Z 21	Z 24	Z 28	Z 37
	Displacement volume V _g (cm ³)		9.9	11.0	14.5	17.0	19.5	26.0
	Size		1	2	2	2	2	2
MPNW 42	Permissible pressure p _{max} (bar)		40	35	25	20	20	15
	Flow rate Q _{max} (l/min)	50 Hz	27.17	30.18	39.79	46.65	53.51	71.34
MPNW 44	Permissible pressure p _{max} (bar)		95	85	65	55	50	35
	Flow rate Q _{max} (l/min)	50 Hz	13.34	14.82	19.54	22.91	26.28	35.04

2.2.3 Internal gear pumps

The internal gear pumps of type IZ are characterized by their particularly low noise levels, very good efficiency and a long service life.

2.2.3.1 Single-circuit internal gear pump (IZ) with 3-phase motor

Ordering example

MPN 404 -IZ 22,9 -3x400/230 V 50 Hz

Single-circuit internal gear pump (IZ) with 3-phase motor

i INFORMATION

Re the following points see Chapter 3.6, "Motor data":

- The flow rate $Q_{\max}$ relates to the rated speed and varies depending on the load.
- Notes on pressures $p_{\max}$ (see Chapter 3.6, "Motor data").
- The permitted pressures $p_{\max}$ apply to a version with a 3x400 V 50 Hz/460 V 60 Hz or 3x230 V 50 Hz/265 V 60 Hz motor.
- Be aware of different motor power ratings and resulting permissible maximum pressures $p_{\max} = (pV_g)_{\max} / V_g$ at other nominal voltages and power frequencies $(pV_g)_{\max}$.

i INFORMATION

For the pump version Z, the maximum hydraulic work value $(pV_g)_{\max}$ is 10% lower.

Internal gear pump IZ

Type	Delivery flow coding		IZ 7.5	IZ 9.1	IZ 11.9	IZ 16.2	IZ 19.2	IZ 22.9
	Displacement volume V _g (cm ³)		5.4	6.4	7.9	10.9	13.3	15.8
	Size		2	2	2	2	2	2
MPN 42	Permissible pressure p _{max} (bar)		115	95	80	55	45	40
	Flow rate Q _{max} (l/min)	50 Hz	14.74	17.47	21.56	29.75	36.30	43.12
		60 Hz	17.89	20.20	26.17	36.11	44.05	52.34
MPN 44	Permissible pressure p _{max} (bar)		200	160	130	100	80	70
	Flow rate Q _{max} (l/min)	50 Hz	7.20	8.53	10.53	14.53	17.73	21.06
		60 Hz	8.64	10.24	12.63	17.43	21.27	25.27
MPN 46	Permissible pressure p _{max} (bar)		180	155	125	90	70	60
	Flow rate Q _{max} (l/min)	50 Hz	14.90	17.66	21.79	30.07	36.69	43.59
		60 Hz	18.05	21.39	26.40	36.43	44.45	52.80
MPN 48	Permissible pressure p _{max} (bar)		250	250	215	155	125	105
	Flow rate Q _{max} (l/min)	50 Hz	7.25	8.59	10.61	14.63	17.86	21.21
		60 Hz	8.81	10.44	12.89	17.79	21.70	25.78
MPN 404	Permissible pressure p _{max} (bar)		250	250	250	240	195	165
	Flow rate Q _{max} (l/min)	50 Hz	7.25	8.59	10.61	14.63	17.86	21.21
		60 Hz	8.78	10.41	12.85	17.73	21.64	25.70

2.2.3.2 Single-circuit internal gear pump (IZ) with single-phase motor

Ordering example

MPNW 42 -IZ 22,9 -1x230 V 50 Hz

Single-circuit internal gear pump (IZ) with single-phase motor

i INFORMATION

Re the following points [see Chapter 3.6, "Motor data"](#):

- The flow rate $Q_{\max}$ relates to the rated speed and varies depending on the load.
- Notes on pressures $p_{\max}$ ([see Chapter 3.6, "Motor data"](#)).
- The permissible pressures $p_{\max}$ relate to a version with a 1x230 V 50 Hz motor.
- Be aware of different motor power ratings and resulting permissible maximum pressures $p_{\max} = (pV_g)_{\max} / V_g$, at other nominal voltages and power frequencies $(pV_g)_{\max}$.
- It cannot be started up directly against the effects of pressure.

i INFORMATION

For the pump version **Z**, the maximum hydraulic work value $(pV_g)_{\max}$ is 10% lower.

! NOTICE

- An operating capacitor is required in order to operate an AC motor.
- The operating capacitor is not included in the scope of delivery.

Internal gear pump IZ

Type	Delivery flow coding		IZ 7.5	IZ 9.1	IZ 11.9	IZ 16.2	IZ 19.2	IZ 22.9
	Displacement volume V_g (cm ³)		5.4	6.4	7.9	10.9	13.3	15.8
	Size		2	2	2	2	2	2
MPNW 42	Permissible pressure $p_{\max}$ (bar)		70	60	50	35	30	25
	Flow rate $Q_{\max}$ (l/min)	50 Hz	14.82	17.56	21.68	29.91	36.50	43.26
MPNW 44	Permissible pressure $p_{\max}$ (bar)		180	150	120	90	70	60
	Flow rate $Q_{\max}$ (l/min)	50 Hz	7.28	8.62	10.65	14.69	17.92	21.29

2.3 Dual-circuit pumps (double pumps)

Combinations of basic pumps from the tables in [Chapter 2.2.1, "High-pressure pumps"](#) and [Chapter 2.2.2, "Gear pumps"](#)

Combination options Dual-circuit pump

Coding	Pressure connection P1	Pressure connection P3	Examples
HH	3 pump elements	3 pump elements	HH 0.9/0.9
HZ	2, 3 or 6 pump elements	All gear pumps	HZ 0.9/11.3 HZ 0.9/7.0

2.3.1 Double high-pressure pump version

Combination of two sets of three pump elements each; for flow rates and maximum pressures, see [Chapter 2.2.1.1, "Single-circuit radial piston pump \(H\) with 3-phase motor"](#) and [Chapter 2.2.1.2, "Single-circuit radial piston pump \(H\) with single-phase motor"](#)

Ordering example

MPN 42	-H	H	1,25	/6,5	-3x400/230 V 50 Hz
				Pressure connection P3	
				Pressure connection P1	
				Pressure connection P3	Pressure connection P3: Radial piston pump H
				Pressure connection P1	Pressure connection P1: Radial piston pump H

Pressure connection P1 and P3

Radial piston pump H

Coding	H 0.9	H 1.25	H 1.5	H 2.5	H 3.6	H 4.3	H 5.1	H 5.6	H 6.5
Piston diameter (mm)	6	7	8	10	12	13	14	15	16
Number of pump elements	3	3	3	3	3	3	3	3	3
Displacement volume V_g (cm ³ /rev)	0.64	0.88	1.15	1.79	2.58	3.03	3.51	4.03	4.58



INFORMATION

Accessories (to be ordered separately)

Adapter G 1/8 - M16x1.5 for pressure hose connection order no. 3026 4075-00, Sk 7207 013

2.3.2 High-pressure low-pressure pump

Combination of two, three or six pump elements of existing high-pressure pumps see Chapter 2.2.1.1, "Single-circuit radial piston pump (H) with 3-phase motor", see Chapter 2.2.1.2, "Single-circuit radial piston pump (H) with single-phase motor" and a gear pump in accordance with see Chapter 2.2.2.1, "Single-circuit gear pump (Z) with 3-phase motor"

Ordering example

MPN 404	-H	Z	11,5	/87	-3x400/230 V 50 Hz
				Pressure connection P3	
				Pressure connection P1	
				Pressure connection P3	2.2.2.1 "Single-circuit gear pump (Z) with 3-phase motor"
					Gear pump Z
					Gear pump Z with single-phase motor
					Internal gear pump IZ
				Pressure connection P1	2.2.1.1 "Single-circuit radial piston pump (H) with 3-phase motor"
					Radial piston pump H
					Radial piston pump H with single-phase motor

3.1 General data

Conformity	<ul style="list-style-type: none"> Declaration of incorporation according to Machinery Directive 2006/42/EC Declaration of conformity according to Low-Voltage Directive 2014/35/EU UKCA declaration of conformity according to Electrical Equipment (Safety) Regulations 2016 No. 1101 <p>(see Assembly instructions for compact hydraulic power pack type MPN and MPNW: B 7207)</p> <ul style="list-style-type: none"> UL conformity of stators: E116360/E216350 UL conformity of connection set/flexes: E42256
Version / Model	<p>Hydraulic power pack with built-in electric motor (1-phase or 3-phase version) and single-circuit pump or dual-circuit pump (high pressure and low pressure)</p> <p>Motor pump: Single-circuit pump or dual-circuit pump (high pressure and low pressure)</p>
Pump version	Valve-controlled radial piston pump, gear pump or internal gear pump
Operating mode	<ul style="list-style-type: none"> Short period operation (S2) Periodic intermittent operation (S3) Continuous periodic operation (S6) <p>An application in continuous periodic operation S6 is possible depending on pump size and load, but only permissible if the oil tank is sufficiently large.</p>
Installation position	Vertical (MPN) or horizontal (MPN..L)
Material	<p>Steel; nitrided valve housing, electro-galvanised sealing nuts and connection block, hardened and ground functional inner parts</p> <p>Housing: Aluminium</p>
Attachment	<ul style="list-style-type: none"> Motor pump: Threaded holes M8 Cover plate/tank: Attachment 4x Ø9, see Chapter 4.3, "Tank and cover plate versions" (each item 6 in the image caption)
Hydraulic connection	Via bolted-on connection blocks see Chapter 4.3, "Tank and cover plate versions"
Hydraulic fluid	<p>Pump H and Z: Hydraulic fluid, according to DIN 51524 Parts 2 to 3; ISO VG 10 to 68 according to DIN ISO 3448 Viscosity range: 4 - 800 mm²/s Optimal operating range: approx. 10 - 500 mm²/s</p> <p>Pump IZ: Hydraulic fluid HL - HLP, corresponding to DIN 51 524 Parts 1 to 2 Operating viscosity: 10 - 300 mm²/s Start viscosity: 2000 mm²/s Also suitable for biologically degradable hydraulic fluids type HEES (synthetic ester) at operating temperatures up to approx. +70°C.</p>
Cleanliness level	<p>ISO 4406</p> <p>21/18/15...19/17/13</p>
Temperatures	<p>Environment: approx. -20 to +60°C, hydraulic fluid: -20 to +80°C, ensure the correct viscosity range.</p> <p>Start temperature: down to -40 °C is permissible (take account of the start viscosities!), as long as the steady-state temperature is at least 20 K higher during subsequent operation.</p> <p>Biologically degradable hydraulic fluids: note manufacturer specifications. With consideration for the seal compatibility, not above +70°C.</p>

Rotation direction	<ul style="list-style-type: none"> • Radial piston pump – any • Gear pump, internal gear pump – anticlockwise <p>(Rotation direction only ascertainable from check of flow rate; if there is no flow rate in the 3-phase version, replace two of the three main conductors)</p>	
Speed range (min ... max)	Radial piston pump H	200 ... 3500 min ⁻¹ 200 ... 2850 min ⁻¹ (optimal)
	Gear pump Z	
	Z 1.1 ... Z 1.7	800 ... 5000 min ⁻¹
	Z 2.0 ... Z 2.7	600 ... 4500 min ⁻¹
	Z 3.5 ... Z 6.4	500 ... 4000 min ⁻¹
	Z 6.9 ... Z 8.4	500 ... 3800 min ⁻¹
	Z 8.8 ... Z 11.3	500 ... 3000 min ⁻¹
	Internal gear pump IZ	
	IZ 7.5 / IZ 9.1 / IZ 11.9	200 ... 4000 min ⁻¹
	IZ 16.2 / IZ 19.2 / IZ 22.9	200 ... 3600 min ⁻¹
	Means of transport	2 eye-bolts

3.2 Pressure and volumetric flow

Pressure	<ul style="list-style-type: none"> ■ Pressure side (connection P): depending on the flow rate; see Chapter 2.2, "Single-circuit pumps", Chapter 2.3, "Dual-circuit pumps (double pumps)" ■ Suction side (container interior): ambient air pressure. Tank not suitable for charging.
Start against pressure	<ul style="list-style-type: none"> ■ The version with 3-phase motor can start against the pressure $p_{\max}$. ■ The version with single-phase motor can only act counter to a minor pressure. <p>The control system must therefore always be designed for pressureless start-up, e.g. by means of a circulation solenoid valve, which is open when the motor starts, for example, and interrupts the pressureless circulation of the pump again approx. 0.5...1 s after the start signal (e.g. by means of a delay relay).</p>
Fill volume and usable volume	see Chapter 2.1.3, "Tank version, cover plate version"

3.3 Weight

(Without hydraulic fluid)

Motor	Type			
	MPN 42	= 12.8 kg		
	MPN 44	= 12.8 kg		
	MPN 46	= 13.3 kg		
	MPN 48	= 13.3 kg		
	MPN 404	= 19.9 kg		
	MPNW 42	= 12.8 kg		
	MPNW 44	= 14.8 kg		
Radial piston pump	Coding	Number of pump elements		
		2	3	6
	H (single-circuit pump)	2.8 kg	4.8 kg	5.5 kg
	HH (dual-circuit pump)	--	--	5.5 kg
	Gear pump	Coding		
Z 2.0; Z 2.7; Z 3.5		= 1.95 kg		
Z 4.5		= 2.0 kg		
Z 5.2		= 2.1 kg		
Z 6.9; Z 8.8; Z 9.8		= 2.2 kg		
Z 11.3		= 2.3 kg		
Z 14.4		= 2.4 kg		
Z 6.5; Z 9.0; Z 12.3; Z 16		= 2.8 kg		
Z 21; Z 24		= 3.25 kg		
Z 28		= 3.3 kg		
Z 37		= 3.5 kg		
Z 45		= 6.7 kg		
Z 59; Z 75		= 7.7 kg		
Z 87		= 8.1 kg		
Internal gear pump	Coding			
	IZ 7.5	= 2.9 kg		
	IZ 9.1	= 3.0 kg		
	IZ 11.9	= 3.1 kg		
	IZ 16.2	= 3.3 kg		
	IZ 19.2	= 3.5 kg		
	IZ 22.9	= 3.6 kg		

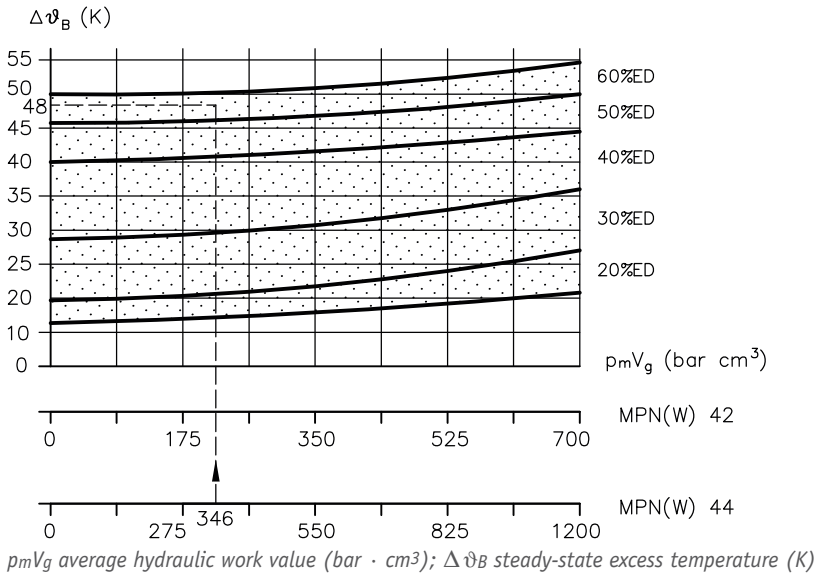
Cover plates	Coding	
	D 10	= 1.75 kg
	D 25	= 2.85 kg
	D 55	= 6.15 kg
Tank (incl. cover plate)	Coding	
	B 10	= 6.75 kg
	B 25	= 10.4 kg
	B 55	= 15.85 kg
	B 110	= 19.2 kg

3.4 Characteristic lines

3.4.1 Build-up of heat

Diagrams for approximate heating determination depending on the container filling volume and average hydraulic work value

B10 tank version



For B10 and MPN 44, 60 %ED and $p_m V_g = 346$ bar $\cdot$ cm³ results in a steady-state excess temperature in the range of $\Delta \vartheta_B \approx 48$ °C.

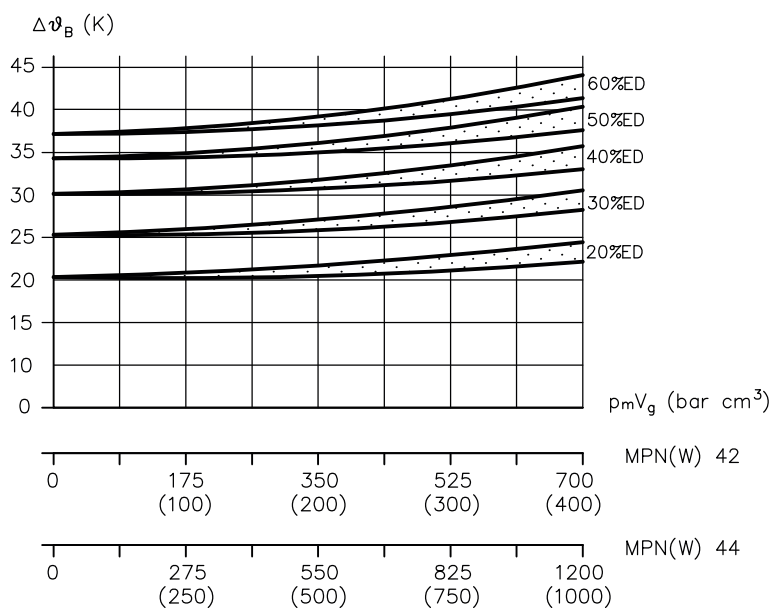
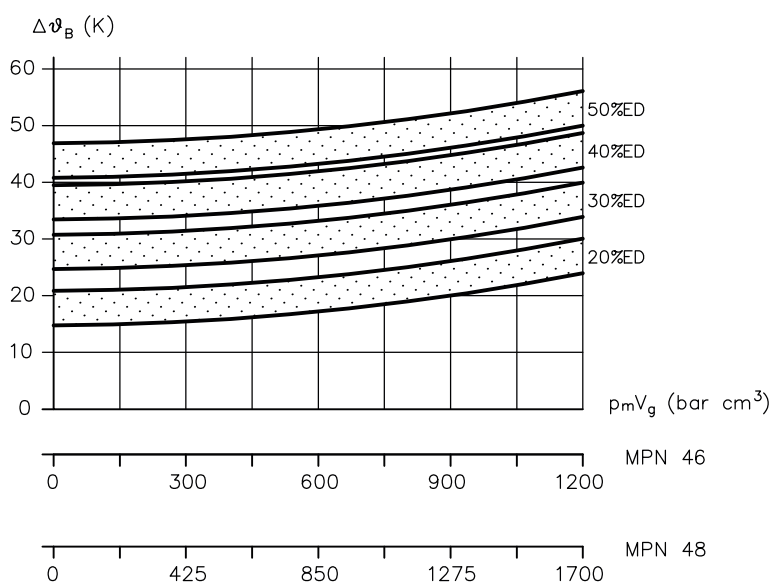
An ambient temperature of 25 °C results in a steady-state temperature of approx. $\vartheta_{oil\ B} \approx 25 + 48 \approx 73$ °C.

Depending on the version and flow rate, the steady-state excess temperatures vary within an ED range.

Tendency:

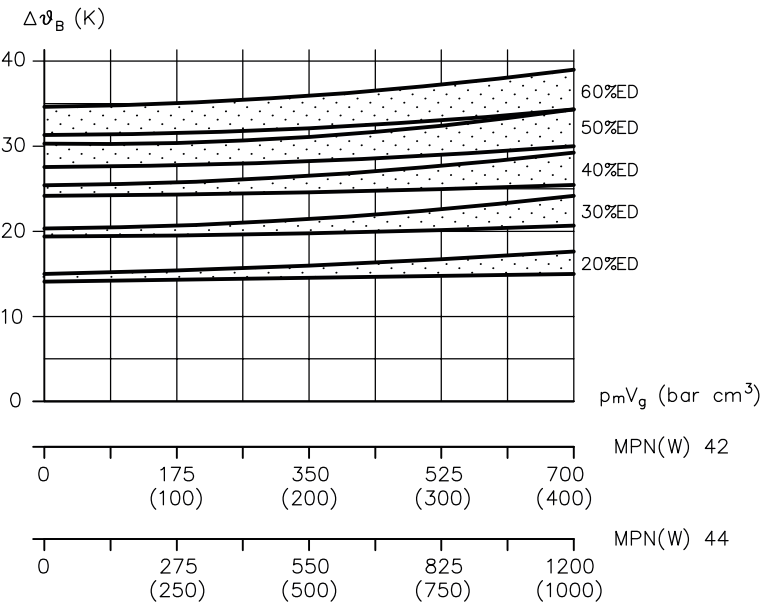
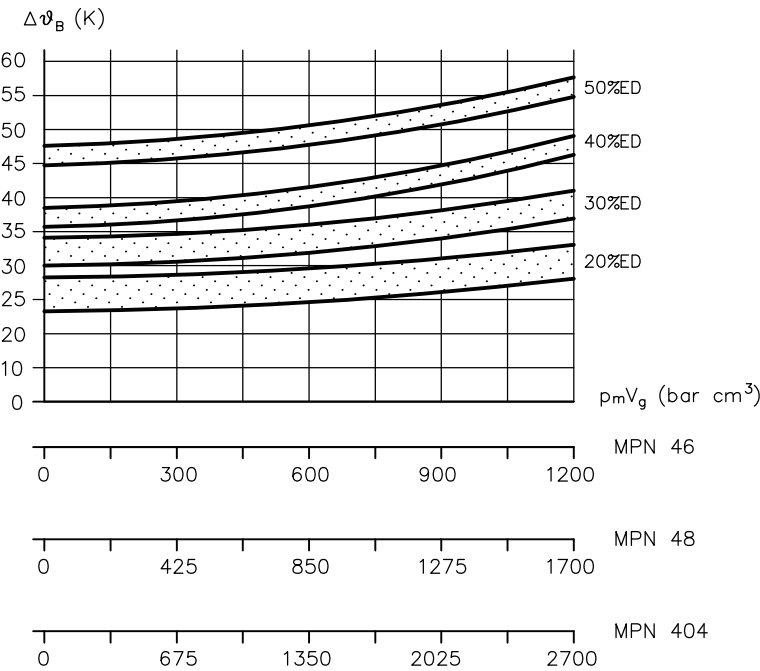
- $Q_{Pu} > 8$ l/min in the upper range
- Motors with rotation speeds of > 2700 min⁻¹ in the upper range
- Motors with rotation speeds of 1350 to 1800 min⁻¹ in the lower range

B25 tank version



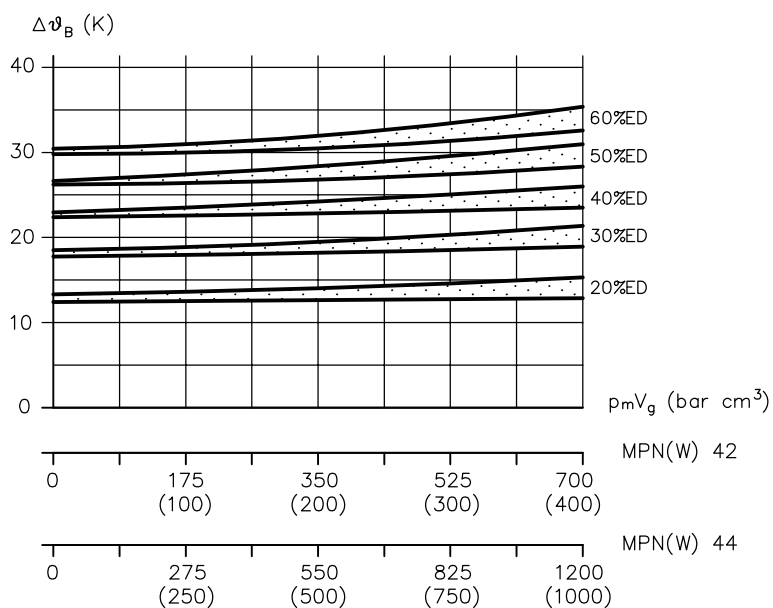
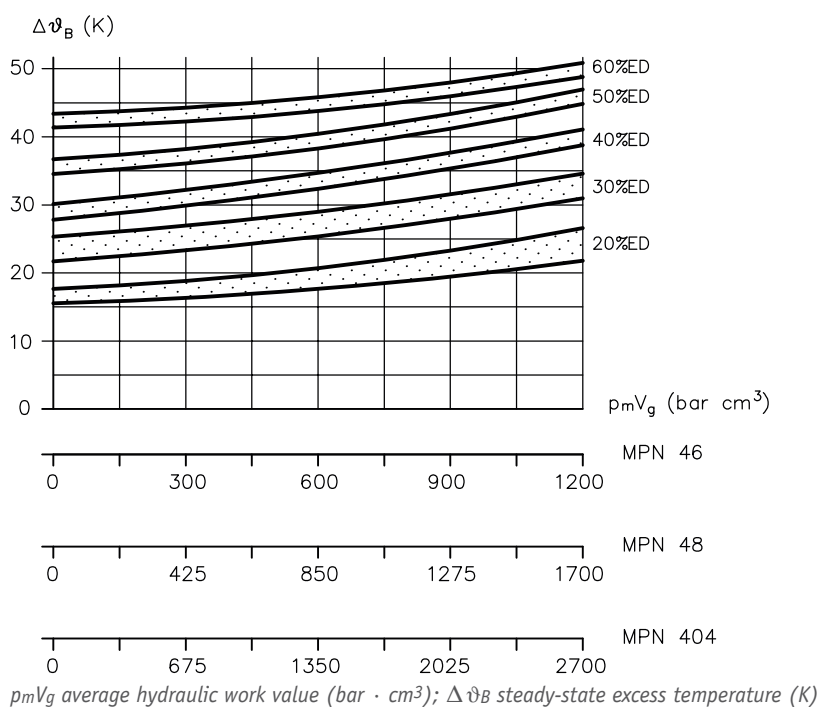
$p_m V_g$ average hydraulic work value (bar $\cdot$ cm^3); $\Delta\vartheta_B$ steady-state excess temperature (K)

B55 tank version



$p_m V_g$ average hydraulic work value (bar $\cdot$ cm^3); $\Delta\vartheta_B$ steady-state excess temperature (K)

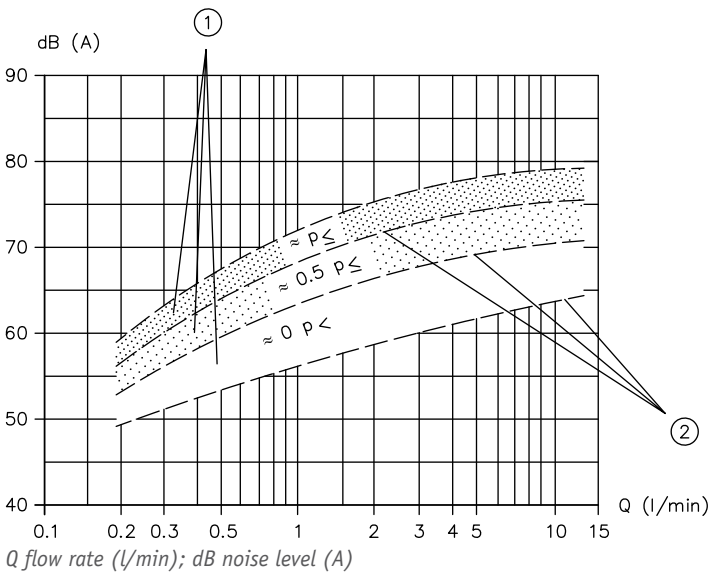
B110 tank version



3.4.2 Running noise

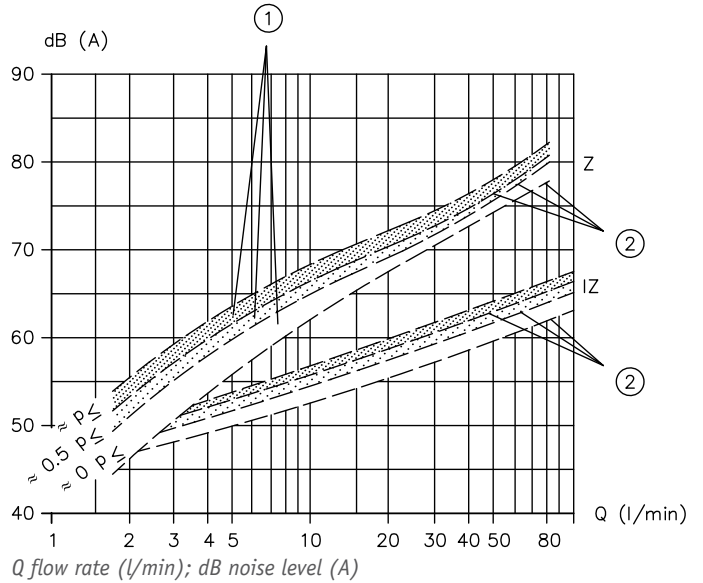
Measured in the acoustic measurement chamber according to ISO 3744, distance between sound sensor and pump (d) = 1 m

MPN... - H...



MPN... - Z...

MPN... - IZ...



1 Upper area of the respective field: MPN(W) 44, MPN 48 and MPN 404

2 Lower area of the respective field: MPN(W) 42.. to MPN 46..

The specified ranges of the noise level are intended to serve as an estimate of the expected running noise. They take into account the variance that can be identified from measurements. Pumps with smaller flow rates usually tend toward the lower limit, whereas pumps with larger flow rates tend toward the upper limit. The noise level of dual-circuit pumps is approximately in the same range as the higher level of a single-circuit pump of the same size used as a high- or low-pressure stage.

To ensure that the smooth running of the hydraulic power pack is not impaired when it is installed at the site, it is recommended to install the tank using rubber-metal fastening elements and to connect the lines using short pieces of hose. The damping body of the fastening elements should enable a soft (supercritical) bearing. Further information can be found in detailed technical publications from relevant manufacturers.

3.5 Electrical data

Data applies to radial piston pumps and gear pumps.

Connection	<ul style="list-style-type: none"> For version with HARTING connector: Cable 1.5 mm² For version with integrated terminal box: Cable fitting M20x1.5 must be provided by the customer For single pump version: Cable length 0.6 m, cable marking see Chapter 4.4.2, "Electrical connection" <p>3-phase current: 6 x 0.82 mm²</p> <p>Alternating current: Main winding 2 x 2.08 mm² Auxiliary winding 2 x 0.82 mm² Winding protection contact switch 2 x 0.52 mm²</p>
Protection class	IP 54 according to IEC 60529, applies to the whole compact pump unit as a comparison protection class for purely electrical equipment
Protection class	IEC 61140 protection class 1
Insulation	<p>Designed in accordance with EN 60 664-1</p> <ul style="list-style-type: none"> For 4- or 3-wire AC voltage systems L1-L2-L3-PE (3-phase systems) with an earthed neutral point to 500 V AC nominal phase voltage phase-phase For 4- or 3-wire AC voltage systems L1-L2-L3 (3-phase systems) without an earthed neutral point (e.g. overseas) up to a nominal phase voltage of f300 V AC phase-phase For a single-phase and earthed 2-wire alternating current system L-N (mains) up to a nominal voltage of 300 V AC.
Insulation material class	B

3.6 Motor data

3-phase motor

i INFORMATION

3-phase motors can be connected in a star (Y) or delta (Δ) circuit.

Type	Nominal voltage, power frequency U_N (V), f (Hz)	Nominal power P_N (kW)	Rated speed n_N (min ⁻¹)	Nominal current I_N (A)	Starting current ratio I_A / I_N	Power factor $\cos \varphi$	Hydraulic work value (pV_g) _{max} (bar cm ³ /rev)
MPN 42	3x400/230 V 50 Hz YΔ	2.1	2785	4.9/8.4	4.8	0.87	680
	3x460/265 V 60 Hz YΔ	2.5	3380	4.8/8.3	5.4	0.88	
MPN 44	3x400/230 V 50 Hz YΔ	2.1	1360	4.9/8.5	4.1	0.86	1155
	3x460/265 V 60 Hz YΔ	2.4	1632	4.6/8.0	4.6	0.86	
MPN 44 V	3x400/230 V 50 Hz YΔ						
MPN 46	3x400/230 V 50 Hz YΔ	3.0	2815	6.4/11.0	5.7	0.88	1040
	3x460/265 V 60 Hz YΔ	3.6	3410	6.3/11.3	6.2	0.89	
MPN 48	3x400/230 V 50 Hz YΔ	3.0	1370	6.7/11.5	4.2	0.84	1730
	3x460/265 V 60 Hz YΔ	3.6	1665	6.6/11.3	4.7	0.85	
MPN 404	3x400/230 V 50 Hz YΔ	4.2	1370	9.2/16.0	5.0	0.88	2650
	3x460/265 V 60 Hz YΔ	5.0	1660	9.5/16.5	5.3	0.89	

Single-phase motor

Type	Nominal voltage, power frequency U_N (V), f (Hz)	Nominal power P_N (kW)	Rated speed n_N (min ⁻¹)	Nominal current I_N (A)	Starting current ratio I_A / I_N	Power factor $\cos \varphi$	Recommend- ed operating capacitor C_B (μF)	Hydraulic work value (pV_g) _{max} (bar cm ³ /rev)
MPNW 42	1x230V 50 Hz	1.9	2800	10.5	3.3	0.94	40	395
MPNW 44	1x230V 50 Hz	1.9	1375	10.1	3.3	0.94	60/40	980

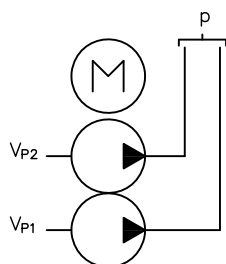
For MPNW 42 and MPNW 44:

Where the utilisation is < 75 % of the maximum possible hydraulic work value ($p_{max} \cdot V_g$), use an approx. 30% smaller capacitor to reduce the power losses.

Motor load on dual-circuit pumps

Using the projected pressures p_1 and p_2 , it must be checked for each of the three possible loading cases 1 to 3 whether the product remains $(p \cdot V_g)_{\text{calc.}} \leq (p \cdot V_g)_{\text{calc. max.}}$. The pressure limits in accordance with Chapter 2.2, "Single-circuit pumps" and Chapter 2.3, "Dual-circuit pumps (double pumps)" also apply.

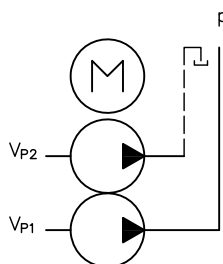
Load case 1



Both pumps work against the common pressure, $p_1 = p_2 = p$

$$(p \cdot V_g)_{\text{calc.}} = p \cdot (V_{P1} + V_{P2})$$

Load case 2

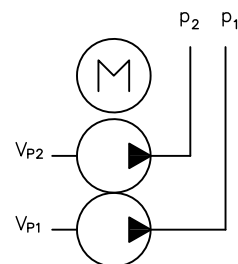


One pump V_{P1} works against pressure, the other runs empty, $p_1 = p$

$$(p \cdot V_g)_{\text{calc.}} = p \cdot V_{P1} + 3 V_{P2}$$

(For the empty-running pump, approx. 3 bar of circulation resistance is taken into account)

Load case 3



Both pumps work simultaneously against different pressures

$$(p \cdot V_g)_{\text{calc.}} = p_1 \cdot V_{P1} + p_2 \cdot V_{P2}$$

3.6.1 Current consumption characteristic lines

The following characteristic lines are reference values. They are used to determine the current consumption and the expected heating (Chapter 3.4.1, "Build-up of heat") as well as to set the motor protection circuit (overload protection).

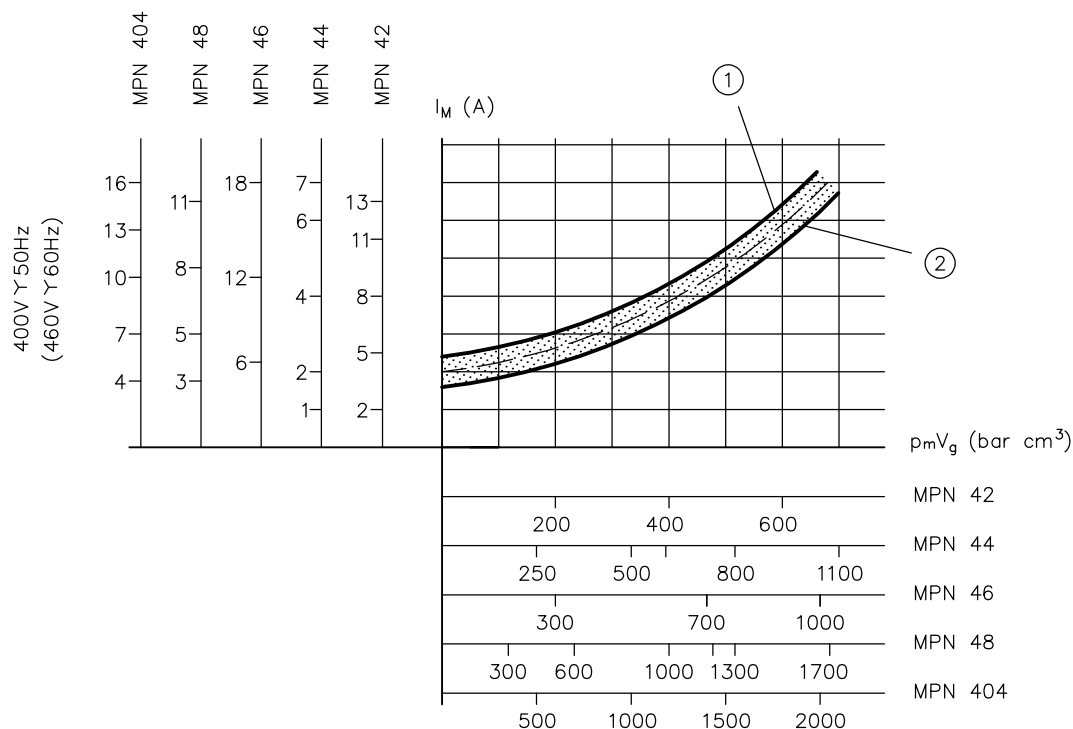
The reference values for the motor current can easily be determined for other nominal voltages by conversion, for example:

$$\text{Mains 230 V 50 Hz: } I_{230 \text{ V}} \approx I_{400 \text{ V}} \cdot \frac{400 \text{ V}}{230 \text{ V}}; \quad \text{Mains 500 V 50 Hz: } I_{230 \text{ V}} \approx I_{400 \text{ V}} \cdot \frac{400 \text{ V}}{500 \text{ V}}$$

i INFORMATION

For 230 V 50 Hz (265 V 60 Hz), the motor current values must be multiplied by $\sqrt{3}$.

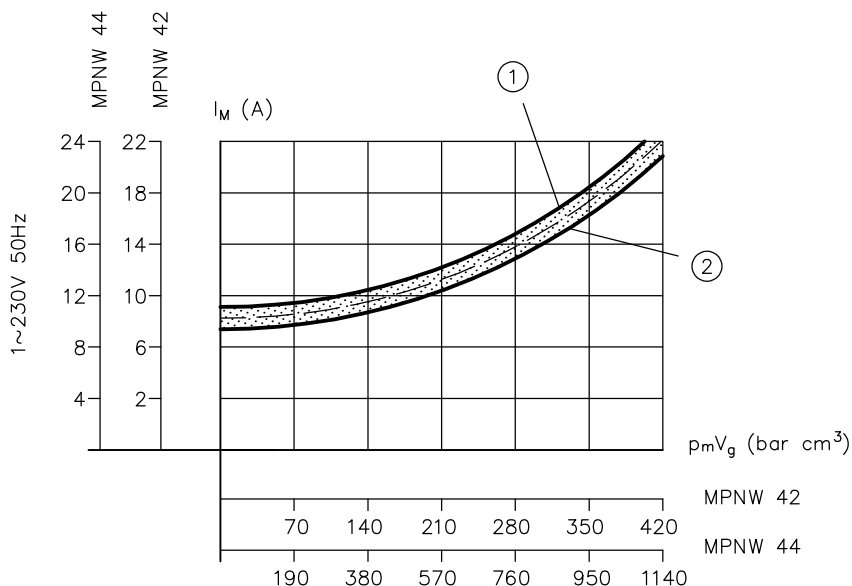
3-phase version:



$p_m V_g$ hydraulic work value (bar cm^3); I_M motor current (A)

- 1 Gear pump
- 2 Radial piston pump

AC version:



$p_m V_g$ hydraulic work value (bar cm^3); I_M motor current (A)

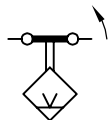
- 1 Gear pump
- 2 Radial piston pump

3.7 Additional options

3.7.1 Silica gel filter

Desiccant quantity	100 g
Absorption capacity	50 ml
Filter efficiency	3 µm absolute; ($\beta \geq 200$)
Operating temperature range	-29°C to +93 °C

3.7.2 Level switch

Coding	D, S	
Max. DC/AC switching capacity	60 W / 60 VA	
Max. DC/AC current	0.8 A ($\cos \varphi = 1$)	
Max. voltage	230 V 50/60 Hz	
Circuit symbol	Coding D (N/C contact) 	Coding S (N/O contact) 

A protective circuit is to be implemented in the case of an inductive load.

Connection to a separate female connector (DIN 43650-C, 8 mm)

3.7.3 Temperature switch

i INFORMATION

On the version with a single-phase motor, the temperature switch is integrated as a winding protection contact in the stator.

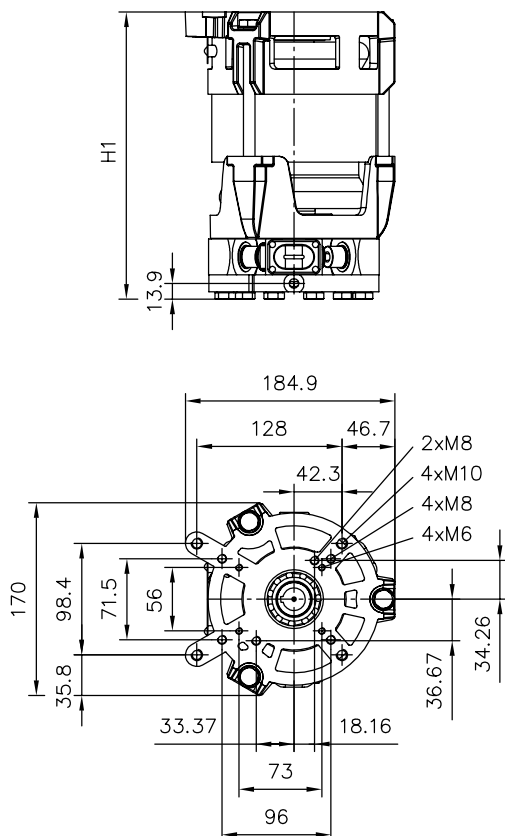
Coding	T, T 50, T 60
Signal indication	80 °C ± 5 K
Max. voltage	<ul style="list-style-type: none"> AC: 250 V 50/60 Hz 3.5 A DC: 42 V 1 A
Nominal current (cos φ ~ 0.6)	1.6 A
Max. current at 24 V (cos φ = 1)	1.5 A
Electrical connection	on terminal box/HARTING plug
Circuit symbol	

4 Dimensions

All dimensions in mm, subject to change.

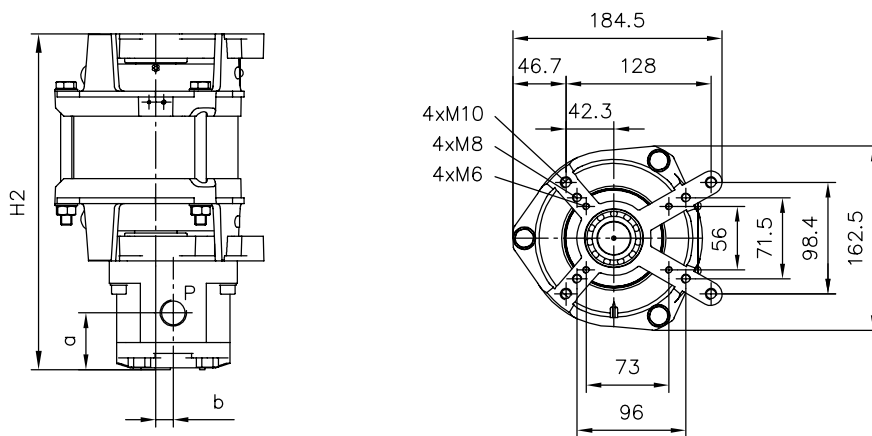
4.1 Single-circuit pumps

4.1.1 Version with radial piston pump



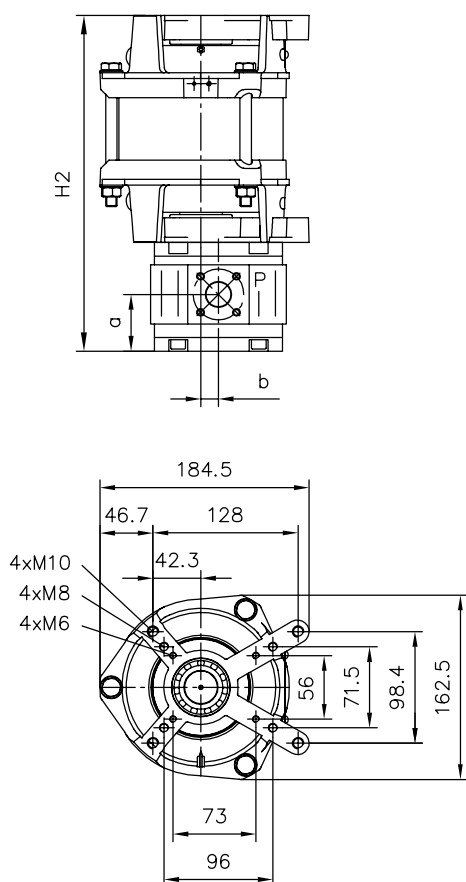
Type	H1
MPN 42	246.4
MPNW 42	
MPN 44	253.4
MPN 46	267.4
MPN 48	276.4
MPNW 44	
MPN 404	308.4
Ports (ISO 228-1)	
P	G 1/8

4.1.2 Version with gear pump



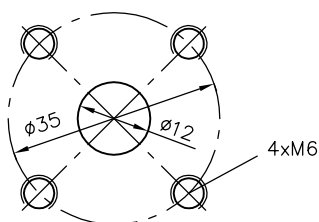
Pump	H2					Pressure connection and suction port		a	b
	MPN 42 MPNW 42	MPN 44	MPN 46	MPN 48 MPNW 44	MPN 404	P	S		
Z 2.0	260.3	267.3	281.3	290.3	322.3	G 3/8		34.9	11.3
Z 2.7	261.9	268.9	282.9	291.9	323.9			35.7	
Z 3.5	263.5	270.5	284.5	293.5	325.5			36.5	
Z 4.5	265.5	272.5	286.5	295.5	327.5			37.5	
Z 5.2	268.3	275.3	289.3	298.3	330.3			38.8	
Z 6.9	271.5	278.5	292.5	301.5	333.5			40.5	
Z 8.8	275.5	282.5	296.5	305.5	337.5			42.5	
Z 9.8	275.5	282.5	296.5	305.5	337.5			42.5	
Z 11.3	281	288	302	311	343			45.2	
Z 14.4	287.5	294.5	308.5	317.5	349.5	G 1/2		48.5	15.5
Z 6.5	286	293	307	316	348			47	
Z 9.0	289	296	310	319	351			50	
Z 12.3	289	296	310	319	351	G 1/2	G 3/4	52.5	
Z 16	289	296	310	319	351			54.8	
Z 21	313	320	334	343	375			58	
Z 24	313	320	334	343	375			60.2	
Z 28	313	320	334	343	375	G 3/4	G 1	62	21.7
Z 37	325	332	346	355	387			67.7	
Z 45	333	340	354	363	395		G 3/4	69.5	
Z 59	342	349	363	372	404		G 1	73.5	
Z 75	352	359	373	382	414			76.5	
Z 87	352	359	373	382	414	G 1	G 1 1/4	81	

4.1.3 Version with internal gear pump



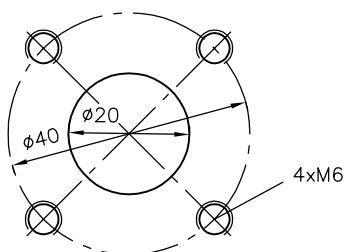
Pressure connection

Pressure flange adapter HAWE no. 6013 3405-00



Suction port

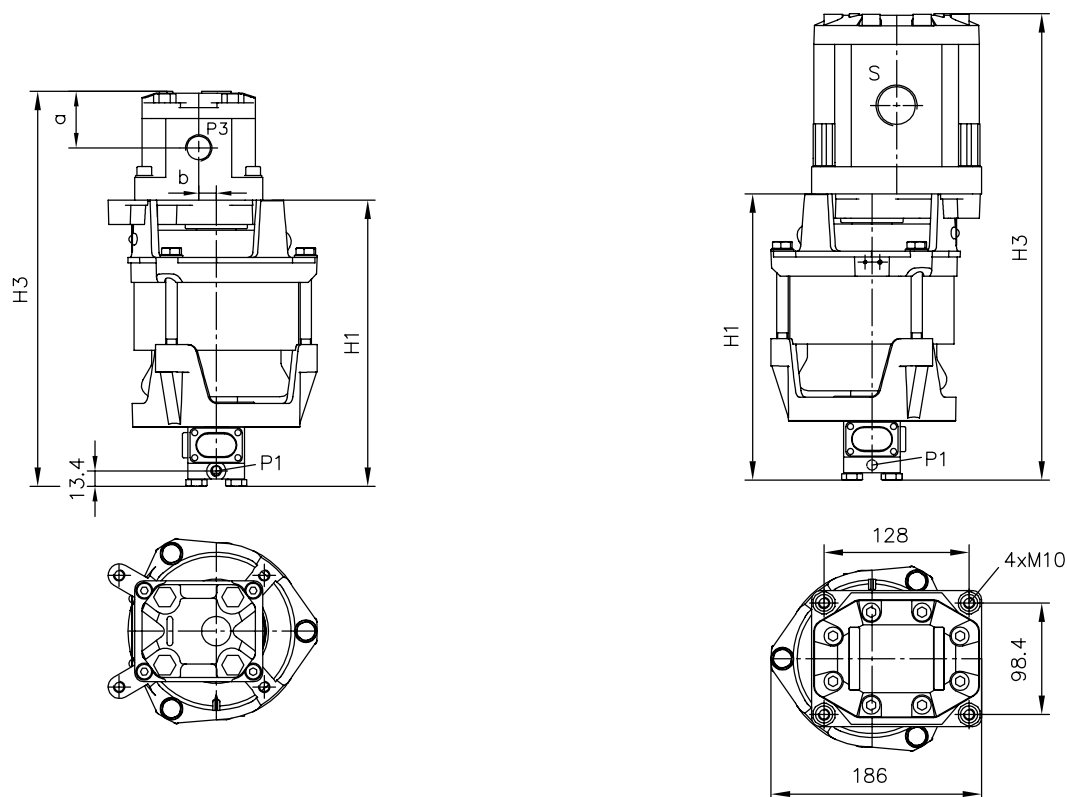
Suction flange adapter HAWE no. 6013 3407-00



Pump	H2					a	b
	MPN 42 MPNW 42	MPN 44	MPN 46	MPN 48 MPNW 44	MPN 404		
IZ 7.5	328.9	335.9	335.9	358.9	390.9	43	17
IZ 9.1	330.9	337.9	351.9	360.9	392.9	44	
IZ 11.9	333.9	340.9	354.9	363.9	395.9	45.5	
IZ 16.2	339.9	346.9	360.9	369.9	401.9	48.5	
IZ 19.2	344.9	351.9	365.9	374.9	406.9	51	
IZ 22.9	349.9	356.9	370.9	379.9	411.9	53	

4.2 Dual-circuit pumps

4.2.1 Version with radial piston gear pump (high-pressure low-pressure pump)

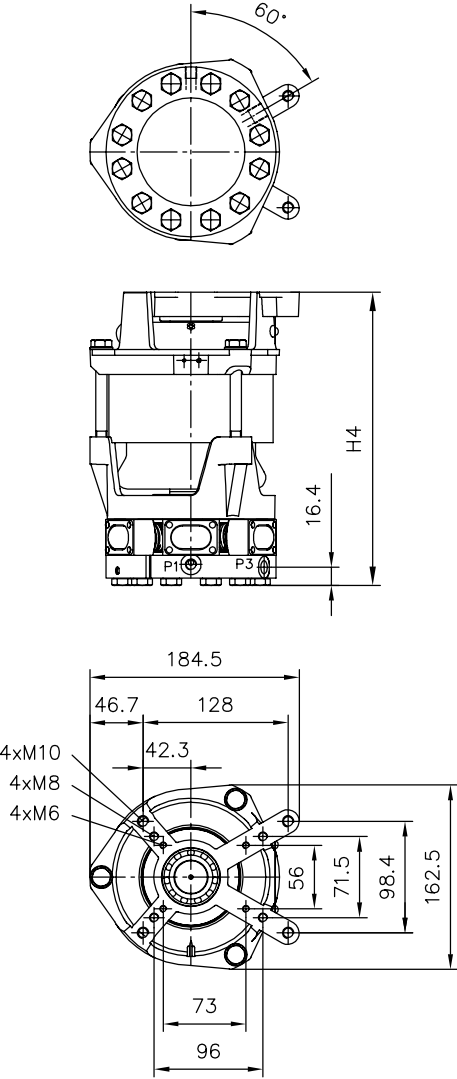


Type	H1
MPN 42 MPNW 42	246.4
MPN 44	253.4
MPN 46	267.4
MPN 48 MPNW 44	276.4
MPN 404	308.4

	Ports (ISO 228-1)
P1, P3	G 1/4

Pump	H3					Suction ports	a	b
	MPN 42 MPNW 42	MPN 44	MPN 46	MPN 48 MPNW 44	MPN 404	S		
Z 2.0	313.7	320.7	334.7	343.7	375.7	G 3/8	34.9	11.3
Z 2.7	315.3	322.3	336.3	345.3	377.3		35.7	
Z 3.5	316.9	323.9	337.9	346.9	378.9		36.5	
Z 4.5	318.9	325.9	339.9	348.9	380.9		37.5	
Z 5.2	321.7	328.7	342.7	351.7	383.7		38.8	
Z 6.9	324.9	331.9	345.9	354.9	386.9		40.5	
Z 8.8	328.9	335.9	349.9	358.9	390.9		42.5	
Z 9.8	328.9	335.9	349.9	358.9	390.9		42.5	
Z 11.3	334.4	341.4	355.4	364.4	396.4		45.2	
Z 14.4	340.9	347.9	361.9	370.9	402.9		48.5	
Z 6.5	339.4	346.4	360.4	369.4	401.4	G 1/2	47	15.5
Z 9.0	342.4	349.4	363.4	372.4	404.4		50	
Z 12.3	342.4	349.4	363.4	372.4	404.4		52.5	
Z 16	342.4	349.4	363.4	372.4	404.4	G 3/4	54.8	
Z 21	366.4	373.4	387.4	396.4	428.4		58	
Z 24	366.4	373.4	387.4	396.4	428.4		60.2	
Z 28	366.4	373.4	387.4	396.4	428.4		62	
Z 37	378.4	385.4	399.4	408.4	440.4	G 1	67.7	
Z 45	386.4	393.4	407.4	416.4	448.4	G 3/4	69.5	21.7
Z 59	395.4	402.4	416.4	425.4	457.4	G 1	73.5	
Z 75	405.4	412.4	426.4	435.4	467.4		76.5	
Z 87	405.4	412.4	426.4	435.4	467.4	G 1/4	81	
Z 110	413.4	420.4	434.4	443.4	475.4		85	
Z 135	424.4	431.4	445.4	454.4	486.4		90.5	

4.2.2 Version with high-pressure high-pressure pump

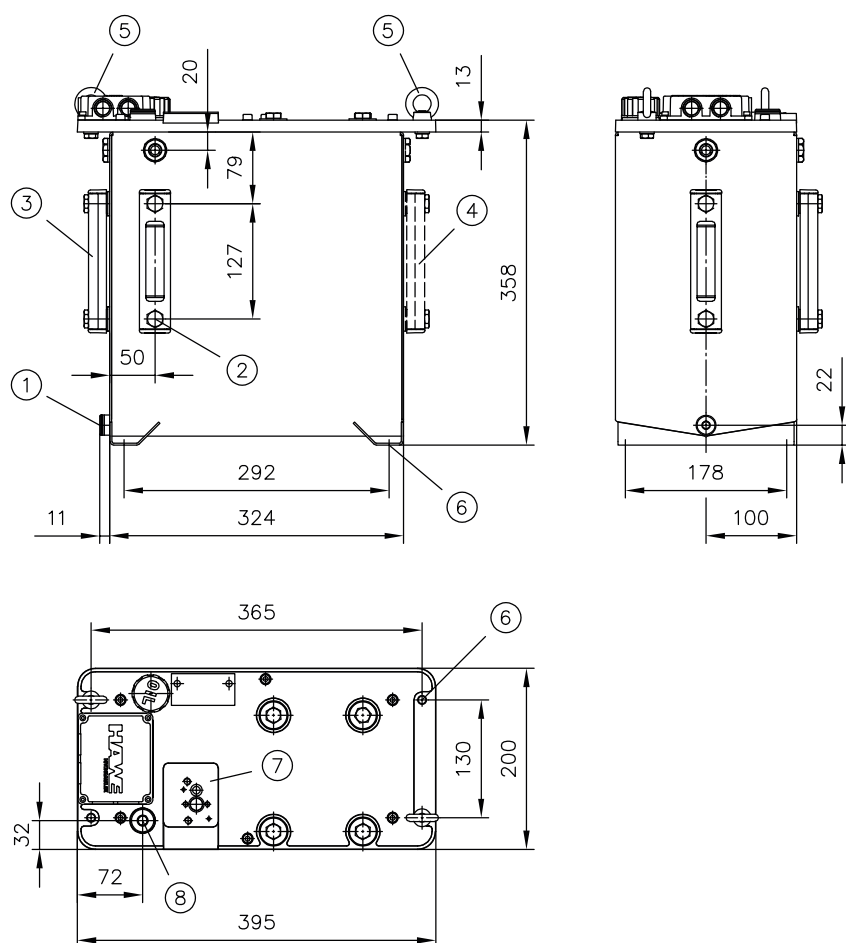


Type	H4
MPN 42	
MPNW 42	251.4
MPN 44	258.4
MPN 46	272.4
MPN 48	
MPNW 44	281.4
MPN 404	313.4

Ports (ISO 228-1)	
P1	G 1/8
P3	G 1/4

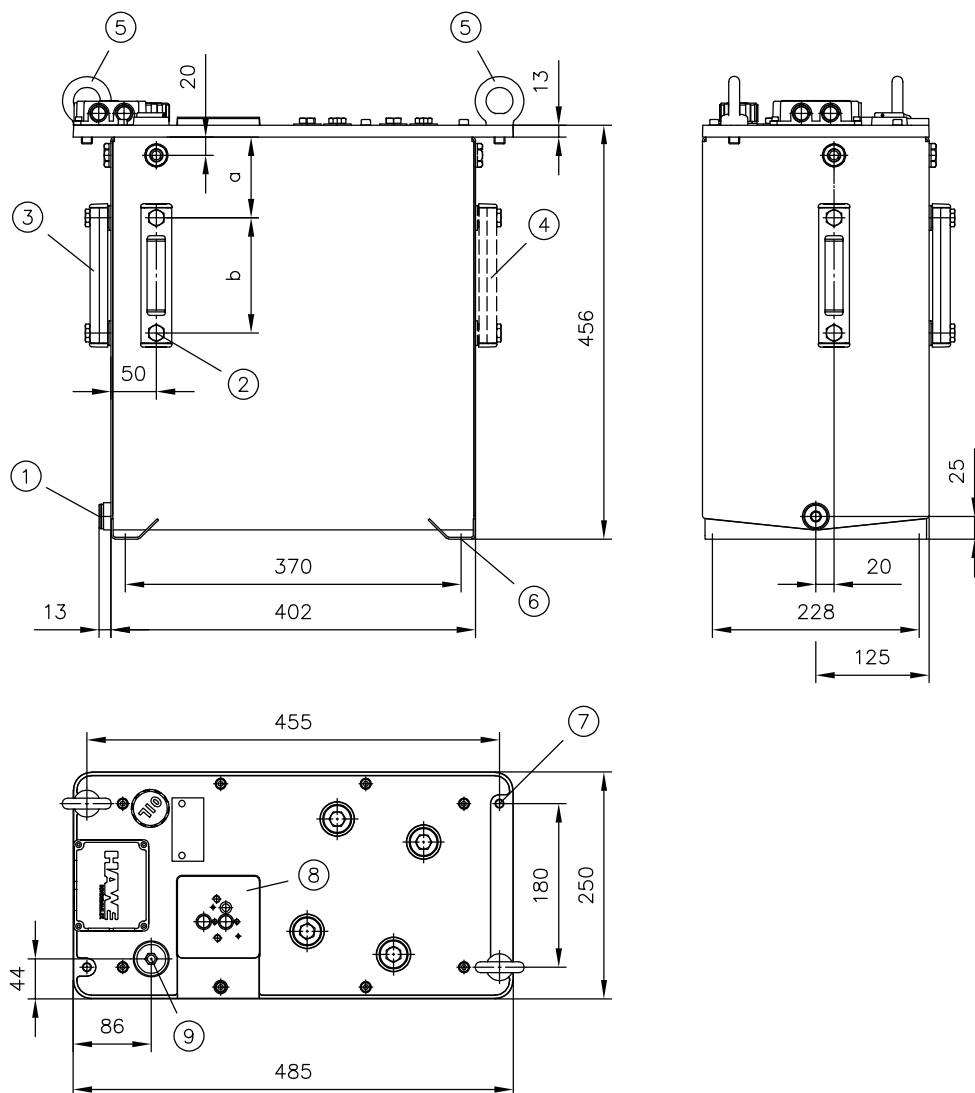
4.3 Tank and cover plate versions

B10, D10



- 1 Oil drain G 1/2
- 2 Level gauge coding K
- 3 Level gauge coding K1
- 4 Level gauge coding K3
- 5 Ring nut
- 6 Attachment 4x Ø9
- 7 Connection base, [see Chapter 4.4](#)
- 8 Additional return connection G 1/2

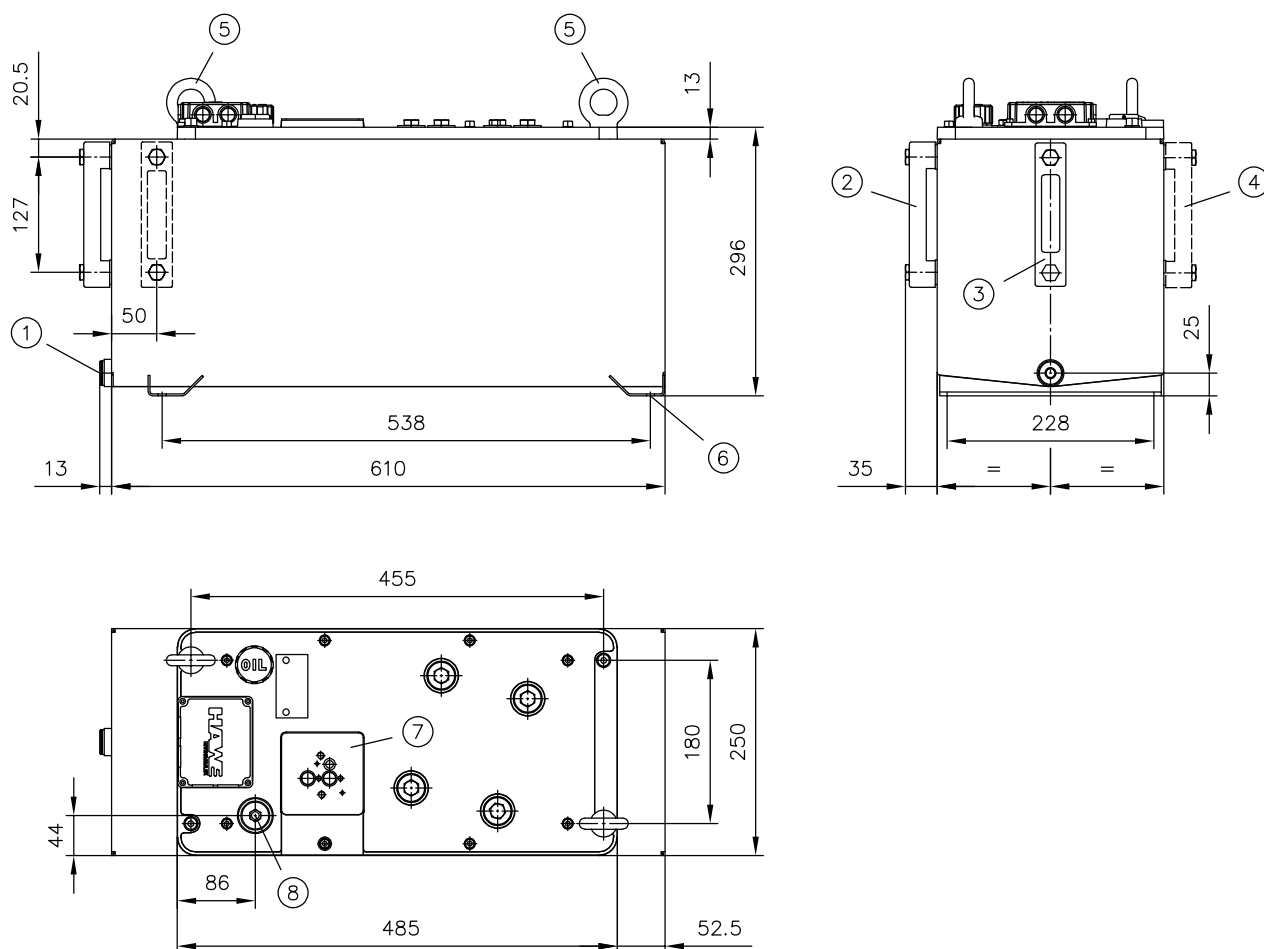
B25, D25



- 1 Oil drain G 1/2
- 2 Level gauge coding K
- 3 Level gauge coding K1
- 4 Level gauge coding K3
- 5 Ring nut
- 6 Attachment 4x Ø9
- 7 Attachment 2x Ø9
- 8 Connection base, [see Chapter 4.4](#)
- 9 Additional return connection G 3/4

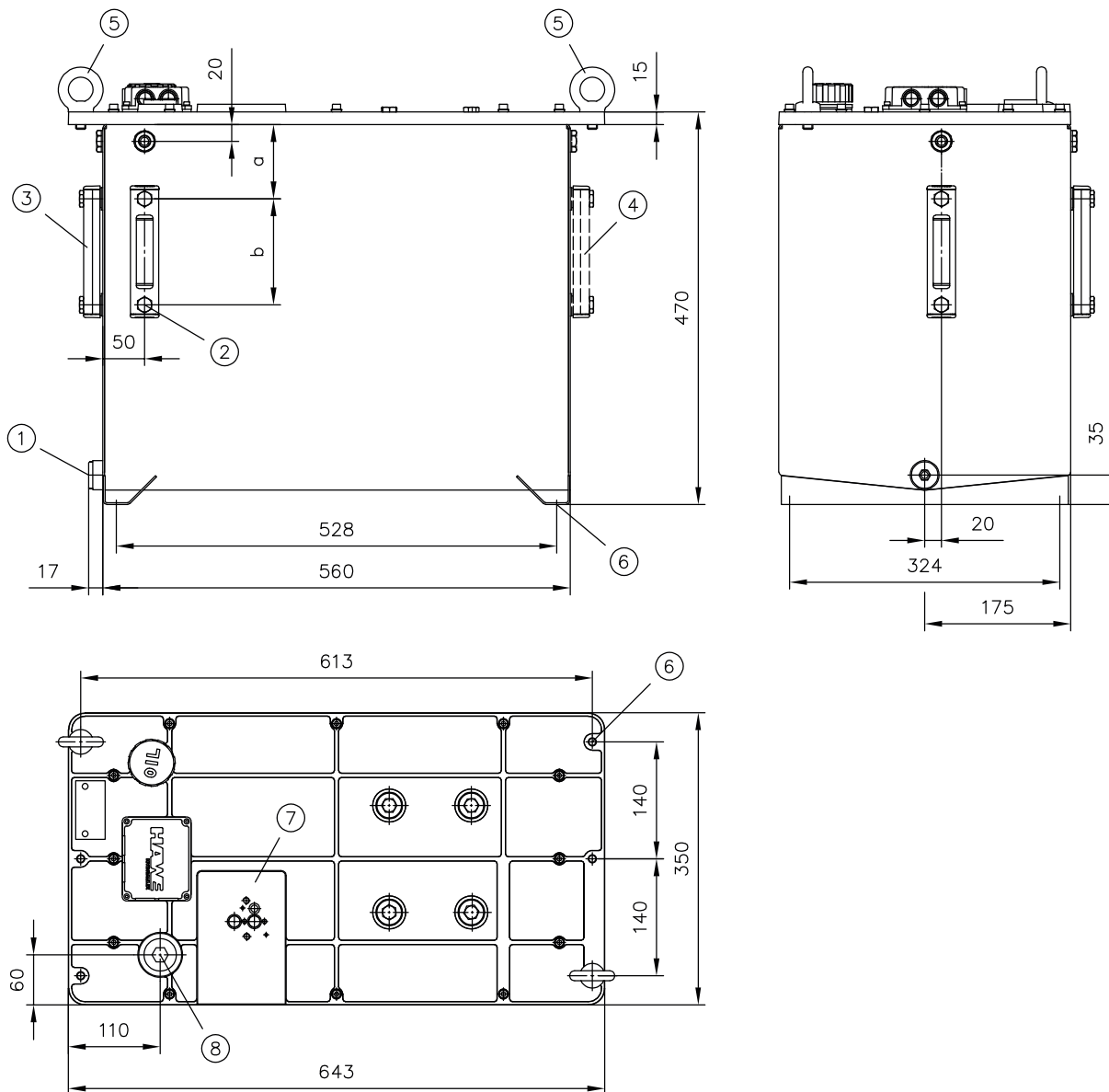
Level indicator	a	b
Short oil level gauge (oil volume, option 1)	89	127
Long oil level gauge (oil volume, option 2)	107	176

[see Chapter 2.1.3, "Tank version, cover plate version"](#)

B25L


- 1 Oil drain G 1/2
- 2 Level gauge coding K
- 3 Level gauge coding K1
- 4 Level gauge coding K4
- 5 Ring nut
- 6 Attachment 4xØ9
- 7 Connection base, [see Chapter 4.4](#)
- 8 Additional return connection G 3/4

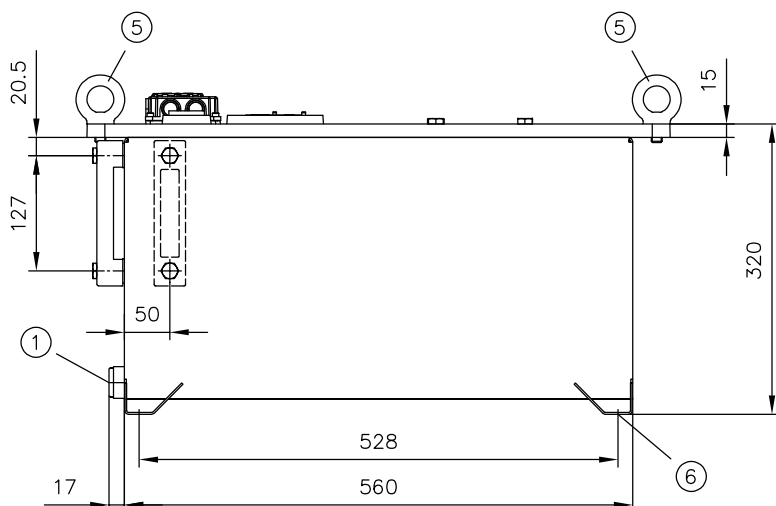
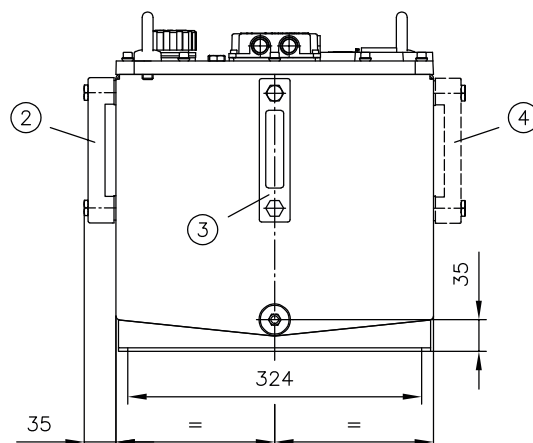
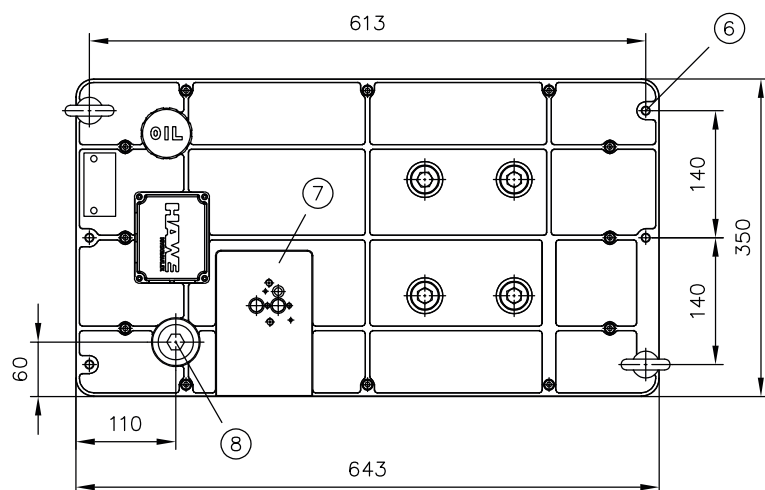
B55, D55



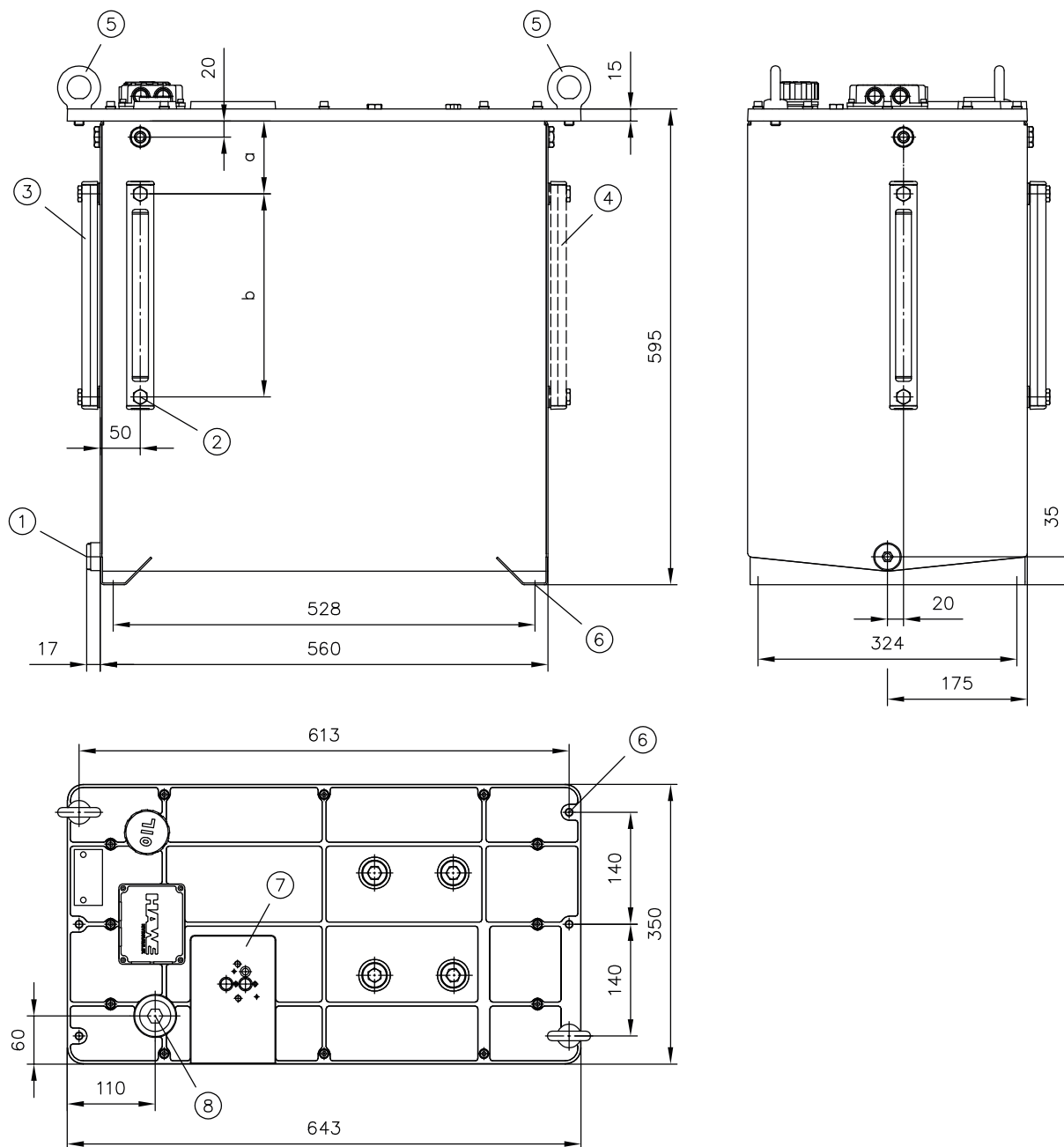
- 1 Oil drain G 1/2
- 2 Level gauge coding K
- 3 Level gauge coding K1
- 4 Level gauge coding K3
- 5 Ring nut
- 6 Attachment 4x Ø9
- 7 Connection base, [see Chapter 4.4](#)
- 8 Additional return connection G 1

Level indicator	a	b
Short oil level gauge (oil volume, option 1)	89	127
Long oil level gauge (oil volume, option 2)	107	176

B55L



B110, D55

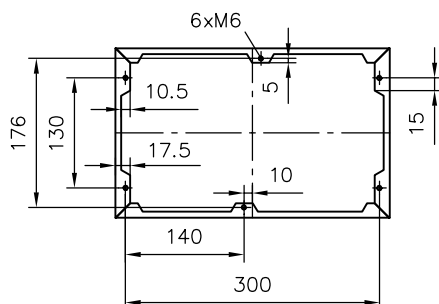


- 1 Oil drain G 1/2
- 2 Level gauge coding K
- 3 Level gauge coding K1
- 4 Level gauge coding K3
- 5 Ring nut
- 6 Attachment 4x Ø9
- 7 Connection base, [see Chapter 4.4](#)
- 8 Additional return connection G 1

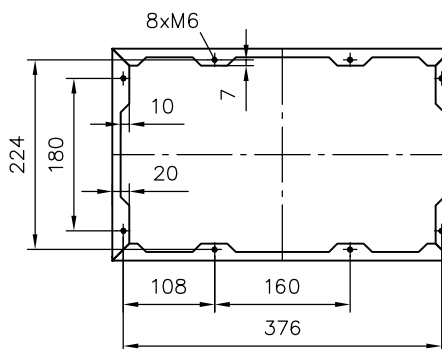
Level indicator	a	b
Short oil level gauge (oil volume, option 1)	91	254
Long oil level gauge (oil volume, option 2)	77.5	305

Mounting opening for attaching the cover plate version in customer-manufactured oil tanks

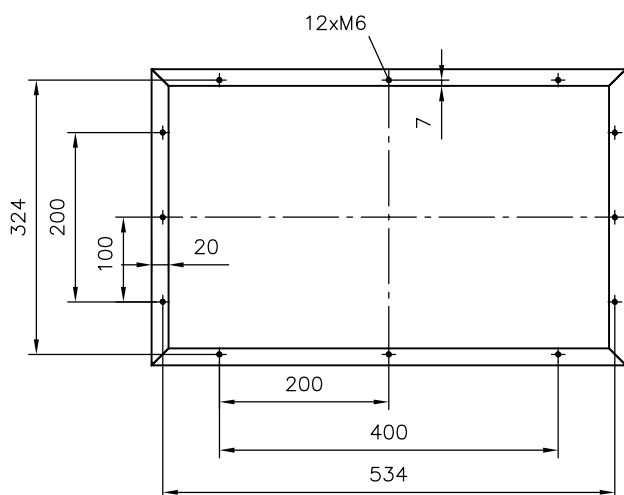
D10



D25



D55

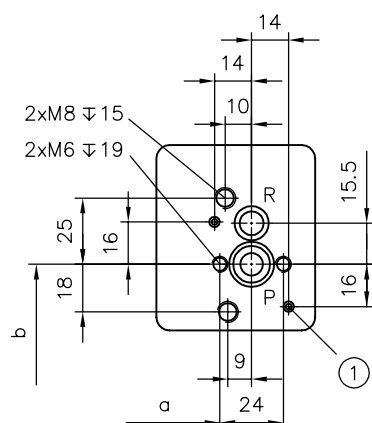


4.4 Connections

4.4.1 Hydraulic connection

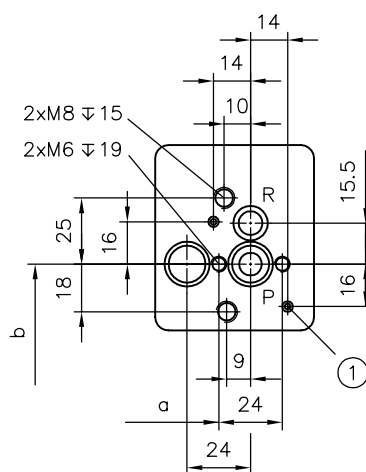
Coding **B(D)...** .20

Single-circuit pumps H, Z



1 Grooved pin ISO 8746 A4x6

Dual-circuit pumps HH, HZ



1 Grooved pin ISO 8746 A4x6

Tank/cover plate	Flow rate $Q_{\max}$ (l/min)	a 1)	b 2)
B10..20, D10..20	20	119	50
B25..20, D25..20		156	85
B55..20, D55..20		211	100
B110..20, D55..20		211	100

Ports	O-ring NBR 90 Shore
P	8x2
R	9x2

1) up to short cover plate edge

2) up to long cover plate edge

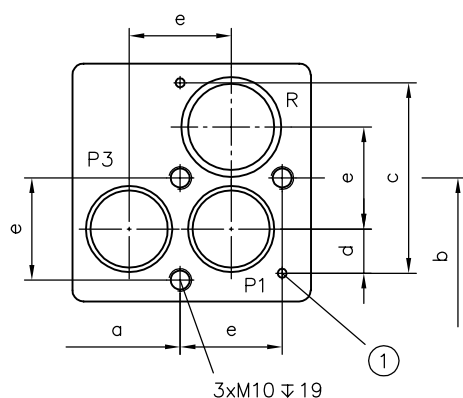
see Chapter 4.3, "Tank and cover plate versions"

i INFORMATION

Suitable for connection blocks in accordance with D 6905 AB, D 6905 B, D 6905 C, see Chapter 6.1.12, "Connection blocks"

Coding **B(D)...** **.80** and **.160**

suitable for connection blocks C 80, C 81, C 160, C 161 see Chapter 6.1.12, "Connection blocks"



1 Grooved pin ISO 8746 A4x6

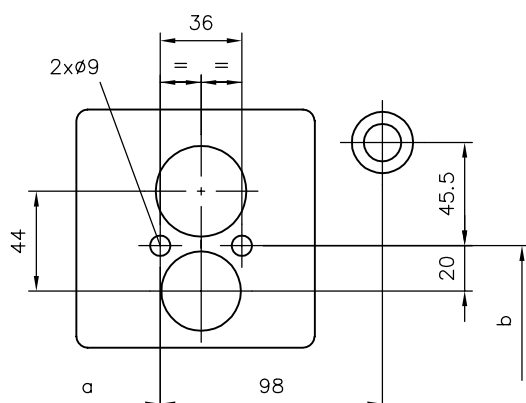
Tank/cover plate	Flow rate Q_{max} (l/min)	a 1)	b 2)	c	d	e
B25.80, D25.80	80	164	91	60	16	32
B55.80, D55.80		207	116	60	16	32
B55.160, D55.160	160	202.5	99.5	84	22.5	45
B110.160, D55.160		202.5	99.5	84	22.5	45

Ports	O-ring NBR 90 Shore	
	B25.80, D25.80 B55.80, D55.80	B55.160, D55.160 B110.160, D55.160
P1, P3	18x2	22x2
R	26x2	39.34x2.62

1) up to short cover plate edge
2) up to long cover plate edge
see Chapter 4.3, "Tank and cover plate versions"

Coding **B(D)...** **.90**

only in combination with type CR 4 M and type NE 70



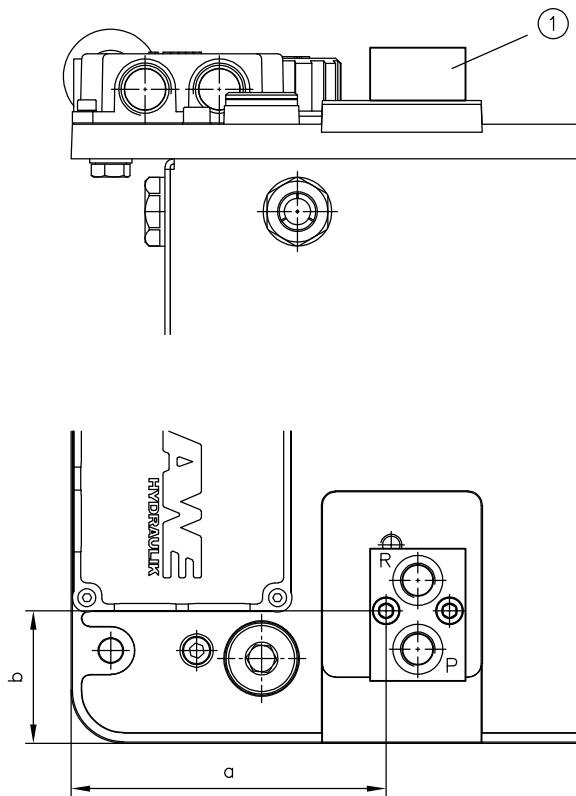
For further information, see

- Two-stage valve type NE 70 in accordance with D 7161
- Switch units type CR 4 M in accordance with D 7150

Tank/cover plate	Flow rate Q_{max} (l/min)	a 1)	b 2)
B25.90, D25.90	90	132	85
B55.90, D55.90		192	100
B110.90, D55.90		2192	100

1) up to short cover plate edge
2) up to long cover plate edge
see Chapter 4.3, "Tank and cover plate versions"

Example: Connection block C 5, C 6



1 Connection block type C 5(6); see [D 6905 C](#)

4.4.2 Electrical connection

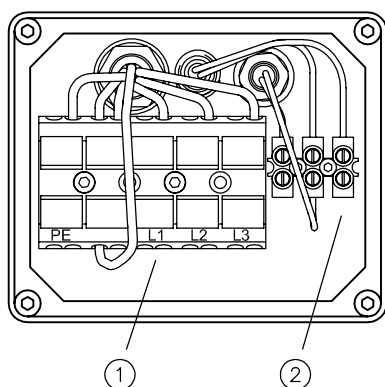
! NOTICE

The terminal connections shown only apply to pump variants H, Z and IZ (rotation direction: anticlockwise).

For variant HZ (rotation direction: clockwise), the following connections must be swapped: U1 and V1 as well as U2 and V2 or Z1 and Z2.

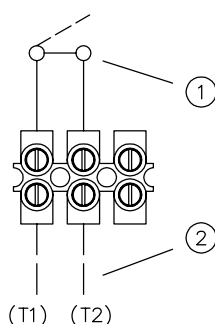
For the wiring: Leave the flexes in the terminal box at a sufficient length (approx. 65 mm) so that they can be rewired from Υ to Δ and vice versa if necessary.

Terminal box



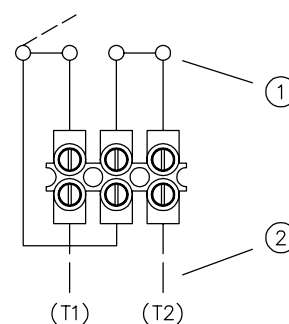
Level switch or temperature switch

D(S) or T, T 50, T 60



Level switch and temperature switch

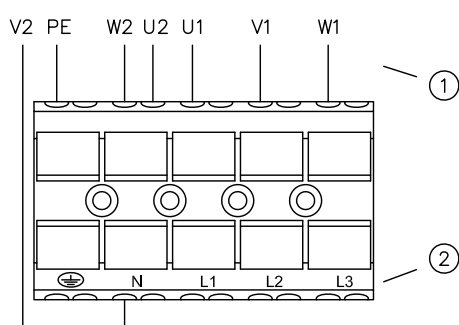
D(S)T, T 50, T 60



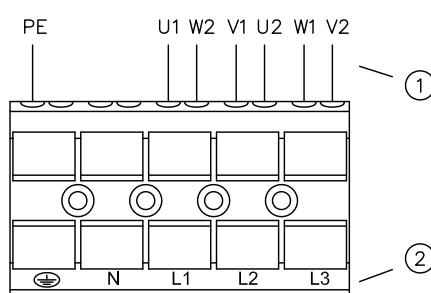
- 1 Customer-side connections
- 2 Temperature switch and/or level switch

3-phase motor

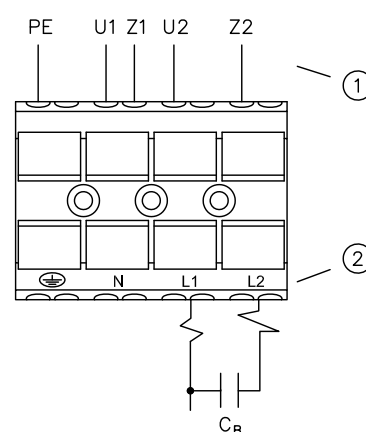
Υ switching



Δ switching



Single-phase motor



- 1 Factory-set connections
- 2 Customer-side connections

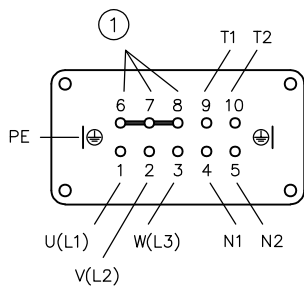
C_B - Operating capacitor not included in scope of delivery

- PE (green-yellow)
- U1 (brown)
- U2 (red)
- V1 (blue)
- V2 (violet)
- W1 (black)
- W2 (orange)

- PE (green-yellow)
- U1 (blue)
- U2 (brown)
- Z1 (black)
- Z2 (red)

Harting plug

Terminal box



- 1 Pin 6, 7 and 8 bridged

5**Installation, operation and maintenance information****! NOTICE****Reference to other document**

For hydraulic power pack MPN, MPNW: [Assembly instructions for compact hydraulic power pack type MPN and MPNW: B 7207](#)

Available for this product: assembly instructions with notes on

- intended use,
- operating and maintenance,
- Assembly information

6 Other information

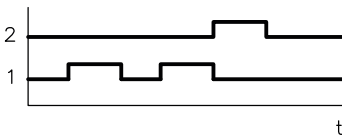
6.1 Planning information

i INFORMATION

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.

6.1.1 Drawing up function diagram

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



6.1.2 Determining pressures and flow rates

1. Dimension and select actuators based on the reaction forces that occur
2. Calculate flow rates based on the desired velocity profiles

! NOTICE

Observe the reset times of spring-loaded clamping cylinders when dimensioning pipelines or hose lines as well as the valves

In the case of time-linked clamping devices, the release of spring-loaded clamping cylinders may 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.

3. Calculate necessary operating pressures
4. Determine maximum necessary pump flow rate Q (l/min)
5. Determine system operating pressure $p_{\max}$ (bar)

Q - flow rate

p - pressure

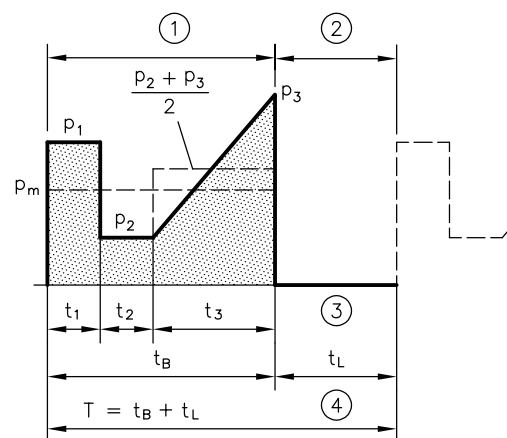
A - Area

v - Velocity

F - Force

$$Q \left(\frac{l}{\min} \right) = 0,06 \cdot A \left(mm^2 \right) \cdot v \left(\frac{m}{s} \right)$$

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



- 1 Loaded period t_B
- 2 No-load period t_L
- 3 No load
- 4 One working cycle

6.1.3 Creating a hydraulic circuit diagram

Selection criteria

- Single circuit system
- Accumulator charging mode
- Use of an accumulator to provide short-term support for the pump flow rate

6.1.4 Drawing 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 duty cycle %ED
- S2 – Short period operation
- S3 – Periodic intermittent operation
- S6 – Continuous operation with intermittent load

An application in continuous periodic operation S6 is possible depending on pump size and load, but only permissible if the oil tank is sufficiently large.

6.1.5 Selecting the compact hydraulic power pack

1. Select basic type based on power supply

- 3-phase current
- Alternating current

2. Select motor

- Permissible voltage ranges:

Nominal voltage

		Permissible nominal voltage tolerances	
		50 Hz	60 Hz
Series	3x400 V 50 Hz	± 10%	± 5%
	3x230 V 50 Hz		
	1x230 V 50 Hz	± 10%	--

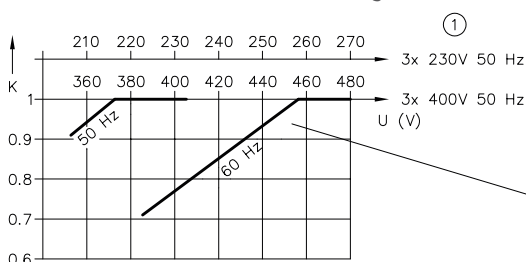
- 400 V 50 Hz 3-phase motors can be used without restrictions in 460 V 60 Hz supply networks.
- Single-phase motors can only be used in supply networks with the nominal voltage and rated frequency.
- It can be operated at undervoltage. Bear in mind that this will involve performance restrictions.

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

$p_{\max}$ (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

1 Motor design



INFORMATION

Pump flow rate 1.2 x greater than with 50 Hz operation.

- If certain possible undervoltages are specified for supply networks at the site of use, the correction factor for the lowest expected voltage value must be determined.

3. Select electrical connection

- Terminal box
 - HARTING plug
4. Select pump type (radial piston pump, gear pump, internal gear pump, pump combination)
 5. Select the key figure for the pump flow rate, taking into account the maximum permissible pressure
 6. Determine basic type based on motor size
 7. Estimate noise level on the basis of parameters

6.1.6 Calculating the hydraulic work value

1. Calculate mean pressure
2. Calculate mean hydraulic work value (average pressure x flow rate)
3. Calculate maximum hydraulic work value (max. operating pressure x flow rate)

Calculation

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

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

6.1.7 Determining the steady-state temperature

i INFORMATION

Observe the maximum permissible temperature of the hydraulic fluid of 80°C!

For further restrictions regarding other hydraulic fluids see Chapter 3.1, "General data"

Calculation

$$\vartheta_{oil\ B} = \Delta \vartheta_B + \vartheta_U$$

$\vartheta_{oil\ B}$ (°C) Steady-state temperature of the hydraulic fluid

$\Delta \vartheta_B$ (K) Steady-state temperature (estimation from the characteristic lines to determine the excess temperature)

ϑ_U (K) Ambient temperature at the place of installation

For an approximate check of the steady-state temperature of the hydraulic fluid, the two most important data are generally sufficient:

- average hydraulic work of the pump $(pV_g)_m$ and
- relative load duration per working cycle (% duty cycle).

Other influencing factors are

- Pressure run during the load phase (average pressure)
- Time share of the no-load phase
- Additional throttle losses over and above normal flow resistances (approx. 30%) from valves and lines are only to be taken into account if they take effect over a longer share of time within a working cycle (load phase). For instance, this includes work against the pressure-limiting valve (loss = 100%)

$$\text{Relative duty cycle \% ED} = \frac{t_B}{t_B + t_L} \cdot 100$$

t_B Load time

t_L No-load time

i INFORMATION

Lower steady-state excess temperatures with larger tank.

6.1.8 Determining the maximum current consumption

Determine current consumption from the electrical data

► see Chapter 3.5, "Electrical data"

Set motor protection circuit

1. Set motor protection circuit to approximately 0.85 to 0.9 times the motor current (I_M); see [Assembly instructions for compact hydraulic power pack type MPN and MPNW: B 7207](#).
 - ✓ When operating normally, the motor protection circuit will not trip prematurely.
 - ✓ When the pressure-limiting valve triggers, the period until shutdown does not become long enough for the hydraulic fluid's temperature to exceed its permissible maximum.
2. Run a test run to check the motor protection circuit's settings.

i INFORMATION

Additional safety precautions against malfunctions are the temperature switches, level switches and pressure switches. These are optionally available for the hydraulic power pack.

6.1.9 Selecting the operating capacitor

! NOTICE

- An operating capacitor is required in order to operate an AC motor.
- The operating capacitor is not included in the scope of delivery.

- The values listed in the table, [see Chapter 3.6, "Motor data"](#), ensure that the specified pressures are achieved.
- Where the utilisation is < 75% of the maximum possible hydraulic work value (pV_g): use an approx. 30% smaller capacitor to reduce the power losses.
- Select capacitor according to motor voltage:

Motor voltage	Rated voltage
1x 230 V 50 Hz	400 V DB

6.1.10 Setting the pump after-run

If the compact hydraulic power pack is wired directly to the hydraulic cylinder, e.g. in the circuit for clamping devices (B-type connection blocks), and if a pressure switch causes it to cut out once the set pressure has been reached, a certain increase in pressure still takes place as a result of the after-run action of the pump motor.

The level of this additional rise in pressure is dependent on the pressure setting, on the consumer volume and on the pump flow rate.

If you wish to prevent these pressure rises, the setting for the pressure-limiting valve has to be adjusted in line with the switch-off point on the pressure switch. As a result, the subsequent delivery from the pump is discharged via the pressure-limiting valve.

The adjustment of the after-run should be carried out as follows:

1. Open the pressure-limiting valve fully.
2. Set the pressure switch to the highest value (by turning the adjusting screw clockwise as far as it will go).
3. Switch on the pump (with a consumer and pressure gauge connected) and turn up the pressure-limiting valve until the pressure gauge shows the required end operating pressure.
4. Turn the pressure switch in the opposite direction until the pump is switched off at the pressure value set.
[see Chapter 3, "Parameters"](#)
5. Lock the pressure-limiting valve and the pressure switches.

The rise in pressure due to the after-run can also be avoided by using an accumulator or additional volume in the load line.

If the hydraulic power pack is used to full capacity, i.e. the pressure setting is close to the maximum permissible pressure, then practically no after-run occurs because the pump comes to a standstill almost immediately after being switched off.
[see Chapter 2, "Available versions"](#)

6.1.11 Planning for silica gel filter

High humidity or temperature fluctuation, e.g. from permanent load alternation or environmental effects promote water condensation inside the tank.

To avoid damage (including short circuits) from condensation inside the tank, use of a silica gel filter is indispensable.

6.1.12 Connection blocks

A connection block is necessary to make a compact hydraulic power pack ready for a hydraulic connection.

i INFORMATION

- When selecting one, take note of the specifications for the connection blocks and mounted directional valves.
- When setting the pressure-limiting valve on the connection block, take note of the pump's and valve mounting's maximum permitted pressure.

Type	Description	Publication
AB	<p>For single-circuit pumps with a pressure-limiting valve and the possibility of direct mounting of directional valve banks</p> <p>Optional:</p> <ul style="list-style-type: none"> ▪ Pressure filter or return line filter ▪ Idle circulation valve ▪ Accumulator charging valve ▪ Proportional pressure-limiting valve 	<p>D 6905 AB SK 6905 AD SK 6905 AD-TUEV</p>
B	<p>For single-circuit pumps for the activation of single-acting cylinders with a pressure-limiting valve and drain valve</p> <p>Optional:</p> <ul style="list-style-type: none"> ▪ Throttle valve 	D 6905 B
C	<p>For single-circuit pumps with connections P and R for direct piping</p>	<p>D 6905 C SK 6906 C</p>
AI, AN, NA C30, SS, VV	<p>For dual-circuit pumps with a pressure-limiting valve and the partial possibility of direct mounting of directional valve banks</p> <p>Optional:</p> <ul style="list-style-type: none"> ▪ Pressure filter or return line filter ▪ Accumulator charging valve ▪ Two-stage valve ▪ Idle circulation valve 	D 6905 A/2

6.1.13 Directional valve banks

i INFORMATION

The direct mounting of valve banks with directional valves on connection blocks enables a compact hydraulic unit to be assembled without the need for additional piping.

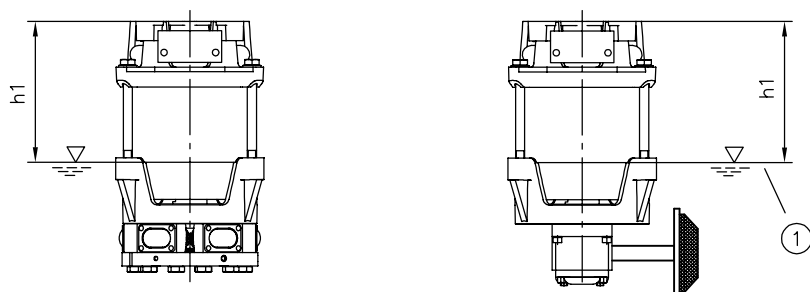
This applies to all types except type **C**.

Type	Description	p _{max} (bar)	Publication
VB	Valve bank (directional seated valve)	700	D 7302
BWN, BWH	Valve bank (directional seated valve)	450	D 7470 B/1
SWR, SWS	Valve bank (directional spool valve)	315	D 7951
BA	Valve bank for the combination of different directional valves with connection pattern NG 6 in accordance with DIN 24 340-A6	400	D 7788
BVH	Valve bank (directional seated valve)	400	D 7788 BV
NBVP	Directional seated valve	400	D 7765 N
ROLV	Directional seated valve	400	D 8144
NSWP	Directional spool valve	315	D 7451 N
NSMD	Clamping module (Directional spool valve with a pressure reducing valve and acknowledge function)	120	D 7787
NZP	Intermediate plates with connection pattern NG 6 in accordance with DIN 24 340-A6	400	D 7788 Z
POL, PRL, PIL	Proportional directional spool valve	350	D 6394
PIH	Proportional directional spool valve	350	D 6418
SWPM	Directional valve	320	D 6420/1
CR 4	Switch unit	400 bar (high pressure) 60 bar (low pressure)	D 7150
NE 70	Two-stage valve	700 bar (high pressure) 80 bar (low pressure)	D 7161

6.2 Installation in customer-manufactured oil tank

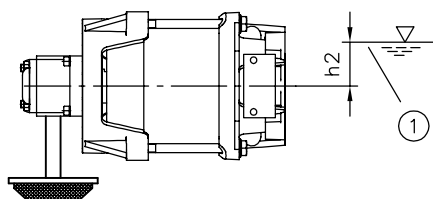
Select the dimensions for customer-manufactured oil tanks so that the motor always remains under the oil level, even with maximum oil extraction by the consumer.

Vertical installation position: The lower winding head must be below the minimum oil level.



1 min. oil level

Horizontal installation position: The suction parts of the gear pump must be below the minimum oil level.



1 min. oil level

h_2 = depending on size, gear pump and selected suction part (see dimension drawings [Chapter 4, "Dimensions"](#) and [Chapter 6.2.1, "Suction parts for MPN...-Z.. when installed in customer-manufactured oil tanks"](#))

Type	h_1	h_2
MPN 42 MPNW 42	105	35
MPN 44	113	35
MPN 46	124	35
MPN 48 MPNW 44	132	60
MPN 404	163	60

Thermal load of the motor

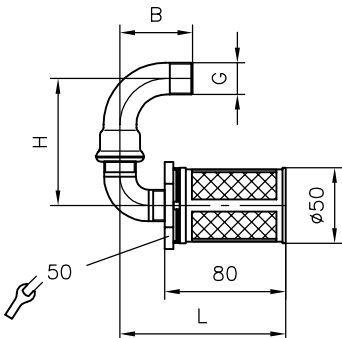
Motor is completely below the oil level	Maximum load permissible
Motor has approx. 1/4 of its rib contour above the oil level	No-load operation no longer permissible, provide for standby mode
Motor has more than 1/4 of its rib contour above the oil level	Check the motor heating by resistance measurement in accordance with VDE 0530 (under given operating conditions): carry out after a series of switching cycles at the end of the load phase and repeat until a further increase in temperature in the motor winding is no longer detectable. Limit of oil temperature approx. 80 °C, permissible limit temperature in the winding 130 °C (insulation class B).

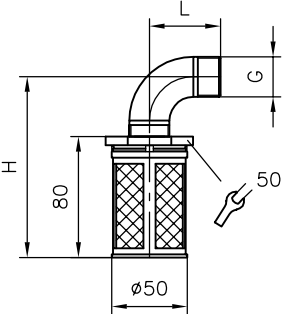
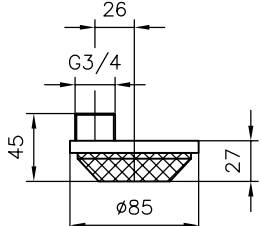
6.2.1 Suction parts for MPN...-Z.. when installed in customer-manufactured oil tanks

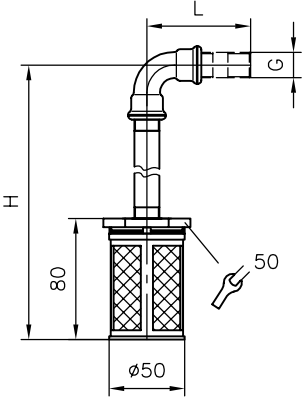
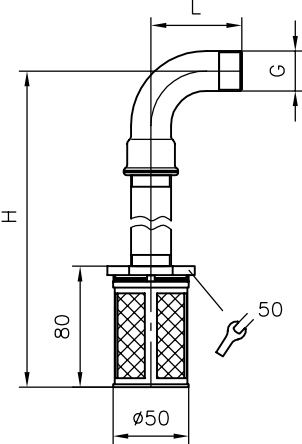
The suction parts are delivered loose in their individual parts.

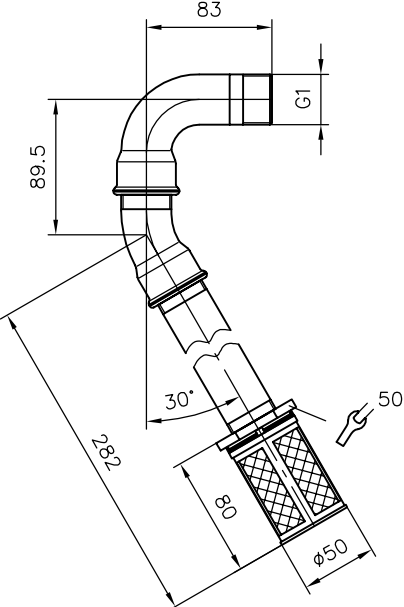
Note during connection

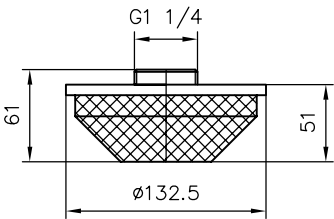
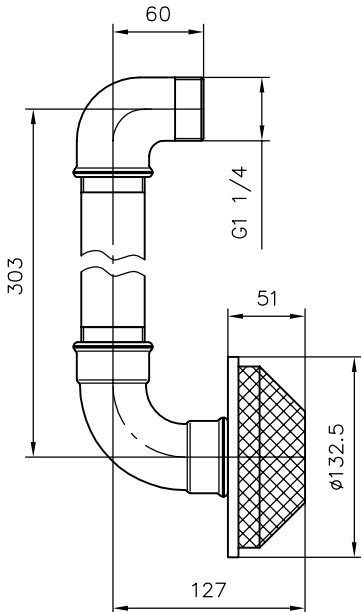
- Seal threaded connections carefully to avoid an ingress of air. (e.g. with commercially available plastic sealing tape, lint-free).
- For conical screw-in threads of the double nipples or fittings: Leave the first 2 or 3 threads free to prevent any sheared-off sealing tape residue from being flushed out and entering the hydraulic system.
- For small flow rates and higher pressure loads: If the oil level drops below the motor, check the winding heating by measuring the resistance if necessary; see Chapter 6.2, "Installation in customer-manufactured oil tank".

For pump type	Principal dimensions (mm)				
	Image	G	H	L	B
MPN(W) 4.-Z BG.1 with -D10		G 3/8	71	105	42
MPN(W) 4.-Z 9 + 12.3 with -D10		G 1/2	84	109.5	48

For pump type	Principal dimensions (mm)			
	Image	G	H	L
MPN(W) 4.-Z BG.1		G 3/8	116	42
MPN(W) 4.-Z 9 + 12.3		G 1/2	120.5	48
MPN(W) 4.-Z 6 ... 28 + 45		G 3/4	119.5	47
MPN(W) 4.-Z 37 + 59 + 75		G 1	118	47
MPN(W) 4.-Z 16 + 21 with -D10		--	--	--

For pump type	Principal dimensions (mm)			
	Image	G	H	L
MPN(W) 4.-HZ BG.1		G 3/8	311	68.5
MPN(W) 4.-HZ 9 + 12.3		G 3/8	307	77.5
MPN(W) 4.-HZ 16 ... 28		G 3/4	314	60
MPN(W) 4.-HZ 37		G 1	301	63
MPN(W) 4.-HZ 45		G 3/4	295	50
MPN(W) 4.-HZ 59 + 75		G 1	276	52

For pump type	Principal dimensions (mm)	
	Image	
MPN(W) 4.-HZ 37 with -D25		

For pump type	Principal dimensions (mm)
	Image
MPN(W) 4.-Z 87	
MPN(W) 4.-HZ 87	
MPN(W) 4.-IZ	see Chapter 4.1.3, "Version with internal gear pump"

6.3 Rotation direction

Setting the rotation direction

- ! NOTICE**
For type MPN..-H of any kind:
The flow direction remains the same.
- ! NOTICE**
For types MPN..Z (HZ, IZ), a specific rotation direction is required.
In the installed state, the motor cannot be viewed. The rotation direction can therefore only be determined via a check of the flow rate. The Z-pump rotates anticlockwise as standard (anticlockwise facing the shaft).
► Carry out the flow test as described below.

Flow test:

- Return the pressure connection of the Z-pump (both pressure connections for double pumps) to the oil tank using a transparent plastic hose.
- Switch the motor on and off again several times (tap).
✓ Flow rate remains absent: Swap two of the three main conductors of the motor. This causes the motor to rotate in the opposite direction.
- Repeat the flow test.

6.4 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 (e.g. 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, 3 · 400VAC 4kW 50-60Hz (made by Murr-Elektronik, D-71570 Oppenweiler, Germany).

References

Compact hydraulic power packs

- Compact hydraulic power pack type KA and KAW size 2: D 8010
- Compact hydraulic power packs type KA size 4: D 8010-4
- Compact hydraulic power pack type INKA 1: D 8132-1
- Compact hydraulic power pack type MPN and MPNW: D 7207
- 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 NPC: D 7940
- Mini hydraulic power pack type H 300, 350: D 6344
- Mini hydraulic power pack type H 400, 410, 440: D 6345
- Mini hydraulic power pack type HR 050: D 6014
- Micro hydraulic power pack type HR 080: D 6342
- Mini hydraulic power pack type HR 120: D 6343
- Servo hydraulic power pack type HS 120: D 6347
- Mini hydraulic power pack type A: D 6025

Connection blocks

- Connection blocks for single-circuit pumps types AB, AL: D 6905 AB
- Connection blocks type B for hydraulic power packs: D 6905 B
- Connection blocks type C: D 6905 C
- Connection blocks for dual-circuit pumps types AN, AL, NA: D 6905 A/2

Valves and valve banks

- 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 CWP: D 7451 CWP
- 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 seated valve type ROLV: D 8144
- Directional spool valve type NSWP 2: D 7451 N
- Clamping module type NSMD: D 7787
- Intermediate plate type NZP: D 7788 Z

Attached components

- Fitting type X 84: D 7077
- Diaphragm accumulator type AC: D 7969
- Miniature accumulator type AC: D 7571

