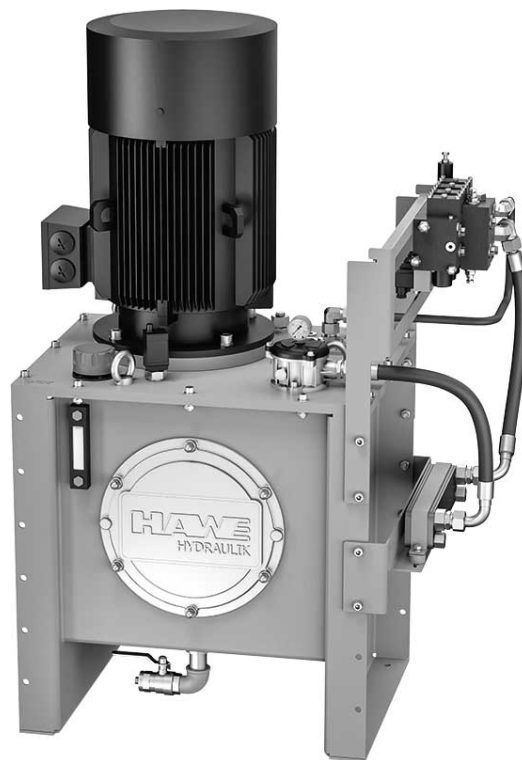


Hydraulic power pack type FXU

Product documentation

Operating pressure p_{\max} :	HP/LP: 700/260 bar
Geometric displacement V_g :	HP/LP: 64.15/87.5 cm ³ /rev
Usable volume V_{use} :	Max. 565 l
Motor power:	Max. 37 kW



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Printing date / document generated on: 20.01.2019

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1 Overview of hydraulic power pack type FXU

Standard hydraulic power packs from the FXU series are a type of hydraulic power pack. They are characterised by their very flexible design and customer-specific modular adjustment options.

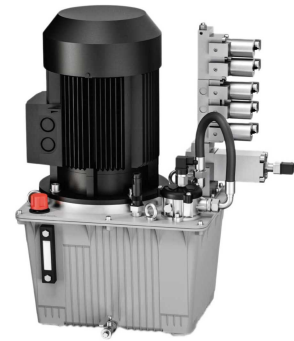
The power packs are equipped with aluminium or steel oil tanks. The pump is located in the tank. One pump or a pump combination is possible.

Radial piston pumps or external gear pumps are both used, as well as combinations of external gear pumps with radial piston pumps.

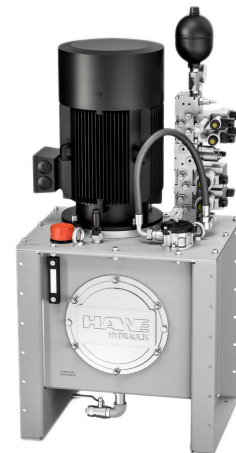
The pumps are installed under a top housing cover in an aluminium or steel tank.

Features and benefits:

- Hydraulic power pack for continuous operation (S1 operation)
- Customer-specific documentation with EPlan Fluid and step model
- It is possible to mount HAWE valve banks with seated and spool valves directly
- It is possible to attach proportional directional spool valves from series PSL 3
- Quick to configure due to tailored modular system



Hydraulic power pack FXU with aluminium tank



Hydraulic power pack FXU with steel tank

2 Available versions, main data

2.1 Order coding

Order coding example:

FXU	-R 9,5	-BL 70	-F042/10	/OA	-NT1	/W	/A90	-UA	-V7,5	-3 x 690/400 V 50 Hz
										Motor voltage Motor voltage see Chapter 2.4, "Motor"
										Nominal motor power V = With motor Z = Prepared for motor see Chapter 2.4, "Motor"
										Connection/adaptor for valve mounting UA = Adapter for valve mounting see Chapter 2.5, "Valve mounting"
										Drain valve A90 = Drain valve with 90° angle see Chapter 2.3.1, "Tank option"
										Feet for aluminium tank W = Feet see Chapter 2.3.1, "Tank option"
										Level/temperature sensor NT1 = Level/temperature sensor with 1 switching point see Chapter 2.3.4, "Monitoring"
										Filter option OA = Optical visual clogging indicator see Chapter , "Visual clogging indicator"
										Return line filter F = Return line filter see Chapter 2.3.3, "Return line filter"
										Tank BL = Tank see Chapter 2.3, "Tank"
										Pump type and size R = Radial piston pumps, see Chapter 2.2.1, "Radial piston pump R/RG" Z = External gear pumps, see Chapter 2.2.2, "External gear pump" RZ = Dual-stage pump, see Chapter 2.2.3, "Dual-stage pump"

Basic type FXU

2.2 Pump types and combinations

2.2.1 Radial piston pump R/RG

Radial piston pumps generate a flow rate using piston elements that are arranged in a star formation around a motor shaft and actuated by an eccentric tappet. Depending on the size of the pump, up to six stars are arranged one above the other.

Radial piston pumps are particularly well suited to high pressures of up to 700 bar.

Radial piston pumps type R and RG in accordance with [D 6010](#) are used.

Order coding example:

FXU -R 9,5 ...

Radial piston pump

Radial piston pump type R/RG

Coding output volume lpm at 1400 rpm)	Size R pump	Pump elements number	Pump element \varnothing (mm)	Geometric displacement V_g (cm ³ /rev)	Operating pressure p_{max} (bar)	Min. motor nominal size (kW)	Max. motor nominal size (kW)	Min. tank nominal size
1.4	6011	5	6	1.07	700	3.0	7.5	BL 30
2.08	6011	5	7	1.46	600	3.0	7.5	BL 30
2.1	6011	7	6	1.5	700	3.0	7.5	BL 30
2.6	6011	5	8	1.91	550	3.0	7.5	BL 30
2.7	6012	10	6	2.15	700	3.0	11.0	BL 44
2.9	6011	7	7	2.05	600	3.0	7.5	BL 30
3.7	6011	7	8	2.67	550	3.0	7.5	BL 30
4	6012	14	6	3.01	700	3.0	11.0	BL 44
4.15	6012	10	7	2.92	600	3.0	11.0	BL 44
4.2	6011	5	10	2.98	450	3.0	7.5	BL 30
5.3	6012	10	8	3.82	550	3.0	11.0	BL 44
5.8	6011	7	10	4.18	450	3.0	7.5	BL 30
5.85	6012	14	7	4.09	600	3.0	11.0	BL 44
6	6011	5	12	4.3	350	3.0	7.5	BL 30
6.1	6014	20	6	4.3	700	5.5	30.0	BS 100
7	6011	5	13	5.04	300	3.0	7.5	BL 30
7.4	6012	14	8	5.35	550	3.0	11.0	BL 44
8	6014	28	6	6.01	700	5.5	30.0	BS 100
8.2	6012	10	10	5.97	450	3.0	11.0	BL 44
8.3	6011	5	14	5.85	250	3.0	7.5	BL 30
8.35	6014	20	7	5.85	600	5.5	30.0	BS 100
8.4	6011	7	12	6.01	350	3.0	7.5	BL 30
9.5	6011	5	15	6.71	200	3.0	7.5	BL 30
9.8	6011	7	13	7.06	300	3.0	7.5	BL 30

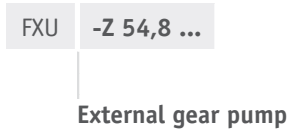
Coding output volume lpm at 1400 rpm)	Size R pump	Pump elements number	Pump element \varnothing (mm)	Geometric displacement Vg (cm ³ /rev)	Operating pressure p _{max} (bar)	Min. motor nominal size (kW)	Max. motor nominal size (kW)	Min. tank nominal size
10.9	6011	5	16	7.64	160	3.0	7.5	BL 30
11	6014	20	8	7.64	550	5.5	30.0	BS 100
11.6	6012	14	10	8.35	450	3.0	11.0	BL 44
11.65	6014	28	7	8.19	600	5.5	30.0	BS 100
11.8	6011	7	14	8.19	250	3.0	7.5	BL 30
12	6012	10	12	8.59	350	3.0	11.0	BL 44
12.7	6016	42	6	9.02	700	11.0	37.0	BS 100
13.3	6011	7	15	9.4	200	3.0	7.5	BL 44
14.2	6012	10	13	10.08	300	3.0	11.0	BL 44
15	6014	28	8	10.69	550	5.5	30.0	BS 100
15.3	6011	7	16	10.69	160	3.0	7.5	BL 44
16.8	6012	10	14	11.69	250	3.0	11.0	BL 44
17	6012	14	12	12.03	350	3.0	11.0	BL 44
17.4	6014	20	10	11.93	450	5.5	30.0	BS 100
17.45	6016	42	7	12.28	600	11.0	37.0	BS 100
19.3	6012	10	15	13.42	200	3.0	11.0	BL 70
20	6012	14	13	14.12	300	3.0	11.0	BL 70
21.7	6012	10	16	15.27	160	3.0	11.0	BL 70
22	6016	42	8	16.04	550	11.0	37.0	BS 100
23	6014	28	10	16.7	450	5.5	30.0	BS 100
23.5	6012	14	14	16.37	250	3.0	11.0	BL 70
25	6014	20	12	17.18	350	5.5	30.0	BS 100
26.5	6012	14	15	18.79	200	3.0	11.0	BL 70
30	6014	20	13	20.17	300	5.5	30.0	BS 100
30.4	6012	14	16	21.38	160	3.0	11.0	BS 100
34	6014	28	12	24.05	350	5.5	30.0	BS 100
34.5	6016	42	10	25.06	450	11.0	37.0	BS 100
35	6014	20	14	23.39	250	5.5	30.0	BS 100
38	6014	20	15	26.85	200	5.5	30.0	BS 100
40	6014	28	13	28.23	300	5.5	30.0	BS 100
43.4	6014	20	16	30.55	160	5.5	30.0	BS 160
47	6014	28	14	32.74	250	5.5	30.0	BS 160
51	6016	42	12	36.08	350	11.0	37.0	BS 160
53	6014	28	15	37.59	200	5.5	30.0	BS 160
60	6016	42	13	42.35	300	11.0	37.0	BS 160
60.8	6014	28	16	42.76	160	5.5	30.0	BS 160
70	6016	42	14	49.11	250	11.0	37.0	BS 250
80	6016	42	15	56.38	200	11.0	37.0	BS 250
91.2	6016	42	16	64.15	160	11.0	37.0	BS 250

2.2.2 External gear pump

External gear pumps generate the flow rate by transporting the medium between the gear wheel and the housing. They offer a cost-effective alternative to radial piston pumps at low pressures.

These pumps are designed to generate less noise.

Order coding example:



Gear pump type Z

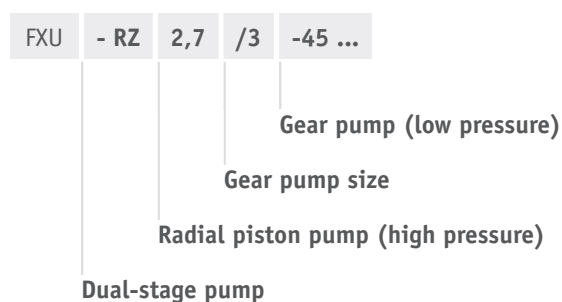
Coding (output volume lpm at 1400 rpm)	Size Z pump	Geometric displacement V _g (cm ³ /rev)	Operating pressure p _{max} (bar)	Min. motor nominal size (kW)	Max. motor nominal size (kW)	Min. tank nominal size
5.4	2	4.1	250	3.0	22.0	BL 30
8.1	2	6.2	250	3.0	22.0	BL 30
10.7	2	8.2	250	3.0	22.0	BL 30
14.6	2	11.2	250	3.0	22.0	BL 44
18.3	2	14	240	3.0	22.0	BL 70
20.9	2	16	240	3.0	22.0	BL 70
26.1	2	20	200	3.0	22.0	BL 70
28.7	3	22	260	3.0	37.0	BS 100
36.5	3	28	260	3.0	37.0	BS 100
41.8	3	32	260	3.0	37.0	BS 160
49.6	3	38	240	3.0	37.0	BS 160
54.8	3	42	240	3.0	37.0	BS 160
69.2	3	53	220	3.0	37.0	BS 160
82.2	3	63	200	3.0	37.0	BS 160

2.2.3 Dual-stage pump

In a dual-stage pump, a radial piston pump (high pressure) is combined with a gear pump (low pressure) to enable switching between low pressure and high pressure. For this purpose, the specified radial piston pumps can be combined with the gear pumps listed in the following table.

Dual-stage pumps type RZ in accordance with [D 6910](#) are used.

Order coding example:



Dual-stage pump (radial piston pump, high pressure)

Coding (output volume lpm at 1400 rpm)	RZ pump size	Number of pump elements	Pump elements Ø (mm)	Geometric displacement V _g (cm ³ /rev)	Operating pressure p _{max} (bar)	Min. motor nominal size (kW)	Max. motor nominal size (kW)
1.4	6911	5	6	1.07	700	3.0	11.0
2.08	6911	5	7	1.46	600	3.0	11.0
2.1	6911	7	6	1.5	700	3.0	11.0
2.6	6911	5	8	1.91	550	3.0	11.0
2.7	6912	10	6	2.15	700	3.0	11.0
2.9	6911	7	7	2.05	600	3.0	11.0
3.7	6911	7	8	2.67	550	3.0	11.0
4	6912	14	6	3.01	700	3.0	11.0
4.15	6912	10	7	2.92	600	3.0	11.0
4.2	6911	5	10	2.98	450	3.0	11.0
5.3	6912	10	8	3.82	550	3.0	11.0
5.8	6911	7	10	4.18	450	3.0	11.0
5.85	6912	14	7	4.09	600	3.0	11.0
6	6911	5	12	4.3	350	3.0	11.0
6.1	6914	20	6	4.3	700	5.5	22.0
7	6911	5	13	5.04	300	3.0	11.0
7.4	6912	14	8	5.35	550	3.0	11.0
8	6914	28	6	6.01	700	5.5	22.0
8.2	6912	10	10	5.97	450	3.0	11.0
8.3	6911	5	14	5.85	250	3.0	11.0
8.35	6914	20	7	5.85	600	5.5	22.0
8.4	6911	7	12	6.01	350	3.0	11.0
9.5	6911	5	15	6.71	200	3.0	11.0
9.8	6911	7	13	7.06	300	3.0	11.0

Coding (output volume lpm at 1400 rpm)	RZ pump size	Number of pump elements	Pump elements Ø (mm)	Geometric displacement V _g (cm ³ /rev)	Operating pressure p _{max} (bar)	Min. motor nominal size (kW)	Max. motor nominal size (kW)
10.9	6911	5	16	7.64	160	3.0	11.0
11	6914	20	8	7.64	550	5.5	22.0
11.6	6912	14	10	8.35	450	3.0	11.0
11.65	6914	28	7	8.19	600	5.5	22.0
11.8	6911	7	14	8.19	250	3.0	11.0
12	6912	10	12	8.59	350	3.0	11.0
12.7	6916	42	6	9.02	700	11.0	30.0
13.3	6911	7	15	9.4	200	3.0	11.0
14.2	6912	10	13	10.08	300	3.0	11.0
15	6914	28	8	10.69	550	5.5	22.0
15.3	6911	7	16	10.69	160	3.0	11.0
16.8	6912	10	14	11.69	250	3.0	11.0
17	6912	14	12	12.03	350	3.0	11.0
17.4	6914	20	10	11.93	450	5.5	22.0
17.45	6916	42	7	12.28	600	11.0	30.0
19.3	6912	10	15	13.42	200	3.0	11.0
20	6912	14	13	14.12	300	3.0	11.0
21.7	6912	10	16	15.27	160	3.0	11.0
22	6916	42	8	16.04	550	11.0	30.0
23	6914	28	10	16.7	450	5.5	22.0
23.5	6912	14	14	16.37	250	3.0	11.0
25	6914	20	12	17.18	350	5.5	22.0
26.5	6912	14	15	18.79	200	3.0	11.0
30	6914	20	13	20.17	300	5.5	22.0
30.4	6912	14	16	21.38	160	3.0	11.0
34	6914	28	12	24.05	350	5.5	22.0
34.5	6916	42	10	25.06	450	11.0	30.0
35	6914	20	14	23.39	250	5.5	22.0
38	6914	20	15	26.85	200	5.5	22.0
40	6914	28	13	28.23	300	5.5	22.0
43.4	6914	20	16	30.55	160	5.5	22.0
47	6914	28	14	32.74	250	5.5	22.0
51	6916	42	12	36.08	350	11.0	30.0
53	6914	28	15	37.59	200	5.5	22.0
60	6916	42	13	42.35	300	11.0	30.0
60.8	6914	28	16	42.76	160	5.5	22.0
70	6916	42	14	49.11	250	11.0	30.0
80	6916	42	15	56.38	200	11.0	30.0
91.2	6916	42	16	64.15	160	11.0	30.0

Dual-stage pump (gear pump, low pressure)

Coding (output volume lpm at 1400 rpm)	Z pump size	Geometric displacement V _g (cm ³ /rev)	Operating pressure p _{max} (bar)	Minimum tank size with RZ pump of size					
				6911 with motor ≤ 4 kW	6911 with motor ≥ 5.5 kW	6912 with motor ≤ 7.5 kW	6912 with motor = 11 kW	6914	6916 with motor ≤ 30 kW
6.5	2	4.5	240	BL 30	BL 70	BL 70	BL 70	BS 100	BS 630
9	2	6	240	BL 30	BL 70	BL 70	BS 100	BS 100	BS 630
12.3	2	8.5	230	BL 30	BL 70	BL 70	BS 100	BS 100	BS 630
16	2	11	230	BL 40	BL 70	BL 70	BS 100	BS 100	BS 630
21	2	14.5	230	BL 40	BL 70	BL 70	BS 100	BS 100	BS 630
24	2	17	230	BL 40	BL 70	BL 70	BS 100	BS 100	BS 630
28	2	19.5	200	BL 40	BL 70	BL 70	BS 100	BS 100	BS 630
37	2	26	180	BL 40	BL 70	BL 70	BS 100	BS 100	BS 630
45	3	30.1	200	BL 40	BS 100	BS 100	BS 100	BS 100	BS 630
59	3	41.6	180	BL 70	BS 100	BS 100	BS 100	BS 160	--
75	3	50.2	180	BL 70	BS 100	BS 100	BS 100	BS 160	--
87	3	61	150	BL 70	BS 100	BS 100	BS 100	BS 160	--
110	3	71.8	140	BL 70	BS 100	BS 100	BS 100	BS 160	--
135	3	87.5	110	BL 70	BS 100	BS 100	BS 100	BS 160	--

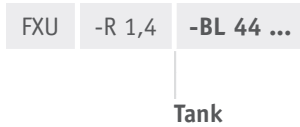
2.3 Tank

The oil tanks in the FlexUnits are made of aluminium or steel.

i NOTE

When selecting the tank, please observe the planning information (see [Chapter 6.1.2, "Tank"](#)) and the minimum tank sizes specified in the pump selection tables.

Order coding example:



Tank

Coding	Volume V (l)	Nominal volume $V_{use}(l)$	Version	Eff. surface (m ²)	Max. nominal motor size (kW)
BL 30	30	27	Aluminium	0.6	7.5
BL 44	44	40	Aluminium	0.8	15
BL 70	70	63	Aluminium	1.0	15
BS 100	100	90	Steel	1.2	22
BS 160	160	144	Steel	1.7	30
BS 250	250	225	Steel	2.3	30
BS 400	400	360	Steel	2.9	37
BS 630	630	565	Steel	3.9	37

2.3.1 Tank option

Set-up

Aluminium tanks can optionally be equipped with feet that make it easier to handle the hydraulic power packs.

Order coding example:



Coding	Description
No designation	No feet
W	Feet

Tank draining

A drain valve can be fitted to provide an easy way to drain the tank. If no drain valve is fitted, the tank is drained via a tapped plug.

Order coding example:



Coding	Description	Connecting thread
No designation	Tapped plug	G 1 (steel tank BS...) G 1/2 (aluminium tank BL...)
A	Drain valve, straight	G 1 (steel tank BS 100, BS 400, BS 600) G 1/2 (aluminium tank BL...)
A90	Drain valve, 90° angle	G 1 (steel tank BS...) G 1/2 (aluminium tank BL...)

2.3.2 Heat exchanger

The FlexUnits' heat exchangers are designed as oil-water plate heat exchangers. They use a cold water flow in order to reduce the oil temperature. The hydraulic power packs with steel tanks can be fitted with heat exchangers. In this instance, a return line filter is always required.

The water flow rate should be half the oil flow rate.

Order coding example:

FXU -R 19,3 -BS 100 -F100/10/ **B 10-30**

Heat exchanger

Coding	Max. oil flow rate (lpm)	Max. cooling capacity (kW) when $T\Delta = 40\text{ K}$	Max. spec. cooling capacity (kW/K)	Water connection
B 8-20	40	15	0.38	G 1/2
B 8-30	70	25	0.63	G 1/2
B 10-20	80	28	0.70	G 3/4
B 10-30	110	40	1.00	G 3/4
B 10-70	150	60	1.50	G 1

2.3.3 Return line filter

Return line filters filter the returning oil flow.

i NOTE

When selecting the filter, please observe [Chapter 6.1.4, "Filter"](#).

A bypass opens in the event of a contaminated filter cartridge. This ensures that the system can continue to be operated for a short period. The hydraulic fluid is no longer filtered in this case! The filter cartridge must be replaced urgently.

- Filter element: microfibre, filter fineness 6 µm, 10 µm; resin-impregnated paper filter fineness 25 µm
- Bypass opening pressure: 1.75 bar

Order coding example:

FXU - R 1,4 - BL 44 - **F020/10** /EA ...

Return line filter

Return line filter

Coding	Flow rate for reflux (lpm)	Filter fineness (µm)	Connecting thread	Size
F008/6	8	6	G 1/2	030
F016/6	16	6	G 3/4	100
F030/6	30	6	G 3/4	100
F042/6	42	6	G 1	100
F116/6	116	6	G 1 1/4	181
F208/6	208	6	G 1 1/2	181
F020/10	20	10	G 1/2	030
F042/10	42	10	G 3/4	100
F051/10	50	10	G 3/4	100
F100/10	100	10	G 1	100
F184/10	180	10	G 1 1/4	181
F300/10	300	10	G 1 1/2	181
F049/25	049	25	G 1/2	030
F070/25	070	25	G 3/4	100
F090/25	090	25	G 3/4	100
F180/25	180	25	G 1	100
F220/25	220	25	G 1 1/4	181
F300/25	300	25	G 1 1/2	181

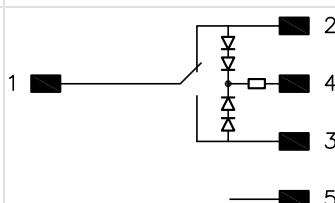
The filters can be equipped with an optical or an electrical visual clogging indicator.

Order coding example:

FXU -R 1,4 -BL 44 -F020/10 /EA ...

Visual clogging indicator

Visual clogging indicator

Coding	Description	
No designation	Without visual clogging indicator, measurement fitting G 1/8	
OA	Optical (vertical, 3 colours)	<p>Display:</p> <ul style="list-style-type: none"> Green up to 1.4 bar Yellow from 1.4 to 1.7 bar Red from 1.7 bar
EA	Electrical/optical	<ul style="list-style-type: none"> Max. switching capacity: 0.4 A/24 V DC Electrical connection: M12, 5-pole Switching signal at 1.5 bar With green/red LED Switching function F: Change-over contact 

2.3.4 Monitoring

The level switch and temperature switch use electric switching signals to signal oil levels falling below the permissible level and the oil temperature value exceeding the permissible level. This allows measures to be initiated if the system is in a critical state.

Order coding example:

FXU -R 9,95 -BL 70 -NT1...

Accessories for monitoring Level and temperature monitoring

Level switch and temperature switch

Coding	Description	Function
NT1	<p>Level switch / temperature switch</p> <ul style="list-style-type: none"> Operating voltage: 10 – 36 V DC Max. switching capacity: 10 W Plug type M12, 5-pin <p>Level switch:</p> <ul style="list-style-type: none"> Switching function L1: N/C contact opens when level falls <p>Temperature switch:</p> <ul style="list-style-type: none"> Switching function: N/C contact opens when temperature increases Switching temperature: 80°C (± 3°C) 	<p>L1 Switching function T Temperature switch</p>
NT2	<p>Two level switches / one temperature switch</p> <ul style="list-style-type: none"> Operating voltage: 10 – 36 V DC Max. switching capacity: 10 W Plug type M12, 5-pin <p>Level switch:</p> <ul style="list-style-type: none"> Switching function L1 (bottom): N/C contact opens when level falls Switching function L2 (top): N/O contact closes when level falls <p>Temperature switch:</p> <ul style="list-style-type: none"> Switching function: N/C contact opens when temperature increases Switching temperature: 80°C (± 3°C) 	<p>L1 Switching function L2 Switching function T Temperature switch</p>
NT IO	<p>Level and temperature switch with IO-Link. A freely programmable switch output; with digital display and three adjustment buttons</p> <p>Switching function: programmable (PNP)</p> <ul style="list-style-type: none"> Operating voltage: 18 – 30 V DC Max. switching capacity: 10 W Plug type M 12, 4-pin 	<p>1 +24 V 2 PNP switching signal 3 GND 4 IO-Link</p>

2.4 Motor

Motors in V1 design in accordance with DIN EN 60034 are envisaged on the FlexUnits.

If the hydraulic power pack is ordered with a motor, motors up to 5.5 kW are made of aluminium and larger motors are made of grey cast iron. The connection voltage of the motors is:

⇒ up to and including 3 kW	Υ 3 x 400 V 50 Hz, 3 x 460 V 60 Hz Δ 3 x 230 V 50 Hz, 3 x 265 V 60 Hz
⇒ from 4 kW	Υ 3 x 690 V 50 Hz Δ 3 x 400 V 50 Hz, 3 x 460 V 60 Hz

An overvoltage or undervoltage of 5% is acceptable. In the case of undervoltage, relevant power losses must be taken into account. The motors have protection class IP 55.

The efficiency class of the motors in accordance with DIN EN 60034-30-1 is IE 3.

The hydraulic power packs can be supplied without a motor, which must then be provided by the customer.

Order coding example:

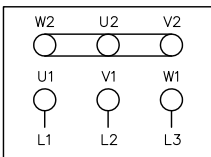
FXU -R1,4 -BL 44 /F020 -V3,0...

Nominal motor power

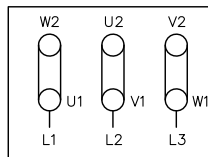
V = with motor, see table "Motor fitted"

Z = prepared for motor, see table "Motor fitted by customer"

Motor connection for star pattern



Motor connection for delta circuit



Motor fitted

Coding	Size	Nominal motor power P_{nom} (kW)	Power factor $\cos \varphi$	Nominal current U_{nom} (A) (400 V)	Initial current/ nominal current
V 3.0	100L	3	0.82	6.02	7.6
V 4.0	112M	4	0.82	7.95	7.7
V 5.5	132S	5.5	0.83	10.67	7.5
V 7.5	132M	7.5	0.84	14.26	7.5
V 11	160M	11	0.85	20.4	7.5
V 15	160L	15	0.86	27.3	7.5
V 18.5	180M	18.5	0.86	33.5	7.9
V 22	180L	22	0.86	39.7	7.9
V 30	200L	30	0.86	53.2	7.9
V 37	225S	37	0.86	66.1	7.9

Motor fitted by customer

Coding	Size	Nominal motor power P_{nom} (kW)
Z 3.0	100L	without motor, self-attachment
Z 4.0	112M	without motor, self-attachment
Z 5.5	132S	without motor, self-attachment
Z 7.5	132M	without motor, self-attachment
Z 11	160M	without motor, self-attachment
Z 15	160L	without motor, self-attachment
Z 18.5	180M	without motor, self-attachment
Z 22	180L	without motor, self-attachment
Z 30	200L	without motor, self-attachment
Z 37	225S	without motor, self-attachment

2.5 Valve mounting

Various valve banks can be connected to and mounted on the hydraulic power packs. Pipe connectors and connection blocks are available for this.

Order coding example:

FXU R 9,5 -BL70 -F042 -UA...

Connection/adapter for valve mounting UA = Adapter for valve attachment

Connection for valve mounting

Coding	Description	Single circuit	Dual circuit
VR	Pipe connector (bulkhead connector) Connection for valve bank PSL 3	●	
VR2	Pipe connector (bulkhead connector)		●
UA	Adapter for connection block – Type A in accordance with D 6905 A/1 – Type B in accordance with D 6905 B	● ●	●
UB1 UB1/R	Adapter for valve bank BNG 2 in accordance with D 7788 BNG (nominal size 6) in P – without check valve in P – with check valve in P	●	
UNE 2	Adapter for two-stage valve type NE 20 or NE 21 in accordance with D 7161		●
UNE 7	Adapter for two-stage valve type NE 70 or for switch unit type CR 4 in accordance with D 7161		●

3 Parameters

General information

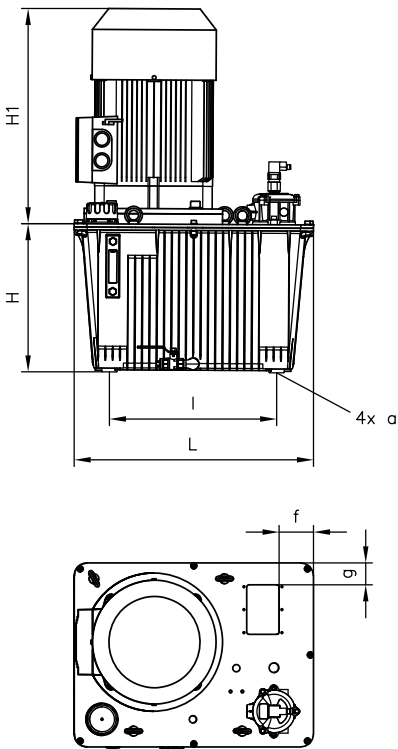
Designation	Hydraulic power pack
Installation position	Vertical
Hydraulic fluid	Hydraulic oil: according to part 1 to 3; ISO VG 10 to 68 according to DIN 51519 Viscosity range: min. approx. 10, max. approx. 300 mm ² /s Optimal operating range: approx. 10 to 35 mm ² /s Also suitable for biologically degradable pressure fluids type HEES (synthetic ester) at operating temperatures up to approx. +70°C.
Cleanliness level	ISO 4406 <u>21/18/15...19/17/13</u>
Temperatures	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.

4 Dimensions

All dimensions in mm, subject to change.

4.1 Aluminium tank

Aluminium tank



Motor

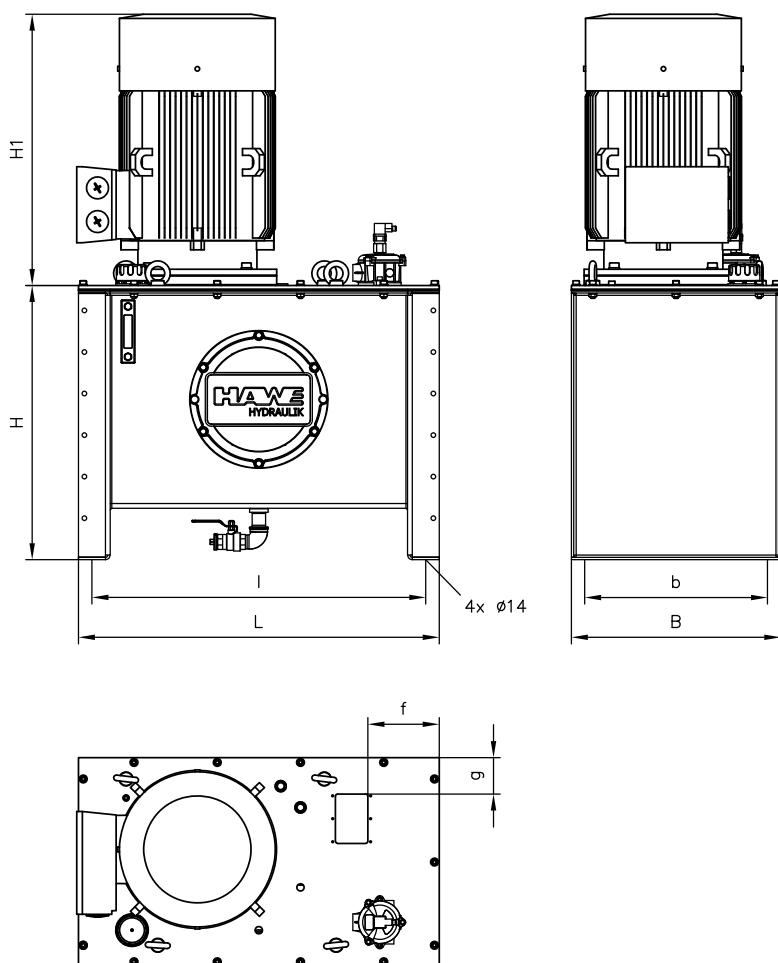
Coding	H1 with Z pump	H1 with R or RZ pump
V3,0	385	430
V4,0	405	450
V5,5	415	465
V7.5	445	495
V11	615	675
V15	660	720

Aluminium tank

Coding	H	L	B	l	b	a	f	g	Tank connections
BL 30	291	490	350	326	176	M 10, 10 deep	45	25	1 x 15L (M22 x 1.5)
BL 44	324	515	425	341	241	M 10; 14 deep	40	30	1 x 18L (M26 x 1.5)
BL 70	374	605	475	422.5	282.5	M 10, 14 deep	87	55.5	1 x 18L (M26 x 1.5)

4.2 Steel tank

Steel tank



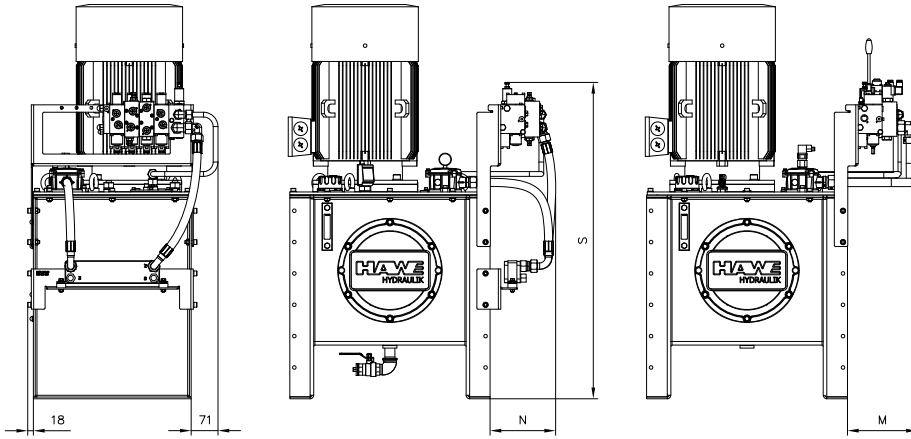
Motor

Coding	H1 with Z pump	H1 with R or RZ pump
V3.0	385	430
V4.0	405	450
V5.5	415	465
V7.5	445	495
V11	615	675
V15	660	720
V18.5	667	727
V22	697	757
V30	760	810
V37	783	843

Steel tank

Coding	H	L	B	l	b	f	g	Tank connections
BS 100	693	672	530	594	428	126	73	2 x 18L (M26 x 1.5)
BS 160	693	912	530	834	428	181	93	2 x 22L (M30 x 2.0)
BS 250	693	1312	530	1234	428	581	93	2 x 28L (M36 x 2.0)
BS 400	765	1272	906	1114	804	489	263	2 x 35L (M45 x 2.0)
BS 630	765	1642	906	1484	804	-	-	-

Steel tank with add-on proportional directional spool valve and heat exchanger



Cooler

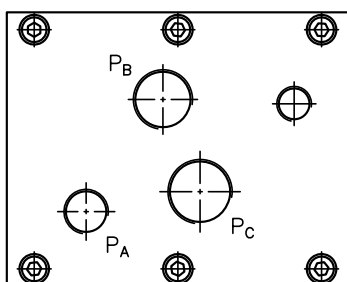
Coding	N (mm)
B 8-20	Approx. 215
B 8-30	Approx. 240
B 10-20	Approx. 230
B 10-30	Approx. 250
B 10-70	Approx. 350

Tank

Coding	M max. (mm)	S (mm)
BS 100	235	1060
BS 160	235	1060
BS 250	235	1060
BS 400	249	1130
BS 630	249	1130

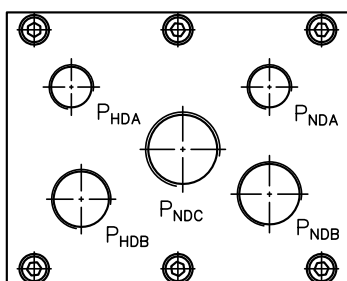
4.3 Pipe connector, connection for valve mounting

Pipe connector VR (single-circuit)



Pump type	Designation	Port size
Z pump in aluminium tank	P _A	12 L (M18 x 1.5)
Z pump in steel tank	P _C	18 L (M26 x 1.5)
R pump sizes 6011 and 6012 up to piston diameter 12	P _A	10 S (M18 x 1.5)
R pump sizes 6011 and 6012 starting from piston diameter 13	P _A	12 L (M18 x 1.5)
R pump sizes 6014 and 6016 up to piston diameter 8	P _A	10 S (M18 x 1.5)
R pump sizes 6014 and 6016 piston diameter 10-13	P _B	16 S (M24 x 1.5)
R pump sizes 6014 and 6016 starting from piston diameter 14	P _C	18 L (M26 x 1.5)

Pipe connector VR2 (dual-circuit)



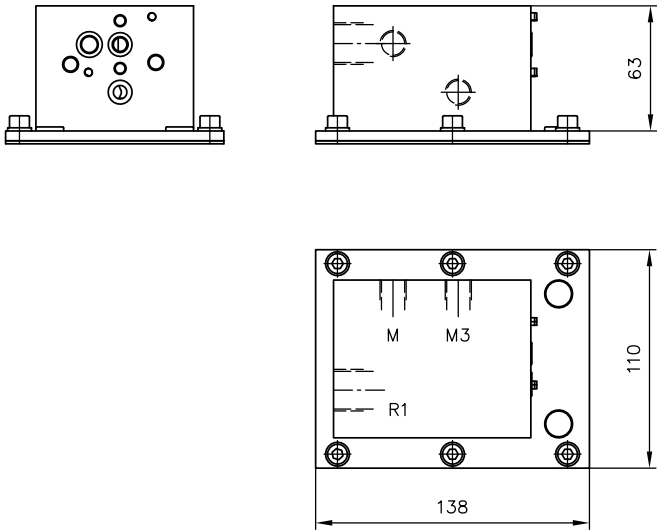
Pump type (low pressure)	Designation	Port size
Z5 – Z28	P _{NDA}	12 L (M18 x 1.5)
Z37 – Z75	P _{NDB}	18 L (M26 x 1.5)
Z87 – Z135	P _{NDC}	22 L (M30 x 2)

Pump type (high pressure)	Designation	Port size
R pump size 6911	P _{HDA}	10 S (M18x 1.5)
R pump sizes 6912 and 6914 up to piston diameter 8	P _{HDA}	10 S (M18x 1.5)
R pump sizes 6912 and 6914 starting from piston diameter 10	P _{HDB}	16 S (M24 x 1.5)

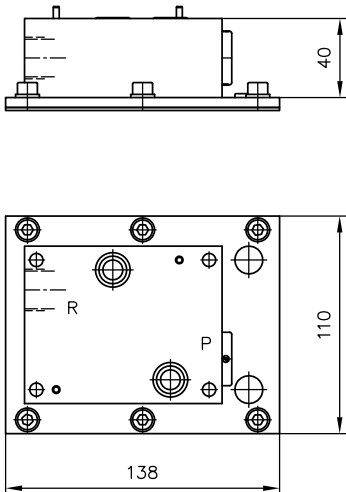
Reflux on pipe connectors VR and VR2 is conducted via the return line filter connection ([See "Return line filter"](#)).

If the version does not have a return line filter, refluxes are conducted via a connection plate.

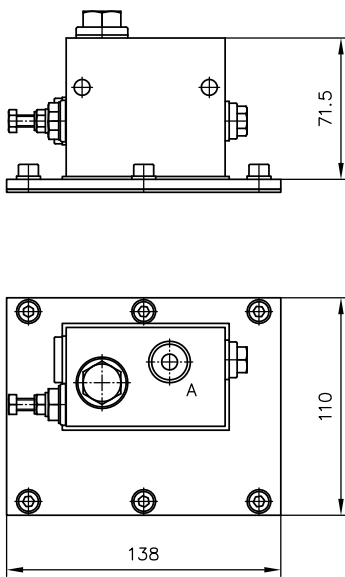
Adapter UA for connection blocks type A and B (in accordance with D 6905 A/1 or D 6905 B)



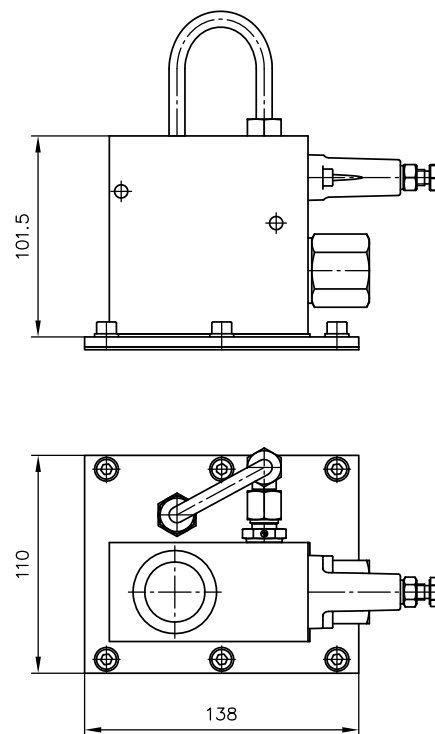
Adapter UB1 and UB1/R for valve bank



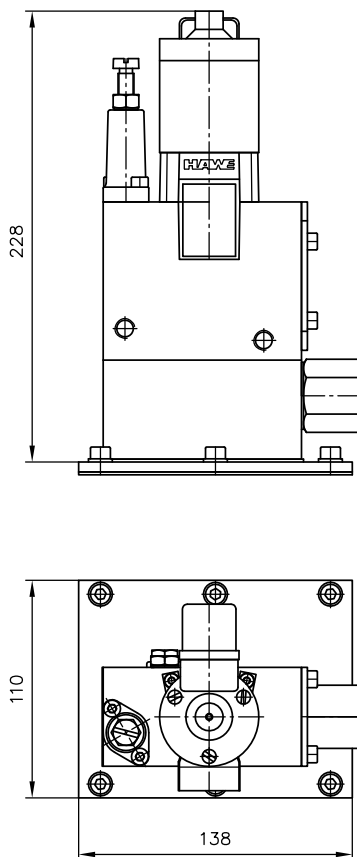
Adapter with built-in two-stage valve NE 20, NE 21 in accordance with D 7161



Adapter with built-in two-stage valve NE 70 in accordance with D 7161



Adapter with built-in switch unit CR 4 in accordance with D 7150



5.1 Intended use

This hydraulic power pack 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.

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.

Purity and filtering of the hydraulic fluid

Fine contamination can significantly impair the function of a hydraulic power pack. 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 highest degree of purity. Under some circumstances the fresh hydraulic fluid must be filtered before use.

Adhere to the cleanliness level of the hydraulic fluid in order to maintain faultless operation.
(also see cleanliness level in [Chapter 3, "Parameters"](#))

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

6 Other information

6.1 Planning information

6.1.1 Electric drive

Electric drive design

The electric drive must provide sufficient power to convey the pump flow rate at the desired operating pressure.

Connecting the electrical wiring:

Ensure the required supply voltage (nominal voltage +/- 5%). The grid must also have sufficient current (amperes).

The hydraulic power packs have protection class IP 54 in accordance with IEC 60529. The protection against accidental contact corresponds to IEC 61140 protection class I.

The connections must be designed according to the current consumption of the motors.

Motor power

The required motor power P_{Motor} is calculated from the maximum operating pressure p and flow rate Q using the formula

$$P_{\text{Motor}} [\text{kW}] \geq (Q [\text{lpm}] \times p [\text{bar}]) / (0.6 \times 0.8)$$

In this context, 0.8 is the approximate efficiency level of the pump.

For dual-stage or dual-circuit hydraulic power packs, the maximum power consumption that may occur at various operating states must be calculated.

Motor connection

The motor is connected electrically via the motor terminal box.

6.1.2 Tank

For hydraulic power packs operating in continuous operation (S1) or in continuous operation with intermittent load (S6), the tank volume (in l) must be five times the output volume (in lpm).

For hydraulic power packs operating in short-term (S2) or intermittent operation (S3), the oil volume only needs to be two or three times greater than the output capacity.

The joint output volume of both pumps is required for the calculations for hydraulic power packs with double pumps.

The heat loss produced in the hydraulic power pack is discharged predominantly via the tank. For this reason, the choice of tank size has an impact on the oil heating.

The oil heating ΔT above the ambient temperature can be calculated as follows:

$$\Delta T [K] = PV [W] / (U \times A [m^2])$$

Whereby:

- PV [W]: The power loss, which can be 30 – 100% of the supplied hydraulic power, depending on the operation mode.
- U: The heat transfer coefficient, which is 12 W/(m²K) when the air is still, and around 20 W/(m²K) when the air is moving.
- A: The effective emission surface area of the hydraulic tank (indicated in Chapter 2.3 under tank data).

In order to calculate the oil temperature, the ambient temperature has to be added to ΔT .

6.1.3 Valve bank

Hydraulic power packs of the FXU series are suitable for mounting many different valve banks.

It must be ensured when choosing the valve banks that the maximum flow rate of the selected valve bank is not exceeded. Due to a surface ratio in the cylinder, the return flow rate may be significantly greater than the output volume of the hydraulic power pack.

Seated valve banks are used in hydraulic power packs that work in standby mode. In doing so, you prevent internal losses that occur in spool valves.

6.1.4 Filter

When selecting the filter size, the maximum flow rate of the returning oil and the surface ratio of the connected cylinders must be taken into account.

Recommended filter fineness:

Systems with conventional directional valves: 25 μm

Systems with proportional valves: 10 μm

Systems with servo valves: 6 μm

HAWE Hydraulik SE, Postfach 11 55, 85605 Aschheim/München

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

Hydraulic power pack type FXU
acc. to our **documentation D 6020** (latest release)

is an incomplete machine (acc. to article 2g), which is exclusively intended for installation or assembly of another machinery or equipment.
The specific technical documents, necessary acc. to appendix VII B, can be prepared any time and transmitted in electronic form to the responsible national authority on request.
Risk assessment and analysis are implemented according to appendix I of the Machinery Directive.
The dept. Product, Application & Service is authorized to compile the specific technical documents necessary acc. to appendix VII B.

HAWE Hydraulik SE, Dept. Product, Application & Service, Einsteinring 17, D-85609 Aschheim/Munich

The following basic safety and health protection requests acc. to appendix I of this guideline do apply and are complying with:

Chapter 1.1.2, 1.1.3, 1.1.5, 1.2 (complete chapter), 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 incomplete machine also fulfills below shown EU-Directives:

*2014/35/EU:2014-02-26 Directive of electrical equipment designed for use within certain voltage limits
2014/68/EU:2014-05-15 Pressure equipment Directive (applicable if an accumulator is used)*

Following harmonized guidelines have been used:

EN 12100-1:2011-03 Safety of machinery - General principles for design

EN ISO 4413:2011-04 Hydraulic fluid power - General rules and safety requirements for systems and their components

EN 60204-1:2014-10 Safety of machinery - Electrical equipment of machines - Part 1: General requirements

We assume that the delivered equipment is intended for the installation into a machine.

Putting in operation is forbidden until it has been verified that the machine, where our products shall be installed, is complying with the Machinery Directive 2006/42/EC.

This Declaration of Incorporation is void, when our product has been modified without our written approval.

Aschheim, 2018-08-14



Dipl.-Ing. M. Knobloch (Direktor, Produkt, Application and Service)

Further information

Additional versions

- Radial piston pump type R and RG: D 6010
- Dual-stage pump type RZ: D 6910
- Connection blocks type A for hydraulic power packs: D 6905 A/1
- Connection blocks type B for hydraulic power packs: D 6905 B
- Two-stage valve type NE: D 7161
- Switch unit type CR: D 7150
- Valve bank (nominal size 6) type BA: D 7788
- Valve bank (directional seated valve) type BVH: D 7788 BV
- Intermediate plate type NZP: D 7788 Z
- Valve bank type BNG: D 7788 BNG
- Valve bank (directional seated valve) type BWN and BWH: D 7470 B/1
- Valve bank (directional seated valve) type VB: D 7302
- Directional seated valve type NBVP 16: D 7765 N

Further information

HAWE Hydraulik SE is a responsible development partner with application expertise and experience in more than 70 areas of mechanical engineering and plant engineering. The product range includes hydraulic power packs, constant and variable pumps, valves, sensors and accessories. The modular system is complemented by electronic components that are perfectly coordinated with the hydraulic components and that simplify control, signal evaluation and fault detection. The intelligent system solutions reduce energy consumption and operating costs. Compact drives save space and permit innovative machine design.

Across the globe, approximately 2000 employees in 16 countries and sales partners in more than 40 countries provide customers with local, professional and personal support.

The company is certified in accordance with ISO 9001, ISO 4413, ISO 50001, OHSAS 18001.



■ HAWE subsidiaries and service repair shops

- Germany
- Finland
- France
- Italy
- Austria
- Switzerland

● HAWE sales partners

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- Spain
- Sweden
- USA
- Canada
- Russia
- China
- India
- Japan
- Korea
- Singapore
- Australia

You can find further information on HAWE Hydraulik, your local contact and the range of hydraulics training sessions offered at: www.hawe.com.