Hydraulic power pack type FXU

Product documentation

For Continuous operation with constant load (S1)

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

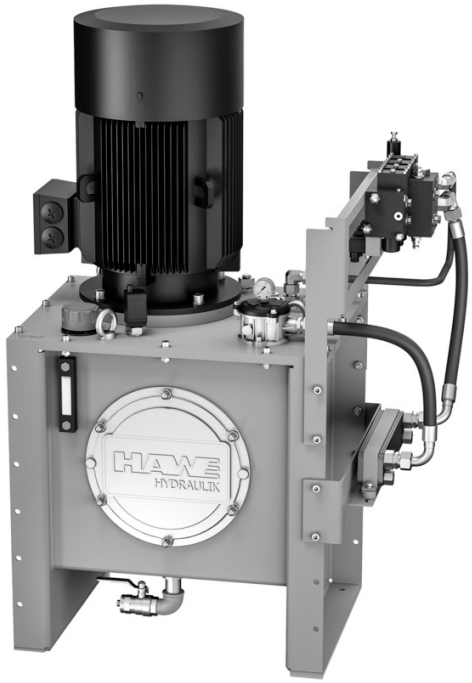

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Table of Contents

1 Overview of hydraulic power pack type FXU

Standard hydraulic power packs 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.

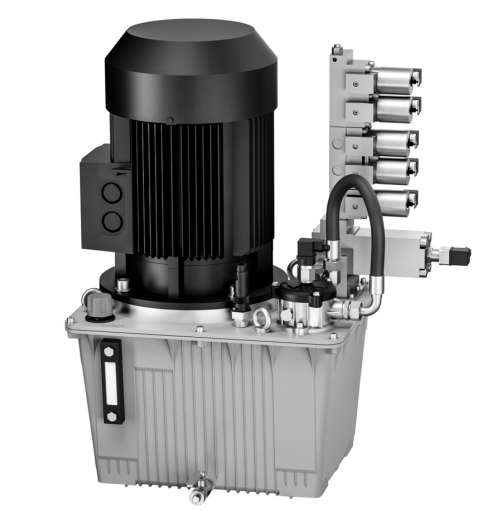
Radial piston pumps or external gear pumps are both used, as well as combinations of external gear pumps with radial piston pumps.
The pumps are installed under a top housing cover in an aluminium or steel tank.

Features and advantages

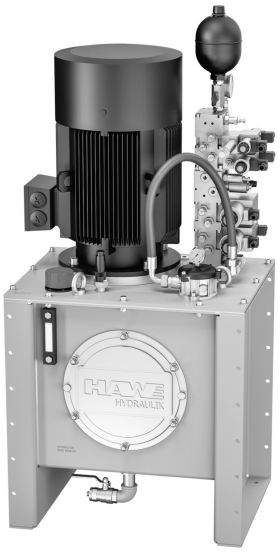
- Quick to configure due to tailored modular system
- Customer-specific documentation with EPlan-Fluid and step model
- It is possible to mount HAWE valve banks with seated and spool valves directly
- Attaching proportional directional spool valves from series PSL 3 possible
- Low noise when using a gear pump

Intended applications

- Machine tools with a continuous flow rate requirement
- Recycling systems
- Plastics machinery
- Pressing applications such as vulcanising and briquetting



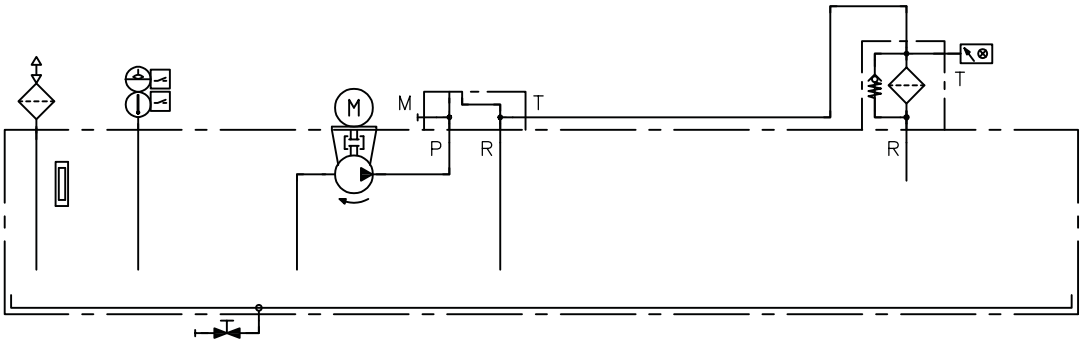
Hydraulic power pack FXU with aluminium tank



Hydraulic power pack FXU with steel tank

2 Available versions

Circuit symbol



Ordering example

FXU	-R 9,5	-BS 160	-F042/10	/OA	-NT1	/P	/A90	/B 8-20	-UA	-V7,5	-3x690/400V 50Hz

Motor voltage 2.3 "Motor"

Nominal motor power 2.3 "Motor"

2.4 "Valve mounting"

2.2.2 "Heat exchanger"

Tank draining 2.2.1 "Tank option"

Set-up 2.2.1 "Tank option"

Level/temperature sensor 2.2.5 "Monitoring"

Filter option 2.2.4 "Contamination indicator"

2.2.3 "Return line filter"

2.2 "Tank"

Pump type and size

- 2.1.1 "Radial piston pump"
- 2.1.2 "External gear pump"
- 2.1.3 "Dual-stage pump"

Basic type

2.1 Pump types and combinations

2.1.1 Radial piston pump

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.

Ordering example

FXU **-R 9,5 ...**

Radial piston pump

Radial piston pump R, RG

Coding (Flow rate l/min at 1400 min-1)	Size R pump	Pump elements		Displacement volume V_g (cm³/rev)	Pressure p_{max} (bar)	min. nominal power of motor (kW)	max. nominal power of motor (kW)	min. tank nominal size
		Number	∅ (mm)					
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
10.9	6011	5	16	7.64	160	3.0	7.5	BL 30

Coding (Flow rate l/min at 1400 min-1)	Size R pump	Pump elements		Displacement volume V_g (cm³/rev)	Pressure p_{max} (bar)	min. nominal power of motor (kW)	max. nominal power of motor (kW)	min. tank nominal size
		Number	∅ (mm)					
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	3.0	37.0	BS 250
80	6016	42	15	56.38	200	3.0	37.0	BS 250
91.2	6016	42	16	64.15	160	3.0	37.0	BS 250

2.1.2 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.

Ordering example

FXU **-Z 54,8 ...**

External gear pump

External gear pump Z

Coding (Flow volume l/min at 1400 min^{-1})	Size Z pump	Displacement volume V_g (cm^3/rev)	Pressure p_{max} (bar)	min. nominal power of motor (kW)	max. nominal power of motor (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

2.1.3 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 high pressure and low pressure (HP/LP). 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.

Ordering example

FXU **-RZ** **2,7** **/3** **-45 ...**

- **-45 ...** — Gear pump (low pressure)
- **/3** — Gear pump size
- **2,7** — Radial piston pump (high pressure)
- **-RZ** — Dual-stage pump

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

Coding (Flow volume l/min at 1400 min^{-1})	RZ pump size	Pump elements		Displacement volume V_g (cm³/rev)	Pressure p_{max} (bar)	min. nominal power of motor (kW)	max. nominal power of motor (kW)
		Number	∅ (mm)				
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 (Flow volume l/min at 1400 min-1)	RZ pump size	Pump elements		Displacement volume V_g (cm³/rev)	Pressure p_{max} (bar)	min. nominal power of motor (kW)	max. nominal power of motor (kW)
		Number	∅ (mm)				
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 RZ (gear pump, low pressure)

Coding (Flow volume l/min at 1400 min-1)	RZ pump size	Displacement volume V_g (cm³/rev)	Pressure p_{max} (bar)	min. tank size with RZ pump of size					
				6911	6911	6912	6912	6914	6916
				with motor					
				≤ 4 kW	≥ 5.5 kW	≤ 7.5 kW	= 11 kW	--	≤ 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	--

2.2 Tank

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

NOTICE

When selecting the tank, observe the planning instructions (see Chapter 6.1.2, "Tank") and observe the minimum tank sizes from the pump selection tables.

Ordering example

FXU	-R 1,4	**-BL 44 ...**
		Tank

Tank

Coding	Volume V (l)	max. usable volume $V_{usable\ max}$ (l)	optimum usable volume V_{opt} (l)	Version	Eff. Surface (m^2)	max. nominal power of motor (kW)
BL 30	30	27	15	Aluminium	0.6	7.5
BL 44	44	40	25	Aluminium	0.8	15
BL 70	70	63	35	Aluminium	1.0	15
BS 100	100	90	52	Steel	1.2	22
BS 160	160	144	76	Steel	1.7	30
BS 250	250	225	115	Steel	2.3	30
BS 400	400	360	190	Steel	2.9	37
BS 630	630	565	255	Steel	3.9	37

2.2.1 Tank option

Set-up

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

Ordering example

FXU	-R 9,95	-BL 70	**/W..**
FXU	-R 30,4	-BS 160	**/P 160**
			Tank option Set-up

Coding	Description	Dimensions of oil tray L x W x H (mm)
without coding	No feet	
W	Feet	
P 30	Oil tray for BL 30	400 x 550 x 160
P 44	Oil tray for BL 44	500 x 600 x 160
P 70	Oil tray for BS 70	580 x 730 x 160
P 100	Oil tray for BS 100	628 x 1110 x 339
P 160	Oil tray for BS 160	628 x 1350 x 394
P 250	Oil tray for BS 250	628 x 1750 x 428
P 400	Oil tray for BS 400	1004 x 1630 x 450
P 630	Oil tray for BS 630	1004 x 2000 x 480

INFORMATION
Oil tray only possible without 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.

Ordering example

FXU	-R 9,95	BL 70	**/A90...**
			Oil drain valve

Coding	Description	Connecting thread
without coding	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...)

2.2.2 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.

Ordering example

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

Heat exchanger

Coding	max. oil flow rate (l/min)	max. cooling capacity (kW) when TΔ = 40 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

2.2.3 Return line filter

Return line filters filter the returning oil flow.

NOTICE
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

Ordering example

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

Return line filter

Return line filter

Coding	Flow rate for reflux (l/min)	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	49	25	G 1/2	030
F070/25	70	25	G 3/4	100
F090/25	90	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

2.2.4 Contamination indicator

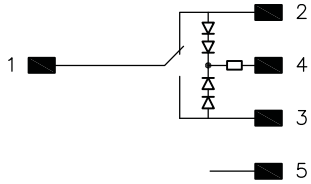
The filters can be equipped with an optical or an electrical visual clogging indicator.

Ordering example

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

Contamination indicator

Contamination indicator

Coding	Description	Function
without coding	without contamination indicator, measurement fitting G 1/8	
OA	Optical (vertical, 3 colours) **Display:** ▪ Green up to 1.4 bar ▪ Yellow from 1.4 to 1.7 bar ▪ Red from 1.7 bar	
EA	Electrical/optical ▪ Max. switching capacity: 0.4 A / 24 V DC ▪ Electrical connection: M12, 5-pin ▪ Switching signal at 1.5 bar ▪ With green/red LED ▪ Switching function F: Change-over contact	

2.2.5 Monitoring

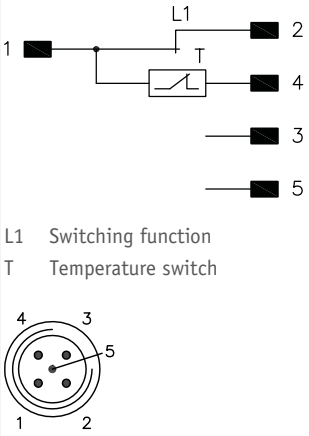
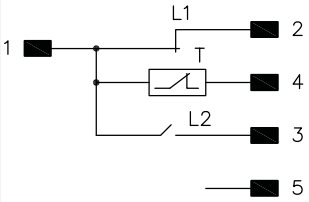
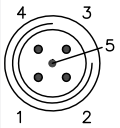
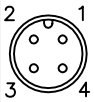
The level switch and temperature switch use electric switching signals to signal oil levels falling below the permissible level and the oil temperature value exceeding the permissible level. This allows measures to be initiated if the system is in a critical state.

Ordering example

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

Accessories for monitoring Level and temperature monitoring

Level switch and temperature switch

Coding	Description	Function
NT1	Level switch / temperature switch ▪ Operating voltage: 10 ... 36 V DC ▪ Max. switching capacity: 10 W ▪ Plug type M12, 5-pin **Level switch:** ▪ Switching function L1: N/C contact opens when level falls **Temperature switch:** ▪ Switching function: N/C contact opens when temperature increases ▪ Switching temperature: 80°C (± 3°C)	 L1 Switching function T Temperature switch
NT2	Two level switches / one temperature switch ▪ Operating voltage: 10 ... 36 V DC ▪ Max. switching capacity: 10 W ▪ Plug type M12, 5-pin **Level switch:** ▪ Switching function L1 (bottom): N/C contact opens when level falls ▪ Switching function L2 (top): N/O contact closes when level falls **Temperature switch:** ▪ Switching function: N/C contact opens when temperature increases ▪ Switching temperature: 80°C (± 3°C)	 L1 Switching function L2 Switching function T Temperature switch 
NT IO	Level and temperature switch with IO-Link. A freely programmable switch output; with digital display and three adjustment buttons ▪ Switching function: programmable (PNP) ▪ Operating voltage: 18 - 30 V DC ▪ Max. switching capacity: 10 W ▪ Plug type M 12, 4-pin	 1 +24 V 2 PNP switching signal 3 GND 4 IO-Link

2.3 Motor

Motors in V1 design in accordance with 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 — ⋎ 3 x 400 V 50 Hz, 3 x 460 V 60 Hz; △ 3 x 230 V 50 Hz, 3 x 265 V 60 Hz
- from 4 kW — ⋎ 3 x 690 V 50 Hz; △ 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 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.

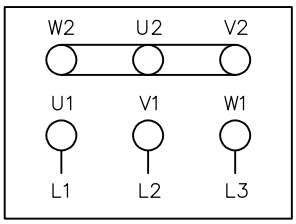
Ordering example

FXU	-R1,4	-BL 44	/F020	**-V 3,0...**

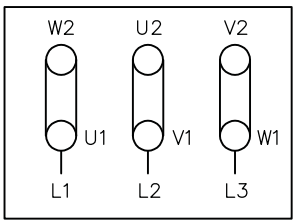
Nominal motor power

- V = with motor, see "Motor fitted"
- Z = prepared for motor, see "Motor fitted by customer"

Motor connection for star pattern



Motor connection for delta circuit



Motor fitted

Coding	Size	Nominal motor power P (kW)	Power factor cos φ	Nominal current U (A) (400 V)	Starting current ratio I_A/I_W
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 (kW)
Z 3.0	100L	▪ Without motor ▪ Self-mounting
Z 4.0	112M	
Z 5.5	132S	
Z 7.5	132M	
Z 11	160M	
Z 15	160L	
Z 18.5	180M	
Z 22	180L	
Z 30	200L	
Z 37	225S	

2.4 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.

Ordering 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) Valve bank connection PSL 3	●	
VR2	Pipe connector (bulkhead connector) Valve bank connection PSL 3 **INFORMATION** Mounting of PSL valve bank only in combination with steel tank.		●
UA	Adapter for connection block ▪ Type A in accordance with D 6905 AB ▪ 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 ▪ **UB1:** without check valve in P ▪ **UB1/R:** 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

3.1 General data

Conformity	Declaration of incorporation according to Machinery Directive 2006/42/EC (see assembly instructions for standard hydraulic power pack type FXU: B 6020)
Version / Model	Hydraulic power pack with external electric motor and single-circuit or dual-circuit pump
Pump version	Valve-controlled radial piston pump or gear pump
Operating mode	▪ Continuous operation with constant load (S1)
Installation position	Vertical
Material	Tank: depending on version – aluminium or steel
Hydraulic connection	Connection via connection block or direct piping possible
Hydraulic fluid	Hydraulic fluid, according to DIN 51 524 Parts 1 to 3; ISO VG 10 to 68 according to DIN ISO 3448 **R, RZ:** Viscosity range: 10 - 500 mm²/s **Z:** Viscosity range: 10 - 100 mm²/s Optimal operating range: approx. 20 – 100 mm²/s Also suitable for biologically degradable hydraulic fluids type HEES (synthetic ester) at operating temperatures up to approx. +70°C.
Cleanliness level	**ISO 4406** 21/18/15...19/17/13
Temperatures	Environment: approx. -40 to +80 °C, hydraulic fluid: -25 to +80 °C, pay attention to the viscosity range. 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. Biologically degradable hydraulic fluids: note manufacturer specifications. With consideration for the seal compatibility, not above +70°C.
Rotation direction	Radial piston pump (type H) – any Gear pump (type Z) – left-turning
Speed range (min ... max)	Radial piston pump (type H): see D 6010 Gear pump (type Z): see D 6820 Dual-stage pumps (type RZ): see D 6910
Breather filter	PUR filter fineness 10 µm
Operating elevation	< 1000 m above sea level
Transport equipment	Number of eyebolts depending on tank size

3.2 Weight

R pump	Assembly	Number of cylinders	Weight
	7631	2	= 3.0 kg
		3	= 3.1 kg
		5	= 3.2 kg
	6010	1	= 2.5 kg
		2	= 2.5 kg
		3	= 3.1 kg
	6011	5	= 5.0 kg
		7	= 5.8 kg
	6012	10	= 8.7 kg
		14	= 10.5 kg
	6014	20	= 21.5 kg
		28	= 24.2 kg
	6016	42	= 39.1 kg

Z pump			
	Size 1	**Type**	
		Z 2.0; Z 2.7	= 0.9 kg
		Z 3.5; Z 4.5; Z 5.2	= 1.0 kg
		Z 6.9; Z 8.8	= 1.1 kg
		Z 9.8; Z 11.3	= 1.2 kg
		Z 14.4	= 1.3 kg
	Size 2	**Type**	
		Z 6.5	= 2.3 kg
		Z 9.0	= 2.4 kg
		Z 12.3	= 2.5 kg
		Z 16	= 2.6 kg
		Z 21	= 2.8 kg
		Z 24	= 2.9 kg
		Z 28	= 3.1 kg
		Z 37	= 3.4 kg
	Size 3	**Type**	
		Z 45	= 6.1 kg
		Z 59	= 6.5 kg
		Z 75	= 6.8 kg
		Z 87	= 7.2 kg
		Z 110	= 7.7 kg
		Z 135	= 8.2 kg

RZ pump	Combination of R and Z pump

Tank			Cover plate
	BL 30	= 5 kg	= 7.5 kg
	BL 44	= 7 kg	= 10.5 kg
	BL 70	= 10 kg	= 14.6 kg
	BS 100	= 85 kg	= 23.7 kg
	BS 160	= 118 kg	= 29.8 kg
	BS 250	= 132 kg	= 48.6 kg
	BS 400	= 185 kg	= 95.3 kg
	BS 630	= 235 kg	= 97.5 kg
Oil tray	P 30	= 5 kg	
	P 44	= 7 kg	
	P 70	= 10 kg	
	P 100	= 63 kg	
	P 160	= 75.2 kg	
	P 250	= 91.3 kg	
	P 400	= 122.5 kg	
	P 630	= 142 kg	
Heat exchanger	B 8-20	= 2.3 kg	
	B 8-30	= 3.3 kg	
	B 10-20	= 3.5 kg	
	B 10-30	= 4.4 kg	
	B 10-70	= 8.5 kg	
Return line filter	030	= 0.4 kg	
	100	= 0.7 kg	
	181	= 3.0 kg	

Motor	V 3.0	= 32 kg
	V 4.0	= 46 kg
	V 5.5	= 56 kg
	V 7.5	= 85 kg
	V 11	= 145 kg
	V 15	= 160 kg
	V 18.5	= 215 kg
	V 22	= 227 kg
	V 30	= 331 kg
	V 37	= 375 kg

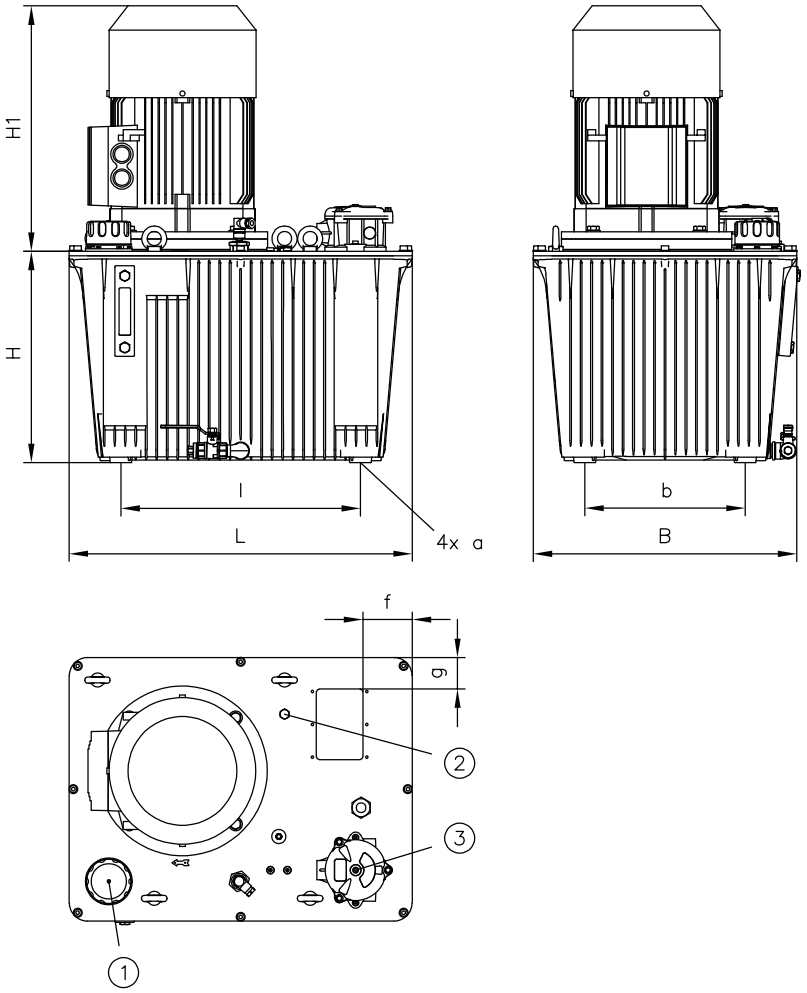
INFORMATION

Weight for motor dependent on manufacturer and may slightly vary.

4 Dimensions

All dimensions in mm, subject to change.

4.1 Aluminium tank



1 Filler
2 Vent hole for R pump
3 Return line filter

Coding	B	H	L	a	b	f	g	l	Tank connections
BL 30	350	294	490	M10, 10 deep	176	45	25	326	1x 15L (M22x1.5)
BL 44	425	324	515	M10, 14 deep	241	40	30	341	1x 18L (M26x1.5)
BL 70	475	374	605	M10, 14 deep	282.5	87	55.5	422.5	1x 18L (M26x1.5)

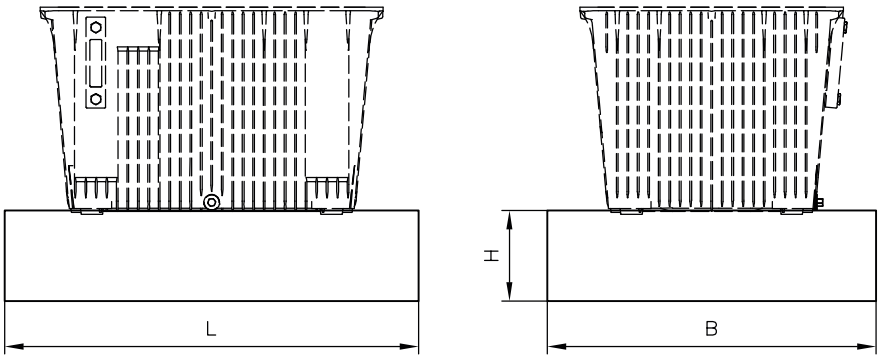
Motor

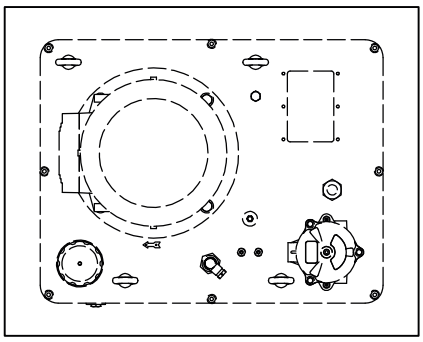
Coding	H1 with Z pump	H1 with R or RZ pump
V 3.0	385	430
V 4.0	405	450
V 5.5	415	465
V 7.5	445	495
V 11	615	675
V 15	660	720

INFORMATION

H1 may slightly differ depending on the motor manufacturer.

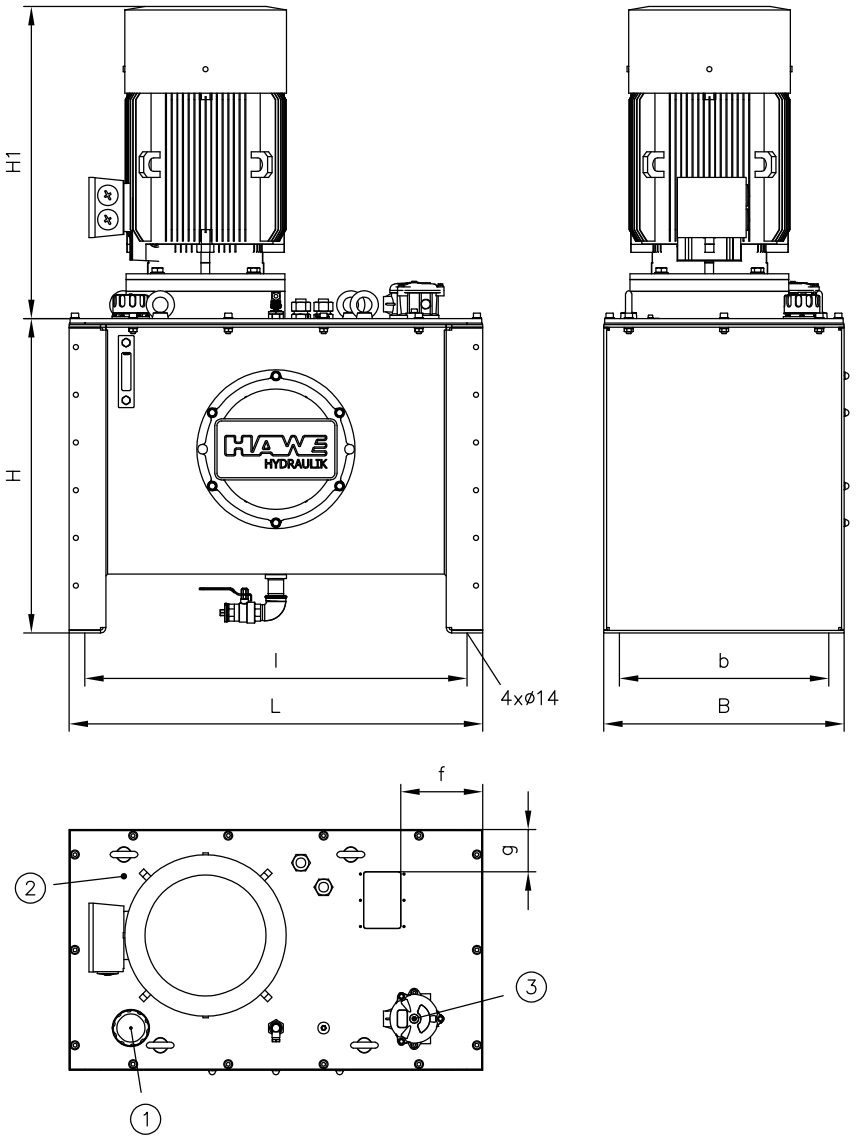
Oil tray for aluminium tank





Coding	Description	B	H	L
P 30	Oil tray for BL 30	400	160	550
P 44	Oil tray for BL 44	500	160	600
P 70	Oil tray for BL 70	580	160	730

4.2 Steel tank



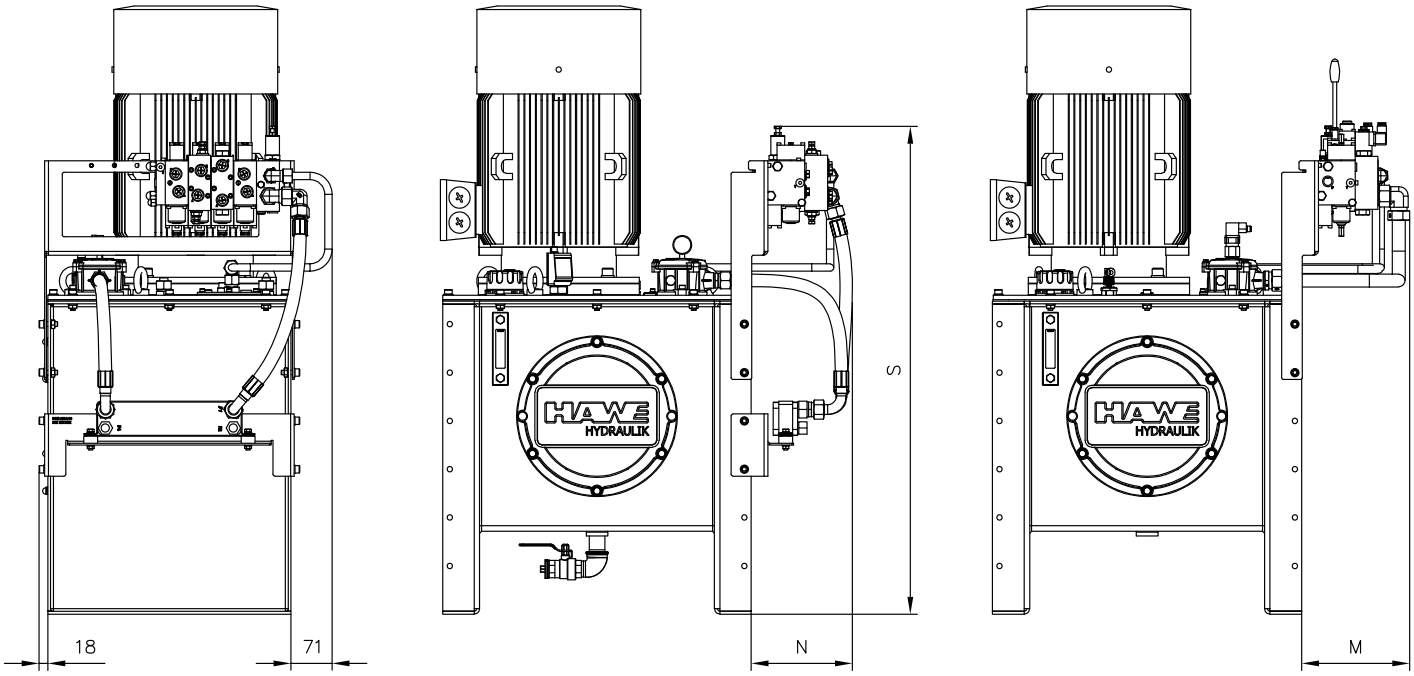
1 Filler
2 Vent hole for R pump
3 Return line filter

Coding	B	H	L	b	f	g	l	Tank connections
BS 100	530	693	672	428	126	73	594	2x 18L (M26x1.5)
BS 160	530	693	912	428	181	93	834	2x 22L (M30x2.0)
BS 250	530	693	1312	428	581	93	1234	2x 28L (M36x2.0)
BS 400	906	765	1272	804	489	263	1114	2x 35L (M45x2.0)
BS 630	906	765	1642	804	--	--	1484	--

Motor

Coding	H1 with Z pump	H1 with R or RZ pump
V 3.0	385	430
V 4.0	405	450
V 5.5	415	465
V 7.5	445	495
V 11	615	675
V 15	660	720
V 18.5	667	727
V 22	697	757
V 30	760	810
V 37	783	843

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



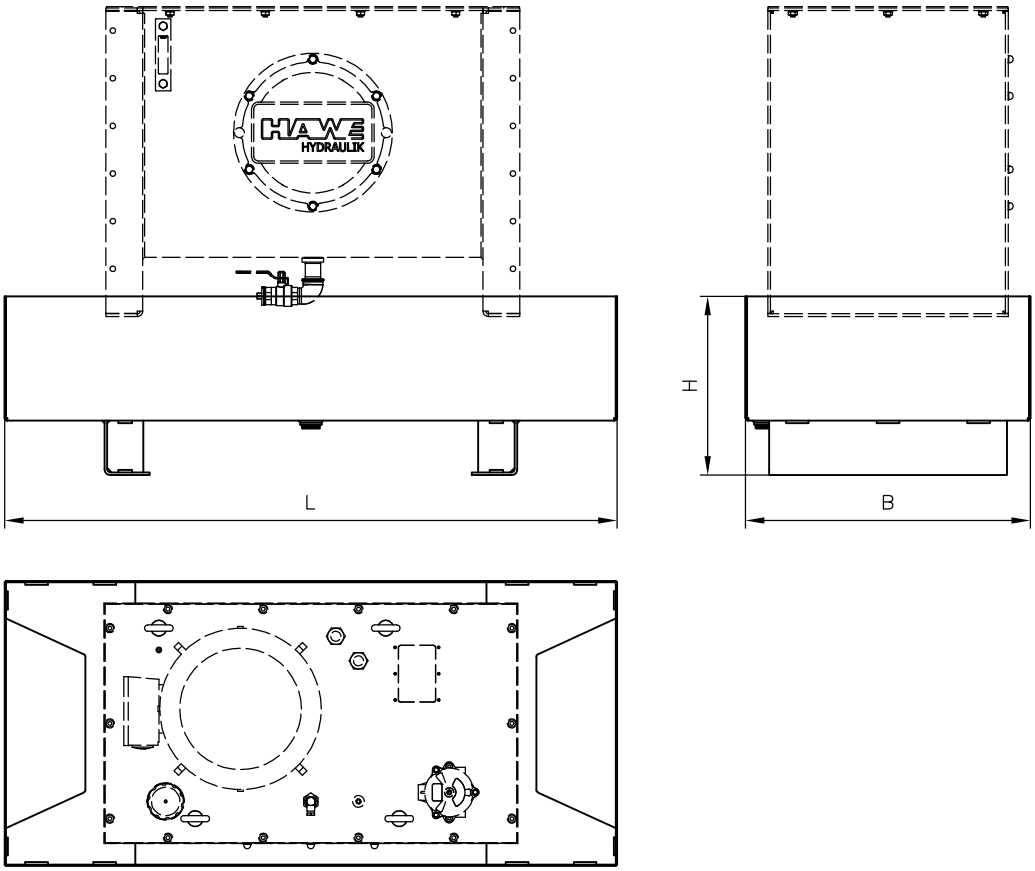
Heat exchanger

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

Oil tray for steel tank

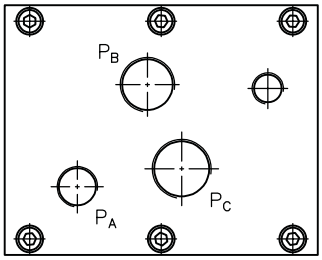


Coding	Description	B	H	L
P 100	Oil tray for BS 100	628	339	1110
P 160	Oil tray for BS 160	628	394	1350
P 250	Oil tray for BS 250	628	428	1750
P 400	Oil tray for BS 400	1004	450	1630
P 630	Oil tray for BS 630	1004	480	2000

4.3 Pipe connector, connection for valve mounting

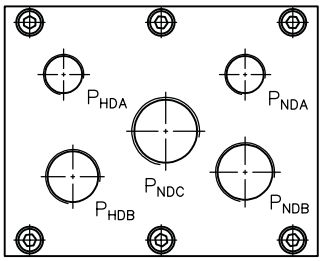
Pipe connector

VR (Single circuit)



Pump type	Designation	Port size
Z pump in aluminium tank	P_A	12L (M18x1.5)
Z pump in steel tank	P_C	18L (M26x1.5)
R pump sizes 6011 and 6012 up to piston diameter ∅12	P_A	10S (M18x1.5)
R pump sizes 6011 and 6012 starting from piston diameter ∅13	P_A	12L (M18x1.5)
R pump sizes 6014 and 6016 up to piston diameter ∅8	P_A	10S (M18x1.5)
R pump sizes 6014 and 6016 piston diameter ∅10-13	P_B	16S (M24x1.5)
R pump sizes 6014 and 6016 starting from piston diameter ∅14	P_C	18L (M26x1.5)

VR2 (Dual circuit)

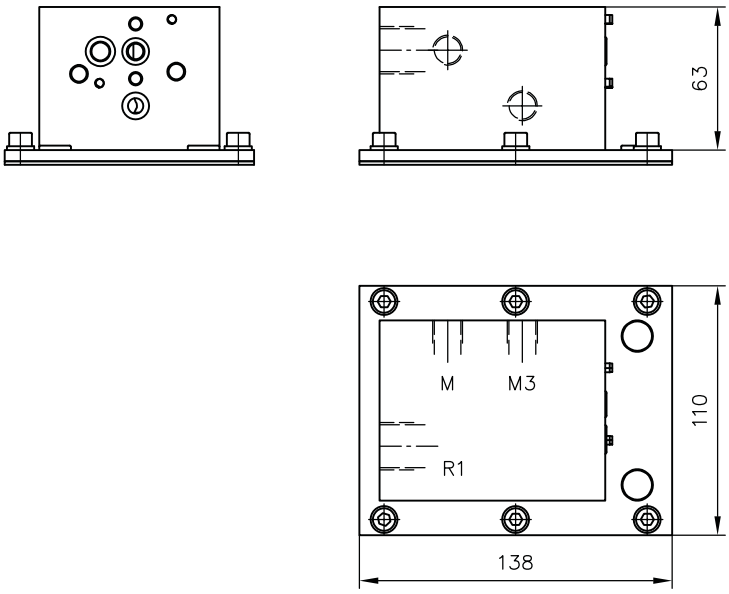


Pump type	Designation	Port size
(low pressure)		
Z5 – Z28	P_{NDA}	12L (M18x1.5)
Z37 – Z75	P_{NDB}	18L (M26x1.5)
Z87 – Z135	P_{NDC}	22L (M30x2)
(High pressure)		
R pump size 6911	P_{HDA}	10S (M18x1.5)
R pump sizes 6912 and 6914 up to piston diameter ∅8	P_{HDA}	10S (M18x1.5)
R pump sizes 6912 and 6914 starting from piston diameter ∅10	P_{HDB}	16S (M24x1.5)

Reflux for the pipe connectors VR and VR2 via return line filter connection, see Chapter 2.2.3, "Return line filter".
In the case of version without return line filter, refluxes via a connection plate are provided.

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

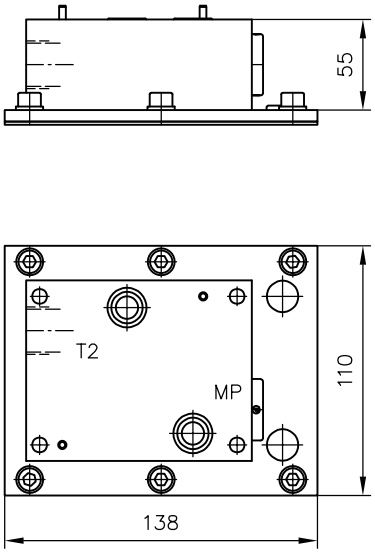
UA



	Connections (ISO 228-1)
M, M3	G 1/4
R1	G 1/2

Adapter for valve bank

UB1, UB1/R

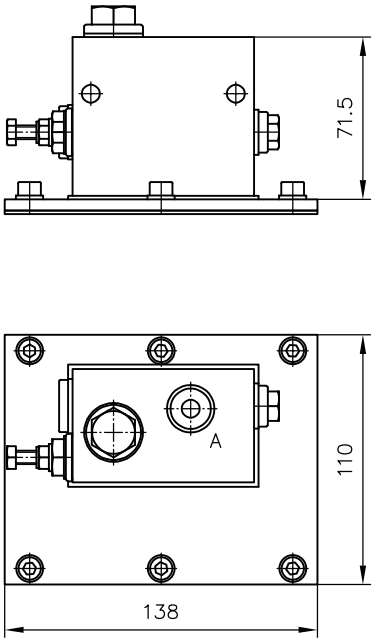


	Connections (ISO 228-1)
MP, T2	G 1/2

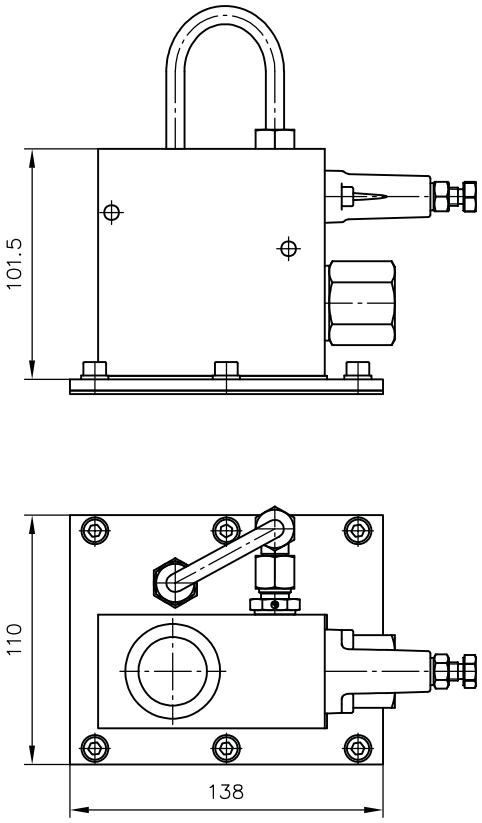
Adapter with built-in two-stage valve in accordance with D 7161

For port sizes, see D 7161 two-stage valve type NE

UNE 2
with two-stage valve type NE 20, NE 21

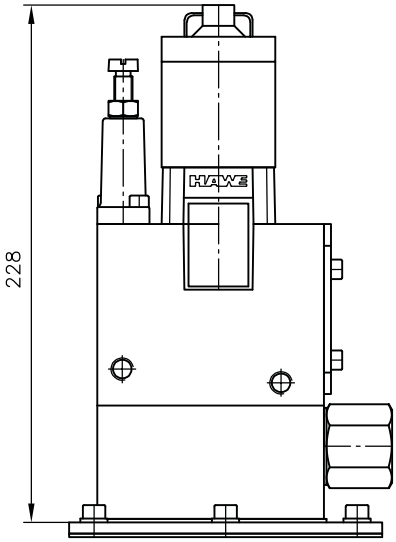


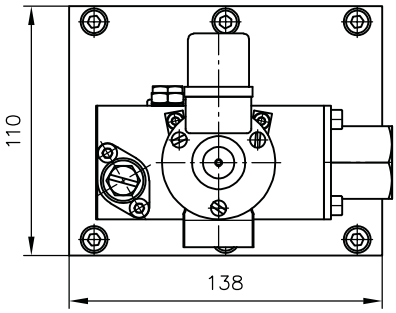
UNE 7
with two-stage valve type NE 70



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

UNE 7
with switch unit type CR 4





5 Installation, operation and maintenance information

NOTICE

Reference to other document

Assembly instructions for hydraulic power pack type FXU: B 6020

Available for this product: assembly instructions with notes on

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

6 Other information

6.1 Planning information

6.1.1 Electric motor

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**

$$P_{Motor} \geq \frac{Q \times p}{600 \times 0.8}$$

Whereby:

P_{motor} (kW): Motor power

Q (l/min): Flow rate

p (bar): Operating pressure

0.8 is the approximate efficiency of the pump here.

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.

NOTICE

The grounding must be provided by the customer.

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 flow rate (in l/min).

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 flow rate 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:

$$\Delta T = \frac{PV}{U \times A}$$

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 (m²): 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

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 SWPN: D 7451 AT
- 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

D 6020 04-2024-1.4

HAWE Hydraulik SE
Einsteinring 17 | 85609 Aschheim/Munich | P.O. Box 11 55 | 85605 Aschheim | Germany
Phone +49 89 379100-1000 | info@hawe.de | www.hawe.com

hawe.com/contact