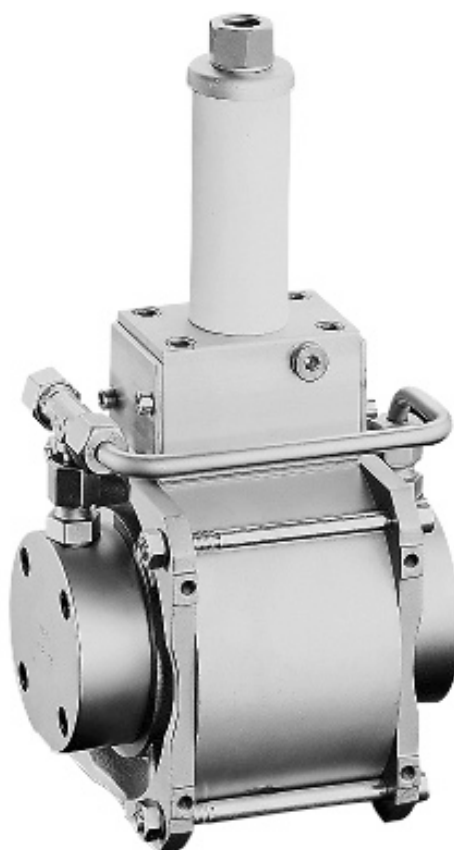


# Air-driven hydraulic pump type LP

## Product documentation



Displacement volume $V_{\max \text{ geom.}}$ :	29 cm <sup>3</sup> /double stroke
Delivery flow rate $Q_{\max \text{ hydr.}}$ :	12 lpm
Operating pressure $p_{\max \text{ hydr.}}$ :	700 bar
Operating pressure $p_{\max \text{ air}}$ :	10 bar



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**1****Overview for air-driven hydraulic pump type LP**

Air-driven hydraulic power packs are pneumatically driven, reciprocally acting plunger pumps. They operate as pneumatic pressure amplifiers with oscillating movement and automatic stroke reversal control.

The air-driven hydraulic pump type LP can generate an operating pressure of up to 700 bar. The delivery flow is dependent on the air pressure set and the hydraulic counter-pressure currently present. It can drop away until the pump comes to a standstill. The pump restarts automatically as soon as the hydraulic consumer pressure drops (pressure maintenance).

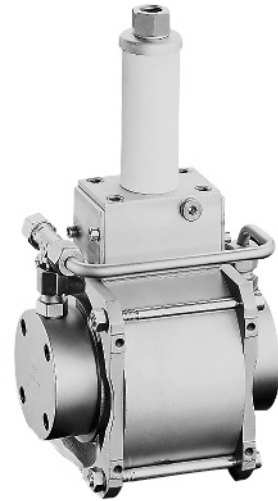
The hydraulic pump type LP is available as a single pump, in the cover plate version or as a hydraulic power pack with different tank sizes. Compatible, ready-for-connection, complete solutions can be assembled easily using a wide range of connection blocks and the valve banks that can be combined with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

**Features and benefits**

- High operating pressures
- Suitable for use in potentially explosive areas
- Energy supplied by means of compressed air
- Start-stop can be implemented via pump

**Intended applications**

- Construction and construction materials machinery
- Fixture design
- Testing and laboratory equipment



*Air-driven hydraulic pump type LP*

**1.1 Air-side seals**

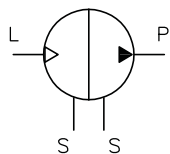
Air-side seals are designed with PTFE cuffs.

**Features and benefits**

- low friction
- high oil delivery flow
- excellent temperature resistance
- low seal wear

## 2 Available versions

### Circuit symbol



### Ordering example

LP 80-10	/P	-R	-/S100	-NBR	-X	-X	-X	-EX
2.1 "Basic type, size and plunger pistons"								
2.2 "Pump version"								
2.3 "Pipe module"								
2.4 "Intake module"								
Seal NBR								
Geometry long silencer (standard)								
Pressure standard								
Additional options without								
2.5 "Approval"								

## 2.1 Basic type, size and plunger pistons

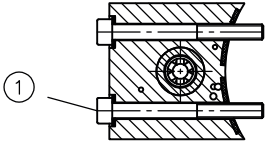
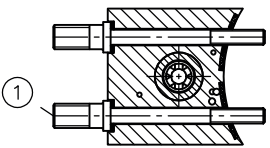
Type	Coding	R (with piping)		X (single for self-piping)		Pressure ratio	Geometric displacement volume per double stroke	
Piston Ø (air side)	Plunger Ø (hydraulics side)	Maximum permissible pressure (bar)	Corresponding air pressure (bar)	Maximum permissible pressure (bar)	Corresponding air pressure (bar)		Hydraulics side V <sub>hydr.</sub> (cm <sup>3</sup> )	Air side V <sub>L</sub> (cm <sup>3</sup> )
LP 80	8	700	7,2	700	7,2	1 : 99	1,5	152 – V <sub>hydr.</sub>
	10	630	10	620	10	1 : 63	2,4	
	12	430		430		1 : 43	3,4	
	16	245		245		1 : 24	6,1	
LP 125	8	700	3,0	700 *	3,0	1 : 243	2,1	503 – V <sub>hydr.</sub>
	10		4,7		4,7	1 : 155	3,2	
	12		6,7		6,7	1 : 108	4,6	
	16	590	10	590	10	1 : 60	8,2	
	18	460		460		1 : 47	10,4	
	20	370		370		1 : 38	12,9	
	25	230		230		1 : 24	20,1	
	30	155		155		1 : 16	29,0	

\* higher pressures on request

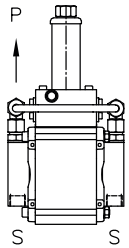
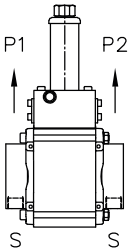
### ! NOTICE

For self-piping: Make sure that the intended fittings and pipes can withstand the necessary pressure! Special maximum pressure fittings are required for the versions for max. 700 bar.

## 2.2 Pump version

Coding	Description	
P	Single pump	 <p>1 Cylinder screw ISO 4762-M5x50-12.9-Geomet 321A</p>
A	Single pump for cover plate / tank mounting	 <p>1 Grub screw</p>
D	Cover plate version	see <a href="#">Hydraulic power pack type LP: D 7280 H</a>
B	Tank version	

## 2.3 Pipe module

Coding	Description	
R	with piping	 <p><i>Consolidated to one output P</i></p>
X	single for self-piping	 <p><i>Individual outputs for self-piping</i></p>

## 2.4 Intake module


Coding	For type	Suitable for maximum clear tank height (mm)	
		H1 = depth (height) of intake module	H1 + H = total height of pump without silencer
X	No intake module		
S 35	LP 80	max. 35	160
S 60		max. 60	185
S 100		max. 100	225
S 200		max. 200	325
S 65	LP 125	max. 65	max. 225 *
S 75		max. 75	max. 235 *
S 165		max. 165	max. 325 *
S 250		max. 250	max. 410 *

see Chapter 4, "Dimensions"

\*The total height H + H1 refers to the configuration with the largest piston in each case.

## 2.5 Approval

Coding	Designation
N	Standard
EX	ATEX (see <a href="#">B ATEX</a> )

 **NOTICE**  
 Grounding connection possible: Thread on pump cylinder (mounting thread B2)



## 3 Parameters

### 3.1 General data

Design	Air-driven hydraulic pump
Model	Single pump
Material	Aluminium alloy: control module (silencer: plastic), pump module Steel: pipe module, intake module, pump module
Attachment	<ul style="list-style-type: none"> <li>LP 80: on the pump cylinder</li> <li>LP 125: Flange</li> </ul>
Installation position	Rotation direction: any
Air consumption	see Chapter 3.3, "Characteristic lines", page 10
Ports/connections	<ul style="list-style-type: none"> <li>P = hydraulic oil outlet</li> <li>S = intake oil connection</li> <li>L = compressed-air connection</li> </ul>
Compressed air (air-side, drive)	<p>compressed air prepared from commercially available service units Compressed air with the following cleanliness levels according to ISO 8573-1:2010 was used to qualify the air pump LP.</p> <ul style="list-style-type: none"> <li>Solid particles: Class 1</li> <li>Water: Class 4</li> <li>Oil: Class 2</li> </ul>
Hydraulic fluid (hydraulics side, pump)	<p>Hydraulic fluid, according to DIN 51 524 Parts 1 to 3; ISO VG 10 to 68 according to DIN ISO 3448 Viscosity range: 4 - 1500 mm<sup>2</sup>/s Optimal operating range: approx. 10 - 500 mm<sup>2</sup>/s Also suitable for biologically degradable hydraulic fluids type HEPG (polyalkylene glycol) and HEES (synthetic ester) at operating temperatures up to approx. +70°C.</p>
Cleanliness level	<b>ISO 4406</b> <u>19/17/14</u>
Temperatures	<p>Environment: approx. +5 ... +40 °C, hydraulic fluid: 0 ... +80 °C, ensure the correct viscosity range. Biologically degradable hydraulic fluids: note manufacturer specifications. With consideration for the seal compatibility, not above +70°C.</p>

#### ! NOTICE

The energy required to operate the air pump is supplied to the system via compressed air. When the air pump is operated, the compressed air is expanded, resulting in a cooling effect due to the expansion. The working process therefore cools the air and the pump.

If the **air pump is operated at temperatures just above 0°C**, the expansion cold can cause moisture to precipitate in the form of small water droplets, which then freeze into small ice crystals. The ice crystals settle on the inside of the silencer. **The ice layer that forms then creates a dynamic pressure and brings the working process to a halt.**

In general, the likelihood of this **effect occurring is reduced** if there is **no moisture** precipitation during expansion. This is possible if **dried air is used to operate the air pump.**

### 3.2 Pressure and volumetric flow

Operating pressure	Hydraulics side, pump: <a href="#">see Chapter 2.1, "Basic type, size and plunger pistons"</a> Air side, drive: $p_L = 1.5 - 10 \text{ bar}$
Flow rate	<a href="#">see Chapter 2.1, "Basic type, size and plunger pistons"</a>

### 3.3 Characteristic lines

Reference values for delivery flow and pressure depending on the operating pressure.

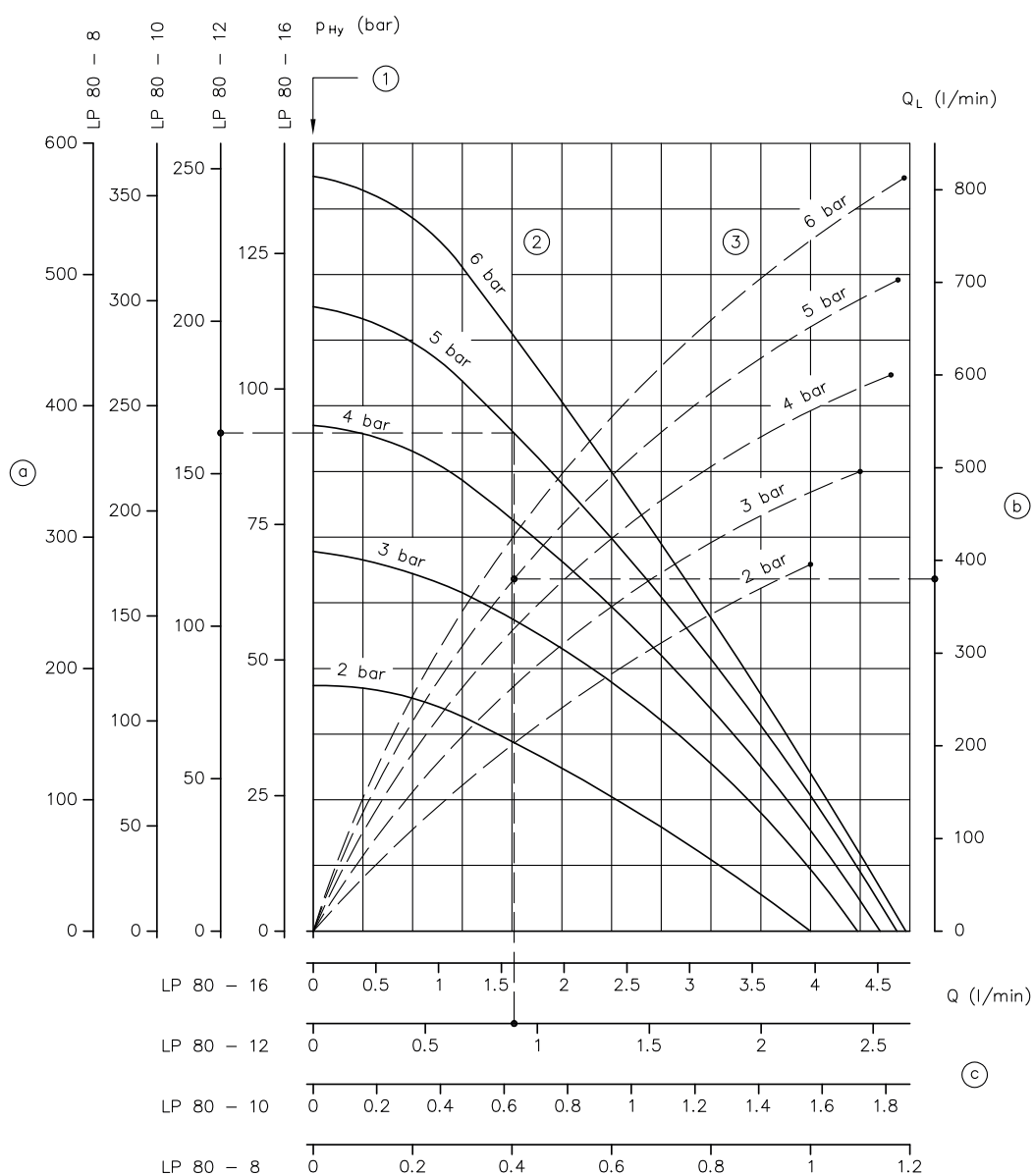
The reference value for the air required refers to the normal condition.

Values  $\pm 5 \%$  (hydraulic) and  $\pm 10 \%$  (pneumatic) are within the tolerance range.

Viscosity of the hydraulic fluid approx.  $50 \text{ mm}^2/\text{s}$

Acoustic data measured at viscosity at DTE22 of  $\sim 30 \text{ mm}^2/\text{s}$

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

**LP 80**


a Hydraulic operating pressure  $p_{Hy}$  (bar)

b Air consumption  $Q_L$  (lpm)

c Delivery flow  $Q$  (lpm)

1 Stand-still pressure

2 Operating air pressure  $p_L$

3 Air consumption at  $p_L$

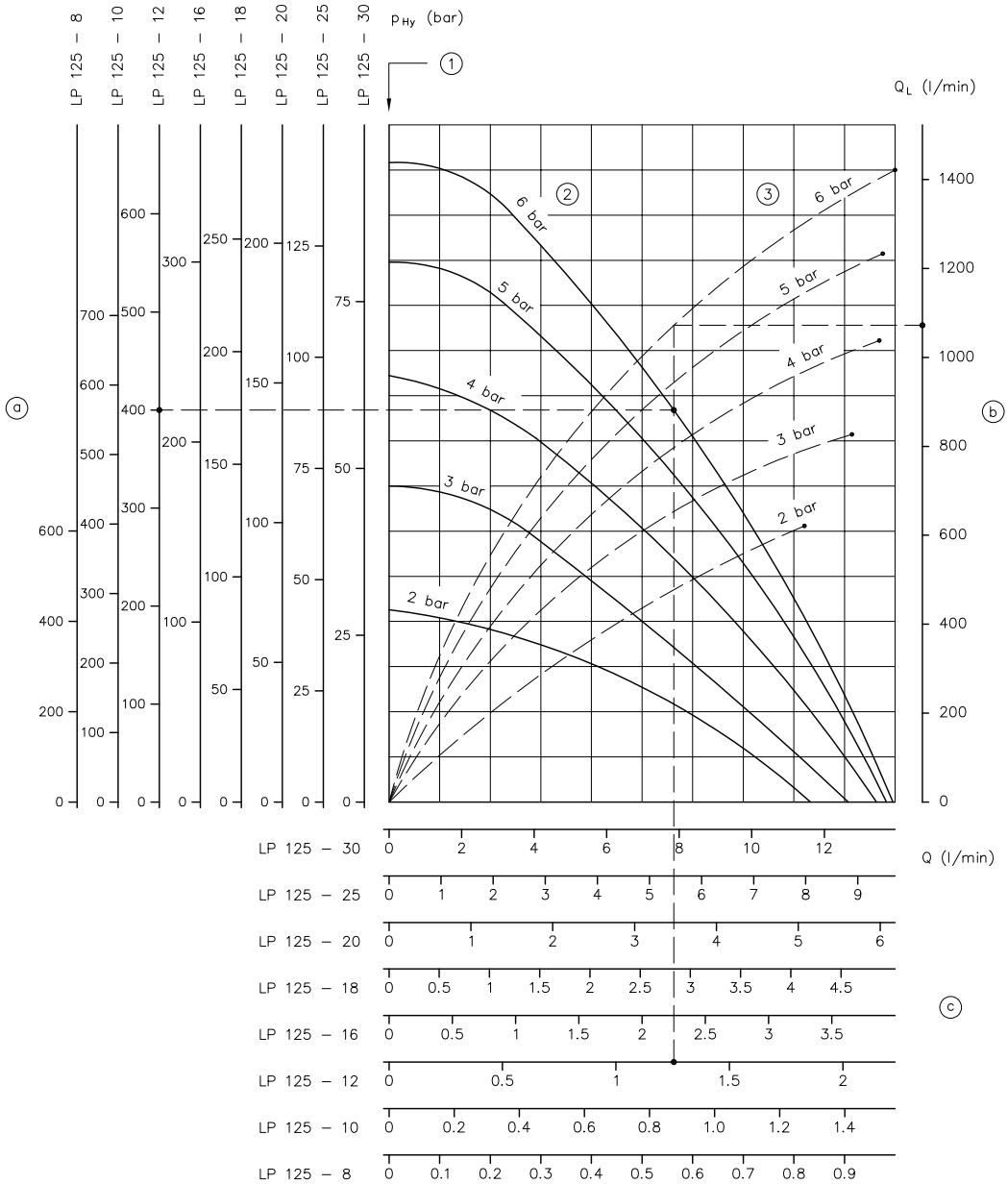
**Example**

At 160 bar consumer pressure and 5 bar operating air pressure, an LP 80-12 achieves a delivery flow rate of approx. 0.8 lpm (at an air consumption of approx. 380 lpm), see dotted line. The stand-still air pressure is approx. 3.8 bar (air pressure at which the pump starts to supply medium, at a consumer pressure of 160 bar).

**! NOTICE**

- The values given apply to operation with a "run-in" pump. (i.e. after approx. 150 operating hours)
- When operating with low pneumatic pressure (especially in combination with simultaneously high hydraulic pressure), the efficiency can deviate 20-50 % downwards!

## LP 125



- a Hydraulic operating pressure  $p_{Hy}$  (bar)  
b Air consumption  $Q_L$  (lpm)  
c Delivery flow  $Q$  (lpm)  
1 Stand-still pressure  
2 Operating air pressure  $p_L$   
3 Air consumption at  $p_L$

### Example

At 400 bar consumer pressure and 6 bar operating air pressure, an LP 125-12 achieves a delivery flow rate of approx. 1.3 lpm (at an air consumption of approx. 1090 lpm), see dotted line.  
The stand-still air pressure is approx. 3.8 bar (air pressure at which the pump starts to supply medium, at a consumer pressure of 400 bar).

### NOTICE

- The values given apply to operation with a "run-in" pump. (i.e. after approx. 150 operating hours)
- When operating with low pneumatic pressure (especially in combination with simultaneously high hydraulic pressure), the efficiency can deviate 20-50 % downwards!

### 3.3.1 Running noise

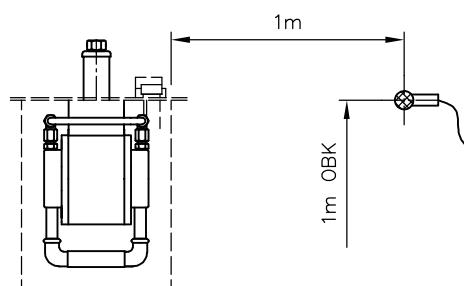
The running noise depends on the operating air pressure and is optimally limited, in relation to the overall efficiency of the pump, by the exhaust air silencer.

#### Measuring conditions:

- Workroom
- Noise level at approx. 42 dB (A), measured 1 m above the ground and 1 m away from the object
- Pump standing on 50 mm insulation felt

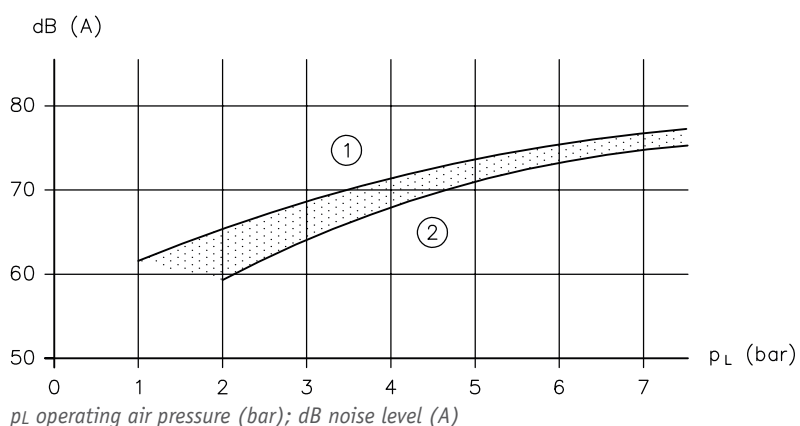
#### Measurement device:

- Precision noise level measuring device according to DIN IEC 651 Cl. 1



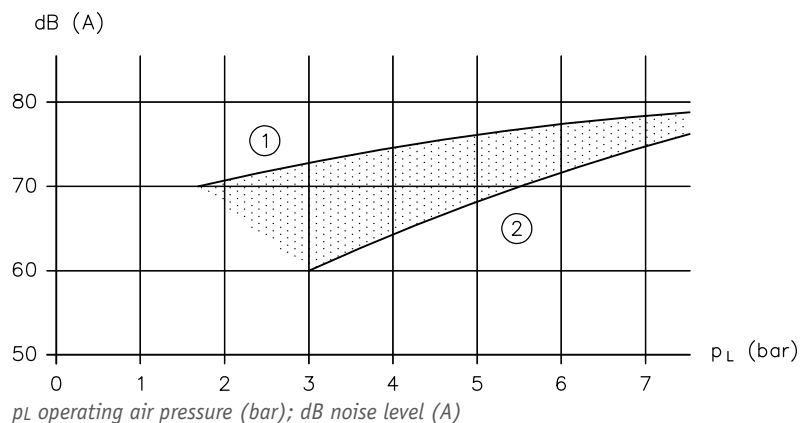
Viscosity of the hydraulic fluid approx. 50 mm<sup>2</sup>/s

### LP 80



- 1 Hydraulic operating pressure  $p = 0$
- 2 Pressure against  $p_{max}$  (near stand-still pressure)

## LP 125



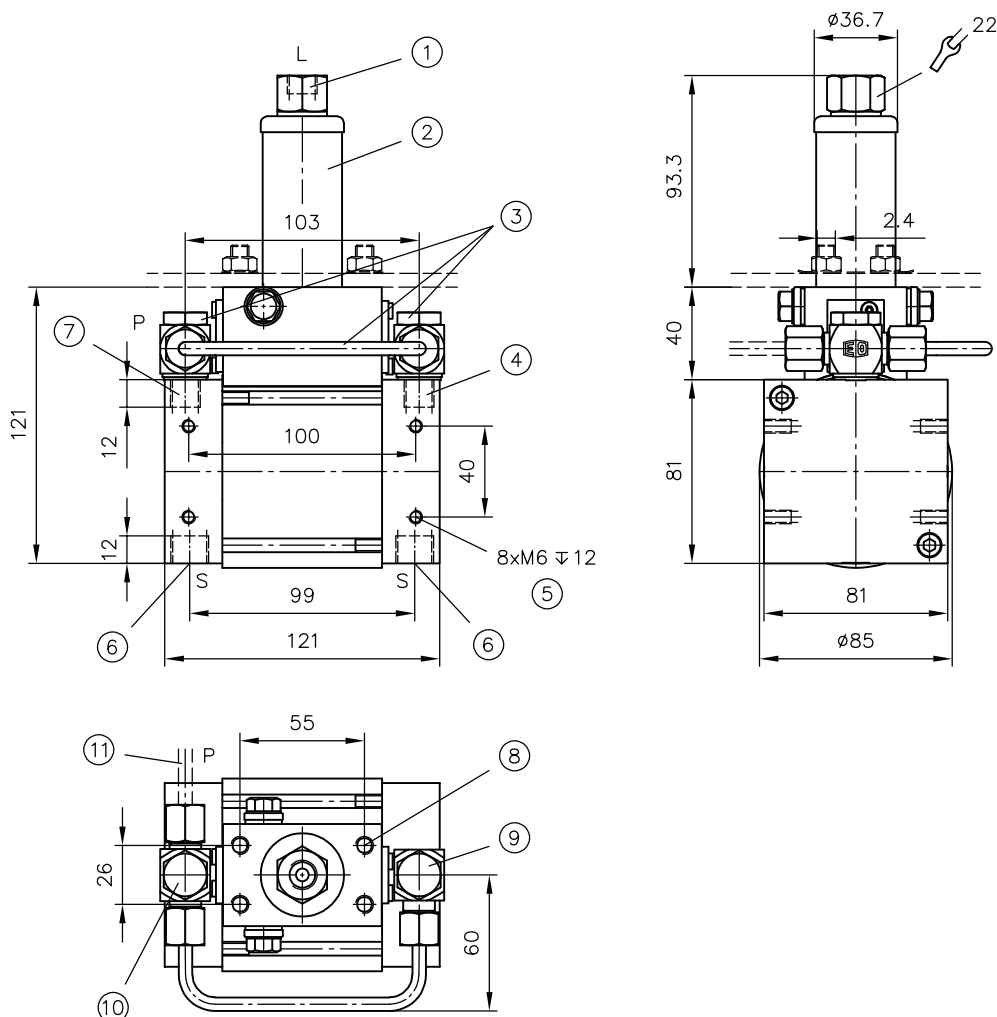
## 3.4 Weight

Pump without pipe module	Type	
	LP 80	= 5 kg
	LP 125	= 8.5 kg
Pipe module	Type	
	LP 80	= 0.25 kg
	LP 125	= 0.4 kg
Intake module	Coding	
	S 35	= 0.18 kg
	S 60	= 0.24 kg
	S 100	= 0.31 kg
	S 200	= 0.49 kg
	S 65	= 0.35 kg
	S 75	= 0.38 kg
	S 165	= 0.60 kg
	S 250	= 0.81 kg
	S 80	= 0.39 kg
	S 140	= 0.50 kg
	S 220	= 0.74 kg

## 4 Dimensions

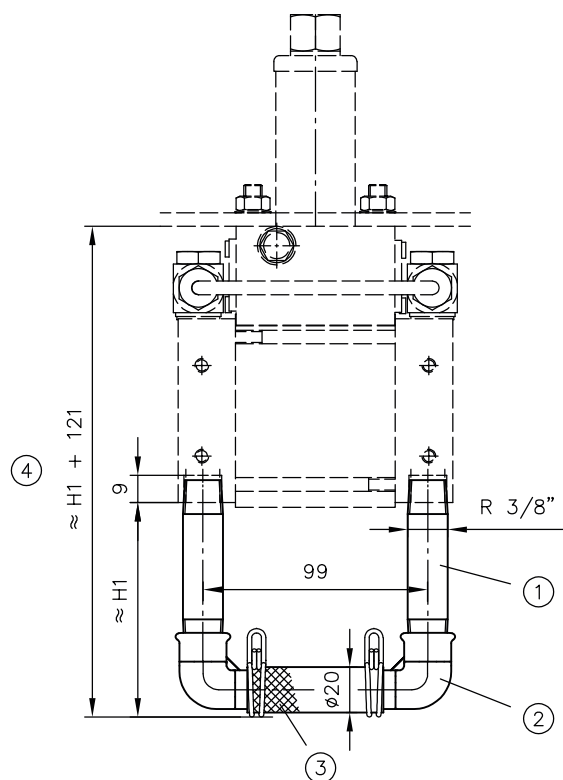
All dimensions in mm, subject to change.

### 4.1 Hydraulic pump LP 80



- 1 Compressed-air port G 1/4
- 2 Silencer
- 3 Piping omitted on version LP 80-...-X (pump without pipe module)
- 4 Pressure connection P 2: G 1/4 for version LP 80-...-X (pump without pipe module)
- 5 Mounting thread B 2
- 6 Suction port G 3/8: Screw-in hole similar to shape X DIN 3852 part 2
- 7 Pressure connection P 1: G 1/4 for LP 80-...-X (pump without pipe module)
- 8 Mounting thread B 1 (screw tightening torque: max. 6 Nm)
- 9 Elbow pipe screw connection (only for variant "with piping, coding R")
- 10 Pipe screw connection T (only for variant "with piping, coding R")
- 11 High-pressure connection of seamless precision pipe

**Intake module LP 80**



- 1 Double nipple
- 2 Fitting, angle ISO 49 EN 10242 3/8" x A 4
- 3 Strainer (HAWE), mesh size 0.8 mm
- 4 Total installation depth

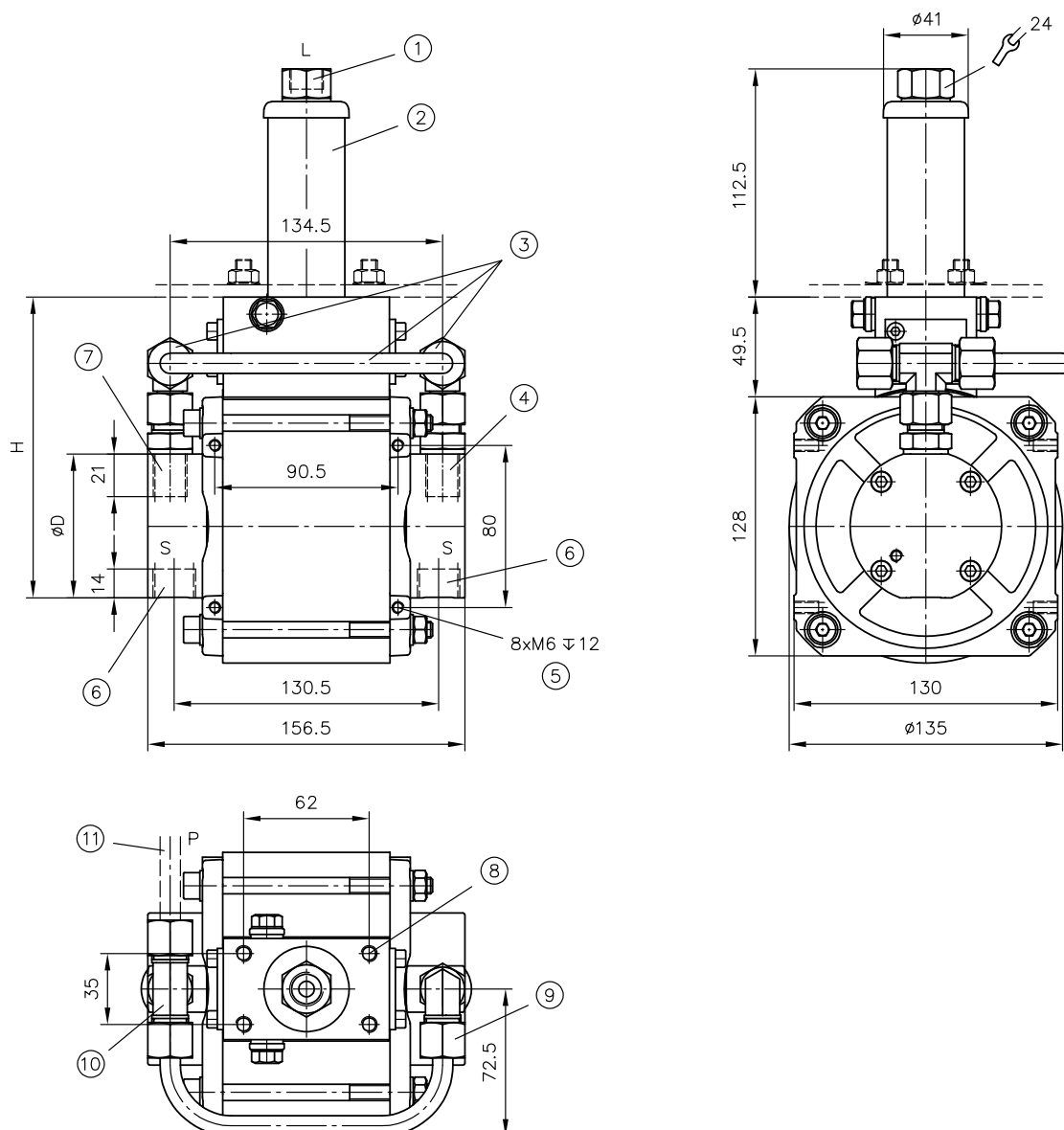
**Coding**

**suitable for max. clear tank height**

	<b>H1</b>	<b>H1 + H = total height of pump without silencer = pump in tank + safety clearance</b>
<b>S 35</b>	max. 35	160
<b>S 60</b>	max. 60	185
<b>S 100</b>	max. 100	225
<b>S 200</b>	max. 200	325



## 4.2 Hydraulic pump LP 125



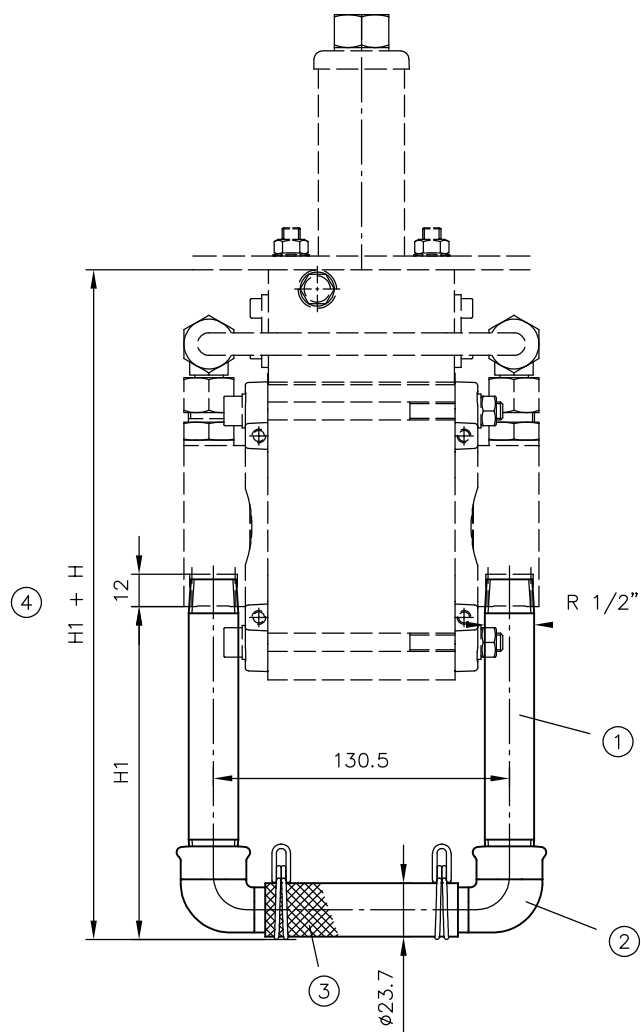
- 1 Compressed-air port G 3/8
- 2 Silencer
- 3 Piping omitted on version LP 125-...-X (pump without pipe module)
- 4 Pressure connection P 2: G 3/8 or G 1/4 for version LP 125-... X
- 5 Mounting thread B 2
- 6 Suction port G 1/2: Screw-in hole similar to shape X DIN 3852 part 2
- 7 Pressure connection P 1: G 3/8 for version LP 125-...-X (pump without pipe module)
- 8 Mounting thread B 1 (screw tightening torque: max. 6 Nm)
- 9 Elbow pipe screw connection (only for variant "with piping, coding R")
- 10 Pipe screw connection T (only for variant "with piping, coding R")
- 11 High-pressure connection (pipe  $\varnothing$  10 mm (for cover plate / tank version) or variable if variant "single, for self-piping, coding X")

LP 125	$\varnothing D$	H
-8, -10, -12	75	148,5
-16, -18, -20	80	151,0
-25	85	153,0
-30	90	156,0

### **i** INFORMATION

For LP 125, the height H depends on the piston.

Intake module LP 125



- 1 Double nipple
- 2 Fitting, angle ISO 49 EN 10242 1/2" x A 4
- 3 Strainer (HAWE), mesh size 0.8 mm
- 4 Total installation depth

Coding	H1
S 65	max. 65
S 75	max. 75
S 165	max. 165
S 250	max. 250

LP 125	H
-8, -10, -12	148,5
-16, -18, -20	151,0
-25	153,0
-30	156,0

# 5

## Installation, operation and maintenance information

Observe the document B 5488 "General operating instructions for assembly, commissioning, and maintenance."

### 5.1 Intended use

This product is intended exclusively for hydraulic applications (fluid technology).

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

#### 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 specialist personnel.
- ▶ The product must only be operated within the specified technical parameters described in detail in this document.
- ▶ All components must be suitable for the operating conditions when using an assembly.
- ▶ The operating instructions for 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 disassembly (in particular in combination with hydraulic accumulators).

#### DANGER

##### Sudden movement of the hydraulic drives when disassembled incorrectly

Risk of serious injury or death

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

### 5.3 Operating instructions

Observe product configuration and pressure/flow rate.

The statements and technical parameters in this document must be strictly observed.

The instructions for the complete technical system must also always be followed.

#### NOTICE

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

#### CAUTION

##### Overloading components due to incorrect pressure settings.

Risk of minor injury.

- Pay attention to the maximum operating pressure of the pump, valves and fittings.
- Always monitor the pressure gauge when setting and changing the pressure.

## Purity and filtering of the hydraulic fluid

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

### Examples of fine contamination include:

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

#### NOTICE

**New hydraulic fluid from the manufacturer may not have the required purity.**

Damage to the product is possible.

- ▶ Filter new hydraulic fluid to a high quality when filling.
- ▶ Do not mix hydraulic fluids. Always use hydraulic fluid that is from the same manufacturer, of the same type, and with the same viscosity properties.

For smooth operation, pay attention to the cleanliness level of the hydraulic fluid (cleanliness level [see Chapter 3, "Parameters"](#)).

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

## 5.4 Maintenance information

Check regularly (at least once a year) by visual inspection whether the hydraulic connections are damaged. If external leakages are found, shut down and repair the system.

Clean the surface of the device regularly (at least once a year) (dust deposits and dirt).

### 5.4.1 Maintenance unit

Commercially available maintenance units consisting of an air filter (filter cartridge of approx. 5 µm) with water separator, pressure reducing valve (pressure reducer), lubricator and pressure gauge are required for proper compressed-air preparation and safe and reliable functioning of the pumps.

Type	Normal nominal flow (lpm)
LP 80	≥ 800
LP 125	≥ 1600

**6****Other information****6.1 Long running times**

A pressurised gas or gas mixture cools down during sudden, adiabatic expansion. Likewise, the components in which the expansion takes place and through which the cold gas flows until it exits, also cool down.

In typical operation, the components heat up between the work cycles during downtime intervals due to the higher ambient temperature. During continuous operation, the components can cool down to such an extent that water vapour condenses on them and frost forms or icing takes place.

On the hydraulic pump type LP, the reversing valve and the exhaust air silencer can ice up during exceptionally long running times. This applies to continuous operation from approx. a quarter of an hour in combination with air pressures greater than approx. 4 bar.

**Prevent icing up:**

- Fill an antifreeze lubricant (anti-icing lubricant, e.g. BP-Energol AX or Kompranol N74) into the oil tank of the maintenance unit. Arrange the pump so that the exhaust air silencer points horizontally to the side or vertically downwards so that the mixture of condensation water and antifreeze drips off and does not enter the reversing valve via the exhaust air duct. This prevents malfunctions.

Hydraulic power packs according to [D 7280 H](#) must not be used. The pump must be installed outside the tank.

## References

### Additional versions

- Hydraulic power pack type LP: D 7280 H
- Manual pump type H, HD and HE: D 7147/1
- Hand pump type CH: D 7147 CH
- Connection blocks for single-circuit pump types AB, AL: D 6905 AB
- Valve bank (directional seated valve) type VB: D 7302
- Valve bank (nominal size 6) type BA: D 7788
- Valve bank (directional seated valve) type BWN and BWH: D 7470 B/1

