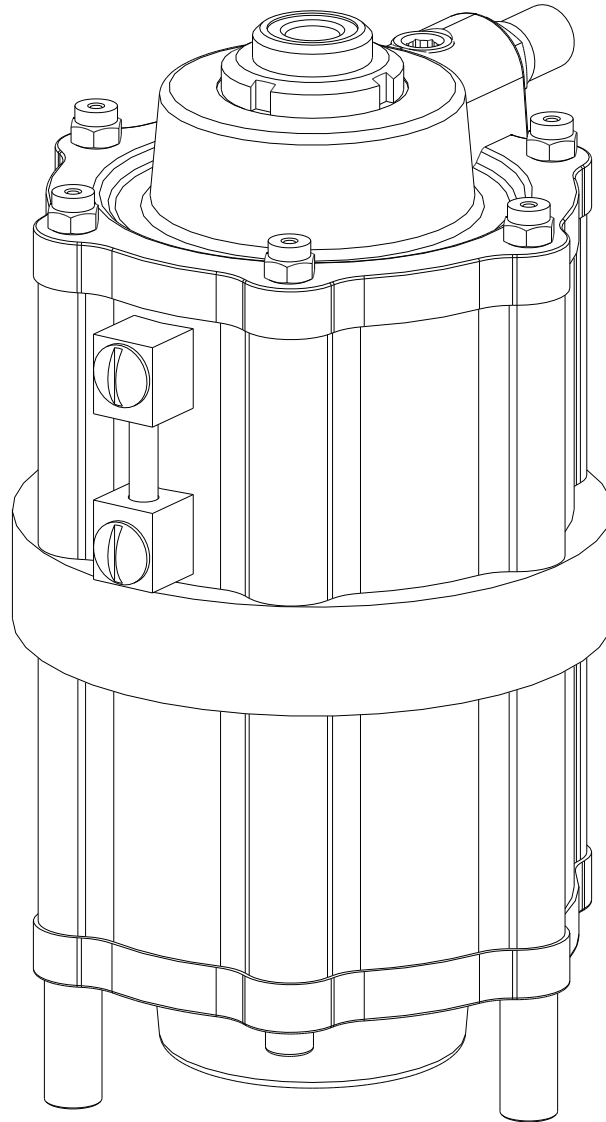


Pressure Intensifier HPU



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**Operating
instructions**

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INDEX

1. Technical Data	Page 2
2. Safety Requirements	Page 3
3. General Information	Page 4
4. Design and Operating Features	Pages 5-7
5. Installation Instructions	Page 8
6. Charging System with Fluid	Pages 9
7. Trouble Shooting	Pages 10
8. Maintenance	Page 10
9. Spare Parts	Page 10

1. TECHNICAL DATA

Input: Compressed Air, filtered, oiled or unoled 0.5 bar to 10 bar (7 psi to 150 psi)
 Operating Temperature Range: 15 °C to 70 °C (59 °F - 158 °F)
 without fluid level gage up to 80 °C (176°F)

Intensifier Model No.	Pressure Multiplier	Displaceable High Pressure Volume		Available Oil Reserve	
		[cm ³]	[cu in]	[cm ³]	[cu in]
HPU 100/18/0,2 - 3099787	30 :1	20	1.2	450	27.5
HPU 100/32/0,1 - 4099591	10:1	10	0,6	120	7,5
HPU 100/32/0,4	10:1	40	2.4	200	12.2
HPU 100/32/1	10:1	100	6.1	750	45.8
HPU 100/50/2,5	4:1	250	15.3	600	36.6
HPU 140/32/1,2	19:1	120	7.3	1800	109.8
HPU 140/50/2,5	8:1	250	15.3	1450	88.5
HPU 140/63/4	5:1	400	24.4	1250	76.3
HPU 200/32/1 - 3031292	39:1	100	6.1	3200	195.3
HPU 200/50/4 - 3099677	16:1	400	24.4	4800	292.9
HPU 200/63/4	10:1	400	24.4	3100	189.2
HPU 200/100/8	4:1	800	48.8	2000	122.0
HPU 200/100/16	4:1	1600	97.6	4300	162.4

Recommended Hydraulic Fluid

Only Quality Industrial Oils with a viscosity class ISO VG 32, such as DIN 51 524 or Mobil Vactra 1, should be used.

Field of application

HPU Pressure Intensifiers are used to boost the operating pressure in applications where the available shop air pressure is insufficient to provide the necessary power and/or to meet the requirement for highly uniform movement of a work piece.

The instructions outlined in this Manual must be adhered to in order to assure reliable performance. The manufacturer disclaims any liability for damage caused if the units are used for purposes other than those intended.

2. SAFETY REQUIREMENTS

NOTE:

CAUTION !

Special care must be exercised in following the installation and maintenance procedures where this <Caution !>sign is shown.

General Guidelines

- Pressure Intensifiers do not fall into the category of independent equipment machinery. This Manual is intended to assist the designer of machines and equipment to incorporate the HPU in a professional manner and to provide the maintenance requirements to ensure reliable operation of the system.
- Personnel involved with the installation of the HPU must read and understand the Operation Instructions and, in particular, these Safety Instructions.
- The Manual is written for engineering personnel with a background in fluid technology to guarantee the proper installation and maintenance of an HPU Pressure Intensifier. Any arbitrary alteration or modification to the HPU will become the user's responsibility and relieves the manufacturer of all liabilities.
- The Pressure Intensifier must be installed in an upright position.
- Piping and connector hardware in the hydraulic section of the system must be designed to meet the applicable safety requirements of the hydraulic operating pressure.
- Special care must be exercised when filling the Pressure Intensifier and the Work Cylinder with hydraulic fluid. For detailed instructions refer to Section 6 of this Manual.
- The Controls of the System must be designed to insure that the oil moves freely back and forth between Pressure Intensifier and Work Cylinder.

3. GENERAL INFORMATION

The EU machine directive 2006/42/EC does not apply to this device. Therefore, it is also not provided with the CE marking according to the machine guideline.

These operating instructions are intended to enable the manufacturer of the overall operational system to properly install the device and instruct the user about any necessary maintenance.

These operating instructions are intended for engineers of the manufacturer providing the overall system, and not for the user of the system.

It is assumed that the fundamentals of pneumatics and hydraulics are known.

Only if these operating instructions are understood and complied with can installation mistakes can be avoided and trouble-free operation be guaranteed.

However, if you do encounter problems please contact our company, field staff or agencies.

We reserve the right to make technical modifications

Applications

Pressure Intensifiers are used in Hydro-Pneumatic Drives with compressed air being the input power source and high pressure hydraulic oil the out-put. This open type Hydro-Pneumatic System viewed in the direction of power transmission usually consists of a Pressure Intensifier, a Directional Control Valve and a Hydraulic Work Cylinder.

The low pressure compressed air input energy is converted into high pressure hydraulic power. Because of the high flow rate of compressed air the pneumatic energy is instantly available and only negligible losses occur while being converted into hydraulic energy. Uneven movement inherent to pneumatic systems is eliminated.

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4. DESIGN AND OPERATION FEATURES

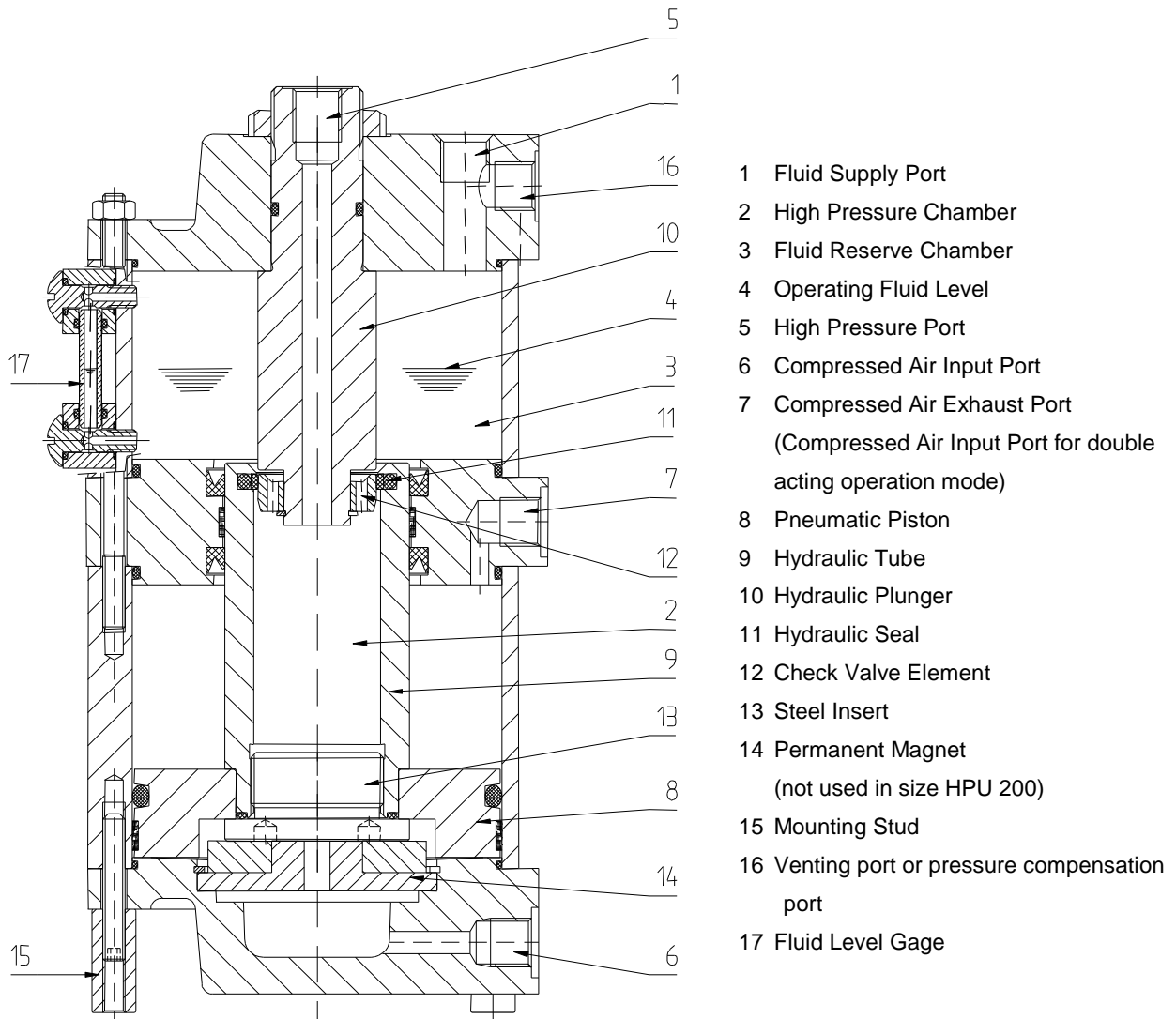


Fig. 1 Crossection of HPU Pressure Intensifier

Operation

It is assumed that the Pressure Intensifier is charged with fluid and properly vented.

Upon applying compressed air to Port #6, the Pneumatic Piston #8 and the Hydraulic Tube #9 will move towards the Hydraulic Plunger #10. After a short distance the Hydraulic Seal #11 and the Check Valve Element #12 will seal off the High Pressure Chamber #2 from the Fluid Reserve Chamber #3. The hydraulic pressure at port #5 increases with the area ratio between Piston #8 and Plunger #10. The increase in pressure during the stroke will depend on the drive load acting on the Work Cylinder.

The return of piston #8 to its starting position occurs when the air supply at port #6 is exhausted.

The HPU Pressure Intensifier can be installed to operate in either SINGLE-ACTING (Fig.2) or DOUBLE-ACTING (Fig.3) Mode

In **Single-Acting Operating Mode** (Fig. 2) the oil column is returned from the Work Cylinder to the Pressure Intensifier until the internal Check Valve #12 opens. Piston #8 with the integral steel insert is completely pulled into its starting position by the magnetic field of the Ring Assembly #14 (Fig. 1). Thus, any leakage from the drive is automatically compensated for and air is prevented from entering the system by the dynamically acting Seal # 11 and the internal Check Valve #12.

Work Cycle Time Reduction

In order to reduce the work cycle time in a system using a Pressure Intensifier, it is recommended that an Air Pressure Regulator #5 (relieving type) set at approx. 0.5 to 1 bar (7 to 14 psi) be applied at port #16 (Fig. 1).

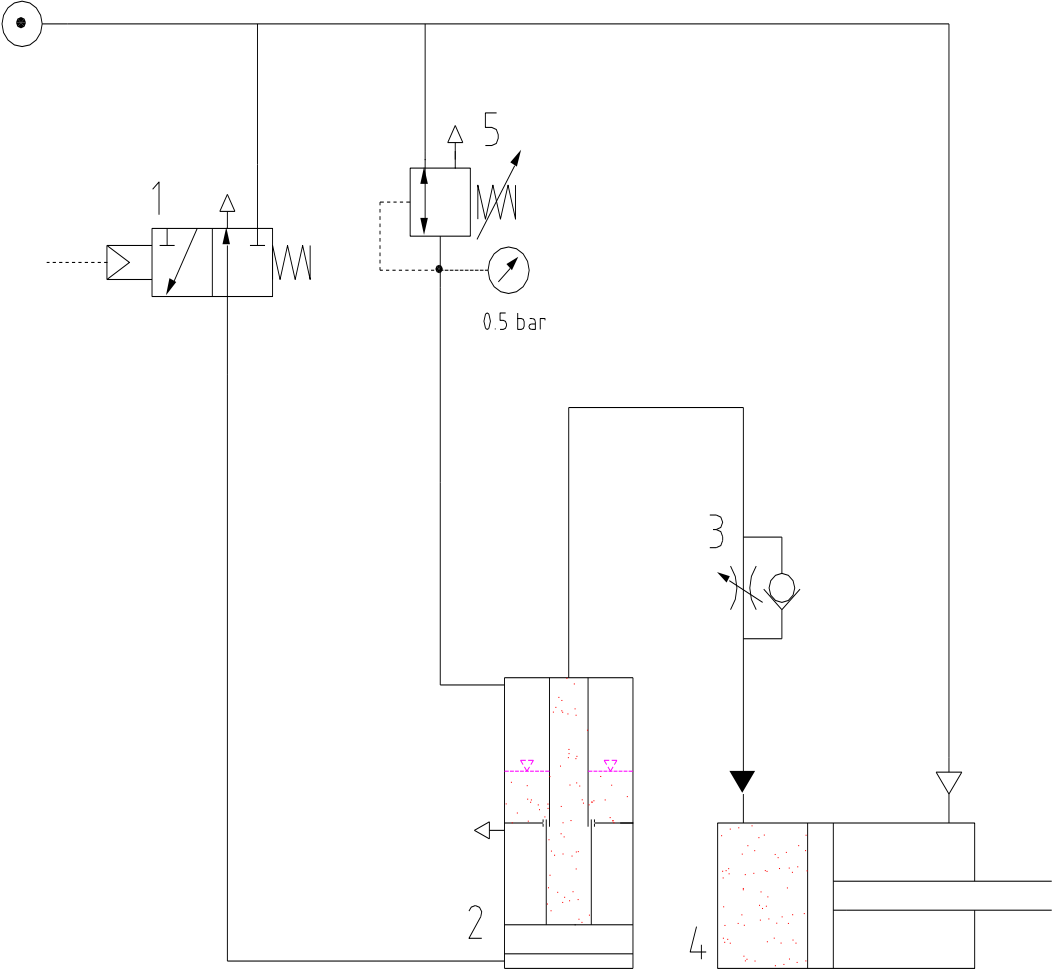


Fig. 2 Single-Acting Operation

- 1 –3-way Control Valve
- 2 –HPU Pressure Intensifier
- 3 –Hyd. Flow Control Valve
- 4 –Work Cylinder
- 5 –Pressure Regulator (optional for all HPU sizes, for the HPU-200 series required)

IMPORTANT: The HPU-200 size Intensifier design does not feature a Magnetic Ring Assembly #14. In absence of the magnetic field, the hydraulic tube assembly #9 must be returned to its starting position by applying the recommended pressure at port #16.

Double Acting Operating Mode

In order to improve the efficiency and, in particular, to increase the speed at which the Pressure Intensifier can stroke, the system can be operated in Double Acting Mode (Fig. 3). For this mode port #7 should be pressurized with 0,5-1 bar. Without this measure, chances are that the Pressure Intensifier will run ahead of the Work Cylinder causing a negative pressure in piping and Work Cylinder. This would result in air entering the system. For additional speed there could be used a quick exhaust valve at port #6.

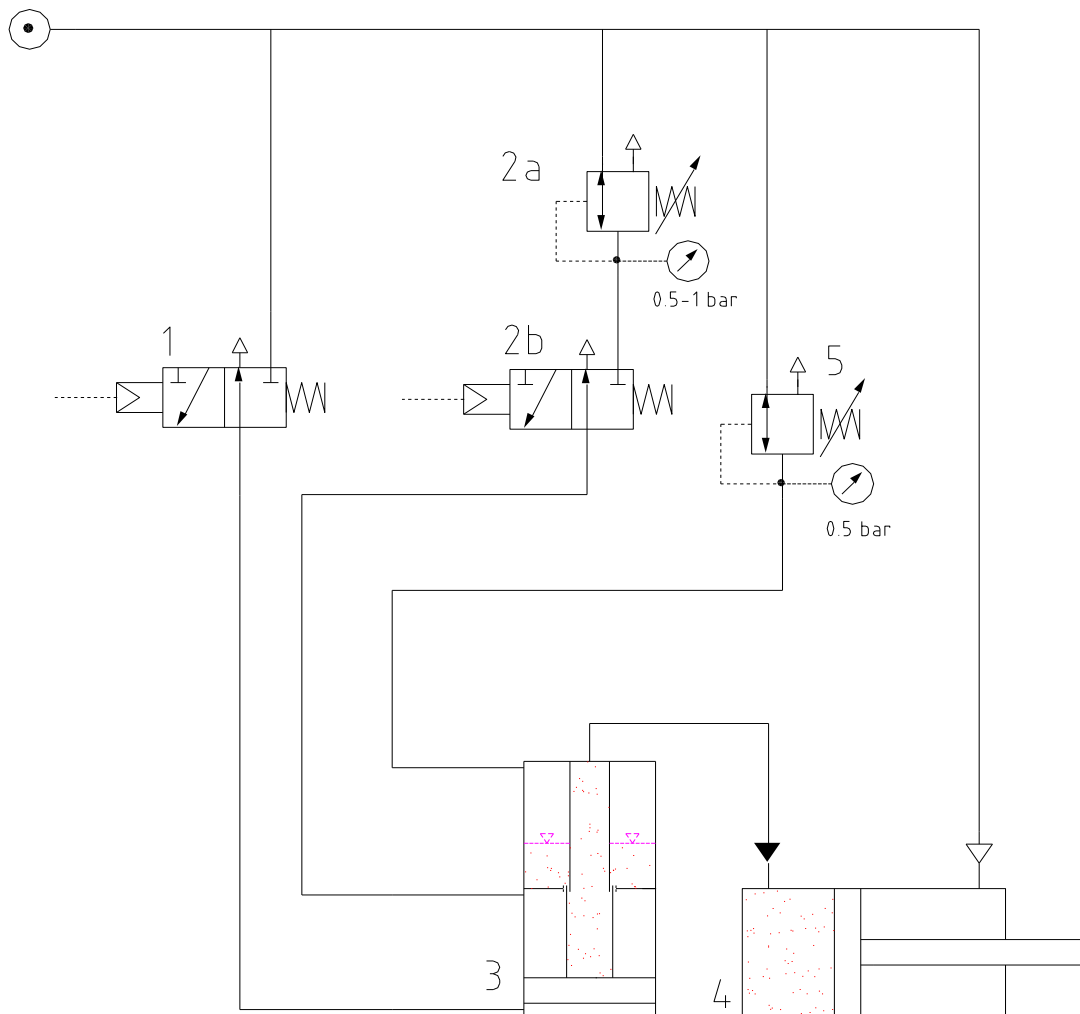


Fig. 3 Double-Acting Operation

- 1 – 3-way Control Valve (Work)
- 2a – Pressure Regulator (Reset HPU)
- 2b – 3-way Control Valve (Reset HPU)
- 3 – HPU Pressure Intensifier
- 4 – Work Cylinder
- 5 – Pressure Regulator (optional for all HPU sizes, for the HPU-200 series required)

5. INSTALLATION INSTRUCTIONS

- The HPU must be mounted as closely as possible to the Work Cylinder
- The HPU must be installed in a vertical position and secured by the 3 mounting screws #15.
- The use of controls shall be laid out in accordance with paragraph 4.

CAUTION!

All piping and connections must be rated for the maximum hydraulic pressure generated by the Intensifier.

CAUTION!

Use only low pressure relieving type regulators at port #16 for oil compensation purposes.

6. CHARGING THE SYSTEM WITH HYDRAULIC FLUID

Prerequisites

Charging the System can only be done after:

- The installation of intensifier and Work Cylinder.
- Pneumatic and Hydraulic Controls are installed
- The Work Cylinder is pneumatically pressurized to fully return the Cylinder
- The Pneumatic Piston #8 (Fig. 1) is in the starting position.
- The Pressure at port #16 (Fig. 1) must be zero.

Charging Procedure

Before starting the filling process at port #1 (Fig. 1) the hydraulic connection at the Work Cylinder should be loosened to permit the air in the hydraulic piping to escape. As soon as fluid starts to leak out, the connection must be tightened again. By using a funnel to charge the system with fluid, the air in the Reserve Chamber #3 will be vented during the process.

- The Pressure Intensifier is charged through port #1 (Fig. 1) with an industrial oil, such as type DIN-E 51 524 or Mobil Vactra #1, until the fluid level on the indicator has reached the mark of approx. 2/3 full.
- Close port #1 by replacing the plug and gradually apply air pressure to the Reserve Chamber #3 using a Low Pressure Regulator at port #16. Do not exceed 1 bar (15 psi). The High Pressure Chamber #2 ,hydraulic piping and the empty volume in the Work Cylinder will be filled with fluid over the Check Valve Element #12.
- Vent Fluid Reserve Chamber through relieving port of the Low Pressure Regulator.
- Check the hydraulic fluid level at the visual indicator and replenish oil if necessary.

CAUTION!

The Pressure Intensifier is correctly filled when the fluid level indicator rests at the 1/2 full mark.

- The system must be cycled several times to make sure the correct fluid level is maintained.

Option

The HPU Pressure Indicator can be equipped with an Electric Fluid Level Sensor providing a warning signal if the oil level is above or below the recommended safe limits.

7. TROUBLE SHOOTING

Problem	Cause	Remedy
Excessive loss of fluid displayed by the Fluid Level Indicator	Hydraulic leak caused by defective seal #11 (Fig. 1) or Work cylinder seal	Replace seal (see paragraph "Spare Parts")
Motion of the Work Cylinder piston rod is not uniform	Hydraulic system contains air	Air in system must be vented (see paragraph 6)
Work Cylinder does not reach its end position	The oil volume between Pressure Intensifier and Work Cylinder is too low	Refer to paragraph 6, see note "Important" below
Pressure drop between Pressure Intensifier and Work Cylinder	The oil volume between Pressure Intensifier and Work Cylinder is too low	Refer to paragraph 6, see note "Important" below

Important: The Pressure Intensifier should be returned to its starting position at least once a day. Any minor fluid loss which might occur during Operation would be compensated for by the oil in the Reserve Chamber.

8. MAINTENANCE

Maintenance work is limited to checking the level of die hydraulic fluid and refilling it as outlined in paragraph 6 to compensate for possible losses due to leakage.

9. SPARE PARTS

Specify the complete HPU Model and part number when ordering spare parts. Seal kits are only available as complete sets.

CAUTION!

Check all sliding surfaces for possible wear marks when replacing the seals.

Replace any parts which show signs of premature wear.
