Intensifier 0.2 – 2.6 l/min

Intensification ratio 1.5 – 7.5 max. operating pressure up to 500 bar, double acting

Table of contents

1 Description of the product

An oscillating pump piston, that will be automatically reversed in the end positions by a hydraulically-operated valve, is installed in the intensifier. The ratio of the piston areas corresponds to the intensification ratio. For unhindered flow in the low-pressure range, the pump piston will be bypassed by means of a bypass-line. A pilot-controlled check valve shuts off the high pressure.

2 Validity of the documentation

Hydraulic intensifiers as per data sheet D 8.756. The following types or part numbers are concerned:

Pipe thread version, intensification ratio 1.5 to 7.5:

- 8755 120, 128, 132, 140, 148, 162, 175
- 8755 015, 020, 028, 032, 040, 050, 066

Manifold-mounting version, intensification ratio 1.5 to 6.6:

- 8755 615, 620, 628, 632, 640, 650, 666

Double-acting function, intensification ratio 1.5 to 5.0:

- 8755 515, 520, 532, 540, 550

3 Target group of this document

- Specialists, fitters and set-up men of machines and installations with hydraulic expert knowledge.

Qualification of the personnel

Expert knowledge means that the personnel must

- be in the position to read and completely understand technical specifications such as circuit diagrams and product-specific drawing documents,
- have expert knowledge (electric, hydraulic, pneumatic knowledge, etc.) of function and design of the corresponding components.

An **expert** is somebody who has due to its professional education and experiences sufficient knowledge and is familiar with the relevant regulations so that he

- can judge the entrusted works,
- can recognize the possible dangers,
- can take the required measures to eliminate dangers,
- knows the acknowledged standards, rules and guidelines of the technology.
- has the required knowledge for repair and mounting.

4 Symbols and signal words

⚠ WARNING

Person damage

Stands for a possibly dangerous situation.
If it is not avoided, death or very severe injuries will result.

⚠ CAUTION

Easy injuries / property damage

Stands for a possibly dangerous situation.
If it is not avoided, minor injuries or material damages will result.

Hazardous to the environment

The symbol stands for important information for the proper handling with materials that are hazardous to the environment.
Ignoring these notes can lead to heavy damages to the environment.

Mandatory sign!

The symbol stands for important information, necessary protection equipment, etc.

NOTE

- This symbol stands for tips for users or especially useful information. This is no signal word for a dangerous or harmful situation.

5 For your safety

5.1 Basic information

The operating instructions serve to information and avoidance of dangers for transport, operation and maintenance.
Only in strict compliance with these operating instructions, accidents and property damages can be avoided as well as trouble-free operation of the product can be guaranteed.
Furthermore, the consideration of the operating instructions will result in:

- avoid injuries
- reduced down times and repair costs,
- increased service life of the products.

5.2 Safety instructions

⚠ WARNING

Injuries caused by missing safety devices!

- To avoid injuries appropriate safety devices must be provided by the customer.

Injuries due to non-compliance of the operating instructions!

- The product may only be operated, if the operating instructions - especially the chapter "Safety instructions" have been read and understood.

Injuries due to misuse, incorrect operation or abuse!

Injuries can occur if the product is not used within the intended use and the technical performance data.

- Before start up, read the operating instructions!

⚠ WARNING

Poisoning due to contact with hydraulic oil!

- For handling with hydraulic oil consider the material safety data sheet.
- Wear protection equipment.

Injury by high-pressure injection (squirting out of hydraulic oil under high pressure)!

- Improper connection can lead to escapes of oil under high pressure at the connections.
- Mounting or dismounting of the element must only be made in depressurised mode of the hydraulic system.
- Connection of the hydraulic line as per DIN 3852/ISO 1179.
- Unused connections have to be locked professionally.
- Use all mounting holes.

Burning due to hot oil!

- In operating conditions oil temperatures up to 70 °C can appear due to environment influences.
- All works must only be made in cool mode!

Burning due to hot surface!

- In operating conditions, surface temperatures of more than 70 °C can appear at the product.
- All maintenance and repair works must only be effected in cooled mode or with safety gloves.

Injury / burning due to contact with energized parts!

- Before working on electric equipment, the energized parts must be de-energized and secured.
- Do not open protection covers at electric parts.
- All electrical works must only be realised by electricians.

⚠ CAUTION

Work by qualified personnel

- Works only to be effected by authorised personnel.

Performance of the product!

The admissible performance data of the product, see chapter "Technical characteristics", may not be exceeded.

NOTE

Qualification of personnel

All works may only be effected by qualified personnel familiar with the handling of hydraulic components.

5.3 Personal protective equipment

For works at and with the product, wear safety goggles!

For works at and with the product, wear protective gloves!

For works at and with the product, wear safety shoes!

For all works at the product, the operator has to make sure that the necessary protection equipment will be worn.

6 Application

6.1 Intended use

The products are used to generate hydraulic pressure in industrial applications for bending or clamping of workpieces and / or to operate fixtures alternatively hydraulic actuators within closed, low in dust rooms.

Furthermore the following belongs to possible uses:

- Use within the capacity indicated in the technical characteristics (see data sheet).
- Use as per operating instructions.
- Compliance with service intervals.
- Qualified and trained personnel for the corresponding activities.
- Mounting of spare parts only with the same specifications as the original part.

6.2 Misapplication

⚠ WARNING

Injuries, material damages or malfunctions!

- Do not modify the product!

The use of these products is not admitted:

- For domestic use.
- On pallets or machine tool tables in primary shaping and metal forming machine tools.
- If due to physical / chemical effects (vibrations, welding currents or others) damages of the products or seals can be caused.
- In machines, on pallets or machine tool tables that are used to change the characteristics of the material (magnetise, radiation, photochemical procedures, etc.).
- In areas for which special guidelines apply, especially installations and machines:
  - For the use on fun fairs and in leisure parks.
  - In food processing or in areas with special hygiene regulations.
  - For military purposes.
  - In mines.
  - In explosive and aggressive environments (e.g. ATEX).
  - In medical engineering.
  - In the aerospace industry.
  - For passenger transport.
- For other operating and environmental conditions e.g.:
  - Higher operating pressures than indicated on the data sheet or installation drawing.
  - With hydraulic fluids that do not correspond to the specifications.

7 Installation

⚠ WARNING

Injury by high-pressure injection (squirting out of hydraulic oil under high pressure)!

- Improper connection can lead to escapes of oil under high pressure at the connections.
- Mounting or dismounting of the element must only be made in depressurised mode of the hydraulic system.
- Connection of the hydraulic line as per DIN 3852/ISO 1179.
- Unused connections have to be locked professionally.
- Use all mounting holes.

For works at and with the product, wear suitable protection equipment!

NOTE

Monitor operating pressure

The operating pressure of the high-pressure circuit has to be monitored to avoid too high pressures.

For example, using a pressure gauge or a pressure switch.

7.1 Overview of components

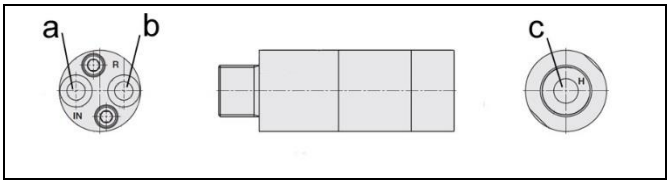

Figure 1: Design pipe thread version

a	Port IN	c	Port H
b	Port R		

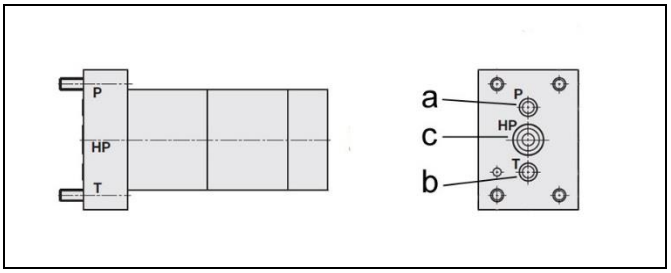

Figure 2: Design manifold-mounting version

a	Port P	c	Port HP
b	Port T		

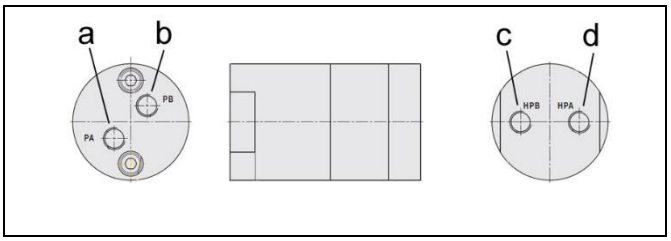

Figure 3: Design double-acting function

a	Port PA	c	Port HPB
b	Port PB	d	Port HPA

7.2 Installation

⚠ CAUTION

Malfunctions!

Chips, coolants and cutting fluids can cause malfunctions.

- Protect the power units against penetration of chips, coolants and cutting fluids!

NOTE

Extremely high hydraulic pressures

The intensifier can produce extremely high hydraulic pressures. The manufacturer of the system must provide effective safety valves for protection against excessive pressures.

Use of the intensifier

If the intensifier will be used on uncoupled systems (no connection to the pressure generator) a pilot-controlled check valve should be mounted at the high-pressure side (consider min. control pressure!). When using additional accumulators, these must necessarily be used after the pilot-controlled check valve and be secured with a pressure relief valve.

Connect double acting

The connection of the intensifier must always be double acting. For oil supply, port R must be depressurised.

Function

Pump piston and valve slide are fit with minimum clearance. In order to permanently secure the function, it is imperative to install a high-pressure filter at the input IN of the intensifier (see hydraulic circuit diagram).

Leakage

As long as pressure is available at IN, the intensifier has an internal leakage between the ports IN and R.

Avoid pressure drop

If no pressure is available at IN, the pressure can drop in the high-pressure area in case of a leakage. By the installation of a pilot-controlled check valve at port H a pressure drop is avoided. This applies in particular to uncoupled systems (clamping pallets).

7.2.1 Connection of the hydraulic equipment

1. Connect hydraulic lines to qualifying standards and pay attention to scrupulous cleanness!

NOTE

More details

- See ROEMHELD data sheets A 0.100, F 9.300, F 9.310 and F 9.360.

Screwed Plug

- Use only fittings "screwed plug B and E" as per DIN 3852 (ISO 1179).

hydraulic connection

- Do not use sealing tape, copper rings or coned fittings.

Pressure fluids

- Use hydraulic oil as per ROEMHELD data sheet A 0.100.

NOTE

Hydraulic oil

The hydraulic oil must be perfectly filtered with particles not larger than nominally 10 µm. This is the reason why we offer a filter unit (part-no. 3887-060), which
can be directly integrated in the tubing of the low-pressure side (see page 2).

Completely bleeded

After completion of all assembly and installation works, the hydraulic system must be completely bleeded.

8 Operation

8.1 Functional principle

The flow rate is supplied without pressure through input IN via the check valves RV1, RV2 and DV to the output H and thereby to the hydraulic cylinders. With increasing counter pressure the oscillating pump OP starts working. The flow rate at output H is getting smaller and smaller and is nearly zero when reaching the maximum operating pressure. The pump holds constant the pressure at H as long as low-pressure is available at IN. Between the ports IN and R there will be leakage of approx. 50 cm3/min, since due to functional reasons the pump elements cannot be sealed without leakage. To retract the cylinders, port IN will be depressurised and port R pressurised. At the same time, the check valve DV will be opened and enables free return flow.

8.1.1 Use of pipe thread version

Intensifiers with pipe thread are very compact. They are integrated into the piping of a clamping fixture, specifically where high-pressure is required. Thus the costs for piping can be considerably reduced.

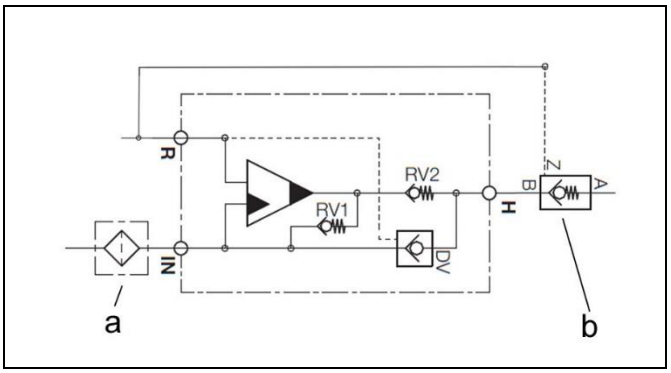

Figure 4: Connecting scheme of pipe thread version

a Accessory high-pressure filter 10 µm (data sheet F9.500)	b Pilot-operated check valve see note "Avoid pressure drop"

8.1.2 Use of manifold-mounting version

Intensifiers for manifold mounting allow mounting without pipes on special mounting plates or directly on the fixture body provided with drilled channels and a ground manifold-mounting surface.

NOTE

A pressure filter has to be provided in the P line to the intensifier (see data sheet). The high-pressure area must be well ventilated to avoid unnecessary prolongation of the clamping time.

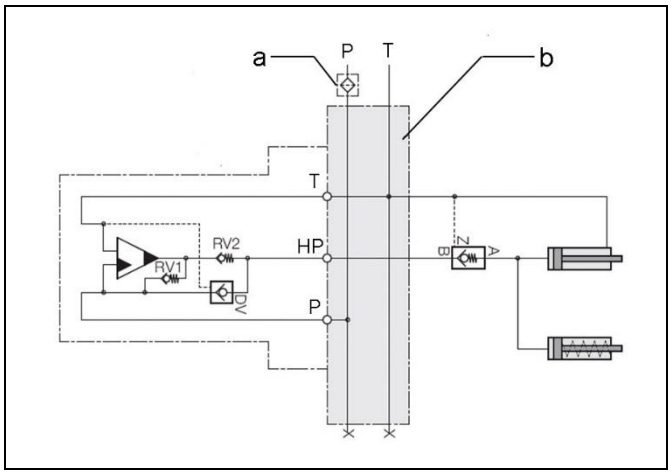

Figure 5: Connecting scheme of manifold-mounting version

a	Accessory high-pressure filter 10 µm (data sheet F9.500)	b	Fixture body or mounting plate

8.1.3 Use of double-acting function

With these intensifiers, double-acting hydraulic cylinders can be supplied with high pressure for extension as well as retraction. The separate operation of two single-acting cylinders is only possible, if they extend and retract alternately (see hydraulic circuit diagram).

NOTE

The simultaneous pressurisation of both ports is not admissible. While one side is pressurised, the other side must be depressurised. If constant pressure has to be maintained at the high-pressure ports, independently of the input pressure, one or two additional pilot-operated check valves have to be installed (see hydraulic circuit diagram).

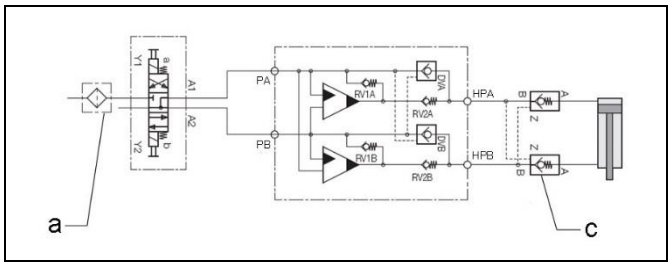

Figure 6: Connecting scheme of double-acting function

a	Accessory high-pressure filter 10 µm (data sheet F9.500)	c	Accessory pilot-controlled check valve (data sheet C2.9511)

9 Maintenance

⚠ WARNING

Burning due to hot surface!

- In operating conditions, surface temperatures of more than 70 °C can appear at the product.
- All maintenance and repair works must only be effected in cooled mode or with safety gloves.

For works at and with the product, wear suitable protection equipment!

9.1 Plan for maintenance

Maintenance works	Interval	Realisation
Cleaning	As required	Operator
Check	daily	Operator
Checking of hydraulic system and components	yearly	Qualified personnel
Check the hydraulic fluid	after 1250 operating hours or 6 months	Qualified personnel
Exchange of hydraulic fluids	in case of damages	Qualified personnel
Repair		ROEMHELD service staff

9.1.1 Regular checks

Checks by the operator have to be effected as follows:

9.1.2 Daily checks

- Check all fixing screws, retighten if required.
- Check if hydraulic hoses, pipes and cables are damaged, or have chafe marks, etc.).
- Check hydraulic components for external leakage - retighten fittings, if required.
- Hydraulic hoses must not get in contact with substances which can cause a damage (acids, lys, solvents, ...).

9.1.3 Cleaning

⚠ WARNING

Injury by flying out components or oil!

- For cleaning works always wear safety goggles, protective shoes and safety gloves.

⚠ CAUTION

Aggressive cleaning agents

The product must not be cleaned with:

- Corrosive or corroding components or
- Organic solvents as halogen or aromatic hydrocarbons and ketones (cellulose thinner, acetone, etc.), because this can destroy the seals.

10 Trouble shooting

Trouble: Caused by intensifier:	Possible cause	Possible system solution
High pressure will not be built up	Swarf in DV1 valve (oil is contaminated with swarf)	1. Check for leaks on the high pressure side 2. Flush the intensifier to loosen swarf/dirt
	Air in the hydraulic system	Bleeding
	Internal seal damaged.	⚠ **Caution!** Repair only by ROEMHELD service personnel. Return for repair.
Intensifier cycles continuously (even if the max. clamping pressure is reached.)	Leakage between IN and R. Pump elements are for functional reasons not leakage-free.	Depressurise port IN
High pressure will be reduced immediately.	Swarf in DV2 valve (oil is contaminated with swarf) Swarf in DV valve (if available)	1. Flush the intensifier to loosen swarf/dirt 2. Check reservoir pressure
The valve DV can not release the high pressure.	Input pressure too low. (see data sheet)	1. Check the available pressure for release and the available high pressure during release.
Trouble: In the hydraulic circuit	**Possible cause**	**Possible system solution**
Intensifier shows no response	Input pressure too low. (min. 20 bar) Input volume too low. (min. 2 l/min)	Increase the input pressure to min. 20 bar. Increase the input pressure to min. 2 l/min.
High pressure is not stable	Pressure fluctuations on the input side The hysteresis varies depending on the intensification ratio between -5 to -10 bar	

11 Technical characteristics

Characteristics of type 8755-0XX

Type	Intensification **i**	Max. flow rate IN [l/min]	Max. flow rate H*) [l/min]	Max. operating pressure - low-pressure side IN in [bar]	Max. operating pressure - high-pressure side H [bar]
8755-015	1.5	8	2.6	200	300
8755-020	2.0	8	2.4	200	400
8755-028	2.8	8	1.4	178	500
8755-032	3.2	15	1.6	156	500
8755-040	4.0	14	1.3	125	500
8755-050	5.0	14	1.0	100	500
8755-066	6.6	13	0.4	75	500

Characteristics of type 8755-1XX

Type	Intensification **i**	Max. flow rate IN [l/min]	Max. flow rate H*) [l/min]	Max. operating pressure low-pressure side IN in [bar]	Max. operating pressure - high-pressure side H [bar]
8755-120	2.0	8	1.5	200	400
8755-128	2.8	8	1.5	178	500
8755-132	3.3	8	0.8	151	500
8755-140	4.0	8	0.6	125	500
8755-148	4.8	8	0.5	104	500
8755-162	6.2	8	0.4	80	500
8755-175	7.5	8	0.2	67	500

*) Flow rate at output H with a counter pressure of 60% of the max. operating pressure. With increasing counter pressure the flow rate tends to zero.

Characteristics of type 8755-6XX

Type	Intensification i	Max. flow rate Q_{IN} [l/min]	Max. flow rate Q_{HP} [l/min]	Max. operating pressure low-pressure side P in [bar]	Max. operating pressure high-pressure side HP*) [bar]
8755-615	1.5	8	2.6	200	300
8755-620	2.0	12	2.4	200	400
8755-628	2.8	13	1.4	178	500
8755-632	3.2	15	1.6	156	500
8755-640	4.0	14	1.3	125	500
8755-650	5.0	14	1.0	100	500
8755-666	6.6	13	0.4	75	500

*) Flow rate at output HP with a counter pressure of 60% of the max. operating pressure. With increasing counter pressure the flow rate tends to zero.

Characteristics of type 8755-6XX

Type	Intensification i	Max. flow rate PA, PB [l/min]	Max. flow rate HPA, HPB*) [l/min]	Max. operating pressure low-pressure side PA, PB [bar]	Max. operating pressure high-pressure side HPA, HPB [bar]
8755-515	1.5	8	2.6	200	300
8755-520	2.0	12	2.4	200	400
8755-532	3.2	15	1.6	155	500
8755-540	4.0	14	1.3	125	500
8755-550	5.0	14	1.0	100	500

*) Flow rate at output HPA or HPB with a counter pressure of 60% of the max. operating pressure. With increasing counter pressure the flow rate tends to zero.

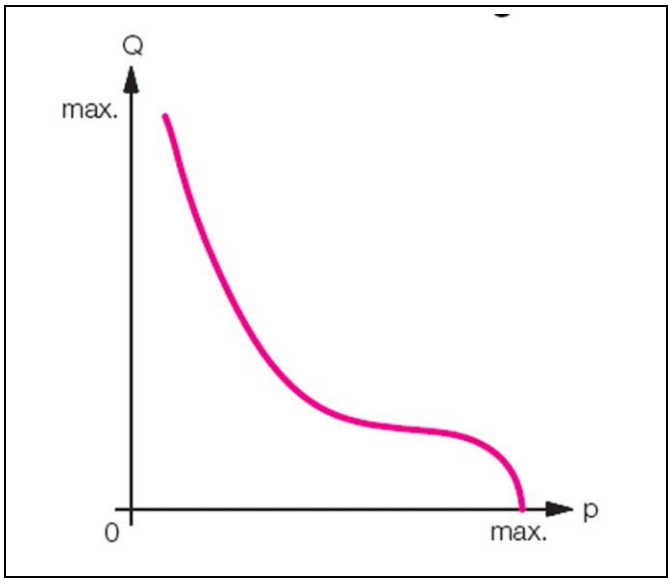

Figure 7: Pressure / flow rate diagram

Hydraulic fluids

NOTE

Hydraulic fluids

Operation of the products with hydraulic fluids that do not correspond to the specifications is inadmissible. See technical characteristics:

12 Disposal

Hazardous to the environment

Due to possible environmental pollution, the individual components must be disposed only by an authorised expert company.

The individual materials have to be disposed as per the existing regulations and directives as well as the environmental conditions.
Special attention has to be drawn to the disposal of components with residual portions of hydraulic fluids. The instructions for the disposal at the material safety data sheet have to be considered.
For the disposal of electrical and electronic components (e.g. stroke measuring systems, proximity switches, etc.) country-specific legal regulations and specifications have to be kept.

13 Declaration of manufacture

Manufacturer

Römheld GmbH Friedrichshütte
Römheldstraße 1-5
35321 Laubach, Germany
Tel.: +49 (0) 64 05 / 89-0
Fax: +49 (0) 64 05 / 89-211
E-mail: info@roemheld.de
www.roemheld.com

Declaration of manufacture of the products

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Double-acting function, intensification ratio 1.5 to 5.0:

- 8755 515, 520, 532, 540, 550

They are designed and manufactured in line with the relevant versions of the directives **2006/42/EC** (EC MSRL) and in compliance with the valid technical rules and standards.
In accordance with EC-MSRL and EN 982, these products are components that are not yet ready for use and are exclusively designed for the installation in a machine, a fixture or a plant.

According to the pressure equipment directives the products are not to be classified as pressure reservoirs but as hydraulic placing devices, since pressure is not the essential factor for the design, but the strength, the inherent stability and solidity with regard to static or dynamic operating stress.

The products may only be put into operation after it was assessed that the incomplete machine/machine, in which the product shall be installed, corresponds to the machinery directives (2006/42/EC).

The manufacturer commits to transmit the special documents of the products to state authorities on request.
The technical documentation as per appendix VII part B was prepared for the products.

Responsible person for the documentation:
Dipl.-Ing. (FH) Jürgen Niesner, Tel.: +49(0)6405 89-0.

Römheld GmbH
Friedrichshütte

Laubach, 10.02.2016