



Hydraulic Intensifier

single and double acting, max. operating pressure 500 / 125 bar



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1 Validity of the documentation

Hydraulic intensifiers as per data sheet D 8.753. The following types or part numbers are concerned:

Hydraulic intensifiers

- 8753 200, 201, 202, 203

2 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.

3 Safety instructions

DANGER

Danger of life / heavy health damages

Stands for an imminent danger.

If it is not avoided, death or very severe injuries will result.

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.

4 For your safety

4.1 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:

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

4.2 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!

Injury due to overturning product!

- Overturning product due to inappropriate means of transportation.
- Do not stand below the load during lifting and lowering, stay outside the danger zone.
- Use suitable means of transportation.
- Pay attention to the weight of the equipment.
- Pay attention that the product is safely located (centre of gravity see instruction sign).

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.

Hydraulic power unit can be damaged!

- Stick absolutely to the indicated direction of the rotary field.

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.

📘 Note

Qualification of personnel

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

4.3 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.

5 Description of the product

Application

Hydraulic intensifiers convert a hydraulic pressure on the primary side (input) into a higher pressure on the secondary side (output).

This enables the use of the comparatively low pressure of machine tool hydraulics to pressurise a hydraulic cylinder with increased pressure.

The oil quantity to be transmitted is not important for the intensifiers of this data sheet. Only after oil supply of the hydraulic cylinder in the low-pressure range is affected, the piston of

intensification will be activated according to its specification by an external valve control or by an integrated switching function.

5.1 Type 8753-200

Intensifier 8753-200 is mainly used for single-acting hydraulic elements.

5.2 Type 8753-201

Intensifier 8753-201 is used for double-acting hydraulic elements.

5.3 Type 8753-202 and -203

The single-acting intensifiers 8753-202 and 8753-203 are used for operation of single-acting hydraulic elements e.g. work supports.

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 vibrations or other physical / chemical effects 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 Transport



Hazardous to the environment

During improper transit, escaping oil residuals can lead to environmental pollutions.

Transport the product only in an upright position!
Pay attention to the sign on the packaging: "Top, do not overturn".

⚠ WARNING

Injury due to overturning product!

- Overturning product due to inappropriate means of transportation.
- Do not stand below the load during lifting and lowering, stay outside the danger zone.
- Use suitable means of transportation.
- Pay attention to the weight of the equipment.
- Pay attention that the product is safely located (centre of gravity see instruction sign).



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

The product is delivered in a solid carton box (on a throw-away pallet) and may only be transported to the installation site by means of a corresponding conveyor (pay attention to the min. lifting force).

The product must only be lifted down from the transport pallet by means of a conveyor, the product must centrally rest on the two fork rakes e.g. of the fork-lift truck.

8 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.

Poisoning due to contact with hydraulic oil!

Wear, damage of the seals, ageing and incorrect mounting of the seal kit by the operator can lead to escapes of oil.

Incorrect connection can lead to escapes of oil at the ports.

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

⚠ CAUTION

Z port sucks liquid

If liquids can be sucked in by the control pressure or venting port (port Z), components can be damaged.

- When mounting, pay attention that no liquids can be sucked in by port Z.



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

i Note

Intensification volume

The intensification volume of intensifiers is 21 cm³. This is the reason why no hydraulic element, which functions only with high pressure, e.g. hydraulic accumulators with a gas-preload pressure of more than 100 bar and an oil absorption exceeding 10 cm³, must be used in the high-pressure range.

The intensification volume of 21 cm³ is only used to generate the high-pressure, i.e. the compressibility of the hydraulic oil (1 % at a pressure increase of 150 bar) and the increase of volume of the high-pressure hoses (1 cm³ per m at a pressure increase of 100 bar) has to be considered.

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.

8.1 Overview of components

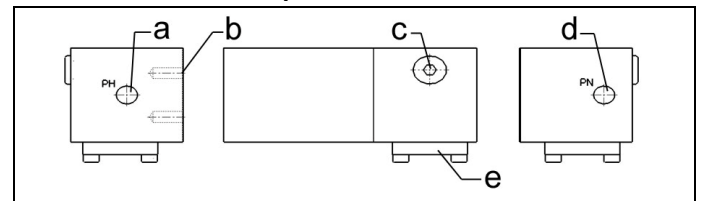


Figure 1: Design 8753 200

a Port PH	d Port PN
b Fixing possibilities	e Closure plate
c Control pressure port or vent screw (port Z)	

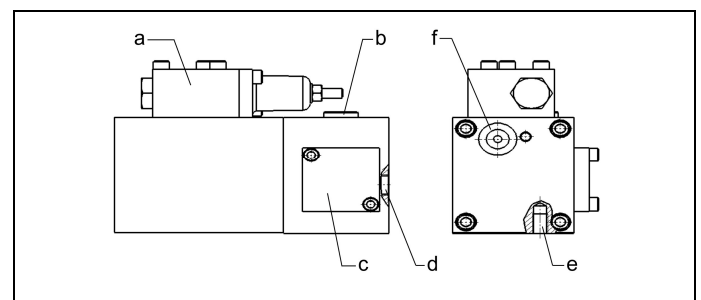


Figure 2: Design 8753 201

a Sequence valve	d Port PH
b Control pressure port or vent screw (port Z)	e Fixing possibility
c Closure plate	d Port PN

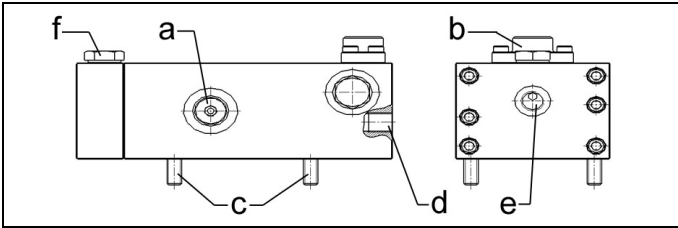


Figure 3: Design 8753 202 and 8753 203

a Control pressure port or vent screw (port Z)	d Port PN
b Cover	e Port PH
c Fixing screws	f Screw plug

8.2 Installation

⚠ CAUTION

Malfunctions!

Chips, coolants and cutting fluids can cause malfunctions.

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

8.3 Connection diagram for 8753-20X

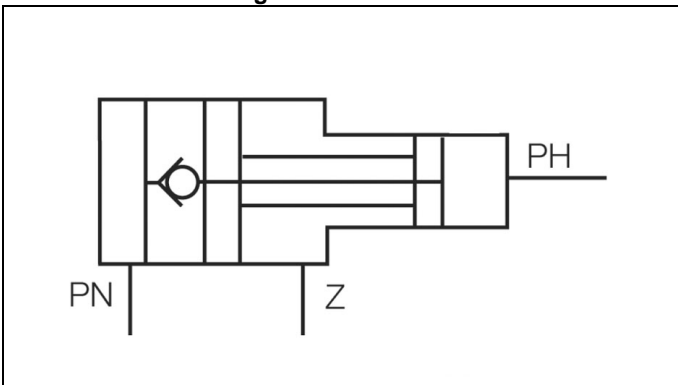


Figure 4: Connection diagram for type D8753-20X

Connection	Function
PH	High-pressure port
PN	Low-pressure port
Z	Control pressure/venting

Type	PN line	Z line	Result (PH line)
8753 200	Pressure	Pressure	Build up of low pressure
	Pressure	No pressure	Build up of high pressure
	No pressure	Pressure	Piston of intensification retracts, oil volume can return into the reservoir.
8753 201	Pressure	vented	P
	No pressure	vented	Piston of intensification can retract
8753 202	Pressure	vented	Low pressure up to 60 bar (not adjustable), than high pressure
	No pressure	vented	piston retracts by an internal spring

Adjust sequence valve (8753-201)

- Screw in completely sequence valve.
- Switch on pressure generator.
- Unscrew slowly sequence valve until pressure intensification will be effected. Unscrew by a complete rotation. The operating pressure will be adjusted to 80 to 90 % of the low pressure.

8.4 Connection of the hydraulic equipment

1. Connect hydraulic lines to qualifying standards and pay attention to scrupulous cleanliness (A = Extend, B = Retract)!

ⓘ 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.

Filtration and cleanliness level of the hydraulic fluid

Pay attention to the indication for filtration and purity class of the hydraulic fluid (see technical characteristics).

Completely bled

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

8.4.1 Hydraulic diagram for type D8753-200

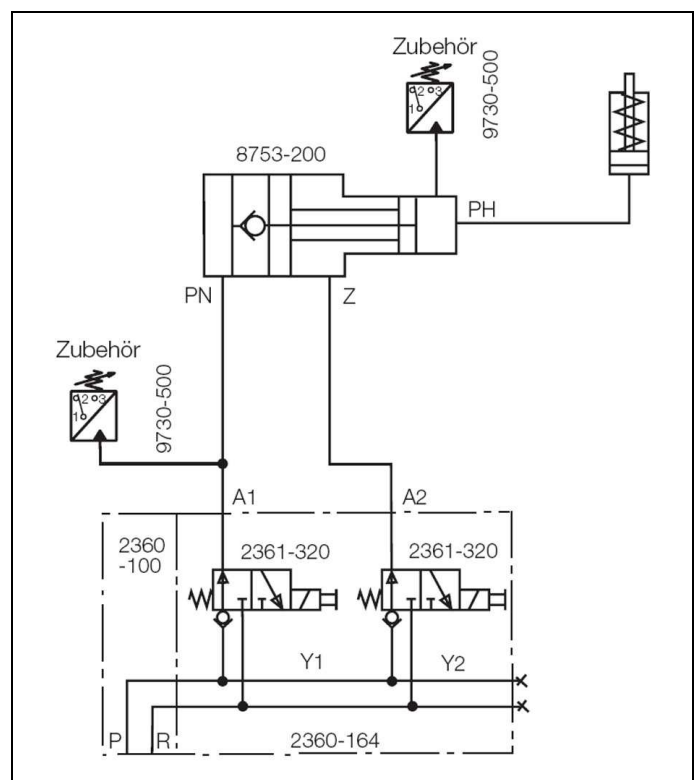


Figure 5: Hydraulic diagram type D8753-200

To fill the hydraulic cylinder, the piston of intensification must be kept in its off-position via control port "Z". For this purpose a second 3/2 directional control valve Y2 is required. In order to intensify the pressure after filling with the ratio 1:4, this valve has to be discharged in the low-pressure area to the reservoir after pressure built-up. This timing will be determined by a pressure switch mounted in the low-pressure area between the valve and the intensifier.

To unclamp the hydraulic cylinder, the low-pressure port is discharged to the reservoir and the control port "Z" is connected to pressure. The piston of intensification moves to its off-position and the check valve opens.

Note

Option: the pressure switch can be mounted in the high-pressure range to effect an active pressure monitoring for machine tool interlock.

8.4.2 Hydraulic diagram for type D8753-201

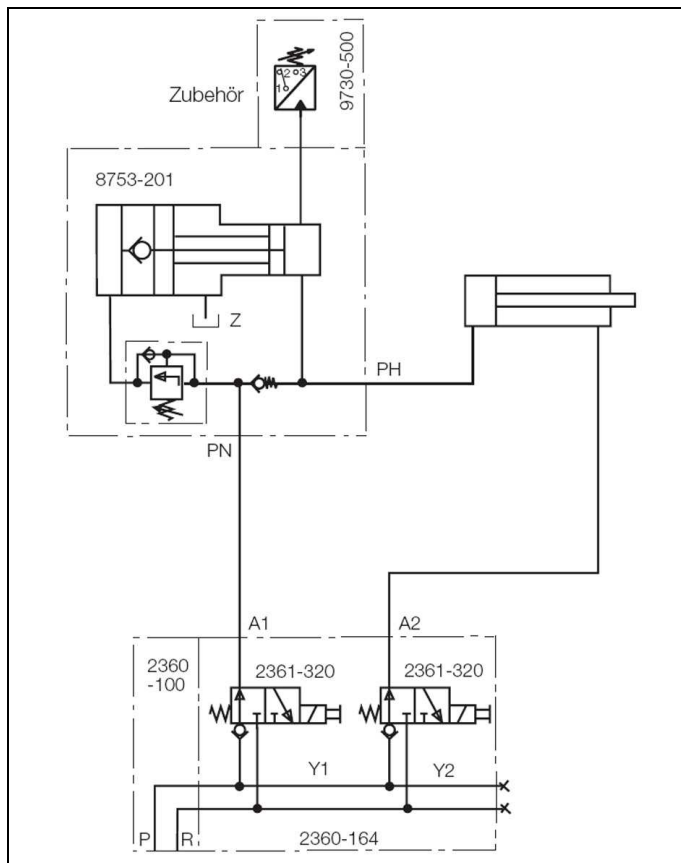


Figure 6: Hydraulic diagram type D8753-201

Intensifier 8753-201 is used for double-acting hydraulic elements.

For filling in the low-pressure range, oil flows through the incorporated check valve to the cylinder.

The intensifier will be only activated, if the adjusted opening pressure at the integrated sequence valve is exceeded.

The opening pressure should be approx. 80-90% of the max. low-pressure. The returning oil during unclamping of the cylinder presses the piston of intensification in its off-position and opens the check valve in the piston. Via this valve the oil returns to the reservoir.

The function group intensifier/hydraulic cylinder is switched like a double-acting cylinder, i.e. without further control elements by two assigned 3/2 directional control valves.

Note

The pressure switch which can be retrofitted in the high-pressure range is used for pressure monitoring for machine tool interlock.

8.4.3 Hydraulic diagram for type D8753-202 and -203

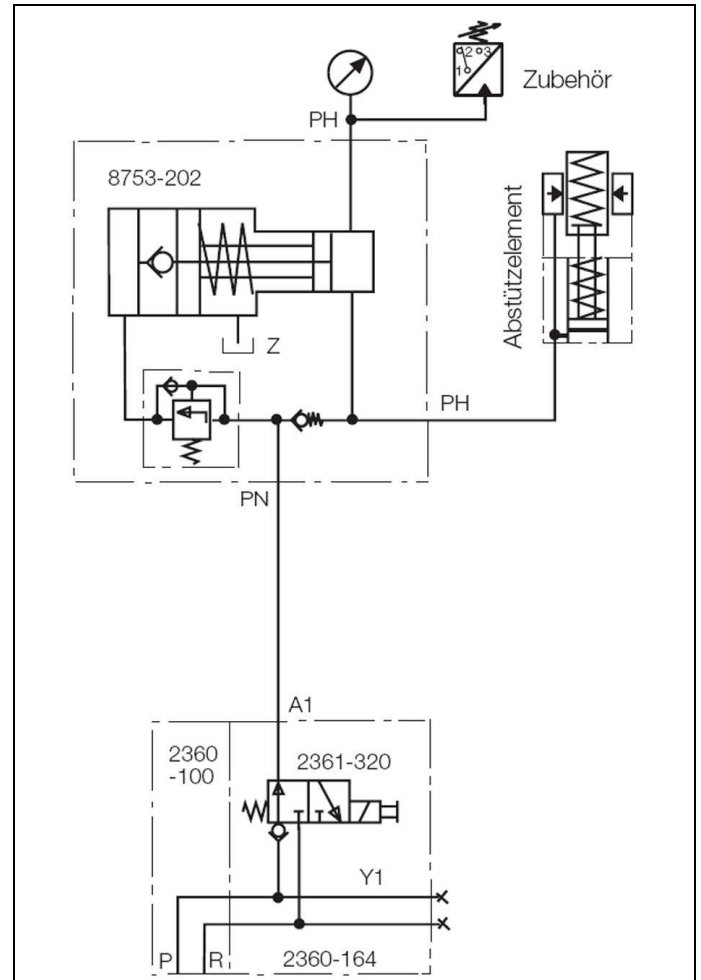


Figure 7: Hydraulic diagram type D8753-202 and -203

The single-acting intensifiers 8753-202 and 8753-203 are used for operation of single-acting hydraulic elements e.g. work supports.

For filling in the low-pressure range, oil flows through the incorporated check valve to the cylinder. The intensifier will be only activated, if the adjusted pressure at the integrated sequence valve is exceeded.

This opening pressure is not adjustable and is approx 60 bar for 8753-202 and approx. 40 bar for 8753-203. The operating pressure on the low-pressure side should be at least 10 bar above this opening pressure. Both versions generate on the high-pressure side a pressure that is 3.85 times higher than the pressure on the low-pressure side.

During unclamping the piston will be returned by an installed spring. The check valve will be opened in the off-position and the connected cylinders return also to their off-position.

By means of an additional pressure gauge the high-pressure part can be controlled.

Note

An additional pressure switch monitors the pressure for machine tool interlock.

9 Operation

WARNING

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

Improper connection and use can lead to escapes of oil under high pressure at the seals.

- Mounting or dismounting of the element must only be made in depressurised mode.
- Fixing has to be made in an appropriate way.

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

Wear, damage of the seals, ageing and incorrect mounting of the seal kit by the operator can lead to escapes of oil under high pressure.

- Before using them make a visual control.

CAUTION

Component damage or malfunction due to pressure on oil tank!

Oil reservoir can be damaged!

- Open oil filler / bleeding screw one revolution, so that a pressure compensation takes place.
- When using the types with vent port "Z", make sure that no liquid is sucked.
- The hydraulic system has to be bled completely!
- It is imperative to check the high-pressure range by a pressure gauge!
- Intensifier is delivered without oil filling. After connecting the cylinder, the oil reservoir can be filled. Swarf or contamination in the hydraulic oil lead to increased wear or damage at the guides, running surfaces and seals.
- Use hydraulic oil as per ROEMHELD data sheet A 0.100.

Note

Procedures, see individual sections.

10 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!

Note

Operating instructions

- Further operating instructions for individual components are available in the internet (www.ROEMHELD.com) or on request!

10.1 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

10.2 Regular checks

Checks by the operator have to be effected as follows:

10.2.1 Daily checks

- Check all fixing screws, retighten if required.
- Check all cable fixings and fittings, 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,).

10.3 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.

The following cleaning works have to be effected daily at the mechanical components:

- Clean the product only with cleaning clothes.
- Afterwards lubricate slightly movable components (piston rods, guides etc.) and not coated steel components.

11 Trouble shooting

Trouble	Cause	Remedy
Pressure will not be built up	Oil volume is not sufficient.	Check oil volume and refill oil, if necessary
	Internal seal damaged.	⚠ Caution ! Repair only by ROEMHELD service personnel. Return for repair.
	Replenishing of oil is not possible.	Open oil filling screw (a) by one revolution
	Air in the hydraulic system	Bleeding

12 Technical characteristics

Technical characteristics type 8753-200 and -201

Type	D8753-200	D8753-201
Sequence valve	without	with
Transmission ratio	1:4	1:4
High-pressure side		
Max. operating pressure [bar]	500	500
Low-pressure side		
Max. operating pressure [bar]	125	125
Max. flow rate [l/min]	8	8
Intensification volume [cm ³]	21	21
Part-no.	8753-200	8753-201

Technical characteristics type 8753-202 and -203

Type (part-no.)	D8753-202	D8753-203
Intensification ratio	1:3.85	1:3.85
Low-pressure side		
Sequence pressure [bar]	approx. 60	approx. 40
Min. operating pressure [bar]	70	50
Max. operating pressure [bar]	130	130
High-pressure side		
Min. operating pressure [bar]	270	190
Max. operating pressure [bar]	500	500
Max. flow rate [l/min]	8	8
Usable oil volume [cm ³]	21	21
Part-no.	8753-202	8753-203

* Minimum pressure of machine hydraulics

Hydraulic fluids

Note

Hydraulic fluids

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

Purity of the hydraulic fluids

The admissible contamination (unsolved impurities in the hydraulic fluid) depends on the component of the hydraulic system that is most sensitive to dirt. The indicated purity class is the maximally admissible value that should not be exceeded, with regard to the operating safety (clogging of gaps, orifices as well as the locking of the control piston) and the service life (wear reduction).

Note

- Please note that a new hydraulic fluid "on tap" does not meet the requirements of cleanness. If necessary, use cleaned oil.
- By mixing different types of fluid, it can occur under certain circumstances unwanted chemical reactions with sludging, gumming or similar.
- Therefore, the respective manufacturers should be consulted for a change between different hydraulic fluids.
- In any case, the entire hydraulic system is to be rinsed thoroughly.

Recommendation:

The use of hydraulic filter is recommended.
(see data sheet F 9.500)

13 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.

14 Declaration of manufacture

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Declaration of manufacture of the products

Hydraulic intensifiers as per data sheet D 8.753. The following types or part numbers are concerned:

Hydraulic intensifiers

- 8753 200, 201, 202, 203

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.

14.1 List of the applied standards

2006/42/EC Machinery Directive

2001/95/EC, General product safety

92/58/EEC, Minimum requirements for the provision of safety and/or health signs at work

89/391/EEC, Introduction of measures to encourage improvements in the safety and health of workers at work

89/655/EEC, Minimum safety and health requirements for the use by workers of personal protective equipment at the workplace

Operating safety regulations (BetrSichV) for the transposal of the directive on the introduction of measures to encourage improvements in the safety and health of workers at work. (German implementation of the Work Equipment Directive 89/655/EEC)

Product Safety Act - PSG; November 2011

DIN EN ISO 12100, 2011-03, Safety of machinery; Basic concepts, General principles for design (replacement for part 1 and 2)

DIN EN ISO 14121-1, 2007-12, Safety of machinery- Risk assessment- Part 1: Principles

DIN EN ISO 13732-1, 2008-12, Ergonomics of the thermal environment - Methods for the assessment of human responses to contact with surfaces - Part 1: Hot surfaces

DIN EN 614-1 a. 2, 2009-06, Safety of machinery - Ergonomic design principles

DIN EN 626-1, 2008-09, Safety of machinery - Reduction of risks to health from hazardous substances emitted by machinery

DIN EN ISO 13849-1, 2008-12, Safety of machinery - Safety-related parts of control systems - General principles for design

DIN EN ISO 13849-2, 2008-09, Safety of machinery - Safety-related parts of control systems - Validation

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

DIN EN ISO 11201, 2009-11, Acoustics - Noise emitted by machinery and equipment - Measurement of emission sound pressure levels at a work station

DIN EN 60073; 2003-05, Basic and safety principles for man-machine interface

DIN EN 61310-1; 2008-09, Safety of machinery - Indication, marking and actuation. Requirements on signals

DIN EN 81714-2, 2007-08, Design of graphical symbols for use in the technical documentation of products

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Römheld GmbH

Friedrichshütte

Laubach, 28.03.2013

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