



## Position flexible clamps

### double acting, separate locking port



### 1 Description of the product

The position flexible clamp is a small vice with two movable jaws, which are operated by a common hydraulic port. Independently of its position within the clamping area, the workpiece will be clamped nipper-like (floating).

By means of a separate locking port, both jaws are hydraulically locked. The clamped workpiece can no longer "float", if the machining forces are introduced.

Oil supply to the locking port can be controlled by a sequence valve or a second clamping circuit.

### 2 Validity of the documentation

This document applies to the following products:

Position flexible clamp of data sheet B1.732. The following types or part numbers are concerned:

- 4412-974

### 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.

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## 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.

### **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 for information and avoidance of dangers when installing the products into the machine as well as information and references for transport, storage 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 products can be guaranteed.

Furthermore, the consideration of the operating instructions will:

- avoid injuries
- reduce down times and repair costs,
- increase the service life of the products.

### 5.2 Safety instructions

The product was manufactured in accordance with the generally accepted rules of the technology.

Observe the safety instructions and the operating instructions given in this manual, in order to avoid personal damage or material damage.

- Read these operating instructions thoroughly and completely, before you work with the product.
- Keep these operating instructions so that they are accessible to all users at any time.
- Pay attention to the current safety regulations, regulations for accident prevention and environmental protection of the country in which the product will be used.
- Use the ROEMHELD product only in perfect technical condition.
- Observe all notes on the product.
- Use only accessories and spare parts approved by the manufacturer in order to exclude danger to persons because of not suited spare parts.
- Respect the intended use.
- You only may start up the product, when it has been found that the incomplete machine or machine, in which the product shall be mounted, corresponds to the country-specific provisions, safety regulations and standards.

- Perform a risk analysis for the incomplete machine, or the machine.  
 Due to the interactions between the product and the machine/fixture or the environment, risks may arise that only can be determined and minimized by the user, e.g. :  
 - generated forces,  
 - generated movements,  
 - Influence of hydraulic and electrical control,  
 - etc.

## 6 Application

### 6.1 Intended use

The products are used in industrial/commercial applications to transform hydraulic pressure to a movement and /or force. They must only be operated with hydraulic oil.

In addition, use in compliance with the intended purpose includes:

- Use within the capacity limits specified in the technical data (see data sheet).
- Use as described in this operating manual.
- Compliance with maintenance intervals.
- Qualified and trained personnel for the corresponding activities.
- Mounting of spare parts only with the same specifications as the original part.
- Only HLP hydraulic oils may be used.
- Only clamping jaws may be moved.

### 6.2 Misapplication

#### **WARNING**

#### **Injuries, material damages or malfunctions!**

Modifications can lead to weakening of the components, reduction in strength or malfunctions.

- Do not modify the product!

The use of these products is not permitted:

- For domestic use.
- For the use on fun fairs and in amusement parks.
- In food processing or in areas with special hygiene regulations.
- In mines.
- In ATEX areas (in explosive and aggressive environments, e.g. explosive gases and dusts).
- If chemically acting media damage the seals (seal material durability) or components and thereby functional failure or premature failure could occur.

**Special solutions are available on request!**

## 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.

#### **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.

#### **Poisoning due to contact with hydraulic oil.**

Wear, damage of the seals, aging 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.

#### **Injury by dropping parts!**

Some products have a heavy weight and can cause injury when dropping.

- Transport products professionally.
- Wear personal protection equipment!

Weight specifications see chapter "Technical characteristics".

### **NOTE**

#### **Aggressive cutting fluids**

If aggressive cutting fluids and coolants with swarf can penetrate in the area of the clamping jaws of single-acting fixture clamps, this has to be prevented by the customer.

#### **Smooth running**

Pay attention to smooth running when mounting!

### 7.1 Design

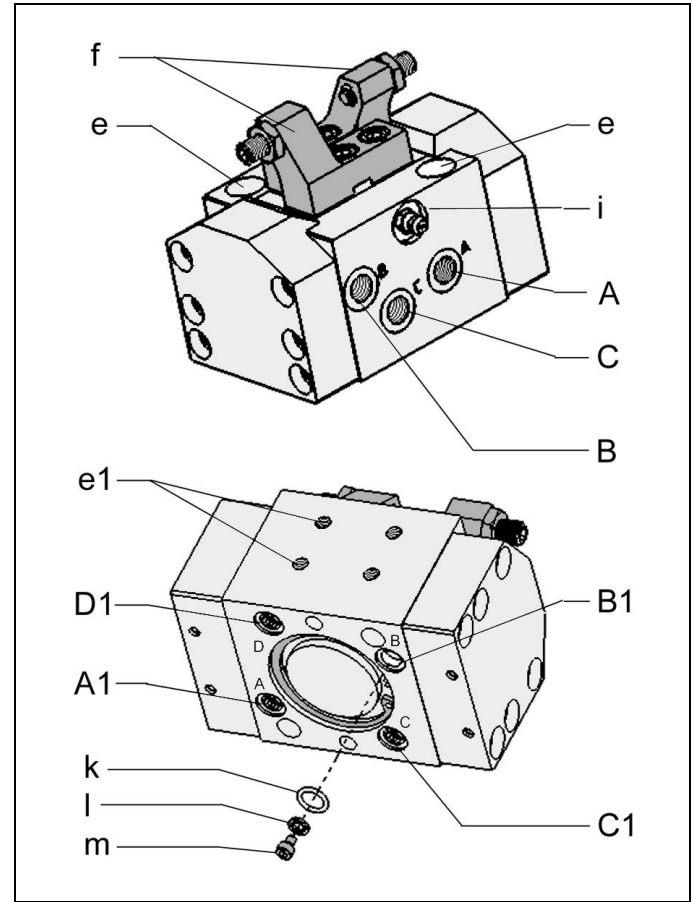


Figure 1: Components

|                                                       |                                      |
|-------------------------------------------------------|--------------------------------------|
| e Mounting holes                                      | A1 Clamping, for manifold mounting   |
| e1 Mounting thread                                    | B1 Unclamping, for manifold mounting |
| f Clamping lever with ball pressure screw (accessory) | C1 Locking, for manifold mounting    |
| i Lubricating nipple                                  |                                      |
| k O-ring (accessory)                                  |                                      |
| l Sealing ring                                        |                                      |
| m Socket head cap screw                               |                                      |

## 7.2 Mounting types

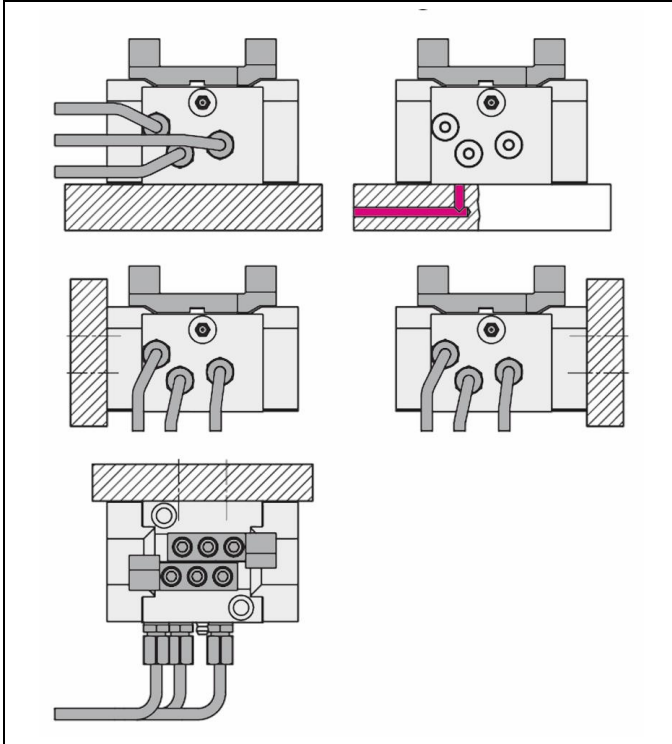


Figure 2: Installation and connecting possibilities

The position flexible clamping element, can be fixed alternatively at the bottom or at the back. It can also be fixed at both sides. For this purpose per screw row two of the three available screws have to be removed and replaced by the fixing screws (dimensions see data sheet). For manifold mounting remove socket head cap screws with sealing rings and screw-in plugs G 1/8 in the body. O-rings and screw plugs see accessories (see data sheet).

## 7.3 Admissible oil flow rate

### **WARNING**

#### Injury due to overload of the element

High-pressure injection (squirting out of hydraulic oil under high pressure) or flying components!

- Due to throttling or closing of ports a pressure intensification can occur.
- Connect the ports professionally!

### **CAUTION**

#### Malfunction or early failure

Exceeding the max. flow rate can lead to overload and premature failure of the product..

- The maximum flow rate must not be exceeded!

### 7.3.1 Throttling of the flow rate

The throttling always has to be effected in the supply line to the element. Only thus pressure intensification and thereby pressures exceeding the operating pressure are avoided. The hydraulic circuit diagram shows flow control valves which allow oil return from the element without any impediments.

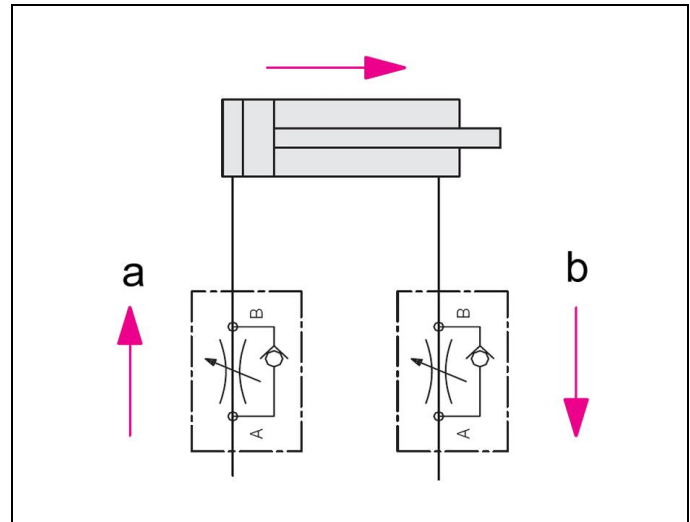


Figure 3: Hydraulic circuit diagram without flow control valves

|                        |             |
|------------------------|-------------|
| a Throttling direction | b Free flow |
|------------------------|-------------|

If a return-flow throttling is required due to a negative load, it must be guaranteed that the max. operating pressure (see technical characteristics) will not be exceeded.

## 7.4 Installation of pipe-mounted types

1. Clean the support surfaces.
2. Fasten the element support at the flange surface (see figure "Mounting types").

### **NOTE**

#### Tightening torques

- The tightening torques for the fixing screws have to be designed with reference to the application (e. g. as per VDI 2230).

Proposals and approximate values for the tightening torques see chapter "Technical characteristics".

## 7.5 Installation of manifold-mounted types

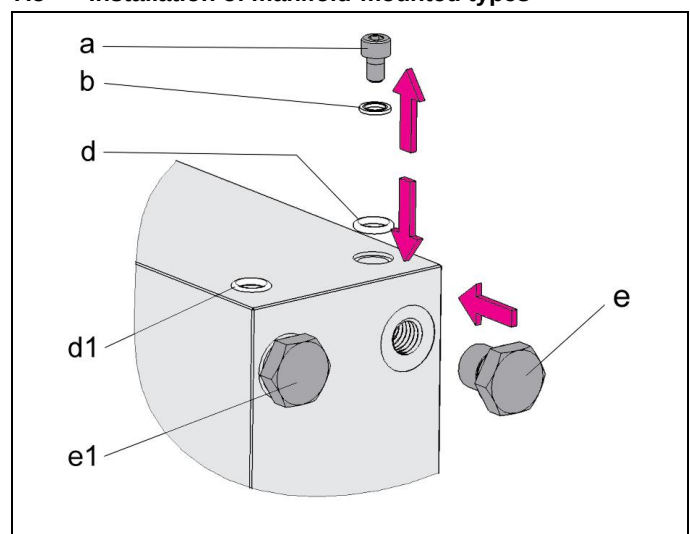


Figure 4: Example of the preparation for hydraulic ports without pipes

## NOTE

### Arrangement of the ports

- The figure shown is a schematic sketch. The arrangement of the ports depends on the respective product (see chapter Design).

|                                                |                          |
|------------------------------------------------|--------------------------|
| a Socket head cap screw                        | d1 Mounted O-ring        |
| b Sealing ring                                 | e Screw plug (accessory) |
| d O-ring (accessory, according to the version) | e1 Mounted screw plug    |

- Drill the holes for hydraulic oil supply and return in the fixture (see also data sheet or installation drawing).
- Grind or finish mill flange surface ( $Ra \leq 0.8$  and a flatness of 0.04 mm to 100 x 100 mm. Marks, scratches, shrink holes are not admissible on the surface.)

For some versions:

- Remove socket head cap screws and sealing rings. Insert O-rings (accessory, if required).
  - Seal pipe ports with screw plug (accessory, if required)
- Clean the support surfaces.
  - Position and fix on the fixture.
  - Install bleeding screws at the upper ends of the piping.

## NOTE

### Tightening torques

- The tightening torques for the fixing screws have to be designed with reference to the application (e. g. as per VDI 2230).

Proposals and approximate values for the tightening torques see chapter "Technical characteristics".

## 7.6 Connection of the hydraulic equipment

### CAUTION

#### Work by qualified personnel

- Works only to be effected by authorised personnel.

- 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 bled

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

## 8 Start up

- Check tight seating (check tightening torque of the fixing screws, see chapter "Technical characteristics").
- Check tight seating of hydraulic connections (check tightening torque of the hydraulic connections, see chapter "Technical characteristics").
- Bleed the hydraulic system.

## NOTE

### Clamping time

- Without bleeding the clamping time will be considerably prolonged and function problems may occur.

### 8.1 Bleeding of pipe-mounted types

- Loosen carefully at low pressure union nut of the pipe at the hydraulic ports.
- Pump until bubble free oil comes out.
- Fasten union nuts of the pipe.
- Check tightness.

### 8.2 Bleeding of manifold-mounted types

- Loosen carefully the bleeding screws of the fixture at low pressure.
- Pump until bubble free oil comes out.
- Fasten the bleeding screws.
- Check correct function.
- Check sealing of the hydraulic connections!

## Note

Pay attention to identical stroke of both clamping jaws. Already 2 mm difference in stroke can cause an one-sided displacing force of 10 N onto the workpiece.

## 9 Maintenance

### WARNING

#### Burning due to hot surface!

During operation, surface temperatures on the product can exceed 70°C.

- Maintenance and repair work should only be performed in a cooled down condition and/or with protective gloves.

### Note

The upper face of the position flexible clamping element has to be checked from time to time with regard to contamination by swarf and cleaned, if required.

#### 9.1 Plan for maintenance

| Maintenance works   | Interval                                                                                                                                                                                                                  | Realisation                                                                                                                                                                                                                                             |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cleaning            | As required<br>With increased dirt and coolant ingress more frequently!                                                                                                                                                   | Operator                                                                                                                                                                                                                                                |
| Regular checks      | daily                                                                                                                                                                                                                     | Operator                                                                                                                                                                                                                                                |
| Regular lubrication | Every 50,000 clamping cycles, lubricate with RENOLIT HLT 2 * through lubricating nipple (i) or connection (D1).<br><br>► <b>Note</b><br>With increased dirt and coolant ingress lubrication must be made more frequently! |  <b>Caution !</b><br>If this lubrication will not be made, this can lead to a failure or interference of the floating clamping!<br><br>Operator or central lubrication |
| Repair              |                                                                                                                                                                                                                           | Qualified personnel                                                                                                                                                                                                                                     |

- \* Brand name  
Description as per DIN 51 502: KPHC 2 N-40.  
Description as per ISO 6743-9: ISO-L-X-DDHB 2

#### 9.2 Cleaning

### CAUTION

#### Material damage, damage to moving components

Damage to piston rods, plungers, bolts, etc., as well as wipers and seals can lead to leakage or premature failure!

- Do not use cleaning agents (steel wool or similar) that cause scratches, marks or the like.

#### Material damage, damage or functional failure

Aggressive cleaning agents can cause damage, especially to seals.

The product must not be cleaned with:

- corrosive or caustic substances or
- organic, solvents such as halogenated or aromatic hydrocarbons and ketones (cellulose thinner, acetone, etc.).

The element must be cleaned at regular intervals. Especially the clamping slide and the housing have to be cleaned of swarf and other liquids.

In the case of heavy contamination, the cleaning has to be made in shorter intervals.

#### 9.3 Regular checks

1. Check tightness of hydraulic connections (visual control).
2. Leakage control at the housing and the clamping slide.
3. Clamping force control by pressure control.
4. Check the observance of the maintenance intervals.

#### 9.4 Exchange seal kit

The exchange of the seal kit is made in case of external leakages. For high availability, the seals have to be changed at the latest after 1,000,000 cycles or 2 years.

The seal kit is available as spare part. An instruction for the exchange of the seal kit is available on request.

### NOTE

#### Seal Kits

- Do not install seal kits which were exposed to light for a longer time.
- Pay attention to the storage conditions (see chapter "Technical characteristics").
- Only use original seals.

## 10 Trouble shooting

| Trouble                                                         | Cause                                                                                                                                          | Remedy                                                                                                         |
|-----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Clamping unit does not approach                                 | <ul style="list-style-type: none"> <li>• Clamping unit is dirty</li> <li>• Swarf jammed between the clamping unit and mounting body</li> </ul> | <ul style="list-style-type: none"> <li>• Clean and grease</li> <li>• Remove swarf, clean and grease</li> </ul> |
| Clamping unit has too much play:                                | Guide worn out                                                                                                                                 | Exchange clamping claw, exchange component, if required.                                                       |
| Clamping pressure reduces due to leakages at the fixture clamp: | Wear at the seals                                                                                                                              | Renew seals.                                                                                                   |
| Clamping unit does not firmly clamp during machining:           | Locking of the clamping unit does not function.                                                                                                | <ul style="list-style-type: none"> <li>• Check connections</li> <li>• Renew seals.</li> </ul>                  |

## 11 Accessory

### NOTE

#### Accessories

- See data sheet.

## 12 Technical characteristics

### General characteristics

| Type     | Maximum operating pressure<br>[bar] | Maximum clamping force<br>[kN] | Maximum retention force<br>[kN] |
|----------|-------------------------------------|--------------------------------|---------------------------------|
| 4412 974 | 250                                 | 7                              | 4                               |

**Proposal, tightening torques for screws of tensile strength 8.8, 10.9, 12.9**

### NOTE

The indicated values are approximate values and have to be interpreted according to the user's application!  
See note!

| Thread | Tightening torque<br>[Nm] |      |      |
|--------|---------------------------|------|------|
|        | 8.8                       | 10.9 | 12.9 |
| M3     | 1,3                       | 1,8  | 2,1  |
| M4     | 2,9                       | 4,1  | 4,9  |
| M5     | 6,0                       | 8,5  | 10   |
| M6     | 10                        | 15   | 18   |
| M8     | 25                        | 36   | 45   |
| M10    | 49                        | 72   | 84   |
| M12    | 85                        | 125  | 145  |
| M14    | 135                       | 200  | 235  |
| M16    | 210                       | 310  | 365  |
| M20    | 425                       | 610  | 710  |
| M24    | 730                       | 1050 | 1220 |
| M30    | 1,450                     | 2100 | 2450 |

**Note:** Valid for workpieces and set screws made of steel with metric thread and connecting surface dimensions as per DIN 912, 931, 933, 934 / ISO 4762, 4014, 4017, 4032  
In the table values for tightening torques the following is considered:  
Design steel/steel, friction value  $\mu_{ges} = 0.14$  - not oiled, utilisation of the minimum yield point = 90%.

### NOTE

#### Further information

- For further technical data see ROEMHELD data sheet. B1732

## 13 Storage

### CAUTION

#### Damage due to incorrect storage of components

In case of improper storage, the seals can embrittle and resinification of the anti-corrosive oil or corrosion on/in the element can occur.

- Storage in the packaging and moderate environmental conditions.
- The product must not be exposed to direct sunlight, since UV light may cause serious damage to the seals.

The elements are tested by default with mineral oil. The exterior of the elements is treated with a corrosion inhibitor.

The oil film remaining after the test provides for a six-month interior corrosion protection, if stored in dry and uniformly tempered rooms.

For longer storage times, the element has to be filled with a non-resinifying corrosion inhibitor and the outside surfaces must be treated.

## 14 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.

## **15 Declaration of manufacture**

### **Manufacturer**

Römheld GmbH Friedrichshütte  
Römheldstraße 1-5  
35321 Laubach, Germany  
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E-mail: [info@roemheld.de](mailto:info@roemheld.de)  
[www.roemheld.com](http://www.roemheld.com)

### **Responsible person for the documentation:**

Dipl.-Ing. (FH) Jürgen Niesner, Tel.: +49(0)6405 89-0.

### **Declaration of manufacture of the products**

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, 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.

Laubach, 02.01.2024