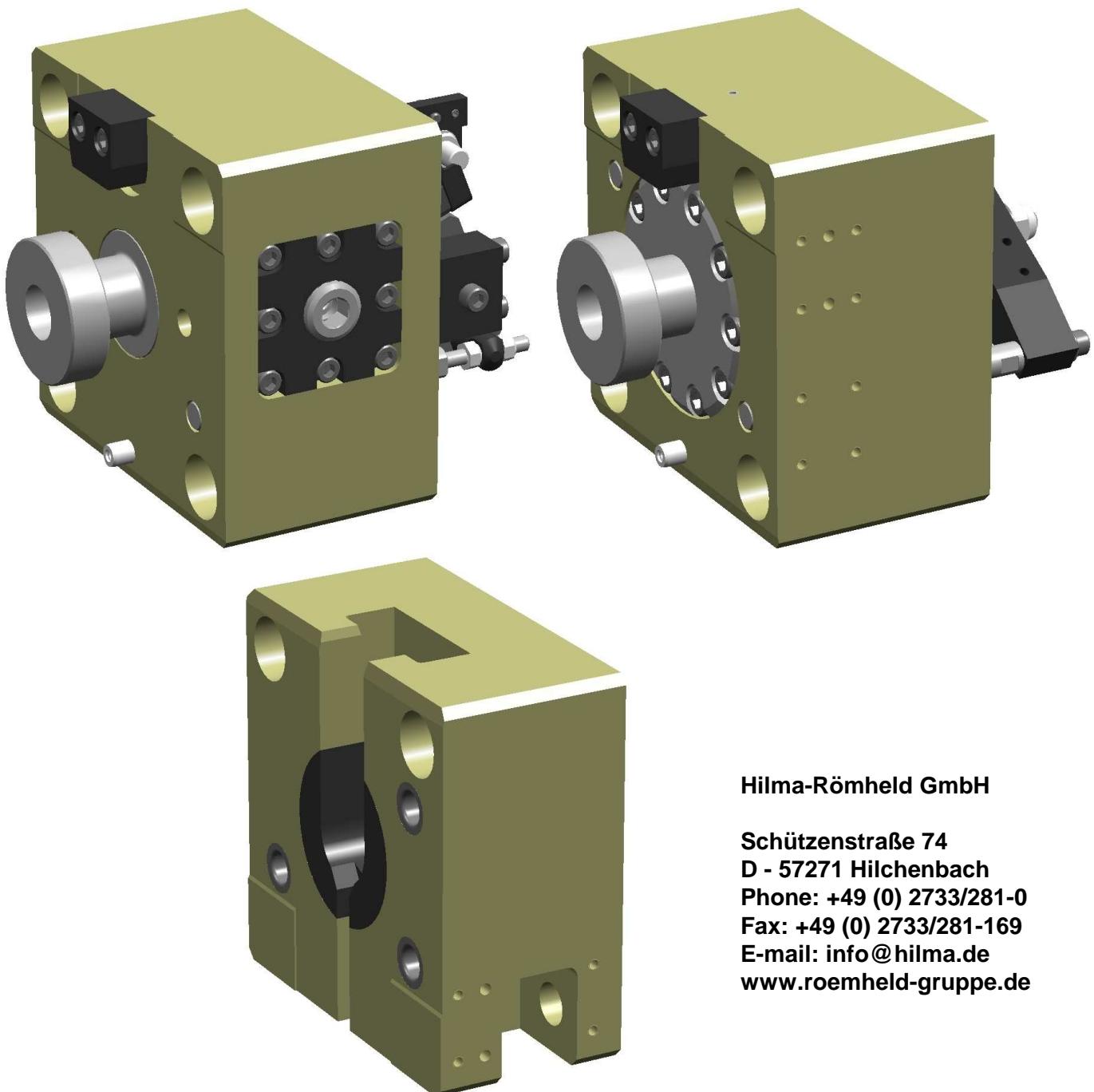


# Operating manual

Including installation instructions  
for incomplete machines as per Machinery directive 2006/42/EG

**hydraulic grip rail coupling**  
with mechanical locking  
**mechanical grip rail coupling**

Type 292x  
Type 291x



Hilma-Römhled GmbH

Schützenstraße 74  
D - 57271 Hilchenbach  
Phone: +49 (0) 2733/281-0  
Fax: +49 (0) 2733/281-169  
E-mail: [info@hilma.de](mailto:info@hilma.de)  
[www.roemheld-gruppe.de](http://www.roemheld-gruppe.de)



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**In order to ensure safe operation of the equipment for its intended purpose, please read the operating manual before installation and before putting the system into operation for the first time!**

### 1 General information, safety information and manufacturer's declaration

#### 1.1 General

Hilma-Römheld grip rail couplings have been thoroughly checked. They are designed for use as specified in the technical data. If the technical instructions are not observed, the safety of the operator and the proper functioning of the machine may be put at risk. Unauthorised modification or alterations to Hilma-Römheld grip rail couplings are prohibited for reasons of safety. If this instruction is not observed, our guarantee will be invalid.

#### 1.2 Field of application

Hilma-Römheld grip rail couplings are designed for the non-positive and form-fit fastening of grip rails to presses. Operation of grip rail couplings remote from the press or similar machines is not permitted.

In the unclamping position the tie rod is extended (and the depending on version existing centering pins are retracted) thus allowing the interchangeable rail to be inserted or extracted.

In the clamping position the tie rod is retracted (and the depending on version existing centering pins are extended to center the two halves of the coupling).

The grip rail coupling is fastened to the grip rail. It is hydraulically and electrically ready for connection as far as the 'grip rail coupling - machine' interface.

#### 1.3 Operating characteristics

Hilma Römheld grip rail couplings must not be exposed to higher loads than those specified. The maximum operating pressure must not be exceeded.



## **1.4 Temperatures**

The maximum operating temperature for the standard version is 70 °C; for higher temperatures special versions must be used.

## **1.5 Important safety information**

- Install the hydraulic system only using suitable connecting elements (see chapter 4 'Installation').
- Fasten screws by applying the specified tightening torque (see chapter 4 'Installation').
- Installation and repair work must only be carried out with no pressure in the system.
- Do not exceed specified operating pressures and temperatures.
- Never put hands or tools into the moving area of the grip rail coupling during clamping and unclamping. **Danger of being squeezed!!!**
- At other times, hydraulic pressure must be maintained, in line with machine directive 2006/42/EG and for general safety.

Before putting the elements into operation, the operator must be fully trained.

Young people under 16 years old must not be allowed to operate the clamps. Staff over 16 years old are permitted to operate the consoles under supervision as part of their apprenticeship. The operating instructions must be readily accessible. The operator must inform any third parties involved of any danger in the working area.

## **1.6 Manufacturer's declaration**

The grip rail couplings have been developed, designed and manufactured in accordance with the "Machinery" directive 2006/42/EC, and they are intended, as incomplete machine, for installation in a machine.

## **2 Design and function**

### **2.1 Design**

The grip rail couplings consist of 2 main subassemblies (the two halves of the coupling):

1. The active part including the clamping and locking mechanism, (depending on version centering pins) and position control is for connection to the grip rail on the machine.
2. The passive part without any moving parts is for installation on the interchangeable rail.

Automatic couplings provided on the active and the passive parts (optional) ensure, safe supply of operating media to the equipment fastened to the interchangeable rail.

### **2.2 Function**

- Clamping

In the unclamping position the tie rod on the active part is extended. The centering pins are retracted into the housing. The signal 'unclamping position' is energised.

When inserting the active part into the passive part, the two coupling halves are roughly positioned using guide elements.

#### **Hydraulic design**

When pressure is applied to port 'A', the depending on version existing centering pins extend and centre the active and the passive part to each other. Simultaneously, the tie rod is pulled back towards the clamping point and pulls the two coupling halves together. The signal 'unclamping position' goes out.

Once the clamping position has been reached, the clamping force will be built up by the clamping and locking mechanism. Then the tie rod is mechanically self-locked. The 'clamping position' signal is energised.

If the clamping position is overtravelled or clamping is carried out without a die, the 'clamping position' signal goes out.

- Unclamping

When pressure is applied to port 'B', the clamping and locking mechanism is released and the tie rod moves from the clamping edge towards the unclamping position. The 'clamping position' signal goes out.

Simultaneously, the depending on version existing centering pins are retracted into the active part. The 'unclamping position' signal is energised.



### Mechanical design

When turning the drive spindle in clockwise the depending on version existing centering pins extend and centre the active and the passive part to each other. Simultaneously, the tie rod is pulled back towards the clamping point and pulls the two coupling halves together. The signal 'unclamping position' goes out.

Once the clamping position has been reached, the clamping force will be built up by torque the spindle. Then the tie rod is mechanically self-locked. The 'clamping position' signal is energised.

If the clamping position is overtravelled or clamping is carried out without a die, the 'clamping position' signal goes out.

#### - Unclamping

When turning the drive spindle in counterclockwise, the clamping and locking mechanism is released and the tie rod moves from the clamping edge towards the unclamping position. The 'clamping position' signal goes out.

Simultaneously, the depending on version existing centering pins are retracted into the active part. The 'unclamping position' signal is energised.

The unclamping and clamping positions are controlled by inductive proximity switches.

## 3.0 Technical data, main dimensions

### TGrip rail coupling

Clamping force	See drawing
Operating pressure (hydraulic)	60 bar
Clamping torque (mechanical)	See drawing
Max. volume flow	2.5 dm <sup>3</sup> /min
Oil requirement clamping/unclamping	See drawing
Centering repeating accuracy	± 0.02 mm with centering pins (± 0.15 mm w/o centering pins)
Max. axial shift	± 2 mm with centering pins
Clamping stroke tie rod	3 mm
Total stroke tie rod	See drawing
Stroke positioning pins	See drawing
Pull-back force centering pins	See drawing
Masse (ohne Medienkupplungen)	See drawing

### Inductive proximity switches

Manufacturer	Balluff
Type	BES 516-325-E5-C-S4
	BES Z04E-PSD10Z-EV00,2-504
Voltage	24 (10-30) V DC

### Hydraulic interface

Port A	G1/4" for clamping
Port B	G1/4" for unclamping

### Mechanical interface

Hexagon socket or TORX for clamping and unclamping	See drawing
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Drawings with further technical data and dimensions on request.



#### 4 Installation, connection and commissioning

When installing the incomplete machine 'Grip rail coupling' the following minimum conditions must be met, in order to ensure that it can be assembled together with other components to form a complete machine without risk to the health and safety of personnel:

##### **4.1 Installation, connection and commissioning**

- Installation work must only be carried out when the system is unpressurized.
- Hole pattern as per drawing and data sheet, respectively..
- Fasten the active part to the grip rail on the machine using appropriate screws.
- After alignment, tighten the screws by applying the tightening torque as per DIN.
- Roughly fasten the passive part to the interchangeable rail using screws or stay bolts and hexagon nuts
- Put the coupling halves together and clamp them.
- After alignment of the interchangeable rail, fasten screws and hexagon nuts on the passive part by applying the tightening torque as per DIN

For the fastening pattern, see drawing in chapter 3 (Technical data, main dimensions)

##### **4.2 Hydraulic installation**

The hydraulic pipework on the machine side must have an adequate size (8x1; 5 DIN 2391-St35 NBK or larger), must be installed in accordance with the specifications (DIN EN ISO 4413) and must conform to up-to-date practice for high-pressure hydraulics.

Pipes should be as short as possible; pipe bends should have a large radius.

Neat installation is essential for trouble-free operation of the system. Make sure that the pipe ends are free from burrs and that pipes, high-pressure hoses and screw fittings are cleaned and blown through.

Plugs should only be removed just before making the connection.

##### **4.3 Electrical installation**

Plug-in connections - proximity switches

BES 516-325-E5-C-S4	
Unclamping position	brown +
	blue -
Signal S1	white
Clamping position	brown +
	blue -
Signal S2	white

mechanical grip rail coupling

BES Z04E-PSD10Z-EV00,2-504 Twin-Set	
	Pin 1 + (brown)
	Pin 3 - (blue)
Signal S1 Clamping pos.	Pin 4 (black)
Signal S2 Unclamping pos.	Pin 2 (white)

hydraulic grip rail coupling

BES Z04E-PSD10Z-EV00,2-504 Twin-Set	
	Pin 1 + (brown)
	Pin 3 - (blue)
Signal S1 Unclamping pos.	Pin 4 (black)
Signal S2 Clamping pos.	Pin 2 (white)

#### 4.4 Commissioning

Read the operating manual before commissioning!

Fit the pressure generator with a pressure control valve adapted to the operating pressure.

Secure the working area.

Only use clean, new oil. Bleed the complete system with the pump running at low pressure (=20 bar) from the highest point until the oil emerging is free from bubbles

Set the operating pressure (60 bar) on the hydraulic unit.

Limit the volume flow to 2.5 dm<sup>3</sup>/min.

Clamp and unclamp the element several times. Check whether clamping and unclamping is carried out without any trouble. Check the function of the proximity switches for the unclamping and clamping position.

Check the hydraulic installation for tightness. Visually check all pipes, hoses, screw fittings and clamping elements under pressure.



**ATTENTION:** When clamping and unclamping operations are carried out, keep your hands well away from the moving range of the clamping elements. **DANGER OF INJURY!!**

**Control:**

In the case of clamping and unclamping, a hunting period of the power unit of up to 10 seconds after reaching of the operating pressure (60 bar) must be provided for, in order to ensure the application of the full clamping force and complete locking of the clamping and locking element!

#### 5 Trouble shooting

The grip rail coupling has left our premises in perfect condition. All functions have been tested, and necessary adjustments have been made.

If any malfunction should occur even though the conditions stipulated in chapter 4.0 (Installation and commissioning) have been duly observed, please try to establish the cause using the table below:

Fault	Cause	Remedial action
The clamping pressure is not maintained, the pump is frequently switched on.	Loose screw fitting / hydraulic connection.  Seals worn.	Identify leakage points and tighten screw fittings with no pressure in the system, replace if necessary. Have seals changed by specialised staff or send the active part for repair.
The proximity switch ' <i>Unclamping position</i> ' does not trigger.	Voltage supply / Signal return line interrupted.  Proximity switch / cable defective.	Check / repair all plug-in connections, contacts and cables, proximity switches and cables (see chapter 6 'Maintenance and repair')
The active part does not clamp / lock.	Power unit switches off before locking is completed.  Not enough clamping torque	Follow-up time of the power unit too short (see chapter 4.4 'Commissioning / control) Check clamping torque
The proximity switch ' <i>Parking position</i> ' does not trigger.	Voltage supply / Signal return line interrupted.  Proximity switch / cable defective.	Check / repair all plug-in connections, contacts and cables, proximity switches and cables (see chapter 6 'Maintenance and repair')



## **6 Maintenance and repair**

Hydraulic valves are sensitive to dirt. No impurities must get into the hydraulic oil. It is recommended that the oil be changed once a year.

When carrying out routine maintenance work on the press:

- visually check the electrical connections (plug, cable) for damage
- check the hydraulic system for tightness.

For spares and installation sketches, see chapter 7.0 (Technical appendix).

The Clamping mechanism of mechanical grip-rail-couplings have to be lubricated with the lubrication nipple at the couplings front side regulary after 500 clampings with grease Rivolta S.K.D. by Bremer & Leguil.

In the case of failure it is recommended that the grip rail coupling is replaced by a spare part in order to avoid press downtimes. The repair can be carried out outside the press, if necessary in our Hilchenbach works.

Repairs of grip rail couplings, especially seals and the clamping and locking mechanism should only be carried out by specialised staff!



### **ATTENTION!**

Before dismantling the grip rail coupling, disconnect the electrical and hydraulic connections!  
Dismantle the grip rail coupling only when the tie rod is in the unclamping position!

After changing a grip rail coupling, it must be clamped and unclamped several times, in order to ensure bleeding by means of the power unit (this also applies if hydraulic connections have been disconnected).

**For commissioning, see chapter 4.0 (Installation und commissioning)**

## 7 Technical appendix

The technical appendix comprises the list of spare parts and the installation sketches.

### 7.1 List of spare parts

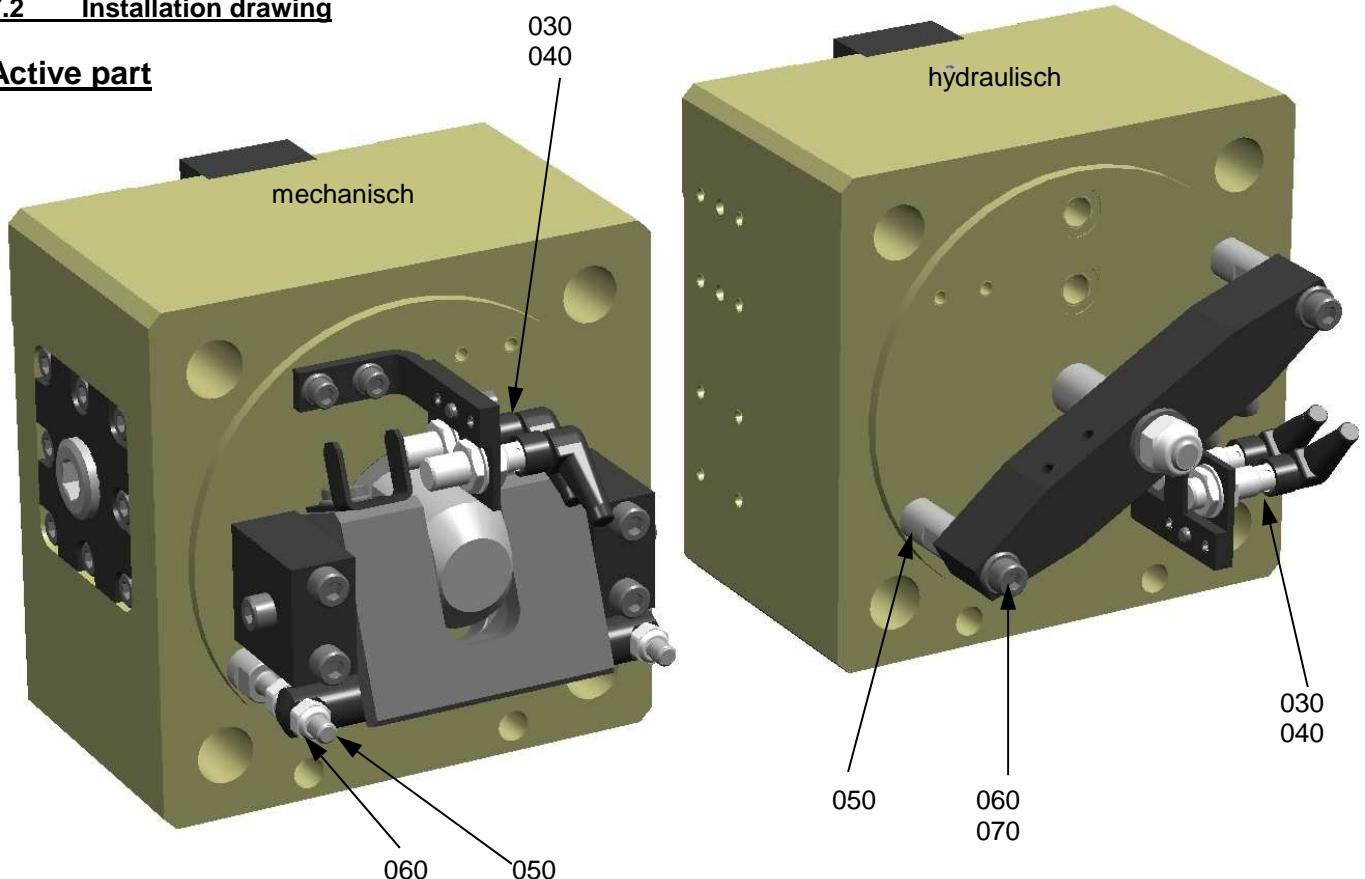
Item no.	Designation	Part no.
010	Active part	See drawing
020	Passive part	See drawing
030	Proximity switch BES 516-325-E5-C-S4	2.5012.0040
030	Proximity switch Twin-Set BES Z04E-PSD10Z-EV00,2-504	2.5012.0073
040	Coupler socket	2.0975.0024
050	Positioning pin, energy coupling	*)
060	Centering bolt, active part	*)
060	Cheese head screw	*)
070	Washer	*)
080	Straight pin	*)

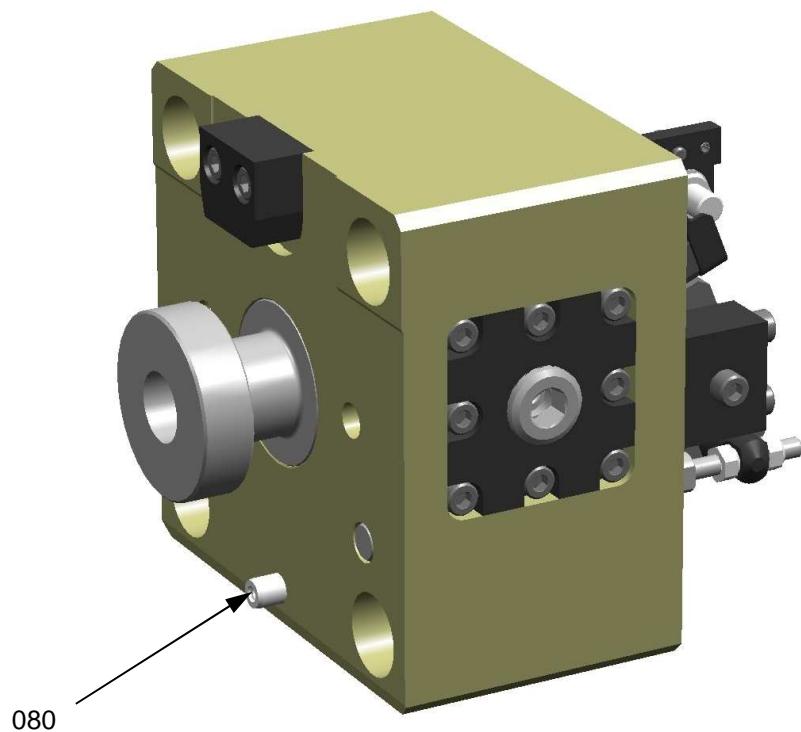
When ordering, please indicate the **part no. of Activ part**, the **item no.** and the **designation of the spare part!**

If a repair of the grip rail coupling, especially of seals and of the clamping and locking mechanism, is necessary, it is recommended that the grip rail coupling is replaced by a spare unit in order to avoid press down-times. The repair can be carried out away from the press, if necessary in our Hilchenbach works.

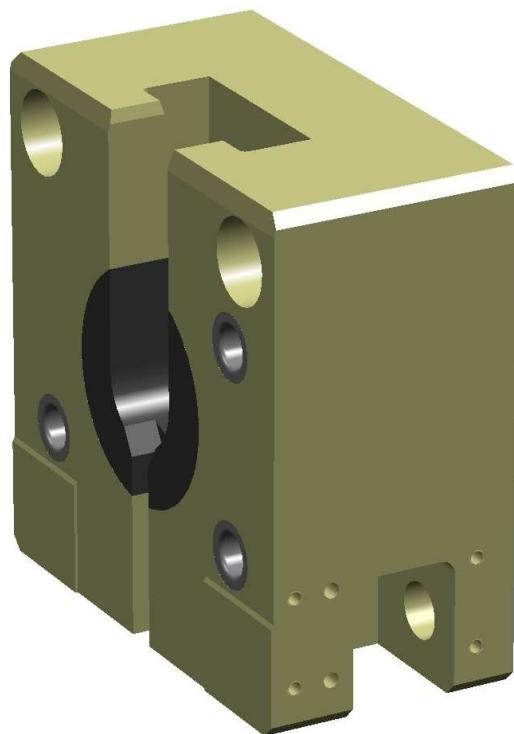
### 7.2 Installation drawing

#### Active part





**Passive part**





## **Manufacturer's declaration for incomplete machine**

in conformity with directive

**'Machinery' EG-RL 2006/42/EC**  
**dated June 9, 2006.**

We, **Hilma- Römhled**  
**Schützenstrasse 74**  
**57271 Hilchenbach,**

declare that the incomplete machine and its variants:

**grip rail coupling**  
**hydraulic or mechanical**

**Type 292x**  
**Type 291x**

as supplied by us has been specifically designed for installation in a machine taking due account of standard DIN EN ISO 12100 and 13857. The documentation has been prepared taking account of appendix VII B.

On request, the national authorities will receive the documentation as a printout by mail or as a .pdf file by e-mail.

The grip rail coupling must only be put into operation after the conformity of the machine with the EC directives has been demonstrated.

The design of our products is in accordance with DIN EN ISO 4413 and EN 60204-1.

Responsible for documentation:

Frank Grosche  
Schützenstraße 74  
57271 Hilchenbach

Hilchenbach den 08.10.2010  
H.-J. Molka  
Geschäftsführung