# Operating Manual

including installation and assembly instructions
for incomplete machines as per Machinery Directive 2006/42/EC

Angular clamping elements, clamping force 40 kN type 8.2312.xxxx
⇒ with T-slot adapter (18, 22 or 28 mm)
⇒ for permanent installation
⇒ for permanent installation with position monitoring

Angular clamping elements, clamping force 66 kN type 8.2314.xxxx
⇒ with T-slot adapter (18, 22 or 28 mm)
⇒ for permanent installation
⇒ for permanent installation with position monitoring

Angular clamping elements, clamping force 110 kN type 8.2315.xxxx
⇒ with T-slot adapter (28 or 36 mm)
⇒ for permanent installation
⇒ for permanent installation with position monitoring

Special types 8.231x.8xxx

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**In order to ensure safe operation and functional reliability. please read the operating manual before putting the clamps into operation for the first time!**

## 1 Safety information

### 1.1 General

The safety of Hilma angular clamps has been thoroughly checked. They are designed for use as specified in the technical data. If the technical data is not observed, the health of the operator and the proper functioning of the machine may be put at risk. Unauthorised modification or alteration of Hilma swing clamps is prohibited for reasons of safety. If this instruction is not observed, our guarantee will be invalid.

### 1.2 Field of application

Hilma angular clamps are designed for use on presses or similar machines. The angular clamps are either installed in a fixed position or inserted into the T-slots. Operation of the angular clamps other than on presses or similar machines is not permitted.

### 1.3 Operational parameters

- Clamping force
  - Angular clamp 8.2312 : 40 kN
  - Angular clamp 8.2314 : 66 kN
  - Angular clamp 8.2315 : 110 kN
- Maximum operating pressure: 400 bar

## 1.4 Temperatures

The maximum operating temperature for standard swing clamps is 100 °C, for higher temperatures special designs should be used.
The maximum operating temperature for the version **with position monitoring** is **70°C.**

## 1.5 Important information on danger

**-** Stationary angular clamps should only be installed using the fastening screws provided for this purpose:

- Angular clamp 8.2312 : 2 x cheese head screw DIN912 M12x75 **10.9**
- Angular clamp 8.2314 : 2 x cheese head screw DIN912 M16x90 **12.9**
- Angular clamp 8.2315 : 2 x cheese head screw DIN912 M20x110 **12.9**

- During clamping, keep your hands away from the danger zone of the clamps -> pinch hazard,
- Installation and repair work must only be carried out when the system is unpressurised.
- Do not exceed the specified operating pressures and temperatures.

Before putting the clamps into operation, the operator must be fully trained .
Young people less than 16 years old are not allowed to operate the clamps. Staff aged over 16 years are allowed to operate the clamps under supervision as part of their apprenticeship. The operating instructions must be accessible to the operator. The operator must advise any other personnel of possible risks in the operating area.

## 1.6 Manufacturer's declaration

The angular clamps have been developed, designed and manufactured in accordance with the EC Directive 'Machinery' 89/392/EEC.

# 2 Design and function

## 2.1 Design

The angular clamp consists of a housing, a single-acting hydraulic piston with spring return, a clamping lever . The angular clamp for installation in T-slots has a T-slot adapter and a fastening screw in addition to the above components. The angular clamp with position monitoring has a proximity switch with connecting cable in addition to the components of the stationary design.

## 2.2 Functional description

**- Clamping**
When applying oil to the "P" port, the piston extends and thus provokes a rotary movement of the clamping lever. The clamping surface of the lever moves downwards until it is in contact with the workpiece. Once clamping pressure has built up, the die is clamped correctly.
**Clamp with position monitoring**
The proximity switch is actuated within the nominal clamping range ± **1,5** mm. Once the clamping lever gets into contact within this range will the signal of the proximity switch be set to 1.
Nominal clamping range in the standard design :
Angular clamp 8.2312 : 20 mm
Angular clamp 8.2314 : 25 mm
Angular clamp 8.2315 : 32 mm

- **Unclamping**
For unclamping the angular clamp, the "P" port is without pressure connected to the tank. The piston return spring presses the piston downwards and thus the hydraulic oil back into the tank. Another pressure spring moves the clamping lever into its home position. The die is unclamped and may be removed.
**Clamp with position monitoring**
Once the clamping lever has left the monitored area will the signal of the proximity switch be set to 0.

## 3 Technical data, main dimensions

| **Angular clamping element** | 8.2312 | | 8.2314. | | 8.2315. | |
|---|---|---|---|---|---|---|
| Clamping force | 40 | kN | 66 | kN | 110 | KN |
| Total stroke | 5.5 | mm | 6 | mm | 6 | Mm |
| Operating pressure | 400 | bar | 400 | bar | 400 | Bar |
| Oil consumption clamping | 6.4 | cm ³ | 10 | cm³ | 16 | cm³ |
| Oil consumption unclamping | by spring | | by spring | | by spring | |
| Max. temperature (standard) | 100 | ° | 100 | ° | 100 | ° |
| **Inductive proximity switch** | | | only with position monitoring | | only with position monitoring | |
| Manufacturer | - | | -IPF | | -IPF | |
| Type | - | | -IB 260270 | | - IB 260270 | |
| Voltage | - | | -24 V DC | | -24 V DC | |
| **Electrical interface** | | | | | | |
| | | | | | | |
| **Hydraulic interface** | | | | | | |
| | | | | | | |
| P port | G 1/4„ | | G 1/4„ | | G 1/4„ | |

## 4 Installation, connection and putting into operation

### 4.1 Installation

- Fasten the stationary angular clamp using the screws mentioned in chapter 1.5
- Installation work must only be carried out when the system is in an unpressurised condition.

### 4.2 Hydraulic installation

The hydraulic pipework on the machine side must be of sufficient size (8x1,5 DIN 2391-St35 NBK or larger), must be installed in accordance with the specifications (DIN EN 982) and must conform with up-to-date practice for high-pressure hydraulics. Pipes should be as short as possible. For single acting cylinders with a spring return, the maximum length should be 5 m, for double acting cylinders longer pipes may be used. 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. Protective plugs should only be removed immediately before connecting the hydraulic system. .

### 4.3 Electrical installation

**Only for angular clamps with position monitoring:**

| **Proximity switch** | | **Connecting cable** |
|---|---|---|
| Pin1 brown + | -> | 1 brown L+ |
| Pin3 blue - | -> | 3 blue L- |
| Pin4 black signal | -> | 4 black = clamping signal |

Connecting thread on the proximity switch: M8x1
Screw the connecting cable to the proximity switch. Connect the connecting cable to the controls in accordance with the pin assignment.
When replacing angular clamping element with M12x1 thread, use an adapter connecting cable M8x1 to M12x1.

## 4.4 Putting into operation

- When loading the dies, observe pinch edges
- Provide the pressure generator with a pressure relief valve suitable for the operating pressure
- Protect the clamping element from pressure peaks due to external effects
- Apply pressure to the elements and clamp and unclamp them several times in the manual mode. Always perform the full movement until the stop and give time for pressure build-up in the lower end position.

- Read the operating manual before putting the clamps into operation for the first time
- Only use clean, fresh oil
- Bleed the complete system at the highest point at low pressure (20bar ), in order to eliminate any bubbles
- Apply pressure to the elements and clamp and unclamp them several times
- Check the hydraulic system for tightness by a visual inspection of the pipes and hoses, screw fittings and clamping elements while pressure is applied

**ATTENTION**:
During clamping and unclamping, keep your hands and tools out of the movement zone
**RISK OF INJURY!**

**Controls:**
In the case of *all clamping elements,* the time provided in the control sequence between the different movements must be sufficiently long (t>3s), in order to allow all functions to run smoothly.

Depending on the design of the hydraulic system of the machine (pipe cross sections, hose lengths, pump position and delivery, etc.) the time may vary. It may be necessary to increase or decrease the quoted values, depending on the system parameters.

## 5 Trouble shooting

The angular clamping elements have left our premises in a perfect condition. All functions have been tested, and necessary adjustments have been made.

If any malfunction should occur even though the information contained in chapter 4.0 (Installation and connection) has been duly observed, check once again the hydraulic installation and the software. If no cause can be found for the malfunction, please contact the manufacturer.

## 6 Maintenance and repair

Under normal conditions, the angular clamping elements do not need special maintenance. However, a visual check and a check of the functioning should be carried out once a month
Hydraulic valves are very sensitive to dirt. Make sure that no impurities get into the hydraulic fluid. We recommend that the oil is
changed once a year. When carrying out routine maintenance work on the press:
- check the hydraulic system for tightness
- visually inspect the clamping elements for mechanical damage or wear

**Information:** Design of the hydraulic equipment in accordance with **DIN EN 982** "Safety-relevant requirements applying to hydraulic systems and their components".

List of spare parts and installation sketches, see chapter 7.0 (Technical appendix).

In case of troubles, it is recommended to replace the angular clamping elements, in order to avoid downtimes of the equipment. Repair can then be made in our premises in Hilchenbach.

**ATTENTION:** Before dismantling the elements, disconnect hydraulic connections!

Following replacement,. move the element several ties to bleed it through the pump unit (this also applies when hydraulic connections have been disconnected).

**For putting the clamping elements into operation, please observe chapter 4.0 (Installation and connection).**

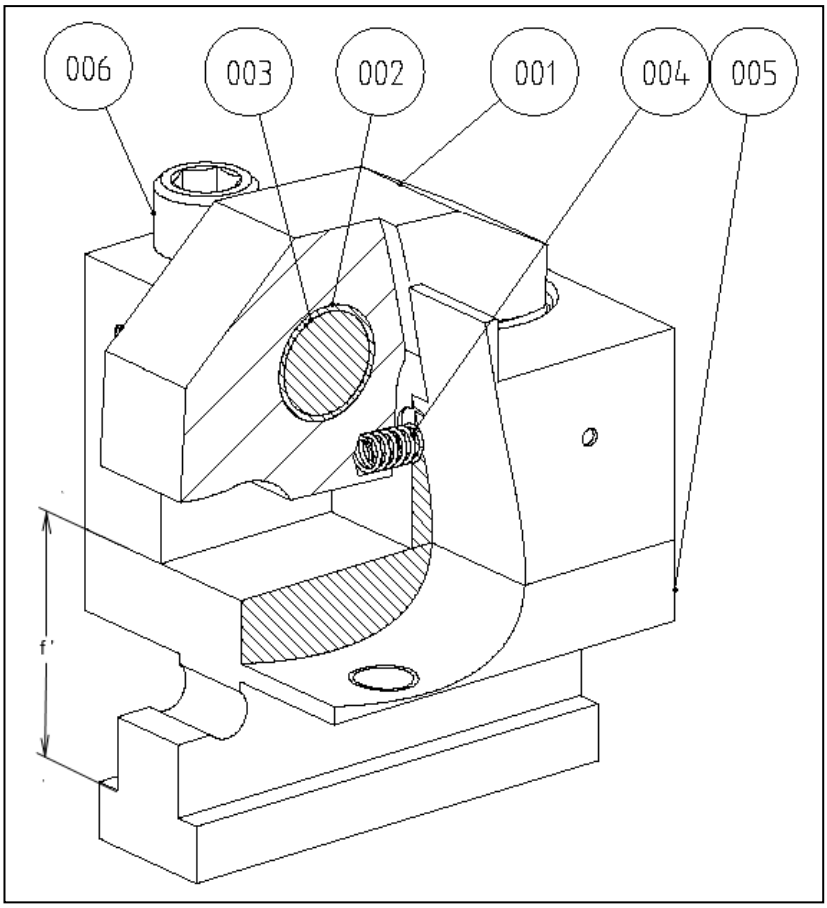
## 7 Technical appendix / Spare parts

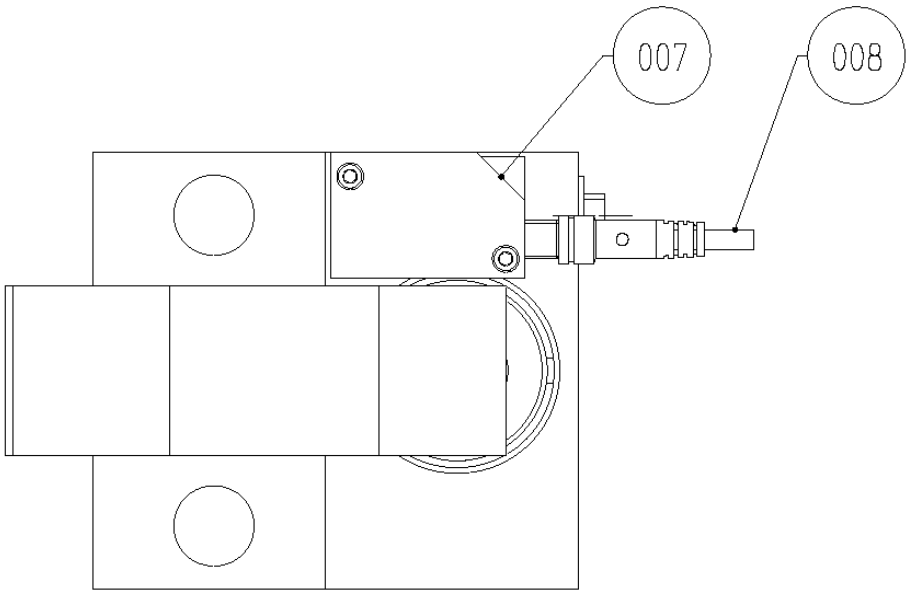
The part numbers listed in the spare part list are valid for the standard version of the angular clamp. By special versions it is possible to determine the number of the required spare part with account of the angular clamp no. and the position of the list of part.

| Item | Part list no. | Designation | 8.2312.xxxx | 8.2314.xxxx | 8.2315.xxxx |
|---|---|---|---|---|---|
| 001 | 040 | Clamping lever | 5.2016.0062 | 5.2016.0058 | 5.2016.0063 |
| 002 | 110 | DU sleeve | 1.1850.0037 | 1.1850.0006 | 1.1850.0007 PAP3025<br>1.1850.0031 PAP3030 |
| 003 | 140 | Bolt | 5.1013.0385 | 5.1013.0133 | 5.1013.0135 |
| 004 | 160 | Pressure spring | 1.2098.0021 | 1.2098.0021 | 1.2098.0350 |
| | | Seal Kid | | | |
| | | | for position monitoring | | |
| 007 | 180 | Proximity switch | 2.5012.0076 | 2.5012.0076 | 2.5012.0076 |
| 008 | | Connecting cable M8 | 2.0975.0028 | 2.0975.0028 | 2.0975.0028 |
| 008 | | Adapter cable M8-M12 | 2.0978.0030 | 2.0975.0030 | 2.0975.0030 |

To order spare T-Slot adapters pos 05 we need the Type Nr. 8.231X.XXXX of the Clamping Element , the f ' dimension of the T-Slot adapter without spacer plates and the with of the T-Slot.

## 7.1 Angular clamping element



# Declaration of incorporation

as per

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

We, **Hilma- Römheld**
**Schützenstrasse 74**
**57271 Hilchenbach,** declare, that the incomplete machine and its variants:

## Angular clamping elements

**types**
**8.2312.xxxx**
**8.2314.xxxx**
**8.2315.xxxx**
**8.231x.8xxx**

as supplied by us has been specifically designed for incorporation into a machine, taking full account of DIN EN ISO 12100 and 13857. The documentation has been prepared in conformity with appendix VII B. If required, the national authority may receive the documentation as a hard copy by post or by e-mail as a PDF format file. The machine into which the parts are to be integrated must only be put into operation after the conformity of the machine with the above EC directive has been demonstrated.
The design of our products is in accordance with DIN EN ISO 4413 and EN 60204-1.

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Hilchenbach 30.11.2014
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Managing Director