



# Operating Manual

## Pull clamping element with T-slot

double-acting

Type 235X-050

235X-060

235X-065

Special designs

8.235X.8XXX



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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 pull clamping elements with T-slot have been thoroughly checked and 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 pull clamping elements are prohibited for reasons of safety. If this instruction is not observed, our guarantee will be invalid.



Careful observation of the contents of this operating manual is a precondition for trouble-free operation of the pull clamping elements. Malfunctions during commissioning and press operation are often due to incorrect installation or operating and control errors (see also chapter 5.0 'Trouble shooting')

### 1.2 Field of application

Hilma-Römheld pull clamping elements with T-slot can be used for a variety of clamping tasks. The element is recommended for hydraulic clamping elements for press tools.

*A pull clamping element can be used in multiple arrangements for a press bed and ram, where it is integrated or installed in a countersunk manner.*

### 1.3 Operating characteristics

Hilma Römheld pull clamping elements with T-slot should only be subject to the values indicated. The maximum operating pressure must not be exceeded.

## 1.4 Temperatures

The maximum operating temperature for the standard version is 80 °C.

## 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 pull clamping elements during clamping and unclamping.

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 pull clamping elements with T-slot have been developed, designed and manufactured in accordance with the "Machinery" directive 98/37/EC. The manufacturer's declaration is attached to the present operating manual.

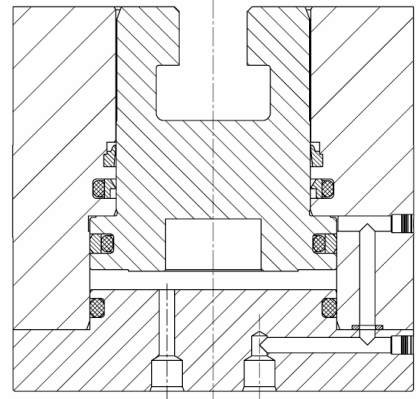
## 2 Design and function

### 2.1 Design

A pull clamping element consists of the cylinder housing, a cover and the pull piston with an integral T-slot.

### 2.2 Function

The pull clamping element works like a double-acting cylinder. The two piston end positions may be subjected to the max. operating pressure.

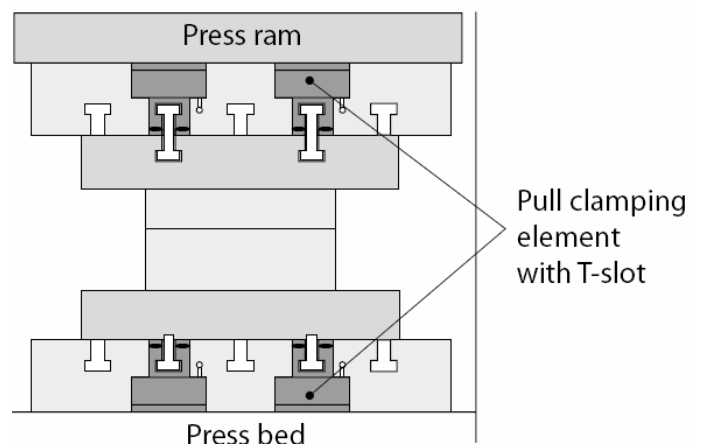


**Dies may be clamped using firmly installed T-bars or T-bar segments on the press bed or using detachable double T-bars.**

Clamping the die using double T-bars on the ram

#### Example:

Clamping of the die  
Clamping the die using firmly mounted T-bars or T-bar segments on the press bed



Due to the lack of mechanical coupling, different friction of the components and different pipe lengths, several pull clamping elements in one hydraulic circuit may perform non uniform piston movements (no synchronous retracting and extending of all elements!).

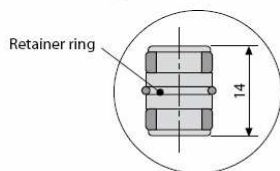
## 3 Technical data, main dimensions

For T-slot to DIN 650	18	22	28
<b>Clamping force at 400 bar (kN)</b>	<b>55,2</b>	<b>76</b>	<b>144</b>
Clamping force at 100 bar (kN)	13,8	19	36
Piston Ø I (mm)	70	80	105
Piston rod Ø d H7/f7 (mm)	56	63	80
Stroke (mm)	6	6	6
Oil consumption clamping (cm <sup>3</sup> )	9	12	22
Oil consumption unclamping (cm <sup>3</sup> )	23	30	52
a (mm)	18	22	28
b (mm)	30	37	46
c e 8 (mm)	110	130	166
e (mm)	96	106	110
f (mm)	14	18	22
g (mm)	M12	M16	M20
h (mm)	21	23	27
k (mm)	111	125	135
n (mm)	15,5	19,5	25,5
o (mm)	31,1	36,2	46,7
p ± 0,05 (mm)	15	15	15
Weight (kg)	6,1	9,5	16,6
<b>Connection lengthways to the T-slot</b>			
Part no.	2354-060	2355-060	2356-060
<b>Connection crosswise to the T-slot</b>			
Part no.	2354-065	2355-065	2356-065

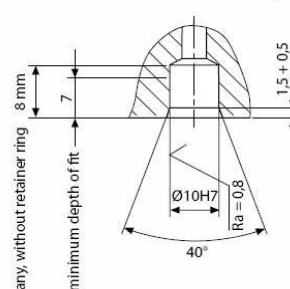
Max. operating pressure 400 bar  
Other sizes and special versions are available on request.

### Plug-in connector for flanged connection Part no. 9210-132 (is supplied with the clamping element)

#### Plug-in connector

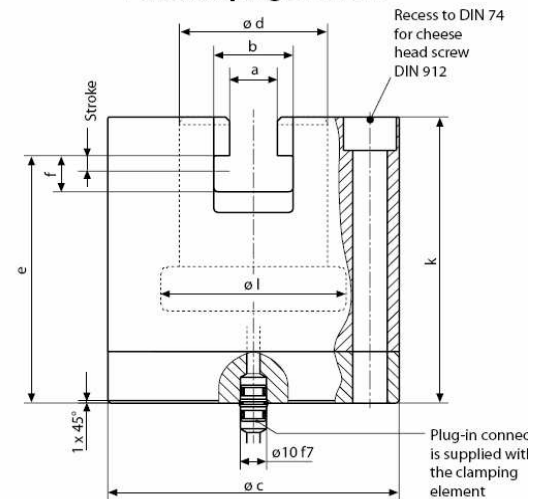


#### Accommodation space

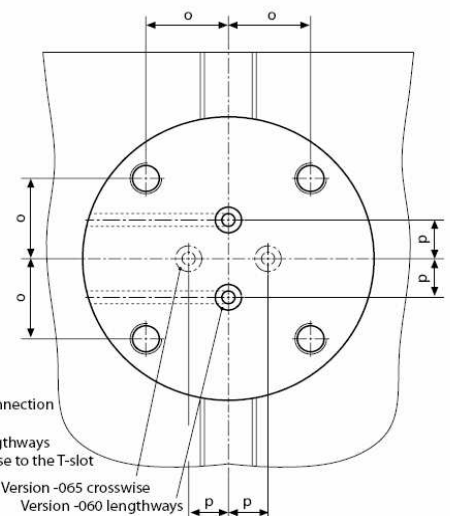
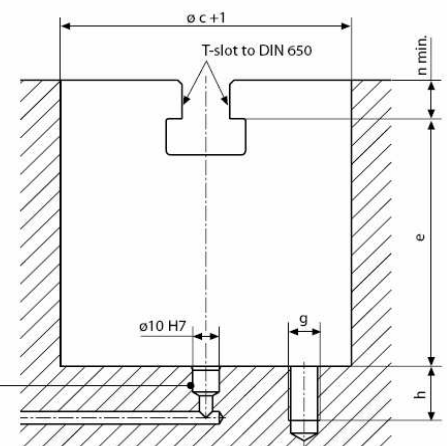


Type of drilled connection hole for plug-in connector

#### Pull clamping element



#### Drilled location hole



### Important information

Make sure that the T-slot of the clamping piston is subject to an axial load only. The T-nut must be in contact over its complete surface. Transverse loads must be avoided.

In view of the surface ratio of the pull clamping elements, only check valves having a minimum ratio of 3.5 : 1 may be used for maintaining the clamping force.

Normally the max. operating temperature is 80°C. Higher temperatures may be catered for by request

For installation dimensions and technical data for special designs 8.235X.8XXX please see the attached drawings.

## **4. Installation, connection and commissioning**

### **4.1 Installation**

- Installation work must only be carried out when the system is not under pressure,
- Hole pattern as per drawing and data sheet, respectively,
- Tighten the pull clamping element using screws as per DIN specification by applying the nominal tightening torque.

#### **4.1.1 Clamping and unclamping times**

When changing dies, the time available for hydraulic clamping and unclamping is relatively short. Design the delivery from the hydraulic unit so that clamping and unclamping times of between 2 and 5 seconds are achieved. For reasons of functional safety shorter clamping and unclamping times are not recommended.

Clamping and unclamping times:

$$t = (V * z * 60) / (Q_p * 1000) \text{ in sec}$$

t = Clamping and unclamping time respectively (s)

V = Oil requirement for each pull clamping element (cm<sup>3</sup>)

z = Number of pull clamping elements

Q<sub>p</sub> = Pump delivery (l/min)

### **4.2 Hydraulic installation**

Connect the hydraulic pull clamping elements using screw fittings according to DIN 2353 (heavy series)

The hydraulic pipes on the machine side must be adequately dimensioned (12x2.5 DIN 2391-St35 NBK or larger) and installed in accordance with the standard specifications (DIN EN ISO 4413) and the state of the art of 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 all pipes, high-pressure hoses and screw fittings are cleaned and blown through.

- Plugs should only be removed immediately before making the connection.
- Connect matching pull clamping elements to connection blocks.
- Avoid series connection.
- Use pipes of adequate dimensions so as to avoid pressure loss.
- Provide each hydraulic connection with a pressure measuring connection for adjusting and checking operational data. This allows a malfunction to be pinpointed.
- Fasten pipes using pipe clips.

**In the case of doubt, please send the installation plan to be checked.**

### **4.3 Pressure monitoring**

The hydraulic pressure in all clamping circuits of the clamping system must be monitored by pressure switches. In addition to a pressure switch for monitoring the pressure in the complete clamping system and for activating the pump in the event of a loss in pressure, each clamping circuit must be provided with a pressure switch for ensuring machine safety. In the case of a pressure loss of more than 15-20% these pressure switches should ensure that the machine is disconnected.

### **4.4 Commissioning**

**Pleas 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
- Clamp and unclamp the element several times. Carry out a visual check.

- 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!!**

## 5 Trouble shooting



The Hilma pull clamping elements with T-slot have 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 element does not clamp or un-clamp	<ul style="list-style-type: none"> <li>- Hydraulic supply has been interrupted / not correct.</li> <li>-Hydraulic system has not been bled,</li> <li>-Operational pressure has not been adjusted correctly.</li> <li>- Hydraulic unit does not function / is not in operation.</li> </ul>	<p>Check all hydraulic pipes and hoses up to the hydraulic unit.</p> <p>Check for correct connection (clamping / unclamping). Bleed the hydraulic system. Correct the operational pressure.</p>

## 6 Maintenance and repair

Pull clamping elements with T-slots do not require special maintenance. Visually check the clamping elements and the feed pipes once a month. 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 (plugs, cables) for damage. Check all connections in the hydraulic system for tightness.

**Please note:** Design of the hydraulic equipment is in accordance with **DIN EN ISO 4413**, ensuring that safety requirements for fluid-conducting equipment and their components are met.

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

After an element has been replaced it is recommended that it is clamped and unclamped several times, in order to ensure that bleeding takes place by means of the power unit (this also applies if hydraulic connections have been disconnected).

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





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

in conformity with directive

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

We, **Hilma- Römheld**  
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declare that the incomplete machine and its variants:

### **Pull clamping elements with T-slot**

	<b>Type 235X-050</b>
	<b>Type 235X-060</b>
	<b>Type 235X-065</b>
<b>Special design</b>	<b>Type 8.235X.8XXX</b>

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 pull clamping element 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.

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