ROEMHELD
HILMA ▪ STARK

Operating Instructions

including installation statement and assembly instructions
for incomplete machines according to Machinery Directive 2006/42/EG

Clamping bolt, mechanical

Types: 2272-xxx
2273-xxx
2274-xxx

Hilma-Römheld GmbH
Schützenstrasse 74
57271 Hilchenbach
Germany
Phone: +49-2733/281-0
Fax: +49-2733/281-113
E-Mail: info@hilma.de
www.roemheld-gruppe.de

Contents

In order to ensure safe and functional operation, be sure to have read and understood this operation manual before installation and start-up!

1 Safety instructions

1.1 General

Hilma-Römheld clamping bolts are safety-tested and approved for use in accordance with the technical specifications. Non-adherence to these specifications may result in danger to the operator and/or malfunctions of the machine. For reasons of safety, unauthorised conversions or modifications of Hilma-Römheld clamping bolts are prohibited and will invalidate the warranty.

1.2 Area of application

Hilma-Römheld clamping bolts are intended for use on presses, punches or similar machines and/or on devices and equipment structures.

1.3 Operating characteristics

The maximum specified loads of the Hilma Römheld clamping bolts must not be exceeded. (see 3.0).

Attention: Subjecting the clamping bolts to excessive loads can result in their destruction! Persons can be endangered if clamping elements fail!

1.4 Temperatures

The maximum operating temperature for the standard model is 250 °C. For higher temperatures, special models must be used (max. temp. 400 °C).

1.5 Hazard warnings

- The clamping bolts must be carefully set in the clamping position before the clamping force is applied, beware of risk of crushing.
- When clamping, the clamping bolt must always be vertical in relation to the clamping point, so that the clamping and operating force can be properly absorbed and passed on.
- Clamping at an angle will lead to partial overloading of the clamping point and clamping element, which in turn will result in plastic material deformation.
- Do not exceed the rated clamping force in operation (take account of retraction forces).
- Observe the tightening torque to achieve the clamping force in accordance with the table.
- When clamping for extended periods, the clamping force must be checked once per day.

The operator must be appropriately instructed before operating the clamping elements for the first time. The clamping elements must not be operated by persons under the age of 16. Apprentices over the age of 16 may operate the elements, but only under supervision. The operation manual must be made available to the operator. The operator must inform third parties about possible hazards in the working area.

1.6 Installation instruction

Hilma clamping bolts have been developed, designed and produced in compliance with the EC Machinery Directive 2006/42/EC (see also Annex).

2 Structure and function

2.1 Structure

The clamping bolts are fitted with a wedge system as force amplifier. This innovative system allows to achieve extreme clamping forces with low torques and easy manual operation. The solid design of all components, the self-locking function as well as a high overload capability ensure maximum operational safety.

2.2 Function description

Due to its geometry, the bolt's wedge system is self-locking in any clamping position and provides for a clamping stroke of up to 3 mm. As a result, any clamping forces up to the rated value may be achieved independent of the torque. Clamping force diagrams may be provided upon request.

2.3 Interpretation of the clamping bolt size

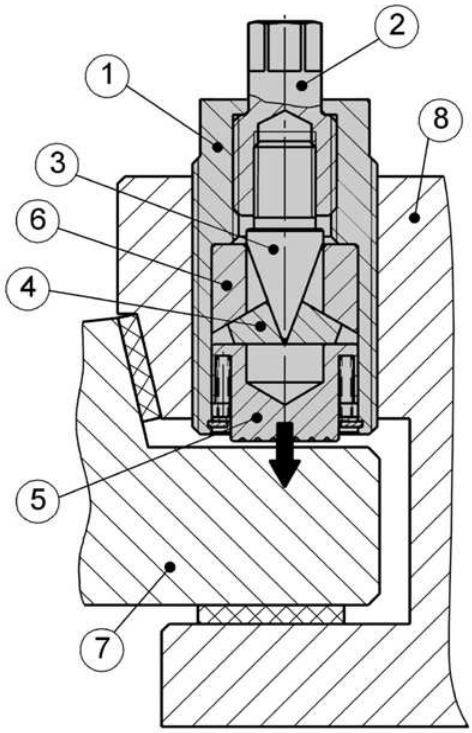
The main criteria for selecting a power clamping bolts are the required clamping force and the thread size.
The **rated clamping force** of the clamping bolt is the force generated at the specified tightening torque via the wedge system and transferred to the work piece (=pre-load force).
After the actual clamping operation, however, additional loads may occur in the form of operating forces (e.g. tool weights, cutting loads, etc.) which subject the clamping bolts to additional forces. The **maximum permissible static load** which the clamping bolt has to withstand without failing is therefore higher and may amount to a multiple of the rated clamping force (for data please refer to catalogue, product group 6).

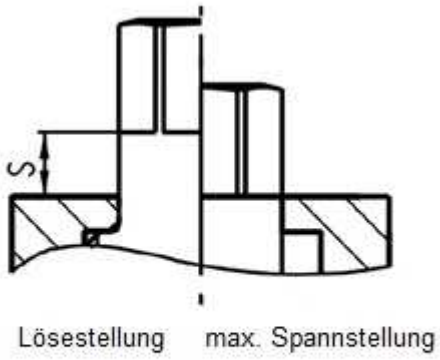
2.4 Clamping

Before the torque is applied, the clamping bolt must be secured hand-tight against the clamping edge so that it has no backlash. When handling resilient components, the clamping bolt must be secured hand-tight by using an external hex driver (1). After tightening the clamping bolt manually until it stops (7), the drive spindle (2) is operated by turning the operating hex driver clockwise. This will move the wedge gate valve (3) axially in the clamping direction and pushes the wedge elements (4) radially to the outside. This again results in the axial stroke of the pressure piece (5) against the clamping element, whereby the wedge elements are supported on the wedge bearing (6) and directly introduce the clamping forces into the device (8).
When the entire clamping stroke (approx. 2 revolutions of SW 1) is used up to an internal stop, the drive blocks and/or the torque wrench is disengaged without having achieved the required clamping force. In this case, the clamping procedure has to be repeated. A clamping stroke check over the operation distance "s" is possible. The maximum clamping position is achieved if the bottom edge of the operating hex driver is flush with the top edge of the enclosure (figure on the right).

2.5 Loosening

The loosening procedure is performed in the reverse order. By turning the operating hex driver to the left until it stops, the wedge gate valve moves backward and the clamping system is released. Coil springs press the pressure piece and the wedge elements back into their original position.





3 Technical data, main dimensions

Clamping screw		Tightening torque	
Clamping force / at tightening torque kN	Type 2272 40	M36 / 45 Nm	
Clamping force / at tightening torque kN	Type 2273 80	M48 / 90 Nm	
Clamping force / at tightening torque kN	Type 2274 120	M64 / 140 Nm	

4 Assembly, installation, start-up

4.1 Storage and transport

During transport, safeguard clamping elements against mechanical damage and, whenever possible, only store in enclosed, dry spaces. In the event of short-term outdoor storage, protect against all environmental influences that may cause damage.

4.2 Start-up

Read the operation manual before using the product for the first time.

- Put the element in the clamping position and carefully hand-tighten it by using a wrench.

- Build up clamping force by using a pre-set torque wrench.

- (For precise instructions, please refer to 2.4).

Attention: The clamping bolt must be vertical in relation to the clamping point.

CAUTION: To avoid injury, only hold the element by the outer edge when bringing the clamping bolt into the
clamping position.
RISK OF CRUSHING!

5 Troubleshooting

Hilma clamping bolts leave our company in good order and condition. All functions are checked and the necessary settings made. Should any malfunctions occur after observing the notes in chapter 4.0 (Assembly, installation and start-up), please use the following table to check the possible causes:

Error	Possible causes	Activities
No clamping force is built up	- Tightening torque incorrect.	- Incorrect torque set on the torque wrench, check the gauge,

6 Maintenance and repair

Generally speaking, clamping bolts do not require any special maintenance. It is recommended to check the clamping bolt for visible damage before every clamping operation. In the event of high dirt levels, the hydraulic clamping bolt must be cleaned at regular intervals.

For start-up, observe the notes in chapter 4.0 (Assembly, installation and start-up).

Installation statement for incomplete machines

pursuant to

Machinery Directive EG-RL 2006/42/EG dated 09 June 2006.

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

Mechanical clamping bolt types: **8.2272.xxxx**
8.2273.xxxx
8.2274.xxxx

as delivered by us are intended for integration into a machine in compliance with DIN EN ISO 12100 und 13857.
The documents were prepared in accordance with Annex VII B.
As requested, the national authority shall obtain the documents as a hardcopy by mail or as a pdf.-file by e-mail.
Commissioning shall be prohibited until it has been determined that the machine in which the components are to be installed complies with the regulations of the above-stated EG Machinery Directive.
Our components are designed in compliance with the standards EN 60204-1.

Responsible for the document:
Nils Kolb
Schützenstrasse 74
57271 Hilchenbach

Hilchenbach, this 26/08/2015
H.- J. Molka
Management board