

Technical Data Sheet TI-F16

Locking Unit KFHW Special version for Machine Tools

For a detailed functional description refer to "Technical Information TI-F10".
Further important practical advice is given in "Operating Manual BA-F16".

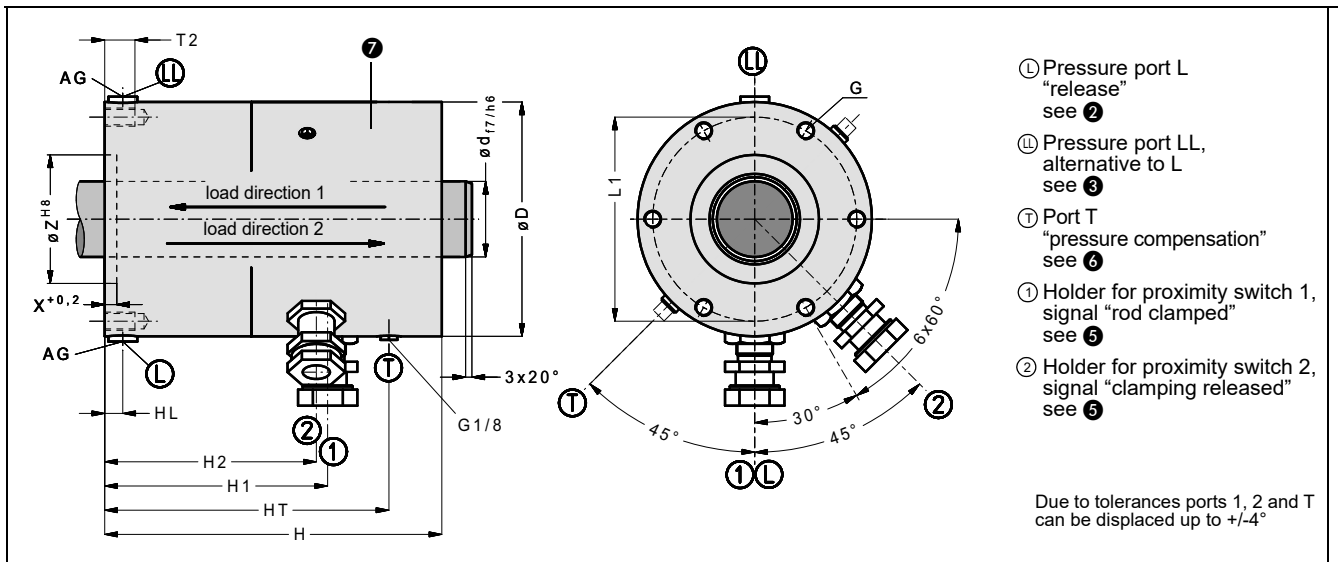


Fig. 1: Dimensions Locking Unit KFHW (CAD-Files download at www.sitema.com)

Type	Ident.-No. (order no.)	d mm	F kN	p bar	D mm	H mm	L1 mm	T2 mm	G	Z mm	X mm	AG	VL cm ³	HL mm	H1 mm	H2 mm	HT mm	Weight kg
KFHW 18	KFHW 018 01	18	5	40	75	122	60	12	M6	30	4	G1/8	6	23	90	81,5	99	4
KFHW 25	KFHW 025 01	25	12	50	96	140	82	15	M8	50	7	G1/8	12	21	88,5	83	114	7
KFHW 32	KFHW 032 01	32	20	50	115	173	96	18	M10	60	6	G1/4	22	20	117,5	112	140	13
KFHW 40	KFHW 040 10	40	35	50	140	200	115	18	M10	70	6	G1/4	34	19	130	122,5	167	22

Subject to modification without prior notice

1 The nominal holding force F is the minimum holding force for dry or hydraulic-oil wetted rods.

2 The pressure p is required to release the clamping. The admissible operating pressure is 160 bar.

3 As supplied, pressure port LL is plugged by a plug screw. It may be used alternatively to pressure port L and is useful for filling / air-bleeding. We recommend connecting auto-bleeders to the ports which are not in use (see "Technical Information TI-Z10").

4 Hydraulic operating volume

5 Proximity switch holders are provided for standard inductive proximity switches (M12 x 1 nominal switching distance 2 mm, flush mountable, NO (normally open)).

For easier service, the proximity switch holders have a depth stop and are pre-adjusted when delivered from the factory. The switches only need to be inserted to the stop and then clamped.

The proximity switches are not supplied in the standard scope of delivery, but are available as accessories.

6 Internal volume changes during switching are compensated at port T. It is plugged with an air filter which, in a dry and clean factory environment, offers sufficient protection against dust etc.

If, however, moisture or aggressive media are present, a pressure-less hose instead of the filter must be installed to connect the Locking Unit KFHW with clean atmosphere (e.g. a clean pressureless container).

7 KFHW 18 / KFHW 25: The surface of the housing parts is made of stainless steel. KFHW 32 / KFHW 40: The surface of the housing parts is galvanized and blue chromated.

Purpose

The Locking Unit KFHW is used as an infinitely variable lock on linear axes in machine tools which are operated with the use of cooling lubricants.

The Locking Unit KFHW absorbs axial forces in both load directions.

Axial play

The load is held free from axial play in load direction 1.

In standard designs, the load is also free from axial play in load direction 2 as long as the load does not exceed 80 % of the nominal holding force (F). In the case of exceeding, the axial play in load direction 2 is about 0.1 - 0.3 mm.

Operating conditions

The Locking Unit KFHW is suitable not only for dry environment, but also for operation in the presence of coolant or lubricant spray. For this reason, all external parts and sealing surfaces are made of corrosion protected material.

In case of heavy soiling conditions (grinding dust, chips, other liquids, etc.), please contact SITEMA.

The permitted surface temperature is -20°C to +60°C.

Viscous lubricants and grease may reduce the holding force.

Required risk assessment

It must be ensured that the dimensions and arrangement of a SITEMA Locking Unit KFHW used in safety-relevant applications meet the requirements of the risk evaluation DIN EN ISO 12100:2011-03 and also comply with any further standards and regulations applicable for the intended use. The Locking Unit KFHW alone principally cannot form a complete safety solution. It is however suitable to be part of such a solution. Furthermore, all attachments and fixations have to be dimensioned correspondingly. This is generally the duty of the system manufacturer and the user.

Choosing the right size

The table shows the nominal holding force F of the various types. The value of F must be higher than the maximum axial load acting on the rod.

In case vertically moving masses shall be held or stopped or in case other dynamic impact forces occur, an appropriate safety factor must be applied. This factor has to be defined by the user depending on the requirements, but should not be less than 1.5.

Port T

The tapped hole marked T (tank, oil leakage) is used for pressure compensation (breathing). It is plugged with a filter element when supplied from the factory.

In case the Locking Unit KFHW is to operate in dirty or corrosive environment, port T has to be connected to clean atmosphere or the hydraulic tank by a pressureless line.

Design and attachment of the rod

The Locking Unit KFHW will operate correctly only if the rod has a suitable surface:

- ISO tolerance field f7 or h6
- induction hardened min. HRC 56, surface hardening depth:
 - ø up to 30 mm: min. 1 mm
 - ø over 30 mm: min. 1.5 mm
- surface roughness: Rz = 1 to 4 µm (Ra 0.15 - 0.3 µm)
- protection against corrosion, e.g. hard chromium plating: 20 ±10 µm, 800 – 1 000 HV
- lead-in chamfer, rounded:
 - ø 18 mm up to ø 80 mm: min. 4 x 30 °
 - ø over 80 mm up to ø 180 mm: min. 5 x 30 °
 - ø over 180 mm up to ø 380 mm: min. 7 x 30 °

Often, the following standard rods fulfill the above mentioned requirements and can then be used:

- piston rods (ISO tolerance field f7), hard chrome plated
- rods for linear ball bearings (ISO tolerance field h6)

The rod must not be lubricated with grease.

The actual holding force of the Locking Unit KFHW is higher than the **nominal holding force (F)** indicated in the data sheets and drawings but will not be higher than twice this value. Therefore, all **fixation elements** carrying the load (rod, its attachment, etc.) have to be dimensioned for at least **2 x F**. Please note that at dynamic loads, the full holding force (2 x F) can occur.

In case of overload, the rod will slip. This does normally not cause any damage to the rod or the clamping unit.

Generally, the basic rod material needs to have sufficient yield strength. In the case of compression-loaded rods, sufficient buckling resistance must be assured.

Mounting information

As supplied, the Locking Unit KFHW is blocked in its released state and can be slid over and fixed to the clamping rod easily. After mounting, the lock plates must be removed. Please refer to the operating manual for further information.

Pressure fluid

Hydraulic oil (HLP) in accordance with DIN 51524-2:2006 must be used as pressure fluid. Please consult SITEMA before using any other fluids.

Control

In most applications, an actuation as suggested in the drawing below is used.

During every operational cycle, the 3/2-way valve is actuated electrically and releases the Locking Unit KFHW. In all other operational conditions including power failure, emergency stop etc., the Locking Unit KFHW engages and holds the rod or brakes the load. Likewise, the load is secured when the pressure line breaks.

To prevent possible problems, the rod shall not be driven unless proximity switch 2 indicates the signal "clamping released".

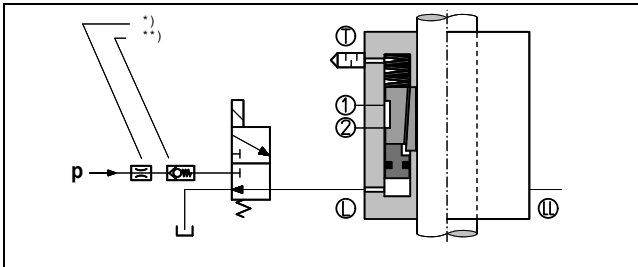


Fig. 2: Schematic diagram of hydraulic circuit

- * In case impact noises due to excess pressure are audible when pressurizing the Locking Unit KFHW, these can be suppressed by means of a flow control valve in the p-line.
- ** In case the pressure is not sufficiently constant (e.g. pressure drop at the beginning of a downward stroke), we recommend a check valve in the p-connection of the valve.

⚠ WARNING!

Risk due to slowed discharge of pressure medium!
Slowed discharge of the pressure medium may cause a dangerous situation. The clamping then only locks with a time delay.

- ☛ Make sure that the discharge of the pressure medium from pressure port L is **not** impaired by any additional components.
- ☛ Route all connection lines without any kinks.
- ☛ If there is any danger of kinking, take appropriate precautions (protective tube, thicker hose, etc.).

If a particular quick response time of the Locking Unit KFHW is required, the following preconditions must be met:

- short line distances
- fast valve response times
- appropriate control
- large valve and line cross-sections

Regular functional checks

The Locking Unit KFHW must be functionally checked at regular intervals. Regular checking is the only way to ensure that the Locking Unit KFHW will operate safely in the long run.

Please see the *operating manual* for further details.

Maintenance

The maintenance is limited to the regular performance tests.

Should the Locking Unit KFHW cease to comply with the required characteristics, the safety for working with the machine or system may no longer be given. In this case the Locking Unit KFHW must be immediately and professionally repaired by SITEMA.

The Locking Unit KFHW are safety components. Any repair or refurbishing must be carried out by SITEMA. SITEMA cannot take any responsibility for repairs by another party.