SITEMA Expertise in Safety

English translation of German original

TI-F50-EN-08/2011

Technical Data Sheet TI-F50
Locking Unit KFH

For detailed functional description refer to *„Technical Information TI-F10“*. Furthermore important practical advices are given in the *„Operating Manual BA-F50“*.

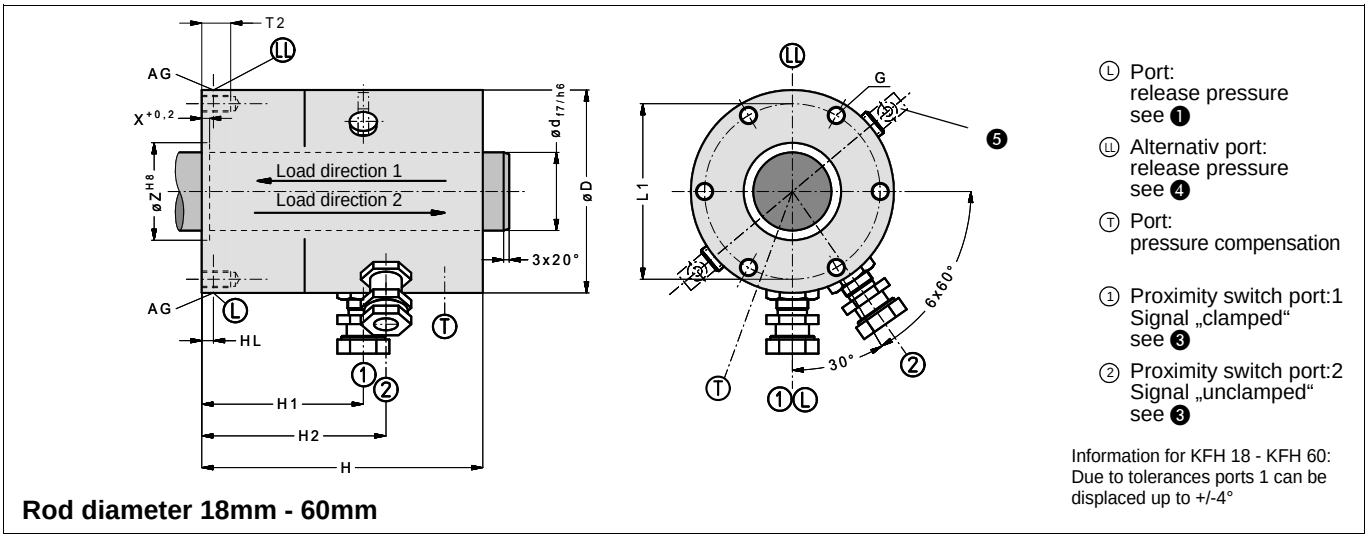

Fig. 1: Dimensions Locking Unit KFH (CAD-Files download at www.sitema.com)

			❶	❶									❷				
Type	**Ident.-No.**	**d**	**F**	**p**	**D**	**H**	**L1**	**T2**	**G**	**Z**	**X**	**AG**	**VL**	**HL**	**H1**	**H2**	**Weight**
		mm	*kN*	*bar*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*cm³*	*mm*	*mm*	*mm*	*kg*
KFH 18	KFH 018 50	18	10	70	70	122	60	12	M6	30	4	G1/8	6	23	88,5	96,5	3
KFH 18	KFH 018 51	18	5	40													
KFH 25	KFH 025 50	25	20	100	95	140	82	15	M8	50	6	G1/8	12	21	89,5	83	7
KFH 25	KFH 025 51	25	12	50													
KFH 28	KFH 028 50	28	40	100	115	178	96	18	M10	60	6	G1/4	23	20	118	112	13
KFH 28	KFH 028 51	28	20	50													
KFH 32	KFH 032 50	32	40	100													
KFH 32	KFH 032 51	32	20	50													
KFH 36	KFH 036 50	36	50	100	138	200	115	18	M10	70	6	G1/4	28	19	109,5	119	18
KFH 36	KFH 036 51	36	35	55													
KFH 40	KFH 040 50	40	50	100													
KFH 40	KFH 040 51	40	35	55													
KFH 45	KFH 045 50	45	75	100	155	213	135	20	M12	85	8	G1/4	43	20	147,5	140	26
KFH 45	KFH 045 51	45	45	75													
KFH 50	KFH 050 50	50	75	100													
KFH 50	KFH 050 51	50	45	75													
KFH 56	KFH 056 50	56	100	100	180	228	160	20	M12	95	10	G1/4	62	22	151,5	144	36
KFH 56	KFH 056 51	56	70	70													
KFH 60	KFH 060 50	60	100	100													
KFH 60	KFH 060 51	60	70	70													

Subject to modification without prior notice

❶ F is guaranteed as nominal (minimum) holding force for dry or mineral oil wetted shafts.
p is the pressure required for releasing. The permissible working pressure is 160 bar.

❷ Hydraulic operating volume.

❸ Proximity switch holders are provided for standard proximity switches M12x1 shielded and with a nominal switching distance of 2 mm, except KFH 18 and KFH 25: M8x1 with nominal distance 1,5 mm.

❹ Plugged hydraulic port LL alternative to L, also usefull for bleeding.

❺ Spacers are provided to keep released. To be removed after installation!

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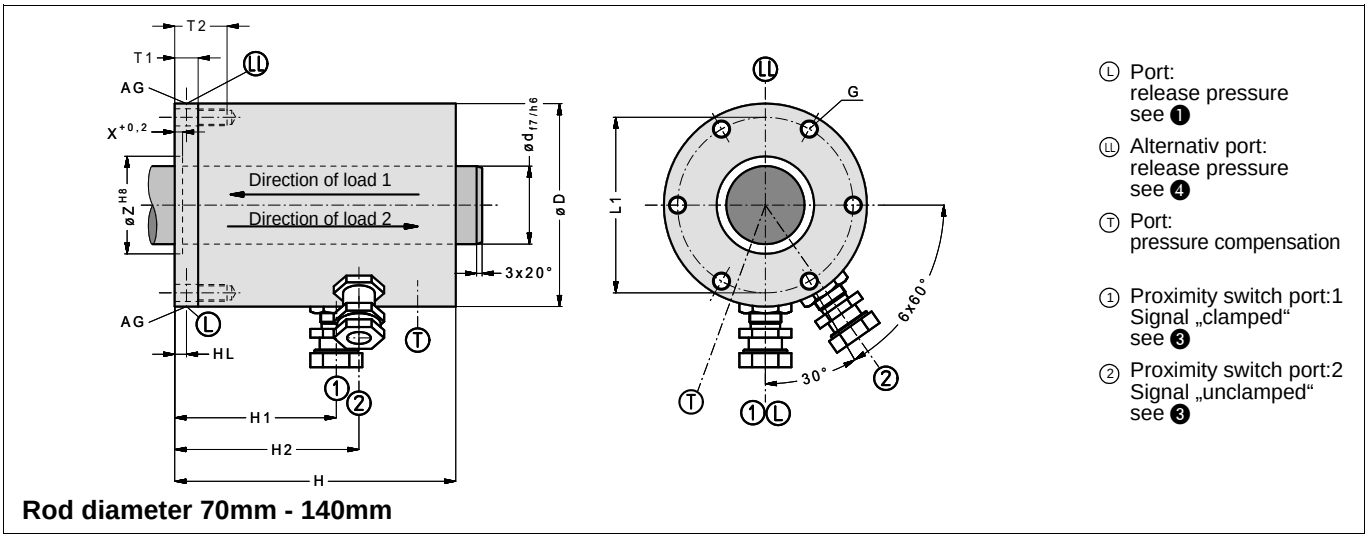
Locking Unit KFH

For detailed functional description refer to *„Technical Information TI-F10“*. Furthermore important practical advices are given in the *„Operating Manual BA-F51“*.



Rod diameter 70mm - 140mm

Fig. 2: Dimensions Locking Unit KFH (CAD-Files download at www.sitema.com)

			❶	❶										❷				
Type	**Ident.-No.**	**d**	**F**	**p**	**D**	**H**	**L1**	**T1**	**T2**	**G**	**Z**	**X**	**AG**	**VL**	**HL**	**H1**	**H2**	**Weight**
		mm	*kN*	*bar*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*mm*	*cm³*	*mm*	*mm*	*mm*	*kg*
KFH 70	KFH 070 50	70	150	100	225	302	195	26	56	M16	110	10	G1/4	86	13	192	185	79
KFH 70	KFH 070 51	70	80	60														
KFH 80	KFH 080 50	80	150	100														
KFH 80	KFH 080 51	80	80	60														
KFH 90	KFH 090 50	90	250	130	260	360	225	30	65	M20	125	10	G3/8	100	15	221	214	118
KFH 90	KFH 090 51	90	190	100														
KFH 100	KFH 100 50	100	250	130														
KFH 100	KFH 100 51	100	190	100														
KFH 125	KFH 125 50	125	330	100	350	405	300	40	90	M30	230	10	G3/8	220	26	244,5	235	225
KFH 140	KFH 140 50	140	600	100	430	514	370	50	95	M30	170	10	G3/8	250	30	346	334	458

Subject to modification without prior notice

❶ F is guaranteed as nominal (minimum) holding force for dry or mineral oil wetted shafts.
p is the pressure required for releasing. The permissible working pressure is 160 bar.

❷ Hydraulic operating volume.

❸ Proximity switch holders are provided for standard proximity switches M12x1 shielded and with a nominal switching distance of 2 mm.
For easier service, the proximity switch holders have a positive stop and are preset when deliverd from the factory.

❹ Plugged hydraulic port LL alternative to L, also usefull for bleeding.

Operational purpose

The Locking Device KFH clamps a shaft in any position. It is commonly used on a cylinder rod or an other round shaft and holds axial forces in both axial directions.

Load direction

A force in load dircetion 1 is always held without backlash

If the force acts in load direction 2 a backlash also does not occur, provided the force is not exceeding approx. 80% of the nominal holding force F. Otherwise the possible axial displacement is 0.1 - 0.3 mm.

Choosing the right size

The table (*Page 1* and *Page 2*) shows the nominal holding force F of the various items. The value F must be higher than the static load in the particular application.

In case a vertically moved mass is to be secured, a reasonable safety factor must be applied by the designer. This factor depends on the kind of machinery, but shoudn't be less than 1.5.

If people have to be secured against dangers of lifted static loads at the necessary regular testing must be performed with at least 1.5 times the load.

To guarantee the holding force during service even under unfavourable conditions, the actual holding force when new has to be higher than the nominal holding force. It will not, however, exceed twice the value. The fixing elements that absorb the force (e.g. articulations for the holding rod) must therefore be dimensioned for 2 x F.

T- port

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 KFH is to work in corrosive environment, e.g. coolant spray, port T must be connected to clean atmosphere or hydraulic tank by a pipe or hose

Rod material

The Locking Unit KFH will operate correctly only if the rod has the correct surface:

- ISO tolerance field f7 or h6
- Surface roughness: Rz = 1 to 4 µm.
- Rod surface hardened (min HRC 56).
- Hardchrome plated surface recommended
- Lead-in chamfer 3x20°, rounded.

As the actual holding force can be as high as two times the nominal holding force F (for F see data sheets or dimensional drawing), care must be taken to ensure that the strength of rod material is adequate. In the case of compression-loaded rods, sufficient buckling resistance must be assured.

In practice, suitable and commercially available rods are:

1. Piston rods, hard chrome plated (ISO tolerance f7)
   Basic material: Yield strength, min. 580 N/mm²
   Induction hardened HRC 56 - 64 / min. 1 mm deep
   Hard chrome plating: 800-1100 HV min. 13 µm deep
   Surface finish: RA 0,15 - 0,25
2. Shafts for linear ball bearings (ISO tolerance h6)
   Induction hardened HRC > 60
   Surface finish: RA 0,15 - 0,25

Pressure fluid

Hydraulic oil (HLP) in accordance with DIN 51524-2 must be used as pressure medium. Please consult us before using any other media.

Control

In most applications the actuation suggested in *Abb.3* is used.

During every operational cycle the 3/2-way valve is actuated electrically and releases the locking unit. In all other operational conditions, as well as in cases of power failure, emergency stop, etc. the locking unit becomes effective secures the rod and stops the load. In case the pressure should fail, the load is secured in the same way.

To avoid possible problems, the shaft should not be driven unless the proximity switch 2 indicates "unclamped".

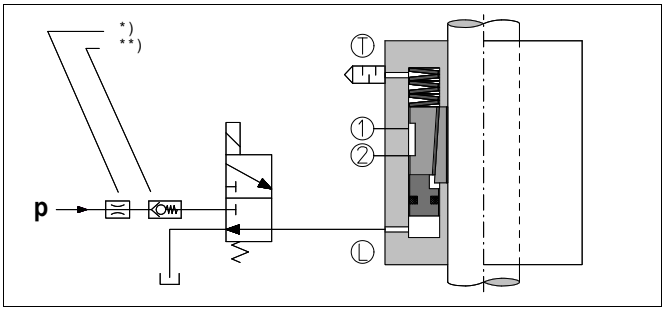


Fig. 3: Schematic diagramm of hydraulic circuit

* If impact noises are audible when pressuring the Locking Unit KFH due to excess pressure, they can be suppressed by means of a flow control valve in the p-line.

** If the pressure (p) is not suficiently constant (e.g. pressure drop at the beginning of a downward stroke) we recommend a check valve in the p-connection of the valve.

Under no circumstances may the hydraulic flow between connection L and the tank be impaired by any additional components.

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

- Short piping distances
- large valve and pipe cross-sections
- fast valve response times

Operating conditions

The Locking Unit KFH is designed to operate in usual clean and dry shop atmosphere.

In case of other environments at least the T-port for breathing purposes is to be connected to a clen and dry volume (tank). Should heavy soiling conditions (grinding dust, chips, other liquids, etc.) exist, please contact SITEMA.

Grease on the rod may reduce the holding force. The permissible ambient temperature is 0 - 60°C.

Regular functional checks

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

For applications in the field of personal safety (operater protection), testing must be carried out at least once every 6 months. Depending on the relevant application parameters (soiling level, cycle time, control), significantly more frequent checks may be advisable. In many cases, even (fully automatic) daily checks may be necessary.

For testing a force at least equal to the working force, but normally equal to the nominal holding force F is applied.

In every case the criteria is, that the test force is held without slipping.

Required risk assessment

It must be ensured that the dimensions and arrangement of SITEMA - Safety Brakes in safety-relevant applications meet the requirements of the risk evaluation DIN EN ISO 14121-1 and also comply with any further standards and regulations applying to the intended use. This is the duty of the system manufacturer and the user.

Maintenance

Maintenance is limited to the regular test of the holding force as prescribed above.

The SITEMA - Locking Unit KFH is a safety element. Any repair or refurbishing must be carried out by SITEMA. SITEMA cannot take any responsibility for repairs by another party.