

Technical Data Sheet TI-F60

Locking Unit KFHA for standard cylinders according to ISO 6020/2

For a detailed functional description refer to "Technical Information TI-F10".
Further important practical advice is given in "Operating Manual BA-F60".

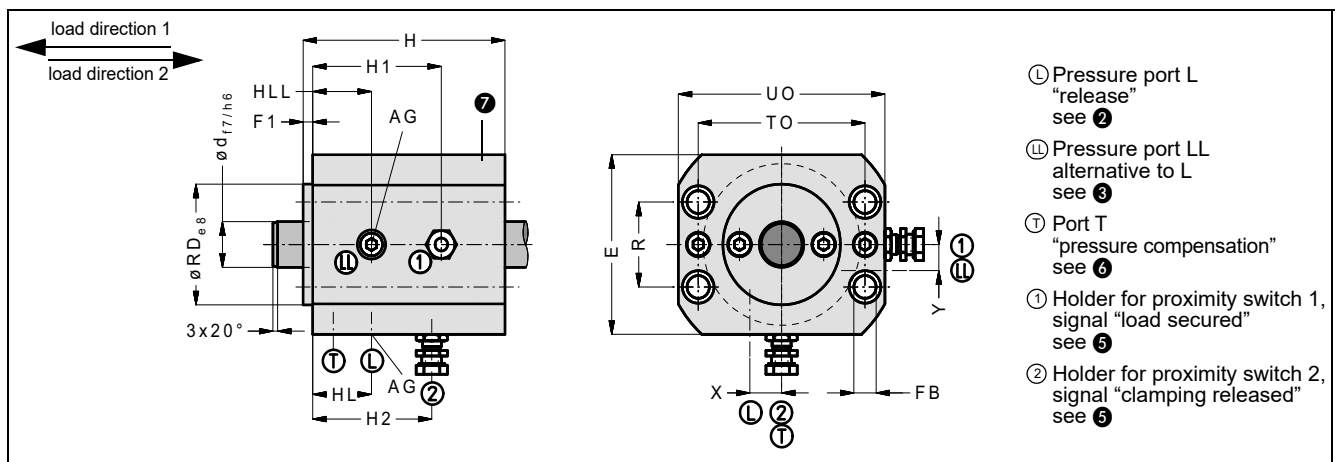


Fig. 1: Dimensions Locking Unit KFHA (CAD-Files download at www.sitema.com)

Type Ident.-No.	ø piston	d	F	P	E	UO	H	R	TO	FB	RD	F1	H1	H2	HL	X	HLL	Y	AG	VL	Wgt
(order no.)	mm	mm	kN	bar	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	cm ³	kg
KFHA 40-18 KFHA 040 018 050-1 KFHA 040 018 070-1	40	18	9 11	50 70	88	110	112	41	87	11	62	6	69,5	63,5	36	17	36	0	G1/8	8	6.5
KFHA 50-22 KFHA 050 022 050-1 KFHA 050 022 070-1	50	22	12 20	50 70	110	130	130	52	105	13,5	74	6	81	75	35	0	35	0	G1/8	14	10.5
KFHA 50-28 KFHA 050 028 050-1 KFHA 050 028 070-1		28	12 20	50 70																	
KFHA 63-28 KFHA 063 028 050-1 KFHA 063 028 070-1 KFHA 063 028 100-1	63	28	14 20 32	50 70 100	130	145	161	65	117	13,5	88	8	100	94	46	25	46	0	G1/4	15	17.5
KFHA 63-36 KFHA 063 036 050-1 KFHA 063 036 070-1 KFHA 063 036 100-1		36	14 20 32	50 70 100																	
KFHA 80-36 KFHA 080 036 050-1 KFHA 080 036 070-1	80	36	34 52	50 70	164	180	184	83	149	17,5	105	8	107	99	49	0	55	0	G1/4	30	31.5
KFHA 80-45 KFHA 080 045 050-1 KFHA 080 045 070-1		45	34 52	50 70																	
KFHA 100-45 KFHA 100 045 050-1 KFHA 100 045 070-1 KFHA 100 045 100-1	100	45	32 55 75	50 70 100	180	200	210	97	162	17,5	125	8	103	95	45	30	45	26	G1/4	41	45
KFHA 100-56 KFHA 100 056 050-1 KFHA 100 056 070-1 KFHA 100 056 100-1		56	32 55 75	50 70 100																	
KFHA 125-56 KFHA 125 056 050-1 KFHA 125 056 100-1	125	56	80 125	50 100	234	250	248	126	208	22	150	8	168	160	49	0	61	0	G1/4	80	86
KFHA 125-70 KFHA 125 070 050-1 KFHA 125 070 100-1		70	80 125	50 100																	

Subject to modification without prior notice

Delivery including centering ring A or B matching the cylinder mounting style.

IMPORTANT: Please indicate the desired type in your order (see chapter "Mounting to a cylinder", one page 4).

Mounting without centering ring is not permissible. Ring C for mounting without cylinder on request.

Order example for Locking Unit KFHA 40-18, 50 bar, with centering ring B: KFHA 040 018 050-1 (ring B).

- ❶ The nominal holding force F is the minimum holding force for dry or hydraulic-oil wetted rods.
- ❷ The pressure p is required to release the clamping. The admissible operating pressure is 160 bar.
- ❸ 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 (not supplied in scope of delivery; available as option - see "Technical Information TI-Z10").
- ❹ Hydraulic operating volume.
- ❺ Proximity switch holders are provided for standard inductive proximity switches M8 x 1 with a nominal switching distance of 1,5 mm (flush mountable, NO (normally open)); from size KFHA 80: M12 x 1 with a nominal switching distance of 2 mm).
- ❻ 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 pressureless hose instead of the filter must be installed to connect the Locking Unit KFHA with clean atmosphere (e.g. a clean pressureless container).
- ❼ The surface of the housing parts is black-oxidized.

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.

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Furthermore important practical advices are given in the "Operating Manual BA-F60".

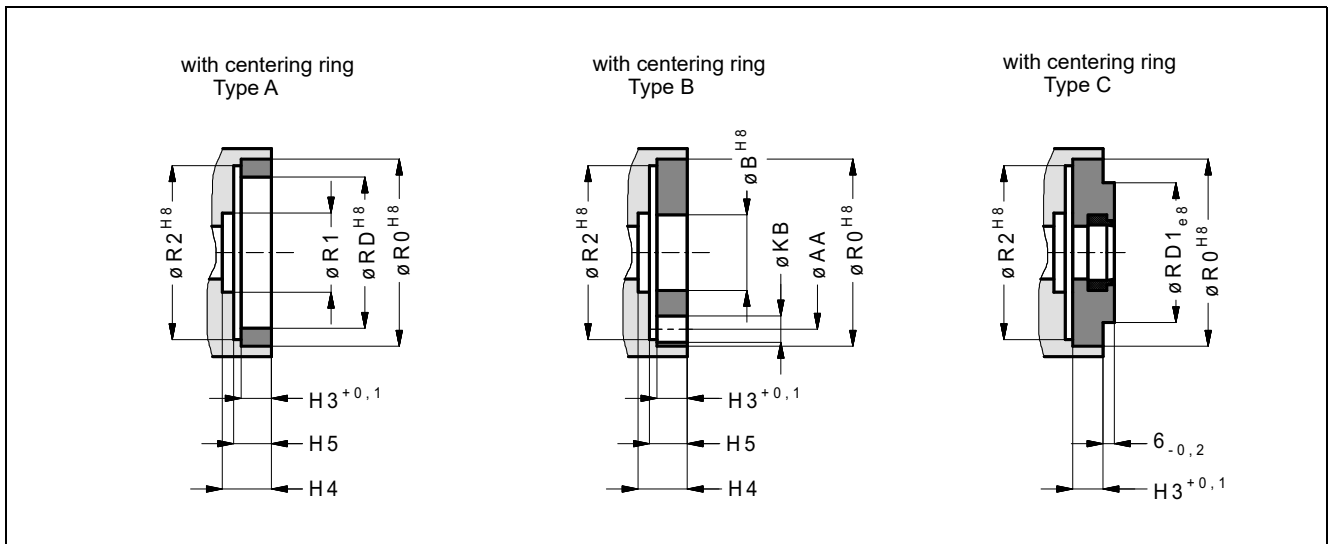


Fig. 2: Dimensions for mounting possibilities Locking Unit KFHA

Type Ident.-No.	ø piston	d	R0	RD	RD1	R1	R2	B	H3	H4 min.	H5 min.	AA	KB (4x90°)
(order no.)	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
KFHA 40-18	40	18	80	62	62	31	72	30	7	22,5	17,5	59	16
KFHA 50-22	50	22	99	74	74	35	95	34	12	25,5	19,5	74	23
KFHA 50-28		28				43		42					
KFHA 63-28	63	28	117	75	88	43	112	42	12	29,5	20,5	91	23
KFHA 63-36		36		88		51		50					
KFHA 80-36	80	36	149	82	105	51	145	50	18	29,5	20,5	117	29
KFHA 80-45		45		105		61		60					
KFHA 100-45	100	45	168	92	125	61	160	60	18	32,5	22,5	137	29
KFHA 100-56		56		125		73		72					
KFHA 125-56	125	56	219	105	150	73	205	72	19	32,5	26,5	178	38
KFHA 125-70		70		150		89		88					

Subject to modification without prior notice

Purpose

The Locking Unit KFHA clamps a shaft in any position. It is commonly used to clamp the rod of standard cylinders according to ISO 6020-2 (160 bar) or other shafts independent from the cylinder. It holds axial forces in both directions.

Mounting to a cylinder

The Locking Unit KFHA is prepared to be mounted on a cylinder according to ISO 6020-2. It is compatible to the different mounting possibilities listed below.

In each case the Locking Unit KFHA itself is to be mounted on the cylinder head. Depending on the flange of the cylinder head, different centering rings are required.

Please note that usually an extended piston rod is needed. The piston rod must be hardened, see chapter "Design and attachment of the rod", one page 5.

Mounting the Locking Unit KFHA to the standard head rectangular flange acc. to ISO-ME5 / centering ring A

Mount in this way if the combination uses one of the following mounting types:

- ME5 (head rectangular flange)
- MX2 (tie rods extended cap end)
- MT2 (cap trunnion)

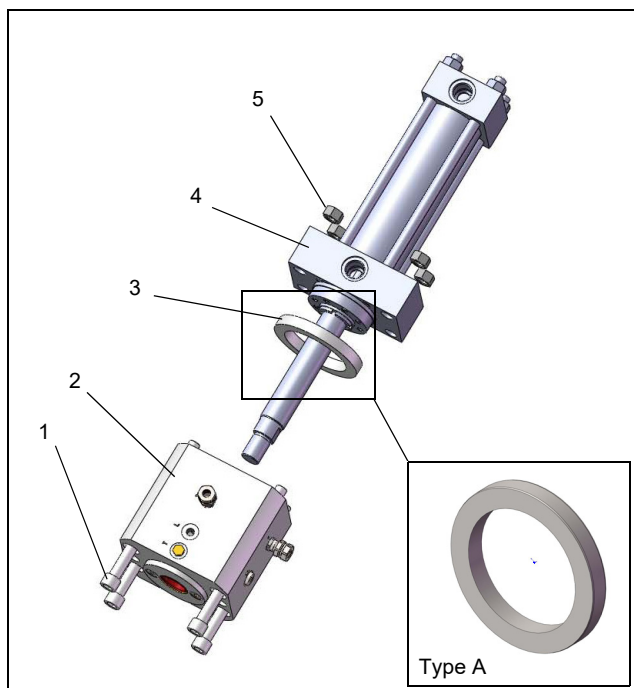


Fig. 3: Application example for mounting on head flange

- 1 Bolts DIN 912
- 2 Locking Unit KFHA
- 3 Centering ring A, inner diameter RD (acc. to ISO)
- 4 Cylinder ISO ME5 with extended piston rod
- 5 Nut

Mounting the Locking Unit KFHA to a special head rectangular flange / centering ring B

Cylinder with special head flange (with hole pattern acc. to ISO-ME5) and with projecting tie rods.

Mount in this way if the combination uses one of the following mounting types, all of which require the tie rods to be fastened from the head end:

- ME6 (cap rectangular flange)
- MP5, MP1, MP3 (cap fixed clevis or eye)
- MT4 (intermediate fixed trunnion)
- MS2 (side lugs; note: dimension E is wider than the cylinder)

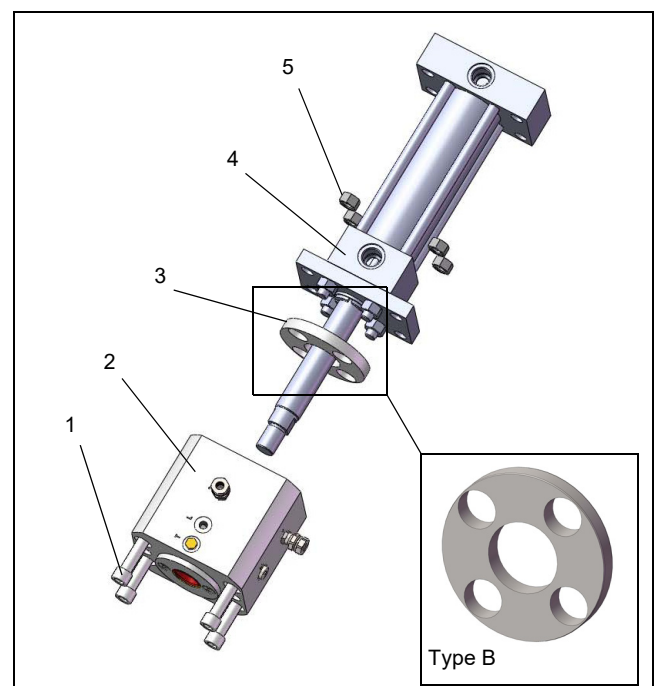


Fig. 4: Application example for mounting on special head flange

- 1 Bolts DIN 912
- 2 Locking Unit KFHA
- 3 Centering ring B, inner diameter B (acc. to ISO) with 4 openings for the tie rods and nuts
- 4 Cylinder with special flange and extended piston rod
- 5 Nut

Mounting without a cylinder

Mounting the Locking Unit KFHA in applications without cylinder / centering ring C

Mount in this way if the Locking Unit KFHA shall be used on a separate rod.

This type of mounting is only admissible in combination with the centering ring which has to be ordered together with the unit.

The support surface on the machine element must face the centering ring side of the Locking Unit KFHA.

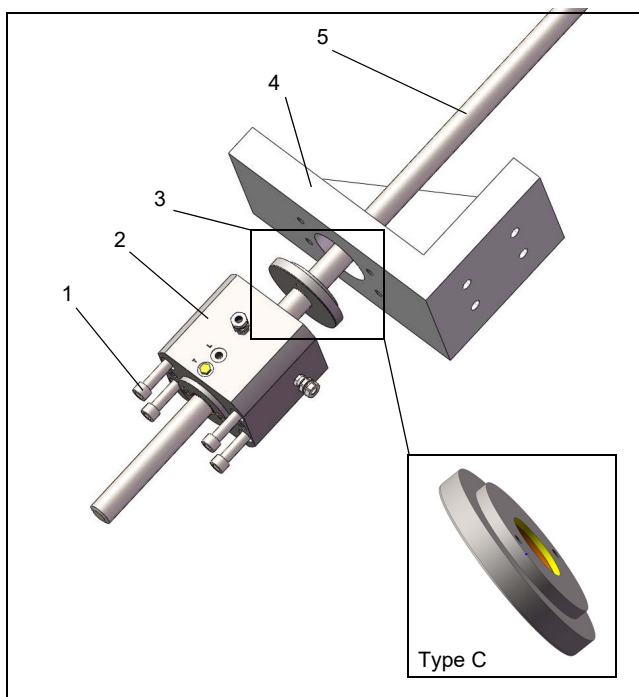


Fig. 5: Application example for mounting without cylinder

- 1 Through bolts DIN 912
- 2 Locking Unit KFHA
- 3 Centering ring C with wiper
- 4 Machine element
- 5 Clamping rod

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 KFHA is designed to operate in normal clean and dry workshop atmosphere.

Operation in other environmental conditions is possible if at least port T is connected to a clean and dry atmosphere (e.g. tank). In case of heavy soiling conditions (grinding dust, chips, other liquids, etc.), please contact SITEMA.

Viscous lubricants and grease may reduce the holding force. The permitted surface temperature is -20°C to +60°C.

Required risk assessment

It must be ensured that the dimensions and arrangement of a Locking Unit KFHA used in safety-relevant applications meet the requirements of the risk evaluation EN ISO 12100:2010 and also comply with any further standards and regulations applicable for the intended use. The Locking Unit KFHA 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.

Design and attachment of the rod

The Locking Unit KFHA 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 KFHA 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 suffi-

cient yield strength. In the case of compression-loaded rods, sufficient buckling resistance must be assured.

Pressure fluid

Hydraulic oil (HLP) in accordance with DIN 51524-2:2017 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 KFHA. In all other operational conditions including power failure, emergency stop etc., the Locking Unit KFHA 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".

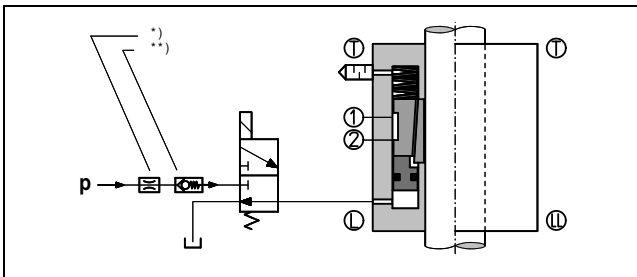


Fig. 6: Schematic diagram of hydraulic circuit

- * In case impact noises due to excess pressure are audible when pressurizing the Locking Unit KFHA, 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 KFHA is required, the following preconditions must be met:

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

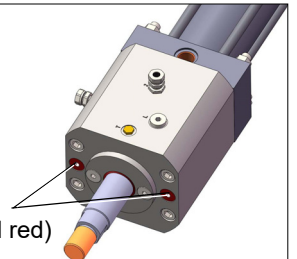
Emergency releasing

In case the hydraulic releasing should not work, a mechanical emergency releasing is possible.

This method is only admissible for emergency cases and not suitable for repeated use.

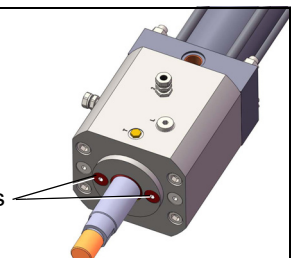
Operating condition

Parking position of the releasing screws (painted red)



Emergency releasing

Position of the releasing screws (painted red) during emergency releasing



Regular performance tests

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

Please see the *operating manual* for further details.

Maintenance

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

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