

English translation of German original

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".

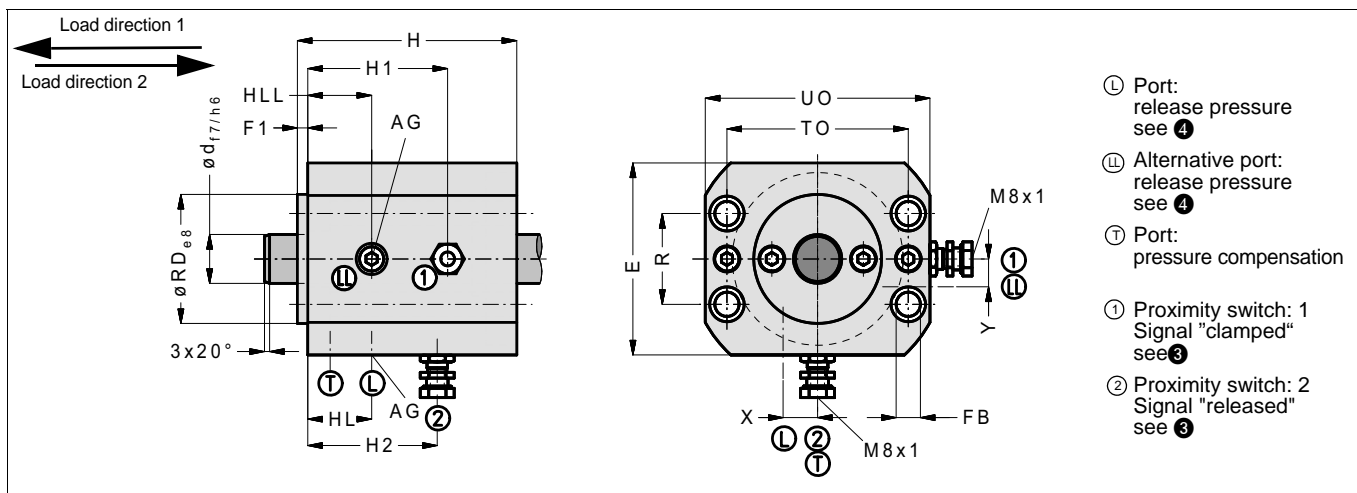


Fig. 1: Dimensions Locking Unit KFHA (CAD-Files download at www.sitema.com)

Type Ident.-No.	ø piston	d	①		E	UO	H	R	TO	FB	RD	F1	H1	H2	HL	X	HLL	Y	AG	VL	Weight
			F	P																	
	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
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	9,5
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
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																	

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)

① 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.

② Hydraulic operating volume.

③ Proximity switch holders are provided for standard proximity switches M8x1 with a nominal switching distance of 1,5 mm (flush mountable).

For easier service, the proximity switch holders have a depth stop and are pre-adjusted when delivered from the factory.

④ Plugged hydraulic port LL alternative to L, useful for bleeding.

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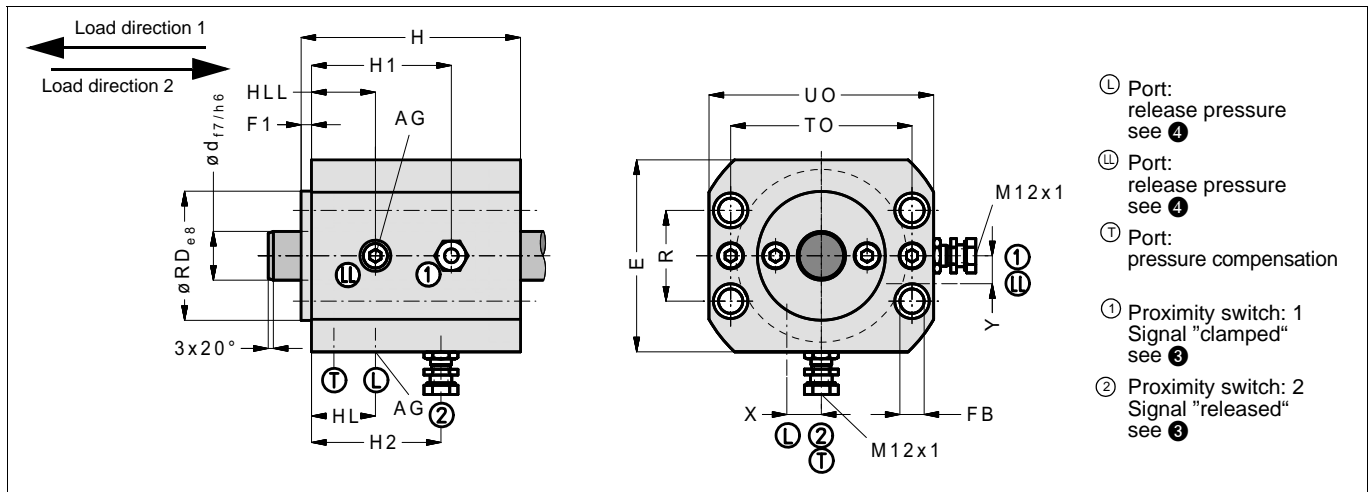


Fig. 2: Dimensions Locking Unit KFHA (CAD-Files download at www.sitema.com)

Type	ϕ piston	d	F	p	E	UO	H	R	TO	FB	RD	F1	H1	H2	HL	X	HLL	Y	AG	VL	Weight
	mm	mm	kN	bar	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm		cm ³	kg
KFHA 80-36 KFHA 080 036 050-1 KFHA 080 036 070-1	80	36	34	50	164	180	184	83	149	17,5	105	8	107	99	49	0	55	0	G1/4	30	31,5
52			70																		
KFHA 80-45 KFHA 080 045 050-1 KFHA 080 045 070-1	80	45	34	50	164	180	184	83	149	17,5	105	8	107	99	49	0	55	0	G1/4	30	31,5
52			70																		
KFHA 100-45 KFHA 100 045 050-1 KFHA 100 045 070-1 KFHA 100 045 100-1	100	45	32	50	180	200	210	97	162	17,5	125	8	103	95	45	30	45	26	G1/4	41	44
55			70																		
KFHA 100-56 KFHA 100 056 050-1 KFHA 100 056 070-1 KFHA 100 056 100-1	100	56	32	50	180	200	210	97	162	17,5	125	8	103	95	45	30	45	26	G1/4	41	44
55			70																		
KFHA 125-56 KFHA 125 056 050-1 KFHA 125 056 100-1	125	56	80	50	234	250	248	126	208	22	150	8	168	160	49	0	61	0	G1/4	80	84
125			100																		
KFHA 125-70 KFHA 125 070 050-1 KFHA 125 070 100-1	125	70	80	50	234	250	248	126	208	22	150	8	168	160	49	0	61	0	G1/4	80	84
125			100																		

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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 80-36, 50 bar, with centering ring B: KFHA 080 036 050-1 (ring B)

① 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.

② Hydraulic operating volume.

③ Proximity switch holders are provided for standard proximity switches M8x1 with a nominal switching distance of 1,5 mm (flush mountable).

For easier service, the proximity switch holders have a depth stop and are pre-adjusted when delivered from the factory.

④ Plugged hydraulic port LL alternative to L, useful for bleeding.

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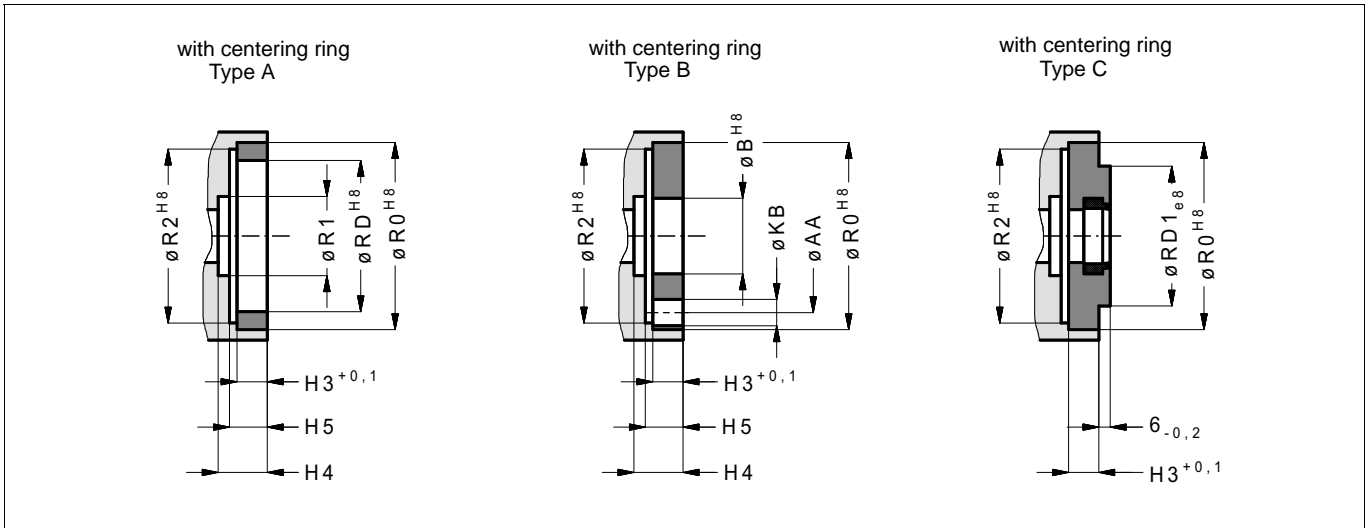


Fig. 3: Dimensions for mounting possibilities Locking Unit KFHA

Typ	\varnothing piston	d	R0	RD	RD1	R1	R2	B	H3	H4	H5	AA	KB (4x90°)
	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					

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Operational 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.

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)

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)

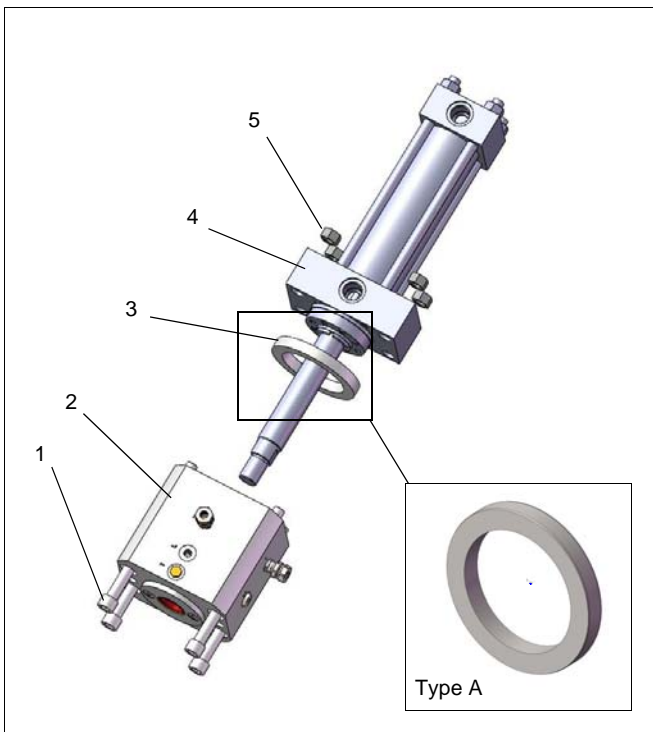


Fig. 4: Application example for mounting on head flange

- 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

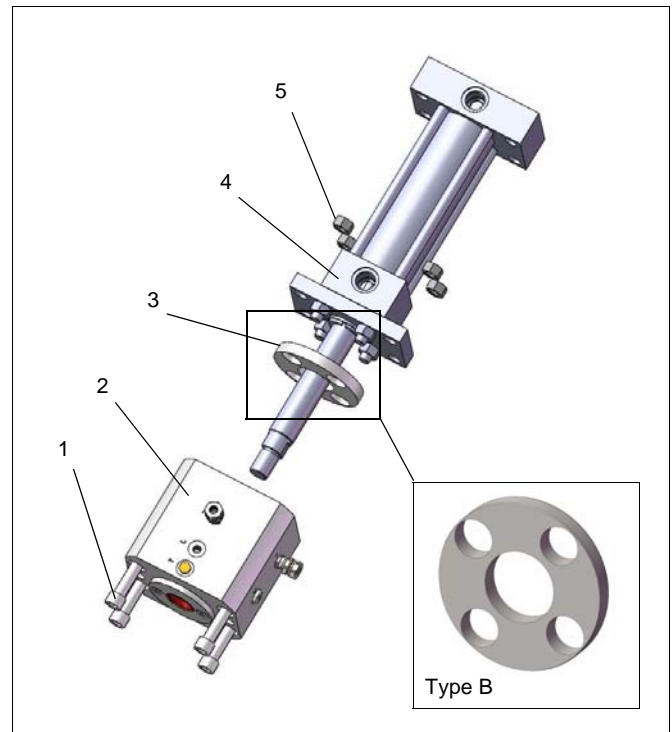


Fig. 5: Application example for mounting on special head flange

- 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.

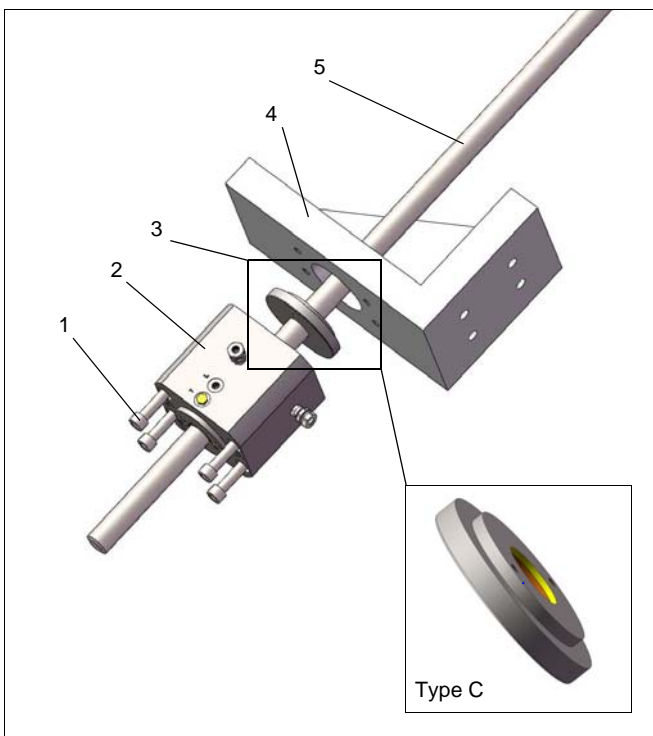


Fig. 6: Application example for mounting without cylinder

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

Axial play

A force in load direction 1 is always held without backlash.

If the force acts in load direction 2, no backlash will occur either, provided that the force does not exceed approx. 80% of the nominal holding force F . In this case, the possible axial displacement is 0.1 - 0.3 mm.

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 KFHA 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 KFHA will operate correctly only if the rod has a suitable surface:

- ISO tolerance field f7 or h6
- Surface roughness: $R_z = 1$ to $4 \mu\text{m}$
- Rod surface hardened (min. HRC 56)
- Lead-in chamfer min. $3 \times 20^\circ$, rounded

An additional hard chrome plating $20 \pm 10 \mu\text{m}$, 800 – 1000 HV is recommended.

The following rod qualities are widely available and suitable:

1. Piston rods, hard chrome plated (ISO tolerance f7)
 - Basic material: yield strength min. 580 N/mm^2
 - Induction hardened HRC 56 - 64, min. depth 1 mm
 - Hard chrome plating: 800-1100 HV, min. depth 13 μm
 - Surface finish: $R_a 0.15 - 0.25 \mu\text{m}$
2. Shafts for linear ball bearings (ISO tolerance h6)
 - Induction hardened HRC > 60
 - Surface finish: $R_a 0.15 - 0.25 \mu\text{m}$

The actual holding force of the Locking Unit KFHA is higher than the nominal holding force 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 $2 \times F$. Please note that at dynamic loads (e.g. when braking), the full holding force ($2 \times F$) can occur. Only if it is certain that the maximum loads are effectively smaller, the attachments can be designed for these smaller values.

Generally, the basic rod material has to have sufficient 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 must be used as pressure medium. Please consult SITEMA before using any other media.

Control

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

During every operational cycle, the 3/2-way valve is actuated electrically and releases the locking unit. In all other operational conditions including power failure, emergency stop etc., the locking unit 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 "released".

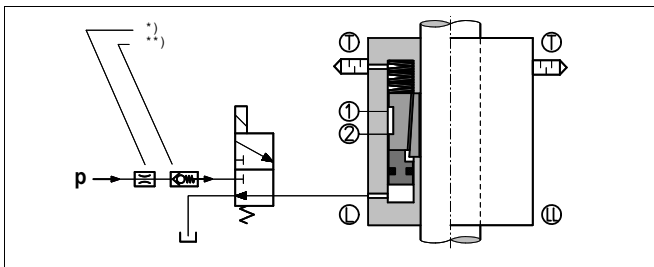


Fig. 7: Schematic diagram of hydraulic circuit

* 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.

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

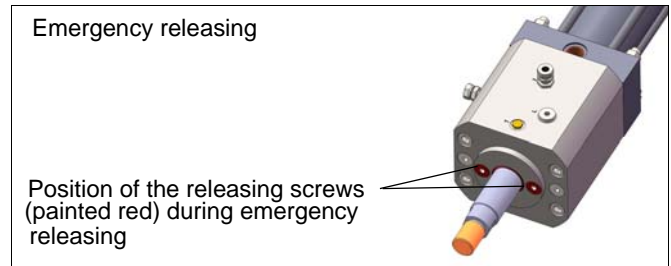
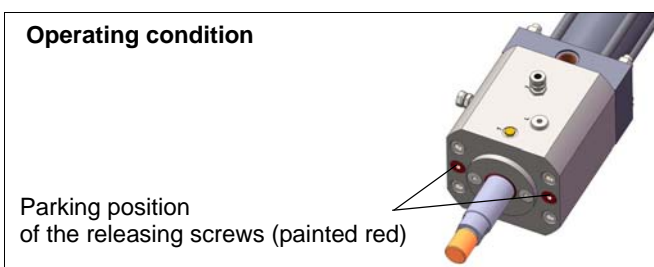
If a particular quick response of the Locking Unit KFHA is required, the following preconditions must be met:

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

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 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.

Regular functional checks

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

Please see the operation manual for further details.

Required risk assessment

It must be ensured that the dimensions and arrangement of a SITEMA Locking Unit KFHA 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 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.

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.