

Technical Data Sheet TI-F22 Locking Units KFPA series

Z types for use with standard cylinder according to ISO 15552
 (corresponds to the withdrawn standards ISO 6431, DIN ISO 6431, VDMA 24 562)
 For a detailed functional description, refer to "Technical Information TI-F10".
 Further important practical advice is given in "Operation Manual BA-F22".

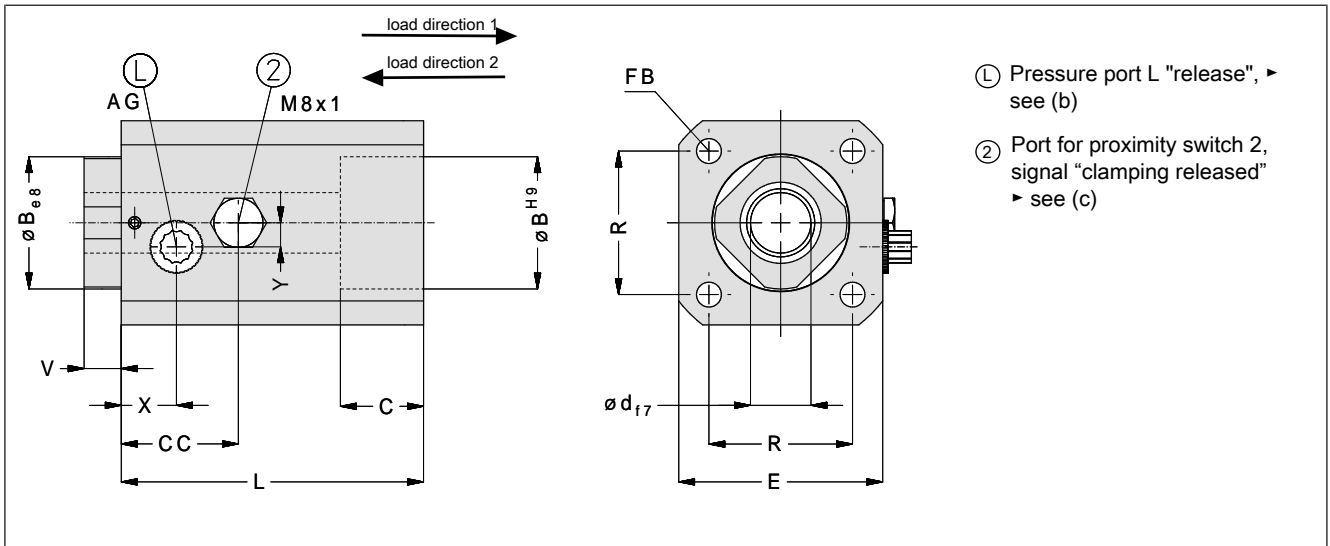


Fig. 1: Dimensions of KFPA locking unit, Z type, for use with standard cylinder (download of CAD files: www.sitema.com)

Type	ID no. (order no.)	(a)							(d)							
		d	F	B	C	V	CC	L	E	R	FB ϕ	V	AG	X	Y	Wt.
		mm	kN	mm	mm	mm	mm	mm	mm	mm	mm	cm ³		mm	mm	kg
KFPA 40-16 - Z	KFPA 040 016-1	16	0.9	35	22	10	31	80	54	38	6.6	6	G1/8	15	6	0.7
KFPA 50-20 - Z	KFPA 050 020-1	20	1.6	40	29	12	37	99	64	46.5	9	20	G1/8	15	6	1.3
KFPA 63-20 - Z	KFPA 063 020-1	20	2.2	45	29	12	37	101	75	56.5	9	20	G1/8	15	6	1.7
KFPA 80-25 - Z	KFPA 080 025-1	25	4.2	45	35	16	38	110	96	72	11	60	G1/8	15	6	2.7
KFPA 100-25 - Z	KFPA 100 025-1	25	6.9	55	38	16	38	115	115	89	11	80	G1/4	11	-	4.8
KFPA 125-32 - Z	KFPA 125 032-1	32	8.7	60	50	15.7	41	130	145	110	13.5	120	G1/4	14	-	8.8
KFPA 160-40 - Z	KFPA 160 040-1	40	10.9	65	52	19.7	50	140	180	140	17.5	240	G1/4	14	-	14.8

Subject to modification without prior notice

- (a) The nominal holding force F is the minimum holding force for dry rods or rods wetted with hydraulic fluid.
- (b) To release the clamping, a pressure of 4 bar is required. The permissible operating pressure is 8 bar.
- (c) The port is designed for a standard inductive proximity switch: M8 x 1, nominal switching distance 1.5 mm, flush mountable, NO (normally open).
- (d) Pneumatic operating volume
- (e) The aluminum surfaces of the housing parts are anodized.

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S types for use with separate rod

For a detailed functional description, refer to "Technical Information TI-F10".

Further important practical advice is given in "Operation Manual BA-F22".

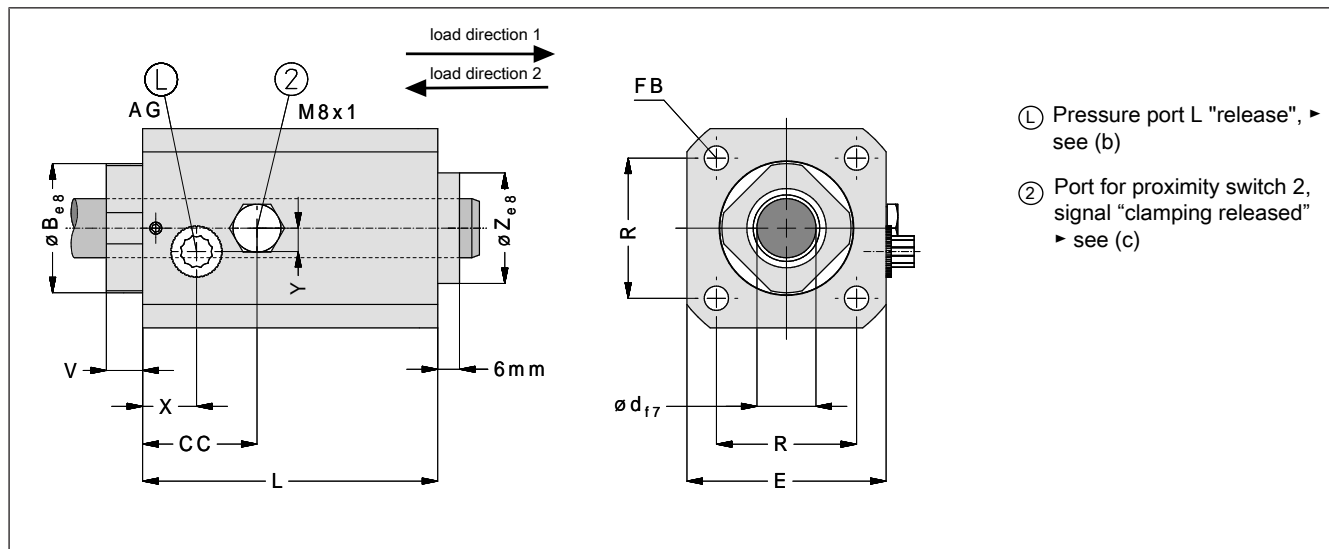


Fig. 2: Dimensions of KFPA locking unit, S type, for use with separate rod (download of CAD files: www.sitema.com)

Type	ID no. (order no.)	(a)										(d)					Wt. kg
		d mm	F kN	B mm	C mm	V mm	CC mm	L mm	E mm	R mm	FB ø mm	V cm ³	AG	X mm	Y mm		
KFPA 40-16 - S	KFPA 040 016-2	16	0.9	35	10	30	31	80	54	38	6.6	6	G1/8	15	6	0.7	
KFPA 50-20 - S	KFPA 050 020-2	20	1.6	40	12	35	37	99	64	46.5	9	20	G1/8	15	6	1.3	
KFPA 63-20 - S	KFPA 063 020-2	20	2.2	45	12	40	37	101	75	56.5	9	20	G1/8	15	6	1.7	
KFPA 80-25 - S	KFPA 080 025-2	25	4.2	45	16	40	38	110	96	72	11	60	G1/8	15	6	2.7	
KFPA 100-25 - S	KFPA 100 025-2	25	6.9	55	16	45	38	115	115	89	11	80	G1/4	11	-	4.8	
KFPA 125-32 - S	KFPA 125 032-2	32	8.7	60	15.7	55	41	130	145	110	13.5	120	G1/4	14	-	8.8	
KFPA 160-40 - S	KFPA 160 040-2	40	10.9	65	19.7	60	50	140	180	140	17.5	240	G1/4	14	-	14.8	

Subject to modification without prior notice

- (a) The nominal holding force F is the minimum holding force for dry rods or rods wetted with hydraulic fluid.
- (b) To release the clamping, a pressure of 4 bar is required. The permissible operating pressure is 8 bar.
- (c) The port is designed for a standard inductive proximity switch: M8 x 1, nominal switching distance 1.5 mm, flush mountable, NO (normally open).
- (d) Pneumatic operating volume
- (e) The aluminum surfaces of the housing parts are anodized.

Technical Information

Purpose

The KFPA locking unit clamps a rod in any position. It is commonly used to clamp the piston rods of standard cylinders according to ISO 15552 or other rods.

The KFPA locking unit absorbs axial forces in both load directions.

Types

The KFPA series is available in two types:

- Z types for use with standard cylinder according to ISO 15552
- S types for use with separate clamping rod

Types of mounting

Z types: Mounting on a standard cylinder

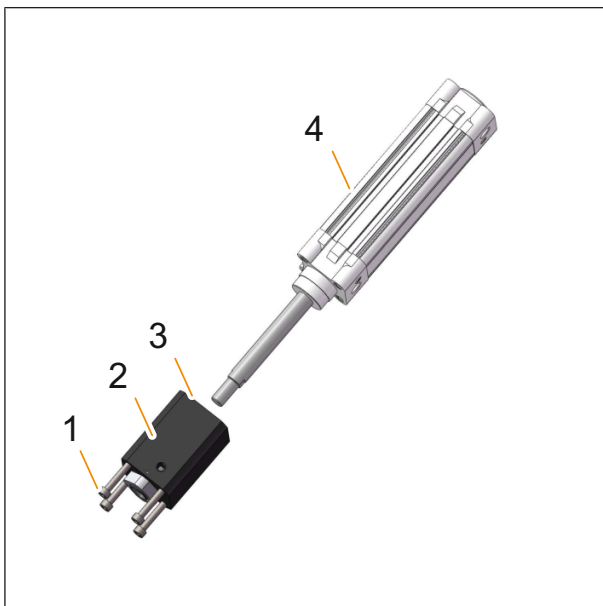


Fig. 3: Z type, mounting on standard cylinder

1	Mounting screw according to DIN 912
2	KFPA locking unit, Z type
3	Mounting side
4	Standard cylinder ISO 15552

The KFPA locking unit, Z type, is mounted with the mounting side (3) to the cylinder head (4). The inserted mounting screws are used for fastening. Please note that usually an extended piston rod is needed. The piston rod must be hardened, see *Requirements of the clamping rod* further down in this document.

S types: Mounting with separate clamping rod

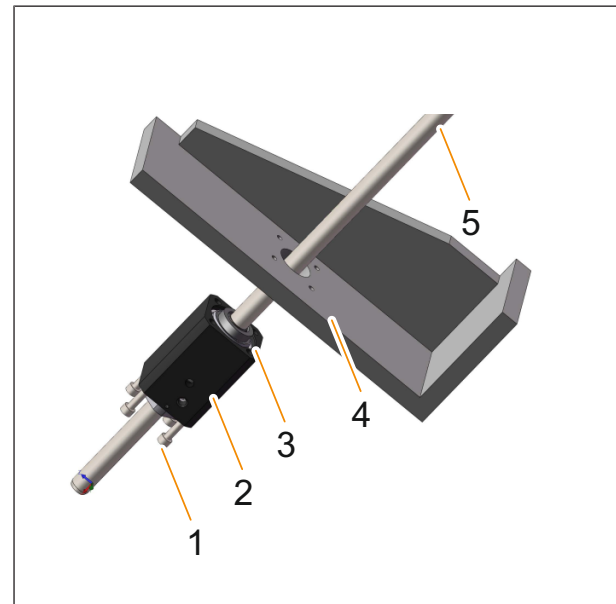


Fig. 4: S type, mounted with separate clamping rod

1	Mounting screw according to DIN 912
2	KFPA locking unit, S type
3	Mounting side
4	Machine element
5	Clamping rod

The KFPA locking unit, S type, is attached with the mounting side (3) to the machine element (4). The inserted mounting screws are used for fastening.

Axial play

The maximum axial play in both load directions is 0.1 mm.

Operating conditions

The KFPA locking unit is designed for operation in a dry and clean environment.

Please contact SITEMA if you have an environment with heavy contamination (particles, grease, grinding dust, or chips) or extreme temperatures.

Viscous lubricants and grease may reduce the holding force.

The permitted surface temperature is 0 to 60 °C.

Risk assessment

It must be ensured that the dimensions and arrangement of a Locking Unit 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 alone is not a complete safety solution. It is however suitable to be part of such a solution. Furthermore, all attachments and connections have to be dimensioned correspondingly. This is generally the duty of the system manufacturer and of the operator.

Choosing the right type

The table shows the nominal holding force F for each type. F must be higher than the maximum axial load acting on the rod.

If it is required to hold or brake vertically moving masses or if any 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.

Requirements of the clamping rod

The KFPA locking unit only operates correctly if the clamping rod fulfills the following requirements:

Requirement	Diameter	Value
ISO tolerance zone	n.a.	f7 or h6
induction hardened	n.a.	min. HRC 56
surface hardening depth	ø to 30 mm ø over 30 mm	min. 1 mm min. 1.5 mm
surface roughness	n.a.	Rz = 1 to 4 µm (Ra 0.15 to 0.3 µm)
Corrosion protection	n.a.	e.g. hard chromium plating 20 ± 10 µm 800 - 1000 HV
lead-in chamfer rounded	ø 18 to 80 mm ø over 80 to 180 mm ø over 180 to 380 mm	min. 4 x 30 ° min. 5 x 30 ° min. 7 x 30 °

Table 3: Requirements of the clamping rod

The rod may not be lubricated with grease.

i Manufacturers of cylinder rods or rods for linear ball bearings usually offer suitable rods.

Attachment of the clamping rod

The actual holding force of the KFPA locking unit is higher than the nominal holding force (F) indicated in the data sheets and drawings; but it will not be higher than twice this value. Therefore, all fastening 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 slips, normally causing no damage to rod and locking unit.

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

fast valve response times

The compressed air must be dried and filtered. SITEMA recommends compressed air according to ISO 8573-1:2010 [7:4:4].

Actuation

In most applications an actuation is used as shown in the figure below.

During every operational cycle, the 3/2-way valve is actuated electrically which releases the clamping. In all other operational conditions, as well as in cases of power failure, the locking unit locks, secures the rod and/or stops the load. The load is also secured if the supply pipe fails.

To avoid problems, a movement of the rod should only be permitted after the proximity switch 2 has switched to the signal "clamping released".

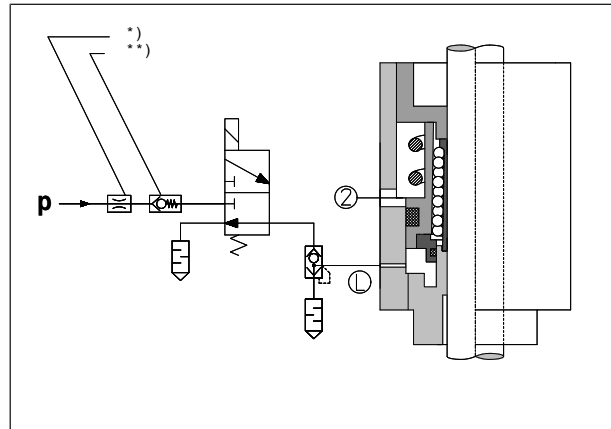


Fig. 5: Actuation

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

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

- installation of a dump valve at L
- short line distances
- quick valve response times
- suitable controller

Regular performance tests

A performance check of the locking unit must be carried out at regular intervals. Regular performance checks are the only way to ensure that the unit will operate safely in the long run.

Please see the operating manual for further details.

Maintenance and repair

Maintenance is limited to the regular performance tests. If the performance test shows that locking unit no longer complies with the requirements, a safe operation of the machine or system may no longer be given. In this case the locking unit must be immediately and professionally repaired and tested by SITEMA.

To ensure the function as safety-related component, any repair must be carried out by SITEMA. SITEMA cannot take any responsibility for repairs carried out by another party.