

Technical Data Sheet TI-F22 Locking Units series KFPA

Z types for use with standard cylinders 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(corresponds to the withdrawn standards ISO 6431, DIN ISO 6431, VDMA 24 562)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".

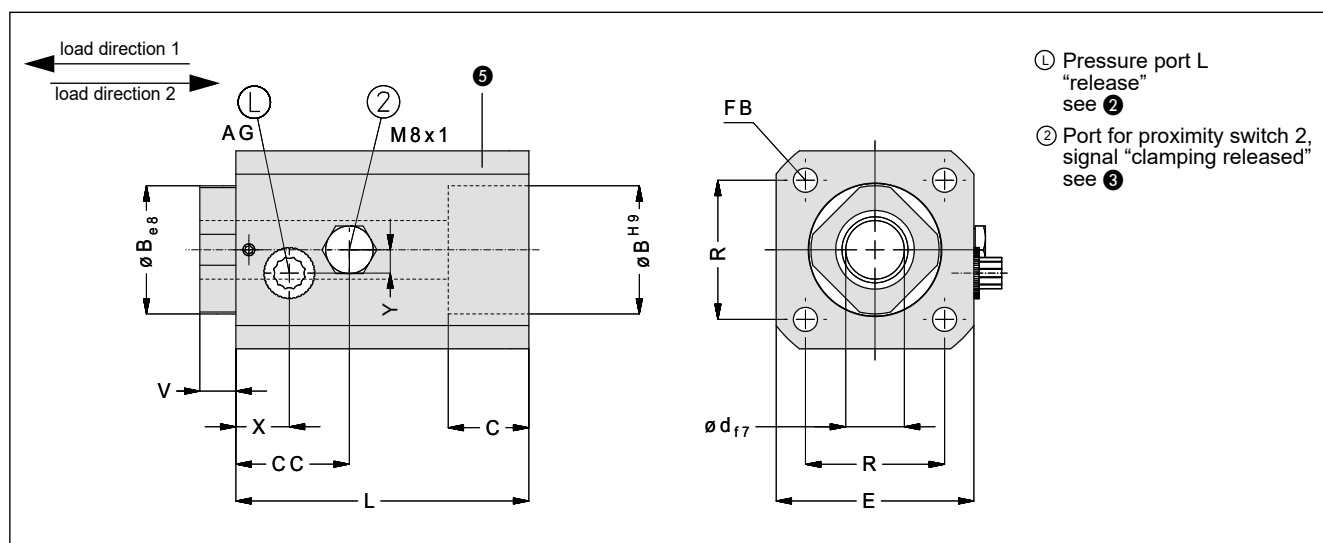


Fig. 1: Dimensions of Locking Unit KFPA, Z types for use with standard cylinder (download CAD files from www.sitema.com)

Type	ID no. (order no.)	ø piston rod mm	d mm	F kN	B mm	V mm	C mm	CC mm	L mm	E mm	R mm	FB ø mm	V cm ³	AG mm	X mm	Y mm	Weight kg
KFPA 40-16 - Z	KFPA 040 016-1	40	16	0.9	35	10	22	31	80	54	38	6.6	2.5	1/8	15	6	0.7
KFPA 50-20 - Z	KFPA 050 020-1	50	20	1.6	40	12	29	37	99	64	46.5	9	5.5	1/8	15	6	1.3
KFPA 63-20 - Z	KFPA 063 020-1	63	20	2.2	45	12	29	37	101	75	56.5	9	6.5	1/8	15	6	1.7
KFPA 80-25 - Z	KFPA 080 025-1	80	25	4.2	45	16	35	38	110	96	72	11	14	1/8	15	6	2.7
KFPA 100-25 - Z	KFPA 100 025-1	100	25	6.9	55	16	38	38	115	115	89	11	19	1/4	11	-	4.8
KFPA 125-32 - Z	KFPA 125 032-1	125	32	8.7	60	15.7	50	41	130	145	110	13.5	27	1/4	14	-	8.8
KFPA 160-40 - Z	KFPA 160 040-1	160	40	10.9	65	19.7	52	50	140	180	140	17.5	59	1/4	14	-	14.8

Subject to modification without prior notice

- ❶ The nominal holding force F is the minimum holding force for dry or hydraulic-oil wetted rods.
- ❷ The pressure p required for releasing is 4 bar. The permissible operating pressure is 8 bar.
- ❸ The port is provided for a standard inductive proximity switch (M8 x 1 with a nominal switching distance of 1.5 mm, flush mountable, NO (normally open)).
- ❹ Pneumatic operating volume
- ❺ The aluminum surfaces of the housing parts are anodized.

Technical Data Sheet TI-F22 Locking Units series KFPA 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".

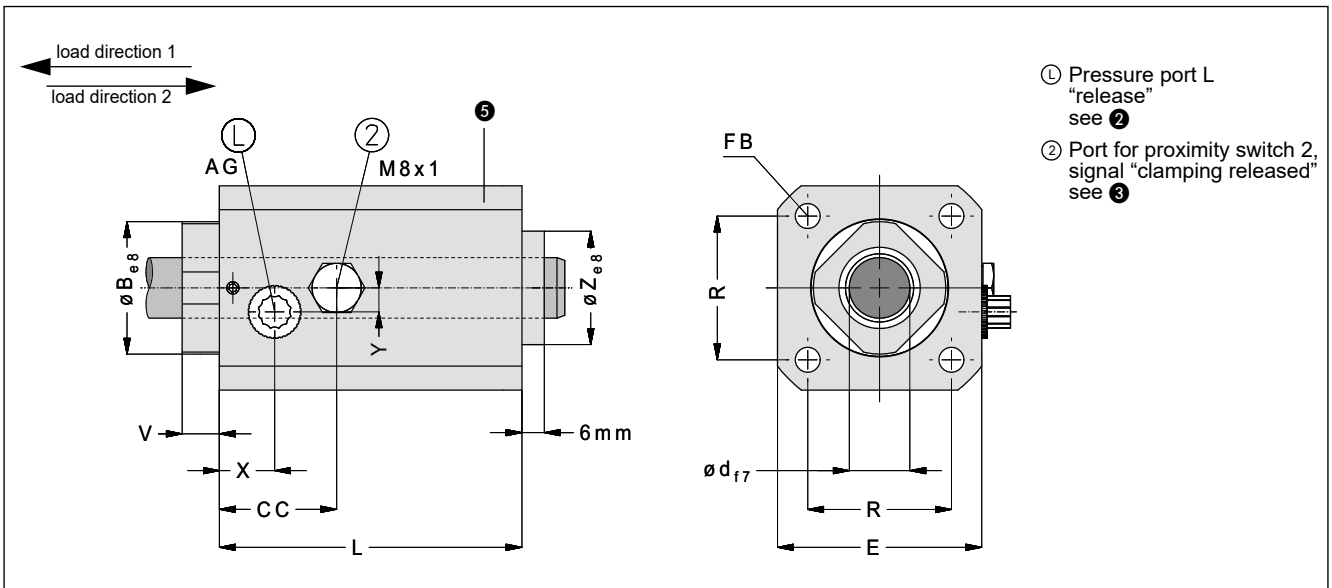


Fig. 2: Dimensions of Locking Unit KFPA, S types for use with separate rod (download CAD files from www.sitema.com)

Type	ID no.	d	F	B	V	Z	CC	L	E	R	FB ø	V	AG	X	Y	Weight
	(order no.)	mm	kN	mm	mm	mm	mm	mm	mm	mm	mm	cm ³		mm	mm	kg
KFPA 40-16 - S	KFPA 040 016-2	16	0.9	35	10	30	31	80	54	38	6.6	2.5	1/8	15	6	0.7
KFPA 50-20 - S	KFPA 050 020-2	20	1.6	40	12	35	37	99	64	46.5	9	5.5	1/8	15	6	1.3
KFPA 63-20 - S	KFPA 063 020-2	20	2.2	45	12	40	37	101	75	56.5	9	6.5	1/8	15	6	1.7
KFPA 80-25 - S	KFPA 080 025-2	25	4.2	45	16	40	38	110	96	72	11	14	1/8	15	6	2.7
KFPA 100-25 - S	KFPA 100 025-2	25	6.9	55	16	45	38	115	115	89	11	19	1/4	11	-	4.8
KFPA 125-32 - S	KFPA 125 032-2	32	8.7	60	15.7	55	41	130	145	110	13.5	27	1/4	14	-	8.8
KFPA 160-40 - S	KFPA 160 040-2	40	10.9	65	19.7	60	50	140	180	140	17.5	59	1/4	14	-	14.8

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 required for releasing is 4 bar. The permissible operating pressure is 8 bar.
- ③ The port is provided for a standard inductive proximity switch (M8 x 1 with a nominal switching distance of 1.5 mm, flush mountable, NO (normally open)).
- ④ Pneumatic operating volume
- ⑤ The aluminum surfaces of the housing parts are anodized.

Operational purpose

The Locking Unit KFPA clamps a rod in any position. It is commonly used to clamp the rod of standard cylinders according to ISO 15552 or other rods independent from a cylinder.

Locking Unit KFPA holds axial forces in both directions.

Mounting types

The series KFPA is available in **two styles**:

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

Z types for mounting on standard cylinder

The Locking Unit KFPA, type Z is to be mounted with the mounting side (3), Fig. 3: to the cylinder head (4), Fig. 3: using the mounting screws (1).

Please note that usually an extended piston rod is needed. The piston rod must be hardened, see Kapitel "Design and attachment of the rod" on page 4.

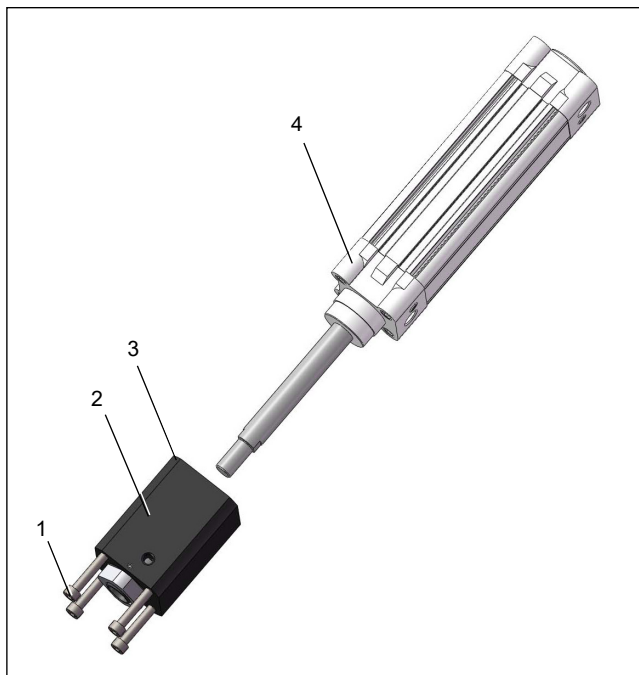


Fig. 3: Application example for mounting on standard cylinder

- 1 Mounting screws DIN 912, pushed through
- 2 Locking Unit KFPA, type Z
- 3 Mounting side
- 4 Standard cylinder according to ISO15552

S types for mounting with separate rod

The Locking Unit KFPA, type S is to be attached with the mounting side (3), Fig. 4: to the machine element (4), Fig. 4:.

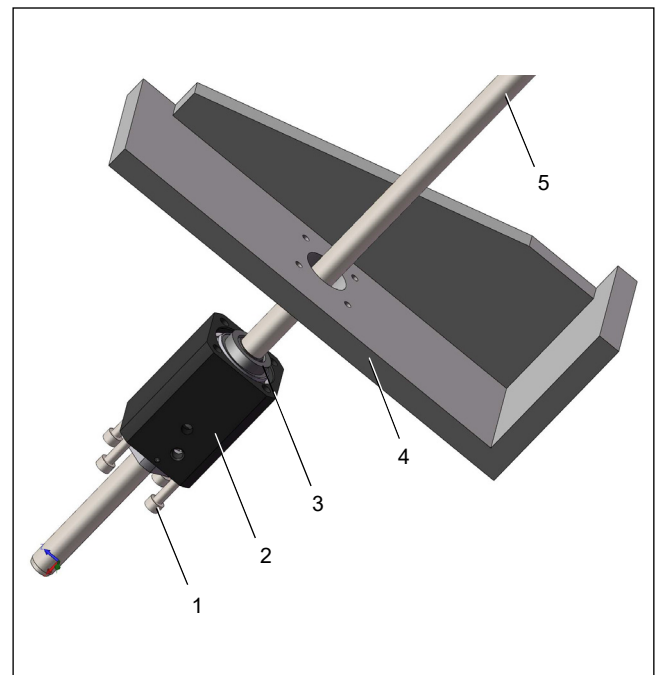


Fig. 4: Application example for mounting with separate rod

- 1 Mounting screws DIN 912, pushed through
- 2 Locking Unit KFPA, type S
- 3 Mounting side (with wiper and guiding strip)
- 4 Machine element
- 5 Clamping rod

Axial play

The axial play in both load directions is about max. 0.1 mm.

Operating conditions

The Locking Unit KFPA is designed to operate in normal clean and dry workshop atmosphere.

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 0°C to +60°C.

Required risk assessment

It must be ensured that the dimensions and arrangement of a Locking Unit KFPA 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 KFPA 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 type

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 KFPA 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:
 \varnothing up to 30 mm: min. 1 mm
 \varnothing over 30 mm: min. 1.5 mm
- surface roughness: $Rz = 1$ to $4 \mu\text{m}$ ($Ra 0.15 - 0.3 \mu\text{m}$)
- protection against corrosion, e.g. hard chromium plating: $20 \pm 10 \mu\text{m}$, 800 – 1 000 HV
- lead-in chamfer, rounded:
 \varnothing 18 mm up to \varnothing 80 mm: min. $4 \times 30^\circ$
 \varnothing over 80 mm up to \varnothing 180 mm: min. $5 \times 30^\circ$
 \varnothing over 180 mm up to \varnothing 380 mm: min. $7 \times 30^\circ$

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.

Make sure the base material of the rod is of adequate strength. Ensure that there is no risk of pressurized rods being kinked.

The actual holding force of the Locking Unit KFPA 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.

Pressure fluid

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

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 KFPA. In all other operational conditions including power failure, etc., the Locking Unit KFPA 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".

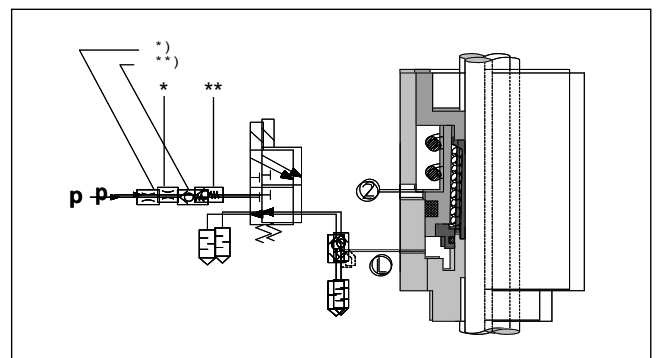


Fig. 5: Schematic diagram of pneumatic circuit

* In case impact noises due to excess pressure are audible when pressurizing the Locking Unit KFPA, these can be suppressed by means of a flow control valve (throttle) 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 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 KFPA is required, the following preconditions must be met:

- installation of a dump valve at L
- short line distances
- fast valve response times
- appropriate control

Regular performance tests

The Locking Unit KFPA must be functionally checked at regular intervals. Regular checking is the only way to ensure that the Locking Unit KFPA 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 Units KFPA 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 Units KFPA must be immediately and professionally repaired by SITEMA.

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