

# Technical Data Sheet TI-F21 Locking Units series KFPC

For a detailed functional description refer to "Technical Information TI-F10".  
Further important practical advice is given in "Operating Manual BA-F21".

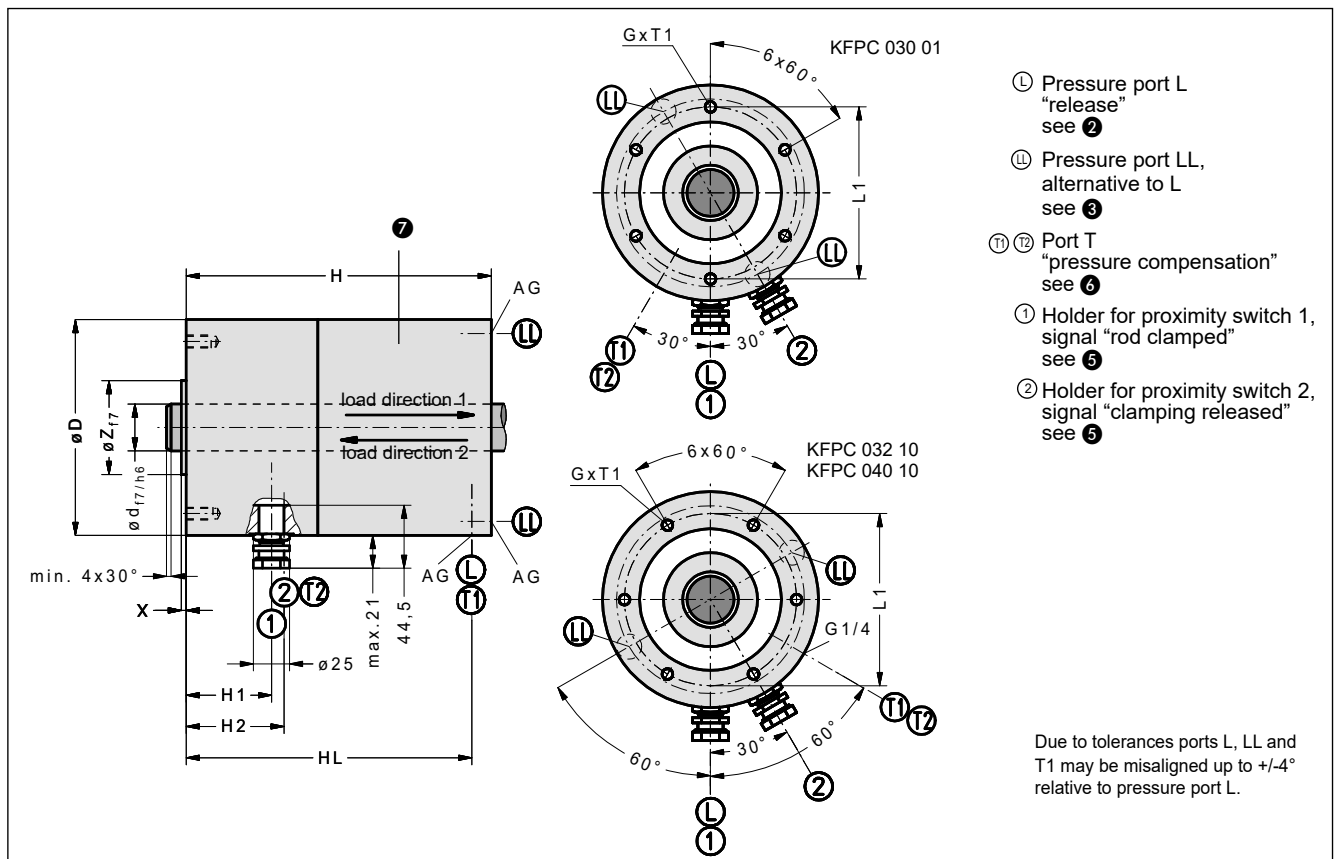


Fig. 1: Dimensions Locking Unit KFPC (CAD-Files download at [www.sitema.com](http://www.sitema.com))

Type	ID no. (order no.)	d mm	F kN	p bar	D mm	H mm	L1 mm	T1 mm	G	Z mm	X mm	AG	V cm <sup>3</sup>	HL mm	H1 mm	H2 mm	Wt. kg
<b>KFPC 30</b>	KFPC 030 01	30	12	4	138	195	110	16	M8	60	3	G1/4	220	182.5	57.5	65.5	8.5
<b>KFPC 32</b>	KFPC 032 10	32	20	4	168	250	140	20	M10	85	3	G1/4	350	231.5	65	73	17
<b>KFPC 40</b>	KFPC 040 10	40	30	4	185	300	145	24	M12	85	3	G1/4	600	282	72	80	22

Subject to modification without prior notice

- ① F is the nominal (minimum) holding force for dry or hydraulic-oil wetted rods.
- ② The pressure p is required to release the clamping. The admissible operating pressure is 8 bar.
- ③ As supplied, pressure port LL is plugged by a plug screw. It may be used alternatively to pressure port L.
- ④ Pneumatic operating volume
- ⑤ Proximity switch holders are provided for standard inductive proximity switches (M12 x 1 nominal switching distance 2 mm, flush mountable, NO (normally open)).  
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.

⑥ Internal volume changes during switching are compensated at ports T1 and T2. Air filters are fitted to the ports for "breathing". In a dry and clean factory environment, this offers sufficient protection against dust etc.

If, however, moisture or aggressive media are present (e. g. coolant spray), pressureless hoses instead of the filters must be installed to connect the Locking Unit KFPC with clean atmosphere (e. g. a clean pressureless container).

⑦ The aluminum surfaces of the housing parts are anodized.

## Purpose

The Locking Unit KFPC is used as a stepless rod clamp for linear axes in machine tools.

The Locking Unit KFPC absorbs axial forces in both load directions.

## 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 KFPC is suitable not only for dry environment, but also for operation in the presence of coolant or lubricant spray. For this reason, all external parts and sealing surfaces are made of corrosion protected material.

In case of heavy soiling conditions (grinding dust, chips, other liquids, etc.), please contact SITEMA.

The permitted surface temperature is 0°C to +60°C.

Viscous lubricants and grease may reduce the holding force.

## Required risk assessment

It must be ensured that the dimensions and arrangement of a Locking Unit KFPC 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 KFPC 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 KFPC 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 KFPC 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 KFPC. In all other operational conditions including power failure, emergency stop etc., the Locking Unit KFPC 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".

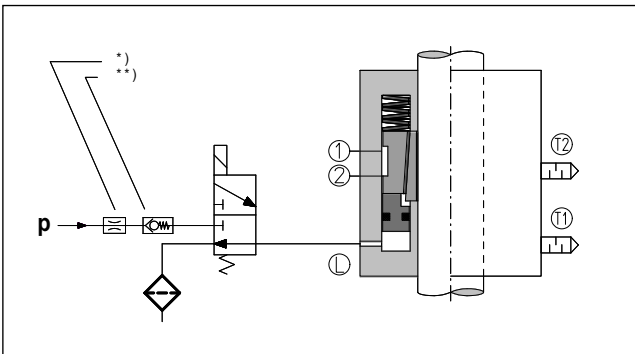


Fig. 2: Schematic diagram of pneumatic circuit

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

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

**Regular performance tests**

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

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