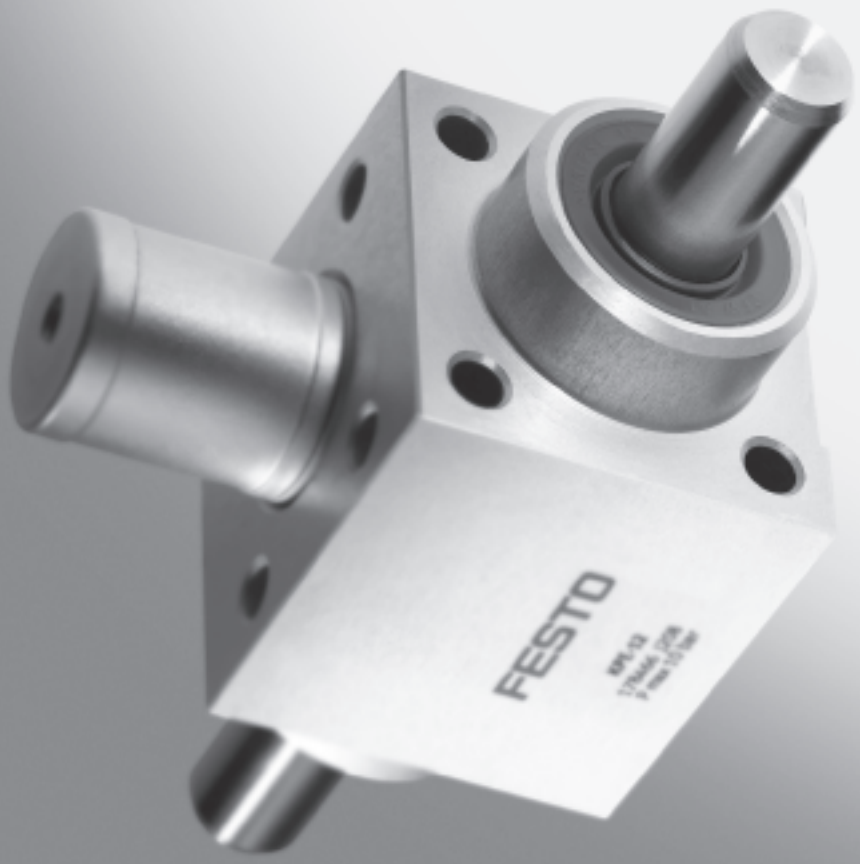
Clamping cartridges/units



- Holding, clamping and braking of round material
- Wide choice of variants
- Any assembly position

Clamping cartridges/units

Key features

At a glance

- The clamping cartridges/clamping units use spring force to hold round material in any desired position.
- Able to stop and hold material for long periods, even in applications involving varying loads, fluctuating operating pressure and system leaks.
- The clamping force is released by pressurising the clamping mechanism.
- Clamping cartridges and clamping units can be mounted in any position.
- They are not suitable for use as positioning devices.
- The clamping cartridge KP and the clamping units KPE, KEC, KEC-S are discrete components and are not intended for use as attachments for pneumatic cylinders.
- In their clamped state, the clamping cartridges and clamping units are not free of backlash when their piston rods are subjected to alternating loads.

Selection aid

Clamping cartridge KP ➔ 4

- For in-house assembly of clamping units
- Not certified for use in safety-relevant control systems

Clamping unit KPE ➔ 6

- Ready-to-install combination of clamping cartridge KP and housing
- Versatile mounting options ➔ 7
- Not certified for use in safety-relevant control systems

Clamping unit KEC ➔ 8

- **For use as holding device (static application):**
  - Holding and clamping in the event of a power failure
  - Protection against pressure failure and pressure drop
  - Securing the piston rod during intermediate stops for process operations
- Mounting hole pattern to ISO 15552 (DIN ISO 6431)
- Not certified for use in safety-relevant control systems

Clamping-unit cylinder KEC-...-S, for safety-related applications ➔ 10

- **For use as holding device (static application):**
  - Holding and clamping in the event of a power failure
  - Protection against pressure failure and pressure drop
  - Securing of the piston rod during intermediate stops for process operations
- **For use as a braking device (dynamic application):**
  - Braking or stopping of movements
  - Suspension of movement upon entering a danger area
- Mounting hole pattern to ISO 15552 (DIN ISO 6431)
- When used as a braking device, the overtravel must be checked regularly
- Suitable for use in safety-related parts of control systems belonging to category 1 to EN ISO 13849-1 (reliable component). For use in higher categories, additional control measures are required
- Certified for use in safety-relevant control systems by the BG-Institute for Occupational Safety and Health (Berufsgenossenschaftlichen Institut für Arbeitsschutz – BIA) in Germany
- Products intended for use in safety-related applications must be selected, sized and arranged in accordance with the risk assessment (EN ISO 14121-1) as well as any other valid standards and regulations

Clamping cartridges/units

Key features and type codes

Requirements for the round material to be clamped

in combination with clamping cartridge KP or clamping unit KPE

- Material:
  - Hard-chromium plated steel
  - Hardened steel
  - Rolled steel:
    tensile strength > 650 N/mm^2,
    hardness (HB30) > 175
- Diameter tolerance: h8
- Surface roughness:
  $R_{max.}$ = 4 µm
- The specified holding forces refer to a static load. If these values are exceeded, slippage may occur
- Clamping cartridge KP and clamping unit KPE are not suitable for dynamic operation

in combination with clamping unit KEC

- Material:
  - Hard-chromium plated steel:
    coating thickness min. 20 µm
  - Hardened steel:
    min. HRC 60
- Diameter tolerance: h7 ... f7
- Surface roughness:
  $R_{max.}$ = 4 µm
- The specified holding forces refer to a static load. If these values are exceeded, slippage may occur
- Clamping unit KEC is not suitable for dynamic operation
- The following applies to clamping unit KEC-S:
  Dynamic forces occurring during operation must not exceed the static holding force

Type codes

KP	–	4	–	80	–	

Type	
KP	Clamping cartridge
KPE	Clamping unit
KEC	

Round material to be clamped ∅ [mm]

Static holding force [N]

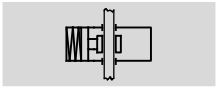
Certification	
S	Safety component to Machinery Directive 2006/42/EC. Approved for use in safety-related parts of control systems. Certified by the Institute for Occupational Safety and Health (Berufsgenossenschaftlichen Institut für Arbeitsschutz - BIA) in Germany.

Clamping cartridges KP

Technical data

FESTO

Function



- Ø - Diameter of round material to be clamped: 4 ... 32 mm

- ≡ - Force 80 ... 7,500 N

- Note

Additional measures are required for use in safety-related control systems; in Europe, for example, the standards listed under the EC Machinery Directive must be observed. Without additional measures in accordance with statutory minimum requirements, the product is not suitable for use in safety-related sections of control systems.

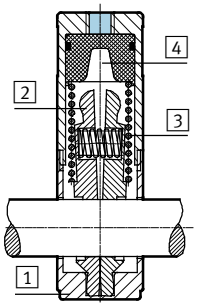
General technical data											
For round material ∅		4	6	8	10	12	16	20	25	32	
Pneumatic connection		M5					G1⁄8				
Design		Tilting wedge mechanism									
Type of mounting		Via self-configured housing									
Clamping type with effective direction		At both ends									
		Clamping via spring force, air to release									
Static holding force	[N]	80	180	350	350	600	1,000	1,400	2,000	5,000	7,500
Max. axial backlash with clamped piston rod without load	[mm]	0.2	0.3		0.5			0.7			1
Min. release pressure	[bar]	3									
Assembly position		Any									
Product weight	[g]	10	15	50	50	50	90	170	170	700	1,600

Operating and environmental conditions		
Operating medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4]
Note on operating/pilot medium		Operation with lubricated medium possible (in which case lubricated operation will always be required)
Operating pressure	[bar]	≤ 10
Ambient temperature	[°C]	–10 ... +80
Corrosion resistance class CRC[1)]		2

1) Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Materials

Sectional view

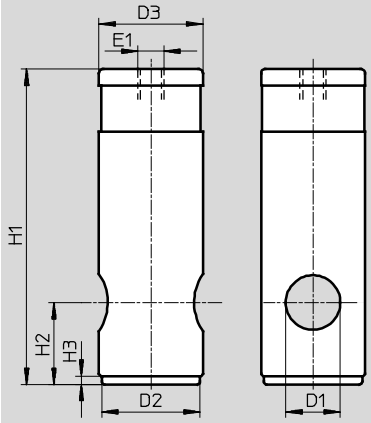


Clamping cartridge		
1	Body	Anodised aluminium
2	Clamping plates	Brass
3	Spring	Spring steel
4	Piston	Polyacetal
–	Seals	Nitrile rubber, polyurethane

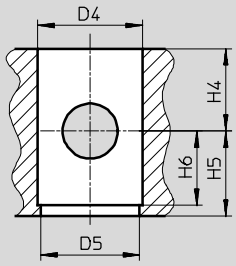
Clamping cartridges KP

Technical data

Dimensions and ordering data Download CAD data ➔ **www.festo.com**



Installation dimensions



Note

When installing the clamping cartridge in a housing, plain bearings must be installed on both sides of this housing.

For ∅ [mm]	D1 ∅	D2 ∅ h12	D3 ∅ f9	D4 ∅ D9	D5 ∅	E1	H1	H2
4	4	10	12	12	11	M5	28	7
6	6	14	16	16	15	M5	35	10
8	8	18	20	20	19	M5	62	17.5
10	10	18	20	20	19	M5	62	17.5
12	12	18	20	20	19	M5	62	17.5
16	16	22	24	24	23	G1⁄8	83	22
20	20	28	30	30	29	G1⁄8	100	25
	20	36	38	38	37	G1⁄8	115.5	30
25	25	46	48	48	47	G1⁄8	155	36
32	32	63	65	65	64	G1⁄8	195	55

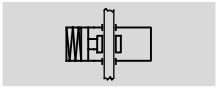
For ∅ [mm]	H3	H4 min.	H5 min.	H6	Weight [g]	Part No.	Type
4	2	9	7	6	10	**178 452**	**KP-4-80**
6	3	10	11	8	15	**178 453**	**KP-6-180**
8	3	18	18.5	15.5	50	**178 454**	**KP-8-350**
10	3	18	18.5	15.5	50	**178 455**	**KP-10-350**
12	3	18	18.5	15.5	50	**178 456**	**KP-12-600**
16	3	22	23	20	90	**178 457**	**KP-16-1000**
20	3	25	26	23	170	**178 458**	**KP-20-1400**
	3	30	31	28	170	**178 459**	**KP-20-2000**
25	3	36	37	34	700	**178 460**	**KP-25-5000**
32	3	55	56	53	1,600	**178 461**	**KP-32-7500**

Clamping units KPE

Technical data

FESTO

Function



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Diameter of round material to be clamped: 4 ... 32 mm

Force 80 ... 7,500 N

Note

Additional measures are required for use in safety-related control systems; in Europe, for example, the standards listed under the EC Machinery Directive must be observed. Without additional measures in accordance with statutory minimum requirements, the product is not suitable for use in safety-related sections of control systems.

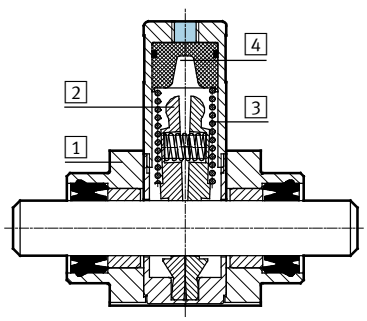
General technical data										
For round material ∅		4	6	8	10	12	16	20	25	32
Pneumatic connection		M5					G1⁄8			
Design		Tilting wedge mechanism								
Type of mounting		Via mounting thread Via through-holes								
Clamping type with effective direction		At both ends								
		Clamping via spring force, air to release								
Static holding force	[N]	80	180	350	350	600	1,000	1,400	5,000	7,500
Max. axial backlash with clamped piston rod without load	[mm]	0.2	0.3		0.5			0.7		1
Min. release pressure	[bar]	3								
Assembly position		Any								
Product weight	[g]	100	150	240	260	270	410	930	2,000	4,600

Operating and environmental conditions		
Operating medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4]
Note on operating/pilot medium		Operation with lubricated medium possible (in which case lubricated operation will always be required)
Operating pressure	[bar]	≤ 10
Ambient temperature	[°C]	–10 ... +80
Corrosion resistance class CRC[1)]		2

1) Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Materials

Sectional view



Clamping unit		
1	Housing	Anodised aluminium
2	Clamping plates	Brass
3	Spring	Spring steel
4	Piston	Polyacetal
–	Seals	Nitrile rubber, polyurethane

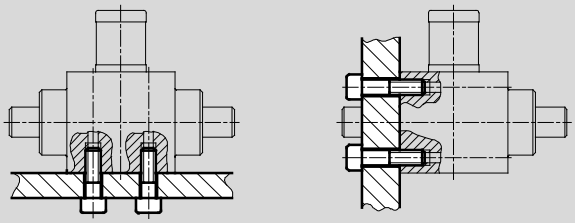
Clamping units KPE

Technical data

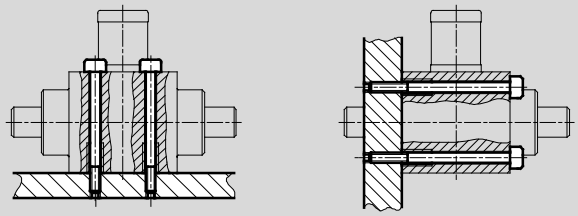
FESTO

Mounting options

Via mounting thread



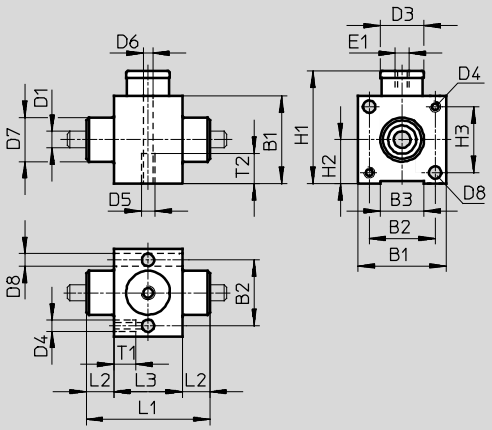
Via through-holes



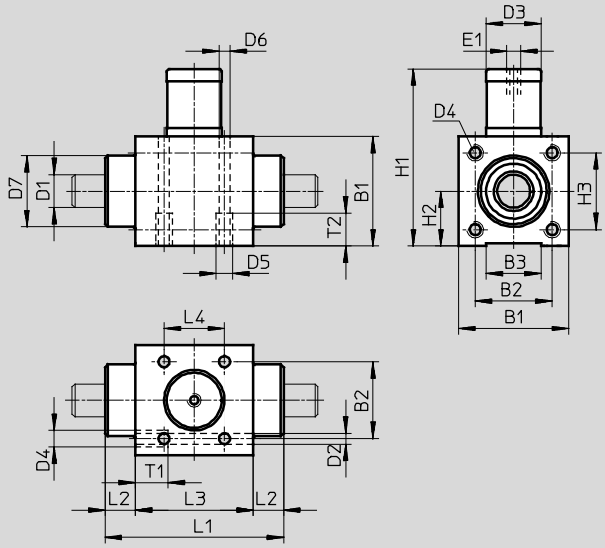
Dimensions and ordering data

Download CAD data ➔ **www.festo.com**

For round material ∅ 4 ... 6 mm



For round material ∅ 8 ... 32 mm



For ∅ [mm]	B1	B2	B3	D1 ∅	D2 ∅	D3 ∅	D4	D5	D6 ∅	D7 ∅ d11	D8 ∅	E1	H1	H2
4	27	19.5	12	4	–	12	–	M5	4.2	12	4.5	M5	34.5	13.5
6	32	24	16	6	–	16	–	M5	4.2	16	4.5	M5	41	16
8	36	27	20	8	4.2	20	M5	M5	4.2	22	–	M5	62.5	18
10	36	27	20	10	4.2	20	M5	M5	4.2	22	–	M5	62.5	18
12	40	28	20	12	5.2	20	M6	M6	5.2	28	–	M5	64.5	20
16	45	32.5	25	16	5.2	24	M6	M6	5.2	32	–	G1/8	83.5	22.5
20	65	50	38	20	6.5	38	M8	M8	6.5	45	–	G1/8	118	32.5
25	88	65	50	25	8.5	48	M10	M10	8.5	55	–	G1/8	163	44
32	118	90	70	32	10.3	65	M12	M12	10.3	60	–	G1/8	199	59

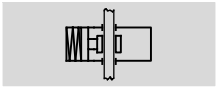
For ∅ [mm]	H3	L1	L2	L3	L4	T1	T2	Weight [g]	Part No.	Type
4	19.5	33	7.5	18	–	9	11	100	**178 462**	**KPE-4**
6	24	45	10	25	–	9	11	150	**178 463**	**KPE-6**
8	27	58	10	38	20	10	11	240	**178 464**	**KPE-8**
10	27	62	12	38	20	10	11	260	**178 465**	**KPE-10**
12	28	65	11	43	22	12	12	270	**178 466**	**KPE-12**
16	32.5	69	12.5	44	22	12	12	410	**178 467**	**KPE-16**
20	50	83	12.5	58	30	16	16	930	**178 468**	**KPE-20**
25	65	100	15	70	34	20	20	2,000	**178 469**	**KPE-25**
32	90	154	25	104	60	24	24	4,600	**178 470**	**KPE-32**

Clamping units KEC

Technical data

FESTO

Function



- Ø - Diameter of round material to be clamped: 16 ... 25 mm

- ☰ - Force 1,300 ... 8,000 N

- Note

Additional measures are required for use in safety-related control systems; in Europe, for example, the standards listed under the EC Machinery Directive must be observed. Without additional measures in accordance with statutory minimum requirements, the product is not suitable for use in safety-related sections of control systems.

General technical data				
For round material ∅		16	20	25
Pneumatic connection		G1⁄8	G1⁄4	G3⁄8
Type of mounting		Via accessories ➔ 12		
Clamping type with effective direction		At both ends		
		Clamping via spring force, air to release		
Static holding force		1,300	3,200	8,000
Min. release pressure	[bar]	3.8		
Assembly position		Any		
Product weight	[g]	1,860	4,515	16,760

Operating and environmental conditions		
Operating medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4]
Note on operating/pilot medium		Operation with lubricated medium possible (in which case lubricated operation will always be required)
Operating pressure	[bar]	3.8 ... 10
Ambient temperature	[°C]	–20 ... +80
ATEX		Specified types ➔ www.festo.com

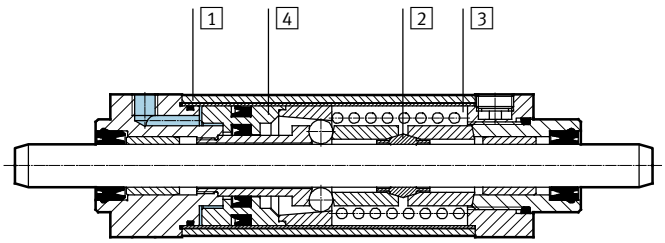
- Note

The specified holding force refers to a static load. If this value is exceeded, slippage may occur. Dynamic forces occurring during operation must not exceed the static holding force if slippage is to be avoided. The clamping unit is backlash-free in the clamped condition if varying loads are applied to the piston rod.

Activation:
The clamping unit may only be released when equilibrium of forces is present on the piston rod. Otherwise there is a risk of accidents due to the sudden movement of the piston rod. Blocking off the air supply at both ends (e.g. with a 5/3-way valve) does not provide any safety.

Materials

Sectional view

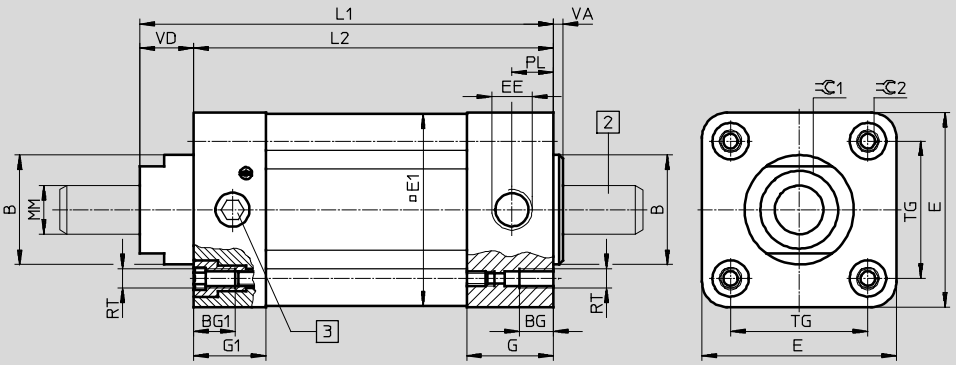


Clamping unit		
1	Housing	Wrought aluminium alloy
2	Clamping jaws	Tool steel
3	Spring	High-alloy steel
4	Piston	Wrought aluminium alloy
–	Seals	Nitrile rubber, polyurethane

Clamping units KEC

Technical data

Dimensions and ordering data Download CAD data ➔ **www.festo.com**



- Note

The clamping unit can only be exhausted when it contains round material.

2 Round material to be clamped
3 Locking screw

For ∅ [mm]	B ∅ f8	BG	BG1	E	E1	EE	G	G1	L1	L2	MM ∅
16	35	15	15	54	53	G1⁄8	27	22	178	160	16
20	45	14	17	80	79	G1⁄4	30	29.5	208.5	187	20
25	55	17	17	126	126	G3⁄8	32.5	32.5	287	258	25

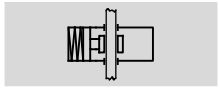
For ∅ [mm]	PL	RT	TG	VA	VD	=C1	=C2	Weight [g]	Part No.	Type
16	13	M6	38	5.5	18	30	6	1,860	**527 492**	**KEC-16**
20	15.5	M8	56.5	6	21.5	36	8	4,515	**527 493**	**KEC-20**
25	17	M10	89	7	29	41	10	15,600	**527 494**	**KEC-25**

Clamping units KEC-...-S

Technical data

FESTO

Function



- Ø - Diameter of round material to be clamped: 16 ... 25 mm

- ≡ - Force 1,300 ... 8,000 N

General technical data				
For round material ∅		16	20	25
Pneumatic connection		G1⁄8	G1⁄4	G3⁄8
Type of mounting		Via accessories ➔ 12		
Clamping type with effective direction		At both ends		
		Clamping via spring force, air to release		
Static holding force		1,300	3,200	8,000
Min. release pressure	[bar]	3.8		
Assembly position		Any		
CE symbol		EU-compliant to directive 98/37/EC (machines)		
Function		Single-channel to EN ISO 13849-1, category 1		
Certification		BIA (Berufsgenossenschaftliches Institut für Arbeitsschutz – BG-Institute for Occupational Safety and Health)		
Product weight	[g]	1,860	4,515	15,600

Operating and environmental conditions		
Operating medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4]
Note on operating/pilot medium		Operation with lubricated medium possible (in which case lubricated operation will always be required)
Operating pressure	[bar]	3.8 ... 8
Max. permissible test pressure	[bar]	10
Ambient temperature	[°C]	–10 ... +60

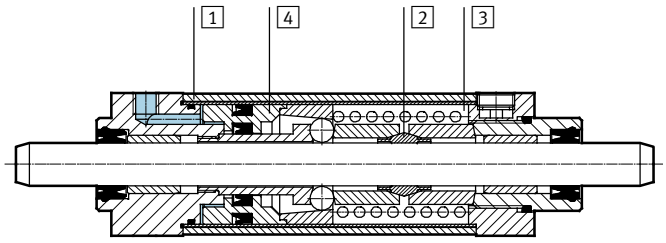
- Note

The specified holding force refers to a static load. If this value is exceeded, slippage may occur. Dynamic forces occurring during operation must not exceed the static holding force if slippage is to be avoided. The clamping unit is backlash-free in the clamped condition if varying loads are applied to the piston rod.

Activation:
The clamping unit may only be released when equilibrium of forces is present on the round material. Otherwise there is a risk of accidents due to the sudden movement of the round material. Blocking off the air supply at both ends (e.g. with a 5/3-way valve) does not provide any safety.

Materials

Sectional view



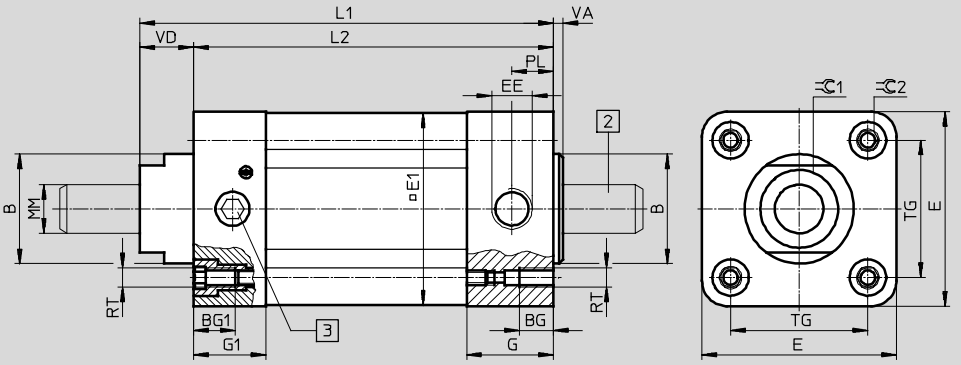
Clamping unit		
1	Housing	Wrought aluminium alloy
2	Clamping jaws	Tool steel
3	Spring	High-alloy steel
4	Piston	Wrought aluminium alloy
–	Seals	Nitrile rubber, polyurethane

Clamping units KEC-...-S

Technical data

Dimensions and ordering data Download CAD data ➔ **www.festo.com**

for use in safety-relevant control systems



- Note

The clamping unit can only be exhausted when it contains round material.

2 Round material to be clamped
3 Locking screw

For ∅ [mm]	B ∅ f8	BG	BG1	E	E1	EE	G	G1	L1	L2	MM ∅
16	35	15	15	54	53	G⅛	27	22	178	160	16
20	45	14	17	80	79	G¼	30	29.5	208.5	187	20
25	55	17	17	126	126	G⅜	32.5	32.5	287	258	25

For ∅ [mm]	PL	RT	TG	VA	VD	⏥1	⏥2	Weight [g]	Part No.	Type
16	13	M6	38	5.5	18	30	6	1,860	**538 242**	**KEC-16-S**
20	15.5	M8	56.5	6	21.5	36	8	4,515	**538 243**	**KEC-20-S**
25	17	M10	89	7	29	41	10	15,600	**538 244**	**KEC-25-S**

- Note

The overtravel is the distance that the round material covers between exhausting of the clamping unit and coming to a standstill. It must be determined by the customer when setting up the machine and be compared with the calculated overtravel ➔ DIN EN 999/EN ISO 13849-2.

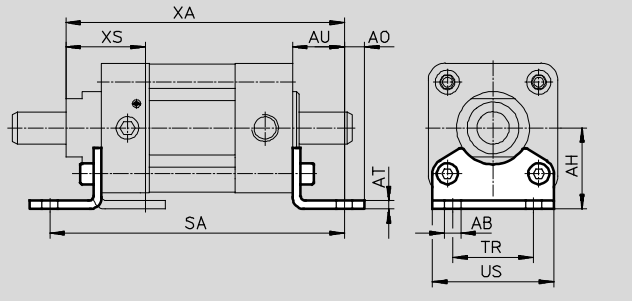
The clamping unit KEC-S can be used in safety-related parts of control systems belonging to category 1 (reliable component) as defined by EN ISO 13849-1. For use in higher categories than category 1 to EN ISO 13849-1, the overtravel must be achieved even in the event of faults.

It is dependent on the environmental conditions and stress, e.g.:
- Operating pressure
- Nominal size of switching valve
- Line length
- Diameter of connecting line to clamping unit
- Load and speed

The overtravel can be reduced by attaching a quick exhaust valve to the supply port of the clamping unit.

Foot mounting HNC

Material:
Galvanised steel
Free of copper, PTFE and silicone



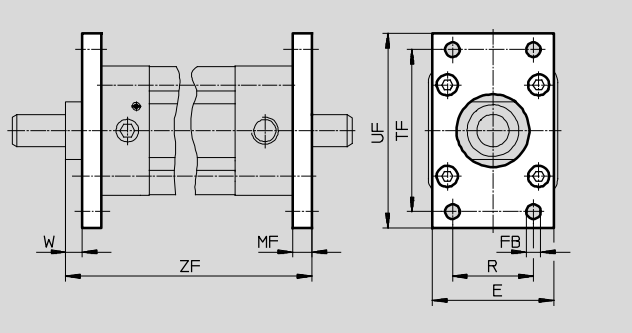
Dimensions and ordering data

For ∅ [mm]	AB ∅	AH	AO	AT	AU	SA	TR	US	XA	XS	CRC[1]	Weight [g]	Part No.	Type
16	10	36	9	5	28	216	36	54	206	42	2	193	**174 370**	**HNC-40**
20	10	50	12.5	6	32	251	50	75	240.5	48.5	2	436	**174 372**	**HNC-63**
25	14.5	71	17.5	6	41	340	75	110	328	64	2	1,009	**174 374**	**HNC-100**

1) Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents

Flange mounting FNC

Material:
Galvanised steel
Free of copper, PTFE and silicone



Dimensions and ordering data

For ∅ [mm]	E	FB ∅ H13	MF	R	TF	UF	W	ZF	CRC[1]	Weight [g]	Part No.	Type
16	54	9	10	36	72	90	8	188	1	291	**174 377**	**FNC-40**
20	75	9	12	50	100	120	9.5	220.5	1	679	**174 379**	**FNC-63**
25	110	14	16	75	150	175	13	303	1	2,041	**174 381**	**FNC-100**

1) Corrosion resistance class 1 according to Festo standard 940 070
Components with light corrosion exposure. Protection for transport and storage. Components without significant decorative function or surface, e.g. installed out of sight internally or behind covers.