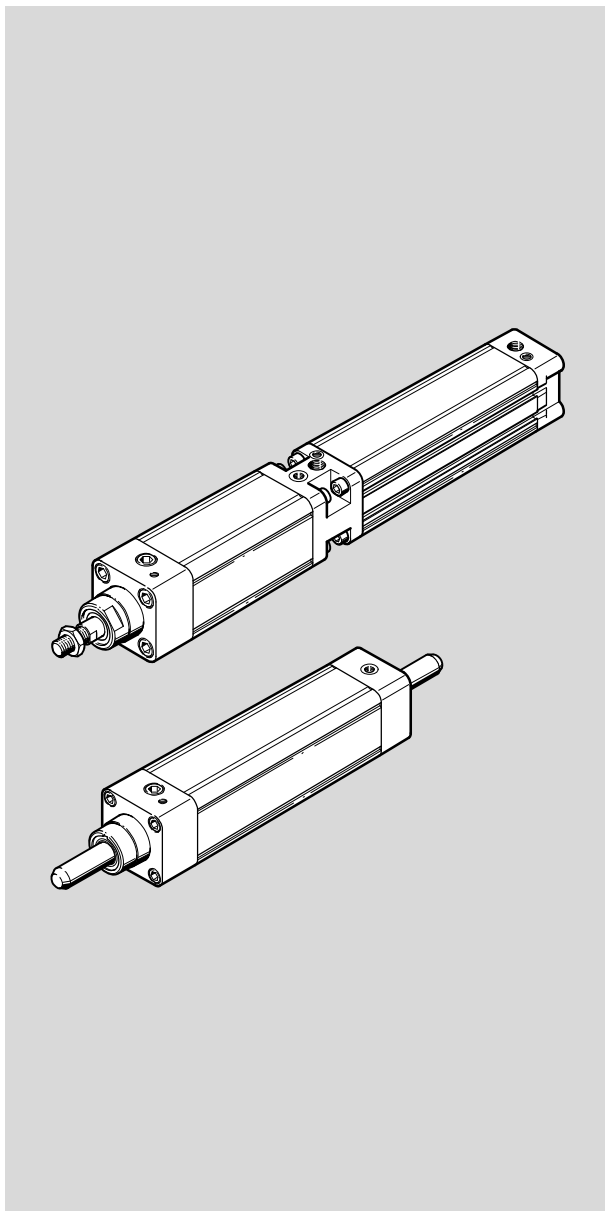


Cylinder with clamping unit / Clamping unit

DNCKE-...-S / KEC-...-S

FESTO

en **Operating
instructions**



8074354
2017-10c
[8074356]

Original instructions

Symbols:



Warning



Caution



Note



Environment



Accessories

The clamping unit KEC-S or the cylinder with clamping unit DNCKE-S is designated a product or cylinder in these operating instructions.

Installation and commissioning may only be performed in accordance with these instructions by technicians with appropriate qualifications.

English – Cylinder with clamping unit / Clamping unit DNCKE-...-S / KEC-...-S

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Documentation on the product

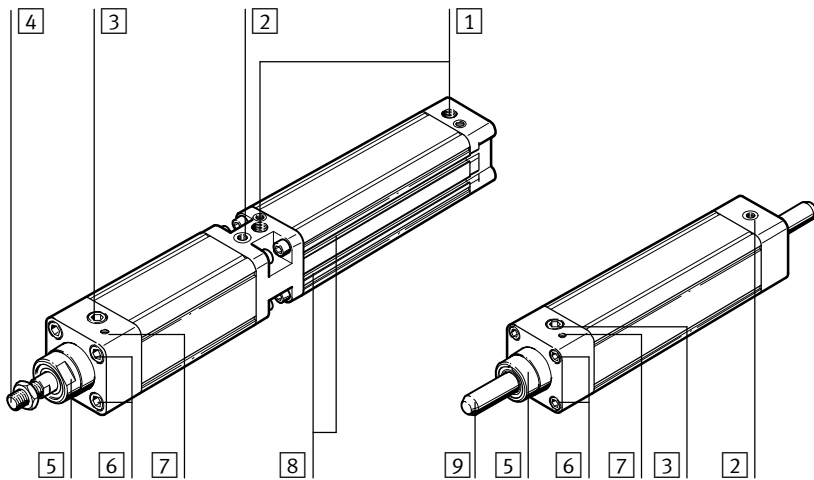


For all available product documentation → www.festo.com/pk

1 Configuration

DNCKE-...-S

KEC-...-S



- | | |
|---|---|
| <ul style="list-style-type: none"> 1 Compressed air supply port for cylinders next to the adjusting screws for the pneumatic cushioning (only for DNCKE) 2 Compressed air supply port for loosening the clamp 3 Locking screw with hex key (for adjusting sleeve) 4 Piston rod (only DNCKE) | <ul style="list-style-type: none"> 5 Adjusting sleeve with spanner flat 6 Hollow bolt with thread for mounting 7 Hole with filter element for exhausting the clamping chamber 8 Slots for proximity switch (only DNCKE) 9 Round material for transport protection (only KEC) |
|---|---|

Fig. 1

Definition

In these operating instructions, the designation “clamping unit” is used for:

- the individual product KEC
- the design type DNCKE integrated in the cylinder

In these operating instructions, the designation “round material” is used for:

- the transport lock for KEC
- the piston rod for DNCKE

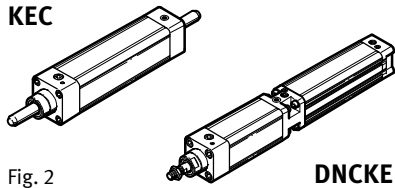


Fig. 2

2 Safety

2.1 Use for intended purpose

The clamping unit KEC is intended to serve both as an individual product and integrated into a cylinder DNC (for cylinder with clamping unit DNCKE) for the following usage:

- holding, clamping and to avoid movement of round material
- braking (stopping a movement) for processing or handling procedures in a normal industry environment without substances and ambient conditions that influence the function or materials used

The intended use has been checked by the Institute for Occupational Safety and Health and is documented by a DGUV test certificate.

If used as a braking device, e.g. for interrupting potentially dangerous movements in a danger zone, a regular check is required of the overtravel as a factor of the travel speed and the frequency of the braking procedures (increased wear) as well as of the local operating conditions (min./max. temperature).

2.2 Foreseeable misuse

The clamping unit is not suitable for positioning tasks or for transmitting torques and lateral forces.

A self-aligning rod coupler (→ 11 Accessories) can prevent the transmission of lateral forces and bending moments.

2.3 Specified standards

Version status
DIN EN ISO 12100:2011-03
DIN EN ISO 4414:2011-04
DIN EN ISO 13849-1:2008-12

Tab. 1 Standards specified in the document

2.4 General safety information



WARNING

Risk of injury! Uncontrolled movement. Piston rods can move out suddenly and unexpectedly, thereby causing injury to anybody who is in the positioning range.

- Make sure that nobody can place his/her hand in the positioning range of the payload.
- Make sure that no foreign objects are present in the positioning range of the payload.
- Do not make any modifications to the product. Improper modifications impair the functioning and represent a safety risk.

The operating modes must guarantee that the residual risk is less than/equal to the accepted risk (→ DIN EN ISO 12100). The measures for risk reduction are to be taken in accordance with DIN EN ISO 4414, DIN EN ISO 12100 and DIN EN ISO 13849-1.

Monitor/check the function of the entire system during use in accordance with the measures defined in the validation report (→ DIN EN ISO 13849-2).

- Take into consideration the applicable legal regulations for the respective destination.
- Only use the product if it is in its original status and in an excellent technical status.
- Use the product only within the defined values (→ 13 Technical data).
- Take into account labelling on the product.
- Observe other applicable documents.
- Take into consideration the ambient conditions at the location of use.
- Protect the product during storage and operation from the following:
 - wetness or moisture
 - corrosive coolant or other materials (e.g. ozone)
 - UV radiation
 - oils, greases and grease-solvent vapours
 - grinding dust
 - glowing chips or sparks


2.5 Mounting and connecting

- Observe tightening torques. Unless otherwise specified, the tolerance is $\pm 20\%$.

2.6 Qualification of specialized personnel

Only qualified specialized personnel may perform installation, commissioning, maintenance and disassembly of the clamping unit. The qualified personnel must be familiar with installation and operation of electrical and pneumatic control systems.

3 Function

Pressurizing with compressed air on the supply port  (→ Fig. 1) opens the internal clamping component through a pneumatically driven release mechanism. The round material can then move freely.

If the compressed air supply port is exhausted, a spring-loaded mechanism generates the clamping force of the clamping component. The round material is clamped this way.

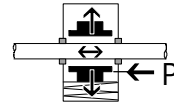


Fig. 3

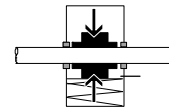


Fig. 4

4 Transport

- Take product weight into account (→ 13 Technical data).

5 Installation

5.1 Mechanical installation

Prerequisites



Note

Lateral loadings and bending moments on the round material damage the function and destroy the internal clamping component.

- Make sure that the load on the round material is only in the direction of movement. If necessary to avoid lateral forces, use a self-aligning rod coupler (→ 11Accessories).



Note

Movement of the round material against the clamping forces creates high wear on the internal clamping element and the round material.

- Make sure that the holding force is never exceeded. Otherwise, unexpected movements may occur.

- Make sure that the clamping unit is installed as follows:
 - operating elements always accessible
 - product fastened free of mechanical stress and bending
 - Always fasten the clamping unit on the side opposite the braking direction **r** (→ Fig. 5)
- Check whether safety measures (e.g. toothed latches or moving bolts) are also required externally (→ DIN EN ISO 12100 and DIN EN ISO 13849-1).
- Select the installation type for the desired application.
Refer to the Festo catalogue for information on other ways of mounting the clamping unit (→ Fig. 5) and on the required accessories.

5.1.1 Mount clamping unit

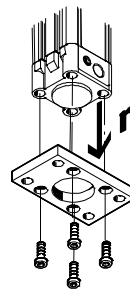
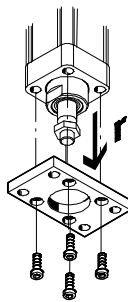
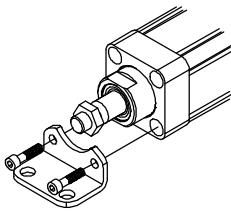
Interfaces for mounting components on the cover

e.g. with foot mounting HNC¹⁾

(only permitted for use as a holding device)

e.g. with flange mounting FNC¹⁾

(permitted for use as a holding and braking device – observe braking direction **r**)

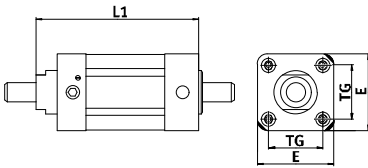


1) → www.festo.com/catalogue

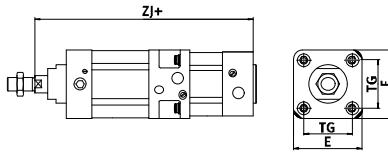
Fig. 5

Dimensions (→ Catalogue specifications)¹⁾

Clamping unit KEC



Clamping unit (with cylinder) DNCKE



1) → www.festo.com/catalogue

Fig. 6

Size	DNCKE	40	63	100
	KEC	16	20	25
L1 ²⁾	[mm]	178	208.5	287
ZJ+ (plus stroke length)	[mm]	277	315	408
TG	[mm]	38	56.5	89
E	[mm]	54	80	126
Screw-in depth	[mm]	9.5 ... 15	12.5 ... 14	14 ... 17
Screw		M6 (4x)	M8 (4x)	M10 (4x)
Tightening torque	[Nm]	5	13	30

2) Dimension depends on how the adjusting screw is set.

Tab. 2

- Place the clamping unit in the intended position.
- Evenly tighten screws (tightening torques → Tab. 2).

5.1.2 Mount attachment components

Mounting on the DNCKE

- Mount the attachment component to the piston rod.
The spanner flat 10 on the piston rod serves as a counter holder for the lock nut. If necessary, secure the lock nut with a screw locking agent.

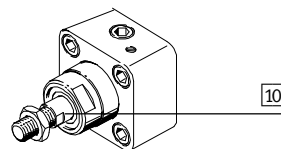


Fig. 7

5.1.3 Mounting accessories

If proximity switches are used in the cylinder with clamping unit DNCKE:

- Use proximity sensors from the Festo accessories (→ www.festo.com/catalogue).
- Place the proximity switches in the slots 8 of the cylinder.
- Tighten the proximity switches in the desired switching positions.

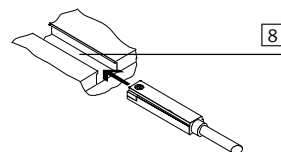


Fig. 8

5.2 Pneumatic installation

5.2.1 Prerequisites

- Check whether the following accessories are required:

Description	Type	Function
Check valve	HGL	Slows pressure reduction when compressed air is lost
		Redundancy with “stop function”
Compensation reservoir	VZS	Reduction of pressure fluctuations in the following compressed air string

Tab. 3

- Use a one-way flow control valve type (e.g. GRLZ or GRLA) directly at the respective compressed air supply port.

Activating the cylinder with clamping unit:

- Select the activation for your application.

Example for clamping unit activation

2 safety functions are possible:

- SF1: Protection against unexpected start-up of the piston rod (holding function)
- SF2: Stopping a dangerous movement of the piston rod (emergency brake function)

Before the clamping unit is loosened, measures must be taken to prevent the piston rod from taking off suddenly.

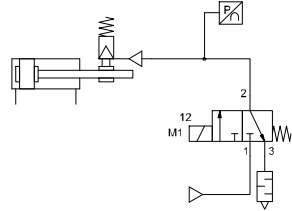


Fig. 9

5.2.2 Functional tests

Functional test when used as a holding device (clamping function)

The frequency (or test interval) must be determined for a statistical functional test, depending on the application/risk evaluation and the selected category in accordance with DIN EN ISO 13849. In addition, the static functional test, if not required by C-standards or other regulations, must be performed at least once per month and every 100 000 switching cycles.

Functional test when used as an emergency braking device (emergency brake/emergency stop function)

In principle, a static functional test and a dynamic braking test are required after every emergency brake (emergency stop).

The frequency (or test interval) must be determined for a “dynamic braking test”, depending on the application/risk evaluation and the selected category in accordance with DIN EN ISO 13849.

In addition, the dynamic braking test, if not required by C-standards or other regulations, must be performed at least once per year. After the dynamic braking test, a static functional test must be performed.

For notes on conducting the static functional test and the dynamic braking test (➔ 6.4 test of clamping force/overtravel).

5.2.3 Make tubing connection to the clamping unit

In case of use in normal ambient atmosphere (without particles):

- Remove the covers (if any) from the compressed air supply ports.
- Remove dirt particles or foreign matter in the ports and tubing lines.
- Use tubing lines that are as short as possible. This permits short switching times.
- Connect the tubing to the supply ports of the clamping unit 2 and, if applicable, to the supply ports of the cylinder 1 in accordance with DIN EN ISO 4414.

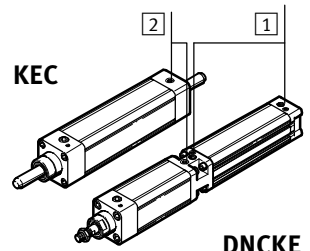


Fig. 10

Size	DNCKE	40	63	100
	KEC	16	20	25
Supply port for clamping unit	2	G 1/8	G 1/4	G 3/8
Compressed air supply port for cylinder (only DNCKE)	1	G 1/4	G 3/8	G 1/2

Tab. 4

If used in fine dusty or misty ambient air to prevent dirt particles from entering the pneumatic system:

- Use a barbed fitting (e.g. QS-CM-M5) instead of the filter nipple in the exhaust channel 7 of the spring interior.
- Guide hose into an area with clean ambient air.

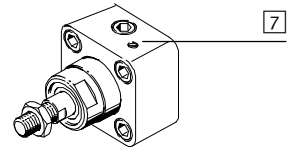


Fig. 11

6 Commissioning



WARNING

Unexpected movement of components.
Injury due to impacts or pinching.

- Protect positioning range from access (e.g. with protective guards).
- Make sure that no foreign objects are present in the positioning range.

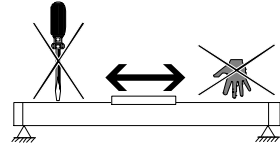


Fig. 12



Note

- Ensure that:
 - Only qualified specialized personnel makes the settings.
 - The holding force corresponds to the specified values (→ 6.4. Checking clamping force/overtravel).
 - The limit values are not exceeded (→ 13 Technical data).



Note

Clamping without round material will destroy the inside clamping component.

- Make sure that the clamping unit KEC is always pressurised if round material is not introduced.
If the clamping unit KEC is exhausted without round material inserted, the high spring force will deform the inside clamping component until it cannot function.

6.1 Dismantling of the round material (only required for KEC)

1. Pressurize the supply port [2] with at least 3.8 bar.
2. Loosen the locking screw [3] with a hex key wrench.

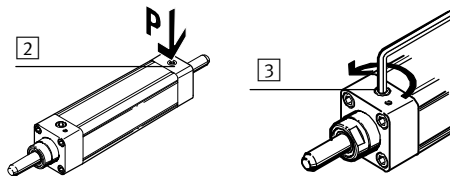


Fig. 13

Size	DNCKE	40	63	100
	KEC	16	20	25
Width across flats for hex key [3] \ominus	[mm]	6	8	

Tab. 5

3. Loosen the adjusting sleeve [5] half a turn in an anti-clockwise direction
4. Pull supplied round material [9] out completely.

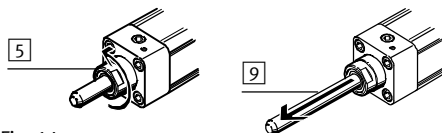


Fig. 14



Note

If the round material is inserted tilted, it may damage the wiper and the seals.

- A 15°-chamfer at least 3 mm wide at the end of the round material ensures it can be pushed on without a problem (rod quality → 13 Technical data).

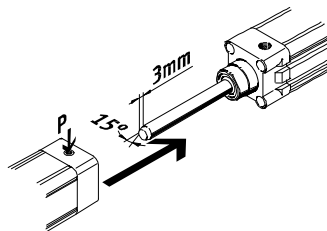


Fig. 15

5. Push the clamping unit carefully onto the rod of the plug-in product.
6. Adjust the KEC to the new round material (→ Following chapter).

6.2 Adjustment of the clamping unit



Note

Adjustment is not required when the DNCKE is commissioned for the first time.

1. Exhaust the cylinder in a stable position (e.g. If installed vertically, at the lowest point).
2. Pressurize the supply port **2** with at least 3.8 bar.
3. Loosen the locking screw **3** with a hex key wrench.

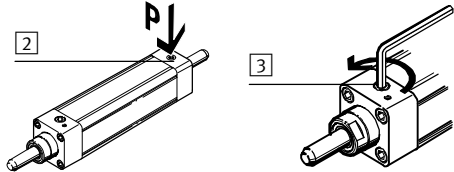


Fig. 16

Size	DNCKE	40	63	100
	KEC	16	20	25
Width across flats for hex key 1	[mm]	6	8	

Tab. 6

4. Loosen the adjusting sleeve **5** half a turn in an anti-clockwise direction.

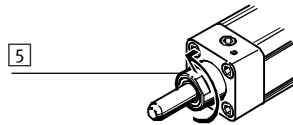


Fig. 17

5. Turn the adjusting sleeve **5** clockwise until the round material can no longer move.
6. Turn the adjusting sleeve **5** clockwise until the round material just moves freely (approx. 10°...30°).

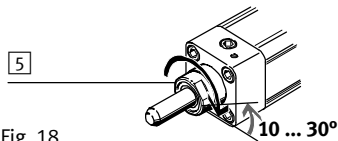


Fig. 18

7. Tighten locking screw **3** again.
The tightening torque is 7 Nm.
8. Exhaust the clamping unit.
The round material is clamped this way.

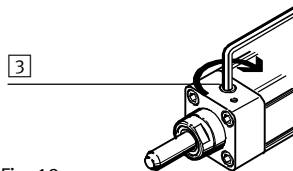


Fig. 19

6.3 Test run

- Comply with limits for all loads.

For setting the speed and pneumatic cushioning:

1. First, completely screw in screws of the upstream one-way flow control valves 11 and the pneumatic cushioning 12 at the DNCKE, then unscrew again around one turn.

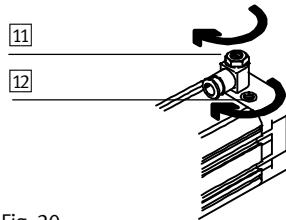


Fig. 20

2. Pressurise the complete system slowly, e.g. with the soft-start valve type HEL.
3. Pressurise the cylinders simultaneously at both supply ports (1 → Fig. 1, only for DNCKE). This prevents movement in the direction of the unpressurised cylinder chambers.
4. Pressurise the clamping unit at the supply port (2 → Fig. 1) with at least 3.8 bar. The piston rod might already then move slowly into the extended end position.
5. Start a test run at low cycle rate and at low impact speed.
6. Repeat the test run, increasing the speed in steps until the operating speed is reached. If the speed is set correctly, the payload (e.g. the moved machine part) will reach the end position without striking hard against it.
7. In the test run, check whether the following equipment settings need to be modified.
 - speed of the payload
 - pneumatic cushioning
 - clamping force

After completing the necessary adjustments:

8. End the test run.

6.4 Checking clamping force/overtravel



WARNING

Unexpected movement of components.

Injury due to impacts or pinching.

If the clamping force of the clamping unit is no longer sufficient, the movable parts of the pneumatic components can cause uncontrolled movements.

Uncontrolled movements of the connected actuators can cause personal injury or material damage. Frequent checking of the overtravel will increase wear, depending on how often this is done.

- Perform a check of the overtravel only if the product is used as a brake.
The overtravel is dependent on the load and the environmental conditions: temperature, oil on the piston rod, number of switching cycles, speed, mass, operating pressure and control (diagrams → 14 Characteristic curves).
- The overtravel check in a dynamic brake test must be performed beginning with the maximum possible speed in the application (the maximum permissible travel speed must not be exceeded).
- The clamping force is checked from the rest position.

The specified test examples correspond to the maximum applications. Deviating applications (sloping mounting position) cannot be represented. The specific application might have to be calculated and tested separately.



WARNING

Unexpected movement of components.

Injury due to impacts or pinching.

- Make sure that there is an equilibrium of forces on the piston of the drive cylinder. Especially when the device is mounted vertically, there is a danger of the piston rod extending suddenly when it is loosened due to the axial force (weight force).

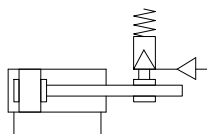


Note

- Observe the following points:
 - The test force (test pressure) must at least equal the force (pressure) in the application or must be specified in the risk assessment of the application.
 - The test force must not be greater than the maximum static holding force (→ 13 Technical data).
 - The overtravel in the dynamic brake test must be less than the tolerable overtravel from the application/risk assessment.
 - The piston rod must not slip through during the test over a period of 60 s. Remedy in case of slipping: Readjust the clamping unit (→ 6.2 Adjustment of the clamping unit).

Horizontal mounting position

Case 1: without additional weight force:



P

Fig. 21

Size	KEC	16	20	25
Test force F_p	[N]	1300	3200	8000

Tab. 7

Static functional test	Dynamic brake test
Place the piston rod in the retracted end position.	
Exhaust port (2) → Fig. 1). The clamp is active.	Pressurise cylinder chamber of the DNCKE in the advancing direction with $P = 10$ bar while simultaneously exhausting the cylinder chamber in the returning direction. That corresponds to the following test force (for testing with KEC → Tab. 7). <ul style="list-style-type: none"> - The movement begins (danger of crushing). - The max. permissible travel speed must not be exceeded.
Pressurise cylinder chamber of the DNCKE in the advancing direction with $P = 10$ bar while simultaneously exhausting the cylinder chamber in the returning direction. Test force for testing with KEC → Tab. 7.	Exhaust port (2) → Fig. 1). <ul style="list-style-type: none"> - Braking begins. - The cylinder stops. Determine path from the exhaust start signal until the cylinder is at rest. <ul style="list-style-type: none"> - This path equals the overtravel.
Apply the test force (test pressure) for 60 seconds. During this time, the piston must not move further.	

Tab. 8

Vertical mounting position

Case 2: Test with additional weight force suspended:

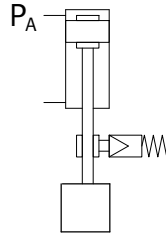


Fig. 22

- Calculate the required test pressure P_A using the following equation:

$$P_A = \frac{(F_P - m \times g)}{A} \times 10$$

P_A = test pressure [bar]

F_P = test force [N]

m = effective load [kg]

g = acceleration due to gravity [9.81 m/s²]

A = piston surface area [sq. mm]

Size	DNCKE	40	63	100
Test force F_P	[N]	1300	3200	8000
Piston area A	Extending direction [sq. mm]	1257	3117	7854

Tab. 9

Static functional test	Dynamic brake test
Place the piston rod in the retracted end position.	
Exhaust port (2) → Fig. 1). The clamp is active.	Pressurise cylinder chamber of the DNCKE in the advancing direction with test pressure P_A (→ Tab. 9) while simultaneously exhausting the cylinder chamber in the returning direction. <ul style="list-style-type: none"> – The movement begins (danger of crushing). – The max. permissible travel speed must not be exceeded.
Pressurise cylinder chamber of the DNCKE in the advancing direction with test pressure P_A (→ Tab. 9) while simultaneously exhausting the cylinder chamber in the returning direction.	Exhaust port (2) → Fig. 1). <ul style="list-style-type: none"> – Braking begins. – The cylinder stops.
	Determine path from the exhaust start signal until the cylinder is at rest. <ul style="list-style-type: none"> – This path equals the overtravel.
Apply the test force (test pressure) for 60 seconds. During this time, the piston must not move further.	

Tab. 10

Case 3: Test with additional weight force upright:

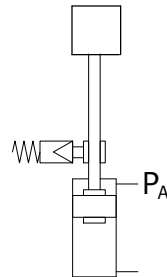


Fig. 23

- Calculate the required test pressure P_A ¹⁾ using the following equation:

$$P_A = \frac{(F_P - m \times g)}{A} \times 10$$

P_A = test pressure [bar]

F_P = test force [N]

m = effective load [kg]

g = acceleration due to gravity [9.81 m/s²]

A = piston surface area [sq. mm]

Size	DNCKE	40	63	100
Test force F_P	[N]	1300	3200	8000
Piston area A Returning direction	[sq. mm]	1055	2803	7363

1) The test pressure P_A must **not** exceed 10 bar (→ 13 Technical data).

Even with a calculation result of $P_A > 10$ bar, only the maximum test pressure of 10 bar may be applied.

Tab. 11

Static functional test	Dynamic brake test
Place the piston rod in the advanced end position.	
Exhaust port (2) → Fig. 1). The clamp is active.	Pressurise cylinder chamber of the DNCKE in the returning direction with test pressure P_A (→ Tab. 11) while simultaneously exhausting the cylinder chamber in the advancing direction. <ul style="list-style-type: none"> – The movement begins (danger of crushing). – The max. permissible travel speed must not be exceeded.
Pressurise cylinder chamber of the DNCKE in the returning direction with test pressure P_A (→ Tab. 11) while simultaneously exhausting the cylinder chamber in the advancing direction.	Exhaust port (2) → Fig. 1). <ul style="list-style-type: none"> – Braking begins – The cylinder stops.
	Determine path from the exhaust start signal until the cylinder is at rest. <ul style="list-style-type: none"> – This path equals the overtravel.
The test force (test pressure) should last 60 s. During this time, the piston must not move further.	

Tab. 12

7 Operation

Before loosening the clamping



WARNING

Unexpected movement of components.
Injury due to impacts or pinching.

- Make sure that there is an equilibrium of forces on the piston of the drive cylinder. Especially when the device is mounted vertically, there is a danger of the piston rod extending suddenly when it is loosened due to the axial force (weight force).

After an emergency stop and after each adjustment, consider:



Note

The further operational reliability of the clamping unit may be impaired, depending on the brake loading.

- Check clamping unit for safe function (→ 6.4 Check of the overtravel):
 - after every emergency stop
 - after every adjustment
 - at least once per month

If the clamping unit does not clamp the payload securely:

- Readjust the clamping unit (→ 6.2 Adjustment of the clamping unit).

If there are modifications to the payload or operating pressure:



Note

Payloads that have been increased subsequently and modified operating pressure change the clamping conditions and might impair operational reliability.

- Observe that the maximum loadings do not exceed the permitted limits (→ 13 Technical data).

If the clamping unit does not clamp the payload securely:

- Readjust the clamping unit (→ 6.2 Adjustment of the clamping unit).

If the product is used as a braking device:



Note

Frequent use of the product as a brake will increase wear depending on how often this is done.

- Therefore, check the overtravel regularly (in accordance with the specifications in the chapter “Validating by checking” in the validation report as per EN 13849-2). The overtravel is dependent on the load and the environmental conditions: temperature, oil on the piston rod, number of switching cycles, speed, mass, operating pressure and control (diagrams → 14 Characteristic curves).

**Note**

- A permanently pressurised clamping unit can jeopardize the operational reliability.
- Exhaust the clamping unit at least once per day.

7.1 Adjustment of the clamping unit

- Adjust the clamping unit regularly or when there are signs of wear:

Test procedure	Clamping unit as holding device	Clamping unit as braking device
Signs of wear	<ul style="list-style-type: none"> – Loud noises – Clamping unit cannot hold the payload securely. – Holding force is not achieved (slippage). <p>If properly set, the payload should always maintain the clamping position and reach the end positions without knocking hard against them.</p>	
Test cycle	Every 100,000 clampings and at least once per month	The testing and adjusting cycle depends on the specifications of the application and must be determined by the machine manufacturer within the framework of the validation report.
Adjusting cycle	Every 500,000 clampings or when there are signs of wear	
Adjusting procedure	→ 6.2 Adjustment of the clamping unit	

Tab. 13

- In the following cases, check to see if more frequent tests are required:
 - high thermal load
 - large accumulation of dirt
 - when there are fat solvent fluids or fumes in the vicinity
- Avoid contamination of the round material or exhaust port (7) → Fig. 1).
Only in this way can you be sure that functioning is not impaired.

8 Maintenance and care



WARNING

Unexpected movement of components.
Injury due to impacts or pinching.

- When working on the clamping unit, switch off the controller and secure it against being switched back on unintentionally.

- Clean the clamping unit as required with a soft cloth. Do not use aggressive cleaning agents.
- The clamping unit is lubricated for life. Additional lubrication is not necessary.

9 Disassembly and repair



WARNING

Unexpected movement of components.
Injury due to impacts or pinching.

- Secure payload and verify load-free status before dismantling.
- When working on the clamping unit, exhaust it beforehand.
- Observe notes on transport (➔ 4 Transport).



WARNING

Parts flying through the air!

Injury due to impacts or pinching.

Pre-stressed springs may be ejected suddenly during dismantling. Sudden release of internal spring forces (e.g. when dismantling the housing cover) may cause injury.

- Do not dismantle clamping unit.

If repairs are required:

- Send clamping unit to Festo or contact Festo service (➔ www.festo.com).

Information about spare parts and auxiliary means (➔ www.festo.com/spareparts).

10 Disposal

- Dispose of packaging and clamping unit at the end of its useful life through environmentally friendly recycling in accordance with applicable regulations.

11 Accessories

➔ www.festo.com/catalogue

12 Fault clearance

Malfunction	Possible cause	Remedy
Clamping unit does not open.	Clamping unit leaky	Send clamping unit to Festo with description of fault.
	Insufficient operating pressure	Increase operating pressure to maximum permitted value.
	Clamping unit not correctly adjusted	Readjust round material (→ 6.2 Adjustment of the clamping unit).
Hard knocking in cylinder end position	Speed too high	Reduce the impact speed.
	Cushioning not sufficient	Increase cushioning or use additional external cushioning components.
	Payload too great	
Round material slips through.	Payload too great	Reduce payload.
	Speed too high	Select lower speed.
		Brake additionally with power valves.
	Operating pressure on cylinder too high	Reduce operating pressure.
		Modify control.
	Round material contaminated	Clean the round material with a soft cloth and protect from dirt.
	Round material does not meet the quality requirements	Comply with specifications for the quality of the round material (→ 13 Technical data).
	Clamping unit not correctly adjusted or worn	Readjust round material (→ 6.2 Adjustment of the clamping unit).
	Clamping component worn or clamping mechanism defective	Replace clamping unit or send it to Festo with description of fault.
Malfunctions in position scanning at the DNCKE	Position of proximity sensors incorrect	Correct position of proximity sensors.
	Incorrect type of proximity sensor used	Only use suitable proximity sensors (→ www.festo.com/catalogue).
	Proximity sensor defective	Replace proximity sensor.
	Ferrite components in the vicinity of the proximity sensor.	Use components made of non-magnetic materials.

Tab. 14

13 Technical data

Size	DNCKE	40	63	100
	KEC	16	20	25
Clamping type		Clamping through spring force, releasing through compressed air		
Mounting position		any		
Operating medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4]; operation with lubricated medium possible (in which case lubricated operation will always be required)		
Operating pressure				
Clamping unit	[bar]	3.8 ... 8		
Cylinder	DNCKE [bar]	0.6 ... 8		
Max. test pressure	DNCKE [bar]	10		
Round material				
Diameter	[mm]	16 [h7 ... f7]	20 [h7 ... f7]	25 [h7 ... f7]
Quality		Hardened (min. HRC 60) or hard chrome-plated (thickness of layer min. 20 µm)		
		Surface roughness Rt less than 4 µm		
		3 mm wide 15° chamfer on the end of the round material		
Static and dynamic holding force	[N]	1300	3200	8000
Theoretical force	DNCKE			
Advance at 6 bar	[N]	754	1870	4712
Return at 6 bar	[N]	633	1682	4418
Advance at max. test pressure	[N]	1257	3117	7854
Return at max. test pressure	[N]	1055	2803	7363
Max. permissible travel speed	[m/s]	1		
Ambient temperature	[°C]	-10 ... +60		
Storage temperature	[°C]	-20 ... +80		
Vibration and shock (without payload)				
Vibration in accordance with IEC 60068 part 2-6		± 3.5 mm deflection at 2-8 Hz 10 m/s ² acceleration at 8-27 Hz ± 0.35 mm deflection at 27-60 Hz 50 m/s ² acceleration at 60-160 Hz 10 m/s ² acceleration at 160-200 Hz		
Shock in accordance with IEC 60068 part 2-27		± 300 m/s ² acceleration with 11 ms duration 5 shocks per direction		
Continuous shock in accordance with IEC 60068 part 2-29		± 150 m/s ² acceleration at 6 ms duration 1000 shocks per direction		

Size	DNCKE	40	63	100	
	KEC	16	20	25	
Materials					
Housing, cover		Aluminium			
Piston rod	DNCKE	Steel (hard chrome-plated)			
Tie rods, collar nuts		Steel			
Seals		TPE-U, NBR			
Weight					
Basic weight	KEC	[kg]	1.9	4.5	16.8
Basic weight	DNCKE	[kg]	2.3	5.5	18.2
per 10 mm stroke	DNCKE	[kg]	0.045	0.073	0.11

Tab. 15

14 Characteristic curves



Note

For illustration, the following diagrams show overtravel in terms of various parameters. The overtravel determined in a customer application can deviate from the examples depicted here.
Additional information (→ 7 Operation).

Overtravel s [mm] with exhausted clamping unit until standstill with vertical mounting position as a factor of the speed v [m/s] at 6 bar

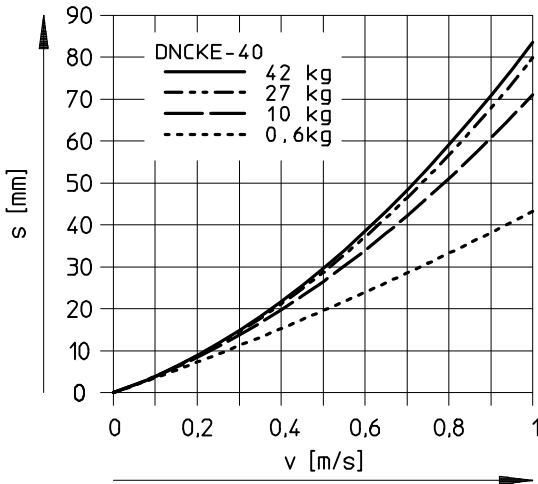


Fig. 24

Overtravel s [mm] with exhausted clamping unit until standstill with vertical mounting position as a factor of the speed v [m/s] at 6 bar

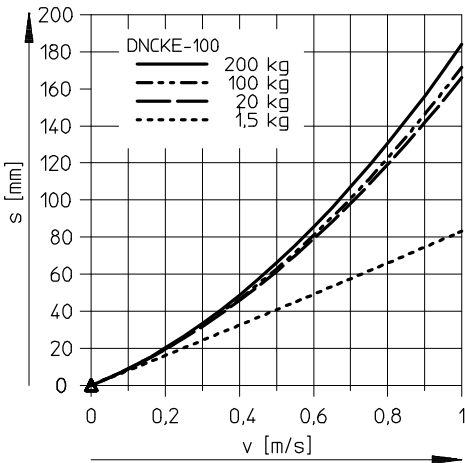
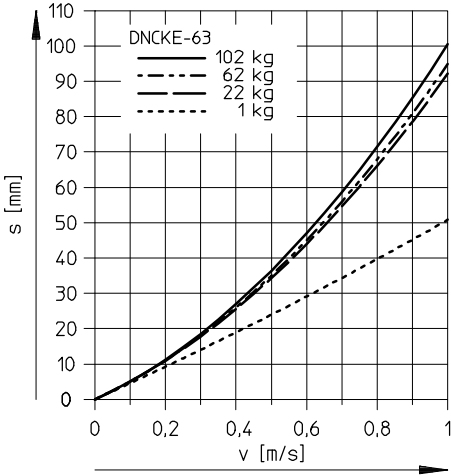


Fig. 25

DNCKE-...-S / KEC-...-S

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