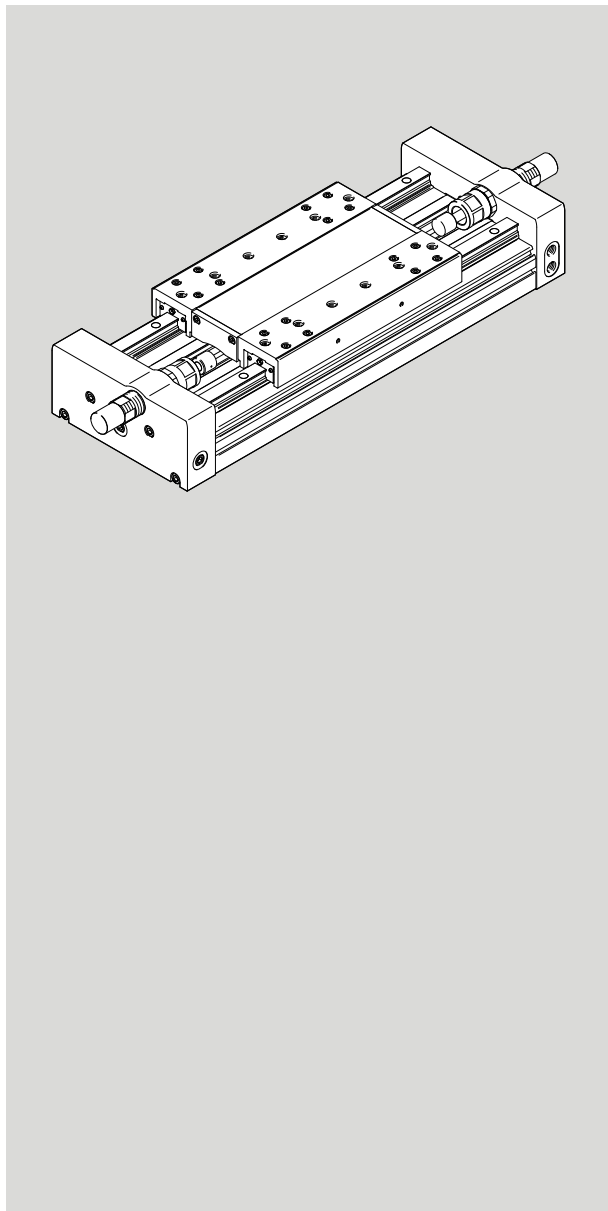


# DGC-HD

Linear drive



# FESTO

Instructions | Operat-  
ing



8100423  
2018-10b  
[8100425]

Translation of the original instructions

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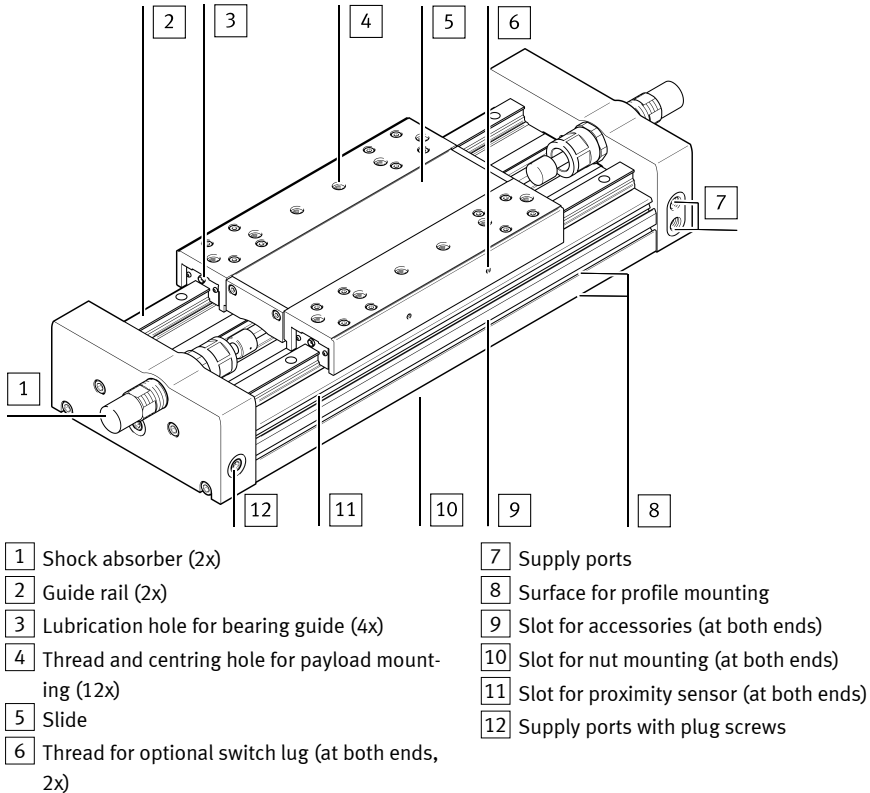
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# 1 Applicable documents



All available documents for the product → [www.festo.com/pk](http://www.festo.com/pk).

# 2 Operating elements and connections



- 1 Shock absorber (2x)
- 2 Guide rail (2x)
- 3 Lubrication hole for bearing guide (4x)
- 4 Thread and centring hole for payload mounting (12x)
- 5 Slide
- 6 Thread for optional switch lug (at both ends, 2x)
- 7 Supply ports
- 8 Surface for profile mounting
- 9 Slot for accessories (at both ends)
- 10 Slot for nut mounting (at both ends)
- 11 Slot for proximity sensor (at both ends)
- 12 Supply ports with plug screws

Fig. 1

# 3 Function and application

When the compressed air supply ports are pressurised reciprocally, the internal slide in the cylinder barrel moves back and forth. The rigid connection causes the slide **5** to move too. The slot in the cylinder barrel required for this is covered by a belt system. The slide is mounted on a roller bearing. The reference position of the slide can be queried with the help of proximity sensors in the slots **11**.

## Transport and storage

The linear drive DGC-...-HD is intended for positioning payloads with large masses. It is approved for the slide and yoke operating mode (→ observe load limits).



Fig. 2 Slide mode



Fig. 3 Yoke mode

Unpressurised movement of the slide is permitted only for fault clearance and at low speeds. If the speed is too high, the negative pressure that occurs can pull the sealing band into the piston chamber. This can lead to:

- High leakage and
- Impermissible acceleration (e.g. with a vertical mounting position).

## 4 Transport and storage

### NOTICE!

- Avoid touching the guide rail with your hands during transport and storage, as this will damage the grease film.
- 
- Take the product's weight into account. The DGC-HD weighs up to 100 kg depending on the design. For transport, the conveyors must be spaced according to the permissible support spacings (support spacings → 13 Characteristic curves).
  - Ensure storage conditions as follows:
    - Short storage times
    - Cool, dry, well-shaded, corrosion-resistant locations.

## 5 Requirements for product use

### NOTICE!

Malfunctions will occur if the device is incorrectly used.

- Make sure that the specifications contained in this chapter are adhered to at all times.
- 
- Take into consideration the legal regulations applicable for the location as well as:
    - Regulations and standards
    - Regulations of the testing organisations and insurers
    - National specifications
  - Observe the warnings and notes on the product and in the relevant operating instructions.
  - Remove transport packaging, such as films, caps and cardboard.  
The material used in the packaging has been specifically chosen for its recyclability (exception: oiled paper = residual waste).

- Observe the local regulations for the environmentally-friendly disposal of electronic components.
- Take into account the material specifications (→ 12 Technical data).
- Use the product in its original status, without any unauthorised modifications.
- Take into consideration the ambient conditions at the location of use.  
Corrosive elements in the environment (e.g. ozone) will reduce the service life of the product.
- Compare the limit values specified in these operating instructions with your actual application (e.g. pressures, forces, torques, temperatures, masses, speeds).  
Operation of the product in compliance with the relevant safety regulations depends on adherence to the load limits.
- Take the tolerance of the tightening torques into account. Unless otherwise specified, the tolerance is  $\pm 20\%$ .
- Make sure there is a supply of correctly prepared compressed air (→ 12 Technical data).

## 6 Installation

### 6.1 Mechanical installation

- Avoid pressing or suctioning the sealing band.  
Damage to the sealing band reduces operating reliability. Jerky movement of the unpressurised slide can cause negative pressure that sucks the sealing band into the piston chamber.
- Leave all screws and threaded bolts in their original states, unless you are requested to modify them in these instructions.
- Avoid damaging or contaminating the belt system.  
Damage reduces safety and the lifecycle of the DGC-HD.

#### 6.1.1 Installing the product

##### NOTICE!

Tensile loads that are too heavy may cause the screws in the cover to be pulled out.

- Mount the DGC-HD with profile mountings or slot nuts (→ Tab. 1). It is not possible to mount on the connection cover/end cap.
- 
- Ensure an installation without distortions and bends (evenness of the bearing surface  $\leq 0.05\%$  of the stroke length; max. 0.5 mm). For gantry applications, attention must also be paid to parallel alignment when aligning the axes. For additional information, please contact your local Festo Service.
  - Position the DGC-HD in such a way that its operating elements are accessible.
  - Observe the required support spacing. The diagrams (→ 13 Characteristic curves) give the support spacing that results dependent on the mounting position and payload. Exceeding the specified minimum distance requires a functional test in each individual case.

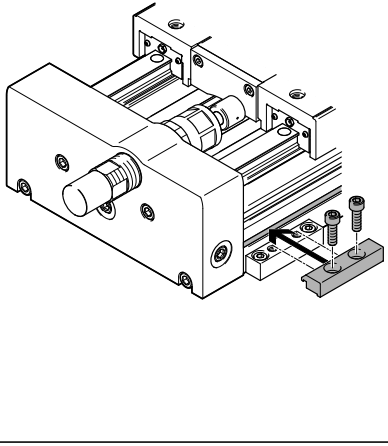
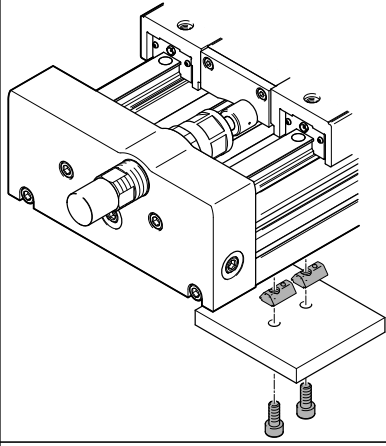


##### NOTICE!

Unfavourable mounting variants can damage the DGC-HD.

- Ensure that the mounting components are outside the travel range of the slide.

1. Mount the DGC-HD.

2. Please select the corresponding accessories from our catalogue (→ [www.festo.com/catalogue](http://www.festo.com/catalogue)).

Profile mounting	Slot nut mounting
MUE	NST
	
Profile mounting in the slot for the mounting surface  → Fig. 1.	Slot nut mounting in the slot  → Fig. 1. When tilting, the slot nuts glide into the slot at each point.

Tab. 1

3. Tighten the retaining screws evenly with the following tightening torque.

Size		18	25	40
Screw	MUE	M5	M5	M8
	NST (at the side)	M5	M5	M6
	NST (underneath)	M5	M6	M6
Tightening torque	MUE [Nm]	5	5	20
	NST (at the side) [Nm]	5.9	5.9	9.9
	NST (underneath) [Nm]	5.9	9.9	9.9

Tab. 2

### 6.1.2 Installation of the payload

For hard and stiff payloads (e.g. made from steel):

#### NOTICE!

If the aluminium slide is bent against a curved payload, the service life of the guide will be reduced.

- Make sure that the mounting surface of the payloads is even to within  $t \leq 0.01$  mm. When using additional slides, any differences in height must be compensated.

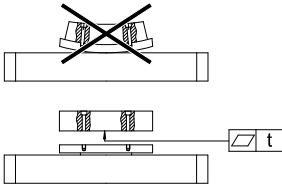


Fig. 4

- Position the payload in such a way that the break-down torque resulting from the force  $F$  (parallel to the axis of motion) and the lever arm "a" remains low.

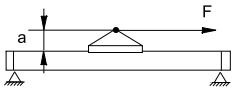


Fig. 5

1. Mount the payload on the slide with the screws and centring sleeves.
2. Ensure that the tightening torques and the max. screw-in depth  $D$  are observed.

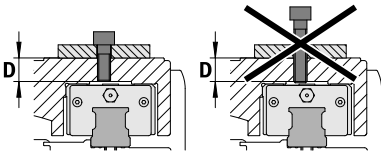


Fig. 6

Size		18	25	40
Screw (side/top)		M5	M6	M6
Max. screw-in depth $D$	[mm]	8.4	9.5	10
Centring hole (H7)	[mm]	$\varnothing 9$	$\varnothing 9$	$\varnothing 9$
Tightening torque	[Nm]	5.9	9.9	9.9

Tab. 3

For payloads with own guide:



## Installation

- Adjust the guides of the payload and DGC-HD so that they are exactly parallel. You will then avoid overloading the guide and increased wear.

### 6.1.3 Installation of accessories

If proximity sensors are used:

- Use:
  - Inductive proximity sensor with switch lug **13** (→ assembly instructions for the accessories used) in the slot **11** or with a mounting bracket **14** in the slot **9**
  - Magnetic proximity switches in the slot **11**.

Mounting alternatives:

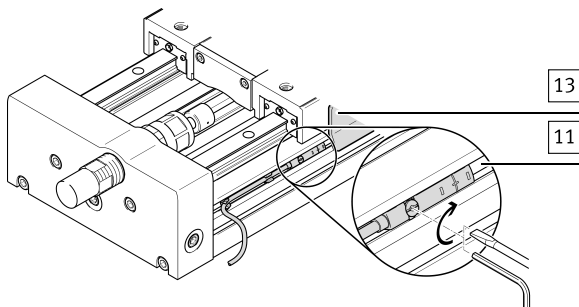


Fig. 7 Mounting in the slot

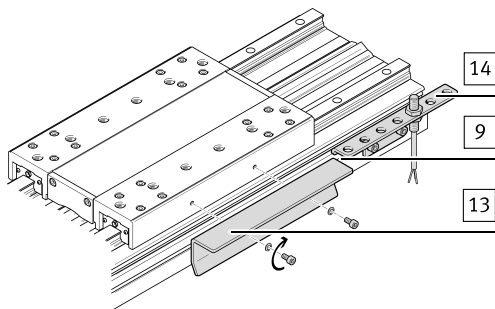


Fig. 8 Mounting via mounting bracket

To protect the end positions:

- Use an emergency buffer or shock absorber (→ assembly instructions for the accessories used).

To avoid contamination:

- Use slot covers in all unused slots.

## 6.2 Pneumatic installation

For installation in a vertical or sloping position:

**⚠ WARNING!**

Personal injury and material damage!

If there is a pressure failure, the working load will fall.

- Check whether HGL check valves are necessary. This prevents the moving load from suddenly slipping.
  - Check whether safety measures are required to prevent slow sinking as a result of leakage (e.g. toothed latches, moveable bolts or emergency buffers).
- 
- Select the appropriate supply ports.  
In addition to the supply ports provided at the factory (W), there are also the alternative ports (A). These are fitted with plug screws.

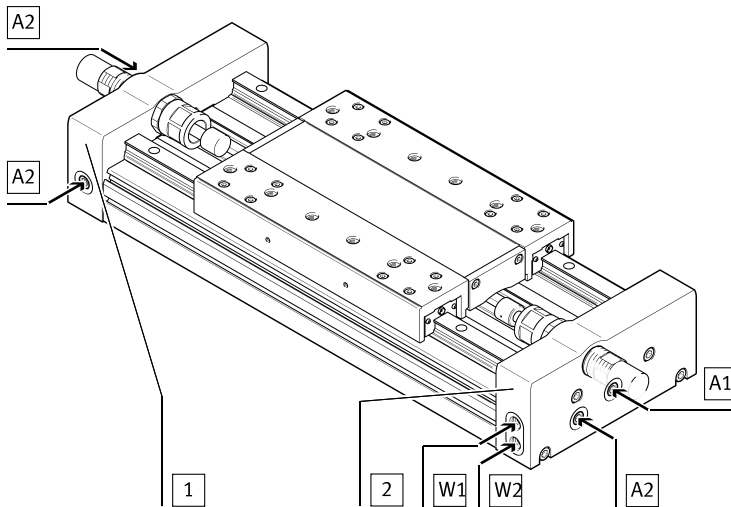


Fig. 9

Legend	Description
W1	Supply port ex works (movement to shutoff side <b>1</b> )
W2	Supply port ex works (movement to connection side <b>2</b> )
A1	Alternative connection (movement to shutoff side <b>1</b> )
A2	Alternative connection (movement to connection side <b>2</b> )
<b>1</b>	Shutoff side
<b>2</b>	Connection side

Tab. 4

To set the speed:

- Screw the one-way flow control valves GRLA into the check valves.

## 7 Commissioning

Before each commissioning and in operation:

### **⚠ WARNING!**

Payloads can cause personal injury and material damage (risk of crushing).

- Make sure that, in the travel range:
    - Nobody can place his/her hand in the path of moving components (e.g. by providing a protective guard).
    - There are no foreign objects in the path of the moving components.
- It should not be possible to grasp the DGC-HD until the load has come to a complete rest.

With medium or large payloads and/or at high speeds:

- Use the engineering software "DGC-QuickCalc" for pneumatic drives in the support portal (→ [www.festo.com/sp](http://www.festo.com/sp)).
- Use sufficiently large arrester fixtures.

Without external arrester fixtures, the DGC-HD will tolerate the maximum speeds and payloads set out in the catalogue specifications or table (→ 12 Technical data).

The limit values may not be exceeded, even during malfunctions.

### **Commissioning – processing**

- Slowly pressurise the system as a whole.  
In this way you will prevent sudden uncontrolled movements.  
For slow start-up pressurisation, use on-off valve HEL.
1. Close the one-way flow control valves
    - for both sides initially, and
    - then open again one turn.

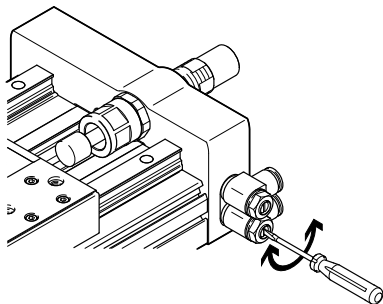


Fig. 10

2. Pressurise the DGC-HD as follows:
  - Initially simultaneously at both sides. This causes the slide to move slightly to a point of balance.
  - Then exhaust the DGC-HD on just one side. This prevents peak loads on the DGC-HD and in the compressed air system.
3. Start a test run.

4. Check whether the slide speed has to be modified.
5. Unscrew the one-way flow control valves slowly until the desired slide speed is reached.  
The slide should reach the end positions without striking them harshly or recoiling.

For precision adjustment of the stroke:

**NOTICE!**

Operating the DGC without a stop sleeve (H) and lock nut (K) destroys the DGC-HD.

- Assemble the cushioning components only together with the stop sleeve (H) and the lock nut (K).

1. Loosen the lock nut (K).
2. Screw or unscrew the cushioning component. For stability reasons, the distance  $d$  may not exceed the values from the following table (➔ Tab. 5).
3. Tighten the lock nuts (K) again with the following tightening torque.

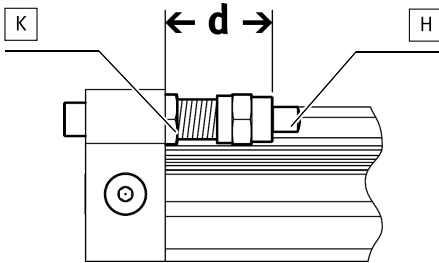


Fig. 11

Size	18	25	40
Distance $d$ [mm]	27.3 ... 52.3	31 ... 56	41 ... 76
Tightening torque [Nm]	20	35	60

Tab. 5

If the useful load or dynamics are modified:

- Check whether other cushioning elements are required.

## 8 Maintenance and care

Cleaning and maintenance:

1. Clean the belt system and the guide rail with a soft cloth as required. Any agents that do not damage the material may be used as cleaning agents.
2. Avoid cleaning agents which will damage the belt system (PU).  
Excessive friction or grease-solvent cleaning agents (e.g. soap suds) will damage the grease layer.

**NOTICE!**

The lubrication interval  $S_{int}$  is dependent on the load acting on the product.

- Cut the lubrication interval  $S_{int}$  (→ Fig.12) in half if any of the following situations apply:
  - Dusty and dirty environment
  - Nominal strokes > 2000 mm
  - Speeds > 2 m/s
  - Travel profile  $\Delta$  triangular operation (frequent acceleration and braking)
  - Ambient temperatures > 40 °C
  - Service age of product > 3 years

If several of these factors apply at the same time, the lubrication interval should be quartered.

- Grease the following components:

	Bearing guide	Guide rail
Lubricating point (→ Fig.13)	Lubrication hole [3]	Interface [2]
Lubrication interval	(→ Fig.12)	If required <sup>1)</sup>
Grease <sup>2)</sup>	Roller bearing grease	

1) or if the component no longer has a layer of grease

2) Pressure grease gun, blast pipes and grease (→ 10 accessories)

Tab. 6

To grease the **bearing guide**:

1. Calculate the load comparison factor  $f_v$  with the help of the formula for combined loads (→ 12 Technical data) and determine the lubricating interval  $S_{int}$  (→ Fig.12).

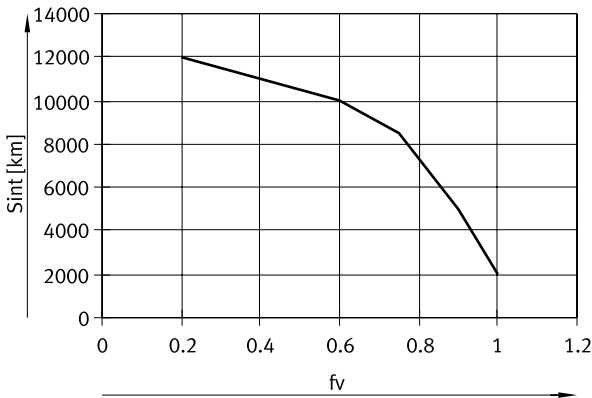


Fig. 12

2. Grease the bearing guide on both sides at all lubrication holes [3].

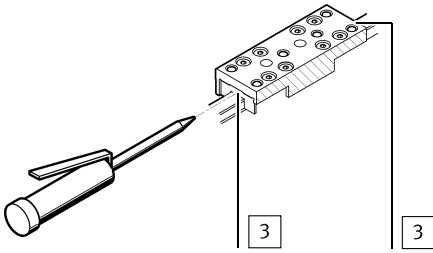


Fig. 13

3. Move the slide along the complete positioning path during lubrication in order to distribute the grease evenly.

Alternatively, Festo offers inspection services including re-lubrication. Otherwise, the DGC-HD is maintenance-free.

## 9 Repair

- Recommendation: Send the DGC-HD to our repair service.  
As a result, the required fine tuning and tests will be taken into special consideration.
  - Information about spare parts and aids can be found at: (➔ [www.festo.com/spareparts](http://www.festo.com/spareparts)).
- To replace the cushioning components:
- Observe the section "Precision adjustment of the stroke" (➔ 7 Commissioning).

## 10 Accessories

### NOTICE!

- Please select the corresponding accessories from our catalogue (➔ [www.festo.com/catalogue](http://www.festo.com/catalogue)).

Designation	Part number/type
Pressure grease gun with pinpoint nozzle	647958/LUB-1 <sup>1)</sup>
Blast pipe, axial outlet	647959/LUB-1-TR-I <sup>1)</sup>
Blast pipe, radial outlet	647960/LUB-1-TR-L <sup>1)</sup>
Roller bearing grease	LUB-KC1 from Festo <sup>1)</sup>

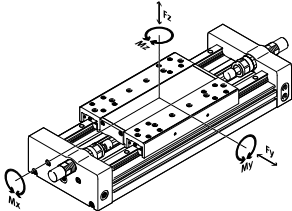
1) (➔ Spare parts catalogue under [www.festo.com/spareparts](http://www.festo.com/spareparts))

## 11 Fault clearance

Malfunction	Possible cause	Remedy
Irregular movement of the slide	One-way flow control valve not installed correctly	Control flow of exhaust air, if possible (not supply air).
	Tensions	Install the DGC-HD in such a way, that it is free of tension (evenness of the bearing surface: → 6.1 Mechanical installation)
		Align the DGC-HD so it is exactly parallel to the second axis
	Roller bearing/bearing guide is defective	Grease the DGC-HD (→ 8 Maintenance and care)
Send the DGC-HD to Festo for repair		
Slide does not move	Loads too high	Reduce payload/travel speed
	Retaining screws for the payload are too long	Observe the maximum screw-in depth (→ 6.1.2 Installation of the payload)
Heavy leakage	Seal worn	Replace wearing parts: – Self-repair with a set of wearing parts – Return to Festo for repair
	Sealing band pressed/sucked in	When the linear actuator is unpressurised, move the slide by hand through the entire stroke twice (if necessary, move fixed stops into the end position)
		Avoid negative pressure in the piston chamber (e.g. only move the unpressurised slide slowly when the valve is disconnected).
Cylinder does not reach the desired speed	Lack of volume air	– Increase connection cross-section – Connect volume upstream
	High friction or counteracting force	Observe limit values

Tab. 8

## 12 Technical data

Size <sup>1)</sup>		18	25	40
Pneumatic connection		M5	G1/8	G1/4
Design		Pneumatic linear drive with heavy-duty guide		
Guide		Recirculating ball bearing guide		
Cushioning	YSR	Shock absorber, hard characteristics		
	YSRW	Shock absorber, soft characteristics		
Mounting position		Any		
Operating medium		Compressed air to ISO 8573-1:2010 [7:-:-]		
Note on the operating medium		Lubricated operation possible (in which case lubricated operation will always be required)		
Operating pressure	[bar]	2.5 ... 8		1.5 ... 8
Ambient temperature	[°C]	-10 ... +60		
Theor. force at 6 bar	[N]	153	295	754
Max. speed	[m/s]	3		
Max. impact energy		(→ <a href="http://www.festo.com/catalogue">www.festo.com/catalogue</a> )		
Permissible forces on the slide				
$F_{y,max} = F_{z,max}$	[N]	3650	5600	13000
Permissible torques on the slide				
$M_{x,max}$	[Nm]	140	300	900
$M_{y,max} = M_{z,max}$	[Nm]	275	500	1450
		Condition for combined loads: $f_v = \frac{ F_{y,dyn} }{F_{y,max}} + \frac{ F_{z,dyn} }{F_{z,max}} + \frac{ M_{x,dyn} }{M_{x,max}} + \frac{ M_{y,dyn} }{M_{y,max}} + \frac{ M_{z,dyn} }{M_{z,max}} \leq 1$		
Note on materials		Contains paint-wetting impairment substances		
Materials				
Profile, cover, slide		Aluminium		
Ball bearing, guide, screws		Steel		
Scraper		POM		



## Characteristic curves

Size <sup>1)</sup>	18	25	40
Seals	NBR, TPE-U		
Weight			
0 stroke [kg]	3.987	7.509	20.469
Per 10 mm stroke [kg]	0.071	0.105	0.199

<sup>1)</sup> The following tool is available for sizing tasks: "DGC-QuickCalc" engineering software (➔ [www.festo.com/sp](http://www.festo.com/sp))

Tab. 9

### 13 Characteristic curves

Max. permissible support spacing  $l$  depending on the force  $F$

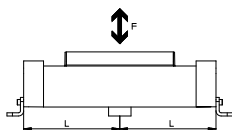


Fig. 14

DGC-HD

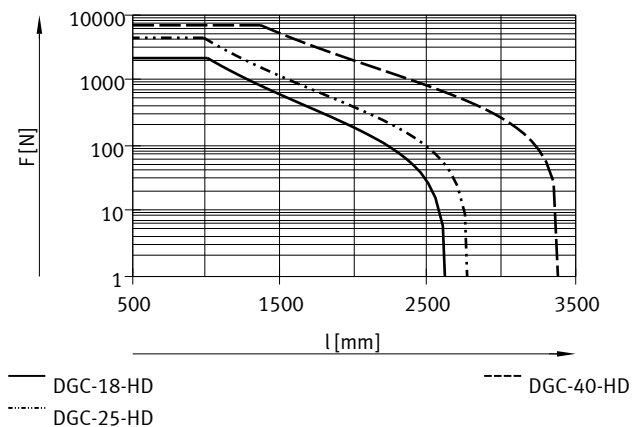


Fig. 15

Characteristic curves

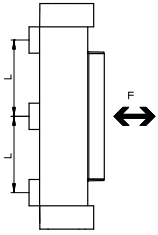


Fig. 16

DGC-HD

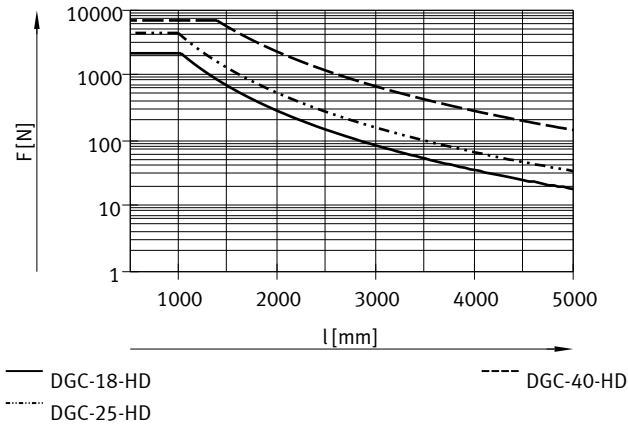


Fig. 17



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