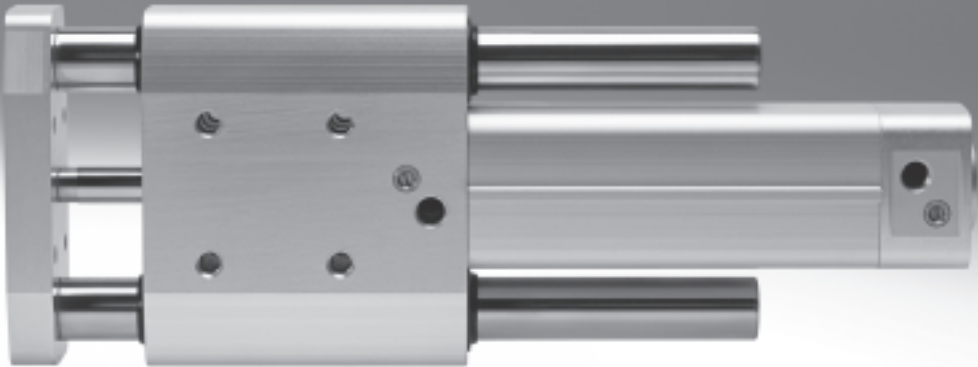


**Guided drives DGRF-C, Clean Design**



# Guided drives DGRF-C, Clean Design

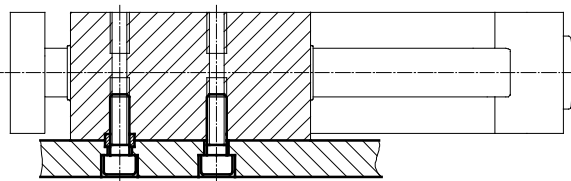
Key features and product range overview

## At a glance

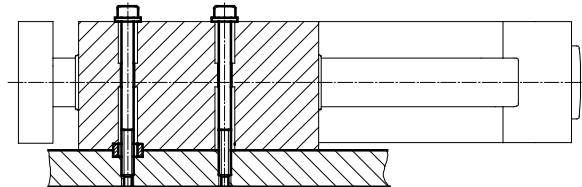
- The guided drive is used wherever hygiene, ease of cleaning and resistance are important, predominantly in dry and splash zones in the food and packaging industry
  - Corrosion-resistant in harsh ambient conditions
  - Easy-to-clean design
  - FDA-compliant
  - Suitable for unlubricated operation
  - Resistant to conventional cleaning agents
  - For hygiene reasons, the threads on the end caps should be sealed with cover plates
  - Variant (A3): special piston rod seal and guide rod wiper seal increase the service life of the drive
- Areas of application:**
- Bottling systems in the beverage industry
    - Labelling and palletising machines
  - Milk processing
    - Filling ice cream and yoghurt containers, etc.
  - Meat processing
  - Confectionery production
  - Bakery production
  - Packaging industry
    - Foodstuffs, pharmaceuticals, cosmetics, chemicals, beverages and tobacco

## Mounting options

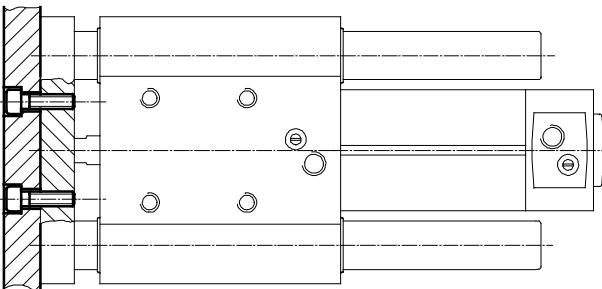
From underneath



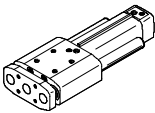
From above



On the yoke plate

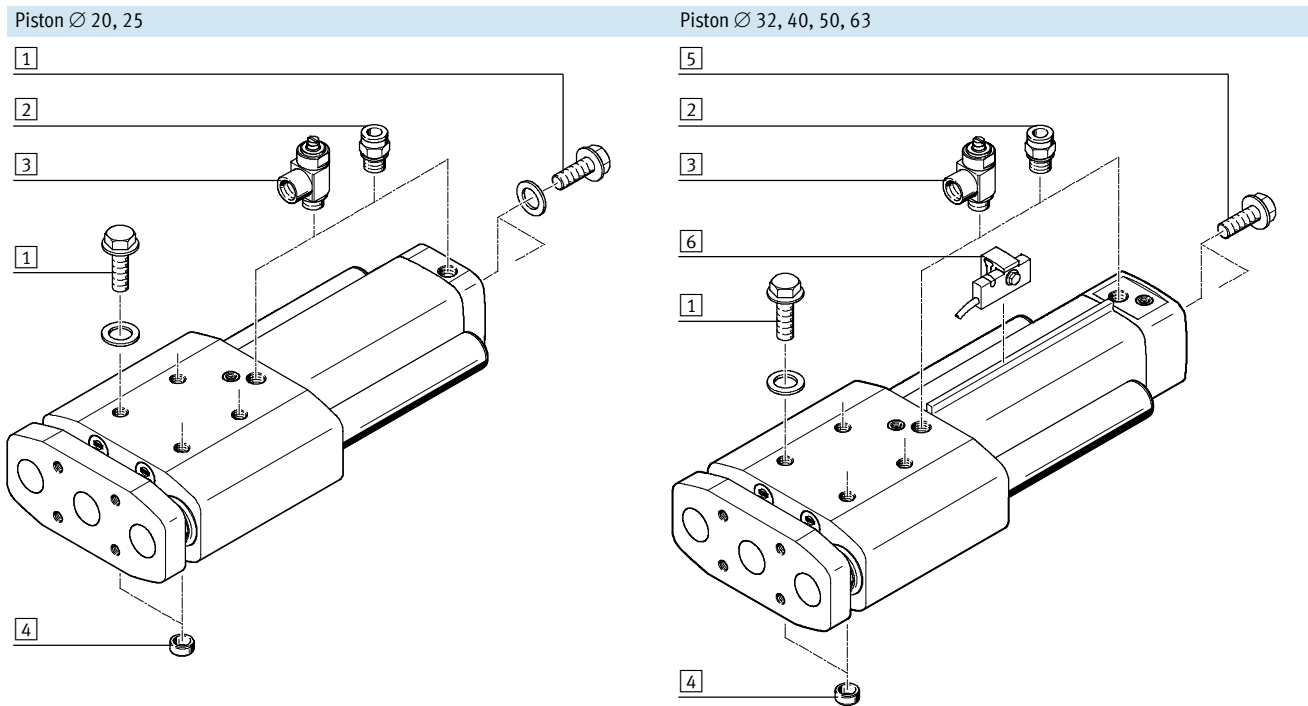


## Product range overview

Function	Type	Piston Ø	Stroke	Cushioning		Position sensing	Mounting rail	Unlubricated operation
				P	PPV	A	R	A3
Double-acting	 DGRF-C-GF	20, 25	10 ... 400	■	–	–	–	■
		32	10 ... 400	■	■	■	■	■
		40, 50, 63	10 ... 400	–	■	■	■	■

# Guided drives DGRF-C, Clean Design

Peripherals overview



Accessories			
	Brief description	→ Page/Internet	
1	Cover plate DAMD	<ul style="list-style-type: none"> <li>• For sealing unused mounting threads</li> <li>• The cover disc is included with the screw</li> <li>• The screws are not included with the drive</li> </ul>	13
2	Push-in fitting QS-F/QSL-F/CRQS/CRQSL/NPQP	For connecting compressed air tubing with standard O.D.	11
3	One-way flow control valve CRGRLA/GRLA-F	For regulating speed	13
4	Centring sleeve ZBH	<ul style="list-style-type: none"> <li>• For centring the guided drive</li> <li>• Two centring sleeves included in the scope of delivery</li> </ul>	13
5	Cover plate CR	<ul style="list-style-type: none"> <li>• For sealing unused mounting threads</li> <li>• The screws are not included with the drive</li> </ul>	13
6	Proximity sensor SMT-C1	<ul style="list-style-type: none"> <li>• For sensing the position</li> <li>• Proximity sensor is mounted on the sensor mounting rail</li> </ul>	11

# Guided drives DGRF-C, Clean Design

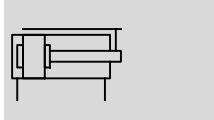
Type codes

		DGRF	-	C	-	GF	-	32	-	200	-	PPV	-	A	-	R	-	A3	
<b>Type</b>																			
Double-acting																			
DGRF	Guided drive																		
<b>Version</b>																			
C	Easy-to-clean design																		
<b>Guide</b>																			
GF	Plain-bearing guide																		
<b>Piston Ø [mm]</b>																			
<b>Stroke [mm]</b>																			
<b>Cushioning</b>																			
P	Flexible cushioning rings at both ends																		
PPV	Pneumatic cushioning, adjustable at both ends																		
<b>Position sensing</b>																			
A	Via proximity sensor																		
<b>Sensor mounting, external</b>																			
R	Mounting rail for proximity sensor																		
<b>Wiper seal material</b>																			
-	Standard																		
A3	Suitable for unlubricated operation																		

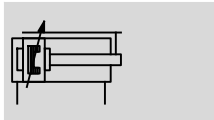
# Guided drives DGRF-C, Clean Design

Technical data

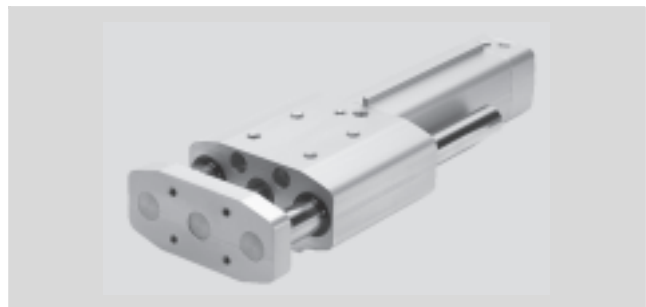
Function  
Piston Ø 20, 25



Piston Ø 32, 40, 50, 63



- - Diameter  
20 ... 63 mm
- - Stroke length  
10 ... 400 mm
- - [www.festo.com](http://www.festo.com)



General technical data						
Piston Ø	20	25	32	40	50	63
Pneumatic connection	M5	M5	G1/8	G1/4	G1/4	G3/8
Mode of operation	Double-acting					
Design	Guide					
	Guide rods with yoke					
Guide	Plain-bearing guide					
Cushioning	P	Flexible cushioning rings at both ends			-	
	PPV	-			Pneumatic cushioning, adjustable at both ends	
Cushioning length	[mm]	-	20	20	22	22
Position sensing		Via proximity sensor				
Type of mounting	Via through-hole					
	Via female thread					
Mounting position	Any					
Torsional backlash <sup>1)</sup>	[°]	0.13	0.11	0.10	0.09	0.07

1) Retracted state, without load

Operating and environmental conditions						
Piston Ø	20	25	32	40	50	63
Variant			P	PPV		
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]	2.5 ... 10	2 ... 10	2 ... 12	2 ... 12	1.5 ... 12
	A3 [bar]	2 ... 10		2 ... 12	1.5 ... 12	
Ambient temperature	[°C]	-20 ... +80				
Suitability for use in the food industry	As per manufacturer's declaration (→ Support / Downloads)					
Corrosion resistance class CRC <sup>1)</sup>	3					

1) Corrosion resistance class 3 according to Festo standard 940 070  
Components subject to high corrosion stress. External visible parts in direct contact with industrial atmospheres or media such as solvents and cleaning agents, with a predominantly functional requirement for the surface

Force [N] and impact energy [J]						
Piston Ø	20	25	32	40	50	63
Theoretical force at 6 bar, advancing	189	295	483	754	1,178	1,870
Theoretical force at 6 bar, retracting	141	247	415	633	990	1,682
Max. impact energy in the end positions with P cushioning	0.2	0.3	0.4	-	-	-

Permissible impact velocity:

$$v_{perm.} = \sqrt{\frac{2 \times E_{perm.}}{m_{dead} + m_{load}}}$$

Maximum permissible load:

$$m_{load} = \frac{2 \times E_{perm.}}{v^2} - m_{dead}$$

- $v_{perm.}$  Permissible impact velocity
- $E_{perm.}$  Max. impact energy
- $m_{intrinsic}$  Moving load (drive)
- $m_{load}$  Moving effective load

- Note  
This data represents the maximum values that can be achieved. The maximum permissible impact energy must be observed.

# Guided drives DGRF-C, Clean Design

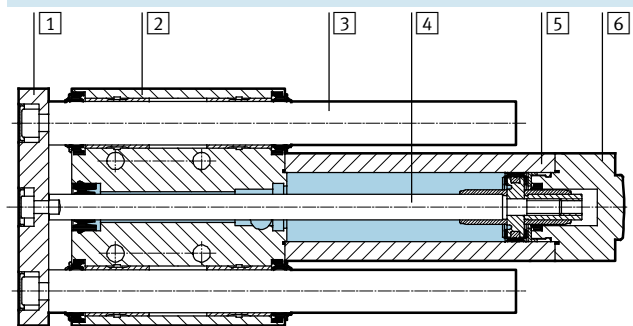
Technical data

FESTO

Weight [g]							
Piston $\varnothing$ Variant	20	25	32		40	50	63
			P	PPV			
Product weight with 0 mm stroke	900	1,200	2,100	2,300	2,950	4,700	6,100
Additional weight per 10 mm stroke	52	55	80	83	92	142	147
Moving load with 0 mm stroke	420	490	900	910	1,100	1,800	2,100
Additional load per 10 mm stroke	38	38	58	58	65	102	102

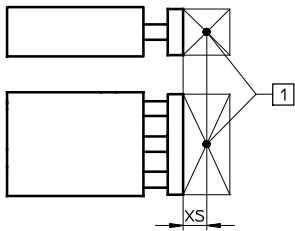
## Materials

Sectional view



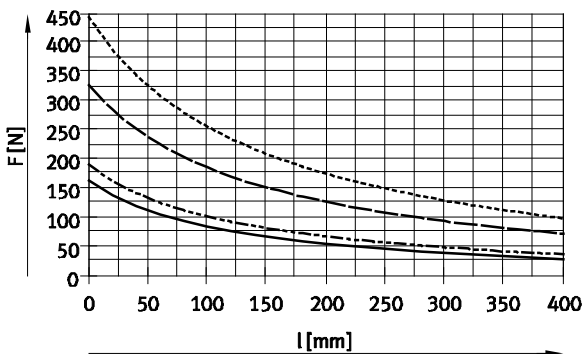
Guided drive	Standard	A3
1 Yoke plate	Wrought aluminium alloy	
2 Housing	Wrought aluminium alloy	
3 Guide rod	High-alloy stainless steel	
4 Piston rod	High-alloy stainless steel	
5 Cylinder barrel	Wrought aluminium alloy	
6 End cap	Wrought aluminium alloy	
- Seal	Polyurethane elastomer	Polyethylene
- Note on materials	RoHS-compliant	

## Max. effective load F as a function of stroke l



1 Centre of gravity of effective load

- Load data are based on a distance from the centre of gravity of XS = 50 mm
- Load data can be requested for larger distances

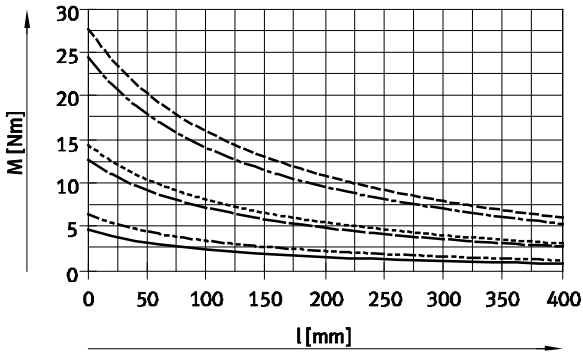
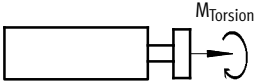


- ∅ 20
- - - ∅ 25
- ∅ 32/40
- - - ∅ 50/63

# Guided drives DGRF-C, Clean Design

Technical data

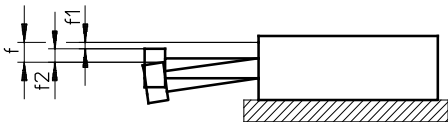
## Max. torque load M as a function of stroke l



- Ø 20
- - - Ø 25
- · — Ø 32
- · - · - Ø 40
- - - - - Ø 50
- · - · - · - Ø 63

## Deflection of piston rod

Deflection f1 due to bearing backlash as a function of stroke l



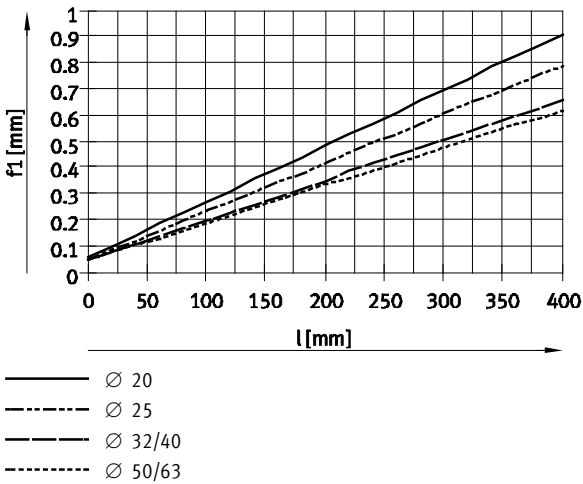
$$f = f_1 + f_2$$

f = Total deflection of piston rod

f1 = Deflection due to bearing backlash

f2 = Deflection due to lateral force

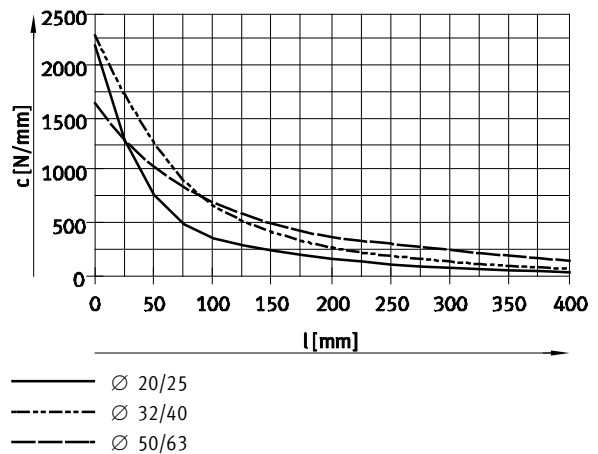
Deflection f1, due to bearing backlash as a function of stroke l



- Ø 20
- - - Ø 25
- · — Ø 32/40
- · - · - Ø 50/63

Deflection f2, due to effective load F and rigidity c as a function of stroke l

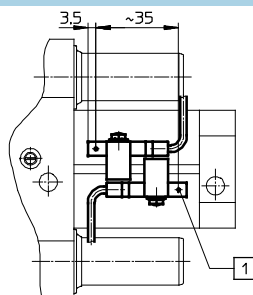
$$f_2 = \frac{F}{c}$$



- Ø 20/25
- - - Ø 32/40
- · — Ø 50/63

## End-position sensing

A minimum stroke is required to be able to sense both end positions at the cylinder.



- 1 Position of the proximity sensor within the housing

Piston Ø	32	40	50	63
Minimum stroke [mm]	35	35	35	30

# Guided drives DGRF-C, Clean Design

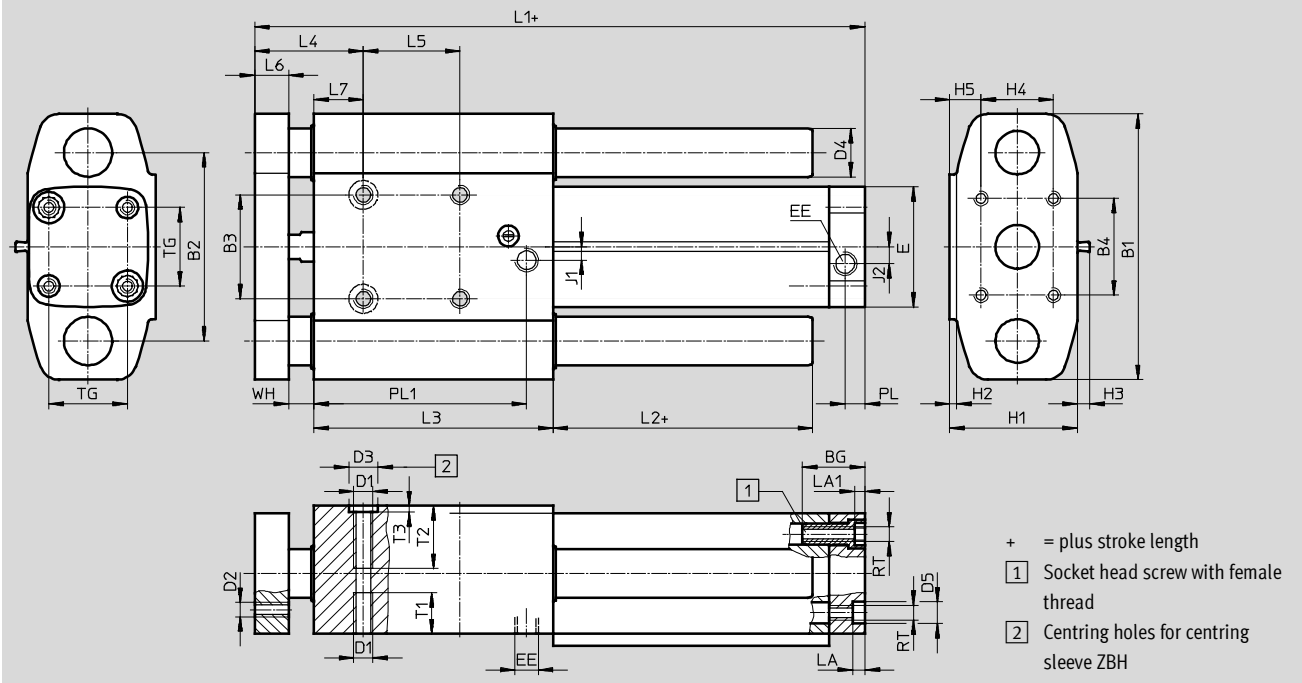
Technical data

FESTO

## Dimensions

Download CAD data → [www.festo.com](http://www.festo.com)

DGRF-...-P-... – Flexible cushioning rings at both ends



∅	BG	B1	B2	B3 <sup>2)</sup>	B4	D1	D2	D3 <sup>3)</sup>	D4	D5	E	EE
[mm]								∅ H7	∅	∅ F9		
20	19.5	83	58	30	30	M6	M5	9	16	9	37	M5
25	19.5	95	68	35	40	M6	M6	9	16	9	42	M5
32	26	110	78	43	40	M8	M6	12	20	9	50	G <sup>1</sup> / <sub>8</sub>

∅	H1	H2	H3 <sup>1)</sup>	H4	H5	J1	J2	L1	L2	L3	L4	L5
[mm]												
20	39	2	–	20	10.5	0	0	115 +1.4/-0.8	7	68	40 +1/-0.9	30
25	44	2	–	20	13	0	0	126 +1.4/-0.8	7	77	40 +1/-0.9	40
32	53	3	5	30	13	5.5	7	152.8 ±1.1	7.4	99	45 +0.9/-1	40

∅	L6	L7	LA	LA1	PL	PL1	RT	T1	T2	T3	TG	WH
[mm]												
20	12	18	4.9	4.6	6	62	M5	13	20	2.1	22	10 +0.5/-0.7
25	12	18	4.9	4.6	6	71	M5	13	25	2.1	26	10 +0.5/-0.7
32	14	20.4	5.1	4.6	8.2	88	M6	17	26	2.6	32.5	10.7 +0.3/-0.9

- 1) Only in combination with sensor mounting rail (DGRF-...-R)
- 2) Tolerance between centring holes ±0.02 mm
- 3) Two centring sleeves included in the scope of delivery



# Guided drives DGRF-C, Clean Design

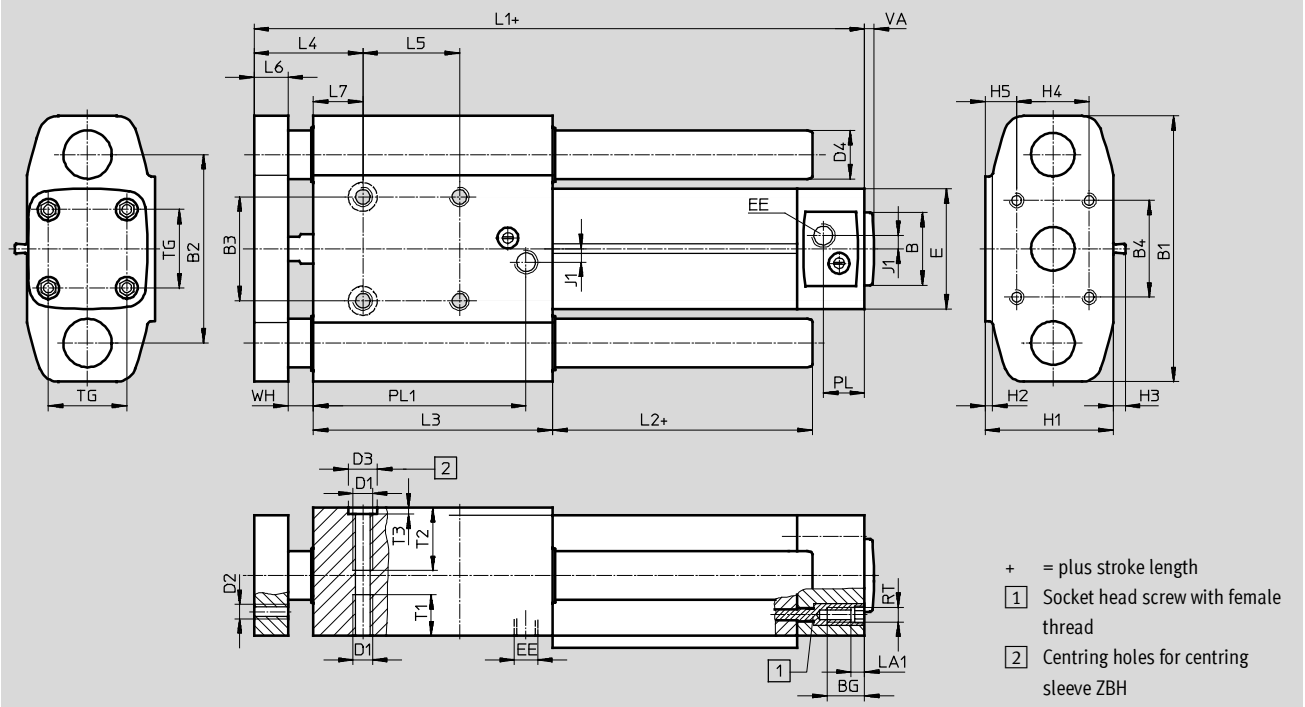
Technical data

FESTO

## Dimensions

Download CAD data → [www.festo.com](http://www.festo.com)

DGRF-...-PPV-... – Pneumatic cushioning, adjustable at both ends



∅	B	BG	B1	B2	B3 <sup>2)</sup>	B4	D1	D2	D3 <sup>3)</sup>	D4	E	EE
[mm]	∅ d11								∅ H7	∅		
32	30	16	110	78	43	40	M8	M6	12	20	50	G <sup>1</sup> / <sub>8</sub>
40	35	16	120	88	51	50	M8	M6	12	20	58	G <sup>1</sup> / <sub>4</sub>
50	40	17	148	110	64	60	M8	M8	12	25	70	G <sup>1</sup> / <sub>4</sub>
63	45	17	162	125	80	80	M10	M8	12	25	81	G <sup>3</sup> / <sub>8</sub>

∅	H1	H2	H3 <sup>1)</sup>	H4	H5	J1	L1	L2	L3	L4	L5
[mm]											
32	53	3	5	30	13	5.5	177.6 +1.9/-1.2	7.4	99	45 +1.5/-1.1	40
40	61	3	5	30	17	6.5	183.5 +1.9/-1.3	7.5	99	45 +1.5/-1.1	40
50	73	3	5	40	18	8.5	193.5 +1.7/-1.3	7.7	105	50 +1.3/-1.2	40
63	84	3	5	40	23.5	11	207.3 +1.7/-1.3	7.5	105	50 +1.3/-1.2	40

∅	L6	L7	LA1	PL	PL1	RT	T1	T2	T3	TG	VA	WH
[mm]												
32	14	20.4	5.6	17	88	M6	17	26	2.6	32.5	4	10.6 +1/-0.9
40	14	20.5	5.6	19	83	M6	17	26	2.6	38	4	10.5 ±1
50	16	22.7	6.1	20	89	M8	17	20	2.6	46.5	4	11.3 +0.8/-1
63	20	18.5	6.1	25	79.5	M8	17	24	2.6	56.5	4	11.5 +0.8/-1

1) Only in combination with sensor mounting rail (DGRF-...-R)

2) Tolerance between centring holes ±0.02 mm

3) Two centring sleeves included in the scope of delivery

# Guided drives DGRF-C, Clean Design

Ordering data – Modular products

Ordering table									
Size	20	25	32	40	50	63	Condi- tions	Code	Enter code
<b>M</b> Module No.	<b>562216</b>	<b>562217</b>	<b>563366</b>	<b>562219</b>	<b>562220</b>	<b>562221</b>			
Function	Guided drive							<b>DGRF</b>	DGRF
Product design	Easy-to-clean design							<b>-C</b>	-C
Guide	Plain-bearing guide							<b>-GF</b>	-GF
Piston Ø	20	25	32	40	50	63		-...	
Stroke [mm]	10 ... 400							-...	
Cushioning	Flexible cushioning rings at both ends							<b>-P</b>	
				Pneumatic cushioning, adjustable at both ends				<b>-PPV</b>	
Position sensing				Via proximity sensor			<b>1</b>	<b>A</b>	
Sensor mounting, external				Mounting rail for proximity sensor			<b>1</b>	<b>-R</b>	
<b>O</b> Wiper seal variant	Standard								
	For unlubricated operation							<b>-A3</b>	

**1** **A, R** Always present with piston Ø 32 ... 63.

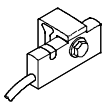
Transfer order code





**DGRF** -  **C** -  **GF** -  -  -   -  -




# Guided drives DGRF-C, Clean Design

Accessories

FESTO

Ordering data – Proximity sensors for T-slot, magneto-resistive						Technical data → Internet: smt	
	Type of mounting	Switching output	Electrical connection	Cable length [m]	Part No.	Type	
N/O contact							
	Is mounted on the mounting rail	PNP	Cable, 3-wire	5.0	571339	SMT-C1-PS-24V-K-5,0-OE	
			Plug M8x1, 3-pin	0.3	571342	SMT-C1-PS-24V-K-0,3-M8D	
			Plug M12x1, 3-pin	0.3	571341	SMT-C1-PS-24V-K-0,3-M12	

Ordering data – Connecting cables for SMT-C1...					Technical data → Internet: nebu	
	Electrical connection, left	Electrical connection, right	Cable length [m]	Part No.	Type	
	Straight socket, M8x1, 3-pin	Cable, open end, 3-wire	2.5	541333	NEBU-M8G3-K-2.5-LE3	
			5	541334	NEBU-M8G3-K-5-LE3	
	Straight socket, M12x1, 5-pin	Cable, open end, 3-wire	2.5	541363	NEBU-M12G5-K-2.5-LE3	
			5	541364	NEBU-M12G5-K-5-LE3	
	Angled socket, M8x1, 3-pin	Cable, open end, 3-wire	2.5	541338	NEBU-M8W3-K-2.5-LE3	
			5	541341	NEBU-M8W3-K-5-LE3	
	Angled socket, M12x1, 5-pin	Cable, open end, 3-wire	2.5	541367	NEBU-M12W5-K-2.5-LE3	
			5	541370	NEBU-M12W5-K-5-LE3	



Ordering data – Push-in fittings				Technical data → Internet: quick star		
	Connection		Material	Part No.	Type	PU <sup>2)</sup>
	Thread	Tubing O.D.				
With external hexagon						
	M5	4	Brass, nickel and chrome-plated	533844	QS-F-M5-4 <sup>1)</sup>	10
		6		533845	QS-F-M5-6 <sup>1)</sup>	
	G1/8	4		193408	QS-F-G1/8-4 <sup>1)</sup>	
		6		193409	QS-F-G1/8-6 <sup>1)</sup>	
		8		193410	QS-F-G1/8-8 <sup>1)</sup>	
	G1/4	6		193411	QS-F-G1/4-6 <sup>1)</sup>	
		8		193412	QS-F-G1/4-8 <sup>1)</sup>	
		10		193413	QS-F-G1/4-10 <sup>1)</sup>	
	G3/8	8		193414	QS-F-G3/8-8 <sup>1)</sup>	
		10		193415	QS-F-G3/8-10 <sup>1)</sup>	
		12		193487	QS-F-G3/8-12 <sup>1)</sup>	
		M5		4	Stainless steel	
6			162861	CRQS-M5-6 <sup>1)</sup>		
R1/8		4	132643	CRQS-1/8-4		
		6	162862	CRQS-1/8-6		
		8	162863	CRQS-1/8-8		
R1/4		6	132644	CRQS-1/4-6		
		8	162864	CRQS-1/4-8		
		10	162865	CRQS-1/4-10		
R3/8		10	162866	CRQS-3/8-10		
		12	162867	CRQS-3/8-12		
		R1/8	4	Polypropylene		133041
	6		133043		NPQP-D-R18-Q6-FD-P10	
	8		133045		NPQP-D-R18-Q8-FD-P10	
	R1/4	6	133044		NPQP-D-R14-Q6-FD-P10	
		8	133046		NPQP-D-R14-Q8-FD-P10	
		10	133047		NPQP-D-R14-Q10-FD-P10	
	R3/8	10	133048		NPQP-D-R38-Q10-FD-P10	
		12	133049		NPQP-D-R38-Q12-FD-P10	

1) With sealing ring  
2) Packaging unit

# Guided drives DGRF-C, Clean Design




Accessories

FESTO

Ordering data – Push-in fittings				Technical data → Internet: quick star			
	Connection		Material	Part No.	Type	PU <sup>2)</sup>	
	Thread	Tubing O.D.					
<b>With internal hexagon</b>							
	M5	4	Brass, nickel and chrome-plated	533924	QS-F-M5-4-I <sup>1)</sup>	10	
		6		537014	QS-F-M5-6-I <sup>1)</sup>		
	G1/8	4		533927	QS-F-G1/8-4-I <sup>1)</sup>		
		6		533928	QS-F-G1/8-6-I <sup>1)</sup>		
		8		533929	QS-F-G1/8-8-I <sup>1)</sup>		
	G1/4	8		533930	QS-F-G1/4-8-I <sup>1)</sup>		
		10		533931	QS-F-G1/4-10-I <sup>1)</sup>		
	G3/8	12		8002796	QS-F-G3/8-12-I-B <sup>1)</sup>		
	M5	4		Stainless steel	132328	CRQS-M5-4-I <sup>1)</sup>	1
		6			132329	CRQS-M5-6-I <sup>1)</sup>	
	R1/8	6	132330		CRQS-1/8-6-I		
		8	132331		CRQS-1/8-8-I		
	R1/4	8	132332		CRQS-1/4-8-I		
		10	132333		CRQS-1/4-10-I		
	R3/8	10	132334		CRQS-3/8-10-I		

1) With sealing ring

2) Packaging unit

Ordering data – Push-in L-fittings				Technical data → Internet: crqsl					
	Connection		Material	Part No.	Type	PU <sup>2)</sup>			
	Thread	Tubing O.D.							
<b>With external hexagon</b>									
	M5	4	Brass, nickel and chrome-plated	533849	QSL-F-M5-4 <sup>1)</sup>	10			
		6		533850	QSL-F-M5-6 <sup>1)</sup>				
	G1/8	4		193418	QSL-F-G1/8-4 <sup>1)</sup>				
		6		193419	QSL-F-G1/8-6 <sup>1)</sup>				
		8		193420	QSL-F-G1/8-8 <sup>1)</sup>				
	G1/4	6		193421	QSL-F-G1/4-6 <sup>1)</sup>				
		8		193422	QSL-F-G1/4-8 <sup>1)</sup>				
		10		193423	QSL-F-G1/4-10 <sup>1)</sup>				
		12		533853	QSL-F-G1/4-12 <sup>1)</sup>				
	G3/8	8		193424	QSL-F-G3/8-8 <sup>1)</sup>				
		10		193425	QSL-F-G3/8-10 <sup>1)</sup>				
		12		197486	QSL-F-G3/8-12 <sup>1)</sup>				
	M5	4	Stainless steel	162870	CRQSL-M5-4 <sup>1)</sup>	1			
		6		162871	CRQSL-M5-6 <sup>1)</sup>				
	R1/8	4		132598	CRQSL-1/8-4				
		6		162872	CRQSL-1/8-6				
		8		162873	CRQSL-1/8-8				
	R1/4	6		132599	CRQSL-1/4-6				
		8		162874	CRQSL-1/4-8				
		10		162875	CRQSL-1/4-10				
	R3/8	10		162876	CRQSL-3/8-10				
		12		162877	CRQSL-3/8-12				
		R1/8		4	Polypropylene		133051	NPQP-L-R18-Q4-FD-P10	10
				6			133053	NPQP-L-R18-Q6-FD-P10	
8			133055	NPQP-L-R18-Q8-FD-P10					
R1/4		6	133054	NPQP-L-R14-Q6-FD-P10					
		8	133056	NPQP-L-R14-Q8-FD-P10					
		10	133057	NPQP-L-R14-Q10-FD-P10					
R3/8		10	133058	NPQP-L-R38-Q10-FD-P10					
		12	133059	NPQP-L-R38-Q12-FD-P10					



1) With sealing ring

2) Packaging unit


# Guided drives DGRF-C, Clean Design




Accessories

FESTO

Ordering data – One-way flow control valves				Technical data → Internet: crgla		
	Connection		Material	Part No.	Type	PU <sup>1)</sup>
	Thread	For push-in fitting				
	M5	CRQS/CRQSL/CRQST, Quick Star	Electropolished special steel casting	161403	CRGRLA-M5-B	1
	G1/8			161404	CRGRLA-1/8-B	
	G1/4			161405	CRGRLA-1/4-B	
	G3/8			161406	CRGRLA-3/8-B	
	G1/8	Push-in connector is integrated	Chrome-plated metal	195597	GRLA-F-1/8-QS-4-D	1
				195598	GRLA-F-1/8-QS-6-D	
				195599	GRLA-F-1/8-QS-8-D	
				195600	GRLA-F-1/4-QS-6-D	
	G1/4			195601	GRLA-F-1/4-QS-8-D	

1) Packaging unit


Ordering data – Plastic tubing, standard O.D.		Technical data → Internet: tubing
		Type
	Approved for use in the food industry and resistant to hydrolysis	PUN-H
	Good resistance to chemicals and hydrolysis	PLN
	Pneumatic tubing with resistance to high temperatures and chemicals	PFAN

Ordering data – Cover plates, corrosion-resistant				
	For Ø	Description	Part No. Type PU <sup>1)</sup>	
For mounting thread on the guide				
	20, 25	With cover disc	543715 DAMD-P-M6-12-R1	4
	32, 40, 50		543716 DAMD-P-M8-16-R1	
	63		543717 DAMD-P-M10-16-R1	
For mounting thread on the end cap				
	20, 25	With cover disc	543714 DAMD-P-M5-10-R1	4
	32 <sup>2)</sup>		543715 DAMD-P-M6-12-R1	
	32 <sup>3)</sup> , 40	-	650120 CR-M6x12-A2-70:6KT	
	50, 63		650121 CR-M8x16-A2-70:6KT	

1) Packaging unit

2) For drive with P cushioning

3) For drive with PPV cushioning

Ordering data – Centring sleeves		Technical data → Internet: zbh		
	For Ø	Part No.	Type	PU <sup>1)</sup>
	20, 25	150927	ZBH-9	10
	32, 40, 50, 63	189653	ZBH-12	

1) Packaging unit