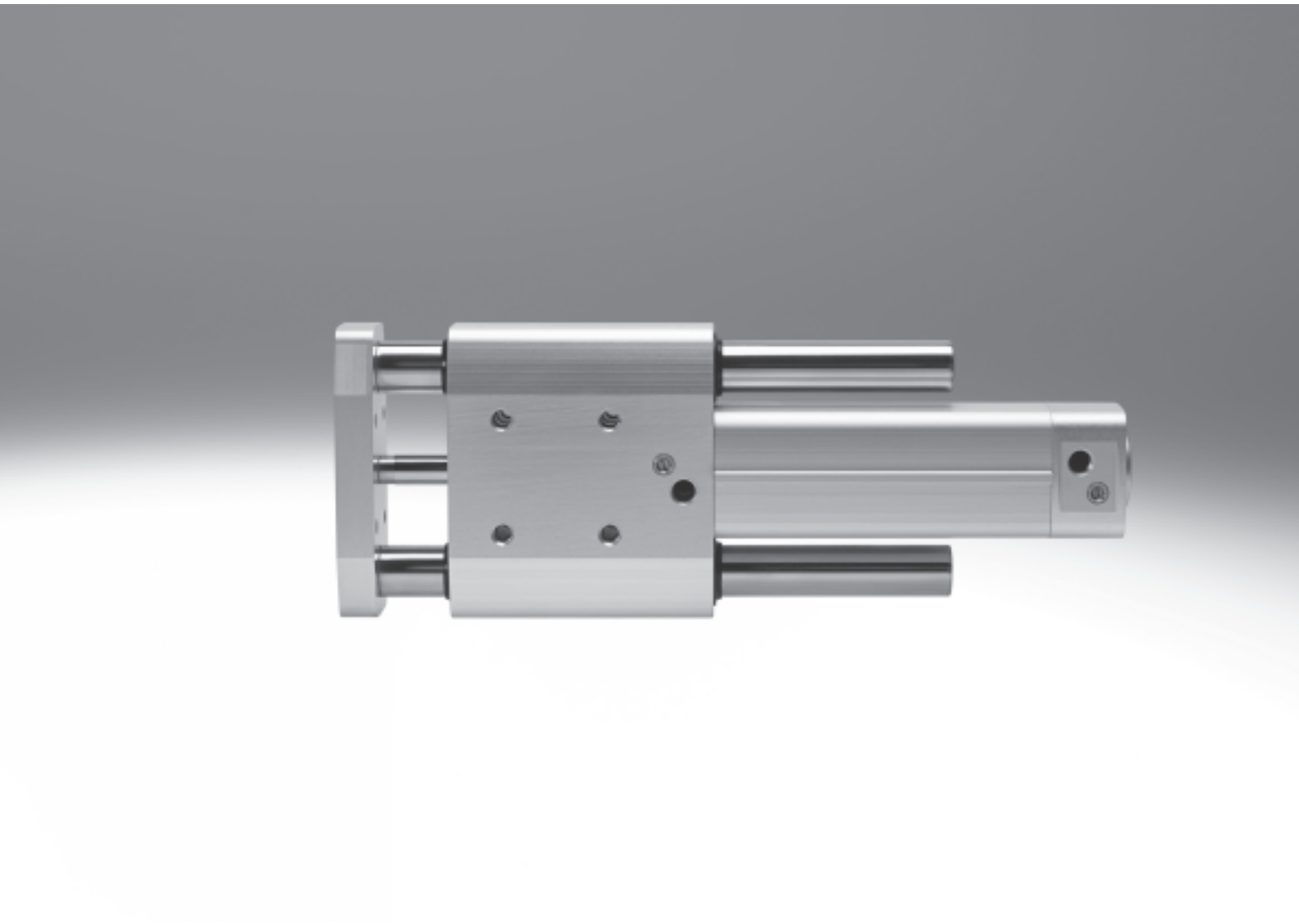
Guided drives DGRF, Clean Design

FESTO



New

Guided drives DGRF, Clean Design

Key features and product range overview

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At a glance

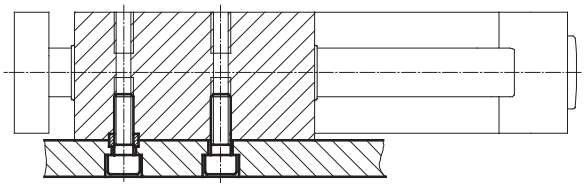
- The guided drive is used wherever hygiene, ease of cleaning and resistance are important, predominantly in dry and splash zones in the food and packaging industry
- Corrosion-resistant in harsh ambient conditions
- Easy-to-clean design
- FDA-compliant
- Suitable for unlubricated operation
- Resistant to conventional cleaning agents
- For hygiene reasons, the threads on the end caps should be sealed with blanking screws
- Variant (A3): special piston rod seal and guide rod wiper seal increase the service life of the drive

Areas of application:

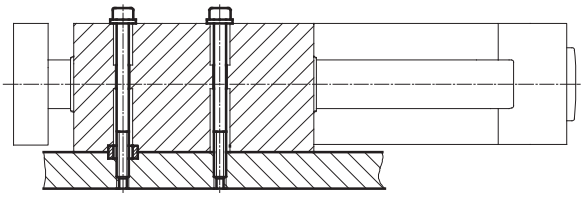
- Bottling systems in the beverage industry
  - Labelling and palletising machines
- Milk processing
  - Filling ice cream and yoghurt containers, etc.
- Meat processing
- Confectionery production
- Bakery production
- Packaging industry
  - Foodstuffs, pharmaceuticals, cosmetics, chemicals, beverages and tobacco

Mounting options

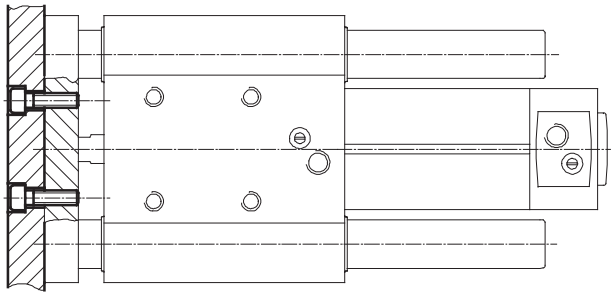
From underneath



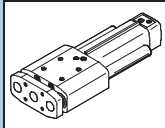
From above



On the yoke plate



Product range overview

Function	Type	Piston ∅	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, Clean Design

Peripherals overview

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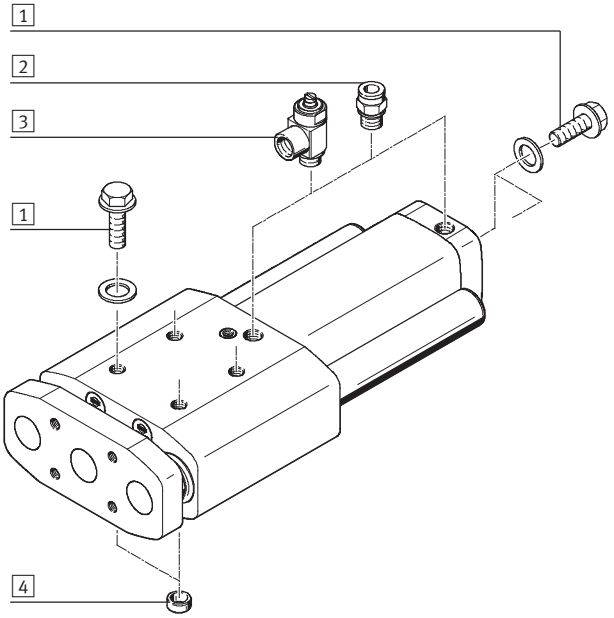
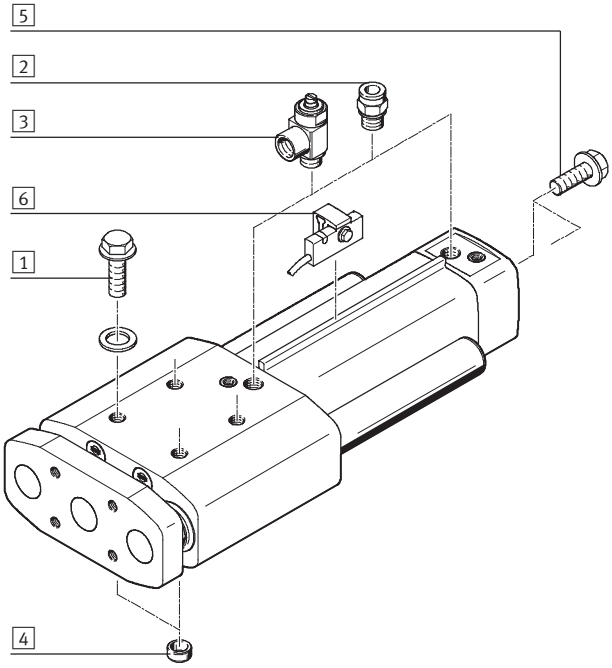
Piston ∅ 20, 25



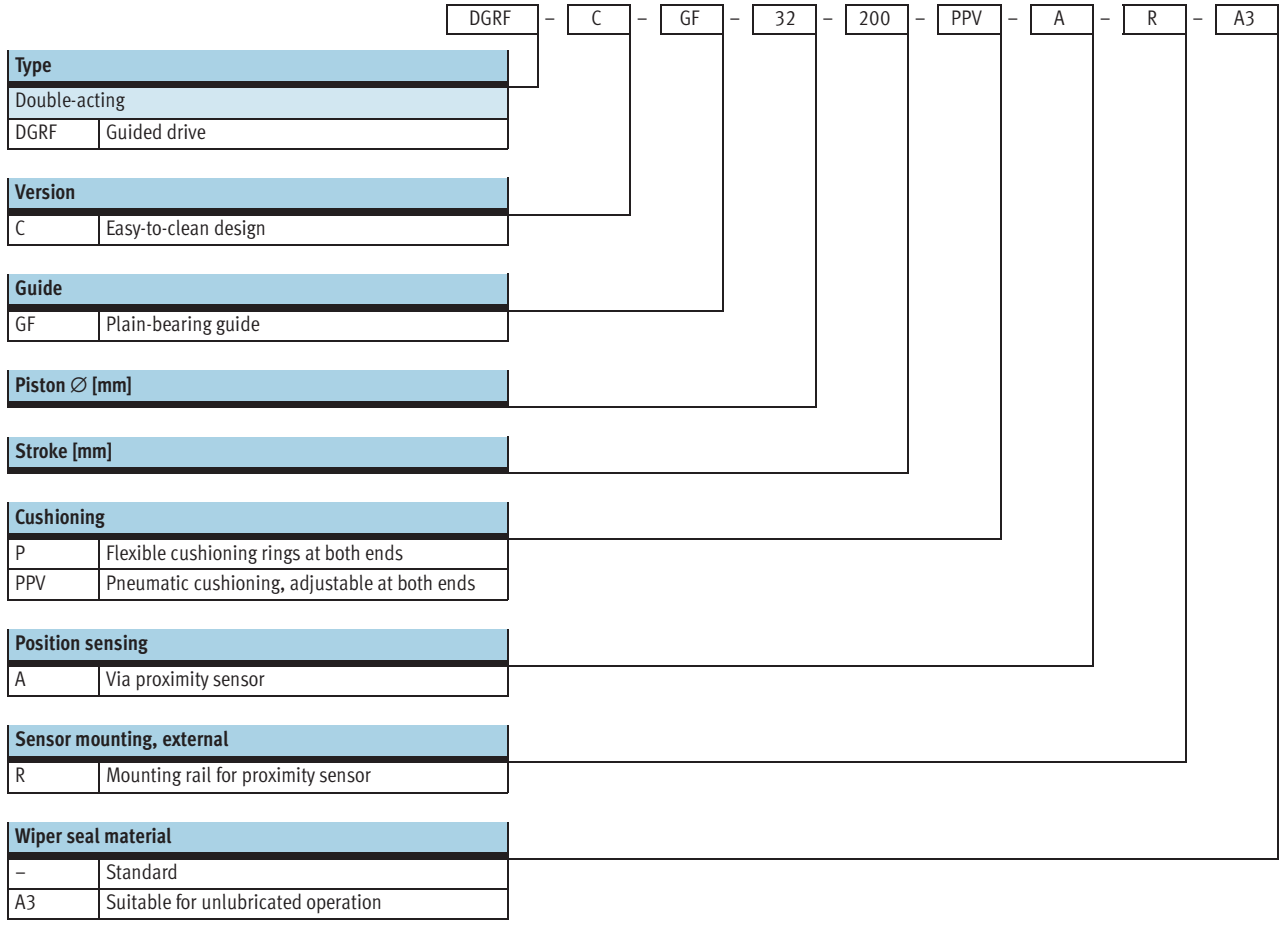
Piston ∅ 32, 40, 50, 63



Accessories			
		Brief description	**→ Page/Internet**
1	Blanking screw DAMD	• For sealing unused mounting threads • The cover disc is included with the screw • The screws are not included with the drive	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	• For centring the guided drive • Two centring sleeves included in the scope of delivery	13
5	Blanking screw CR	• For sealing unused mounting threads • The screws are not included with the drive	13
6	Proximity sensor SMT-C1	• For sensing the position • Proximity sensor is mounted on the sensor mounting rail	11

Guided drives DGRF, Clean Design

Type codes



Type	
Double-acting	
DGRF	Guided drive

Version	
C	Easy-to-clean design

Guide	
GF	Plain-bearing guide

Piston ∅ [mm]

Stroke [mm]

Cushioning	
P	Flexible cushioning rings at both ends
PPV	Pneumatic cushioning, adjustable at both ends

Position sensing	
A	Via proximity sensor

Sensor mounting, external	
R	Mounting rail for proximity sensor

Wiper seal material	
–	Standard
A3	Suitable for unlubricated operation

Guided drives DGRF, Clean Design

Technical data

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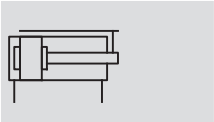
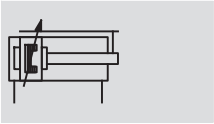
Function

Piston ∅ 20, 25

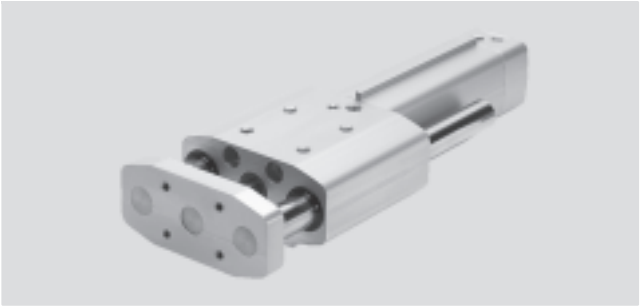


Piston ∅ 32, 40, 50, 63



Diameter
20 ... 63 mm

Stroke length
10 ... 400 mm



General technical data							
Piston ∅		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[1]	[°]	0.13	0.11	0.10	0.09	0.07	0.06

1) Retracted state, without load

Operating and environmental conditions								
Piston ∅		20	25	32		40	50	63
Variant				P	PPV			
Operating medium		Filtered compressed air, lubricated or unlubricated						
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						
Corrosion resistance class CRC[1]		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 ∅	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, Clean Design

Technical data

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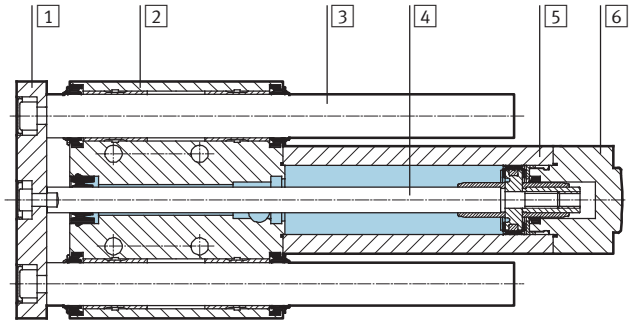
Weight [g]							
Piston ∅	20	25	32		40	50	63
Variant			P	PPV			
Product weight with 0 mm stroke	900	1,200	2,100	2,300	2,950	4,700	6,100
Additional weight per 10 mm stroke	52	55	80	83	92	142	147
Moving load with 0 mm stroke	420	490	900	910	1,100	1,800	2,100
Additional load per 10 mm stroke	38	38	58	58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

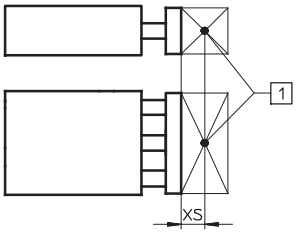
Materials

Sectional view



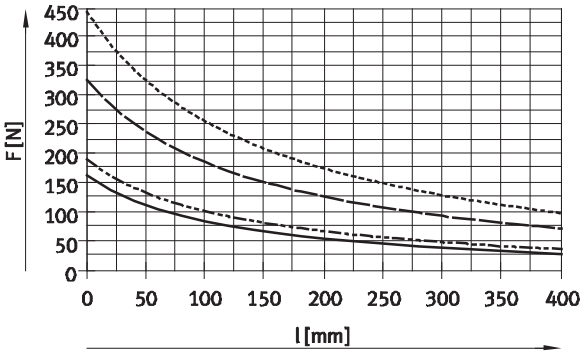
Guided drive	Standard	A3
1 Yoke plate	Wrought aluminium alloy	
2 Housing	Wrought aluminium alloy	
3 Guide rod	High-alloy stainless steel	
4 Piston rod	High-alloy stainless steel	
5 Cylinder barrel	Wrought aluminium alloy	
6 End cap	Wrought aluminium alloy	
– Seal	Polyurethane elastomer	Polyethylene
–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

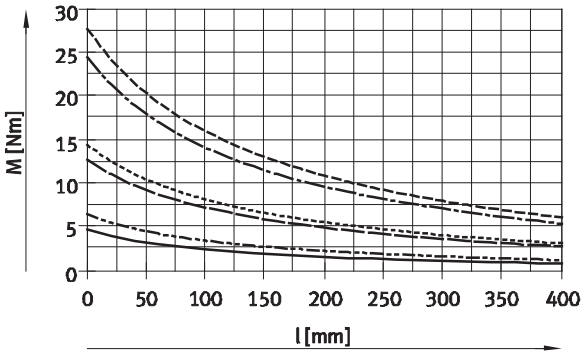


Guided drives DGRF, Clean Design

Technical data

FESTO

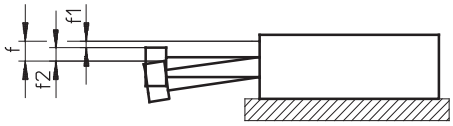
Max. torque load M as a function of stroke l



— ∅ 20
– – ∅ 25
— — ∅ 32
· · · ∅ 40
— · — ∅ 50
– – – ∅ 63

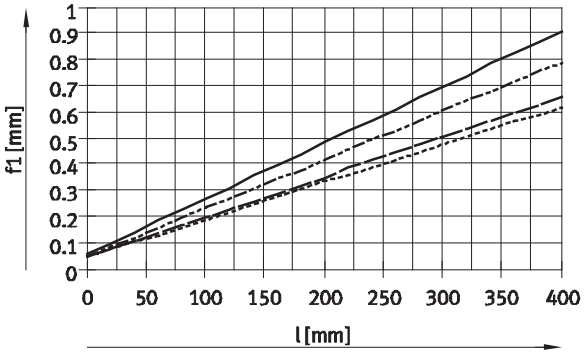
Deflection of piston rod

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



f = f1 + f2
f = Total deflection of piston rod
f1 = Deflection due to bearing backlash
f2 = Deflection due to lateral force

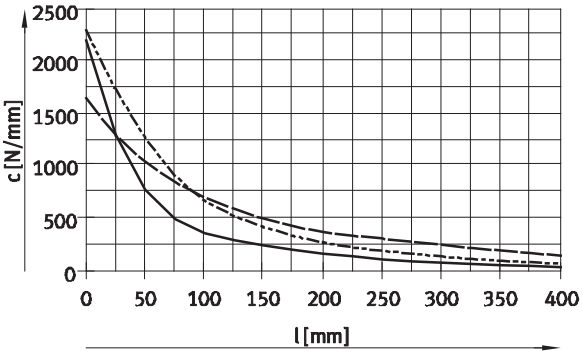
Deflection f1,
due to bearing backlash as a function of stroke l



— ∅ 20
– – ∅ 25
— — ∅ 32/40
· · · ∅ 50/63

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

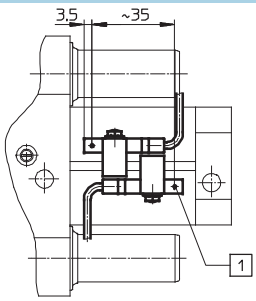
$$f2 = \frac{F}{c}$$



— ∅ 20/25
– – ∅ 32/40
— — ∅ 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 ∅		32	40	50	63
Minimum stroke	[mm]	35	35	35	30

Guided drives DGRF, Clean Design

Technical data

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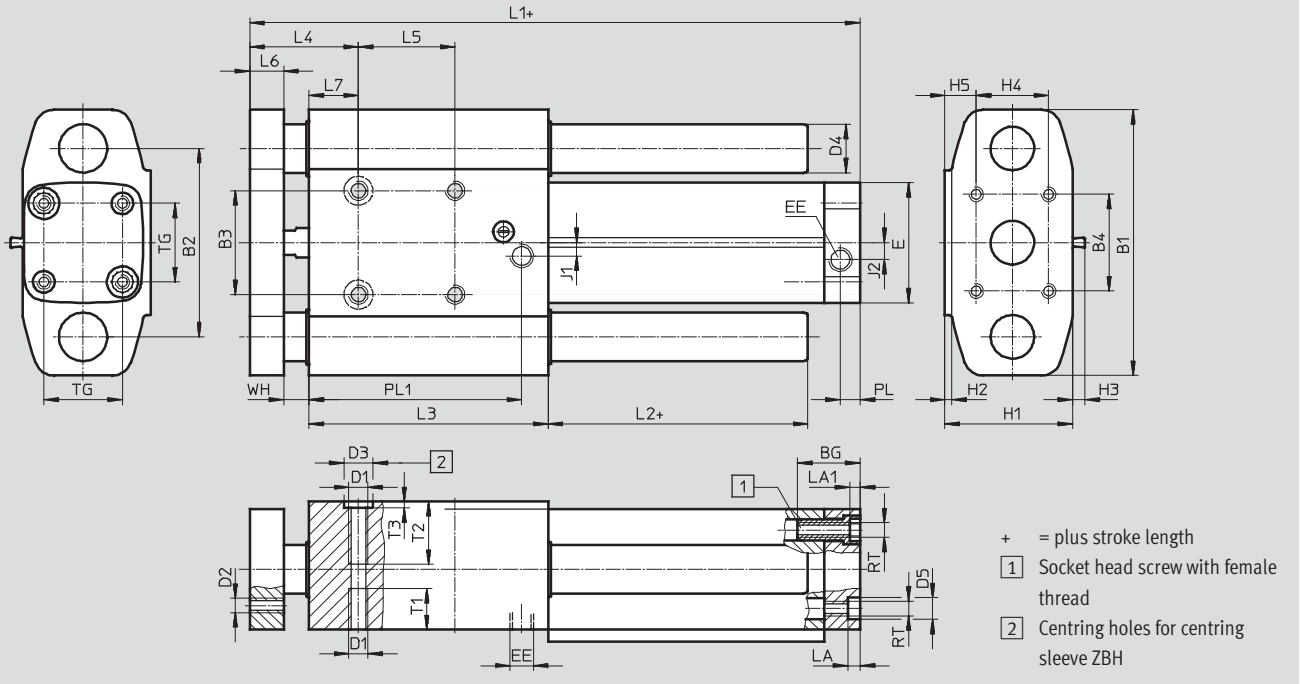
Dimensions Download CAD data ➔ **www.festo.com**

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



\+ = plus stroke length

1 Socket head screw with female thread

2 Centring holes for centring sleeve ZBH

∅ [mm]	BG	B1	B2	B3[2]	B4	D1	D2	D3[3] ∅ H7	D4 ∅	D5 ∅ F9	E	EE
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	G1⁄8

∅ [mm]	H1	H2	H3[1]	H4	H5	J1	J2	L1	L2	L3	L4	L5
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

∅ [mm]	L6	L7	LA	LA1	PL	PL1	RT	T1	T2	T3	TG	WH
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

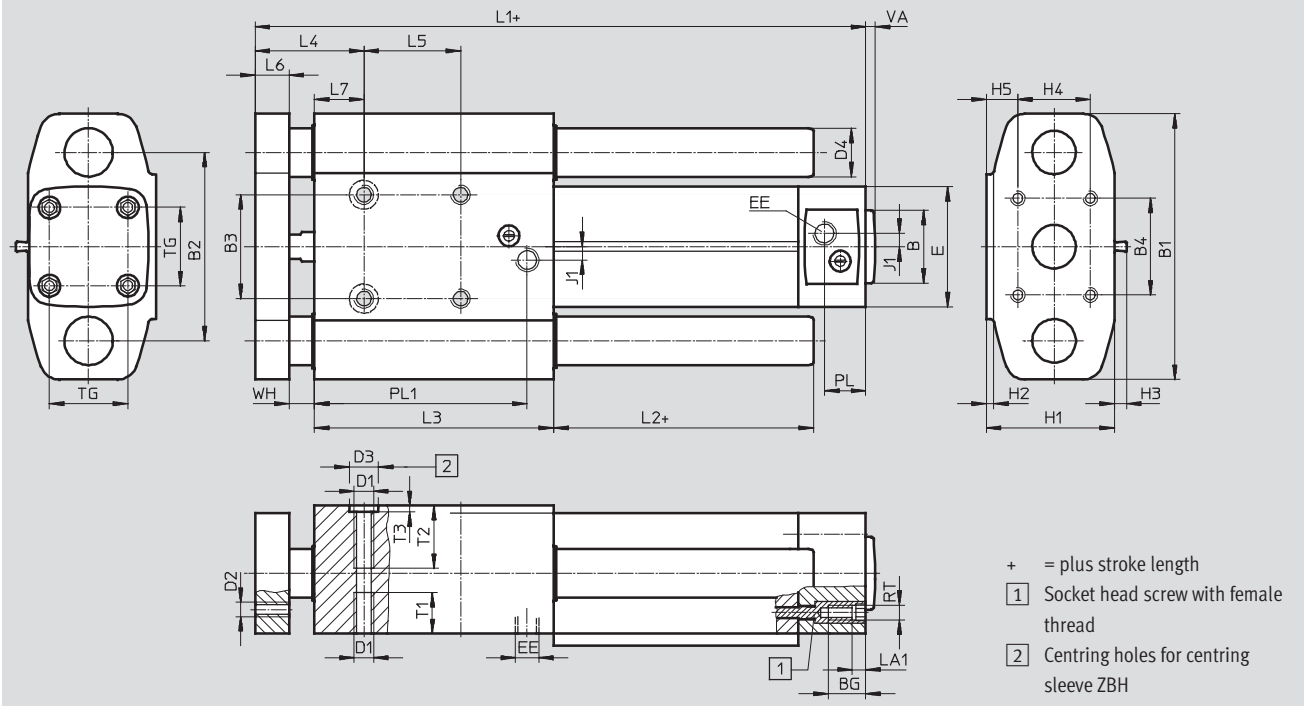
Guided drives DGRF, Clean Design

Technical data

FESTO

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

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



\+ = plus stroke length

1 Socket head screw with female thread

2 Centring holes for centring sleeve ZBH

∅ [mm]	B ∅ d11	BG	B1	B2	B3[2]	B4	D1	D2	D3[3] ∅ H7	D4 ∅	E	EE
32	30	16	110	78	43	40	M8	M6	12	20	50	G1⁄8
40	35	16	120	88	51	50	M8	M6	12	20	58	G1⁄4
50	40	17	148	110	64	60	M8	M8	12	25	70	G1⁄4
63	45	17	162	125	80	80	M10	M8	12	25	81	G3⁄8

∅ [mm]	H1	H2	H3[1]	H4	H5	J1	L1	L2	L3	L4	L5
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

∅ [mm]	L6	L7	LA1	PL	PL1	RT	T1	T2	T3	TG	VA	WH
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, Clean Design

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Ordering data – Modular products

Ordering table

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

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

Transfer order code

	DGRF	–	C	–	GF	–		–		–		–		–		–	

Guided drives DGRF, Clean Design

Accessories

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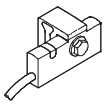
Ordering data – Proximity sensors for T-slot, magneto-resistive — Technical data ➔ Internet: smt

	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[2]
	Thread	Tubing O.D.				
With external hexagon						
	M5	4	Brass, nickel and chrome-plated	**533844**	**QS-F-M5-4**[1]	10
		6		**533845**	**QS-F-M5-6**[1]	
	G1/8	4		**193408**	**QS-F-G1/8-4**[1]	
		6		**193409**	**QS-F-G1/8-6**[1]	
		8		**193410**	**QS-F-G1/8-8**[1]	
	G1/4	6		**193411**	**QS-F-G1/4-6**[1]	
		8		**193412**	**QS-F-G1/4-8**[1]	
		10		**193413**	**QS-F-G1/4-10**[1]	
	G3/8	8		**193414**	**QS-F-G3/8-8**[1]	
		10		**193415**	**QS-F-G3/8-10**[1]	
		12		**193487**	**QS-F-G3/8-12**[1]	
	M5	4	Stainless steel	**162860**	**CRQS-M5-4**[1]	1
		6		**162861**	**CRQS-M5-6**[1]	
	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	**132417**	**NPQP-D-R18-Q4**	1
		6		**132418**	**NPQP-D-R18-Q6**	
		8		**132419**	**NPQP-D-R18-Q8**	
	R1/4	6		**132421**	**NPQP-D-R14-Q6**	
		8		**132422**	**NPQP-D-R14-Q8**	
		10		**132423**	**NPQP-D-R14-Q10**	
	R3/8	10		**132424**	**NPQP-D-R38-Q10**	
		12		**132425**	**NPQP-D-R38-Q12**	

1) With sealing ring
2) Packaging unit

Guided drives DGRF, Clean Design

Accessories

FESTO

Ordering data – Push-in fittings Technical data ➔ Internet: quick star

	Connection		Material	Part No.	Type	PU[2]
	Thread	Tubing O.D.				
With internal hexagon						
	M5	4	Brass, nickel and chrome-plated	533924	QS-F-M5-4-I[1]	10
		6		537014	QS-F-M5-6-I[1]	
	G1/8	4		533927	QS-F-G1/8-4-I[1]	
		6		533928	QS-F-G1/8-6-I[1]	
		8		533929	QS-F-G1/8-8-I[1]	
	G1/4	8		533930	QS-F-G1/4-8-I[1]	
		10		533931	QS-F-G1/4-10-I[1]	
	G3/8	12		533932	QS-F-G3/8-12-I[1]	
	M5	4	Stainless steel	132328	CRQS-M5-4-I[1]	1
		6		132329	CRQS-M5-6-I[1]	
	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[2]
	Thread	Tubing O.D.				
With external hexagon						
	M5	4	Brass, nickel and chrome-plated	533849	QSL-F-M5-4[1]	10
		6		533850	QSL-F-M5-6[1]	
	G1/8	4		193418	QSL-F-G1/8-4[1]	
		6		193419	QSL-F-G1/8-6[1]	
		8		193420	QSL-F-G1/8-8[1]	
	G1/4	6		193421	QSL-F-G1/4-6[1]	
		8		193422	QSL-F-G1/4-8[1]	
		10		193423	QSL-F-G1/4-10[1]	
		12		533853	QSL-F-G1/4-12[1]	
	G3/8	8		193424	QSL-F-G3/8-8[1]	
		10		193425	QSL-F-G3/8-10[1]	
		12		197486	QSL-F-G3/8-12[1]	
	M5	4	Stainless steel	162870	CRQSL-M5-4[1]	1
		6		162871	CRQSL-M5-6[1]	
	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	132428	NPQP-L-R18-Q4	1
		6		132429	NPQP-L-R18-Q6	
		8		132430	NPQP-L-R18-Q8	
	R1/4	6		132432	NPQP-L-R14-Q6	
		8		132433	NPQP-L-R14-Q8	
		10		132434	NPQP-L-R14-Q10	
	R3/8	10		132435	NPQP-L-R38-Q10	
		12		132436	NPQP-L-R38-Q12	

1) With sealing ring
2) Packaging unit

Guided drives DGRF, Clean Design

Accessories

FESTO

Ordering data – One-way flow control valves — Technical data ➔ Internet: crgrla

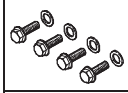
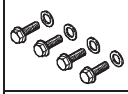
	Connection		Material	Part No.	Type	PU[1]
	Thread	For push-in fitting				
	M5	CRQS/CRQSL/CRQST, Quick Star	Electropolished special steel casting	**161403**	**CRGRLA-M5-B**	1
	G1⁄8			**161404**	**CRGRLA-1⁄8-B**	
	G1⁄4			**161405**	**CRGRLA-1⁄4-B**	
	G3⁄8			**161406**	**CRGRLA-3⁄8-B**	
	G1⁄8	Push-in connector 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**	
	G1⁄4			**195600**	**GRLA-F-1⁄4-QS-6-D**	
				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 – Blanking screws, corrosion-resistant

	For ∅	Description	Part No.	Type	PU[1]
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[2]		**543715**	**DAMD-P-M6-12-R1**	
	32[3], 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 ∅	Part No.	Type	PU[1]
	20, 25	**150927**	**ZBH-9**	10
	32, 40, 50, 63	**189653**	**ZBH-12**	

1) Packaging unit