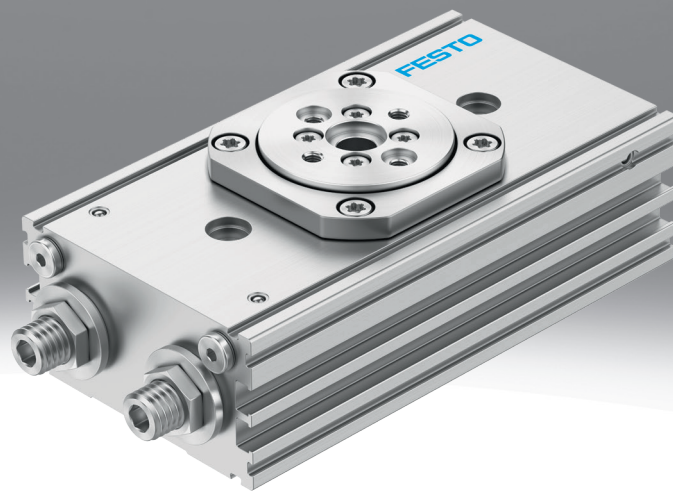


## Semi-rotary drive DRRS

**FESTO**



## Characteristics

### At a glance

[Link](#) [↗](#) [drrs](#)

- Rack-and-pinion principle
- Extremely accurate in the end positions
- High load-bearing capacity for the bearing, precise and backlash-free
- High mass moments of inertia
- Defined interfaces
- Supply ports at both ends
- Slots on both sides for mounting proximity switches
- Choice of mounting options
- Perfectly suited for handling applications

### Diagrams

[Link](#) [↗](#) [drrs](#)



The diagrams shown in this document are also available online. These can be used to display precise values.

### Nominal swivel angle [°]

The swivel angle is adjusted via the cushioning elements using a hex screwdriver. If possible, the reduction of the swivel angle should be evenly distributed over both end positions.

- Clockwise direction of rotation: swivel angle decreases
- Anticlockwise direction of rotation: swivel angle increases

### Output shaft

[FH] Flanged shaft, hollow

- The shaft is hollow on the inside. This allows it to be used for carrying electrical signals or compressed air
- Compressed air tubing is required to pass compressed air through the hollow flanged shaft

### Cushioning

[P] Elastic cushioning rings/plates on both sides

Elastic cushioning, with metal stop

Benefits:

- No adjustment required
- Saves time

### Position sensing

[A] For proximity sensor

By using proximity switches, any position can be detected.

### Special material properties

Recommended for production systems for manufacturing lithium-ion batteries

Product:

- Metals with more than 1% copper, zinc or nickel by mass are excluded from use. Exceptions are nickel in steel, chemically nickel-plated surfaces, circuit boards, cables, electrical plug connectors and coils

Accessories:

- Please contact your Festo representative for information on which accessories are suitable for manufacturing lithium-ion batteries

## Type code

001	Series	
DRRS	Semi-rotary drive	

002	Size [mm]	
12	12	
16	16	
20	20	
25	25	

003	Nominal swivel angle [°]	
180	180	

004	Output shaft	
FH	Flanged shaft, hollow	

005	Cushioning	
P	Elastic cushioning rings/plates on both sides	

006	Position sensing	
A	For proximity sensor	

## Datasheet

## General technical data

Size	12	16	20	25
Design	Rack and pinion			
Mode of operation	Double-acting			
Pneumatic connection	M3	M5		
Type of mounting	Either: Via mounting kit With through-hole Via female thread			
Swivel angle	180 deg			
Cushioning	Elastic cushioning rings/plates at both ends			
Repetition accuracy	0.05 deg	0.07 deg		
Axial eccentricity poppet valve	0.05 mm	0.07 mm		
Position detection <sup>1)</sup>	Via proximity switch			
Mounting position	optional			

1) Note the operating range of the proximity switches.

## Operating and environmental conditions

Size	12	16	20	25
Operating pressure	0.3 ... 0.8 MPa			
Operating pressure	3 ... 8 bar			
Operating pressure	43.5 ... 116 psi			
Note on operating and pilot medium	Lubricated operation possible (in which case lubricated operation will always be required)			
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]			
Ambient temperature	0 ... 60°C			
Storage temperature	-20 ... 60°C			
Corrosion resistance class CRC <sup>1)</sup>	1 - Low corrosion stress			

1) More information: [www.festo.com/x/topic/crc](http://www.festo.com/x/topic/crc)

## Weight

Size	12	16	20	25
Product weight	310 g	630 g	790 g	1,240 g

## Forces and torques

Size	12	16	20	25
Max. axial load static	80 N	140 N	350 N	450 N
Max. bending moment	2 Nm	4 Nm	5 Nm	10 Nm
Theoretical torque at 0.6 MPa (6 bar, 87 psi) <sup>1)</sup>	0.9 Nm	2.1 Nm	3.3 Nm	6.6 Nm
Permissible mass moment of inertia	0.005 kgm <sup>2</sup>	0.008 kgm <sup>2</sup>	0.0175 kgm <sup>2</sup>	0.04 kgm <sup>2</sup>

1) If, in the end positions, a torque which exceeds 50% of the theoretical torque acts against the direction of rotation, no exact end position is guaranteed.

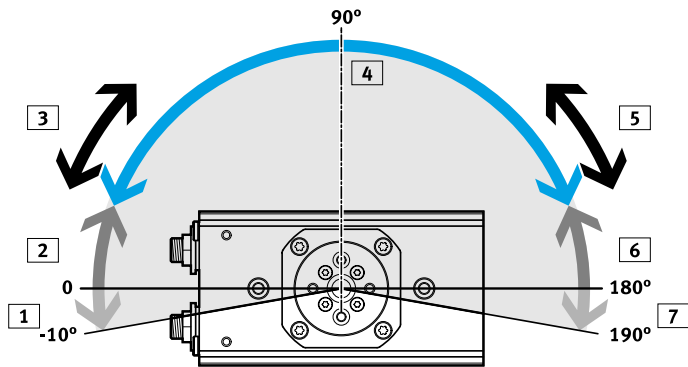
This can be avoided by using a semi-rotary drive with double the torque.

## Materials

Size	12	16	20	25
Material housing	Anodised aluminium			
Material drive shaft	-			
Material seals	NBR TPE-U(PU)			
Note on materials	RoHS-compliant			
LABS (PWIS) conformity	VDMA24364-C1-L			
Cleanroom class	Class 9 according to ISO 14644-1			
Suitability for the production of Li-ion batteries	Metals with more than 1% by mass of copper, zinc or nickel by mass are excluded from use. Exceptions are nickel in steel, chemically nickel-plated surfaces, printed circuit boards, cables, electrical plug connectors and coils			

## Datasheet

## Swivel angle



Fundamentally, the following applies:

Swivel angle  $\geq$  cushioning angle

Swivel angle =  $180^\circ + \text{difference swivel angle right} + \text{difference swivel angle left}$

1 = difference swivel angle left (+)

2 = difference swivel angle left (-)

3 = cushioning angle

4 = swivel angle

5 = cushioning angle

6 = difference swivel angle right (-)

7 = difference swivel angle right (+)

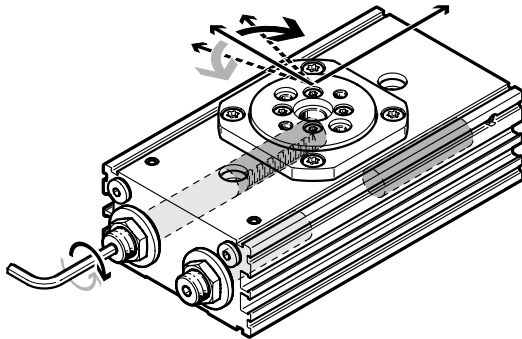
Note: Illustrated position of the flange shaft corresponds to the mid-position (swivel angle  $90^\circ$ ).

Size	12	16	20	25
Swivel angle	180 deg			
Min. swivel angle <sup>1)</sup>	45 deg			
Max. swivel angle	200 deg			
Setting range of swivel angle for each end position <sup>2)</sup>	+10/-100 deg			
Cushioning angle	23.5 deg	19.5 deg	27.5 deg	25.5 deg

1) Smaller swivel angles are adjustable. However, this reduces the cushioning energy.

2) Continuously adjustable

## Swivel angle adjustment



Direction of rotation to the right:

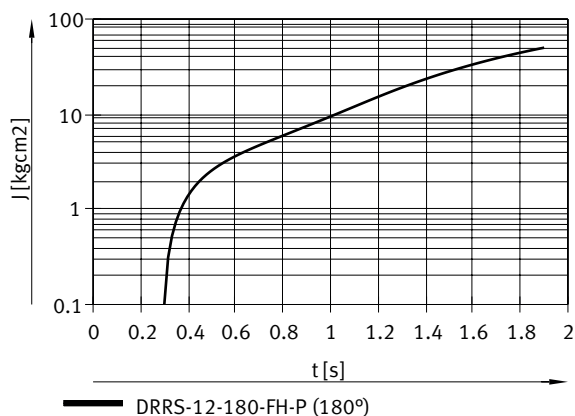
- Swivel angle decreases

Anticlockwise direction of rotation:

- Swivel angle increases

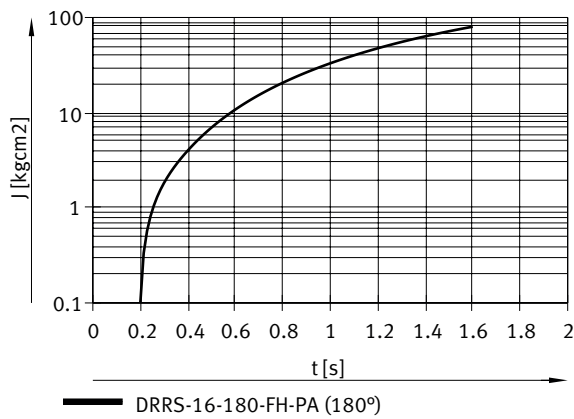
The swivel angle is adjusted via the cushioning components using a hex screwdriver. If possible, the swivel angle should be reduced evenly over both end positions.

Max. permissible mass moment of inertia  $J$  at the flange shaft as a function of swivel time  $t$  (at room temperature and an operating pressure of 0.6 MPa (6 bar, 87 psi), – DRRS-12-180-...-P, swivel angle  $180^\circ$ )

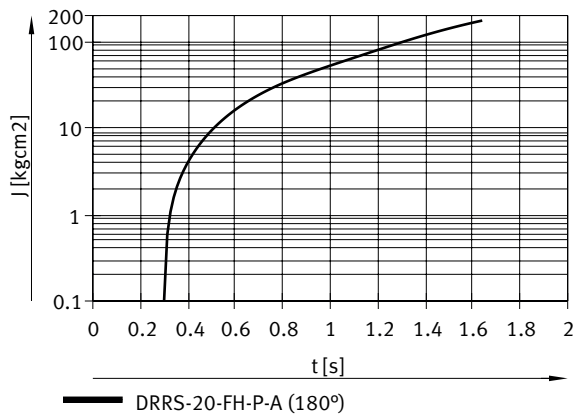


Datasheet

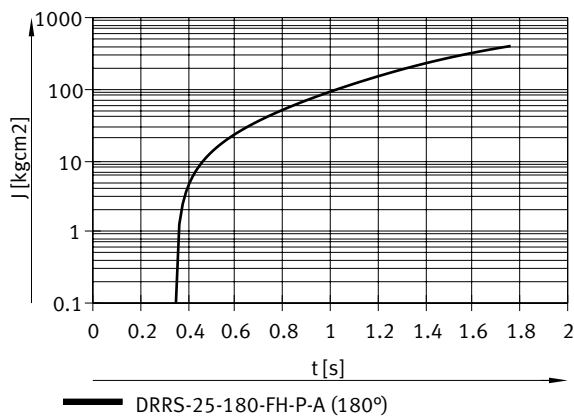
Max. permissible mass moment of inertia  $J$  at the flange shaft as a function of swivel time  $t$  (at room temperature and an operating pressure of 0.6 MPa (6 bar, 87 psi), – DRRS-16-180-...-P, swivel angle 180°



Max. permissible mass moment of inertia  $J$  at the flange shaft as a function of swivel time  $t$  (at room temperature and an operating pressure of 0.6 MPa (6 bar, 87 psi), – DRRS-20-180-...-P, swivel angle 180°

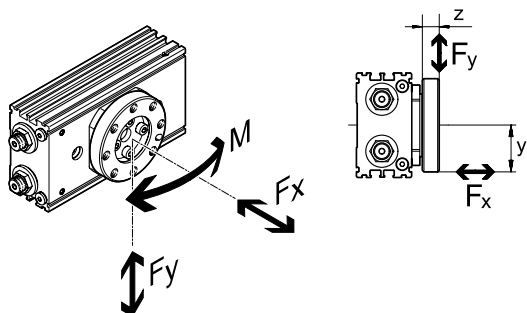


Max. permissible mass moment of inertia  $J$  at the flange shaft as a function of swivel time  $t$  (at room temperature and an operating pressure of 0.6 MPa (6 bar, 87 psi), – DRRS-25-180-...-P, swivel angle 180°



## Datasheet

## Max. load capacity at push-on flange DARF-Q13-...-1

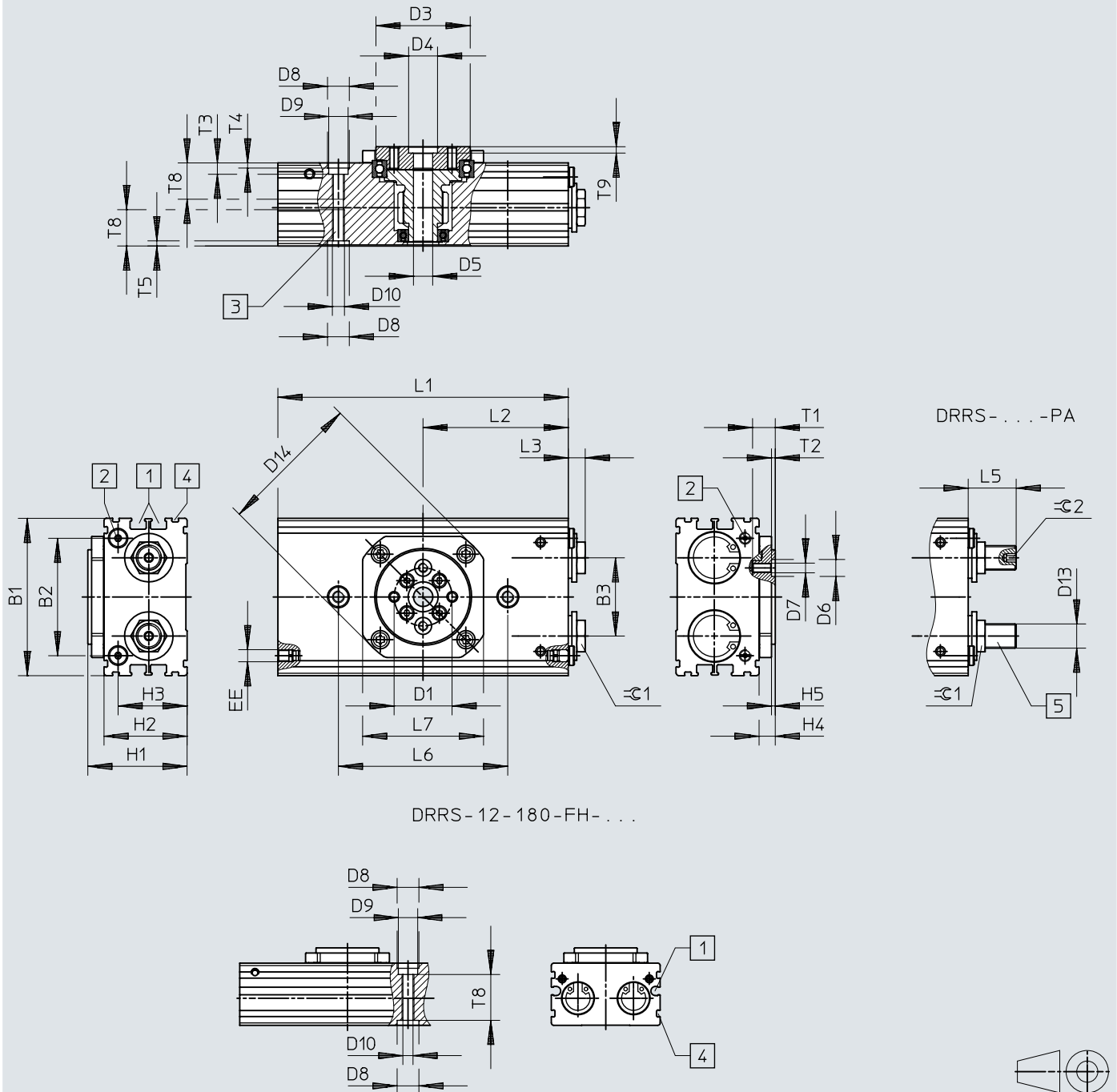


- The limits of the flange shaft and the max. bending moment of the push-on flange apply to the radial forces  $F_y$ .
- The max. bending moment represents the load limit of the push-on flange and must not be exceeded.
- The zero point for dimension  $z$  is always the flange level of the basic drive, independently of the attachments.
- The max. static axial load represents an additional load.

Size	12	16	20	25
Max. axial load static	80 N	140 N	350 N	450 N
Max. bending moment	2 Nm	4 Nm	5 Nm	10 Nm

## Dimensions

## Dimensions – Semi-rotary drives DRRS

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

[1] Sensor slot for proximity switch

[2] Compressed air ports

[3] Mounting thread

[4] For profile mounting

[5] Cushioning P

[6] Note: The semi-rotary drive may only be operated with a flow control valve. The flow control valves should be installed as close as possible to the semi-rotary drive.

[7] Note: Illustrated position of the flange shaft corresponds to the mid-position (swivel angle 90°).



## Dimensions

	B1	B2	B3	D1 ∅	D3 ∅ ±0,05	D4 ∅ H8	D5 ∅	D6 ∅ H8	D7	D8 ∅ H7	D9 ∅	D10	D13
DRRS-12-180-FH-PA	45	36	23	20	26	7	5	5	M3	9	8	M5	M6x0,5
DRRS-16-180-FH-PA	60	44,2	30,8	21	34	12	8	7	M4				M8x1
DRRS-20-180-FH-PA	65	48,5	32,4	24	39								M10x1
DRRS-25-180-FH-PA	60	60	37,2	26	49,5	15	10,5	9	M5	12	10	M6	M12x1

	D14 ∅	EE	H1	H2	H3	H4	H5	L1 ±0,1	L2	L3	L5		
											180°	min.	max.
DRRS-12-180-FH-PA	42	M3	32	25,7	19,2	6,3	2,1	89	44,5	2,5	18	-11,8	+1,2
DRRS-16-180-FH-PA	52	M5	39	32	27,2	7	2,3	114	57		23,1	-14,4	+1,5
DRRS-20-180-FH-PA	59		41	34,3	28,5	6,7	1,6	120	60		23,3	-13,7	
DRRS-25-180-FH-PA	68		46	39	31,5	7	1,8	150	75		27	-17,7	2

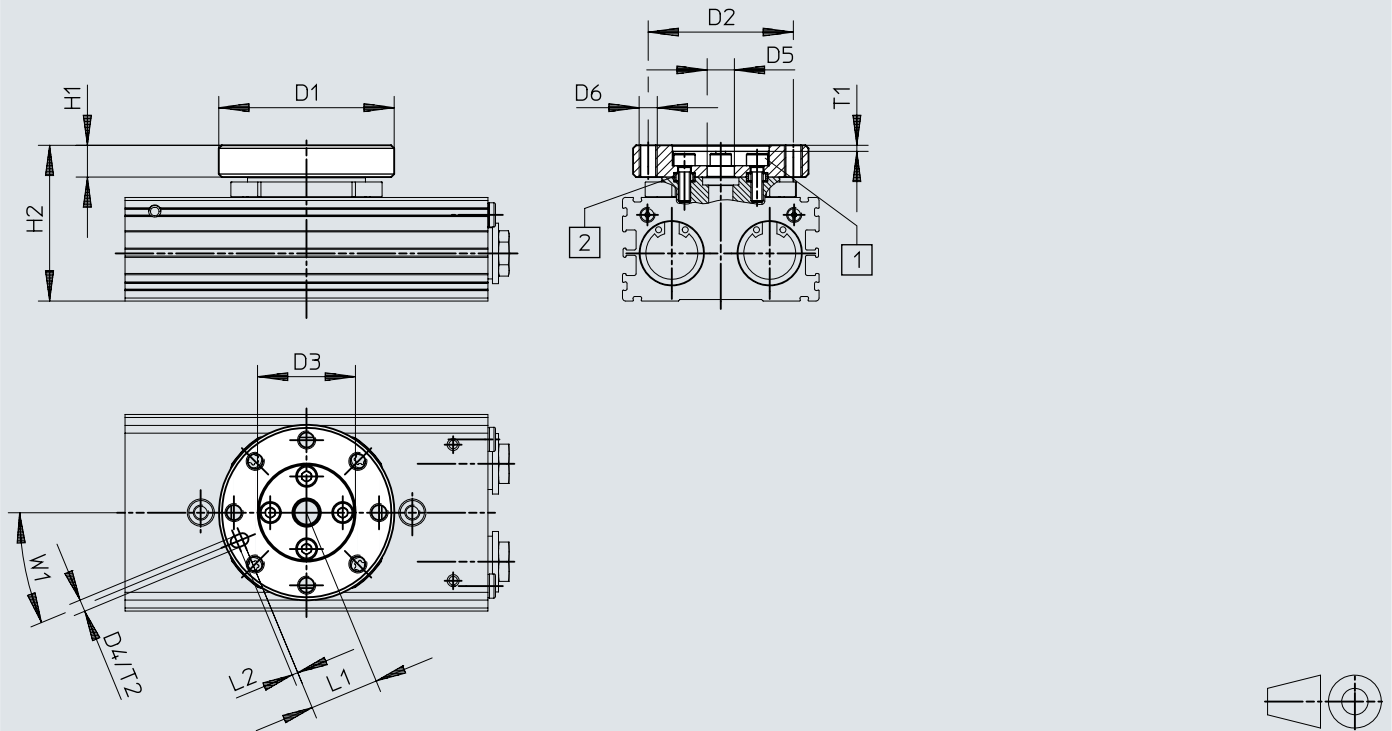
  

	L6	L7	T1 max.	T2 +0,1	T3	T4	T5	T8	T9 +0,1	≅C1	≅C2
DRRS-12-180-FH-PA	50	34,6	4,8	1,2	4,7	2,1	2,1	18,9	1,6	8	3
DRRS-16-180-FH-PA	64	43,4	6	1,6				14,5	2,6	10	5
DRRS-20-180-FH-PA	70	50	9,2					15		13	
DRRS-25-180-FH-PA	80	60	9	2,1	5,7	2,6	2,6	18	3,2	15	6

## Dimensions

### Dimensions – Push-on flange DARF-Q13-...-1

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



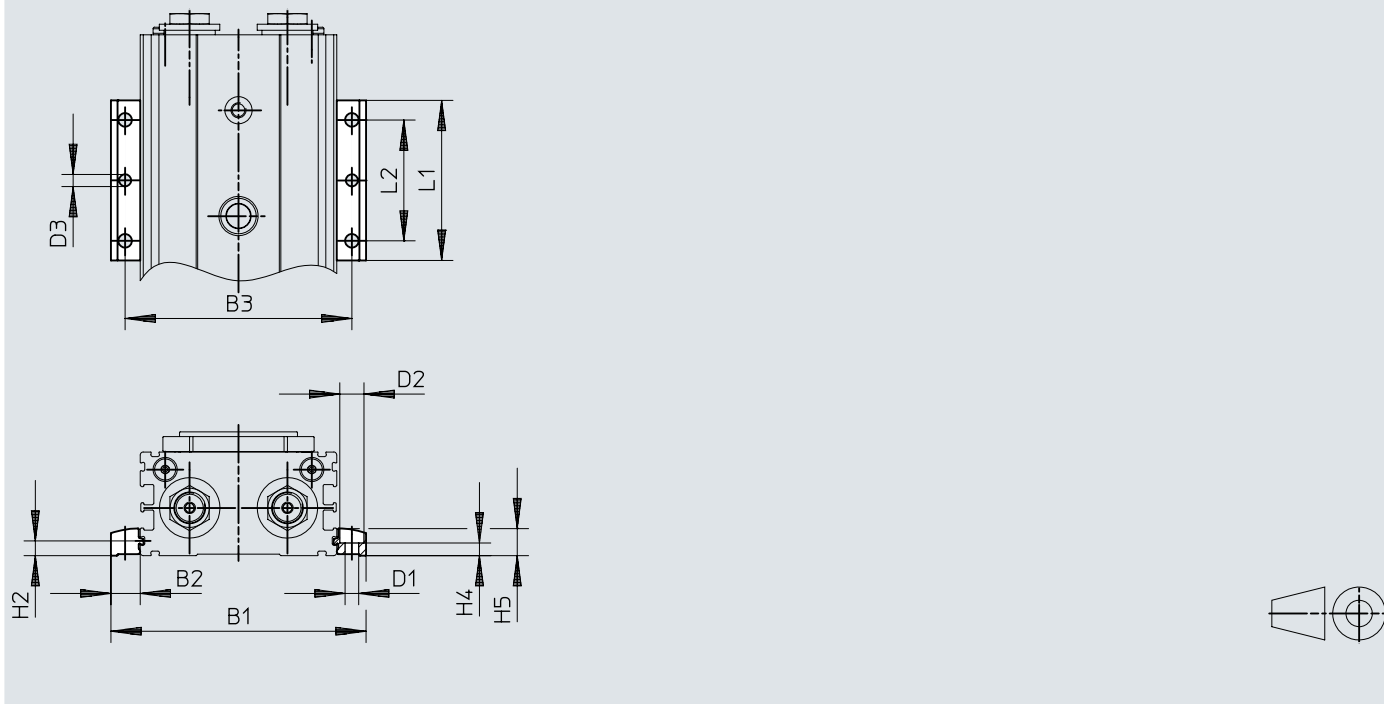
- [1] Socket head screw
- [2] Drilled hole for centring sleeve
- [3] The attachment can be positioned every 90°

	B1	B2 +0,1 -0,2	D1 ∅ h9	D2 ∅	D3 ∅ H8	D4 H9	D5 ∅	D6
DARF-Q13-12-1	10	4,8	40	32	20	3	6	M5x0,8
DARF-Q13-16-1	10,5	6,2	51,5	43	28	4	9	M6x1
DARF-Q13-20-1	12	7,5	58	48	32			
DARF-Q13-25-1	13	10	66	55	35	5	11	M8x1,25

	H1 ±0,05	H2	L1	L2	T1	T2	W1
DARF-Q13-12-1	9	41	15	2	2	3,5	22,5
DARF-Q13-16-1	10	49	20,5			4,5	
DARF-Q13-20-1	10,5	51,5	23			4,5	
DARF-Q13-25-1	12	58	26,5			5,5	

## Dimensions

## Dimensions – Profile mounting EAHF-L2-...-P

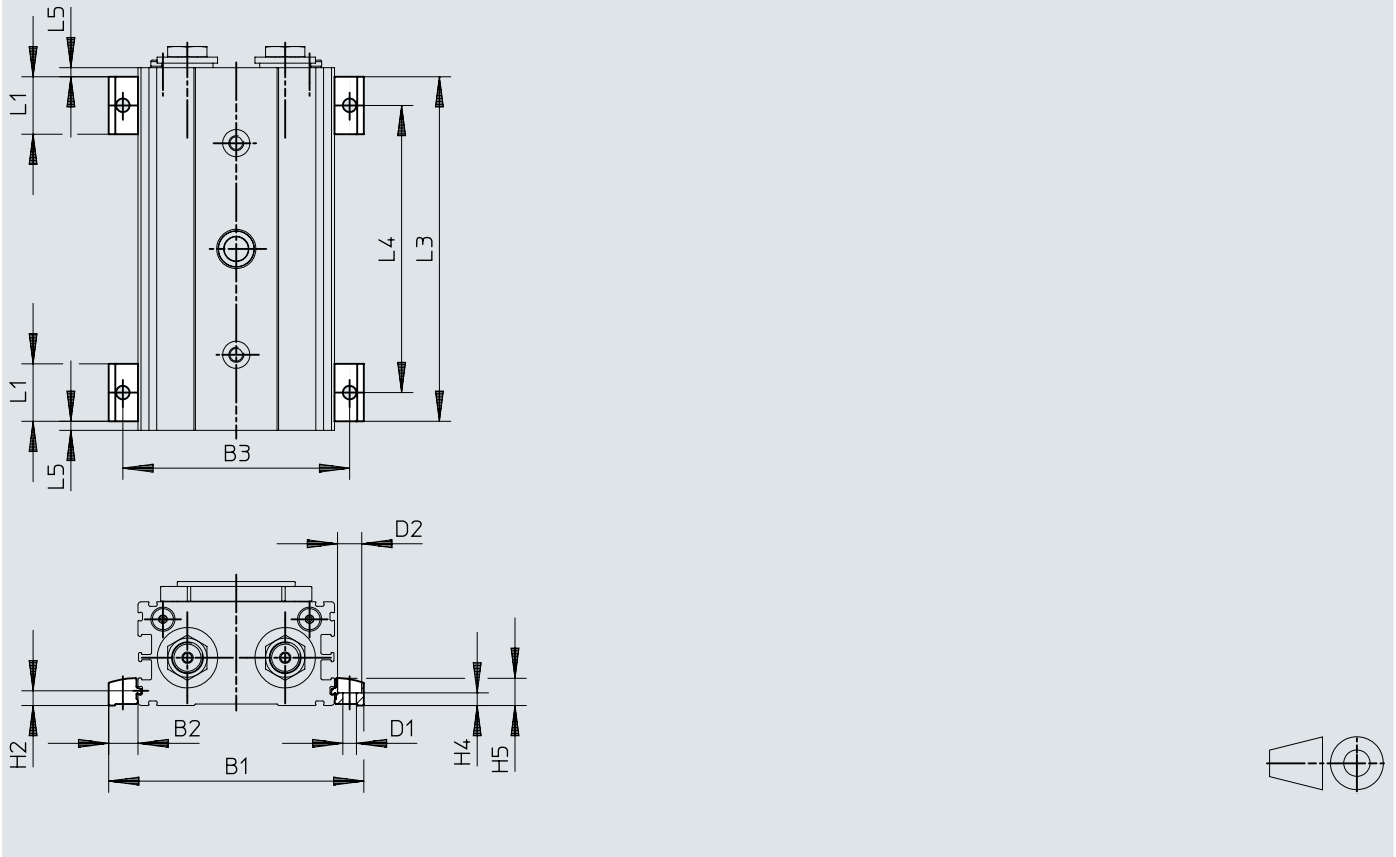
Download CAD data [www.festo.com](http://www.festo.com)

		B1	B2	B3	D1 ∅ H13	D2 ∅ H13	D3	H2	H4 ±0,1	H5	L1	L2
EAHF-L2-25-P	DRRS-12	64,4	9,7	55	4,5	8	4	4,9	4,2	9	53	40
	DRRS-16	79,4		70								
	DRRS-20	84,4		75								
	DRRS-25	94,4		85								

## Dimensions

### Dimensions – Profile mounting EAHF-L2-...-P-S


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



		B1	B2	B3	D1 ∅ H13	D2 ∅ H13	H2	H4 ±0,1
EAHF-L2-25-P-S	DRRS-12	64,4	9,7	55	4,5	8	4,9	4,2
	DRRS-16	79,4		70				
	DRRS-20	84,4		75				
	DRRS-25	94,4		85				

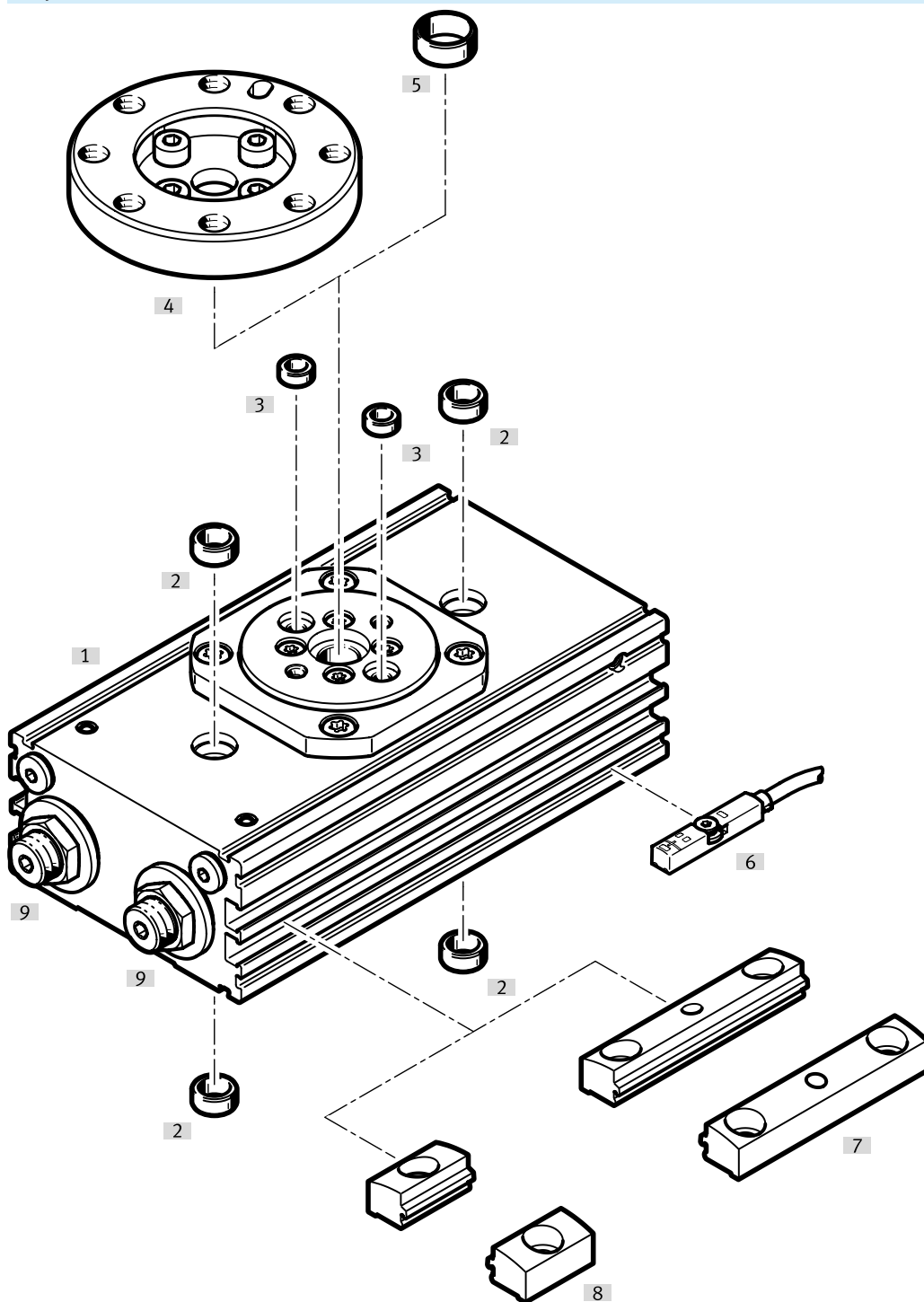
		H540	L1	L3		L4		L5
				min.	max.	min.	max.	min.
EAHF-L2-25-P-S	DRRS-12	9	19	59	83	40	64	3
	DRRS-16			73	108	54	89	
	DRRS-20			79	114	60	95	
	DRRS-25			89	144	70	125	

## Ordering data

DRRS						
	Size	Swivel angle	Cushioning	Pneumatic connection	Part no.	Type
	12	180 deg	Elastic cushioning rings/plates at both ends	M3	<b>8163607</b>	<b>DRRS-12-180-FH-PA</b>
	16			M5	<b>8163609</b>	<b>DRRS-16-180-FH-PA</b>
	20			<b>8163611</b>	<b>DRRS-20-180-FH-PA</b>	
	25			<b>8163613</b>	<b>DRRS-25-180-FH-PA</b>	

## Peripherals

### Peripherals overview

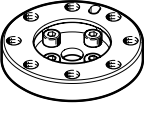


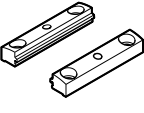
Accessories			→ Link
Type/order code	Description		
[1] Semi-rotary drive DRRS	Double-acting		<a href="#">drrs</a>
[2] Centring sleeve ZBH	For centring the drive		<a href="#">16</a>
[3] Centring sleeve ZBH	For centring attachments (included in the scope of delivery of the attachments)		<a href="#">16</a>
[4] Push-on flange DARF-Q13-...-1	For mounting on the flanged shaft		<a href="#">16</a>
[5] Centring sleeve ZBH	For centring attachments (included in the scope of delivery of the attachments)		<a href="#">16</a>
[6] Proximity switch SMT-8	- For sizes 16 ... 25 - For sensing the piston position		<a href="#">17</a>
[6] Proximity switch SDBT-MSB	- For sizes 16 ... 25 - For sensing the piston position		<a href="#">17</a>


## Peripherals


Accessories		→ Link
Type/order code	Description	
[6] Proximity switch SMT-10	- For size 12 - For sensing the piston position	<a href="#">17</a>
[6] Proximity switch SDBC-MSB	- For size 12 - For sensing the piston position	<a href="#">17</a>
[7] Profile mounting EAHF-L2-...-P	For mounting on the side of the profile	<a href="#">16</a>
[8] Profile mounting EAHF-L2-...-P-S	For mounting on the side of the profile	<a href="#">16</a>
[9] Cushioning P	Elastic cushioning, with metal stop	<a href="#">dyef</a>
[10] One-way flow control valve GRLA	For adjusting the swivel speed	<a href="#">16</a>


## Accessories


Push-on flange DARF-Q13-...-1						
	Size	Type of mounting	Material flange	Product weight	Part no.	Type
	12	Via through-hole and centring sleeve	Anodised wrought aluminium alloy	23 g	8163621	DARF-Q13-12-1
	16			52 g	8163622	DARF-Q13-16-1
	20			66 g	8163623	DARF-Q13-20-1
	25			94 g	8163624	DARF-Q13-25-1


Profile mounting EAHF-L2-...-P					
	Material plate	Note on materials	Product weight	Part no.	Type
	Anodised wrought aluminium alloy	RoHS-compliant	19 g	4835684	EAHF-L2-25-P


Profile mounting EAHF-L2-...-P-S					
	Material plate	Note on materials	Product weight	Part no.	Type
	Anodised wrought aluminium alloy	RoHS-compliant	4 g	5183153	EAHF-L2-25-P-S

Centring sleeve ZBH-5						
	Description	Material sleeve	Size of pack	Product weight	Part no.	Type
	For size 12	Steel	10	1 g	8146543	ZBH-5-B

Centring sleeve ZBH-7						
	Description	Material sleeve	Size of pack	Product weight	Part no.	Type
	For sizes 12, 16, 20	Steel	10	1 g	8146544	ZBH-7-B

Centring sleeve ZBH-9						
	Description	Material sleeve	Size of pack	Product weight	Part no.	Type
	For sizes 12, 16, 20, 25	Steel	10	2 g	8137184	ZBH-9-B

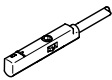
Centring sleeve ZBH-12						
	Description	Material sleeve	Size of pack	Product weight	Part no.	Type
	For sizes 16, 20, 25	Steel	10	1 g	8137185	ZBH-12-B

One-way flow control valve GRLA					
	Pneumatic connection, port 2	Pneumatic connection 1	Product weight	Part no.	Type
	M3	Push-in connector 3 mm	7 g	175041	GRLA-M3-QS-3
	M5		13 g	★ 193137	GRLA-M5-QS-3-D

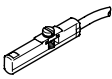


## Accessories

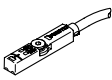
**Proximity switch SMT-10M for round slot, magneto-resistive – for sizes 12** Link [smt](#)

	Type of mounting	Switching output	Electrical connection	Cable length	Part no.	Type
	Screw-clamped, Insertable in the slot from above	3-wire NPN N/O contact	Open end	2.5 m	★ 551377	SMT-10M-NS-24V-E-2,5-L-OE
			Plug M8, A-coded	0.3 m	★ 551379	SMT-10M-NS-24V-E-0,3-L-M8D
		3-wire PNP N/O contact	Open end	2.5 m	★ 551373	SMT-10M-PS-24V-E-2,5-L-OE
			Plug M8, A-coded	0.3 m	★ 551375	SMT-10M-PS-24V-E-0,3-L-M8D
		2-wire PNP N/O contact	Open end	2.5 m	★ 551382	SMT-10M-ZS-24V-E-2,5-L-OE

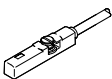
**Proximity switch SDBC-MSB for round slot, magneto-resistive – for size 12** Link [sdbc](#)

	Switching output	Switching element function	Electrical connection	Cable length	Part no.	Type
	NPN	N/O contact	Open end	2 m	8139724	SDBC-MSB-1L-NU-K-2-LE
			Plug M8, A-coded	0.3 m	8139727	SDBC-MSB-1L-NU-K-0.3-M8
	PNP		Open end	2 m	8139723	SDBC-MSB-1L-PU-K-2-LE
			Plug M8, A-coded	0.3 m	8139726	SDBC-MSB-1L-PU-K-0.3-M8
	Non-contacting, 2-wire		Open end	2 m	8139725	SDBC-MSB-1L-ZU-K-2-LE

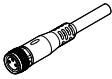
**Proximity switch SMT-8M for T-slot, magneto-resistive – for sizes 16 ... 25** Link [smt](#)

	Type of mounting	Switching output	Electrical connection	Cable length	Part no.	Type
	Screw-clamped, Insertable in the slot from above	3-wire NPN N/O contact	Open end	2.5 m	★ 574338	SMT-8M-A-NS-24V-E-2,5-OE
			Plug M8, A-coded	0.3 m	★ 574339	SMT-8M-A-NS-24V-E-0,3-M8D
		3-wire PNP N/O contact	Open end	2.5 m	★ 574335	SMT-8M-A-PS-24V-E-2,5-OE
			Plug M8, A-coded	0.3 m	★ 574334	SMT-8M-A-PS-24V-E-0,3-M8D
		2-wire PNP N/O contact	Open end	5 m	★ 8165237	SMT-8M-A-ZS-24V-E-5,0-OE

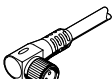
**Proximity switch SDBT-MSB for T-slot, magneto-resistive – for sizes 16 ... 25** Link [sdbt](#)

	Switching output	Switching element function	Electrical connection	Cable length	Part no.	Type
	NPN	N/O contact	Open end	2 m	8150172	SDBT-MSB-1L-NU-K-2-LE
			Plug M8, A-coded	0.3 m	8150175	SDBT-MSB-1L-NU-K-0.3-M8
	PNP		Open end	2 m	8150171	SDBT-MSB-1L-PU-K-2-LE
			Plug M8, A-coded	0.3 m	8150174	SDBT-MSB-1L-PU-K-0.3-M8
	Non-contacting, 2-wire		Open end	2 m	8150173	SDBT-MSB-1L-ZU-K-2-LE

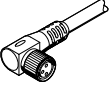
**Connecting cables NEBU, straight**

	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	3	2.5 m	541333	NEBU-M8G3-K-2.5-LE3
				5 m	541334	NEBU-M8G3-K-5-LE3

**Connecting cables NEBU, angled**

	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	3	2.5 m	541338	NEBU-M8W3-K-2.5-LE3

## Accessories

Connecting cables NEBU, angled						
	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	3	5 m	<b>541341</b>	<b>NEBU-M8W3-K-5-LE3</b>