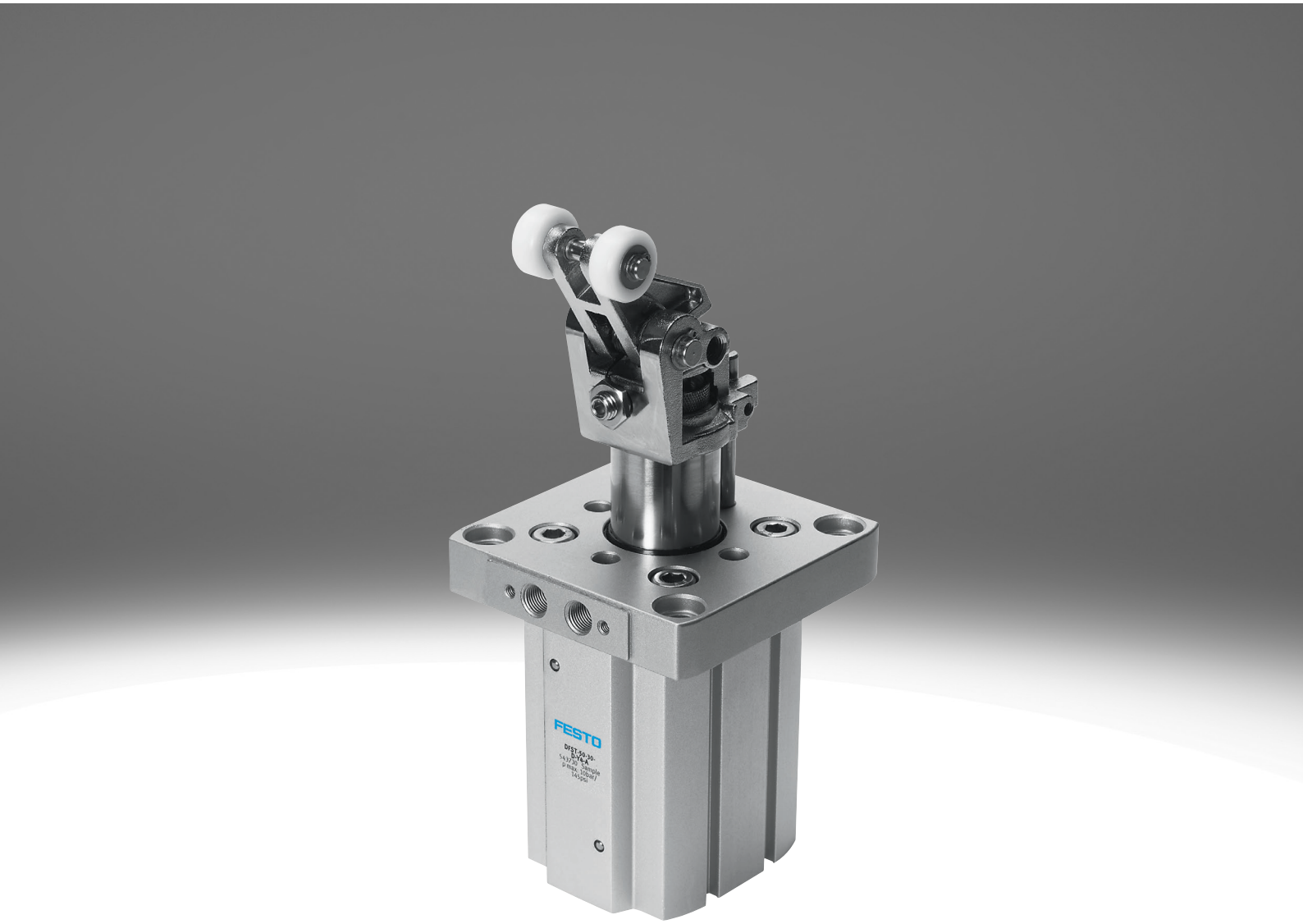
Stopper cylinder DFST



Characteristics

At a glance

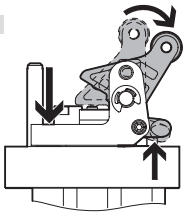
- Gentle stopping without vibrations or noise
- Flexible range of applications thanks to the adjustable shock absorber
- Sturdy design for a long service life
- Easy replacement of the shock absorber

With cushioning for heavy and sensitive loads
- Size 32: Workpieces up to 40 kg
- Size 50... 80: Workpieces up to 800 kg

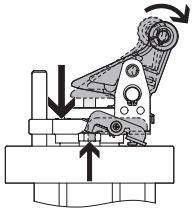
Interlock

[L]	With toggle lever locking mechanism

1



2

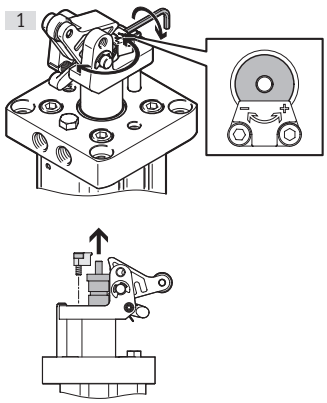


[1] Size 32
[2] Sizes 50... 80
- Fixes the toggle lever in the end position after the stop process, preventing the spring force of the shock absorber from pushing the transported goods backwards. Application: Defined position, for example for an indexing process

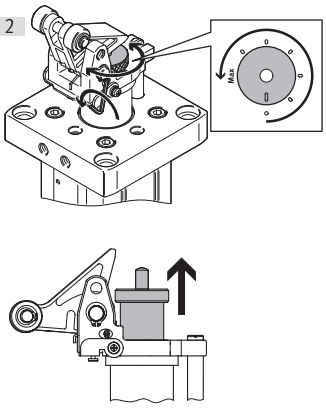
Cushioning

[Y4]	Shock absorber, adjustable, at front

1



2



Simple shock absorber adjustment using a scale

[1] Size 32
- Cushioning characteristics can be adjusted by simply rotating the shock absorber
- All that is required to replace the shock absorber is to undo a lock bolt

[2] Sizes 50... 80
- Cushioning characteristic can be adjusted by simply rotating the shock absorber. The new visualisation of the cushioning adjustment makes it easier, for example, to commission multiple stopper cylinders.
- All that is required to replace the shock absorber is to undo a lock bolt.

Characteristics

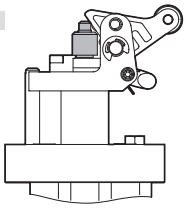
Position sensing

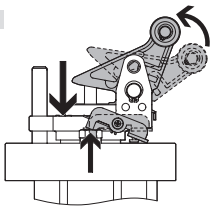
- Possible at the toggle lever
- Possible at the piston position

Roller version

Polymer or steel can be selected as a material

Application example

1 

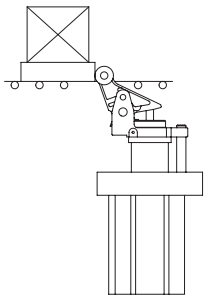
2 

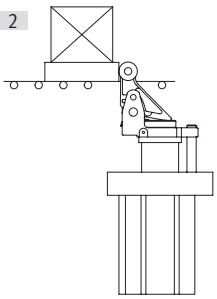
Lever deactivating mechanism
Application: Convenient alternative to holding the stopper in the lower end position, for example during the installation process

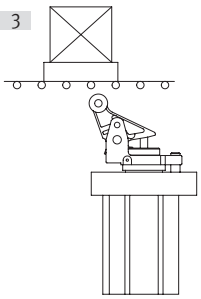
[1] Size 32
- Deactivates the toggle lever by putting the cap on. This allows the pallets to pass through.

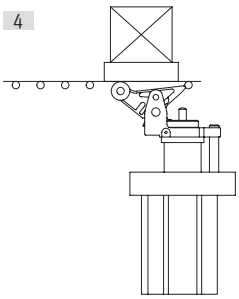
[2] Sizes 50... 80
- Deactivates the toggle lever by manually pressing down the toggle lever so that pallets can pass through. New: Automatic release of the toggle lever as the piston rod is retracted

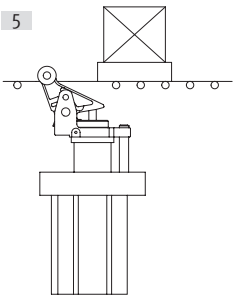
Overview

1 

2 

3 

4 

5 

Function sequence
- [1] Gentle braking of heavy loads via a hydraulic shock absorber in the piston rod.
- [2] Toggle lever reaches the rear end position. Optionally with lever locking mechanism: the transported product cannot be pushed back by the shock absorber
- [3] The transported product is released by compressed air, and the toggle lever is unlocked simultaneously.
- [4] The piston is extended as a result of spring force or compressed air. The toggle lever tips back, preventing the transported product from being lifted.
- [5] The toggle lever is raised by spring force and can stop the next transported product

Type code

001	Series	
DFST	Stopper cylinder	

002	Piston diameter [mm]	
32	32	
50	50	
63	63	
80	80	

003	Stroke [mm]	
20	20	
30	30	
40	40	

004	Function	
	Double-acting with spring	
D	Double-acting	

005	Interlock	
	None	
L	With toggle lever locking mechanism	

006	Cushioning	
Y4	Shock absorber, adjustable, at front	

007	Position sensing	
A	For proximity sensor	

008	Roller version	
S	Steel	
	Polymer	

009	Generation	
G2	2nd generation	

Datasheet

General technical data

Piston diameter	32 mm	50 mm	63 mm	80 mm
Design	Piston rod with toggle lever			
Mode of operation [1]	Double-acting, Pulling			
Pneumatic connection	G1/8			
Stroke	20 mm	30 mm		40 mm
Protection against torque/ guide	Guide rod			
Type of mounting	With through-hole			
Cushioning	Elastic cushioning rings/plates at both ends, Shock absorber, adjustable, at front			
Cushioning length	14	15		20
Position detection	Via proximity switch			
Sensing the toggle lever position	Via inductive sensors			
Mounting position	Vertical			
Product weight	750 g	1,900 g	3,400 g	6,350 g

1) „Double-acting with spring“ can also be used as a single-acting drive

Operating and environmental conditions

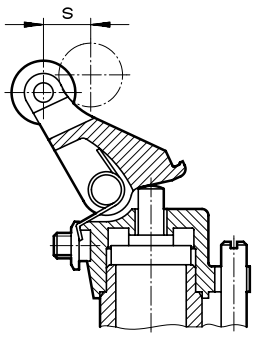
Operating pressure [1]	0.2 ... 1 MPa
Operating pressure	29 ... 145 psi
Operating pressure	2 ... 10 bar
Operating medium	Compressed air to ISO 8573-1:2010 [7:-:-]
Ambient temperature [2]	5 ... 60°C
Corrosion resistance class CRC [3]	1 - Low corrosion stress

1) A minimum operating pressure of 0.3 MPa (3 bar, 45 psi) is required for DFST-50 in combination with the lever locking mechanism.
2) Observe the operating range of the proximity switches
3) More information www.festo.com/x/topic/kbk

Materials

Material roll	Steel, POM
Material piston rod	High-alloy stainless steel
Material housing	Wrought aluminium alloy
Material cover	Die-cast aluminium
Material seals	NBR
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

Braking distance

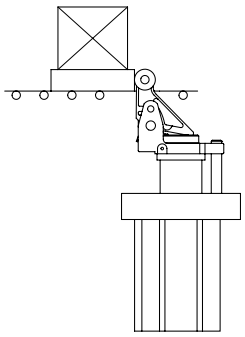


The braking distance s refers to the distance from when contact is made with the toggle lever to the end stop.

For DFST-32: 14 mm
For DFST-50: 15 mm
For DFST-63: 15 mm
For DFST-80: 20 mm

Datasheet

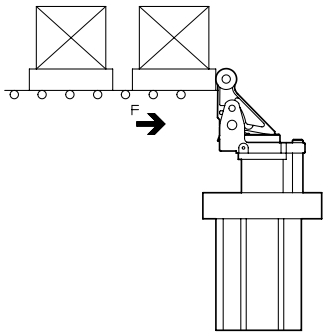
Resetting force F of the toggle lever against the conveying direction



The resetting force refers to the minimum force that must be applied to press the toggle lever into the end position.

For DFST-32: 4 N
For DFST-50: 22 N
For DFST-63: 23 N
For DFST-80: 36 N

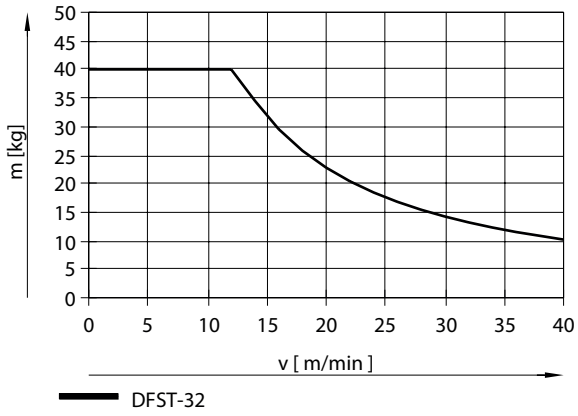
Permissible impact force F on the rollers of the toggle lever when the piston rod is advanced and the toggle lever is pushed into the end position



The permissible impact force refers to the force that can briefly act on the toggle lever when it is already in the end position, without damaging the piston rod bearing and the toggle lever mechanism.

For DFST-32: 1000 N
For DFST-50: 3000 N
For DFST-63: 5000 N
For DFST-80: 6000 N

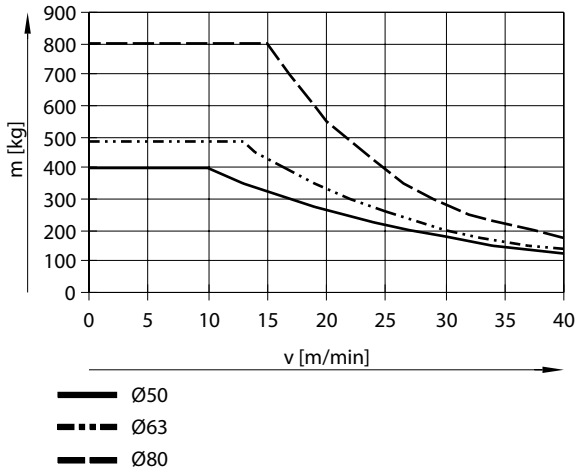
Permissible mass m as a function of conveying speed v for DFST-32



A coefficient of friction of μ = 0.1 was taken into consideration in the values.

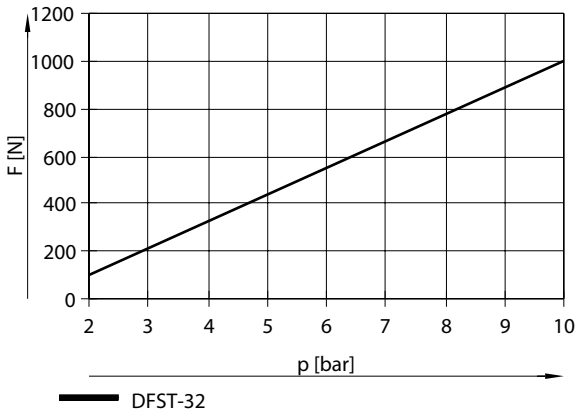
Datasheet

Permissible mass m as a function of the conveying speed v for DFST-50 ... 80



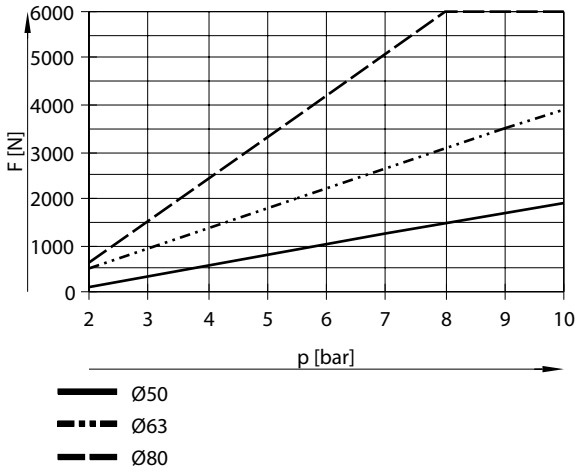
A coefficient of friction of μ = 0.1 was taken into consideration in the values.

Permissible lateral force F during the switching operation as a function of pressure p for DFST-32



The applied load exerts a lateral force on the piston rod. A certain minimum pressure must be applied to ensure that the cylinder functions properly.

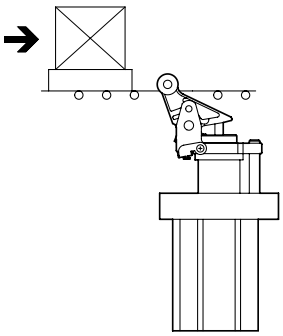
Permissible lateral force F during the switching operation as a function of pressure p for DFST-50 ... 80



The applied load exerts a lateral force on the piston rod. A certain minimum pressure must be applied to ensure that the cylinder functions properly.

Datasheet

Selection aid: Stopping a pallet



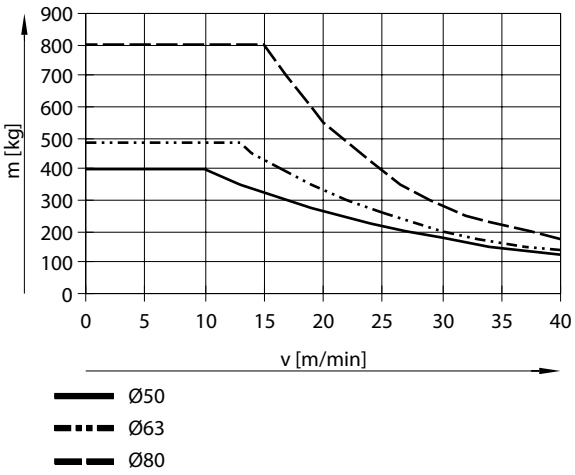
The stopper cylinder is used to decelerate an individual pallet, with or without end-position locking. Toggle lever and shock absorber are pressed through again for each pallet.

Example

Where:
Friction factor μ = 0.1
Conveying speed v = 20 m/min
Pallet with workpiece m = 200 kg
Operating pressure p = 0.6 MPa (6 bar, 87 psi)

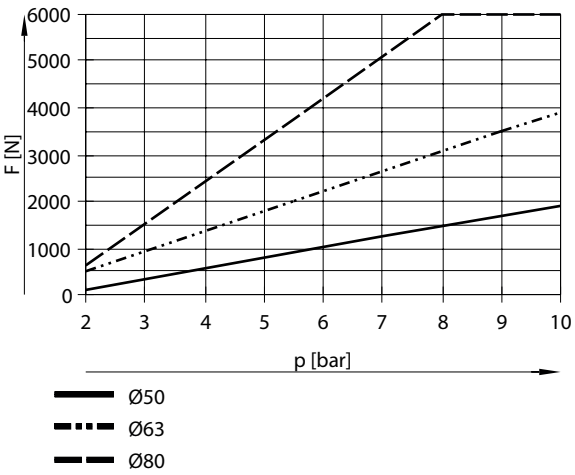
Selection: Stopper cylinder DFST-50

1. Checking the permissible mass



The maximum permissible mass at a conveying speed of 20 m/min is 250 kg. This means that a total mass of 200 kg for the pallet and the workpiece is permitted.

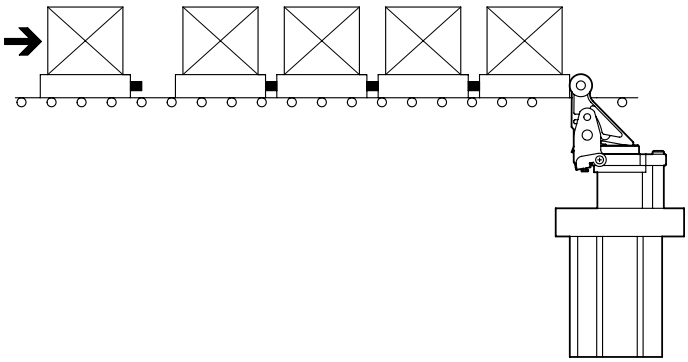
2. Checking the permissible lateral force during the switching operation



Lateral force FQ = Friction force FR
FR = μ x m x g
= 0.1 x 200 kg x 9.81 m/s2
= approx. 200 N
The maximum permissible lateral force at an operating pressure of 0.6 MPa (6 bar, 87 psi) is 1000 N.
This means that the lateral force of 200 N is permissible.

Datasheet

Selection aid: Stopping or separating several pallets



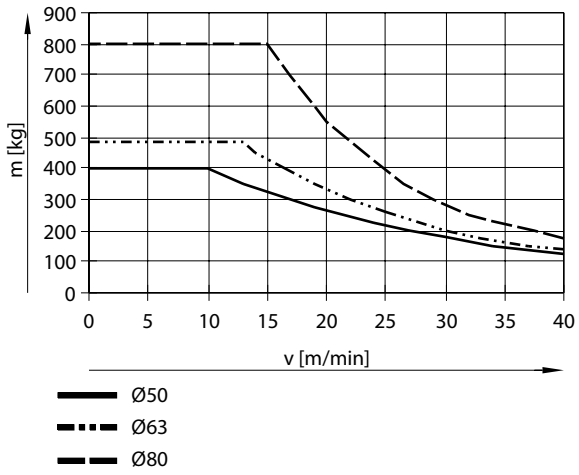
The stopper cylinder is used to separate pallets. Additional pallets collide with the pallets that have already pressed through the toggle lever. Since the shock absorber in the stopper cylinder is not effective in this case, a certain amount of buffering between the pallets must be ensured (e.g. by using elastomer elements).

Example

Where:
Friction factor μ = 0.1
Conveying speed v = 15 m/min
Pallet with workpiece m = 100 kg
Operating pressure p = 0.6 MPa (6 bar, 87 psi)
Maximum number of pallets accumulating simultaneously nG = 1
Maximum number of all queued pallets nA = 5
Maximum number of all subsequent pallets nA-1 = 4
Spring travel of the pallet buffer sF = 10 mm

Selection: Stopper cylinder DFST-50

1. Checking the permissible mass of the first pallet



The maximum permissible mass at a conveying speed of 15 m/min is 320 kg. This means that a total mass of 100 kg for the pallet and the workpiece is permitted.

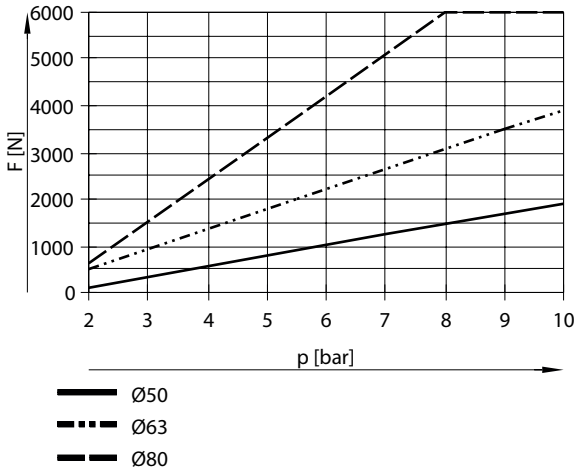
2a. Calculating the maximum permissible impact force when pallets collide with a pallet resting against the stopper cylinder

The maximum permissible impact force for the DFST-50 is 3000 N. This means that, with a total force of 1150 N, the number of pallets is permissible.

Frictional force: FR = μ x (nA x m) x g = 0.1 x (5 x 100 kg) x 9.81 m/s2 = approx. 500 N
Max. total force: Fges = FS + FR = 650 N + 500 N = 1150 N

Datasheet

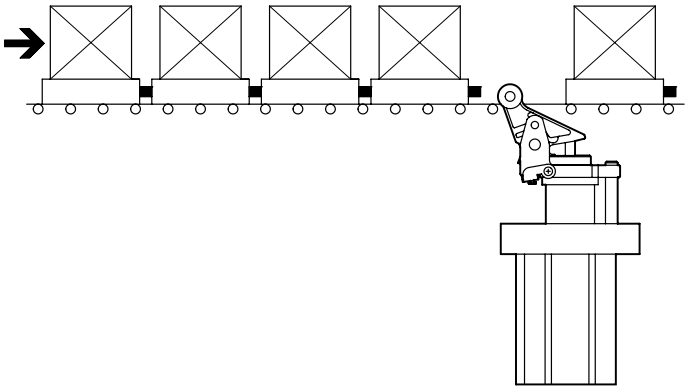
2b. Checking the permissible lateral force during the switching operation



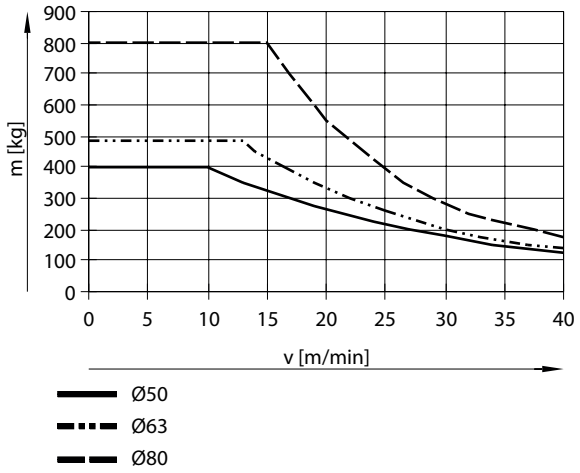
Lateral force FQ = Friction force FR
FR = 500 N

The maximum permissible lateral force at an operating pressure of 0.6 MPa (6 bar, 87 psi) is 1000 N.
This means that the lateral force of 500 N is permissible.

3. Separating and advancing the pallets



3. Separating and advancing the pallets



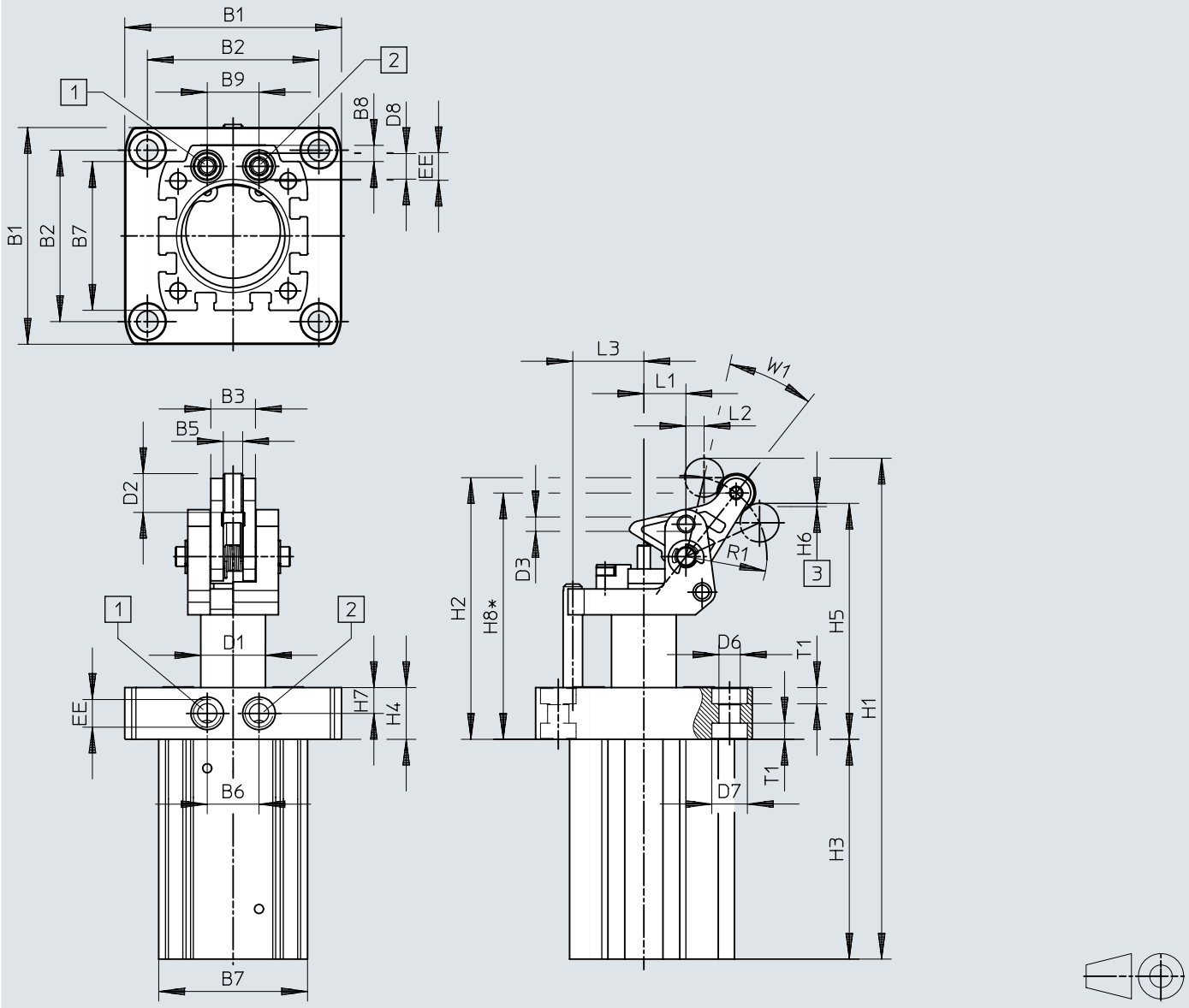
The maximum permissible mass for DFST-50 at a conveying speed of 15 m/min is 320 kg. Since the total mass of the 4 pallets that advance towards the stopper cylinder is 400 kg, the next largest stopper cylinder must be selected for separating.

Max. total mass:
mG = nA-1 x m = 4 x 100 kg = 400 kg

Results:
The DFST-63 stopper cylinder must be selected to separate 5 pallets.

Dimensions

Dimensions – Stopper cylinder DFST-32 Download CAD data www.festo.com



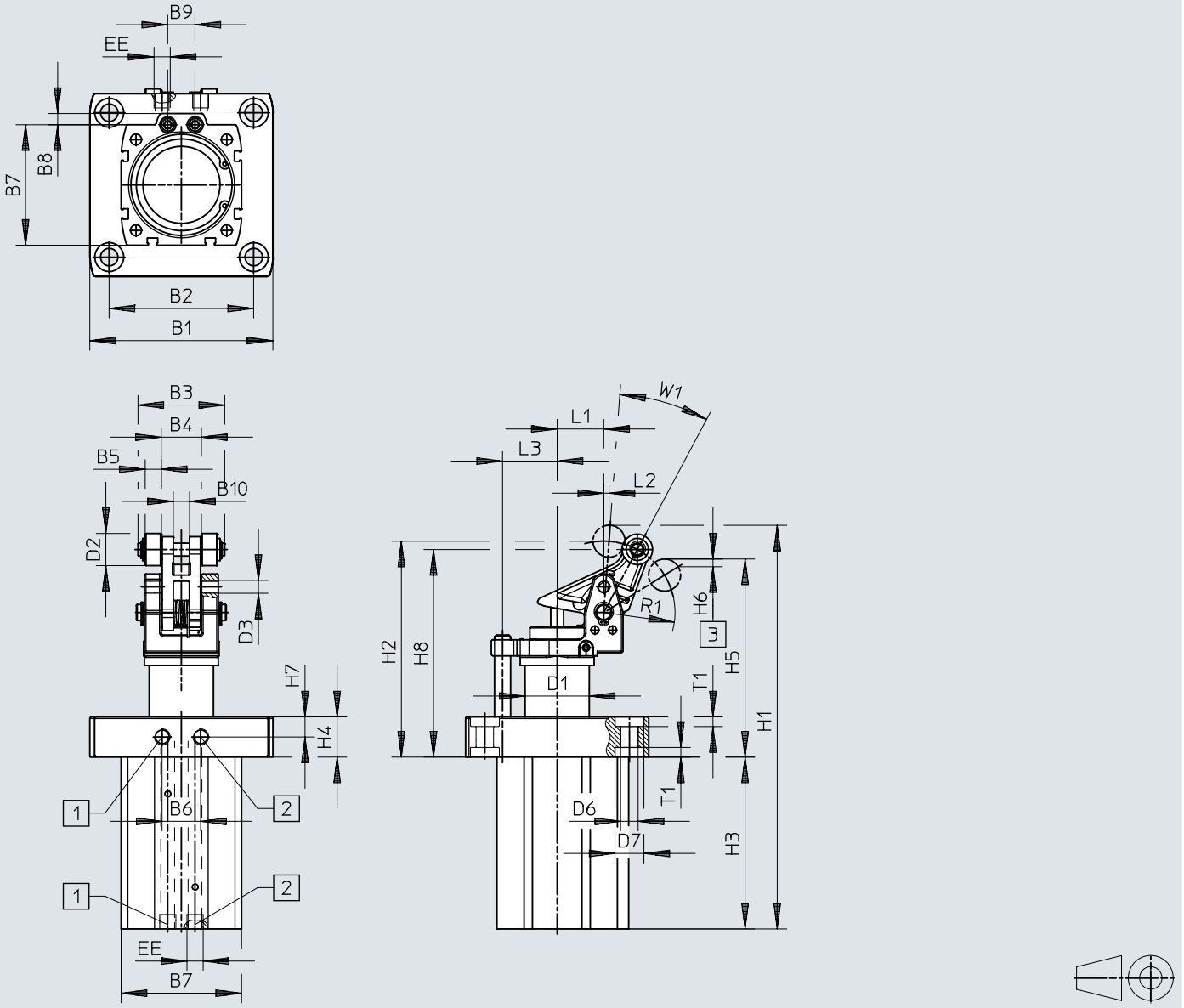
[1] Compressed air supply port for retracting
[2] Compressed air supply port for extending
[3] Lowest permissible pallet underside

	B1	B2	B3	B5	B6	B7	B8	B9	D1 ø	D2 ø	D3	D6 ø	D7 ø	D8	EE
DFST-32-G2	67	53	13,8	6	16	46	5	16	20	12	M5x0,5	6,6	11	7,9	G1/8

	H1	H2	H3	H4	H5	H6	H7	H8	L1	L2	L3	R1	T1	W1
DFST-32-G2	155,3	81,3	68	16	73,8	1	8	76,1	13	3	22	25	5	31,4

Dimensions

Dimensions – Stopper cylinder DFST-50 ... 80 Download CAD data www.festo.com



[1] Compressed air supply port for retracting
[2] Compressed air supply port for extending
[3] Lowest permissible pallet underside

	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	D1 ø	D2 ø	D3	D6	D7
DFST-50-G2	93	73	43	20	8	17	64	7	17	8,1	32	20	M8x1	9	14
DFST-63-G2	114	90	54	25	10	24	75	7	17	10,1	40	20	M8x1	11	18
DFST-80-G2	138	110	63	30	12	24	95	7	17	12,1	50	25	M8x1	13	20

	EE	H1	H2	H3	H4	H5	H6	H7	H8	L1	L2	L3	R1	T1	W1
DFST-50-G2	G1/8	218,8	117,8	91	17,5	106,8	2,76	8,75	112,1	23	6,3	26	38,5	5	23,5
DFST-63-G2	G1/8	251	134	107	25	123,5	6,23	12,5	129,5	29	6	34	44,4	6	20,3
DFST-80-G2	G1/8	322,5	159	151	19	143,8	4,31	9,5	152,2	36	8	42	55,6	6	23,5

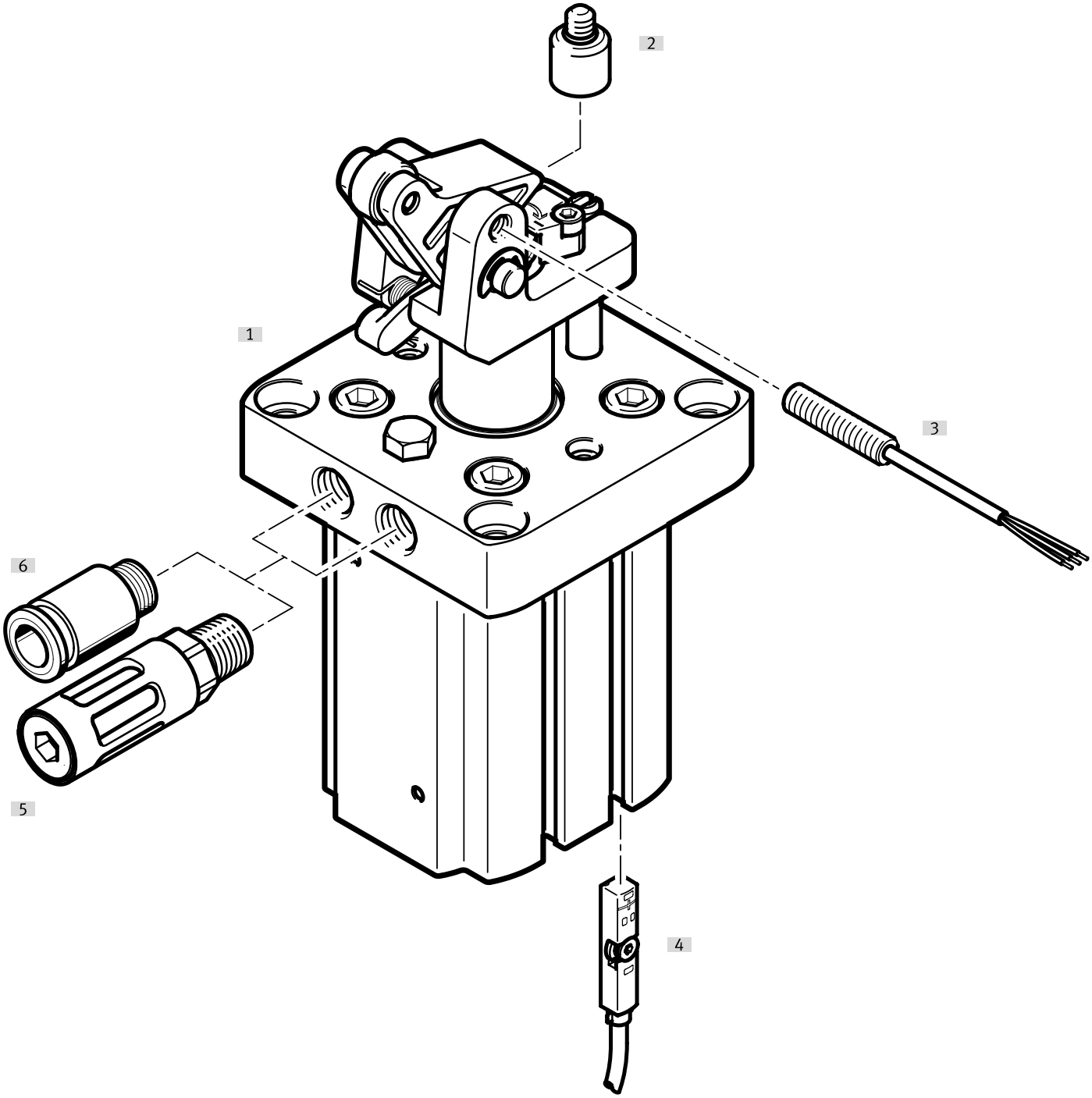
Ordering data

Ordering data

	Piston diameter	Function	Roller version	Interlock	Part no.	Type
	32 mm	Double-acting with spring	Polymer	With toggle lever locking mechanism	**8093004**	**DFST-32-20-L-Y4-A-G2**
				None	**8093003**	**DFST-32-20-Y4-A-G2**
			Steel	With toggle lever locking mechanism	**8093008**	**DFST-32-20-L-Y4-A-S-G2**
				None	**8093007**	**DFST-32-20-Y4-A-S-G2**
		Double-acting	Polymer		**8093005**	**DFST-32-20-D-Y4-A-G2**
			Steel		**8093009**	**DFST-32-20-D-Y4-A-S-G2**
			Polymer	With toggle lever locking mechanism	**8093006**	**DFST-32-20-DL-Y4-A-G2**
			Steel		**8093010**	**DFST-32-20-DL-Y4-A-S-G2**
	50 mm	Double-acting with spring	Polymer	None	**8090409**	**DFST-50-30-Y4-A-S-G2**
					8090405	**DFST-50-30-Y4-A-G2**
				With toggle lever locking mechanism	**8090406**	**DFST-50-30-L-Y4-A-G2**
			Steel		**8090410**	**DFST-50-30-L-Y4-A-S-G2**
		Double-acting	Polymer	None	**8090407**	**DFST-50-30-D-Y4-A-G2**
				With toggle lever locking mechanism	**8090408**	**DFST-50-30-DL-Y4-A-G2**
			Steel	None	**8090411**	**DFST-50-30-D-Y4-A-S-G2**
				With toggle lever locking mechanism	**8090412**	**DFST-50-30-DL-Y4-A-S-G2**
	63 mm	Double-acting with spring			**8085911**	**DFST-63-30-L-Y4-A-S-G2**
				None	**8085910**	**DFST-63-30-Y4-A-S-G2**
			Polymer	With toggle lever locking mechanism	**8085907**	**DFST-63-30-L-Y4-A-G2**
				None	**8085906**	**DFST-63-30-Y4-A-G2**
		Double-acting			**8085908**	**DFST-63-30-D-Y4-A-G2**
				With toggle lever locking mechanism	**8085909**	**DFST-63-30-DL-Y4-A-G2**
			Steel	None	**8085912**	**DFST-63-30-D-Y4-A-S-G2**
				With toggle lever locking mechanism	**8085913**	**DFST-63-30-DL-Y4-A-S-G2**
	80 mm	Double-acting with spring			**8089690**	**DFST-80-40-L-Y4-A-S-G2**
				None	**8089689**	**DFST-80-40-Y4-A-S-G2**
			Polymer		**8089685**	**DFST-80-40-Y4-A-G2**
				With toggle lever locking mechanism	**8089686**	**DFST-80-40-L-Y4-A-G2**
		Double-acting	Steel	None	**8089691**	**DFST-80-40-D-Y4-A-S-G2**
				With toggle lever locking mechanism	**8089692**	**DFST-80-40-DL-Y4-A-S-G2**
			Polymer		**8089688**	**DFST-80-40-DL-Y4-A-G2**
				None	**8089687**	**DFST-80-40-D-Y4-A-G2**

Peripherals

For DFST-32



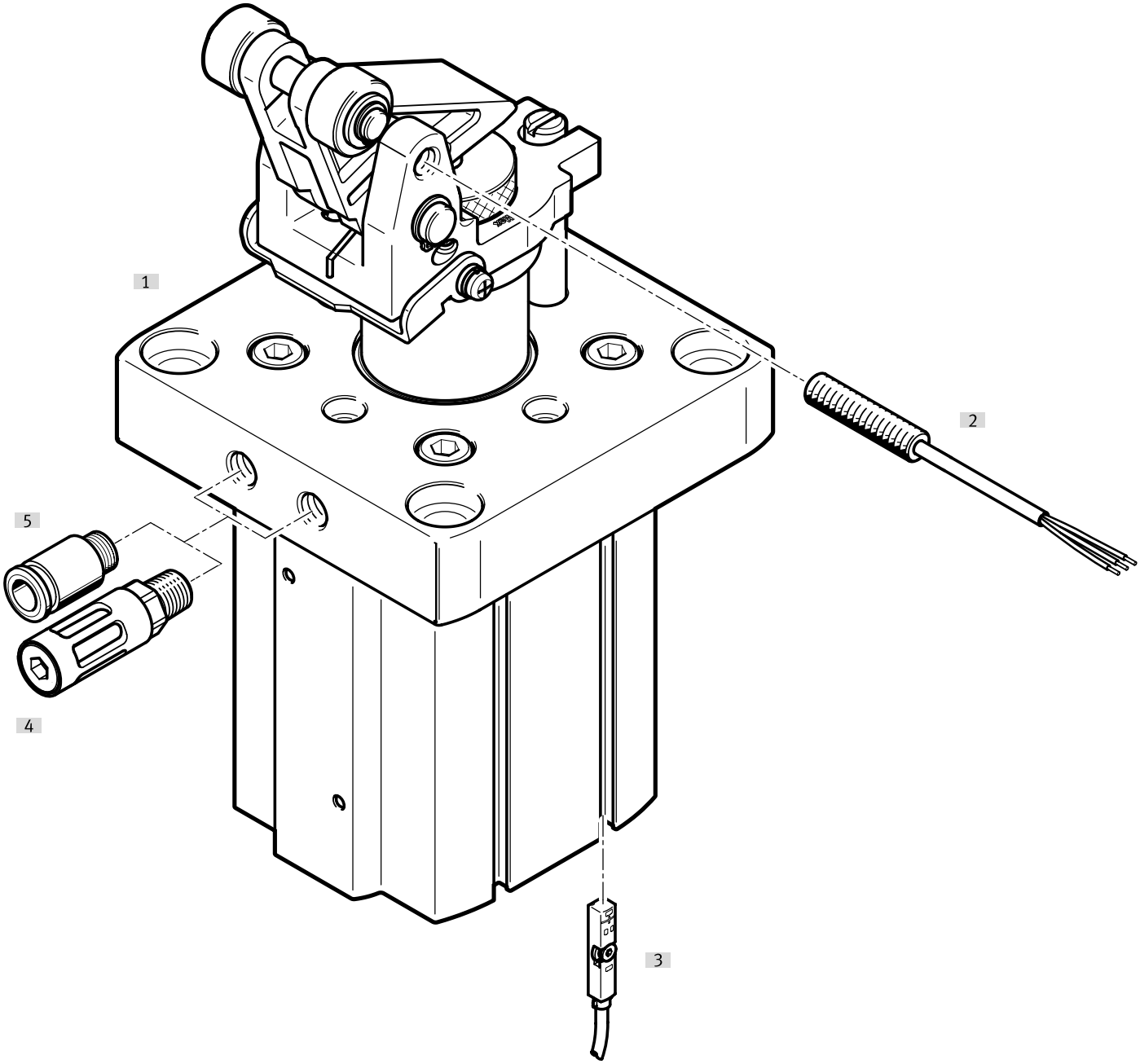
Accessories			→ Link
	Type/order code	Description	
[1]	Stopper cylinders DFST-G2	Pneumatic drive	dfst
[2]	Lever deactivating mechanism DADP-TF	• For deactivating the toggle lever • Not included in the scope of delivery of the linear gantry	17
[3]	Proximity switch, inductive SIEN-M8	To sense the toggle lever position	17
[4]	Proximity switch SME-8	For sensing the piston position	17
[4]	Proximity switch SMT-8	For sensing the piston position	17
[5]	Silencer	• For noise reduction at the exhaust port. • Only in combination as a single-acting function	schalldämpfer
[6]	Push-in fitting QS	For connecting compressed air tubing with standard O.D.	qs

Peripherals

Accessories			→ Link
	Type/order code	Description	
[7]	Lever locking mechanism DADP-TL	• For fixing the toggle lever in the rear end position • Included in the scope of delivery for variant DFST-...-L	17

Peripherals

For DFST-50 ... 80



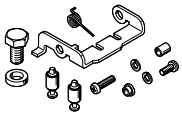
Accessories			→ Link
	Type/order code	Description	
[1]	Stopper cylinders DFST-G2	Pneumatic drive	dfst
[2]	Proximity switch, inductive SIEN-M8	To sense the toggle lever position	17
[3]	Proximity switch SME-8	For sensing the piston position	17
[3]	Proximity switch SMT-8	For sensing the piston position	17
[4]	Silencer	• For noise reduction at the exhaust port. • Only in combination as a single-acting function	schalldämpfer
[5]	Push-in fitting QS	For connecting compressed air tubing with standard O.D.	qs
[6]	Toggle lever function kit DADP-TU	• For fixing the toggle lever in the rear end position or deactivating the toggle lever. The transported goods are released and the toggle lever unlocked simultaneously when pressurised • Included in the scope of delivery for variant DFST-...-L	17

Accessories

Lever deactivating mechanism DADP-TF

	Description	Product weight	Part no.	Type
	For Ø 32	3 g	**8097333**	**DADP-TF-F3-32**

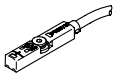
Toggle lever function kit DADP-TU

	Description	Product weight	Part no.	Type
	For Ø 50	35 g	**8093804**	**DADP-TU-F3-50**
	For Ø 63	36 g	**8093805**	**DADP-TU-F3-63**
	For Ø 80	53 g	**8093806**	**DADP-TU-F3-80**

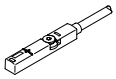
Lever locking mechanism DADP-TL

	Description	Product weight	Part no.	Type
	For Ø 32	5 g	**8097332**	**DADP-TL-F3-32**

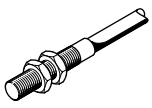
Proximity switch SMT-8 for T-slot, magneto-resistive — Link smt

	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/C contact	Open end	7.5 m	**574340**	**SMT-8M-A-PO-24V-E-7,5-OE**
		3-wire PNP N/O contact		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**

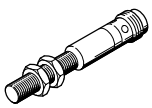
Proximity switch SME-8M for T-slot, magnetic reed — Link sme

	Type of mounting	Switching output	Electrical connection	Cable length	Part no.	Type
	Screw-clamped, Insertable in the slot from above	3-wire N/O contact	Open end	2.5 m	**543862**	**SME-8M-DS-24V-K-2,5-OE**
				5 m	**543863**	**SME-8M-DS-24V-K-5,0-OE**
			Plug M8, A-coded	0.3 m	**543861**	**SME-8M-DS-24V-K-0,3-M8D**
		2-wire PNP N/O contact	Open end	2.5 m	**543872**	**SME-8M-ZS-24V-K-2,5-OE**

Proximity switch SIEN, inductive, with cable — Link sien

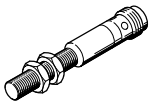
	Type of mounting	Switching output	Electrical connection	Cable length	Part no.	Type
	Via lock nut	PNP	Open end	2.5 m	**150386**	**SIEN-M8B-PS-K-L**
					150370	**SIEN-M5B-PS-K-L**

Proximity switch SIEN, inductive, without cable — Link sien

	Type of mounting [1]	Switching output	Electrical connection	Part no.	Type
	Via lock nut	PNP	Plug M8, A-coded	**150387**	**SIEN-M8B-PS-S-L**

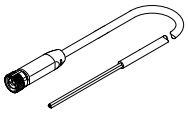
Accessories

Proximity switch SIEN, inductive, without cable — Link sien

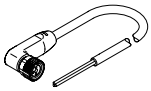
	Type of mounting [1]	Switching output	Electrical connection	Part no.	Type
	Via lock nut	PNP	Plug M8, A-coded	**150371**	**SIEN-M5B-PS-S-L**

1) With sensor bracket SL-DSM-S

Connecting cables NEBA, 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	★ **8078223**	**NEBA-M8G3-U-2.5-N-LE3**
				5 m	★ **8078224**	**NEBA-M8G3-U-5-N-LE3**

Connecting cables NEBA, 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	★ **8078230**	**NEBA-M8W3-U-2.5-N-LE3**
				5 m	★ **8078231**	**NEBA-M8W3-U-5-N-LE3**