Stopper cylinders DFST-G2

FESTO



Key features

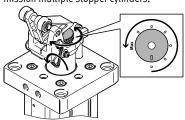
At a glance

- · With cushioning for heavy loads
- · Flexible range of applications owing to adjustable shock absorber
- Gentle stopping without impact vibration or noise

- Double- or single-acting function
- · Sturdy design for long service life

Simple shock absorber adjustment using a scale

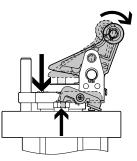
Cushioning characteristic can be adjusted by simply rotating the shock absorber. The new visualisation of the cushioning adjustment makes it easier e.g. to commission multiple stopper cylinders.

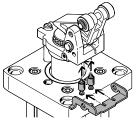


Optional: Lever locking mechanism

Fixes the toggle lever in the end position after the stop process, preventing the spring force of the shock absorber from pushing the load backwards.

Application: Defined position, e.g. for an indexing process



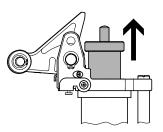


Note:

Two pins are included in the scope of delivery of the DFST-...-L. One pin is for the lever locking mechanism and the other for the lever deactivating mechanism. The pin for the lever locking mechanism is fitted prior to delivery.

Simple replacement of the shock absorber

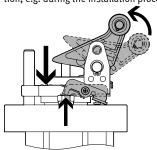
All that is required to replace the shock absorber is to undo a lock bolt.



Optional: Lever deactivating mechanism

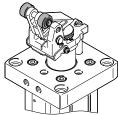
Deactivates the toggle lever by manually pressing down the toggle lever so that pallets can pass through. New: Automatic release of the toggle lever as the piston rod is retracted.

Application: Convenient alternative to retaining the stopper in the lower end position, e.g. during the installation process.



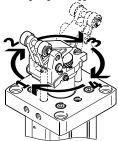
Roller material

Material can be selected from polymer or steel



Adjustable effective direction (90°, 180°, 270°)

For aligning the toggle lever in relation to the supply ports.



Key features

At a glance

Supply port From the side



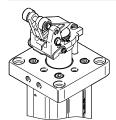
Underneath



Versatile position sensing Toggle lever

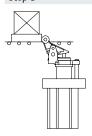


Piston position



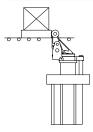
Functional sequence

Step 1



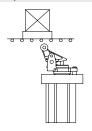
Gentle stopping of heavy loads via a hydraulic shock absorber in the piston rod.

Step 2



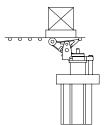
Toggle lever reaches the rear end position. Optionally with lever locking mechanism: the load cannot be pushed back by the shock absorber.

Step 3



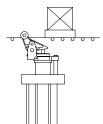
The load is released by means of compressed air, and the toggle lever is unlocked simultaneously.

Step 4



The piston is extended by means of spring force or compressed air. The toggle lever tips back which prevents the load from being lifted.

Step 5



The toggle lever is raised by means of spring force and can stop the next workpiece carrier.

Type codes

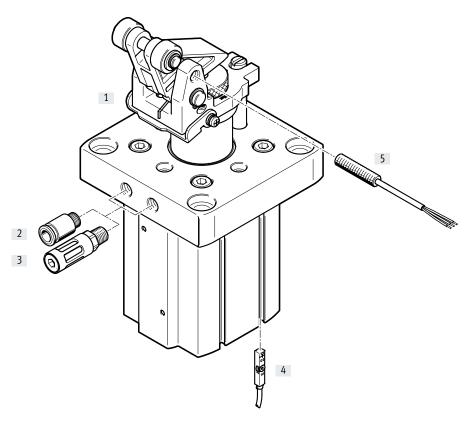
001	Series
DFST	Stopper cylinder
002	Piston diameter [mm]
50	50
63	63
80	80
003	Stroke [mm]
30	30
40	40
004	Function
	Double-acting with spring
D	Double-acting

005	Interlock	
	None	
L	With toggle lever locking mechanism	
006	Cushioning	
Y4	Shock absorber, adjustable, at front	
007	Position sensing	
Α	For proximity sensor	
008	Rollers	
008	Rollers POM	
008 S	-	
	POM	



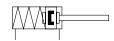
The DFST double-acting with spring variant can also be used as a single-acting drive.

Peripherals overview



Acce	ccessories					
	Туре	Description	→ Page/Internet			
[1]	Toggle lever function selection kit	For fixing the toggle lever in the rear end position or deactivating the toggle lever. The load is released and the toggle lever unlocked simultaneously on pressurisation	14			
[2]	Push-in fitting QS	For connecting tubing with standard outside diameters	qs			
[3]	Silencer	For noise reduction at the exhaust port. Only in combination as a single-acting function	silencer			
[4]	Proximity sensor SME-/SMT-8	For sensing the piston position	14			
[5]	Proximity sensor SIEN-M8	For sensing the toggle lever position	14			





Diameter 50 ... 80 mm

- Stroke length 30 ... 40 mm



General technical data	eneral technical data					
Piston Ø		50	63	80		
Pneumatic connection		G1/8				
Stroke [n	nm]	30	30	40		
Design		Piston rod with toggle lever				
Mode of operation		Double-acting Double-acting				
		Double-acting with spring				
Protection against torsion/guide		Guide rod				
Type of mounting		With through-hole				
Cushioning		Elastic cushioning rings/plates at both e	nds (for piston rod movement)			
		Adjustable shock absorber				
Position sensing		For proximity sensor				
Toggle lever position sensing		Via inductive sensors				
Mounting position		Vertical				
Product weight [g]	1900	3400	6350		

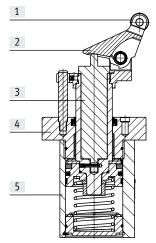
Operating and environmental conditions		
Operating medium		Compressed air to ISO 8573-1:2010 [7:-:-]
Operating pressure	[bar]	210
Ambient temperature	[°C]	5 60
Corrosion resistance KBK ¹⁾		1

¹⁾ Corrosion resistance class CRC 1 to Festo standard FN 940070

Low corrosion stress. Dry internal use or transport and storage protection. Also applies to parts behind covers, in non-visible interior areas, and parts which are covered in the application (e.g. drive trunnions).

Materials





Pisto	on Ø	50	63		80		
[1]	Rollers						
	[]	POM					
	[S]	Steel	Steel				
[2]	Attachments	Nickel-plated cast steel	Nickel-plated cast steel				
[3]	Piston rod	High-alloy stainless steel					
[4]	Cover	Die-cast aluminium	Aluminium				
[5]	Housing	Wrought aluminium alloy					
-	Seals	NBR	NBR				
	Note on materials	LABS-containing substance	LABS-containing substances				
		RoHS-compliant	RoHS-compliant				

Braking distance

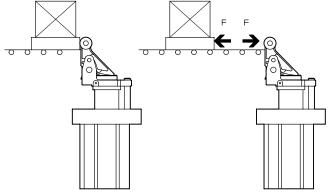
The braking distance s refers to the distance from when contact is made with the toggle lever to the end stop.



Piston Ø		50	63	80
Braking distance	[mm]	15	15	20

Resetting force F_R of the toggle lever against the delivery direction

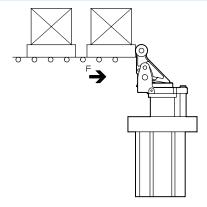
The resetting force refers to the minimum force that must be applied to press the toggle lever into the end position.



			<u> </u>	
Piston Ø		50	63	80
Resetting force at the toggle lever	[N]	22	23	36

Permissible impact force F_S on the rollers of the toggle lever with piston rod advanced and toggle lever pushed to the end position

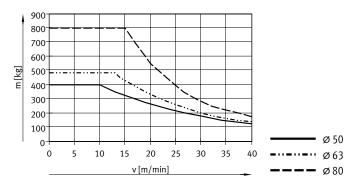
The permissible impact force refers to the momentary force that can act on the toggle lever when it is already pushed into its end position without damaging the rod bearing or the toggle lever mechanism.



Piston Ø		50	63	80
Impact force	[N]	3000	5000	6000

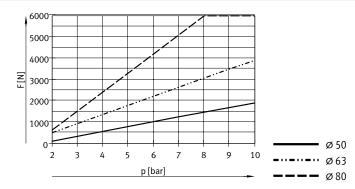
Permissible load m as a function of conveyor speed v

A coefficient of friction of μ = 0.1 has been taken into consideration in the values in the adjacent graph.



Permissible lateral force $\mathbf{F}_{\mathbf{Q}}$ during the switching operation as a function of the pressure \mathbf{p}

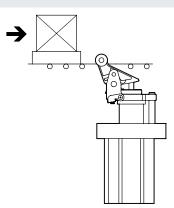
The applied load causes a lateral force on the piston rod. A certain minimum pressure must be applied in order to guarantee the cylinder function.



Selection aid

Stopping a pallet

The stopper cylinder is used to break an individual workpiece carrier, with or without end-position locking. Toggle lever and shock absorber are pushed to their end position again for each pallet.



Example

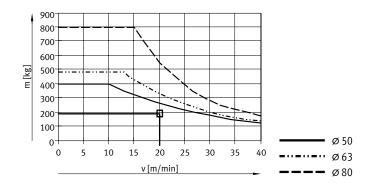
Given:

Friction factor $\mu = 0.1$ Conveying speed v = 20 m/min Pallet with workpiece m = 200 kg Operating pressure p = 6 bar

Selection: Stopper cylinder DFST-50

1. Checking the permissible load

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



2. Checking the permissible lateral force during the switching operation

Lateral force F_Q = Frictional force F_R

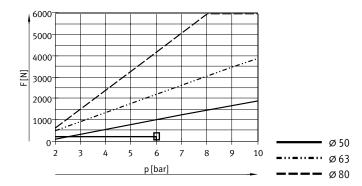
 $F_R = \mu x m x g$

 $= 0.1 \times 200 \text{ kg} \times 9.81 \text{ m/s}^2$

= approx. 200 N

The maximum permissible lateral force at an operating pressure of 6 bar is 1000 N.

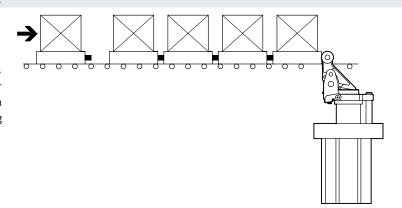
This means that the lateral force of 200 N is permissible.



Selection aid

Stopping or separating several pallets

The stopper cylinder is used to separate pallets. Further workpiece carriers accumulate behind carriers that have already pushed the toggle lever into its end position. Since the shock absorber in the stopper cylinder is inoperative in this case, a certain amount of buffering between the pallets must be guaranteed (e.g. elastomer elements).



Example

Given:

Friction factor $\mu = 0.1$

Conveying speed v = 15 m/min

Pallet with workpiece m = 100 kg

Operating pressure p = 6 bar

Maximum number of pallets accumulating simultaneously $n_G = 1$

Maximum number of all queued pallets $n_A = 5$

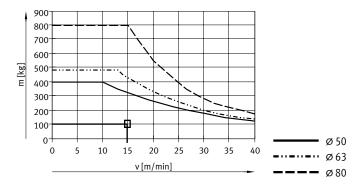
Maximum number of all advancing pallets $n_A-1 = 4$

Spring travel of the pallet buffer sF = 10 mm

Selection: Stopper cylinder DFST-50

1. Checking the permissible load of the first pallet

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



2a. Calculation of the maximum permissible impact force when pallets accumulate behind a pallet resting against the stopper cylinder

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

$$F_{S-}\frac{(n_{G}\times m)\times v^{2}}{S_{F}}=\frac{(1\times 100 kg)\times (15m\ /\ 60s)^{2}}{0,01m}=ca.650N$$
 Impact force calculation:

Friction force: $F_R = \mu x (n_A x m) x g = 0.1 x (5 x 100 kg) x 9.81 m/s^2 = approx. 500 N$

Max. total force: $F_{ges} = F_S + F_R = 650 \text{ N} + 500 \text{ N} = 1150 \text{ N}$

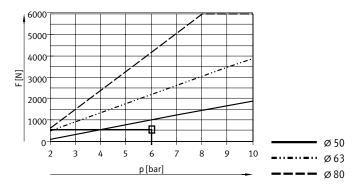
Selection aid

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

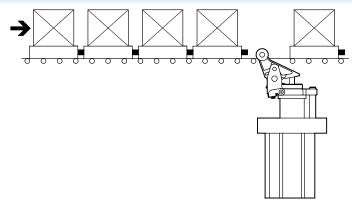
Lateral force F_Q = Frictional force F_R F_R = 500 N

The maximum permissible lateral force at an operating pressure of 6 bar is 1000 N.

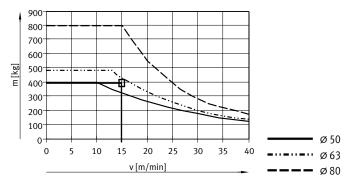
This means that a lateral force of 500 N is permissible.



3. Separating and advancing the pallets



The maximum permissible load with the DFST-50 at a conveying speed of 15 m/min is 320 kg. Since the total load of the 4 pallets advancing on the stopper cylinder is 400 kg, the next size of stopper cylinder must be selected for separating.



Max. total load:

 $m_G = n_{A-1} \times m = 4 \times 100 \text{ kg} = 400 \text{ kg}$

Result

To separate 5 pallets, the stopper cylinder DFST-63 must be selected.

Dimensions Download CAD data → www.festo.com d 1 [1] Supply port, retracting [2] Supply port, advancing [3] Lowest permissible pallet underside 1 2 В1 B2 В3 В4 В5 В6 В7 В8 В9 B10 Ø [mm] 50 93 73 43 20 17 64 8 17 8.1 63 114 90 54 25 10 24 75 17 10.1 80 138 110 63 30 12 24 95 17 12.1 D1 D2 Н1 Ø D3 D6 D7 EE H2 Н3 Н4 [mm] Ø Ø 20 50 20 M8x1 9 14 G1/8 218.8 117.8 91 17.5 20 20 M8x1 G1/8 107 63 11 18 251 134 25 80 50 25 M8x1 13 20 G1/8 322.5 159 19 151

Ø

[mm] 50

63

80

Н5

106.8

123.5

143.8

Н6

2.76

6.23

4.31

Н7

8.75

12.5

9.5

Н8

112.1

129.5

152.2

L1

23

29

36

L2

6.3

8

L3

26

34

42

R1

38.5

44.4

55.6

T1

5

6

W1

23.5

20.3

23.5



Ordering data	Piston Ø	Roller made from steel	With spring	With lever locking mechanism	Part no.	Туре
	50		-		8090405	DFST-50-30-Y4-A-G2
			•	•	8090406	DFST-50-30-L-Y4-A-G2
CAR					8090407	DFST-50-30-D-Y4-A-G2
				•	8090408	DFST-50-30-DL-Y4-A-G2
			•		8090409	DFST-50-30-Y4-A-S-G2
			•	•	8090410	DFST-50-30-L-Y4-A-S-G2
					8090411	DFST-50-30-D-Y4-A-S-G2
				•	8090412	DFST-50-30-DL-Y4-A-S-G2
	63		•		8085906	DFST-63-30-Y4-A-G2
			•	•	8085907	DFST-63-30-L-Y4-A-G2
					8085908	DFST-63-30-D-Y4-A-G2
				•	8085909	DFST-63-30-DL-Y4-A-G2
			•		8085910	DFST-63-30-Y4-A-S-G2
			•	•	8085911	DFST-63-30-L-Y4-A-S-G2
					8085912	DFST-63-30-D-Y4-A-S-G2
				•	8085913	DFST-63-30-DL-Y4-A-S-G2
	80		•		8089685	DFST-80-40-Y4-A-G2
			•	•	8089686	DFST-80-40-L-Y4-A-G2
					8089687	DFST-80-40-D-Y4-A-G2
				•	8089688	DFST-80-40-DL-Y4-A-G2
		•	•		8089689	DFST-80-40-Y4-A-S-G2
		•	-	•	8089690	DFST-80-40-L-Y4-A-S-G2
					8089691	DFST-80-40-D-Y4-A-S-G2
				•	8089692	DFST-80-40-DL-Y4-A-S-G2

Accessories

Ordering data – Toggle lever function selection kit					
	for Ø	Part no.	Туре		
	50	8093804	DADP-TU-F3-50		
	63	8093805	DADP-TU-F3-63		
	80	8093806	DADP-TU-F3-80		
<u> </u>					

Ordering data -	– Proximity sensors for T-s	slot, magneto-resistive				Data sheets → Internet: smt
	Type of mounting	Switching output	Electrical connection	Cable length [m]	Part no.	Туре
N/O contact						
	Inserted in the slot	PNP	Cable, 3-wire	2.5	574335	SMT-8M-A-PS-24V-E-2,5-OE
OFF ST.	from above,		Plug M8x1, 3-pin	0.3	574334	SMT-8M-A-PS-24V-E-0,3-M8D
	flush with the cylin-		Plug M12x1, 3-pin	0.3	574337	SMT-8M-A-PS-24V-E-0,3-M12
	der profile,	NPN	Cable, 3-wire	2.5	574338	SMT-8M-A-NS-24V-E-2,5-0E
	short design		Plug M8x1, 3-pin	0.3	574339	SMT-8M-A-NS-24V-E-0,3-M8D
N/C						
	Inserted in the slot	PNP	Cable, 3-wire	7.5	574340	SMT-8M-A-PO-24V-E-7,5-OE
STE ST.	from above,					
•	flush with the cylin-					
	der profile,					
	short design					

Ordering data – Pr	Data sheets → Internet: sme						
	Type of mounting	Switching out- put	Electrical connection	Cable length [m]	Part no.	Туре	
N/O contact							
	Insertable in the slot from above,	Contacting	Cable, 3-wire	2.5	543862	SME-8M-DS-24V-K-2,5-OE	
	flush with the cylinder profile			5.0	543863	SME-8M-DS-24V-K-5,0-OE	
			Cable, 2-wire	2.5	543872	SME-8M-ZS-24V-K-2,5-OE	
			Plug M8x1, 3-pin	0.3	543861	SME-8M-DS-24V-K-0,3-M8D	

Ordering data − Proximity sensors, inductive Data sheets → Inter						
	Thread	Contact	Connection	Part no.	Туре	
	M8	N/O contact	Cable, 2.5 m	150386	SIEN-M8B-PS-K-L	
			Plug	150387	SIEN-M8B-PS-S-L	
		N/C	Cable, 2.5 m	150390	SIEN-M8B-PO-K-L	
			Plug	150391	SIEN-M8B-PO-S-L	

Ordering data – Connecting cables					Data sheets → Internet: nebu
	Electrical connection, left	Electrical connection, right	Cable length [m]	Part no.	Туре
	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		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		2.5	541367	NEBU-M12W5-K-2.5-LE3
			5	541370	NEBU-M12W5-K-5-LE3