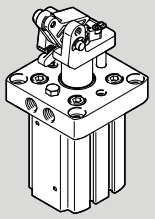
DFST-32-...-G2
Stopper cylinder



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Instructions | Operating

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1 Applicable Documents

All available documents for the product ➔ www.festo.com/sp.

2 Safety

2.1 Safety instructions

- Take into consideration the ambient conditions at the location of use.
- Only use the product in original status without unauthorised modifications.
- Observe labelling on the product.
- Store the product in a cool, dry, UV-protected and corrosion-protected environment. Ensure that storage times are kept to a minimum.
- Prior to mounting, installation and maintenance work: Switch off compressed air supply and secure it from being switched back on.
- Observe tightening torques. Unless otherwise specified, the tolerance is ± 20 %.

2.2 Intended Use

The stopper cylinder DFST is designed for use as a retractable fixed stop in order to reach defined holding positions with transported material (e.g. on mounting or sorting systems). The DFST sorts the stationary transported material in buffer zones.

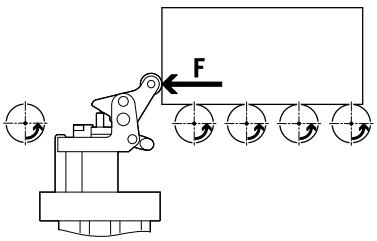


Fig. 1 Stopping transported material

2.3 Foreseeable misuse

With DFST-...-L: the toggle lever must not be overrun in the stop direction by the transported material when the lever locking mechanism is active. Otherwise the transported material will damage the locking mechanism.

2.4 Training of qualified personnel

Installation, commissioning, maintenance and disassembly should only be conducted by qualified personnel.
The skilled personnel must be familiar with the installation of pneumatic control systems.

3 Further information

- Accessories ➔ www.festo.com/catalogue.
- Spare parts ➔ www.festo.com/spareparts.

4 Service

Contact your regional Festo contact person if you have technical questions ➔ www.festo.com.

5 Product overview

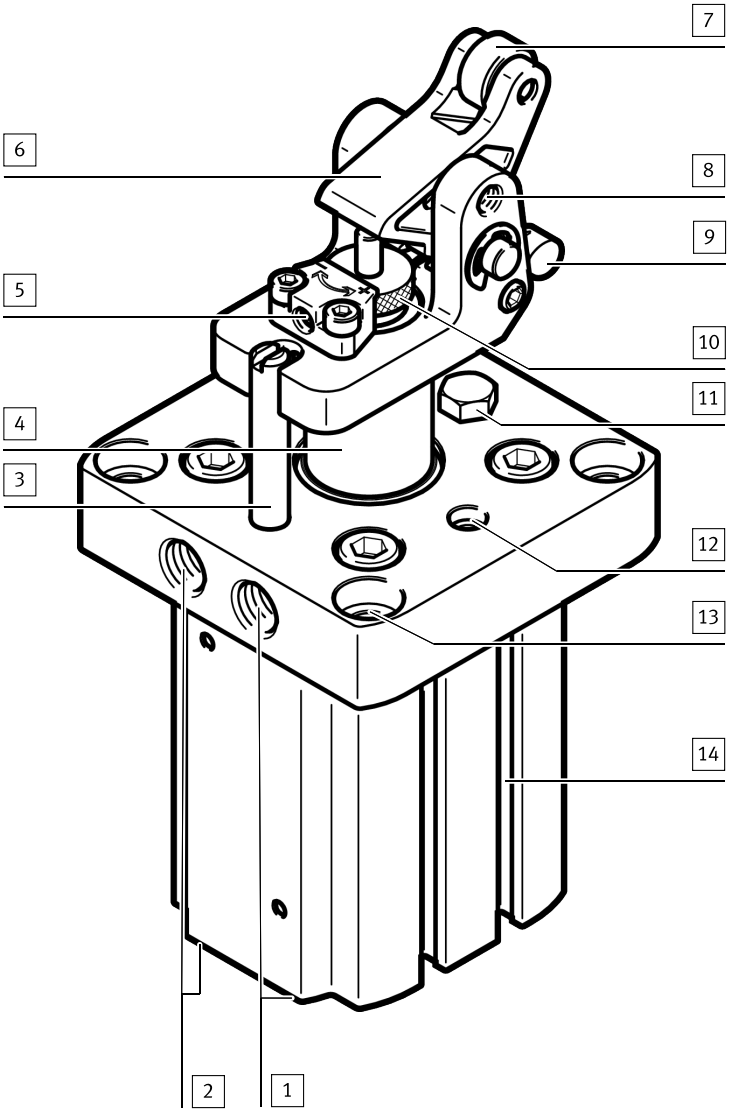
5.1 Function

The stopper cylinder DFST is a double-acting cylinder. The piston rod is extended with the toggle lever mechanism by pressurising the supply port 1 . The toggle lever gently stops the incoming transported material with the integrated shock absorber. The piston rod is retracted by pressurising the supply port 2 . The stopper cylinder with spring return (not applicable for DFST-...-D/DL) can also be set to single-acting. This is done by screwing a silencer into the supply port 1. This makes sense if reduced extension velocities are sufficient.

Lever Locking Mechanism

With the stopper cylinder DFST-..-L with a factory-installed lever locking mechanism, the toggle lever locks into its end position. When the stopper cylinder is retracted, the toggle lever locking mechanism is automatically deactivated.

5.2 Structure



1 Supply port (extending, 2x)
2 Supply port (retracting, 2x)
3 Guide rod for protection against rotation
4 Piston rod
5 Detent for knurled nut
6 Roller toggle lever
7 Stop roller
8 Thread for inductive proximity sensor (2x)
9 Lever locking mechanism (optional)
10 Knurled nut for setting the cushioning
11 Stop for lever locking mechanism
12 Hole for mounting toggle lever deactivation mechanism
13 Through-hole for mounting (4x)
14 Slot for proximity sensor (6x)

Fig. 2 Product design

6 Mounting

6.1 Preparation

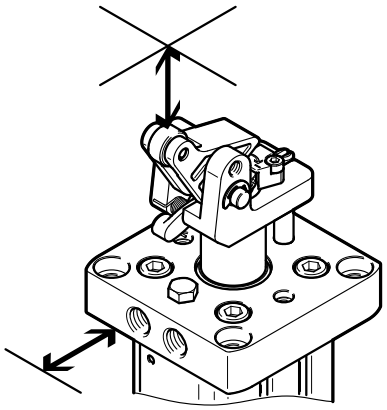


Fig. 3 Maintain required distances

- Leave sufficient space for the pneumatic connections and for replacing the shock absorber.

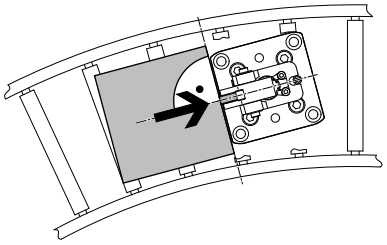


Fig. 4 Alignment of transported material

- Observe the following points:
  - the conveyed material impinges on the roller of the toggle lever.
  - the direction of transport of the transported material is exactly perpendicular to the roller toggle lever.

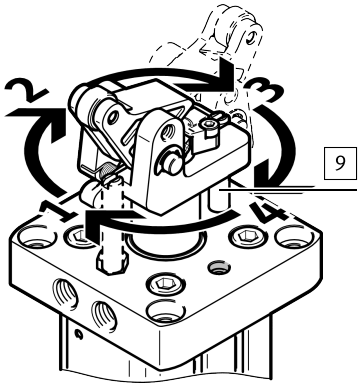


Fig. 5 Changing stopper head

- The roller toggle lever 9 can be rotated 90° to each of 4 positions by the offset of the guide rod. Lock guide rod with thread-locking compound when screwing it into the new position.

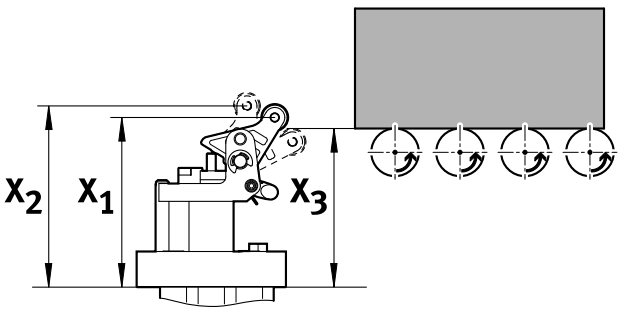


Fig. 6 Mounting Clearances

- Observe distances X_1, X_2 and X_3. The distances refer to the bottom of the flange as the mounting level of the stopper cylinder with the piston rod extended.

Size		32
X1 (maximum distance from the bottom of the pallet)	[mm]	76.1
X2 (toggle lever pressed)	[mm]	81.3
X3 (minimum distance from the bottom of the pallet)	[mm]	73.8[1)]

1) The dimensions refer to the position of the maximum energy absorption (knurled nut in the upper position).

Tab. 1 Mounting Clearances

6.2 Mounting

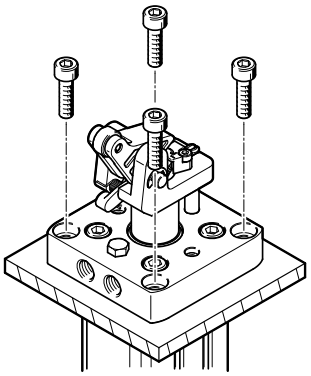


Fig. 7 Direct mounting

- Fasten the stopper cylinder with 4 screws.

Size	32
Screw	M6

Tab. 2 Screw Sizes

6.3 Mounting Accessories

Proximity Sensor

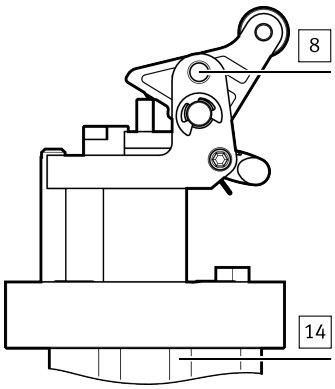


Fig. 8

- Fasten the proximity sensor in the thread 8 or in the slot 14 in accordance with the assembly instructions.

Lever Deactivating Mechanism

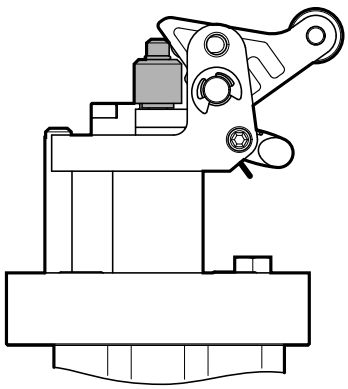
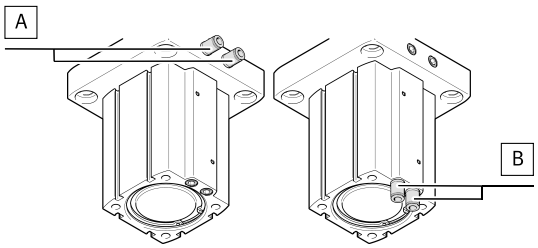


Fig. 9 Lever Deactivating Mechanism

- Attach the lever deactivating mechanism in accordance with the assembly instructions.

7 Pneumatic installation

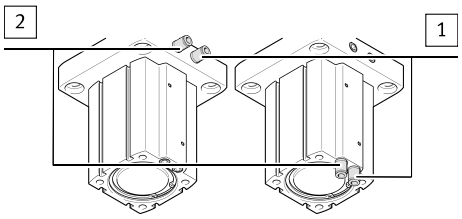
- Select one of the two alternative connections:



A Connection on flange B Connection from below

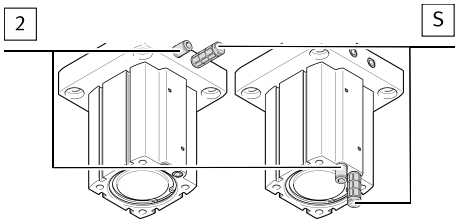
Fig. 10 Alternative pneumatic ports

- Select one of the two actuation types (single-acting/double-acting):



2 Retracting connection 1 Extending connection

Fig. 11 Double-acting actuation



2 Retracting connection S Silencer

Fig. 12 Single-acting actuation

1. When used as a single-acting cylinder: screw a silencer into the supply port on the bottom (➔ www.festo.com/catalogue).
2. Connect hoses to supply ports.
   If necessary, convert and seal threaded pins in the alternative connections.

8 Commissioning

⚠ WARNING!

Risk of injury due to unexpected movement of components.

- Protect the positioning range from unwanted intervention.
- Keep foreign objects out of the positioning range.

1. Pressurise the system slowly.
2. Start test run:

Double-acting insert	Single-acting insert	Reaction
Pressurise 1 supply port.	Exhaust 2 supply port.	The piston rod extends.
Start stopper cylinder with transported material.		The moving transported material is stopped and presses the toggle lever to the rear end position (with the DFST-...-L variant this locks the toggle lever).
Pressurise 2 supply port and exhaust supply 1 port.	Pressurise 2 supply port.	The piston rod retracts. The lever deactivating mechanism is released. The transported materials is moved on.
Pressurise 1 supply port and exhaust supply 2 port.	Exhaust 2 supply port.	Piston rod extends. The stopper cylinder can stop the next batch of transported material.

Tab. 3 Commissioning Steps

3. Finish test run after completing all settings.

Automatic Unlocking of the Lever Locking Mechanism with DFST-...-L (Accessories)

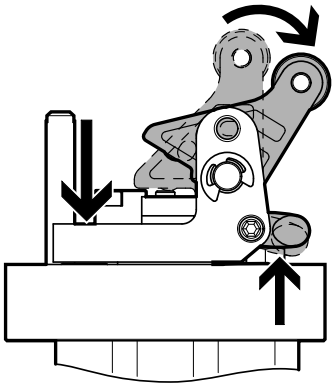


Fig. 13

- Pressurise 2 supply port.
  ↳ When the piston rod is retracted, it presses the lever locking mechanism on the screw and releases the toggle lever.

Cushioning Setting

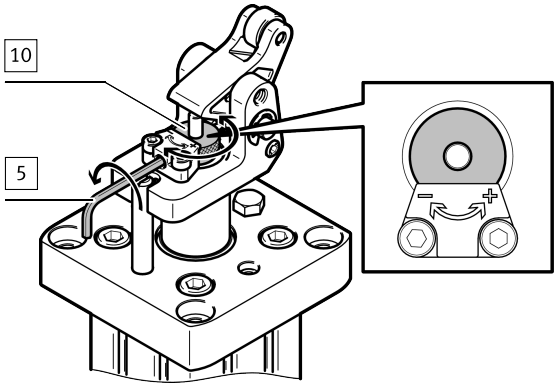


Fig. 14 Adjust shock absorber

1. Loosen the detent for the knurled nut 5.
2. Turn knurled nut until the desired cushioning is reached.
   ↳ When the setting is correct, the transported material presses the toggle lever quickly and stops. The cushioning is too hard if the transported material springs back immediately or requires a long time to press the toggle lever down completely. The cushioning is too soft if the toggle lever hits the end position hard without any visible damping.
   The setting range has an upper and a lower stop:
   – Turn knurled nut 10 anticlockwise in the "+" direction: cushioning becomes harder
   – Turn knurled nut 10 clockwise in the "-" direction: cushioning becomes softer
3. Tighten the detent for the knurled nut 5. Tightening torque: 1.5 Nm

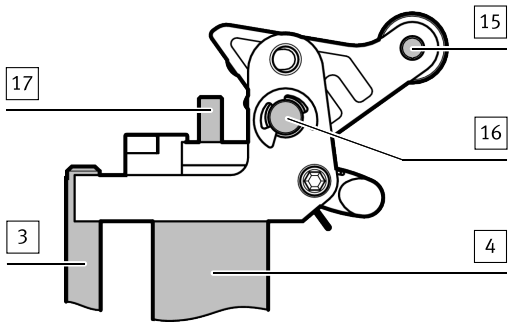
9 Maintenance

9.1 Cleaning

Clean the outside of the product with a soft cloth. Do not use aggressive cleaning agents.

9.2 Lubrication

- After every cleaning grease the following components with LUB-KC1
  ➔ www.festo.com/spareparts:



15 Bolt of the stop roller
16 Bolt of the toggle lever
4 Piston rod
3 Guide rod for protection against rotation
17 Grease thrust bolt on the front side

Fig. 15 Lubrication points

- With DFST-...-L with lever locking mechanism: also grease all bearing points of the moving parts.

9.3 Fault Clearance

Malfunction	Possible cause	Remedy
Wear on one side of the guide rod	Transported material impacts diagonally on the toggle lever	Align stopper cylinder in the direction of transport, transported material must meet the toggle lever vertically.
Hard impact on the toggle lever	Cushioning incorrectly set	Correct cushioning
	Conveyor speed too high	Reduce velocity
	Shock absorber faulty	Replace shock absorber (➔ spare parts catalogue, www.festo.com)
Piston rod in initial position despite pressurisation	Tubing connection error	Check blanking plug Check tubing connection
	Reduced flow rate through elbow connectors	Avoid elbow connectors
Toggle lever does not reach end position	Cushioning incorrectly set	Correct cushioning
	Transported material load (push-through force) too low	– Increase load – Increase coefficient of friction between conveyor and material – Increase slope of conveyor

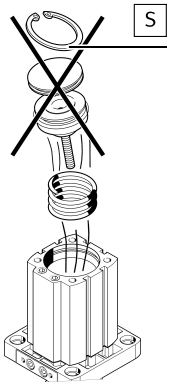
Tab. 4 Fault Clearance

9.4 Repair

⚠ WARNING!

Risk of injury caused by ejected components.
Springs under tension and compressed air eject the piston cap outwards when demounting the retaining ring.

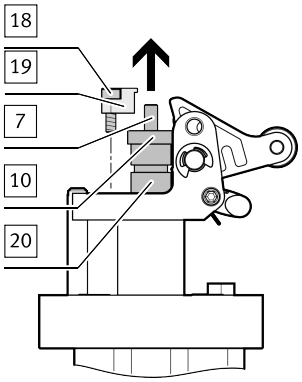
- Never release the retaining ring on the bottom of the product.
- Open the product only by unscrewing the fitting between the flange cover and cylinder barrel.



S Retaining ring

Fig. 16 Do not release retaining ring

Replacing the Shock Absorber



18 Retaining screw stop
19 Stop
7 Thrust bolt
10 Knurled nut
20 Shock absorber

Fig. 17 Replace shock absorber

1. Loosen the detent for the knurled nut 5.
2. Loosen the retaining screws 18 from the stop and remove the stop 19.
3. Remove the knurled nut 10 with the thrust bolt 7.
4. Replace shock absorber 20.
5. Attach knurled nut 10 with thrust bolt 7.
6. Attach the stop 19 and screw in the retaining screws 18.
7. Tighten the detent for the knurled nut 5. Tightening torque 1.5 Nm.

10 Disposal

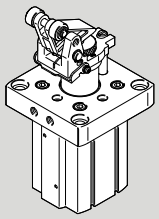
Dispose of the product and packaging at the end of its useful life through environmentally friendly recycling in accordance with applicable regulations.

11 Technical Data

Size		32
Constructive design		Piston rod with toggle lever
Mode of operation		– Double-acting with spring (extending) – With lever locking mechanism
Mounting position		Vertical
Operating medium		Compressed air to ISO 8573-1:2010 [7:–:–]
Operating pressure range	[MPa]	0.2 ... 1
	[psi]	29 ... 145
	[bar]	2 ... 10
Pneumatic connection		G1/8
Reset force		
Reset force of the toggle lever (max.)	[N]	4
Reset spring of the piston rod (min.)	[N]	20
Cushioning		
Cylinder		Elastic cushioning rings/plates, at both ends
Toggle lever		Adjustable shock absorber
Ambient temperature	[°C]	+5 ... +60
Materials		
Cover, housing		Aluminium
Piston rod		High-alloy stainless steel
Attachments		Cast steel, nickel-plated
Screws		Steel
Rollers		POM, steel (with DFST-...-S)
Seals		NBR
Weight	[g]	750

Tab. 5 Technical Data

DFST-50 ... 80-G2
Stopper cylinder



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www.festo.com

Operating instructions

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1 Applicable Documents

All available documents for the product ➔ www.festo.com/sp.

2 Safety

2.1 Safety Instructions

– Take into consideration the ambient conditions at the location of use.
– Only use the product in original status without unauthorised modifications.
– Observe labelling on the product.
– Store the product in a cool, dry, UV-protected and corrosion-protected environment. Ensure that storage times are kept to a minimum.
– Prior to mounting, installation and maintenance work: Switch off compressed air supply and secure it from being switched back on.
– Observe tightening torques. Unless otherwise specified, the tolerance is ± 20 %.

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The stopper cylinder DFST is designed for use as a retractable fixed stop in order to reach defined holding positions with transported material (e.g. on mounting or sorting systems). The DFST sorts the stationary transported material in buffer zones.

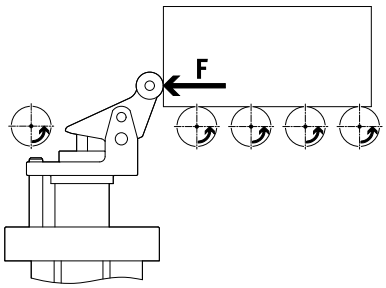

Fig. 1 Stopping transported material

2.3 Foreseeable misuse

With DFST-...-L: the toggle lever must not be overrun in the stop direction by the transported material when the lever locking mechanism is active. Otherwise the transported material will damage the locking mechanism.

2.4 Training of qualified personnel

Installation, commissioning, maintenance and disassembly should only be conducted by qualified personnel.
The skilled personnel must be familiar with the installation of pneumatic control systems.

3 Further information

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– Spare parts ➔ www.festo.com/spareparts.

4 Service

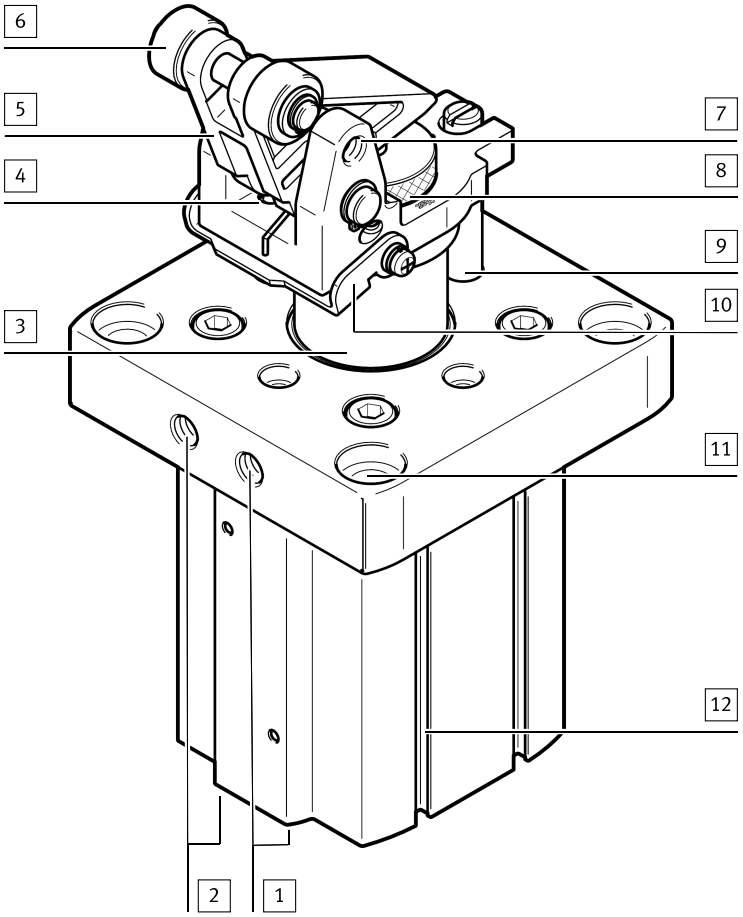
Contact your regional Festo contact person if you have technical questions ➔ www.festo.com.

5 Product overview

5.1 Function

The stopper cylinder DFST is a double-acting cylinder. The piston rod is extended with the toggle lever mechanism by pressurising the supply port 1. The toggle lever gently stops the incoming transported material with the integrated shock absorber. The piston rod is retracted by pressurising the supply port 2. The stopper cylinder with spring return (not applicable for DFST-...-D/DL) can also be set to single-acting. This is done by screwing a silencer into the supply port 1 on the bottom. This makes sense if reduced extension velocities are sufficient.
With the stopper cylinder DFST-...-L with factory-installed lever locking mechanism, the toggle lever locks into its end position. To use the function of the lever deactivating mechanism, the attached toggle lever function selection kit must be converted ➔ 10 Modification.

5.2 Design



1 Supply port (extending, 2x)
2 Supply port (retracting, 2x)
3 Piston rod
4 Drilled hole for pin for lever locking mechanism/lever deactivating mechanism (2x)
5 Roller toggle lever
6 Stop roller (2x)
7 Thread for inductive proximity sensor (2x)
8 Knurled nut for setting the cushioning
9 Guide rod for protection against rotation
10 Toggle lever function kit (optional)
11 Through-hole for mounting (4x)
12 Slot for proximity sensor (6x)

Fig. 2 Product design stopper cylinder DFST-...-G2

6 Assembly

6.1 Preparation

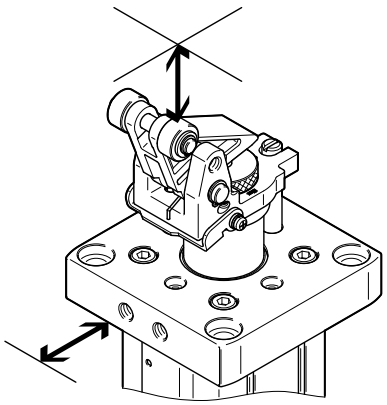


Fig. 3 Maintain required distances

- Leave sufficient space for the pneumatic connections and for replacing the shock absorber.

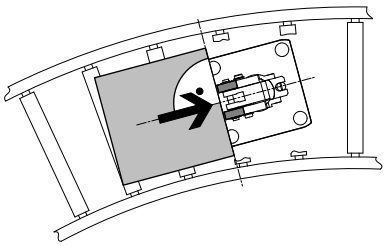
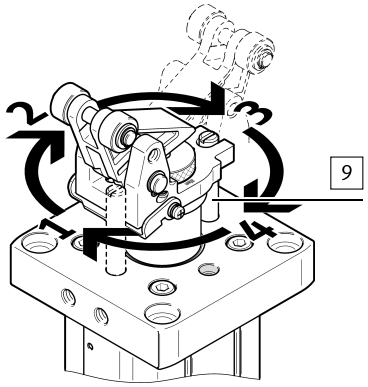


Fig. 4 Alignment of transported material

- Observe the following points:
  - the transported material impacts both rollers of the toggle lever
  - the direction of transport of the transported material is exactly perpendicular to the roller toggle lever.
  - with lever deactivating mechanism installed, the toggle lever can lock if the transported material is stationary above the stopper cylinder when the piston rod is extended.



9 Guide rod

Fig. 5 Changing stopper head

- The roller toggle lever can be rotated by 90° in each of the 4 positions by moving the guide rod 9. Lock guide rod with thread-locking compound when screwing it into the new position.

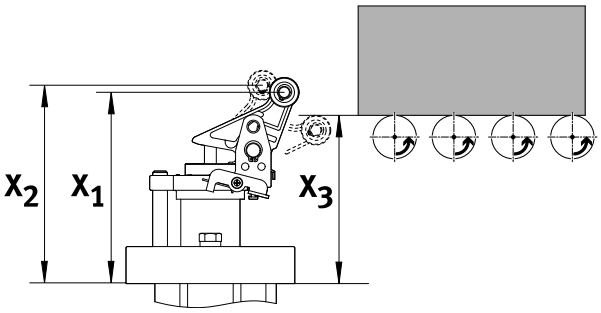


Fig. 6 Mounting distances

- Observe distances X1, X2 and X3. The distances refer to the bottom of the flange as the mounting level of the stopper cylinder with the piston rod extended.

Size		50	63	80
X1 (maximum distance from the bottom of the pallet)	[mm]	112.1	129.5	152
X2 (toggle lever pressed)	[mm]	117.8	134	159
X3 (minimum distance from the bottom of the pallet)	[mm]	106.8	123.5	143.8

Tab. 1 Mounting distances

6.2 Mounting

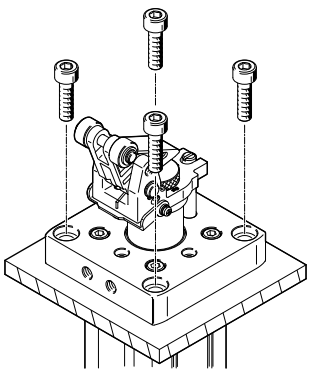


Fig. 7 Direct mounting

- Fasten the stopper cylinder with 4 screws.

Size	50	63	80
Screw	M8	M10	M12

Tab. 2 Screw sizes

6.3 Mounting accessories

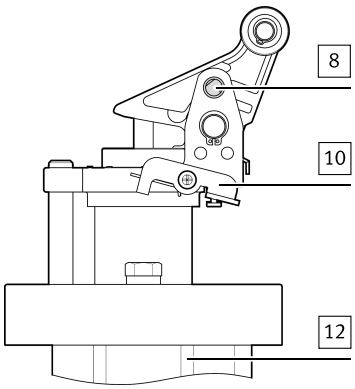
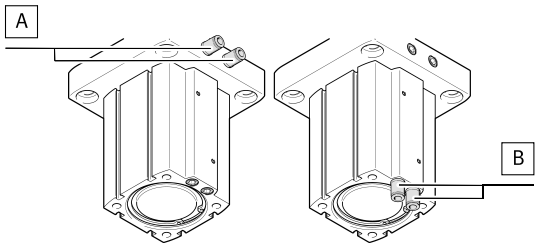


Fig. 8 Mounting positions for accessories

- Mount accessories according to the assembly instructions:
  - Use proximity sensors in the thread 8 or in the slot 12
  - Toggle lever function kit 10 on the stopper cylinder.

7 Pneumatic installation

- Select one of the two alternative connections:

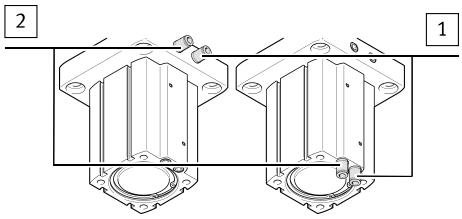


A Connection on flange

B Connection from below

Fig. 9 Alternative pneumatic ports

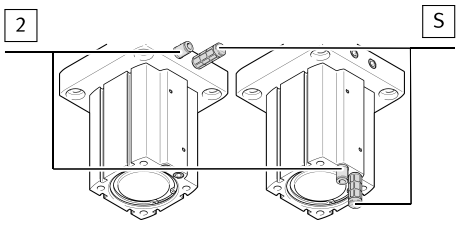
- Select one of the two actuation types (single-acting/double-acting):



2 Retracting connection

1 Extending connection

Fig. 10 Double-acting actuation



2 Retracting connection

S Silencer

Fig. 11 Single-acting actuation

1. When used as a single-acting cylinder: screw a silencer into the supply port on the bottom (➔ www.festo.com/catalogue).
2. Connect hoses to supply ports.
   If necessary, convert and seal threaded pins in the alternative connections.

8 Commissioning

⚠ WARNING!

Risk of injury due to unexpected movement of components.
- Protect the positioning range from unwanted intervention.
- Keep foreign objects out of the positioning range.

1. Pressurise the system slowly.
2. Start test run:

Double-acting insert	Single-acting insert	Reaction
Pressurise [1] supply port.	Exhaust [2] supply port.	The piston rod advances.
Start stopper cylinder with transported material.		The moving transported material is stopped and presses the toggle lever to the rear end position (with the DFST-...-L variant this locks the toggle lever).
Pressurise [2] supply port and exhaust supply [1] port.	Pressurise [2] supply port.	The piston rod retracts. The lever deactivating mechanism is released. The transported material is moved on.
Pressurise [1] supply port and exhaust supply [2] port.	Exhaust [2] supply port.	Piston rod extends. The stopper cylinder can stop the next batch of transported material.

Tab. 3 Commissioning steps

3. Finish test run after completing all settings.

Automatic unlocking of the lever locking mechanism/lever deactivating mechanism with DFST-...-L (accessories)

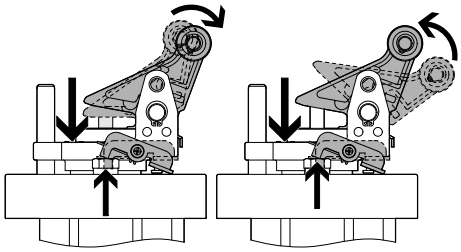


Fig. 12 Unlock/activate toggle lever

- Pressurise [2] supply port.
  - When the piston rod is retracted, it presses the lever locking mechanism/lever deactivating mechanism on the screw and releases the toggle lever.

Cushioning setting

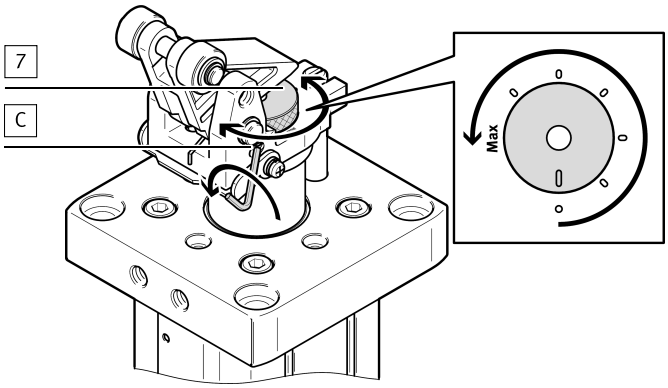


Fig. 13 Adjust shock absorber

1. Loosen lock nut [C].
2. Turn knurled nut until the desired cushioning is reached.
   - When the setting is correct, the transported material presses the toggle lever quickly and stops. The cushioning is too hard if the transported material springs back immediately or requires a long time to press the toggle lever down completely. The cushioning is too soft if the toggle lever hits the end position hard without any visible damping.
   The setting range is approx. 270° and has an upper and a lower stop:
   – Turn knurled nut [7] anticlockwise in the direction "Max" mark: cushioning becomes harder.
   – Turn knurled nut [7] clockwise to the "0" mark: cushioning becomes softer

   i

   Mark positions of the knurled nuts. This simplifies adjustment of the cushioning when replacing a shock absorber.

3. Tighten lock nut [C]. Tightening torque: 2 Nm

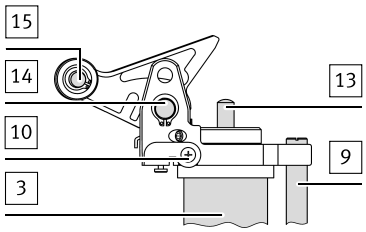
9 Maintenance

9.1 Cleaning

Clean the outside of the product with a soft cloth. Do not use aggressive cleaning agents.

9.2 Lubrication

- After every cleaning grease the following components with LUB-KC1
  ➔ www.festo.com/spareparts:



[3] Piston rod
[9] Guide rod
[10] Lever locking/deactivation mechanism
[13] Thrust bolts
[14] Bolt of the toggle lever
[15] Bolt of the stop roller

Fig. 14 Lubrication points

- With DFST-...-L with lever locking/deactivation mechanism: also grease all bearing points of the moving parts.

9.3 Fault clearance

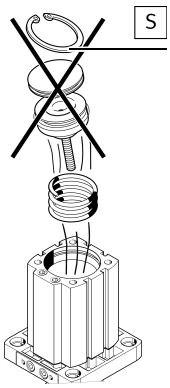
Malfunction	Possible cause	Remedy
Wear on one side of the guide rod	Transported material impacts diagonally on the toggle lever	Align stopper cylinder in the direction of transport, transported material must meet the toggle lever vertically ➔ 6.1 Preparation
Hard impact on the toggle lever	Cushioning incorrectly set	Correct cushioning ➔ 8 Commissioning
	Conveyor speed too high	Reduce velocity
	Shock absorber faulty	Replace shock absorber (➔ spare parts catalogue, www.festo.com)
Piston rod in initial position despite pressurisation	Tubing connection error	Check blanking plug Check tubing connection
	Reduced flow rate through elbow connectors	Avoid elbow connectors
Toggle lever does not reach end position	Cushioning incorrectly set	Correct cushioning ➔ 8 Commissioning
	Transported material load (push-through force) too low	– Increase load – Increase coefficient of friction between conveyor and material – Increase slope of conveyor

Tab. 4 Fault clearance

9.4 Repair

⚠ WARNING!

Risk of injury caused by ejected components.
Springs under tension and compressed air eject the piston cap outwards when demounting the retaining ring.
- Never release the retaining ring on the bottom of the product.
- Open the product only by unscrewing the fitting between the flange cover and cylinder barrel.



[S] Retaining ring

Fig. 15 Do not release retaining ring

Replacing the shock absorber

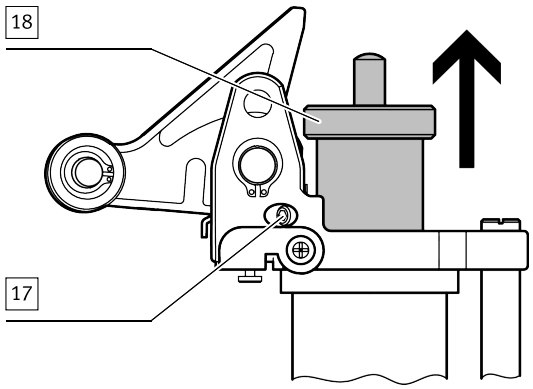


Fig. 16 Replacing the shock absorber

1. Mark the setting of the old shock absorber on the stopper cylinder.
2. Loosen locking screw 17.
3. Replace shock absorber 18.
4. Screw in the knurled nut of the new shock absorber clockwise to the stop (zero setting).
5. Mark zero setting on the knurled nut.
6. Turn mark to previous setting.
7. Tighten locking screw 17.

10 Modification

With DFST-...-L: modification for deactivation of toggle lever ➔ attached assembly instructions.

11 Disposal

ENVIRONMENT!

Send the packaging and product for environmentally sound recycling in accordance with the current regulations ➔ www.festo.com/sp.

12 Technical data

Size		50	63	80
Design		Piston rod with toggle lever		
Mode of operation		D: double-acting with spring (extending) L: with lever locking mechanism/lever deactivating mechanism		
Mounting position		Vertical		
Operating medium		Compressed air to ISO 8573-1:2010 [7:–:–]		
Operating pressure range	[MPa]	0.2 ... 1		
	[psi]	29 ... 145		
	[bar]	2 ... 10		
Pneumatic connection		G1/8		
Ambient temperature	[°C]	+5 ... +60 °C		
Max. permissible weight of the load to be stopped	[kg]	400 (at v = 10 m/min)	480 (at v = 13 m/min)	500 (at v = 13 m/min)
Weight	[g]	1930	3410	6340
Reset force				
of the toggle lever (max.)	[N]	22	23	36
Reset spring of the piston rod (min.)	[N]	35	55	62
Cushioning				
Cylinder		Elastic cushioning rings/plates, at both ends		
Toggle lever		Adjustable shock absorber		
Materials				
Cover, housing		Aluminium		
Piston rod		High-alloy stainless steel		
Attachments		Cast steel, nickel-plated		
Screws		Steel		
Roles		POM, steel (with DFST-...-S)		
Seals		NBR		

Tab. 5 Technical data