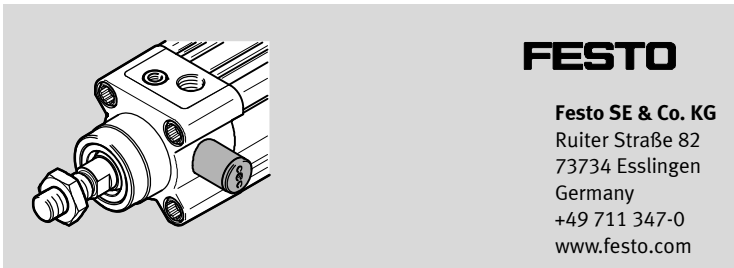


ADN-...-EL... , DNC-...-EL..., DSBC-...-E...



Operating instructions 8067882
 Original instructions 1703e
 [8067884]

End-position locking ADN-...-EL..., DNC-...-EL..., DSBC-...-E... English

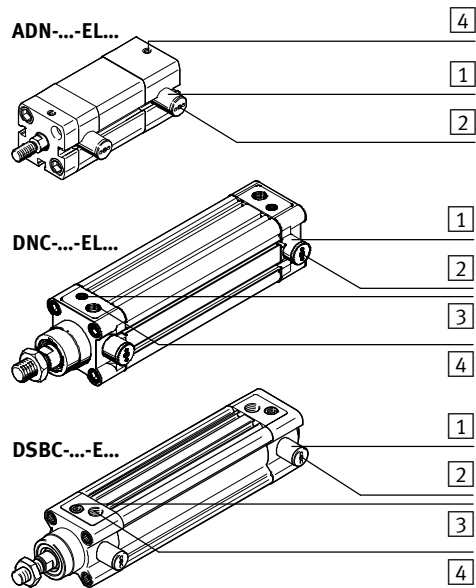
For all available product documentation → www.festo.com/pk

Note

Installation and commissioning is to be carried out only by qualified personnel.

- If used in safety-relevant applications, additional measures are necessary, e.g. in Europe the standards listed under the EC Machinery Directive must be observed. Without additional measures in accordance with legally specified minimum requirements, the product is **not** suitable as a safety relevant component in control systems.
- Note the specifications/instructions in the relevant documentation accompanying the product.

1 Control sections and connections



- 1 End-position locking
- 2 Orifice for
 - manual unlocking and locking
 - Pressure compensation
- 3 Adjusting screw for end-position cushioning (only for DNC-...-EL... and DSBC-...-E...)
- 4 Compressed air supply port for cylinder

Fig. 1

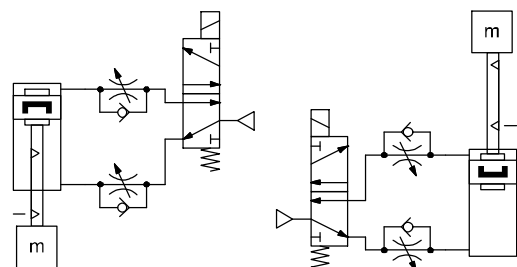


Fig. 2

2 Function and application

In the end position of the cylinder, the bolt of the end-position locking with spring pre-stressing grips with positive locking into a slot of the piston rod. This positive grip locks the piston rod.

For unlocking, first the cylinder chamber lying opposite the locked end position (opposite chamber) is pressurized. Through pressurization of the cylinder chamber of the locked end position, the bolt is then pressed out of the slot – the piston rod is freely movable. The cylinder can be travelled by venting the opposite chamber. Interlock is made after the end position of the cylinder is reached when the pressure in the related cylinder chamber drops. As soon as the pressure force falls below the spring force of the end-position locking, the bolt again grasps into the slot of the piston rod.

i During the unlocking and locking procedure, leakage can occur briefly at the orifice [2].

The end-position locking is intended for holding a load in the event of a pressure failure (e.g. if the cylinder mounting position is vertical).

3 Requirements for product use

- Compare the limit values in these operating instructions with your actual application (e.g. pressures, forces, torques, temperatures). Operation of the product in compliance with the relevant safety regulations is contingent on adherence to the load limits.
- Ensure that there is a supply of correctly prepared compressed air.
- Make sure that the necessary operating pressure is maintained. (→ 7 Technical data).
- Pressurize your complete system slowly until the operating pressure is reached. No unexpected movements of the actuators will then occur. For slow start-up pressurization use soft-start valve type HEL.
- Take into consideration the ambient conditions at the location of use.
- Also observe the regulations of the workers' compensation trade association, the German Technical Control Board (TÜV) or relevant national regulations.
- Note the warnings and instructions on the product and in the relevant operating instructions.
- Use the product in its original status, without any unauthorised changes.

3.1 Mechanical installation

Note

The unlocking function can be disabled.

- Make sure that the orifice [2] of the end-position locking:
 - is always open; otherwise, a back pressure can build up which prevents unlocking.
 - is **not** pressurized with compressed air; otherwise, the bolt will no longer run out of the slot.

To avoid malfunctions:

- Do **not** use the head of a screw as a position indicator. If the head lies flush with the edge of the housing, you have no control whether the bolt has actually locked into place completely.

When **unlocking** by hand:

- Turn a screw (→ table Fig. 5) through the orifice [2] of the end-position locking into the thread of the bolt (→ Fig. 3).
- Pull the screw, and with it the bolt, out of the slot. The piston rod is now unlocked. When you let go of the screw, the spring presses the bolt back into the slot. The piston rod is locked again.

For **permanent unlocking** when setting:

- Use a screw with lock nut (A) to fix the bolt in the unlocked position (→ Fig. 3).

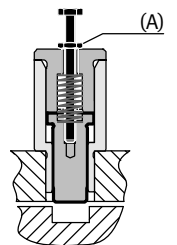


Fig. 3

For **permanent locking** when setting:

- Turn a screw (→ table Fig. 5) into the thread of the orifice [2] of the end-position locking until the bolt locks the piston rod (→ Fig. 4).
- Secure the screw with a locking nut (in case of vibrations).

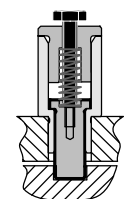


Fig. 4

ADN-/DNC-/DSBC-...-E...	20/25	32/40	50/63	80/100
For unlocking:				
- screw (minimum length)	M2 x 30	M2 x 30	M3 x 40	M3 x 50
- tensile force [N]	4	4	10	25
- stroke [mm]	2.7	3.5	4.7	6.0
For locking:				
- screw with continuous thread (minimum length)	M3 x 20	M3 x 20	M5 x 35	M5 x 45

Fig. 5

3.2 Pneumatic fitting



Note

The cylinder can move uncontrolled.

- Avoid 3-way valves for control of the cylinder, especially valves with the function “mid-position closed” and the design “metallic sealing”.

Leakage air, which flows over the 3-way valve into the cylinder, can release the locking again after a certain period.

- Use one-way flow control valves (exhaust air flow control) for regulating the speed of the cylinder (pneumatic control → Fig. 2).
Observe thereby the maximum permissible impact energy (→ www.festo.com/catalogue).

4 Commissioning



Warning

Injuries due to uncontrolled moving parts in the environment of the cylinder.

- Make sure that the cylinder is logically correctly controlled.
The locking mechanism can be damaged as a result of incorrect control. Under certain circumstances this can lead to the piston rod suddenly extending or retracting.



Note

Damage to the end-position locking due to excessive piston rod forces.

- Make sure that the cylinder chamber lying opposite the end position locking (opposite chamber) is pressurized with compressed air before each unlocking.
This relieves the locking mechanism of external forces. Pressurization of the opposite chamber can be specified through evaluation of the current cylinder position, e.g. by a higher-order controller.
- Make sure that the maximum holding force is not exceeded (→ 7 Technical data). An unpressurized opposite chamber impairs unlocking; even with low operating pressure, the locking mechanism may not unlock, be overloaded or even destroyed.

To set the end-position cushioning (only DNC and DSBC with variant PPV):



Note

Wear of bolt and slot.

An adjusting screw [3] that is screwed in too far (strong end-position cushioning) can result in the bolt not catching securely.

1. Ascertain the number of turns required of the setting screw for end position cushioning (by screwing in and out completely).
2. Turn the screw back in half the number of turns.
3. Turn the screw back out, if necessary, until the cylinder piston does not impact too hard.

In the case of an unpressurized cylinder (only with end-position locking ELB, ELV, E1 or E2):

- Make sure that the piston rod is not retracted or extended. Otherwise, the bolt will brush against the end position lock on the piston rod. This will lead to premature wear and to impairments of functioning (→ chapter 3.1, section “to permanently unlock while setting”).

If several cylinder with end-position locking are used:

- Avoid parallel operation of cylinders for movement of an individual workpiece.
Otherwise, there is a possibility that one of the end position locks will not unlock at the right moment.

5 Operation



Note

No unlocking of the end position.

- Make sure that the cylinder always reaches its internal end position.
External stops can shift the end position.
Possible consequences:
 - the internal end position is not reached
 - the end-position locking does not latch
 - the locking mechanism wears prematurely.

If used in a dirty environment (e.g. dust, splash-water):

- Fasten a fitting (B) and a tube to the orifice [2] of the end-position locking (→ 7 technical data).
- Remove the tube from the dirty area to prevent ingress of dust and splash-water.

These measures can lead to an increase in the required operating pressure for unlocking. In addition, the unlocking and locking times are extended.

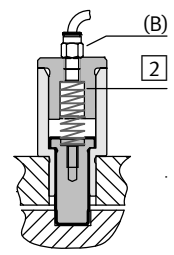


Fig. 6

To check the end-position locking:

1. Vent the cylinder.
 2. Pressurize the cylinder with the application-specific load.
Observe thereby the max. holding force (→ 7 Technical data).
- Make sure that no damage can occur if the end-position locking does not catch.

6 Trouble-shooting

Malfunction	Possible cause	Remedy
End position is not locked	Wear	Send to Festo Service Order new cylinder
	Excessive exhaust air flow control	Open flow control valve
	Permanent manual unlocking	Unscrew screw from orifice [2]
	The internal end position of the cylinder is not reached.	Do not use any external stops (internal end position must always be reached)
	Too long and narrow connecting cable between the valves and the cylinder	Use short connecting cable with cross section that is as large as possible
End position is not unlocked	Dirty silencers	Replace silencers
	Permanent manual locking	Unscrew screw from orifice [2]
	Operating pressure at the cylinder too low	Increase operating pressure (→ 7 Technical data)
	Connection at the orifice [2] clogged	Clean end-position locking or connected tubing connection
	Unpressurized opposite chamber	Pressurize the opposite chamber before each unlocking (→ 4 Commissioning)

7 Technical data

ADN-/DNC-/DSBC-...-E...	20	25	32/40	50/63	80/100
Function	Double-acting cylinder with single-acting interlock through spring force				
End-position locking					
– ADN/DNC-...-ELB, DSBC-...-E1	At both ends				
– ADN/DNC-...-ELV, DSBC-...-E2	To the front				
– ADN/DNC-...-ELH, DSBC-...-E3	At the rear				
Operating medium (at the cylinder)	Compressed air to ISO 8573-1:2010 [7:4:4]				
Thread at orifice [2]	M3		M5		
Max. axial backlash with end position locked					
– ADN/DNC ¹⁾	[mm]	1.3		2.1	
– DSBC ¹⁾	[mm]	1.3		1.5	
Maximum holding force of the end-position locking ²⁾	[N]	250	500	2000	5000
Permissible temperature range	[°C]	–20 ... +80			
Operating pressure					
– for unlocking	[bar]	min. 2.5		min. 1.5	
– for locking (residual pressure)	[bar]	max. 0.5			
– maximum at ADN-...-EL...	[bar]	10			
– maximum at DNC-...-EL...	[bar]	12			
– maximum at DSBC-...-E...	[bar]	12			
Materials (end-position locking)					
– housing, cover, piston, spring	Steel				
– cushioning seal	Polyurethane				
– guide ring	Polyacetal/polyethylene				

- 1) The specifications are calculated values - in the hold direction, without load.
- 2) But no more than 50 % of the theoretical cylinder force (recommended values → www.festo.com/catalogue).