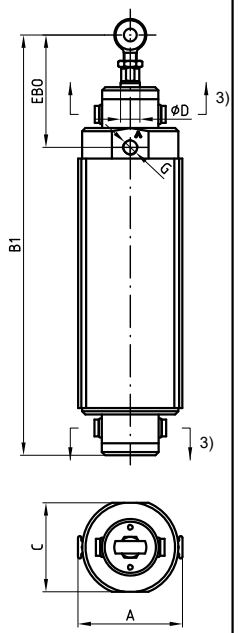
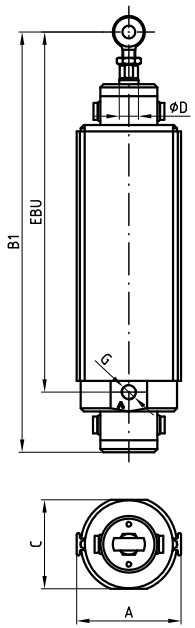
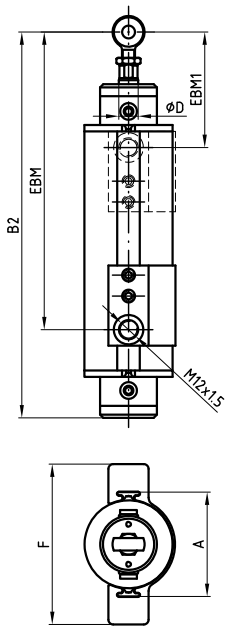
Pneumatic cylinder
PODV
mounted at UPPER end [4]
locked at both ends [5]



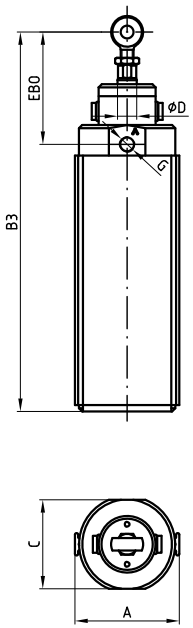
Pneumatic cylinder
PUDV
mounted at LOWER end [4]
locked at both ends [5]



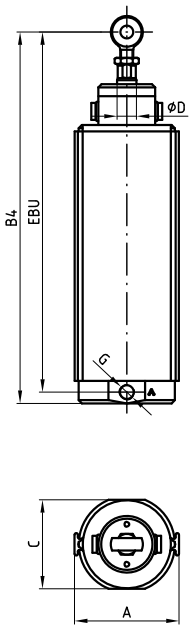
Pneumatic cylinder
PMDV
CENTRE mounted [4]
locked at both ends [5]



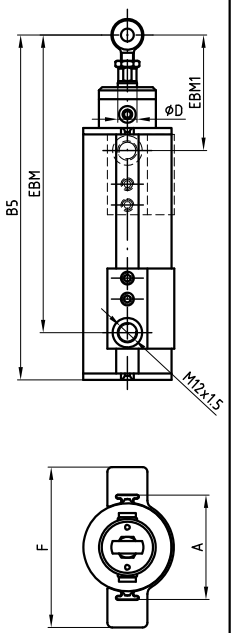
Pneumatic cylinder
POAV
mounted at UPPER end [4]
locked when extended [5]



Pneumatic cylinder
PUAV
mounted at LOWER end [4]
locked when extended [5]



Pneumatic cylinder
PMAV
CENTRE mounted [4]
locked when extended [5]



Piston-Ø	Ø32	Ø40		Ø50		Ø63			Ø80	
Pipe external-Ø	Ø36	Ø44		Ø55		Ø69			Ø88	
Size A	44	54		65		79			100	
Size B1	162+stroke							172+stroke	180+stroke	190+stroke
Size B2	143.5+stroke	153.5+stroke	143.5+stroke	153.5+stroke	143.5+stroke	153.5+stroke	164.5+stroke		168.5+stroke	178.5+stroke
Size B3	136.5+stroke						146.5+stroke		154.5+stroke	164.5+stroke
Size B4	131.5+stroke						141.5+stroke		153+stroke	163+stroke
Size B5	118+stroke	128+stroke	118+stroke	128+stroke	118+stroke	128+stroke	139+stroke		143+stroke	153+stroke
Size C	37	45		55.5		69.5			88	
Size D	Ø12	Ø16	Ø12	Ø16/Ø20	Ø12	Ø16/Ø20	Ø25		Ø20	Ø25
Size EBO	70						80		70	80
Size EBU	124.5+stroke						134.5+stroke		143.5+stroke	153.5+stroke
Size EBM[1]	105 to stroke+104	115 to stroke+114	105 to stroke+104	115 to stroke+114	105 to stroke+104	115 to stroke+114	125 to stroke+125		115 to stroke+129	125 to stroke+139
Size EBM1[1)2)]	75	85	75	85	75	85	85		85	95
Size F	100								130	
Size G	G1/8"								G1/4"	
Theoretical lifting force at 6bar	480N	750N		1180N		1870N			3015N	

1) only available for connection part!
2) connection part rotated through 180°
3) Unlocking the extended position through pulling both unlocking screws in draw positions.
4) O ... mounted at UPPER end, U ... mounted at LOWER end, M ... CENTRE mounted
5) DV ... locked at both ends, AV ... locked when extended
6) Type approval test to VdS 2579:2012-05 and VdS 2583:2012-05.

Technical instructions see 02.001.DAT.04.00-E:
- Please observe all safety instructions!

Commissioning:
Befor commissioning make sure that:
- The cylinder can be easily moved.
- Check if the pneumatic cylinder drives its complete stroke without collision with other plant components. During this, also control on deformations at max. load and max. pressurisation.
- Check the end position locking (if exist).
- Check if the piston rod and the unlocking screws are rost-free.
- Check if the piston rod is damaged.
- The atmosphere in which the pneumatic cylinder is mounted must not be corrosive.

Maintenance:
The maintenance must be carry out through a for this trained maintenance staff once a year. It must be checked following points:
- Check if the unlocking screws are rost-free.
- Check the seal ring of the unlocking screw on wear, damage and sealing to the housing.
- Check if the piston rod is rost-free, not damaged and not dirty (clean if necessary).
- Check the dirt wiper on wear and sealing to the piston rod.
- Test all cylinder components for leacks (it is absolutely necessary, to check the cylinder in each stroke positions and control directions (OPEN or CLOSE)).
- Check for dust-free (clean if necessary).

Ordering desigantion
PUDV 40/12-250-8
- 8 — eye-bolt diameter [mm]
- 250 — stroke [mm]
- 12 — piston rod diameter [mm]
- 40 — piston diameter [mm]
- PUDV — locking [5], mounting [4], cylinder series P

Technical data:

max. operating pressure	stroke-, mounting- and installation position dependent, but max. 30bar (see table: 02.027.T0.*, 02.027.T1.*, 02.027.T2.*)
min. operating pressure	4bar
max. static housing pressure	60bar
testing pressure [6]	90bar
max. pulling force of locking	6500N
ambient temperature range -25°C	- +60°C to VdS 2159 for 2hrs up to +110°C
air quality	filtered and unoiled
VdS approval no.	Ø32...G500008, Ø40...G500009, Ø50...G500010, Ø63...G500011, Ø80...G507006

Setting range eye bolt: (for the size B1, B3, B4, EBO, EBU)
eye bolt M8x40: +10mm/-4mm (for piston rod Ø12)
eye bolt M10x60: +30mm/-4mm (for piston rod Ø16, Ø20 and Ø25)

Setting range eye bolt: (for the size B2, B5, EBM, EBM1)
eye bolt M8x40: +/-7mm (for piston rod Ø12)
eye bolt M10x60: +/-17mm (for piston rod Ø16, Ø20 and Ø25)

Required CO2 amount at 10bar [g]:

$$M = \frac{d*d*\pi}{4}*(h+20)*k*10^{-6}$$

d ... piston-Ø [mm]; h ... stroke [mm]; k ... 26 [g/ltr]

Tolerance | Scale 3:10 | Material

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Approved: HA	Issue Date: 25.01.2022			Document State: Valid
Grasl Pneumatic Mechanik Gmbh QM FO 05.24.0				Document Number: 02.001.DAT.00.06-E

Technical Instructions

Pneumatic cylinder, double-acting, typ P and D

Please read through these technical instructions carefully and fully. Work on these devices must only be carried out by qualified personnel.

Meaning of the symbols

Safety instructions must be observed!
The disregarding of these instructions can lead to personal injury and / or material damage.

Advice, the non-compliance with these instructions or the technical data shall lead to the loss of rights under guarantee.

Correct,
This is how it should be done.

Incorrect,
This is how it should not be done.

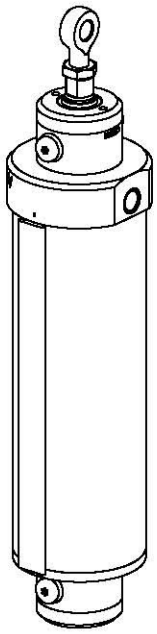
Correct and proper use

The cylinder serve the purpose of opening and closing NSHEV devices, such as windows, blinds and vents in the roof area (no free access for system-external persons). The producer of the NSHEV is responsible for implementing EN 12101 and preventing the occurrence of overloads, e.g. due to snow and wind. For all other applications the compatibility and thus the security can not be guaranteed. On the application of voltage, a movement command is activated.

If the drives are installed below an installation height of 2,5m to the floor, or to the next access level, appropriate devices must be fitted so that people are not endangered (crushing and trapping hazards). Apply the Directives, Rules and Standards intended for this purpose, such as, for example, EN 14351 and ASR A1.6. Do not allow children to play with the device or its control and / or control devices, including window controls.

Technical details

The cylinder are suitable for compressed air (filtered through filter element), or for CO2 from suitable CO2 bottles.



picture 1: pneumatic cylinder

The technical data and permissible loads on the cylinders must be observed.

The cylinder must not be loaded beyond its permissible nominal data.

The drives must only be used in normal atmospheric conditions. In the case of atypical ambient atmosphere (for example, SO2-, saline atmosphere), please consult.

Installation

Handle the drive only with appropriate PPE (eg cut resistant gloves).

Prepare the installation space of the cylinder in such a way that there is no risk of crushing (e.g.: providing protection plates).

The cylinder mounting must be designed according to the cylinder forces.

The following must be observed before mounting:

Check the completeness of the scope of supply. Check cylinder and piston rod for transport damages.

Ensure that the cylinder can freely pivot in the whole of the stroke range and cannot come into contact with parts of the building.

Before fixing the cylinders to the coupling bracket, mounting brackets or other fixing elements, the possible installation dimensions of the relevant drive designs must be taken from the data sheets.

Mount the cylinders on the appropriate fixing elements. It must be ensured that the mountings are secured by means of appropriate safety devices (siehe picture 2).

In order to prevent the screwing out of the eyebolt, the lock nut must be tightened (siehe picture 2).

Pay attention to the aligned installation of coupling brackets, mounting brackets or other fixing elements. Lateral forces must be avoided (siehe picture 2).

It must be ensured that the cylinders can always reach their end position, otherwise locking, possibly existing internal locking, is not guaranteed. Use the eyebolt (adjustment range) for adjustment. Check the setting in the retracted condition by means of marking on the piston rod end (see picture 3).

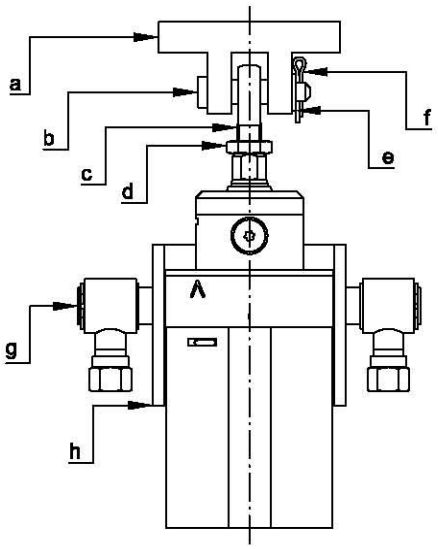
Setting the closing force with which the NSHEV is driven into the seal by adjusting the eye bolt or other piston rod suspensions. (NRWG must be tightly closed all around).

When installing the console, make sure that the pivot axis of the cylinder is parallel to the hinge axis (see picture 4).

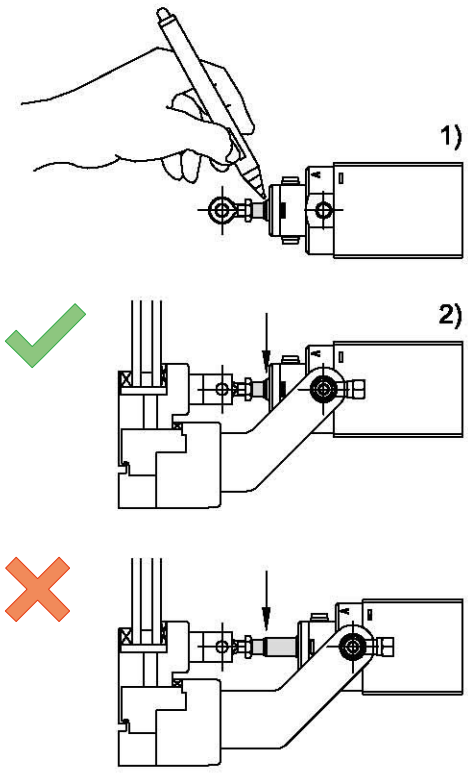
Cylinder mounting

Mount the cylinder with the fixing material (picture 5 / *1).

a … coupling bracket
b … coupling bracket bolts
c … eyebolt
d … lock nut
e … washer
f … split pin
g … bearing pins
h … mounting bracket



picture 2: fixing elements



picture 3: end position

When screwing in the fittings, position them straight to the hole. Otherwise, a perfect function can not be guaranteed. Tightening torque *20-30Nm*.

Regard direction of arrow according to picture 5 / * 2!

Piston rod mounting

Mount the piston rod over the appropriate mounting version in the provided mounting.

Eye bolt

Regard the adjustment range! To prevent the eye bolt from being unscrewed, the nut must be countered. (picture 6 / * 1).

Clevis / Spring locking bolt

To prevent the clevis from unscrewing, it is glued in at the factory with a suitable screwlock.

The spring locking bolt must be locked again, as in the delivery condition. (picture 6 / *2).

Installation

Before commissioning, the following must be regarded:

Stop the control of the cylinder and depressurize the cylinder to prevent unwanted movements adue to external control/move commands. As the cylinder depressurises, the cylinder may move (check memory). Therefore, the cylinder or the device should be blocked.

Check if the cylinder can pass through its full stroke without collision with other parts of the system. In this case, it is also important to take care of deformations at maximum load and maximum pressure.

Check the function of the end position locking (if existing).

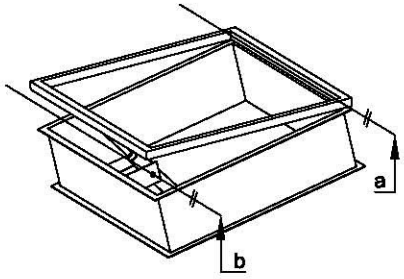
Normal operation

The cylinder has no internal protection against crushing.

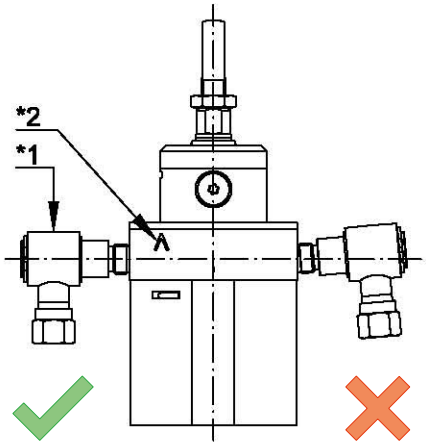
Locking (if existing)

- The cyl. is in the extended end position, pressureless, locked.
- Unlocking:
  Pneumatic: Apply pressure to the compressed air supply.
  Manual: Pull on the unlocking device (picture 7).

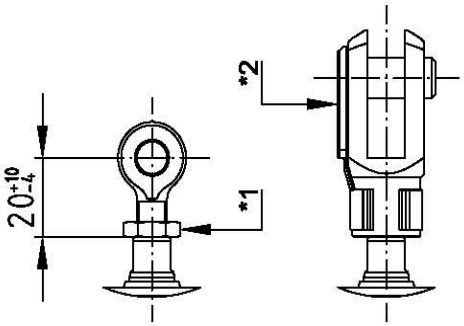
a …Scharnierachse
b …Schwenkachse



picture 4: installation



picture 5: direction of arrow



picture 6: piston rod mounting

Release the locking under load will cause the window, louver or flap to move. This can lead to serious injury.

A force-supporting operation by external influences, e.g. overhead installation, gas pressure-/spring-support and the like, is not permitted. There is a risk of failing the locking.

Maintenance/dismantling/fault finding

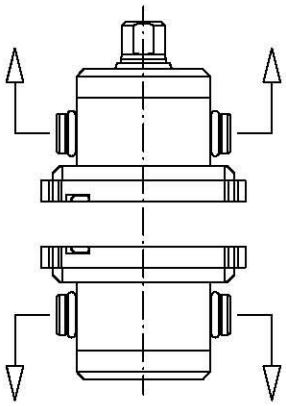
Stop the control of the cylinder and depressurize the cylinder to prevent unwanted movements adue to external control/move commands. As the cylinder depressurises, the cylinder may move (check memory). Therefore, the cylinder or the device should be blocked.

Make sure that the working area is clear of obstacles and that there are no persons in the danger zone.

When re-connect, observe possible movements by pending travel commands.

The following points must be checked:

- Check unlocking screws for rust-freeness.
- Check the seal ring of the unlocking screw for wear, damage and sealing to the housing.
- Check the piston rod for rust-freeness, damage and cleanliness (clean if necessary).
- Check wiper for piston rod for wear and sealing to piston rod.
- Check all cylinder parts for tightness (it is absolutely necessary to check the cylinder in any lifting position).
- Check for dustiness (clean if necessary).
- During the course of the annual maintenance, an inspection of the mechanical fixings must be carried out. Where necessary, these must be re-tightened using customary tools.
- Inspection of the structural conditions for changes with regard to the requirements listed in the point, Installation.
- The equipment should be checked for imbalance, signs of wear or damage to cables, springs and fasteners.
- Perform a manual functional test.



picture 7: locking

The maintenance must be carried out once per year by a specialist trained for the purpose.

The cylinder must not be opened. The unauthorized opening of the zylinder shall lead to the exclusion of liability and loss of warranty. After opening the housing, the drive is no longer safe to operate and must not be used anymore.

The cylinder contains pre-tensioned springs which can cause injuries if opened without authorization.

Disposal

The cylinder consists of the following materials: rubber compound (NBR), plastic (POM), aluminum (AlCuMgPb, AlMgSi0.5), steel (1.4104).

The cylinder must be disposed of in accordance with national regulations.