

Technical description:

- 1) Anodised aluminium housing with a pushrod made of aluminium or steel
- 2) Internal interference suppression according to EN55011
- 3) Disconnection in both end positions through internal limit switches
- 4) Electronic overload emergency disconnection
- 5) Electric parallel connection possible (NOTE: but no synchronized operation)
- 6) Eye bolt Ø6, Ø8 (standard) or Ø10mm
- 7) Clevis Ø6, Ø8 or Ø10mm
- 8) Light grey silicone connection cable - standard lenght 2,5m; other lenghts on request  
--> with standard version: 2x2.5qmm / cable jacket Ø approx. 9mm  
--> with option E: 2x2.5qmm / 3x1.5qmm / cable jacket Ø approx. 11mm

Possible options:

- 1) Various versions with bottom mountings:  
It is also possible to design actuators with bottom mountings (see data sheet 07.021.DAT.01.xx).
- 2) Various push rod suspensions:  
See the data sheet 07.021.DAT.02.xx.
- 3) RAL colour.... (on request):  
The actuator housing can be provided in various shades of RAL colours. For example, if option "RAL3000" is indicated, the housing will be painted in RAL3000 (red)
- 4) Option E:  
Internal floating limit switch (Option E=opener) for both end positions;  
load capacity 24VDC/1A (e.g. for position indication)

Ordering designation:

SG(typ)/(pushrod) - (stroke) - (pushrod mounting) - (cable length) - (options)

Legend:

type: actuator type to be selected from the list  
push rod: depending on type (see table, Ø25A/Ø25: aluminum, Ø25S: steel)  
stroke: stroke [mm]  
Push rod ending: - eye bolt (standard): bore hole of the eye bolt [mm].  
- clevis: bore hole and lenght of slot of the clevis [mm].

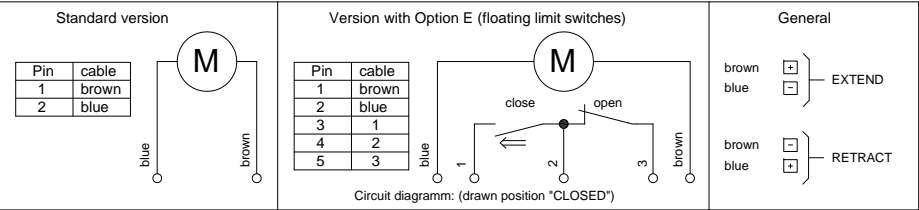
cable length: length of connection cable [m]  
protection class: protection class according to DIN EN 60 529  
options: list of all desired options

Ordering example: SG20P/25 - 750 - 8 - 2,5 - RAL 3000

General technical data:

sealing version	standard
rated voltage	24VDC
no load current	0,8A
permissible ambient temperature	-25°C - +60°C
max. permissible temperature to EN 12101-2 attachment G	300° - 30min
protection type according to DIN EN 60 529	IP 54

Connection diagramsms:



Diese Zeichnung ist Eigentum der  
Fa. Grasl GmbH A-3454 Reidling, Europastraß 1  
Die Weiterverwendung oder Vervielfälti-  
gung ohne unser schriftliches Einver-  
ständnis ist verboten!

Technical data of actuator types SG16x:

Designation	SG16A	SG16B	SG16C	SG16D	SG16E	SG16F	SG16G	SG16H	SG16J	SG16L	SG16M	SG16N	SG16P	SG16R	Unit	
Pushing and pulling force (full load)	1530	990	710	560	400	1040	670	480	380	2030	1320	950	740	530	N	
Current with full load	1.6														A	
Speed (no load)	6.2	11.2	15.6	20.0	27.7	9.2	16.8	23.4	30.0	4.6	8.4	11.7	15.0	20.8	mm/s	
Speed at full load	5.1	9.3	12.9	16.6	23.0	7.7	14.0	19.4	24.9	3.8	7.0	9.7	12.5	17.2	mm/s	
Maximum stroke at full load	1) 842	1046	1232	1397	1643	1770	2200	2592	2940	518	644	759	861	1012	mm	
Operating mode for peak load according DIN VDE 0530 part 1 (with 25°C ambient temperature)	S2 4 min.															
Operating mode for continuous load according DIN VDE 0530 part 1 (with 40°C ambient temperature)	S3 21% 3) (Maximum time of operation in one direction: 4 min)															
Stability (locking force)	2)	3200 (with standard bearing pins LB12-SL13) / 3500 (with bearing pins LB18-2-SL13)													N	
Possible pushrod versions	Ø25A, Ø25, Ø25S						Ø25, Ø25S			Ø25A, Ø25, Ø25S					mm	
Standard bearing pin diameter	Ø12															mm
Dimensions (see dimesional drawing):	Figure 2	Figure 1				Figure 2	Figure 1			Figure 2	Figure 1					

Technical data of actuator types SG20x:

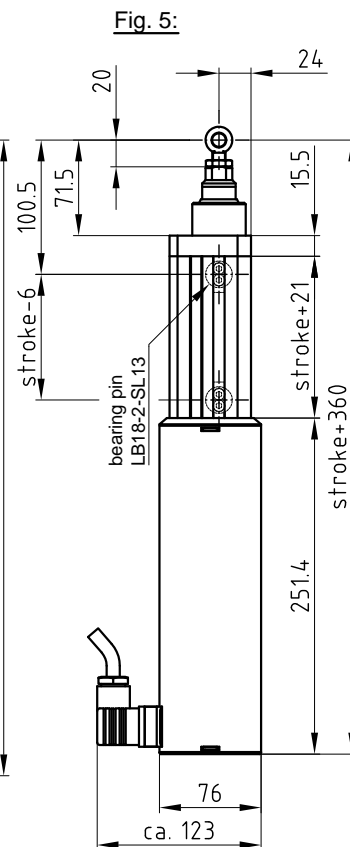
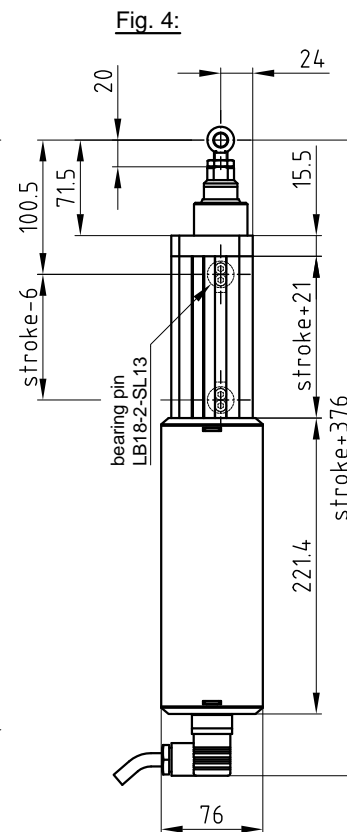
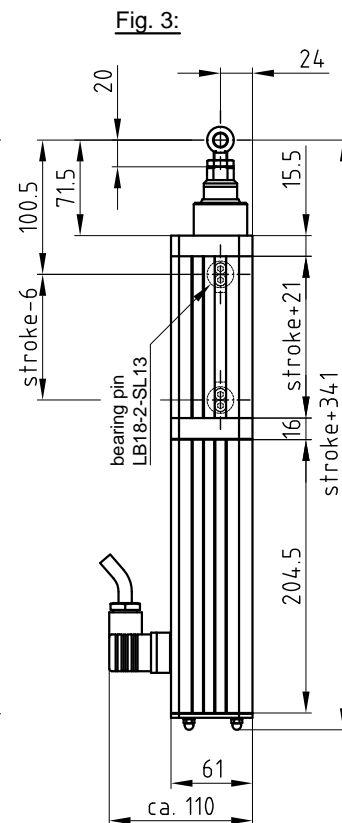
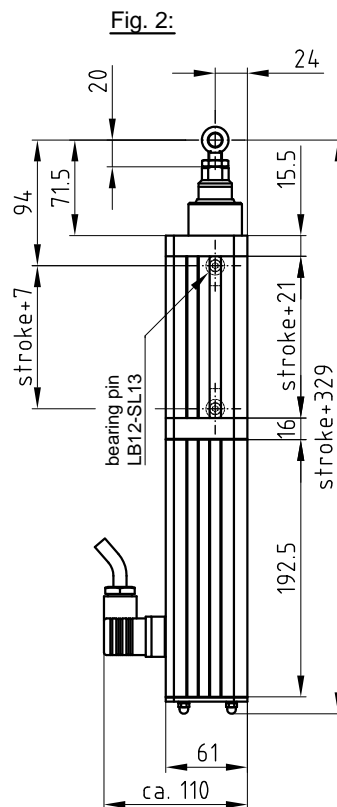
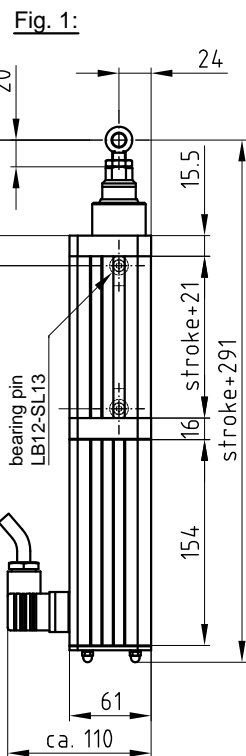
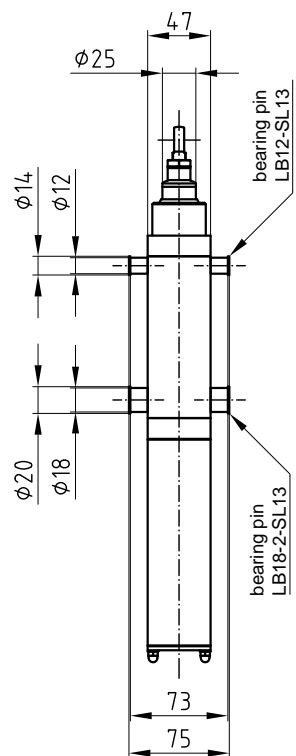
Designation	SG20A	SG20B	SG20C	SG20D	SG20E	SG20F	SG20G	SG20H	SG20J	SG20L	SG20M	SG20N	SG20P	SG20R	Unit	
Pushing and pulling force (full load)	2000	1300	930	730	530	1360	880	630	490	2660	1720	1240	960	700	N	
Current with full load	2.0														A	
Speed (no load)	6.2	11.2	15.6	20.0	27.7	9.2	16.8	23.4	30.1	4.6	8.4	11.7	15.0	20.8	mm/s	
Speed at full load	4.8	8.8	12.2	15.7	21.7	7.2	13.2	18.3	23.6	3.6	6.6	9.2	11.8	16.3	mm/s	
Maximum stroke at full load	1)	739	918	1082	1227	1443	1555	1932	2277	2582	455	566	667	756	889	mm
Operating mode for peak load according DIN VDE 0530 part 1 (with 25°C ambient temperature)	S2 2.5min.															
Operating mode for continuous load according DIN VDE 0530 part 1 (with 40°C ambient temperature)	S3 13% 3) (Maximum time of operation in one direction: 2.5min)															
Stability (locking force)	2)	3200 (with standard bearing pins LB12-SL13) / 3500 (with bearing pins LB18-2-SL13)													N	
Possible pushrod versions	Ø25A, Ø25, Ø25S					Ø25, Ø25S				Ø25A, Ø25, Ø25S					mm	
Standard bearing pin diameter	Ø12															mm
Dimensions (see dimesional drawing):	Figure 2	Figure 1				Figure 2	Figure 1			Figure 2	Figure 1					

Technical data of actuator types SG26x:

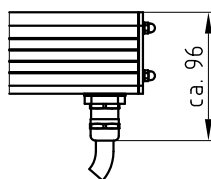
Designation	SG26A	SG26B	SG26C	SG26D	SG26E	SG26F	SG26G	SG26H	SG26J	SG26M	SG26N	SG26P	SG26R	Unit	
Pushing and pulling force (full load)	2710	1760	1260	980	710	1840	1190	860	670	2330	1680	1300	940	N	
Current with full load	2.6													A	
Speed (no load)	6.2	11.2	15.6	20.1	27.7	9.2	16.8	23.4	30.1	8.4	11.7	15.0	20.8	mm/s	
Speed at full load	4.4	8.1	11.2	14.4	19.9	6.6	12.1	16.8	21.6	6.1	8.4	10.8	14.9	mm/s	
Maximum stroke at full load	1)	638	793	934	1059	1245	1342	1667	1965	2228	488	575	653	767	mm
Operating mode for peak load according DIN VDE 0530 part 1 (with 25°C ambient temperature)	S2 1.5min.														
Operating mode for continuous load according DIN VDE 0530 part 1 (with 40°C ambient temperature)	S3 8% 3) [Maximum time of operation in one direction: 1.5min]														
Stability (locking force)	2)	3200 (with standard bearing pins LB12-SL13) / 3500 (with bearing pins LB18-2-SL13)													N
Possible pushrod versions	Ø25A, Ø25, Ø25S					Ø25, Ø25S				Ø25A, Ø25, Ø25S				mm	
Standard bearing pin diameter	Ø12														mm
Dimensions (see dimesional drawing):	Figure 2	Figure 1				Figure 2	Figure 1								

- 1) The maximum stroke with full load is the stroke which the drive is able to extend with full load without articulating the spindle. For greater strokes the pushing force must be reduced. Corresponding force-stroke diagrams are supplied by us on request.
- 2) The stability is the maximum pulling force that may occur on the retracted pushrod. (locking force = holding force)
- 3) Either under load extending and load supporting retracting or under load retracting and load supporting extending.

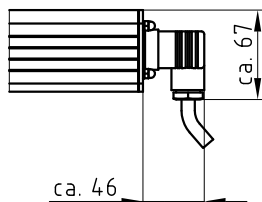
GRASL Pneumatic-Mechanik GmbH A-3454 Reidling Europastraße 1				Freimaßtoleranz nach DIN 7168:		Maßstab: 1:1		Werkstoff:	
						ID - Nr.:			
				Datum		Name		Bezeichnung:	
				Bear.		23.09.2009		Simetzberger	
06				Englisch, Tschechisch		21.08.2017		HA	
05				Standicherheit		Norm			
04				Zul. Umgebungstemp.					
03				Polnisch		Type:		Zeichnung Nr.:	
02				Tabelle		21.09.2010		SA	
01				Tabelle		22.12.2009		SA	
Zus.				Änderung		Datum		Name	
								(Urspr.)	
								(Ers.f.)	
								07.021.DAT.04.05	
								(Ers.d.)	



**Option PG, option E:**  
(with cable screw  
connection MS-M20x1,5)



**Option KU:**  
(with connector on  
housing bottom)



#### Eye bolt:

M10x40 Ø8 or Ø10: +10mm/-4mm setting range  
Thread in the tube plug: M10x29

#### Bearing pin:

- SG08x - SG26x (Fig. 1-2): LB12-SL13 (Ø12, shaft length 13mm)  
- SG40x - SG120x (Fig. 2-5): LB18-2-SL13 (Ø18, shaft length 13mm)  
On request, the actuators SG08x - SG26x can also be supplied with LB18-2-SL13.





Tolerance		Scale	1:4	Material	
Created Simetzberger	Sheet 1/2	Format A3	Overview of housing dimensions Electro-linear-actuator SG	Document Style Data sheet	
Approved HA	Issue Date 27.09.2017			Document State Valid	
Grasl Pneumatic Mechanik GmbH		QM FO 05.24.0		Document Number 07.021.DAT.00.03-E	

# Technical Instructions

## Spindle drives type S, G, SG

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.

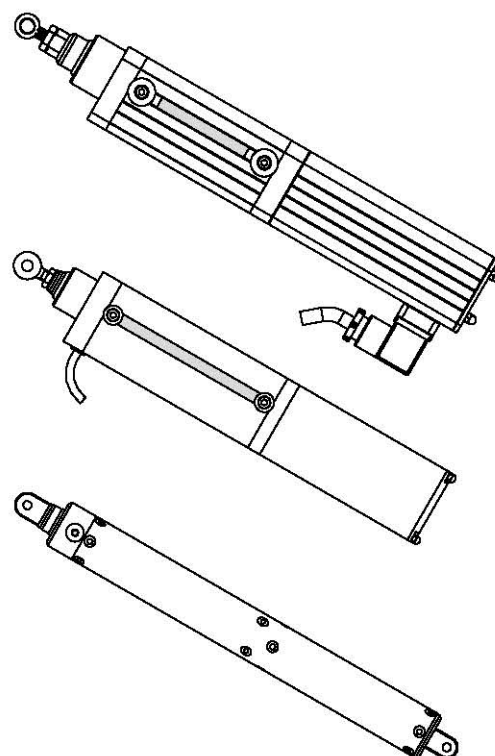
### Correct and proper use

The drives serve the purpose of opening and closing windows, blinds and vents in the roof area (no free access for system-external persons). On the application of voltage, a movement command is activated.

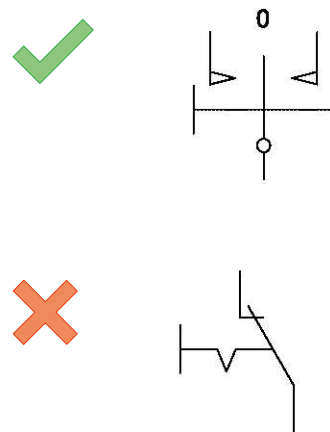
If the drives are installed below an installation height of 2,5m, appropriate devices must be fitted so that people are not endangered (crushing and trapping hazards). Apply the Directives, Rules and Standards intended for this purpose, such as, for example, BGR 232 Power-operated Windows, Doors and Gates (Trade Association Regulations), DIN EN 12453 Safety in Use of Power Operated Doors - Requirements and EN 60335-2-103:2003.

### Technical details/control

The drives are suitable for connection to K+G/Grasl - control centres. With control via other control centres or other power supplies, the compatibility must be checked. As the drive housings are not earthed, it must be ensured via the controller that no voltages are routed to the drives over the protective low voltage (keyword, galvanic isolation on the transformer, etc.).



picture 1: spindle drives



picture 2: ventilation buttons

With a fault on the internal drive overload cut-off device in the event of a short circuit or overcurrent, the upstream controller as a second safety circuit must disconnect the defective drive via a fuse or similar.

**i** The dimensioning must be carried out and / or be checked by a qualified electrical company. In doing so, in addition to the nominal values the maximum start-up current of the drives must be taken into account.

**!** The cross section of the cable between the junction box and the control centre must be so dimensioned that even at full load the voltage drop between the control centre and the drive does not exceed 1V (see the control centre documentation).

The drives must only be operated with a nominal voltage of 24VDC and with a tolerance of +30/-20% and a residual ripple <5%. Only with these limits can the trouble-free functioning of the motor electronics be guaranteed.

For the control of the drives, only use mutually mechanically interlocked ventilation buttons with contactless centre positions, "no changeover switch", with independent return from the two switching positions (see picture 2). The direct switching of the direction of movement while the drive is running is not permitted and can lead to defects (approx. 2s pause required).

After full extension or retraction, the opposite direction must be travelled for approx. 1s before the previous direction can be travelled again (type series S).

## Installation

**!** Handle the drive only wearing safety gloves and suitable work clothes.

**!** So design the installation area of the drive that there is no risk of crushing injuries (for example, provide protective covers).

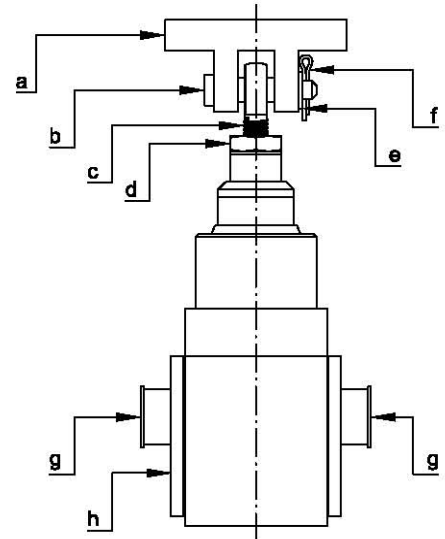
Before the installation, the following must be observed:

**i** Check the completeness of the scope of supply. Inspect the drive for transport damage.

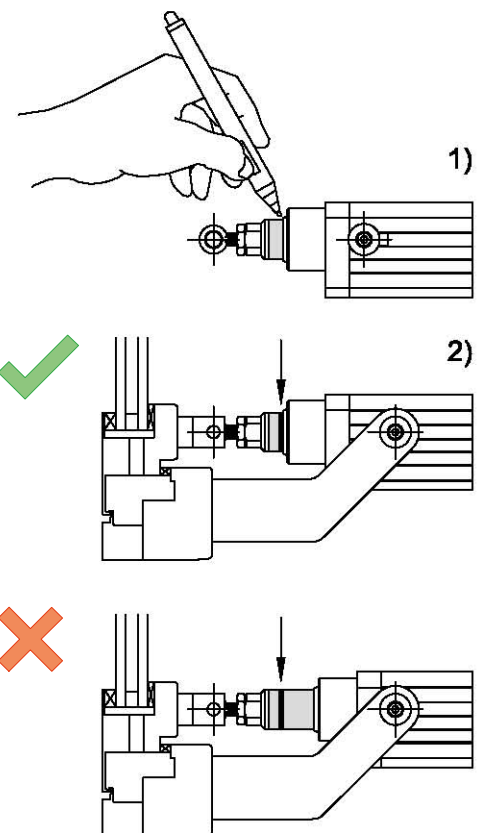
Connect the drive via a customer-provided junction box with strain relief. When selecting the cable length, take into account the positioning of the box and the pivoting range of the drive.

Ensure that the drives can freely pivot in the whole of the stroke range and cannot come into contact with parts of the building (see the data sheets for the cable outlets of the drives).

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




picture 3: fixing elements




picture 4: end position

Before fixing the drives 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 drives on the appropriate fixing elements. It must be ensured that the mountings are secured by means of appropriate safety devices (see picture 3).

 In order to prevent the screwing out of the eyebolt, the lock nut must be tightened (see picture 3).

Pay attention to the aligned installation of coupling brackets, mounting brackets or other fixing elements. Lateral forces must be avoided (see picture 3).

 It must be ensured that the drives can always reach their end positions as otherwise the internal end cut-off is not guaranteed. Use the eyebolt (adjustment range) and bearing pins for adjustment. Continuous operation over the load cut-off is not permitted. Check the setting in the retracted condition by means of marking on the pushrod end (see picture 4).

Setting the closing force with which the NSHEV is driven into the seal (NSHEV must be tightly closed all around):

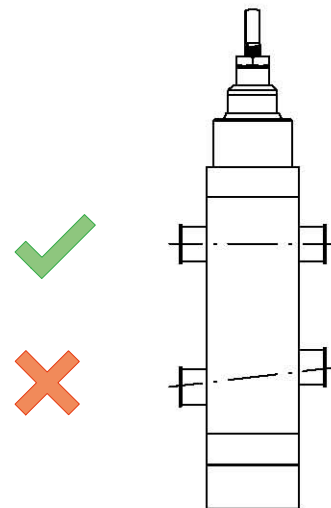
 In the process, the maximum pushing / pulling force of the drive must not be exceeded (see the data sheets) as otherwise it cannot travel fully in (internal limit switches are then not activated).

- Drives with variable mountings (lateral guide slots or clamping rings): by pulling the drives, for example, with a spring balance, and then tightening the bearing pins / plugs. During the setting, the bearing pins / plugs must be loosened so far so that the movement of the drive along the drive axis is possible.
- Drives with fixed mountings: by adjusting the eyebolt or other pushrod mountings.

With drives with variable mountings (lateral guide slots) it must be ensured that the bearing plugs / pins lie on the same axis (see picture 5) and that this is parallel to the hinge axis. In addition, when fitting the mounting bracket, it must be ensured that the pivot axis of the drives is parallel to the hinge axis (see picture 6).

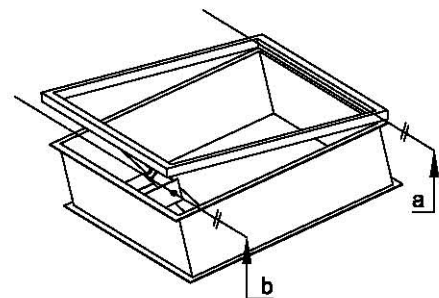
It must also be ensured that the sliding blocks are inserted parallel to the slot. In order to prevent twisting during fitting, the fixing screws should first be carefully hand-tightened so that the sliding blocks are correctly clamped against the profile (see picture 7). Then secure them with sufficient tightening torque (max. tightening torque  $M_5 = 10Nm$ ).

Due to their low cut resistance, handle the connecting cables of the drives with great care. Be careful with sharp-edged materials. Use rubber grommets, cable glands, etc.

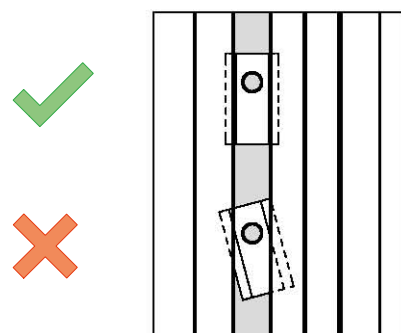


picture 5: bearing pin position

a ...hinge axis  
b ...pivot axis



picture 6: installation






picture 7: sliding block

## Commissioning

When commissioning (test run, installation or maintenance work), for example, with accumulators it is absolutely necessary to fit a fuse of the same value as the nominal current of the drive in the supply line of the drive. In doing so, the drives must not be connected to the drive output of a control centre / controller at the same time. Otherwise it can lead to faults on the power output of the control centre / controller. During test runs, the complete NSHEV mechanical systems must be observed.



## Maintenance/dismantling/fault finding

-  The maintenance must be carried out once per year by a specialist trained for the purpose.
-  The drive must not be opened. The unauthorized opening of the drive 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.
-  Through external controls (for example, automatic command devices outside the field of vision) non-foreseeable control commands can occur which can result in movements of the opening construction.

The following points must be checked:


- 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 pushrod for damage and cleanliness (clean where necessary).
- Inspection of the pushrod wiper for wear.
- Inspection for freeness from dust (clean where necessary).
- Inspection of the structural conditions for changes with regard to the requirements listed in the point, Installation.

## Normal operation

-  The drive has no internal protection against crushing injuries.
-  The static self-locking effect can be lost due to external influences.

## Disposal

The drive consists of electronic parts, wires, steel, non-ferrous metal and plastic.

-  The drive must be disposed of in accordance with national regulations.