

## 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].

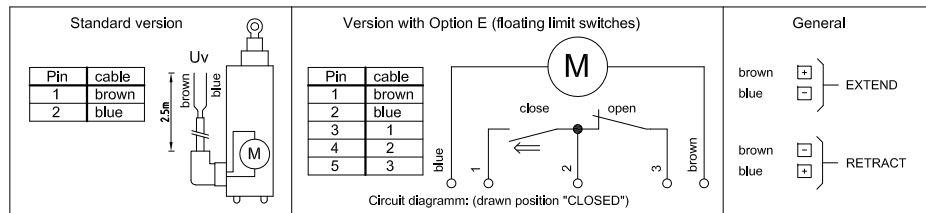
cable length: length of connection cable [m]

protection class: protection class according to DIN EN 60 529

options: list of all desired options

Ordering example: SG40P/25 - 750 - 8 - 2,5 - RAL 3000

## Connection diagramms:



## General technical data:

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

- 1) The maximum stroke with full load is the stroke, that an actuator is able to extend with full load without spindle permanently bended. For greater strokes a pushing force must be reduced. Corresponding force-stroke diagrams can be supplied by us on request.
- 2) The stability is the maximum pulling force that may occur on the retracted push rod. (locking force = holding force)
- 3) Either an actuator is being extended under a load and supporting load, while being retracted or retracting under a load and supporting, while being extended.
- 4) Starting current I<sub>s</sub> [A] = supply voltage U<sub>s</sub> [V] / terminal resistance R<sub>s</sub> [Ω]  
When determining U<sub>s</sub>, observe the resistances (internal resistance voltage source, line resistances, ...) to the actuator connection cable.
- 5) At U<sub>s</sub>=24V.

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!

formell geprüft am  
29.5.2002 KW

## Technical data of actuator types SG40x:

| Designation                                                                                      | SG40A                                                        | SG40B                                    | SG40C | SG40D | SG40E | SG40F     | SG40G    | SG40H | SG40J | SG40L | SG40M           | SG40N    | SG40P | SG40R | SG40S | SG40T     | SG40U    | SG40V | SG40W | Unit |    |
|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------|-------|-------|-------|-----------|----------|-------|-------|-------|-----------------|----------|-------|-------|-------|-----------|----------|-------|-------|------|----|
| Pushing and pulling force (full load)                                                            | 3850                                                         | 2490                                     | 1800  | 1400  | 1010  | 2610      | 1690     | 1220  | 950   | 4850  | 3330            | 2600     | 1660  | 1300  | 3290  | 2250      | 1760     | 1130  | 880   | N    |    |
| Theoretical pressure force during deadlock                                                       | 5) 24600                                                     | 15000                                    | 10800 | 8400  | 6200  | 16600     | 10200    | 7400  | 5800  | 27000 | 19200           | 15000    | 9600  | 7600  | 18200 | 13000     | 10200    | 6600  | 5200  | N    |    |
| Current with full load                                                                           | 4,0                                                          |                                          |       |       |       |           |          |       |       |       |                 |          |       |       |       |           |          |       |       |      | A  |
| Speed (no load)                                                                                  | 6,7                                                          | 12,2                                     | 17,0  | 21,9  | 30,2  | 10,1      | 18,4     | 25,5  | 32,8  | 6,1   | 9,6             | 12,2     | 19,1  | 24,5  | 9,2   | 14,3      | 18,4     | 28,7  | 36,7  | mm/s |    |
| Speed at full load                                                                               | 5,3                                                          | 9,7                                      | 13,5  | 17,4  | 24,1  | 8,0       | 14,6     | 20,3  | 26,1  | 4,9   | 7,6             | 9,7      | 15,2  | 19,5  | 7,3   | 11,4      | 14,6     | 22,8  | 29,2  | mm/s |    |
| Maximum stroke at full load                                                                      | 1) 529                                                       | 657                                      | 774   | 878   | 1032  | 1112      | 1382     | 1629  | 1847  | 4711  | 569             | 644      | 805   | 910   | 991   | 1197      | 1354     | 1693  | 1915  | mm   |    |
| Terminal resistance R_A at 20°C                                                                  | 4) 1,1                                                       |                                          |       |       |       |           |          |       |       |       |                 |          |       |       |       |           |          |       |       |      | Ω  |
| Operating mode for peak load according DIN VDE 0530 part 1 (with 25°C ambient temperature)       | S2 4min.                                                     |                                          |       |       |       |           |          |       |       |       |                 |          |       |       |       |           |          |       |       |      |    |
| Operating mode for continuous load according DIN VDE 0530 part 1 (with 40°C ambient temperature) | S3 20% 3) (Maximum time of operation in one direction: 4min) |                                          |       |       |       |           |          |       |       |       |                 |          |       |       |       |           |          |       |       |      |    |
| Stability (locking force)                                                                        | 2) 6400                                                      | (with standard bearing pins LB18-2-SL13) |       |       |       |           |          |       |       |       |                 |          |       |       |       |           |          |       |       |      | N  |
| Possible pushrod versions                                                                        | Ø25A, Ø25, Ø25S                                              |                                          |       |       |       | Ø25, Ø25S |          |       |       |       | Ø25A, Ø25, Ø25S |          |       |       |       | Ø25, Ø25S |          |       |       |      | mm |
| Standard bearing pin diameter                                                                    | Ø18                                                          |                                          |       |       |       |           |          |       |       |       |                 |          |       |       |       |           |          |       |       |      | mm |
| Dimensions (see dimesional drawing!)                                                             | Figure 2                                                     | Figure 1                                 |       |       |       | Figure 2  | Figure 1 |       |       |       | Figure 3        | Figure 2 |       |       |       | Figure 3  | Figure 2 |       |       |      |    |

## Technical data of actuator types SG60x:

| Designation                                                                                      | SG60D                                                        | SG60E                                         | SG60F     | SG60J    | SG60M           | SG60N | SG60P | SG60R | SG60S     | SG60T | SG60U    | SG60V | SG60W | Unit |    |
|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------|-----------|----------|-----------------|-------|-------|-------|-----------|-------|----------|-------|-------|------|----|
| Pushing and pulling force (full load)                                                            | 2220                                                         | 1600                                          | 4140      | 1500     | 5280            | 4130  | 2640  | 2060  | 5220      | 3580  | 2800     | 1790  | 1400  | N    |    |
| Theoretical pressure force during deadlock                                                       | 5) 8800                                                      | 6400                                          | 17400     | 6000     | 20200           | 15800 | 10200 | 8000  | 19200     | 13600 | 10600    | 6800  | 5400  | N    |    |
| Current with full load                                                                           | 6.0                                                          |                                               |           |          |                 |       |       |       |           |       |          |       |       | A    |    |
| Speed (no load)                                                                                  | 21.9                                                         | 30.3                                          | 10.1      | 32.8     | 9.6             | 12.3  | 19.2  | 24.5  | 9.2       | 14.4  | 18.4     | 28.7  | 36.8  | mm/s |    |
| Speed at full load                                                                               | 15.2                                                         | 21.0                                          | 7.0       | 22.8     | 6.7             | 8.5   | 13.3  | 17.0  | 6.4       | 10.0  | 12.8     | 20.0  | 25.6  | mm/s |    |
| Maximum stroke at full load                                                                      | 1) 702                                                       | 826                                           | 890       | 1478     | 455             | 515   | 644   | 728   | 793       | 958   | 1083     | 1354  | 1532  | mm   |    |
| Terminal resistance R_A at 20°C                                                                  | 4)                                                           | 1.1                                           |           |          |                 |       |       |       |           |       |          |       |       | Ω    |    |
| Operating mode for peak load according DIN VDE 0530 part 1 (with 25°C ambient temperature)       | S2 2min.                                                     |                                               |           |          |                 |       |       |       |           |       |          |       |       |      |    |
| Operating mode for continuous load according DIN VDE 0530 part 1 (with 40°C ambient temperature) | S3 10% 3) (Maximum time of operation in one direction: 2min) |                                               |           |          |                 |       |       |       |           |       |          |       |       |      |    |
| Stability (locking force)                                                                        | 2)                                                           | 6400 (with standard bearing pins LB18-2-SL13) |           |          |                 |       |       |       |           |       |          |       |       | N    |    |
| Possible pushrod versions                                                                        | Ø25A, Ø25, Ø25S                                              |                                               | Ø25, Ø25S |          | Ø25A, Ø25, Ø25S |       |       |       | Ø25, Ø25S |       |          |       |       | mm   |    |
| Standard bearing pin diameter                                                                    | Ø18                                                          |                                               |           |          |                 |       |       |       |           |       |          |       |       |      | mm |
| Dimensions (see dimensional drawing!)                                                            | Figure 1                                                     |                                               | Figure 2  | Figure 1 | Figure 2        |       |       |       | Figure 3  |       | Figure 2 |       |       |      |    |

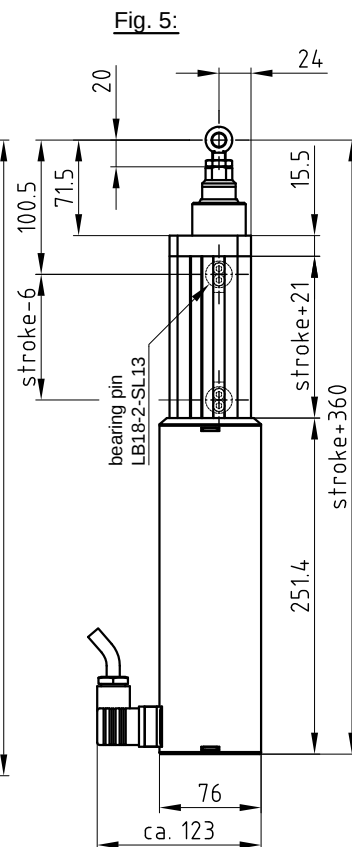
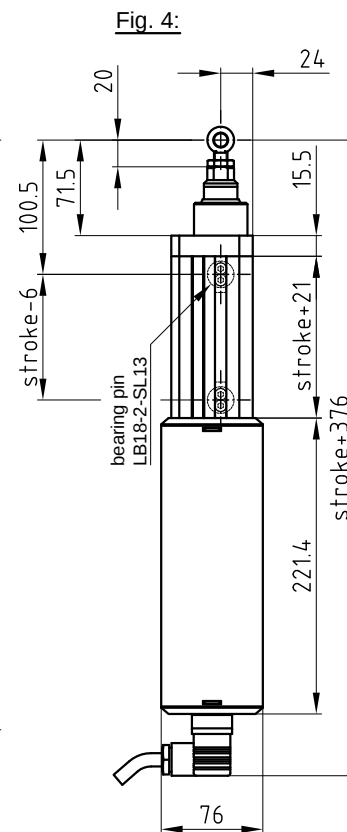
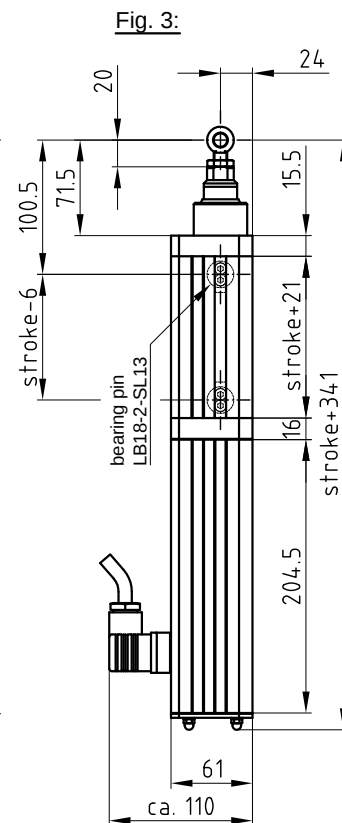
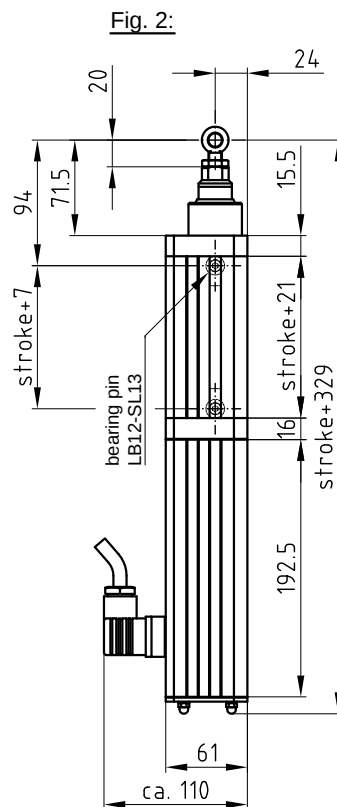
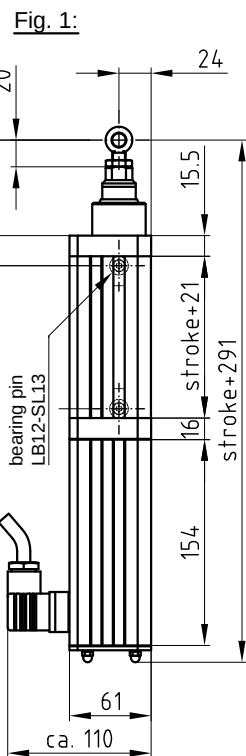
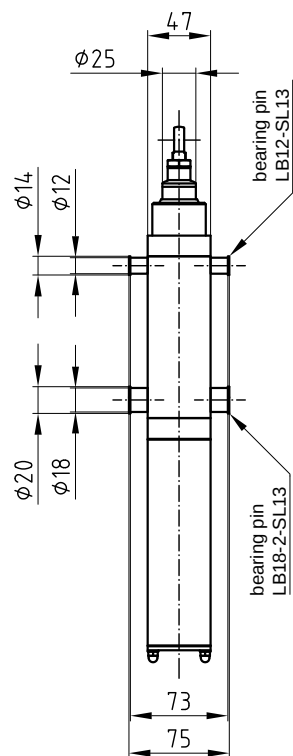
## Technical data of actuator types SG80x:

| Designation                                                                                      |    | SG80E                                                                  | SG80N | SG80P | SG80R | SG80T     | SG80U | SG80V | SG80W | Unit |
|--------------------------------------------------------------------------------------------------|----|------------------------------------------------------------------------|-------|-------|-------|-----------|-------|-------|-------|------|
| Pushing and pulling force (full load)                                                            |    | 2200                                                                   | 5660  | 3620  | 2830  | 4900      | 3830  | 2450  | 1920  | N    |
| Theoretical pressure force during deadlock                                                       | 5) | 6600                                                                   | 16200 | 10400 | 8200  | 14000     | 11000 | 7000  | 5600  | N    |
| Current with full load                                                                           |    | 8.0                                                                    |       |       |       |           |       |       |       | A    |
| Speed (no load)                                                                                  |    | 30.3                                                                   | 12.3  | 19.2  | 24.5  | 14.4      | 18.4  | 28.7  | 36.8  | mm/s |
| Speed at full load                                                                               |    | 18.1                                                                   | 7.3   | 11.5  | 14.7  | 8.6       | 11.0  | 17.2  | 22.0  | mm/s |
| Maximum stroke at full load                                                                      | 1) | 708                                                                    | 442   | 552   | 625   | 821       | 929   | 1161  | 1314  | mm   |
| Terminal resistance R <sub>A</sub> at 20°C                                                       | 4) | 1.1                                                                    |       |       |       |           |       |       |       | Ω    |
| Operating mode for peak load according DIN VDE 0530 part 1 (with 25°C ambient temperature)       |    | S2 1min.                                                               |       |       |       |           |       |       |       |      |
| Operating mode for continuous load according DIN VDE 0530 part 1 (with 40°C ambient temperature) |    | S3 5% <sup>3)</sup> (Maximum time of operation in one direction: 1min) |       |       |       |           |       |       |       |      |
| Stability (locking force)                                                                        | 2) | 6400 (with standard bearing pins LB18-2-SL13)                          |       |       |       |           |       |       |       | N    |
| Possible pushrod versions                                                                        |    | Ø25A, Ø25, Ø25S                                                        |       |       |       | Ø25, Ø25S |       |       |       | mm   |
| Standard bearing pin diameter                                                                    |    | Ø18                                                                    |       |       |       |           |       |       |       | mm   |
| Dimensions (see dimensional drawing):                                                            |    | Figure 1                                                               |       |       |       | Figure 2  |       |       |       |      |

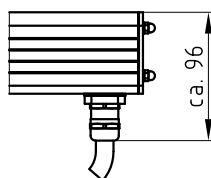
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|-----------------------------------------------------------------------|-----------------------|------------|------|-----------------------------------|------------|--------------|----------------|------------------------------------------------------------------------------------------|-----------|-----------|
| GRASL<br>Pneumatic-Mechanik GmbH<br>A-3454 Reidling<br>Europastraße 1 |                       |            |      | Freimaßtoleranz<br>nach DIN 7168: |            | Maßstab: 1:1 |                | Werkstoff:                                                                               |           |           |
|                                                                       |                       |            |      |                                   |            |              |                |                                                                                          |           | ID - Nr.: |
|                                                                       |                       |            |      |                                   | Datum      | Name         |                | Bezeichnung:<br><br>Data sheet<br>Electro-linear-actuator<br>Type: SG40x - SG60x - SG80x |           |           |
| 07                                                                    | Technische Daten      | 16.05.2018 | SA   | Bear.                             | 23.09.2009 | Simetzberger |                |                                                                                          |           |           |
| 06                                                                    | Engl., Tsche., SG40RL | 20.07.2017 | SA   | Gepr.                             | 25.07.2018 | HA           |                |                                                                                          |           |           |
| 05                                                                    | Zul. Umgebungstemp.   | 24.07.2012 | SA   | Norm                              |            |              |                |                                                                                          |           |           |
| 04                                                                    | SG40RL erweitert      | 25.10.2011 | GS   |                                   |            |              |                |                                                                                          |           |           |
| 03                                                                    | Polnisch              | 11.08.2011 | SA   | Type:                             | SG         |              | Zeichnung Nr.: |                                                                                          | Blatt     |           |
| 02                                                                    | Tabelle               | 21.09.2010 | SA   |                                   |            |              |                |                                                                                          |           |           |
| 01                                                                    | Tabelle               | 22.12.2009 | SA   |                                   |            |              |                |                                                                                          |           |           |
| Zus.                                                                  | Änderung              | Datum      | Name | (Urspr.)                          |            |              | (Ers.f.):      | 07.021.DAT.05.06                                                                         | (Ers.d.): |           |
|                                                                       |                       |            |      |                                   |            |              |                |                                                                                          |           |           |

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29.5.2002 KW

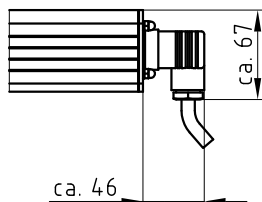
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**Option PG, option E:**  
(with cable screw  
connection MS-M20x1,5)



**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<br>Simetzberger               | Sheet<br>1/2             | Format<br>A3 | Overview of<br>housing dimensions<br>Electro-linear-actuator SG | Document Style<br>Data sheet |  |
| Approved<br>HA                        | Issue Date<br>27.09.2017 |              |                                                                 | Document State<br>Valid      |  |
| Grasl                                 |                          |              |                                                                 | Document Number              |  |
| Pneumatic Mechanik GmbH OM FO 05.24.0 |                          |              |                                                                 | 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.

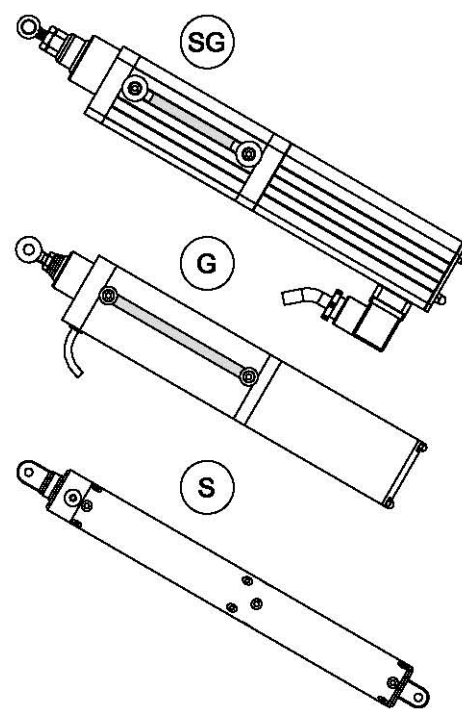
### Meaning of the symbols

-  **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.

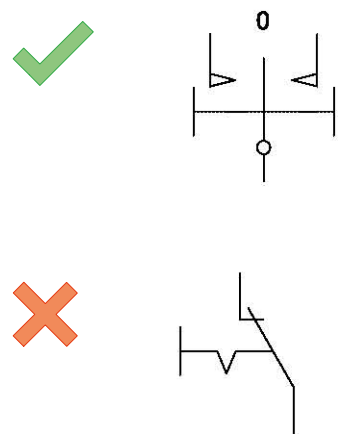
### Correct and proper use

The drives serve the purpose of opening and closing NSHEV's, 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 the implementation of EN 12101. 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, DIN EN 60335-2-103:2003 and ASR A1.6. Do not allow children to play with the device or its control and / or control devices, including window controls.



picture 1: spindle drives



picture 2: ventilation buttons

## 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.).

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 according to drive data sheet 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.

The drives must only be used in normal atmospheric conditions. In the case of atypical ambient atmosphere (for example, SO<sub>2</sub>-, saline atmosphere), please consult.

**i** The drives are not allowed to be loaded beyond their technical datas. The technical data must be adhered to.

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).

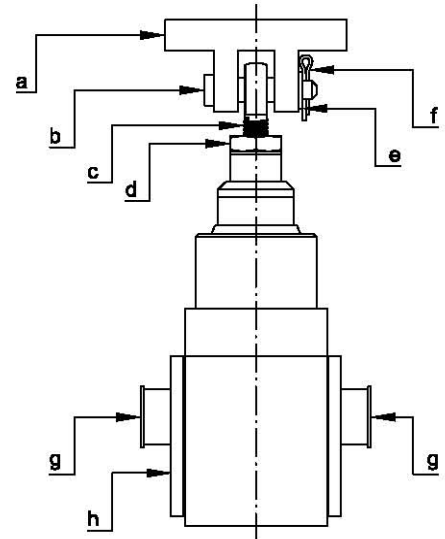
After full extension or retraction, the opposite direction must be travelled for approx. 1s before the previous direction can be travelled again (type series S).

Sound pressure level: L<sub>PA</sub> ≤ 70dB(A) (test distance 1m)

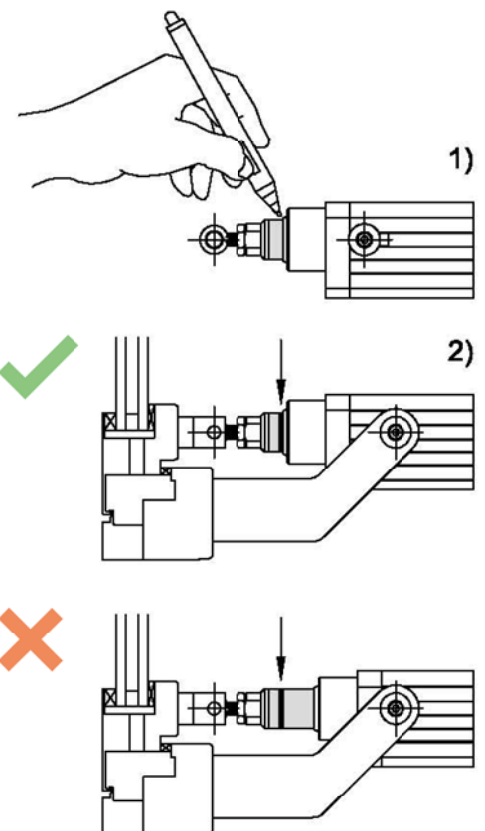
## Installation

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

- 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

 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:

 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).

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).

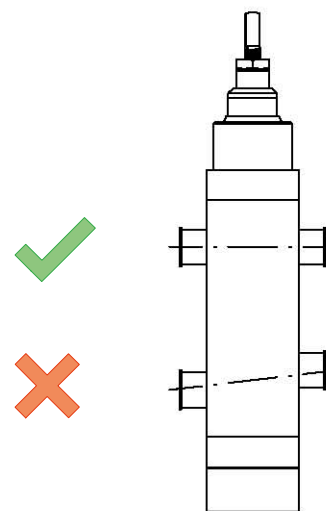
 It must be ensured that the drives can always reach their end positions as otherwise the internal end cut-off is not guaranteed. Use the eyebolt (adjustment range) and bearing pins for adjustment. Continuous operation over the load cut-off is not permitted. Check the setting in the retracted condition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

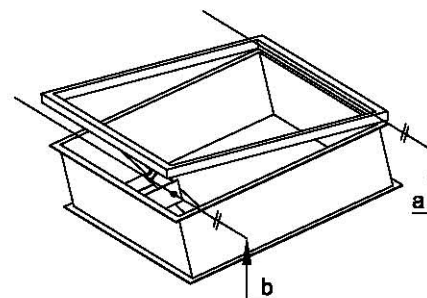
- Drives with variable mountings (lateral guide slots or clamping rings): by pulling the drives, for example, with a spring balance, and then tightening the bearing pins / plugs. During the setting, the bearing pins / plugs must be loosened so far so that the movement of the drive along the drive axis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

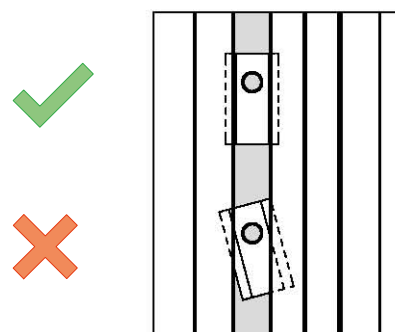


picture 5: bearing pin position

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



picture 6: installation



picture 7: sliding block

ture 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 M5 = 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.

## Maintenance/dismantling/fault finding

-  Disconnect the drives to avoid unwanted movements due to external control and drive commands.
-  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:

- 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.
- The equipment should be checked for imbalance, signs of wear or damage to cables, springs and fasteners.
- Perform a manual functional test.

## 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 and 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.

## Normal operation

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

## 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.