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Operating instructions
Stepless holding brake (SHB)

Sizes 5.0 - 5.3
Safety brake for profile rail guides

Issue date 2017-09

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1 General information

Please read and follow the operating instructions carefully! Non-observance may lead to malfunctions or failure of the brake and associated damage. These operating instructions are an integral part of the brake delivery. Always keep the operating instructions easily accessible near the brake.

1.1 Definitions of terms

Term	Meaning
Stepless holding brake (SHB)	Pneumatically actuated spring-applied brakes as a component for holding and delaying moving machine parts.
Rated holding force F	Is the theoretical holding force assigned to the designation. The nominal holding force lies within the specified nominal holding force tolerances.
Load mass	Designation for the weight that the brake must hold.

2 Safety

2.1 Safety and information symbols

Symbol	Signal word	Meaning
	DANGER	Indicates an imminent danger. If it is not avoided, death or serious injury will result.
	WARNING	Indicates a potentially hazardous situation. Failure to avoid this could result in death or serious injury.
	CAUTION	Indicates a hazardous situation. Failure to avoid this could result in light or minor injuries.
	ATTENTION	Possible damage to property may result.
	Note	Indicates application tips and other particularly useful information. It is not a signal word for a dangerous or

2.2 General information

Brakes can also pose other hazards, e.g:

Hand injuries
Danger of retraction

Serious personal injury and damage to property can occur:

- If the brake is used improperly.
- If the brake has been changed or modified.
- If the relevant STANDARDS of safety or installation conditions are not observed.

2.2.1 Personnel requirements

To avoid personal injury and damage to property only qualified and trained persons are allowed to work on the components. They must be sufficiently familiar with their design, transport, installation, commissioning, maintenance and disposal in accordance with the relevant standards and regulations.

Before installation and commissioning, the installation and operating instructions must be read carefully and the safety instructions must be observed, as incorrect handling can lead to personal injury and damage to property. The pneumatic brakes have been developed and manufactured according to the rules of technology known at the time and are generally considered safe to operate at the time of delivery

- Technical data and specifications (type plate and documentation) must be strictly adhered to.
  General information:

General information:

During the necessary risk assessment when the machine or plant is being designed, the hazards must be assessed in accordance with Machinery Directive 2006/42/EC and must be eliminated by means of suitable protective measures.

Brakes for safety-related applications must be used in a single or redundant manner according to the required category to achieve the required performance level (PLr) as defined by EN ISO 13849. This is invariably the task of the system manufacturer.

2.3 Correct use

Stepless holding brakes (SHB) are intended for use in machines and systems and may only be used for the purpose ordered and confirmed. Use outside the respective technical specifications is considered incorrect.

Stepless holding brakes (SHB) are used for holding and decelerating on profile rails.

Stepless holding brakes (SHB) prevent unintentional falling or crashing of gravity-loaded axles.

- Not suitable for use in potentially explosive atmospheres

2.4 Handling

Before mounting, the brake must be checked for proper condition (visual inspection). Not considered to be proper:

- External damage
- Outer oiling
- External soiling

The function of the brake must be checked both after installation and after prolonged periods of system inactivity.

2.5 Required protective measures by the user

- Covering of moving parts to protect against crushing and entrapment.

- Provision of an additional corrosion protection measure if the brake is used in extreme environmental conditions or outdoors with direct weather influences.

2.6 Dimensioning of further machine elements

The effect of the maximum and minimum braking force on the other machine components must be taken into account for sufficient dimensioning. The stepless holding brake (SHB) observes a maximum braking force of 2.5 x nominal holding force and a minimum braking force of 1 x nominal holding force of the brake. If further brakes are arranged behind the stepless holding brake (SHB), the load is added if the braking times of the different brakes overlap.

3. Legal provisions

3.1 The following standards, guidelines and regulations have been applied

(also to be observed during installation and operation)

EN ISO 4414
General rules and safety requirements for pneumatic systems and their components

EN ISO 12100
Safety of machinery - General principles of design -
Risk assessment and risk reduction

EN ISO 13849-1
Safety of machinery - Safety-related parts of control systems

3.2 Liability

The information, notes and technical data given in the documentation were up to date at the time of printing. Claims relating to brakes that have already been delivered cannot be asserted on the basis of this. Liability for damages and operational disturbances are not accepted in the event of:

- Failure to observe the installation and operating instructions,
- Improper use of the brakes,
- Unauthorised modification of the brakes,
- Improper work on the brakes,
- Handling or operating errors.

3.3 Warranty

- The warranty conditions correspond to the conditions of sale and purchase of Leantechnik AG (www.leantechnik.com)
- Defects must be reported to Leantechnik AG immediately after discovery.

3.4 Notes

Note on the Machinery Directive (2006/42/EC) The product is a component for installation in machinery in accordance with Machinery Directive 2006/42/EC. In conjunction with other elements, the brakes can fulfil safety-related applications. The type and scope of the measures necessary are derived from the risk analysis of the machine. The brake is then part of the machine and the machine manufacturer assesses the conformity of the safety device with the directive.
The commissioning of the product is prohibited until it has been ensured that the machine complies with the requirements of the directive.

Note on the ATEX Directive
The product is not suitable for use in potentially explosive atmospheres without this conformity assessment. To use this product in potentially explosive atmospheres, classification and labelling according to Directive 2014/34/EU must be carried out.

4 Product description

4.1 Scope of delivery / delivery condition

- The stepless holding brake (SHB) is assembled ready for installation.
- The stepless holding brake (SHB) is set to the specified nominal holding force.
- Observe the type plate
- The scope of delivery and delivery condition must be confirmed immediately after receipt of the shipment. LEANTECHNIK does not assume any warranty for defect claims asserted after this time. Report transport damage to the supplier immediately. Incompleteness of the delivery and recognisable defects must be reported immediately at the manufacturer's works.

ATTENTION Brake may be damaged Removing the transport lock (K) when the brake is depressurised will result in damage. Only remove the transport lock (K) (red screw head) when pressurised.

Caution Note the brake's own weight The brake may fall during lifting / transporting. Crushing and impacts may result.

4.2 Function

The spring-loaded, closed and pneumatically opened stepless holding brake (SHB) clamps a profile rail in a manner that is infinitely variable and free of play.

Note!
The maximum clamping force can only be achieved when the brake is depressurised.

The spring-loaded system ensures the fail-safe principle with the stepless holding brake (SHB) working as a safety brake.

Note!
If the operating pressure is too low, the brake cannot be properly pressurised (opened).

- By venting the stepless holding brake (SHB) with the required operating pressure, the clamping element of the brake is pressed against the cup spring. The profile rail can be moved (Fig. 1).
- By venting the stepless holding brake (SHB), the cup spring acts on the brake's clamping element. The profile rail is clamped (Fig. 2).

The maximum permissible sliding speed is 2 m/s. Higher speeds on request

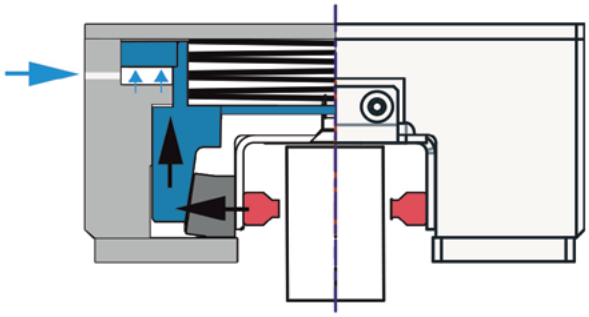


Fig. 1 Sliding profile rail under the influence of pressure

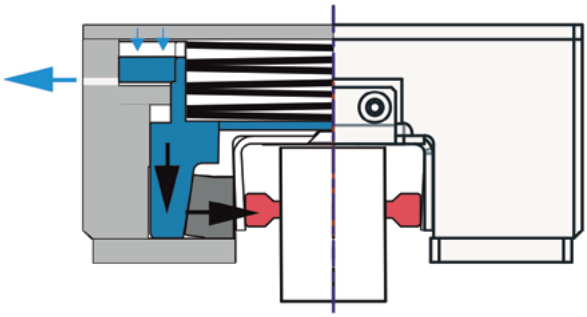


Fig. 2 Clamped profile rail with pressure relief

5 Technical data

5.1 Notes

5.1.1 Conditions of use

The indicated values are guideline values which have been determined in test facilities. The suitability for the intended application must be determined, if necessary, by independent testing. When designing the brakes, the installation situations, permissible friction work and braking distances as well as ambient conditions must be carefully checked and coordinated.

- Mounting and connection dimensions at the place of use must be matched to the size of the brake.
- The use of the brake under extreme environmental conditions or outdoors with direct contact with weather influences is not permitted.
- The surfaces of the exterior components are provided with a phosphate coating in the factory, which ensures a corrosion protection base.
- The provision of the required operating pressure must be guaranteed.

5.1.2 Ambient temperature

-10 °C to +60 °C

The technical data refers to the specified temperature range.

5.1.3 Protection class

(mechanical) IP44: When installed, protected against solid foreign bodies with a diameter of >1 mm and against splashing water on all sides.

5.1.4 Noise emissions

Generally no noise emissions

5.1.5 Installation location

The stepless holding brake (SHB) can be used in any installation position.

5.1.6 Requirements for the use of the product

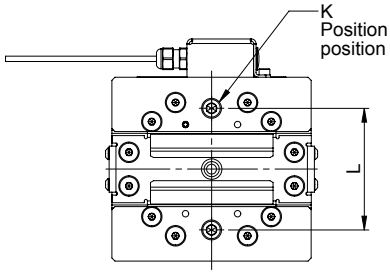
Compare the limit values in these operating instructions with the current application, e.g.

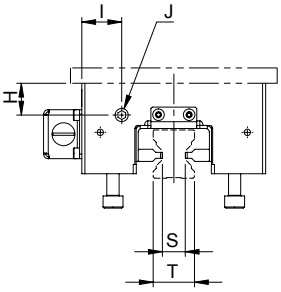
- Pressure
- Clamping forces / braking forces
- Braking distances
- Masses
- Temperatures etc.
- Pressure medium

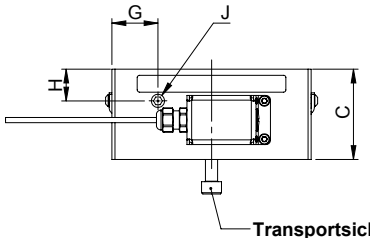
5.1.7 SHB1 short version

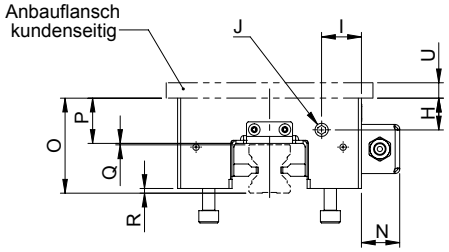
ACHTUNG!
Bremse nie ohne Führungsschiene betreiben. Das Betätigen der Bremse ohne Führungsschiene führt zu Beschädigung

ATTENTION!
Never operate the brake without a guide rail. Activation of the brake without a guide rail will cause damage



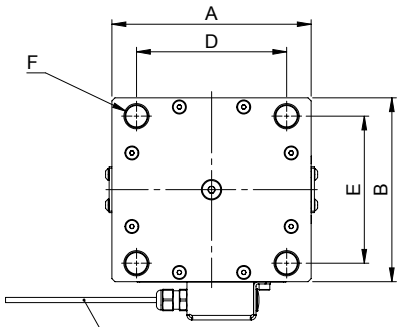




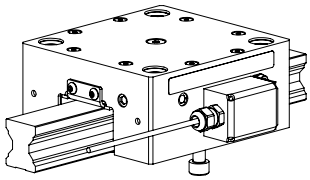


Transportsicherung
(rote Schraubenkopf)
nur im druckbeaufschlagten Zustand entfernen!
Bremse nur mit Führungsschiene schliessen!

Transportation lock
(red bot head)
remove only when pressurised!
close brake only with guide rail!



M
Schaltzustandskontrolle
switching condition monitoring
Kabellänge / cable length 4.8m



5.1.7 SHB1 short version

SHB1 Short version		Unit	5.0	5.1	5.3
	A	mm	115	130	190
	B	mm	100	120	170
	C	mm	50	59	86.7
	D	mm	92	98	152
	E	mm	82	96	134
	F	mm	M12↧21.5	M16↧28	M24↧43
	G	mm	25	30	37
	H	mm	15.5	20.7	32.7
	I	mm	21	26	40
	J	mm	G 1/8 ↧ 9.5 Connection Ma=12Nm		
	K	mm	M6	M8	M10
	L	mm	66	79.4	112.4
Balluff inductive sensor	M	mm	BES516-3005-G-E4-C-PU-05		
	N	mm	25	25	25
	O	mm	54.2 +-/0.1	62 +-/0.1	92.2 +/-0.1
	P	mm	26	29.5	42.7
	Q	mm	2.2	1	1
	R	mm	4.2	3	5.5
	S	mm	15	15	29
	T	mm	23	27	48
Min. required thickness of the customer-side mounting flange (steel)	U	mm	10	15	35
Nominal holding force [3)4)] at 6 bar		N	1750	3000	6000
Nominal holding force [3)4)] at 20 bar using a pressure booster		N	5000	7500	15000
Opening pressure	min.	bar	6 or 20		
	max.	bar	8 or 28		
Stiffness		N/µm	380	490	1000
Max. sliding speed		m/s	2		
Ambient temperature		°C	-10 to +60		
Air consumption per Circuit in standard litre at Opening pressure	at 6 bar	NL	0.09	0.135	0.25
	at 20 bar	NL	0.3	0.448	0.65
Pressure medium			Compressed air with compressed air quality according to ISO 8573-1 class 4		
Weight		kg	3.3	4.9	15.67

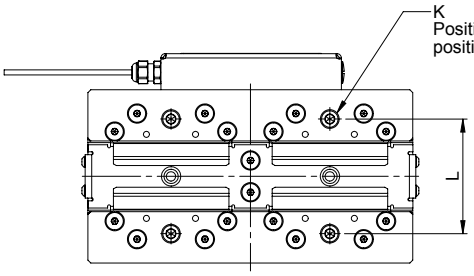
Article number SHB1 short version	5.0	5.1	5.3
20 bar version	501 388	501 390	501 392
6 bar version	501 443	501 445	501 447

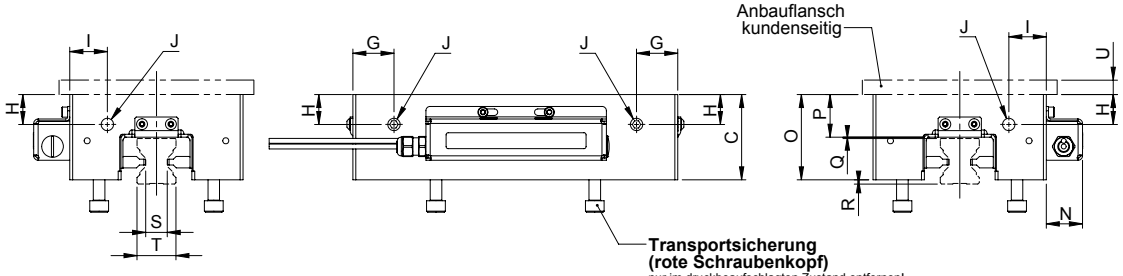
3) Minimum holding force when the brake is depressurised and when the profile rail is dry or wetted with mineral oil
4) With a switching frequency of >200,000, a reduction in the nominal holding force of 20% must be expected

5.1.7 SHB2 long version

ACHTUNG!
Bremse nie ohne Führungsschiene betreiben. Das Betätigen der Bremse ohne Führungsschiene führt zu Beschädigung

ATTENTION!
Never operate the brake without a guide rail. Activation of the brake without a guide rail will cause damage





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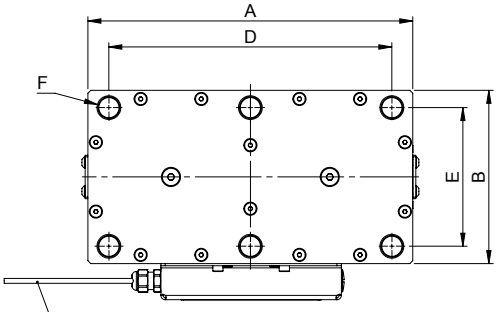
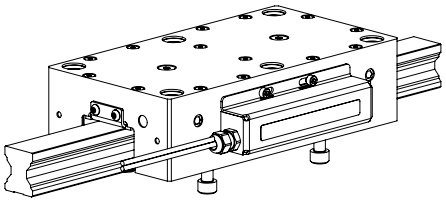




5.1.7 SHB2 long version

SHB2		Unit	5.0	5.1	5.3
Long version	A	mm	192	225	325
	B	mm	100	120	170
	C	mm	50	59	86.7
	D	mm	170	196	288
	E	mm	82	96	134
	F	mm	M12↧21.5	M16↧28	M24↧43
	G	mm	25	28.5	35
	H	mm	21.5	20.7	32.7
	I	mm	21	26	40
	J	mm	G 1/8 ↧ 9.5 Connection Ma=12Nm		
	K	mm	M6	M8	M10
	L	mm	66	79.4	112.4
Balluff inductive sensor	M	mm	BES516-3005-G-E4-C-PU-05		
	N	mm	25	25	25
	O	mm	54.2 +-/0.1	62 +-/0.1	92.2 +/-0.1
	P	mm	26	29.5	42.7
	Q	mm	2.2	1	1
	R	mm	4.2	3	5.5
	S	mm	15	15	29
	T	mm	23	27	48
Min. required thickness of the customer-side mounting flange (steel)	U	mm	10	15	35
Nominal holding force [3)4)] at 6 bar		N	5000	7500	15000
Nominal holding force [3)4)] at 20 bar using a pressure booster		N	5000	7500	15000
Opening pressure	min.	bar	6 or 20		
	max.	bar	8 or 28		
Stiffness		N/µm	380	490	1000
Max. sliding speed		m/s	2		
Ambient temperature		°C	-10 to +60		
Air consumption per	at 6 bar	NL	0.18	0.269	0.5
Circuit in standard litre at	at 20 bar	NL	0.6	0.897	1.3
Opening pressure					
Pressure medium			Compressed air with compressed air quality according to ISO 8573-1 class 4		
Weight		kg	5.33	8.86	26.67

Article number	5.0	5.1	5.3
SHB2 long version			
20 bar version	501 389	501 391	501 393
6 bar version	501 444	501 446	501 448

3) Minimum holding force when the brake is depressurised and when the profile rail is dry or wetted with mineral oil
4) With a switching frequency of >200,000, a reduction in the nominal holding force of 20% must be expected

6 Correct use

See also Section 2.3

6.1 Instructions for use

- Static application: - Hold and clamp in the event of power failure - In case of pressure drop - EMERGENCY STOP
- Observance of the correct dimensioning of the clamping force and switching frequency during EMERGENCY STOP for safe holding of the mass and safe adherence to the required braking distance.
- Use in a clean environment (penetration of lubricating greases, coarse dust and other friction-reducing substances can impair the clamping / braking function).
- Use in closed buildings (in tropical regions, high ambient humidity and temperatures below 0 °C with long downtimes, in marine climates, only with special measures).

6.2 Limitations

- The brake is not suitable for use in heavily soiled environments
- The brake is not suitable for use in high ambient temperatures >70 °C
- The brake is not suitable for use in liquid media
- The brake is not suitable for use in a vacuum
- The brake not suitable for contact with abrasive media (e.g. friction and grinding dust)
- The brake is not suitable for contact with aggressive, corrosive media (e.g. solvents, acids, alkalis, salt, etc.)
- The brake is not suitable for contact with foodstuffs

6.3 Reasonably foreseeable misuse

The following uses are prohibited and can lead to hazards.

- Any opening of the screws on the housing.
- Operation without profile rail.
- Exceeding the specified maximum operating pressure.
- Changing the brake by means of additional recesses, drill holes, etc.

6.4 Duration of use

20 years or after reaching T10d (definition see EN ISO 13849-1) service life.

6.5 Brake design

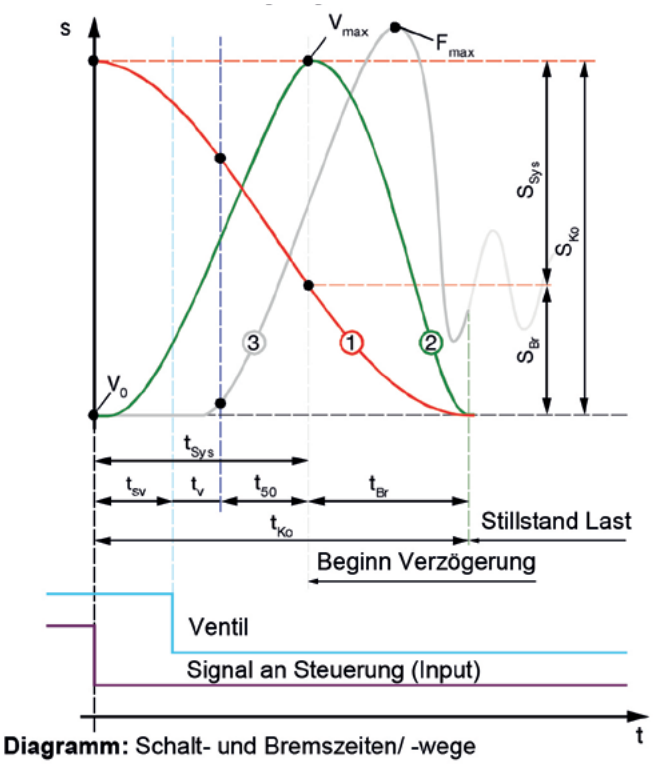


Diagramm: Schalt- und Bremszeiten/ -wege

Designation

1		Path
2		Speed
3		Axial force
β	[°]	Angular position 0° (horizontal) to 90° (vertical)
aB	[m/s2]	Acceleration of the downwards moving load, depending on the angular position
av	[m/s2]	Deceleration
g	[m/s2]	Acceleration due to gravity (9.81 m/s2)
FBr	[N]	Braking force for dynamic calculation
Freq.	[N]	Required holding force
FNom	[N]	Nominal holding force (minimum holding force)
FNtot	[N]	Rated holding force total (one or more brakes)
Fmax	[N]	Maximum holding force
m	[kg]	Load mass
SBr	[m]	Braking path: path from beginning of deceleration until the load comes to a standstill
SSys	[m]	System path: path travelled by the load until deceleration starts.
SKo	[m]	Stopping distance: path from signal interruption until the load comes to a standstill
t50	[s]	Brake switching time
tV[1)]	[s]	Valve switching time (not applicable for Type 382.0 __._)
tSV	[s]	Control unit switching time (signal processing time)
tSys	[s]	System switching time
tBr	[s]	Brake braking time

General

When selecting the brake, the nominal holding force must be greater than or equal to the required holding force.

FNom ≥ Freq. [N]

Design for dynamic braking (EMERGENCY STOP)

As security, at least the weight of the load to be held + 100 % reserve must be provided for.
The greater the ratio of the nominal holding force to the required holding force, the shorter the stopping distance is (under identical technical conditions)
The minimum holding force required can be calculated using the following formula:

$$\text{Freq.} = \frac{m \times g}{0.5}\ [N]$$

Design for static holding (clamping)

As security, at least the weight of the mass to be held +20 % reserve must be provided for.
The minimum holding force required can be calculated using the following formula:

$$\text{Freq.} = \frac{m \times g}{0.8}\ [N]$$

The stopping distance / stopping time of the load to be braked is strongly dependent on the following influences:

- Switching time of the control unit (signal processing)
- Switching time of the control valve
- Switching time of the brake
- Cross-section and length of cables

The greater the sum of the switching times the later the deceleration of the load (due to longer lasting acceleration). The stopping distance / stopping time becomes longer (with constant holding force).

Designation

tKo	[s]	Stopping time: Time Signal interruption to standstill of the load
V0	[m/s2]	Initial speed
Vmax	[m/s2]	Maximum speed

6.5.1 Calculation example (dynamic braking)

Details		
Angular position of profile rail	β	= 90° (vertical axis)
Mass	m	= 200 kg
Initial speed	V0	= 0.5 m/s
Valve switching time	tV	= 0.016 s
Control unit switching time	tSV	= 0.020 s
Available operating pressure		= 6 bar

1. Preselection of braking force

$$Freq. = \frac{m \times g}{0.5} \quad [N]$$

$$Freq. = \frac{200 \times 9.81}{0.5} = 3924 \quad [N]$$

Selected: SHB 2 Size 5.1,
Type 3850.0_0_ _ at 6 bar,
Nominal holding force FNom = 6000 N
(from Section 5.2 Table "Technical data")

2. Calculation of stopping distance/stopping time

Checking the selected brake size

Acceleration of the load

aB	=	g x sin(β)	=	9.81x sin(90°)	= 9.81	[m/s2]

Acceleration of the load

SSys	=	V0 × tSys + aB × tSys2 × 0.5			[m/s2]
SSys	=	0.5 × 0.079 + 9.81 × 0.0792 × 0.5			[m/s2]
SSys	=	0.071			[m/s2]
tSys	=	t50 + tV + tSV	=	0.043 + 0.016 + 0.02	
tSys	=	0.079			[m/s2]

Braking distance

$$SBr = \frac{Vmax2}{2 \times \left(\frac{FNtot - aB}{m} \right)} \quad [m]$$

$$SBr = \frac{1.272}{2 \times 20.19} = 0.04 \quad [m]$$

$$Vmax = V0 + aB \times tSys[m/s]$$

$$Vmax = 0.5 + 9.81 \times 0.079 = 1.27 \quad [m/s]$$

Stopping distance

$$SKo = SBr + SSys \ [m]$$

$$SKo = 0.04 + 0.071 = 0.11 \quad [m]$$

Stopping time

$$tKo = tBr + tSys \ [s]$$

$$tKo = 0.063 + 0.079 = 0.142 \ [s]$$

$$tBr = \frac{Vmax}{\frac{FNtot}{m} - aB} = \frac{1.27}{20.19} = 0.063 \ [s]$$

Deceleration (for system dimensioning

$$aV = \frac{FNtot \times 2.5}{m} - g = \frac{6000 \times 2.5}{200} - 9.8 = 65.1 \quad [m/s2]$$

$$Load = \frac{aV}{g} = \frac{65.19}{9.81} = 6.64 \quad [g]$$

Switching times	Size		
	5.0	5.1	5.3
Brake switching time Type 3850/1 t50 [s]	0.035	0.035	0.040

7 Storage

7.1 Storage of brakes

- Brakes should be stored lying down, in dry rooms, free of dust and vibrations.
- Relative humidity < 50 %.
- Temperature without major fluctuations in the range from 0 °C to +40 °C.
- No direct sunlight or UV light.
- Do not store aggressive, corrosive substances (solvents / acids / alkalis / salts / etc.) nearby.

8 Installation

8.1 Installation conditions

Observe before installing!

8.1.1 General

• The brake is supplied ready for installation.

Note!
The brake must not be dismantled!

• The nominal holding force is determined by the preloading of the springs at the factory. The ball clamping screws for the adjustment of the stroke path are secured against twisting with Loctite 243.

CAUTION Nominal holding force can be influenced. Turning of the ball clamping screw by the customer can lead to malfunctions. Never turn the ball clamping screws.

8.1.2 Profile rail

Requirements on the profile rail

Note!
The function of the stepless holding brake (SHB) is only guaranteed if the rail surface is properly maintained.

ATTENTION Never operate the brake without a profile rail
Operating the brake without a profile rail leads to damage. The brake can no longer be used.

CAUTION The clamping effect can be impaired by friction-reducing materials such as tough lubricants, greases or separating agents - clean if necessary. See Section 11.4

8.1.3 Control

Leantechnik recommends the following pneumatic controls. The piston chamber is filled with compressed air, thus eliminating the spring force. In the event of a power failure, the compressed air in the piston chamber is discharged. The spring force acts on the clamping element. The profile rail is clamped/braked.

Switching time-related applications

Recommendation!
For applications to optimise the switching time (reduction of braking path)

- Select the shortest possible cable paths. Cross sections and the lengths of the cables influence the response times considerably.
- For faster brake application we recommend a quick exhaust valve (6) (selected according to the compressed air connection thread).

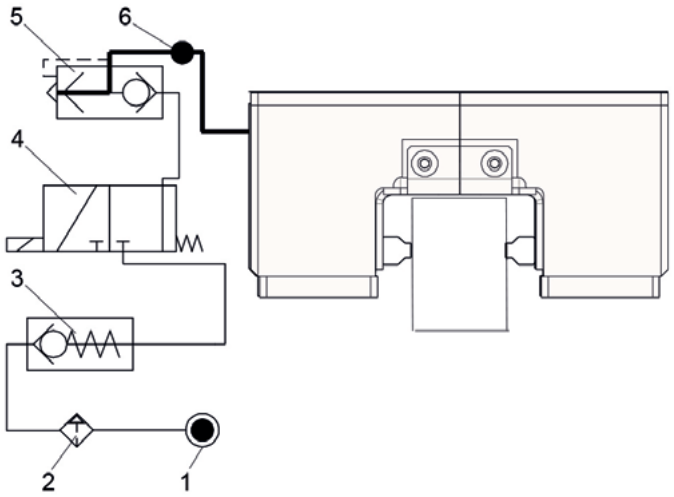
Note!
The flowing away of compressed air must not be compromised by any other components.

- The size and speed of the 3/2-way valve (5) influences the switching time.

Safety-related applications

Recommendation!
For applications to optimise safety (in case of danger to persons)

- Use of a proximity switch for switch condition monitoring (see Section 9.1)
- In addition, use a pressure monitor (pressure switch 6) between the brake and the quick exhaust valve.



Position	Denomination
1	Pressure source
2	Maintenance unit
3	Check valve (for pressure fluctuations)
4	3/2-way valve (installation as close as possible to the brake)
5	Quick exhaust valve (for fast switching times)
6	Pressure switch (query for safety-relevant application)

8.2 Installation

8.2.1 Prerequisite

- Unpack the brake
- Check completeness
- Check the details on the type plate
- Visual inspection (e.g. after prolonged storage)

CAUTION Observe the dead weight of the brake: When lifting / dismantling, the brake may drop. Crushing and impacts may result.

8.2.2 Preparation

- Have the necessary tools ready:
  - Open-end wrench, etc.
  - Torque wrench
- Observe the required minimum thickness of the customer's mounting flange (dimension U).
- Have fastening screws ready (not included in scope of delivery)

Size and tightening torques of the fastening screws				
Size	Thread	Tightening torque	Strength class	Max. screw-in depth B
5.0	6 x M12	109 Nm	10.9	21.7 mm
5.1	6 x M16	260 Nm	10.9	27.7 mm
5.3	6 x M24	900 Nm	10.9	43 mm

All tightening torques are recommendations. This information does not release the user from checking the data in relation to the installation situation.

8.2.3 Installation process

With wipers (optional), the connections m3 and m4 cannot be used.

1. Remove the screw plug from the desired pneumatic connection (J)
2. Connect the pneumatic hose via the thread on the pneumatic connection (J) to the brake
3. Load the brake with operating pressure. See Technical data.
4. Unscrew the transport lock (K) and remove it

ATTENTION Brake may be damaged
Removing the transport lock when the brake is depressurised will result in damage. Only remove the transport lock (red screw head) when pressurised.

6. Push the brake onto the profile rail.
7. Screw in the fastening screws (without torque).
8. Screw locking with Loctite 243
9. Depressurise the brake and thus tension it (centring).

ATTENTION Close the brake only with the guide. The brake must be pushed onto the profile rail.

10. Tighten the fastening screws with tightening torque Nm.
11. Apply pressure to the brake.
12. Depressurise the brake again (pressure relief).
13. Tighten the fastening screws with tightening torque

CAUTION Load crash possible
The brake has no function when the transport locks are screwed in. The transport lock (red screw head) must be removed.

9 Switch condition monitoring

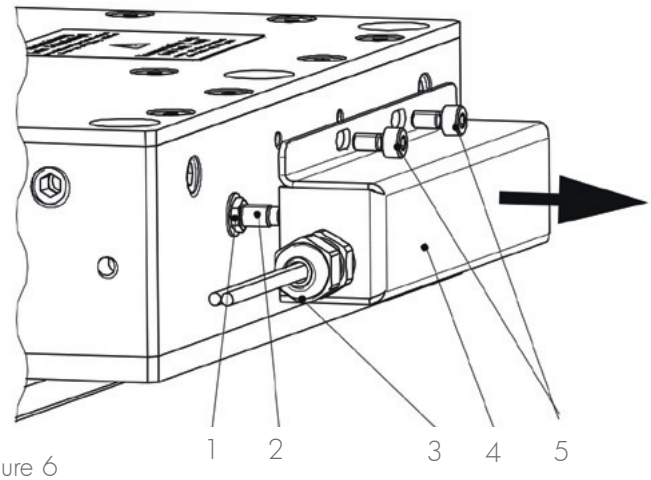


Figure 6

Note!
Switching condition monitoring is set and installed at the factory.

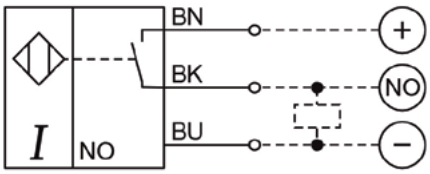
A proximity switch (2) emits a signal for each brake condition change.
SHB 2 is equipped with 2 proximity switches (2).

Plausibility check

Brake open	Pressure on	Signal OFF
Brake closed	Pressure switched off	Signal ON

A signal evaluation of both conditions must be carried out by the customer.

Wiring diagram:



Technical data	
PNP/closer	
Rated operating voltage	U_e=24 VDC
Operating voltage	U_e=10...30 VDC
Cable length	5000mm

Replacing the proximity switch

Note!
Proximity switches are not considered to be fail-safe, and appropriate access for replacement or adjustment must be possible.

Prerequisite

WARNING Load crash possible
Gravity-loaded axles must be fixed in place before work commences and therefore secured against falling.

• Brake is depressurised (closed) on the profile rail.

Disassembly

1. Unscrew the cable gland (3)
2. Unscrew the cylinder screws (5)
3. Remove the cover plate (4)
4. Unscrew the hexagon nut (1), unscrew the proximity switch (2) and remove.

Installation and adjustment

Initial situation: Proximity switch is not connected

Activity		Result
1.	Check whether the brake is depressurised	
2.	Screw the proximity switch in carefully until it stops	
2.1	Unscrew the proximity switch 1 revolution (360°)	
3.	Lock the proximity switch (2) with a hexagon nut (1) (Tightening torque: 2 Nm	
4.	Connect the proximity switch (see wiring diagram)	"ON" signal
5.	Set operating pressure	"OFF" signal
6.	Carry out a functional check	
6.1	Switch off pressure	"ON" signal
6.2	Switch on pressure	"OFF" signal
7.	Pull the cable through the cable gland (3	
8.	Screw on the cover plate (4)	
9.	Tighten the cable gland (3)	

10 Commissioning

10.1 Brake test (before commissioning)

- All fastening screws must be checked for their prescribed tightening torque.
- Visual inspection of the pneumatic connections and lines.
- Check for leaks (pressure is switched on).

10.2 Brake test (static)

Caution During the brake test, hazards to persons and machine damage cannot be ruled out due to malfunctions (assembly errors, control errors, etc.). Do not enter danger area. Take any measures necessary to intercept or attenuate the load. Check the setup!

10.2.1 (Static) brake test

- The brake test is carried out by load transfer or by the drive.

Recommendation!
Test the brake with the nominal holding force or the maximum load mass.

10.3 Brake test (during operation)

Recommendation!
The assurance of the necessary holding force with all control and braking times in the event of danger from gravity-loaded axles must be checked by a test. A cyclical brake test during operation provides additional safety. Depending on the hazard, the relevant regulations and standards must be observed.

10.3.1 Regular function check (static)

- Depending on the application requirements, it is advisable to carry out regular brake force checks (depending on the application), e.g. test the static holding force once per shift with the nominal holding force or the maximum load mass.
- In addition to the regular check of the holding force, we recommend the use of switching condition monitoring (optional) in order to check the switching condition of the brake and to avoid a possible load drop in the event of vertical installation.

Recommendation!
The holding force can be reduced by friction-reduced substances. If the brake does not reach the nominal holding force during the functional test, repeat at 90 % of the nominal holding force and clean the profile rail at the next opportunity (see Section 11.4).

11 Maintenance / Inspection / Switching frequency

11.1 Switching frequency

The stepless holding brake (SHB) is designed for a switching frequency of up to 200,000 switching operations.

11.2 Inspection

Check the condition

Measure	Condition	Interval	Execution
Visual inspection	Pneumatics	Determined by machine operator depending on installation situation Please consult Leantechnik AG	Qualified personnel
	Profile rail	After each EMERGENCY STOP	
	Signs of wear	Determined by machine operator depending on installation situation Please consult Leantechnik AG	Leantechnik AG

11.3 Maintenance

The stepless holding brake (SHB) is largely maintenance-free

Action	Note/Comment	Interval	Execution
Function test	Carry out regular function tests	see Section 10.3	Qualified personnel
Check profile rail	The profile rail must be checked regularly for soiling with friction-reducing substances and cleaned if necessary (see Section 11.4). Special measures are required in the event of heavy dust and dirt accumulation or extreme environmental conditions. Please contact Leantechnik AG	At least every 6 months	

If the stepless holding brake (SHB) no longer meets the required characteristics or if the prescribed safety for working on the machine or system is no longer assured, the brake must be inspected by Leantechnik AG and, if necessary, professionally repaired and approved.

11.4 Cleaning

Only in the event that heavy soiling impairs the function of the brake

• Clean the profile rail (using a lint-free, clean cloth) with methylated spirit.

The rail may be lubricated with oil or common bed track greases!

12 Disassembly

CAUTION Observe the dead weight of the brake
When lifting / dismantling, the
brake may drop. Crushing and
impacts may result.

WARNING Load crash possible
The brake must be unloaded.
The unloaded condition must be checked before disassembly
- Secure the danger area
- Support the load

Disassembly is carried out in the opposite order to Section 8.2.3 "Installation process".

13 Disposal

For disposal, observe the specific regulations of the respective country of use.

All steel components:
Steel scrap (key no. 160117)

Seals, O-rings, V-seals, elastomers:
Plastic (key no. 160119)

14 Malfunctions

Error	Possible causes	Correction	Execution
Brake does not ventilate	Operating pressure too low	Check the operating pressure and increase if necessary	Qualified personnel
	Valve faulty	Replace the faulty valve	
	Leak in the supply line	Seal the leak	
Brake does not brake	Wear limit of the brake reached	Replace the brake	Leantechnik AG
	Valve faulty	Replace the faulty valve	Qualified personnel
	Profile rail does not fit the brake	Check the design, check technical data	
Brake does not release	Cross section of supply line too small	Attach a line with a larger cross-section	
Braking distance too long	Profile rail does not fit the brake	Check the design, check technical data	
	Profile rail / brake shoes worn too much	Replace the brake	Leantechnik AG
	Cross section of lines too small	Attach line with a larger cross section	Qualified personnel
	Friction-reducing substances on the profile rail	Clean the profile rail	
	Incorrect dimensioning	Check the design, check technical data	
	3/2-way valve too slow		
Switching condition monitoring gives no signal	Mounting and adjustment of the switching condition monitoring faulty	Carry out the setting again, see 9.1	
	Brake does not ventilate	See error Brake does not ventilate	
	Cable faulty	Replace the faulty cable	
	Proximity switch faulty	Replace the faulty proximity switch	

Leantechnik accepts no liability or warranty for the use of spare parts and accessories not supplied by Leantechnik, or for any resulting damage.