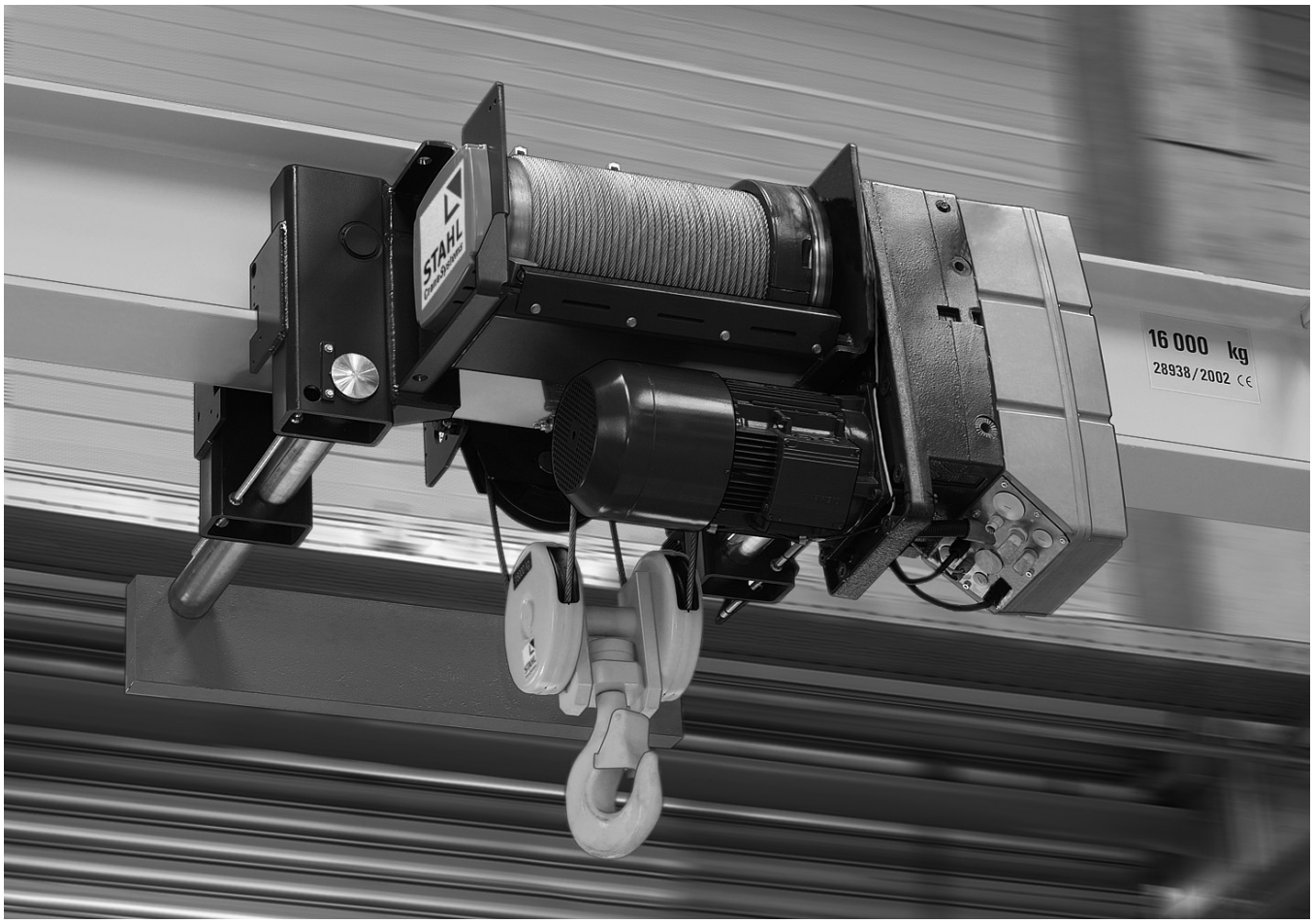


SH

Wire Rope Hoists _

EN

Operating and Maintenance Instructions

STAHL CraneSystems

Fundamental information

You have purchased a product manufactured by STAHL CraneSystems GmbH. This wire rope hoist has been constructed in compliance with the applicable standards and regulations.

Inspect hoist for damage caused in transit immediately upon delivery.

Report damage caused in transit and after consulting the manufacturer/supplier repair or have repaired before installation and commissioning.
Do not install or commission a damaged hoist!

- **Assembly**
- **installation**
- **commissioning**
- **tests**
- **maintenance and elimination of faults**

may only be carried out by a qualified person

Terms employed

User
Whoever uses and employs the wire rope hoist or has it operated by suitable trained personnel is considered to be the user (employer/company).

Trained personnel
Trained personnel are persons who have been instructed and trained in the duties with which they are entrusted and the risks which may arise from incorrect behaviour, have been advised on the necessary protective devices, precautions, applicable regulations, accident prevention regulations and prevailing conditions and have proven their ability.

Skilled electrician
A skilled electrician possesses knowledge and experience on electrical equipment arising from specialist training and, with knowledge of the applicable standards and regulations, is able to assess the work with which he is entrusted and detect and avoid possible risks.

Definition of a qualified person (specialist):
A qualified person is one with the necessary qualification, based on theoretical and practical knowledge of hoists, for the required activities as listed in the operating instructions.
The person must be in a position to assess the safety of the installation in conjunction with the application. Persons with the authority to undertake certain maintenance work on our products include service engineers of manufacturer and trained fitters with the corresponding certification.

Seminars:
Comprehensive understanding of material handling products is a prerequisite for the correct use of equipment. Competent and practically oriented, we impart the specialist knowledge required for the correct use, monitoring and care of your installation.
Ask for our seminar programme → you will find information on it on the last page.

Contents

1 Safety instructions

1.1 Symbols

Transport
The wire rope hoist is delivered on a special pallet. This enables the hoist to be loaded and unloaded safely with a fork-lift truck. If the wire rope hoist is to be transported suspended, it must be attached by the **suspension lugs** provided, see sketch.

Safety at work
This symbol marks all information on safety at work where risks to life and limb are entailed.

Warning of electrical voltage
Covers such as hoods and caps which are marked with this symbol may only be opened by "qualified persons or suitably instructed personnel".

Warning of suspended load
It is forbidden for persons to stand under suspended loads. This entails risks to life and limb!

Safety in operation
Information marked with this symbol must be observed to avoid damage to the wire rope hoist or the goods transported.

In these operating instructions, these symbols mark particularly important information on risks and safety in operation.

1.2 Operating instructions

Read carefully and observe the operating instructions.

1.3 Use for intended purpose

- Wire rope hoists are intended for lifting freely movable and guided loads that cannot tilt. Depending on their design, they are for stationary or mobile use. If loads are to be towed horizontally, or in the case of guided loads, automatic operation, continual deadweight or constantly repeated hoisting motions, the individual application must be assessed. Please contact the manufacturer in case of doubt.
- Any fundamental alterations and modifications to the wire rope hoist, such as e.g welding on load-bearing components, structural alterations to load-bearing components, alteration of drives, alteration of speeds and motor outputs, replacing trolleys, etc. must be authorised by the manufacturer, otherwise the declaration of conformity will be invalidated.
- Also any work on or additions to the control must be authorised by the manufacturer. The manufacturer cannot accept any liability for malfunctioning after unauthorised work on the control.

Not permitted:

- Exceeding the safe working load
- Transporting persons
- Pulling loads at an angle
- Pulling loads loose
- Pulling or towing loads if the wire rope hoist has not been especially designed for this application.
- Manipulating the overload cut-off, apart from corrections as described on page 57.
- Operating the hoist with slack rope.
- If the hoist forms "part of a machine," the person placing it on the market must ensure that the hoist meets the specific regulations of the application

1.4 Safety-conscious operation

SH wire rope hoists are constructed according to the state of the art and equipped with an overload cut-off. In spite of this, dangers may arise from incorrect use or use for an unintended purpose.

- The user is responsible for ensuring that work is carried out with safety in mind and avoiding risks, see page 2.
- Read the operating instructions before starting to work with the wire rope hoist.
- Do not lift any loads heavier than the rated load.
- Standing under a suspended load is forbidden. Danger to life and limb!
- Observe the "Duties of crane operator", see page 30.
- Before starting work, find out where the EMERGENCY STOP button is (usually in the control pendant).
- Do **not** put your hand between edges which might pinch or cut.
- Do not use the emergency limit switch (ultimate limit switch for highest and lowest hook position) as an operational limit switch.
- Report damage and defects to the wire rope hoist (abnormal noises, impaired braking function, deformations, ...) to the person responsible immediately. Do not use the wire rope hoist until the faults have been eliminated.
- Do not remove information plates from the wire rope hoist. Replace illegible or damaged plates.
- Have hoist inspected by the relevant authority before commissioning.

1.5 Organisational safety precautions

- Only direct persons to operate the hoist if they have been trained or instructed in its use. Observe the legal minimum age!
- At regular intervals, check that work is being caried out in a safety-conscious manner.
- Observe the intervals specified for periodic tests. File the test reports in the test log book.
- Store the operating instructions within easy reach where the wire rope hoist is operated.

1.6 General regulations

- Safety regulations and accident prevention regulations.
- National regulations

1.7 Installation, commissioning, maintenance and repairs

- Installation, commissioning, maintenance and repairs may be carried out by qualified persons only, see page 2.
- We recommend having installation carried out by personnel engaged by the manufacturer.
- Do not carry out any alterations or modifications.
- Additional fitments must be approved by the manufacturer.
  (During welding work, electrode and ground must be in contact with the same component!)
- Use only **original spare parts** for repairs.

If the wire rope hoist is constantly operated out of doors and exposed to the elements without protection, we recommend fitting a small roof or at least "parking" the hoist under a roof.

1.8 Warranty

- The warranty will become invalid if these operating instructions are not observed for installation, operation, inspection and maintenance.
- Repairs and elimination of faults within the scope of the warranty may only be performed by qualified personnel (see page 2) after the manufacturer/supplier has been consulted and has given his approval.
  The warranty will become invalid if the hoist is modified or original spare parts not used.

1.9 Periodic tests

Hoists and cranes must be inspected by a **qualified person** see page 2 at least once a year. The results of the test must be recorded and filed in the test log book.
The remaining service life of the hoist acc. to FEM 9.755 must also be established during this inspection.
The periodic tests must be adapted to the hoist's use. Intensive use entails shorter maintenance intervals.

All tests must be initiated by the user, see page 2.

1.10 After sales service

With the purchase of this wire rope hoist, you have decided on a high-quality piece of lifting equipment. Our after sales service will give you advice on its correct use. You will find information on our after sales service on the back cover.

In order to maintain the safety and constant availability of your wire rope hoist, we recommend concluding a maintenance agreement on the basis of which we will undertake the "periodic tests" on your behalf.

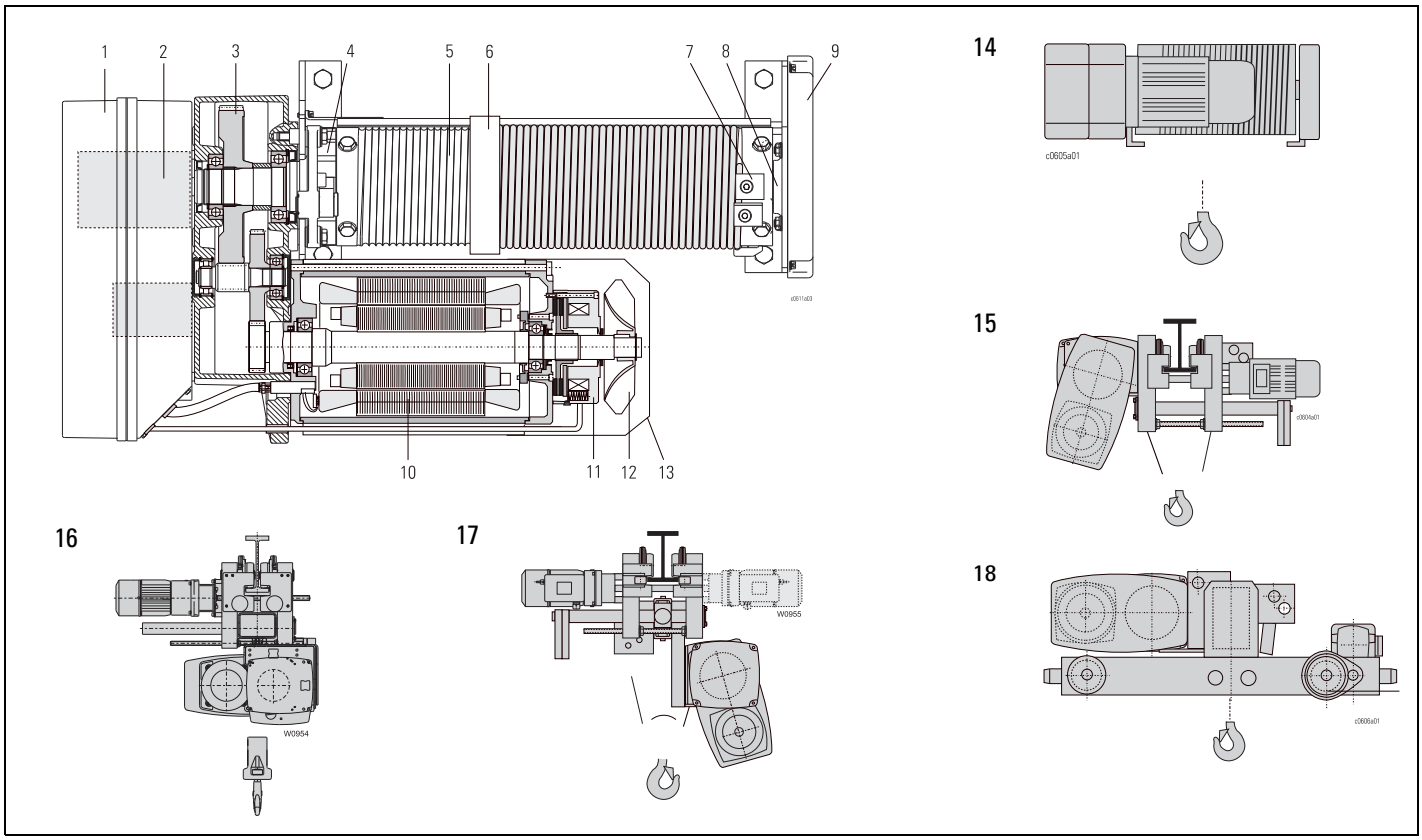
Repairs will be carried out professionally and quickly by our trained personnel.

2 Seilzug kennen lernen

The modular concept of our series of wire rope hoists permits a multitude of variations on the basis of series components.

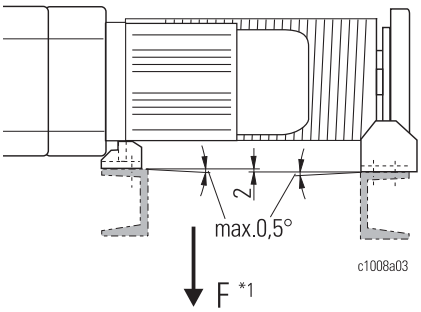
Our certified quality assurance system to DIN ISO 9001/EN 29001 guarantees consistently high quality.

If you have any questions, for example on hoists modified to customers' specific applications, please contact one of our branches or subsidiaries. We will be pleased to advise you!



1 Panel box with connection parts
2 Gear limit switch
3 Gear
4 Mounting point for safety brake (SH4 - SH6)
5 Rope drum
6 Rope guide with rope tensioning spring
7 Clamps for rope attachment
8 Rope drum bearing
9 End cover
10 Motor
11 Brake
12 Fan
13 Fan cover
14 Stationary wire rope hoist, hoist for installation
15 Wire rope hoist with "short headroom" monorail trolley
16 Wire rope hoist with "standard headroom" monorail trolley
17 Wire rope hoist with "articulated" monorail trolley
18 Wire rope hoist with double rail crab

3.1 Stationary wire rope hoist



M_T (Rope drum torque)

SH 3: M_T = 0.5 x F x 126 mm
SH 4: M_T = 0.5 x F x 167 mm
SH 5: M_T = 0.5 x F x 219 mm
SH 6 : M_T = 0.5 x F x 356 mm

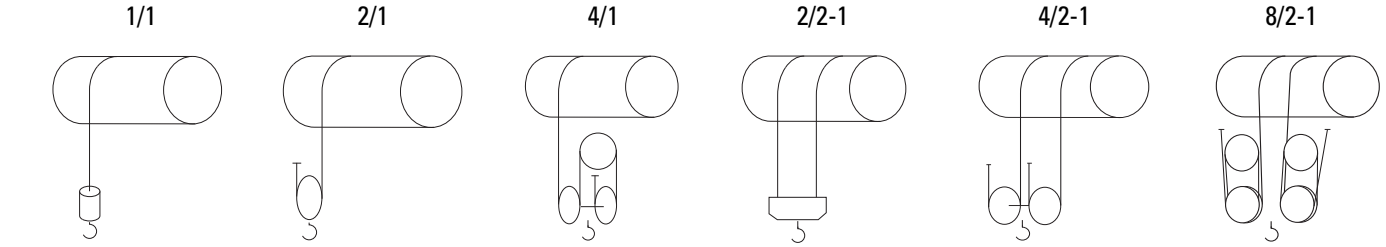
Possible fixing positions and rope lead-off
Feet "at bottom," and "at top" are possible for designs with bottom hook block (rope lead-off vertically downwards).

The SH wire rope hoist with 1/1 and 2/2 rope lead-off can be installed in various positions. The fleet angles possible can be seen from the sketches on pages 9 and 10.

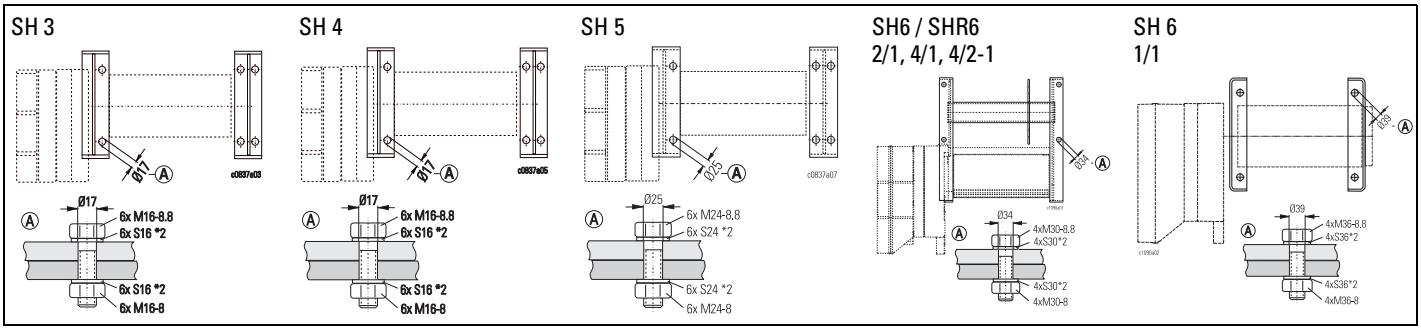
If possible, install the hoist in the **preferred installation position ***,** see page 9.

- Use the fixing elements specified, see sketches and tables.
- Take care that no distortion arises from unevenness, etc. (see sketch, max. 0.5°, max. 2mm)
- The customer's substructure must take up the torque M_T from the rope drum. It must therefore be torsion resistant.
- If the rope lead-off is not vertical, the shearing forces arising must be taken up by a support bar.
- For tightening torques, see page 63

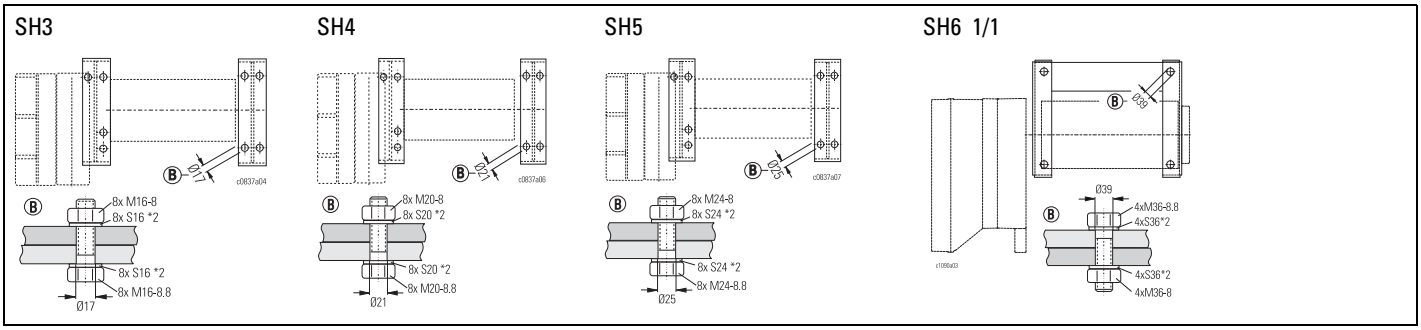
Standard reevings



3.1.1 Feet at bottom



3.1.2 Feet at top



*1 Tractive force at rope drum
*2 Lock washer (Schnorr)

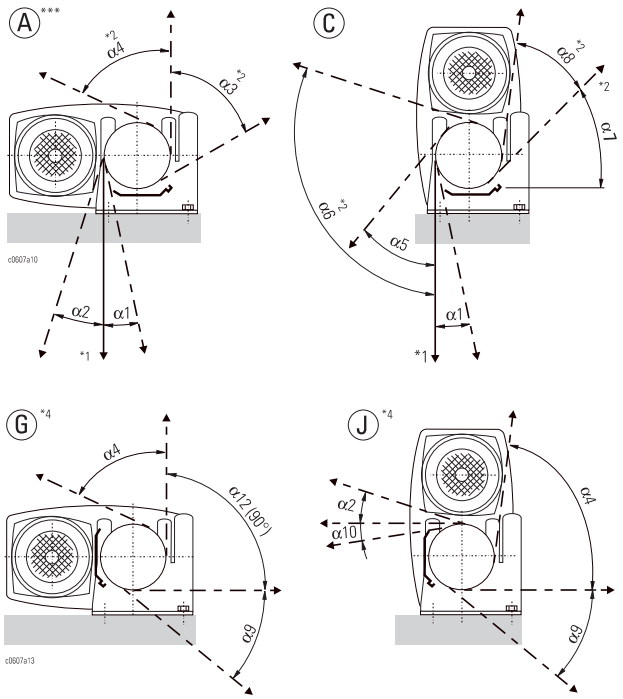
BASH_02_1.FM

3.2 Fleet angles

3.2.1 Feet at bottom

	1/1, 2/2			
	SH 3	SH 4	SH5	SH6
α1	4°	5°	8°	8°
α2	23°	13°	20°	18°
α3	27°	30°	30°	30°
α4	74°	73°	76°	80°
α5	30°	30°	30°	25°
α6	113°	103°	110°	108°
α7	83°	81°	60°	60°
α8	11	12°	18°	20°
α9	24°	26°	30°	12°
α10	7°	7°	8°	8°
α12	90°	90°	90°	-

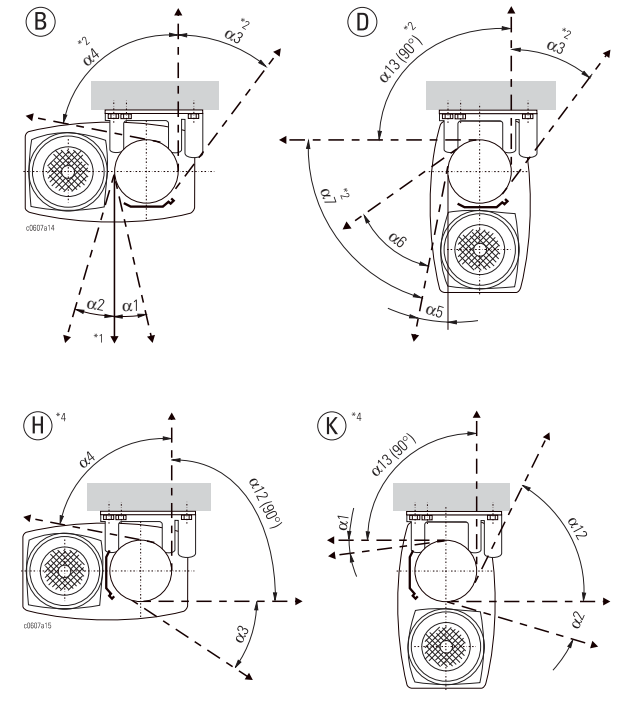
SH 3
SH 4
SH 5
SH 6



3.2.2 Feet at top

	1/1, 2/2			
	SH 3	SH 4	SH 5	SH 6
α1	4°	5°	8°	8°
α2	23°	13°	20°	18°
α3	27°	30°	30°	12°
α4	74°	73°	76°	80°
α5	16°	17°	14°	-
α6	34°	32°	36°	-
α7	74°	73°	76°	-
α12	90°	90°	90°	8°
α13	90°	90°	90°	30°

SH 3
SH 4
SH 5
SH 6



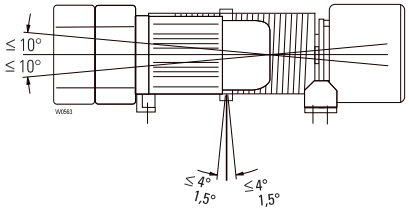
*** Preferred installation position
*1 Standard
*2 By turning rope guide
*4 By turning rope guide and grease pan; version G, H not possible for SH 6

3.2.3 Fleet angles

Type	
	γ
SH 3	53°
SH 4	60°
SH 5	53°
SH 6	53°

The rope guide must be adjusted to the fleet angle. Observe also the radial rope exit angle γ.

3.2.4 Angles of installation

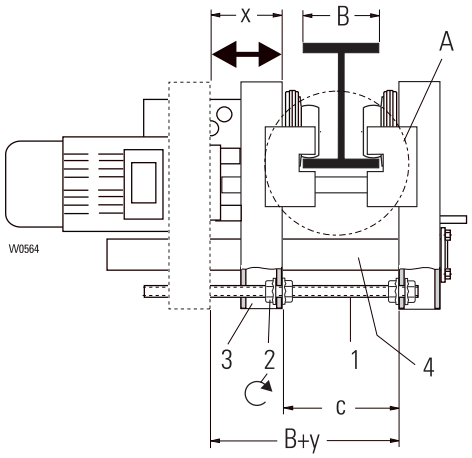


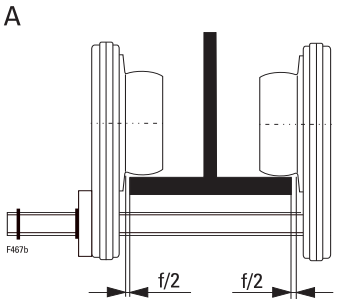
- Instal the wire rope hoist within the permissible range of angles. Hoists with rope drives with bottom hook blocks must always be installed horizontal to their longitudinal axis.
- The max. permissible rope exit angle acc. to standard is 4° for non-twist-free wire ropes, 1.5° for twist-free wire ropes. However even at these angles a reduction in service life is to be expected.
- The wire rope must not touch the rope guide or structural elements.

3.3 Trolleys/crabs

3.3.1 Monorail trolley (KE-S33 - 76)

with SH 3, SH 4, SH 5, SHR 6, SH 6 wire rope hoists





- Check flange width "B" and clearance "c" against table 1 and set trolley to beam width if necessary.
  Caution! If the flange width is altered (by customer), it may be necessary to alter the counterweight to prevent the trolley canting. Please have it checked by our after-sales service.

Installation if end of runway is freely accessible

- Slide trolley onto end of runway and check play f/2.

Installation if end of runway is not accessible

- Unscrew nuts (2) on threaded bolts (1) and slide trolley side cheek (3) outwards by approx. "x" mm or until dimension "B+y" is reached (table 1).
- Push hoist side of trolley onto lower flange of runway beam and secure against slipping.
- Push trolley side cheek (3) towards the runway beam on support bolt (4).
- Adjust dimension "c" with nuts (2), tighten nuts (2).
- Check track gauge "c" and play "f/2".
- Tighten nuts (2) with torque spanner.
- For tightening torques see table 1.

Table 1

Hoist	ØD	Trolley	I	I	I I	I	c	f/2	x	y	↻
	mm		INP	IPE	IPB	"	mm				Nm
SH 3	80	KE-S33	B= 90...500				B+67*1	1.5	70	137	210
SH 4	100	KE-S44					B+67*1	1.5	80	147	210
SH 5	140	KE-S65	B= 119...500				B+67*1	1.5	95	162	210
SHR 6, SH 6	200	KE-S76	B= 124...500				B+92*1	1.5	95	187	210

Drive shaft for travel drive (trolleys KE-S33 - KE-S65)

- Fit drive shaft in mounting position X3 or X4 depending on flange width (B) of runway beam and length (L) of drive shaft (D).
- Fit circlips (S).
- See sketch and table 2.

Table 2

ØD [mm]	B [mm]	Drive shaft		
		L [mm]	Position	
80 100	90 - 145	390	X3	-
	146 - 195		-	X4
	196 - 250	495	X3	-
	251 - 306		-	X4
	301 - 350	595	X3	-
	351 - 399		-	X4
	400 - 450	695	X3	-
	451 - 500		-	X4
140	119 - 145	505	X3	-
	146 - 200		-	X4
	201 - 250	505	X3	-
	251 - 305		-	X4
	330 - 400	710	X3	-
	401 - 500		-	X4
200	124 - 220	510	see page 12	
	221 - 400	740		
	401 - 500	780		

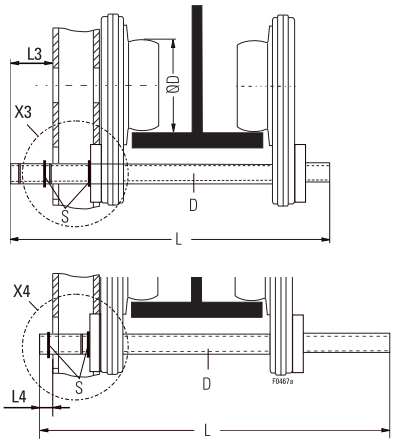


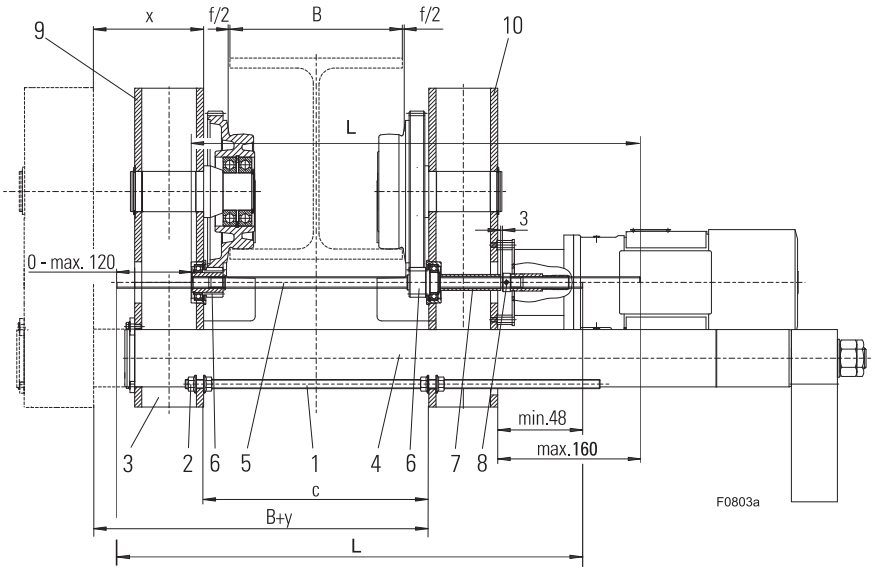
Table 3

ØD [mm]	L3 ±2 [mm]	L4 ±2 [mm]
80 100	96.4	46.4
140	124.6	46.4

*1 with INP beam: -2 mm

Drive shaft for trolley drive (trolley KE-S76)

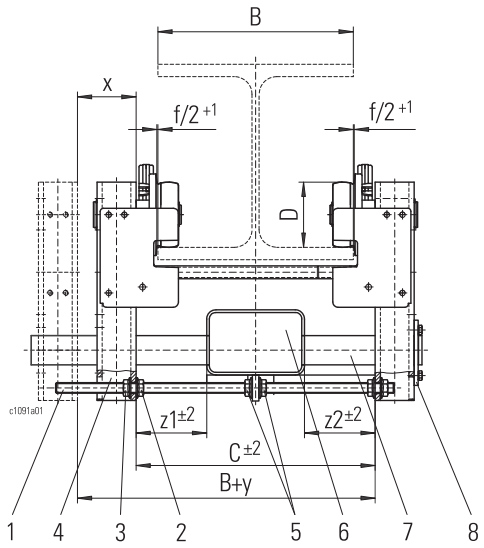
- The drive shaft is suitable for girder flange widths "B" from 124 to ≤220, >221 to ≤400 and >401 to 500 mm; see table 2, page 11 for length "L".
- Insert drive shaft (5) into the two drive pinions (6) from the counterweight side, then assemble spacer tube (7) and adjusting ring (8).
- Adjust drive shaft (5) so that on the hoist side the shaft end projects by between "min. 0 mm" and "max. 120 mm" beyond the drive pinion (6) and on the counterweight side the shaft end projects by between "min. 48 mm" and "max. 160 mm" beyond the trolley side cheek (10).
- Lock adjusting ring (8) with adjusting screw so that on spacer tube (7) lying against drive pinion (6) there is a play of approx. "3 mm" to adjusting ring (8).
- After fitting travel drive, check drive shaft (5) for ease of movement.



For dimensions B, c, f/2, x and y see tables 1 and 2, page 11

3.3.2Monorail trolley (UE-S4)

with SH 4, SH 5 1/1 wire rope hoists (single fall)



- Check flange width "B" and clearance "c±2" against the table and set trolley to beam width if necessary. Ensure that the connection piece (square tube) (6) is in the centre (of dimension "c") between the trolley side cheeks ("z1" = "z2").
- After unscrewing nuts (3) together with nuts (2), adjust clearance "c±2" and tighten nuts (3).
- Tighten nuts (3) with torque spanner. Tightening torques see table.
- Clearance "c" results in a flange play of "f/2+1" on each side. If necessary, correct flange play by means of clearance "c".

Installation if end of runway is freely accessible

- Slide trolley onto end of runway and check play f/2.

Installation if end of runway is not accessible

- Loosen nuts (3) on threaded bolts (1) in the square tube of the trolley side cheeks (4) and unscrew by dimension "x".
- Push trolley side cheeks (4) apart in parallel up to the unscrewed nuts (3) until dimension "B+y or c+x" is reached, and lift trolley onto runway from below.
- Slide trolley onto the bottom flange of the runway beam on the axle keep plate side (8) and secure against shifting.
- Push trolley side cheeks (4) back to nuts (2), retighten nuts (3).
- Check track gauge "c±2" and play of guide rollers "f/2".
- Tighten nuts (3) with torque spanner. Tightening torques see table.

Centering connection piece

- Loosen nuts (5) and shift connection piece (6) on connecting bolt (7) so that dimensions "z1" and "z2" between trolley side cheeks (4) and connection piece (6) are equal on both sides.
- Tighten nuts (5) with torque spanner. For tightening torques see table.

ØD	Trolley	I	I	I I	I	c	f/2	x	y	↻
mm		INP	IPE	IPB	"	mm				Nm
100	UE-S4	B= 90...500				B+67*1	1.5	75	142	210

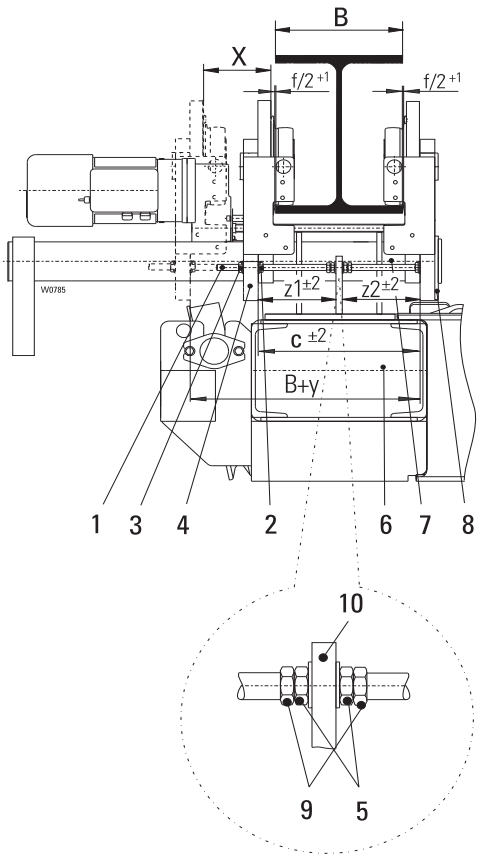
Connecting bolt and drive shaft

- Use connecting bolt and drive shaft suitable for beam range "B". (For dimensions, see sketch and table 2, page 11).

*1 for INP beam: -2 mm

3.3.3Monorail trolley (UE-S776)

with SH 6, 4/1 wire rope hoists (four-fall)



- Check flange width "B" and clearance "c±2" against the table and set trolley to beam width if necessary. Ensure that the connection piece (square tube) (6) is in the centre (of dimension "c") between the trolley side cheeks ("z1" = "z2").
- After unscrewing nuts (3) together with nuts (2), adjust clearance "c±2" and tighten nuts (3).
- Do **not** distort plate (10)! Tighten nuts (5) lightly and then unscrew by a quarter turn. Lock nuts 9 against nuts 5 with a torque spanner. See table for tightening torques.
- Tighten nuts (3) with torque spanner. See table for tightening torques.
- Clearance "c" results in a flange play of "f/2+1" on each side. If necessary, correct flange play by means of clearance "c".

Installation if end of runway is freely accessible

- Slide trolley onto end of runway and check play f/2.

Installation if end of runway is not accessible

- Loosen nuts (3) on threaded bolts (1) in the square tube of the trolley side cheeks (4) and unscrew by dimension "x".
- Push trolley side cheeks (4) apart in parallel up to the unscrewed nuts (3) until dimension "B+y or c+x" is reached, and lift trolley onto runway from below.
- Slide trolley onto the bottom flange of the runway beam on the axle keep plate side (8) and secure against shifting.
- Push trolley side cheeks (4) back to nuts (2), retighten nuts (3).
- Check track gauge "c±2" and play of guide rollers "f/2".
- Tighten nuts (3) with torque spanner. For tightening torques, see table.

Centering connection piece

- Loosen nuts (5) and shift connection piece (6) on connecting bolt (7) so that dimensions "z1" and "z2" between trolley side cheeks (4) and connection piece (6) are equal on both sides.
- Tighten nuts (5) with torque spanner. For tightening torques see table.

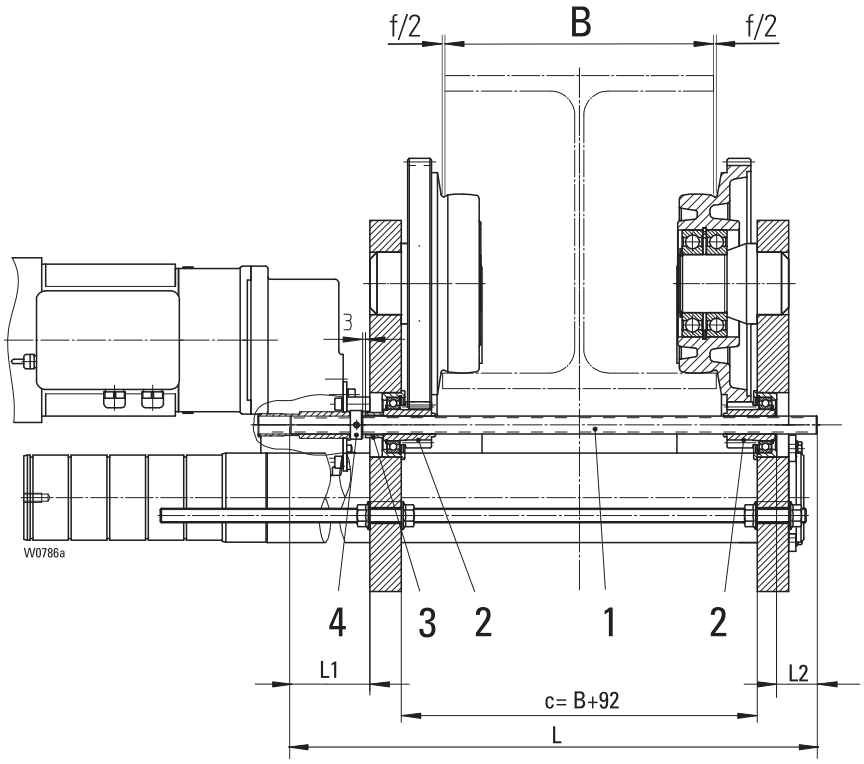
ØD	Trolley	I	I	I I	I	c	f/2	x	y	↻
mm		INP	IPE	IPB	"	mm				Nm
200	UE-S776	B= 185....500				B+92	1.5	95	187	210

Connecting bolt and drive shaft

- Use connecting bolt and drive shaft suitable for beam range "B".
(For dimensions, see sketch on page 15).

Drive shaft for trolley drive (trolley UE-S776)

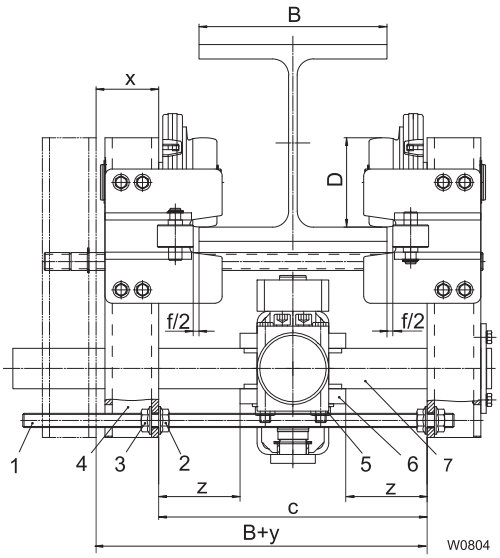
- The drive shaft is suitable for girder flange widths "B" from 185 to 500 mm, see table for length "L".
- Insert drive shaft (1) into the two drive pinions (6) from the counterweight side, then assemble spacer tube (3) and adjusting ring (4).
- Adjust drive shaft (1) to dimension L1, dimension L2 must lie between the values given in the table.
- Lock adjusting ring (4) with adjusting screw.
- After fitting travel drive, check drive shaft (1) for ease of movement. The axial play should be approx. 3 mm.



B [mm]	L [mm]	L1 [mm]	L2 [mm]
185 - 220	510	84	191 - 95
221 - 360	620	84	172 - 33
361 - 450	740	134	98 - 9
451 - 500	740	84	58 - 9

For dimensions f/2 see table on page 14

3.4 Articulated trolley (DKE-S4 / DKE-S6)



with SH 3, SH 4, SH 5 wire rope hoists

- Check flange width "B" and clearance "c" against the table and set trolley to beam width if necessary. Ensure that the connection piece (square tube) (6) is in the centre (of dimension "c") between the trolley side cheeks ("z1" = "z2").
- After unscrewing nuts (3) together with nuts (2), adjust clearance "c" and tighten nuts (3).
- Tighten nuts (3) with torque spanner.
- See table for tightening torques.
- Clearance "c" results in a flange play of "f/2" on each side. If necessary, correct flange play by means of clearance "c".

Installation if end of runway is freely accessible

- Slide trolley onto end of runway.

Installation if end of runway is not accessible

- Loosen nuts (3) on threaded bolts (1) in the square tube of the trolley side cheeks (4) and unscrew by dimension "x".
- Push trolley side cheeks (4) apart in parallel up to the unscrewed nuts (3) until dimension "B+y or c+x" is reached, and lift trolley onto runway from below.
- Lift trolley onto runway from below.
- Slide trolley onto the bottom flange of the runway beam on the hoist side and secure against shifting.
- Push trolley side cheeks (4) back to nuts (2), retighten nuts (3).
- Check track gauge "c" and play of guide rollers "f/2".
- Tighten nuts (3) with torque spanner.
- See table for tightening torques.

Centering bogie

- Loosen nuts (5) and shift bogie (6) on connecting bolt (7).
- Dimension "z" between trolley side cheeks (4) and bogie (6) is equal on both sides.
- Tighten nuts (5) with torque spanner.
- For tightening torques see table.

Hoist	ØD	Trolley	B	f/2	c	x	y	Nut (3)	Nut (5)
	[mm]		[mm]					[Nm]	
SH 3 SH 4	100	DKE-S 4	90 - 220	1.5	B+80	67	147	215	85
SH 5	140	DKE-S 6	119 - 300	1.5	B+84	75	159	215	85

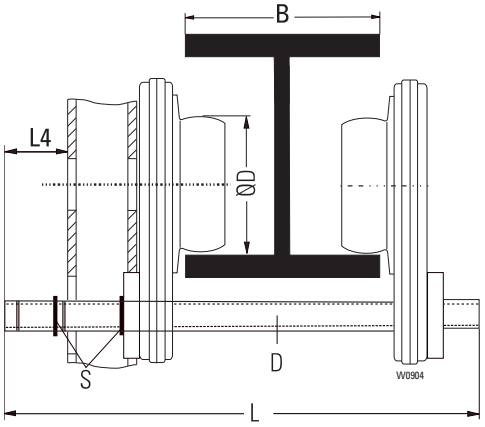
BASH_02_1.FM

Drive shaft for travel drive (DKE-S4 / DKE-S6)

Trolleys with one travel drive

- Mount a drive shaft of a length (L) suitable for the beam width (B)
- Fit lockwashers (S) acc. to dimension L4
- The mounting position of the drive shaft does not change over the corresponding beam range (B).

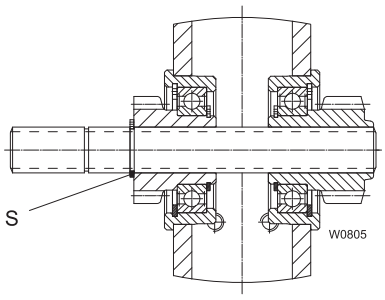
ØD	B	Drive shaft	
		L	L4 ±2
[mm]	[mm]	[mm]	[mm]
100	90 - 128	390	46.4
	129 - 220	495	
140	119 - 280	495	
	281 - 300	710	



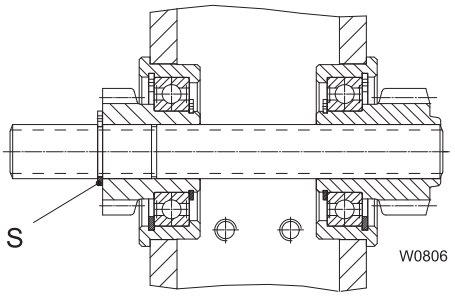
Trolleys with two travel drives

- Drive shaft is completely independent of the beam width
- Mount lockwashers (S) acc. to sketch

ØD100

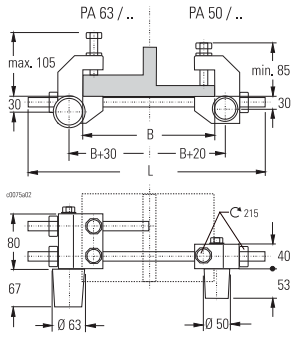


ØD 140



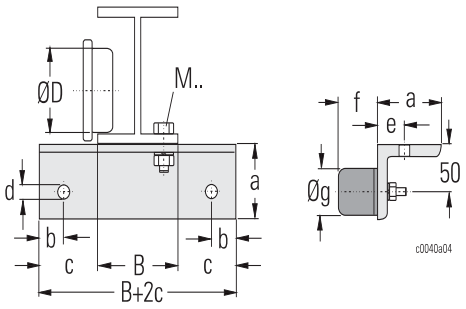
End stops

- Mount end stops with rubber buffers at end of runway.



Type	B	L	kg	E max	mka	ØD	Order no.
	max		max	*3	*1		
	mm	mm	kg	Nm	kg	mm	
PA 50/200	200	350	3200	200	700	63	01 740 24 27 0
PA 50/300	300	450				80	01 740 25 27 0
PA 50/500	500	650				100	01 740 26 27 0
PA 63/200	200	350	10000	440	3200	100	01 740 27 27 0
PA 63/300	300	450				140	01 740 28 27 0
PA 63/500	500	650					01 740 29 27 0

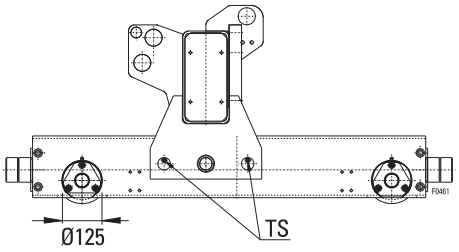
Suggestion for solution by customer



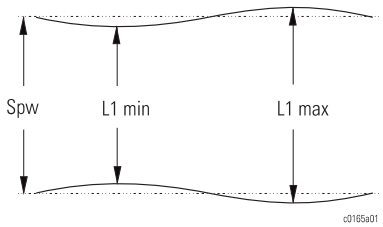
ØD	*4	b	c	d	e	f	g	M..	Order no.
mm								*2	
80	L80x80x10	30	34	9	32	34	40	M10,M12	577 985 0
100	L80x80x10	30	57,5	9	32	34	40	M10,M12	577 985 0
125	L80x80x10	30	68,5	11	32	42	50	M10,M12	577 971 0
160	L80x80x10	30	68,5	11	32	42	50	M10,M12	577 971 0
200	L80x80x10	40	95	11	32	53	63	M10,M12	577 992 0
	L100x100x10	50	105	14	36	66	80		577 993 0

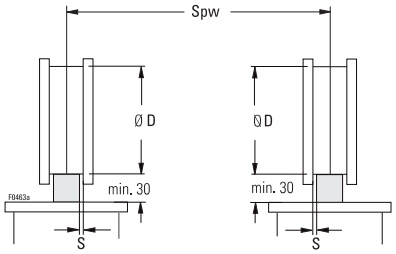
*1 Incl. counterweight
*2 Travel speed V max.: 20 m/min.
*3 E = 0.1415 • mka • v^2 • x (Nm) mka (t), v (m/min)
x = with travel limit switch: 0.72
x = without travel limit switch: 1.0

3.5 Double rail crab (OE-S)



- Check track gauge Spw on crab and rail.
- L1 max - L1 min = 5 mm, see sketch.
- Check lateral play between rail and flange, see sketch.
- Bolt rubber buffers to crab or runway end stop.
- Fit suitable stops. For dimensions see sketch and table.
- Remove transport anchor screw TS (only on crabs with wheel Ø 125).
- The runway must meet the requirements of DIN 4132.
- The rail joints must be even on both running and guide surfaces; grind down if necessary.

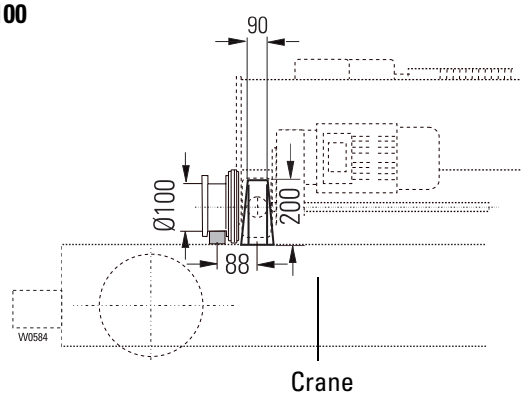




S as per table if crab is positioned symmetrically on runway. If asymmetrically, $S_{left} + S_{right} = 2 \times S$

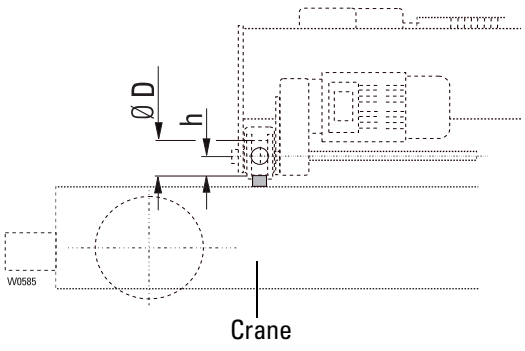
End stops

Ø100



Ø D	S
100	2,5-5
125	2,5-5
160	3,5-6
200	4,5-7

Ø125 - Ø200



Ø D	h
100	45
125	97
160	100
200	100

3.6 Travel limit switch

3.6.1 Monorail trolley

The travel limit switches (optional) are mounted on the trolley.

3.6.2 Double rail crab

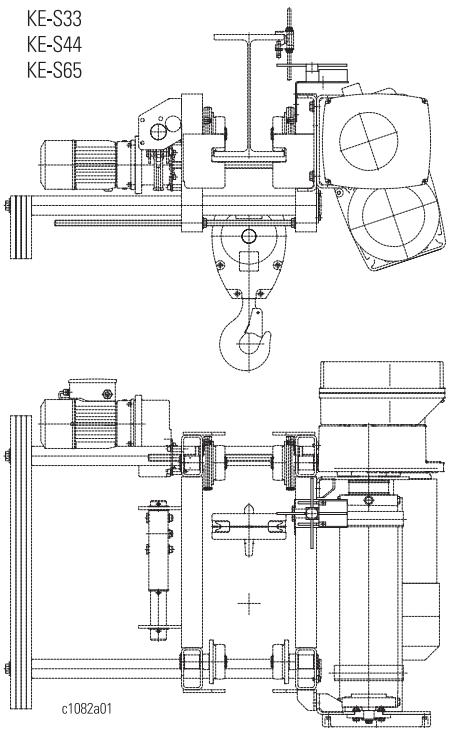
The travel limit switch assembly is supplied ready-wired but not mounted and must be secured to the towing arm for the power supply.

The switching contacts are designed for control current.

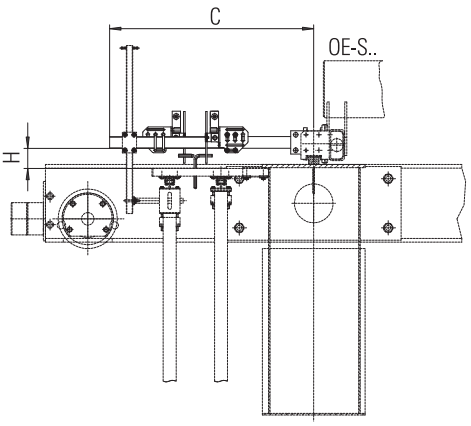
Switching functions:
1. Limit switching in both directions of travel (1 two-way switch, 2 ramps).
2. Pre-switching and limit switching in both directions of travel (1 two-way switch, 4 ramps).
   The speed is switched over from "fast" to "slow" before the end of the runway is reached, and is cut off at the end of the runway.

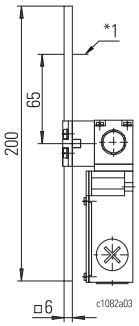
X = stop, left
Y = stop, right
Z = fast / slow

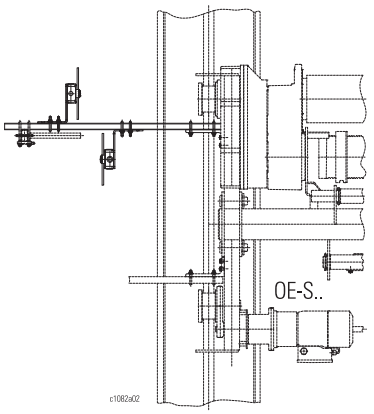
Monorail trolley



Double rail crab







Type	H	C
	[mm]	
OE-S 04	77	795
OE-S 05	85	915
OE-S 06	87	915
OE-S 07	107	915

*1 Switch activator by customer

BASH_02_1.FM

3.7 Electrical equipment

For the sake of safety, have the wire rope hoist connected by a skilled electrician (see page 2). Observe the relevant safety and accident prevention regulations!

3.7.1 Supply cables

- As fixed installed cables:
  NYY, NYM
- As flexible cables:
  H07RN-F or NGFLGöu, or equivalent cables.
- See page 62 for minimum cross-section and max. length of supply cable.

3.7.2 Terminals

- Check that all terminals are firmly attached.

3.7.3 Fusing

- NEOZED, DIAZED or NH fuses in operating class gL/gG, see page 59-61.
- Observe the correct fuse sizes so that the crane switch contacts do not weld if there is a short circuit and overload protection of lead is ensured!

3.7.4 EMERGENCY STOP

It must be possible to disconnect the system electrically from the operating position. This function can be provided by:

- EMERGENCY STOP button in the control pendant in conjunction with the crane switch contactor,
- main isolator, if this is directly accessible and positioned close to the operating position.

3.7.5 Main isolator

- must disconnect the wire rope hoist on all poles,
- must be lockable in OFF position,
- must be installed in an easily accessible place in the system,
- must be marked as such to avoid mistakes.

3.7.6 Disconnecting switch

- is necessary if more than one floor-operated hoist is supplied with power,
- must be lockable in OFF position.

3.7.7 Electromagnetic compatibility

No particular protective measures are taken on electric wire rope hoists with control by customer or crane manufacturer's control. In order to comply with the requirements of EN 55014-1, suitable precautions must be taken by the customer.
In order to achieve an optimum result with minimum effort, we recommend using our FEM1 radio interference suppression module for the SH wire rope hoist.
Order no. 578 525 0 $\leq$ 415V.
Order no. 578 526 0 $\leq$ 800V.
Clip the module onto the tophat rail and connect to the mains supply cable.

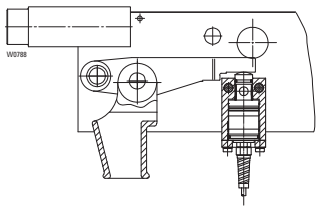
3.7.8 Overload cut-off

Description of system

- prevents an overload being lifted. If an overload has been established, the load can only be lowered. The switch is set in the factory. Corrections are only permissible in special cases, see page 57.
  In certain applications, wire rope hoists may also be used without an overload cut-off. **However in this case they do not meet the requirements of the EU directives and are not marked with the CE symbol.**

Load measurement at rope anchorage

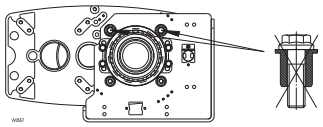
With LET electronic sensor



The overload cut-off is set to rated load +10%.

Load measurement at gear

With LEI electronic sensor



The overload cut-off is set to rated load +10% overload.
On **stationary** SH4 and SH5 wire rope hoists, remove the transport anchor screws marked in **red** after installation and **before** commissioning.

3.7.9 Connecting to mains

- Compare existing mains voltage and frequency with the information on the rating plate.
- Route cables into the hoist connection box through the cable glands.
- Connect according to the circuit diagrams supplied.
  Measure control voltage. If the measured value exceeds the rated control voltage by more than 10%, a different tapping point must be selected on the primary side of the control transformer.
- Do not connect any live lead to the temperature sensors! Damaged temperature sensors cannot protect the motor.
- Check that the direction of rotation of the rope drum corresponds to the symbols on the control pendant : Press "**slow up**" button on control pendant. **Never press** "**down**" **button first!** If the hook moves upwards or does not move because the limit switch has disconnected in top hook position, the phase connection is correct.
- Crosscheck by pressing "**slow down**" button on control pendant.
  If the movement of the hook does not correspond to the symbols on the control pendant, interchange two phase conductors of the supply cable.

Caution! Risk of accident! If this is not observed, serious accidents or damage to the hoist may occur!

Controls by others

- If the controls are supplied by others, connect the temperature sensors of the hoist motor, the hoist brake, the overload cut-off and the emergency hoist limit switch according to our connection diagrams.
- Do not connect any live lead to the temperature sensors! Damaged temperature sensors cannot protect the motor.
- Construct the control according to the circuit diagrams supplied.
- The declaration of conformity is valid only for the scope supplied by the manufacturer.

3.8 SHF hoists with frequency inverter

- See concise operating instructions HOISTING - TRAVEL (Siemens)

3.9 Reeving rope

The wire rope is wound onto the drum in the factory. If not, see page 50, "Replacing wire rope".
If the bottom hook block is not fitted, proceed as follows:

- Gripper pliers hold the rope securely.
- The wire rope hoist must be switched on in order to reeve the rope. All work must therefore be carried out with extreme care: for your safety and for troublefree functioning of the wire rope hoist!

1. Lay out the end of the rope not wound on the drum, or let it hang freely.
2. Check that the wire rope lies snugly on the rope drum, tighten if necessary. **Avoid slack rope on the drum! Slack rope can destroy the rope guide and the wire rope.**
3. Colour code the beginning of the rope on one side.
4. Reeve the end of the rope into the rope sheave(s) of the bottom hook block and return pulley(s), see page 25.
   Do not twist the rope; the colour coding facilitates checking.
5. Fasten the end of the rope in the rope anchorage, see page 26-28 (12-35).
6. Perform several runs over the full height of lift without load.
7. Repeat with increasing loads.
8. Make any twisting in the rope which may occur visible by sticking on a paper tag. Severe twisting is shown by the bottom hook block's turning, especially when not under load.
9. If any twisting should occur, remove the wire rope and untwist by letting it hang freely or laying it out. Twisting in the wire rope prejudices safety and service life.

Any twisting should therefore be removed before subjecting the hoist to any further load. The rope could otherwise be permanently distorted and might have to be replaced!

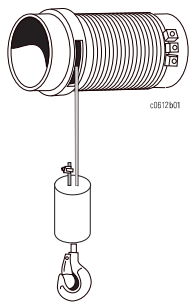
Reeving rope (SH3 - SH6)
Reeve the rope as shown in the schematic drawings and attach the end of the rope at the rope anchorage.
Caution! The bottom hook block must hang horizontal **(./2-1)**

	SH3 - SH5	SH6
1/1	1	1
2/1	2	4
4/1	3	5
2/2-1	6	6
4/2-1	7	8
8/2-1	-	9

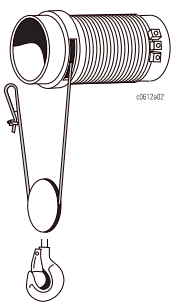
	SH3 - SH5	SH6
2/1	4	4
4/1	5	5
4/2-1	8	8

	SH3 - SH5	SH6
2/1	4	4
4/1	5	5
4/2-1	8	8
8/2-1	-	9

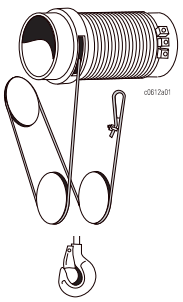
1/1
L
1



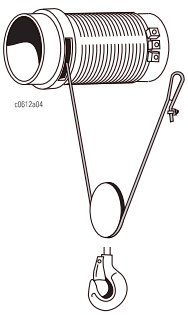
2/1
L
2



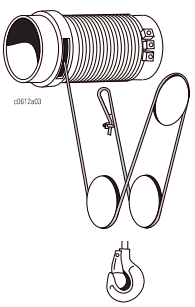
4/1
L
3



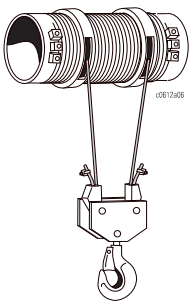
2/1
L
4



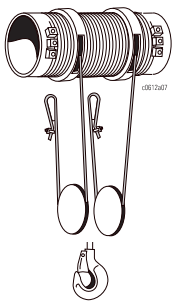
4/1
L
5



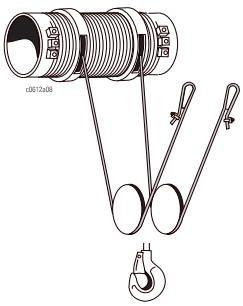
2/2-1
R L
6



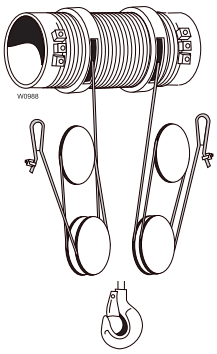
4/2-1
R L
7



4/2-1
R L
8

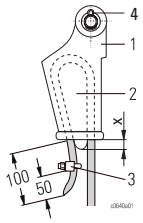


8/2-1
R L
9



L = left-hand thread
R = right-hand thread

11



Rope anchorage (SH3 - SH6)

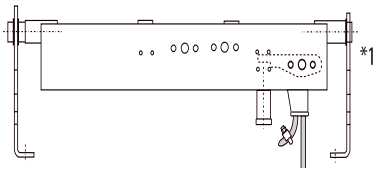
- Note information plate at rope anchorage.
- Insert end of rope into rope anchorage according to reeving, see sketches 11-35 and tables on pages 26, 27, 28.
- Place rope around rope wedge (2) and pull it into the tapered rope recess (1) until the loose end of the rope projects by approx. 100 mm.
- Secure loose end of rope with rope clamp (3) approx. 50 mm from the end of the rope. See table for tightening torque.
- Max. projection of rope wedge SH 3 - SH 4 $x_{max.}$ = 6mm ; SH 5 - 6 $x_{max.}$ = 15mm
- Replace split pin (4) after dismantling it; bend ends of split pin up.

Rope Ø [mm]	M..	Tightening torque [Nm]
5-6,5	M6	6
7-8	M8	10
8,5-10	M8	20
12-12,5	M12	40
14-16	M14	95
20	M16	130

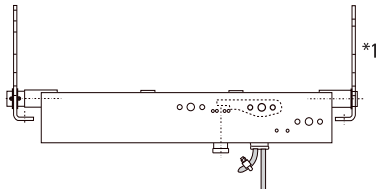
	Length L	SH 3	SH 4	SH 5
2/1	L2	12	12	12
	L3	12	12	12
	L4	-	-	-
4/1	L2	21	14	22
	L3	21	14	22
	L4	-	-	22
4/2-1	L2	17	18	17
	L3	17	18	17
	L4	-	-	17

Rope anchorage (SH3 - SH5)

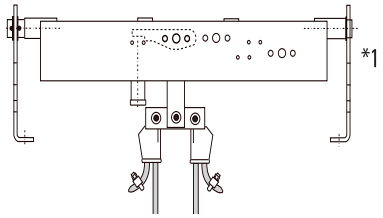
12



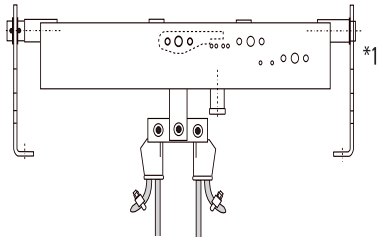
14



17



18



*1 Gear side

BASH_02_1.FM

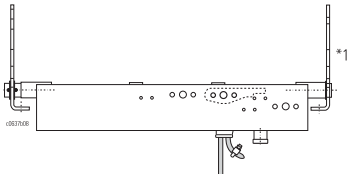
Rope anchorage (SH3 - SH5)

	Length L	SH 3	SH 4	SH 5
2/1	L2	12	12	12
	L3	12	12	12
	L4	-	-	-
4/1	L2	21	14	22
	L3	21	14	22
	L4	-	-	22
4/2-1	L2	17	18	17
	L3	17	18	17
	L4	-	-	17

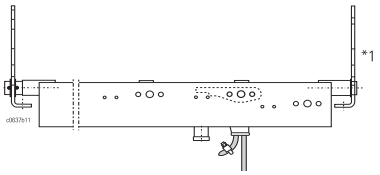
	Length L	SH 3	SH 4	SH 5
2/1		24	24	24
4/1		23	23	23
4/2-1	L2	25	25	25
	L3	26	26	26
	L4	-	-	26

	Length L	SH 3	SH 4	SH 5
2/1		28	28	28
4/1		27	27	27
4/2-1	L2	29	29	29
	L3	29	30	29
	L4	-	-	29

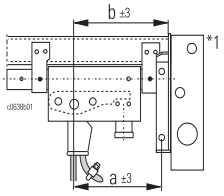
21



22

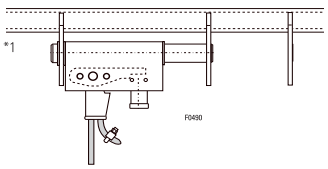


23

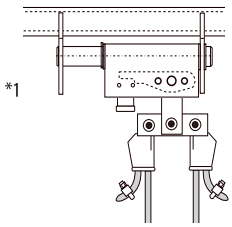


	a	b
SH3..	216	241
SH4..	265	290
SH5..	334	366

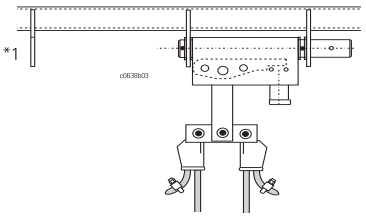
24



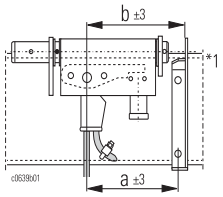
25



26

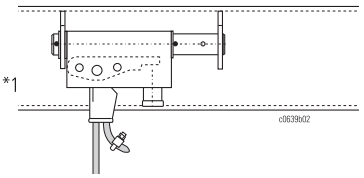


27

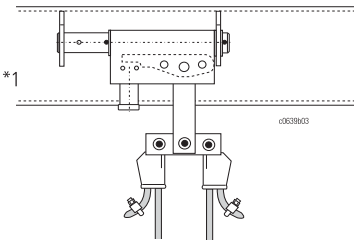


	a	b
SH3..	216	241
SH4..	265	290
SH5..	334	366

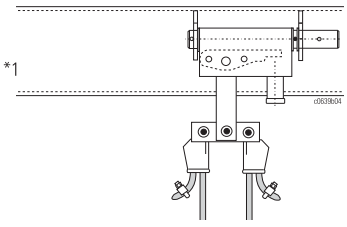
28



29



30



*1 Geear side

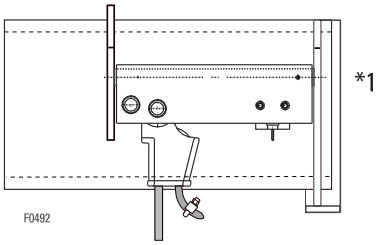
Rope anchorage(SH6)

	SH 6	
	Length L	
2/1	L2-L5	32
4/1	L2-L5	31
2/2-1		-
4/2-1	L2-L5	34
8/2-1	L3-L5	35

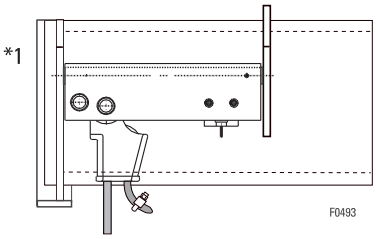
	SH 6	
	Length L	
2/1	L2-L5	32
4/1	L2-L5	31
4/2-1	L2-L5	34

	SH 6	
	Length L	
2/1	L2-L5	32
4/1	L2-L5	31
4/2-1	L2-L5	34
8/2-1	L3-L5	35

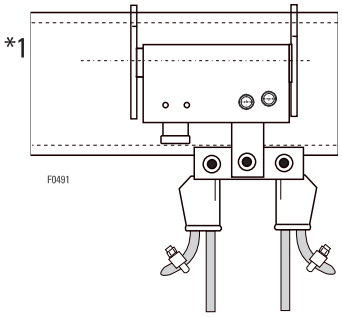
31



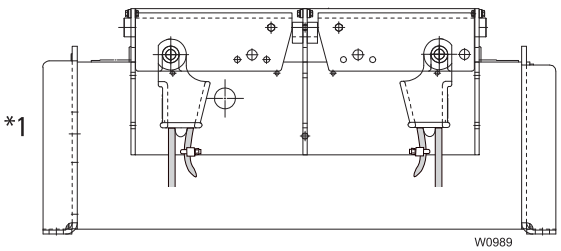
32



34



35



*1 Gear side

4.1 Commissioning

The wire rope hoist has been subjected to a final inspection by the manufacturer in accordance with the EC Machinery Directive.

Commissioning must be carried out by a qualified person, see page 2.
The "Safety instructions" on page 4...6 must also be observed.

The following checks must be carried out:

- Check that the wire rope hoist is completed with the original accessories as supplied (e.g. bottom hook block), see page 24.
- Check correct selection and installation of all electrical equipment, see page 21, "Connecting to mains", see page 23.
- Check that the seating of fixing screws is firm and secure, see page 8, 11, 13, 14, 63.
- Check correct functioning of runway end stops.
- The direction of motion of the load hook must correspond to the symbols on the control pendant.
- Check the presence and correct functioning of all safety devices.
- Check emergency hoist limit switch or combined operational and emergency hoist limit switch, see page 36, 39, 42, 43.
- Check overload cut-off, see page 46.
- Confirm that commissioning has been duly carried out in the test log book in section "Confirmation of commissioning".
- If the wire rope hoist in conjunction with a crane system is to be subjected to a test load during the acceptance test, the overload cut-off must be deactivated (see 6.9, page 46), see circuit diagram.
- Run rope in under partial load (will improve service life).

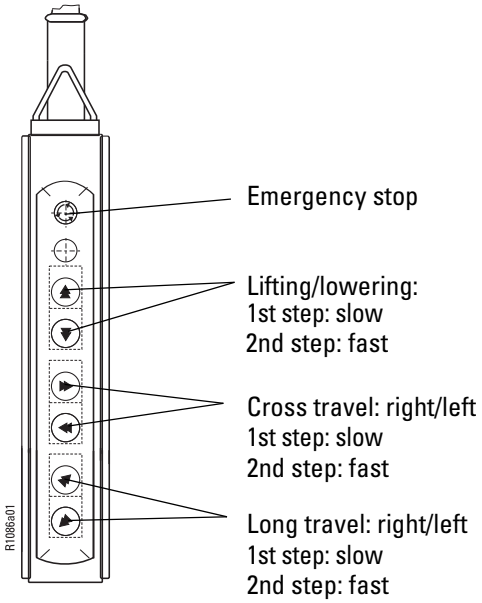
5.1 Duties of crane operator

When working with wire rope hoists, the following points must be observed:

- Every day before starting work, check brakes and limit switches and inspect the system for any visible defects.
- Stop working with the crane if there are any defects which might prejudice its safety in operation.
- At close of work, secure cranes which are exposed to wind with the wind safeguard mechanism.
- The rope drum must be free of coarse foreign matter.
- Do not move loads above people.
- Do not leave suspended loads unattended, the control pendant must be within easy reach.
- Do not use emergency limit switch during normal operation.
- Do not load above rated capacity.
- Pulling loads at angles, dragging loads, or towing vehicles with the load or load suspension equipment is forbidden!
- Do not heave up any loads which are jammed.
- Approach final positions for hoisting, lowering and travel in normal operation only if an operational limit switch is fitted.
- Inching operation (repeated brief activation of the motor to achieve small movements) is not permissible. Motors and brakes could be subjected to an impermissible temperature rise. This would lead to the temperature control disconnecting and the load could then not be set down for some time. Switchgear and motors could be damaged.
- Do not move in the opposite direction until the hoist has come to a stop.
- Observe the safety instructions, see page 4-6.

5.2 Operating from control pendant

Standard design
2-step



Safety note
If the rocker switch is no longer depressed by the operator, it returns to the 0 position, the hoist motion is automatically stopped (dead man's control).
If the hoist malfunctions, e.g. the actual motion does not correspond to the motion intended in activating the rocker switch, release the rocker switch immediately. If the motion continues, press the emergency stop button.

5.3 Emergency stop

Every hoist must have a means of disconnecting the power supply to all drives under load from the ground.
After an emergency stop, the operator must not restart the hoist /crane system until a qualified person has determined that the fault which led to this function being activated has been eliminated and no danger can arise from the continued operation of the system.

- The emergency stop button is on the control pendant.
- Press emergency stop, the system comes to a halt.
- To release the emergency stop: turn the button in the direction shown.

6 Inspection and maintenance

This section deals with operational reliability, availability, and maintaining the value of your wire rope hoist.
Although this wire rope hoist is practically maintenance-free, the components subject to wear (e.g. wire rope, brake) and components important for ensuring explosion protection must be inspected regularly. This is required by the accident prevention regulations.
Inspection and maintenance must be carried out by qualified persons who have received special training in explosion protection, see page 2.

General information on inspection and maintenance

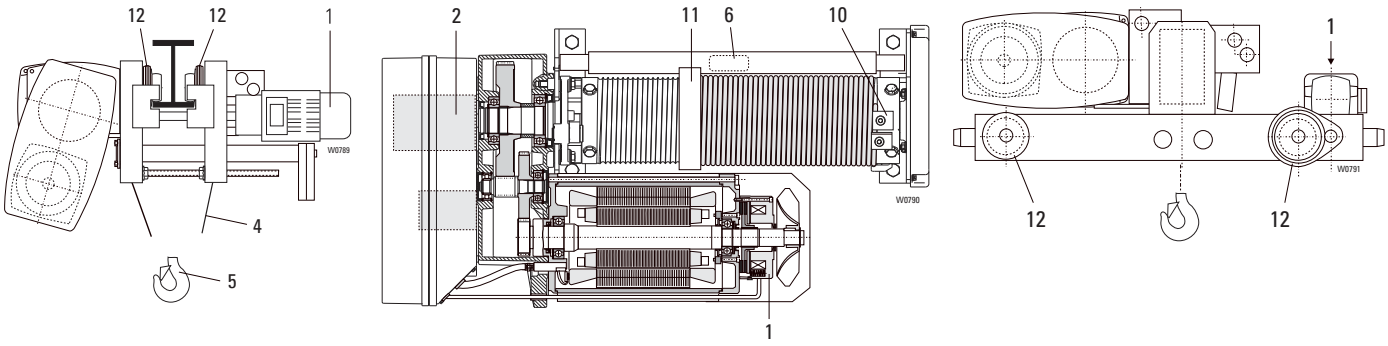
- Maintenance and repair work may only be carried out when the winch is unloaded.
- Before starting, switch off and lock main isolator.
- Observe the requirements of the accident prevention regulations.
- Periodic tests including maintenance every 12 months, possibly earlier if so prescribed by national regulations, are to be performed by a fitter engaged by the manufacturer.
- The specified inspection and maintenance intervals apply for normal conditions of use.

The inspection and maintenance intervals must be adapted accordingly if one or more the following conditions apply:

- if after evaluating the acutual use it can be seen that the theoretical useful life of the winch will be less than 10 years,
- in the case of operation in more than one shift or heavy duty
- in the case of adverse conditions (dirt, solvents, temperature, etc.)
- If abrasive dusts are present (foundry, cement industry, glass manufacture or processing, etc.) the maintenance intervals for the rope guide (cleaning, lubricating, checking and if necessary replacing tension spring, etc.) must be reduced.

A general overhaul must be carried out after the useful lifetime has expired.
Lubricants and lubrication points, see page 60.

6.1 Inspection intervals



6.1.1 Every day

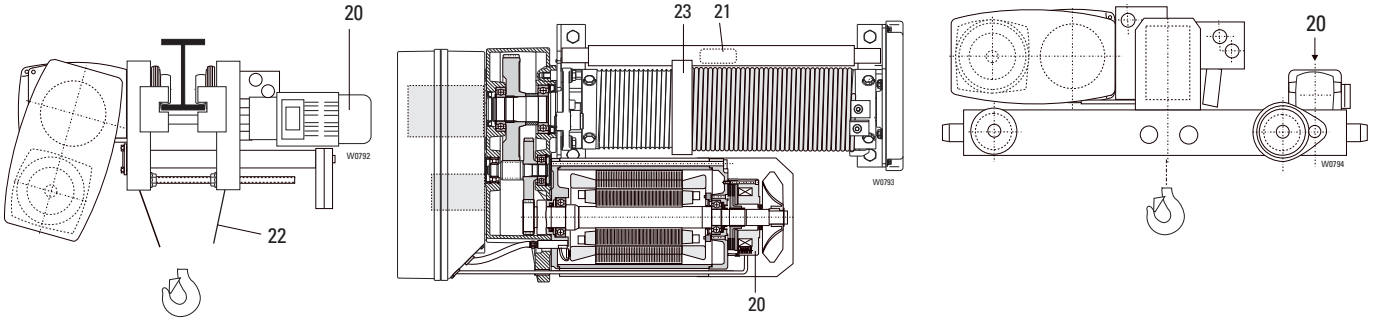
Before starting work

- Check function of brake(s) (1)
- Emergency hoist limit switch (2) if there is no operational hoist limit switch, operational hoist limit switch, if any, see page 36, 39, 43
- EMERGENCY STOP, crane switch, see page 21
- Rope (4), see page 49

6.1.2 Once a year

- Emergency limit switch (2) if there is an operational limit switch, see page 35
- Check suspension of control pendant (cable and steel wire must be correctly attached)
- Load hook (5), cracks, cold deformation, wear
- Overload cut-off (6), see page 46
- Disconnect switch and main isolator, see page 21
- PE connections and equipotential bonding
- Establish remaining service life, see page 54
- Rope attachment (10), see page 50, rope sheaves, see page 52
- Rope guide (11), see page 49, 51
- Drive parts (12), flanges, wheels etc., see page 53
- Screw connections, welds
- End stops, buffers
- Safety clearances
- Power supply cable
- Cable glands
- Current collectors
- Switching functions

6.2 Maintenance intervals

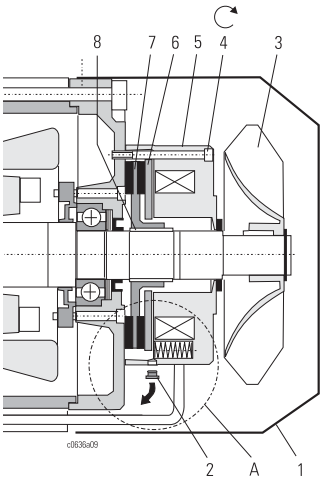


6.2.1 Once a year

- Brake (20), measure air gap, replace brake disc if necessary, see page 34
- Overload cut-off (21), see page 46
- Grease rope (22) with brush, see page 64
- Grease rope guide (23) with brush, see page 64
- Tighten clamping points for electric cables

6.3 Hoist motor brake (RSM)

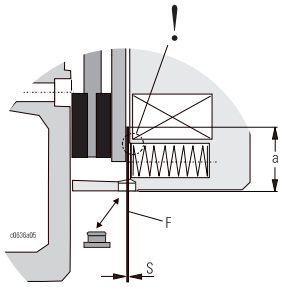
Carry out work on the hoist brake only when the hoist is unloaded and the bottom hook block has been set down.
Switch off and padlock main isolator.



6.3.1 Checking brake

- Remove fan cover (1)
- Remove plug (2)
- Measure air gap (S) with feeler gauge (F). N.B.: When measuring, ensure that the feeler gauge is pushed in at least as far as depth "a" and does not catch on shoulder (!). See table for max. permissible air gap (S). The brake is not adjustable. If the max. permissible air gap (S) has been reached, the brake disc (brake rotor) must be replaced.

"A"



6.3.2 Replacing brake disc (brake rotor)

- Remove fan cover (1)
- Pull off fanwheel (3), remove feather key
- Disconnect brake
- Unscrew fixing screws (4)
- Remove magnet piece (5) together with armature disc (6)
- Remove brake disc (brake rotor) (7)
- Clean brake (wear a dust protection mask)
- Check friction surfaces for wear
- Push new brake disc (brake rotor) (7) onto hub (8) and check radial play. If there is increased play in the gearing between brake disc (7) and hub (8) the hub (8) must be pulled off the motor shaft and replaced.
  Before removing hub (8) please contact the manufacturer.

Replace in reverse order. Ensure that the check hole for measuring the air gap is underneath.
Observe tightening torques.

Hoist motor type	Hoist brake	S max. [mm]	a [mm]	↻
12/2H33 4H33	RSM16 RSM16	0,8 0,7	25	9 Nm 9 Nm
12/2H42 4H42	RSM32 RSM32	0,9 0,8	25	9 Nm 9 Nm
12/2H62 4H62	RSM60 RSM60	1,7 1,7	25	22 Nm 22 Nm
12/2H71 4H71	RSM100 RSM100	1,8 1,8	30	22 Nm 22 Nm
12/2H72 4H72	RSM150 RSM100	1,8 1,2	30	22 Nm 22 Nm
12/2H73 4H73	RSM150 RSM150	1,6 1,4	30 30	22 Nm 22 Nm
4H82	RSM250	1,5	40	45 Nm
24/4H92	RSM500	2,0	40	45 Nm

Check brake data according to rating plate on hoist motor!

6.4 Travel motor brake

See operating instructions for travel motors.

6.5 Hoist limit switch (versions)

N.B.:
The hoist limit switch version installed must be determined on the basis of the sticker in the limit switch (see stickers).

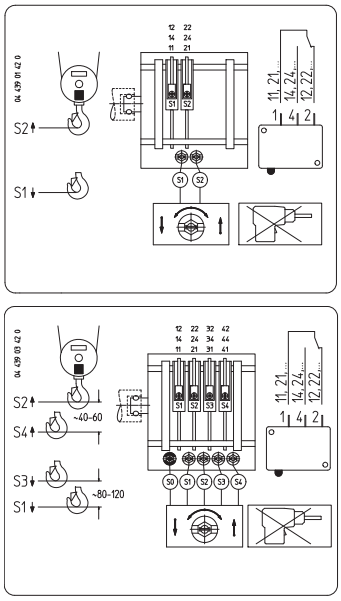


Fig. 1/2

6.5.1 Standard crane - version I (Fig. 1/2)
See chapter 6.6 for description of system

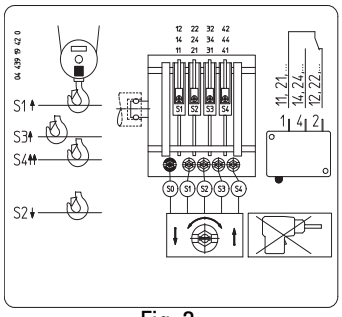


Fig. 3

6.5.2 Standard crane - version II (Fig. 3)
See chapter 6.7 for description of system

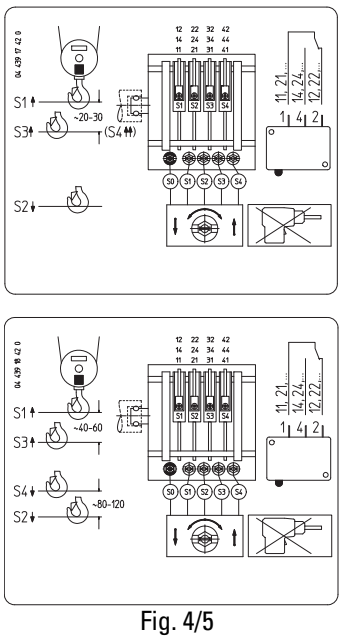
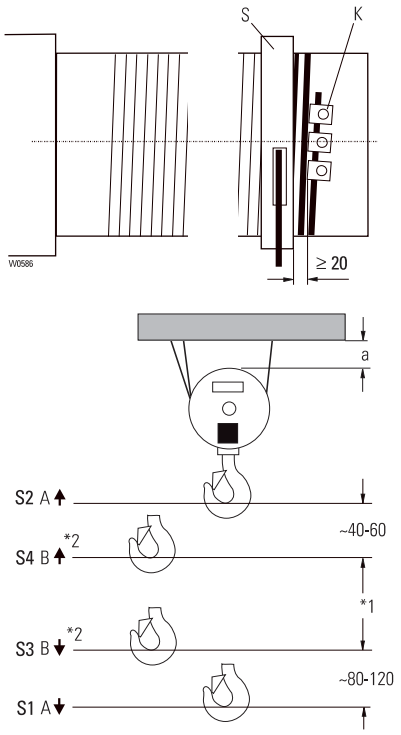


Fig. 4/5

6.5.3 Radio-controlled crane - version III (Fig. 4/5)
See chapter 6.8 for description of system

6.6 Hoist limit switch (standard crane)



	a [mm]	
	50 Hz	60 Hz
	130	150
	70	80
	40	50

6.6.1 Description of system

The wire rope hoist is equipped as standard with an **emergency limit switch** for disconnecting in top and bottom hook position. (Switching points A↑ and A↓). The gear limit switch (GE-S) is installed in the panel box on the gear.
If the original controls/circuit diagrams are used, the corresponding hoisting direction and the cross travel if any are disabled when the limit switch is activated. The opposing hoisting direction is clear.

An additional **operational limit switch** *2 for disconnecting in top and bottom hook position during normal operation can be fitted as an option. (Additional switching points B↑ and B↓).
The control pendant includes an override button for checking the emergency limit switch (S260).
If the operational limit switch fails, the hoist can only leave the end position by activating this override button.

6.6.2 Safety notes

The limit switch is constructed according to the state of the art and is safe in operation. However dangers may arise if it is used incorrectly and not for its intended purpose.

6.6.3 Testing emergency hoist limit switch

- Test at fast and creep speed without load.

1 Activate the **"up" button** on the control pendant carefully, observing the hoisting motion, until the limit switch disconnects in top hook position (A↑).
2 Minimum clearance "a" between bottom hook block and nearest obstacle, see table, if necessary reset the limit switch, see page 37.
3 Press the **"down" button** and check bottom hook position in the same way.
4 Minimum clearance between rope guide (S) and clamping claws (K) for rope anchorage = 20 mm, see sketch, if necessary reset limit switch, see page 37.

6.6.4 Testing combined operational and emergency hoist limit switch

- Test at fast and creep speed without load.

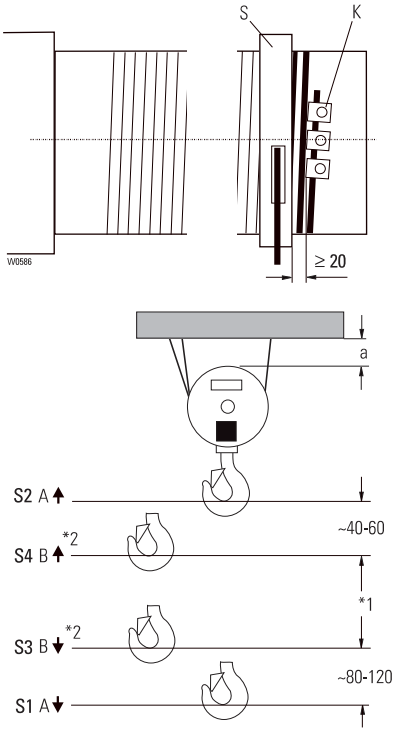
1 Activate the **"up" button** on the control pendant carefully, observing the hoisting motion, until the limit switch disconnects in the highest operational hook position (B↑).
2 Press the override button in the control and at the sametime the "up" button until the **emergency limit switch** disconnects (A↑). If the hoist does not continue to move, the emergency limit switch was activated in step 1 and the operational limit switch is not working. (As an option, the override button is also possible in the control pendant.)
3 Minimum clearance "a" see table.
4 Press **"down" button** and check bottom hook position in the same way.
5 Minimum clearance between rope guide (S) and clamping claws (K) for rope anchorage = 20 mm, see sketch, if this is not the case, reset limit switch.

- The clearances between the switching points for operational and emergency limit switches are set for normal operating conditions, however they can be adjusted if necessary.

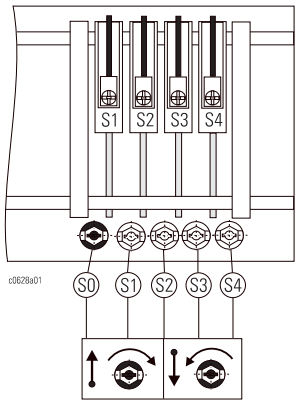
*1 Effective hook path with operational limit switch
*2 Option

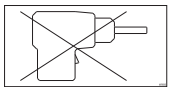
BASH_02_1.FM

6.6.5 Setting limit switch



	a [mm]	
	50 Hz	60 Hz
1/1 2/2-1	130	150
2/1 4/2-1	70	80
4/1	40	50





The cover of the limit switch must be removed to set the contacts. This exposes live contact connections. There is thus a danger of contact with live parts!

The limit switch can be adjusted at the setscrews (S1)-(S2) or (S1)-(S4):
Turning to the left: switching point is moved "downwards",
Turning to the right: switching point is moved "upwards".

Adjusting en bloc
All the cam discs can be moved together with the aid of the black setscrew (S0). The settings of the individual contacts relative to one another remain unchanged.

Set the limit switch using a socket spanner (04 430 50 99 0) **and without using excessive force. Do not use a power screwdriver or similar.**

- Adjust the switching points in the following sequence:

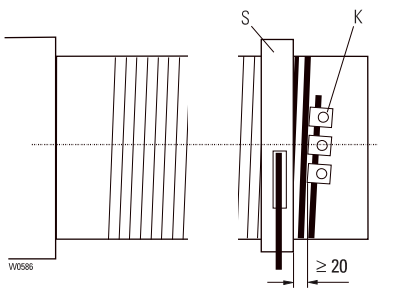
Emergency limit switch:
1. A↑ (S2)
2. A↓ (S1)

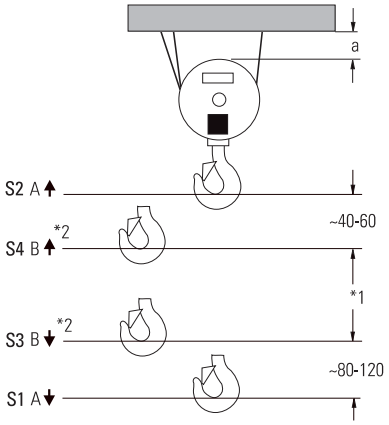
Combined emergency and operational limit switch
1. A↑ (S2)
2. B↑ (S4)
3. A↓ (S1)
4. B↓ (S3)

Switching point A↑ (S2)
"Emergency limit switch top hook position"
- Lift bottom hook block 2/1 to a+10 mm or to a+5 mm for 4/1 (sketch, table). If necessary turn setscrew (S2) to the right beforehand.
- Turn setscrew (S2) to the left until contact S2 switches audibly.
- Check cut-off point in main and creep hoist

Switching point B↑ (S4)
"Operational limit switch top hook position"
(Minimum clearance to A↑ 60 mm for 2/1, 40 mm for 4/1)
- Lift bottom hook block 2/1 to 10 mm, or to 5 mm for 4/1, below the desired cut-off point, if necessary turn setscrew (S4) to the right beforehand.
- Turn setscrew (S4) to the left until contact S4 switches audibly.
- Check cut-off point in main and creep hoist.

*1 Effective hook path with operational limit switch
*2 Option





6.6.5 Setting limit switch (continued)

Switching point A↓ (S1)
"Emergency limit switch bottom hook position"
(Minimum clearance between rope guide (S) and clamping claws (K) for rope anchorage = 20 mm, see sketch)

Set bottom hook position so that the bottom hook block does not touch the ground (would cause slack rope).

- Lower bottom hook block 2/1 to 120 mm, or 60 mm for 4/1, above desired hook position, if necessary turn setscrew (S1) to the left beforehand.
- Turn setscrew (S1) to the right until contact S1 switches audibly.
- Check cut-off point in main and creep hoist.

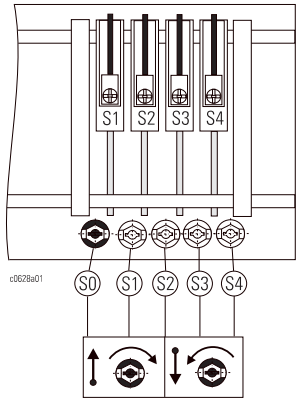
Switching point B↓ (S3)
"Operational limit switch bottom hook position"
(Minimum clearance to A↑ 120 mm for 2/1, 80 mm for 4/1)

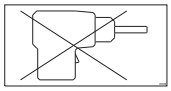
- Lower bottom hook block 2/1 to 120 mm, or 60 mm for 4/1, above desired hook position, if necessary turn setscrew (S3) to the left beforehand
- Turn setscrew (S3) to the right until contact S3 switches audibly
- Check cut-off point in main and creep hoist.

.

	a [mm]	
	50 Hz	60 Hz
1/1 2/2-1	130	150
2/1 4/2-1	70	80
4/1	40	50

Safety note:
Incorrectly set limit switches may cause serious accidents!





6.6.6 Servicing limit switch

Maintenance work is restricted to checking the cut-off points. No maintenance or inspection is necessary for the gear limit switch itself.

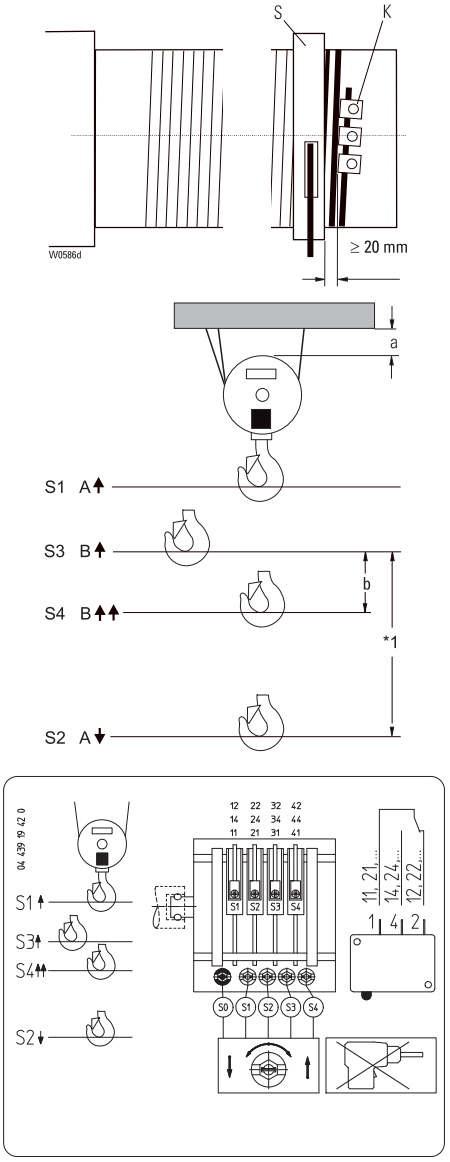
Any dust deposits that may be visible when the housing is opened must on no account be removed with compressed air as this would force the dust into the contacts and impair the switching function.

On no account must benzene or other solvents be used to clean the limit switch!

*1 Effective hook path with operational limit switch
*2 Option

BASH_02_1.FM

6.7 Hoist limit switch (standard crane)



6.7.1 Description of system

The wire rope hoist is equipped as standard with an **emergency limit switch** for disconnecting in top and bottom hook position. (Switching points A↑ and A↓).

The hoist is also equipped with an **operational and emergency limit switch** for disconnecting in top hook position during normal operation. (Switching points B↑ and B↑↑). Switching point B↑↑ disconnects the fast speed and B↑ the slow speed in upwards direction.
If the operational limit switch (B↑, B↑↑) is overrun during a fault, the emergency hoist limit switch (A↑) disconnects the main contactor / hoist contactor. The hoist can only leave the end position by activating switch S261 in the hoist control after the fault has been eliminated.
The gear limit switch (GE-S) is in the panel box on the gear.

6.7.2 Safety notes

The limit switch is constructed according to the state of the art and is safe in operation. However dangers may arise if it is used incorrectly and not for its intended purpose.

6.7.3 Testing emergency hoist limit switch

- Test at creep speed without load.

1 Activate the "up" button on the control pendant carefully, observing the hoisting motion, until the limit switch disconnects in the highest operational hook position (B↑).
2 Press the override button (S260) in the control and at the same time the "up" button until the emergency limit switch disconnects (A↑). If the hoist does not continue to move, the emergency limit switch was activated in step 1 and the operational limit switch is not functioning.
3 Minimum clearance "a" - "c" between bottom hook block and the nearest obstacle see table, if necessary reset the limit switch, see page 40.
4 Press the override button (S261) in the control panel and at the same time the "down" button to leave the limit switch area.
5 Press the "down" button until the emergency hoist limit switch disconnects (A↓).
6 Minimum clearance between rope guide (S) and clamping claws (K) for rope anchorage = 20 mm, see sketch, if this is not the case, reset limit switch.

- The clearances between the switching points for operational and emergency limit switches are set for normal operating conditions, however they can be adjusted if necessary.

	a/b [mm]		c
	50 Hz	60 Hz	[mm]
	130	150	40
	70	80	20
	40	50	10

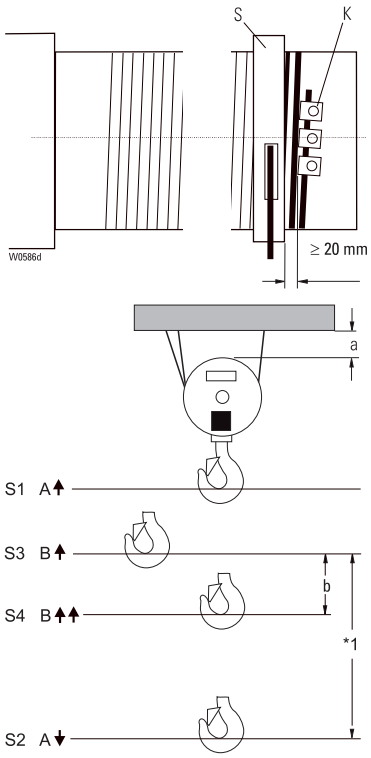
6.7.4 Testing operational hoist limit switch

- Test without load.

1 Activate the "up" button on the control pendant carefully, observing the hoisting motion, until the limit switch disconnects in the highest operational hook position (B↑).
2 Minimum clearance between bottom hook block and the nearest obstacle, see table, if necessary reset limit switch, see page 40.

*1 Effective hook path

BASH_02_1.FM



6.7.5 Setting limit switch

The cover of the limit switch must be removed to set the contacts. This exposes live contact connections. There is thus a **danger** of contact with live parts!

The limit switch can be adjusted at the setscrews (S1)-(S2) or (S1)-(S4):
Turning to the left: switching point is moved "downwards",
Turning to the right: switching point is moved "upwards".

Adjusting en bloc
All the cam discs can be moved together with the aid of the black setscrew (S0). The settings of the individual contacts relative to one another remain unchanged.

Set the limit switch using a socket spanner (04 430 50 99 0) **and without using excessive force. Do not use a power screwdriver or similar.**

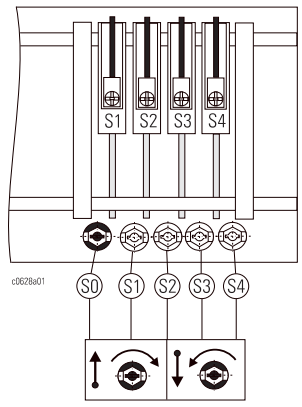
- Adjust the switching points in the following sequence:

1. A↑ (S1)
2. B↑ (S3)
3. B↑↑ (S4)
4. A↓ (S2)

	a/b [mm]		c
	50 Hz	60 Hz	[mm]
	130	150	40
	70	80	20
	40	50	10

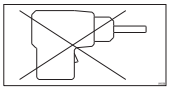
Switching point A↑ (S1)
"Emergency limit switch top hook position"
- Lift bottom hook block to "a" - "c", (sketch, table). If necessary turn setscrew (S1) to the right beforehand.
- Turn setscrew (S1) to the left until contact S1 switches audibly.
- Press override button (S261) in panel box and at the same time "down" button to leave the limit switch area.

Switching point B↑/B↑↑ (S3/S4)
- Lift bottom hook block 2/1 to a+10 mm, or to a+5 mm for 4/1, if necessary turn setscrew (S1) to the right beforehand.
- Turn setscrew (S3) to the left until contact S3 switches audibly
- Lower and lift bottom hook block until B↑ (S3) switches.
- Lower bottom hook block by b (sketch, table).
- Turn setscrew S4 to the left until contact S4 switches audibly.
- Check cut-off point in main and creep hoist.



Switching point A↓ (S2)
"Emergency limit switch bottom hook position"
(Minimum clearance between rope guide (S) and clamping claws (K) for rope attachment = 20 mm, see sketch)
Set bottom hook position so that the bottom hook block does not touch the ground (would cause slack rope)

- Lower bottom hook block to desired hook position, if necessary turn setscrew (S2) to the left beforehand.
- Turn setscrew (S2) to the right until contact S2 switches audibly.
- Check cut-off point in main and creep hoist.



Safety note:
Incorrectly set limit switches may cause serious accidents!

BASH_02_1.FM

6.7.6 Servicing limit switch

Maintenance work is restricted to checking the cut-off points. No maintenance or inspection is necessary for the gear limit switch itself.

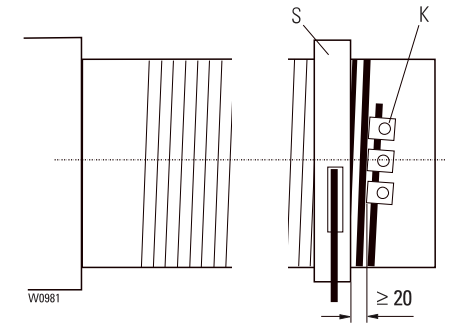
Any dust deposits that may be visible when the housing is opened must on no account be removed with compressed air as this would force the dust into the contacts and impair the switching function.

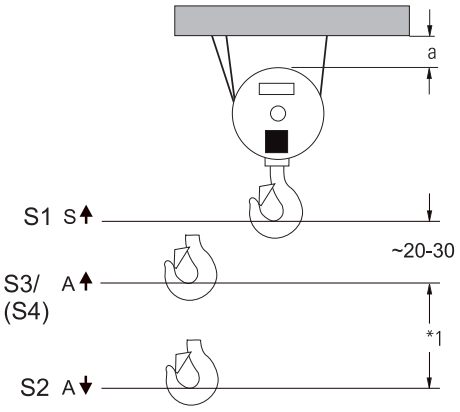
On no account must benzene or other solvents be used to clean the limit switch!

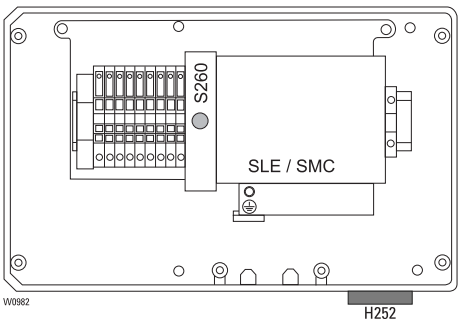
*1 Effective hook path

6.8 Hoist limit switch

(radio-controlled crane)







6.8.1 Description of emergency hoist limit switch system

The wire rope hoist is equipped as standard with an **emergency limit switch** for disconnecting in top and bottom hook position. (Switching points A↑ and A↓). The gear limit switch (GE-S) is installed in the panel box on the gear.
If the original controls/circuit diagrams are used, only the corresponding hoisting direction is disabled when the limit switch is activated. The opposing hoisting direction is clear.
It is equipped with an additional **safety hoist limit switch** (S↑) above top hook position. If during a fault the emergency limit switch for top hook position is overrun, the safety hoist limit switch disconnects the hwole hoist and the fault indicator light (H252) on the electronics box lights up. Leaving the limit switch region is not possible until the faulthas been elminated and terminals 110 to 116 on the terminal strip in the hoist control have been bridged.
The gear limit switch (GE-S) is in the control box on the gear.

6.8.2 Safety notes

The limit switch is constructed according to the state of the art and is safe in operation. However dangers may arise if it is not set and used for its intended purpose.

6.8.3 Testing emergency hoist limit switch

- Test at fast and creep speed without load.

1 Activate the **"up" button** on the control pendant carefully, observing the hoisting motion, until the limit switch disconnects in top hook position (A↑).
2 Minimum clearance "a" between bottom hook block and nearest obstacle, see table, if necessary reset the limit switch, see page 44.
3 Press the **"down" button** and check bottom hook position in the same way.
4 Minimum clearance between rope guide (S) and clamping claws (K) for rope anchorage = 20 mm, see sketch, if necessary reset limit switch, see page 44.

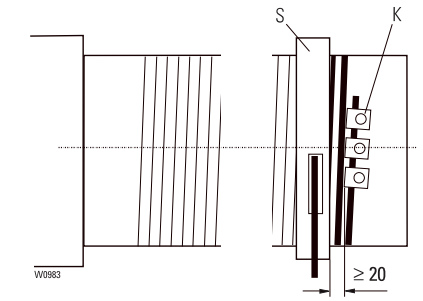
6.8.4 Testing emergency hoist limit switch and indicator light

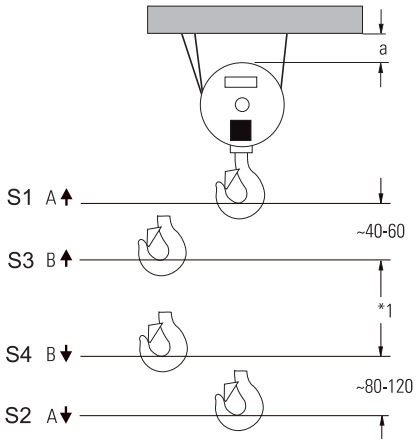
The safety hoist limit switch (S↑) is set in the factory and does not need to be tested on-site.
It is possible to test the indicator light (H252) using a bridging wire between indicator light and terminal strip.

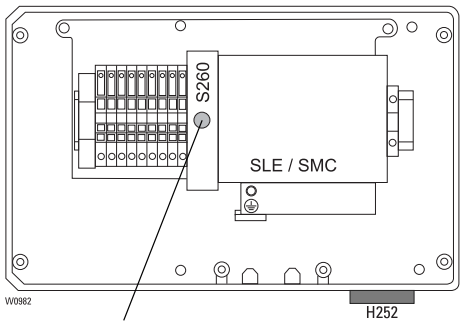
	a [mm]	
	50 Hz	60 Hz
1/1 2/2-1	130	150
2/1 4/2-1	70	80
4/1	40	50

*1 Effective hook path

BASH_02_1.FM







Override button

6.8.5 Description of optional operational hoist limit switch system

An additional **operational limit switch** for disconnecting in top and bottom hook position during normal operation can be fitted as an option. In this case 2 cut-off points for the operational hoist limit switch (B↑ and B↓) are wired in advance of the 2 cut-off points for the emergency hoist limit switch (A↑ und A↓). There is an override button (S260) in the electronics box for testing the emergency hoist limit switch. If the operational limit switch fails, the hoist can only leave the end position by activating this button (S260).
The indicator light lights up when the emergency hoist limit switch has disconnected. (A↑)

6.8.6 Testing combined operational and emergency hoist limit switch

- Test at fast and creep speed without load.

1 Activate the **"up" button** on the control pendant carefully, observing the hoisting motion, until the limit switch disconnects in the highest operational hook position (B↑).
2 Press the override button in the electronics box and at the same time the "up" button until the **emergency limit switch** disconnects (A↑). In addition the indicator light (H252) on the electronics box lights up. If the hoist does not continue to move, the emergency limit switch was activated in step 1 and the operational limit switch is not working.
3 Minimum clearance "a" see table.
4 Press **"down" button** and check bottom hook position in the same way.
5 Minimum clearance between rope guide (S) and clamping claws (K) for rope anchorage = 20 mm, see sketch, if this is not the case, reset limit switch, see page 45.

- The clearances between the switching points for operational and emergency limit switches are set for normal operating conditions, however they can be adjusted if necessary.

6.8.7 Servicing gear limit switch

Maintenance work is restricted to checking the cut-off points. No maintenance or inspection is necessary for the gear limit switch itself.

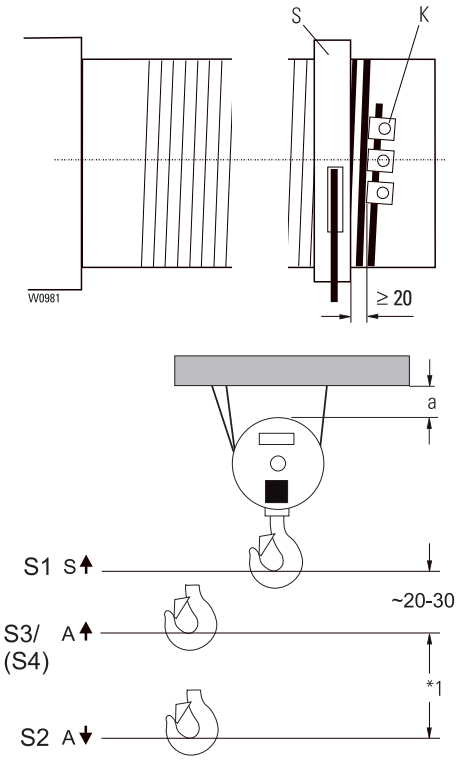
Any dust deposits that may be visible when the housing is opened must on no account be removed with compressed air as this would force the dust into the contacts and impair the switching function.

On no account must benzene or other solvents be used to clean the limit switch!

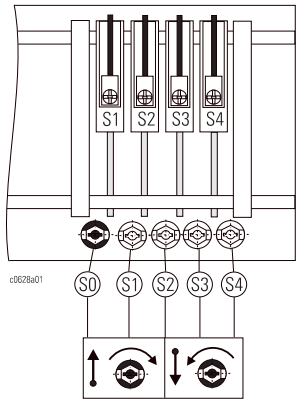
	a [mm]	
	50 Hz	60 Hz
1/1 2/2-1	130	150
2/1 4/2-1	70	80
4/1	40	50

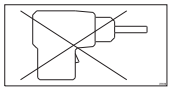
*1 Effective hook path

6.8.8 Setting hoist limit switch



	a [mm]	
	50 Hz	60 Hz
1/1 2/2-1	130	150
2/1 4/2-1	70	80
4/1	40	50





The cover of the limit switch must be removed to set the contacts. This exposes live contact connections. There is thus a danger of contact with live parts!

The limit switch can be adjusted at the setscrews (S1)-(S3) or (S1)-(S4):
Turning to the left: switching point is moved "downwards",
Turning to the right: switching point is moved "upwards".

Adjusting en bloc
All the cam discs can be moved together with the aid of the black setscrew (S0). The settings of the individual contacts relative to one another remain unchanged.

Set the limit switch using a socket spanner (04 430 50 99 0) **and without using excessive force. Do not use a power screwdriver or similar.**

- Adjust the switching points in the following sequence:

Emergency limit switch:
1. A↑ (S3/S4))
2. S↑ (S1)
2. A↓ (S2)

Switching point A↑ (S3/S4)
"Emergency limit switch top hook position"
- Lift bottom hook block 2/1 to a+10 mm or to a+5 mm for 4/1 (sketch, table). If necessary turn setscrew (S3/S4 and S1) to the right beforehand.
- Turn setscrew (S3 or S4) to the left until contact S3 or S4 switches audibly.
- Check cut-off point in main and creep hoist

Switching point S↑ (S1)
"Safety limit switch above top hook position"
- Lift bottom hook block until emergency hoist limit switch is reached, if necessary turn setscrew (S1) to the right beforehand.
- Turn setscrew (S1) to the left until contact S1 switches audibly.
- Turn setscrew (S1) back to the right by approx. ½ turn.

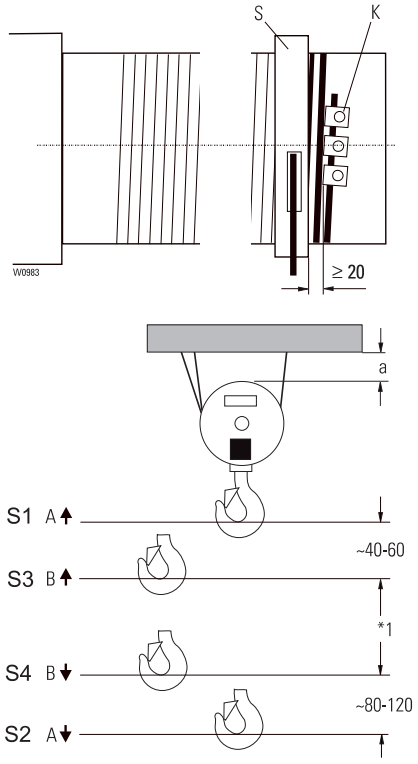
Switching point A↓ (S2)
"Emergency limit switch bottom hook position"
(Minimum clearance between rope guide (S) and clamping claws (K) for rope anchorage = 20 mm, see sketch)

Set bottom hook position so that the bottom hook block does not touch the ground (would cause slack rope).

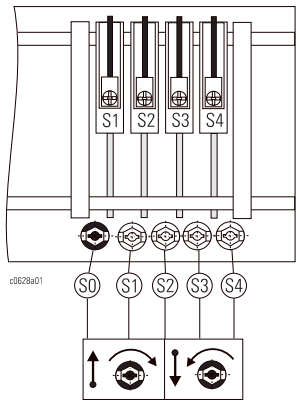
- Lower bottom hook block to desired hook position, if necessary turn setscrew (S2) to the left beforehand.
- Turn setscrew (S2) to the right until contact S2 switches audibly.
- Check cut-off point in main and creep hoist.

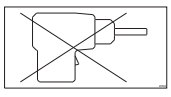
*1 Effective hook path

BASH_02_1.FM



	a [mm]	
	50 Hz	60 Hz
1/1 2/2-1	130	150
2/1 4/2-1	70	80
4/1	40	50





6.8.8 Setting hoist limit switch (continued)

Combined operational and emergency hoist limit switch:

1. A↑ (S1)
2. B↑ (S3)
3. A↓ (S2)
4. B↓ (S4)

Switching point A↑ (S1)
"Emergency limit switch top hook position"

- Lift bottom hook block 2/1 to a+10 mm or to a+5 mm for 4/1 (sketch, table). If necessary turn setscrew (S1) to the right beforehand.
- Turn setscrew (S1) to the left until contact S1 switches audibly.
- Check cut-off point in main and creep hoist

Switching point B↑ (S3)
"Operational limit switch top hook position"
(Minimum clearance to A↑ 60 mm for 2/1, 40 mm for 4/1)

- Lift bottom hook block 2/1 to 10 mm, or to 5 mm for 4/1, below the desired cut-off point, if necessary turn setscrew (S3) to the right beforehand.
- Turn setscrew (S3) to the left until contact S3 switches audibly.
- Check cut-off point in main and creep hoist.

Switching point A↓ (S2)
"Emergency limit switch bottom hook position"
(Minimum clearance between rope guide (S) and clamping claws (K) for rope anchorage = 20 mm, see sketch)
Set bottom hook position so that the bottom hook block does not touch the ground (would cause slack rope).

- Lower bottom hook block to desired hook position, if necessary turn setscrew (S2) to the left beforehand.
- Turn setscrew (S2) to the right until contact S2 switches audibly.
- Check cut-off point in main and creep hoist.

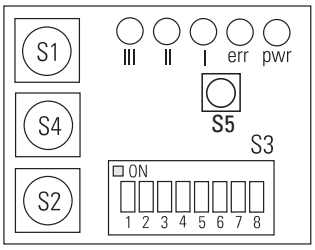
Switching point B↓ (S3)
"Operational limit switch bottom hook position"
(Minimum clearance to A↑ 120 mm for 2/1, 80 mm for 4/1)

- Lower bottom hook block 2/1 to 120 mm, or 60 mm for 4/1, above desired hook position, if necessary turn setscrew (S4) to the left beforehand
- Turn setscrew (S4) to the right until contact S4 switches audibly
- Check cut-off point in main and creep hoist.

Safety note:
Incorrectly set limit switches may cause serious accidents!

*1 Effective hook path

6.9 Overload cut-off



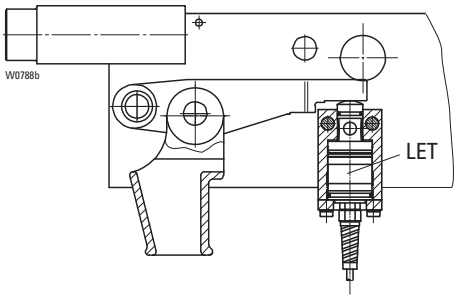
6.9.1 Description of system

The SLE21 / Multicontroller SMC21 load monitor with its electronic sensor is set in the factory. Corrections are only permitted in special cases, see page 57.
The factory settings are shown under the front cover of the SLE 21 load monitor (sketch).

6.9.2 Testing overload cut-off

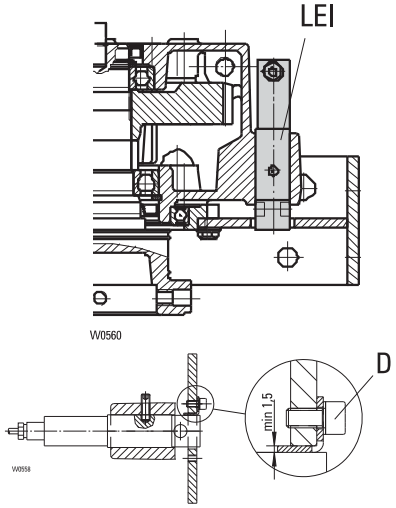
If an overload is detected, the wire rope hoist is switched off in the upwards direction. Only lowering is then possible. Lifting is not possible until the wire rope hoist has been unloaded.

- Attach rated load +10% overload and take load up slowly. After the rope has been tautened the overload cut-off must disconnect the hoist.



6.9.3 Maintenance of LET overload cut-off

After off-loading hoist, check all moving parts for ease of movement. Clean without dismantling and grease from the outside with a thin-bodied lubricant.
See page 22 for a description of the system.



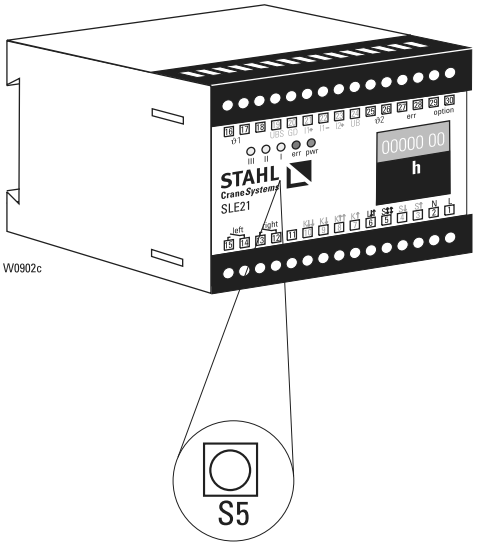
6.9.4 Maintenance of LEI overload cut-off

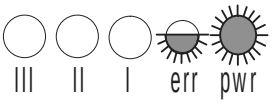
- Check thickness of plate (min. 1.5 mm). If necessary, replace plate after removing screw (D).

6.10Crane test

SLE21 / SMC21

1. Carefully remove front cover of SLE21 / SMC21.
2. The cut-off point is increased by pressing button (S5) permitting the test load of 125% to be lifted.





Button (S5) pressed.
Cut-off threshhold is raised.

Safety note:
Extremely heavy loads can be lifted.
Risk of accident!

The device automatically returns to the original cut-off point after 45 minutes.

6.11 Rope drive

6.11.1 Rope and rope attachment - general information

After commissioning a new wire rope hoist, or after replacing the rope, the rope of multi-fall hoists may twist.
This can be seen from the bottom hook block turning, particularly when unloaded.
Twisting in the rope prejudices safety and service life.

Remove any twists!

- Regularly inspect the rope for twisting. To do so, run the hoist into highest and lowest hook positions without load.
- If any twisting is detected, untwist the rope immediately. See page 25, "Reeving rope" and see page 50, "Removing rope".
- Check rope. Take particular note of the sections of rope near rope pulleys, return pulleys or equalizing pulleys and in the region of the rope anchorage.
- If any of the following damage occurs, replace the rope immediately.

1. Excess visible wire fractures, see page 49, table.
   The rope must be free of load for testing to facilite detecting any broken wires when bending the rope by hand (approximately by radius of rope sheave).
2. Nest of wire fractures or broken strand.
3. Diameter reduced by 10% due to corrosion or wear (independent of breakage).
4. Diameter reduced due to structural changes over considerable sections.
5. Formation of baskets or loops, knots, necking, kinks or other mechanical damage.
6. Corkscrew-type deformation. Divergence due to deformation: ≥ 1/3x rope diameter.
7. In addition, the rope must be replaced as required by DIN 15020, FEM 9.661 and ISO 4309.
8. In certain applications (e.g. twist-free wire rope, constant deadweight, recurrent stopping position, automatic operation etc.) wire fractures may occur inside the rope without being visible from outside.
   Risk of accident!
   In case of doubt please contact the manufacturer.

6.1.2 Replacement of wire rope due to broken wires

Twist-free wire rope

Rope diameter [mm]	5,5	7	9	12	14	20
Number of external strands	12	12	15	15	15	18
Rope make-up *	18X7+SE	d1315z	d1315z	d1315z	d1315z	d1318
Broken wires visible 1Bm, 1Am	4	4	5	5	5	6
(FEM 9.661) 2m - 4m	8	8	10	10	10	11
over a length of [mm]	33	42	54	72	84	120
or						
Broken wires visible 1Bm, 1Am	8	8	10	10	10	11
(FEM 9.661) 2m - 4m	16	16	16	19	19	22
over a length of [mm]	165	210	270	360	420	600

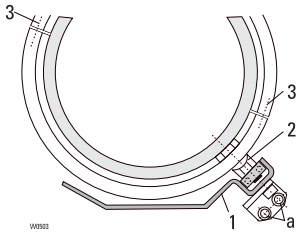
Non twist-free wire rope

Rope diameter [mm]	5,5	7	9	9	12	12,5	14	20
Number of external strands	6	8	8	8	8	8	8	8
Rope make-up *	6x19W	8x19W	8x19W	Alphalift	Turbolift	8x19W	8x19W	8x36WS
Broken wires visible 1Bm, 1Am	5	6	6	6	9	6	6	12
(FEM 9.661) 2m - 4m	10	13	13	13	18	13	13	24
over a length of [mm]	33	42	54	54	72	75	84	120
or								
Broken wires visible 1Bm, 1Am	10	13	13	13	18	13	13	24
(FEM 9.661) 2m - 4m	19	26	26	26	35	26	26	48
over a length of [mm]	165	210	270	270	360	375	420	600

* See data sheet for rope make-up

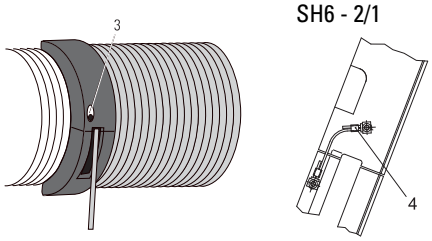
6.11.3Removing rope guide

SH3 - SH5



SH6

SH6 - 2/1



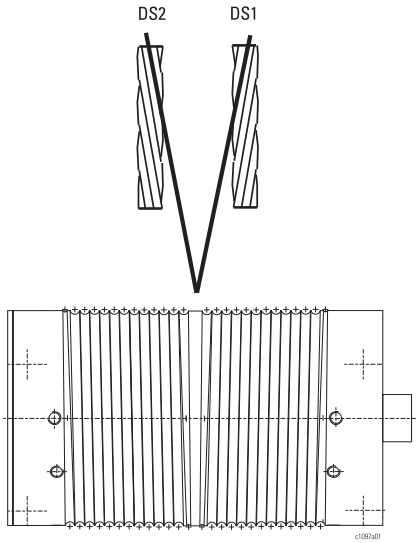
1st method (preferable!)
- Unscrew protective plate (1) under the rope drum at points (a). The rope guide can then be rotated freely. Do **not** unscrew stop with bearing (2)!
- Unscrew screws (3).
- Unscrew rope guide safety cable (4) (if any) on one side.
- Remove half-rings.
- Unhook rope tensioning spring.

2nd method
- Unscrew stop with bearing (2) from rope guide. The rope guide can then be rotated freely. Continue as described under 1.

Caution: The stop with bearing (2) is locked with a conical spring washer DIN 6796. This must be refitted correctly.

6.11.4 Replacing wire rope

SH wire rope hoists have a special rope which is the optimum for the most common applications. The substitute rope must be equivalent to the original in terms of quality, strength and make-up. Please consult the works certificate or the rope certificate to see which rope is fitted.

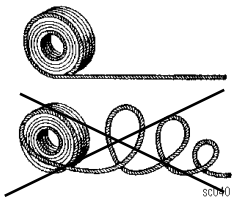


In the case of 2 wire ropes with different lays

- wire rope with right-hand lay (DS1) on rope drum with left-hand groove
- wire rope with left-hand lay (DS2) on rope drum with rigth-hand groove
- The direction of lay of the wire ropes makes a V-pattern (see sketch).

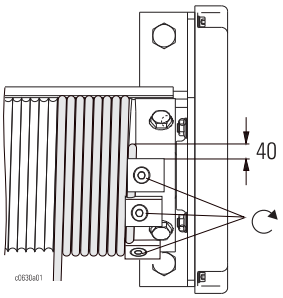
Removing rope

- Lower bottom hook block to just above the lowest hook position and set it down on a firm support.
- Release end of wire rope in rope anchorage (rope clamp with rope wedge).
- Run the remaining rope off the drum.
- Unscrew the fixing screws in the clamping plates on the rope drum.



Fitting rope

- Unroll new rope out straight if possible, without twists, kinks or loops. Protect rope from dirt.
- Attach rope to rope drum with all the clamping plates (do not forget the lock washers!) Allow the rope end to project by approx. 30-40 mm.
- Tightly wind about 5-10 turns onto the drum under power. Let the rope run through a greased rag. For type of grease see page 64.
- Fit rope guide, see page 51, "Fitting rope guide".
- Reeve the loose end of the rope according to the number of falls, fasten with the rope wedge and secure with a rope clamp, see page 26, "Rope anchorage".
- Retighten clamping plates. For tightening torques see table.
- Run rope in with partial load.

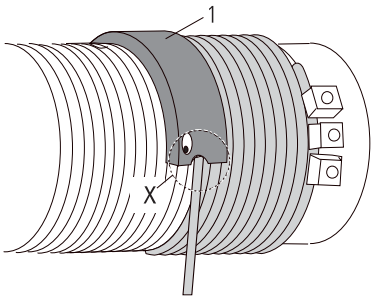


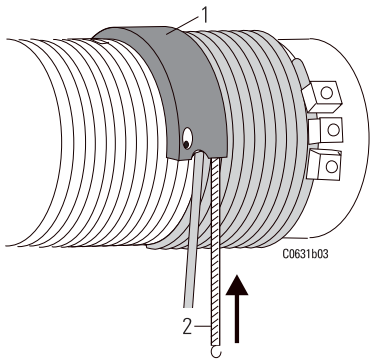
- **Caution! Risk of accident!**
- After fitting a new rope, or shortening the old one, reset the hoist limit switch. See page 37, 40,44, "Setting hoist limit switch".
- If the new rope twists after some time in operation, untwist the rope immediately. See page 25, "Reeving rope" and "Removing rope".

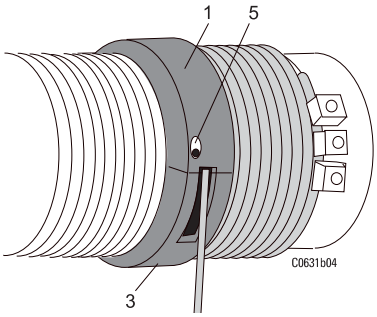
Type	M..	↻
		Nm
SH 3	M6	10
	M10	40
SH 4	M10	50
SH 5	M10	50
	M12	87
SH 6	M12	87
	M16	210

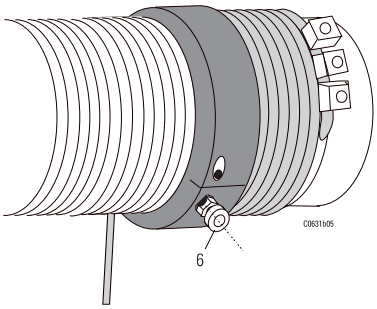
BASH_02_1.FM

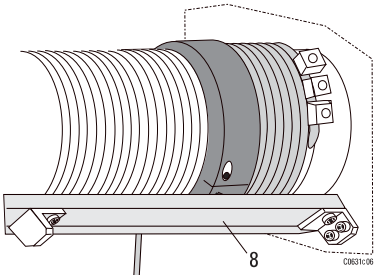
6.11.5 Fitting rope guide



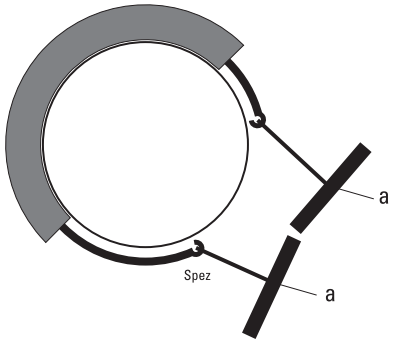


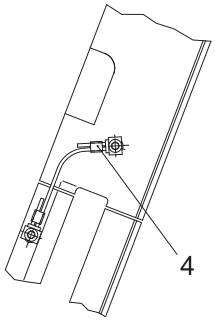






- Grease thread and rope guide groove thoroughly.
- Place the half-ring (1) with the short window section onto the rope drum next to the last rope winding so that the rope exits from the region of the window (x).
- Push rope tensioning spring (2) into the guide groove of the half-ring (1) and hook the ends of the spring together. A special tool (a), see sketch, will make this easier.
- Place the second half-ring (3) with the long rope exit window on the rope drum so that the rope exits from the drum groove through the window straight and without kinking. The second half-ring must lie flush against the first.
- Bolt the two half-rings together with pressure screws and bolts (5)
- **The rope guide must rest lightly on the drum and be able to be turned by hand. If this is not the case the guide has been fitted incorrectly or the rope drum is damaged.**
- Bolt stop with bearing and conical spring washer (6) to the rope guide.
- Fit rope guide safety catch (7) (SH6 - 2/1 L4-L5)
- Bolt on protective plate (8).





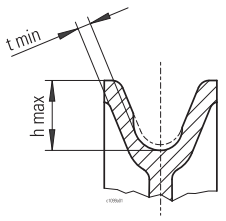
6.11.6 Inspection and maintenance of rope sheave

- Check rope sheaves for wear. We recommend having them checked by personnel trained by us. They should also be checked for easy running, indicating that the ball bearings are in good condition.

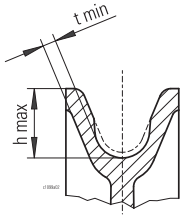
Wear on rope sheave
Notes on limits for wear

Rope sheaves				
Part number	ØD	t min	h max	h new
01 430 01 53 0	98	4	13	11
01 430 04 53 0	100	4	13	10
01 430 00 53 0	125	4	14	12
22 330 00 53 0	140	4	16	14
01 430 06 53 0	154	4	21,5	19,5
03 330 20 53 0	160	4	19	16,5
24 330 00 53 0	200	5,5	24	21
01 430 05 53 0	218	5,5	26,5	24,5
01 430 03 53 0	225	5,5	24	21
03 330 40 53 0	250	5,5	28	25
25 330 00 53 0	375	6,5	37,5	34
25 330 03 53 0	375	6,5	36	32,5
46 330 00 53 0	400	7	33,5	30
26 330 01 53 0	450	10	39	35
09 430 00 53 0	450	10	39	35
46 330 01 53 0	480	10	36,5	32,5

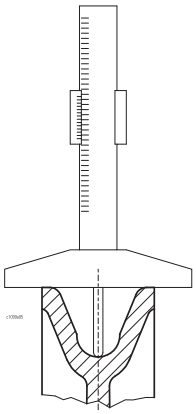
on one side and at base



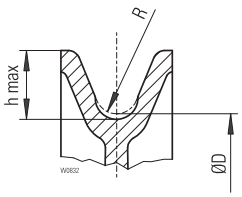
on both sides and at base



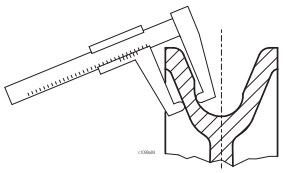
Measuring depth of base of groove with depth gauge

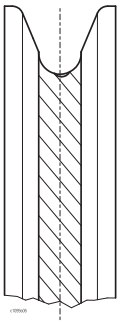


on both sides and at base



Measuring thickness of wall with special caliper gauge





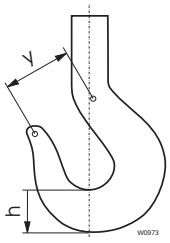
The rope sheave must be replaced if the wall thickness as measured is <t min or the groove depth as measured is >h max. Furthermore, the rope sheave must be replaced when replacing the wire rope if the rope strands have dug into the base of the groove. Impressions of single wires are acceptable.
A rope sheave must also be replaced if the radius of the base of the groove R has become too small for the new rope due to reduction in diameter of the old rope or wear.

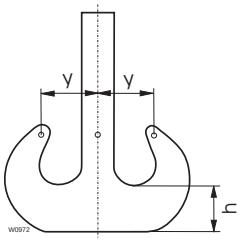
N.B.
The negative profile of the rope in the base of the groove may provide optimum contact to the wire rope currently fitted.

Rope sheaves should be rotated without load on the rope to check the easy and concentric running of the bearings.

Bottom hook blocks
The bottom hook block must be checked for damage. Deformations, cracks and cuts caused by impact must be assessed.
The damage can only be assessed by trained maintenance personnel.

6.11.7 Checking load hook





RSN, RS, RF																
	0,25	0,4	0,5	0,8	1	1,6	2,5	4	5	6	10	2,5	4	5	6	10
	[mm]											[mm]				
h	24	29	31	37	40	48	58	67	75	85	106	58	67	75	85	106
$h_{min.}$	18,24	27,55	29,45	35,15	38,0	45,6	55,1	63,65	71,25	80,75	100,7	55,1	63,65	71,25	80,75	100,7

y_{neu} see hook certificate
$y_{zul} = \leq 1{,}1 \times y_{neu}$
If value h_{min} and/or y_{zul} are reached $\rightarrow$ replace hook

BASH_02_1.FM

6.12 Trolley/crab

Wheels, wheel drive and runway

- Visual inspection of wheels for wear. See tables for limits for wear.
- Visual inspection of runway girder for wear.

Visual inspection of wheel flanges for wear.

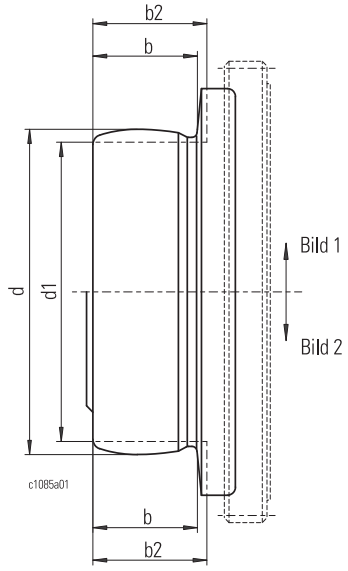


Fig.	Nominal value		Limit for wear	
	d [mm]	b [mm]	**d1** [mm]	**b2** [mm]
1	80	27,5	**76**	**29,5**
1	100	33	**95**	**35**
1	125	38	**119**	**40**
1	140	44,5	**133**	**47**
2		42,5		**45**
1	160	44,5	**152**	**47**
2	200	42,5	**190**	**45**

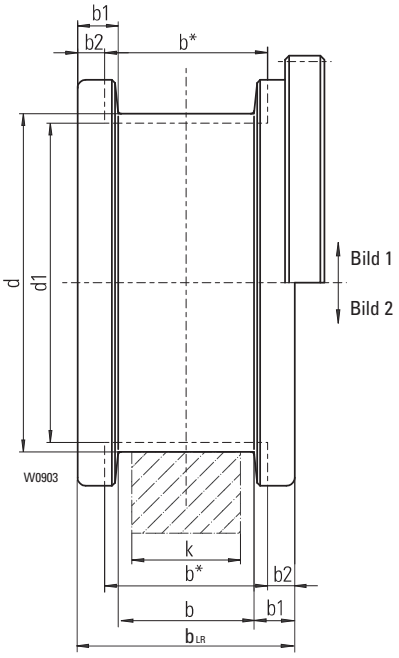


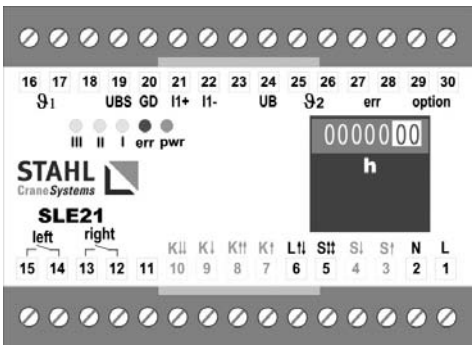
Fig.	d	bLR	Nominal value b	k min	k max	b1	Limit for wear d1	b2	Max. play =b*-k kmin	kmax
				[mm]						
1	100	80	50	40	45	15	95	5,5	13	13
		80	60	50	55	10		5,5	13	13
2	125	80	50	40	45	15	118,75	7	13	13
		80	60	50	55	10		7	13	11
2	160	85	52	40	45	16,5	152	8	16	16
		85	62	50	55	11,5)		13,5	18	18
2	200	100	54	40	45	23	190	10,5	18	18
		100	64	50	55	18		10,5	18	18
		100	74	60	65	13		10,5	18	14
2	315	115	54	40	45	30,5 (29)	300	13,5	18	18
		115	64	50	55	25,5 (24)		13,5	18	18
		115	74	60	65	20,5 (19)		13,5	18	18
2	400	118,5	65	50	55	27,5 (26)	385	16	20	20
		118,5	75	60	65	22,5 (21)		16	20	20
		118,5	85	70	75	17,5 (16)		16	16,5	11,5

If <u>any one</u> of the limits for wear d1, b2 (b*-k) is attained, the part must be replaced.

( ) for machined faces

6.13 Remaining service life

According to FEM 9.755, the operating mode and operating time must be established by the user, see page 2, and recorded in the test log book in order to calculate the remaining service life.
After the service life has expired a general overhaul (S.W.P.) *1 must be carried out.
Wire rope hoists are equipped ex factory with a suitable registration device.
Various devices are used:



6.13.1 Operating hours counter in SLE21 load monitor

The operating hours counter in the load monitor of the overload cut-off adds up the operating time of the hoist. In order to obtain the lifetime expired in full load hours, the operating hours must be calculated with load factor "k".
This is carried out by qualified personnel, see page 2, during the annual "periodic test".
If 90% of the theoretical full load lifetime has expired, a general overhaul (GO) must be scheduled and carried out at the earliest possible date.

6.13.2 STAHL SMC21 Multicontroller (optional)

The operating time of the hoist and the full load operating hours are recorded in the SMC21. The SMC21 calculates the full load operating hours from the relevant hoisted load and the operating hours of the hoist.
The remaining service life is calculated with reference to the mechanism group and can be read off by means of a PC (laptop).

If the theoretical full load lifetime has expired, this is also indicated by an illuminated red LCD, a general overhaul must be scheduled and carried out.

Note:
Reading the full load operating hours does not replace the prescribed tests including inspecting the wearing parts (rope, return sheaves...)

6.14 General overhaul

FEM9.511	1Am	2m	3m	4m
D [h]	800	1600	3200	6400

The mechanism (motor and gear; not applicable to wearing parts) of the SH.. wire rope hoist is classified according to FEM 9.511. The theoretical full load lifetime in hours shown opposite (D) is applicable for normal hoist applications.
If the full load lifetime (D) minus the lifetime expired is nought, the wire rope hoist must be overhauled by the manufacturer.

Components which are in the power flux may only be overhauled by the manufacturer.

The rope drive is classified according to FEM 9.661, see works certificate.

*1 Safe Working Period

7 Fault-finding

7.1 What is to be done if?

7.1.1 Wire rope hoist does not start, motor hums

- Not all power phases are present.

1. Check fuses,
2. Check supply cable,
3. Check control pendant and switchgear.

7.1.2 Wire rope hoist does not start after a long stoppage, or starts with difficulty, motor hums

- Hoist brake is stuck.

1. Remove fan cover
2. Dismantle brake

7.1.3 Loud clicking when switching on

- Measure air gap, see page 34.
- Replace brake disc if necessary, see page 34.

7.1.4 Braking path too long

- Brake displacement too long.
- Brake lining worn.
- Replace brake disc, see page 34, "Hoist motor brake",

7.1.5 Bottom hook block and rope rotate

- Rope is twisted.
- Untwist rope, see page 50, "Replacing rope".

7.1.6 Cross travel not possible

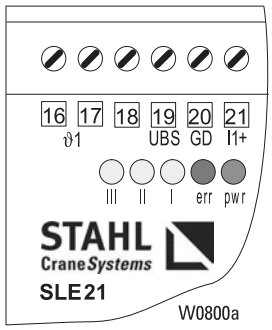
- Hoist is in highest hook position, cross travel is disconnected.
- Lower bottom hook block until up motion is possible again

7.1.7 Lowering not possible

- Hoist is in bottom hook position
- Operational or emergency hoist limit switch is faulty
- Check hoist limit switch

7.1 What is to be done if? (continued)

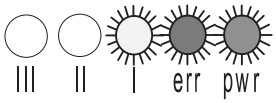
7.1.8 Load is not lifted



- SLE21 load monitor / SMC21 Multicontroller has been actuated or is faulty.

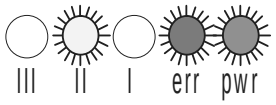
1. Check setting, see page 46.
2. Actions for SLE21 / SMC21
   LED I...III "on" and LED err => error.

Actions to eliminate an error may only be performed by trained personnel.



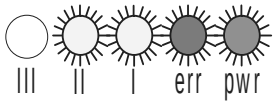
Error specification - Sensor current <1 mA or > 24 mA

Elimination of error - Check voltage supply
- Check sensor current (terminal 21)
- Check sensor cable
- Replace sensor



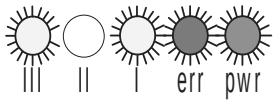
Error specification - Overload

Elimination of error - Remove load from hoist



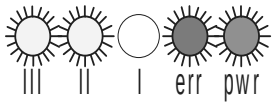
Error specification - Overtemperature (hoisting motion not possible)

Elimination of error - Allow motor to cool down - check PTC thermistors



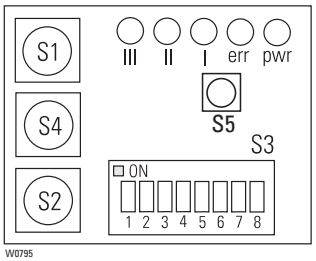
Error specification - Control error

Elimination of error - Check wiring
(lifting terminal 3 and lowering terminal 4 are activated simultaneously)



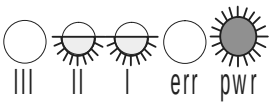
Error specification - System error

Elimination of error - Check voltage (terminal 6)
- Switch SLE21 / SMC21 off/on
- Replace SLE21/SMC21



7.1.9 Correction of cut-off threshhold for SLE21 with electronic sensor

- **Corrections to the cut-off threshhold may be carried out by trained personnel only.** The load monitor will only accept alterations of -20% to +8% on the factory setting. If these limits are exceeded, I and II flash.



Permissible cut-off range exceeded or below target
-lower cut-off threshhold (S2/S4)
-raise cut-off threshhold (S2/S4)

- Rough adjustment with S4, ~16%/ switching position,
- Fine adjustment with S2,~1%/switching position,
see page 45.

Caution: Do not exceed 110% nominal load

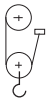
7.1.10 Correction of cut-off threshhold for SMC21

A laptop and the Config Tool software is required for this.

8 Technical data

8.1 FEM classification

Classification of mechanism, rope drive and motor in acc. with FEM for SH



1/1 2/2-1	2/1 4/2-1	4/1	6/1	8/1	Type	FEM 9.661 Rope drive	FEM 9.511 Mechanism	FEM 9.683 Motor	Type	FEM 9.661 Rope drive	FEM 9.511 Mechanism	FEM 9.683 Motor
500	1000	2000			SH 3005-25 SH 3005-40	3m	4m	4m				
630	1250	2500			SH 3006-25 SH 3006-40	2m	3m	4m				
800	1600	3200			SH 3008-20 SH 3006-32	2m	2m	4m	SH 4008-25 SH 4008-40	3m	4m	4m
1000	2000	4000			SH 4010-25 SH 4010-40	2m	3m	4m				
1250	2500	5000			SH 4012-20 SH 4012-32	2m	2m	4m				
1600	3200	6300			SH 4016-16 SH 4016-25	1Am	1Am	4m	SH 5016-25 SH 5016-40	3m	4m	4m
2000	4000	8000			SH 5020-25 SH 5020-40	2m	3m	4m				
2500	5000	10000			SH 5025-20 SH 5025-32	2m	2m	4m	SHR 6025-20 SHR 6025-32 SHR 6025-40	2m	4m	4m
3200	6300	12500			SH 5032-16 SH 5032-25	1Am	1Am	4m	SHR 6032-16 SHR 6032-25 SHR 6032-40	2m	4m	4m
4000	8000	16000			SHR 6040-12 SHR 6040-20 SHR 6040-32	1Am	3m	4m	SH 6040-12 SH 6040-20 SH 6040-32	3m	3m	4m
5000	10000	20000			SH 6050-16 SH 6050-25	2m	2m	4m	SH 6050-40	2m	2m	1Am
6300	12500	25000			SH 6063-12 SH 6063-20	1Am	1Am	4m	SH 6063-32	1Am	1Am	1Am
8000	16000	32000	50000	63000								
10000	20000	40000	63000	80000								
12500	25000	50000	80000	100000								

8.2 Conditions of use

The hoist is designed for use in industry and for the ambient conditions usual in industry in non-hazardous areas.
Special measures must be taken for particular applications such as e.g. high degree of chemical pollution, outdoor use, offshore application, etc.
The manufacturer will be pleased to advise you.

Protection against dust and moisture to EN 60 529
IP 55

Permissible ambient temperatures
-20°C ... +40°C (standard)
-20°C ... +60°C (option
-5°C ... +80°C (option)
-40°C ... +40°C (off-standard design)

BASH_02_1.FM

8.3 Hoist

8.3.1 Pole-changing hoist motors 50Hz

Hoists		Motor *4	50 Hz										Main fuse gL / gG *3		
						220...240 V		380...415 V		480...525 V			220... 240 V	380... 415 V	480... 525 V
			kW	% DC	c/h	In [A]	Ik [A]	In [A]	Ik [A]	In [A]	Ik [A]	cos phi k	[A]		
SH 3005-25 SH 3006-25 SH 3008-20		12/2H33	0,4/2,4 0,5/3,0 0,5/3,0	20/50 20/40 20/40	360/180 240/120 240/120	7,0/10,6 7,0/11,8 7,0/11,8	8,3/43,0	4,0/6,1 4,0/6,8 4,0/6,8	4,8/25,0	3,2/4,9 3,2/5,4 3,2/5,4	3,8/20,0	0,82/0,91	16	10	10
SH 3005-40 SH 3006-40 SH 3008-32	SH 4008-25 SH 4010-25 SH 4012-20 SH 4016-16	12/2H42	0,6/3,9 0,7/4,8 0,7/4,8 0,7/4,8	20/50 20/40 20/40 20/40	360/180 240/120 240/120 240/120	8,7/15,7 8,9/17,4 8,9/17,4 8,9/17,4	13,0/82,0	5,0/9,0 5,1/10,0 5,1/10,0 5,1/10,0	7,5/47,0	4,0/7,2 4,1/8,0 4,1/8,0 4,1/8,0	6,0/38,0	0,79/0,87	25	16	16
	SH 4008-40 SH 4010-40 SH 4012-32 SH 4016-25	12/2H62	1,0/6,1 1,1/7,6 1,1/7,6 1,1/7,6	20/50 20/40 20/40 20/40	480/240 360/180 360/180 360/180	10,1/21,0 10,4/25,0 10,4/25,0 10,4/25,0	19,1/165	5,8/12,0 6,0/15,0 6,0/15,0 6,0/15,0	11,0/95,0	4,6/9,6 4,8/11,6 4,8/11,6 4,8/11,6	8,8/76,0	0,74/0,77	50	25	20
SH 5016-25 SH 5020-25 SH 5025-20	- SHR 6025-20 SHR 6032-16 SHR 6040-12 SH 6040-12	12/2H71	1,3/7,6 1,5/9,5 1,5/9,5 1,5/9,5 1,5/9,5	20/50 20/40 20/40 20/40 20/40	480/240 300/150 300/150 300/150 300/150	14,8/28,0 16,7/37,0 16,7/37,0 16,7/37,0 16,7/37,0	32,2/183	8,5/16,0 9,6/21,0 9,6/21,0 9,6/21,0 9,6/21,0	18,5/105	6,8/12,8 7,7/16,9 7,7/16,9 7,7/16,9 7,7/16,9	14,8/84,0	0,62/0,64	50	35	25
SH 5016-40 SH 5020-40 SH 5025-32 SH 5032-25	- SHR 6025-32 SHR 6032-25 SH. 6040-20 SH 6050-16 SH 6063-12	12/2H72 *1	1,9/12,0 2,4/15,5 2,4/15,5 2,4/15,5 2,4/15,5 2,4/15,5	20/50 20/40 20/40 20/40 20/40 20/40	480/240 240/120 240/120 240/120 240/120 240/120	19,5/43,0 23,0/59,0 23,0/59,0 23,0/59,0 23,0/59,0 23,0/59,0	45,2/304	11,2/25,0 13,4/34,0 13,4/34,0 13,4/34,0 13,4/34,0 13,4/34,0	26,0/175	9,0/20,0 10,7/27,0 10,7/27,0 10,7/27,0 10,7/27,0 10,7/27,0	20,8/140	0,62/0,64	80	50	35
	SHR 6025-40 SHR 6032-40 SH. 6040-32 SH 6050-25 SH 6063-20	12/2H73 *1	3,1/19,0 3,8/24,0 3,8/24,0 3,8/24,0 3,8/24,0	20/50 20/40 20/40 20/40 20/40	360/180 240/120 240/120 240/120 240/120	38,0/63,0 38,0/83,0 38,0/83,0 38,0/83,0 38,0/83,0	77,0/423	22,0/36,0 22,0/48,0 22,0/48,0 22,0/48,0 22,0/48,0	44,0/243	17,6/29,0 17,6/38,0 17,6/38,0 17,6/38,0 17,6/38,0	35,0/194	0,59/0,63	100	63	63
	SH 6050-40 SH 6063-32	24/4H92 *1	5,6/38,0 5,6/38,0	10/20 10/20	120/60 120/60	- -	- -	53,0/73,0 53,0/73,0	76,0/471	42,0/58,0 42,0/58,0	61,0/377	0,51/0,63	*2	100	80

Motor currents at other voltages:

Formula

$$I_{xV} = I_{400\,V} \cdot \frac{400\,V}{x\,V}$$

*1 Operation only with special starting circuit via 12/24-pole winding

*2 On request

*3 The 2-pole starting current for main hoist and the rated current for the travel motor were taken into consideration when selecting the main fuse.

*4 The motors are designed for rated voltage ranges.
In accordance with EN 60034 a voltage tolerance of ±5% and a frequency tolerance of ±2% apply on top of the rated voltage ranges.
The maximum current occurring in the rated voltage range is given.

8.3.2 Pole-changing hoist motors 60Hz

Hoists		Motor *4	60 Hz										Main fuse gL / gG *3		
						380...415 V		440...480 V		550...600 V			380... 415 V	440... 480 V	550... 600 V
			kW	%DCD	c/h	In [A]	Ik [A]	In [A]	Ik [A]	In [A]	Ik [A]	cos phi k	[A]		
SH 3005-25 SH 3006-25 SH 3008-20		12/2H33	0,4/2,9 0,6/3,6 0,6/3,6	20/50 20/40 20/40	360/180 240/120 240/120	4,6/7,0 4,6/7,8 4,6/7,8	5,5/29,0	4,0/6,1 4,0/6,8 4,0/6,8	4,8/25,0	3,2/4,9 3,2/5,4 3,2/5,4	3,8/20,0	0,82/0,91	16	10	10
SH 3005-40 SH 3006-40 SH 3008-32	SH 4008-25 SH 4010-25 SH 4012-20 SH 4016-16	12/2H42	0,7/4,7 0,9/5,8 0,9/5,8 0,9/5,8	20/50 20/40 20/40 20/40	360/180 240/120 240/120 240/120	5,8/10,4 5,9/11,5 5,9/11,5 5,9/11,5	8,6/54,0	5,0/9,0 5,1/10,0 5,1/10,0 5,1/10,0	7,5/47,0	4,0/7,2 4,1/8,0 4,1/8,0 4,1/8,0	6,0/38,0	0,79/0,87	20	16	16
	SH 4008-40 SH 4010-40 SH 4012-32 SH 4016-25	12/2H62	1,2/7,3 1,3/9,1 1,3/9,1 1,3/9,1	20/50 20/40 20/40 20/40	480/240 360/180 360/180 360/180	6,7/13,8 6,9/17,0 6,9/17,0 6,9/17,0	12,7/109	5,8/12,0 6,0/15,0 6,0/15,0 6,0/15,0	11,0/95,0	4,6/9,6 4,8/11,6 4,8/11,6 4,8/11,6	8,8/76,0	0,74/0,77	35	25	20
SH 5016-25 SH 5020-25 SH 5025-20	- SHR 6025-20 SHR 6032-16 SHR 6040-12 SH 6040-12	12/2H71	1,5/9,1 1,8/11,4 1,8/11,4 1,8/11,4 1,8/11,4	20/50 20/40 20/40 20/40 20/40	480/240 300/150 300/150 300/150 300/150	9,8/18,4 11,0/24,0 11,0/24,0 11,0/24,0 11,0/24,0	21,3/121	8,5/16,0 9,6/21,0 9,6/21,0 9,6/21,0 9,6/21,0	18,5/105	6,8/12,8 7,7/16,9 7,7/16,9 7,7/16,9 7,7/16,9	14,8/84,0	0,62/0,64	35	35	25
SH 5016-40 SH 5020-40 SH 5025-32 SH 5032-25	- SHR 6025-32 SHR 6032-25 SH. 6040-20 SH 6050-16 SH 6063-12	12/2H72 *1	2,3/14,4 2,9/18,6 2,9/18,6 2,9/18,6 2,9/18,6 2,9/18,6	20/50 20/40 20/40 20/40 20/40 20/40	480/240 240/120 240/120 240/120 240/120 240/120	12,9/29,0 15,4/39,0 15,4/39,0 15,4/39,0 15,4/39,0 15,4/39,0	29,9/201	11,2/25,0 13,4/34,0 13,4/34,0 13,4/34,0 13,4/34,0 13,4/34,0	26,0/175	9,0/20,0 10,7/27,0 10,7/27,0 10,7/27,0 10,7/27,0 10,7/27,0	20,8/140	0,62/0,64	50	50	35
	SHR 6025-40 SHR 6032-40 SH. 6040-32 SH 6050-25 SH 6063-20	12/2H73 *1	3,7/23,0 4,5/29,0 4,5/29,0 4,5/29,0 4,5/29,0	20/50 20/40 20/40 20/40 20/40	360/180 240/120 240/120 240/120 240/120	25,0/41,0 25,0/55,0 25,0/55,0 25,0/55,0 25,0/55,0	51,0/279	22,0/36,0 22,0/48,0 22,0/48,0 22,0/48,0 22,0/48,0	44,0/243	17,6/29,0 17,6/38,0 17,6/38,0 17,6/38,0 17,6/38,0	35,0/194	0,59/0,63	80	63	63
	SH 6050-40 SH 6063-32	24/4H92 *1	6,8/46,0 6,8/46,0	10/20 10/20	120/60 120/60	61,0/84,0 61,0/84,0	87,0/542	53,0/73,0 53,0/73,0	76,0/471	42,0/58,0 42,0/58,0	61,0/377	0,51/0,63	125	100	80

Motor currents at other voltages:

Formula

$$I_{xV} = I_{400\,V} \cdot \frac{400\,V}{x\,V}$$

*1 Operation only with special starting circuit via 12/24-pole winding
*2 On request
*3 The 2-pole starting current for main hoist and the rated current for the travel motor were taken into consideration when selecting the main fuse.
*4 The motors are designed for rated voltage ranges.
In accordance with EN 60034 a voltage tolerance of ±5% and a frequency tolerance of ±2% apply on top of the rated voltage ranges.
The maximum current occurring in the rated voltage range is given.

BASH_02_1.FM

8.3.3 Frequency-controlled hoist motors 50Hz

50 Hz									
Hoist motor	kW	DC	380-415 V		480-525 V		cos φ FU	Mains fuse	
								380-415 V	480-525 V
		%	In [A]	I max. FU [A]	In [A]	I max. FU [A]		[A]	
4H33	2,4	60	6,3	12,8	5,0		0,98	16	
	3,0		7,1		5,7				
4H42	3,9	60	9,4	16	7,5		0,98	16	
	4,8		10,6		8,5				
4H62	6,1	60	13,6	32,8	10,9		0,98	16	
	7,6		15,6		12,5			25	
4H71	7,6	60	17	32,8	13,6		0,98	25	
	9,5		19,6		15,7			35	
4H72	12,0	60	28	54,4	22		0,98	35	
	15,5		32		25			40	
4H73	19,0	60	41	75	33	74	0,98	63	50
	24,0		47		37				
4H82	30,0	60	65	115	52	97	0,98	80	63
	38,0		75		60				

8.3.4 Frequency-controlled hoist motors 60Hz

60 Hz												
Hoist motor	kW	DC	380-415 V		440-480 V		550-600 V		cos φ FU	Mains fuse		
										380-415 V	440-480 V	550-600 V
		%	In [A]	I max. FU [A]	In [A]	I max. FU [A]	In [A]	I max. FU [A]		[A]		
4H33	2,9	60	7,2		6,3	12,8	5,0		0,98		16	
	3,6		8,2		7,1		5,7					
4H42	4,7	60	10,8		9,4	16	7,5		0,98		16	
	5,8		12		10,6		8,5					
4H62	7,3	60	15,6		13,6	32,8	10,9		0,98		16	
	9,1		17,9		15,6		12,5				25	
4H71	9,1	60	19,6		17	32,8	13,6		0,98		25	
	11,4		23		19,6		15,7				35	
4H72	14,4	60	32		28	54,4	22		0,98		35	
	18,6		37		32		25				40	
4H73	22,8	60	47	94	41	75	33	74	0,98	63	63	50
	28,8		53		47		37					
4H82	36,0	60	75	115	65	115	52	97	0,98	80	80	63
	46,0		86	147	75		60			100	80	63

*1 Protection not 100% with gL/gG, we recommend additional semiconductor fuses (gR)

The motors are designed for rated voltage ranges.
In accordance with EN 60034 a voltage tolerance of ±5% and a frequency tolerance of ±2% apply on top of the rated voltage ranges. If these are fully utilised, the permissible limit temperature of the temperature class may be exceeded by 10 K.
The maximum current occurring in the rated voltage range is given.

8.4 Cable cross sections and lengths of supply cable

1	2						3						4						5			6						7					
Hoist motor type	Stationary Fixed installation in PVC conduit Power supply to hoist						Trolley/crab Crane Fixed installation in PVC conduit Power supply to infeed (customer's cable to beginning of rising mains)						Trolley/crab Festoon cable in free air as flexible PVC-sheathed cable from end of rising mains to hoist						Rising mains max. 10 m Fixed installation in PVC conduit from main isolator to end of rising mains			Crane Festoon cable in free air as flexible PVC-sheathed cable from end of rising mains along crane runway to crane control						Crane Festoon cable in free air as flexible PVC-sheathed cable power supply along crane bridge to hoist					
	ΔU ≤ 5%						ΔU ≤ 1%						ΔU ≤ 4% (4 + 5)															ΔU ≤ 2,5%					
																			ΔU ≤1,5% (5 + 6)													
50 Hz																																
	220-240 V		380-415 V		480-525 V		220-240 V		380-415 V		480-525 V		220-240 V		380-415 V		480-525 V		230 V	400 V	500 V	220-240 V		380-415 V		480-525 V		220-240 V		380-415 V		480-525 V	
	S	L1	S	L1	S	L1	S	L1	S	L1	S	L1	S	L1	S	L1	S	L1	S	S	S	S	L1	S	L1	S	L1	S	L1	S	L1	S	L1
	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[mm]²	[mm]²	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]
12/2H33	6,0	57	2,5	72	1,5	68	10,0	18	4,0	22	2,5	21	6,0	37	2,5	48	1,5	44	10,0	4,0	2,5	10,0	17	2,5	14	2,5	22	6,0	27	2,5	34	1,5	32
12/2H42	10,0	53	4,0	64	2,5	63	16,0	16	6,0	18	4,0	19	10,0	34	4,0	42	2,5	41	16,0	6,0	4,0	16,0	14	6,0	17	4,0	18	10,0	25	4,0	30	2,5	30
12/2H62	16,0	48	6,0	54	4,0	56	25,0	14	10,0	17	6,0	16	16,0	31	6,0	36	4,0	37	25,0	10,0	6,0	25,0	12	10,0	16	6,0	15	16,0	23	6,0	26	4,0	27
12/2H71	16,0	52	6,0	59	4,0	61	25,0	16	10,0	19	6,0	18	16,0	34	6,0	40	4,0	41	25,0	10,0	6,0	25,0	14	10,0	19	6,0	17	16,0	25	6,0	29	4,0	30
12/2H72	25,0	49	10,0	59	6,0	55	35,0	13	16,0	18	10,0	18	35,0	44	10,0	40	6,0	40	35,0	16,0	16,0	35,0	10	16,0	18	6,0	13	25,0	24	10,0	29	6,0	27
12/2H73	35,0	50	16,0	69	10,0	67	35,0	10	16,0	14	10,0	13	35,0	32	10,0	30	10,0	47	50,0	25,0	16,0	50,0	11	16,0	14	10,0	14	50,0	35	16,0	34	10,0	33
24/4H91	25,0	31	16,0	60	10,0	59	70,0	17	35,0	26	25,0	29	35,0	29	16,0	44	10,0	42	70,0	50,0	25,0	50,0	11	25,0	23	10,0	13	35,0	22	16,0	30	10,0	29
24/4H92	-		25,0	55	16,0	55	-		50,0	22	35,0	24	-		25,0	39	16,0	39	-	50,0	35,0	-		35,0	16	25,0	19	-		25,0	27	16,0	27
60 Hz																																
	380-415 V		440-480 V		550-600 V		380-415 V		440-480 V		550-600 V		380-415 V		440-480 V		550-600 V		400 V	460 V	575 V	380-415 V		440-480 V		550-600 V		380-415 V		440-480 V		550-600 V	
	S	L1	S	L1	S	L1	S	L1	S	L1	S	L1	S	L1	S	L1	S	L1	S	S	S	S	L1	S	L1	S	L1	S	L1	S	L1	S	L1
	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[mm]²	[mm]²	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]	[mm]²	[m]
12/2H33	2,5	63	1,5	50	1,5	78	4,0	19	2,5	15	1,5	14	2,5	41	2,5	56	1,5	52	4,0	4,0	2,5	4,0	18	2,5	17	1,5	16	2,5	29	2,5	39	1,5	36
12/2H42	4,0	56	4,0	74	2,5	72	6,0	16	4,0	14	2,5	14	4,0	40	4,0	49	2,5	48	16,0	6,0	4,0	6,0	20	4,0	14	2,5	14	4,0	26	4,0	35	2,5	34
12/2H62	6,0	47	6,0	62	4,0	65	10,0	15	10,0	20	6,0	19	6,0	33	6,0	42	4,0	44	16,0	10,0	6,0	10,0	17	6,0	12	6,0	18	6,0	23	6,0	30	4,0	31
12/2H71	6,0	51	6,0	68	4,0	70	10,0	17	10,0	22	6,0	21	6,0	34	4,0	31	2,5	30	10,0	10,0	6,0	10,0	15	6,0	14	4,0	14	6,0	25	6,0	33	4,0	34
12/2H72	10,0	51	10,0	68	6,0	63	16,0	16	16,0	21	10,0	21	16,0	58	10,0	47	6,0	46	25,0	16,0	16,0	16,0	18	10,0	14	6,0	15	10,0	25	10,0	33	6,0	31
12/2H73	16,0	60	10,0	49	10,0	77	16,0	12	10,0	10	10,0	15	16,0	41	10,0	35	6,0	33	25,0	25,0	16,0	16,0	11	10,0	11	6,0	10	16,0	29	16,0	39	10,0	38
24/4H91	16,0	52	16,0	69	10,0	68	50,0	32	35,0	30	25,0	33	16,0	37	10,0	30	10,0	47	35,0	25,0	16,0	25,0	17	16,0	14	10,0	14	25,0	40	16,0	34	10,0	33
24/4H92	35,0	68	25,0	64	16,0	64	70,0	27	50,0	25	35,0	28	25,0	33	16,0	29	10,0	29	50,0	50,0	35,0	50,0	19	35,0	20	25,0	23	35,0	33	25,0	32	16,0	32

For larger cross-sections, the max. cable lengths are calculated as follows:
$L^* = L \times S^* / S$

S = Recommended cross-section for cable length stated
L1...L5 = Max. supply cable length of the individual types of power supply. Sum of voltage drops ≤5 %.
A loop impedance of max. 250 mΩ was taken as basis for coordinating the short circuit protection of the power contactors and calculating the cable lengths.
The cross-sections take into consideration the overload protection of the cables corresponding to the types of cable and installation.

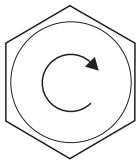
Depending on the lengths of the individual sections, the percentual voltage drops given above may be distributed differently in particular cases to find an economical solution.

The cross-sections must be adapted in the case of longer cables and other types of power supply.

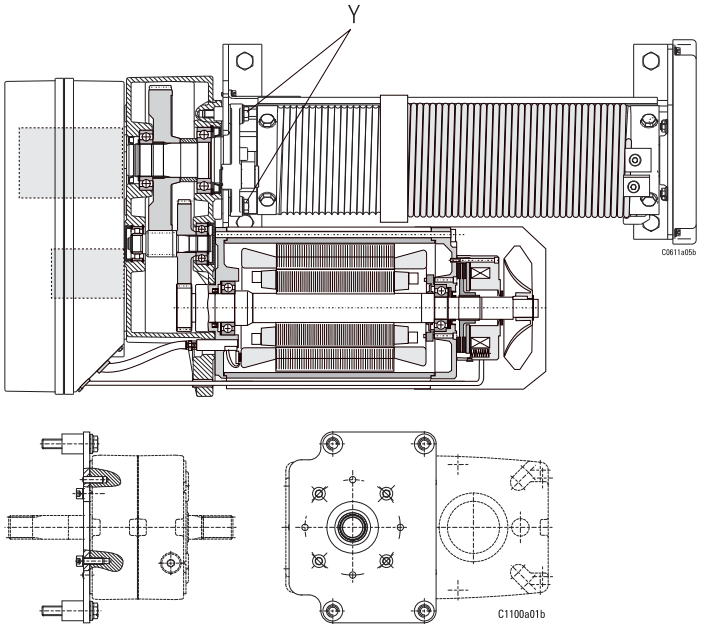
BASH_02_1.FM

8.5 Tightening torques for screws

All screws should be tightened with a torque spanner. See table for the tightening torques generally applicable for screws grade 8.8 and 10.9.
Values (Y) apply for the attachment of the mounting plate to the gear.



M..	Screw grade		
	8.8	10.9	10.9
	standard		Y
	[Nm]		[Nm]
M6	10	19	-
M8	25	42	-
M10	51	85	75
M12	87	130	87
M16	215	330	250
M20	430	-	-
M24	740	-	-
M30	1500	-	-
M36	2600	-	-

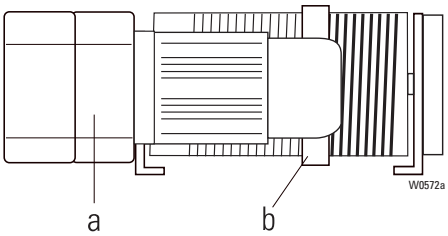


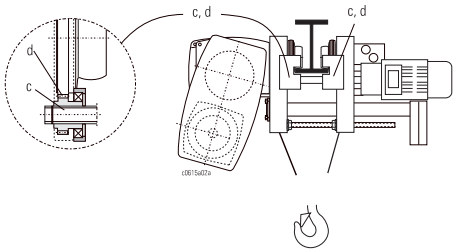
Other screw connections and applicable tightening torques

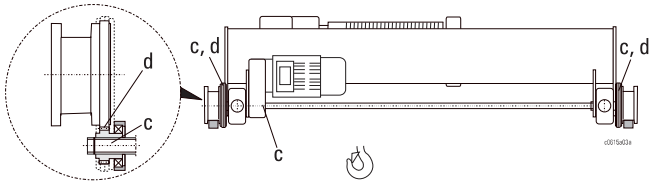
No.	Screw connection	Type	Screw connection		
	Part 1 / Part 2		M..	Grade	MA [Nm]
1	Gear casing/panel box	SH 3 - SH 4	M6	8.8	6
2	Gear casing/support plate	SH 3 SH 4 SH 5	M10 M12 M16	100 100 100	75 87 310
3	Rope drum/gear drive shaft	SH 5	M12	100	130
4	Rope drum/clamping plate	SH 3	M6/8	8.8	10/25
5	Rope drum bearing journal/holding washer	SH 3 SH 4-SH 5 SH 6	M8 M10 M16	100	42 75 260
6	Rope drum flange bearing/support plate (fan side)	SH 3 SH 4-SH 5 SH 6	M8 M10 M16	100	42 75 215
7	Grease pan/guide rail	SH 6	M10	100	75
8	Support plate (fan side)/grease pan	SH 3-SH 4 SH 5	M8 M8	C45K RSt37	20 10
9	Support plate (gear side, fan side)/fixing tube (Dg)	SH 3-SH 4	M16	100	330
10	Axle holder/trolley side cheek (hoist side) (kBh-Dg)	SH 3-SH 5 (kBh) SH 6 (kBh) SH3-SH4 (Dg) SH5 (Dg)	M8 M8 M8 M8	8.8 100 8.8 100	25 42 20 42
11	Threaded bolt/trolley side cheek (hoist side/counterweight)	SH3-SH 6	M16	100	215
12	Return pulley bearing plate/bearing pedestal (kBh)	SH 6	M12	100	115
13	Suspension bearing plate/bearing pedestal (kBh)	SH 6	M12	100	115
14	Pivot pin/mounting bracket (Dg)	SH 3-SH 5	M12	8.8	85
15	Pivot pin/pivot pin (Dg)	SH 3-SH 5	M12	8.8	85
16	Guide roller holder/trolley side cheek (Dg)	SH 3-SH 5	M8	100	42

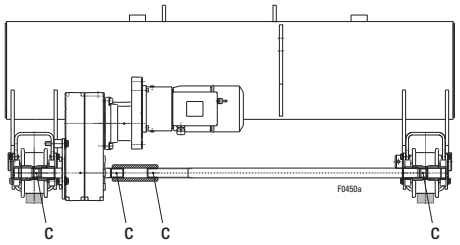
kBh = "short headroom" trolley
Og = double rail crab
Dg = articulated trolley

8.6 Lubricants

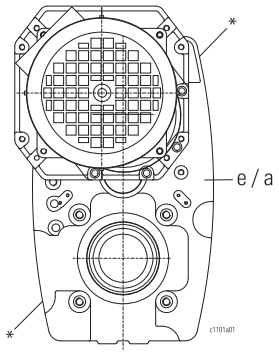




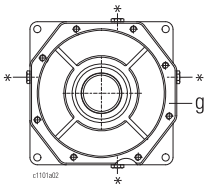




SH 30
SH 40
SH 50
SH 60
SHR 60



SH 30
SH 40
SH 50
SH 60



* Oil filling/oil drainage screw
Depending on installation position of gear, the filling screw is "at the top" and the drainage screw "at the bottom".

Position of lubrication point	Type of lubricant	Designation	Quantity of lubricant		Characteristics, makes
a	Oil	CLP 460 (PG 220)	SH 30..: 1500 ml SH 40..: 2000 ml SH 50..: 6000 ml SH 60..: 16000 ml SH 60..: 18000 ml *1	1	1 Viscosity: 460 /s/40°C (220/s/40°C), pour point: -20°C (-40°C) flash point: +265°C (+320°C), e.g.: Fuchs Renolin CLP 460*, Aral Degol BG 460, BP Energol GR-XP 460, Esso Spartan EP 460, Mobil Gear 634, Tribol 1100/460, (Shell Tivela Oil WB) 2 Soap base: Lithium + MoS2, dripping point: approx. 185°C penetration: 310-340, operating temperature: -20°to +120°C e.g.: Aralub PMD1*, BP Multi-purpose Grease L21M, Esso Multi-purpose Grease M, Mobilith SHC 460, Shell Retinax AM, STABYL L-TS 1 Mo 3 Soap base: Synthetic (lithium), dripping point: approx 150°C penetration: 400-430 (400-430), operating temperature: -20°to +80°C (-35°to +130°C), e.g.: Aralub FDP00, BP Energrease HT-00 EP, Esso Liquid Gear Grease, Shell Special, Gear grease H*, Mobilux Liquid grease EP 004, (Tivela Compound A) 4 Soap base: Lithium + MoS2 (Synthetic + lithium), dripping point: approx. +180°C, penetration: 355-385 (400-430), operating temperature: -30°to +120°C (-35°to +130°C), e.g.: Aralub LFZ 0, Renolit FLM 0*, Tribol Molub-Aloy MPG 00, (Tivela Compound A) 5 Soap base: Lithium, dripping point: approx. +170°C (+260°), penetration: 220-250 (265-290), operating temperature: -20°to +120°C (-40°to + 120°C), e.g.: Aralub HL3, BP Energrease RBB3, ESSO Roller Bearing Grease Andak C AC 205, Mobilux 3* (Mobil Mobilgrease 28)
b	Grease	GOOF (GPGOOK)	600 - 2500 g	3	
c	Grease	KPF1K	100 g	2	
d	Grease	K3K (KE2N)	500 - 1000 g	5	
g	Grease	KPFOK (GPON)	SH 30..: 100 g SH 40..:	4	
	Oil	CLP 460 (PG 220)	SH 50..: 2500 ml SH 60..: 2500 ml SHR60..: 2500 ml	1	

8.7 Lubricants for travel drive

See operating instructions of travel drive

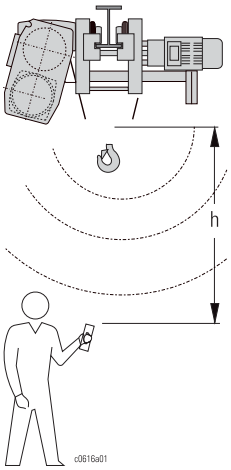
( ) Lubricants for low operating temperatures, -40 ... +40°C)
* Factory filling
*1 SH 60, motor at top

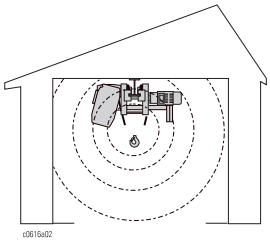
BASH_02_1.FM

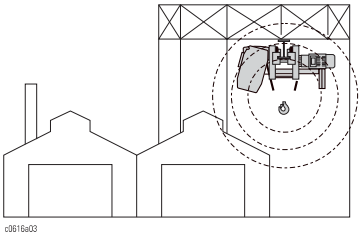
8.8 Sound pressure level

The sound pressure level was measured at a distance of 1 m from the wire rope hoist. The mean sound pressure level is calculated for one operating cycle (50% with nominal load, 50% without load).

Instead of stating an emission value based on a workplace, the values from table 1 and 2 at measuring distance "h" can be used.







1

Type	[db (A)] + / - 3				
	h [m]				
	1 m	2 m	4 m	8 m	16 m
SH 30	76	73	70	67	64
SH 40	76	73	70	67	64
SH 50	78	75	72	69	66
SH 60	78	75	72	69	66

2

Type	[db (A)] + / - 3				
	h [m]				
	1 m	2 m	4 m	8 m	16 m
SH 30	76	70	64	58	52
SH 40	76	70	64	58	52
SH 50	78	72	66	60	50
SH 60	78	72	66	60	50

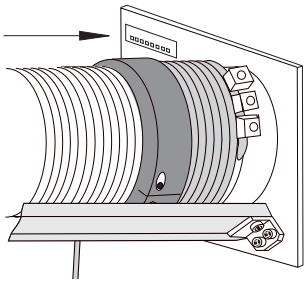
8.9 Circuit diagrams

See separate enclosure

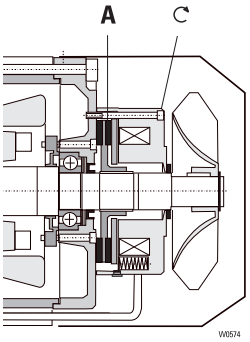
9 Wearing parts

9.1 Serial number

When ordering original spare parts, please always indicate the serial number of the hoist. This is affixed to the inside of the bearing support plate (see sketch).



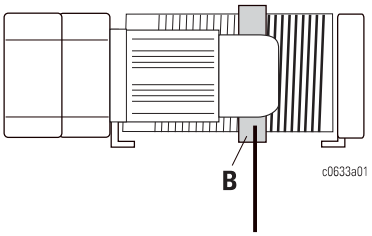
9.2 Hoist

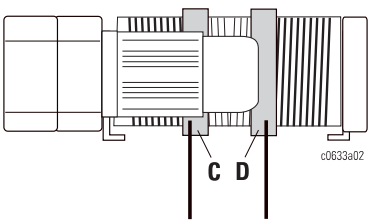


RSM hoist motor brake

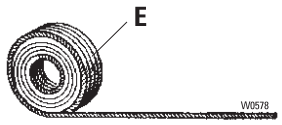
Hoist motor	Hoist motor brake		A
			Order no.
12/2H33 4H33	RSM16 RSM16	9 Nm 9 Nm	04 430 00 65 0 04 430 17 65 0
12/2H42 4H42	RSM32 RSM32	9 Nm 9 Nm	04 430 23 65 0 04 430 34 65 0
12/2H62 4H62	RSM60 RSM60	22 Nm 22 Nm	04 430 40 65 0 04 430 50 65 0
12/2H71 4H71	RSM100 RSM100	22 Nm 22 Nm	04 430 57 65 0 04 430 81 65 0
12/2H72 4H72	RSM150 RSM100	22 Nm 22 Nm	04 430 67 65 0 04 430 81 65 0
12/2H73 4H73	RSM150 RSM150	22 Nm 22 Nm	04 430 67 65 0 04 430 92 65 0
4H82	RSM250	45 Nm	05 430 00 65 0
24/4H92	RSM500	45 Nm	05 430 10 65 0

Rope guide





Hoist type	B	C	D
	Bestell-Nr	Bestell-Nr	Bestell-Nr
SH 30	03 430 02 43 0	03 430 01 43 0	03 430 00 43 0
SH 40	04 430 00 43 0	04 430 02 43 0	04 430 01 43 0
SH 50	05 430 01 43 0	05 430 02 43 0	05 430 00 43 0
SH 60 - 2/1, L4 - L5	06 430 08 43 0	-	-
SH 60	06 430 03 43 0	06 430 04 43 0	06 430 00 43 0



Wire rope (E)

See works certificate or rope certificate for length and number of wire rope.

BASH_02_1.FM

10.1 Seminars

We offer seminars covering all main product groups, such as seminars for crane operators, wire rope hoist seminar, chain hoist seminar, seminar on load suspension equipment and seminar for material conveying equipment.
However we would be please to offer a special programme orientated on your individual specifications and requirements.
The seminars are individual modules or can form part of a long-term training course; they are held in German or English.
Each seminar is concluded with a certificate.

You can obtain information on our seminar programme from:

STAHL CraneSystems GmbH
Daimlerstraße 6 | D-74653 Künzelsau | Tel. +49 7940 128-0
marketing@stahlcranes.com

Or you can find information at →www.stahlcranes.com

F-BA-2.6-EN-10.08-mp

○ **Tochtergesellschaft/*Subsidiary***

Austria
Steyregg
Tel +43 732 641111-0
Fax +43 732 641111-33
office@stahlcranes.at

Great Britain
Birmingham
Tel +44 121 7676400
Fax +44 121 7676485
info@stahlcranes.co.uk

Portugal
Lissabon
Tel +351 21 44471-60
Fax +351 21 44471-69
ferrometal@ferrometal.pt

Switzerland
Däniken
Tel +41 62 82513-80
Fax +41 62 82513-81
info@stahlcranes.ch

China
Shanghai
Tel +86 21 6257 2211
Fax +86 21 6254 1907
service_cn@stahlcranes.cn

India
Chennai
Tel +91 44 4352-3955
Fax +91 44 4352-3957
indiasales@stahlcranes.in

Singapore
Singapore
Tel +65 6271 2220
Fax +65 6377 1555
sales@stahlcranes.sg

United Arab Emirates
Dubai
Tel +971 4 805-3700
Fax +971 4 805-3701
info@stahlcranes.ae

France
Paris
Tel +33 1 39985060
Fax +33 1 34111818
info@stahlcranes.fr

Italy
S. Colombano
Tel +39 0185 358391
Fax +39 0185 358219
info@stahlcranes.it

Spain
Madrid
Tel +34 91 484-0865
Fax +34 91 490-5143
info@stahlcranes.es

USA
Charleston, SC
Tel +1 843 767-1951
Fax +1 843 767-4366
sales@stahlcranes.us

● **Vertriebspartner/*Sales partner***

Die Adressen von über 100 Vertriebspartnern weltweit finden Sie im Internet auf www.stahlcranes.com unter Kontakt.
You will find the addresses of over 100 sales partners on the Internet at www.stahlcranes.com under Contact.

➔ **www.stahlcranes.com**

STAHL CraneSystems GmbH, Daimlerstr. 6, 74653 Künzelsau, Germany
Tel +49 7940 128-0, Fax +49 7940 55665, marketing@stahlcranes.com

STAHL CraneSystems