



AS7

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## Explosion-Protected Wire Rope Hoists – Operating and Maintenance Instructions

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↘ EN

 II 2 G (ATEX) - Zone 1

 II 2 D (ATEX) - Zone 21

**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 an Ex-specialist**

### **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:**

A qualified person is one with the necessary qualification, based on theoretical and practical knowledge of hoists, in particular with regard to explosion protection, 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.

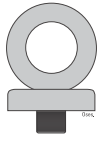
#### **Seminars:**

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.

Please ask for our seminar programme.

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## 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.

### Explosion protection

The explosion-protected wire rope hoist complies with EC directive 94/9/EC (ATEX 100a) and is constructed according to the corresponding European standards. The components are certified by a designated institute (PTB). Mechanical explosion protection is designed and manufactured in accordance with the EN standards 13 463 presently in preparation. The documents are filed in a designated place. Certification has been ensured by means of a quality management system.



Components bearing this symbol are explosion-protected (protection class Ex, e: e.g. connection boxes and Ex, d: e.g. panel boxes for electrical equipment, motors and brakes). Work on these components may only be carried out by skilled personnel that has been especially trained on explosion protection. This applies also to work performed on mechanical components → mechanical explosion protection in accordance with ATEX.



### 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 Mechanical components

"Mechanical explosion protection" refers to all mechanical sub-assemblies (non-electrical sub-assemblies).

These include for example:

- 1) Rope drive with drum and load suspension equipment
- 2) Gear
- 3) Trolley and crane wheels

These sub-assemblies have been manufactured in such a way, relating to the specific order, that they do not present any risks when used for the intended purpose. To ensure lifetime safety, these sub-assemblies must be inspected and serviced carefully in accordance with these operating instructions.

## 1.3 Operating instructions

Follow the operating instructions. The operating instructions are required by the EC Machinery Directive and EC Directive 94/9. The operator is legally required inter alia by EC Directive 99/92 to observe them.

## 1.4 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.
- Do not carry out any alterations or modifications. Additional fitments must be authorised by the manufacturer. The declaration of conformity may be invalidated.

### 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.
- Altering the overload cut-off.
- 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

## 1.5 Safety-conscious operation

The AS7. ex/Zone 1 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 operator is responsible for ensuring that work is carried out with safety in mind and avoiding risks. (EC Directive 99/92/EC, decree on safety in operation).
- Read the operating instructions before starting to work with the wire rope hoist.
- Observe the "Duties of crane operator", see page 18.
- Before starting work, find out where the EMERGENCY STOP button is (usually in the control pendant).
- **Do not** place your hand between edges which may 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.

## 1.6 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 carried 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.

## 1.7 General regulations



- Safety regulations and accident prevention regulations.
- National regulations
- Statutory regulations relating to EC Directive 99/92.

## 1.8 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 trained personnel commissioned by the manufacturer.
- Use only **original spare parts** for repairs, otherwise the guarantee will become invalid.
- Do not carry out any alterations or modifications.
- Additional fitments must be approved by the manufacturer (STAHL CraneSystems).

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.

## 1.9 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

## 1.10 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.



The components ensuring explosion protection must be checked every 3 years at the latest. As a rule, some of these are checked during the annual inspection (e.g. installation, attachment...) If the ambient conditions are severe, the intervals between the periodic tests must be shortened as necessary.

## 1.11 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.

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.



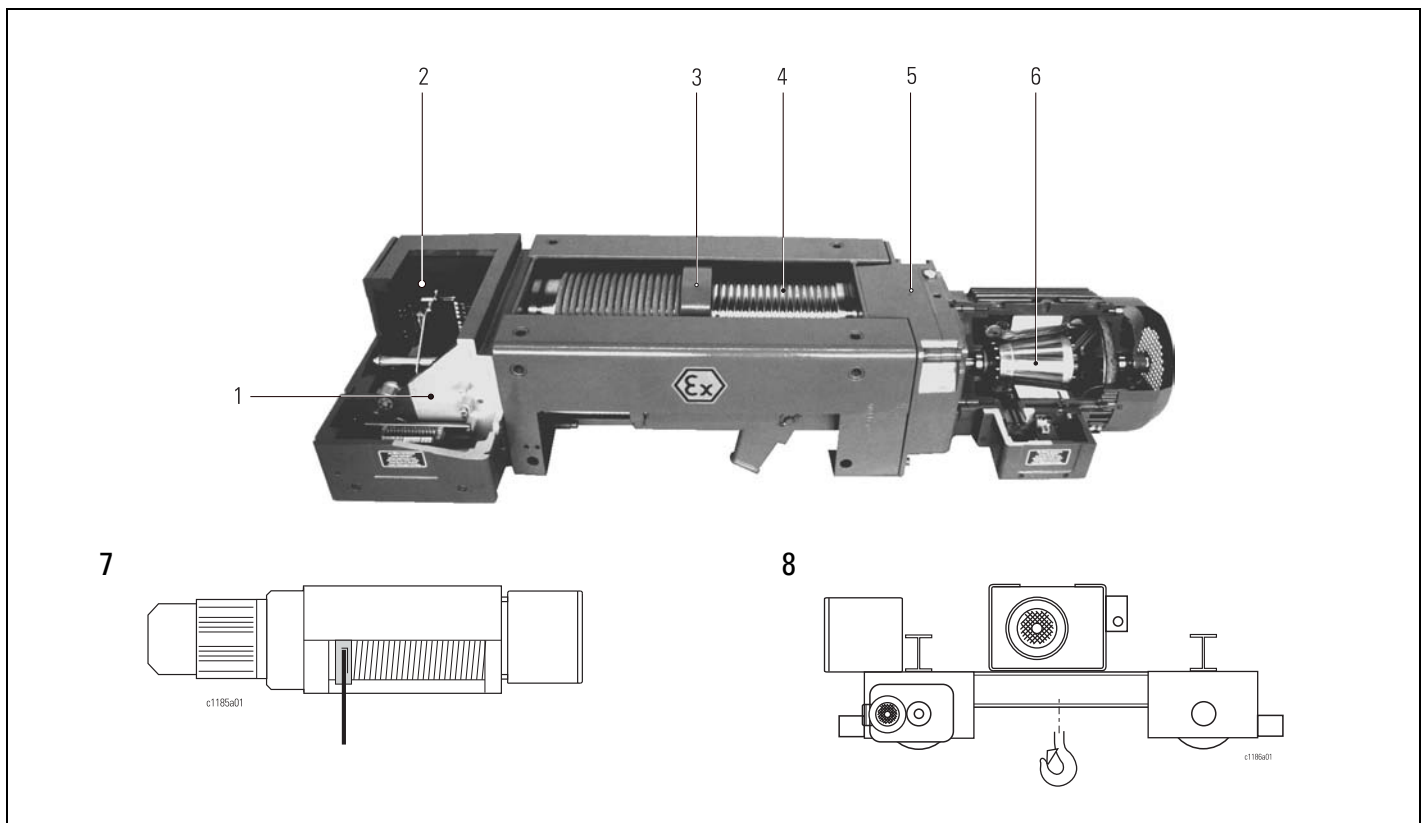
The modular concept of our series of wire rope hoists permits a multitude of variations on the basis of series components.

Our certified quality assurance system to DIN ISO 9001/EN 29001 and our special in-house process inspection to EC directive 94/9/EC guarantee consistently high quality.

**The AS7ex/Zone 1 wire rope hoist is designed for use in Zone 1 in acc. with EC directive 99/92/EC. The equipment category in acc. with EC directive 94/9/EC is ⊕ II 2 G.**

**The AS7ex/Zone 21 wire rope hoist is designed for use in Zone 1 in acc. with EC directive 99/92/EC. The equipment category in acc. with EC directive 94/9/EC is ⊕ II 2 D.**

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!

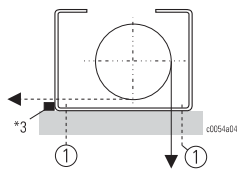


- 1 Ex connection box in "increased safety" (Ex e) or "flameproof enclosure" (Ex d)
- 2 Flameproof panel box
- 3 Rope guide
- 4 Rope drum
- 6 Explosion-protected sliding rotor brake motor
- 7 Stationary explosion-protected hoist
- 8 Explosion-protected hoist with double-rail crab

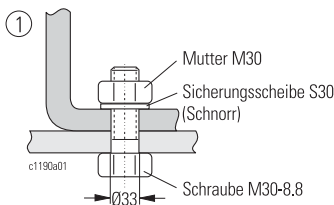


## 3.1 Stationary wire rope hoist

### Possible installation positions

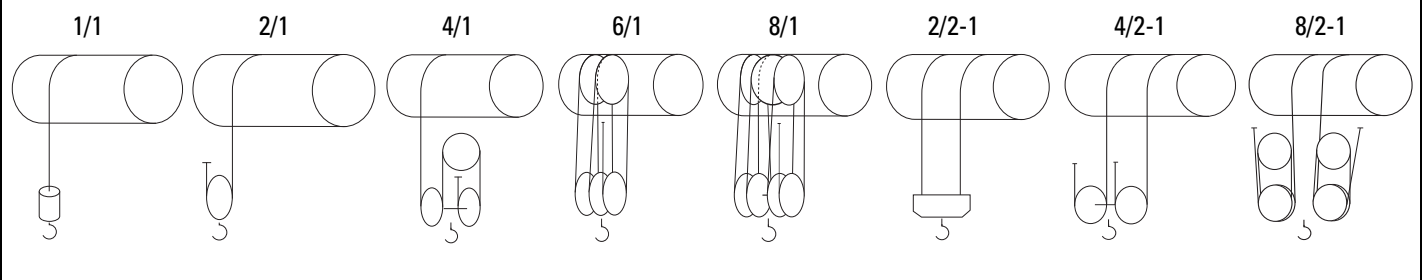


In standard design with rope lead-off vertically downwards, the wire rope hoist is bolted onto a horizontal surface by means of the foot holes. Please consult us in the case of other rope lead-offs.



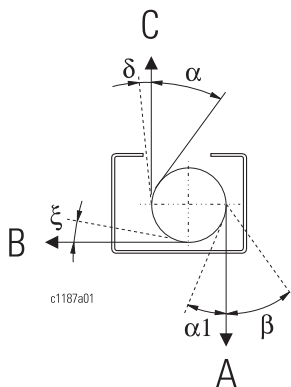
- Use the fixing elements specified, see sketch.
- Take care that no distortion arises from unevenness, etc.
- Take up any lateral forces in the attachment by a support bar (see sketch \*3).

### Standard reevings



### 3.1.1 Fleet angles

The fleet angles given in the table can be obtained by rotating the rope guide on the rope drum and positioning the wire rope hoist accordingly. The rope guide must be adapted to the fleet angle. Observe also the radial rope exit angle  $\gamma$ .

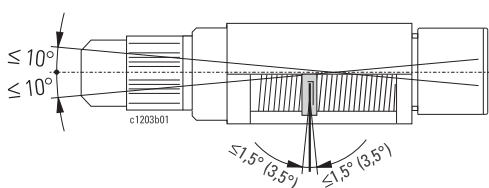


Type	Standard		by rotating rope guide			
	A		B	C		
	$\alpha 1$	$\beta$	$\xi$	$\alpha$	$\delta$	
AS 70	18°	30°	3-10°	on request		55°

### 3.1.2 Angles of installation

- Install 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 at these angles a reduction in service life is to be expected. The wire rope must not touch the rope guide or structural elements.

This could lead to increased wear and damage and higher temperatures and sparks at the point of contact that must be avoided at all costs in Ex areas.



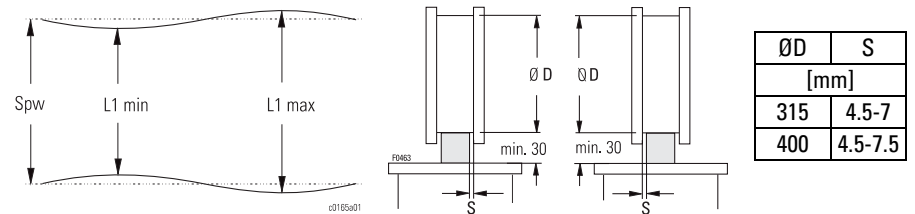


#### 3.2 Double rail crab

- 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. 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.



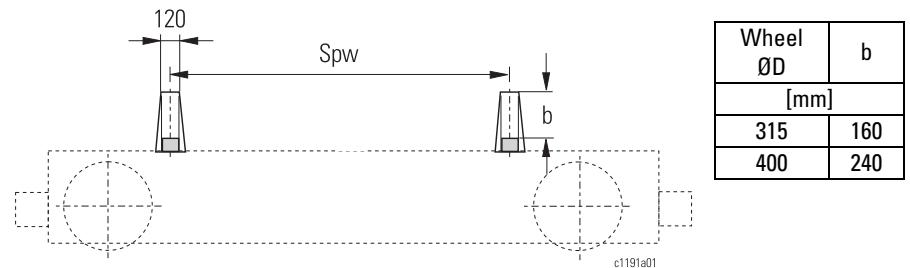
Check that the crab runs smoothly over the whole runway without jamming or increased friction at the wheel flanges. Increased friction at the flanges due to poor beam quality or incorrect crab adjustment may lead to temperature rise or increased wear. This must be avoided at all costs.



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

#### End stops

The crabs are equipped with buffers.  
 Suitable end stops must be provided at the end of the runway.



#### 3.3 Travel limit switches

##### 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.

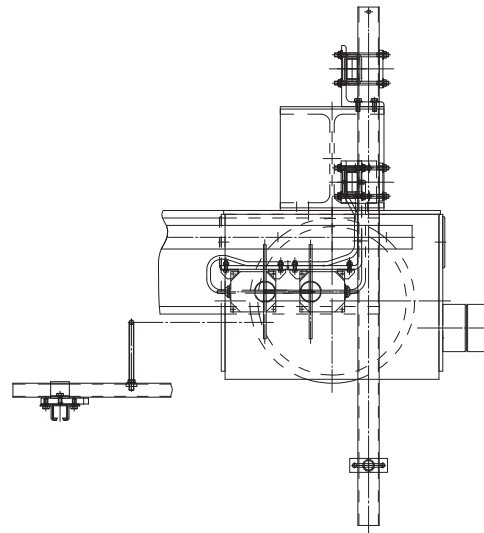
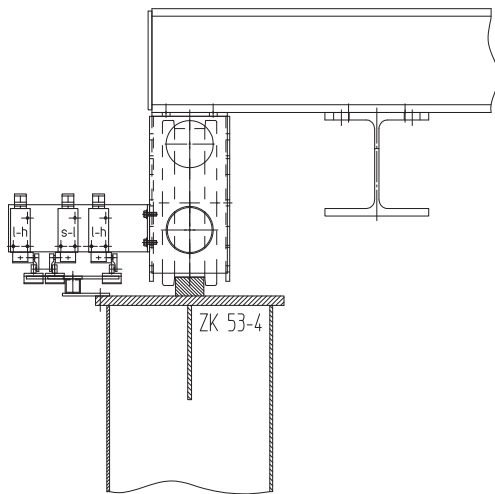
Switching functions:

1. Limit switching in both directions of travel (2 switches).
2. Pre-switching and limit switching in both directions of travel (3 switches).

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



### 3.4 Electrical equipment



For the sake of safety, have the wire rope hoist connected by a skilled electrician. Observe the relevant safety and accident prevention regulations! The skilled electrician must be acquainted with permissible clearances in air and creepage paths, and with cable glands in hazardous areas. Only electrical equipment approved for use in the relevant Ex Zone may be used!

#### In addition for Zone 21:

EN 50281-1-2 must be observed for installation.

#### 3.4.1 Supply cable

- As fixed installed cables:  
NYY, NYM
- As flexible cables:  
H07RN-F or NGFLGöu, or equivalent cables.
- see page 39 for minimum cross-section and max. length of supply cable.

#### 3.4.2 Fusing

- NEOZED, DIAZED or NH fuses in operating class gL/gG, see page 38.
- 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!

#### 3.4.3 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.

#### 3.4.4 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.

#### 3.4.5 Disconnecting switch

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

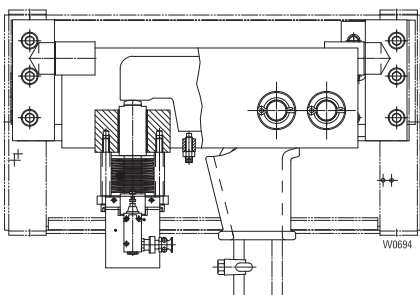
#### 3.4.6 Overload cut-off

- 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 27.
- 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 mechanical sensor

- The overload cut-off is set to rated load +15%.



#### 3.4 Electrical equipment (continued)

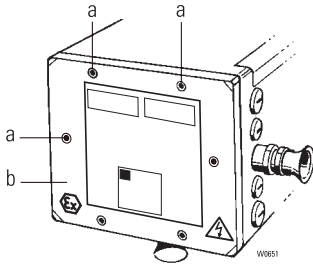


#### 3.4.7 Mains connection

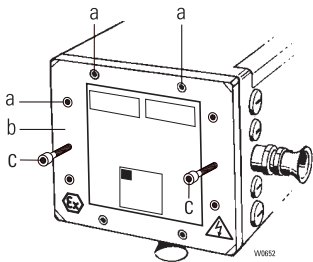
Before a connection box or panel box is opened, the apparatus must be disconnected.

**Caution! Pay attention to the explosion hazard. If necessary call in site safety representative!**

Ex e connection box



Ex d connection box



#### Opening and closing connection box

- Remove socket head cap screws (a).
- Lift off cover (b) with gasket (Ex e enclosures).
- Remove socket head cap screws (a), press cover (b) off using screws (c), avoid canting (Ex d enclosures).
- Clean Ex joints (Ex d enclosures) only with a rag or with detergent. If any damage is ascertained, they must be checked by the manufacturer. Do not commission equipment.
- Insert cover (b) into joint. (Do not forget gasket on Ex e!).
- Tighten all screws.

**All socket head cap screws must be grade 8.8.**

#### 3.4.8 Cable glands

Cable glands are an important constituent of the explosion protection and must therefore be fitted and maintained by qualified personnel.

In accordance with EN 50014 (and EN 50018 in the case of flameproof enclosed connection boxes), tested and certified cable glands must be used for the entry of flexibly installed cables in explosion-protected connection boxes. To avoid kinking, the cable glands must be specially shaped and provide effect strain relief (clip). Corresponding Ex tested and Ex certified cable glands must be used for fixed installed cables. The cables must be fastened down immediately in front of the gland, e.g. by means of a clip.

Cable glands for cables moved frequently must be secured with Loctite 275.

The power supply (supply cable) may be round or flat cable. In both cases the glands must meet the above requirements.

### 3.4.9 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 Ex cable glands.
- Connect according to the circuit diagrams supplied.
- 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.**

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.

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



### 3.4.10 Test before first commissioning

- obliges the operator to have the installed, modified or repaired electrical equipment or electrical equipment combined into systems tested according to a special test in order to establish its proper condition as regards erection, installation and operation.

A comprehensive functional test and safety inspection must be performed after installation to ensure safety in operation.

This test is often subject to specific national regulations. After completion, the test must be recorded in the test log book.

- Faults must be eliminated before commissioning.

We recommend having this test performed by the manufacturer.

#### Controls by others (option)

##### (Only after consulting the manufacturer)

- If the controls are supplied by others, all electrical components must be wired according to our connection diagrams.
- Control components installed on our hoists in hazardous areas by the operator or a control engineer engaged by the operator are the responsibility of the operator or control engineer. STAHL CraneSystems accepts no liability for these.
- Work on controls (**explosion-protected electrical equipment**) beyond the mere connection of cables may only be performed by companies with a certified quality assurance system (EC Directive 94/9/EC), We recommend purchasing the complete control from the manufacturer, STAHL CraneSystems.

**The CE conformation will only be valid if the complete crane is Acc. to the following rules and regulations:**

- EC directive on explosion protection 94/9/EC (ATEX)
- EC machinery directive 98/37/EC
- EC EMC directives 2004/ 108/EC

### 3.5 Reeving rope

The wire rope is wound onto the drum in the factory. If not, see page 30, "Fitting 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 15. **Do not twist the rope**; the colour coding facilitates checking.
  5. Fasten the end of the rope in the rope anchorage, see page 16 (11-18).
  6. Perform several runs over the full height of lift without load.
  7. Repeat with increasing loads.
  8. Make any twisting in the rope 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!**

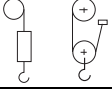
### 3 Installing wire rope hoist

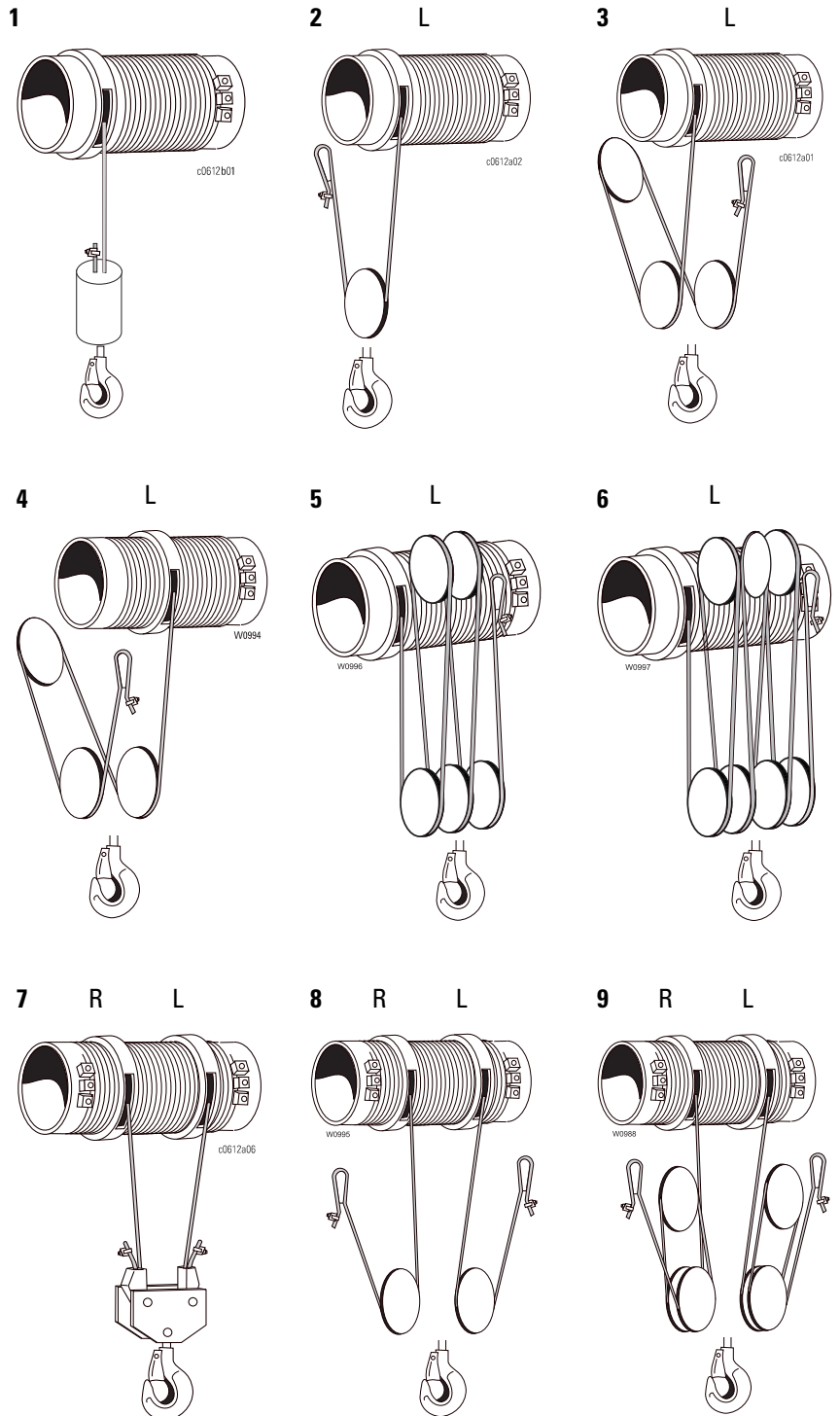
 Zone 1 (ATEX)  
 Zone 21 (ATEX)

#### Reeving rope

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 horizontally (./2-1)

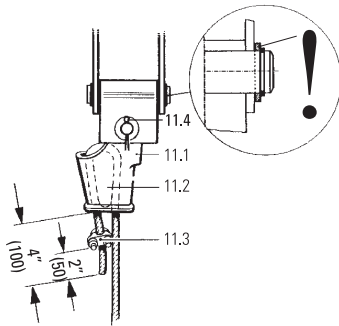
	Length L	Fig.
1/1	L1 - L4	1
2/1	L1 - L4	2
4/1	L1 - L3 L4	3 4
6/1	L1 - L4	5
8/1	L1 - L4	6
2/2-1	L1 - L4	7
4/2-1	L1 - L4	8
8/2-1	L1 - L4	9



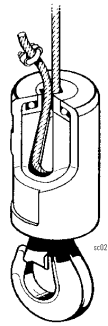
L = left-hand thread  
 R = right-hand thread



11



12

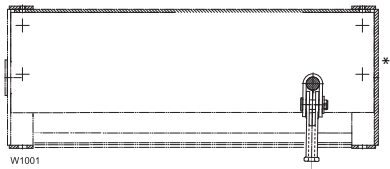


#### Rope anchorage

- Note information plate at rope anchorage.
- Insert end of rope into rope anchorage according to reeving, see sketches 11-16.
- Place rope around rope wedge 11.2 and pull it into the tapered rope recess 11.1 until the loose end of the rope projects by approx. 100 mm.
- Secure loose end of rope with rope clamp 11.3 approx. 50 mm from the end of the rope. Tightening torque [Nm] see table
- Replace split pin (11.4) after dismantling it; bend ends of split pin up

Rope-Ø [mm]	M..	Tightening torque [Nm]
20	M 16	100
24/26	M 20	140

13



14

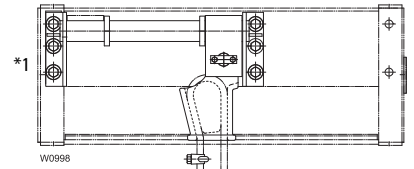
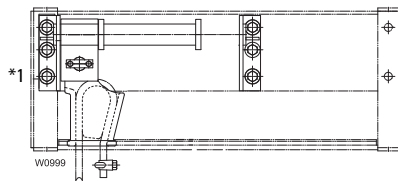
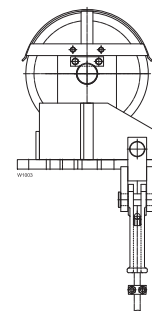


Diagram	Length L	Fig.
	L1 - L4	12
	L1 - L4	13
	L1 - L3	14
	L4	15
	L1 - L4	16
	L1 - L4	16
	-	-
	L1 - L4	17
	L1 - L4	18

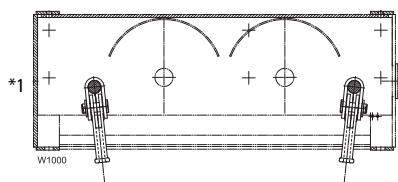
15



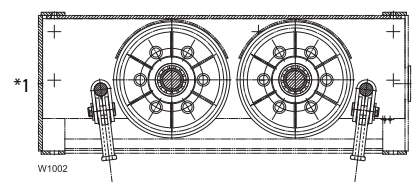
16



17



18



\*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...7 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 14.
- Check correct selection and installation of all electrical equipment, see page 11, "Electrical equipment".
- The Ex symbol must be affixed to the hoist or crane.
- Electrical connection, see page 12.
- Check that the seating of fixing screws is firm and secure, see page 8, 40.
- 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 25.
- Check overload cut-off, see page 25.
- 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 bridged (see 6.7 page 27) see circuit diagram.

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 (STAHL CraneSystems GmbH). 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.

Our qualified personnel is available to perform a reacceptance test after authorised modifications.

### 5.1 Duties of crane operator

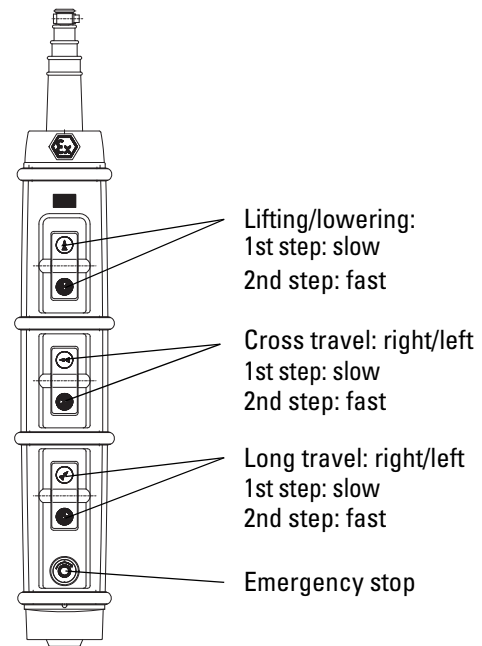


#### When working with wire rope hoists, the following points must be observed:

- 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.
- Do not allow load and bottom hook block to hit machines or structural steelwork. In adverse conditions (rust, aluminium, high impact speed) there is a risk of sparking.
- Avoid trolley and crane wheels' slipping due to swinging of load or spinning of drive wheels. There is a risk of sparking and increased temperature rise.

### 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.

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 wire rope hoist is unloaded.
- Before starting, switch off and lock main isolator.



### It is not permitted to work on live parts in areas exposed to explosion hazards!

#### In addition for Zone 21:

- **Dust deposits over 5 mm thick are not permissible.**

If any dust is deposited, it must be removed from indentations, corners and surfaces in good time.

The electrical components (motor, control) and mechanical components (e.g. gear) have a surface temperature of max. 120°C during normal operation at an ambient temperature of 50°C.

A dust deposit of above 5 mm prevents the heat being dispersed sufficiently (insulation) and an impermissible temperature rise will occur on the surfaces and in the adjoining layer of dust.

The operator is obliged to prevent a 5 mm layer of dust by observing the hoist and cleaning operations at suitable intervals.

- **Remove any dust which may be present before carrying out maintenance work!**  
The dust must be removed to prevent it entering any open enclosures of the components during maintenance.
- Observe the requirements of the accident prevention regulations.
- Periodic tests including maintenance every 12 months, possibly earlier if so prescribed by national regulations, to be performed by a fitter engaged by the manufacturer.
- The specified testing and maintenance intervals apply under normal operating conditions.

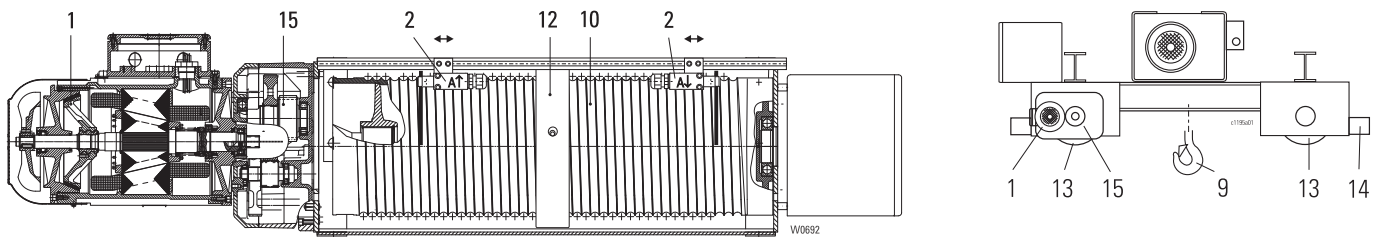
The testing and maintenance intervals must be adapted accordingly if one or more of the following conditions apply:

- If after determining the actual use it can be foreseen that the theoretical useful life of the hoist will be less than 10 years
- Multi-shift operation or heavy duty
- 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 40.

### 6.1 Inspection intervals



#### 6.1.1 Every day

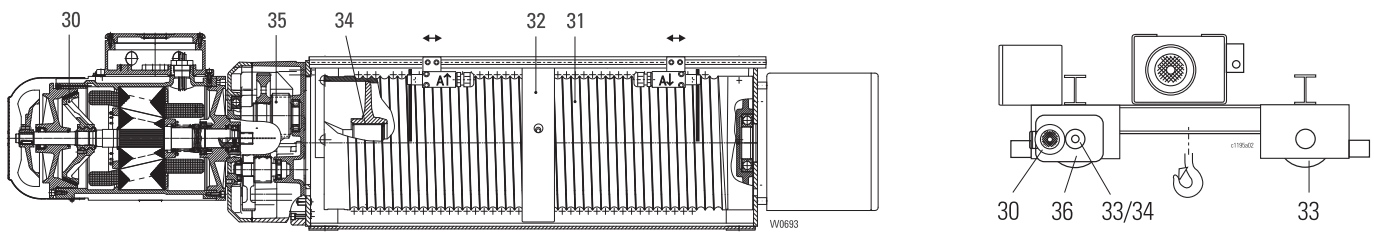
Before starting work

- Check function of brake (1), see pages 23, 24
- Emergency limit switch (2) if there is no operational limit switch, operational limit switch, if any, see page 25
- EMERGENCY STOP, crane switch, see page 19
- Rope (4), see page 29

#### 6.1.2 Once a year

- Check suspension of control pendant (cable and steel wire must be correctly attached)
- Load hook (9), cracks, cold deformation, wear
- Overload cut-off, see page 27
- Disconnect switch and main isolator, see page 11
- PE connections and equipotential bonding
- Establish remaining service life, see page 34
- Rope attachment see page 29, rope sheaves, see page 32
- Rope guide (11), see page 29, 31
- Drive parts (13), flanges, wheels etc., see page 33
- Screw connections, welds
- End stops, buffers (14)
- Gear (15), see page 34
- Safety clearances
- Power supply cable
- Cable glands
- Switching functions

### 6.2 Maintenance intervals



#### 6.2.1 Once a year

- Brake (30), measure air gap, replace brake disc if necessary, see page 23, 24
- Grease rope (31) with brush, see page 39
- Grease rope guide and rope guide stop with brush, see page 40
- Drive parts (33) grease gearing with brush
- Tighten clamping points for electric cables
- Connection of flameproof panel box, remove condensation if necessary, clean and grease Ex joint

#### 6.2.2 Every 10 years

- Spline shaft gear/rope drum, toothed coupling of travel drive, grease with brush (34)
- Change oil in hoist gear (35)
- Change oil in travel motor gear (36)

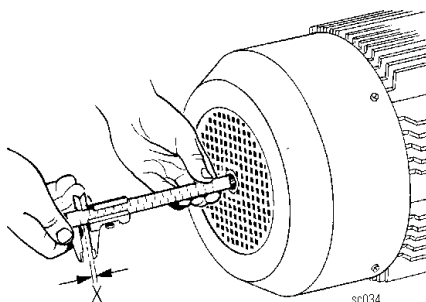


## 6.3 Hoist motor brake

Check brake at regular intervals. The intervals must be adapted in accordance with the application. Too great a brake displacement will lead to a high temperature rise in the motor and mechanical damage.

- Carry out work on the hoist brake only when the hoist is unloaded and the bottom hook block has been set down.

### 6.3.1 Checking brake

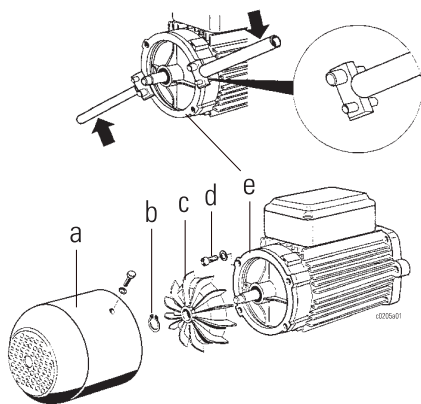


- Measure displacement of motor shaft, switching motor on briefly, see sketch.

The displacement of the motor shaft is the difference between the dimension fan cover → motor shaft when running (L1) and fan cover → motor shaft when standing still (L2) ( $X = L1 - L2$ ). The dimensions L1, L2 differ for different motors. The minimum displacement must not be less than X min. to prevent the brake disc touching during normal operation. The max. displacement must not exceed X max..

	Hoist motor A6ex
X min.	1.5
X max.	3.0

### 6.3.2 Adjusting brake



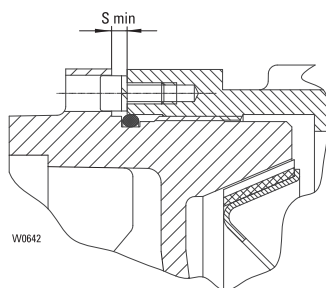
1. Measure displacement of motor shaft.
2. Remove fan cover (a), fanwheel (c) and unscrew screws (d).
3. Rotate motor cover (e) clockwise, keeping the holes aligned, until the minimum permissible brake displacement has been reached. One rotation of the motor cover reduces the brake displacement by 2 mm.

**Do not use force when rotating the cover. The Ex joints could be damaged!**

4. Replace motor cover with screws (d).
5. Push fanwheel (c) onto motor shaft and lock with lock washer (b).
6. Replace fan cover (a)

- We recommend using our special tool for rotating the motor cover. see sketch

- If dimension S min. has been reached, replace brake disc.



	Hoist motor A6 ex
S min	2.1

**All socket head cap screws must be grade 8.8.**

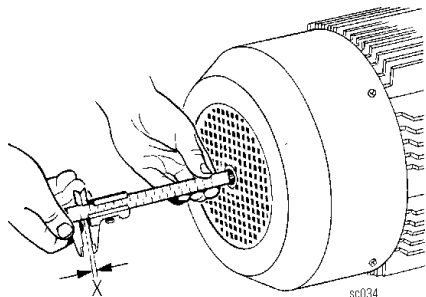
## 6.4 Travel motor brake

Check brake at regular intervals. The intervals must be adapted in accordance with the application. Too great a brake displacement will lead to a high temperature rise in the motor and mechanical damage.

- Move trolley into a secure position.

### 6.4.1 Testing brake

- Measure displacement of motor shaft, switching motor on briefly, see sketch



The displacement of the motor shaft is the difference between the dimension fan cover → motor shaft when running (L1) and fan cover → motor shaft when standing still. (L2) ( $X = L1 - L2$ ). The dimensions L1, L2 differ for different motors. The minimum displacement must not be less than X min. to prevent the brake disc touching during normal operation. The max. displacement must not exceed X max..

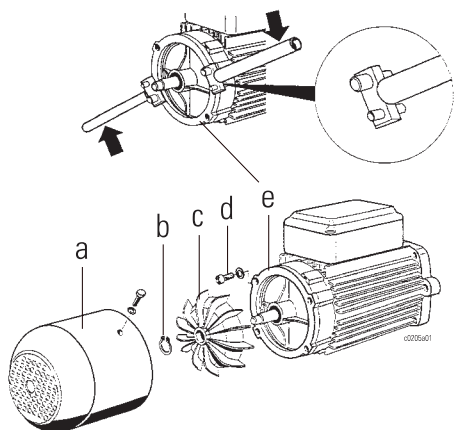
	Travel motor	
	A1 ex	A2ex
X min	0.7	0.7
X max	2.5	2.5

### 6.4.2 Adjusting brake

1. Measure displacement of motor shaft.
2. Remove fan cover (a), fanwheel (c) and unscrew screws (d).
3. Rotate motor cover (e) clockwise, keeping the holes aligned, until the minimum permissible brake displacement has been reached. One rotation of the motor cover reduces the brake displacement by 2 mm.

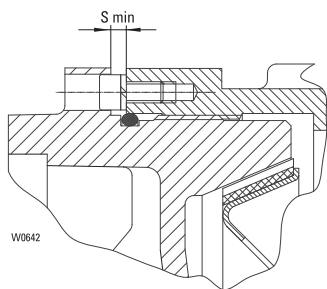
**Do not use force when rotating the cover. The Ex joints could be damaged!**

4. Replace motor cover with screws (d).
5. Push fanwheel (c) onto motor shaft and lock with lock washer (b).
6. Replace fan cover (a).



- We recommend using our special tool for rotating the motor cover. see sketch

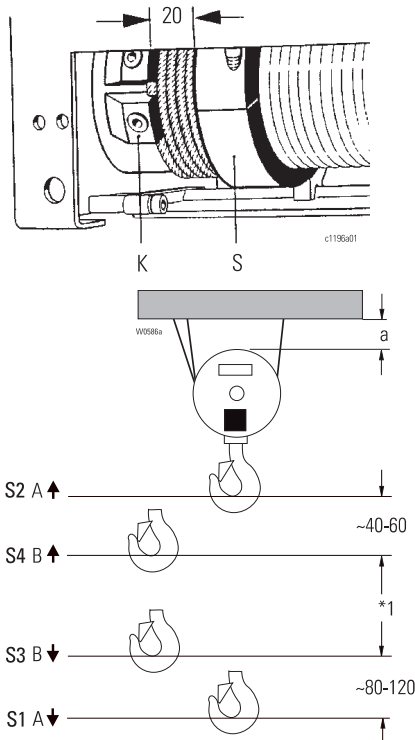
- If dimension S min. has been reached, replace brake disc.



	Travel motor	
	A1 ex	A2 ex
S min	0.8	3.2

**All socket head cap screws must be grade 8.8.**

## 6.5 Hoist limit switch



	a [mm]	
	50 Hz	60 Hz
1/1	130	150
2/2-1	130	150
2/1	70	80
4/2-1	70	80
4/1	40	50
6/1	40	50
8/1	40	50



### 6.5.1 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↓).

#### Option 1

An additional **operational limit switch** for disconnecting in top and bottom hook position during normal operation can be fitted as an option. (Additional switching points B↑ and B↓).

#### Option 2

Gear limit switch (see separate operating instructions).

### 6.5.2 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.

### 6.5.3 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 26.
- 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.

### 6.5.4 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 override button (U) on control pendant 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.
- 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:  
 ~40-60 mm in top hook position,  
 ~ 80-120 mm in bottom hook position.  
 However they can be adjusted if necessary.



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

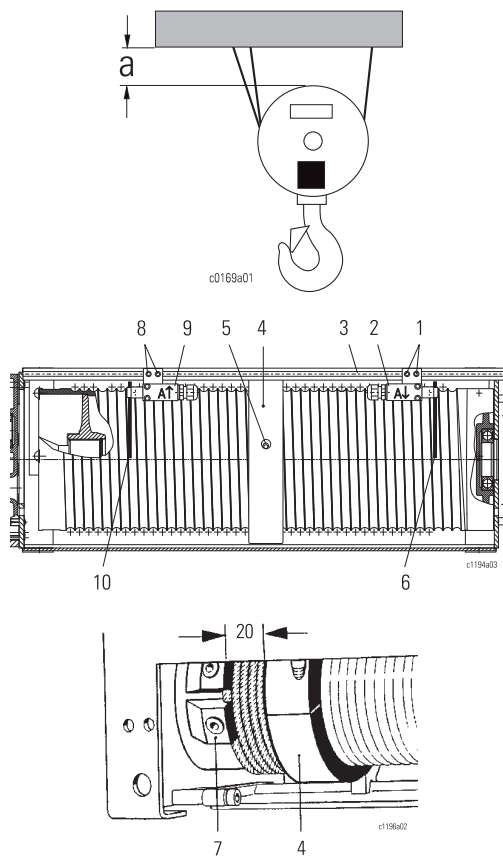
\*1 Effective hook path with operational limit switch

## 6.5 Hoist limit switch (continued)

### 6.5.5 Setting emergency hoist limit switch

see page 25, "Testing emergency limit switch".

1. Before adjustment, perform several runs over the whole height of lift without load.
2. Press the **"up" button** on the control pendant until the bottom hook block has reached the desired position for the emergency hoist limit switch. Minimum clearance "a" between bottom hook block and the next obstacle, see table.



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

3. Unscrew screws (1) and push switching element (2) along the C-rail (3) until the switching element (2) is disconnected by the cam (5) and the drive rod (6), see sketch.
4. Press **"down" button** and proceed to lowest hook position.
5. Minimum clearance between rope guide (3) and rope fixing clamps (7) = 20 mm.
6. Unscrew screws (8) and push switching element (9) along the C-rail (3) until the switching element (9) is disconnected by the cam (5) and the drive rod (10), see sketch.
7. Check setting without load.

### 6.5.6 Setting operational hoist limit switch

The operational hoist limit switches switch off before the emergency hoist limit switch.

Setting is performed basically as described under "Setting emergency hoist limit switch".

The clearances between the switching points for operational and emergency limit switches are normally.

~40-60 mm in top hook position,

~ 80-120 mm in bottom hook position.

They can however be adjusted if necessary.

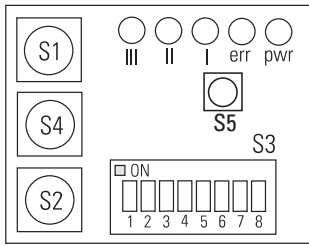


**Safety note:**  
Incorrectly set limit switches may cause serious accidents!

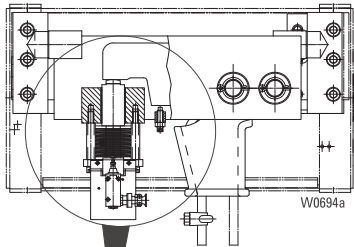
### 6.5.7 Maintenance of limit switches

Maintenance work is restricted to checking the cut-off points. No maintenance or inspection is necessary on the limit switches themselves.

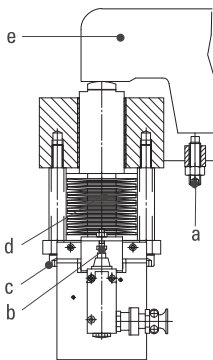
## 6.6 Overload cut-off



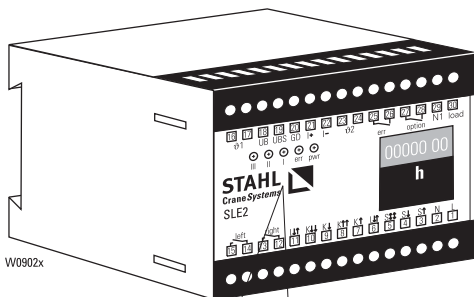
W0795



W0694a



## 6.7 Crane test



W0902x



### 6.6.1 Description of system

The SLE2 overload cut-off with mechanical sensor is set in the factory. Corrections are only permitted in special cases.

The factory settings are shown on a sketch under the front cover of the evaluation device

### 6.6.2 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 nominal load +10% overload and take load up slowly. After the rope has been tautened the overload cut-off must be activated.

### 6.6.3 Maintenance of overload cut-off

- Clean, check and grease spring bolt guide (d). The measuring unit with the four cheese-head screws (c) can be dismantled without altering the setting. The guided cup springs are pretensioned. **This setting must not be altered!**

### 6.6.4 Adjusting overload cut-off

1. Adjust overload cut-off with adjusting screw (d) so that the nominal load is lifted and it switches off at 10% overload.
2. Set the timing element in the control so that the load is not measured until the acceleration forces have died down (range of adjustment 0.3 ... 3.0 sec.). Set this time as short as possible.
3. Screw down set screw (a) until it touches lever (e).
4. Lock set screw (a) with nut.

The SLE is mounted in the flameproof enclosure (Ex d).

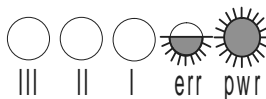
Work on and in the Ex d enclosure may only be carried out by qualified personnel trained in explosion protection!

The Ex d enclosure is under the larger of the two covers on the panel box.

**Pay attention to explosion hazards, if necessary contact the site safety officer.**

1. Carefully remove front cover of evaluation device.

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 threshold is raised.



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

The device automatically returns to the original cut-off point after 30 minutes

### 6.8 Rope drive

#### 6.8.1 Rope and rope attachment

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 14, "Reeving rope" and see page 30, "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 29, table.

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:  $\geq 1/3x$  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.



## 6.8.2 Broken wires necessitating replacement of wire rope

### Twist-free wire rope

Diameter of wire rope [mm]	<b>20</b>	<b>25</b>					
Number of external strands	18						
Rope make-up *	36X7+SE						
Broken wires visible 1Bm, 1Am (FEM 9.661)2m - 4m	6 11						
over a length of [mm]	120						
or							
Broken wires visible 1Bm, 1Am (FEM 9.661)2m - 4m	11 22						
over a length of [mm]	600						

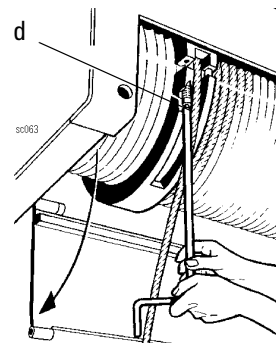
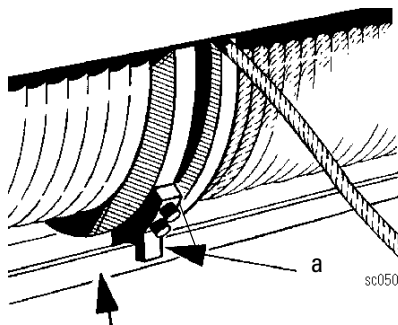
### Non-twist-free wire rope

Diameter of wire rope [mm]	<b>20</b>	<b>25</b>					
Number of external strands	9	8					
Rope make-up *	6x35+7FE	8x36W					
Broken wires visible 1Bm, 1Am (FEM 9.661) 2m - 4m	9 18	12 24					
over a length of [mm]	120	150					
or							
Broken wires visible 1Bm, 1Am (FEM 9.661) 2m - 4m	18 35	24 48					
over a length of [mm]	600	750					

\* See data sheet for rope make-up

## 6.8.3 Removing rope guide

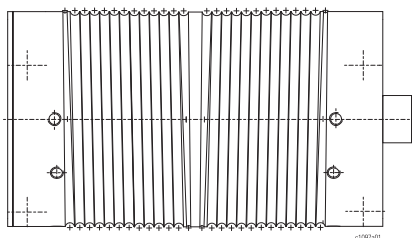
- Unscrew stop (a) of rope guide.
- Unscrew screws (d).
- Remove half-rings.
- Unhook rope tensioning spring.





## 6.8.4 Replacing rope

The AS7 ex/Zone 1 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.

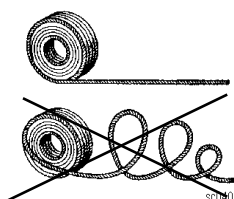


In the case of 2 wire ropes with different lays

- 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 right-hand groove

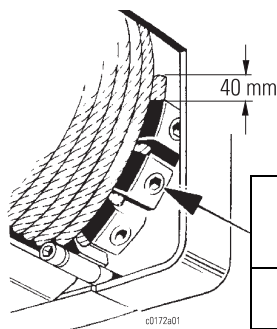
### Removing rope

- 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

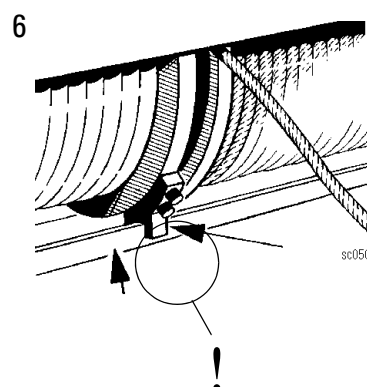
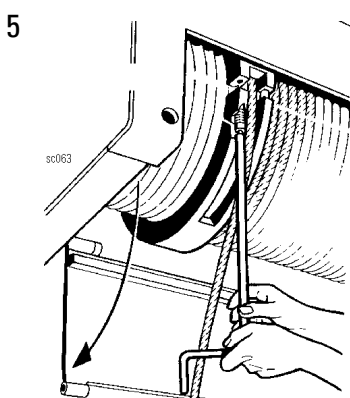
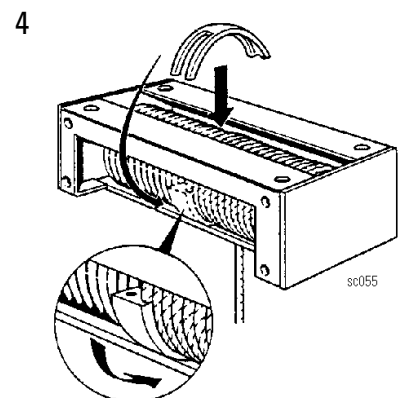
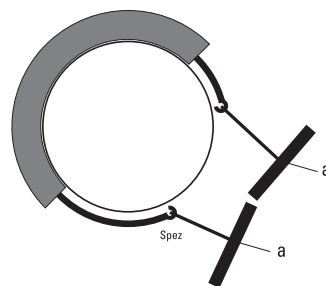
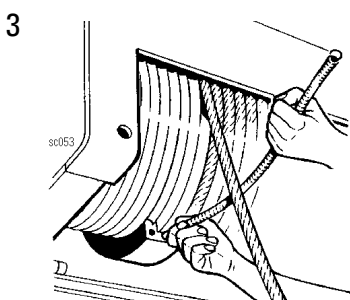
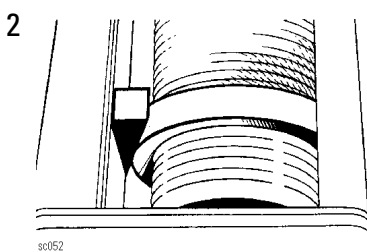
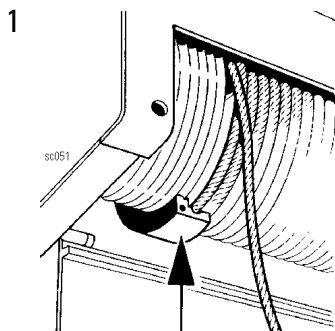
- Unroll new rope out straight if possible, without twists, kinks or loops. Protect rope from dirt.
- Attach rope to rope drum with all the clamping plates (do not forget the lock washers!) Allow the rope end to project by approx. 30-40 mm.
- Tightly wind about 5-10 turns onto the drum under power. Let the rope run through a greased rag. Type of grease see page 40.
- Fit rope guide, see page 31 "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 14 "Reeving rope".
- Retighten clamping plates. Tightening torques see table.
- Run rope in with partial load.



M..	Nm
M16	210
M20	410

- **Caution! Risk of accident!**
- After fitting a new rope, or shortening the old one, reset the hoist limit switch. see page 26, "Setting emergency hoist limit switch".
- If the new rope twists after some time in operation, untwist the rope immediately. see page 14, "Reeving rope" and "Removing rope".

## 6.8.5 Fitting rope guide



- Grease thread and groove in rope guide thoroughly.

Push the half-ring with the threaded holes onto the drum (1).  
Block half-ring against the supporting frame with a wooden wedge (2).

- Push the spring into the guide groove of the half-ring (3) and hook the ends of the spring together. (Use special tool (a), see sketch).
- Push the half-ring with the rope exit slot onto the drum so that the first empty groove of the drum engages the corresponding thread of the half-ring (4).
- Screw half-rings together with compression springs 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.
- Screw down stop to prevent it turning and grease (6).

## 6.8.6 Inspection and maintenance of rope sheave

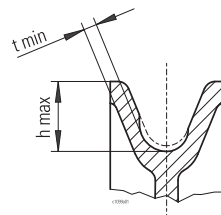
- Check rope sheaves for wear. We recommend having them checked by personnel trained by us. They should also be checked for easy running, indicating that the ball bearings are in good condition.

Wear on rope sheave

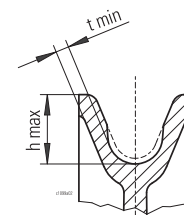
Notes on limits for wear

Rope sheave				
Part number	D new	t min	h max	h new
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

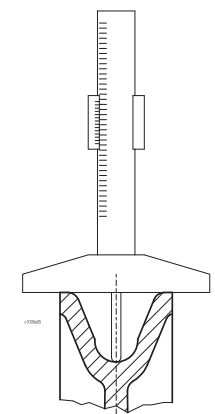
on one side and at base



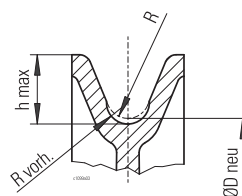
on both sides and at base



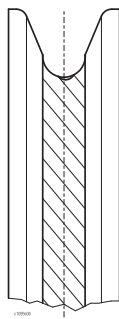
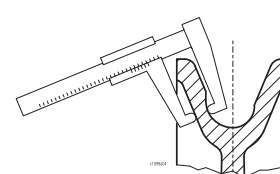
Measuring depth of base of groove with depth gauge



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.

The causes of damage indicating impact and friction stresses must be ascertained. If this type of stress is to be expected during normal operation of the hoist, measures must be taken to eliminate this source of danger. Retrofitting the bottom hook block with a low-sparking metal coating should be considered.

There is a risk of impact sparks if bottom hook blocks swing and hit structural steelwork. Rusty steelwork and/or light metal increases the risk.

### In addition for Zone 21:

There is a risk of dust collecting inside the protective covers of bottom hook blocks and may damage the roller bearings of the rope sheaves. This may lead to a temperature rise in the bearings. Dust deposits in bottom hook blocks must therefore be eliminated. Replace any bearings which have become stiff due to dust deposits.



## 6.8 Rope drive (continued)

## 6.8.7 Checking load hook

RSN, RS, RF														
	5	10	20	32	40						10	20	32	40
	[mm]													
h	75	106	150	190	212						95	132	170	190
h <sub>min.</sub>	71,25	100,7	142,1	180,1	200,8						90	125,1	161,1	180,0

$y_{neu}$  see hook certificate

$$y_{zul} \leq 1,1 \times y_{neu}$$

If value  $h_{min}$  and/or  $y_{zul}$  are reached → replace

## 6.9 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.

A high degree of wear on the flanges indicates that the trolley cants or is running with its weight heavily on one side. The causes of this must be ascertained and eliminated. The running characteristics can be improved by using a guide system. This avoids abrasion and the play of the track gauge can be reduced.

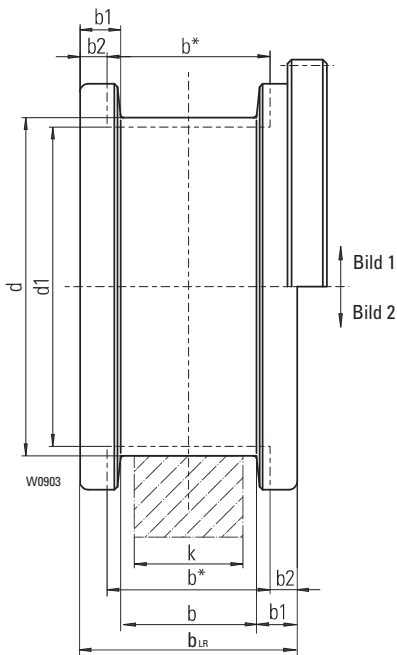


Fig.	d	Nominal value				Limit for wear				
		b <sub>LR</sub>	b	k		b1	d1	b2	Max. play = b*-k	
				min	max				k <sub>min</sub>	k <sub>max</sub>
[mm]										
2	200	100	54	40	45	23	190	10,5	18	18
		100	64	50	55	18		10,5	18	18
		100	74	60	65	13		10,5	18	14
2	315	115	54	40	45	30,5 (29)	300	13,5	18	18
		115	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 any one of the limits for wear d1, b2 (b\*-k) is attained, the part must be replaced.**

( ) for machined facesr

- Inspection of lower flange on cranes with sectional girder  
The running surface of the trolley wheels must be checked for uneven wear and the causes of any such wear ascertained. Driven wheels must not display any slippage to the running surface which would cause increased abrasion and temperature rise.
- Inspection of rails on cranes and crane runways  
The rails must be laid parallel within the permissible tolerances (see page 9) to prevent the crab or crane jamming. Rail joints must provide a smooth surface to avoid impact and deformation.
- Inspection of buffer and buffer stop.  
Ensure that the buffer impact is taken up by the centre of the stop elements provided and that the materials exhibit no detrimental characteristics, see page 9.



### 6.10 Gear



The gearing of AS hoists is hardened and has a high safety factor. With their minimum classification of 1 Bm or 1 Am to FEM 9.511 the gears have a long service life. All bearing points have roller bearings.

- During annual maintenance, check whether any oil has leaked (puddle of oil underneath the gear, drops of oil on the gearbox). If any loss of oil is ascertained, the oil must be changed and repairs scheduled if necessary.
- Note any gear noises from the hoist when under load and without load. Rough, noisy running, knocking sounds indicate possible faults. (See "Noise level" for information on normal noise level.)

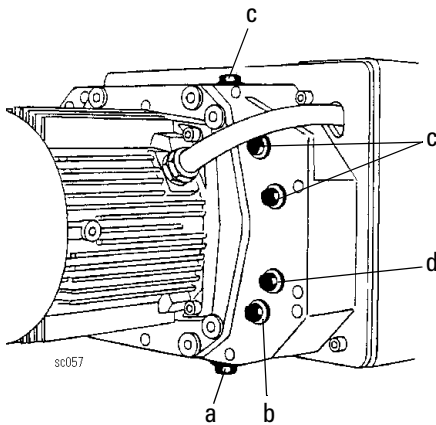
If any faults are detected, repairs must be scheduled. If there is any uncertainty, a fresh diagnosis can be made after consulting other experts, e.g. from the manufacturer.

#### Oil level

When the wire rope hoist is horizontal the oil level should reach the inspection plug. (The oil level inspection plug is marked in red.)

- see page 40 for type and quantity of oil.
- Dispose of used oil correctly to protect the environment.

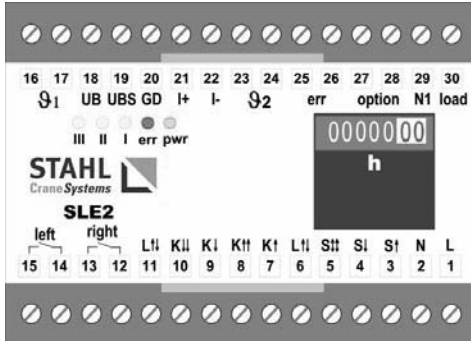
- a = Oil drainage plug
- b = Oil inspection plug
- c = Oil filling plug
- d = Oil inspection plug



## 6.11 Remaining service life

According to FEM 9.755, the operating mode and operating time must be established by the user 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.



### 6.11.1 Operating hours counter in SLE2 evaluation device

The operating hours counter in the evaluation device 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..

### 6.11.2 STAHL SMC Multicontroller (optional)

The operating time of the hoist and the full load operating hours are recorded in the SMC. The SMC 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...)

## 6.12 General overhaul

FEM9.511	1Bm	1Am	2m	3m	4m
D [h]	400	800	1600	3200	6400

The mechanism (motor and gear; not applicable to wearing parts) of the AS 7.. 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.

The rope drive is classified according to FEM 9.611.



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

In particular, the criteria important for explosion protection must be observed.



As the service life of components such as gears is limited in accordance with the classification, it must be ensured that this is not exceeded. After the scheduled service life has expired hazards may arise, also with regard to explosion protection. Thus the operator must take the responsibility for the remaining service life and the necessity of a general overhaul. We cannot accept any liability for damage occasioned by non-observance.

\*1 Safe Working Period

## 7.1 What should 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 motor brake is stuck.
- 1 Remove fan cover
  - 2 Place a block on the end of the motor shaft and hit with a hammer.

### 7.1.3 Loud clicking when switching on

- Brake displacement too large.
- Adjust brake, see page 23, 24.

### 7.1.4 Bottom hook block and rope twist

- Rope is twisted.
- 1 Untwist rope, see page 30, "Replacing rope".

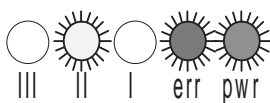
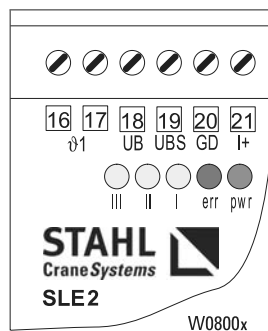
### 7.1.5 Braking path too long

- Brake displacement too large.
  - Brake lining worn.
- 1 Adjust brake, see page 23, 24.

### 7.1.6 Load is not lifted

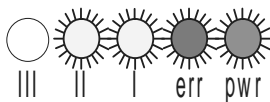
- Overload cut-off SLE has been actuated or is defective.
- 1 Check setting, see page 27.
  - 2 Actions for SLE2  
LED I...III "on" and LED err => error

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



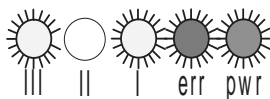
**Error specification** - Overload

**Elimination of error** - Remove load from hoist



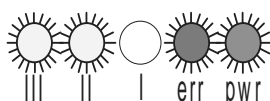
**Error specification** - Overtemperature

**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 and terminal 11)  
- Switch load monitor off/on  
- Replace load monitor

## 8.1 FEM classification

### Classification of mechanism, rope drive and motor acc. to FEM for AS 7 ..... ex

				
1/1	2/1 4/2-1	4/1	6/1	8/1
6300	12500	25000		
8000	16000	32000	50000	63000
10000	20000	40000	63000	80000

FEM			
1Bm	1Am	2m	3m
			AS 7063-10 ex
		AS 7080-08 ex	
	AS 7100-06ex		

## 8.2 Conditions of use

The hoist is designed for use in industry and for the ambient conditions usual in industry.

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.

### Equipment classification

#### Zone 1



Equipment group II  
Category 2G

#### Zone 21



Equipment group II  
Category 2D

### Explosion protection

#### Zone 1

 II 2 G Ex de IIB T4  
 II 2 G ck T4  
 (Ex de IIC T4)

#### Zone 21

 II 2D tD A21 IP66 120°C  
 II 2D ck T120°C

### Protection against dust and humidity in acc. with EN 60 529

#### Zone 1

IP 54 (IP66)

#### Zone 21

IP66

### Permissible ambient temperatures

#### Zone 1

-20°C ... +40°C (+60° as option)

#### Zone 21

-20°C ... +40°C (+60° as option)





Further travel motor data

Code	Motor type	400 V, 50 Hz							400 V, 60 Hz						
		P	n1	In	Ik	cos phi k	DC	Ac	P	n1	In	Ik	cos phi k	DC	Ac
		kW	1/min	A	A		%		kW	1/min	A	A		%	
...503ex	2/8A05/505ex	0.06/0.32	500/2540	1.0/1.1	1.1/3.4	0.79/0.89	20/40	540	0.08/0.39	670/3140	1.5/1.6	1.7/4.9	0.78/0.90	20/40	500
...113ex	2/8A1/506ex	0.15/0.68	620/2840	1.6/2.5	2.1/10.3	0.79/0.87	20/40	300	0.18/0.82	750/3420	2.2/3.2	2.2/10.8	0.73/0.85	20/40	270
...103ex	2/8A1/505ex	0.25/1.20	580/2780	1.6/2.6	2.5/13.5	0.74/0.77	20/40	360	0.32/1.45	750/3380	2.2/3.4	3.4/18.6	0.72/0.74	20/40	330
...203ex	2/8A2/500ex	0.40/2.00	550/2760	2.7/4.8	4.2/21.9	0.66/0.77	20/40	350	0.50/2.40	680/3330	3.4/6.0	5.3/30.6	0.64/0.75	20/40	330

8.5 Cable cross-section and length of supply cable

1	2		3				4				5			6			7																
Hoist motor type	Stationary Fixed installation in PVC conduit  Power supply to hoist		Crab / Crane Fixed installation in PVC conduit  Power supply to infeed (customer's cable to start of rising mains)				Crab Festoon cable in free air - flexible rubber-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 - flexible rubber-sheathed cable  From end of rising mains along crane runway to crane control			Crane Festoon cable in free air - flexible rubber-sheathed cable  Power supply along crane bridge to hoist																
	$\Delta U \leq 5\%$		$\Delta U \leq 1\%$				$\Delta U \leq 4\% (4 + 5)$				$\Delta U \leq 1,5\% (5 + 6)$			$\Delta U \leq 2,5\%$																			
<b>50 Hz</b>																																	
	230 V		400 V		500 V		230 V		400 V		500 V		230 V		400 V		500 V		230 V		400 V		500 V										
	S	L1	S	L1	S	L1	S	L2	S	L2	S	L2	S	L3	S	L3	S	L3	S	S	S	S	L4	S	L4	S	L4	S	L5	S	L5	S	L5
	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	
..A6ex	35	85	16	117	10	114	35	16	16	23	10	22																					
<b>60 Hz</b>																																	
	400 V		460 V		575 V		400 V		460 V		575 V		400 V		460 V		575 V		400 V		460 V		575 V		400 V		460 V		575 V				
	S	L1	S	L1	S	L1	S	L2	S	L2	S	L2	S	L3	S	L3	S	L3	S	S	S	S	L4	S	L4	S	L4	S	L5	S	L5	S	L5
	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	[mm] <sup>2</sup>	[m]	
..A6ex	25	152	16	129	10	126	25	30	16	25	10	24																					

S = Minimum cross-section

L1...L5 = Max. supply cable length of the individual types of power supply  $\geq$  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 minimum cross-sections take into consideration the overload protection of the cables corresponding to the types of cable and installation.

$$S_{(550...600 \text{ V}, 60 \text{ Hz})} = S_{(480...525 \text{ V}, 50 \text{ Hz})} \quad L_{(550...600 \text{ V}, 60 \text{ Hz})} = L_{(480...525 \text{ V}, 50 \text{ Hz})} \times 1.15$$

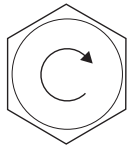
$$S_{(440...460 \text{ V}, 60 \text{ Hz})} = S_{(380...415 \text{ V}, 50 \text{ Hz})} \quad L_{(440...460 \text{ V}, 60 \text{ Hz})} = L_{(380...415 \text{ V}, 50 \text{ Hz})} \times 1.15$$

For larger cross-sections, the max. cable lengths are calculated as follows:

$$L^* = L \times S^* / S$$

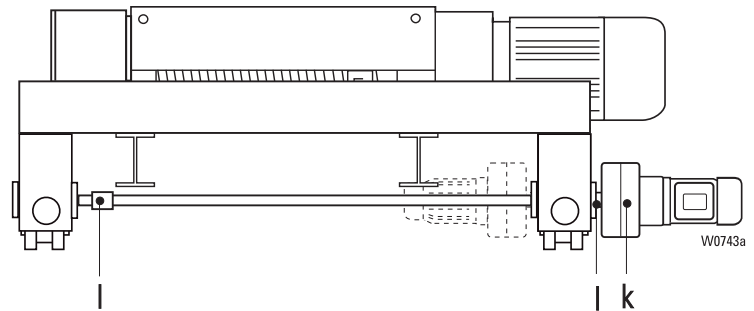
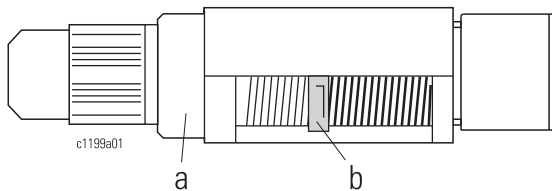
## 8.6 Tightening torques for screws

All screws should be tightened with a torque spanner. see table for the torques generally applicable for screws grade 8.8.



		Tightening torques for screw grade 8.8								
Gewinde M..		M6	M8	M10	M12	M16	M20	M24	M30	M36
Anzugsmoment [Nm]		10	25	51	87	215	430	730	1500	2600

## 8.7 Lubricants



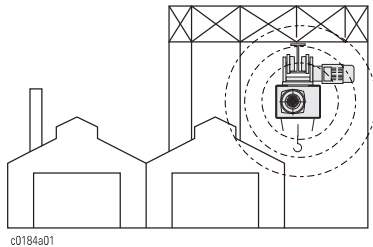
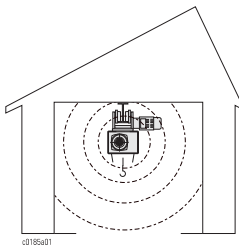
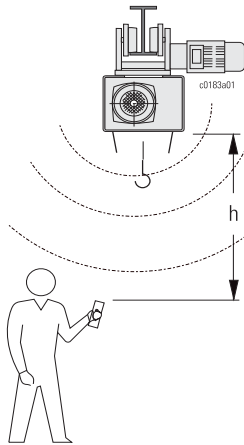
Position of lubrication point		Type of lubricant	Designation DIN 51502	Quantity	Characteristics, makes	
a	Hoist gear	Oil	CLP 460 (PG 220)	AS 7...: 15000 ml	1	1 Viscosity: 460 /s/40°C (220/s/40°C), pour point: -20°C (-40°C) flash point: +265°C (+320°C), e.g.: Fuchs Renolin CLP 460*, Aral Degol BG 460, BP Energol GR-XP 460, Esso Spartan EP 460, Mobil Gear 634, Tribol 1100/460, (Shell Tivela Oil WB) 2 Soap base: Lithium + MoS <sub>2</sub> , 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)
b	Rope guide Wire rope	Grease	GOOF (GPGOOK)	2500 g	3	
k	Fahrgetriebe	Öl	CLP 460 (PG 220)	SA-C 57 ...: 1000 ml SA-C 67 ...: 3000 ml	2	
l	Vielkeilwelle	Fett	KPF1K	SA-D 57 ...: 100 g SA-D 67 ...: 100 g	1	

(i) (Lubricants for low operating temperatures, -40 ... +40°C)  
\* Factory filling

8.8 Noise level

The noise level was measured at a distance of 1 m from the wire rope hoist. The mean noise 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
AS 7. ex	80	77	74	71	68

**2**

Type	[db (A)] +/- 3				
	h [m]				
	1 m	2 m	4 m	8 m	16 m
AS 7. ex	80	74	68	62	56

8.9 Circuit diagrams

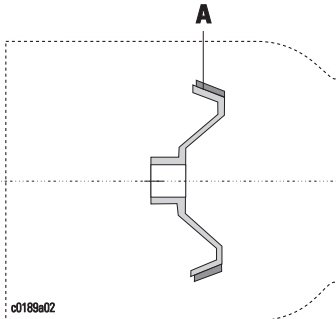
See separate enclosure

## 9.1 Serial number

When ordering original spare parts, please always indicate the serial number of the hoist

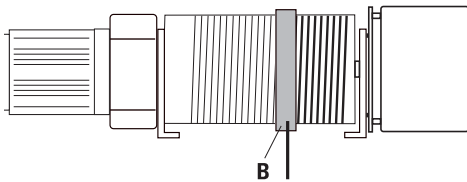
## 9.2 Hoist

### Hoist brake

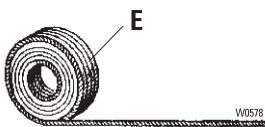
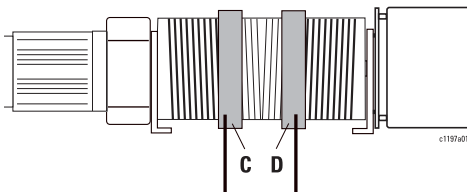


Hoist type	Hoist motor	Brake disc A
		Order no.
AS 7. ex	A 6ex	46 330 20 18 0

### Rope guide



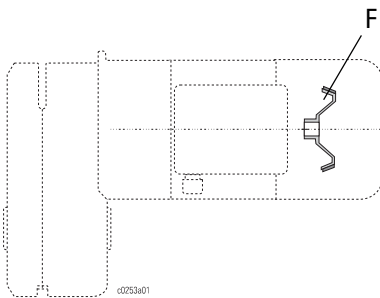
Hoist type	B	C	D
	Order no.	Order no.	Order no.
AS 7. ex	47 330 00 43 0	46 330 08 43 0	46 330 00 43 0



### Wire rope (E)

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

## 9.3 Travel motor

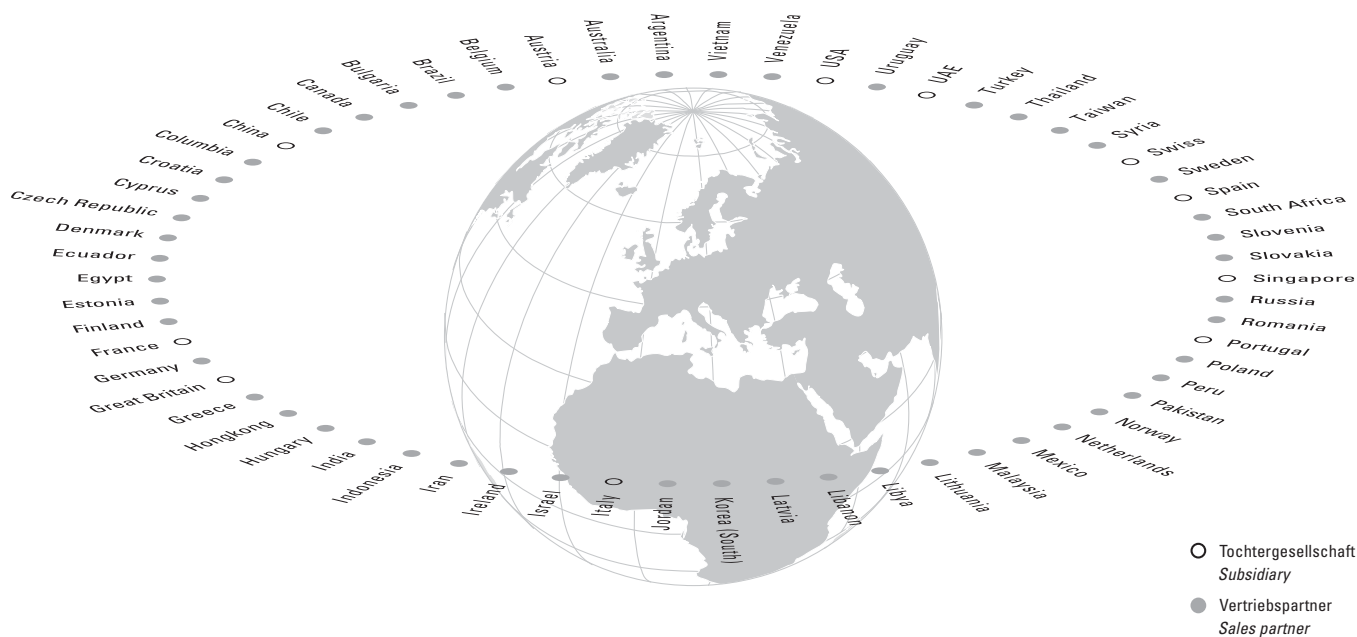


Travel drive	Travel motor type	Brake disc F
		Order no.
SA-D ... 1.3	A1 ex	41 330 20 18 0
SA-D ... 203	A2 ex	42 330 20 18 0



Replacement and repairs may only be carried out by qualified personnel.





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