



YKA  
SKA

YKB  
SKB

YKC  
SKC

YKD  
SKD

YKE  
SKE

## Wire Rope Hoists

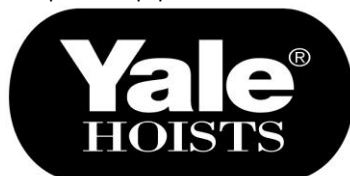
### Operation & Service Manual

en-US

**Before installing hoist, fill in the information below.  
Refer to the Hoist and Motor data plates.**

Model No. \_\_\_\_\_  
 Serial No. \_\_\_\_\_  
 Purchase Date \_\_\_\_\_  
 Voltage \_\_\_\_\_  
 Rated Load \_\_\_\_\_

**Follow all instructions and warnings for inspecting, maintaining and operating this product.**  
 The use of any hoist presents some risk of personal injury or property damage. That risk is greatly increased if proper instructions and warnings are not followed. Before using this hoist, each operator should become thoroughly familiar with all warnings, instructions and recommendations in this manual. Retain this manual for future reference and use.  
 Forward this manual to operator. Failure to operate equipment as directed in manual may cause injury.



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As a Yale/Shawbox Hoist and Trolley user you are assured of reliable repair and parts services through a network of Master Parts Depots and Service Centers that are strategically located in the United States and Canada. These facilities have been selected on the basis of their demonstrated ability to handle all parts and repair requirements promptly and efficiently. To quickly obtain the name of the Master Parts Depot or Service Center located nearest you, call (800) 888-0985, Fax: (716) 689-5644, visit [www.cmworks.com](http://www.cmworks.com)

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# Contents

|             |   |           |
|-------------|---|-----------|
| <b>1</b>    | <b>General information .....</b>                                  | <b>7</b>  |
| <b>1.1</b>  | <b>Information about safety messages .....</b>                    | <b>7</b>  |
|             | 1.1.1 Explanation of signal words and symbols .....               | 7         |
|             | 1.1.2 Safety instructions .....                                   | 7         |
|             | 1.1.3 Section safety messages .....                               | 7         |
|             | 1.1.4 Embedded safety messages .....                              | 7         |
|             | 1.1.5 Safety alert symbols .....                                  | 8         |
|             | 1.1.6 Additional symbol .....                                     | 8         |
| <b>1.2</b>  | <b>Spare parts .....</b>  | <b>8</b>  |
| <b>1.3</b>  | <b>Target audience and responsibilities .....</b>                 | <b>8</b>  |
| <b>1.4</b>  | <b>Crane logbook.....</b>   | <b>9</b>  |
| <b>1.5</b>  | <b>Transport and storage .....</b>                                | <b>9</b>  |
| <b>1.6</b>  | <b>Weight .....</b>   | <b>9</b>  |
| <b>1.7</b>  | <b>Installation, commissioning, maintenance and repairs .....</b> | <b>9</b>  |
| <b>1.8</b>  | <b>After-sales service.....</b>                                   | <b>10</b> |
| <b>1.9</b>  | <b>Periodic inspections .....</b>                                 | <b>10</b> |
| <b>1.10</b> | <b>Environmental information .....</b>                            | <b>10</b> |
|             | 1.10.1 Life cycle assessment .....                                | 10        |
|             | 1.10.2 Energy consumption .....                                   | 10        |
| <b>2</b>    | <b>General safety notes .....</b>                                 | <b>11</b> |
| <b>2.1</b>  | <b>Use for intended purpose.....</b>                              | <b>11</b> |
| <b>2.2</b>  | <b>Inappropriate use.....</b>                                     | <b>12</b> |
| <b>2.3</b>  | <b>Residual hazards .....</b>                                     | <b>12</b> |
| <b>2.4</b>  | <b>Organizational safety precautions .....</b>                    | <b>13</b> |
| <b>2.5</b>  | <b>General regulations.....</b>                                   | <b>13</b> |
| <b>2.6</b>  | <b>Recommended PPE .....</b>                                      | <b>13</b> |
| <b>2.7</b>  | <b>Working above floor level.....</b>                             | <b>14</b> |
| <b>2.8</b>  | <b>Sound pressure level .....</b>                                 | <b>14</b> |
| <b>2.9</b>  | <b>Fire safety .....</b>  | <b>14</b> |
| <b>2.10</b> | <b>Safety-conscious operation .....</b>                           | <b>15</b> |
| <b>2.11</b> | <b>Attaching load .....</b>                                       | <b>15</b> |
| <b>3</b>    | <b>Introduction .....</b>   | <b>16</b> |
| <b>3.1</b>  | <b>Incorporation.....</b>   | <b>17</b> |
| <b>4</b>    | <b>Installation .....</b>   | <b>18</b> |
| <b>4.1</b>  | <b>Stationary hoist.....</b>                                      | <b>18</b> |
|             | 4.1.1 Attachment at bottom.....                                   | 19        |
|             | 4.1.2 Attachment at top .....                                     | 21        |
| <b>4.2</b>  | <b>Fleet angle .....</b>  | <b>22</b> |
|             | 4.2.1 Attachment at bottom.....                                   | 22        |
|             | 4.2.2 Attachment at top .....                                     | 23        |
|             | 4.2.3 Attachment at side .....                                    | 24        |
|             | 4.2.4 Fleet angle.....  | 24        |
|             | 4.2.5 Angle of installation .....                                 | 25        |
| <b>4.3</b>  | <b>Monorail trolleys .....</b>                                    | <b>25</b> |
|             | 4.3.1 Underslung trolley KE-S33 – 76 .....                        | 25        |
|             | 4.3.2 Underslung trolley UE-S4 .....                              | 27        |
|             | 4.3.3 Underslung trolley UE-S776 .....                            | 29        |
|             | 4.3.4 Articulated trolley (DKE-S4 / DKE-S6) .....                 | 31        |
| <b>4.4</b>  | <b>End stops for monorail trolleys .....</b>                      | <b>34</b> |
| <b>4.5</b>  | <b>Double rail trolley (OE-S) .....</b>                           | <b>35</b> |
| <b>4.6</b>  | <b>End stops for double rail trolleys .....</b>                   | <b>36</b> |
|             | 4.6.1 Wheel diameter D = 3.9 in. ....                             | 36        |
|             | 4.6.2 Wheel diameter D = 4.9 - 7.9 in. ....                       | 36        |
| <b>4.7</b>  | <b>Anti-jump catch (option).....</b>                              | <b>37</b> |
|             | 4.7.1 Description of system.....                                  | 37        |
|             | 4.7.2 Procedure .....   | 37        |
| <b>4.8</b>  | <b>Travel limit switches.....</b>                                 | <b>40</b> |
|             | 4.8.1 Monorail trolley .....                                      | 40        |

|             |        |   |            |
|-------------|--------|---|------------|
|             | 4.8.2  | Double rail trolley.....  | 40         |
| <b>4.9</b>  |        | <b>Electrical equipment .....</b>   | <b>41</b>  |
|             | 4.9.1  | Supply cables.....  | 41         |
|             | 4.9.2  | Terminals.....  | 41         |
|             | 4.9.3  | Protection of equipment.....  | 42         |
|             | 4.9.4  | Emergency stop.....   | 42         |
|             | 4.9.5  | Runway conductor disconnecting means.....   | 42         |
|             | 4.9.6  | Disconnect switch.....  | 42         |
|             | 4.9.7  | Protective conductor.....   | 42         |
|             | 4.9.8  | Connection fuses.....   | 43         |
|             | 4.9.9  | Electromagnetic compatibility.....  | 43         |
|             | 4.9.10 | Overload safety device.....   | 44         |
|             | 4.9.11 | Connecting to mains.....  | 45         |
|             | 4.9.12 | Control and control functions.....  | 46         |
|             | 4.9.13 | Electric motors and related equipment.....  | 47         |
| <b>4.10</b> |        | <b>YK/SK hoists with frequency inverter (VFD).....</b>  | <b>47</b>  |
| <b>4.11</b> |        | <b>Hook operated hoist limit switch with weight ball “BLS” (option) .....</b>                                     | <b>48</b>  |
|             | 4.11.1 | Adjusting/mounting hook operated hoist limit switch with weight ball.....   | 49         |
| <b>4.12</b> |        | <b>Hook operated hoist limit switch with switch rod “PLS” (option).....</b>                                       | <b>50</b>  |
|             | 4.12.1 | Mounting hook operated hoist limit switch with switch rod on stationary wire rope hoists (YKA/SKA / YKB/SKB)..... | 51         |
|             | 4.12.2 | Mounting hook operated hoist limit switch with switch rod on stationary wire rope hoists (YKC/SKC).....           | 54         |
|             | 4.12.3 | Mounting hook operated hoist limit switch with switch rod on stationary wire rope hoists (YKE/SKE / YKD/SKD)..... | 56         |
|             | 4.12.4 | Mounting hook operated hoist limit switch with switch rod on trolleys (KE-S..).....                               | 58         |
|             | 4.12.5 | Mounting hook operated hoist limit switch with switch rod on trolleys (UE-S77).....                               | 67         |
|             | 4.12.6 | Mounting hook operated hoist limit switch with switch rod on trolleys (OE-S).....                                 | 68         |
| <b>4.13</b> |        | <b>Reeving rope .....</b>   | <b>70</b>  |
|             | 4.13.1 | Overview of reeving.....  | 71         |
|             | 4.13.2 | Rope fastening point (YKA/SKA - YKE/SKE).....   | 72         |
|             | 4.13.3 | Position of the rope fastening point.....   | 75         |
| <b>5</b>    |        | <b>Commissioning.....</b>   | <b>80</b>  |
| <b>6</b>    |        | <b>Operating.....</b>   | <b>81</b>  |
| <b>6.1</b>  |        | <b>Operating precautions.....</b>   | <b>81</b>  |
| <b>6.2</b>  |        | <b>Duties of crane operator.....</b>  | <b>83</b>  |
| <b>6.3</b>  |        | <b>Control pendant.....</b>   | <b>84</b>  |
| <b>6.4</b>  |        | <b>Emergency stop.....</b>  | <b>84</b>  |
| <b>6.5</b>  |        | <b>Hoists with frequency converter.....</b>   | <b>85</b>  |
| <b>7</b>    |        | <b>Inspection and maintenance.....</b>  | <b>86</b>  |
| <b>7.1</b>  |        | <b>Inspection intervals.....</b>  | <b>87</b>  |
| <b>7.2</b>  |        | <b>Maintenance intervals.....</b>   | <b>88</b>  |
| <b>7.3</b>  |        | <b>Motors.....</b>  | <b>89</b>  |
| <b>7.4</b>  |        | <b>Gears.....</b>   | <b>89</b>  |
|             | 7.4.1  | Changing the gear oil.....  | 90         |
| <b>7.5</b>  |        | <b>Drive-through mechanism conversion or replacement (single girder trolleys) .....</b>                           | <b>91</b>  |
|             | 7.5.1  | Drive-through mechanism for travel drive (trolleys KE-S33 - KE-S65).....  | 91         |
|             | 7.5.2  | Underslung trolley UE-S4.....   | 91         |
|             | 7.5.3  | Drive-through mechanism for travel drive (trolley KE-S76).....  | 92         |
|             | 7.5.4  | Drive-through mechanism for travel drive (UE-S776).....   | 93         |
|             | 7.5.5  | Underslung trolley UE-S776 with wire rope hoists YKE/SKE 4PS (4-strand).....                                      | 93         |
|             | 7.5.6  | Drive-through mechanism for travel drive (DKE-S4 / DKE-S6).....   | 94         |
| <b>7.6</b>  |        | <b>Hoist motor brake (RSM).....</b>   | <b>95</b>  |
|             | 7.6.1  | Checking the brake.....   | 95         |
|             | 7.6.2  | Replacing the brake rotor.....  | 96         |
| <b>7.7</b>  |        | <b>Hoist motor brake (NM) 12/2H...-MF.....</b>  | <b>98</b>  |
|             | 7.7.1  | Checking the brake.....   | 98         |
|             | 7.7.2  | Replacing the brake rotor.....  | 98         |
| <b>7.8</b>  |        | <b>Hoist motor brake (NM) 4H...-MF.....</b>   | <b>100</b> |
|             | 7.8.1  | Checking the brake.....   | 100        |
|             | 7.8.2  | Replacing the brake rotor.....  | 101        |

|      |   |  |            |
|------|---|--|------------|
| 7.9  | <b>Hoist motor brake (NM) 4HS</b> .....                       |  | <b>103</b> |
|      | 7.9.1   | Checking the brake .....   | 103        |
|      | 7.9.2   | Replacing the brake rotor .....  | 104        |
| 7.10 | <b>Replacing the pressure springs</b> .....                   |  | <b>106</b> |
| 7.11 | <b>Travel motor brake</b> .....                               |  | <b>107</b> |
| 7.12 | <b>Geared limit switch</b> .....                              |  | <b>108</b> |
|      | 7.12.1  | System description for geared limit switch - version 1 .....                                     | 108        |
|      | 7.12.2  | System description for geared limit switch - version 2 .....                                     | 109        |
|      | 7.12.3  | Maintenance work on the geared limit switch .....  | 109        |
| 7.13 | <b>Checking the geared limit switch</b> .....                 |  | <b>110</b> |
|      | 7.13.1  | Checking the operational hoist limit switch - version 1 (S3) .....                               | 110        |
|      | 7.13.2  | Checking the emergency hoist limit switch - version 1 (S1) .....                                 | 111        |
|      | 7.13.3  | Checking the operational hoist limit switch - version 2 (S3) .....                               | 113        |
|      | 7.13.4  | Checking the emergency hoist limit switch - version 2 (S1) .....                                 | 114        |
| 7.14 | <b>Adjusting the geared limit switch</b> .....                |  | <b>116</b> |
|      | 7.14.1  | Geared limit switch - version 1.....   | 117        |
|      | 7.14.2  | Geared limit switch - version 2.....   | 121        |
| 7.15 | <b>Hook dimensions C for KE-S.. trolleys</b> .....            |  | <b>124</b> |
| 7.16 | <b>Assembling the bottom hook block</b> .....                 |  | <b>131</b> |
| 7.17 | <b>Overload safety device</b> .....                           |  | <b>132</b> |
|      | 7.17.1  | Testing overload safety device .....   | 132        |
|      | 7.17.2  | Maintenance of overload safety device with pressure sensor.....                                  | 132        |
|      | 7.17.3  | Maintenance of overload safety device with shear force sensor.....                               | 132        |
| 7.18 | <b>Crane test</b> .....                                       |  | <b>132</b> |
| 7.19 | <b>Rope drive</b> .....                                       |  | <b>133</b> |
|      | 7.19.1  | Rope and rope attachment - general information .....   | 133        |
|      | 7.19.2  | Replacement of wire rope due to broken wires.....  | 134        |
|      | 7.19.3  | Removing the rope guide.....   | 136        |
|      | 7.19.4  | Installing the rope guide .....  | 137        |
|      | 7.19.5  | Replacing the rope guide .....   | 139        |
|      | 7.19.6  | Changing the wire rope.....  | 140        |
|      | 7.19.7  | Checking rope drum for wear .....  | 143        |
|      | 7.19.8  | Checking and maintaining the rope sheave.....  | 144        |
|      | 7.19.9  | <b>Checking the load hook</b> .....  | 146        |
| 7.20 | <b>Trolley</b> .....  |  | <b>147</b> |
| 7.21 | <b>Remaining service life</b> .....                           |  | <b>148</b> |
|      | 7.21.1  | Operating hours counter in SLE load monitor.....   | 148        |
|      | 7.21.2  | Multicontroller SMC (optional) .....   | 148        |
| 7.22 | <b>General overhaul</b> .....                                 |  | <b>149</b> |
| 8    | <b>Wearing parts</b> .....                                    |  | <b>150</b> |
| 8.1  | <b>Serial number</b> .....                                    |  | <b>150</b> |
| 8.2  | <b>Hoist</b> .....  |  | <b>150</b> |
| 9    | <b>Troubleshooting</b> .....                                  |  | <b>152</b> |
| 10   | <b>Decommissioning</b> .....                                  |  | <b>154</b> |
| 10.1 | <b>Dismantling</b> .....                                      |  | <b>154</b> |
| 10.2 | <b>Scrap disposal</b> .....                                   |  | <b>154</b> |
| 11   | <b>Technical data</b> .....                                   |  | <b>155</b> |
| 11.1 | <b>Conditions of use</b> .....                                |  | <b>155</b> |
| 11.2 | <b>Hoist</b> .....  |  | <b>156</b> |
|      | 11.2.1  | Pole-changing hoist motors 12/2H..-MF 50Hz.....  | 156        |
|      | 11.2.2  | Pole-changing hoist motors 12/2H..-MF 60Hz.....  | 157        |
|      | 11.2.3  | Pole-changing hoist motors ../H.. 50Hz.....  | 158        |
|      | 11.2.4  | Pole-changing hoist motors ../H.. 60Hz.....  | 158        |
|      | 11.2.5  | Frequency-controlled hoist motors 4H..-MF 100 Hz.....  | 159        |
|      | 11.2.6  | Frequency-controlled hoist motors 4H..-MF 120 Hz.....  | 159        |
|      | 11.2.7  | Frequency-controlled hoist motors 4HS..-MF 100 Hz .....  | 160        |
|      | 11.2.8  | Frequency-controlled hoist motors 4HS..-MF 120 Hz .....  | 160        |
| 11.3 | <b>Cable cross sections and lengths of supply cable</b> ..... |  | <b>161</b> |
|      | 11.3.1  | Cable cross sections and lengths of supply cable for pole-changing hoist motors 12/2H..-MF ..... | 161        |

---

|      |        |   |     |
|------|--------|---|-----|
|      | 11.3.2 | Cable cross sections and lengths of supply cable for pole-changing hoist motors |     |
|      |        | ..H.  | 162 |
| 11.4 |        | Tightening torques .....  | 163 |
| 11.5 |        | Lubricants.....   | 165 |
| 11.6 |        | Lubricants for travel drive .....   | 165 |
| 11.7 |        | Circuit diagrams .....  | 165 |

# 1 General information




## 1 General information

You have purchased a Yale product.  
This product was constructed in accordance with the applicable European standards and regulations.  
Read carefully and observe this manual. Store the manual within easy reach at the place of operation.

### 1.1 Information about safety messages

#### 1.1.1 Explanation of signal words and symbols

The following signal words are used in safety messages.

| Signal word  | Meaning  |
|--|--|
|  <b>DANGER</b>  | Indicates a hazardous situation which, if not avoided, will result in death or serious injury.   |
|  <b>WARNING</b> | Indicates a hazardous situation which, if not avoided, could result in death or serious injury.  |
|  <b>CAUTION</b> | Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. |
| <b>NOTICE</b>  | Indicates possible material or environmental damage.   |

#### 1.1.2 Safety instructions

The fundamental hazards and required safety measures are listed in section **“General safety notes”**.

#### 1.1.3 Section safety messages


Section safety messages relate to an entire section and are laid out as follows.

##### **SIGNAL WORD**

Type and source of hazard  
Possible consequences if disregarded  
➤ Measures to prevent the hazard






#### 1.1.4 Embedded safety messages

Embedded safety messages are placed directly before or after a required action and are structured as follows.


 **SIGNAL WORD** Type and source of hazard, possible consequences if disregarded.  
➤ Measures to prevent the hazard,

# 1 General information

## 1.1.5 Safety alert symbols

| Symbol  | Meaning               |
|---|-----------------------|
|  | General hazard        |
|  | Electric shock hazard |
|  | Falling parts hazard  |
|  | Suspended load hazard |
|  | Hand injury hazard    |

## 1.1.6 Additional symbol

| Symbol  | Meaning        |
|---|----------------|
|  | Important note |

## 1.2 Spare parts

### **WARNING**

**Safety hazard.** Incorrect or defective spare parts may lead to damage, malfunctions or the complete failure of the machine.

- Use only original spare parts.

## 1.3 Target audience and responsibilities

### **Owner**

Whoever uses and employs the product or has it operated by suitable trained personnel is considered to be the owner (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 behavior, have been advised on the necessary protective devices, precautions, applicable regulations, accident prevention regulations and prevailing conditions and have proven their ability.

### **Qualified person**

A qualified person is a person who by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, successfully demonstrates the ability to solve/resolve problems relating to the subject matter, the work, or the project.

### **Electrical qualified person**

An electrical qualified person is defined as:

One who has received training in and has demonstrated skills and knowledge in the construction and operation of electric equipment and installations and the hazard involved.



# 1 General information

## 1.4 Crane logbook

A completed crane logbook must be kept for each hoist. The results of the periodic inspections must be entered in the logbook.

## 1.5 Transport and storage

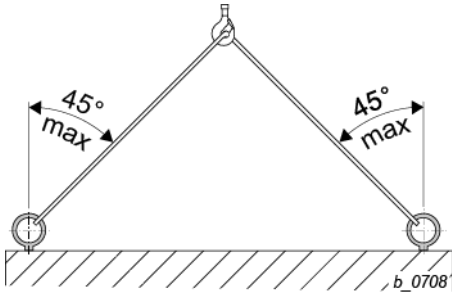


Fig. 1

### Transport

The product is delivered on a special pallet. This enables it to be loaded and unloaded safely with a fork-lift truck.

1. **⚠ WARNING Falling parts hazard.** If the product is to be transported suspended, attach the product to the sling points provided. The sling points are designed for a max. diagonal pull  $\leq 45^\circ$ .
2. Do not allow the hoist to drop. Set the product down on the ground correctly.
3. Avoid damage to the product and its components by loading and unloading it correctly.

### Storage

1. Store the product and its accessories in a dry place.
2. Store it in a stable position, secure it against toppling or overturning.
3. Observe environmental protection laws for storage (do not allow oil etc. to leak).
4. Make sure that the ground is firm and does not permit the machine to sink in.
5. Ensure the load is evenly distributed, support the hoist at several points.
6. Do not kink the ropes and avoid contact with the ground.

## 1.6 Weight

See factory certificate.

## 1.7 Installation, commissioning, maintenance and repairs

1. Make sure that installation, commissioning, maintenance and repairs are carried out by qualified persons only.
2. We recommend having installation carried out by qualified personnel engaged by the manufacturer.
3. Do not carry out any alterations or modifications.
4. Make sure that additional fitments are approved by the manufacturer.  
(During welding work, electrode and ground must be in contact with the same component!)
5. Use only original spare parts for repairs.
6. Make sure that dismantled guards are screwed down again and locked.

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

- For detailed information about installation see chapter "**Installation**".
- For detailed information about commissioning see chapter "**Commissioning**".
- For detailed information and about maintenance and repairs see chapter "**Inspection and maintenance**".

# 1 General information

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## 1.8 After-sales service

You have purchased a high-quality product. Our after sales service will give you advice on its correct use.

In order to maintain the safety and constant availability of the product, we recommend concluding a maintenance agreement.

### **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 system.

Ask for our seminar program.

## 1.9 Periodic inspections

- Hoists and cranes must be inspected by a qualified person least once a year, more frequently if so specified by national regulations.
- The results of the inspections must be recorded and filed in the test logbook.
- The remaining service life of the hoist must also be established during this inspection.
- The periodic inspections must be adapted to the hoist's use. Intensive use or adverse environmental conditions entail shorter maintenance intervals.

**All tests must always be initiated by the owner!**

## 1.10 Environmental information

Environmental aspects have been taken into account when developing and manufacturing this equipment. Please note the instructions on safe lubrication and waste disposal to avoid pollution risks during use. Appropriate use and correct maintenance will improve the environmental performance of this product.

### **1.10.1 Life cycle assessment**

The stages of the product service life are:

- Production of materials,
- components and energy,
- transport to factory,
- manufacture and assembly,
- transport to customer,
- on-site installation,
- operating phase including maintenance and modernization,
- dismantling and recycling of materials at end of service life.

### **1.10.2 Energy consumption**

The energy consumption during the operating phase has the highest impact on the environment. Electricity is required for starting and running the motors and for lighting, heating, cooling and other optional electrical components and parts of the hoist.

## 2 General safety notes

---

## 2 General safety notes



The products are constructed according to the state of the art and recognized safety rules. However, during use danger to the life and limb of the user or a third party can arise, or adverse effects can affect the product and other property.

### 2.1 Use for intended purpose

- Wire rope hoists are intended for lifting freely movable loads. Depending on their design, they are for stationary or mobile use.
- In the case of wire rope hoists with multiple load-bearing equipment, ensure that the load is distributed evenly between the falls.
- Any fundamental alterations and modifications to the product, 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 authorized by the manufacturer, otherwise the declaration of conformity/declaration of incorporation will be invalidated.
- Also any work on or additions to the control must be authorized by the manufacturer. The manufacturer cannot accept any liability for malfunctioning after unauthorized work on the control.
- The conditions in the place of use of the hoist must correspond to the operating conditions for which the hoist was designed (including indoor/outdoor use, ambient temperature, radiation temperature, wind, dust, splash water, snow, water, etc.
- For hoists which work in combination and have more than one control (tandem operation), action must be taken to coordinate the controls. This applies also to the reaction of the protective devices. Controls must be constructed accordingly.
- For hoists intended for automatic operation, the control must be designed accordingly.

## 2 General safety notes

---

### 2.2 Inappropriate use

- Use in areas with potentially explosive atmosphere.
- Transporting molten metal.
- Exceeding the maximum working load.
- Transporting persons.
- Pulling/towing or raising/lowering of a guided load.
- Using the hoist in applications in which the working load changes with the position of the load, as the hoist is not equipped with a load display and additional warning device when it cuts off at overload.
- Breaking away, pulling or towing of loads.
- Use of rope drive for “guided loads” without being designed for this type of application.
- Breaking away of tilted loads if the rope drive is designed for the “guided load” application.
- Pulling loads at an angle, dragging loads or moving vehicles with the load or load suspension equipment.
- Do not knot load ropes or chains or shorten them with devices such as bolts, screws or similar.
- Removing the safety latch from suspension and load hooks.
- Manipulating the overload safety device.
- Operation with slack rope (loose windings on the rope drum).
- If the product forms “part of a machine”, the person placing it on the market must ensure that the product meets the specific regulations of the application.
- Application of external torques due to forces that are exercised from outside the system, e.g. with gripper operation or through tilting/bumping of the load, in particular with the option 4×90° hook locking.

### 2.3 Residual hazards

The machine has been subjected to a risk analysis. The design and construction based on this correspond to the state of the art. However, residual hazards remain during operation and maintenance and these could result in serious or even fatal injuries to personnel.

- Risk of crushing
- Hazard due to falling parts (attached to the load or on the load)
- Load toppling due to unsuitable or damaged load-bearing equipment
- Risk of electric shock

#### **Preventative measures:**

1. Use LOTO (Lockout/Tagout) procedure in accordance to national, state and local regulations and company policy.
2. Switch the machine off and ensure it cannot be switched on again before carrying out maintenance, cleaning and repair work.
3. Switch off the power supply before all work on the electrical system. Check that the components to be replaced are free of current and voltage.
4. Do not remove any safety devices or override them by manipulating them.
5. When lifting or lowering loads ensure that no-one is in the immediate danger area.
6. It is forbidden for anyone to stand in the danger area.

## 2 General safety notes

---

### 2.4 Organizational safety precautions

- The owner may only employ insured persons to operate a crane single-handedly (crane operator), install or perform maintenance on the product if they are capable both physically and mentally,
  - have been instructed in operating and maintaining the crane and have shown him proof of their competence and
  - may be expected to perform the duties assigned them reliably.
- At regular intervals, check that work is being carried out in a safety-conscious manner.
- Observe the intervals specified for periodic inspections. File the test reports in the logbook.

### 2.5 General regulations

- Safety and accident prevention regulations.
- All national, state and local regulations.

### 2.6 Recommended PPE



Fig. 2

#### Personal protective equipment to be provided by the owner

- Safety shoes
- Gloves (only if there is no danger of them being drawn into equipment)
- Protective goggles
- Hart hat
- Hearing protection
- Closely fitting clothes (danger of clothing being drawn into equipment)
- When operating the hoist or standing close to the hoist, wire rope or chain there is a danger of fingers, clothing, jewelry, etc. being drawn into equipment

## 2 General safety notes

### 2.7 Working above floor level

Personnel must be protected from falling. Observe the national, state, and local regulations, and company policies when working above the floor level.

### 2.8 Sound pressure level

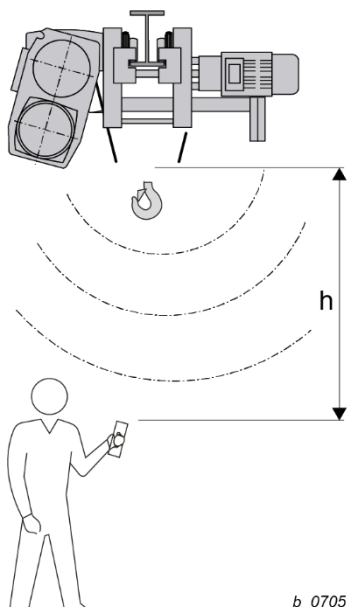
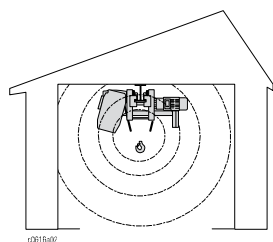
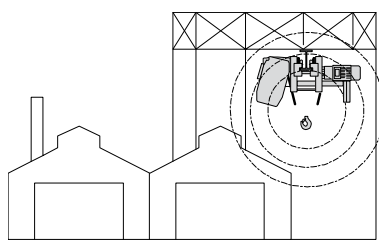


Fig. 3

b\_0705



10216/001



10216/003

Fig. 4

The sound pressure level was measured at a distance of **3 ft** from the wire rope hoist. The mean sound pressure level is calculated for one operating cycle (50% with maximum permissible load, 50% without load).

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

| Type    | [db (A)] +/-3 |      |       |       |       |
|---------|---------------|------|-------|-------|-------|
|         | h [ft]        |      |       |       |       |
|         | 3 ft          | 7 ft | 13 ft | 26 ft | 52 ft |
| YKA/SKA | 76            | 73   | 70    | 67    | 64    |
| YKB/SKB | 76            | 73   | 70    | 67    | 64    |
| YKC/SKC | 78            | 75   | 72    | 69    | 66    |
| YKE/SKE | 78            | 75   | 72    | 69    | 66    |

Tab. 1

| Type    | [db (A)] +/-3 |      |       |       |       |
|---------|---------------|------|-------|-------|-------|
|         | h [ft]        |      |       |       |       |
|         | 3 ft          | 7 ft | 13 ft | 26 ft | 52 ft |
| YKA/SKA | 76            | 70   | 64    | 58    | 52    |
| YKB/SKB | 76            | 70   | 64    | 58    | 52    |
| YKC/SKC | 78            | 72   | 66    | 60    | 50    |
| YKE/SKE | 78            | 72   | 66    | 60    | 50    |

Tab. 2

### 2.9 Fire safety

#### ⚠ WARNING

**Safety hazard.** Never use a powder extinguisher in the presence of high voltages. Only fight the fire if this is possible without subjecting yourself to risk. Switch off the crane if this is possible. Evacuate the area. Advise other persons on potential danger and call for help.

## 2 General safety notes

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### 2.10 Safety-conscious operation

YK/SK wire rope hoists are constructed according to the state of the art and equipped with an overload safety device in standard version. In spite of this, dangers may arise from inappropriate use or use for an unintended purpose.

1. The owner is responsible for ensuring that work is carried out with safety in mind and avoiding risks.
2. Read the instructions before starting to work with the product.
3. Standing under a suspended load is forbidden. Danger to life and limb!
4. Observe the "Duties of crane operator".
5. Before starting work, find out where the emergency stop button is (usually in the control pendant).
6. Do not put your hand between edges which might crush or cut.
7. Do not grasp the moving rope.
8. Take note of the relevant instructions when attaching loads.
9. Do not stand between load and wall.
10. Start lifting the load carefully.
11. Never attempt to remedy a malfunction while the load is suspended.
12. Never use bent, open or distorted load hooks, or attempt to straighten them.
13. Have a damaged hook safety latch repaired.
14. Never anneal the hook.
15. Never lock the buttons of the control switch in place.
16. Never allow the load to drop into the hoist's load-bearing equipment.
17. Before lifting loads, ensure that the stated maximum working load is not exceeded.
18. When lifting and setting down loads, ensure that they are in a stable position in order to avoid accidents due to the load toppling or overturning.
19. Secure the load if the power is cut.
20. Do not kink or crush control cables.
21. Choose a safe place from which to operate the hoist.
22. Joining or mending ropes, chains or belts is not permitted.
23. Never touch metal components that are colder than 32 °F or hotter than 131 °F without wearing protective gloves.
24. Do not use the emergency limit switch (ultimate limit switch for highest and lowest hook position) as an operational limit switch.
25. Report damage and defects to the product (abnormal noises, impaired braking function, deformations, etc.) to the person responsible immediately. Do not use the product until the faults have been eliminated.
26. Do not remove information plates from the product. Replace illegible or damaged plates.
27. Have hoist inspected by the relevant authority before commissioning.

### 2.11 Attaching load

1. Use only tested and approved slings for attaching the load.
2. The hoist rope must not be wound around the load.
3. The load must always be suspended from the base of the hook. The tip of the hook must not be subjected to load.
4. Removing the safety latch from suspension and load hooks is not permitted.
5. Only attach hook block when stopped.
6. Hook or hook block turns under load – release the hook block and rope when lifting the load.
7. Do not reach into the hook block opening at the rope inlet – crushing hazard!
8. Guide the hook block on the load hook bracket - not on the hook base! – crushing hazard!

### 3 Introduction

### 3 Introduction

Wire rope hoists are intended for lifting freely movable loads.

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

The design is characterized by the rope drum and hoist motor being arranged in parallel. The hoist drive is a cylindrical rotor motor with a separately activated D.C. brake. Its design complies with the FEM calculation regulations which are adapted to the requirements of hoist operation.

The main components of the wire rope hoist are the hoist motor, the gear, the rope drum and the control box with connection parts.

Our certified quality assurance system to ISO 9001 guarantees consistently high quality.

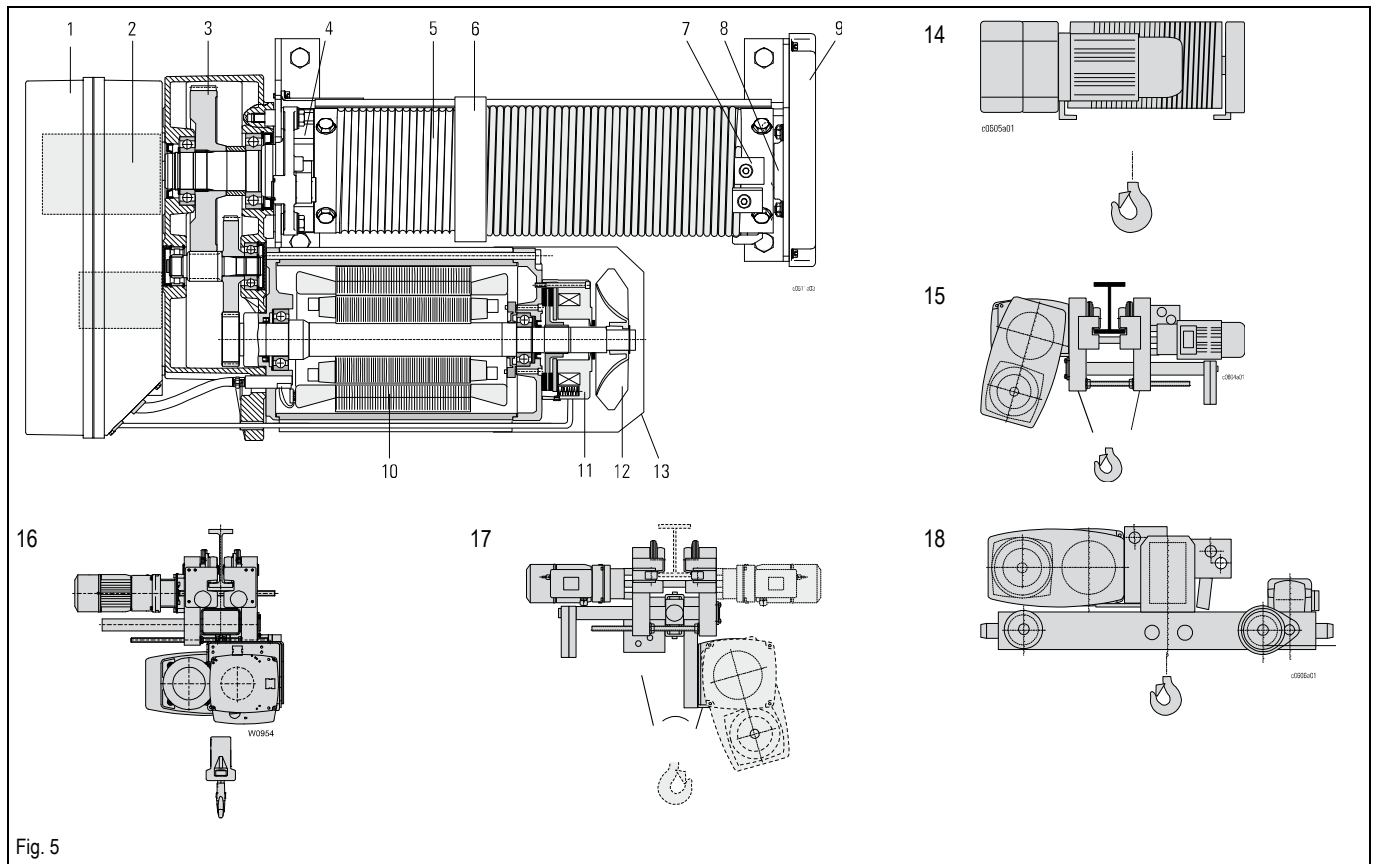


Fig. 5

- |   |  |
|---|--|
| 1 Panel box with connection parts                         | 2 Emergency hoist limit switch, operational hoist limit switch |
| 3 Gear  | 4 Mounting point for safety brake (YKB/SKB – YKE/SKE)          |
| 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 incorporation         |
| 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 trolley                    |



## 3 Introduction

---

### 3.1 Incorporation

#### **Stationary hoist (hoist for incorporation)**

The hoist is connected to a fixed structure by means of bolt joints permitting it to be attached to a base, wall or ceiling.

#### **Mobile hoist**

The hoists can be mounted on 4 different types of travel carriage.

## 4 Installation

### 4 Installation



#### ⚠ WARNING

Improper assembly can cause material damage or severe injuries.

- Ensure that the supporting structure is designed for the maximum hoist load.
- Ensure that a competent person carries out the assembly.
- Adhere to the national and local safety and accident prevention regulations, the occupational safety acts and environmental provisions.
- Work that cannot be carried out from floor level must always be carried out from lifting platforms.
- Use a safety harness when performing any work outside of lifting platforms.
- Wear the prescribed personal protective equipment.
- Secure the danger zone.
- Maintain a sufficient safety distance from the product.
- Use only original mounting accessories from the manufacturer.
- Tighten the bolted connections to the specified tightening torques.
- Secure the trolleys during assembly, e.g. with straps, so that they cannot fall.

#### 4.1 Stationary hoist

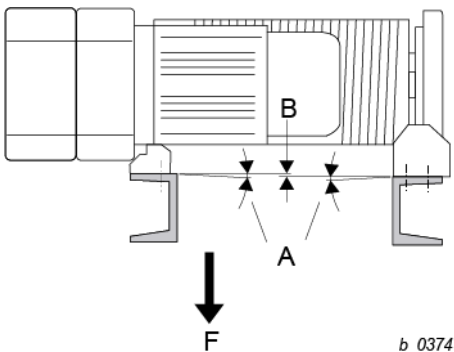


Fig. 6

| Type    | $M_T$ (rope drum torque)                   |
|---------|--|
|         | [lb <sub>f</sub> in]                       |
| YKA/SKA | $M_T = 0.5 \times F \times 5 \text{ in}$   |
| YKB/SKB | $M_T = 0.5 \times F \times 6.6 \text{ in}$ |
| YKC/SKC | $M_T = 0.5 \times F \times 8.6 \text{ in}$ |
| YKE/SKE | $M_T = 0.5 \times F \times 14 \text{ in}$  |

#### Possible mounting positions and fleet angles

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

The YK/SK wire rope hoist with 1PS and 1PS twin hook rope lead-off can be installed in various positions (fleet angles see section **4.2 Fleet angle**)

1. If possible, install the hoist in the **preferred installation position** \*\*\* (see section **4.2.1 Attachment at bottom**)
2. Use the fixing elements specified, see the following figures and tables.
3. Take care that no distortion arises from unevenness (see figure item **A = max. 0.5°**, item **B = max. 0.079 in**).
4. The customer's substructure must take up the torque  $M_T$  from the rope drum. It must therefore be torsion resistant.
5. If the rope lead-off is not vertical, the shearing forces arising must be taken up by a shear bar.
6. For tightening torques see chapter **Tightening torques**.

| Standard reevings |     |     |     |     |     |
|-------------------|-----|-----|-----|-----|-----|
| 1PS               | 2PS | 4PS | 1PD | 2PD | 4PD |
|                   |     |     |     |     |     |

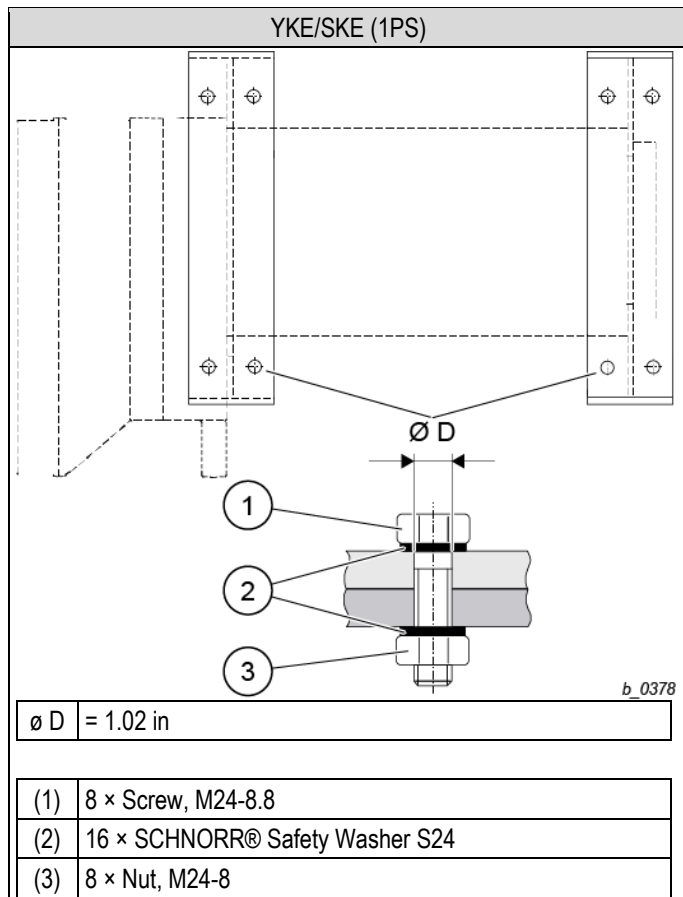
Fig. 7

# 4 Installation

## 4.1.1 Attachment at bottom

| YKA/SKA  |                                 | YKB/SKB                           |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
|--|---------------------------------|-----------------------------------|--------------------|-----|---------------------------------|-----|----------------|--|--|-----|--------------------|-----|---------------------------------|-----|----------------|
|  |                                 |                                   |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
| $\varnothing D = 0.67 \text{ in}$  |                                 | $\varnothing D = 0.83 \text{ in}$ |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
| <table border="1"> <tr> <td>(1)</td> <td>6 × Screw, M16-8.8</td> </tr> <tr> <td>(2)</td> <td>12 × SCHNORR® Safety Washer S16</td> </tr> <tr> <td>(3)</td> <td>6 × Nut, M16-8</td> </tr> </table> |                                 | (1)                               | 6 × Screw, M16-8.8 | (2) | 12 × SCHNORR® Safety Washer S16 | (3) | 6 × Nut, M16-8 | <table border="1"> <tr> <td>(1)</td> <td>6 × Screw, M20-8.8</td> </tr> <tr> <td>(2)</td> <td>12 × SCHNORR® Safety Washer S20</td> </tr> <tr> <td>(3)</td> <td>6 × Nut, M20-8</td> </tr> </table> |  | (1) | 6 × Screw, M20-8.8 | (2) | 12 × SCHNORR® Safety Washer S20 | (3) | 6 × Nut, M20-8 |
| (1)  | 6 × Screw, M16-8.8              |                                   |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
| (2)  | 12 × SCHNORR® Safety Washer S16 |                                   |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
| (3)  | 6 × Nut, M16-8                  |                                   |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
| (1)  | 6 × Screw, M20-8.8              |                                   |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
| (2)  | 12 × SCHNORR® Safety Washer S20 |                                   |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
| (3)  | 6 × Nut, M20-8                  |                                   |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
| YKC/SKC  |                                 | YKD/SKD, YKE/SKE (2PS, 4PS, 2PD)  |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
|  |                                 |                                   |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
| $\varnothing D = 0.98 \text{ in}$  |                                 | $\varnothing D = 1.34 \text{ in}$ |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
| <table border="1"> <tr> <td>(1)</td> <td>6 × Screw, M24-8.8</td> </tr> <tr> <td>(2)</td> <td>12 × SCHNORR® Safety Washer S24</td> </tr> <tr> <td>(3)</td> <td>6 × Nut, M24-8</td> </tr> </table> |                                 | (1)                               | 6 × Screw, M24-8.8 | (2) | 12 × SCHNORR® Safety Washer S24 | (3) | 6 × Nut, M24-8 | <table border="1"> <tr> <td>(1)</td> <td>4 × Screw, M30-8.8</td> </tr> <tr> <td>(2)</td> <td>8 × SCHNORR® Safety Washer S30</td> </tr> <tr> <td>(3)</td> <td>4 × Nut, M30-8</td> </tr> </table>  |  | (1) | 4 × Screw, M30-8.8 | (2) | 8 × SCHNORR® Safety Washer S30  | (3) | 4 × Nut, M30-8 |
| (1)  | 6 × Screw, M24-8.8              |                                   |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
| (2)  | 12 × SCHNORR® Safety Washer S24 |                                   |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
| (3)  | 6 × Nut, M24-8                  |                                   |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
| (1)  | 4 × Screw, M30-8.8              |                                   |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
| (2)  | 8 × SCHNORR® Safety Washer S30  |                                   |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |
| (3)  | 4 × Nut, M30-8                  |                                   |                    |     |                                 |     |                |  |  |     |                    |     |                                 |     |                |

## 4 Installation



# 4 Installation

## 4.1.2 Attachment at top

| YKA/SKA                           |                                     | YKB/SKB                           |                                     |
|-----------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|
|                                   |                                     |                                   |                                     |
| <i>b_0363</i>                     |                                     | <i>b_0363</i>                     |                                     |
| $\varnothing D = 0.67 \text{ in}$ |                                     | $\varnothing D = 0.83 \text{ in}$ |                                     |
| (1)                               | 8 × Screw, M16-8.8                  | (1)                               | 7(8) × Screw, M20-8.8               |
| (2)                               | 16 × SCHNORR® Safety Washer S16     | (2)                               | 14(16) × SCHNORR® Safety Washer S20 |
| (3)                               | 8 × Nut, M16-8                      | (3)                               | 7(8) × Nut, M20-8                   |
| YKC/SKC                           |                                     | YKE/SKE (1PS)                     |                                     |
|                                   |                                     |                                   |                                     |
| <i>b_0363</i>                     |                                     | <i>b_0366</i>                     |                                     |
| $\varnothing D = 0.98 \text{ in}$ |                                     | $\varnothing D = 1.02 \text{ in}$ |                                     |
| (1)                               | 7(8) × Screw, M24-8.8               | (1)                               | 8 × Screw, M24-8.8                  |
| (2)                               | 14(16) × SCHNORR® Safety Washer S24 | (2)                               | 16 × SCHNORR® Safety Washer S24     |
| (3)                               | 7(8) × Nut, M24-8                   | (3)                               | 8 × Nut, M24-8                      |

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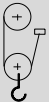
## 4 Installation

### 4.2 Fleet angle

#### 4.2.1 Attachment at bottom

##### Wire rope hoist types

YKA/SKA, YKB/SKB, YKC/SKC, YKE/SKE

|               | <br>1PS,<br>1PS twin hook |             |             |             |
|---------------|--|-------------|-------------|-------------|
|               | YKA/<br>SKA  | YKB/<br>SKB | YKC/<br>SKC | YKE/<br>SKE |
| $\alpha_1$    | 4°   | 5°          | 8°          | 8°          |
| $\alpha_2$    | 23°  | 13°         | 20°         | 18°         |
| $\alpha_3$    | 27°  | 30°         | 30°         | 30°         |
| $\alpha_4$    | 74°  | 73°         | 76°         | 80°         |
| $\alpha_5$    | 30°  | 30°         | 30°         | 25°         |
| $\alpha_6$    | 113°   | 103°        | 110°        | 108°        |
| $\alpha_7$    | 63°  | 61°         | 60°         | 60°         |
| $\alpha_8$    | 11°  | 12°         | 16°         | 20°         |
| $\alpha_9$    | 24°  | 26°         | 30°         | -           |
| $\alpha_{10}$ | 7°   | 7°          | 8°          | 8°          |
| $\alpha_{12}$ | 90°  | 90°         | 90°         | -           |

Tab. 3

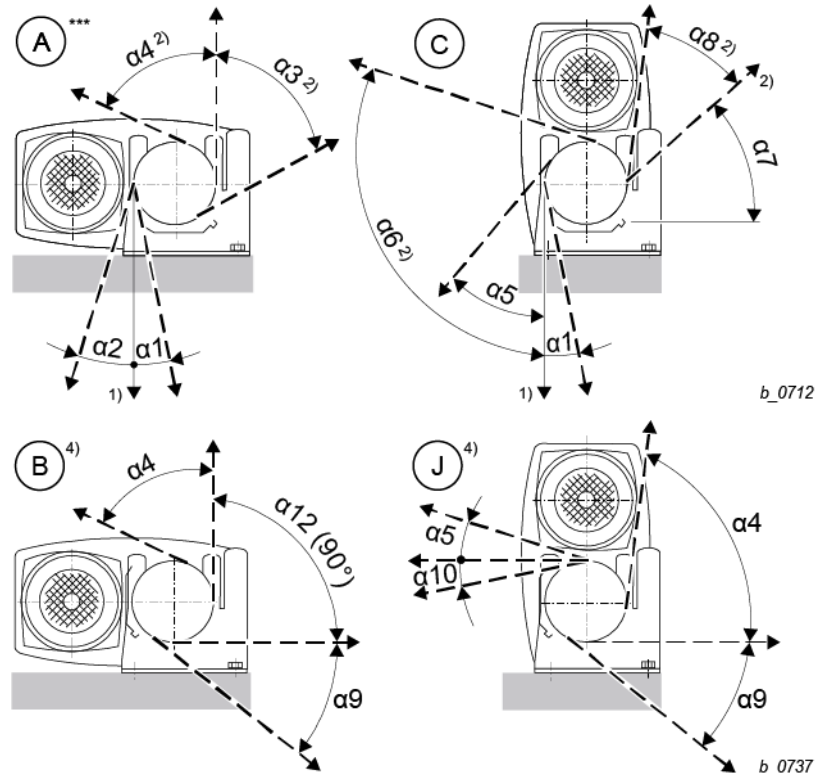


Fig. 8

\*\*\* Preferred installation position

1) Standard

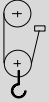
2) By turning rope guide

4) By turning rope guide and grease pan.

**Type YKE/SKE:** Version (G) not possible

## 4 Installation

### 4.2.2 Attachment at top Wire rope hoist types YKA/SKA, YKB/SKB, YKC/SKC, YKE/SKE

|               | <br>1PS,<br>1PS twin hook |             |             |               |
|---------------|--|-------------|-------------|---------------|
|               | YKA/<br>SKA  | YKB/<br>SKB | YKC/<br>SKC | YKE/<br>SKE   |
| $\alpha_1$    | 4°   | 5°          | 8°          | on<br>request |
| $\alpha_2$    | 23°  | 13°         | 20°         |               |
| $\alpha_3$    | 27°  | 30°         | 30°         |               |
| $\alpha_4$    | 74°  | 73°         | 76°         |               |
| $\alpha_5$    | 16°  | 17°         | 14°         |               |
| $\alpha_6$    | 35°  | 32°         | 36°         |               |
| $\alpha_7$    | 74°  | 74°         | 76°         |               |
| $\alpha_{12}$ | 90°  | 90°         | 90°         |               |
| $\alpha_{13}$ | 90°  | 90°         | 90°         |               |

Tab. 4

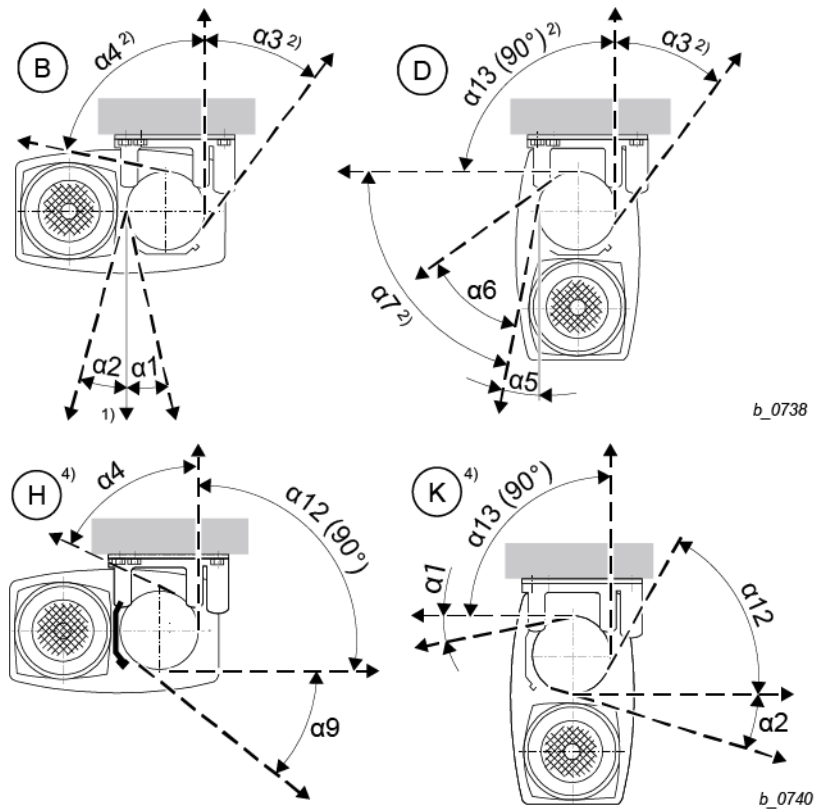


Fig. 9


- 1) Standard
  - 2) By turning rope guide
  - 4) By turning rope guide and grease pan.
- Type YKE/SKE:** Version (H) not possible

## 4 Installation

### 4.2.3 Attachment at side

Wire rope hoist types

YKA/SKA, YKB/SKB, YKC/SKC, YKE/SKE

|               | <br>1PS,<br>1PS twin hook |             |             |               |
|---------------|--|-------------|-------------|---------------|
|               | YKA/<br>SKA  | YKB/<br>SKB | YKC/<br>SKC | YKE/<br>SKE   |
| $\alpha_1$    | 21°  | 23°         | 18°         | on<br>request |
| $\alpha_2$    | 12°  | 13°         | 20°         |               |
| $\alpha_3$    | 74°  | 73°         | 76°         |               |
| $\alpha_4$    | 10°  | 10°         | 20°         |               |
| $\alpha_5$    | 21°  | 23°         | 18°         |               |
| $\alpha_6$    | 23°  | 20°         | 20°         |               |
| $\alpha_7$    | 27°  | 30°         | 30°         |               |
| $\alpha_8$    | 74°  | 73°         | 76°         |               |
| $\alpha_9$    | 4°   | 5°          | 8°          |               |
| $\alpha_{10}$ | 23°  | 13°         | 20°         |               |
| $\alpha_{11}$ | 27°  | 30°         | 30°         |               |
| $\alpha_{12}$ | 74°  | 73°         | 76°         |               |
| $\alpha_{13}$ | -  | -           | 70°         |               |
| $\alpha_{14}$ | -  | -           | 6°          |               |

Tab. 5

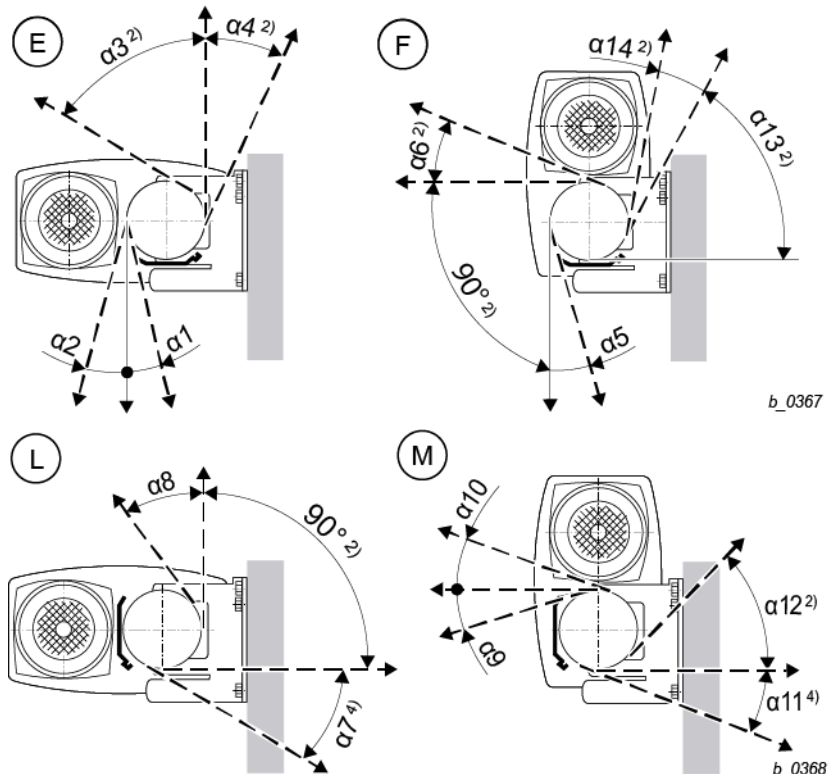
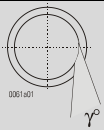


Fig. 10

- 2) By turning rope guide
  - 4) By turning rope guide and grease pan.
- Type YKE/SKE:** Version (H) not possible

### 4.2.4 Fleet angle

1. Adjust the rope guide to the fleet angle.
2. Observe also the radial rope exit angle  $\gamma$ .

| Wire rope hoist<br>type | <br>$\gamma$ |
|-------------------------|---|
|                         | $\gamma$  |
| YKA/SKA                 | 39°   |
| YKB/SKB                 | 39°   |
| YKC/SKC                 | 39°   |
| YKE/SKE                 | 39°   |

Tab. 6



## 4 Installation

### 4.2.5 Angle of installation

#### ⚠ WARNING

**Rope damage hazard.** The wire rope must not touch the rope guide or structural elements.

➤ Always install the hoist horizontal.

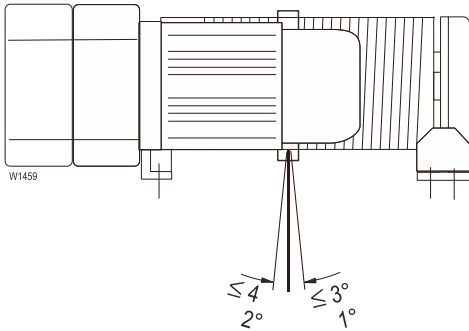


Fig. 11

1. Install hoists with rope drives with bottom hook blocks always horizontal to their longitudinal axis.
2. Do not exceed the fleet angle to the direction of the rope drum groove and the rope sheave of  $4^\circ/3^\circ$  for non-rotation-resistant wire ropes,  $2^\circ/1^\circ$  for rotation-resistant wire ropes. However even at these angles a reduction in service life is to be expected. Equip rope sheaves with a suitable guard to prevent the rope jumping out of the groove, max. clearance of the guard  $<0.5 \times$  rope diameter. The rope must not slip off the sheave axle if the sheave breaks. The rope suspension must be designed to prevent kinking and other additional stresses. The rope suspension for non-rotation-resistant wire ropes must be designed so that it cannot rotate around its longitudinal axis. The rope spread angle of  $45^\circ$  in top hook position must not be exceeded.

## 4.3 Monorail trolleys

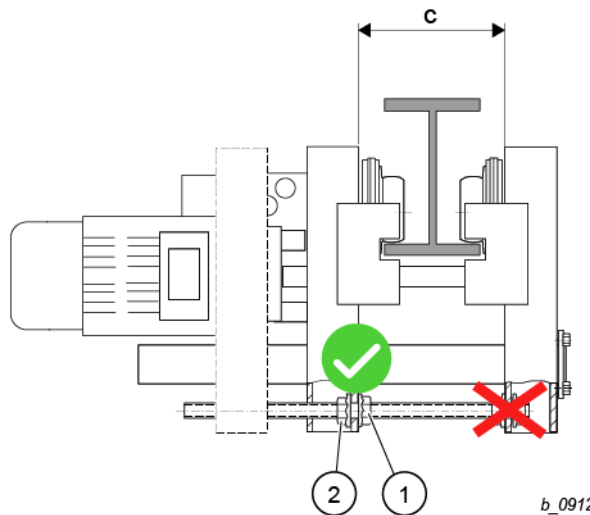
The trolleys are constructed according to the state of the art and supplied with mounted buffers.

#### NOTICE

Danger of material damage.

When using the optional hook operated hoist limit switch, this must be mounted in the operating position before assembling the trolley, see the **Hook operated operational hoist limit switch** (option) section.

### 4.3.1 Underslung trolley KE-S33 – 76



**⚠ WARNING** If the setting is established with the incorrect nuts (marked in the figure on the threaded rod end with an X), there is a risk of the load toppling.

➤ **Only** perform setting work with the nuts (1) and (2).

#### Preparatory work

#### NOTICE

Danger of material damage

Modification of the flange width (on-site) can result in a change to the counterweight being necessary, in order to avoid the trolley tipping.

➤ Have this checked by the manufacturer.

- (1) Nuts
- (2) Nuts
- (3) Trolley side cheek
- (4) Support bolt
- (5) Threaded bolt

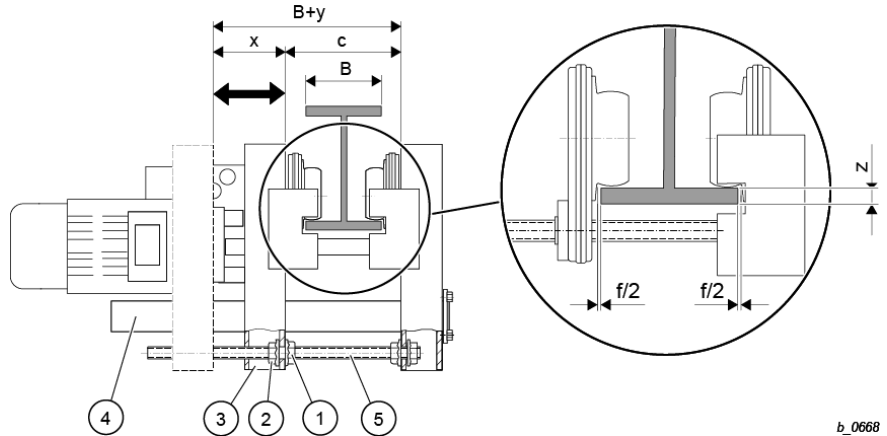


Fig. 12

1. Check flange width "B" and dimension "c" on the basis of Tab. 7 and adjust the trolley to the beam width if necessary.

### Adjustment work, dimension "c":

1. Loosen the nut (2).
2. Adjust dimension "c" with the nut (1).
3. Tighten the nut (2) to the prescribed tightening torque 159 lbf ft.

### Assembly with a freely accessible runway end

1. Slide the trolley onto the runway end, check track clearance  $f/2$  with a feeler gauge and adjust if necessary (see **Preparatory work**).
  - The dimension " $f/2$ " **must** be  $0.02^{+0.04}$  in at the widest point of the runway. The dimension " $f/2$ " **may** be max. 0.1 in at the narrowest point of the runway.

### Assembly with an inaccessible runway end

1. Loosen the nuts (2) on the threaded bolts (5) and unscrew by dimension "x".
2. Slide the trolley side cheek (3) apart parallel, to the unscrewed nut (2) until the dimension "B" + "y" is reached.
3. Mount the trolley on the wire rope hoist in the bottom flange of the runway beam and secure against slipping out.
4. Slide the trolley side cheek (3) back against the nut (1).
  - When doing so, thread in the drive-through mechanism (see section 7.5).
5. Tighten the nut (2) to the prescribed tightening torque 159 lbf ft.
6. Check the track clearance " $f/2$ " with a feeler gauge and adjust if necessary (see **"Preparatory work"**).
  - The dimension " $f/2$ " **must** be  $0.02^{+0.04}$  in at the widest point of the runway. The dimension " $f/2$ " **may** be max. 0.1 in at the narrowest point of the runway.

| Type    | Ø D<br>[in] | Trolley | B          | c        | x    |     |      | Z <sub>max</sub> |
|---------|-------------|---------|------------|----------|------|-----|------|------------------|
|         |             |         |            |          | [in] |     |      |                  |
| YKA/SKA | 3.1         | KE-S33  | 3.5...27.6 | B+2.6 *1 | 2.8  | 5.4 | 0.91 |                  |
| YKB/SKB | 3.9         | KE-S44  | 3.5...29.5 |          | 3.1  | 5.8 | 0.98 |                  |
| YKC/SKC | 5.5         | KE-S65  | 4.7...30.5 |          | 3.7  | 6.4 | 1.4  |                  |
| YKD/SKD | 7.9         | KE-S76  | 4.9...27.8 | B+3.6 *1 | 3.7  | 7.4 | 1.8  |                  |
| YKE/SKE |             |         |            |          |      |     |      |                  |

Tab. 7

\*1 with I (INP/IPN) EN 10024 beam: -0.079 in

### 4.3.2 Underslung trolley UE-S4

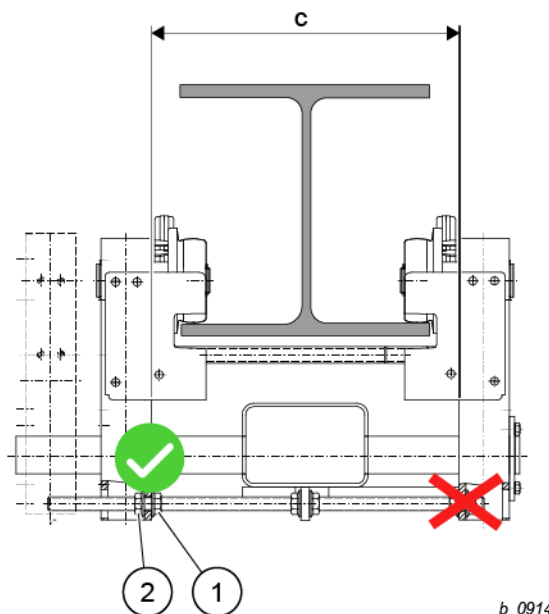


Fig. 13

b\_0914

**⚠ WARNING** If the setting is established with the incorrect nuts (marked in the figure on the threaded rod end with an X), there is a risk of the load toppling.

➤ **Only** perform setting work with the nuts (1) and (2).

## Preparatory work

- (1) Nut
- (2) Nut
- (3) Threaded bolt
- (4) Trolley side cheek
- (5) Nuts
- (6) Connection part
- (7) Connecting pin
- (8) Axle holder side

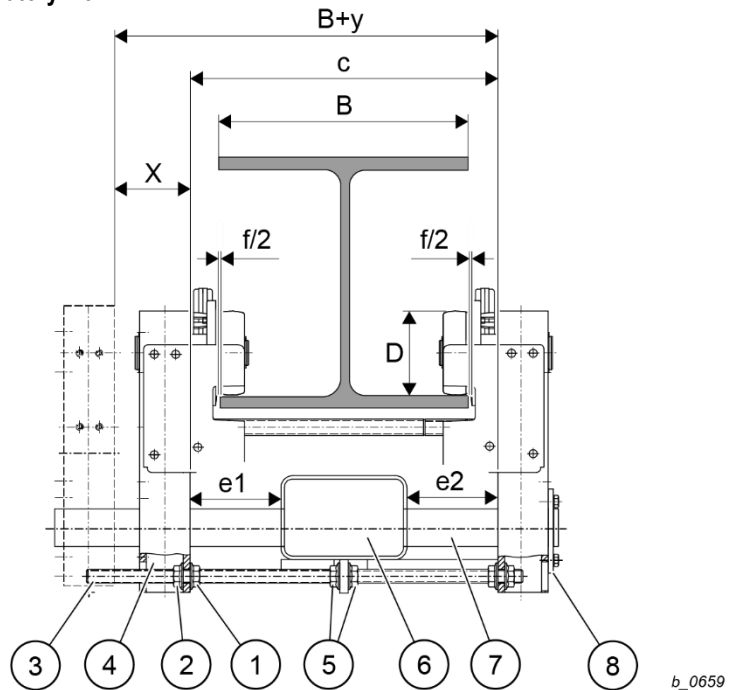


Fig. 14

1. Check flange width "B" and dimension "c" on the basis of Tab. 9 and adjust the trolley to the beam width if necessary.
  - Observe here that the connection part (square-section tube) (6) must be positioned centrally (to dimension "c") between the trolley side cheeks ("e1" = "e2").

### Adjustment work, dimension "c":

1. Loosen the nut (2).
2. Adjust dimension "c" with the nut (1).
3. Tighten the nut (2) to the prescribed tightening torque 159 lb<sub>f</sub> ft.

### Adjustment work, connection part:

1. Loosen the nuts (5) and slide the connection part (6) on the connecting pin (7) such that the dimensions "e1" and "e2" are equal on the left and right between the trolley side cheeks (4) and the connection piece (6).
2. Tighten the nuts (5) to the prescribed tightening torque 159 lb<sub>f</sub> ft.

### Assembly with a freely accessible runway end

1. Slide the trolley onto the runway end, check track clearance f/2 with a feeler gauge and adjust if necessary (see **Preparatory work**).
  - The dimension "f/2" **must** be 0.02 <sup>+0.04</sup> in at the widest point of the runway. The dimension "f/2" **may** be max. 0.1 in at the narrowest point of the runway.

### Assembly with an inaccessible runway end

1. Loosen the nuts (2) on the threaded bolts (3) and unscrew by dimension "x".
2. Slide the trolley side cheek (4) apart parallel, to the unscrewed nuts (2) until the dimension "B" + "y" is reached.
3. Mount the trolley on the axle holder side (8) in the bottom flange of the runway beam and secure against slipping down.
4. Slide the trolley side cheek (4) back against the nuts (1).
  - When doing so, thread in the drive-through mechanism (see section 7.5).
5. Tighten the nuts (3) to the prescribed tightening torque 159 lb<sub>f</sub> ft.
6. Check the track clearance "f/2" with a feeler gauge and adjust if necessary (see **Preparatory work**).
  - The dimension "f/2" **must** be 0.02 <sup>+0.04</sup> in at the widest point of the runway. The dimension "f/2" **may** be max. 0.1 in at the narrowest point of the runway.

| Type                          | Ø D  | Trolley | B          | c       | x | y   | Z <sub>max</sub> |
|-------------------------------|------|---------|------------|---------|---|-----|------------------|
|                               | [in] |         |            |         |   |     |                  |
| YKA/SKA<br>YKB/SKB<br>YKC/SKC | 3.9  | UE-S4   | 3.5...19.7 | B+2.6*1 | 3 | 5.6 | 0.98             |

Tab. 8

\*1 with I (INP/IPN) EN 10024 beam: -0.079 in

### 4.3.3 Underslung trolley UE-S776

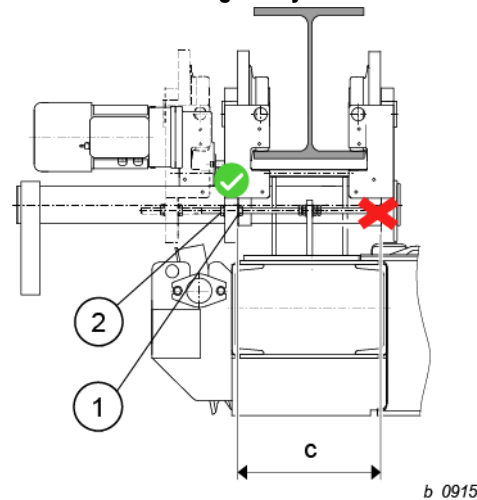


Fig. 15

**⚠ WARNING** If the setting is established with the incorrect nuts (marked in the figure on the threaded rod end with an X), there is a risk of the load toppling.

- **Only** perform setting work with the nuts (1) and (2).

## Preparatory work

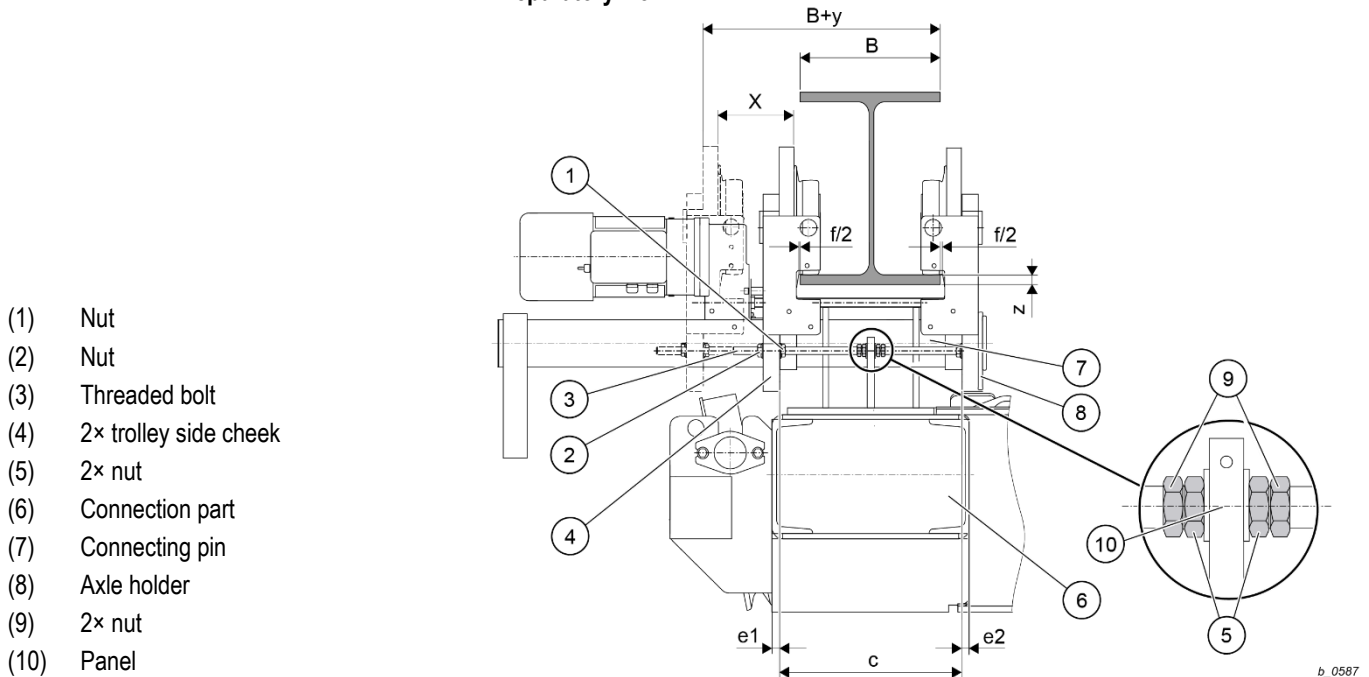


Fig. 16

1. Check flange width “B” and dimension “c” on the basis of the table and adjust the trolley to the beam width if necessary.
  - Observe here that the connection part (6) must be positioned centrally (to dimension “c”) between the trolley side cheeks (“e1” = “e2”).

### Adjustment work, dimension “c”:

1. Loosen the nut (2).
2. Adjust dimension “c” with the nut (1).
3. Tighten the nut (2) to the prescribed tightening torque 159 lb<sub>f</sub> ft.

### Adjustment work, connection part:

1. Loosen the nuts (5) and (9), then slide the connection part (6) on the connecting pin (7) such that the dimensions “e1” and “e2” are equal on the left and right between the trolley side cheeks (4) and the connection piece (6).
2. Do not tension panel (10)! To do so, lightly tighten the nuts (5) and then loosen once more by one 1/4 revolution respectively. Tighten the nuts (9) against nuts (5) to the prescribed tightening torque 159 lb<sub>f</sub> ft.

### Assembly with a freely accessible runway end

1. Slide the trolley onto the runway end, check track clearance “f/2” with a feeler gauge and adjust if necessary (see **Preparatory work**).
  - The dimension “f/2” **must** be 0.02 <sup>+0.04</sup> in at the widest point of the runway. The dimension “f/2” **may** be max. 0.1 in at the narrowest point of the runway.

### Assembly with an inaccessible runway end

1. Loosen the nuts (2) on the threaded bolts (3) and unscrew by dimension "x".
2. Slide the trolley side cheeks (4) apart parallel, to the unscrewed nuts (2) until the dimension "B" + "y" is reached.
3. Mount the trolley on the axle holder side (8) in the bottom flange of the runway beam and secure against slipping down.
4. Slide the trolley side cheeks (4) back against the nuts (1).
  - When doing so, thread in the drive-through mechanism (see section 7.5).
5. Tighten the nuts (3) to the prescribed tightening torque 159 lb·ft.
6. Check the track clearance "f/2" with a feeler gauge and adjust if necessary (see "Preparatory work").
  - The dimension "f/2" **must** be  $0.02^{+0.04}$  in at the widest point of the runway. The dimension "f/2" **may** be max. 0.1 in at the narrowest point of the runway.

| Type    | Ø D  | Trolley | B          | c                   | x   | y   | Z <sub>max</sub> |
|---------|------|---------|------------|---------------------|-----|-----|------------------|
|         | [in] |         |            |                     |     |     |                  |
| YKE/SKE | 7.9  | UE-S776 | 7.3...19.7 | B+3.6 <sup>*1</sup> | 3.7 | 7.4 | 1.8              |

Tab. 9

\*1 with I (INP/IPN) EN 10024 beam: -0.08 in

### 4.3.4 Articulated trolley (DKE-S4 / DKE-S6)

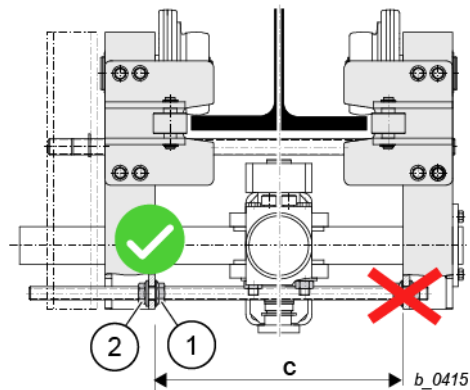


Fig. 17

**⚠ WARNING** If the setting is established with the incorrect nuts (marked in the figure on the threaded rod end with an X), there is a risk of the load toppling.

➤ **Only** perform setting work with the nuts (1) and (2).

## Preparatory work

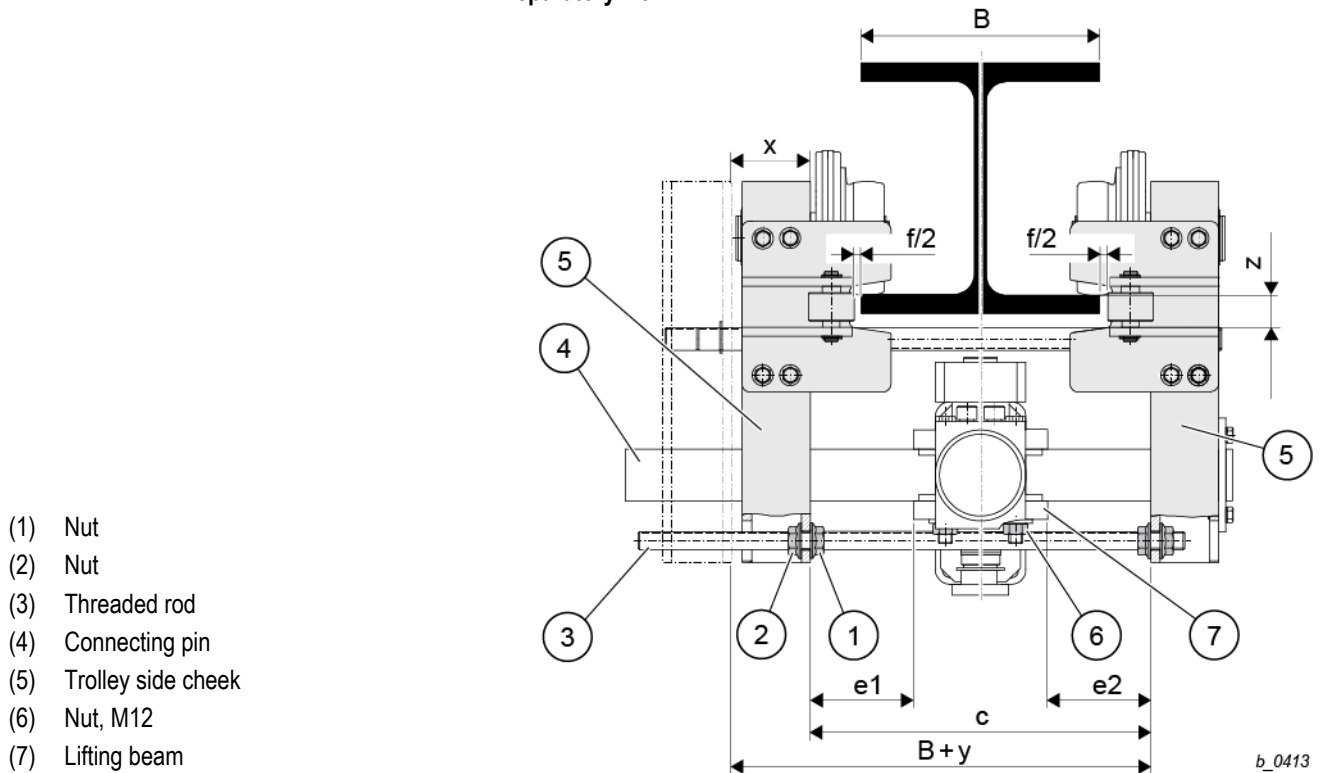


Fig. 18

1. Check flange width "B" and dimension "c" on the basis of the table and adjust the trolley to the beam width if necessary.
  - Observe here that the lifting beam (7) must be positioned centrally (to dimension "c") between the trolley side cheeks ("e1" = "e2").

### Adjustment work, dimension "c":

1. Loosen the nut (2).
2. Adjust dimension "c" with the nut (1).
3. Tighten the nut (2) to the prescribed tightening torque 159 lbf ft.

### Adjustment work, lifting beam:

1. Loosen the nuts (6) and slide the lifting beam (7) on the connecting pin (2) such that the dimensions "e1" and "e2" are equal on the left and right between the trolley side cheeks (1) and the lifting beam (7).
2. Tighten the nuts (6) to the prescribed tightening torque 63 lbf ft.

### Assembly with a freely accessible runway end

1. Slide the trolley onto the runway end, check track clearance "f/2" with a feeler gauge and adjust if necessary (see **Preparatory work**).
  - The dimension "f/2" **must** be 0.02 <sup>+0.04</sup> in at the widest point of the runway. The dimension "f/2" **may** be max. 0.1 in at the narrowest point of the runway.



### Assembly with an inaccessible runway end

2. Loosen the nuts (2) on the threaded bolts (3) and unscrew by dimension "x".
3. Slide the trolley side cheeks (5) apart parallel, to the unscrewed nuts (2) until the dimension "B" + "y" is reached.
4. Mount the trolley in the bottom flange of the runway beam and secure against slipping out.
5. Slide the trolley side cheeks (5) back against the nuts (2).
  - When doing so, thread in the drive-through mechanism (see section 7.5).
6. Screw the nuts (2) back and tighten to the prescribed tightening torque 159 lb<sub>f</sub> ft.
7. Check the track clearance "f/2" with a feeler gauge and adjust if necessary (see **Preparatory work**).
  - The dimension "f/2" **must** be 0.02 <sup>+0.04</sup> in at the widest point of the runway. The dimension "f/2" **may** be max. 0.1 in at the narrowest point of the runway.

| Type               | Ø D  | Trolley | B          | c       | x   | y   | Z <sub>max</sub> |
|--------------------|------|---------|------------|---------|-----|-----|------------------|
|                    | [in] |         |            |         |     |     |                  |
| YKA/SKA<br>YKB/SKB | 3.9  | DKE-S4  | 3.5...11.8 | B+3.1*1 | 2.6 | 5.8 | 1.1              |
| YKC/SKC            | 5.5  | DKE-S6  | 4.7...11.8 | B+3.3*1 | 3   | 6.3 | 1.6              |

Tab. 10

\*1 with I (INP/IPN) EN 10024 beam: -0.079 in

## 4 Installation

### 4.4 End stops for monorail trolleys



#### ⚠ WARNING

**Falling parts hazard.** If there are no end stops, the trolley can travel over the end of the runway.

- Mount suitable end stops at the end of the runway before commissioning the hoist.

The monorail trolleys are supplied as standard with buffers. Suitable runway end stops, to be clamped onto the lower flange of the runway, can be supplied.



#### ⚠ WARNING

**Falling parts hazard.**

- With inclined flanges use supplied special screws.

|   | [mm]                            | [in]                            |
|---|---------------------------------|---------------------------------|
| A | 112                             | 4.41                            |
| B | 134                             | 5.28                            |
| C | 56                              | 2.2                             |
| D | ≥ 15                            | ≥ 0.59                          |
| E | 70                              | 2.76                            |
| F | 63                              | 2.48                            |
| G | 33                              | 1.3                             |
| H | flange width<br>see table below | flange width<br>see table below |
| J | 7 - 35                          | 0.28 - 1.38                     |
| K | 25 - 40                         | 0.98 - 1.57                     |
| L | 70                              | 2.76                            |
| M | 40                              | 1.57                            |
| N | 94                              | 3.7                             |
| P | 134                             | 5.28                            |
| Q | ≥ 15                            | ≥ 0.59                          |
| R | 56                              | 2.2                             |
| S | 105                             | 4.13                            |
| T | 190                             | 7.48                            |

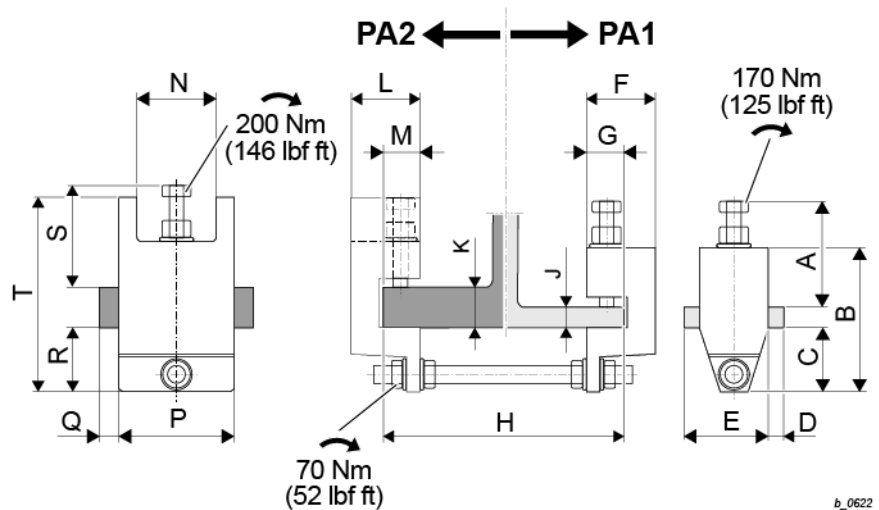


Fig. 19

b\_0622

|  | Type <sup>1)</sup> | H max.<br>[in] | Weight<br>[lb] | Trolley                    |            | E max.<br>[lbf ft] | Max. buffer force<br>[lbf] | Order No.                                  |
|--|--------------------|----------------|----------------|----------------------------|------------|--------------------|----------------------------|--|
|  |                    |                |                | Type                       | max. [ton] |                    |                            |  |
|  | PA1/300            | ≤11.8          | 13             | ≤YKD/SKD, 4PS<br>(≤KE-S76) | 17.6       | 207                | 9663                       | A0174057270                                |
|  | PA1/500            | 11.8-19.7      | 14             |                            |            |                    |                            | A0174058270                                |
|  | PA1/1000           | 19.7-39.4      | 14             | ≤YKE/SKE, 4PS<br>(≤UE-S77) | 27.6       | 251                | 8989                       | A0174064270                                |
|  | PA2/500            | ≤19.7          | 31             |                            |            |                    |                            | A0174059270                                |
|  | PA2/1000           | >19.7-39.4     | 32             |                            |            |                    |                            | A0174065270                                |
|  | PA1/300            | ≤11.8          | 13             | ≤YKD/SKE, 4PS<br>(≤KE-S76) | 17.6       | 207                | 9663                       | A0174057270<br>+ A0174000920 <sup>2)</sup> |

Tab. 15

- 1) Limit switches necessary for travel speeds  
> 105 fpm (PA1)  
> 82 fpm (PA2)
- 2) Special screw (must also be ordered)

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## 4 Installation

### 4.5 Double rail trolley (OE-S)

The double rail trolleys are supplied with mounted buffers.

#### NOTICE

The trolley must run 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 trolley adjustment may lead to increased wear.

➤ Ensure that the trolley runs smoothly without increased friction at the wheel flanges.

1. The runway must meet the requirements of ISO 12488-1.
2. Make sure that the rail joints are even on both running and guide surfaces. Grind down if necessary.

#### Check track gage

| Ø D<br>[in] | a<br>[in]   | b min<br>[in] |
|-------------|-------------|---------------|
| 3.9         | 0.1...0.2   | 1.2           |
| 4.9         | 0.1...0.2   | 1.2           |
| 6.3         | 0.14...0.24 | 1.2           |
| 7.9         | 0.18...0.28 | 1.2           |

Tab. 11

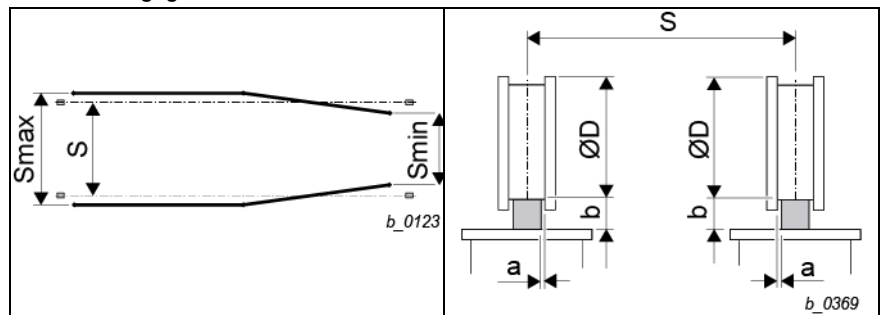


Fig. 20

1. Check track gage “S” on trolley and rail ( $S_{max} - S_{min} = 0.197 \text{ in.}$ )
2. Check lateral play “a” between rail and flange.
3. “a” as per Tab. 15, if trolley is positioned symmetrically on runway.  
If asymmetrically,  $a_{left} + a_{right} = 2 \times a$ .

#### Transport anchor screws

(only on trolleys with wheel diameter  $D = 4.9 \text{ in.}$ )

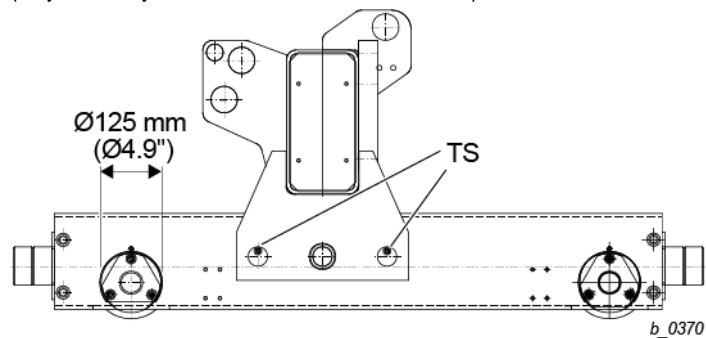


Fig. 21

1. Remove transport anchor screws “TS”.

#### Bolt buffers and stops

1. Bolt rubber buffers to trolley or runway end stop.
2. Fit suitable stops (dimensions see next section).

## 4 Installation

### 4.6 End stops for double rail trolleys

#### ⚠ WARNING



**Falling parts hazard.** If there are no end stops, the trolley can travel over the end of the runway.

➤ Mount suitable end stops at the end of the runway before commissioning the hoist.

#### 4.6.1 Wheel diameter $D = 3.9$ in.

| Pos | [mm] | [in] |
|-----|------|------|
| A   | 90   | 3.54 |
| B   | 200  | 7.87 |
| C   | 88   | 3.46 |
| D   | Ø100 | 3.94 |

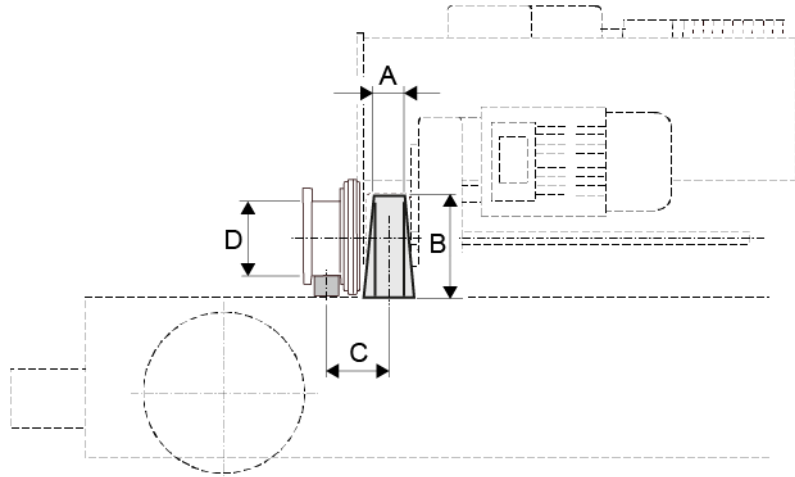


Fig. 22

b\_0371

#### 4.6.2 Wheel diameter $D = 4.9 - 7.9$ in.

| Pos | [mm]  | [in]   |
|-----|-------|--------|
| D   | Ø 125 | Ø 3.94 |
|     | Ø 160 | Ø 6.3  |
|     | Ø 200 | Ø 7.87 |
| H   | 97    | 3.82   |
|     | 100   | 3.94   |
|     | 100   | 3.94   |

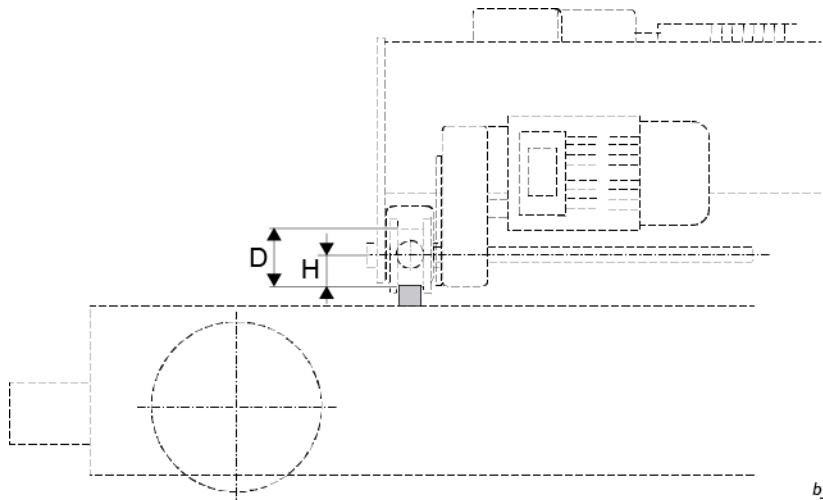


Fig. 23

b\_0372

Tab. 12

## 4 Installation

### 4.7 Anti-jump catch (option)

#### 4.7.1 Description of system

The anti-jump catch acts as an anti-derail device, preventing the trolley jumping off the rail and falling.

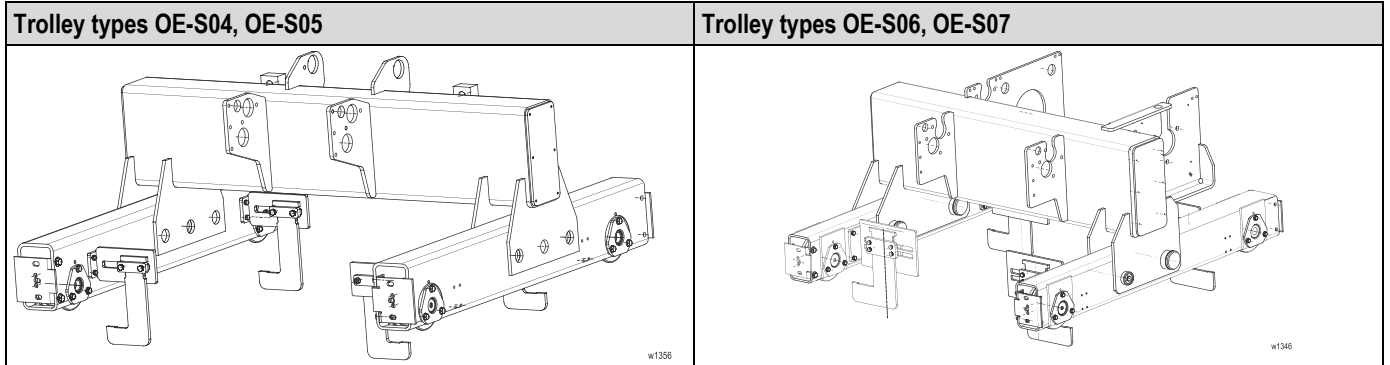


Fig. 24

Fig. 25

#### 4.7.2 Procedure

**⚠ WARNING**



**Falling parts hazard.**

- Cordon off and secure danger area during installation and dismantling work.

The anti-jump catch is supplied pre-mounted on the trolley and must be adapted to the actual runway situation.

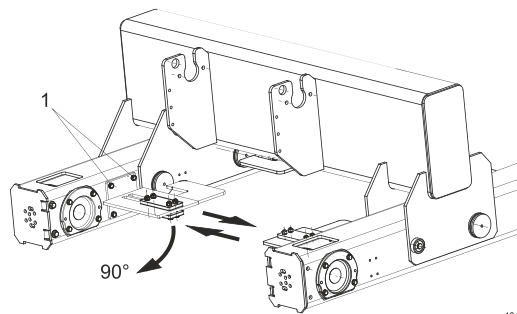


Fig. 26

1. Unscrew fixing screws (1) of anti-jump catch.
2. Swivel the whole unit by 90° and re-screw.  
Tightening torque **M8 = 8.4 lbf ft**, **M10 = 37.6 lbf ft**.

#### Trolley type OE-S07 4PD

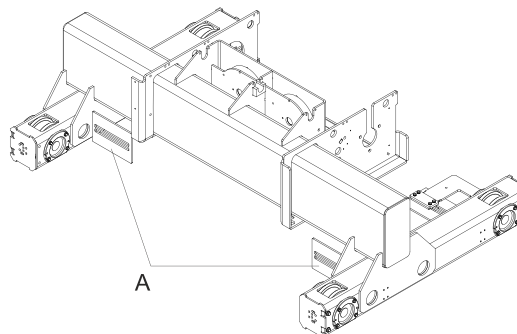


Fig. 27

There are two retaining plates "A" welded in place.

1. Swivel two units of the anti-jump catch by 90°.

## 4 Installation

### Vertical adjustment

1. Measure dimension X, see Fig.

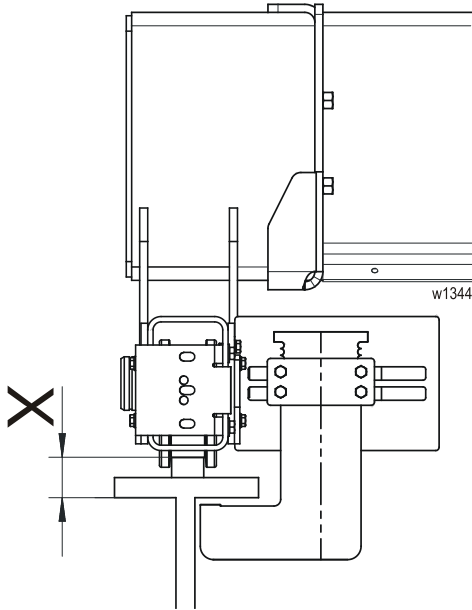


Fig. 28

2. Select positions of hook and eccentric from the table.

#### Trolley type OE-S04

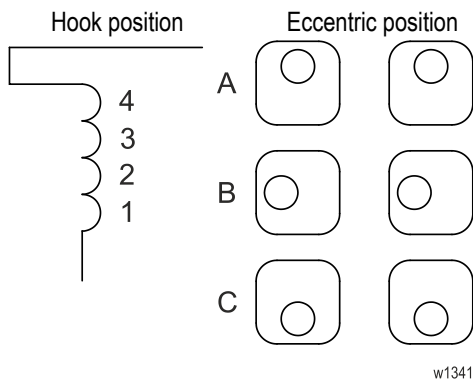


Fig. 29

#### Trolley type OE-S05

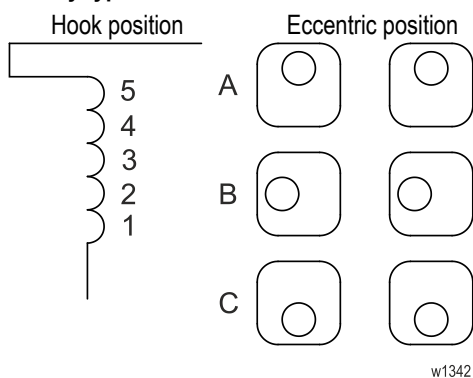


Fig. 30

#### Trolley type OE-S04

| X [in]      | Hook position | Eccentric |
|-------------|---------------|-----------|
| 1.65...1.77 | 1             | B         |
| 1.79...1.89 |               | C         |
| 1.91...2.05 | 2             | A         |
| 2.07...2.17 |               | B         |
| 2.19...2.28 |               | C         |
| 2.3...2.44  | 3             | A         |
| 2.46...2.56 |               | B         |
| 2.58...2.68 |               | C         |
| 2.7...2.83  | 4             | A         |
| 2.85...2.95 |               | B         |

#### Trolley type OE-S05

| X [in]      | Hook position | Eccentric |
|-------------|---------------|-----------|
| 1.57...1.69 | 1             | B         |
| 1.71...1.81 |               | C         |
| 1.83...1.95 | 2             | A         |
| 1.97...2.09 |               | B         |
| 2.11...2.2  |               | C         |
| 2.22...2.34 | 3             | A         |
| 2.36...2.48 |               | B         |
| 2.5...2.6   |               | C         |
| 2.62...2.74 | 4             | A         |
| 2.76...2.87 |               | B         |
| 2.89...2.99 | 5             | C         |
| 3.01...3.13 |               | A         |
| 3.15...3.27 |               | B         |

## 4 Installation

### Trolley types OE-S06 - OE-S07

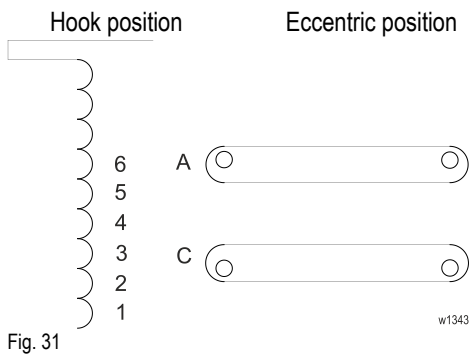


Fig. 31

### Trolley types OE-S06 - OE-S07

| X [in]      | Hook position | Eccentric |
|-------------|---------------|-----------|
| 1.5...1.59  | 1             | A         |
| 1.61...1.79 |               | C         |
| 1.81...1.99 | 2             | A         |
| 2.01...2.19 |               | C         |
| 2.2...2.38  | 3             | A         |
| 2.4...2.58  |               | C         |
| 2.6...2.78  | 4             | A         |
| 2.8...2.97  |               | C         |
| 2.99...3.17 | 5             | A         |
| 3.19...3.37 |               | C         |
| 3.39...3.56 | 6             | A         |
| 3.58...3.76 |               | C         |

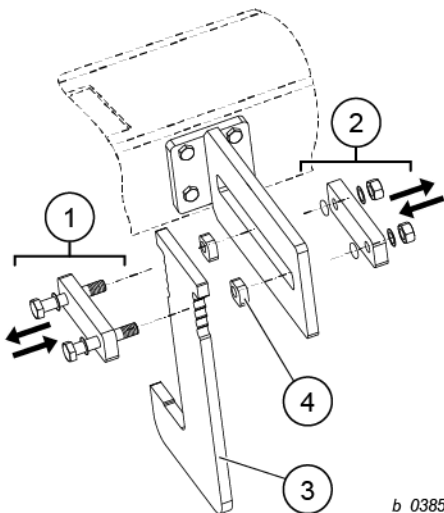


Fig. 32

- Unscrew fixing elements (1 + 2)
- On OE-S07 4PD, the pieces of two units are supplied loose (please unscrew as required).
- Remove hook (3)
- Rotate hook by 180° (OE-S04)
- Insert adjusting screws (S) in the hook position determined from the table.
- Position eccentric plates (4) in slot as specified by the table.
- Tighten fixing elements (1 + 2) finger-tight.

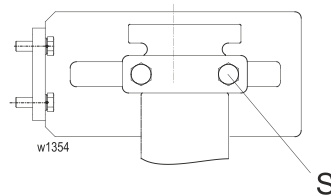


Fig. 33

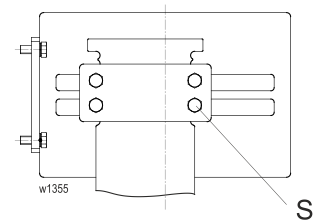


Fig. 34

### Horizontal adjustment:

| Pos | OE-S04 -OE-S05 | OE-S06 - OE-S07 |
|-----|----------------|-----------------|
|     | [in]           | [in]            |
| Z   | ≥ 0.39         | ≥ 0.59          |
| Y   | ≥ 1.18         | ≥ 1.18          |

1. Adjust final hook position according to Fig. and table.
2. Tighten fixing elements (1) and (2) with tightening torque **M10 = 38 lb<sub>r</sub> ft.**

### NOTICE

**Malfunction hazard.** In the event of a fault, e.g. trolley running into the runway end stops unchecked, broken rope, all elements of the anti-jump catch must be checked immediately for damage/faults and completely replaced if necessary. The functional reliability of the system must be ensured.

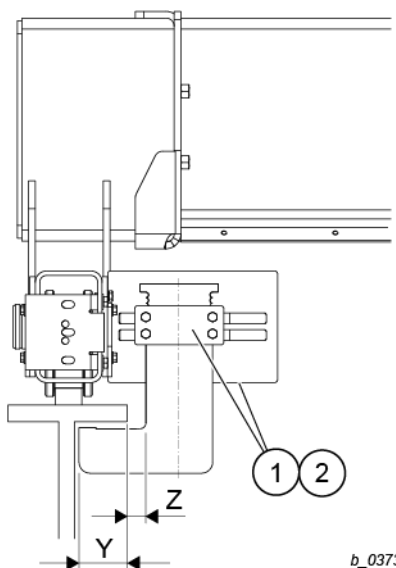


Fig. 35

## 4 Installation

### 4.8 Travel limit switches

#### 4.8.1 Monorail trolley

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

#### 4.8.2 Double rail trolley

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

#### ⚠ WARNING



**Falling parts hazard.** If limit switches are defective, wrongly installed or wrongly set, the trolley will run into the end stops without being braked.

➤ Check the correct functioning and settings of the limit switches before commissioning

The switching contacts are designed for control current.

Switching functions:

- Limit switching in both directions of travel (1 two-way switch, 2 ramps).
- 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.



Fig. 36

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

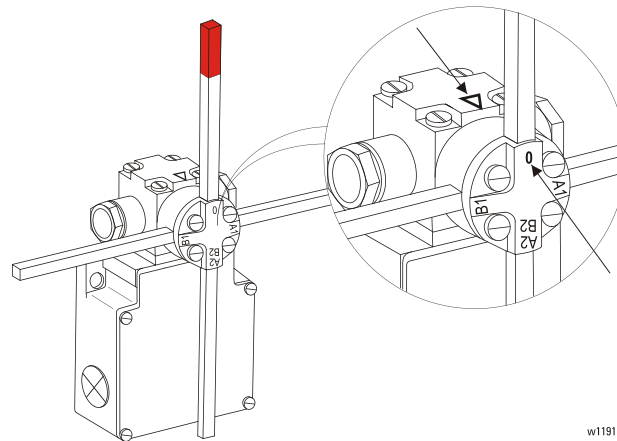


Fig. 37



There is no mechanical stop after the switch has been activated twice in the same direction.

- When mounting, ensure that the cross of the switch is in neutral position.  
Red mark = 0

Neutral position: “0” on the rotating head coincides with the arrow marking on the switch housing.



### 4.9 Electrical equipment



#### **⚠ DANGER**

##### **Electric shock hazard**

- Make sure an electrical qualified person performs the work.
  - Observe the relevant safety and accident prevention regulations.
- 

Electrical equipment was installed per NFPA 70 or other National, State, and Local regulations. It comprises all electrical equipment of the hoist:

- Energy supply (main isolator, conductor lines...)
- Energy distribution (transformers, crane disconnect switch, special circuits...)
- Operator interface and control devices mounted on the hoist (control pendant, radio transmitter, devices for emergency stop, limit switches...)
- Hoist control (electronic control devices, safety devices, radio receiver...)
- Drive, motor controls (power contactors, inverters...)
- Main drives (motors, brakes...)
- Auxiliary drives, sensors, load suspension equipment, actuators...)

#### **4.9.1 Supply cables**

Electrical service can be either power by cable or guarded system having sliding shoe contacts or wheel type collectors.

1. See section 11.3 for minimum cross-section and max. length of supply cable.
2. Select cables, leads and conductor lines to match the existing operating conditions (e.g. voltage, current, protection against electric shock, assessment of cables and leads) and for external influences (e.g. ambient temperature, presence of water or corrosive materials, mechanical stress).

#### **4.9.2 Terminals**

1. Check that all terminals are firm.

### 4.9.3 Protection of equipment

Protective devices include:

- Devices for overcurrent protection (fuses, circuit breakers)
- Motor protection devices
- Overload safety devices
- Temperature monitors
- Limit switches

The protective devices in the electrical equipment installed in the scope of supply must in no case be removed, replaced by different devices or bridged.

If a protective device has reacted, the hoist must not be put back in service until the cause has been determined and eliminated with the assistance of a qualified person.

### Overcurrent protection devices

Every hoist must have devices for disconnecting and switching the power supply. This function is performed by the following devices:

### 4.9.4 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.

### 4.9.5 Runway conductor disconnecting means

- 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.

### 4.9.6 Disconnect switch

Required for one or more hoists,

- must be lockable in OFF position.

### 4.9.7 Protective conductor

#### WARNING



With a missing protective conductor, an electric shock hazard exists. Material damage, severe injuries or death can result.

- Connect the external protective earth system (PE) close to the terminals of the phase conductor using a protective conductor for each mains connection.

---

Without a protective earth connection, malfunctions can arise during operation. The protective earth connection facilitates protective equipotential bonding for protection against electric shocks, as well as functional equipotential bonding for the avoidance of electrical interference effects on electronic systems.

### 4.9.8 Connection fuses

- Overcurrent protection devices.
- The fuse values must be observed so that the crane switch contacts do not weld if there is a short circuit and overload protection of lead is ensured.

### 4.9.9 Electromagnetic compatibility

Electromagnetic compatibility (EMC) mainly concerns the emission of electromagnetic interference and the immunity of electronic components and systems to this interference. If the following interference suppression measures are correctly installed and applied, the equipment will not cause any electromagnetic interference above the level permissible for the intended operating environment and have sufficient resistance to electromagnetic interference to function without error.

Detailed information on EMC-compliant installation is given in a separate instruction manual. The system builder is responsible for the EMC of the system as a whole.

In general, the product is designed for the operating environment "industrial environment", or "2nd environment" in the case of use of frequency-controlled drives.

The electronic control devices of the overload protection and any frequency inverters installed are interference-suppressed. You will find further information in the relevant operating instructions of the devices.

The contacts of power contactors and rectifiers for motor brakes may generate interference exceeding the permissible values depending on output, cable length and other system parameters.

Ready-to-connect electric wire rope hoists with declaration of conformity complying with machinery and EMC directives are interference-suppressed for the above operating environment.

No particular protective measures have been taken on electric wire rope hoists with control by customer or crane builder's control. Appropriate precautions must be taken by the customer in order to comply with EMC standards with regard to interference values.

In order to achieve an optimum result with minimum outlay, we recommend using our radio interference suppression module FEM1 for the YK/SK wire rope hoist.

- Order no. A5785250 ≤ 415 V
- Order no. A5785260 ≤ 800 V

Clip the module onto the top-hat rail and connect it to the mains supply cable.

## 4.9.10 Overload safety device

The wire rope hoist is supplied with an overload protection.

### Description of system

The overload safety device is a device which automatically prevents the hoist moving loads exceeding its safe working load during normal operation, taking into account the dynamic effects. This is achieved by measuring the force transmitted with the aid of a sensor and cutting the energy supply to the hoist drive and brake (stopping the hoist motion) (indirect-acting overload protection). In hoist controls the overload protection (safety-related function) is provided by various components (SRP/CS). The point of departure is where the safety-related signals are generated and the endpoint is the output of the power control elements. The electronic control device (SLE/SMC) acts as a safety device.

The protective devices of the electrical equipment installed in the scope of supply must in no case be removed, replaced by different devices or bridged.

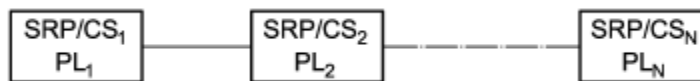


Fig. 38

Load sensor

Safety device

Contactor or inverter control

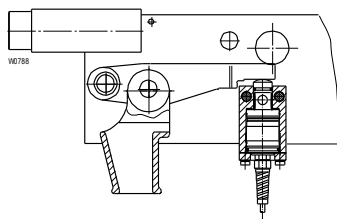


Fig. 39

### Load measurement at rope anchorage

(reevings: 2PS, 4PS, 2PD, 4PD)

#### with electronic pressure sensor

The overload safety device is set to maximum working load +10%.

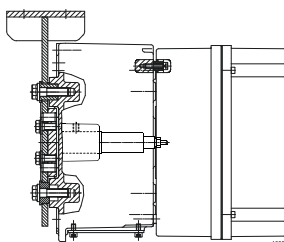


Fig. 40

### Load measurement at gear

(reevings: 1PS, 1PD)

#### with electronic shear force sensor

The overload safety device is set to maximum working load +10% overload.

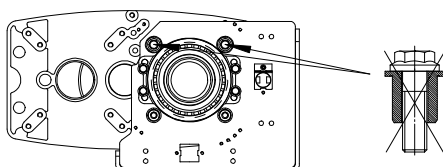


Fig. 41

### NOTICE

On YKB/SKB and YKC/SKC wire rope hoists with 1PS and 1PD reevings, remove the transport anchor screws marked in red after installation and before commissioning.

### Overload safety device by others



When an overload safety device and thus the placement of the load sensors to measure the rope forces are designed by others, all requirements relating to rope reeving, fleet angle and angle of installation of the hoist must be observed, see section. 4.2

The overload safety device must be set during commissioning, see supplementary operating instructions.

The declaration of conformity/declaration of incorporation only apply to the manufacturer's scope of delivery.

The overload safety device cannot be set by the manufacturer if it is provided by others.

#### 4.9.11 Connecting to mains

##### WARNING

**Safety hazard.** If this procedure is not observed, serious accidents or damage to the hoist may occur!

---

1. Compare existing mains voltage and frequency with the information on the rating plate.
2. Route cables into the hoist connection box through the cable glands.
3. Connect according to the circuit diagrams supplied.
4. 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.
5. Do not connect any live lead to the temperature sensors! Damaged temperature sensors cannot protect the motor.

##### WARNING

On three phase hoists, it is possible to have "Reverse Phasing" causing the block to lower when the "UP" button is depressed. When this condition exists, the hoist operation will be dangerous.

---

6. Check that the direction of rotation of the rope drum corresponds to the symbols on the control pendant: Activate "**slow up**" button on control pendant. Never activate "**down**" button first! If the hook moves upwards or does not move because the hoist limit switch has disconnected in top hook position, the phase connection is correct.
7. Crosscheck by activating "**slow down**" button on control pendant.
8. If the movement of the hook does not correspond to the symbols on the control pendant, interchange two phase conductors of the supply cable.

### 4.9.12 Control and control functions

Each hoist control is equipped with an electronic control device. This electronic control device functions as a central safety device for the overload safety device and as motor control and monitoring unit. The device functions are adapted to the different hoist and drive types and the particular function modules selected (load limits, pole-changing or frequency-controlled motors, etc.) by parameterizing the device.

Two variants are used for this electronic control pendant:

#### Variant 1

- SLE load monitor
- Standard control
- Parameterized with HEX and DIP switches

#### Variant 2

- SMC multi-controller
- Extended functions - optional device
- Parameterized with config-tool and RS232 data interface or a USB interface

The following safety functions are integrated into the electronic control devices:

- Overload safety device
- Crane test possible with the aid of test button
- Protection against unexpected start-up
- Control of hoist motors with motor management

In addition, the devices perform the following non-safety-relevant control functions:

- Recording operating hours
- Temperature control for hoist and travel motors
- Display of system status

The general description of the control merely provides an outline. Detailed information on technical data, functions, integrating the control supplied into superordinate crane controls and troubleshooting are described in separate operating instructions for the electronic control devices and shown in the circuit diagrams. The same applies for frequency inverter controls.

#### Controls by others

- If the unit is being supplied less controls. CMCO cannot guarantee hoist / motor performance utilizing controls not recommended or provided by CMCO.
- If the controls are supplied by others, connect the temperature sensors of the hoist and travel motors, the hoist brake, the overload safety device and the emergency hoist limit switch according to the connection diagrams.
- Do not connect any live lead to the temperature sensors! Damaged temperature sensors cannot protect the motor.
- When integrating the supplied control sections into an overall control, the product standards for hoists and technical specifications as regards functionality, signal sequence and timing of this control must be observed. The circuit diagrams and block circuit diagrams supplied as hoist documentation must be followed and implemented by the customer when constructing the control. The system builder is responsible for the system as a whole.

### 4.9.13 Electric motors and related equipment

The hoist motors meet the standards of EN 60034-1 and are specially dimensioned and designed for hoist operating conditions.

#### Hoist motor

- 12/2-pole motor with separately controlled D.C. brake for contactor control
  - The brake is designed as an operating brake
- or
- 4-pole motor with separately controlled D.C. brake for frequency control
  - The brake is designed as a holding brake and discharges the function of emergency stop
  - Encoder with 600 pulses/rotation mounted on motor as standard (see encoder type plate and electrical switch diagrams).

#### Travel motor

- 8/2- pole motor with separately controlled D.C. brake for contactor control
  - Integrated centrifugal mass for smooth acceleration and braking
- or
- 4- pole motor with separately controlled D.C. brake for frequency control

The motors are equipped with closable condensation holes 1). All motors have ptc sensors integrated into the winding as thermal overload protection.

#### Specification:

|                |        |                                     |
|----------------|--------|-------------------------------------|
| Thermal class: | F / H  | Utilization / insulation system     |
| Construction:  | IM B5  | flange mounting on drive side       |
| Cooling:       | IC 411 | surface cooling with integrated fan |

#### Standard operating conditions

- -4 °F ... +104 °F
- Humidity up to 80%
- Air pressure up to 3280 ft above sea level

#### Options

- IP 66 1)
- Forced ventilation
- Space heating 1)
- Manual release for brake

1)

Motors whose winding is subject to condensation due to climatic conditions, e.g. motors standing still in damp environments or motors exposed to high temperature fluctuations can be equipped with space heaters. They must also always be used in combination with type of protection IP 66 and high humidity.

### 4.10 YK/SK hoists with frequency inverter (VFD)

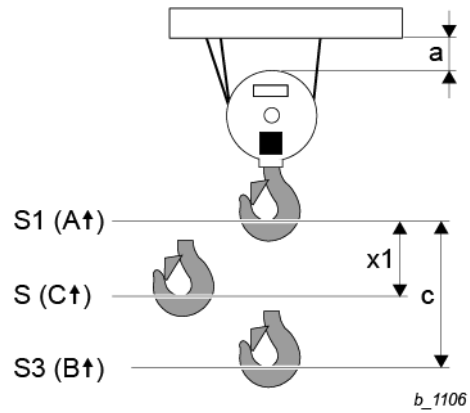
For information on the frequency inverter, see the separate instructions.

## 4 Installation

### 4.11 Hook operated hoist limit switch with weight ball "BLS" (option)

The hook operated hoist limit switch is also available as "hook operated hoist limit switch with switch rod" variant. Only one variant can be mounted.

- a min. distance to first obstacle
- c Dimension between emergency and operational hoist limit switching, "top"
- x1 Dimension between hook operated hoist limit switching and emergency hoist limit switching, "top"
- S (C↑) Hook operated hoist limit switching
- S1 (A↑) Emergency hoist limit switching, "top"
- S3 (B↑) Operational hoist limit switching, "top"



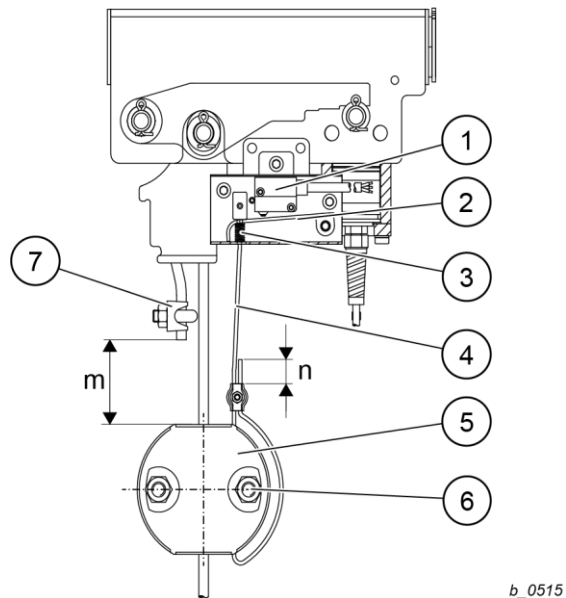
The hook operated limit switch can be integrated as an optional hoist limit switch. It is triggered after the standard operational hoist limit switch S3, when the hook block relieves the weight-loaded limit switch.

If this option is used, the C-dimension increases in accordance with the table.

| Type             | Hook dimension "C" enlargement |         |
|------------------|--------------------------------|---------|
|                  | [in]                           | x1 [in] |
| YKA/SKA, YKB/SKB | 5.9                            | 2       |
| YKC/SKC, YKE/SKE | 7.9                            | 2       |
| YKD/SKD          | 9.8                            | 2       |

|   |           |
|---|-----------|
| m | ≥ 2 in    |
| n | ≥ 0.79 in |

- (1) Switch
- (2) Rocker push button
- (3) Spring
- (4) Connecting rope
- (5) Ball
- (6) Bolted connection
- (7) wedge clamp



#### Function

- The hook travels against the ball (5) and thereby relieves the connecting rope (4).
- The connecting rope (4) relieves the spring (3).
- The spring (3) actuates the switch (1) via the rocker push button (2). The hoisting movement is stopped.



### 4.11.1 Adjusting/mounting hook operated hoist limit switch with weight ball

1. Adjust the geared limit switch, see **Adjusting the geared limit switch** section.
2. Press the UP button in the control pendant carefully.
3. Observe the hoisting movement until the operational hoist limit switch switches off in the top hook position (B↑).

If the hook operated hoist limit switch with weight ball is already mounted:

1. Keep the connecting rope taut.
2. Actuate the override button "S260" in the control box and the UP button on the control pendant at the same time, until the emergency hoist limit switch switches off (A↑).
3. Actuate the override button "S261" in the control box and the DOWN button on the control pendant at the same time to lower the hook by the dimension "x1" (see table above) into position (C↑).

If the ball has not yet been mounted:

1. Open the bolted connections (6).
2. Fit the ball (5) on the rope.
3. Tighten the bolted connections (6) to the prescribed tightening torque, see the **Tightening torques for screws** section.

If the ball has already been mounted:

1. Loosen the rope clamp on the connecting rope (4) to adjust.
2. Draw the connecting rope (4) through the ball (5) until the switch (1) is actuated.
3. Secure the connecting rope (4) with the rope clamp such that dimension "n" is maintained.
4. Check whether dimension "m" is maintained. If this is not the case, shorten the rope at the wedge clamp (7).

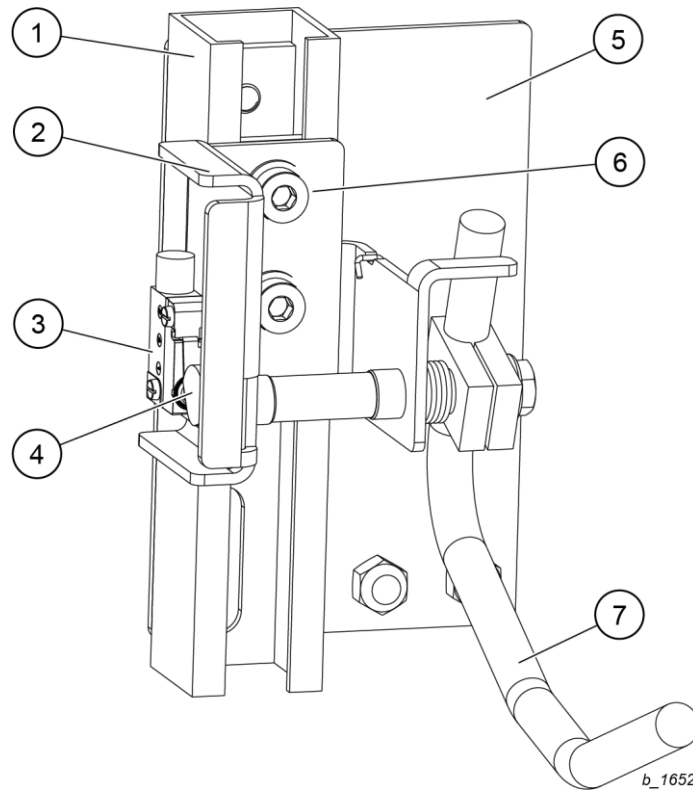
If this is not possible:

1. Increase dimension "x1" and then check the switch-off position, see Checking the geared limit switch section
2. If necessary, adjust the geared limit switch, see Adjusting the geared limit switch section.
3. If necessary, shorten the connecting rope (4) such that dimension "n" is achieved.

## 4 Installation

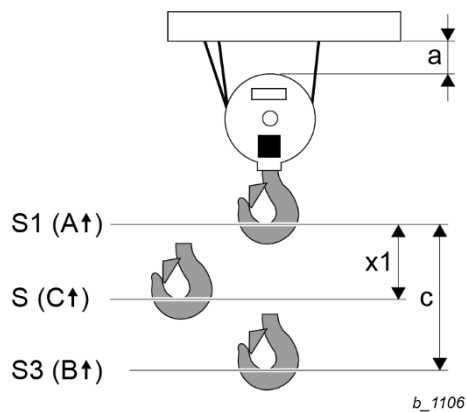
### 4.12 Hook operated hoist limit switch with switch rod "PLS" (option)

The hook operated hoist limit switch is also available as "hook operated hoist limit switch with weight ball" variant. Only one variant can be mounted.



- (1) C-profile
- (2) "PLS" switching unit
- (3) Microswitch
- (4) Shaft with switching cams
- (5) Retaining plate
- (6) Screw
- (7) Switch rod

- a min. distance to first obstacle
- c Dimension between emergency and operational hoist limit switching, "top"
- x1 Dimension between hook operated hoist limit switching and emergency hoist limit switching, "top"
- S Hook operated hoist limit switch
- (C↑)
- S1 Emergency hoist limit switching, "top"
- (A↑)
- S3 Operational hoist limit switching, "top"
- (B↑)



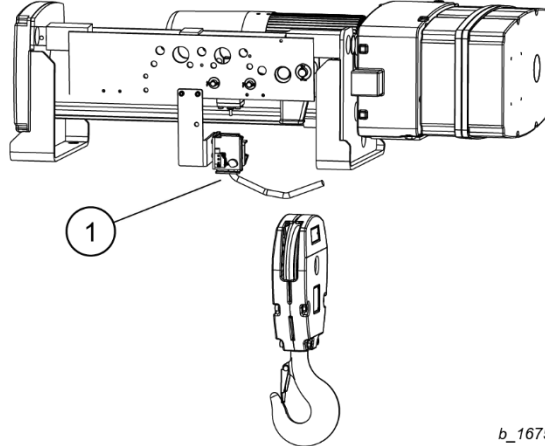
#### Function

- The bottom hook block moves against the shift rod (7) and hoists it.
- The microswitch (3) is actuated via the shaft with switching cams (4).
- The hoisting movement is stopped.

## 4 Installation

### 4.12.1 Mounting hook operated hoist limit switch with switch rod on stationary wire rope hoists (YKA/SKA / YKB/SKB)

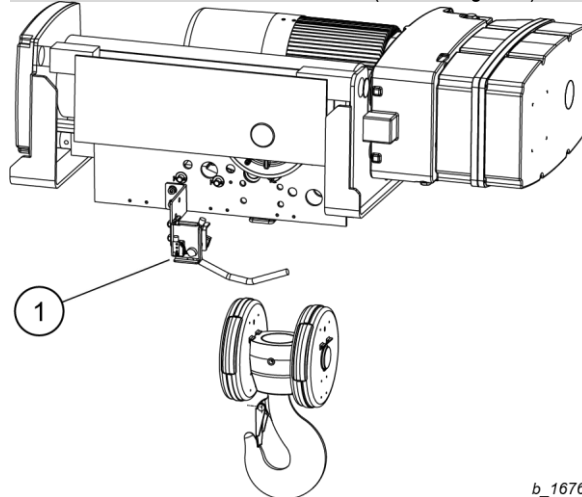
Hoist limit switch with attachment set (for reeving 2PS)



(1) "PLS" switching unit

b\_1675

Hoist limit switch with attachment set (for reeving 4PS)



(1) "PLS" switching unit

b\_1676

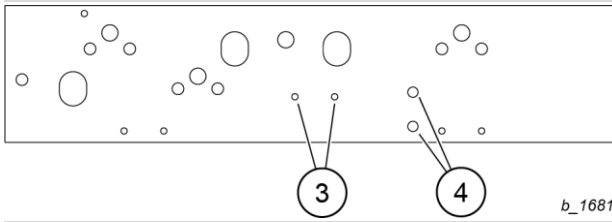
| Assembly position 1 | Assembly position 2 | Assembly position 3 | Assembly position 4 |
|---------------------|---------------------|---------------------|---------------------|
| <p>b_1677</p>       | <p>b_1678</p>       | <p>b_1679</p>       | <p>b_1680</p>       |

(2) Mounting position of the screws

## 4 Installation

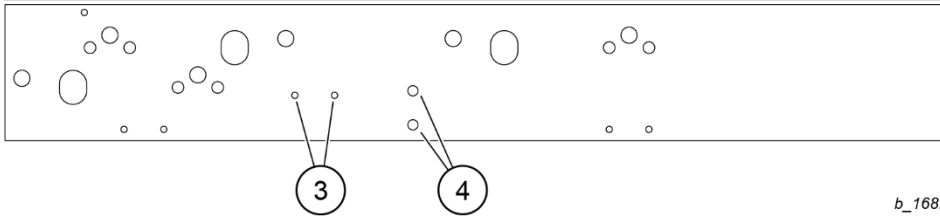
### Mounting holes on the lifting beam

#### YKA/SKA (drum length L2)



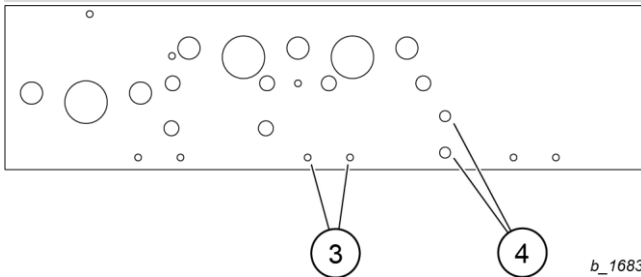
b\_1681

#### YKA/SKA (drum length L3)



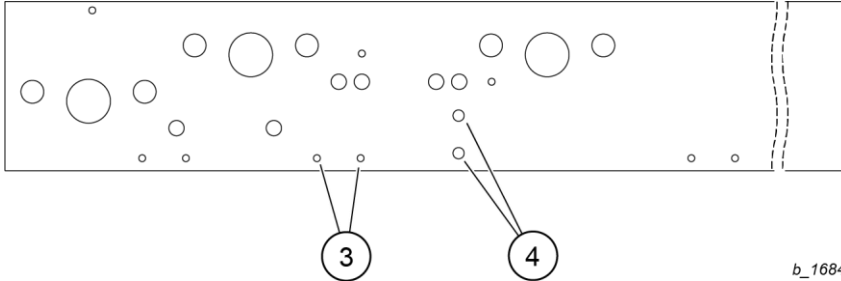
b\_1682

#### YKB/SKB (drum length L2)



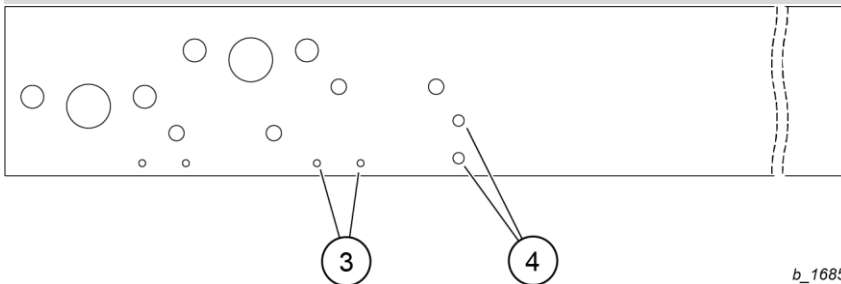
b\_1683

#### YKB/SKB (drum length L3)



b\_1684

#### YKB/SKB (drum length L4)



b\_1685

(3) Mounting holes for reeving 2PS

(4) Mounting holes for reeving 4PS

## 4 Installation

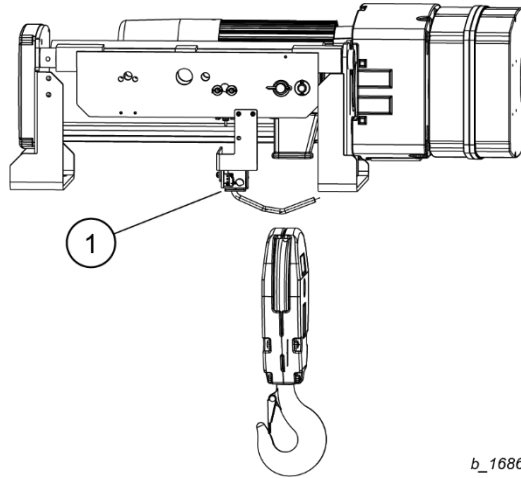
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| Type    | Reeving | Assembly position |
|---------|---------|-------------------|
| YKA/SKA | 2PS     | 1                 |
|         | 4PS     | 3                 |
| YKB/SKB | 2PS     | 2                 |
|         | 4PS     | 4                 |

1. Observe the mounting positions of the screws (2), see figure above.
2. Fasten the “PLS” (1) switching unit on at the prescribed position with the bolted connections, see figures above.
3. Tighten the bolted connections with the prescribed tightening torque (12 Nm).
4. Perform a functional test, see the **Performing a functional test** section.

## 4.12.2 Mounting hook operated hoist limit switch with switch rod on stationary wire rope hoists (YKC/SKC)

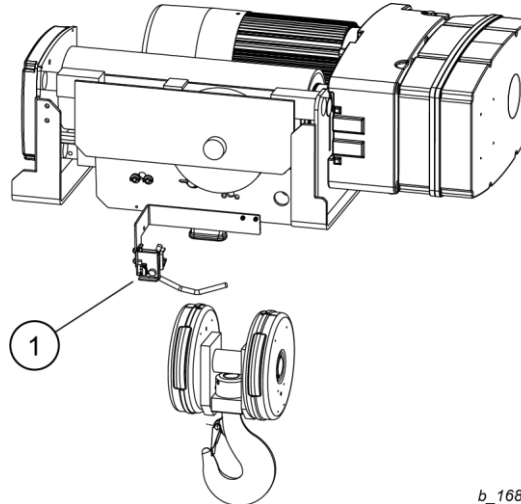
### Hoist limit switch with attachment set (reeving 2PS)



(1) "PLS" switching unit

b\_1686

### Hoist limit switch with attachment set (reeving 4PS)



(1) "PLS" switching unit

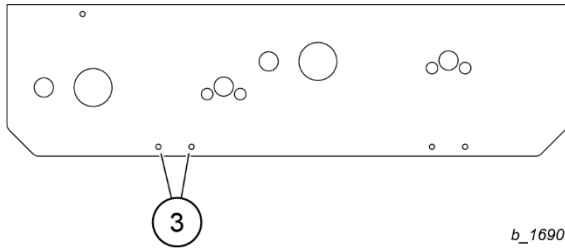
b\_1687

| Assembly position 1                      | Assembly position 2                      |
|--|--|
| <p style="text-align: right;">b_1688</p> | <p style="text-align: right;">b_1689</p> |

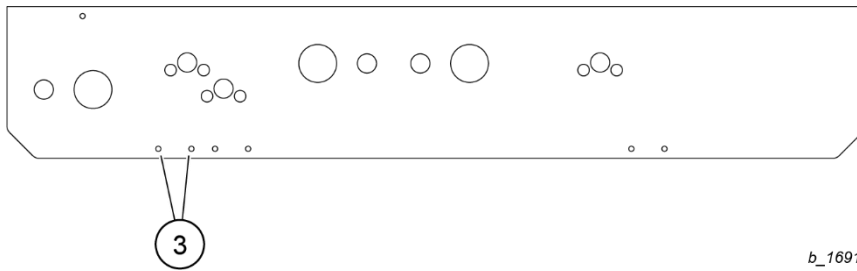
## 4 Installation

### Mounting holes on the lifting beam

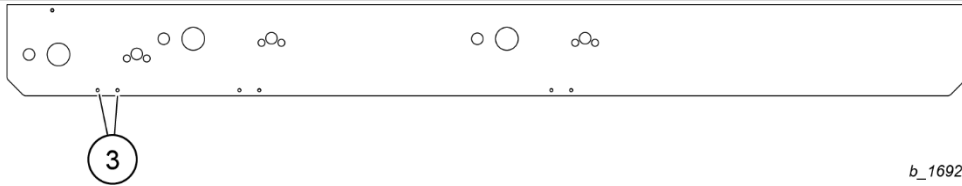
#### Drum length L2



#### Drum length L3



#### Drum length L4

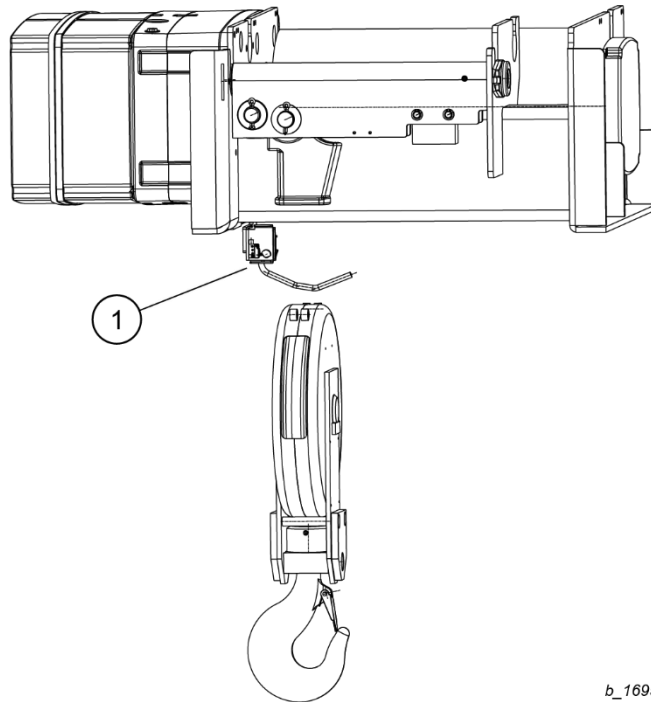


(3) Mounting holes

| Reeving | Assembly position |
|---------|-------------------|
| 2PS     | 1                 |
| 4PS     | 2                 |

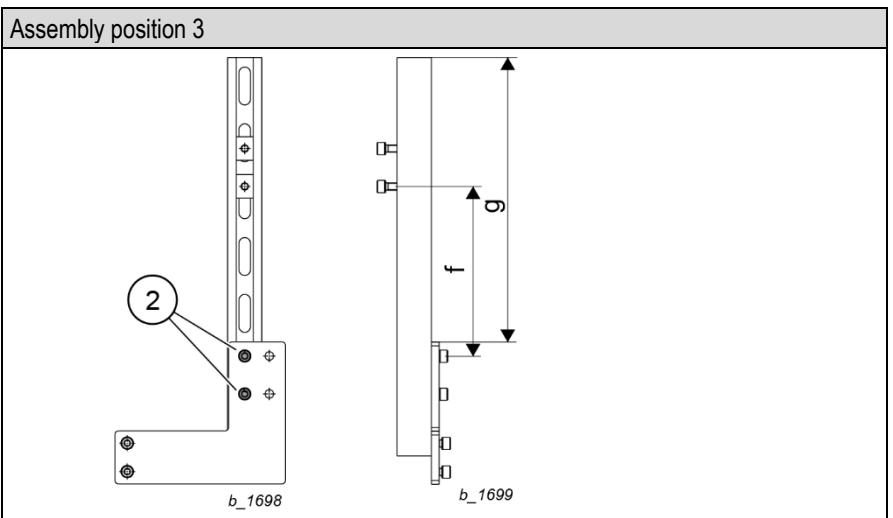
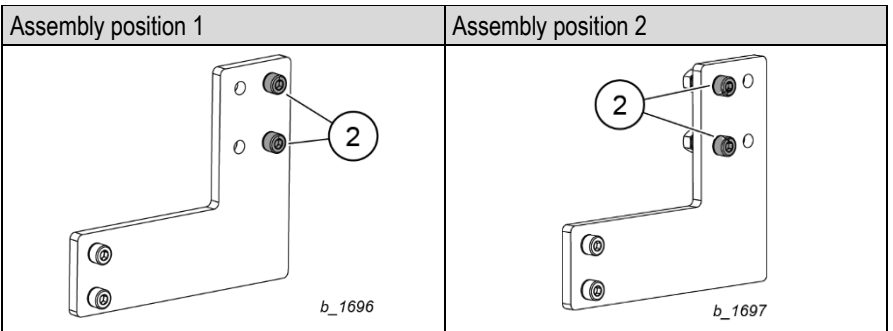
1. Fasten the “PLS” (1) switching unit on at the prescribed position with the bolted connections, see figures above.
2. Tighten the bolted connections with the prescribed tightening torque (12 Nm).
3. Perform a functional test, see the **Performing a functional test** section.

## 4.12.3 Mounting hook operated hoist limit switch with switch rod on stationary wire rope hoists (YKE/SKE / YKD/SKD)



(1) "PLS" switching unit

b\_1695



| dimension | [in]  |
|-----------|-------|
| f         | 7.05  |
| g         | 11.81 |



## 4 Installation

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**Arrangement of the mounting positions**

| Type    | Reeving | Drum length       | Assembly position |
|---------|---------|-------------------|-------------------|
| YKE/SKE | 2PS     | L2 + L3 + L4 + L5 | 2                 |
|         | 4PS     | L2 + L3 + L4 + L5 | 1                 |
| YKD/SKD | 2PS     | L2                | 2                 |
|         | 2PS     | L3 + L4 + L5      | 3                 |
|         | 4PS     | L2 + L3 + L4 + L5 | 1                 |

1. Observe the mounting position of the screws (2).
2. Fasten the “PLS” (1) switching unit on at the prescribed position with the bolted connections, see figures above.
3. Tighten the bolted connections with the prescribed tightening torque (12 Nm).
4. Perform a functional test, see the **Performing a functional test** section

### 4.12.4 Mounting hook operated hoist limit switch with switch rod on trolleys (KE-S..)

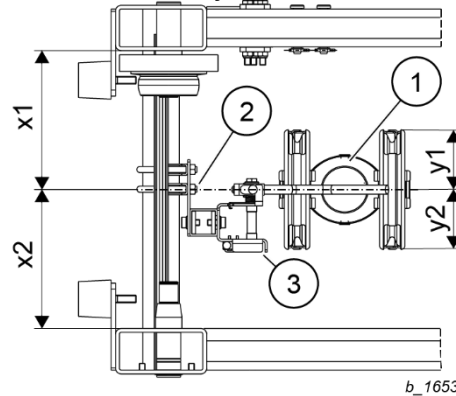


The hook operated hoist limit switch is shipped in transport position, i.e. turned upwards.

Before commissioning, the switching unit "PLS" (3) must be turned downwards.

1. Loosen the bracket clips (2).
2. Turn the switching unit "PLS" (3) into the vertical position.
3. Tighten the bracket clips (2) to the prescribed tightening torque (12 Nm).

#### Retrofitted assembly



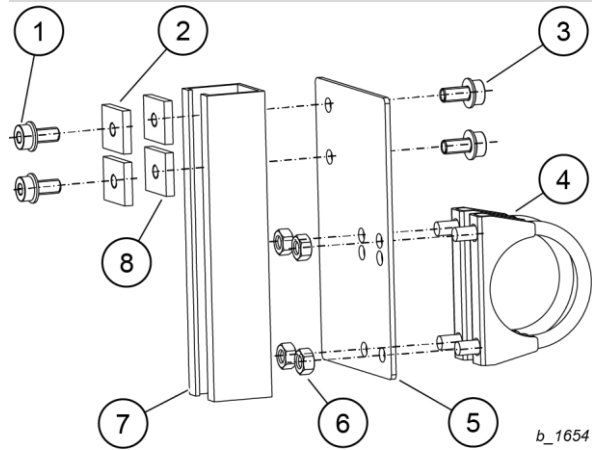
- (1) Bottom hook block
- (2) Bracket clip
- (3) "PLS" switching unit

1. Fasten the bracket clip (2) whilst ensuring that dimensions "z1" and "z2" are of equal size.
2. Tighten the bracket clips (2) to the prescribed tightening torque (12 Nm).
3. Position the "PLS" switching unit (3) as specified, see the **Mounting position** of the "DCS" switching unit section.
4. Ensure that the switch rod (7) of the "PLS" switching unit (3) is centred above the bottom hook block (1) (dimension "y1" = dimension "y2").
5. Mount the connection cable to the connection bolt with cable ties and attach it to the control, see circuit diagram supplied.

# 4 Installation

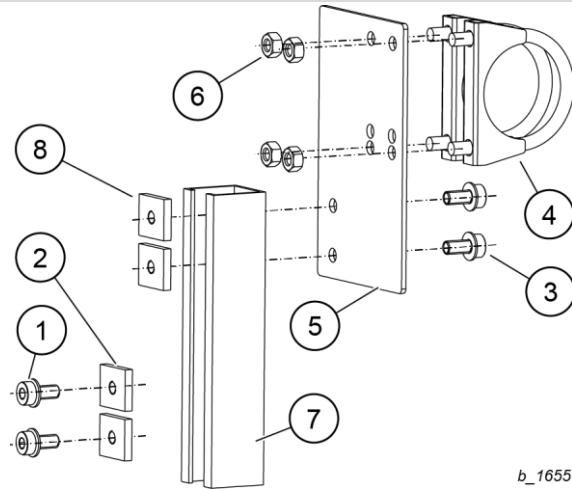
## Assembly position of the "PLS" switching unit

Assembly position 1



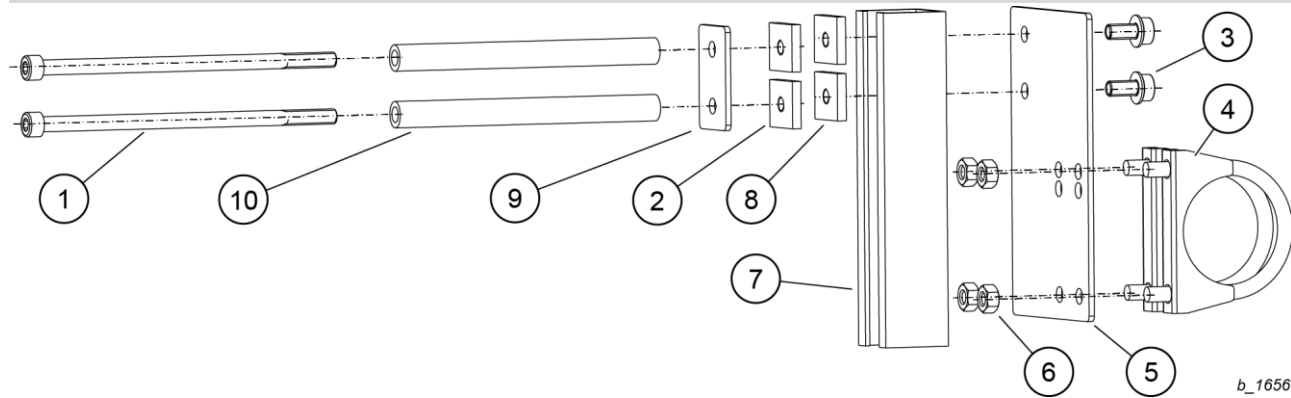
b\_1654

Assembly position 2



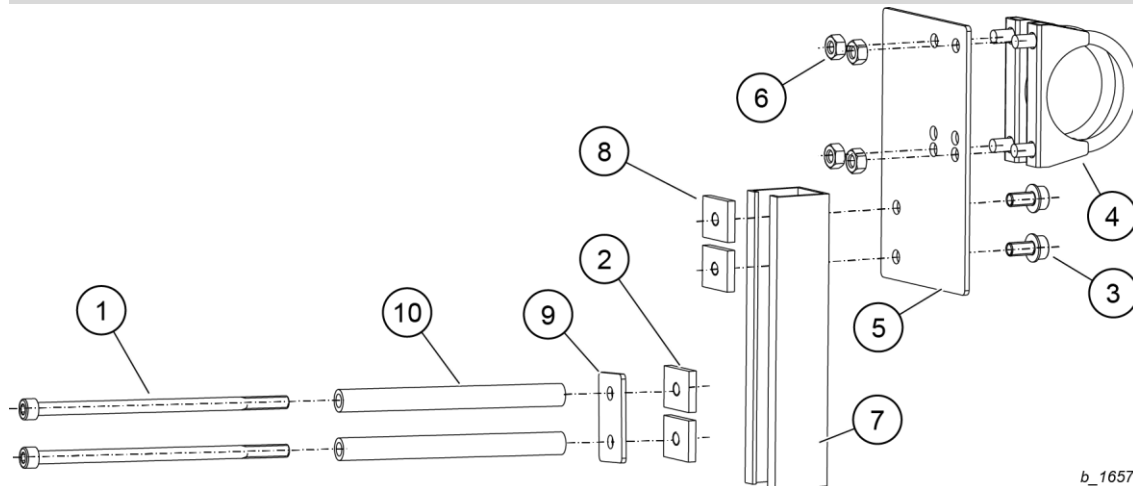
b\_1655

Assembly position 3



b\_1656

Assembly position 4

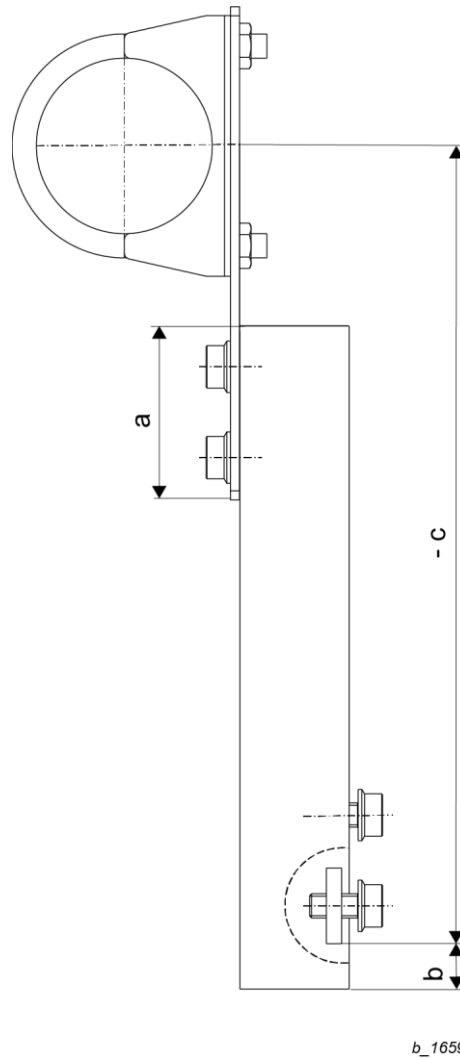
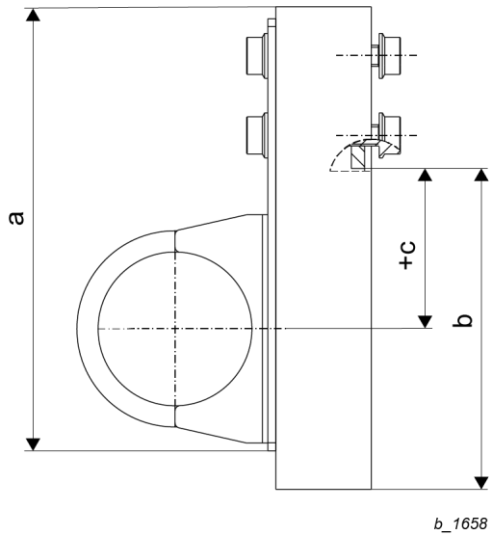


b\_1657

- (1) Screw
- (2) Threaded plate
- (3) Screw
- (4) Bracket clip
- (5) Retaining plate

- (6) Nut
- (7) C-profile
- (8) Threaded plate
- (9) Plate
- (10) Spacer sleeve

## 4 Installation



| Dimension "c" |   |
|---------------|---|
| +             | Measured from the centre of the bracket clip upwards.   |
| -             | Measured from the centre of the bracket clip downwards. |

### Arrangement of the mounting positions (KE-S33)

| Reeving | Flange width | Assembly position |
|---------|--------------|-------------------|
|         | [in]         |                   |
| 2PS     | 3.2 – 8.4    | 1                 |
|         | 8.4 – 31.5   | 2                 |
| 4PS     | 3.2 – 12.1   | 1                 |
|         | 12.1 – 31.5  | 2                 |

## 4 Installation

Dimensions "a", "b", "c" assignment

| Reeving | Flange width | a    | b    | c      |
|---------|--------------|------|------|--------|
|         | [in]         | [in] | [in] | [in]   |
| 2PS     | 3.2          | 6.22 | 4.61 | +2.24  |
|         | 4.7          | 6.22 | 4.61 | +2.24  |
|         | 6.7          | 6.22 | 2.24 | -0.08  |
|         | 11.8         | 4.76 | 0.47 | -6.5   |
|         | 15.7         | 9.57 | 0.63 | -11.1  |
|         | 19.7         | 4.84 | 0.63 | -15.83 |
|         | 31.5         | 2.48 | 0.63 | -30    |
| 4PS     | 3.2          | 6.22 | 4.76 | +2.4   |
|         | 4.7          | 6.22 | 4.76 | +2.4   |
|         | 6.7          | 6.22 | 4.76 | +2.4   |
|         | 11.8         | 6.22 | 0.43 | -1.89  |
|         | 15.7         | 4.76 | 0.16 | -6.81  |
|         | 19.7         | 9.57 | 0.2  | -11.54 |
|         | 31.5         | 7.2  | 0.2  | -25.71 |

Arrangement of the mounting positions (KE-S44)

| Reeving | Flange width | Drum length | Assembly position |
|---------|--------------|-------------|-------------------|
|         | [in]         |             |                   |
| 2PS     | 3.2 – 9.8    | L2 + L3     | 1                 |
|         | 9.9 – 31.5   | L2 + L3     | 2                 |
|         | 3.2 – 13.8   | L4          | 1                 |
|         | 13.8 – 31.5  | L4          | 2                 |
| 4PS     | 3.2 – 13.8   | L2          | 1                 |
|         | 13.8 – 31.5  | L2          | 2                 |
|         | 3.2 – 13.8   | L3 + L4     | 3                 |
|         | 13.8 – 31.5  | L3 + L4     | 4                 |

Dimensions "a", "b", "c" assignment

| Reeving | Flange width | Drum length  | Remark                         | a                  | b                  | c                   |
|---------|--------------|--------------|--------------------------------|--------------------|--------------------|---------------------|
|         | [in]         |              |                                | [in]               | [in]               | [in]                |
| 2PS     | 3.2          | L2 + L3      |                                | 6.38               | 4.76               | +2.36               |
|         | 4.7          | L2 + L3      |                                | 6.38               | 4.76               | +2.36               |
|         | 6.7          | L2 + L3      |                                | 6.38               | 4.76               | +2.36               |
|         | 11.8         | L2 + L3      |                                | 6.97               | 0.67               | -3.9                |
|         | 15.7         | L2 + L3      |                                | 2.24               | 0.67               | -8.62               |
|         | 19.7         | L2 + L3      |                                | 7.05               | 0.65               | -13.43              |
|         | 31.5         | L2 + L3      |                                | 4.69               | 0.63               | -27.6               |
|         | 3.2          | L4           |                                | 6.38               | 3.78               | +1.38               |
|         | 4.7          | L4           |                                | 6.38               | 4.37               | +1.97               |
|         | 6.7          | L4           |                                | 6.38               | 4.76               | +2.36               |
|         | 11.8         | L4           |                                | 6.38               | 3.19               | +0.79               |
|         | 15.7         | L4           |                                | 4.61               | 0.67               | -3.9                |
|         | 19.7         | L4           |                                | 4.61               | 0.67               | -8.62               |
|         | 31.5         | L4           | Shorten the C-profile to 26 in | 9.33 <sup>1)</sup> | 0.71 <sup>1)</sup> | -22.8 <sup>1)</sup> |
| 4PS     | 3.2          | L2 + L3 + L4 |                                | 6.38               | 4.76               | 2.36                |
|         | 4.7          | L2 + L3 + L4 |                                | 6.38               | 4.76               | 2.36                |
|         | 6.7          | L2 + L3 + L4 |                                | 6.38               | 4.76               | 2.36                |
|         | 11.8         | L2 + L3 + L4 |                                | 6.38               | 3.58               | 1.18                |
|         | 15.7         | L2 + L3 + L4 |                                | 6.97               | 1.06               | -3.5                |
|         | 19.7         | L2 + L3 + L4 |                                | 2.24               | 1.06               | -8.23               |
|         | 31.5         | L2 + L3 + L4 |                                | 9.33               | 1.1                | -22.4               |

<sup>1)</sup> Dimensions for shortened C-profile

Arrangement of the mounting positions (KE-S65)

| Type                                     | Reeving | Flange width | Drum length  | Assembly position |
|--|---------|--------------|--------------|-------------------|
|  |         | [in]         |              |                   |
| YKC/SKC<br>Drum pull force<br>≤ 2500 daN | 2PS     | 4.7 – 13.8   | L2 + L3      | 3                 |
|  |         | 13.8 – 31.5  | L2 + L3      | 4                 |
|  |         | 4.7 – 19.7   | L4           | 3                 |
|  |         | 19.7 – 31.5  | L4           | 4                 |
| YKC/SKC<br>Drum pull force<br>> 2500 daN | 2PS     | 4.7 – 13.8   | L2 + L3      | 3                 |
|  |         | 13.8 – 31.5  | L2 + L3      | 4                 |
| YKC/SKC<br>Drum pull force<br>≤ 2500 daN | 4PS     | 4.7 – 19.7   | L2 + L3 + L4 | 3                 |
|  |         | 19.7 – 31.5  | L2 + L3 + L4 | 4                 |
| YKC/SKC<br>Drum pull force<br>> 2500 daN | 4PS     | 4.7 – 19.7   | L2           | 1                 |
|  |         | 19.7 – 31.5  | L2           | 2                 |
|  |         | 4.7 – 19.7   | L3           | 3                 |
|  |         | 19.7 – 31.5  | L3           | 4                 |

ba-o 2.6 0-us-3.3-ys | A11867501 Rev AF

## 4 Installation

Dimensions "a", "b", "c" assignment

| Type  | Reeving | Flange width | Drum length  | a                  | b                  | c      |
|---|---------|--------------|--------------|--------------------|--------------------|--------|
|   |         | [in]         |              | [in]               | [in]               | [in]   |
| YKC/SKC<br>Drum pull<br>force<br>≤ 2500 daN | 2PS     | 4.7          | L2 + L3      | 7.72               | 3.94               | +2.56  |
|   |         | 6.7          | L2 + L3      | 7.72               | 4.72               | +3.35  |
|   |         | 11.8         | L2 + L3      | 6.54               | 2.56               | 0      |
|   |         | 15.7         | L2 + L3      | 5.79               | 0.87               | -4.69  |
|   |         | 19.7         | L2 + L3      | 8.15 <sup>1)</sup> | 0.98 <sup>1)</sup> | -9.41  |
|   |         | 31.5         | L2 + L3      | 8.15               | 0.98               | -23.58 |
|   |         | 4.7          | L4           | 7.72               | 3.7                | +2.32  |
|   |         | 6.7          | L4           | 7.72               | 4.29               | +2.91  |
|   |         | 11.8         | L4           | 7.72               | 4.69               | +3.31  |
|   |         | 15.7         | L4           | 7.72               | 4.69               | +3.31  |
|   |         | 19.7         | L4           | 6.54               | 4.49               | +1.93  |
|   |         | 31.5         | L4           | 8.15               | 0.55               | -12.2  |
| YKC/SKC<br>Drum pull<br>force<br>> 2500 daN | 2PS     | 4.7          | L2 + L3      | 7.72               | 4.13               | +2.76  |
|   |         | 6.7          | L2 + L3      | 7.72               | 4.72               | +3.35  |
|   |         | 11.8         | L2 + L3      | 6.54               | 2.56               | 0      |
|   |         | 15.7         | L2 + L3      | 5.79               | 0.87               | -4.69  |
|   |         | 19.7         | L2 + L3      | 8.15 <sup>1)</sup> | 0.98 <sup>1)</sup> | -9.41  |
|   |         | 31.5         | L2 + L3      | 8.15               | 0.98               | -23.58 |
| YKC/SKC<br>Drum pull<br>force<br>≤ 2500 daN | 4PS     | 4.7          | L2 + L3 + L4 | 6.54               | 4.53               | +1.97  |
|   |         | 6.7          | L2 + L3 + L4 | 7.72               | 3.94               | +2.56  |
|   |         | 11.8         | L2 + L3 + L4 | 7.72               | 4.72               | +3.35  |
|   |         | 15.7         | L2 + L3 + L4 | 7.72               | 3.74               | +2.36  |
|   |         | 19.7         | L2 + L3 + L4 | 6.54               | 0.2                | -2.32  |
|   |         | 31.5         | L2 + L3 + L4 | 3.43               | 0.98               | -16.5  |
| YKC/SKC<br>Drum pull<br>force<br>> 2500 daN | 4PS     | 4.7          | L2 + L3      | 7.72               | 3.74               | +2.36  |
|   |         | 6.7          | L2 + L3      | 7.72               | 4.13               | +2.76  |
|   |         | 11.8         | L2 + L3      | 7.72               | 4.72               | +3.35  |
|   |         | 15.7         | L2 + L3      | 7.72               | 3.74               | +2.36  |
|   |         | 19.7         | L2 + L3      | 6.54               | 0.2                | -2.32  |
|   |         | 31.5         | L2 + L3      | 3.43               | 0.98               | -16.5  |

<sup>1)</sup> Shorten the C-profile to a length of 14.2 in.

Arrangement of the mounting positions (KE-S76)

| Type        | Reeving      | Flange width | Drum length  | Assembly position |
|-------------|--------------|--------------|--------------|-------------------|
|             |              | [in]         |              |                   |
| YKE/SKE     | 2PS          | 4.9 – 21.3   | L2 + L3 + L4 | 3                 |
|             |              | 21.3 – 31.5  | L2 + L3 + L4 | 4                 |
| YKD/SKD     |              | 4.9 – 13     | L2           | 3                 |
|             |              | 13 – 31.5    | L2           | 4                 |
|             |              | 4.9 – 31.5   | L3 + L4      | 4                 |
|             |              | 4PS          | 4.9 – 19.7   | L2 + L3 + L4      |
| 19.7 – 31.5 | L2 + L3 + L4 |              | 4            |                   |

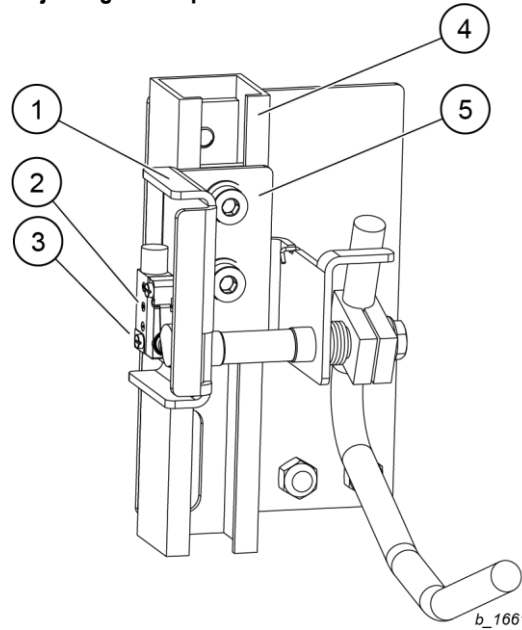
Dimensions "a", "b", "c" assignment

| Type    | Reeving | Flange width | Drum length  | a     | b    | c      |
|---------|---------|--------------|--------------|-------|------|--------|
|         |         | [in]         |              | [in]  | [in] | [in]   |
| YKE/SKE | 2PS     | 4.9          | L2 + L3 + L4 | 7.76  | 2.2  | +0.16  |
|         |         | 6.7          | L2 + L3 + L4 | 7.76  | 2.8  | +0.75  |
|         |         | 11.8         | L2 + L3 + L4 | 7.76  | 4.37 | +3.9   |
|         |         | 15.7         | L2 + L3 + L4 | 8.94  | 4.76 | +2.32  |
|         |         | 19.7         | L2 + L3 + L4 | 7.76  | 2.4  | +0.35  |
|         |         | 31.5         | L2 + L3 + L4 | 7.05  | 0.63 | -13.78 |
| YKD/SKD |         | 4.9          | L2           | 7.76  | 3.98 | +1.93  |
|         |         | 6.7          | L2           | 7.76  | 4.76 | +2.72  |
|         |         | 11.8         | L2           | 7.76  | 2.01 | 0      |
|         |         | 15.7         | L2           | 6.97  | 0.2  | -4.72  |
|         |         | 19.7         | L2           | 2.24  | 0.2  | -9.45  |
|         |         | 31.5         | L2           | 9.41  | 0.24 | -23.62 |
|         |         | 4.9          | L3 + L4      | 8.23  | 0.83 | -12.4  |
|         |         | 6.7          | L3 + L4      | 9.41  | 0.04 | -12.01 |
|         |         | 11.8         | L3 + L4      | 10.59 | 0.04 | -10.83 |
|         |         | 15.7         | L3 + L4      | 10.59 | 1.22 | -9.65  |
|         |         | 19.7         | L3 + L4      | 10.59 | 1.22 | -9.65  |
|         |         | 31.5         | L3 + L4      | 9.41  | 0.04 | -23.82 |
| YKD/SKD | 4PS     | 4.9          | L2 + L3 + L4 | 7.76  | 3.7  | +1.65  |
|         |         | 6.7          | L2 + L3 + L4 | 7.76  | 4.09 | +2.05  |
|         |         | 11.8         | L2 + L3 + L4 | 8.94  | 4.29 | +3.43  |
|         |         | 15.7         | L2 + L3 + L4 | 7.76  | 3.31 | +1.26  |
|         |         | 19.7         | L2 + L3 + L4 | 6.97  | 1.5  | -3.43  |
|         |         | 31.5         | L2 + L3 + L4 | 3.5   | 0.35 | -17.6  |

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### Adjusting hook operated hoist limit switch with switch rod (KE-S..)

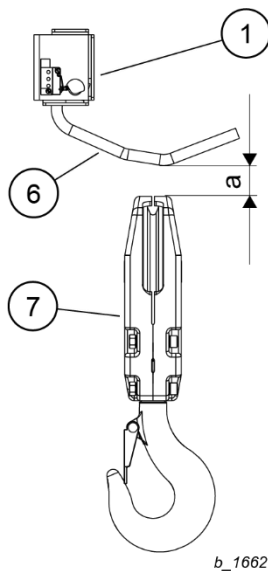


- (1) "PLS" switching unit
- (2) Microswitch
- (3) Screw
- (4) C-profile
- (5) Screw

1. Adjust the geared limit switch, see **Adjusting the geared limit switch** section.
2. Press the UP button in the control pendant carefully.
3. Observe the hoisting movement until the operational hoist limit switch switches off in the top hook position (B↑).



A pre-mounted "PLS" switching unit (1) is mounted above switch position S3.



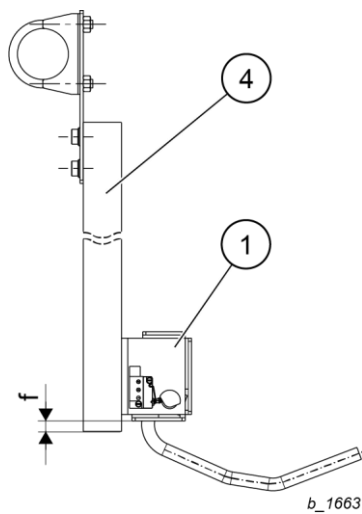
4. Measure the distance between the switch rod (6) and the bottom hook block (7). Dimension "a" must be approx. 1.18 in – 1.38 in.
5. Actuate the override button "S260" on the control box and the UP button at the same time until the bottom hook block stops.
  - The switch-off position must be set by the dimension "x1" (0.39 in) before the emergency stop S1.
6. In case of deviations, correct the position of the "PLS" switching unit (1).
  - Loosen the screws (5) on the "PLS" switching unit (1).
  - Move the "PLS" switching unit (1).
  - Tighten the screws (5) on the "PLS" switching unit (1) to the prescribed tightening torque, see the **Tightening torques for screws** chapter.

a Dimension 1.18 in – 1.38 in

- (1) "PLS" switching unit
- (6) Switch rod
- (7) Bottom hook block

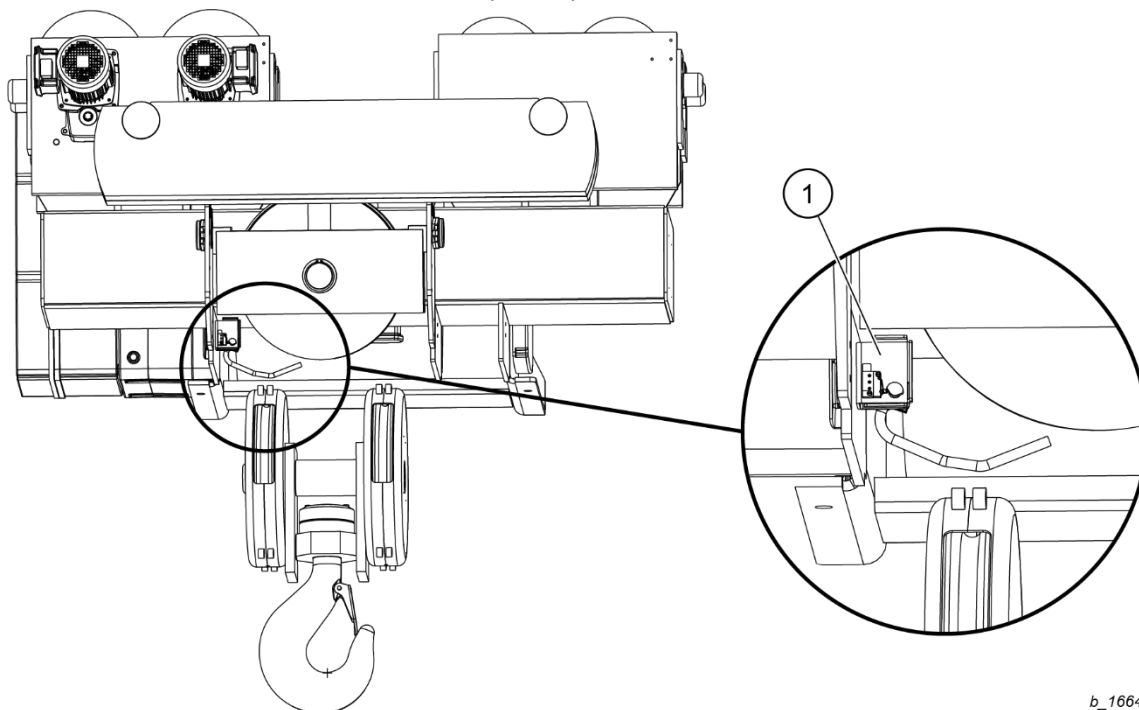
## 4 Installation

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7. Shorten the C-profile (4) in the event of overhangs > 0.39 in.
8. Mark the assembly position of the "PLS" switching unit (1) and the overhang "f" from the C-profile (4).
9. Disassemble the "PLS" switching unit (1) and secure it against falling down.
10. Disassemble the C-profile (4) and shorten it accordingly.
11. Assemble the parts in reverse order.
12. Check the switch-off position again.

### 4.12.5 Mounting hook operated hoist limit switch with switch rod on trolleys (UE-S77)

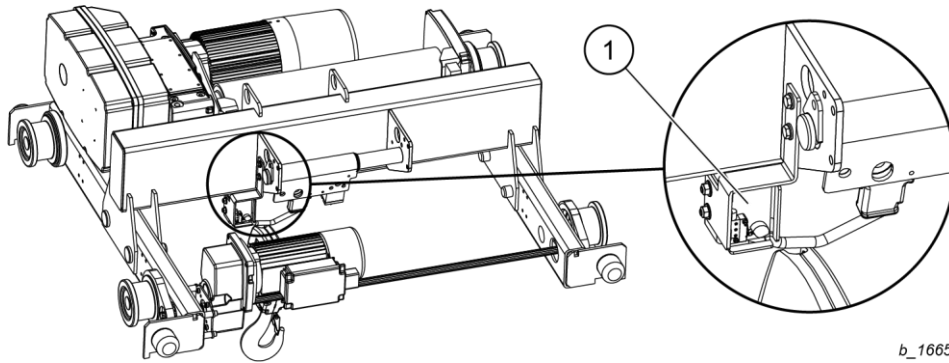


b\_1664

1. Fasten the "PLS" (1) switching unit on at the prescribed position with the bolted connections, see figures above.
2. Tighten the bolted connections with the prescribed tightening torque (12 Nm).
3. Perform a functional test, see the **Performing a functional test** section

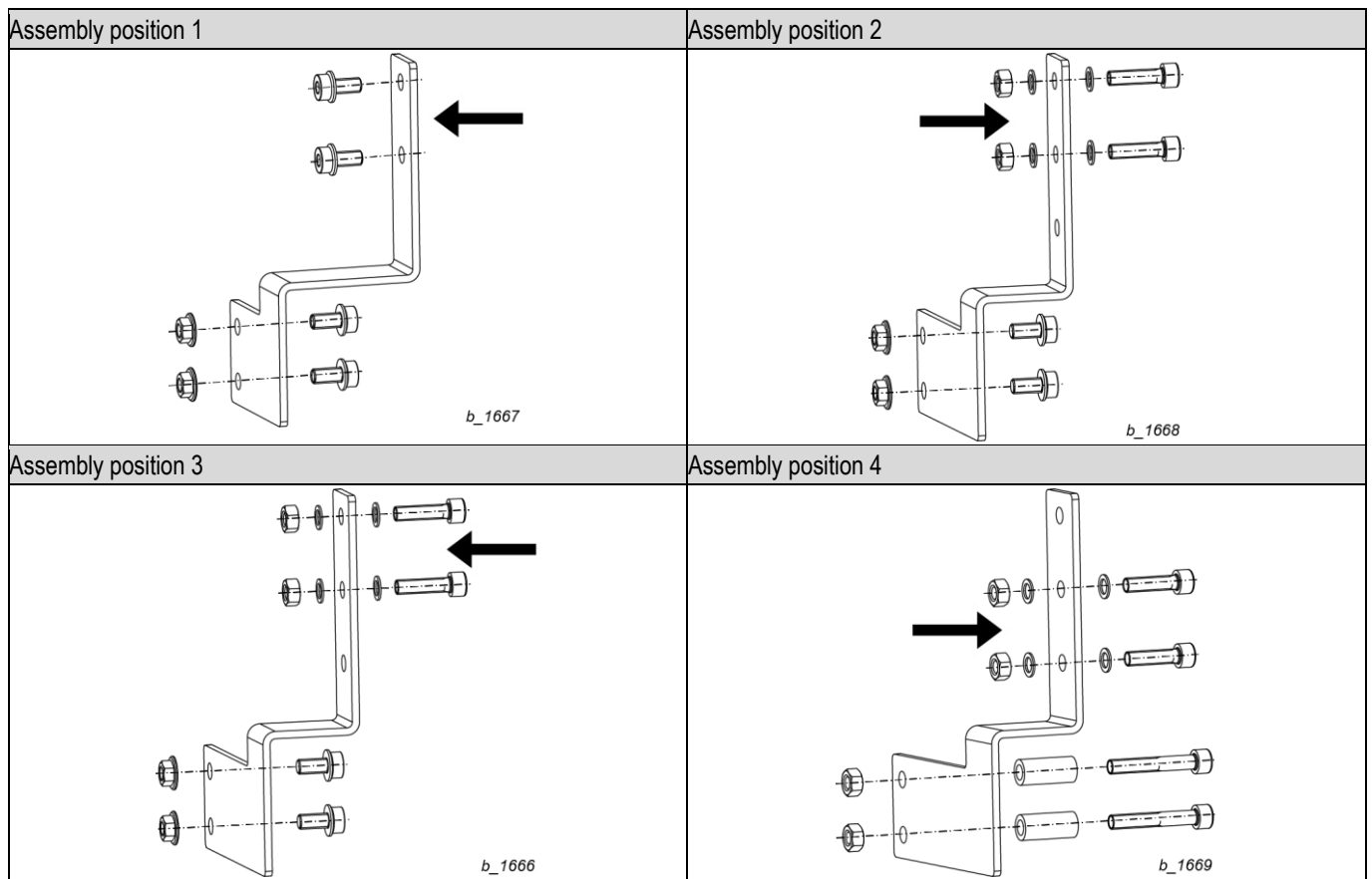
## 4 Installation

### 4.12.6 Mounting hook operated hoist limit switch with switch rod on trolleys (OE-S)



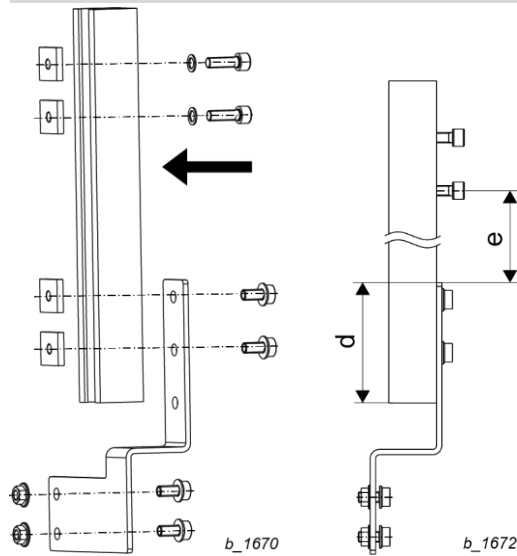
b\_1665

(1) "PLS" switching unit



## 4 Installation

Assembly position 5



| Dimension | [in] |
|-----------|------|
| d         | 3.58 |
| e         | 4.84 |

The arrow in the figure shows the contact area.

| Type    | Trolley type | Reeving  | Drum length       | Assembly position |
|---------|--------------|----------|-------------------|-------------------|
| YKA/SKA | OE-S04       | 2PS, 4PS | L2 + L3           | 1                 |
| YKB/SKB | OE-S04       | 2PS, 4PS | L2 + L3 + L4      | 1                 |
| YKC/SKC | OE-S05       | 2PS, 4PS | L2 + L3 + L4      | 1                 |
|         | OE-S06       |          |                   |                   |
| YKE/SKE | OE-S06       | 2PS      | L2 + L3 + L4 + L5 | 2 <sup>1)</sup>   |
|         | OE-S07       | 4PS      | L2 + L3 + L4 + L5 | 4                 |
| YKD/SKD | OE-S06       | 2PS      | L2                | 3 <sup>1)</sup>   |
|         |              |          | L3 + L4 + L5      | 5                 |
|         |              | 4PS      | L2 + L3 + L4 + L5 | 3 <sup>1)</sup>   |

<sup>1)</sup> Observe the assembly position of the screws.

1. Observe the mounting position of the screws.
2. Fasten the “PLS” (1) switching unit on at the prescribed position with the bolted connections, see figures above.
3. Tighten the bolted connections with the prescribed tightening torque (12 Nm).
4. Perform a functional test, see the **Performing a functional test** section

### Perform the functional test

1. Move the operational limit switch (B↑) to the top.
  - Movement stops.
2. Actuate the override button “S260” on the control box and the UP button at the same time until the hoisting movement stops.
  - No more upward movement is possible.
3. Actuate the DOWN button.
  - If a downwards movement is possible, the “PLS” switching unit has tripped.
  - If no downwards movement is possible, then the emergency limit switch has tripped. In this case the “PLS” switching unit must be adjusted anew.

### 4.13 Reeving rope

The wire rope is wound onto the drum in the factory. If not, see section **Changing the wire rope**.

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 smooth functioning of the wire rope hoist!

If the bottom hook block is not fitted, proceed as follows:

1. Gripper pliers hold the rope securely with a gripper pliers.
2. Lay out the end of the rope not wound on the drum, or let it hang freely.
3. Check that the wire rope lies snugly on the rope drum, tighten if necessary.
  - If the fit is loose:
    - Dismount the rope guide, see section **Removing rope guide**
    - Tighten up the wire rope on the rope drum and tension.
    - Mount the rope guide, see section **Installing the rope guide**

#### NOTICE

**Material damage hazard.** Slack rope can destroy the rope guide and the wire rope. Avoid slack rope on the drum.



Fig. 42

4. Color code the beginning of the rope on one side.

Reeve the end of the rope into the rope sheave(s) of the bottom hook block and return pulley(s) (see next page for details).

#### NOTICE

**Material damage hazard to wire rope.** Do not twist the rope, the color coding facilitates checking.

5. Fasten the end of the rope in the rope anchorage
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.

#### NOTICE

**Material damage hazard.** Twisted ropes compromise safety and damage the rope. If any twisting occurs, 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 must 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 (YKA/SKA – YKE/SKE)

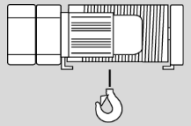
#### NOTICE

Reeve the rope as shown in the schematic drawings and attach the end of the rope at the rope anchorage. The bottom hook block must hang horizontally (.PD)

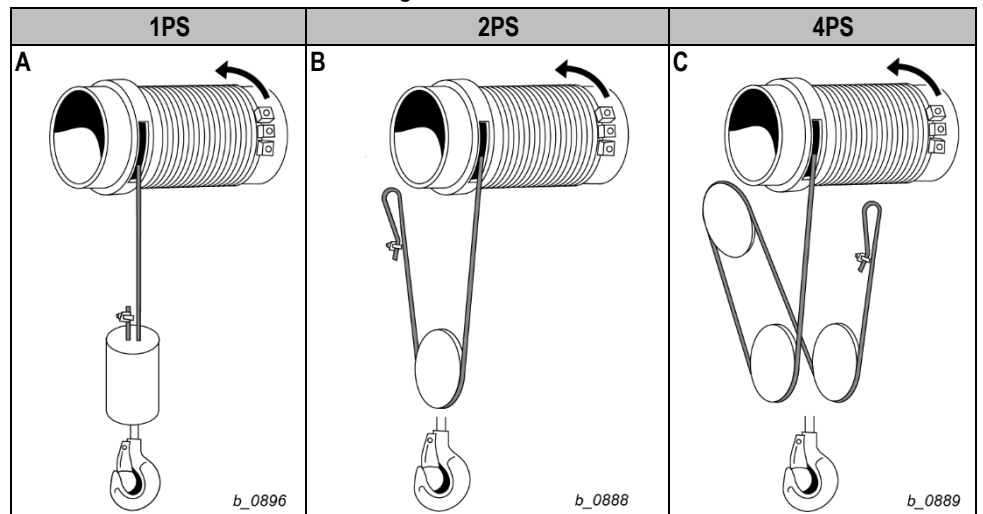
The hook may rotate after a short time in operation due to residual stress in the rope

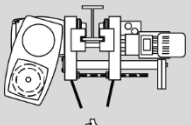
# 4 Installation

## 4.13.1 Overview of reeving

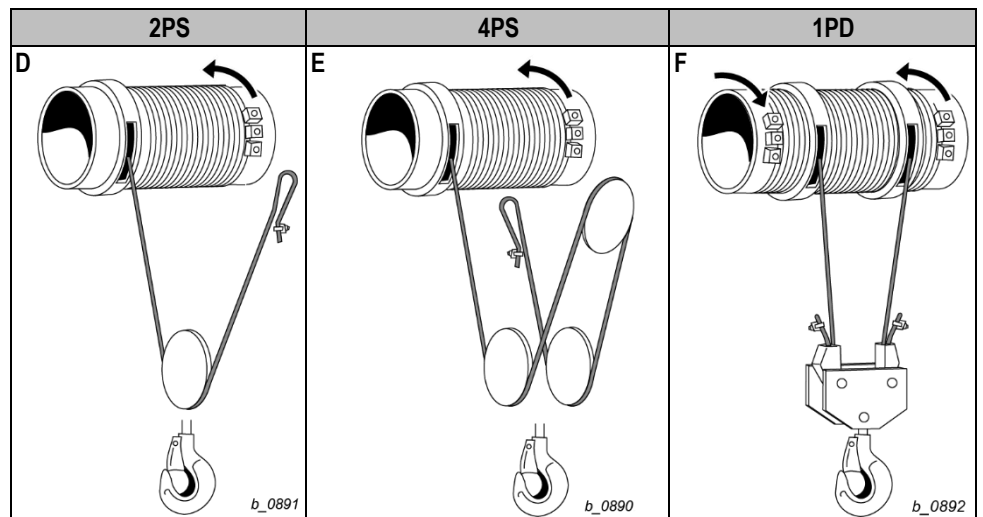
| Reeving |  |         |
|---------|---|---------|
|         | YKA/SKA<br>YKB/SKB<br>YKC/SKC   | YKE/SKE |
| 1PS     | A   | A       |
| 2PS     | B   | D       |
| 4PS     | C   | E       |
| 1PD     | F   | F       |
| 2PD     | G   | H       |
| 4PD     | -   | I       |

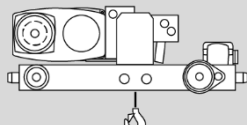
Tab. 13



| Reeving |  |         |
|---------|---|---------|
|         | YKA/SKA<br>YKB/SKB<br>YKC/SKC   | YKE/SKE |
| 2PS     | D   | D       |
| 4PS     | E   | E       |
| 2PD     | H   | H       |

Tab. 14



| Reeving |  |         |
|---------|---|---------|
|         | YKA/SKA<br>YKB/SKB<br>YKC/SKC   | YKE/SKE |
| 2PS     | D   | D       |
| 4PS     | E   | E       |
| 2PD     | H   | H       |
| 4PD     | -   | I       |

Tab. 15

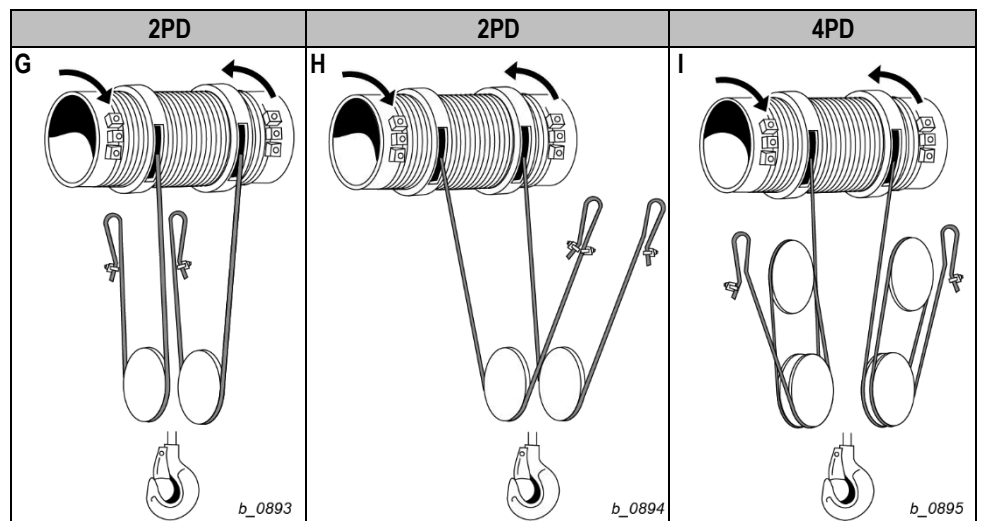
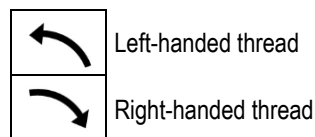


Fig. 43



## 4.13.2 Rope fastening point (YKA/SKA - YKE/SKE)

**i** If special ropes are used, refer to the section **Rope fastening point (YKA/SKA - YKE/SKE) with special ropes**.



**⚠ WARNING**  
Danger of falling load

If ropes are not secured according to instructions, this leads to the rope slipping and the load falling.

- Always tighten and secure ropes at the rope fastening point according to instructions.
- Replace cotter pins every time after disassembly.

| Type    | a    | L   | x    |
|---------|------|-----|------|
|         | [in] |     |      |
| YKA/SKA | 0.98 | 3.9 | 0.24 |
| YKB/SKB |      | 5.1 | 0.59 |
| YKE/SKE |      | 6.3 |      |

- (1) Rope bag
- (2) Rope wedge
- (3) Rope clamp
- (4) Cotter pin
- (5) Rope

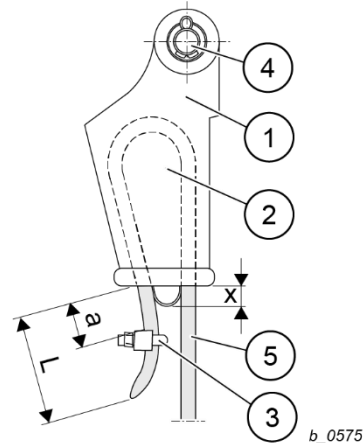


Fig. 44

1. Feed the rope end through the rope bag (1) (see figure).
2. Lay rope (5) around the rope wedge (2) and draw together in the rope bag (1).
  - The rope end must protrude out of the rope bag (1) by dimension “L” (see table) as a minimum.
3. Secure rope end with rope clamp (3), dimension “a” away from the rope bag. The rope clamp must not be mounted at the rope binding. For tightening torque (see table).
4. Check the protruding end of the rope wedge.
  - Maximum value per “x” (see table).
5. Assemble the rope bag (1) at the fastening point.
  - Observe the indicating label on the rope fastening point and the section **Position of the rope fastening point**.
6. Secure with a cotter pin (4).
  - The cotter pin (4) must always be replaced after disassembly.

| Rope-Ø        | Thread size | Tightening torque    |
|---------------|-------------|----------------------|
| [in]          |             | [lb <sub>f</sub> ft] |
| 0.197...0.256 | M6          | 4                    |
| 0.276...0.315 | M8          | 7                    |
| 0.335...0.394 | M8          | 15                   |
| 0.472...0.492 | M12         | 30                   |
| 0.551...0.63  | M14         | 70                   |
| 0.787         | M16         | 96                   |

Tab. 16

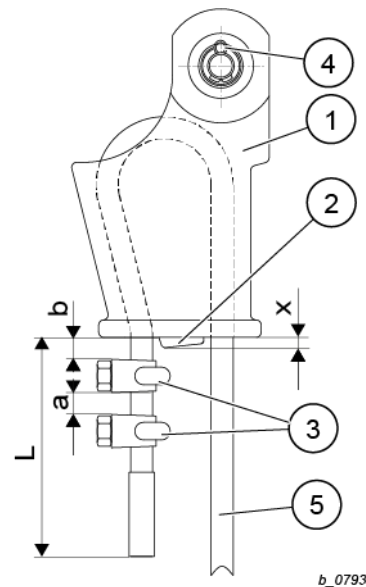


### Rope fastening point (YKA/SKA - YKE/SKE) with special ropes

Procedure only for ropes listed in the table

| Rope Ø<br>[in] | Part number *) |
|----------------|----------------|
| 0.354          | A70009035      |
| 0.492          | A70009036      |

\*) see works certificate.



- (1) Rope bag
- (2) Rope wedge
- (3) Rope clamp
- (4) Cotter pin
- (5) Rope

Fig. 45

1. Clean the rope (5) in the area of the rope anchorage.
  - The area must be clear of grease.
2. Clean the rope bag (1) and rope wedge (2).
  - The rope bag (1) and rope wedge (2) must be clear of grease.
3. Feed the rope end through the rope bag (1) (see figure).
4. Lay rope (4) around the rope wedge (2) and draw together in the rope bag (1).
  - The rope end must protrude out of the rope bag (1) by length “L” (see table).
5. Secure rope end with rope clamps away from the rope bag at the specified points. The rope clamp must not be mounted at the rope binding. Secure.
  - For dimension “a” and “b” and the tightening torque, refer to the table.
6. Assemble the rope bag at the fastening point.
  - Observe the indicating label on the rope fastening point and the section **Position of the rope fastening point**.
7. Secure with a cotter pin.
  - The cotter pin must always be replaced after disassembly.

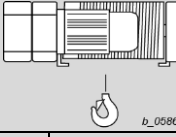

## 4 Installation

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8. Load the wire rope hoist multiple times (max. load). The following is recommended:
  - Load and hold 5 times; each holding phase should last at least one minute.
  - The result of the load is a rope that is firmly drawn into the rope bag.
9. Check the protruding end of the rope wedge.
  - Maximum value per “x” (see table).
10. Check dimension “a” and “b” during annual maintenance.
  - To ensure the rope does not slip out of the rope bag.
  - With deviations, assemble the rope again as described.

| Rope Ø | Part number | L    | a    | b    | x    | Tightening torque |
|--------|-------------|------|------|------|------|-------------------|
| [in]   |             | [in] |      |      |      | [lb·ft]           |
| 0.354  | A70009035   | 5.9  | 0.98 | 0.98 | 0.24 | 15                |
| 0.492  | A70009036   | 5.9  | 0.98 | 0.98 | 0.39 | 30                |

# 4 Installation

|         |                            |   |             |             |
|---------|----------------------------|---|-------------|-------------|
|         |                            |  |             |             |
| Reeving | Drum length<br>(see order) |  |             |             |
|         |                            | Wire rope hoist type  |             |             |
|         |                            | YKA/<br>SKA   | YKB/<br>SKB | YKC/<br>SKC |
| 2PS     | L2                         | A   | A           | A           |
|         | L3                         | A   | A           | A           |
|         | L4                         |   | A           | A           |
| 4PS     | L2                         | E   | B           | F           |
|         | L3                         | E   | B           | F           |
|         | L4                         | --  | B           | F           |
| 2PD     | L2                         | C   | D           | C           |
|         | L3                         | C   | D           | C           |
|         | L4                         | --  | --          | C           |

Tab. 17

## 4.13.3 Position of the rope fastening point

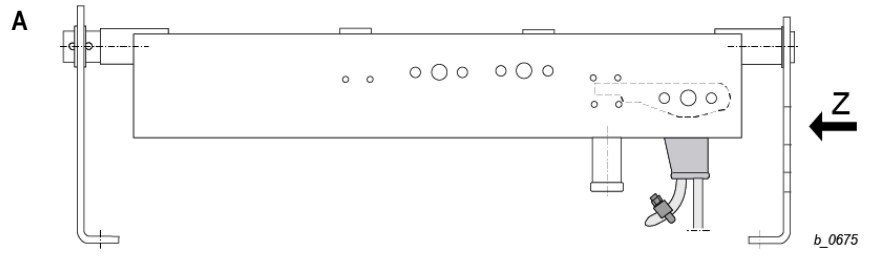


Fig. 46

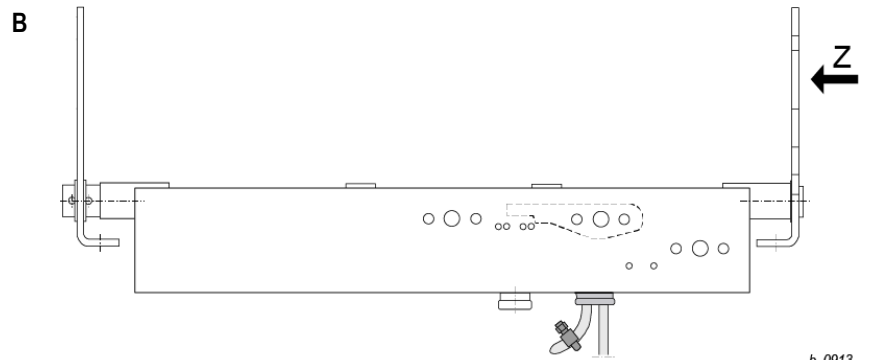


Fig. 47

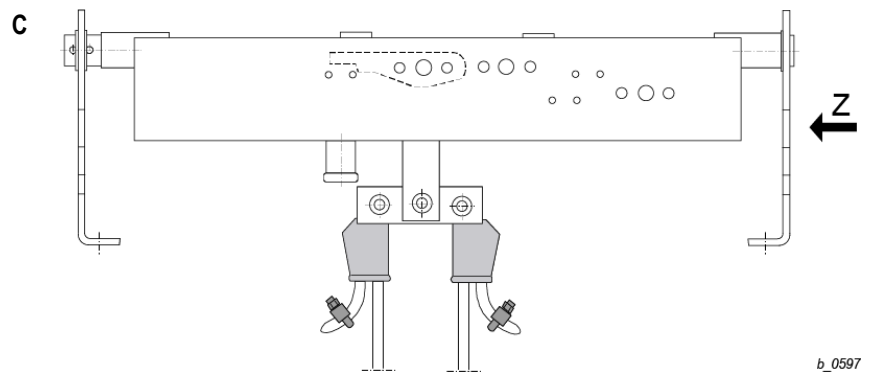


Fig. 48

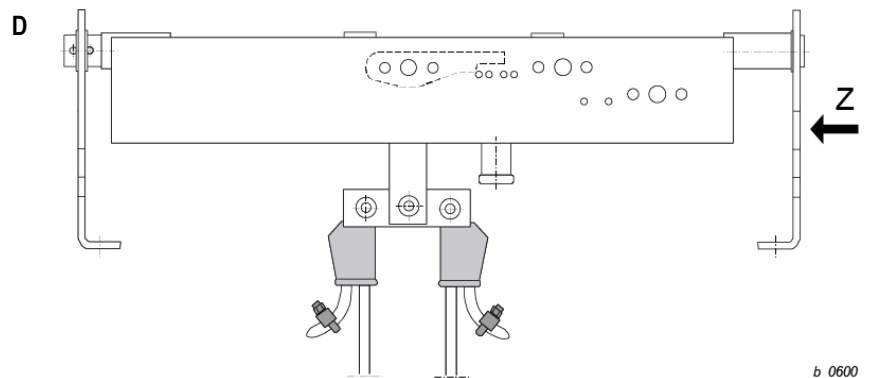


Fig. 49

Z = on the gear side

# 4 Installation

| Reeving | Drum length<br>(see order) | Wire rope hoist type |             |             |
|---------|----------------------------|----------------------|-------------|-------------|
|         |                            | YKA/<br>SKA          | YKB/<br>SKB | YKC/<br>SKC |
|         |                            | 2PS                  | L2          | <b>A</b>    |
|         | L3                         | <b>A</b>             | <b>A</b>    | <b>A</b>    |
|         | L4                         |                      | <b>A</b>    | <b>A</b>    |
| 4PS     | L2                         | <b>E</b>             | <b>B</b>    | <b>F</b>    |
|         | L3                         | <b>E</b>             | <b>B</b>    | <b>F</b>    |
|         | L4                         | --                   | <b>B</b>    | <b>F</b>    |
| 2PD     | L2                         | <b>C</b>             | <b>D</b>    | <b>C</b>    |
|         | L3                         | <b>C</b>             | <b>D</b>    | <b>C</b>    |
|         | L4                         | --                   | --          | <b>C</b>    |

Tab. 18

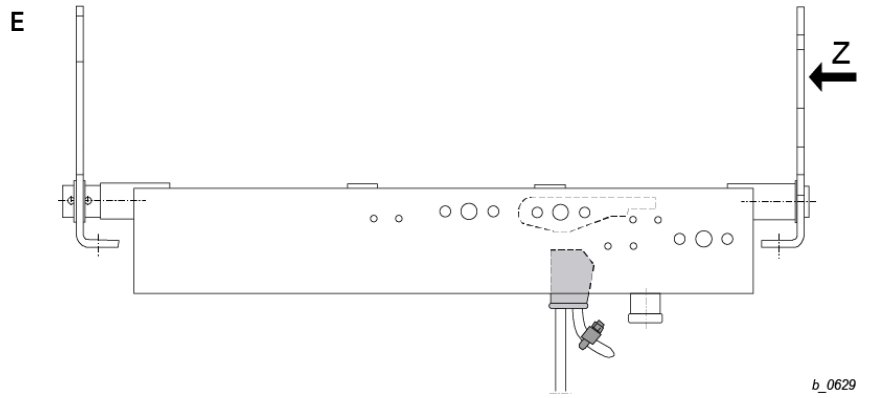


Fig. 50

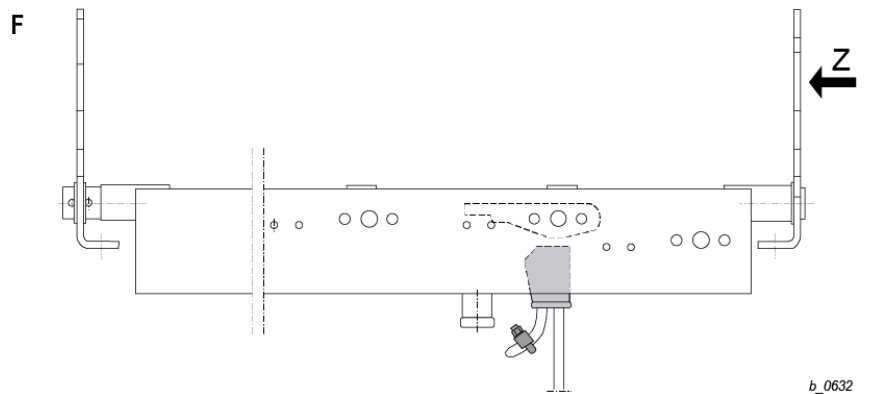


Fig. 51

Z = on the gear side

# 4 Installation

|         |                            |                      |             |             |
|---------|----------------------------|----------------------|-------------|-------------|
|         |                            |                      |             |             |
| Reeving | Drum length<br>(see order) |                      |             |             |
|         |                            | Wire rope hoist type |             |             |
|         |                            | YKA/<br>SKA          | YKB/<br>SKB | YKC/<br>SKC |
| 2PS     |                            | <b>H</b>             | <b>H</b>    | <b>H</b>    |
| 4PS     |                            | <b>G</b>             | <b>G</b>    | <b>G</b>    |
| 2PD     | L2                         | <b>I</b>             | <b>I</b>    | <b>I</b>    |
|         | L3                         | <b>J</b>             | <b>J</b>    | <b>J</b>    |
|         | L4                         | --                   | --          | <b>J</b>    |

Tab. 19

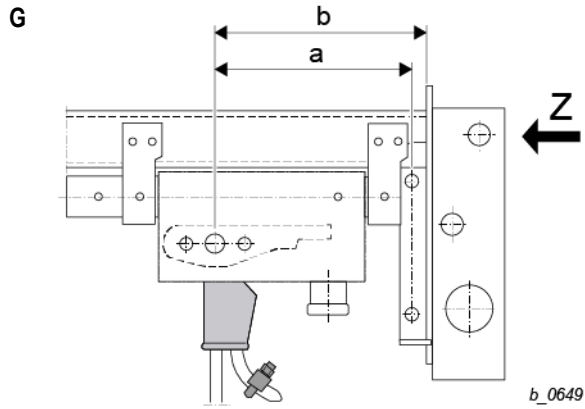


Fig. 52

| Type    | a<br>[in] | b<br>[in] |
|---------|-----------|-----------|
| YKA/SKA | 8.5       | 8.4       |
| YKB/SKB | 10.4      | 11.4      |
| YKC/SKC | 13.1      | 14.4      |

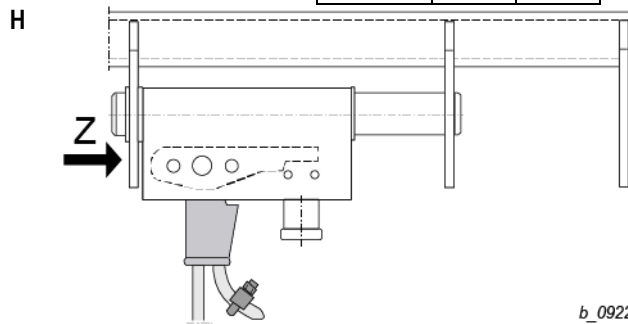


Fig. 53

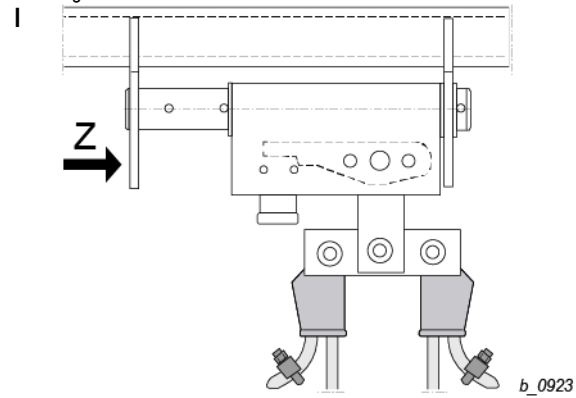


Fig. 54

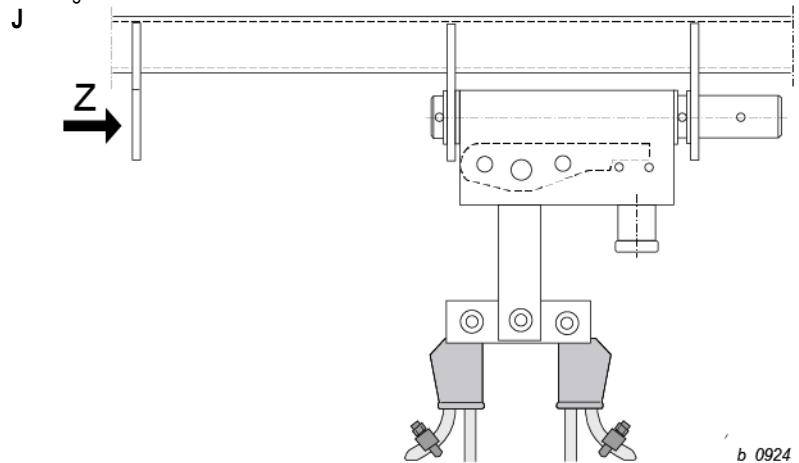


Fig. 55

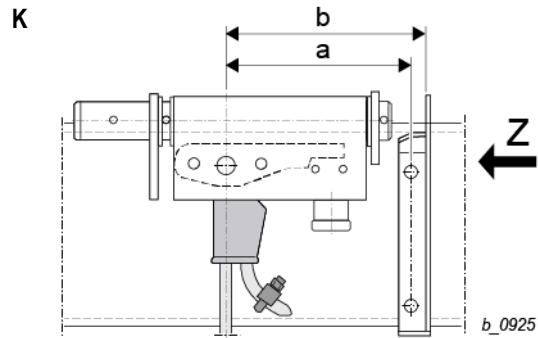
Z = on the gear side

# 4 Installation

## Rope fastening point (YKA/SKA - YKC/SKC)

|         |                            |                      |             |             |
|---------|----------------------------|----------------------|-------------|-------------|
|         |                            |                      |             |             |
| Reeving | Drum length<br>(see order) |                      |             |             |
|         |                            | Wire rope hoist type |             |             |
|         |                            | YKA/<br>SKA          | YKB/<br>SKB | YKC/<br>SKC |
| 2PS     |                            | L                    | L           | L           |
| 4PS     |                            | K                    | K           | K           |
| 2PD     | L2                         | M                    | M           | M           |
|         | L3                         | M                    | N           | M           |
|         | L4                         | --                   | --          | M           |

Tab. 20



| Type        | a [in] | b [in] |
|-------------|--------|--------|
| YKA/<br>SKA | 8.5    | 9.5    |
| YKB/<br>SKB | 10.4   | 11.4   |
| YKC/<br>SKC | 13.1   | 14.4   |

Fig. 56

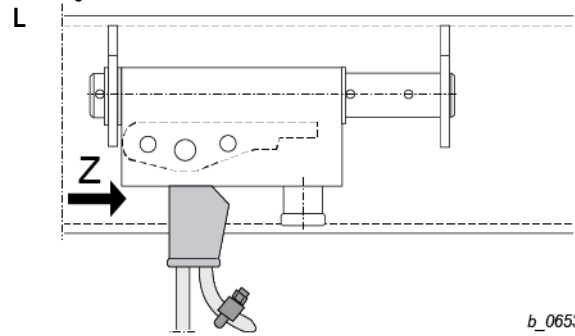


Fig. 57

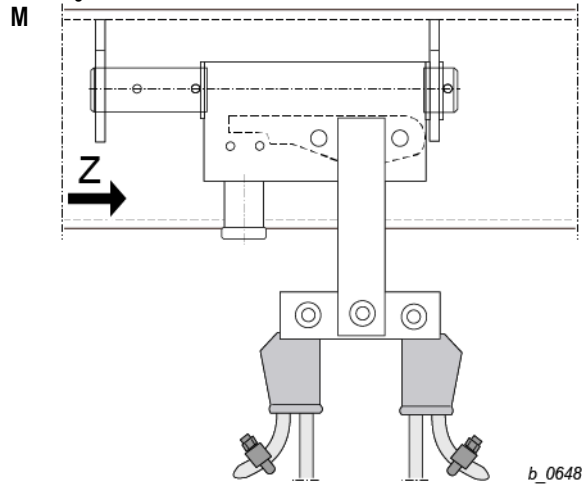


Fig. 58

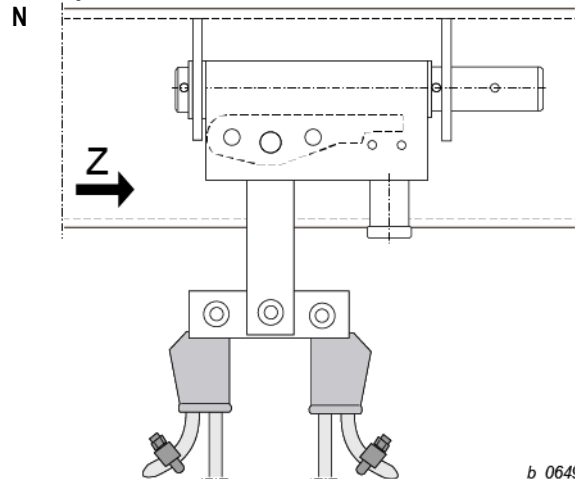
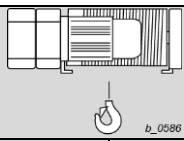


Fig. 59

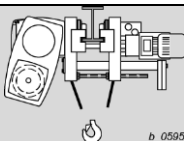
Z = on the gear side

# 4 Installation



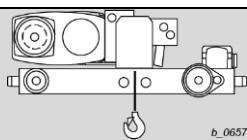
| Reeving | Drum length (see order) | Wire rope hoist type YKE/SKE |
|---------|-------------------------|------------------------------|
| 2PS     | L2 – L5                 | <b>P</b>                     |
| 4PS     | L2 – L5                 | <b>O</b>                     |
| 1PD     |                         | -                            |
| 2PD     | L2 – L5                 | <b>R</b>                     |
| 4PD     | L3 – L5                 | <b>S</b>                     |

Tab. 21



| Reeving | Drum length (see order) | Wire rope hoist type YKE/SKE |
|---------|-------------------------|------------------------------|
| 2PS     | L2 – L5                 | <b>P</b>                     |
| 4PS     | L2 – L5                 | <b>O</b>                     |
| 2PD     | L2 – L5                 | <b>R</b>                     |

Tab. 22



| Reeving | Drum length (see order) | Wire rope hoist type YKE/SKE |
|---------|-------------------------|------------------------------|
| 2PS     | L2 – L5                 | <b>P</b>                     |
| 4PS     | L2 – L5                 | <b>O</b>                     |
| 2PD     | L2 – L5                 | <b>R</b>                     |
| 4PD     | L3 – L5                 | <b>S</b>                     |

Tab. 23

## Rope fastening point (YKE/SKE)

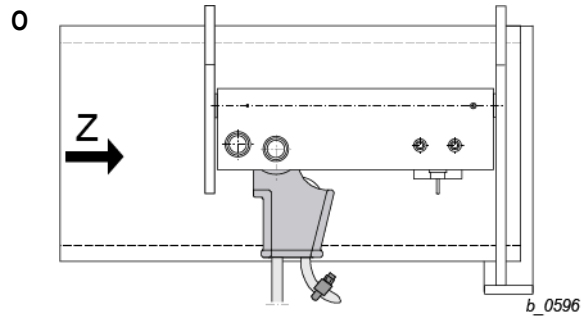


Fig. 60

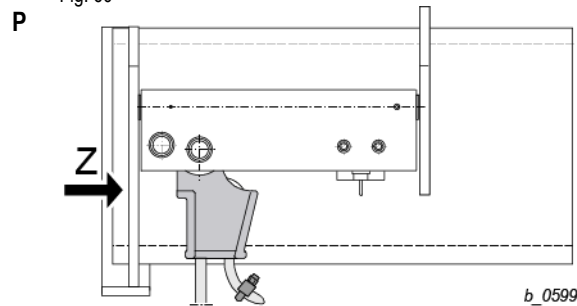


Fig. 61

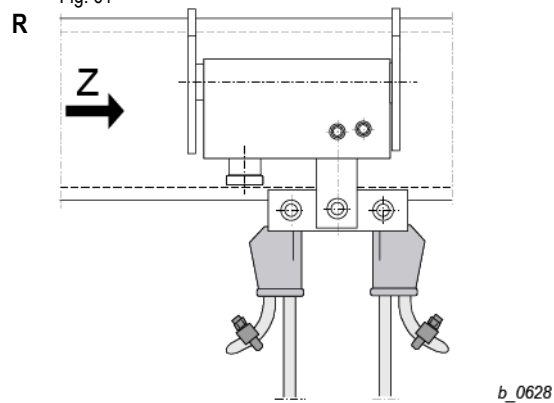


Fig. 62

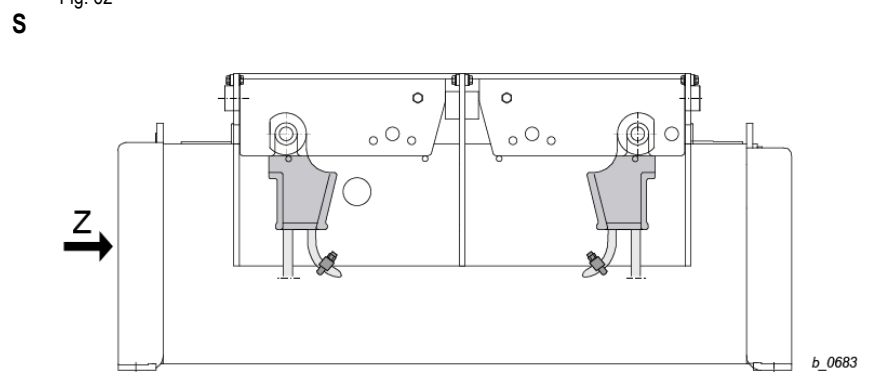


Fig. 63

Z = on the gear side

### ⚠ WARNING

Danger of personal injuries

- Make sure that a competent person authorized to test cranes carries out the commissioning.

When commissioning the hoist and after service works, perform repeat testing.

The following activities, settings and checks must be carried out:

1. Correct completion of the wire rope hoist with the original accessory parts supplied (e.g. see section **Hook operated hoist limit switch (optional)**).
2. Remove the transport locks marked in red with wire rope hoists YKB and YKC, reeving 1PS and 1PD after assembly and before commissioning (see section **Overload safety device**).
3. Check the tight seating of the rope on the drum and tighten the wire rope if necessary (see section **Rope drive**).
4. Check gear locking bolt and replace with the bleeder screw supplied if necessary (see section **Gears**).
5. Check correct selection and installation of all electrical equipment.
  - Electrical connection (see section **Electrical equipment**).
6. Rope reeving, rope twist, rope lead-off angle and set-up angle of the wire rope hoist in accordance with the specifications in section **Reeving rope**.
7. Firm and secure seating of the fastening screws.
8. Runway end stops for functional safety.

### ⚠ WARNING

**Safety hazard.** On three phase hoists, it is possible to have “Reverse Phasing” causing the block to lower when the “UP” button is depressed. When this condition exists, the hoist operation will be dangerous.

9. The direction of motion of the load hook must correspond to the symbols on the control pendant.
10. Set-up and function of all protection measures.
11. Check setting of the emergency hoist limit switch or combined operational and emergency hoist limit switch (see section **Checking the geared limit switch**).



Drive in rope with partial load (increases the lifetime).

12. Functional test of all control functions and safety circuits (movements, brakes, emergency stopping, path limiter).
13. Check the maximum rated capacity of the hoisting mechanism with test loads (see section **Crane test**).
14. Function of the overload protection (see section **Overload safety device**).
  - It is not possible to implement settings in the factory with the on-site overload protection and the test must therefore take place during commissioning.
15. Confirmation of correct commissioning in the log book under the section **Confirmation of commissioning**.



## 6 Operating

---

## 6 Operating

### ⚠ WARNING

**Safety hazard.** Bridging limit switches or operating the hoist with a damaged rope or brake is not permissible.

---

### 6.1 Operating precautions

1. **DO** read the Operation & Service Manual.
2. **DO** read the applicable sections of FEM 9.756, Section IX "SERIES LIFTING EQUIPMENT"
3. **DO** be familiar with hoist operating controls, procedures, and warnings.
4. **DO** make sure that the hook travel is in the same direction as shown on the controls.
5. **DO** maintain firm footing when operating hoist.
6. **DO** make sure that the load slings or other approved attachments are properly sized and seated in the hook saddle.
7. **DO** make sure that the hook latch is closed and not supporting the load.
8. **DO** make sure that load is free to move and will clear all obstructions.
9. **DO** take up slack carefully, check load balance, lift a few inches and check load's holding action before continuing.
10. **DO** avoid swinging load or load hook.
11. **DO** make sure that all persons stay clear of the suspended load.
12. **DO** warn personnel of an approaching load.
13. **DO** protect wire from weld splatter or other damaging contaminants.
14. **DO** promptly report any malfunction, unusual performance or damage of the hoist.
15. **DO** inspect the hoist regularly, replace damaged or worn parts, and keep appropriate records of maintenance.
16. **DO** use hoist manufacturer's recommended parts when repairing a hoist.
17. **DO** use hook latches.
18. **DO** apply lubricant to the wire rope as recommended.
19. **DO NOT** lift more than rated load.
20. **DO NOT** use the hoist load-limiting device to measure the load.
21. **DO NOT** use a damaged hoist or a hoist that is not working properly.
22. **DO NOT** use the hoist with twisted, kinked, damaged, or worn wire rope.
23. **DO NOT** lift a load unless wire rope is properly seated in its groove(s).
24. **DO NOT** use wire rope as a sling or wrap rope around the load.
25. **DO NOT** lift a load if any binding prevents equal loading on all supporting ropes.
26. **DO NOT** apply the load to the tip of the hook.
27. **DO NOT** operate unless load is centered under hoist.
28. **DO NOT** allow your attention to be diverted from operating the hoist.
29. **DO NOT** operate the hoist beyond limits of wire rope travel.
30. **DO NOT** use limit switches as routine operating stops unless recommended. They are emergency devices only.
31. **DO NOT** use the hoist to lift, support, or transport people.
32. **DO NOT** lift loads over people.
33. **DO NOT** leave a suspended load unattended unless specific precautions have been taken.
34. **DO NOT** allow sharp contact between two hoists or between hoist and obstructions.

35. **DO NOT** allow the rope or hook to be used as a ground for welding.
36. **DO NOT** allow the rope or hook to be touched by a live welding electrode.
37. **DO NOT** remove or obscure the warnings on the hoist.
38. **DO NOT** adjust or repair a hoist unless qualified to perform hoist maintenance.
39. **DO NOT** attempt to lengthen the wire rope or repair damaged wire rope.
40. **DO NOT** allow personnel not physically fit or properly qualified, to operate hoist.
41. **DO NOT** operate hoists unless hook moves in the same direction as indicated on the push button.
42. **DO NOT** operate hoist unless limit switches are operating properly.
43. **DO** avoid operating hoist when hook is not centered under hoist. Avoid side pulls and swinging of load or load hook when traveling hoist.
44. **DO** operate hoist within recommended duty cycle and **DO NOT** jog unnecessarily.
45. **DO** conduct regular visual inspections for signs of damage and wear.
46. **DO NOT** operate the hoist with hooks that have opened up.
47. **DO** provide supporting structure that has an appropriate design factor based on the load rating and dead weight of the hoist. If in doubt of the supporting structure's strength, consult a structural engineer.
48. **DO NOT** use hoist in location that will not allow operator movement to be free of the load.
49. **DO**, when starting to lift, move the load a few inches at which time the hoist should be checked for proper load holding action. The operation shall be continued only after the operator is assured that the hoist is operating properly and that the load is supported in the center of the base bowl/saddle of the hook.
50. **DO** observe recommended inspection and maintenance procedures.
51. **DO** use common sense and best judgment whenever operating a hoist.
52. **DO NOT** remove drop lugs. Removal will create an unsafe operating condition.
53. **DO NOT** lift guided loads.

### 6.2 Duties of crane operator

**Personal protective equipment must be provided by the owner.**

#### **Requirements for workplace**

1. The operator must not stand in the hazard area.
2. The hazard area must be clearly visible.
3. The movement of the load in all directions must be clearly visible.

#### **▲ WARNING**

#### **Safety hazard.**

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

1. The crane operator must observe the load, or if the crane is unloaded, the load suspension equipment during all movements of the crane if they could cause danger. If it is not possible to observe the crane, the crane operator may only control the crane by following signals from a signaller.
  2. Wear ear protectors in noisy environments.
  3. Start lifting load with the slowest hoisting speed.
  4. The crane operator must give warning signals as necessary.
  5. Loads attached by hand may only be moved by the crane operator after an unambiguous signal from the person attaching the load, the signaller or another person responsible appointed by the owner. If signals need to be used to communicate with the crane operator they must be agreed between the person responsible and the crane operator before being used.
  6. Every day before starting work, check brakes and limit switches and inspect the system for any visible defects.
  7. Stop working with the crane if there are any defects which might prejudice its safety in operation.
  8. At close of work, secure cranes which are exposed to wind with the wind safeguard mechanism.
  9. The rope drum and rope must be free of coarse foreign matter.
  10. Do not move loads above people.
  11. Before starting work, ensure there is sufficient workspace.
  12. Do not leave suspended loads unattended, the control pendant must be within easy reach.
  13. Do not activate emergency hoist limit switch during normal operation.
  14. Do not load above the permitted maximum working load.
  15. Use only tested and approved sling equipment
  16. Pulling loads at angles, dragging loads, or towing vehicles with the load or load suspension equipment is forbidden!
  17. Do not jerk free any loads which are jammed.
  18. Approach final positions for hoisting, lowering and travel in normal operation only if an operational hoist limit switch is fitted.
  19. 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.
  20. Do not move in the opposite direction until the hoist has come to a stop.
  21. Observe the safety instructions in this manual.
-

## 6.3 Control pendant

**⚠ WARNING**

**Danger of unintentional movement of hoist**

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.

If this also fails to bring the hoist to a standstill, the emergency stop switch (mains connection switch) should be immediately switched off and secured to prevent re-activation.

- (1) Emergency stopping  
Hoist/lower
- (2) Step 1: slow  
Step 2: fast  
Long travel: right/left
- (3) Step 1: slow  
Step 2: fast  
Long travel: forwards/backwards
- (4) Step 1: slow  
Step 2: fast

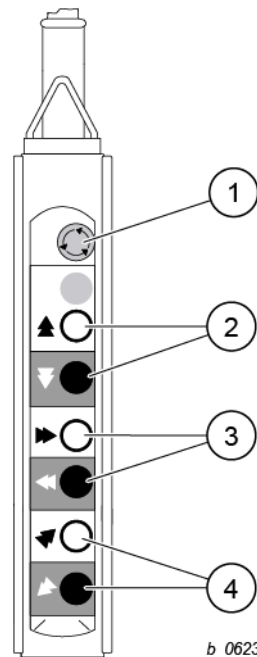


Fig. 64

## 6.4 Emergency stop

**⚠ WARNING**

**Safety hazard.** 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.

Every hoist must have a means of disconnecting the power supply to all drives under load from the ground.

The emergency stop is on the control pendant.

1. Press emergency stop button, the system comes to a halt.
2. To release the emergency stop:
  - on STH: turn the button in the direction shown

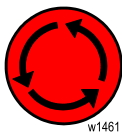
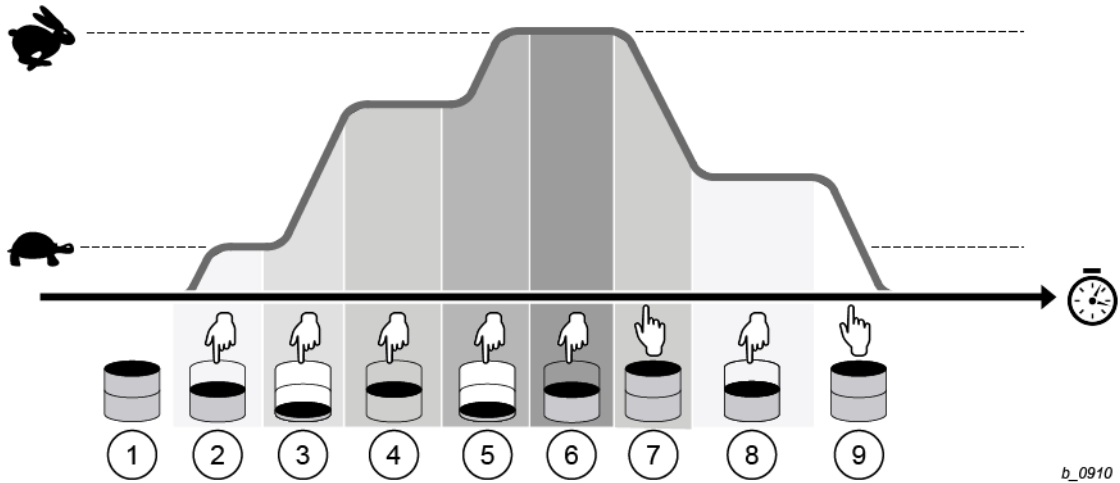


Fig. 65

## 6.5 Hoists with frequency converter



The 2-stage actuation of the pushbuttons enables a fast changeover from "fast" to "slow" and vice versa.

- (1) Pushbutton is not actuated  
→ Motor does not rotate
- (2) Stage I on the pushbutton is actuated  
→ Motor accelerates to preset low speed
- (3) Stage II on the pushbutton is actuated  
→ Motor accelerates to maximum speed
- (4) Stage I on the pushbutton is actuated during acceleration  
→ the current speed is maintained
- (5) Stage II on the pushbutton is actuated  
→ Motor accelerates to maximum speed
- (6) Stage I on the pushbutton is actuated  
→ the current or maximum speed is maintained
- (7) Pushbutton is released  
→ Motor decelerates
- (8) Stage I on the pushbutton is actuated  
→ the current speed is maintained
- (9) Pushbutton is released  
→ Motor decelerates to a standstill

### 7 Inspection and maintenance

- This wire rope hoist is largely maintenance-free.
- Components that are subject to wear (e.g. wire rope, brake) must be subjected to regular tests.
  - This is also required by the accident prevention regulations.
- Tests and maintenance must be performed by qualified personnel.

#### ⚠ WARNING



#### Falling parts hazard.

- Cordon off and secure danger area before inspection and maintenance work.

#### ⚠ WARNING



If work is necessary on live parts, a second person must be involved to stop hazardous movements through emergency stopping in case of an emergency or to actuate the main isolation switch / disconnecter to switch off the power.

#### NOTICE

#### Danger of material damage due to damage or wear

If tests or maintenance on the hoist show increased wear or damage, the hoist shall only be put back into operation after the defects have been eliminated.

#### General information on inspection and maintenance

1. Make sure a qualified person performs inspection and maintenance.
2. Perform maintenance and repair work only when the hoist is unloaded.
3. Before starting disconnect power and implement a Lockout/Tagout (LOTO) procedure before servicing the equipment.
4. Check that the hoist is de-energized.
5. Perform periodic inspections including maintenance every 12 months, possibly earlier if so prescribed by national regulations like ASME B30.16.

**NOTE:** The specified inspection and maintenance intervals apply for normal conditions of use.

If major components are replaced, further tests must be performed.

- Replacing components of the overload safety device (sensor, electronic overload device)  
For load test of cut-off values of system, see separate Operating instructions / Service manual
- Replacement of electrical equipment and renewal of electric leads and connections  
Insulation resistance test and testing the continuity of the PE system
- Correct phase connection

The hoist's electrical equipment must be checked regularly. Damage to electrical equipment, loose terminals, damaged cables and worn switchgear contacts must be remedied immediately.

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

- If after evaluating the actual use it can be seen that the theoretical useful life of the hoist 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 section **Lubricants**.

# 7 Inspection and maintenance

## 7.1 Inspection intervals

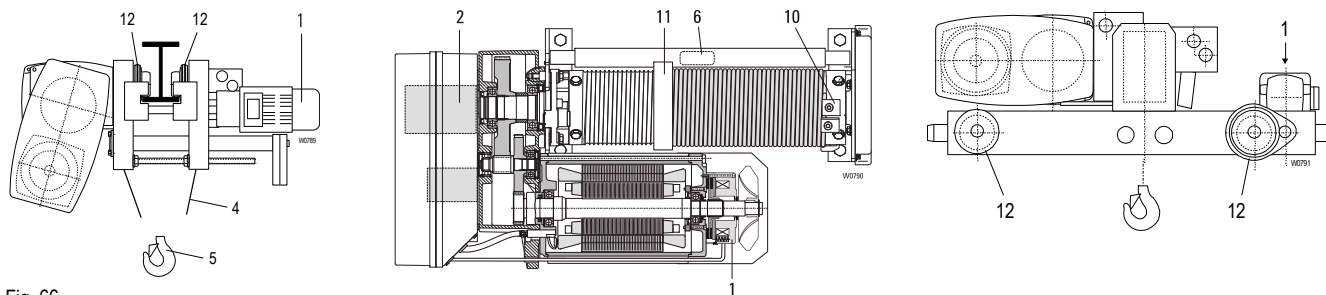


Fig. 66

| Test every day before starting work *1 | Periodic inspection every 12 months *2 | Inspection table  | see page     |
|--|--|---|--------------|
| •                                      | •                                      | Function of brakes (1) with regard to braking efficiency and activation   |              |
| •                                      | •                                      | Functional test of the hoist limit switch: <ul style="list-style-type: none"> <li>Operational hoist limit switch, if available.</li> <li>Emergency hoist limit switch (2), if no operational hoist limit switch available.</li> <li>Hook operated hoist limit switch, if this is present as an option.</li> </ul> | 48, 110, 111 |
| •                                      | •                                      | Emergency stop, travel limit switches, crane switch   | 42           |
| •                                      | •                                      | Rope (4)  | 133          |
| •                                      | •                                      | Check state of system for obvious defects   |              |
|  | •                                      | Check suspension of control pendant (cable and steel wire must be correctly attached)   |              |
|  | •                                      | Load hook (5), cracks, distortion, wear, corrosion, function of hook safety latch   |              |
|  | •                                      | Overload safety device (6)  | 125          |
|  | •                                      | Disconnect switch and main isolator   | 42           |
|  | •                                      | PE connections and equipotential bonding  |              |
|  | •                                      | Establish remaining service life  | 148          |
|  | •                                      | Rope attachment (10) and rope sheaves   | 133, 144     |
|  | •                                      | Rope guide (11)   | 136, 137     |
|  | •                                      | Drive parts (12), wheel flanges, wheels etc.  | 147          |
|  | •                                      | Bolt joints, welds  |              |
|  | •                                      | End stops, buffers  |              |
|  | •                                      | Safety clearances   |              |
|  | •                                      | Power supply cable  |              |
|  | •                                      | Cable glands  |              |
|  | •                                      | Towing arm  |              |
|  | •                                      | Switching functions   |              |
|  | •                                      | All parts in the power flux   |              |

\*1 By user

**i** Periodic inspections including maintenance at least every 12 months, possibly more frequently if so prescribed by national regulations, to be performed by a qualified person.

\*2 Heavy duty or unfavorable conditions (dirt, solvents, multi-shift operation, etc.) entail a reduction of this inspection and maintenance interval.

### ⚠ WARNING

**Safety hazard.** If work needs to be carried out on live parts, a second person must be present who can stop dangerous movements in an emergency by means of the emergency stop or disconnect the power supply by means of the main isolator / disconnect switch.

## 7.2 Maintenance intervals

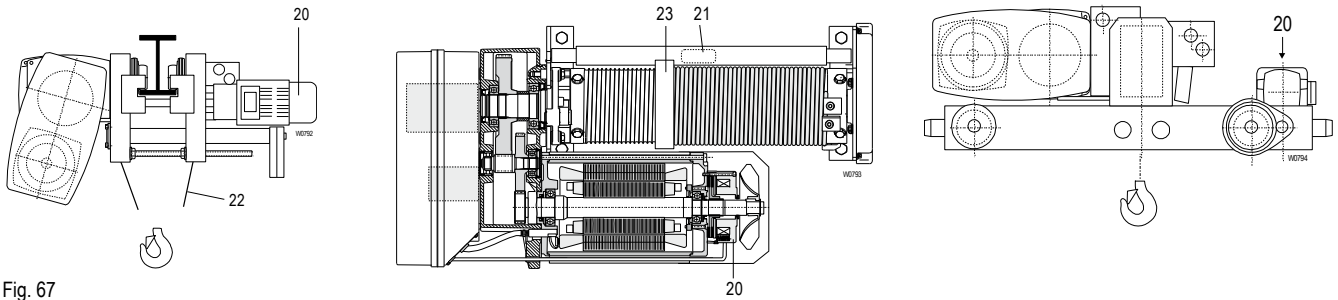


Fig. 67

| Periodic inspection every 12 months *2 | Work every 5 years | Work every 10 years | Maintenance table  | see page         |
|--|--------------------|---------------------|--|------------------|
| •                                      |                    |                     | Brake (20), measure air gap, replace brake disk if necessary                             | 95, 98, 100, 103 |
| •                                      |                    |                     | Overload safety device (21)  | 125              |
| •                                      |                    |                     | Grease rope (22) with brush  | 165              |
| •                                      |                    |                     | Grease rope guide (23) with brush  | 165              |
| •                                      |                    |                     | Tighten clamping points for electric cables  |                  |
|  |                    | •                   | Oil change (normal mode)   | 165              |
|  | •                  |                     | Oil change in case of ambient temperatures $\geq 131$ °F and engine rating M7 and higher | 165              |

**i** Periodic inspections including maintenance at least every 12 months, possibly more frequently if so prescribed by national regulations, to be performed by a qualified person. \*2 Heavy duty or unfavorable conditions (dirt, solvents, multi-shift operation, etc.) entail a reduction of this inspection and maintenance interval.

### NOTICE

**Material damage hazard.** If increased wear or damage is ascertained when inspecting or maintaining the hoist, the latter must not be put into operation again until the faults have been eliminated.



## 7 Inspection and maintenance

### 7.3 Motors



#### ⚠ DANGER

**Electric shock hazard.** Some motor parts are live. Any contact with live parts can cause severe injury or death. Motors have dangerous rotating parts and hot surfaces.

Ensure that:

- the motor runs correctly (e.g. no variations in speed, no noise emission),
- there are no strong vibrations.

The insulation resistance must be checked after a long period of storage or shutdown, if possible at a winding temperature of +68 °F ... +86 °F. Before starting to measure the insulation resistance, pay attention to the operating instructions of the insulation measurement instrument being used.

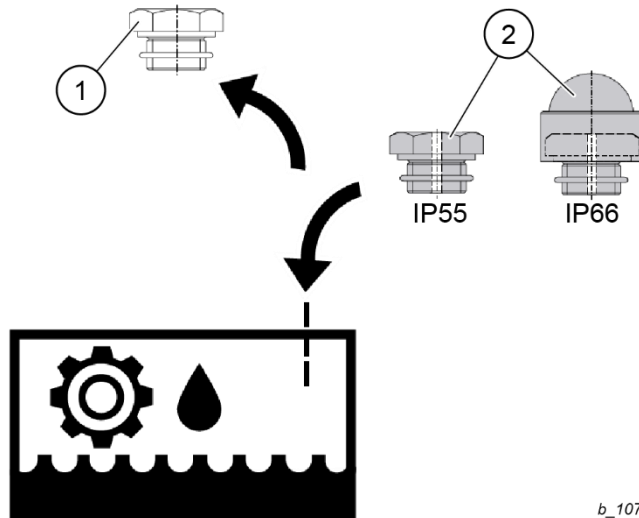
Measuring voltage: 500 V.

Minimum insulation resistance for new, cleaned or overhauled windings: 10 MΩ.

Critical specific insulation resistance after a long period of operation: 0.5 MΩ / kV.

If the critical insulation resistance is reached or undershot, the windings must be dried, or thoroughly cleaned and dried after removing the rotor.

### 7.4 Gears



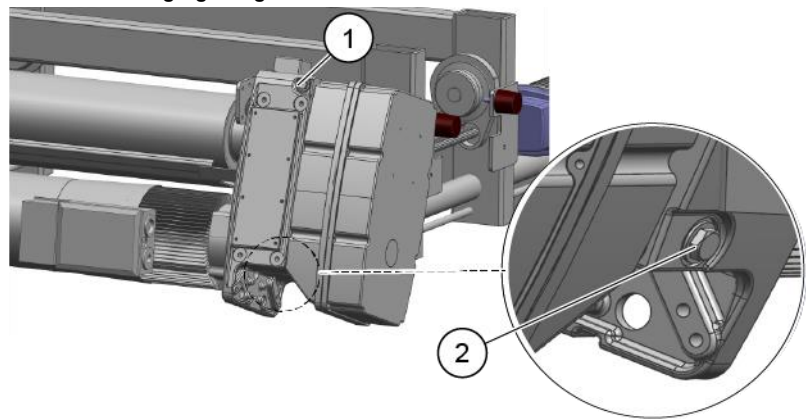
- (1) Screw plug
- (2) Bleeder screw

Before commissioning, the screw plug (1) used for transport must be replaced by the bleeder screw (2) provided if necessary.



Small quantities of oil may leak out of the bleeder screw.

### 7.4.1 Changing the gear oil



b\_0930



The oil should be drained when at operating temperature if possible.

1. Open the oil drain screw (2) and oil filler plug / bleeder screw (1).
2. Collect oil in a suitable container.
3. Replace copper sealing rings.
4. Tighten the oil drain screw (2) (for tightening torque see table).
5. Fill with oil.
  - For suitable oil types and quantities, see section **Lubricants**.
6. Tighten the oil filler plug / bleeder screw (1) (for tightening torque see table).
  - The bleeder screw (1) must always be at the highest point of the gear.

| Thread size | Tightening torque    |
|-------------|----------------------|
|             | [lb <sub>r</sub> ft] |
| M16x1.5     | 30                   |
| M22x1.5     | 52                   |

7.5 Drive-through mechanism conversion or replacement (single girder trolleys)

7.5.1 Drive-through mechanism for travel drive (trolleys KE-S33 - KE-S65)

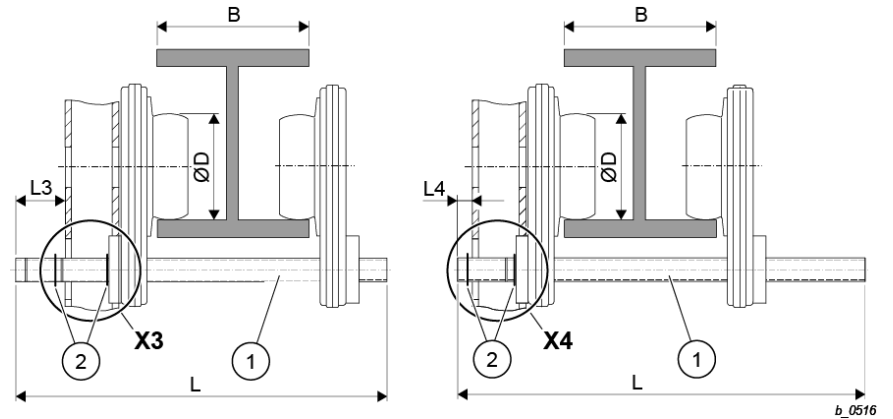


Fig. 68 Depending on the flange width (B) of the runway beam and the length (L) of the drive-through mechanism (1), install the drive-through mechanism in the installation position X3 or X4.

- Install retaining rings (2).
- See figure above and table.

| Travel drive         | Ø D<br>[in] | B<br>[in]   | Drive-through mechanism |                        |                        |     |
|----------------------|-------------|-------------|-------------------------|------------------------|------------------------|-----|
|                      |             |             | L<br>[in]               | Installation location  |                        |     |
|                      |             |             |                         | X3<br>L3 ±0.08<br>[in] | X4<br>L4 ±0.08<br>[in] |     |
| SF17 1..<br>SF17 2.. | 3.1         | 3.5...5.7   | 15.4                    | 3.8                    | -                      |     |
|                      | 3.9         | 5.7...7.7   |                         | 19.5                   | -                      | 1.8 |
|                      |             | 7.7...9.8   | 3.8                     |                        | -                      |     |
|                      |             | 9.9...12    | -                       |                        | 1.8                    |     |
|                      |             | 12.1...13.8 | 23.4                    |                        | 3.8                    | -   |
|                      |             | 13.8...15.7 | -                       |                        | 1.8                    |     |
|                      | 15.8...17.7 | 27.4        | 3.8                     | -                      |                        |     |
| 17.8...19.7          | -           | 1.8         |                         |                        |                        |     |
| SF17 2..             | 5.5         | 4.7...7.9   | 19.9                    | 4.9                    | -                      |     |
|                      |             | 7.9...12.2  | 27.4                    | -                      | 1.8                    |     |
|                      |             | 12.2...15.7 |                         | 4.9                    | -                      |     |
|                      |             | 15.8...19.7 |                         | -                      | 1.8                    |     |
| SF17 2..             | 7.9         | 4.9...8.7   | 20.1                    | see next page          |                        |     |
|                      |             | 8.7...15.7  | 29.1                    |                        |                        |     |
|                      |             | 15.8...19.7 | 30.7                    |                        |                        |     |

Tab. 24

7.5.2 Underslung trolley UE-S4

Connecting pin and drive-through mechanism

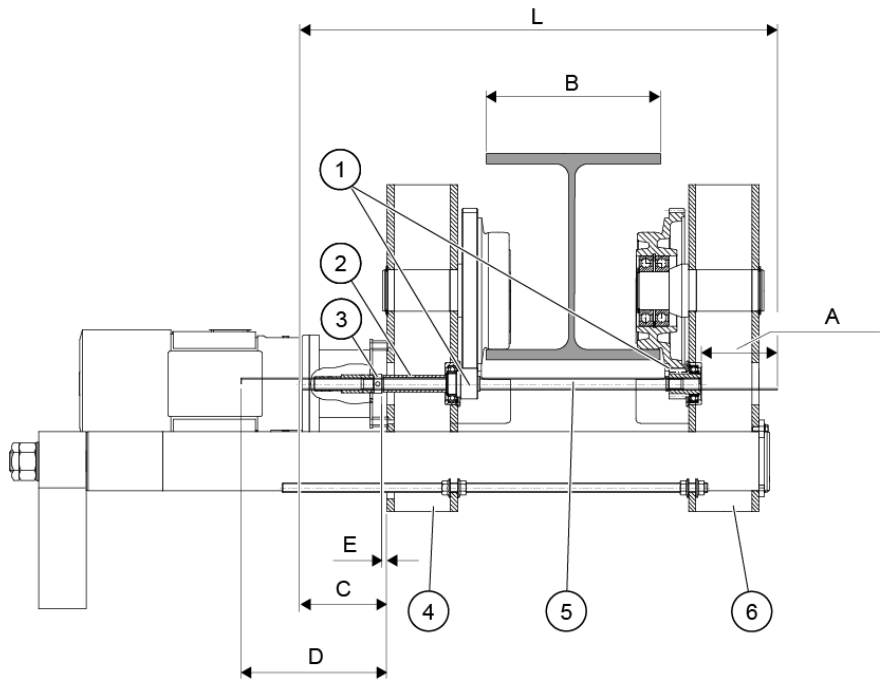
- Use connecting pin and drive-through mechanism that fit beam area "B" (for dimensions see Fig. 68 and Tab. 24).

### 7.5.3 Drive-through mechanism for travel drive (trolley KE-S76)

The drive-through mechanism is suitable for beam flange widths "B" of 4.9...19.7 in; for length "L" see Tab. 24, page 91.

| Dimension | min. | max. |
|-----------|------|------|
|           | [in] |      |
| A         | 0    | 4.7  |
| C         | 1.9  |      |
| D         | 6.3  |      |
| E         | 0.08 | 0.16 |

- (1) Drive pinion
- (2) Spacer tube
- (3) Adjusting ring
- (4) Trolley side cheek
- (5) Drive-through shaft
- (6) Trolley side cheek



b\_0672

Fig. 69

1. Guide the drive-through shaft (5) into both drive pinions (1) from the travel drive side.
2. Slide on the spacer tube (2) and adjusting ring (3).

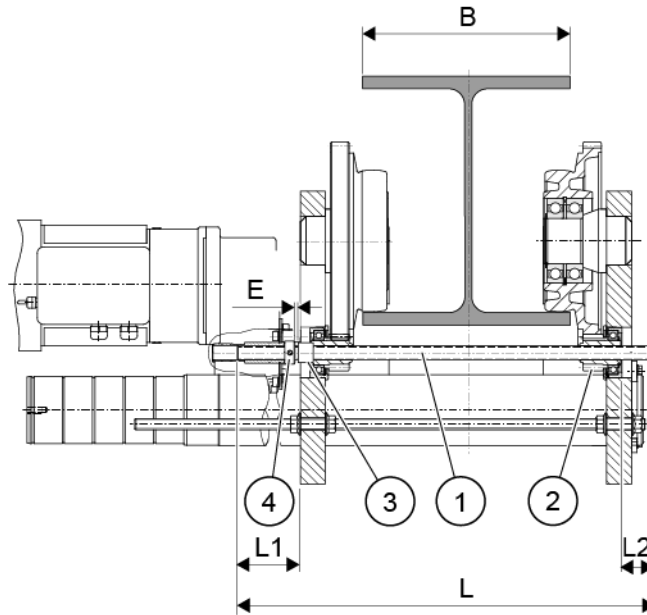
#### Adjust the drive-through shaft (5)

Observe the following points:

1. Set the drive-through shaft (5) to the specified dimensions.
  - The shaft end on the wire rope side is permitted to protrude from the drive pinion into the trolley side cheek (6) by dimension **A**.
  - The shaft end on the travel drive side must protrude beyond the trolley side cheek (4) by the minimum dimension **C** and the maximum dimension **D**.
2. Secure the adjusting ring (3) with the adjustment screw.
  - An air gap **E** must be present between the drive pinion (1) with fitted spacer tube (2) and the adjusting ring (3).
  - After assembly of the travel drive, check that the drive-through shaft (5) slides easily.

## 7.5.4 Drive-through mechanism for travel drive (UE-S776)

The drive-through mechanism is suitable for beam flange widths "B" of 7.3...19.7 in; for length "L" see Tab. 25.



- (1) Drive-through shaft
- (2) Drive pinion
- (3) Spacer tube
- (4) Adjusting ring

b\_0614

Fig. 70

1. Guide the drive-through shaft (5) into both drive pinions (1) from the counterweight side.
2. Slide on the spacer tube (2) and adjusting ring (3).
3. Adjust the drive-through shaft (1) to the dimension L1, dimension L2 must lie within the table values.
4. Secure the adjusting ring (4) with the adjustment screw.
  - An air gap E must be present between the adjusting ring (4) and spacer tube (3).
5. After assembly of the travel drive, check that the drive-through shaft (1) slides easily.

| B           | L    | L1  | L2        | E           |
|-------------|------|-----|-----------|-------------|
| [in]        |      |     |           |             |
| 7.3...8.7   | 20.1 | 3.3 | 5.1...3.7 | 0.08...0.16 |
| 8.7...14.2  | 24.4 | 3.3 | 6.8...1.3 |             |
| 14.2...17.7 | 29.1 | 5.3 | 3.9...0.4 |             |
| 17.8...19.7 | 29.1 | 3.3 | 2.3...0.4 |             |

Tab. 25

## 7.5.5 Underslung trolley UE-S776 with wire rope hoists YKE/SKE 4PS (4-strand) Connecting pin and drive-through mechanism

- Use connecting pin and drive-through mechanism that fit beam area "B" (for dimensions see Fig. 70).

## 7.5.6 Drive-through mechanism for travel drive (DKE-S4 / DKE-S6)

- Drive-through mechanism (1) is suitable for beam widths "B" of 3.5...11.8 in. For length "L", see Tab. 26.

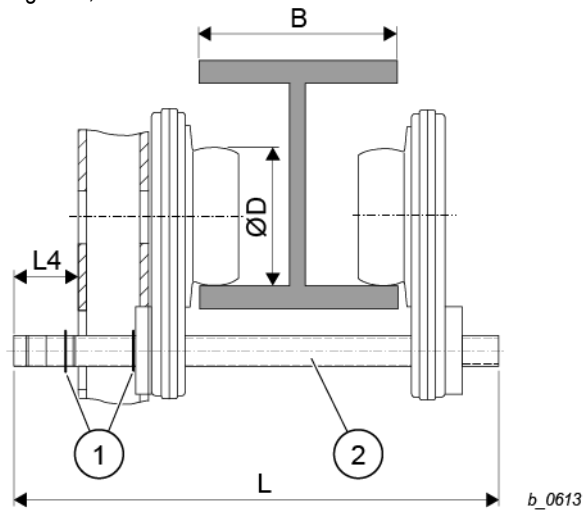


Fig. 71

### Trolleys with one travel drive

- Assemble retaining rings (1) per dimension L4.
- The installation position of the drive-through mechanism does not change over the respective beam area "B".

### Trolleys with two travel drives

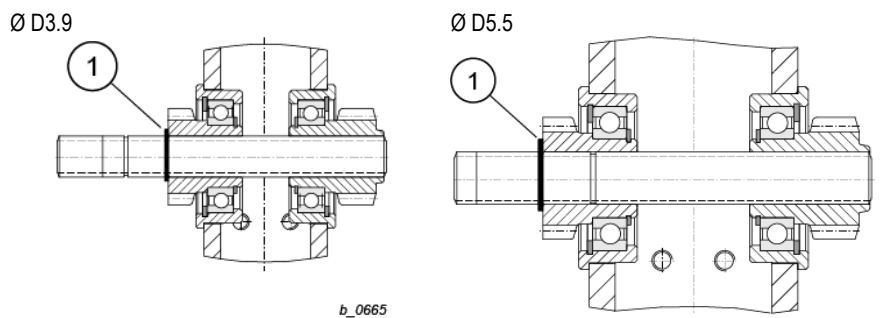


Fig. 72

- Drive-through mechanism is fully independent of the beam width.
- Assemble retaining rings (1) per Fig. 71 and Fig. 72.

| Ø D  | B           | Drive-through mechanism D |           |
|------|-------------|---------------------------|-----------|
|      |             | L                         | L4 ±0.079 |
| [in] |             |                           |           |
| 3.9  | 3.5...5     | 15.4                      | 1.8       |
|      | 5.1...8.7   | 19.5                      |           |
| 5.5  | 4.7...11    | 19.5                      | 1.8       |
|      | 11.1...11.8 | 28                        |           |

Tab. 26

## 7.6 Hoist motor brake (RSM)

This inspection and maintenance is of particularly important to ensure safety. If brake maintenance is not performed correctly or the brake does not function correctly, the load may fall!

**▲ WARNING**



**Danger of falling load**

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

➤ Switch off the main isolation switch and secure against being switched on again!

- (1) Fastening screws
- (2) Fan cover
- (3) Stopping plug
- (5) Retaining ring
- (6) Fanwheel
- (7) Parallel key
- (8) Fastening screws
- (9) Coil carrier
- (10) Brake rotor
- (11) Hub
- (12) V-ring (IP66)
- (13) Retaining ring
- (14) Motor shaft

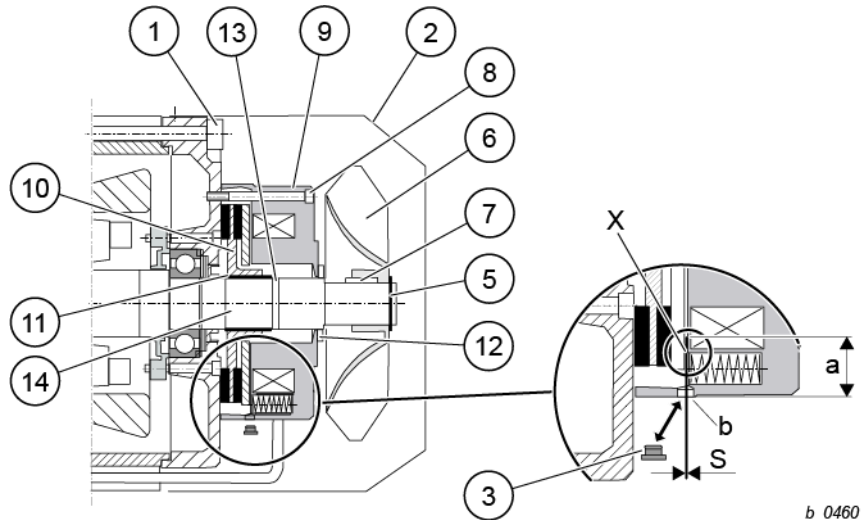


Fig. 73

### 7.6.1 Checking the brake

1. Remove fan cover (2)
2. Remove stopping plug (3)
3. Measure the air gap (S) with a feeler gauge (b).
4. **NOTICE** When measuring, ensure that the feeler gauge (b) is slid up to insertion depth "a" as a minimum and does not become caught on the ledge (!). Refer to the table for the maximum permissible air gap (S). The brake is not readjustable. Once the max. permissible air gap (S) has been reached, the brake rotor must be replaced.

### 7.6.2 Replacing the brake rotor

#### ⚠ CAUTION

Brake dust is hazardous to health.

- Do not clean brakes with compressed air, brushes or similar.
- Use a vacuum system or a damp cloth to remove brake dust.
- If dust develops, wear safety eyewear and a fine dust mask.

#### ⚠ WARNING



With an incorrectly assembled brake rotor, the brake cannot hold the load and the load will fall.

This can lead to serious injuries and even death.

- Replacement work may only be carried out by a competent person.



The pressure springs of the brake must always be replaced at the same time.

1. Remove fan cover (1)
2. Remove retaining ring (5)
3. Take off fanwheel (6), remove parallel key (7)
4. Disconnect electrical connection of the brake
5. Unscrew the fastening screws (8)
6. Remove coil carrier (9)
7. Take off brake rotor (10)

**NOTICE** When dampening the cloths, **only use** isopropyl alcohol. The use of brake cleaner is **not permissible**.

- Ensure sufficient drying time for the cleaned surfaces.



We cannot recommend cleaning the rotor / friction linings because oil / grease has usually worked into the lining and this can only be removed from the surface area to a limited degree.

Furthermore, it is not possible to fully exclude negative reactions between the cleaning products and the lining. We therefore recommend use of the spare parts kit here.

8. Check friction surfaces for wear and clean with a damp cloth.
9. Slide a new brake rotor (10) onto the hub (11) and check the available clearance.

**NOTICE** Danger of damage

- If increased clearance is present in the gearing between the brake rotor (10) and hub (11), remove the hub (11) from the motor shaft (14) and replace it. Be sure to consult the production factory before removing the hub (8).

10. Clean coil carrier.
11. Replace the brake pressure springs (see section **Replacing the pressure springs**).
12. Check the O-ring of the coil carrier for damage and replace if necessary.



13. Assemble in reverse order.

- Steps 7 to 12 are omitted.
- Make sure that the inspection bore for the air gap measurement is in the lower area.
- After tightening the fastening screws (8) (for tightening torque see table), mark the fastening screws (8).

| Hoist motor type | Hoist brake | S max. | a    | Tightening torque (8) |
|------------------|-------------|--------|------|-----------------------|
|                  |             | [in]   | [in] | [lbf ft]              |
| 12/2H73/100.822  | RSM150      | 0.063  | 1.2  | 16                    |
| 12/2H73-1PC3052  |             | 0.035  | 1.2  |                       |
| 24/4H92          | RSM500      | 0.079  | 1.6  | 33                    |

Tab. 27

Check the brake data against the rating plate on the hoist motor!

## 7.7 Hoist motor brake (NM) 12/2H...-MF

### ▲ WARNING

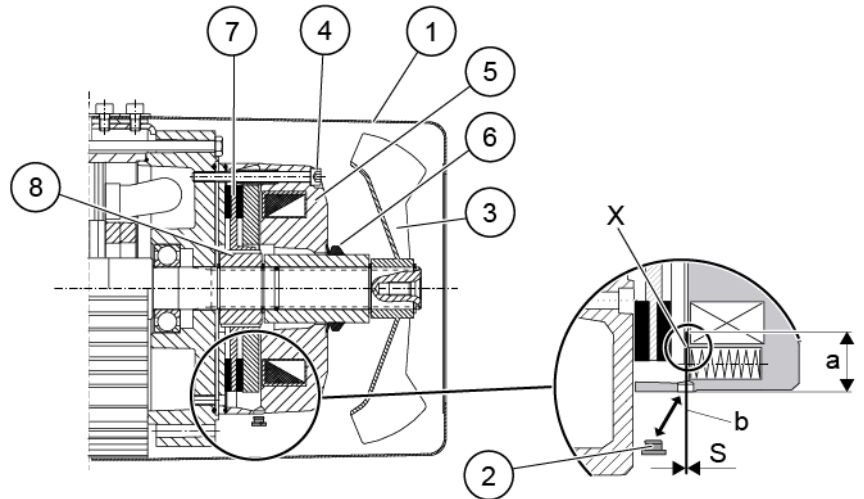


#### Danger of falling load

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

- Switch off the main isolation switch and secure against being switched on again!

- (1) Fan cover
- (2) Stopping plug
- (3) Fanwheel
- (4) Fastening screws
- (5) Coil carrier
- (6) V-ring (IP66)
- (7) Brake rotor
- (8) Hub



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### 7.7.1 Checking the brake

1. Remove fan cover (1).
2. Remove stopping plug (2).
3. Measure the air gap (S) with a feeler gauge (b).
4. **NOTICE** When measuring, ensure that the feeler gauge is slid up to insertion depth "a" as a minimum (see Tab. 28) and does not become caught on the ledge (!). For the maximum permissible air gap (S) refer to Tab. 28. The brake is not readjustable. Once the max. permissible air gap (S) has been reached, the brake rotor must be replaced.

### 7.7.2 Replacing the brake rotor

#### ▲ CAUTION

Brake dust is hazardous to health.

- Do not clean brakes with compressed air, brushes or similar.
- Use a vacuum system or a damp cloth to remove brake dust.
- If dust develops, wear safety eyewear and a fine dusk mask.

#### ▲ WARNING



With an incorrectly assembled brake rotor, the brake cannot hold the load and the load will fall. This can result in serious injuries and even death.

- Ensure that a competent person carries out the replacement work.



The pressure springs of the brake must always be replaced at the same time.

1. Remove fan cover (1).
2. Take off fanwheel (3), remove bushing with V-ring (6).

3. Disassemble electrical connection of the brake.
4. Unscrew the fastening screws (4)
5. Remove coil carrier (5) complete with anchor plate (6).
6. Take off brake rotor (7).

**NOTICE** When dampening the cloths, **only use** isopropyl alcohol. The use of brake cleaner is **not permissible**.

- Ensure sufficient drying time for the cleaned surfaces.



We cannot recommend cleaning the rotor / friction linings because oil / grease has usually worked into the lining and this can only be removed from the surface area to a limited degree. Furthermore, it is not possible to fully exclude negative reactions between the cleaning products and the lining. We therefore recommend use of the spare parts kit here.

7. Check friction surfaces for wear and clean with a damp cloth.
8. Slide a new brake rotor (7) onto the hub (8) and check the available clearance.

**NOTICE** Danger of damage

- If increased clearance is present in the gearing between the brake rotor (7) and hub (8), remove the hub (8) from the motor shaft and replace it. Be sure to consult the production factory before removing the hub (8).
9. Clean coil carrier.
  10. Replace the brake pressure springs (see section **Replacing the pressure springs**).
  11. Check the O-ring of the coil carrier for damage and replace if necessary.
  12. Assemble in reverse order.
    - Steps 6 to 11 are omitted.
    - Make sure that the inspection bore for the air gap measurement is in the lower area.
    - After tightening the fastening screws (4) (for tightening torque see Tab. 28), mark the fastening screws (4).

| Hoist motor type   | Hoist brake | S max. | a    | Tightening torque (4) |
|--------------------|-------------|--------|------|-----------------------|
|                    |             | [in]   | [in] | [lbf ft]              |
| 12/2H33-MF10Z-106  | NM38722     | 0.024  | 1    | 7                     |
| 12/2H42-MF10X-106  | NM38732     | 0.024  | 1    | 7                     |
| 12/2H62-MF11X-106  | NM38742     | 0.031  | 1    | 16                    |
| 12/2H71-MF11X-106  | NM38742     | 0.031  | 1    | 16                    |
| 12/2H72-MF13Z-106  | NM38754     | 0.035  | 1.2  | 16                    |
| 12/2H91-MF16ZC-106 | NM38790     | 0.035  | 1.6  | 33                    |

Tab. 28

Check the brake data against the rating plate on the hoist motor!

## 7.8 Hoist motor brake (NM) 4H.-MF

**⚠ WARNING**



**Danger of falling load**

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

➤ Switch off the main isolation switch and secure against being switched on again!

- (1) Stopping plug
- (2) Stopping plug
- (3) Enclosure upper part
- (4) Stud bolt
- (5) Fan cover
- (6) Stud bolts
- (7) Fanwheel
- (8) Fastening screws
- (9) Coil carrier
- (10) Anchor plate
- (11) Brake rotor
- (12) Hub
- (13) Enclosure lower part
- (14) Retaining ring
- (15) V-ring (IP66)

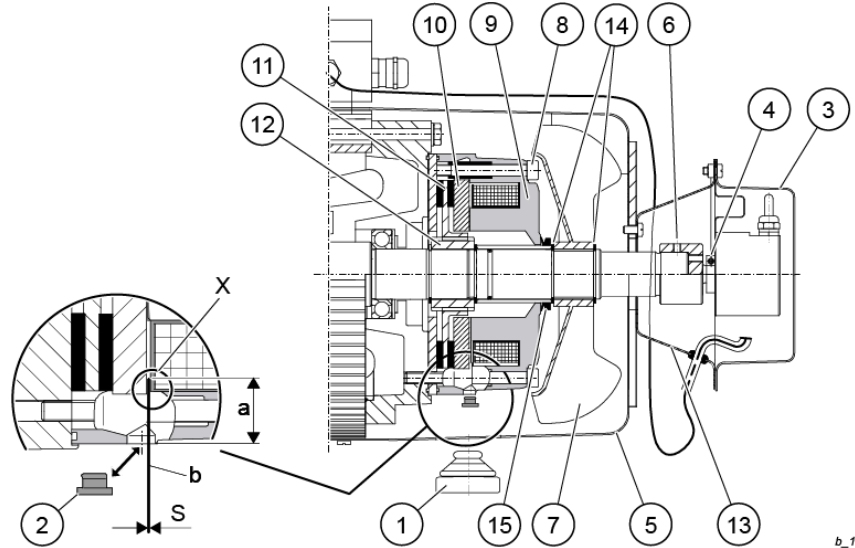


Fig. 74

### 7.8.1 Checking the brake

1. Remove stopping plug from the fan cover.
2. Remove stopping plug (2) with pliers
3. Measure the air gap (S) with a feeler gauge (b).
4. **NOTICE** When measuring, ensure that the feeler gauge (b) is slid up to insertion depth "a" as a minimum and does not become caught on the ledge (!). Refer to the table for the maximum permissible air gap (S). The brake is not readjustable. Once the max. permissible air gap (S) has been reached, the brake rotor must be replaced.

### 7.8.2 Replacing the brake rotor

#### ⚠ CAUTION

Brake dust is hazardous to health.

- Do not clean brakes with compressed air, brushes or similar.
- Use a vacuum system or a damp cloth to remove brake dust.
- If dust develops, wear safety eyewear and a fine dust mask.

#### ⚠ WARNING



With an incorrectly assembled brake rotor, the brake cannot hold the load and the load will fall. This can result in serious injuries and even death.

- Ensure that a competent person carries out the replacement work.



The pressure springs of the brake must always be replaced at the same time.

1. Disassemble enclosure upper part (3).
2. Loosen stud bolt (4).
3. Take off encoder and leave attached to the connection cable.
4. Disassemble enclosure lower part (13).
5. Disassemble fan cover (5).
6. Loosen stud bolts (6) on the adapter shaft.
7. Disassemble adapter shaft with jacking screws (M6).
8. Remove retaining ring (14) for fanwheel (7).
9. Take off fanwheel (7), remove V-ring (15).
10. Remove retaining ring (14).
11. Disconnect electrical connection of the brake.
12. Unscrew the fastening screws (8).
13. Remove coil carrier (9).
14. Take off brake rotor (11).

**NOTICE** When dampening the cloths, **only use** isopropyl alcohol. The use of brake cleaner is **not permissible**.

- Ensure sufficient drying time for the cleaned surfaces.



We cannot recommend cleaning the rotor / friction linings because oil / grease has usually worked into the lining and this can only be removed from the surface area to a limited degree.

Furthermore, it is not possible to fully exclude negative reactions between the cleaning products and the lining. We therefore recommend use of the spare parts kit here.

15. Check friction surfaces for wear and clean with a damp cloth.

16. Slide a new brake rotor (11), identical to the previous rotor, onto the hub (12) and check the clearance.

**NOTICE** Danger of damage

- If increased clearance is present in the gearing between the brake rotor (11) and hub (12), remove the hub (12) from the motor shaft and replace it. Be sure to consult the production factory before removing the hub (12).

17. Replace the brake pressure springs (see section **Replacing the pressure springs**).

18. Check the O-ring of the coil carrier for damage and replace if necessary.

19. Clean coil carrier.

20. Assemble in reverse order.

- Steps 14 to 19 are omitted.
- Make sure that the inspection bore for the air gap measurement matches with the opening in the fan cover. Secure the stud bolts (6) with thread locker.
- After tightening the fastening screws (8) (for tightening torque see Tab. 29), mark the fastening screws (8).

| Hoist motor type | Hoist brake | S max. | a    | Tightening torque (8) |
|------------------|-------------|--------|------|-----------------------|
|                  |             | [in]   | [in] | [lbf ft]              |
| 4H33-MF10MB-200  | NM38720     | 0.024  | 1    | 7                     |
| 4H42-MF10MC-200  | NM38730     | 0.024  | 1    | 7                     |
| 4H62-MF11MA-200  | NM38740     | 0.031  | 1    | 16                    |
| 4H71-MF11MB-200  | NM38740     | 0.031  | 1    | 16                    |
| 4H72-MF13Z-200   | NM38741     | 0.031  | 1.2  | 16                    |
| 4H73-MF13ZB-200  | NM38753     | 0.035  | 1.2  | 16                    |
| 4H81-MF13ZC-200  | NM38753     | 0.035  | 1.2  | 16                    |
| 4H82-MF13X-200   | NM38781     | 0.035  | 1.2  | 16                    |

Tab. 29

Check the brake data against the rating plate on the hoist motor!

## 7.9 Hoist motor brake (NM) 4HS.

**⚠ WARNING**



**Danger of falling load**

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

- Switch off the main isolation switch and secure against being switched on again!

- (1) Stopping plug
- (2) Stopping plug
- (4) Stud bolt
- (5) External ventilation
- (6) Stud bolt
- (7) V-ring
- (8) Fastening screws
- (9) Coil carrier
- (10) Anchor plate
- (11) Brake rotor
- (12) Hub
- (16) Fastening screws

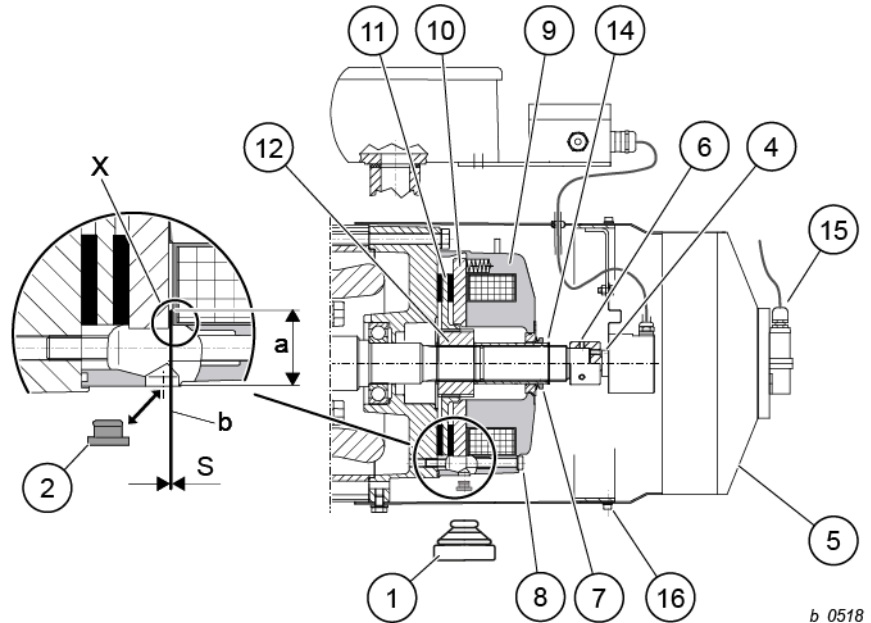


Fig. 75

### 7.9.1 Checking the brake

1. Remove stopping plug (1)
2. Remove stopping plug (2) with pliers
3. Measure the air gap (S) with a feeler gauge (b).
4. **NOTICE** When measuring, ensure that the feeler gauge (b) is slid up to insertion depth "a" as a minimum and does not become caught on the ledge (!). For the maximum permissible air gap (S) refer to Tab. 30) The brake is not readjustable. Once the max. permissible air gap (S) has been reached, the brake rotor must be replaced.

### 7.9.2 Replacing the brake rotor

#### ⚠ CAUTION

Brake dust is hazardous to health.

- Do not clean brakes with compressed air, brushes or similar.
- Use a vacuum system or a damp cloth to remove brake dust.
- If dust develops, wear safety eyewear and a fine dust mask.

#### ⚠ WARNING



With an incorrectly assembled brake rotor, the brake cannot hold the load and the load will fall. This can result in serious injuries and even death.

- Ensure that a competent person carries out the replacement work.



The pressure springs of the brake must always be replaced at the same time.

1. Unplug the plug (15).
2. Unscrew the fastening screws (16).
3. Disassemble external ventilation (5).
4. Loosen stud bolt (4).
5. Disassemble the encoder.
6. Disassemble the encoder bracket.
7. Loosen stud bolts (6) on the adapter shaft.
8. Disassemble adapter shaft with jacking screws (M6).
9. Remove V-Ring (7) (IP66).
10. Remove retaining ring (14).
11. Disassemble electrical connection of the brake.
12. Unscrew the fastening screws (8).
13. Remove coil carrier (9).
14. Take off brake rotor (11).

**NOTICE** When dampening the cloths, **only use** isopropyl alcohol. The use of brake cleaner is **not permissible**.

- Ensure sufficient drying time for the cleaned surfaces.



We cannot recommend cleaning the rotor / friction linings because oil / grease has usually worked into the lining and this can only be removed from the surface area to a limited degree.

Furthermore, it is not possible to fully exclude negative reactions between the cleaning products and the lining. We therefore recommend use of the spare parts kit here.

15. Check friction surfaces for wear and clean with a damp cloth.



16. Slide a new brake rotor (11), identical to the previous rotor, onto the hub (12) and check the clearance.

**NOTICE** Danger of damage

- If increased clearance is present in the gearing between the brake rotor (11) and hub (12), remove the hub (12) from the motor shaft and replace it. Be sure to consult the production factory before removing the hub (12).

17. Replace the brake pressure springs (see section **Replacing the pressure springs**).

18. Check the O-ring of the coil carrier for damage and replace if necessary.

19. Clean coil carrier.

20. Assemble in reverse order.

- Steps 14 to 19 are omitted.
- Make sure that the inspection bore for the air gap measurement matches with the opening in the fan cover. Secure the stud bolts (6) with thread locker.
- After tightening the fastening screws (8) (for tightening torque see Tab. 30), mark the fastening screws (8).

| Hoist motor type | Hoist brake | S max. | a    | Tightening torque (8) |
|------------------|-------------|--------|------|-----------------------|
|                  |             | [in]   | [in] | [lbf ft]              |
| 4HS3             | NM38730     | 0.024  | 1    | 7                     |
| 4HS5             | NM40940     | 0.031  | 1    | 16                    |
| 4HS7             | NM40951     | 0.031  | 1.2  | 16                    |
| 4HS8             | NM40980     | 0.035  | 1.2  | 16                    |
| 4HSA             | NM40980     | 0.035  | 1.2  | 16                    |

Tab. 30

Check the brake data against the rating plate on the hoist motor!

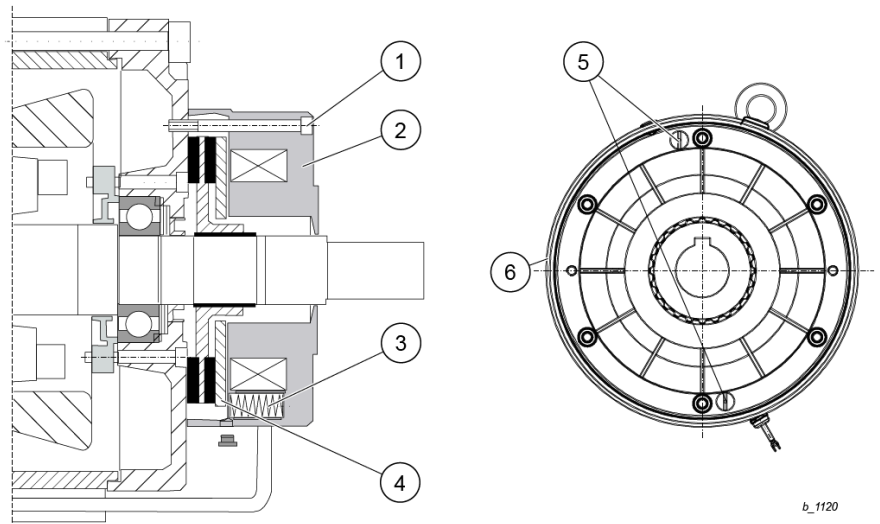
### 7.10 Replacing the pressure springs

#### ⚠ CAUTION

Brake dust is hazardous to health.

- Do not clean brakes with compressed air, brushes or similar.
- Use a vacuum system or a damp cloth to remove brake dust.
- If dust develops, wear safety eyewear and a fine dust mask.

- (1) Fastening screws
- (2) Coil carrier
- (3) Pressure spring
- (4) Anchor plate
- (5) Shoulder screws
- (6) O-ring



1. For preparatory works, see hoist motor brake chapter for the respective motor.
2. Set the coil carrier (2) down on a clean work surface.

**⚠ CAUTION** The pressure springs push against the anchor plate; injuries can result from incorrect loosening.

- In order to remove the shoulder screws, press the anchor plate against the coil carrier (with larger sizes use a spindle press if necessary) to avoid sudden relief of the spring pressure. Observe the installation of the anchor plate.
3. Unscrew both shoulder screws (5) uniformly in turn.
  4. Remove and set down the anchor plate (4) and shoulder screws (5).

**NOTICE** When dampening the cloths, **only use** isopropyl alcohol. The use of brake cleaner is **not permissible**.

- Ensure sufficient drying time for the cleaned surfaces.

5. Clean the anchor plate (4) with a damp cloth.

## 7 Inspection and maintenance

6. Remove all old pressure screws (3) from the coil carrier (2).
7. Clean the coil carrier (2) with a damp cloth.



The thickness and number of windings of the pressure screws may vary. It is therefore essential to symmetrically distribute the pressure springs in the coil carrier.

8. Equip the coil carrier (2) with the correct new pressure spring set.
9. Lay anchor plate (4) on the coil carrier or pressure springs,
  - (observe the installation position, with size 16 to 60, use fastening screws (1) as a centring aid if necessary).
10. Press the anchor plate (4) down against the spring force (e.g. with a spindle press) and screw in the shoulder screws with the tightening torque specified in the table.
11. Clean the friction surface of the anchor plate (4) so that this is **clear of grease**.
12. For subsequent work, see hoist motor brake chapter for the respective motor.

| Hoist motor type   | Brake fastening screws (1) | Shoulder screws (5) |
|--------------------|----------------------------|---------------------|
|                    | [lbr ft]                   |                     |
| 12/2H33-MF10Z-106  | 7                          | 1                   |
| 4H33-MF10MB-200    |                            |                     |
| 12/2H42-MF10X-106  |                            |                     |
| 4H42-MF10MC-200    |                            |                     |
| 4HS3               |                            |                     |
| 4HS5               | 16                         | 3                   |
| 12/2H62-MF11X-106  |                            |                     |
| 12/2H71-MF11X-106  |                            |                     |
| 4H62-MF11MA-200    |                            |                     |
| 4H71-MF11MB-200    |                            |                     |
| 4H72-MF13Z-200     |                            |                     |
| 4H73-MF13ZB-200    |                            | 6                   |
| 4H81-MF13ZC-200    |                            |                     |
| 4H82-MF13X-200     |                            |                     |
| 12/2H72-MF13Z-106  |                            |                     |
| 4HS7               |                            |                     |
| 4HS8               |                            |                     |
| 4HSA               |                            |                     |
| 12/2H73/100.822    | 33                         | 14                  |
| 12/2H73-1PC3052    |                            |                     |
| 24/4H92            |                            |                     |
| 12/2H91-MF16ZC-106 |                            |                     |

### 7.11 Travel motor brake

See instructions for travel motors.

## 7.12 Geared limit switch

**⚠ WARNING**

Danger of personal injuries

- The geared limit switch is built in accordance with state of the art engineering and is operationally safe.
- However, it may pose dangers if it is not used as intended.



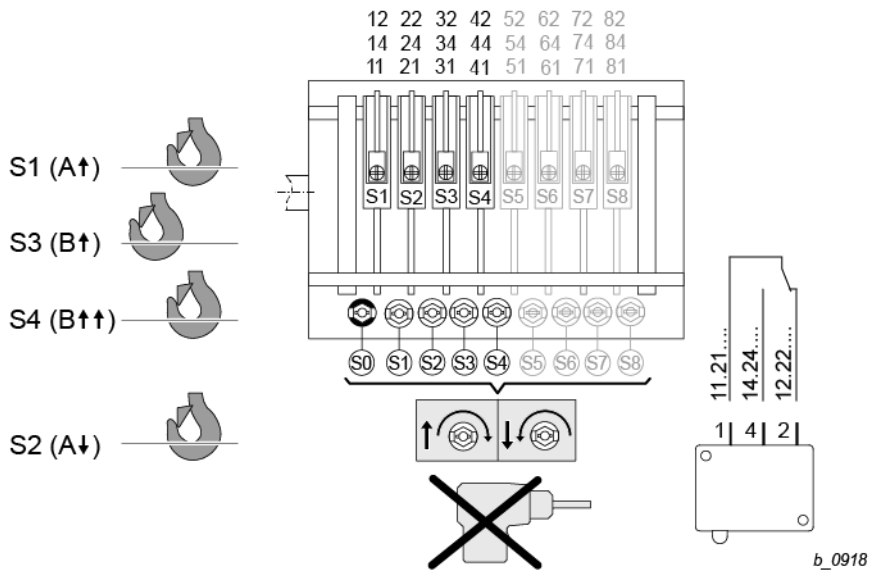
- Observe the specifications in the enclosed circuit diagram.
- Observe for information on the sticker, which is applied to the inside of the hood of the geared limit switch.

### 7.12.1 System description for geared limit switch - version 1

This geared limit switch is suitable for wire rope hoists with pole-changeable hoist motors.

The geared limit switch has an emergency hoist limit switch (switching points A↑ and A↓) for the highest and lowest hook position. Additionally, the geared limit switch is equipped with an operational hoist limit switch for switching off in the highest hook position in normal operation (switching point B↑). At switching point B↑↑, switching takes place from the fastest to the slowest speed or vice versa.

If overtravel of the operational hoist limit switch takes place with a fault (B↑), the emergency hoist limit switch (A↑) switches off the hoisting movement. Only once the error has been eliminated is it possible to drive out of the area again.



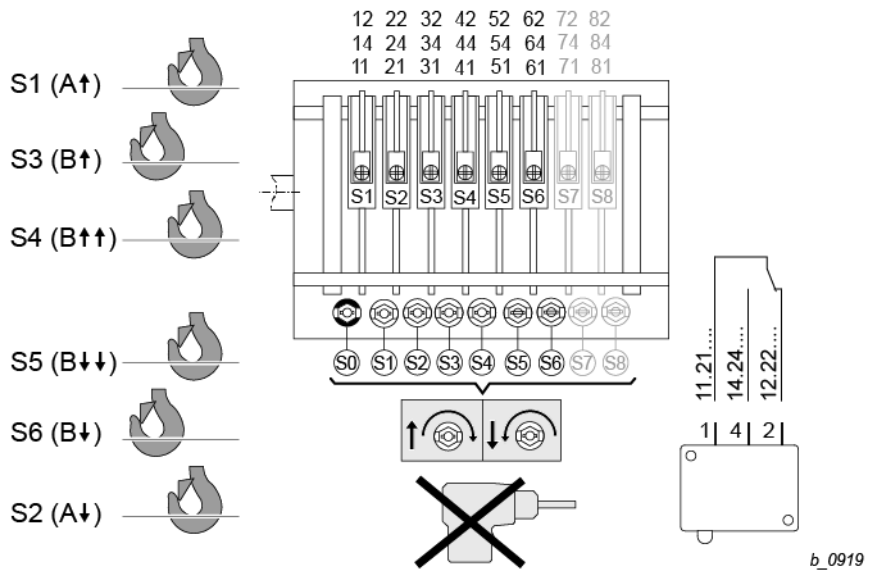
| Adjustment screw      | Switching point | Function  | Remark      |
|-----------------------|-----------------|---|-------------|
| <b>S0 (S1-S8)</b>     |                 | Adjustment screw for the block adjustment of all switching points |             |
| <b>S1</b>             | <b>(A↑)</b>     | Emergency hoist limit switching, "top"                            | factory-set |
| <b>S3</b>             | <b>(B↑)</b>     | Operational hoist limit switching, "top"                          |             |
| <b>S4</b>             | <b>(B↑↑)</b>    | Fast/slow switching "top"   |             |
| <b>S2</b>             | <b>(A↓)</b>     | Emergency hoist limit switching, "bottom"                         |             |
| <b>S5, S6, S7, S8</b> |                 | Optional  |             |

## 7.12.2 System description for geared limit switch - version 2

This geared limit switch is suitable for wire rope hoists with frequency-controlled hoist motors.

The geared limit switch has an emergency hoist limit switch (switching points A↑ and A↓) for the highest and lowest hook position. Additionally, the geared limit switch is equipped with operational hoist limit switches for switching off in the highest and lowest hook position in normal operation (switching points B↓ and B↑). At switching points B↑↑ and B↓↓, switching takes place from the fastest to the slowest speed or vice versa.

If overtravel of the operational hoist limit switch takes place with a fault (B↑ or B↓), the emergency hoist limit switch (A↑ or A↓) switches off the hoisting movement. Only once the error has been eliminated is it possible to drive out of the area again.



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| Adjustment screw  | Switching point | Function  | Remark      |
|-------------------|-----------------|---|-------------|
| <b>S0 (S1-S8)</b> |                 | Adjustment screw for the block adjustment of all switching points |             |
| <b>S1</b>         | <b>(A↑)</b>     | Emergency hoist limit switching, "top"                            | factory-set |
| <b>S3</b>         | <b>(B↑)</b>     | Operational hoist limit switching, "top"                          |             |
| <b>S4</b>         | <b>(B↑↑)</b>    | Fast/slow switching "top"   |             |
| <b>S2</b>         | <b>(A↓)</b>     | Emergency hoist limit switching, "bottom"                         |             |
| <b>S6</b>         | <b>(B↓)</b>     | Operational hoist limit switching, "bottom"                       |             |
| <b>S5</b>         | <b>(B↓↓)</b>    | Fast/slow switching "bottom"                                      |             |
| <b>S7, S8</b>     |                 | Optional  |             |

## 7.12.3 Maintenance work on the geared limit switch

The maintenance work is limited to checking the switch-off points. No maintenance and inspection work is necessary on the geared limit switch itself.

## 7.13 Checking the geared limit switch



### ⚠ WARNING

Danger due to falling load!

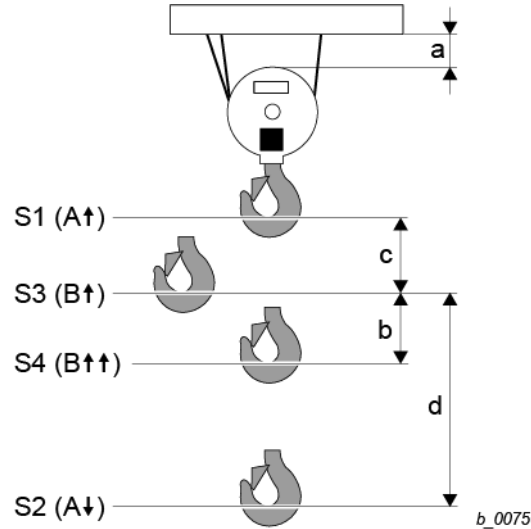
- Perform all checks and settings without load only.
- Cordon off and secure the danger zone.

| Dim.            | [in]                |       |     |
|-----------------|---------------------|-------|-----|
|                 | 50 Hz               | 60 Hz |     |
| a <sup>*1</sup> | 1PS<br>1PD          | 5.1   | 5.9 |
|                 | 2PS<br>2PD          | 2.8   | 3.1 |
|                 | 4PS<br>4PD          | 1.6   | 2   |
| b               | b = a               |       |     |
| c <sup>*1</sup> | 2.4                 |       |     |
| d               | Effective hook path |       |     |

<sup>\*1</sup> With the option **hook operated hoist limit switch** (see section 4.12), dimension "a" increases by 3.9 in, dimension "c" increases in accordance with the table.

| Type             | Dimension "c"<br><b>enlargement</b> |
|------------------|-------------------------------------|
|                  | [in]                                |
| YKA/SKA, YKB/SKB | 2                                   |
| YKC/SKC, YKE/SKE | 3.9                                 |
| YKD/SKD          | 5.9                                 |

### 7.13.1 Checking the operational hoist limit switch - version 1 (S3)



1. Actuate the UP-button in the control pendant with caution.
2. Observe the hoisting movement, until the operational hoist limit switch switches off in the top hook position (B↑).
3. Prior to reaching the switch-off point (B↑), make sure that a reduction to the slow speed takes place (B↑↑).
4. The minimum distance "a" + "c" between the hook block and the next-obstacle or hook aperture "C" (see section **Hook dimensions C for KE-S.. trolleys**) must be maintained as a minimum, depending on the dimension at which the hook hangs lower.
5. With deviations, adjust the geared limit switch again, see section **Adjusting the geared limit switch**.

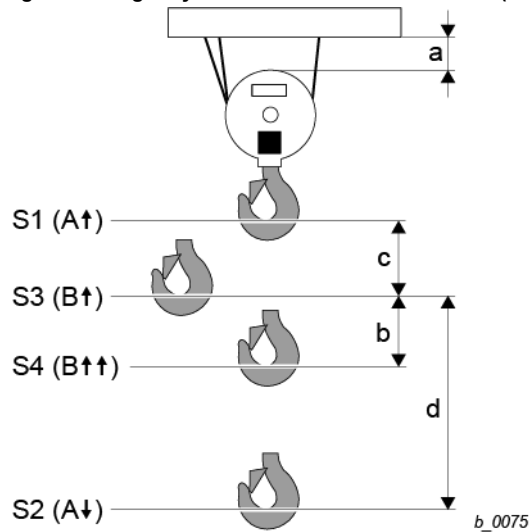
The switching point distances between operational and emergency hoist limit switch are aligned with normal conditions of operation and can be increased if necessary.

## 7.13.2 Checking the emergency hoist limit switch - version 1 (S1)

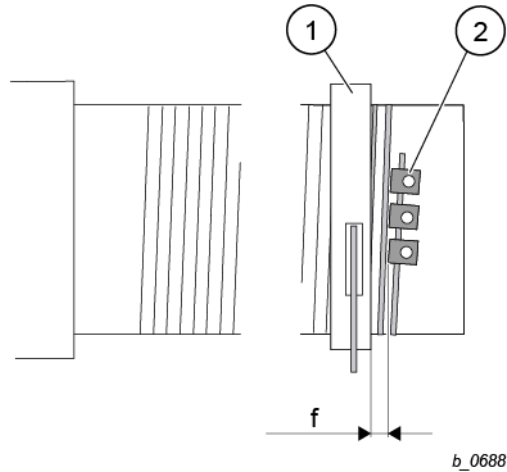
| Dim. | [in]                |       |     |
|------|---------------------|-------|-----|
|      | 50 Hz               | 60 Hz |     |
| a*1  | 1PS<br>1PD          | 5.1   | 5.9 |
|      | 2PS<br>2PD          | 2.8   | 3.1 |
|      | 4PS<br>4PD          | 1.6   | 2   |
| b    | b = a               |       |     |
| c*1  | 2.4                 |       |     |
| d    | Effective hook path |       |     |

\*1 With the option **hook operated hoist limit switch** (see section 4.12), dimension "a" increases by 3.9 in, dimension "c" increases in accordance with the table.

| Type             | Dimension "c"<br><b>enlargement</b> |
|------------------|-------------------------------------|
|                  | [in]                                |
| YKA/SKA, YKB/SKB | 2                                   |
| YKC/SKC, YKE/SKE | 3.9                                 |
| YKD/SKD          | 5.9                                 |



1. Check with precision hoist.
2. Actuate the UP-button in the control pendant with caution.
3. Observe the hoisting movement, until the operational hoist limit switch switches off in the top hook position (B↑).
4. Actuate the override button (S260) in the control box and the UP-button at the same time until the emergency hoist limit switch switches off (A↑).
  - When using the optional hook operated hoist limit switch (see chapter 4.11), this must be overridden.
  - If the wire rope hoist does not travel further, the emergency hoist limit switch has already switched off during step 2 and the operational hoist limit switch is not working.
5. The minimum distance "a" between the hook block and the next obstacle, see table, or hook aperture "C" - "c" (see section **Hook dimensions C for KE-S.. trolleys**) must be maintained as a minimum, depending on the dimension at which the hook hangs lower.
6. With deviations, adjust the geared limit switch again (see section **Adjusting the geared limit switch**).
7. Actuate the override button (S261) in the control box and the DOWN-button at the same time to exit the top switching area.



8. Carefully actuate the DOWN-button in the control pendant until the emergency hoist limit switch switches off (A↓).
  - Do not undershoot the minimum distance “f”, of  $f \geq 0.79$  in between the rope guide ring (1) and the clamping claws (2) for the rope anchorage.
  - With emergency hoist limit switching, the load hook must not be lowered onto the ground.
9. Measure the distance from the rope guide ring to the clamping claws.

The minimum distance “f” between the rope guide ring (1) and the clamping claws (2) for the rope anchorage  $f \geq 0.79$  in.
10. With deviations, adjust the geared limit switch again (see section **7.14 Adjusting the switching points**).

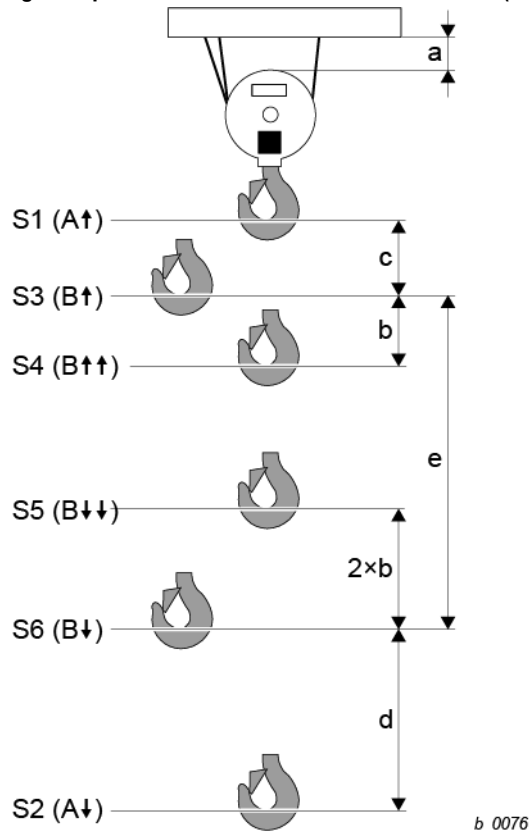


## 7.13.3 Checking the operational hoist limit switch - version 2 (S3)

| Dim. | [in]                          |  |       |         |
|------|-------------------------------|--|-------|---------|
|      |                               | 50 Hz  | 60 Hz | Reeving |
| a*1  | 1PS<br>1PD                    | 5.1  | 5.9   | 1       |
|      | 2PS<br>2PD                    | 2.8  | 3.1   | 2       |
|      | 4PS<br>4PD                    | 1.6  | 2     | 4       |
| b    | YK/SK with frequency inverter | $b = V \times t \times 0.023 \text{ ft}$<br>$V = \text{Hoist speed [fpm]}$<br>$t = \text{Brake ramp [s]}$<br>(Factory setting = 1.5 s)<br>Example:<br>YKC/SKC-L05-...S264-V<br>$b = 64 \times 1.5 \times 0.023 = 2.2 \text{ ft}$ |       |         |
| c*1  |                               | 2.4  |       |         |
| d    |                               | 4.7  |       |         |
| e    |                               | Effective hook path  |       |         |

\*1 With the option **hook operated hoist limit switch** (see section 4.12), dimension "a" increases by 3.9 in, dimension "c" increases in accordance with the table.

| Type             | Dimension "c" enlargement |
|------------------|---------------------------|
|                  | [in]                      |
| YKA/SKA, YKB/SKB | 2                         |
| YKC/SKC, YKE/SKE | 3.9                       |
| YKD/SKD          | 5.9                       |



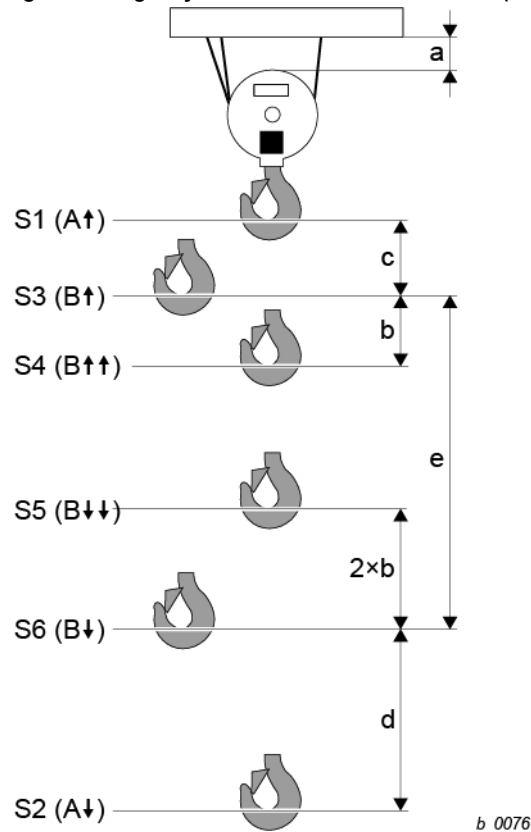
1. Actuate the UP-button in the control pendant with caution.
2. Observe the hoisting movement, until the operational hoist limit switch switches off in the top hook position (B↑).
3. Prior to reaching the switch-off point (B↑), make sure that a reduction to the slow speed takes place (B↑↑).
4. The minimum distance "a" + "c" between the hook block and the next obstacle, see table, or hook aperture "C" (see section 7.15) must be maintained as a minimum, depending on the dimension at which the hook hangs lower.
5. With deviations, adjust the geared limit switch again (see section **7.14 Adjusting the switching points**).
6. Carefully actuate the DOWN-button in the control pendant whilst observing the hoisting movement until the operational hoist limit switch switches off in the lower hook position (B↓). Prior to reaching the switch-off point (B↓), make sure that a reduction to the slow speed takes place (B↓↓).
7. Maintain the minimum distance "d" between the switching point (B↓) and (A↓) (see figure).
8. With deviations, adjust the geared limit switch again (see section **7.14 Adjusting the switching points**).

## 7.13.4 Checking the emergency hoist limit switch - version 2 (S1)

| Dim.            | [in]                          |  |       |         |
|-----------------|-------------------------------|--|-------|---------|
|                 |                               | 50 Hz  | 60 Hz | Reeving |
| a <sup>*1</sup> | 1PS<br>1PD                    | 5.1  | 5.9   | 1       |
|                 | 2PS<br>2PD                    | 2.8  | 3.1   | 2       |
|                 | 4PS<br>4PD                    | 1.6  | 2     | 4       |
| b               | YK/SK with frequency inverter | $b = V \times t \times 0.023 \text{ ft}$<br>$V = \text{Hoist speed [fpm]}$<br>$t = \text{Brake ramp [s]}$<br>(Factory setting = 1.5 s)<br>Example:<br>YKC/SKC-L05-...S264-V<br>$b = 64 \times 1.5 \times 0.023 = 2.2 \text{ ft}$ |       |         |
| c <sup>*1</sup> | 2.4                           |  |       |         |
| d               | 4.7                           |  |       |         |
| e               | Effective hook path           |  |       |         |

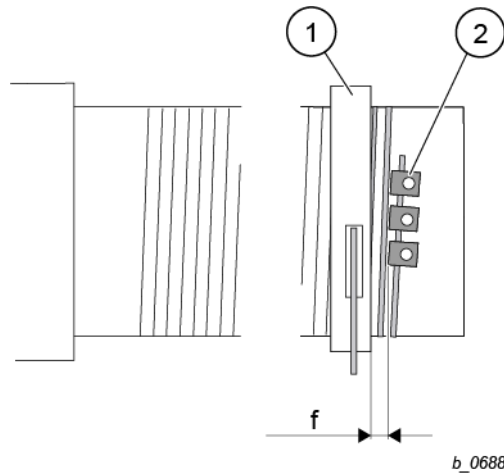
\*1 With the option **hook operated hoist limit switch** (see section 4.12), dimension "a" increases by 3.9 in, dimension "c" increases in accordance with the table.

| Type             | Dimension "c" enlargement |
|------------------|---------------------------|
|                  | [in]                      |
| YKA/SKA, YKB/SKB | 2                         |
| YKC/SKC, YKE/SKE | 3.9                       |
| YKD/SKD          | 5.9                       |



1. Check with precision hoist.
2. Actuate the UP-button in the control pendant with caution.
3. Observe the hoisting movement, until the operational hoist limit switch switches off in the top hook position (B↑).
4. Actuate the override button (S260) in the control box and the UP-button at the same time, until the emergency hoist limit switch switches off (A↑).
  - When using the optional hook operated hoist limit switch (see chapter 4.11), this must be overridden.
  - If the wire rope hoist does not travel further, the emergency hoist limit switch has already switched off during step 2 and the operational hoist limit switch is not working.
5. The minimum distance "a" between the hook block and the next obstacle, see table, or hook aperture "C" - c (see section 7.15) must be maintained as a minimum, depending on the dimension at which the hook hangs lower.

6. With deviations, adjust the geared limit switch again (see section **7.14 Adjusting the switching points**).
7. Actuate the override button (S261) in the control box and the DOWN-button at the same time to exit the top switching area.
8. Actuate the DOWN-button in the control pendant with caution.
9. Observe the hoisting movement, until the operational hoist limit switch switches off in the lower hook position (B↓).



10. Actuate the override button (S262) in the control box and the DOWN-button at the same time, until the emergency hoist limit switch switches off (A↓).
  - If the wire rope hoist does not travel further, the emergency hoist limit switch has already switched off during step 9 and the operational hoist limit switch is not working.
  - Do not undershoot the minimum distance “f”, of  $f \geq 0.79$  in between the rope guide ring (1) and the clamping claws (2) for the rope anchorage.
  - With emergency hoist limit switching, the load hook must not be lowered onto the ground.
11. Measure the distance from the rope guide ring to the clamping claws.
  - The minimum distance “f” between the rope guide ring (1) and the clamping claws (2) for the rope anchorage  $f \geq 0.79$  in.
12. With deviations, adjust the geared limit switch again (see section **7.14.2 Adjusting the switching points**).
13. Actuate the override button (S261) in the control box and the UP-button at the same time to exit the hoist limit switch area.

### 7.14 Adjusting the geared limit switch

- With rope drums carrying ropes, the switching points are preset in the factory.
- If ropes are delivered loose, the switching points must be set.

#### ⚠ WARNING



Danger due to electrical voltage.

The hood must be removed from the geared limit switch to adjust the switching points. This exposes the live contact connections. Touching live parts can cause severe injuries or death.

- Ensure that a competent person adjusts the switching points.

#### ⚠ WARNING

Danger of personal injuries.

Incorrectly set hoist limit switches can lead to serious accidents.

- Check the operational hoist limit switch daily to ensure its function and correct setting.

#### ⚠ WARNING



Danger due to falling load!

- Perform all checks and settings without load only.
- Cordon off and secure the danger zone.

#### NOTICE

Danger of material damage.

Never remove dust accumulations with the enclosure open using compressed air, because the dust can significantly penetrate the contacts as a result of this and impair the switching capacity.

Never use benzene or other solvents to clean the hoist limit switch!

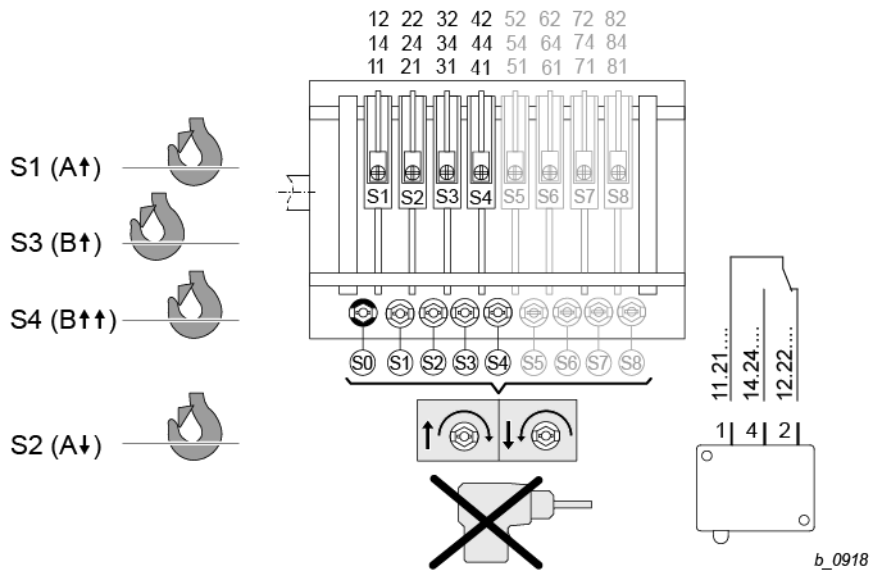


- Observe for information on the sticker, which is applied to the inside of the hood of the geared limit switch.



#### Setting options:

- Adjust the individual switching points “S1” to “S6”.
  - Each switching point is approached and set.
- Adjust via the block adjustment “S0”.
  - Using the black adjustment screw “S0” it is possible to perform upward and downward block adjustment of all switching points. The relative setting of the individual switching points to each other remains unaffected here.

## 7.14.1 Geared limit switch - version 1



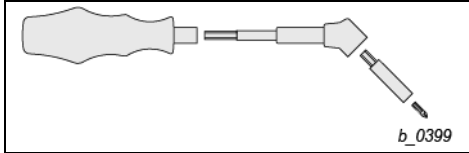
The individual switching points are set in the factory with the adjustment screws “S1” to “S4”.

-  Turning clockwise: Switching point is shifted upwards ↑
-  Turning anticlockwise: Switching point is shifted downwards ↓

The switching points must be set in the following order:

| Adjustment screw | Switching point | Function                                  |
|------------------|-----------------|---|
| <b>S3</b>        | <b>(B↑)</b>     | Operational hoist limit switching, “top”  |
| <b>S1</b>        | <b>(A↑)</b>     | Emergency hoist limit switching, “top”    |
| <b>S4</b>        | <b>(B↑↑)</b>    | Fast/slow switching “top”                 |
| <b>S2</b>        | <b>(A↓)</b>     | Emergency hoist limit switching, “bottom” |

## 7 Inspection and maintenance



Adjustment tool for geared limit switch  
(Ordering no. A0443050990)

### Preparatory work

1. Remove the screws on the hood of the geared limit switch.
2. Remove the hood.

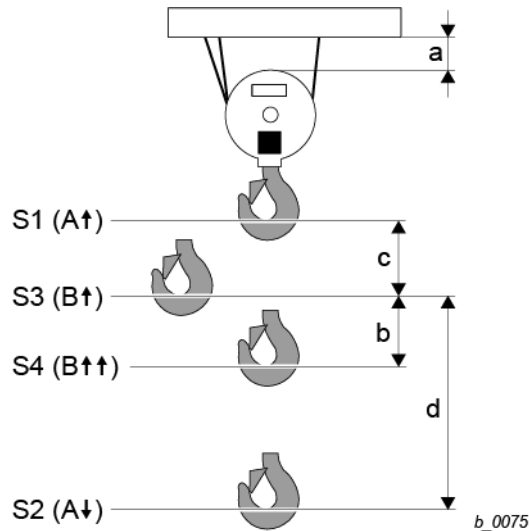
**NOTICE** The geared limit switch can be damaged if an electric screwdriver is used to set the switching points.

- Only adjust the switching points with the “adjustment tool for geared limit switch”.

| Dim. | [in]                |       |       |
|------|---------------------|-------|-------|
| a*1  |                     | 50 Hz | 60 Hz |
|      | 1PS<br>1PD          | 5.1   | 5.9   |
|      | 2PS<br>2PD          | 2.8   | 3.1   |
|      | 4PS<br>4PD          | 1.6   | 2     |
| b    | b = a               |       |       |
| c*1  | 2.4                 |       |       |
| d    | Effective hook path |       |       |

\*1 With the option **hook operated hoist limit switch** (see section 4.12), dimension “a” increases by 3.9 in, dimension “c” increases in accordance with the table.

| Type             | Dimension “c”<br>enlargement |
|------------------|------------------------------|
|                  | [in]                         |
| YKA/SKA, YKB/SKB | 2                            |
| YKC/SKC, YKE/SKE | 3.9                          |
| YKD/SKD          | 5.9                          |



### Adjusting operational hoist limit switching, “top” (B↑)

- 1st Actuate the UP-button in the control pendant with caution.
2. Hoist the load hook to 0.39 in in front of the switch-off point (B↑).
  - (Observe the minimum distance “a” + “c” between the hook block and the next obstacle or hook aperture “C” (see section 7.15), depending on the dimension at which the hook hangs lower.
  - If the operational hoist limit switch should switch off beforehand, turn the adjustment screw “S3” clockwise 1 revolution and repeat step 2.
3. Turn the adjustment screw “S3” anticlockwise until the switch contact latches audibly.
4. Actuate the DOWN-button in the control pendant.
  - The “top” operational hoist limit switching position has been set.

### Adjusting emergency hoist limit switching, “top” (A↑)

The “top” operational hoist limit switching position must be set.

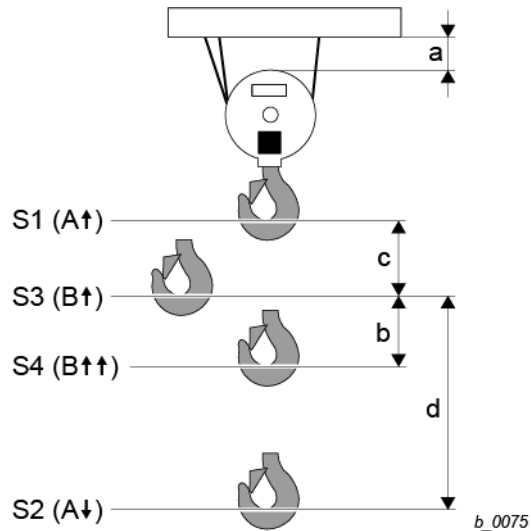
1. Actuate the UP-button in the control pendant with caution.
2. Observe the hoisting movement, until operational hoist limit switching (B↑) switches off in the top hook position.
3. Actuate the override button (S260) in the control box and the UP-button at the same time, until 0.39 in before the switch-off point (A↑).
  - When using the option hook operated hoist limit switch (see section 4.12), this must be overridden (keep the connecting rope under tension).
  - Observe the minimum distance “a” between the hook block and the next obstacle, see table, or hook aperture “C” - “c” (see section 7.15), depending on the dimension at which the hook hangs lower.
  - If the emergency hoist limit switch should switch off beforehand, turn the adjustment screw “S1” clockwise 1 revolution and repeat step 4.
4. Turn the adjustment screw “S1” anticlockwise until the switch contact latches audibly.
5. Actuate the override button (S261) in the control box and the DOWN-button at the same time to exit the switching area.
  - The “top” emergency hoist limit switching position has been set.

## 7 Inspection and maintenance

| Dim. | [in]                |              |
|------|---------------------|--------------|
| a*1  | 50 Hz               | 60 Hz        |
|      | 1PS<br>1PD          | 5.1      5.9 |
|      | 2PS<br>2PD          | 2.8      3.1 |
|      | 4PS<br>4PD          | 1.6      2   |
| b    | b = a               |              |
| c*1  | 2.4                 |              |
| d    | Effective hook path |              |

\*1 With the option **hook operated hoist limit switch** (see section 4.12), dimension "a" increases by 3.9 in, dimension "c" increases in accordance with the table.

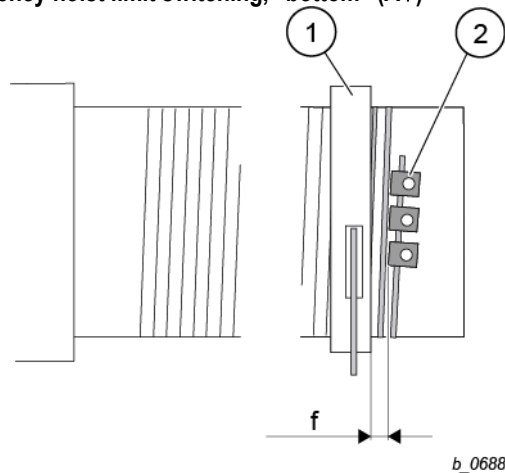
| Type             | Dimension "c"<br>enlargement |
|------------------|------------------------------|
|                  | [in]                         |
| YKA/SKA, YKB/SKB | 2                            |
| YKC/SKC, YKE/SKE | 3.9                          |
| YKD/SKD          | 5.9                          |



### Adjusting the fast/slow switching "top" (B↑↑)

- Hoist the load hook to 0.39 in in front of the desired switch-off point (observe the minimum distance "b").
  - If the load hook should become slower beforehand, turn the adjustment screw "S4" clockwise 1 revolution and repeat step 1.
- Turn the adjustment screw "S4" anticlockwise until the switch contact latches audibly.
- Actuate the DOWN-button in the control pendant.
  - The fast/slow switching "top" has been set.

### Adjusting emergency hoist limit switching, "bottom" (A↓)



- Actuate the DOWN-button in the control pendant with caution.

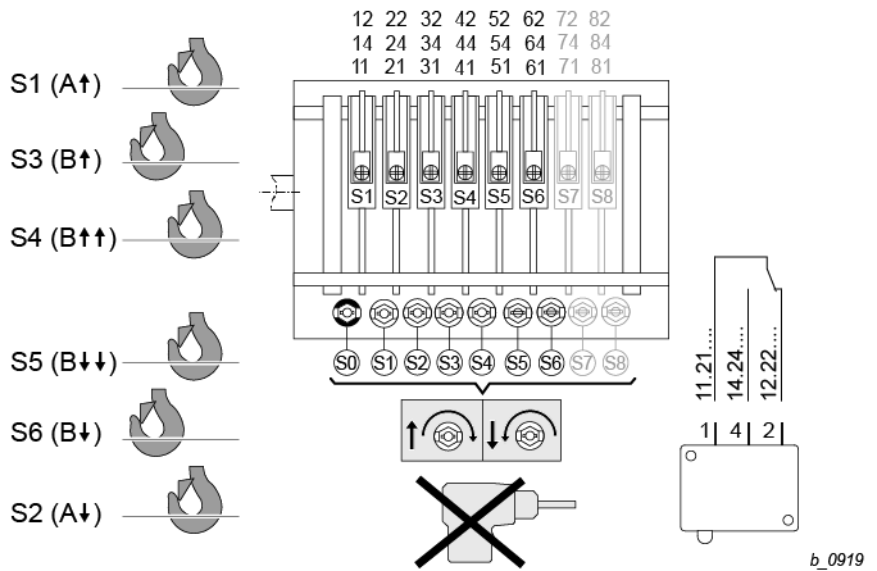


2. Lower the load hook to 0.39 in in front of the switching point (A↓).
  - Do not undershoot the minimum distance “f”, of  $f \geq 0.79$  in between the rope guide ring (1) and the clamping claws (2) for the rope anchorage.
  - The load hook must not be lowered onto the ground.
  - If the emergency hoist limit switch should switch off beforehand, turn the adjustment screw “S2” anticlockwise 1 revolution and repeat step 2.
3. Turn the adjustment screw “S2” clockwise until the switch contact latches audibly.
4. Actuate the UP-button in the control pendant.
  - The “bottom” emergency hoist limit switching position has been set.

### Checking the switching points

- After setting the switching points, check these at a slow lifting and lowering speed and readjust the switching points if necessary.

### 7.14.2 Geared limit switch - version 2



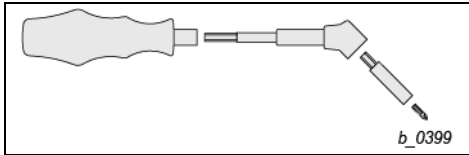
The individual switching points are set in the factory with the adjustment screws “S1” to “S6”.

- ↻ Turning clockwise: Switching point is shifted upwards ↑
- ↻ Turning anticlockwise: Switching point is shifted downwards ↓

The switching points must be set in the following order:

| Adjustment screw | Switching point | Function                                    |
|------------------|-----------------|---|
| <b>S3</b>        | <b>(B↑)</b>     | Operational hoist limit switching, “top”    |
| <b>S1</b>        | <b>(A↑)</b>     | Emergency hoist limit switching, “top”      |
| <b>S4</b>        | <b>(B↑↑)</b>    | Fast/slow switching “top”                   |
| <b>S2</b>        | <b>(A↓)</b>     | Emergency hoist limit switching, “bottom”   |
| <b>S6</b>        | <b>(B↓)</b>     | Operational hoist limit switching, “bottom” |
| <b>S5</b>        | <b>(B↓↓)</b>    | Fast/slow switching “bottom”                |

## 7 Inspection and maintenance



Adjustment tool for geared limit switch  
(Ordering no. A0443050990)

### Preparatory work

1. Remove the screws on the hood of the geared limit switch.
2. Remove the hood.

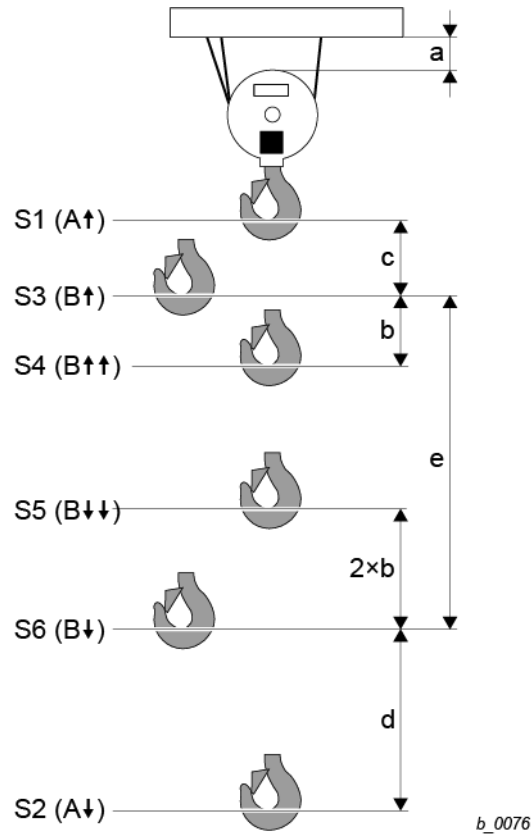
**NOTICE** The geared limit switch can be damaged if an electric screwdriver is used to set the switching points.

- Only adjust the switching points with the “adjustment tool for geared limit switch”.

| Dim. | [in]                          |  |         |   |
|------|-------------------------------|--|---------|---|
| a*1  | 50 Hz                         | 60 Hz  | Reeving |   |
|      | 1PS<br>1PD                    | 5.1  | 5.9     | 1 |
|      | 2PS<br>2PD                    | 2.8  | 3.1     | 2 |
| b    | 4PS<br>4PD                    | 1.6  | 2       | 4 |
|      | YK/SK with frequency inverter | $b = V \times t \times 0.023 \text{ ft}$<br>$V = \text{Hoist speed [fpm]}$<br>$t = \text{Brake ramp [s]}$<br>(Factory setting = 1.5 s)<br>Example:<br>YKC/SKC-L05-...S264-V<br>$b = 64 \times 1.5 \times 0.023 = 2.2 \text{ ft}$ |         |   |
| c*1  | 2.4                           |  |         |   |
| d    | 4.7                           |  |         |   |
| e    | Effective hook path           |  |         |   |

\*1 With the option **hook operated hoist limit switch** (see section 4.12), dimension “a” increases by 3.9 in, dimension “c” increases in accordance with the table.

| Type             | Dimension “c” enlargement |
|------------------|---------------------------|
|                  | [in]                      |
| YKA/SKA, YKB/SKB | 2                         |
| YKC/SKC, YKE/SKE | 3.9                       |
| YKD/SKD          | 5.9                       |



### Adjusting operational hoist limit switching, “top” (B↑)

See section 7.15.1 *Geared limit switch - version 1*

### Adjusting emergency hoist limit switching, “top” (A↑)

See section 7.15.1 *Geared limit switch - version 1*

### Adjusting the fast/slow switching “top” (B↑↑)

See section 7.15.1 *Geared limit switch - version 1*

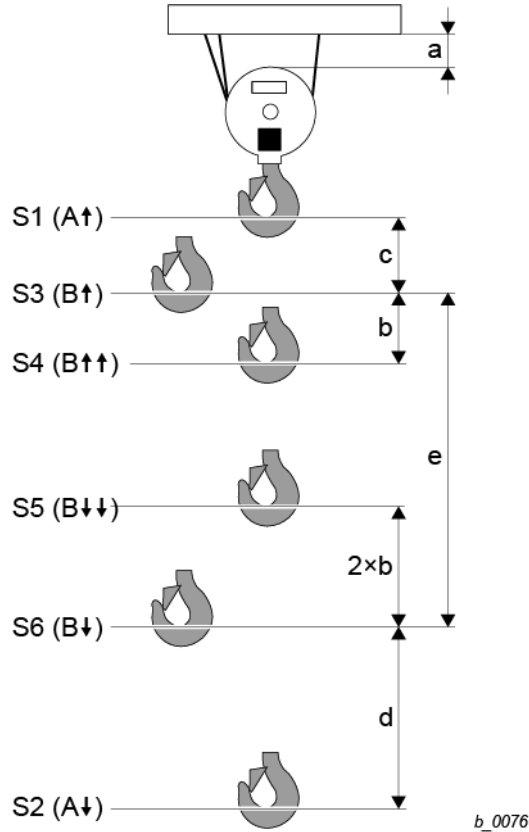
## Adjusting operational hoist limit switching, "bottom" (B↓)

1. Actuate the DOWN-button in the control pendant with caution.
2. Lower the load hook to 0.39 in in front of the switching point (observe the minimum distance "d").
  - If the operational hoist limit switch should switch off beforehand, turn the adjustment screw "S6" anticlockwise 1 revolution and repeat step 2.
3. Turn the adjustment screw "S6" clockwise until the switch contact latches audibly.
4. Actuate the UP-button in the control pendant.
  - The "bottom" operational hoist limit switching position has been set.

| Dim. | [in]  |       |         |   |
|------|---|-------|---------|---|
|      | 50 Hz   | 60 Hz | Reeving |   |
| a*1  | 1PS<br>1PD  | 5.1   | 5.9     | 1 |
|      | 2PS<br>2PD  | 2.8   | 3.1     | 2 |
|      | 4PS<br>4PD  | 1.6   | 2       | 4 |
| b    | YK/SK with frequency inverter<br>$b = V \times t \times 0.023 \text{ ft}$<br>V = Hoist speed [fpm]<br>t = Brake ramp [s]<br>(Factory setting = 1.5 s)<br>Example:<br>YKC/SKC-L05-...S264-V<br>$b = 64 \times 1.5 \times 0.023 = 2.2 \text{ ft}$ |       |         |   |
| c*1  | 2.4   |       |         |   |
| d    | 4.7   |       |         |   |
| e    | Effective hook path   |       |         |   |

\*1 With the option **hook operated hoist limit switch** (see section 4.11), dimension "a" increases by 3.9 in, dimension "c" increases in accordance with the table.

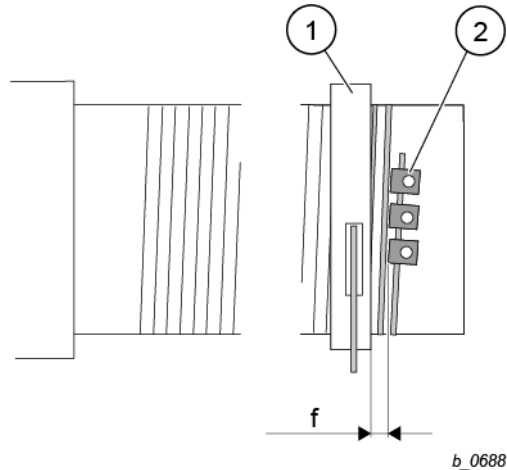
| Type             | Dimension "c" enlargement |
|------------------|---------------------------|
|                  | [in]                      |
| YKA/SKA, YKB/SKB | 2                         |
| YKC/SKC, YKE/SKE | 3.9                       |
| YKD/SKD          | 5.9                       |



## Adjusting emergency hoist limit switching, "bottom" (A↓)

The "bottom" operational hoist limit switching position must be set.

1. Actuate the DOWN button in the control pendant with caution.
2. Observe the hoisting movement, until operational hoist limit switching (B↓) switches off in the bottom hook position.



3. Actuate the override button (S262) in the control box and the DOWN button at the same time, until 0.39 in before the switching point (A↓).
  - Do not undershoot the minimum distance “f”, of  $f \geq 0.79$  in between the rope guide ring (1) and the clamping claws (2) for the rope anchorage.
  - The load hook must not be lowered onto the ground.
  - If the emergency hoist limit switch should switch off beforehand, turn the adjustment screw “S2” anticlockwise 1 revolution and repeat step 4.
4. Turn the adjustment screw “S2” clockwise until the switch contact latches audibly.
5. Actuate the override button (S261) in the control box and the UP-button at the same time to exit the switching area.
  - The “bottom” emergency hoist limit switching position has been set.

### Adjusting the fast/slow switching “bottom” (B↓↓)

1. Hoist the load hook to 0.39 in in front of the desired switch-off point (observe the minimum distance “b”).
2. Turn the adjustment screw “S5” clockwise until the switch contact latches audibly.

### Checking the switching points

- After setting the switching points, check these at a slow lifting and lowering speed and readjust the switching points if necessary.

## 7.15 Hook dimensions C for KE-S.. trolleys

The following hook dimensions C apply for the top operational hoist limit switch cut-off point (B↑).

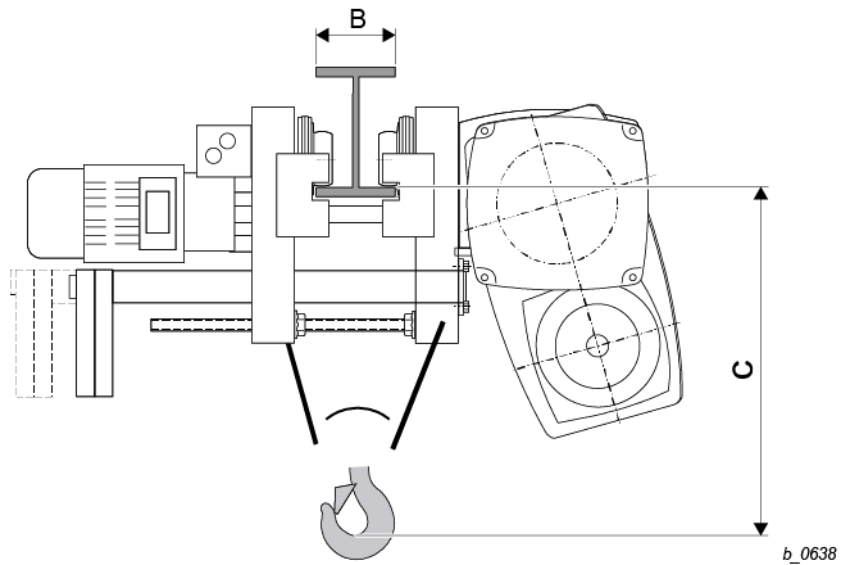
### ▲ WARNING

#### Danger of personal injuries

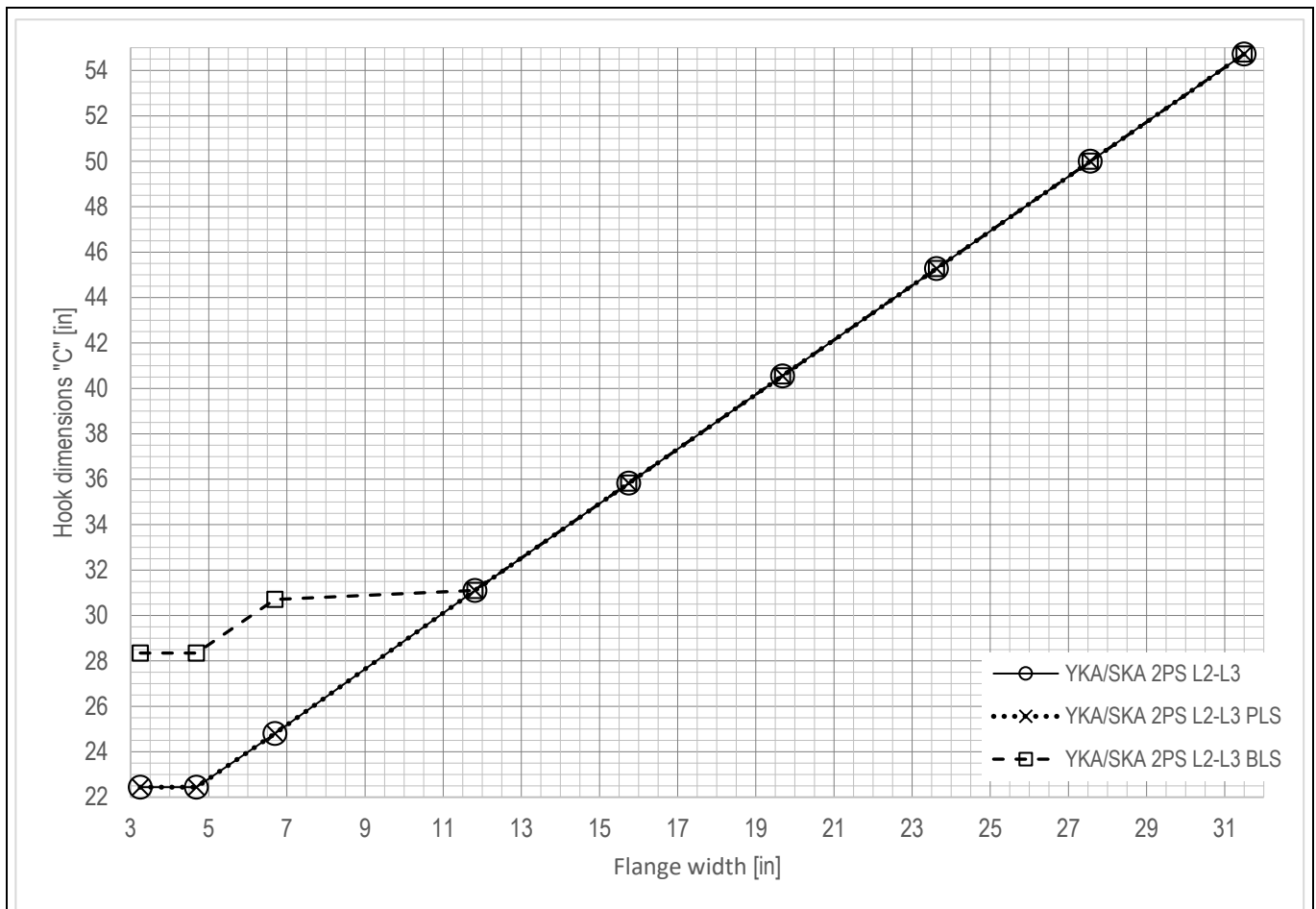
Incorrectly set hoist limit switches can lead to serious accidents.

- Check the operational hoist limit switch daily to ensure its function and correct setting.

## 7 Inspection and maintenance



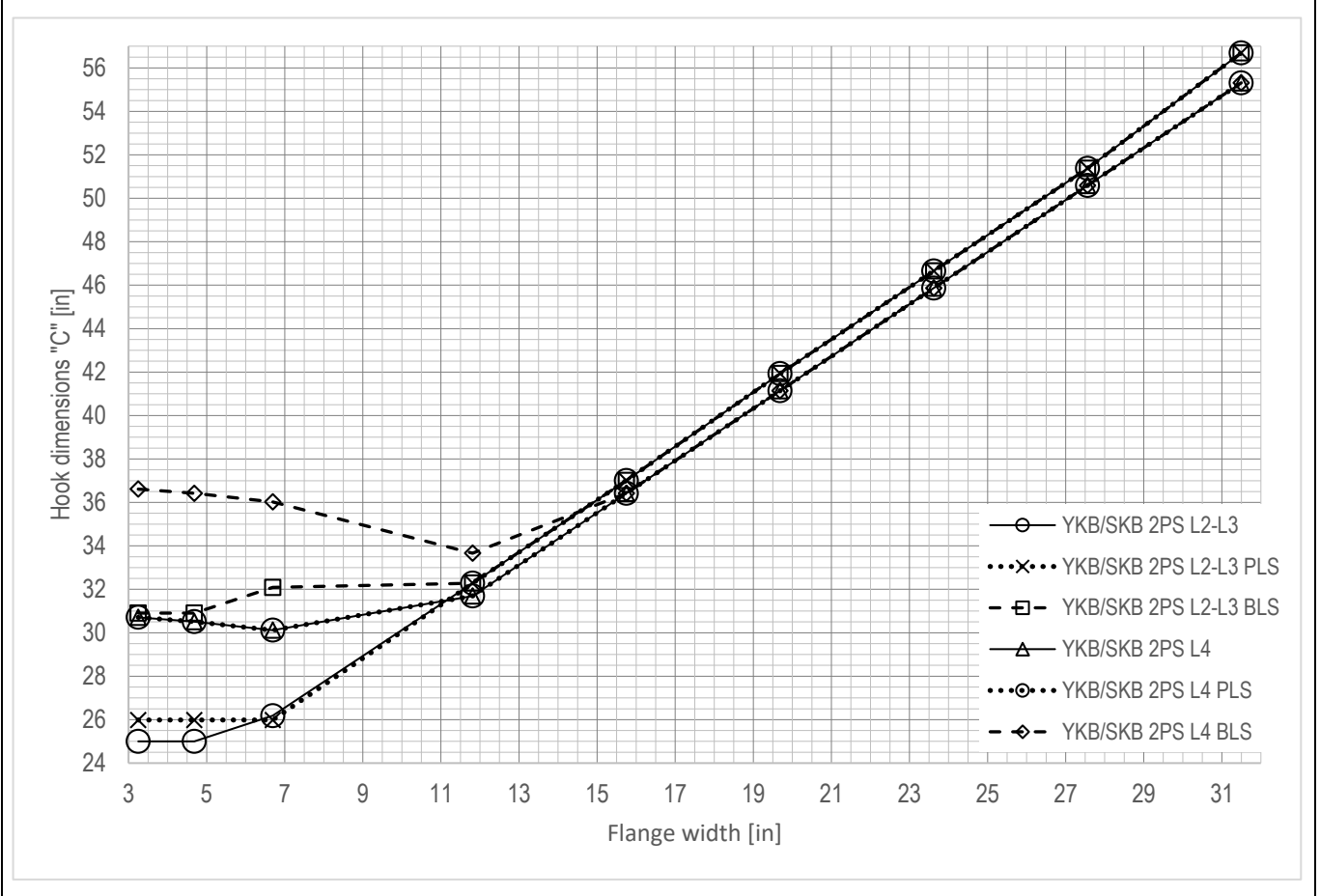
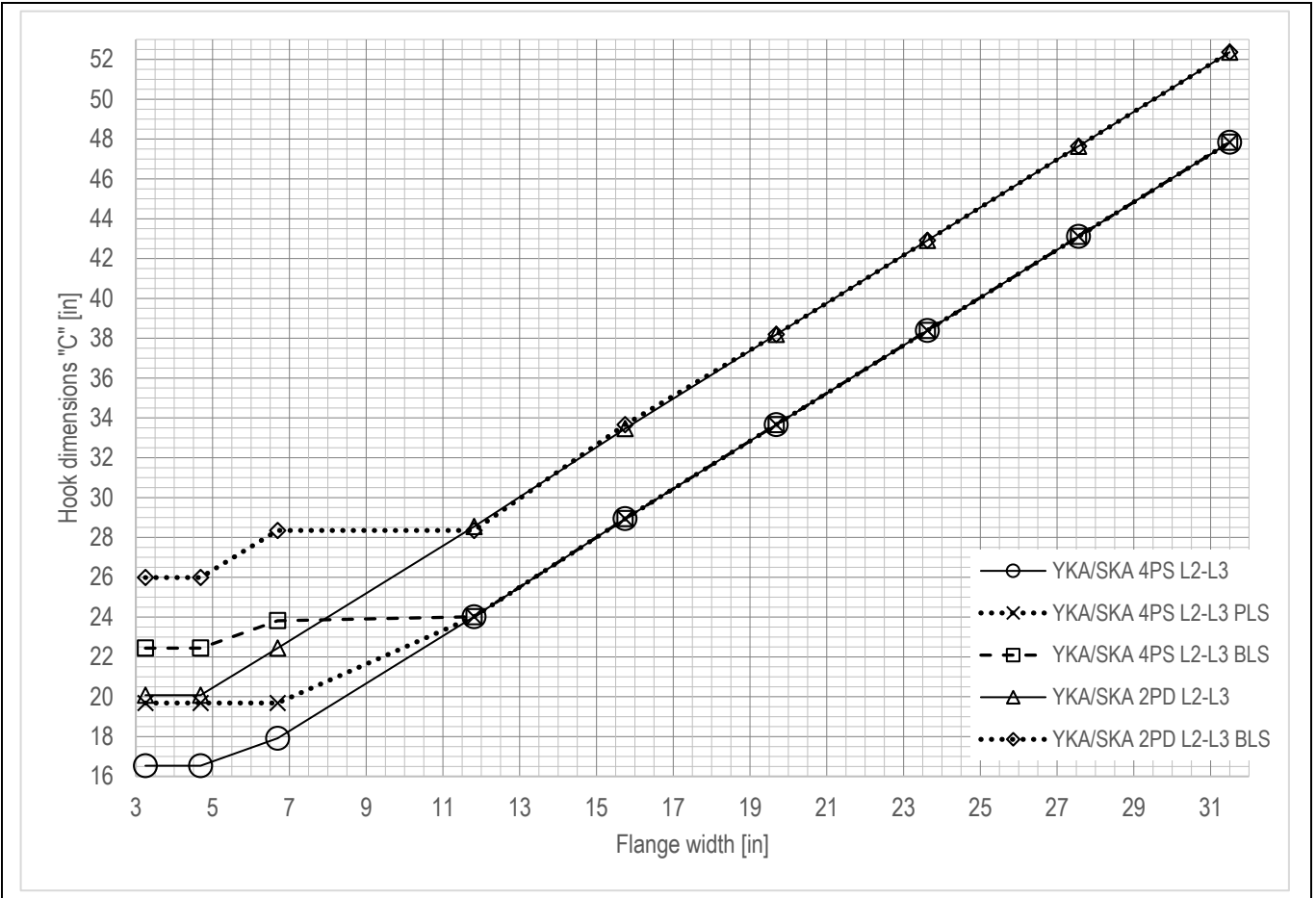
"B" Flange width  
 "C" Hook dimension "C"



### Instructions for using the diagram

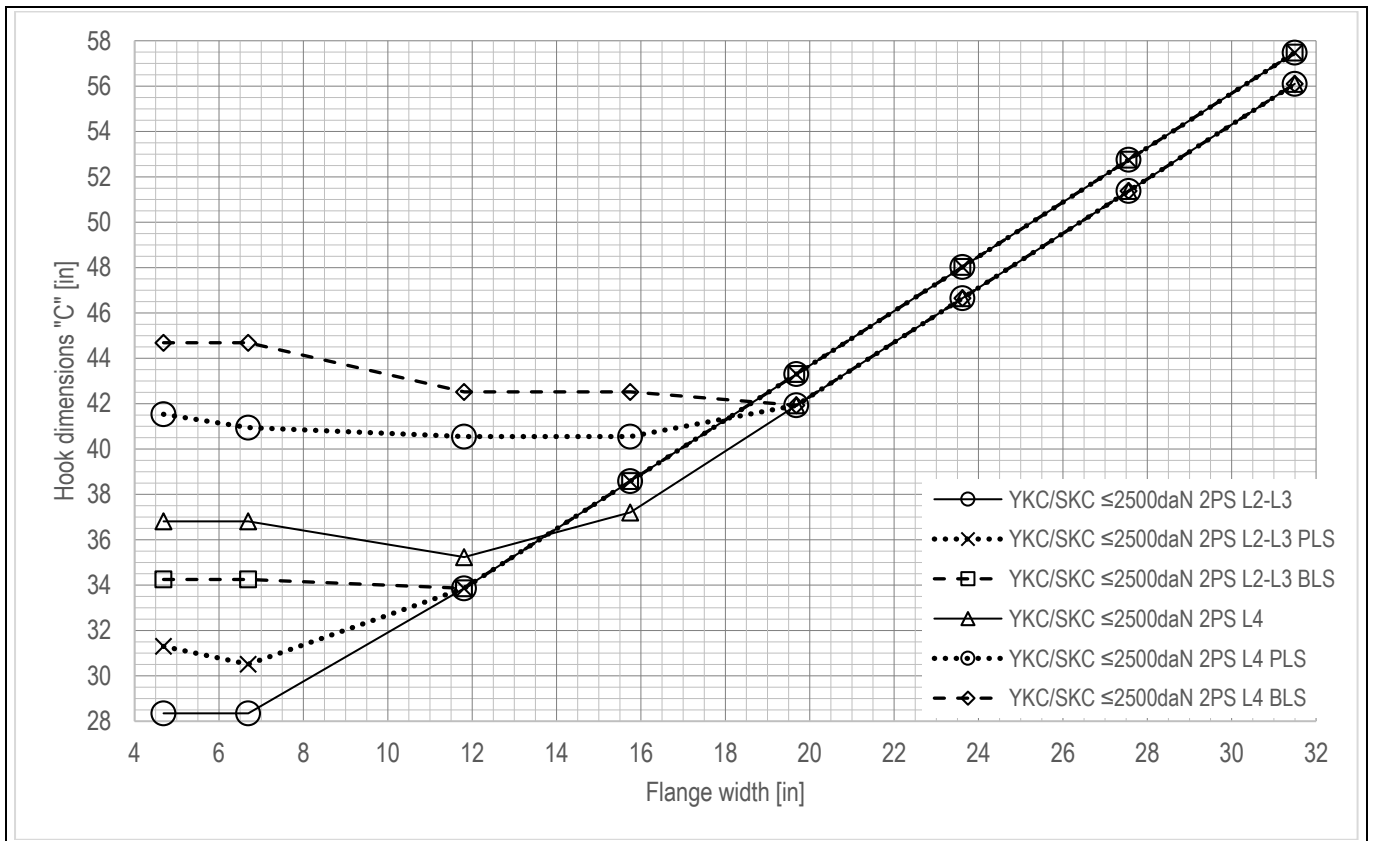
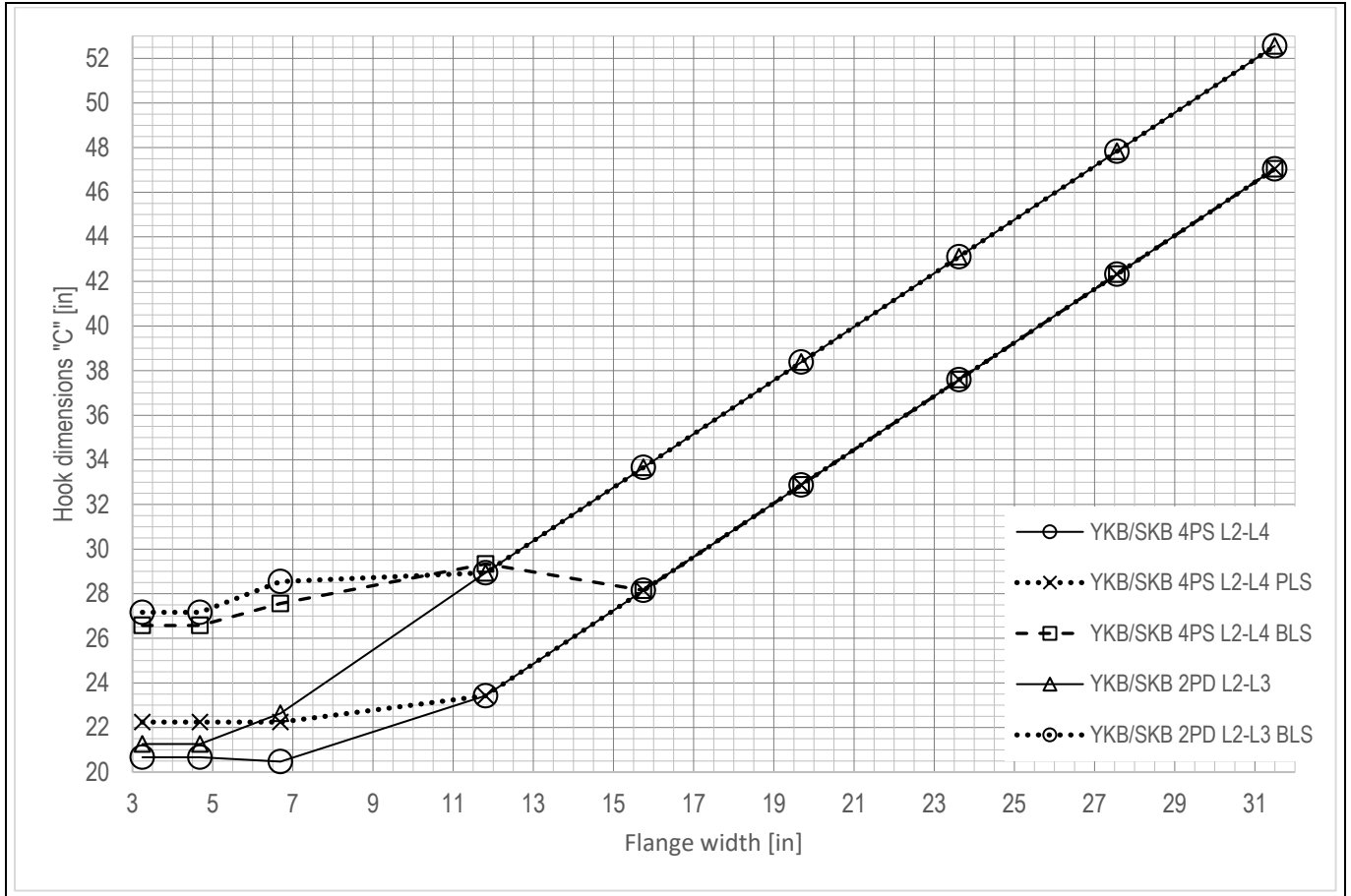
1. Select the diagram line for the wire rope hoist.
2. Draw a vertical line for the corresponding flange width.
3. Draw a horizontal line through the point of intersection and read off the hook dimension "C".

# 7 Inspection and maintenance



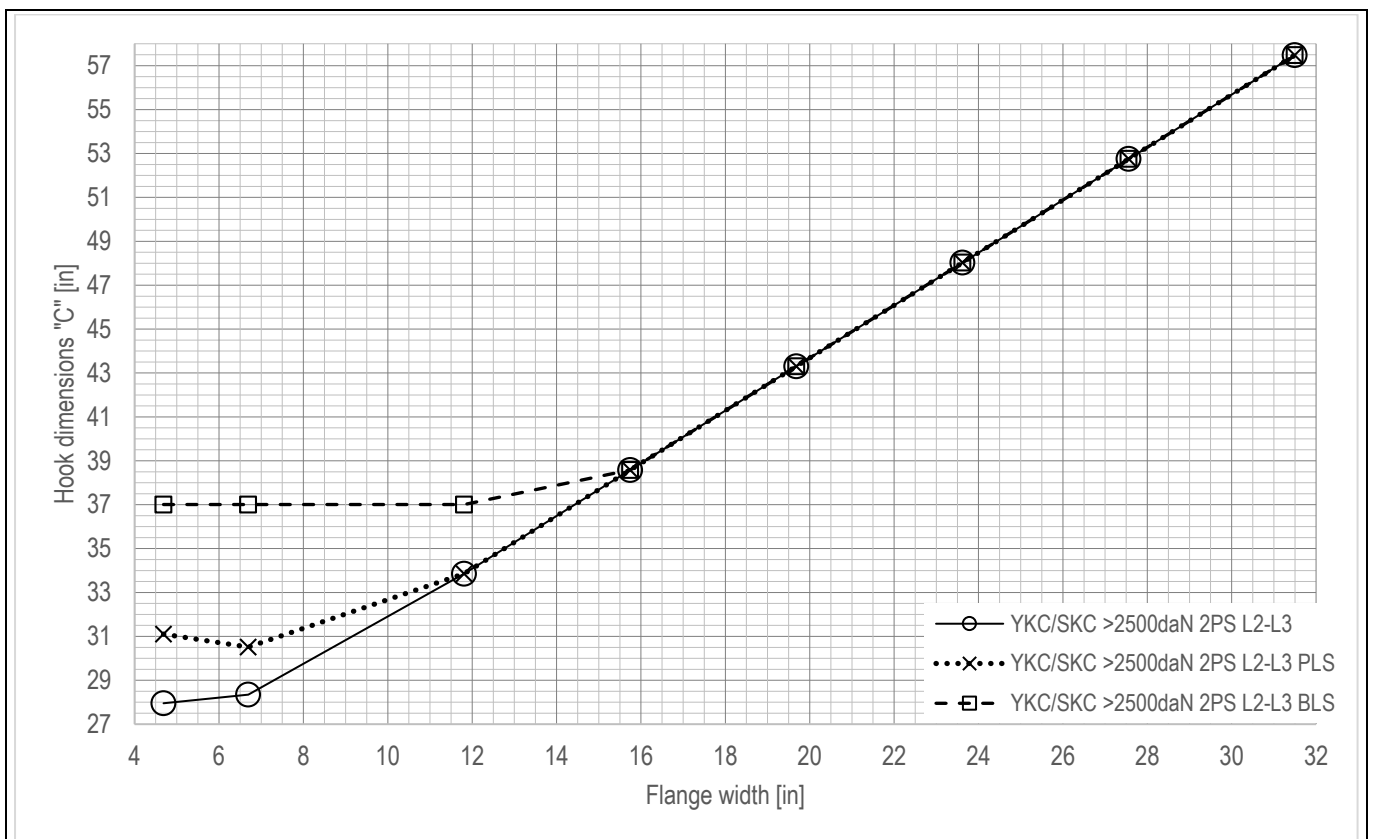
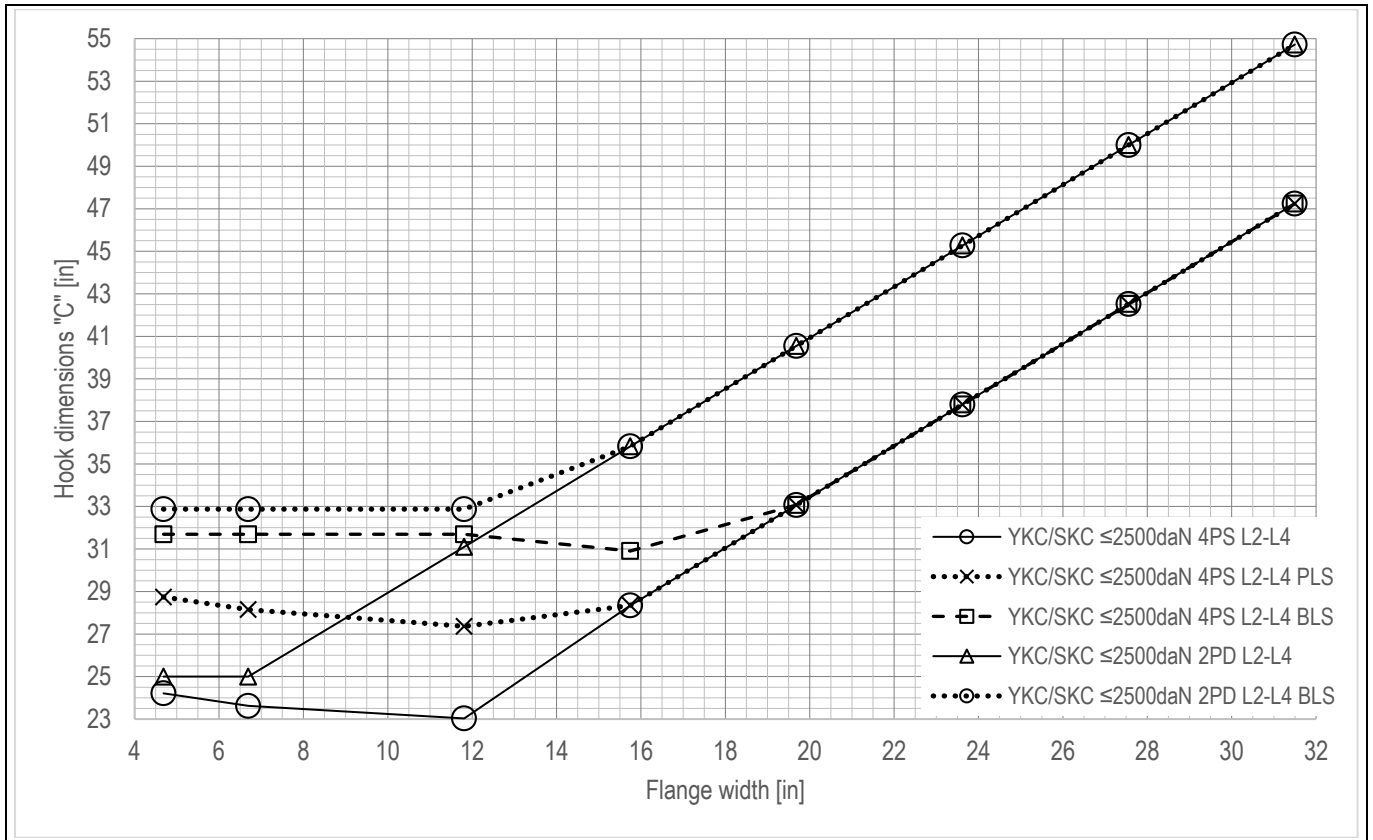
ba-o.2.6.0-us-3.3-ys | A11867501 Rev AF

# 7 Inspection and maintenance



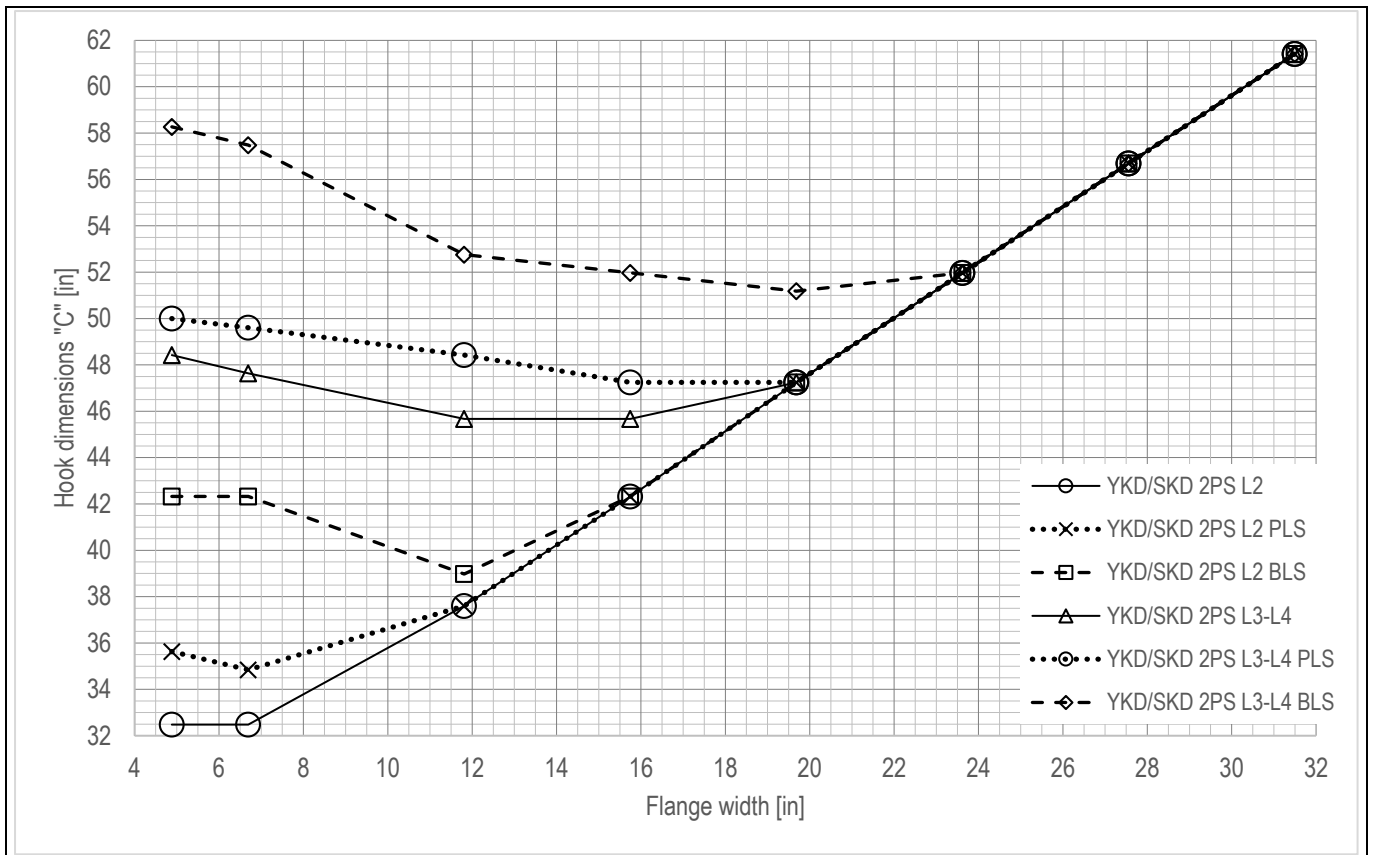
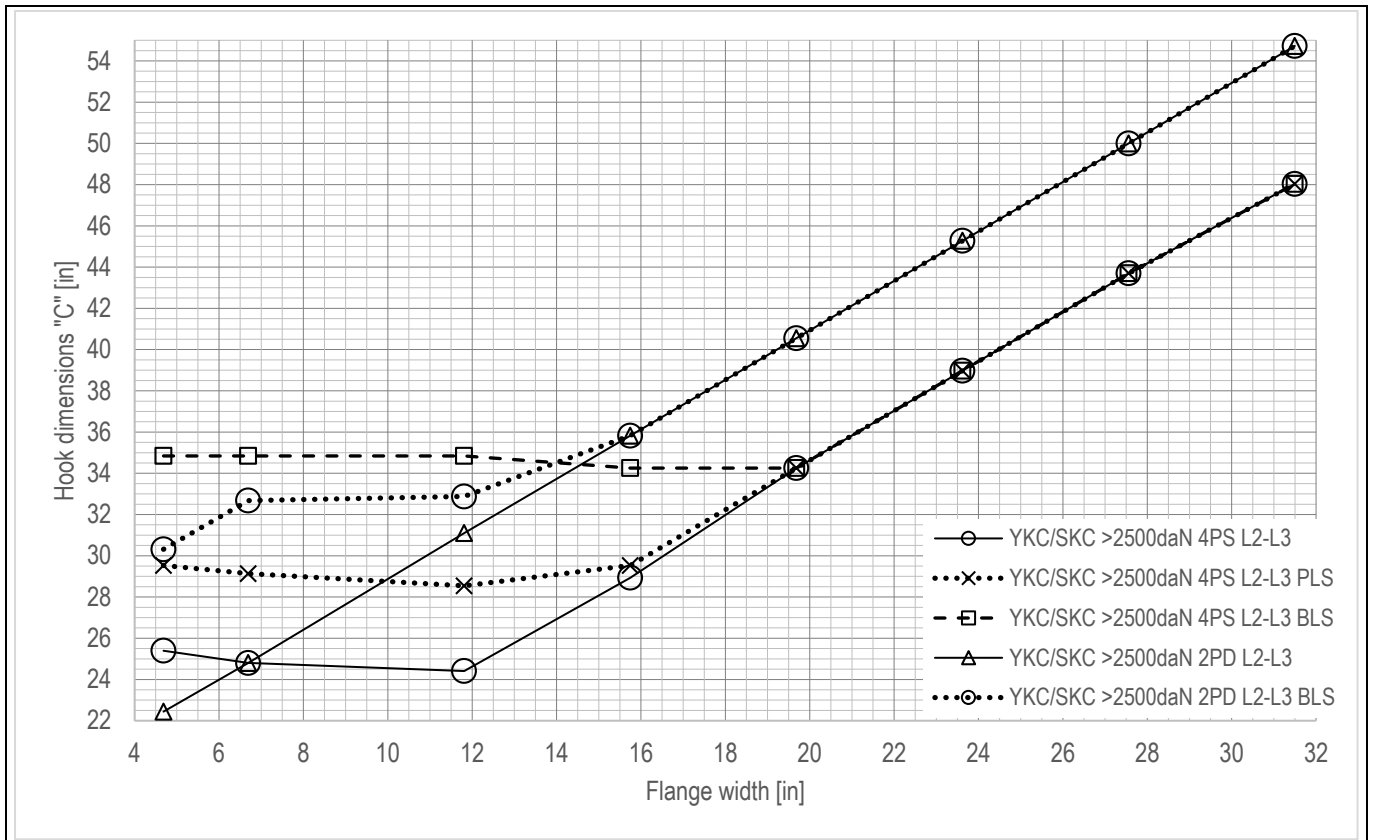
ba-o.2.6.0-us-3.3-vs | A11867501 Rev.AF

# 7 Inspection and maintenance

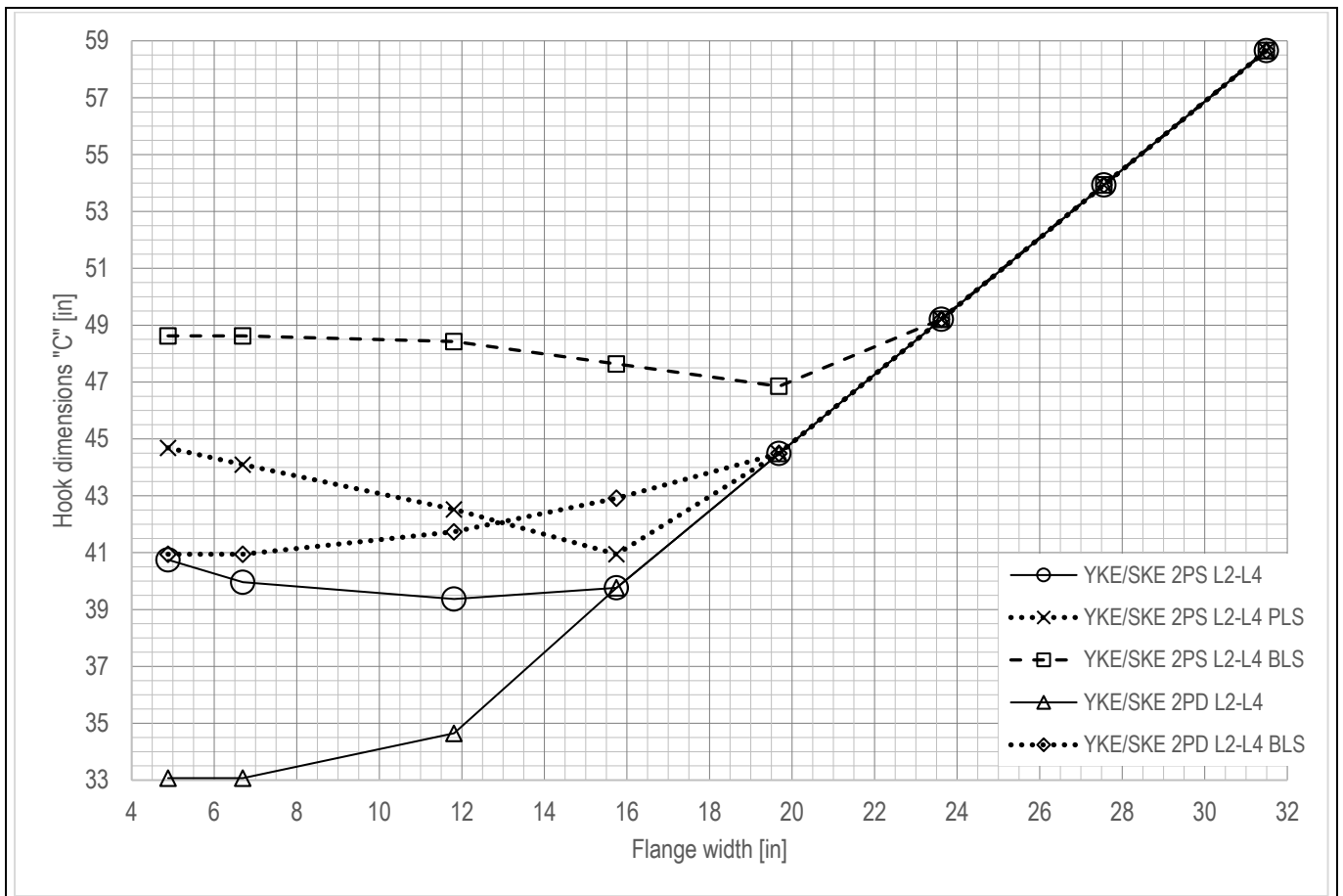
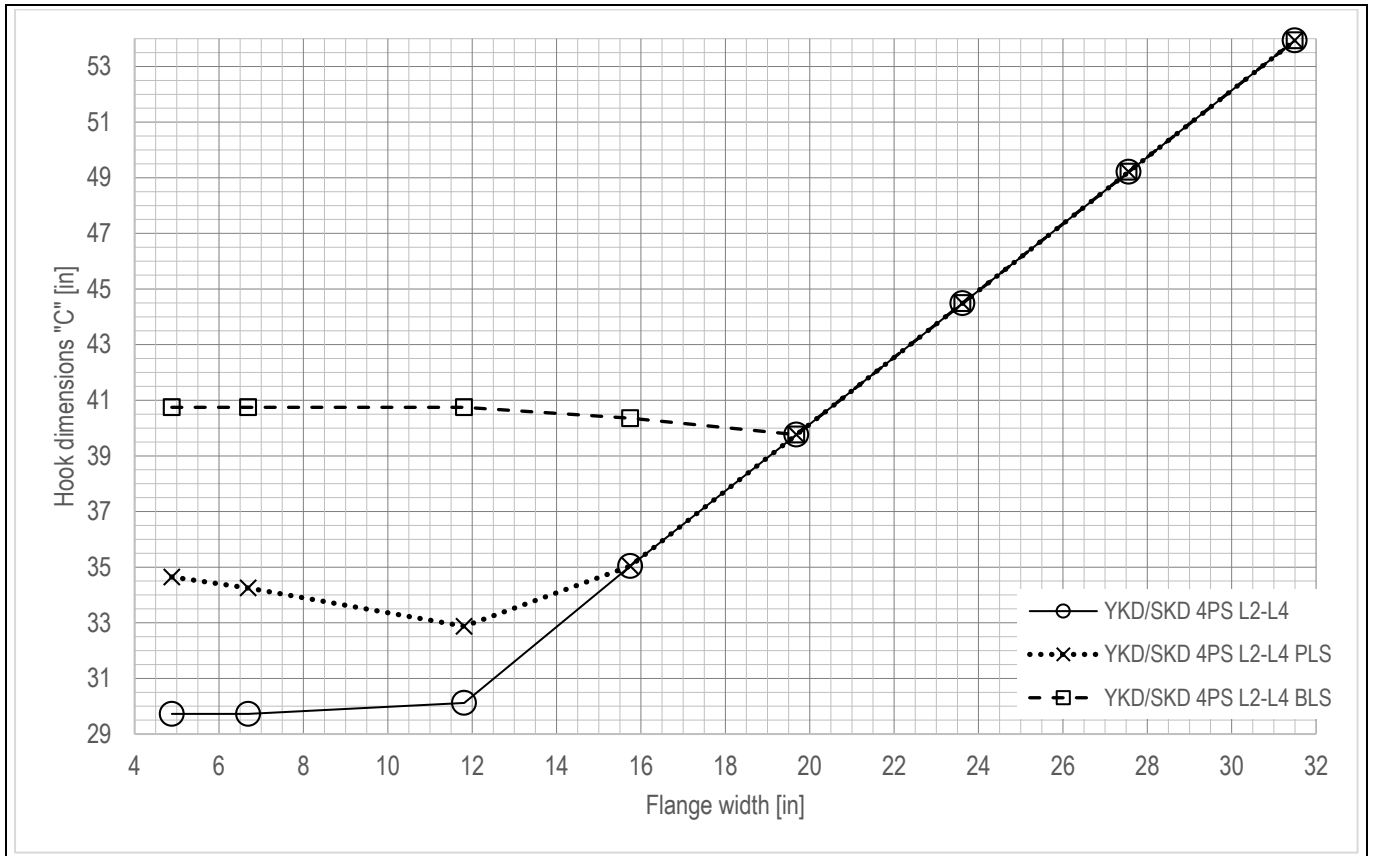


ba-o.2.6.0-us-3.3-ys | A11867501 Rev AF





# 7 Inspection and maintenance



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## 7 Inspection and maintenance

### 7.16 Assembling the bottom hook block



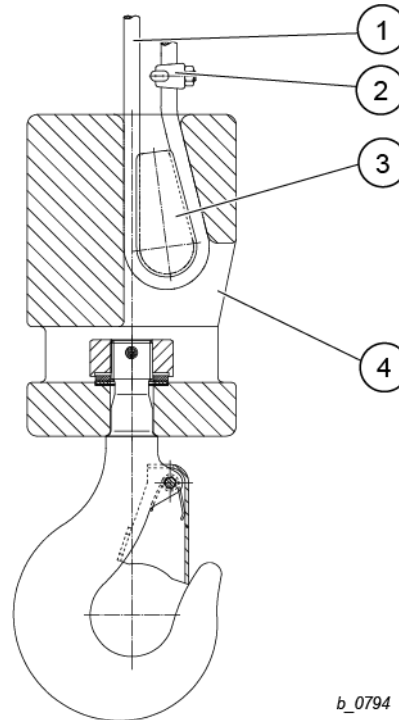
#### ▲ WARNING

Danger due to falling load!

An incorrectly assembled bottom hook block can lead to serious accidents.

- Check the bottom hook block daily for damage and correct seating.

| Type    | a    | L   |
|---------|------|-----|
|         | [in] |     |
| YKA/SKA | 0.98 | 3.9 |
| YKB/SKB |      |     |
| YKC/SKC |      | 5.1 |
| YKE/SKE |      | 6.3 |



- (1) Rope
- (2) Rope clamp
- (3) Rope wedge
- (4) Bottom hook block

Fig. 76

4. Feed the rope end through the bottom hook block (4) (see figure).
5. Lay rope (1) around the rope wedge (3) and draw together in the rope bag (1).
6. The rope end must protrude out of the bottom hook block (4) by dimension "L" (see table) as a minimum.
7. Secure rope end with rope clamp (2), dimension "a" away from the bottom hook block (4).
  - The rope clamp must not be mounted at the rope binding. For tightening torque, see table.

| Rope-Ø        | Thread size | Tightening torque    |
|---------------|-------------|----------------------|
| [in]          |             | [lb <sub>f</sub> ft] |
| 0.197...0.256 | M6          | 4                    |
| 0.276...0.315 | M8          | 7                    |
| 0.335...0.394 | M8          | 15                   |
| 0.472...0.492 | M12         | 30                   |
| 0.551...0.63  | M14         | 70                   |
| 0.787         | M16         | 96                   |

### 7.17 Overload safety device

#### 7.17.1 Testing overload safety device

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.

1. Attach a test load of 100% maximum working load + 10% overload and take load up slowly. After the rope is tautened the overload safety device must disconnect the hoist. If the hoist is not disconnected, see original operating instructions of overload device.

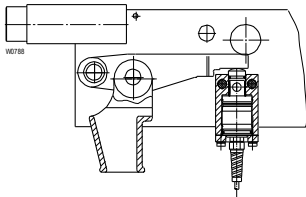


Fig. 77

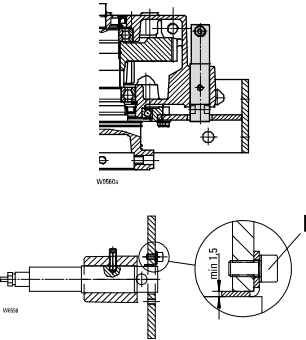


Fig. 78

#### 7.17.2 Maintenance of overload safety device with pressure sensor

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

#### 7.17.3 Maintenance of overload safety device with shear force sensor

1. Check plate thickness (**min. 0.059 in.**)
2. If necessary, replace plate after removing screw (D).

### 7.18 Crane test

#### ⚠ WARNING

**Safety hazard.** Make sure that the crane test is performed by a qualified person.

Test loads must be provided by the owner.

The crane test is part of commissioning the wire rope hoist. The test comprises:

#### **Dynamic test: 1.1 × maximum working load**

Test each direction of movement at slow and fast speed. The crane must operate smoothly during the test.

#### **Static test: 1.25 × maximum working load**

The test load must not be lifted more than max. 7.9 in from the ground at slow speed during the static test.



To enable this test to be performed, a qualified person can raise the overload cut-off threshold following the original operating instructions of the overload device.

### 7.19 Rope drive

#### 7.19.1 Rope and rope attachment - general information

##### ⚠ WARNING



Danger due to damaged or twisted ropes!  
A twist in the rope impairs its safety and durability.  
➤ Therefore always remove twists!

##### ⚠ WARNING



Danger due to wire breakage!  
With specific applications (e.g. rotation-free rope, constant dead load, repeated holding position, automatic operation, oscillations, etc.), wire breakage can arise inside the rope, which is not visible from the outside.  
Danger of accidents!  
➤ In case of doubt, contact the manufacturer.

##### ⚠ WARNING



Danger of load crash!  
Further use of a wire rope that is worn out can lead to the rope breaking and a load crash, resulting in serious injuries or even death.  
➤ Check the wire rope regularly.  
➤ If a wire rope is worn out, it must be replaced immediately.  
➤ Use only original spare parts.

Wire ropes must be checked in accordance with the periods listed in the risk assessment, although at least once yearly. Depending on the operating conditions and the operational situation, additional tests may be necessary. Personnel who have been commissioned with monitoring wire ropes must be familiar with the relevant standards.

A wire rope is worn out once it is no longer possible to be certain of safe continued operation due to wear. Maintenance, monitoring and the following criteria for discarding worn wire ropes are described in detail in the standard ISO 4309. Typical damage and wear conditions of wire ropes are presented in the following.

## 7.19.2 Replacement of wire rope due to broken wires



The part number of the rope is listed in the works certificate.

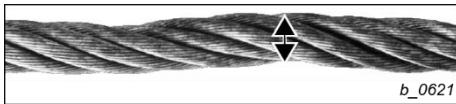
Wire ropes must be replaced if one of the following criteria applies. The listed criteria are examples derived from the standard **ISO 4309 Cranes - Wire ropes - Care and maintenance, inspection and discard**.

### Corrosion

In order to distinguish between corrosion of the wires and the rope surface:

- Wipe off or brush off the rope sections to be checked.
- Check the wire rope for corrosion in accordance with the following table and replace if necessary.

| Type of corrosion  | Condition   | Classification of the degree of severity  |
|--------------------|---|---|
| External corrosion | Wire surface heavily corroded, wires loose.   | Replacement necessary with 100 %  |
| Internal corrosion | Clear visible signs of internal corrosion, e.g. corrosion particles emerging.         | Replacement necessary with 100 %  |
| Fretting corrosion | Reddish brown dust between the strands, which almost covers the entire outer surface. | Replacement necessary with 100 % or with uncertainty regarding the degree of severity |



### Reduction in rope diameter

- Replace wire ropes with the following even reductions in the rope diameter (as % of the nominal diameter).
  - ≤ 10 % with single-layer ropes with fibre core
  - ≤ 7.5 % with single-layer ropes with steel core or ropes stranded in parallel
  - ≤ 5 % with rotation resistant ropes

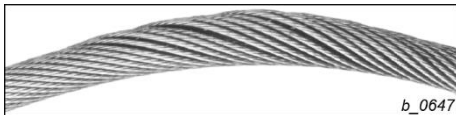
### Local reduction of the rope diameter

- Replace wire ropes with visible local reductions (constrictions).



### Corkscrew-like deformations

- Replace wire ropes with corkscrew-like deformations of more than 1/10 of the rope diameter.



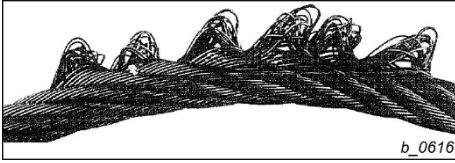
### Bird-caging

- Replace wire ropes with bird-caging.



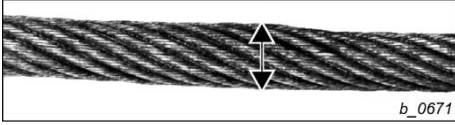
### Protruding or deformed cores or strands

- Replace wire ropes with protruding or deformed cores or strands.



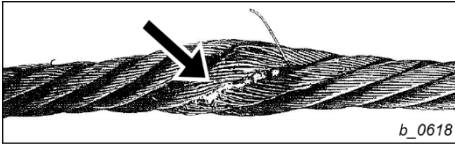
### Loop formations

- Replace wire ropes with loop formations.



### Local increase of the rope diameter

- Replace wire ropes with the following local rope diameter increases.
  - ≤ 5 % with wire ropes with steel core
  - ≤ 10 % with wire ropes with fibre core



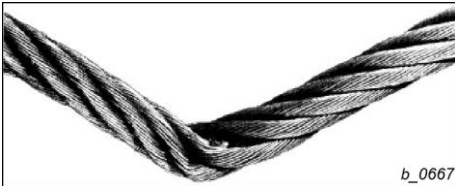
### Flattening

- Check wire ropes with flattening daily and replace if necessary.



### Kinks or tightened rope loops

- Replace wire ropes with kinks or tightened rope loops.



### Bends

- Replace wire ropes with severe bends.

### Damage due to the effects of heat or arcs

- Replace wire ropes with bluish discolouration or broken or melted wires.

### Wire breakages

- Relieve the rope tension and bend the rope roughly by hand to the radius of the rope pulley.
- Compare visible wire breakages with the number of wire breakages permitted (see rope certificate) and replace if necessary.

### Twist formation



Wire ropes must be checked daily for twist formations.

- Travel to the highest and lowest hook position without a load.
- With visible twist formations, untwist the wire rope (see section 4.13 **Rope reeving** and the section section **Discarding a wire rope**).

## 7.19.3 Removing the rope guide

### NOTICE

Danger of material damage

The stop with bearing (2) is secured with a spring washer DIN 6796.

This protection must be correctly reinstalled.

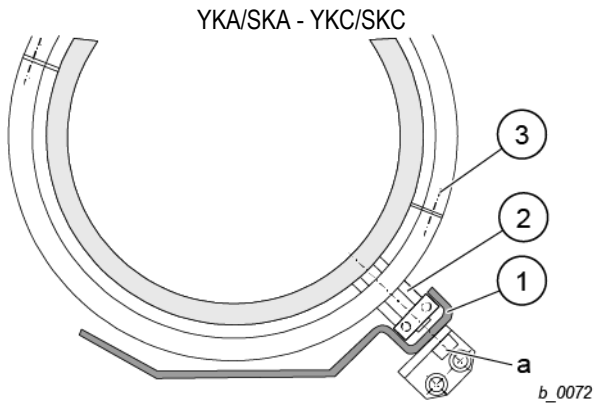


Fig. 79

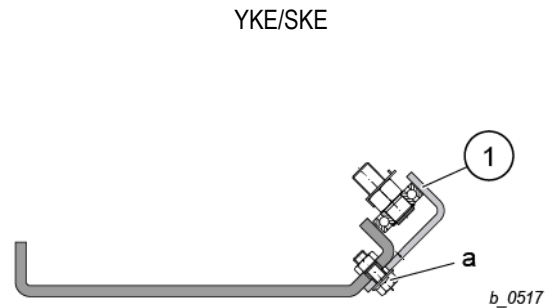
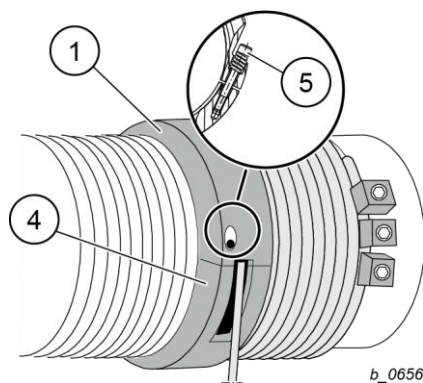
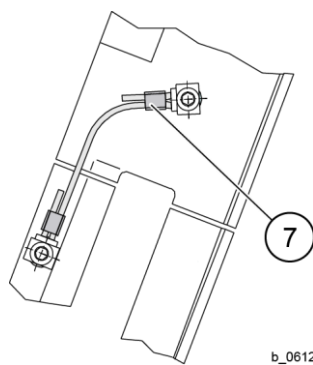


Fig. 80

1. Unscrew the protective plate (1) beneath the rope drum at the points (a). The rope guide ring now turns freely. Do not unscrew the stop with bearing (2)!



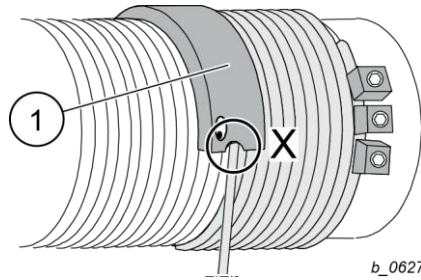
2. Loosen screws (5).



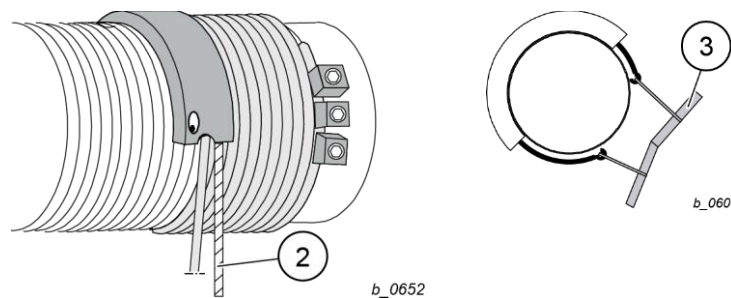
3. Loosen the rope guide ring lock (7) on one side (if present).
4. Remove the ring halves (1) and (4).
5. Detach the rope tension spring.



## 7.19.4 Installing the rope guide

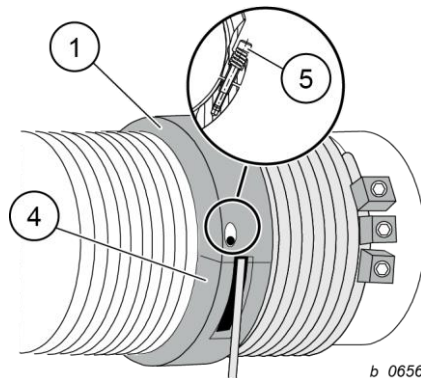


1. Place the ring half of the rope guide with small opening (1) next to the last rope winding of the rope drum such that the wire rope exits the opening "X".



Special tool,  
Part no. A0443001660

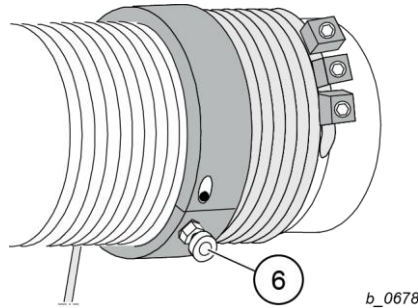
2. Slide the rope tension spring (2) with special tool (3) into the guide groove of the rope guide ring half (1) and hook the spring ends together.



3. Place second rope guide ring half with large opening (4) on the rope drum.
4. Run the wire rope straight and free of bends from the drum groove through the opening.
5. Make sure that the two rope guide ring halves (1) and (4) meet each other with no offset.
6. Connect both rope guide ring halves (1) and (4) together with screw/spring (5).
7. Make sure the rope guide lies flexibly on the rope drum and can be turned by hand.



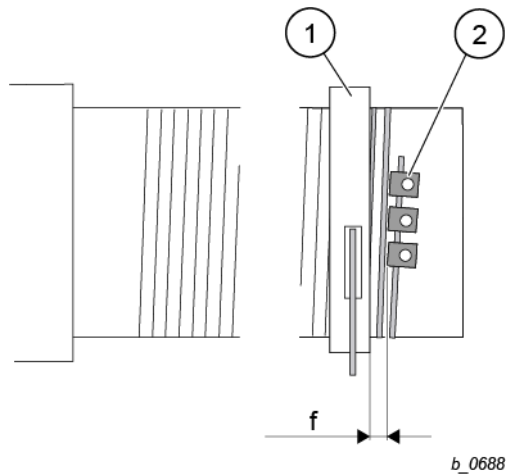
If this is not the case, an error has occurred during installation or the rope drum is damaged.



8. If necessary, assemble the stop (6) with bearing and spring washer (for tightening torques see table).

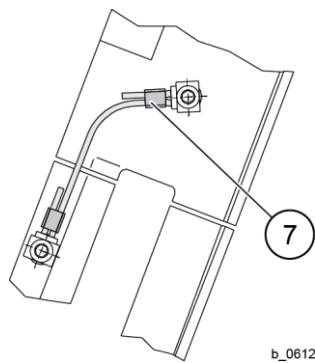
| Type            | Thread size | Tightening torque    |
|-----------------|-------------|----------------------|
|                 |             | [lb <sub>r</sub> ft] |
| YKA/SKA-YKB/SKB | M8×1        | 15                   |
| YKC/SKC         | M10×1       | 30                   |
| YKE/SKE         | M16×1       | 118                  |

9. Install the grease pan again!

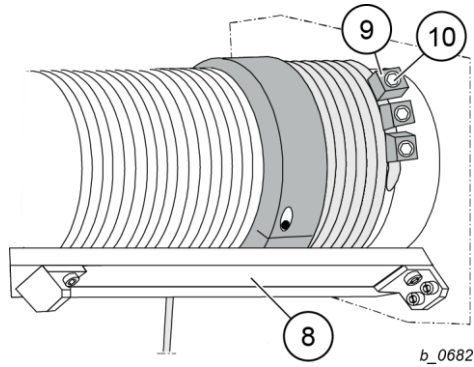


10. Observe the minimum distance  $f \geq 0.79$  in) between the rope guide ring (1) and clamping plates (2) for the rope anchorage.

**With wire rope hoist type YKE/SKE-2PS with drum lengths L4 – L5:**



1. Assemble the rope guide ring lock (7).



2. Assemble the protective plate (8).
3. Tighten the clamping plates (9) with screws (10) and safety washers (for tightening torques see table).

| Type    | Thread size | Tightening torque    |
|---------|-------------|----------------------|
|         |             | [lb <sub>r</sub> ft] |
| YKA/SKA | M6          | 7                    |
|         | M10         | 30                   |
| YKB/SKB | M10         | 37                   |
| YKC/SKC | M10         | 37                   |
|         | M12         | 64                   |
| YKE/SKE | M12         | 64                   |
|         | M16         | 155                  |

### 7.19.5 Replacing the rope guide



The rope guide ring has 2 pre-drilled holes 10° and 30°. Rope guide rings for other angles must be drilled according to the order.

1. Remove the rope guide (see section 7.19.3).
2. Screw bearing into the new rope guide ring at the same point.
  - Assemble on the half of the rope guide ring with the opening for the rope (30°) for stationary wire rope hoist, underslung trolley (nBh) and double-rail crab.
  - Assemble on the half of the rope guide ring without opening for the rope (10°) for underslung trolley (kBh).
3. Install the rope guide (see section 7.19.4).

### 7.19.6 Changing the wire rope

#### ⚠ WARNING

Danger due to unsuitable rope

The replacement rope must be the same as the original rope. To determine which wire rope is installed, refer to the works certificate or rope certificate.

#### ⚠ WARNING

Always tighten and secure ropes at the rope fastening point according to instructions. Replace cotter pins every time after disassembly.

With 2 wire ropes with a different direction of lay, observe the following:

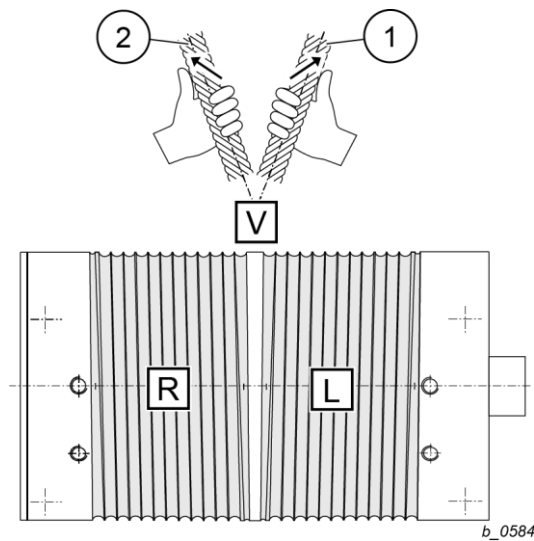


Fig. 81

- right-hand lay wire rope (1) laid on rope drum with left-hand groove (L)
- left-hand lay wire rope (2) laid on rope drum with right-hand groove (R)

#### ⚠ WARNING



Danger of falling parts

- Cordon off and secure the danger zone.

#### Discarding a wire rope

1. Travel with the hook block until shortly before the lowest hook position and set down on a firm surface.
2. Undo the rope end in the rope fastening point (rope lock with rope wedge).
3. Set down the rope end.
  - Do not allow the rope to drop to the ground uncontrolled.
4. Remove the rope guide (see section 7.19.3 **Removing the rope guide**).
5. With the block adjustment on the geared limit switch, set the switch-off at the bottom (see section 7.14 Adjusting the switching points)
  - Turning anticlockwise: Switching point is shifted downwards ↓.
6. Allow the remaining rope to run off the drum.
7. Secure the rope against falling.
8. Loosen the fastening screws for the clamping plates on the rope drum.
  - Do not allow the rope to drop to the ground uncontrolled.

### Fitting the wire rope

**⚠ WARNING** Danger of personal injuries.

- After applying a new rope or shortening the old rope, it is necessary to adjust the hoist limit switch.

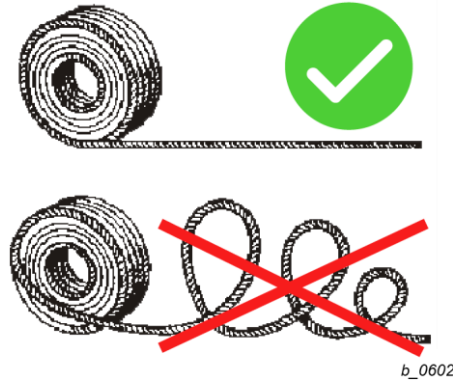


Fig. 82

1. Roll out the new wire rope straight on a clean and level surface.
2. When unrolling, make sure no loops, bends or twists arise and that no foreign objects penetrate the wire rope.

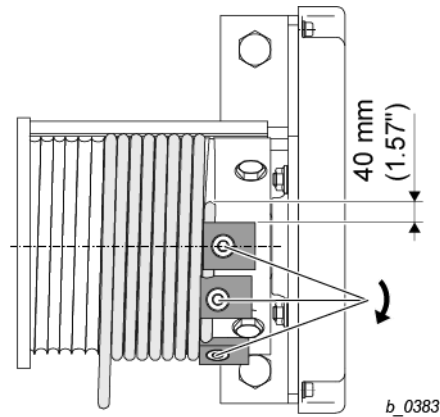


Fig. 83

3. Mount the rope (6) on the rope drum with all clamping plates (9) (do not forget the safety washers!).
  - Leave the rope end projecting approx. 1.18...1.57 in.
4. Wind the rope 5-10 windings taut with the motorized drive.
  - When doing so, allow the rope to run through a greasy cloth (for grease type, see section 11.5 "Lubricants").
5. Install the rope guide (see section 7.19.4 "Installing the rope guide").

6. With the block adjustment, set the switch-off at the top (see section 7.14 Adjusting the switching points).
  - Turning clockwise: Switching point is shifted upwards ↑.
7. Reeve the loose rope end through the hook block according to the number of strands, mount and fasten with the rope wedge and secure with a rope clamp (see section 4.13.2 "Rope fastening point").
8. Tighten the screws (8) for the clamping plates (9) once more (for tightening torques see table).

| Type    | Thread size | Tightening torque    |
|---------|-------------|----------------------|
|         |             | [lb <sub>r</sub> ft] |
| YKA/SKA | M6          | 7                    |
|         | M10         | 30                   |
| YKB/SKB | M10         | 37                   |
| YKC/SKC | M10         | 37                   |
|         | M12         | 64                   |
| YKE/SKE | M12         | 64                   |
|         | M16         | 155                  |

Tab. 31

9. Run the rope in with a partial load.
10. Check the geared limit switch and adjust if necessary (see section 7.14 Adjusting the switching points).



If the new rope exhibits a twist after a certain operation time, untwist the rope immediately (see section 4.13, "Rope reeving" and "Discarding a wire rope").

## 7.19.7 Checking rope drum for wear

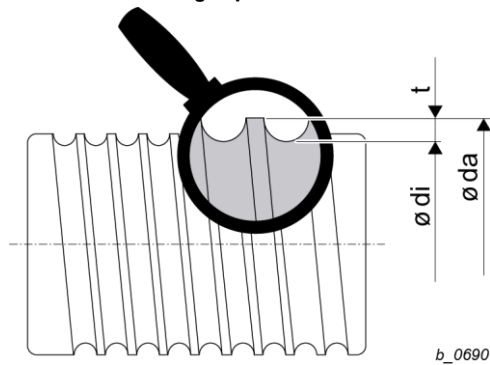


Fig. 84

b\_0690

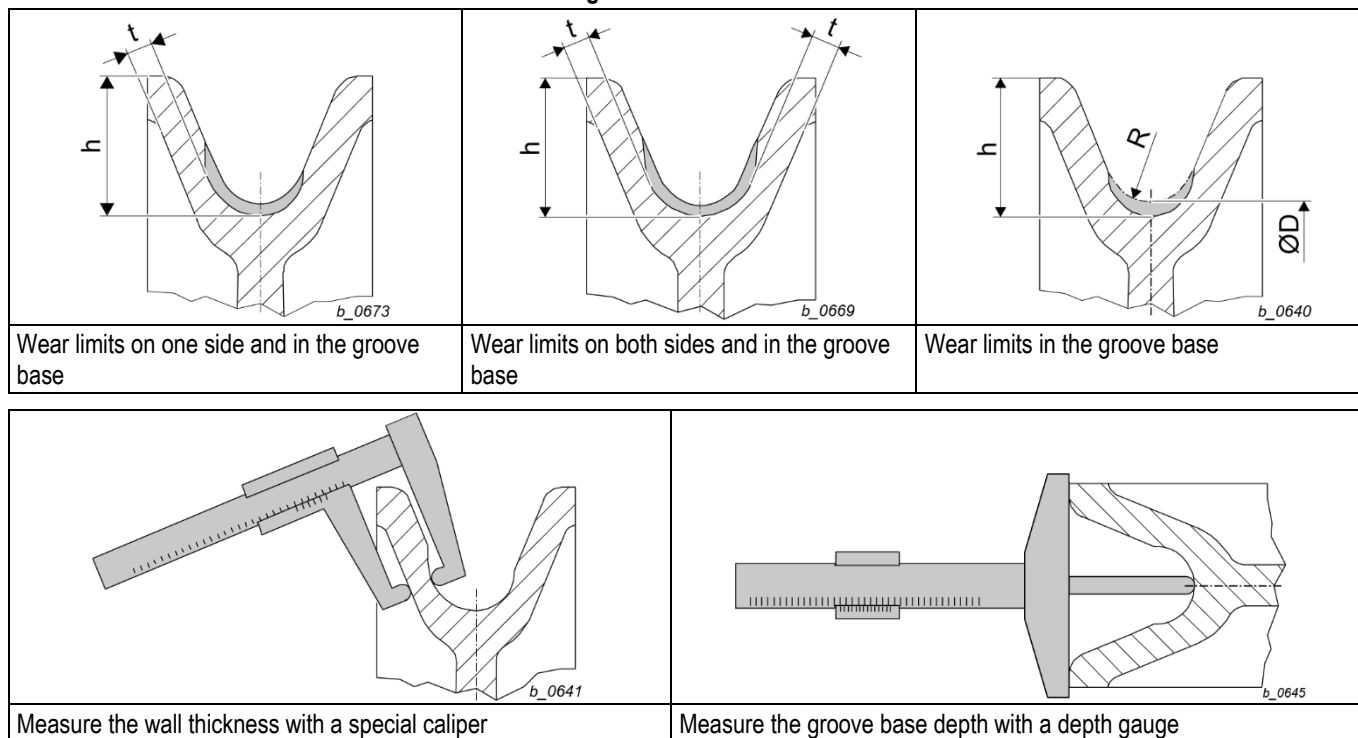
| Type of wire rope hoist | Rope diameter<br>[in] | Nominal values |            |           | Limits for wear |                |               |
|-------------------------|-----------------------|----------------|------------|-----------|-----------------|----------------|---------------|
|                         |                       | da<br>[in]     | di<br>[in] | t<br>[in] | da min<br>[in]  | di min<br>[in] | t max<br>[in] |
| YKA/SKE                 | 0.217                 | 4.91           | 4.73       | 0.087     | 4.88            | 4.71           | 0.098         |
|                         | 0.236                 | 4.91           | 4.72       | 0.094     | 4.88            | 4.69           | 0.106         |
|                         | 0.256...0.276         | 4.91           | 4.69       | 0.11      | 4.88            | 4.65           | 0.126         |
| YKB/SKB                 | 0.276                 | 6.51           | 6.29       | 0.11      | 6.48            | 6.26           | 0.126         |
|                         | 0.335...0.354         | 6.51           | 6.22       | 0.144     | 6.48            | 6.19           | 0.161         |
| YKC/SKC                 | 0.335...0.354         | 8.52           | 8.24       | 0.144     | 8.49            | 8.2            | 0.161         |
|                         | 0.394                 | 8.54           | 8.23       | 0.157     | 8.5             | 8.19           | 0.177         |
|                         | 0.472...0.492         | 8.52           | 8.13       | 0.197     | 8.48            | 8.08           | 0.22          |
| YKE/SKE                 | 0.472...0.492         | 13.86          | 13.46      | 0.197     | 13.81           | 13.42          | 0.22          |
|                         | 0.551                 | 13.86          | 13.43      | 0.217     | 13.8            | 13.37          | 0.244         |
|                         | 0.63                  | 13.86          | 13.39      | 0.236     | 13.79           | 13.33          | 0.264         |
|                         | 0.787                 | 13.86          | 13.23      | 0.315     | 13.78           | 13.15          | 0.354         |

Tab. 32

## 7.19.8 Checking and maintaining the rope sheave

1. Relieve rope tension.
2. Check rope sheaves for wear. We recommend a test by our competent personnel. It is also necessary to ensure smooth running, which indicates that the ball bearing is in good condition.

### Checking the wear limits



### Checking the wear limits

1. Measure wall thickness "t" with a special caliper.
2. Measure groove base depth "h" with a depth gauge.

If the measured values exceed or fall short of the values in the table:

3. Replace the rope sheave.

| Ordering no. | New rope sheave |                 | Max. base height "h" | Min. wall thickness "t" |
|--------------|-----------------|-----------------|----------------------|-------------------------|
|              | Ø D             | Base height "h" |                      |                         |
|              | [in]            | [in]            |                      |                         |
| A0143001530  | 3.86            | 0.433           | 0.512                | 0.157                   |
| A0143004530  | 3.94            | 0.394           | 0.512                | 0.157                   |
| A0143000530  | 4.92            | 0.472           | 0.551                | 0.157                   |
| A2233000530  | 5.51            | 0.551           | 0.63                 | 0.157                   |
| A0143006530  | 6.06            | 0.768           | 0.846                | 0.157                   |
| A0333020530  | 6.3             | 0.65            | 0.748                | 0.157                   |
| A2433000530  | 7.87            | 0.827           | 0.945                | 0.217                   |
| A0143005530  | 8.58            | 0.965           | 1.043                | 0.217                   |
| A0143003530  | 8.86            | 0.827           | 0.945                | 0.217                   |
| A0333040530  | 9.84            | 0.984           | 1.102                | 0.217                   |
| A2533000530  | 14.76           | 1.339           | 1.476                | 0.256                   |
| A2533003530  | 14.76           | 1.28            | 1.417                | 0.256                   |
| A4633000530  | 15.75           | 1.181           | 1.319                | 0.276                   |
| A2633001530  | 17.72           | 1.378           | 1.535                | 0.394                   |
| A0943000530  | 17.72           | 1.378           | 1.535                | 0.394                   |
| A4633001530  | 18.9            | 1.28            | 1.437                | 0.394                   |

Tab. 33



## 7 Inspection and maintenance

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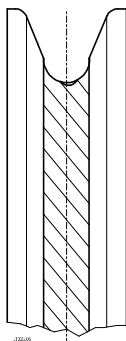


Fig. 85

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.

## 7.19.9 Checking the load hook

### NOTICE

#### Danger of material damage

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 a qualified person.

1. **Warning** A damaged load hook can cause the load to fall and result in serious injuries.
  - Check the load hook for damage, corrosion and wear.
  - Check function of the hook safety latch.
2. With visible damage, corrosion or wear, replace the load hook.
3. Measure the dimensions "y" and "h".
4. Compare the measured values with the permissible values (see table).
5. If "y max." is exceeded or "h min" is undershot, replace the load hook.

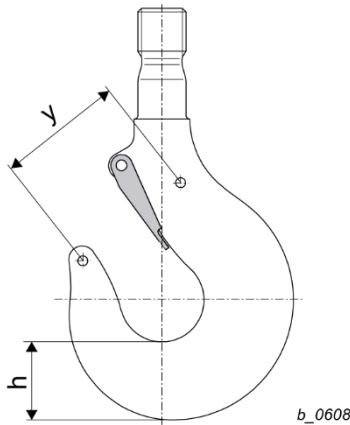


Fig. 86

b\_0608

| RSN,<br>RS | Hook size |      |      |      |      |      |      |      |      |      |      |
|------------|-----------|------|------|------|------|------|------|------|------|------|------|
|            | 025       | 04   | 05   | 08   | 1    | 1.6  | 2.5  | 4    | 5    | 6    | 10   |
|            | [in]      |      |      |      |      |      |      |      |      |      |      |
| h          | 0.94      | 1.14 | 1.22 | 1.46 | 1.57 | 1.89 | 2.28 | 2.64 | 2.95 | 3.35 | 4.17 |
| h min      | 0.9       | 1.09 | 1.16 | 1.39 | 1.5  | 1.8  | 2.17 | 2.51 | 2.81 | 3.18 | 3.96 |

Tab. 34

| RSN,<br>RS | Hook size |      |      |      |      |
|------------|-----------|------|------|------|------|
|            | 2.5       | 4    | 5    | 6    | 10   |
|            | [in]      |      |      |      |      |
| h          | 1.97      | 2.36 | 2.64 | 2.95 | 3.74 |
| h min      | 1.87      | 2.24 | 2.51 | 2.81 | 3.56 |

Tab. 35

$y_{\text{new}}$  see hook certificate.

$y_{\text{max}} \leq 1.1 \times y_{\text{new}}$

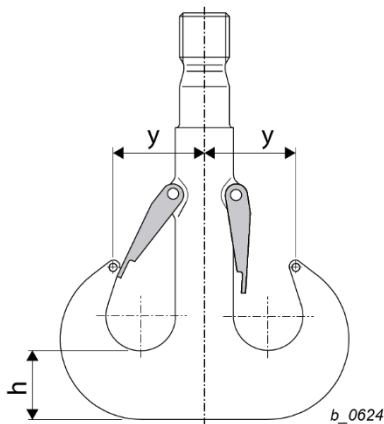
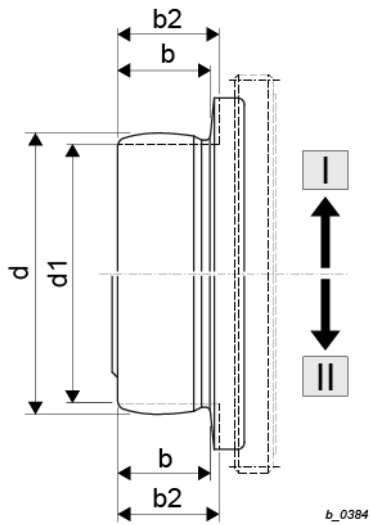


Fig. 87

b\_0624

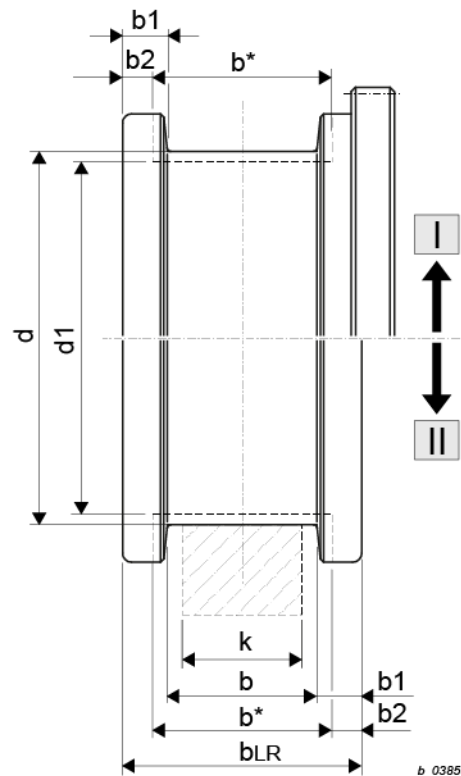
7.20 Trolley



Wheels, wheel drive and runway

| Fig. | Nominal value |      | Limit for wear |      |
|------|---------------|------|----------------|------|
|      | Ø d           | b    | Ø d1           | b2   |
|      | [in]          |      |                |      |
| I    | 3.15          | 1.08 | 2.99           | 1.16 |
| I    | 3.94          | 1.3  | 3.74           | 1.38 |
| I    | 5.51          | 1.75 | 5.24           | 1.85 |
| II   |               | 1.67 |                | 1.77 |
| I    | 6.3           | 1.75 | 5.98           | 1.85 |
| II   | 7.87          | 1.67 | 7.48           | 1.77 |

Tab. 36



| Fig. | Ø d  | Nominal value   |      |      |      | Limit for wear |      |                      |
|------|------|-----------------|------|------|------|----------------|------|----------------------|
|      |      | b <sub>LR</sub> | b    | k    | b1   | Ø d1           | b2   | max clearance=(b*-k) |
|      |      | [in]            |      |      |      |                |      |                      |
| I    | 3.94 | 3.15            | 1.97 | 1.57 | 0.59 | 3.74           | 0.22 | 0.51                 |
|      |      | 3.15            | 2.36 | 1.97 | 0.39 |                |      | 0.51                 |
| II   | 4.92 | 3.15            | 1.97 | 1.57 | 0.59 | 4.68           | 0.28 | 0.51                 |
|      |      | 3.15            | 2.36 | 1.97 | 0.39 |                |      | 0.51                 |
| II   | 6.3  | 3.35            | 2.05 | 1.57 | 0.65 | 5.98           | 0.31 | 0.63                 |
|      |      | 3.35            | 2.44 | 1.97 | 0.45 |                |      | 0.63                 |
| II   | 7.87 | 3.94            | 2.13 | 1.57 | 0.91 | 7.48           | 0.41 | 0.71                 |
|      |      | 3.94            | 2.13 | 1.77 | 0.91 |                |      | 0.71                 |
|      |      | 3.94            | 2.52 | 1.97 | 0.71 |                |      | 0.71                 |
|      |      | 3.94            | 2.52 | 2.17 | 0.71 |                |      | 0.71                 |
|      |      | 3.94            | 2.91 | 2.36 | 0.51 |                |      | 0.71                 |
|      |      | 3.94            | 2.91 | 2.56 | 0.51 |                |      | 0.55                 |

Tab. 37

1. Perform visual inspection of runway girder for wear.
2. Perform visual inspection of wheel flanges for wear.
3. Perform visual inspection of wheels for wear.
4. **WARNING** Safety risk. If any one of the limits for wear d1, b2, (b\*-k) is attained, the part must be replaced by a qualified person.

## 7.21 Remaining service life

The operating mode and operating time must be established by the owner, see section 1.3 and recorded in the logbook in order to calculate the remaining service life.

After the service life has expired a general overhaul (S.W.P. = Safe Working Period) must be carried out.

### 7.21.1 Operating hours counter in SLE load monitor

The operating hours counter in the SLE load monitor adds up the operating times of the hoisting mechanism. In order to obtain the used lifetime (remaining service life) in full-load hours, the operating hours are to be evaluated with the load spectrum data "k". This is performed by a competent person within the framework of the annual "periodic inspection", see section 1.5.

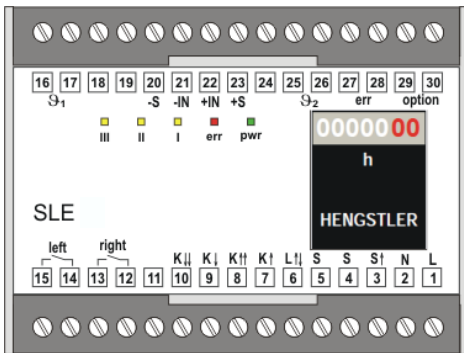


Fig. 90

### 7.21.2 Multicontroller SMC (optional)

The Multicontroller SMC has a load spectrum recorder. The load-specific operating hours of the hoisting mechanism are stored in the load spectrum recorder. The SMC uses this load spectrum data to calculate the full-load operating hours of the hoisting mechanism. The remaining service life is calculated from the full-load operating hours determined, with consideration to the mechanism group. Once the theoretical full-load lifetime has been reached, this is indicated by continuous flashing of the three yellow LEDs (I, II, III) on the SMC.

**If this is the case, a general overhaul must be performed in accordance with the manufacturer's specifications.**

The operating hours and the load spectrum data can be read out via this with a PC (laptop).

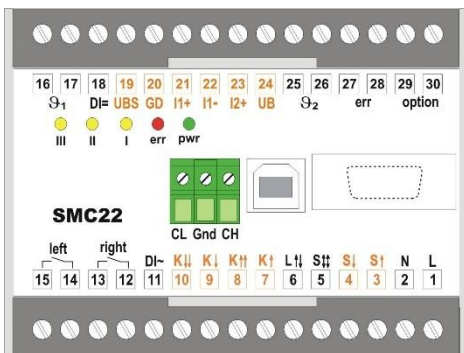


Fig. 91

### NOTICE

Reading out the operating hours counter with the SLE or reading out the load spectrum data with the SMC does not replace the prescribed tests, including testing the wearing parts (rope, return sheaves, etc.).

## 7.22 General overhaul

The gear mechanism (motor and gears; does not affect the wearing parts) of the wire rope hoist SH is classified per FEM / ISO standards. The theoretical full load lifetime in hours shown opposite (D) is applicable for normal hoist applications.

| FEM / ISO | M4  | M5   | M6   | M7   |
|-----------|-----|------|------|------|
| D [h]     | 800 | 1600 | 3200 | 6400 |

Tab. 38

If the full load lifetime (D) minus the lifetime expired is nought, the wire rope hoist must be overhauled by the manufacturer.

### NOTICE

**Danger of material damage.** 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 factory certificate.

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. 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.

## 8 Wearing parts

## 8 Wearing parts

### ⚠ WARNING

#### Safety hazard.

- Make sure that replacement and repairs are performed by qualified persons only.

### 8.1 Serial number

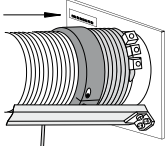


Fig. 92

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

### 8.2 Hoist

#### Brake rotor



When replacing the brake rotor, the pressure springs must always be replaced.

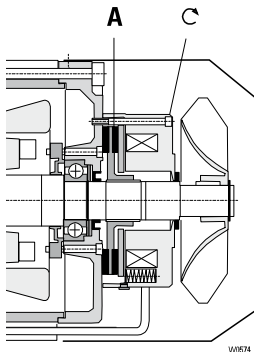


Fig. 93

#### RSM brake rotor

| Hoist motor     | Hoist motor brake | A           | Tightening torque |
|-----------------|-------------------|-------------|-------------------|
|                 |                   | Order no.   | [lbf ft]          |
| 12/2H73/100.822 | RSM150            | A0443075650 | 16                |
| 12/2H73-1PC3052 |                   | A70017594   |                   |
| 24/4H92         | RSM500            | A0543011650 | 33                |

Tab. 39

#### NM brake rotor

| Hoist motor   | Hoist motor brake | A         | Tightening torque |    |
|---------------|-------------------|-----------|-------------------|----|
|               |                   | Order no. | [lbf ft]          |    |
| 12/2H33-MF... | NM 38722          | A5674770  | 7                 |    |
| 4H33-MF...    | NM 38720          | A5674770  |                   |    |
| 12/2H42-MF... | NM 38732          | A5674750  |                   |    |
| 4H42-MF...    | NM 38730          | A5674750  |                   |    |
| 4HS3-MF...    | NM 38730          | A5676320  |                   |    |
| 12/2H62-MF... | NM 38732          | A5678050  | 16                |    |
| 4H62-MF...    | NM 38740          | A5674790  |                   |    |
| 12/2H71-MF... | NM 38742          | A5674790  |                   |    |
| 4H71-MF...    | NM 38740          | A5674790  |                   |    |
| 4HS5-MF...    | NM 40940          | A5676330  |                   |    |
| 12/2H72-MF... | NM 38754          | A5675700  |                   |    |
| 4H72-MF...    | NM 38741          | A5675690  |                   |    |
| 4HS7-MF...    | NM 40951          | A5676340  |                   |    |
| 4H73-MF...    | NM 38753          | A5675500  |                   |    |
| 4SH8-MF...    | NM 40980          | A5676350  |                   |    |
| 4H81-MF...    | NM 38753          | A5675500  |                   |    |
| 4H82-MF...    | NM 38781          | A5675710  |                   |    |
| 4HSA-MF...    | NM 40980          | A5676350  |                   |    |
| 12/2H91-MF... | NM 38790          | A5675910  |                   | 33 |

Tab. 40

## 8 Wearing parts

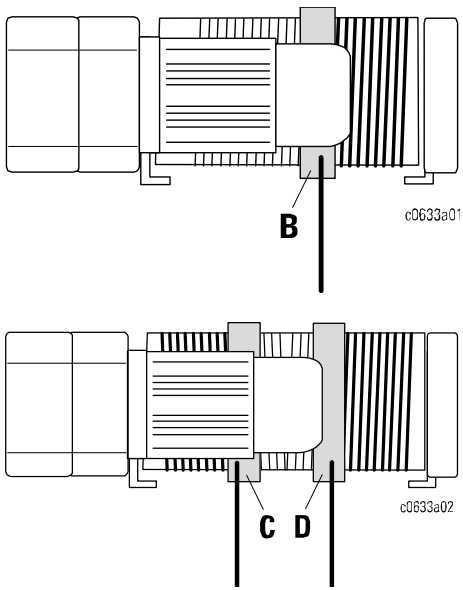


Fig. 94

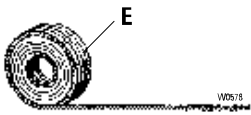


Fig. 95

### Rope guide

| Wire rope hoist type   | B           | C           | D           |
|------------------------|-------------|-------------|-------------|
|                        | Order no.   | Order no.   | Order no.   |
| YKA/SKA                | A0343002430 | A0343001430 | A0343000430 |
| YKB/SKB                | A0443000430 | A0443002430 | A0443001430 |
| YKC/SKC                | A0543001430 | A0543002430 | A0543000430 |
| YKE/SKE (2PS), L4 - L5 | A0643008430 | -           | -           |
| YKE/SKE                | A0643003430 | A0643004430 | A0643000430 |

Tab. 41

### Wire rope (E)

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

## 9 Troubleshooting

### 9 Troubleshooting

**⚠ DANGER**



**Electric shock hazard.**

- Make sure an electrical qualified person performs the work.
- Disconnect power and implement a Lockout/Tagout (LOTO) procedure before servicing the equipment.

| Trouble   | Possible cause                                  | Remedy  |
|---|---|---|
| <b>Hoist does NOT operate</b>   | No power to hoist                               | <ol style="list-style-type: none"> <li>1. Check switches, and fuses.</li> <li>2. Check connections in power supply lines.</li> <li>3. Check power collectors.</li> </ol>  |
|   | Wrong voltage                                   | <ol style="list-style-type: none"> <li>1. Check if the supply voltage is in accordance with the voltage indicated on motor data plate.</li> </ol>   |
|   | Loose or broken wire connections                | <ol style="list-style-type: none"> <li>1. Shut off the power.</li> <li>2. Remove electrical cover, and check wire connections.</li> <li>3. Check wire connections of control pendant.</li> <li>4. Check wire connections of limit switches.</li> <li>5. Correct wiring if necessary.</li> </ol>   |
|   | Contactors not functioning                      | <ol style="list-style-type: none"> <li>1. Check if jumper wires are properly installed.</li> <li>2. Check if contactor armatures move freely.</li> <li>3. Check if contactor is burned or welded.</li> <li>4. Replace contactor if necessary.</li> </ol>  |
|   | No control voltage                              | <ol style="list-style-type: none"> <li>1. Check if transformer fuse is blown.</li> <li>2. If fuse is burn, check control pendant for grounding and/or shorts.</li> <li>3. Check transformer coil for signs of overheating.</li> <li>4. Check if the transformer secondary is the same voltage as the coils to which it is connected.</li> <li>5. Replace transformer if necessary.</li> </ol> |
|   | Motor burned out                                | <ol style="list-style-type: none"> <li>1. Replace motor.</li> <li>2. Check input power supply.</li> <li>3. Check hoist motor connections.</li> </ol>  |
| <b>Hoist does NOT operate, motor hums</b>   | Not all power phases are present                | <ol style="list-style-type: none"> <li>1. Check fuses, replace if necessary</li> <li>2. Check input power supply.</li> <li>3. Check control pendant.</li> </ol>   |
| <b>Hoist does NOT start after a longer shutdown, or starts with difficulty, motor hums.</b> | Hoist brake stuck                               | <ol style="list-style-type: none"> <li>1. Check brake.</li> <li>2. Replace brake if necessary.</li> </ol>   |
| <b>Hoist motor overheats</b>  | Excessive load                                  | <ol style="list-style-type: none"> <li>1. Reduce load to rated load of hoist, as shown on nameplate.</li> </ol>   |
|   | Excessive duty cycle                            | <ol style="list-style-type: none"> <li>1. Reduce frequency of lifts.</li> <li>2. Reduce amount of jogging.</li> </ol>   |
|   | Wrong voltage or frequency                      | <ol style="list-style-type: none"> <li>1. Check if the supply voltage is in accordance with the voltage indicated on motor data plate.</li> <li>2. Check hoist and inspect for defective, worn or damaged parts.</li> </ol>   |
|   | Defective motor or worn bearings in hoist frame | <ol style="list-style-type: none"> <li>1. Disassemble hoist.</li> <li>2. Inspect for defective, worn or damaged parts.</li> <li>3. Replace parts if necessary.</li> </ol>   |
| <b>Hoist operates intermittently</b>  | Collectors make poor contact                    | <ol style="list-style-type: none"> <li>1. Check electrical connections.</li> <li>2. Check collectors for free movement of spring arms, or weak springs.</li> </ol>  |
|   | Loose contacts                                  | <ol style="list-style-type: none"> <li>1. Check wire connections.</li> <li>2. Correct wiring if necessary.</li> </ol>   |
| <b>Braking distance is too long</b>   | Brake lining worn                               | <ol style="list-style-type: none"> <li>1. Replace brake disk.</li> </ol>  |

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## 9 Troubleshooting

| Trouble  | Possible cause   | Remedy   |
|--|--|--|
| <b>Loud clicking noise when motor starts</b>         | Air gap on brake is too wide   | <ol style="list-style-type: none"> <li>1. Measure air gap on motor.</li> <li>2. Replace brake disk if the maximum air gap is reached.</li> </ol>   |
| <b>Lifting of rated load NOT possible</b>            | Low voltage  | <ol style="list-style-type: none"> <li>1. Check if the supply voltage is in accordance with the voltage indicated on motor data plate.</li> <li>2. Check hoist motor connections.</li> <li>3. Check size of power supply lines.</li> </ol>                                 |
| <b>Hook moves in wrong direction</b>                 | Hoist wired incorrectly  | <ol style="list-style-type: none"> <li>1. Check wiring connections with appropriate wiring diagram.</li> <li>2. Correct wiring if necessary.</li> </ol>  |
| <b>Lifting NOT possible</b>                          | Upper hook position is reached   | 1. Activate DOWN button  |
|  | Excessive load   | 2. Reduce load to rated load of hoist, as shown on nameplate   |
|  | Limit switch defective   | <ol style="list-style-type: none"> <li>1. Check operational hoist limit switch.</li> <li>2. Check emergency hoist limit switch.</li> <li>3. Replace limit switch if necessary.</li> </ol>  |
|  | Condition monitoring device (SMC..., SLE..) is activated or is defective | 1. Check supplied manual of the condition monitoring device (SMC..., SLE..)  |
|  | UP button inoperative  | <ol style="list-style-type: none"> <li>1. Check button contacts and wires.</li> <li>2. Correct wiring or repair control pendant if necessary.</li> </ol>   |
|  | Contact assembly not functioning   | <ol style="list-style-type: none"> <li>1. Check if jumper wires are properly installed.</li> <li>2. Check if contactor armatures move freely.</li> <li>3. Check if contactor is burned or welded.</li> <li>4. Correct wiring or replace contactor if necessary.</li> </ol> |
|  | Hoist electrical circuit open  | <ol style="list-style-type: none"> <li>1. Check if connections are loose.</li> <li>2. Check if jumper wires on contactor are properly installed.</li> <li>3. Correct wiring if necessary.</li> </ol>   |
| <b>Lowering NOT possible</b>                         | Bottom hook position is reached  | 1. Activate UP button  |
|  | Limit switch faulty  | <ol style="list-style-type: none"> <li>1. Check operational hoist limit switch.</li> <li>2. Check emergency hoist limit switch.</li> <li>3. Replace limit switch if necessary.</li> </ol>  |
|  | DOWN button inoperative  | <ol style="list-style-type: none"> <li>1. Check button contacts and wires.</li> <li>2. Correct wiring or repair control pendant if necessary.</li> </ol>   |
|  | Contact assembly not functioning   | <ol style="list-style-type: none"> <li>1. Check if jumper wires are properly installed.</li> <li>2. Check if contactor armatures move freely.</li> <li>3. Check if contactor is burned or welded.</li> <li>4. Correct wiring or replace contactor if necessary.</li> </ol> |
|  | Lower electrical circuit open  | <ol style="list-style-type: none"> <li>1. Check if connections are loose.</li> <li>2. Check if jumper wires on contactor are properly installed.</li> <li>3. Correct wiring if necessary.</li> </ol>   |
| <b>Hook block and rope are rotating</b>              | Rope twisted   | <ol style="list-style-type: none"> <li>1. Turn rope anchorage 1 to 2 times in opposite direction (360°) to the twisted rope.</li> <li>2. Perform several runs without load over the full lifting height.</li> <li>3. If necessary, repeat these steps 2 times.</li> </ol>  |
| <b>Hoist does NOT follow the control commands</b>    | Condition monitoring device error  | 1. Check supplied manual of the condition monitoring device (SMC..., SLE..)  |
| <b>Cross traveling NOT possible</b>                  | Excessive load   | 1. Reduce load to rated load of hoist, as shown on nameplate.  |
|  | Travel limit switch defective  | 1. Check travel limit switch, replace if necessary   |
|  | Fuses defective  | 1. Check fuses, replace if necessary   |
| <b>Load drifts excessively when hoist is stopped</b> | Excessive load   | 1. Reduce load to rated load of hoist, as shown on nameplate.  |

## 10 Decommissioning

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### 10 Decommissioning

#### 10.1 Dismantling

#### **▲ WARNING**

##### **Falling parts hazard**

➤ Secure hoist when dismantling.

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1. Dismantle hoist correctly.
2. First remove lubricants.

#### 10.2 Scrap disposal

#### **NOTICE**

Electronic components, electric scrap, lubricants and other auxiliary substances are hazardous waste and may only be disposed of by approved recycling companies. Overload devices must be returned to the manufacturer.

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Dismantled components must be recycled after correct dismantling. It is imperative to observe national regulations on environmentally compatible disposal. Local authorities will provide relevant information.

## 11 Technical data

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### 11 Technical data

#### 11.1 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 are necessary 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 60529**

See factory certificate

#### **Permissible ambient temperatures**

See factory certificate

# 11 Technical data

## 11.2 Hoist

The designation of the type of wire rope hoist and the motor installed can be seen from the rating plate/factory certificate.

All technical data given refer to the standard version and standard operating conditions. The technical data given in the order acknowledgement or individual documentation apply for optional versions and off-standard applications. Motor specifications for more information and further technical details are available on request.

### 11.2.1 Pole-changing hoist motors 12/2H..-MF 50Hz

| 50 Hz         |          |                 |                |                    |                    |                    |                    |           |                     |             |
|---------------|----------|-----------------|----------------|--------------------|--------------------|--------------------|--------------------|-----------|---------------------|-------------|
| Motor *3      | Power    | Duration factor | Switching/hour | Nominal current    | Starting current   | Nominal current    | Starting current   | cos phi k | Main fuse CC / J *2 |             |
|               |          |                 |                | 220...240 V        |                    | 380...415 V        |                    |           | 220...240 V         | 380...415 V |
|               | [HP]     | CDF [%]         | [c/h]          | I <sub>N</sub> [A] | I <sub>k</sub> [A] | I <sub>N</sub> [A] | I <sub>k</sub> [A] | [A]       |                     |             |
| 12/2H33-MF    | 0.5/3.2  | 20/60           | 480/240        | 6.4/10.4           | 13.2/67.8          | 3.7/6.0            | 7.6/39.0           | 0.78/0.83 | 20                  | 15          |
|               | 0.5/3.9  | 20/50           | 360/180        | 6.6/12.2           |                    | 3.8/7.0            |                    |           |                     |             |
|               | 0.7/4.8  | 20/40           | 240/120        | 7.1/14.0           |                    | 4.1/8.2            |                    |           |                     |             |
| 12/2H42-MF    | 0.5/3.9  | 20/60           | 480/240        | 8.7/12.2           | 15.0/76.5          | 5.0/7.0            | 8.6/44.0           | 0.77/0.84 | 20                  | 15          |
|               | 0.7/4.8  | 20/50           | 360/180        | 8.7/14.6           |                    | 5.0/8.4            |                    |           |                     |             |
|               | 0.9/6    | 20/40           | 240/120        | 9.6/17.0           |                    | 5.5/9.9            |                    |           |                     |             |
| 12/2H62-MF    | 1.3/8    | 20/60           | 480/240        | 15.5/23.5          | 27.8/144.0         | 8.9/13.5           | 16.0/83.0          | 0.69/0.77 | 50                  | 25          |
|               | 1.6/10.1 | 20/50           | 360/180        | 16.0/28.0          |                    | 9.0/16.0           |                    |           |                     |             |
| 12/2H71-MF *1 | 1.3/8    | 20/60           | 480/240        | 15.5/23.5          | 27.8/144.0         | 8.9/13.5           | 16.0/83.0          | 0.69/0.77 | 50                  | 30          |
|               | 1.6/10.1 | 20/50           | 360/180        | 15.7/28.3          |                    | 9.0/16.3           |                    |           |                     |             |
|               | 1.9/12.1 | 20/40           | 240/120        | 19.0/33.0          |                    | 11.0/19.0          |                    |           |                     |             |
| 12/2H72-MF *1 | 2.7/16.1 | 20/50           | 360/180        | 20.9/43.5          | 43.5/252.0         | 12.0/25.0          | 25.0/145.0         | 0.68/0.67 | 80                  | 50          |
|               | 3.4/20.1 | 20/40           | 240/120        | 24.0/56.0          |                    | 14.0/32.0          |                    |           |                     |             |
| 12/2H91-MF *1 | 6.7/40.2 | 20/40           | 240/120        | 45.0/101.0         | 78.3/435.0         | 26.0/58.0          | 45.0/250.0         | 0.60/0.70 | 100                 | 60          |

| 50 Hz         |          |                 |                |                    |                    |                    |                    |           |                     |             |
|---------------|----------|-----------------|----------------|--------------------|--------------------|--------------------|--------------------|-----------|---------------------|-------------|
| Motor *3      | Power    | Duration factor | Switching/hour | Nominal current    | Starting current   | Nominal current    | Starting current   | cos phi k | Main fuse CC / J *2 |             |
|               |          |                 |                | 420...460 V        |                    | 500...525 V        |                    |           | 420...460 V         | 500...525 V |
|               | [HP]     | CDF [%]         | [c/h]          | I <sub>N</sub> [A] | I <sub>k</sub> [A] | I <sub>N</sub> [A] | I <sub>k</sub> [A] | [A]       |                     |             |
| 12/2H33-MF    | 0.5/3.2  | 20/60           | 480/240        | 3.4/5.5            | 6.9/35.5           | 3.0/4.8            | 6.1/31.2           | 0.78/0.83 | 15                  | 15          |
|               | 0.5/3.9  | 20/50           | 360/180        | 3.5/6.4            |                    | 3.0/5.6            |                    |           |                     |             |
|               | 0.7/4.8  | 20/40           | 240/120        | 3.7/7.5            |                    | 3.3/6.6            |                    |           |                     |             |
| 12/2H42-MF    | 0.5/3.9  | 20/60           | 480/240        | 4.5/6.4            | 7.8/40.0           | 4.0/5.6            | 6.9/35.2           | 0.77/0.84 | 15                  | 15          |
|               | 0.7/4.8  | 20/50           | 360/180        | 4.5/7.6            |                    | 4.0/6.7            |                    |           |                     |             |
|               | 0.9/6    | 20/40           | 240/120        | 5.0/9.0            |                    | 4.4/7.9            |                    |           |                     |             |
| 12/2H62-MF    | 1.3/8    | 20/60           | 480/240        | 8.1/12.3           | 14.5/75.5          | 7.1/10.8           | 12.8/66.4          | 0.69/0.77 | 25                  | 20          |
|               | 1.6/10.1 | 20/50           | 360/180        | 8.2/14.5           |                    | 7.2/13.0           |                    |           |                     |             |
| 12/2H71-MF *1 | 1.3/8    | 20/60           | 480/240        | 8.1/12.3           | 14.5/75.5          | 7.1/10.8           | 12.8/66.4          | 0.69/0.77 | 25                  | 25          |
|               | 1.6/10.1 | 20/50           | 360/180        | 8.2/14.8           |                    | 7.2/13.0           |                    |           |                     |             |
|               | 1.9/12.1 | 20/40           | 240/120        | 10.0/17.3          |                    | 8.8/15.0           |                    |           |                     |             |
| 12/2H72-MF *1 | 2.7/16.1 | 20/50           | 360/180        | 10.9/22.7          | 22.7/132.0         | 9.6/20.0           | 20.0/116.0         | 0.68/0.67 | 50                  | 30          |
|               | 3.4/20.1 | 20/40           | 240/120        | 12.7/29.0          |                    | 11.0/26.0          |                    |           |                     |             |
| 12/2H91-MF *1 | 6.7/40.2 | 20/40           | 240/120        | 24.0/53.0          | 40.9/227.0         | 21.0/47.0          | 36.0/200.0         | 0.60/0.70 | 60                  | 50          |

Tab. 42

Motor currents at other voltages:

$$\text{Formula } I_{xV} = I_{400V} * \frac{400V}{xV}$$

\*1 Operation only with special starting circuit via 12-pole winding.

\*2 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.

\*3 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.

11.2.2 Pole-changing hoist motors 12/2H..-MF 60Hz

| 60 Hz         |          |                 |                |                    |                    |                    |                    |           |                     |             |
|---------------|----------|-----------------|----------------|--------------------|--------------------|--------------------|--------------------|-----------|---------------------|-------------|
| Motor *3      | Power    | Duration factor | Switching/hour | Nominal current    | Starting current   | Nominal current    | Starting current   | cos phi k | Main fuse CC / J *2 |             |
|               |          |                 |                | 208...230 V        |                    | 360...400 V        |                    |           | 208...230 V         | 360...400 V |
|               | [HP]     | CDF [%]         | [c/h]          | I <sub>N</sub> [A] | I <sub>K</sub> [A] | I <sub>N</sub> [A] | I <sub>K</sub> [A] | [A]       |                     |             |
| 12/2H33-MF    | 0.7/4.7  | 20/50           | 360/180        | 8.2/15.3           | 15.3/89.9          | 4.7/8.8            | 8.8/52.1           | 0.73/0.77 | 25                  | 20          |
|               | 0.9/5.8  | 20/40           | 240/120        | 8.4/17.0           |                    | 4.8/10.0           |                    |           |                     |             |
| 12/2H42-MF    | 0.9/5.8  | 20/50           | 360/180        | 10.2/17.8          | 17.6/102.0         | 5.9/10.3           | 10.2/59.3          | 0.74/0.78 | 25                  | 20          |
|               | 1.2/7.2  | 20/40           | 240/120        | 11.0/22.0          |                    | 6.5/13.0           |                    |           |                     |             |
| 12/2H62-MF    | 1.6/9.7  | 20/60           | 480/240        | 17.8/28.2          | 31.4/167.0         | 10.3/16.3          | 18.2/96.8          | 0.68/0.75 | 50                  | 30          |
|               | 1.9/12.1 | 20/50           | 360/180        | 18.0/33.0          |                    | 10.5/19.0          |                    |           |                     |             |
| 12/2H71-MF *1 | 1.6/9.7  | 20/60           | 480/240        | 17.8/28.2          | 31.4/167.0         | 10.3/16.3          | 18.2/96.8          | 0.68/0.75 | 60                  | 60          |
|               | 1.9/12.1 | 20/50           | 360/180        | 18.2/33.5          |                    | 10.5/19.4          |                    |           |                     |             |
|               | 2.1/14.8 | 20/40           | 240/120        | 21.0/42.0          |                    | 12.0/24.0          |                    |           |                     |             |
| 12/2H72-MF *1 | 3.1/18.8 | 20/50           | 360/180        | 27.2/54.4          | 52.3/312.0         | 15.7/31.5          | 30.3/180.0         | 0.64/0.60 | 80                  | 50          |
|               | 4/24.1   | 20/40           | 240/120        | 27.0/67.0          |                    | 16.0/39.0          |                    |           |                     |             |
| 12/2H91-MF *1 | 8/48.3   | 20/40           | 240/120        | 54.0/121.0         | 94.1/523.0         | 31.5/70.0          | 54.5/303.0         | 0.60/0.70 | 125                 | 60          |

| 60 Hz         |          |                 |                |                    |                    |                    |                    |           |                     |             |
|---------------|----------|-----------------|----------------|--------------------|--------------------|--------------------|--------------------|-----------|---------------------|-------------|
| Motor *3      | Power    | Duration factor | Switching/hour | Nominal current    | Starting current   | Nominal current    | Starting current   | cos phi k | Main fuse CC / J *2 |             |
|               |          |                 |                | 440...480 V        |                    | 575...600 V        |                    |           | 440...480 V         | 575...600 V |
|               | [HP]     | CDF [%]         | [c/h]          | I <sub>N</sub> [A] | I <sub>K</sub> [A] | I <sub>N</sub> [A] | I <sub>K</sub> [A] | [A]       |                     |             |
| 12/2H33-MF    | 0.7/4.7  | 20/50           | 360/180        | 3.9/7.3            | 7.3/43.0           | 3.1/5.8            | 5.8/34.4           | 0.73/0.77 | 15                  | 15          |
|               | 0.9/5.8  | 20/40           | 240/120        | 4.0/8.3            |                    | 3.2/6.6            |                    |           |                     |             |
| 12/2H42-MF    | 0.9/5.8  | 20/50           | 360/180        | 4.9/8.5            | 8.4/49.0           | 3.9/6.8            | 6.7/39.2           | 0.74/0.78 | 15                  | 15          |
|               | 1.2/7.2  | 20/40           | 240/120        | 5.4/10.0           |                    | 4.3/8.2            |                    |           |                     |             |
| 12/2H62-MF    | 1.6/9.7  | 20/60           | 480/240        | 8.5/13.5           | 15.0/80.0          | 6.8/10.8           | 12.0/64.0          | 0.68/0.75 | 25                  | 20          |
|               | 1.9/12.1 | 20/50           | 360/180        | 8.7/16.0           |                    | 7.0/12.8           |                    |           |                     |             |
| 12/2H71-MF *1 | 1.6/9.7  | 20/60           | 480/240        | 8.5/13.5           | 15.0/80.0          | 6.8/10.8           | 12.0/64.0          | 0.68/0.75 | 30                  | 25          |
|               | 1.9/12.1 | 20/50           | 360/180        | 8.7/16.0           |                    | 7.0/12.8           |                    |           |                     |             |
|               | 2.1/14.8 | 20/40           | 240/120        | 10.0/20.0          |                    | 8.0/16.0           |                    |           |                     |             |
| 12/2H72-MF *1 | 3.1/18.8 | 20/50           | 360/180        | 13.0/26.0          | 25.0/149.0         | 10.4/20.8          | 20.0/119.0         | 0.64/0.60 | 50                  | 30          |
|               | 4/24.1   | 20/40           | 240/120        | 13.0/32.0          |                    | 10.0/26.0          |                    |           |                     |             |
| 12/2H91-MF *1 | 8/48.3   | 20/40           | 240/120        | 26.0/58.0          | 45.0/250.0         | 21.0/47.0          | 36.0/200.0         | 0.60/0.70 | 60                  | 50          |

Tab. 43

Motor currents at other voltages:

$$\text{Formula } I_{xV} = I_{400V} * \frac{400V}{xV}$$

\*1 Operation only with special starting circuit via 12-pole winding.

\*2 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.

\*3 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.

11.2.3 Pole-changing hoist motors ../H.. 50Hz

| 50 Hz                  |          |                 |                |                    |                    |                    |                    |           |                     |             |
|------------------------|----------|-----------------|----------------|--------------------|--------------------|--------------------|--------------------|-----------|---------------------|-------------|
| Motor *3               | Power    | Duration factor | Switching/hour | Nominal current    | Starting current   | Nominal current    | Starting current   | cos phi k | Main fuse CC / J *2 |             |
|                        |          |                 |                | 220...240 V        |                    | 380...415 V        |                    |           | 220...240 V         | 380...415 V |
|                        | [HP]     | CDF [%]         | [c/h]          | I <sub>N</sub> [A] | I <sub>k</sub> [A] | I <sub>N</sub> [A] | I <sub>k</sub> [A] | [A]       |                     |             |
| 12/2H73/<br>100.822 *1 | 4.2/25.5 | 20/50           | 360/180        | 38.3/62.6          | 76.5/423           | 22.0/36.0          | 44.0/243           | 0.59/0.63 | 100                 | 60          |
|                        | 5.1/32.2 | 20/40           | 240/120        | 38.3/83.5          |                    | 22.0/48.0          |                    |           |                     |             |
| 12/2H73-<br>1PC3052 *1 | 4.2/25.5 | 20/50           | 360/180        | 36.0/81.0          | 69.0/483           | 21.0/47.0          | 40.0/278           | 0.56/0.66 | 100                 | 60          |
|                        | 5.1/32.2 | 20/40           | 240/120        | 38.0/96.0          |                    | 22.0/55.0          |                    |           |                     |             |
| 24/4H92 *1             | 7.5/51   | 13/27           | 160/80         | -                  | -                  | 53.0/73.0          | 76.0/471           | 0.51/0.63 | -                   | 100         |

| 50 Hz                  |          |                 |                |                    |                    |                    |                    |           |                     |   |
|------------------------|----------|-----------------|----------------|--------------------|--------------------|--------------------|--------------------|-----------|---------------------|---|
| Motor *3               | Power    | Duration factor | Switching/hour | Nominal current    | Starting current   | Nominal current    | Starting current   | cos phi k | Main fuse CC / J *2 |   |
|                        |          |                 |                | 480...525 V        |                    | -                  |                    |           | 480...525 V         | - |
|                        | [HP]     | CDF [%]         | [c/h]          | I <sub>N</sub> [A] | I <sub>k</sub> [A] | I <sub>N</sub> [A] | I <sub>k</sub> [A] | [A]       |                     |   |
| 12/2H73/<br>100.822 *1 | 4.2/25.5 | 20/50           | 360/180        | 17.6/28.8          | 35.2/194           | -                  | -                  | 0.59/0.63 | 60                  | - |
|                        | 5.1/32.2 | 20/40           | 240/120        | 17.6/38.4          |                    | -                  |                    |           |                     |   |
| 12/2H73-<br>1PC3052 *1 | 4.2/25.5 | 20/50           | 360/180        | 16.6/37.0          | 32.0/222           | -                  | -                  | 0.56/0.66 | 60                  | - |
|                        | 5.1/32.2 | 20/40           | 240/120        | 17.6/44.0          |                    | -                  |                    |           |                     |   |
| 24/4H92 *1             | 7.5/51   | 13/27           | 160/80         | 42.4/58.4          | 60.8/377           | -                  | -                  | 0.51/0.63 | 80                  | - |

Tab. 44

11.2.4 Pole-changing hoist motors ../H.. 60Hz

| 60 Hz                  |          |                 |                |                    |                    |                    |                    |           |                     |             |
|------------------------|----------|-----------------|----------------|--------------------|--------------------|--------------------|--------------------|-----------|---------------------|-------------|
| Motor *3               | Power    | Duration factor | Switching/hour | Nominal current    | Starting current   | Nominal current    | Starting current   | cos phi k | Main fuse CC / J *2 |             |
|                        |          |                 |                | 220...240 V        |                    | 380...415 V        |                    |           | 220...240 V         | 380...415 V |
|                        | [HP]     | CDF [%]         | [c/h]          | I <sub>N</sub> [A] | I <sub>k</sub> [A] | I <sub>N</sub> [A] | I <sub>k</sub> [A] | [A]       |                     |             |
| 12/2H73/<br>100.822 *1 | 5/30.6   | 20/50           | 360/180        | 44.0/72.0          | 88.0/486           | 25.3/41.4          | 50.6/279           | 0.59/0.63 | 125                 | 80          |
|                        | 6/38.6   | 20/40           | 240/120        | 44.0/96.0          |                    | 25.3/55.2          |                    |           |                     |             |
| 12/2H73-<br>1PC3052 *1 | 5/30.8   | 20/50           | 360/180        | 41.0/90.0          | 80.0/576           | 24.0/52.0          | 46.0/331           | 0.52/0.60 | 125                 | 80          |
|                        | 6/38.9   | 20/40           | 240/120        | 42.0/108           |                    | 24.0/62.0          |                    |           |                     |             |
| 24/4H92 *1             | 9.1/61.7 | 13/27           | 160/80         | -                  | -                  | 61.0/84.0          | 87.4/542           | 0.51/0.63 | -                   | 125         |

| 60 Hz                  |          |                 |                |                    |                    |                    |                    |           |                     |             |
|------------------------|----------|-----------------|----------------|--------------------|--------------------|--------------------|--------------------|-----------|---------------------|-------------|
| Motor *3               | Power    | Duration factor | Switching/hour | Nominal current    | Starting current   | Nominal current    | Starting current   | cos phi k | Main fuse CC / J *2 |             |
|                        |          |                 |                | 440...480 V        |                    | 550...600 V        |                    |           | 440...480 V         | 550...600 V |
|                        | [HP]     | CDF [%]         | [c/h]          | I <sub>N</sub> [A] | I <sub>k</sub> [A] | I <sub>N</sub> [A] | I <sub>k</sub> [A] | [A]       |                     |             |
| 12/2H73/<br>100.822 *1 | 5/30.6   | 20/50           | 360/180        | 22.0/36.0          | 44.0/243           | 17.6/28.8          | 35.2/194           | 0.59/0.63 | 60                  | 60          |
|                        | 6/38.6   | 20/40           | 240/120        | 22.0/48.0          |                    | 17.6/38.4          |                    |           |                     |             |
| 12/2H73-<br>1PC3052 *1 | 5/30.8   | 20/50           | 360/180        | 21.0/45.0          | 40.0/288           | 16.5/36.0          | 32.0/230           | 0.52/0.60 | 60                  | 60          |
|                        | 6/38.9   | 20/40           | 240/120        | 21.0/45.0          |                    | 16.8/43.0          |                    |           |                     |             |
| 24/4H92 *1             | 9.1/61.7 | 13/27           | 160/80         | 53.0/73.0          | 76.0/471           | 42.4/58.4          | 60.8/377           | 0.51/0.63 | 100                 | 80          |

Tab. 45

Motor currents at other voltages:

$$\text{Formula } I_{xV} = I_{400V} * \frac{400V}{xV}$$

- \*1 Operation only with special starting circuit via 12-pole or 24-pole winding.
- \*2 The 2-pole or 4-pole starting current for main hoist and the rated current for the travel motor were taken into consideration when selecting the main fuse.
- \*3 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.

11.2.5 Frequency-controlled hoist motors 4H..-MF 100 Hz

| 100 Hz         |       |                 |                    |             |             |                     |             |             |
|----------------|-------|-----------------|--------------------|-------------|-------------|---------------------|-------------|-------------|
| Hoist motor *2 | Power | Duration factor | Nominal current    |             |             | Main fuse CC / J *1 |             |             |
|                |       |                 | 380...415 V        | 500...525 V | 660...690 V | 380...415 V         | 500...525 V | 660...690 V |
|                | [HP]  | CDF [%]         | I <sub>N</sub> [A] |             |             | [A]                 |             |             |
| 4H33-MF        | 3.9   | 70              | 8.3                | 6.6         | 5.0         | 10                  | 10          | 10          |
|                | 4.8   | 60              | 9.4                | 7.5         | 5.7         |                     |             |             |
| 4H42-MF        | 4.8   | 70              | 9.3                | 7.4         | 5.6         | 15                  | 10          | 10          |
|                | 6     | 60              | 10.7               | 8.6         | 6.5         |                     |             |             |
| 4H62-MF        | 8     | 70              | 15.5               | 12.4        | 9.4         | 20                  | 10          | 10          |
|                | 10.1  | 60              | 18.0               | 14.4        | 10.9        |                     |             |             |
| 4H71-MF        | 10.1  | 70              | 18.0               | 14.4        | 10.9        | 25                  | 15          | 15          |
|                | 12.1  | 60              | 21.0               | 17.0        | 12.7        |                     |             |             |
| 4H72-MF        | 16.1  | 70              | 25.0               | 20.0        | 15.2        | 30                  | 20          | 20          |
|                | 20.1  | 60              | 31.0               | 25.0        | 19.0        |                     |             |             |
| 4H73-MF        | 24.1  | 70              | 34.0               | 27.2        | 20.6        | 50                  | 30          | 30          |
|                | 30.8  | 60              | 42.0               | 34.0        | 26.0        |                     |             |             |
| 4H81-MF        | 30.8  | 70              | 45.0               | 36.0        | 27.3        | 60                  | 40          | 40          |
|                | 37.5  | 60              | 55.0               | 44.0        | 33.0        |                     |             |             |
| 4H82-MF        | 37.5  | 70              | 57.0               | 45.6        | 34.5        | 80                  | 50          | 50          |
|                | 46.9  | 60              | 64.0               | 51.0        | 39.0        |                     |             |             |

Tab. 46

11.2.6 Frequency-controlled hoist motors 4H..-MF 120 Hz

| 120 Hz         |       |                 |                    |             |             |                     |             |             |
|----------------|-------|-----------------|--------------------|-------------|-------------|---------------------|-------------|-------------|
| Hoist motor *2 | Power | Duration factor | Nominal current    |             |             | Main fuse CC / J *1 |             |             |
|                |       |                 | 360...400 V        | 440...480 V | 575...600 V | 360...400 V         | 440...480 V | 575...600 V |
|                | [HP]  | CDF [%]         | I <sub>N</sub> [A] |             |             | [A]                 |             |             |
| 4H33-MF        | 4.7   | 70              | 9.9                | 8.2         | 6.6         | 10                  | 10          | 10          |
|                | 5.8   | 60              | 11.3               | 9.3         | 7.4         |                     |             |             |
| 4H42-MF        | 5.8   | 70              | 11.3               | 9.3         | 7.4         | 15                  | 15          | 10          |
|                | 7.2   | 60              | 13.1               | 10.8        | 8.6         |                     |             |             |
| 4H62-MF        | 9.7   | 70              | 20.6               | 17.0        | 13.6        | 20                  | 20          | 10          |
|                | 12.1  | 60              | 23.0               | 19.0        | 15.2        |                     |             |             |
| 4H71-MF        | 12.1  | 70              | 23.0               | 19.0        | 15.2        | 25                  | 25          | 15          |
|                | 14.8  | 60              | 27.0               | 22.0        | 18.0        |                     |             |             |
| 4H72-MF        | 18.8  | 70              | 31.5               | 26.0        | 20.8        | 30                  | 30          | 20          |
|                | 24.1  | 60              | 38.0               | 31.0        | 25.0        |                     |             |             |
| 4H73-MF        | 28.2  | 70              | 43.6               | 36.0        | 28.8        | 50                  | 50          | 30          |
|                | 36.2  | 60              | 53.0               | 44.0        | 35.0        |                     |             |             |
| 4H81-MF        | 37.5  | 70              | 55.7               | 46.0        | 36.8        | 60                  | 60          | 40          |
|                | 45.6  | 60              | 68.0               | 56.0        | 45.0        |                     |             |             |
| 4H82-MF        | 45.6  | 70              | 67.8               | 56.0        | 44.8        | 80                  | 80          | 50          |
|                | 56.3  | 60              | 79.0               | 65.0        | 52.0        |                     |             |             |

Tab. 47

\*1 Protection not 100 % with CC / J, we recommend additional semiconductor fuses.  
 \*2 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 utilized, 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.

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## 11.2.7 Frequency-controlled hoist motors 4HS.-MF 100 Hz

| 100 Hz         |       |                 |                    |             |   |                     |             |   |
|----------------|-------|-----------------|--------------------|-------------|---|---------------------|-------------|---|
| Hoist motor *2 | Power | Duration factor | Nominal current    |             |   | Main fuse CC / J *1 |             |   |
|                |       |                 | 380...415 V        | 500...525 V | - | 380...415 V         | 500...525 V | - |
|                | [HP]  | CDF [%]         | I <sub>N</sub> [A] |             |   | [A]                 |             |   |
| 4HS3           | 3.9   | 80              | 8.3                | 6.6         | - | 15                  | 10          | - |
|                | 4.8   | 70              | 9.3                | 7.4         | - |                     |             |   |
|                | 6     | 60              | 10.7               | 8.6         | - |                     |             |   |
| 4HS5           | 8     | 80              | 15.5               | 12.4        | - | 25                  | 15          | - |
|                | 10.1  | 70              | 18.0               | 14.4        | - |                     |             |   |
|                | 12.1  | 60              | 21.0               | 16.8        | - |                     |             |   |
| 4HS7           | 16.1  | 80              | 24.0               | 19.2        | - | 50                  | 25          | - |
|                | 20.1  | 70              | 28.0               | 22.4        | - |                     |             |   |
|                | 24.1  | 60              | 34.0               | 27.2        | - |                     |             |   |
| 4HS8           | 24.1  | 70              | 34.0               | 27.2        | - | 50                  | 30          | - |
|                | 30.8  | 60              | 42.0               | 33.6        | - |                     |             |   |
| 4HSA           | 37.5  | 70              | 57.0               | 45.6        | - | 80                  | 50          | - |
|                | 46.9  | 60              | 64.0               | 51.2        | - |                     |             |   |

Tab. 48

## 11.2.8 Frequency-controlled hoist motors 4HS.-MF 120 Hz

| 120 Hz         |       |                 |                    |             |   |                     |             |   |
|----------------|-------|-----------------|--------------------|-------------|---|---------------------|-------------|---|
| Hoist motor *2 | Power | Duration factor | Nominal current    |             |   | Main fuse CC / J *1 |             |   |
|                |       |                 | 440...480 V        | 575...600 V | - | 440...480 V         | 575...600 V | - |
|                | [HP]  | CDF [%]         | I <sub>N</sub> [A] |             |   | [A]                 |             |   |
| 4HS3           | 4.7   | 80              | 8.1                | 6.5         | - | 15                  | 10          | - |
|                | 5.8   | 70              | 9.3                | 7.4         | - |                     |             |   |
|                | 7.2   | 60              | 10.8               | 8.6         | - |                     |             |   |
| 4HS5           | 9.7   | 70              | 17.0               | 13.6        | - | 25                  | 15          | - |
|                | 12.1  | 60              | 19.0               | 15.2        | - |                     |             |   |
|                | 14.8  | 60              | 22.0               | 17.6        | - |                     |             |   |
| 4HS7           | 18.8  | 80              | 23.0               | 18.4        | - | 50                  | 25          | - |
|                | 24.1  | 70              | 26.0               | 20.8        | - |                     |             |   |
|                | 28.2  | 60              | 36.0               | 28.8        | - |                     |             |   |
| 4HS8           | 28.2  | 70              | 36.0               | 28.8        | - | 50                  | 30          | - |
|                | 36.2  | 60              | 44.0               | 35.2        | - |                     |             |   |
| 4HSA           | 45.6  | 70              | 56.0               | 44.8        | - | 80                  | 50          | - |
|                | 56.3  | 60              | 65.0               | 52.0        | - |                     |             |   |

Tab. 49

\*1 Protection not 100 % with CC / J, we recommend additional semiconductor fuses.

\*2 The motors are designed for rated voltage ranges. In accordance with EN 60034 a voltage tolerance of  $\pm 5\%$  and a frequency tolerance of  $\pm 2\%$  apply on top of the rated voltage ranges. If these are fully utilized, 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.



# 11 Technical data

## 11.3 Cable cross sections and lengths of supply cable

### 11.3.1 Cable cross sections and lengths of supply cable for pole-changing hoist motors 12/2H..MF

| 1<br>Hoist motor type | 2<br>Stationary Hoist             |     |             |     | 3<br>Hoist/crane  |     |             |     | 4<br>Hoist   |     |             |     | 5<br>Rising mains max. 33 ft              |       | 6<br>Crane   |     |                             |     | 7<br>Crane   |     |                       |     |  |
|-----------------------|-----------------------------------|-----|-------------|-----|---|-----|-------------|-----|--|-----|-------------|-----|---|-------|--|-----|-----------------------------|-----|--|-----|-----------------------|-----|--|
|                       | Fixed installation in PVC conduit |     |             |     | Fixed installation in PVC conduit                                       |     |             |     | Festoon cable in free air as flexible PVC-sheathed cable |     |             |     | Fixed installation in PVC conduit         |       | Festoon cable in free air as flexible PVC-sheathed cable     |     |                             |     | Festoon cable in free air as flexible PVC-sheathed cable |     |                       |     |  |
|                       | Power supply to hoist             |     |             |     | Power supply to in-feed (customer's cable to beginning of rising mains) |     |             |     | From end of rising mains to hoist                        |     |             |     | From main isolator to end of rising mains |       | From end of rising mains along crane runway to crane control |     |                             |     | Power supply along crane bridge to hoist                 |     |                       |     |  |
|                       | $\Delta U \leq 5\%$               |     |             |     | $\Delta U \leq 1\%$   |     |             |     | $\Delta U \leq 4\% (4+5)$                                |     |             |     |   |       |  |     | $\Delta U \leq 1.5\% (5+6)$ |     |  |     | $\Delta U \leq 2.5\%$ |     |  |
| S                     | L1                                | S   | L1          | S   | L2  | S   | L2          | S   | L3   | S   | L3          | S   | S   | S     | L4   | S   | L4                          | S   | L5   | S   | L5                    |     |  |
| AWG                   | [ft]                              | AWG | [ft]        | AWG | [ft]  | AWG | [ft]        | AWG | [ft]   | AWG | [ft]        | AWG | AWG                                       | AWG   | [ft]   | AWG | [ft]                        | AWG | [ft]   | AWG | [ft]                  |     |  |
| <b>50 Hz</b>          |                                   |     |             |     |   |     |             |     |  |     |             |     |   |       |  |     |                             |     |  |     |                       |     |  |
|                       | 380...415 V                       |     | 500...525 V |     | 380...415 V   |     | 500...525 V |     | 380...415 V  |     | 500...525 V |     | 400 V                                     | 500 V | 380...415 V  |     | 500...525 V                 |     | 380...415 V  |     | 500...525 V           |     |  |
| 12/2H33               | 12                                | 167 | 14          | 157 | 10  | 52  | 12          | 49  | 12   | 108 | 14          | 102 | 10  | 12    | 8  | 66  | 10                          | 69  | 10   | 128 | 12                    | 125 |  |
| 12/2H42               | 10                                | 233 | 12          | 230 | 8   | 66  | 10          | 69  | 10   | 154 | 12          | 151 | 8   | 10    | 8  | 66  | 10                          | 69  | 10   | 108 | 12                    | 108 |  |
| 12/2H62               | 8                                 | 203 | 10          | 210 | 6   | 66  | 8           | 62  | 8  | 138 | 10          | 141 | 6   | 8     | 6  | 66  | 8                           | 59  | 8  | 98  | 10                    | 102 |  |
| 12/2H71               | 8                                 | 203 | 10          | 210 | 6   | 66  | 8           | 62  | 8  | 138 | 10          | 141 | 6   | 8     | 6  | 66  | 8                           | 59  | 8  | 98  | 10                    | 102 |  |
| 12/2H72               | 6                                 | 223 | 8           | 210 | 4   | 69  | 6           | 69  | 6  | 154 | 8           | 144 | 4   | 6     | 4  | 72  | 6                           | 69  | 6  | 108 | 8                     | 102 |  |
| 12/2H91               | 4                                 | 197 | 6           | 194 | 2   | 62  | 4           | 62  | 4  | 135 | 6           | 131 | 2   | 4     | 2  | 59  | 4                           | 59  | 4  | 98  | 6                     | 95  |  |
| <b>60 Hz</b>          |                                   |     |             |     |   |     |             |     |  |     |             |     |   |       |  |     |                             |     |  |     |                       |     |  |
|                       | 440...480 V                       |     | 575...600 V |     | 440...480 V   |     | 575...600V  |     | 440...480 V  |     | 575...600 V |     | 460 V                                     | 575 V | 440...480 V  |     | 575...600 V                 |     | 440...480 V  |     | 575...600 V           |     |  |
| 12/2H33               | 12                                | 187 | 14          | 177 | 10  | 59  | 12          | 56  | 12   | 125 | 14          | 115 | 10  | 12    | 10   | 52  | 12                          | 52  | 12   | 92  | 14                    | 85  |  |
| 12/2H42               | 10                                | 259 | 12          | 253 | 8   | 72  | 10          | 75  | 12   | 108 | 14          | 102 | 8   | 10    | 10   | 52  | 12                          | 52  | 10   | 121 | 12                    | 118 |  |
| 12/2H62               | 8                                 | 249 | 10          | 259 | 6   | 79  | 8           | 75  | 10   | 115 | 12          | 112 | 6   | 8     | 8  | 52  | 10                          | 52  | 8  | 118 | 10                    | 125 |  |
| 12/2H71               | 8                                 | 249 | 10          | 259 | 6   | 79  | 8           | 75  | 10   | 115 | 12          | 112 | 6   | 8     | 8  | 52  | 10                          | 52  | 8  | 118 | 10                    | 125 |  |
| 12/2H72               | 6                                 | 279 | 8           | 259 | 4   | 89  | 6           | 85  | 8  | 118 | 10          | 121 | 4   | 6     | 6  | 62  | 8                           | 56  | 6  | 135 | 8                     | 128 |  |
| 12/2H91               | 4                                 | 226 | 6           | 223 | 2   | 69  | 4           | 69  | 6  | 98  | 6           | 154 | 2   | 4     | 2  | 72  | 4                           | 72  | 4  | 112 | 6                     | 108 |  |

Tab. 50

11.3.2 Cable cross sections and lengths of supply cable for pole-changing hoist motors ..I..H..

| 1<br>Hoist motor type | 2<br>Stationary Hoist             |     |             |     | 3<br>Hoist/crane  |     |             |     | 4<br>Hoist   |     |             |     | 5                                 |       | 6<br>Crane   |     |             |     | 7<br>Crane   |     |             |     |
|-----------------------|-----------------------------------|-----|-------------|-----|---|-----|-------------|-----|--|-----|-------------|-----|-----------------------------------|-------|--|-----|-------------|-----|--|-----|-------------|-----|
|                       | Fixed installation in PVC conduit |     |             |     | Fixed installation in PVC conduit                                       |     |             |     | Festoon cable in free air as flexible PVC-sheathed cable |     |             |     | Rising mains max. 33 ft           |       | Festoon cable in free air as flexible PVC-sheathed cable     |     |             |     | Festoon cable in free air as flexible PVC-sheathed cable |     |             |     |
|                       | Power supply to hoist             |     |             |     | Power supply to in-feed (customer's cable to beginning of rising mains) |     |             |     | From end of rising mains to hoist                        |     |             |     | Fixed installation in PVC conduit |       | From end of rising mains along crane runway to crane control |     |             |     | Power supply along crane bridge to hoist                 |     |             |     |
|                       | $\Delta U \leq 5\%$               |     |             |     | $\Delta U \leq 1\%$   |     |             |     | $\Delta U \leq 4\% (4+5)$                                |     |             |     |                                   |       | $\Delta U \leq 1.5\% (5+6)$                                  |     |             |     | $\Delta U \leq 2.5\%$                                    |     |             |     |
| S                     | L1                                | S   | L1          | S   | L2  | S   | L2          | S   | L3   | S   | L3          | S   | S                                 | S     | L4   | S   | L4          | S   | L5   | S   | L5          |     |
| AWG                   | [ft]                              | AWG | [ft]        | AWG | [ft]  | AWG | [ft]        | AWG | [ft]   | AWG | [ft]        | AWG | AWG                               | AWG   | [ft]   | AWG | [ft]        | AWG | [ft]   | AWG | [ft]        |     |
| <b>50 Hz</b>          |                                   |     |             |     |   |     |             |     |  |     |             |     |                                   |       |  |     |             |     |  |     |             |     |
|                       | 380...415 V                       |     | 500...525 V |     | 380...415 V   |     | 500...525 V |     | 380...415 V  |     | 500...525 V |     | 400 V                             | 500 V | 380...415 V  |     | 500...525 V |     | 380...415 V  |     | 500...525 V |     |
| 12/2H73/100.822       | 4                                 | 226 | 6           | 220 | 2   | 69  | 4           | 69  | 6  | 98  | 6           | 154 | 2                                 | 4     | 2  | 72  | 4           | 72  | 4  | 112 | 6           | 108 |
| 12/2H73-1PC3052       | 4                                 | 187 | 6           | 184 | 1   | 82  | 2           | 92  | 6  | 82  | 6           | 131 | 1                                 | 2     | 2  | 62  | 4           | 66  | 4  | 92  | 6           | 92  |
| 24/4H92               | 2                                 | 180 | 4           | 180 | -1  | 72  | 1           | 79  | 2  | 128 | 4           | 128 | -1                                | 1     | 1  | 52  | 2           | 62  | 1  | 125 | 4           | 89  |
| <b>60 Hz</b>          |                                   |     |             |     |   |     |             |     |  |     |             |     |                                   |       |  |     |             |     |  |     |             |     |
|                       | 440...480 V                       |     | 575...600 V |     | 440...480 V   |     | 575...600V  |     | 440...480 V  |     | 575...600 V |     | 460 V                             | 575 V | 440...480 V  |     | 575...600 V |     | 440...480 V  |     | 575...600 V |     |
| 12/2H73/100.822       | 4                                 | 259 | 6           | 253 | 2   | 79  | 4           | 79  | 6  | 115 | 8           | 108 | 2                                 | 4     | 4  | 56  | 6           | 56  | 4  | 128 | 6           | 125 |
| 12/2H73-1PC3052       | 4                                 | 230 | 6           | 223 | 2   | 72  | 4           | 72  | 6  | 102 | 8           | 95  | 2                                 | 4     | 2  | 72  | 4           | 72  | 4  | 115 | 6           | 112 |
| 24/4H92               | 2                                 | 210 | 4           | 210 | -1  | 82  | 1           | 92  | 2  | 151 | 4           | 151 | -1                                | 1     | 1  | 66  | 2           | 72  | 2  | 105 | 4           | 105 |

Tab. 51

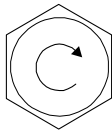
## 11.4 Tightening torques

All screws should be tightened with a torque spanner. See Tab. 52 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.

**▲ WARNING**

**Safety hazard.** Unsuitable installation material and incorrect tightening torques may lead to damage and accidents.

- Use only original spare parts.
- Tighten screw connection with a torque spanner to the prescribed tightening torque.



| Thread | Screw grade |      |     |
|--------|-------------|------|-----|
|        | 8.8         | 10.9 | 100 |
|        | Standard    |      | Y   |
|        | [lb: ft]    |      |     |
| M6     | 8           | 11   | -   |
| M8     | 18          | 26   | -   |
| M10    | 36          | 51   | 55  |
| M12    | 63          | 90   | 64  |
| M16    | 155         | 221  | 184 |
| M20    | 302         | -    | -   |
| M24    | 524         | -    | -   |
| M30    | 1040        | -    | -   |
| M36    | 1814        | -    | -   |

Tab. 52

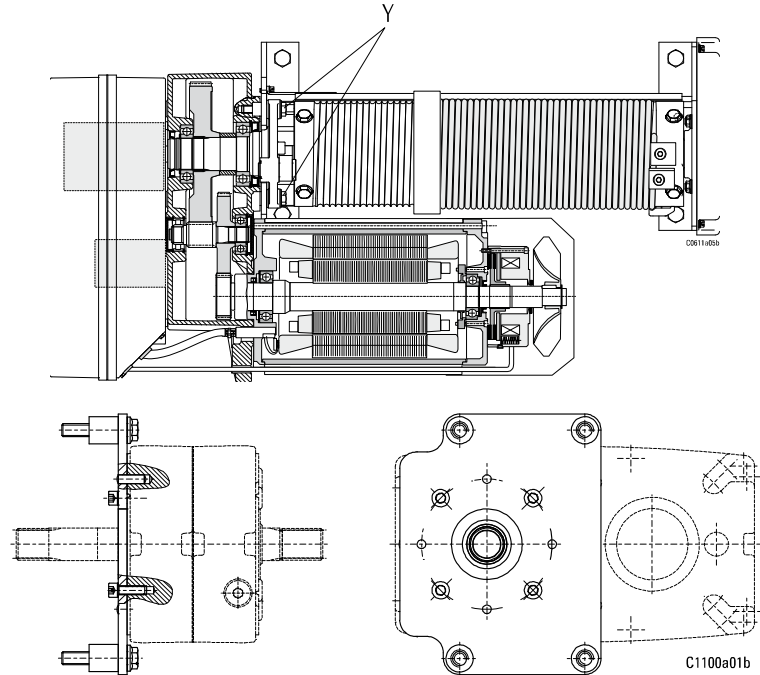


Fig. 96

Other screw connections and applicable tightening torques

| No. | Screw connection  | Wire rope type          | Screw connection |        |                             |
|-----|---|-------------------------|------------------|--------|-----------------------------|
|     | Part 1 / Part 2   |                         | Thread size      | Grade  | Tightening torque<br>lbf ft |
| 1   | Gear casing/panel box                                       | YKA/SKA – YKB/SKB       | M6               | 8.8    | 4                           |
| 2   | Gear casing/support plate                                   | YKA/SKA                 | M10              | 100    | 55                          |
|     |   | YKB/SKB                 | M12              |        | 64                          |
|     |   | YKC/SKC                 | M16              |        | 229                         |
| 3   | Rope drum/gear drive shaft                                  | YKC/SKC                 | M12              | 100    | 96                          |
| 4   | Rope drum/clamping plate                                    | YKA/SKA                 | M6 / 8           | 8.8    | 7 / 18                      |
| 5   | Rope drum bearing journal/holding washer                    | YKA/SKA                 | M8               | 100    | 31                          |
|     |   | YKB/SKB – YKC/SKC       | M10              |        | 55                          |
|     |   | YKE/SKE                 | M16              |        | 192                         |
| 6   | Rope drum flange bearing/support plate (fan side)           | YKA/SKA                 | M8               | 100    | 31                          |
|     |   | YKB/SKB – YKC/SKC       | M10              |        | 55                          |
|     |   | YKE/SKE                 | M16              |        | 159                         |
| 7   | Grease pan/guide rail                                       | YKE/SKE                 | M10              | 100    | 55                          |
| 8   | Support plate (fan side)/grease pan                         | YKA/SKA – YKB/SKB       | M8               | C45K   | 15                          |
|     |   | YKC/SKC                 | M8               | S235JR | 7                           |
| 9   | Support plate (gear side, fan side)/fixing tube (Dg)        | YKA/SKA – YKB/SKB       | M16              | 100    | 243                         |
| 10  | Axle holder/trolley side cheek (hoist side) (kBh-Dg)        | YKA/SKA – YKC/SKC (kBh) | M8               | 8.8    | 18                          |
|     |   | YKE/SKE (kBh)           | M8               | 100    | 31                          |
|     |   | YKA/SKA – YKB/SKB (Dg)  | M8               | 8.8    | 15                          |
|     |   | YKC/SKC (Dg)            | M8               | 100    | 31                          |
| 11  | Threaded bolt/trolley side cheek (hoist side/counterweight) | YKA/SKA – YKE/SKE       | M16              | 100    | 159                         |
| 12  | Return pulley bearing plate/bearing pedestal (kBh)          | YKE/SKE                 | M12              | 100    | 85                          |
| 13  | Suspension bearing plate/bearing pedestal (kBh)             | YKE/SKE                 | M12              | 100    | 85                          |
| 14  | Pivot pin/mounting bracket (Dg)                             | YKA/SKA – YKC/SKC       | M12              | 8.8    | 63                          |
| 15  | Pivot pin/pivot pin (Dg)                                    | YKA/SKA – YKC/SKC       | M12              | 8.8    | 63                          |
| 16  | Guide roller holder/trolley side cheek (Dg)                 | YKA/SKA – YKC/SKC       | M8               | 100    | 31                          |

Tab. 53

kBh= underhung low headroom trolley  
 Og= double rail trolley  
 Dg= articulated trolley

# 11 Technical data

## 11.5 Lubricants

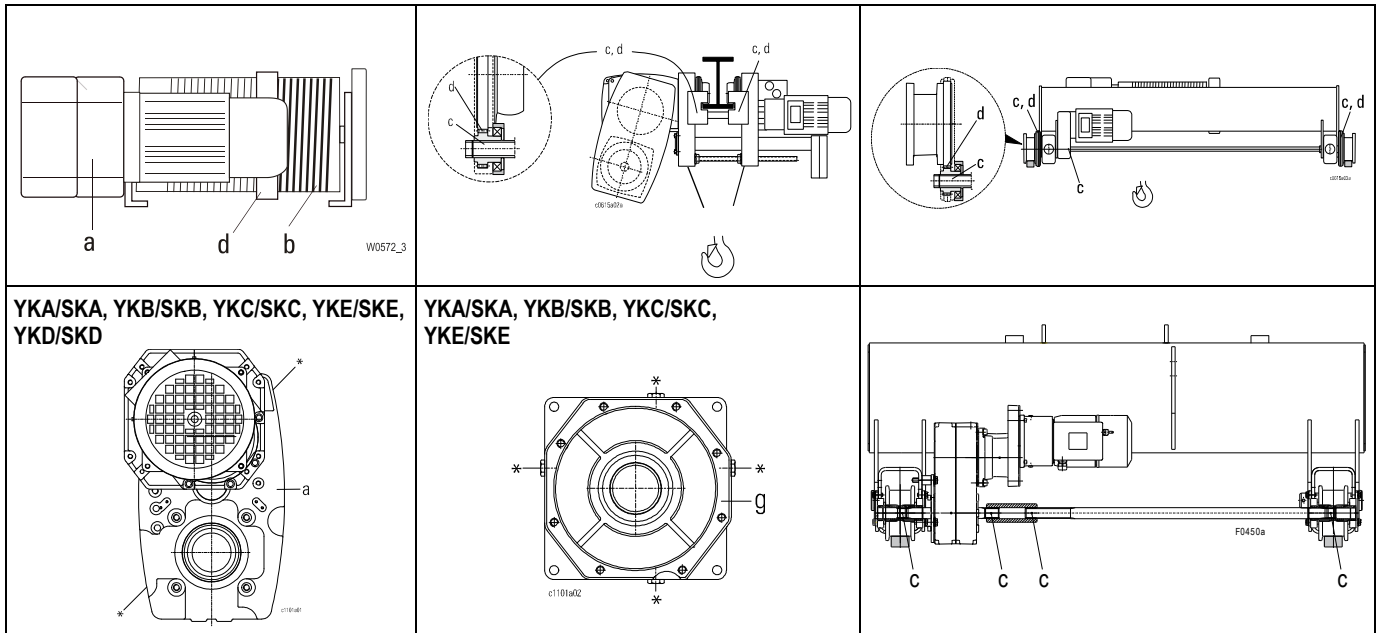


Fig 97

| Lubrication point | Type of lubricant | Factory filling (DIN 51502)  | Alternative lubricants   | Quantity   |
|-------------------|-------------------|--|--|--|
| a                 | Oil               | Fuchs Renolin CLP 460<br>(Fuchs Renolin Unisyn CLP 220)            | - Aral Degol BG 460 Plus<br>- Castrol Alpha SP 460<br>- Castrol Tribol 1100/460<br>- Shell Omala S4 WE 320   | YKA/SKA: 1.32 qt<br>YKB/SKB: 1.76 qt<br>YKC/SKC: 5.28 qt<br>YKE/SKE: 14.08 qt<br>YKD/SKD: 2.2 qt |
| b                 | Grease            | Shell Gadus S2 V220 00<br>KP 2N<br>(Fuchs Renolit RHF1)            | - Fuchs Renolit Duraplex EP3<br>- BP Energrease LS-EP 00<br>- CENTOPLEX GLP 500                              | 1.3 - 5.5 lb   |
| c                 | Grease            | Mobilux EP 3<br>(Fuchs Renolit RHF1 GPG 00k)                       | - Shell Gadus S2 V100 3<br>- Fuchs Renolit Duraplex EP3<br>- BP Energrease LS-EP3<br>- Klüberplex BEM 41-132 | 3.5 oz   |
| d                 | Grease            | Mobilux EP 3<br>K3K<br>(Fuchs Renolit RHF1)                        | - Shell Gadus S2 V100 3<br>- Fuchs Renolit Duraplex EP3<br>- BP Energrease LS-EP3<br>- Klüberplex BEM 41-132 | 1.1 - 2.2 lb   |
| g                 | Grease            | Fuchs Renolit FLM 0<br>KPF 0K<br>(Fuchs Renolit RHF1)              | - Castrol Viscogen 0<br>- Klüberplex AG 11-461   | YKA/SKA: 3.5 oz<br>YKB/SKB:  |
|                   | Oil               | Fuchs Renolin CLP 460<br>CLP 460<br>(Fuchs Renolin Unisyn CLP 220) | - Aral Degol BG 460 Plus<br>- Castrol Alpha SP 460<br>- Castrol Tribol 110/460<br>- Shell Omala S4 WE 320    | YKC/SKC: 2.2 qt<br>YKE/SKE: 2.2 qt<br>YKD/SKD: 2.2 qt  |

Tab. 54

- \* Oil filling/oil drainage screw.  
Depending on installation position of gear, the filling screw may be “at the top” and the drainage screw “at the bottom”
- ( ) Synthetic lubricant for operating temperatures -40 °F... +104 °F
- \*1 YKE/SKE, motor at top

## 11.6 Lubricants for travel drive

See instructions of travel drive.

## 11.7 Circuit diagrams

See separate enclosure.

# WARRANTY

## LIMITATION OF WARRANTIES, REMEDIES AND DAMAGES

### INDEMNIFICATION AND SAFE OPERATION

Buyer shall comply with and require its employees to comply with directions set forth in instructions and manuals furnished by Seller and shall use and require its employees to follow such instructions and manuals and to use reasonable care in the use and maintenance of the goods. Buyer shall not remove or permit anyone to remove any warning or instruction signs on the goods. In the event of personal injury or damage to property or business arising from the use of the goods, Buyer shall within 48 hours thereafter give Seller written notice of such injury or damage. Buyer shall cooperate with Seller in investigating any such injury or damage and in the defense of any claims arising therefrom.

If Buyer fails to comply with this section or if any injury or damage is caused, in whole or in part, by Buyer's failure to comply with applicable federal or state safety requirements, Buyer shall indemnify and hold Seller harmless against any claims, loss or expense for injury or damage arising from the use of the goods.

### CMCO Warranty (HOISTS)

- A. Columbus McKinnon Corporation ("Seller") warrants to the original end user ("Buyer") that: (a) for a period of one (1) year from the date of Seller's delivery of the goods (collectively, the "Goods") to the carrier, the electrical components of the Goods will be free from defects in workmanship and materials; and (b) for a period of three (3) years from the date of Seller's delivery of the goods (collectively, the "Goods") to the carrier, the mechanical components of the Goods will be free from defects in workmanship and materials.
- B. IN THE EVENT OF ANY BREACH OF SUCH WARRANTY, SELLER'S SOLE OBLIGATION SHALL BE EXCLUSIVELY LIMITED TO, AT THE OPTION OF SELLER, REPAIR OR REPLACEMENT, F.O.B. SELLER'S POINT OF SHIPMENT, OF ANY GOODS THAT SELLER DETERMINES TO HAVE BEEN DEFECTIVE OR, IF SELLER DETERMINES THAT SUCH REPAIR OR REPLACEMENT IS NOT FEASIBLE, TO A REFUND OF THE PURCHASE PRICE UPON RETURN OF THE GOODS TO SELLER. NO CLAIM AGAINST SELLER FOR ANY BREACH OF (i) SUCH WARRANTY WITH RESPECT TO THE ELECTRICAL COMPONENTS OF ANY GOOD SHALL BE VALID OR ENFORCEABLE UNLESS BUYER'S WRITTEN NOTICE THEREOF IS RECEIVED BY SELLER WITHIN ONE (1) YEAR FROM THE DATE OF SELLER'S DELIVERY TO THE CARRIER AND (ii) SUCH WARRANTY WITH RESPECT TO THE MECHANICAL COMPONENTS OF ANY GOOD SHALL BE VALID OR ENFORCEABLE UNLESS BUYER'S WRITTEN NOTICE THEREOF IS RECEIVED BY SELLER WITHIN ONE (1) YEAR FROM THE DATE THE DATE ANY ALLEGED CLAIM ACCRUES. EXCEPT FOR THE WARRANTY SET FORTH ABOVE, SELLER MAKES NO OTHER WARRANTIES WITH RESPECT TO THE GOODS, WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, QUALITY AND/OR THOSE ARISING BY STATUTE OR OTHERWISE BY LAW OR FROM ANY COURSE OF DEALING OR USE OF TRADE, ALL OF WHICH ARE HEREBY EXPRESSLY DISCLAIMED.

- C. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER OR ANY THIRD PARTY WITH RESPECT TO ANY GOOD, WHETHER IN CONTRACT, TORT OR OTHER THEORY OF LAW, FOR LOSS OF PROFITS OR LOSS OF USE, OR FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, DIRECT OR INDIRECT DAMAGES, HOWSOEVER CAUSED. SELLER'S MAXIMUM LIABILITY TO BUYER WITH RESPECT TO THE GOODS SHALL IN NO EVENT EXCEED THE PRICE PAID BY BUYER FOR THE GOODS THAT ARE THE SUBJECT OF THE APPLICABLE CLAIM.
- D. Seller shall not be liable for any damage, injury or loss arising out of the use of the Goods if, prior to such damage, injury or loss, such Goods are: (1) damaged or misused following Seller's delivery to the carrier; (2) not maintained, inspected, or used in compliance with applicable law and Seller's written instructions and recommendations; or (3) installed, repaired, altered or modified (a) with any part or accessory other than those supplied by Seller or (b) without compliance with such laws, instructions or recommendations.
- E. This warranty is limited and provided only to the original end user. **Each Good must be registered within sixty (60) days of receipt of each product to establish eligibility.** Please register at [www.cmworks.com/hoist-warranty-registration](http://www.cmworks.com/hoist-warranty-registration) or submit registration card via US mail.
- F. Any action against Seller for breach of warranty, negligence or otherwise in connection with the electrical components of any Good must be commenced by Buyer within one (1) year after: (a) the date any alleged claim accrues; or (b) the date of delivery of the Goods to Buyer, whichever is earlier. Any action against Seller for breach of warranty, negligence or otherwise in connection with the mechanical components of any Good must be commenced by Buyer within one (1) year after the date any alleged claim accrues.
- G. This warranty is contingent upon Buyer's proper maintenance and care of the Goods, and does not extend to normal wear and tear. Seller reserves the right, at its option, to void this warranty in the event of Buyer's use with the Goods of parts or accessories other than those supplied by Seller.

## **WARNING**

**Alterations or modifications of equipment and use of non-factory repair parts can lead to dangerous operation and injury.**

### TO AVOID INJURY:

- Do not alter or modify equipment.
- Do use only factory replacement parts.



FAMILY OF BRANDS



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