Operating Manual
Drive TW63
Legal information
All rights reserved
© Copyright by ThyssenKrupp Aufzugswerke GmbH

Note on industrial property rights ISO 16016
Printed in Germany
This document – including excerpts – may only be reprinted or otherwise copied
with the express approval in writing of ThyssenKrupp Aufzugswerke GmbH.

Any duplication, dissemination or storage on data media unauthorised by
ThyssenKrupp Aufzugswerke GmbH is an infringement of copyright and shall give
rise to prosecution.

Right to make changes of a technical nature reserved
We expressly reserve the right to make changes of a technical nature for the
purpose of improving our products or enhancing the safety standard - even without
a separate announcement.

Colouring
The colouring of the components used in our documentation is used only for the
documentation.
Enquire about colours for your products from your ThyssenKrupp Aufzugswerke
Sales Partner.

Issued by
ThyssenKrupp Aufzugswerke GmbH
Bernhäuser Strasse 45
73765 Neuhausen a. d. F.
Germany

E-mail: Eli.elevator.plant.de@thyssenkrupp.com
Internet: www.thyssenkrupp-elevator-eli.de
Table of Contents

<table>
<thead>
<tr>
<th>TW63 drive</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Safety</td>
<td>6</td>
</tr>
<tr>
<td>1.1 Symbols</td>
<td>6</td>
</tr>
<tr>
<td>1.2 Safety instructions</td>
<td>7</td>
</tr>
<tr>
<td>2. Product description</td>
<td>10</td>
</tr>
<tr>
<td>2.1 Description</td>
<td>10</td>
</tr>
<tr>
<td>2.2 Functional description</td>
<td>11</td>
</tr>
<tr>
<td>3. Technology</td>
<td>14</td>
</tr>
<tr>
<td>3.1 Technical data</td>
<td>14</td>
</tr>
<tr>
<td>3.2 Dimensions of machine</td>
<td>15</td>
</tr>
<tr>
<td>3.3 Dimensions of machine base frame (optional)</td>
<td>20</td>
</tr>
<tr>
<td>3.4 Encoder</td>
<td>21</td>
</tr>
<tr>
<td>4. Transport and storage</td>
<td>22</td>
</tr>
<tr>
<td>5. Mounting the machine</td>
<td>26</td>
</tr>
<tr>
<td>5.1 Connecting the gear drive motors</td>
<td>26</td>
</tr>
<tr>
<td>5.2 Terminal connecting plan for DEE motor and magnetic clamps</td>
<td>27</td>
</tr>
<tr>
<td>5.3 Terminal connecting information for motors complying with BV 6531 - 21</td>
<td>28</td>
</tr>
<tr>
<td>5.4 Terminal connecting information for motors complying with BV 6531 - 22</td>
<td>29</td>
</tr>
<tr>
<td>5.5 Terminal connecting information for VFD motors</td>
<td>30</td>
</tr>
<tr>
<td>5.6 Fitting the rope guard for traction sheave</td>
<td>31</td>
</tr>
<tr>
<td>6. Commissioning</td>
<td>32</td>
</tr>
<tr>
<td>6.1 Emergency operation</td>
<td>33</td>
</tr>
<tr>
<td>7. Maintenance / Service</td>
<td>34</td>
</tr>
<tr>
<td>7.1 Lubrication</td>
<td>35</td>
</tr>
<tr>
<td>7.2 Checking the backlash</td>
<td>37</td>
</tr>
<tr>
<td>7.3 Replacing brake shoes</td>
<td>38</td>
</tr>
<tr>
<td>7.4 Setting braking deceleration</td>
<td>39</td>
</tr>
<tr>
<td>7.5 Setting brake shoe stroke and armature base plate</td>
<td>40</td>
</tr>
<tr>
<td>7.6 Traction sheave replacement</td>
<td>41</td>
</tr>
<tr>
<td>7.7 Motor replacement</td>
<td>42</td>
</tr>
<tr>
<td>7.8 Checking for escaping grease / oil</td>
<td>43</td>
</tr>
<tr>
<td>8. Special versions (optional)</td>
<td>44</td>
</tr>
<tr>
<td>8.1 Brake monitoring circuit</td>
<td>44</td>
</tr>
<tr>
<td>9. Appendix</td>
<td>46</td>
</tr>
<tr>
<td>9.1 Blocking clamp</td>
<td>46</td>
</tr>
<tr>
<td>9.2 Tightening torques - tightness values</td>
<td>47</td>
</tr>
<tr>
<td>10. Changes</td>
<td>50</td>
</tr>
<tr>
<td>Flexible coupling</td>
<td></td>
</tr>
<tr>
<td>Encoder</td>
<td></td>
</tr>
</tbody>
</table>
1. Safety

1.1 Symbols

The following pictograms and designations are used in this operating manual:

**Danger**

This symbol indicates extreme danger to life and the health of persons. Nonobservance can lead to death or severe injury!

**Warning**

This symbol warns against imminent danger. Nonobservance can lead to physical injury or extensive damage to property. Warnings must always be observed!

**Note**

This symbol indicates important information and operating instructions. Nonobservance can lead to damage, danger or malfunctions.

**Test/Check**

Test steps are specified with this symbol. The test instructions marked in this way must be followed without fail. They contribute to preventing personal injury or damage to property.
1.2 Safety instructions

Notes regarding this operating manual
A requirement for safe handling and non-disruptive operation of this assembly is knowledge of the fundamental safety regulations. This operating manual contains the most important information that is required to operate the assembly safely. The operating manual, in particular the safety instructions, is to be complied with by all persons who work on this assembly. Furthermore, the rules and regulations covering accident prevention that apply to the installation site are to be complied with.

Obligations of the operator
The operator undertakes only to allow persons to work on the assembly who
- are familiar with the regulations regarding work safety and accident prevention and have been instructed in handling the assembly.
- have read the chapter on safety and the warnings in this operating manual.

Note: Check the safety awareness of the personnel at regular intervals.

Obligations on the part of personnel
Persons assigned to work on subassemblies undertake before starting work to
- observe the regulations regarding work safety and accident prevention.
- read the chapter on safety and the warnings in this operating manual.

Training of the personnel
Only trained and instructed qualified personnel may work on the assembly. The responsibility of the personnel is to be clearly defined for all tasks involving commissioning, operation, maintenance and repair.

Organisational measures
The required personal protective equipment is to be provided by the operator. All existing safety devices are to be tested regularly in accordance with the maintenance plan.
Informal notes on the safety measures

- The operating manual is to be kept permanently at the usage site of the installation.
- Complementary to the operating manual, the generally applicable and local regulations for accident prevention and environmental protection are to be provided and complied with.
- Legally prescribed safety instructions are to be provided for the users at clearly visible positions.
- Keep all safety and hazard warnings on the installation in a legible condition.

Use in line with intended purpose

The TW63 has been constructed using state-of-the-art technology and in line with the recognised technical safety regulations. The TW63 may only be
- deployed in line with the intended purpose and
- used when all the technical safety features are in perfect condition

The exclusive intended purpose of the TW63 is to drive elevator cars. Any other or additional form of use shall be regarded as non-compliant with the intended use. THYSSENKRUPP AUFZUGSWERKE GmbH shall not be liable for any damage arising from such use and any damage arising due to operator errors. Proper use in line with the intended purpose also includes
- observance of all instructions in the operating manual and
- adherence to commissioning instructions, system description and inspection and maintenance work.

Warranty and liability

As a general principle, the 'General Terms of Sale and Delivery' of THYSSENKRUPP AUFZUGSWERKE GmbH apply. Warranty and liability claims in the event of personal injury and damage to property shall be excluded if they arise due to any of the following causes:
- Improper use that is not in line with the intended purpose of the TW63
- Installation, commissioning, operation and maintenance of the TW63 that is not in line with accepted technical principles

- Operation of the TW63 machine with defective and/or non-operative safety and protective devices
- Nonobservance of the instructions in the operating manual with regard to transport, storage, installation, commissioning, operation and maintenance of the TW63
- Constructional changes to the TW63 performed by the operator
- Changes to the drive ratios (power output etc.) performed by the operator
- Deficient monitoring of parts that are subject to wear
- Repairs that are carried out improperly
• Cases of catastrophe due to third-party interference and force majeure.

Constructional changes to the TW63 performed by the operator

The TW63 is set at the plant and delivered ready for operation. **Important:** The oil necessary for operation has been added at the plant! Check this **before** the first commissioning by looking at the oil gauge glass (see chapter 7).

If changes are made to the machine, the entire warranty of THYSSENKRUPP AUFZUGSWERKE GmbH shall become null and void.

Dangers in handling the TW63

The traction sheave and the handwinding wheel of the TW63 are designed without a safety cover and may only be used in an enclosed room. It must be ensured when persons are in the machine room that there is adequate safety clearance to all revolving (marked in yellow) parts.

**Note:** With the vertical version, do not place any objects (e.g. tools etc.) on the handwinding wheel, as there is a risk of injury as a result of parts being thrown.

In the event of improper use, there is a risk of personal injury or to the life of the user or third parties, or impairment on the assembly or other assets can arise. Malfunctions that can impair safety are to be rectified immediately.
2. Product description

2.1 Description

Fig. 2.1

Version TW63 V
(Vertical motor arrangement)

<table>
<thead>
<tr>
<th></th>
<th>Actual-value sensor</th>
<th></th>
<th>Rope guard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Handwinding wheel / flywheel rim</td>
<td>10</td>
<td>Machine base frame (optional)</td>
</tr>
<tr>
<td>2</td>
<td>Forced ventilation (optional)</td>
<td>11</td>
<td>Name plate</td>
</tr>
<tr>
<td>3</td>
<td>Motor</td>
<td>12</td>
<td>Gear housing</td>
</tr>
<tr>
<td>4</td>
<td>Armature base plate</td>
<td>13</td>
<td>Rope guard carrier</td>
</tr>
<tr>
<td>5</td>
<td>Brake shoe</td>
<td>14</td>
<td>Brake monitoring switch</td>
</tr>
<tr>
<td>6</td>
<td>Traction sheave</td>
<td>15</td>
<td>Motor terminal box</td>
</tr>
<tr>
<td>7</td>
<td>Disc on the traction sheave shaft</td>
<td>16</td>
<td>Brake magnet</td>
</tr>
</tbody>
</table>

**Versions:**
The following version of the machine can be chosen depending on customer needs: gear reduction, traction sheave version, motor version, motor arrangement (vertical / horizontal), encoder version
2.2 Functional description

The gear (gear drive) consists of a single-stage worm gear mounted on roller bearings. The housing is in monoblock design with a bearing bracket integrated on one side or on both sides and integrated dual-circuit brake. The worm gear toothing runs in oil. The traction sheave is overhung.

The TW63 will be available from May 2011 onwards and it differs from the previous version in that there are modified anti-friction bearings with optimised sealing (hub unit on worm shaft).
Depending on the version, the drive comes from a three-phase motor standing vertically on the gear or flange-connected horizontally on the gear to the worm shaft, via worm wheel, traction sheave shaft to the traction sheave.

**Brake:**
The dual circuit shoe brake is spring actuated. Two independently acting brake shoes press the brake lining onto the brake disc with spring force preset on the system.
The braking force is configured in such a way that one of the brake blocks is sufficient to bring an elevator car loaded with full weight to a standstill. The brake is released by electrically operated magnetic clamps.
In the case of manual operation, the enclosed brake release lever must be applied to the cast-on recesses of the ends of the brake shoes. Pressing in the direction of the machine (see Fig. 2.2.1 in the direction of the arrow) presses the brake shoes apart, triggering the brake.

Fig. 2.2.1
Traction sheave:

The one-part traction sheaves are fastened overhung on the drive shaft by using a cone (1:15) and a mounting plate including 3 screws (M16-8.8 microencapsulated with locking washer).

<table>
<thead>
<tr>
<th>Designation</th>
<th>Unit</th>
<th>Technical data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine version</td>
<td></td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SA9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SA9</td>
</tr>
<tr>
<td>Diameter - DT</td>
<td>mm</td>
<td>450 510 590 520 675</td>
</tr>
<tr>
<td>Rim width - B</td>
<td>mm</td>
<td>132 110 96</td>
</tr>
<tr>
<td>Max. number of grooves - z x d</td>
<td></td>
<td>8 x 8 7 x 10/11 8 x 8 7 x 10/11 5 x 13 6 x 8 5 x 10/11 6 x 8 4 x 12</td>
</tr>
<tr>
<td>Groove type</td>
<td></td>
<td>Seat / vee groove</td>
</tr>
<tr>
<td>Vee groove angle</td>
<td>°</td>
<td>Depends on project specs 1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vee groove K40 2)</td>
</tr>
<tr>
<td>Weight</td>
<td>kg</td>
<td>50 60 70 50 70</td>
</tr>
<tr>
<td>Material</td>
<td></td>
<td>Specially alloyed EN-GJL 250</td>
</tr>
</tbody>
</table>

1) Version in accordance with a factory standard 60 300 50 00 0 with hardened groove flanks (min. 50 HRc)
2) Standard version

Table 2.2.1
3. Technology

3.1 Technical data

Permitted load of the traction sheave shaft:
- for standard version: max. 43 kN
- for SA 9 (extended wheel shaft): max. 41 kN

Axle distance: 155 mm

Brake magnet connection:
- Connection values magnetic clamp: two magnets are connected in succession.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>50 V</td>
</tr>
<tr>
<td>Rated current</td>
<td>1.1 A</td>
</tr>
<tr>
<td>Type of protection</td>
<td>IP65</td>
</tr>
<tr>
<td>Power supply</td>
<td></td>
</tr>
<tr>
<td>for field forcing device</td>
<td>200 V</td>
</tr>
<tr>
<td>for retentive voltage</td>
<td>100 V</td>
</tr>
</tbody>
</table>

Magnetic clamp nominal force: 2* 2500 N
Max. braking torque: approx. 2* 90 Nm
Brake disc diameter: 200 mm

Weight:
- Standard version of motor in A4 design
- Gear drive (without motor and traction sheave): 250 kg
- Gear drive SA 9 (without motor and traction sheave): 290 kg
- Gear drive (with motor and traction sheave): approx. 370 kg
- Gear drive SA 9 (with motor and traction sheave): approx. 410 kg
- Traction sheave according to order 450 - 675 mm dia.: approx. 50 - 70 kg
3.2 Dimensions of machine

3.2.1 Version with motor type A4 / vertical motor position

Fig. 3.2.1

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Air guidance, motor</td>
</tr>
<tr>
<td>2</td>
<td>Centre of gravity</td>
</tr>
</tbody>
</table>
3.2.2 Version with motor type A4 / horizontal motor position

Fig. 3.2.2

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Centre of gravity</td>
</tr>
<tr>
<td>2</td>
<td>Pictured: traction sheave position - left / right is mirror-inverted to A-A</td>
</tr>
<tr>
<td>3</td>
<td>With oil drain at side (SA11)</td>
</tr>
</tbody>
</table>
3.2.3  Version with motor type IMB5/V1

Fig. 3.2.3

<table>
<thead>
<tr>
<th></th>
<th>Length of intermediate flange for motor in line with:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BV6530-06 / Sheet 1: 0 mm</td>
</tr>
<tr>
<td></td>
<td>BV6530-06 / Sheet 6: 64 mm</td>
</tr>
</tbody>
</table>

ThyssenKrupp Aufzugswerke GmbH
3.2.4 Version with emergency brake, NBS

Fig. 3.2.4

1 With Warner brake
SZ1700/1700 Nm

2 With Mayr brake
RSO800/2200 Nm
3.2.5 Version for traction sheave in the shaft - SA9

Fig. 3.2.5

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dimension for middle of self-aligning bearing</td>
</tr>
<tr>
<td>2</td>
<td>Dimension for middle of bearing housing</td>
</tr>
<tr>
<td>3</td>
<td>With vertical motor position</td>
</tr>
<tr>
<td>4</td>
<td>With horizontal motor position</td>
</tr>
</tbody>
</table>
3.3 Dimensions of machine base frame (optional)

Setup
To isolate the body, the machine base frame is placed on isolation elements. These differ according to the type of mounting:

a) Rubber block 100 x 100 x 50 high without support
   for mounting the machine on the machine room floor without a cement floor or directly surface mounted on the cement floor.

b) Rubber block same as a) but with additional support 140 x 140 x 80 mm high
   For setup on a cement floor, support cast in cement floor.
   (floor covering thickness ≤ 60 mm)

Mounting the base frame
Loosely bolt together base frames supplied as single parts in the machine room. Make sure that the supports are mounted with additional drilled holes (2 holes) and pulley support on the correct side. Mount and secure the deflecting pulley with axle on the pulley supports.
Place and align the base frame on the isolation elements according to the plan of installation.
Use lifting gear to place the machine on the base frame; the traction sheave must be on the deflecting pulley side. Move the machine sideways on the base frame until the required ASL dimension (parallel gap between the ropes at the rope departure) is reached. Bolt the machine onto the base frame.
Align the traction sheave and deflecting pulley as parallel. Balance out uneven surfaces by inserting the enclosed shims. The machine housing must not be tensioned. Tighten the screws with the prescribed torque. See chapter 9. Plumb the rope departure on the rope pulley at the elevator car and/or mounting on the car and counterweight.

Important: With a side or oblique rope departure, the gear box casing on the machine base frame is to be secured by means of car steady plates with set screws.

The versions can be found in the general arrangement drawing.

The arrangement of the suspension ropes in the suspension plates, on the traction sheave as well as the rope pulleys should be as symmetrical as possible.
3.4 Encoder

**Overview:** The following encoders are available for the TW63

Distinction by type depending on the control system deployed

**1. TTL for Thyssen control system CPI**
for $v < 1.5 \text{ m/s}$ with 1024 impulses
for $v \geq 1.5 \text{ m/s}$ with 4096 impulses
Connection takes place with SUB-D 9 ribbon connector with knurled screw UNC4-40

**2. HTL for third-party control systems or third-party converters**
with 2 x 64 impulses
Connection takes place with insulation stripped and wire end sleeves attached.

**3. HTL for third-party control systems or third-party converters**
with 1024 impulses
Connection takes place with insulation stripped and wire end sleeves attached.

**4. Sine, cosine for third-party control systems or third-party converters**
with 1024 impulses
Connection takes place with insulation stripped and wire end sleeves attached.

*Comply with the manufacturer's instructions in chapter 9*
4. Transport and storage

Packaging:

The gear box casing is bolted directly onto the special pallet.

Gear box casing is bolted directly onto the special pallet. Wood support under non-TK motor.

Gear box casing is bolted with an intermediate wood layer onto the special pallet. Wood support under non-TK motor. Wood backing spacers under traction sheave.
Further packaging depends on the order and is country-specific (air/sea/land freight).

**Transport:**
Transport must be effected in **compliance with the safety regulations** and observing the centre of gravity of the machine.

**Important:** Machine is filled with oil. It may only be transported and stored upright.

**Fork-lift truck transport:**
- For transport, always pick up the transport pallet, not the machine itself, with the forklift. Secure the load against falling over.
- Pay attention to protruding parts! Danger of injury and damage!

**Crane transport:**
- Do not walk underneath suspended loads!
- Secure the machine without base frame with cable to the transport hanger. In the case of a machine that is mounted on the machine base frame, attach a transport rope to the base frame.
- Secure the machine against slipping and falling over.

---

**Fig. 4.7**

*Transport hanger*
In the case of **vertical transport with non-ThyssenKrupp motors**, remove the handwinding wheel and screw in an M12 eyebolt.

Use suitable lifting gear to lift slowly without jerking.

Once transport has been completed, the handwinding wheel must be remounted.

**Rope attachment:** In the case of a machine **without** machine base frame, attach the transport rope to the transport hanger. Pay attention to the picture symbols on the packaging or elsewhere.

---

**Dimensions and weight**

The weight data is specified on the packaging on a label below the transport hangers. Please refer to the delivery note for the dimensions. Rough specifications, see chapter 2.3 'Technical data'.
**Check on acceptance by the recipient**
The delivered parts and their packaging are to be checked for completeness, damage or other conspicuous features.

**Reporting and documenting damage in transit**
On delivery, make sure that no damage in transit has occurred. Any damage that is determined is to be documented immediately (sketch, photo, description of the damage). Forward the corresponding documents without delay to THYSSENKRUPP AUFZUGSWERKE GmbH.

**Unpacking**
Dispose of packaging materials in an environmentally compatible manner or reuse them. Specific transport equipment and shipping braces remain with the customer.

**Intermediate storage**
If the assembly is not installed immediately after delivery, it must be stored carefully in a protected location. On covering, attention is to be paid to ensuring that no condensation can form and that no moisture can penetrate. The assembly must not be stored outdoors. Bare parts have no long-term preservation.

**Ambient conditions**
The environment at the final location (moisture, temperature) must correspond to normal indoor climate conditions for machine and pulley rooms. (According to EN 81, between +5°C and +40°C)
5. Mounting the machine

Depending on the scope of the order, the TW63 gear drive is delivered with machine base frame and deflecting pulley. The base frame is installed and set up depending on the customer on supports, beams, a concrete pedestal or directly cast in concrete in the machine room floor.

For installation and mounting of the base frame supports, a drawing and parts list are enclosed with the base frame.

**Important:** Use the enclosed mounting parts to mount the base frame according to the drawing. Comply with the specified tightness and the corresponding tightening torques. See details in chapter 9.1.

In order to comply with regulations for noise abatement and sound transmission, isolation elements are to be inserted between the frame supports and the ground.

The number of rubber elements is based on the total weight load. The required individual load should be between 7 KN and 12 KN per element. The location and arrangement of the rubber elements can be found in the plan of installation.

**Note:** On arrangement of the supports, it is to be taken into account that the overall centre of gravity lies within the rubber elements (also in the case of elevator car suspension on the deflecting pulley side).

If the supporting surface of the machine base frame is cast as a cement floor, the floor thickness should be $\leq 60$ mm. Isolation elements with supports (80 mm high) are to be inserted. Part of the base is also to be cast in the floor.

You will find assembly instructions and data for the machine base frame in chapter 3, **Aligning the machine**

The machine is to be set up according to the plan of installation (drawing). The rope departure from the traction sheave is to be aligned plumb to the elevator car mounting or the elevator car rope pulley and the counterweight according to the drawing. With load applied to the ropes, the machine should be aligned vertically on its installation surface. Irregularities are to be balanced out by inserting shims under the floor support.

**SA9** traction sheave in the shaft, machine with extended traction sheave shaft and pedestal bearing.

**Important:** On setting up a gear drive with pedestal bearing, it must be ensured without fail that

- the compensating supports are mounted and secured according to instructions
- the traction sheave shaft is aligned horizontally
- the bearings of the machine and the outside bearing are exactly aligned

### 5.1 Note on connecting motors

Connecting the motor: on connecting the motor, the enclosed terminal connecting plan in the motor terminal box and/or the terminal connecting plan and corresponding building codes are to be complied with.
5.2 Terminal connecting plan for DEE motor and magnetic clamps

<table>
<thead>
<tr>
<th>Anschlussplan = terminal connection plan = schéma de raccordement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anschlusskasten Motor / terminal box motor / Boîte à bornes du moteur</td>
</tr>
</tbody>
</table>

**Klemmenleiste**
Terminal block

**Réglette de raccordement**
DEE 132 / 140

**ACHTUNG! - N.B. - ATTENTION !**
An den Klemmen der Kaltleiter keine Spannung größer als 2,5V anlegen!
Do not apply more than 2.5V at the terminals of the PTC thermistors!
Ne pas appliquer de tension supérieure à 2,5V aux bornes des résistances PTC!

---

**Fig. 5.2.1**

Motor connection

Magnetic clamp connection
5.3 Terminal connecting information for motors complying with BV 6531 – 21
for pole-changing three-phase motors, type A4

Schaltungsausführung nach Angabe im Leistungsschild.
Connection as stated on the rating plate.
Branchement suivant indications sur la plaque signalétique.

**Schaltzeichen**

**S1** Normally open contact in the winding
**RS** Min. 22 Ω, max. 47 Ω
**CS** Min. 0.22 µF/250 V~, max. 0.47 µF/250 V~
**CA** Starting capacitor for fan
**RB** Varistor SIOV-S14K275

**Kaltleiter**  PTC thermistor
**Résistances PTC**

ACHTUNG! ATTENTION! ATTENTION!
An die Klemmen der Kaltleiter keine Spannungen größer als 2,5 V anlegen!
Do not apply more than 2.5 V at the terminals of the PTC thermistors!
Ne pas appliquer de tension supérieure à 2,5V aux bornes des résistances PTC!
5.4 Terminal connecting information for motors complying with BV 6531 – 22 for three-phase motors with direct current brake winding, type A4

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>Normally open contact in the winding</td>
</tr>
<tr>
<td>RS</td>
<td>Min. 22 Ω, max. 47 Ω</td>
</tr>
<tr>
<td>CS</td>
<td>Min. 0.22 µF/250 V~, max. 0.47 µF/250 V~</td>
</tr>
<tr>
<td>CA</td>
<td>Starting capacitor for fan</td>
</tr>
<tr>
<td>RB</td>
<td>Varistor SIOV-S14K275</td>
</tr>
</tbody>
</table>

The low speed winding is to be designed as a direct current winding or placed in a brake in-line circuit.
5.5 Terminal connecting information for VFD motors for special motors, B5 design

Schaltung nach Angabe am Leistungsschild.
Connection as stated on the rating plate.
Branchement suivant indications sur la plaque signalétique.

Bremswicklung
Brake winding
Bobinage du frein

(1U2) (1V2)

(1U1) (1V1) (1H1)

2U 2V 2W

F1 F2

Kaltleiter
PTC thermistors
Résistances PTC

Achtung! - Attention!
An die Klemmen der Kaltleiter keine Spannung größer als 2,5V anlegen.
Do not apply more than 2.5V at the terminals of the thermistors.
Ne pas appliquer de tension supérieure à 2,5V aux bornes des résistances PTC!

The brake magnets must be placed in a circuit in the separate terminal box of the gear drive (SA12)
5.6 Fitting the rope guard for traction sheave

Use the enclosed screws to bolt the rope guard onto the rope guard carrier. Pivot the rope guard carrier to set the guard in such a way that the gap between the rope and guard on the rope run-in and run-out side of the traction sheave is as small as possible (1 - 2 mm).

With inclined pulling, adapt the location of the rope guard carrier by remounting the changed rope pull direction.

**Note:** Tighten the securing bolts of the rope guard carrier on the gear drive after alignment with the prescribed torque. Tightening torque, see table in the Appendix of the operating manual.

![Fig. 5.6.1](image1)

**Important:**
For machines with rope run-in direction of 0 - 90° above the horizontal (e.g.: machine arrangement up/down beside), an additional rope guard is required to prevent the entry of foreign bodies between the rope and groove. If the rope run-in zone is protected within the machine base frame, the function "protection against injury" is not required.

**Note:** For SA9 traction sheave in the shaft, no rope guard is fitted at the plant.
6. Commissioning

**Before** commissioning the machine, the following points should be checked and carried out:

- Safety, auxiliary and installation tools removed from the danger zone
- Check the setup of the machine, base frame, pedestal and rope departure
- Oil drain pipe mounted and closed off with cap
- Gear oil level checked
- Mounting of the machine and base frame checked
- With a side or oblique rope departure, gear box casing secured against moving with steady plates and set screws
- Bolts tightened and secured with the prescribed torque (see table 'Tightening torques', 9.1)
- Brake block stroke and setting checked
- With SA3, setting and function of the brake test switch checked
- Brake test carried out with one brake block in each case
- Function of handbrake release checked
- Rope guard fitted and distance to traction sheave set
- Power connections and earthing of motor, forced ventilation and brake magnet connected and secured
- Direction arrow (Up / Down) attached above traction sheave and clearly visible on the motor near the handwinding wheel according to the direction of travel

**Note:** If the traction sheave and rope pulley are delivered separately, they are to be mounted properly.
If the machine was dismantled due to weight, transport or space, removed parts are to be reassembled to their original state and the mounting parts tightened with the corresponding tightening torque (see table 'Tightening torques', 9.1).

For assembly, use only original construction and mounting parts from ThyssenKrupp Aufzugswerke GmbH, as otherwise no warranty can be provided.
6.1 Emergency operation

The TW63 is equipped for emergency operation with a handwinding wheel and a brake release lever that is delivered separately.

The brake release lever is to be applied to the cast-on recesses of the ends of the brake blocks (see Fig. 6.1). Pressing the levers together presses the brake blocks apart, opening the brake.

For emergency rescue of trapped persons, the handwinding wheel might also have to be moved to bring the elevator car into the nearest landing. Depending on the load, the elevator car can begin to move quickly after opening the brake. Immediately let go of the handwinding wheel and control the speed of the elevator car by pressing the brake release lever with varying degrees of force.

**Important:** If the handwinding wheel is used for installation and maintenance purposes (e.g. "drawing out of the safety gear"), the person carrying out the work must have a secure footing and stance. If the electrical recall is operated simultaneously, there is a risk of injury.

![Fig. 6.1](image)
7. Maintenance / service

**Maintenance period:** Maintenance of the machine should take place within the framework of central maintenance of the elevator, at least once a year.

**Note:** Commissioning and maintenance work may only be carried out by trained and instructed qualified personnel. All laws and regulations for elevator systems as well as accident prevention regulations must be known and complied with.

More details on the sequence, settings and data can be found in Chapter:

<table>
<thead>
<tr>
<th>Action</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check the oil level; top up if necessary</td>
<td>7</td>
</tr>
<tr>
<td>Change the oil (when the change date is reached)</td>
<td>7</td>
</tr>
<tr>
<td>Check the brake shoes for wear; the remaining lining thickness must be at least 3 mm</td>
<td>7</td>
</tr>
<tr>
<td>Check the brake setting; the block stroke should be 0.3 + 0.1 mm</td>
<td>7</td>
</tr>
<tr>
<td>Check the braking deceleration</td>
<td>7</td>
</tr>
<tr>
<td>Check the armature base plate setting and its ease of movement</td>
<td>7</td>
</tr>
<tr>
<td>Check worm gear toothing for wear</td>
<td></td>
</tr>
<tr>
<td>Check the backlash between the worm shaft and worm wheel, 0.04 mm to 0.12 mm at 20° C</td>
<td>7</td>
</tr>
<tr>
<td>Check groove profile on the traction sheave for damage and wear</td>
<td></td>
</tr>
<tr>
<td>Check secure seating of bolts of the traction sheave mount</td>
<td>9</td>
</tr>
<tr>
<td>Check pulley grooves for damage and wear</td>
<td></td>
</tr>
<tr>
<td>Check proper and adequate condition and safety of electrical connections</td>
<td></td>
</tr>
<tr>
<td>Check that protective and safety devices are present and correctly set</td>
<td></td>
</tr>
</tbody>
</table>
7.1 Lubrication

<table>
<thead>
<tr>
<th>Lubricant</th>
<th>Replacement interval</th>
<th>Vertical motor</th>
<th>Filling amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synthetic gear oil SM1</td>
<td>For the first time after 4 years then every 8 years</td>
<td>Vertical</td>
<td>= 11 litres</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Horizontal</td>
<td>= 9 litres</td>
</tr>
</tbody>
</table>

**Oil change**
- Before the oil change, run the gear until it reaches operating temperature.
- Discharge the gear oil by removing the cap on the oil drain pipe.
- Collect the old oil in a container specifically designed for the purpose.
- Close the oil drain after discharging the gear with sealing tape and the cap.
- Fill the machine with the prescribed amount of oil through the upper opening on the gear box casing (red cap, see Fig. 7.1.2).
- Check the level at the oil gauge glass (see Fig 7.1)
- Enter the date for the next oil change in the type plate on the gear box casing.
- Never mix various types of oil.
- Do not let any oil seep through to the groundwater.
- Dispose of old oil as well as cleaning cloths contaminated with oil and grease according to applicable regional regulations.
- Use only lubricants approved by THYSSENKRUPP AUFZUGSWERKE.

**Note:** THYSSENKRUPP AUFZUGSWERKE GmbH shall not be liable for losses caused by the use of non-approved lubricants.

Version with vertical motor position

![Oil gauge glass](image1)

**Oil gauge glass**

![Oil filling hole](image2)

**Oil filling hole**

![Oil drain](image3)

**Oil drain**

![Fig. 7.1.1](image4)

**Fig. 7.1.1**

![Fig. 7.1.2](image5)

**Fig. 7.1.2**
Version with horizontal motor position

Checking the oil level:

The oil level must be +/- 5 mm from the middles of the gauge glass. When topping up, the machine should remain at a standstill for a certain period (out of service for approx. 5 minutes).

The drive is filled with oil at the plant.

---

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Oil filling hole</td>
</tr>
<tr>
<td>2</td>
<td>Oil gauge glass</td>
</tr>
<tr>
<td>3</td>
<td>Oil drain</td>
</tr>
</tbody>
</table>

---

Fig. 7.1.3

---

Oil level at middle of gauge glass +/- 5 mm

---

Fig. 7.1.4
### 7.2 Checking the backlash

Wear enlarges the backlash on the worm drive between the worm wheel and worm shaft.

If the wear limit value (backlash) of **1.5 mm** is reached, the gear drive can no longer be deployed for safety reasons. Replace the gear drive.

**Measurement possibility:**
- Take the load off the gear drive; (remove ropes from the traction sheave)
- Run the measurement with the brake closed
- Fit a dial gauge to the traction sheave; e.g. screw clamp
- Specify the measured radius (M) and mark the measuring point
  - The radius (r) for the TW63 = 130 mm
  - Attach a dial gauge with magnet stator at the gear drive housing and align to the measuring point (M).
- Turn the traction sheave by hand until the dial gauge pointer moves.
- Move the traction sheave back and forth until resistance is felt in both directions. The tooth flanks of the worm wheel should have a load of approx. 20 - 50 N.
- Read off the dial gauge (ME).
- Use the formula below to calculate the backlash.
- This measurement is to be carried out in at least three different positions!

![Diagram of backlash measurement](Fig. 7.2.1)

\[
\text{Backlash} = \frac{\text{ME} \times r}{M}
\]

- **M** = radius
- **ME** = measurement result
- **r** = radius of worm wheel
- All dimensions in mm
7.3 Replacing brake shoes

**Note:** With a remaining lining thickness of less than or equal to 3 mm or if the linings are damaged (e.g. glazing), the brake linings must be replaced.

- Before starting work, secure the counterweight and elevator car; switch off the power to the installation.
- Loosen the nuts on the tension springs and remove.
- Remove the bolt locking screw and brake block pins.
- Remove one brake block; mount the armature base plate on new brake blocks. In doing so, lightly grease the rubbing surface between the armature base plate and armature screw.
- Check the ease of movement of the armature base plate; adjust if necessary. It should be possible to move the armature base plate with low resistance on the screw.
- Secure setting by tightening the lock nuts.
- Install the pre-assembled brake blocks; do not tighten the nuts on the tension springs.

**Important:** The thread on the brake block pins must be on the outside on installation, as the pin can otherwise no longer be pulled out.

- Pretension the brake tension springs to a maximum of 13.5 mm. (approx. 11 revolutions of the lock nuts)
- Set the brake block stroke by adjusting the armature base plate screw on the brake block. The brake block stroke should be 0.3 mm + 0.1 mm, measured to the middle of the brake disc.
- Change and set the second brake shoe in the same way.
- After replacement of the brake blocks, run the lift with return and observe whether the both brake blocks open uniformly.
- Check the stroke paths and deceleration; if required, adjust.

![Fig. 7.3.1: Brake shoe setting, illustration without motor and traction sheave](image-url)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Worm shaft</td>
</tr>
<tr>
<td>2</td>
<td>Brake disc</td>
</tr>
<tr>
<td>3</td>
<td>Magnetic clamp</td>
</tr>
<tr>
<td>4</td>
<td>Cover ring</td>
</tr>
<tr>
<td>5</td>
<td>Armature base plate</td>
</tr>
<tr>
<td>6</td>
<td>Armature base plate screw</td>
</tr>
<tr>
<td>7</td>
<td>Brake shoes</td>
</tr>
<tr>
<td>8</td>
<td>Dial gauge</td>
</tr>
<tr>
<td>9</td>
<td>Tightening screw</td>
</tr>
</tbody>
</table>

Stroke 0.3 + 0.1 mm
7.4 Setting braking deceleration

The brake adjustment is to be carried out only with one effective brake block with the elevator car loaded with the rated load on a descending run (full down) or with an empty elevator car on an ascending run (empty up) according to the deceleration values in the table below. The braking torque must be set on uniformly on both brake blocks by pretensioning the brake spring depending on the installation.

<table>
<thead>
<tr>
<th>Machine with flywheel mass</th>
<th>Machine with handwinding wheel</th>
</tr>
</thead>
<tbody>
<tr>
<td>V m/s ≤ 0.63</td>
<td>V m/s ≤ 0.63</td>
</tr>
<tr>
<td>- a (full down) m/s²</td>
<td>- a (full down) m/s²</td>
</tr>
<tr>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td>0.5</td>
<td>0.6</td>
</tr>
<tr>
<td>0.6</td>
<td>0.75</td>
</tr>
</tbody>
</table>

**Table:** Brake deceleration values

![Diagram](image)
7.5 Setting and checking the brake block stroke and armature base plate

Before first commissioning and during monitoring, the working stroke of the brake blocks, the pretension of the brake springs and movement of the armature base plates are to be checked.

Sequence:

1. Check ease of movement of the armature base plate:
After a longer period of use, it can occur that the rubber disc settles between the armature base plate and brake (Fig. 7.4.1, Item 6). This means that the pretension of the armature base plate becomes insufficient. To restore the pretension, the lock nuts between the brake block and armature base plate must be adjusted. Correct pretension is achieved when the armature base plate can be turned on the armature screw despite light suction.

2. Check the stroke:
Align a dial gauge on the brake block at the height of the centre of the brake disc. Switch the drive to operate the brake block while checking the stroke of the brake block. The path should be 0.3 mm + 0.1 mm.

Adjusting: If there are deviations, loosen the lock nuts (Fig. 7.4.1, Item 8) and adjust the anchor bolt with an Allen key. Secure the setting.

Note: On opening the brakes, make sure that both brake blocks work with the same stroke.

3. Setting the initial tension of the springs:
A correct setting of the initial tension is only possible within the framework of a deceleration measurement. The maximum pretension path of 13.5 mm must not be exceeded.

Note: If brake test switches SA3 are fitted, they must be checked or adjusted after a brake adjustment.

See SA3 brake monitoring circuit, chapter 8
7.6 Traction sheave replacement

Disassembly:

- Switch off the power to the installation; secure the car and counterweight in position.
- Ease load on traction sheave; lay down ropes.
- Secure the traction sheave to the lifting gear with a rope or chain.
- Undo the screws on the mounting plate for the traction sheave and loosely screw them in the outer circle of holes of the traction sheave into the traction sheave hub (see Fig. below, Item 2).
- Place a spacer (approximately 5 – 10 mm thick and slightly smaller than the hub hole diameter) between the shaft end and the disc.
- By tightening the screws diagonally and evenly, remove the traction sheave from the shaft

Installation:

- Clean shaft end and traction sheave bore. Under no circumstances, are the dimensions of the feather key, groove, shaft or drilled hole to be changed. There must be no visible damage on the contact surfaces.
- Do not apply grease or oil to the shaft and bore.
- Place the new traction sheave on the conical shaft end of the worm wheel shaft.
- Align the locations of the feather key and groove in relation to one another.
- Push the traction sheave onto the worm wheel shaft.
- Screw on a disc with supplied screws (microencapsulated) and detent edged washers on the inner circle of holes of the disc. Tighten the screws evenly and alternately.

Danger: If mounted incorrectly, the traction sheave can come loose.

- Comply with the bolt tightness of 8.8 and tightening torque = 150 Nm! See table 9 in the Appendix.

Fig. 7.6.1
7.7 Motor replacement

Note: In the case of motors of the A4 model series, the rotor is shrunk directly onto the worm shaft. This means the rotor can only be replaced with the worm shaft. For this reason, the motor should only be replaced in the plant.

Disassembly:
Disconnect the power from the installation and secure the car and counterweight.
Attach and secure the motor to the lifting gear.
Unplug the electrical connections and lines from the motor (motor and magnetic clamp connections).
Remove the nuts from the motor, brake and coupling disc.
Comply with the installation instructions for the flexible coupling in Appendix 9.
Carefully pull the motor from the studs and place on the ground.

Installation:
Compare the motor data of both motors.
Attach and secure the replacement motor to the lifting gear.
Raise the motor using the lifting gear and align the motor coupling and brake disc. The locations of the mounting holes must match those of the screws.
Push the motor and coupling on the gear drive onto the brake disc and intermediate flange. Screw in and tighten the screws evenly with the prescribed torque (see table with tightening torques 9 in the Appendix).

Note: Comply with the assembly instructions for the flexible coupling SA14 in chapter 9.
7.8 Checking for escaping grease / oil

Examine the area around the bearing cover, brake drum and brake linings for traces of oil. A small amount of escaping oil means individual drops of oil or traces of oil in the area of the bearing seal.

<table>
<thead>
<tr>
<th>Contamination level</th>
<th>Procedure</th>
<th>Every 3 months (6 months if elevator used infrequently, &lt; 50,000 runs per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No escaping oil determined</td>
<td>Check regularly within the framework of maintenance</td>
<td></td>
</tr>
<tr>
<td>If a small amount of escaping oil is determined</td>
<td>Clean and check regularly within the framework of maintenance</td>
<td></td>
</tr>
<tr>
<td>If a large amount of escaping oil is determined or brake disc/brake linings already fouled with oil</td>
<td>Clean the drive and if necessary the brake, and carry out short-term repairs. Before continuing operation until modification, run a brake test. If the braking effect is inadequate, shut down the installation.</td>
<td>Repair after 4 weeks at the latest</td>
</tr>
</tbody>
</table>

Horizontal version

Vertical version

Bearing cover

Brake drum

V ring

Fig. 7.8.1
8. Special versions (optional)

8.1 Brake monitoring circuit

The brake monitoring circuit checks the brake blocks.

It prevents motor movements when the brake is partially or fully closed. It enables detection of any brake lining wear at an early stage. Switches (sensors) are used to check whether the brake blocks are closed, open, or worn. The travel signal - derived from the W/W1 contactor - is used for the evaluation.

Display is by means of LEDs on the sensors, on the brake monitoring in the control cabinet, and by deactivation of the drive. If a Teleservice device is connected, the fault is shown on the display.

Installation:

1. If not included in the scope of delivery, make two cables (0.3*0.75 mm² with PVC jacket) for direct connection of the sensors to the control system and connect them.

2. The hexagon screws (microencapsulated) with lock nut that are to be adjusted are pre-assembled on the brake blocks at the plant. The switch tappet on the sensor must be opposite the setting screw, but should not make contact with it.

Setting:

Before starting to set the sensor; the stroke of the brake blocks must be adjusted! For description, see chapter 7

3. Switch on the emergency operation switch and elevator control system.

4. Adjust the setting screw for the switch until the LED lights up.

5. Slowly turn the screw back until the LED goes out.

6. Adjust the setting screw by ¼ revolution (corresponds to around 0.3 mm) towards the switch and tighten the nut. LED lights up continuously.

7. Activate the motor to open and close the brakes, checking as you do so that there is a switch change at the sensors between opened and closed brake.
Fig. 8.1.1: Machine with fitted brake test switches (sensors)

Fig. 8.1.2: Adjusting the brake test switch (sensor) at the hexagon screw

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Spring tension screw</td>
</tr>
<tr>
<td>2</td>
<td>Brake shoes</td>
</tr>
<tr>
<td>3</td>
<td>Setting screw</td>
</tr>
<tr>
<td>4</td>
<td>Brake test switch (sensor)</td>
</tr>
<tr>
<td>5</td>
<td>Switch tappet</td>
</tr>
</tbody>
</table>
9. Appendix

9.1 Blocking clamp

A blocking clamp that matches the traction sheave (rim width and design) is part of each machine.

**Deployment of the blocking clamp:**
Use the blocking clamp to prevent movements due to **slipping ropes** during installation work on the elevator car or counterweight or during work where the rope traction of the installation is insufficient (e.g. pulling out of the safety gear).

**Note:** The blocking clamp is to be tensioned via the screwed connection until it is excluded that ropes will slip.

![Diagram of blocking clamp](image)

**Fig. 9.1.1**

Mounting the blocking clamp on the traction sheave

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Traction sheave</td>
</tr>
<tr>
<td>2</td>
<td>Ropes (cables)</td>
</tr>
<tr>
<td>3</td>
<td>Pressure piece</td>
</tr>
<tr>
<td>4</td>
<td>Washer</td>
</tr>
<tr>
<td>5</td>
<td>Hexagon nut</td>
</tr>
<tr>
<td>6</td>
<td>Spacer sleeve</td>
</tr>
<tr>
<td>7</td>
<td>Clamp clip</td>
</tr>
</tbody>
</table>

**Important:** After completion of the installation work, remove the blocking clamp, as otherwise the installation will be damaged.
9.2 Tightening torques- tightness values for mounting parts on the machine

Important: Must be complied with when working on the machine or replacing parts!

<table>
<thead>
<tr>
<th>Part Description</th>
<th>Tightness</th>
<th>DIN/ISO</th>
<th>Tightening torque Nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handwinding wheel to hub</td>
<td>8.8</td>
<td>4762</td>
<td>20</td>
</tr>
<tr>
<td>Slotted pan head tapping screw M 8*12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locking washer S8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hub to shaft</td>
<td>8.8</td>
<td>4762</td>
<td>75</td>
</tr>
<tr>
<td>Slotted pan head tapping screw M 12 * 35 microencapsulated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detent edged screw SK M12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring-type straight pin 6 *18</td>
<td>8752</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse encoder to motor casing</td>
<td>8.8</td>
<td>4762</td>
<td>9</td>
</tr>
<tr>
<td>Slotted pan head tapping screw M 6 *12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locking washer S8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor bearing cover to motor casing</td>
<td>8.8</td>
<td>4762</td>
<td>9</td>
</tr>
<tr>
<td>Slotted pan head tapping screw M 6 *12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor casing to gear box casing</td>
<td>8.8</td>
<td>4762</td>
<td>75</td>
</tr>
<tr>
<td>Slotted pan head tapping screw M 12 * 35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brake disc to worm shaft (only for A4 motors)</td>
<td>8.8</td>
<td>4762</td>
<td>600</td>
</tr>
<tr>
<td>Shaft nut M 55 * 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal bearing cover to gear box casing</td>
<td>8.8</td>
<td>4762</td>
<td>75</td>
</tr>
<tr>
<td>Slotted pan head tapping screw M 12 * 35 microencapsulated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disc on the traction sheave shaft</td>
<td>8.8</td>
<td>4762</td>
<td>150</td>
</tr>
<tr>
<td>Slotted pan head tapping screw M16 * 40 microencapsulated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detent edged washer SK M16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bearing bracket on housing</td>
<td>8.8</td>
<td>4762</td>
<td>40</td>
</tr>
<tr>
<td>Slotted pan head tapping screw M 10 * 30 microencapsulated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bearing cover to bearing bracket</td>
<td>8.8</td>
<td>4017</td>
<td>40</td>
</tr>
<tr>
<td>Hexagon screw M10 * 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detent edged washer SK M10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disc to bearing - worm wheel shaft</td>
<td>8.8</td>
<td>4762</td>
<td>40</td>
</tr>
<tr>
<td>Slotted pan head tapping screw M 10 * 30 microencapsulated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locking screw on brake block pin</td>
<td>8.8</td>
<td>4762</td>
<td>9</td>
</tr>
<tr>
<td>Slotted pan head tapping screw M6 * 12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detent edged washer SK M6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Tightening Torques

<table>
<thead>
<tr>
<th>Component Description</th>
<th>Tensioning Type</th>
<th>DIN/ISO Ref</th>
<th>Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake magnet to housing, Hexagon screw M16 * 120</td>
<td>8.8</td>
<td>4014</td>
<td>150</td>
</tr>
<tr>
<td>Machine to machine base frame (version 1 - 3/4), Hexagon screw M20 * 90</td>
<td>8.8</td>
<td>4014</td>
<td>190 / 350</td>
</tr>
<tr>
<td>Disc 21</td>
<td></td>
<td>125</td>
<td></td>
</tr>
<tr>
<td>Hexagon nut M20</td>
<td>8</td>
<td>4032</td>
<td></td>
</tr>
<tr>
<td>Lock nut M20</td>
<td></td>
<td>7967</td>
<td></td>
</tr>
</tbody>
</table>

### Tightening Torques for Mounting Parts on the Machine Base Frame

| Hexagon screw M6 * 20 | 8.8 | 4017 | 9 |
| Hexagon screw M10 * 16 | 8.8 | 4017 | 40 |
| Hexagon screw M12 * 35 | 8.8 | 4017 | 75 |
| Hexagon screw M16 * 25 | 8.8 | 4017 | 190 |
| Hexagon screw M16 * 40 | 8.8 | 4017 | 190 |
| Hexagon screw M16 * 80 | 8.8 | 4017 | 190 |

- **Detent edged washer SK M10**
- **Detent edged washer SK M12**
- **Detent edged washer SK M16**

**Note:**

Fit the screws, washers and detent edged washers, nuts and lock nuts according to the details in the drawing enclosed with the base frame and tighten with the specified torque.
For use cases not listed in the table, the following apply for:
- Allen screws DIN 912  ISO 4762
- Hexagon screws DIN 931 / 933  ISO 4014 / 4017

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Tightness 8.8</th>
<th>10.9</th>
<th>12.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4</td>
<td>2.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M5</td>
<td>5.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M6</td>
<td>9.0</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>M8</td>
<td>23</td>
<td>30</td>
<td>35</td>
</tr>
<tr>
<td>M10</td>
<td>45</td>
<td>60</td>
<td>75</td>
</tr>
<tr>
<td>M12</td>
<td>75</td>
<td>110</td>
<td>130</td>
</tr>
<tr>
<td>M16</td>
<td>190</td>
<td>270</td>
<td>320</td>
</tr>
<tr>
<td>M20</td>
<td>370</td>
<td>520</td>
<td>620</td>
</tr>
<tr>
<td>M24</td>
<td>640</td>
<td>900</td>
<td>1100</td>
</tr>
</tbody>
</table>

The screws are to be tightened with a torque wrench!

**Note:** Microencapsulated screws are to be replaced after they have been used once.

For assembly, use only original construction and mounting parts from ThyssenKrupp Aufzugswerke GmbH, as otherwise no warranty can be provided.
10. Changes

<table>
<thead>
<tr>
<th>Version</th>
<th>Changes</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>09/2012</td>
<td>Table for traction sheave changed (D520 traction sheave), as well as dimensions of the drive (details regarding oil drain at side) added.</td>
<td>2, 3</td>
</tr>
</tbody>
</table>
**Fitting instructions for Centaflex couplings**

with highly elastic rubber elements

**Important notes — observe strictly**

The radial and axial screws connecting the rubber element to the hub must all be tightened to the torque given in the table below, using a **torque wrench**.

Tightening with a torque wrench is particularly important with the larger sizes. Tightening *by feel* will not do as experience has proved the tightening torque in such cases are far too low.

Tightening torques which are too low will inevitably lead to slackening of the screws in service and consequently to the destruction of the coupling.

Ensure that on tightening the screws, the aluminum bushes in the rubber part are not twisted at the same time, but straight. In order to reduce friction between the screw head and the aluminum part, a small amount of **grease** should be applied under the head of the screw before fitting. If necessary, use a suitable tool for applying counter-pressure on the element to prevent twisting of the rubber part during tightening of the screws. This is particularly important with the radial screws, otherwise the cylindrical faces between aluminum inset and hub will not engage on the full area, but only on two corners. This will inevitably lead to slackening of the screws and subsequent destruction of the coupling. If the coupling is supplied in a pre-assembled state, do not dismantle it, but fit it in this condition.

<table>
<thead>
<tr>
<th>Centaflex Size</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>6/12</th>
<th>10/22</th>
<th>15/28</th>
<th>25/36</th>
<th>39</th>
<th>40</th>
<th>50</th>
<th>70</th>
<th>90</th>
<th>110</th>
<th>200/250</th>
<th>400/500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw Size</td>
<td>M6</td>
<td>M8</td>
<td>M8</td>
<td>M10</td>
<td>M12</td>
<td>M14</td>
<td>M16</td>
<td>M16</td>
<td>M20</td>
<td>M20</td>
<td>M20</td>
<td>M24</td>
<td>M20</td>
<td>M20/M24</td>
<td>M20/M24</td>
</tr>
<tr>
<td>Tightening torque Nm</td>
<td>10</td>
<td>25</td>
<td>25</td>
<td>50</td>
<td>85</td>
<td>140</td>
<td>220</td>
<td>220</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>400</td>
<td>500</td>
<td>600/1000</td>
<td>800/1000</td>
</tr>
<tr>
<td>nNp</td>
<td>1.0</td>
<td>2.5</td>
<td>2.5</td>
<td>5.0</td>
<td>8.5</td>
<td>14</td>
<td>22</td>
<td>22</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>81</td>
<td>105</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Sequency of Assembly**

- **Lightly grease**
- Fit the rubber element onto the shaft or the adapter plate onto the flywheel.
- Fit the radial and axial screws.
- Push the radial screws into the rubber element and then tighten the screw with a **torque wrench**.
- Push the shaft and the hub onto the flywheel.
- Fit the axial socket bolts on to the large hub or adapter plate on the flywheel.
- Position the element with the side having the rubber free face of the axial aluminum insert towards the large hub and, using the radial screws, mount it on the cylindrical hub. During this process, the rubber element is pulled together radially and receives its preload. Then, push the coupled elements together and in so doing, caulk the coupling with tight axial pressure onto the socket bolts. The rubber element is subjected to a little more radial compression, and the preload is thus increased. The axial bolts in the rubber element should be smeared lightly with grease beforehand to allow the socket bolts to slide easily in the inserts.

**Standard Design**

Fit the hubs onto the shafts or the adapter plate onto the flywheel.

Fit the rubber element to the flanged hub or flywheel, by means of axial screws.

This must be carried out before engaging the radial screws in the cylindrical hub.

Push the shaft-mounted cylindrical hub inside the rubber element and then fasten the rubber element on it with radial screws. During this process, the rubber element is compressed radially and is pre-loaded for increased capacity.

**Design S (plug-in or blind fitting type)**

Fit the hubs onto the shafts or the adapter plate onto the flywheel.

Fit the axial socket bolts on to the large hub or adapter plate on the flywheel.

Position the element with the side having the rubber free face of the axial aluminum insert towards the large hub and, using the radial screws, mount it on the cylindrical hub. During this process, the rubber element is pulled together radially and receives its preload. Then, push the coupled elements together and in so doing, caulk the coupling with tight axial pressure onto the socket bolts. The rubber element is subjected to a little more radial compression, and the preload is thus increased. The axial bolts in the rubber element should be smeared lightly with grease beforehand to allow the socket bolts to slide easily in the inserts.
Use only the "Inbus Plus" screws provided which are marked on the threads with a micro-encapsulated adhesive which locks the screw in the thread and secures them reliably against slackening. For adequate effect, the hardening period for this adhesive after bolting up is approximately 4-5 hours at room temperature (20° C). The coupling should not be operated before this period has elapsed.

The adhesive will be fully hardened after 24 hours. Higher temperatures will speed up the hardening process, at 70° C (using a hot air blower), for instance, the hardening will take only 15 minutes. Inbus Plus is temperature-proof between -80° and + 90° C and the screws can be reused up to 3 times max. Any adhesive stripped off during bolting up will settle between the hub and the aluminium part, but this will have a beneficial effect in that it enhances the friction grip between these parts.

Note: Anaerobic adhesives (such as Loctite, Omnifit etc.) will loosen the adhesion of the rubber and the insert and will consequently destroy the coupling.

Such adhesives should therefore be avoided if possible. Where the use of this adhesive is unavoidable apply it very sparingly so that no surplus adhesive will moisten the rubber.

We cannot accept any complaints concerning rubber parts which have become defective through the action of adhesives not supplied or recommended by us.

The coupling is completely maintenance-free and does not require any lubrication. Splashing with oil and similar substances should be avoided, since natural rubber is not oil-resistant.

However occasional minor contact with oil or grease is not harmful as this oil will be blown off during rotation of the coupling.

**Centaloc Clamping Hub**

If the hubs are equipped with Centaloc clamping (see page 13), the clamping screws must be tightened at least to the following tightening torques:

<table>
<thead>
<tr>
<th>Clamp screw</th>
<th>Tightening torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 10</td>
<td>30</td>
</tr>
<tr>
<td>M 12</td>
<td>50</td>
</tr>
<tr>
<td>M 14</td>
<td>70</td>
</tr>
<tr>
<td>M 16</td>
<td>120</td>
</tr>
<tr>
<td>M 20</td>
<td>200</td>
</tr>
</tbody>
</table>

After assembly, the coupling should be carefully aligned if the coupled elements are not already in good alignment by virtue of being spigot located. In the interest of a long service life from the coupling, the higher the speed, the more meticulous should be the alignment. In design type 2, the alignment can very easily be checked with a straight-edge. The outer diameter of the flange hub must be flush with the outer diameter of the rubber element in those areas where the radial screws sit: i.e. in different radial positions.

In design types 1 and 3 the distance "Z" must be measured at all axially bolted points of the rubber element (2, 3 or 4 points depending on the size) and must be set as accurately as possible to the value "Z" quoted in the table below.

For spigot located components there is no need to align the coupling.

**Position of cyl. hubs:**

The long end of the cyl. hub, usually identifiable by a chamfer, is normally as shown in drawing below. However, in some special applications, the hub must be reversed. When in doubt, install as shown in the relevant installation drawing.
ThyssenKrupp Aufzugswerke GmbH

**Ordering Code: K364AB15S-B56**

Device dimensions: 30mm
Max. speed: 1800 rpm.
Polarity-reversal protection: no
Short-circuit protection (signals): yes
Operating temperature: -5°C to +50°C
Storage temperature: -20°C to +70°C
Protection rating: IP00

**Power supply**
- 15V
- 15V/-15V
- +/-5%

**Output level A/B**
- High: 11.7 V
- Low: 2.8 V

**Operational details**
- Rise time: <= 10 ms
- Fall time: <= 10 ms
- Pulse width (50%/50%): 60% ± 6%
- Phase displacement (A/B): 75° ± 105°
- Connection: 10 m shielded cable with terminal sockets 6.3 - 1. Shield is connected with protective cover.

**Outputs**
- A-Channel 64 r.p.m.
- B-Channel 64 r.p.m.
- C-Channel 128 r.p.m.

In case of 15V supply, +/-15V can be connected to ground. Channel C is available in case of +/-15V supply only.

**Scope of delivery**
- Circuit board: Pre-assembled under galvanized protective cover with 10 m cable (connected) including terminal sockets; Connector cup wheel

**Packing**
- Plastic bag

**Connector details**

<table>
<thead>
<tr>
<th>Function</th>
<th>Pin</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6</td>
<td>grey</td>
</tr>
<tr>
<td>B</td>
<td>5</td>
<td>rose</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>green</td>
</tr>
<tr>
<td>Ground</td>
<td>4</td>
<td>yellow</td>
</tr>
<tr>
<td>+15V</td>
<td>1</td>
<td>brown</td>
</tr>
<tr>
<td>-15V</td>
<td>2</td>
<td>white</td>
</tr>
<tr>
<td>Shield</td>
<td></td>
<td>open</td>
</tr>
</tbody>
</table>

Ground (potential) has been isolated from shield and housing.

03.03.2000: Specifications without engagement, subject to errors and modifications.
Hollow-Shaft Encoder WDG 100H

Ordering Code: WDG 100H-38-XXXX-ABN-I05-K3-B59

Electrical Data:
- Voltage: 5 VDC ±10%
- Power consumption: max. 60 mA
- Channels: A, B, N and ABN inv.
- Output: push pull
- Signal level: at 20 mA
- Pulse frequency: max. 200 kHz
- Circuit protection: no

Electrical Data:
- General Layout: gem. DIN VDE 0160
- Output circuit: 5 VDC, 1000 µA

Specifications

Mechanical Data
- Housing: Aluminium
- Diameter: 38 mm
- Depth: 42 mm
- Attachment: about Hollow-shaft with 2 set screw M4

Hollow Shaft
- Material: Stainless steel
- Load on: max. 200 N radial
- Shaft end: max. 100 N axial
- Torque: 1.5 Ncm
- Fastening: 2 x M4, DIN 913

Bearings
- Type: 2 precision ball
- Life: 3 x 10^6 revs. at 100% of full rated shaft load
- Speed: max. 3,500 r.p.m.
- Weight: approx. 720 g

Connection:
- Radial ready made cable with 9 pin.
- SubD-connector

Optic
- Light source: IR - LED
- Life: typ. 100,000 hrs.
- Scanning: differential

Accuracy
- Phase shift: 90° ± 7.5%
- Pulse-on/off-ratio: 50% ± 7%

Environmental Data
- ESD (DIN EN 61000-4-2): 8 kV
- Burst (DIN EN 61000-4-4): 2 kV
- Power supply: 1 kV
- Protection rating (DIN EN 60529): IP 54
- Vibration (DIN EN 60068-2-6): 50 m/s² (10-2000 Hz)
- Shock (DIN EN 60068-2-27): 1000 m/s² (11 ms)

Connector details

Function Pin
Positive 9
A 2
A inv. 1
B 3
B inv. 4
N 5
N inv. 6
Negative 7
Shield 8 + Housing

Shaft turning clockwise, when looking at encoder front.

09.03.2000: Specifications without engagement, subject to errors and modifications.
Hollow-Shaft Encoder WDG 100H

Ordering Code: WDG 100H-38-1024-ABN-I24-K3-C07

No. of lines: 1024 r.p.m.
Hollow-Shaft diameter: 38 mm
Thyssen Reference No.: 0099016030

Electrical Data:
- Power supply: 10 - 30 VDC
- Power consumption: max. 60 mA
- Channels: A, B, N, ABN inv.
- Output: HIL, differential driver
- Load: max. 40 mA
- Signal level: at 20 mA
- H = U2 2.5 VDC
- L = 2.5 VDC
- Pulse frequency: max. 200 kHz
- Circuit protection: NPN OC, 10 mA
- Control Output: VCC = 30 VDC
- Cable length: max. 100 m

Output circuit: 10-30 VDC: I24

Dimensional drawing WDG 100 H, Dimensional specifications in mm.

Shaft turning clockwise, when looking at encoder front.

Specifications

Mechanical Data
- Flange: Aluminium
- Housing: Aluminium
- Diameter: 100 mm
- Depth: 42 mm
- Attachment: about Hollow-shaft with 2 set screw M4

Hollow Shaft
- Material: stainless steel
- Diameter: 38 mm
- Load on: max. 200 N radial
- Shaft end: max. 100 N axial
- Torque: 1.5 Nm
- Fastening: 2 x M4, DIN 913

Bearings
- Type: 2 precision ball
- Life: 3 x 10^7 revs. at 100%
- Of full rated shaft load: 4 x 10^7 revs. at 40%
- 3 x 10^7 revs. at 20%

Speed: max. 3,500 r.p.m.
Weight: approx. 720 g
Connection: radial with 10 m shielded cable with end splice

Electrical Data
- General Layout:
  Supply / Output: gem. DIN VDE 0160
  → Output circuit
- Optic
  Light source: IR - LED
  Life: typ. 100,000 hrs.
  Scanning: differential

Accuracy
- Phase shift: 90° ± 7.5%
- Pulse -on/off- ratio: 50% ± 7%

Environmental - Data
with housing earthed
- ESD (DIN EN 61000-4-2): 8 kV
- Burst (DIN EN 61000-4-4): 2 kV
- Power supply: 2 kV
- Signals: 1 kV
- Protection rating (DIN 60529): IP 54
- Vibration (DIN EN 60068-2-6): 50m/s² (10-2000 Hz)
- Shock (DIN EN 60068-2-27): 1000m/s² (11 ms)
- Operating temperature: -10 - +70°C
- Storage temperature: -30 - +80°C

Cable details
- Function | Colour
- Positive | brown
- A | green
- B | yellow
- N | grey
- A inv. | red
- B inv. | black
- N inv. | violet
- Negative | white
- Shield | cord

09.03.2000: Specifications without engagement, subject to errors and modifications.
Hollow-Shaft Encoder WDG 100H

Ordering Code: WDG 100H-38-1024-ABN-SIN-K3-C07
No. of lines: 1024 r.p.m.,
Hollow-Shaft diameter: 38 mm
Thyssen Reference No.: 0099019030

Electrical Data:
- Power supply: 4.75 - 5.5 VDC
- Power consumption: max. 100 mA without load
- Channels: Sinus, Cosinus, N
- Output: push pull
- Load on output: min. 120 Ohm terminating resistor
- Signal level: 1 Vss +/- 25%
- Pulse frequency (-3dB): 100 kHz
- Circuit protection: no
- Control Output: conducting when defective
- Cable length: max. 150m at <260pF/m
- Design according to: gem. DIN VDE0160

Output circuit Sinus: SIN

Dimensional drawing WDG 100 H, Dimensional specifications in mm

Shaft turning clockwise, when looking at encoder front.

Specifications

Mechanical Data
- Flange: Aluminium
- Housing: Aluminium
- Diameter: 100 mm
- Depth: 42 mm
- Attachment: about Hollow-shaft with 2 set screw M4

Hollow Shaft
- Material: stainless steel
- Diameter: 38 mm
- Load on: max. 200 N radial
- Shaft end: max. 100 N axial
- Torque: 1.5 Nm
- Fastening: 2 x M4, DIN 913

Bearings
- Type: 2 precision ball
- Life: 3 x 10^6 revs. at 100%
- Of full rated shaft load
- 4 x 10^6 revs. at 40%
- 3 x 10^6 revs. at 20%
- Speed: max. 3.500 r.p.m.
- Weight: approx. 720 g
- Connection: radial with 10 m shielded cable with end splice

Optic
- Light source: IR - LED
- Life: typ. 100.000 hrs.
- Scanning: differential

Accuracy
- Phase shift: 90° ± 7,5%

Environmental Data
with housing earthed
- ESD (DIN EN 61000-4-2): 8 kV
- Burst (DIN EN 61000-4-4): 2 kV
- Protection rating (DIN 60529): IP 54
- Vibration (DIN EN 60068-2-6): 50m/s² (10-2000 Hz)
- Shock (DIN EN 60068-2-27): 1000m/s² (11 ms)
- Operating temperature: -10 - +70°C
- Storage temperature: -30 - +80°C

Cable details
- Function: Colour
  - Positive: brown
  - A: green
  - A inv.: yellow
  - B: grey
  - B inv.: rose
  - N: black
  - N inv.: violet
  - Negative: white
  - Shield: cord

09.03.2000/Specifications without engagement, subject to errors and modifications.
Wachendorff Incremental encoders WDG

Product information WDG

This product information serves for the installation and connection of the encoder. You will find further information in our catalogue Wachendorff encoders WDG.

Safety-Related Guidelines

General Notes

The product knowledge is written for technically qualified personnel having special knowledge required in the field of measuring and control technology.

The exact information on all safety instructions and warnings contained in this product information as well as their appropriate technical application are prerequisites for safe installation and setup as well as the safety in operation and maintenance of the Wachendorff encoders. This absolutely requires that all measures be taken by qualified personnel. All persons working on the projection and installation of encoders should be familiar with the safety concept of automation technology and qualified as defined above.

For the sake of clarity, not all details of the handling of encoders in all conceivable cases of application are described in this product information, nor can it cover all conceivable ways of mounting, operation and maintenance.

Should you require further information or face special problems that have not been dealt with in sufficient detail in this product information, please contact us and ask for this information. The technical data are given in the specification.

If these safety guidelines are not respected, this can result in damage to property, personal injury or death.

The Wachendorff encoders can only be operated in the application cases described in this product information.

We would also point out that all obligations of Wachendorff only result from the respective purchase agreement definitely regulating the warranty.

Purpose of application, improper usage

Wachendorff encoders exclusively serve for producing a number of electrical signals proportional to the mechanical turning of the encoder shaft. These signals can be used for the following purposes:
- Calculation of a pulse number, e.g. for the determination of a position, a volume or a force.
- Calculation of a frequency e.g. for the determination of a speed or speed change.

The evaluation of the signal should be performed using adequate electronic components. Please consider especially that no signals are given when the shaft is turned without power being connected to the unit. Nor can an actual value memory of the evaluating device recognize these turnings.

An encoder should not be used as the only means of averting dangerous conditions of the machines and installations.

The machines and installations must be designed in a way that defective conditions cannot provoke situations dangerous to the operating personnel (e.g. caused by independent limit switches, mechanical locks). Above all make sure that the malfunction or failure cannot result in damage to property or danger to the operating personnel. If this is observed, an encoder can be used to prevent defects in machines or installations. It is also important to prevent precautions taken for the safety of an installation from being rendered ineffective by the use of encoders. Moreover, an encoder should not be used as a step or tension device for driving elements. Mechanical and electrical limit values should not be exceeded. "Emergency off" installations have to remain effective in all operating modes of the machine.

28.10.1996/without guarantee (e-pane/keumpg@conetipsideira.x.doc)

Notes on mounting

When mounting the unit, you should especially make sure not to exceed the admissible bearing loads. If the encoder shaft is mounted fixed, an adequate spring or shaft, that keeps housing in place should be used so that the admissible loads of the encoder bearings are not exceeded. The encoder shaft, the flange and the bezel should not be worked on subsequently. The encoder may only be mounted with little force. The encoders should not be thrown or dropped. The min. admissible cable bending radii have to be observed. The connection cable must not be routed with mechanical tension. Please consider the fact that, in spite of their protection mode IP65, the encoders must not be exposed to a constant strong influence of water. The encoder does not contain any parts that have to be maintained by the user; it must not be opened. Repairs may only be carried out by the producer.

The non-observation of these guidelines will result in the loss of the producer’s warranty and possibly in a malfunction or the failure of the encoder.

Notes on installation

The encoders have to be installed and connected respecting the relevant EN, DIN and VDE standards. During installation, power must not be connected to the encoder. Install the power supply and signal cables in such a manner as to prevent electric noise signals (e.g. inductive or capacitive interference voltages) from affecting the function of the encoder.

Attention: In case of encoders having a 5VDC power supply as well as certain output circuits the a wrong polarity of the power supply, a short circuit of the outputs or the connection of power to the outputs can cause the failure of the encoders.

Suitable hardware and software safety measures will have to be taken in order to prevent an interruption of the power supply or signal lines from causing an undefined or dangerous condition.

Notes on mounting, maintenance and repair work

The malfunction of an encoder can result in the following events:
- Breakdown of a channel: The channel either sends a constant voltage signal or no signals at all. Possible cause: cable break, breakdown of parts, measure to take: repair at the factory.
- Too many pulses: The electronic device counts more pulses than those given by the shaft rotations of the encoder. Possible cause: electric noise on the signal lines, defective parts. Measures to take: effective electric noise protection measures, repair at the factory.
- Not enough pulses: The electronic device counts less pulses than those given by the shaft rotations of the encoder. Possible cause: troubles of the power supply, mechanical slippage, limit frequency of the encoder or of the electronic device exceeded. Measures to take: test power supply, remove mechanical slippage, test limit frequencies.
- Electrical breakdown of the encoder: The encoder gives no signals. Possible causes: power supply defective, defective parts in the encoder. Measures to take: test power supply, repair of the encoder at the factory.
- Defective encoder shaft: The encoder shaft can only be turned with difficulty or not at all. Possible cause: defective bearings. Measures to take: test the mechanical load of the encoder shaft, repair at the factory.
- Bezel damage: The bezel of the encoder is damaged visibly (e.g. crushed or burst bezels).

In any case of malfunction and especially of visible defects, the safe function of the encoder is no longer guaranteed. The encoder may not be operated any more. Measures to take: put out of action, test the whole system and repair at the factory. Please consider the notes on electrical noise protection.

Encoders do not contain any parts that can or have to be maintained by the user. Repairs may only be carried out by Wachendorff.
ABV, ESV and the shaft calculations can be found in the following operating manual:

Document number
DE 65 999 01 86 0
EN 65 999 02 86 0
FR 9710 000 9229