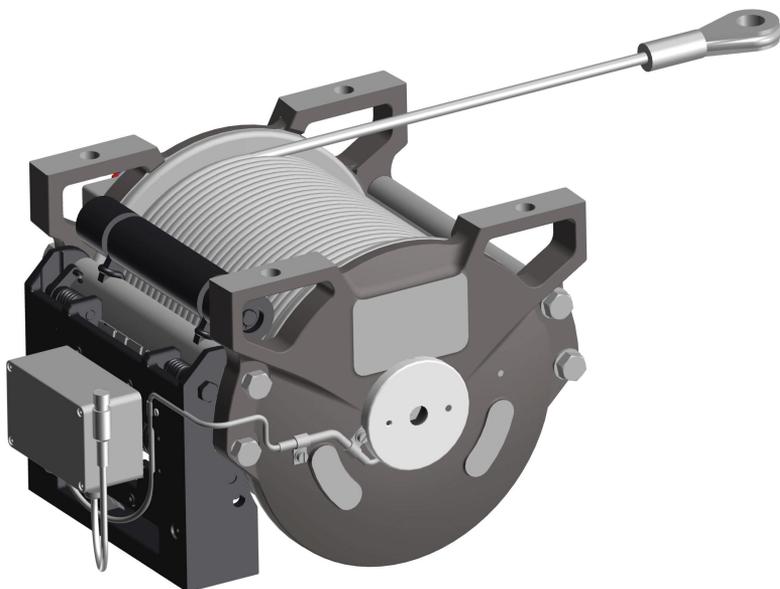


# TC1-TC2-TC2L-TC3-TC5 X4 TI1-TI2-TI2L-TI4-TI5 X4



**Hoist Operator's Manual GB**

737 4310





## **Congratulations!**

You are now the owner of a quality Product manufactured by Hiab (part of Cargotec Corporation).

The aim of this manual is to help you handle, maintain your crane safely and with full satisfaction.

This Manual provides detailed information about your Product, its control systems and its practical management and maintenance.

Please read the complete Manual carefully and make sure that you understand its contents. Please also carefully familiarise yourself with your Product before you start to use it.



Help us to improve this manual. Please send your comments and suggestions to **documentation@hiab.com**

This manual applies to Hoists that operate with the crane control system  
SPACE X4 from serial number:

**263418.**

**2023-03**

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# 1. Knowledge required

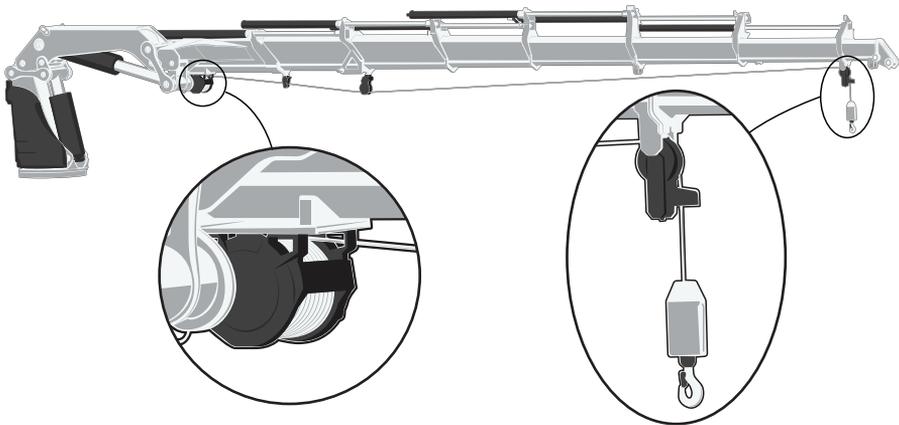
## 1.1. Hoist models

This manual covers these TITAN hoist models:

- TC1/TC2/TC2L/TC3/TC5
- TI1/TI2/TI2L/TI4/TI5

The hoist, designed for an EFFER crane, is installed on the 2nd boom or on the JIB.

The hoist fulfills the European Machine Directive and is marked with the CE sign.



## 1.2. Introduction for Hoists

**Always study the Operator's Manual for both crane and hoist**

These instructions contain important recommendations for the operation and maintenance of the TC/TI hoists and are especially meant for the operating and maintenance personnel.

Only authorised experts are allowed to install, operate, maintain and repair the TC/TI hoists. All instructions have to be read, understood and noted by the operating and maintenance personnel before installation, initial operation and maintenance.

We would like to point out especially the safety notes mentioned in chapter: Safety precautions and warnings.

Long operation safety can only be guaranteed when installation and operation of the hoist system is made according to instructions and when you keep to the maintenance intervals and the operating material.



These instructions have to be kept together with the crane operator's manual, any other crane optional component manual, interchangeable equipment manual or lifting accessory manual, and have to be accessible to the operating and maintenance personnel.

Operation faults and poor care can lead to failures and unnecessary repairs.

Ensure that you comply with the statutory requirements of the country in which you use the crane and lifting accessories.

**NOTE**

EFFER reserves the right to change specifications, equipment, operating instructions and maintenance instructions without prior notice.

### 1.3. Determination - Hoist

The TC/TI hoists belong to the group of hoisting winches. The use as determined is hoisting and lowering of loads as specified for each hoist type and under the attention of the given installation regulations as well as of the safety notes.

**DANGER**

Transportation of passengers with the hoist is not permitted.

The use as determined also includes the related equipment manufacturer's recommendations regarding installation, operation and maintenance.

Machine safety is guaranteed only if it is used for its intended purpose and according to instructions in this manual.

### 1.4. Indications in the Operator's Manual

Please pay attention to the following instructions and use extra caution in these cases. Inform other users about these working safety symbols. In addition to the safety symbols and recommendations contained herein, the rules and regulations regarding safety and accident prevention of the country of application must be followed.

#### What must you do and not do?

The following indications are used in the Operator's Manual:

**DANGER**

Danger to life for yourself or to bystanders.

Follow the instructions carefully!

**WARNING**

Danger of injury to yourself or to bystanders, or danger of serious damage to the crane or other objects.

Follow the instructions carefully.

**CAUTION**

Hazard for the crane or crane components. Follow the instructions carefully.

**Important:**

If actions are numbered, do them in numerical order!

1. Do this
2. Do that
3. ....

**NOTE**

Extra information that can prevent problems.

**TIP**

Tip to make the work easier to carry out.

## 1.5. Temperature range

The TC hoists are designed for operation in a temperature range / ambient temperature of  $-30^{\circ}\text{C}$  up to  $+60^{\circ}\text{C}$  ( $-22^{\circ}$  to  $140^{\circ}\text{F}$ ).

The TI hoists are designed for operation in a temperature range / ambient temperature of  $-40^{\circ}\text{C}$  up to  $+63^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $145^{\circ}\text{F}$ ).

**NOTE**

Please contact us regarding extreme temperatures, vibrations, jerks, sand, dust or sea water or any other extreme environmental condition.

### Hydraulic oil temperature:

At normal operation of the hoist system hydraulic oil temperatures should be between  $+30^{\circ}\text{C}$  and  $+60^{\circ}\text{C}$ . If the oil temperature is too low respectively too high, the sealing rings will lose their sealing characteristics. Further the durability of the hydraulic oil will be reduced, in case the oil temperature of  $+60^{\circ}\text{C}$  is exceeded.

**WARNING**

Leakage oil temperature, which is dependent upon pressure and speed, is always higher than the circuit temperature.

At no point in the installation may the temperature exceed  $+90^{\circ}\text{C}$ .

## 1.6. Warranty

The Seller only provides Warranty if the conditions specified in the "Service and Warranty Manual" are fulfilled.

Refer to the Service and Warranty Manual of your Product.

## 2. Safety precautions and warnings

### 2.1. General safety instructions

The DINAMIC OIL hoists have to be used according to the determination. Each use which is exceeding this, is understood as use as not determined.

Plates with notes, which are fixed on the hoist system and on the lifting accessories, have to be noted and must not be removed.

During the hoist operation the operator has to watch the movements of the load as well as the entire danger zone. In uncertain situations, observation by additional personnel or by means of radio equipment must be guaranteed.

Modifications and changes without any authorization, which jeopardize the safety of the hoist system, are forbidden.

Lubrication points on the hoist have to be lubricated once a month.

The hoist system must be stopped during maintenance works.

### 2.2. Safety notes to hoist operation

Towing works and passenger transports with the hoist system are not allowed.

During hoist operation the rope must not be pulled off the hoist drum completely. Three or five safety windings have to remain on the drum.

Hot oil can cause danger of burning in case of change of gear oil or hydraulic oil!

The parts which are necessary for the complete function of the hoist system, must not be treated on their surface (lacquered, glued etc.). These are most of all ropes, rope guide parts, valve activators, operating units, optical indications and indication labels as well as ventilations (sintered bush) on electronic units and operating units.

### 2.3. Safety recommendations hoist

**Study the entire Operator's Manuals for the crane and hoist carefully.**



#### **DANGER**

If you do not study the complete Operator's Manuals for your crane and hoist carefully, it could lead to fatal accidents or serious damage.



#### **WARNING**

Before the hoist is to be used a thorough check of the following is necessary:

- hoses, pipes and connections
- rope and pulleys
- lifting accessories

**Make sure that everything is in acceptable condition, that no visual damage or oil leaks exist.**



## DANGER

- Never walk or stand under a suspended load.
- Ensure that there are no unauthorised persons within the operating range of your crane! No persons are allowed close to the crane working zone.
- In case of oil leakage, do not go close to the leak. Fluid under high pressure may cause serious injury to persons.



## TIP

Mark out the working range, e.g. with cones. Put on your vehicle's warning lights.



## WARNING

- Do not drag or tow loads with the hoist rope or the crane.
- To avoid swinging loads additional guiding ropes from the ground are to be used.
- Do not handle loads containing unattached components.
- Use the appropriate lifting attachment for each type of goods to be handled.
- Do not handle goods which are not properly fastened.
- If daylight is not sufficient, use suitable artificial light to work under safe conditions.

## 2.4. Use of the Hoist

The hoist is an optional crane component which permits load handling without any or only limited boom movement. An obvious advantage is that the hoist makes it possible to handle loads far below ground level. Lifting and lowering are achieved by winding/ unwinding the rope. A number of auxiliary components are needed, such as intermediate pulleys and a hook pulley. As an option, a snatch block can be installed to multiply the lifting capacity.

The operator should take care during hoist operation that the rope is not pulled off the drum completely. The hoist control system is fitted with an automatic system to prevent that. Three or five safety windings will always remain on the drum.



## DANGER

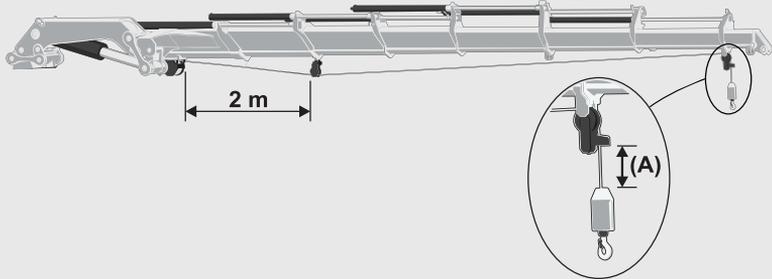
- Watch out for hazards!
- Always stay clear of the rope, top-roller and the counterweight when operating the hoist.



## WARNING

### During operation:

- When using the hoist, follow the instructions carefully!
- The counterweight should not touch the top-roller. As a safety measure, distance (A) between them should preferably not be less than a visible gap, to allow getting out of an overload situation and avoid unnecessary stresses in the boom system.



- When working with the extensions retracted, keep a minimum distance of 2m between the hoist and the rope guide on the first extension. This to avoid incorrect winding of the rope onto the drum.

## 2.5. Lifting loads with hoist



## DANGER

- Use only Hiab original ropes or a rope that meets Hiab's specifications.
- Check and clean hoist rope regularly but not using high pressure fluid jets neither steam jets.
- Replace the rope if it is damaged.
- Always use safety gloves when handling ropes or slings.
- Never guide a moving rope with your hands!

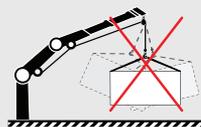


**WARNING**

- Make sure that ropes do not touch or slide over corners, cutting edges or other obstacles.

**WARNING**

- Rope connections, bushings, press heads, short splices, etc. must not be run through the top roller.

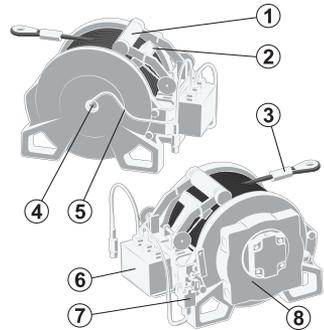


## 3. Structure and parts of hoist

### 3.1. Hoist Components

The Hoist consists of the following components:

- (1) Pressure roller
- (2) Wear pad (for rope-end-monitoring)
- (3) Rope
- (4) Load sensor
- (5) Cable (to load sensor)
- (6) Electronic box
- (7) Switch (for rope-end-monitoring)
- (8) Motor

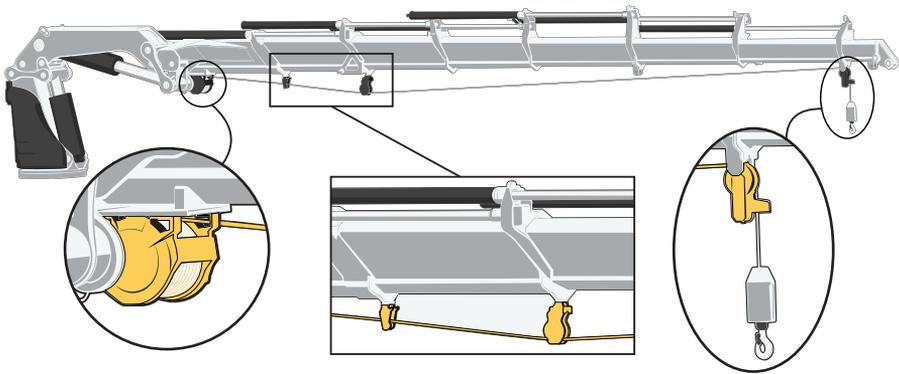


## 4. Operation

### 4.1. General operation

The hoist is an optional crane component which permits load handling without any or only limited boom movement. An obvious advantage is that the hoist makes it possible to handle loads far below ground level.

Lifting and lowering is achieved by winding/unwinding the rope. A number of auxiliary components are needed, such as intermediate pulleys and a hook pulley. As an option, a snatch block can be installed to multiply the lifting capacity.

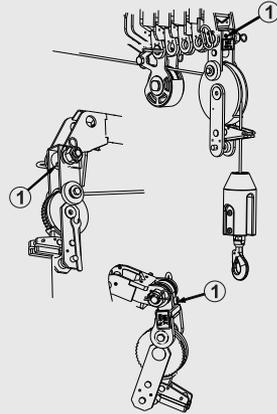


Follow the operating instructions for hoist and crane, containing the safety recommendations, as well as the safety instructions.



## WARNING

To prevent damage to the extension and the link, make sure the link is correctly fitted. There are different kinds of links on different cranes. Always fit the links with the grease nipple (1) pointing forward.

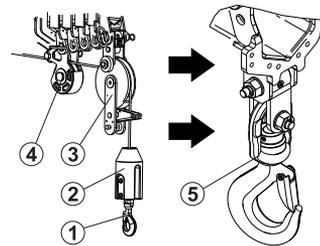


## DANGER

Before operation always check that the rope is correct guided through the pulley/s.

## 4.2. Before operating the crane into transport position if you have the hoist

1. Remove from the tip of the crane/JIB:
  - (1) The hook for hoist application.
  - (2) The counterweight
  - (3) The top roller
2. Remove other additional pulleys (4) that can cause damages during the operation.
3. Install the crane hook (5) on the tip of the crane/JIB before operating the crane into transport position.

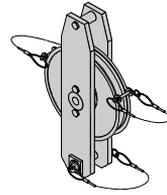


## NOTE

For integrated pulleys, refer to your crane/JIB operator's manual for more information.

### 4.3. Snatch block [option]

The hoisting force of the hoist can be doubled by using a snatch block.



#### CAUTION

Snatch block is not available for all crane configurations. Check the compatibility in the operator's manual of your crane.

If you are not sure how to use the snatch block, contact an authorised service workshop.

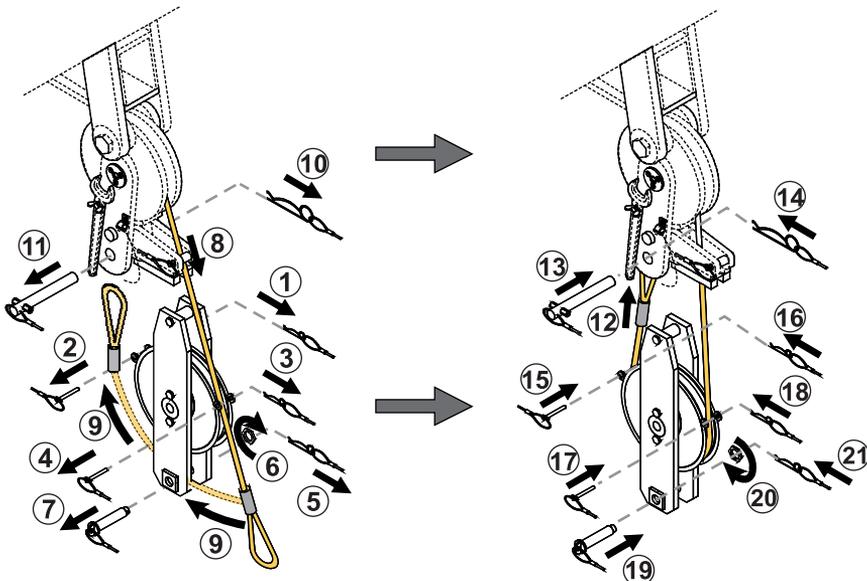


#### DANGER

Make sure that the snatch block is permitted in the configuration of your crane. If not, you can cause injury or serious damage to the crane.

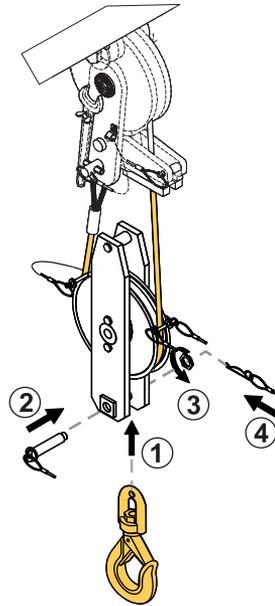
#### Guide the rope through the snatch block.

Follow the instructions in the order 1-21.



### Install the hook in the snatch block.

Follow the instructions in the order 1-4.

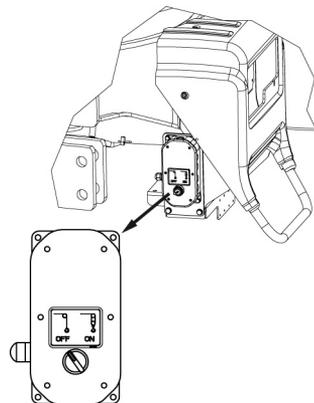


#### 4.3.1. Snatch block selector [option]

There is a selector box where you have to select if you want to work with or without snatch block.

- Key switch OFF: the hoist works without snatch block.
- Key switch ON: the hoist works with snatch block.

If you use the snatch block (with the snatch block switch activated), the hoisting capacity will be automatically adjusted for safe crane operation.

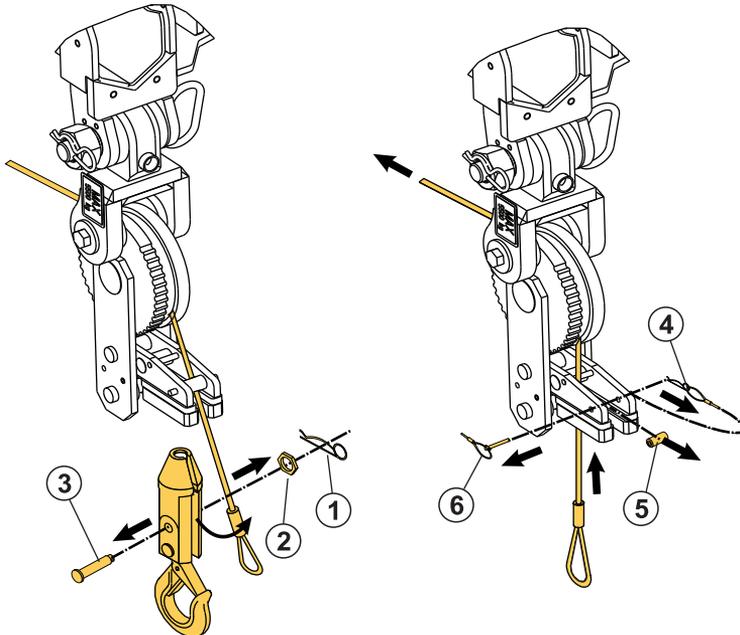


#### NOTE

When starting to work without snatch block, first turn the key to ON position and then to OFF position.

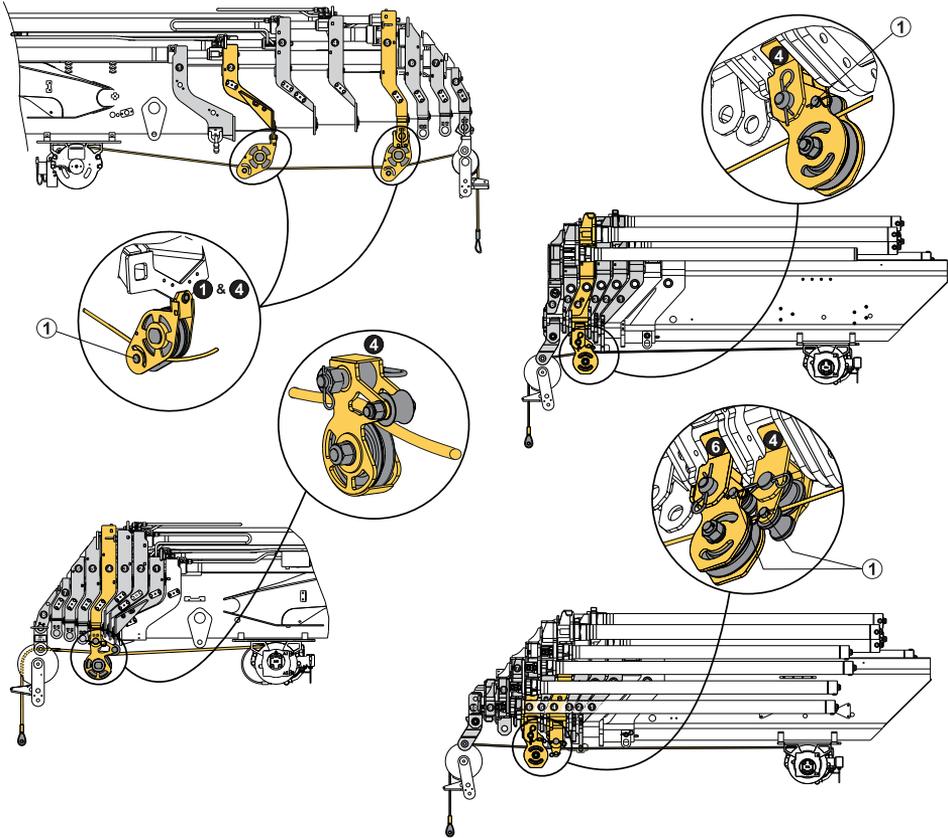
## 5. Change from hoist to hook operation

### 5.1. How to change from hoist to hook operation



1. Remove the counterweight:
  - a. Remove the locking pin (1), the nut (2) and the pin (3).
  - b. Release the rope.
2. Remove the rope from the top roller:
  - a. Remove the locking pin (4), the roller (5) and the securing pin (6).
  - b. Pass the rope through the top roller.

3. Remove the rope from the intermediate pulleys and rope guides:
  - a. Remove necessary components (locking pins, clevis pins, rollers...) to pass the rope (1).
  - b. Install them again.



This picture shows some examples of intermediate pulleys and rope guides in different crane configuration with hoist.



#### NOTE

How to remove the rope depends on the crane model. The design and the number of intermediate pulleys and rope guides depend on how many extensions the crane has.



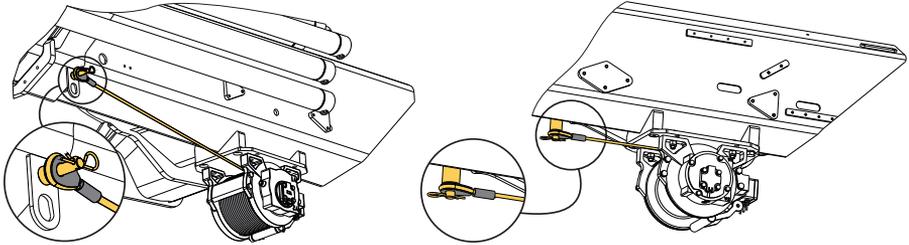
#### NOTE

Intermediate pulley on the 6th extension exists only for crane configurations with more than 8 extensions.

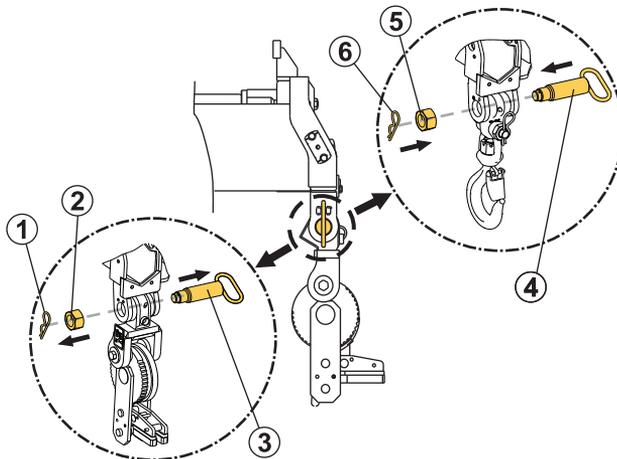

**NOTE**

For cranes with JIB, refer to the JIB Operator's manual for more detailed information about how to remove the rope.

4. Put the rope end in the 2nd boom support, and then tighten the rope lightly.



5. Remove the intermediate pulleys (if needed).
6. Remove the top roller and fit the hook:



- a. Remove the locking pins (1), the nuts (2) and the shaft (3).
- b. Put the hook and the shaft (4) in place.
- c. Tighten the nut (5).
- d. Secure with the locking pin (6).

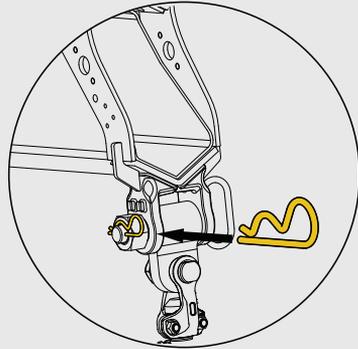

**WARNING**

To prevent injury, hold the top roller firmly in your hand while you remove it.

**WARNING**

Always insert the locking pin in the shaft for all the attachments on the tip of the crane (hook, top-roller, pulleys...).

Do it in the same direction as shown in the picture.

**WARNING**

If you attach/detach equipment to/from the tip of the crane and the boom system is not in horizontal position, stay away to avoid getting caught between the boom extensions as it is normal that they can move towards each other.

## 6. Displacing the hoist

### 6.1. Displacing the hoist manually



#### WARNING

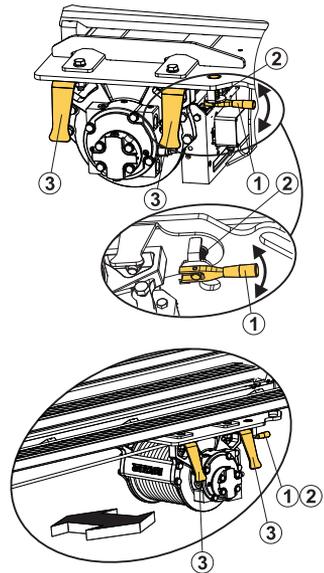
The hoist must work in line with the pulleys.

To displace the hoist from the outside position to the central position:

1. Turn 90° clockwise the lever (1), then the shaft (2) is unlocked.
2. Push the hoist to the central position with the handles (3).
3. Turn 90° counterclockwise the lever (1), to lock the shaft (2).

To displace the hoist from the central position to the outside position:

1. Turn 90° clockwise the lever (1), then the shaft (2) is unlocked.
2. Pull the hoist to the outside position with the handles (3).
3. Turn 90° counterclockwise the lever (1), to lock the shaft (2).

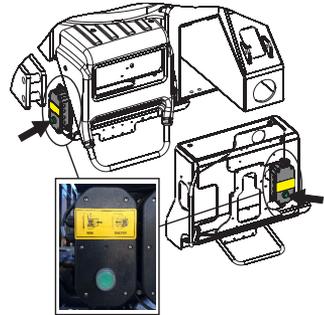


#### DANGER

Before lifting load with the hoist, be sure that the hoist is locked with the lever (1) in working position.

## 6.2. Displacing the hoist with the hoist switch box

The hoist must work in its central position.



### DANGER

Before lifting load with the hoist, be sure that the hoist is in working position.

**To displace the hoist from the outside position to the central position (A):**

- Press the button while the hoist moves to the central position (working position).

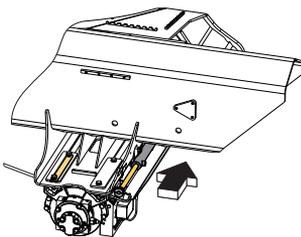


### WARNING

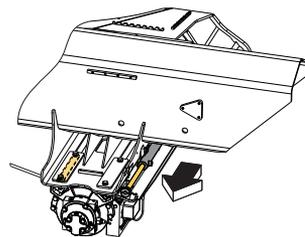
To operate the crane to parking position when it has JIB and hoist, the hoist must be placed in the outside position.

**To displace the hoist from the central position to the outside position (B):**

- Press the button while the hoist moves to the outside position (transport position).



(A)



(B)

## 6.3. Displacing the hoist with the XSDrive

The hoist must work in its central position.

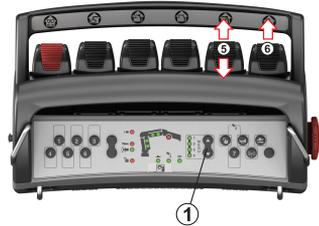

**DANGER**

Before lifting load with the hoist, be sure that the hoist is in working position.

Press the crane menu button (1) to go to crane menu 2.

**To displace the hoist from the outside position to the central position (A):**

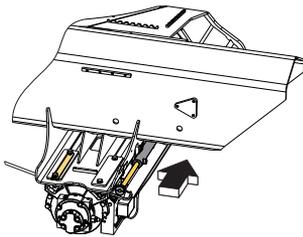
1. Keep the 6th lever forward.
2. Move the hoist to the central position (working position) with the 5th lever forward.


**WARNING**

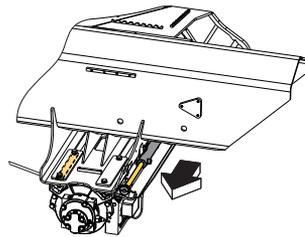
To operate the crane to parking position when it has JIB and hoist, the hoist must be placed in the outside position.

**To displace the hoist from the central position to the outside position (B):**

1. Keep the 6th lever forward.
2. Move the hoist to the outside position (transport position) with the 5th lever backward.



(A)



(B)

## 6.4. Displacing the hoist with the CombiDrive

The hoist must work in its central position.

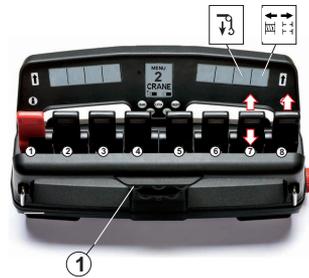

**DANGER**

Before lifting load with the hoist, be sure that the hoist is in working position.

Press the crane menu button (1) to go to crane menu 2.

**To displace the hoist from the outside position to the central position (A):**

1. Keep the 8th lever forward.
2. Move the hoist to the central position (working position) with the 7th lever forward.

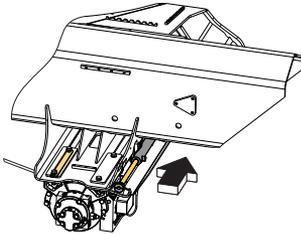


**WARNING**

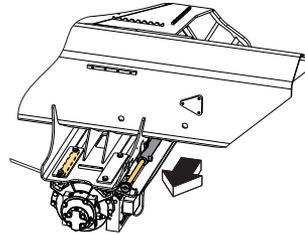
To operate the crane to parking position when it has JIB and hoist, the hoist must be placed in the outside position.

**To displace the hoist from the central position to the outside position (B):**

1. Keep the 8th lever forward.
2. Move the hoist to the outside position (transport position) with the 7th lever backward.



(A)



(B)

## 7. Maintenance and service

### 7.1. Gear oil

Before delivery, the TC/TI hoists were filled with a usual gear oil (SAE 80W-90-API-GL5).

For maintenance intervals respectively change and control the gear oil (see Regular maintenance and works).

If an oil leakage occur or if a gear repair is necessary, fill up the oil.



#### **WARNING**

**The gear oil must not be mixed with synthetic oil.**

#### 7.1.1. Gear oil specification

specification	SAE 80W-90
military specification	API- GL 5
specific weight at 15°C [g/ml]	0.90
viscosity at 40°C [mm <sup>2</sup> /s]	92
viscosity at 100°C [mm <sup>2</sup> /s]	11
pour-point [°C]	-27
flash point [°C]	+240

#### 7.1.2. Hydraulic oil

Recommended Hydraulic Oil, see Crane Operator's Manual

## 7.2. Rope maintenance material



#### **CAUTION**

**For the maintenance of the rope, do not use motor oil, machine oil or grease.**

As rope maintenance material, which has to be applied after each wet cleaning, we recommend a wire rope spray lubricant. This lubricant is especially easy in use and penetrates deeply into the rope layers due to its creeping ability.

### 7.3. Hoist maintenance plan

Interval	Action	Operating material
<b>Daily</b>	Visual and acoustic check of the complete hoist system for abnormal operation and noises.	
	Visual control of the rope*	
	Visual control of leaks	
<b>When required</b>	Cleaning of rope	Clear water and brush
	Rope care	Wire rope spray lubricant
	Change of rope**	New rope
<b>Monthly</b>	Check of the fixing elements	
	Visual control of pressure roller	New pressure roller
	Gear oil control***	Gear oil SAE 80W-90
<b>After first 100 operating hours, latest after 6 months</b>	First change of gear oil****	Gear oil SAE 80W-90
<b>TC: After 1000 operating hours, latest after 1 year</b> <b>TI: After 300 operating hours, latest after 2 years</b>	Change of gear oil	Gear oil SAE 80W-90
<b>Yearly</b>	Check of the braking system	
	Complete hoist system check	

\* When the rope must be discarded, (see Check rope)

\*\* Use an original rope (see Change of rope)

\*\*\* You have to find out reason which leads to a loss of oil and the repair has to be done by experts.

\*\*\*\* Replace it in during the crane 1st SERVICE after 50 hours.

### 7.4. Check-up of the braking system

At the regular check-up of the crane a test load has to be lifted near to the ground and the energy supply of the hoisting hoist has to be switched off (switch off drive motor). Checking time approx. 5 minutes. The load must not sink in this condition. If the load sink, finish the operation and contact an authorized service workshop.

### 7.5. Oil level checking

**Recommended oil:**

Use a hypoid oil, type API GL-5, SAE J2360 (Formerly MIL-L-2105), viscosity SAE-80W-90, cleanliness NAS 1638:8.

For example: "ENI ROTRA MP 80W-90", "SHELL SPIRAX S2 A 80W/90" or equivalent quality.



### CAUTION

The oil used for filling must be clean. Do not mix different oils. In general, a mixture will change the oil properties.

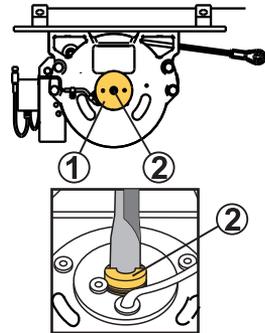
#### Supplier recommendation:

Carry out gear oil control every 3 months.

However, if an oil leakage occurs or a gear repair is necessary, top up the hoist gear with oil.

#### Procedure

1. The hoist must be in horizontal position.
2. Stop the crane and switch off.
3. Remove plate (1).
4. Remove screw (2) and check if oil is leaking out.
  - a. If the oil flows from the opening, proceed as described in the next step.
  - b. If the oil is too low, proceed as described under "Oil filling / Top up or oil replacement procedures".
5. Tighten screw (2) when oil level is OK.
6. Mount plate (1) again.



## 7.6. Oil filling, top up and replacement procedures

#### Supplier recommendation:



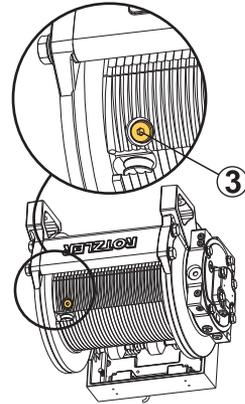
### NOTE

The replacement of the oil must be done by an authorised service workshop according to:

- The first oil change must be done after the initial 100 hoist operating hours, at the latest after 6 months.
- For **TC series**: change of gear oil after 1000 operating hours, at the latest 1 year.
- For the **TI series**: change of gear oil every 300 operating hours, no longer than 2 years.

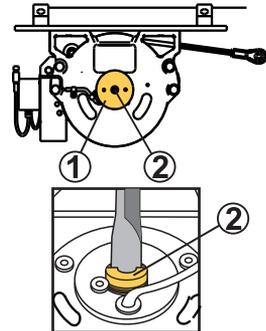
### Drain off the oil

1. Make sure that the gear oil is warm. If necessary, heat up by reeling in and out a number of times.
2. Reel out the rope so much that you get access to opening (3).
3. Place an oil container under the drum and remove screw (3).
4. Turn the drum until the opening is at the underside.
5. Drain all oil. Discard according to local procedures.



### Oil filling, top up

1. Remove plate (1) and screw (2).
2. Turn the drum so opening (3) is above the centre line.
3. Fill the drum with oil until it starts leaking out of the opening at the side (content approx 1.2 - 1.4 liters).
4. Mount both screws and the plate again.
5. Reel in the rope.



### Gear oil quantity in the drum:

TC1 = 0.5 l	TC2 = 0.6* l	TC2L = 1.25* l	TC3 = 2.3 l	TC5 = 3.5 l
TI1 = 0.5 l	TI2 = 0.7 l	TI2L = 1.4 l	TI4 = 2.5 l	TI5 = 3.5 l
* +0.1 l if hoist has No. 400000...xxx				



### TIP

These filling amount can be less than the indicated filling amount, since oil remains in the hoist.

## 7.7. Check rope



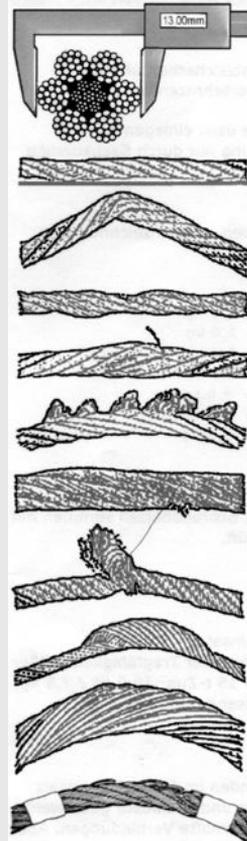
### WARNING

As ropes undergo very heavy strain and are not of permanent durability, it is important for the safety of the hoist system and like this for their operating personnel, to carry out a thorough check-up and to renew the rope in time.

After every use the rope has to be checked for damage according to the national regulations of the country of application.

Various types of damage are illustrated on the right that indicate when the rope needs to be replaced:

- Reduction of rope nominal diameter by more than 10%
- Corkscrew-type deformation
- Kinked rope
- Contracted rope
- Flattening rope
- Loop formation of wires on the rope
- Knots on the rope
- Splicing on the rope
- Basket formation on the rope
- Loose wires in the rope
- Individual wire breakages.



### WARNING

A rope has to be discarded, when there are:

- 2 ruptures on a length of  $6 \times d$ , or
- 4 ruptures on a length of  $30 \times d$ , for ropes diameter  $d(\varnothing) = 7, 8, 10$  mm, or
- 5 ruptures on a length of  $30 \times d$ , for ropes diameter  $d(\varnothing) = 12, 14, 16$  mm.

These are the number of ruptures in the outer layers according to DIN 15020; ISO 4309.

### 7.7.1. Clean the hoist rope

If the rope is extremely dirty:

1. Unwind the rope until the end.
2. Clean the rope with clear water and a brush.
3. Let the rope dry.
4. After each wet cleaning, lubricate the rope.



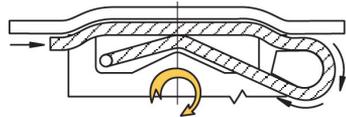
#### NOTE

Do not clean the rope with steam jet blower or high pressure cleaner.

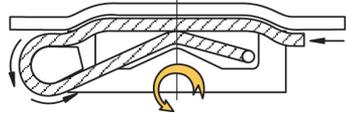
### 7.7.2. Course and requirements of the rope

Depending on the direction of rotation of the hoist (CW or CC) it has to be noted, from which side the rope is directed into the rope inlet.

Course of the rope CW (clockwise)



Course of the rope CC (counter clockwise)



## Rope requirements

For the hoists we recommend a rotating resistant rope, cross lay to the right. Always use HIAB original rope or a rope that meets Hiab's specifications.

hoist type	rope Ø (mm)	possible hoisting force (kN)		
		1st layer	4th layer	5th layer
TC1	8	11.5	9.5	-
TC2/TC2L	10	24	18	-
TC3	14 (12)	39 (39)	30 (xx)	-
TC5	14 (16)	54 (54)	43 (xx)	-
TI1	8	12.5	10	9.5
TI2	10	26	20	19
TI2L	10	26	20	-
TI4	13	45	35	33
TI5	-	-	-	-



### NOTE

When choosing a rope under all circumstances the standards of the country of the user have to be noted.

This applies especially for the permitted loading of the rope.

## 7.8. Change of rope



### NOTE

Always use Hiab original rope or a rope that meets supplier's specifications.



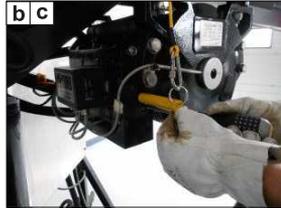
### WARNING

- Incorrect installation of the rope may allow the load to drop down, causing material damage, severe injury or even death.
- Always wear protective gloves when handling a hoist rope.
- Carry out the procedure with two persons.
- During hoist movements, keep at least 2 m distance from the hoist drum.
- Make sure to keep your fingers and clothing out of the way of the moving hoist parts.

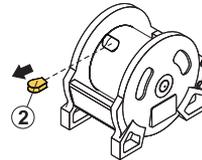
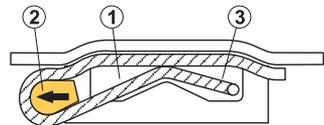
### Old rope has to be discarded

1. Activate the emergency stop button on your crane.
2. Keep the roller, which is connected with the rope end switch, disengaged.

- a. Insert a screwdriver in the lower hole behind the hoist drum.
- b. Push the screwdriver to the right, and the roller will be moved forward.
- c. Press in a pin or a new screwdriver to keep the roller in place.
- d. Keep the hoist end rope switch in override position.



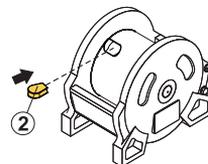
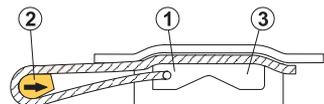
- 3.
4. Guide the rope out of the rope guide/s and top-roller.
5. Release the emergency stop button on your crane.
6. Unwind the rope **without load**, until the last 3 or 5 safety windings are left.
  - Wind the old rope around an empty drum.
  - Or place it on the floor in the shape of an eight figure (a left turn followed by a right turn, etc.) to prevent loops and tangling.
7. When there are 3 or 5 windings remaining on the hoist drum, turn the hoist drum slowly until you have access to the rope pocket (1).
8. Activate the emergency stop button on your crane.
9. Detach the rope wedge (2) in the direction of the arrow. Refer to the sign placed on the hoist.
10. Pull out the old rope from the rope inlet (3) and remove it from the drum.
11. Discard the rope.



### Install a new rope

1. Prepare the positioning of the rope to ensure that it does not twist or form loops during the installation.
2. Make sure that the hoist end rope switch keeps in override position.
3. Activate the emergency stop button on your crane.
4. Guide the smooth end of the new rope through the top-roller and the rope guide/s.
5. Guide the rope end through the inlet (3). Insert rope around rope wedge (2) as indicated and insert both in the cast-in pocket (1) in the direction of the arrow.
 

**Make sure that the rope with rope wedge are perfectly clamped in the rope pocket.**
6. Release the emergency stop button on your crane.
7. Spool on the rope. Keep it tensioned as much as possible, to ensure that the rope is spooled flat and tight on the drum.
  - The first layer should follow the grooves on the drum. The following layers are wound similarly.



- Constantly verify visually that the rope is wound correctly on the drum.
  - Stop and correct if needed.
8. Activate the emergency stop button on your crane.
  9. Remove the pin or the screwdriver from the roller to keep the hoist end rope switch active again.
  10. Release the emergency stop button on your crane.
  11. After the replacement, unwind the rope completely (with counterweight) and wind it again.
    - In order to achieve a high spooling quality and durability the rope always has to be spooled on with a minimum hook load according to the following table.

<b>Hoist type</b>	<b>Minimum load</b>
TC1 / TI1	40 - 80 kg
TC2 / TC2L / TI2 / TI2L	70 - 140 kg
TC3 / TI4	150 - 300 kg
TC5 / TI5	200 - 400 kg
<b>As a basic rule we recommend ~ 5% of the hoist load capacity.</b>	

- Make sure that the rope spools up on the hoist drum and that the end rope switch are working properly.

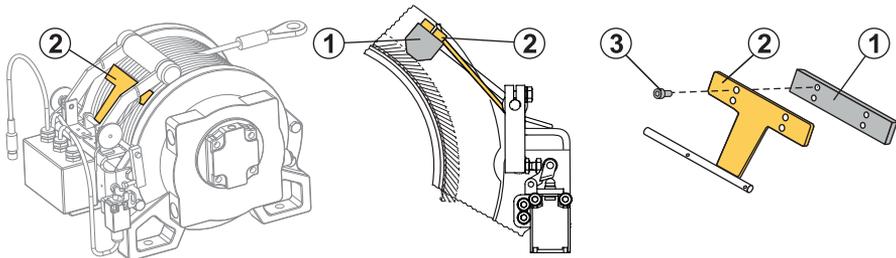
## 7.9. Maintenance and monitoring of rope end

### Inspection of the wear pad



#### CAUTION

In order to prevent possible damage to the rope, the wear pad (1) must be replaced, before metal of the clamp (2) or the screws (3) become visible.



It is recommended to inspect the wear pad at least every 6 months.

Under following conditions it is necessary to inspect wearing parts more often than the normal maintenance inspection:

- intensive use
- mainly operation on the top rope layer
- rough environmental conditions (sand, dust, etc.)

### Changing of the wear pad

Remove the screws (3) and the wear pad (1) from the clamp (2). Fit the new wear pad and secure with the screws (3).

## 7.10. Lubrication

### General greasing of the cranes

Incorrect or insufficient lubrication of a crane is the number one cause of premature failure.



#### WARNING

Before and after a long stop of the crane, lubrication is absolutely necessary. This is especially important after a winter shutdown.



#### WARNING

Follow the lubrication schedule exactly. If you do not do so, you can cause serious damage to the crane, interchangeable equipment and/or optional crane component.

Procedure:

1. Shut down the crane.
2. Make sure that all the lubrication points are clean before lubricating. Dirt can damage the parts.
3. Lubricate all points in each section.
4. Operate the crane through the full cycle for each section. Moving the lubricated parts is really important to get the full and correct lubrication of all moving components.
5. Shut down the crane and repeat the lubrication.
6. Lubrication is finished when the grease spills out from the ends. Clean the excess grease.

**WARNING**

Personnel should never attempt to work on a crane that is moving. Serious injury or death will occur if you try to work on an activated/moving crane.

**CAUTION**

When you use pressure grease pumps, open the plastic safety guard of the nipple and close it at the end.

**Greases**

Use lithium-based grease containing EP additives (consistencies 2 and 3 are recommended, depending on the climate).

**CAUTION**

Do NOT grease with graphite or molybdenum-disulphide additives.

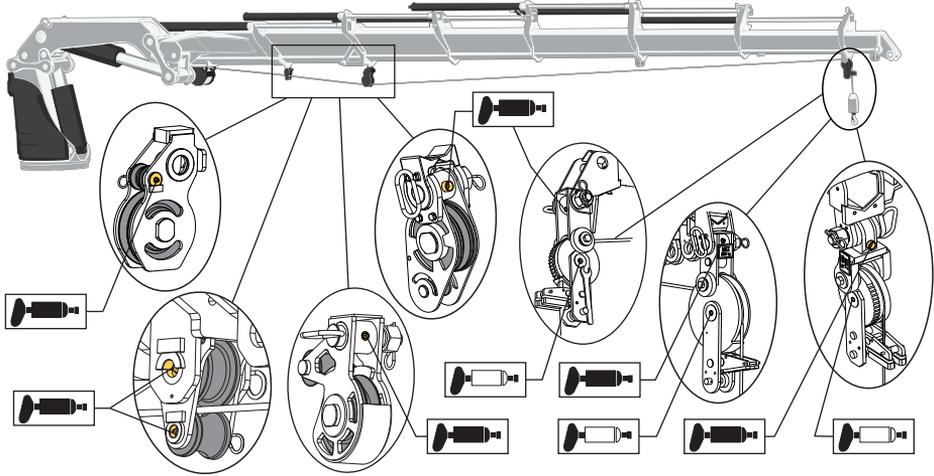
**Recommended greases:**

BP LS EP 2, ESSO UNIWAY EP2 N, AGIP GR MU/EP3, NYNÄS UNIFETT EP.

**Alternative:**

Use a Teflon grease spray to lubricate the extensions and mobile parts.

### 7.10.1. Lubrication of intermediate pulleys, rope guides and top roller



	Lubricate after every 16 hours of use.
	Lubricate every 3 months. If the hoist is used less frequently than 3 months, lubricate before every use.

## 7.11. Faults in the hoist

Faults in the hoist must be rectified immediately.



### DANGER

- Only correct yourself the faults that according to the table you may rectify.
- Follow the instructions exactly!
- All other faults may be dealt with only by personnel in an authorised service workshop!

Symptom	Probable cause	Action
Hoist will not hoist/pull rated load.	Inadequate hydraulic system supply pressure.	Verify hydraulic system supply pressure and correct as required.
	Damaged hoist motor.	Go to an authorised service workshop to have the motor replaced.
	Hoist center line is distorted due to uneven mounting surface.	Contact an authorised service workshop.
	Binding load carrying sheaves.	Inspect and repair or lubricate sheaves as required.
Hoist will not turn at rated speed.	Inadequate hydraulic system supply volume.	Verify hydraulic system supply volume and correct as required.
	Damaged hoist motor.	Go to an authorised service workshop to have the motor replaced.
	Hoist center line is distorted due to uneven mounting surface.	Contact an authorised service workshop.
	Binding load carrying sheaves.	Inspect and repair or lubricate sheaves as required.
Hoist will not hold the load.	The rope is wound onto the drum in the wrong direction.	Spool rope according to section in this manual: Course and requirements of the rope.
	Clutch assembly is damaged.	Verify and replace as required.
	Brake Friction or Separator Plates are worn or damaged.	Verify and replace as required.

## 8. Technical data

### 8.1. Type plate

9055N4000 Seildurchmesser rope diameter <input type="text"/> mm Seillänge rope length <input type="text"/> m Verhältnis D/d relation D/d <input type="text"/> Triebwerkgruppe class of mechanism <input type="text"/> max. Zugkraft 1. Lage max. pulling force 1. layer <input type="text"/> kN Nennzugkraft 1. Lage rated line pull 1. layer <input type="text"/> kN min. Bruchkraft min. breaking force <input type="text"/> kN für DIN 14584 geeignet ja <input type="checkbox"/> nein <input type="checkbox"/> according to DIN 14584 ROTZLER ROTZLER GmbH + Co. KG D-79688 Stettlen Ind. spez. techn. Daten	Bestell-Code order code <input type="text"/> Windentyp winch type <input type="text"/> Baujahr date of manuf. <input type="text"/> Fabr.-Nr. serial no. <input type="text"/> max. Belastung max. load <input type="text"/> kN max. Nennbelastung max. rated load <input type="text"/> kN Seilbefestigung geeignet für Seildurchmesser von <input type="text"/> bis <input type="text"/> mm rope attachment according to rope diameter from <input type="text"/> to <input type="text"/> mm	ID Code <input type="text"/> Type <input type="text"/> Rated load <input type="text"/> kN Rated speed <input type="text"/> Class of mechanism <input type="text"/> ENGINEERED IN GERMANY Serial no. <input type="text"/> Year of manufacture <input type="text"/> (Please date, too later, which only rope not considered) ROTZLER ROTZLER Deutschland GmbH + Co. KG 79688 Stettlen, GERMANY Refer to owner's manual
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#### NOTE

You will find the technical data on the type plate on your hoist.  
 These data are very important, and necessary for operation.

### 8.2. Theoretical using time Hoist

Drive group	M3
class of operating time	T3
theoretical using time (years)	12.8 - 6.4
at an average, daily operat. time (h)	0.5 - 1.0
calc. total operating time (h)	1600
load spectrum	L2
hours of full line pull (h)	400



#### CAUTION

Hoist systems have to undergo a general repair/service after the end of the theoretical using time.



#### CAUTION

In the country of application, the national regulations which are individually valid for hoisting and pulling units, have to be followed.

## 8.3. Hoists TC1 / TC2 / TC2L / TC3 / TC5

### 8.3.1. Performance Data TC1, rope capacity

Rope diameter 8 mm

Rope capacity according to DIN 15020 Grooved drum	Rope layer			
	1	2	3	4
Max. hoisting force [kN]	11.5	11	10	9.5
Rope length in m/layer, rope diameter 8 mm	10	12	12	13 (4*)
Total rope length [m]	10	22	34	47 (38*)
Weight in kg (ca): <sup>1)</sup> hoist <sup>2)</sup> hoist + rope	<sup>1)</sup> 54 <sup>2)</sup> 64			
Max. oil flow [l/min]	40			
Noise level [dBA]	83			

(\*) rope length 38 m

### 8.3.2. Performance Data TC2, rope capacity

Rope diameter 10 mm

Rope capacity according to DIN 15020 Grooved drum	Rope layer			
	1	2	3	4
Max. hoisting force [kN]	24	21	20	18
Rope length in m/layer, rope diameter 10 mm	10	12	13	14
Total rope length [m]	10	22	35	49
Weight in kg (ca): <sup>1)</sup> hoist <sup>2)</sup> hoist + rope	<sup>1)</sup> 76 <sup>2)</sup> 98			
Max. oil flow [l/min]	97			
Noise level [dBA]	90			

### 8.3.3. Performance Data TC2L, rope capacity

#### Rope diameter 10 mm

Rope capacity according to DIN 15020 Grooved drum	Rope layer			
	1	2	3	4
Max. hoisting force [kN]	24	21	20	18
Rope length in m/layer, rope diameter 10 mm	15	17	18	19
Total rope length [m]	15	32	50	69
Weight in kg (ca): <sup>1)</sup> hoist <sup>2)</sup> hoist + rope	1)98 2)129			
Max. oil flow [l/min]	97			
Noise level [dBA]	90			

### 8.3.4. Performance Data TC3, rope capacity

#### Rope diameter 12 mm

Rope capacity according to DIN 15020 Grooved drum	Rope layer		
	1	2	3
Max. hoisting force [kN]	39	36	33
Rope length in m/layer, rope diameter 12 mm	23	24	23
Total rope length [m]	23	47	70
Weight in [kg] (approx.): <sup>1)</sup> hoist <sup>2)</sup> hoist + rope	1)191 2)248		
Max. oil flow [l/min]	100		
Noise level [dBA]	91		

#### Rope diameter 14 mm

Rope capacity according to DIN 15020 Grooved drum	Rope layer			
	1	2	3	4
Max. hoisting force [kN]	39	35	33	30
Rope length in m/layer, rope diameter 14 mm	14	16	17	18
Total rope length [m]	14	30	47	65
Weight in kg (ca): <sup>1)</sup> hoist <sup>2)</sup> hoist + rope	1)191 2)248			
Max. oil flow [l/min]	100			
Noise level [dBA]	91			

### 8.3.5. Performance Data TC5, rope capacity

#### Rope diameter 14 mm

Rope capacity according to DIN 15020 Grooved drum	Rope layer			
	1	2	3	4
Max. hoisting force [kN]	54	50	46	43
Rope length in m/layer, rope diameter 14 mm	20	21	23	25
Total rope length [m]	20	41	64	89
Weight in kg (ca): <sup>1)</sup> hoist <sup>2)</sup> hoist + rope	<sup>1)</sup> 191 <sup>2)</sup> 276			
Max. oil flow [l/min]	120			
Noise level [dBA]	86			

#### Rope diameter 16 mm

Rope capacity according to DIN 15020 Grooved drum	Rope layer		
	1	2	3
Max. hoisting force [kN]	54	49	45
Rope length in m/layer, rope diameter 16 mm	17	18	20
Total rope length [m]	17	35	55
Weight in kg (ca): <sup>1)</sup> hoist <sup>2)</sup> hoist + rope	<sup>1)</sup> 191 <sup>2)</sup> 265		
Max. oil flow [l/min]	100		
Noise level [dBA]	86		

## 8.4. Hoists TI1 / TI2 / TI2L / TI4

### 8.4.1. Performance Data TI1, rope capacity

#### Rope diameter 8 mm

Data based on basic hoist without options	Rope layer				
	1	2	3	4	5
Max. hoisting force [kN]	12.5	11.5	10.5	10	9.5
Total rope length [m]	10	21	34	46 (38*)	60
Weight in [kg] (approx.): <sup>1)</sup> hoist <sup>2)</sup> hoist + rope	<sup>1)</sup> 53 <sup>2)</sup> 63				
Max. oil flow [l/min]	44				
Noise level [dBA]	88				

(\*) rope length 38 m

### 8.4.2. Performance Data TI2, rope capacity

#### Rope diameter 10 mm

Data based on basic hoist without options	Rope layer				
	1	2	3	4	5
Max. hoisting force [kN]	26	24	22	20	19
Total rope length [m]	10	22	34	48	62
Weight in [kg] (approx.): <sup>1)</sup> hoist <sup>2)</sup> hoist + rope	1) 74 2) 98				
Max. oil flow [l/min]	105				
Noise level [dBA]	88				

### 8.4.3. Performance Data TI2L, rope capacity

#### Rope diameter 10 mm

Data based on basic hoist without options	Rope layer			
	1	2	3	4
Max. hoisting force [kN]	24	21	20	18
Total rope length [m]	15	32	50	69
Weight in [kg] (approx.): <sup>1)</sup> hoist <sup>2)</sup> hoist + rope	1) 90 2) 123			
Max. oil flow [l/min]	100			
Noise level [dBA]	88			

#### 8.4.4. Performance Data TI4, rope capacity

##### Rope diameter 13 mm, length 68 m

Data based on basic hoist without options	Rope layer			
	1	2	3	4
Max. hoisting force [kN]	45	41	38	35
Total rope length [m]	15	31	49	68
Weight in [kg] (approx.): <sup>1)</sup> hoist <sup>2)</sup> hoist + rope	<sup>1)</sup> 182 <sup>2)</sup> 237			
Max. oil flow [l/min]	126			
Noise level [dBA]	91			

##### Rope diameter 13 mm, length 87 m

Data based on basic hoist without options	Rope layer				
	1	2	3	4	5
Max. hoisting force [kN]	45	41	38	35	33
Total rope length [m]	15	31	49	68	87
Weight in [kg] (approx.): <sup>1)</sup> hoist <sup>2)</sup> hoist + rope	<sup>1)</sup> 182 <sup>2)</sup> 237				
Max. oil flow [l/min]	126				
Noise level [dBA]	91				



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