



# User manual

## Ocean Enviro 4.6

OE-1050-A1-4-4.6-6-FS-002



**MANUFACTURER: SH Group**  
**CUSTOMER: EIVA**

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## 1 CONTACT INFORMATION

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### Statement Of Limited Liability

Extreme care should be exercised when operating or servicing this equipment. It should be operated or serviced only by qualified personnel with knowledge and training in the handling and maintenance of mechanical, hydraulic and electrical equipment.

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## 1.1 END USER

SH Group is constantly working to provide the best service to our customers. Therefore we kindly ask you to fill out a copy of this sheet and mail it to us. In the event that SH Group has to reach the specific user with product information it is important that we have the latest contact information.

Name: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Telephone: \_\_\_\_\_

\_\_\_\_\_

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E-Mail: \_\_\_\_\_

\_\_\_\_\_

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Please mail or E-Mail current contact information.

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## 2 SAFETY

Read this section before using the winch. Failure to follow the instructions and safety precautions in this manual can result in serious injury or death.

### 2.2 PRECAUTIONARY STATEMENTS

Each safety message in this section is defined by one of the following warning labels that inform the user of the severity of the hazard associated with the described condition. In addition, these warning labels will be found throughout this document in conjunction with operational procedures and descriptions of other conditions that have associated hazards. It is essential that all personnel associated with the operation and maintenance of this machinery read and understand the Safety section.



Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury, or property damage.



Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

## 2.3 EMERGENCY STOPS



Use the emergency stops if a situation demands that the winch has to be stopped immediately. All personnel should be instructed where they are located. There are emergency stops at the following locations:



Figur 2 Electrical cabinet located on winch



Figur 1 Remote control (option)

## 2.4 NORMAL OPERATIONS

**Before starting operations perform the following:**

- Perform a visual inspection of the winch.
- Confirm there are no personnel within the working area of the winch.



### **Electromagnetic Interference (EMI)**

Cardiac pacemakers are known to be susceptible to strong electromagnetic fields. The electromagnetic interference created by the dynamic braking process can constitute a mortal danger to users of implanted pacemakers.

### **Entrapment hazard**

The winch is equipped with multiple moving parts that may rotate in opposite directions and therefore constitute an entrapment hazard.

### **Material Safety**

Refer to section for information regarding the safe use and disposal of the products recommended by the manufacturer for the use and maintenance of the winch.

### **Personal Protective Equipment (PPE)**

Operating a winch or working near an operating winch is a hazardous environment. Adhere to the vessel's safety measures regarding personal protective equipment.

### **Operator**

Use a trained operator familiar with the winch operations. The operator should read and understand this manual before operating the winch.

### **Safe and controlled operation**

The winch is a complex machine that dispenses tremendous forces. These forces can be destructive to the winch itself. Continuous use of the winch at its maximum capacities can significantly reduce its performance and working life and create a dangerous hazard.



## 2.5 MAINTENANCE

### **CAUTION**

- Only certified electricians or qualified personnel should maintain or perform repairs to the electrical systems.
- Only certified hydraulic technicians or qualified personnel should maintain or perform repairs to the hydraulic systems.
- Only certified mechanics or qualified personnel should maintain or perform repairs to the mechanical systems.
- To maintain the warranty for the full warranty period, parts must be replaced with OEM equipment specified in this document or by SH Group.

### **DANGER**

- Do not make repairs while the winch is in operation.
- Electrical maintenance and repairs must only be performed with the power disconnected at the circuit breakers at the Power Supply Cabinet.

### 3 RESTRICTIONS



#### 3.6 INTENDED USE OF THE WINCH

The winch is a single drum electrical winch for the specific purpose of lifting and deploying of oceanographic and hydrographic equipment .

#### 3.7 UNINTENDED USE OF THE WINCH

The winch must not be subjected to loads or functional demands exceeding those of section 4 “Winch basic specifications”, Mechanical, hydraulic and electrical modifications may only be made to the winch with the prior written consent of SH Group. Unauthorized modifications will unconditionally void the warranty and SH Group disclaims responsibility for the functionality and safety of the winch, as it may no longer meet the applicable directives.

#### 3.8 REQUIREMENTS FOR THE OPERATOR

The operator must read and understand this manual thoroughly before using the winch and furthermore be trained in handling the winch. SH Group offers a training program if this is needed. Refer to the Contact Information at the front of this document.

#### 3.9 REQUIREMENTS FOR OTHER PERSONNEL

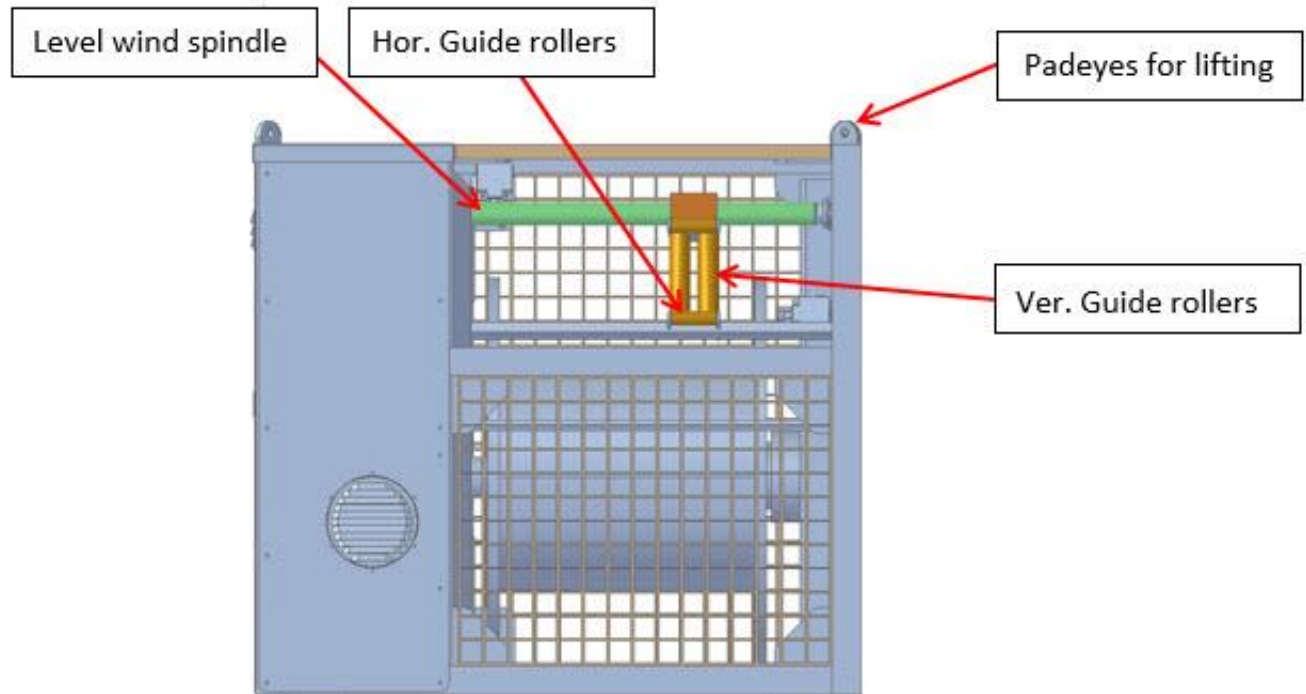
Personnel performing repairs and maintenance on the winch and personnel working in close proximity to the winch must read and understand section 2 Safety.

## 4 WINCH BASIC SPECIFICATION

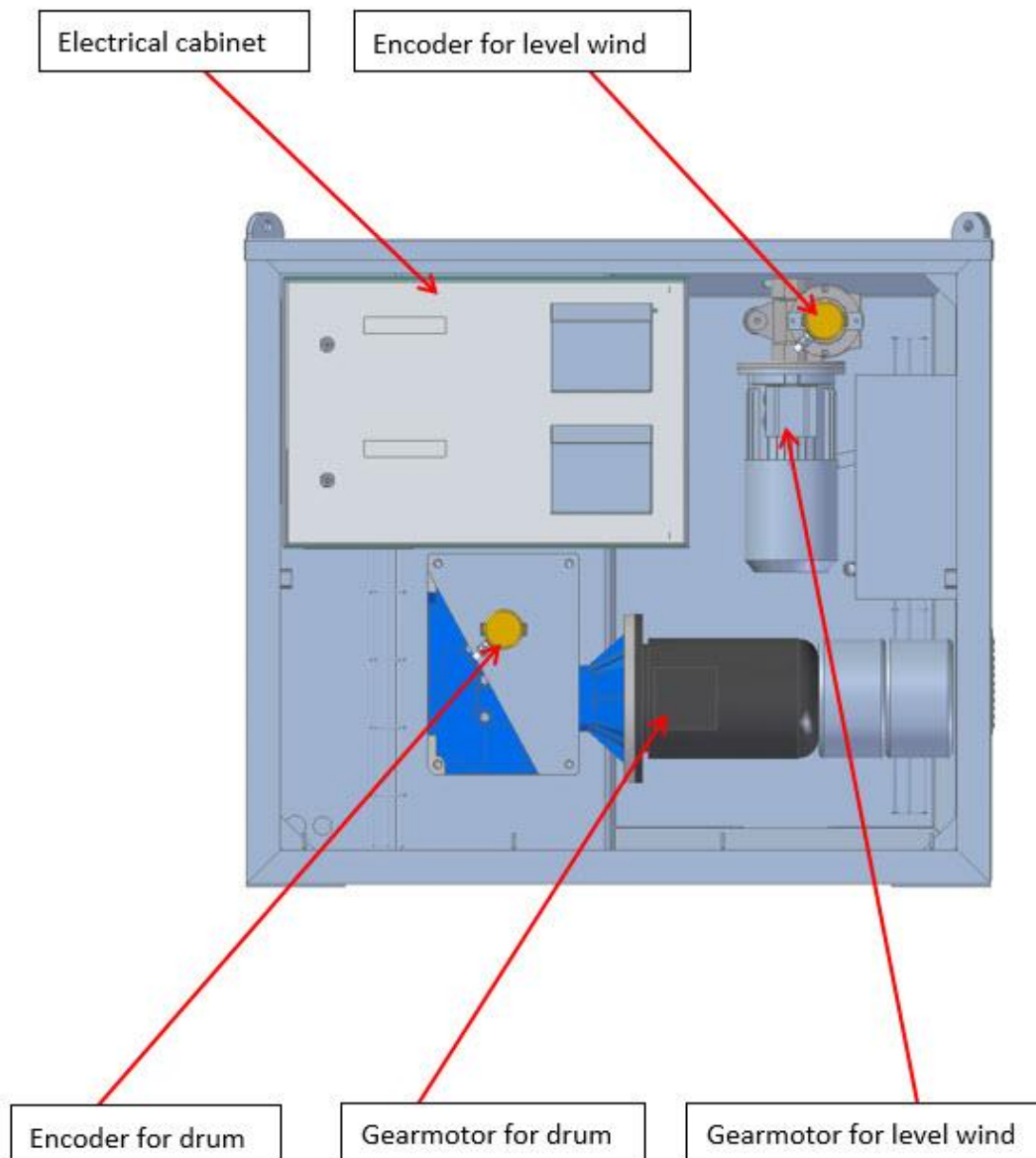
**Type:** Ocean Enviro 4.6

<b>Performance:</b>	Line pull 1 layer standard (SWL)	6 KN.
	Speed 1 layer @ 50Hz	28 m/min
	Speed 1 layer @ 60Hz	32 m/min
	Motor size	4/4,6 kW
	Voltage level	400/440 V – 50/60Hz
	Line pull 1 layer High speed (SWL)	3,2 KN
	Speed 1 layer @ 50Hz	58 m/min
	Speed 1 layer @ 60Hz	66 m/min
	Motor size	4/4.6 KW
	Voltage level	400/440 V – 50/60Hz
<b>Overall Dimension:</b>	Width.	1100 mm
	Depth.	1250 mm
	Height excl. sea fastening brackets.	1195mm
<b>Drum:</b>	Diameter	400 mm
	Flange diameter	700 mm
	Length.	443 mm
	Excl. umbilical an slip ring	550 kg
<b>Weight approx.:</b>		
<b>Level wind:</b>	Direct driven	Electrical

## 4.10 OVERVIEW



Figur 3-Winch seen from umbilical side



Figur 4- Winch seen from left side

## 5 DESCRIPTION OF PRODUCT

The drum is mounted directly onto a Bevel helical gearbox and is mounted with an electric asynchronous motor, which is controlled by a frequency converter. The motor has a built in electric disc brake. The drive motor has a thermostat to protect the windings. It will trip the motor if winding temperature exceeds 140°C. The motor also has a cooling fan that activates and deactivates as required.

When the winch pays out umbilical, the motor acts as a generator and produces electric power. The power generated by the winch is burned off in the “brake resistor bank”.

During lowering of a load or deceleration, the frequency converter sends the current to the brake resistors, burning off the energy.

The winch has 3 basic working modes on which all functions are based.

- 1) Local mode
- 2) Remote mode (option)
- 3) PC mode (option)

### 5.11 LOCAL MODE

In local mode, the winch is controlled manually and can only be operated from the main control panel. Use the “Pay In/Out” button to pull the load in or out. Use the “Speed Control” button to adjust the speed of the load.

### 5.12 REMOTE MODE

In remote mode, the winch is operated from the enclosed remote control panel. Use the “Pay In/Out” joystick to lower or raise the load. The joystick has a built in adjustable speed control to control the load.

### 5.13 PC MODE

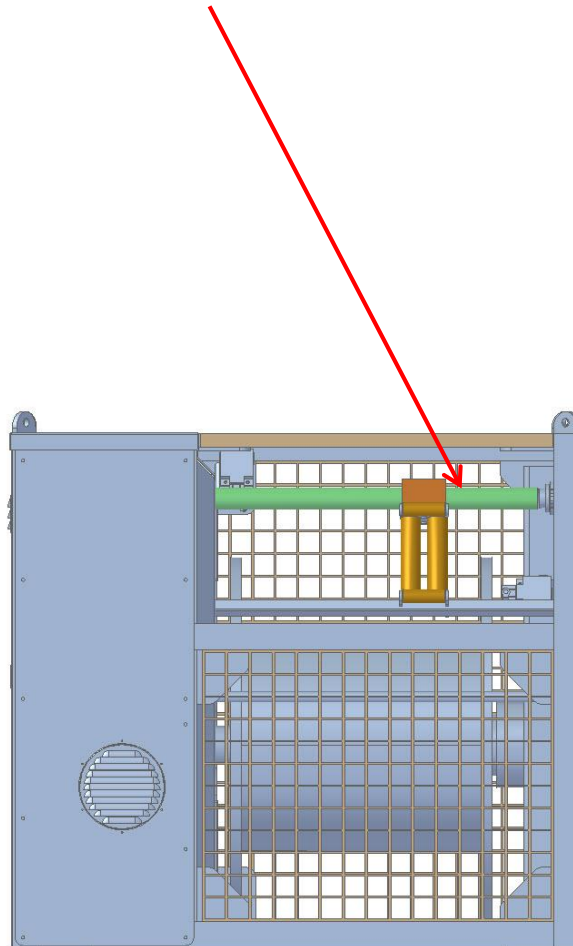
In PC mode the winch is operated/monitored from a PC via cable to operating room.



The frequency converter uses 1000Volts. Wait at least 15 minutes before working with electrical parts. (See also data sheet)

## 5.14 LEVEL WIND

The winch is equipped with an electronical controlled level wind to aid spooling of the umbilical on the drum.



## 6 INSTALLATION

This chapter will guide you through the installation of the winch. It handles the physical installation regarding lifting and mounting of the winch. The installation should only be carried out by skilled personal.



Before any installation, the safety instructions in chapter 2.5 “Safety” must be read and followed.

### 6.1 PRE-CHECK

Before any start up, all listed parts below must be present and proper installed according to this chapter. This is to ensure working safety and performances set out in the specification. All parts must be checked for damages caused by transportation or incorrect handling.

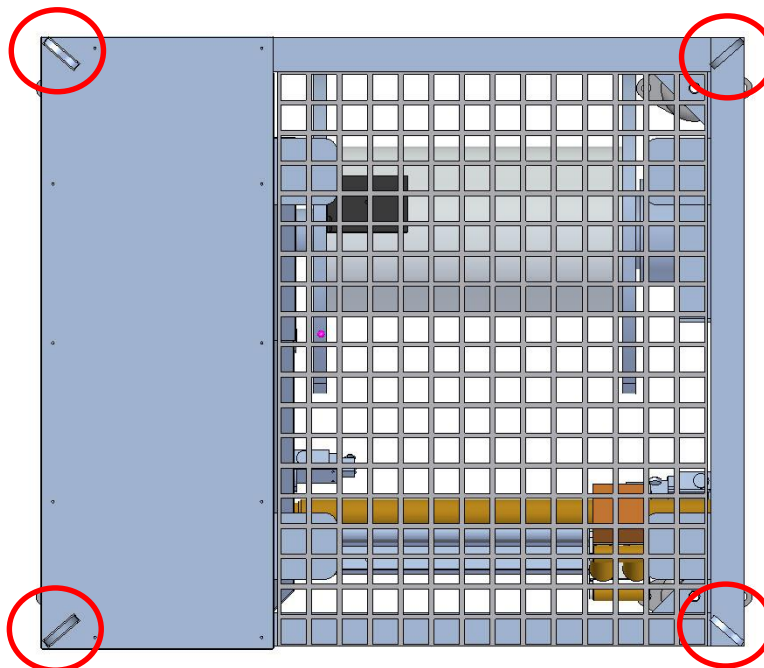
Check list		
No.	Description	Checked
1	Winch, including tarpaulin.	<input type="checkbox"/>
2	Remote control panel.	<input type="checkbox"/>
3	Additional 50m cable for remote control.	<input type="checkbox"/>



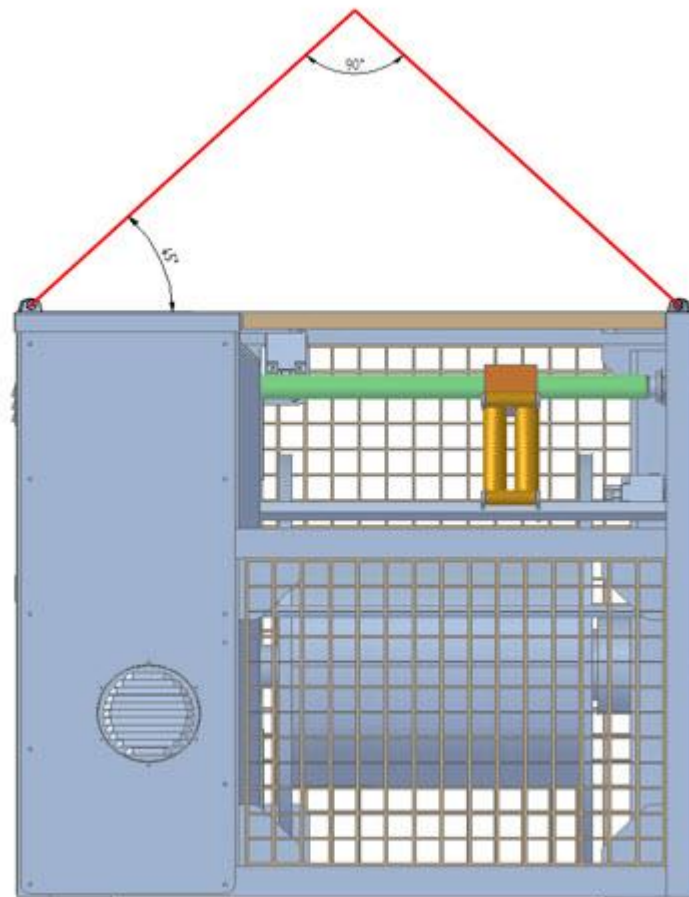
## 6.2 LIFTING

When lifting the frame make sure, that the structure is free of all external connections and all lifted parts are safely fastened to the frame.

The winch is ready for lifting, when wire slings are mounted to lifting eyes, shown in pictures below.

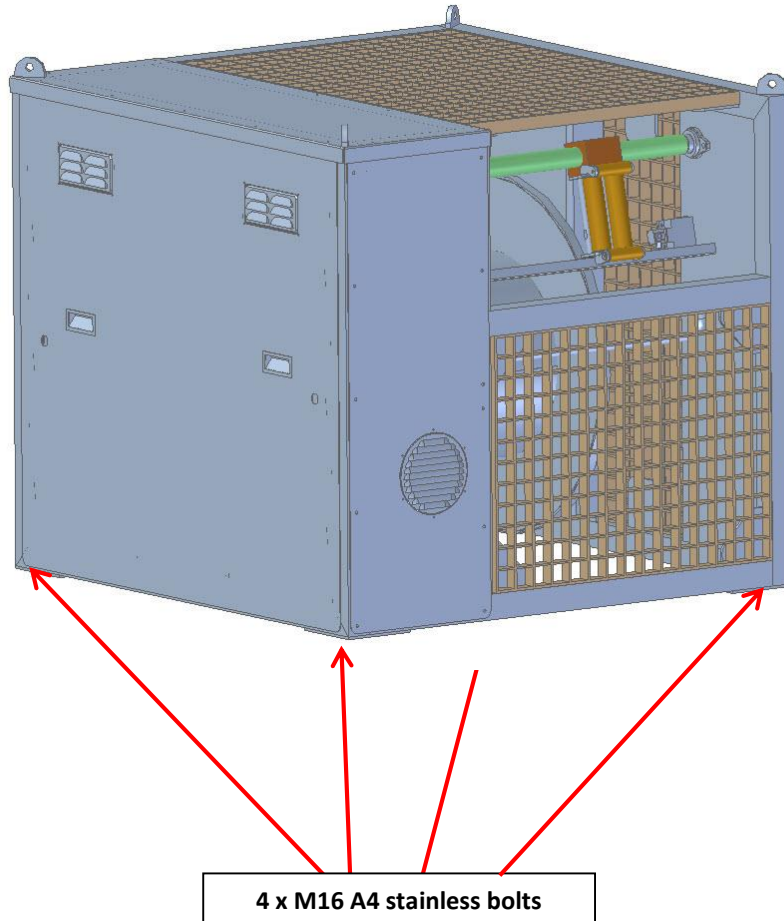


**Max Gross: 1300 kg**



**Front view**

## 6.3 PHYSICAL INSTALLATION OF WINCH



**Mounting should only be made by skilled personal.**

The winch must be mounted with 4 bolts to a solid foundation. We recommend M16, A4 stainless steel nuts (class 80)

Afterwards the installation, the procedure below should be carried out

- **Moving parts**
  - Inspect all moving parts for correct freely operation without any obstructions.
- **Inspection**
  - Do a visual inspection according to section 17.1 "Planned preventive maintenance". Grease if necessary.

## 6.4 CONNECTIONS

### External connections (electrical)

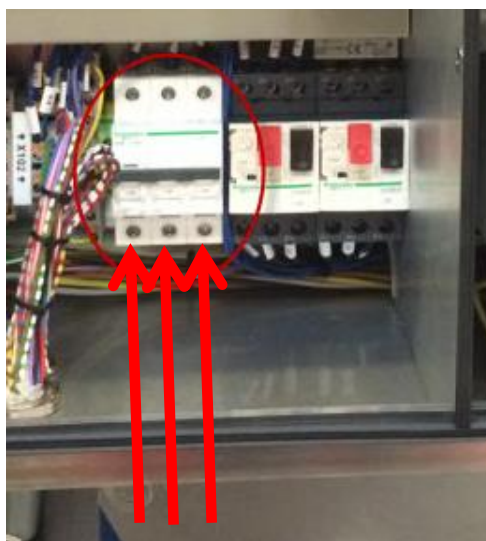
The electrical power requirements are:

Voltage: 400(440) V A/C

Frequency: 50 Hz or (60 Hz)

Please note that the winch is designed for 400 V A/C/50 Hz power supply. If the winch is connected to a 440 V A/C/60 Hz power supply, there will be a 20% increase in speed.

The picture below show the connection point in the main cabinet.



Before turning the power on the first time the voltage has to be measured and found correct.

## 7 START-UP PROCEDURE

Before starting the winch, check that all components from installation procedure in section 6 “Installation” are present, properly installed and connected.

1. Check rotation on motors
  - Make sure that the motors are rotating the right way according to marking arrows on cabinets.
2. Inspection of system
  - Make a complete visual inspection according to section 17.1 “Planned preventive maintenance”.
3. Switch on the main breaker
4. Check lamp indications on main control cabinet
  - a. Reset emergency stop (Press blue button)
  - b. Acknowledge alarms on touch screen.

The winch should now be ready for operation.

### 7.1 START UP AFTER LONG TERM STORAGE

If the winch has been preserved in accordance with section 18, a general clean-up has to be done before starting the winch. Besides the clean-up, the different steps described below have to be done.

### 7.2 MECHANICAL INSTRUCTIONS



- Remove anti-corrosion agent according to data sheet for the used agent.
- Change gear oil. In the preservation instruction, it is recommended to fill up the gears with oil. The correct functional oil level is when the level reaches the gear center point, when gear is not running.
- Do a complete inspection according to the preventive maintenance.
- Remove old grease and do a new lubrication according to section 17.4

## 8 OPERATION

There are two ways of operating the Winch.

- 1) The local control panel mounted on the front side of the cabinet.
- 2) The remote control.

Use this chapter as a guide in the understanding of handling the winch.

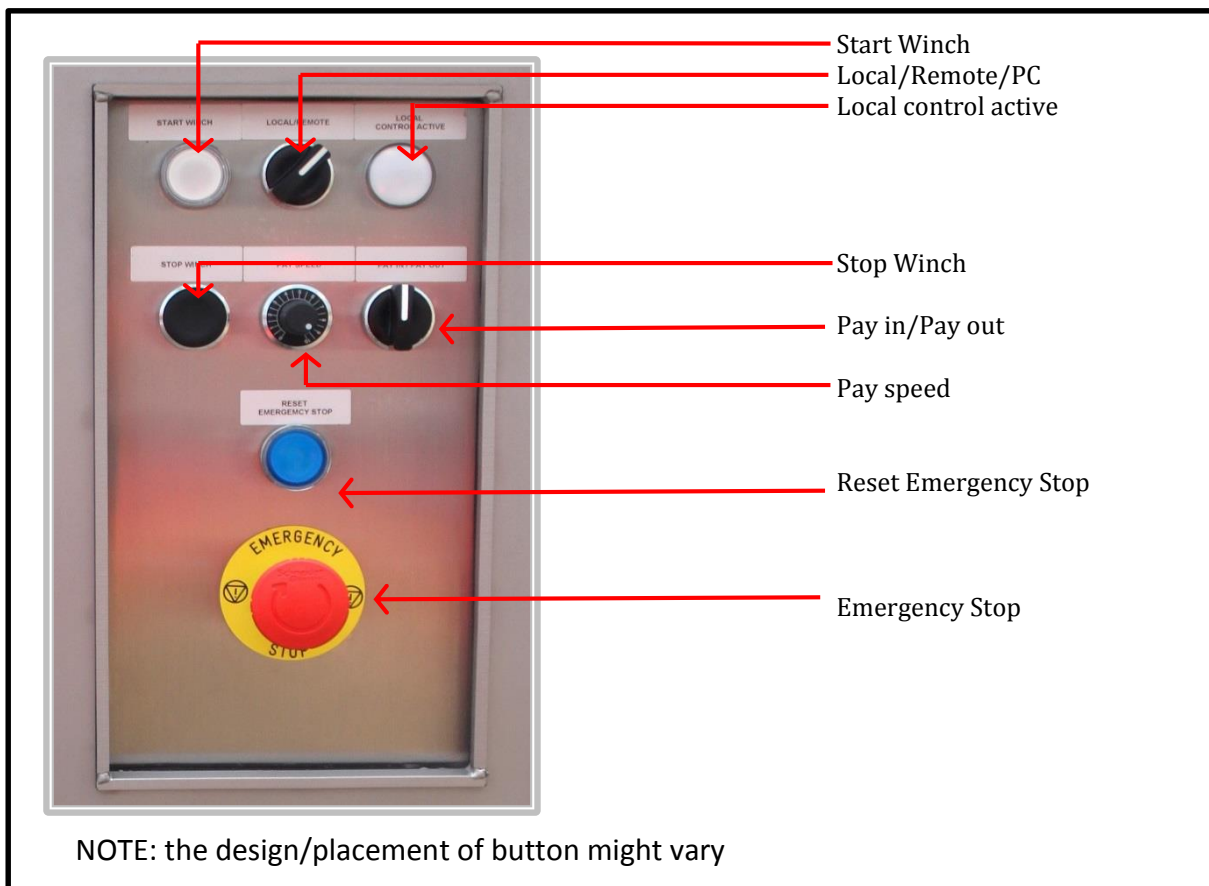


Before any use of the winch, the chapter 2 "Safety" must be read and followed.



Before start up make sure that, the daily maintenance has been carried out, and the system is ready for operation. See the section 17.1 "Planned preventive maintenance".

### 8.3 LOCAL CONTROL PANEL



- **Start Winch:** Push the button to start the winch. Illuminated lamp indicates ready for operation.
- **Local/Remote:** 2 position mode selector without spring return to neutral. To operate from the remote control turn the selector into remote mode. It is not possible to operate the remote control if the mode selector is positioned in Local mode.

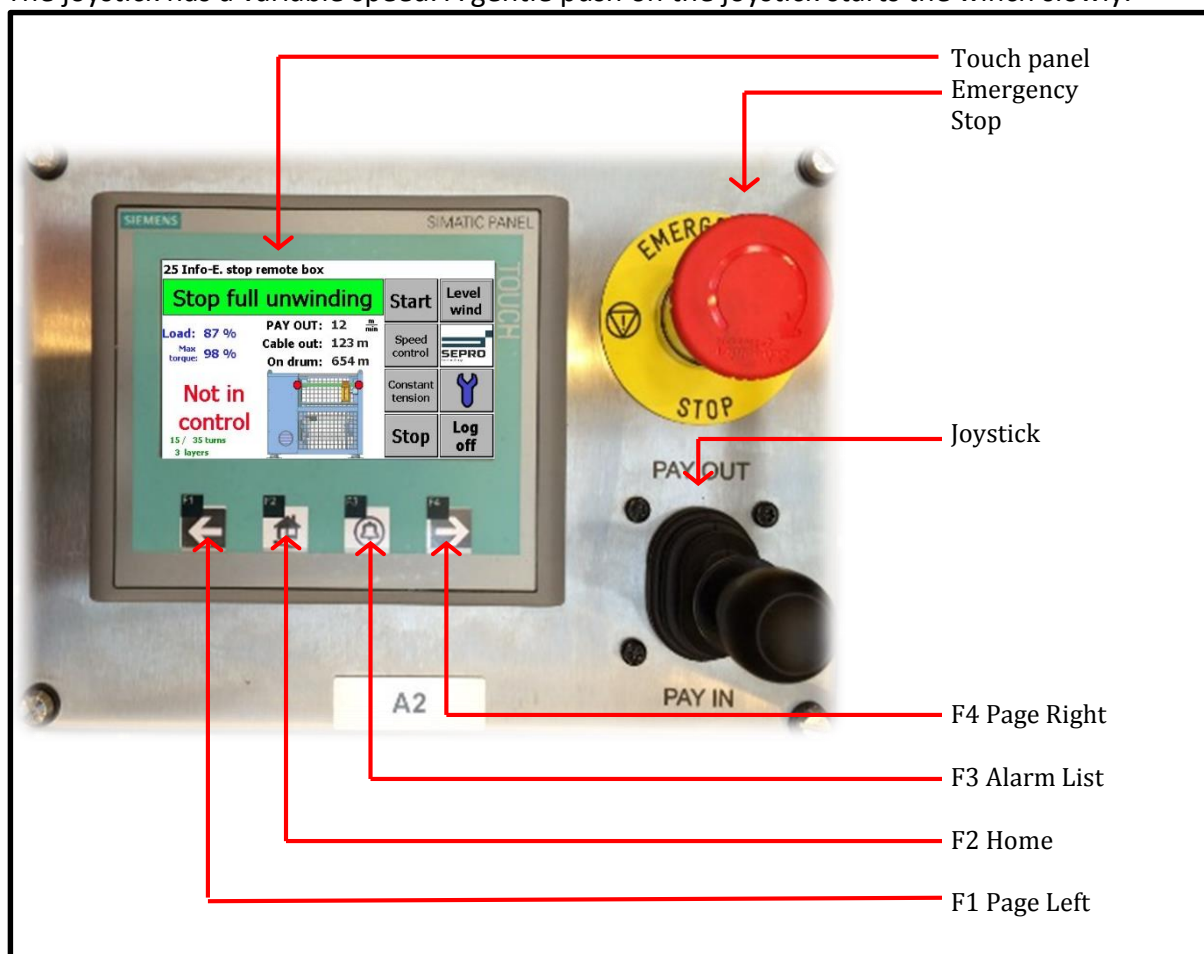
- **Local Control Active:** The lamp will illuminate if Local control is active.
- **Stop Winch:** Push the button to stop the Winch
- **Pay in /Pay out:** 2 position mode selector without spring return to neutral. Use this selector choose between pay in/pay out
- **Pay Speed:** Use the button to adjust the speed of Pay in/Pay out
- **Reset Emergency stop:** Illuminated lamp indicates that the emergency stop button has been activated. Push the button to reset the emergency stop. It is not possible to operate the winch without resetting the EMG-button.
- **Emergency Stop:** Push the emergency stop button if an emergency occurs.  
To operate after an emergency stop, the EMG button needs to reset before any operation can continue. Resetting the EMG button is done by turning the button in the direction shown on the button and afterwards pushing the reset emergency stop.

## 8.4 REMOTE CONTROL (OPTION)

The remote control panel contains:

- a 4" Siemens Touch panel
- joystick for the general control
- emergency button.

The joystick has a variable speed. A gentle push on the joystick starts the winch slowly.

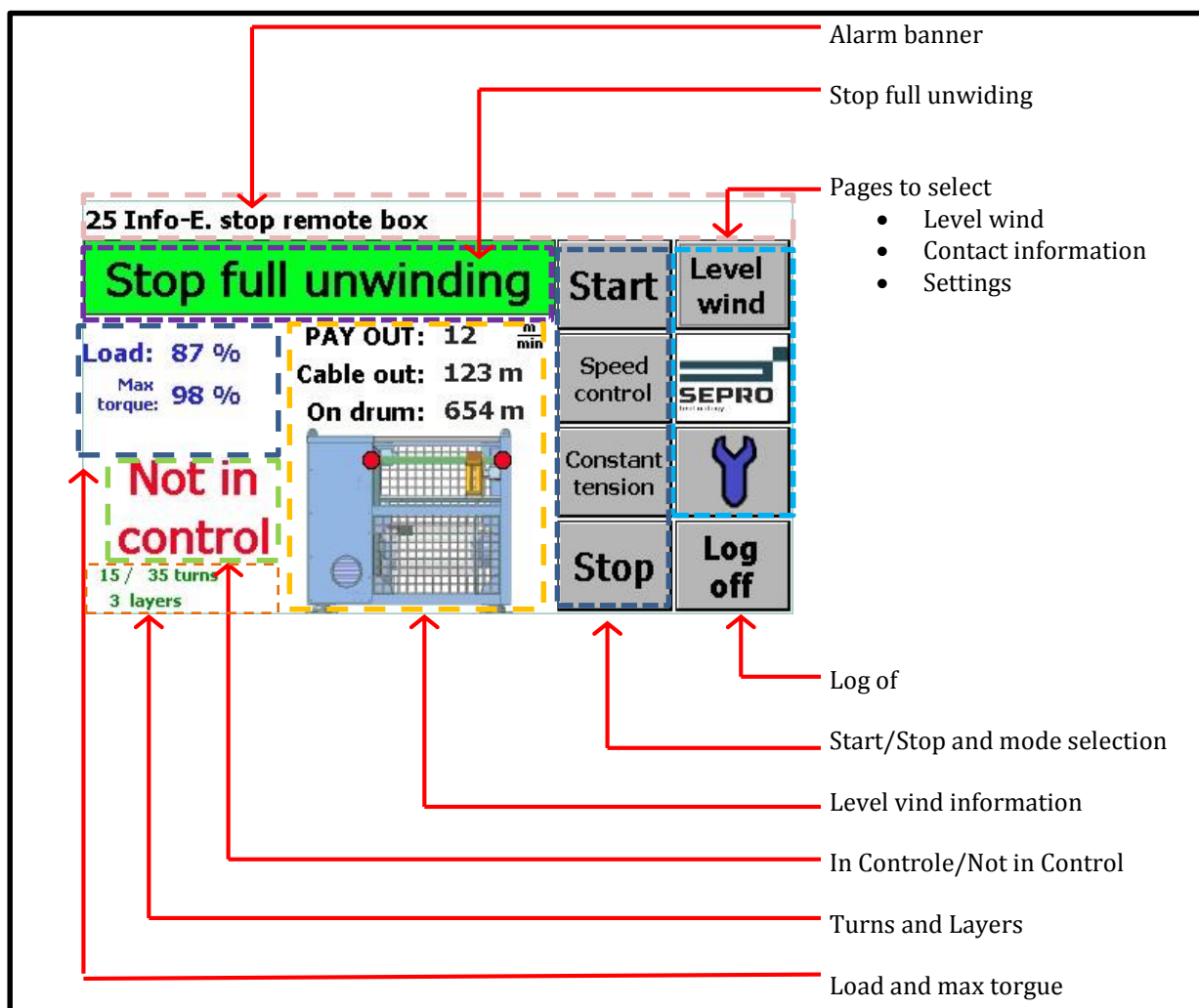




- **Touch Panel:** To use remote control, turn the mode selector on the local control panel into remote. Operate the display by touching the screen.
- **Joystick Pay in/ Pay out:** A single axis joystick, Use the Joystick to controle Pay in/Pay out. The speed can be adjusted by pushing the joystick.
- **F4 & F1:** Use F1 and F4 to scroll left and right on the subpages
- **F3 :** Push F3 to get a list of alarms.
- **F2:** Use the Home button to get back to the main page.
- **Emergency Stop:** Push the emergency stop button if an emergency occurs.  
To operate after an emergency stop, the EMG button needs to reset before any operation can continue. Resetting the EMG button is done by turning the button in the direction shown on the button

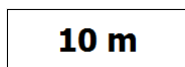
## 8.5 DISPLAY OVERVIEW

The picture is an example of the various possibilities of data displayed on the different pages.





### 8.5.1 General for display views



Values that can be adjusted are shown black on white with a black frame. Pressing the number brings up a numerical keyboard for entering values.



The question mark button links to a help page for the current page.

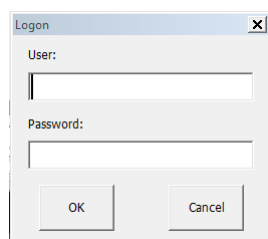


Top left on help pages: go back up to the calling page.



Navigates to sub-pages, at the Settings Page for example, or among primary pages

## 8.6 ACCESS CONTROL



Some actions requires a password. If you do not have clearance to perform the action you trying to do a logon window will appear. Enter the user name and the corresponding password. On the setting page it is possible to log off when logged in.

There is a password in three levels indicated when needed in this manual like this:



3 is the highest level.

Normally operation does not require password and this is not indicated. In a few cases when it could be expected but is not required it is indicated like this:



## 8.7 PC CONTROL (OPTION)

PC control or AWC is an option where it is possible to monitor few alarms and control selected controls via an external computer.

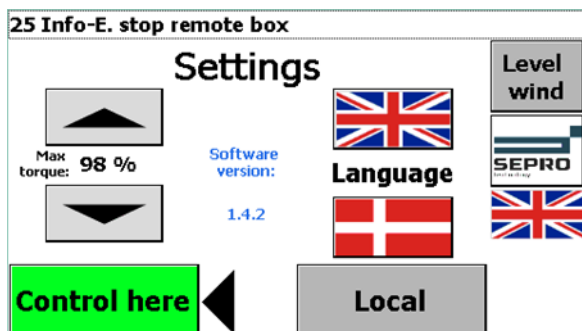
## 9 SETTING PAGES



To change settings push the button with the wrench key.

It is possible to shift between Settings and Cable data by pushing, right and left buttons F1 and F4.

### 9.8 PANEL SETTINGS



Select language:

Optional, not in this winch.

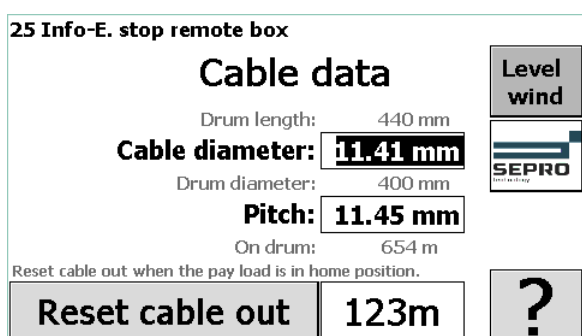
See the software version.



In the corner of the display it is shown if control is on the remote or local.

The log off button is only visible when logged in, and it is possible to log off by pressing it.

## 10 CABLE DATA



The page shows information's about cable and the drum.

It is possible to adjust the cable size and the pitch.

This is the distance between cable rounds. The pitch cannot be less than the cable diameter.

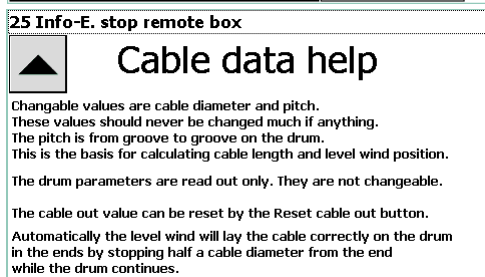
The display will show the length of the cable on the drum during an operation.



It is possible to reset the length of cable out. Reset to zero when all the cable is on the drum, or when

the load reaches the water surface. It is to be regarded like a trip counter.

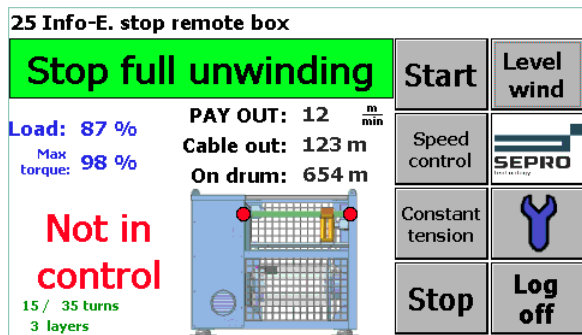
Pressing the question mark will provide help and the two other buttons at the right are for getting to the level wind page and the contact page.



## 11 OPERATION MAIN PAGES

Main pages are selected by home button F2. They includes the Main page itself and the I/O page. The latter is only for read out and for service. Shift between them by right and left buttons F1 and F4.

### 11.1 NORMAL OPERATION AND VIEW




The page shown here is for showing the various possibilities.

At the bottom middle is a front view of the winch. On this are indications for the level wind end stops and moving direction. Here level wind is shown moving left and left end switch off (red). Note the view is reverse.

Above is the main information about status of operation. Load and maximum torque is to the left. Maximum torque is only visible in Constant tension.

Bottom left is shown turns and layers and whether this panel is not in control.

### 11.2 STOP FULL UNWINDING

The unwinding will be stops automatically when there is less than 8 turns left on the drum. 

**Allow full unwinding.**

Then the button to allow full unwinding will be visible, just below the alarm banner at the top. The allowance can be stopped again, it will stop automatically after 3 minutes or when out of the stop unwinding zone (8 turns).

**NOTE:** Never unwind the bottom layer unless you want the cable off.

If you accidentally do so, you should use a rubber hammer to put the cable turns as tight as possible. Otherwise the following layers will flex up and down.

There is no program stop for unwillingly unwinding the bottom layer but keep attention.

The Speed is though always restricted when cable is near the end either in or out.

### 11.3 START/STOP AND MODE

To the right are buttons for start/stop and mode selection.

Start button



Start is always together with another operation.

Speed control



Can always be selected.

Constant tension








Only if conditions are fulfilled.

Stop




Always possible when started.

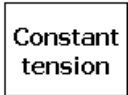
## 11.4 FOR ALL OPERATING MODES BUTTONS THIS APPLIES ABOUT VIEW:

	Grey text on grey.	Is not selected; cannot be selected.	Either it is not presently allowed or control is local.
	Black text on grey.	Is not selected; can be selected.	Remote control is selected.
	Blinking black and white	Ramping in or out.	Wait for ramping to end.
	Black text on green background.	Active operation mode; can be deselected.	Remote control is selected.
	Grey text on green background.	Active operation mode; cannot be deselected from here.	Local control is selected.

## 11.5 DESCRIPTION OF OPERATING MODES:

	Speed control can always be selected. Full speed and torque are available. Setting can reduce torque and speed can be restricted. Near both ends of the cable speed is restricted. Joystick is controlling the speed.
--	---

## 11.6 CONSTANT TENSION

	Constant tension can be selected when there is at least 5 m of wire out. Up to full speed and full torque is allowed. The joystick now adjusts the tension (Max torque) which is visible during this operation.
---	---

Should the conditions fail during operation mode automatically changes to speed control.

## 12 VIEW OF INPUTS AND OUTPUTS

25 Info-E. stop remote box

**Digital inputs**

- 0.0 Drum encoder A
- 0.1 Drum encoder B
- 0.2 Level wind encoder
- 0.3 Level wind encoder
- 0.4 Start
- 0.5 Stop
- 0.6 Remote control
- 0.7 Emergency stop

25 Info-E. stop remote box

**Analog inputs**

- 56 0 Potentiometer
- 58 0 spare
- 90 0 Joystick
- 92 0 spare
- 94 0 spare
- 96 0 spare

**Analog outputs**

- 90 0 spare
- 92 0 spare

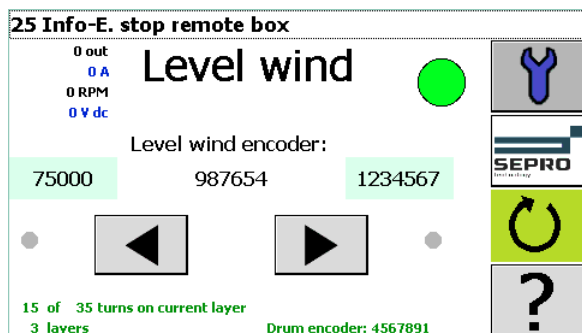
These pages shows digital and analog inputs and outputs in the PLC.

These pages are primarily for service purpose.

## 13 LEVEL WIND PAGES

The level wind pages are for controlling of the level wind and for setting it for automatic operation. It includes 5 pages. These are Level wind; Level winds offset setting, both these with help pages, and finally start point setting. Shift between them by right and left buttons F1 and F4. The help pages are selected by question mark.

### 13.1 LEVEL WIND



Level wind position is shown in the middle. The end position values can be adjusted by pressing the numbers in each end for 5 seconds when the level wind has been moved to the end.

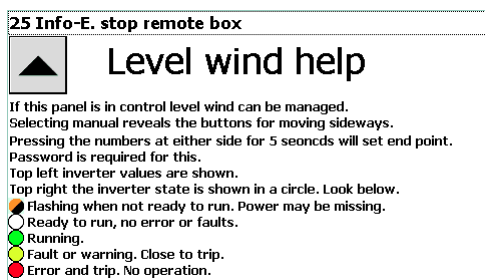
Switch between automatic operation and manual operation by the mode button.

Status for level wind inverter is shown

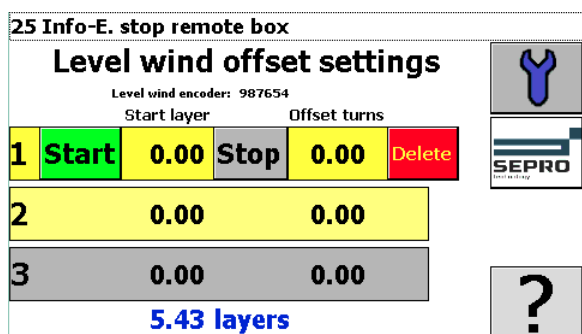
next to the headline. Legend is on the help page. Key values for the inverter are also shown.

Drum position is shown at the bottom as encoder value and as layers and turns.

In manual it is possible to run the level wind manually with the two buttons which get visible when manual is selected.



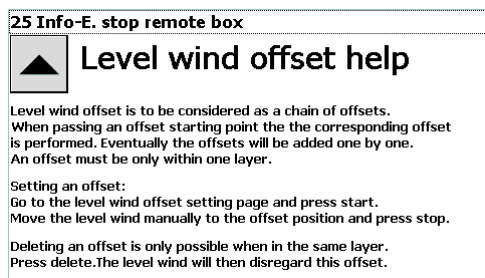
#### 13.1.1 Level wind offset settings



This page allows the operator to set up the offsets necessary for a correct level wind function.

Here all is shown. In normal operation only relevant buttons are visible.

The offsets are to compensate for inaccuracy in the cable and the spooling.



The offsets can be used in any order. Delete is only possible when the cable is in the same layer.

Spooling must be stopped. Then the procedure is: press start, go to page level wind and move level wind manually, go to this page and press stop. Delete removes an offset.

When the start layer position is reached the level wind will do the offset turns. This works in both directions.

Note that the units for the 2 columns Start layer and Offset turns are not the same.

## 13.2 LEVEL WIND START POINT

**This start point must only be set when a new cable is mounted.**

**25 Info-E. stop remote box**

**Start point**  
Level wind encoder: 987654

Start point is set only when cable is mounted.  
Drum encoder value must be between 10,000 and 100,000.  
Password level 3 is needed to set the starting point.

**12345**

15 turns of 35  
3 layers Drum encoder raw: 45612

**Start point**  
Press for 5 seconds.



Start point is the starting offset. This is the encoder value when the cable on drum is 0 m.

The encoder value must be less than 100,000 when being set. The button is only visible then. A value around 50,000 is suggested. Too small a value is not desirable.

The button must be pressed for 5 seconds.

## 13.3 CONTACT INFORMATION

**25 Info-E. stop remote box**



NO-4307 Sandnes  
+47 5171 5800  
post@seprotechnology.com

DK-5700 Svendborg  
+45 6221 7810  
sh@shgroup.dk

Name and address of the manufacturers for contact.

## 14 ALARMS

### 14.1 LIST

Alarm list	
7:54:59 AM 117 I Motor 1 brake is not open	▲
7:54:59 AM 118 I Motor 1.1 brake is not open	▲
7:54:59 AM 119 I Motor 2 brake is not open	▲
7:54:59 AM 120 I Motor 2.1 brake is not open	▲
7:54:59 AM 121 I Motor 3 brake is not open	▲
7:54:59 AM 122 I Motor 3.1 brake is not open	▲
7:42:47 AM 33 I Info-Level wind position error	➡
7:54:31 AM 34 I Info-Low pressure cooling water	➡
7:54:31 AM 35 I Info-Motor 1 too hot	▼
7:54:31 AM 36 I Info-Motor 1.1 too hot	▼
7:54:31 AM 37 I Info-Motor 2 too hot	▼

Alarms are shown on each page as one line banner at the top, except alarm pages.

Pressing the alarm button F3 opens the alarm list page with all existing alarms and warnings.

Alarms must be gone and acknowledged to leave the list. Warnings need no acknowledgement.

Alarms have numbers over 100, warnings below.

State of the alarms and warnings is indicated by letters: I=Incomming, A=Acknowledged,

O=Outgoing. More than one letter can be combined.

Use the acknowledge button to acknowledge alarms.

Use left or right buttons to switch to saved alarms (alarm log) and help.



### 14.2 SAVED ALARMS

Alarm log	
2/14/2014 7:41:55 AM 270006 I Project modified: Alarms cannot b...	▲
2/14/2014 7:41:55 AM 110001 I Change to operating mode 'online'.	▲
2/14/2014 7:42:47 AM 33 I Info-Level wind position error	▲
2/14/2014 7:54:31 AM 34 I Info-Low pressure cooling water	▲
2/14/2014 7:54:31 AM 35 I Info-Motor 1 too hot	▲
2/14/2014 7:54:31 AM 36 I Info-Motor 1.1 too hot	▲
2/14/2014 7:54:31 AM 37 I Info-Motor 2 too hot	▲
2/14/2014 7:54:31 AM 38 I Info-Motor 2.1 too hot	▲
2/14/2014 7:54:31 AM 39 I Info-Motor 3 too hot	▲
2/14/2014 7:54:31 AM 40 I Info-Motor 3.1 too hot	▲
2/14/2014 7:54:31 AM 41 I Info-MRU not ready	▲

The alarm log shows saved alarms like the alarm list. No acknowledgement is possible. Each change of state is recorded.

Status are: I=Incomming, A=Acknowledged, O=Outgoing

Back to the alarm list using left or right button.

### 14.3 LIST OF ALARMS

101	Drum encoder not counting	Errors	125	Motor 1 thermistor	Errors
102	Emergency stop	Errors	126	Motor 1.1 thermistor	Errors
103	Gear oil too hot too long	Errors	127	Motor 2 thermistor	Errors
104	HPU oil too hot too long	Errors	128	Motor 2.1 thermistor	Errors
105	Inverter 1 error	Errors	129	Motor 3 thermistor	Errors
106	Inverter 2 error	Errors	130	Motor 3.1 thermistor	Errors
107	Inverter 3 error	Errors	131	Alarm-131	Errors
108	Inverter level wind error	Errors	132	Torque different directions	Errors
109	Level wind brake is not open	Errors	133	Motor 1 brake is not closed	Errors
110	Level wind encoder fault	Errors	134	Motor 1.1 brake is not closed	Errors
111	Level wind thermistor	Errors	135	Motor 2 brake is not closed	Errors
112	Low level gear oil	Errors	136	Motor 2.1 brake is not closed	Errors
113	Low level HPU oil	Errors	137	Motor 3 brake is not closed	Errors
114	Low pressure gear oil	Errors	138	Motor 3.1 brake is not closed	Errors
115	Low pressure HPU	Errors	139	Local I/O communication lost	Errors
116	Alarm-116	Errors	140	Rack I/O communication lost	Errors
117	Motor 1 brake is not open	Errors	141	Inverter 1 not auto	Errors
118	Motor 1.1 brake is not open	Errors	142	Inverter 2 not auto	Errors
119	Motor 2 brake is not open	Errors	143	Inverter 3 not auto	Errors
120	Motor 2.1 brake is not open	Errors	144	Inverter level wind not auto	Errors
121	Motor 3 brake is not open	Errors	145	Alarm-145	Errors
122	Motor 3.1 brake is not open	Errors	146	Alarm-146	Errors
123	Motor brakes are not all open	Errors	147	Alarm-147	Errors
124	Motor brakes not all closed	Errors	148	Alarm-148	Errors

Some alarms are optional and not relevant for this winch.

### 14.4 WARNINGS

41	Info-MRU not ready	Warnings
42	Info-Overload protection is active	Warnings
43	Info-Resistor hot - no pay out	Warnings
44	Info-Cable nearly all out	Warnings
45	Info-Motor temperature difference	Warnings
46	Info-manual operation	Warnings
47	Info-A frame comm. time out	Warnings
48	Info-forced out of low tension	Warnings
49	Info-spare 49	Warnings
50	Info-Resistor warm	Warnings
51	Info-Low water pressure resistor - no	Warnings
52	Info-Thermal error circulation pump	Warnings
53	Spare-info 53	Warnings
54	Spare-info 54	Warnings
55	Spare-info 55	Warnings
56	Spare-info 56	Warnings
57	Spare-info 57	Warnings
58	Spare-info 58	Warnings
59	Spare-info 59	Warnings
60	Spare-info 60	Warnings
61	Spare-info 61	Warnings
62	Spare-info 62	Warnings
63	Spare-info 63	Warnings
64	Spare-info 64	Warnings
65	Spare-info 65	Warnings
66	Spare-info 66	Warnings
67	Spare-info 67	Warnings
68	Spare-info 68	Warnings
69	Spare-info 69	Warnings
70	Spare-info 70	Warnings
71	Spare-info 71	Warnings
72	Spare-info 72	Warnings
73	Spare-info 73	Warnings
74	Spare-info 74	Warnings
75	Spare-info 75	Warnings
76	Spare-info 76	Warnings
77	Spare-info 77	Warnings
78	Spare-info 78	Warnings
79	Spare-info 79	Warnings
80	Spare-info 80	Warnings

Some warnings are optional and not relevant for this winch



## 15 MAINTENANCE

It is essential that the winch is being treated in accordance with this section, to ensure the performance throughout the lifetime of the product. The winch is designed for minimal maintenance. However, due to working conditions, there will always be an ongoing minor maintenance. With this section, the operator is able to perform the daily maintenance.



**Before any kind of maintenance or inspection, the section "Error! Reference source not found." should always be followed.**

Disassembling the system has to be done under very clean conditions.

Moreover, it is always a good idea to be aware of abnormal noise from the winch. It will be able to detect a minor fault that usually only is a small matter in the beginning, but which can destroy the entire system, if it is allowed to evolve.

To ensure a long life and reliable system, the winch should be regularly cleaned of impurities.

## 15.1 PLANED PREVENTIVE MAINTENANCE

This section contains description of the general maintenance procedures. In the end of the section you will find a schedule over the procedures. This eases the overview and guides to a systematic plan of the maintenance. The schedule comes in to identical pages, one master and one for noting dates and signature.



It should be noticed that the time intervals only are guidelines and represents the maximum number of hours between services. Depending on the specific use and the local environment, the intervals can be greatly reduced. For the same reason SH Group disclaims any liability for this product. See introduction in front of this manual.

For every 4000 hours the schedule should be completed.

## 15.2 OIL LEVEL CONTROL IN MAIN DRIVE GEARS.


Correct oil level in all gears must be checked on a daily basis. This is done by visually securing that oil level reaches the gear center point when gears are not running.



### 15.3 REPLACEMENT OF GEAR OIL



Only use prescribed oil type. Use the material safety sheet in order to handle the oil.

Prescribed gear oil type		
	TOTAL Carter SH100	-20oC to +5oC
	TOTAL Carter SH150	+5oC to +40oC
	TOTAL Carter SH220	+20oC to +50oC

## 15.4 GREASE POINT

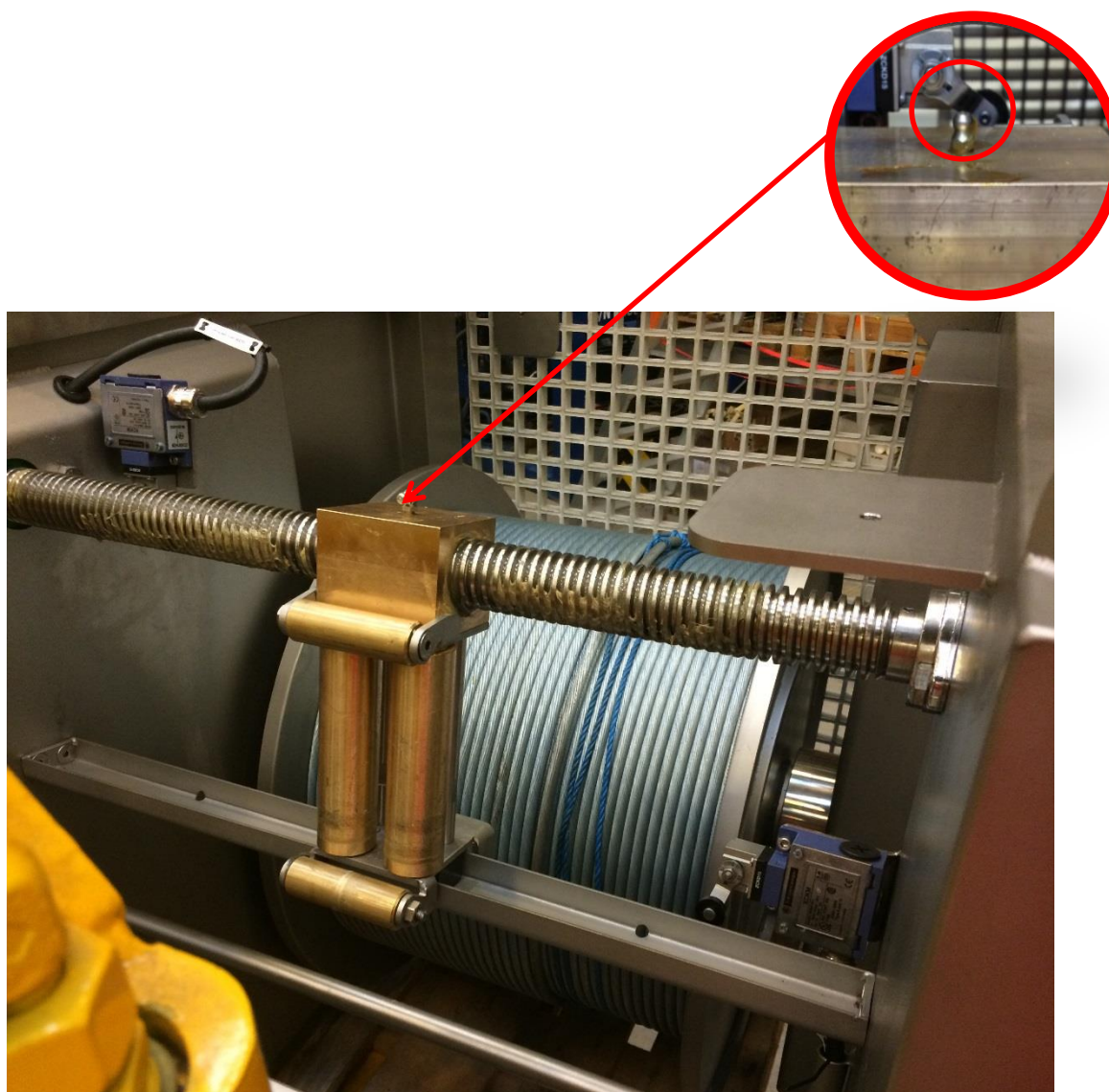
The winch is equipped with a grease point for the level wind shown on the picture below, the location are marked with a circle.

Please follow the maintenance schedule to ensure a constant grease level. Afterwards each lubrication, check the surfaces for correct grease layer.

Prescribed grease type



TOTAL CERAN WR2.



## 15.5 CHECK OF BRAKE SYSTEMS

The brake system is designed to hold 1,5 x SWL.

In accordance with lifting equipment standard it has to be tested every 12 month. Use the guide below for testing the brake.

### **Stop the winch.**

Add a load at 1,5 x SWL to the umbilical.

The winch should be able to hold the load for 5 minutes.

Remove the load from the umbilical.

If the test result is found ok, the winch is ready for use.

## 15.6 BRAKE RESISTOR

Every year the brake resistor has to be controlled for correct resistance in elements and insulation from elements to ground. It is done by measuring the resistance with an ohmmeter. Always keep the brake resistor in clean condition.

The correct resistance value is printed on the side of the brake resistor.



Before measuring, the power to the winch has to be disconnected and secured against reconnection.

## 15.7 DISCONNECT WIRES

Wires from the frequency converter have to be disconnected on the resistor terminals.

Check ohmmeter

Check the ohmmeter measure 0Ω when the testing probes are hold together.

Resistance measurement

Measure the resistance, by placing the test probes in the resistor terminals.

Insulation test

Last step is insulation measurement. It is done by 1000V measured from terminal to ground.

## 16 DEMOBILIZE AND LONG TERM STORAGE

It is important to protect and secure the winch when not in use or during transport. This must be done in order to avoid dangerous situations where the pressure equipment and the electrical installation may pose a danger to personnel and materials. In addition, it is desired to achieve maximum service life and avoid/minimize operational and operating difficulties. In the following sections, it is described how the winch is best prepared to accrue and dismantling. It is necessary to follow the guide chronological starting with the electrical part in section Electrical equipment18.1

### 16.1 ELECTRICAL EQUIPMENT



**Make sure that the electrical power is switched off at the external power supply breaker.**  
**Removing the cables and disconnection of power must be carried out by a qualified person.**  
To make the reinstallation easier it is a recommendation to take pictures of the dismantling.

#### Guide to preservation

Dismount the supply cable.

- Protect cabinet and cables from water intrusion afterwards by sealing cable ends and feed through.

## 16.2 MECHANICAL EQUIPMENT

When the electrical systems are disconnected, the preservation of the winch can begin.



### 1. Surface treatment

- All non-greased raw surfaces of the winch must be protected by anti-corrosion agent (Tectyl).

### 2. Grease

Protect- greased surfaces, like the level wind spindle and guides by a complete layer of grease, and afterwards wrap with plastic film.

To prevent corrosion on the inside of housing due to condensation it is important to fill up the gearbox with oil. Use only the prescribed gear oil.

**NOTE:** Remember to drain the oil to normal level before using the winch again.

It is recommended to cover the winch under a tarpaulin.

## 17 DISPOSAL

Disposal should be in accordance with local law. It is recommended to contact your local authorities if there should be any doubts. For specific information on used chemicals on the winch, see section 18 "Material safety data sheets"



## 18 SAFETY DATA SHEET.