

# User Manual for

# Drum Winch

# SWI-TEC Mastlift



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# Table of Contents

<b>Approved Use</b>	3
<b>1. Description of the SWI-TEC Mastlift</b>	3
1.1 Standard Features	4
<b>2. Training</b>	5
<b>3. Installation</b>	5
3.1 Selection of the location	5
3.2 Use of the device	6
<b>4. Operating Instructions</b>	7
4.1 Lifting a Person	7
4.2 Lowering a Person	7
4.3 Operation of the Brake Mechanism	7
<b>5. Manufacturer's Guidelines</b>	8
<b>5.1 Checking the Drum Winch Before Each Use</b>	8
5.1.1 Checking the Endless Line	9
5.1.2 Checking the Drum Winch	9
<b>5.2 Maintenance of the Drum Winch</b>	9
<b>5.3 Storage of the Drum Winch</b>	9
<b>5.4 Care of the Drum Winch</b>	9
<b>5.5 Disposal of the Drum Winch</b>	10
<b>6. Commissioning Instructions</b>	10
<b>Certificate German Lloyd</b>	12

## Approved Use

The SWI-TEC Mastlift is a manually operated drum winch for lifting and lowering persons. It is only for boat leisure approved and not for industrial use.

The hand-operated drum winch must not be used to transport material loads.

The drum winch may be used for the transport of persons only in conjunction with a second independent, tested and approved fall arresting device (e.g. guided type fall arrester or retracting lifeline) and must be attached to a separate, tested anchorage point.

The drum winch must not be used in areas exposed to higher risks such as danger of explosions or corrosive environment.

## 1. Description of the SWI-TEC Mastlift

The drum winch may be used for lifting, lowering and positioning of persons.

The drum winch has a Load Line which is wound on a drum. With the use of an Endless Line the Load Line can be wound onto or off the drum. In this way the person is lifted or lowered. A pawl/ratchet mechanism ensures that a person is always securely held in position at all times. The SWI-TEC Mastlift has a Load Line guide.

### 1.1 Standard features of the SWI-TEC Mastlift:

#### **SWI-TEC Mastlift 13m**

- Weight: 6.7 kg
- Dimensions: Ø 165 mm, L = 215 mm
- Approved load of 150 kg
- A drum roll with 6 mm Polyester-Dyneema rope
- Working height: 13 m
- Number of Load Line layers: 6 layers
- Two layers of rope remain on the drum at the end of downward movement.
- Aluminum / plastic housing
- Ambient temperature for operation: between -30° C and +50° C.
- Ambient temperature for lubricants: between -30° C and +120° C.
- Noise: ≤ 70 dB(A)
- A manual force of about 26 daN is required on the Endless Line when a maximum load of 150 kg is applied to the top rope layer.
- Load Line:

Cover material:	Polyester
Core material:	Dyneema
Diameter:	6 mm
Breaking Strength:	2.500 daN
Length:	13 m

**Only original ropes from SWI-TEC must be used.**

### **SWI-TEC Mastlift 25m**

- Weight: 7.6 kg
- Dimensions: Ø 185 mm, L = 215 mm
- Approved load of 150 kg
- A drum roll with 6 mm Polyester-Dyneema rope
- Working height: 25 m
- Number of Load Line layers: 7 layers
- Two layers of rope remain on the drum at the end of downward movement.
- Aluminum / plastic housing
- Ambient temperature for operation: between -30° C and +50° C
- Ambient temperature for lubricants: between -30° C and +120° C
- Noise: ≤ 70 dB(A)
- A manual force of about 26 daN is required on the Endless Line when a maximum load of 150 kg is applied to the top rope layer.

- Load Line:

Cover material:	Polyester
Core material:	Dyneema
Diameter:	6 mm
Breaking Strength:	2.500 daN
Length:	25 m

**Only original ropes from SWI-TEC must be used.**

The lifting and lowering drive mechanism incorporates a braking system. The device is manually operated by an Endless Line which is used to wind the Load Line onto or off the drum.

The Endless Line can be released at any time. The brake system in the driving mechanism prevents further movement of the Load Line.

### **Warning**

The user must ensure that the Load Line is always kept under tension. A tensile force of 20 N must be maintained in order for the Load Line to be wrapped tightly onto the drum.

## 2. Training Requirements

The original operating instructions must be accessible to the user before using the device. The user must be trained on the equipment by the operator / owner. The operator / owner of the equipment shall bear full responsibility that proper training is carried out. All original instructions, signs and labels must be observed when using this device. In addition, use only tested and approved harnesses, attachment points and connection means. Before commissioning the device, perform a visual and a functional test.

## 3. Installation

### 3.1 Site selection

Before installing the device it is necessary to have carefully examined all factors that may affect the use of the drum winch and other equipment. These factors include job set up, environmental factors, location and type of workplace hazards, location and strength of the anchorage point to which the drum winch is mounted. Leave yourself enough time to consider all foreseeable possibilities. Always consult a competent person to who is familiar with the dangers and localities in the specific workplace

Estimate the expected Load Line length required. Install the unit so that the Load Line and the Endless Line easily reach the lowest point of the expected work location. Consider it may need extra length if the person has to perform work offset from the vertical. The Load Line must not be crossed and but must always be able to move freely. If necessary include in the work schedule the set up of safety barriers and signage so that other equipment, materials and people do not interfere with the proper operation of the unit.

The device including the Load Line and the Endless Line must not pass over sharp edges or too close to objects where they might catch. Avoid mounting locations where waste, pollutants, and falling objects may impair or damage the device, Load Line and Endless Line or cause injury to people.

The drum winch must be free to move at the anchorage point and **must not** be rigidly mounted. (blue sticker must be outside of the mast and if you use our SWI-TEC protective-cover the Logo on the cover must be outside of the mast). The Load Line must **always run vertically** off the drum.

**Never install the equipment where the device or lines risk exposure to electrical hazards.**

#### **Note**

Create a work plan and a rescue plan before starting the installation. Take into consideration the original instructions and the risk assessment of the client.

#### **Caution**

The person operating the device must be secured against risk of falling with his/her own tested and approved restraint or fall arrest system. Also, the person must be safeguarded against falling objects.

**3.2 Use of the device**

The fixed anchorage point must have a safety factor of 10:1 for personnel, but at least be suitable for a force absorption of 7.5 kN. For the second safety, depending on the intended use, a separate solid anchorage point with a force absorption capacity of 7.5 kN must be available (second halyard). The anchorage points must be tested. Approved connectors must meet the forces imparted by the anchorage points. Attaching the device to crane hook is prohibited.

**Caution**

A competent person must be consulted if the security of the anchorage is in question.

**1. Anchorage**  
**Minimum Load Capacity: 7,5 kN**



**Carabiner  
Connectors (EN 362)**



**Drum Winch SWI-TEC Mastlift**



**Carabiner  
Connectors (EN 362)**



**2. Anchorage**  
**Minimum Load Capacity: 7,5 kN**



**Carabiner  
Connectors (EN 362)**



**Guided Type Fall Arrestor  
(EN 353-2) or  
Retractable Type Fall  
Arrestor (EN 360)**



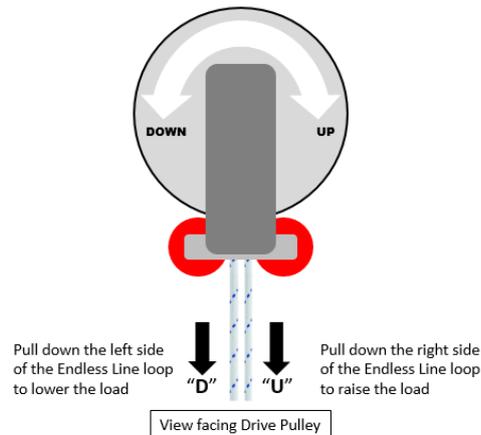
**Carabiner  
Connectors (EN 362)**

## E.g. Personnel Lifting Device

### 4. Operating instructions

#### 4.1 Lifting a person

Pull on the Endless Line to raise a person. You can raise the person, with a maximum load of 150 kg on the top layer of rope, using a manual force of about 26 daN on the Endless Line. The manual force is practically the same for both the 13m and 25m version due to the different diameters of the pulley. The Endless Line must only be operated by 1 person (not two or more people at a time).



#### **Important**

Make sure that the Load Line is tightly and evenly wound onto the drum.

#### 4.2 Lowering a person

To lower a person, disengage the lock with a well-measured tug on the other side of the Endless Line and continue to pull evenly. The person is then lowered in a smooth motion.

#### 4.3 Operation of the braking system

The brake mechanism engages automatically, the load is securely held in any position. The weight of the attached person activates the braking system automatically. The device is blocked. During lowering (pulling on the Endless Line), the brake is disengaged, but re-engages immediately by the weight of the attached person when the pulling action is stopped. The brake engages the mechanical pawl/ratchet device.

#### **Important**

If the Load Line is completely wound out from the drum, all the way to the end and the Endless Line continues to be pulled on the same side, the Load Line is wound up onto the drum in the wrong direction and the brake function is overridden. The typical "**clicking**" sound of the pawl/ratchet mechanism is **not** audible in this situation.

The user will notice immediately after switching the pulling action to the other side of the Endless Line that no braking effect is present and will sink back to the end position of the fully wound out Load Line (the Endless Line must be pulled through a length of 2 m in order to raise the load a distance of 20 cm). When the user now continues to pull on the same side of the Endless Line, the load is again lifted, however, now the "**clicking**" sound of the pawl/ratchet mechanism will be audible and the braking function is active.

## **5. Manufacturer's regulations**

**Observe all national rules and regulations of the respective country where the drum winch is used that may apply to the operation and any equipment safety standard approval requirements.**

Never exceed the maximum load limits specified on the data plate attached to the unit.

It is strictly prohibited to alter any part or parts of the device.

Never use two or more drum winches to raise and lower persons. A shift of the load could lead to only one device carrying the full weight of the load and thereby cause all devices to fail.

Always load the device evenly. Do not move people abruptly, as this could induce dynamic loading forces which could exceed the maximum operating load.

Always locate the winch in such a manner that when raising and lowering the Load Line is prevented from chafing. The Load Line must be able to move freely at all times.

Whenever a person is to be raised, first check the unit by lifting the load a few inches to make sure that the "**clicking**" sound of the pawl/ratchet mechanism is audible.

Check each time before using the drum winch and the Load Line for external damage. If in doubt, the device must not be used without prior repair.

The drum winch may only be used in conjunction with a second independent, tested and approved fall arresting device which must be attached to a separate, tested anchorage point (second halyard).

**Only the manufacturer, or personnel approved by the manufacturer in writing, may repair the appliance, or make any repairs, exchanges, replace or add parts to the drum winch.**

### **5.1 Inspecting the drum winch before each use**

Before each use, the user must check the device carefully, observe the original user instructions and all Safety-, Warning- and Caution Labels. Inspections by the user are all the more important the more adverse the environmental and workplace conditions are to which the drum winch is exposed. The drum winch must be inspected for any signs of wear, damage, alteration or missing parts.

### 5.1.1 Inspecting the Endless Line

Inspect the Endless Line for signs of contamination, abrasion and cuts. Check the splice.

### 5.1.2 Inspecting the drum winch

Check the drum winch for any signs of external damage.

**Should the inspections of the device show any signs damage, wear, alteration or missing parts then the unit is to be taken out of service and returned to the manufacturer or an authorized repair station.**

## 5.2 Maintenance of the drum winch

The frequency of the periodic maintenance depends on the specific environmental conditions, the conditions and frequency of use and must be carried out at intervals of 5 (five) years. **For product liability reasons, this service has to be performed by the manufacturer or personnel approved by the manufacturer in writing. Only the manufacturer, or personnel approved by the manufacturer in writing, may repair the appliance, or make any repairs, exchanges, replace or add parts to the drum winch. After 10 years a major overhaul is to be performed by the manufacturer.**

## 5.3 Storage of the drum winch

Store it in a dry, clean place. The device must not be exposed to permanent UV light.

During storage, the Load Line must always be fully retracted with the brake disengaged (short pulling action on the Endless Line).

## 5.4 Care of the drum winch

The device should be cleaned with a damp cloth and dried using an absorbent cloth.

### **Important**

Do not clean the unit with any chemical cleaner containing trichloroethane, thinner or cold cleaner.

**Do not use grease near the brake pads.**

## 5.5 Disposal of the drum winch

For safety reasons, the device must be discarded or replaced after fifteen (15) years from the date of manufacture.

The manufacturer will deny any and all claims if the device continues to be used after this period.

### **Exception**

If after fifteen (15) years a winch is still in perfect condition, the manufacturer may grant an extension of 2 (two) additional years after a thorough examination by the manufacturer. This requires, however, that the inspections from this point forward may only be carried out by the manufacturer!

## 6. Commissioning Instructions - Setup Guide for the drum winch

**Removal of the end cover to provide access to the Drive Pulley and explanation of the function of the pawl/ratchet bypass lever.**

1. Fold the safety ring of the Safety Pin (A) and remove from the Cap Nut (B).
2. Unscrew the Cap Nut (B) and remove the End Cover (C).
3. Press the Locking Lever (black ball) (D) and pull out the desired length of the Load Line (F).
4. After releasing the Locking Lever (D) the Load Line must be pulled out with a firm tug. With this movement the pawl/ratchet mechanism is again engaged.
5. Lead the Endless Line through the Guide Rollers (E) and the slot in the End Cover (C) and place it into the groove in the drive pulley. Make sure the Endless Line is fully seated in the groove.
6. Replace the End Cover (C) together with the Guide Rollers (E).

### **Important**

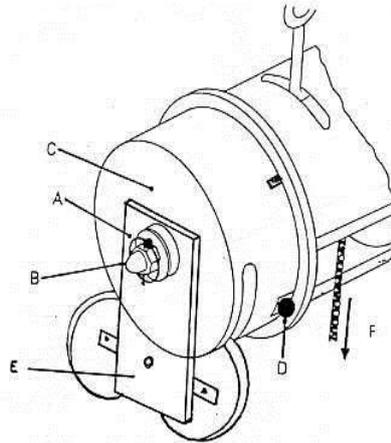
It is important to ensure that the slots on the End Cover (C) line up exactly with the guide pins on the device. The pin/slot positions allow this to occur in only one position so that the Locking Lever (D) is secured. Check for proper alignment if any effort is required.

7. Screw the Cap Nut (B) until the hole is aligned with the hole in the axle.
8. Insert the Safety Pin (A) and fold down the safety ring.

### **Important**

**Functional Check:** When pulling on the Endless Line to wind the Load Line onto the drum the pawl/ratchet mechanism should emit an audible "**clicking**" sound

- A Safety Pin
- B Cap Nut
- C End Cover
- D Locking Lever
- E Guide Rollers
- F Load Line



Only the manufacturer, or personnel approved by the manufacturer in writing, may repair the appliance, or make any repairs, exchanges, replace or add parts to the drum winch.

## Production and Distribution

### Distribution – Germany

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Date:	Our reference:	Your reference:
2016-09-27	4740-14-12636-408	SWI-TEC-Mastlift

#### Technical Statement:

##### Drum Winch SWI-TEC- Mastlift, Drum Winch

**Manufacturing Plant:** SWI-TEC, Neveta Nautica S.L., Poligono 9, Apartado 51, E-07680 Porto Cristo (Mallorca)

**Sales office:** SWI-TEC, Neveta Nautica S.L., Poligono 9, Apartado 51, E-07680 Porto Cristo (Mallorca)

#### Technical Data:

- Working height, 13m / 25m
- Mass/Weight: 220x180mm / 6,7kg; 220x200mm / 7,6kg
- Load max.: 150kg
- Used rope: support cable  $\varnothing$  6mm - Dyneema, Handrope  $\varnothing$  10mm - Polyester (endless)
- Gear ratio: 1:10
- Safety windings: 3
- Drum- $\varnothing$ : 60mm (fluted)
- Application / use: Vertical
- Purpose: hoisting and lowering of a person with concurrently applied secondary safety device against falling hazard
- Operating place: recreational crafts, i.e. application not subject to classification, work safety regulations, etc.
- Ambient temperature limits (manufacturer info): -30° C and +65° C

#### Test specification/Test basis for design test:

- 1.) Datasheet SWI-TEC-Mastlift 13m/25m, 2016-07-01
- 2.) Original operating instructions for drum winches SWI-TEC- Mastlift, 2015-01-08

#### And based on:

- 3.) GL Classification- and building regulations, VI supplementary regulations and guidelines, 2 lifting equipment, 2 lifting equipment of ships and offshore vessels
- 4.) DNVGL-ST-0377 Standard for shipboard lifting appliances
- 5.) DNVGL, Guideline Dyneema fibre rope – safety, bending radius (adapter: STHE, 2015-04-10)

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**Drawings:**

- ZSB SWI-TEC-Mastlift 13m, Rev B, Page 1 (similarly 25m)
- ZSB SWI-TEC-Mastlift 13m, Rev B, Pages 2
- ZSB SWI-TEC-Mastlift 13m, Rev B, Pages 3

**Scope:** Review of SWI-TEC-Mastlift calculations (materials, safety factors), main shaft (ultimate strength only), drum, cable connection (3 turns), load brake or work brake

**Conclusion:** The winch **SWI-TEC-Mastlift** meets the technical specifications of the data sheet. It is suitable for the intended use – hoisting and lowering of persons.

**Note:** The "ratchet brakes (ratchet and pawl mechanism)" is acting as clutch when lifting or lowering. It does not work as mechanically and operationally independent second brake (ref. GL Rules Part VI, Chapter 2, Section 9).

The operating instructions, in particular the instructions for operating the winch, are an integral part of the intended use. Special attention needs to be paid to make sure that rope is wound up properly; lifting operation must be stopped immediately in the event of overriding.

**Usage Note:**

In operation, an additional and independent system against free fall hazard needs to be used, e.g. a fall arrester.

The review was performed by Dipl.-Ing. Frank Poetsch, Principal Approval Engineer, Machinery (MCADE698).

for **DNV GL**



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