The Mobile Winch with TIRAK®
for Material Transport
with wire rope winder for 250 m of wire rope

Operating and Maintenance Manual

This manual must be available for the user at all times.
Additional copies can be obtained on request.

Mobile Winch Models
MX 500 P/250
MX 700 P/250

Mobile Winch Model
MT 1000 P/250

Specification:
Model: Serial No: Delivery Date:

Greifzug GmbH
A TRACTEL Group Company
1. Warning Advice

Failure to follow all instructions contained in this manual and all Safety regulations may result in injury.

Anchoring, maintenance, and/or operation of “Mobile Winches with TIRAK®” must only be carried out by persons, who are fully trained and authorised to anchor, maintain, and/or operate the winch by their employer. The operator should know and follow the employers safety rules and worksite regulations as well as the manufacturers instructions and safety rules in this manual.

2. Machine Description

2.1 Purpose
The “Mobile Winch with TIRAK®” is a portable, electrically driven hoist for lifting, lowering, and pulling of loads by means of a TIRAK® wire rope recommended by the manufacturer. This wire rope is mandatory for the safe and troublefree working with the “Mobile Winch with TIRAK®”.

2.2 Working principle
Provided that the “Mobile Winch with TIRAK®” is aligned in direction of pull, it will work in any position and in any direction. For either lifting or lowering there is one corresponding push button. The wire rope is driven through the hoist with constantly even safety and is stored in the rope reeler. The reeler is automatically driven by the in-running resp. out-running wire rope.

The “Mobile Winch with TIRAK®” of MT 1000 series with a capacity of 1000 kgs is complete with a pulling force limiting device.

MAN-RIDING is not allowed, unless the following conditions are met:
- The “Mobile Winch with TIRAK®” winch must be suitable for man-riding, and
- A secondary fall arrest device, operating on a separate safety wire rope must be provided; the Primary and Safety rope must not be attached to the same anchor point, and
- the Man-riding installation and suspension system must comply with all relevant Safety Regulations in force for such installations.

Where a TIRAK® machine is used as part of a suspended access system the manufacturer of the system is responsible for the design and construction of the system. The user is responsible for the safe use of the equipment having read and understood the instruction manual(s) supplied by the manufacturer.
2.3 Main components and operating controls

![Diagram of winch components]

2.4 Technical Data

Design according to DIN 15 020, transmission group 1 Bm.

Technical modifications reserved.

<table>
<thead>
<tr>
<th>Mobile winch with TIRAK®</th>
<th>Capacity</th>
<th>Wire rope speed</th>
<th>Type of drive</th>
<th>Output</th>
<th>Rated current</th>
<th>TIRAK rope Ø</th>
<th>Dead weight approx.</th>
<th>Dimensions</th>
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<td>kg</td>
<td>m/min</td>
<td></td>
<td>kW</td>
<td>A mm</td>
<td>kg³</td>
<td>kg/min</td>
<td>a b c</td>
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<td>8</td>
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<td>1,9/3,6</td>
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</table>

1) If the capacity is not sufficient in direct pull, multiply it by reeving the rope according to the block and tackle principle. Details on page 4.
2) D = 400 V three phase; W = 230 V single phase.
3) without wire rope
4) with Lifting force limiter

2.5 Wire Ropes

- Diameter: 8 mm (see ferrule)
- Construction: non rotating
- Equipment: Swivelling hook
- Marking: One core red colored
- Weight: 0.25 kg/m

2.6 Noise emission (at 1m distance)

"Mobile Winch with TIRAK®"

<table>
<thead>
<tr>
<th>Type</th>
<th>Capacity</th>
<th>Noise emission</th>
</tr>
</thead>
<tbody>
<tr>
<td>MX 300 P/80:</td>
<td>max. 72 dB(A)</td>
<td></td>
</tr>
<tr>
<td>MX 500 P/80:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MX 700 P/80 und:</td>
<td>max. 70 dB(A)</td>
<td></td>
</tr>
<tr>
<td>MT 1000 P/80:</td>
<td></td>
<td></td>
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</tbody>
</table>
3. Setting up

3.1 Required equipment
a) “Mobile Winch with TIRAK” of correct capacity.
b) TIRAK® wire rope with correct diameter and of sufficient length.
c) Electric supply cable of correct type and required length, with sufficient leads cross sectional area.
d) Anchoring devices for fixing both the hoist and the load (i.e. slings, belts or similar) of sufficient strength.
e) Pulleys (if required) for diverting or reeving the wire rope of sufficient strength and diameter.
f) Oil to lubricate the wire rope.

Thoroughly inspect all equipment to ensure there are no faults!

3.2 Transport

The “Mobile Winch with TIRAK®” can be carried by its frame. For the transport by crane fasten slings or similar carrying devices to the eye bolts of the frame.

3.3 Mounting

3.3.1 Choice of the anchor point
a) The anchor point (Fig. 2 and 4) resp. the wall/ceiling (Fig. 3/3a) must be checked by a competent person to ensure it is of sufficient strength to take the load and any shock load imposed.

b) If you want to lift/pull through an opening in the wall or ceiling capable of taking the load, simply site the “Mobile Winch with TIRAK®” by or above the hole (Fig. 3).

If the hole is not big enough for the rope hook to pass through, position the “Mobile Winch with TIRAK®” and pass the wire rope through the hole and then into the hoist (Fig. 3a).

Details for wire rope installation see chapter 7, on pages 8/9.

3.3.2 Increasing the capacity by reeving the wire rope

If the capacity of the “Mobile Winch with TIRAK®” is not sufficient in direct pull, it can be multiplied by reeving the wire rope according to the block and tackle principle (Fig. 5).

But double capacity means half speed.

ATTENTION! A competent person must check –

a) that the pulleys and the anchoring devices as well as all anchor points are of sufficient strength, and

b) that the pulleys are of the correct diameter.

Important for horizontal pull:
Do not confuse the dead weight of the load with the effort required to pull it: the TIRAK® has only to overcome the friction coefficient.
3.3.2 Increasing the capacity …  
(continued)

**Attention!**  
With the wire rope reeved the upper limit switch cannot be activated by the fist grip clip, which is mounted on the rope near the rope hook. 
The operator has to watch the load very carefully or have it watched by a second person.  
The rope hook must not reach the diverter pulley!

3.3.3 Anchoring the hoist

**(A) Anchoring with a sling, belt or similar**

Opposite to the wire rope entry the TIRAK frame contains an anchor bolt (Fig. 6). Use it for anchoring the “Mobile Winch with TIRAK™” to an appropriate anchor point.  

**Attention!**

- Check the correct position of the safety pin according to Fig. 7!  
- The “Mobile Winch with TIRAK™” must be able to align itself in pulling direction (Fig. 8).
- Maximum allowable deviation from squareness is 5° (Fig. 9). If necessary use diverter pulleys (Fig. 2).

**Attention!**  
When using diverter pulleys the upper limit switch cannot be activated by the rope clamp, which is mounted on the rope near the rope hook. 
The operator has to watch the load very carefully or have it watched by a second person.  
The rope hook must not reach the diverter pulley!

**(B) Positioning by/above an opening in the wall or ceiling capable of taking the load**

**Attention!**

- The wire rope must be able to freely run in and out!  
- Secure the “Mobile Winch with TIRAK™” against becoming displaced!
3.4 Electrical Connections

a) Ensure correct mains voltage supply:
   - **Three phase:** 400 V (3P + E + 0), 50 Hz, 16 A CE-plug
   - **Single phase:** 230 V (2P + E), 50 Hz, 16 A Schuko-plug

   If in doubt: ask the supplier.

b) To avoid power loss between power source and the TIRAK®, always use power cables with adequate cross sectional area. See Tables 1a and 1b.

c) Use only heavy duty cables with incorporated strain relief.

d) Hanging cables longer than 30 m should be fixed by means of a cable sleeve or cable clamp.

e) When using a generator its output must be at least 2.5 times greater than the TIRAK® power consumption.

4. Operation

4.1 Electrical Controls

Push button control for UP and DOWN (Fig. 11).

On machines with two speed motor:

- Half depressed = low speed
- Fully depressed = high speed.

Red EMERGENCY-STOP button:

- Button depressed = mains supply interrupted.

To START, turn red EMERGENCY-STOP button clockwise, until it releases.

**Important:** The built-in phase control relay prevents the motor from turning in the wrong direction. If the hoist does not run, turn the phase inverter of the plug for 180° (Fig. 12).

4.2 Checks before starting

a) Check that the UP/DOWN push buttons and EMERGENCY-STOP button are working correctly.

b) Check correct anchoring of “Mobile Winch with TIRAK®” and load.

c) Make sure that no person is immediately below the suspended load.

4.3 Normal Operation

a) To lift/pull: depress the UP button.

To lower: depress the DOWN button.

b) TO STOP movement of the load:

   A) release push button;
   B) press EMERGENCY-STOP;
   C) pull out the plug!

   In cases B) and C): STOP working. The “Mobile Winch with TIRAK®” must be checked/repairs by the manufacturer or a repair shop agreed by him.

c) **Attention** must be paid to the load during all movements – if necessary by a second person.

d) Keep wire rope lightly lubricated.

e) When lifting/lowering prevent the load from rotating (Fig. 12).

f) When stopping the hoist the load is securely held at any position by the primary brake.

4.4 Security of suspended loads

Cordon off the danger zone below any suspended load.
4.5 Emergency Descent

In case of power failure you can manually open the brake on hoists which are equipped for this purpose:

- Take the control lever from the TIRAK® carrying handle, insert it through the motor cover into the brake release point and push it in arrow direction (Fig. 13).
- With the brake released the load is lowered, and the centrifugal brake limits the speed of descent.

To STOP: release the control lever.

After use: Restore brake release lever into its rest.

4.6 Troubleshooting

**WARNING!** AVOID INJURIES:

1. Checks an repairs of the electrical equipment must only be carried out by qualified electricians! Wiring diagrams are shown in the control box of the motor.
2. Any other repairs should only be carried out by the manufacture or by a repair shop agreed by him. And only original spare parts shall be used.

### 4.6.1 Wire Rope Drive Mechanism Troubles

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| The hoist operates, but the wire rope does not move through, i.e. no UP or DOWN travel. | Damaged wire rope, wrong wire rope, or obstructed wire rope exit. | You may continue your job proceeding as follows:  
- If available, install an auxiliary hoist, and take over the load with that hoist.  
- Disconnect the load from the slack wire rope of the failed hoist.  
- Continue the work with the newly installed hoist. |

**WARNING! STOP OPERATIONS IMMEDIATELY!** Continued operation the “Mobile Winch with TIRAK®” might cause breakage of wire rope!

**CONTACT YOUR SUPPLIER**

### 4.6.2 Troubles with Motor, Control or Brake

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Motor does not run at all.</td>
<td>Upper limit switch has cut off lifting/pulling.</td>
<td>No problem – lowering/releasing the load is possible.</td>
</tr>
</tbody>
</table>
| 2. Excessive motor noise | Wire rope end detector has cut off lowering/releasing. Reeler survey switch has cut off lowering/releasing.  
- Slack wire rope between drum and TIRAK. | Torque of drum sliding clutch is too low. Check/adjust according to para 8.1.2 on page 11. |
| 3. Overheating | Phase inversion | Turn phase inverter of plug for 180°. |
| 4. Abnormal noises | Current failure | Check fuses, power cords, connections. |
| | Overheating | Let the motor cool down. Trace the reason for overheating:  
- Insufficient cooling  
- Overload |  
- Clean air inlet at the motor cover, and ensure a good ventilation of the motor.  
- Check the load. If necessary reduce the load or use multiple sheave blocks (see chapter 3.3.2 on page 4). |

**DANGER!** Disconnect any power supply before opening a control box or a pendant control!

If the above checks and actions do not overcome the problem:  
**CONTACT GREIFZUG GmbH or a repair shop agreed by him.**
5. Replacing the wire rope

5.1 Preparation

CAUTION!
Use gloves, when handling wire ropes.

a) Use only specified wire ropes (see chapter 2.5, page 3).
b) Check correct diameter and sufficient length of the wire rope.
c) Always unreel the wire rope in a straight line (Fig. 14), to prevent it from becoming unusable because of loops.
d) Check the condition of the wire rope for damage:
   - swivelling hook is not bent; safety catch is in place on the hook; proper connection between the wire rope and the hook (rope eye, ferrule) (Fig. 15);
   - the wire rope has no visible damage along its total length; the fused and tapered end is according to Fig. 16.
e) Check the wire rope equipment (Fig. 17):
   - Fist grip clip for upper limit switch activation,
   - Limit switch activating spring.

5.2 Running out the wire rope

When unreeling the the wire rope (i.e. going DOWN) the TIRAK® pulls the wire rope off the reeler against the braking force of the incorporated friction coupling.

We recommend to take off the fist grip clip near the rope hook, to slide the limit switch activating spring over the out-coming wire rope and to store the wire rope on a drum hasp.

a) Press DOWN-button to let the wire rope run out and STOP, before the last loop of wire rope is torn off the drum (Fig. 18).
c) Loosen fixing bow.

Important:
The wire ropeguiding tube is pushed away from the drum by means of the spring and stops DOWNWARDS travel by means of the limit switch (Fig. 19 a), which controls proper wire rope storage (stopping at slack wire rope) and prevents the wire rope from being inadvertently run out causing a load to fall down.

To completely run out the wire rope:

d) Push wire rope guiding tube towards the drum (Fig. 20) and press DOWN button, until the wire rope has come out.
e) Take off limit switch activating spring from the wire rope.

Important: Keep fist grip clip and limit switch spring at hand — You need them when installing the new wire rope!
5.3 Wire Rope Installation

a) Slide the limit switch spring onto the wire rope tip (Fig. 17).
b) Feed the wire rope as far as possible into the wire rope entry guide of the upper limit switch.
c) Press UP-button, and push the wire rope, until it starts to reeve itself automatically.
d) If it will not reeve, check:
   - Wire rope tip in correct shape?
   - Did you press UP-button?
   - On three phase motor: Let a qualified electrician exchange the leads of two phases inside the hoist plug.
e) Let the wire rope run through until its end reaches the rope reeler.
f) Fix the wire rope’s end to the reeler with the fixing bow (Fig. 18).
g) Press UP-button to reel the wire rope.

**Important:**
Check that the first layer of wire rope is properly coiled — i.e. no gaps between the rope loops (Fig. 21)!

h) Fix fist grip clip for upper limit switch activation to the wire rope between the ferrule and the limit switch spring (Fig. 17).

6. Out of Operation

6.1 Temporary Stoppage

- Disconnect power supply, to prevent any unauthorized operation:
  - Disconnect power cord at the hoist pigtail as well as the main outlet
  - turn and lock the main switch to „0“.
- Cordon off the danger zone below any suspended load.

6.2 End of Operation

- Let the wire rope completely run in.
- Disconnect power cord at the hoist pigtail as well as the main outlet; check for any damage and reel the cable.
- Disconnect the “Mobile GRIPWINCH®” from its anchor point.
- Clean the exterior and store it in a clean and dry place.
7. Safety advice

a) DO NOT overload the “Mobile Winch with TIRAK®”.
b) DO NOT stand below a suspended load.
c) The “Mobile Winch with TIRAK®” must only be used for lifting, pulling, and lowering of loads. Use for other purposes is not allowed.
d) Anchoring, maintenance, and/or the operation of the “Mobile Winch with TIRAK®” must only be done by persons, who are familiar with it. They must have obtained the order to anchor, maintain, and/or operate the hoist by the employer.
e) The operator has to know and to follow all relevant local safety regulations, and maintenance recommendations, as well as this operating instruction, and the operator has to have been instructed.
f) The operator must not start any movement of the load until he has checked that the hoist and the load are properly anchored, and that no person is stood in the danger zone below any suspended load, or until he has got a starting signal from the slinger.
g) The operator must watch the load during all movement operations of the hoist.

h) The operator must watch the load very carefully or have it watched by a second person. The rope hook must not reach the diverter pulley!

i) DO NOT use the “Mobile Winch with TIRAK®” with standard electric equipment in a potentially explosive atmosphere – around distilleries, refineries, chemical plants, ship or silo interiors. Always obtain official approval before commencing operations at these or similar locations.

8. Maintenance/Checks/Repair

8.1 Maintenance

8.1.1 Wire rope conveying mechanism
The mechanism does not require any special maintenance.

Lubrication: Keep the wire rope lightly lubricated. This will not affect the gripping power but will prolong the life of wire rope to a maximum.

8.1.2 Wire rope drum and Guiding
a) Keep rope reeler clean and take care that it is always free-running.
b) Keep rope guide spring clean.
c) Correct wire rope winding requires a defined torque of the sliding clutch, which is incorporated to the reeler drum. The required torque at the radius defined by the adjustment hole (1) is:

- 9 m/min wire rope speed approx. 20 daN(kg);
- 18 m/min wire rope speed approx. 26 daN(kg).

k) The “Mobile Winch with TIRAK®” has to be anchored in such way, that the deviation from squareness of the wire rope under load does not exceed 5°.

m) Do not use the wire rope to fix the load, and do not pull it over sharp edges.

l) The wire rope reeler must always be able to free-running.

m) Do not use the winch, if wire rope end is not fixed to the drum.

n) Near the ferrule of the hook there must be fixed a fist grip clip for upper limit switch activation. Never let the fist grip clip be pulled towards the ferrule.

o) The operator has to watch the load very carefully or have it watched by a second person. The rope hook must not reach the diverter pulley!

p) In case of wire rope reeving the upper limit switch cannot be activated by the fist grip clip. The operator has to watch the load very carefully or have it watched by a second person.

q) DO NOT use the “Mobile Winch with TIRAK®” with standard electric equipment in a potentially explosive atmosphere – around distilleries, refineries, chemical plants, ship or silo interiors. Always obtain official approval before commencing operations at these or similar locations.
To check the torque proceed as follows:
1) Fix a dynamometer to a rod slid into adjustment hole (1) (Fig. 24).
2) Push and hold UP-button, and control torque at the dynamometer.
   If torque is not correct:
3) Loosen stud screw (2) and turn adjustment nut (3)
   – clockwise in order to tighten,
   – counter-clockwise in order to loosen sliding clutch torque.
4) When the correct torque is set, retighten stud screw (2).

8.1.3 Wire ropes
a) Always unreel and reel the wire rope.
b) Do not use the wire rope for fixing the load, and do not pull it over sharp edges.
c) Keep the wire rope always clean and lightly lubricated.

8.2 Checks
8.2.1 Essential checks
a) General
   Prior to every operation
   and
   during operation make sure, that the “Mobile Winch with TIRAK®” and all other used equipment (anchoring devices, pulleys etc.)
   – are properly installed
   – and without visible damage.

Attention!
If during operation damage appear:
   – STOP operating,
   – if necessary: cordon off the danger zone ,
   – and
   – let the damage be removed!

b) Wire Ropes
Attention!
Wire ropes should be checked along their entire length before every operation and replaced if any one of the following defects is noticed:
   – 10 or more broken wires along any length of 30 times the diameter of the wire rope.
   – Excessive external or internal corrosion .
   – Heat damage, externally recognised by discoloration.
   – Reduction of the wire rope diameter by 5 % or more compared to the nominal diameter.
   – Exterior deformations*) of the wire rope like bird-caging, kink or loop formation.

8.3 Repair
Repair of “Mobile Winches with TIRAK®” must only be carried out by the manufacturer, or by a qualified person, and only original spare parts shall be used.

*) These are only examples of the most common wire rope damage. Maintenance and safety checks of the wire rope must be done according to the safety regulations in force.
9. Spare parts

9.1 Wire rope drive mechanism

As well as spare part number and description please always quote
– TIRAK® type
– wire rope diameter, and
– Serial N°!

9.2 Motor and Brake

As well as spare part number and description please always quote
– Motor type
– Type and supply voltage of the brake!

9.3 Electrical Controls

In case of enquiries or spare parts order please always quote the
Wiring Diagram N°!
The Wiring diagram is situated in the control box of the motor.

9.4 Nameplates and Labels

Make sure that all nameplates and labels are in place and not obscured (s. Fig. 23).
Replace missing labels and those which are not legible!

Spare parts lists are available from your supplier or from TIRFOR Ltd.

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DECLARATION
OF CONFORMITY

Greifzug Hebezeugbau GmbH
D-51434 Bergisch Gladbach, Postfach 20 04 40,
represented by Mr. Clemens Vedova, MBA Insead,
General Marketing Manager, declares that:

The equipment described below conforms to the technical safety rules, which are applicable for the supply to the European Union market.

Signature

C. Vedova

APPLICABLE REGLEMENTATIONS:

EU-DIRECTIVES: N° 89/392 – 91/368 – 93/44
N° 93/68 – 89/336 – 92/31 – 93/68
EU-STANDARDS: N° EN 292 – EN 418
EN 60204-1 – EN 50081-1 – PREN 50082-1
GERMAN STANDARD:
UVV „Winden, Hub- und Zuggeräte (VBG 8)”

DESCRIPTION: Electric driven endless winch
APPLICATION: Lifting, lowering and pulling of loads
MAKE: Mobile Winch with TIRAK®
MODEL: MX 500 P/250, MX 700 P/250,
MT 1000 P/250

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Fig. 23

A) Label „Capacity”
B) TIRAK® Nameplate with serial N°
C) Motor Nameplate
D) Brake Nameplate
E) Label „Wire rope Ø”
F) Label „Emergency descent”
G) Label „Phase control relay”
H) Label „Limit switch spring”