tirak®

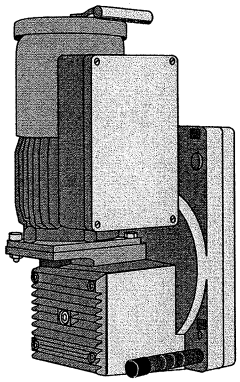
Electrically powered endless hoist

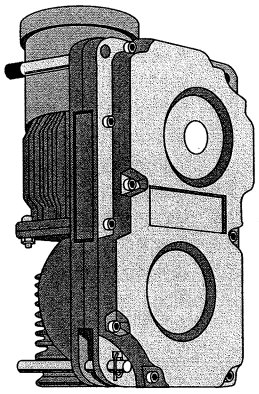
for materials handling

Original Operating Instructions

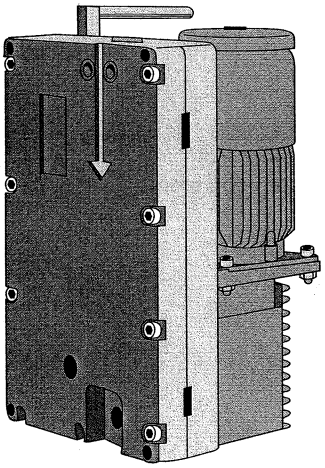
CE

TIRAK®
series
X 300
X 500
X 700
X 800
X 1020

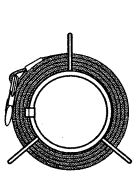


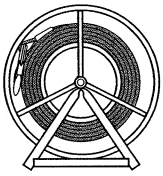


TIRAK®
series
T 1000



TIRAK®
series
X 3050





With TIRAK® wire ropes
of different lengths
on winders

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

Tractel Group

www.tractel.com

Contents

Information for this Operating and Maintenance Manual

Date of edition

1. Edition: May 2000

Copyright

The copyright of these assembly and operating instructions shall remain with the manufacturer.

Address of the manufacturer:

GREIFZUG Hebezeugbau GmbH
Scheidtbachstraße 19-21
51469 Bergisch Gladbach
Germany
Telefon: +49 / 22 02 / 10 04-0
Telefax: +49 / 22 02 / 10 04-50 or -70

For addresses of other TRACTEL Group Companies see page 28.

Notes for mabufacturers of an installation with built-in TIRAK®

Important!

The manufacturer of an installation for lifting/ pulling/driving loads in which a TIRAK® hoist is built in **must indicate all instructions** for the safe use of this installation **at the corresponding points of the instructions which must be prepared for the installation by the manufacturer.**

Merely enclosing these instructions does not satisfy the requirements of **the EC Machinery Directive** or the applicable standards!

Explanation of symbols used

Safety advice

Symbol	Code word	Meaning	Possible consequences of non-compliance
	**DANGER**	**IMMEDIATE or possibly imminent danger:**	**Fatal or serious injuries!**
	**DANGER**	**IMMEDIATE or possibly imminent danger through dangerous voltage:**	**Fatal or serious injuries!**
	**CAUTION**	Possibly **dangerous situation:**	**Injuries to persons** or **damage to property.**

Altre avvertenze

	**Attention**	Possibly **dangerous situation:**	**Damage to appliance.** or its **surroundings.**
	**Important**	**Useful tips** for optimum working:	None

Directions

 (without code word))

Instruction to **operation/ documentation in writing.**

1. Safety advice

Follow all instructions and safety regulations contained in this manual to avoid injuries.

a) **DO NOT** overload the TIRAK® hoist.

b) **DO NOT** stand below a suspended load.

c) TIRAK® hoists must only be used for lifting, pulling, lowering, and moving back-and-fro of loads[1]. Use for other purposes is not allowed.

d) TIRAK® hoists with standard electric equipment must not be used in a potentially explosive atmosphere[2].

e) Anchoring, maintenance, and/or the operation of TIRAK® hoists must only be done by persons, who are familiar with it. Employees must have received the instruction to anchor, maintain, and/or operate the hoist by their employer.

f) 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 must have been instructed.

g) 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.

h) The operator must watch the load during all movement operations of the hoist. If the operator is unable to watch the complete working area, the danger zone must be cordoned off, or a second person must be positioned to enable the complete working area to be watched and have adequate means of communication with the hoist operator during the whole operation.

i) The TIRAK® hoist has to be anchored so that the wire rope under load is vertically entering the hoist.

k) Use only the recommended TIRAK® rope in good condition. Use only normally commercially available multi-purpose grease for the lubrication of the rope. Do not use lubricants containing disulphide (e.g. Molycote®).

l) When using a rope other than the recommended TIRAK® rope the warranty entitlement given by GREIFZUG Hebezeugbau GmbH or other company of the TRACTEL Group shall not apply.

m) Before starting the assembly check all parts for completeness and error-free quality.

n) Only anchor the TIRAK® hoist at the points provided for this purpose (connection rods, anchor points, or load pins).

o) When using self-securing nuts please observe the following:
   - the screw must **protrude from the nut** with at least half its thread diameter;
   - **do not re-use nuts** if they can be unscrewed by hand!

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

q) Do not fix any load to the free wire rope end, which exits from the winch at the opposite side to the wire rope under load.
Exception: Use of a TIRAK® hoist of the type series T 1000 in to-and-fro travel.

r) Never use a rope which is too short for the job you are doing. When the load or machine is at its lowest point, a minimum length of 1 metre of wire rope should be below the rope exit of the TIRAK®.

s) The ferrule of the wire rope hook must not reach the TIRAK®-casing during lifting/pulling the load. Exception: A limit switch for lifting limitation is attached to the TIRAK® hoist (see accessories on page 25).

t) The electrical connection of the TIRAK® as well as of electrical accessories must be carried out in accordance with EN 60204-1.

u) Checks and repairs to the electrical system must only be carried out by qualified electricians.

v) Other checks and repairs must only be carried out by GREIFZUG Hebezeugbau GmbH, an other company of the TRACTEL Group or by a hoist workshop.

w) GREIFZUG Hebezeugbau GmbH or other company of the TRACTEL Group shall assume no liability for damages resulting from conversions or alterations to the devices supplied by itself or as a result of the use of non-original parts.

1) TIRAK®-Hoists for man riding on request.
2) TIRAK®-Hoists can be supplied for these applications on request.

2. Exclusion of non-intended use

Use of standard TIRAK® hoists and other equipment for materials handling under the following conditions **is prohibited**:

- at temperatures **below -10 °C** or **above +50 °C**, for **X 1030 to 2050 P** series **below -15 °C** or **above +80 °C** (for advice regarding gearbox oils for lower/higher temperatures see chapter 8.3);
- in potentially explosive atmosphere.

Machines for these conditions can be supplied on request.

3. Machine description

3.1 Purpose

TIRAK® hoists of the series

X 300 , X 500 , X 700 , X 800,
T 1020, X 1000, X 3050

are portable, electric driven hoists for

lifting, lowering, pulling, and movement of loads

by means of a TIRAK® wire rope prescribed by the manufacturer.

This wire rope is mandatory for the safe and trouble-free working with TIRAK® hoists.

3.2 Working principle

Provided that TIRAK® hoists are aligned in the direction of pull, they 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 winch with constantly equal safety, and the length of wire rope i. e. the possible pulling length, is practically unlimited.

TIRAK® hoists with a **capacity of 1000 kg or more** have an integrated load limiting device.

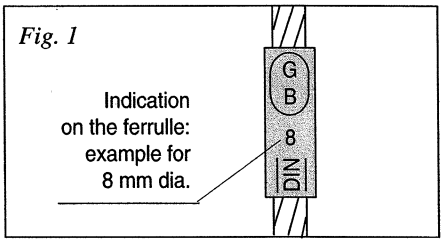
TIRAK® hoists of **T 1000** series can **pull in both directions**.

3.3 Allowed TIRAK® wire rope for materials handling

for TIRAK®-series	**Wire rope-Ø**
X 300 X 500 X 700 X 800 T 1000	**8 mm**
X 1020	**9 mm**
X 3050	**14 mm**

Identification: one **red** strand.
Diamater indication on the ferrule:

Fig. 1



3.4 Noise emission

TIRAK® series (Distance 1 m)

X 300: ..... max. 72 dB(A)

X 500/700/800/1020, T 1000: ..... max. 70 dB(A)

X 3050 ..... max. 78,5 dB(A)

3.5 Main components and operating controls

Fig. 2a

TIRAK®
series
X 300
X 500
X 700
X 800
X 1020

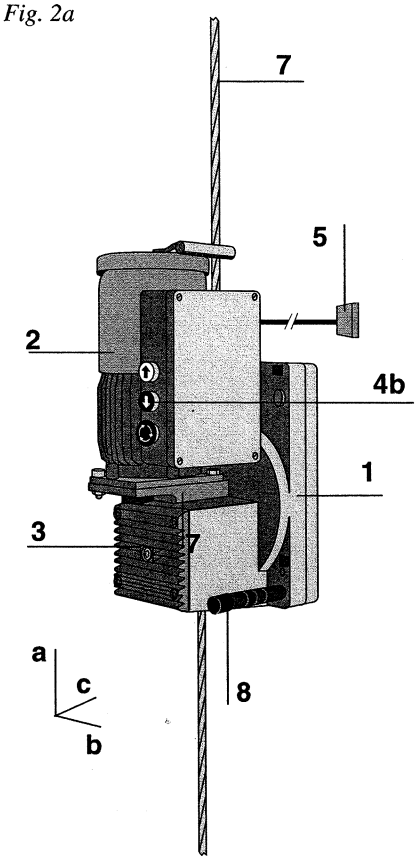


Fig. 2b

TIRAK®
series
T 1000

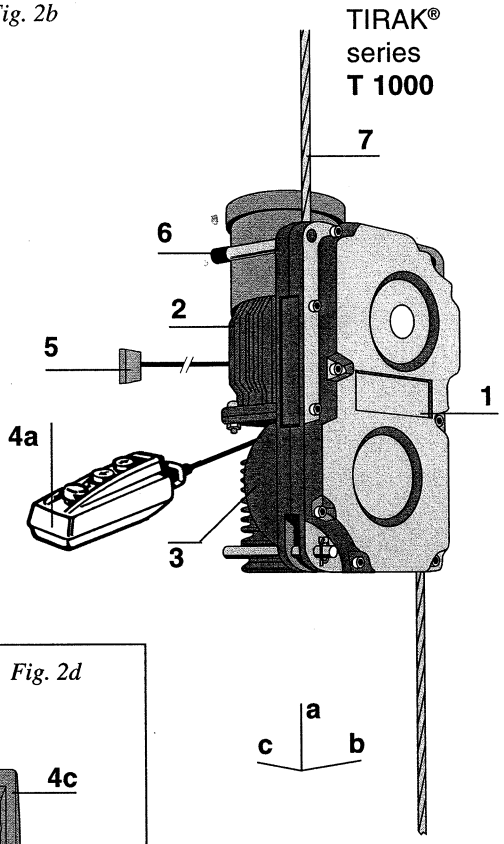


Fig. 2d

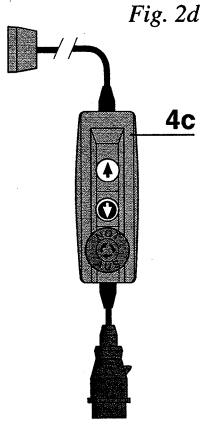
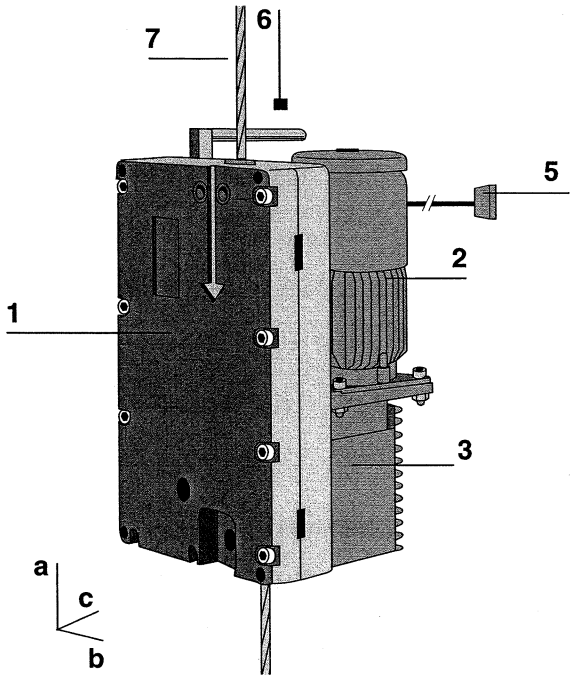


Fig. 2c

TIRAK®
series
X 3050



1. Wire rope drive mechanism
2. Motor
3. Gearbox
4. Controls
   a with central control box
   b at the terminal box
   c with pendant control, mounted on the terminal box
   d with pendant control, with connector
5. Where appliable:
   connector to the central control box
6. Brake release lever
7. Wire rope

3.6 Technical Data

Design according to DIN 15 020, transmission group 1 B_m resp. 1 C_m.
Technical modifications reserved.

Hoist	Capacity-	Rope speed	Type of drive	Output	Rated current	TIRAK®-rope Ø	Dead weight approx.	Dimensions		
								a	b	c
TIRAK®-Model	kg[2]	m/min	–[3]	kW	A	mm	kg[4]	mm	mm	mm
X 300	**300**	9	D	0,5	1,6	8	27	437	262	265
X 302		18	D	0,9	2,6	8	27	437	262	265
X 301		9	W	0,45	4,5	8	29	476	257	245
X 500	**500**	9	D	0,9	2,8	8	40	489	297	265
X 502		18	D	1,8	5,0	8	43	504	297	265
X 503		9/18	D	0,9/1,8	2,8/5,1	8	47	504	297	285
X 501		9	W	0,9	6,5	8	49	556	297	256
X 700	**700**	9	D	1,5	3,9	8	45	525	297	265
X 800	**800**	9	D	1,6	4,5	8	45	525	297	265
X 805		4,5/9	D	0,8/1,6	3/4,2	8	50	563	304	285
X 806		4,5/18	D	0,8/3,2	3,6/9	8	71	603	328	315
X 803		9/18	D	1,75/3,5	4/8	8	49	550	297	285
T 1000	**980**	9	D	1,9	4,6	8	71	580	336	311
T 1005	(1000[5])	4,5/9	D	0,9/1,9	3,6/4,6	8	84	642	355	318
T 1006		4,5/18	D	0,9/3,8	4,0/9,7	8	94	679	386	348
T 1003		9/18	D	1,9/3,8	5,5/9,5	8	85	642	355	348
X 1020	**980**	9	D	1,9	4,6	9	45	525	297	265
X 1025	(1000[5])	4,5/9	D	0,9/1,9	3,5/4,8	9	55	563	307	285
X 1026		4,5/18	D	0,9/3,8	4/9,6	9	71	605	332	315
X 1023		9/18	D	1,9/3,8	4,5/8,5	9	56	563	307	315
X 3050	**3000[5]**	6	D	3,8	9,9	14	105	669	400	372
X 3052		12[6]	D	7,5	17	14	117	681	403	372
X 3053		6/12[6]	D	3,8/7,5	9,9/19	14	156	786	428	442

Table 1

1) Hoist to 9 m/min = transmission group 1B_m, Hoists over 9 m/min = transmission group 1C_m
2) If the capacity is not sufficient in direct pull, multiply it by reeving the rope according to the block and tackle principle.
3) D = 415 V three phase current; W =110/220 V single phase current.
4) Weight without wire rope. 5) With load limiting device.
6) 60 % duty cycle at 12 m/min.

3.7 Increasing the capacity by reeving the wire rope

If the capacity of the TIRAK® hoist is not sufficient in direct lifting or pulling, it can be multiplied by reeving the wire rope according to the block and tackle principle.

But double capacity means **half speed**, **triple capacity** means **1/3 speed** etc.

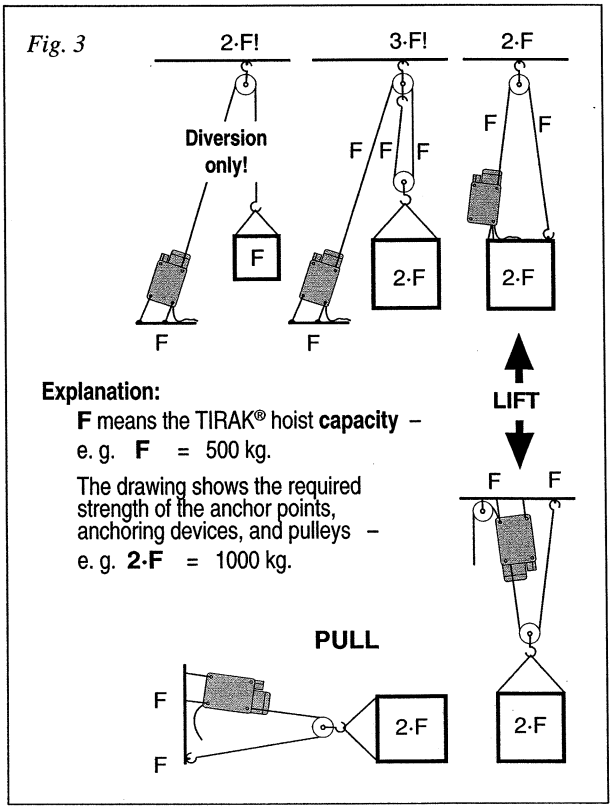
Important for horizontal pull:
Do not confuse the **dead weight** of the load with the **effort required** to pull it: the TIRAK® has only to overcome the friction coefficient.

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

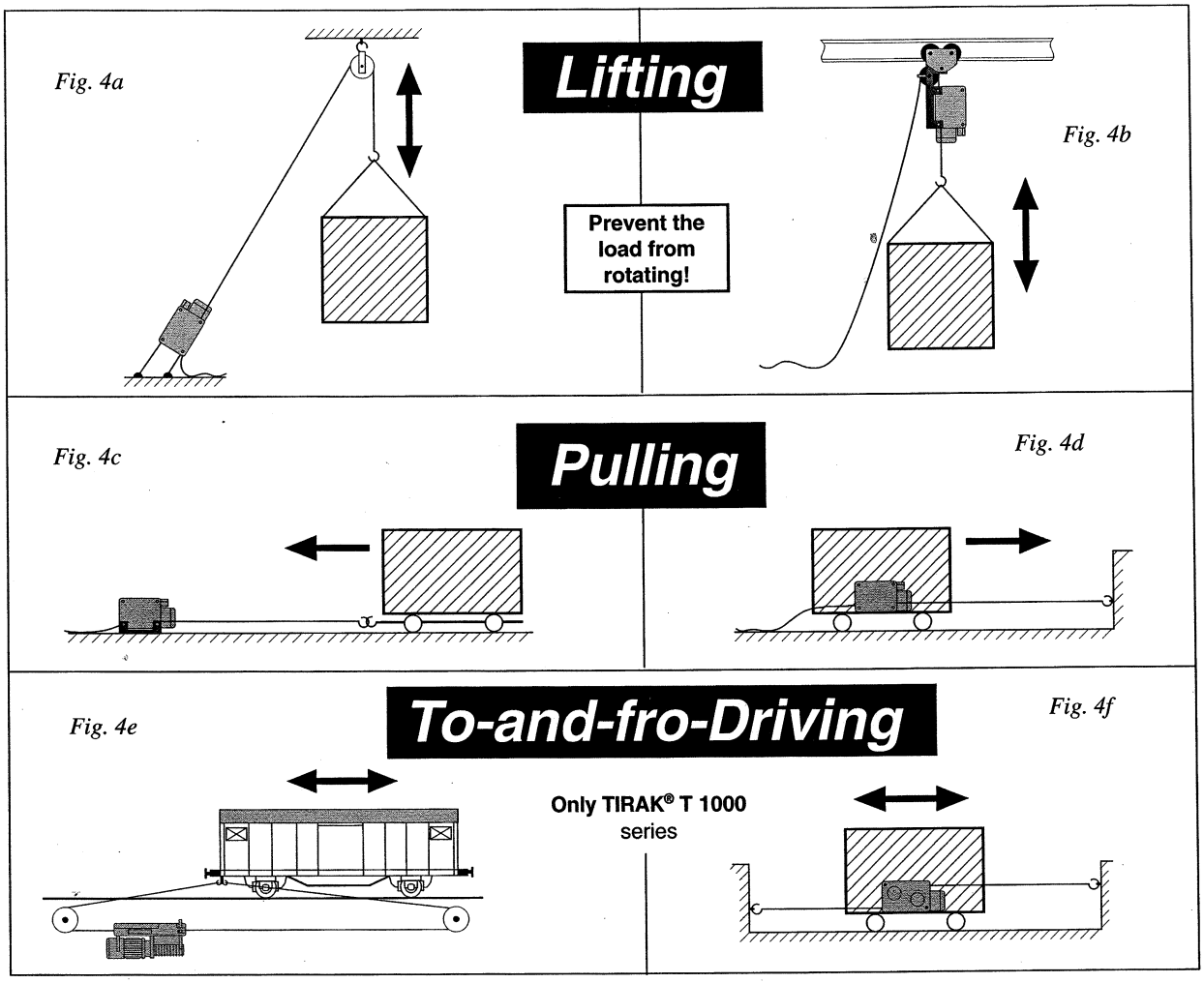
b) that the pulleys are of the correct diameter.

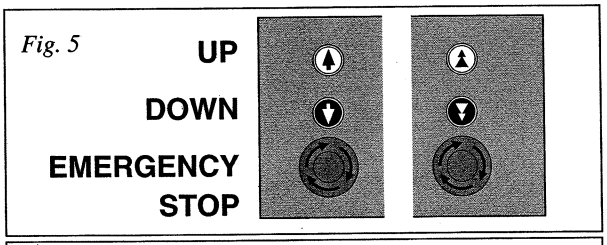
Fig. 3

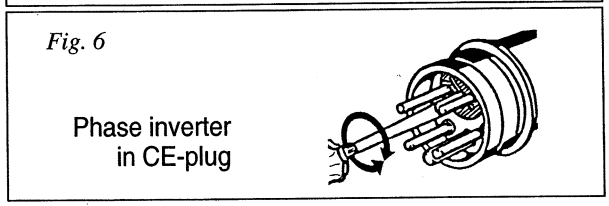


Explanation:
F means the TIRAK® hoist **capacity** –
e. g. **F** = 500 kg.
The drawing shows the required strength of the anchor points, anchoring devices, and pulleys –
e. g. **2·F** = 1000 kg.

3.8 Anchoring examples for materials handling







3.9 Safety devices

3.9.1 Primary brake

Electromagnetic brake which closes automatically

- if the UP/Down-button is released
- in case of power supply failure.

3.9.2 Emergency Stop

Pushing the red EMERGENCY STOP button in case of emergency completely switches off the hoist control. To start after clearing the problem, **turn** the EMERGENCY-STOP button **clockwise** until it releases.

3.9.3 Phase control relay

In controls with 3-phase motors, the integrated phase control relay stops the operation if the phases are reversed. This prevents wrong coordination of the UP/DOWN-buttons which would prevent operation of the load limiting device.

Correction: turn the **phase inverter** of the plug by 180° (Fig. 6).

3.9.4 Load limiting device

TIRAK®-Models **with 1000 kg capacity or more** are equipped with a **load limiting device**.

The load limiting device is set by the manufacturer in such a manner that it switches off the lifting movement at the latest when the load has reached 1.25 times the carrying capacity of the hoist.

3.9.4.1 Electronic pulling force limiting device

Possible causes for switching off:

- overload or
- blocking of the load when lifting/pulling.

Action following switching off:

Press DOWN button,

- until the load has settled and reduce the load until there is no longer any overload or
- until the load is free from the obstacle. **Remove the obstacle** before continuing to lift or pull.

Function of the load limiting device

The electronic load limiting device reacts to the current consumption of the motor. The overload is detected during lifting/pulling.

Reducing the switch off threshold value

Setting to a lower threshold value e.g. as a result of a lower carrying capacity of the components to which the hoist or diverter pulleys are anchored, can only be carried out by a qualified electrician or a hoist workshop (fig. 7):

A Pre-Setting

A.1 Nominal curent

Turn **upper regulator** to the right as far as the stop.

A.2 Start-bridging

Turn **lower regulator** to the right as far as the stop.

B. Setting

(Example for TIRAK® X 1030)

B.1 Setting the overload

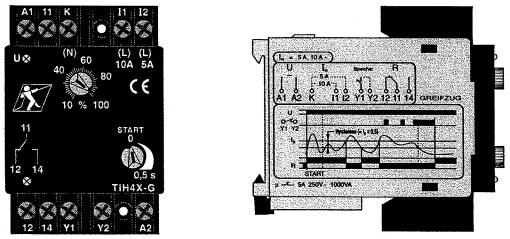
Attach **overload = rated load + 25 %**
(e. g. **1250 kg**)

During the lifting of the overload turn the **upper regulator** to the left until the hoist stops.

Lower overload until the rope is slack.

Again lift overload – the hoist must stop as soon as it comes under load.

Fig. 7 Electronic load limiting device



B.2 Setting the rated load

Attach **rated load** (e. g. **1000 kg**) and lift the nominal load from ground.

Turn **lower regulator** to the left as far as the stop.

Press UP button – the hoist must stop immediately.

***Following each stopping of** the hoist during this setting procedure, **press the DOWN button shortly** so that the upward travel is again possible.*

Step by step
– turn the **lower regulator** slightly to the right,
– then press UP button,
until lifting of the **suspended nominal load** is possible.

Important note for TIRAK® with 2 speeds (pole changing motor):
The control system contains **2 load limiting devices**, the **setting** must be carried out **for both speeds.**

3.9.4.2 Mechanical load limiting device

The load limiting device is installed in the rope drive and switches off the UPWARD travel in the event of overload.

Possible causes of switching off:

- overload or
- blocking of the load when lifting/pulling.

Action following switching off:

Press DOWN button,

- until the load has settled and reduce the load until there is no longer any overload or
- until the load is free from the obstacle; **remove obstacle** before continuing to lift or pull.

3.9.5 Manual operation

Details in chapter 5.5 on page 18

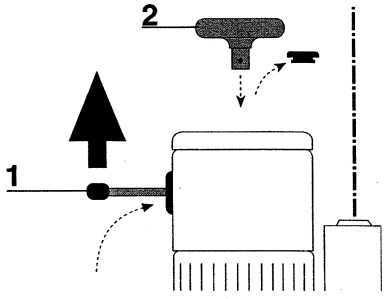
3.9.5.1 Emergency Descent

In case of power failure you can **manually open the brake** with lever (1) (Fig. 8).

3.9.5.2 Manual lifting

With the **brake opened** the load can be lifted with the hand wheel (2) placed on the motor shaft (Fig. 8).

Fig. 8



3.10 Residual risks

CAUTION!
The following risks are not constructively covered for the TIRAK® hoist :

On TIRAK® hoists without limit switch (standard version):

a) **Damage to the rope** when the rope hook is pulled as far as the TIRAK® housing. Consequently **observe rope hook during lifting/ pulling** so as to be able to stop in time.

b) **Running out of the slack wire rope end**. Consequently
   - always ensure a **sufficiently long rope**;
   - **watch rope end during lowering/slackening** so as to be able to stop in good time.

On TIRAK® hoists with load limiting device:

c) **The load limiting device** is set to the maximum carrying capacity of the respective hoist. Should a lower value be necessary e.g. due to a lower carrying capacity of components to which the hoist or diverter pulleys are anchored:
   - have **electronic load limiting device** set by a qualified person (see section 3.9.4);
   - have **mechanical load limiting device** set by the manufacturer.

d) The **electronic load limiting device** only detects an overload during lifting/pulling. Therefore particular care should be exercised when a load carrying device (material container or similar) is loaded when suspended or being lowered.

4. Setting up

4.1 Required equipment

a) TIRAK® of correct capacity, speed and voltage. Machines with a **capacity of 1000 kg or more** must have a built-in load limiting device.

b) TIRAK® wire rope with correct diameter and of sufficient length. Grease to lubricate the rope

c) Electric supply cable of correct type and required length, with correct number of wires and cross sectional area.

d) Anchoring devices for fixing the load i.e. slings, belts or similar of sufficient strength.

e) Pulleys for diverting or reeving the wire rope of sufficient strength and diameter.

Check condition of all components.

4.2 Anchoring the TIRAK®-Hoist

4.2.1 Anchoring devices and dimensions

Fig. 9 **Series X 300 P**

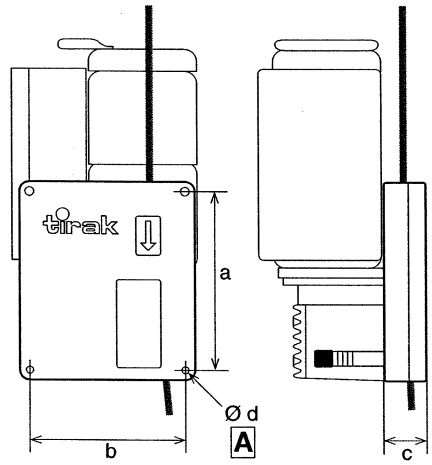
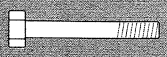


Table 3

Dimension	Dimensions [mm] for TIRAK® series			
	X 300	X 500 / 700 / 800 X 1020	T 1000	X 3050
a	255	300	449	570
b	220	267	250	360
c	60	60	56	117
Ø d	10,5	10,5	-	16,1
e	-	35	-	45
e_1	-	-	-	35
f	-	67	-	132
g	-	26	28	40
h	-	19	14	27
h_1	-	-	-	70
Ø i	-	16,5	16,5	30,1
k	112	100	-	-
l	40	40	-	70
m	12	12	-	-
n	98	98	-	-
o	32	32	-	-
p	26	26	-	-
Ø q	13	13	-	-

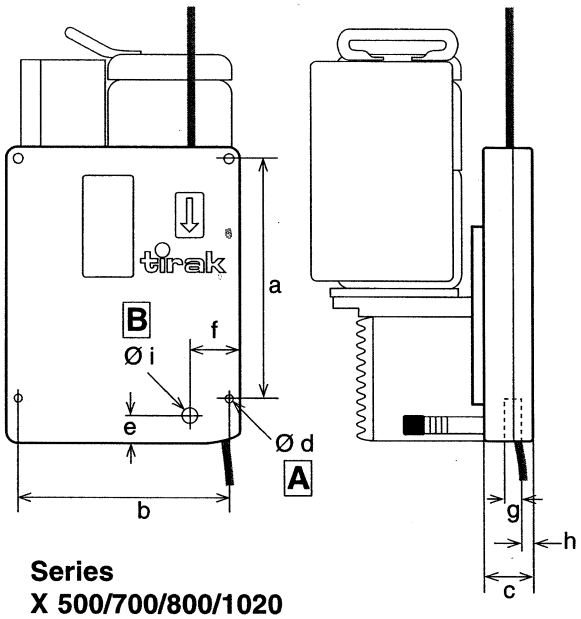
Anchoring devices



- Series **X 300/500/700/800** and **X 1020** when screwing the housing to the points **(A)**:
  M10x... screws, at least grade 8.8 with self-locking nuts;
- series **X 300/500/700/800** and **X 1020** when anchoring by means of the adapter (Fig. 11):
  M12x...screws, at least grade 8.8 with self-locking nuts;
- Series **X 500/700/800/1020 P** when screwing the housing to point **(B)**:
  M16x... screws, at least grade 8.8 with self-locking nuts;
- Series **T 1000** at points **(C + D)**:
  M16x... screws, at least grade 8.8 with self-locking nuts;
- Series **X 3050** when screwing the housing to the points **(A)**:
  M16x... screws, at least grade 8.8 with self-locking nuts;
- Series **X 3050** when screwing to point **(B)**:
  M30x... screws, at least grade 8.8 with self-locking nuts;

  Instead of the screws, bolts or similar with at least the same strength can be used.

Fig. 10



Series
X 500/700/800/1020

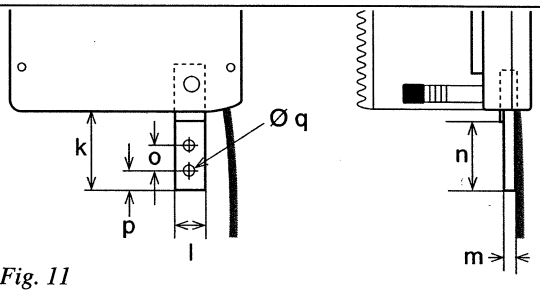
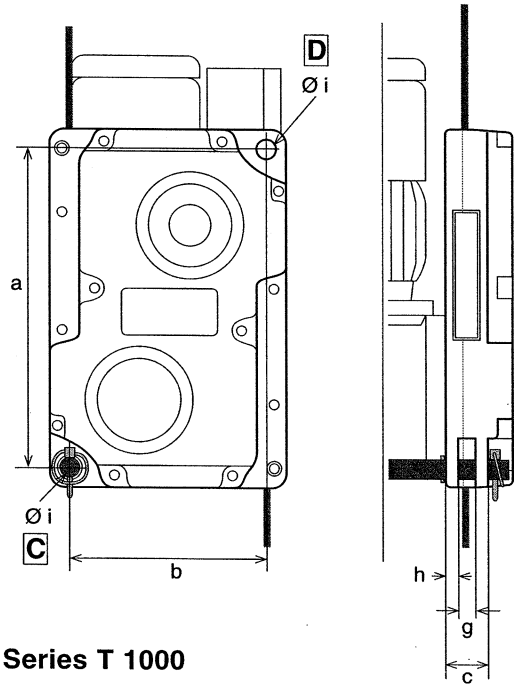


Fig. 11

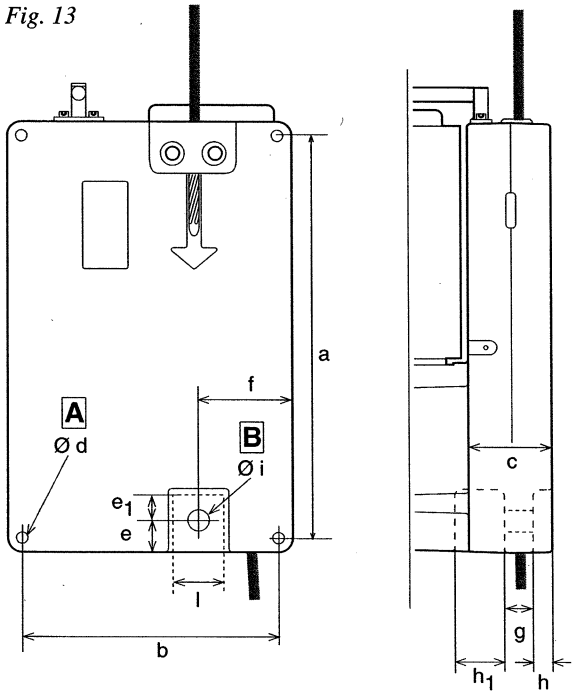
Adapter (optional) for
Series X 300/500/700/800/1020

Fig. 12



Series T 1000

Fig. 13



Series X 3050

4.2.2 Anchoring the TIRAK® hoist

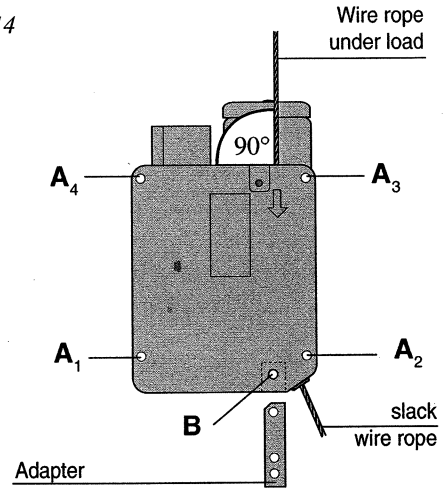
Attention:
ALWAYS anchor the TIRAK® hoist in such way that the **wire rope enters** the hoist **perpendicularly**, when under load (Fig. 14)

A) TIRAK®-series X 300 / 500 / 700 / 800 / 1020
(Fig. 14)

- Anchor TIRAK® with the **adapter at point (B)**, **or**
- anchor the TIRAK® hoist **at least at two** of the four anchoring points (A);
  allowed: A_1<–>A_2, A_2<–>A_3, A_3<–>A_4

Attention!
NOT allowed: anchoring only at points A_1<–>A_3 or A_1<–>A_4 or A_2<–>A_4.

Fig. 14



Series X 300/500/700/800/1020

B) TIRAK®-series X 3050
(Fig. 15)

- **Anchor** TIRAK® hoist with **bolt or shackle at point (B)**.

Attention:
Support TIRAK®-hoist with additional adapters in the direction of pull.

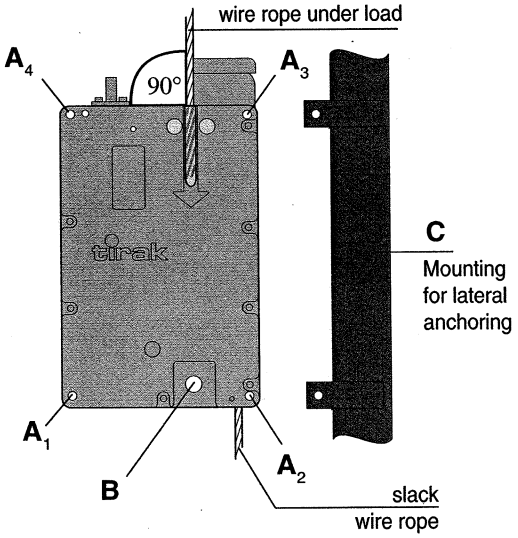
- Or anchor the TIRAK® hoist **at least at two** of the four anchoring points (A_1 to A_4);
  allowed: A_1<–>A_2, A_2<–>A_3, A_3<–>A_4,

Attention!
NOT allowed: anchoring only at points A_1<–>A_3 or A_1<–>A_4 or A_2<–>A_4.

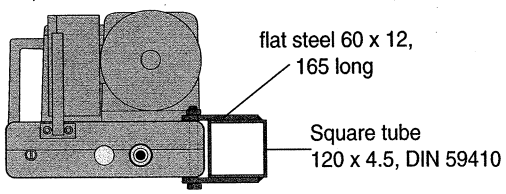
Attention:
It must be ensured by means of the mounting (C) that the force is distributed evenly over both anchor points.

Important:
When planning the anchoring we recommend consultation with the manufacturer.

Fig. 15



series X 3050



C) TIRAK® series T 1000
(Fig. 16)

- If the load is to be pulled by the hook (C) in the direction of **wire rope entry (A1)**, the TIRAK® must be anchored at point (B1).

Attention: On the **screw connection (a)** only tighten the securing nut to such an extent that **approx. 1 mm play** remains to the anchoring links (b) since otherwise these could be damaged (fig. 17).

Attention: If the load is to be pulled in the direction of **wire rope entry (A2)**, the TIRAK® must be anchored at the point (B2) **and the control** must be changed by a qualified electrician so **that the** correct **connection for UP-/ DOWN-buttons** is guaranteed.

- When **pulling in both directions**, you must anchor the TIRAK® **at both points (B1 and B2)**. (Fig. 16).

D) All TIRAK® hoists!

Attention:
When using an anchor bolt with safety pin: Check the **correct position of the safety pin** according to Fig. 18.

Fig. 16

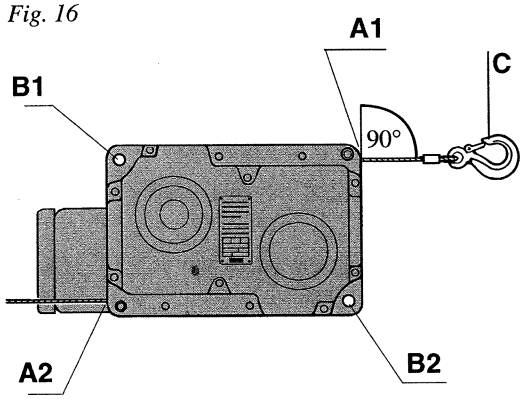


Fig. 17

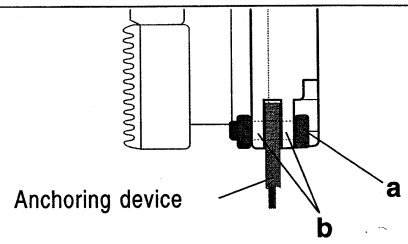
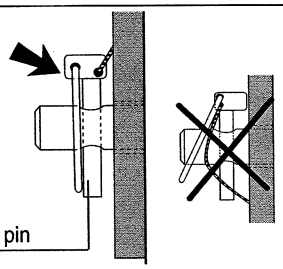


Fig. 18



4.3 Wire rope exit

4.3.1 Slack wire rope

Always ensure that the wire rope exit is not obstructed!

Use a diverter pulley for the slack wire rope (Fig. 19) to prevent damage or use another wire rope leading system to prevent damage from rubbing over sharp edges.

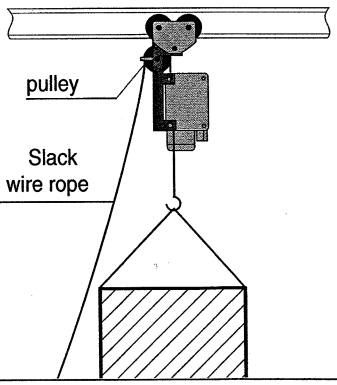
Make sure that the slack wire rope

- is freely hanging down and able to untwist itself

  or

- is properly reeled to prevent the formation of loops/knots (Fig. 20)

Fig. 19



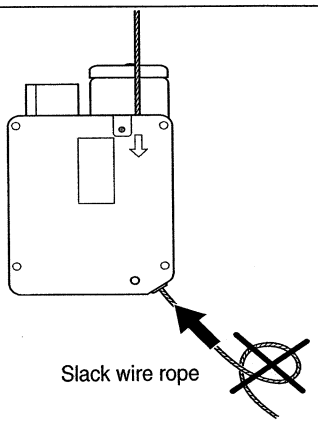
4.3.2 Use of wire rope winders

The loose, unloaded end ot the wire rope can also be stored on suitable wire rope winders (e.g. motor or spring wire rope drums).

When planning we recommend consulting the manufacturer of the TIRAK® hoists regarding design and arrangement of the wire rope winders.

A tip: **Mobile hoists** with the TIRAK® are a very compact **unit of hoist and wire rope winder**. Details on page 26.

Fig. 20



4.4 Electrical Connections

DANGER!

The electrical connection for TIRAK® hoists must conform to EN 60204-1.

The lead must be protected by fuse by the customer.

Always pull the plug out before opening a central control!

a) Ensure that the **mains voltage** is adequate for the **motor** of the TIRAK® –

- **Three phase**:
  400 V (3P + E + 0), 50 Hz,
  16 amp rated plug and socket
- **Single phase**:
  230 V (2P + E), 50 Hz,
  16 amp rated plug and socket

If in doubt ask.

b) To avoid power loss between power source and the TIRAK® always use power cables with **adequate cross sectional area.**
See tables 4a and 4b.

Table 1a
indicates the reference letter of the TIRAK® model and the mains supply voltage.

Maximum speed must be used for TIRAK® with two speeds.

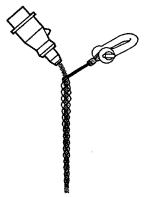
Table 1b
gives the **minimum cable cross section** based on the reference letter.

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

Hanging cables longer than 30 m should be fixed by means of a cable sleeve or cable clamp (Fig. 21).

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

Fig. 21



Cable sleeve

TIRAK® series	Max. wire rope speed m/min	1 TIRAK			2 TIRAK		
		3 phase 400V	3 phase 230V	1 Ph 230V~	3 Phase 400V	3 Phase 230V	1 Ph 230V~
X 300	9	A	B	C	A	D	E
	18	A	C	-	B	E	-
X 500	9	A	C	E	B	E	F
	18	B	E	-	D	G	-
X 700	9	A	D	-	B	E	-
	18	B	E	-	D	F	-
X 800	9	B	E	-	D	F	-
	18	C	F	-	E	G	-
T 1000	9	B	E	-	D	F	-
	18	C	F	-	E	G	-
X 1020	9	B	E	-	D	F	-
	18	C	F	-	E	G	-
X 3050	6	D	F	-	F	G	-
	12	E	F	-	F	G	-

Table 4.1

Reference letter of table 1a	For cable lengths up to ... 20 m	50 m	100 m	200 m
A	1,5	1,5	1,5	1,5
B	1,5	1,5	1,5	2,5
C	1,5	1,5	2,5	4
D	1,5	2,5	4	6
E	1,5	2,5	4	10
F	1,5	4	10	16
G	2,5	6	10	16
	Cross section (mm²)			

Table 4.2

4.5 Electrical Controls

Push button control for **UP** and **DOWN**.

On TIRAK® with **two speed motor**:

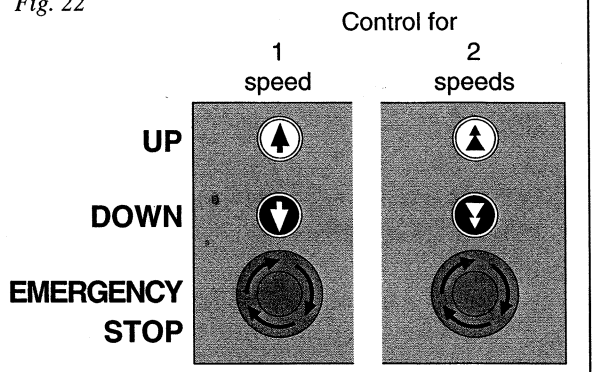
half-depressed	=	low speed
fully depressed	=	high speed.

EMERGENCY-STOP button:

Button depressed	=	mains supply interrupted.

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

Fig. 22



4.6 Wire rope installation

4.6.1 Preparing the wire ropes

CAUTION!
Use gloves, when handling wire ropes.

a) Use only **TIRAK® wire ropes** specified by the TIRAK® manufacturer.

b) Check **correct diameter** (Fig. 23) and **sufficient length** of the wire rope.

c) Always **unreel** the wire rope **in a straight line** (Fig. 24), to prevent it from becoming unusable because of loops.

d) Check the **rope condition** for damage:
- Hook is not bent; safety catch is in place on the hook; proper connection between the wire rope and the hook (thimble, ferrule) (Fig. 25);
- the wire rope has no visible damage along its total length; the fused and tapered end is according to Fig. 26.

e) **Attention!**

Never use the TIRAK® wire rope for fixing the load!

Never let the wire rope rub over sharp edges!

Always keep it **lightly lubricated**!

Always ensure a **clear rope exit**

Important!

If the anchoring point for the wire rope is **above** the TIRAK®:
First anchor the wire rope, then insert it into the TIRAK® hoist.

Fig. 23

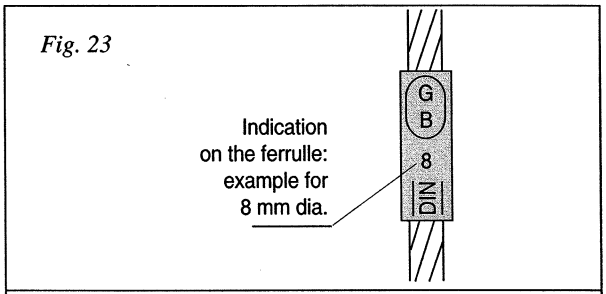


Fig. 24

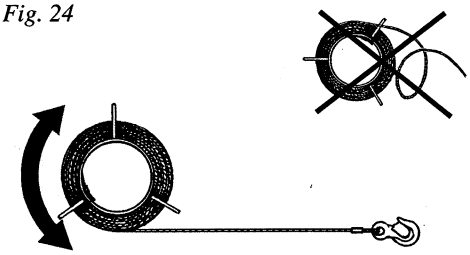


Fig. 25

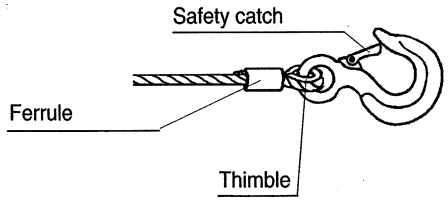
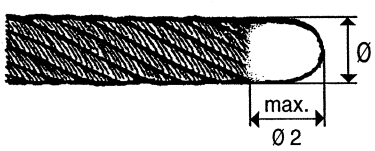


Fig. 26



4.6.2 Wire rope installation

A) TIRAK® series X 300 / 500 / 700 / 800 / 1020 / 3050

a) Feed the wire rope as far as possible into the wire rope entry guide **at the motor side only** (Fig. 27).

b) Press **UP**-button, and push in the wire rope, until it starts to reeve itself automatically and exits at the opposite side.

Attention!

Never use the DOWN button to install the wire rope, because the load limiting device will not function!

Ensure a clear rope exit (Fig. 27)!

c) **If the wire rope does not reeve, check**:

- Is the **wire rope tip** in good condition?
- Did you press **the correct button**?

Attention on 3 phase motors!
Never operate the TIRAK with the **phases reversed** – turn the **phase inverter** of the plug by 180° (Fig. 28).

Fig. 27

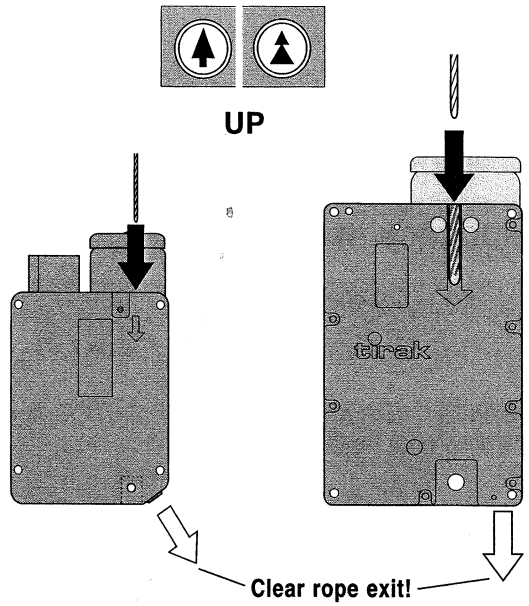
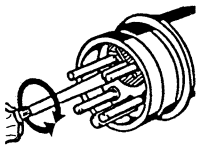


Fig. 28



B) TIRAK® series T 1000

a) On **standard machines** feed the wire rope as far as possible into the wire rope entry **(A1)** (Fig . 29a).

For **special machines with inverted drive direction** (see also chapter 4.2.2 on page 13) feed the wire rope as far as possible into the wire rope entry **(A2)** (Fig. 29b).

b) Press **UP**-button, and push in the wire rope, until it starts to reeve itself automatically and exits at the opposite side.

Attention!

Never use DOWN button to install the wire rope, the load limiting device will not function!

Ensure a clear rope exit!

c) **If the wire rope does not reeve, check:**

- Is the **wire rope tip** in good condition?
- Did you press **the correct button**?
- Turn the **phase inverter** of the plug by 180° (Fig. 28).

Fig. 29a
Standard machine

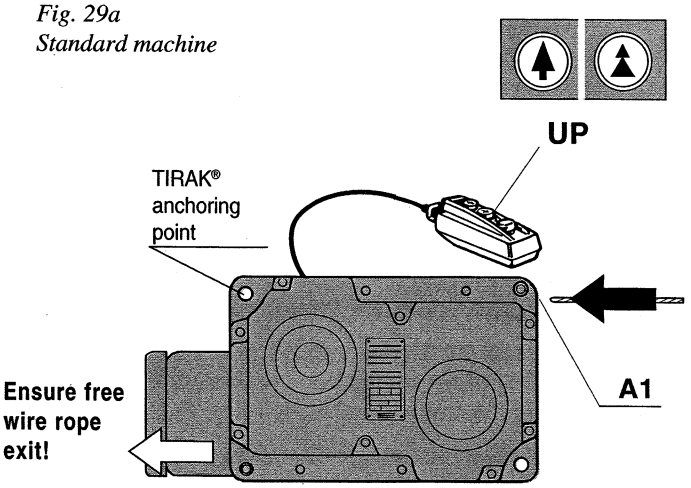
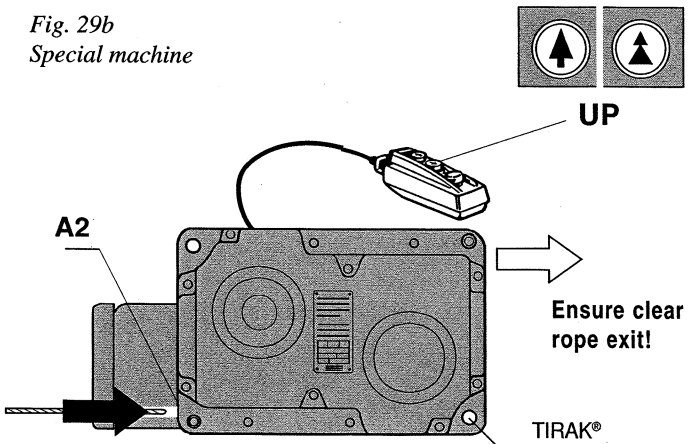


Fig. 29b
Special machine



5. Operation

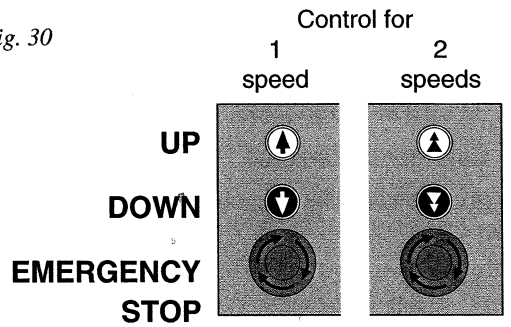
5.1 Checks before starting

a) Check correct anchoring of TIRAK® hoist, pulleys and load.

b) Check correct function of push buttons for **UP** and **DOWN** as well as **EMERGENCY STOP** (Fig. 30).

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

Fig. 30



5.2 Weekly check of wire rope and cable

DANGER!

Damaged wire ropes endanger operational safety!

Therefore examine **wire rope** in accordance with section 8.2.1 on page 22 for damage which requires replacement.

Attention!

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.

Check all **power supply and control cables** and if necessary replace.

5.3 Operation

5.3.1 Stop / EMERGENCY STOP (Fig. 30)

a) **To STOP movement release UP- or DOWN-**button. The load stops.

If not :

b) **Press EMERGENCY STOP-Button,** the control must stop completely.

if that does not function:

c) **Pull out the plug!**

CAUTION! in cases **b)** and **c)**:

STOP working.
Have the TIRAK **checked/repaired by a qualified electrician.**

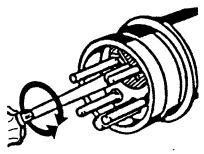
5.3.2 Service Operation (Fig. 30)

a) To **START**, turn the **EMERGENCY-STOP button** clockwise until it releases – it comes out and the control is ON.

b) **Lift/Pull**: press **UP**-button.
Lower/Release: press **DOWN**-button.

To STOP, release button (see also chapter **5.3.1**).

Fig. 31



Important: If the hoist wil not start, it might be possible that two phases of power supply are reversed so that the integrated phase control relay blocks the control.
Correction: turn the **phase inverter** of the plug by 180° (Fig. 31).

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

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

e) When lifting/lowering **prevent the load from rotating** (Fig. 32).
If this is not possible, use a non-rotating wire rope with a ball-bearing swivel hook.

f) When lowering/releasing **watch the slack wire rope**:

- it has to be **without damage**;
- it must **not show loops** (Fig. 33) or other deformations.

g) Keep the wire rope lightly lubricated.

Fig. 32

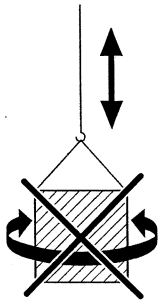
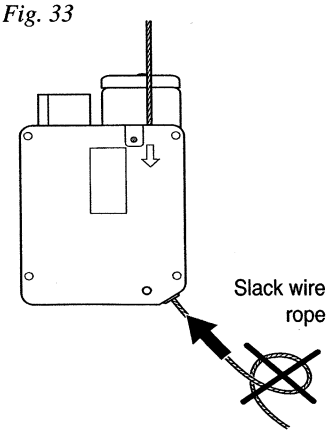


Fig. 33



5.4 Securing moving loads

CAUTION!

Danger zone under moving loads must be cordoned off.

5.5 Manual operation

5.5.1 Emergency Descent

In case of power failure you can **manually open the brake**:

a) Take the control lever (1) from the carrying handle, insert it through the motor cover into the brake release point, and raise it (Fig. 34). The TIRAK® starts running.

b) Lower the load or let the TIRAK® descend along the wire rope with the load.
The **centrifugal brake** limits the speed of descent.

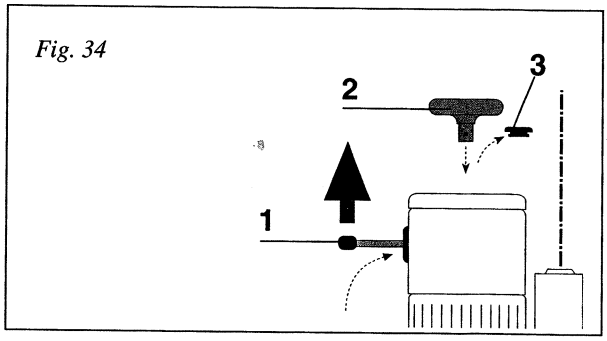
c) **To STOP**: release the control lever (1).

d) **After use**: put back the control lever (1) in the carrying handle.

Attention!

Emergency descent in case of overloading is prohibited!

Fig. 34



5.5.2 Manual lifting

a) Take off rubber cap (3).

b) Put the hand wheel (2) on the motor shaft and with the **brake opened** (see above) turn to the right (TIRAK® T...) or to the left (TIRAK® X...) to lift the load or let the TIRAK® climb the wire rope together with the load.

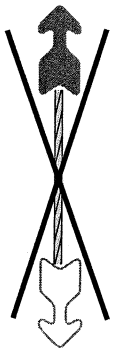
c) **After use**: put brake release lever (1), hand wheel (2) and rubber cap (3) back to their original positions.

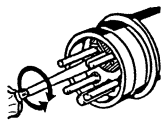
6. Troubleshooting

WARNING!
Avoid injuries:

1. Checks and repairs of the electrical equipment must only be carried out by **qualified electricians! Wiring diagrams** are shown in the control box of the motor.

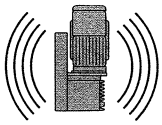
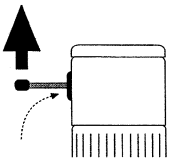
2. Any other repairs should only be carried out by the manufacturer (or Group company) or by a qualified person, and only original spare parts shall be used.

Breakdown	Cause	Remedy
Wire rope is not moving, although the motor starts when UP or DOWN button is depressed. 	**DANGER! IMMEDIATELY STOP WORK! Any attempt to continue operating the TIRAK® hoist jeopardizes the operational safety!**	
	A1 **Wire rope** stuck in the TIRAK® hoist. Defective or incorrect wire rope or **Obstructed wire rope** at the rope exit	– Support the load (e.g. with a rope clamp and a lever hoist). – Cut the wire rope with a bolt cutter at both sides of the TIRAK®. – The TIRAK® must be repaired. – If a substitute TIRAK® or other suitable hoist, e.g. a TIRFOR® is available: anchor a new wire rope, and install the substitute hoist to take the load. When the load is being fully supported by the substitute hoist remove the temporary supporting device and defective wire rope. Continue working.
	A2 **The load has become caught on an obstacle** or **the load is tied down.**	**Carefully** release load from the obstacle or untie. **Check** wire rope, slings and load carrying device for their **operational safety**.

Breakdown	Cause	Remedy
The hoist **doesn't move at all.** 	**A3 Power failure**	
	a) Control switched off.	a) turn the **EMERGENCY-STOP button** clockwise until it releases.
	b) Interrupted power supply.	b) Check reason and wait, until power returns.
	c) On 3-phase motors: two phases changed in the supply, the built-in phase control relay blocks the hoist control.	c) Turn phase inverter of the central control plug by 180°. 
	d) Defect connection between power supply and hoist control.	d) Check lead and control cable, fuses and connections or wiring of central control and terminal boxes and repair if necessary.
	A4 Wrong connection, e. g. no neutral conductor	Compare connection with wiring diagram. If necessary, conversion **by the manufacturer**.
	A5 Protective switching off due to overheating:	
	a) One phase is missing	a) Check/repair fuses/leads/connections.
	b) Insufficient cooling	b) Clean air inlet at the motor cover.
	c) Voltage too high/too low	c) Check voltage and current consumption on the motor **under load**. If necessary increase lead cross section.
	A6 Brake does not open (no "click" noise, when switching on/off)	
	a) Defective supply conductor, brake coil, or rectifier.	a) Have supply conductor, brake coil and rectifier checked by an electrician and repaired/replaced.
	b) Worn brake rotor.	b) Send the TIRAK® for repairs.
The hoist **dos not lift/pull**, although descending/releasing is possible. 	**DANGER! Thoughtless behaviour endangers the operational safety**	Lower the load carefully and remove the obstacle.
	B1 The load has become caught on an obstacle.	Check rope, slings or other load fixing devices and load carrying device **for their operational safety**.
	B2 Overload	Check the load. If necessary reduce the load or use multiple sheave blocks. (see page 7 chapter 3.7).
	B3 Wire rope completely run out following lowering/slackening with unloaded hoist.	Install wire rope again. Check why it had run out. Avoid repetition e. g. by use of a longer wire rope.
	B5 One phase is missing.	Check fuses and leads.
	B6 Error in the UP control circuit of the TIRAK® hoist.	Check connections, wiring, contactors and replace if necessary.
On single phase motors only	**B7 lack of motor power**	
	a) Defective starting capacitor	a) Have starting capacitor checked/ replaced by an electrician.
	b) Defective centrifugal switch (starting capacitor overloaded)	b) Check the current at the auxiliary winding in the terminal box. Repair by the manufacturer or a hoist workshop.

DANGER!
Always pull the plug out before opening a terminal box or a pendant or central control!

DANGER!
Always pull the plug out before opening a terminal box or a pendant or central control!

Breakdown	Cause	Remedy
Excessive motor noise or **hoist is crunching,**   although UP and DOWN travel are possible.	**C1 Overheating**	Individual causes as well as their correction see page 19 point **A5**.
	C2 Dirt in the rope drive **Attention!** Continuing travel can lead to damage on the rope and the rope drive.	**Replace** the TIRAK® **as urgently as possible** and have **checked/repaired** by the manufacturer or a hoist workshop.
The load can not be lowered, although it can be lifted. 	**DANGER!** **Thoughtless behaviour endangers the operational safety!** **D1 The load has hit an obstacle** or **has become caught on an obstacle.**	Carefully lift the load, if necessary by manual lifting (see 5.5.2 on page 18) and remove the obstacle. Check rope, slings or other load fixing **for their operational safety**.
DANGER! Always pull the plug out before opening a terminal box or a pendant resp. central control!	**D3 Error in the DOWN control circuit** of the TIRAK® hoist.	If necessary **emergency descent** by inserting and pulling upwards the brake release lever. (see 5.5.1 on page 18)  Check connections,wiring, contactors and replace if necessary.

Should these steps not explain the cause and provide a remedy, contact GREIFZUG Hebezeugbau GmbH, an other company of the TRACTEL Group, or a hoist workshop.

7. Out of Operation

7.1 Temporary stoppage

a) **Disconnect the power supply** to prevent any unauthorised operation:
   - Disconnect power supply cable from site distributor,

     or, if available,
   - turn and lock the main switch to "0".

b) **Cordon off the danger zone** below any suspended load.

7.2 End of Operation

- Run out the **wire rope** from the TIRAK® winch, clean and **reel** it.
- Disconnect the power supply cable from the site distributor. Check for any damage and reel the power supply cable.
- Disconnect the TIRAK® winch from its anchor point.
- Clean the exterior of the TIRAK®, and store it together with the wire rope in a clean and dry place.

8. Maintenance

Deadline (Performer)	Test item	Regulations	Details on page
Each working day: (Supervisor)	**Anchoring parts TIRAK® hoists**	UVV "Hoists" VBG 8	22
Each working week: (Supervisor)	**Wire ropes Electric cables**	VBG 9a, DIN 15020, part 2 –	22
Annually, at the latest however after 500 or 250 operating hours (Qualified person)	**TIRAK® hoists**	UVV "Hoists" VBG 8 EN 1808 (see above)	23

8.1 Maintenance

8.1.1 Hoist

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.

TIRAK® series X 3050

Lubrication of the drive disks - outer toothing:

Replenish the reservoir behind the lubricating nipple every 50 operating hours with a grease gun (fig. 35).

Specification: Water-insoluble and thermoduric adhesive gear box grease, e. g. VARILUB

Quantity: two times approx. 5 cm^3

- Prepare grease gun and press in first portion with 3 to 5 shots;
- Allow TIRAK® to run for approx. two seconds;
- Press in second portion.

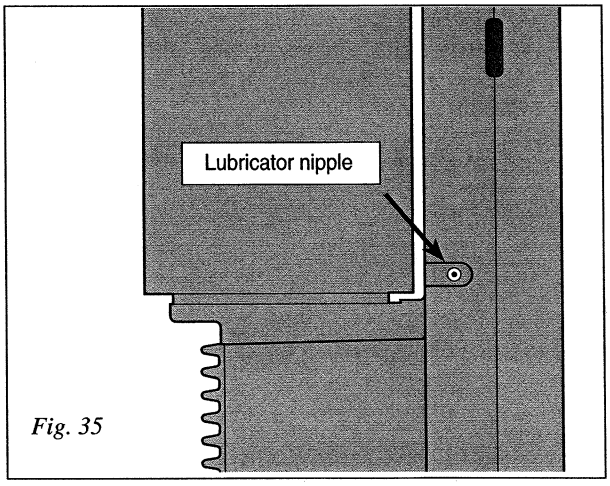


Fig. 35

8.1.2 Wire ropes

a) Always unreel and reel the wire rope.

b) Do not use the wire rope for fixing a load, and do not pull it over sharp edges.

c) Always keep the wire rope **clean** and **lightly lubricated**. Use normally commercially available multi-purpose grease; **do not use** lubricants containing disulphide (e.g. Molycote®).

8.1.3 Motor, brake, and gear box

a) The **motor** does not require any special maintenance. If it is **very dirty**, it should be cleaned to ensure an effective air flow.

b) The **brake** does not require any special maintenance. If it is **very dirty**, it should be cleaned. **Keep it free of oil or grease!**

c) The **gear box** is maintenance-free.

8.2 Checks

8.2.1 Essential checks

a) General

Prior to every operation
and
during operation make sure, that

- the TIRAK® hoist,
- and all other used equipment (anchoring devices, pulleys etc.)

are properly installed
and
without visible damage

Attention!

If **during operation** damage appears:

- **STOP operating,**
- if necessary: **cordon off the danger zone,** and
- have the **damage removed** by a qualified person!

b) Nameplates and labels

Make sure that all nameplates and labels are in place and not obscured (see section 9.4, pages 23 to 24).

Replace missing labels and those which are not legible!

c) Wire ropes

Attention!

Replace wire ropes, if one of the following defects is determined **during** the prescribed **weekly check**:

- **8 or more wire breaks** (fig. 36) on a length which corresponds to 30 times the rope diameter.

Fig. 36

- Heavy **rust formation** on the surface or inside.
- **Heat damage**, recognisable through discoloured wires.
- **Reduction of the diameter** by 5% or more compared with the nominal diameter (fig. 38).
- **External damage** to the rope – fig. 37 shows the most frequent forms of damage.

  These **examples** do not however replace the **DIN 15 020, folio 2 reference for wire rope checks**!

Fig. 37

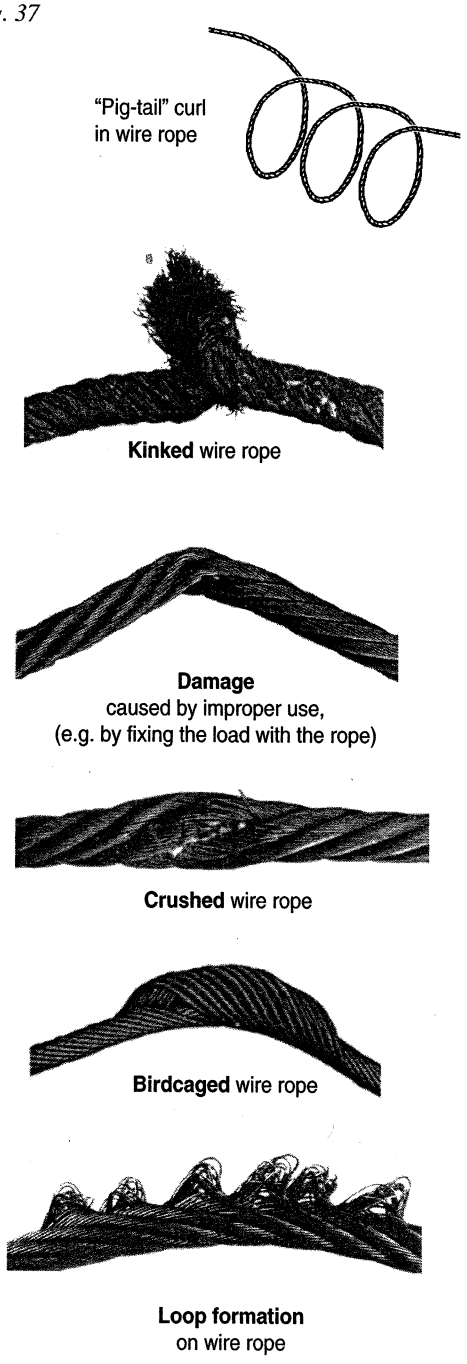
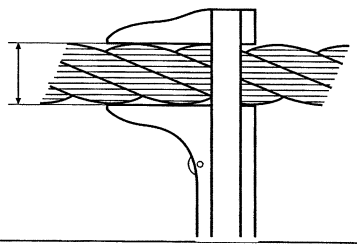


Fig. 38



d) Electric cables

Replace lead and control cables if damage to the insulation or to cable connections is determined during the prescribed weekly check.

8.2.2 Safety Inspection

Checks by a competent person:

1. The TIRAK® should be thoroughly examined **every twelve months** or more regularly (see 2 below) depending on the working practice and current safety regulations in force.
2. The TIRAK® should be thoroughly examined at the latest **after 500 running hours** but for hoists with 18 m/min. and hoists of the series X 3050 with 12 m/min. speed **after 250 running hours.**

It is the responsibility of the employer that a **written register is kept** showing the **dates, period of use and inspection record.**

8.3 Repair

Repair of TIRAK® hoists must only be carried out **by the manufacturer** (or Group company), or by a **qualified person** and **only original spare parts** shall be used.

If a **gearbox oil change** is necessary, take one of the oils specified below according to the temperature range that the hoist will be usually used in.

Quantities required:

X 300 series:	1,4 l
X 500-1020 series:	2,0 l
T 1000 series:	2,0 l
X 3050 series:	5,0 l

Temperature range	**-10 to +50 °C**	**-35 to +40 °C**	**-15 to +80 °C**
API Specification	**Mineral oils[3] SAE85W-140 GL5[1]**	**Synthetic oils[3] CLPPG or PGLP ISO VG 100**	**CLPPG or PGLP ISO VG 460[2]**
Sample oils (other oils on request)	**BP Hypogear EP 90 SHELL Spirax HD 90 TEXACO Multigear EP6 S80 W90**	**BP Enersyn SG-XP 100 SHELL Tivela Oil SD 100 TEXACO Synlube CLP 100**	**BP Enersyn SG-XP 460 SHELL Tivela Oil SD 460 TEXACO Synlube CLP 460**

1) Standard charge on series X 300 to 820 P and T 1020 P; **also see foot note 3)!**
2) Standard charge on series X 1030 to 2050 P
3) **Important: Changing between mineral and synthetic oils requires the complete cleaning of the gearbox parts.**

9. Spare Parts

9.1 Hoist

As well as the **spare part number** and **description** please always quote

- **TIRAK® model**
- **wire rope diameter**, and
- **serial number.**

9.2 Motor and brake

As well as the **spare part number** and **description** please always quote

- **Motor type**

or

- **Type and supply voltage of the brake.**

9.3 Electric controls

In case of enquiries or spare parts order please always quote the

wiring diagram number.

The wiring diagram is situated in the control box of the motor.

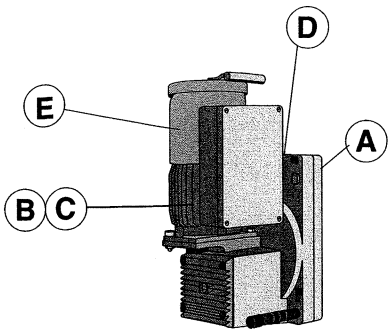
9.4 Nameplates and labels

Make sure that all nameplates and labels are in place and not obscured (see fig. 39).

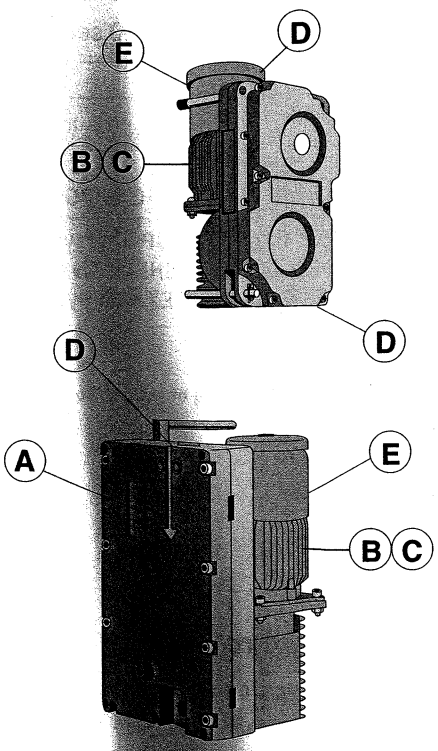
Replace missing labels and those which are not legible!

Spare parts lists are available from your supplier or from the manufacturer.

Fig. 39



A) TIRAK® nameplate
B) Motor nameplate
C) Brake nameplate
D) Adhesive „Wire rope diameter"
E) Adhesive „EMERGENCY STOP"



A

tirak® **Motorized traction machine**

1. SET-UP INSTRUCTIONS

Anchor the machine. Connect to electric/air supply (see motor name plate). Feed in the wire rope. Start the motor. Push wire rope inside,until it reeves itself automatically.

Do not obstruct the wire rope outlet!

For details consult Operating Manual.

IMPORTANT: Use only special TIRAK wire rope in good condition with short fused and tapered end.

Lightly lubricate the wire rope.

Only TIRAK P models may be used for man riding. Use a BLOCSTOP® fall arrest device

2. TECHNICAL DATA

Model:	Capacity (daN/kg):
Admissible load for man riding (kg):	
Working speed (meters/min):	
Wire rope diameter (mm):	Breaking strenght (kg):
Year of manufacture: **200**	Serial-No.:
In case of inquiry or spare parts order, please mention type, **wire rope diameter,** and **serial number.**	

B

GREIFZUG GmbH Bergisch Gladbach

Type		Nr.
E-Mot.	60 Hz	U_{min}
	kW	cos φ
	V	A
Schalt.	Schutzart IP 55	F Is.Kl.

C

GREIFZUG GmbH Bergisch Gladbach

Bremstyp			
Leistung	W	Spulenspannung	V
Moment	Nm		

D

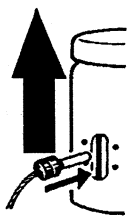
Ø 8 mm

Ø 9 mm

Ø 10 mm

Ø 14 mm

E



Notablaß
Bremslüfterhebel
im Handgriff

Emergency Descent
Brake release lever
in TIRAK handle

Descente d'urgence
Manette de commande du frein
dans la poignée de portage

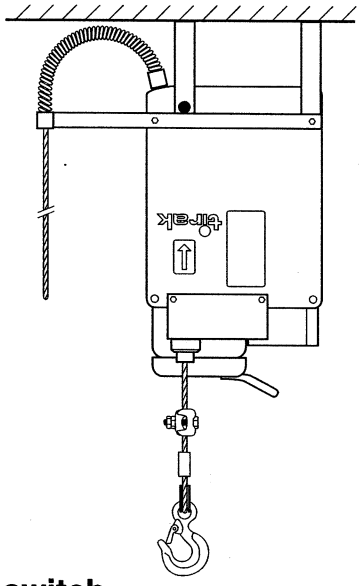
G 207-09/94

Suitable accessories

Details on request

Wire rope guiding spring

– *to divert the slack wire rope end*



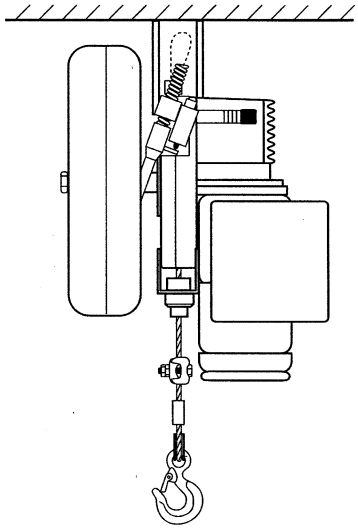
Limit switch

– *for cutting off the lifting/pulling movement*

Wire rope storage devices

– *automatic rope reeler for wire rope lenths up to 80 m (see fig.)*

– *driven wire rope drums for wire rope lenths up to 500 m*



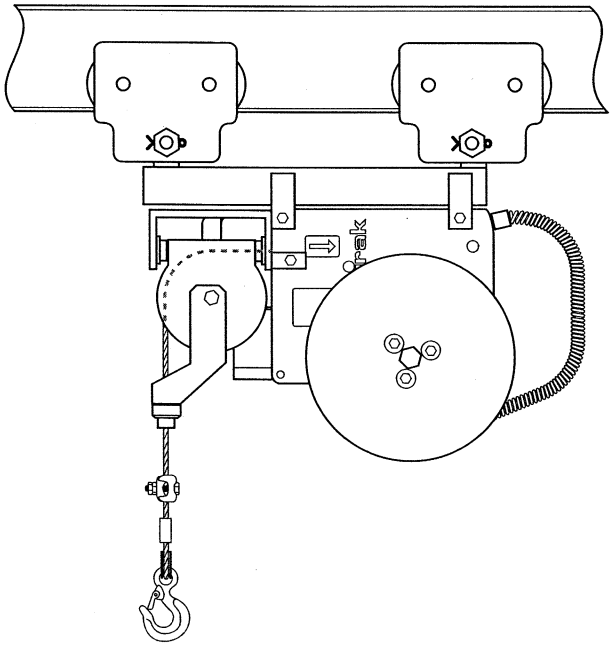
Wire rope storage capacity up to 500 m are offered by the "Mobile winches with the TIRAK®" shown on page 26.

Suspension on beam trolleys

– *for the lateral movement of the TIRAK®;*

– *with plain, geared or electric driven trolleys;*

– *the picture shows a hoist equipped with wire rope guiding device and automatic wire rope reeler.*

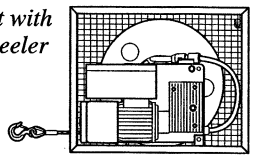


TIRAK® as "Mobile Winch"

TIRAK® with rope storage for rope lengths from 80 to 500 m

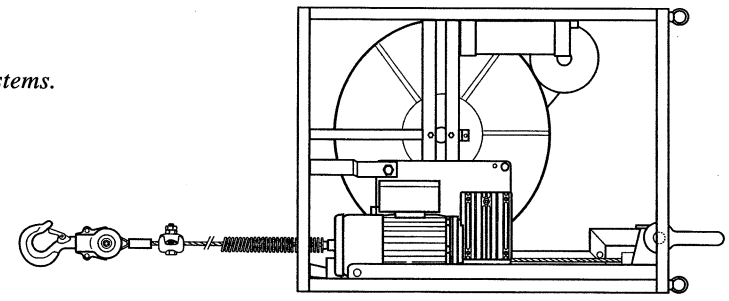
CE

300 kg hoist with 80 m rope reeler



- *The ideal hoist for frequently changing places of use.*
- *Quick, simple, versatile:*
  - *Assembly on construction site.*
  - *Repair and maintenance work in finished buildings.*
  - *Drive for internal transport systems.*

3 t hoist with 500 m rope winder



Saves space, weight and costs

compared to a crane or drum winch of the same carrying capacity and range!

Details on request

TIRAK® hoists for man riding applications

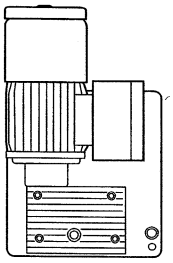
The ideal hoist for "Suspended Access Equipment"

- *Unlimited travel height.*
- *Maximum capacity of the man-riding equipment due to the minimum weight of the hoist.*
- *CE approved.*

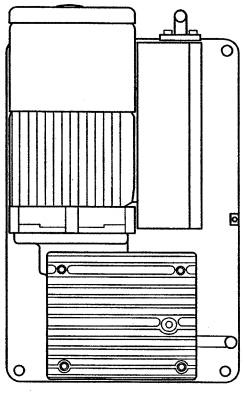
*In addition we offer **BLOCSTOP®** fall arrest devices, which act as a secondary brake on a separate safety wire rope.*

Details on request

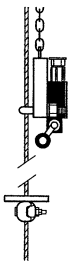
Capacity 0,3 to 2 t



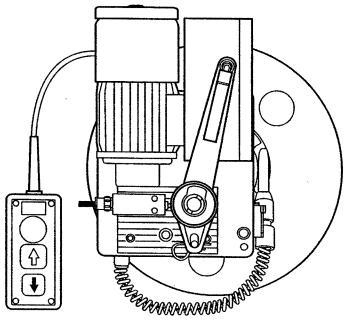
300 kg hoist



2 t hoist



Limit switch



Series XS 300 P for silo inspection

These devices conform to the special safety requirements applicable for inspecting silos:

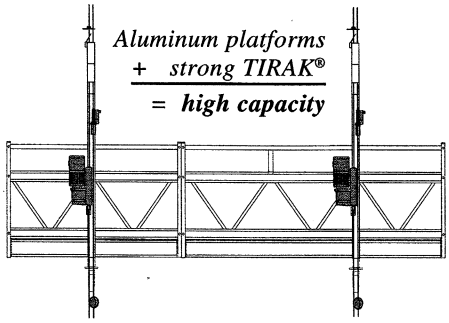
- *Hand operation,*
- *hanging limit switch for the manual operation when passing through the silo opening.*

The device illustrated is equipped with an automatic rope reeler for a 40 m rope.

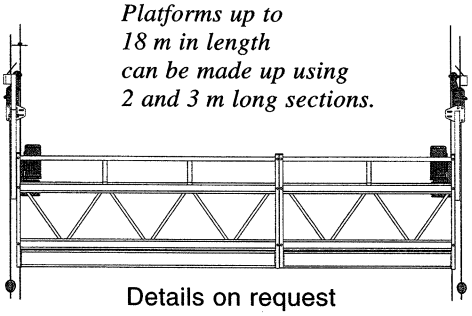
Details on request

Access solutions from the TRACTEL Group

Suspended platforms, working cage & seat



Aluminum platforms
+ strong TIRAK®
*= **high capacity***



Platforms up to 18 m in length can be made up using 2 and 3 m long sections.

Details on request

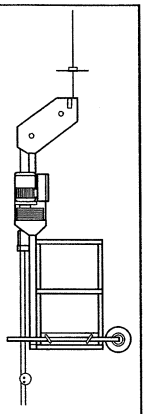
*These new, mobile platforms and seats with unlimited travel height for assembly, inspection and repairs offer you **the comfort of a lift combined with a working platform.***

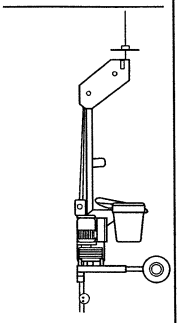
*Whether you have to **work at height** as facade designer or window cleaner, as insulation specialist, as chimney, boiler and tank setter or as painter and corrosion protection personnel:*

*Make use of this sensible replacement for standing scaffolding! **Travel to height**, and indeed to precisely that height which gets you to the most productive working position. Because that helps to **save time and money!***

*Increase your **competitiveness** by **reducing operating costs.***

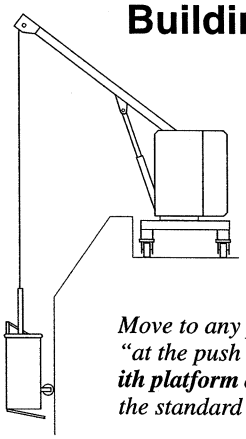
That improves the bottom line!





Whether purchased or rented – the economic alternative to scaffolding!

Building maintenance and inspection installations

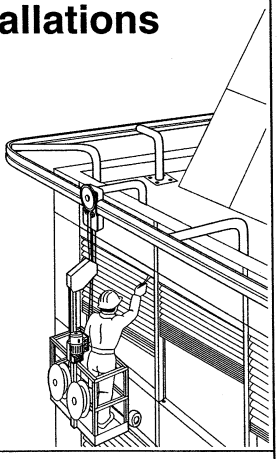


Modern, daring building constructions demand creative solutions.

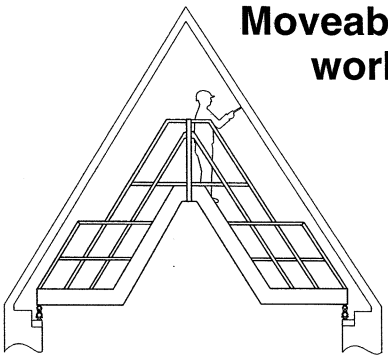
The earlier you involve our team in your planning the easier and cheaper the installation will be!

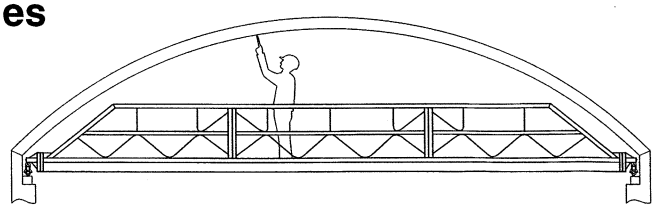
*Move to any position of the facade "at the push of a button" – **ith platform and roof car,** the standard solution.*

*For inspecting building constructions **outside and inside** – with platforms which move on **rail systems.***



Moveable stairs and work gantries





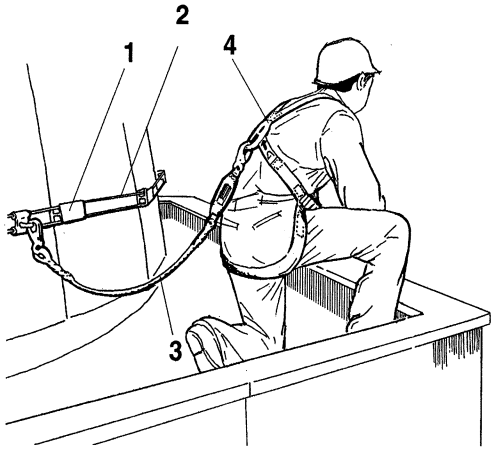
For cleaning, inspecting and repairing windows, facades and glass roofs, inside and outside.

Details on request

Let your buildings always shine!

The TRACTEL Group safety package

TRAVSAFE® – horizontal travelling lifeline system



TRAVSAFE® is a patented horizontal running protection system for working at heights in which there is a risk of falling.

***Areas of use**: buildings and roofs, aircraft hangars, shopping centres, bridges and viaducts, industrial installations, overhead cranes, oil and gas containers, telecommunication towers ...*

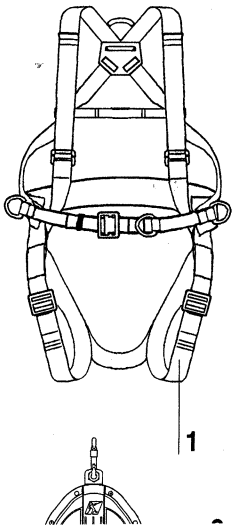
The TRAVSAFE® system consists of two wire ropes along which a traveller (1) slides. These lifelines are held by brackets (2) anchored to the building. The user anchors the connection devices (3) of his personal protective equipment (4) to the holding ring of the traveller.

The TRAVSAFE® travelling lifeline enables free and unhindered movement and work.

TRAVSAFE® systems require thorough planning and professional installation – challenge us to provide extensive advice.

Gives a sure hold, just where you need it!

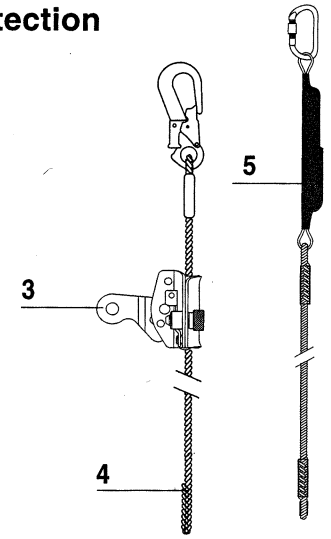
Fall arrest equipment for personal protection



*For all work in which there is a risk of falling "**Safety first**" is the overriding objective. The appropriate equipment must be put together depending on the location and work to be performed. The product range of our safety program offers the following, amongst other things:*

- *Harnesses and working belts, also as a practical combination (1)*
- *retractable lifelines (2)*
- *rope grabs (3)*
- *climbing protection devices*
- *retaining ropes*
- *lanyards (4)*
- *shock absorber (5)*
- *various connectors*

For common applications we offer



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