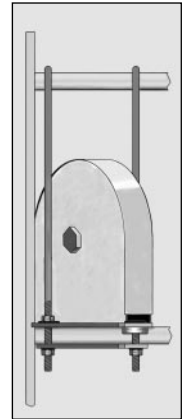
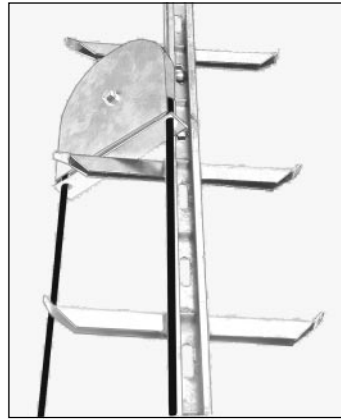
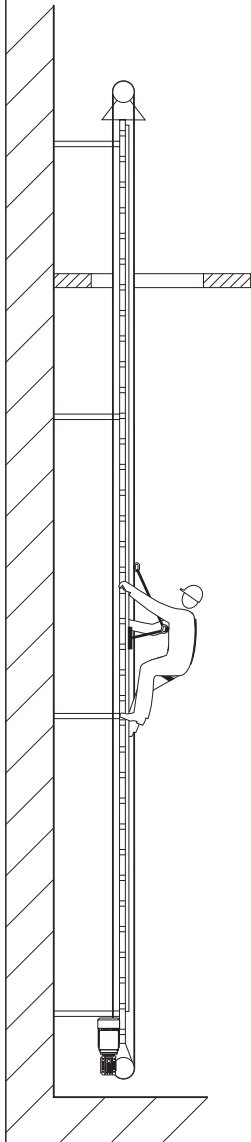


# tractelift®

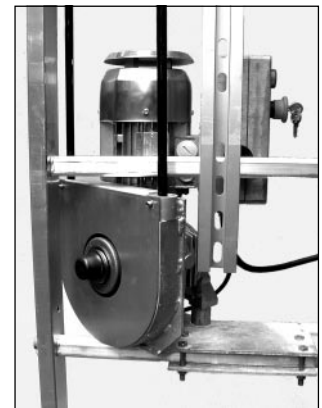
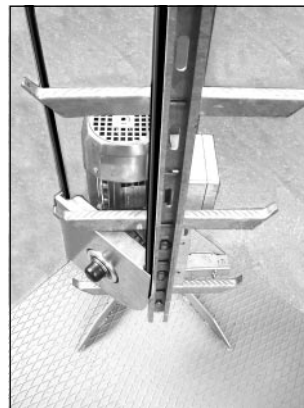
## Climbing Aid for vertical ladders

### Installation and Maintenance Instructions



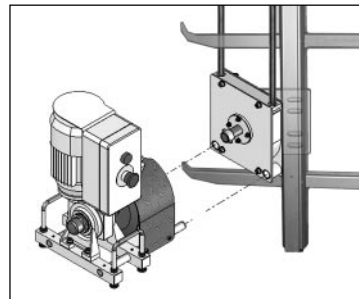
Square rungs

Round rungs



Model M (middle pole ladders)

Model S (side rail ladders)



Model D (e. g. for middle pole ladders)










Manufacturer's Certifications

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# Explanation of Symbols used in this manual

<b>Safety advices</b>			
Symbol	Code Word	Meaning	Possible damage after noncompliance
	<b>DANGER</b>	<b>IMMEDIATE</b> or possibly imminent danger:	<b>Death or very severe injuries!</b>
	<b>DANGER</b>	<b>IMMEDIATE</b> or possibly imminent danger from hazardous electric voltage:	<b>Death or very severe injuries!</b>
	<b>CAUTION</b>	Potentially hazardous situation:	<b>Slight injuries or material damage.</b>
<b>Other advices</b>			
	<b>Note</b>	Potentially hazardous situation:	<b>Damage to the device or its surrounding area</b>
	<b>Important</b>	Useful tips for best operation	none
<b>Regulations</b> (without code word)			
	Information for written implementation / documentation		
			Instruction to wear Personal Protection Equipment (PPE)

## Information related to these instructions

### Date of issue

1<sup>st</sup> edition: October 2006

### Copyright

The manufacturer holds the copyright of this installation and maintenance manual.

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# 1. Safety advice

## CAUTION!



Avoid injuries by strictly following the instructions!

- a) Installation and/or maintenance of the Climbing Aid may only be carried out by persons, who are familiar with the equipment and whose weight is **minimum 120 lbs!** They must have received instruction by the contractor to perform this task.
- b) The personnel must be in good health and be at least 18 years of age.  
The personnel must be familiar with the relevant accident prevention guidelines, especially the „Safety rules for applying **Personal Protection Equipment** as well as for **Holding and Rescuing** (ANSI Z359, CSA Z259).  
The personnel must have read and fully understood this installation and maintenance instruction.
- c) A copy of this installation and maintenance instruction must be provided to all personnel and always be accessible to them.
- d) If more than one person is entrusted with one of the above activities, then the contractor must appoint a supervisor, who is authorized to give the necessary instructions.
- f) The system's electrical connection must comply with applicable standards.
- g) Prior to starting with assembly, check all parts to ensure they are complete and in perfect condition.
- h) When using self-locking nuts, pay attention to the following:
  - at least half of the length of the diameter of the threaded section of the nut **stands proud out of the nut**;
  - nuts must **not be used** if they can be loosened by hand (without tools)!
- i) Inspections and repairs on the electrics may only be carried out by qualified electricians.
- k) Repairs to the Climbing Aid may only be carried out by qualified installers.
- l) If **load-bearing parts** are to be serviced or replaced, then the **operational safety of the system must be inspected by a competent person**.
- m) Modifications, additions and retrofits on suspension devices and/or platforms are prohibited without the written approval of the supplier.
- n) TRACTEL assumes no liability for damage due to retrofits and alterations on equipment or where non-original spare parts are used that the company has not approved in writing.



## WARNING!

- e) **During the installation** there is the **hazard of falling!**



**During climbing/descending the ladder you have to use your personal protection equipment:**

Harnesses with fall arrester used on a fall protection system (ANSI Z359, CSA Z259).

**Relevant standards** (no claim for completeness):

ANSI Z359.0

OSHA 1910.66

CSA Z259.02, Z259.12, Z259.124, Z259.201

## 2. Description of the Climbing Aid

### 2.1 General

This manual is both valid for Climbing Aids on **middle pole ladders** (Fig. 1 + 2) as well as on **side rail ladders** (Fig. 3 + 4).

### 2.2 Principle

The Climbing Aid alleviates persons climbing a vertical ladder (Fig. 1) with a constant pulling force of approx. 88 lbf ( $\approx 40$  daN). For this purpose the climber connects his harness with a belt clamp to the endless round belt.

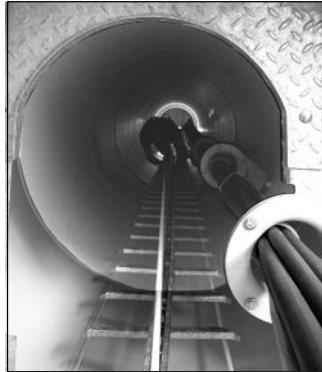


Fig. 1

### 2.3 Drive and Control

At the lower end of the ladder (Fig. 2), a motor with an oil-bathed adjustable sliding clutch drives the endless round belt by means of a driver pulley.

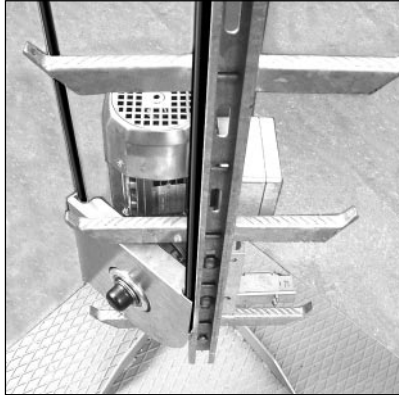


Fig. 2

On **model D** the motor can be **detached** from the driver pulley. (Fig. 2a)

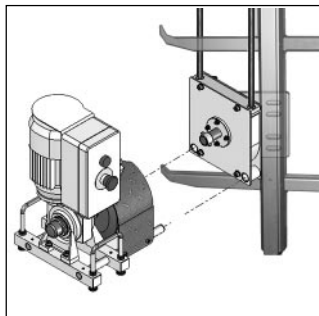


Fig. 2a

The continuous welded reinforced round belt, made of special synthetic material ( $\varnothing$  1/2 inch / 12,5 mm), runs on the driver pulley of the motor and a diverter pulley at the upper end of the vertical ladder (Fig. 3).

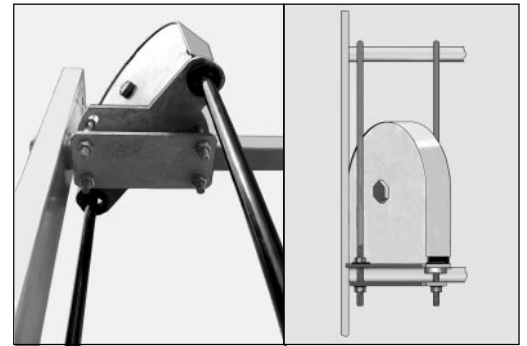


Fig. 3

Switching on/off the motor is hands free, because the motor is controlled by a time delay relay and a switch, which is activated at every revolution of the driver pulley:

- At the first switch signal, ex. when one starts to climb pulling the round belt upwards, the motor starts and keeps running, as long as the signal is repeated with each pulley rotation.
- Stopping the round belt's movement, ex. when one stops climbing, the signal is not repeated within a pre-adjusted time period, and the motor stops.
- Turning on/off the Climbing Aid is possible at any position along the round belt.

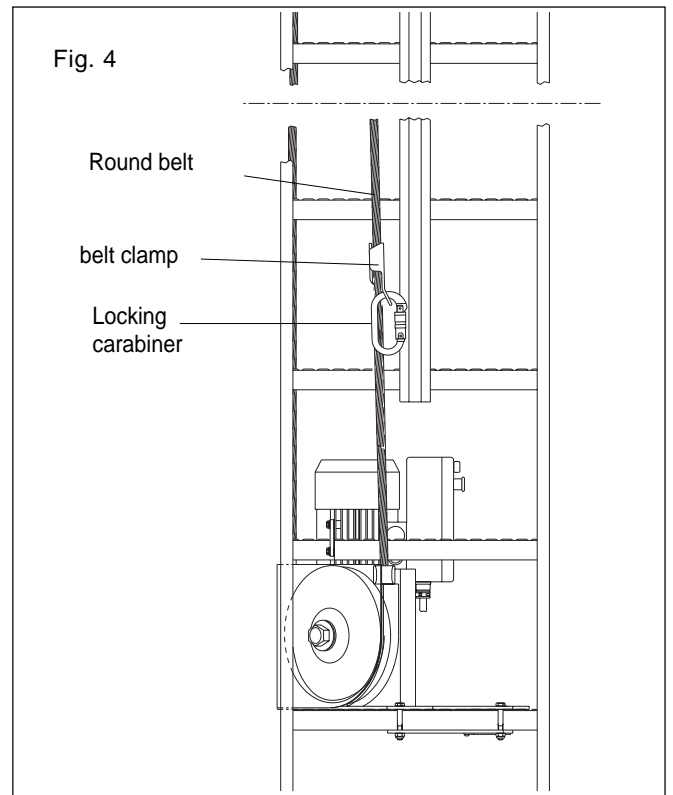


Fig. 4

### 2.4 Connection to the round belt

The connection to the round belt is made by a belt clamp, fixed to the chest or waist anchor ring of the harness by means of a locking carabiner (Figs. 4 + 5).

## 3. Personal Protection Equipment

### 3.1 General



#### DANGER!

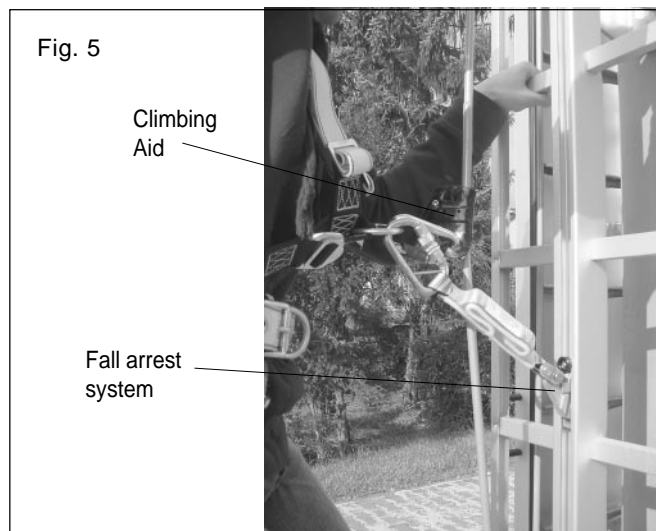
The Climbing Aid is NOT a personal fall arrest system!



During climbing/descending, the person has to protect himself using the fall arrest system on the ladder (Fig. 5).

This can be, for example, a fall arrest system with fall arrest device on the middle pole of the ladder, connected to the anchor ring of the harness.

The **fall protection system** is **not a part of the Climbing Aid**, but a part of the vertical ladder. The shown pictures/drawings shall be understood as examples.



### 3.2 Fall protection during installation

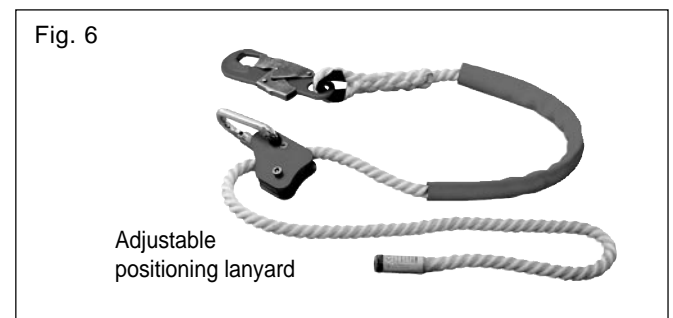


#### CAUTION!

During all installation work on the ladder the installer is in danger of falling off the ladder.

- The **fall protection system must be used in any case!**
- In addition, the installer has to secure himself to the ladder with an adjustable positioning lanyard**, before starting with an installation:
  - Attach the lanyard to one of the D-rings at the waist belt, guide it behind the ladder, and attach the other end to the second D-ring.
  - Lock both locking carabiners.
  - Adjust the length of the lanyard to get sufficient freedom of movement for executing the installation.

The use of the positioning lanyard will reduce the possibility of fall, when leaning around the edge of the ladder to install belt guides or similar.



## Installation instruction

Installation requires two persons.

## 4. Preparing the installation

### 4.1 Components

Check completeness:

- Driver unit** (on **Model D** motor unit and driver pulley)
- Diverter unit**  
For standard ladders with **round steps** including **two anchor brackets**.
- Round belt** on drum hasp in sufficient length.
- Belt guiding devices** for
  - behind** the ladder, and
  - in front** of the ladder, if there are obstacles.**Quantity depending on the tower's height.**
- For aluminum ladders:  
Two **step reinforcement devices**.

## 4.2 Required tools

Check completeness:

### 4.2.1 Installation kit (Fig. 7)

- 1 Welding clamp with fixing brackets
- 2 Welding iron with thermo regulator
- 3 Special cutter
- 4 Cutter-knife
- 5 **bravo** lever hoist (250 kg) with 3 m (10 feet) of chain
- 6 2 belt clamps with locking carabiner
- 7 **handifor**® dynamometer with 2 hooks (220 lbs/100 kg<sup>1</sup>)
- 8 Thermometer
- 9 Pipe hook with key ring and hose clamp
- 10 Sling Ø 4.5 mm/ 0.5 m
- 11 Tool box

#### 1) Important!

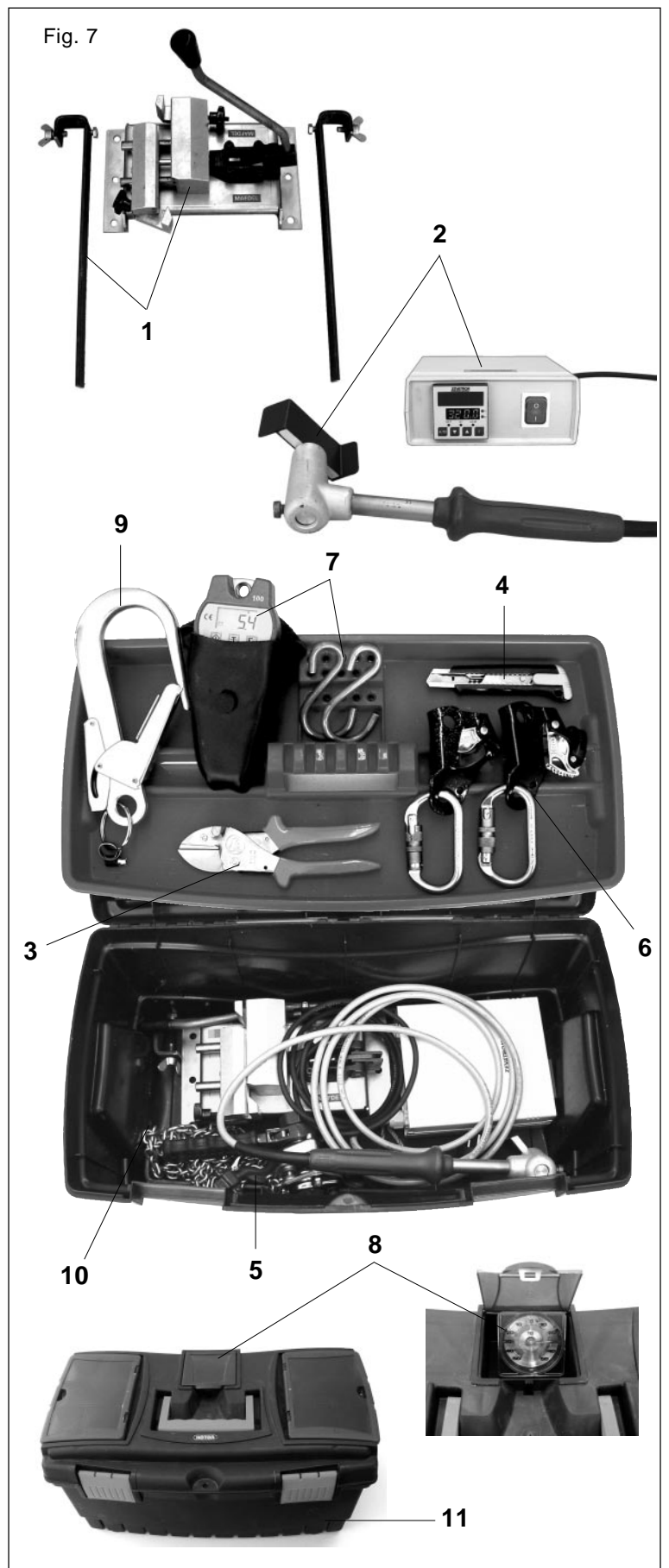


If there are temperatures below 32 °F, you need a **dynamometer with higher capacity**, ex. a dynafor® for 500 lbs (250 kg).

### 4.2.2 Tools / Accessories

(on site!)

- a) 1 Set of socket wrenches 10 to 30 mm with extension
- b) 1 Set of open end wrenches 10 / 13 / 19 / 30 mm
- c) 1 Socket spanner size 10
- d) - Insulating tape
- e) - Molycote® grease paste DX
- f) 1 Walkie-talkie-set for communication between the two installers



## 5. Installation



### Note!

Apply Loctite® grease paste DX on all stainless steel screw connections!

**On aluminum ladders:** To avoid electro-chemical corrosion **protect steps and/or poles with insulating tape** at those places, where they might get in contact with stainless-steel-components (screws or guiding devices)!

### 5.1 Driver unit installation

#### a) On side rail ladders:

Connect the driver unit to the lowest possible step (Fig. 8a).

If not pre-assembled: Place Buffer disk (X) with its double-sided adhesive tape between step and control box.



### Important!

On aluminum ladders, insert step reinforcement to avoid deformation of the step, when tensioning the round belt.

#### b) On middle pole ladders:

Connect the driver unit at the lowest possible to the middle pole (Fig. 8b).

### 5.1a Driver unit of model D

#### A) Assembly of driver pulley MD/SD

On **model D** the motor can be **detached** from the driver pulley (Fig. 8c).

Driver pulley assembly is done in the same way as described in chapter 5.1.

#### B) Motor Installation model D

a) Take off safety pin (D) (Fig. 8d) from the connecting rod of the motor unit (A).

b) Slide motor unit (A) into the guide bushings (C) of the driver disk unit (B) (Fig. 8c).

c) Fix motor unit (A) to driver disk unit (B) by means of safety pin (D) (Fig. 8d).

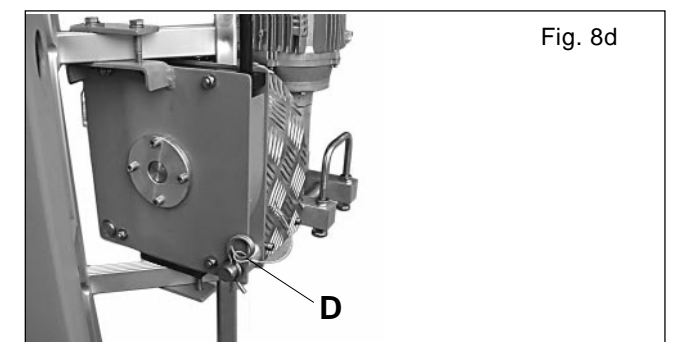
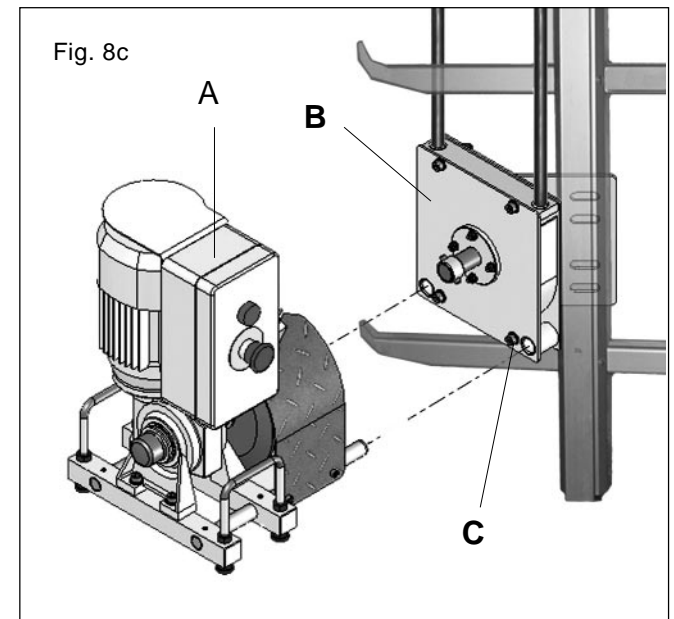
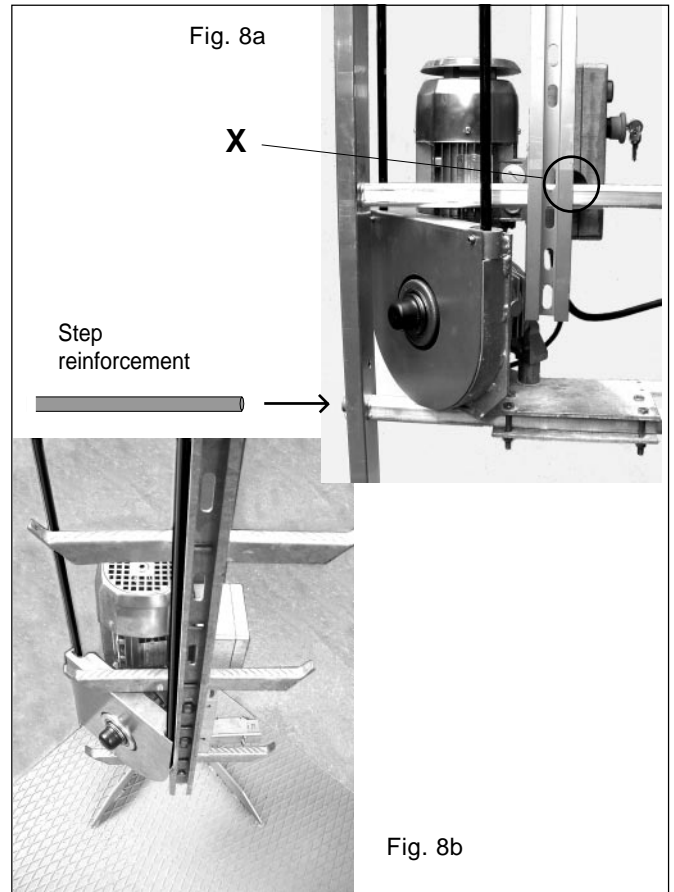
### Note:



Fig. 8c shows a middle pole ladder, Fig. 8d standard ladder.

Application of the motor unit (A) is the same on both ladder systems.

d) Connect to power supply.





## 5.2 Diverter unit and round belt

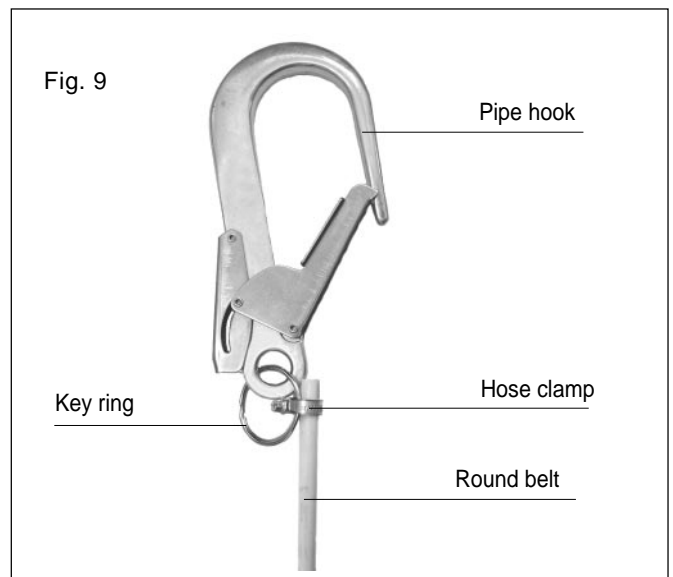
### 5.2.1 Preparation

- a) Material and equipment to be taken with on the ascent:
- pre-assembled **diverter unit** c/w anchoring parts; for ladders with round steps incl. the **two anchor brackets**
  - **Round belt**
  - **Tools and material:**  
Steckschlüssel size 10, wrench/ratchet size 13 and 19, screw driver for the hose clamp, Molycote® grease paste DX, insulating band (only for aluminum-ladders)
  - **1 step reinforcement** (only for aluminum-ladders)
  - **Pole strap**

- b) Connect the round belt's end by means of the hose clamp to the key ring of the pipe hook (fig. 9).

### 5.2.2 Ascent

- a) The 1<sup>st</sup> installer connects the pipe hook with the round belt to one of the D-rings of its harness, and takes the rest of the material.



- b) He secures himself to the climbing protection system and starts climbing.
- c) The 2<sup>nd</sup> installer watches the proper un-coiling of the round belt from the hasp.
- d) After arriving on top,
- Safely lay down the material on the platform.
  - Take the round belt off the harness and secure to the ladder by means of the pipe hook.



### CAUTION!

Before starting installation work, the installer has to secure himself to the ladder using an adjustable positioning lanyard!

### 5.2.3 Diverter unit installation

- a) **On side rail ladders:**

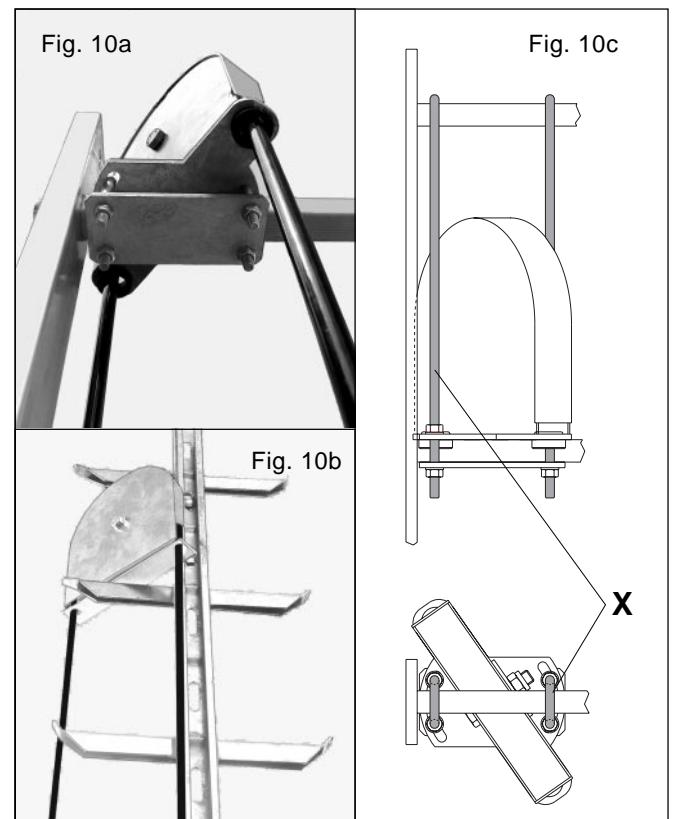
Fix the diverter unit at the highest possible step, at the left side of the middle pole (Fig. 10a).

**On aluminum ladders, insert step reinforcement.**


On round steps use anchor brackets (X) to avoid the diverter unit from tilting (Fig. 10c).

- b) **On middle pole ladders:**

Fix the diverter unit at the highest possible to the middle pole (Fig. 10b).



## 5.2.4 Preassembling the round belt

 **Note!** During the following steps, securely hold the round belt to protect it against falling down!

- Open the hose clamp, take off the belt's end, and insert it at **(A)** in the entry bushing of the diverter pulley, until it exits at **(B)** (Fig. 11).
- Fix the belt's end again to the pipe hook.
- Before starting with decent:



### WARNING

**Make sure that the harness is safely connected to the fall protection system!**



**Not before that**, take off **one locking carabiner** of the **adjustable positioning lanyard**, guide it behind the ladder, and connect it in that way to a free D-ring of the harness, that it will not interfere during descent.

- Guide the belt's end **behind the upper anchor bracket of the ladder**, and connect the pipe hook to one of the D-rings of the harness – this makes it easier to pull down the belt's end.
- The installer at ground level again watches the correct uncoiling of the round belt.

### Note!



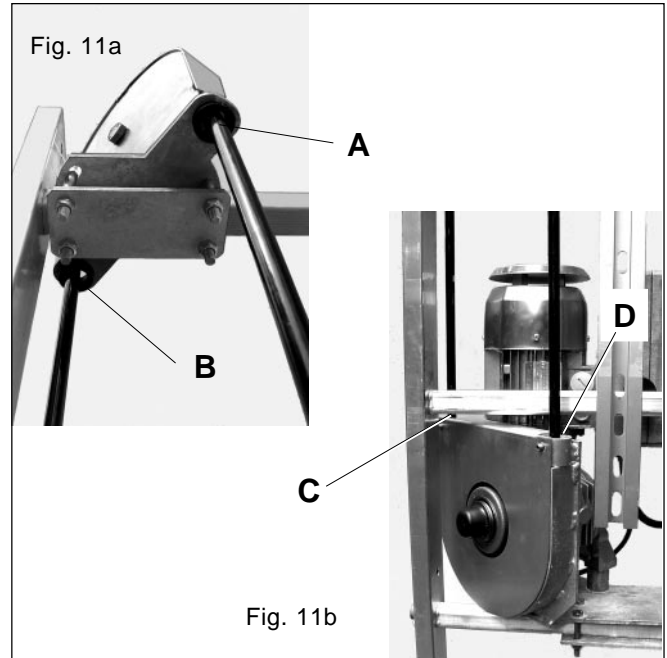
**The belt's end must run behind the ladder at its total length!**



### Important!

**At the next step do not let go the belt's end**, since it could be pulled upwards by the weight of the belt hanging in front of the ladder.

- At the places, where the ladder is connected to the tower wall by brackets:  
Unhook the rope clamp from your harness, guide it behind the bracket, and hook it up again to the harness.
- When reaching the ground, open the hose clamp and remove the belt clamp.
- Introduce the belt's end at **(C)** and push it through between driver pulley and guide cover, until it exits at **(D)**.  
Pull the end out, until it is approx. 5 ft. (1.5 m) long.

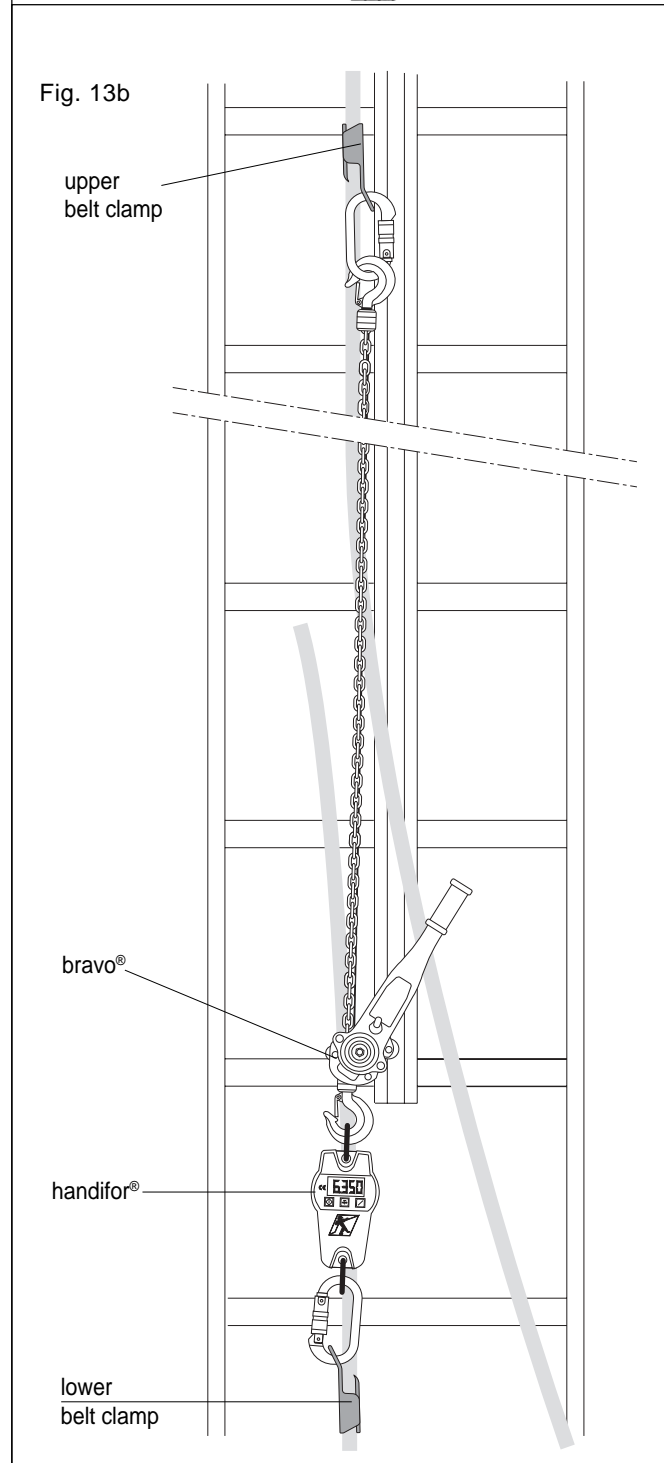
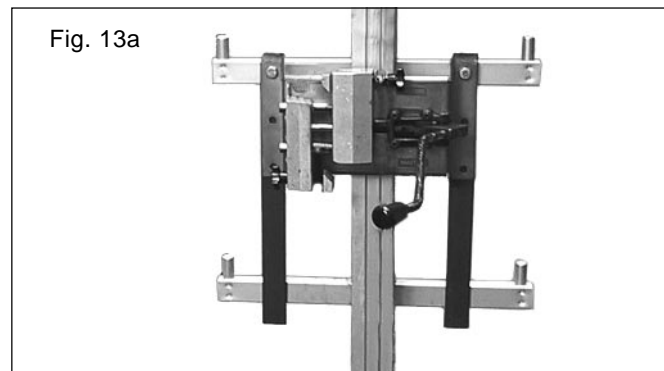
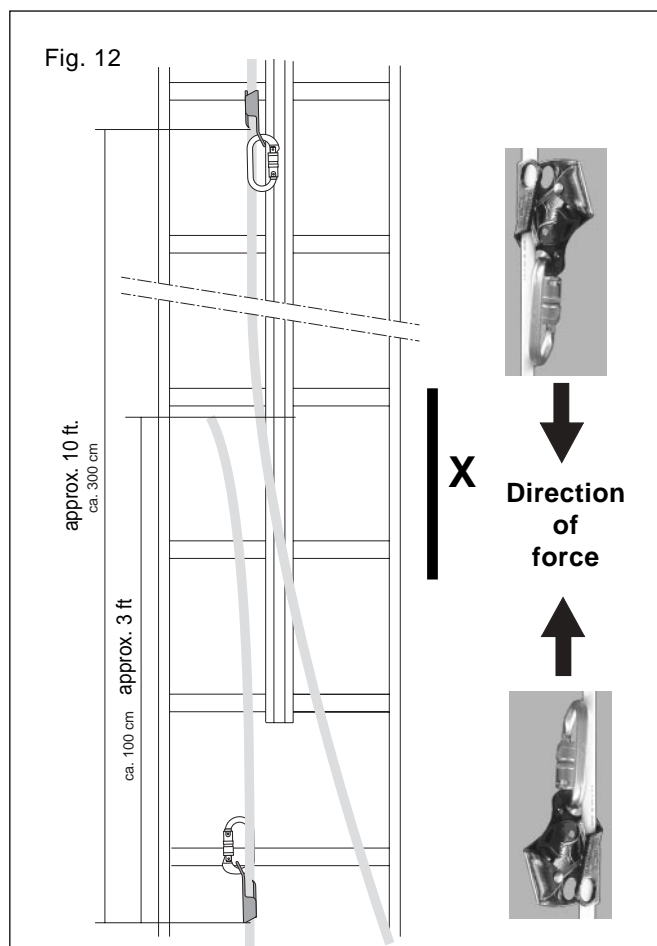


### 5.3 Welding the round belt to form an endless loop

The following drawings and fotos are analogously valid for standard and middle pole ladders.

#### 5.3.1 Setting-up

- At the height (X) of the lower belt's end (Fig. 12), fix the welding clamp with its fixing bracket on a ladder step (Fig. 13a).
- Approx. 3 ft. (100 cm) under the belt's end, which comes from the driver pulley, fasten a belt clamp – **with pulling direction upwards**. (Fig. 12).
- Approx. 10 ft. (3 m) above this clamp, fasten the second belt clamp to the round belt, which comes from the top – **with pulling direction downwards** (Fig. 12).
- Anchor the chain hook of the lever hoist to the locking carabiner of the upper rope grab, and pull through by hand the chain as far as possible (Fig. 13b).
- Anchor **handifor**® dynamometer between the top hook of the lever hoist and the locking carabiner of the lower belt clamp (Fig. 13b).



### 5.3.2 Pre-stretching the belt

- Switch on the dynamometer and push the tare-button to set the display to zero.
- Check the surrounding temperature.
- With the lever hoist, tension the round belt
  - to approx. 220 lbf (100 daN) for temperatures above 32 °F ( $\geq 0$  °C),
  - to the value of table 1 **plus 10%** for temperatures less than 32 °F (below 0 °C).

#### Important!



Before welding the round belt, it must be **evenly tensioned over its total length**. This requires some time:

- For about 10 minutes**, watch the dynamometer's display, and **adjust the tension** to approx. 220 lbf (100 daN) (respectively the above defined value for minus grades), until it stays stable.

### 5.3.3 Final tension adjustment before welding

**Adjust the tension according to table 1, and watch the display for about 5 minutes:**

If necessary, adjust tension until it is stable.

Temperature		Tension	
°F	°C	lbf	daN
-4 <sup>1)</sup>	-20 <sup>1)</sup>	440 <sup>1)</sup>	200 <sup>1)</sup>
5 <sup>1)</sup>	-15 <sup>1)</sup>	353 <sup>1)</sup>	160 <sup>1)</sup>
14 <sup>1)</sup>	-10 <sup>1)</sup>	293 <sup>1)</sup>	133 <sup>1)</sup>
23 <sup>1)</sup>	-5 <sup>1)</sup>	255 <sup>1)</sup>	116 <sup>1)</sup>
32	0	220	99
41	5	200	91
50	10	193	83
59	15	173	78,5
68	20	163	74
77	25	153	69,5
86	30	143	65
95	35	138	62,5
104	40	132	60
113	45	129	58,5
122	50	126	57
131	55	121	55
140	60	117	53

Table 1

- When assembling at these temperatures you must get a dynamometer with a **capacity higher than 220 lbf** (100 daN), ex. a DYNAFOR® with a capacity of 500 lbs (250 kg):  
 Model LLX: Accuracy  $\pm 0,2\%$  / smallest load 0.5 lb, or  
 Model LLZ: Accuracy  $\pm 0,8\%$  / smallest load 1 lb.

### 5.3.4 Heating up the welding iron

#### CAUTION!



**Danger of burning at the welding iron!**

**Prepare a safe place to put it on.  
Take care, when welding!**

- Put the welding iron and the thermo regulator to a safe place, so that they don't interfere with the following preparation procedures (Fig. 14a).
- Connect the thermo regulator to power supply and switch it on.

**After approx. 15 minutes** the welding iron has reached its **working temperature**, as soon as the **red digital figure** shows the (yellow) value below, which is the factory adjusted temperature (Fig. 14b).

Fig. 14a



Fig. 14b



### 5.3.5 Fixing the belt's ends

#### Important!



**Twist both belts so that they bend „towards the outside” (Fig. 15) – this gets them lying parallelly to the welding jaws after fixing them with the clamping screws.**

- With the cam lever completely open the welding clamp, and if necessary, untwist the clamping screws, until the belt can be inserted.
- Insert the belt's end coming from the driver unit into the left clamp (Fig.15).

#### Important!



If the belt's end does not project over welding clamp for at least 1/4 to 1/2 inch (5 to 10 mm), push the complete pre-tensioned belt upwards for the required distance.

- Insert the belt coming from the top into the right clamp, and tightly fix both belts by means of the clamping screws.
- Important!**



Push the cam lever to the right, until the belts get into contact, for two reasons:

- To check, that the lever is not obstructed during the welding procedure, and
- to get practice – in particular on side rail ladders – how to turn the cranked (offset) cam lever for quickly closing the welding clamp, after the welding iron will be taken off.

Completely re-open the welding clamp.

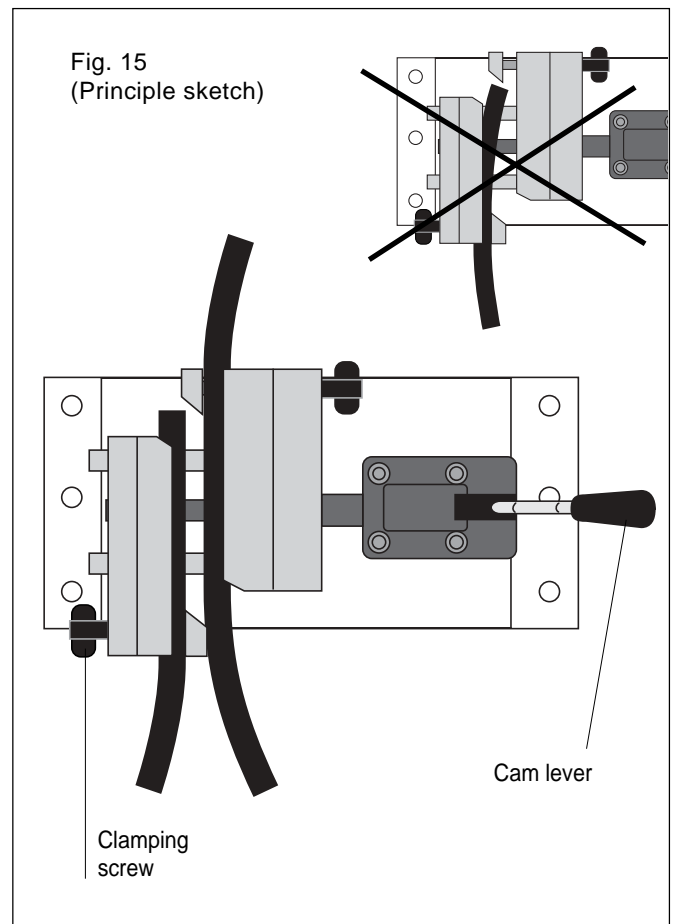
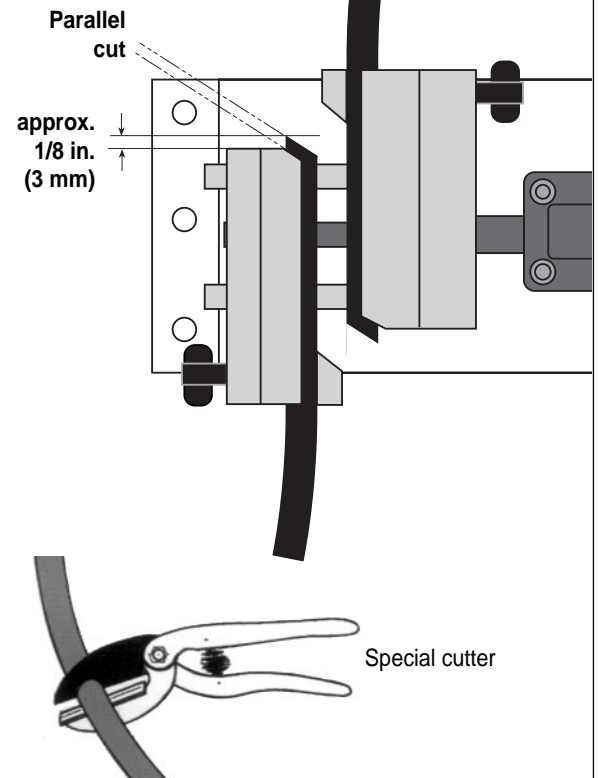


Fig. 16



### 5.3.6 Cutting the round belt

- Using the special cutter, cut both belt ends according to Fig. 16:

- **make parallel cuts that are angled,** and
- **with approx. 1/8 in. (3 mm) projection.**

This provides for a most complete contact to the welding iron.

- Take care, that the **welding areas of the belts are clean.**

### 5.3.7 Welding the belt

#### CAUTION!



**Danger of burning at the welding iron!**

**Prepare a safe place to rest it, while hot.  
Take care, when welding!**

- With the left hand**, put and hold the hot welding iron between the belts' ends (Fig. 17).
- With the right hand**, firmly push the cam lever backwards and to the right to **melt and compress the belts**, until the index has reached the **1<sup>st</sup> black marking** (Fig. 18).

#### Note!



**DO NOT reach the red area!  
The result would be a bad weld joint,  
which could cause a rupture of the belt.**

- Making the weld joint

#### Importanttttt!



**Getting a correct joint requires  
that the following steps are made  
instantaneously one after the other!**

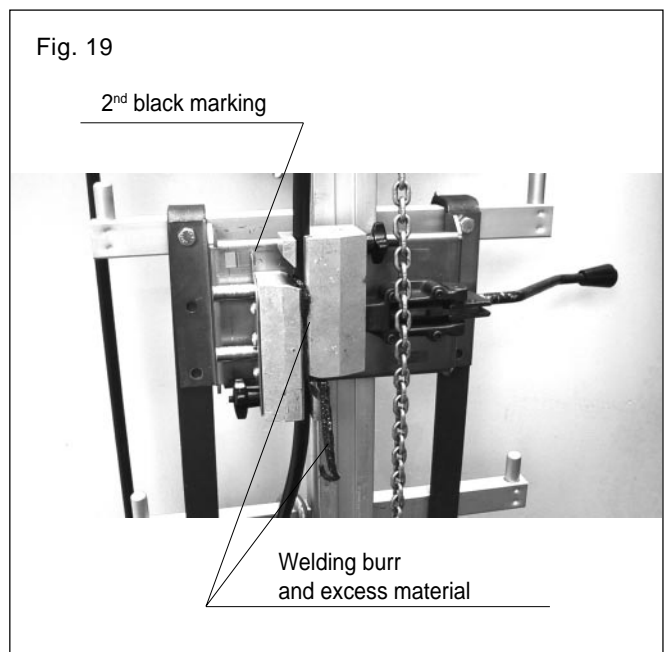
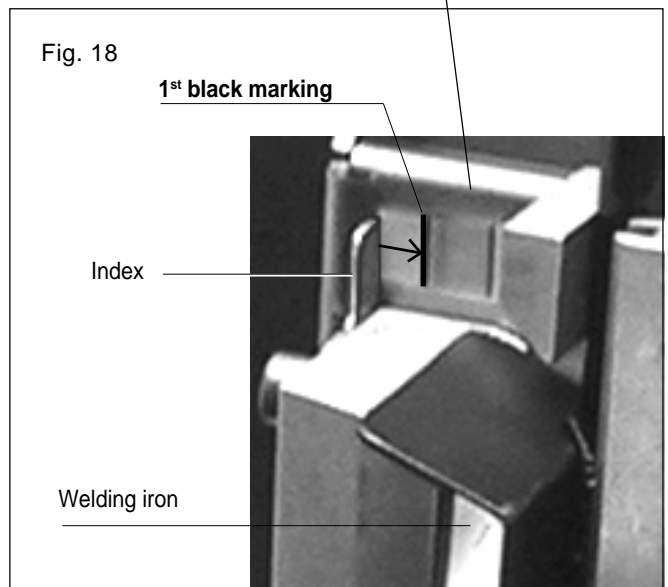
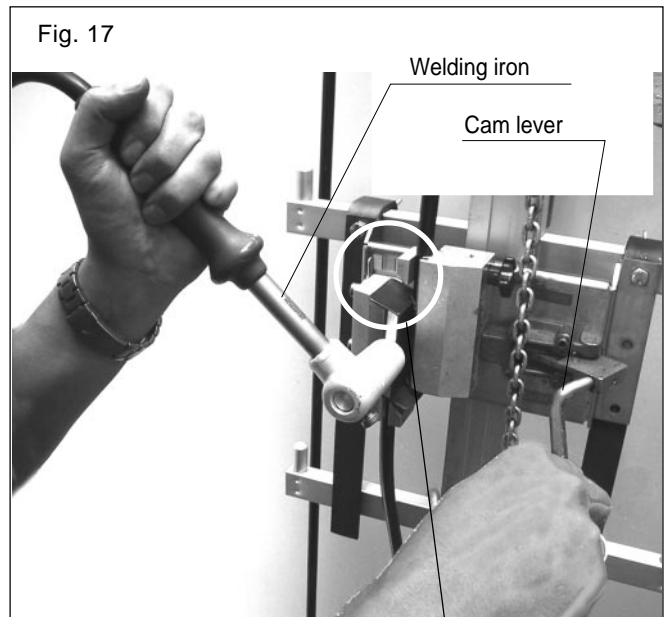
- **Open the welding clamp,**
- **remove the welding iron,**
- **immediately close the clamp by firmly pushing the cam lever backwards, until it reaches its limit stop!**

During this procedure, a lot of liquified plastic emerges from the clamp – **this is o. k.**, since half of the material from both belts over the welding length has to be displaced

The index must be on the **2<sup>nd</sup> black marking** at the right end of the coloured scale – it's not until then, that the welding clamp is completely locked for the cooling down.

**Cooling time: approx. 5 minutes.**

- Safely lay down the welding iron for cooling down, and switch off the thermo regulator.  
(See next page for cleaning the welding iron.)



### 5.3.8 Clear away the tools

After cooling down of the weld joint:

- a) Completely release the clamping screws, and open the welding clamp by means of the cam lever, so that the belt is free.
- b) Release the lever hoist, take off the **handifor®**, switch it off and store it in the sheath.
- c) Take off the lever hoist, the welding clamp, and the two belt clamps.
- d) If necessary, clean all tools, and store them in the tool box.



#### Important!

**Let the welding iron completely cool down!**

- e) Then, **simply wipe off the melted material**, ex. with a cotton cloth, or once cooled it can be removed by using one's fingernails – **DO NOT use sharp tools!**
- f) Store the welding iron and the thermo regulator to the tools box.

### 5.3.9 Deflash the weld

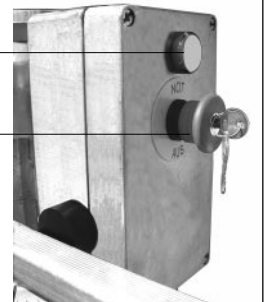
- a) Cut off larger material remaining with the special cutter.
- b) Using the cutter-knife trim the welding burr to get an even round surface of the belt.

## 5.4 Connecting to power supply and function control

- a) Activate power supply
  1. If necessary:  
Switch on the **main switch** resp. **connect the plug** to the power supply.
  2. Turn the key of the **service switch** to the right – the **EMERGENCY-STOP-button** comes out, the signal lamp shows green.
- b) **Switching on:** To start the motor, pull the round belt upwards.
- c) On three-phase-motors. **Check the motor running direction** – the round belt **in front of the ladder** must run upwards.  
If not, **correct:**
  - Push EMERGENCY-STOP-button.
  - Change two phases of the power supply.
- d) Switch on again.
- e) **Stopping:** Stop the round belt's movement<sup>1)</sup> – after the preset time delay the motor automatically stops.
- f) **Switching off:** Push **EMERGENCY-STOP-button**, the signal lamp goes off.

Fig. 20 Signal lamp

Service Switch  
and  
**EMERGENCY-STOP**



#### 1) Note!



**If it does not work, or only with high effort: Push EMERGENCY-STOP-button.**

**Due to longer standstill the sliding clutch may have too much torque**, because its friction lining and gasket are not sufficiently lubricated.

For **pulling off the clutch** and simultaneously **checking the clutch force**, follow the instructions of chapters 6.1.2 and 6.1.3 on page 17.

Pulling off the clutch does not result in damage on friction lining and gasket. During normal operation, both get the sufficient lubrication.

## 5.5 Test operation and guiding device assembly

### 5.5.1 Required material

- a) If the round belt is not free-running on its total length, guiding devices have to be mounted at the relevant places. This can be necessary at
- intermediate platforms or
  - other obstacles.



**Note!** In front of the ladder, the belt must be also guided at those places, where it is not obstructed during idle-running – but a person using the Climbing Aid pulls it away from the ladder, which may cause the belt to contact an obstacle!

- b) According to the local conditions, carry with you the adequate number of **belt guides (1)**, **threaded anchor bracket (2)**, **anchor plates (3)** and **self-locking nuts M 6 (4)** (Fig. 21).
- c) **Tools and materials:**
- Pole strap
  - Socket spanner size 10
  - Molycote® grease paste DX
  - Insulating tape (only for Aluminum-ladders)

### 5.5.2 Test ascent and guiding device assembly

- a) Connect the harness to the fall arrest system.
- b) Fix the belt clamp to the belt and connect it to the chest- or waist D-ring.
- c) Step upwards for one or two steps until the motor starts, and start climbing.
- d) Check the round belt's course, and at every place, where it touches an obstacle, stop the round belt, and mount a guiding device.

#### CAUTION!



Before starting installation work, the installer has to secure himself with the adjustable positioning lanyard!



#### Note!

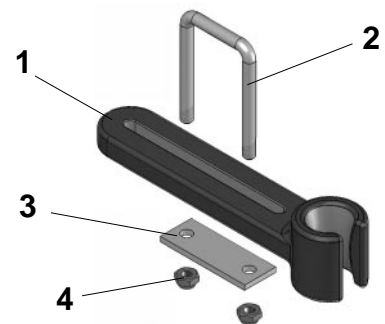
**On aluminum ladders:** To avoid electro-chemical corrosion **protect steps and/or poles with insulating tape**, where the guiding devices are mounted!

Apply Loctite® **grease paste DX** on all **stainless steel screw connections!**

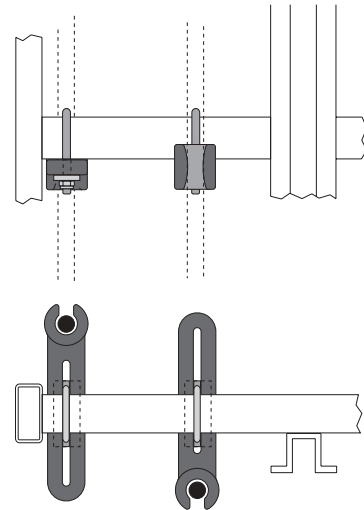
- A** **Front** guiding devices, ex. in the area of platform hatches:

**Connect the guiding device** under the step (Fig. 21), and **insert the belt**.

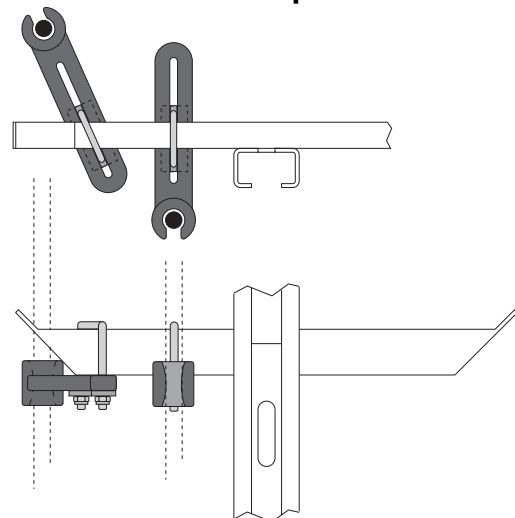
Fig. 21 (Principle sketches)



**Standard ladder**



**Middle-pole ladder**



- B** **Rear** guiding device, ex. in the area of anchor brackets of the ladder:

Put the **belt guide** on the belt and connect it under the step (Fig. 21).

To protect the belt from contact with the obstacle: Mount the belt guide sideways offset.



### 5.5.3 Descending

- a) The **tractelift®** may also be used for descending to equally relieve the person while climbing downwards. Wear on the friction clutch between motor and driver pulley is not important.
- b) **If this is not desired**, e.g. for shorter distances: **take off the belt clamp from the round belt.**  
Otherwise, the motor will start, since the round belt gets the driver pulley moving, which after one revolution or less, gives the start signal.  
If this inadvertently happens,
- **stop the motor** by catching and holding the belt for a short time, and
  - **take off the rope clamp.**
- b) During descent check the correct position of the belt at all installed guiding devices.
- c) After reaching ground level
- stop the Climbing Aid.
  - Unhook the harness from the fall arrest system, take off the adjustable positioning lanyard.
  - Store tools and material.

**The Climbing Aid is now ready for use.**

### 5.5.4 Setting out of service

#### Disconnect the drive unit from power supply:

- Push the **EMERGENCY-STOP-button** – the signal lamp goes off.
- Take off the key and store it to its intended place.
- On **installations with detachable motor unit:**  
If requested, take off the motor unit, and store it at a safe place.

### 5.6 Record keeping



After finishing assembly and checks the responsible installer reports the “Inspection before Initial Operation” to the log-book.

The log-book remains on place.

## Maintenance Instructions

The Climbing Aid is on principle maintenance-free. During annual safety inspection resp. during intermediate service, ex. in the course of “trouble-shooting”, a competent person should check the installation according to the following instructions **Required tools/material** see chapter 4.2 on page 7.

## 6. Inspection and Maintenance

### 6.1 Driver unit

#### 6.1.1 Motor, control and gearbox

**Motor, control and gearbox** are on principle maintenance-free.

##### a) Visual check

- for damage, oil loss, corrosion, dirt, in the controlbox infiltrated water, or impurities,
- of correct anchoring of bracket, fixing plates, and driver disk guard plate.

b) **Start the motor for functional check** regarding vibration and abnormal noise. Stop the motor.

c) If the motor is **very dirty**, it should be cleaned to ensure an effective air flow.

### 6.1.2 Sliding clutch check

Check clutch adjustment by means of a **handifor®** 220 lbs (100 kg) (Fig. 22).

- Put the belt clamp on the round belt.
- Connect the **handifor®** dynamometer to the locking carabiner of the belt clamp.
- By means of a sling anchor the handifor® to the nearest step.
- Start the motor (by pulling the belt upwards against the resistance of the sliding clutch<sup>1)</sup>), The actual traction force will be shown.

If the display value **does not match with the rated value** of 88 lbf (40 daN), **readjust the traction force** according to 6.1.3.

#### Important!



**They motor stops after a short time – this is no breakdown!**

Due to the test method the driver disk is blocked, so that there is no signal to continue running within the preset time delay.

### 6.1.3 Traction force adjustment

- Push EMERGENCY-STOP-button to prevent the motor from inadvertently starting during the adjustment.
- Remove the black protection cap (Fig. 22) from the adjusting nut of the driver unit, and loosen the stud screw.
- With an open wrench size 30 mm, turn the adjusting nut:
  - clockwise** – to **increase** the traction force.
  - counter-clockwise** – to **reduce** it.
- Start the motor and repeat the check according to 6.1.2

**If necessary, repeat the adjustment, until the traction force has reached the correct value.**

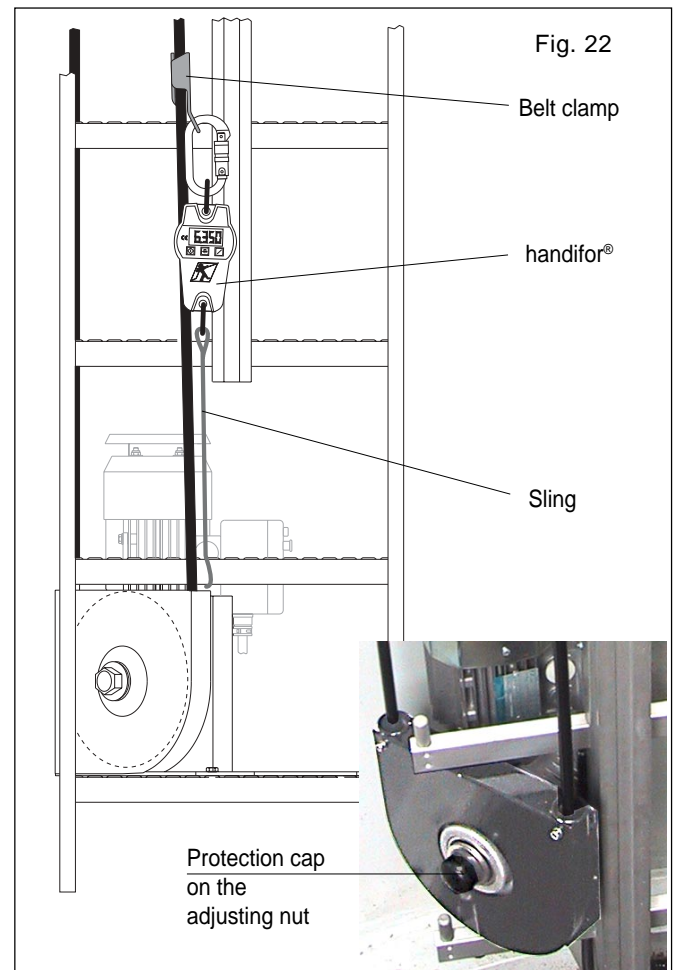
- Fix the adjusting nut by means of the stud screw, and put on the protection cap.

## 6.2 Diverter unit

### a) Visual check

- for damage, oil loss, corrosion, or dirt,
- of correct anchoring of bracket, fixing plates, and diverter disk guard plate.

- Start the motor for functional control** regarding vibration and abnormal noise. Stop the motor.



### 1) Note!



**If it does not work, or only with high effort: Push EMERGENCY-STOP-button.**

**Due to longer standstill the sliding clutch may have too much torque**, because its friction lining and gasket are not sufficiently lubricated.

- Reduce the traction force** (see 6.1.3).
- Start the motor and continue with adjusting the traction force.

Pulling off the clutch does not result in damage on friction lining and gasket. During normal operation, both get the sufficient lubrication.

## 6.3 Round belt and Round belt guiding

### 6.3.1 Belt condition / Guiding devices

Visual control for damage, wear, or oil contamination.

### 6.3.2 Belt pre-tension check

a) Test method (Fig. 23):

- Put the belt clamps on the round belt with a distance of approx. 6 ft (2 m) to enable the welding clamp to be placed at (X), if necessary.
- Anchor the load hook of the lever hoist to the upper belt clamp. Adjust the chain to the required length.
- Anchor **handifor**® between the top hook of the lever hoist and the locking carabiner of the lower belt clamp.

b) **Pre-tension check**

Activate the lever hoist, until the belt between the rope clamps is unloaded.

The **handifor**® shows the actual pre-tension of the belt (see table 2).

If the actual value differs for **more than  $\pm 5\%$**  from the rated value, cut the belt according to 6.3.3, and start with a new welding procedure.

### 6.3.3 Cutting the round belt

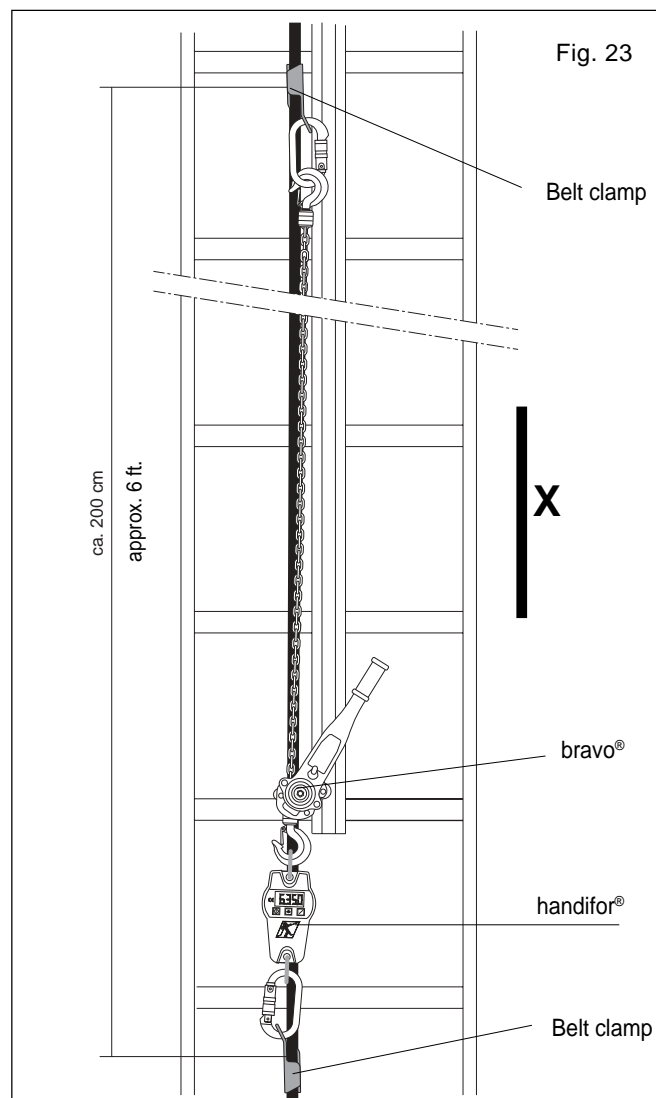
- a) With the lever hoist, tension the belt to the value according to table 2.
- b) With the special cutter, cut the belt at the middle of the area marked with (X), where the welding clamp will be placed.

**Instructions for  
welding the round belt  
see chapter 5.3, pages 11 to 15**

Temperature		Tension	
°F	°C	lbf	daN
-4 <sup>1)</sup>	-20 <sup>1)</sup>	440 <sup>1)</sup>	200 <sup>1)</sup>
5 <sup>1)</sup>	-15 <sup>1)</sup>	353 <sup>1)</sup>	160 <sup>1)</sup>
14 <sup>1)</sup>	-10 <sup>1)</sup>	293 <sup>1)</sup>	133 <sup>1)</sup>
23 <sup>1)</sup>	-5 <sup>1)</sup>	255 <sup>1)</sup>	116 <sup>1)</sup>
32	0	220	99
41	5	200	91
50	10	193	83
59	15	173	78,5
68	20	163	74
77	25	153	69,5
86	30	143	65
95	35	138	62,5
104	40	132	60
113	45	129	58,5
122	50	126	57
131	55	121	55
140	60	117	53

Table 2

- 1) When assembling at these temperatures you must get a dynamometer with a **capacity higher than 220 lbf** (100 daN), ex. a DYNAFOR® with a capacity of 500 lbs (250 kg):  
Model LLX: Accuracy  $\pm 0,2\%$  / smallest load 0.5 lb, or  
Model LLZ: Accuracy  $\pm 0,8\%$  / smallest load 1 lb.



## 6.4 Time delay for automatic control

Adjusting the time delay is made at the time delay relay inside the control box:

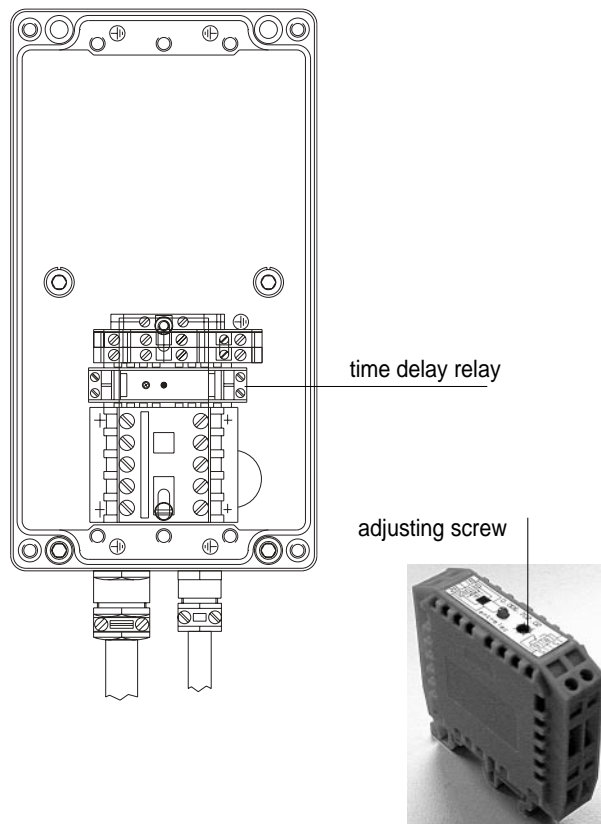
- a) Disconnect the driver unit from power supply.
- b) Open the terminal box.
- c) Turn the adjusting screw (Fig. 24)  
**clockwise** – to **increase** the time delay  
**counter-clockwise** – to **reduce** it.
- d) Close the terminal box.
- e) Connect the driver unit to the power supply.
- f) Check the time delay.

If necessary repeat this adjustment, until the time delay is set to the required value.

## 6.5 Belt clamp and locking carabiner

- a) Visual control for damage.
- b) Function control (catch and clamping jaw).

Fig. 24  
(Also valid for single phase motors)



## 7. Safety inspection

1. “**Inspection before Initial Operation**” by a competent person (see chapter 5.6, page 16).
2. **Yearly Inspection**, or more regularly depending on the working practice, by a competent person.



The result of these inspections has to be written down in the log-book.

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