



INFORMAÇÃO TÉCNICA

TIRFOR ATÉ 3 TON.



Os aparelhos Tirfor® são guinchos manuais portáteis de cabo passante. Podem elevar, puxar e posicionar cargas ao longo de uma grande distância. Podem ser utilizados em múltiplas configurações e com grandes extensões de cabo. As manobras realizam-se com a ajuda de uma alavanca. A capacidade de carga do sistema Tirfor® pode ser aumentada utilizando roldanas de reenvio.

- Peso reduzido — Instalação rápida
- Sem limitação de comprimento de cabo
- Maneável, ligeiro, robusto, potente
- Multiplicação da capacidade através de poleias de reenvio
- Protecção contra sobrecargas
- Posicionamento milimétrico da carga

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Ver Especificações e Recomendações nas páginas abaixo.



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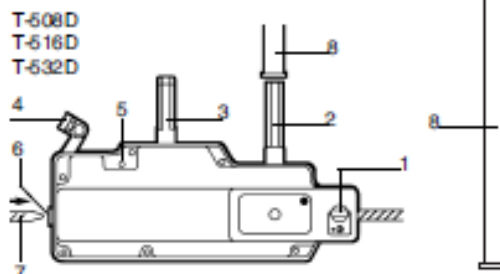
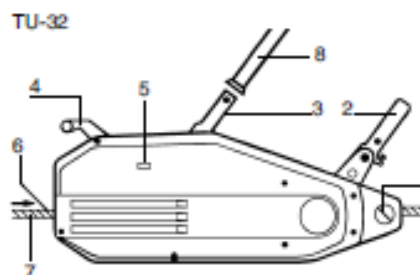
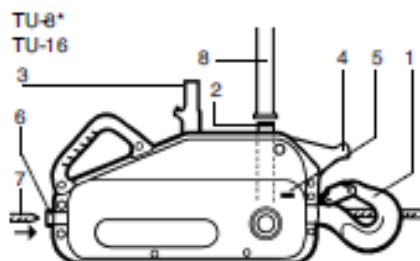
PICTURES

A, B

Always concerned to improve the quality of its products, the TRACTEL® Group reserves the right to modify the specifications of the equipment described in this manual.

The companies of the TRACTEL® Group and their agents or distributors will supply on request descriptive documentation on the full range of TRACTEL® products : lifting and pulling machines, permanent and temporary access equipment, safety devices, electronic load indicators, accessories such as pulley blocks, hooks, slings, ground anchors, etc...

The TRACTEL® network is able to supply an after-sales and regular maintenance service. Should you have any queries or require technical assistance, please do not hesitate to contact your TRACTEL® dealer.



1. Hook / anchor pin
2. Forward operating lever
3. Reverse operating lever
4. Rope release lever
5. Rope release safety catch
6. Rope guide
7. Wire rope
8. Telescopic operating handle

Wire rope on reeler





GENERAL WARNING

1. Before installing and using this unit, to ensure safe, efficient use of the unit, be sure you have read and fully understood the information and instructions given in this manual. A copy of this manual should be made available to every operator. Extra copies of this manual will be supplied on request.
 2. Do not use the unit if any of the plates mounted on the unit is missing or if any of the information on the plates, as indicated at the end of the manual, is no longer legible. Identical plates will be supplied on request; these must be secured on the unit before it can be used again.
 3. Make sure that all persons operating this unit know perfectly how to use it in a safe way, in observance of all safety at work regulations. This manual must be made available to all users.
 4. This unit must only be used in compliance with all applicable safety regulations and standards concerning installation, use, maintenance and inspection of equipment lifting devices.
 5. For all professional applications, the unit must be placed under the responsibility of a person who is entirely familiar with the applicable regulations and who has the authority to ensure the applicable regulations are applied if this person is not the operator.
 6. Any person using the unit for the first time must first verify that he has fully understood all the safety and correct operation requirements involved in use of the unit. The first-time operator must check, under risk-free conditions, before applying the load and over a limited lifting height, that he has fully understood how to safely and efficiently use the unit.
 7. The unit must only be installed and set into service under conditions ensuring the installer's safety in compliance with the regulations applicable to its category.
 8. Each time, before using the unit, inspect the unit for any visible damage, as well as the accessories used with the unit.
 9. Tractel® declines any responsibility for use of this unit in a setup configuration not described in this manual.
 10. The unit must be suspended vertically to an anchoring point and a structure having sufficient strength to withstand the maximum utilization load indicated in this manual. If several units are used, the strength of the structure must be compatible with the number of lifting units used and with the maximum utilization load of the units.
 11. Tractel® declines any responsibility for the consequences of any changes made to the unit or removal of parts forming part of the unit.
 12. Tractel® will only guarantee operation of the unit provided it is equipped with an original Tractel® wire rope in accordance with the specifications indicated in this manual.
 13. Tractel® declines any responsibility for the consequences resulting from disassembly of the unit in any way not described in this manual or repairs performed without Tractel® authorization, especially as concerns replacement of original parts by parts of another manufacturer.
 14. Tractel® declines any responsibility for the consequences resulting from any unauthorized changes or repairs to the wire rope.
 15. The unit must never be used for any operations other than those described in this manual. The unit must never be used to handle any loads exceeding the maximum utilization load indicated on the unit. It must never be used in explosive atmospheres.
 16. The unit must never be used for lifting people.
 17. The unit is designed for manual operation and must never be motorized.
 18. When a load is to be lifted by several units, a technical study must first be carried out by a qualified technician before installation of the units. The installation must then be carried out in compliance with the study, in particular to ensure an even distribution of the load under appropriate conditions. Tractel® declines any responsibility for the consequences resulting from use of a Tractel® device in combination with other lifting devices of another manufacturer.
 19. Never park or circulate under a load. Access to the area under the load should be indicated by signs and prohibited.
 20. To ensure safe use of the unit, it should be visually inspected and serviced regularly. The unit must be periodically inspected by a Tractel®-approved repair agent as indicated in this manual.
 21. The wire rope must be in good condition to ensure safe, correct operation of the unit. Discard any wire rope which shows any signs of excess wear or damage. The condition of the wire rope should be checked each time before using the unit as detailed in the "wire rope" section.
 22. When the unit is not being used, it should be stored in a location inaccessible to persons not authorized to use the unit.
 23. When using the unit, the operator must ensure that the wire rope remains constantly tensioned by the load, and more particularly, the operator must ensure that the load is not temporarily snagged by an obstacle when coming down as this could result in rupture of the wire rope when the load is released from its obstacle.
 24. If the unit is to be definitively removed from use, make sure the unit is discarded in a way which will prevent any possible use of the unit. All environment protection regulations must be observed.
- IMPORTANT :** For professional applications, in particular if the unit is to be operated by an employee, make sure that you are in compliance with all safety at work regulations governing installation, maintenance and use of the equipment, and more specifically as concerns the required inspections : verification on commissioning by user, periodic inspections, and inspections subsequent to disassembly or repair operations.



TECHNICAL DATA

MODEL		TU-8	T-508D	TU-16	T-516D	TU-32	T-532D
Maximum working load	t	0,8		1,6		3,2	
Weight :							
machine	kg	8,4	6,6	18	13,5	27	24
telescopic operating handle	kg	1	1	2,4	2,3	2,4	2,3
standard 20 m of wire rope, complete	kg	6,1	6,1	13,1	13,1	26,6	26,6
Total weight of standard equipment	kg	15,5	13,7	33,5	28,9	56	52,9
Machine dimensions :							
length	mm	527	420	660	530	676	620
length with optional hook	mm	-	550	-	650	860	840
height	mm	265	250	330	315	330	355
width	mm	108	99	140	127	156	130
telescopic handle : closed/extended	cm	51/77	40/69	68/119	65/115	68/119	65/115
TIRFOR wire rope							
diameter	mm	8,3		11,5		16,3	
guaranteed breaking strain*	daN	4000		8000		16000	
weight per meter	kg	0,25		0,5		1	
Rope travel (forward/reverse)**	mm	70/76	46/63	56/70	42/57	30/48	18/36

* Including end fittings of the wire rope.

** One complete cycle of the operating lever at maximum working load.

1. INTRODUCTION AND DESCRIPTION OF EQUIPMENT

The TIRFOR® machine is a hand-operated lifting and pulling machine. It is versatile, portable and multi-purpose, not only for pulling and lifting but also for lowering, tensioning and guying.

The originality of the TIRFOR® machine is the principle of operation directly on the wire rope which passes through the mechanism rather than being reeled onto a drum of a hoist or conventional winch. The pull is applied by means of two pairs of self-energised jaws which exert a grip on the wire rope in proportion to the load being lifted or pulled. A telescopic operating lever fitted to either the forward or the reverse lever transmits the effort to the jaw mechanism to give forward or reverse movement of the wire rope.

The machine is fitted with a hook or anchor pin, depending on the model, so that it can be secured quickly to any suitable anchor point.

TIRFOR® machines, intended for lifting and pulling materials, are available in two ranges each with three models of different capacities :

- T-508D range for light duty applications (with safety release catch),
- TU range for heavy duty applications (with safety release catch).

Each machine is supplied with a telescopic operating handle, and usually with a 20 m standard length of spe-

cial TIRFOR® wire rope fitted with a safety hook and wound onto a metal reeler. Longer or shorter lengths of wire rope are available on request.

This manual together with a guarantee card are supplied with each machine, as well as the CE declaration of conformity.

⚠ IMPORTANT : TIRFOR® wire rope has been specially designed to meet the particular requirements of the TIRFOR® machine. The manufacturer does not guarantee the safe operation of machines used with wire rope other than TIRFOR® wire rope.

2. RIGGING ARRANGEMENTS

Various ways of rigging are shown in Figs. 2.1, 2.2, 2.3 and 2.4 p.30. Figs. 4 and 5 show particular arrangements (one forbidden and the other recommended).

The machine may be anchored to a fixed point with the wire rope travelling towards the machine (Figs. 2.1, 2.2, 2.3), or travel along the wire rope, with the load, the wire rope itself anchored to a fixed point (Fig. 2.4).

In example 2.2, the maximum working load of the pulley and the anchor point should be equal to or greater than twice the load.

N.B. Whatever the rigging arrangement, and if the machine is anchored directly to a fixed point, ensure



that there are no obstructions around the machine which could prevent the wire rope, the machine and anchor from operating in a straight line. It is therefore recommended to use a sling of an appropriate capacity between the anchor point and the machine (Fig. 3).

⚠ WARNING : Any rigging arrangement which requires the calculation of the forces applied should be checked by a competent engineer, with special attention to the appropriate strength of fixed point used. For work such as guiding the trunk in tree felling, the operator should ensure that he is outside the danger area by passing the wire rope around one or more return pulleys.

The capacity of the machine may be increased considerably for the same effort by the operator by using multiple sheave blocks. (See the examples set out in Figs. 6.1 and 6.2).

The increase in the capacity shown is reduced depending on the efficiency of the pulleys.

The diameter of the pulleys used should be equal to at least 18 times the diameter of the wire rope. (Refer to the applicable regulations).

For any rigging arrangement other than those described in this manual, please consult TRACTEL®, or a competent specialist engineer before operating the machine.

3. INSTALLATING THE WIRE ROPE

N.B. When handling the wire rope it is recommended to protect the hands by using work gloves.

If the wire rope is to be anchored to a high anchor point, the wire rope should be anchored before fitting the wire rope in the machine.

1. Uncoil the wire rope in a straight line to prevent loops or kinks.
2. Release the internal mechanism (See section 4: «Releasing and engaging the jaws»).
3. Insert the wire rope through the rope guide at the end opposite to the anchor point (hook or anchor pin).
4. Push the wire rope through the machine, and if necessary, helping it by operating the forward operating lever.
5. When the wire rope appears through the anchor point, pull the slack wire rope through the machine, to the point required.
6. Engage the jaws by operating the rope release mechanism (See section 4: «Releasing and engaging the jaws»).

7. Anchor the TIRFOR® machine or the wire rope to the appropriate fixed point (See section 5: «Anchoring») taking care to ensure that the anchor point (hook or pin, depending on the model) is correctly fixed.
8. Extend the telescopic operating handle until the spring locks into position. If necessary twist the two sections of the handle, one inside other, to align the spring (Fig. 1 p. 9).
9. Replace the telescopic operating handle on the chosen operating lever (forward or reverse) and twist the handle to ensure that it is locked in position (about a half turn).

After this procedure, the machine is ready for operation, providing the load is correctly anchored to the machine or the wire rope (See section 5: «Anchoring» and section 2 «Rigging arrangements»).

4. RELEASING AND CLOSING THE JAWS

Each machine is fitted with a lever (Fig. 1 p. 9) for releasing the jaw mechanism which should only be operated when the machine is not under load.

There are two positions for the rope release lever (See Fig. 7, 8 and 9) : released or engaged.

N.B. When not in operation, it is recommended that the rope release lever should be in the engaged position. The machine must therefore be released before attempting to feed in the wire rope.

4.1. TU-8 or TU-16 (Fig.7)

Releasing :

1. Completely press the rope release safety catch (5) and lift the rope release lever (4).
2. Release the safety catch and continue to lift the rope release lever until it locks into position. The internal mechanism is in the released position.

Engaging :

1. Lift the rope release lever slightly.
2. Press and maintain pressure on the rope release safety catch, allowing the release lever to slowly travel back to its original position. Release the safety catch. The release lever locks in position under the effect of its spring.

4.2. TU-32 (Fig.8)

Place the anchor point against a support.

Releasing :

1. Completely press rope release safety catch (5) and push the rope release lever (4) towards the anchor point.
2. Release the safety catch and continue to push the rope release lever until it locks into position. The internal mechanism is in the released position.

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Engaging :

1. Push the rope release lever towards the anchor point.
2. Press and maintain pressure on the rope release safety catch, allowing the release lever to slowly travel back to its original position. Release the safety catch. The release lever locks in position under the effect of its spring.

4.3. T-500D range (Fig.9)

Place the anchor point against a support.

Releasing :

Turn the rope release safety catch (5) and push the rope release lever (4) towards the anchor pin until it locks into position when raised slightly at its limit. Release the safety catch.

Engaging :

1. Turn the rope release safety catch
2. Press the rope release lever vertically downwards, allowing the lever to travel back to its original position under the effects of its spring. Release the safety catch.

5. ANCHORING

Failure to anchor the TIRFOR® machine correctly runs the risk of a serious accident. The user must always ensure before operation that the anchor point(s) for the machine and wire-rope are of sufficient strength to hold the load.

It is recommended that TIRFOR® machines should be anchored to a fixed point or to the load using an appropriate capacity sling. It is forbidden to use the machine's wire rope as a sling by passing it around the load and hooking it back onto itself (Fig.10-1 : incorrect anchoring arrangement; Fig.10-2 : correct anchoring arrangement).

The anchoring arrangement of models TU-8 and TU-16 is a hook fitted with a safety catch (Figs. 11 and 12). In all cases when anchoring the machine the safety catch of the anchor hook should be correctly closed, in its position at the tip of the hook (Fig.12). This advice for the machine anchor hook also applies to the hook fitted to the wire rope.


TIRFOR® machines TU-32 and T-500D are anchored by means of a removable anchor pin, fitted across the two ends of the side cases (Fig. 13 and 14) and locked in position by a spring clip (Figs. 15 and 16).

Optional hooks are available to fit the anchor point of models T-500D and TU-32.

To anchor using the anchor pin, follow the procedure below:

1. Open the spring clip of the anchor pin.
2. Remove the spring clip from the anchor pin.

3. Slide the anchor pin out of the side cases (Fig. 14).
4. Fit the anchoring arrangement, such as a sling, between the side cases.
5. Refit the anchor pin through the side cases and anchoring arrangement, such as the eyes of a sling.
6. Refit the spring clip to the anchor pin.
7. Close the spring clip, ensuring that it fits correctly over the end of the anchor pin and cannot fall out.

 **Warning :** It is essential for the safe operation of the machine to ensure that, before loading the machine, the anchor points, hooks or pins, are correctly secured, (with the safety catch correctly located on the hook - Fig. 12).

6. OPERATION

TIRFOR® machines are very easy to use. Place the telescopic operating handle on either the forward or reverse operating lever, lock it into position by twisting, and move the operating handle to and fro. The operating arc is variable for ease of operation.

When operation stops, both jaws automatically grip the wire rope and hold the load which is spread equally between the jaws.

The to-and-fro operation of the forward or reverse lever gives continuous movement of the load.

7. RELEASING THE WIRE ROPE AND STORAGE

It is essential to take the load off the machine before attempting to release the jaws. To do this, operate the reverse operating lever until there is no tension in the wire rope.

Remove the telescopic operating handle and return it to the closed position.

Release the machine and follow the instructions for installing the wire rope in the reverse order. Re-engage the jaws of the machine before putting it into storage.

Store the machine and wire rope in a dry place, away from the effects of the weather. The wire rope should be completely removed from the machine and rewound onto its reeler.

Before reeling the wire rope, it is recommended to inspect it, clean it with a brush and then grease it. (See section 10).

8. SAFETY DEVICES

8.1. Overload limiting safety devices

All TIRFOR® machines incorporate a shear pin system. In case of overload, one or more pins (depending on the model), fitted to the forward operating lever, shear and prevent further forward or lifting operations. Reverse

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operation is still possible to enable the load to be lowered or the wire rope to be slackened.

8.2. Rope release safety device

Models TU and T-500D are fitted with a «two-handed» rope release system which requires deliberate operation by the user to release the machine. See section 4: «Releasing and engaging the jaws».

9. REPLACING THE SHEAR PINS

Figures 17, 18, 19 and 20 show the position of the shear pins for the various models. Spare shear pins are in the stub of the operating levers for models TU-8 and TU-16, and in the rope release lever for the other models, behind the plastic cap.

Remove the sheared pins with a suitable punch. For models TU-8 and TU-16, remove the forward operating handle stub by using an extractor.

Remove the sheared pins. Refit the forward operating handle stub on the crank and align the grooves for the shear pins (Figs. 17 and 18).

For models T-500D and TU-32, align the holes of the upper and lower sections of the forward operating lever. Position the spare shear pin(s) and drive them in with a hammer.

Warning : It is forbidden to replace sheared pins by anything other than genuine TIRFOR® shear pins of the same model.

Before putting the machine back into operation, ensure that the cause of the overload is removed. If necessary, use multiple sheave blocks (Fig.6).

Remember to re-order sheared pins and put them back in the correct place.

10. WIRE ROPE

To guarantee the safe operation of TIRFOR® machines, it is essential to use them exclusively with TIRFOR® wire rope which has been specially designed to meet the requirements of the TIRFOR® machine.

TIRFOR® wire ropes have a red strand which is visible on new rope.

One end of the wire rope has an end fitting, such as a safety hook, fitted to a thimble fixed by a metal ferrule (Fig. 21). The other end of the wire rope is lused and tapered (Fig. 22).

A wire rope in good condition is a guarantee of safety, to the same extent as a machine in good condition. It is necessary to continuously monitor the state of the wire rope, to clean and oil it with a rag soaked with motor oil or grease.

Grease or oil containing graphite additives or molybdenum disulphide must not be used.

Visual examination of the wire rope

The wire rope should be examined daily to detect any signs of wear (damage or broken wires : See examples in Fig. 23).

In case of any apparent wear, have the wire rope checked by a competent person. Any wire rope with a reduction from the nominal diameter by more than 10% should be replaced. (See Fig. 24 for the correct method of measuring the diameter of a wire rope).

IMPORTANT : It is recommended, specially for lifting applications, to ensure that the length of wire rope is greater than actually required. Allow an extra meter approximately.

When lifting or lowering loads over long lengths of wire rope, steps should be taken to stop the load from rotating to prevent the wire rope from unlaying.

Never allow a tensioned wire rope to rub over sharp edges. The wire rope must only be used with pulleys of an appropriate diameter.

Never expose the wire rope to temperatures beyond 100 degrees C. Never use wire rope that has been subject to damage such as fire, corrosive chemicals or atmosphere, or exposed to electric current.

Storage : See section 7.

11. MAINTENANCE INSTRUCTIONS

The machine should be inspected, cleaned and lubricated at regular intervals, at least annually, by an approved TRACTEL® repairer.

Never use grease or oil containing graphite additives or molybdenum disulphide.

To clean the machine, allow the machine to soak in a bath of some proprietary cleansing fluid but not acetone and derivatives or ethylene trichloride and derivatives. Then shake the machine vigorously to loosen foreign matter and turn it upside down to allow the dirt to come out through the openings for the operating levers. Allow the mechanism to drain and become dry.

After this treatment, ensure that the machine is well lubricated by applying a quantity of oil (type SAE 90-120) onto the internal mechanism through the openings for the operating levers, and for the models TU-8 and TU-16, through the special lubrication holes. To carry out this procedure, it is best for the machine to be not under load and in the released position.

Alternatively operate the forward and reverse operating levers to allow the lubricant to penetrate all parts of the mechanism.



N.B. Excess lubrication cannot cause the machine or wire rope to slip.

Any machine where the side cases show signs of dents or damage, or of which the hook is damaged (models TU-8 and TU-16), should be returned to an approved repairer of TRACTEL's network.

12. ⚠ WARNINGS AGAINST HAZARDOUS OPERATIONS

The operation of TIRFOR® machines, in accordance with the instructions of this manual, is a guarantee of safety. Nevertheless, it is useful to draw the attention of users to the following warnings :

- TIRFOR® machines as described in this manual must not be used for lifting people.
- Never attempt to motorise the models of TIRFOR® machines described in this manual.
- TIRFOR® machines must not be used beyond their maximum working load.
- TIRFOR® machines must not be used for applications other than those for which they are intended.
- Never attempt to operate the rope release mechanism whilst the machine is under load.
- Never obstruct the operating levers or the rope release lever.
- Never operate the forward and reverse operating levers at the same time.
- Never use a handle, other than the telescopic operating handle supplied, to operate the TIRFOR® machine.
- It is forbidden to replace sheared pins by anything other than genuine TIRFOR® shear pins of the same model.
- Never anchor the machine other than by its appropriate anchor point.
- Never obstruct the machine, which could prevent the machine, the wire rope and the anchor points from operating in a straight line.
- Never use the TIRFOR® wire rope as a sling.
- Never apply a load to the loose wire rope exiting from the anchor point of the TIRFOR® machine.

- Never subject the controls to sharp knocks.
- Never attempt to reverse the rope completely through the machine whilst under load.
- Do not operate the TIRFOR® machine when the rope ferrule gets to within 10 cm of the machine. Otherwise the ferrule is likely to foul the casing and push the rope guide inside the machine.

13. TROUBLESHOOTING

1) **The forward operating lever moves freely and does not operate the mechanism:** the machine has been overloaded and the shear pins have sheared. See section 9 for replacing the shear pins.

2) Pumping:

A lack of lubricant in a TIRFOR® machine sometimes brings about a condition known as «pumping» which is not at all dangerous, but which is inconvenient. This situation occurs when the jaw which is gripping the rope becomes locked onto it preventing the other jaw from taking over the load. As the operating lever is moved in one direction the machine travels a few centimeters, but when the operating lever travels in the other direction the machine moves back the same distance in sympathy with the jaw which is locked onto the rope. The TIRFOR® machine should be thoroughly lubricated and it will recommence working normally.

3) Jerkiness:

This is also a symptom of lack of lubrication. The TIRFOR® machine should be thoroughly lubricated.

4) Blockage:

If the wire rope becomes blocked in the machine, generally because a damaged section of wire rope is stuck within the jaws, it is imperative to stop operating the machine. The load should be taken by another machine on a separate wire rope, or by another means, whilst ensuring that all **safety precautions** are taken. When the blocked machine is no longer under load, the damaged rope may be released and removed. Should this not be possible, return the machine and wire rope to the manufacturer or an approved repairer.

14. HEALTH AND SAFETY AT WORK

All lifting equipment must be supplied, operated, maintained and tested according to the provisions of the relevant health and safety at work regulations.

It is also the responsibility of every company to ensure that their employees have been fully and properly trained in the safe operation of their equipment.

**Ensure that the labels are in place.
Replacement labels can be supplied on request.**