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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 indicators, accessories such as pulleys, blocks, hooks, rings, 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. Before using the TIRFOR machine, it is essential for the safe and correct operation of the equipment that this manual be read and fully understood, and that all the instructions be followed. This manual should be made available to every operator. Extra copies of this manual will be supplied on request.

2. The TIRFOR machine allows the operator to carry out work with complete safety. Ensure that this machine is only handled over for use or rigging to an operator who is trained to operate it in a responsible manner.

3. Never use a machine which is not in good working condition. Replace any worn or damaged wire rope (see Section 13). Continuous monitoring of the condition of the machine, its wire rope, and anchor sling is an important safety consideration.

4. The manufacturer declines any responsibility for the consequences of dismantling or altering the machine by any unauthorised person. Specially excluded is the replacement of original parts by parts of another manufacturer.

5. The models as described in this manual must not be used for lifting people.

6. Moreover, these models are designed for manual operation and must not be motorised. The TRACTEL Group has designed special motorised models (TU-16H and TU-32H).

7. Never attempt to overhaul the machine.

8. Standard TIRFOR machines are not designed for use in explosive atmospheres.

9. IMPORTANT: If the equipment described in this manual is supplied to a non-employer person, check that you meet your obligations with respect to safety at work regulations (see page 11 - chapter 14).

LIFTING PEOPLE AND SPECIAL APPLICATIONS:
For further information on equipment for lifting people, and on any special application, please refer to TRACTEL S.A.S.

TECHNICAL DATA

<table>
<thead>
<tr>
<th>MODEL</th>
<th>TU-8</th>
<th>T-508D</th>
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<td>66/119</td>
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<td>0.590</td>
<td>0.590</td>
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</tr>
</tbody>
</table>

Rope usage (length/diameter)** | 70/76 | 49/63 | 30/70 | 42/57 | 33/45 | 33/45 |

* including end fitting of the wire rope.
** One complete cycle of the overall value of max. working load.
1. DESCRIPTION OF EQUIPMENT

The TRIFOR machine is a hand-operated lifting and pulling machine. It is versatile, portable, and multi-purpose, not only for lifting and pulling but also for lowering, tightening and paying off.

The originality of the TRIFOR machine is the principle of operation directly on the wire rope, which passes through the machine rather than being passed onto a drum or conventional winch. The pull is applied by means of two pairs of self-energising jaws which are inserted into 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 movements of the jaw mechanism.

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

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

- T-6000 range for light duty applications (with safety release catch)
- T-2000 range for heavy duty applications (with safety release catch)

Each machine is supplied with a telescopic operating handle, and usually with a 20m standard length of special TRIFOR wire rope fitted with a safety hook and wrapped onto a metal spool. 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 EC declaration of conformity.

IMPORTANT: TRIFOR wire rope has been specially designed to meet the particular requirements of the TRIFOR machine. The manufacturer does not recommend the use of any other type of wire rope, and all operations of all machines, except TRIFOR wire rope.

2. RIGGING ARRANGEMENTS

Various examples of rigging arrangements are shown in Figs. 2, 3, 4, 5 and 6. The following arrangements are recommended:

The machine may be anchored to a fixed point with the wire rope travelling towards the machine (Figs. 2, 3, 4, 5, 6), or along the wire rope, with the load, the wire rope itself anchored to a fixed point (Fig. 2).

In example 2, the maximum working load of the pulleys and the anchor point should be equal to or greater than twice the load.

N.B. Whatever the rigging arrangement, ensure that the machine is anchored directly to a fixed point, and 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 appropriate size between the anchor point and the machine (Fig. 3).

WARNING: Any rigging arrangement which requires the installation of the forces applied should be checked by a competent engineer, with special attention to the appropriate strength of fixed points used.

For work such as the lifting of felled trees, the operator should ensure that the tree is outside the danger area by passing the wire rope around the tree or more return pulleys.
3. INSTALLING THE WIRE ROPE

N.B. When handing 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. Unclog the wire rope in a straight line to prevent loops or kinks.
2. Release the internal clamp (see Figure 4.1 - Releasing and engaging the jaws).
3. Insert the wire rope through the guide of the end opposite to the anchor point (hook or similar 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 4.1 - Releasing and engaging the jaws).
7. Anchor the TIGHT-FIT machine or the wire rope to the appropriate fixed point (see section 5.1 - 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 the other, to align the spring (Fig. 4.1).
9. Release the telescopic operating handle on the chosen operating lever (forward or opposite) 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, drawing the load is correctly anchored to the machine, or the wire rope (see section 6.1 - Anchoring) and section 3.2 - Rigging arrangements).

4. RELEASING AND CLOSING THE JAWS

Each machine is fitted with a lever (Fig. 1 item 2) 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 & 9) released or engaged.

N.B. When in operation, it is recommended that the rope release lever should be in the engaged position. The machine must therefore be released before altering 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 the spring.

4.2. TU-32 (Fig. 8)

Place the anchor point against a support.

**Releasing**
1. Completely press the 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.

**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. TS003 (Fig. 9)

Place the anchor point against a support.

**Releasing**
1. Turn the rope release safety catch (5) to 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 effect 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 the load using an appropriate capacity sling. It is essential to use the machine's wire rope as a sling by passing it around the load and hooking it back onto itself (Fig. 10 - Incorrect anchoring arrangement). The anchoring arrangement of models TU-4 and TU-16 is a hook fitted with a safety catch (Fig. 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 load (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-6000, as mentioned by means of all removable anchor pin, fitted across the two ends of the anchor bar (Fig. 13 and 14), and locked in position by a spring clip (See Figs. 15 and 16).

Optional hooks are available for two anchor point of models T-6000 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 eye sockets (Fig. 14).
4. Fit the anchoring arrangement, such as a sling, between the two eye sockets.
5. Re-fit the anchor pin through the eye sockets and anchoring arrangement, such as the eye of a sling.
6. Re-fit the spring clip to the anchor pin.
7. Close the spring clip, ensuring the hook 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 and move it into position by twisting and move the operating handle to and fro. The operating arc is a 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.

Fig. 12 - Anchor pin in position

Fig. 14 - Anchor pin removed

Fig. 15 - Spring clip closed

Fig. 16 - Spring clip open

The forward and 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 and move it to the position 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.

Before uncoiling the wire rope, it is recommended to inspect it, clean it with a brush and then grease it.

(See section 9).
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), solidly fixed in the operating lever, shear and prevent further forward or lifting operations. Reverse operation is still possible to remove the load to the lower end of the wire rode to be sheared

8.2 Rope release safety device

Models TU and T 5000 are fitted with a two-handled rope release system which releases de-coupled operator by the user to release the machine. See section 4 - Releasing and engaging the lever

9. REPLACING THE SHEAR PINS

Figures 17, 18, 19 and 20 show the position of the shear pins for the various models. These shear pins are in the tab of the operating levers for models TU-8 and TU-16 and in the rope release lever for the other models. Remove the plastic cap. Remove the damaged pins with a suitable punch.

For models TU-8 and TU-16, remove the forward operating handle stud by using an extractor. Remove the shear pins. Refit the forward operating handle on the crack and align the grooves for the shear pins (Figs. 17 and 18).

For models T 5000 and T 52, align the notches of the shear and other sections of the forward operating levers.

Position the new shear pins and drive them in with a hammer.

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

Before putting the machine back into operation, ensure that the causes of the overload are removed. If necessary, use multiple shear blocks (See Fig. 5).

Remember to re-order shear 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 bush (See Fig. 21). The other end of the wire rope is fluted and tapered (See 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 check and repair it with a brake greased with motor oil or grease (Grade or Grease 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 (distortion or broken wires) (See examples in Fig. 23). In cases of any apparent wear, move the wire rope checked by a competent person. Any wire rope with a reduction in the normal diameter of more than 10% should be replaced (See Fig. 24) for the correct method of measuring the diameter of a wire rope).

Fig. 20 - Examples of damaged wire rope

11. MAINTENANCE INSTRUCTIONS

The machine should be inspected, cleaned and lubricated at regular intervals, at least annually by an approved IMPACTIS SALES service. Never use grease or oil containing graphite additives or molybdenum disulphide to clean the machine. Always clean the machine with warm water. Use a proprietary cleansing fluid and do not operate the machine with oil in the bearings. After cleaning, ensure that the machine is well lubricated by applying a quantity of oil (type SAE 30-120) onto the internal mechanism through the openings for the operating levers and the mobiles, TIR and TIR, through the special lubrication holes. To carry out this procedure, it is best for the machine to be under load and in the released position.

Alternatively, operate the forward and reverse...
operating levels 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 where the hook is damaged (models TUB and TU-B), should be returned to an approved service of TRACTEL B.A.S. network for repair.

12. WARNINGS AGAINST HAZARDOUS OPERATIONS

The operation of TRIFOR machines, according to the instructions of this manual, is a guarantee of safety. Nevertheless, it is useful to draw the attention of users to the following warnings:
- TRIFOR machines as described in this manual must not be used for lifting people.
- Never attempt to operate the machine in abnormal conditions.
- Never exceed the maximum working load.
- TRIFOR machines must not be used beyond their maximum working load.
- TRIFOR machines must not be used for applications other than those for which they are intended.
- Never attempt to operate the machine while the machine is under load.
- Never obstruct the operating lever 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 TRIFOR machine.
- It is forbidden to replace sheathed pins by anything other than genuine TRIFOR sheathed pins of the same model.
- Never replace the machine other than by its appropriate anchor point.
- Never obstruct the machine, which should prevent the locking, the wire rope and the anchor points from operating in a straight line.
- Never use the TRIFOR wire rope as a sling.
- Never apply a load to the rope when operating from the anchor point of the TRIFOR machine.
- Never subject the machine to sharp loads.
- Never store the rope completely through the machine while under load.
- Do not operate the TRIFOR machine when the rope tension gets to within 10 cm of the machine.
- Otherwise the tension is likely to fail 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 lubrication in a TRIFOR machine sometimes brings about a condition known as 'pumping', which is at all dangerous, but which is inconvenient. This situation occurs when the jaw, which grips the rope, becomes locked onto it preventing the other jaw from taking over the load.
- As the operating lever is moved more, the machine travels a few centimeters, but when the operating lever travels in the other direction, the machine shows back, the same distance in sympathy with the jaw which is locked onto the rope. The TRIFOR machine should be thoroughly lubricated and will recommence working normally.

3. Jerkiness:
- There is also a symptom of lack of lubrication. The TRIFOR 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, while ensuring that all safety precautions are taken. When the blockage is no longer understood, the damaged rope may be renewed 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 are fully and properly trained in the safe operation of their equipment.
Ensure that the labels indicated above in black are in place. Replacement labels can be supplied on request.

Accessories for TIRFOR machines:

- Hooks for TIRFOR (TU 5D)
- Eye bolts
- Lashing non-conducting blocks
- Slings
- Ground anchors

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