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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 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.

GENERAL WARNING

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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' 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 guaranty 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. 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.
18. During the up-down lifting operations, the user must always keep the load in view.
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.

1. PRESENTATION

1.1 Theory of operation

The minifor™ is a portable electric hoist with feed-through wire rope for lifting and pulling operations. The hoist implements a self-clamping drive system providing unlimited lifting wire rope travel.

The drive system is formed by a pulley with specially-shaped groove in which the wire rope is clamped under the effect of the load by two swivel rollers.

A pre-clamping spring which acts on the rollers maintains the wire rope on the pulley when no load is attached to the system. Beyond the action of the pre-clamping spring, the clamping action of the wire rope on the drive pulley is proportional to the load.

The technical design of the system ensures a high degree of safety provided the instructions given in this manual in the section entitled « Anchoring the hoist – Installation diagrams » are strictly observed.

The minifor™ hoist must only be used with the specific minifor™ lifting wire rope with diameter indicated (see specifications) to fully ensure safe, efficient use.

TRACTEL® declines any responsibility for the consequences resulting from use of the hoist with a wire rope other than the minifor™ wire rope.

Each minifor™ hoist is tested before shipment for 110 % of its maximum utilization load.

1.2 Composition of a standard supply MINIFOR

Each minifor™ (depending on model) is supplied in a box or metal case containing :

1. The hoist with its control box, equipped with its carrying handle, its safety hook and a power supply cable with male/female connector.
2. A plastic bag, containing :
   - a low limit stop on spring,
   - a 3mm ALLEN wrench to secure the limit stops on the wire rope.
3. A plastic bag, containing :
   - this manual,
   - the CE compliance certificate,
   - if necessary, the documents concerning the radio remote control.
4. Depending on the control option, the lifting wire rope (to the length required) mounted on a reel, equipped with a safety hook and a high limit stop mounted on spring.

1.3 Description and markings

Figure 1 shows a standard minifor™ in its most frequently used operating position, ready for operation, suspended on a clamp secured to a beam. The standard hoist is supplied with a 2.5m electric control cable with control box (Fig. 2) and a 0.50 m electrical power supply cable. On request, the unit can be supplied with different control and power supply cable lengths. Each unit carries a serial number on the top of the casing. The complete number (including letter) must be given whenever requesting spare parts or repairs.

Regularly check that all the labels are in place and can be easily read.

The length of the lifting wire rope is marked on the end sleeve in the hook. If necessary, check the wire rope length as it is possible that the wire rope may have been shortened since the unit was delivered. All the minifor™ hoists are supplied with a control box (Fig. 2), with double insulation IP 65 and 3 controls : Up, Down and Emergency stop.

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2. FUNCTIONAL SPECIFICATIONS (On request : other voltages and frequencies)

	TR10	TR30	TR30S		TR50	
	1 ~	1 ~	1 ~	3 ~	1 ~	3 ~
W.L.L. standard/with tackle (kg)	100 / 300	300 / 600	300 / 600		500 / 950	
Speed standard/with tackle (m/min)	15 / 7,5	5 / 2,5	13 / 6,5		7 / 3,5	
Power (Kw)	0,25		1,1		1,1	
Startup current (A)	17,3		16	19 / 11	16	19 / 11
Nominal current (A)	3,9		8	5,9 / 3,4	8	5,9 / 3,4
Power supply voltage (V)	230		230	230 / 400	230	230 / 400
Control voltage (V)	230		230	48	230	48
Frequency (Hz)	50		50		50	
Ø of steel wire rope (mm)	6,5		6,5		6,5	
Weight of wire rope per meter (kg)	0,17		0,17		0,17	
Weight of std hoist (without wire rope) (kg)	21		32	28	32	28
Weight winder with 20 m of wire rope (kg)	+ 23		-	-	-	-
Weight winder with 27 m of wire rope (kg)	+ 28		-	-	-	-
Weight winder with 40 m of wire rope (kg)	+ 30		-	-	-	-
Weight of tackle (kg)	+ 9		+ 10		+ 10	
L_{pA} dB(A)	74	73	76		78	
L_{WA} dB(A)	86	85	88		90	

NOTE : The « Up » and « Down » controls are indicated on the corresponding control buttons by an arrow showing the direction of movement, with the control box held in its hanging position (Fig. 2).

3. ACCESSORIES AND SPARE PARTS

The following parts and accessories can be supplied and installed by the user :

- High and low limit stops (interchangeable).
- Lifting wire rope equipped with eye hook.
- Fuse.
- Power supply connector (electrician).

4. ANCHORING THE HOIST – INSTALLATION DIAGRAM

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Check that the fixed attachment point is sufficiently strong for the force to be applied.

If the hoist is to be mounted in a location which is dangerous for the operator, the safety precautions required by the applicable work regulations must be taken to eliminate any safety hazards during the operation. In this case, it may be preferable to install the lifting wire rope in the hoist before starting the fastening operation (see section 5).

The hoist can be used suspended or bearing on its base.

4.1 Anchoring the hoist in the suspended position

This is the easiest and most commonly used installation method. The unit must only be secured by its hook (except 4.2 below) and never by its handle. It is prohibited to secure the wire rope hook to the fixed point and to operate the hoist as it moves along the wire rope (Fig. 3: mandatory installation, Fig. 4: prohibited installation).

The hoist hook must be placed in the fixed point fastening device so that the fastening device is fully engaged on the hook. The safety flap on the hook must close completely. If any interference appears in the swivel part of the hoist hook with the fastening component, a sling of appropriate capacity should be used.

4.2 Anchoring the hoist bearing on its base

This type of installation requires special precautions :

1. The bearing surface on which the hoist is placed must be flat and horizontal.
2. This surface must have a hole for passage of the two wire rope strands. The configuration and dimensions of the hole are given in figure 24 showing the bearing face of the hoist and its position on the hole.
3. The hoist must be positioned so that the lifting wire rope with load does not rub against the side of the hole, and in such a way that the fixed limit stops on the wire rope are able to come into contact with the limit levers on the hoist.
4. The hoist must be wedged so that it does not move on its bearing face.
5. The platform on which the hoist is placed must have the required stability and strength to ensure safe operation.
6. The load must be freely suspended (Fig. 5) or connected to the unit by means of an idler pulley mandatorily and strictly located directly below the unit (Fig. 6).

IMPORTANT : With this installation, never lift a load until it has been placed directly beneath the hoist, except when an idler pulley is used.

4.3 Securing the load

The load must be secured using the hook on the lifting wire rope and never the hook on the hoist.

The load must be secured using a sling with a capacity, size and type appropriate to the object to be handled. The hoist wire rope must never be used as a sling, running it around an object and fastened with its hook (Fig. 7: correct slinging, Fig. 8: prohibited slinging).

4.4 Installation diagrams

4.4.1 Hoist suspended, load suspended directly

This is the most simple configuration (Fig. 7). The main precaution to be taken is to avoid any obstacle against which the load or lifting wire rope could bear laterally or butt against.

4.4.2 Hoist suspended, direct slanted lifting

This configuration requires a stable slanted plane on which the load is pulled and maintained (Fig. 9).

4.4.3 Hoist suspended, indirect pulling or lifting

This configuration requires an idler pulley secured to a fixed point (Fig. 11). Also see section 5.5.

4.4.4 Hoist secured horizontally for direct pulling

To ensure safe use of the unit, neither the hoist or wire rope should touch any object when tensioned (Fig. 10) at any time.

Check that you have **perfectly aligned the unit on the wire rope** by anchoring the hoist so that it can swivel freely, for example using a sling.

Never secure the hoist rigidly on a structure. Ensure that the wire rope strands move freely and do not rub against anything.

NOTE : If an idler pulley is interposed to hoist the load on a slanted plane, due to the driving action of the load, apply the lifting configuration described in section 4.4.3.

4.4.5 Hoist secured on floor

Lifting using idler pulley. Same recommendations as for case described in 4.4.4. The strength of the pulley and its attachment must be calculated for a double load force (Fig. 12). Also see section 5.5.

4.4.6 Hoist bearing against surface, load freely suspended

Strictly follow the instructions given in section 4.2. and 5.5. Be especially careful to avoid any swinging of the load. Proceed as shown in Fig. 5.

4.4.7 Hoist bearing against surface, load not freely suspended

This configuration requires use of an idler pulley secured directly in line with the hoist (Fig. 6). See sections 4.2 and 5.5.

4.4.8 Tackle

All the above recommendations apply, especially when tackle is used. In this case, special care must be taken when tensioning (see section 11).

Note: If idler pulleys are used, be careful to position the limit stops as described in section 5.4 (Fig. 13).

5. SETTING UP

5.1 Preliminary checks

- Ensure that the load or force does not exceed the maximum utilization load specified for the hoist.
- Remember that the use of idler pulleys will significantly increase the force to be produced to lift a load.
- Ensure that the strength of the fixed point is sufficient to safely apply a force equal to the maximum utilization load (or twice this load in the configuration described in 4.4.5).
- Ensure the hoist is correctly secured.
- Ensure the lifting wire rope is in good condition.
- Ensure the length of the lifting wire rope is sufficient for the distance to be covered by the load. Provide an additional 1.50m for passage through the hoist and a sufficient length of loose strand.
- Ensure the length of the electrical control cable is sufficient to connect the device at the location defined by the operator under safe working conditions.

5.2 Electrical recommendations

1) Before using the hoist with a new connection, refer to the nameplate on the motor.
   Check the characteristics of the power supply, single phase or three-phase, voltage, available amperage. Check that the current supplied is compatible with the characteristics on the motor nameplate. The available current must be equal or greater than the current indicated on the nameplate.
2) If a power supply extension is used, ensure the potential has the following characteristics :
   - **single phase** 230 V. : 3 wires (1 phase, 1 neutral, 1 ground) with section of 2.5 mm^2.
   - **three-phase** 400 V. : 4 wires (3 phases, 1 ground) with section of 2.5 mm^2.

   These characteristics are valid for up to 50 m of electrical cable. For greater lengths, contact your TRACTEL® dealer.
3) The electrical extension connection must be reinforced by an accessory (« sock ») to withstand the weight of the extension at the connector.
4) If the connector supplied with the electrical power supply cable is to be changed, this intervention must only be performed by a qualified technician. Any intervention on the control box cable must also only be performed by a qualified technician. No intervention should be performed on the electrical unit of the hoist (except for changing a fuse), by anyone other than a TRACTEL®-approved repair agent.
5) Check that the worksite or building installation on which the minifor™ is to be connected is equipped with the regulatory electrical safety devices such as a differential circuit-breaker and a ground connection to protect the operator, the minifor™ and the equipment.
6) If the minifor™ is supplied from an electric power generator, check that it provides (at minimum), the required startup voltage and power. (6 kVa for single-phase minifor™, 8 kVa for minifor™ three-phase minifor™).

5.3 Hoists with three-phase motor (TR30S / TR50)

The hoists equipped with a three-phase motor have a phase direction detector inhibiting operation should the phase order be inverted. If following an inverted connection, the three-phase minifor™ TR30S/TR50 does not operate, disconnect the power connector and, using a screwdriver, turn the imprint in the male connector by 180° to re-establish the correct phase order (see Fig. 14).

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5.4 Installing the lifting wire rope in the unit

NOTE : Gloves should be worn when handling the wire rope.

- The wire rope must be fully unwound and untwisted over its entire length before you begin to install it in the hoist.
- Lubricate the lifting wire rope to facilitate insertion in the hoist.
- Check that the high limit stop is engaged on the lifting wire rope (spring toward unit) on the wire rope hook side.
- Connect the power wire rope to the power outlet.
- **Insert** the free end of the **lifting wire rope** (welded, rounded tip) in the unit through the **engagement hole marked by an arrow** on the casing.

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NOTE : Never insert the wire rope in the other hole ; this hole is only used for exit of the wire rope. Never secure a load to the loose end of the wire rope.

- Press the « up » button on the control box while pushing the wire rope so that it engages on the pulley in the unit. (see three-phase units, see 5.3).
- When the wire rope comes out of the unit, continue the movement to obtain a length of wire rope of around 1 meter coming out of the unit.
- On the free end of the wire rope (1), slide on the low limit stop so that the end of the spring is near the unit (2) and tighten the screw on the stop ring (3) using an ALLEN wrench (4). There should be at least **one meter of wire rope between this ring and the wire rope end**.
- Ensure that the stop cannot slide on the wire rope. (Fig. 15).

NOTE : You may wish to further limit the travel of the load downward ; in this case, unwind the corresponding length of wire rope before securing the limit ring.

On the other end, secure the high limit stop ring in accordance with the height at which you may want to limit the travel of the load in the upward direction. Secure the limit stop and check it by applying the same procedure as for the low limit stop.

- Check that the hoist limit levers operate correctly, as well as the other safety devices as described in section 8.

There should be a limit stop at around 1 meter ahead of the free end of the lifting wire rope and another limit stop on the wire rope hook slide, both limit stops securely and appropriately attached. This a mandatory safety requirement.

5.5 Limit stops and pulleys

If the installation comprises one or several return pulleys, only pulleys of appropriate diameter should be used. In this case, the high limit (1) and low limit (2) stops must be positioned on the wire rope so that neither the high limit stop or the load be able to come into contact with a pulley. The high limit stop must be mounted between the hoist and the pulley which is nearest on the wire rope path (see Fig. 13).

IMPORTANT : Check that the anchor points and pulleys are of appropriate strength with respect to the forces which will be applied.

5.6 Check with load

With the load fastened, lift it slightly and check that the « Up » and « Down » controls operate correctly; also check operation of the “Emergency stop” control.

Once you have ensured that these functions operate correctly, you can proceed with the maneuvers.

If the unit does not operate correctly, return it to a TRACTEL®-approved repair agent (Also see section 5.3).

6. OPERATING THE HOIST

The hoist is operated by pressing on either the « Up » or « Down » button on the control box (Fig. 2). The control box must always be held in the vertical position, hanging on its control cable. Never turn over the control box (control cable entry downward) as this can result in control mistakes.

When the « Up » or « Down » button is released, the movement stops. When using the minifor™ to lift a load to a very high location, the unit should be stopped for around 15 minutes every fifty meters of operation to prevent the unit from overheating.

The 230V single phase motor is protected against overheating by a heat probe in the winding. This probe inhibits operation by opening the control circuit so long as the winding temperature has not returned to an acceptable value.

NOTE : The casing may heat up to 80°C. This is normal.

A red emergency stop button is provided to stop movement of the system in the event of incorrect operation of the « Up » or « Down » buttons (see section 8 : Safety devices).

The following precautions must be taken when performing up or down movements :

- The load should not swing or turn.
- Keep all obstacles away from the lifting wire rope and load.

- Check that the loose strand is free along its entire length.
- Do not allow the loaded strand to become loose if the load is not stably bearing on a sufficiently strong support.
- Do not apply short successive actions on the pushbuttons.

IMPORTANT :
The loose strand of the wire rope must be kept away from the loaded strand, and more particularly, when two loaded strands are used with tackle so that the loose strand does not become tangled with the loaded strands.

For the same reasons, the loose wire rope strand must be kept away from any obstacle which could catch it and you should be careful to prevent the loose strand from becoming tangled in itself; this could result in preventing the low limit stop attached to the loose strand from reaching the stopping mechanisms (limit stop levers) on the unit. Blockage of the loose strand when moving up (load moving down) could result in rupture of the wire rope and the load falling.

Deformation of the wire rope can also cause the wire rope to block in the hoist or on contact of the deformed part with the hoist. Whatever the cause of the wire rope movement becoming blocked, the hoisting operation should be stopped immediately. See section 13.

The limit stops are not control components but safety components. These should never be used intentionally in this respect and only serve as stopping mechanisms in the event of unintentional overshoot of the planned travel distance.

Never park or work under the load. If necessary, set up a safety barrier around the area under the load.

7. SHUTDOWN – STORAGE

Do not disconnect the wire rope hook from the load until the load is stable and firmly bearing on a sufficiently strong support.

The hoist can remain in position provided it is properly sheltered from weather and located in a dry location. Disconnect the unit electrically when not in use.

Make sure the hoist cannot be used by unauthorized persons.

For storage, the unit can be stored in its case. The wire rope must be removed from the unit (except those models having a winder) and rolled on its reel.

The unit must never be set on its base when the wire rope is engaged in the unit as this would result in bending and damaging the wire rope.

8. SAFETY DEVICES

The hoist is provided with the following safety devices :

- A no-current brake motor.
- Emergency stop control on control box – Red button (see Fig. 2).
- Mechanical interlock, prohibiting simultaneous action of Up and Down controls.
- Very-low voltage control (48 V) for three-phase units.
- High and low limit levers on unit, working with stops on wire rope.
- Safety latches (1) on hooks (Figs. 16 and 17)
- Electrical protection for control box: class 2.
- Control protection fuse, in electrical unit.

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The emergency stop function is ensured by pressing the red button (Fig. 2). To restart the unit after an emergency stop, the emergency stop button must be unlocked by turning it in the direction of the arrows marked on the button, after having ensured that all the emergency conditions have been eliminated.

9. LIFTING WIRE ROPE

The minifor™ wire rope is equipped with a safety hook at one of its ends. The hook is mounted on a wire rope loop equipped with a lug crimped in a metal sleeve (see Fig.17). The other end is welded and ground. This end must be maintained welded, rounded and free of any irregularities (see Fig. 18).

To ensure safe use of the minifor™ hoists, they must only be used with the minifor™ wire rope specially designed for the hoist (diameter of 6.5 mm).

Use of a damaged or inappropriate wire rope represents a serious risk of accident and failure. The condition of the wire rope should be monitored regularly and the wire rope should be immediately eliminated if it shows any sign of damage such as deformation, bending or broken wires (Fig. 19). Any wire rope whose nominal diameter has been reduced by 10% or which has more than 10 broken wires over a length of 200 mm should be eliminated. Standard ISO 4309 (Measure as shown in Fig. 20).

Do not expose the wire rope to temperatures exceeding 100°C or to any corrosive mechanical or chemical agents.

Store the wire rope wound on its reel in a location which is free of humidity after having carefully cleaned and lubricated the wire rope along its entire length. Do not use grease or oil containing molybdenum disulphide or graphite additives.

10. SERVICING

Servicing the unit consists in regularly checking that it is in good condition, in cleaning it and having it periodically inspected (at least once a year) by a TRACTEL®-approved repair agent. No greasing or lubrication of the unit is required by the user. (For maintenance of the lifting wire rope, see section 9). Check that the hoist suspension hook mounting screw and the handle locknut are always properly tightened. Replace these if necessary.

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Any visible damage to the unit and its equipment, in particular its hooks, lifting wire rope and electrical conductors should be repaired before resuming use of the unit.

IMPORTANT : Except when replacing a fuse in the electrical box, the unit must only be opened by a TRACTEL®-approved repair agent.

11. TACKLE MINIFOR (fig. 25.c)

11.1. Description

A minifor™ tackle kit can be mounted on all the minifor™ models. This system will double the capacity (maximum utilization load) of the unit (except for model TR50). On the other hand, the speed is decreased by half.

The minifor™ must only be equipped using the minifor™ tackle kit. No additional system should be added.

The minifor™ tackle kit comprises (Fig. 21) :

- A fastening device for the carrier wire rope strand.
- A tackle pulley equipped with a high limit spring.
- A user manual.

This kit must only be used with a minifor™.

11.2. Installation

If tackle is used, the necessary wire rope length is at least twice the lifting height plus around 2 m which includes one meter for the loose strand coming out of the unit.

The limit spring mounted on the tackle pulley replaces the high limit stop supplied with the wire rope. To limit the travel upward, it is still possible to add the standard high limit stop; this is placed between the pulley and the wire rope entry on the unit marked by an arrow.

IMPORTANT : If tackle is used, double the maximum utilization load to be taken into account for safety calculations.

NOTE : Be careful to install the tackle pulley so that its limit spring is located on the cable between the pulley and the wire rope entry on the unit. See user manual for tackle kit. Figure 25 shows the various configurations.

NOTE : Due to the risk of the wire rope strands becoming entangled, the minifor™ should only be used for direct vertical lifting (Fig. 5) when tackle is used.

11.3. Operation

When operating the hoist with the tackle system, the operator must take **special care to ensure that the load does not turn** in order to keep the three strands of the cable from becoming entangled (two loaded strands + loose strand). Immediately stop the load movement if the loose strand becomes entangled with the other strands and clear the loose strand before resuming the hoisting operation.

For more details concerning use of the minifor™ equipped with tackle, refer to the user manual supplied with the minifor™ tackle kit.

12. SPECIAL MINIFOR HOIST

12.1 Minifor TR10/TR30 with integrated winder

The TR10/TR30 models can be supplied optionally equipped with a spring-type wire rope winder, equipped with its cable with either of two lengths as may be required : 20, 27 or 40m (fig 25.d).

This equipment eliminates the need for a « loose » strand of variable length.

The assembly is supplied with the two high and low limit stops on the cable. The cable hook is equipped with a weight. The weight is indispensable and should not be removed.

The winder must be installed in factory. Minifor owners can return their unit to Tractel to have the winder installed.

The unit must be set up and used so that its winder turns freely **without rubbing against any exterior obstacle.**

IMPORTANT : A minifor™ equipped with a winder must not be used bearing against a platform (risk of rubbing)

12.2 Minifor with radio remote control (fig. 25.b)

All the minifor™ models can be supplied optionally equipped with a radio remote control system consisting of a portable control transmitter (Fig. 22.a) and a receiver on the hoist (Fig. 22.b). The transmitter operates on a battery. A charger (supplied with 100 to 250 Vca with 12 Vcc 150 mA

output) is supplied. The radio remote control enables the user to control the up, down and emergency stop functions of the hoist with no need for a control cable. It operates by transmission of an encoded RF wave.

The code for each unit can be modified by the user, in particular when several remote-control hoists are used at the same site. The transmitter and receiver each contain an 8-key encoder.

The transmitter and receiver keys must have the same code. The encoders are accessed by unscrewing the covers on the transmitter and receiver. Refer to the radio remote control manufacturer's documents supplied with the unit. Check that the antenna is on the unit before using the system (Fig. 23).

The radio remote controlled minifor™ should only be operated from a location where the load movements are clearly visible. When this is not possible, appropriate measures should be taken to eliminate any uncontrolled hazards which could arise.

NOTE : The transmitter unit must be used and handled with care and is subject to damage from shocks.

NOTE : Unless the codes are changed accordingly, any command generated from the transmitter will cause the same and nearly simultaneous movement of all the radio remote controlled hoists located on the same site within range of the radio remote control transmitter.

The transmitter has a range of around 30 meters.

NOTE : When performing an operation, keep in mind that the system has a slight reaction time. **For this reason, it is not possible to control several hoists from a single transmitter in a perfectly synchronized way.**

This radio remote control system is approved in France by the Telecommunications Authorities (ART) and does not require any individual license for use. No changes should be made to the radio remote control system.

Use of the radio remote controlled minifor™ outside France is subject to verification for compatibility with local regulations concerning radio waves.

The radio remote controlled minifor™s do not come with a control box connected by a control cable (optional, on request).

13. RECOMMENDATIONS FOR USE

When used in compliance with the information given in this manual, the minifor™ hoists are entirely safe. The hoist operator should however be careful never to use the minifor™ inappropriately as described below:

IT IS PROHIBITED :

- To use a minifor™ hoist, even occasionally, to lift persons.
- To use a minifor™ hoist for operations other than those for which it is designed or using installation diagrams other than those described in this manual.
- To use a hoist beyond its maximum utilization load specification.
- To set up the hoist under conditions which may be dangerous to the operator.
- To fasten a load to the hoist hook and fasten the cable hook to a fixed point.
- To anchor the hoist by its handle.
- To start up the unit without first checking that the limit stops are correctly positioned.
- To connect the unit to an electrical connector without first ensuring that the power supplied matches the hoist specifications and that the power circuit is equipped with the regulatory electrical safety devices.
- To secure the hoist in a structure (except as described in section 4.2) or to interfere with self-alignment on the cable.
- To use tackle with the hoist other than the specific minifor™ tackle kit designed for the minifor™ hoist.
- To pull a load along the floor using a unit which is not properly aligned with the movement of the load.
- To force operation if the wire rope is blocked in or against the hoist.
- To operate a hoist using a three-phase power supply with commands inverted with respect to the direction indicated.
- To apply a load on the loose strand of the lifting wire rope.
- To use a minifor™ equipped with tackle bearing against a surface.
- To use the lifting wire rope as a means of slinging a load.
- To allow the load to swing under the hoist.
- To stand or move around under the load.

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14. MALFUNCTIONS

Fault	Possible causes	Action
1- Cable binding	• Cable deformation inside or in contact with the equipment.	• Stop the manoeuvre immediately without forcing. • Take the load by another means that offers the regulatory safety cover and release the unloaded equipment. Try to release the cable from the equipment. If this proves to be impossible, send the equipment and the cable to an approved TRACTEL® repair service. • Should a fault be found on the cable, discard it.
	• The slack strand has caught up around another strand or an obstacle. • Load has caught up on something while rising.	• The slack strand must be released and check the forward cable before starting up movement again. • Release the load and check the forward cable before starting up movement again.
2- No motor rotation	• Emergency stop has been triggered. • End of run lever in the appliance has triggered.	• Release the emergency stop button (rotation). • If the stop has been caused by the action of the end of run stop on the lever, turn it backwards.
	• Fuse has blown.	• Change the fuse (2A control protection fuse).
	• End of run lever jammed or broken.	• Return the equipment to a TRACTEL® approved repair service.
	• Power down, defective plug or connector.	• Have repaired by an electrician.
	• Defective contacts or control box.	• Return the equipment to a TRACTEL® approved repair service.
	• After intense usage the motor is too hot and the heat probe triggers (single phase 230 V motor).	• Wait for cooling.
	• Reversed phases (three phase motor).	• See chapter 5.3.
3- Motor rotation in one direction only	• End of run damaged. • Defective contact or control box. • Contact spool burned out.	• Return the equipment to a TRACTEL® approved repair service.

4- Feeble motor rotation with “groaning”	• Defective power supply. • Major drop in voltage. • Electromagnetic brake jammed shut. • Lack of torque on start-up (defective permanent condenser or motor winding coil burnout). • Defective reduction gear or brake. • Overload.	• Check the power supply voltage. • Return the equipment to a TRACTEL® approved repair service if the power supply voltage or surges are not the cause. • Reduce or hoist the load.
5- Cable cannot be inserted	• Overly thick cable. • Defective cable tip. • Cable deformation. • For a three phase model, reversed controls. • Worn interior guiding parts.	• Check the diameter. Replace with a cable of the correct diameter. • If necessary, re-weld the end of the cable using a blowtorch. Grind and round off. • Discard the deformed part. Cut, re-weld and grind the cut end. • Press the “Down” button. If the cable engages normally, press the “Up” button to release it and reverse the phases on the connector set up for this purpose. • Should none of the above causes be revealed, send the Minifor to a TRACTEL® approved repair service.
6- The cable slides or slips on the uphill	• Overly thin cable. • Cable wear more than 10% of the nominal diameter. • Heavy wear to the tightening system.	• Check the diameter of the cable as shown in the instructions. If the cable should prove to be non-compliant or worn, discard it and replace with a new one. • If the cable is normal, send the Minifor to a TRACTEL® approved repair service.
7- Load descent is no longer slowed: the cable slides despite the motor being stopped	• Brake maladjusted. • Worn brake shoes. • Brake shoes tainted by oil or grease. • Overload.	• Adjust the air gap. • Return the equipment to a TRACTEL® approved repair service.
8- The motor cuts out during a manoeuvre	• After intense usage the motor is too hot and the heat probe triggers.	• Wait for cooling.