

USER MANUAL

WINCHLIM300 GEOPHYSICAL LOGGING WINCH

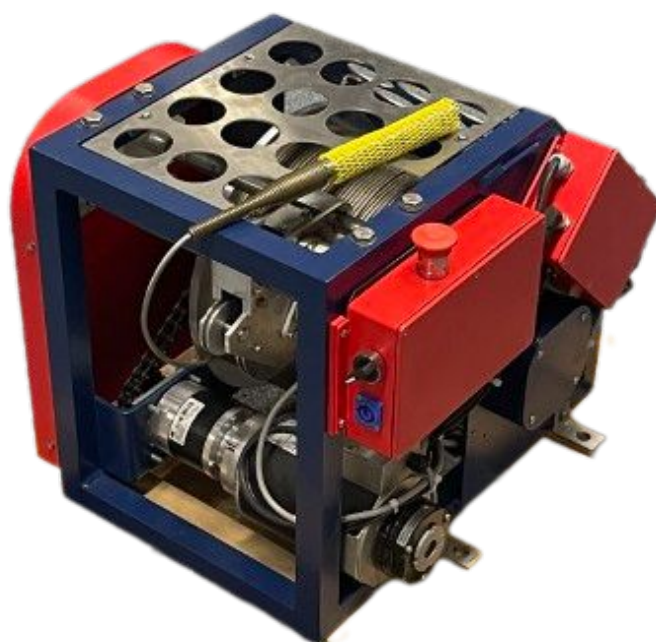


Table of Contents

IMPORTANT SAFETY INFORMATION.....	3
1. GENERAL DESCRIPTION & PRINCIPAL SPECIFICATIONS.....	4
2. PRINCIPAL FEATURES OF THE WINCHLIM300.....	5
2.1 MOTOR AND GEARBOX.....	5
2.2 DEPTH MEASUREMENT.....	5
2.3 LEVEL WIND SYSTEM.....	5
2.5 FOUR-CONDUCTOR ARMoured WIRELINE CABLE.....	6
2.6 GO-4 CABLEHEAD.....	7
3. WINCH CONTROL UNIT.....	8
4. INSTALLATION & CONNECTION.....	9
5. OPERATING MODES.....	13
5.1 MANAGED MODE.....	13
5.2 BASIC MODE.....	13
5.3 WIRELESS MODE.....	14
5.4 SETTINGS MODE - DEPTH.....	14
5.5 SETTINGS MODE – WT. MAX.....	15
6. TECHNICAL SUPPORT.....	16

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IMPORTANT SAFETY INFORMATION



General hazard



Electrical hazard



Risk of crushing



Rotating equipment

General: this equipment has been designed and built with operator safety as a priority. Nevertheless, while in use, this equipment can present a number of safety risks that must be taken into account and adequately managed in the work environment. The icons above are used in the following chapters of this document to indicate a risk either of a general, or more specific, nature according to type.

Operation: this equipment should always be operated by trained personnel familiar with its use and in line with the recommendations contained in this document. Use of this equipment outside recommended limits will void the equipment warranty and may present a safety risk.

Maintenance: disconnect the winch from its power supply before carrying out basic maintenance tasks such as cleaning, cable re-heading etc. Maintenance should only be carried out by competent personnel. If, for any reason, the winch is powered on with the motor drive unit cover removed, voltages of up to 220 Vac may be present on exposed contacts.

1. GENERAL DESCRIPTION & PRINCIPAL SPECIFICATIONS

The WINCHLIM300 is a 110/230 Vac-powered winch intended for use in borehole geophysical logging operations. It comprises of the main winch unit itself and a control unit attached to the winch by a 3 m connecting cable. The winch drum has a capacity of 300 m (984') of 3/16" four-conductor geophysical logging cable. An auto-spooling system is included.

The principal characteristics of the WINCHLIM300 are as follows:

(i) Physical characteristics

Length:	52 cm
Width:	45 cm
Height:	57 cm
Weight (without cable):	40 kg
Weight (with 300 m of cable):	70 kg

(ii) Electrical characteristics

Supply voltage:	110 or 230 Vac
Power rating:	600 W

(iii) Operating conditions

Operating temperature:	0 to 50°C
Humidity:	0 to 85% non-condensing
Spooling speed range:	0 – 20 m/min
Max. recommended load:	50 kg

The following sections of this document explain the features of the WINCHLIM300 and give guidance in respect to operation and maintenance procedures with a view to maximising the operating life of the equipment.

2. PRINCIPAL FEATURES OF THE WINCHLIM300

The principal features of these winches are described below.

2.1 MOTOR AND GEARBOX

The WINCHLIM300 is equipped with a 0.6 kW dc electric motor and high-efficiency gearbox. The gearbox is lubricated for life and should not, under normal circumstances, require any user intervention or maintenance.

An electromagnetic brake is integrated into the winch's drive system which activates when either the winch drum stops rotating or the direction switch on the control unit (see page 8) is set to the STOP position.

Motor life will depend on hours of use. If any abnormal noise or loss of power is noticed, this could be a sign that the brushes are becoming worn and require replacement. **Please contact us for service advice in this case.**



The motor supply voltage (0 to 60 Vdc) is generated by the on-board power supply. **NEVER TRY TO OPERATE THE MOTOR DIRECTLY FROM AN EXTERNAL POWER SOURCE.**

The electromagnetic brake on the WINCHLIM300 may require cleaning and maintenance periodically, particularly if the winch is used regularly in a dusty and/or corrosive environment. **Should the distinctive noise of the brake setting and releasing not be heard as normal, and/or the winch for any reason not spool/unspool as it should, please contact us for service advice.**

2.2 DEPTH MEASUREMENT

The winch equipped with a 5V supply 1000 ppr incremental optical encoder coupled to a measuring pulley of 333 mm effective circumference. The triple-pulley assembly is designed to provide a good contact between the logging cable and depth pulley, thus ensuring a reliable measurement under normal circumstances. Should it be the case that cable tension is lower than usual (e.g. a light probe is being used in a dense/viscous drilling mud) depth measurement precision may be reduced, particularly in the downwards direction. If possible, it is advisable to add a supplementary weight or "sinker bar" to the downhole probe so that a minimum tension of 5 to 10 kg is present.

It is important to maintain the depth pulley assembly system free of any deposits, eg. dried drilling mud, that may become lodged in the throat of the pulley and cause an erroneous measurement.

Should it for any reason be required to do so, an external depth pulley can be connected to the winch to replace the on-board depth measurement system by connecting it to the appropriate socket on the winch power unit.

2.3 LEVEL WIND SYSTEM

A level wind system is fitted to the winch to ensure a regular and even spooling of the logging cable on to and off from the winch drum. The level wind screw causes the depth pulley assembly to move laterally at the required rate as cable is wound in or out.

Should it become necessary, the pulley assembly position can be adjusted by using a 19 mm spanner to manually turn the level wind screw using the flats machined on the screw for this purpose (see photo on following page). Following any adjustment, be sure that the pulley assembly moves in the correct direction compared to the winding/unwinding cable. If this is not the case, manually displace the pulley assembly as described above until it reaches the end of its travel and returns to the correct position. Thereafter the pulley assembly should move in the right direction with respect to the cable.



TO AVOID THE POSSIBILITY OF INJURY, ALL ADJUSTMENTS SHOULD BE MADE WITH THE WINCH ISOLATED FROM ITS POWER SUPPLY.

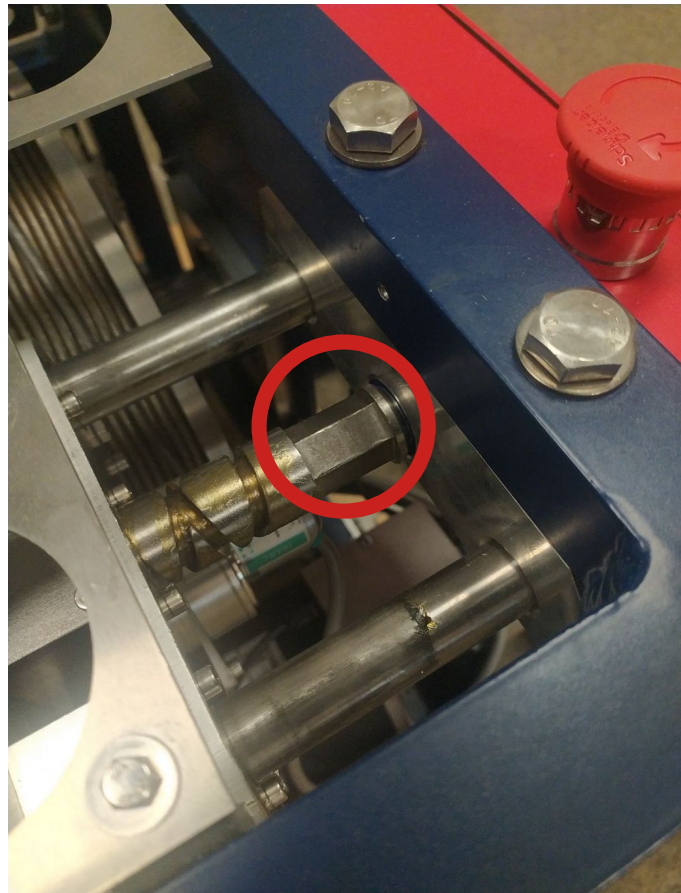


Figure 1: Level wind screw adjustment – flats for 19 mm spanner.

As mentioned above, the level wind system incorporates a torque limiter which decouples the winch drum and depth pulley assembly should, for any reason, an excessive force develop between the two concerned elements. With use, it may become necessary to adjust the setting of the torque limiter if, for example, the pulley assembly starts to slip or lose synchronisation with the drum for no apparent reason.

The level wind screw and the two guide bars in front and behind it should be greased regularly and cleaned as necessary in order to maximise its operating life.

2.5 FOUR-CONDUCTOR ARMoured WIRELINE CABLE

A certain number of precautions can be taken in order to maximise the working life of the wireline cable:

- if necessary, use a cable wiper in order to clean residual drilling mud or other material from the cable before spooling it back onto the winch;
- particularly if working in a saline environment, rinse the cable periodically with fresh water and re-lubricate the cable with a suitable product;
- spool cable onto the drum as smoothly and regularly as possible, do not allow the cable to become kinked or deformed;
- ensure during operations that the cable is not rubbing excessively against eg. part of a tripod or the drilling machine;
- check while logging that sheave wheels remain in good alignment so that the cable does not arrive on or leave from the sheave wheel at an angle and rub excessively on the sheave wheel flange;

- use a sheave wheel having a groove correctly dimensioned for the cable diameter;
- do not use a sheave wheel that is too small with respect to the cable diameter;
- periodically unspool the cable and re-spool it on the winch drum in the reverse direction so that wear is more evenly spread over the entire length of the cable.

2.6 GO-4 CABLEHEAD

The cablehead provides the mechanical and electrical connections to the logging probe being run in the borehole. As such, it is a critical link and potential point of failure in the system. The importance of its care and maintenance can not be over-emphasised.

The two key points in this respect are:

- silicone grease should be regularly pumped into the cablehead via the M6-threaded greasing port until the excess grease begins to be squeezed out at the spring side;
- to maintain them in good condition and prevent borehole fluid entering the connector, a thin film of silicone grease should be applied to the two o-rings on the cablehead, preferably at each change of logging probe.
During this procedure take care not to introduce any grease into the four female connector sockets which may cause connectivity issues. The o-rings themselves should be checked regularly and changed periodically and/or when showing signs of wear. A good indication of excessive wear is when the resistance felt on inserting the cablehead into the probe top connector is no longer present as normal.
When necessary, the o-rings should be only replaced with the correct part (BS-014 / 12.42 x 1.78 mm NITRILE Shore 70).



Figure 2: Grease nipple screwed in place in the GO-4 cablehead prior to greasing



Figure 3: Cablehead greasing in progress

A recommended product for this application because of its high viscosity over a wide temperature range is **Molykote 111 Compound** silicone grease.

A separate document supplied with the winch describes the cablehead and its care and maintenance in more detail.

3. WINCH CONTROL UNIT

The main features of the winch control unit are shown in the photo below.

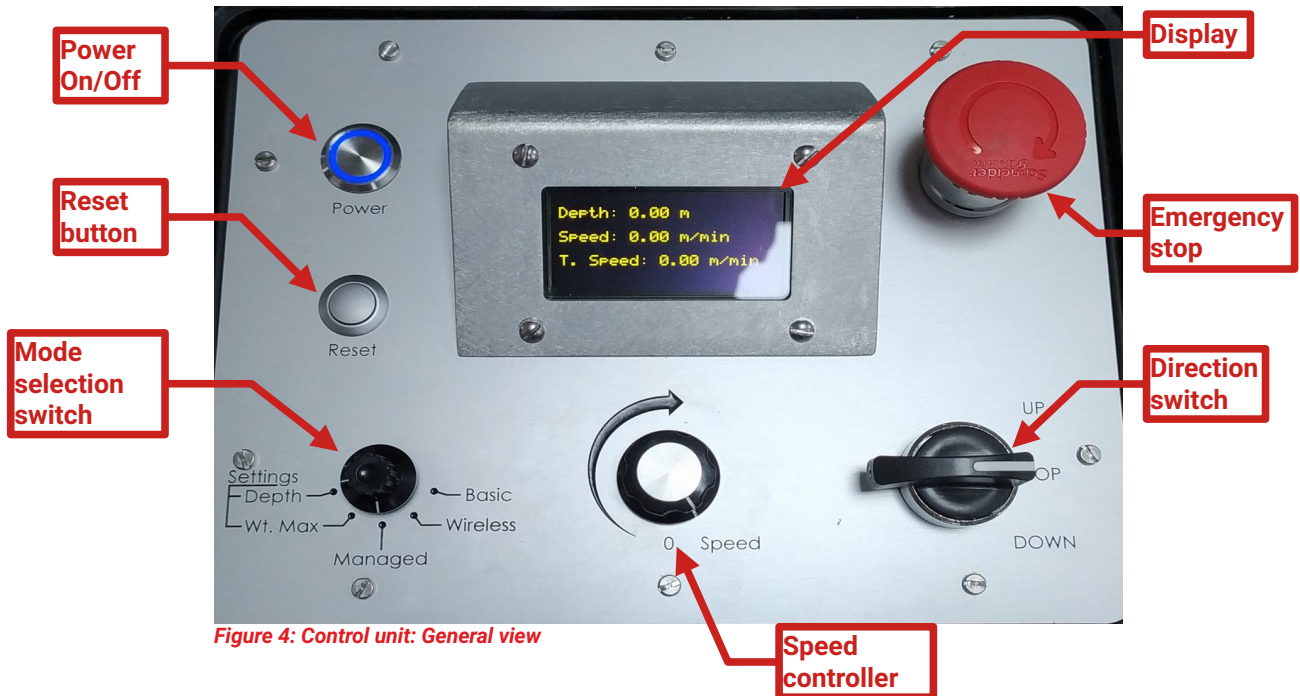


Figure 4: Control unit: General view

A brief explanation for each of the controls is given below:

- the **Power** button, as its name suggests, is used to switch on or off the control unit;
- the **Reset** button is used during the winch parameter setting procedure and to “zero” the depth indicated on the display when required;
- the **Mode** selection switch puts the controller into one of its three possible operating modes (see later in this document) and is also used during the winch parameter setting procedure;
- the **Speed** controller is used to vary the winch winding speed;
- the **Direction** selector switch has down, stop and up positions;
- the **Emergency stop** button stops the winch motor and powers off the control unit.



It should be noted that the emergency stop button on the control unit does not isolate the winch drive unit from the 230 Vac power supply. **VERIFY ALWAYS BEFORE BEGINNING ANY MAINTENANCE OR REPAIR TASK THAT THE WINCH IS COMPLETELY DISCONNECTED FROM ANY SOURCE OF ELECTRICAL POWER.**

4. INSTALLATION & CONNECTION

The WINCHLIM300 is equipped with fixation points allowing it to be securely mounted in a vehicle or on a skid-type platform. It is recommended to use fixing bolts of M12 size.

In the case of a vehicle installation, the winch position should be chosen so that the weight is as evenly distributed as possible both longitudinally and laterally with respect to the vehicle's normal centre of gravity.

See the plans on the following pages for the winch overall dimensions and fixation point positions.

An On/Off switch, emergency stop button and connections for 110/230Vac power, data communications with the eMINDLogger module and the remote control unit are provided as shown below.

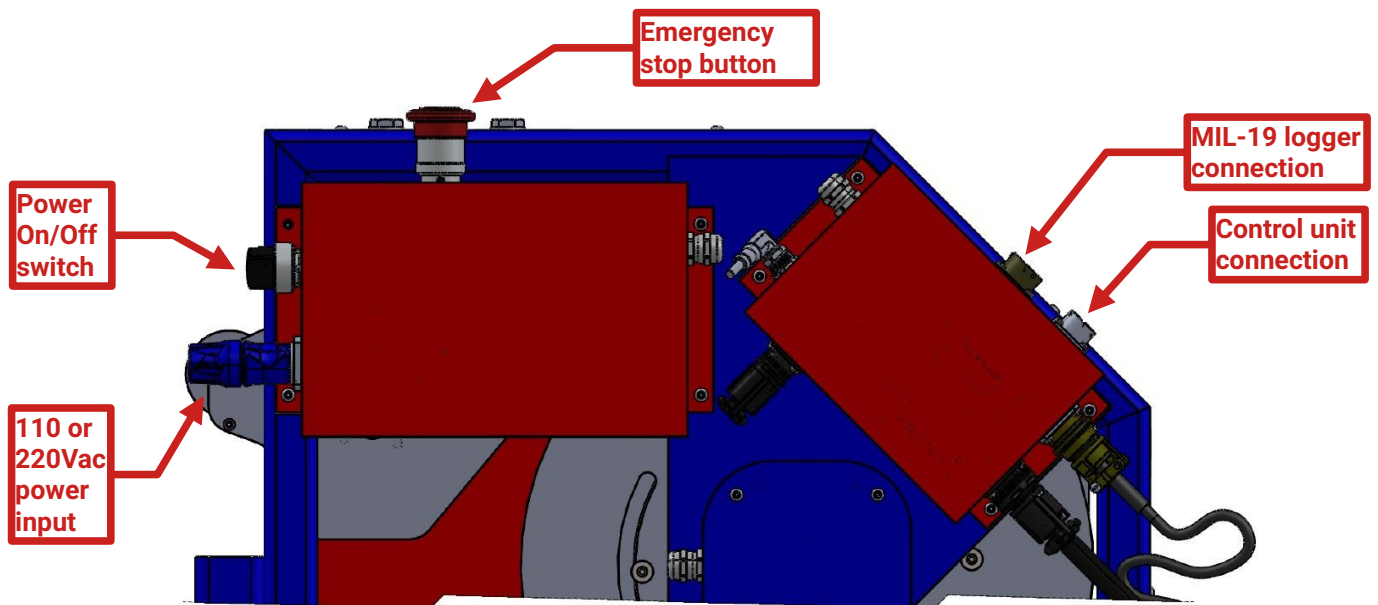


Figure 5: Winch connections

For continuity/isolation testing from the GO-4 cablehead through to the MIL-19 logger connector, please refer to the information below.

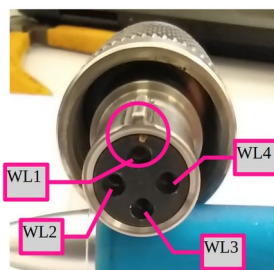


Figure 6: GO-4 connector pin assignments

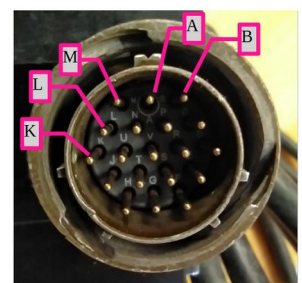


Figure 7: MIL-19 logger connector pin assignments

GO-4 pin assignment	MIL-19 pin assignment	Function in 4-conductor operation	Function in mono-cable operation
WL1	B	UPHOLE DATA	UPHOLE/DOWNHOLE DATA & PROBE POWER
WL2	A	DOWNHOLE DATA	NOT USED
WL3	L	MUD-PLUG RETURN	NOT USED
WL4	M	PROBE POWER +100Vdc	NOT USED
CABLE ARMOUR	K	EARTH	EARTH

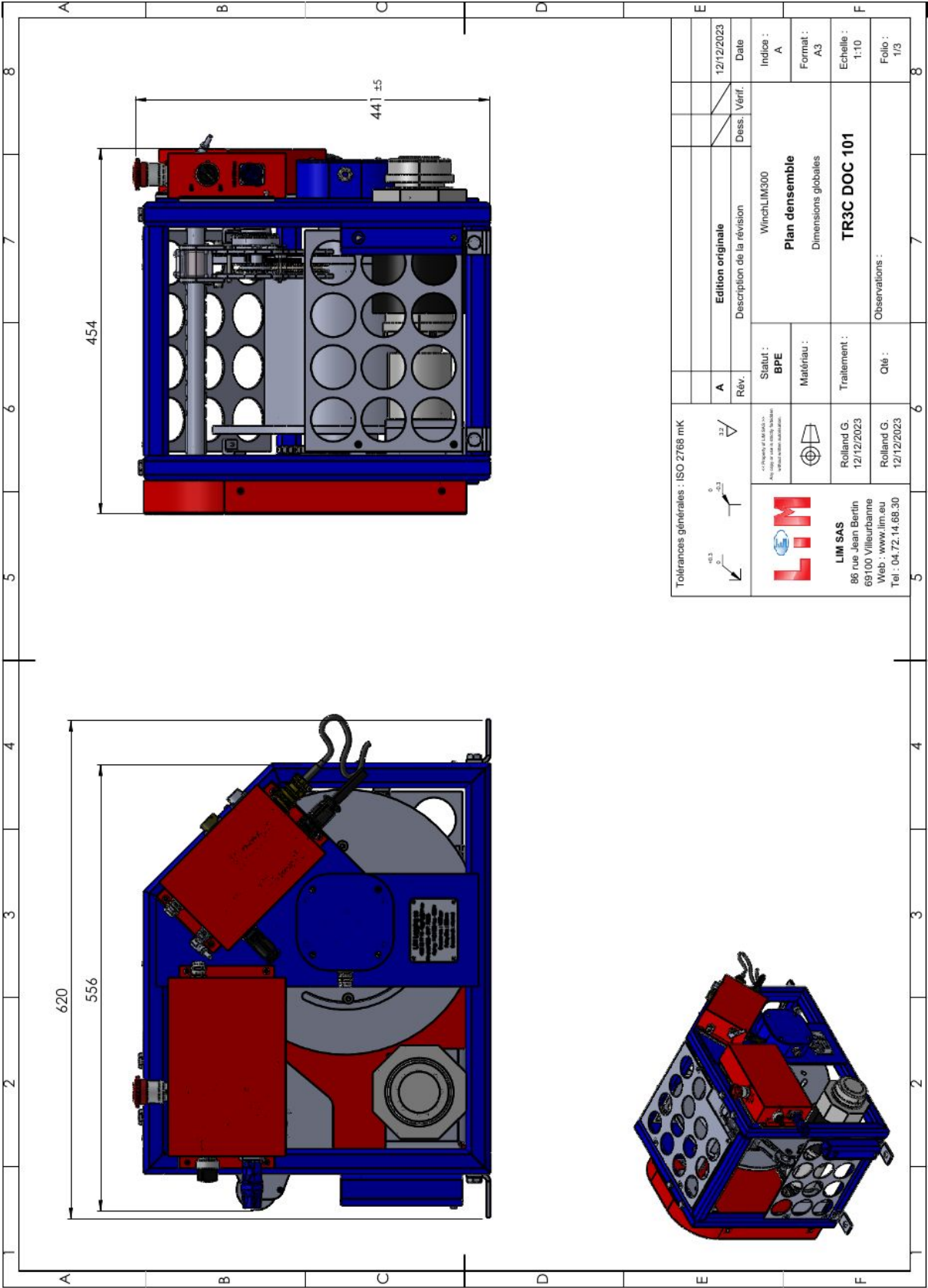


Figure 8: WINCHLIM300: General view and overall dimensions

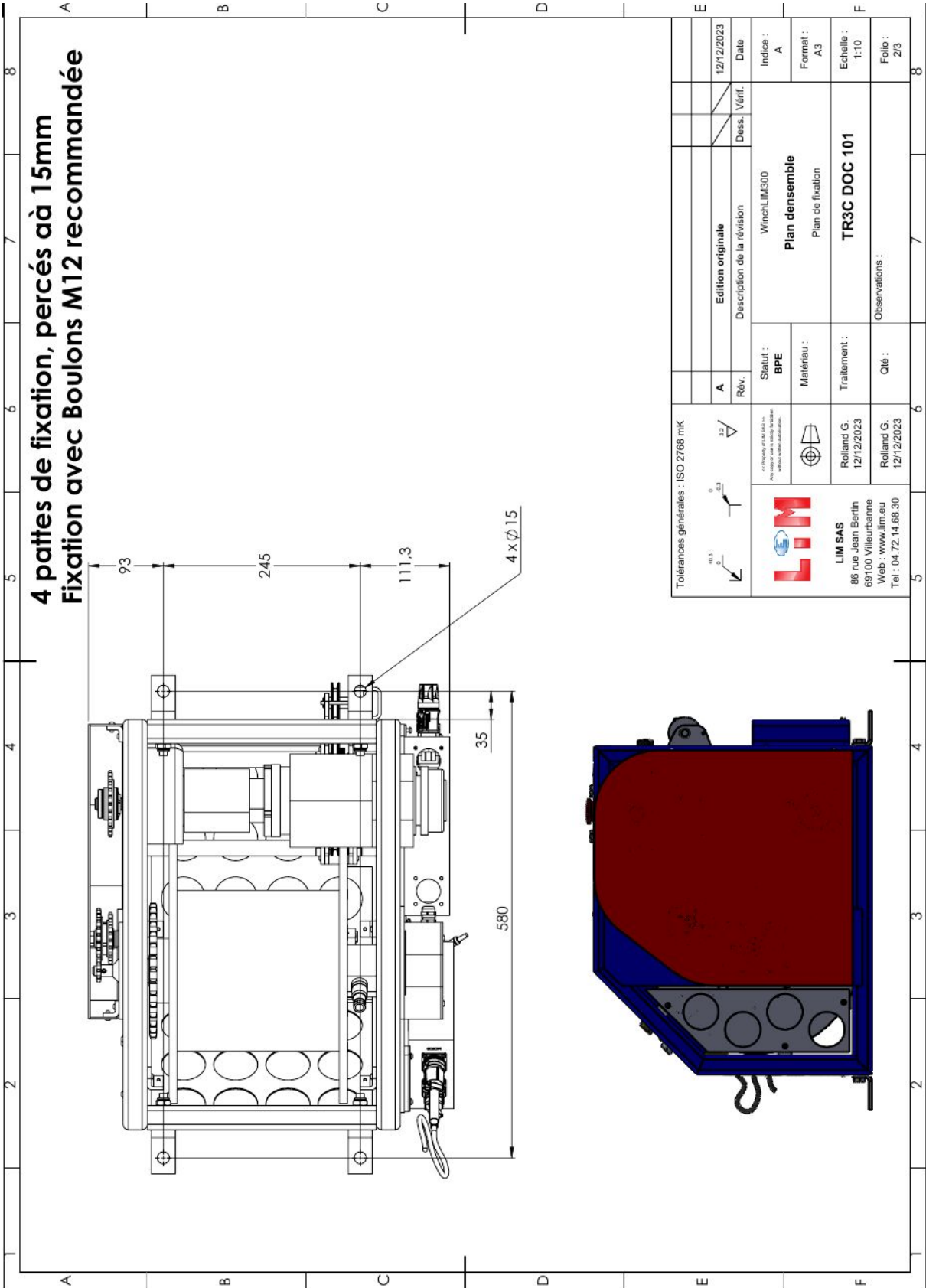


Figure 9: WINCHLIM300: Side view and fixation point (x4) locations

5. OPERATING MODES

5.1 MANAGED MODE

When operated in **Managed** mode the winch will maintain a constant speed. **This is the recommended operating mode for general use.**

While operating in this mode, the control unit screen displays current depth, speed and direction, as well as the “target” speed as set by the position of the control knob.

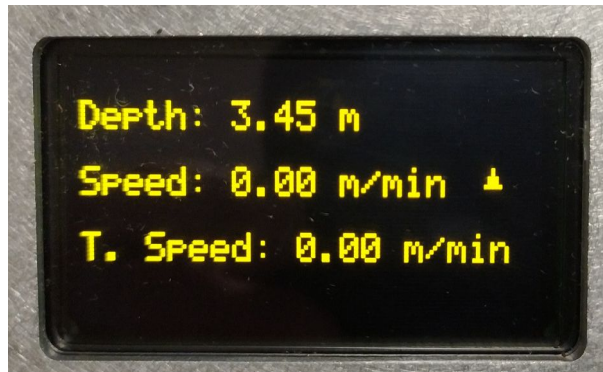


Figure 10: Managed Mode: Control unit display

If and when necessary, the depth value can be reset to zero using the **Reset** button.

The spooling speed increases or decreases in a linear fashion according to the control knob position over the available range of 0 to 20 m/min.

While in **Managed** mode a warning message “**SAFETY**” may appear on the lower line of the display. This will occur if a different operating mode is selected while the speed controller is not in its **zero** position.

5.2 BASIC MODE

When operated in **Basic** mode the speed regulation function is not activated. The motor is powered directly by the drive unit without taking into account the feedback from the optical encoder.

When used inappropriately, this mode of operation can cause excessive load to be applied to certain components of the winch or accessory equipment such as sheave wheels.



WE RECOMMEND THAT THIS MODE ONLY BE USED IN CASE OF NECESSITY AND AFTER TAKING THE APPROPRIATE PRECAUTIONS E.G. SHOULD IT BE NECESSARY TO APPLY A HIGHER THAN NORMAL PULLING FORCE TEMPORARILY IN THE CASE OF A DIAMETER REDUCTION OR OBSTRUCTION BEING ENCOUNTERED IN THE BOREHOLE DURING LOGGING OPERATIONS.

5.3 WIRELESS MODE

As its name suggests, **Wireless** mode allows the winch to be operated at two different fixed speeds using a wireless remote controller. This mode of operation is intended for use e.g. during set-up on the borehole where it can be advantageous for an operator to have the possibility to spool cable in or out while being at the exterior of the logging vehicle or unit. The approximate range of the wireless module is 30 m.

The wireless remote control has four buttons as shown below:



Figure 11: Wireless remote control unit

Buttons “A” and “C” activate the winch in the down and up directions respectively. **The winch will only operate for as long as pressure is maintained on the button.**

Button “B”, when pressed, switches from low (10 m/min) to high (20 m/min) speed and vice versa.

Button “D” will perform a depth zero reset on the control unit.

5.4 SETTINGS MODE - DEPTH

With the selector switch in this position the parameters of the depth measurement system can be modified if necessary. In this mode the control unit displays the depth encoder resolution in pulses per rotation, the effective pulley circumference and the pulley direction.

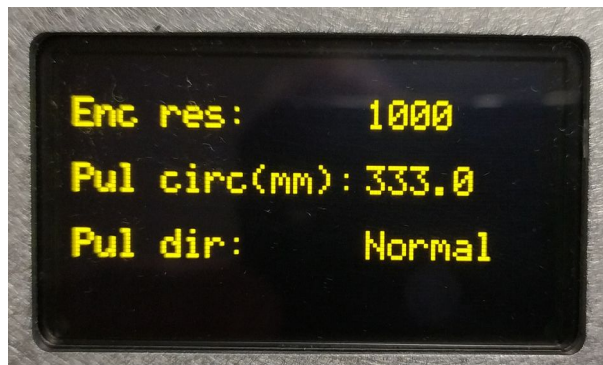


Figure 12: Settings Mode - Depth - Control unit display

These parameters do not normally require adjustment unless e.g. the depth encoder is replaced for some reason with a model having a different resolution or to compensate depth pulley wear with age.

Should it become necessary to apply a modification, first turn the speed controller until the appropriate line of the display begins to flash. Press the **Reset** button to begin modifying the value. The individual numerical values can be modified successively one by one by turning the speed controller and then pressing the **Reset** button again to move to the next number. The new value will be saved when the entire line begins to flash once more.

At this point another parameter can be selected and modified if necessary. Otherwise, the mode switch selector can be switched to another position as required.

5.5 SETTINGS MODE – WT. MAX.

This menu option is present for compatibility reasons in case the control unit is used with a WINCHLIM600 or WINCHLIM1200, both of which incorporate a strain-gauge tension sensor.



Figure 13: Settings Mode - Wt. Max. - Control unit display

It is not relevant to the WinchLIM300 which is not equipped with a cable tension sensor.

6. TECHNICAL SUPPORT

In case of need, support can be obtained by telephone (+352 26 30 53 13) or through email (logging@lim.eu).

LIM Logging's normal working hours are Monday to Friday 08h30 to 17h30.

Support requests are treated as urgent and will be responded to as quickly as we are able to do so.