



**Eddyfi
Technologies**
Beyond current

Getting Started with **AC POWERED REEL**



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About This Manual

This manual has been prepared to assist you in the operation and maintenance of your Eddyfi Technologies' Inuktun equipment. Correct and prudent operation rests with the operator who must thoroughly understand the operation, maintenance, service, and job requirements. The specifications and information in this manual are current at the time of printing.

This product is continually being updated and improved. This manual endeavors to explain and define the functionality of the product; schematics or pictorials and detailed functionality may differ slightly from what is described in this manual.

Eddyfi Technologies reserves the right to change and/or amend these specifications at any time without notice.

Information in this manual does not necessarily replace specific regulations, codes, standards, or requirements of others, such as government regulations.

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Description

The AC Powered Reel has been designed for tether cable deployment and recovery in the operation of Eddyfi Technologies inspection equipment. The winch is equipped with a variable speed motor drive capable of maintaining constant speed and controlled braking. It is provided with a hand brake for arresting movement and a backup manual hand crank. A release clutch allows for freewheeling deployment with a friction damper to reduce overrun. An electronic encoder provides tether distance feedback.

The winch is available with 13-inch, 18-inch, and 36-inch drum widths to accommodate a wide range of cable diameters and lengths. An optional automatic level wind is available to simplify cable management and streamline deployment. Fiber optic variants are available to support long range equipment and high-speed data streaming. Air-slip configurations are possible for equipment requiring pressurized air delivery through the tether.

The winch is convertible between 115V or 230V AC (50/60Hz) power sources.

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Specifications

Dimensions:	
Length	38.5in / 98cm
Width	29in / 74cm (13-inch / 33cm drum) 33in / 84cm (18-inch / 46cm drum) 51in / 130cm (36-inch / 92cm drum)
Height	29in / 74cm
Drum I.D.	8.6in / 21.8cm
Flange O.D.	25.5in / 64.8cm
Weight (13-Inch Drum):	
Empty	190lbs / 86kg
Full Tether *	400lbs / 182kg
Weight (18-Inch Drum):	
Empty	260lbs / 118kg
Full Tether *	550lbs / 250kg
Weight (36-Inch Drum):	
Empty	290lbs / 132kg
Full Tether *	870lbs / 395kg
Pull:	
Standard Motor	200lbs / 90kg
2:1 Reduction Gearbox	400lbs / 181kg
Manual Crank	500lbs / 227kg (max)
Max Feed/Recovery Rate:	
Drum Empty (Center Wraps) **	72ft/min / 22m/min (standard gearbox)
Drum Full (Outer Wraps) **	206ft/min / 63m/min (standard gearbox)
AC Power Input	1200W (peak) 115/230VAC, 60/50Hz ***
Working Environment	Splash resistant for spooling wet tethers and for cleaning. Not intended for outdoor installation, standing water, or rain.
Operating Temperature	0°C to +40°C (+32°F to +104°F)
Storage Temperature	-10°C to +60°C (+14°F to +140°F)

- (*) Weights are approximate and may vary with winch configuration and tether type. The weights listed for fully spooled reels are based on Inuktun Versatrax 150™ MkII tether.
- (**) These values are at full motor speed and represent the tether feed rates at the inner wind diameter (empty) and at the outside wind diameter (full).
- (***) The winch must be set to match the intended 115V or 230V AC line supply voltage. Refer the supply requirements section of this manual for details.

Cable Capacity (13-inch Drum)

Cable Diameter	Estimated Max Capacity (90% Wrap Efficiency)
0.31 in / 7.9 mm	4000 ft / 1200 m
0.35 in / 8.9 mm	3300 ft / 1000 m
0.42 in / 10.7 mm	2230 ft / 680 m
0.45 in / 11.4 mm	1970 ft / 600 m
0.52 in / 13.2 mm	1600 ft / 488 m

Cable Capacity (18-inch Drum)

Cable Diameter	Estimated Max Capacity (90% Wrap Efficiency)
0.31 in / 7.9 mm	6000 ft / 1800 m
0.35 in / 8.9 mm	4500 ft / 1350 m
0.42 in / 10.7 mm	3200 ft / 960 m
0.45 in / 11.4 mm	2800 ft / 840 m
0.52 in / 13.2 mm	2100 ft / 630 m

Cable Capacity (36-inch Drum)

Cable Diameter	Estimated Max Capacity (90% Wrap Efficiency)
0.38 in / 8.9 mm	6600 ft / 2000 m
0.42 in / 10.7 mm	6200 ft / 1800m
0.45 in / 11.4 mm	5600 ft / 1700 m
0.52 in / 13.2 mm	4300 ft / 1300 m

Certification

This system is built in accordance with the Low Voltage Directive 2006/95/EC and Directive 2014/35/EU, Machinery Directive 2006/42/EC, and Electromagnetic Compatibility Directive 2004/108/EC and Directive 2014/30/EU.



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Safety

Safe use of this product requires every operator to read and understand the user manual and follow the safety guidelines contained within. Untrained personnel should not operate this equipment. This user manual should be stored where it will be accessible to all operators.



- All personnel operating this equipment must read and understand the user manual prior to system operation.
- Servicing and repair should be performed only by trained, qualified, personnel.



WARNING: Entanglement Hazard

- Be mindful of moving parts. Keep hands, loose clothing, hanging jewelry, and long hair away from the reel, sheave, drive chains, and level wind.
- Never attempt to manually adjust the lay of the cable winds while the drum is moving. Fingers, hair, or loose clothing can become trapped under the cable causing immediate injury.
- Be aware of cable loops. Never stand in or on loose cable.



WARNING: Pinch / Crush Hazard

- Keep hands and other body parts away from the sides of the automatic level wind shuttle. The level wind is driven with enough force to crush a hand or body part trapped between the shuttle and the winch frame.



WARNING: Hazardous Voltage

- The winch wiring contains hazardous voltages. System configurations may include deck cable and tether connections, motor drives, and internal wiring carrying voltages of up to 400VDC and 240VAC. Do not operate with damaged cables or wiring.

- Under no circumstances should this equipment be used in a potentially explosive atmosphere.
- Under no circumstances should this winch be used to suspend personnel or other live payloads.
- This winch is not intended to lift or support overhead objects. Use of this winch must be confined to horizontal towing or vertical lowering of the supplied equipment only.
- The emergency stop power button disconnects all power to the winch drive. It also disables any electronic braking. If the cable is under tension or is supporting suspended equipment, removing

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power may allow runaway or dropped loads. The hand brake has been fitted to halt free running loads and must be accessible while the winch is in use.

- The winch can generate very strong pulling forces and must be securely bolted down when in use to prevent unexpected movement.
- Never stand on the tether cable or in loose cable wraps. The vehicle and winch can pull the cable from underfoot and cause a fall. Cable loops may cause entanglement.
- Do not operate the winch without the factory guard plates in place.
- Always stow the manual crank handle after use. When installed, the crank handle is directly linked to the drum and may turn with significant speed and force. Do not attempt to catch a spinning crank handle.
- The winch is not intended for outdoor installation or use in rain or standing water. The winch should be provided with a roofed area when necessary.
- The winch carries voltages supplied by multiple sources. Always unplug the winch's AC power cord, power down the system power supply, and disconnect the deck cable at the controller before servicing.
- When relocating the winch, follow safe practices and applicable worksite regulations. The drum hand brake should be set during transport.

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Installation

Lift Points

The winch is equipped with lifting eyebolts located at each of the four upper corners of the frame. A spreader bar is recommended for lifting but is not required. If a spreader bar is not used, the center lift point should be several feet above the top of the winch to reduce side loading the eyebolts. Use caution when lifting to avoid damage to exposed cables and components. Lift slowly until the winch is free and clear. Always use all four eyebolts when lifting.

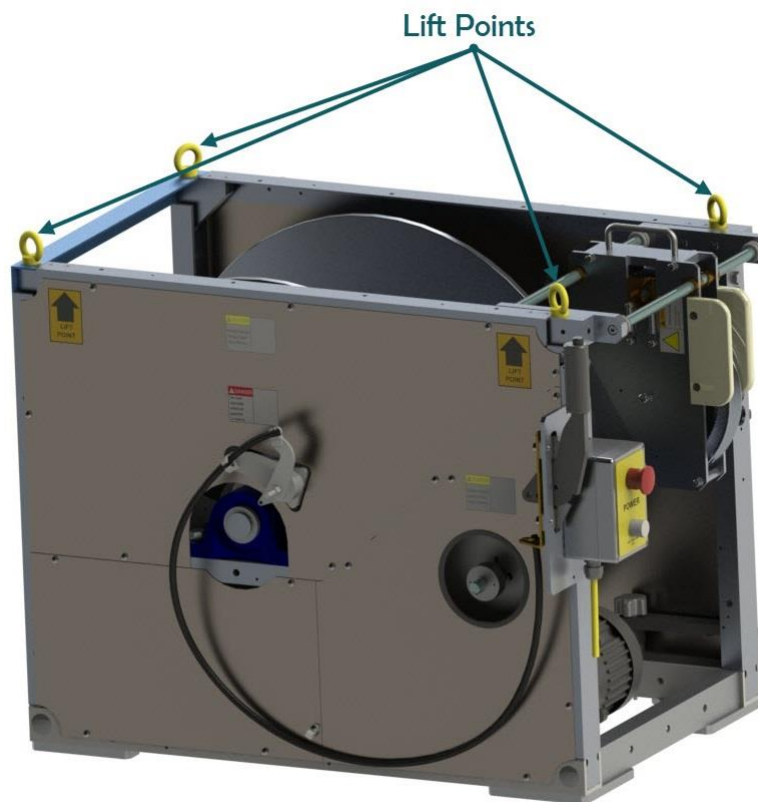


FIGURE 1: LIFTING EYE BOLTS

Mounting

To prevent unexpected movement or damage during operation, the winch must be mounted securely to its installation platform. Bolt holes are located on the winch frame as shown below. Use 3/8-inch (10mm) bolts and flat washers for mounting.

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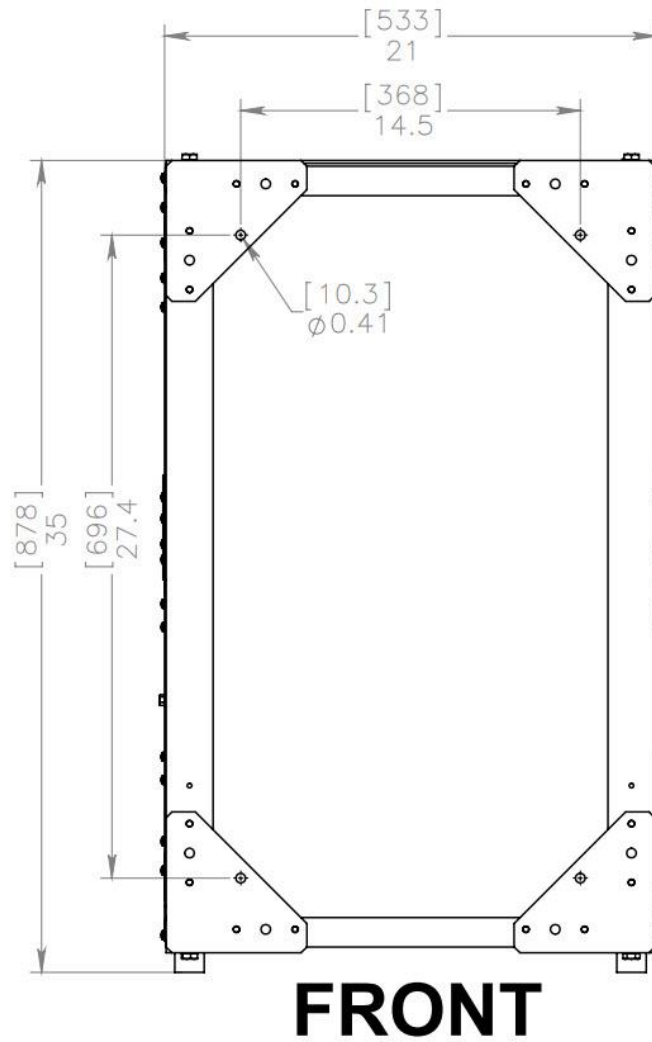


FIGURE 2: 13-INCH DRUM WINCH MOUNTING BOLT PATTERN

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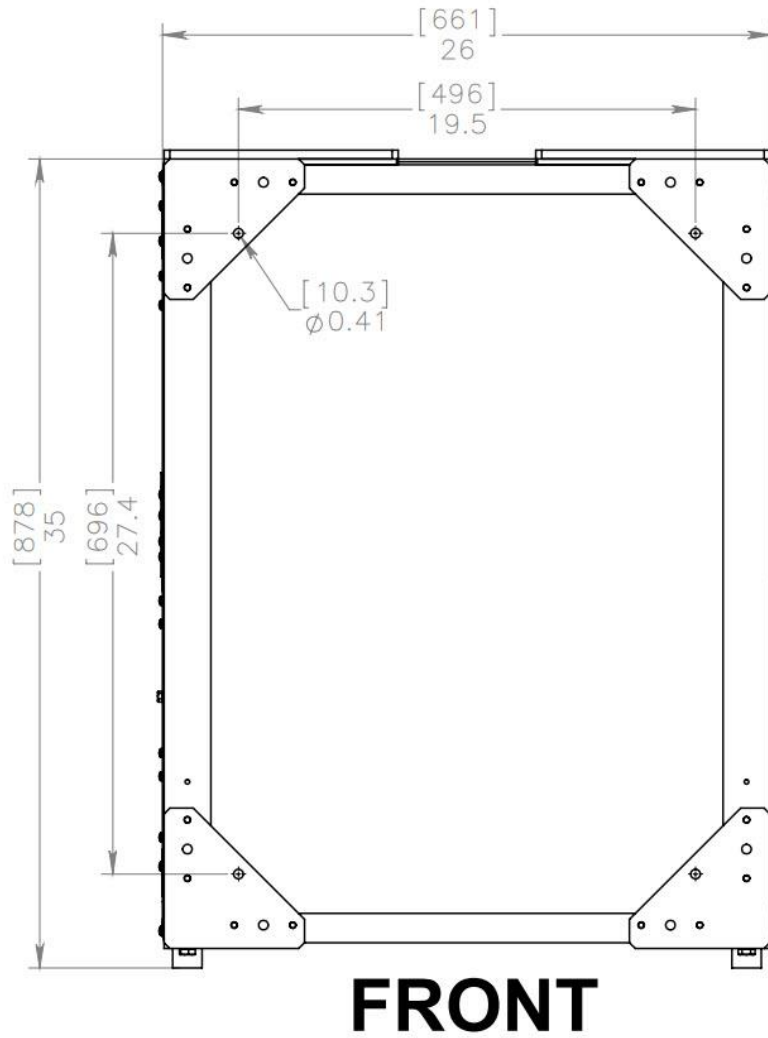


FIGURE 3: 18-INCH DRUM WINCH MOUNTING BOLT PATTERN

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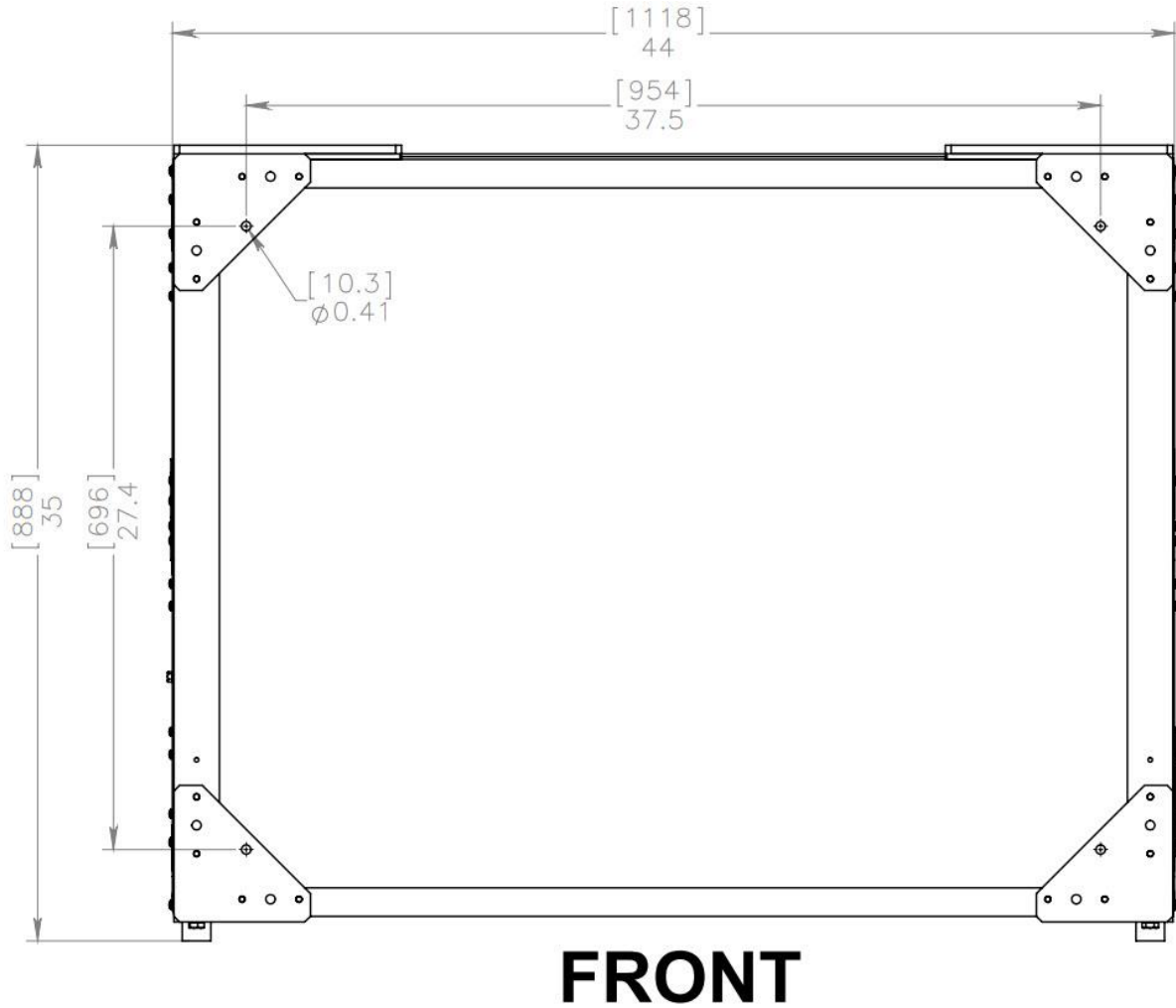


FIGURE 4: 36-INCH DRUM WINCH MOUNTING BOLT PATTERN

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Setup

Working Environment

The winch is intended for use in a dry, covered, environment. It is not intended for outdoor installation or use in standing water or rain. The winch is splash resistant to allow for spooling of wet tethers and for cleaning; however, power should be disconnected when cleaning.

Refer to the specifications table for operating and storage temperatures

Supply Requirements

The winch may be powered from a 115V or 230V AC (50/60Hz) power source. The line voltage must be set inside the winch drive control pendant. A ground fault protected (GFCI) outlet is recommended whenever operating in a potentially damp or outdoor environment.

Caution: The winch control's AC input selection jumpers must be correctly set to match the line voltage of the power source (115V or 230V AC). Incorrect selection may result in device failure.

AC Line Voltage Selection

115V or 230V AC input supply is selected with two jumpers accessible inside the drive controller.

1. Verify the winch's power cord is unplugged.
2. Open the drive control pendant by unscrewing the four captive screws at the corners of its front cover.
3. Set jumpers J1 and J2 to match the supply. Both jumpers must be set (Figure 5 and Figure 6).
 - a. For 115VAC: Set jumpers J1 and J2 to their 115V position.
 - b. For 230VAC: Set jumpers J1 and J2 to their 230V position.
4. Close and re-secure the front cover.
5. Unless otherwise specified, the winch's power cord is fitted with a North American 115V AC NEMA 5-15 type plug. An adapter or plug replacement may be required to match local supply receptacles. Plugs must include an earth connection.

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FIGURE 5: LINE VOLTAGE SELECTION, JUMPERS J1 AND J2

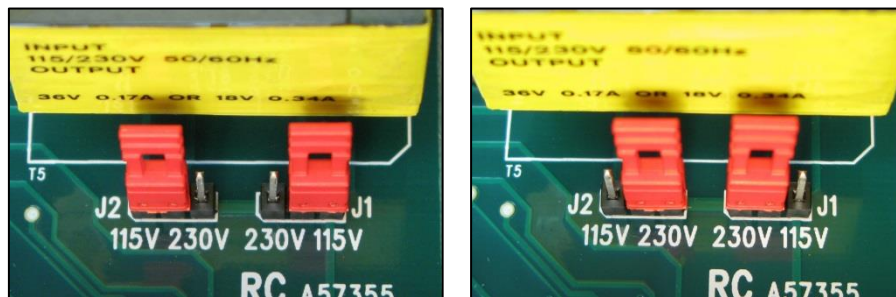


FIGURE 6: J1 AND J2 INPUT SELECTION JUMPERS (115V AND 230V POSITIONS)

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Generators and Inverters

If powering the system from a generator or inverter, refer to that unit's operating manual for recommendations on continuous and peak load ratings. These power sources may apply a reduced output rating based on electrical load, air temperature, and altitude. Remember to include the power needs of all connected devices when selecting a generator or inverter (including the system power supply and any external monitors, lighting, etc.).

Operation

Winch Operating Guidelines

Winch operation and monitoring is a vital part of the inspection process. It is the responsibility of the operator to ensure that the tether is not damaged during deployment and recovery. Anyone operating the winch must be familiar with and understand its use.

The winch is equipped with variable speed control and a level wind mechanism. Clean, level winding of the tether is important for ensuring drum capacity and maximizing tether life. When winding the tether, the cable should be wrapped neatly on the drum with no crossed loops. The winch may be fitted with a manual level wind or an optional automatic level wind. The manual level wind is operated by sliding the sheave side-to-side to manually control the lay of the cable onto the drum.

When deploying an inspection vehicle over a horizontal run, the winch's drive clutch can be disengaged to allow the vehicle to pull tether directly from the winch. This method should not be used for down hole inspection or in live pipes with flowing current.



Warning: The operator must be mindful of any equipment handlers and the potential for cable loops or snags; the winch has enough power to cause damage to the cable or snagged equipment, or to pull a handler off his or her feet.

General rules for winch operation:

1. Maintain open communication between the winch operator and any equipment handlers during deployment and insertion.
2. Ensure the drive clutch is engaged before operation.
3. Do not allow the tether to be snap-loaded or kinked during deployment. This may result in damage to the cable's internal conductors or fiber optics.
4. Do not allow loose wraps to collect on the spool. Loose wraps may become crossed over neighboring winds and cause a kinked or tangled cable. Large loops may fall off the end of the spool and jam.
5. Never fully un-spool the tether from the drum. The inner end of the tether is anchored inside the drum. If the spool is turned past the entry point, the tether will become kinked and may require re-termination. Always leave 3-4 turns on the drum to provide a friction strain relief for the

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internal cable termination. A band of tape has been wrapped around the last few coils to provide a visible and audible warning.

6. While retrieving an inspection vehicle the winch should be monitored to maintain a small amount of cable tension. This will prevent loose cable from collecting or tangling behind the vehicle as it backs up. Carefully monitor the cable during retrieval. A sharp rise in tension may indicate a snagged cable or stuck vehicle.
7. It is recommended that the cable be observed during re-spooling so that any cable damage may be noted before the next inspection. Passing the cable through a rag as it is pulled back onto the reel will clear any mud and debris and allow the cable jacket to be assessed.

Tether Handling Guidelines

The tether is a vital part of the crawler system. It feeds power and control signals to the vehicle and returns data from sensors. If the tether is damaged, the vehicle may become crippled or inoperable. This may result in significant repair costs, down time, and loss of production. For maximum tether life and reliability, please review the following tether handling tips:

- Never step or stand on the tether. This may cause damage to internal wire insulation or conductors leading to reduced cable life. Trampling fosters the wrong attitude toward the tether. Remember, this is an expensive multi-conductor cable, not a common electrical extension cord.
- Never allow cars or other vehicles to drive over the tether. This will cause concentrated, immediate, and permanent damage. Set up road cones or blockades to direct vehicles away.
- Do not bend the tether beyond its minimum bend diameter; this is generally 20 times the diameter of the cable. For standard Versatrax tethers the minimum bend diameter is eight inches. If the tether is difficult to bend, it has already been bent too far. If the tether is bent beyond its minimum diameter wire fatigue will be accelerated. Any sheaves or tackle should support the tether at or beyond its minimum bend diameter.
- Never kink the tether. Kinks may occur when there is slack tether with closing loops, or if the tether is allowed to overlap on the drum and becomes trapped. Kinks may cause internal breakage. The cable may also develop bulges or deformations resulting in accelerated internal and external wear. Use care to take up any slack while operating the crawler.
- Do not snap load the tether. Loads may peak at a very high value when the tether snaps taut. Snap loading may occur when a slack tether is reeled onto a motorized spool. Refer to the system manual specifications for the safe tether working load.

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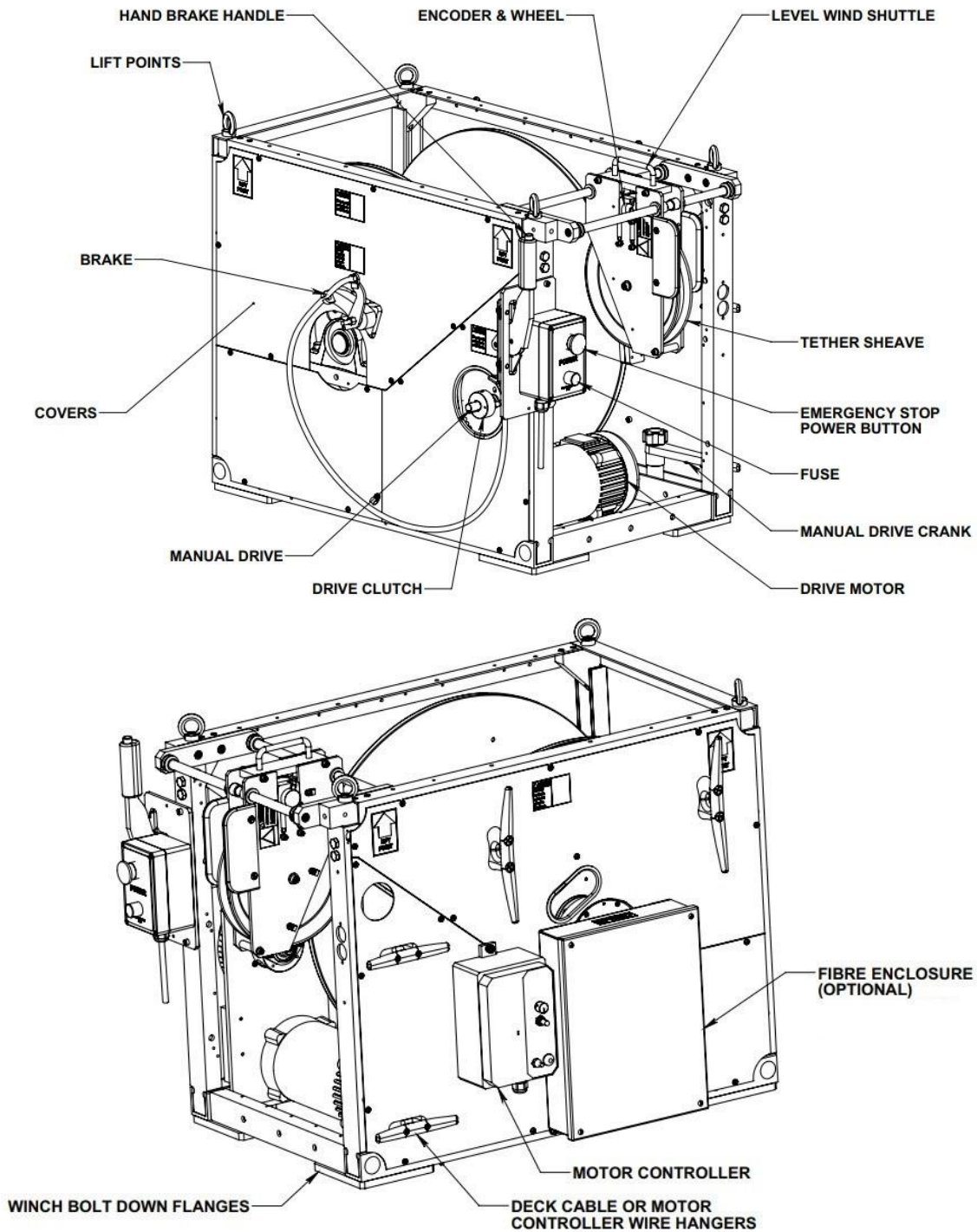


FIGURE 7: WINCH FEATURES

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Pre-Operation Inspection

The following items are recommended as part of the system pre-operation checklist:

1. Confirm all power and deck cable connections are securely mated.
2. Check that the level wind carriage is free to move over its entire range.
3. Check that no objects, tools, etc., have fallen into the winch mechanism around the chain or drum.
4. Check that the tether has no loose, dangling coils on the drum. Eliminate any loose coils before beginning operation.
5. Ensure that the drive clutch is fully engaged.
6. Power the winch, release the drum brake, and test for proper motor function before system deployment.

Unspooling the Tether

1. While unspooling the tether make sure that the tether is not snap-loaded or kinked.
2. The crawler may optionally be allowed to pull tether directly off the spool by disengaging the winch's drive clutch.
3. Move the level wind with the tether to prevent any sharp bends while unspooling.
4. Do not allow slack winds to build up on the drum. If necessary, stop and adjust the cable.
5. Never fully unspool the tether. Always maintain 3-4 turns on the drum to provide friction strain relief for the internal cable termination.
6. The winch operator should maintain communication with the vehicle operator to coordinate starting, stopping, and speed changes.

Spooling the Tether

1. When spooling the tether during vehicle recovery, care must be taken to maintain cable tension and prevent loose slack from accumulating behind the crawler. The operator must watch for any sharp rise in tension that may indicate a snagged cable or stuck vehicle.
2. Clutched crawler tracks, such as Inuktun Minitracs™, may be remotely disengaged from their drive motors to allow the tracks to freewheel. These crawlers can then be retrieved under winch power alone. Refer to the crawler manual for details of clutch operation.
3. Move the level wind side-to-side to guide the cable wraps for a clean and ordered wind. For equipment fitted with an automatic level wind, monitor the winds during retrieval, occasional adjustments may still be necessary.

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Emergency Stop Power Button

The winch is fitted with an emergency stop power button. The power button may be located on the left or right side of the winch, depending on build options, but must be easily accessible during operation. Pressing the power button will cut all electrical power to the drive motor and automatic level wind. The power button is reset by twisting.



Warning: The emergency stop power button disconnects all drive power to the winch. It also disables any electronic motor braking. If the cable is under tension or is supporting suspended equipment, then removing power may allow runaway. The hand brake has been fitted to halt free running loads and must be accessible while the winch is in use.

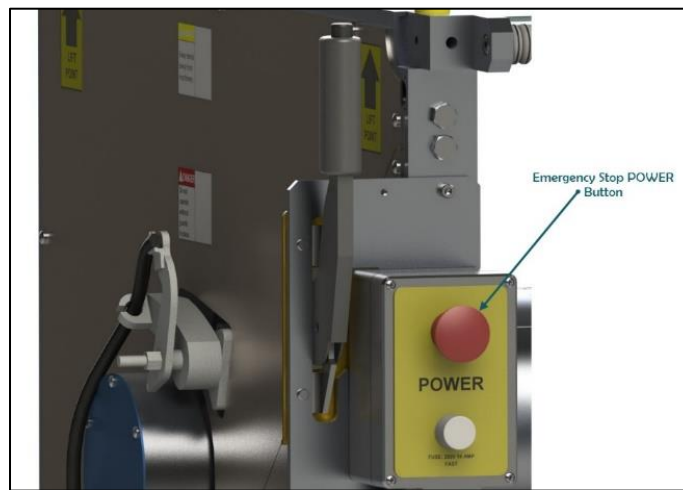


FIGURE 8: EMERGENCY STOP POWER BUTTON

Drive Control Pendant

When power is first connected, the drive controller remains in a disabled state. To enable the drive, first verify the speed control knob is set to zero then push the START/STOP switch toward its start position.

The FWD / REV switch selects the direction of travel. Forward will feed tether from the winch. Reverse will rewind it. The center position stops rotation.

The control knob adjusts the drive between 0 and 100% of available speed. The drive maintains a constant speed even with overhauling loads from suspended devices or water current in an active pipe.

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FIGURE 9: DRIVE CONTROLLER

Drum Hand Brake

The winch is equipped with an automotive style hand brake. The hand brake is intended to hold the drum in place for storage, transport, and, when needed, during operation. The brake is also capable of acting as an emergency brake to arrest runaway loads. To release the brake, press the button at the top of the handle.

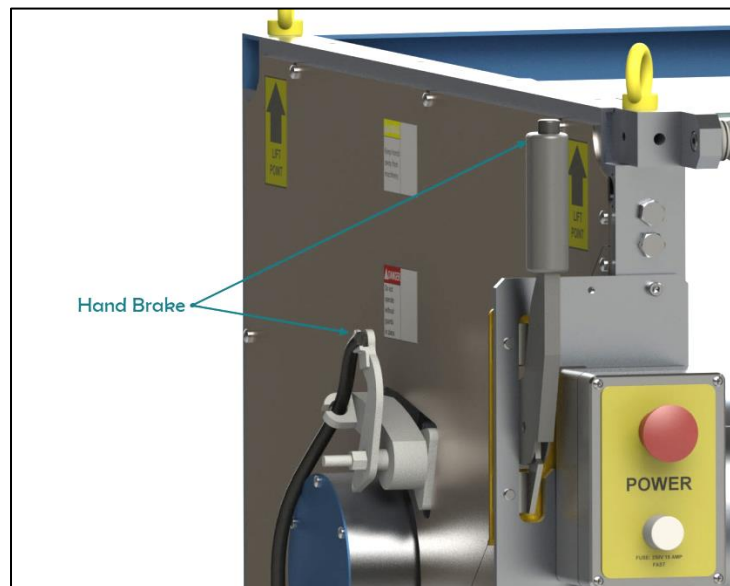


FIGURE 10: WINCH HAND BRAKE

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Free Wheeling

The winch drum may be disengaged from the drive to allow it to turn freely. To disengage, pull outward on the drive clutch. To re-engage, align the clutch pins and push inward.

Caution: When free-wheeling with clutch disengaged, the drum should only be stopped using the hand brake.



Warning: Never disengage the drive clutch while the cable is under tension or supporting suspended equipment.

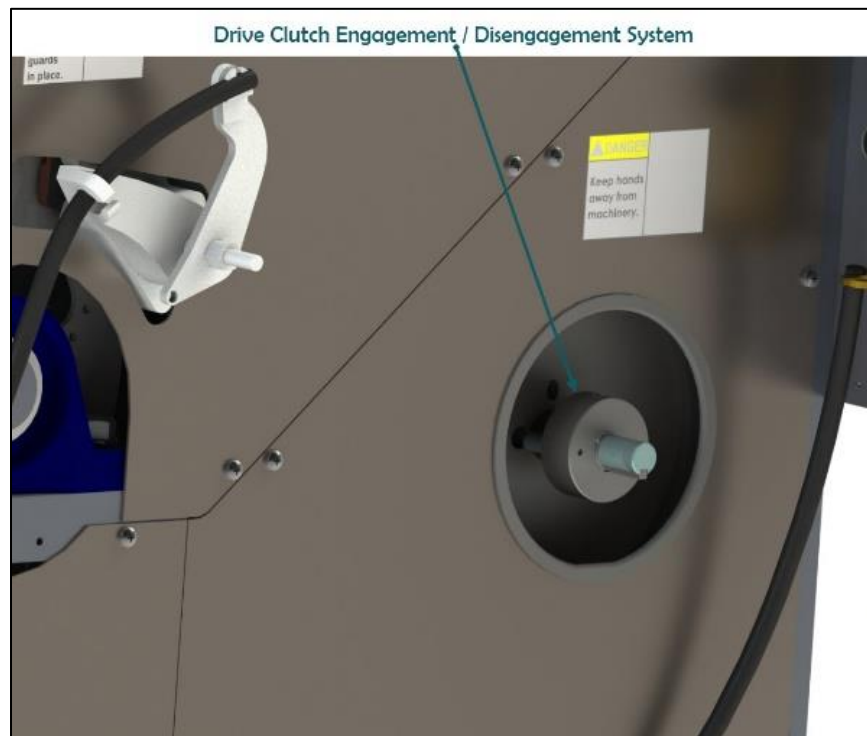


FIGURE 11: CLOSE-UP OF THE DRIVE CLUTCH SYSTEM

Drum Friction Damper

The winch is fitted with a spring-loaded friction damper at the drum flange to help reduce overrun during freewheel unspooling. No adjustment is necessary, however, the friction pad should be periodically checked for wear and replaced if needed.

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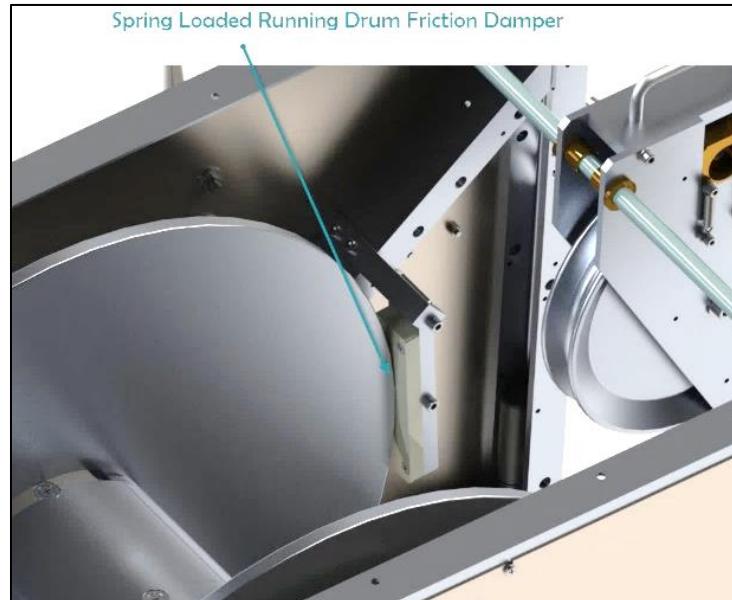


FIGURE 12: DRUM FRICTION DAMPER

Manual Cranking

The winch includes a manual crank handle to assist recovery if the winch becomes disabled. To manually wind the drum:

1. Verify that the tether is not under tension.
2. Disengage the drive clutch at the side of the winch.
3. Install the manual crank handle onto the crank shaft (see Figure 14).
4. Crank the drum by hand.
5. Remove and stow the crank handle after use.



Warning: The crank shaft is linked to drum movement. Any drum rotation, including motion from the drive motor or any external pull on the tether, will transfer back to the crank handle with significant speed and force. Do not attempt to catch a spinning crank handle. Use the hand brake to slow and stop the drum. Always remove and stow the crank handle after use and before operating the winch.

Caution: The crank provides a 10:1 mechanical advantage and can generate pulling forces of up to 500 lbs.

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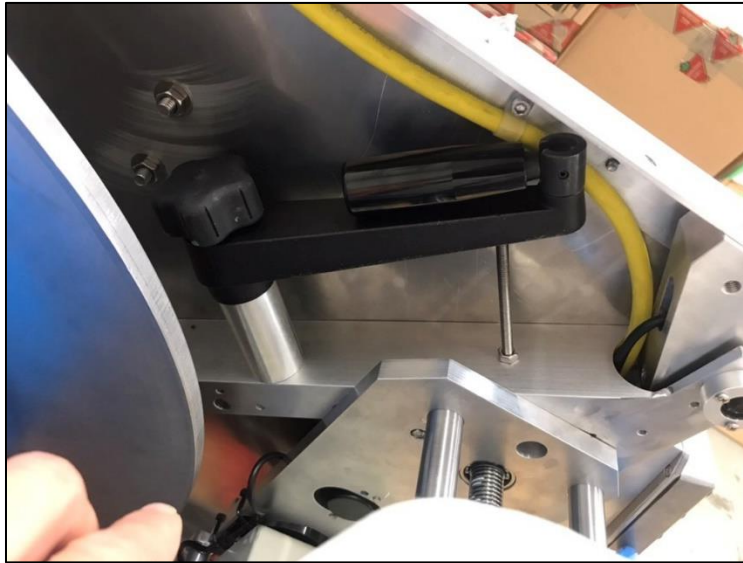


FIGURE 13: MANUAL CRANK HANDLE STOW POSITION



FIGURE 14: MANUAL CRANKING SHAFT POSITION

Tether Feed Distance Encoder

Eddyfi Technologies' Inuktun reels are fitted with an electronic cable feed distance encoder for monitoring cable output length. ICON™ displays and records this data along with any video, device feedback, and sensor information for later inspection review.

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The distance encoder is calibrated at the factory before shipping. Recalibration may become necessary if sheave components or the tether are replaced. Recalibration can be performed using the ICON control software. The calibration data is stored by the winch so that it can move freely between controllers without readjustment.

The encoder draws power from the system's controller / interface box and is independent of winch power. The tether feed continues to be tracked even if the winch is turned off and free-running.

Fiber Optic Tethers (Where Applicable)

Long range crawlers or equipment supporting high definition video or high-speed data links may be fitted with fiber-optic / copper hybrid tether cables. In these applications the reel will be equipped with both copper and optical slip rings and a fiber optic receiver box mounted to the side of the reel.

Setup with a fiber optic winch is identical to that of copper systems. The fiber optic signal interface is designed to be transparent; no special connections are required by the operator and there is no added device or network addressing required. The reel connects to the system's interface box using a standard deck cable.

Fiber optic systems supporting an Ethernet data link are fitted with an RJ45 network jack at the winch's fiber receiver box. This can be connected to a computer or network device using a standard CAT5e or CAT6 network patch cable. When not in use, the jack should be covered with the provided dust cap.

The fiber receivers are powered by the system's controller / interface box. The winch does not need to be powered for the fiber transmitters or vehicle to operate.

Deployment Arm (Optional)

The winch can be fitted with an optional deployment arm to facilitate down-hole operation. The deployment arm is removable and is attached to the winch by a pivot point installed at the bottom of the frame, and two eye bolts at the top. The length and working angle of the arm is adjustable to suit the application.



Warning: Always use the chains and quick-connect links provided with the deployment arm. These have been selected to meet the maximum load conditions of the winch. Substituting non-rated components may result in equipment failure and injury.

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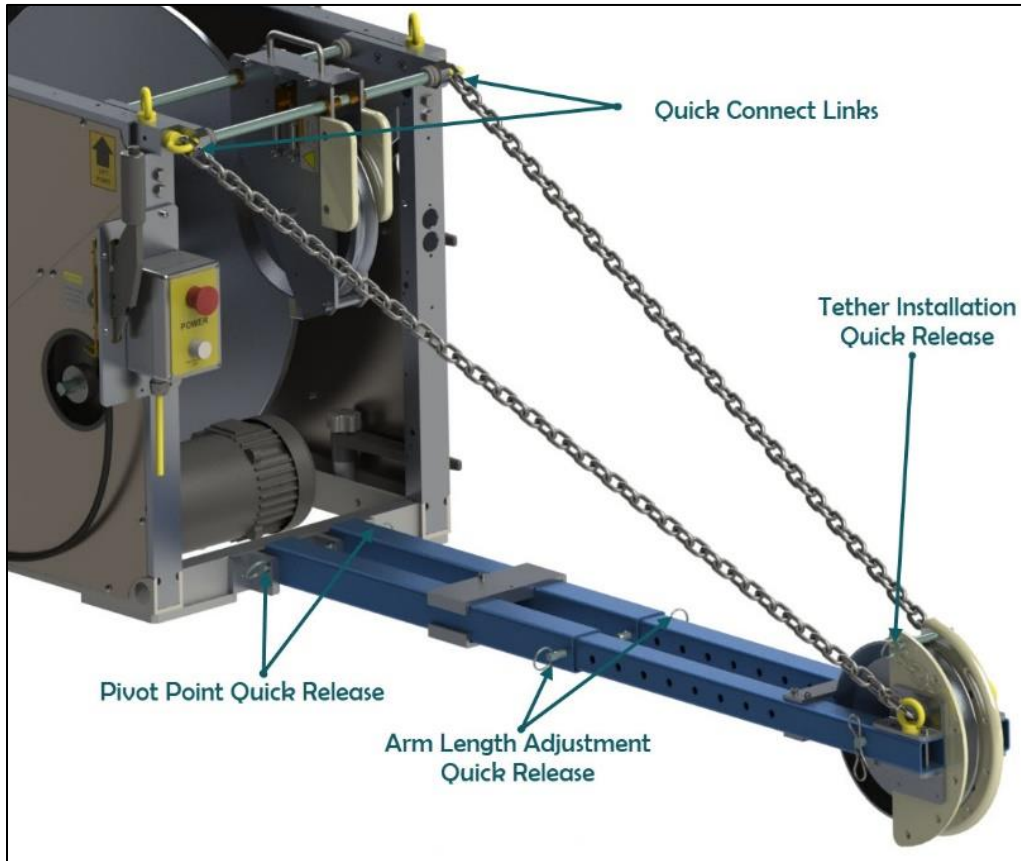


FIGURE 15: OPTIONAL DEPLOYMENT ARM

Automatic Level Wind (Optional)

Level Wind Description

The tether reel may be equipped with an automatic level wind to simplify management during the deployment and recovery of cable. The automatic level wind monitors the rotation of the reel's drum and advances the levelling shuttle to match the wind of the cable.

The level wind's controls allow adjustment of the leveling shuttle's direction, speed, and position. A mechanical clutch is also provided to allow the level wind's lead screw to be disengaged from its drive motor for manual repositioning.

The width of the level wind varies between models of cable reel. While its operation is the same, the mechanical layout may differ from those pictured in this manual.

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Level Wind Safety

Pressing the emergency stop button on the winch will immediately stop the level wind. The winch must always be installed so that the stop button is easily accessible to the operator.

Be mindful of moving parts. Keep hands, loose clothing, hanging jewelry, and long hair away from the reel, cable, cable drum, drive chains, and level wind.



Warning: Never attempt to manually adjust the lay of the cable winds while the drum is moving. Fingers, hair, or loose clothing can become trapped under the cable causing immediate injury.



Warning: Keep hands and other body parts out from between the winch frame and the sides of the level wind shuttle. The level wind is driven with enough force to crush a hand or other body part trapped against the frame.

Disconnect all power sources before servicing. Unplug the winch and disconnect the deck cable from the system interface box / controller.

Level Wind Operation

Level Wind Pre-Operations Inspection

Before beginning each mission, a brief inspection of the equipment is recommended, particularly after a period of storage or recent transport.

1. Verify power and cable connections.
2. Verify that the level wind carriage is free to move and no objects, tools, or debris have fallen into the drum space, drive chain, or level wind path.
3. Check for, and eliminate, any loose cable wraps on the reel drum.
4. Verify the level wind drive clutch engages/disengages cleanly and is in the engaged position.
5. Power the reel and test for proper level wind function: verify the direction is set correctly, both limit switches are functional, and the level wind advances correctly.
6. Use the jog buttons to align the level wind shuttle with the leading cable wrap.

Operating the Auto Level Wind

The tether should be spooled in clean, even rows, with no space between neighboring wraps. This minimizes point pressure caused by overlaps, ensures smooth cable deployment in later operations, and maximizes cable fit on the drum.

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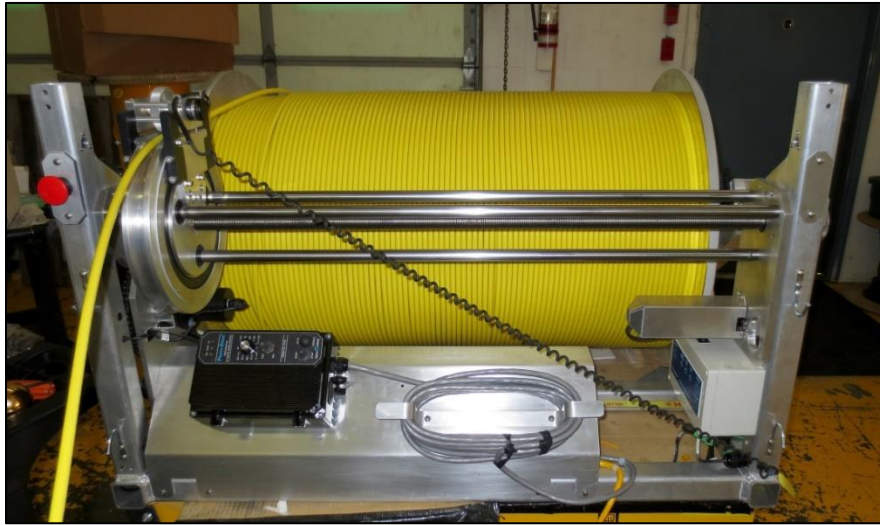


FIGURE 16: CABLE WRAPS SHOULD BE EVEN AND TIGHTLY SPACED

The automatic level wind is active whenever the reel is powered. This allows it to operate during all tether feed and rewind activities, whether manual or motor driven. If desired, the level wind movement can be stopped by pressing the pause button at the controls.

Note: In order for the level wind to operate, the level-wind clutch must be fully engaged.

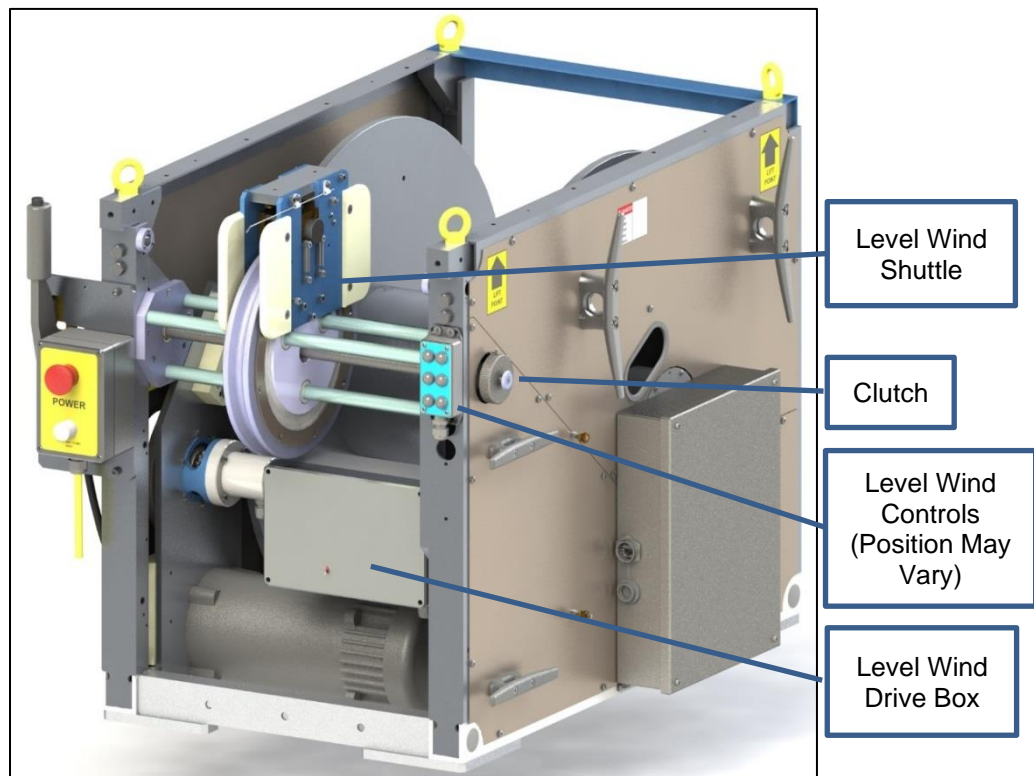


FIGURE 17: AUTOMATIC LEVEL WIND

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The level wind is geared to operate within the speed range of the reel's drive motor. If cable is manually pulled from the reel it is possible to outrun the level wind. If this occurs, temporarily slowing the cable removal will allow the shuttle to catch up.

During rewind, irregularities in the cable may cause it to climb onto a neighboring wrap. The reel should be monitored during cable retrieval; occasional operator intervention may be required to ensure a clean and even wind.

Extra care should be taken as the cable wind nears the edges of the drum. If cable wraps become crossed or pinched to the side of the drum the cable may be drawn back around the reel. Any resulting kink or snap-load may weaken or damage the cable's internal conductors.

The jacket of a clean new tether cable may sometimes have a light surface tackiness and may be more prone to climbing onto neighboring wraps. Applying light tension to the cable as it is wound onto the reel will help encourage the wraps to settle into place. After the first few deployments the jacket will lose this surface stickiness and will require less monitoring.

Note: If power is cycled off and back on, the level wind may occasionally start up in a paused state. Pressing the pause button will restore the level wind to active operation.

Level Wind Controls

The level wind controls are found on the control box mounted to the reel's frame near the emergency stop switch as well as on any optional secondary control pendants. The reel is also fitted with limit switches located on either side of the frame.



FIGURE 18: LEVEL WIND CONTROLS

Direction – Pressing the direction button toggles the level wind shuttle's direction of travel.

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Pause – Pressing the pause button will temporarily stop the automatic leveling function. Pressing the button again will re-enable it. The jog, direction, and trim buttons remain active even while the level wind is paused.

Jog – Pressing the jog buttons will advance the shuttle to the left or right at full speed until the button is released or the shuttle reaches the limit of its travel. To accommodate alternate mounting positions, the direction of the jog buttons can be swapped by pressing and holding the direction button and both jog buttons for five seconds.

Trim – The trim buttons increase or decrease the shuttle speed by a small amount each time they are pressed. Pressing both the trim up and trim down buttons at the same time will reset the trim back to zero. Trim is also automatically cleared when power is reset.

Note: The trim control is intended for minor adjustments in the shuttle speed. The change in speed with each press is small, approximately 1% of the calibrated value. This change may not be immediately noticeable but can have a significant effect across the full width of the drum. For immediate position adjustments the jog function should be used.

If the level wind speed is consistently too slow or too fast the calibration can be adjusted. Contact Eddyfi Technologies technical support for assistance in adjusting the speed calibration.

Limit Switches – These are buttons located at either side of the reel within the vertical posts of the frame. When the level wind contacts a limit switch the shuttle will automatically change direction.

The limit switches are activated by mechanical contact with screws on either side of the cable shuttle. These screws can be re-adjusted if necessary.

Clutch – The level wind motor may be mechanically disengaged by pulling outward on the clutch wheel located at the end of the level wind drive shaft. Once disengaged, the clutch wheel can be spun by hand to manually advance the level wind. The motor is reengaged by lining up the clutch pins and pushing inward to lock the wheel back into place.

Level Wind Control Pendants

The level wind controls are normally mounted to the reel's frame near the emergency stop switch. For convenience, the level wind may be fitted with a secondary control pendant which may be positioned up to 15ft (4.5m) from the reel.

Level Wind Troubleshooting

The following guidance is provided to aid with general troubleshooting. Technical support is also available for assistance; contact information can be found at the back of this manual.

All level wind inputs and motor cables connect back to the level wind drive control box. Before continuing with troubleshooting verify all connections are fully mated and secure (finger tight only).

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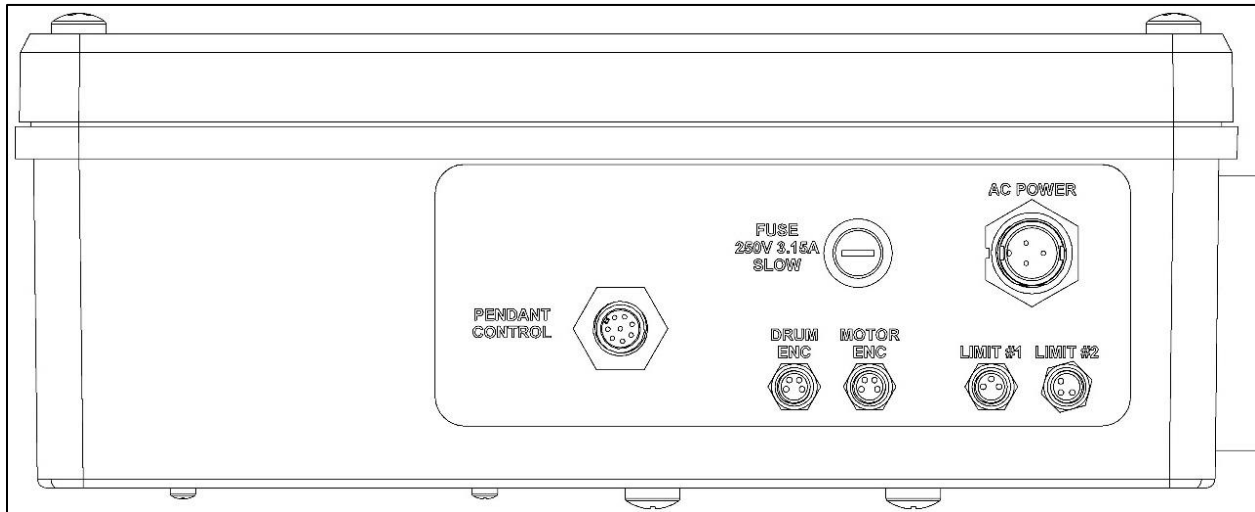


FIGURE 19: LEVEL WIND DRIVE CONTROL BOX CONNECTIONS

The jog buttons are reversed:

- The direction of the two jog buttons can be swapped by pressing and holding the direction button and both jog buttons for five seconds.

The level wind shuttle travels only in one direction:

- Verify that a limit switch has not become mechanically stuck. When pressed, the limit switches should have clear positive movement and should immediately spring back when released.

The level wind acts on jog button inputs but does not respond when spooling or unspooling cable:

- Verify the level wind is not paused. Pressing the pause button will toggle between paused and active states.
- Ensure the drum encoder cable connection is fully mated and secure.

The level wind does not respond to any inputs:

- Verify the power source supplying the reel.
- Verify that the reel is plugged in and its main power button has been enabled (twist to enable).
- Check that the power, motor, and controller input connectors on the bottom of the level wind electronics housing are fully mated and their collars are tightened (finger tight only).
- Verify the limit switches are not stuck. If both limit switches are depressed the level wind shuttle will not move.
- Verify the level wind's fuse is intact. The fuse is accessible at the bottom of the level wind drive control box. A flat screwdriver is needed to unscrew the fuse holder. Fuse information can be found in the Maintenance section of this manual.

The level wind shuttle does not change direction in time or collides with the reel frame:

- Ensure the limit switches are not covered. The limit switches are located at the top of the vertical posts on either side of the reel frame.

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- Verify the adjustment of the trim screws on either side of the level wind shuttle. The limit switch should trigger as the last cable wrap just touches the drum side plate.

The level wind shuttle tracking does not match the cable winding, the cable is consistently climbing onto neighboring wraps, or the cable wraps are too loosely spaced:

- Some variation is normal, and the flow of the wraps may change slightly as the layers stack onto the drum. Occasional jog adjustments may be required for localized wrap tidiness, particularly at the edges of the drum. For positional differences accumulating across the width of the drum, the trim buttons can be used to fine tune the overall level wind speed.
- If the level wind speed is consistently too slow or too fast the calibration can be adjusted. Contact technical support for assistance in adjusting the speed calibration.

Winch Maintenance

Routine Maintenance

A regular maintenance routine will extend the life of the equipment and may provide an early warning for any potential repairs. The below maintenance actions are recommended as part of overall system care.

Monthly:

1. Check for mechanical damage to the winch. Clean out any objects or debris that may have collected in or around frame and drive components.
2. Check the tension of the drive chains. They should be marginally loose. A tight chain will cause excess noise and accelerated wear.
3. If required, grease the drive chain with chain grease (first and second stages).
4. Grease the pillow block bearing on the drum.
5. Clean and lightly grease the level wind guide bars.
6. Remove the oil screw behind the clutch and drip oil into the hole. Reinstall the screw.
7. Remove one of the sheave screws and drip oil into the hole. Reinstall the screw.
8. Ensure fasteners, sprocket set screws, etc., are tight.
9. Keep the mechanisms free from debris which could cause jams.
10. Check the wear pad on the drum friction damper. Replace if necessary.

Winches with automatic level wind (in addition to above items):

1. Check for mechanical damage to the reel, level wind and drive screw. Remove objects and debris that may have collected in or around frame and drive components.
2. Ensure all moving parts are free of sand, dirt, or debris which may affect the levels wind's movement.

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3. Check the tension of the level wind drive chain (located under the lower frame cover at the level wind clutch). When lightly squeezed by hand the chain should have just a small amount of free movement. A tight chain will cause excess noise and accelerated wear. A loose chain will introduce slack in the drive movement.
4. Lubricate the drive chain with an all-weather chain lubricant.
5. Clean and lightly grease the level wind guide bars and drive shaft with a multi-purpose grease, such as Molykote G1502 or equivalent.
6. Ensure fasteners, sprocket set screws, etc., are tight.

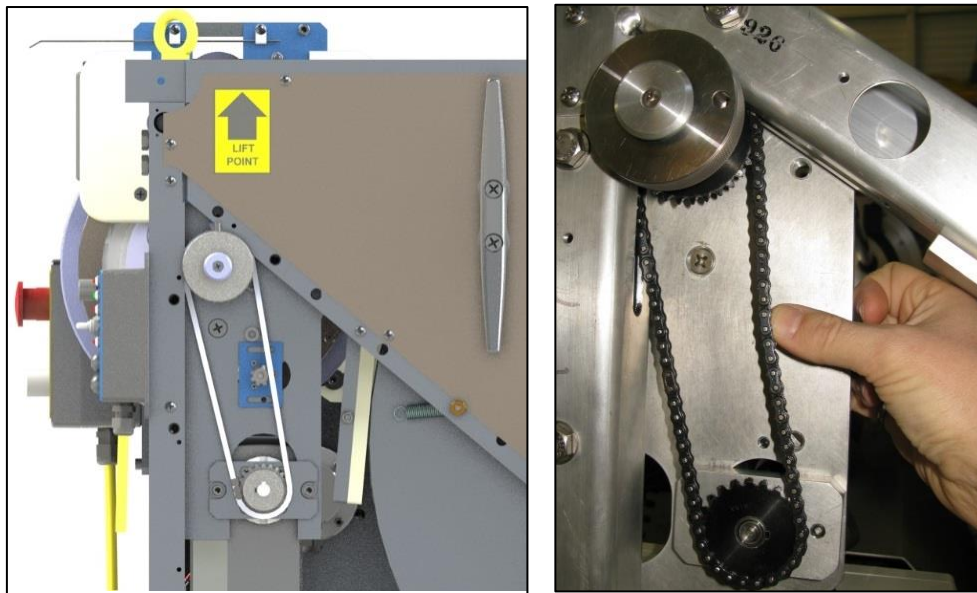


FIGURE 20 - LEVEL WIND CHAIN LOCATION AND TENSION.

Fuses

The winch's power input fuse is located on the junction box, below the emergency stop power button. The automatic level wind's fuse is located on the bottom of its drive box mounted below the shuttle mechanism. Fuses must only be replaced with ones of equivalent type and rating.

AC Line Input	15A 250V, Fast Acting, ¼ x 1-¼" (Bussmann ABC-15-R)
Auto Level Wind	3.15A 250V, Time Delay, 5x20mm (Bussmann S506-2-R)

Caution: A blown fuse is an indication of possible component failure. If, after replacing a fuse, the system does not operate normally, or if the fuse blows a second time, please contact Eddyfi Technologies technical support.

Tether Re-Termination

Tether termination is system specific and a specialized service beyond the scope of this manual. Contact Eddyfi Technologies technical support if the tether becomes damaged and requires re-termination.

Tether Replacement

The tether cable connects to slip-rings inside the winch drum. Removal of the tether requires some disassembly. It is recommended that Eddyfi Technologies technical support be contacted before proceeding.

Tether Removal

1. Unspool the entire cable, taking care to leave the vehicle-end connector accessible. It is recommended that the cable be transferred directly onto an empty cable spool. This will simplify later re-winding and reduce the risk of tangles. If a spool is not available, the cable should be coiled neatly where it will not be disturbed until it is re-wound.
2. The last few wraps of tether are taped down. Remove the tape and continue unspooling until the tether entry point is reached.
3. Unplug the winch and ensure that the deck cable is disconnected from the system controller.
4. Remove the Phillips screws from each of the drum core covers (Figure 21).
5. Using a knife carefully cut the silicone seal around the edge of the drum core covers and lift them away. Take care not to damage or cut the tether. Clean away all silicone from the drum and covers.
6. Undo all tether connections at the internal slip-ring.
7. Unscrew the internal tether clamps. These will be nylon P-clamps held by M5x10mm socket cap screws.
8. Remove the tether from the level wind sheave:
 - a. Winches with manual level wind (Figure 22):
 - i. Remove the bottom spacer and screws from below the sheave.
 - ii. Remove the sheave's left and right axle bolts.
 - iii. Lower the sheave out from between the two side plates.
 - b. Winches with automatic level wind (Figure 23):
 - i. Unscrew the cable guide / encoder assembly from the sheave (six M6x16mm socket cap screws, three each side).
 - ii. Lift the assembly up and away from the tether sheave.

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Tether Installation

1. Unplug the winch and ensure that the deck cable is disconnected from the system controller.
2. Reverse the removal process described in step eight above to install the tether back on the sheave.
3. Clean the drum covers and drum openings of all old silicone. Silicone will not stick to old silicone.
4. Feed at least one loop of tether around the interior of the drum and secure it using the internal P-clamps. The tether should sit tight against the inside wall of the drum core.
5. Connect the tether to the slip ring. 400V tethers will also include a ground lead for connection to a spade terminal on the drum side plate.

Note: It is strongly recommended that the system be briefly turned on and vehicle function confirmed before continuing.

6. Apply silicone sealant around the edge of the drum covers and re-install them, securing all cover screws in place.
7. Apply additional silicone as required to seal around the covers and tether entry.
8. Wind 3-4 wraps of tether onto the drum and tape them down with duct tape. This is an end-of-tether reserve and warning.
9. Neatly wind the remaining tether.

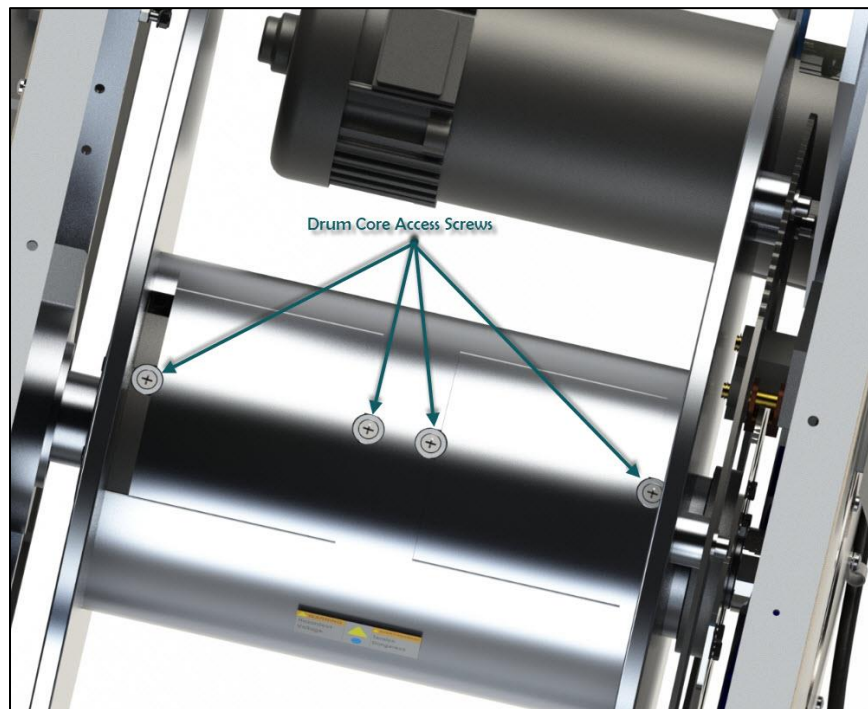


FIGURE 21: DRUM CORE COVERS AND ACCESS SCREWS

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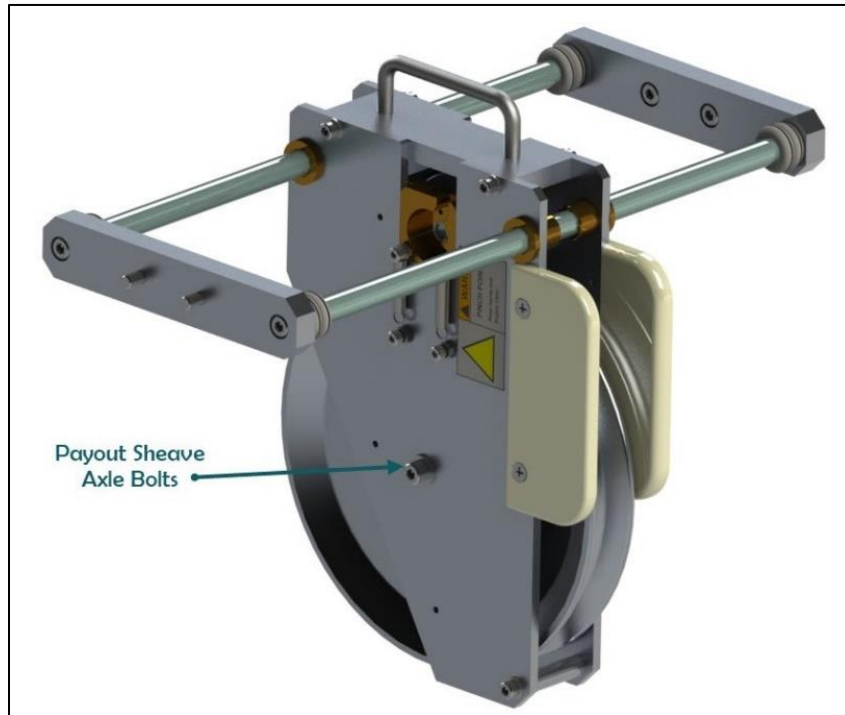


FIGURE 22: MANUAL LEVEL WIND SHEAVE TETHER REMOVAL

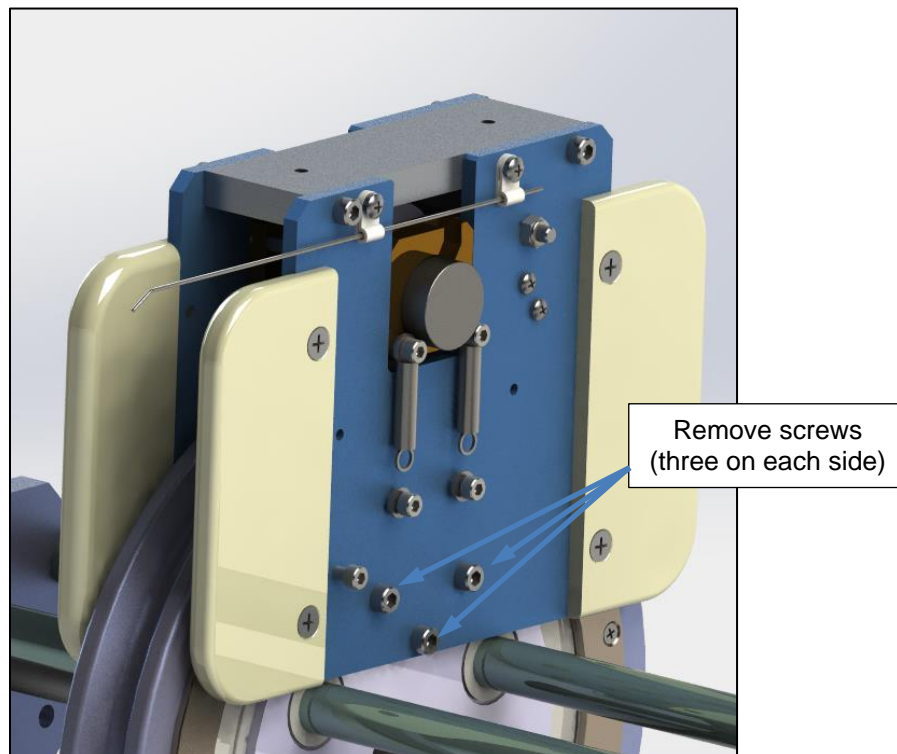


FIGURE 23: AUTO LEVEL WIND TETHER REMOVAL

Parts and Repairs

Ordering Parts/Customer Service

Spare and/or replacement parts are available for your product and can be ordered directly from your local office.

When ordering parts always make sure to quote the sales order acknowledgement (SOA) number and/or the serial number of the system component in question.

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Warranty Repairs

Warranty conditions are specified in the Warranty section. Should any conditions of the manufacturer's warranty be breached, the warranty may be considered void. All returned items must be sent prepaid to Eddyfi Technologies at the above address.

Factory Returns to Canada

Some sub-assemblies of your Eddyfi Technologies product are not field-serviceable and may need to return to the factory for repair. Warranty claims must return to the factory for evaluation.

To return an item for evaluation or repair, first contact Eddyfi Technologies at our toll-free number or e-mail address. Eddyfi Technologies will supply a Return Merchandise Authorization (RMA) number with detailed shipping and customs instructions. Items shipped without an RMA number will be held at Eddyfi Technologies until the correct paperwork is completed. If cross-border shipments are not labelled as per the instructions, the items may be held by customs and issued additional fees.

All returned items must be sent prepaid unless other specific arrangements have been made.

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When the product or system is being shipped anywhere by courier or shipping company, it must be packaged in the original packaging it was received in. This measure greatly reduces the consequences of rough handling and subsequent shipping damage.

Eddyfi Technologies cannot be held responsible for damages due to improper packaging. Shipping damage may have significant impact on repair turnaround times.

Product/System Drawing Package Availability

Mechanical assembly and electrical wiring drawing packages for your equipment are available in PDF format upon request. Printed copies may also be purchased. Contact your local sales representative for more information.

Limited Warranty Policy

Refer to the Eddyfi Technologies website for warranty terms for this product
www.eddyfi.com/en/salesterms

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