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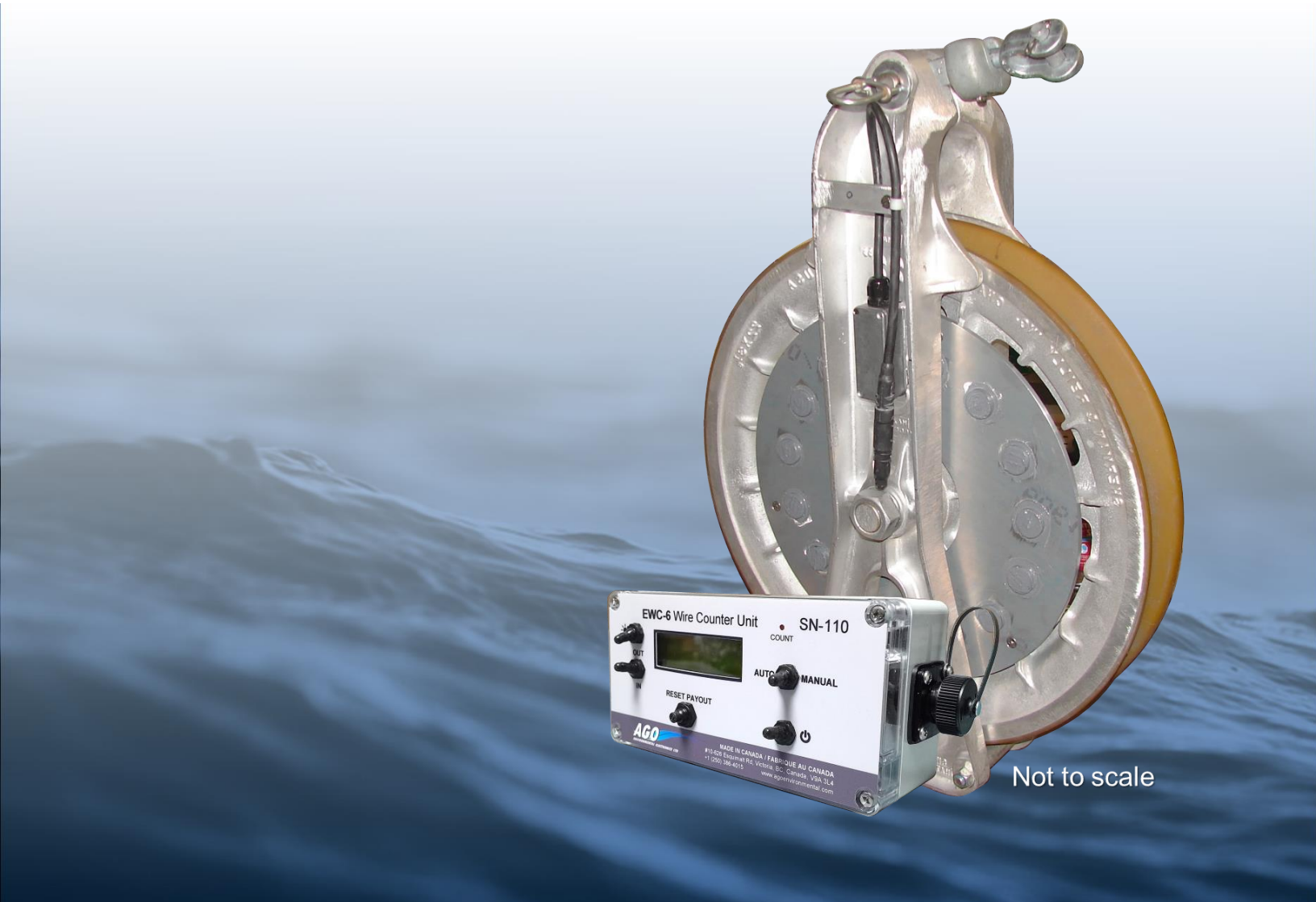
EWC-6 Electronic Wire Counter

Operation Manual

24 October 2025



Contents

Revision log:

Rev	Description	Release date
1.1	Written	2016-08-03
1.2	Updated maximum count value to reflect firmware changes	2023-01-04
1.3	Corrected Scale Factor formula	19 June 2024

1. Overview

The EWC-6 Electronic Wire Counter unit is a simple, handheld, splash-proof wire payout display unit for use with A.G.O.'s matching magnetically-encoded sheaves, pulleys, and wheels. It displays both wire length (up to 4999.9 units, either meters or feet) and line speed simultaneously on its two-line LCD display.

A.G.O.'s magnetically-encoded sheaves detect wheel movement with two sealed magnetic reed switches arranged 90 degrees out of phase to each other to generate a quadrature output from the magnets spaced evenly around the wheel. The reed switches transmit their signals to the EWC-6 via a 4-conductor cable.

EWC-6 features

- Up/down counting
- Automatic and manual direction control
- 2-line LCD display (showing length and speed simultaneously) with backlight
- Powerable by internal 9V alkaline battery or external 9-24VDC (12VDC nominal) source
- Data output to a computer (USB output standard; serial D-Sub available as upgrade)
- Cabled connection to compatible magnetically encoded sheave (standard length 5m; extended lengths available up to 50m)

Standard specifications

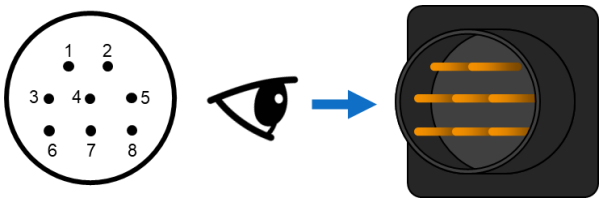
Display values	Length paid out and line speed	**Display units**	Meters or feet
Max count	+/- 4999.9 units (m or ft)	**Resolution**	0.1m (0.328ft = 3.9in)
Power	9V internal battery or can take up to 24VDC external power*	**Battery life**	90 hrs (backlight off) 20 hrs (backlight on)

* When powered by an external source, the EWC-6 draws approximately 6mA current with the backlight off, and about 25mA with the backlight on.

Primary connections

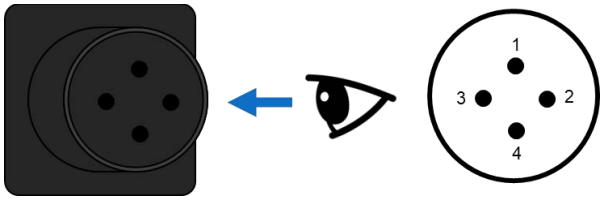
Connector pinouts

Data out / Power in bulkhead connector on EWC-6 (Amp 205841-1)



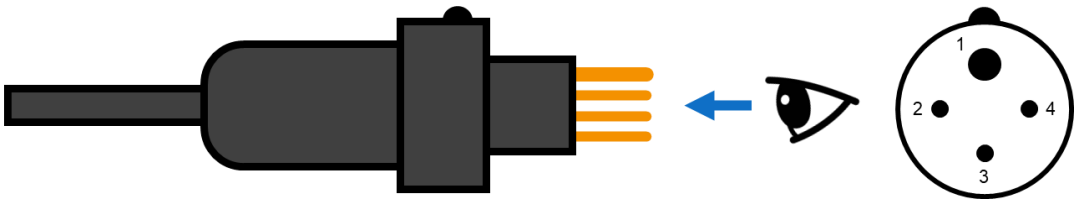
Pin #	Function	Wire colour (inside EWC-6)
1	Power ground	BLACK
2	NC	--
3	NC	--
4	External power	RED
5	USB ground	BROWN
6	USB SIG+	GREEN
7	USB SIG-	WHITE
8	USB 5V from computer	ORANGE

Signal in bulkhead connector on EWC-6 (Amp 206430-1)



Sheave pigtail cable (RMG-4MP)

Sheave terminal box



Pin #	Function	Wire colour (inside EWC-6)	Wire colour (inside sheave box)
1	Ground	GRAY	WHITE
2	Contact “A”	WHITE	BLACK
3	Contact “B”	YELLOW	GREEN
4	NC	--	--

2. Data output format

The standard EWC-6 is equipped with a short ~1m long USB cable for connecting it to a computer for data logging and recalibration.

The data output format is an NMEA compliant transmission with the following parameters:

Baud rate	Data bits	Stop bit	Parity bit
4800*	8	1	None

* The baud rate may optionally be switched to 9600 baud using an internal switch.

The data output NMEA sentence format is as follows:

$YXXDR,D,301.2,M,L,S,30.0,M,R*24[CR][LF]	
$	NMEA sentence delimiter (beginning of sentence)
YX	Identifies talker device type as a Transducer
XDR	Sentence formatter for a transducer measurement
D	Indicates that measurement is a linear displacement
301.2	Actual length measurement in meters
M	Indicates that displacement is measured in meters (changes to F for feet)
L	Transducer ID
S	Speed
30.0	Actual speed measurement in meters/min
M	Indicates that speed is measured in meters/min (changes to F for ft/min)
R	Rate
*****	NMEA sentence delimiter (end of sentence)
24	Checksum (EXOR of all characters between but not including the $ and * characters, reported as a 2-digit hexadecimal number)
[CR][LF]	Carriage Return and Line Feed characters (decimal 13 followed by decimal 10)

Some payload companies (e.g. side scan sonar companies like Klein) may have their payload monitoring software configured to parse this string and incorporate its values into the payload monitoring system – check with your payload rep to find out if the EWC-6 is directly compatible with your payload's software.

3. General Operation

Controls overview:

Backlight switch	Turns on the LCD display's backlight (very faint in daylight, but helpful in darkness and shade)
Count direction switch	Toggles count direction (only active when using EWC-6 in Manual count mode)
Length reset button	Zeroes/tares the payout length
Count indicator light	Flashes with every pulse from the reed switches to indicate whether the unit is receiving signals from the metering wheel.
Auto/Manual switch	Toggles the EWC-6 between automatic and manual counting Counting in Auto mode will automatically detect when the wheel has reversed direction. Counting in Manual mode will require the user to manually switch the count direction when the payout direction changes.
Power switch	Turns unit on and off

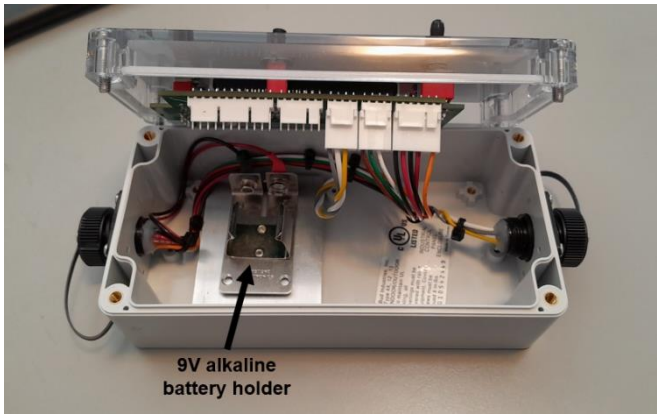
Powering the EWC-6:

If using an external power source rather than the internal 9V battery, connect the counter to the external power source via the red and black wires on its combined data-output/power-input cable.

EWC-6's equipped for data output over USB can also be powered directly over the USB cable from compatible powered USB-A ports.

If using the internal 9V battery, unscrew the four lid screws using a Phillips (**+**) head screwdriver to open the EWC-6 and install the battery.

Close and re-seal the EWC-6 lid before continuing.



Automatic counting

When the unit is in Auto mode, it will automatically detect the metering wheel's direction and add/subtract payout length accordingly.

NOTE: The EWC-6 does **not** include controls for reversing the count if the detected directions in Auto mode are opposite of the actual directions (i.e. it increases the payout length when recovering cable and vice versa).

For counting in Auto mode, it is recommended to connect the EWC-6 to the metering wheel and power it on briefly to check the automatic count directions relative to the wheel orientation **before** hanging the metering wheel up for operations.

Manual counting

When the unit is in Manual mode, the operator/user is responsible for manually toggling the Out/In count direction switch to sync with their winch's direction. If the user does not toggle the Out/In count direction switch, the EWC-6 will continue increasing the count in one direction even if the metering wheel rotation changes direction.

False counts

The count indicator light is useful for troubleshooting false counts. If the count indicator light is flashing, then the EWC-6 is receiving count signals from the metering wheel.

When holding a stationary position, ensure the wheel is stopped with the reed switches between two magnets on the wheel. If the wheel is stopped with a magnet over one or both reed switches, it will result in "false" counts as the metering wheel rocks gently with ship motion and causes the magnet to repeatedly trigger the reed switches even though no actual line movement is occurring.

This false count condition can be caught by making sure that the count indicator light is not flashing when the line is stopped.

NOTE: Large amounts of ship motion may cause false counts regardless of how much care is taken to position the wheel with the reed switches between magnets.

Zeroing the count

The length measurement can be "zeroed" at any point by pressing the "Reset Payout" button. This will set the current length measurement to zero so the counter will count up or down from the zero point. Zeroing is recommended at the beginning of operations to ensure that any counts logged while setting up the system prior to payload deployment are cleared, and operational length measurements are accurate.

Zeroing is also commonly used on ships to zero the count when the payload is at the water surface so that the EWC-6 is effectively only measuring the length of cable deployed below the surface of the water rather than the absolute total amount of cable paid out including the length between the winch and the water.

It is not possible to "un-zero" the count on the EWC-6 and return to displaying the absolute length measurement. Operators must recover cable back to the original starting position prior to zeroing and then press the "Reset Payout" button again if they want to start counting absolute length paid out instead.

Count limits

The EWC-6's processor can only handle displaying values to a maximum of ±4999.9 length units (meters or feet). If counting continues beyond this value, the display will continue counting starting from 0 (essentially displaying counts measured beyond 5000 units). The EWC-6 will still count down normally during recovery if this happens, and will skip from 0 to 4999.9 units when it reaches that cross-over point. It will only go from 0 to negative values once it reaches the count's true zero point.

4. Data logging and recalibration on a computer

The EWC-6 does not have any special proprietary software associated with it. The only computer program required to communicate with the EWC-6 for basic data logging and/or recalibration is a terminal emulator program such as Tera Term.

The EWC-6 must be connected to a computer to recalibrate its scale factor every time it and its associated metering wheel are to be used with a new cable diameter.

If the computer does not automatically install the USB driver, one can be downloaded here for various operating systems: http://www.ftdichip.com/Drivers/VCP.htm It may be necessary to restart the computer for the driver to function properly.

Calculating a new cable scale factor for recalibration

1. Collect and record the following variables for your EWC-6 + sheave system in the units corresponding to the units you want the EWC-6 to display in:

		For display in m and m/s	For display in ft and ft/s
Sheave groove diameter*	D	D = _____ meters	D = _____ feet
Cable diameter	d	D = _____ meters	D = _____ feet
Number of magnets*	N	N = _____	N = _____
Scale Factor Constant	C	C = 0.1 meters / pulse	C = 0.328 feet / pulse

*Standard A.G.O. sheave size data is available at the end of this manual for reference.

2. Calculate the scale factor per the Scale Factor formula:

$$Scale\ Factor = \frac{CN}{\pi(D + d)}$$

Manually determining the scale factor

If the scale factor calculated per the above does not seem to generate reasonably accurate EWC measurements, the scale factor can be empirically determined with manual methods:

1. Connect the EWC to the computer and program it for the desired units with the scale factor set to 1.
2. Carefully manually feed a known-length sample length (5m or 15ft suggested) of the desired cable size through the sheave connected to the EWC to make it rotate and count the length. Ensure the cable does not slip in the sheave groove.
3. Record the EWC's measured "length" – this will not be the correct length, but will be used to calculate the scale factor in the next step.
4. Divide the actual cable length by the EWC's measured "length" – this should be the new scale factor.

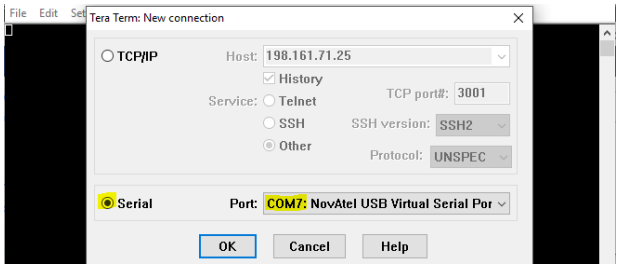
$$Scale\ Factor = \frac{Actual\ cable\ length}{Measured\ "length"\ with\ Scale\ Factor = 1}$$

5. Repeat the length measurement test with the new scale factor to validate it.

Connecting the EWC-6 to the computer

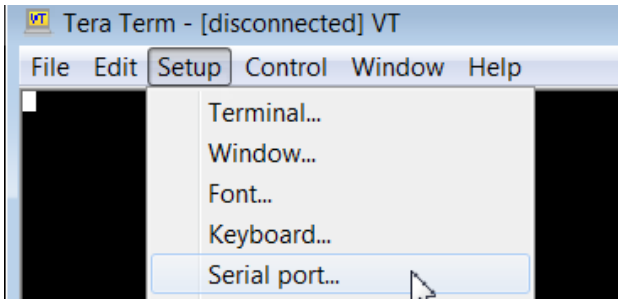
1. Connect the EWC-6 to the computer using its provided USB or serial cable.
   Open your terminal emulator program (e.g. Tera Term).
   Instructions for establishing the connection with the EWC-6 inside the teminal emulator program will be written for Tera Term, but the process should be similar for other terminal emulator programs.

2. When Tera Term opens, select the “Serial” button and select the COM port corresponding to the EWC-6’s data cable from the drop-down menu. Press the OK button.



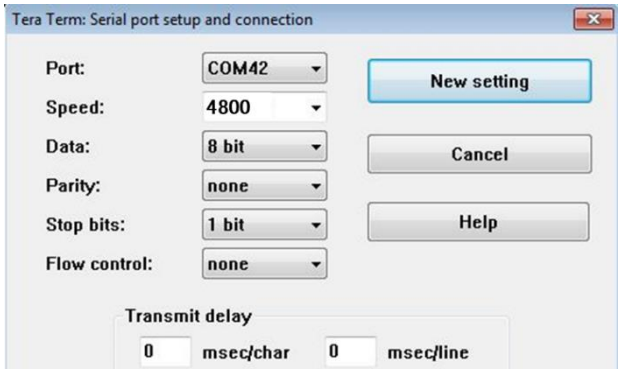
   Now the port connection has been established, but Tera Term likely does not have the right port settings yet, and so it will be displaying the data received from the EWC-6 as strings of nonsense. This is normal and will be fixed in the next steps.

3. At the top of the main black Tera Term window, select the “Setup” menu and click “Serial port”. A “Serial port setup” window will open.



4. Check and set the following settings in the “Serial port setup” window:
   Baud rate/Speed = 4800
   Data = 8 bit
   Parity = none
   Stop = 1 bit
   Flow control = none

   Apply the changes by pressing the “New setting” button.



   The main Tera Term terminal window should now be displaying a continuous feed of cable payout data in a readable format matching the EWC-6’s data sentence format.

Programming the new scale factor

1. In the Tera Term window, type “cmd” to enter programming mode for the EWC-6.
2. Per the prompt, enter the newly calculated scale factor.
3. The next prompt will ask for the scale factor units. Type “m” for metric units or “f” for imperial units.
   If you calculated the scale factor using metric (meter) units, enter “m”.
   If you calculated the scale factor using imperial (feet) units, enter “f”.
4. The program should display “Updated”. You may now disconnect the EWC-6 from the computer and use it with the new scale factor.
5. It is recommended to check/validate the new scale factor by measuring a known length of cable (e.g. 5m) with the sheave prior to operations. This can be done with the EWC-6 still attached to the computer if preferred for quick and easy scale factor adjustments before returning to operations with the newly recalibrated EWC-6.

5. General Care and Maintenance

Avoid dropping the EWC-6 or otherwise impacting its switches if possible.

The EWC-6 is only splashproof if either the plastic caps on its bulkhead connectors or their mating cables are securely twisted on. Regardless, it is not recommended to recklessly expose the EWC-6 to excessive water or submersion.

It is recommended to lubricate the rubber moulded RMG-4 connector on the metering wheel with a grease such as MOLYKOTE DOW CORNING ® DC4 Electrical Insulating Compound to make connections easier. Dry connections may be more difficult than lubricated connections.

6. Troubleshooting

The following is a (non-exhaustive) guide to troubleshooting some basic EWC-6 errors:

Problem	Possible causes	Actions
The EWC-6 is not turning on.	No power source is connected.	Install a 9V battery, or connect the EWC-6 to an external 9-24VDC power source, either by plugging in its USB cable or by connecting its red and black external power wires to a suitable power supply.
	Internal battery is dead (if using the internal 9V battery).	Replace the internal 9V battery or try using an external power source.
	External power source is faulty.	Check external power source or try installing an internal 9V battery.
The backlight can turn on when the power switch is on, but the EWC-6 is unresponsive with a blank display.	The EWC-6 has lost its programming.	Contact A.G.O. EWC-6 will require re-programming that can only be done at A.G.O.
The measured length is noticeably inaccurate.	The EWC-6 has not been calibrated for the current cable diameter.	Recalibrate the EWC-6 with the scale factor for the current cable being used.
The count does not increment even though the wheel is spinning. **AND/OR** The count does not change direction with the metering wheel when the EWC-6 is used in Auto mode.	The EWC-6 is not connected to the metering wheel.	Ensure the EWC-6 is connected to the metering wheel. If it is already connected, ensure all connections are secure.
	A wire in the cable between the EWC-6 and the metering wheel is loose or severed.	Disconnect the cable between the EWC-6 and the metering wheel. Use a continuity meter to check continuity between every pin. Replacement may be required if any pins that should be continuous are actually discontinuous.
	One of the reed switch connections inside the sheave box may be loose or disconnected.	Open the reed switch box on the sheave. Check the connections between the RMG-4 wires and the reed switch wires to ensure they are all tight. Re-do any loose connections.
	One (or both) of the reed switches may have failed.	Use a continuity meter to check continuity between Pin 1 and Pin 2 (reed switch A) and Pin 1 and Pin 3 (reed switch B) on the sheave's RMG-4 cable. They should each be continuous if a magnet is under them, and open circuit when a magnet is not under them. If either switch is always on or always off, replace it with a new switch.
The count direction on Auto mode is opposite of the actual direction (i.e. EWC-6 increments down while paying out).	The metering wheel has been hung backwards relative to the EWC-6's default count orientation.	Re-hang the sheave in the opposite orientation.
The EWC-6 is connected to a computer but is not outputting any data	The EWC-6 is not turned on.	Turn on the EWC-6.
	The EWC-6's communication settings have not been configured.	Follow the instructions for setting up the EWC-6's communication settings on the computer. If attempting to read the EWC-6's data in your payload's specific software, follow the software-maker's instructions for setting it up with the EWC-6.
The EWC-6's data stream when connected to a computer is nonsense.	The transmission parameters have not been configured properly.	Configure the transmission parameters on the computer to match the EWC-6's parameters.

7. Repairs

EWC-6's are delivered with a spare reed switch and spare magnet. Additional spare reed switches (Honeywell MSP-5) are widely available and can be sourced globally off the shelf if needed.

If other parts in the EWC-6 + metering wheel system need repairs or replacing (e.g. the sheave-to-EWC cable), please contact A.G.O. for assistance.

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Replacing reed switches

If the EWC-6 is always counting in one direction while in Auto mode or is not counting at all (including no flashing of the count indicator light), one or both of the reed switches installed on the metering wheel may need replacing.

Use a multimeter set to continuity mode to test for:

- Continuity in the cable between the wheel and the EWC-6
- Continuity between Contact A and Ground (Pins 1 and 2) on the metering wheel's cable
  - Should be continuous when a magnet is under the switch
  - Should be open circuit when a magnet is not under the switch
- Similarly, continuity between Contact B and Ground (Pins 1 and 3) on the metering wheel's cable

The reed switch contacts should be continuous with ground when a magnet is under them, and open circuit when a magnet is not under them. If this is not the case for either switch (i.e. always open circuit or always continuous regardless of magnet positioning), it will need to be replaced.

1. Unscrew the cover on the box on the metering wheel to expose the backs of the reed switches and their connections to the RMG-4 wires (either twist-on wire connectors or Wago lever-nuts).

2. Use a continuity meter to identify which connection corresponds to the faulty switch(es), and trace the wires back to the switch(es).
3. Loosen (but try not to remove!) the screws inside the box that fasten it to the metering wheel. Carefully remove the faulty switch(es), while making sure not to lose the ¼" O-rings that are sandwiched between the metering wheel and the box.
4. Insert the replacement switch(es), ensuring that they go through the ¼" O-rings between the metering wheel and the box. Push them in while rotating the wheel to ensure that they are close to the magnets without hitting them while the wheel rotates.
5. Tighten the screws that fasten the box to the metering wheel. Connect the new switch(es) to the corresponding RMG-4 wires. Seal the lid with a silicone RTV sealant and screw it shut.

8. Standard AGO Sheave Sizes Reference

Brand	Sheave	# of magnets N	Groove root diameter D	Max cable size	Safe Working Load[1]	Maximum Load Limit[1]
Loomis	**PS-06[2]**	4	6” (152.4mm)	0.25” (6.35mm)	375 lbs (170 kg)	1,500 lbs (680 kg)
Sherman & Reilly	**SR10[3]**	7	7.9375” (201.6mm)	1.00” (25.4mm)	1,625 lbs (737 kg)	6,500 lbs (2,948 kg)
	SR12	8	10” (254.0mm)	1.10” (28.1mm)	1,625 lbs (737 kg)	6,500 lbs (2,948 kg)
	SR14[3]	10	12.239” (310.9mm)	1.21” (30.7mm)	1,875 lbs (850 kg)	7,500 lbs (3,401 kg)
	SR16	11	14” (355.6mm)	1.34” (34.0mm)	2,250 lbs (1,020 kg)	9,000 lbs (4,082 kg)
	SR20	13	16.25” (412.8mm)	1.51” (38.4mm)	3,000 lbs (1,361 kg)	12,000 lbs (5,442 kg)
	SR22	15	18.125” (460.4mm)	1.51” (38.4mm)	3,000 lbs (1,361 kg)	12,000 lbs (5,442 kg)
	SR28	19	24” (609.6mm)	1.86” (47.3mm)	3,000 lbs (1,361 kg)	12,000 lbs (5,442 kg)
	SR35	24	30.25 (768.4mm)	2.09” (53.2mm)	3,000 lbs (1,361 kg)	12,000 lbs (5,442 kg)
	SR42	29	36” (914.4mm)	2.09” (53.2mm)	4,250 lbs (1,927 kg)	17,000 lbs (7,710 kg)

1. Load limits refer to the maximum load applied to the sheave as measured at the shackle that supports it. It is the operator’s duty to determine the corresponding tension limit according to their particular site’s geometry and how much the cable is wrapped over the sheave. For a conservative estimate on recommended safe maximum tension for a given sheave, divide the Safe Working Load by 2.

2. The Loomis sheave is a simple plastic trolling block with bushings rather than bearings. It is not recommended for use in high-speed applications like sound velocity profiling as the friction can cause the material supporting the axle to deform.

   The Loomis sheave is not a snatch block and must be almost completely disassembled to load and unload cable. Sherman & Reilly sheaves are snatch blocks – their frames can be opened up on the side to load and unload cable without disassembling the sheave.

3. These sizes are not commonly kept in stock and may have longer leadtimes compared to other more commonly-stocked sizes.