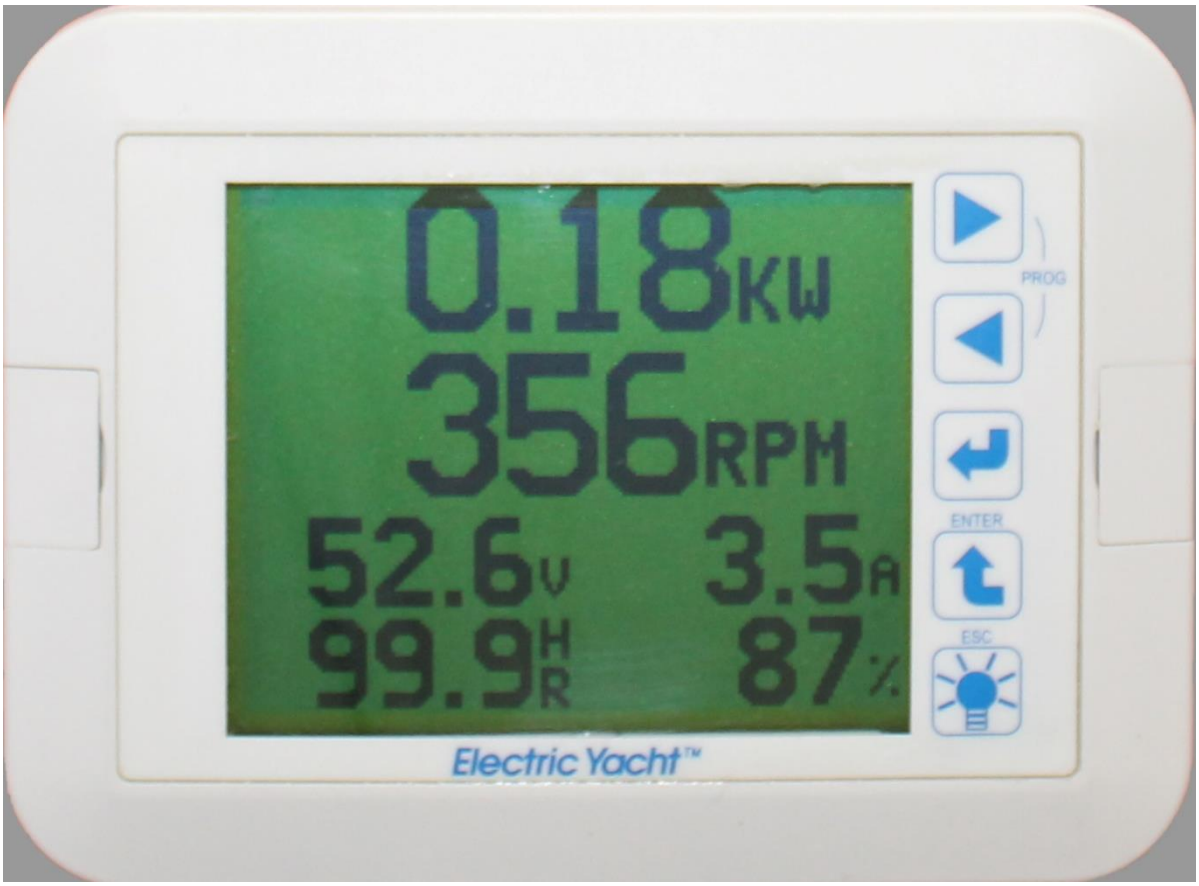
Electric Yacht Battery Monitor
(p/n 01057)

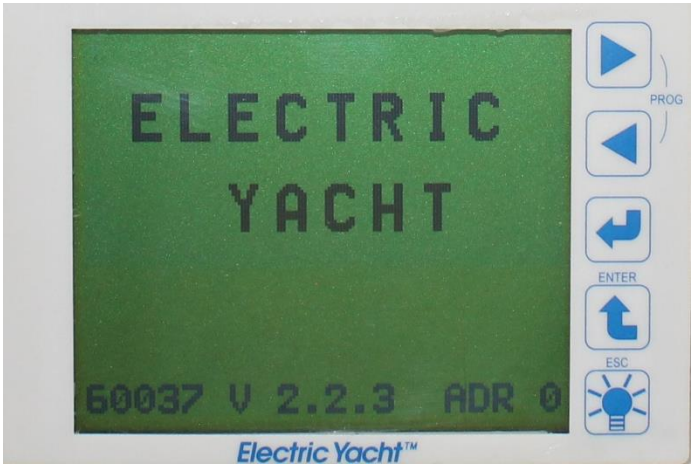


This Electric Yacht battery monitor is designed to provide the helmsman with all needed battery and motor operating information. It is also used for system setup and commissioning. The battery monitor employs a 160 x 128 high contrast monochrome screen designed for high visibility in both daylight and low light operation. A backlight is provided for night operation. It receives power from the motor's Master Control Module by a connection that supplies power and communication. The communication is over the Electric Yacht RS-485 communication bus and/or a CAN bus connection depending on motor model.

NAVIGATION

RIGHT and LEFT keys	Used to change values when in programming mode. They can also be used to adjust the display contrast in normal operating mode.
ENTER key	Used to advance to the next entry in programming mode or to toggle between the main screen and the detail screen(s) when not in programming mode.
ESCAPE key	Used to back out of programming mode without saving any changes.
BACKLIGHT intensity key	Provides six levels of backlight intensity.
Modes	The display has two basic modes of operation. **Operating** mode is entered on power up and is used for normal operation. **Programming** mode is entered by pressing and holding the RIGHT and LEFT arrow keys simultaneously for five seconds. The bottom line of the display will change from displaying **KEY ON** and **XXXX.X HRS** to **BATTERY TYPE** when programming mode is entered.

POWER UP

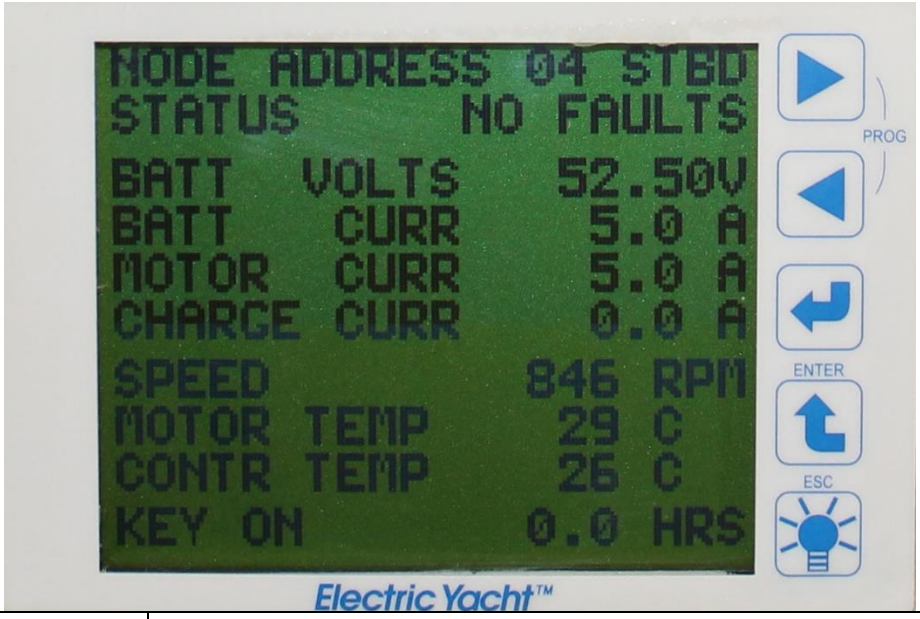
	When power is turned on, the display will power up. It will say ELECTRIC YACHT across the upper part of the screen. The bottom line of the screen will show the firmware p/n and version number that is programmed into its microprocessor. It will also show its node address on the Electric Yacht RS-485 communication bus. Normally, this will show as **ADR 0.** If a second display is connected to the same bus, it needs to be set to **ADR 1**.

OPERATING Mode

After a few seconds the display will exit START UP mode and enter OPERATING mode. There are two screens that can be selected by pressing the ENTER key.	
MAIN screen	Has an auto configuration function. It will display all relevant information available, depending on what is happening with the motor and any active battery charging devices. If, for example, the motor is not rotating, MOTOR SPEED (RPM) will not be displayed. When the motor begins to rotate, the screen will automatically reconfigure to show MOTOR SPEED (RPM).
	When at rest only BATTERY VOLTAGE and STATE OF CHARGE (SOC) need to show in large text. There is also a bottom line of small text providing additional information. If there are no fault conditions, it will show the state of the key switch (KEY ON or KEY OFF) to the left and the TOTAL RUNTIME of the system to the right.
	When the motor is in operation with no charging devices active the screen will reconfigure.
	The top line shows the power consumption in kilowatts (kW). If the motor is regenerating power while sailing a (+) will show to the left of the number.
	Motor speed is shown in RPM.
	Battery voltage is shown in volts (V) and battery current is shown in amperes (A).
	The bottom field will alternate. It will show KEY status and RUNTIME alternating with TIME TO DISCHARGE (TTD) and SOC. A TTD or SOC reading of zero indicate full battery discharge and should be avoided.
When a charging device is operating additional information will be displayed.	The top line now shows net Charge or Discharge to the battery.
	The second line is speed again.
	The third line shows motor power on the left and charge power on the right. Again, a + sign indicates charging.
	The bottom line alternates between Key status/Total Runtime, TTD/SOC and Voltage/Current (amps).

DIAGNOSTIC Screen

Press the ENTER key while in run mode to enter the DIAGNOSTIC screen. This screen displays the data shown to the right.

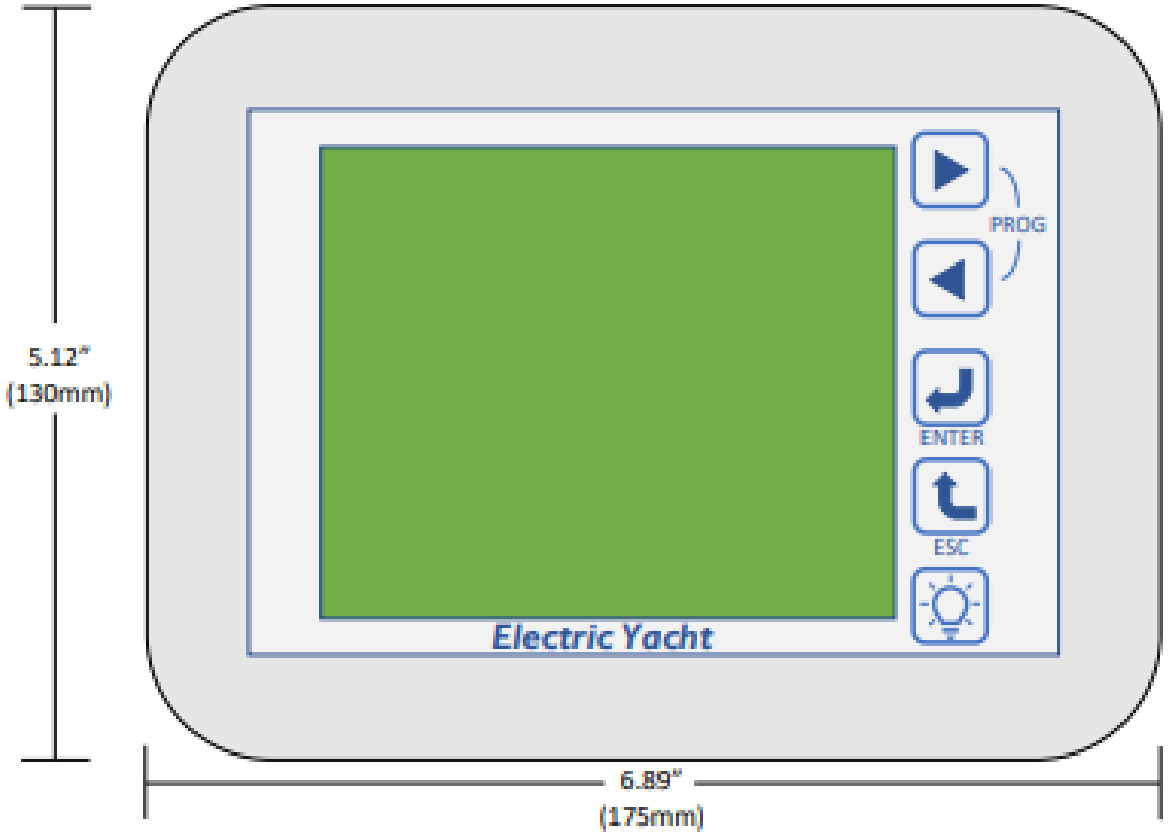


NODE ADDRESS 04 STBD	Every node powered by a battery pack will have a node address. The display is normally address 0. If a second display is added, it will be set to address 1. A single motor will be address 4. In a two motor system, this will be the starboard motor. The port motor will be set to address 6. Normally, this is preconfigured. If changes are necessary, contact the factory.
STATUS	This should show NO FAULTS. If there is a problem with the system, a fault code will be displayed. Table 1 below provides a description of these codes.
BATT VOLTS	This is your battery voltage.
BATT CURR	This is net battery current in amps. If there is no charging current, it is the same as motor current.
MOTOR CURR	This is the current going to the motor in amps. If regenerating under sail, there will be a + sign in front of the number indicating current flow into the battery.
CHARGE CURR	This is current coming from any charging source. It will only display if the system has a current sensor installed on the charging buss. Normally, there is a + sign in front of the number indicating current flow into the battery. If there are loads on this bus, such as a dc-dc converter, there may not be a + sign, indicating current flow out of the battery.
SPEED	Motor speed in RPM. This is at the motor head, not at the output shaft.

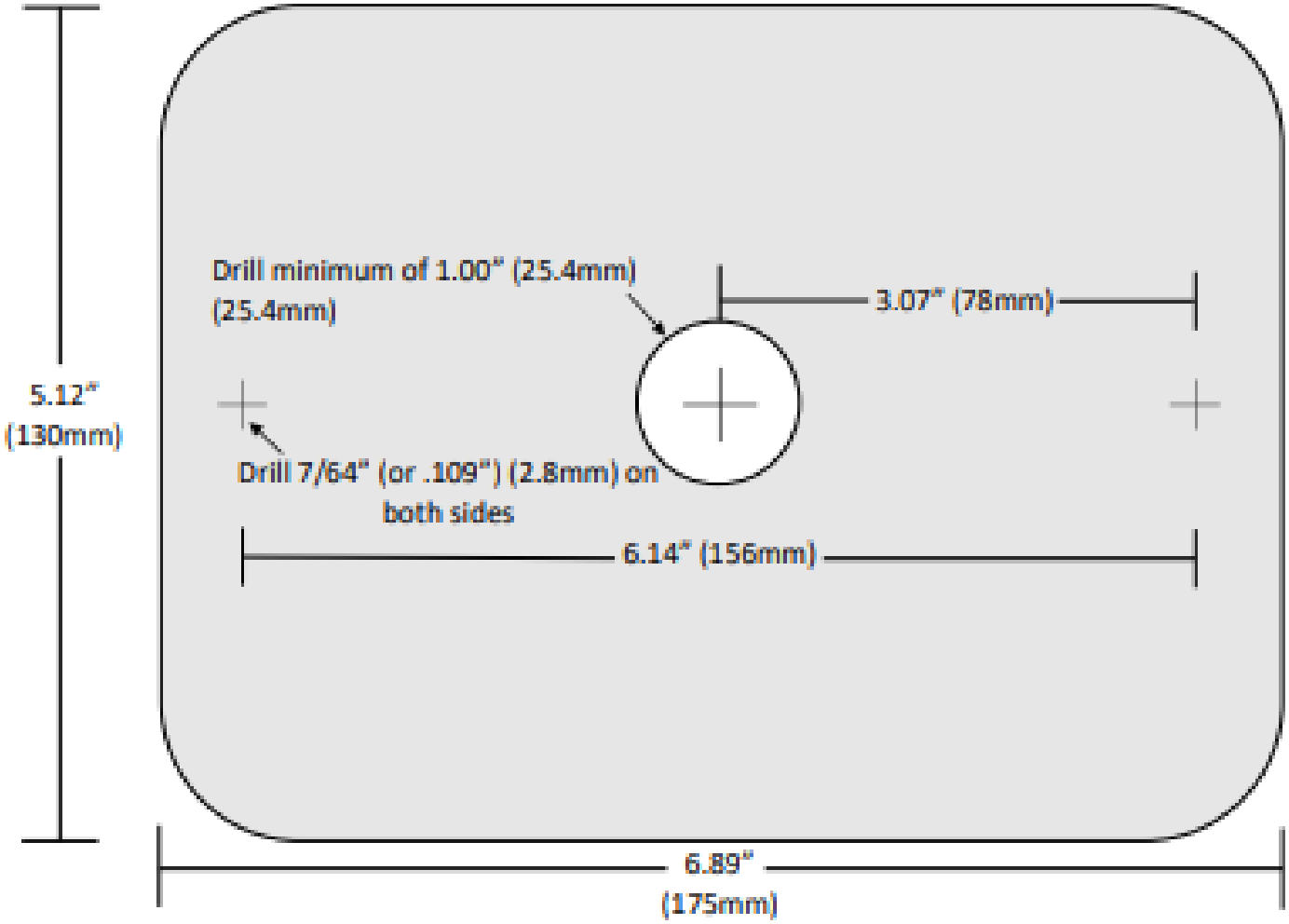
MOTOR TEMP	Internal temperature of the motor windings in degrees C. The motor will start to cut back power above 140C and will self-regulate its internal temperature to stay within safe operating limits.
CONTR TEMP	Temperature of the power section in the Sevcon motor controller in degrees C. It will cut back power above 70C and will self-regulate its internal temperature to stay within safe operating limits.
KEY ON/OFF xxxx.x HRS	This shows the status of the key switch and total operating hours of the system. The hour meter advances any time the output shaft is turning. This includes while regenerating power. It does not advance when the system is on, but not turning.

FAULT CODES

The number after each of these fault codes indicates the error code from the Sevcon motor controller. When one of these faults is active, the small green LED on the Sevcon motor controller will be flashing. It will flash the number of times corresponding to the fault code, then stop for a second before repeating.	
NEUT FLT 2	This normally indicates the throttle control was not in the neutral position when the key was turned to ON. Move the throttle to neutral and the fault code should clear and allow normal operation. If it can't be cleared, there is likely a problem with the throttle control or its wiring that will need further investigation.
SHORT CKT 3	This indicates a short circuit condition in the motor windings or cables from the Sevcon controller (M1, M2 and M3) to the motor. It should be investigated immediately.
RELAY FLT 4	This indicates an issue with the main power relay or power to the main power relay. We use high quality vacuum relays that are very reliable. If this fault occurs, it is most likely an issue with the power wiring or wiring to the relay coil (blue wires).
LOW VOLT 7	This normally indicates a low battery voltage condition. The motor will try to operate at reduced power, but will stop if the voltage falls further. If this is not due to a discharged battery, it may indicate a problem with the battery wiring and will require further investigation.
HIGH TEMP 8	This indicates the motor or motor controller have reached the thermal cut back point. You will notice a reduction in power. The system will self-regulate power output to stay within safe operating limits.
ENC FAULT 11	This indicates an issue with the shaft position encoder within the motor. A signal from this device is necessary for proper operation of the motor. The problem could be with the encoder itself or with the connections. These signals are carried on the cable coming from the fan side of the motor that connects through a black 8-position connector.
If any of these codes occur and cannot be resolved, contact the factory at (INSERT PHONE #) for assistance.	


5.12"
(130mm)
PROG
ENTER
ESC
Electric Yacht
6.89"
(175mm)


6.9" (175.26mm)
1.2" (30.48mm)


Drill minimum of 1.00" (25.4mm)
(25.4mm)
3.07" (78mm)
5.12"
(130mm)
Drill 7/64" (or .109") (2.8mm) on
both sides
6.14" (156mm)
6.89"
(175mm)