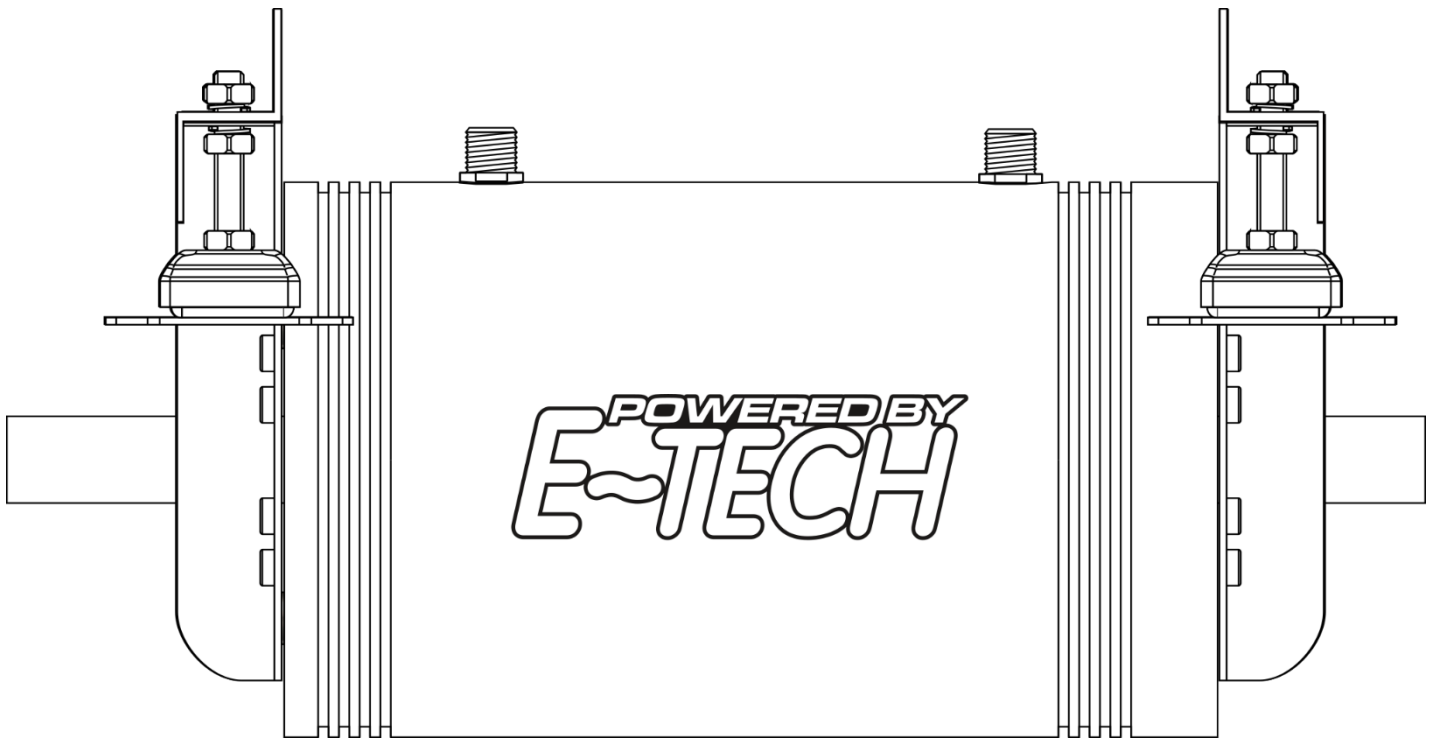


E-TECH WG DRIVE MANUAL



POWERED BY
E~TECH

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I. INTRODUCTION

The E-TECH electric drive for yachts and sport boats is developed to offer the user the maximum comfort and pleasure. Read this manual carefully before the first use. It will give you all the information about the technology and the safe use of your E-TECH drive. Besides that you will learn what you can do yourself. In all other cases consult your dealer or a qualified mechanic, who will provide you with a trouble free use of your electric drive system and you will keep the full warranty. Modifications on the engine, electronic controls, joystick and other drive components, without written consent of the producer, may result in the seizure of the warranty. An electric boat drive is a clean and quiet propulsion system. The energy for the engine is supplied by the batteries which are on board. E-TECH system is optimized, to ensure most effective drives also because of the water cooled installation, the range can be considerably extended by carefully using the energy resources. To achieve the best results keep an eye on the control instruments of the battery monitor.

We wish you a clean and quiet boat trip with the E-TECH electric drive.

Producent: Star Investments

Address: Sochaczewska 12, 05-870 Blonie, Poland

Email: office@etechdrives.com

Website: starboats.eu

1. Technical data

This product complies with EC directives:



2014/30/EU (EMV)

DIN/EC 68-2-6 and DIN/EC 68-2-29 (Vibration)

EN ISO 10133:2017

EN ISO 16315:2016

Engine number:

Please fill in the engine number here:

For reference purposes use this engine number in the future.

2. Warranty

E-Tech warranty guarantee free of charge repairs during the warranty period. E-Tech distinguish two types of warranty:

- Personal use: warranty period 24 months
- Commercial use: warranty period 12 months

If you need to extend standard warranty period please contact E-TECH, before finalizing an order.

2.1. Return policy

Products purchased from E-TECH authorized Marketplace sellers are subjected to the authorized Marketplace sellers' return policy. Therefore, customers may contact the sellers for the return requests.

2.2. Remedies

If a hardware defect is found and a valid claim is received by E-TECH within the Limited Warranty Period, E-TECH will, at its option and to the extent permitted by law, either (1) repair the product at no charge, using new or refurbished replacement parts or, (2) replace the product with a new or refurbished product. In the event of a defect, to the extent permitted by law, these are your sole and exclusive remedies. Shipping and handling charges may apply except where prohibited by applicable law. This Limited Warranty is valid only in the jurisdictions where the products are sold by authorized Marketplace sellers, and is valid to the extent permitted by the applicable laws of such jurisdictions.

2.3. How to obtain warranty service

A Warranty Service Order must be requested from E-TECH within Limited Warranty Period from the date of receipt of shipment. To request a Warranty Service Order, contact E-TECH Service Team. To obtain warranty service, you must deliver the product, in either its original packaging or packaging providing an equal degree of protection, to the address specified by E-TECH. In accordance with applicable law, E-TECH may require the customer to furnish proof of purchase details and/or comply with registration requirements before receiving warranty service. It is your responsibility to backup any data, software, or other materials you may have stored or preserved on the product. It is likely that such data, software, or other materials will be lost or reformatted during service, and E-TECH will not be responsible for any such damage or loss.

2.4. Exclusions and limitations

This Limited Warranty applies only to the product manufactured by or for E-TECH, that can be identified by the E-TECH trademark, trade name, or logo affixed to it, and purchased from E-TECH authorized Marketplace sellers. The Limited Warranty does not apply to any (a) Damage due to acts of nature or God, for example, lightning strikes, tornadoes and the like; (b) Negligence; (c) Modifications to any part of the Product; (d) Damage caused by use with non E-TECH products; (e) Damage caused by accident, abuse, misuse, flood, fire, earthquake or other external causes; (f) Damage caused by operating the Product outside the permitted or intended uses described by E-TECH or with improper voltage or power supply; or (g) Damage caused by service (including upgrades and expansions) performed by anyone who is not a representative of E-TECH. Recovery and reinstallation of software programs and user data are not covered under this Limited Warranty. No E-TECH reseller, agent, or employee is authorized to make any modification, extension, or addition to this Limited Warranty. If any term is held to be illegal or unenforceable, the legality or enforceability of the remaining terms shall not be affected or impaired.

2.5. Implied warranties

Except to the extent prohibited by applicable law, all implied shall be limited in duration to the duration of this limited warranty. Some jurisdictions do not allow limitations on the duration of an implied warranty, so the above limitation may not apply to you.

2.6. Limitation of damages

Except to the extent prohibited by applicable law, E-TECH shall not be liable for any incidental, indirect, special, or consequential damages, including but not limited to loss of profits, revenue or data, resulting from any breach of express or implied warranty or condition, or under any other legal theory, even when E-TECH has been advised of the possibility of such damages. Some jurisdictions do not allow the exclusion

or limitation of special, indirect, incidental or consequential damages, so the above limitation or exclusion may not apply to you.

2.7. Limited product warranty

E-TECH warrants the original purchaser that your E-TECH product shall be free from defects in materials and workmanship under normal use for a period aforementioned. E-TECH does not warrant the operation of the product will be uninterrupted or error-free. E-TECH is not responsible for damage arising from failure to follow instructions relating to the product's usage.

3. Additional information

E-TECH keeps the rights to change any information within this manual without warning. Please visit our website for updated version of this document. Other documents can be found on our website in download section.

3.1. Who can operate the vessel

The boat shall only be operated by captains of 16 years old and older. He or she should have a good knowledge of this user manual and possess enough qualifications to operate the vessel.

3.2. Start and finish

Before sailing away, you must not forget to remove the shore power connection, put the throttle in neutral position, the main switch should be in "ON" position. The monitor shows whether the batteries are fully charged. When you end your trip set the throttle in neutral position, turn the ignition key OFF, switch off the main switch and never forget to connect the shore power cable in order to have full batteries for your next trip.

3.3. Battery monitor (optional)

In the case your boat is equipped with a Victron Energy BMV battery monitor we advise you to read the manual regarding this equipment carefully.

A battery monitor shows the charging status of the battery pack. Furthermore you can check the remaining energy after charging. These are always approximate readings. Make sure not to discharge your battery pack more than 75% (follow the battery producers instruction). In the marina the battery charger shall always be connected and also after each trip the batteries shall be charged.

3.4. Safety

In the rare case of the engine or the installation is overheated by severe stress or failing cooling, the thermic fuse will reduce engine power, or even stop the engine.

When assessing damage or failure on the system immediate stop using it until the problem is solved.

3.5. After the first use

Three weeks or 50 working hours after the first use all cable connections should be checked and if needed tightened.

3.6. What can you do yourself?

If moving the throttle does not give any reaction, make sure the main switch and the ignition key are turned on. If both are in ON position and engine still don't give any reaction, check main fuse and replace it if necessary. Check if all connections are tighten.

In case of the engine underpower performance, check the propeller to make sure it is free from dirt and debris and whether the shaft can turn freely. If debris are removed and shaft is not turning freely please contact E-TECH.

E-TECH drive system is known for its trouble free functioning during the years of use, problems rarely may arise, in this case contact your local E-TECH specialist or the producer immediately.

3.7. What you cannot do yourself?

In the case the main fuse burns out regularly, you should not wait to contact an E-TECH mechanic. When visible damage on the engine, battery charger, electronic control components, or parts of the wiring is found, don't try to fix this damage yourself, but immediately contact your local E-TECH specialist. With other non-common things or alarms you have to call your local E-TECH specialist. Always have the engine number ready.

II. ENGINE SET INSTALLATION

When receiving the package please check for visual package damage. In case of damaged package please contact E-Tech immediately for further instructions.

4. Drive construction and components

All the components listed below should be included in your package. Depending on your order some of the elements might or might not be included in the package, more information below.

NOTE: Double engine set will include the same parts as single engine set with double quantity. Double engine set may be equipped with double throttle or two single throttles depending on your order.

4.1. Single engine set

Single engine set includes:

- E-TECH engine
- Engine controller (device responsible for controlling the engine)
- Single throttle (top or side mounted / double throttle available for double engine set)
- Display
- Ignition with key
- two (2) data cables to connect throttle and display
- one (1) red cable to connect controller with battery (this cable allows display to stay in the standby)
- Battery fuse
- Main switch

4.2. Cooling system (inboard or outboard)

- Two (2) pumps installed with one (1) fluid tank
- Two (2) coolant tubes
- Two (2) coolant outlets installed on the motor
- One (1) cooler with fans (inboard) or stainless steel heat exchanger (outboard)


4.3. Additional

Optional additional equipment:

- Propeller
- Battery pack (AGM or Lithium batteries)¹
- Battery charger
- Trim/lift


¹ Any other types of batteries might not be applicable, please contact E-TECH before supplying batteries locally.

- Shore power fuse
- Charging function switch²

	<p>WARNING !</p> <p><u>Always make sure that the batteries are installed in such a place that the batteries will never be submersed in order to avoid leaks of hazardous fluids and chemicals. Also tighten the batteries in a way that the batteries cannot move unwanted.</u></p>
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5. Installation

All installation schemes are shown in separate INSTALLATION MANUAL file. You can find it on E-TECH website or by contacting us directly.

	<p>WARNING !</p> <p><u>During work on the E-TECH installation you should always disconnect the main power cable from the battery pack.</u></p>
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6. First use

Before first use please make sure that batteries are fully charged and connection is tighten properly. Before first use user need to adjust display readings to have accurate indications on E-Tech display:

- Check the batteries capacity labeled down on every battery (for example 250Ah) do not add capacity of the batteries, total capacity for pack of batteries equals to the singular battery capacity;
- Check the batteries voltage when fully charged using voltmeter, and adjust the voltage on the display. Follow display manual for more information.

6.1. Adjusting voltage readings

To adjust voltage readings you will need voltmeter.

6.2. Adjusting capacity readings

To adjust capacity readings please fully charge your batteries, afterwards please disconnect the charger.

Check the capacity of your batteries. User can find the battery capacity on the battery label or battery specification sheet.

Note: if your batteries are connected in parallel you need to multiply the capacity. If your batteries are connected in series do not multiply the capacity.

² Charging function switch will be included if controller is equipped with charging function.


7. Display functions


All display functions are shown in separate DISPLAY MANUAL. You can find it on E-TECH website or by contacting us directly.

8. Throttle

With the throttle one can determine the speed and direction. At departure you should move the throttle slowly forward to gain speed in forward direction. To go backward you should move the throttle slowly backwards. By moving the throttle more or less (forward or backwards) you can adjust the speed of the boat. In case you have to shift from forward to backward and vice versa (while maneuvering the boat) you always do this slowly to prevent the drive from damage. Always adjust your speed to the circumstances. The actual energy consumption and the rpm is readable on the display.

III. Maintenance

	<p>WARNING !</p> <p><u>Working on the drive shaft and/or the propeller must always be performed with the main switch turned off!</u></p>
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	<p>WARNING !</p> <p><u>The propeller and the shaft should always turn freely;</u> <u>Never lay any objects on the batteries;</u> <u>All the cables should always be in good condition, not damaged and tightly fixed;</u></p>
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8.1. Once a year maintenance

The E-TECH system is practically maintenance free.

The maintenance of the system is limited to the following only once a year:

- Check engine supports and tighten if needed;
- Check cable and tubes connections and tighten if needed;
- Lubricate the battery connections with sour free Vaseline;

8.2. Storage

If the boat is not in use (in the winter) it is the best to leave the charger connected to the shore power. The charger will keep the battery pack in the optimal condition with a drop charge. At the start of the new watersport season you will benefit from fully charged batteries. The AGM or Gel batteries don't require any service other than cleaning the top with a dry cloth.

9. Trouble shooting

Customers may read error codes in PC software or Android Devices. To be able to program the controller read the following instructions carefully. A Bluetooth connection is needed to download the programmers App.

For Android follow the link:

<https://kellycontroller.com/wp-content/uploads/kls/ACAduserEnglish-KLS.zip>

For PC follow the link:

<https://kellycontroller.com/wp-content/uploads/kls/Kelly-KLS-Configuration-Program.zip>

Using Kelly firmware you can read error codes. List of error codes and its meaning listed below:

1.3	● ●●	Low voltage error	1. The controller will clear after 5 seconds if battery volts return to normal.
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			2. Check battery volts & recharge if required.
1.4	● ●●●●	Reserved	
2.1	●● ●	Motor did not start	Motor did not reach 25 electrical RPM within 2 seconds of start-up. Hall sensor or phase wiring problem.
2.2	●● ●●	Internal volts fault	<ol style="list-style-type: none"> 1. Measure that B+ & PWR are correct when measured to B+ or RTN. 2. There may be excessive load on the +5V supply caused by too low value of Regen or throttle potentiometers or incorrect wiring. 3. Controller is damaged. Contact your dealer.
2.3	●● ●●●	Over temperature	The controller temperature has exceeded 100°C. The controller will be stopped but will restart when temperature falls below 80°C.
2.4	●● ●●●●	Throttle error at power-up	Throttle signal is higher than the preset "dead zone" at Power On. Fault clears when throttle is released.
3.1	●●● ●	Reserved	
3.2	●●● ●●	Internal reset	May be caused by some transient fault condition like a temporary over-current, momentarily high or low battery voltage. This can happen during normal operation.
3.3	●●● ●●●	Hall throttle is open or short-circuit	When the throttle is repaired, a restart will clear the fault.
3.4	●●● ●●●●	Angle sensor error	<ol style="list-style-type: none"> 1. Speed sensor type error. Customers may set the correct sensor type through user program or App. Please download how to use Identification function instruction from the website (www.kellycontroller.com) 2. Incorrect wiring. 3. Speed sensor is damaged or defective. Or feedback signal is erratic.
4.1	●●●● ●	Reserved	
4.2	●●●● ●●	Reserved	
4.3	●●●● ●●●	Motor over-temperature	Motor temperature has exceeded the configured maximum. The controller will shut down until the motor temperature cools down.
4.4	●●●● ●●●●	Hall Galvanometer sensor error	<ol style="list-style-type: none"> 1. Hall galvanometer device is damaged inside the controller. This error code is only valid for KLS-80801 controller.

IV. CHARGING FUNCTION

Charging function allow vessel operator to recharge batteries while sailing or using other propulsion on the boat (hybrid system). NOTE: E-Tech drives cannot be operated as generators and propulsion at the same time.

To start charging batteries using E-TECH drives as generators, please follow this steps:

- move throttle to neutral position,
- turn ignition key to ON position,
- turn ON charging switch (indicator light will appear when ON)³,
- when indicator light will appear and charging switch is in ON position move throttle forward slightly to start charging. When charging started please move throttle back to neutral position. (NOTE: throttle position is not related to charging power! Throttle needs to be slightly forward to start charging only, pushing throttle to maximum position will not increase charging performance. Maximum forward throttle position might be dangerous for operator. If charging switch will be turned OFF unintentionally motor will start working as a propulsion).
- good job! Your batteries are charging⁴.

!DO NOT TURN OFF CHARGING FUNCTION WHEN THROTTLE IS NOT IN NEUTRAL POSITION!

To stop charging batteries using E-TECH drives generator function, please follow this steps:

To stop charging temporarily:

- to stop charging temporarily you can move throttle slightly backward and move it back to neutral position. Motor will stop charging the batteries. To start charging again please move throttle forward slightly to start charging. When charging started please move throttle back to neutral position.

To stop charging:

- check if throttle is in neutral position, if not please change it to neutral,
- turn charging switch into OFF position,
- good job! Your E-TECH drives is ready to work as propulsion system.

Charging function should be turned OFF when batteries are fully charged, otherwise E-Tech controller will turn OFF itself showing OVERVOLTAGE error.

If propeller makes too much drag while charging function is ON please adjust “BRK_SW Brk Per%” using Kelly app for more information contact E-Tech or check Controller manual.

DO NOT MAKE ANY CHANGES IN CONTROLLER PROGRAM WHILE THROTTLE IN NOT IN NEUTRAL POSITION AND/OR WHEN MOTOR SHAFT IS TURNING (ALSO WHILE SAILING OR USING DIFFERENT PROPULSION SYSTEM)

³ Charging switch is ON or OFF position, switch will stay in desired position until switching it ON or OFF again.

⁴ Charging performance is only related to propeller RPM (not throttle position).