User Manual - Full Version

for Electronic Speed Controller *NITRIDE 1/10 G2*

Dated: 27.1.2026

The latest version of manual you will find here

http://www.elceram-rc.cz/download/

Datum of Revision	Description
27.1.2026	Typo correction on page 22 and 30

MANUAL CONTENTS

1. Introduction

Thank you for purchasing NITRIDE 1/10 G2 and for your trust in ELCERAM product. By this decision, you have chosen a new generation electronic speed controller (ESC) for sensored brushless motors developed especially for 1/10 RC cars, endowed with many unique features and functions.

Using the advanced technologies, NITRIDE 1/10 G2 is a high-performance device requiring a professional approach. Improper usage and unauthorized modification to our product is extremely dangerous and may damage the product and related devices. We, ELCERAM, are not responsible for any damages occurred by unprofessional or unsuitable way of using our product.

Please, take your time and read the following instructions carefully before you start using your ESC!

We reserve rights to modify our product design, appearance, features and usage requirements without notification.

2. Warning and Safety

- Please read all instructions carefully before using the product!
- To avoid short circuits, ensure that all wires and connections are well insulated before connecting the ESC to related devices. Ensure all devices are well connected to prevent poor connections and avoid damage to your electronic devices.
- Read through the manuals of all power devices and chassis and ensure the power configuration is rational before using this unit.
- Please use a soldering iron with the power of at least 60 W to solder all input/output wires and connectors.
- The device has to be disconnected from battery if not used!
- It is the high-power electronic device, please double check the polarity of battery interconnection! Incorrect connection to the battery cause damage of the external capacitor. We are not responsible for a product damage caused by the incorrect battery connection.

- It is professional top level racing product and it is extremely important to double check the setting before use!
- This product is not a toy and it is not intended for children. Users under 18 years should use this product only with the direct supervision of a responsible and knowledgeable adult. Keep this product away from the reach of small children.
- Do not touch the device Immediately after using, it can generate high temperatures. If the temperature of ESC is higher than 70 °C, the buttons can be hot. Please, wait until it cools down to 50 °C before you switch it off by button, or disconnect the ESC from the battery for switch off.
- Stop the usage immediately once the temperature of the ESC exceeds 130 °C, as this may cause damage to both the ESC and motor. We recommend setting the "ESC Thermal Protection" to 130 °C (this refers to the internal temperature of the ESC).
- Never leave the device unsupervised while it is switched on, in use or connected with a power source. If a defect occurs, it could cause a damage or fire of the product or the surroundings.
- Never wrap your product in plastic film, metal foil or similar, if it is switched on.
- Never allow this product to come in contact with water, oil, fuels or other electroconductive liquids.
- Never place this product near the source of fire or very high temperatures.
- Never disconnect ESC from the battery while the motor is turning (while pressing the throttle).

3. Key Features and Specifications

- Developed especially for 1/10th professional RC cars.
- For sensored BLDC motors from 4,5 T up.
- TFT LCD color display with resolution 160 x 80 pixels, matt surface.
- Size: 36,5 (L) x 34 (W) x 24 (H) mm.
- Weight: 59 g without wires
- Ultra low centre of gravity.
- Power supply: 2S LiPo.
- ESC current cont. / pulsed: 180 A / 1500 A.
- BEC: 6 - 7,4 V adjustable, BEC current Cont. / Peak: 6A/12A
- Intelligent fan connector for easy cooling setup
- Reverse polarity protection.
- Intelligent algorithms for ESC protection.
- Enhanced water and dust resistance.
- Extreme low internal resistance based on silver conductive layer.
- Advanced Cooling Technology based on Aluminium Nitride Ceramic Cooler.
- Revolutionary battery current and discharge real-time monitoring
- Continuous BEC voltage monitoring.
- Continuous motor speed monitoring.
- RPM limiter supported.
- Revolutionary easy Rx calibration.
- Realtime monitoring: battery voltage, ESC and motor temperatures, motor diagnostics and more.
- Self-diagnostic before the race: motor temperature, sensor cable, bad motor, battery, BEC voltage and more.
- Post-race data evaluation.
- Easy programming: throttle, brake, boost and turbo timing, hall angle, BEC and many other functions.
- Race data logging, temperature and other curves, histograms and more.
- Adjustable maintenance reminder for easy check.
- No programming interface needed.
- Designed and produced in Czech Republic.
- Thoroughly tested under race conditions.
- Zero Timing (Blinky Mode) supported.

4. Installation

Installation of NITRIDE 1/10 G2 is quick and easy - you can stick it to the chassis of your car using Aluminium mounting plate (ELC022) included in the package and double-sided tape. Recommended tape type is 3M GPH-110.

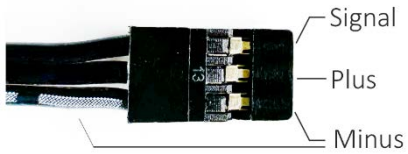
You can also screw NITRIDE directly onto a suitable place on your chassis, ideally with good thermal conductivity.

For highly demanding conditions where better cooling effect is desired, especially for motors 4.5 T and 5.0 T, we recommend to use passive heatsink or external FAN. The new Aluminium mounting plate included in the package and also available as option part ELC022 is already equiped with FAN holder for quick and easy FAN installation, for example ELCERAM FAN 2510, available as option part ELC025.

5. Connections

Please, maintain the following rules while soldering all the wires and connections:

Avoid short circuits between any tabs!



Grey stripe is battery minus!

External capacitors

External capacitors are highly recommended to use together with NITRIDE 1/10. External capacitors are included in the package. It can be also ordered as a spare part nr. ELC005 or you can use any other external capacitors with following parameters: Aluminium electrolytic, low ESR, double 560 uF / 20 V.

Soldering tips

Please use a soldering iron with the power of at least 60 W to solder all input / output wires and connectors.

Reverse polarity protection

ESC is protected against reversing + and – wires when connecting battery and will also protect your receiver, servo and everything else connected to BEC. It will NOT protect anything connected directly to battery wires. It will NOT protect external capacitors.

! WARNING !: external capacitors will be usually destroyed by reversing polarity, suffering internal damage and/or their protection diode burned itself to protect you against cap explosion. Always replace the caps after reversing polarity. Failed capacitors may overheat and short the battery causing fire and will destroy your ESC in short to medium term when running at power even if quick tests shows ESC powering up and motor working correctly.

Fan connector

2-pin JST connector designed for an easy setup of external cooling. Power to fan is taken from BEC - you can customize BEC voltage in the UI, please use correct fan for voltage that you are using. ELCERAM fan is recommended (item ELC025). Fan will run briefly at ESC power up and then depending on temperature chosen on FAN screen.

6. Main Screen Description and Basic Control of ESC

Basic Description of ESC Using

The using of ESC is very simple and there is no other programming interface needed.

Turning on

After short pressing of ON/OFF/ENTER button, the ESC will be switched on.

Turning off

If you press ON/OFF/ENTER for about 3 seconds the ESC will be switched off. The ESC can be switched off also by disconnecting from the battery (always allow motor to fully stop before disconnecting battery).

7. Programming and Screens schema

GUI uses following design patterns:

White is static text.
Blue numbers are values updated in real time.
Pink are settings that you can change.

Exception to that is main screen which is optimized for maximum readability during quick checks before race. Temperature and voltage numbers there use "semaphore" color scheme: low temperatures and full voltage are green to indicate ready for race status and they go up to red when hot and discharged.

Buttons are multifunctional. There is the help text on the display just above every button showing what will happen if you press the button. The text above the ENTER button is underlined sometimes. That means you have two possibilities depending on how long you press the button. For example: reset/next. Short press = reset, Long press = next.

Changing values: value being edited flashes, you can increase/decrease it by left and right button. These buttons can also have special meaning in rare cases - follow description above button. Values are applied immediately and saved to ESC's internal flash memory after last item on the screen has been entered.

Features are accessible for setting in real-time, even when the motor is running. You have to be careful and have on your mind that it can cause destruction of some components if used without proper caution.

There are 3 Menu loops available - picture below:

1) Race data loop - LCD backlight Black

In this menu loop you can monitor race data and events before race. There is no ESC setup here. You can move through the Race data loop using left or right buttons. For any action on the screen press ENTER button - see the help above the button. The most of race information will be reset after the ESC is switched off. Exceptions are maintenance and data on ESC history screen.

Graphs, histograms, data log and events screens are automatically saved at the end of each race. Saved data will remain in the ESC during power off state and will be displayed when turned on until the start of the next race.

2) Setting 1 loop - LCD backlight Blue

For entry to this Setting hold right and left button simultaneously for about 2 s. For return, hold both buttons again.

You can set all the most important parameters of your ESC for the race in this loop.

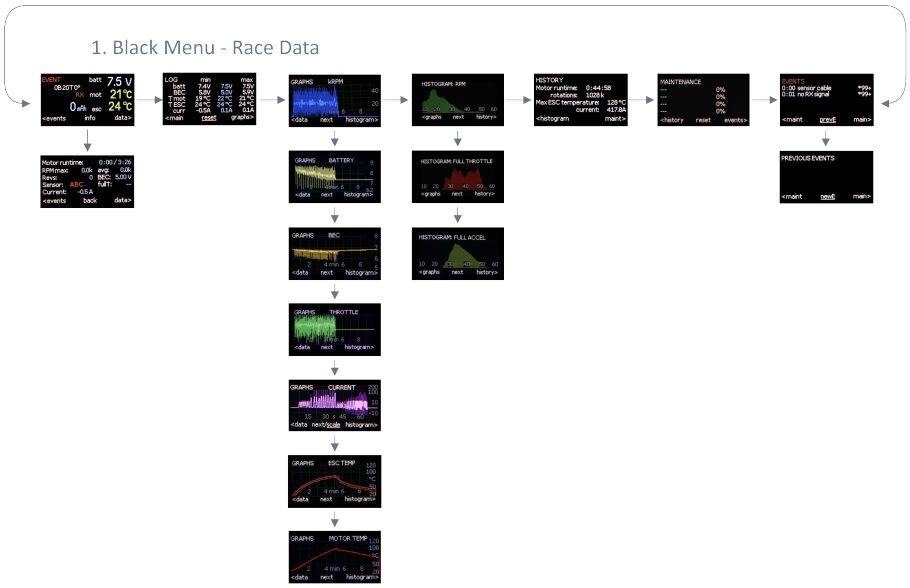
! Warning ! It is professional product for top racing and features are accessible for setting in real-time. During setting of parameters, you have to be careful and have on your mind that it can cause destruction of some components.

3) Setting 2 loop - LCD backlight Yellow

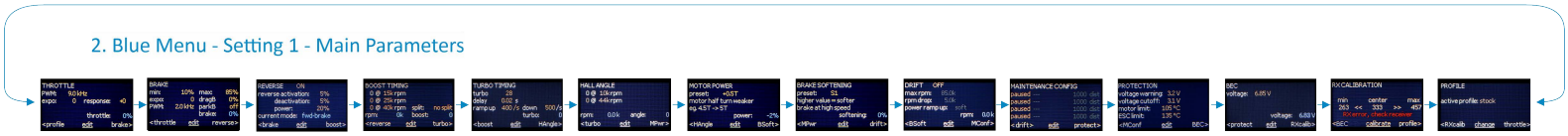
For entry to this Setting hold right and left button simultaneously about 4 s. For return, hold both buttons again.

You will probably use this loop less frequently than Setting 1. Here you can set basic parameters shared across all profiles.

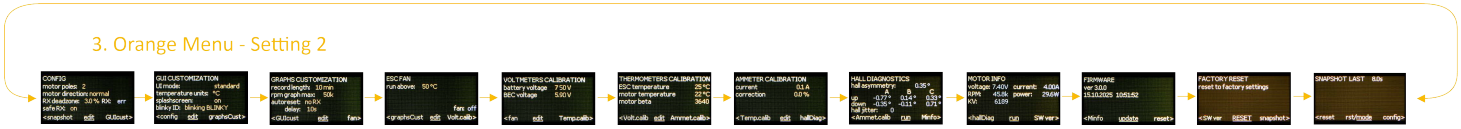
Screens schema:

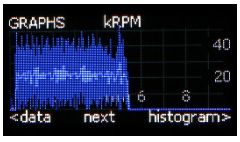
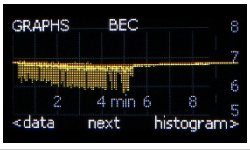


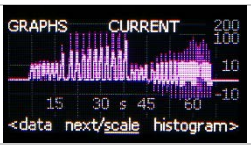
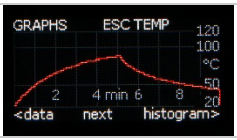
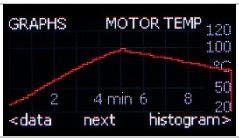
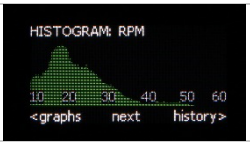
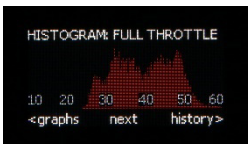
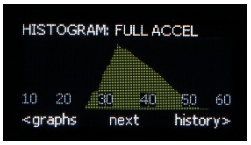
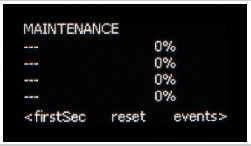
Push Settings buttons for **2** sec.



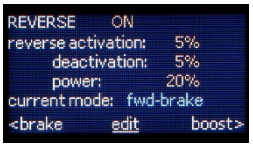
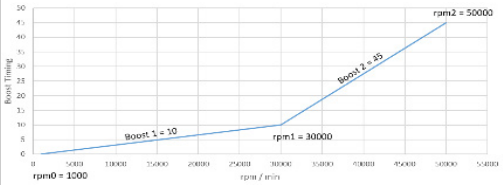
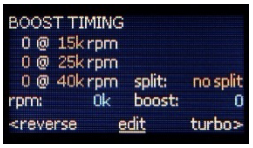
Push Settings buttons for **4** sec.

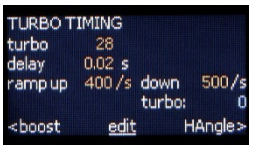


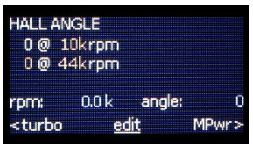
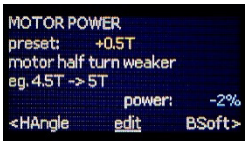
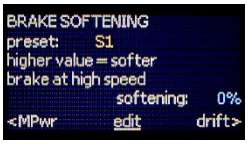
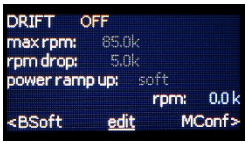
RACE DATA	Item	Comments
MAIN SCREEN		
	EVENT flag	Shows up when there was at least one event generated. Flag is yellow for warning events, red if there is at least one error event. You can see the events on separate screen to the left, see description below.
	batt	Battery voltage shown in “semaphore” colors: green is fully charged, ready for race, blue is standard color, yellow and then red when discharged to the selected battery protection limit. Voltage limit can be set in blue PROTECTION screen. Number will be flashing for a moment after each battery overload.
	Timing setting	Shown in format: boost setting (with B), turbo setting (T) and virtual hall angle (°). Set timings in blue configuration screens. Special green string will be shown for stock racing with zero boost, you can customize it in GUI CUSTOMIZATION yellow screen.
	SENS flag (blinking)	Motor sensor cable problem detected. Check connector, wire insulation etc. You can use sensor readout on Main screen/info for easier diagnostics.
	RX flag (blinking)	No RX signal detected. Most likely you do not have your transmitter turned on. For more troubleshooting tips check later chapters of this manual. There is a numerical Rx value in this place if radio link is established.
	mot	Motor temperature. Color scheme is “semaphore” – green = cold, ready for race; blue = standard readout, yellow and red= heated up to the selected limit. Motors without temperature sensor will show “LOW”.
	esc	ESC temperature. Color scheme is “semaphore” – green = cold, ready for race; blue = standard readout, yellow and red= heated up to the selected limit. Temperature limits are set in blue PROTECTION screen.
	Current/Battery discharge	Big number in lower left corner. Shows current draw when the motor is running, switches to discharged capacity every time motor stops.
MAIN CREEN / INFO		
	Motor runtime	First number: how long was motor running during this session, second number: length of this session. Session starts at power up and ends when you turn the ESC off.
	RPM max	Highest rpm reached during this session
	avg	Average rpm in this session. Computed only from the time when motor was turning (first number on top line)
	Revs	Motor revolutions in this session.
	BEC	BEC voltmeter. You can set required voltage in BEC blue settings screen.
	Sensor	Input from motor sensor cable. Normally in blue, one or two letters shown. Shown in red if an invalid state is detected. Turn the motor one full revolution to check all signals from motor.
	Current	Current flowing through ESC – sum of motor current, everything connected to BEC cable and internal ESC draw.
LOG	Screen shows minimum, current and maximum values recorded during this session in white or saved values from previous session in gray.	
	batt	Battery voltage
	BEC	BEC voltage
	T mot	Motor temperature
	T ESC	ESC temperature
	curr	Current draw
GRAPHS kRPM		
	Shows motor rpm history during this session or saved from previous session (marked “PREVIOUS” in title line). Horizontal axis is in minutes, vertical in thousands of rpm. You can customize axes in yellow “GRAPHS CUSTOMIZATION” screen. Darker blue shows extremes, averages are brighter.	
GRAPHS BATTERY		
	Shows battery voltage history. Horizontal axis is in minutes, vertical in volts. Vertical scale is set by 2S/4S switch in yellow CONFIG screen. Darker yellow shows extremes, averages are brighter. You can customize horizontal axis scale in yellow “GRAPHS CUSTOMIZATION” screen.	
GRAPHS BEC		
	Shows BEC voltage history. Horizontal axis is in minutes, vertical in volts. Darker yellow shows extremes, averages are brighter. You can customize horizontal axis scale in yellow “GRAPHS CUSTOMIZATION” screen.	

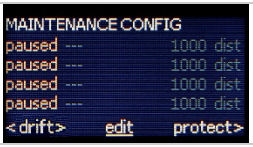
GRAPHS THROTTLE	
	Throttle position history.Horizontal axis in minutes, vertical from full brake to full throttle. Darker green shows extremes, averages are brighter. You can customize horizontal axis scale in yellow “GRAPHS CUSTOMIZATION” screen.
GRAPHS CURRENT	
	Current draw history. Current can be negative when braking and in some special cases when motor slows down – energy is recuperated back to battery. Scale is nonlinear to show small values in detail while preserving peaks. You can switch vertical scale by long middle button press and customize horizontal axis scale in yellow “GRAPHS CUSTOMIZATION” screen.
GRAPHS ESC TEMP	
	ESC temperature history. Red line is core temperature, measured in ceramic cooler, pink line shows temperature of internal capacitors. Horizontal axis in minutes, vertical is temperature. You can customize temperature units in GUI CUSTOMIZATION yellow screen and horizontal axis scale in yellow “GRAPHS CUSTOMIZATION” screen.
GRAPHS MOTOR TEMP	
	Motor temperature history. Horizontal axis in minutes, vertical is temperature. You can customize temperature units in GUI CUSTOMIZATION yellow screen and horizontal axis scale in yellow “GRAPHS CUSTOMIZATION” screen.
HISTOGRAM RPM	
	Histogram of motor rpm during this session or saved from previous session. In this case motor have spent most time just below 20k rpm and only very small time above 40k. Use this histogram to optimize your car and/or driving habits: most of time on this track is spent in rather slow speed and you should focus on car control these regimes.
HISTOGRAM FULL THROTTLE	
	Histogram of motor rpm when on full throttle. Similar to rpm histogram but time at brake or partial throttle is not shown here. Use this histogram to optimize your motor power and/or driving habits: your car has spent most of time at low speed but you do not need more power there because you only need press the throttle more. But you are using full power above 30k and getting more power there through ESC settings or different motor or gearing etc. would be beneficial. For more power at slower speeds, you may consider using throttle expo.
HISTOGRAM FULL ACCEL	
	Similar to full throttle histogram but this one is biased towards time when you *begin* to use full power. Rationale behind this is simple – you have to optimize power at the beginning of straights, because any velocity advantage you gain here helps you to be faster during whole time until braking. In our example, car has spent most time below 20k (green histogram), went on straights between 30 and 50k (red histogram), but most important accelerations and most power needs are just above 30k rpm (this histogram). Use this histogram to optimize your motor power and/or driving habits: explore the envelope, find most important power needs and optimize drivetrain accordingly.
HISTORY	
	These are values collected during whole ESC’s lifetime. They cannot be reset. Please note: these are not zero when you buy new ESC – values come from output stress tests in the factory.
MAINTENANCE	
	List of tracked maintenance items together with their current life cycle percent. See MAINTENANCE CONFIG blue screen for instruction how to set it up. Press middle button and choose an item to reset it to zero.

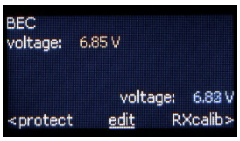
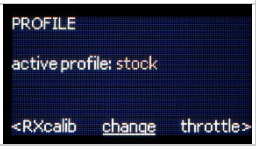
EVENTS	
	List of events generated in this session. Time of first occurrence is on the left, event count is on the right. See later chapter of this manual for more info on event system. Hold middle button to see previous events
PREVIOUS EVENTS	
	List of events saved at the end of previous session. See chapter 13 below for more info on event system.

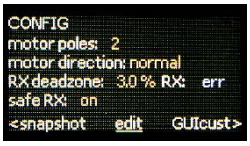
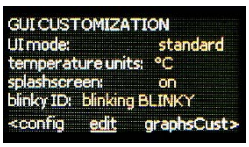
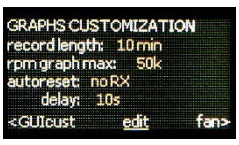
SETTING 1	Parameter Name	Default value	Typical value	Min. value	Max. value	Comments
THROTTLE						
	PWM	8 kHz	8 kHz	1 kHz	45 kHz	Lower PWM frequency = more current through motor and more aggressive throttle response
	expo	0	0	-64	+64	Zero = linear / line Positive expo = logarithmical curve = more mid throttle power Negative expo = exponential curve = less mid throttle power
	response	0	0	-15	+10	Changes sensitivity of your throttle. Bigger value means quicker response of the throttle Use positive value if you want sharp reactions and you have quality transmitter/receiver combo. Use negative value if you want calmer, less nervous behavior.
BRAKE						
	min	10 %	10 %	0 %	50%	Initial brake force – at the point where you move the throttle from neutral position to the brake. If Drag brake is activated, min brake = drag brake
	max	100 %	95 %	1 %	200 %	Maximum brake force
	expo	0	0	-125	125	Zero = linear / line Positive expo = more mid brake Negative expo = less mid brake
	dragB	0%	10 %	0 %	100 %	Drag brake: amount of brake when the throttle is in neutral position
	PWM	2 kHz	2 kHz	1 kHz	45 kHz	Brake PWM frequency. Lower value = more current through motor during braking = more aggressive brake
	parkB	off	off	off	on	Park brake: brakes will be fully engaged when the car is stationary
REVERSE						
	activation	5 %	5 %	1 %	50 %	Percentual position of brake for activation of reverse. You have to go across this threshold twice to activate reversing.
	deactivation	5 %	5 %	0 %	50 %	Percentual position of throttle for deactivation of reverse. ESC will switch back to braking mode once you add more power than deactivation threshold.
	power	20 %	20 %	1 %	100 %	Power limit when reversing. More power = more speed during reverse, less power = better control
BOOST TIMING						
	rpm 0	15000	5000	1000	48000	Boost timing will add power to the motor at the price of increased power draw, higher temperatures and lower efficiency. It is always zero in low rpm and then can go up according to these coefficients. Use zero boosts for stock racing. 
	rpm 1	25000	20000	2000	49000	
	rpm 2	50000	50000	3000	50000	
	boost1	0	0	0	63	
	boost2	0	0	0	63	
	split	No split	No split	30	90	Split will change behavior of the ESC: it will use motor without boost at low throttle and adds boost only when more throttle is used. ESC will increase power from zero to full as you go from zero throttle to 'split' value and then starts adding boost as you continue to press throttle towards 100%. Use this if you need to squeeze last bit of motor efficiency in slower sections of track– motor running without boost at full throttle runs cooler than boosted motor at same output power but partial throttle. Recommended starting value: 100 minus your boost timing setting. Too high or low settings will cause 'knee' in throttle response (similar to expo), which may or may not be desirable depending on user preferences.

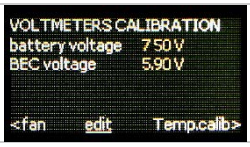
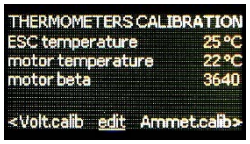
TURBO TIMING	Turbo timing has same effect as boost timing but is activated at full throttle.					
	turbo	25	40	0	50	Turbo timing amount. More value = more top speed and battery strain. Use zero for stock racing.
	delay	0.05 s	0.03 s	0.00 s	1.00 s	Required time at full throttle until turbo activates
	ramp up	250 / s	300 / s	10 / s	1000 / s	Higher value = faster turbo increase. When Rx reaches full throttle, system will wait *delay* time and then the timing will increase at *ramp up* rate until *turbo* value is reached.
	ramp down	350 / s	300 / s	10 / s	1000 / s	More Ramp down = faster turbo decrease

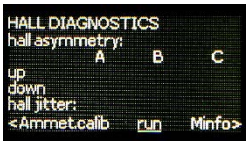
HALL ANGLE	Similar function like mechanical timing by motor but in specific rpm range using software. It brings more power efficiency for your system.					
	rpm 0	10000	30000	5000	49000	Start of Hall Angle increase
	rpm 1	44000	45000	6000	50000	End of Hall Angle increase
	hall angle	0	0	0	20	This value of mechanical timing (motor end bell setting) = Hall angle will be progressively reached between rpm0 and rmp1. The hall angle value will be kept above rpm1 at constant level. Use zero for stock racing.
MOTOR POWER	This variant is shown only if *UI mode* is set to *standard*. You will get variant shown below if you set *UI mode* to *expert*.					
	preset	off	off	+4T	off	ESC will make motor behave like a weaker motor. You can use this if your motor is too strong for a track and/or conditions and you do not have or want to exchange motor for weaker.
MOTOR POWER	This variant is shown only if *UI mode* is set to *expert*. You will get variant shown above if you set *UI mode* to standard.					
	<all numbers>	Filled from last preset set in *standard UI mode*.	zeros	-99	0	Values for specific motor rpm. Function is same as standard variant, but allows you to customize much deeper. Use this if you for example want to tune differently for slow and fast sections of track. The lower the value (more negative) the less power you get.
BRAKE SOFTENING	This variant is shown only if *UI mode* is set to *standard*. You will get variant shown below if you set *UI mode* to *expert*.					
	preset	off	off	S1	S5	Softens the brake at high speed. Use higher preset if you need more controllable brake due to track conditions.
BRAKE SOFTENING	This variant is shown only if *UI mode* is set to *expert*. You will get variant shown above if you set *UI mode* to standard.					
	<all numbers>	Filled from last preset set in *standard UI mode*.	zeros	-99	0	Values for specific motor rpm. Function is same as standard variant, but allows you to customize brake at specific rpm.
DRIFT						
	max rpm	off	45000	10000	60000	Max. rpm value limits motor rpm. You can use this for example to protect drivetrain from excessive rpm in air on jumps.
	Rpm drop	5	5	0	10	Rpm will have to drop this amount before motor power will be reengaged. If you set rpm drop for example 5k and max. rpm 50k, the rpm will be fluctuating between 45k - 50k.
	Power ramp up	balanced	Instant (drift cars) balanced (rest)	softest	instant	Sets a way how a motor is disengaged or engaged. Softer values protect your drivetrain. Use sharp values only if you need it and your drivetrain can withstand it.

MAINTENANCE CONFIG	Using this function, you can keep track of the wear of components of your car. Each line contains four values:	
	status	Paused = maintenance item disabled On = maintenance item set up and running Silent = up and running but maintenance events will not be generated
	item name	name of item to track
	number	Selected motor runtime in minutes or motor revolutions in distance units (depending on next option)

	dist/min	Switches between minutes or runtime or distance covered. 1 distance unit = 100.000 rotations of motor. That is distance usually covered in approx. one 5 min race (depending on track and gear ratio).				
PROTECTION						
	voltage warning	3.6 V	3.4 V	3.1 V	4.1 V	ESC begins to limit power when battery voltage drops to this value
	voltage cutoff	3.4 V	3.3 V	3.0 V	4.0 V	ESC power will be reduced to zero when battery voltage drops to this value
	motor limit	100 °C	100 °C	70 °C	150 °C	ESC begins to limit power when motor reaches this temperature
	ESC limit	125 °C	125 °C	125 °C	150 °C	ESC begins to limit power when ESC reaches this temperature
BEC						
	voltage	6.00 V	6.00 V	6.00 V	7.4 V	Using this value, you can change BEC voltage for your servo and receiver in 0.05V steps. Higher voltage means more speed and power for your servo. If the battery voltage is below approx. 7.8 V, BEC voltage output will be decreased accordingly because of voltage drop on the switching regulator.
RX CALIBRATION						
	! WARNING ! Keep the sensor cable disconnected during the first power on until ESC is calibrated with your radio system, to avoid unexpected motor start! Hold calibrate (middle) button for 1s to activate. Push full throttle, full brake and return to neutral. Push Ok button to confirm. The calibration is done. Calibration is shared across all profiles.					
PROFILE						
	You can choose active profile here. Each profile has its own set of parameters (blue screens listed above).					

SETTING 2	Item	Comments
CONFIG		
	Motor poles	Choice between 2/4/6/8 motor poles. Set according a motor which you are using. Incorrect setting will make all rpm values incorrect. Small motors are usually 2 pole, bigger 4 pole, consult motor manufacturer's documentation for correct value.
	Motor direction	Choice between normal/reversed rotation.
	RX deadzone	Deadzone close to min/neutral/max. This is necessary to compensate for transmitter mechanical inaccuracy. You can try to decrease this number if you have high quality radio set, increase in case of any problems.
	Safe RX	Safe Rx will prevent motor from suddenly turning during power up if you have the throttle pressed. You have to return the throttle to neutral before going forward.
GUI CUSTOMIZATION		
	UI mode	Choice between standard and expert mode. Expert mode allows more customization of motor and brake power at the cost of more complicated user interface. See motor power / brake softening screens.
	Temperature units	°C or °F
	Splashscreen	ELCERAM splashscreen enable. Pease note that disabling splashscreen will not speed up boot – ESC starts controlling motor as soon as valid Rx signal is received regardless of screen content.
	Blinky ID	Customizes main screen identification if you have no timing set up (stock category).
GRAPHS CUSTOMIZATION		
	Record length	Horizontal axis range in minutes
	Rpm graph max	Rpm (blue) graph vertical axis range
	autoreset	On = system starts to record data from fresh after specified period of inactivity. Use this if you need to have ESC powered up for a long time before race and want to have graphs showing the race.
	Delay	Minimum inactivity period for autoreset which will cause reset
ESC FAN		

	Run above	Controls power to fan connector at the side of the ESC – setting a temperature here allows a fan to be off before race, saving battery and staying quiet.
VOLTMETERS CALIBRATION		
	Battery voltage	Voltmeter is calibrated from factory. Edit this number if recalibration is needed. See chapter below for details.
	BEC voltage	Voltmeter is calibrated from factory. Edit this number if recalibration is needed. See chapter below for details.
THERMOMETERS CALIBRATION		
	ESC temperature	Thermometer is calibrated from factory. Edit this number if recalibration is needed. See chapter below for details.
	Motor temperature	Thermometer is calibrated from factory. Edit this number if recalibration is needed. See chapter below for details.
	Motor beta	Characteristics of motor thermometer. Obtain exact value from motor manufacturer to get precise data. Default value of 4200 is acceptable for most motors, unless manufacturer uses nonstandard output. See chapter below for details.
AMPEREMETER CALIBRATION		
	Current	Ammeter is calibrated from factory. Edit this number if recalibration is needed. See chapter below for details.

	Correction	Scales the output to match your ecosystem if necessary. See chapter below for details.
HALL DIAGNOSTICS		
	Analyzing motor sensor system Caution! motor will run during this test. Disconnecting it from car drivetrain is recommended for both safety and accuracy of results. Test will run the motor for a couple of seconds and print following numbers: Hall asymmetry: each hall is triggered once up and once down during one electrical turn of the motor. This number aggregates inaccuracies of sensors (both in their placement angle and in their internal electronics) with rotor magnet asymmetry. Better motor has lower number. Then there are six numbers, each one for a hall and direction. Lower numbers are better. These are part of the input for hall asymmetry number above. Hall jitter: if a hall sensor output jumps to new value, then back to old and to new as the motor turns instead of cleanly switching from old to new, then it is counted as jitter, however brief is that multiple transition. ESC can handle such motor but both ESC and motor can run hotter if these happen too often. Good motor should have zero here.	
MOTOR INFO		
	Getting info about motor Caution! motor will run during this test. Disconnecting it from car drivetrain is recommended for both safety and accuracy of results. Test will run the motor for a couple of seconds and print following numbers: Voltage: battery voltage during test Current: average current during test run RPM: revs during the test: Power: motor input power KV: motor KV	
FIRMWARE		
	Firmware version	Firmware version and manufacture date of this batch of CPU board.
	Update (middle button long press)	Enables to update FW according to procedure in chapter 15.

FACTORY RESET	
	This will reset ESC settings to factory values. Please note that history will *not* be erased (see black HISTORY screen).
SNAPSHOT	
	"black box" high resolution short time graph for diagnostics. Color of lines match colors of standard graphs, records only when the motor is turning. See chapter below for details.

8. Profiles and Default Settings

There are various profiles preset for different car types and track conditions. The Profile can be simply changed in blue menu - Profile.
Choose your profile according to your preferences. All the profiles are adjustable and you can simply save your changes.

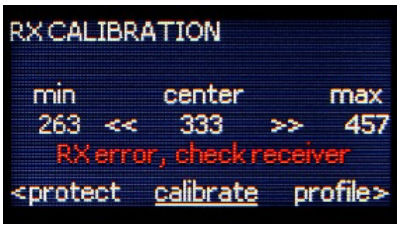
SETTINGS	PARAMETER	PROFILE					
		stock	onroad modified	offroad modified	offroad dirt	drift	custom
THROTTLE	PWM	2kHz	8kHz	9kHz	12kHz	10kHz	8kHz
	expo	50	0	0	0	0	0
	response	+5	+0	+0	+0	+0	+0
BRAKE	min	20%	10%	10%	10%	5%	10%
	max	100%	100%	85%	80%	100%	100%
	expo	32	0	0	0	0	0
	dragB	0%	0%	0%	0%	5%	0%
	PWM	1kHz	2kHz	2kHz	3kHz	2.5kHz	2kHz
	parkB	off	off	off	off	off	off
REVERSE		off	off	off	off	off	off
BOOST TIMING	0@	15k	15k	15k	15k	1k	15k
	timing1	0	0	0	0	15	0
	rpm1	25k	25k	25k	25k	2k	25k
	timing2	0	0	0	0	20	0
	rpm2	40k	40k	40k	40k	20k	40k
	split	no split	no split	no split	no split	no split	no split
TURBO TIMING	turbo	0	20	20	10	30	25
	delay	0.05	0.05	0.05	0.05	0.02	0.05
	ramp up	250 /s	250 /s	300 /s	150 /s	instant	250 /s
	down	350 /s	500 /s	400 /s	300 /s	instant	350 /s
HALL ANGLE	0@	10k	10k	10k	10k	10k	10k
	hall1	0	0	0	0	0	0
	rpm1	44k	44k	44k	44k	44k	44k
MOTOR POWER	preset	off	off	off	off	off	off
BRAKE SOFTENING	preset	off	off	off	S2	off	off
DRIFT		off	off	off	off	on	off
	max rpm					50k	

9. RX Calibration

! WARNING ! Keep the sensor cable disconnected during the first power on until ESC is calibrated with your radio system to avoid unexpected motor start!

! WARNING ! We recommend to use one of the radio control systems compatible with NITRIDE – listed in chapter 4. The table will be extended during the time.

! WARNING ! If you have Futaba Radio system, please reverse throttle on the transmitter before first turn on!



For radio system calibration, choose the RX CALIBRATION in the Blue menu (picture above) using the buttons. Press calibrate button and hold it for approx. 1s. Push full throttle, full brake and return to neutral. Then press the Ok button. The calibration is done.

10. Temperature, Voltage and Amperemeter Calibration

ESC Temperature Calibration

The temperature of your ESC was calibrated in factory. If needed you can re-calibrate it.

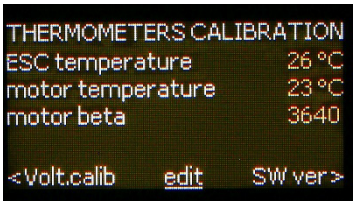
For this case use the thermometer for ensuring the ambient temperature. Then choose the THERMOMETERS CALIBRATION in the Yellow menu (picture below) using the setting buttons. Set the ESC temperature according to the ambient temperature using edit button and then +/- buttons and press Ok. The temperature calibration is done.

! TIP ! The calibration should be finished short time after switching on, because ESC heats up itself.

Motor Temperature Calibration

If temperature NTC sensor is included in your motor, the motor temperature has to be calibrated.

For motor temperature calibration let the car with motor to stabilize in room temperature for at least 20 minutes. Then turn ESC on and go to Yellow THERMOMETERS CALIBRATION screen.



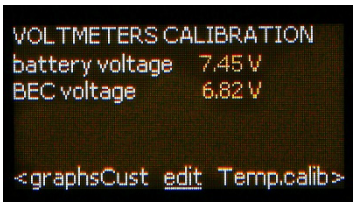
Check motor temperature: If the temperature is displayed, but is significantly lower than expected (in the order of 20°C/36F less) then you have a motor with nonstandard temperature sensor wiring. In that case increase motor beta by 2000 first (for example 4200 -> 6200), save and check temperature again.

Set the motor temperature according to ESC temperature using +/- buttons. Then press Ok. The temperature calibration is done.

! TIP ! In some cases, you will need to change motor beta dependence according to temperature sensor used by motor manufacturer. Default value 4200 (or 6200 for nonstandard motors) has acceptable accuracy for most motors.

Battery and BEC voltage Calibration

Measure battery/BEC voltage using a multimeter. Then choose the VOLTMETERS CALIBRATION in the Yellow menu (picture below) and set the measured value using edit button and +/-.

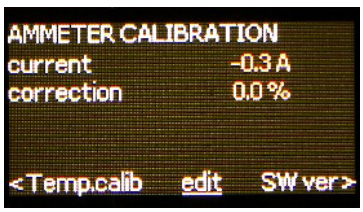


Ammeter Calibration

You can use this screen to calibrate zero current. Unplug BEC cable and edit number on first line to set desired value.

Purpose of “correction” setting is to allow you customizing output to your ecosystem. Battery chemistry is not 100% efficient, you can always expect to discharge less than recharge (rest is spent as battery heating up), and each charger measures mAh with unknown error.
ESC is set up in factory against calibrated charger when using typical battery. If you want to match battery discharge with eg. number shown on your personal charger set correction to suitable value.

Please note:
- current draw of running ESC alone is approx. 0.06A. You will see combined draw of ESC, motor, receiver, servo and any other accessories connected to BEC output.
- ESC is optimized for racing (max. power, min. weight and size), it is not able nor supposed to be as accurate as standalone specialized instrument.
- each ESC is individually calibrated and compensated in factory but 100% accuracy cannot be guaranteed during extreme temperature swings in race conditions



11. Zero Timing / Blinky / Stock Mode

NITRIDE also supports the Zero timing / Blinky / Stock mode.

Switching to Zero Timing Mode

If all of these parameters - Turbo Timing, Boost Timing and Hall Angle in Blue menu (Setting 1) - are set to 0, the ESC is switched to Zero Timing Mode. In this case, the inscription "ZERO TIMING" is blinking green on the main screen.

Alternatively, the user can change this sign for the inscription "BLINKY" or "STOCK" and choose, if the inscription will be static or blinky. The option can be made in Yellow menu (Setting 2): Setting 2 → Gui Customization → blinky ID

Changing of inscription does not affect the function of Zero Timing Mode, it´s just an ID to display on main screen. Please use ID which complies with rules of races you are in.

Switching the Zero Timing Mode Off

If any of these parameters - Turbo Timing, Boost Timing or Hall Angle - are set to a different value than 0, the Zero Timing mode is switched off and the inscription "ZERO TIMING" disappears from the display.

12. The Motor Choice

NITRIDE 1/10 was tested with the most of sensored motors available on the market, with or without temperature sensor. If motor has no temperature sensor, "LOW" will be displayed.

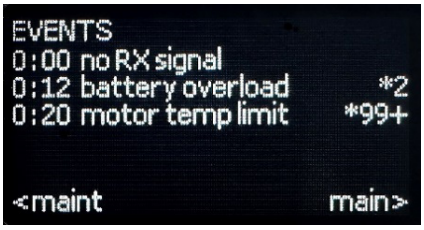
NITRIDE 1/10 has very linear and smooth throttle characteristics especially if boost timing is set to zero. From this point of view consider carefully the choice of your Motor Turns.

13. Troubleshooting: EVENTs and SNAPSHOT screens

NITRIDE 1/10 has revolutionary self-diagnostics and you can see the event notifications before and after race immediately on the display.

The example of the events you can see in the picture bellow:

These events inform you that:



In the time 0:00 the ESC has no Rx signal from your Receiver.

In the time 0:12 was your battery overloaded with high current consumption. This happened 2 times during this session.

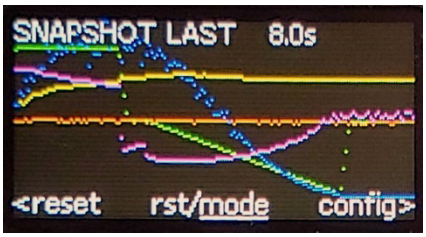
In the time 0:20 you reached maximum temperature limit of your motor. Your motor was hotter than limit more than 99 times in this session.

Description of Possible Events:

Displayed	Event description, common problems and recommendation
no Rx signal	The ESC does not see a signal from your receiver - Rx. Will be displayed if you switch on ESC before the transmitter is turned on. Transmitter and Receiver not paired. Bind your radio system.
sensor cable	Data from motor sensors are invalid - check your sensor cable connection
motor temp limit	Motor reached “motor limit” temperature - ESC starts to limit max. power
motor temp OVER	Motor temperature exceeded “motor limit” + 5 °C - Motor power will be reduced to the minimum
ESC temp limit	ESC reached “ESC limit” temperature - ESC starts to limit max. power
ESC temp OVER	ESC reached “ESC limit” + 5 °C - ESC power will be reduced to the minimum
battery EMPTY	Battery was discharged below “voltage cutoff” level
low battery	Battery was discharged below “voltage warning” level
battery overload	Current flow was too high for your battery – check battery connectors for tight fit, reduce boost timing, use motor with more turns, consider replacing the battery
pwr limit – check motor	Power flowing through ESC is extremely high - ESC starts to limit max power. Usually caused by shorted motor or incorrect mechanical timing or loose hall sensors magnet in the rotor. Try to change motor.
pwr OVER – check motor	Power flowing through ESC is extremely high - ESC power will be reduced to the minimum. Usually caused by shorted motor or incorrect mechanical timing or loose hall sensors magnet in the rotor. Try to change motor.
unexpected reset	Current flow was extremely high for your battery and subsequent voltage drop caused ESC reset. Session data are lost and all graphs etc. will start from this moment. Check battery connectors for tight fit, reduce boost timing, use motor with more turns, consider replacing the battery.
maintenance interval	At least one of your maintenance counters reached 100%
MAINTENANCE INTERVAL	At least one of your maintenance counters reached 200%. Lifetime of an item is not tracked beyond 200%.
check RX cable	Poor Rx signal from receiver (noise in data). Check Rx connector, check Rx cable. Verify Rx calibration.
flash read error	Some settings or history will not be saved. Flash memory may be worn out. Try reset to factory settings.

flash write error	Some settings or history will not be saved. Flash memory may be worn out. Try reset to factory settings.
BEC voltage low	BEC voltage under 2V. May be generated by servo in big crashes or battery voltage dips during battery overload. Check insulation of Rx and servo cables for possible short circuit. Bad servo motor, replace servo.
check battery cables	Battery was unable to absorb energy regenerated from braking. Braking power was reduced. Check battery connectors for tight fit, check capacitor board.

Snapshot screen



Snapshot screen provides a "black box" view for analysis of crash or any other problem. Records only when the motor is turning, keeping recorded data when the motor is stopped. It is set to record last eight seconds by default but mode can be switched by long press to shorter time or to record first seconds of motor run if you need to analyze acceleration from standstill.

Colors match colors in standard graphs: yellow is battery voltage, orange is BEC voltage, green is throttle position, blue is engine RPM, purple is current.

Purple line (current) has highly nonlinear scale (log-like) to show both extremely high currents in case some HW faults and small currents to see details. First pixel from zero is approx. 0.1A, second 0.2A, then smoothly changes scale to reach 3A at 10th pixel and continues with two pixels step per double the current. In simple terms, it starts with extremely high resolution close to zero and each pixel means 40% more current later, visually zooming small values and flattening peaks.

Additional Troubleshooting

Problem	Cause	Solution
Display is frozen, white or any other visible artifacts are present	Dirty connector or contact Momentarily lost during crash Electrostatic discharge	Hold settings buttons to reset display. Check and clean the connector. Use new cover.
Motor is tugging and ECS temperature rises	Wrong phase connection	Check cables to motor (A B C).
BEC voltage drops or inaccurate	Discharged battery or battery voltage dips	BEC voltage will be always slightly below battery voltage. High motor draw makes therefore both battery and BEC voltage to drop. Typical BEC voltage accuracy is +-2% due to extreme nature of ESC (size/weight/temperatures).
Motor does not run	Red "RX" flashing on main screen? ➔ Rx problem	Turn on transmitter. Check BEC cable to receiver. Re-calibrate Rx
	Red "SENS" flashing on main screen? ➔ Sensor cable problem	Check sensor cable and connectors – use main screen/info to verify signals.

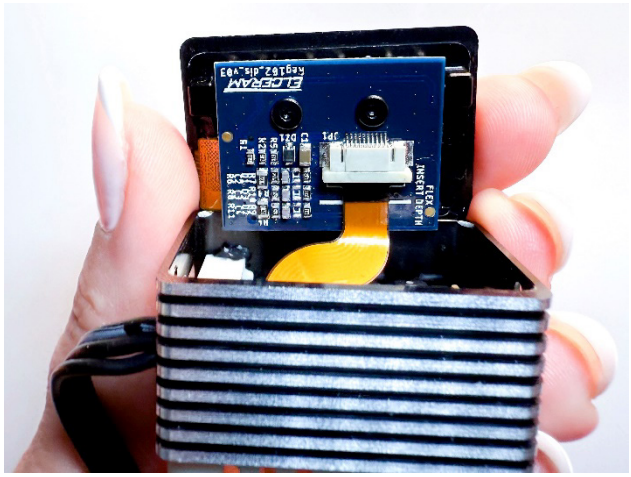
	Rx number on main screen is not blue? ➔ ESC protection active	Safe Rx active – return throttle to neutral. Overheat/undervoltage – see below
	Voltage number on main screen is red? ➔ Discharged battery or incorrect protection setup	Charge battery or battery protection not set up correctly – re-calibrate battery voltmeter and check blue “Protection” screen.
	Temperature on main screen is red? ➔ Motor or esc overheated	Let it cool down
Motor temperature shows “LOW”	Sensor cable fault.	Replace sensor cable.
	Motor has no temperature sensor	Replace motor.
	Too low ambient temperature	ESC is not able to measure temperatures deep below freezing point. Wait for motor to warm up.
Motor temperature shows a number significantly lower than expected when at room temperature	Motor with nonstandard temperature sensor wiring	Correct with motor beta – see temperature calibration section in this manual
Motor temperature starts at strange temperature and then settles down.	Motor uses temperature signal for other purposes for some time after power up.	Some motor manufacturers do this. Just wait for temperature to settle down or replace motor for well behaving.
Current not showing zero value when it should	Current is drawn by devices connected to BEC output	Verify zero with BEC cable unplugged.
	Zero is shown when ESC is cold but not when hot	Check ammeter calibration section for additional information and context.

14. Display and Maintenance

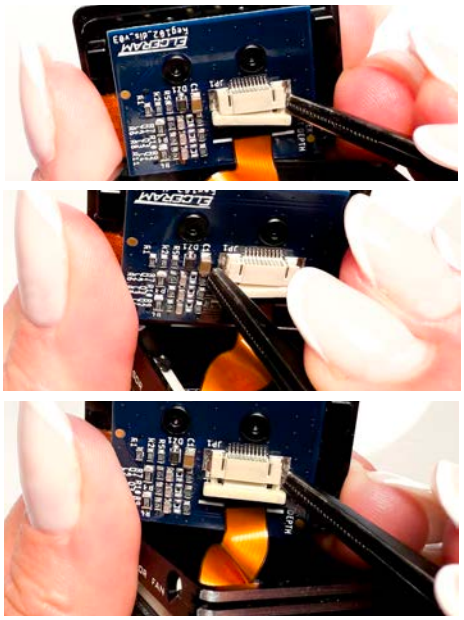
Display is very resistant and does not need any maintenance. We suggest cleaning using microfiber cloth.

Please be informed, that the aluminium cover, display and buttons are replaceable in case of any incident. Display with buttons is replaceable separately, without changing cover - spare part number ELC023. Aluminium cover is also changeable separately - spare part number ELC024.

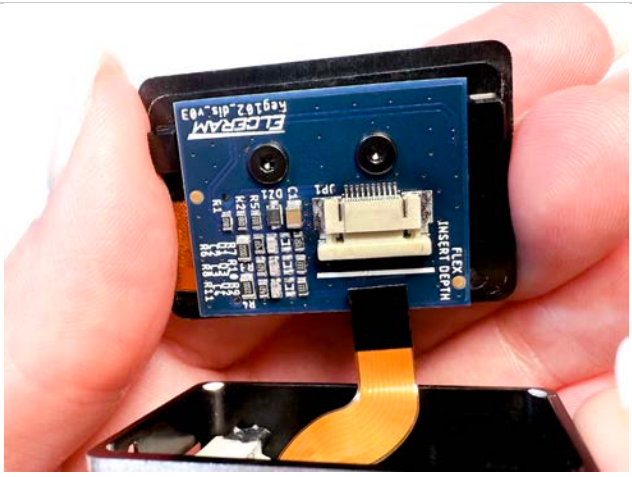
Cover Replacement



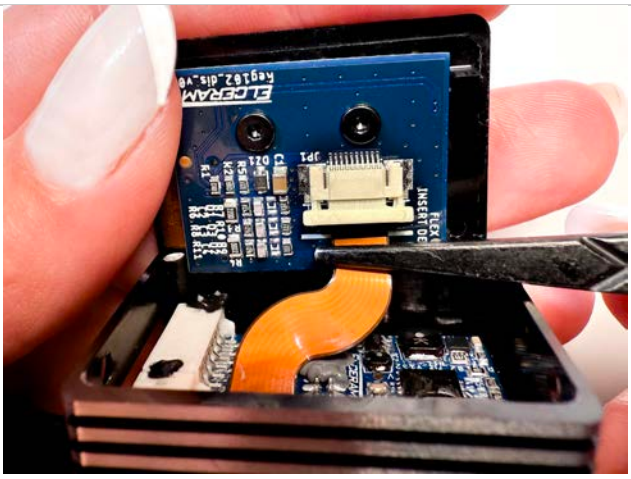
1. To change cover, unscrew the 2 screws using Alen key 1,27 mm / 0,05” and lift the cover carefully.



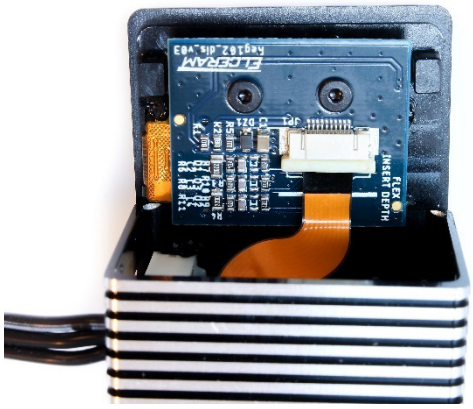
2. Open the connector holder pulling gently left and right side alternately using tweezers or screwdriver.



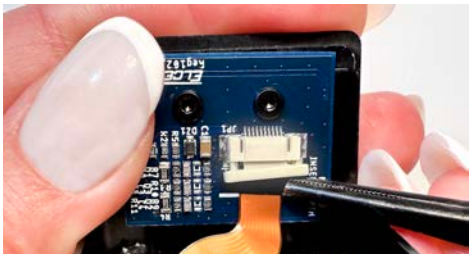
3. Pull the flex cable gently down.

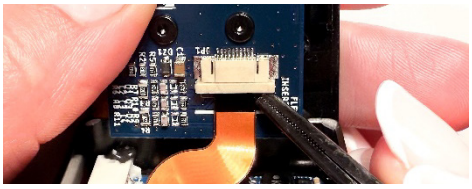


4. Replace cover, open connector and insert flex cable gently using tweezers.



5. The correct depth of the flex cable insert is signed by the white line under the connector.





6. Make sure the cable is in correct position and depth and close the connector.

Screw the cover.

BE CAREFUL: connectors are not designed to handle force and should not require force to close. Double check flex placement if the connector does not close easily.

Avoid dust contamination when opening the ESC.

Do not disconnect cover too often, connectors are designed to handle only a couple of disconnections and reconnections.

There is a small probability that the image on display will be frozen or display will turn backlight to white or black after big car crash or due to a electrostatic discharge. This can happen because of display connector losing contact for a short time. In this case you can reset display by holding settings buttons the same way as to switch to Blue Setting.

15. Firmware Update

If a FW update is needed, please use the option part nr. ELC018 - ELCERAM USB programmer and follow instructions below:

1. Connect the USB programmer to your computer and launch the loader on computer. Select the port if necessary.

2. Connect the ESC to the battery and turn ESC on.

3. Connect the ESC to the USB programmer using the sensor cable.

4. Go to the FIRMWARE screen in orange menu, press the middle button for 2 seconds and then press left button. The Firmware update screen will appear.

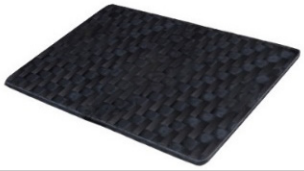
5. Select desired FW version in loader and press Enter to start the update.

6. Wait until the data transfer is complete.

7. Disconnect the ESC from the USB Programmer.

In case of update crash during updating, turn ESC off and start from the step 1. Skip the step 4.

16. Option parts

Part number	Description	Picture
ELC003	**Graphite Installation Kit for NITRIDE 1/10 G1 and G2** Graphite plate 30,1 x 34,1 mm 2 screws M3x5 mm	
ELC005	**External Low ESR Capacitors for NITRIDE and NITRIDE 1/10 G1 and G2** Soldered on the ceramic PCB with thick silver layer	
ELC006	**ELCERAM RC Cables AWG13 for NITRIDE 1/10 G1 and G2** 1 m	
ELC004	**Universal Graphite Plate** 50 x 60 x 1 mm	
ELC007	**ELCERAM Advanced Passive Heatsink for NITRIDE and NITRIDE 1/10 G1 and G2 in XB4** 2 screws M3x5 mm	
ELC010	**Double-sided Tapes for NITRIDE 1/10 G1 and G2** 3M 5915 28 mm x 32 mm x 0,6 mm 5 pcs	
ELC016	**Installation Plate for NITRIDE 1/10 G1 and G2 in Schumacher CAT L1R** Aluminium installation plate 2 screws M3x5 mm	
ELC018	**ELCERAM USB Programmer for NITRIDE and NITRIDE 1/10 G2** Programming cable for FW update	

ELC019	**ELCERAM RC Cables AWG12** **for NITRIDE 1/10 G2** 1 m	
ELC022	**Aluminium Installation Kit with FAN holder** **for NITRIDE 1/10 G1 and G2** Aluminium installation plate 2 screws M3x5	
ELC023	**Spare Display Module with Buttons** **for NITRIDE and NITRIDE 1/10 G2** Does not include Aluminium cover. Compatible with ELC024. Allen key Tool 0,05 " (1,27 mm) and new screws included.	
ELC024	**Spare Aluminium Cover** **for NITRIDE and NITRIDE1/10 G2** Does not include display and buttons. Compatible with ELC023. New screws included.	
ELC025	**ELCERAM FAN 2510** High speed ESC cooling FAN 25 x 25 x 10 mm Operating voltage 6-8,4 VDC Suitable with all ELCERAM ESCs equipped with 2-pin JST connector. Easy installation with ELC022.	

17. Recycling

Electronic devices marked with the crossed-out dustbin symbol must not be disposed of in normal household waste, but must instead be handed in at a specialized collection and recycling facility.

18. Conformity and Declarations

The producer, company ELCERAM a.s., hereby declares that Electronic Speed Controller NITRIDE 1/10 complies with the requirements of relevant directives, regulations and harmonized European standards.

The full text of the EU Declaration of Conformity is available at following website: www.elceram-rc.com.