DTXC3164-66
DTXC3172/74
DTXC3194-95

ONYX™

BRUSHLESS SYSTEM

INSTRUCTION MANUAL

The Onyx brushless systems are great for installing into newly built kits or upgrading existing RTR brushed and brushless systems. Ideal for off-road platforms, their range of popular kV sizes make the Onyx systems a select choice for buggies, trucks and short course vehicles. The ESCs feature a waterproof case, enabling them to go just about anywhere. Each system comes pre-installed with bullet connectors and Deans® Ultra® Connector to make installation a breeze. The ESC has many adjustable features that can be manually programmed or programmed with the optional Onyx Programming Card which simplifies this process.

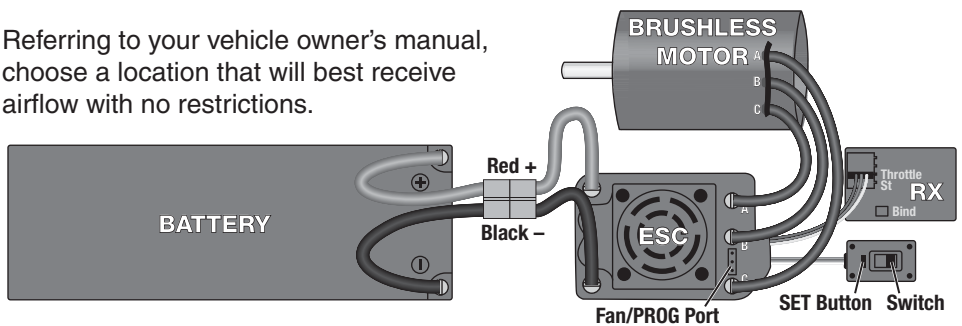
It is strongly recommended to read this manual completely before use! Damage resulting from misuse or modification will void your warranty.

SPECIAL FEATURES

- Completely waterproof and dustproof.
- Excellent start-up, acceleration and linearity features, suitable for buggies, trucks and short course vehicles.
- Powerful 6V/3A BEC.
- Pre-installed bullet connectors for motor connections
- Pre-installed Deans battery connector.
- Multiple protection modes: low voltage cut-off, thermal, throttle signal loss and motor blocked protections.
- Easy manual programming through the SET button located on the switch and also compatible with the Onyx Programming Card (DTXM1352).
- Special programming port for connecting to Programming Card eliminates the need to remove the receiver lead.

INSTALLATION

Referring to your vehicle owner's manual, choose a location that will best receive airflow with no restrictions.



1. Use servo tape to securely mount the ESC to the chassis.
2. Use the motor screws included with your vehicle to mount the motor. Refer to your vehicle owner's manual for proper gearing selection.
3. Connect the three ESC wires to the three motor wires.

4. Connect the battery connector to battery. **Note:** Once the battery is connected and the ESC is turned on, the green LED will flash and the ESC will beep in relation to the number of LiPo cells that are connected to the ESC. If the indication provided by the ESC does not match the number of cells in your battery, disconnect and recharge the battery before re-connecting.

THROTTLE CALIBRATION

Note: *For Futaba transmitters, reverse the throttle channel.*

Warning: *Prior to throttle calibration, be sure that all trims and sub-trims are at zero. Failure to do so could result in improper calibration.*

1. Turn the transmitter on and set its throttle and brake EPA (End Point Adjustment) to maximum. If the transmitter has an ABS function, disable it.

2. Hold the SET button located on the ESC power switch and turn the ESC on. Release the SET button as soon as the red LED flashes on the ESC and the motor beeps.

3. With the red LED flashing, ensure that the Tx throttle is at neutral and all trims and sub-trims are at zero. After confirmation, press the SET button. The ESC will confirm the neutral setting has been completed by beeping one time and flashing the green LED once.

4. Move the trigger to the full throttle position and press the SET button. The green LED will flash two times and the motor will beep twice to confirm that the setting has been made.

5. Push the trigger to the full brake position and press the SET button. The green LED will flash three times and the motor will beep three times to confirm that the setting has been made. The trigger may be released to neutral at this time. A second group of flashes by the green LED will confirm that throttle calibration has been completed properly and the ESC is ready for use.

LED indication in Normal Running mode:

A. Neutral – No LED indication.
B. Forward or Reverse – Indicated by a red LED.
C. Full Throttle – Indicated by green and red LED.

PROGRAMMABLE SETTINGS

Programming steps start on page 6.

Running Mode: In "Forward with Brake" the car can go forward and brake, but will not run in reverse. This setting is mainly used for competition where reverse should be disabled. "Forward/Reverse with Brake" mode provides reverse, which is suitable for practice or everyday driving.

> ***Note:*** *"Forward/Reverse with Brake" mode uses a double brake input to enable reverse. This means that in order to activate reverse, the throttle trigger must be pushed forward twice before reverse is enabled. The first push will activate the brake, the second push will enable reverse.*

"Forward/Reverse" mode is forward and reverse only. The car will go to reverse immediately once the trigger is pushed to the full brake position.

Drag Brake: Sets the amount of brake applied at neutral throttle to simulate the slight braking effect at the neutral position.

Low Voltage Cut-off: Prevents the lithium battery pack from over discharging. The ESC monitors the battery's voltage at all times. If the voltage is lower than the threshold for 2 seconds, the output power will be cut off, and the red LED will flash twice in sets of three.

Start Mode (also referred to as "Punch"): Select from "Level 1" to "Level 9". Level 1 has a very soft start effect, while Level 9 has a very aggressive start effect.

> ***Note:*** *To use Level 7 through 9, you must use a good quality battery pack with a powerful discharge ability. Otherwise these modes cannot get the burst start effect as you want. If the motor cannot run smoothly (the motor is stuttering), it may be the weak discharge ability of the battery pack. Choose a better battery pack or reduce the gear ratio.*

Maximum Brake Force: The ESC provides proportional brake function. The brake force is related to the position of the throttle trigger. Maximum brake force refers to the force when the throttle is located at the end point of the backward zone. A very large brake force

can shorten the brake time, but it may damage the gears. The “disable” option inhibits the inherent brake function of the speed controller. When this option is selected, the brake function is realized by a traditional mechanical disc-brake system driven by a servo.

Maximum Reverse Force: Sets how much power will be applied in the reverse direction. Different value makes different reverse speed.

Initial Brake Force: It is also called “minimum brake force” and refers to the force when the throttle is located at the initial position of the brake. The default value is equal to the drag brake setting so the brake effect can be very smooth.

Throttle Neutral Range: The amount of travel in the trigger between neutral and brake, and between neutral and throttle.

Timing: 0° of advance is the lowest setting resulting in more torque, less RPM, least motor heat, but longest run times. Turning the timing up to the highest setting will do just the opposite.

Thermal Protection: Protects the ESC from damage occurring by excessive heat.

Motor Rotation: Changes the direction that the motor turns.

LiPo Cells: Must be set to correspond to the number of LiPo cells being used in application. If you are using a discharged 4S battery, the ESC may mistakenly measure it as a fully charged 3S battery and then the LVC protection function will be incorrect. Always be sure to use a fully charged LiPo when using the “Auto Calculate” setting.

Note: *To reset all programming to its default value, hold the SET button for 3 seconds while the trigger is at neutral. The red and green LEDs will flash at the same time confirming the settings have been changed to default.*

PROGRAMMING THE ESC

Programming of the ESC involves LED flashes and matching audible tones. Each LED indication and audible tone will represent a different adjustable feature.

Below is a chart of programmable values that each setting can be changed with audible and LED indications for each feature. A "—" will represent a long beep and flash, where a "•" will represent a short beep and flash.

FEATURE	INDICATION GREEN LED	SETTINGS (RED LED) 1 •	2 ••	3 •••	4 ••••	5 —	6 —•	7 —••	8 —•••	9 —••••
Running Mode	•	Forward w/Brake	Fwd/Rev w/Brake	Forward & Reverse						
Drag Brake Force	••	0%	5%	10%	20%	40%	60%	80%	100%	
Low Voltage Cut-Off Threshold	•••	3.0V/Cell	3.2V/Cell	3.4V/Cell						
Start Mode (Punch)	••••	Level1	Level2	Level3	Level4	Level5	Level6	Level7	Level8	Level9
Max Brake Force	—	25%	50%	75%	100%	Disable				
Max Rev Force	—•	25%	50%	75%	100%					
Initial Brake Force	—••	=Drag Brake Force	0%	20%	40%					
Neutral Range	—•••	6% (Narrow)	9% (Normal)	12% (Wide)						
Timing (only for sensorless motors)	—••••	0.00°	3.75°	7.50°	11.25°	15.00°	18.75°	22.50°	26.25°	
Heat Protection	——	Enable	Disable							
Motor Rotation	——•	Counter Clockwise	Clockwise							
LiPo Cells	——••	Auto Calculate	2 Cells	3 Cells	4 Cells			Default settings		

Short (•)
Long (—)

TO PROGRAM THE ESC:

1. Turn on the transmitter.

2. Press and hold the SET button on the ESC and apply power. The red LED will flash repeatedly for a few seconds. Continue to hold the SET button until the green LED starts to flash in a pattern according to the INDICATION column in the chart.

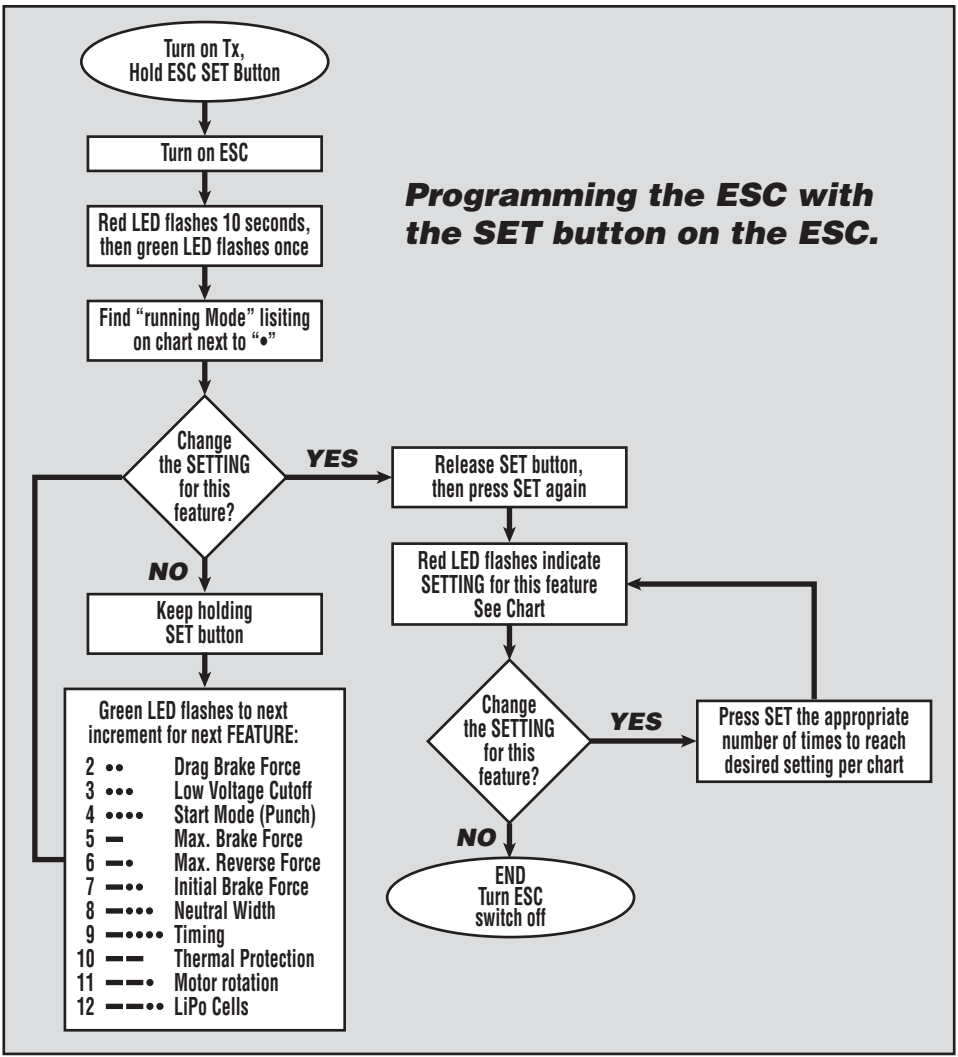
3. Release the SET button once the given indication matches the FEATURE to be adjusted. Example: Releasing the SET button when the green LED and beep is long (**—)** will enter the “Maximum Brake Force” feature.

4. Once the feature to be changed is entered, press the SET button to achieve the desired setting. The red LED will confirm the chosen setting after pressing the SET button.

5. Turn the ESC off when completed.

6. If you wish to change another feature, repeat the above steps.

NOTE: The power to the ESC must be reset each time a feature is adjusted.



Programming the ESC with the SET button on the ESC.

SPECIFICATIONS

Motor

	DTXC3164	DTXC3165	DTXC3166	DTXC3172	DTXC3174	DTXC3194	DTXC3195
Scale	1/10					1/8	
kV	3930	4420	5900	3650	4550	2200	2650
Suitable Car	1/10 2WD Buggy/Truck/SC			1/10 4WD SC		1/8 Buggy/Truck	
Input Voltage	2-3S	2S		2-3S	2S	3-4S	4S
Connectors	4mm Male Bullet Connector						
Pole	2			4			
Shaft Diameter	3.175mm			5mm			
Dimension	35.8mm x 50mm					39.8mm x 73.8mm	
Weight	225g					374g	

ESC

	1/10TH ESC (80A)	1/8TH ESC (120A)
Cont./Burst Current	80A/520A	120A/760A
Suitable Motor	Sensorless brushless motors	
Suitable Car	1/10 SCT/Truggy/Buggy/Monster	1/10 SCT/Truggy/Buggy/Monster 1/8 SCT/Buggy
Motor Limit	2S LiPo: kV ≤ 6000 3S LiPo: kV ≤ 4000	2S LiPo: kV ≤ 6000 3S LiPo: kV ≤ 4000 4S LiPo: kV ≤ 3000
Resistance	0.0007Ω	0.0004Ω
Battery	2-3S LiPo	2-4S LiPo
BEC Output*	6V/3A (Linear mode built-in BEC)	6V/3A (Switching mode built-in BEC)
Dimension	59.3mm x 38.4mm x 33.6mm	
Weight	113g (w/five 12AWG 200mm wires)	110g (w/five 12AWG 200mm wires)

TROUBLESHOOTING

Below is a list of possible problems, reasons and solutions. If you are experiencing something other than what is listed, contact Hobby Services for additional assistance.

ESC does not power up when switch is turned on: *Check that the battery connections between the ESC and battery are connected properly.*

After power is initiated the motor doesn't work but emits an audible tone in 1 second intervals: *Input voltage is too high or too low. Check that the battery pack is fully charged and that the ESC has been programmed to the correct number of cells.*

After power is turned on, the red LED lights but the motor doesn't work: *Throttle signal is abnormal. Make sure the receiver lead is securely connected to channel 2 of the receiver.*

The motor runs in the opposite direction when throttle is applied: *The wire connections between the motor and ESC are incorrect. Swap any two wire connections between the ESC and motor. Or change the programmable setting "Motor Rotation" to the opposite direction.*

The motor suddenly stops running while in use: *The throttle signal is lost. Check the connection between the ESC and receiver and also the transmitter. The ESC has entered Low Voltage Protection Mode or Thermal Protection Mode. A flashing red LED means Low Voltage and a flashing green LED means Thermal Protection. Also, ensure that your battery has sufficient capacity and a high enough C-rating.*

The motor stops or stutters during quick acceleration: *The battery has a bad discharge performance, gear ratio is too aggressive or the programmable setting "Start Mode" is set too aggressive. Trying using a higher quality battery, changing to a softer gear ratio or set the "Start Mode" to a softer value.*

When the trigger is in the neutral range, the red LED and green LED flash simultaneously: *Over current protection, motor demagnetization or the motor is over-loaded. Reduce the load by using a softer gear ratio or change the motor.*

Does not connect to the optional Programming Card: *Be sure that the program card is connected to the program port and not the receiver lead.*

When the ESC is turned on, the LED and audible indications do not match that of the connected LiPo battery: *Battery is not fully charged and the ESC is recognizing it differently. Also, check that the "LiPo" cells feature setting is correct.*

Red LED flashes twice, in sets of three: *ESC has reached low voltage cut-off. Disconnect battery and recharge.*

SERVICE PROCEDURES

ESCs that operate normally when received by Hobby Services will be charged a minimum service fee and return shipping charges. Before sending your ESC in for service, it is important that you review the "Troubleshooting Guide" on this instruction sheet. The ESC may appear to have failed when other problems exist in the system – such as a defective transmitter, receiver or servo, or incorrect adjustments/installation.

- Hobby dealers are not authorized to replace ESCs thought to be defective.
- Do not cut the input wires of the ESC before sending it for service. A fee will be charged for cut wires which must be replaced for testing.

180 DAY LIMITED WARRANTY (USA & CANADA ONLY)

DuraTrax warrants this product to be free from defects in materials and workmanship for a period of 180 days from the date of purchase. During that period, we will repair or replace, at our option, any product that does not meet these standards. You will be required to provide proof of purchase date (receipt or invoice). If, during the warranty period, your ESC shows defects caused by abuse, misuse or accident, it will be repaired or replaced at our option, at a service charge not greater than 50% of the current retail list price. Be sure to include your daytime telephone number in case we need to contact you about your repair. This warranty does not cover components worn by use, application or reverse voltage, cross connections, poor installation, subjection of components to foreign materials, any alterations to wires or tampering. In no case shall our liability exceed the original cost of the product.

Your warranty is voided if:

- You apply reverse voltage to the ESC by connecting the motor battery backwards.
- You allow any wires to become frayed which could cause a short.
- You use more than the rated number of cells in the motor battery.
- You tamper with any of the electronic components.

Under no circumstances will the purchaser be entitled to consequential or incidental damages. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. If you attempt to disassemble or repair this unit yourself it may void the warranty.

For service to your DuraTrax ESC, either in or out of warranty, send it post-paid and insured to:

Hobby Services (217) 398-0007
3002 N. Apollo Dr. Suite 1
Champaign, IL 61822
E-Mail: hobbyservices@hobbico.com

duratrax.com

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