

The XRAY XMC300R is bi-directional ESC (electronic speed controller) with electronic brake and reverse suggested for use with 180, 280, and 300 “micro” motors; it will fit 1/18, 1/20, and 1/24 micro cars.

SPECIFICATIONS	XMC300R TECHNICAL DATA
<ul style="list-style-type: none">operated by microprocessor, fully digital controllerbi-directional ESC for use with up to 300-size motorssmooth linear regulation of drive from 0% to 100%installed electronic brake 100%brake responds only after switching from the forward movement to the reverse movement, braking time is 0.1 sec, after end of braking the ESC will automatically switch to reversebattery elimination circuitry (BEC)	<div>Input Power:4-6 cell battery NiMH or NiCD / 4.8V-7.2V</div> <div>Min. Resistance:0.032 Ω / 7.5V</div> <div>Max. Resistance:0.040 Ω / 6V</div> <div>Continuous Current:max. 15A</div> <div>Peak Current:max. 50A / 0.05 sec.</div> <div>PWM Frequency:900 Hz</div> <div>BEC:5V / 0.5A steady, 5V / 1A short-timed</div> <div>Temperature Range:0-40°C / 32-72°F</div> <div>Dimensions:30x19.5x10.5mm / 1.180" x 0.768" x 0.413"</div>

WARNING!
<div><ul style="list-style-type: none">This product is not suitable for children except under the direct supervision of an adult.First-time users should seek advice from people who have experience with RC cars and who have properly installed and used electronic speed controllers.Never leave your model unattended with the battery connected.Be sure that your operating frequency is clear before turning on or running your model, and never share the same frequency with somebody else at the same time. Ensure that others are aware of the operating frequency you are using and when you are using it.Always turn on your transmitter before you turn on the ESC or connect the battery pack. Always turn off the ESC or disconnect the battery pack before turning off your transmitter.Immediately after using your model, do NOT touch the model’s electronic equipment, as it may be hot.When you connect the battery and turn on the electronics, make sure your car is physically prevented from moving or getting away from you and causing damage.Technical faults of mechanical or electrical nature may cause the motor to jump into motion unexpectedly, which can cause serious damage or injury.</div> <div><ul style="list-style-type: none">All cables and connectors must be effectively insulated. Short circuits can ruin your ESC, servo, or battery pack.Use only polarized connectors for ESC connections.Do not reverse the polarity of the ESC connections.If a fault should occur, this could cause a fire in the model and threaten anything in the vicinity.Do not allow any metal part to short circuit the batteries, ESC, or other electrical/electronic device on the model.The ESC is designed exclusively for use in battery-operated radio-controlled models. No other usage is permissible.Like all electronic components, the ESC must not be exposed to water or fire.Do not stall the motor. The ESC will fail within seconds if power is applied to the motor when the car cannot move.When the motor is connected to the ESC, do not connect a separate battery to the motor to run it. This will damage the ESC and invalidate the warranty.This speed controller is NOT waterproof.Always make sure that enough air can get to the speed controller so that good cooling conditions are achieved.</div>

NEVER:
<div><ul style="list-style-type: none">This ESC is designed to use with micro stock motors and micro motors up to size 300. Never use this ESC with motors larger than 300 as you will ruin the ESC.Never use this ESC with brushless motors.Never run your model car in water, snow or wet conditions. This could result in an electronic device shorting out and causing a fire.Avoid incorrect connections. Reverse polarity will damage the ESC and void your warranty.Do not let output tabs (where wires connect to ESC) touch any other surface. Never touch the output tabs with any metal parts or conducting material. This may short your ESC and void your warranty.Do not attach a Schottky diode to your ESC or motor. This will ruin the forward/reverse ESC and void your warranty.</div> <div><ul style="list-style-type: none">Do not modify any parts of the ESC and especially do not modify or change any of the wires otherwise you void warranty.Never leave your model car unattended when the battery is connected. If a fault should occur the result could be a fire in the model which could destroy anything else in the vicinity and injury persons.Never wrap your ESC in foil or film; air must always be able to flow round and over the unit.Never change the polarity of the receiver plug.Never use water or chemicals to clean the ESC.Never expose the ESC to extreme heat or cold temperatures.Never touch the ESC and any of its parts after a run. It could be very hot and injure you.Never dry the ESC in a microwave oven.</div>

 **SCHOTTKY DIODE**

Do NOT use the Schottky diode on the motor when using XMC300R speed controller.

The Schottky diode can be used only with pure forward/brake speed controllers. Using Schottky diode on your motor when using XMC300R speed controller will destroy the ESC and thus will void the warranty immediately.



INSTALLATION TIPS:
<ul style="list-style-type: none">Mount the ESC in the model car using a double-sided foam tape.When installing the ESC in an XRAY model racing car use the supplied screws to install it in the designed location.Provide plenty of cooling openings in the car body; this increases the performance and extends the life of electronic components.Install the ESC in a location where it is protected from crash damage.The ESC should be installed in such a way that you have easy access to the buttons.Ensure that there is an adequate distance (at least 3cm) between the ESC and power cables and the receiver or receiver aerial. Avoid direct contact between all power system components and the receiver or aerial, as this can cause interference. If you encounter interference problems, reposition the components in the model.The aerial should be run vertically up and away from the receiver. Avoid contact with any parts made of carbon fiber or metal. If the aerial is too long, don’t coil up the excess length. Make sure to read and understand the instructions supplied with your radio control system.

CONNECTIONS

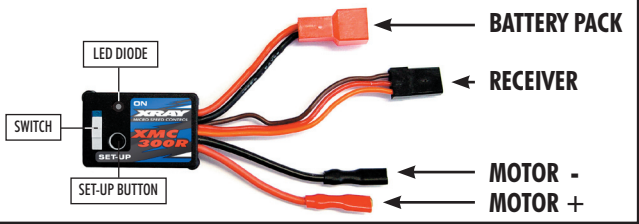
The ESC is connected to various components:

MOTOR – red and black wire with female plug,

RECEIVER - black connector

BATTERY PACK - red connector.

The battery used may be 4.8V (4-cell), 6V (5-cell), or 7.2V (6-cell).



SPEED CONTROLLER LED INDICATION	INSTALLATION										
<p>The LED diode is used for indication of the drive direction.</p> <table><tr><td>Neutral</td><td>steady light</td></tr><tr><td>Partial Throttle</td><td>double-flash (repeats)</td></tr><tr><td>Full Throttle</td><td>steady light</td></tr><tr><td>Brake</td><td>flash (repeats)</td></tr><tr><td>Reverse</td><td>triple-flash (repeats)</td></tr></table>	Neutral	steady light	Partial Throttle	double-flash (repeats)	Full Throttle	steady light	Brake	flash (repeats)	Reverse	triple-flash (repeats)	<p>Follow these steps after you have installed the ESC in your car:</p> <ol style="list-style-type: none">Make sure the white switch on the ESC case is in the OFF position.Connect the ESC to the receiver’s Channel 2 slot.Connect the ESC to the motor: red wire to positive (+) red male wire on the motor, black wire to negative (-) black male wire on the motor.Check all wiring and connections before you connect the ESC to a drive battery. Extremely important: incorrect polarity will damage the speed controller.Connect the red connector of the speed controller to the battery pack. <p>The ESC is now ready for set-up.</p>
Neutral	steady light										
Partial Throttle	double-flash (repeats)										
Full Throttle	steady light										
Brake	flash (repeats)										
Reverse	triple-flash (repeats)										

SET-UP PROCEDURE

The ESC is set-up from the factory for Futaba or JR/Graupner radios ; users with those radios can skip this section.

TRANSMITTER ADJUSTMENTS

THROTTLE ADJUSTMENT	SETTING
High EPA (full throttle)	Maximum
Low EPA (full brake)	Maximum
Exponential	Zero (neutral)
Throttle reversing	Either ‘Normal’ or ‘Reverse’
Throttle trim	Middle (neutral)
Trigger throw	50% throttle : 50% brake
Steering reversing	Reverse
Steering trim	Adjust until front wheels point forward.
Steering EPA	Adjust steering EPA until wheels reach full lock positions (L&R), then reduce EPA settings slightly.

If you transmitter does not feature these set-up functions, it is already in “basic set-up” mode.

- Ensure that the ESC is not connected to the drive battery, and is switched off.
- Remove the motor pinion, or ensure in some other way that the wheels of the model are free to rotate.
- Switch the transmitter on.
- Set the transmitter throttle to neutral.

- Connect the ESC to the battery.
- Hold the Set-up button pressed and at the same time switch on the speed controller (white switch to the ON position).
- After the LED flashes once shortly, the speed controller is ready for Neutral position set-up.

- Neutral position set-up**
- Leave the throttle at neutral, and press the Set-up button for 1 sec.
 - After the LED flashes two times shortly the neutral setting is stored and you can release the Set-up button.

- Full throttle set-up**
- Hold the transmitter at full throttle, and press the Set-up button for 1 sec.
 - After the LED flashes three times shortly the full-throttle setting is stored and you can release the Set-up button.

- Brake set-up**
- Hold the transmitter at full brake, and press the Set-up button for 1 sec.
 - After the LED flashes once-long the brake setting is stored and you can release the Set-up button.

- Set-up finish**
- After the brake set-up, return the throttle to neutral. The ESC will automatically switch to ready-to-use mode.
 - All the settings are now stored. After you disconnect the battery or switch off the ESC all settings will remain stored and you do not need to set-up the ESC anymore.

WARNING

This is not a toy, it is a precision electronic speed controller. This product is not intended for use by children without direct supervision of a responsible, knowledgeable adult. Contents of box may differ from pictures. In line with our policy of continuous product development, the exact specifications of the product may vary without prior notice. Take appropriate safety precautions when using this product; you are responsible for its safe and proper use. Please read the instruction manual before using this product and follow all safety precautions. First time users should seek advise from people who have used this product already in order use this product correctly and safely.

Improper use may cause personal and/or property damage. XRAY and its distributors have no control over damage resulting from shipping, improper construction, or improper usage. XRAY assumes and accepts no responsibility for personal and/or property damages resulting from the use of improper building materials, equipment and operation. By purchasing any item produced by XRAY, the buyer expressly warrants that he/she is in compliance with all applicable federal, state and local laws and regulation regarding the purchase, ownership and use of the item. The buyer expressly agrees to indemnify and hold harmless XRAY for all claims resulting directly or indirectly from the purchase, ownership or use of the product. By the the act of using this product, the user accepts all resulting liability. If the buyer is not prepared to accept this liability, then he/she should return this product in new and unused condition to the place of purchase.

WARRANTY

XRAY guarantees this product to be free from defects in both material and workmanship within 90 days of purchase. The total monetary value under warranty will in no case exceed the cost of the original tool purchased. This warranty does not cover any components damaged by use or modification or as a result of wear. No part will be sent under warranty without proof of purchase. Should you find any defect, contact the local distributor. Service and customer support will be provided through local hobby store where you have purchased the product or by the distributor, therefore make sure to purchase any XRAY products at your local hobby store.

XRAY has no control over usage of this product once it leaves the dealer, therefore XRAY can only offer warranty against all manufacturer’s defects in materials, workmanship, and assembly at point of sale and before use. No warranties are expressed or implied that cover damage caused by what is considered normal use, or cover or imply how the speed controller will last before requiring replacement.

This warranty does NOT cover suitability for specific operation, incorrect installation, components worn by use, application of reverse or improper voltage, shipping, tampering, misuse like any soldering inside the unit, replacing of wires, connection to electrical components not mentioned in the instructions, mechanical damage, immersion of water and cutting of the original wires, plugs, connectors and switches.

XRAY does not pay nor refund shipping on any component sent to XRAY or its distributors for warranty. XRAY reserves the right to make the final determination of the warranty status of any component or part.

TROUBLESHOOTING GUIDE

Car does not react to signals from transmitter	<ul style="list-style-type: none">• Switch on transmitter and ESC.• Check if all connectors (motor, battery, ESC) are properly connected.• Check if batteries are charged.• Check if ESC and servo connectors are plugged into proper receiver channels, and wire color sequences are correct.
Steering works but motor does not run	<ul style="list-style-type: none">• Check motor wiring connections.• Check if ESC is plugged into Ch.2 slot on the receiver.• Check throttle channel operation with a servo.• Check wiring color sequence of receive signal harness.
Car goes forward, but does not reverse	<ul style="list-style-type: none">• Repeat the basic set-up.
Car goes forward, but reverses when trigger goes to neutral	<ul style="list-style-type: none">• Repeat the basic set-up.• Check if front and rear diffs are both inserted in the diff housings correctly.
Brake or reverse activates when applying forward throttle at transmitter	<ul style="list-style-type: none">• On the transmitter, switch the servo reverse setting for the ESC.Motor runs slowly/slow acceleration• Check wiring connections.• Possible bad motor or battery. Replace and check again.• Incorrect transmitter adjustment. Refer to “Transmitter Adjustments” section.
Motor runs backwards	<ul style="list-style-type: none">• Motor wired backwards. Check wiring and reverse.
Receiver glitches/throttle stutters	<ul style="list-style-type: none">• Receiver or antenna may be too close to ESC, power wires, battery, or motor.• Possible damaged receiver/transmitter crystal.• Check wiring connections.• Motor brushes may be worn. Replace motor if necessary.• Possible excessive motor current. Use smaller pinion gear.• Re-adjust transmitter throttle settings (subtrim, neutral position, EPA).

SYMPTOM	CAUSE	REMEDY
Steering servo works, but no motor function	Set-up / basic settings problem	Repeat basic ESC set-up procedure from start; to store the function correctly you must hold full-throttle position while you press the set-up button. Note also that all transmitters functions must be set as described in the instructions
	Speed control connected to wrong receiver channel	Speed control must be connected to Ch.2; check polarity of receiver lead
	Motor defective	Install new motor
	Wiring problem	Check cables and connectors
	Speed control defective	Send ESC for repair
No steering servo function no motor function	Receiver plug incorrectly wired	Check polarity of receiver plug
	Crystal faulty	Replace components one by one to locate fault
	Receiver faulty	
	Transmitter faulty	
Motor does not run when throttle is advanced; motor runs when braking	Receiver power supply circuit faulty	Check BEC output voltage, or send ESC for repair
	Transmitter throttle polarity (direction) has been changed	Repeat ESC set-up procedure. Leave transmitter throttle direction unchanged
No brake function	Set-up / basic settings problem	Repeat basic ESC set-up procedure from start; see also “No motor function” description
	Speed control faulty	Send ESC for repair
Poor braking effect	Set-up / basic settings problems	Repeat basic ESC set-up (see above), or reset Low ATV, EPA, ATL or transmitter to maximum
	Motor pinion / reduction ratio too large	Install smaller motor pinion
Insufficient top speed	Problem with set-up / basic settings. Transmitter has been changed after speed control set-up, or has changed its own settings	Repeat basic ESC set-up procedure from start; see also “No motor function” description
Poor acceleration	Motor faulty, brushes sticking	Install different motor
Speed control overheats	Inadequate cooling	Cut cooling openings in bodywork
	Motor too powerful, or input voltage too high	Use less powerful motor, or battery with lower voltage / fewer cells
	Motor pinion / reduction ratio too high	Install smaller motor pinion
	Car drive / bearing system problem	Check or replace components
	Model run too often without cooling period	Allow speed control to cool off after each full run
Motor does not stop; continues running slowly	Set-up / basic settings problem	Repeat basic ESC set-up procedure
	Speed control faulty	Send ESC for repair
Radio interference	Receiver or aerial too close to power cables, motor, battery or speed control; Receiver aerial too short, or coiled up	See “Installation Tips” section
	Receiver fault; Transmitter or transmitter module fault; Servo fault; Crystal fault, or crystal not correct type	Replace components one by one to locate fault. Use original manufacturer’s crystals only
	Connector contact problem	Check connectors
	Transmitter battery / cells flat	Replace dry cells or recharge transmitter pack
	Transmitter aerial too short	Extend transmitter aerial fully
Imprecise, non-linear control characteristics	Transmitter battery / cells almost flat	Check transmitter battery regularly
	Transmitter or transmitter “car program” has been changed	Repeat basic ESC set-up procedure

LIMITATIONS OF LIABILITY

XRAY makes no other warranties expressed or implied. XRAY shall not be liable for any loss, injury or damages, whether direct, indirect, special, incidental, or consequential, arising from the use, misuse, or abuse of this product and/or any product or accessory required to use this product. In no case shall XRAY’s liability exceed the monetary value of this product. All rights reserved.

REPAIR PROCEDURES

- In case of problems first check the Troubleshooting Guide or contact the hobby shop where you bought the product or contact your national XRAY distributor to obtain information how to proceed with reclamation.

- For quick repair and return service, provide your full address and work and private phone number and add a detailed description of the malfunction.

- Products sent in for repair that operate perfectly will be charged with a service fee. Therefore first check with the Troubleshooting Guide.

- Package your product carefully and follow the instructions you will receive from the national distributor.

If you have any questions, please do not hesitate to contact XRAY at **info@teamxray.com** or visit our website at **www.teamxray.com** for news and updates.