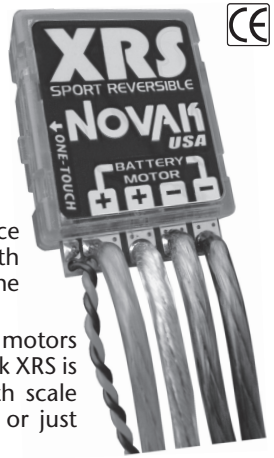
INSTRUCTION MANUAL

XRS SPORT REVERSIBLE ESC

NOVAK



The XRS Sport Reversible...the perfect upgrade!

Designed with ultra-small surface mount technology & loaded with all the standard Novak features, the XRS is the perfect upgrade.

Capable of handling 4-7 cells & motors with as few as 15 turns, the Novak XRS is a great upgrade for your 1/10th scale touring sedan, off-road buggy, or just about any sport application.

The 5V/1A B.E.C. handles most any servo with ease, and **Radio Priority Circuitry** maintains steering control even after the battery has discharged. Novak's new **Smart Braking II Circuitry** gives you full range of braking without going into reverse until you shift it into reverse by returning the trigger to neutral...this provides smoother take-offs in reverse and less wear on your drive train. **Polar Drive Technology** keeps thing cool & improves radio system performance. And of course, **Novak's original One-Touch Set-Up** means your new ESC is the easiest to program.

PRECAUTIONS

- **WATER & ELECTRONICS DON'T MIX!** Do not operate model in or around water. Never allow water, moisture, or other foreign materials to get inside the ESC.
- **15-TURN MOTOR LIMIT** Use only motors with 15 turns or higher. Using motors with fewer turns than 15 will cause overheating and will void the warranty.
- **4 TO 7 CELLS ONLY** Never use fewer than 4, or more than 7 cells *(4.8-8.4 volts DC)* in the main battery pack.
- **NO REVERSE VOLTAGE!** Reverse battery polarity can damage speed control—Disconnect battery immediately.
- **NO SCHOTTKY DIODES** Using external Schottky diodes with reversible ESCs will damage ESC & void warranty.
- **DISCONNECT BATTERIES WHEN NOT IN USE** Always disconnect battery from ESC when unattended or not in use to avoid possible short circuits. Even if switch is off, MOSFETs may fail & cause shorting of battery pack that could result in fire or burning of ESC & surrounding objects.
- **TURN TRANSMITTER ON FIRST** Turn on transmitter before ESC so you will have control of the radio equipment.
- **INSULATE WIRES** Always insulate exposed wiring with heat shrink tubing or electrical tape to avoid short circuits.

XRS SPECIFICATIONS

Input Voltage	4-7 cells *(1.2VDC/cell)*
Motor Limit	15 turn *(@ 6 cells)*
Battery/Motor Connectors	Tamiya/Bullet
Rated Current* *(fwd/rev)*	40 amps
On-Resistance*	0.0055 ohm
B.E.C. Voltage	5.0 volts DC
B.E.C. Current	1.0 amp
PWM Frequency	1000 Hertz
Protection	Thermal Overload
Case Width	1.10 inch *(27.9mm)*
Case Depth	1.31 inches *(33.3mm)*
Case Height	0.53 inch *(13.5mm)*
Weight	1.27 ounce *(36.0 grams)*
Part Number	1830

**MOSFET rating @ 25°C*

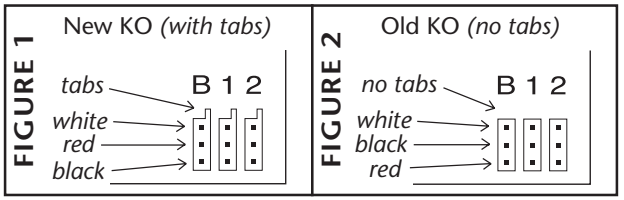
STEP 1 CHANGING INPUT HARNESS

The XRS comes with the industry standard input harness connector that works with all major radio brands. However, with some older style receivers, the wiring sequence in the plastic connector needs to be changed at the receiver-end of the harness. This is important because the electronics in the receiver may be damaged if the wiring sequence is incorrect. Changing the sequence is easy to do, as described below.

JR • Hitec • New KO • Airtronics Z

JR, Hitec, Futaba, new KO, & Airtronics Z receivers do not need to change the sequence of the ESC's input harness wires. *New Airtronics Z receivers have blue plastic cases, & new KO cases have tabs on the input harness openings, as in **Figure 1**.*

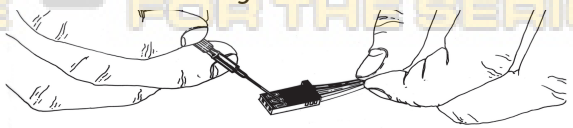
- Insert the input plug into the receiver with the ***BLACK wire toward the outside edge*** of the receiver case.



Old-style KO • Old-style Sanwa/Airtronics

If your receiver is an older KO or Sanwa/Airtronics, you must change the sequence of the ESC's input harness wires. Old Sanwa/Airtronics cases are black in color. Old KO cases do not have the tab openings, as in **Figure 2** above.

- ***Interchange the red & black wires*** in the plug plastic of the ESC's input harness at the receiver end as shown below.
- Insert the input plug into the receiver with the ***RED wire toward the outside edge*** of the receiver case.



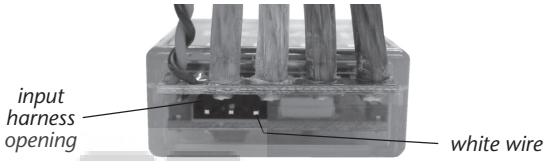
STEP 2 MOUNTING ELECTRONICS

1. **DETERMINE BEST ESC MOUNTING LOCATION**
   Position ESC away from receiver & antenna as shown in Set-Up photo *(on back)*. Choose a mounting position that will keep the power wires from obstructing movement of the vehicle's suspension or the motor pod.
2. **INSTALL SPEED CONTROL**
   Use the included double-sided tape to mount the ESC.
3. **INSTALL ON/OFF SWITCH**
   Determine a convenient place to mount switch where it will be easy to get to. Mount with double-sided tape.
4. **INSTALL RECEIVER**
   Mount the receiver as far from the motor, power wires, battery, and servo as possible. These components all emit radio noise when the throttle is being applied. On graphite or aluminum, place the receiver on edge with the crystal and antenna as far above the chassis as possible.
   Mount the antenna close to the receiver and trail any excess wire off the top of the antenna.

STEP 3 CONNECTING ELECTRONICS

Refer to Set-Up photo on back

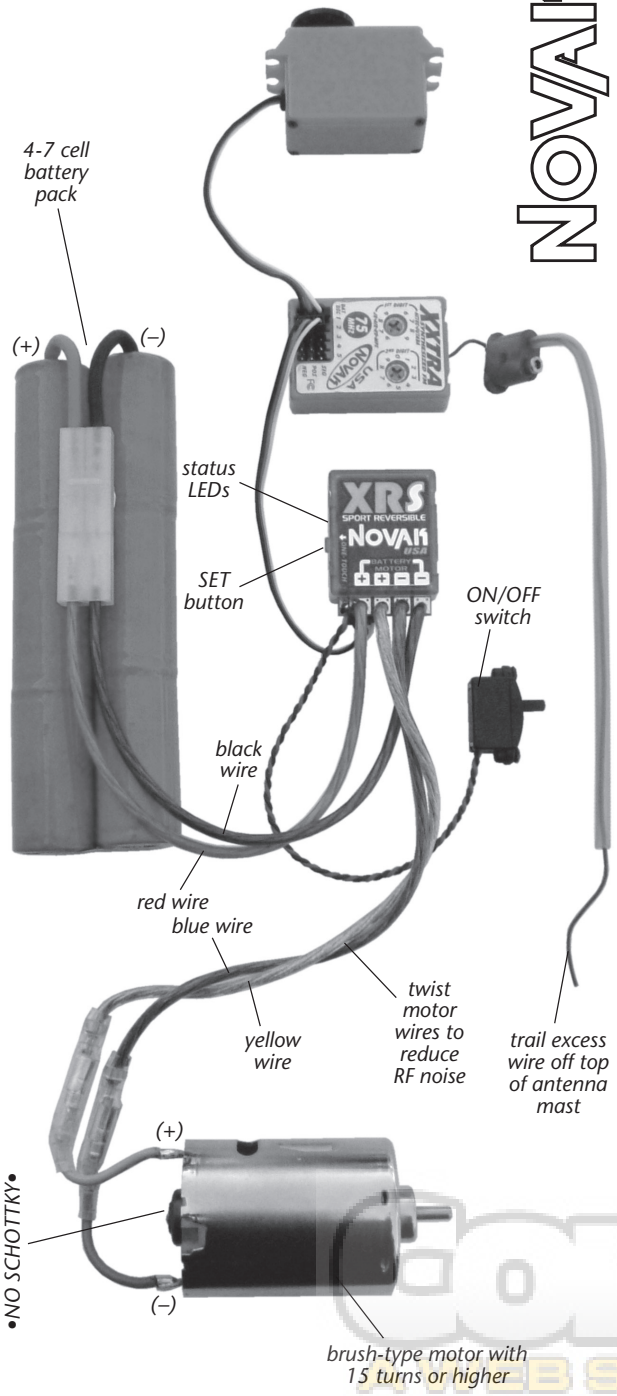
1. **IMPORTANT NOTE ABOUT SCHOTTKY DIODES**
   •NO SCHOTTKY DIODES•
   Schottky diodes must **NOT** be used with reversible ESCs. Schottky use will damage ESC and void the warranty.
2. **CONNECT SPEED CONTROL TO THE RECEIVER**
   After the input plug plastic has been properly wired to match the receiver *(Refer to Step 1)*, plug the ESC's input harness into the **THROTTLE CHANNEL** of the receiver.
   ***Note:** The XRS comes with a user-replaceable input harness that has the same connector on both ends. Should the harness come unplugged from the ESC, insert the connector on the end of the harness into the opening under the power wire tabs with the **WHITE** wire toward the center of the ESC.*



3. **CONNECT SPEED CONTROL TO THE BATTERY PACK**
   Plug the **WHITE** Tamiya-style battery connector from speed control into a 4 to 7 cell battery pack *(1.2 volts DC/cell)*.
4. **CONNECT SPEED CONTROL TO THE MOTOR**
   Plug the bullet connector on the **YELLOW** wire from speed control into the positive connector from the motor.
   Plug the bullet connector on the **BLUE** wire from speed control into the negative connector from the motor.

***TIP:** Twisting the motor wires once or twice as they go to the motor can help reduce any radio noise emitted from the wires.*

SET-UP PHOTO



STEP 4 TRANSMITTER ADJUSTMENTS

•NOT ALL TRANSMITTERS HAVE THESE ADJUSTMENTS•

1. Set **HIGH ATV** or **EPA** to **maximum** setting.
   [Amount of throw at full throttle]
2. Set **LOW ATV**, **EPA**, or **ATL** to **maximum** setting.
   [Amount of throw at full brakes]
3. Set **EXPONENTIAL** to **zero** setting.
   [Throttle channel linearity]
4. Set **THROTTLE CHANNEL REV. SWITCH** to **either** position.
   [Do not change switch position after programming]
5. Set **THROTTLE CHANNEL TRIM** to **middle** position.
   [Adjusts neutral position/Increases or decreases coast brakes]
6. Set **ELECTRONIC TRIGGER THROW ADJUSTMENT** to **50% throttle** and **50% brake** throw (or 5:5).
   [Adjusts trigger throw on electronic/digital pistol-grip transmitters]
7. Set **MECHANICAL TRIGGER THROW ADJUSTMENT** to position with **1/2 throttle** and **1/2 brake** throw.
   [Adjusts trigger throw on mechanical/analog pistol-grip transmitters]

STEP 5 PROGRAMMING SPEED CONTROL

With ESC connected to receiver & charged battery pack:

1. **TURN ON THE TRANSMITTER, THEN SPEED CONTROL**
2. **PRESS AND HOLD SPEED CONTROL'S SET BUTTON**
   With transmitter throttle at neutral, press and hold the ESC **SET** button until the status **LED *turns solid red***.
3. **RELEASE ESC SET BUTTON WHEN LED IS RED**
4. **PULL TRANSMITTER THROTTLE TO FULL-ON POSITION**
   Hold it there until the status **LED *turns solid green***.
   NOTE: Motor will not run during programming even if connected.
5. **PUSH TRANSMITTER THROTTLE TO FULL-REVERSE**
   Hold it there until the status **LED *blinks green***.
6. **RETURN TRANSMITTER THROTTLE TO NEUTRAL**
   Status LED will turn solid red, indicating that throttle is at neutral and proper programming has been completed.

If transmitter settings are changed, programming must be repeated.
If you experience any problems, turn off ESC and repeat programming.

CUSTOMER SERVICE

Monday-Thursday: 8:00am-5:00pm (PST)
Friday: 8:00am-4:00pm *(closed every other Friday)*

(949) 833-8873 • FAX (949) 833-1631

e-mail: cs@teamnovak.com

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TROUBLE-SHOOTING GUIDE

Steering Channel Works But Motor Will Not Run
- Speed control has thermally shut down—Allow ESC to cool down—Use milder motor or smaller pinion gear.
- Check motor connections. Check motor.
- Make sure ESC is plugged into the throttle channel of receiver. Check throttle channel operation with a servo. Check wiring color sequence of receiver signal harness.
- Possible internal damage—Refer to Service Procedures.

Receiver Glitches/Throttle Stutters During Acceleration
- Motor capacitors broken or missing—Refer to Step 3.
- Receiver or antenna too close to speed control, power wires, battery, or motor—Refer to Step 2.
- Bad connections—Check wiring and connectors.
- Motor brushes worn—Replace motor.
- Excessive motor current—Use milder motor/smaller pinion gear.

Motor and Steering Servo Do Not Work
- Check wires, receiver signal harness wiring & color sequence, radio system, crystals, battery/motor connectors, & battery.
- Possible internal damage—Refer to Service Procedures.

Model Runs Slowly/Slow Acceleration
- Check motor and battery connectors—Replace if needed.
- Bad battery or motor—Check operation with another.
- Incorrect transmitter/ESC adjustment—Refer to Steps 4 & 5.

Motor Runs Backwards
- Motor wired backwards—Check wiring and reverse.

SERVICE PROCEDURES

Review the Trouble-Shooting guide and the instructions, as the ESC may appear to have failed when other problems exist.

After reviewing the instructions, if you feel that your ESC requires service, please obtain the most current product service options and pricing by one of the following methods:

WEBSITE: Print a copy of the ***PRODUCT SERVICE FORM*** from the SERVICE section of the website. Fill out the needed information on this form and return it with the Novak product for servicing.

PHONE/FAX/E-MAIL: If you do not have access to the internet, contact our customer service department by phone, fax, or e-mail as listed in the CUSTOMER SERVICE section below, and they will supply you with current service options.

WARRANTY SERVICE: For warranty work, you *MUST CLAIM WARRANTY* on the ***PRODUCT SERVICE FORM*** and include a valid cash register receipt with purchase date on it, or an invoice from previous service work. If warranty provisions have been voided, there will be service charges.

PRODUCT WARRANTY

★ 120 DAY WARRANTY

The XRS is guaranteed to be free from defects in materials or workmanship for a period of 120 days from original date of purchase *(verified by dated, itemized sales receipt)*. Warranty does not cover incorrect installation, components worn by use, damage from using fewer than 4 or more than 7 cells *(1.2 volts DC/cell)* input voltage, cross-connection of the battery/motor, using the same-gender connectors on ESC, reverse voltage application, damage resulting from thermal overload, splices to input or switch harnesses, damage from disassembling case, replacing wires, or excessive force when using SET button, tampering with internal electronics, allowing water, moisture, or other foreign material to enter ESC or get onto PC board, incorrect installation/wiring of battery/motor leads, alternate input plug plastic, external receiver battery pack, or FET servo, allowing exposed wiring to short-circuit, leaving battery pack connected to ESC while unattended or for extended periods of time, use of a Schottky diode, or any damage caused by crash, flooding, or act of God. In no case shall our liability exceed the product's original cost. We reserve the right to modify warranty provisions without notice.

Because Novak Electronics, Inc. has no control over connection and use of the ESC, no liability may be assumed, nor will be accepted for damage resulting from the use of this product. Every ESC is thoroughly tested and cycled before leaving our facility and is, therefore, considered operational. By the act of connecting/operating ESC, the user accepts all resulting liability.

www.teamnovak.com