RA00193

ORDER NO.:
80100
80150

A.I. REVERSE BRUSHLESS

A.I. PRO REVERSE BRUSHLESS

BRUSHLESS + BRUSHED
WATERPROOF
LRP A.I. AUTOMATIC
FAIL SAFE
NIMH, NICD, LIPO

USER MANUAL

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Dear customer,

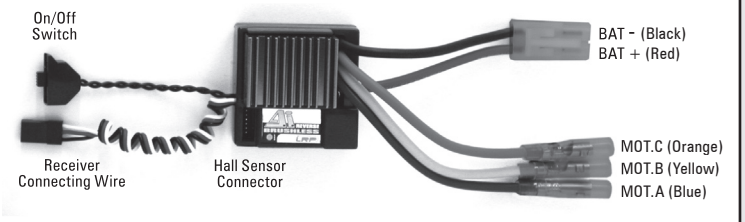
thank you for your trust in this LRP product. By purchasing a LRP A.I. BRUSHLESS (PRO) REVERSE speed-control, you have chosen a high-performance brushless+brushed speed-control. With this unit, LRP presents the promising sensor brushless technology as a sports level Brushless+Brushed speed-control. The main features of this LRP A.I. BRUSHLESS (PRO) REVERSE speed-control are:

- 100% A.I. Automatic Adaptation
- NiMH / NiCd / LiPo
- Waterproof
- Forward/Brake/Reverse
- Multi-Protection-System
- Limited Lifetime Warranty
- Brushless + Brushed
- 4, 5 and 6 cell optimised
- Fail Safe
- Sensored Design
- Plug in and Drive

Please read the following instructions to ensure, that your LRP A.I. BRUSHLESS (PRO) REVERSE speed-control always works up to your full satisfaction.

Please read and understand these instructions completely before you use this product! With operating this product, you accept the LRP warranty terms.

1. CONNECTIONS



RECEIVER CONNECTING WIRE:
This LRP speed-control is equipped with an LRP Multicon receiver wire. As supplied, it will easily fit in all ordinary receivers.

HALL SENSOR WIRE:
This bi-directional multipole wire (which comes with the motor and NOT the speed-control!) connects the speed-control and the motor. Do not alter or modify this cable! There are replaceable/optional hall sensor wires available: • #81910 (20cm) • #81920 (10cm)

POWER WIRES:
The LRP A.I. BRUSHLESS (PRO) REVERSE speed-control comes pre-wired using common „Tamiya-/JST style" battery and motor connectors. Together with a LRP ERASER BRUSHLESS SPORTS MODIFIED motor (#50350-50380) and a pre-assembeled battery-pack from LRPs selection of battery packs, the speed-control can be used instantly without the need of a solder iron. Additionally included with this speed-control are a set of adapter wires, to connect the LRP A.I. BRUSHLESS (PRO) REVERSE with a brushed motor (please see section 5 „Installation" for further reference).
You can also solder the power wires of the speed-control directly to the motor, if you do not want to use the supplied plugs. Nevertheless some soldering skills are still required. However please note, that your warranty may void if you cut-off the plugs. Therefore we recommend using the original power-wires and plugs.

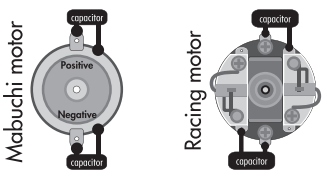
2. INSTALLATION TIPS

- Mount the speedo using the supplied thick/black doubled-sided tape.
- Position the speed-control where it is protected in the event of a crash.
- Install the speed-control so that you have easy access to the connector and buttons.
- Make sure there is enough clearance (about 3cm) between the speed-control, power-wires, antenna and receiver. Avoid any direct contact between power components, the receiver or the antenna. This can cause interference. If interference occurs, position the components at a different place in the model.
- The aerial should be run vertically up and away from the receiver. Avoid contact with any parts made of carbon fibre or metal. If the aerial is too long, don't coil up the excess length. It is better to cut it down to a length of about 35 cm. See also the instructions supplied with your radio control system.
- Make sure there are enough cooling slits in the body. This will increase the performance and life of all the electronic components.

HEATSINK: To achieve best perfomance even under extreme conditions, the heatsink has been directly mounted to the speed-control. This ensures the best possible heat transfer away from the speed-control.
Caution: Never attempt to remove the heatsink.

Because of the physical principles of brushless technology, the speed-controls do get a little hotter then brushed systems. Therefore it is required to let the speed-control cool down completely after every run. When running in extreme conditions (high ambient temperature, low-turn motors, high gear ratios, etc.) we recommend using LRP's brushless cooling set #82500, which includes an optional fan (perfectly sized 25x25mm, pre-wired).

3. SUPPRESSION



ONLY FOR BRUSHED MOTORS! Motors with no capacitors or not enough capacitors may interfere with the speed-control. To avoid this, solder the supplied capacitors to your motor (see picture).
Brushless motors do not require an additional suppression.

CAUTION: Never use Schottky diodes in conjunction with a brushless or forward/reverse brushed speed-control, e.g. the LRP A.I. BRUSHLESS (PRO) REVERSE.

4. SPECIFICATION

	A.I. Brushless Reverse (#80100)	A.I. Brushless Pro Reverse (#80150)
Brushless + Brushed	yes	yes
Brushless + Brushed Adaptation	Automatic	Automatic
Forward/Brake/Reverse	yes	yes
Case Size	41.0 x 41.8mm	41.0 x 41.8mm
Weight (excl. wires)	62g	62g
Voltage Input	4.8 - 8.4V	4.8 - 8.4V
Typical Voltage Drop (Brushless)*	@20A - 0.160V	@20A - 0.072V
Rated Current (Brushless)*	120A/phase	150A/phase
Compatible winding styles	Star	Star
Rec. Motor Limit for Star winds (Brushless)**	over 12.5 turns	over 8.5 turns
Typical Voltage Drop (Brushed)*	@20A - 0.120V	@20A - 0.054V
Rec. Motor Limit (Brushed)**	over 10 turns	over 7 turns
Rated Current (Brushed)*	120A	150A
AutoCell System (NiMH-LiPo automatic adaptation)	yes	yes
4, 5 and 5 cell optimised	yes	yes
B.E.C.	5.0V	5.0V
High Frequency	yes	yes
Sensored Brushless System	yes	yes
Fail-Safe-System	yes	yes
Waterproof	yes	yes
Multi-Protection-System	yes	yes
Standard Tamiya Style Connectors	yes	yes
Set-Up Procedure	Automatic	Automatic

* Transistors rating at 25°C junction temperature
** measured at 7.2V

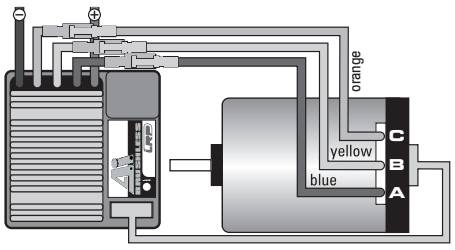
Specifications subject to change without notice.

5. INSTALLATION

The LRP A.I. BRUSHLESS (PRO) REVERSE speed-control comes pre-wired using common „Tamiya-/JST style" battery and motor connectors. Be very careful with the correct wire sequence/colors since an incorrect connection may damage the speed-control!

- Mount the speedo using the supplied thick/black doubled-sided tape.
- Connect the Receiver wire of the speed-control with the receiver (position: Channel 2).
  Caution: Be careful with the correct polarity of the receiver wire!

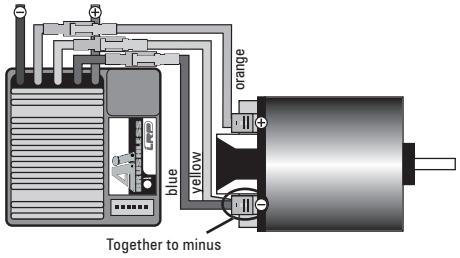
CONNECTION OF A BRUSHLESS MOTOR:
- Blue power-wire ➔ Connect to motor „A"
- Yellow power-wire ➔ Connect to motor „B"
- Orange power-wire ➔ Connect to motor „C"
- Connect the hall sensor cable to the speed-control and the motor.



Hall Sensor Wire

CONNECTION OF A BRUSHED MOTOR:
- Blue/Yellow power-wire ➔ Connect to motor „Minus"
- Orange power-wire ➔ Connect to motor „Plus"

LRP Tip: Use the supplied adapter wires.



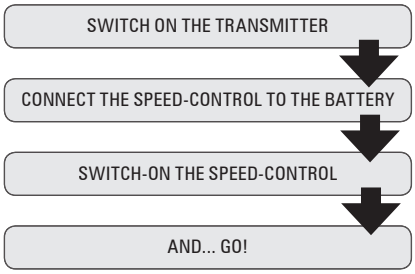
Together to minus

- Doublecheck all connections before connecting the speed-control to a battery.
  CAUTION: If battery is connected with reversed polarity it will destroy your speed-control!
- Red power-wire ➔ Connect to battery „Plus"
- Black power-wire ➔ Connect to battery „Minus"
- You can now switch on the speed-control with the On/Off Switch.
- The speed-control is now ready to be set-up (please see section 6 „Speed-Control Set-up" for further reference).

6. SPEED-CONTROL SET-UP

After wiring up the speed-control, it is ready to operate. No setup is required. The speed-control „learns" the neutral, full-speed forward and full-speed reverse points while the car is running.

Please note: Before you plug in the drive battery, set the transmitter to neutral position and then start the model in the forward direction.



- If you have made a mistake so far, don't worry: Switch off the speed-control for about 10 seconds and start over again.
- After the run, first switch off the speed-control, unplug the battery and then switch off the transmitter. When you start again, first switch on the transmitter, then plug in the battery and switch on the speed-control..

CHECKING THE FUNCTIONS:
Check the LED's when moving your throttle stick and you will see if everything is setup correctly.

FUNCTION	STATE	LED
Neutral	--	green
Forward	partial throttle	off
Forward	full throttle	green
Brake/Reverse	partial brake	off
Brake/Reverse	full brake/reverse	green

7. SPECIAL FEATURES

Automatic Brushless / Brushed Adaptation: The LRP exclusive Automatic Brushless/ Brushed Adaptation detects the connected motor type during turn-on/initialisation and adjusts the correct brushless or brushed operation automatically. No adjustments required by yourself, apart from the correct connection of each motor type (don't forget the hall-sensor-wire for brushless!).

LRP A.I. Automatic: Due to the LRP exclusive A.I. Automatic Technology, there is no need for a manual setup of the speed-control by pushbuttons or potentiometers. All you need to do is simply plug in the speed-control and you're ready to go. The speed-control "learns" the neutral, full-speed forward and full-speed reverse point of the radio system while the car is running. This way, the speed-control has the optimized setup for every run - automaticly. Incorrect setups are a thing of the past with the LRP A.I. BRUSHLESS (PRO) REVERSE speed-controls.

AutoCell System: Ready for the next battery technology – LiPo batteries! LRP's exclusive and smart AutoCell System ensures that LiPo batteries can be used safely without accidentially deep-discharging of the cells. The motor function will be shut-off and the LED will flash if the system recognises very low battery voltage.

Waterproof: Due to latest production technologies and use of HighTech materials, it was possible to make these speed-controls fully waterproof! This material also makes the speed-controls more shock resistant then other similar products. It's no longer needed to seal your speed-control when you are driving in the rain/snow!
But please make sure you still seal your other electronic components (receiver, servo and motor) since these are normally not waterproof and will get damaged due to the water.

Fail Safe System: Digital protection against radio interference, "The guardian angel". The safety electronic can detect reception of a "false" or incomplete radio signal, e.g due to a low transmitter battery or environmental radio interference which reach the model, or if the model is out of the transmitter range. For protection against damage, the speed-control switches to the neutral position, and the model comes to a stop.
LRP tip: The model will remain in a standstill, even if you connect the drive battery to the speed-control first and then switch on the transmitter! Provides perfect protection against mistakes commonly made by beginners.

Sensored Brushless Technology: The sensors allow the perfect knowledge of the brushless motor's magnet position. This results in perfect motor control at high and low RPM's, as well as perfect brake control.

Multi-Protection System, 3-way protection: The perfect protection against short-circuits (motor), overload and overheating (of the speed-control and of the motor). If your speed-control or motor faces overload, the motor function will be shut-off for protection and the LED will flash, although the steering function is maintained. Let everything cool down for a few minutes.
If the speed-control switches off frequently, either the motor used is too strong, the motor pinion is too big or you are using full brake too often. You can improve this if you make additional cooling slots in the body.

8. AUTOCELL SYSTEM

The LRP A.I. BRUSHLESS (PRO) REVERSE speed-control features LRPs excluxive AutoCell System. You can choose between 2 modes:

- LiPo/NiMH-Automatic Mode
- 4-7cell NiMH Racing Mode

The works default setting of the speed-control is LiPo/NiMH-Automatic mode.

When using the LiPo/NiMH-Automatic Mode, the speed-control will switch off the drive function as soon as the battery voltage falls under a value, which is harmful for LiPo batteries. Thus protecting your LiPo battery against deep-discharging. If you are using your speedo with LiPo batteries, we strongly recommend to always use the LiPo/NiMH-Automatic Mode. When using the 4-7cell Racing Mode, the drive function will not be switched off.

Displaying the current mode during switch-on:
You can check the current mode setting by switching on the speed-control while the transmitter is also switched on. The initial flashing of the LED tells you, which mode is currently activated.

- The LED flashes **once**, followed by a short break and then stays on continuously.
  ➔ LiPo/NiMH-Automatic Mode is active.
- The LED flashes **twice**, followed by a short break and then stays on continuously.
  ➔ 4-7cell NiMH Racing Mode is active.

Toggle AutoCell mode:
1. Pull out the receiver wire from the receiver.
2. Turn on the speed-control (with the battery connected).
3. The LED flashes and indicates the current mode. See above for further reference.
4. After approx. 5 sec, the speed-control automatically switches the mode. This will be indicated by the LED flashing again and indicating the new mode.
5. Turn off the speed-control. The new mode setting is now stored.
6. Re-connect the receiver wire of the speed-control with the receiver.

9. TROUBLESHOOTING GUIDE

EXPLANATION: If no remark, cause can be either with brushless or brushed motor. If „BM" is indicated, cause only relating to brushed motor.

SYMPTOM	CAUSE	REMEDY
Servo is working, no motor function.	Speed-control plugged in incorrectly	Plug speed-control in Ch 2
	Overload protection activated	Allow speed-control to cool down
	Wiring problem	Check wires and plugs
	Motor defective	Replace motor
	BM - Motor brushes stuck	Check that brushes are moving freely
	Speed-control defective	Send in product for repair
No servo and no motor function.	Speed-control plugged in incorrectly	Plug speed-control in with correct polarity
	Crystal defective	Replace components one by one.
	Receiver defective	
	Transmitter defective	
	Speed-control defective	Send in product for repair
Motor runs in reverse when accelerating forward on the transmitter.	*BM* - Motor connected incorrectly	Connect motor correctly
Insufficient performance. E.g. poor brake power, topspeed or acceleration..	Motor pinion too big or gear ratio too long.	Use smaller motor pinion/shorter gear ratio
	Transmitter settings changed after set-up	Repeat set-up procedure
	BM - Motor worn out	Maintain motor
	Motor defective	Replace motor
	Speed-control defective.	Send in product for repair
Speed-control overheats or switches off frequently.	Motor stronger than motorlimit or input voltage too high	Use only motors and batteries which are within the specifications of the speed-control
	Motor pinion too big or gear ratio too long.	Use smaller motor pinion/shorter gear ratio
	Drive train or bearing problems.	Check or replace components.
	Model used too often without cool-down periods	Let speed-control cool down after every run
Motor never stops, runs at constant slow speed	Transmitter settings changed after set-up	Repeat set-up procedure
	Humidity/water in speed-control	Immediately unplug and dry speed-control
	Speed-control defective	Send in product for repair
Radio interference	*BM* - Motor suppressors not sufficient	Solder capacitors to motor
	Receiver or antenna too close to power wires, motor, battery or speed-control. Receiver aerial too short or coiled up	See „Installation Tips" and „Installation"
	Receiver defective, too sensitive; Transmitter defective, transmitter output power too low, servo problem	Replace components one by one Only use original manufacturers crystals
	Poor battery connection	Check plugs and connecting wires
	Transmitter batteries empty	Replace / recharge transmitter batteries
	Transmitter antenna too short	Pull out antenna to full length
Speed-control looses settings	Receiver problem (especially with some 2.4GHz systems)	Use a power capacitor on the receiver

REPAIR PROCEDURES / LIMITED WARRANTY

All products from LRP electronic (hereinafter called "LRP") are manufactured according to the highest quality standards. LRP guarantees this product to be free from defects in materials or workmanship for 90 days (non-european countris only) from the original date of purchase verified by sales receipt. This limited warranty doesn't cover defects, which are a result of normal wear, misuse or improper maintenance. This applies among other things on:

- Cut off original power plug or not using reverse polarity protected plugs
- Receiver wire and/or switch wire damaged
- Mechanical damage of the case
- Mechanical damage of electronical components/PCB
- Soldered on the PCB (except on external solder-tabs)
- Connected speed-control with reversed polarity

To eliminate all other possibilities or improper handling, first check all other components and the trouble shooting guide, if available, before you send in this product for repair or warranty. Products sent in for repair, that operate perfect have to be charged with a service fee.

By sending in this product, you assign LRP to repair the product, if it is no warranty or Limited Lifetime Warranty case. The original sales receipt including date of purchase needs to be included. Otherwise, no warranty can be granted. For quick repair- and return service, add your address and detailed description of the malfunction.

Because we don't have control over the installation or use of this product, we can't accept any liability for any damages resulting from using this product. Therefore using this product is at owner's risk. Our limited warranty liability shall be limited to repairing the unit to our original specifications. In no case shall our liability exceed the original cost of the unit. By installing or operating this product, the user accepts all resulting liability.

The specifications like weight, size and others should be seen as guide values. Due to ongoing technical improvements, which are done in the interest of the product, LRP does not take any responsibility for the accuracy of these specs.

With Limited Lifetime Warranty products, the warranty terms on the Limited Lifetime Warranty card do also apply.

LRP-Distributor-Service:

- Package your product carefully and include sales receipt and detailed description of malfunction.
- Send parcel to your national LRP distributor.
- Distributor repairs or exchanges the product.
- Shipment back to you usually by COD (cash on delivery), but this is subject to your national LRP distributor's general policy.