Dear Customer,

Thank you for your trust in the LRP product. By purchasing a LRP SPHERE Brushless AND Brushed speed-control, you have chosen one of the most advanced speed-controls as of today, which is full of high design features such as:

- Brushless AND Brushed operation
- Small and lightweight
- Blue metalised case
- Multi-Protection System
- 4 adj. Modes (motor type selection, punch, initial-brake and automatic-brake)
- Fed/Bld/Rs and Fed/Bld/Racing Mode
- Sensorless Brushless Technology
- External solder tabs
- Intuitive DC-style programming
- 100% Digital Technology

Please read and understand these instructions completely before you use this product!

With operating this product, you accept the LRP warranty terms.

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**Specification**

<table>
<thead>
<tr>
<th>Brushless AND Brushed</th>
<th>yes</th>
<th>Typ. Volt.Drop (Brushed*) @20A</th>
<th>0.026V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward/Brake/Reverse</td>
<td>yes</td>
<td>Rec. Motor Limit (Brushed)**</td>
<td>&gt;7 turns</td>
</tr>
<tr>
<td>Case Size</td>
<td>33.1x37.6x14.9</td>
<td>Rated-Current (Brushed*)</td>
<td>200A</td>
</tr>
<tr>
<td>Weight (ext. wires)</td>
<td>24.5g</td>
<td>R.C.C.</td>
<td>5.5V</td>
</tr>
<tr>
<td>Voltage Input</td>
<td>4.7 cells (4.8-4.9V)</td>
<td>High frequency</td>
<td>yes</td>
</tr>
<tr>
<td>Typ. Volt.Drop (Brushed*) @20A</td>
<td>0.035V</td>
<td>Sensored Brushless System</td>
<td>yes</td>
</tr>
<tr>
<td>Rated Current (Brushless*)</td>
<td>200A</td>
<td>Multi-Protection System</td>
<td>yes</td>
</tr>
<tr>
<td>Rec. Motor Limit (Brushless*)</td>
<td>5.5 turns</td>
<td>Connectors</td>
<td>Std Tamiya</td>
</tr>
<tr>
<td>4 adj. Modes (Brushless/Brushed, Punch, Initial-brake, Auto-brake)</td>
<td>yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Transistors rating at 25°C junction temperature. Specifications subject to change without notice.

**Connections**

**Brush Motor Cables**

- Motor Orange (MOT C)
- Motor Yellow (MOT B)
- Battery Connection
- Hall Sensor Connector

**Receiver Connecting Wire**

This LRP speed-control is equipped with a LRP Multi-con receptor 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 hall sensor wires available:

- #81910 (20cm)
- #81920 (10cm)

**Power Wires**

The SPHERE comes pre-wired using common Tamiya/JST battery connector and JST motor connectors. It’s simply “plug & play” when you intend using a designated LRP or Ready brushed motor! There are adapter wires included to connect the SPHERE to a brushed motor (see chart ‘Installation’ for details). There’s also a complete set of power wires included, which allow you to use a “hardwired” wire setup. The unique split soldering tabs allow easy and convenient replacement of the power wires. Nevertheless some soldering skills are required. Talk to your local hobbyshop if you are concerned about replacing the wires yourself.

There is a replacement power wire set available: #82505

**CAUTION**: Avoid soldering longer then 5sec on soldering joint when replacing the power wires to prevent possible damage to the speed-control.

**Installing Tips**

- After the speed-control, using the supplied double-sided adhesive tape.
- Make sure there are enough cooling fins in the body. This will increase the performance and life of all the electronic components.
- 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 plugs, connectors and buttons.
- Make sure there is enough clearance (about 3cm) between the speed-control, power cable and antenna or receiver. Avoid any direct contact between power components, the receiver or the antenna. This can cause overheating. 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 cut the exess length. It is better to cut it down to a length of about 15 cm. See also the instructions supplied with your radio system.

**Installation**

**Important**: We recommend using the supplied heatshrink on the SPHERE brushless + speed-control in order to achieve best performance even under extreme circumstances. Clean the heatsink and stickerplate before you attach the thermal tape to obtain best possible heat transfer.

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) and a power capacitor.

**MOTOR 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).

**CAUTION**: Never use Schottky diodes in conjunction with a brushed or forward/reverse brushed speed-control, e.g. the LRP SPHERE brushless + brushed digital.

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**User Guide**

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**Important**:

- Never leave your RC model unsupervised when the battery is plugged in. If a defect occurs, it could set fire to the model or the surroundings.
- Never wrap your speed-control in plastic film or metal foil. In fact, make sure it gets enough fresh air.
- Avoid soldering longer then 5sec per soldering joint when replac- ing the power wires to prevent possible damage to the speed-control due to overheating of the components!
- Pay close attention to the following points, as they will destroy the speed-control and void your warranty.
- Never solder a Schottky diode to the motor when you are using a brushed speed-control. A Schottky diode will destroy any brushless or forward/reverse speed-control.
- Never allow the speed-control or other electronic components to come in contact with water. Do not operate the speed-control in the rain. If you ever have to operate in the rain, protect your speed-control properly to avoid that water reaches the speed.
- If the speed-control is connected to the motor, never run the motor directly with a separate battery or run-in device.
- Never connect the speed-control incorrectly or with reversed polarity.
- All wires and connections have to be well insulated. Short-circuits will destroy the speed-control. Pay special attention to the receiver and switch wires.
- Never change the polarity of the receiver connector.
- Never open the speed-control and never solder on the PCB (except on external solder tabs).

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**Connections**

- Connect the speed-control to the receiver (position: channel 2)
- Be very careful with the correct wire sequence!

**Brushless Motor**

- The SPHERE comes pre-wired using common JST motor connectors. It’s simply “plug & play” when you intend using a designated LRP or Ready brushed motor, see picture below! You can, of course, also use the supplied optional power wires for a “hardwired” setup without connectors.
  - MOT A = blue wire
  - MOT B = yellow wire
  - MOT C = orange wire
  - Connect the hall sensor cable to the speed-control and the motor.

**Brushed Motor**

- There are adapter wires supplied with the SPHERE, which allow simple and troublefree connection of a brushed motor, as shown in the picture below. You can, of course, also use the supplied optional power wires for a “hardwired” setup without connectors.
  - MOT A (blue) and MOT B (yellow) will be the combined “minus” on the brushed motor.
  - MOT C (orange) wire will be “plus” on the brushed motor.

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**Specification**

- **4 adj. Modes** (Brushless/Brushed, Punch, Initial-brake, Auto-brake)
- **4 modes** (Brushless + Brushed, Brushless, Brushed, Brushless + Brushed)
In setup mode, the SPHERE stores every step when you press the SET button. All the settings will be stored in the speed-controls memory even if the speed-control will be disconnected from the battery.

**TRANSMITTER SETTINGS**

Setup the following basic functions on your transmitter (if available):
- **Trim**
- **Gain**
- **High ATV, SPA**
  - **Max power**
  - **Max speed**
- **Servo reverse**
- **Steer trim**
- **Throttle reverse**
- **Throttle trim**

**MODE LED**

- **Mode.1** (speed-control type selection): The SPHERE contains 4 speed-controls, which are built into the SPHERE.
  - **Value 1**
    - **Linear**: Allows you to select between the different types of speed-controls, which are built into the SPHERE.
  - **Value 2**
    - **Value 3**
    - **Value 4**

**Function**

- **Hold the transmitter stick at full throttle and press the SET button once.**
  - **Hold the throttle stick at neutral and press the SET button once.**

**ACCESSORIES INDEX**

- **Speed-control defective**
- **Transmitter settings changed after set-up**
- **Transmitter battery empty**
- **Transmitter antenna too short**
- **Reconnect next the unit until the SET LED glows red.**
- **STOP**: Press the SET button for at least 3sec, use the supplied plastic screwdriver.

**CHECKING THE FUNCTIONS:**

When you run through the following functions with the throttle stick, you can check on the LED’s that everything is setup correctly.

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>STATUS</th>
<th>MODE LED</th>
<th>SET LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral and normal brake</td>
<td>off</td>
<td>red</td>
<td></td>
</tr>
<tr>
<td>Neutral and normal brake</td>
<td>on</td>
<td>red</td>
<td></td>
</tr>
<tr>
<td>Forward</td>
<td>green</td>
<td>red</td>
<td></td>
</tr>
<tr>
<td>Reverse</td>
<td>green</td>
<td>red</td>
<td></td>
</tr>
<tr>
<td>Brake/Reverse</td>
<td>red</td>
<td>red</td>
<td></td>
</tr>
<tr>
<td>Brake/Reverse</td>
<td>red</td>
<td>red</td>
<td></td>
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<td>red</td>
<td></td>
</tr>
<tr>
<td>Brake/Reverse</td>
<td>red</td>
<td>red</td>
<td></td>
</tr>
</tbody>
</table>

**MULTI-PROTECTION SYSTEM, 4-way Protection**

This unique monitoring software is the perfect protection for the SPHERE speed-control against short-circuits (motor), overload and overheating. If your speed-control is ever faced with overload, the motor function is switched off for protection and a red SET LED will indicate the overload, although the steering function is maintained. Wait a few minutes to allow the speed-control to cool down. Should you accidentally select one of the brushless motor modes while a brushless motor is connected to the speed-control, or vice versa, there will be no warnings with either of these units on the red LED and alternately flashing green/red on the MODE LED. If the speed-control switches of frequently, either the motor used is too strong, or the motor pinion is too small, or you are using half brake too often. You can improve this by using the supplied heatsink and/or by obtaining the optional LRP fan (#82500).

**POWER CAPACITORS:**

We recommend the use of a power capacitor (as included in LRP’s brushless cooling set #82500), when using the SPHERE speed-control. Power Capacitors improve punch and offer additional protection for the speed-control. Simply connect the power capacitors at BAT+ (Red) and BAT- (Black) on the SPHERE’s soldering tabs.

**REPAIR PROCEDURES / LIMITED WARRANTY**

All products from LRP electronics (hereunder called “LRP”) are manufactured according to the highest quality standards. LRP guarantees this product to be free from defects in material and workmanship for 50 days from the original date of purchase verified by sales receipt. This limited warranty doesn’t cover defects, which are a result of normal usage, misuse or improper maintenance. This applies among other things on:

- Cut of original power plug or not using reverse polarity protected plug
- Motor wear or/and brushless motor.