

SPEED CONTROL USER'S GUIDE

ICS

DIGITAL

No. 8066



LRP
ELECTRONIC

SPEED III CONTROL

Dear Customer,

you purchased one of the most sophisticated electronic speed controls in the world. Before even going into normal production, this speed control won 2 US-Championships and 2 European Championships. World class drivers like Team Associated's Cliff Lett (World Champion), Mark Pavidis (National Champion) and the European Champion Drivers Kevin Moore and Jürgen Lautenbach had great influence on the development of this product. The result is simply the best speed control they ever used. We are sure, that you will agree on that.

Nevertheless, even if installation and set-up of the ICS Digital is pretty simple, please follow the instructions carefully step by step. By doing so, you will achieve greatest performance and can utilize all the unique features.

General Information

Although all LRP products are built to the highest possible quality standards, you should carefully read the following information to avoid any kind of possible malfunction or damage.

This Speed Control is designed to be used in battery powered RC-Models only.

Use by Children

If used by children under 16 years, we strongly recommend parental guidance.

Mounting

- Mount controller with double-sided servo tape.
- A little airflow inside the body shell is absolutely necessary, improves performance and increases lifetime of all electronic components.
- Mount speed control so that it can't be harmed by a crash.
- The speed control should be mounted in a way allowing easy access to the on/off switch, set-up button and current limiter.
- Keep some distance (3 cm, 2 inches) between the speed control, all power wires and the receiver. Especially avoid contact between receiver, antenna and any power wire. This could cause radio glitches. In case of radio glitches, put the components to another place inside the car.
- Keep the power wires as short as possible to avoid radio glitches.
- The receiver antenna should go straight up out off the receiver. Avoid contact with carbon fibre or metal parts. If the antenna is too long, cut it to a length of about 35 cm/14 inches but never coil it. (See also radio instructions)
- **Heat Sinks:** Due to the superior ICS technology, additional heat sinks are not necessary!!

To avoid danger or damage

- **Important:** never leave your RC-Model unattended when the battery is plugged in or the speed control is switched on. In case the speed control was damaged before, this could cause fire to your model or worse.
- **Never** get your speed control or other electronic parts in touch with **water**. Avoid racing in the wet. If you have to, the best protection will be given by Paper Tissues (Kleenex).
- **Avoid cross connection, short circuits or reverse polarity** to avoid damage to the speed control. Use reverse polarity proof connectors with male/female like LRP Hi-Amp (No. 6280) or Reedy Power (No. 652).
- As long as the motor is connected to the speed control, never let it run directly with a separate battery; this causes destruction of the speedo and loss of warranty.
- Never cut off the original connectors and switch - this definitely will cause the loss of any warranty
- Don't plug something into the battery slot of the receiver.
- Never put any kind of metal or wire in touch with the FET Heat Sinks.
- Never cover your speed control with any kind of material - in contrary, airflow increases performance!
- Always look for good isolation of all wires. Wrong handling or cross connection causes fatal damage of your high tech product.
- Never change the polarity of your receiver plug (see detailed instructions).

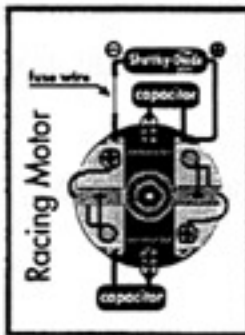
Installation

Always follow the order of the following steps. Each step is described in full detail on the following pages.

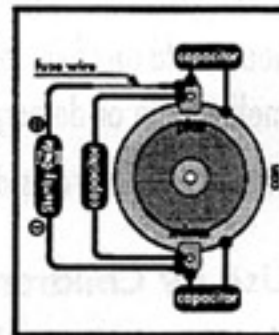
- Solder capacitors and Schottky-diode to the motor.
- Take off the motor pinion or make sure, that the wheels of your car can move free.
- Connect speed control to motor and receiver (channel 2), watch out for right polarity.
- Make sure your speed control switch is in off position.
- Solder 'speed control-battery' connectors to the thick power wires, use polarity proof connectors like LRP Hi-Amp (No. 6280) or Reedy Power (No. 652).
- finally check all the connections **BEFORE** connecting the speed control to the battery!
Attention wrong or cross connection will definitely destroy the speed control !!!

Soldering of Capacitors and Schottky Diode to the motor

Capacitors:



Motors with insufficient or without capacitors can damage your speed control. Therefore you definitely should solder the included capacitors to your motor as shown in the picture.



Schottky-Diode:

The Schottky Diode improves the efficiency of the motor-speed control system and is an additional protection for the brake FETs. Especially very worn motors can cause damage. Solder it to the motor as shown in the picture, make sure that the white ring is at plus.

Schottky diodes are only to be used with **Forward/Brake** speed controls like the ICS. In case you have also a **Forward/Reverse**-speed control, please note that Schottky Diodes will damage Reverse of the **Forward/Reverse** control are never used with these controls.

Connection of Wires

Thick LRP Power Wires:

thick black LRP wire	minus battery
thick red LRP wire	plus battery and plus motor
thick blue LRP wire	minus motor

Thick red LRP Power Wire:

The thick red Power Wire has 2 functions, therefore the following connection is recommended: The wire goes from the speed control to the plus terminal of the battery. From the plus terminal a second wire goes directly to motor plus. Any other connection could cause radio glitches under certain circumstances.

Thin Blue Wire: (Connection of a FET Servo)

FET-Servos like KO1001 are very powerful servos. Since they draw very high Amps from the BEC, they are equipped with an extra wire (normally blue) to avoid BEC-overload. Connect this extra wire to the thin blue controller wire.

Always use the small choke which comes with servo to avoid radio glitches.

If you use a normal servo and not a FET-Servo, the thin blue wire has no function. Leave the wire isolated and don't connect it to other wires or parts of the speedo. A short circuit will definitely destroy the speed control.

Adjusting the Speed Control to Your Transmitter Neutral/Full Throttle/Brake

The basic adjustment is very simple. Just follow the instructions step by step. There is no time limit for all the adjustments.

Each step is completed when you freeze/save the setting by pressing the set-up button. (Different to other manufacturers). The set-up adjustments stay memorized even when no battery is connected.

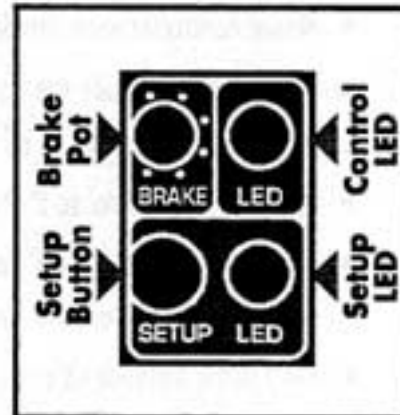
If you make an error while setting up, don't worry, switch off your speed control for about 10 seconds and start again.

Preparations to start set up

- Make sure the speed control is switched off.
- Take off the motor pinion or make sure, that the wheels of your car can move free
- Turn on the transmitter.
- Adjust your transmitter to the following:
 - High ATV, EPA - maximum setting
 - Low ATV, EPA, ATL - maximum setting
 - EXP, EXPO - start with zero
 - SUB Trim, Neutral - middle setting
 - TH Trim, Coast Brake - middle setting
 - Throttle Reverse Switch - any way, don't change after speed control set-up
- Everytime you change your transmitter settings, the speed control set-up procedure has to be run again (except Low ATV, EPA, ATL and EXP, EXPO).

Set-Up

- When a motor is connected, it will not run during the set-up procedure.
- Connect the speed control to a fully charged battery.
- Turn on the speed control and wait for 2 seconds.
- **Press the set-up button for a minimum of 3 seconds.** The lower Set-UP LED will start to flash red to indicate set-up mode. It will flash until the set-up is completed.
- **Make sure your transmitter throttle position is at neutral.**
- **Press the set-up button to freeze/save neutral.**
- If a motor is connected, it will start to peep now to indicate the next step. The upper Control-LED is flashing green.
- **Pull and hold full throttle on the transmitter and press the set-up button to freeze/save full throttle.** Release full throttle on the transmitter after you pressed the set-up button.
- For Instant-Throttle (Drag Racing) hold the throttle at less than maximum while setting up. This set-up is not recommended for circuit racing.
- The upper Control-LED is flashing now red.
- **Push and hold full brake on the transmitter and press the set-up button to freeze/save brake.** Release full brake on the transmitter after you pressed the set-up button.
- The upper Control-LED is now lighting up full red . The lower Set-Up-LED is now lighting up full red.
- **Go back into neutral position of the transmitter throttle.** Now the speed control is fully set and you can start to enjoy your ICS Digital.



Normal Operation

after you set up your speed control always operate the following way:

Start Operation

1. Turn on your transmitter
2. Plug in your battery
3. Switch on your speed control

End Operation

1. Switch off your speed control
 2. Unplug your battery
 3. Turn off your transmitter
- Never leave your RC-Model unattended when the battery is plugged in or the speed control is switched on. In case the speed control was damaged before, this could cause fire. Always disconnect the battery when not in use.
 - Attention: after each run battery, let speed control and motor cool down before you race again, especially using very hot motors like the LRP Big C, Magic, Killer X, Bee D, Viper or 10 to 12 Turn motors of Reedy or other manufacturers. Running too often without cooling break could damage motor or speed control.

Brake Options

You can adjust the brake to any characteristic you prefer with the brake adjustment pot. This allows easy adjustments during the race without having to repeat through the complete Set-Up process.

- Standard Characteristic

For slippery and normal conditions - turn the brake pot fully to the left. This gives a fully linear brake on the complete throttle throw and therefore offers perfect car control while braking. Turning the pot more to the right makes the brake more aggressive. No matter how you adjust the pot, the maximum brake power always stays the same. To limit the maximum brake power use the Low ATV, EPA, ATL function of your transmitter.

- Super Smooth Brake

On extremely slippery tracks you might need an even smoother brake. When the brake pot is already at the maximum left position, limit the maximum brake power by using the Low ATV, EPA, ATL function of your transmitter.

- Aggressive 'Hand Brake'

Turn the brake pot to the right to increase the initial braking power. American Top Drivers like Mark Pavidis or Cliff Lett prefer the aggressive 'Hand Brake' characteristic. This allows to throw the car around the corner.

Turning the pot more to the right makes the brake more aggressive.

Turning the pot more to the left makes the brake less aggressive but more linear.

No matter how you adjust the pot, the maximum brake power always stays the same. To limit the maximum brake power use the Low ATV, EPA, ATL function of your transmitter.

Attention: if you change the Low ATV, EPA, ATL function setting for the first time, check if this has any influence on the neutral position. Don't repeat the speed control set-up.

If you have to repeat the speed control set-up (receiver/transmitter were changed), set the Low ATV, EPA, ATL function to maximum again.

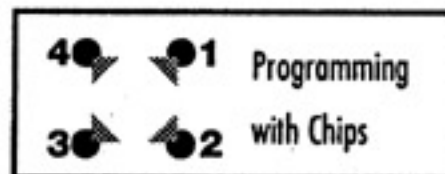
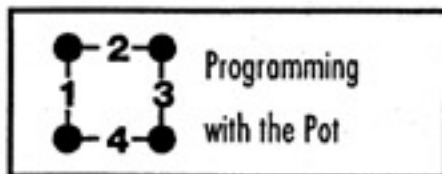
Power Programme/Current Limiter

The ICS Digital (Intelligent Control System) gives you the opportunity to set your speed control up to your individual needs. You can combine several goals and options. In the beginning the options seem confusing, but after playing around for some batteries, you'll well understand the advantages.

In order to keep the current limiter and power programmes activated, the Plug-In-Chips or the optional fully adjustable Limiter Pot (No. 8110) have to stay plugged in.

If you unplug the chips, maximum power and current is chosen, the limiter is set off.

- To change the current limiter value use different plug in chips or the optional limiter pot to adjust the basic current limitation.
Included Plug-In-Chips: 30 A, 50 A, 65 A, 80 A, 120 Amp (to some controls the fully adjustable Limiter Pot is included instead)
- Choose a power programme by the direction the chips are plugged in. Every time you hit the throttle, the speedo control works on the basic current limitation. After a certain time of acceleration, the current limitation is reduced (power is increased) intelligently by the speed control. The programmes vary in the way the power is increased.



Programme	punch	driveability	bat. efficiency	
1	●	● ● ● ●	● ● ● ●	Super smooth
2	● ●	● ● ●	● ● ●	smooth
3	● ● ●	● ●	● ●	punchy + efficient
4	● ● ● ●	●	●	max punch

Attention

The 4 different programmes are a means of fine tuning a car. No matter what programme you choose, we guarantee, that the ICS Digital always offers a linear control characteristic and superior battery efficiency, even with the current limiter unplugged.

Starting Set-Up

Type of Racing	Current Limiter	Power Programme
2WD 6-cell	65	3
2WD 7-cell	80	4
Truck 6-cell	80	3
Truck 7-cell	120	4
4WD 6-cell	80	3
4WD 7-cell	120	4
Pro 10 On-Road 4 min.	65	3
Pro 10 On-Road 5 min.	50	3
1/12	30	2

Current Limiter Fine Tuning

You want ...	set curr. limiter		set prog.
better driveability	1 step down	or	1 step down
more running time	1 step down	or	1 step down
more punch	1 step up	or	1 step up
fully linear acceleration with current limiter	as it is	and	programme 4
maximum punch, no current limiter	unplugged	and	unplugged

It is worthwhile experimenting with the current limiter. Always change step by step either current limiter or power programme at a time. Never both at a time. If you use the Limiter Pot, you should vary 10 to 20 Amps at a time.

Start Automatic

The ICS start automatic gives a definite advantage at the start of circuit and drag racing. While activated response time is reduced and the current limiter is programmed for an optimum start procedure. The first time you lift off throttle (first corner), the ICS goes back to normal setting.

- **Activate Start Automatic:** At the starting grid, push and hold full brakes on the transmitter for at least five seconds (count to 10), the next time the throttle is hit, the automatic is activated.

Motor Choice Cars (6 or 7-cell batteries)

If you want to hot up your model we recommend:

LRP Rallye Series	LRP F1 Series	LRP X-Generation	Tuning Motors
all winds	all winds	all winds	Standard Mabuchi Kyosho Mega Tamiya Sport Tuned Tamiya Acto Power other Modified Motors

For America we recommend Reedy Sonic and Reedy Ultra Sonic with all winds.

Attention: With a 7-cell battery use a smaller motor pinion and check if the motor is suitable.

Plane and Boat: LRP Super Plus Series, VX Turbo, Marine or any other tuning motor.

Rule of Thumb

Less turns give more power but are also harder on the speedo and the batteries (less running time).

Technical Data

Voltage Input with BEC	5 min.	4-10 cells (4.8 - 12.0 V)
Voltage Input with BEC	over 5 min.	max. 7 cells (8.4 V)
Voltage Input without BEC	over 5 min.	
BEC Output Voltage		5.7 V
max. BEC Current	30 sec.	1.6 A
cont. BEC Current	5 min.	0.5 A

Power Data

Rated Current *	450 A
max. Current 30 sec	115 A
cont. Current 5 min	75 A
Switch-On Impulse Supression	yes
EMK Brake	programmeable
Braking Current	140 A
Regenerative Brake	yes
Brake Amplifyer	yes
Motor Current Limitation	programmeable
PWM Frequency	2690 Hz
Weight with wires	42 g
Size in mm	43x34x19

* Transistors Rating at 25° C junction temperature

Maximum Number of Battery Cells and Use with BEC

The speed control's BEC is built for the typical 5-Minute use in RC-Models with car/ flight batteries up to 10 cells and 1 servo. If the model is run with 8 or more cells and 2 or more servos, the BEC has to be disconnected and a separate receiver battery used. Operation With Receiver Pack/without BEC, cut or disconnect the red plus wire of the receiver line and connect the receiver pack directly to the

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receiver.

Repair Procedures/Warranty

In case of problems first check the trouble shooting guide or contact your hobby shop or **LRP-importer**. In case of damage, repair fees are normally far below the recommended retail price of a new unit. Hobby shops are not authorized to replace speed controls thought to be defective.

Warranty can only be accepted if it is claimed by the customer on the warranty sheet and the control sheet and the original sales receipt are included.

For quick repair and return we definitely need your address, Detailed description of the malfunction and the original sales receipt. Repair may be refused without sales receipt.

To guarantee a proper repair, cut off or worn receiver plugs, wires and switches will be replaced and charged in any case. Any speed control treated severely with silicone or anything similar inside, might not be repairable.

Speed controls sent in for repair that operate perfect normally will be charged with a service fee. Therefore first check with the trouble shooting guide.

LRP guarantees this speed control to be free from defects in materials or workmanship for 90 days from the original date of purchase verified by sales receipt. This warranty doesn't 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, poor installation, replacing of wires on the board, connection to electrical components not mentioned in the instructions, mechanical damage, immersion of water and cutting off the original wires, plugs, connectors and switches.

Our warranty liability shall be limited to repairing the unit to our original specifications. Because we have no control over the installation or use of this product, in no case shall our liability exceed the original cost of this unit. We can't accept any liability for any damage resulting from using this product. By the act of installing or operation this speed control, the user accepts all resulting liability.

Trouble Shooting Guide

Symptom	Cause	Action
Servo works and Throttle is dead	set-up problem	re-run complete set-up and make sure that you pull and hold full throttle on the transmitter when you press the set-up button to freeze the function
	motor broken	change motor
	motor brush sticking	check if brush can move
	wiring interrupted	check wires and connections
	speed control broken	send in for repair
Servo and motor dead	BEC defect	check BEC output voltage or send in for repair
	crystal, receiver or transmitter defect	change or check component step by step
	receiver plug wrong	check polarity of receiver plug
Motor dead while pulling throttle; Motor works while pushing brake	you changed throttle direction of the transmitter	just complete re-run set-up procedure; the transmitter can remain as it is
No brakes	incorrect set-up	re-run complete procedure and make sure that you push and hold full brake on the transmitter when you press the set-up button to freeze the function
	internal damage	send in for repair
Insufficient brakes	incorrect set-up	re-run complete set-up procedure
Speed Control gets too hot	insufficient cooling	cut out the cooling holes of the body shell
	motor too strong or too high input voltage	use a softer motor or a battery with less volts/cells
	gear ratio too long	use a smaller motor pinion
	drive train or bearing problem	check or change components
	model run too often without cooling break	let the speed control and motor cool down after each run
	Motor won't stop, runs at low speed	moisture in speed control
Radio Glitches	speed control set-up	re-run complete set-up procedure
	No capacitors on motor	put capacitors on the motor
	receiver or antenna too near to power wires, motor, battery or speed control	see "Installation"
	receiver or crystal broken	change components step by step and use original crystals only
	battery connector bad	check connections
	power wires too long	see "Installation"
	red power wire connected wrong	see "Installation"
	transmitter batteries flat	recharge or change batteries
	short transmitter antenna	pull out antenna to full length
speed control feels strange or unclear	you changed transmitter or car arrangement of the transmitter	re-run complete set-up procedure