



Dear customer

Congratulations on your choice of the mcd99. This is a top-quality speed controller and governor, developed and manufactured in Germany. Please don't allow the extraordinary capabilities of the integral micro-processor control system to frighten you off using it! The system is designed to allow you to set up the speed controller - motor combination to match your model as accurately as possible, virtually regardless of type. If you wish to, you can make any changes you need to the "**standard configuration**", but on the other hand you do not need to make any changes at all.

As supplied, the mcd99 is completely ready for use, without any changes or adjustments at all, as the stick travels are set up to suit the mc 18 ... mc 24 series of RC systems.

If you use the mcd99 "as is", it works just as you would expect with a conventional speed controller, i.e. the motor stops at one end-point of the throttle stick, and runs at full throttle at the other end-point.

The illustration at the top of the page shows a typical wiring arrangement involving the mcd99 and motor, with the controller located on the flight battery. The cables running to the motor should be kept very short, i.e. do not extend them. The cables running to the battery should be no longer than 20 cm and must be twisted together if they are more than 5 cm long.

The mcd99 is supplied with a set of connectors which are plugged into the three motor sockets. They must be removed if you are using a Graupner motor, as these are fitted with matching plugs as standard.

Before you use the mcd99 for the first time please read through the notes in Chapters 1 and 2 of the operating instructions, and observe all the recommendations they contain. The text provides valuable tips which will

help you prevent damage to the motor and controller, and also avoid injuring people.

When you first operate (i.e. test) the controller and motor we recommend that you keep to the lowest permissible number of cells, and run the installed motor without a propeller fitted initially.

First connect a servo to the throttle channel of your receiver and move the throttle stick on the transmitter. If the servo does not follow the stick movement, or does not exhibit full (100%) travel, you must first establish why that is happening, and correct the fault. Check that the receiver battery is connected, that the On/Off switch is set to ON, that the transmitter and receiver crystals are a matched pair, and that servo travel is set to 100% for both sides of neutral at the transmitter.

Disconnect the servo from the receiver and connect the receiver cable attached to the mcd99 to the same channel socket.

Watch the LED to see which stick position arms the controller ("auto-arm" function).

Note: For safety reasons the controller will not allow the motor to be switched on until the transmitter throttle stick has been set to Stop and left there for at least 2 seconds. The indicator then changes from a slowly flashing red-green display to flashing green. When you open the throttle the LED will glow a constant green, and will then grow dimmer as the throttle is advanced. The full throttle position is indicated by a bright green LED.

If the system works "the wrong way round" (i.e. idle = full throttle), you should either operate the servo reverse facility in your transmitter or re-configure the mcd99.

If the motor does not reach the full-throttle setting, your throttle channel is not set to provide +/- 100% travel. You can correct this either by



re-programming the transmitter or by delving into the configuration process of the mcd99.

All the adjustments described above are covered by the basic controller set-up procedure, which is termed the “**standard configuration**” process.

These and all other changes to the configuration are made using the push-button which is plugged into the 3-pin configuration input on the speed controller. It can be left plugged into the mcd99 during the test phase in case you wish to try out different configurations.

You can alter the configuration as often as you wish.

Note: As you will see from [Chapter 9](#), the controller can be set to a vast range of different configurations, and for this reason it is also perfectly possible to mis-configure it.

If you don't know exactly how you have configured your controller, you can reset it at any time to the standard (default) settings.

This is done by carrying out a “general reset”, which is described in [Chapter 9.2](#) along with the standard configuration process.

The configuration values which apply after a “general reset” correspond to the standard factory default settings.

[Chapter 9.3](#) discusses the property configuration process which is carried out using the plug-in push-button just like the standard configuration process. Please watch the LEDs carefully during the configuration process, as they show different colours and flashing patterns to indicate the value you can alter at any one time.

[Chapter 10](#) shows a number of typical property configurations which you will find helpful in understanding the system and becoming familiar with the programming methods.

Finally a few words on the [different procedures](#) used to set the standard configuration, the property configuration, and carry out a “general reset”:

To initiate the “**standard configuration**” process you press the configuration button (command button) before you connect the mcd99 to the flight battery (or drive battery in a boat or vehicle), then connect the battery and release

the button after holding it pressed in for about 2 seconds.

To initiate the “**property configuration**” process you first set the controller to normal operation, e.g. the motor might be running at low speed. You then consult the configuration table in [Chapter 9.3](#) and hold the configuration button (command button) pressed in for the stated length of time to access the configuration parameter which you wish to change.

To carry out a “**general reset**” you proceed as for the standard configuration process, i.e. you press the configuration button (command button) before you connect the mcd99 to the flight or drive battery, but then hold it pressed in for about 30 seconds after connecting the battery. This action performs a “general reset”, and is confirmed by the red LED flashing briefly. When you release the button the controller immediately expects you to enter the appropriate stick positions and stick travels. If the default stick positions set by the “general reset” match those of your transmitter, you can accept them just by disconnecting the speed controller from the battery to interrupt the configuration process.

The following pages are designed to help you when connecting and operating your speed controller, and when making changes to the controller characteristics. Reading this foreword is not enough in itself! You still need to study the whole of the operating instructions carefully to get the best out of your speed controller.

Chapter 6: Properties, factory default settings

Chapter 8: Connections, installation

Chapter 9.2: Standard configuration process (adjusting the controller to the transmitter's stick travel)

Chapter 9.3: Property configuration process (setting and adjusting certain characteristics)

Chapter 9.3.1: Explanatory notes regarding [Chapter 9.3](#)

We hope you have loads of fun with your **mcd99!**



Dear *mcd99* user:

this sheet contains important supplementary information!

You are the owner of a high-performance speed regulator/controller.

We are confident that you have already studied the operating instructions and - in particular - the first two sections. If you want the unit to work reliably and trouble-free it is essential to keep to the cable length limits stated in the instructions.

These are: max. 5 cm (2") to the motor, and max. 20 cm (7...8") to the battery, including the length of any inter-cell links inside the battery.

However:

The stated 20 cm (8") maximum is already excessive if the motor is run at more than the nominal current, i.e. at more than the first, lower current value. This is not the rule when using the *mcd99* in helicopters, but mostly when using in FAI-contest-sailplanes!

If the current drain of your motor is between the controller's nominal and peak current values, the cables must again be no more than 5 cm (2") long. The only way you can keep within this limit is to use in-line soldered battery packs, otherwise you can expect burst capacitors and/or burned-out capacitor pins. Even worse: if the protective effects of the capacitor are lost, there is a danger of consequent damage to the *mcd99*.

If space considerations in your model make it impossible to reduce the cable lengths, it will be necessary to install additional protective capacitors. These should be soldered permanently and directly to the *mcd99* between the power supply conductors (battery + and battery -, no further than 2 cm (1") from the mcd99). To do this remove the insulation from the battery cables just short of the mcd99 and simply solder the capacitor /s to the bare copper. Please be sure to insulate the exposed solder joints and wires very carefully.

If the overall cable length is 10 cm (4") or less you must solder at least one 470 uF/50V capacitor to the cables, and if the cables are longer at least 940 uF/50 V (in the form of two 470 uF/50V capacitors wired in parallel).

Note that these capacitors are polarised: the positive terminal of the capacitor must be soldered to the battery + wire attached to the mcd99, and the negative terminal of the capacitor to the battery - wire attached to the mcd99.

We are confident that this information will save you considerable trouble and expensive repairs.

We hope you have many hours of rewarding pleasure in your hobby.

Yours: the **schulze** team



Important note - no warranty:

Please don't use the mcd99 with motors, which hallsensors scan direct the working magnets.

Because of the field distortions of the statorcoils the hallsensors could produce wrong position signals, which causes a damaged controller.

Never use the mcd99 with KBM39-16 or KBM39-28 motors for example.

No warranty if you use the mcd99 with this kind of motors.

Plettenberg motors use infrared sensors for the rotor position scanning, because light did not interfere with magnetic fields.

