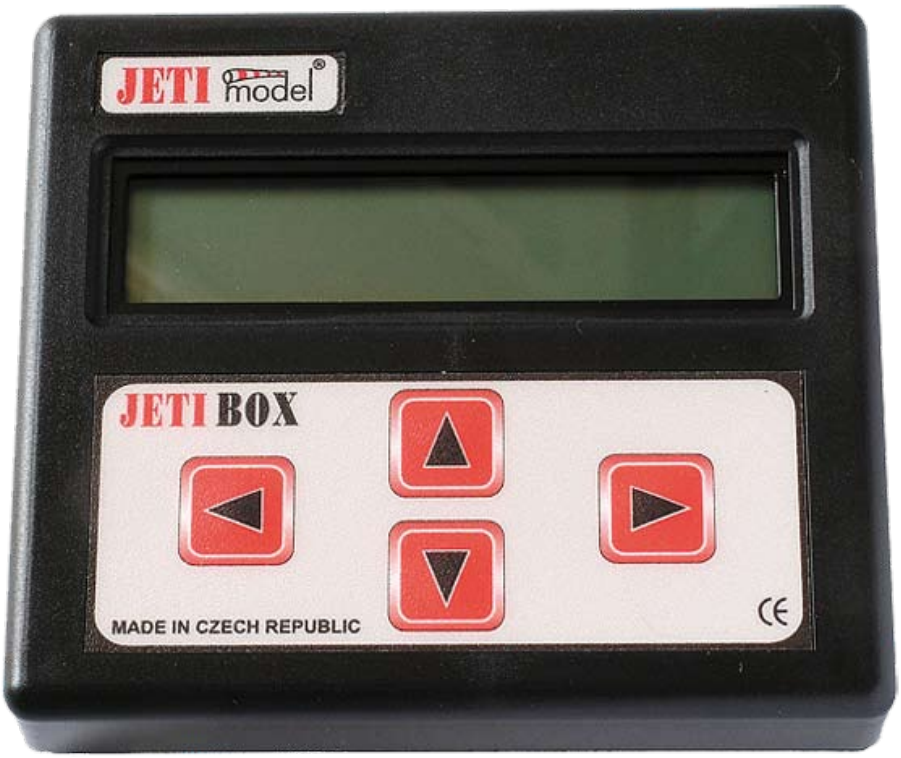
Hacker
Brushless Motors



Manual

JETIBOX

for advanced programming of
MasterSpin-Speedcontroller

Thank you for purchasing a Hacker JetiBox. This product was developed in close co-operation with JETI and incorporates the latest technological developments.
We are proud to provide you with a very efficient programming unit for MasterSpin ESCs. Besides performance our mayor design goal was to assure reliable and safe operation and simple programming of the essential settings by transmitter use. In addition almost all parameters can be changed comfortably by using this JetiBox (programming box). In combination with this device you can adopt your HackerMasterSpin Electronic Speed Controller to your individual needs by the total programming possibilities our new Controller-Line offers.

Although the programming sequences of MasterSpin-Speedcontrollers are particularly logical and therefore easy to perform, using and operating requires some knowledge and a few basic skills. Please read the entire manual thoroughly before attempting to operate this electronic device. Especially important are our safety instructions which must be observed in any case.

We wish you joy and a lot of success with your new JetiBox.

Inhaltsverzeichnis:

1. Safety and operating instructions

Building and operation of radio controlled models requires technical knowledge, careful handling, and safety awareness. Inaccurate assemblage as well as carelessness using can result in significant property and/or personal injuries. For these reasons build correctly, and care about the operating instructions, when mounting and operating a model with Speed Controllers.

The CE sign guarantees the observance of legal rules for undisturbed operation; however it does not entitle you to a careless Controller use. JetiBox is developed exclusively for R/C model applications. Under any circumstances this product may not be used in any man-carrying aircrafts or any other manned devices.
JetiBox is designed for exclusive operating with batteries. Never use this JetiBox by connecting to a power supply. Never connect the JetiBox or other propulsion components directly to the domestic 110/230 V / AC current.

In any case keep your body, any other persons, and objects away from the path of a propeller or other spinning motor parts, while a power battery is connected. Never lean over a running system. Make sure that no parts can come in touch with spinning drive parts; they could be thrown into your face, and could also weaken propeller and drive, causing mechanical or electric failures. Protect yourselves against any dangers coming from propellers and helicopter rotors. Keep anybody, especially small children, who can be hurt when the engine is running, at least 20 feet away. Mechanical or electrical damages can cause the motor to run unexpected and unintentionally. Make sure the motor is always properly mounted even for test runs. Check regularly that all screws of your drive are securely fastened.

Protect the JetiBox against any vibrations, dust, wet, hits or pressures. Check the JetiBox regularly for damages. Should the electronic device have become wet, only reuse it again after doing a longer drying phase and an exact examination! Also the

Use device only by outside temperatures between -10°C (14° F) up to +50°C (122° F). Provide sufficient cooling. JetiBox operations are only permitted in no electrostatic surroundings, where no loading can come true.

JetiBox is not protected against polarity reversions; therefore you must be sure that polarity is correct when connecting the Speed Controller to the power battery. Connection with reversed polarity causes destruction of the device. We suggest using connectors which do not allow connection with reversed polarity mechanically. If you want to reverse the direction of motor rotation, never reverse battery connecting leads. To change the rotation of the motor, simply swap any two motor wires connections or do it by programming.

For any connection you should use exclusively gold contact plugs and sockets which must be soldered perfectly to the wires. Never use strip connectors, crimp connectors or similar. For safety reasons always use identical products from the same manufacturer. This will minimize connection problems for example by battery changing. We recommend to use connectors, plugs and sockets from our accessories assortment.

Warning! High power motor systems can be very dangerous! High currents can heat wires and batteries, causing fires and burning skin. Follow the wiring directions carefully!
Models equipped with high power motors can kill. Always fly at a sanctioned field. Never fly over or near spectators. Even though this Speed Controller is equipped with a safety arming program, you should still use caution when connecting the power battery.

2. Limitation of liability

In that Hacker Motor GmbH has no control over the correct use, installation, application, as well as the Speed Controller maintenance, no liability shall be assumed nor accepted or any damages, losses or costs resulting from the use of the product. Any claims arising from the operating, failure or malfunctioning etc. will be avoided. Hacker Motor GmbH assumes no liability for personal injury, property damage or consequential damages resulting from our delivery or our workmanship. As far as is legally admitted, with which legal arguments ever, the obligation to the compensation is limited to the invoice amount of the affected product. This does not apply, as far as we must avouch unrestrictedly after compelling laws or for rough negligence.

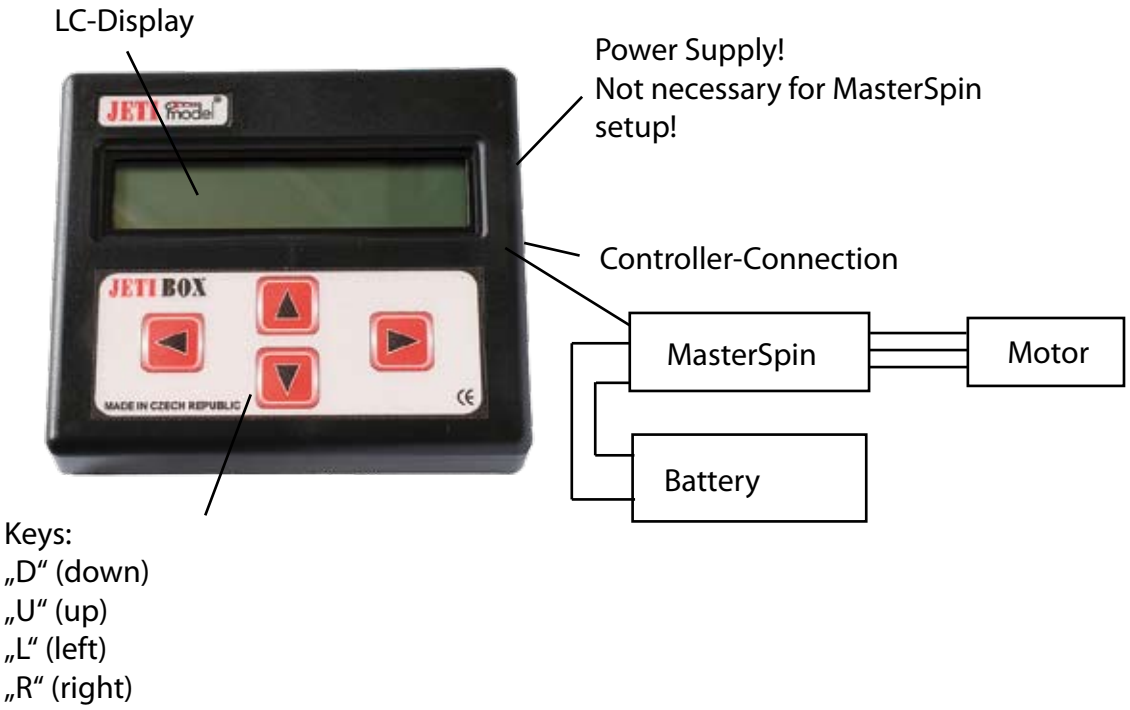
3. Product description

The JetiBox is sophisticated electronic device and especially recommended for MasterSpin ESC use. Various comfortable setting possibilities as well as different operating modes make these Speed Controllers also compatible to other brushless motors.
All MasterSpin-Speed Controllers can be programmed optionally, in addition to the transmitter programming, by the JetiBox (programming box). The JetiBox allows full access to all settings and offers very comfortable programming.

1. Servotesting Unit
2. Measuring of Servospeed
3. Measurement of pulse widths at the receiver output
4. Communication with SPIN controllers
   -Detailed adjustment of parameters
   -Read out adjusted parameters
   -Read out of values recorded by the controller during flight

4. Connections and Controls

Programming of MasterSpin-ESCs:



MasterSpin ESC is not included in delivery with your JetiBox.
Please check, how to use, the manual, which is added in the MasterSpin ESC supply.

5. How to use the JetiBox

The JetiBox need a powersupply. This power will be provided by the MasterSpin ESC. Do not connect an additional R/X-pack while using for setup you MasterSpin ESC!

6 Setup your MasterSpin with JetiBox

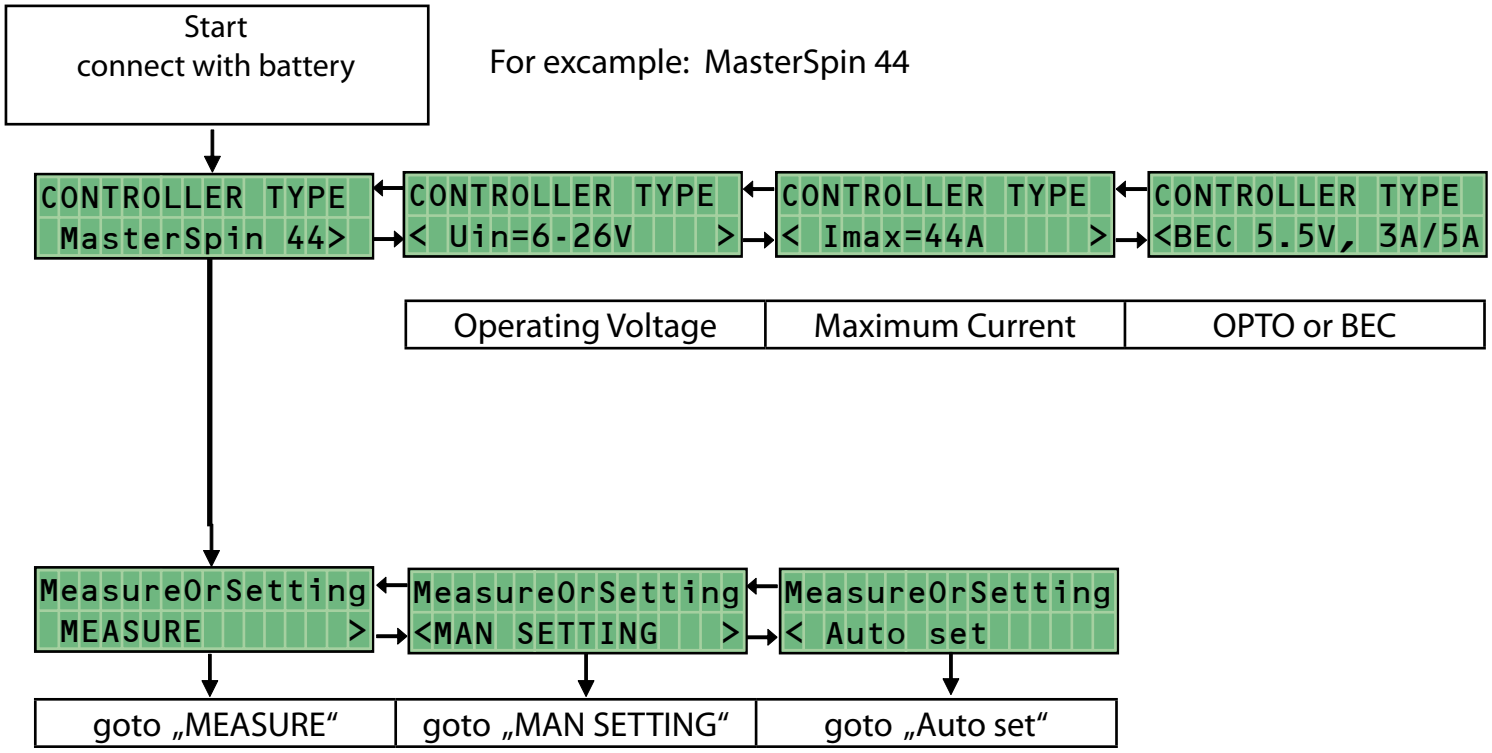
The settings will be done by four push-buttons:

Left	L	←
Right	R	→
Up	U	↑
Down	D	↓

Plug in the receiverlead from the MasterSpin ESC to the „Impuls + -“ at the right side of JETIBOX.

R/X-Lead use by BEC-Typ, seperate Lead on the OPTO-Typs

Before connecting the flight battery remove for the sake of safety the propeller.
Do not connect anything to the connector designated with -+ .
Connect the flight batteries and switch on the switch (void for Spin11). On the display appears the name of the
connected controller. By means of the push-buttons L and P more detailed informations are acquired of your controller.
By means of the push-button D we get to the option line of basic régimes where we either can choose reading out of
measured values or setting of controller parameters (Measure or Setting), with push-buttons L and P we choose
MEASURE – MAN. SETTING – AUTO SET.


Start
connect with battery
For excample: MasterSpin 44
CONTROLLER TYPE
MasterSpin 44>
CONTROLLER TYPE
< Uin=6-26V >
CONTROLLER TYPE
< Imax=44A >
CONTROLLER TYPE
<BEC 5.5V, 3A/5A
Operating Voltage
Maximum Current
OPTO or BEC
MeasureOrSetting
MEASURE >
MeasureOrSetting
<MAN SETTING >
MeasureOrSetting
< Auto set
goto „MEASURE“
goto „MAN SETTING“
goto „Auto set“

Setting with the help of the JETI-Box

This setting is carried out by means of four push-buttons: left L, right P, up N, down D.
Plug in the JR connector of the controller into the plug designated **Impuls + -** , which is positioned on the right side of the **JETI-BOX.**
Before connecting the flight battery remove for the sake of safety the propeller.
Do not connect anything to the connector designated with -+ .
Connect the flight batteries and switch on the switch (void for Spin11). On the display appears the name of the connected controller. By means of the push-buttons L and P more detailed informations are acquired of your controller.
By means of the push-button D we get to the option line of basic régimes where we either can choose reading out of measured values or setting of controller parameters (Measure or Setting), with push-buttons L and P we choose **MEASURE – MAN. SETTING – AUTO SET.**

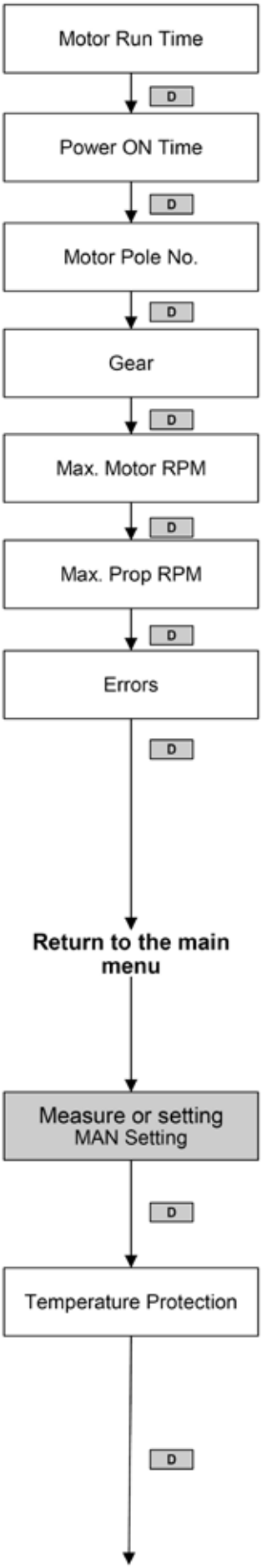
MEASURE – continue with push-button D

Max. Temperature	The controller registers the max. temperature during operation and the time of its occurrence. The time measurement begins with the first revolution of the motor.
D	
Min. Temperature	The controller registers the min. temperature during operation and the time of its occurrence.
D	
Actual Temperature	The display indicates the actual temperature.
D	
Max. Current	The controller registers the max. current at full throttle, the time at which this value occurred and the voltage of the flight batteries corresponding with this current. The measured value corresponds to the current peak which mostly occurs when the motor is abruptly accelerated.
D	
Min. Current	The controller registers the min. current at full throttle, the time at which this value occurred and the voltage of the flight batteries corresponding with this current. The measured value corresponds to the minimum current at full throttle which mostly occurs at horizontal or descending flight, when the motor is unloaded.
D	
Max. Voltage	The controller registers the max. voltage of the flight batteries beginning with the first revolution of the motor as well as the time when this value occurred.
D	
Min. Voltage	The controller registers the min. voltage of the flight batteries beginning with the first revolution of the motor as well as the time when this value occurred.
D	
Actual Voltage	Instantaneous battery voltage.
D	
Off Voltage	Value at which the motor has been switched off or its power throttled down as well as the time, at which this value occurred.

Remark concerning current measurements:

1.) In order to measure correctly, the controller must run at full throttle at least 4 s in the course of the whole flight. In case of constant rpm setting (Heli const. RPM) this condition may not be fulfilled and the measurement will not correspond to real values.

2.) The real average current may travel between the measured value of maximum and minimum current. According to flying style it may approach one or the other value.



The controller registers the overall motor run time. The time is measured from the first motor revolution.

The controller measures the overall time from the first switch-on of the switch (activation of the controller) until switch-off of the controller.

Set the number of motor poles by means of the push-buttons L-P . This parameter is important for correct readings of the max. rpm.

Set the gear ratio of the gearbox. Apply 1:1,0 for direct drive

In the course of operation the controller registers the max. motor rpm and the time at which these rpm have been achieved.

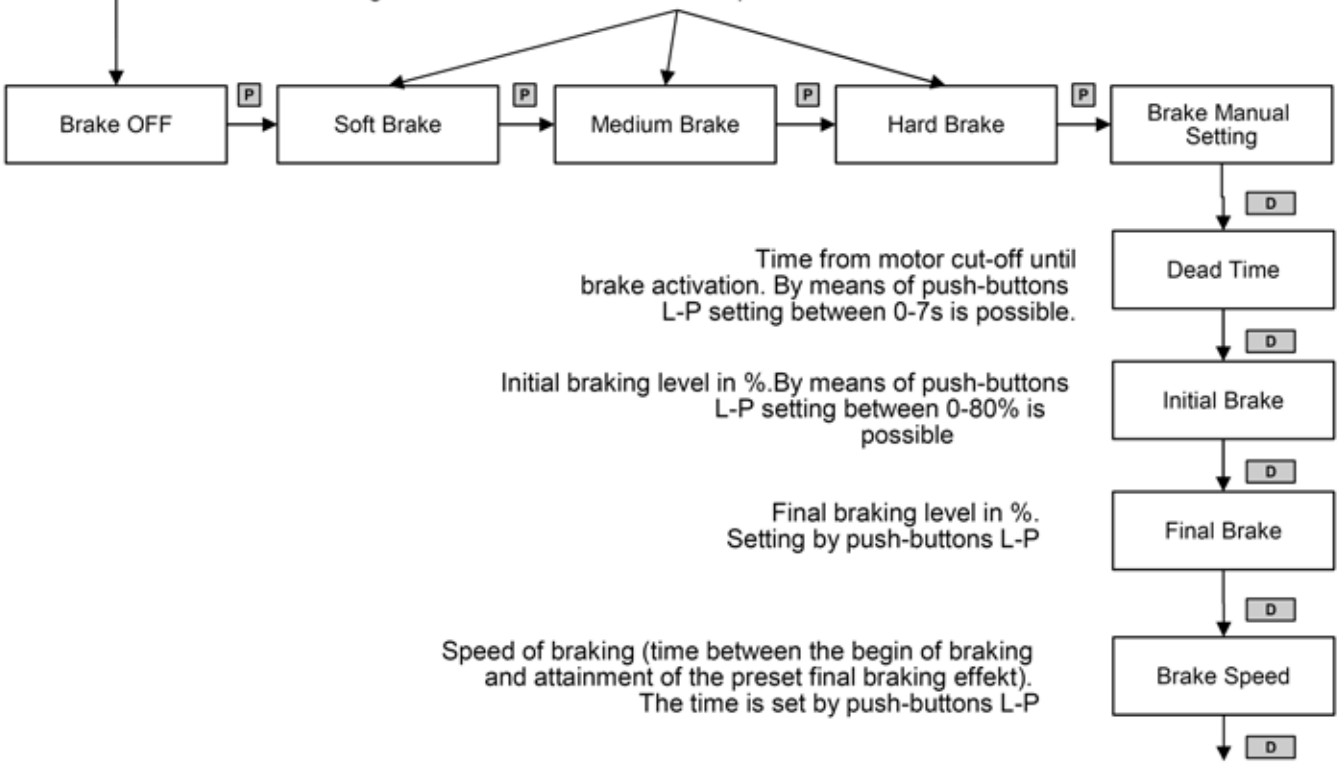
The controller registers the max. rpm of the propeller in the course of operation and the time at which these rpm have been achieved.

If parameters have been exceeded – voltage (U), temperatures (T), commutation (C) and current (I), protections will be activated and the motor will be cut-off. The reading **y** means that parameters became exceeded (an error occurred), the reading **n** indicates that parameters have not been exceeded.
With the help of this error notification the cause of motor cut-off can be determined.
Remark. **Protection in case of incorrect commutation (C)** – if operation becomes unsafe due to many commutation errors as a result of incorrect motor design. In some cases this problem can be solved by increasing the motor timing.

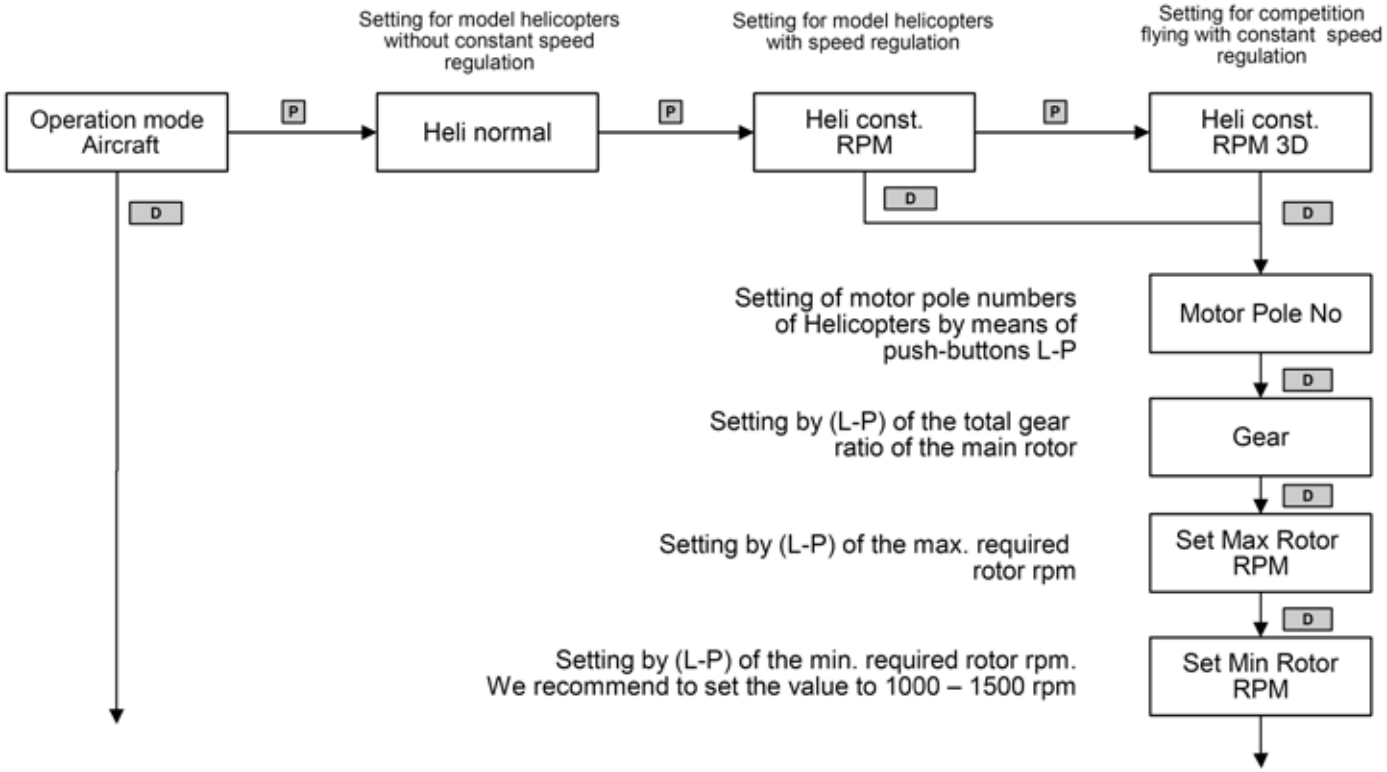
Certain parameters of the controller can be set or checked manually.

With the aid of push-buttons L-P the level of the controller temperature protection can be set.

Redefined brake:
The **first value** is the initial braking level in %, the **second value** – the final braking level in %, the **third value** – time of brake application between the first and second intensity. Confirm brake setting with push-button **D**.
If the brake is switched off jump to line **OPERATION MODE** – switching between modes Aircraft-Helicopter.



If during initial selection we choose **BRAKE OFF** then we proceed further from the line **OPERATION MODE AIRCRAFT** with push-button P for the Heli mode setting.



By means of the push-buttons L-P we set the speed of balancing rpm deviations. The smaller the number, the faster are the interventions. We always proceed from the higher number. If a certain limit becomes exceeded the controller starts to operate unstable (analogy with an overgyrated Model helicopter)

Motor timing (pre-ignition) – setting by means of push-buttons L-P. Recommended values: 2pole motor...0-5°, 4p motor...0-10°, 6p motor..0-20°, 8p and more...20-30° - necessary in case of the so called reversed motor conception

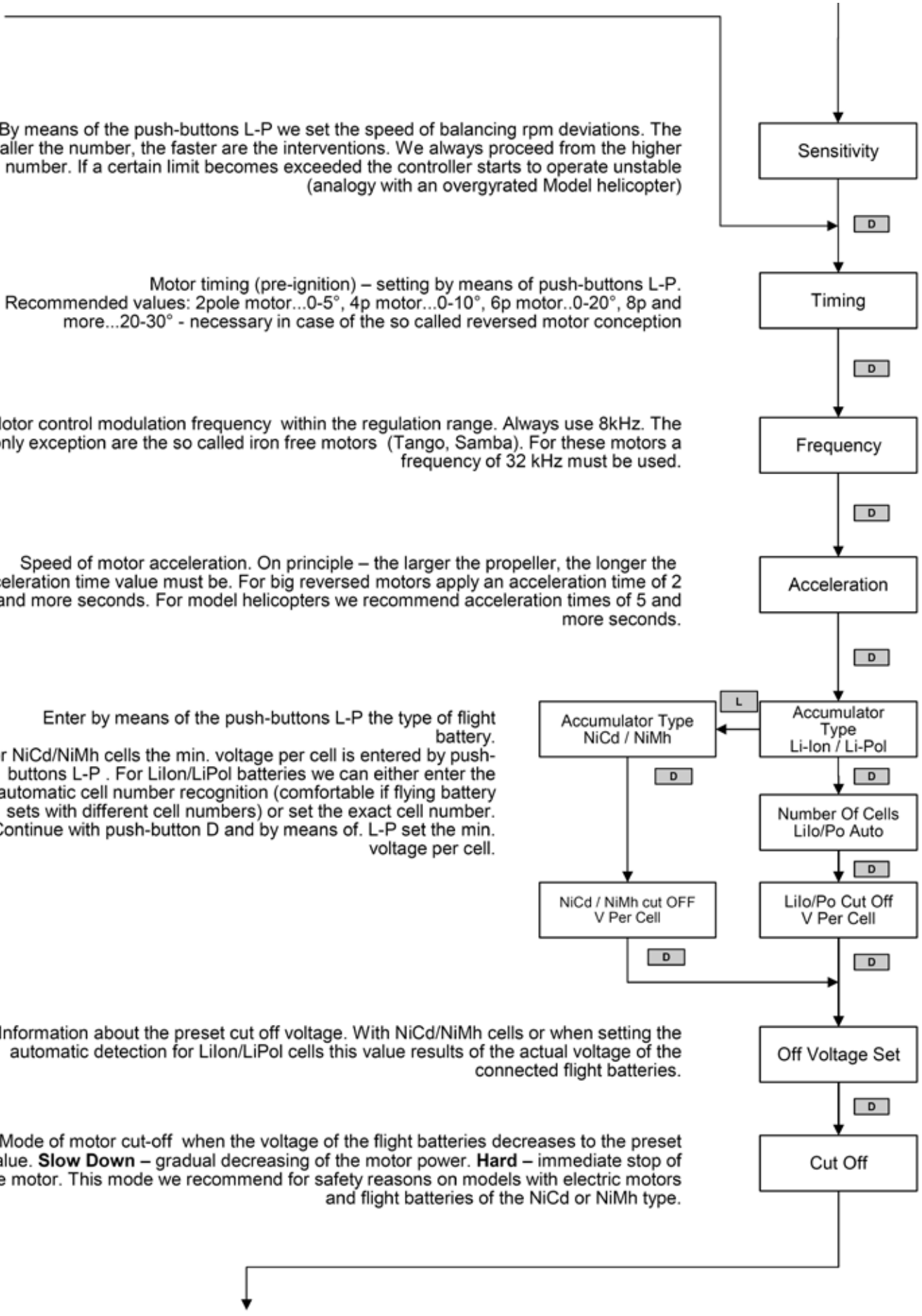
Motor control modulation frequency within the regulation range. Always use 8kHz. The only exception are the so called iron free motors (Tango, Samba). For these motors a frequency of 32 kHz must be used.

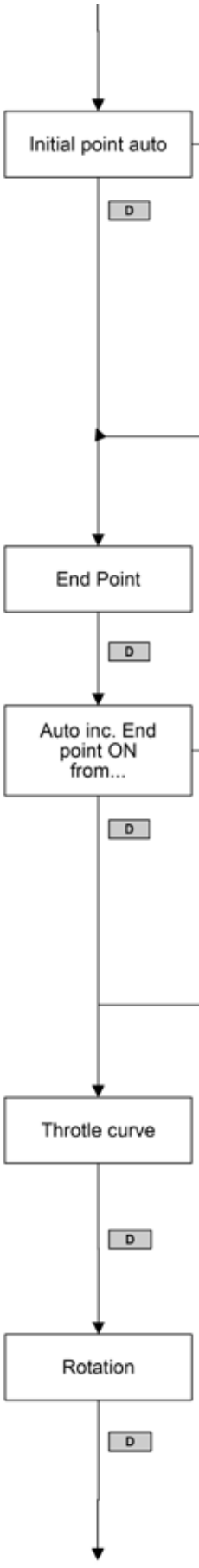
Speed of motor acceleration. On principle – the larger the propeller, the longer the acceleration time value must be. For big reversed motors apply an acceleration time of 2 and more seconds. For model helicopters we recommend acceleration times of 5 and more seconds.

Enter by means of the push-buttons L-P the type of flight battery.
For NiCd/NiMh cells the min. voltage per cell is entered by push-buttons L-P . For LiIon/LiPol batteries we can either enter the automatic cell number recognition (comfortable if flying battery sets with different cell numbers) or set the exact cell number. Continue with push-button D and by means of. L-P set the min. voltage per cell.

Information about the preset cut off voltage. With NiCd/NiMh cells or when setting the automatic detection for LiIon/LiPol cells this value results of the actual voltage of the connected flight batteries.

Mode of motor cut-off when the voltage of the flight batteries decreases to the preset value. **Slow Down** – gradual decreasing of the motor power. **Hard** – immediate stop of the motor. This mode we recommend for safety reasons on models with electric motors and flight batteries of the NiCd or NiMh type.





The initial regulation point serves as instantaneous value of the motor throttle stick in the stop position.

setting of the initial regulation point as fixed value in ms. The setting of the values is carried out by means of the push-buttons L-P.

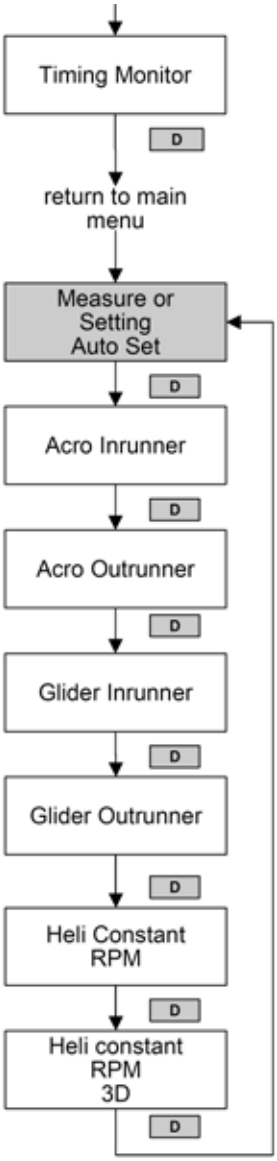
With the push-buttons L-P we adjust the required full throttle values. This value can also be set with the help of the transmitter (see Setting with the help of the R/C equipment).

Automatic extension of the regulation range when in the line **END POINT** the set pulse width is exceeded.

Fixation of the set value in the line **END POINT** as "full throttle" position, when this value is exceeded no extension of the regulation range occurs.

Regulation curve:
- **Logarithmical –** a logarithmic course of rpm with the throttle stick displacement (linear power course with the throttle stick displacement). This course is applied if most of the flight time is carried out within a region of 50% of full throttle.
- **Linear –** a linear course of rpm with the throttle stick displacement . This course is applied if most of the flight time is carried out within a region of 30% of full throttle.
- **Exponential –** an exponential course of rpm with the throttle stick displacement.This course is applied model airplanes.

Direction of motor rotation is set by means of push-buttons L-P



If activated, it announces 5s after controller activation without turning the motor by means of beeps the actual timing condition as shown by the following table:
0-7°(single tones), 8-18°(double tones), 19-23°(triple tones), 24-30°(quadruple tones)

We apply this mode for putting the controller into operation in a fast and simple way for instance after loosing track during setting. The setting content is practically the same as setting with the help of R/C equipment. Confirmation of the setting is carried out by means of the push-button P.

Remark 1: **Extending the battery cables.**

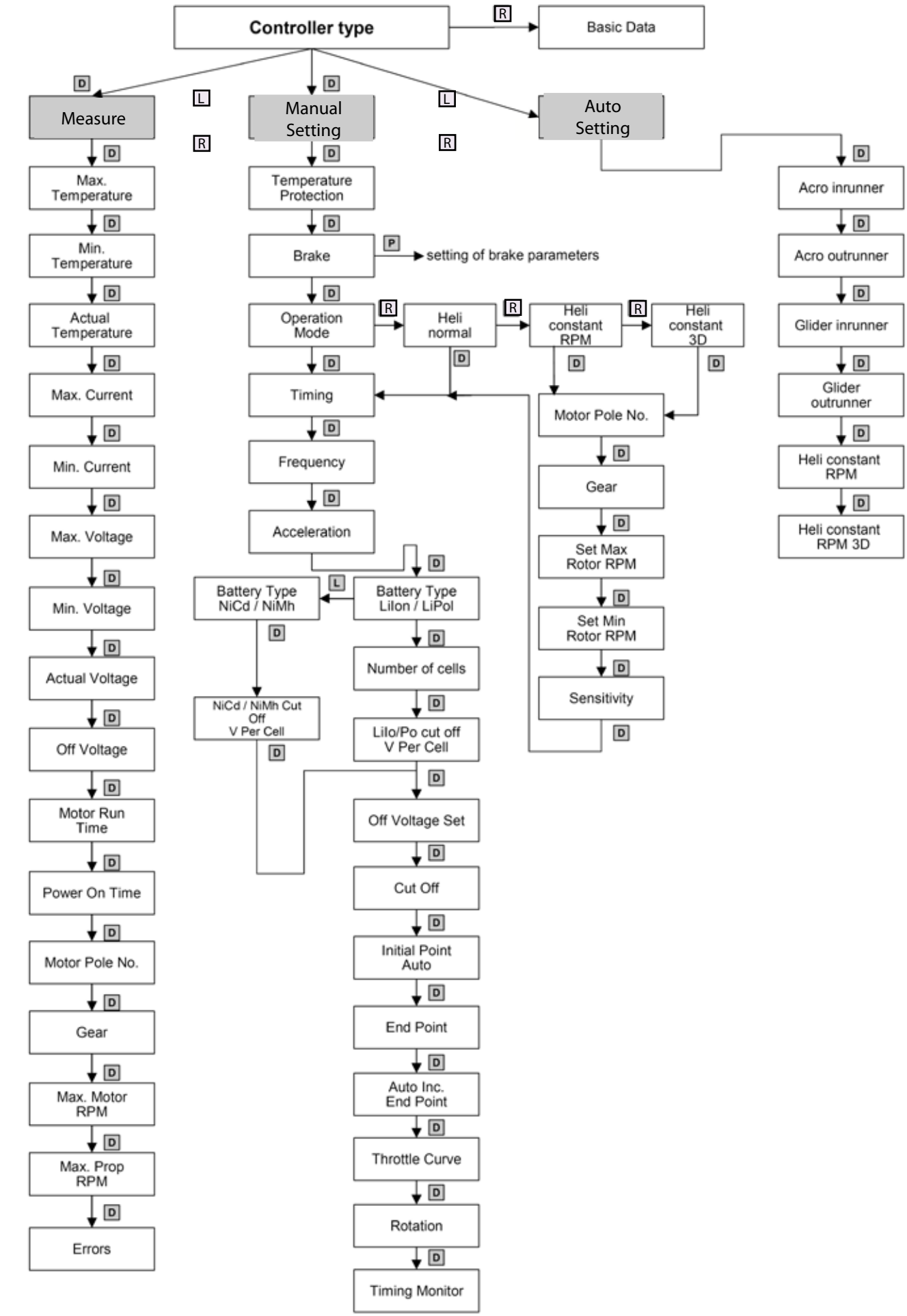
As a matter of principle only cables from the battery to the controller can be extended. If the extension is larger than 20 cm it is unavoidable to connect between the cables a low impedance electrolytic capacitor of a capacity 100-300 µF. These capacitors must be inserted between every cable section longer than 25-30 cm.

Remark 2: **Multi motor models**

We recommend to use the same controller type for each motor. In case of SPIN controllers switch on only one BEC. The switches of the other controllers remain in the "SWITCHED OFF" position.
When using controllers with BEC it is generally necessary to use only one common flight battery. If we want to to utilize 2 and more batteries these must be connected in parallel.

TIP:
If you do not know the pole number of your motor please contact the manufacturer.
If you own a revolution counter and know the gear ratio of your gear box (direct 1:1) you will be able to find the pole number as follows.
Switch on the motor and with the help of the revolution counter measure the maximum propeller (rotor) rpm. Connect the JETI Box and go in the menu MEASUREMENT to the maximum propeller RPM display (Max. Prop RPM). If the shown value does not correspond with your measured value check the gear ratio setting (Gear) and change the pole number inputs until your measured RPM will be identical with the value in the JETI Box display (Max. Prop RPM). As a result you will obtain the pole number of your motor (Motor Pole No.)

7.1 Programming options with JetiBox



8. Declaration of conformity

The described products are in compliance with the relevant and applicable EC guidelines for electro-magnetic compatibility:

89/336/EWG
92/31/EWG
93/68/EWG

9. Protection features

MasterSpin-Speed Controllers are fitted out with a couple of monitoring devices to protect the Speed Controller as well as to care about the proper use of reception signals.
The protection functions guarantee the correct functioning of Speed Controller and motor in the whole speed and current area. But they can't protect against inadmissible handling and operating conditions like for example short circuits or a reversed polarity of power battery.

The Speed Controller protections switch the motor off if:

- The Speed Controller reaches a temperature of 100° C (= 215 ° F) This is the basic setup and can be adjusted with the JetiBox! However, this does not protect against short cuts.
- The battery voltage drops under the minimal operating voltage of the respective type.
- The current drain is strongly distinguish in different phases (asymmetrical load).
  Speed Controllers do not have a current monitoring. The protection is only made by tempera ture monitoring
- If no valid receiver signal is received for more than 3 sec. Besides, the Speed Controllers processor checks the input after a logical mathematic procedure. If correct impulses are received again, the motor would be restarted.

10. Warranty

Any Speed Controllers has to pass several tests during production. We emphasise a high quality standard. Therefore we provide 24 months warranty to our Speed Controllers.
The warranty consists, during the guarantee time, in a free of charge repair service for proved material defects. We reserve device changing, if repair is impossible for economic reasons.

As voucher for beginning and expiration of the warranty serves invoice issued by product acquisition. Possible repairs do not extend the warranty period. Incorrect application or operations, e.g., by polarity reverse, over voltage or wetness, avoid warranty claims.
This is also considered for faults based on strong wear or excessive vibrations.
Further claims, for example secondary damages, are expelled. The liability for losses by the device or its application is also expelled.

Any shipping to Hacker Motor GmbH must be free of charge; unfree shipping will not be accepted. We can not take any responsibility for transport damages or loss of your shipment. For any warranty recover following conditions must be fulfilled:

- Add invoice for Product purchase into the package
- The Roduct has to be used in accordance with its operating instructions
- The Product has to be used in accordance to the voltage and currents range indicated by the technical data
- The following form must be filled out and included:

  http://www.hacker-motor.com/images/Reparaturauftrag.pdf

11. MASTER-Spin-Controller - Technical Datas

Typ	Betriebsspannung/Zellenzahl	Maße (mm)	Innenwi-derstand (mOhm)	Swit-ching BEC	Max. Servo-anzahl	Helimodus aktivierbar	Gewicht in Gramm	Strom Dauer (2,2Ah batt.)	FETs
MasterSpin 11	5-12NC /2-4 LiPo/5-17V	32x23x6	2 x 8	✓	6	✓	12	11	6
MasterSpin 22	5-12NC /2-4 LiPo/5-17V	32x23x7	2 x 4	✓	6	✓	18	22	12
MasterSpin 33	5-14NC /2-5 LiPo/5-21V	42x23x7	2 x 2,6	✓	7	✓	30	33	18
MasterSpin 44	6-18NC /2-6 LiPo/6-26V	52x25x10	2 x 2,0	✓	8	✓	40	44	24
MasterSpin 55	6-24NC /2-8 LiPo/6-34V	52x25x15	2 x 1,1	✓	8	✓	56	55	48
MasterSpin 66	6-18NC /2-6 LiPo/6-26V	52x25x12	2 x 1,0	✓	8	✓	50	70	48
MasterSpin 70 Opto	6-18NC /2-6 LiPo/6-26V	52x25x12	2 x 1,0			✓	50	70	48
MasterSPIN 48 Opto	14-30NC /4-10 LiPo/12-42V	52x25x12	2 x 2,5			✓	45	48*	48
MasterSpin 75 0pto	14-30NC /4-10 LiPo/12-42V	52x25x15	2 x 1,6			✓	55	75*	72
MasterSpin F5B Opto	8-18NC /3-6 LiPo/7-26V	52x25x16	2 x 0,25			n.a.	55	200**	96
MasterSpin F5D Opto	6-16NC /2-5 LiPo/5-24V	52x25x12	2 x 0,33			n.a.	50	140**	72
MasterSpin F5F Opto	6-16NC /2-5 LiPo/5-24V	52x25x14	2 x 0,66			n.a.	50	125**	72
MasterSpin 77 0pto	14-36NC /4-12 LiPo/12-50V	75x55x17	2 x 1,25			✓	105	75	48
MasterSpin 99 0pto	14-36NC /4-12 LiPo/12-50V	75x55x17	2 x 1,1			✓	105	90	48
MasterSpin 200 Opto	24-40NC /6-14 LiPo/18-59V	63x120x27	2 x 0,8			n.a.	270	200	30
MasterSpin 300 Opto	24-40NC /6-14 LiPo/18-59V	63x120x27	2 x 0,5			n.a.	460	300	30
MasterSpin 70 NAVY	6-14NC /2-5 LiPo/6-21V	52x25x15	2 x 1,0	✓	8	n.a.	65	70	48
MasterSpin 99 NAVY	14-30NC /4-10 LiPo/12-42V	75x55x22	2 x 1,1			n.a.	115	90	48
Type	Operating Voltage / Cell count	Dimensi-ons (mm)	Resistance (mOhm)	Swit-ching BEC	Max. Servo-number	Helimode / constant RPM inside	Weight in Grams	Nomina-Current (2,2Ah. batt)	FETs

* mit guten Kühlung und Umgebungstemperatur unter 20°C
* with good cooling and outside temperature under 20°C
** gilt für Wettbewerbstypische Einschaltzeiten
** valid for typical runtime in competition

12. FAQ (Frequently Asked Questions)

How do I connect a motor (three black cables) to the Speed Controller (blue, red, and yellow cable)?	Simply connect one black cable to one coloured cable. If the motor turns in the wrong direction, just swap any two of the three cables. Additionally the rotation can be changed by programming with the JetiBox for all MasterSpin Controllers.
Do I need a JetiBox to set the controller for Li-Io / LiPo battery use?	Basicly, you can set one of six modes with your transmitter. In all of these modes there is LiPo-Cut Off enabled. This is a LiPo-Autodetect with a slow down on 3,0V/cell. Please Note! LiPo-Autodetect only works correct if LiPo-Pack is fully charged when conected! For further LiPo-Setup, please use JetiBox!
Which Speed Controller timing is best for my motor?	Timing 0..4°: Hacker-Brushless Motor Series B-20, B-40 and B-50, as well as C-40 and C-50 Motors and all other 2-pole Innrunner. Timing 0..10°: 4-pole Inrunner Timing 5..18°: 6-pole to 8-pole Innrunner Timing 24°: For Motorseries A-20 to A200, as well as other 10-pole to 14-pole outrunner motors. Timing 24..30°: 14-pole and more. Please check the manual of your motor! With the JetiBox the timing can be changed in 1° steps (from 0° to 30°). This allows fine tuning for „special cases“.
My motor has no brake any more. Is my motor damaged?	No. In most cases it‘s not the motor‘s fault. Most probably the Speed Controller is set to other mode by accident. This can happen if the controller is started up while the throttle stick is in „full power“ position. Please check if can hear only one „Beep“ after start up of the Speed Controller. In case you hear two „Beeps“ change the mode to your prefered mode.
My motor doesn‘t turn and only wobbles. Is my motor damaged?	Most probably not. In most cases this behaviour is caused by a bad connection between the Speed Controller and the motor. Check all connections. Change the connectors or re-solder bad connections if necessary. In some cases the cables are only hold in place by hear shrink tube. Bad connections cause an increased transition resistance. This may cause a loss of power, a not properly turning motor, up to complete destruction of the power stage.
I can‘t program my Speed Controller with the JetiBox. What do I make wrong?	Please check first if your Speed controller is featured with the necessary software. You must read the word ***MasterSpin*** on the lable. The older MASTER Speed Controller series with label MASTER xx-3P or MASTER xx-Flight or Heli (xx stand for the operating current version) can not be programmed with the JetiBox. The software of a Speed Controller can not be updated. Please make sure the JetiBox is properly connected.

How do I connect the JetiBox for programming to the Speed Controller?	Connect the JetiBox to the Speed Controller. The motor must not be connected . If you connect a motor, do not mount the propeller or pinion to avoid injuries by rotating parts. At last connect the power battery. Without power battery the controller can't receive the programming commands.
My motor doesn't „Beep" if I connect a battery to the Speed Controller!	Pleas check the following points: • Is the Speed controller properly connected according to this manual? • Is your speed controller in good order and condition (no mechanical or electrical damages visual)? • Is the BEC switch turned on (only for versions with BEC) • Is the receiver power turned on? • Is the receiver battery fully charged, properly connected and switched on (position ON / EIN)? • In case the „motor stop" position is programmes to a fixed pulse value, the throttle stick and trim must be in the according position. The Speed Controller is only activated it the throttle stick is in the proper „motor stop" position when started up. • Is the power battery fully charged? If a cutoff voltage is programmed, the voltage of the power battery must exceed the cutoff voltage.
My motor is not running until „1/3 throttle" position and the speed can't be commanded sensitive.	Most probably the throttle stick ATV adjustment is not set to 100% for both side or the throttle stick is not in the proper „motor stop" position when the Speed Controller is started up. In mode automatic initial point the Speed Controller may assume a higher throttle stick position as „motor stop" position. This reduces the usable throttle stick resolution. As result the Speed controller can't be commanded fully sensitive. To adjust the correct throttle stick throw disconnect the power battery. Please make sure your ATV adjustment is set to 100% for both side, your throttle stick is in the proper motor stop position and the trim is in neutral position. Than re-connect the power battery. The Speed Controller initial point will be new adjusted (if automatic mode is set).
Can I dump the stored settings of a Speed Controller to a Prog-Box?	Yes! The JetiBox works like a Display and Keyboard.
Where can I get help if I have further questions not explained in the manual?	1. Ask the authorised dealer where you bought your Speed Controller 2. Look for further information on our homepage *www.hacker-motor.com* 3. Send an email to: service@hacker-motor.com 4. Call our service via phoner: +49 871-953628-0
Is it possible to run two or more motors on only one Controller?	No! Only one motor can be used with one Speedcontroller! If you have only one batterypack, you can connect both ESCs parallel. If you use more batterypacks, all packs must be connected parallel! If you use BEC-Typ ESCs, only ONE BEC can be used. All others must be switched of!

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WEEE-Reg.-Nr. DE 55352581