



Controllers SPIN

Dear friends,

herewith we present a new line of controllers for brushless motors named SPIN. Our intention was to implement into the new design the best experiences and know-how collected over the last ten years with brushless controller development.

All controllers contain a new type of voltage regulator for the receiver and servos, the so called switched BEC. Owing to this element a considerable increase of applicability of controllers with BEC towards higher numbers of flight battery cells could be achieved. Another advantage is the independence of servo numbers of the input voltage.

General connecting conditions of the controller:

- apply only new high quality connectors properly soldered to the cables
- for controllers SPIN 11 and SPIN 22 we recommend G2 connectors, for the higher types use G3,5 or G4. After soldering of the connectors check if the springy front part remained rotary. It may happen that the flux rises along the connector surface and in the worst case galvanically separates the springy part from the connector body. A remedy is possible by washing the connector with a brush in nitro diluent. In operation see to it that the connectors stay clean and the plug-in force remains high. If this force decreases replace the connectors immediately. We recommend replacement of connectors after 1-2 flight seasons.
- the distance between motor and controller should not exceed 10-15 cm. Flight battery cables can be extended to 20-25 cm
- connect the JR connector to the throttle channel of the receiver

The table shows basic data:

Type	Sustained current [A] (2,2Ah batt.)	Quiescent current *1 [mA]	Batteries NiXX/LiXX/voltage	Min.shut down voltage [V]	Dimensions [mm]	Weight [g]
SPIN 11	11	1,4	5-12 / 2-4 / 5-17V	4,5	32x23x6	12
SPIN 22	22	1,4	5-12 / 2-4 / 5-17V	4,5	32x23x7	18
SPIN 33	33	1,4	5-14 / 2-5 / 5-21V	4,5	42x23x7	30
SPIN 44	44	1,4	6-18 / 2-6 / 6-26V	5	52x25x10	40
SPIN 55	55	1,4	6-24 / 2-8 / 6-34V	5	52x25x12	70
SPIN 66	70	1,4	6-18 / 2-6 / 6-26V	5	52x25x12	70

*1 controller current consumption with batteries connected and switch in OFF position

Type	Voltage BEC [V]	Max.current BEC [A]	Max. servo number	Resistance in conducting state [mΩ]	Number of power transistors	Cable cross-section (input / output) [mm ²]	Input capacitance [μF]
SPIN 11	5,5	2,5	6	2x 8	6	0,5 / 0,5	1x 220
SPIN 22	5,5	2,5	6	2x 4	12	1,5 / 1	1x 470
SPIN 33	5,5	3	7	2x 2,6	18	2,5 / 1,5	2x 220
SPIN 44	5,5	5	8	2x 2	24	2,5 / 2,5	2x 220
SPIN 55	5,5	5	8	2x 0,94	48	4 / 2,5	2x 330
SPIN 66	5,5	5	8	2x 1	48	4 / 2,5	2x 470

Setting with the help of the R/C equipment

- connect the controller by means of the JR connector to the receiver throttle channel and connect the motor.
- shift the throttle stick to position „full throttle“, switch on the transmitter and connect the flight batteries.
- switch on the switch (void for SPIN 11), after five seconds four tones sound ♪♪♪♪. If the throttle stick is immediately shifted back to low throttle position the value of the full throttle position is stored in the memory (END POINT), otherways follows:

♪ single tones - **mode 1** Acro inrunner:
classic

- this mode is appointed to aerobatic models driven by motors of conception. (inrunner)
- brake not active
- timing 0°
- gradual switching off when 68% of the starting voltage is reached.

♪♪ two tones - **mode 2** Acro outrunner:

- this mode is appointed to aerobatic models driven by motors of the reversed conception. (outrunner)
- brake not active
- timing 24°
- gradual switching off when 68% of the starting voltage is reached.

♪♪♪ groups of three tones - **mode 3** Glider inrunner: - this mode is appointed to gliders driven by motors of classic conception. (inrunner)

- brake activated
- timing 0°
- gradual switching off when 68% of the starting voltage is reached.

♪♪ ♪♪ groups of four tones - **mode 4** Glider outrunner: - this mode is appointed to gliders driven by motors of the reversed conception. (outrunner)

- brake activated
- timing 24°
- gradual switching off when 68% of the starting voltage is reached.

♪♪ ♪♪♪ groups of five tones - **mode 5** Heli constant RPM:

- this mode is appointed to model helicopters with the claim for constant speed regulation with changing load/unload of the rotor. This mode does not support fast speed changes
- timing 0°
- gradual switching off when 68% of the starting voltage is reached.

♪♪ ♪♪ ♪♪ groups of six tones - **mode 6** Heli constant RPM (3D):

- this mode is appointed to model helicopters with the claim
- timing 0°
- gradual switching off when 68% of the starting voltage is reached.

Confirmation of the setting is carried out by shifting back the throttle to low throttle position during the tone signals of the factual mode.

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.

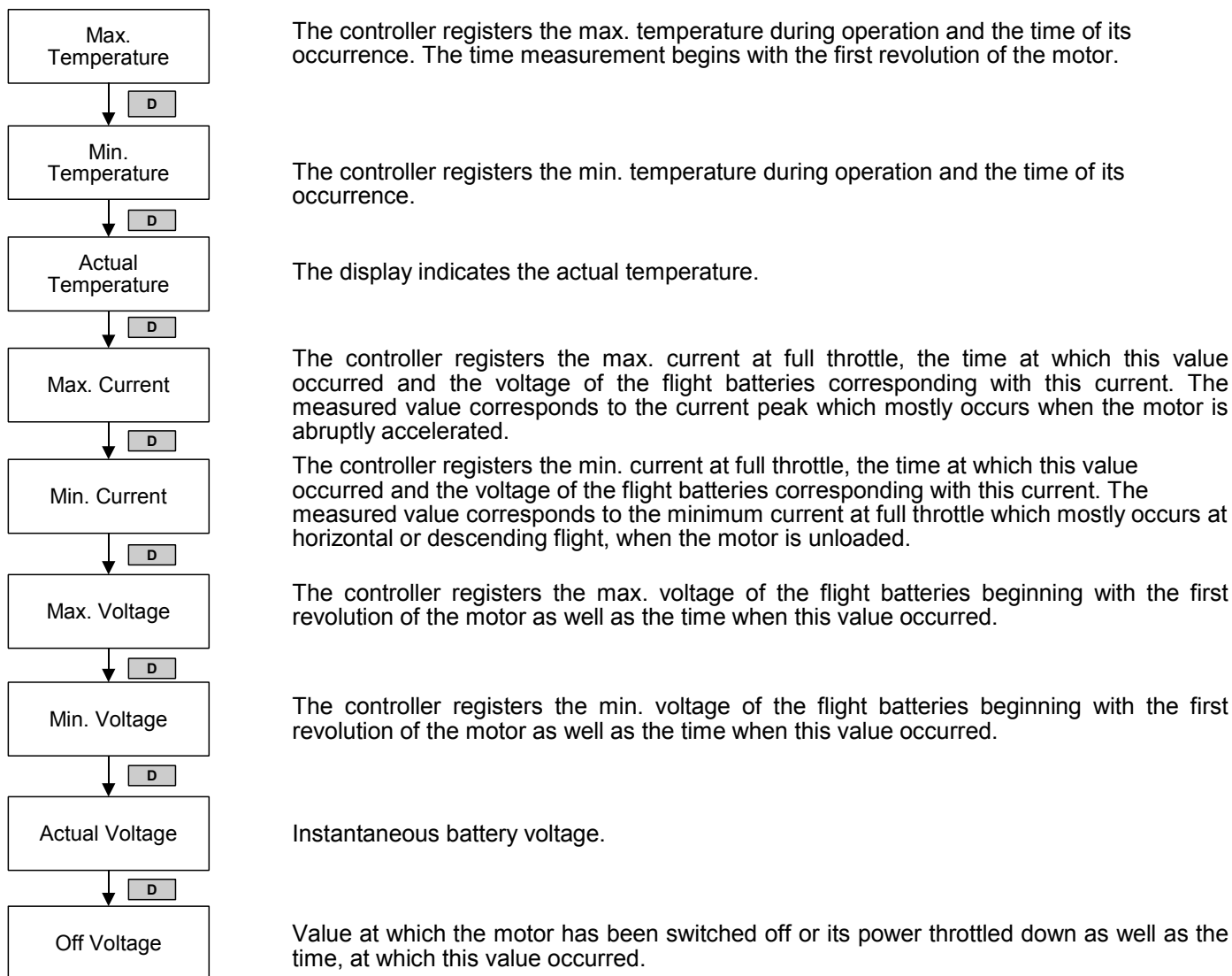
Do not connect anything to the connector designated with **-+**.

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.

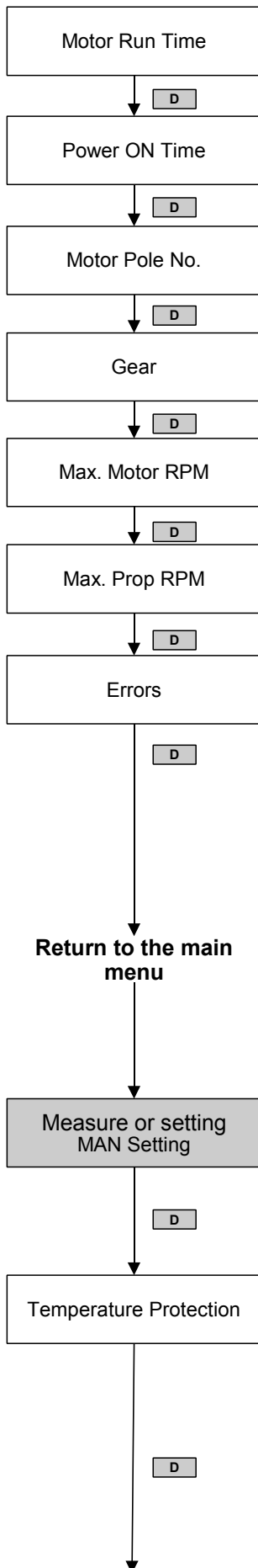
MEASURE – continue with push-button D



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.

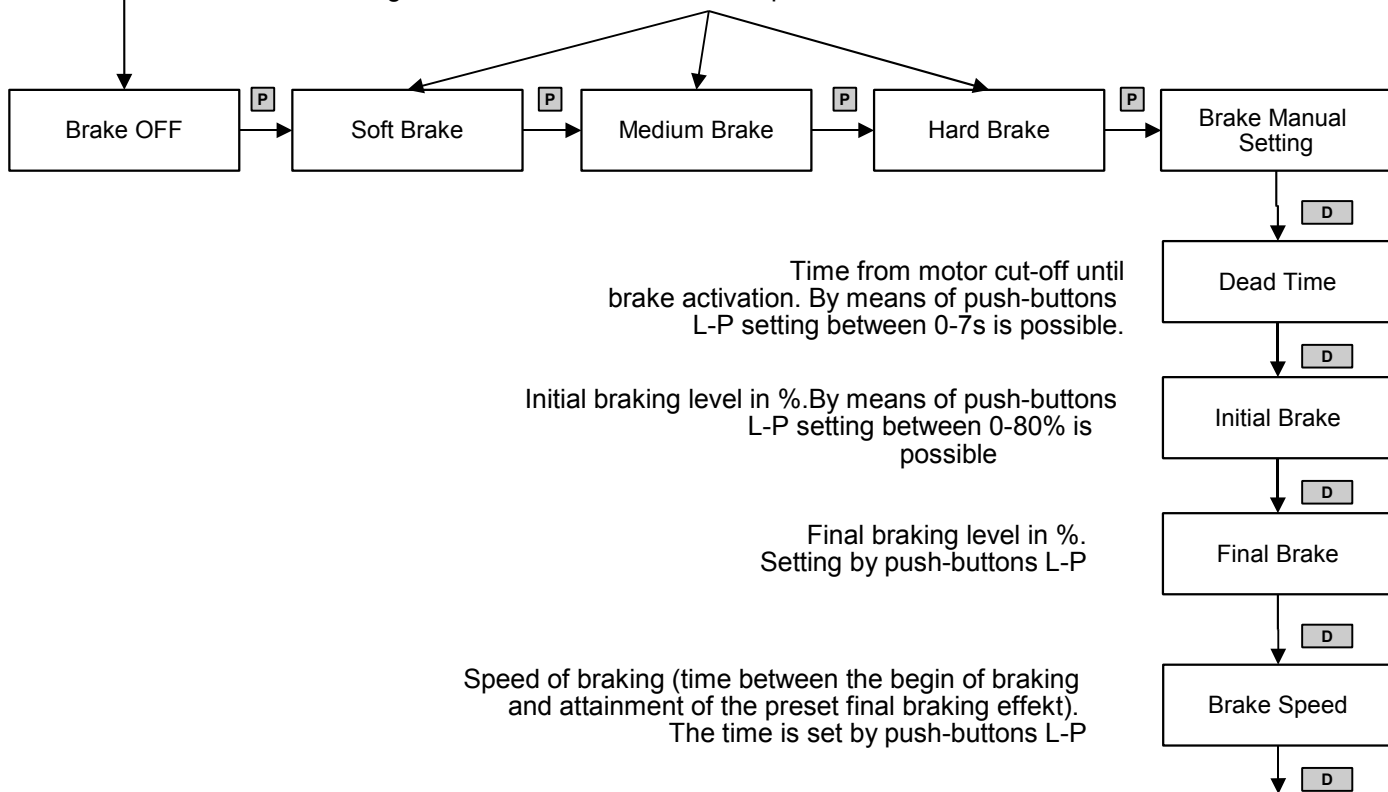
Certain parameters of the controller can be set or checked manually.

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.



Time from motor cut-off until brake activation. By means of push-buttons L-P setting between 0-7s is possible.

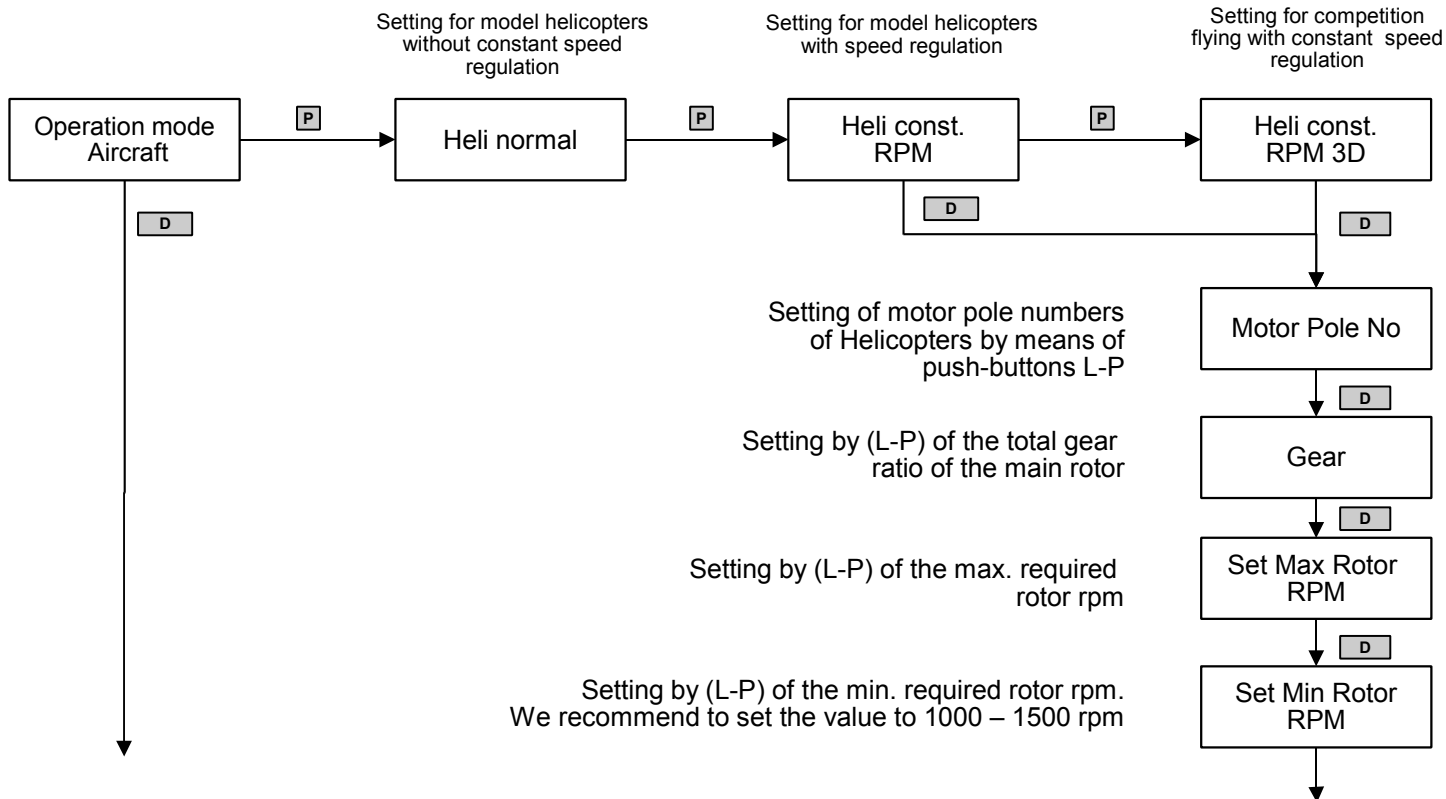
Initial braking level in %. By means of push-buttons L-P setting between 0-80% is possible

Final braking level in %. Setting by push-buttons L-P

Speed of braking (time between the begin of braking and attainment of the preset final braking effect). The time is set by push-buttons L-P

Jump to position TIMING

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.



Setting for model helicopters without constant speed regulation

Setting for model helicopters with speed regulation

Setting for competition flying with constant speed regulation

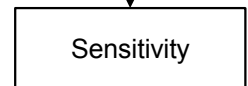
Setting of motor pole numbers of Helicopters by means of push-buttons L-P

Setting by (L-P) of the total gear ratio of the main rotor

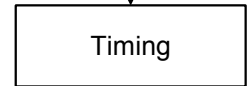
Setting by (L-P) of the max. required rotor rpm

Setting by (L-P) of the min. required rotor rpm. We recommend to set the value to 1000 – 1500 rpm

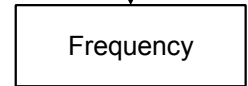
By means of the push-buttons L-P we set the speed of balancing rpm deviations. The smaller the number, the faster are the interventions. We always proceed from the higher number. If a certain limit becomes exceeded the controller starts to operate unstable (analogy with an overgrated Model helicopter)



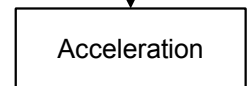
Motor timing (pre-ignition) – setting by means of push-buttons L-P. Recommended values: 2pole motor...0-5°, 4p motor...0-10°, 6p motor..0-20°, 8p and more...20-30° - necessary in case of the so called reversed motor conception



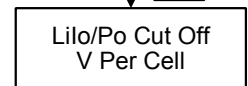
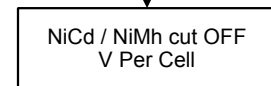
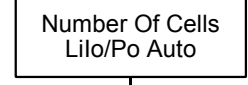
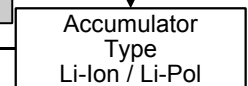
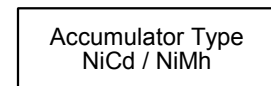
Motor control modulation frequency within the regulation range. Always use 8kHz. The only exception are the so called iron free motors (Tango, Samba). For these motors a frequency of 32 kHz must be used.



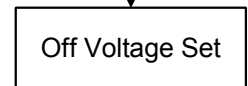
Speed of motor acceleration. On principle – the larger the propeller, the longer the acceleration time value must be. For big reversed motors apply an acceleration time of 2 and more seconds. For model helicopters we recommend acceleration times of 5 and more seconds.



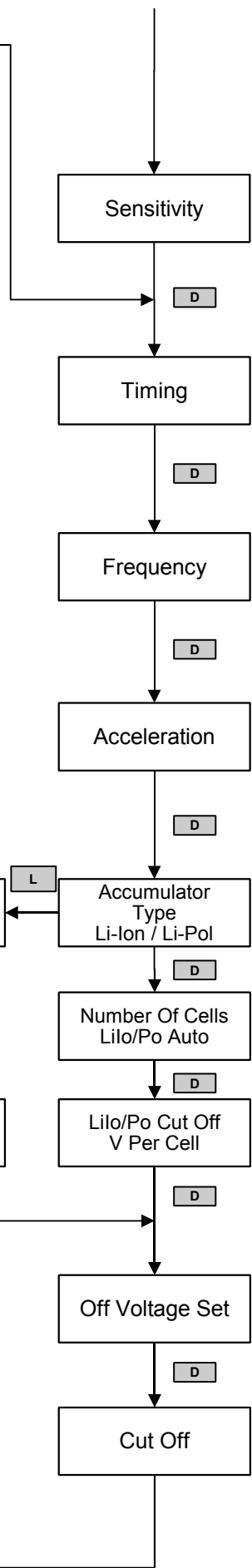
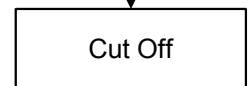
Enter by means of the push-buttons L-P the type of flight battery. For NiCd/NiMh cells the min. voltage per cell is entered by push-buttons L-P. For Lilon/LiPol batteries we can either enter the automatic cell number recognition (comfortable if flying battery sets with different cell numbers) or set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

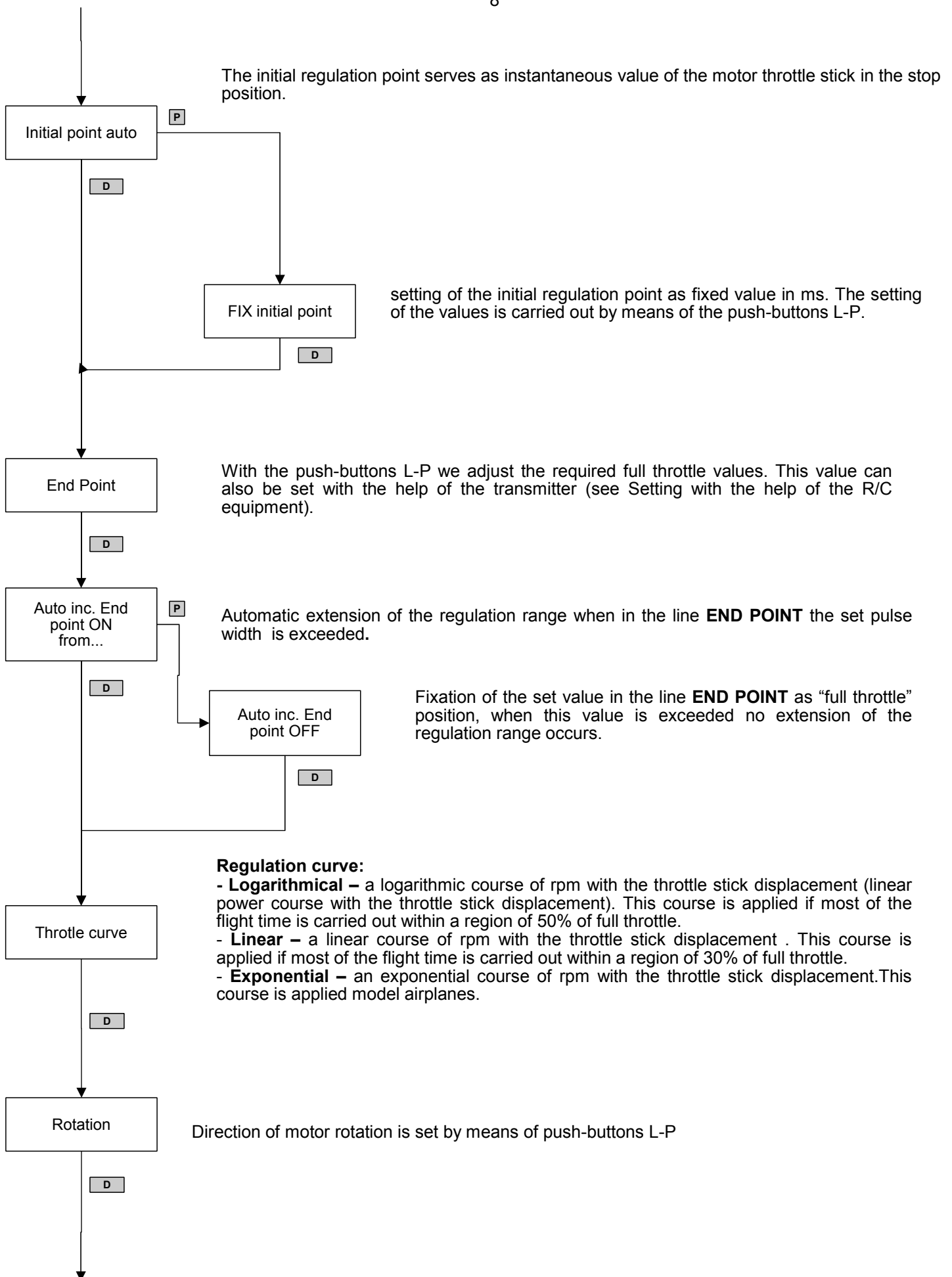


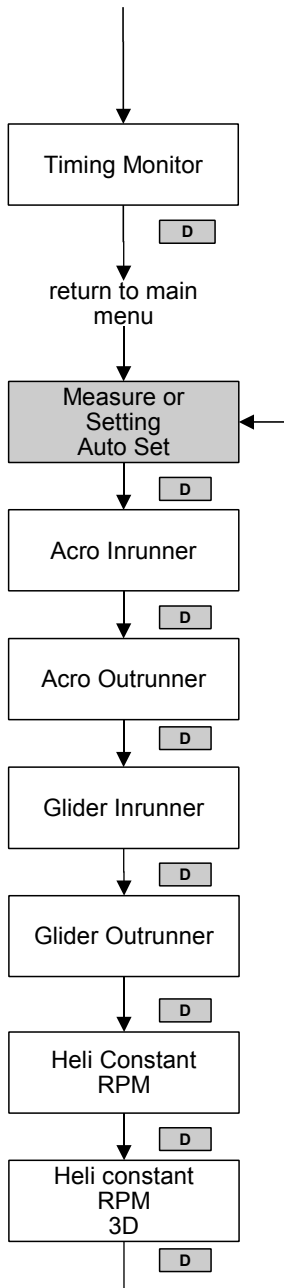
Information about the preset cut off voltage. With NiCd/NiMh cells or when setting the automatic detection for Lilon/LiPol cells this value results of the actual voltage of the connected flight batteries.



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.







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 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.)

The following table allows a fast skim through the menu

