dsys

MDD18
MDD36
MDD72

ESCs DC

CONTENTS

Version HW: 1.3 / SW: 6.2

USER GUIDE

CE

Universal DC Motor Electronic Speed Controllers (ESC) Reversible / Unidirectional

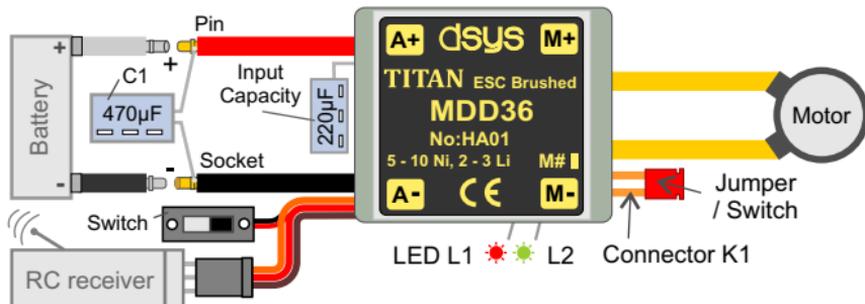**TITAN** Product Line

W - (MDDxxW) resistant to splashing water, snow, humidity and dust.

Car / Boat / Plane / BUS

TIR, Tractor, Tank, Dinghy, Sub, Glider. Suitable also for motors with gearbox.

The ESCs are designed for smooth speed control of electric motors in RC models powered only from batteries.

WIRING

Solder a pin connector to a red cable and socket connector to a black cable. If you extend the cables, solder the C1 low ESR (470-2200uF / 25V) capacitor.

Solder a yellow cable M+ to a marked motor lead and a cable M- to the second lead. (we do not recommend any cables extension).

Use high quality and proper power rate connectors only, resistant to spontaneous disconnecting. Solder and insulate all connections properly.

If you do not use the switch, cut it off close to the ESC´s case and insulate the bare wires. (The ESC is turn on with open switch).

Powering the receiver and servo.

ESC BEC. Leave all three pins in the ESC control connector

brown GND, red +5V, orange pulses ⎍⎍.
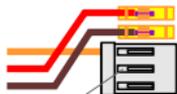
Receiver´s battery:
 pull out the pin with red wire and insulate it.

External BEC: pull out red and brown wire pins and
 insulate them.

 Plug the cable connector to the RC receiver throttle
 channel. Place the cable at least 3cm away from the
 motor and ESC wiring.

Lift up the tab and
pull the wire out.

 Secure all cables to avoid disconnection.

 For high power operating ensure proper airflow for ESC´s cooling
 (holes in the model body, auxiliary heat sink to the ESC on the side with
 label, fan).

M# MEMORY SELECTION

The M2 memory is selected by adding the jumper into K1,
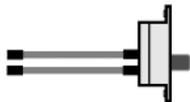 default set is boat, no jumper selects the M1 with Car default
 settings.

 Example: program the M1 for Li-Pol and M2 for Ni-MH then
 you can select the accumulators type with the jumper.

 The K1 state **is read only when the ESC is turned on.**

You can use the switch instead of the jumper.

 Solder the switch cable into K1 pins and insulate with

 sleeving tube.

OPERATION

Start. Turn the transmitter on. Move the stick to STOP position (neutral
 for reversible mode, fully backward for unidirectional mode).
 Connect the battery; switch the ESC on.
 You will hear one double beep, LEDs will blink.
 You will hear 1x/2x beeps; LEDs will blink (per M1 / M2).
 You will hear one long beep, red and green LED will blink.
 Your RC-model is now ready to start.

Stop. Move the stick to STOP position, wait for motor full stop.
 Swith the ESC off, disconnect the battery.
 Turn the transmitter off.

FACTORY DEFAULTS

Turn the transmitter on, move the stick fully Fwd.

Connect the battery, turn the ESC on. You will hear one double beep, LEDs will blink, you will hear one or two beeps (M1 / M2), LEDs will blink.

Wait 10s for 4 short red LED blinks.

Stick to Neutral (red LED blink).

Stick fully Fwd (red LED blink).

Stick fully Bwd (red LED blink).

Disconnect the power.

EASY PROGRAMMING

(no jumper for M1 memory, inserted jumper for M2 memory)

Programming with stick.

Turn the transmitter on. Move the stick fully Fwd. Connect the battery and turn the ESC on. The red LED will blink. Wait for 10 seconds, the red LED will blink 4x.

Move stick to Neutral, the red LED will blink. (the throttle stick range was set, disconnect the power or continue with next step).

Stick to Neutral, the red LED blinking indicates P1. To increase the P parameter move the stick Fwd and back to Neutral .

To select the parameter move the stick Bkw and back to Neutral, the green LED blinks out the H value.

Moving the stick Fwd and Bkw to Neutral increases the value.

Moving the stick Bkw and back to Neutral selects the value.

The programming is not time limited. To terminate the programming disconnect the power, all values are stored.

Programming with programmer (Card): Use the MDP4 programmer.

P1 Model. Preset RC model types:
(**P**: Power Fwd/Bwd, **A**: Acceleration, **Br N**: Brake at Neutral)

H1(user) value set in **P1** enables entering **P2 - P15.**

H2 Car-S (Sport), P 100/100%, A: 0,8s, Br N 20%.
H3 Car-T (Training), P: 60/60%, A: 2s, Br: 20%.
H4 Car-R (Race), P:100/0%; A: 0,4s; Br N 40%.

H5 BUS, Setable Constant Power.
P: 100/100%.

H6 Boat-S (Sport), P:100/100%, A: 0,8s.
H7 Boat-T (Training): P:60/40%, A: 2s.

H8 Dinghy, P: 100%; A: 0,8s.

H9 Plane, P: 100%, A: 0,8s.

Setting for all preset models:
Battery type - Auto. Power at Uo - cut off. Stick - linear.
Dead Band at Neutral - Middle. Idle - no.
Control characteristic per P2.
By selecting one of the preset models the programming is
terminated. Red LED are on. Disconnect the ESC power.

P2 Control. ←◎‖→ **Car.** Reversible, start from Neutral. Moving stick
from Fwd to Bwd activates the brake. Moving stick from Fwd to
Neutral and than to Bwd activates reversing. Reversing can be
activated also by moving stick from Fwd to Neutral and after
decelerating (**0,3 / 0,5 / 1s**) to Bwd. Reversing can be disabled by
setting power **0%** at P8 .

←‖→ **Car C (**expedition, tank). Reversible. Start from Neutral.
Smooth transition to both directions (after deceleration).

II←→II BUS BUS (TIR, expedition, Bus). Reversible . At start or after full stop with stick at neutral you can choose the direction. Moving the stick Fwd/Bwd you can run the motor up to maximum speed. The initial acceleration 25s can be smoothly reduced up to 0,2s at **P6**. When the required speed is reached move the stick to Neutral.

The ESC will maintain constant power. To reduce the speed, move the stick from neutral to opposite direction. When you reach the required speed, move the stick back to Neutral.

Crossing the Neutral you can reduce the speed up to full stop.

The initial deceleration 25s can be smoothly reduced up to 0,2s at **P7**. After the time for power reduction elapsed the brake is activated N (**P9**).

II⟶ Dinghy. Unidirectional. Only Fwd direction. Start from stop stick position (stick fully Bwd).

←II→ Boat. Reversible. Start from Neutral. Smooth transition from one direction to the other after deceleration.

II⟶ Plane. Unidirectional. Forward direction only. Start from idle stick position Stop (fully Bwd).

P3 Battery type.

Automatic: cut off is set to 70% of initial battery voltage level.

For **Li-Pol/Li-ion/Li-Fe** set Li-Xx. Set number of used cells.

For **NiCd/NiMH** set Ni-xx. Set number of used cells.
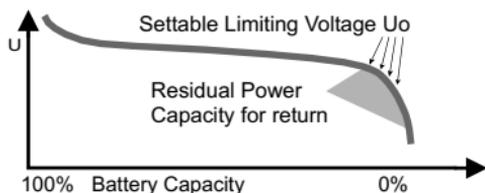
For **Pb** set Ni-xx,Pb.

P4 Uo.

Battery cut off voltage (per cell) per P3. **Ni-xx** - NiMH/NiCd (0,7V to 1,1V). **Pb** (4,8/9,6V to 5,4/10,8V). **Li-Xx** - LiPol/LiIon (2,8V to 3,6V). LiFe - A123 (2,4V or 2,6V).

P5 Power Uo.

Reducing or cut off at the Uo voltage (new start from stick position). The **OFF U** turns the battery control off (battery can be damaged).

6

P6 Acceleration. Power rise time from 0% to 100%. For powerful motors set at least **1s!**

P7 Deceleration. Power deceleration time from 0% to 100%. For full stop with gradual power reduction in Neutral set the parameter **P10 to 0%** (Brake).

P8 Power Fwd. Maximal power at forward direction.

P9 Power Bwd. Maximal power at backward direction.

P10 Brake N. Brake at Neutral.

After 1s is set to 100% (except for **H1** - no brake).

P11 Rise time BrN. Set the brake rise time N.

For powerful motors set at least **1s!**

P12 Brake A.B.S. Interrupted braking with settable brake to cycle time ratio.

It is turn on after 80% brake hardness is achieved.

P13 Stick.

Linear - even response.

Logarithmic - smooth control around the stick max.

Exponential - smooth control around minimum stick position.

P14 Neutral Dead Band.

Non-responsive range around STOP stick position.

P15 Idle.

NO the same property as if the engaged gear.

Yes lighten the motor like when gear is at Neutral (increases thermal losses).

Tab.1 Parameters Values Settings with Transmitter stick and Programmer (Card) MDP4.

| P		H1	H2	H3	H4	H5	H6	H7	H8	H9
1	Model	User	Car-S	Car-T	Car-R	BUS	Boat-S	Boat-T	Dinghy	Plane
2	Control	Car 0,3s	Car 0,5s	Car 1s	Car C	BUS	Dinghy	Boat	Plane	
3	Battery	Automatic	2S Li-xx	3S Li-xx	5Ni-xx	6Ni; Pb	7Ni-xx	8Ni-xx	9Ni-xx	10Ni-xx
4	Uo Ni-x; Pb	0,7V	0,8V	0,9V	1,0V	1,1V	4,8 / 9,6	5 / 10V	5,2 / 10,4	5,4 / 10,8
	Uo Li-Xx	2,8V	2,9V	3,0V	3,1V	3,2V	3,4V	3,6V	2,4 Li-Fe	2,6 Li-Fe
5	Power Uo	cut off	reduction	OFF U						
6	Acceleration	0,2s	0,4s	0,8s	1s	2s	4s	8s	16s	
7	Deceleration	0,2s	0,4s	0,8s	1s	2s	4s	8s	16s	
8	Power Fwd	100%	80%	60%	40%	20%	10%	5%		
9	Power Bwd	100%	80%	60%	40%	20%	10%	0%		
10	Brake N	0%	10%	20%	40%	60%	80%	100%		
11	Rise BrN	0,2s	0,4s	0,8s	1s					
12	Brake A.B.S.	NO	1:2 / 0,1s	1:2 / 0,2s	1:1 / 0,1s	1:1 / 0,2s	2:1 / 0,1s	2:1 / 0,2s		
13	Stick	linear	logaritm.	exponen.						
14	N Dead Band	small	middle	large	extra large					
15	Idle	NO	YES							

Forward
Neutral
Brake
Backward

⚙ **Programming with Transmitter Stick:**

Turn the transmitter on, stick full **Fwd**. Connect control cable to the RC receiver. Connect the battery, turn the ESC on.

LED L1+L2 will flash once.
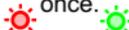
After 10s red L1 will flash 4 times

Move stick to **Neutral**, red LED L1 will flash shortly.

Stick to **Bwd**, red L1 flash once.

Stick to **Neutral.**

P1	**LED L1**
P2	
P3	
P4	
P5	
P6	
P7	
P8	
P9	
P10	
P11	
P12	
P13	
P14	
P15	

The red LED L1 will blink 1x (P1). To **increase** the parameter number move stick from **Neutral** to **Fwd** and back to Neutral.

To **select** the parameter move stick from **Neutral** to **Bwd** and back to Neutral.

The number of green L2 LED blinks corresponds with the stored value. The value can by increased or selected by the stick.

After the last parameter **P15** or value H9 there you will proceed back to parameter **P1** or value H1.

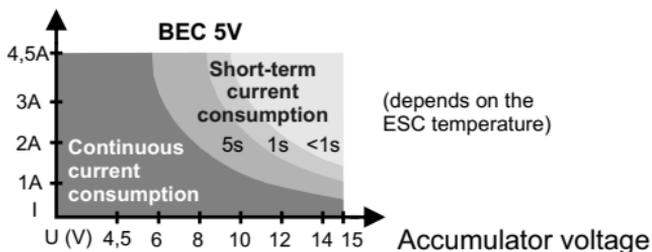| H1	H2	H3	H4	H5	H6	H7	H8	H9

LED L2

BEC

Powers the receiver and servos with 5V voltage (or custom level, for example 6,0V, 7,4V). The loading depends on battery voltage and ESC temperature.

For high current current consumption use external BEC.

BEC 5V — Continuous current consumption / Short-term current consumption (5s 1s <1s) (depends on the ESC temperature). Accumulator voltage U (V) 4,5 6 8 10 12 14 15; I 1A 2A 3A 4,5A.

RECOMMENDATIONS & TIPS

Motor does not start .

Check wiring, control connector orientation, transmitter and parameter **P3** setting.

Motor runs in opposite direction.

Reverse the transmitter signal deviation or swap the motor leads cables.

Motor is shut down.

Power cause: charge the accumulators, set lower Uo (**P4**).

Over current cause: check motor operation, reduce the load, use more power rating motor.

Overheating cause: ensure more effective cooling.

Maximum power is not reached.

Set the control stick range at Neutral to 1,5ms, Fwd at least to 1.8ms and Bwd to 1,2ms. For higher settings the range is adjusted automatically.

Sometimes the LED is not ON at Neutral, Brake is turning off.

Set the stick range (Programming, Page.3). Set wider clearance at neutral (**P14**), set stick to linear (**P13**).

BEC is overheating or limiting the power.

Check the current consumption of all devices powered by BEC. Check if the servos movement is not limited by obstackles.

The ESC cannot be programmed.
Set standard control stick range. Check if the stick deviation is not reversed. The power voltage, must be over 4,5V.

The ESC or Servos are twitching. Clean and suppress the motor properly. Change cable location in the RC-model. Solder 220µF/10V low ESR capacitor, insulate the connections.
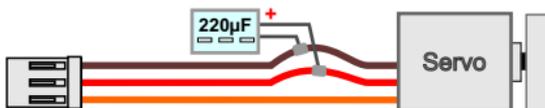
You can reduce the noise using DSYS MDOP1 opto-isolator.

🎵 ☀ ☀ VISUAL AND ACOUSTIC INDICATORS

Red and green LEDs blink and 1x double beep and 1x/2x beeps: Battery Connection.

The red and green LEDs are on. Stick at STOP Position at Full Fwd/Bwd and at all stick positions when under-voltage.

The green LED is on. The stick at Fwd direction.

The red LED is on. The stick at Bwd direction.

The red LED blinks 4x: entering the programming mode.

The red LED blinks 1x/1s, motor is beeping: Signal loss.

The red and green LEDs alternate blinking: Too wide stick range.

Repeating 2x Red LED's blinks: Wrong programming mode entering.

Repeating 3x Red LED's blinks: High ESC's temperature start, over-voltage.

The last LEDs state is on at all stick positions: high temperature.

Fats RED and GRN LEDs blinking: Current Over-Load.

ⓘ   **SAFETY PROTECTIONS**

Start.

Start is enabled only from STOP position. If the motor fails to accelerate within 2s, the motor power can be cut off.

Power.

Protect the separately connected ESC against the polarity inversion.

BEC.

Short-circuit, over-current and over-temperature protection.

Temperature.

Reduced the power at higher temperatures, cut off the motor at temperatures over 105°C.

Current.

Reduce the possibility of current overloading by cutting the motor off (Fast overloading can damage the ESC).

Under-voltage.

At Uo voltage (**P5**) reduce /cut off the motor. When <4,5V the motor is cut off, start when the voltage is >4,7V.

Over-voltage.

When the voltage exceeds >15V motor will not start.

Signal.

Covers the signal loss for 0,5s.

The electronic board is protected by special coating (against humidity, vibration and dust).

The "**W**" type is protected against splashing water, snow, humidity and dust.

Attention! Motor when stalling, accelerating rapidly or sharp braking can destroy under rated ESC! Example: The current consumption of 15A motor when accelerating or stalling can rise over 80A (crashed into an obstacle, plant wrapped around the boat propeller and etc.).

Voltage applied to motor outputs M+/M-, connecting M+/M- to +/- accumulator poles, M+/M- short-circuit, connecting not suppressed motor or rapid current overload will result in ESC destruction!

TECHNICAL SPECIFICATIONS

Type:	MDD18	MDD36	MDD72
Case size (mm)	32 x 25 x 9	39 x 26 x 10	47 x 31 x 11
Weight / (W)	18g / 20g	26g / 28g	39g / 41g
Number of Cells	5-10 NiCd/MH, 2-3 LiPol/Li-ion/LiFe, Pb 6/12V		
Continuous current *	18A	36A	72A
Short-term 3s *	22A	42A	85A
Servo cable AWG:	24	24	24
Power cable AWG:	16 / 18	14 / 16	12 / 14
BEC 5V current:	3A, max. current 4,5A		
MOSFET (25°C)	2x 3,7mΩ	2x 1,9mΩ	2x 1,2mΩ
Input Capacitance	1x 100µF	1x 220µF	1x 470µF
PWM control	up to 4kHz		
Min. Voltage	4,7V / 4,5V (Page 12)		
Max. Voltage	15V		
Idle consumption:	cca.0,5mA (switch off)		
RC Transmitter:	Pulses 1,5ms ± 0,3 to 0,7ms, T=5÷30ms		
Version:	HW: 1.2 / SW: 6.1		
Environmental Temperature:	-10°C to +40°C		
Intended environment: housing, business and light industry			

* Current MOSFET at maximal junction temperature 25°C, effective cooling and at 100% PWM.

⚠ OPERATIONAL INSTRUCTIONS AND SAFETY RULES

To ensure reliability and long ESC life read user guide thoroughly and follow its instructions!

Before connecting the battery check the motor power rating and proper loading. Do not overtake the ESC maximum current and voltage.

Do not charge battery while connected to the ESC. Connect the battery right before the usage and disconnect them when finished. While the motor Is still running do not turn off the ESC, do not disconnect the battery or motor, it could cause the ESC damage. Be aware of disconnecting the low quality connectors (during the operation the connectors must not heat up). Do not rotate the motor manually while the battery is not connected. Do not connect the battery lead directly to motor.

Protect your ESC against drops, aggressive environment, liquids, splashing water and snow (line "W" is resistible against splashing water and snow). Do not connect ESC to battery when taking it from cool to hot environment, wait at least for 20 minutes.

WARNING: Operate under adult supervision only. Keep the ESC out of reach of children. Do not let the ESC out of your sight and be careful with the motor as it could start anytime (another transmitter, noise, accident manipulation and etc.). Use the ESC very carefully to prevent operator or spectator injury. The motor while rotating is very dangerous.

Wrong montage and wiring, any connection shortage, not abiding the operational instructions and safety rules can cause the operator danger, ESC destruction even ignition. The damage is cumulative it can show up on next ESC start (partial damage became total).

Check and maintain the ESC wiring, isolating and montage after every start.

If you discover any defect on the ESC, please return the product to your seller or manufacturer with the defect description and information about used motor and battery(you can leave the connectors on).

For more information see: www.dsys-rc.com (Support, Tips and Tricks).

NOTES

Thank you for purchasing the universal, powerful and reliable DSYS TITAN series Electronic Speed Controller.

Your DSYS Team

PACKAGE CONTENT

Quantity

MDDxx (W) with user guide .... 1 pc
Jumper .... 1 pc
Heat Shrink tube 6mm/8cm .... 1 pc

For more information about our products for hobbyist please visit www.dsys.cz (Products).

QUALITY: All our products are undergoing series of tests to ensure high reliability, long lifetime and consistent safety.

WARRANTY: Our product are guaranteed for 24 months under the conditions described in attached warranty certificate.

SERVICE: We provides expert advice, warranty/expired warranty repair services.

ENVIRONMENT: When the product is no longer in use, dispose of it at an official waste site or inquire about "reverse distribution" (ask your contractor if they offer this service).

INFORMATION, TECHNICAL SUPPORT, SERVICE

Contact us on email.

Information and Support .... info@dsys.cz
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Visit our website at .... www.dsys.cz

RC Model Electronic - Manufacturing / Service.
Zdenek David, Hrusnova 12, Brno 62100, Czech Republic

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