Operating Manual

Double Speed Controller UFR-1230-D V1.01



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Basic description

The double speed controller UFR-1230-D has been designed especially for all RC vehicles with two brushed DC motors, such as tracked vehicles and ships.

With various setting options the speed controller can be easily adjusted to all model requirements and driving behaviours. All settings can be set with DIP switches and the software "Drive-Teacher".

The speed controller is equipped with 8 switching outputs to connect LEDs and other lights directly.

The double speed controller UFR-1230-D has following characteristics:

- Outputs for 2 drive motors, usable as two separate speed controller or with dual mixer function
- Supply voltage 6 – 18 V
- Maximum motor current 2 x 30 A (short-term 2 x 60 A)
- PWM pulse frequency 20 or 40 kHz
- 8 switching outputs for lights (braking, driving backwards, parking, flashing)
- Powerful BEC with 5,2 V and 3 A continuous current (short circuit proof)
- 3 proportional channels (throttle, steering, and control channel)
- 2 proportional outputs (outputs for sound module)
- Failsafe in case of receiver signal disturbances (motor stop)
- Protection when switching on supply voltage
- Battery voltage monitoring
- Temperatur monitoring
- Short circuit protection at motor output stage

Options adjustable with DIP switches:

- Load regulation on/off
- Parking brake on/off
- Battery type: LiPo/other
- Teaching function (setup)

Following functions are adjustable with the software "Drive-Teacher" and can be transferred with the data cable K-USB-2 (optional available):

- Firmware update
- Diagnosis
- Invertion of channels
- Deactivation of low voltage monitoring
- Reduction of driving backwards speed to 50 %
- Selection of PWM pulse frequency between 20 or 40 kHz (for bell-armature motors)
- Adjustment of load regulation

- Activation/adjustment of inertia
- Activation/adjustment of emergency brake
- Adjustment of hand brake sensitivity
- Adjustment of two throttle curves
- Configuration of switching outputs (output type, brightness, etc.)
- Configuration of light switch (controllable with proportional channel)
- Configuration of control channel
- Configuration of nautic/multiswitch modules

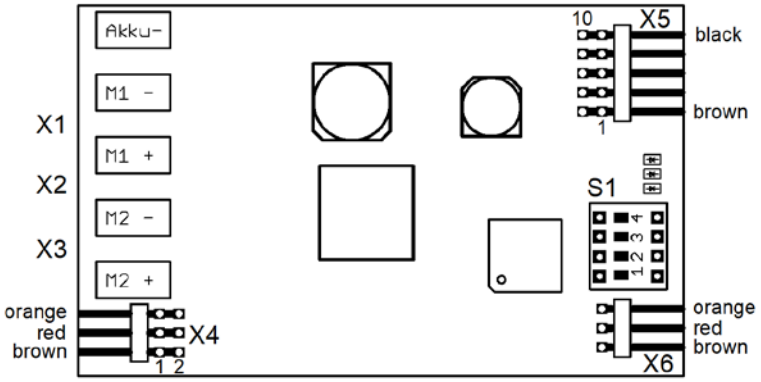
Safety notes

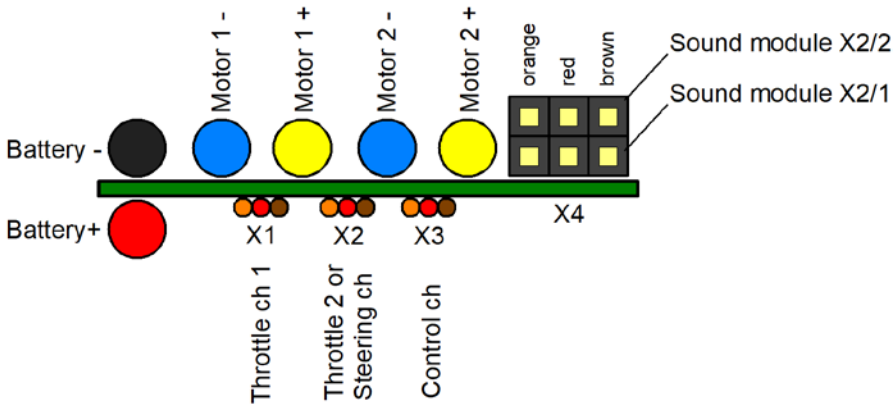
- Please read this operating manual carefully and keep it for future use!
- The integrated circuits on the speed controller are sensitive to electrostatic charge. Therefore it is important that you don't touch these components, before discharging yourself (e.g. through a grip onto a grounded device).
- Under certain circumstances unfavourable placement and wiring of the speed controller in the model may lead to restriction of transmitter range (mainly with 35/40 MHz transmitter).
- The speed controller should only be used with supply voltage given in the technical data.
- Always switch off power before connecting the speed controller!
- The speed controller is not suitable for children under 14 years.

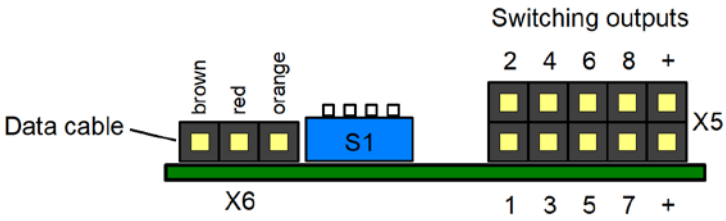
Technical data

Supply voltage (U_b):	6 – 18 V DC
Power consumption:	Stand-by current: approx. 40 mA
Motor current:	Max. 2 x 30 A continuous current, 2 x 60 A short-term current (1 minute)
BEC voltage:	5,2 V
BEC current:	Max. 3 A continous current, 5 A short-term current (10 seconds)
Proportional inputs:	3 pieces (1,000 – 2,000 ms): • Throttle channel • Steering channel • Control channel (for lights)
Proportional outputs:	2 pieces (1,000 – 2,000 ms): • Outputs for sound module
Switching outputs:	8 pieces (npn – open collector), max. 1,5 A per output, sum of all outputs must no exceed 3,0 A
Protection features:	• Short circuit protection at motor output stage • Short circuit protection at switching outputs • Short circuit protection at BEC • Temperature monitoring • Battery voltage monitoring • Protection while switching on power supply • Failsafe for proportional inputs
Additional ports:	• Programming interface for data cable
Cables for connection:	• For battery: 2 x 2,5 mm², length approx. 15 cm (with Deans T plug connector) • For motor: 4 x 2,5 mm², length approx. 15 cm • For receiver: servo patch 3 x 0,14 mm², length approx. 30 cm
Permitted ambient temperature:	0 – 60 °C
Permitted humidity:	Max. 85 %
Size:	80 x 50 x 23 mm
Weight:	95 g

Pin assignment



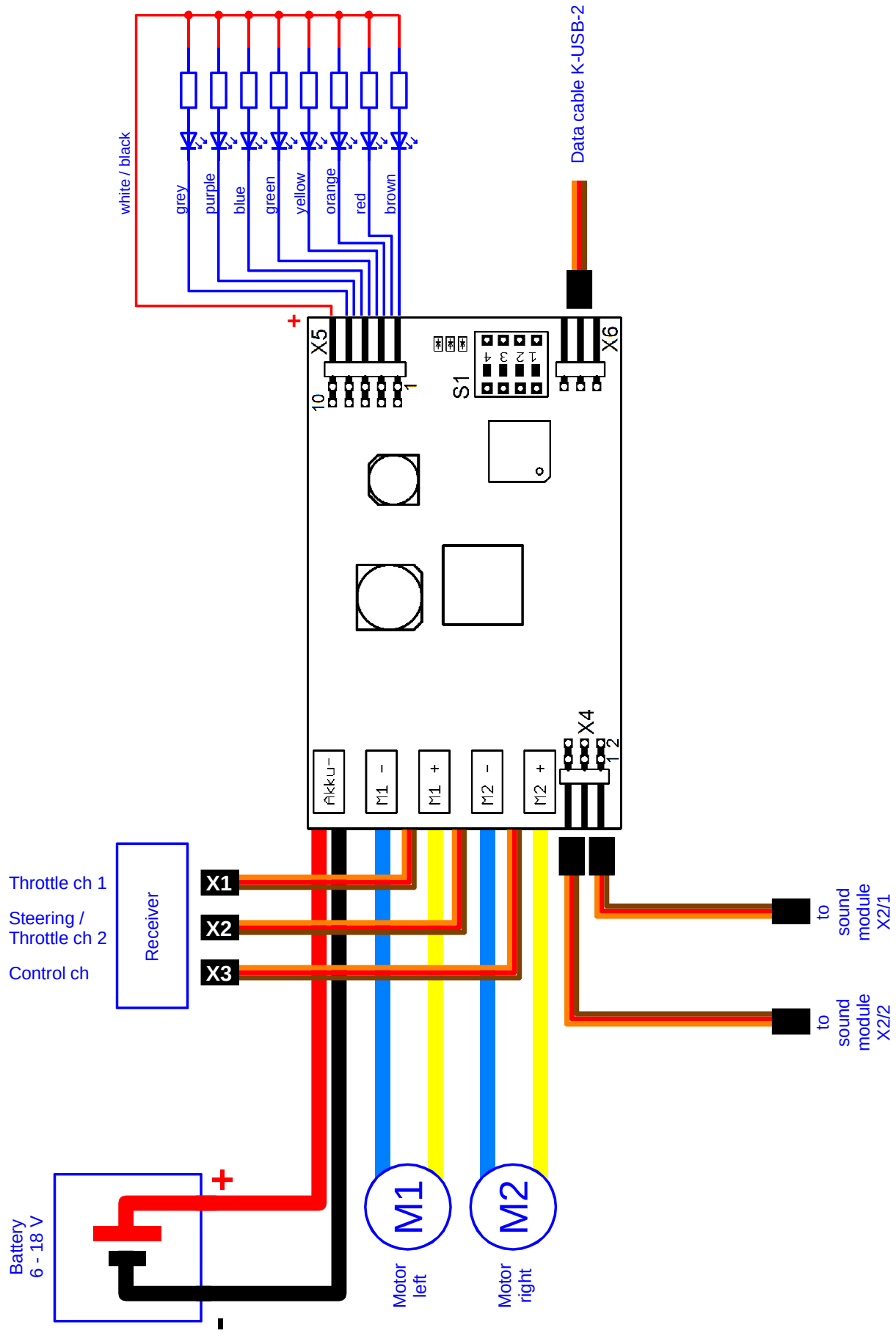




Connections at the double speed controller:

Battery	Red: battery +, black: battery - (Deans T plug connector)
Motor 1	Yellow: motor +, blue: motor - (left motor)
Motor 2	Yellow: motor +, blue: motor - (right motor)
X1	Proportional input: throttle channel
X2	Proportional input: throttle channel 2 or steering channel
X3	Proportional input: control channel
X4/1	Proportional output: sound module X2/1
X4/2	Proportional output: sound module X2/2 (only if digital communication with sound module is not used)
X5	Switching outputs 1 - 8
X6	Port for data cable K-USB-2

Wiring diagram



Installation of speed controller

For a safe installation of the speed controller, we recommend to use Velcro tape on the UFR-1230-D cover.

Pay attention not to connect components and conductor tracks with any metal parts! This may cause a short circuit and destroys the speed controller!

Connection of speed controller

Always switch off power before connecting the module!

Connection of supply voltage (battery):
The speed controller is suitable for 6 – 18 V DC. To connect power supply the red cable is plugged to the positive pole of the battery and the black cable to the negative pole of the battery.

For easy connection, the speed controller is delivered with Deans T plug connectors.

Pay attention to a correct connection of the supply voltage poles! A wrong connection destroys the speed controller immediately!!!

Connection of motor:
The yellow cable is used to connect the positive pole of the motor. The blue cable is connected to the negative pole of the motor.

M1 is for the **left** motor and M2 for the **right** motor.

In case the driving direction is wrong (forwards and backwards are opposite), change the connection of the motor cables or invert the channel in your Drive-Teacher, see page 30.

Connection of receiver (X1, X2 and X3):
3 servo cables (X1 - X3) are soldered to the speed controller UFR-1230, for connecting the speed controller to the receiver.

Assignment if no dual mixer function is used:

Servo cable	Channel of receiver
X1	Throttle channel 1, left motor
X2	Throttle channel 2, right motor
X3	Control channel (for light functions)

Assignment with dual mixer:

Servo cable	Channel of receiver
X1	Throttle channel
X2	Steering channel
X3	Control channel (for light functions)

Throttle channel X1 (and X2) must be connected to the receiver in order to control the motors.

Control channel X3 is optional for light functions.

The speed controller has its own BEC supply voltage; an additional receiver battery is not required.

In case the BEC voltage of the UFR-1230-D should not be used, the red cable from servo cable X1 and X2 and the red servo cables from X4/1 and X4/2 must be disconnected.

Connection of sound module (X4/1 and X4/2)
The UFR-1230-D has two special outputs for connecting a sound module (for example the USM-RC-2). Output X4/1 (lower pins) transmits speed information of motor 1 to the sound module and X4/2 (upper pins) of motor 2.

If the digital communication between sound module and speed controller is used, only one connection between X4/1 (UFR-1230-D) to X2/1 (sound module) is required, in order to transmit speed information of both motors. See page 12 for more information.

Connection of switching outputs (X5):
To connect lights at the switching outputs we recommend using the supplied flat ribbon cable or terminal clamp AKL-10 or AKL-10-W. Other cables and clamps with a size 0,14mm² – 0,5mm² can be used as well.

The speed controller switches always the negative pole to the connected load. The positive pole is therefore always connected to the load, see page 7 (wiring diagram).

The joint positive pole for all outputs is at X5 on pin 9 and 10. It is also possible to connect the load directly to the positive pole of the battery.

Assignment of flat ribbon cable:

Output	Flat ribbon cable
1	brown
2	red
3	orange
4	yellow
5	green
6	blue
7	purple
8	grey
Positive pole	white
Positive pole	black

When connecting the flat ribbon cable the black cable points up to the edge of the board.

The switched voltage of the outputs (with 100 % brightness) is always as high as the supply voltage of the speed controller.

LEDs always require series resistors! Pay attention to the correct polarity. The resistor values depend on the LED colour and the LED current.

The values below are for standard LEDs with a current of 15 mA.

Supply voltage	Series resistor
6 V	270 Ohm
7,2 V	330 Ohm
8,4 V	470 Ohm
9,6 V	510 Ohm
12 V	680 Ohm
14 V	820 Ohm
16 V	1 kOhm

For your own calculation you can use a resistor calculator, like www.leds.de/widerstandsrechner.

If more LEDs should be connected to one output (indicator front and back) it is better to use for each LED its own resistor. A series connection should be avoided.

General remarks for wiring:

Always use cables with a core diameter of at least 2,5 mm² for connecting the power supply and the motors. For connections of lights you can use smaller cables such as 0,25 mm².

Unfortunately motors are often strong interference sources, which could disturb other electronic modules in your model. Therefore all motors should be absolutely interference-suppressed!

It is important to pay attention to „clean" wire routing. Always use short wires and avoid any unnecessary loops. The supply voltage wires of the speed controller should be connected to the driving-battery as direct as possible.

A separate installation of interfering cables (for example motor cables) can achieve significant improvements.

Connection of data cable K-USB-2 (X6)

The data cable K-USB-2 is connected to X6.

Following functions require a data cable:

- Transmission of Drive-Teacher configurations
- Read-out configurations of speed controller
- Run diagnosis functions
- Update of firmware

Combination UFR-1230-D and sound module USM-RC-2

In combination with the sound module USM-RC-2, both throttle channels from the receiver are connected directly to the speed controller (X1 and X2). The sound module (prop #1, X2/1) is connected with a servo patch cable to X4/1 (lower pins) of the double speed controller and receives information through this connection.

The sound module receives the actual speed information directly from the speed controller, even if the cruise control and the load regulation are active.

Digital transmission to sound module
We recommend to activate the digigtal commuincation between sound module and speed controller. Configuration → Speed Controller → Other → Digital communication with sound module.

You also need to activate „Digital mode with UFR ESC“ in your Sound-Teacher (Configuration → General → General → Module configuration).

The digital communication offers several advantages:

- The sero point (driving diagram) is always correct.
- More precise transfer of speed data.
- Additional outputs from the USM-RC-2 can be used for connecting lights, in case the 8 light outputs at the UFR-1230-D are not enough. For this, only the types for the outputs must be selected in the Sound-Teacher.
- The sound module monitors all functions of the UFR-1230. For example, if the speed controller is flashing the sound module activates the corresponding indicator sound automatically.

DIP switches

Following functions can be activated and deactivated with the DIP switches:

Switch	OFF	ON
1	Load regulation off	Load regulation on
2	Handbrake off	Handbrake on
3	Other type of battery	LiPo Battery
4	Normal driving	Setup (teaching) on

All DIP switches can be changed during driving, except of switch 3, which must be used before turning on power supply.

Load regulation

With DIP switch 1 an optional load regulation can be activated. The speed controller monitors the current driving speed in case the throttle channel position differs from the actual driving speed due to environmental impacts and will maintain the driving speed.

For example a tracked vehicle starts to drive up a hill, this requires more throttle to keep the pace. With activated load regulation the throttle adjustment is automatically done by the speed controller when driving up or down a hill.

While driving curves with activated load regulation the inner chain is slowed down. This helps steering the vehicle better.

The load regulation effect is particularly visible at a slow/medium driving speed. However, at a very slow speed the load regulation may reach its limits.

How heavy the load regulation should adjust the speed can be set in the Drive-Teacher.

Depending on the motor the load regulation effect may vary. This function is still in „development stage“ and we can not guarantee a perfect performance with all motor types.

The load regulation can also be activated/deactivated (temporarily) with an additional function (control channel X3). The dip switch 1 position sets the standard setting of the load regulation.

Handbrake

With activated handbrake (DIP switch 2 ON) the vehicle is stopped by the EMF motor brake to prevent a roll away.

When accelerating, the handbrake is deactivated automatically. In the Drive-Teacher you can set the handbrake hardness and wether it should be activated only while standing or as soon as the throttle channel is in neutral position and the vehicle is still rolling out.

However, the EMF brake is not as effective as a mechanical brake. At a steep incline the vehicle may roll away despite the handbrake.

Selection of battery type

With a LiPo battery DIP switch 3 must be set ON. With all other types of batteries the switch is OFF.

The battery setting is important for a correct low voltage monitoring, see page 22.

Setup (teaching function)

With the teaching function important parameters can be synchronised between the radio and the speed controller, such as:

- Neutral position of throttle channel X1
- Neutral position of throttle or steering channel X2
- Neutral position of control channel X3
- Maximum position of throttle channel X1
- Minimal position of trottle channel X1
- Maximum position of throttle or steering channel X2
- Minimal position of trottle or steering channel X2

The speed controller is delivered with following standard setting: neutral position (1,5 ms), minimal position (1,0 ms) and maximal position (2,0 ms).

We recommend to „teach“ the speed controller with the radio at least once.
The motors are not triggered during teaching, except of the peeper in step 4, 5 and 6.

Procedure of teaching with UFR-1230-D dual mixer:

1. Connect throttle channel X1, steering channel X2 and control channel X3 to your receiver.
2. All channels must be in neutral position. Turn on receiver.
3. Put **DIP switch 4** to **ON**.
4. Turn on supply voltage at speed controller → the blue LED is flashing once and the green LED is flashing fast. If there is a good signal at throttle channel X1 and steering channel X2 the neutral positions are saved.
   If the red LED is flashing, the speed controller can not detect a correct signal at X1 and/or X2. Please check all connections again.
5. For a short time give full speed and press the stick all the way up. Return to neutral position → the blue LED flashes two times and lights permanently afterwards.
6. Within 10 seconds press the throttle stick down and give full speed backwards and return to neutral position → the blue LED flashes three times.
7. The green and red LEDs are flashing fast.
8. Put the steering channel for a short time completely to the left and return to neutral → the blue LED flashes four times and lights afterwards permanently.
9. Within 10 seconds put the steering channel for a short time completely to the right and return to neutral → the blue LED flashes five times and turns afterwards off.
10. The green LED lights permanently.
11. The setup is completed. Turn the **DIP switch 4 OFF**.

Procedure of teaching with *no* UFR-1230-D dual mixer:

1. Connect throttle channel X1, steering channel X2 and control channel X3 to your receiver.
2. All channels and trimmer must be in neutral position. Turn on receiver.
3. Put **DIP switch 4** to **ON**.
4. Turn on supply voltage at speed controller → the blue LED is flashing once and the green LED is flashing fast. If there is a good signal at throttle channel X1 and steering channel X2 the neutral positions are saved.
   If the red LED is flashing, the speed controller can not detect a correct signal at X1 and/or X2. Please check all connections again.
5. For a short time put the throttle channel for the left motor completely up (full throttle) and return to neutral → the blue LED flashes two times and lights permanently afterwards.
6. Within 10 seconds press the throttle stick fort he left motor down and give full speed backwards and return to neutral position → the blue LED flashes three times.
7. The green and red LEDs are flashing fast.
8. Put the throttle channel for the right motor for a short time completely to full speed and return to neutral → the blue LED flashes four times and lights afterwards permanently.
9. Within 10 seconds put the throttle channel for the right motor for a short time completely to full speed backwards and return to neutral → the blue LED flashes five times and turns afterwards off.
10. The green LED lights permanently.
11. The setup is completed. Turn the **DIP switch 4 OFF**.

Additional functions

Following additional functions can be triggered with control channel X3:

- Triggering outputs 1 – 8 static
- Indicator left
- Indicator right
- Hazard light
- Light switch +
- Light switch -
- Changing to throttle curve 2
- Load regulation on/off
- Inertia off
- Inertia light
- Inertia medium
- Inertia heavy

With a normal proportional channel a maximum of 8 functions can be triggered, see page 31.

To trigger more functions we recommend to use a radio with nautic/multiswitch module.

With the function „output 1 – 8“ the outputs are always switched as static (on/off), independet from the defined output type. Flashing lights, such as indicators must be switched with the specific light function „indicator left“ and „indicator right“ and not by „output 1 – 8“.

Control channel X3

With control channel X3 lights and other additional functions can be switched.

The proportional channel X3 is divided in 5 areas, namely A, B, N, C and D, which indicate the possible control stick positions.

Area N is the middle position and therefore neutral with no function.

Area A is on the left and D on the right side. Some radios have an opposite division. In this case the channel must be inverted at the radio or with the Drive-Teacher to trigger functions (left/right indicator) correctly.

Standard setting of control channel X3:

	A	B	N	C	D
Short in position	Indicator left on/off	Output 7		Output 8	Indicator right on/off
Long in position	Output 5			Hazard light on/off	Output 6

The assignment of functions can be changed with the Drive-Teacher, see page 17).

If the function „automatic indicator lights while turning“ is activated in the Drive-Teacher the indicator lights can only be activated with the steering channel (X2) and no longer with the control channel (X3)!

Simulation of a control stick with switches

In most cases the control sticks of a radio are occupied with other functions. Therefore you need a different option to control the functions of channel X3.

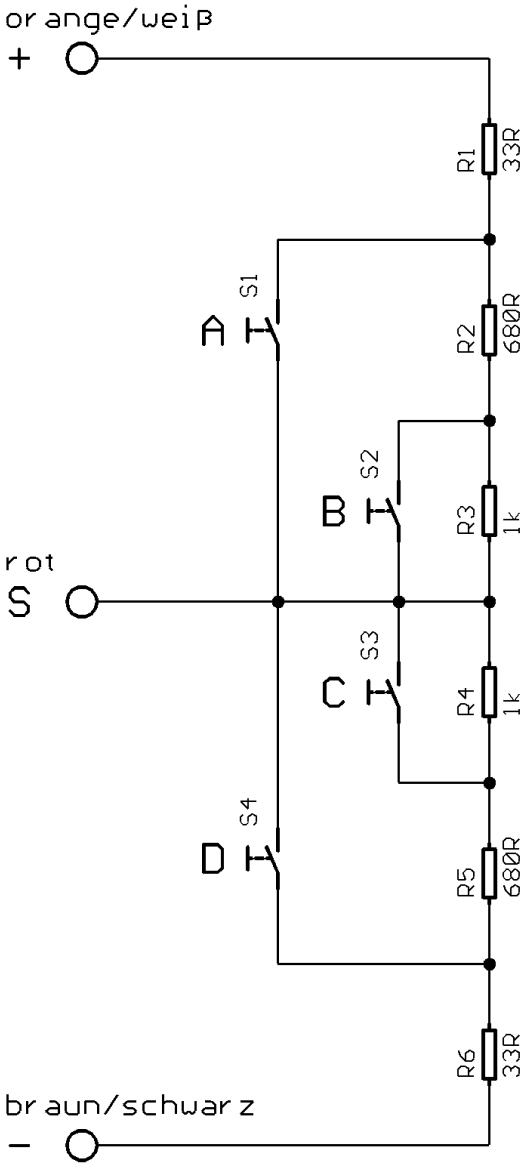
With one free channel and two switches the different possitions of a poti/control stick can be simulated. You can find the circuit plan on the right. Example: if you press switch S1 position A of a control stick is simulated and the programmed function (light) is activated or deactivated.

For this setting you need 6 resitors and 4 switches (or 2 switches with neutral position). You can built the circuit easily on a board in a short time.

The resistor values should be sufficient for the most comercially available radios. The 5 thresholds can be adjusted with the Drive-Teacher.

Depending on your radio type the circuit as well as the installation might be different.

With some radios (Futaba/Robbe) you might need one additional 68k Ohm resistor for neutral „S“.



Hint:
The correct function can be checked with the diagnosis function of the Drive-Teacher.

You can also buy „ready to use“ switch modules in our online shop. For Robbe radios we recommend switch SMS-R and for all other types of radios SMS-G.

Nautic/Multiswitch

All additional functions of the UFR-1230 can be controlled with nautic and multiswitch modules.

Following switch modules can be used with the speed controller UFR-1230-D:

- BEIER-Electronic NMS-16-R, NMS-16-G and NMS-24-G
- BEIER-Electronic EMS-16-R, EMS-16-G and EMS-24-G
- BEIER-Electronic MSC-8-C, MSC-10-C and MSC-8-C-LCD
- Graupner Nautic-Expert Module (Nr. 4108), Multikanal
- Robbe Multi-Switch Module (Nr. 8084, 8101, 8413, F1511)
- Mergen/CP 12-Channel and 16-Channel Multiswitch

Some of the new radio types have „software-nautic-switches“ which might be used as well. For more information please check the operating manual of your radio.

To use the nautic mode the option must be activated in the Drive-Teacher.

For each switch position additional functions, see page 16, can be set in the Drive-Teacher, see page 30. When pressing the switch the assigned function is activated.

With the option „memory“ the function stays activated until the switch is pressed again.

To use a nautic/multiswitch module the servo channel X3 of the UFR-1230-D must be connected to the correct receiver output (corresponding to the used transmitter input).

If the UFR-1230-D receives correct data from the nautic/multiswitch module, the blue LED flashes regularly in short intervalls. With EMS modules the blue LED only lights as long as one of the switches is pressed.

If the blue LED is not flashing regularly or the nautic/multiswitch module is not working properly, please check the settings in your radio. In the operating manual of your radio you can read more about the required settings for a nautic module.

Radios with Jeti Duplex 2,4 GHz the „output period“ of the receiver must be set with the Jeti-Box to „by transmitter“ or „auto“. Further important settings are: ATV high limit: 2,20 ms, ATV low limit: 0,80 ms.

Switching outputs

The UFR-1230-D switching outputs can be used for connecting LEDs and other lights.

The UFR-1230-D is delivered with following output setting:

Output	Typ
1	Brake light
2	Reversing light
3	Indicator left
4	Indicator right
5	Static (on/off)
6	Static (on/off)
7	Static (on/off)
8	Static (on/off)

With the software Drive-Teacher and the data cable K-USB-2 all settings can be changed. Following output types are available:

- Static (on/off)
- Flashing
- Impulse
- Indicator left
- Indicator right
- Brake light
- Reversing light
- While standing on
- While driving on

All outputs are minus switching, which means the negative pole is always switched to the connected load (for example to LEDs, lights, relais etc.). The positive pole of the supply voltage is connected directly to each load.

The light intensity (PWM control) of each output can be set in 2 % steps between 2 % and 100 %.

Optionally, a light bulb effect can be activated for each output. This behaves an LED when switching on and off, then like a light bulb (softer on and off).

Output „static“ on
For simple on and off light functions.

Output „flashing“ on
With this output type lights flash in a certain frequency. You can set the frequency for each output in your Drive-Teacher at **„option 1“**. Times between 1 and 255 are possible. 1 is with 50 Hz the fastest and 255 (0,196 Hz) the slowest frequency.

The flashing frequency in Hz can be calculatet with following: f = 1 / (Value x 0,02).

Output „impulse“ on
With the setting impulse the output will be activated for a certain time. A typical application is a short muzzle flash from a cannon.

The pulse time can be set in the Drive-Teacher with the „**option 1**“. Values between 1 and 255 are possible. 1 is the shortest pulse duration (0.1 s) and 255 the longest with 25.5 s.

The pulse time can be calculated by multiplying the entered value with 0.1s.
A value of 5 means for example a pulse time of 0.5 s.

Outputs “indicator left“ and “indicator right“
The indicator lights can be switched with control channel X3, see page 17.

The indicators are always switched off automatically with the steering channel X2. For example after turning right the indicator is deactivated as soon as the steering channel X2 is in neutral position again.

Alternatively, it is possible to activate the indicator lights automatically while turning, see page 31.

For hazard lights both indicators flash simultaneously.

Output „reversing light“
The output for reversing light is always activated as soon as the reverse gear is activated or the model is driving backwards.

Output „brake light“
The brake light is always activated for a short time as soon as the model slows down. For a realistic effect the light duration depends on the brake intensity.

Output “in motion on“
This output is always switched on when the model is moving, whether it is moving forwards or in reverse.

Output “in stationary on“
This output is always switched on when the model is standing.

Short circuit protection at motor output

If a short circuit at the motor output is detected, following actions are carried out:

- Motor stop
- Fast flashing of braking lights (you can change the flashing output with your Drive-Teacher, see page 31)
- Flashing of red LED on UFR-1230-D

Temperature monitoring

The UFR-1230-D has an integrated sensor to monitor constantly the temperature. If the measured temperature exceeds 80 °C following actions are executed:

- Reduction of driving speed to maximum 30 %
- Slow flashing of braking lights lights (you can change the output with your Drive-Teacher, see page 31)
- Slow flashing of red LED on the UFR-1230-D

Low voltage monitoring

LiPo batteries must not be discharged too deeply to avoid damages. Therefor the speed controller monitors permanently the battery voltage. Is this value below a certain threshold (3,2 V per cell with LiPo, 1,0 V per cell with NiCd and NiCd) following actions are executed:

- Reduction of driving speed to maximum 30 %
- Slowly flashing of reversing lights lights (you can change the output with your Drive-Teacher, see page 31)
- Slowly flashing of the blue LED on the UFR-1230-D

When connecting a LiPo-, NiMh- or NiCd battery the speed controller recognizes the number of cells automatically. For the correct detection of cells, the battery must not be (almost) empty. When turning on the supply voltage a signal tone beeps for each cell. For example with a 2S LiPo the speed controller beeps twice and with a 3S LiPo three times.

With the Drive-Teacher the low voltage monitoring can be deactivated, which might be necessary with some types of batteries.

Current monitoring of outputs

The 8 switching outputs are monitored continously. In case of a detected current overload all 8 outputs are deactivated.

This current monitoring is no 100 % short circuit protection! It is important to avoid short circuits when connecting the outputs.

If a overcurrent is detected following actions are executed:

- Deactivation of all outputs
- The red LED on the speed controller lights permanently

Monitoring of proportional inputs/failsafe

The signals of proportional channel X1, X2 and X3 are monitored permanently by the speed controller.

In case no correct signal is received at the throttle channel X1 and X2 the speed controller stops due to safety reasons and the blue LED lights permanently at the speed controller.

To avoid a sudden „start“ when connecting the suppy voltage both throttle channels must be in neutral position in order to control the motor. The green LED flashes slowly as long as both throttle channel were not in neutral position.

LEDs on UFR-1230-D

The speed controller has 3 LEDs to indicate the different states and problems.

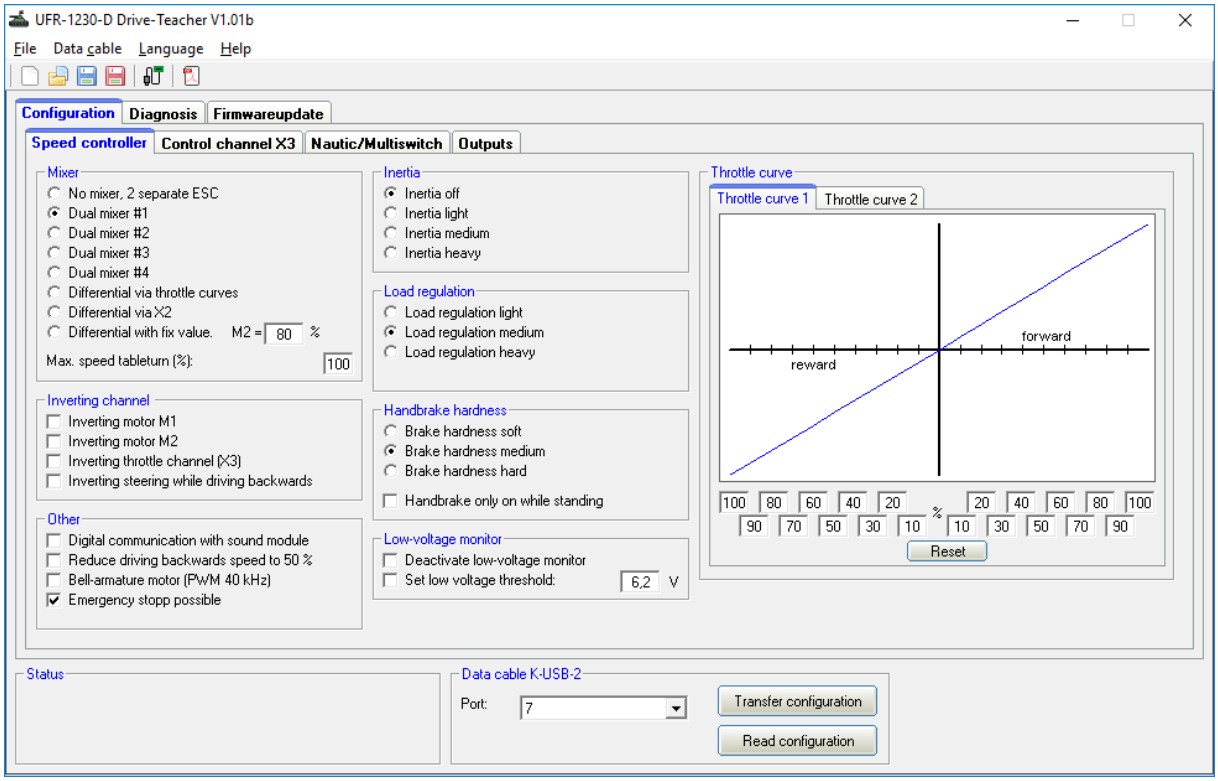
State/Problem	**green LED**	**red LED**	**blue LED**
Ready for operation	on		
Throttle has not been in neutral position yet	slow flashing		
Overcurrent at switching outputs		on	
High temperature		slow flashing	
Overcurrent at motor output stage		fast flashing	
No signal at throttle channel			on
Low voltage			slow flashing

Installation of software „UFR-1230-D Drive-Teacher“

Additional options can be set at the speed controller with the Windows-based software „UFR-1230-D Drive-Teacher“.

A free download of the software is available on our website.

At delivery the speed controller is ready for use. Therefore the software is only necessary when adjustments from the standard setting should be done. The data cable K-USB-2 is required to transfer the new configuration.



System requirements

- Windows compatible computer
- Windows 2000, NT, XP, Vista, Windows 7, Windows 8 or Windows 10
- approx. 5 MB free hard disk drive
- free USB port (1.0, 1.1, 2.0 or 3.0)

Installation of software

After download, the software must be installed on the computer. Just start the downloaded program and follow the instructions. Do not forget to activate the desktop icon.

How to use the software „UFR-1230-D Drive-Teacher“

Menue

File	**Create new project**	Creates a new project
	Open project	Opens an existing project
	Save project	Saves the current project
	Save project as	Saves a copy of the current project with a new name
	Upload project data via datacable	Uploads the complete project data via datacable to the sound module
	Check automatically for updates	On every start of the Sound-Teacher, it will be checked if a new version is available
	Check now manually for updates	Checks if a new version is available
	Close	Closes the program
Data cable	**Upload configuration to UFR-1230-D**	Transfers the current settings to the speed controller
	Download configuration from UFR-1230-D	Reads out the settings from the speed controller
	Reset throttle channel setup	Resets the setup values from channels X1 and X2 to the factory settings. Also, the neutral position of X3 is reset
Language	**German**	Switches to german language
	English	Switches to english language
Help	**Manual**	Opens manual
	Info	Shows informations about the software

Functions

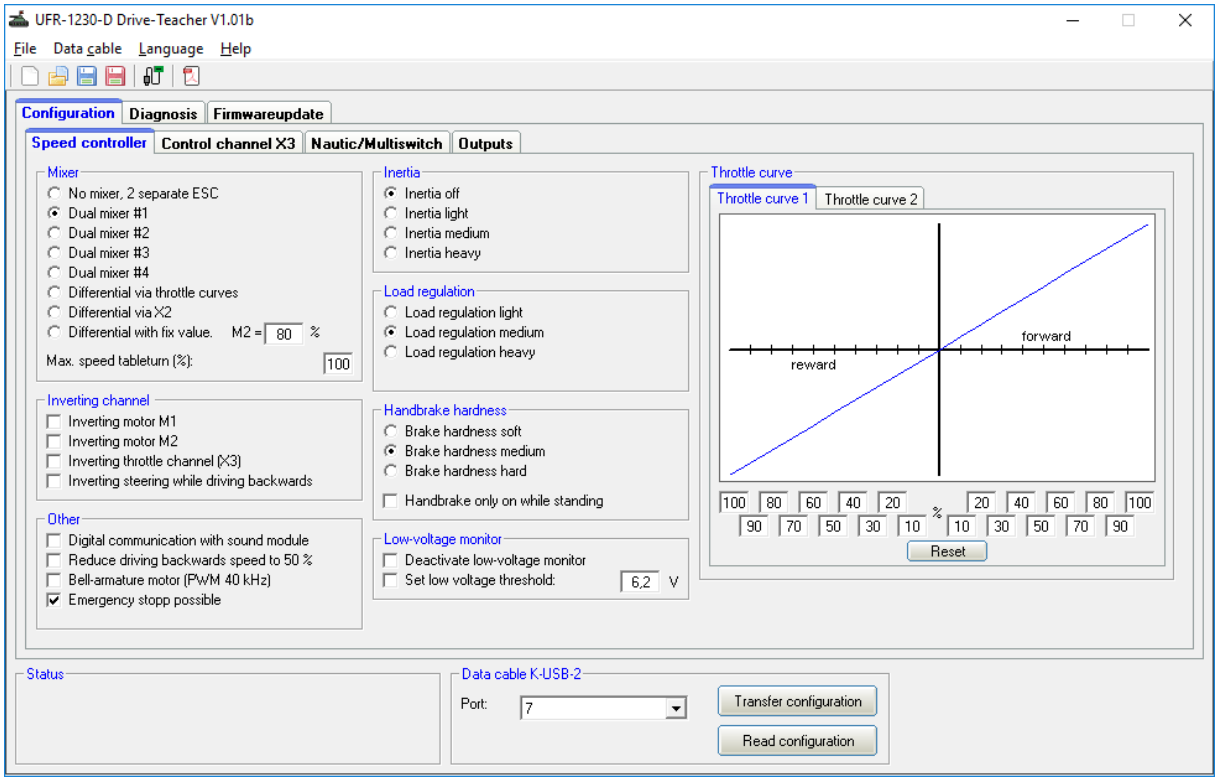
The Drive-Teacher is separated in 3 sections:

- Configuration
- Diagnosis
- Firmwareupdate

The section configuration has 5 subdivisions:

- Speed controller
- Throttle channel X3
- Nautic/Multiswitch
- Outputs

Configuration – speed controller



The picture shows the standard settings at delivery.

Dual mixer

With no dual mixer both motors can be used completely separate. X1 controls motor M1 and X2 motor M2, just like two separate speed controller.

With dual mixer throttle channel X1 and steering channel X2 are mixed by the UFR-1230-D and both motors are controlled, in terms of speed and direction.

Dual mixer #1:	Standard dual mixer (mixing ratio 1:1)
Dual mixer #2:	The steering is less mixed than with dual mixer #1 (mixing ratio 1:0,75)
Dual mixer #3:	The steering is less mixed than with dual mixer #2 (mixing ratio 1:0,5)
Dual mixer #4:	Like dual mixer # 1, however, only 1 chain is activated at table turning

There are also 3 different variants possible for controlling the two motors via an electronic differential. Here, both motors are always controlled together via the throttle channel X1. The electronic differential sets the ratio as the speed is distributed to both motors. This variant is not suitable for tracked vehicles, as can not be steered in this way.

- At "Differential via throttle curves", throttle curve 1 sets the speed for motor M1. The throttle curve 2 sets the speed for motor M2.
- If „Differential via X2“ is enabled, velocity distribution is controlled via channel X2. If X2 is neutral, both motors are running at the same speed. In

accordance with the direction and level of X2, the speed of one motor is then proportionally reduced. The value indicates the speed of the slower motor at full range of X2.

- At "Differential with fixed value", the speed ratio of the two motors is set via a fixed value. Motor M1 is always the faster motor. Motor M2 is the slower motor. For example, with a value of 50 %, motor M2 always runs at half the speed of motor M1.

Invert channel

In case the motor is running in the opposite direction (backwards instead of forwards) it can be inverted in this setting.

Also control channel (X3) can be reversed.

With activated dual mixer, the steering when driving backwards can be inverted, as well.

Other

Using digital communication all speed and light data are transferred from speed controller UFR-1230-D to sound module USM-RC-2 with only one connection at X4/1, see page 12 for more information. In your Drive-Teacher the settings „Digital communication with sound module“ and in your Sound-Teacher „Digital mode with UFR ESC“ must be activated.

The driving backwards speed can be reduced to 50 %.

When using a bell-armature motor, this motor type should be activated in the Drive-Teacher. The PWM pulse frequency is increased to 40 kHz to protect the motor.

With the function „Emergency stop possible“, the model can quickly be stopped by a complete pressing down of the gas throttle. Other settings, such as cruise control, brake funktion, load regulation, hand brake, inertia etc. have no effect on this function. The emergency stop is always given priority.

Low voltage monitoring

Low voltage monitoring can be deactivated and adapted here.

The Low voltage threshold can be set between 5,5 V and 25,5 V. If no value is manually set, the threshold is automatically set corresponding to the used battery type, see page 22.

Load regulation

With activated load regulation, see page 13, one of the different regulation intensities (light, medium and heavy) can be set here.

Inertia

To simulate a very heavy vehicle the option mass inertia can be activated here. Acceleration and decelaration are slowed down for a realistic driving behaviour. Keep in mind: the vehicle also has a longer stopping distance!

With control chanel X3 the different intensities of inertia can be activated and deactivated using additional functions. The setting in the speed controller with the Drive-Teacher is the standard setting when turning on the model.

Hardness of handbrake

If the function handbrake is activated with DIP switch 2 the hardness of braking can be set here.

The handbrake can only be active while parking/standing. Without this option, the handbrake hits as soon as the throttle is in neutral position and the vehicle is still rolling.

Throttle curve 1 and 2

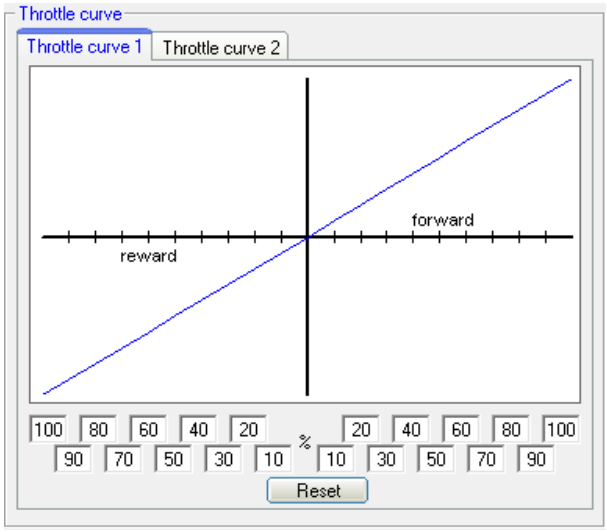
Using the curve, the proportion between throttle signal and driving behaviour can be set in the diagram. Both driving directions (backwards and forwards) have 10 values (at 10 %, 20 %, 30 %, 40 %, 50 %, 60 %, 70 %, 80 %, 90 % and 100 % of throttle signal) to adjust the driving behaviour.

For example a very sensitive acceleration behaviour for driving slowly or a limitted maxium speed can be set.

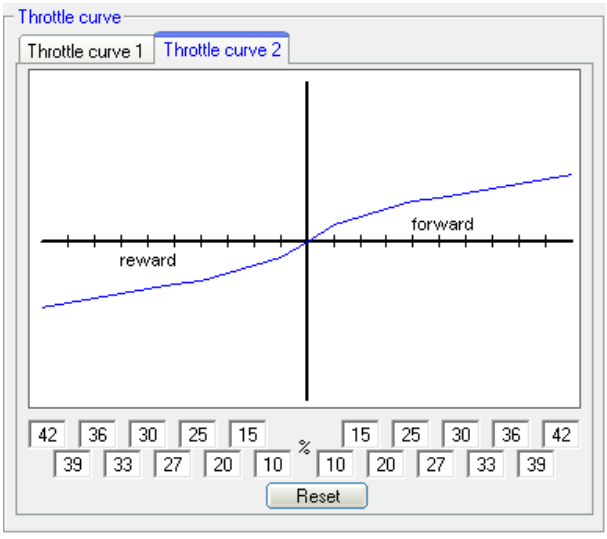
With „reset“ the curve returns to its initial values.

The throttle curve 2 can be activated with a function of control channel X3 while driving. This enables for example to use throttle curve 1 for normal driving and throttle curve 2 for maneuvring with very sensitive acceleration behaviour.

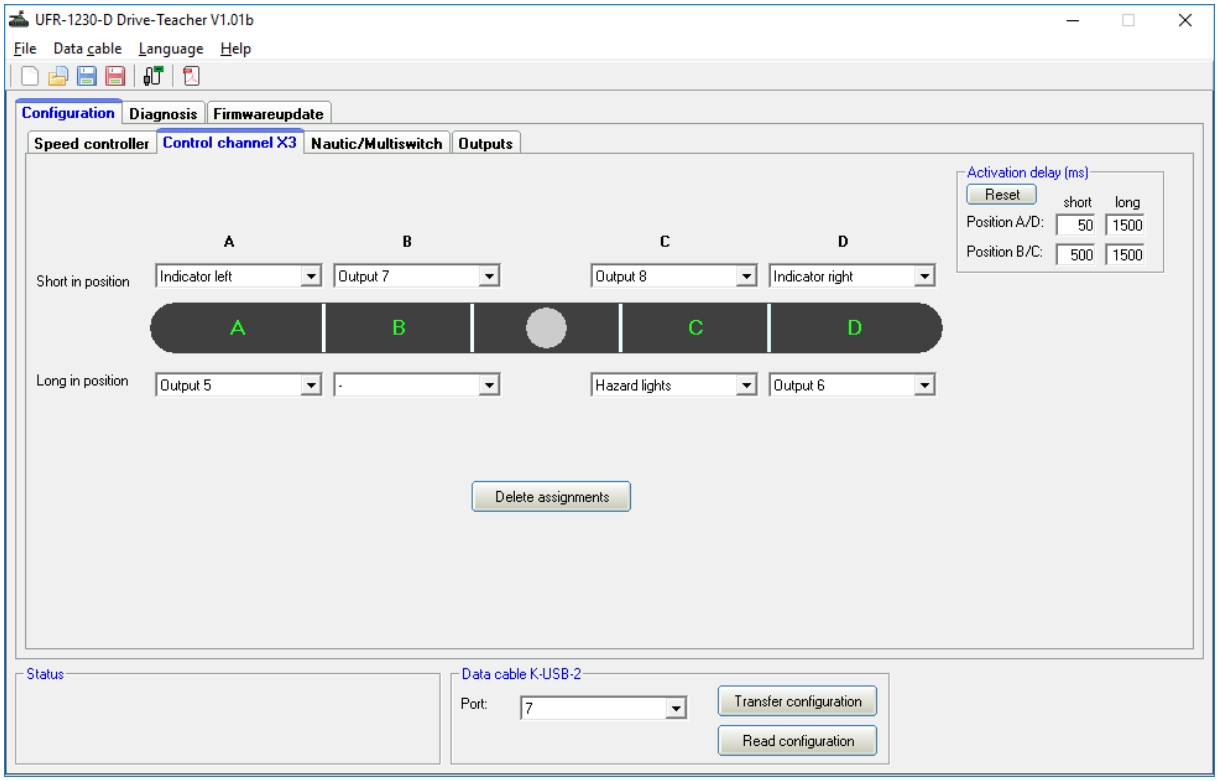
Example for nomal driving:



Example for maneuvring:



Configuration – steering channel X3



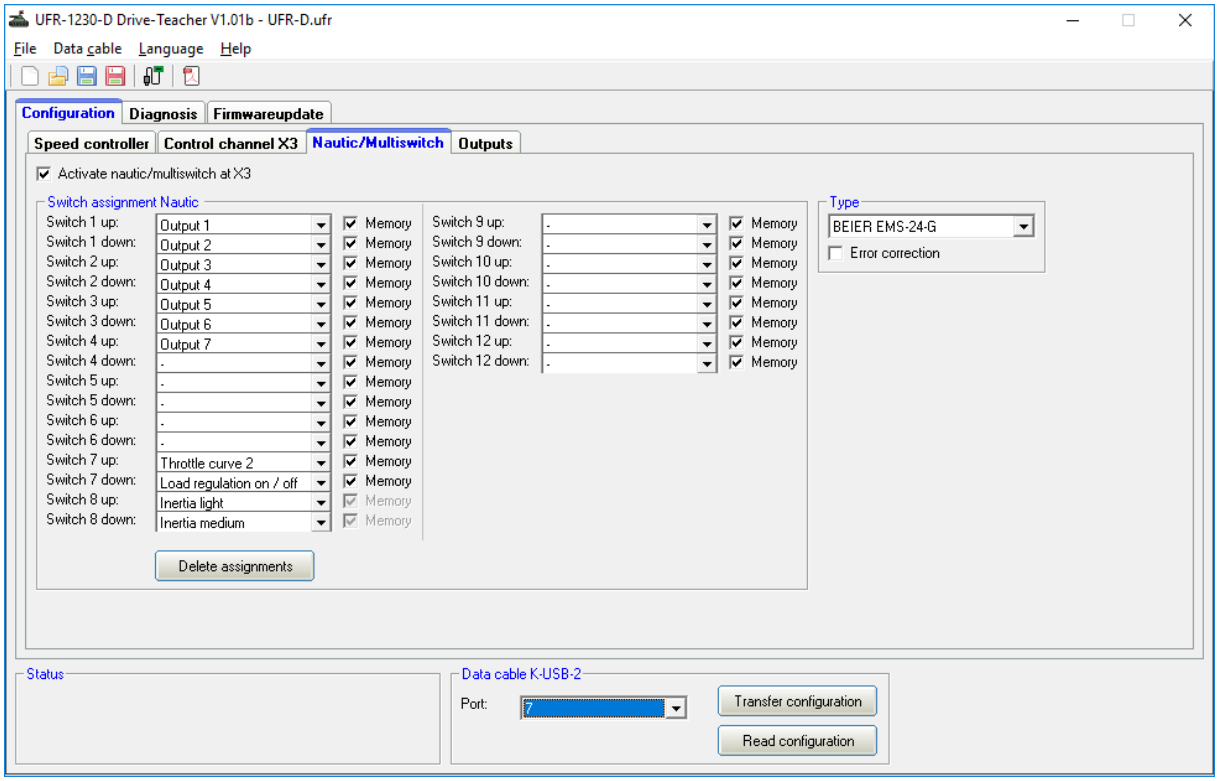
The picture shows the standard settings of the control channel X3.

All available additional functions for control channel X3 are listed on page 16.

Each of the 4 areas (A, B, C and D) can be set with 2 functions for short and long in position. The functions are alway switched in „memory“ mode.

Each thresholds can be adjusted using the white line to define the area in which a function should be carried out.

Configuration - Nautic/Multiswitch



In the standard setting the nautic mode is deactivated.

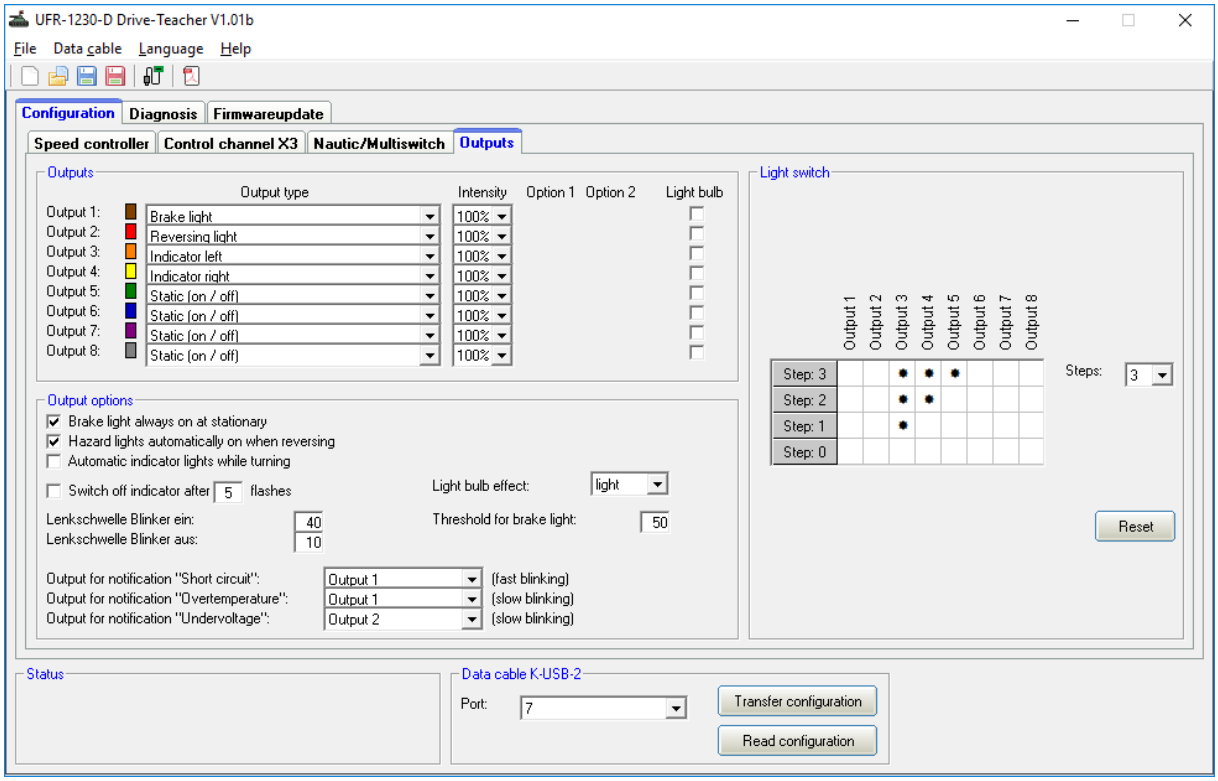
Assignment of switches
For each switch position a function can be set (see page 16) optional with the function „memory“.

Type
Select the transmitter ort he switch type you are using in this box.

Error correction
For a better nautic transmission an error correction can be activated. With the error correction the nautic transmission takes a bit longer (approx. +200 ms). Especially with some 2,4 GHz transmitter the error correction is helpful in order to avoid disturbances and mal functions.

Manual setting
The transmission protokoll can be set manually with this setting. Only use this option under instruction. In most cases a manual setting is not required.

Configuration - Outputs



The picture shows the standard settings for output 1- 8.

The boxes indicate the colour of the flat ribbon cable for this output.

Output type
Different function can be assigned to this outputs (see page 16).

Intensity
For each output the light intensity can be set in 2 % steps.

Option 1 and option 2
Additional options are available for some outputs. More information can be found on page 20.

Light bulb effekt
Optionally, a light bulb effect can be activated for each output. This behaves an LED when switching on and off, then like a light bulb (softer on and off).

Additional options
With the function „Bake light always on at stationary“ the brake light always switches on as long as the model is standing.

With the option „Hazard lights automatically on when reversing“ both indicators flash while the vehicle is driving backwards.

With the option „Automatic indicator lights while turning“ the indicators flash as soon as the steering channel (X2) is out of neutral position. When driving straight ahead

again the indicators are deactivated. With this option it is only possible to activate the indicators by the steering channel and not with the control channel (X3) any longer.

It is possible to deactivate the indicator after a certain amount of flashing.

The light bulb effect can be set in 3 levels: Light, medium and strong.

The steering thresholds for automatic indicator lights can also be set.

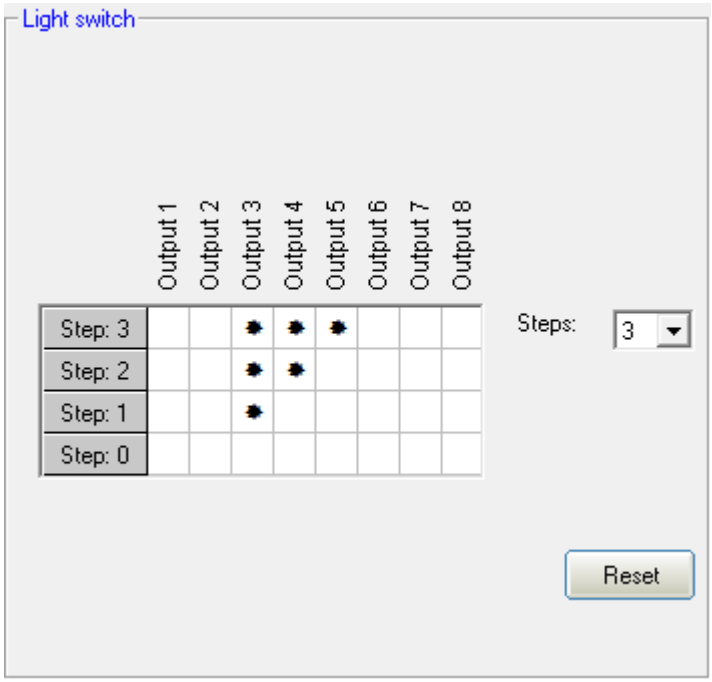
The outputs for warning/notification lights (blinking) for „short circuit“, „overtemperature“ and „undervoltage“ can be set here.

Light switch

The light switch is individually programmable with up to 6 steps. For each step different light outputs can be activated with „✸“.

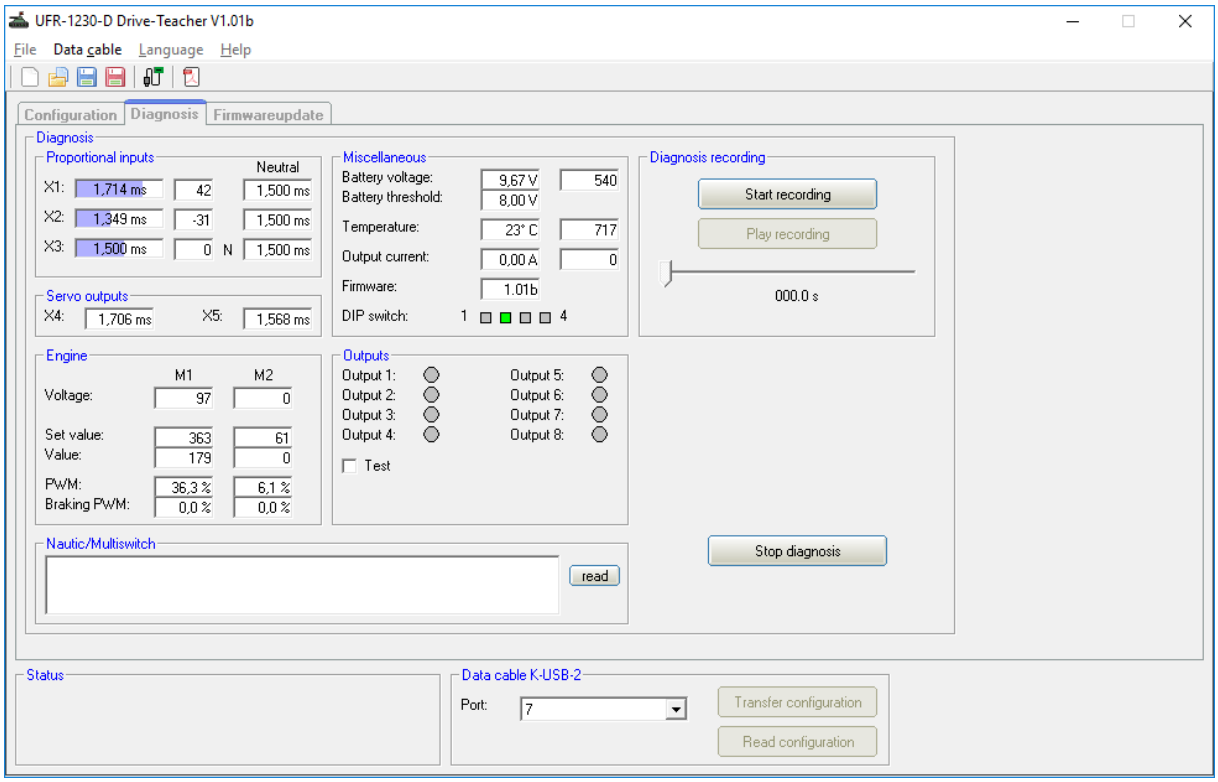
Using control channel X3 and the function „light switch +“ and „light switch -„ the activated steps can be changed.

When turning on the speed controller the light switch is always in step 0.



The picture shows the standard setting.

Diagnosis



With the diagnosis function the different speed controller functions can be checked. The data cable K-USB-2 must be connected to X6 of the speed controller.

Proportional inputs
Shows values from the receiver for proportional channel 1 to 3. In neutral position the values in the middle should be 0.

A slight fluctuation of the three channels is normal and no indication for problems.

Motor
A few values for the motor output stage are shown here. These values are only for internal checks.

Various
The values in this field are mostly for internal checks.

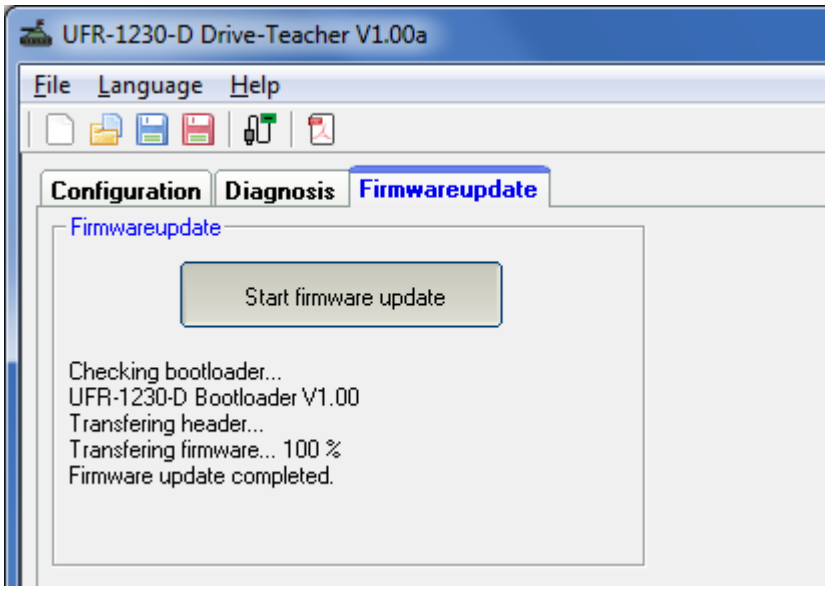
Outputs
The 8 light outputs are shown in this field. An active output is shown green.

When activating the option „Test“ all 8 outputs are activated one by one as a running light. The wiring of all outputs can be checked using this function even if no transmitter is connected.

Nautic mode
With activated Nautic mode, the transmitted signals can be checked for example after installing a new multiswitch or for trouble shooting.

It is possible to record the diagnosis files on the hard disk. The speed controller needs to be connected to the computer with the data cable K-USM-2. A diagnosis during „normal“ driving is therefore not possible.

Firmware update



As soon as a new update is available you will get a notice from the Drive-Teacher. It is also possible to download the update manually.

With every update of the software the firmware for the speed controller is updated as well.

An update takes approx. 10 seconds. The red and blue LEDs are flashing a couple of times alternately.

Never disconnect the speed controller from supply voltage during the update!

