ECU converter Kolibri-NG

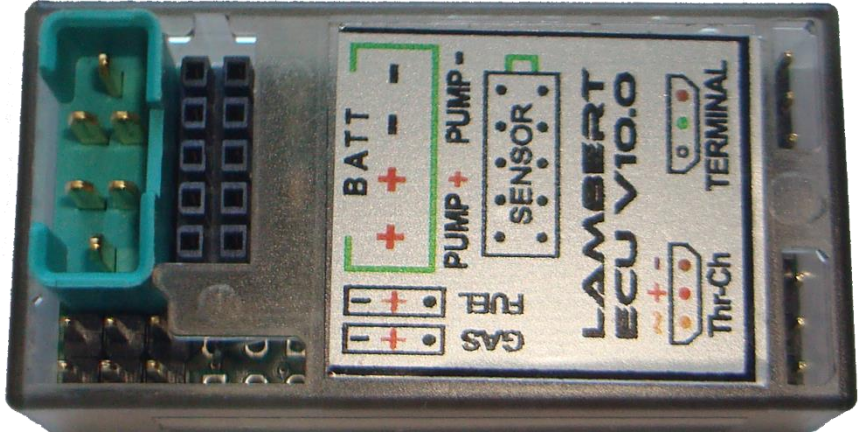## Manual Version 1.0

30 mm

22 mm

4 mm
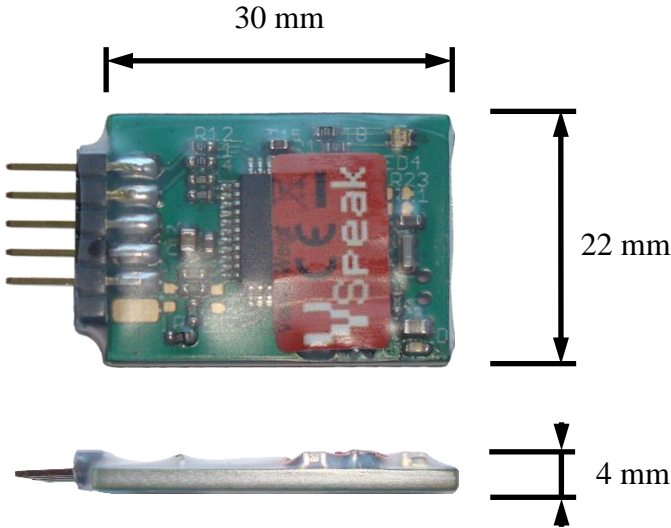
Introduction

The VSpeak ECU Converter provides the data of the Kolibri ECU on the telemetry system of your remote control system.

The ECU Converter calculates the fuel consumption and also transmits it to the respective transmitter of the model pilot.

Settings of the VSpeak converter can be made directly from the transmitter for Jeti, HoTT and PowerBox, for all other RC systems with the aid of the HDT included in the scope of delivery of the turbine.

Supported ECU: Kolibri-NG (**N**ext **G**eneration):

Content

Page

1 Hardware

Data LED: green (ON)   → receiving data from the Kolibri ECU

   green (flashing)   → receiving data from the Kolibri ECU **and** data transfer to the receiver (at Jeti only then, if JetiBox buttons are activated)

   red   (ON)   → programming mode using Kolibri HDT

The blue LED is blinking every second to signal the normal function of the ECU Converter.

data LED green/red

connection cable

blue LED
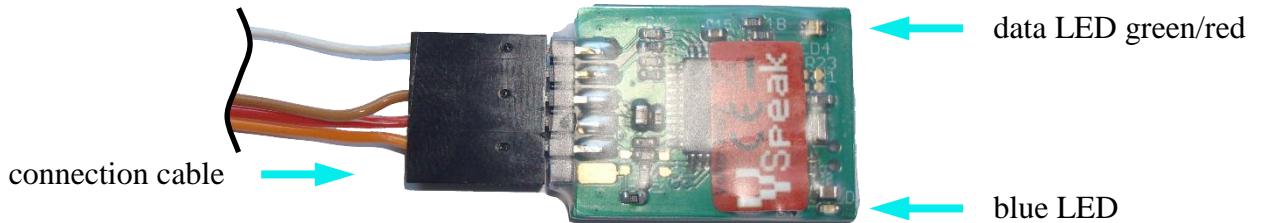
The connection cable included in the scope of delivery is connected with the 6-pin plug to the pin header of the converter as shown above, the other two plugs as follows:

Connection: 1. ECU

UNI Servo plug

The 3-wire UNI servo plug is connected to the ECU at the slot labeled Terminal.

The data exchange between the ECU and the VSpeak converter is signaled in green by the 2-color Data LED.

The ECU converter can be operated in parallel with the Kolibri HDT by means of a V cable

2. Telemetry data

Jeti / MSB / HoTT / Futaba
JR PROPO / FrSky / PowerBox:

UNI servo plug

The 1-wire UNI servo plug is plugged into the telemetry port of the respective receiver

O R, in the **Spektrum** – version:

X-Bus plug

The X Bus plug of the ECU Converter is connected to the X-BUS connector of TM1000 or Spektrum receiver with X-BUS connector.

The attachment of the VSpeak ECU converter in the model can be done with velcro tape, double sided tape or cable ties.

2 Telemetry

The voltage for the VSpeak ECU Converter is supplied by the ECU.

The telemetry of the ECU converter can be switched between the systems Jeti Duplex, Multiplex, HoTT, Futaba, FrSky, JR PROPO, PowerBox and Spectrum, see section 2.0.

2.0 Selection of the telemetry system / System settings

With the help of a modified V-cable (signal pin pulled out of the servo plug) the VSpeak ECU converter and the Kolibri HDT are connected to the Kolibri ECU (Terminal Port) according to the following graphic: (this ensures that the voltage for the Kolibri HDT of max. **5V is NOT exceeded!**)

modified V-cable
Signal-Pin pulled out of the servo plug
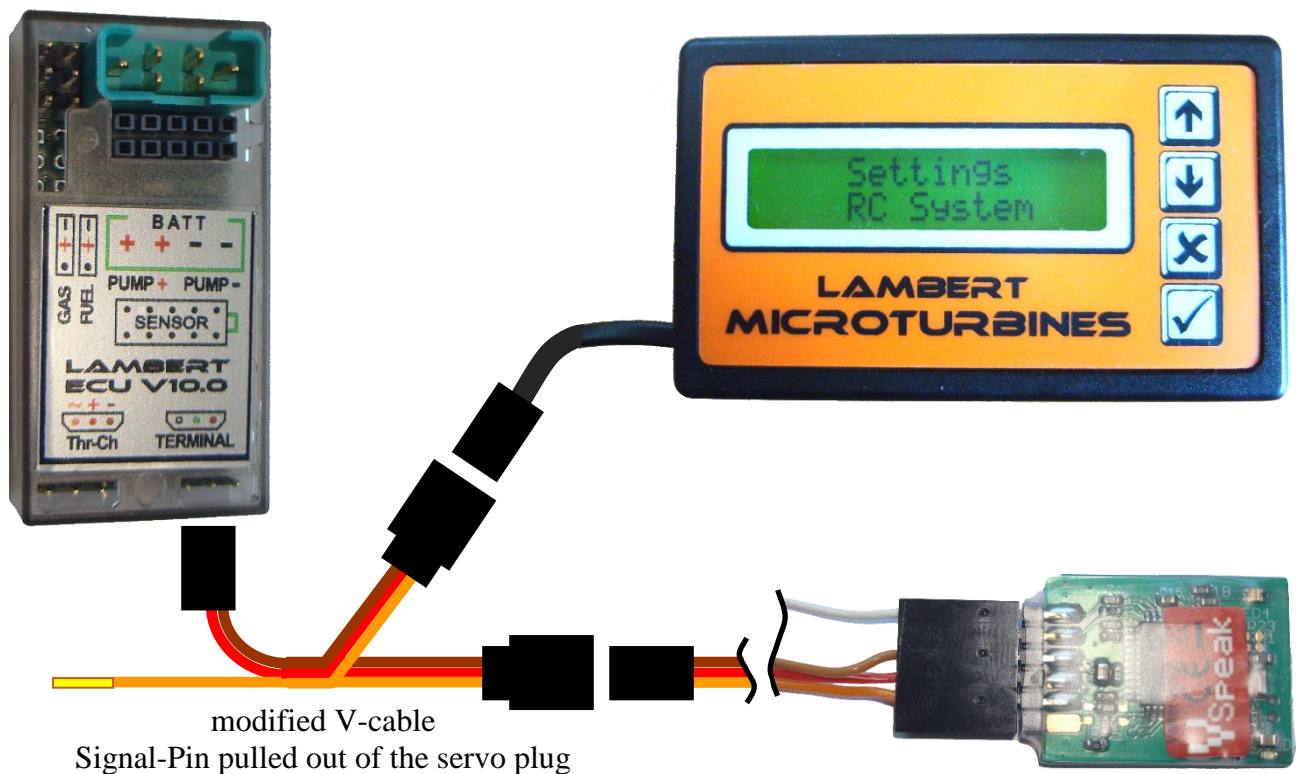
In the parameterization mode, the data LED lights red, every button click is displayed with green.

The handling of the Terminal is done in the usual way, parameter selection with [✓] , break / back with [✗] and change values with [↑] or [↓]
Each time the parameter is changed, the previously changed value is stored in the ECU converter.

2.0.1 Selection telemetriy system

```
┌─────────────────────┐
│     Settings        │
│     RC System       │
└─────────────────────┘
```

✓   ✗

```
┌─────────────────────┐
│  Telemetry Select   │
│   Jeti Duplex EX    │
└─────────────────────┘
┌─────────────────────┐
│  Telemetry Select   │────✓──→ section 2.2.3
│    Multiplex MSB    │
└─────────────────────┘
┌─────────────────────┐
│  Telemetry Select   │
│   Graupner HoTT     │
└─────────────────────┘
┌─────────────────────┐
│  Telemetry Select   │────✓──→ section 2.4.3
│      Futaba         │
└─────────────────────┘
┌─────────────────────┐
│  Telemetry Select   │────✓──→ section 2.5.4
│    Futaba V10       │
└─────────────────────┘
┌─────────────────────┐
│  Telemetry Select   │────✓──→ section 2.6.5
│      FrSKY          │
└─────────────────────┘
┌─────────────────────┐
│  Telemetry Select   │────✓──→ section 2.7.2
│     JR PROPO        │
└─────────────────────┘
┌─────────────────────┐
│  Telemetry Select   │
│  PowerBox P2-BUS    │
└─────────────────────┘
┌─────────────────────┐
│  Telemetry Select   │────✓──→ section 2.9.2
│   Spektrum X-BUS    │
└─────────────────────┘
```
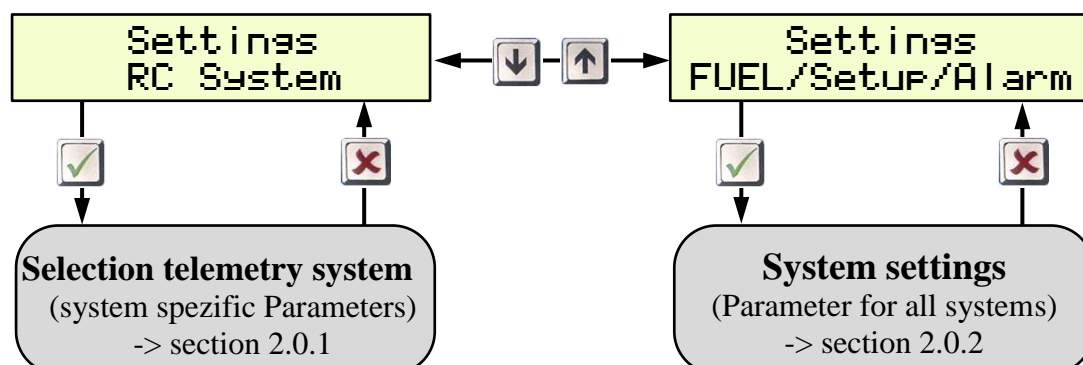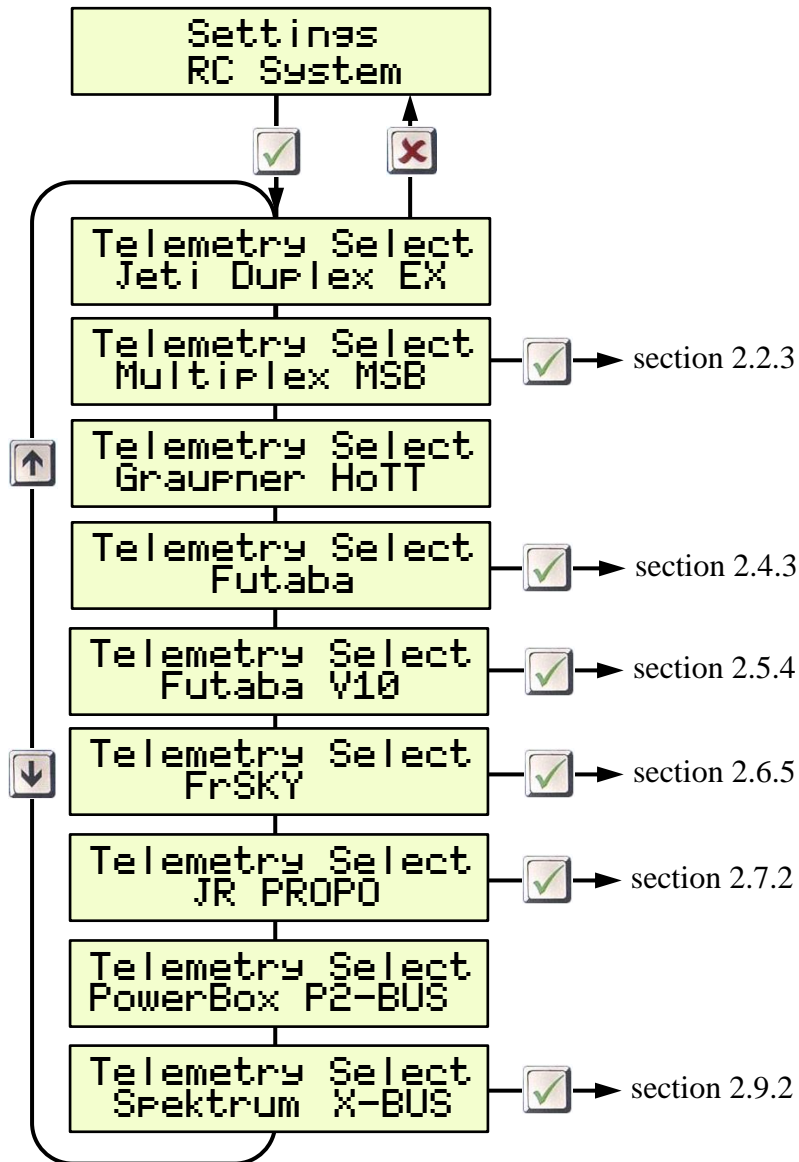
With Jeti, HoTT and PowerBox, all other settings can be made directly from the transmitter. For all other remote control systems further specific settings can be made (follow the respective section).

2.0.2 System settings

The System settings menu contains all the parameters that are effective for several telemetry systems (The parameters are largely self-explanatory, the set values on delivery are shown in the graphic):

Alarms: Lower values as "low" thresholds trigger alarms. The "low..." alarms are activated after at first exceeding the "Low ..." alarm threshold. The low RPM alarm ends at Pump = 0.0V,

```
      Settings
   FUEL/Setup/Alarm
```
⮕ ✅

```
   FUEL Tank Size
      1000 ml
```
Values: 100 …. 8000 ml   Step size: 20 ml

✅

```
  FUEL-Flow @ 2.0V
     50 ml/min
```
Values: 20 …. 200 ml/min   Step size: 1 ml/min

✅

```
  FUEL-Flow @ 4.0V
     95 ml/min
```
Values: 30 …. 600 ml/min   Step size: 1 ml/min

✅

```
   FUEL rounded
      1 ml
```
Values: 1 ml / 5 ml / 10 ml

✅

```
   Taxi  Tank
      OFF
```
Values: OFF / ON

✅

```
      RPM
     x 1 rpm
```
The actual turbine speed is the displayed value multiplied by the parameter **RPM**.
Values: 1, 10, 100 and 1000

✅

```
   FUEL Tank low
      100 ml
```
Values: OFF, 20 …. 2500 ml   Step size: 10 ml

✅

```
   RPM low
      OFF
```
Values: OFF, 40000 …. 110000   Step size: 1000

✅

```
    EGT high
     990 °C
```
Values: 400 …. 990 °C   Step size: 5°C

✅

```
  VSpeak ECU Conv.
  Kolibri-NG  V1.0
```
Version display

2.0.2.1 FUEL Tank Size

. . . is the capacity of the main tank in ml. The tank size is required for the fuel consumption and for the calculation of the FUEL alarm

2.0.2.2 FUEL-Flow @ 2.0V   respectively 4.0V

FUEL-Flow are the two parameters for the current fuel flow at 2.0V or 4.0V pump voltage.

The two parameters can be determined with the help of a flow meter - or, if you don't have one at hand, in the following way: You can run the turbine with 2.0 or 4.0V pump voltage for a period of 1 minute and measure it fuel used. A more precise result can be obtained by carrying out the measurement over several minutes and dividing the amount of fuel consumed by the number of minutes.

2.0.2.3 FUEL rounded

The display accuracy of FUEL (ml) can be set here.
Rounding the display makes sense, when using speech to reduce the announcement syllables.

2.0.2.4 Option Taxi Tank

For models where a taxi tank is plugged into the main tank until the model is lifted off, set "Taxi Tank = ON". If the turbine is in the "Running" status, then when THROTTLE = 80% is exceeded for the **second time**, the FUEL will "reset", ie the displayed FUEL is only once set to "full" (the value set at "Fuel Tank Size") again at this time.

2.1 Jeti Duplex EX

2.1.1 EX-Daten DC/DS-Sender

(VSECU … **VS***peak* **ECU** *converter*):
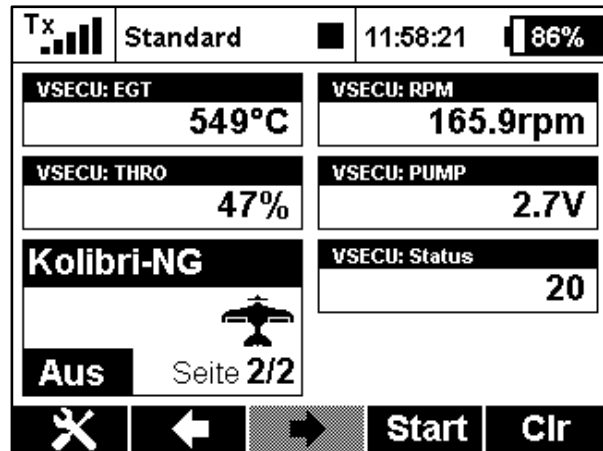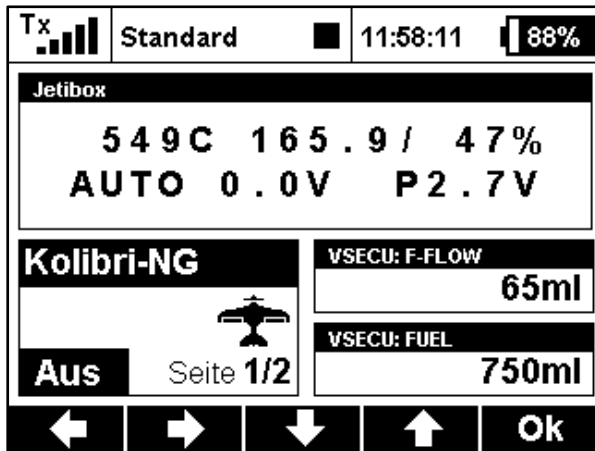
2.1.1.1 JetiBox

The ECU display shows the assignment of the Jeti keys to the original terminal as shown in the picture.

- left-button: (long pushed) Rückkehr zum Expandermenu
  (if ECU converter is shared with other sensors are connected via an expander)

- left-/right-button: together pushed Setup ECU converter
  (s. section 2.1.1.3)

2.1.1.2 Turbine status – numerical Values

The turbines status messages are also displayed as numerical values. The assignment is given in the table.

These status values can be used in Jeti radios, e.g. in logical links, or in LUA-supported radios for LUA scripts.

Status	Description
20	AUTO
15	RAMP-UP
14	FUELHEAT
13	PUMPSTART
12	PROP-HEAT
11	PROPIGNIT
10	STANDBY
3	SLOW-DOWN
2	COOL-DOWN
1	ON
0	OFF
-1	GLOW PLUG!
-2	BATT LOW!
-10	**FLAME OUT**


```
ECU settings

3-SYSTEM

3.1 BATTERY
    VOLTAGES

BATTERY-MIN VOLT
6.4 Volts
```

2.1.1.3 Alarms / Parameterization

From the ECU data display, the parameter display can be accessed by pressing the ◄ + ► Left+Right button.

With the ▲ Up button the parameter display will left (..to ECU data display). Within the parameter display you can scroll with the ► Right button - or - ◄ Left button between the parameter groups "Alarm", "Alarmcode", "FUEL Tank Size", "FUEL rounded", "F-Flow/Pump-V", Taxi Tank" and "ECU-EX-Name".

When the desired parameter group is selected, the parameter can be changed by using ▼ Down and ▲ Up button.

Value changes are made with the ► Right button – or- ◄ Left button.

Example of parameter selection and parameterization:
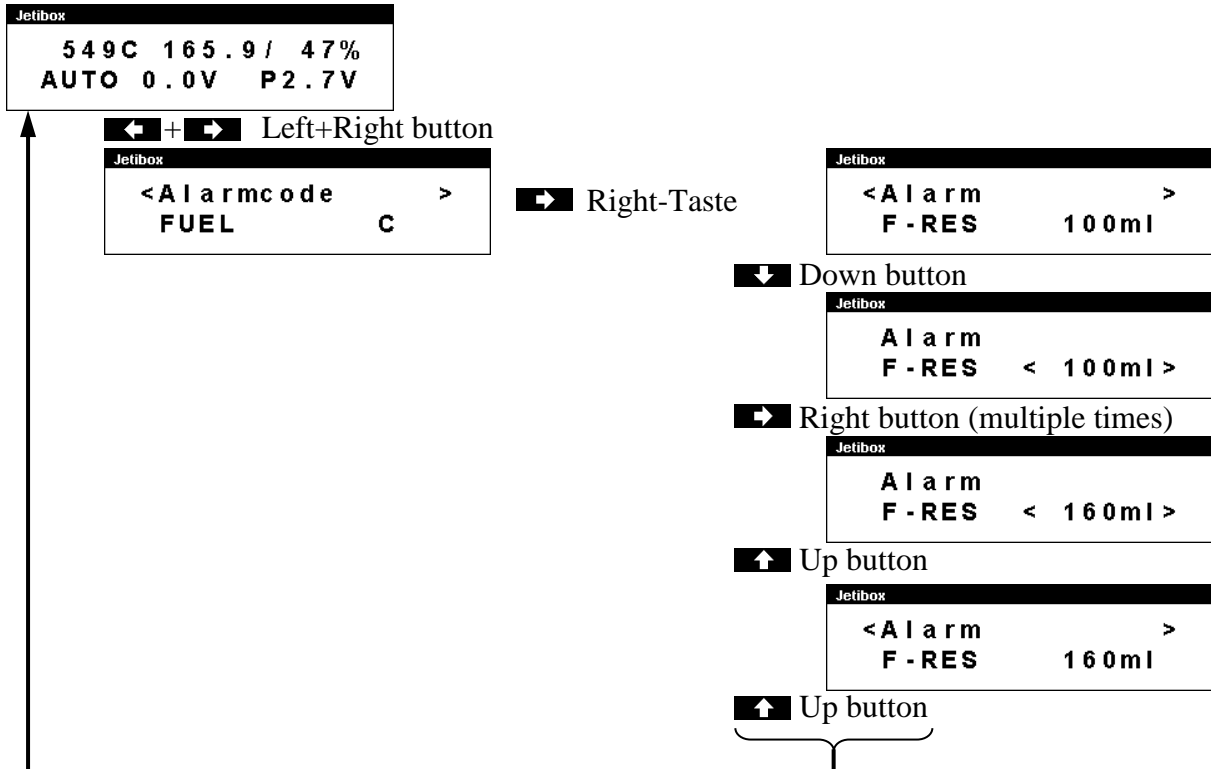
Parameter-group	Parameter	Value range	Step size	Set-Value (Default)
Alarm	F-RES	OFF, 50 . . . 2500 ml	10 ml	100 ml
	RPM	OFF, 40.000 . . . 110.000 rpm	1000 rpm	OFF
	EGT	400 . . . 990 °C	5 °C	990 °C
Alarmcode	FUEL	A, B, C, . . . , X, Y, Z		C
	RPM			L
	EGT			T
	BATT			U
FUEL Tank Size		100 . . . 8.000 ml	20 ml	1.000 ml
FUEL rounded		1, 5 , 10 ml		1 ml
F-Flow / Pump-V	@ 2.0 V	20 . . . 200 ml/min	1 ml/min	50 ml/min
	@ 4.0 V	30 . . . 600 ml/min	1 ml/min	95 ml/min
Taxi Tank	OFF, ON			OFF
Jeti-Sensor	EX Name	VSECU, L-ECU, R-ECU, 1LECU, 2RECU		VSECU

Alarms

Irrespective of the possibility to program alarm thresholds for the "EX" values in Jeti transmitters the VSpeak ECU Converter has the ability to set alarms (by using alarm codes) that are ECU status depending. These alarms can also be announced by the Profibox as voice messages.

As can be seen in the table, the alarms for F-RES and RPM can be switched OFF, if no alarm is to be given at EGT, the alarm threshold can be set to "inaccessible" value.

Permanently pending alarms, e.g. FUEL or BATT, max. 3 times repeated.

- FUEL

  The alarm Fuel is signaled when the fuel rest is lower than the F-RES set value.

- RPM (turbine)

  The alarm RPM is signaled when the turbine rotation speed is lower than the RPM threshold value.

  The speed monitoring is started after at first exceeding RPM alarm threshold and ends with PUMP = 0.0V.

  The RPM alarm is suitable for signaling a "turbine flameout".

- EGT

  The alarm EGT is signaled if the temperature exceeds the value set at EGT.

- BATT

  The BATT alarm is signaled when the battery voltage is lower than the `BATTERY-MIN VOLT` parameter set in the ECU.

Fuel consumption

The VSpeak ECU Converter can calculate the current fuel flow rate (F-FLOW) and the fuel consumption (FUEL) based on the PUMP voltage output by the ECU.

The two parameters required for this can be determined with the help of a flow meter - or, if you don't have one at hand, in the following way: You can run the turbine with 2.0 or 4.0V pump voltage for a period of 1 minute and measure it fuel used. A more precise result can be obtained by carrying out the measurement over several minutes and dividing the amount of fuel consumed by the number of minutes.

FUEL Tank Size is the capacity of the main tank in ml. The tank size is required for the calculation of the alarm (F-RES) for the fuel consumption.

Jeti EX sensor name

In a 2-turbine model 2 VSpeak ECU converter can be used on Jeti Systems via an expander or CentralBox. The EX names are:

"**1L**ECU" for **L**eft turbine ECU on input **1** and
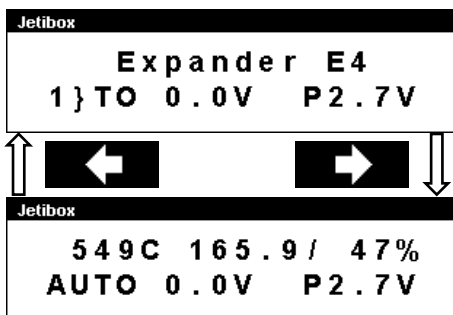"**2R**ECU" for **R**ight turbine ECU at the expander input **2**.

Taxi Tank

For models where a taxi tank is plugged into the main tank until the model is lifted off, set "Taxi Tank = ON". If the turbine is in the "Running" status, then when THROTTLE = 80% is exceeded for the **second time**, the FUEL will "reset", ie the displayed FUEL is only once set to "full" (the value set at "Fuel Tank Size") again at this time.

2.1.1.4 Special Characters

The Kolibri HDT supports some special characters which cannot be displayed on Jeti-systems. Please refer to the following table how these characters are "translated":

LAMBERT MICROTURBINES	JETIBOX COMPATIBLE	
▦	B	battery full
▣	B	battery normal
▢	B	battery empty
℞ᵥ	P	Pump voltage
℃	C	unit "°C"
◻	▄	"empty" Bargraph battery voltage
▦	X	"full" Bargraph battery voltage

2.1.1.5 Expandermenu

```
Jetibox
    Expander E4
1}TO 0.0V  P2.7V
```
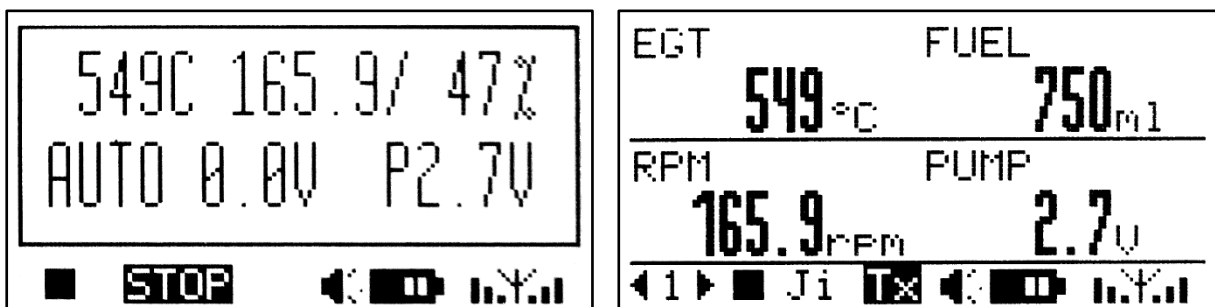⇑ ⬅ ➡ ⇓
```
Jetibox
 549C 165.9/ 47%
AUTO 0.0V  P2.7V
```

If the VSpeak ECU Converter is connected to an Expander or Centralbox and the ECU Converter display is activated with the ➡ Right button, the only way back to the expander menu is pressing the ⬅ Left button (more than 3 sec).

2.1.2 Profibox - autonomous telemetry system for Kolibri-ECU

Using a Jeti Profibox incl. RSat receiver and the VSpeak ECU converter the telemetry data from a Kolibri ECU can be transferred completely self-sufficient to the pilot. Not only the settings using the Profibox can be made, as was shown in the previous chapters - all EX-data and the important alarms are displayed: EGT, FUEL, ECU battery voltage . . . are given as voice messages again.

```
549C 165.9/ 47%
AUTO 0.0V  P2.7V

■ STOP  🔊▐█▌ ⷮ⸗Yⷮ
```

```
EGT              FUEL
   549°c          750ml
RPM              PUMP
   165.9rpm        2.7v
◄1►  ■  Ji  TX 🔊▐█▌ ⷮ⸗Yⷮ
```

2.2 Multiplex MLink (MSB)

2.2.1 Address-Assignment / Alarms

The VSpeak ECU Converter at delivery uses following addresses:

Kolibri	MSB Adresse	Description
ECU Status Alarm	**2**	ECU status
FUEL Alarm	**3**	Fuel Level in ml
RPM Alarm	**4**	Turbine RPM
EGT Alarm	**5**	Exhaust Gas Temperature in °C
THROTTLE	**6**	Throttle Value in %
PUMP	**7**	Pump voltage in V
FUEL-FLOW	**8**	FuelFlow in ml

For the values marked "Alarm" in the above table, alarm thresholds can be set using the Kolibri HDT (see section 2.0.2). Furthermore, the MSB addresses can be set arbitrarily with the help of the Kolibri HDT (s. section 2.2.3).

2.2.2 Turbine status

Kolibri ECU-Status	MSB
AUTO	RUN ...
RAMP-UP	acceler.
FUELHEAT	PreHeat2
PUMPSTART	MainFStrt
PROP-HEAT	PreHeat2
PROPIGNIT	Ignite...
STANDBY	Stby/START
SLOW-DOWN	SlowDown
COOL-DOWN	Cooling
ON	- ON -
OFF	-OFF-
GLOW PLUG!	GlowPlug!
BATT LOW!	BattryLow
FLAME OUT	**Low-Rpm**

To display the turbine status, texts are stored in the multiplex transmitters of the PROFI TX series as well as in the "gooseneck" telemetry display.

These do not 1 : 1 correspond to the status messages of the Kolibri ECU.

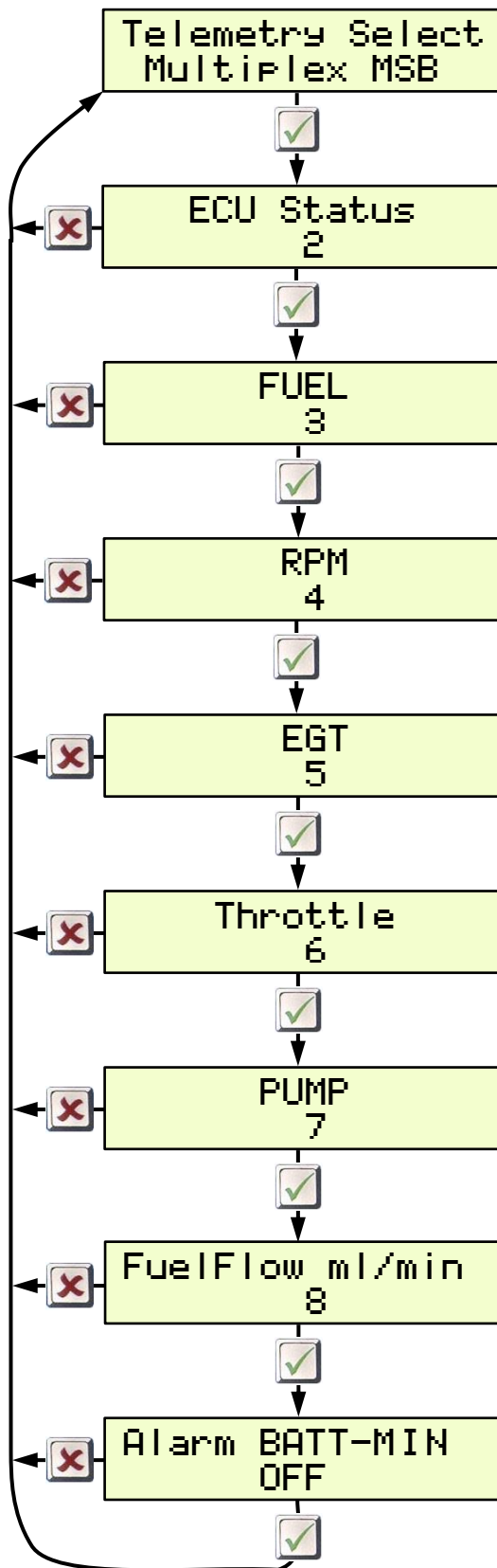The assignment is shown in the adjacent table.

All error messages are displayed inversely on the display.

```
ECU settings

3-SYSTEM

3.1 BATTERY
   VOLTAGES

BATTERY-MIN VOLT
   6.4 Volts
```
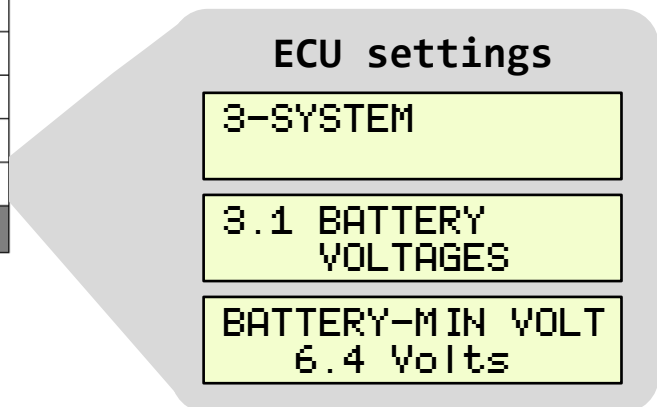
If the parameter `Alarm BATT-MIN` = ON is set in the converter settings (see section 2.2.3), an alarm is output in addition to the "BattryLow" display for the Status.

2.2.3 Setup

With the help of the Kolibri HDT, the MSB addresses can be set arbitrarily - an address duplication within the ECU converter is excluded. Values that should not be displayed can be set to "OFF".

```
┌─────────────────────┐
│  Telemetry Select   │
│    Multiplex MSB    │
└─────────────────────┘
          │ ✓
          ▼
┌─────────────────────┐
│     ECU Status      │ ← ✗
│          2          │
└─────────────────────┘
          │ ✓
          ▼
┌─────────────────────┐
│        FUEL         │ ← ✗
│          3          │
└─────────────────────┘
          │ ✓
          ▼
┌─────────────────────┐
│        RPM          │ ← ✗
│          4          │
└─────────────────────┘
          │ ✓
          ▼
┌─────────────────────┐
│        EGT          │ ← ✗
│          5          │
└─────────────────────┘
          │ ✓
          ▼
┌─────────────────────┐
│      Throttle       │ ← ✗
│          6          │
└─────────────────────┘
          │ ✓
          ▼
┌─────────────────────┐
│       PUMP          │ ← ✗
│          7          │
└─────────────────────┘
          │ ✓
          ▼
┌─────────────────────┐
│   FuelFlow ml/min   │ ← ✗
│          8          │
└─────────────────────┘
          │ ✓
          ▼
┌─────────────────────┐
│   Alarm BATT-MIN    │ ← ✗      s. section 2.2.2
│        OFF          │
└─────────────────────┘
          │ ✓
```

2.3 Graupner HoTT

Using the HoTT System there are 2 ways to transmit telemetry data, on the one hand as "text" and on the other hand only the pure values.

Using text mode it is possible to establish a bi-directional data transfer, meaning you can use the keys of the radio or the Smartbox in order to change/enter values in the sensor. Using speech output is not possible in this mode.
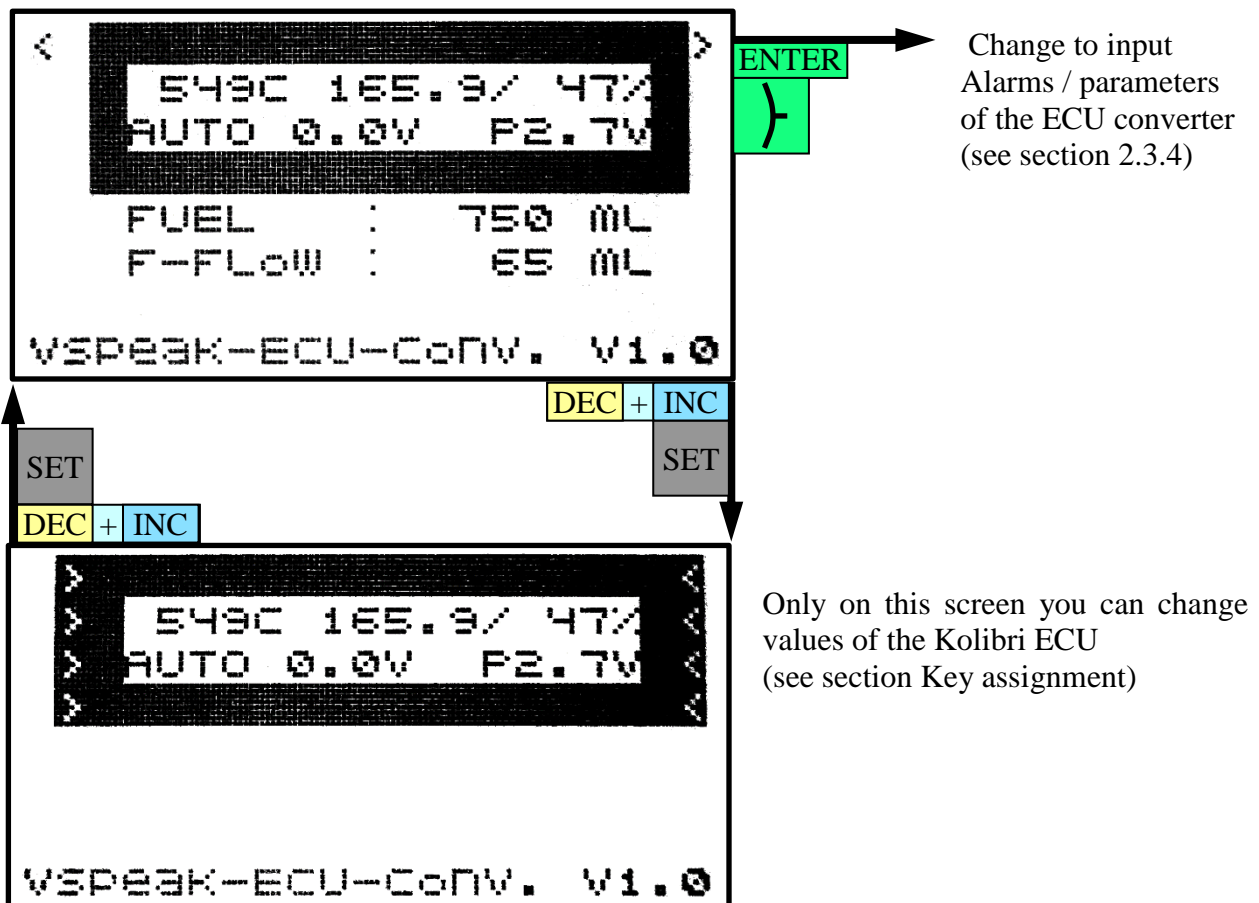
In data-mode the values are only transmitted in a fixed format in one direction. The format is defined by the sensor type. In this mode it is possible to have speech output for the sensor values.

2.3.1 Sensortype

The VSpeak ECU Converter for HoTT is a GAM (**G**eneral **A**ir **M**odul), a ESC (**E**lectronic **S**peed **C**ontroller) – or a VAR (**Var**io). Please select this sensor-type on your radio or Smartbox.
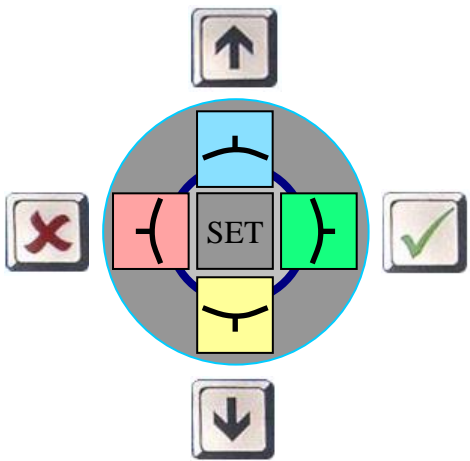
2.3.2 Textdisplay

Using the text-display you can see the current ECU data and you can also change parameters of the Kolibri ECU.

ENTER → Change to input Alarms / parameters of the ECU converter (see section 2.3.4)

Only on this screen you can change values of the Kolibri ECU (see section Key assignment)

The functionality of the Kolibri HDT can be mostly replicated with the HoTT buttons.

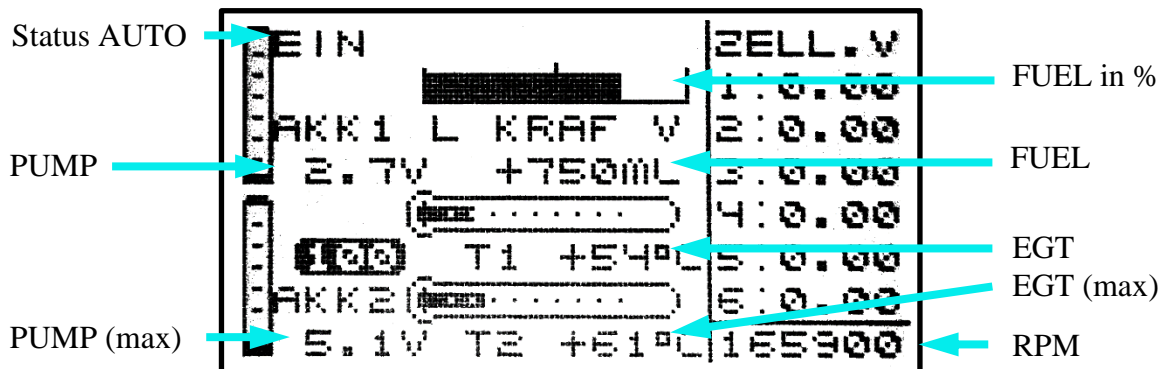For further details on the specific values please consult the manual of the Kolibri ECU.

2.3.2.1 Key assignment

Kolibri HDT				
SMART-BOX	ESC	DEC	INC	ENTER

MX-12 MX-16 MC-16 MC-20 MC-32 ⋮	

2.3.3 Data-Display/Speech

### 2.3.3.1 GAM - General Air Modul

"EIN" indicates that the turbine is in the "Running" status.

Since the GAM can only display temperatures up to 235°C, the temperature is divided by 10. If you see a value of 54°C on the display, you have a "real" temperature of 540 - 549°C.

The fuel level is shown as gauge in % and as numbers in ml. To calculate the percentage of tank volume value FUEL-Size is 100% fully set when turned on.

2.3.3.2 ESC - Electronic Speed Control

PUMP (max)   EGT   EGT (max)

PUMP   FUEL

FUEL in %

RPM   RPM (max)
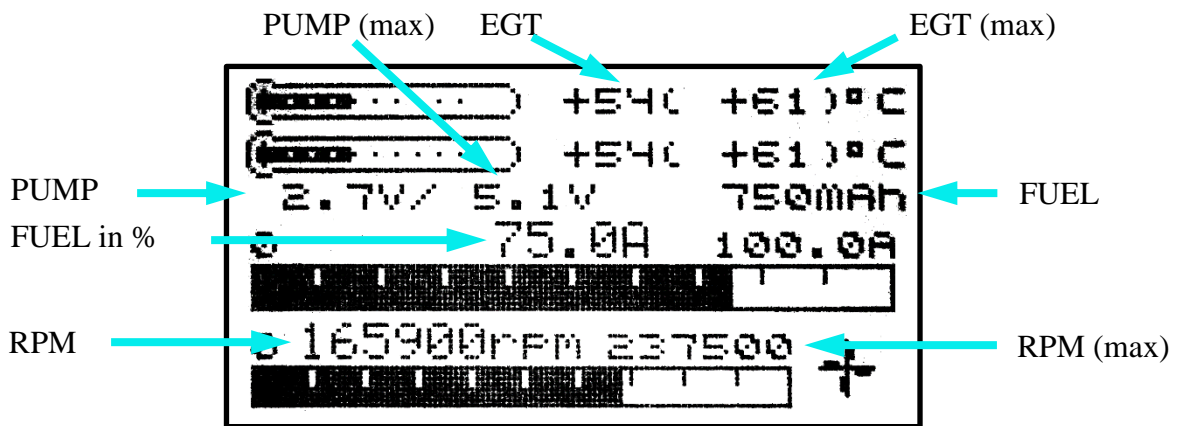
The ESC temperature display is limited to 235 ° C, so the turbine jet temperature is shown divided by 10, or the other way around: 54 ° C in the display corresponds to 540 ... 549 °C.

The fuel consumption is displayed on the display as capacity value, ie, 750mAh are 750ml. On the other hand, the percentage tank level is displayed as the current, ie, 75.0A correspond to 75.0% tank level. The tank level is thus easy to read via the associated bar display. To calculate the percentage of tank volume value FUEL-Size is 100% fully set when turned on.

2.3.3.3 VAR – Variometer

The HoTT Vario offers the possibility to display texts, in the example two lines with an MC20. The bottom line shows the turbine status or error messages. If the turbine is in the "AUTO" status, the lower line shows the EGT and the remaining fuel in ml

PUMP   RPM

EGT   FUEL
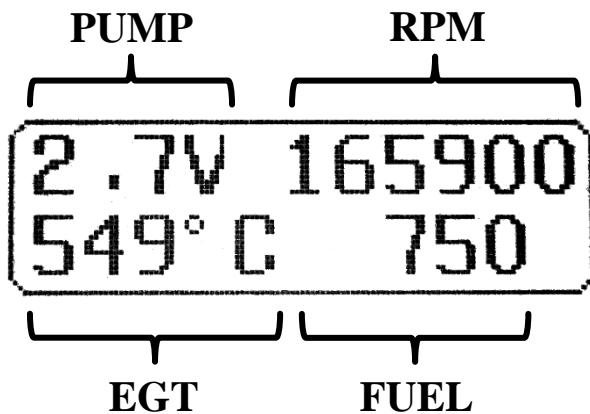
The tank level is converted in a percentage and displayed as altitude, e.g. 52m corresponds to 52% tank level (can be used for the speech output). To calculate the percentage of tank volume value FUEL-Size is 100% fully set when turned on.
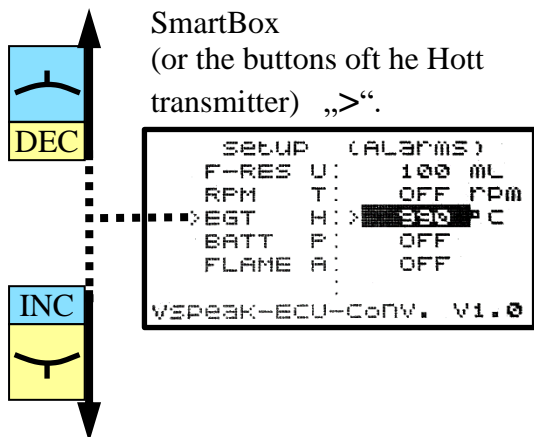
Furthermore, the alarms according to section 2.3.4. are also effective here.

2.3.4 Parameterization
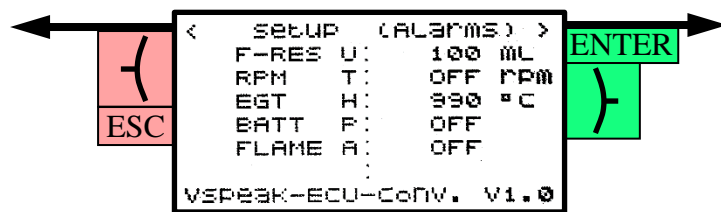
The change of sides takes place with Enter and ESC button of the SmartBox or with the appropriate buttons on the HoTT transmitter.

The parameter is selected with the INC- and DEC-buttons of the SmartBox (or the buttons oft he Hott transmitter) „>".
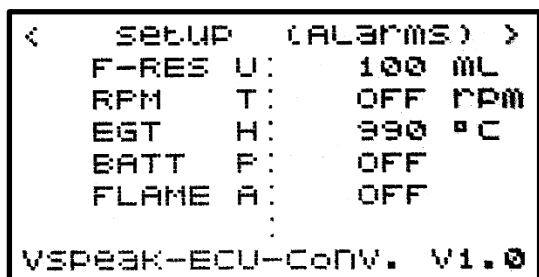

With DEC + INC or SET the value of the selected parameter is enabled for change (inverted).

Witht INC the value can be increased,

with DEC it can be reduced.

Stored is after DEC + INC or SET .

2.3.4.1 Alarms

Settings		
Value range	Step size	Signal tone
OFF,20 . . . 2500 ml	10 ml	U
OFF, 40.0 110.0 x 1000rpm	1000 rpm	T
400 . . . 990 °C	5 °C	H
ON / OFF		P
ON / OFF		A

Upon delivery, the warning thresholds are set as shown in the picture.

- F-RES
  The alarm Fuel Reserve is signaled if the remaining fuel is lower than set at F - RES.

- RPM
  The alarm RPM is signaled when the turbine rotation speed is lower than the RPM threshold value.
  The speed monitoring is started after at first exceeding RPM alarm threshold and ends with PUMP = 0.0V.

- EGT
  The alarm EGT is signaled if the temperature exceeds the value set at EGT.

- BATT
  The BATT alarm is signaled when the battery voltage is lower than the
  BATTERY-MIN VOLT parameter set in the ECU.

- FLAME
  The FLAME alarm signals a " FLAME OUT " exactly when the turbine has shut down - WITHOUT having been switched off by LOW TRIM

2.3.4.2 *FUEL consumption / Sensor type*

The VSpeak ECU Converter can calculate the current fuel flow rate (F-FLOW) and the fuel consumption (FUEL) based on the PUMP voltage

The two parameters required for this (**Flow/2.0V** respectively **/4.0V**) can be determined with the help of a flow meter - or, if you don't have one at hand, in the following way: You can run the turbine with 2.0 or 4.0V pump voltage for a period of 1 minute and measure it fuel used. A more precise result can be obtained by carrying out the measurement over several minutes and dividing the amount of fuel consumed by the number of minutes.

FUEL Tank Size is the capacity of the main tank in ml. The tank size is required for the calculation of the alarm for the fuel consumption (see above alarms: F RES).

```
<     Setup  (FUEL)
    FUEL-Size:1000 mL
    F-rounded:    1 mL
    Flow/2.0V:   50 mL
    Flow/4.0V:   95 mL
    Taxi Tank:  OFF
    Sensor   :  GAM
VSpeak-ECU-Conv.  V1.0
```

Settings	
Value range	Step size
100 . . . 8000ml	20 ml
1, 5, 10	
20 . . . 200ml	1 ml
30 . . . 600ml	1 ml
OFF, ON	
GAM / ESC / VAR	

Upon delivery, the warning thresholds are set as shown in the picture.

For models where a taxi tank is plugged into the main tank until the model is lifted off, set "**Taxi Tank** = ON". If the turbine is in the "Running" status, then when THROTTLE = 80% is exceeded for the **second time**, the FUEL will "reset", ie the displayed FUEL is only once set to "full" (the value set at "Fuel Tank Size") again at this time.

In sensor the sensor type can be GAM, ESC or VAR. The change of the sensor type will only take effect after restarting the ECU converter.

2.4 Futaba S.BUS2

The VSpeak ECU converter is fully compatible with S.BUS2. Registration and connection are established as with any other S.BUS2 sensor

<u>Caution:</u>
We generally recommend a strict separation between sensor values and servo data. Although the S: BUS 2 can transmit servo data, the S.BUS2 should exclusively be used for the transmission of sensor data and only the S.BUS1 should be used for the servos. In this way, the servo data are excluded from influencing on failure of a sensor.

2.4.1 Registration at the transmitter

The VSpeak ECU converter must be registered on the transmitter like any S.BUS2 sensor.

The slot allocation is required only once, this can be done manually or by the transmitter.

Manual Slot Allocation:
1. Select the desired sensor at free slot addresses on the transmitter (see Table Assignment Sensor - ECU Values).
2. Using the Kolibri HDT, set the slot addresses set in the transmitter in the VSpeak ECU converter (see section 2.4.3).

Slot allocation by the transmitter:

To do this, the orange contact must be pulled out of the 3-pin UNI servo plug of the VSpeak connection cable and replaced with the white telemetry contact (also previously removed from the servo plug).

Connect the ECU converter with the modified UNI servo plug to the "S.I / F" socket of the transmitter.

Now you can register the VSpeak ECU Converter - please refer to the instructions of the respective transmitter. For transmitters without supply voltage at the "S.I / F" socket, a receiver battery must also be connected via V-cable.

Since the VSpeak ECU converter displays its data using a total of 5 sensors, the registry has also be done 5 times.

After completing the registration, the cables must be restored to their original state.

Assignment sensor - ECU values

No	Sensor name	Slots	Start *(default)*	original Sensor value	ECU value	
1	CUR-F1678	3	24	CURRENT	Turbine status	(s. section 2.4.2)
				VOLTAGE	PUMP	in V
				CAPACITY	FUEL	in ml
2	SBS-01RM/O	1	27	R.P.M	RPM	in rpm
3	SBS-01T	1	28	TEMP	EGT	in °C
4	SBS-01T	1	OFF	TEMP	F-FLOW	in ml/min
5	SBS-01T	1	OFF	TEMP	THROTTLE	in %

E.g. using a T18MZ transmitter: The sensors are displayed after registration as follows:
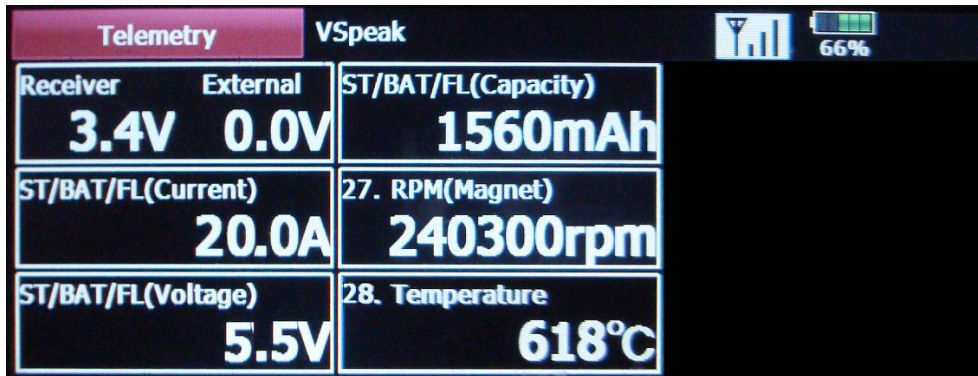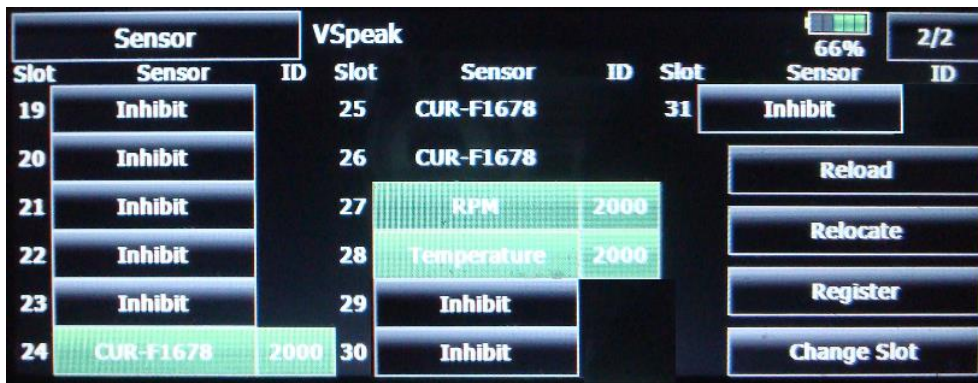
2.4.2 Turbine status – numerical "Current"-Values

The turbines status messages are displayed numerically as current values. Please refer to the table.

Futaba CUR-F1678 CURRENT	Kolibri ECU-Status
20.0 A	AUTO
15.0 A	RAMP-UP
14.0 A	FUELHEAT
13.0 A	PUMPSTART
12.0 A	PROP-HEAT
11.0 A	PROPIGNIT
10.0 A	STANDBY
3.0 A	SLOW-DOWN
2.0 A	COOL-DOWN
1.0 A	ON
0.0 A	OFF
-1.0 A	GLOW PLUG!
-2.0 A	BATT LOW!
-10.0 A	**FLAME OUT**
- 20.0 A	like -10.0A, but only once for 2 seconds

If an alarm of lower MINUS 15.0A is programmed in the transmitter, the "FLAME OUT"-messages is signaled as a current alarm in the transmitter for a duration of 2 seconds

2.4.3 Setup

For the Futaba SBUS2 system a variety of settings in VSpeak ECU converter using the Kolibri HDT can be made.

In the overview the complete menu structure for all possible range of settings is shown.

```
Telemetry Select
     Futaba
```
✓
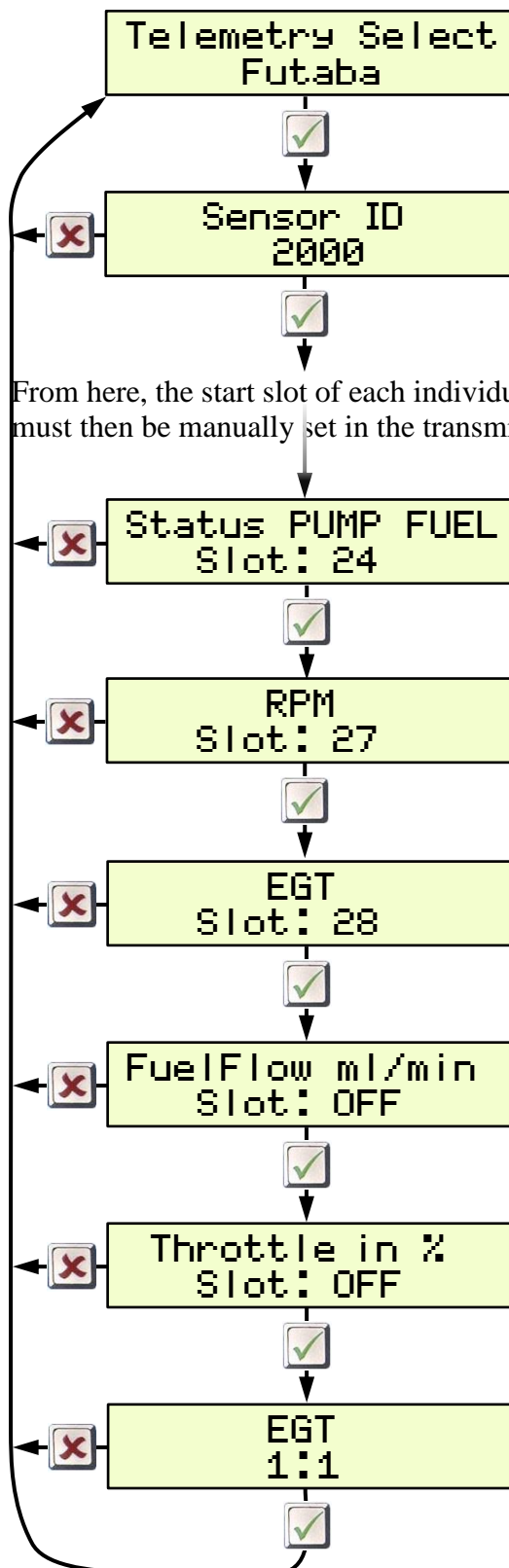
Here the sensor start ID can be set, with which the sensors of the VSpeak ECU converter are registered on the Futaba system.

The ID applies to CUR-F1678, the RPM sensor SBS-01RMO and the first temperature sensor SBS-01T (EGT).

```
Sensor ID
   2000
```
✗ ✓

The second temperature sensor SBS-01T(F-FLOW) then has the sensor start ID + 1, the third (Throttle) Sensor-ID + 2.

From here, the start slot of each individual sensor can be set manually, and the assigned sensor must then be manually set in the transmitter at the relevant slot address.

```
Status PUMP FUEL
   Slot: 24
```
✗ ✓

Slot "OFF" deactivates the sensor in question - it is thus also deactivated for logging on to the transmitter.

```
RPM
Slot: 27
```
✗ ✓

```
EGT
Slot: 28
```
✗ ✓

```
FuelFlow ml/min
   Slot: OFF
```
✗ ✓

```
Throttle in %
   Slot: OFF
```
✗ ✓

```
EGT
1:1
```
✗ ✓

Display of EGT "1:1" - or – "divided by 10".

Since the adjustable temperature alarm thresold in Futaba transmitters is only possible for max. 200 °C, here is the possibility to transfer the temperature value divided by 10.

2.4.4 Alarms

In the Futaba system alarms can be generated according to the set alarm thresholds for each value in the transmitter or the Telemetry Box. In the sensors itself no alarms can be set. This is for most sensor data also sufficient, such as an alarm for monitoring the EGT temperature.

But for alerting the fuel consumption and the speed monitoring the VSpeak ECU converter for Futaba offers the following options: (s. section 2.0.2 **FUEL Tank low** and **RPM low**),

2.4.4.1 FUEL Tank low

1. Setting value = OFF

   Fuel is transferred 1 : 1.

   However, if an alarm threshold of e.g. <100 is programmed, then, after the tank level is lower, the alarm is also triggered - but the alarm only stops, if the transmitter is switched off. That's why:

2. Setting value = 100ml (as example)

   After lowering the tank reserve, the current value 3 x is transferred alternately for 5 seconds as a negative value, followed by 10 seconds as normal positive value.

2.4.4.2 Rotation speed monitoring / RPM low

Thus, the speed is displayed correctly, you have to set the speed display to type: magnet and gear ratio 1.

1. Setting value = OFF

   The current speed is transfer 1 : 1.

   If an alert threshold of for example <35,000 rpm is programmed in the transmitter, then the alarm is already active at the switching on of the turbine and the receiving system. That's why:

2. Setting value = 35.000rpm (as an example)

   The speed is transferred to the transmitter divided by a factor of 10. Only in the alarm case, speeds less than the setting value are transferred 1 : 1. The alarm is active AFTER exceeding the set value.

   In the example, the speed monitoring is only activated after exceeding 35,000 rpm. The actual 40.000rpm are displayed on the transmitter as 4.000rpm, 35,100 as 3.510rpm. If speed decreases further then 35.000rpm speed transfer is 1 : 1. Has the transmitter an alarm threshold set to > 15.000rpm, the alarm starts. If turbine speed falls below 15.000rpm - for example, turbine was switched off, then the alarm stops because speed is now less than the alarm threshold value.

2.4.4.3 Flameout / Status

Turbine status messages are transmitted as numerical "Current" values.
If in the transmitter an alarm threshold for the current of e.g. less than MINUS 15.0A is set, the "FLAME OUT" message is signaled as a current alarm for a period of 2 seconds.

2.5 Futaba S.BUS2 V10

The VSpeak ECU converter is fully compatible with S.BUS2. Registration and connection are established as with any other S.BUS2 sensor

<u>Caution:</u>
We generally recommend a strict separation between sensor values and servo data. Although the S: BUS 2 can transmit servo data, the S.BUS2 should exclusively be used for the transmission of sensor data and only the S.BUS1 should be used for the servos. In this way, the servo data are excluded from influencing on failure of a sensor.

2.5.1 Registration at the transmitter

The VSpeak ECU converter must be registered on the transmitter like any S.BUS2 sensor.

The slot allocation is required only once, this can be done manually or by the transmitter.

Manual Slot Allocation:
1. Select the desired sensor **Jetcat V10** at a free slot address on the transmitter.
2. Using the Kolibri HDT, set the slot address set in the transmitter in the VSpeak ECU converter (see section 2.5.4).

Slot allocation by the transmitter:

To do this, the orange contact must be pulled out of the 3-pin UNI servo plug of the VSpeak connection cable and replaced with the white telemetry contact (also previously removed from the servo plug).

Connect the ECU converter with the modified UNI servo plug to the "S.I / F" socket of the transmitter.

Now you can register the VSpeak ECU Converter - please refer to the instructions of the respective transmitter. For transmitters without supply voltage at the "S.I / F" socket, a receiver battery must also be connected via V-cable.

In contrast to the 5 standard sensors in chapter 2.4, here the slots of the special sensor **JetCat V10** are used to display the data (not every Futaba transmitter supports the sensor JetCat V10).

After completing the registration, the cables must be restored to their original state.

Slot	Sensor	ID	Slot	Sensor	ID	Slot	Sensor	ID
1	Inhibit		7	Inhibit		13	JetCat V10	
2	Inhibit		8	JetCat V10	2200	14	JetCat V10	
3	Inhibit		9	JetCat V10		15	JetCat V10	
4	Inhibit		10	JetCat V10		16	JetCat V10	
5	Inhibit		11	JetCat V10		17	JetCat V10	
6	Inhibit		12	JetCat V10		18	JetCat V10	
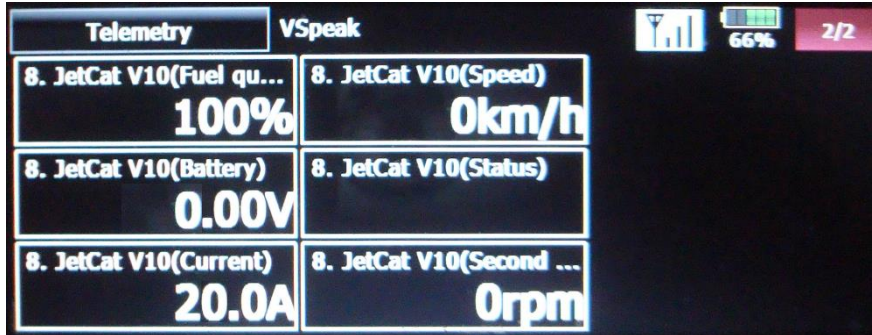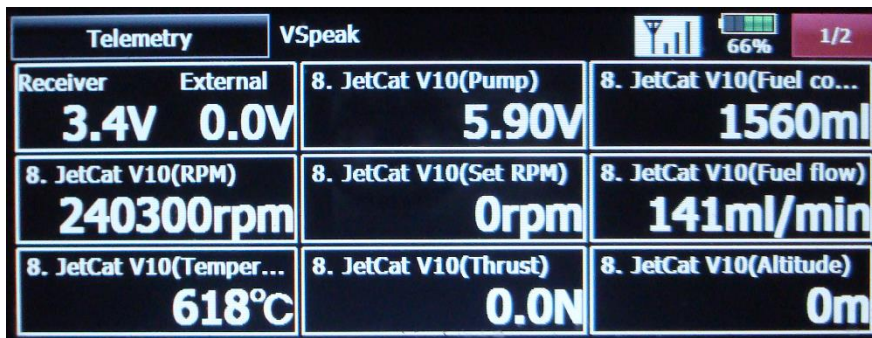
2.5.2 Assignment JetCat V10 - ECU Values

JetCat V10 sensor occupies 14 slots, the assignment is as follows:

Nr.	JetCat V10	Kolibri
1	RPM	RPM
2	Temperature	EGT
3	Pump	PUMP
4	Set RPM	-
5	Thrust	-
6	Fuel	FUEL
7	Fuel flow	FuelFlow
8	Altitude	-
9	Fuel quality	THROTTLE
10	Battery	-
11	Current	ECU- status as numerical current value (s. section 2.5.3)
12	Speed	-
13	State	-
14	Second Shaft	-

2.5.3 Turbine status – numerical "Current"-Values

The turbines status messages are displayed as numerical "Current" values (s. table below).

Kolibri ECU-Status	Futaba CURRENT	Futaba Status JetCat V10
AUTO	20.0 A	Running
RAMP-UP	15.0 A	Starting
FUELHEAT	14.0 A	Starting
PUMPSTART	13.0 A	Starting
PROP-HEAT	12.0 A	Starting
PROPIGNIT	11.0 A	Starting
STANDBY	10.0 A	OFF
SLOW-DOWN	3.0 A	OFF
COOL-DOWN	2.0 A	OFF
ON	1.0 A	OFF
OFF	0.0 A	OFF
GLOW PLUG!	35.0 A	Glow Plug defective
BATT LOW!	40.0 A	Low Battery
FLAME OUT	45.0 A	Low rpm Off
	55.0 A	like 45.0A, but only once for 2 seconds

FLAME OUT is displayed as 45.0A and 55.0A, with 55.0A only being displayed for 2 seconds, then as 45.0A. If you set an alarm> 50.0A, a turbine shutdown (FLAME OUT) is safely displayed.

2.5.4 Setup

For the Futaba SBUS2 system a variety of settings in VSpeak ECU converter using the Kolibri HDT can be made.
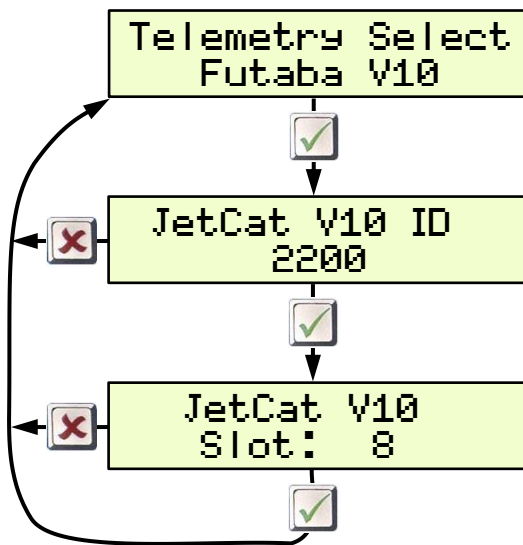
Here the sensor start ID can be set, with which the **Jetcat V10** sensor of the VSpeak ECU converter is registered on the Futaba system.

Here, the StartSlot can also be set manually, in the sender then also manually set **Jetcat V10** at the relevant slot address.

2.5.5 Alarms

In the Futaba system alarms can be generated according to the set alarm thresholds for each value in the transmitter or the Telemetry Box. In the sensors itself no alarms can be set. This is for most sensor data also sufficient, such as an alarm for monitoring the EGT temperature.

But for alerting the the speed monitoring the VSpeak ECU converter for Futaba offers the following options: (s. section 2.0.2 **RPM low**)

2.5.5.1 Rotation speed monitoring / RPM low

Thus, the speed is displayed correctly, you have to set the speed display to type: magnet and gear ratio 1.

1. Setting value = OFF

   The current speed is transfer 1 : 1.

   If an alert threshold of for example <35,000 rpm is programmed in the transmitter, then the alarm is already active at the switching on of the turbine and the receiving system. That's why:

2. Setting value = 35.000rpm (as an example)

   The speed is transferred to the transmitter divided by a factor of 10. Only in the alarm case, speeds less than the setting value are transferred 1 : 1. The alarm is active AFTER exceeding the set value.

   In the example, the speed monitoring is only activated after exceeding 35,000 rpm. The actual 40.000rpm are displayed on the transmitter as 4.000rpm, 35,100 as 3.510rpm. If speed decreases further then 35.000rpm speed transfer is 1 : 1. Has the transmitter an alarm threshold set to > 15.000rpm, the alarm starts. If turbine speed falls below 15.000rpm - for example, turbine was switched off, then the alarm stops because speed is now less than the alarm threshold value.

2.5.5.2 Battery low / EGT high
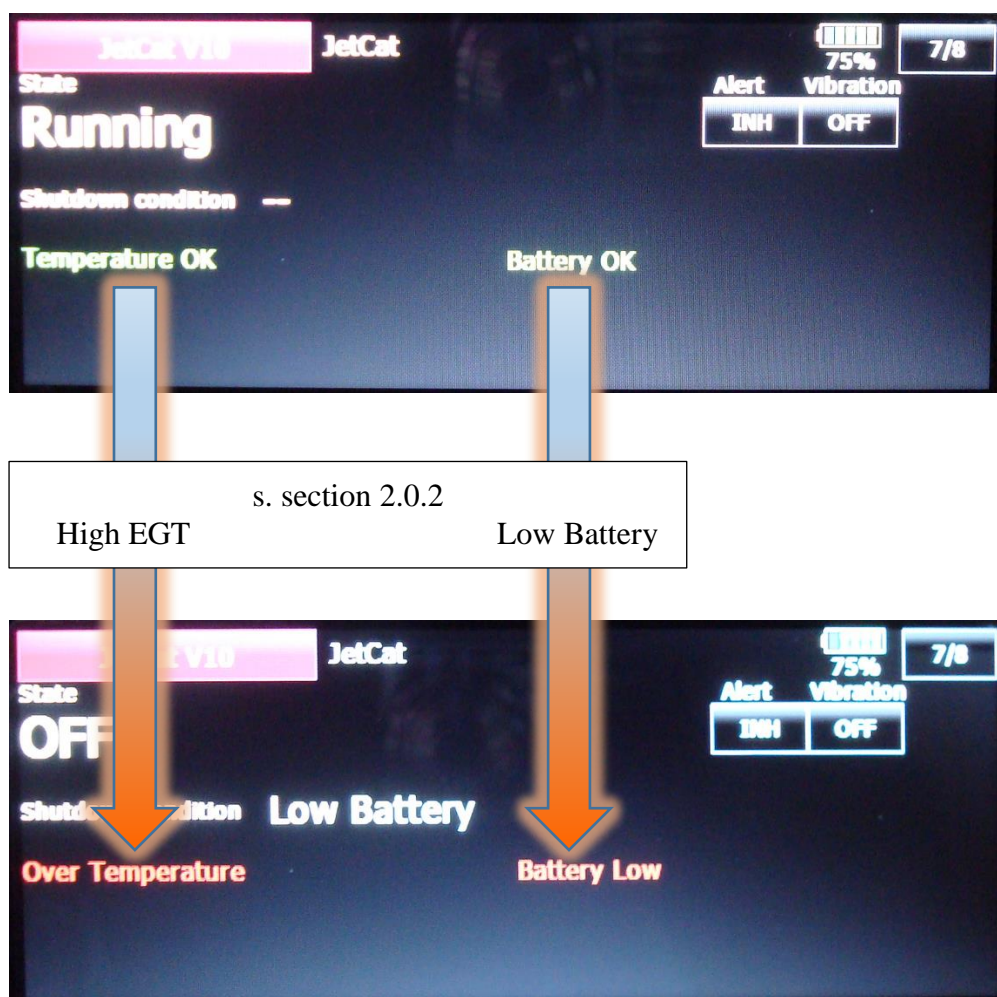
2.5.5.3 Flameout / Status

Turbine status messages are transmitted as numerical "Current" values (s. section 2.5.3)

If in the transmitter an alarm threshold for the current of e.g. more than 50.0A is set, a turbine shutdown (FLAME OUT) is signaled as a current alarm for a period of 2 seconds.

2.6 FrSKY S.Port

The data of the VSpeak ECU converter is available on the FrSky Smart Port as follows:

FrSky ECU Daten	Kolibri
A4	PUMP in V
Fuel	FUEL in ml
RPM	RPM
Thro (…vorher Fuel)	THROTTLE in %
Tmp1	EGT in °C
Tmp2	ECU- Status as Temperature (s. section 2.6.3)
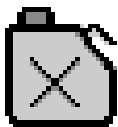
For the provided LUA scripts on the website of VSpeak exactly this spelling is necessary, otherwise the LUA script does not work correctly.

The second "Fuel" value with the unit% has been renamed "**Thro**".

For "Fuel" the PREZISION should be changed from 0.00 to 0.- - ml .

2.6.1 LUA script for Taranis
(X9D and X9E)

On the website of VSpeak you can download the packed file VS_Taranis_LUA.zip for free, a **Readme.pdf** file is included.

2.6.2 LUA script for Horus (openTX)

On the website of VSpeak you can download the packed file VS_Horus_LUA.zip for free, a **Readme.pdf** file is included.

2.6.3 Turbine status – numerical „Temperature"-Values

FrSKY Tmp2	Beschreibung
20	AUTO
15	RAMP-UP
14	FUELHEAT
13	PUMPSTART
12	PROP-HEAT
11	PROPIGNIT
10	STANDBY
3	SLOW-DOWN
2	COOL-DOWN
1	ON
0	OFF
-1	GLOW PLUG!
-2	BATT LOW!
-10	**FLAME OUT**

The turbines status messages are also displayed numerical values. The assignment is given in the table.

```
ECU settings

3-SYSTEM

3.1 BATTERY
    VOLTAGES

BATTERY-MIN VOLT
  6.4 Volts
```
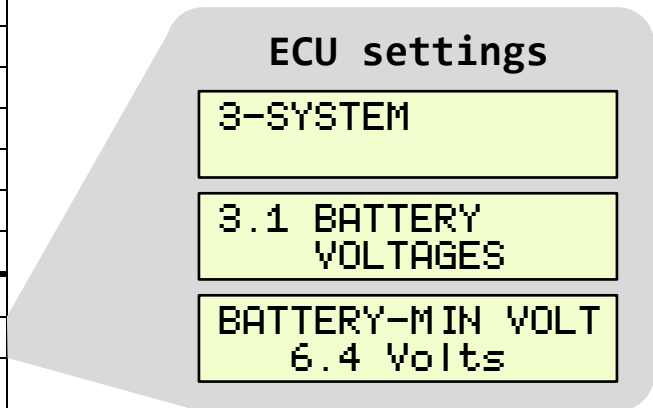
2.6.4 Setup

For the FrSky system a variety of settings in VSpeak ECU converter using the Kolibri HDT can be made.

In the overview the complete menu structure for all possible range of settings is shown.

```
Telemetry Select
     FrSKY

  Physical  ID
       28

  Group Number
       1
```
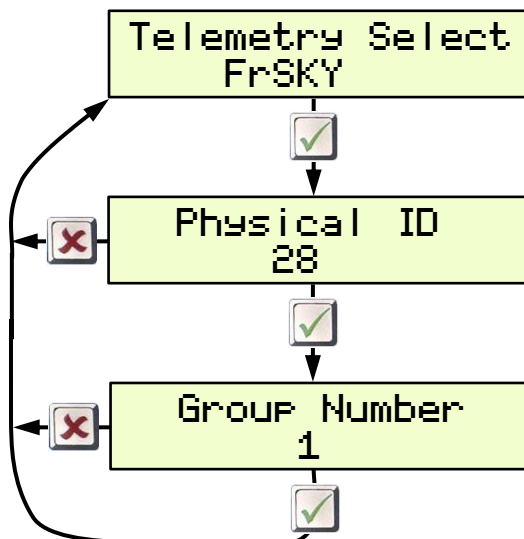
2.6.5 Alarms

At FrSky system, alarms can only be set in the transmitters, so here the alarms described in Section 2.0.2 have no meaning.

2.7 JR PROPO

The displays are described below using the example of an XG8.

| JR Display (Ex. XG8)	Kolibri	
F-AKKU	OFF / ON	
F-PACK A	ECU- Status as numerical current value	(s. section 2.7.1)
F-PACK W	Throttle (%) or Fuel-Flow (ml/min)	(s. section 2.7.2)
F-PACK V	PUMP	
F-PACK C	FUEL (remaining fuel) in ml	
TEMP.	OFF / ON	(s. section 2.7.2)
RPM	OFF / ON	(s. section 2.7.2)

In order to display the rotation speed correctly, the parameters for RPM must be set to: GEAR RATIO , PROPELLER and MAGNET POLE to INH.
The parameter type (MAGNETIC , OPTICAL or MOTOR) does not matter.
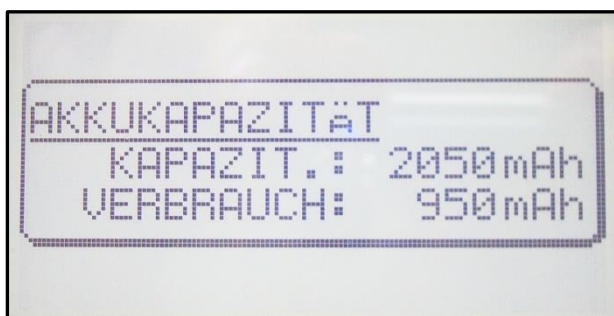
The ECU converter transmits the consumed FUEL (950ml) – but on the radio the remaining fuel is displayed.

This means that the actual tank size must be parameterized in ml in the settings in the radio, here in the example the main tank has 3000 ml volume, which is set as capacity 3000mAh.
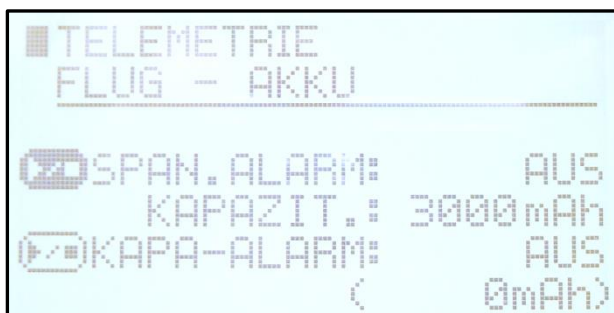
2.7.1 Turbine status – numerical "Current"-Values

The turbines status messages are displayed as numerical "Current" values. The assignment is given in the following table.

JR PROPO F-AKKU A	Kolibri ECU-Status
20.0 A	AUTO
15.0 A	RAMP-UP
14.0 A	FUELHEAT
13.0 A	PUMPSTART
12.0 A	PROP-HEAT
11.0 A	PROPIGNIT
10.0 A	STANDBY
3.0 A	SLOW-DOWN
2.0 A	COOL-DOWN
1.0 A	ON
0.0 A	OFF
35.0 A	GLOW PLUG!
40.0 A	BATT LOW!
45.0 A	FLAME OUT!
55.0 A	like 45.0A, but only once for 2 seconds

FLAME OUT is displayed as 45.0A and 55.0A, with 55.0A only being displayed for 2 seconds, then as 45.0A. If you set an alarm> 50.0A, a turbine shutdown (FLAME OUT) is safely displayed.

2.7.2 Setup

For the JR PROPO system a variety of settings in VSpeak ECU converter using the Kolibri HDT can be made.

In the overview the complete menu structure for all possible range of settings is shown.
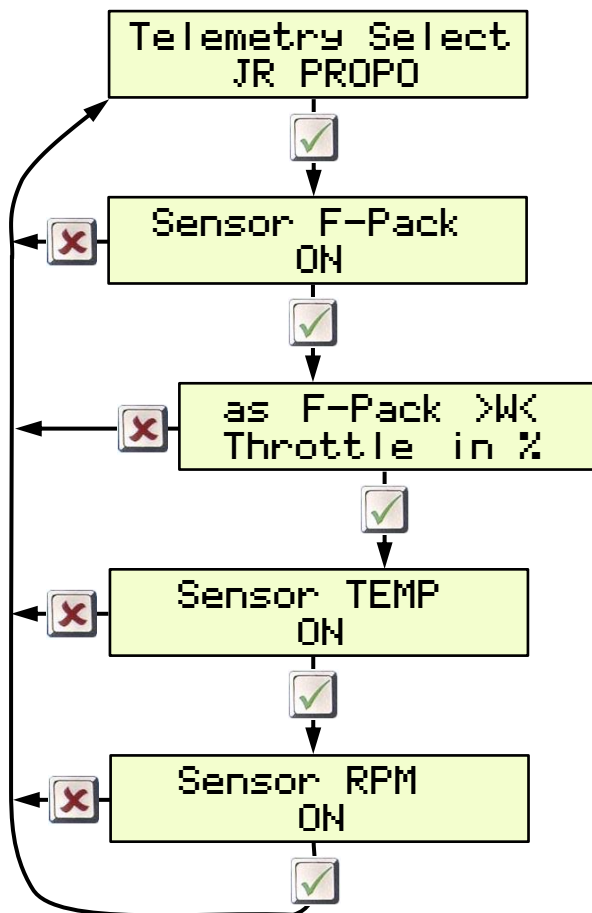
With "ON" / "OFF" you can set whether the relevant sensor is used for data transmission from the ECU converter.

```
┌──────────────────────┐
│  Telemetry Select    │
│     JR PROPO         │
└──────────────────────┘
          ✓
          ↓
┌──────────────────────┐
│  Sensor F-Pack       │
✗ │       ON           │
└──────────────────────┘
          ✓
          ↓
┌──────────────────────┐
│  as F-Pack >W<       │
✗ │  Throttle  in %    │
└──────────────────────┘
          ✓
          ↓
┌──────────────────────┐
│  Sensor TEMP         │
✗ │       ON           │
└──────────────────────┘
          ✓
          ↓
┌──────────────────────┐
│  Sensor RPM          │
✗ │       ON           │
└──────────────────────┘
          ✓
```
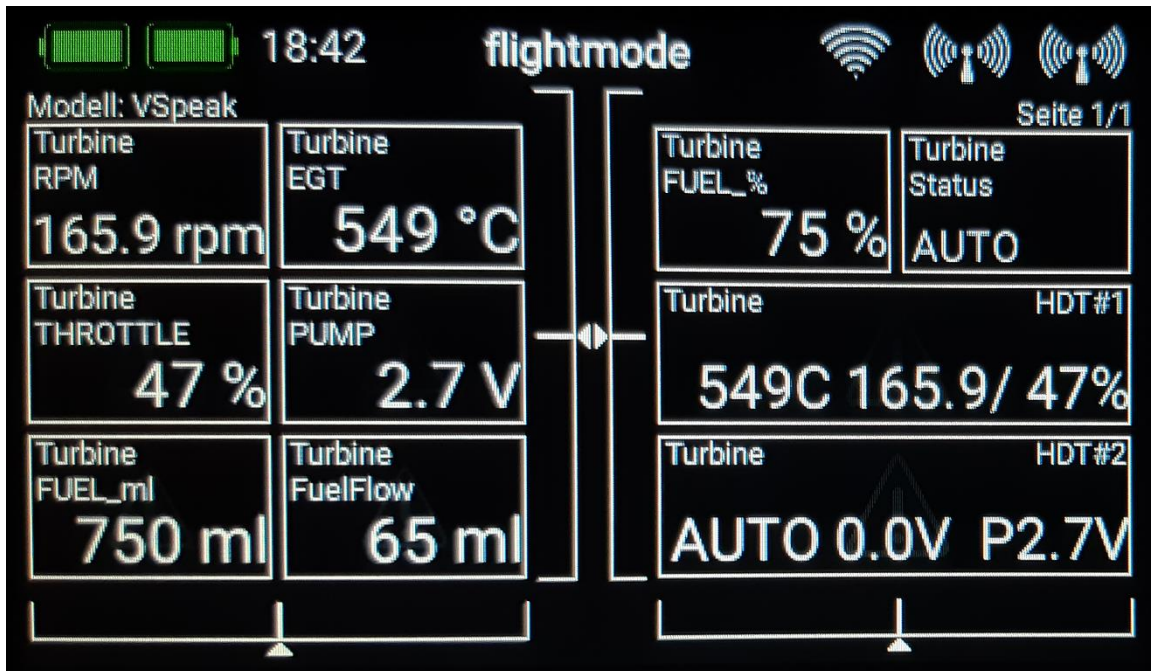
F-PACK, as power in **W**:

- Throttle in %
- FuelFlow in ml/min

2.7.3 Alarms

At JR PROPO system, alarms can only be set in the transmitters, so here the alarms described in Section 2.0.2 have no meaning.

2.8 PowerBox P²Bus

On the P²Bus the turbine data are transmitted as shown in the following picture:

Furthermore, the 2 display lines of the Kolibri HDT can be displayed.
In the case of "Flame OUT", the "Status" message is additionally provided with an alarm.

2.8.1 Setup

All relevant settings can be made directly from the PowerBox transmitter.
Changes to the parameters marked with a yellow background are only effective after a sensor rescan.

2.8.1.1 FUEL

Taxi Tank

> For models where a taxi tank is plugged into the main tank until the model is lifted off, activate "Taxi Tank ". With "Tank Size" the tank volume of the main tank has to be set. If the turbine is in the "Running" status, then when THROTTLE = 80% is exceeded for the **second time**, the FUEL will "reset", ie the displayed FUEL is only once set to "full" (the value set at "Tank Size") again at this time.

Tank Size

Volume of the main tank in ml.

FUEL rounded

The display accuracy of FUEL (ml) can be set here.
Rounding the display makes sense, when using speech to reduce the announcement syllables.

FuelFlow @ 2.0V   bzw. 4.0V

FUEL-Flow are the two parameters for the current fuel flow at 2.0V or 4.0V pump voltage.

The two parameters can be determined with the help of a flow meter - or, if you don't have one at hand, in the following way: You can run the turbine with 2.0 or 4.0V pump voltage for a period of 1 minute and measure it fuel used. A more precise result can be obtained by carrying out the measurement over several minutes and dividing the amount of fuel consumed by the number of minutes.
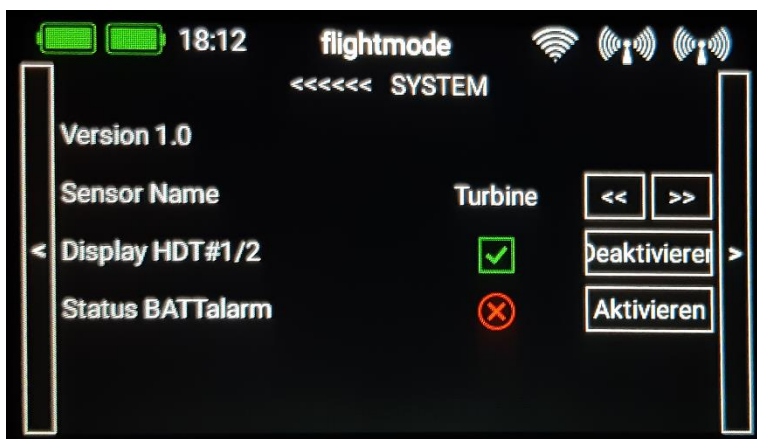

2.8.1.2 PRIORITY
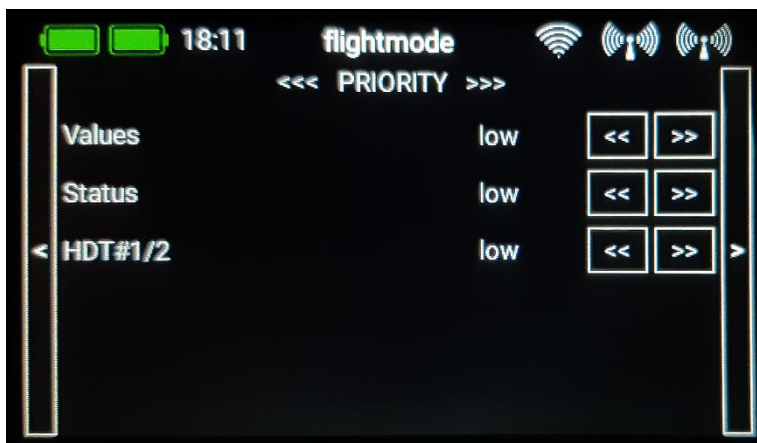
Here you can set the prioritization of the data request for the group of ECU **Values** and the **Status**, you can choose between:
low / high / higher / at highest   - whereby low is sufficient.

2.8.1.3 SYSTEM

Version #.#

Current software version

Sensor Name

It can be connected simultaneously several VSpeak ECU converter at P²Bus, for example, in multi-beam models. The assignment of the sensor address manages the PowerBox transmitter - please read this in the manual of your PowerBox transmitter.

To distinguish between several simultaneously active ECU converters, different names can be selected for Sensor Name, for example:

Turbine   Turbine [1]   [2]   [3]   [4]   [A]   [B]   [C]   [D]   [L]   [M]   [R]   . . .

Display HDT#1/2

Display of the two HDT lines.

If Display HDT#1/2 is deactivated, the two HDT lines are not only not displayed, they are also not transmitted on P²Bus, thus relieving the P²Bus protocol.

Status BATTalarm

When activated, an alarm is output in the "Status" display in addition to the "Flame OUT", even if the turbine battery is lower than MIN.
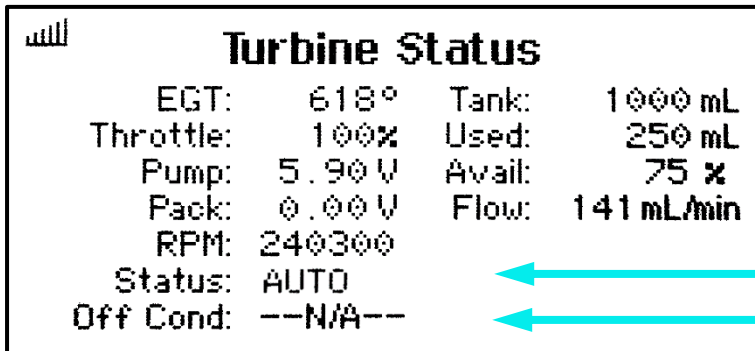The alarm threshold must be set in the Kolibri ECU

```
        ECU settings

    3-SYSTEM


    3.1 BATTERY
        VOLTAGES

    BATTERY-MIN VOLT
        6.4 Volts
```
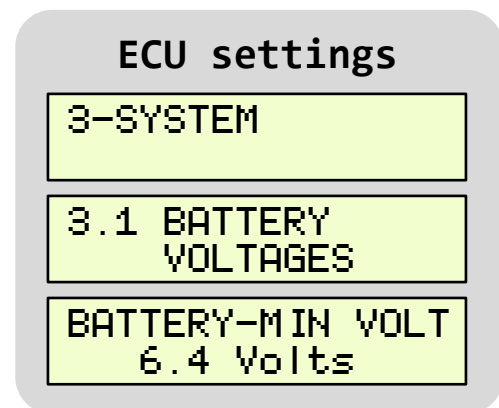
2.9 Spektrum (X-Bus)

You need at least a DX9, DX10T, DX18… in order to view ECU Telemetry. DX6, DX7s and DX8 do not support this sensor
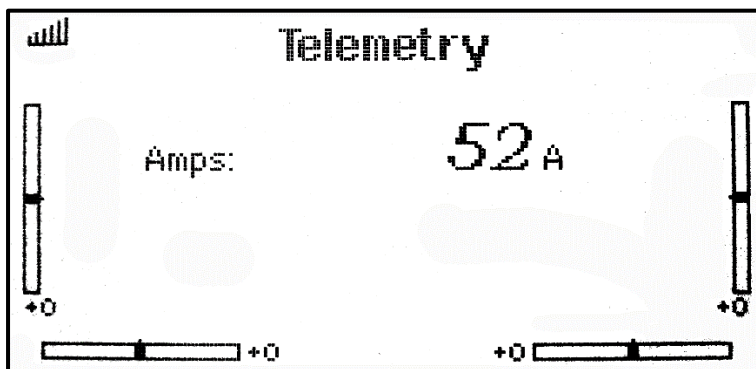
2.9.1 Telemetry display

s. section Turbine status

not supported

Fuel consumption and EGT can also be displayed as a "current".

Used fuel in %. 52A means 52% fuel consumed. You can set an alarm, if you set threshold to 80A you get an alarm if 80% fuel is

Display EGT in ° C divided by 10 as current, 52A = 520 ... .529 ° C (Current alarm to 75A would be active when exceeding 750 ° C)

2.9.2 Setup

The following settings can be made in the VSpeak ECU Converter using the Kolibri HDT.
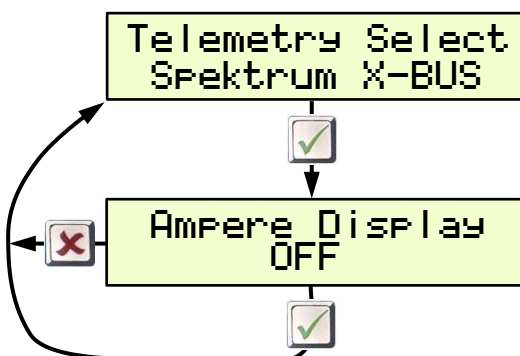
Selection of values to be displayed as amps:

- OFF … Display is not used
- Consumed FUEL %
- EGT divided 10

2.9.3 Alarms

At Spektrum system, alarms can only be set in the transmitters, so here the alarms described in Section 2.0.2 have no meaning.

3 Technical data

Power supply	3,5 … max. 15V from ECU
Current consumption	~22 mA (at 7,4V)
Dimensions	30 x 22 x 4 mm
Weight	~9 g (incl. connection cable)

Connections	UNI servo plug Kolibri ECU – HDT Port (cable length ~ 20 cm)
	
	Radio system:
	• Jeti / Hott / Multiplex / Futaba / JR PROPO / FrSky / PowerBox
	    UNI servo plug (cable length ~ 20 cm)
	• Spektrum
	    X-Bus-Stecker (cable length ~ 20 cm)

4 Instructions for disposal

Equipment marked with the symbol should not be disposed of within household waste.

5 EG Declaration of Conformity

Manufacturer

VSpeak-Modellbau (Volker Weigt)
Priestewitz

We hereby declare that the product

VSpeak ECU Converter

complies with the following European directives:

2004/108/EC	EMC Directive
2006/95/EC	Low Voltage Directive (LVD)
2011/65/EC	Restriction of Hazardous Substances (RoHS)

The presumption of conformity is taken by applying the following harmonized standards:

EN60065	Audio-, video- and similar electronic aparatus - Safety requirements
EN60332	Tests on electric and optical fibre cables under fire conditions
EN60950	Information technology equipment - Safety
EN61000-6-1	Electromagnetic compatibility (EMC)
EN61000-6-3	
EN55022	Information technology equipment - Radio disturbance characteristics

Priestewitz, 2020/09/01   ....

Signature
Volker Weigt
Managing Director

6 Version history

Vers.	Date	Comment
1.0	09.2020	first retail version

7 Contact

Volker Weigt

www.VSpeak-Modell.de
mail: **volker.weigt@vspeak-modell.de**