JETRONIC®-BOX

R/C Controller
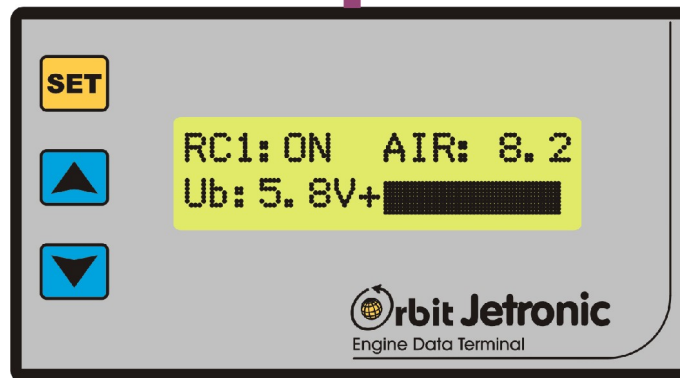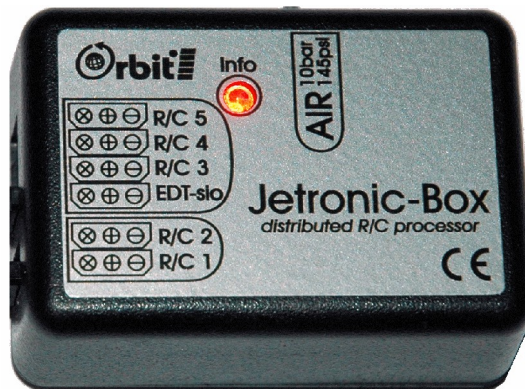
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Introduction

The Orbit JETRONIC-BOX is a universal R/C processor for use in medium-sized and large model aircraft. Two R/C inputs can be programmed to control up to three R/C outputs, for example to implement a landing gear with door control or a cockpit with open/close and lock functions, where even an R/C transmitter with microprocessor control is not sufficient. Since such model functions are often realised using pneumatic systems with an air tank and a pneumatic cylinder, the JETRONIC-BOX also features an air pressure measurement and display function as well as the corresponding adjustable pressure monitoring function.

To read the current operating data and to adjust settings, a suitable display and programming unit (Engine Data Terminal) is required. The following devices are supported:

Orbit JETRONIC-EDT, no.: 0830

Orbit ONBOARD-EDT, no.: 0832

Graupner BOOSTER-EDT no.: 6813.10

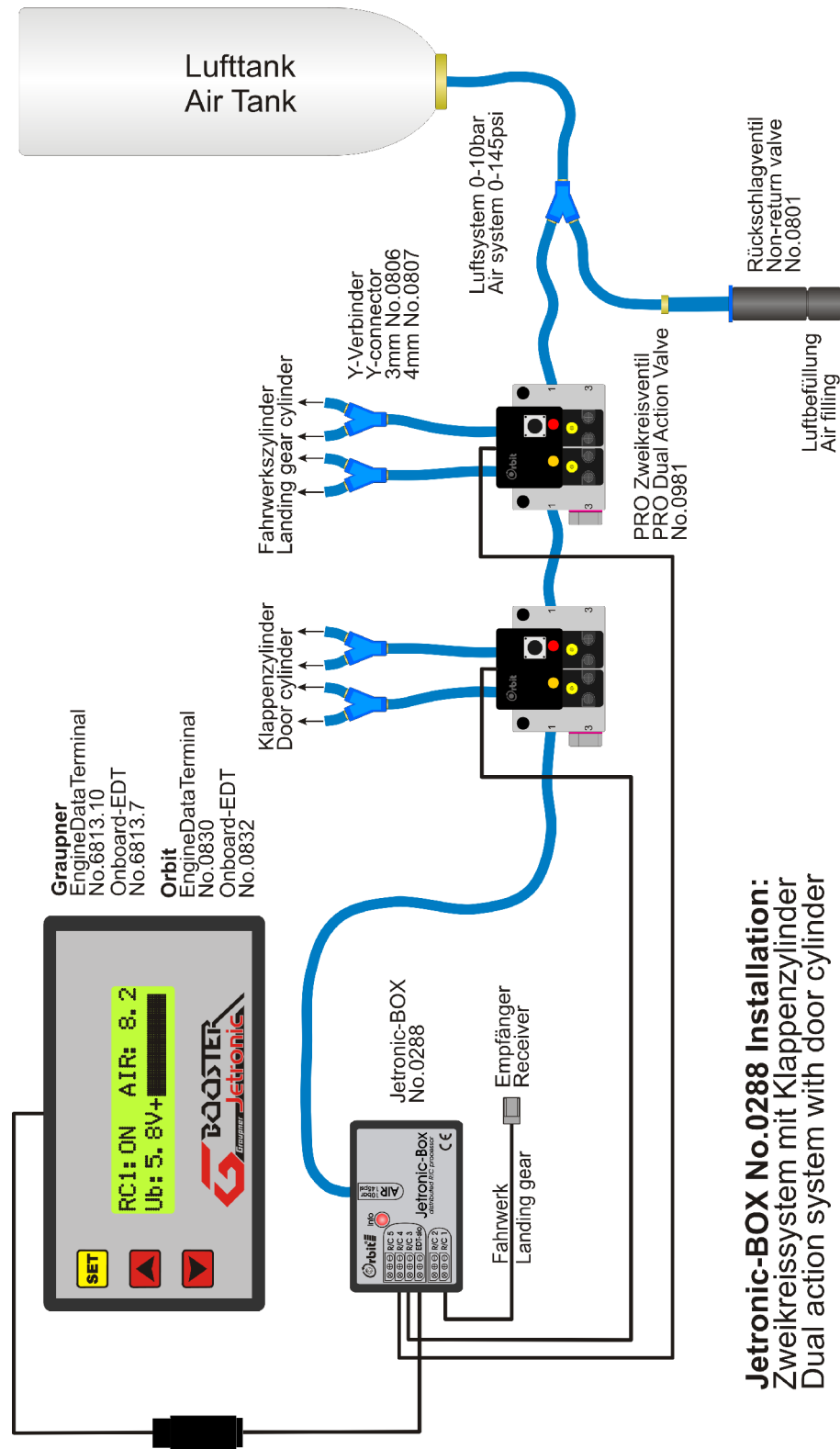Graupner ONBOARD-EDT no.: 6813.7

These units are equipped with an illuminated alphanumeric display and can be connected and disconnected while the system is running, or they can be permanently installed in the model (ONBOARD-EDT).

Besides the current operating parameters, such as the battery voltage, it is also possible to display additional information, such as air pressure or R/C inputs and outputs. All display and adjustment functions are accessible via a menu-controlled plain text dialog. The JETRONIC-BOX is connected to the R/C receiver via RC-1 normally, but RC-2 can be used as well (additional function).

Using a USB cable (type Orbit Jetronic-SIO2USB), the JETRONIC-BOX can be updated via the Internet, making it possible to install new functions or extensions. To do so, use the *JetLog* PC software shipped with the Jetronic-SIO2USB cable.

This makes the JETRONIC-BOX suitable for future model projects, too – for example, flashing position lights, warning lights or special control functions are possible.

Schematic Overview

Lufttank
Air Tank

Luftsystem 0-10bar
Air system 0-145psi

Rückschlagventil
Non-return valve
No.0801

Luftbefüllung
Air filling

Y-Verbinder
Y-connector
3mm No.0806
4mm No.0807

Fahrwerkszylinder
Landing gear cylinder

PRO Zweikreisventil
PRO Dual Action Valve
No.0981

Klappenzylinder
Door cylinder

Graupner
EngineDataTerminal
No.6813.10
Onboard-EDT
No.6813.7

Orbit
EngineDataTerminal
No.0830
Onboard-EDT
No.0832

RC1:ON AIR: 8.2
Ub: 5.8V+

Jetronic-BOX
No.0288

Empfänger
Receiver

Fahrwerk
Landing gear

Jetronic-BOX No.0288 Installation:
Zweikreissystem mit Klappenzylinder
Dual action system with door cylinder

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EDT Display Unit (Engine Data Terminal)

EDT-LEFT:
R/C Eingang 1
R/C input 1

EDT-RIGHT:
Luftdruck [bar]
AIR pressure [bar]

```
RC1:NO   AIR:8.2
Ub5.4V+█████████
```

Ub: Akku / battery
Spannung / voltage

Balkenanzeige
bar graph display
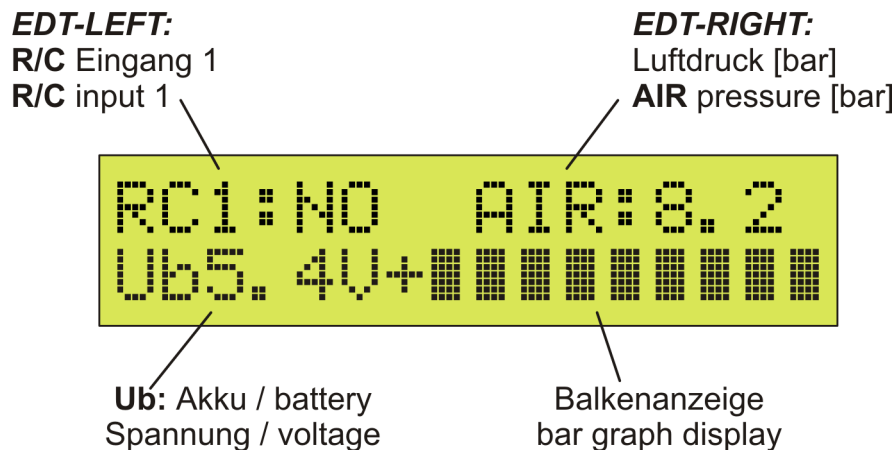
EDT-LEFT and *EDT-RIGHT* are configurable function displays for operating parameters. In the BOX-SETUP menu, you can choose what should be displayed in the *LEFT* and *RIGHT* areas.

In the BOX-SETUP menu under 12:EDT→LEFT and 13:EDT→RIGHT, you can choose either to display one of the R/C ports (RC1 to RC5) or an air pressure value [bar or psi].

In the lower line of the display, the voltage of the receiver system is shown as a bar graph that also has a memory function for the minimum value (voltage under load). The measurement range can be adapted to the battery type used in the BOX-SETUP menu under 10:R/C-BATTERY.

JETRONIC-BOX – Firmware Setup

SETUP Menu

To activate the SETUP menu for changing the firmware configuration, first press the SET key, then use the Up/Down keys to switch between the available items.

```
RC1:NO   AIR:8.2
Ub5.4V+▓▓▓▓▓▓▓▓▓
```

```
1:BOX-SETUP
   >>>
```

```
2:RC-CONTROL
   >>>
```

```
3:RC3-CONTROL
   >>>
```

```
4:RC4-CONTROL
   >>>
```

```
5:RC5-CONTROL
   >>>
```

```
6:TEST-DEVICES
   >>>
```
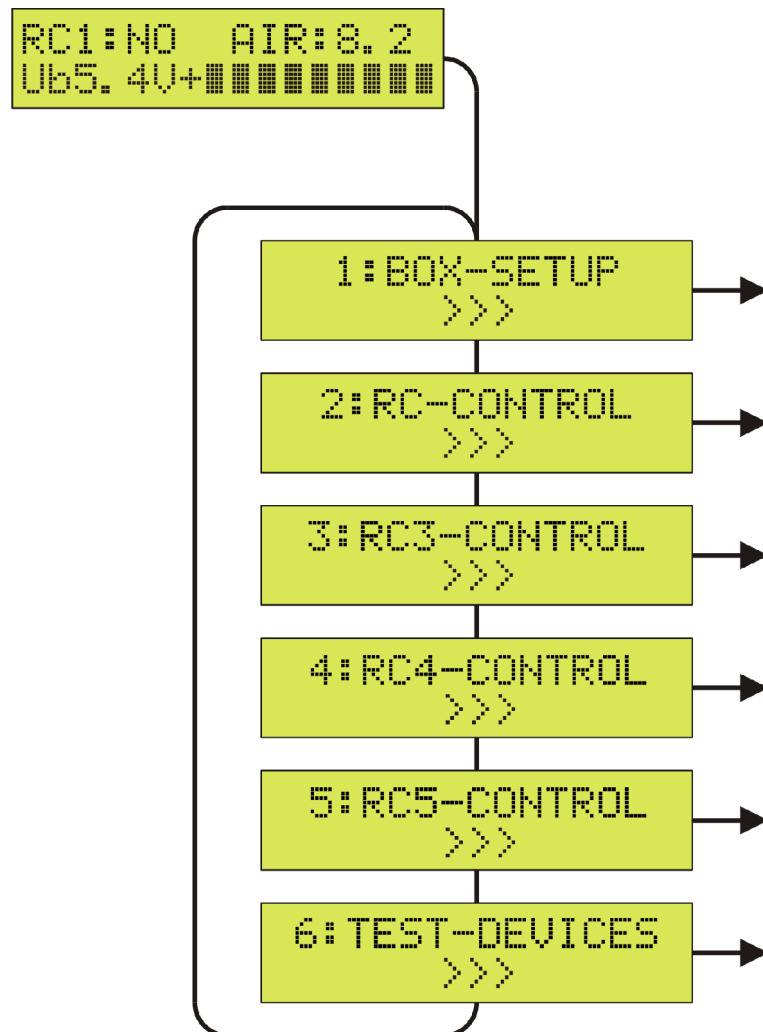
To leave the SETUP menu and to return to the BOX status display, press the SET key for more than 2 seconds (ESC). In the following, the individual submenus of the SETUP menu are described.

1:BOX-SETUP Menu

To activate the 1:BOX-SETUP menu, first press the SET key, then use the Up/Down keys to switch between the available items.

```
1:BOX-SETUP
    >>>
```

```
10:R/C-BATTERY
  Ni4(4.8V)
```

```
11:INFO-LED
    RC1
```

```
12:EDT→LEFT
    RC1
```

```
13:EDT→RIGHT
   AIR[bar]
```

```
14:AIR-FAIL
5.0bar=73psi
```

```
15:AIR-NOMINAL
8.0bar=116psi
```

```
16:RESET-ALL
     NO
```
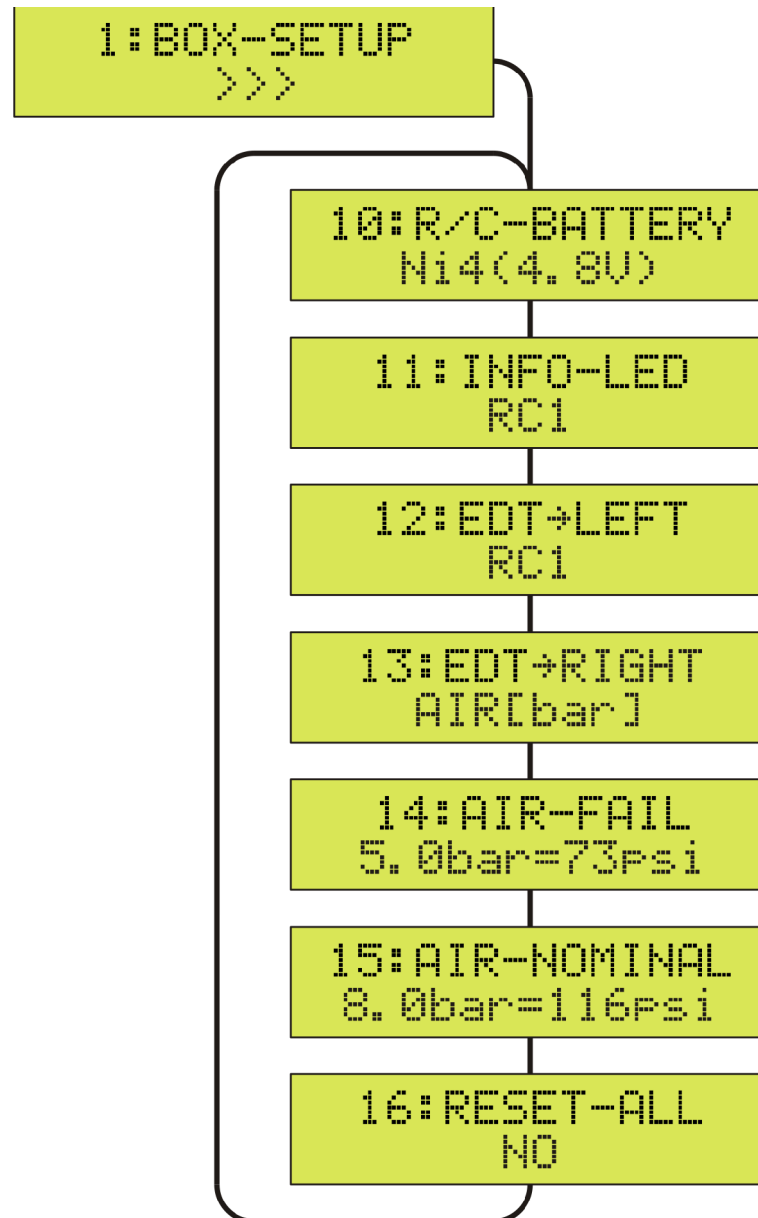
To leave the 1:BOX-SETUP menu and to return to the SETUP menu, press the SET key for more than 2 seconds (ESC).

Pressing the SET key for more than 2 seconds again will return you to the operating status display (>>> changes to <<<, ESC).

1:BOX-SETUP – Basic Settings for the Box

`10:R/C-BATTERY`

Specifies the type of battery used (required for a correct voltage display).
Ni = NiCd or NiMh, Li = lithium ion
Default setting: **Ni4 (4.8V)**

`11:INFO-LED`

Specifies the display function for the info LED on the top side of the device.
OFF: No info LED function
RC1: Status of the RC1 remote control input: ON / OFF / NO signal => LED flashes.
RC2: Status of the RC2 remote control input: ON / OFF / NO signal => LED flashes.
    Or display of the position switches if 20:RC2-MODE is set to POS.-SWITCH.

AIR: Air pressure display via modulated flashing of the LED between 14:AIR-FAIL (LED => OFF)
    and 15:AIR-NOMINAL (LED => ON).

ON: Info LED always on
Default setting: **RC1**

`12:EDT→LEFT`
`13:EDT→RIGHT`

Selects the display function for the left or right display area on the EDT.
RC1: Remote control input RC1 – range: ON / OFF / NO
    A **!** marks the signal as FAIL signal, controlled by 14:AIR-FAIL and 24:@AIR-FAIL.
    A ***** marks the signal as preset-defined, configured by 21:RC1-PRESET.

RC2: Remote control input RC2 – range: ON / OFF / NO
    A **!** marks the signal as FAIL signal, controlled by 14:AIR-FAIL and 24:@AIR-FAIL.
    A ***** marks the signal as preset-defined, configured by 23:RC2-PRESET.

AIR[bar]: Air pressure display in bar (kg/cm^2) – range: 0.0 – 10.0 bar
    A **!** marks the signal as FAIL signal, i.e. pressure dopped below 14:AIR-FAIL.

AIR[psi]: Air pressure display in psi (lb/inch^2) – range: 0 – 145 psi
    A **!** marks the signal as FAIL signal, i.e. pressure dopped below 14:AIR-FAIL.

RC3/4/5: Output RC3/4/5 as servo travel in % – range: ±150 %
Default setting: **RC1 und AIR[bar]**

`14:AIR-FAIL`

Specifies the minimum air pressure for the LED display (11:INFO-LED) as well as the safety
setting (24:@AIR-FAIL).
This parameter should be set to the minimum pressure value where the landing gear is still able to
extend **and** lock safely.
Range: 0.0 bar – 15:AIR-NOMINAL
Default setting: **5.0 bar**

15:AIR-NOMINAL

Specifies the nominal air pressure for the LED display (11:INFO-LED).
This parameter should be set to the pressure value nominally required for the model to take off.
Range: 14:AIR-FAIL – 10 bar
Default setting: **8.0 bar**
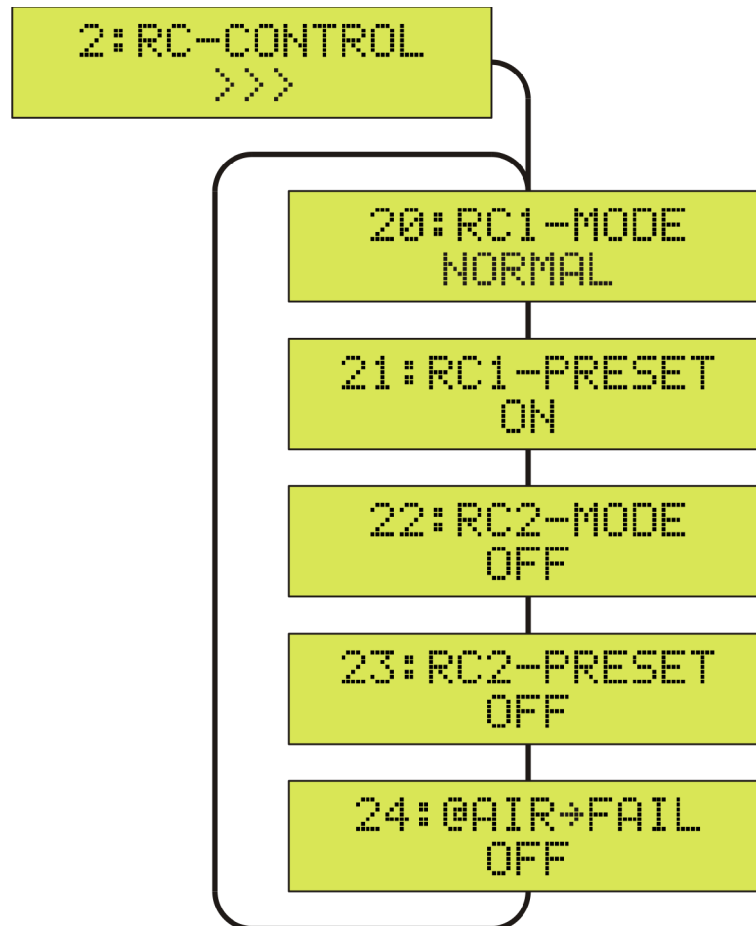

16:RESET-ALL

Resets all JETRONIC-BOX settings to their default values.
The RESET must be confirmed with the SET key.
Default setting: **NO**

2:RC-CONTROL Menu

To activate the 2:RC-CONTROL menu, first press the SET key, then use the Up/Down keys to switch between the available items.

```
        2:RC-CONTROL
            >>>


            20:RC1-MODE
               NORMAL

            21:RC1-PRESET
                ON

            22:RC2-MODE
                OFF

            23:RC2-PRESET
                OFF

            24:@AIR→FAIL
                OFF
```

To leave the 2:RC2-CONTROL menu and to return to the SETUP menu, press the SET key for more than 2 seconds (ESC).

Pressing the SET key for more than 2 seconds again will return you to the operating status display (>>> changes to <<< , ESC).

2:RC-CONTROL – Settings for the Inputs RC1 and RC2

20:RC1-MODE
Specifies the input function for the remote control input RC1.

NORMAL: Standard remote control input, ON $\geq$ 1.65 ms, OFF $\leq$ 1.25 ms
REVERSE: Inverted remote control input, OFF $\geq$ 1.65 ms, ON $\leq$ 1.25 ms
Default setting: **NORMAL**

21:RC1-PRESET
Specifies the power-on setting for the remote control input RC1.
Use this to avoid accidental retraction of the landing gear when turning on the receiver or transmitter. On the display, this is indicated by a * at the RC1 status.

ON: The remote control signal / the switch must first be set to ON.
OFF: The remote control signal / the switch must first be set to OFF.

Default setting: **ON**

22:RC2-MODE
Specifies the input function for the remote control input RC2.

OFF: Remote control input RC2 disabled
NORMAL: Standard remote control input, ON $\geq$ 1.65 ms, OFF $\leq$ 1.25 ms
REVERSE: Inverted remote control input, OFF $\geq$ 1.65 ms, ON $\leq$ 1.25 ms
POS.-SWITCH: Position switch input for the position "gear retracted" active
ANALOG-IN: Measurement of a voltage between 0 and 2.5 V (additional function)

The two outermost pins (-) and (pulse) are used.

Default setting: **OFF**

23:RC2-PRESET
Specifies the power-on setting for the remote control input RC2.
Use this to avoid accidental retraction of the landing gear when turning on the receiver or transmitter. On the display, this is indicated by a * at the RC2 status.

ON: The remote control signal / the switch must first be set to ON.
OFF: The remote control signal / the switch must first be set to OFF.

Default setting: **OFF**

`24:@AIR→FAIL`

Specifies the failsafe function that is activated when the air pressure falls below the minimum value specified with 14:AIR-FAIL.

Typically, the failsafe function activates an ON signal at RC1 (=> extend gear). On the display, this is indicated by a -**!** at the RC1 or RC2 status.

OFF: No air pressure failsafe function

OFF→RC1: Input RC1 is switched to OFF.

ON→RC1: Input RC1 is switched to ON.
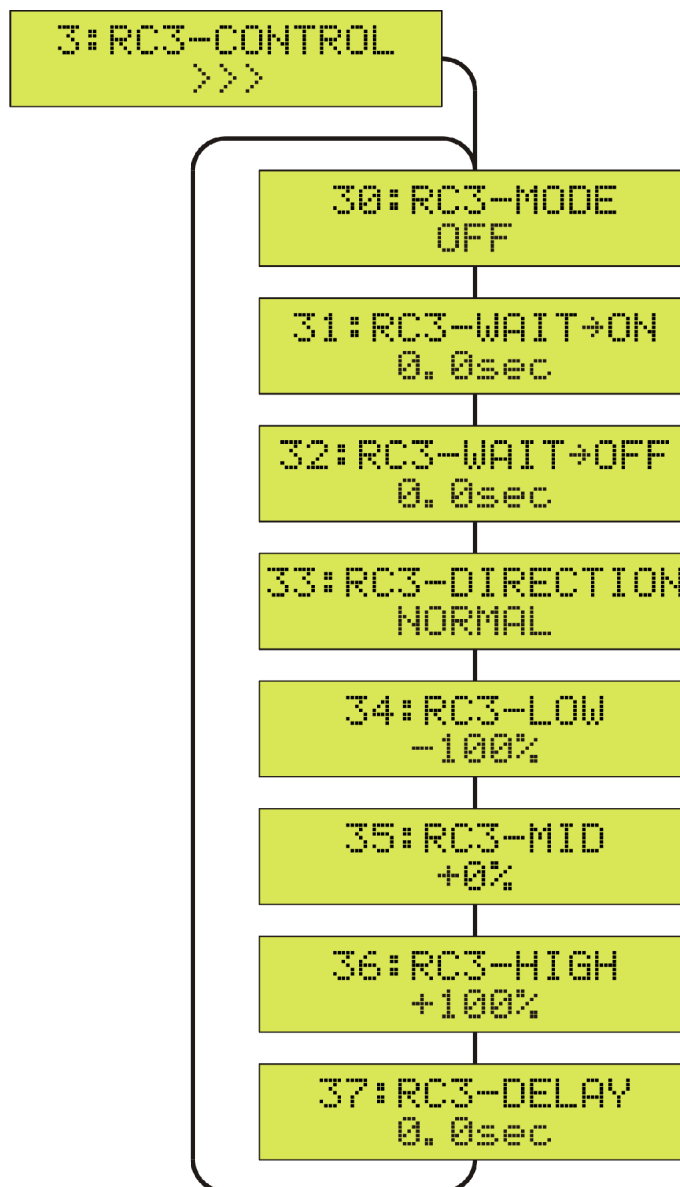
OFF→RC2: Input RC2 is switched to OFF.

ON→RC2: Input RC2 is switched to ON.

Default setting: **OFF**

3/4/5: RC-3/4/5-CONTROL Menu

To activate the 3/4/5:RC3/4/5-CONTROL menu, first press the SET key, then use the Up/Down keys to switch between the available parameters.

To change a parameter, first press the SET key, then use the Up/Down keys to switch between the available values. A **?** marks the value to be set. Pressing the SET key finishes the procedure and saves the new value.

```
          3:RC3-CONTROL
              >>>

              30:RC3-MODE
                 OFF

              31:RC3-WAIT→ON
                 0.0sec

              32:RC3-WAIT→OFF
                 0.0sec

              33:RC3-DIRECTION
                 NORMAL

              34:RC3-LOW
                 -100%

              35:RC3-MID
                 +0%

              36:RC3-HIGH
                 +100%

              37:RC3-DELAY
                 0.0sec
```

To leave the 3:RC3/4/5-CONTROL menu and to return to the SETUP menu, press the SET key for more than 2 seconds (ESC).

Pressing the SET key for more than 2 seconds again will return you to the operating status display (>>> changes to <<< , ESC).

3/4/5:RC3/4/5-CONTROL – Settings for the Outputs RC3, RC4 and RC5

`30:RC3-MODE`

Specifies the basic function for the remote control output RC3.

OFF: The output is switched off and disabled.

RC1-DIRECT   for gears and doors that remain open (bistable function)
The remote control signal OFF/ON at the RC1 input switches the output
between the positions 34:RC3-LOW and 36:RC3-HIGH.

RC1-TRIGGER   for doors that close again automatically (monostable function)
An OFF→ON change of the remote control signal at the RC1 input switches the
output to the position 36:RC3-HIGH for the times specified with 31:RC3-WAIT-ON
(RC1=ON).
An ON→OFF change of the remote control signal at the RC1 input switches the
output to the position 36:RC3-HIGH for the times specified with 32:RC3-WAIT-
OFF (RC1=OFF).
After this time, the output returns to the position 34:RC3-LOW.

RC1-DIR.&POS. works like RC1-DIRECT, but is logical AND'ed with the retracts position-switch.
To this 20:RC2-MODE must be set to POS.-SWITCH.

RC1-TRIG.&POS. works like RC1-TRIGGER, but is logical AND'ed with the retracts position-
switch. To this 20:RC2-MODE must be set to POS.-SWITCH.

RC1-PROP: The output follows the remote control signal at the RC1 input proportional.

Default setting: **OFF**

`31:RC3-WAIT→ON`

Specifies the ON delay.
Range: 0 – 20 seconds
Default setting: **0.0 sec**

`32:RC3-WAIT→OFF`

Specifies the OFF delay.
Range: 0 – 20 seconds
Default setting: **0.0 sec**

`33:RC3-DIRECTION`

Specifies the direction of rotation: NORMAL or REVERSE.
Default setting: **NORMAL**

`34:RC3-LOW`

Specifies the lower end position (LOW).
Range: +-150 %
Default setting: **-100 %**

`35:RC3-MID`

Specifies the middle position (MID)
Range: +-150 %
Default setting: **+0 %**

`36:RC3-HIGH`

Specifies the upper end position (HIGH).
Range: +-150 %
Default setting: **+100 %**

`37:RC3-DELAY`

Additional rotation delay between the positions 34:RC3-LOW and 36:RC3-HIGH
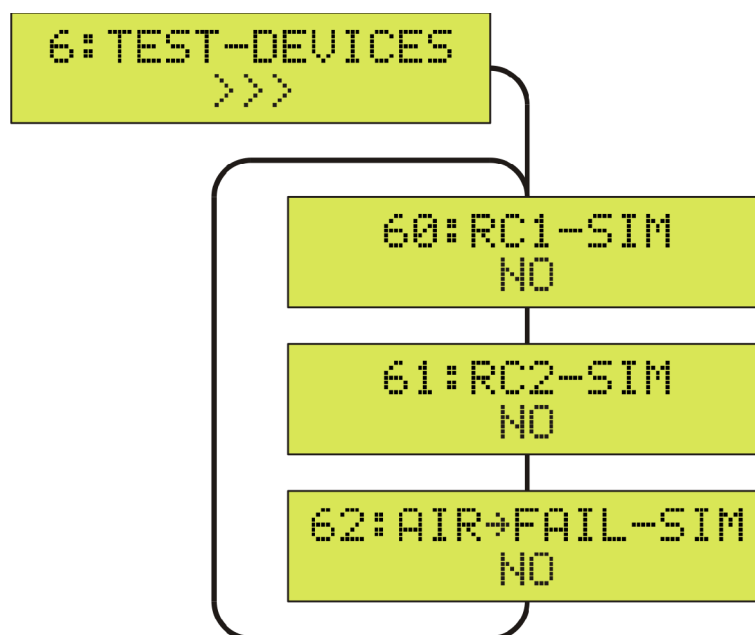Range: 0 – 20 seconds
Default setting: **0.0 sec**

These settings can be applied in the same way to the outputs RC4 and RC5.

6:TEST-DEVICES Menu

To activate the 6:TEST-DEVICES menu, first press the SET key, then use the Up/Down keys to switch between the available test functions.

To activate a test function, first press the SET key, then use the Up/Down keys to test the respective system setting. A **?** marks the setting to be applied. Press the SET key again to finish a test.

```
┌─────────────────────┐
│  6:TEST-DEVICES     │
│        >>>          │
└─────────────────────┘

     ┌─────────────────────┐
     │   60:RC1-SIM        │
     │        NO           │
     └─────────────────────┘

     ┌─────────────────────┐
     │   61:RC2-SIM        │
     │        NO           │
     └─────────────────────┘

     ┌─────────────────────┐
     │  62:AIR-FAIL-SIM    │
     │        NO           │
     └─────────────────────┘
```

To leave the 6:TEST-DEVICES menu and to return to the SETUP menu, press the SET key for more than 2 seconds (ESC).

Pressing the SET key for more than 2 seconds again will return you to the operating status display (>>> changes to <<< , ESC).

6:TEST-DEVICES – Testing the System Settings without Remote Control

60:RC1-SIM
Simulates an ON/OFF signal at the RC1 input, as if you would use the switch on the transmitter.
Range: ON (high) / OFF (low)
Default setting: value of 21:RC1-PRESET

61:RC2-SIM
Simulates an ON/OFF signal at the RC2 input, as if you would use the switch on the transmitter.
Range: ON (high) / OFF (low)
Default setting: value of 23:RC2-PRESET

62:AIR-FAIL→SIM
Simulates a pressure loss at the air connector, as if the air pressure would drop below the value 14:AIR-FAIL (BOX-SETUP).
Range: NOMINAL / FAIL
Default setting: NOMINAL

Example Settings: "Door Sequencer"

Landing Gear with Door Control

Door 1 remains open and closes after a delay of 8 seconds (gear retracted).

Door 2 closes automatically after a delay of 5 seconds (gear extended) or after a delay of 8 seconds (gear retracted).

RC1 input: gear switch ON – extended / OFF – retracted

```
20:RC1-MODE:      NORMAL
21:RC1-PRESET:    ON
```

RC3 output: gear valve or servo

```
30:RC3-MODE:      RC1-DIRECT
31:RC3-WAIT-ON:   0.5 seconds
32:RC3-WAIT-OFF:  0.0 seconds
33:RC3-DIRECTION: any \
34:RC3-LOW:       any |
35:RC3-MID:       any   > depending on the servo or valve
36:RC3-HIGH:      any |
37:RC3-DELAY:     any /
```

RC4 output: door 1, valve or servo

```
40:RC4-MODE:      RC1-DIRECT
41:RC4-WAIT-ON:   0.0 seconds
42:RC4-WAIT-OFF:  8.0 seconds
43:RC4-DIRECTION: any \
44:RC4-LOW:       any  |
45:RC4-MID:       any   > depending on the servo or valve
46:RC4-HIGH:      any  |
47:RC4-DELAY:     any  /
```

RC5 output: door 2, valve or servo

```
50:RC5-MODE:      RC1-TRIGGER
51:RC5-WAIT-ON:   5.0 seconds
52:RC5-WAIT-OFF:  8.0 seconds
53:RC5-DIRECTION: any \
54:RC5-LOW:       any  |
55:RC5-MID:       any   > depending on the servo or valve
56:RC5-HIGH:      any  |
57:RC5-DELAY:     any  /
```

Notes

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