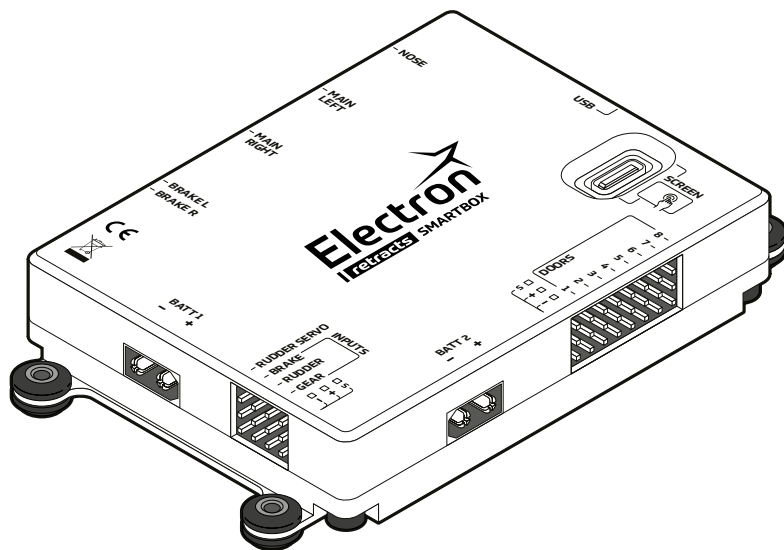




# SmartBox

USER MANUAL AND INSTALLATION INSTRUCTIONS

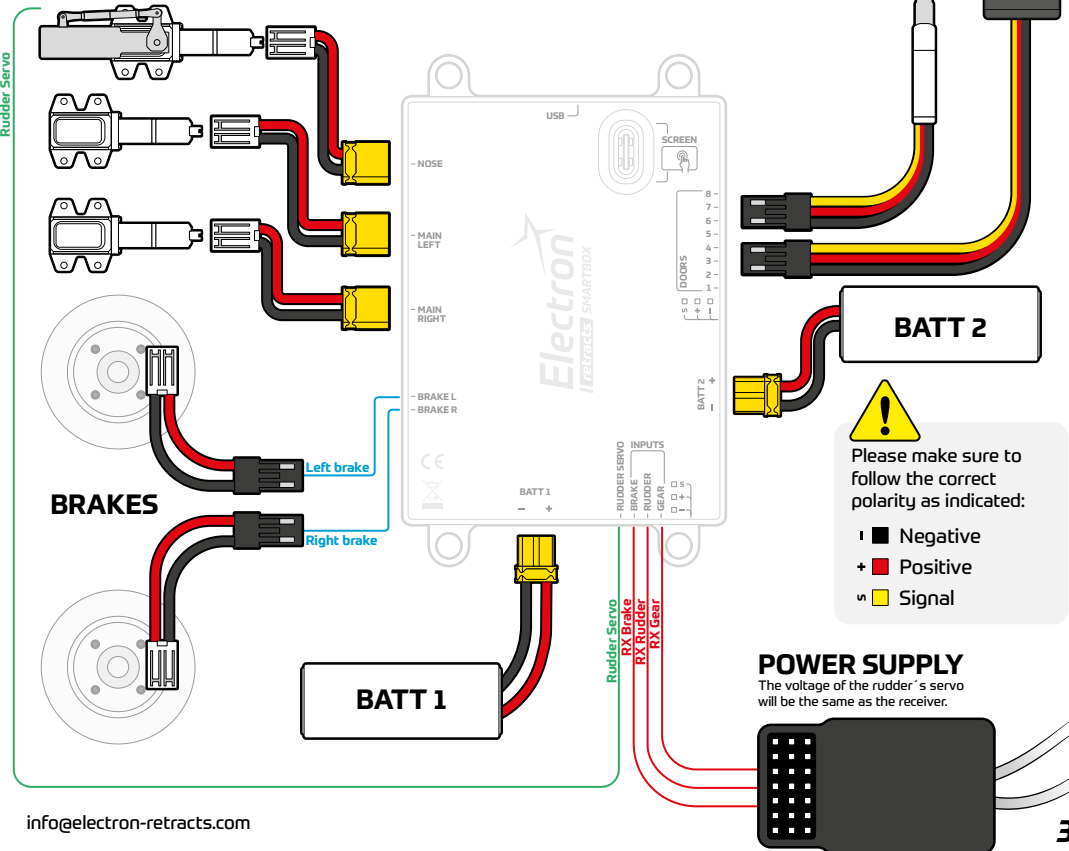
# CONTENTS

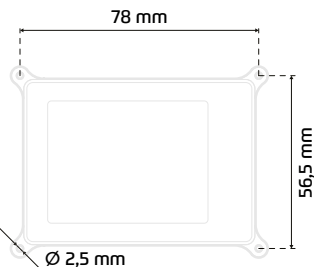
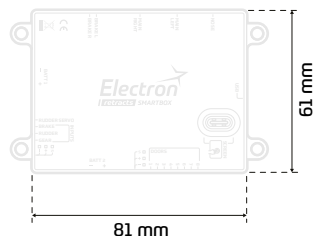
|                                                   | PAGE |
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# CONNECTION DIAGRAM

## RETRACTS





|                                    |                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Weight                             | 80 g                                                                                                                                                                                                                                                                                                                                                  |
| Weight with screen                 | 155 g                                                                                                                                                                                                                                                                                                                                                 |
| Dimensions                         | 81 x 61 x 16,5 mm                                                                                                                                                                                                                                                                                                                                     |
| Screen dimensions                  | 78 x 56,5 x 12,4 mm                                                                                                                                                                                                                                                                                                                                   |
| Input Voltage (Batt 1)             | Check the voltage required for your retract                                                                                                                                                                                                                                                                                                           |
| Input Voltage (Batt 2)             | Up to 13 V                                                                                                                                                                                                                                                                                                                                            |
| Inputs                             | <ul style="list-style-type: none"> <li>• GEAR signal input (PWM)</li> <li>• BRAKE signal input (PWM)</li> <li>• STEERING signal input (PWM)</li> <li>• 2x Battery Input (XT-30 male socket)</li> </ul>                                                                                                                                                |
| Outputs                            | <ul style="list-style-type: none"> <li>• USB-C port (for PC connection)</li> <li>• 3x Retract outputs (XT-30 female socket)</li> <li>• 2x Brake outputs (JR-servo female socket)</li> <li>• 1x Steering Servo output (JR- servo female socket)</li> <li>• 8x Door outputs (JR-servo female socket)</li> <li>• Screen output (USB-C socket)</li> </ul> |
| Max. current per retract output    | 7 A (Peak: 10 A)                                                                                                                                                                                                                                                                                                                                      |
| Max. current per brake output      | 6 A                                                                                                                                                                                                                                                                                                                                                   |
| Max. current per door output       | 5 A                                                                                                                                                                                                                                                                                                                                                   |
| Steering Servo max. current output | 6 A                                                                                                                                                                                                                                                                                                                                                   |
| Temperature range                  | -10°C to +85°C                                                                                                                                                                                                                                                                                                                                        |

We highly encourage to check the manual provided with your landing gear, which contains first use warnings and a connection diagram, before you begin to install your landing gear and use the SmartBox.

## ORIENTATION AND PLACEMENT

The SmartBox has to be installed on a flat surface parallel to the ground, however it doesn't require to be oriented in any specific way.

We recommend installing the SmartBox in a location that allows for the shortest possible connections with the retracts and brakes. The connection wires can be as long as required, however if you use extension wires, use wires of at least the same gauge/section as the ones provided with your landing gear, to avoid voltage drops. The less length and amount of wiring used, the better.

## REGARDING WING CONNECTORS AND WIRES

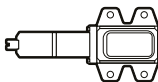
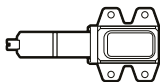
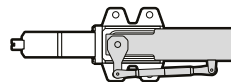
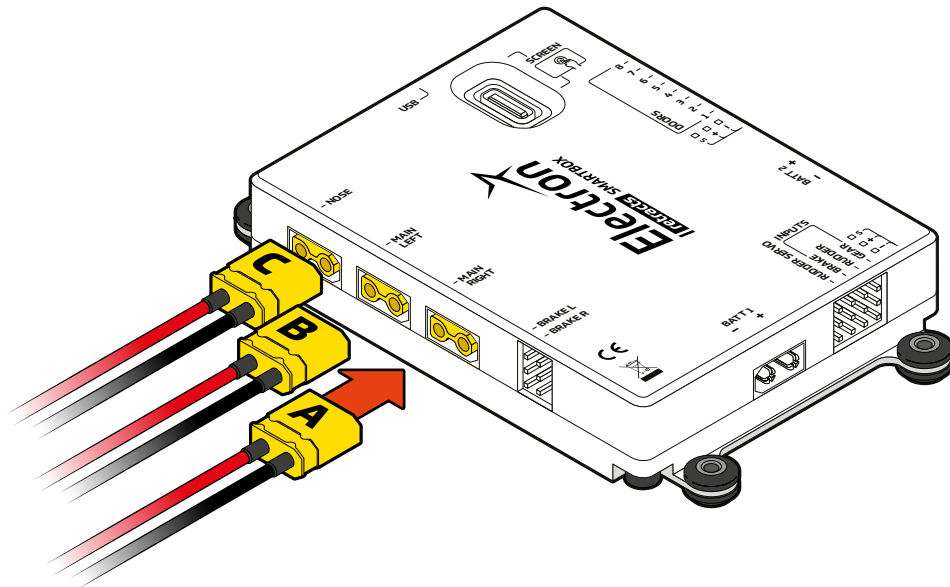
**Do not share/join wires from retracts and/or brakes.** For our retract systems to work correctly, each retract and each brake must have their own individual and isolated positive and negative cables. For instance, this means the negative lead for the Left Gear and the Left Brake, can't be shared/joined together.

**Check you wing connectors.** Some multi-pin wing connectors will internally join multiple pins, effectively joining all negatives, for example. Please check the point above, and make sure your wing connectors are not of this type.

**Retracts**
**STEP 1**

Connect the retract wires to the Gear Outputs. There are three gear outputs, indicated on top of the SmartBox as “Nose”, “Main Left” and “Main Right”, and they correspond to the nose/front retract, and the main/wing left and right retracts, respectively.

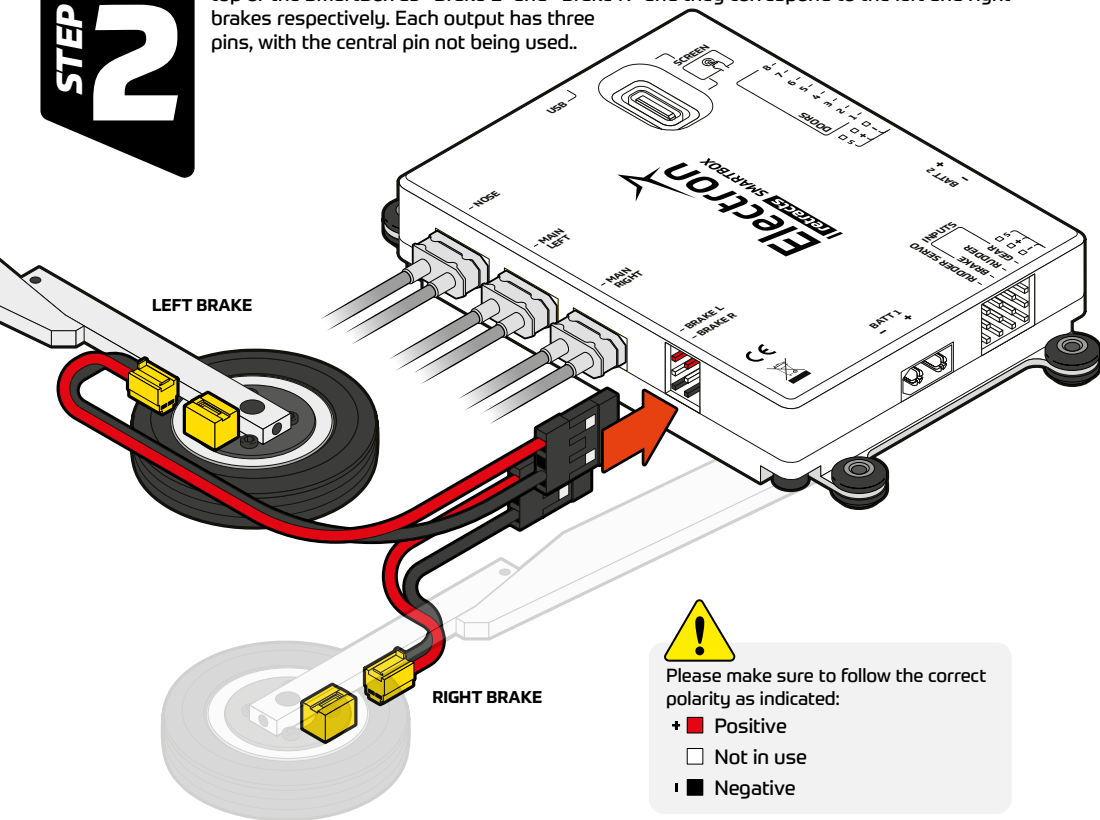
Since the landing gear sets and the SmartBox are provided with wires, you don’t have to worry about the polarity, as the XT-30U connectors have a form factor that prevents incorrect connections.


**A Main right retract**

**B Main left retract**

**C Nose retract**


**Brakes**
**STEP 2**

If your landing gear system doesn't have brakes, you can skip this step.

Connect the brake wires to the Brake Outputs. There are two brake outputs, indicated on top of the SmartBox as "Brake L" and "Brake R" and they correspond to the left and right brakes respectively. Each output has three pins, with the central pin not being used.



Please make sure to follow the correct polarity as indicated:

- + ■ Positive
- Not in use
- ■ Negative

## Steering Servo

# STEP 3

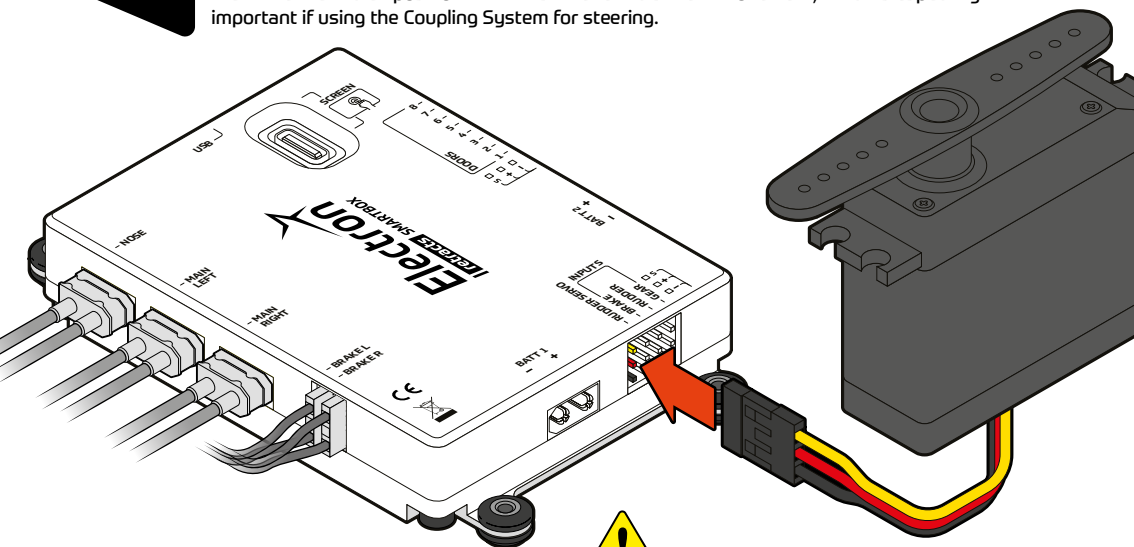
## STEERING SERVO

If your landing gear system doesn't have a steering servo, you can skip this step.

Connect the steering servo wire to the Rudder servo Output.

We highly recommend to operate the steering servo via the SmartBox, as opposed to directly controlling the servo from the receiver. This could cause the servo to move at the wrong time, damaging or blocking the landing gear.

The SmartBox guarantees that the steering servo remains centered and blocked when the retracts are in their retracted position and whilst the retracts are in movement; which is especially important if using the Coupling System for steering.



**NOTE:** The voltage provided by the receiver in the "STEER INPUT" is used to power the steering servo.

# STEP 4

## Input

## INPUT CHANNELS CONNECTION

Connect the radio inputs from your receiver to the SmartBox.

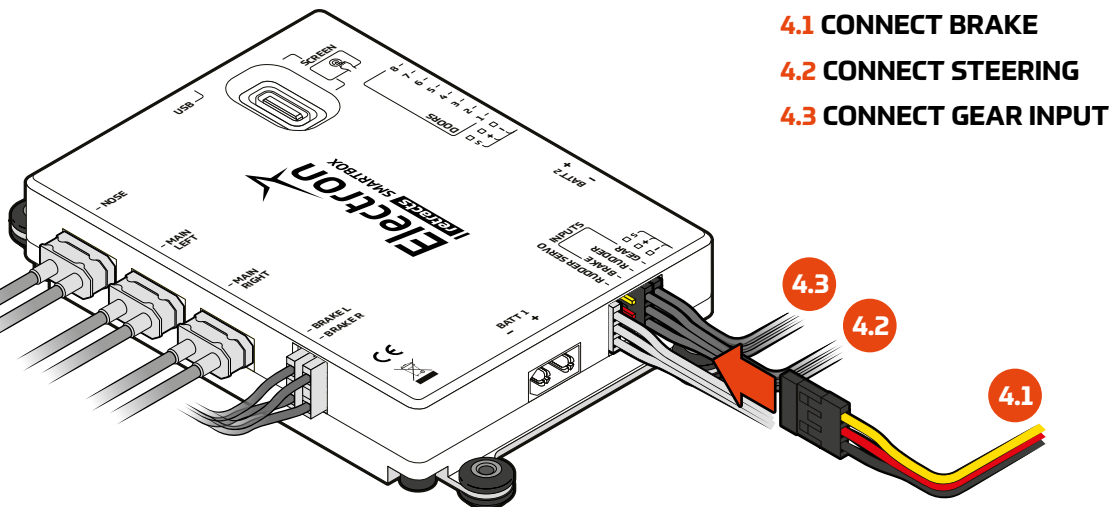
There are three PWM radio inputs. The polarity of these inputs is indicated on top of the SmartBox.

**NOTE:** The voltage provided by the receiver can't be higher than 9 V, and it should be the same for all of signal inputs.



Please make sure to follow the correct polarity as indicated:

- Negative
- Positive
- Signal



**4.1 CONNECT BRAKE**

**4.2 CONNECT STEERING**

**4.3 CONNECT GEAR INPUT**

# Power Supply I

## STEP 5

### BATTERY CONNECTION

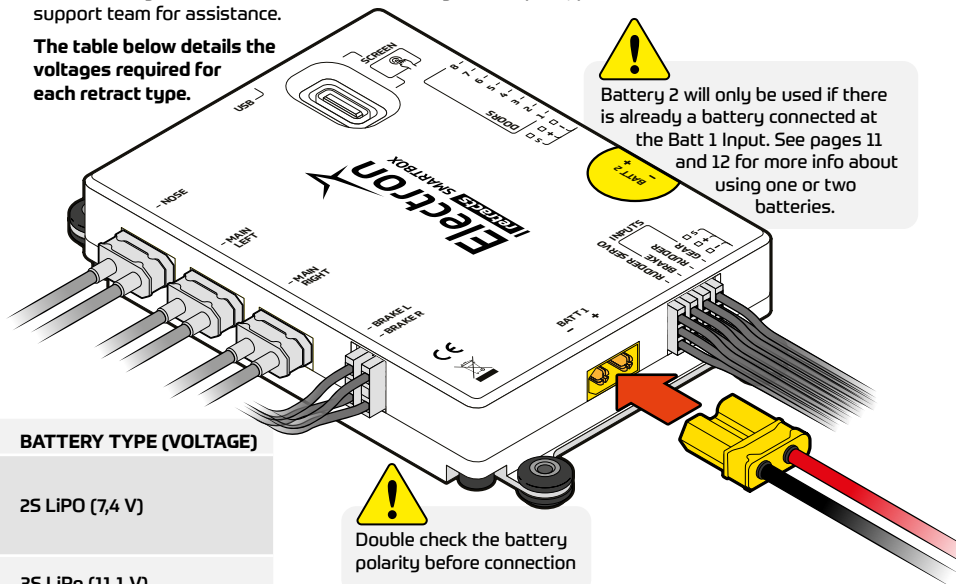
The SmartBox has two battery inputs, both featuring XT-30u male sockets. The XT-30u female connector for the battery is provided with the landing gear set. Make sure to check the polarity of the battery connector when preparing your battery.

In order for the SmartBox to operate, **one battery is always needed at the Batt 1 Input**. The Batt 2 Input, and when and why you might want to use two batteries, will be explained in the next two pages.

The SmartBox itself is powered with the voltage provided by the receiver at the Gear Input. Connecting a battery to Batt 1, will not turn ON the SmartBox.

The battery voltage will be determined by the retract type and version that is to be used with the SmartBox. If you have doubts about what voltage is adequate, please contact the Electron Retracts support team for assistance.

**The table below details the voltages required for each retract type.**



| MODEL         | BATTERY TYPE (VOLTAGE) |
|---------------|------------------------|
| ER-30 Classic | 2S LiPo (7,4 V)        |
| ER-40 Classic |                        |
| ER-50 Classic |                        |
| ER-40 NG      | 3S LiPo (11,1 V)       |
| ER-50 NG      |                        |

**Power  
Supply I**
**STEP  
5**

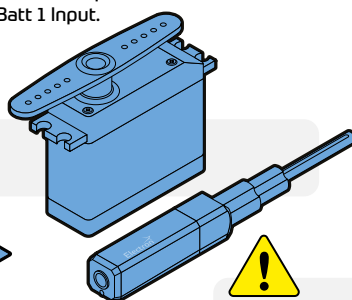
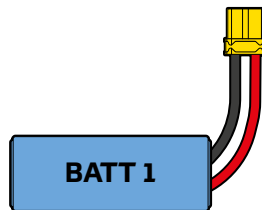
## WORKING WITH A SINGLE BATTERY

At least one battery is required for the SmartBox to properly operate. This battery must be connected at the Batt 1 Input.

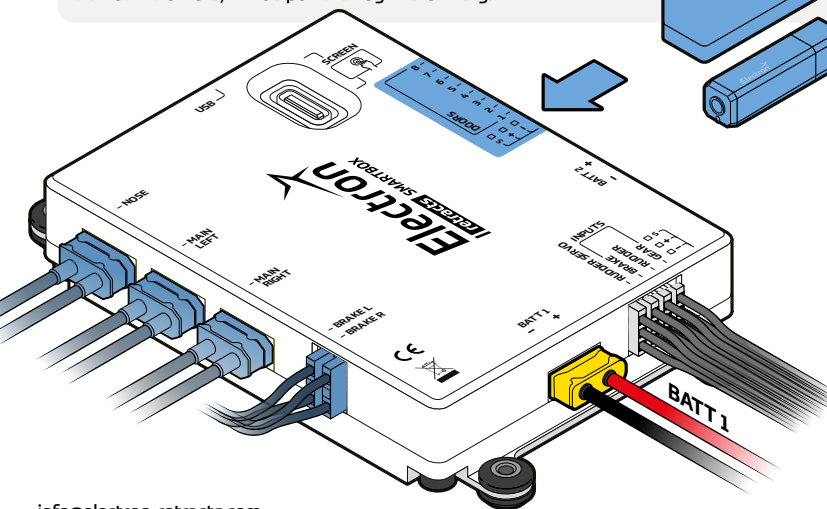
When **only Batt 1 is connected**, all the connected devices (except for the Steering Servo) will draw power from this battery. This includes the retracts, brakes and any servo motors / actuators connected to the Door Outputs.

In case both your retracts and door servos / actuators require the same voltage, you can use just one battery at Batt 1 Input.

When using just the Batt 1 Input, retracts, brakes, and door servos/actuators, will be powered by this battery.



Please make sure to **check the voltage required for your door servos** before you plug them to the SmartBox. With just one battery connected, the door servos/actuators will receive voltage from Batt 1. **Make sure the battery voltage is not harmful for your servos!**



**Power Supply II**
**STEP 5**

## USING TWO BATTERIES. WHEN AND WHY?

The Batt 2 Input can be used in case the door servo motors / actuators of your choice, require a different voltage than your retract units.

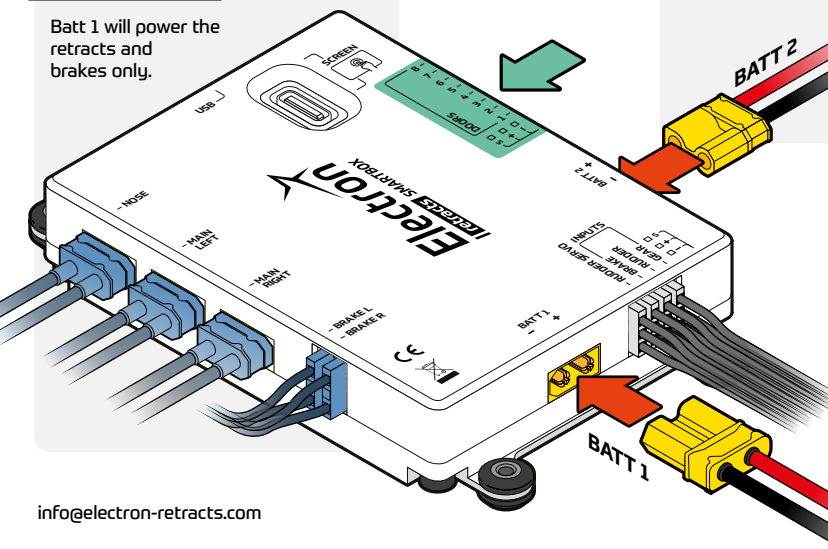
When **two batteries** are connected, the retracts and brakes will draw power from the Batt 1 Input, while the door servos / actuators connected to the Door Outputs, will draw power from the Batt 2 Input.

**BATT 1**

Batt 1 will power the retracts and brakes only.

**BATT 2**

Batt 2 will power the door servos or actuators connected to the Door Outputs.



## Doors

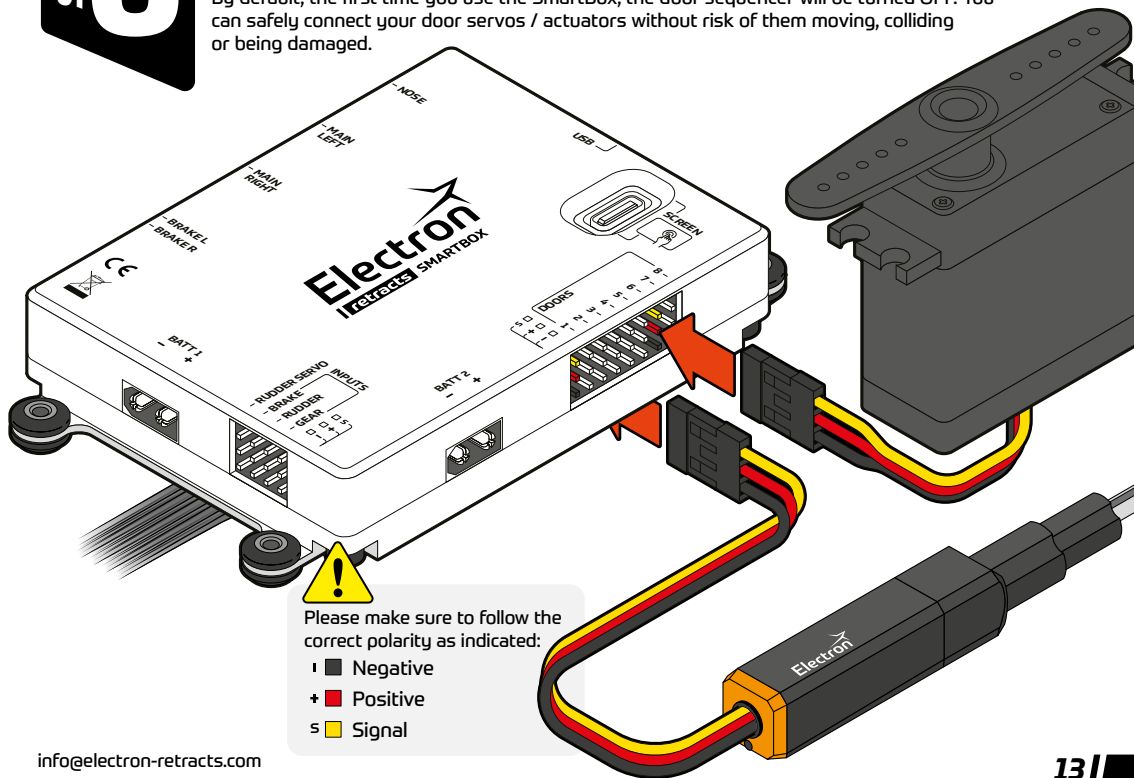
# STEP 6

## CONNECT THE DOOR SERVOS / ACTUATORS

If your landing gear system doesn't have gear doors, you can skip this step.

The SmartBox features up to 8 independent outputs to control servo motors or actuators for the gear doors. You can connect one device per output.

By default, the first time you use the SmartBox, the door sequencer will be turned OFF. You can safely connect your door servos / actuators without risk of them moving, colliding or being damaged.

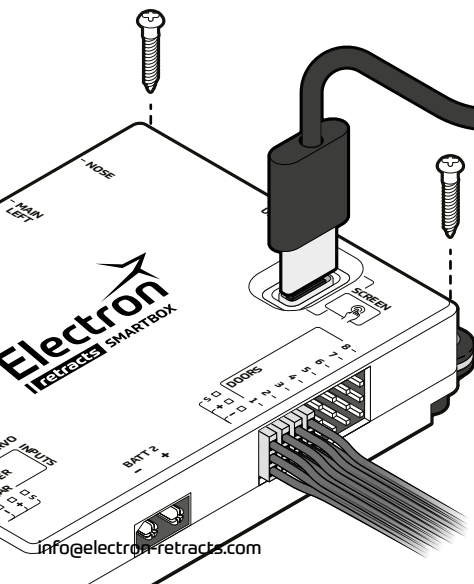


**Doors**  
**STEP 7****CONNECT THE SCREEN**

To program the SmartBox, the touch screen will be needed.

Once configured, **the screen is not necessary for its operation, so it may not be installed on the model.**

Make sure to connect the screen using the provided USB-C cable. Other cables may not work properly.



# CONTROLLER SETUP

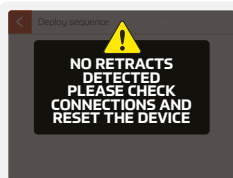
Once all connections have been made, the next step is to set up the SmartBox. The first step will always be the Radio Setup on page 19. **The Radio Setup must be performed at least once for the Smartbox to function properly.**



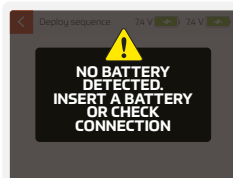
## BEFORE YOU START!

Check the settings of the radio channels used for the landing gear. Make sure the signal range is not limited at all, going from -100% to +100%. Otherwise the Radio Setup process could be unsuccessful.

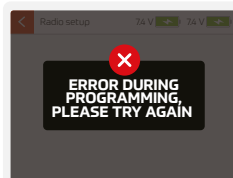
## WARNING AND ERROR MESSAGES



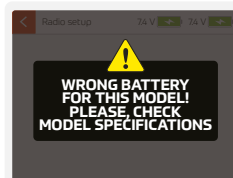
The SmartBox has not detected any retracts on startup. Check the connections and verify the retracts are connected. Then, reset the controller.



Connect an appropriate battery for your retracts on the "Batt 1" input.

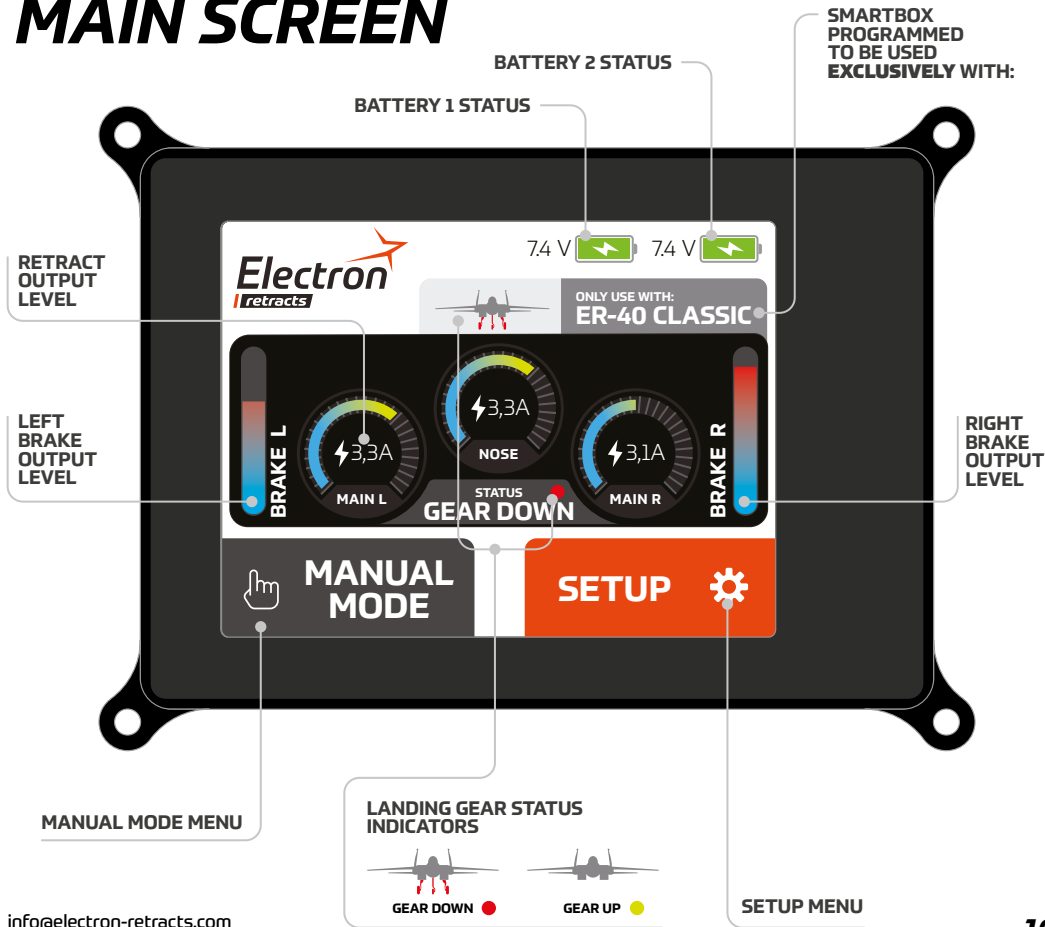


Something went wrong during the programming process. Double check all signals reaching correctly the SmartBox inputs, and verify the signals are not limited and that they have full range.



The voltage of the battery connected does not match the voltage required for the retract type this controller is programmed to work with. Check the manual and verify the battery needed.

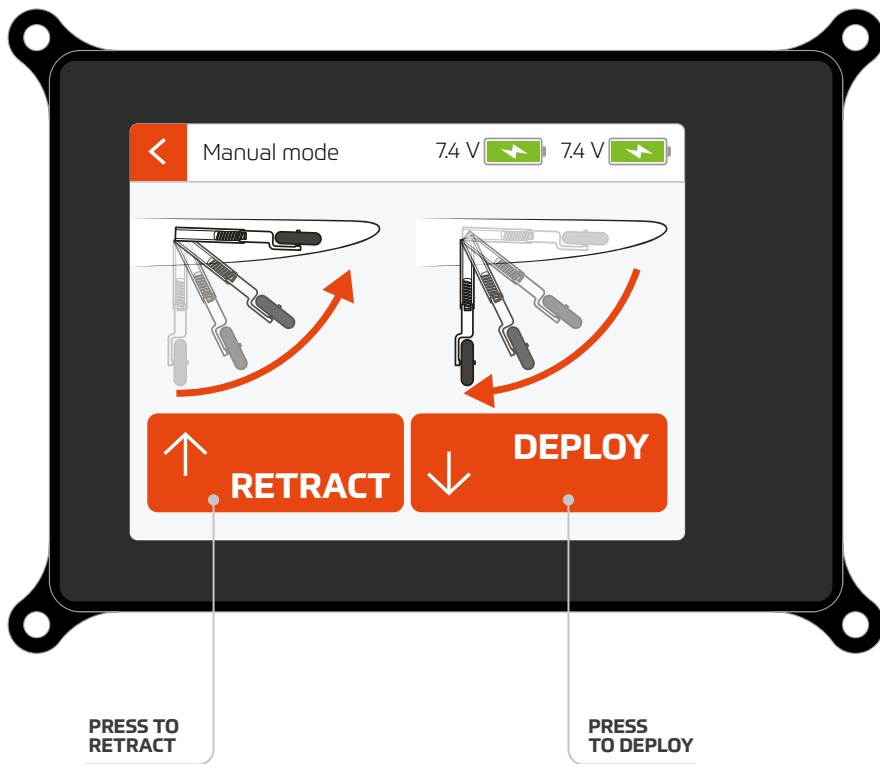
# MAIN SCREEN



## MANUAL MODE

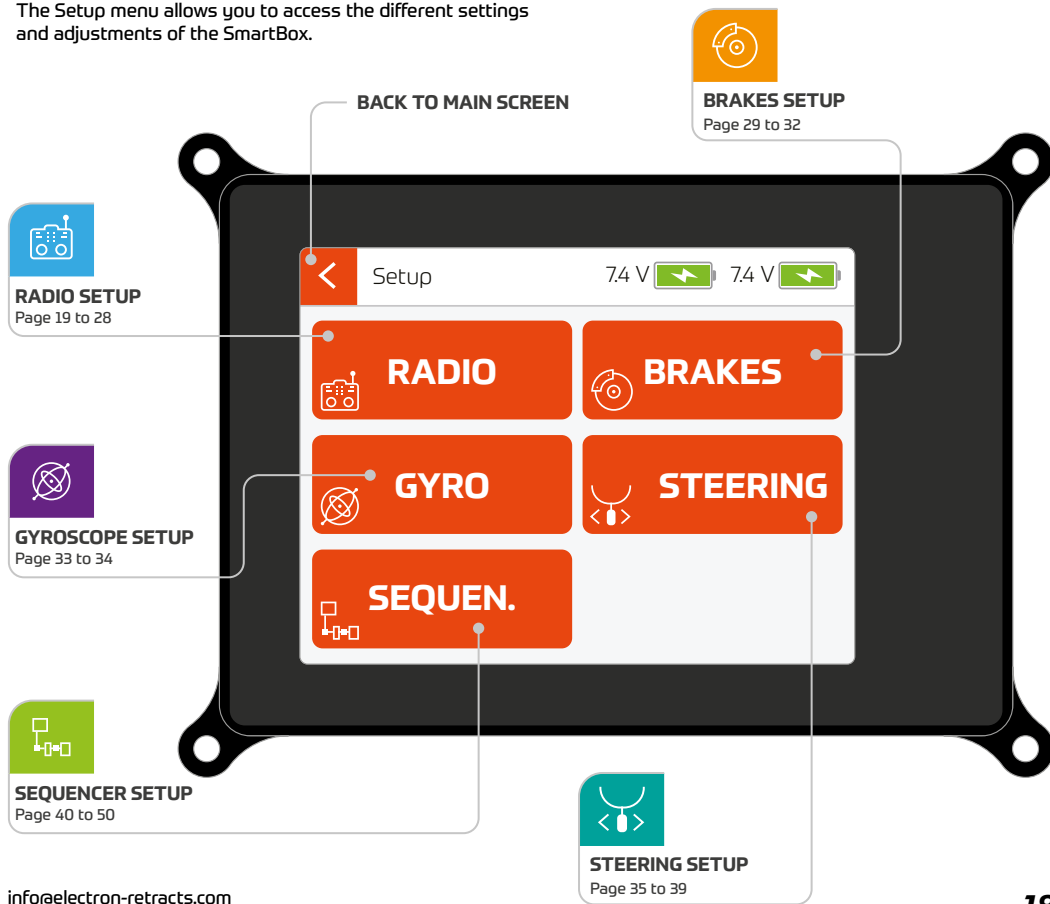
In the Manual Mode menu, you can deploy and retract the landing gear by pressing the corresponding buttons.

If you have already configured the sequencer, when using the Manual mode your sequence will be executed as programmed.



## SETUP MENU

The Setup menu allows you to access the different settings and adjustments of the SmartBox.



Radio setup

7.4 V  7.4 V 

**GEAR**  
INPUT SIGNAL

1000 ms

**BRAKE**  
INPUT SIGNAL

NO SIGNAL

**RUDDER**  
INPUT SIGNAL

1000 ms



RADIO SETUP

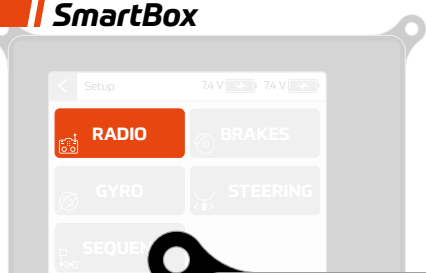


**RADIO SETUP**

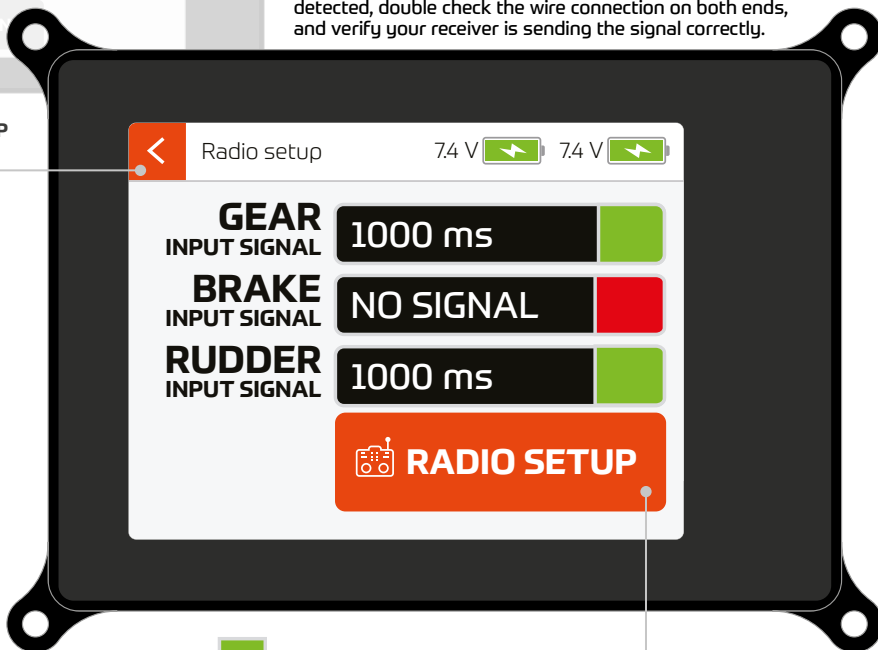
## RADIO SETUP MENU

The Radio menu displays information about the Input signals and their status, and allows you to configure the signals to operate the gear, brakes and the steering servo.

If the signal from any of the inputs is not detected, it will appear in red. In case the input cable is connected to the SmartBox, but the signal is not detected, double check the wire connection on both ends, and verify your receiver is sending the signal correctly.



RETURN  
TO SETUP  
MENU



**SIGNAL DETECTED**



**SIGNAL NOT DETECTED**

PRESS TO  
START RADIO  
SETUP



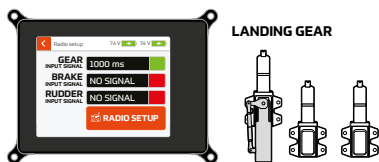
**RADIO SETUP**

# RADIO SETUP WIZARD

The SmartBox features a **setup wizard**, guiding you **step by step** through the **radio setup process** and making it as simple as possible. When performing the Radio Setup, the **SmartBox automatically detects the signal inputs connected**, configuring only those devices that are detected.

In the following pages, we will run through all steps of Radio Setup.

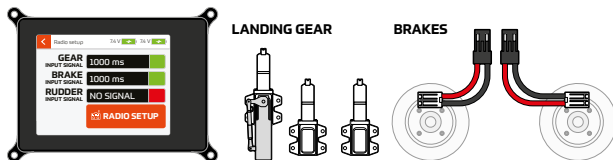
## Landing gear



LANDING GEAR

Pages 22 to 24

## Landing gear + Brakes

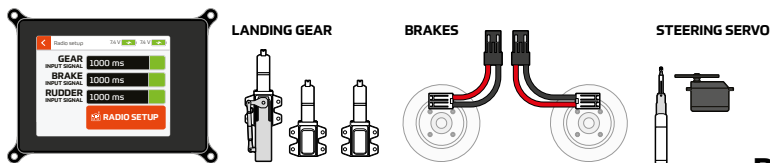


LANDING GEAR

BRAKES

Pages 22 to 26

## Landing gear + Brakes + Steering Servo

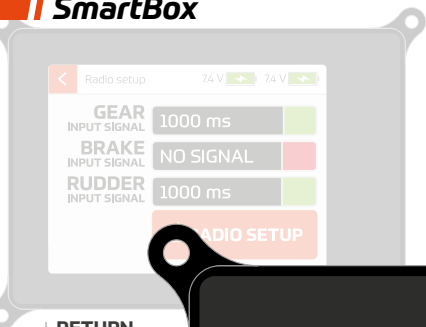


LANDING GEAR

BRAKES

STEERING SERVO

Pages 22 to 27

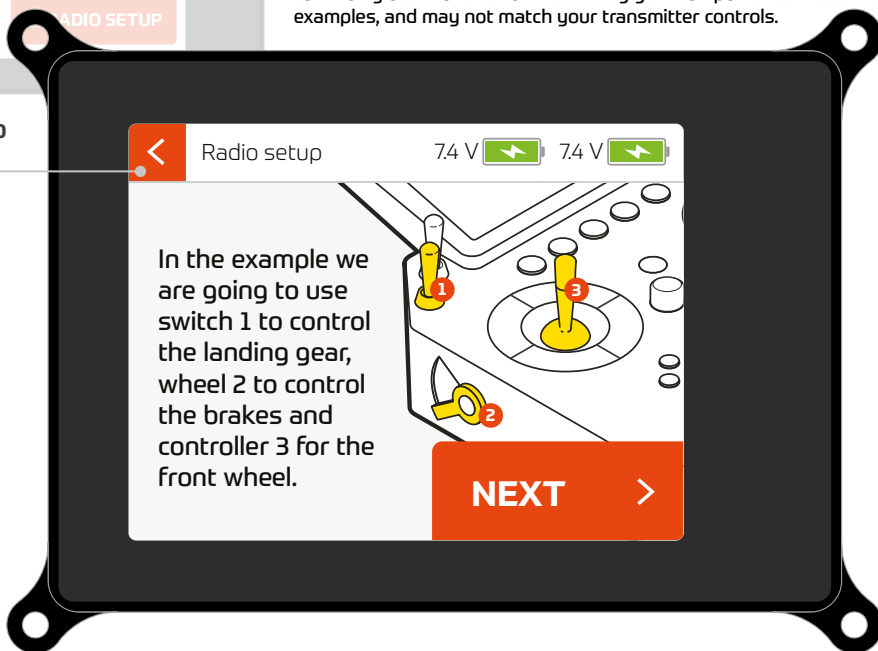


## RADIO SETUP: STEP 1

After pressing the “Radio Setup” button, the SmartBox will display instructions and indications to program the landing gear signals. Follow the instructions indicated by the SmartBox.

The first screen shows an example of a radio transmitter, and the controls commonly used for each of the landing gear components. These are mere examples, and may not match your transmitter controls.

RETURN  
TO RADIO  
MENU



RADIO SETUP

## RADIO SETUP: STEP 2

In this step, we will configure the switch position for the landing gear retraction. Set the switch in the desired position, and press next.

In the example we are going to use switch 1 to control the landing gear, wheel 2 to control the brakes and controller 3 for the front wheel.

NEXT >

RETURN TO  
PREVIOUS  
STEP



Radio setup

74 V



74 V



SET SWITCH POSITION  
FOR LANDING GEAR  
**RETRACTED**, AND  
PRESS **NEXT**

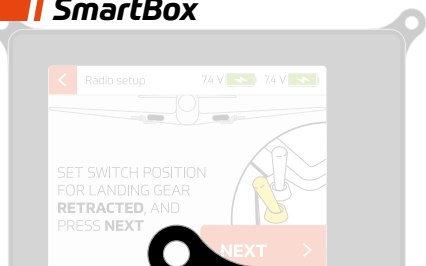
NEXT



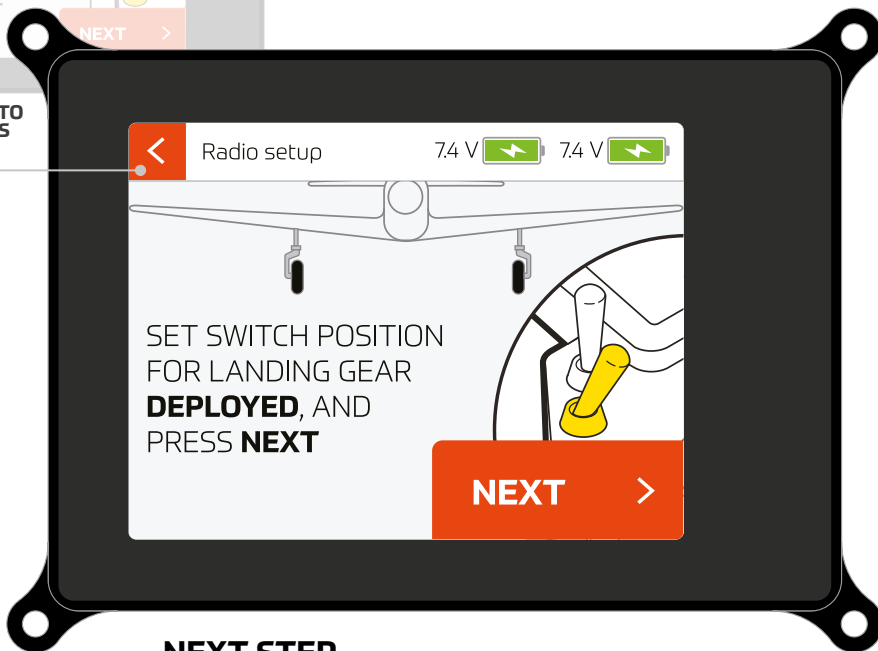
RADIO SETUP

## RADIO SETUP: STEP 3

In this step, we will configure the switch position for the landing gear deployment. Set the switch in the desired position, and press next.



RETURN TO  
PREVIOUS  
STEP

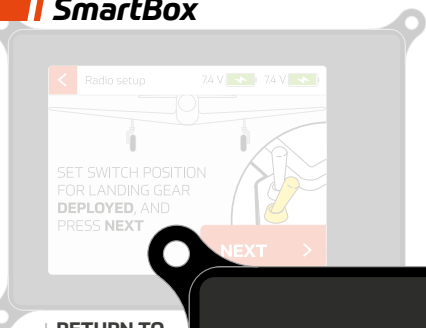


### NEXT STEP

If you only have retracts connected, go to page 28.

If you have brakes as well, continue to next page.

If you don't have brakes, but you have a steering servo, go to page 27.

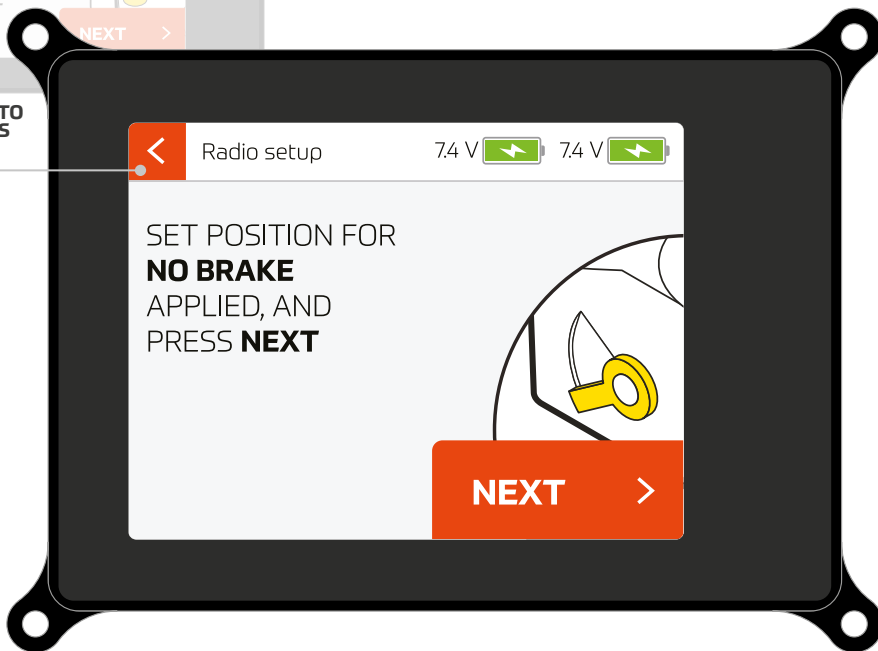


## RADIO SETUP: STEP 4

This step will only appear if the Brake input signal has been detected.

In this step, we will configure the control position for the brakes to be disengaged (0% brake applied). Set the control in the desired position, and press next.

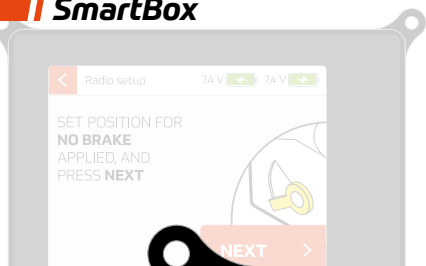
RETURN TO  
PREVIOUS  
STEP



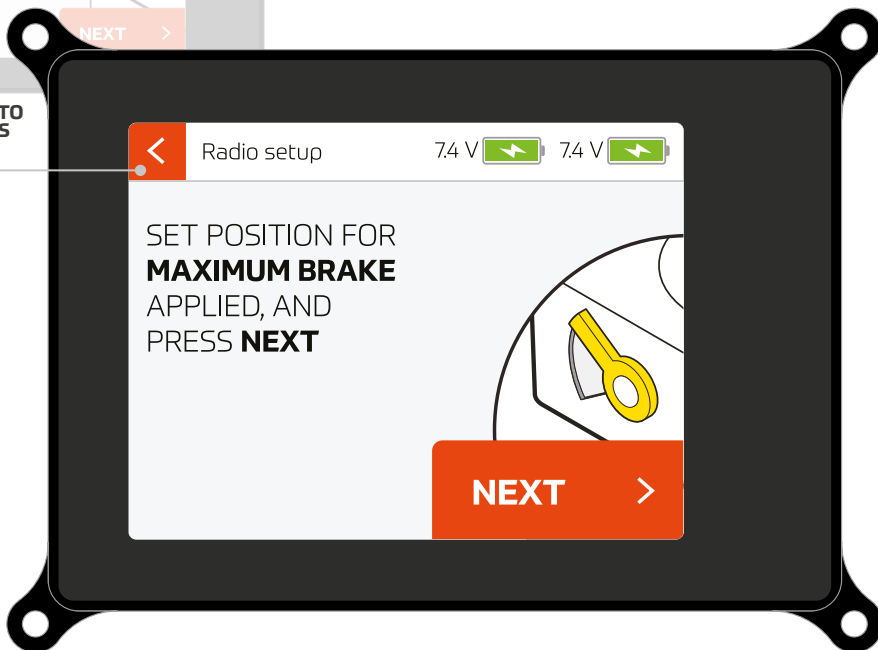
RADIO SETUP

## RADIO SETUP: STEP 5

In this step, we will configure the control position for the brakes to be fully engaged (100% brake applied). Set the control in the desired position, and press next.



RETURN TO  
PREVIOUS  
STEP

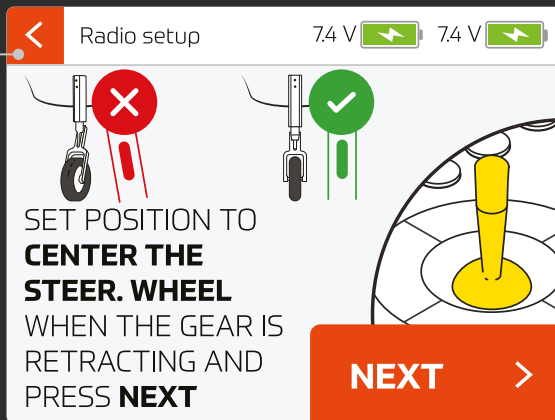


RADIO SETUP

## RADIO SETUP: STEP 6

In this step, using the Rudder stick, we will configure the position the steering servo will move **when the landing gear retracts**. Make sure the front landing gear is well centered. It is extremely important for the center position to be as accurate as possible, specially when using the Coupling System steering. Move the stick to the desired position, and press next.

RETURN TO  
PREVIOUS  
STEP



Later on, you will be able to independently adjust the front landing gear center position **when the landing gear is deployed**. See “Steering Setup” further down the manual.



When toggling the Gear switch to retract the landing gear, the steering servo will move to the position we are now configuring.

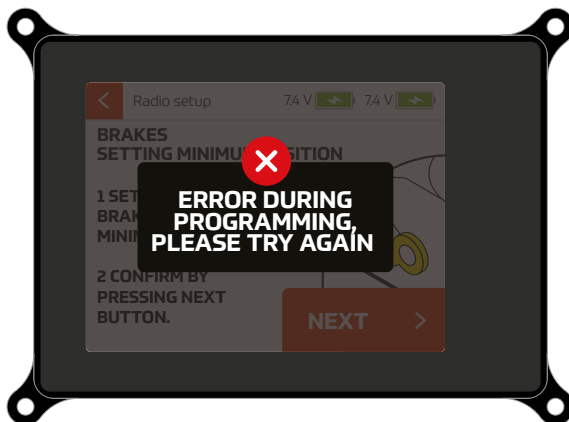
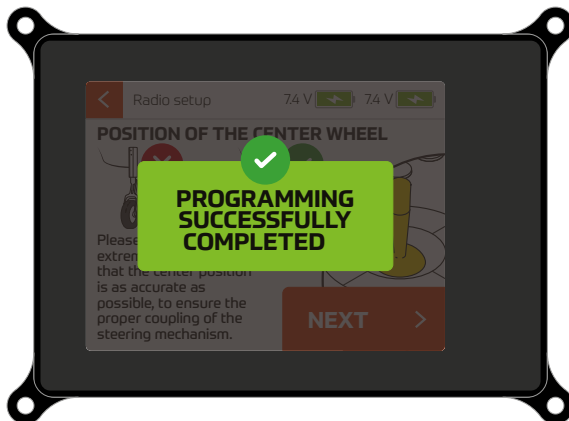
## RADIO SETUP: STEP 7

If the programming has been done correctly, the “Programming successfully completed” message will be displayed.

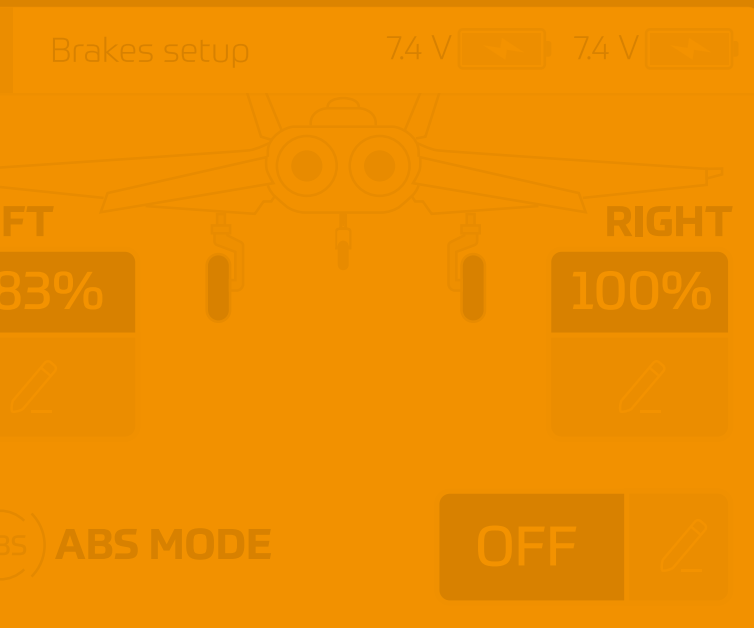
If there has been any issues during the programming, an error message will be displayed.

In the programming fails, double check the signals provided by your receiver, as indicated in page 20. The programming can also fail if the same signal value is used for two commands. For example, if the Gear stick is in the same position for both gear retraction and deployment.

After verifying the signals, Return to the Radio menu, and try to perform the Radio setup once again.



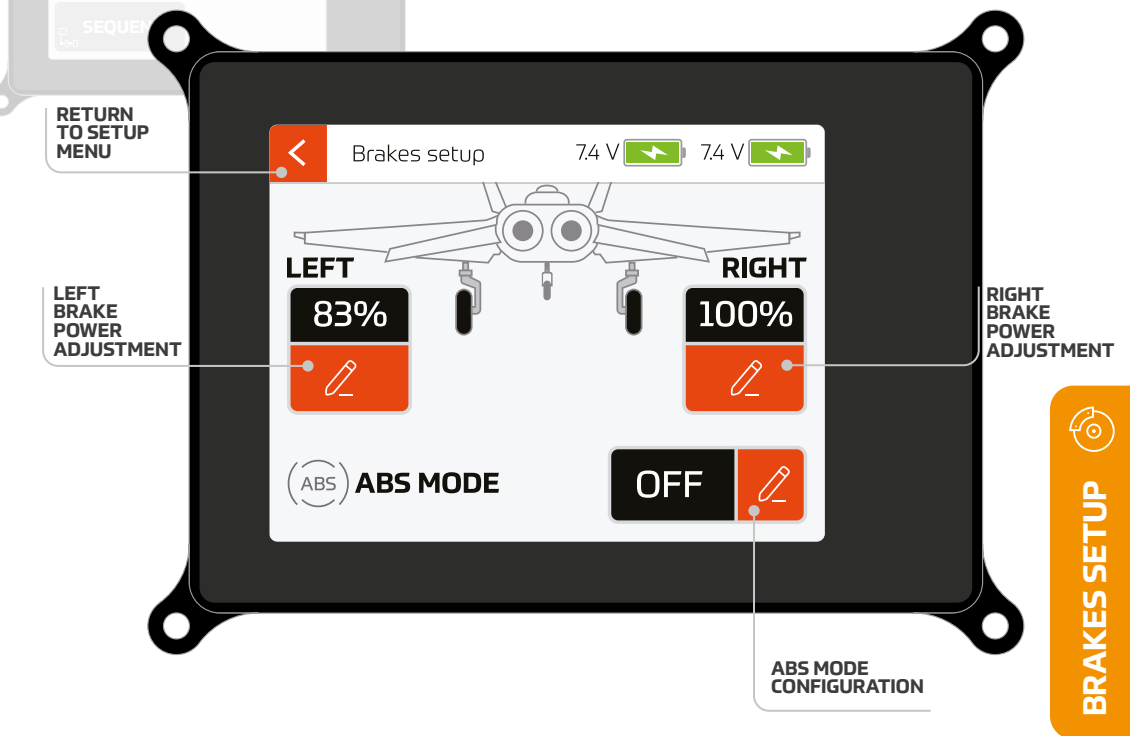
RADIO SETUP



**BRAKES SETUP**

## BRAKES SETUP MENU

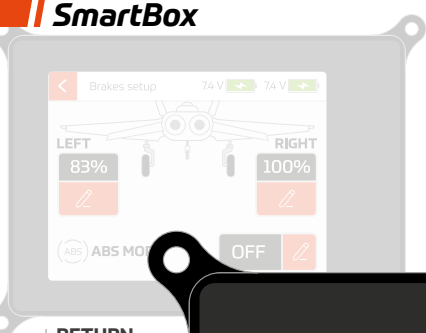
The BRAKES menu allows you to adjust the brakes individually, in case you need to balance them, and also to use the ABS mode.



## BRAKES SETUP: BALANCE ADJUSTMENT

You can adjust and limit how much force each of the brakes is applying. This is very useful in case you need to balance your brakes, when one of them is stronger than the other and causes to model to deviate to a side when braking.

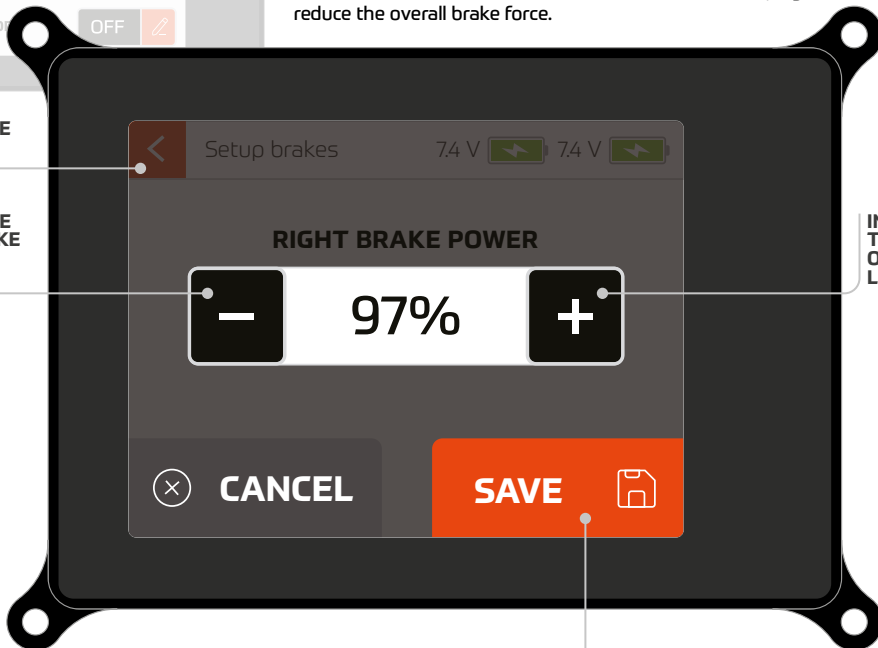
You can also reduce both brake levels at the same time, if you want to reduce the overall brake force.



RETURN  
TO BRAKE  
SETUP

DECREASE  
THE BRAKE  
OUTPUT  
LEVEL

INCREASE  
THE BRAKE  
OUTPUT  
LEVEL



SAVE SETTINGS

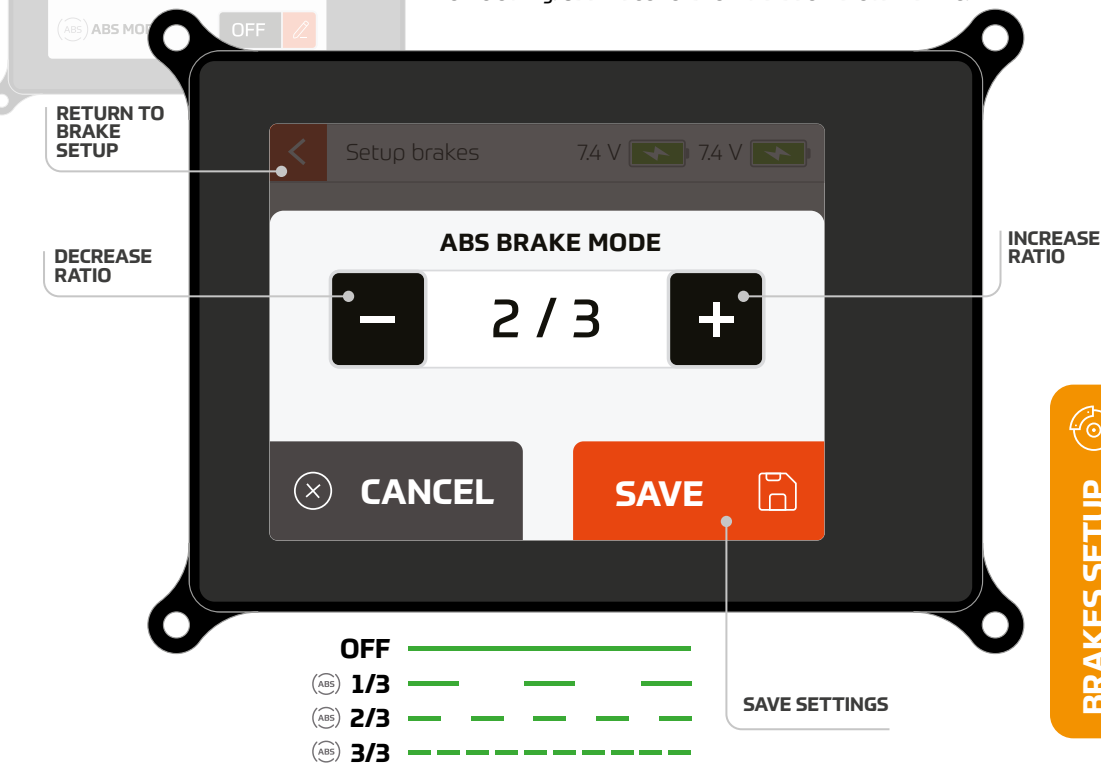


BRAKES SETUP

## BRAKES SETUP: ABS MODE

The SmartBox offers an ABS mode with three different presets. The ABS will release and engage the brake at different ratios, to avoid wheel blocking.

The ABS has 3 different ratios. The higher the value, the more times the brake is released in the same amount of time, which will prevent the wheel from blocking. Use the buttons to increase or reduce the ratio.



Gyro setup

74 V  74 V 

GYRO



ON



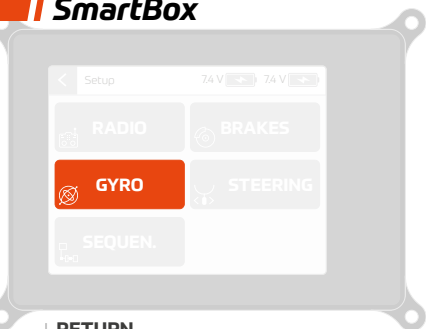
BRAKE  
ASSIST

LOW

2



**GYROSCOPE SETUP**



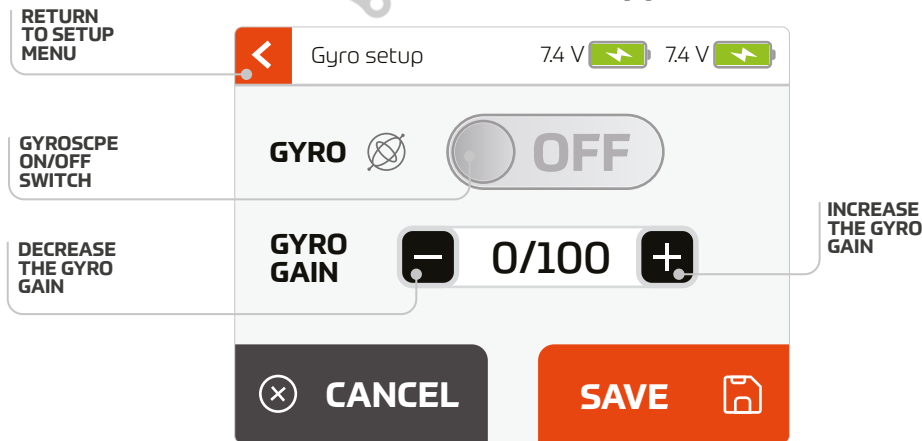
## GYROSCOPE SETUP

The Gyro menu is dedicated to the SmartBox gyroscope, which can be used to correct any deviations of the plane when applying brakes.

You can turn OFF this feature any time, so it does not have any effect on the brakes.

If the gyro is ON, when brakes are engaged by the pilot, the gyro will apply corrections to the the brake outputs to keep a straight trajectory. Notice that, if the brakes are not engaged, the gyro remains idle without any effect.

The gyro will try to maintain the trajectory the plane is heading to, the moment the brakes are engaged.



If you need to adjust the trajectory, you can steer the plane by using the steering servo. When the steering servo is moving, the gyro will turn off momentarily while turning. When the steering servo is no longer being used, the gyro will be once again active, correcting any deviations from the new path (as long as you're still applying brakes).

You can adjust how much the gyro influences the brakes with the Gyro Gain value, which ranges from 0 up to 100.

Our recommendation If you want to use the gyro brake assist, is to start with a low value under 25%, and test the behavior of the plane on the field. If the gyro is barely having an impact and the model still deviates, increase the value. If you feel the gyro is effect is to much for your taste, reduce the value.



Steering setup

74 V  74 V 

SERVO REVERSE

YES 

STEERING TRIM

100% 

SERVO GAIN

83% 

BRAKE STEERING

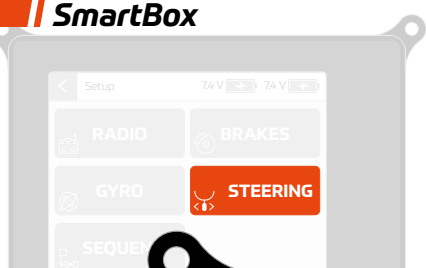
97% 



## STEERING SETUP

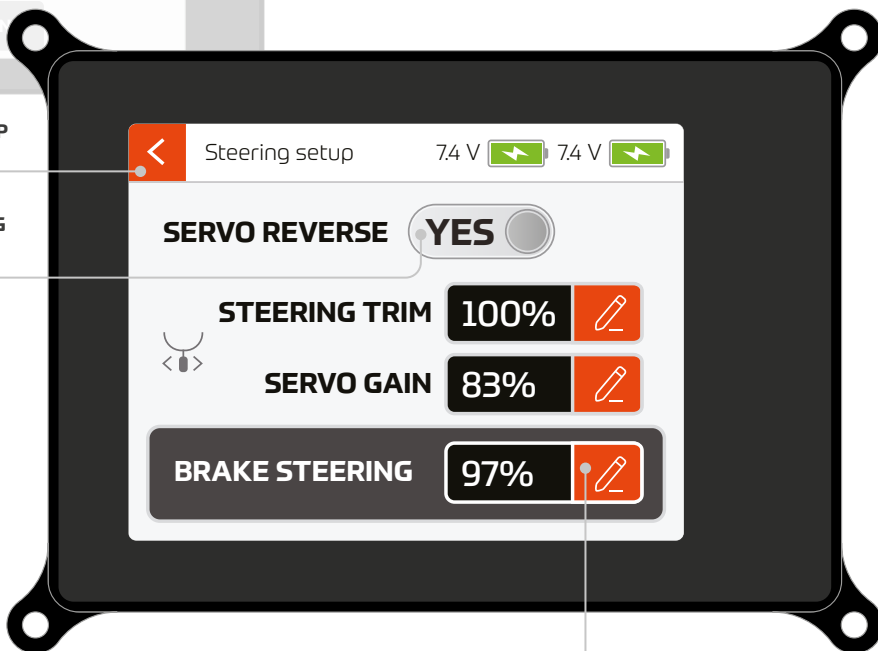
The Steering menu allows to further adjust the steering servo behavior, and also offers options for taildraggers that turn using differential braking.

Use the **Servo Reverse** option to invert the movement of the servo, in case it doesn't turn in the desired direction.



RETURN  
TO SETUP  
MENU

INVERT  
STEERING  
SERVO  
YES / NO



BRAKE  
STEERING  
CONFIGURATION

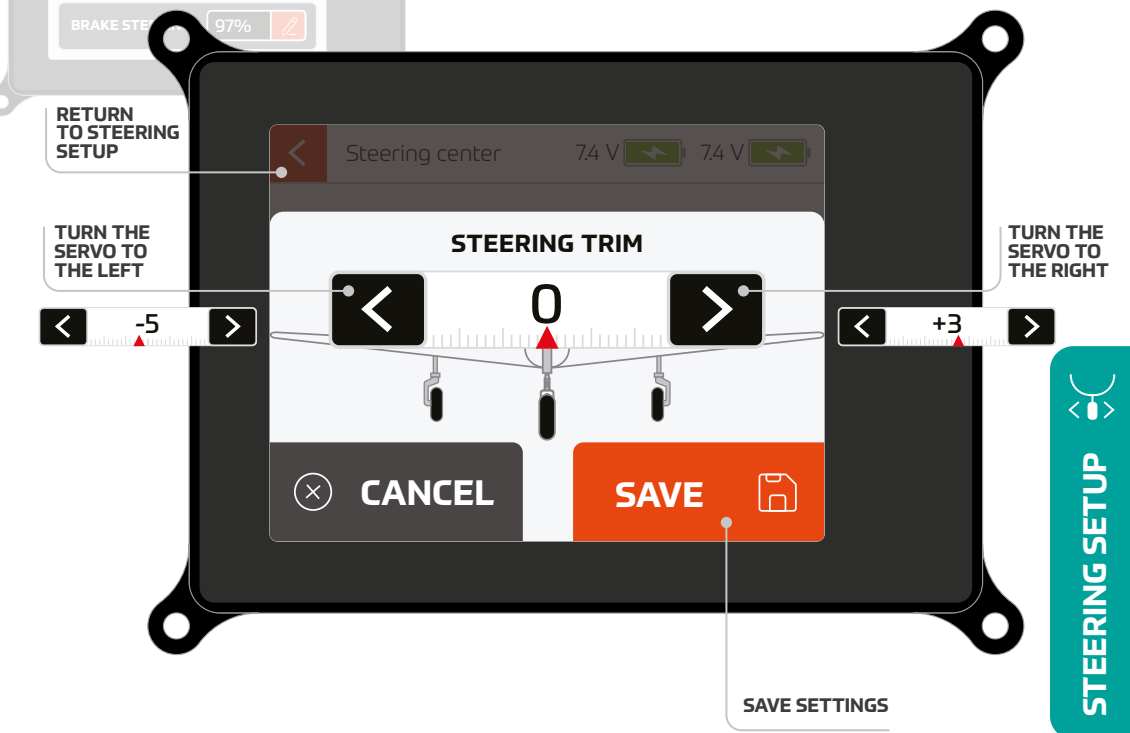


STEERING SETUP

## STEERING SETUP: STEERING TRIM

The Steering trim adjusts the center position of the servo **when the landing gear is deployed**.

Use the buttons to change the position of the servo until the nose strut is aligned.



## STEERING SETUP: SERVO GAIN

The Servo Gain menu allows you to adjust the sensitivity and how much the input signal from the Rudder Input affects the movement of the steering servo.

If the steering servo is too sensible and the range of movement is too broad, reduce the gain. On the other hand, if the servo doesn't turn enough, increase the gain.

Use the buttons to adjust the gain value until you're comfortable with the steering servo behavior.



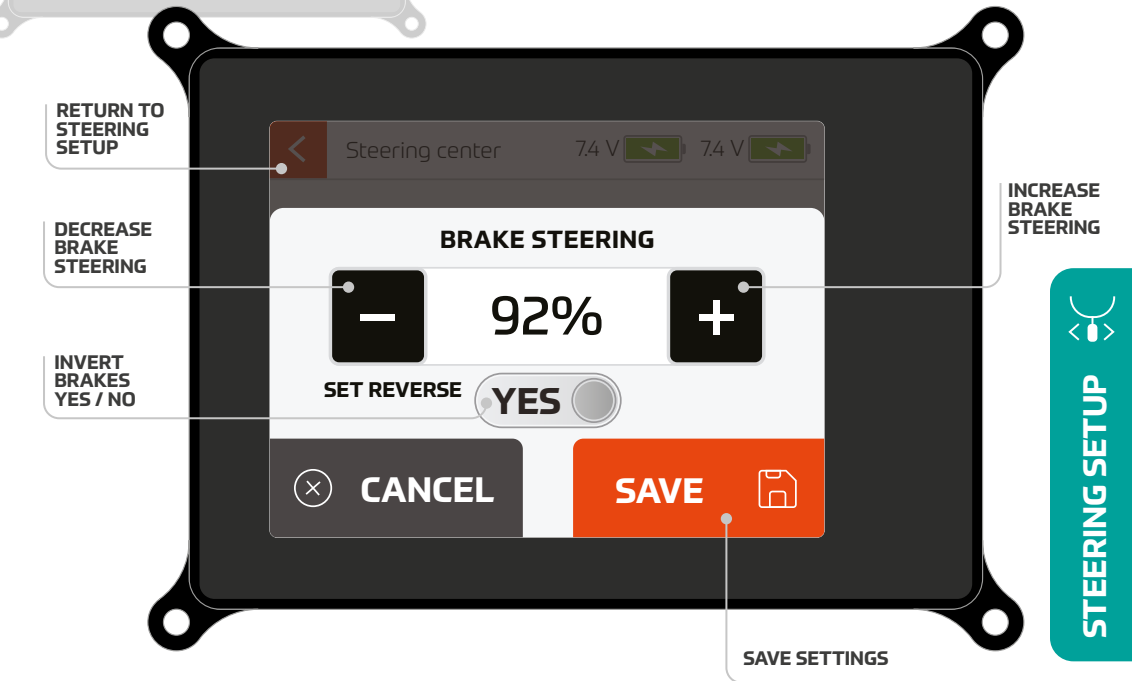
## STEERING SETUP: BRAKE STEERING

With Brake Steering, the brakes can be used to turn the model, which is particularly useful for taildraggers without an steerable tail wheel.

By default, the Brake Steering value is 0%, which means this feature is turned off. To enable this feature, set a value different than 0%.

When Brake Steering is enabled, the Rudder Input signal will be used to engage the left or right brake for differential braking. The higher the value, the more the power the brakes will apply when engaged by the Rudder signal.

You can invert the brakes by toggling the Set Reverse switch.



Sequencer setup

7.4 V  7.4 V 

**SEQUENCER**

**YES**



**DOORS**

**SEQUENCE**



**SEQUENCER SETUP**

# SEQUENCER SETUP

## INTRODUCTION & MAIN SCREEN MENU

The SmartBox features a versatile sequencer to set up and coordinate the deploy and retract sequence of your landing gear and gear doors (whether these are operated by a servo motor or a linear actuator).

This includes configuring the open and close positions for your gear doors, how much time it takes them to open and close, and arranging the whole deploy sequence.

This section of the manual describes all the menus and functionalities related to the sequencer.

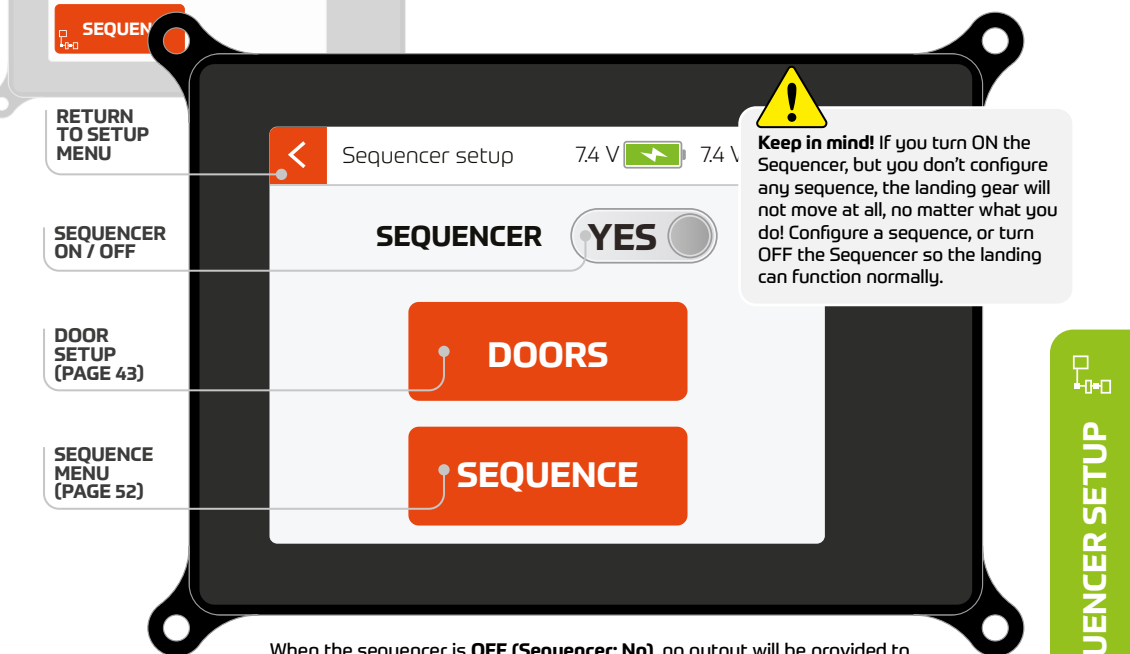
We have included a practical example at the end, creating a sequence step by step.



## SEQUENCER SETUP MAIN SCREEN

In the Sequencer Menu, you can access the **Doors menu**, where the positions and speeds for each of the gear doors are adjusted, and the **Sequence menu**, where you can create and modify your sequence.

The Sequencer switch allows you to turn the sequencer ON and OFF:



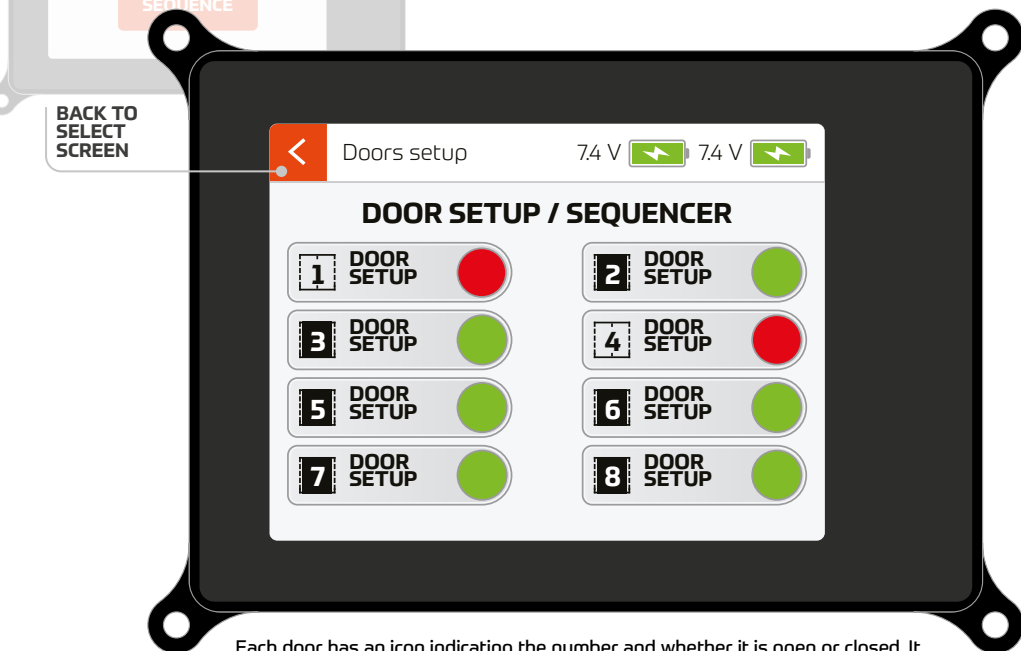
When the sequencer is **OFF (Sequencer: No)**, no output will be provided to the Door outputs, and the landing gear will perform the standard deploy / retract sequence.

When the sequencer is **ON (Sequencer: Yes)**, the SmartBox performs the programmed sequence when using your radio system to operate the landing gear, and also when using the Manual Mode.

## DOORS SETUP / SEQUENCER

In the Doors menu, you can configure each of the 8 door outputs available. In this screen you can adjust and see the current status (open or closed) of each door.

To configure a door, press on its name to access its own menu.



Each door has an icon indicating the number and whether it is open or closed. It is also indicated by the color green (open) and red (closed).

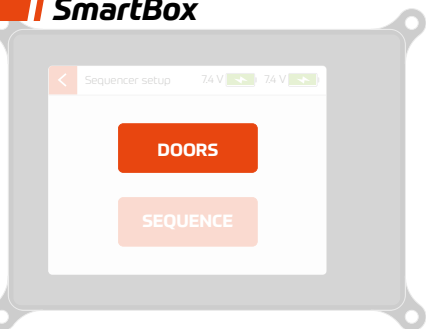
- 1 DOOR NUMBER 1: CLOSED** ●
- 8 DOOR NUMBER 8: OPEN** ●

## DOOR SETUP

When pressing on a Door button, you will enter its configuration menu. On the following page there is a detailed description of each of the buttons and sub-menus.



SEQUENCER SETUP



## DOOR SETUP

We highly advise to read the following descriptions below, so you can fully understand how each of these parameters and menus affect the servos / actuators behavior.

## SERVO OR ACTUATOR

For each door output, you can use a servo motor or a linear actuator. Make sure to select the proper type, otherwise the device may not work as intended.



## ACTUATOR REVERSE (YES/NO)

Allows you to reverse the position of the actuator, in case it needs to be changed.

ACTUATOR REVERSE **YES**

## DOOR SETTINGS

Configure and test the open and closed positions for the servo. When using an actuator, it allows you to test the open and closed positions.



## OPERATION SPEED

Adjust how much time it takes for the servo motor to open and close (you can individually adjust the timing for each movement).

These values are used by the sequencer. Make sure you adjust them according to your needs. For the actuator, the speed is fixed, but the time is still used for the sequencer.



## USING A SERVO: DOOR SETTINGS MENU

When using a servo, the Door Settings menu allows you to adjust the servo position corresponding to the Open and Closed positions.

Use the corresponding buttons to change the servo position for each status.



You can verify both the open and closed door positions with the buttons on the left.

Once you're done, press Save to save your setting and exit the menu. If you press cancel, the changes will be lost.

SAVE SETTINGS

## USING A SERVO: OPERATION SPEED MENU

When using a servo, the Operation Speed menus allows you to adjust the time it takes the servo motor to change between its two positions. These values are used by the sequencer. Make sure you adjust them according to your needs.

The Open Speed value controls how much time takes the servo to open when the door is closed. The Close Speed value controls how much time takes the servo to close when the door is open.

RETURN TO  
PREVIOUS  
MENU

ADJUST THE  
OPENING  
AND CLOSING  
SERVO  
TIMING

The screenshot shows the 'Doors setup' menu with two battery status indicators at 7.4 V. The 'OPEN SPEED' is set to 9.9 sec and the 'CLOSE SPEED' is set to 0.7 sec. Each speed has minus and plus buttons for adjustment. At the bottom, there is a 'CANCEL' button and a 'SAVE' button with a save icon.

If the value is set to 0.0 sec, the servo will move as fast as possible.

Once you're done, press Save to save your setting and exit the menu. If you press cancel, the changes will be lost.

SAVE SETTINGS



SEQUENCER SETUP

## DOORS MENU: USING AN ACTUATOR.

When using a linear actuator instead of a servo for your door, make sure to press the Actuator button.

Our linear Actuators only have two positions, retracted and extended. Therefore it is only necessary to establish which one corresponds to the door being open, and which one to the door being closed.

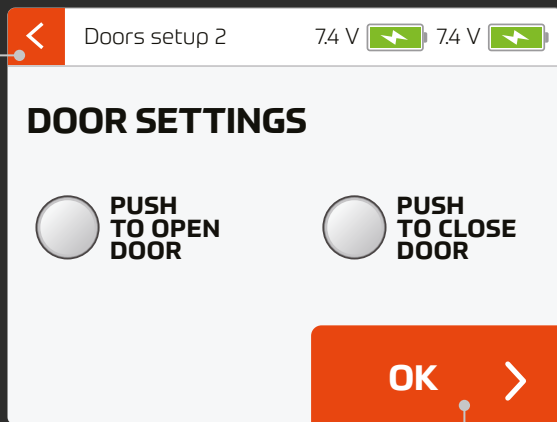


## USING AN ACTUATOR: DOOR SETTINGS MENU

When using an actuator, the position is not adjusted. The linear actuator goes all the way in and out.

In this menu, you use the buttons to verify both the open and closed positions for the door.

RETURN TO  
PREVIOUS  
MENU



If these positions do not correspond with the actual physical position of your door, return to the previous menu by pressing OK, and use the “Actuator Reverse” switch to reverse the positions.

PRESS OK TO  
RETURN TO  
THE PREVIOUS  
MENU

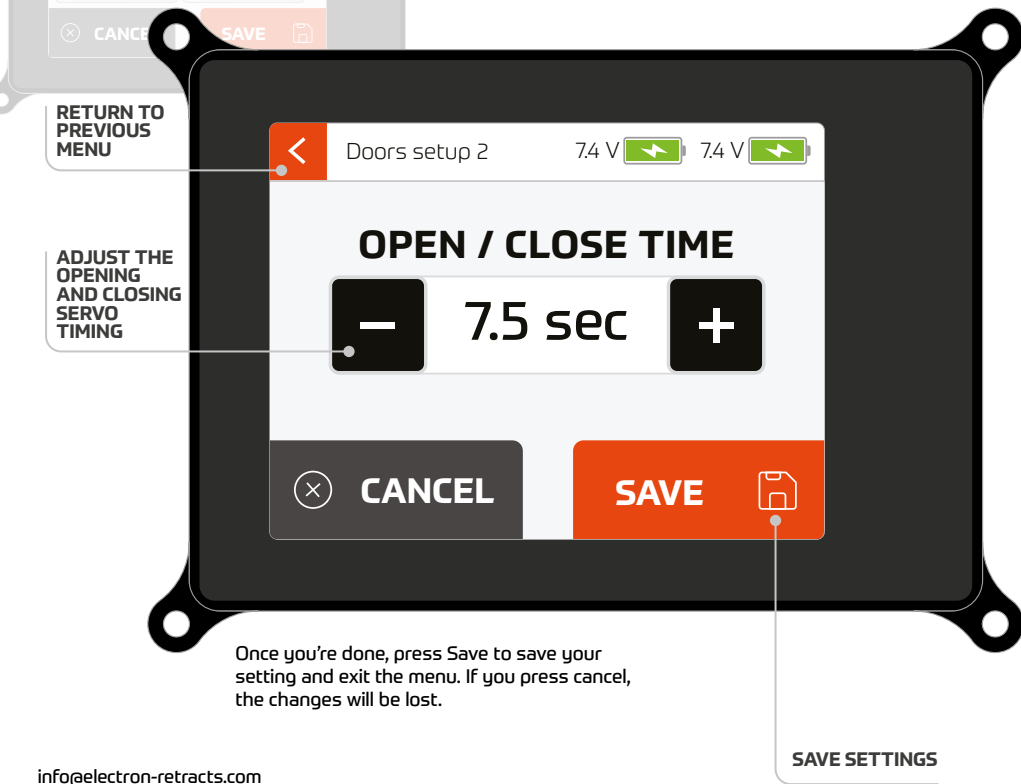


SEQUENCER SETUP

## USING AN ACTUATOR: OPERATION SPEED MENU

When using an actuator, the speed is fixed and will be the same for both the opening and closing movements.

You must adjust the value to match how much the actuator takes to complete it's movement.

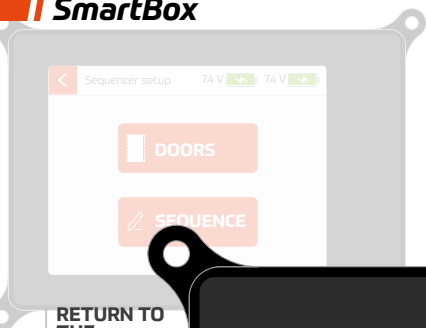


SEQUENCER SETUP

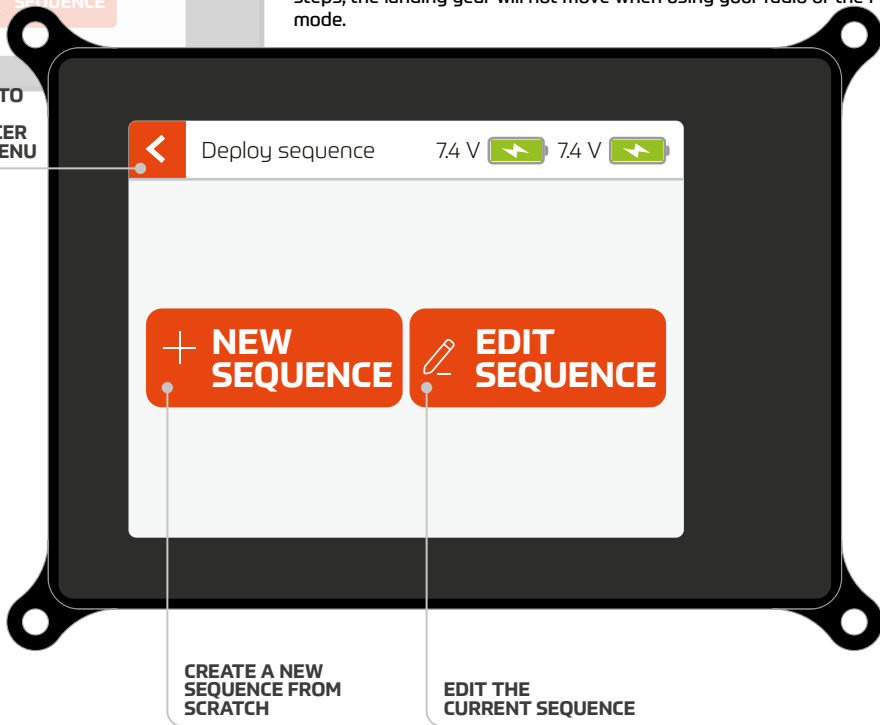
## CREATING A SEQUENCE.

After pressing the Sequence button, you will be able to edit the current sequence, or delete the current sequence and start working on with a new one.

**When using the Sequencer, you must always create your sequence.** The default one is empty. If you turn ON the sequencer, but you don't create any steps, the landing gear will not move when using your radio or the Manual mode.



RETURN TO  
THE  
SEQUENCER  
SETUP MENU



CREATE A NEW  
SEQUENCE FROM  
SCRATCH

EDIT THE  
CURRENT  
SEQUENCE



SEQUENCER SETUP

## CREATING A NEW SEQUENCE

When creating a new sequence, you will be prompted to confirm this decision, as the old sequence will be deleted and it will not be possible to recover it afterwards.



# UNDERSTANDING THE SEQUENCER

1/3

Before we move forward, it's important to establish how the SmartBox Sequencer works. We highly encourage to read this section, as it will prove helpful when creating the landing gear sequence.

**A sequence is made of steps.** Each step represents a different moment in the landing gear deploy sequence. These steps are numerated and executed in order, starting on **Step 1**.

In Step 1, all three landing gears are up, and all the doors are closed. **We will define the deploy sequence**, from this point until the landing gear is fully extended. In Step 1, it is not possible to modify the landing gear or door positions.

**For the retraction sequence**, the SmartBox will follow the defined sequence in reverse.

Usually, the sequence begins with some doors opening, and after that, the landing gears will deploy. When all landing gears are fully extended, the doors may or may not close, depending on the aircraft (some doors may remain open while others are closed).

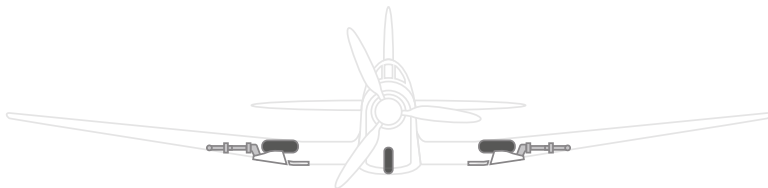
For every change/movement of any number of landing gears or doors, a new step will be needed. Most sequences will require from 3 to 5 steps.



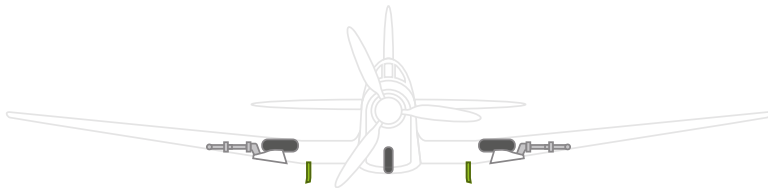
# UNDERSTANDING THE SEQUENCER 2/3

We advise that you write down how your deploy sequence works: start with all gears up and doors closed, and write step by step what should happen. Here is an example:

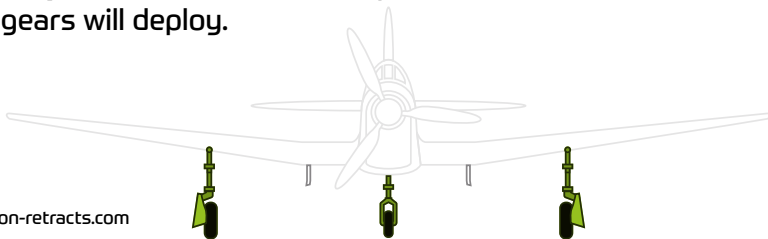
**Step 1:** All doors and gears closed.



**Step 2:** First, the main gear doors (1 and 2), will open.



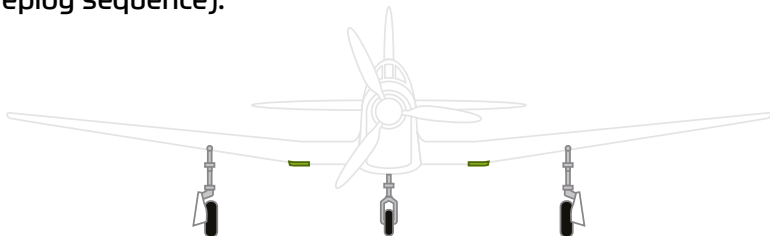
**Step 3:** After the doors are open, the main and nose landing gears will deploy.



# UNDERSTANDING THE SEQUENCER

3/3

**Step 4:** After all the landing gears are fully extended, the main gear doors (1 and 2), will close. (This completes the deploy sequence).



**The sequencer will move to the next step, when all the given orders for the current step are completed.**

In the example above, the sequencer will move from Step 2 to Step 3 after the doors 1 and 2 are fully open. Next, it will move from Step 3 to Step 4 after all the landing gears are fully extended.

We **do not recommend** opening doors and extending landing gears both in the same step. This can lead to a collision which could damage your equipment. Use one step to open the doors, and extend the landing gears on the next one. The same applies for closing doors and retracting landing gears.

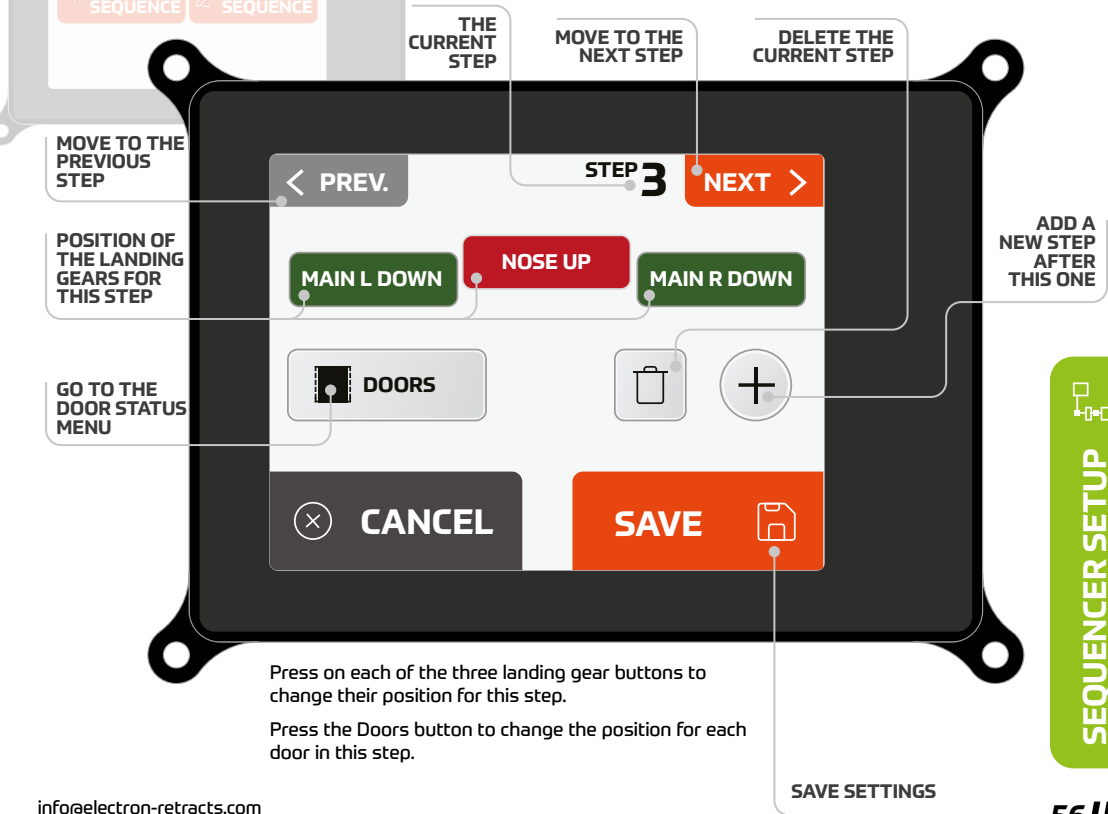


SEQUENCER SETUP

## THE STEP MENU

We will now take a look at the “Step” menu, and how to configure the steps.

Use the Prev. and Next. Buttons to navigate between steps. To create a new step after the current one, press the + button. To delete the current step, press the trash can button.

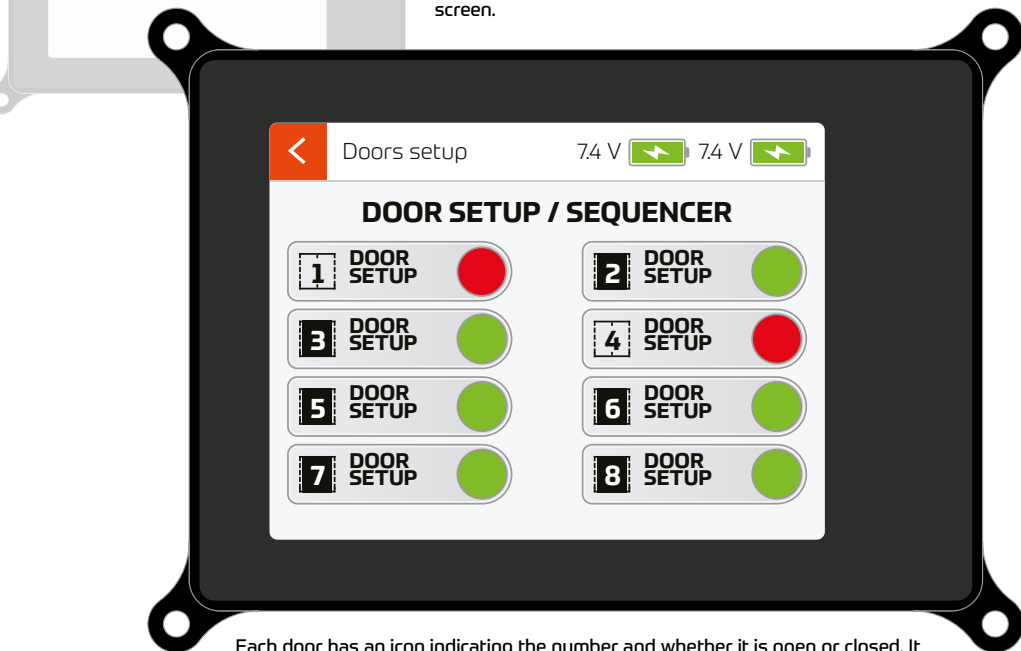


## THE STEP MENU: DOOR MENU.

When pressing the Doors button while editing a step, the following screen will show up.

Press on each of the door buttons to change if the door should be open at closed in this Step.

Once you are done, press on the return button on the top left corner of the screen.



Each door has an icon indicating the number and whether it is open or closed. It is also indicated by the color green (open) and red (closed).

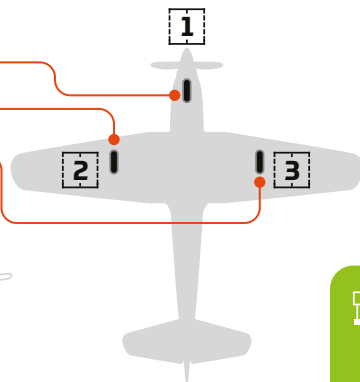
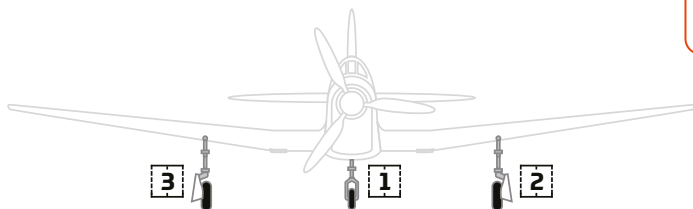
- 1 DOOR NUMBER 1: CLOSED** ●
- 8 DOOR NUMBER 8: OPEN** ●

# SEQUENCE EXAMPLE

We will now create a sequence step by step based on the following scenario:

Our aircraft has have 3 landing gears (one front/nose and two main/rear)  
It has three doors, one for each of the landing gears, and corresponding to the following door outputs.

- Door 1 corresponds to the Nose gear
- Door 2 corresponds to the Main L gear
- Door 3 corresponds to the Main R gear



In this aircraft, the door for the nose gear will close once the gear is deployed, while the doors for the main gears remain open when the gear is extended.

First, we must configure the open and closed positions for the three doors. Go to page 43 for more information. Once the doors are well configured and working as intended, we begin building our sequence.

Next, we describe the deploy sequence, starting with all the gears up and doors closed, so we can identify how many steps we need.

The sequence is as follows:

**Step 1:** Starting point: Gears are retracted and doors are closed.

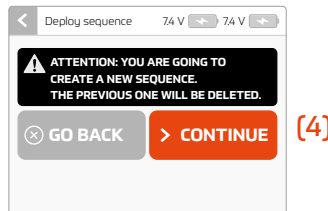
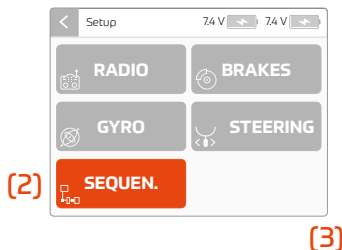
**Step 2:** After the order to deploy the gear is given, the three doors open at the same time.

**Step 3:** After all doors are open, all three landing gears will deploy.

**Step 4:** After all three landing gears are fully deployed, Door 1 (Nose gear) will close. This is the last step in our sequence.

As we can see, we have 4 steps. In the following pages, we will create our sequence, step by step.

Enter the **Setup** menu, (1)  
then **Sequencer Setup > Sequence**, (2)  
and press **New Sequence**. (3)  
Press **Continue** to begin. (4)



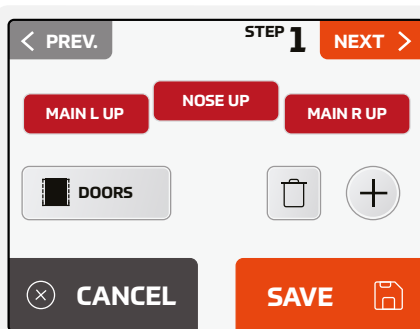
# SEQUENCE

## STEP 1

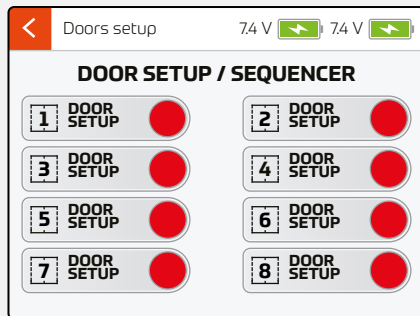
# SEQUENCE EXAMPLE

Step 1 is the beginning of our sequence. There is nothing to adjust on this step. All doors remain closed and all landing gears are retracted.

Press on the + button to create and continue with Step 2.



All gears remain retracted, and all doors remain closed. The SmartBox awaits for the order to deploy the gear.



# SEQUENCE

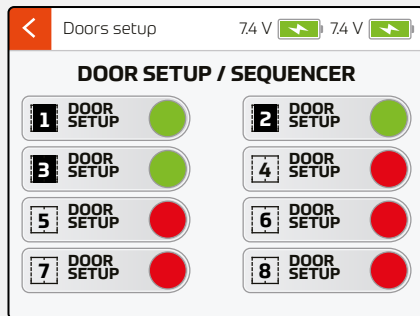
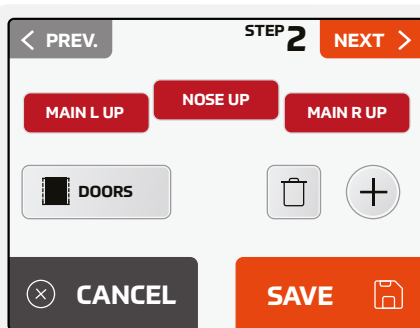
## STEP 2

# SEQUENCE EXAMPLE

Step 2, the retracts must still remain retracted (up), and the doors will open.

Go to the Doors menu, and set doors 1, 2 and 3 to open.

Press on the + button to create and continue with Step 3.



Once we give the order to deploy our gear, the sequencer will move the Step 2 immediately, and the doors will open.



## SEQUENCER SETUP

# SEQUENCE

## STEP 3

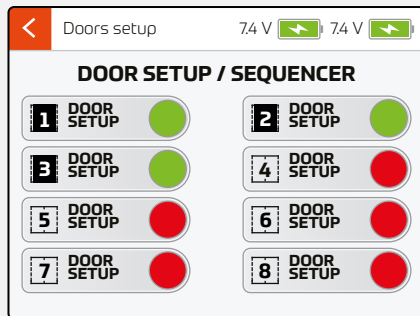
# SEQUENCE EXAMPLE

Step 3, it's time for the landing gears to extend.

Set all three landing gears to be deployed (down).

There are no door changes in this step.

Press on the + button to create and continue with Step 4.



Once all doors are fully open, the sequencer moves to Step 3, and the landing gears begin to deploy.



## SEQUENCER SETUP

# SEQUENCE

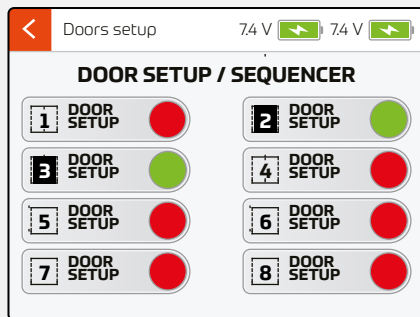
## STEP 4

# SEQUENCE EXAMPLE

In Step 4, we must only close the nose gear door. The main doors remain open when the gear is extended.

Go to the Doors menu, and change doors 1 to closed.

The sequence is completed at this point. Press Save to store the sequence.



Once all the retracts are fully extended, the sequencer moves to Step 4, and door 1 closes now. This sequence is now complete.



## SEQUENCER SETUP



Sequencer setup

7.4 V  7.4 V 

**SEQUENCER**

**YES**



**DOORS**



**SEQUENCE**

# SMARTBOX COMPUTER APP

The SmartBox controller can be updated with the latest firmware and features, through the SmartBox computer application available on the Electron Retracts website.

The program also allows you to update the parameters of your SmartBox controller, in case you need to use with a different set of retracts than the ones originally provided.

To download the application and learn how to use, **use the following link.**

<https://www.electron-retracts.com/manual/smartbox-app-user-guide/>

