Air Safe Failsafe Gear Sequencer

User Guide

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Thank you for your purchase of the Advance Radio Air Safe Sequencer .

Air Safe was designed with Giant Scale Models in mind and combines a high quality 200 psi pressure sensor, a fail safe air monitoring system, a 6 channel Gear sequencer with a built in daylight OLED screen and joystick programming.

In addition, if you are using the Smooth Flite 26 system then you can connect Air Safe to the Smooth Flite to add fail safe pressure monitoring to the Smooth Flite main Gear sequencer.

LETS GET STARTED — in this guide we will show you how to get the most out of the Air Safe system. Please take the time to read and understand this guide before installation.

Joystick Control— Air Safe comes with a built in daylight OLED and 5 way joystick.

Joystick ↑ UP Arrow — moves up between menu items.

Joystick ↓ DOWN Arrow — moves down between menu items.

Joystick → RIGHT Arrow — Increases a value.

Joystick ← LEFT Arrow — Decreases a value.

Joystick PRESS — Selects and item or new page.

Joystick PRESS on the word "RETURN" (at the top of the screen) will return you to a previous page.

WARNING—Air Safe will power air valves, servos (for gear doors) and linear actuated electric retracts i.e. retracts that connect with a servo lead. It is not designed to directly power electric DC motor retracts.

MULTI CHANNEL USAGE—Air Safe offers up to 6 channels of gear and door sequencing. In most cases with air systems 2 or 3 output channels are all that are required for most retract setups. However, If you use a large number of output channels to power servos or linear retracts YOU MUST PROVIDE ENOUGH INPUT POWER TO OPERATE THEM.

DUAL POWER INPUTS—Air Safe has 2 power inputs for larger power setups. The gear channel input will provide power and a second input specifically for additional power connection. For high power setups connect both the gear channel and the additional battery connector to the receiver or Power Expander. DON'T connect a second battery unless the second battery is the same voltage and type as the receiver battery.

Features and Specifications:

- Built-in Air Guard Technology. Air Safe constantly monitors air pressure and will perform a gear down sequence if the user set fail safe air pressure is reached.

- 200 psi high quality absolute pressure gauge.   Tested to 170 psi.

- Works with all major battery chemistries. LiFe. LiPo, Lion, NiMh, NiCD. Battery voltage range can be from 6volts to 8.4volts.

- 6 channel sequencer with PWM outputs to run air valves, servos or linear retracts.

- Easy-to-see daylight OLED screen for setup and pressure monitoring.

- 5 way joystick for easy programmability.

- servo normal/reverse on all channels.

- end point setting on all channels.

- Dual power inputs for larger setups.

- ARXL protocol output to connect to any Advanced Radio ARXL device to send fail safe setting data.

- Stylish anodised aluminium case.

- Dimensions: 38mm x 18mm x 57mm. 1.5" x 0.7" x 2.24"

- Weight: 40grams. 1.4 oz

Screens and Usage

Air Safe Start-up Screen

When you first power up the Air Safe you will see the start-up welcome message with the software version number. After a short time the Air Safe will move to the Run Mode Screen.

```
ADVANCED RADIO

FAILSAFE GEAR

SEQUENCER

VERSION X.XX
```

Run Mode Screen

Run Mode Screen shows the pressure monitor, it gives feedback about system (absolute) pressure. It also shows the current gear position.
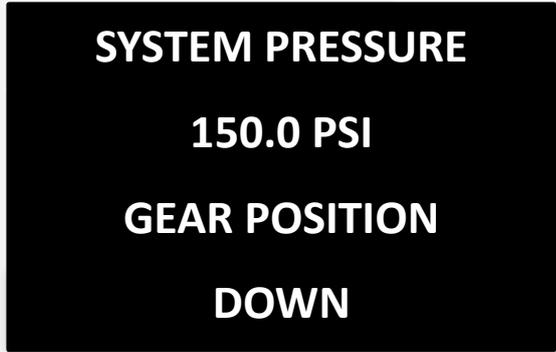
PROGRAMMING MODE—To move to programming mode press the joystick. This will take you to the programming menu.

```
SYSTEM PRESSURE

150.0 PSI

GEAR POSITION

DOWN
```

Programming Main Menu Screen

On the Programming menu use the joystick **↓ DOWN Arrow and ↑ UP Arrow** to move between the different menu items. As you move between the different menu items the selected item will be highlighted with a white background.

Select "FAIL SAFE" to go to the Fail Safe setup page.

Select "SEQUENCER" to go to the Sequencer setup page.

Select "FACTORY RESET" to go to the Factory Reset page.

Select "RETURN" to return to the previous page.

```
RETURN

FAIL SAFE

SEQUENCER

FACTORY RESET
```
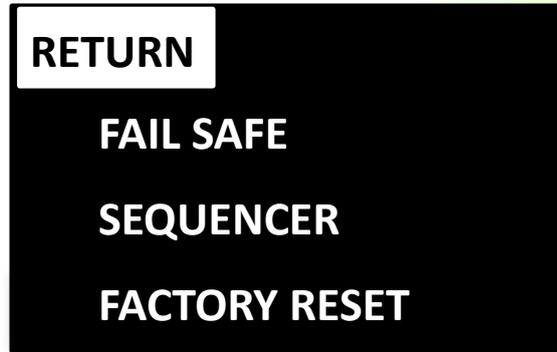
Screens and Usage

Fail Safe Screen

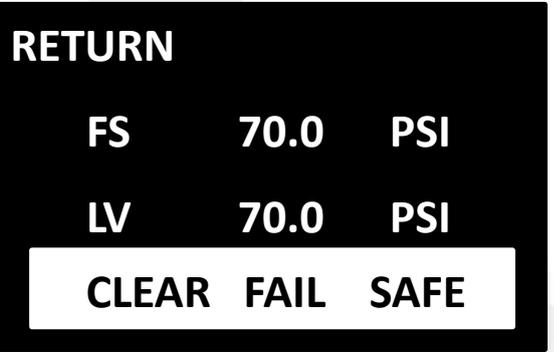This screen shows you the (LV) Live or absolute system pressure as well as the selected (FS) Fail Safe pressure.

To set the Fail Safe pressure (the pressure at which the gear will be triggered to the down position) you:

1) Pump up the system pressure to the desired Fail

   Safe pressure.

2) Move the cursor to the "SET FAIL SAFE" menu item and press the joystick once.

The "SET FAIL SAFE' menu item will flash several times and the current system pressure will be captured as the fails safe trigger pressure. The FS 0.0 PSI will take on the value of the system pressure and the "SET FAIL SAFE" menu item will change to read "CLEAR FAIL SAFE". From this point forward if the system pressure drops below the Fail Safe pressure a gear down event will be triggered.

You can clear the Fail Safe pressure highlighting "CLEAR FAIL SAFE" and pressing the joystick.

```
RETURN

  FS       0.0     PSI

  LV      70.0     PSI

     SET  FAIL  SAFE
```

```
RETURN

  FS      70.0     PSI

  LV      70.0     PSI

    CLEAR  FAIL  SAFE
```

Please Note: system pressures lower than the Fail Safe pressure will not allow you to run the sequencer to the up position or allow system testing during set-up so it is advisable to set the Fail Safe pressure after you have completed pro-gramming the sequencer. You can clear the Fail Safe pressure trigger point at any time by pressing "CLEAR FAIL SAFE"

Screens and Usage

Sequencer Screen

SEQUENCE DOWN/UP This feature allows you to manually operate the sequencer without the need for the TX to be switched on.

To use this feature move the cursor to the SEQUENCE DOWN item.

THEN...

Joystick → RIGHT Arrow — Starts a Sequence to the up position.

Joystick ← LEFT Arrow — Starts a sequence to the down position.

Joystick PRESS — Stops the sequence at the current sequence step.

Hint: The current sequencer position will be shown at the top right of the screen

Please Note: From the factory the sequencer is programmed with all outputs in the down position for all sequence steps so you will not see any movement on the output channels until the sequencer is programmed. A FAIL SAFE event will also over-ride the manual sequencing functionality.

```
RETURN              DOWN-1
   SEQUENCE  DOWN
   SEQUENCER  SETUP
   SEQ  OUTPUT  1—6
```
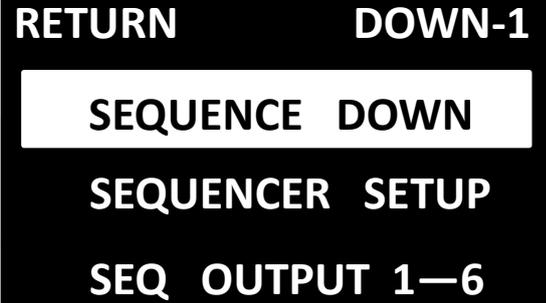
Sequencer Outputs 1-6

Selecting this menu item will take you to the output setup screen.

Highlight and select any output to set up:

- Air valve end points, or reverse air valve function.

- Servo end points, or reverse servo function.
  There is also a speed setting to slow servo travel.

Continued over page...

```
RETURN              DOWN-1
   SEQUENCE  DOWN
   SEQUENCER  SETUP
   SEQ OUTPUTS 1 - 6
```

```
RETURN
   SEQ  OUTPUT  1
   SEQ  OUTPUT  2
   SEQ  OUTPUT  3
   SEQ  OUTPUT  4
   SEQ  OUTPUT  5
   SEQ  OUTPUT  6
```
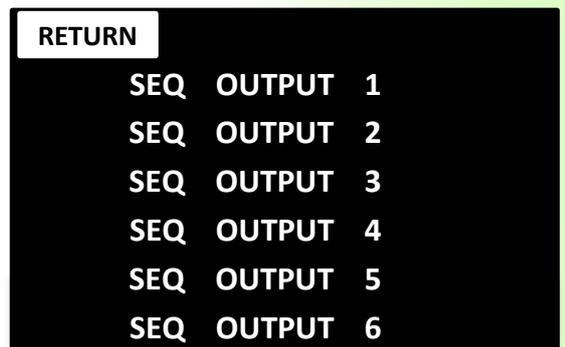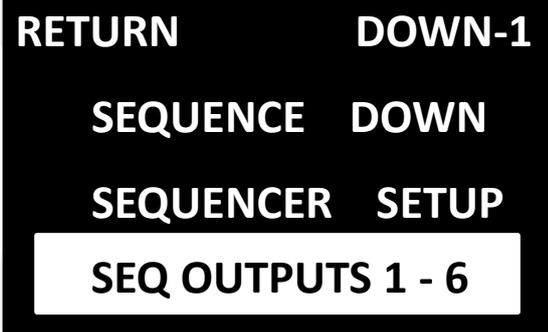
Screens and Usage

Sequencer Outputs 1-6 Programming

Highlight and select any of the 6 SEQ OUTPUTS to take you to the individual output programming screen.

For our example we will use OUTPUT 1.

Note: All outputs have the same features.

```
┌─────────────────────────────┐
│ ┌────────┐                   │
│ │ RETURN │                   │
│ └────────┘                   │
│      SEQ   OUTPUT   1        │
│      SEQ   OUTPUT   2        │
│      SEQ   OUTPUT   3        │
│      SEQ   OUTPUT   4        │
│      SEQ   OUTPUT   5        │
│      SEQ   OUTPUT   6        │
└─────────────────────────────┘
```
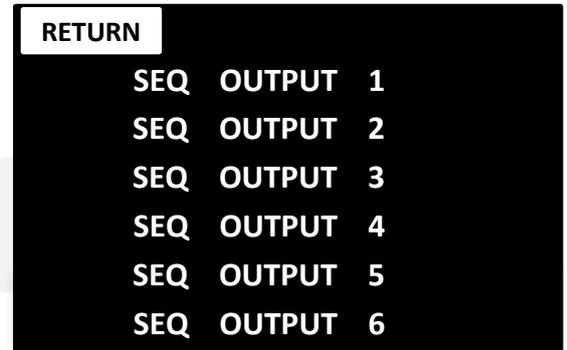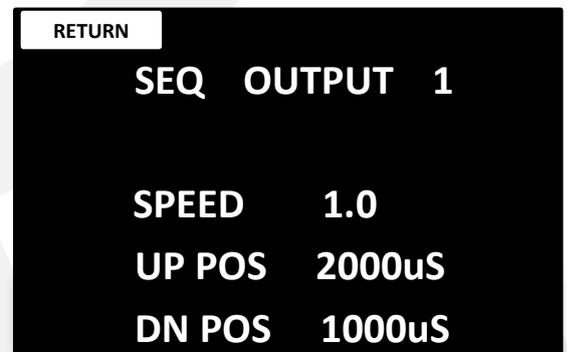
Sequencer Output Programming Screen

SEQ OUTPUT 1 at the top of the screen shows the currently selected output. Any changes made to values will be made to the shown output. In this case Output 1.

Joystick → RIGHT Arrow — Increases a value.

Joystick ← LEFT Arrow — Decreases a value.

```
┌─────────────────────────────┐
│ ┌────────┐                   │
│ │ RETURN │                   │
│ └────────┘                   │
│      SEQ   OUTPUT   1        │
│                             │
│      SPEED      1.0         │
│      UP POS     2000uS      │
│      DN POS     1000uS      │
└─────────────────────────────┘
```

Hint: Press and hold the joystick left or right to move the value/position quicker.

SPEED— Highlight this menu item to slow servo speed. Higher values slow the speed. Lower values increase the speed. A value of zero is servo full speed. Factory default is 1.0

UP POS—Highlight this menu item to alter the UP POSITION of an air valve or servo controlled door.

DN POS—Highlight this menu item to alter the DOWN POSITION of an air valve or servo controlled door.

NOTE: It is important to have the air valve/servo position correctly set before you program the sequencer. The sequencer assumes the Up and Down positions have been correctly set.

Screens and Usage

Sequencer Step Programming

The current step being programmed is shown in the top right corner of the screen. There are 5 steps available for sequencing and each of the 6 outputs can be programmed in the up or down state in each step.

To move between steps, highlight the "RETURN   STEP" (Row at the top) and use

RETURN		UP-5
DELAY	1.0	SEC
OUTPUT	1	DOWN
OUTPUT	2	DOWN
OUTPUT	3	DOWN
OUTPUT	4	DOWN
OUTPUT	5	DOWN
OUTPUT	6	DOWN

the Joystick right or left click to move between sequence steps.

Please note: Sequence step positions can only be changed when the cursor is highlighting the "RETURN STEP" menu item at the top of the screen.

Joystick → RIGHT Arrow — Increases the step number.

Joystick ← LEFT Arrow — Decreases the step number.

DELAY   1.0   SEC — places a pause at the end of the step. This can be used to allow for example gear to come up or doors to open before the next step in the sequence takes place. Delays the step after the Decreases a value.

OUTPUT 1—6 — highlight and of the output rows to chang the output position. Moving the joystick right or left on any output row will toggle the UP/DOWN state of the selected output.

Hint: To manually test the sequencer highlight the "RETURN" and press (push down) the joystick. Then use the manual UP/DOWN function to test the up and down function of the sequencer. You can of course also use the transmitter to test the sequencer.

Please note: The Air Safe Sequencer Arms From Gear Switch Down position (Factory Default). This means the gear switch must be moved to the down position before the sequencer will arm i.e. any sequence function will operate.

Important Sequencer Rules

1) The Air Safe sequencer gives you the ability to slow servos on each output channel.

Smooth Flite also allows you to **(set wait times)** for slower linear devices and air values. Correct understanding of how these two features work together is important to unleashing the power in the Smooth Flite sequencer.

Here are the rules.

If a sequence step has a servo channel that subscribes to "Global Servo Speed " then the complete step takes the duration of the "Global Servo Speed " + any "Wait To Next Step" **BEFORE** moving to the next step.

In other words the servo is played at "Servo Speed" then the "Wait To Next Step" is added to the step **BEFORE** moving on to the next step.

Example 1:	a) Slowest Servo Speed set to 5.

b) Wait To Next Step set to 2.0 seconds

c) Total step time (approx 1 second) + 2.0 = 3.0 seconds

Example 2:	a) All servos Speed set 0.0

b) Wait To Next Step set to 2.0 seconds

c) Total step time 0.0 + 2.0 = 2.0 seconds

In this example it will appear as if the step was missed.

Example 3:	a) All servos Speed set 0.0

b) Wait To Next Step set to 0.0 seconds

c) Total step time 0.0 + 0.0 = 0.0 seconds

Air Safe with Smooth Flite 26

Air Safe can be connected to an auxiliary input (4) on the Smooth Flite 26. When Airsafe is connected to one of the telemetry inputs on the Smooth Flite 26 it passes telemetry data to the main Smooth Flite unit. This allows the Air Safe to act as an air safety system for the main sequencer in the Smooth Flite unit. To operate this feature you will need Smooth Flite Software 5.5 or higher loaded into the Smooth Flite.
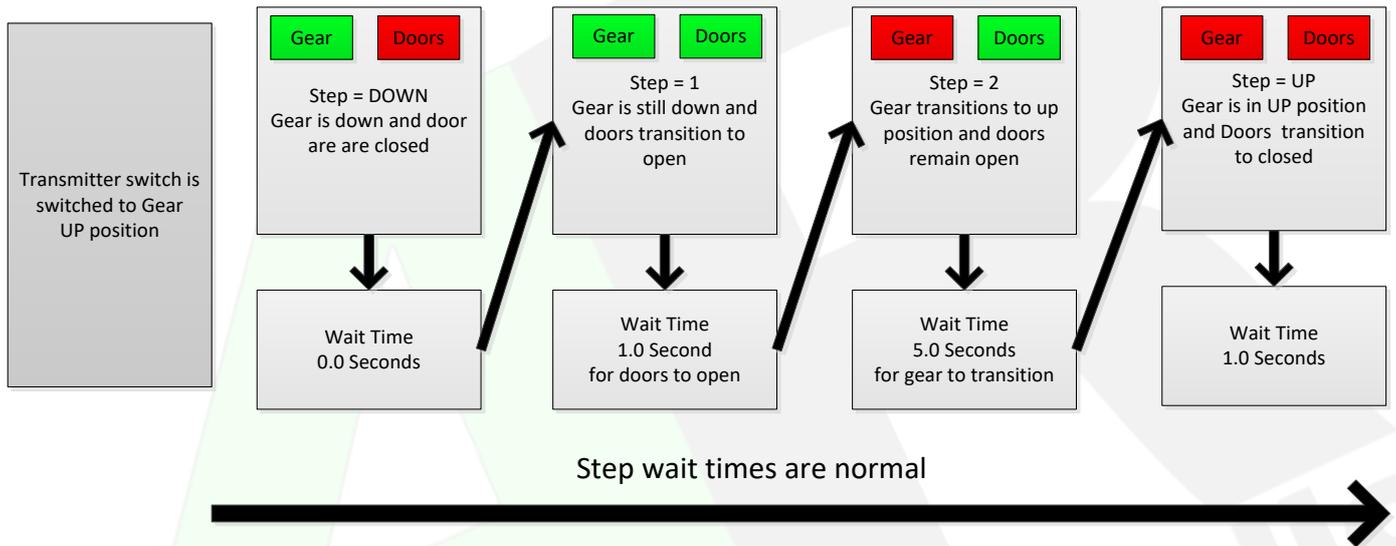
Important Sequencer Rules
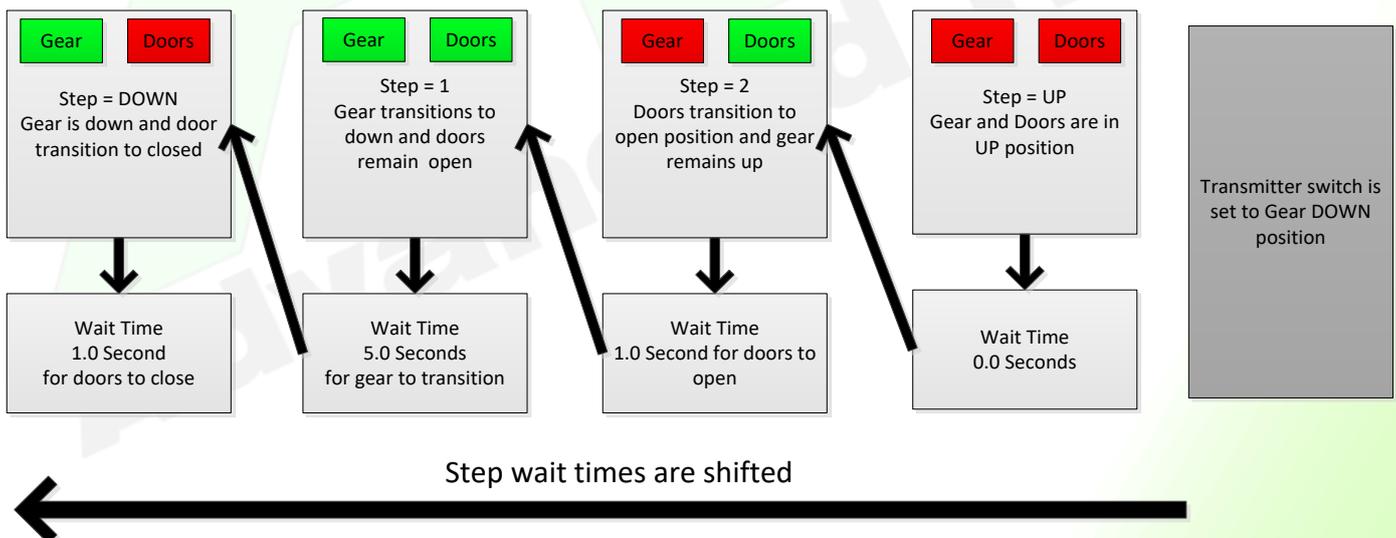
3) Wait Time Step Offset

Sequencing Down to Up—When running the sequencer from the **DOWN** State to the **UP** state wait times for the CURRENT step are applied .

Sequencing UP to DOWN—When running the sequencer from an **UP** State to a **DOWN** state the wait times for the current step + 1 are applied.

Gear Down To Up Sequence

Transmitter switch is switched to Gear UP position	**Gear** **Doors** Step = DOWN Gear is down and door are are closed	**Gear** **Doors** Step = 1 Gear is still down and doors transition to open	**Gear** **Doors** Step = 2 Gear transitions to up position and doors remain open	**Gear** **Doors** Step = UP Gear is in UP position and Doors transition to closed
	Wait Time 0.0 Seconds	Wait Time 1.0 Second for doors to open	Wait Time 5.0 Seconds for gear to transition	Wait Time 1.0 Seconds

Step wait times are normal

Gear Up To Down Sequence

Gear **Doors** Step = DOWN Gear is down and door transition to closed	**Gear** **Doors** Step = 1 Gear transitions to down and doors remain open	**Gear** **Doors** Step = 2 Doors transition to open position and gear remains up	**Gear** **Doors** Step = UP Gear and Doors are in UP position	Transmitter switch is set to Gear DOWN position
Wait Time 1.0 Second for doors to close	Wait Time 5.0 Seconds for gear to transition	Wait Time 1.0 Second for doors to open	Wait Time 0.0 Seconds	

Step wait times are shifted

We hope you enjoy all the power available from the Advanced Radio Air Safe system.

If you have any feedback please feel free to contact us.

The Advanced Radio Engineering Team.

Replacement Warranty

At Advanced Radio our products are designed and tested to very high standards. We use only the highest quality electronic components sourced from reputable manufacturers; ST Micro, BOSCH, TDK, Linear Technology, Texas Instruments, Cypress Semiconductor Corp and NPX. Our circuit boards are assembled in Australia in a certified ISO900-2008 and ISO 13485 medical devices risk management quality assurance environment.

At Advanced Radio we understand the value of the models that run our RC division of electronics. During our many years of operation we have focused on and developed a high quality product and reputable testing regime. Our QC process has been developed from many years of experience designing and working in medical systems. We understand completely the processes involved to achieve a very high quality and reliable product.

Our QC process provides for complete system functionality testing followed by rigorous load and stress testing. If the unit passes this stress test it is further run and heat soaked at 60°C for a period of 8 hours prior to final testing where it is load tested for a second time. If it passes these tests it is then packaged.

We believe in our processes and so we are offering a 2 year warranty on the Air Safe unit if found to be defective in material and/or workmanship when used in the intended purpose.

Shipping charges related to any warranty claim are at the expense of the user, but Advanced Radio may elect to cover shipping charges at it's discretion.

Warranty does not cover over voltage or over current damage beyond stated specification.
Warranty does not cover damage due to negligence, abuse, accident, improper installation or improper mounting.
Warranty does not cover loss of time, inconvenience, loss of model, or other incidental or consequential damages.