STAYSAFE

V1.2 User Manual

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Disclaimer

We (INPROSIS d.o.o.) are not responsible for any injury or damage to property that may occur during use of our product. This includes, but is not limited to, any damages or that can occur when the device fails to operate correctly. We are not responsible for any injury or damage that may occur if the device accidentally stops the motors when no parachute is deployed. We are also not responsible for any damage or injury that may occur if the device fails to detect parachute launch.

Legal Information

Important Safety Instructions

- Mount the device on vibration-free surface.
- Carefully install and secure all connectors and wires.
- Make motor test after installation.
- Test all the systems without installed propellers.
- Make tests on the ground after making any changes in the system.
- Power only with regulated interference-free power supply.
- Do not power with under/over voltage or reverse polarity.
- Check all the requirements for input and output signals.
- Do not use the device after mechanical or electrical stress exposure.
- Do not expose the device to rain or high humidity.
- Do not expose the device to sudden temperature changes.
- Use only with devices that support RC PWM signal.
- Do not arm the motors before connecting a secondary battery.
- Protect your hearing when the sound alarm is active.

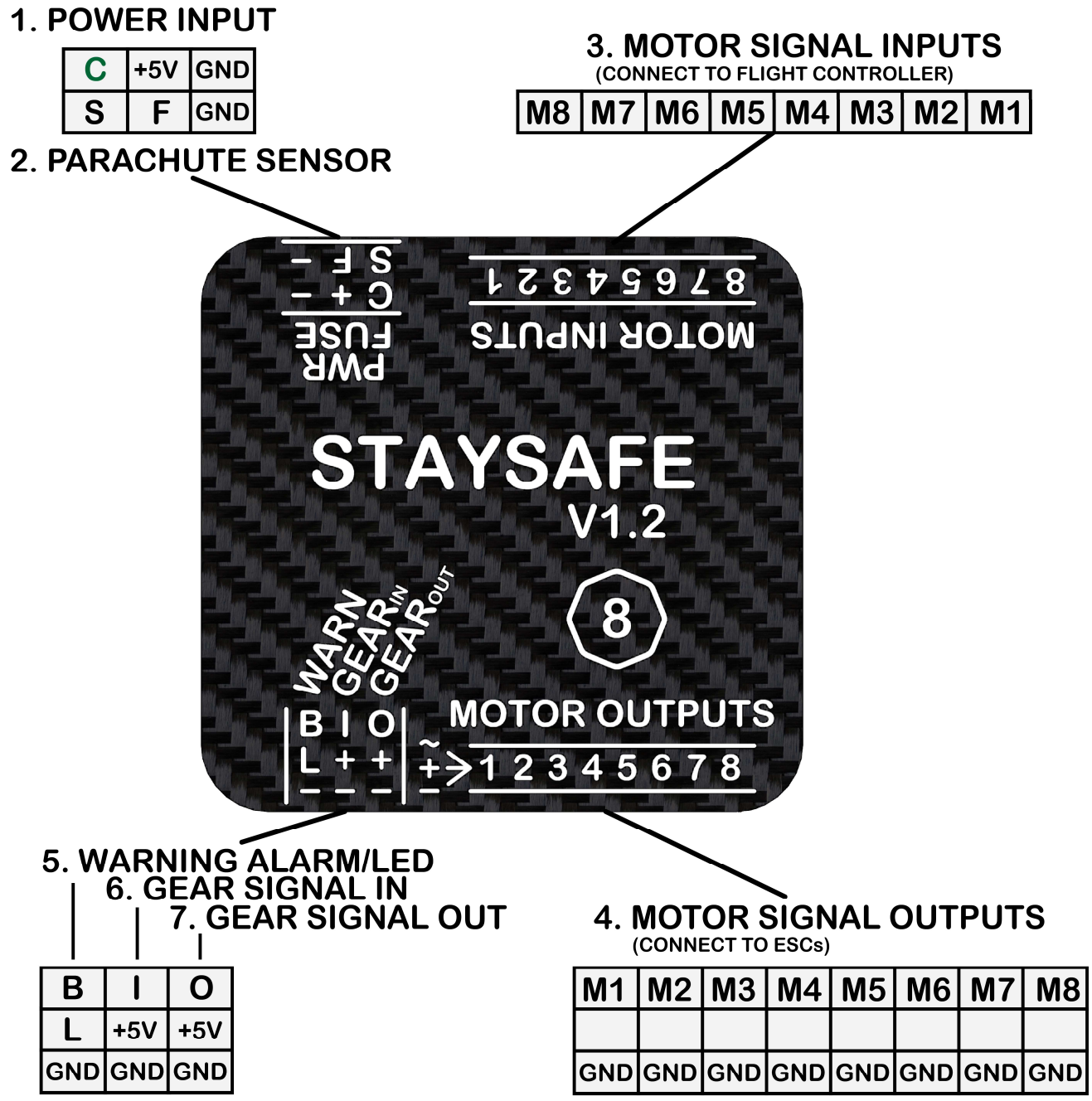
Device Description

Staysafe is an auxiliary safety system that monitors parachute deployment status. It supports up to 6 or 8 motors, depending on device version. In the case of parachute deployment Staysafe responds immediately by shutting off the motors, enabling the alarm and lowering the landing gear. The system is based on two triggering modes. In the first mode it measures mechanical fuse status, which eliminates false triggering. If the fuse is mechanically broken (parachute is physically deployed) than the device is activated. The second is PWM mode. If PWM signal indicate parachute deployment then the device is activated. When Staysafe is activated the motors are stopped by sending stop signal to ESCs, which allows the motors to stop rapidly, especially with active-breaking drive systems. The landing gear is lowered to reduce the risk of impact damage. Sound alarm is turned on in the event of fall to alert the surrounding area. Additional safety feature is preventing user to take-off without properly installed parachute, fuse or secondary battery.

Usage

The device must be properly connected and tested before the first flight. The device should be powered from a reliable 5V source from a primary battery. To start the system correctly, install the primary battery first. Staysafe will emit pulsing sound which will indicate that a secondary battery is not connected yet (or that there is problem with fuse/cables/signal) and that Staysafe is working. In this phase the motors cannot start and the landing gear cannot be raised. After connecting the secondary battery Staysafe will indicate which mode was detected. If voltage was applied to a fuse, it will beep once and start in fuse mode. In case it detect PWM signal between 500us and 1500us, it will beep twice and start in PWM mode. In both cases the aircraft is ready to take-off and all the safety features are properly configured and activated. Only one mode can be selected and only at startup. If both options are available, select FUSE mode option as it is more reliable. When Staysafe is activated it will stop the motors, lower the landing gear and sound the alarm. Please check connection diagram and flowchart for more detailed explanation of operation.

Connection Diagram



Note: Number of motor connections vary with the device version.

WARNING: Wrong connection may damage the device!

1. POWER INPUT

POWER INPUT uses standard 0.1" 3 pin connector. It is recommended that input voltage is 5V, however the device may operate normally in the range from 4.5V to 5.5V. Only regulated and reliable power source should be used. Power consumption is less than 30mA.

GND	- Ground reference connection
+5V	- Power input pin (only regulated voltage should be applied)
C	- Reserved for future use.

2. PARACHUTE SENSOR

PARACHUTE SENSOR uses standard 0.1" 3 pin connector. This is input port for parachute fuse voltage or PWM signal. Maximal fuse voltage is 16.8V. When there is no voltage difference between fuse and GND, Staysafe is activated. If PWM is connected to S, leave F pin unconnected and vice-versa. When PWM duty cycle is between 1520 and 2500us, Staysafe is activated.

GND	- Ground reference connection to trigger or launcher battery.
F	- Fuse voltage pin. Connect this to trigger side of a fuse.
S	- PWM activated input pin. 50Hz, 5V level signal is expected.

3. MOTOR SIGNAL INPUTS

MOTOR SIGNAL INPUTS use standard 0.1" 1x(6/8) pin connector. Only motor signals from a flight controller motor outputs should be connected on these pins. Pins are 5.5V tolerant. Standard 3pin servo cables can be used for this connection in horizontal orientation. Double check order of the motor signals to ensure correct operation of the device.

M1 - M8 - Motor signal input pins from flight controller

4. MOTOR SIGNAL OUTPUTS

MOTOR SIGNAL OUTPUTS use standard 0.1" 3x(6/8) pin connector. Connect ESCs to these pins. If Staysafe is disabled, ESCs will get signal directly from a flight controller. If Staysafe is activated, ESCs will get 900us (stop) signal. Double check order of the motor signals to ensure correct operation of the device.

M1 - M8	- Motor signal output pins to ESCs
/	- Middle pins are electrically insulated.
GND	- Ground reference connection for ESCs

5. WARNING ALARM/LED

WARNING ALARM/LED uses standard 0.1" 3 pin connector. This is sound alarm output and/or LED output. LED pin (L) is connected to VCC with 200 Ohm resistor while alarm pin (B) is connected to VCC directly. Ground pin is switched with MOSFET.

B	- Alarm positive (+) connection
L	- LED positive (+) connection (200 Ohm resistor inbuilt)
GND	- MOSFET controlled ground connection

6. GEAR SIGNAL IN

GEAR SIGNAL IN uses standard 0.1" 3 pin connector. This is landing gear signal input. Signal should be standard RC PWM signal with 5V logic and 50Hz. Usually connected to a flight controller or receiver.

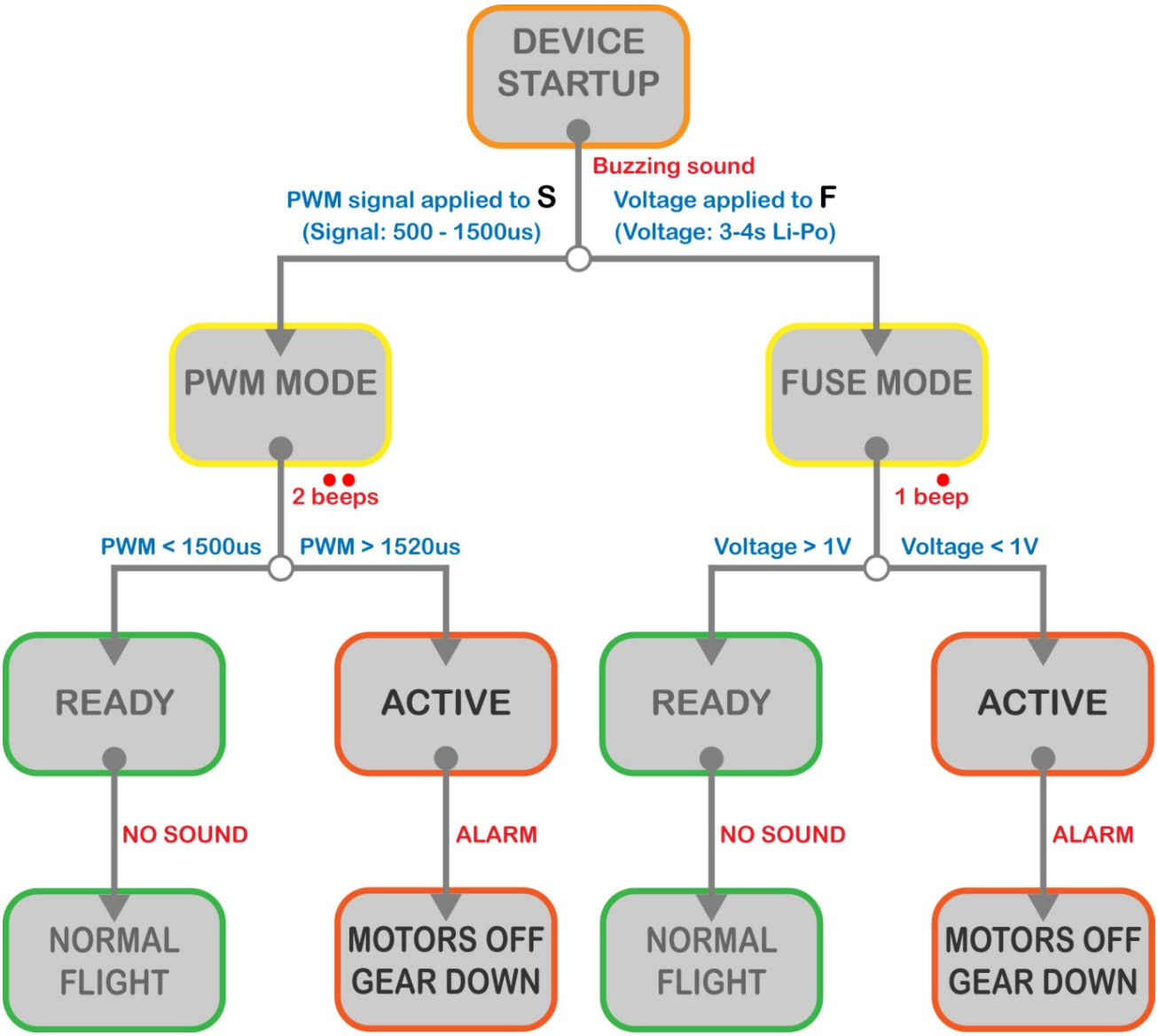
I	- RC PWM input for landing gear
+5V	- This pin is internally connected to VCC (Not for high current!)
GND	- Ground reference connection

7. GEAR SIGNAL OUT

GEAR SIGNAL OUT uses standard 0.1" 3 pin connector. This is landing gear signal output. Signal for lowering the gear is 900us, 50Hz standard RC PWM. Usually connected to a landing gear controller.

O	- RC PWM output for landing gear
+5V	- This pin is internally connected to VCC (Not for high current!)
GND	- Ground reference connection

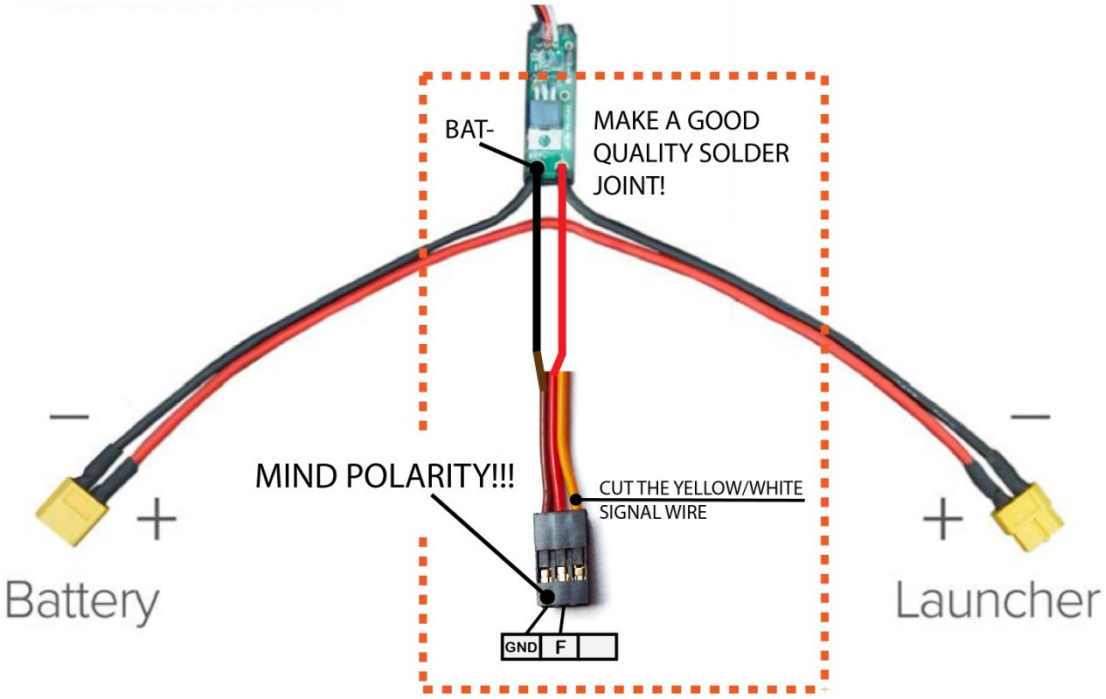
Flowchart Diagram



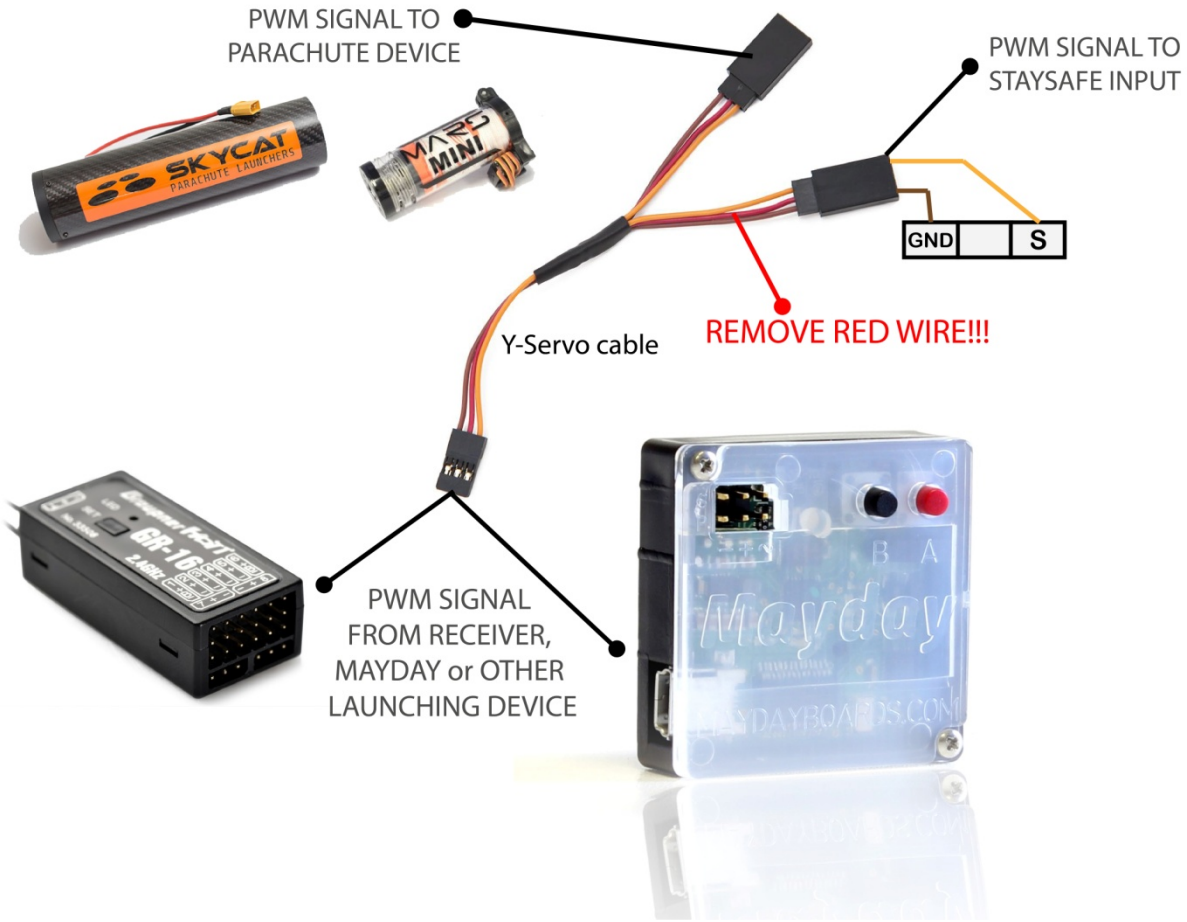
Li-Po - Lithium Polymer battery
PWM - Standard RC "pulse-width modulation" signal

FUSE Connection Example

(SKYCAT trigger is used in this example)



PWM Connection Example



Device Testing & Quality Check

Staysafe is extensively tested with more than 1.000.000 passed parachute (trigger) tests in the development stage. Each individual device has a unique serial number and is also extensively tested in all modes before shipping. A quality check report is shipped with each device.

Limited Warranty Statement

INPROSIS d.o.o grants from the date of delivery of this product for a period of 12 months. The warranty applies only to the material or operational defects already existing when you purchased the item. Damage due the wear, overloading, overvoltage, improper connections, act of god, incorrect accessories or improper handling are excluded from the guarantee. The legal rights and claims are not affected by this guarantee. Please check exact defects before a claim, because we have to ask you to pay shipping costs if the item is free from defects or has defects that are excluded from the warranty.

Technical Specifications

- Number of motors supported: 6 / 8
- Dimensions: 45x43x14mm / 1.77x1.69x0.55"
- Weight: 20g / 0.71oz
- Input voltage range: 4.5V - 5.5V
- Current consumption: 10-30mA
- Recommended input voltage: 5V ±0.1V
- Fuse sensor voltage max: 16.8V (4s Li-Po)
- PWM input signal: 50Hz, 5V, 500us-2500us
- Gear down signal: 900us, 50Hz, 5V
- Motor stop signal: 900us , 50Hz, 5V
- Sound alarm loudness: 107dB+
- Operating temperature: -25°C - +40°C / -13°F - +104°F
- Latest hardware / software version: V1.2 / V1.05
- Development tests: 1.000.000+ trigger cycles passed
- Individual device tests: 10.000 trigger cycles, 2 modes