

SafeStart

user manual

1 A big thank You.

Dear pilot.

Thank you very much for choosing the SCOUT SafeStart device.

We hope you will never come to activate the SafeStart, yet you have made a wise decision to increase your safety.

Please, do not hesitate to contact your dealer on me directly, should you need any help or advice. We would also like to get your feedback and impressions about SafeStart for further research and development.

Fly safe and enjoy
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2 SafeStart Idea

The purpose of the SafeStart device is to **prevent injuries** of pilots when starting the paramotor engine. Most prop strikes with huge damage to pilot occur when pilot start their engine and the engine instantly and unintentionally rews up to full power. Pilot may be unprepared to resist the full power of the paramotor which may result in serious injuries.

Whatever the reason may be:

- stuck carburetor needle,
- stuck throttle cable,
- forgotten cruise control,
- pilot instinctively squeezing the throttle

... either mechanical failure or pilot's error, the SafeStart device will stop the engine instantly and will not let the engine to go full power.

3 SafeStart operation

This device operates as follows:

1. If engine is off, SafeStart is in sleep mode with minimal power consumption
2. First pulse from the spark will wake up the device and the device will monitor engine's RPM.
3. Unsuccessful start attempts with RPM not reaching 1000 will be ignored.
4. If engine RPM exceeds 1000, the engine is considered to be started and a **3 seconds safety period** is engaged:
 - a. In case the revolutions exceed 2700 per minute (this threshold is adjustable), SafeStart kills the ignition instantly for 5 seconds.
 - b. If engines idles without rewing for 3 seconds, the unit will not interfere into engine's operation anymore
5. If RPM falls below 1000, the SafeStart goes into sleep mode waiting for next engine start.

4 Technical parametres

Voltage	3V (2xAAA)
Max current	9 mA
Max current in sleep mode	1uA
Input voltage range	10 to 350 V
Max engine RPM	12000
Max delay	0.6 s
Dimensions	130x60x26 mm
Weight without batteries	105g

5 Safety thresholds

Position	DIL switch			RPM treshhold	
	No.1	No.2	No.3		
000	Off	Off	Off	2700	Best for most engines (including Vittorazi Moster Classic)
010	Off	ON	Off	3300	Best for high-rew engines or engines with flash starter
001	Off	Off	ON	4000	
011	Off	ON	ON	5500*	For engines with two sparks per cycle (F200)

*Note: Some engines have two spark signals per one valve revolution, this means 5500 signals per minute correspond to 2250 RPM on engine.

6 SafeStart Installation Manual

Paramotor engines differ. Some have reverse signals in the ignition circuit and some have even two signals per revolution. It is necessary to follow this process step by step to find out what type of engine you have.

Perform installation exactly in this order. Please, do not skip any steps!

6.1 Part One: cable connection selftest

1. Turn the engine off
2. Turn the safestart device off
3. Turn the DIL switch No. 1 to the ON position. This will turn the device into selftest mode.
4. Turn the DIL switch No. 2 and No.3 into Off position
5. Connect the **red cable** to the kill-switch circuit (cable which comes from the ignition coil)
6. Connect the **black cable** to the engine block (ground). Do not connect the black cable to the paramotor frame as it is insulated from the engine via rubber silentblocks. Connect directly to the engine block!
7. Insert 2x AAA batteries into device and turn main switch on. The LED must go on for 3 seconds.
8. Start the engine and keep it on idle:
 - If the LED blinks, the device is connected correctly and you continue with step 10.
 - if the LED does not blink, go to step 9.
9. Turn the engine off. Switch the black and red cable and start the engine again. If the LED blinks, the device is connected correctly and continue with step 10. If it does not blink, something is wrong:
 - The cables might be disconnected
 - The cables might be broken inside insulation
 - The signal is out of the operating range = Safe Start is not compatible with this type of engine
 - The SafeStart device does not work properly - please contact us for assistance.
10. Turn the engine off
11. Turn the SafeStart device OFF.
12. Turn the DIL switch No1 into OFF position

6.2 Part Two: Set correct number of pulses per revolution

13. Turn the SafeStart device ON
14. Try to start the engine and run it on idle. Check the LED:
 - If the motor runs and LED is off, turn off the engine and continue with step 17.
 - If the motor does not run and the LED is on, the SafeStart has intentionally killed the engine. You need to set higher safety threshold: turn off the engine and turn the DIL switches as follows:
 - i. No.1 into OFF position,
 - ii. No.2 into ON position,
 - iii. No.3 into OFF position for 3300 rpm
15. Try to start the engine and run it on idle. Check the LED:
 - If the motor runs and LED is off, turn off the engine and continue with step 17.
 - If the motor does not run and the LED is on, the SafeStart has intentionally killed the engine. You need to set higher safety threshold: turn off the engine and turn the DIL switches as follows:
 - i. No.1 into OFF position,
 - ii. No.2 into OFF position,
 - iii. No.3 into ON position for 4000 rpm
16. Try to start the engine and run it on idle. Check the LED:
 - If the motor runs and LED is off, turn off the engine and continue with step 17.
 - If the motor does not run and the LED is on, the SafeStart has intentionally killed the engine. You need to set higher safety threshold: turn off the engine and turn the DIL switches as follows:
 - i. No.1 into OFF position,
 - ii. No.2 into ON position,
 - iii. No.3 into ON position for 5500rpm
17. Start the engine, wait for 3 seconds and add throttle to at least 4000 RPM (or above threshold set in steps 14 to 16). Motor must run and the LED must stay off.
18. Turn off the engine, keep the SafeStart unit on.
19. Turn the engine on and increase RPM immediately above set threshold. The SafeStart should kill the engine instantly and LED should be on. It will not be possible to start the engine for next 5 seconds.
20. Repeat steps 17 to 19 few times.
21. Stop the engine

6.3 Part Three: Finish installation

22. If everything worked correctly in step 20, screw the back cover on and fix the SafeStart device on paramotor securely (low vibrations, no heat exposure). Ensure that cables are secured too without danger of getting tangled.
23. Test again few times according to steps 17 to 19.
24. **Congratulations!** You can now feel safer while starting your engine. Keep the device on all the time. Good batteries should last for at least one year.
25. Check batteries sometimes: turn the device off and on again. If the LED goes green for 3 seconds, the batteries are OK.

7 SafeStart Operation Manual

Keep the SafeStart on all the time.
 Check the batteries occasionally.
 Replace batteries once a year.

8 When it is wise to turn the Safe Start off?

Turn SafeStart off when you plan to perform operation in flight that would require ability to start the engine and go to full power instantly without waiting 3 seconds.
 A known issue is performing SAT acro manouvers with engines without clutch. The backward body rotation causes backward airflow through the prop and brakes prop rotation. The engine may stall. Turning the SafeStart off prior such manuevers will enable quick restart of engine in such situation. Exiting the acro manuevers well above aground is safer, however.

9 Now, enjoy your flight!

This is the procedure to start your engine:

1. Always hold the throttle handle with kill-switch instantly accessible.
2. If starting on ground, make sure the paramotor is in stable position. When starting on your back, make sure you are strapped in and keep the prop area free of paraglider lines.
3. Start the engine
4. Wait for 3 seconds
5. Add power for warm-up and fly normally

10 Troubleshooting

Problem	Check/Solution
Engine does not start at all	Check the LED on SafeStart right after unsuccessful start. If the light is off, the SafeStart was not activated and did not kill the engine. To be absolutely sure, turn the SafeStart off and restart the engine. If the engine does not start now, there is some problem with the engine and the SafeStart is not the cause of malfunction.
Engine does not start and LED is on right after start	SafeStart will not work if your spark plug is not shielded. Use a shielded spark plug labeled "R".
Engine does not start and LED is on right after start	Make sure your cruise control is OFF. Cruise control set at throttle open will cause RPM to rise immediately after start and SafeStart will be activated.
Engine does not start and LED is on right after start	The SafeStart was activated and prevents the engine to run properly. The threshold is probably set too low for this type of engine. Do the setup in chapter 6.
Sometimes the engine starts	SafeStart was activated. Idle RPM of your engine may vary a little

Smart idea by Jeff Goin (www.footflyer.com)

Proudly designed and manufactured in Slovakia by SCOUT Aviation. (www.scoutparamotor.com)

but sometimes the engine is killed immediately by SafesStart and LED goes on.

and the set threshold is very close to these levels. Especially engines with flash starter tend to reach high RPM at the very initial phase of starting. Set higher threshold, see chapter 5.

SafeStart does not kill the engine when it should

Do the setup in chapter 6. If problem persists, please contact us. We will find a solution.
