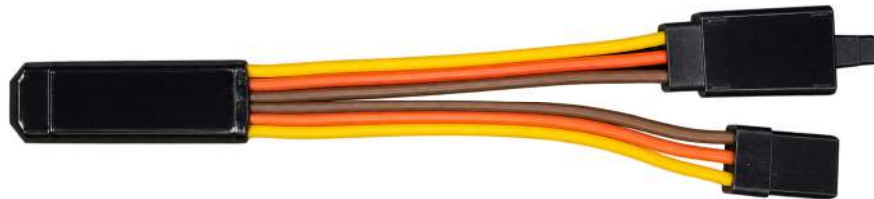


Brolga

(BROLGA AMRT BG-1)

Competition Altimeter & Automatic Motor Run Timer

User Manual



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DRAFT STATUS This document is an initial user-manual draft. Items marked TBC must be confirmed against the production hardware and released firmware before publication.

1. Introduction

1.1 About Brolga

Brolga is a compact competition altimeter and Automatic Motor Run Timer (AMRT) for electric radio-controlled gliders. It is installed inline between the receiver throttle output and the electronic speed controller (ESC).

During a flight, Brolga monitors the throttle command, measures altitude from atmospheric pressure, applies the motor-run timing required by the active firmware, determines the competition Start Height, and retains the result for inspection after the flight.

The design is intentionally simple. Normal flight operation does not require buttons or in-model configuration.

1.2 Intended applications

Brolga is intended for electric soaring applications where motor-run timing and/or barometric launch-height measurement are required. Depending on the installed firmware and applicable competition rules, this may include:

- F5J competition use, subject to the approval status of the relevant Brolga hardware and firmware.
- eRES and other electric-res soaring formats where an AMRT or altitude measurement is permitted or required.
- F5K or other competition formats where the installed firmware provides the required function.
- Vintage and recreational electric soaring where motor-run and altitude information are useful.

IMPORTANT Competition rules vary between classes and may change. The pilot is responsible for confirming that the Brolga hardware, firmware and configuration are permitted for the event being flown.

1.3 Conventions used in this manual

The term Start Height refers to the competition launch-height result determined by the active firmware. Where F5J-specific behaviour is described, it is identified explicitly.

2. Safety and Disclaimer

2.1 General safety

Radio-controlled aircraft, electric motors and propellers can cause serious injury and property damage. Treat the propulsion system as live whenever the flight battery is connected.

- Switch the transmitter on and confirm the throttle is fully off before powering the model.
- For setup or bench testing, remove the propeller or otherwise make the propulsion system mechanically safe.
- Check connector polarity before applying power.
- Secure Brolga and all wiring so that they cannot move into rotating parts or become disconnected in flight.
- Do not operate a damaged, wet, overheated or visibly modified unit.
- Perform a complete throttle and motor-cutoff test before flight after any installation, firmware or radio-programming change.

2.2 Disclaimer

SAFETY AND LIABILITY All reasonable care has been taken in the design, manufacture and testing of Brolga. However, radio-controlled aircraft and their associated electrical and mechanical systems involve inherent risks. To the extent permitted by law, the manufacturer cannot accept responsibility for injury, loss or damage to persons or property arising from the installation, operation, failure or misuse of the unit. It is the responsibility of the user to ensure that Brolga is correctly installed and that the complete radio-control and propulsion system is thoroughly tested before flight. Never rely on Brolga as the sole means of ensuring safe operation of the aircraft or propulsion system. Nothing in this disclaimer excludes any rights or remedies that cannot lawfully be excluded.

2.3 Competition responsibility

The competitor remains responsible for compliance with the current rules of the event being flown. Competition approval, where required, may depend on both the Brolga hardware version and the installed firmware version.

3. Specifications

3.1 General specifications

Parameter	Specification
Device type	Competition altimeter / Automatic Motor Run Timer
Altitude measurement	Barometric
Pressure sample rate	10 Hz
Displayed altitude resolution	0.1 m
Competition Start Height	Whole-metre result where required by the active competition firmware
Display	96 x 16 pixel OLED
Receiver input	Standard RC throttle PWM
ESC output	Standard RC throttle PWM
Motor-start threshold	Throttle pulse width greater than 1200 us
Flight data	DAT-format flight logging
Power	Powered through the receiver/ESC servo connection
Supply-voltage rating	4V to 12.6V
Dimensions	30 x 12 x 7 mm
Weight	7g (including cables)
Firmware version	Shown during startup

3.2 Electrical and environmental limits

Final production limits for supply voltage, operating temperature and storage temperature are TBC and must be verified before publication.

DO NOT EXCEED RATINGS Do not operate Brolga outside the electrical or environmental limits stated.

4. How Brolga Works

4.1 Functional overview



Figure 1 - Standard signal path

Brolga sits directly in the throttle signal path. It reads the receiver command and generates the corresponding output to the ESC while applying the timing and competition behaviour defined by the installed firmware.

1. The receiver provides the throttle PWM signal to Brolga.
2. Brolga monitors the throttle signal and determines when the motor has started.
3. Altitude is measured continuously from atmospheric pressure.
4. The motor command is passed to, or limited for, the ESC according to the active AMRT rules.
5. At the end of the launch sequence, Brolga determines the Start Height.
6. The result is displayed, stored across power cycles and written to the flight log.

4.2 Barometric altitude measurement

Brolga measures atmospheric pressure and converts pressure changes into relative altitude. A reference is established during power-up, so the unit should be allowed to initialise under stable conditions.

Because atmospheric pressure also changes with weather, small changes in indicated ground altitude over time are normal. Display resolution and absolute measurement accuracy are not the same thing.

PRESSURE ACCESS Do not seal Brolga in an airtight enclosure. The pressure sensor must be able to sense the air pressure inside the fuselage.

4.3 Motor-start detection

The current firmware design detects motor start when the receiver throttle pulse width exceeds 1200 us. The transmitter must therefore provide a sufficiently low motor-off signal during startup and a sufficiently high signal when motor power is commanded.

Note that the Brolga firmware provides compliance with the latest FAI rules which requires the output to be held at 900 us until the motor start pulse at 1200 us is detected.

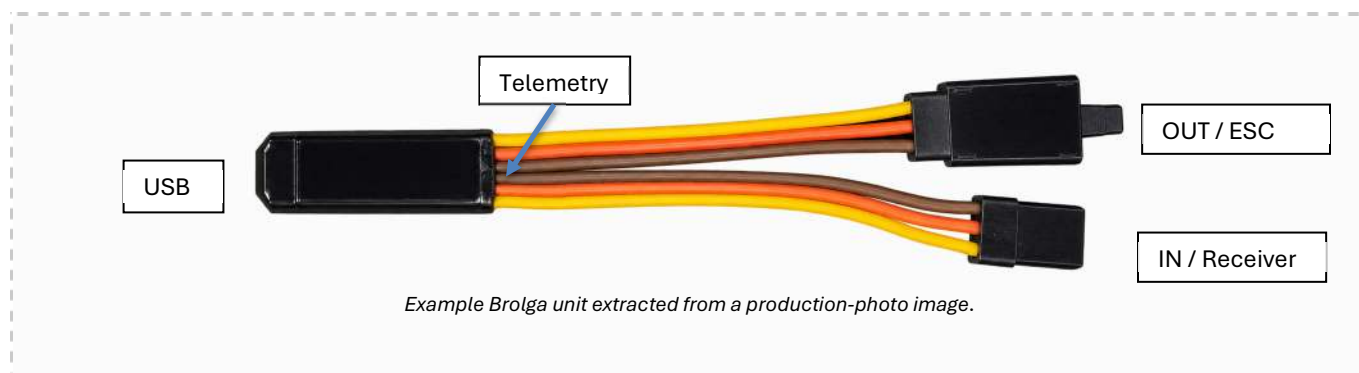
4.4 Start Height sequence

For the current F5J-oriented operating sequence, a detected motor start clears the previous result and begins the launch sequence. The motor-run limit is 30 seconds. The Start Height measurement continues through the 10-second period following motor stop, after which the result is retained and displayed.

FIRMWARE DEPENDENT Exact competition timing and restart behaviour must match the released firmware and applicable competition rules.

5. Hardware Description

5.1 Main features



5.2 Connections

Parameter	Specification
IN / Receiver	Connect to the receiver throttle output.
OUT / ESC	Connect to the ESC throttle input.
USB	Computer / flight-file / firmware function - final production behaviour TBC.
Telemetry	Not documented in this manual unless included in the released production firmware.

5.3 Servo lead polarity

Observe the standard servo-lead polarity used by the production harness.:

- Ground - BROWN
- Positive supply - RED
- Throttle signal - ORANGE

POLARITY Incorrect connection or reversed polarity may damage Brolga, the receiver, ESC or other equipment.

6. Installation in the Aircraft

6.1 Mounting location

- Mount Brolga securely inside the fuselage.
- Do not place it in an airtight compartment.
- Avoid direct propeller blast, strong local pressure pulses and locations immediately beside large heat sources.
- Keep the unit and wiring clear of pushrods, linkages and rotating parts.
- Avoid contact with conductive surfaces that could short the electronics.
- Secure connectors so that normal vibration or handling cannot disconnect them.

6.2 Standard installation



Figure 2 - Standard installation

Connect the receiver throttle output to Brolga IN, then connect Brolga OUT to the ESC throttle lead. Brolga is powered through the servo connection path.

6.4 Installation check

1. Remove the propeller or make the propulsion system mechanically safe.
2. Switch the transmitter on.
3. Set throttle fully off.
4. Power the model.
5. Confirm that Brolga starts normally and that the motor does not start unexpectedly.
6. Verify correct motor operation and confirm the expected motor cutoff behaviour.
7. Power down and re-check connector security before flight.

7. Power-Up and Initialisation

7.1 Before applying power

- Transmitter ON.
- Throttle fully OFF.
- Model stationary where practical.
- Pressure sensor exposed to normal fuselage air pressure.
- Propulsion system safe during initial setup.

7.2 Startup sequence



On power-up, Brolga displays its splash screen, then the firmware version, followed by the previous Start Height result or dashes if no valid result is stored. It then enters the ready state.

7.3 Previous result

The previous Start Height is retained across power cycles. This allows the result to be inspected after the aircraft has been switched off and powered again.

When a new motor start is detected, the previous result is cleared and the display changes to the active-flight state.

7.4 Initial altitude reference

Brolga establishes its pressure reference during startup. For best repeatability, avoid squeezing the fuselage, blowing directly over the unit or moving the model through a strong pressure gradient during initialisation.

8. Flying with Brolga

8.1 Before launch

After initialisation, confirm that the display indicates the expected ready state and that the propulsion system responds correctly.

8.2 Motor start

When the throttle command exceeds the motor-start threshold, Brolga recognises the beginning of the motor run. The previous Start Height is cleared and the launch sequence begins.

8.3 Motor run and cutoff

In the current F5J-oriented firmware, the maximum permitted motor run is 30 seconds. If the pilot switches the motor off earlier, Brolga detects the motor stop and proceeds to the Start Height measurement period.

At the applicable time limit, Brolga prevents further motor drive according to the active firmware.

8.4 Start Height measurement

The current design uses a 10-second post-motor measurement period as per F5J rules. The Start Height is determined from the altitude history for the launch sequence in accordance with the active competition firmware.

After the measurement period, the Start Height result is displayed and stored.

8.5 Landing and power-off

The stored result remains available after power is removed. On the next power-up it is shown during the startup sequence until a new motor run begins.

9. OLED Display

The 96 x 16 OLED is intended to provide the essential information needed at the model without requiring buttons or menus.

9.1 Screen reference

Startup splash



Actual 96 × 16 startup splash rendered by the firmware. The screen includes a simple bird motif at left and a bold BROLGA wordmark.

Firmware version



Version screen rendered from the current source code. Note that the display routine intentionally renders zeroes as the letter O, so version 1.00.52 appears as F5J v1.OO.52.

Dashes screen



This same screen is used for multiple states: no stored result, motor running, the 10-second post-motor measurement period, and a suppressed result after a qualified emergency restart.

Stored / final result example



Result display from the firmware. A small A is shown at the left and the stored altitude is shown large at the right.

Screen	Typical display	Meaning
Splash	Brolga	Power-up identification.
Firmware	FW x.xx	Installed firmware version.
Previous result	123.4 m	Last stored Start Height.

Screen	Typical display	Meaning
No stored result	---.- m	No valid previous Start Height.
Active flight	TBC	Display shown after motor start.
Final result	123.4 m	Measured Start Height for the completed launch sequence.
Error / status	TBC	Any released error or service indications.

9.2 Display resolution and competition value

Altitude is displayed to 0.1 m resolution. Where the competition rules require a whole-metre Start Height, the released competition firmware applies the required whole-metre treatment. For the current F5J implementation this is intended to round down to the full metre.

DO NOT CONFUSE RESOLUTION WITH ACCURACY A display resolution of 0.1 m does not imply an absolute barometric altitude accuracy of +/-0.1 m.

10. F5J Operation

10.1 Scope

This section describes the intended F5J operating sequence of the current Brolga design. It must be checked against the released competition firmware and current FAI requirements before publication.

10.2 Launch sequence

1. Power the model with throttle fully off and allow Brolga to initialise.
2. Motor start is detected when the throttle signal exceeds the configured start threshold.
3. The previous result is cleared.
4. The motor may run until the pilot stops it or the 30-second motor-run limit is reached.
5. After motor stop, Brolga continues the Start Height measurement period for 10 seconds.
6. The resulting Start Height is displayed and stored.

10.3 Competition approval

Do not assume that a particular Brolga hardware or firmware version is approved for F5J unless that approval has been explicitly confirmed by the relevant competition authority or published in the current product documentation.

11. Flight Data Logging

11.1 Flight files

Brolga records flight data in DAT-format files intended for later inspection and analysis. The final published manual should list the exact channels stored by the released firmware.

Expected logged information may include altitude, throttle input, throttle output and launch-event timing. These fields are TBC until the production logging format is frozen.

11.2 Storage

User-facing storage capacity, file numbering behaviour and memory-full behaviour are TBC. These details should be added after production firmware validation.

12. Connecting Brolga to a Computer

12.1 USB connection

The current hardware development includes USB connectivity. Final user behaviour - including whether the unit appears as removable storage, how flight files are accessed and how firmware is updated - is TBC for the production release.

12.2 Flight-file access

Once the production USB behaviour is confirmed, this section should provide a short step-by-step procedure for copying DAT files to a computer or supported mobile device.

12.3 Brolga software

Where separate Brolga software is provided for flight review or firmware management, the detailed software instructions should be kept in a separate guide so that the aircraft installation manual remains simple.

13. Firmware Updates

13.1 Checking the firmware version

The installed firmware version is shown during the startup sequence. Record this version when reporting a problem or checking competition approval.

13.2 Updating firmware

1. Connect the Brolga to a computer using a USB cable.
2. The Brolga will appear as a USB storage drive. Use quick format if asked to initialize the drive.
3. Copy the firmware file **FIRMWARE.bin** to the Brolga drive.
4. Disconnect the Brolga from the USB cable, then reconnect it.
5. The firmware update will start automatically.

FIRMWARE UPDATE Do not remove power or disconnect the data connection while a firmware update is in progress unless the documented recovery procedure specifically instructs you to do so.

14. Pre-Flight Check

- | | |
|--------------------------|--|
| ☐ | Brolga is securely mounted. |
| ☐ | Receiver and ESC connectors are fully inserted and correctly oriented. |
| ☐ | Pressure access is unobstructed. |
| ☐ | Transmitter throttle is fully off before power-up. |
| ☐ | Startup sequence completes normally. |
| ☐ | ESC and motor respond correctly. |
| ☐ | Motor cutoff behaviour has been verified. |
| ☐ | Correct firmware is installed for the intended event. |
| ☐ | No wiring, enclosure or component damage is visible. |

15. Troubleshooting

Problem	Possible cause	Action
No display / no startup	No power, reversed connector, damaged lead	Disconnect power. Check polarity, connectors and supply.

Problem	Possible cause	Action
Motor does not run	Output connection, throttle range, AMRT state	Check receiver output, ESC connection and restart the system if appropriate.
Motor starts unexpectedly	Throttle not fully off or radio programming error	Make propulsion system safe and correct the transmitter throttle setup before further testing.
Motor start is not detected	Throttle pulse does not exceed 1200 us	Check transmitter output range and throttle endpoint.
Ground altitude drifts	Normal atmospheric-pressure change	Small slow changes are normal. Re-power before the flight if a fresh reference is required.
Start Height appears incorrect	Pressure sensor obstructed or strong local pressure effects	Check mounting, pressure access and flight log.
Previous result disappeared	A new motor start was detected	Normal behaviour: a new launch clears the previous result.
Computer does not detect unit	Cable, USB mode or firmware issue	Use a known data-capable cable and follow the released USB procedure.
Display blank after update	Interrupted or failed firmware update	Contact Support

16. Care and Maintenance

- Keep the unit dry. Unless explicitly stated otherwise for the production enclosure, Brolga is not waterproof.
- Clean with a dry or slightly damp cloth only. Do not use solvents.
- Keep the pressure-sensor opening or vent path clear.
- Inspect wiring and connectors after a hard landing, crash or unusual vibration.
- Do not fly a unit showing corrosion, cracked components, damaged insulation or intermittent operation.

17. Technical Notes

17.1 Barometric measurement

Relative altitude is derived from atmospheric pressure. Rapid pressure changes caused by airflow, squeezing a sealed fuselage or obstructing the sensor can disturb the reading.

17.2 Altitude resolution and accuracy

The display resolution is 0.1 m. This is the increment shown on the display and should not be interpreted as the guaranteed absolute accuracy of the altitude measurement.

17.3 Throttle PWM

The receiver input and ESC output use standard RC pulse-width control. Motor-start detection is currently set above 1200 us. The final manual should also state the accepted input range and the output behaviour at invalid or missing input signals once those behaviours are frozen in firmware.

18. Competition and Regulatory Information

18.1 Competition approval

FAI Approval for the Brolga Unit is currently pending

18.2 Rules

The event organiser and current competition rules take precedence over this manual where there is any difference in interpretation.

18.3 Regulatory compliance

Brolga is an extra-low-voltage electronic accessory intended for use in radio-controlled model aircraft. It is powered from the model's receiver/ESC BEC supply and does not contain an intentional radio-frequency transmitter.

Brolga operates entirely below 120 V DC and is therefore outside the scope of the Electrical Equipment Safety System (EESS) requirements for in-scope electrical equipment. General product and electrical safety requirements nevertheless continue to apply.

Any regulatory markings shown on the product or packaging apply only to the markets for which compliance has been established.

19. Disposal

At the end of its service life, do not dispose of Brolga with general household waste where electronic-waste recycling facilities are available. Use an appropriate local electronic recycling service.

20. Support

Parameter	Specification
Website	TBC
Support email	meyer.andrewc@gmail.com
Firmware downloads	Via Email
Documentation	User Manual

When reporting a problem, include the Brolga hardware version or serial number if available, firmware version, receiver type, ESC type, a description of the installation, and the relevant DAT flight file where possible.

21. Revision History

Revision	Date	Changes
0.1	31 Aug 2026	Initial user-manual draft and structure.

Appendix A - Quick Start Guide

SAFETY For bench setup, remove the propeller or otherwise make the propulsion system mechanically safe.

1. Connect receiver throttle output -> Brolga IN.
2. Connect Brolga OUT -> ESC throttle input.
3. Switch the transmitter on and set throttle fully off.
4. Power the model and allow Brolga to initialise.
5. Confirm the expected ready indication.
6. Verify throttle and motor-cutoff operation before fitting or enabling the propeller.
7. Fly the launch sequence.
8. After the measurement period, read the Start Height from the OLED.
9. The previous result remains stored after power-off until a new motor run begins.

Appendix B - Detailed Technical Specifications

Parameter	Specification
Device type	Competition altimeter / Automatic Motor Run Timer (AMRT)
Altitude measurement	Barometric
Barometric sensor	Bosch BMP280
Barometric pressure range	300–1100 hPa
Pressure sample rate	10 Hz
Displayed altitude resolution	0.1 m
Competition Start Height	Whole-metre result where required by the active competition firmware
Display	96 × 16 pixel OLED
Receiver input	Standard RC throttle PWM
Receiver input pulse-width range	Approx. 800–2200 µs
ESC output	Standard RC throttle PWM
ESC output pulse-width range	Approx. 800–2200 µs
Motor-start threshold	Throttle pulse width greater than 1200 µs
Flight data	DAT-format flight logging
Flight-log storage	8 MB non-volatile flash
Flight-log capacity	Multiple flight logs; capacity dependent on flight duration
Data retention	Flight logs and previous result retained without power
Power	Powered through the receiver/ESC servo connection
Supply-voltage rating	4.0–12.6 V
Typical current consumption	<25 mA
Maximum current consumption	<50 mA
Operating temperature	–20 to +50 °C
Storage temperature	–30 to +80 °C, provisional
Dimensions	30 × 12 × 7 mm
Weight	7 g including cables
USB connector	USB Type - Micro
USB interface	USB mass-storage interface for flight-log access and firmware transfer

Firmware version	Shown during startup
Hardware revision	Identified on PCB
Compliance markings	TBC following production compliance assessment