DUO DISCUS FES & BATTERY OPERATION CHECKLISTS

Battery Installation

All cables ..... On side hooks

On-Battery display ..... "BMS OFF , BATTERY OK"

Note: FCU battery levels will show last value until master switch is ON

Batteries .....Check for any visual damage

Warning: Even small, visually detectable damage implies that the affected battery is not airworthy.

Battery compartment cover..... OPEN

Guarded Power switch .....OFF

Avionics Master switch .....OFF

Battery packs.....Install

Battery retaining Plates.....Install & secure

Blue & Red Power cables .....Install

DATA cable connectors (2).....Install

Caution: Before inserting the DATA cable connector, make sure that the orientation is correct. Connector should be plugged in straight, otherwise pins could be damaged.

On-Battery display ......"BMS OFF , BATTERY OK"

Note: FCU battery levels will show last value until master switch is ON

Leave Batteries disconnected until at takeoff position

Battery compartment cover.....Close

Push out

Precut tape and place on fuselage.

Pre-flight test run

After installation of battery packs, it is advised to perform short motor test run on the ground. Short motor run is also recommended before the first flight of a flying day.

Propeller cover and tail dolly.....Remove

Run Up area..... On pavement, Clear area of rocks

Battery compartment cover ..... Open.

Guarded Power switch..... OFF

Battery BMS switches.....ON

Battery self-checks ..... Indicate Complete

Connecting Cable ..... Insert

Battery compartment cover ..... Close and seal with tape

Canopy ..... Closed

Forward and eyeball vents ..... Open

Prop area.....Clear

FCU ON/OFF Switch.....ON
Normal screen appears.

Guarded Power Switch .....ON

CONTROLLER READY..... Displayed

VOLTS & AMPS .....Displayed

FCU Throttle knob .....Rotate (do not push) 1200-1500 RPM
.. Then OFF

PROPELLER PARKED ..... Displayed

Guarded Power Switch .....OFF

Leave FCU powered at all times until after landing

Operation

Forward and eyeball vents ..... Open

Guarded POWER SWITCH .....ON

CONTROLLER READY .....Displayed

FCU throttle knob..... Rotate (no push)

Operate as required- leave vents open during operation

Each battery icon = 10% capacity

Avoid high power settings below 50% battery

Voltage Ranges:

Normal maximum voltage:119 V

95V under load: reduce power to < 8KW unless emergency

90V under load: Critical low power – shut down unless emergency

Maximum Temperatures:

	Motor	Controller	Batteries
Caution	70°C	70°C	45°C
Warning	90°C	90°C	55°C
Critical LAND ASAP			75°C
Max temp difference between batteries			3°C

When complete:

PROPELLER PARKED ..... Displayed

Leave FCU powered at all times until after landing

Vents ..... as required

After landing /Parking and Securing

Guarded POWER SWITCH..... Check OFF

FCU ON/OFF switch .....OFF

BMS Switches on-Battery ..... OFF (0)

Battery Connector cable..... Remove & Store

Batteries ..... Remove to storage

Battery Removal

Avionics Master switch .....OFF

Battery compartment cover ..... Open

Battery Connector Cable .....Removed

Battery power cables .....Remove

Cables .....Store on wall hooks

DATA connector cables .....Remove

DATA cables .....Store on wall hooks

Battery pack fastening knobs .....Unscrew.

Battery retaining plates.....Remove.

Batteries (each) .....lift out by strap

Batteries ..... Transport in designated box

Battery compartment cover ..... Close.

Caution: Always use a transport box or similar for transport and storage of the batteries to protect them from mechanical damage. Make sure you store battery packs in a dry and safe place. Read FES Battery pack manual section 7 and 8 for further instructions

Battery Charging

RED + and BLUE - cables ..... Connect from charger to battery pack

BMS-Charger communication cable ..... Connect

Charger ..... Plug in to outlet (220V AC, 50-60Hz).

BMS switch on top of the battery pack cover .....ON

> Immediately after BMS is switched ON, the BMS starts a test procedure - a check of all 14 cells, one by one. Red »Error LED« turns ON during system's test procedure and turns OFF again when the test is completed without error.

When the test procedure is completed:

- The green »Power LED« starts blinking, indicating that the BMS is working in the normal mode, and BMS sends a signal to the charger to start charging.
- Orange LED on front panel of the charger lights up, which indicates charging. It is also possible to hear the contactor "click" inside of the charger.
- Charging current increases slowly to the maximum value of 9A (or 18A at 1200W) and charger cooling fans turn on after a while.

In normal mode, the green “BMS Power” LED is flashing.
This means that the BMS is turned ON, but not necessary balancing. Balancing starts when one cell reaches a pre-set balancing voltage value, usually 4.1 (this can be changed using BMS Control Software).

- If one or more cells have higher voltage than the others, they will be discharged and the BMS temperature rise will be minimal.
- In case that one cell has lower voltage than the others, all cells with higher voltage will need to be discharged to reach a balanced stat. This leads to higher BMS temperature rise, even if the voltage difference is only 0.010V (10mV).

The red “Error LED” is ON only during the initial test procedure. After the test is finished it turns OFF. If a system error is detected the LED blinks a certain number of times followed by a pause. The number of blinks identifies the error as per table in chapter 4.1.

When the first cell reaches 4.160V, charging current is reduced. If there is a big difference between the cells (more than 50mV), it can take long for all of them to reach 4,16V, as charging current is reduced to 1 A.

When all cells reach 4.160V (+/- 2mV),

- BMS sends a signal to the charger to stop charging.
- The Green OK Check mark LED starts glowing Green.
- This indicates that the charging cycle was completed properly.

Warning: Both battery packs **must have** approximately the same cell voltage levels (close to 4.16 V per cell), before usage. Using two packs with too much difference in voltage is not allowed!

Maximum 1 V difference between total voltages of both packs is acceptable.

For instance, Pack 1: 58.1 V (average 4.150 per cell), Pack 2: 57.11 V (4.080 V per cell), this is just acceptable! Bigger voltage difference is not acceptable!

Removal from Charger

BMS switch.....OFF

Charger ..... Unplug at outlet

Charging cables and signal cable ..... Unplug from battery pack