

AEROS NANOLIGHT TRIKE

ANT-E

QUICK GUIDE



Wing: Combat-T, Discus-T, Fox-13TL, Fox-T

Electric power plant

Manufactured by:

AEROS Ltd
Post-Volynskaya St.5
Kiev 03061
UKRAINE

Tel: (380 44) 455 41 20
Fax: (380 44) 455 41 16
E-mail: info@aeros.com.ua
<http://www.aeros.com.ua>

Important notices

This guide contains the most important information about ANT-E trike. Even that ANT-E is very simple to operate there is still required some basic understanding, as electric drive is quite different from other propulsion systems. It was prepared as a guide to pilots, before their first flight with ANT-E, in order to do it in proper and safe way. This Quick Guide should only be used as a refresh document prior to flying and not as a substitute for the full manual. Users should check for the latest versions and review the full ANT Owner/Service Manual.

Refer to the ANT Owner/Service Manual for complete information regarding the trike operation.

For more information regarding the E-drive please refer to the E-drive manufacturer:

<http://www.geigerengineering.de>

1. Trike Assembly Procedure

The trike comes in two bags – the trike and the motor with controller. The package includes also the propeller, the upper pylon and the front brace tube.

1.1 Unzip the bag with the trike.



1.2 Open the front lower beam with the front wheel. Be careful not to drop the SDI (Smart Drive Interface) / ADI (Advanced Drive Interface) unit. Take care about the throttle cable not to break it. Remove the protection bag from the SDI (ADI) unit. The ADI fixed it to the lower beam joint together with the lower front beam. Install the bolts, install the butterfly nuts and secure them with safety rings. Tighten the bolts with their arms firmly.

The SDI is installed to the corresponding pocket and fixed with Velcro.

Trike with ADI device:



Trike with SDI device:



1.3 Extract both landing gear legs and lock them in position with the lock system.



Make sure the both legs of the landing gear are locked:



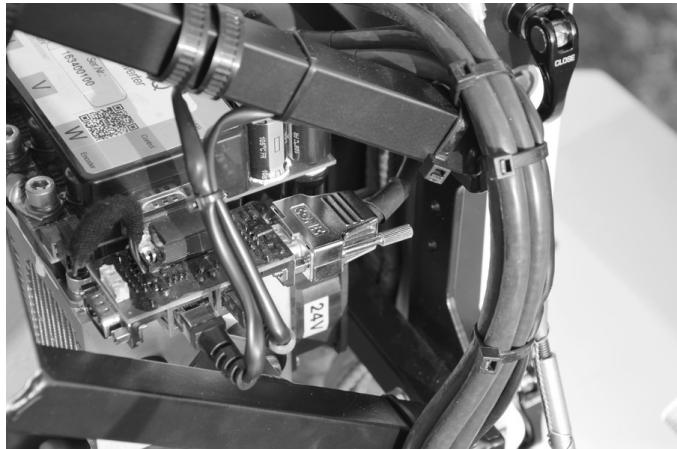
1.4 Open the bag with the motor. Mount the motor on the trike by installing two bolts: upper one and lower one. Install the bolts, install the butterfly nuts and secure them with safety rings. Tighten the bolts with their arms firmly.



Make sure the cable with COM port stays inside the engine mount when mounting the motor.



1.5 Connect the COM port to the controller and tighten it firmly with the screws.



1.6 Connect battery management system cables to the batteries. Connect power cables. Tie the cables together with bundle ties as shown on the photo.



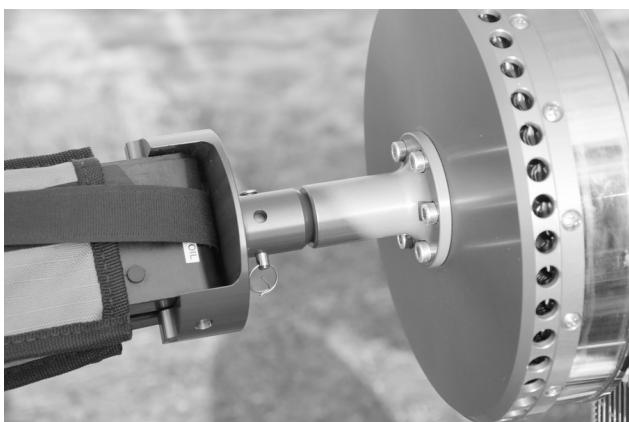
1.7 Install the main upper pylon and fix it with the lower bolt and butterfly nuts and secure with safety rings. Do not tighten the bolt for now.



1.8 Install the front brace tube, attaching it first to the main upper pylon (*Photo20*) and then to the front lower beam.



1.9 Install the propeller and secure it with a pin and a safety ring.



Now your trike is ready for attaching the wing.

Refer to the ANT Owner/Service Manual for more information.

2. Starting the engine

2.1 Press and hold for 1 second the green button (aftermost button) on the battery unit (aftermost battery) for to switch on the battery management system.

It takes 20-25 seconds until the SDI (ADI) display screen lights up. After the system finish self check it will make a single beep.



2.2 Set the potentiometer (throttle pedal) to idle position. Press and hold for 1.5 second the start button on the ADI (SDI) unit. The system will be ready to operate and will play a continuous intermittent sound. After you move the throttle the engine will start and the sound will disappear.

The motor can be deactivated at any time by pressing the start button quickly on the ADI (SDI) unit.

SDI (Smart Drive Interface)



ADI (Advanced Drive Interface)



WARNING:

Keep in mind that while the continuous beep sounds, the engine is active and can be started. This mode is equivalent to the idle mode of the conventional piston engine. Be extremely careful and clear prop.

When the potentiometer / throttle pedal moves in the direction of increasing the rpm, a 4-stage process is started, accelerating the drive. At the first stage, about 0.5 seconds, the folded propeller smoothly opens. The next acceleration phase takes about 1 second and accelerates the drive to about 75% of the rated rpm. The third phase lasts about 0.5 seconds and outputs the motor at 100% speed. At this phase, the propeller develops full thrust. When the safety button is deactivated or the throttle pedal (potentiometer) is returned to the off position, the engine will stop with a delay of 1.5 seconds. Then the engine is installed on the brake position, so that the propeller is folded in flight. If the throttle pedal (potentiometer) is set to a position greater than the minimum, the engine brake is deactivated.

WARNING:

Avoid keeping magnetic memory cards and electronic devices near the motor, since the effect of an alternating magnetic field can lead to erasure of data. The same applies to magnetic sensitive medical devices (such as pacemakers and others)

WARNING:

Special attention should be paid to the minimum clearance between the rotor and the stator. It is only a few tenths of a millimeter, which is why the probability of foreign bodies entering this gap is high. If this happens, it is necessary to blow the engine with compressed air or apply thin strips of non-magnetic foil. A special case is the ingress of iron / steel filings into the gap, as a result they strongly adhere to the magnets. This can be eliminated by disassembling the engine by the manufacturer.

The E-drive system has control algorithms that come into effect when exceeding any limit values, while trying to limit or correct the error. This allows increasing the service life of the system. If there is unwanted limitation of engine speed, then you must immediately make a safe landing. Re-start can only be done after the fault has been fixed.

ATTENTION:

There may be a yellow button to control the motor's reverse installed next to your ADI display or on the right side of the seat frame. This button can be used on the landing run to reduce the run distance. The reverse can be activated when the throttle is set to zero.

To activate the reverse set the throttle to zero, press the reverse button and move the throttle pedal forward.

WARNING:

It is prohibited to use the reverse button in flight - this can cause a dangerous loss of speed.

3. ENGINE CONTROLLER PI300

FUNCTIONALITY

The accidental start of the engine is prevented by the controller. The signal to the controller for the possibility of starting is the "minimum" position of the throttle pedal. The readiness signal for the pilot is an intermittent sound signal.

The following parameters are recorded, monitored, or influenced by PI300:

- Motor temperature
- Battery temperature
- Output temperature
- Battery status
- Discharge current
- Consumed capacity / energy
- Rotor speed
- Power
- Running hours

TROUBLE-SHOOTING

Malfunction	Possible cause of malfunction	Troubleshooting method
The inverter does not control the motor speed	Connection to BMS interrupted	Insert the communication wire in the controller or check its integrity
The temperature of the inverter rises too fast and falls too slowly	The cooler does not work The airflow through the cooler is blocked	Check the cooler and its connection Check for sufficient airflow
RPM too low	The throttle potentiometer is not calibrated The current limit is reached, since the propeller is overloaded	Calibrate the throttle potentiometer Set the propeller to a smaller pitch

4. BATTERY

The battery consists of series of cells on a Lithium-Ion base.

There is a built-in battery management system used in the batteries (BMS).

BATTERY CHARGING

There are several ways to charge the Multimaster system:

1. Batteries are disconnected from the power plant, removed from the trike.
 - a) Connect the charger to each battery and start the charging process by turning on each battery with the On button.
 - b) Connect the charger to both batteries via the charger distribution box and start the charging process by turning on each battery with the On button.

ATTENTION:

The batteries must always have the same charge.

2. The batteries are connected to the power plant:

- a) Connect the charger to each battery individually and start the charging process by turning on only one of the batteries by pressing the On button.
- b) Connect a single charger to the master battery and start it with the On button. After the charging process is started on the master battery, start the connection to the engine controller by pressing again the On button on the master battery for 2 seconds. Thus, all batteries are charged through the power switch channel.

BATTERY STORAGE

If the battery is stored for more than 6 weeks, the advantage for its lifespan will be a reduction to a certain level of charging. To start the appropriate charging function, connect the charger to the battery and hold the On button on the BMS for more than 7 seconds. Entering this mode is confirmed acoustically by acceleration of the sound signal. The LED indicator on the battery will flash alternately green and red. The process may take several days depending on the capacity of the battery, especially if it was fully charged at the time the function was started. If the battery is stored for a very long time, this charging function should be performed every 6 months.

To ensure the battery long life, follow simple rules:

- Never pull out the plug of the charger under load. Always turn off the BMS with the On/off button (press for more than 4 seconds).
- Never leave the battery fully charged or discharged.
- When the battery is fully discharged, charge it at least 50% as soon as possible to avoid deep discharge (Storage mode);
- Store batteries in a dry place at normal temperature. Storage temperature should be in the range of +10 ° C to +25 ° C.
- Never leave the battery under direct sunlight.
- Lithium-ion batteries can only be recharged using the charging system included in the kit.

5. DUO LED INDICATOR

Using the LED indicator (red / green), the following information can be read: charging status, operational readiness or damage. The code for the glow / blink of the LED is explained in the table below.

LED Status	Description
Green glowing	Battery is powered and ready. Blinking duration relative to off duration displays the capacity. For example 75% green duration and 25% off duration indicates 75% rest capacity. Green permanent on means capacity is 100%
Red blinking	Red LED blinking - Error! Look for detailed Information at the drive display or read out the failure with the E-Drive Studio using USB Connection.
Alternate blinking red / green	Red/Green blinking with 0,5sec. Duration on each colour displays charging active.
Alternate blinking red / green	Red/Green blinking fast with 0,1sec. Duration on each colour displays charging is active in Storage mode.
Green blinking	Green/Green blinking fast with 0,1sec. Duration displays discharging is active in Storage mode.

ERROR ANALYSIS / TROUBLESHOOTING:

Malfunction	Possible cause of malfunction	Troubleshooting method
When the power unit is on, the control display turns on for a short time and then turns off again. The red LED blinks on the battery	Communication with the controller is not possible	Insert the communication cable into the controller or check for damage
The charging does not start, the	The battery is too warm, the	Wait until the battery cools down

green LED on the battery blinks	charging process will only be unlocked after reaching the set temperature threshold (default 45 ° C) The charging connector is not powered The charger is malfunctioned	Check the connector, if necessary, use a different connector. Replace the charger
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6. SDI DESCRIPTION

Device controls:

- Controller unlock button: press for more than 1.5 seconds - controller unlocks, fast press - disable unlocking;
- Toggle between different 2-lines desktops;
- Drive speed selector knob (if available).

SDI DISPLAY

Example of possible readings:

59V 23Ah
Err= 2

Line number 1 shows battery voltage 59V, current capacity 23 A * h
Line No. 2 shows error code (for example, 2 = overheating PI300)

List of possible readings displayed:

Use of LCD display lines		
Line	Indication	Explanation
1 st line	51V 15Ah	Battery voltage 51V / current capacity 15Ah
2nd line index 0	I = 178A	Current 178A
2nd line index 1	N = 1920U	Motor RPM 1920 об/мин
2nd line index 2	P = 11450W	Power consumption
2nd line index 3	TA = 45C	The battery pack temperature is 45° C
2nd line index 4	TM = 67C	The motor temperature is 67° C
2nd line index 5	TC = 75C	Speed controller temperature is 75° C
2nd line index 6	Th = 60%	Displays the signal from the potentiometer in %
2nd line index 7	S = 1450I	The value assigned to the inverter 1450 µs (1200-1700 µs)
2nd line index 8	D = 912m	912 minutes of drive operation from the moment of sending to the customer
2nd line index 9	Er = 4	Error with code 4 = motor temperature too high / Limited operating mode activated!

The indicators of the second line can be scrolled using the side button on the interface.

The table below describes possible SDI error codes and possible system response to them.

Error code	Description	System response
1	Low battery voltage; The 40.0 V voltage limit exceedance	Unlocking the controller is deactivated. The drive stops. A warning tone sounds (intermittent 4-second sound)
2	Excess inverter temperature; The 85°C limit exceedance	The temperature control is activated and the power temporarily decreases until no further temperature increase occurs. When its value drops below the threshold, the drive power will be unlocked again. A warning tone sounds (intermittent 4-second sound)
4	Excess motor temperature; The 100°C limit exceedance	The temperature control is activated and the power temporarily decreases until a further temperature rise occurs. When its value drops below the threshold, the drive power will be unlocked again. A warning tone sounds (intermittent 4-second sound)
8	Excess battery temperature; The 60°C limit exceedance	The temperature control is activated and the power temporarily decreases until a further temperature rise occurs. When its value drops below the threshold, the drive power will be unlocked again. A warning tone sounds (intermittent 4-second sound)
16	Motor current limit exceeded	The drive is limited by present value of the current / torque. A warning tone sounds (intermittent 4-second sound)
32	Shutdown after speed limitation (by exceeding the limit value)	Previous speed restriction on exceeding the permissible limit (errors 2, 4, 8, 16) was unsuccessful. Unlocking the controller is deactivated. The engine stops. Shutdown occurs when the following limit values are reached: <ul style="list-style-type: none"> • Output stage temperature > 100 ° C • Engine temperature > 110 ° C • battery temperature > 65 ° C • Motor current > maximum current A warning tone sounds (intermittent 4-second sound)
64	No external controller unlocking via SRC / FRG or ES connectors	Unlocking the controller is deactivated. A warning tone sounds (intermittent 4-second sound)
128	The potentiometer is not set to the "minimum" position	Unlocking the controller is not available. The intermittent signal will sound. Security function.

WARNING:

Be aware that power may decrease up to 50 % when the error occurs. Be preparing to land when the error does not clear.

7. PROPELLER

There is a 2 blade propeller installed on the trike.

The blades of the propeller are made of carbon fiber. The hub is made of high-strength aluminum and has a built-in hinged mechanism that provides synchronous folding of the blades.

The propeller is designed to work with multi-pole electric motors with low torque fluctuations. Use on other power plants, such as internal combustion engines, can lead to a gradual destruction of the propeller.