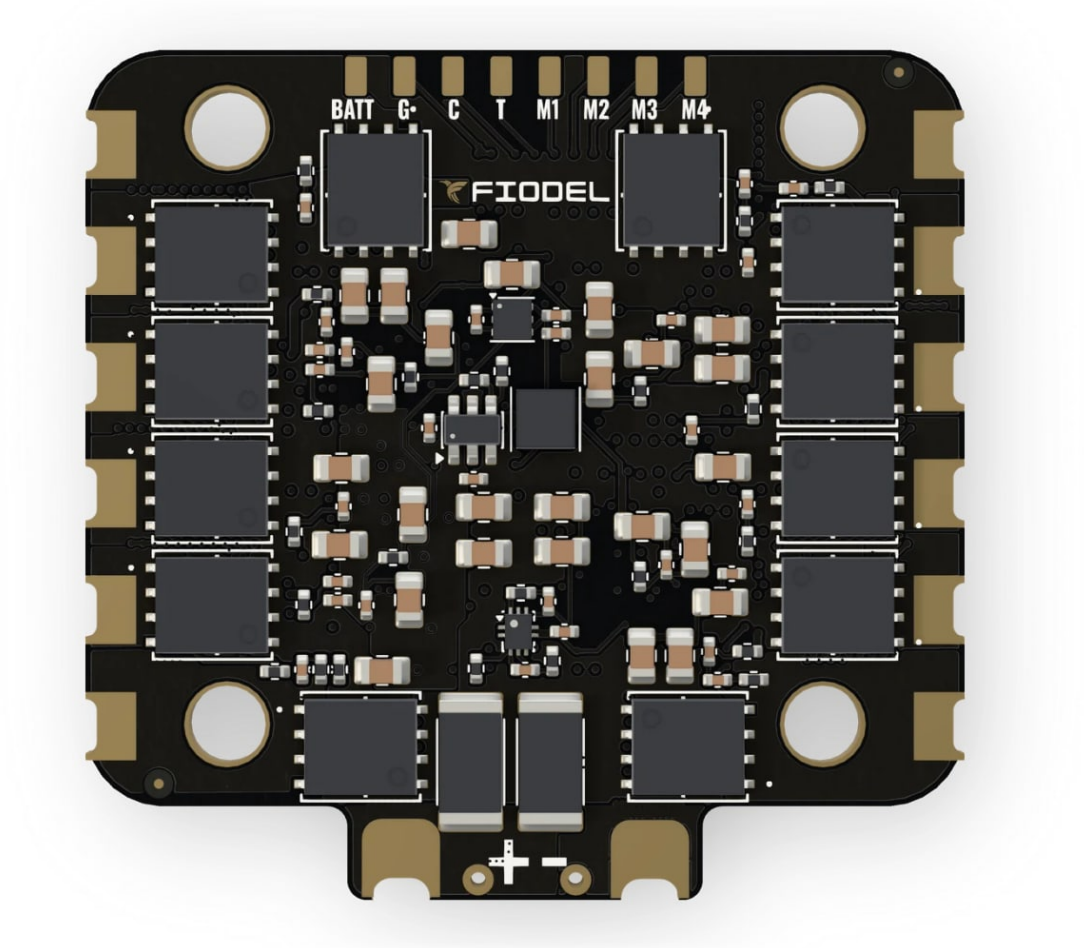
ELECTRONIC SPEED CONTROLLER · FD-ESC-4IN1

Fiodel 4-in-1 ESC

60 A per motor on 6S: four AM32 controllers, TI gate drivers and 24 Toshiba FETs on eight copper layers.



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Before you start

> Solder the supplied 470 µF capacitor across the battery pads before powering the ESC.

> Set the flight controller's current-sensor scale for 10 mV/A, and leave the current limit inside AM32 switched off — current is measured once for the whole board, not per motor.

> There is no 5 V output. The ESC passes battery voltage to the flight controller, which makes its own rails.

> The FET pads sit close to the motor pads. Solder motor wires with a fine tip and check for bridges before connecting a battery.

> Mount on M3 rubber grommets with a flange of 6 mm or less.

In the box

- 4-in-1 ESC
- 60 mm 10-pin JST-SH cable (ESC to flight controller)
- XT60 battery lead, 12 AWG silicone wire, 70 mm
- 470 µF 35 V low-ESR capacitor

Overview

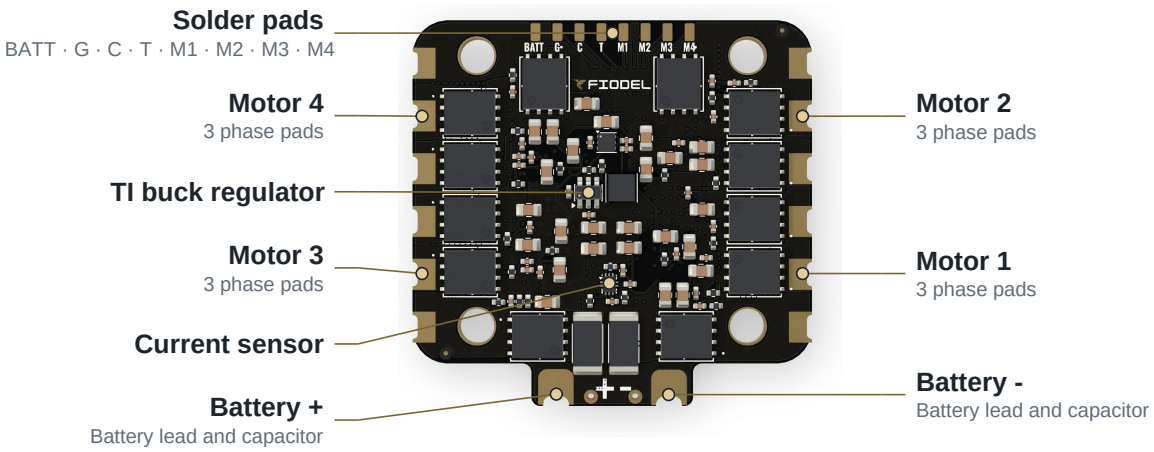
The Fiodel 4-in-1 ESC drives four brushless motors from a 6S pack at 60 A continuous per motor. Each motor channel is a complete controller of its own: an Artery AT32F421 microcontroller running AM32, a Texas Instruments DRV8300 three-phase gate driver and six Toshiba TPHR8504PL MOSFETs.

The power stage is built for clean switching. Every phase has its own RC snubber, every FET bank its own ceramic decoupling, and battery and phase current run on paired copper zones across eight 1 oz layers stitched by via arrays. A TVS diode guards the battery input, and a 470 µF capacitor is supplied to fit at the battery leads.

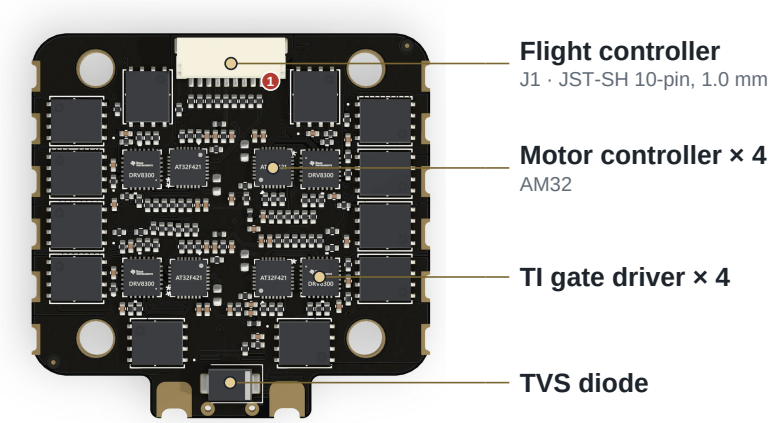
A TI INA190 amplifier on a 0.1 mohm shunt reports total current to the flight controller as an analog voltage. Battery and motor wires solder into castellated pads that take solder from both sides. The flight controller connects through a 10-pin JST-SH socket in the Betaflight pinout, or through a matching row of solder pads.

Layout

TOP SIDE



BOTTOM SIDE



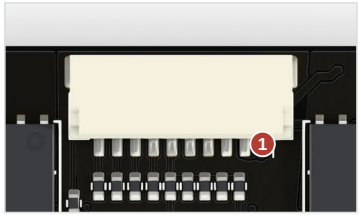
❶ Pin 1 of the socket: the pin tables count from here.

Connections

J1 — Flight controller JST-SH 10-pin, 1.0 mm

Betaflight 10-pin extended ESC pinout.

PIN	SIGNAL	DETAIL
1, 2	Battery + out	Powers the flight controller
3, 4	GND	
5	Current	Analog, 10 mV/A
6	Telemetry	
7	Motor 1 signal	



Bottom side · red 1 = pin 1

8	Motor 2 signal
9	Motor 3 signal
10	Motor 4 signal

Pads — Flight-controller solder pads 8 pads

Same signals as the socket, for direct wiring.

PIN	SIGNAL	DETAIL
BATT	Battery + out	
G	GND	
C	Current	10 mV/A
M1–M4	Motor signals 1–4	
T	Telemetry	

Power — Battery and motors Castellated solder pads

PIN	SIGNAL	DETAIL
Battery + / -	Battery leads	Fit the supplied capacitor across these pads
3 pads per motor	Motor phases A, B, C	Swap any two wires to reverse a motor, or reverse it in AM32

Specifications

RATINGS	
Continuous current	60 A per motor
Battery	6S Li-Po (25.2 V)
Firmware	AM32
Throttle signal	DShot, including bidirectional DShot
Telemetry	Shared serial telemetry line to the flight controller

POWER STAGE	
Controllers	4 × Artery AT32F421G8U7, one per motor
Gate drivers	4 × Texas Instruments DRV8300 three-phase driver
MOSFETs	24 × Toshiba TPHR8504PL — 40 V, 0.85 mohm maximum on-resistance
Snubbers	RC snubber on each of the 12 phases
Input protection	SMBJ28CA TVS diode

Bulk capacitor	470 µF 35 V low-ESR, supplied, fitted at the battery leads

SENSING AND SUPPLIES

Current sensor	TI INA190 on a 0.1 mohm shunt — 10 mV/A analog output
Gate supply	10 V from a Texas Instruments buck regulator
Logic supply	3.3 V LDO
BEC output	None — battery voltage is passed to the flight controller

BOARD

Size	45 × 43.5 mm
Mounting	30.5 × 30.5 mm, four Ø4.0 mm plated and grounded holes for M3 rubber grommets
Construction	8-layer, 1.6 mm, 1 oz copper on every layer, ENIG finish, black solder mask
Battery pads	Two castellated pads, solderable top and bottom
Motor pads	Twelve castellated pads on the two side edges, solderable top and bottom

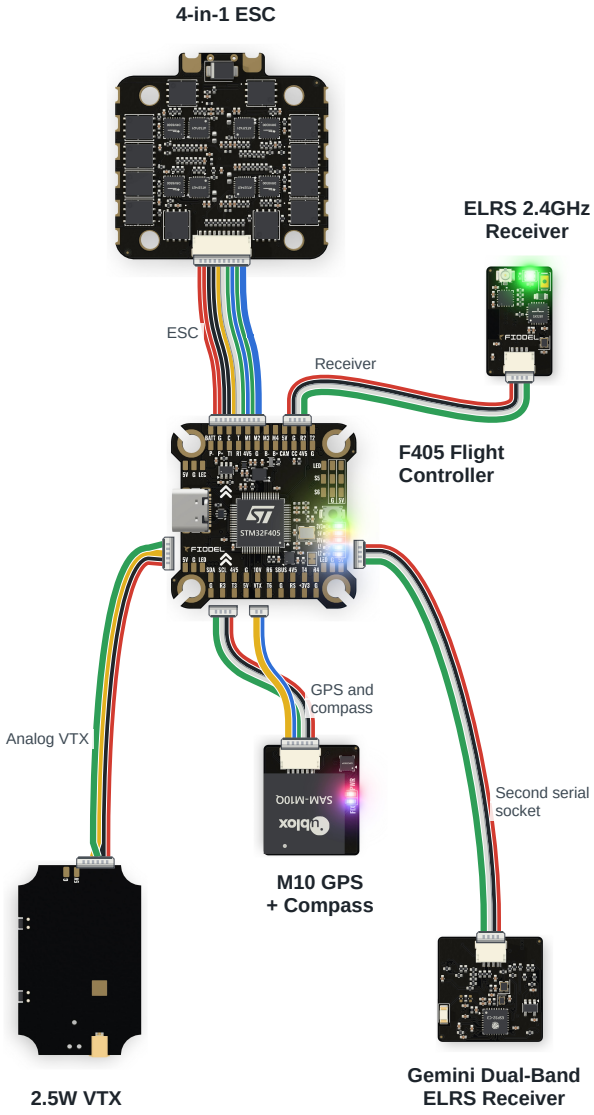
Firmware

Runs	AM32, on all four controllers
Updating	Settings and updates go through the flight controller, with any AM32 configurator.

The board ships with its firmware flashed. The firmware file will be on fiodel.com/products/4in1-esc before the first boards ship.

How the range connects

Every Fiodel board plugs into the flight controller with its own cable, every wire on the pin it really joins. The flight controller is drawn from above, its sockets underneath along the edges its cables leave by; every board is at its true size.



ESC	10-pin cable, in the ESC's box
Receiver	4-pin cable, in the receiver's box
Second serial socket	Same plug as the receiver socket
GPS and compass	Y-cable, in the GPS's box: its 4-pin end to GPS, its 2-pin end to Compass
Analog VTX	10 V, ground, video and SmartAudio

Wire colours: red is power, black is ground, white is data into the flight controller, green is data out of it. Yellow and blue are a cable's other lines.

Setup guides

Step by step, on our site:

First Power-Up of the 4-in-1 ESC
fiodel.com/guides/first-power-up-of-the-4-in-1-esc

Questions

Which firmware does it run?
AM32, on all four controllers. Settings are changed through the flight controller with any AM32 configurator.

Does it work with flight controllers from other brands?
Yes. The socket follows the Betaflight 10-pin ESC pinout and the same signals are on solder pads.

Does it power my flight controller?
It passes battery voltage through the 10-pin cable. Your flight controller needs its own regulators, as the Fiodel F405 has.

Warranty and support

- 6-month warranty against manufacturing defects, serviced at our workshop in Gurugram. Terms: fiodel.com/warranty
- Returns within 7 days for wrong, damaged or dead-on-arrival items: fiodel.com/returns
- Questions: WhatsApp or call +91-9891446688, or write to contact@fiodel.com. 9am–6pm, Monday to Saturday.

This manual is made from the product's page: fiodel.com/products/4in1-esc always has the latest.