MAUCH PC Series Power Cube Owner's Manual

MAUCH PC Series Power Cube

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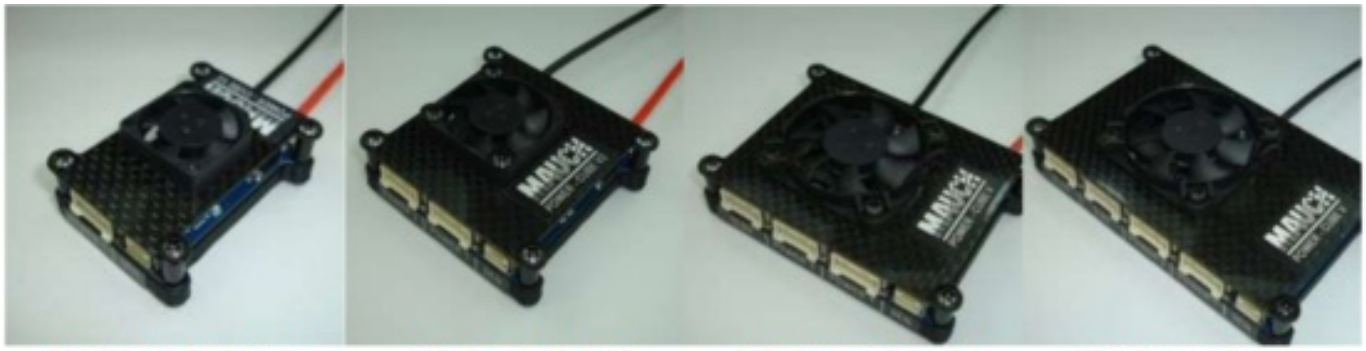
Other Models



051 (051-24) PC1-V3 | 052: Power-Cube 2 | 053: Power-Cube 3 | 054: Power-Cube 4

The Power-Cube series was developed in response to the increasing power demand of bigger UAV-s together with the new Pixhawk 2.1. The installed equipment, such as heated IMU's, optical flow sensors, OSD, dual GPS, telemetry, companion computers, gimbal, camera, landing gear, parachute, digital servos, LED-s, Raspberry Pi 3, Lidar require additional and more reliable and robust power supply. With all or some of this equipment the standard power modules are over-loaded or operating at their upper limits, which means there is a big risk of failure and overheating of the system.

This new series takes care of all the onboard equipment. Each output is rated for continuous current depending on output voltage.

5.3V = 10A with short bursts at 15A (current cutoff at 20A).
6.0V – 8.2V = 9A short bursts at 12A (current cutoff at 15A).
12V = 5.3V = 8A with short bursts at 10A (current cutoff at 12A).
The 051-24 is rated for 100W. Therefore, the output current is dependent on the output voltage.

The design is based on the reference design of the LM5116 from Texas Instruments without any costs cut and further improved component selection, such as oversized FET's, SPEC capacitors from Panasonic… etc.

What's new in "V3":

- Each output includes independent under-voltage protection (13.5V). For the 051-24 the UVLO is approx.3V above the rated output voltage.
- Over voltage feedback loop for all outputs.
- Oversized FET in input stage. -> Nearly spark free connection.

- Soft start (20ms) to ensure proper power up from GND.
- Can be used without anti-spark plugs.
- Now compatible with bench top power supplies units.
- Arming of FET via switch or PWM (receiver or RFD900x and optional PWM module). If no external switch is installed (and no PWM), then the FET will arm itself after 2sec. and the Power-Cube switches on.
- Dual (redundant) 100V linear voltage regulators for FET driver and digital circuit.
- If digital part fails, then Power-Cube will arm itself within 3 sec. -> This emergency power on circuit is running in parallel to the main control and is fully independent.
- Once armed, it can be only disarmed with positive signal from switch and/or an PWM above 1500us. -> This prevents accidentally power off in case of an wire break or PWM signal loss.

Specification:

- Input voltage 13.5V – 60.0V (14S LiPo)
- Cooling fan
- Power ON / LED for each power supply (aka BEC).
- Output ripple voltage maximum 0.005V @5A. -> very stable voltage with low noise.
- Outputs are rated for up to 10A with short bursts @15A (current cutoff 20A).
- All output connectors are Molex / Click-Mate 2.0mm / 6p connectors (with 6x 24AWG gauge wires).
- On-board power supply for PL-xxx sensor boards and/or Sensor Hub X2 and X8.
- Standard Molex 4p sensor output connector. -> Compatible with all parts of the PL – Series.
- Unique enclosure design with 1mm CFK cover plate and fan to ensure the best possible airflow.
- Power-Cube can be attached to the vehicle's frame using the enclosure's 4x M3 screws.
- All Power-Cubes are delivered with a complete cable set for easy setup.

	Power-Cube 1	Power-Cube 2	Power-Cube 3	Power-Cube 4
Input voltage	4-14S	4-14S	4-14S	4-14S
Output 1 (*1)	5.30V / 10A	5.30V / 10A	5.30V / 10A	5.30V / 10A
Output 2 (*2)	---	5.30V / 10A	5.30V / 10A	5.30V / 10A
Output 3 (*2)	---	---	12.0V / 10A	5.30V / 10A
Output 4 (*2)	---	---	---	12.0V / 10A
Soft start	YES	YES	YES	YES
Sensor output / 5.00V / 0.5A	YES	YES	YES	YES
Output voltage OK - LED	YES - 1x	YES - 2x	YES - 3x	YES - 4x
Cooling Fan	25x25x6mm	30x30x6mm	40x40x6mm	40x40x6mm
Size (with enclosure &fan)	45x58x24mm	64x58x24mm	84x58x24mm	101x58x24mm
Weight (*3)	49g	69g	86g	102g

(*1) = Output 1 fixed to 5.30V and can't be changed
(*2) = Other output voltage possible (3.30V-12.0V) upon customer request during order.
(*3) = Weight includes input cable (2x 20cm 16AWG), enclosure and fan.

Operation without Power-Switch:

Power supply is a 60V/3A PSU with no anti-spark plugs. -> The LED will flash fast to indicate that there isn't any power switch installed, then will automatically power on after 2 seconds.
REM: The power switch is optional and the V3 can be used without it!

Operation with Power-Switch:

Power supply is a 60V/3A PSU with no anti-spark plugs. -> The LED and switch will flash every 2 seconds to indicate that the power switch is installed. The Power-Cube can be powered up by pressing the switch firmly.

Safety rules for operation:

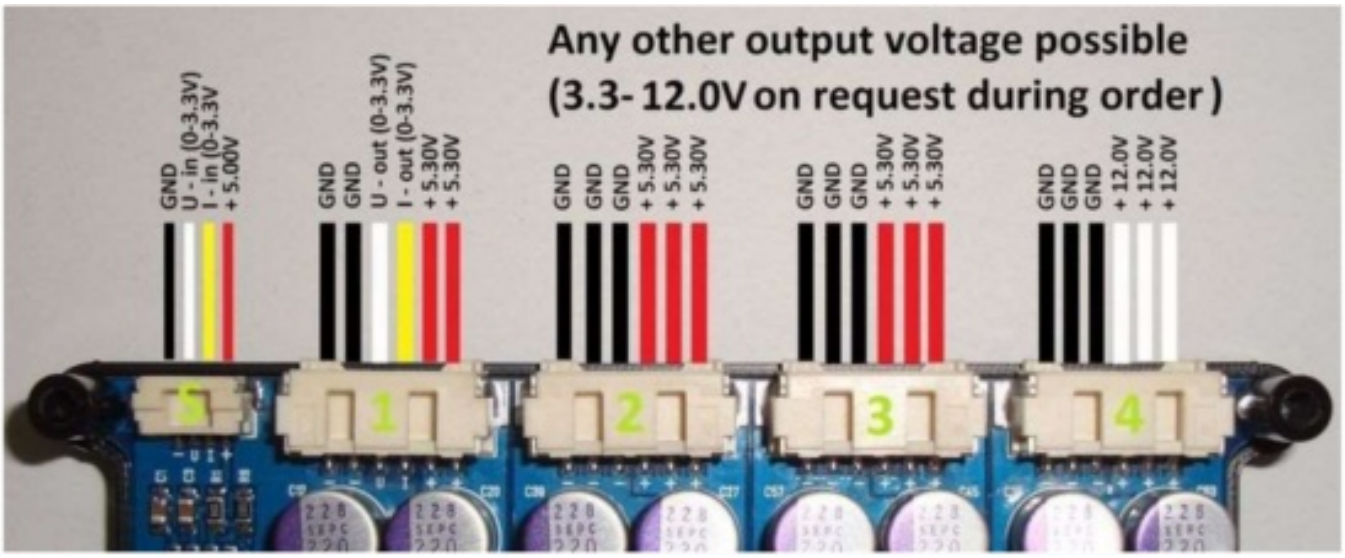
Don't use the Power-Cube to power up any high inductive loads, such as DC motors and any other high inductive load:

If you plan to use any output, to power up DC motors (brushed and brushless) or any other inductive load, then the maximum output current is 50% of the rated output current.
Never connect any output in series or parallel to other outputs.

Installation:

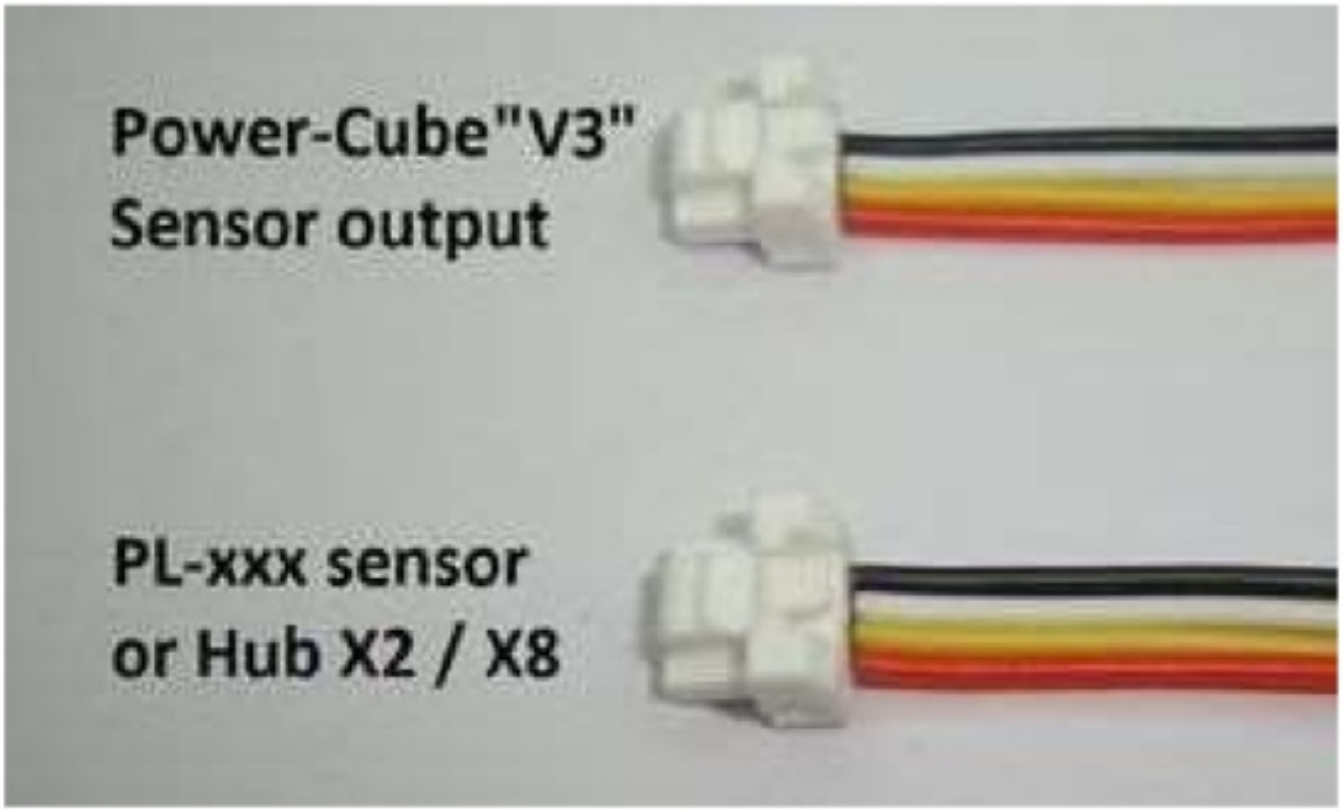
All Power-Cubes can be screwed down to the vehicle's frame. Removing the 4 bottom M3 screws and drill holes into the frame. Reinstall the screws through the frame.

Connectors:



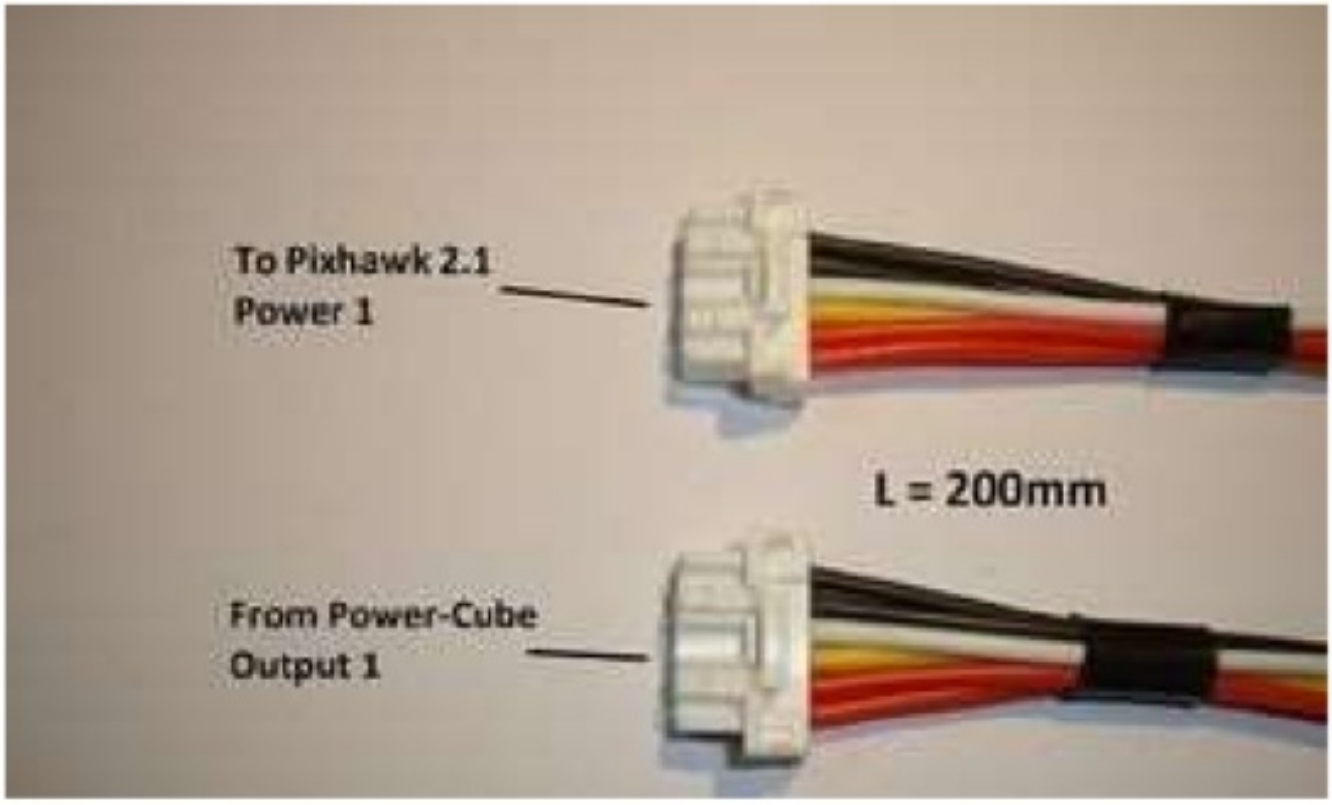
"S" Molex / Clik-Mate / 1.25mm / 4p (5023800400)

This cable is standard delivery and comes with any Power-Cube "V3", except 051-24.
Use this cable to connect the Power-Cube "V3" to any PL-xxx Sensor board or Sensor Hub X2 / X8
L = 150mm
If you need a spare or replacement cable, then please check here !



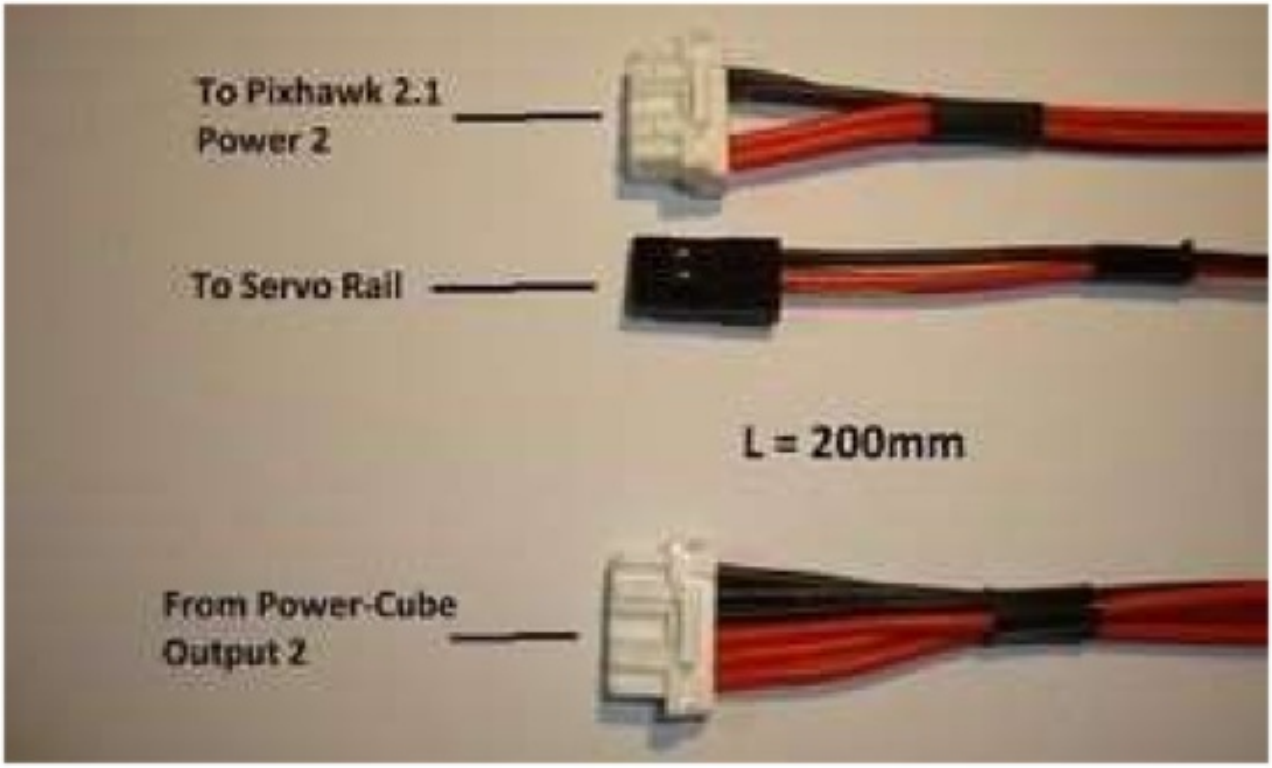
“1” Molex / Clicks-Mate / 1.25mm / 6p (5024390600)

This cable is standard delivery and comes with any Power-Cube 2,3,and 4..
Connect one connector to the Power-Cube’s output “1” and the other one to Pixhawk 2.1 (The Cube) Power 1 input.
If you need a spare or replacement cable, then please check here !
If you need a customized cable for any other flight controller, then please contact us.



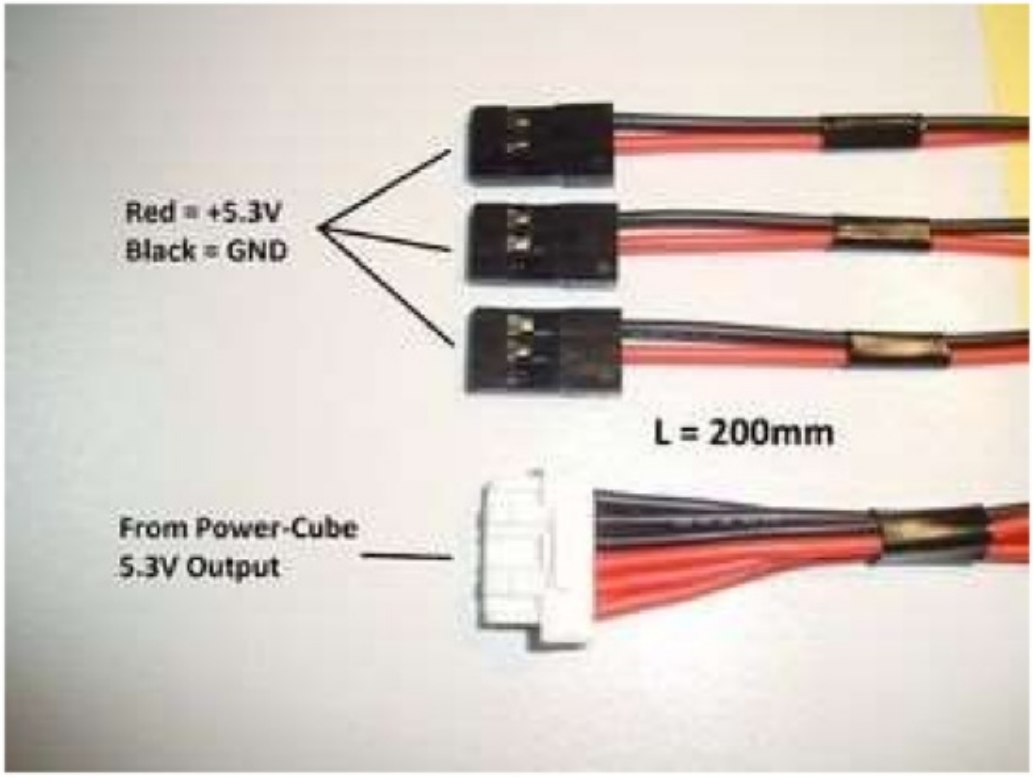
“2” Molex / Click-Mate / 1.25mm / 6p (5024390600)

This cable is standard delivery for Power-Cube 2, 3 and 4.
Connect the connector with 6 wires to the at the Power-Cube's output "2" and the one with 4 wires to the Pixhawk 2.1 / Power 2 input.
The JR connector can be connected to the Pixhawk 2.1 servo rail to power up opto ESCs or any other equipment. Please do not use it to power up digital servos, or any other high current consumption equipment. REM: For a custom order Power-Cube 2 with voltage higher than 5.3V (for example 12.0V) this cable will be replaced with one of the cables from position 3 or 4 with 3x JR connectors. If you need a spare or replacement cable, then please check here !



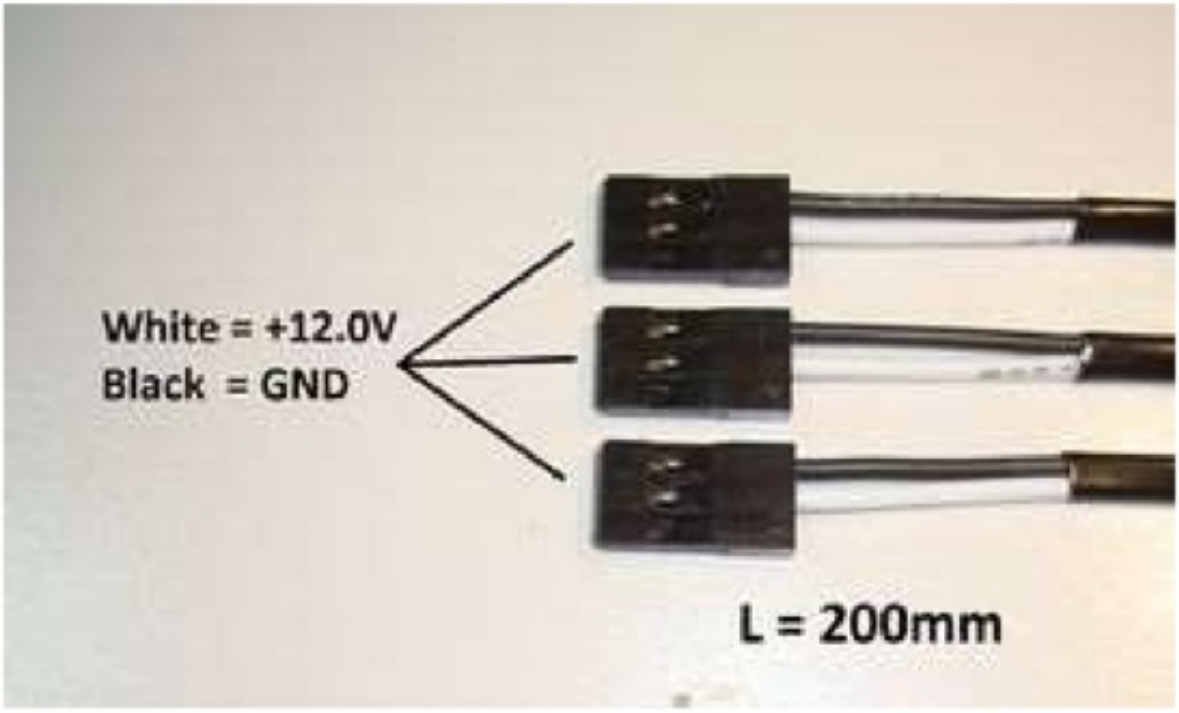
"3" Molex / Clicks-Mate / 1.25mm / 6p (5024390600)

This cable is standard delivery for Power-Cube 4. If you order Power-Cube 3 with 5.3V at output 3, then this cable will be delivered.
Connect it to any high-power consumption equipment. For example connect 2x JR to the servo rail to power up digital servos and the 3rd JR for LED-s or anything else. If you need a spare or replacement cable, then please check here !



“4” Molex / Clicks-Mate / 1.25mm / 6p (5024390600)

This cable is standard delivery for Power-Cube 3 and4 as well as 051-24.
Connect it to any high-power consumption equipment. For example connect 2x JR to the servo rail to power up digital servos and the 3rd JR for LED-s or anything else.
If you need a spare or replacement cable, then please check here !



Customer Support

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Documents / Resources

	MAUCH PC Series Power Cube [pdf] Owner's Manual PC Series, PC Series Power Cube, Power Cube, Cube

References

- User Manual