

Drive System

Driving Motors (CubeMars)

Each of the 6 driving motors requires power and data (CAN and UART) routed from inside the chassis of the rover.

Power

Power is delivered over a black (-) and a red (+) wire. These wires run through the interior of the aluminum extrusions and terminate in a female XT-60 connector at each of the wheels.

Each motor connects to this system via a short power cable with:

- **Male XT-30** on one end — plugs into the motor
- **Male XT-60** on the other end — plugs into the rover's female XT-60 connector

Data

Data is carried over Ethernet cables and connectors, wired to the **T568B** standard.

Each wheel has one Ethernet-in and one Ethernet-out connector, **except** the back wheels, which have an Ethernet-in and a terminator (a 120Ω resistor) in place of Ethernet-out.

Motor numbering:

Position	Motor ID
Front wheels	M1
Middle wheels	M2
Back wheels	M3

Cable layout (per side, 3 cables total):

Cable	Run
Cable 1	Chassis → Front wheel
Cable 2	Front wheel → Middle wheel
Cable 3	Middle wheel → Back wheel

Ethernet Connector Pinouts

Each wheel has two female Ethernet connectors: one **in**, one **out**. Pin assignments below follow T568B pairing (pins grouped by pair: 1-2, 3-6, 4-5, 7-8 in standard Ethernet), but here shown per the rover's female connectors labeling.

M1 - In

Pin	+	-
1	RX	M1 out 1-
2	M1 out 2+	TX
3	M1 out 3+	M1 out 3-
4	CAN HIGH 1	CAN LOW 1

M1 - Out

Pin	+	-
1	—	M1 in 1-
2	M1 in 2+	—
3	M1 in 3+	M1 in 3-
4	CAN HIGH 2	CAN LOW 2

M2 - In

Pin	+	-
1	M2 out 1+	M2 out 1-
2	RX	M2 out 2-
3	M2 out 3+	TX
4	CAN HIGH 2	CAN LOW 2

M2 - Out

Pin	+	-
1	M2 in 1+	M2 in 1-
2	—	M2 in 2-
3	M2 in 3+	—
4	CAN HIGH 3	CAN LOW 3

M3 - In

Pin	+	-
1	—	TX
2	—	—
3	RX	—
4	CAN HIGH 3	CAN LOW 3

Motor-Side Connection

The female Ethernet connector cables connect to the motors via **GH connectors**.

Warning: The GH-side connector should **never** be disconnected from the motor. This connector sits inside the motor driver and is physically flimsy — one driver has already been bricked from being connected/disconnected too many times.

Steering motors

The steering motors are connected through 5-way wire (with one of the channels cut off) to the motor drivers.

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