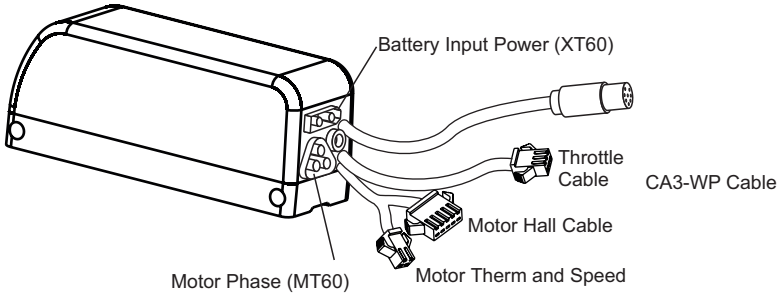


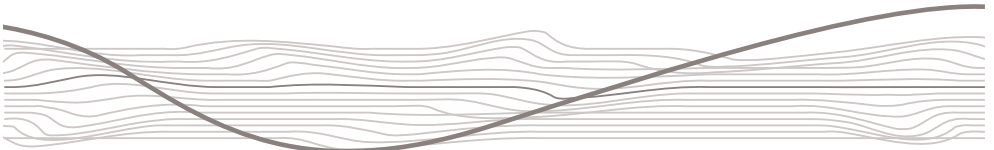
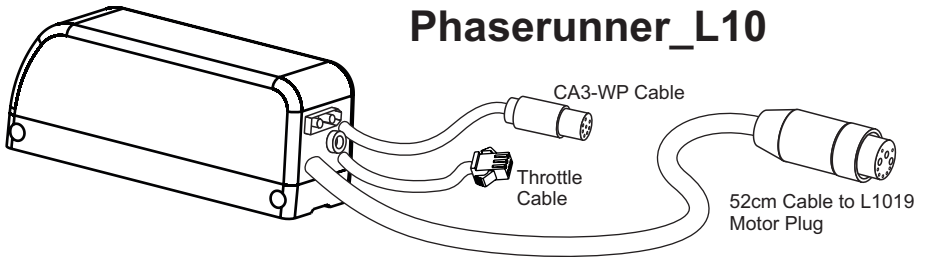
The Phaserunner V3

Updates over V2 Model

Phaserunner_MT

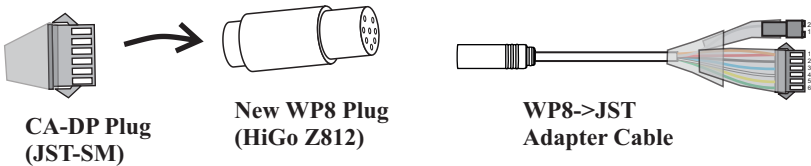


Phaserunner_L10



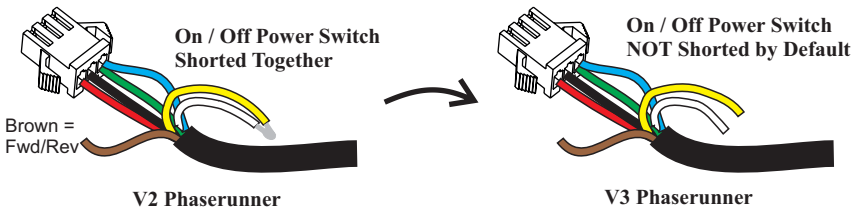
This is the latest V3 model of Grin's Phaserunner motor controller. Although most of the details are similar to the V2 user manual, we have updated several of the connector and wiring specifications as explained here.

1) Cycle Analyst Plug WP8 Plug: This controller now uses an 8 pin waterproof plug for the Cycle Analyst instead of the 6 pin JST standard from previous controllers. That makes it compatible with our new CA3-WP display device and the two extra wires allow for both a motor temperature sensor and on/off switch to the handlebar



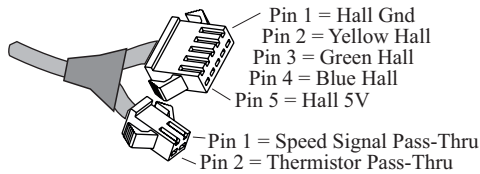
We offer a WP8->JST adapter cable for plug and play connectivity to those using older CA devices with JST plugs. This adapter will also short together the on/off switch wires.

2) On/Off Switch Wiring: By default, the on/off switch wires inside the throttle heatshrink are disconnected rather than shorted together. This means that the Phaserunner will not power on and function until either this switch wires are connected or a CA3-WP is hooked up.



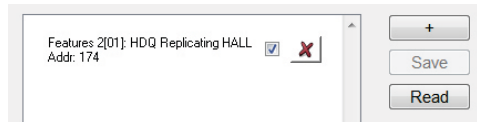
3) Motor Signal Pass-Thru: On the L10 model, motor temperature and speed signals travel through the L1019 motor cable directly to the WP8 plug for the Cycle Analyst.

On the Phaserunner_MT model, there is an extra 2 pin JST connector available to pass these additional signals to the Cycle Analyst Plug if desired.



The Phaserunner parameter **Features2[01] “HDQ Replicating HALL”** can be used to duplicate the motor hall signal on the CA3’s speed line to avoid the need of an external sensor with direct drive motors.

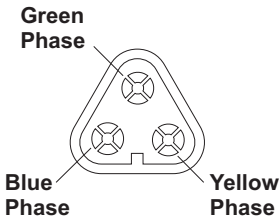
With geared and mid-drive motors that freewheel, this setting must be disabled and the wheel speed sensor attached to pin 1 of the JST plug.



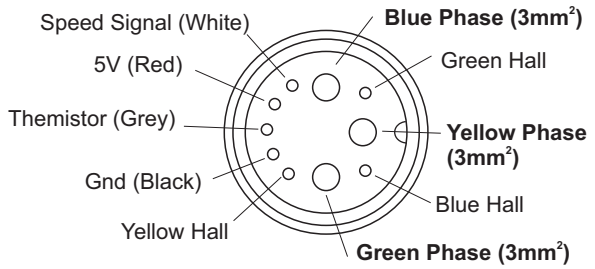
4) TRRS vs TRS Jack: The programming jack appears identical to prior versions and is compatible with all the USB->TTL programming cables offered by Grin. However it now also contains 5V power on the extra ring contact which will allow for future addition of a bluetooth wireless dongle.

Because of this extra 5V power, it is important to keep water out of this programming jack as it would quickly corrode the positive contacts. A rubber 3.5mm TRS plug is included with the Phaserunner and this should be re-inserted after using the programming port.

MT60 Pinout*



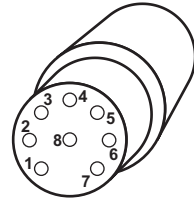
L1019 Motor Cable Pinout


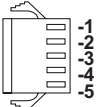



* Pin-colour combinations are intentionally different from Higo pin-colour standard

CA3-WP8 Plug Pinout

	<u>Conductor</u>	<u>Function</u>
1	Green (26AWG)	Throttle Output
2	Yellow (26AWG)	Speed Signal
3	Blue (26AWG)	Shunt -
4	Grey (26AWG)	Temperature Signal
5	White (26AWG)	Shunt +
6	Orange (26AWG)	On/Off Power
7	Red (23AWG)	Battery V+
8	Black (23AWG)	Ground



	<p><u>Throttle:</u> 1=5V 2=Gnd 3=Throt+Ebrake Signals</p>
	<p><u>Hall Sensor*:</u> 1=Gnd 2=Yellow 3=Green 4=Blue 5=5V</p>
	<p><u>Pass-Thru*:</u> 1=Speed 2=Thermistor</p>

JST Pinouts

* Only on _MT Model