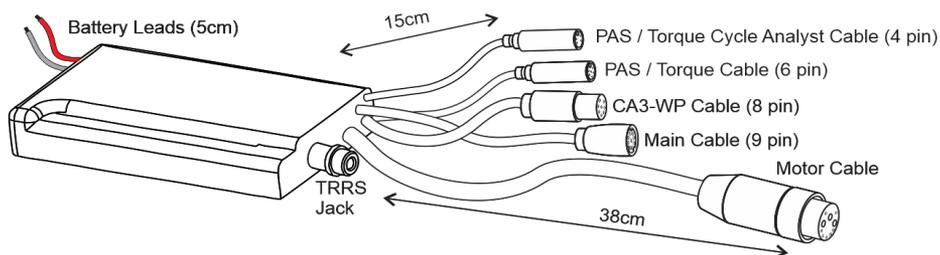




The Baserunner_TSM Motor Controller

User Manual – Rev 1.0



Grin Technologies Ltd
Vancouver, BC, Canada

ph: (604) 569-0902
email: info@ebikes.ca
web: www.ebikes.ca

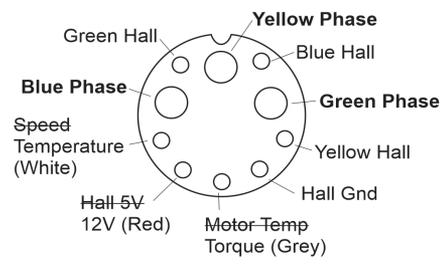
Copyright © 2022

1 Introduction

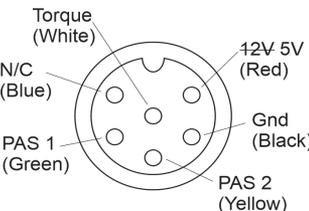
The Baserunner_TSM is a variant of the V5 Baserunner_L10 controller that has been modified to work with hub motors that have a built-in torque sensor, such as the TSM-A5. There are a few differences in the connector wiring in order to support this application which are outlined in this product guide. Three signal wires on the L1019 pinout are changed, and an additional cable has been added to pass the torque sensor signal out of the Baserunner to the Cycle Analyst. For a complete description of the controller functionality, please refer to the standard Baserunner user manual.

2 Connectors

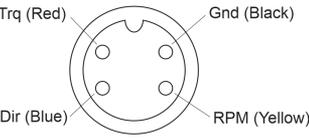
2.1 Motor Cable

 <p>Baserunner_TSM Motor Plug Pinout</p>	<p>On the L10 motor cable, the power (red) wire is 12V instead of 5V, and the grey wire (previously the thermistor) is now the motor torque signal. The previous speed (white) wire is now the thermistor line.</p> <p>To enable a speed reading on the Cycle Analyst, the yellow hall is fed directly to the speed input inside the controller.</p>
---	--

2.2 PAS / Torque Plug

 <p>PAS Pinout</p>	<p>On the 6 pin PAS connector, the power (red) wire has been changed from 12V to 5V to work with standard PAS sensors.</p>
---	--

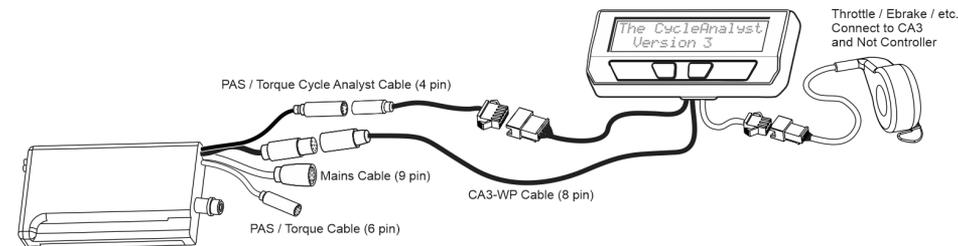
2.3 Additional PAS / Torque CA Plug

 <p>PAS to CA Pinout</p>	<p>There is an additional 4 pin HiGo connector that can pass torque and cadence signals to a Cycle Analyst if CA control is desired. A 4 pin HiGo to 5 pin JST adapter is included for this use case.</p>
---	---

3 Wiring Strategies

The Baserunner_TSM can be hooked up to the controls of an ebike system in one of three ways; either under the control of a V3 Cycle Analyst, under the control of a 3rd party display, or headless with no display at all.

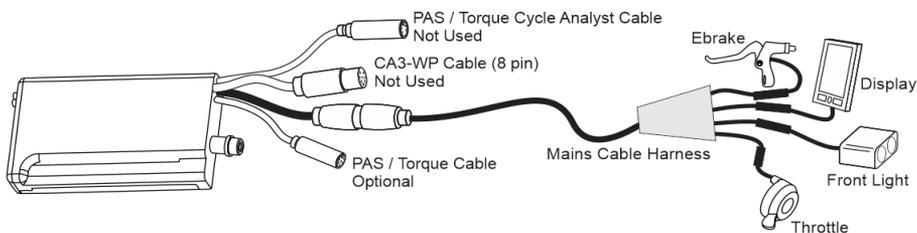
3.1 Cycle Analyst Based Hookup



Wiring up a Baserunner_TSM with a Cycle Analyst is like any other L10 ready to roll system, only instead of plugging the CA3s PAS plug directly to a bottom bracket torque sensor, it is plugged into the Baserunner via the 4 pin HiGo to 5 pin JST adapter. This allows the CA3 to control the bike in wheel torque sensor mode available in the V3.2 Cycle Analyst firmware.

If desired, a quadrature PAS sensor can be installed and hooked up to the 6 pin HiGo PAS connector on the Baserunner_TSM, and these PAS signals will get passed through via the JST adapter as well, for features such as backpedal regen and spacial torque averaging.

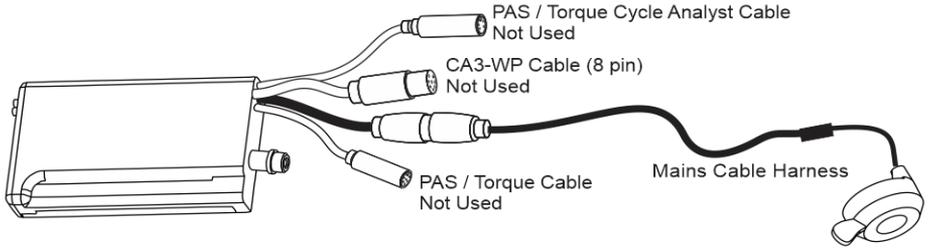
3.2 3rd Party Display Hookup



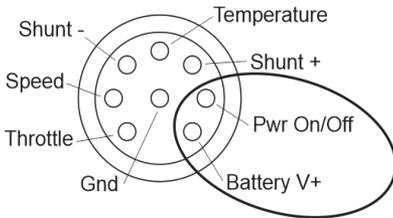
Alternately, it is possible to use the Baserunner_TSM's native axle torque sensing control along with 3rd party displays rather than the CA. The axle torque and motor temperature signals are still fed into the controller's analog input, and the PAS sensor could be optionally used or not depending on whether axle torque or BB torque sensing modes are selected. In this wiring approach, the WP8 Cycle Analyst plug is not needed, but it can be used as a convenient tap point to power a rear bike light.

At present Grin only provides support for this hookup to OEM customers purchasing complete systems with third party displays using the KM5s protocol, and does not offer support or the components for this at the retail level.

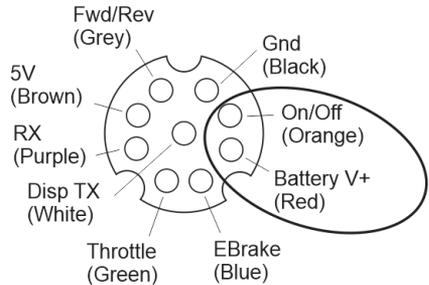
3.3 Headless System



Finally, the Baserunner_TSM can be run with only the TSM-A5 motor, and optionally an additional throttle on the Mains plug. In this arrangement, it is essential to wire up the on/off power switch to V+ on either the WP8 plug or the Mains connector for the controller to turn on.



CA WP Plug On/Off Wiring



Mains Plug On/Off Wiring

There is limited ability to modulate the PAS power assist level in this minimal approach as the controller does not have a native input for increasing or decreasing the PAS power adjustment without reprogramming.