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82119 Harness

By: NetGain Controls, Inc.
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Installation Guide to a Throttle Unit

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Introduction

The 82119 throttle cable assembly is designed to connect a WarP-Drive 2 (Industrial) controller to a dual-channel throttle unit. The drive-by-wire throttle systems supported by the WarP-Drive controller are a critical safety and performance device that must be installed with care to ensure proper operation. Only qualified personnel should attempt to work with the systems associated with this product. Failure to install the throttle correctly can lead to accident or injury. This document provides important details to correctly install the harness to the throttle unit.

Installation Overview

Estimated time: 45-60 minutes to complete the installation.

1. Characterize target throttle device signals.
2. Route the cable.
3. Determine the proper connection points on the target throttle unit.
4. Make high quality connections between the harness and throttle unit.

Package Contents

When you open the package, verify that you received everything.

The package includes:

- Throttle cable with 8-pin Deutsch connector on one end and bare wires on the other end.
- Butt-splice connectors (7) to connect wires

Tools/Supplies Required

The following are some suggestions of tools/supplies that might be required to complete the installation:

- High-quality crimpers (3M part number TR-490 or equivalent recommended).
- Heat shrink gun
- Wire strippers for smaller gauge wire (22awg on the provided harness – throttle cable harness coming from the pedal/throttle connector should be similar).
- Volt meter
- Cable ties for securing harness

Throttle Electrical Requirements

The throttle unit that is to be connected to the harness must meet some basic minimum specifications to work properly with the WarP-Drive controller:

- The throttle must provide two signal channels. It is strongly recommended that the throttle unit's channels be independent of each other and that the output voltages are a 2x multiple of each other. Although heavily discouraged, it is possible to use a single channel device by tying the two throttle signals on the harness together in parallel. This method doesn't allow for some of the safety checks to take place that would otherwise be successfully performed in the case of dual channel throttle devices.
- During calibration, neither throttle channel can be below 0.08 volts at any point in the range of throttle movement.
- During calibration, at least one throttle channel must remain below 4.89 volts at all times. It is permissible for one of the two channels to be above 4.89 volts although it is preferred that the device does not output at or near the rail voltage (5.0 volts).
- During calibration, both channels must exceed 1.75 volts at full throttle movement (100% throttle).
- During normal operation, both throttle channels must remain within 2.5% of the signal values that were present during calibration.
- The throttle device must be capable of operating on 5 VDC and must not draw more than 100 mA per channel (most typical devices draw less than about 10 mA).

Characterize Target Throttle Device Signals

Prior to wiring the harness, it must be determined what signals exist on each throttle wire. Most dual-channel Hall-effect throttle units will have a separate ground, 5 volt supply, and signal comprising each channel. The surest way to determine what wires correspond with these functions is to consult the wiring diagram for the original vehicle or the data sheet for the throttle unit. The next best method for existing in-vehicle throttle units is to probe the wires leading to the throttle unit with the vehicle powered. Doing this will require tapping into the wires. Since you will be cutting the wires for connecting to the 82119 harness anyways, it is probably easiest to just cut and strip the wires and temporarily splice them together by twisting the copper. Use caution to not short any of the wires together when doing this. Using a volt meter, probe two terminals at a time. Look for combinations that supply +5 VDC. The supply voltages should be isolated from each other, so each 5 volt supply should only have one return path (ground). Once the supply wires have been found, connect the negative probe to one of the grounds. Then find one of the remaining wires that provides a voltage somewhere between 0 and 5 volts. This is the signal wire for that channel. Verify that the remaining wire provides a signal between it and the other ground wire. The throttle signal channels (1 and 2) should vary as the throttle is depressed.

These are the signals that should now be characterized:

- 5 volt channel 1
- Throttle signal channel 1
- Ground channel 1

- 5 volt channel 2
- Throttle signal channel 2

- Ground channel 2

If probing cannot validate the above signals, you will need to consult a manual with schematics or a dealership to concretely determine the proper signals. Do not attempt to proceed until sure about all signals.

Installation Process

Once all throttle signals are known, the following steps can be followed to install the harness:

1. Route the included cable from the controller location to the throttle unit. Take care to route the cable as far from high power wiring as possible. Try to follow existing wiring routes and secure the cable as you go. When routing through any holes (e.g. the firewall), make sure to use strain relief such as grommets or cable-glands to prevent wear and damage to the throttle cable.
2. Use the information obtained in the previous section for throttle signal mapping when making connections. The following wire colors map to the various signals:
 - White: 5 volt for signal 1
 - Orange: throttle signal channel 1
 - Blue: ground for signal 1

 - Red: 5 volt for signal 2
 - Green: throttle signal channel 2
 - Black: ground for signal 2
3. Connect each wire in the harness to the corresponding throttle device wires characterized earlier. Use the provided butt-splice connectors to firmly connect the signals. It is imperative that the connection be high quality with low resistance and high mechanical integrity. Use a heat-shrink gun to shrink the tubing that is built into the provided connectors.
4. Secure the bundle of butt-splice connectors using cable-ties or other appropriate measures. Ensure that the throttle cable assembly and connectors will not interfere with driver foot controls or other equipment/devices used to operate the vehicle.
5. Perform the throttle calibration routine on the controller according to the instructions in the controller operating manual. Check for proper operation of the device with the vehicle drive wheels disengaged from the driving surface.