Safety Loop Maintenance Manual

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Introduction

The Safety Loop ensures that the tractive system is in a safe operational state and offers an easy way to shut down the system in case of an emergency or malfunction. This manual gives an overview of the different cases in which the safety loop may not be working as expected.

Steps to Fix the Safety Loop

Basics

In order to properly diagnose a safety loop issue, please look at the issues listed below. If it is not below, a more thorough investigation is necessary. Please refer to the circuit diagrams on the website and go through the components (relays, resistors, transistor) to make sure they are all working properly.

Issues

- LEDs aren’t turning on
  - If neither of the lights are turning on, the power to the safety controller is not present. This could be because of a blown fuse or because of the GLV subsystem. First, take a multi-meter and measure the voltage going to the safety controller, if this is 24 volts, turn off the system and change out the 2AG 6A fuse on the front of the controller. If the lights still do not turn on, check the wiring inside the controller and look for any loose connections.

- The reset button won’t close the safety loop
  - First, verify that the IMD status is clear
  - There is a good chance that there is a problem in a separate subsystem. However, to verify this is the case, put the safety loop cap (which has one wire connecting Safety Loop Out and Safety Loop In) on the 4-wire safety connector on the top of the controller. If the reset button does not engage the safety loop, there is a problem inside the controller. Open the controller and check for a loose connection. The main connections to
check would be the test button as well as the relay corresponding to the safety loop.

- The IMD status doesn’t go from fault to clear
  - This could be an IMD error, or the IMD circuit inside the controller could be malfunctioning. First, take a multi-meter and measure the voltage from the IMD with a 2.2k resistor to ground (this measurement must be grounded). If this is not near 24, there is an error outside the controller. If it stays at 24V, the IMD circuit must be checked inside the controller.

- Only one LED is on
  - If only one LED is on, there is a connection issue inside the controller or the LED has seen the end of its days.

**Safety Controller Wiring**

The wiring of the safety controller follows the following protocol. Red wires indicate either Tractive 24+ or Safety 24+, black wires indicate ground, yellow wires indicate intermediate signals (including the reset button), orange wires are for safety loop out (including the test button), and the purple wires are for the safety loop in. Realize that at some connection points, there are the same colored wires. Also, there are the red wires (going to the LEDs for instance) that will not always be powered. If a wire color doesn’t make sense, refer to the circuit diagram and follow the current path in the controller.