

4 Channels Wheel-Speed Sensor Emulator

AL-WSS

This document describes the AL-WSS-4 portable unit.



Overview

The AL-WSS is a 4-channel wheel-speed sensor emulation unit to be connected between the Device Under Test (DUT) and the instrumentation part of the test system.

The unit is made to interface with NI PXI and/or Compact-RIO instrumentation devices for the purposes of test and validation of software and hardware.

Custom device for VeriStand is included for Hardware-In-the-Loop applications.

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Summary

The increasing complexity of road traffic makes great demands on drivers. Driver assistance systems relieve drivers and optimize safety on the road. Therefore, modern driver assistance systems are part of the standard equipment in almost all new cars in Europe, America and Asia and pose new challenges for garages.

The intelligent data communication of the electronic vehicle systems is supported by sensors. In relation to driving safety, wheel speed sensors are of particular importance and are used in numerous applications in various vehicle systems. In driver assistance systems such as ABS, TCS, ESP or ACC, motor control units use these sensors to determine the wheel speed.

Due to this variety of applications, wheel speed sensors make a direct contribution to driving dynamics, driving safety, driving comfort and reduced fuel consumption and emission.



The unit is designed to used together with FPGA code implemented in LabVIEW FPGA for pattern generation.

Advantages

- The solution replaces the need for real sensors.
- No need to physically simulate sensors environment.
- Allow you to reuse between test applications and give you accuracy, speed, and repeatability.

Detailed description

Parameter	Range	Value
Amount of channels		4 ch
RIG supply		15-25V, Nominellt 24V
DUT Supply Voltage		8-20 V
Current level		5-30 mA <i>7+7+14mA @12V supply</i>
Rm (V variant)		50 Ω
Digital Pulse Width		20-40 ms
Supported protocol	AK protocol	
Current limits	The unit generates three current limits for each WSS emulator channel, one current level is fixed, and the additional two current levels are controlled by digital signals	
External hardware	NI FPGA; NI digital I/O module,	
Software support	VeriStand, LabVIEW, gRPC	

Installation

Electromagnetic Compatibility

This product is intended for use in industrial locations. However, harmful interference may occur in some installations, when the product is connected to a peripheral device or test object, or if the product is used in residential or commercial areas. To minimize interference with radio and television reception and prevent unacceptable performance degradation, install, and use this product in strict accordance with the instructions in the product documentation.

Furthermore, any modifications to the product not expressly approved by Aliaro. could void your authority to operate it under your local regulatory rules.



Caution To ensure the specified EMC performance, operate this product only with Shielded cables and accessories.

Unpacking the module

- Carefully inspect the shipping container and the module for damage. Check for visible damage.
- to the exterior and interior of the damage. If damage appears to have been caused during
- shipment file a claim with the carrier. Retain the packing material for possible inspection.
- and/or reshipment. If the chassis is damaged, do not install it and contact Aliaro.

Aliaro reserve the right to vary from the description given in this data sheet and shall not be liable for any errors.

Hardware Installation

To set up and use the module you need the following items:

Hardware

- AL-WSS unit
- NI Controller
- NI DIO module
- Power cable
- Power input connector
- DSUB15, DSUB9 and DSUB25 harness

Tools

- Screwdriver as needed for your application.
- Wire stripper

Software Installation, LabVIEW drivers

When the module is used with LabVIEW or TestStand, Aliaro drivers need to be installed, see Aliaro driver installation instruction.

Software Installation, Aliaro custom devices

When AL-WSS is used with VeriStand, Custom Devices needs to be installed, see the Custom Device installation instruction.

Safety



Caution Observe all instructions and cautions in the user documentation. Using the model in a manner not specified can damage the model and compromise the built-in safety protection. Return damaged models to Aliaro for repair.

Calibration

The unit is calibrated for 7 /14 /28mA levels @12V supply and 50Ω Load.
Other levels can be tuned by Aliaro prior to delivery or as a service.

Recommended warm-up time
Calibration interval

None.
1 Year or when other levels are required

Specification

Definition and conditions

Warranted specifications describe the performance of a model under stated operating conditions and are covered by the model warranty.

The following characteristic specifications describe values that are relevant to the use of the model under stated operating conditions but are not covered by the model warranty.

- Typical specifications describe the performance met by a majority of models.
- Nominal specifications describe an attribute that is based on design, conformance testing, or supplemental testing.

Specifications are *Typical* unless otherwise noted.

Specifications are valid under the following conditions unless otherwise noted.



Note These specifications only apply to the product as provided by Aliaro. Modifications to the module may invalidate these. Be certain to verify the performance of modified modules.



Caution Observe all instructions and cautions in the user documentation. Using the model in a manner not specified can damage the model and compromise the built-in safety protection. Return damaged models to Aliaro for repair.

Environmental Characteristics

Temperature and Humidity

Operating temperature	0 °C to 40 °C
Storage temperature range	-20 °C to 40 °C
Operating relative humidity range	10% to 90%, noncondensing
Storage relative humidity range	5% to 95%, noncondensing

Connectors (Digital I/O)

The WSS emulator has a DSUB25 (female) to connect to the external digital IO module, such as the NI-9401 and using the same pinout as the NI-9401.

Last Modified: April 28, 2017

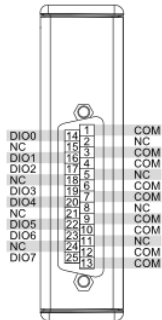


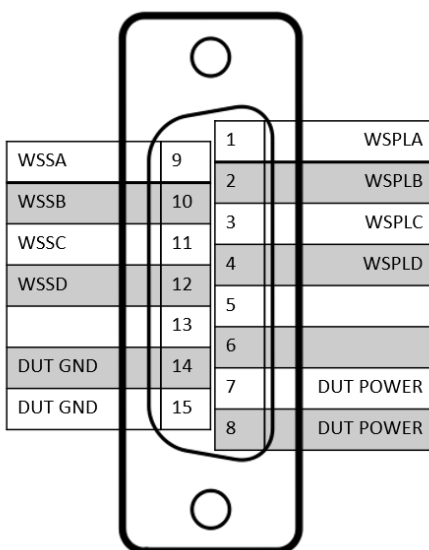
Table 1. Signal Descriptions

Signal	Description
COM	Common reference connection to isolated ground
DIO	Digital input/output signal connection
NC	No connection

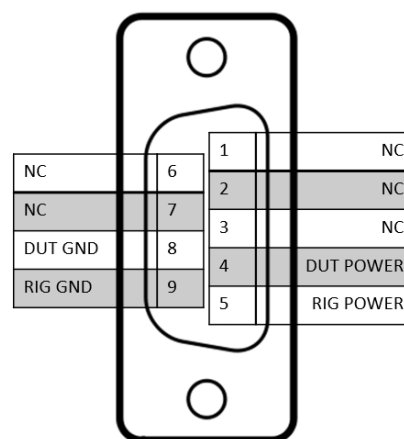
Connectors (Wheel-Speed sensors)

The DSUB15 (female) connector will be used for connecting the four (4) wheel speed sensors and DUB9 (male) will be used for DUT and RIG power.

DSUB15

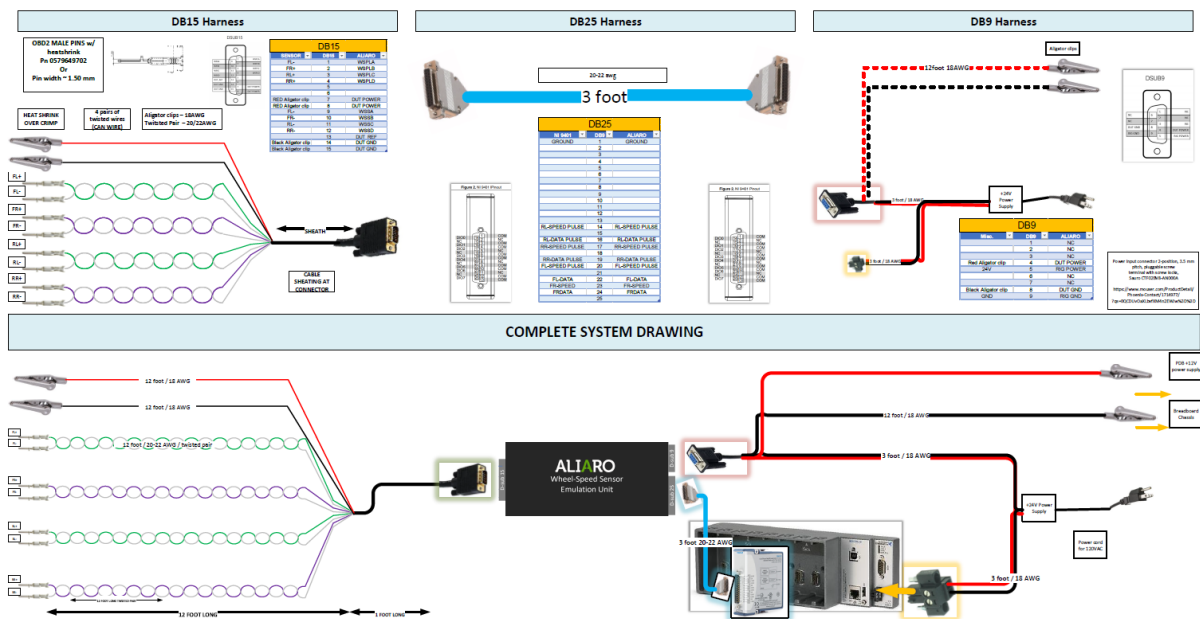


DSUB9



Aliaro reserve the right to vary from the description given in this data sheet and shall not be liable for any errors.

Connection (example using NI CompactRIO+NI 9401)



Product Certifications and Declarations

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information.

To obtain product certifications and the DoC for Aliaro products, visit aliaro.com/certification.

Environmental Management

Aliaro is committed to designing and manufacturing products in an environmentally responsible manner. Aliaro recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to Aliaro customers. For additional environmental information, refer to the Minimize Our Environmental Impact web page at aliaro.com/environment.

This page contains the environmental regulations and directives with which Aliaro complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers At the end of the product life cycle, all Aliaro products must be disposed of according to local laws and regulations.

For more information about how to recycle Aliaro products in your region, visit aliaro.com/environment/weee