



Multi-Scan Board

General Description

The Multi-Scan unit is a 30 channel high precision measurement device designed to interface with a variety of sensors in a number of applications. The solution is based on trusted data acquisition and rugged circuitry found in the Data Acquisition & Measurement (WiDaQ). The wired backbone operates over the industry standard Controller Area Network (CAN) permitting highly reliable, dense sensor deployments. The multi-layer solution consisting of Signal Conditioner, WiDaQ and optically isolated physical channel circuitry provides an excellent solution for environmentally challenged environments.

Typical Applications

- Roof Leak Detection System
 - Conventional Roofs
 - Inverted Roofs
- Flood Monitoring
- Moisture/Temperature/RH Sensing
- Active/Passive Sensor Integration

Features

- 30 Physical Resistance channels capable of reading wide moisture content ranges.
- 30 Physical Voltage channels with the ability to read with an excellent resolution in harsh environments.
- Ability to read 30 differential voltage channels or 30 single ended voltage channels.
- Channel Multiplexing for hybrid systems needing moisture content and leak detection for inverted roof assemblies.
- Each sensor input is optically isolated from each other for robust operation and minimal influence on measurement environment.
- Sensor inputs use terminal block connections for quick and simple connectivity.
- Communications to SMT Building Intelligence Gateway (BiG) via CAN bus.

1 Device Overview

This document contains device specific information for the following models. More information on specifications of the following models can be found in the following sections.

- MS-XXX-R (Resistance)
- MS-XXX-V (Single-ended Voltage)
- MS-XXX-DV (Differential Voltage)
- MS-XXX-INV (Differential Voltage)

2 Hardware Configurations

Multi-Scan units are available in three configurations for higher adaptability in their intended applications.

2.1 Resistance

In this configuration, the multi-scan unit is configured to read resistance on all 30 channels as shown in the following figure 1. The multi-scan unit turns each channel on one by one, takes the measurement on the sense line and sends the data to the Building Intelligence Gateway (BiG).

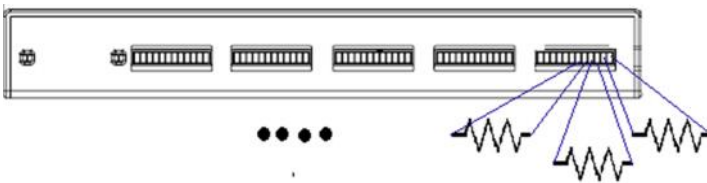


Figure 1 - Resistance Configuration

2.2 Single Ended - Voltage

In this configuration, the multi-scan unit is configured to interface with active sensors and read voltage on all 30 channels as shown in the following figure. The multi-scan energizes each channel individually, takes the measurement on the sense line, and sends the data to the Building Intelligence Gateway (BiG).

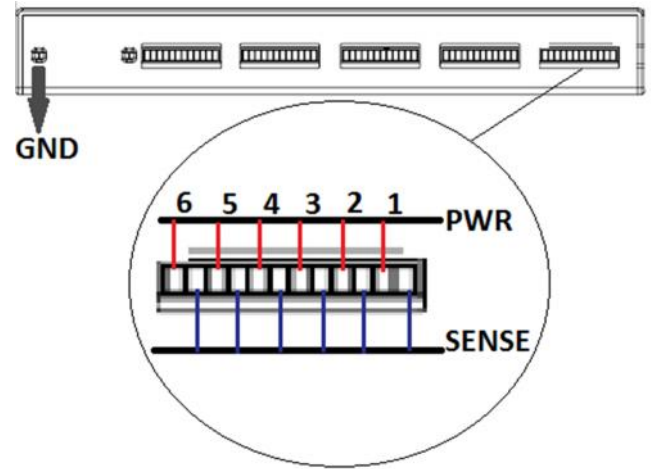


Figure 2 - Single Ended Voltage Configuration

2.3 Differential Voltage

In this configuration, the multi-scan unit is configured to interface with sensors that have a differential voltage output and read voltage on all 30 channels as shown in the following figure. The multi-scan turns each channel on, one at a time, takes the measurement on the sense lines and sends the data to the Building Intelligence Gateway (BiG).

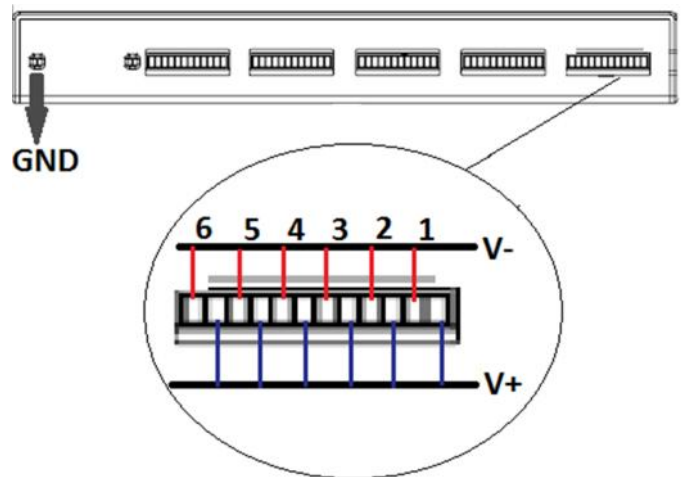


Figure 3 - Differential Voltage Configuration

3 Data Collection and Analysis

Data from Multi-scan units are collected by the Building Intelligence Gateway (BiG) and forwarded to the Analytics server database for further user access and analysis. Please refer to the BiG user manual for sensor configuration and data analysis capabilities.

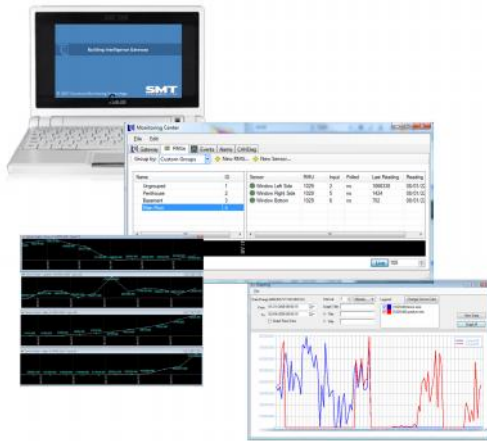


Figure 4 - Data Analysis on BiG

4 Connectivity

Multi-scan communicates with Building Intelligence Gateway (BiG) using CANKey. Multi-scan unit can be connected to the CANKey using the standard CAT5E cable for indoor applications and hyperline cable (UTP2-C5E-SOLID-OUTDOOR-40-500) for outdoor applications. Additional Multi-scan units can be daisy chained to work with a single CANKey unit using CAN IN and CAN OUT pin out as specified in the following figure 5.

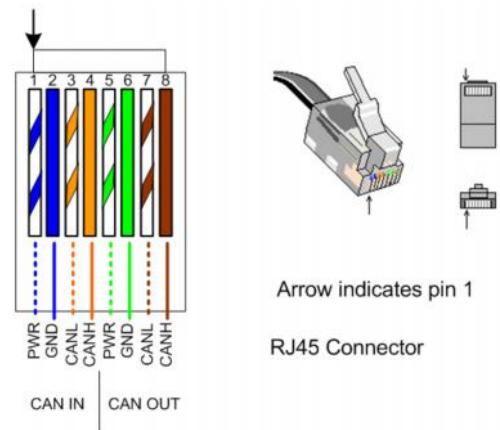


Figure 5 - CAN Connection

5 Push Button/LED Interface

Action	Result
Turn ON/OFF	Press button twice ON – Green Flashes OFF – Red Flashes
Force Reading	Press button once Blink Green followed by communication status: Green – Taking Reading Red – Failed Communication
State	Result
Powered ON	Green Blink – Taking Reading Read Blink – Failed Communication
Powered OFF	After pressing the button once: Red – Unit OFF

6 Electrical Characteristics

Power Source	
Power Supply	12VDC
Operating/Storage Temperature	-10°C to 60°C
Enclosure Rating	TBC

Environmental	
Operating Temperature	0°C to 40°C
Storage Temperature	-10°C to 60°C
Humidity	0% to 90% RH Non Condensing

Physical	
Dimensions	146 x 356 x 50 (mm)
Weight	600g
Number of Channels	30 Channels

Specifications are subject to change without notice

Measurement Electrical/Performance	
<u>Voltage– Input 1-30</u>	
Range	± 2.5V
Resolution (Differential)	3mV
Resolution (Single-Ended)	1mV
Accuracy	± 5%
<u>Resistance – Input 1-30</u>	
Range	100 to 1K
Resolution	10
Accuracy	±5%
Range	1K to 10K
Resolution	100
Accuracy	±5%
Range	10K to 100K
Resolution	1K
Accuracy	±5%
Range	100K to 1M
Resolution	10K
Accuracy	±5%
Range	1M to 10M
Resolution	100K
Accuracy	±5%
Range	10M to 100M
Resolution	1M
Accuracy	±10%
Range	100M to 1G
Resolution	10M
Accuracy	±10%

7 Packaging & Connections

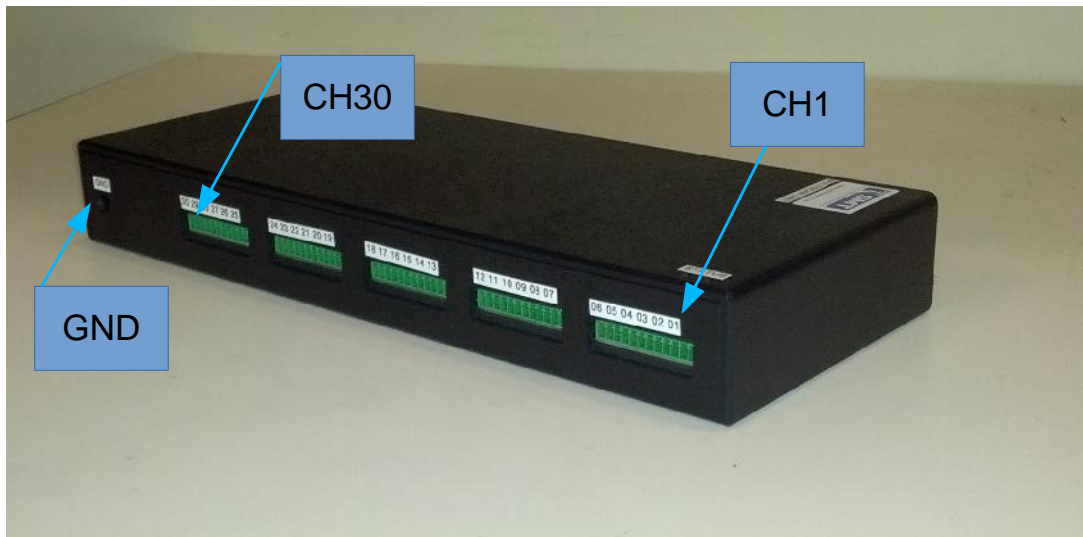
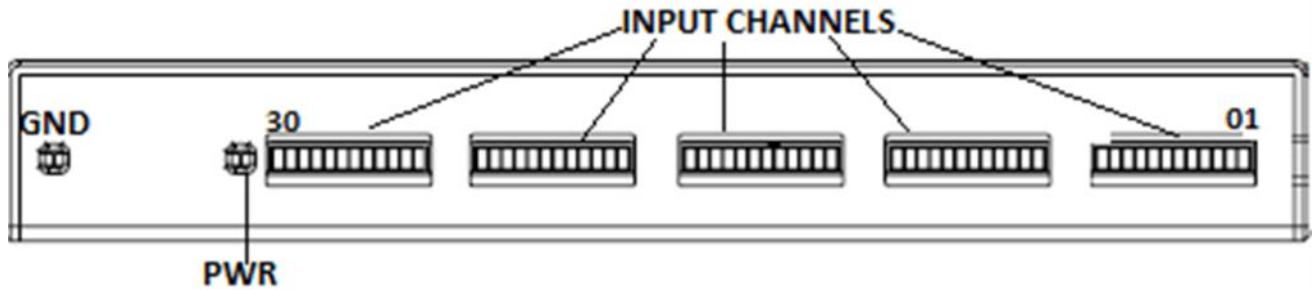


Figure 6 - Channels and Ground Connection

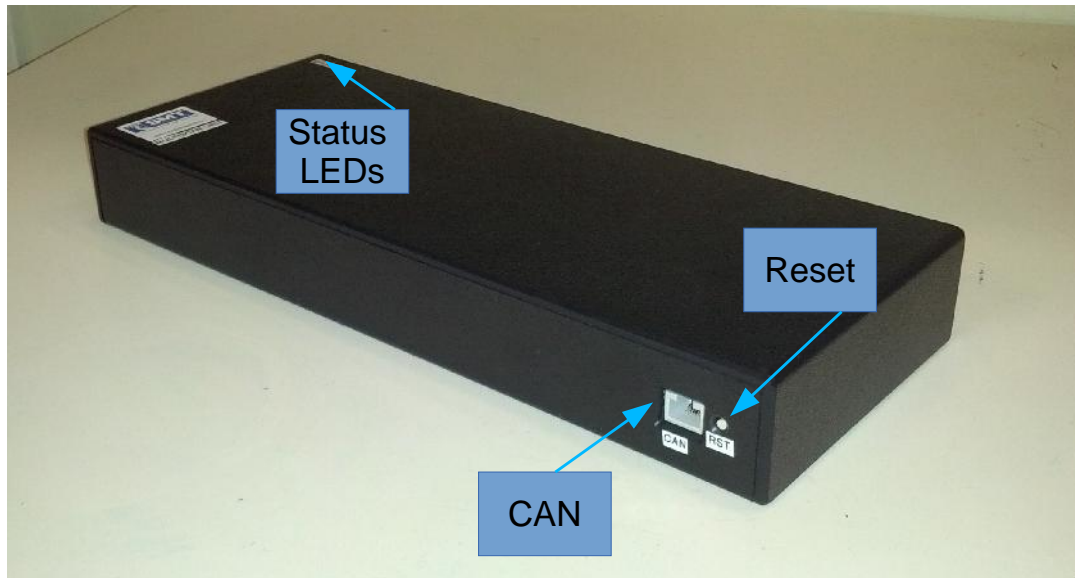


Figure 7 - CAN connectivity, Reset Button, Status LEDs

8 Ordering Information

MS-XXX-R (Resistance)

MS-XXX-V (Single-ended Voltage)

MS-XXX-DV (Differential Voltage)

MS-XXX-INV (Differential Voltage for Inverted Roof
Monitoring)

XXX = Revision number of the Multi-Scan board.

For the latest rev of this board, specify this
value to be 000.

*NOTE: CANKey needs to be ordered separately.