

MLIM-7 ISOLATED ANALOG INTERFACE MODULE

4 / 8 CHANNELS OF ISOLATED ANALOG INPUT FOR MODULOGGER DATA LOGGING SYSTEM

Features...

- Fully isolated (120Vac) analog inputs
- Eliminates AC and DC common mode related measurement problems.
- Installs into ModuLogger Data Logging System
- 4 fully isolated channels or 8 channels isolated in pairs
- Field programmable for thermocouples, voltage, current without any additional external shunts, dividers, etc.
- 400nV resolution (up to 18 bit resolution!)
- Allows up to 44 analog input channels in a single ModuLogger stack
- User programmable filtering levels
- Low-Power design for optimum battery life



Fig 1: MLIM-7 Isolated Interface Module (shown with ModuLogger Data Logging System)

OVERVIEW....

The MLIM-7 provides *isolated* analog input capability to the ModuLogger Portable Data Logging System.

Isolated inputs are extremely valuable in solving difficult signal measurement problems such as:

1. Measurements in the presence of circulating AC currents that exceed the common-mode rejection range of typical non-isolated inputs.
2. In measuring signals that have large DC offsets that exceed the common-mode input range of typical non-isolated inputs.

The module features four channels of fully isolated analog input or eight channels of analog input isolated in pairs. All channels are true differential instrumentation inputs with extremely high common-mode noise rejection.

The MLIM-7 is compatible with the ModuLogger system base and is automatically detected by the ModuLogger upon power-up after installation. With multiple MLIM-7 modules installed, a ModuLogger system can accept up to 44 channels of analog input.

Setup of the input channels and data logging/alarming strategy is done with the standard HyperWare™ icon base programming software.

WHY USE ISOLATED INPUTS?

PROBLEM 1: An electrical utility needs to measure temperatures at various points within a superheater using thermocouples welded onto superheater tubing. Within the generation facility, large AC voltage differentials (10's of volts or more) commonly exist even though all of the equipment is theoretically "grounded". Feeding these signals into non-isolated inputs on conventional non-isolated instrumentation will result in erroneous readings (and possible damage) since the AC voltages superimposed on the DC signals will exceed the input range (referred to as the common-mode input range) of the instrument front end multiplexers, amplifiers, etc.

SOLUTION: Use the MLIM-7 isolated input module which breaks the current path for the AC currents to flow... allowing accurate high resolution measurements on very low (microvolt) level thermocouple signals.

PROBLEM 2: In a process plant, measurements want to be made on various existing 4-20mA loop instrumented parameters (eg flow, temperature, pressure). Different power sources provide loop power for the various 4-20mA loops. Differential AC voltages can exist between these power supply "common" points



due to different levels of power supply design quality. Connecting loops directly into non-isolated inputs can result in reading errors and possibly damage to the inputs due to these common mode exceeding differential voltages. Additionally, inserting instrumentation at varying nodes within the loop can result in DC voltages that exceed the input common mode input range of the instrument once again causing erroneous readings and/or permanent damage.

SOLUTION: Utilize the MLIM-7 and break the problematic DC and AC current paths.

PROBLEM 3: In development of an appliance, it is desired to measure various voltages around a 24VDC circuit which includes a power supply, drive motor, controller and display all in series as well as the current in the circuit via the voltage developed across a precision shunt. Node voltages connected to the data logger will range up to 24Vdc relative to the power supply negative terminal... exceeding the input common mode range of non-isolated inputs and causing measurement errors.

SOLUTION: Utilize the MLIM-7 to provide isolated floating inputs for node voltage and current measurements.

CHANNEL CONFIGURATIONS....

The MLIM-7 has four pairs of channels for analog input. Each pair of channels is fully isolated from the other pairs (as well as other ModuLogger circuitry). Paired inputs share a common. All of the channels can be individually field configured to accept thermocouple, Vdc and mAdc inputs directly without the addition of external shunts, dividers, temperature compensation or other typically inconvenient circuitry.

Standard inputs on each of the channels includes:

Thermocouple; 6 types: J, K, E, T, R, and S

DC Voltage; bipolar ranges from 23mVdc FS to 2.4Vdc FS.

DC Current; bipolar ranges from 500uA to 22mA

One of the channels in a each pair has additional capability to accept up to +/-30Vdc directly.

In many applications, all four pairs of inputs will be usable...providing 8 channels of instrumentation input.

HYPERWARE™ IMPLEMENTATION....

The MLIM-7 module is 100% compatible with the ModuLogger Portable Data Logging System as well as the HyperWare™ communication, programming and data analysis software. As with other ModuLogger modules, upon performing an installed hardware query at the start of programming, 8 isolated input icons will be

returned for integration into a ModuLogger Program Net. Refer to HyperWare™ data sheet for details on the power and features of icon based ModuLogger programming from within HyperWare™.

FEATURES....

The MLIM-7 module incorporates a 18 bit ADC resulting in signal resolutions as high as 1 part in 262,144. Additionally, all inputs are protected from continuous over-voltage input in excess of 120VAC.

MODULE SPECS...

Input Types/Ranges:

Thermocouple Types: J, K, E, T, R and S

DC Voltage: High Range: +/-30Vdc
Low Range: +/-2.4Vdc, +/-1.2Vdc,
+/-100mVdc, +/-55mVdc, +/-23mVdc

DC Current: +/-22mA, +/-11mA, +/-2mA, +/-1mA, +/-500uA

Input Impedance:

Thermocouple / Low Vdc: >15Gigohm

30Vdc Range: >2.5Mohm

Current: 100 ohm shunt

Accuracy:

Thermocouple: +/-0.2C to 1.0C depending on range

DC Voltage: +/-0.01%FS (note 2)

DC Current: +/- [0.1% Rdg +2.5uA]

Resolution:

Thermocouple: 0.1C

DC Voltage: <400nV on 23mV FS Range

<200uV on 30Vdc Range

DC Current: <100nA on 22mA Range

Common Mode Range: 150Vac, 200Vdc (note 1)

Input Protection:

Current Inputs: Fused and transient clamped

Voltage Inputs: Transient voltage clamped

Thermocouple: Transient voltage clamped

Note 1: The ModuLogger system is designed for Class 2 inputs maximum (ie <32Vdc). Voltages above this level are potentially lethal.

Note 2: Maximum settling time enabled.

