

Sentry Series Panel Meter Application

A digital panel meter is used to measure and display all types of processes and electrical variables, such as pressure, flow, temperature, speed, current and voltage. Digital panel (process) meters can monitor levels in sump pump controls and water tanks and monitor pressure in high-pressure alarms. Some digital panel meters are incorporated into another instrument or employed as part of a test system. An example digital panel meter is shown in Figure 1. Digital panel meters can display the measurement in many forms: engineering, scientific, numeric and/or alphanumeric form. Typically, for a digital multi-meter (DMM) the display is a simple 4-6 digit LED numeric value. On some models, it is possible to have a (+) or (-) sign indicating direction of current.



Figure 1: Commercial Digital Panel Meter

The measurement variables are usually scaled and displayed in engineering units from a low voltage (0-5V, 1-5V or 1-10V DC) or a low current (4-20mA) signal. Some digital panel meters have an isolated 4-20mA current output option for producing 4-20mA for any input. This 4-20mA output signal is powered either by the internal or an external power supply. Panel meters are typically powered by AC line (115V/230V) signals and some have an internal isolated 24V transmitter power supply. As part of the panel meter product safety testing, a DC hipot test (dielectric withstand) is done to ensure end-user safety. Figure 2 illustrates the DC hipot test setup.

There are two electrical safety tests performed on a digital panel meter: an **isolation test** and an **overload test**. Isolation tests determine if there is adequate isolation between the input signal and power signal as well as isolation between the individual input power lines. A common isolation hipot test puts a 2000V output across the input and AC power line terminals for a 1-minute duration. The common mode voltage isolation between ground and the AC power line also uses a 2kV rms signal. Table 1 lists the terminal connections for isolation and overload tests.

An overload hipot test is performed to determine the strength of the signal the panel meter can withstand. Although a panel meter usually encounters a low voltage signal at the input terminals, a short in external circuitry or a misdirected signal could cause high voltage to be applied to these terminals. Therefore the meter is subjected to an overload hipot test using a 250V DC continuous signal.

DC Hipot Test

Table 1 lists the terminal connections for the isolation and overload tests and Figure 2 illustrates the setup using a Sentry 35 AC/DC/IR Hipot Tester.

Table 1: Terminal Connections

Terminal	Isolation Test	Overload Test
AC Line – Signal Input	AC Line HIGH – Signal Input (+)	
	AC Line LOW – Signal Input (+)	
	AC Line GND – Signal Input (+)	
	AC Line HIGH – Signal Input (-)	
	AC Line LOW – Signal Input (-)	
	AC Line GND – Signal Input (-)	
AC Line	AC Line HIGH – AC Line LOW	
	AC Line LOW – AC Line GND	
Signal Input		Signal Input (+) – Signal Input (-)

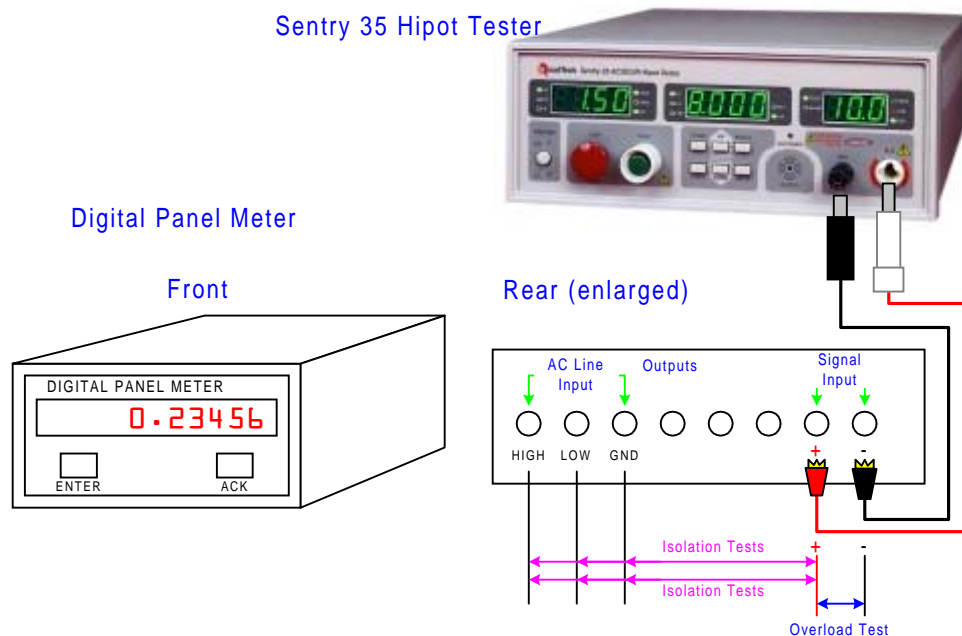


Figure 2: Test Setup

QuadTech manufactures a complete line of hipot testers and electrical safety analyzers capable of performing this digital panel meter product safety test.

For complete product specifications on the Sentry Series Hipot Testers or any of QuadTech's products, please visit us at <http://www.quadtech.com/products>. Do you have an application specific test? Call us at 1-800-253-1230 or email your questions to info@quadtech.com.

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