

Connecting the TEGAM Model 1750 to a PLC/PC as an Upgrade/Replacement for a 1700 Series Digital Ohmmeter

TEGAM Model 1750 Replaces Electro Scientific Series

For many years, the 1700 Series Digital Ohmmeter (originally manufactured by Electro Scientific Industries, but now made by TEGAM, Inc.) has been the standard for high-speed resistance measurement in production applications. Now, the newer, faster, less expensive and more reliable Model 1750 Resistance Measurement System from TEGAM is the preferred upgrade/replacement for all 1700 Series instruments, including the 1701B, 1705B, 1715 Limits Comparator, plus the Model SP3779B. The Model 1750 incorporates all these features, thereby eliminating a separate (1715) comparator box and additional connections to the system controller.

The Challenge: Upgrade to the Model 1750 without replacing the test system controller.

In making the switch to a Model 1750 in a production application, it is highly desirable to accomplish this without replacing the system controller, typically a PLC. Fortunately, the 1750 has been designed as a direct upgrade for the older 1700 series. Still, the features and functions of the 1750 must be understood to make the transition as seamless as possible and take advantage of its new capabilities.

Scope and Purpose of App Note

This application note covers the connections and settings necessary on a Model 1750 to make a smooth transition from the older 1700 Series. The focus of the app note is operation of the 1750 with a PLC in a production application that will benefit from the unit's HI-LO-GO relay output feature, and its comparator function. These are described for both triggered and non-triggered connections. The app note also describes the signals present at various Model 1750 I/O ports and pins.

Connections and Procedures

The Model 1750 may be used in both triggered and non-triggered applications that currently use the 1700 Series, or in similar systems. Use the appropriate connection for your system, as described below.

Non-Triggered PLC Connection

In non-triggered applications, the 1750 can be configured as a "black box" replacement for the 1700 Series instruments, including the 1701B, 1705B and the 1715 Comparator. This includes those applications where the outputs of the 1715 Comparator (HI-LO-GO relays) drive the application. See Figure 1.

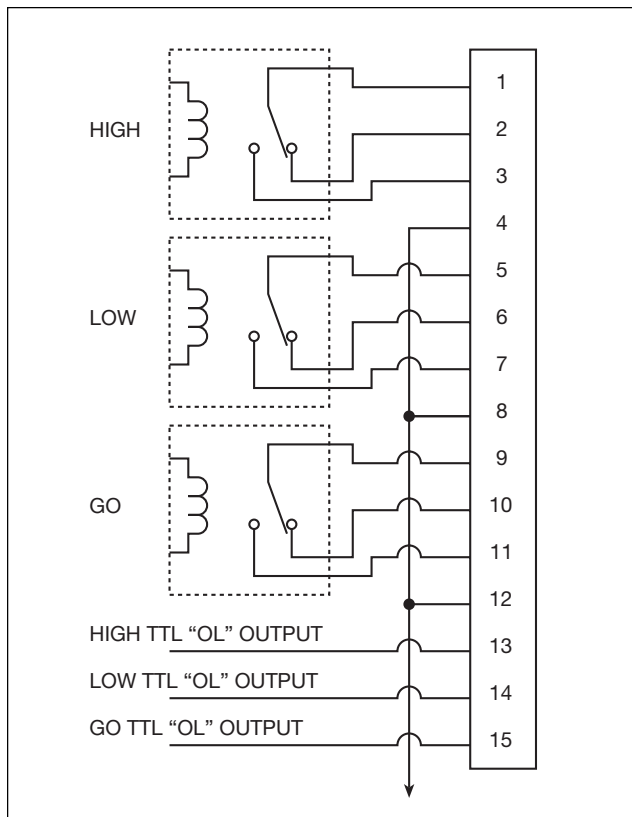


FIGURE 1. COMPARATOR RELAYS PORTS
Pins 1-15 of OUTPUTS port (see Figure 2)
Pins 13, 14, 15 TTL-(0-5V) ONLY

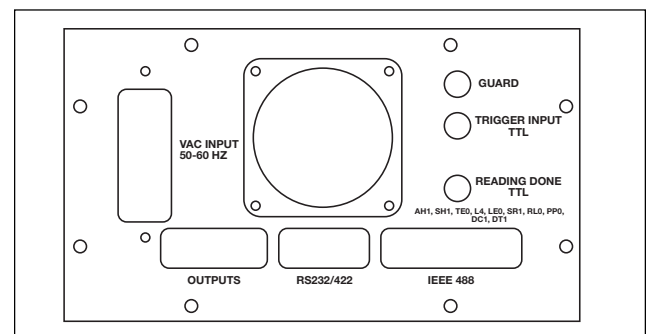


FIGURE 2. 1750 REAR PANEL INTERFACE

NOTE: The 1750 may be connected to a PLC without connecting to the “TRIGGER INPUT TTL” and/or the “READING DONE TTL” BNC connectors. However, using this method will NOT allow the PLC to trigger the 1750 or receive a “Reading Done” signal pulse from the 1750.

For non-triggered applications, connect a standard data cable from your PLC to the Model 1750 “OUTPUTS” port located at the lower left side on the rear panel. See Figure 2. The signals are as follows:

- Pin 9 is V IN; pin 11 is V OUT.
- It is assumed the PLC will read the Model 1750’s 0–5V TTL output signals: Pin 13 (High TTL OUTPUT), pin 14 (Low TTL output), pin 15 (Go TTL OUT).

NOTE: In the nominal 5V TTL circuitry of the 1750, the relays are type G5V1, rated for 30W–125VAC–1A.
OPERATING CURRENT MUST BE BELOW 0.5A.

Triggered PLC Connection

In triggered applications, the PLC initiates each test cycle by triggering the 1750, responds to the 1750, and processes results for the unit under test based on the 1750’s Comparator Output.

Trigger input must be a 0–5V TTL signal:

- Connect the “TRIGGER INPUT TTL” BNC connector to the trigger output of your PLC.
- This signal from your PLC tells the 1750, “Take a reading now”.

NOTE: The Model 1750 trigger input is designed for 0–5V signals. If your PLC has a higher voltage output, you must have a level-shift device (relay or interface card) connected between the higher voltage output of the PLC and the trigger input port of the 1750.

Reading Done, Open Collector signal:

- Connect the “READING DONE TTL” BNC connector to the appropriate input of your PLC.
- This signal from the 1750 tells your PLC “I am done taking the reading you requested.”
- This port is also connected to TTL circuitry. However, the OPEN COLLECTOR design provides interface capability. See Figure 3.

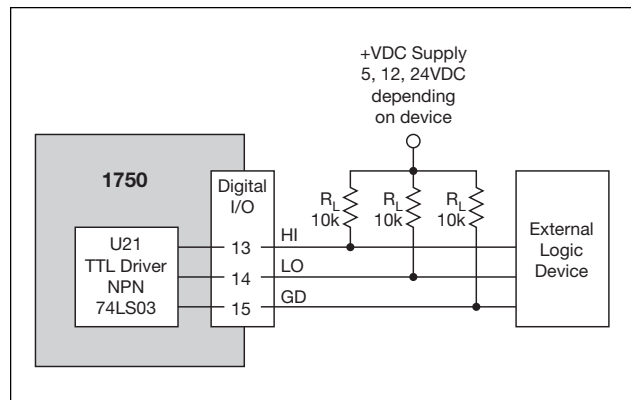


FIGURE 3. Pull-up resistors, R_L , are required for open collector signals in triggered PLC connections.

Outputs:

- Connect a standard data cable from your PLC to the “OUTPUTS” port of the 1750.
- Pin 9 is V IN and pin 11 is V OUT.
- The PLC reads the 0–5V TTL outputs of the 1750: Pin 13 (High TTL OUTPUT), pin 14 (Low TTL output), pin 15 (Go TTL OUT).
- The output circuits for pins 13, 14 and 15 are open collector (floating) and will not be read by the external logic device unless each of the three pins are connected to the external +VDC supply via a 10kΩ pull-up resistor (see Figure 3). In this way, the “enabled” signal will be sensed as 0–5VDC on the external logic device, while +VDC is referenced to ground via the other two pins.

Model 1750 Supports System Upgrades

The information in this app note allows the user to connect the 1750 as a “black box” replacement for one of the 1700 Series. However, the interfaces of the 1750 allow greater flexibility for updating test systems with newer PCs and PLCs. The sole output available on the old 1700 Series for connection to a system controller is buffered BCD (Binary Coded Decimal). A major advantage of the 1750 is three different data communication interfaces (Figure 2): IEEE-488 (GPIB), RS-232 and RS-422, which facilitate its use with PCs and PLCs that operate with those protocols.