

## Are You Making the Most Out of Your Electrical Safety Tester? Exploring the Benefits of Using Simple Relay Control

### Introduction

When performing electrical safety tests on the production line, manufacturers often find themselves between a rock and a hard place: minimizing production costs while maintaining throughput and increasing efficiency. While safety testing is an integral part of the manufacturing and production process, it can seem a burden when performed manually using handheld probes. Yet with advances in the industry, even the most basic testers provide test operators with other more efficient ways to test. Hipot tester manufacturers have said goodbye to the older transformer-in-a-box design, giving way to smarter testers capable of performing fully automated test sequences. While some high-end testers can be connected to a PC, the majority of modern safety testing equipment still affords operators some level of basic automation.

### Simple Relay Control

A common offering is the addition of a set of internal input relay contacts, usually accessible via a standard DB-style connector. These contacts can be used to send signals to the microprocessor-controlled “brain” of the tester. Consider the Signal Input Connector of the SCI 297 Hipot tester:

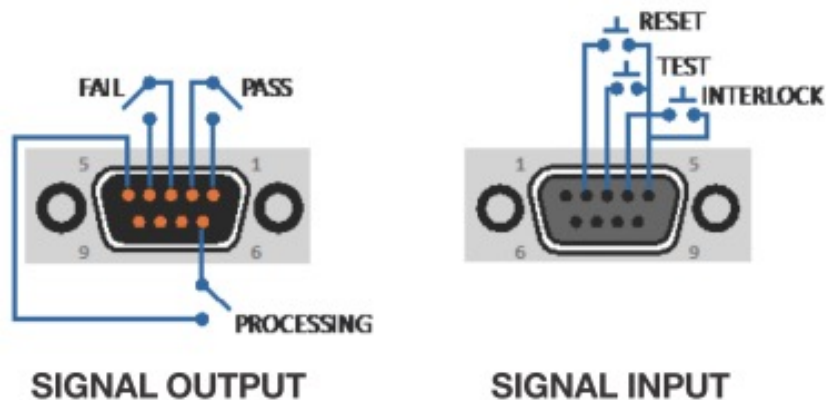


Figure 1.0: SCI 290 Series Remote I/O pinouts



This model comes equipped with a wide variety of input and output controls, giving the test operator more flexibility in setting up and performing tests. Using simple switches and basic circuit theory, the test operator now has full control over both the INTERLOCK, TEST and RESET functions of the instrument. For manufacturers whose primary concern is the safety of the test operator, the INTERLOCK input gives access to a “test-override” circuit. Pins 4 and 5 must be shorted together in order for the tester to perform a test. If for any reason these two pins become disconnected from each other, the tester will stop a test in process or prevent a test from being performed. The applications for this feature are numerous. Primarily developed as an added safety feature, manufacturers have used the Interlock feature with anything from plastic test enclosures to light curtains to emergency off buttons. Still other testers come equipped with multiple output signals as well. In addition to being able to input simple commands like TEST and RESET, the SCI 297 also provides several output signals including PASS, FAIL, PROCESSING.

Remote Input		
Output Signal	Pins	Description
TEST	3 and 5	A normally open momentary switch can be wired across pins 3 and 5 to allow remote operation of the TEST function.
RESET	2 and 5	A normally open momentary switch can be wired across pins 2 and 5 to allow remote operation of the RESET function. For safety, the front panel RESET button remains active even when a remote reset switch is connected so that high current can be shut down from either location.
INTERLOCK	4 and 5	<p>Remote Interlock utilizes a set of closed contacts to enable the tester's output. The output of the tester will be disabled under the following conditions:</p> <ul style="list-style-type: none"> <li>• If the Interlock contacts are open and the TEST button is pushed</li> <li>• If the interlock contacts are opened during a test (test will automatically abort)</li> </ul> <p>A pop-up message will be displayed on the screen:</p> <div data-bbox="609 1444 857 1507" data-label="Text"> <p>Interlock is open</p> </div> <p>The tester can still be used without the external interlock device as long as the Interlock Connector (P/N # 99-10040-01 provided with unit) is plugged into the Remote Interface, Signal Input port. If there is nothing connected to the Remote Interface, Signal Input port to provide a connection to the interlock, the tester will not perform tests.</p>

When the PLC Remote mode is ON, the tester will respond to simple switch or relay contacts closures. When the PLC Remote function is ON the TEST button on the front panel will be disabled.

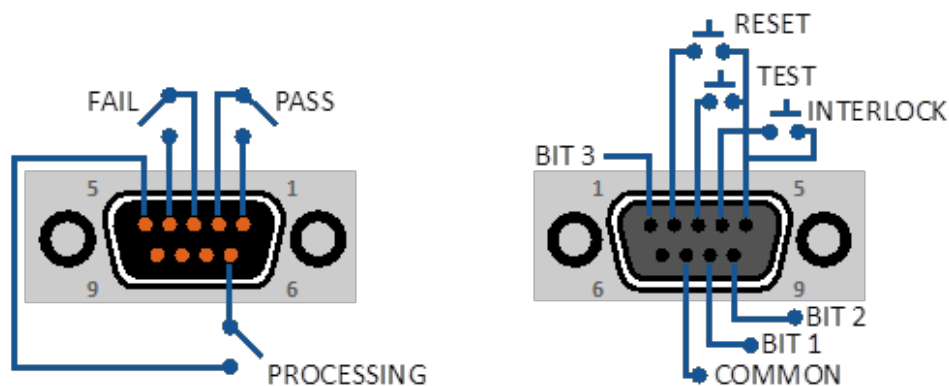
REMOTE INPUT/OUTPUT		
Remote Output		
Output Signal	Pins	Description
PASS	1 and 2	The relay contact closes after detecting that the device under test passed all tests. The connection is opened when the next test is initiated or the reset function is activated.
FAIL	3 and 4	The relay contact closes after detecting that the device under test failed any test. The connection is opened when the next test is initiated or the reset function activated.
PROCESSING	5 and 6	The relay contact closes while the tester is performing a test. The connection is opened at the end of the test.

*These are normally open free contacts and will not provide any voltage or current. The ratings of the contacts are 1 AAC/250 VAC (0.5 ADC). When a terminal becomes active, the relay closes thereby allowing the external voltage to operate an external device.*

Each condition is signaled by a change of state (opening or closing) in the signal's corresponding relay. Operators have access to alternate poles of a relay so that they may connect to it an indicating device such as a light or an alarm. Again, this technology offers operators near unlimited possibilities in determining the method of indication that works with a particular application.

## Advanced Options

Some manufacturers require more than just simple TEST and RESET inputs. Keeping this in mind, some machines allow operators to select and execute a particular test stored in the instrument's memory. The SCI Model 4320 comes equipped with this capability which can be seen in Figure 2.0.



**Figure 2.0: SCI Model 4320 Remote I/O Connectors**



If a technician usually performs different safety testing routines on several products, he need only signal the tester which routine to execute using an input signal to the tester's Remote Input Connector. The SCI Model 4320 allows operators to select and execute from 3 different test memories all with the push of button.

## **Conclusion**

While some safety testing instruments may seem overwhelmingly complex with their multitude of computer-controlled capabilities, more basic forms of remote control do exist. Using simple relay control, many manufacturers have implemented a safer and more efficient safety testing routine. No matter what the level of complexity, from simple push buttons to advanced light curtain and interlocked enclosure test stations, there are options out there for anyone interested in automating or upgrading an outdated safety testing routine.