

Application Note

FIXTURE CLAMP ACTIVATION

Fixture Clamp Activation

Introduction

This document describes how to activate a fixture clamp to release a harness after it has passed.

This document contains the following main sections:

- 1 a list of assumptions – knowledge required to perform the tasks outlined in this document
- 2 a description of the type of fixture clamp with Dynalab recommended type
- 3 an overview of the Dynalab solution to switch testing outlining two basic methods – including information on when to use each method
- 4 an example

Assumptions

To successfully use this document, the following knowledge is required:

- basic knowledge of how to enter harness data using PASS® 6.0
- knowledge of how to use the Sequence table to create a Sequence

For assistance on how to use features of PASS® 6.0, see the PASS® 6.0 Help file.

Description of fixture clamps

Why use fixture clamps?

Many high-volume manufacturers use fixture clamps to prevent the operator from removing the harness before the Analyzer has verified that all tests have passed. This guarantees that the part has passed all tests or was removed by supervisor – providing better quality control.

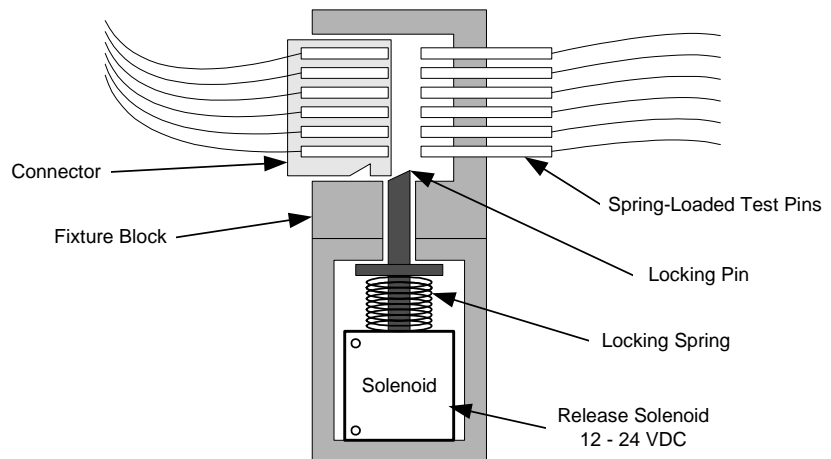
Dynalab recommended type of fixture clamp

Most fixture clamp designs use a mechanical locking device that engages when a connector is inserted into a holder. When all tests have passed, an electric solenoid is used to release the connector at the end of the test.

Dynalab strongly recommends using fixture clamps that are closed by spring pressure. This ensures that the clamp will remain closed even if the power is disconnected.

How do fixture clamps work?

The graphic below illustrates a spring-loaded locking device attached to the fixture block. When the connector is inserted into the fixture, it forces the locking pin to move far enough to allow the connector to pass. The locking spring then pushes the locking pin back into position to engage the lock. When all tests have passed the solenoid pulls the locking pin down to release the lock and allow the connector to be pushed out by the spring force on the spring-loaded pins.



Where do I get fixture clamps?

Fixture clamps are usually produced by the same companies that manufacture fixture block or holders.

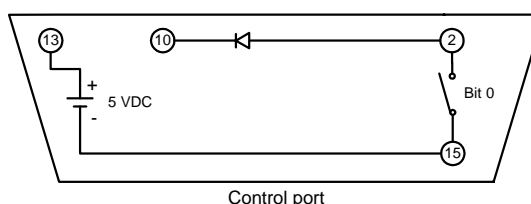
Solution overview

The Analyzer can provide a signal from the *Control port* to release the solenoid under specified conditions – usually after all tests have passed. So, when the harness passes the test, it can be released automatically.

What is the Control port?

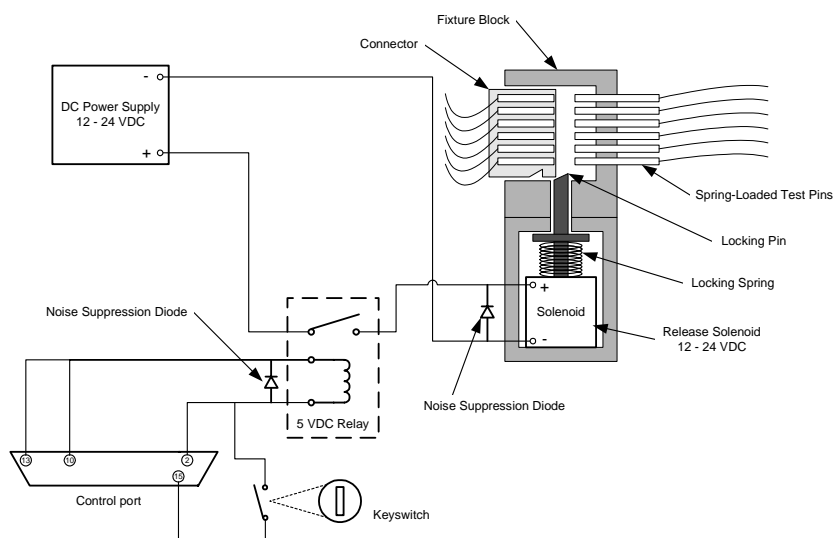
Each Dynalab Circuit Analyzer is equipped with a Control Port providing the user with the ability to operate a variety of external devices from within a Sequence. The Control Port effectively consists of 8 switches, called *bits*, that can be controlled by a set of Sequence items. The bits are numbered 0 through 7.

The diagram below shows how the circuitry inside the Control port works in this application.



See the Control Port Reference document available from Dynalab Test Systems for more details.

Electrical control schematic for clamp operation



Major parts required for clamp operation

Release solenoid

The release solenoid should be a 12 – 24 VDC intermittent solenoid.

Dynalab does not recommend using 120 VAC solenoids due to potential damage to Analyzer and possible injury to the operator if a problem

occurs. Additionally, the power required to actuate high voltage solenoids can cause electrical noise at the switch contacts when switched on or off. This noise may cause the Analyzer to reboot.

Power supply

The release solenoid usually requires a 12 – 24 VDC power supply. The power supply should be chosen to match solenoid power requirements.

Relay

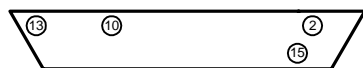
The relay is used to take the signal from the Analyzer and switch contacts to provide power to the solenoid. This is necessary because most solenoid require higher current than the Analyzer can safely control.

The relay MUST be a 5 VDC relay.

Noise suppression diodes

Noise suppression diodes MUST be connected in parallel with the solenoid and relay. They should be located as close as possible to the solenoid and relay. Without these noise suppression devices in place, the electrical noise from the solenoid operation may cause the Analyzer to reboot.

Analyzer Control port



Control port

This image of the Analyzer Control port shows the pins used in this application. These pins are described at the right.

Pin 2 – BIT 0

The Control port bits are points connected to ground when the BSET Sequence item is executed. In this case, bit 0 is connected to ground when BSET is executed with the parameter of “0”.

Pin 10 – SNUB

Allows for additional suppression from relay

Pin 13 – +5 VDC

Control port pin 13 provides power to the relay that controls the release solenoid. Pin 13 can only safely switch 1 Amp. The control port should only be used to power relay. Never connect the release solenoid directly to the Control port.

Pin 15 – GND

Pin 15 is used as a path to ground for the supervisor by-pass keyswitch.

By-pass keyswitch

Switch operated by a supervisor’s key to allow manual activation of the fixture clamp – allows supervisor to release harness if a problem cannot be located or repaired.

Dynalab recommended solution

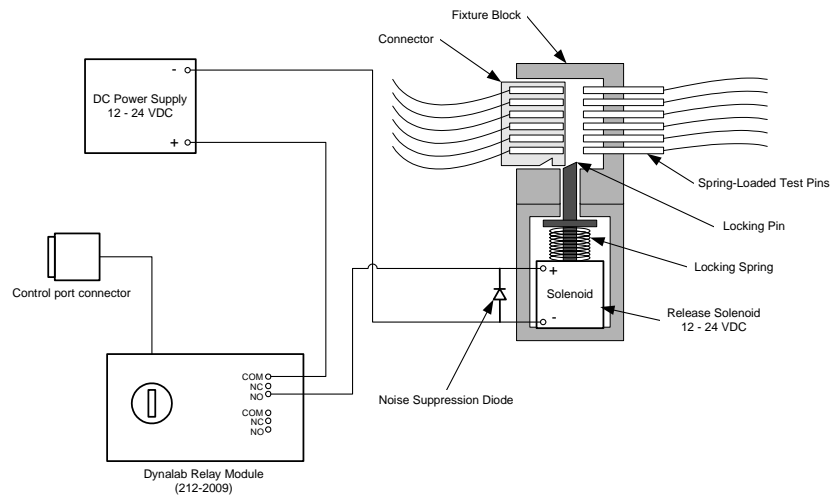
Dynalab recommends using our Relay Module (Part # 212-2009) instead of wiring your own relay and keyswitch. The Relay Module packages relays, noise suppression diodes, and a keyswitch into one convenient unit with a connector that connects directly to the Control port and screw terminals for connecting leads to the fixture clamp.

Benefits

- 1 protects the Analyzer from potential damage due to miswiring
- 2 convenience
- 3 simplified wiring
- 4 LED indicator

Wiring schematic using Relay Module

The diagram below shows the simplified wiring of the fixture clamp system using the Dynalab Relay Module.



Steps to test

Program the harness using the MAIN Netlist tab

Program the harness in the MAIN Netlist tab in the normal manner.

Program the Sequence

Table 1 shows a common Sequence for activating a fixture clamp.

First, the harness is tested completely, and all errors are fixed. After all tests have passed, the Analyzer provides a signal from the Control port to release the fixture clamp. The Sequence then waits for the operator to press the START button before repeating from line 1.

Table 1. Basic Fixture Clamp Activation Sequence

Line	Sequence item	Parameter	Application Effect
1	ADVOFF		Forces the operator to repair errors before continuing the test
2	TEST	MAIN	Performs a complete Netlist scan of MAIN
3	SOUND	4	Play sound 0
4	BSET	0	Turns on bit 0
5	DELAY	1	Delays Sequence execution for 1 second
6	BCLR	0	Turns off bit 0
7	REPORT		Show error report
8	KWAIT	0	Waits for START button input
9	REPEAT		Go to line 1 and continue Sequence execution

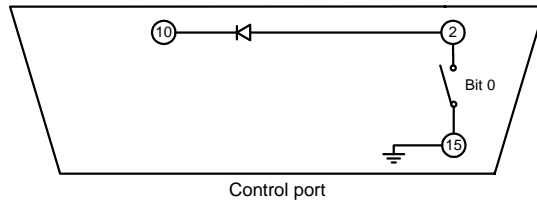
- Line 1** The ADVOFF Sequence item at the beginning of the Sequence instructs the Analyzer not to accept input from the START button when stopped on an error encountered during the TEST scan. This Sequence item prevents the operator from advancing and completing the test until the error has been fixed.
- Line 2** TEST instructs the Analyzer to perform a complete test of the Netlist specified by the parameter, in this case, MAIN. (The TEST Sequence item scans for continuity, shorts, and detection switch closures. See PASS Help for more information about the TEST Sequence item.)
- Line 3** Plays sound zero – “twirl”. Sound zero is generally used to indicate that the harness has passed the test. (See PASS 6.0 Help for a description of available sounds.)
- Line 4** BSET instructs the Analyzer to switch the specified Control port bit to the on position.
- Line 5** DELAY instructs the Analyzer to wait a specified number of seconds before executing the next Sequence item.

The DELAY item is used here to allow enough time for the connector to be removed while the solenoid is powered to unlock the fixture clamp.
- Line 6** BCLR instructs the Analyzer to switch the specified Control port bit to the off position.
- Line 7** REPORT instructs the Analyzer to show the number of errors of each type on the display.
- Line 8** KWAIT forces the Analyzer to wait for START button input before continuing to the next Sequence item.
- Line 9** REPEAT instructs the Analyzer to go to line 1 and repeat execution of Sequence. Sequence execution will continue to repeat in this manner until the STOP button is pressed.

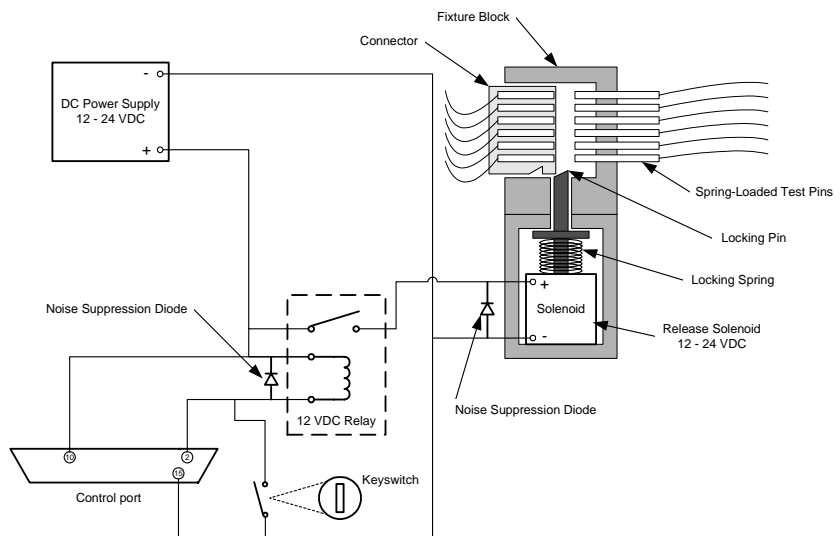
12 volt relay solution

The following solution is not recommended by Dynalab, because, while it is not dangerous, it is more complex to wire than the recommended solution using the Dynalab Relay Module. However, if a 12 VDC relay must be used to control the release solenoid, the following schematic shows the correct wiring.

The diagram below represents the internal Control port wiring when using a 12VDC relay to switch the fixture clamp.



Be sure to use the appropriate noise suppression diodes to prevent unwanted Analyzer resets due to electrical noise from the operation of the relay or solenoid.



Programming for this solution is the same as using the Dynalab Relay Module.