Operating Instructions for PC Based Life Tester

Introduction:

The PC based Life Tester is designed to allow long term testing of motorized equipment. It provides the ability to use a multitude of sensor inputs to determine position or load.

Four channels are available across four virtual stations. Each virtual station can run a mixture of the four channels. For example, Station One could run Channels One and Two while Station Three runs Channel Four. Also Station One could run Channels Two, Three, and Four while Station Two runs Channel One. The tester can run all four channels with simultaneous or independent operation, with a maximum current draw of 72 Amps at a maximum voltage of 20VDC.

Modes of operation include stall current sensing, limit switch/proximity sensing, analog input voltage level detection, and simple time based operation.

Tests are programmed into the tester via the mouse or a touch screen. Most options are selected via a dropdown selection system. The tests can contain up to 999 steps which run serially until the last test step is reached. Upon reaching the last step of the test, the test returns and repeats the test sequence until the user determined number of cycles is complete.

BASIC TESTER OPERATION

Current Sensing

Current sensing is the standard method used for testing motorized equipment. The device under test is operated until it reaches a stall condition with a correspondingly high current draw. Once the desired current draw is reached, as set in the test program, the test step terminates (either successfully or unsuccessfully based on other settings in the test step) and the test continues to the next step.

Conditions for failure in current sensing mode include “Motor On Time Too Short” and “Stall Current Never Reached”.

Limit Switch/ Proximity Sensor Operation

Limit switches or proximity sensors can be used to determine the end of a step instead of stall current. If a limit switch is to be used it is connected across two easy plug terminals above the power output plugs for each channel. Proximity sensors of the two wire variety are connected in an identical manner. Three wire proximity sensors are connected in a manner similar to the limit switches but the blue banana plug on the right front of the tester is used as the ground source for the sensor.

Operation is similar to current sensing in that upon reaching the prox or limit switch the test step being executed is terminated.

Conditions for failure in current sensing mode include “Motor On Time Too Short” and “Limit Switch or Prox Never Reached”.

Analog Input Voltage Sensing

Any analog sensor producing output voltages between +10vdc and -10vdc can also be used as an input device. In this case an additional setting for the test step is required: the voltage required to trigger the completion of the test step. Analog sensors are assumed to be “directional” in that if the motor is running forward the analog input must be wired such that the voltage from the analog device is increasing. If the motor is running in reverse, the analog voltage must be decreasing.

During operation the software in the tester assumes that the setpoint voltage will be reached from the positive direction when the motor is running in reverse and the negative direction when the motor is running in the forward direction.

Wiring for an analog device is very simple. The lower easy connect plug terminals act as the analog input and the black banana plug is used for analog devices which have an output of +10vdc to -10vdc. Devices with only a single direction of output (0 to +10vdc) should be wired to the analog input terminal and the blue banana plug.

Operation is similar to current sensing in that upon reaching the set voltage on the analog input the test step being executed is terminated.

Conditions for failure in current sensing mode include “Motor On Time Too Short” and “Voltage Setpoint Never Reached”.

Time Based Operation

The simplest mode of operation of the tester is time base operation. In this mode the number of seconds the motor is to run in each direction is entered in the test step. There are no error conditions associated with this mode. Upon reaching the desired time the test sequence automatically moves to the next step.

BASIC TESTER SETUP

There are basic parameters that need to be setup for all tests. These are in the middle-right of the station screen and include such parameters as motor voltage, voltage sensing, failure mode, and the number of cycles desired.

Motor voltage is the voltage to be sent to each motor during operation. This voltage is the same for all four channels and can be changed within the test.

(NOTE: This will change the voltage across ALL motors. Do not utilize this feature if you are running multiple tests.)

The voltage is not adjustable using the knobs on the front of the power supply.

Voltage sensing is used by the power supply to control the actual output voltage from the power supply. Remote voltage sensing allows the user to determine the voltage at the motor leads and allow the system to automatically adjust the voltage from the power supply to give the set output voltage to the motor *at the motor leads*. In local voltage sensing the set voltage is applied directly from the power supply and any voltage drop across the wiring in the tester or leads to the motors is ignored.

Errors, such as failure to complete a step in the defined time, can cause the tester to halt its test or simply record the failure and continue. The condition is set with the Failure Mode selection box.

The number of cycles desired determines how many times the test sequence will be executed.

SEQUENCE PROGRAMMING

Overview

The basic principle of the sequence programming is to set up sequential steps which execute until the desired number of cycles is completed.

Available step commands available are:

Off
Set Voltage
Forward
Reverse
Start Loop
Stop Loop
Wait
Skip
Save
End

In addition to step commands which actually control the output of the tester, there are input selections for step termination. Available step termination settings are:

LS/Prox
Time
Analog
Current

Test settings are also available for each step. These settings vary with the step command and step termination settings selected but usually include the following:

Minimum Step Time
Maximum Step Time
Limit Current/Voltage
Inrush Delay

By combining these settings on each of the 4 available channels, an extremely flexible test sequence can be created.

STATION USER INTERFACE

Start
Press the 'Start' button to run your test.

Stop
The Stop button can be clicked on to stop the test at any time.

Note: The test will stop running for one of the following reasons:

- *The 'Stop' button was pressed.*
- *The test ran to completion.*
- *The command power button was turned off.*
- *The power supply faulted.*
- *A fault occurred.*

Step Reports
Clicking this button opens a window showing step report data. This button can be pressed at any time provided a name entered into the 'Test Name' field.

Graphical Reports
Clicking this button opens a window showing graphical data of the channels. This button can be pressed at any time provided a name entered into the 'Test Name' field.

Failure History
Clicking this button opens a window showing failure history of the tests. This button can be pressed at any time provided a name entered into the 'Test Name' field.

Clear Failure Message
This button will erase fault message and reset the power supply.

Jog Forward / Jog Reverse
While a test is not being run, you can manually move the device connected to the channel by pressing the 'Fwd' or 'Rev' button of an enabled channel. Pressing the 'Fwd' button will cause the device to move in a forward direction by sending a positive voltage. Pressing the 'Rev' button will cause the device to move in a reverse direction by sending a negative voltage. Only enabled channels will let you manually control the devices. If the test is running, you will not be able to manually control the channels.

Import
You can import a test created on another computer or add a 'deleted' test back into the 'Test Name' list

Load
If you 'Saved' a prior test, that test can be loaded while the test is not being run. First, select the name of the test from the 'Test Name' dropdown and click on the 'Load' button. The saved test will load. Loading a test will erase all the channels that you have programmed in the grids.

Save
Pressing 'Save', stores all the instructions into a file stored on the hard drive. Any channels current enabled on the virtual station are saved into the file. The test instructions can be reloaded pressing the 'Load' button.

Add
The name of a new test is created by using the 'Add' button. A window where you type the new test name opens. After entering the new name, select 'Accept' and the window will close and add the name to the 'Test Name' list. If you do not want to add the name, click 'Cancel' and the window will close without adding the new name.

Delete
The name of the test will be deleted from the 'Test Name' field.

GRID USER INTERFACE

Right clicking on a step number of a channel grid brings up a popup menu allowing you select one of the following.

Insert Row

Lets you insert a row in the grid at the step that the cursor was pointing to when the right click happened. The insertion only occurs for the channel loaded in the grid.

Delete Row

Lets you delete the selected row in the grid. The deletion occurs at the step that the cursor was pointing to when the right click happened. The deletion only occurs for the channel loaded in the grid.

Insert Row All Channels

This inserts a row in the grid at the step that the cursor was pointing to when the right click occurred. The insertion occurs for all the enabled channels on the current virtual station.

Delete Row All Channels

This deletes the row of instruction from all four channels. The deletion occurs at the step that the cursor was pointing to when the right click happened.

Right clicking on the column heading of a grid brings up a popup menu allowing you to select one of the following actions.

Copy Channel

Selects all the commands and times programmed in the grid.

Paste Channel

This pastes all the commands that were selected in the 'Copy Channel' action into the target grid. You will have to click on a different channel button to display the new target.

Erase Channel

Erases all the programmed instruction for the channel displayed in the grid.

Erase All Channels

This erases all the instructions that are programmed into all four channels.

Cancel

This cancels the popup menu.

COMMAND AND SETTING DETAILS

Off
Select 'off' at the position in the grid where you want the cycle to stop running steps. Any grid command placed after 'Off' will not be run. This only applies to the channel the 'Off' instruction is placed in.

Forward
This causes the device controlled by the channel to move in a forward direction.

Reverse
This causes the device controlled by the channel to move in a reverse direction.

Set Voltage
Select this if the test voltage is to be changed. This affects all channels and should only be used on one channel. The voltage display on the main screen will update to show the voltage being used. The voltage will remain the same until changed in the program or by the operator.

Start Loop
This is used to mark the block of instructions placed between the 'Start Loop' and the 'End Loop' commands that is to be repeated. Each 'Start Loop' requires a 'Stop Loop'. There can be at most four nested loops in a grid. Using a loop instruction repeats the rows of commands placed in all four channels. You are required to enter the number of times the loop is to be run by entering the value into the 'Limit' column.

Stop Loop
This command is used to mark the end of the repeated commands in the loop.

Wait
This is used to have the device connected to the channel not move. The length of the wait time is entered in the 'Max' column. You enter the number of seconds to the nearest tenth of a second in the cell.

Skip
This is used to skip over the instruction in the row. You can use it to hold the values in the row on the grid. The test will ignore these values.

Save
This tells the program to save test data into a file located in C:\Results directory with a '.csv' extension. The program will store the date and time, the cycle count, the step count, step loop count or -1, the step loop max or -1, the amperage and the analog input. You are required to enter how many cycles are to run between data saves.

End
Select 'End' at the position in the grid where you want the cycle to stop running steps. Any grid instructions placed after 'End' will be ignored. This applies to all four channels.

Forward or reverse require you select one of the following commands in the 'Mode' column.

Time (sec)
Select this if the selected direction controlled by the time you enter in the 'Max' column

Limit Switch
Select this if the selected direction controlled by the input from a limit switch or proxy.

Current (A)
Select this if the selected direction is controlled by reaching the amperage you enter into the 'Limit' column.

Analog (V)
Select this if the selected direction is controlled by the analog input from a string pot or linear pot where the maximum and minimum values are set in the 'Limit' column.

Forward or reverse require you enter a value into all the cells to the right.

Inrush
Enter the number of seconds that you want the amperage to be ignored while the device is staring.

Stall
Enter the number of seconds to that you want the device to be allowed to stall.

Max
Enter the maximum number of seconds that the channel is allowed to move the device in the programmed direction.

Min
Enter the minimum number of seconds that the channel is required to move the device in the programmed direction before causing a fault.