



RAIL FIRE & MAINTENANCE

Locomotive Cable Tester

Version History

Rev No	Rev Date	Name	Description
1.1	08.03.2023	Kerry.F	Initial Release

Document Copyright Statement

Product Name: Locomotive Fire Alarm Cable Tester

Manufactured to Conform to Clients Specification

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Section 1.0 Fire Detection System Cable Tester Overview.

The locomotive cable tester has been designed to aid in the commissioning and ongoing maintenance of the locomotive fire system. The locomotive cable tester has been designed to accommodate for the changes to the locomotive fire system to bring into line with AS5062 and the new electric locomotive. As always this cable tester is 100% backwards compatible with all locomotive fire system installed since 1980 with diesel and electric locomotive.



Cable tester

1. Diesel and Electric locomotive
2. Simulates FP280 Fire Panel
3. Simulates System Sensor Fire Panel
4. Simulates Future Flex Locomotive

Section 1.1 Functions and Overview.

1. Monitor the detection zones of open and short circuit by detecting the 1K EOL
2. Display the resistor value of each zone to prevent future fault due to increasing resistance of the cable a resistance of below 300 Ohm is considered a short circuit a resistance of above 1600 Ohms is considered an open circuit.
3. Monitor the actuator line for open and short circuit by detecting the 1K eol for older system the actuator is not fitted with an EOL as the older panel do not monitor short circuits there for the 10 ohm coil is always present.
4. Trainline control and monitoring has been included this is only operation when running of the external supply as the relay with JB1 are powered by the locomotive system

Section 1.2 Main Components.

The cable tester is made up of the following main components and features.

1. Black equipment tough case tactix 345mm Medium Protective Safe Case
2. 7" Colour graphic touch screen
3. Custom made printed circuit board
4. Termination card
5. Three way on off on rocker power switch
6. 37 pin inline male to 37pin female inline Amphenol cable loom
7. Mounting gear plate
8. 6 x 9v Battery

Always use good quality battery such as energiser lithium battery as the actuators pull significant current when energised.

Section 2.0 Connecting The Cable Tester Up.

The cable tester has and a 37 pin Amphenol male socket connected to a length of cable, this allows the cable that would otherwise plug into the fire system to be plug directly into the cable tester.

To turn on the cable tester use the rocker switch on the facia plate, two mean have been provided.

1. Internal battery power (24vdc) train line relay in JB1 are not powered in this position
As relay f and relay G (TL alarm and TL fault require locomotive power to be on)
2. Using power from the locomotive (32vdc). Train line relay in JB1 are powered

Note

The cable tester is designed to operate to a maximum of 42vdc voltage pass this will damage the unit (very badly).

Section 3.0 Cable Tester Front Screen.

Make sure that the 1k end of line resistors has been fitted and the actuator heads removed from the cylinders to prevent any accidental discharge. When the table tester is first switch on, a front screen will be show figure 1 below and an audible message will be played.



Figure 1 Home screen power up

Section 4.0 Cable Tester Operating Mode.

After a few seconds the screen will change to an option select screen as shown in figure 2 below.

Where the operator can select the type of operation been used.



Figure 2 Monitor Mode

Section 4.1 Option No 1 – No Actuators Fitted.

Actuators have been physically disconnected and replated with 1 K resistor this is the normal option required during the manufacture of the locomotive in the USA prior to shipment as no fire suppression system is fitted.

Note

The Foam 1 and Foam 2 Actuation slide switches will be missing from the test screen.

Section 4.2 Option No 2 – Actuators Fitted.

Actuators removed from the cylinders but still connected, this option is a maintenance option as it allow for the actuator heads to be activated.

Note. Due to the legacy system the FP280 fire system only monitored the actuator line for open circuit. The System Sensor fire system monitors the 1k end of line resistor installed within the actuator socket at the factory for open and short circuit by switch the polarity around and the use of some blocking diodes. Since the FP280 and the System Sensor fire system can be interchanged the cable tester will not monitor the line for short circuit in this mode but will operate the actuator heads as the system must be always backwards compatible.

Section 4.3 Option No 3 – Flex Electric Locomotive

Select the 1K EOL only switch, if no actuators are fitted, and the cable end are terminated with 1K EOL this is a typical factory test in the USA prior to shipment as the suppression system has not yet been installed. Once pressed the start button will be shown

Press The Red Actuator Fitted Button to enable the virtual actuator switch on the monitoring screen.

This will allow the actuators can be driven on caution the old actuators are not fitted with a 1K EOL so will be show as a short circuit the new System Sensor Panel actuator have a small EOL card fitted inside the socket and the cable will be monitored for open and short circuit. Once pressed the start button will be shown



Figure 3 Monitor Mode

Press the cyan button places the unit in the operating mode for the flex locomotive

Zone 1 – Battery Thermal Runaway loop 1
 Zone 2 – Battery Thermal Runaway loop 2
 Zone 3 – Temperature Sensor loop 1
 Zone 4 – Temperature Sensor loop 2

Future

Aux Input – Fitted but not used (Future)
 Aux 1 Output – Fitted but not used (Future)
 Aux 2 Output – Fitted but not used (Future)

Once the option has been selected a beep will sound and a green start button will be displayed. See figure 3 below.



Figure 4 Start Screen

Press the green start button to display the test page

Section 5.0 Cable Tester Operating Screen.

After the green start button has been pressed a short beep will sound and the screen will change to the testing screen as shown in figure 5 below.

The screen is made up of all the function of the fire panel, the screen is split into two side left been zone and actuator monitoring the right side been operating and function control.

Section 5.1 Monitoring Screen Left side Screen.

The left side of the monitoring screen is made up of three main parts.

1. Icons showing Open, Short, Normal Cable Status.
2. Four Digit display show approx. EOL value 0-2000 Ohms.
3. Information Bar.

Section 5.1.1 Zone Monitoring.

Each zone ME1, ME2, EC1, EC2, Low Pressure, Foam1 and Foam 2 have the following status icons

- Open Circuit will show yellow if the 1k end of line is missing or cable is open circuit.
- Short Circuit will show red if cable is shorted circuit and the 1k end of line cannot be detected.
- Normal will show green if the 1k end of line is detected.

Section 5.1.2 End of line Resistor Monitor.

The four digit number shows the end of line resistor value for each circuit; this has been provided to aid in preventative maintenance for high resistance joins. The scale value is from 0 ohms to 2k ohms, a reading of 2k ohm indicates an open circuit and this will be reflected by the yellow open circuit icon. A value of 300 ohm indicates a short circuit and this will be reflected by the red short circuit icon.

Section 5.1.3 Information Bar.

A small window located at the top of the display is used to provide some feed back to the operator.

Section 5.2 Monitoring Screen Right Side Screen.

This side is made up of six side switches and conformation icons.

- Shutdown this switch will drive the engine shutdown relay in JB1 the activated icon will change colour to red when power is sent to the relay.
- Alarm this switch will drive the engine shutdown relay in JB1 JB1 the activated icon will change colour to red when power is sent to the relay.
- Fault this switch will drive the engine shutdown relay in JB1 JB1 the activated icon will change colour to red when power is sent to the relay.
- Foam 1 and Foam 2 switch will drive 12vdc to the actuators the activated icon will change colour to red when power is sent to the actuator.
- Rel Ind switches off the manual release lights light on the remote foam release buttons, the activated icon only illuminates when one of the remote switches has been pressed.

Section 5.3 New Function added.

- The TL alarm icon will only operate when the trainline relays have been activated this only happens when the cable tester is powered from the locomotive
- The TL fault icon will only operate when the trainline relays have been activated this only happens when the cable tester is powered from the locomotive

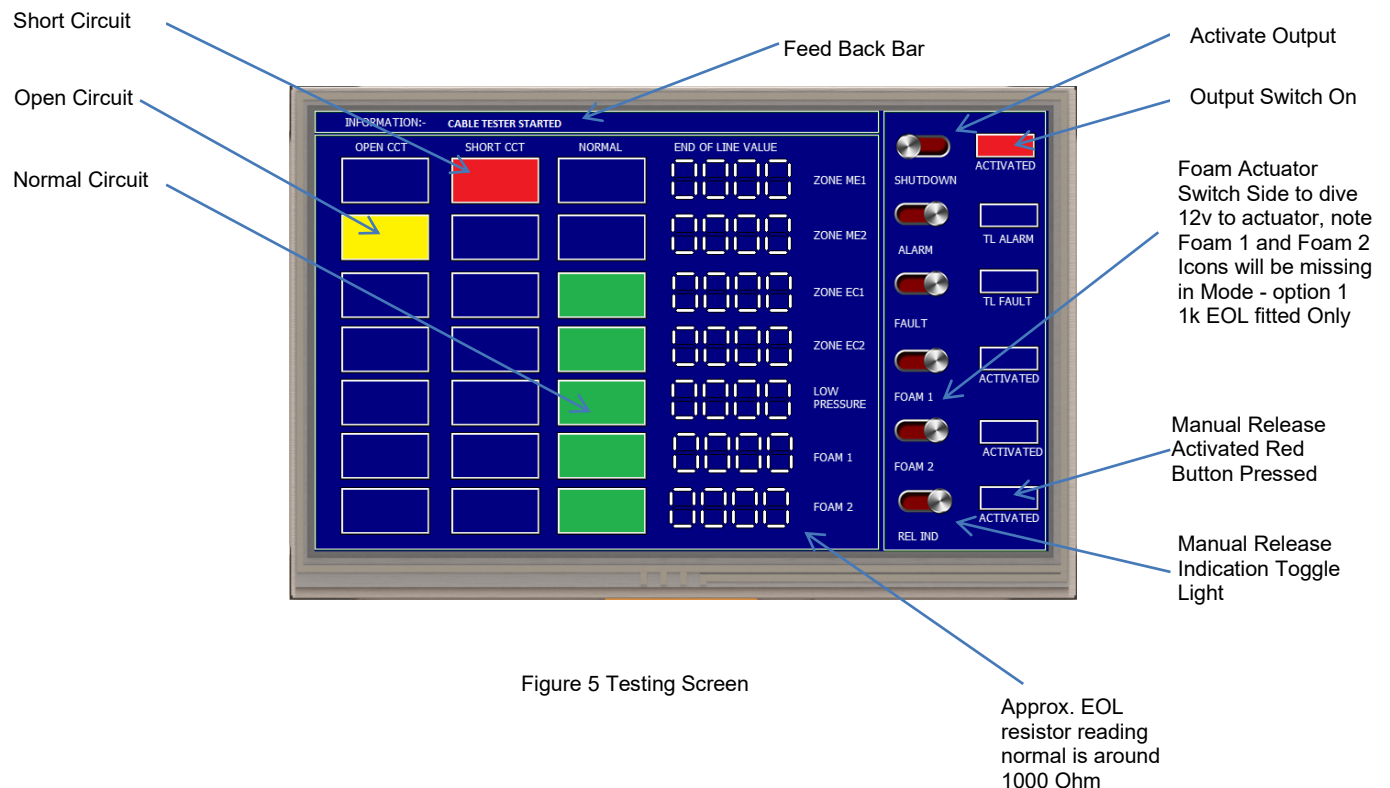


Figure 5 Testing Screen

Section 5.4 Flex Locomotive Test Screen.

The electric locomotive test screen show in figure 6, is similar to the diesel locomotive test screen, the descriptions have been changed and the shutdown test switch removed.

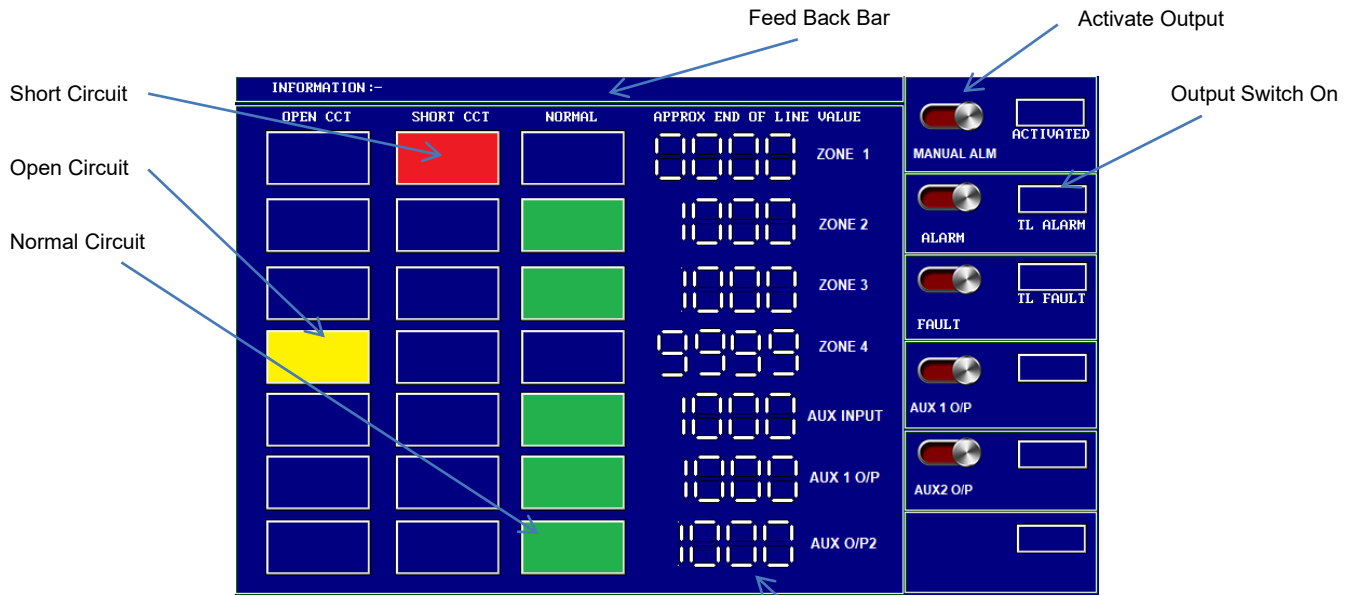


Figure 6 Testing Screen

Approx. EOL resistor reading normal is around 1000 Ohm