PTE0705 Electric Fence Monitor

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DESCRIPTION

The PTE0705 Electric Fence Monitor is designed to allow the voltage on an electric fence to be monitored for the purpose of integration with other systems. It can be thought of as a transducer taking electric fence pulse voltage on the input terminals and delivering the peak voltage readings in a number of different formats.

It may be installed near the energiser or at any point along the fence line.

The PTE0705 replaces all of the models in the PTE700 V2 series: PTE0700, PTE701, PTE702 and PTE703. It combines most of the features of these four units into a single, highly integrated device.

The PTE0705 may be connected to other systems via:

- Form C dry contacts (Relay output)
- 0-10V analogue output
- RS232 data
- SDI-12 protocol *(not available yet)*

The PTE0705 is compatible with modern low impedance electric fence energisers that conform to IEC60335.2.76 standards.

It can measure pulse voltages of up to 10kV peak.

The PTE0705 draws only a few mA from any 10-24V DC supply making it suitable for Solar powered systems.

This manual applies to Firmware Version 3.00 and PCB version 3.1 and higher.

QUICK START GUIDE

Caution: Read the electric fence energiser manual and understand the risks associated before proceeding.

This section gives the minimal information required to get the PTE0705 connected and running.

1. Turn the electric fence energiser off.
2. Remove the cover from the Monitor.
3. Wire the 12V and Gnd to a 10V to 14V power source, but leave the power off for now.
4. If you are going to use the Relay, RS232 or 0-10V outputs wire these up to your equipment now.
5. If you intend to look at the RS232 data configure your terminal program to 9600 baud, 8 data, 1 stop bit, no parity and no handshaking.
6. If you are using a USB to RS232 serial adaptor make sure you identify the correct COM port.
7. Wire the Fence and Ground binding posts (large Red and Green Terminals at the top of the product) to the live and ground wires on the fence. Or directly to the Fence and Earth terminals of the electric fence energiser. Use suitable insulated wire.
8. Check that fence wires are kept 25mm or more away from other equipment and any low voltage wiring.
9. Position the Delay pot to 12 O'clock and the Voltage pot to 9 O'clock.
10. Do not move the calibration trim pot.
11. Turn the electric fence energiser on.
12. Turn the 12V DC supply to the Monitor on.
13. The LEDs should all flash once and then start to light up with each energiser pulse.
14. Wait 30 seconds.
15. The monitor should not go into alarm (beeper off), the 0-10V output will show the fence voltage in /1000, the relay will be in the normal state and the RS232 data will read the fence kV.
16. After a few seconds turn the energiser off.
17. Wait about 30 seconds.
18. The monitor will go into alarm, the 0-10V output will go to 0V, the relay will change state and the RS232 data will show 0kV.
19. Turn the energiser back on and check the connected equipment is reading the data from the monitor.

FEATURES

- Monitors the peak pulse voltage from any electric fence (Note 1,2)
- Low Power Drain from 10 to 24 Vdc (12V nominal)
- Reverse polarity protection
- Relay contact outputs may be configured for normal or fail safe operation (J4)
- The relay may be mimic or latched (J3).
- ASCII RS232 data output stream shows fence voltage each pulse
- 0-10V Analogue output proportional to 0-10kV peak fence voltage with 4 pulse filtering
- Fence input rated to 10kV
- Contains opto isolation as required under IEC60335.2.76, CSA60335.2.76, AS/NZS60335.2.76
- LED bar graph voltage display
- Low Fence Voltage alarm set point or automatic self-setting
- Adjustable calibration
- IP65 weather proof wall mountable enclosure
- Internal beeper for fence fail alert (can be silenced)

Notes

1. Energiser must be above 0.2J rated output.
2. Energiser must be a pulse type, not a continuous AC. Continuous AC are rare but are still sold in the USA.

EXPLANATION OF TERMS

- **Low Fence Voltage Alarm set point** is the fence voltage below which the Monitor will go into Alarm to show a failed fence.

  The PTE0705 Electric Fence Monitor allows you to manually adjust this set point, or alternatively it can be set to automatically adjust this set point. *Please note, automatic is not operating at this time!*

  When automatically adjusting, it also 'follows' the fence's performance. If, for example, the fence were operating at 7kV when the Electric Fence Monitor is switched on, it would set its Low Fence Voltage Alarm set point at about 6kV. As days go by, grass might build up on the electric fence, lowering the voltage on the fence, or a dry spell might slowly increase the voltage on the fence. The Electric Fence Monitor sees the gradual change and adjusts its set point accordingly. If, however, the fence voltage drops more quickly the Electric Fence Monitor will raise an alarm. False alarms are less likely to be raised if the Electric Fence Monitor is allowed to automatically adjust its set point. Another advantage of using auto-adjustment is that the Monitor will also alarm on a quickly rising voltage.

  Note: the Low Voltage Set point and Delay settings are only important if you are using internal Beeper or the relay output.

- **Delay from Low Fence Voltage to alarm** is the adjustable amount of time the Monitor waits after the fence fails before it raises an alarm. For example, if the delay is set to six seconds, and the fence voltage goes low for only three seconds, no alarm is raised. The alarm would only be raised if the fence voltage stayed below the Low Fence Voltage Alarm set point for more than six seconds.

- **Raising the Alarm** is when the Monitor changes the relay to the Alarm state, The Alarm LED lights permanently, and the Beeper sounds. The monitor will go into Alarm if the voltage measured between the Fence and Earth terminals goes below the Low Fence Voltage Alarm Set Point for longer than the Delay as set on the Delay pot. If you do not want the beeper to sound place the jumper on the two pins labelled "/Beeper".

- **Changing Relay to Alarm State.** The relay is on or off. Which of these represents the Alarm state depends on whether J4 is linked (covered by a jumper) or not. If J4 is off the connection from NO to C will be closed on Alarm. This is discussed further on Page 8, under "Relay Output".

- **Optical (opto) isolation from fence inputs** means that the fence inputs are not electrically connected to the rest of the circuitry. Instead, they are connected optically. This helps to protect any accessories connected to the Electric Fence Monitor and the Electric Fence Monitor itself from the high voltages on the fence. A electric fence lightning diverter can add further protection when connected between the fence and the monitor.

- **RS232 output** means that the data collected by the Electric Fence Monitor can be transmitted to other equipment in RS232 serial data format. You can easily use a computer to collect, save and display this information. The data is: 9600,8,n,1 format, No handshaking is required.

SPECIFICATIONS

Specification Name	Specification
Supply voltage	10-24V DC
Supply current	6mA (20mA with relay on)
Min measurable input voltage	0.3 kV
Max measurable input voltage	9.9 kV voltages over 9.9kV are shown as 9.9kV
Acceptable Pulse period	1.0 to 3.0 seconds (0.33 to 1.0Hz)
Input voltage measurement	Peak of Voltage over 200uS from pulse start
Relay output	Dry changeover contacts 30V 1A (<500mA recommended)
Energiser compatibility	All pulse output type energisers with output over 0.2J
Isolation from fence circuit	25kV (design target)
Accuracy 0-10V output	±5% after factory calibration on a 2J energiser
Accuracy RS232 output	±5% after factory calibration on a 2J energiser
Operating temperature range	-10 to +50°C

Table 1 – Specifications

Specifications are subject to change without notice.

For the latest copy of this manual see www.jva-fence.com.au/downloads.php

INSTALLATION

- Remove the 4 screws holding the top cover in place.
- Secure the PTE0705 to the wall or mounting device using the 4 mounting holes that will be hidden after the lid is replaced.
- Thread the 12-volt supply and any output leads into the Electric Fence Monitor enclosure through the cable gland on the side; tighten it to stop moisture or ants from entering.
- Attach a suitable insulated cable from the Electric Fence Monitor's red input binding post to the electric fence, and from the Electric Fence Monitor's green input binding post to a good earth connection. If possible connect to the same fence earth as the energiser is connected to.

OUTPUT CONNECTIONS

The Electric Fence Monitor's Power and Output connections are visible on the bottom edge of the circuit board and consist of a row of pluggable screw terminals. Figure 1 shows the screw terminals, adjustment trimmers and LED's.
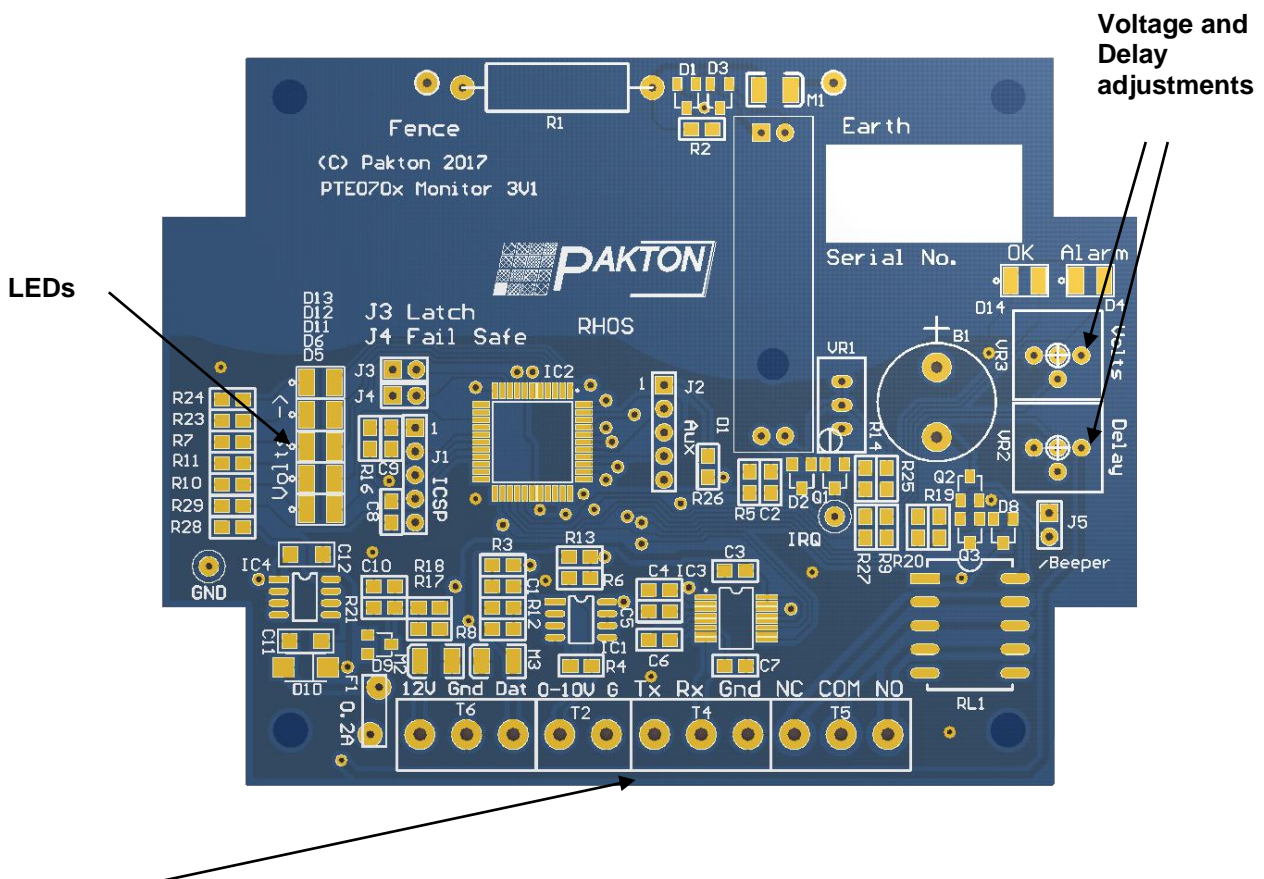
Voltage and Delay adjustments

LEDs

Output terminals along bottom edge of PCB.

Figure 1 - Output Terminal Locations

The cables shown should enter the enclosure of the Electric Fence Monitor through the cable gland on the side. The connections to the electric fence are not shown in Figure 1 – those cables can be connected at the large Red and Green binding posts on the outside top of the Electric Fence Monitor's enclosure.

ELECTRIC FENCE MONITOR OUTPUTS

LED DISPLAY

The Electric Fence Monitor has Seven LEDs. Two Alarm LEDs and 5 Bar Graph LEDs.

The Graph LEDs show the fence voltage in steps of 2kV live with each electric fence pulse detected.

- Green Over 8kV
- Green 6-8kV
- Green 4-6kV
- Red 2-4kV
- Red 0-2kV

- Red Alarm – No Fence Pulse or low voltage. Flashes with a bad pulse, on permanently when the Monitor is in Alarm.
- Green Ok – Flashes with each good pulse seen.

RELAY OUTPUT

The Electric Fence Monitor Relay has three terminals. These three terminals are: Common [C], Normally Closed [NC] and Normally Open [NO.] The relay will connect from C to NO when the fence fails (if J4 is off).

These contact are may be connected to external alarm panels inputs, sirens or strobes.

Terminal	Function
NC	Normally Closed
C	Common
NO	Normally Open

Table 2 – Relay Connections

NOTE:

- The relay contacts are rated at 30V, 1A (<500mA recommended). They **MUST NOT** be used to switch 240Vac. If you want to switch 240V you will need a 240V rated buffer relay with a 12V coil. You can switch the buffer relay coil from the Monitors relay.
- The Relay is can be configured to be "fail safe" by placing a jumper on J4. This means that the relay will be powered on until there is a fence fault. In the alarmed condition, the C and NC terminals are shorted. A fail safe relay will cause the monitor to consume slightly more power.

STAND ALONE OPERATION

In Stand Alone Operation, the relay can be used to switch a siren or a strobe on when an alarm condition is raised. If both a siren and a strobe required they can be connected in parallel (provided the power supply or battery is big enough to power both).
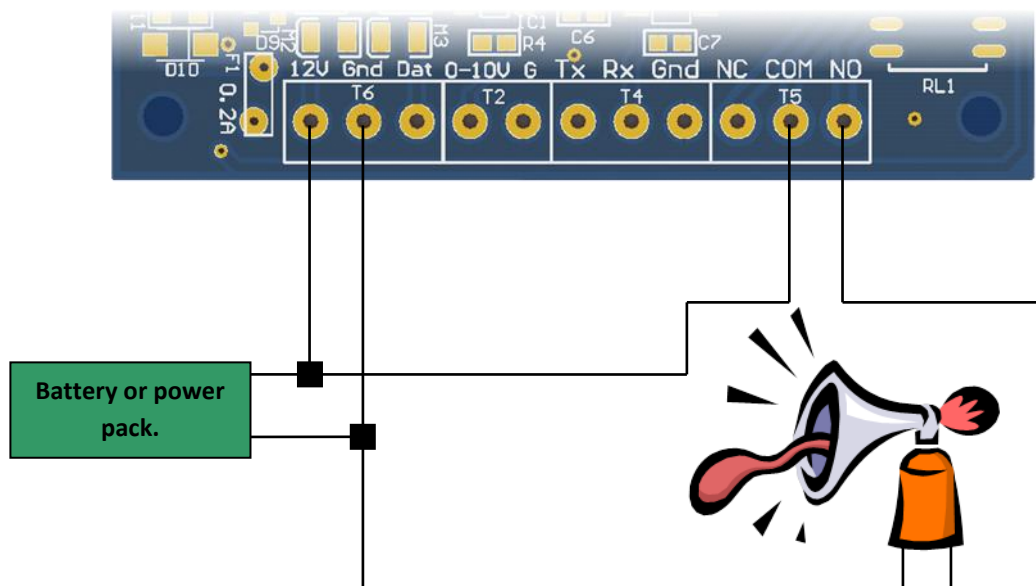

Figure 2 - Stand Alone Operation

CONNECTION TO AN ALARM PANEL

In Alarm Panel Operation, the relay outputs are connected to the alarm panel. See the documentation supplied with the Alarm Panel.
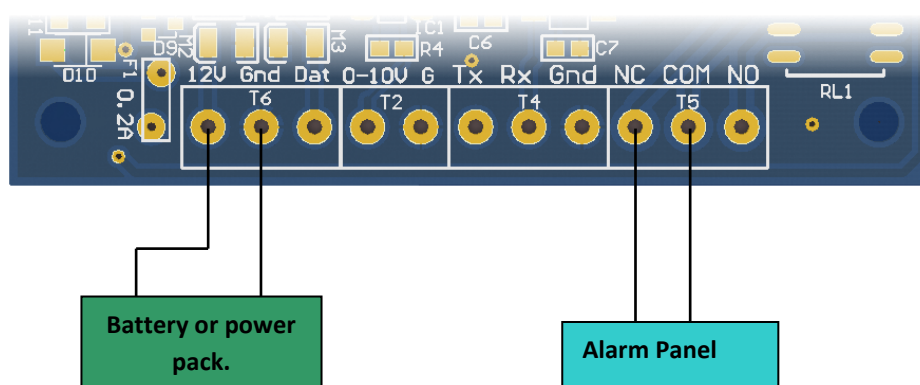

Figure 3 - Alarm Panel Operation

LOW FENCE VOLTAGE SET POINT – AUTOMATIC SETTING

Please note, automatic is not operating at this time!

- Turn the "**Volts"** trimmer fully anticlockwise
- Switch on the electric fence and ensure that it is operating in the expected range.
- Switch on the Electric Fence Monitor by supplying it with twelve volts. If the Electric Fence Monitor was already switched on, it may need to be reset by switching off (disconnecting the twelve volts supply) and switching back on.
- The Electric Fence Monitor has now automatically set the Low Fence Voltage Alarm Set Point and is now monitoring the Electric Fence. You can test its operation by deliberately placing a short on your electric fence – the Electric Fence Monitor will raise an alarm.

LOW FENCE VOLTAGE SET POINT – MANUAL SETTING

- Remove the Jumper from J3 so that an alarm is not latched.
- Turn the **"Volts"** trimmer fully anticlockwise and then *advance it clockwise slightly.* If you do not advance the trimmer, the Electric Fence Monitor will think that it is set to automatically calibrate.
- Switch on the electric fence and ensure that it is operating in the expected range.
- Switch on the Electric Fence Monitor by supplying it with twelve volts.
- The Green OK LED should be flashing, indicating a working fence. The Low Fence Voltage Alarm Set Point is very low at present, because the **"Volts"** trimmer is turned almost completely anticlockwise. Gradually increase the set point by slowly turning the trimmer clockwise. The Low Fence Voltage Alarm Set Point is slowly increasing and will soon rise above your electric fence's voltage. When this happens, the Red Alarm LED will flash and after the delay set on the delay trimmer, the Alarm LED stay on, the beeper and relay will activate.
- The Low Fence Voltage Set Point is now about the same as your electric fence's voltage and needs to be lowered slightly. Do this by turning the **"Volts"** trimmer anticlockwise until the OK LED flashes again.

DELAY SETTING AND LATCHING

- Switch off the electric fence OR place a short across the live to ground to remove the voltage at the monitor. Note the amount of time taken for the Electric Fence Monitor to raise an alarm. Turn the **"Delay"** trimmer anticlockwise to reduce the delay and clockwise to increase the delay.
- The shorter the delay is, the more likely the Electric Fence Monitor is to raise a false alarm, because every electric fence will have an occasional low voltage pulse.
- If Jumper J3 is on an alarm will be latched for the same Delay. This means the fence voltage must come good for the Delay time before an alarm will be cancelled.
- If Jumper J3 is off the alarm will be cancelled after 2 good electric fence pulses. This is mimic mode.

0-10V ANALOGUE OUTPUT

The 0-10V Analogue Output is from terminals V and GND. The 0-10V analogue output voltage linearly represents the fence voltage ranging from 0-10kV, ie:

Fence Voltage = (Analogue Output Voltage) x 1000

Note: The monitor has software filtering which is intended to give the average output over the last 4 pulses.

The minimum time the Monitor must be powered before this output is valid is 3 seconds.

If you are using the 0-10V output you can ignore J3, J4 and the Low Voltage and Delay settings. You may inhibit the internal Beeper by placing a Jumper over the "/Beeper" pins.

RS232 OUTPUT

The default mode is verbose with the output string as below:

V 5500$C_R$$L_F$

Where:

5500 is the measured peak voltage of the last fence pulse and C_R is a carriage return and L_F is a line feed. 8 characters inclusive of the $C_R$$L_F$

The line will be repeated with each fence pulse detected.

If the fence stops (no voltage) the output string will be sent after 2 seconds and each 2 seconds thereafter.

V 0000$C_R$$L_F$

Pin	Function
Tx	Transmit (link to Rx on your equipment)
Rx	Receive
Gnd	Ground

Table 3 – PTE0700 RS232 Connections

If you are using the RS232 output you can ignore J3, J4 and the Low Voltage and Delay settings. You may inhibit the internal Beeper by placing a Jumper over the "/Beeper" pins.

If you require another format then please request it via email to sales@jva-fence.com.au

SDI-12 OUTPUT

The SDI-12 Protocol is not available at the time of writing.

Pin	Function
12V	12V power in
Gnd	Ground (0V)
Dat	SDI-12 data line 0-5V

Table 4 – PTE0705 SDI-12 Connections

If you are using the SDI-12 protocol you can ignore J3, J4 and the Low Voltage and Delay settings. You may inhibit the internal Beeper by placing a Jumper over the "/Beeper" pins.

WARRANTY

The PTE0705 Electric Fence Remote Monitor Series is covered by a 12-month warranty against defective parts or workmanship. If you have any problems, return the Monitor along with your proof of purchase, or contact the store of purchase or distributor.

For assistance
If you have any operational problems, difficulties etc. you can phone or email your questions or comments to JVA:

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More help is available at the WEB site: www.jva-fence.com.au