Electric Fence Station Setup Guide

PTE2500A

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Introduction

The JVA Electric Fence Station is designed to power and monitor electric fencing, including exclusion fencing. JVA recommends it be used to power and monitor two sections of multi-wire boundary fence of up to 10km each. It will detect and report shorts independently in each section. It can send notifications directly to a mobile phone by SMS or email. Using JVA's patented monitoring technology, shorts can be detected even at the end of very long fences. With built in Cellular Gateway and Cloud Router® technology the fences can be turned on or off and their voltage checked at any time directly from a smart phone. It is powered by a 300W solar panel for worry free remote operation.

This setup guide contains information to set up the PTE2500. For more information on the ZM2, PTE0320 gateway or other products contained within the cabinet, please refer to the respective manuals which can be found in the document wallet on the inside of the door. More information on the entire JVA range can be found online at http://www.jva-fence.com.au under "Support".

We provide a short video on the installation of an Electric Fence Station at www.exclusionfence.com

Getting Started

The recommended sequence for installation is:

- Read the manuals
- Design the fence
- Construct the fence
- Install the ground rods and warning signs
- Choose cabinet position and concrete the pole
- Mount the cabinet and solar panel on the pole
- Install the batteries
- Connect the solar panels and batteries to the cabinet
- Turn 12V power on and check the cabinet
- Install a SIM card in the gateway and check the signal
- Arm the system (turn the energizer on) and check the fence
- Optionally mount an antenna
- Register on the Cloud Router® website
- Check online fence control and monitoring

Fence Design

The cabinet powers two sections of electric fence, if these are part of a boundary, it is recommended that they are up to 10km long. Additional cabinets can be placed at 20km intervals along a long boundary fence line. If the Fence to be powered is around paddocks or internal farm fencing, then the limiting factors are more complex, please contact JVA for advice.

An electric fence is made up of 1 or more live wires and 1 or more ground wires. The ground wires should be connected to the energizer earth. This means that live and ground wires need to be taken under every gate and around every strain point. The number of wires and the wire spacing depends on what you are trying to keep in or out and on your budget. Some basic advice follows, please contact JVA for more specific advice.

JVA recommends that the lowest live be at least 200mm off the ground. This will reduce the likelihood of Echidnas getting trapped and grass growth will be less of an issue. It is okay to have an earth wire lower than that. If you want to provide the most effective barrier to untrained animals (exclusion fencing), we suggest putting at least one live offset wire on the outside of the fence 300mm off the ground.

The live wires should be joined with line clamps on both sides of each strainer post.

This parallels up the power feeding out and increases the voltage at distant point on the fence. JVA recommends that the top two wires be ground wires, this will reduce the likelihood of kangaroos causing a short when they get their toes caught in the top wires as they jump over.
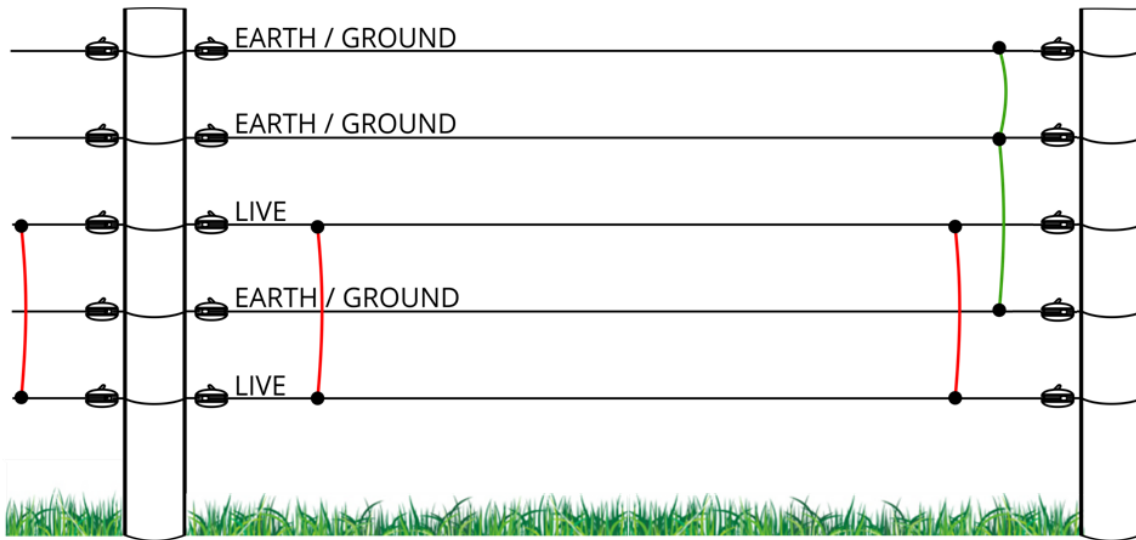
Suggested fence set-up:

EARTH / GROUND

EARTH / GROUND

LIVE

EARTH / GROUND

LIVE

Figure 1

Grounding

For the energizers to work properly there must be a good ground connection. The words **earth** and **ground** mean the same thing in electric fencing. Ground rods and earth stakes are also the same things. A ground rod can be a galvanised star picket, or a brass rod.

Use at least 3 ground rods, 1m deep, spaced at 1-2m intervals along the fence line. If the ground is particularly dry you may need more ground rods.

Once the fence is setup and working test your ground using a JVA Electric Fence Fault Finder (Power Probe). If you read more than 0.5kV on the top of the ground rod you need more rods.
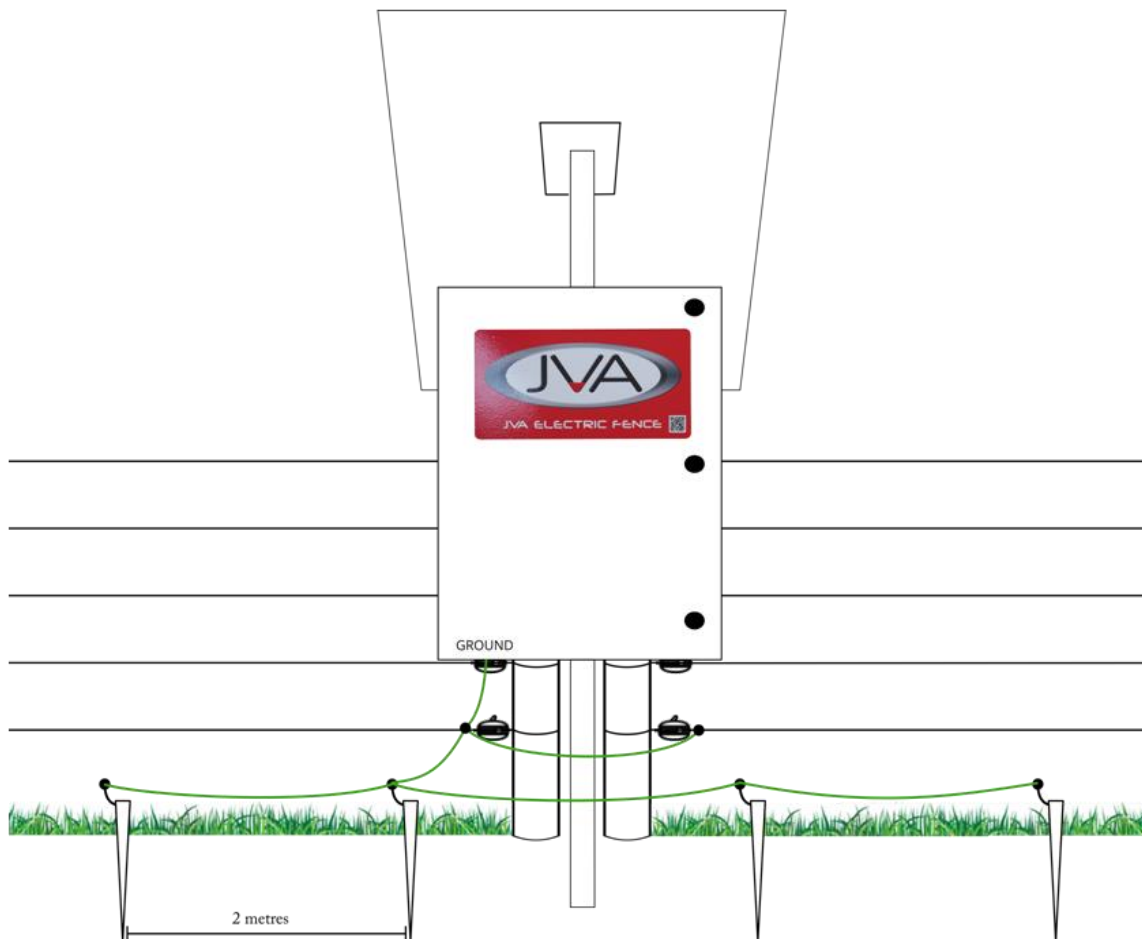
Figure 3

For best results the fence can contain ground wire(s) that connect all the way back to the energizer.
It is also good practice to connect ground wires to 1m deep ground rods every 1km. This is more necessary if the ground wires are not touching metal posts such as star pickets.
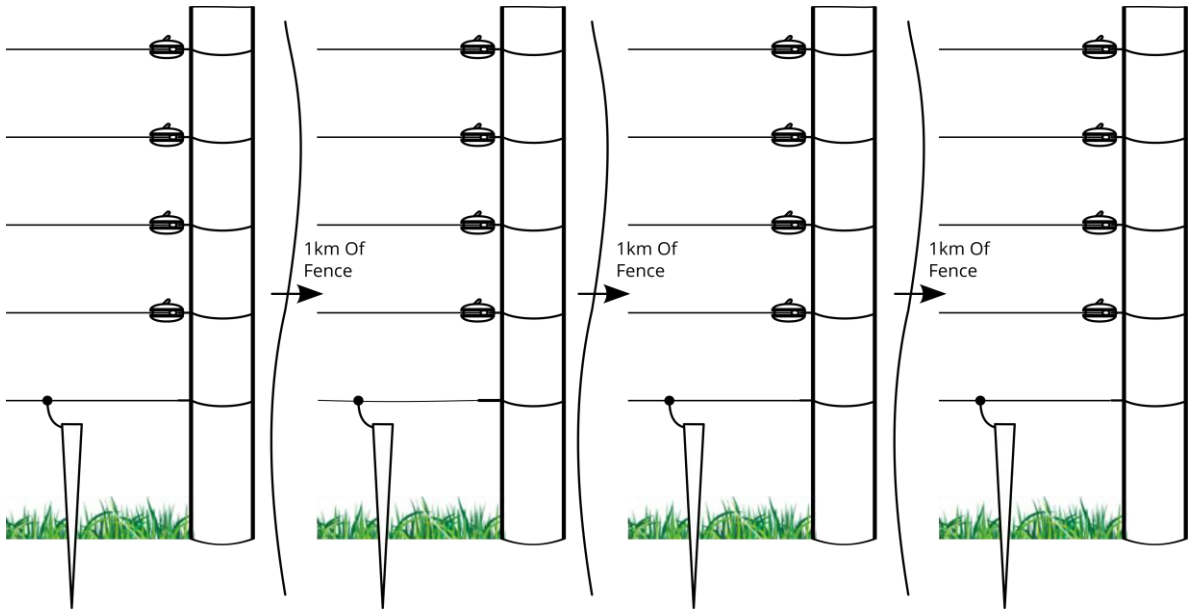

Figure 4

Gates

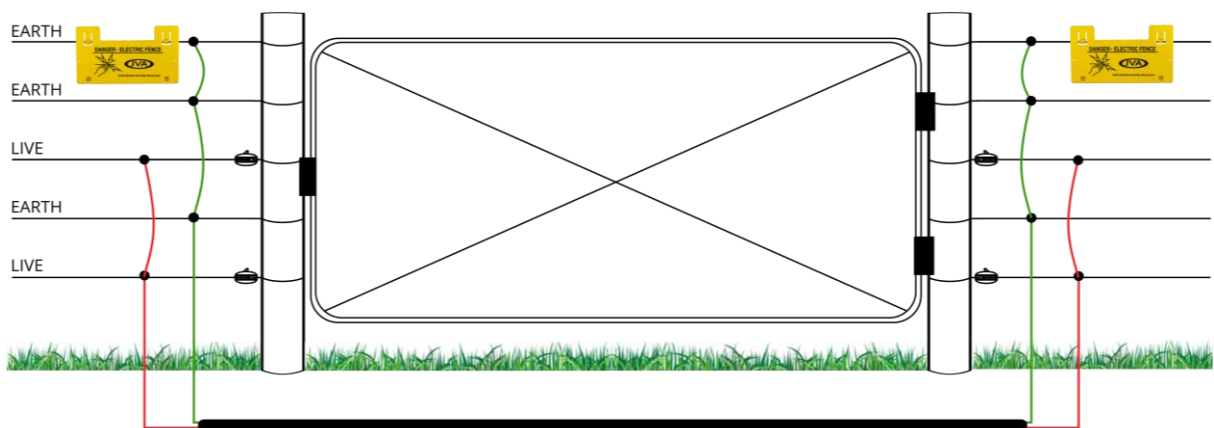**At each gate a live wire and ground wire must be taken under the gate.**

Figure 5

Use electric fence under-gate cable in poly pipe with the ends folded down to prevent water from entering the pipe.

Signage

Warning signs are required at regular intervals on the fence at each gate and fence corner. See the energizer manual for details.
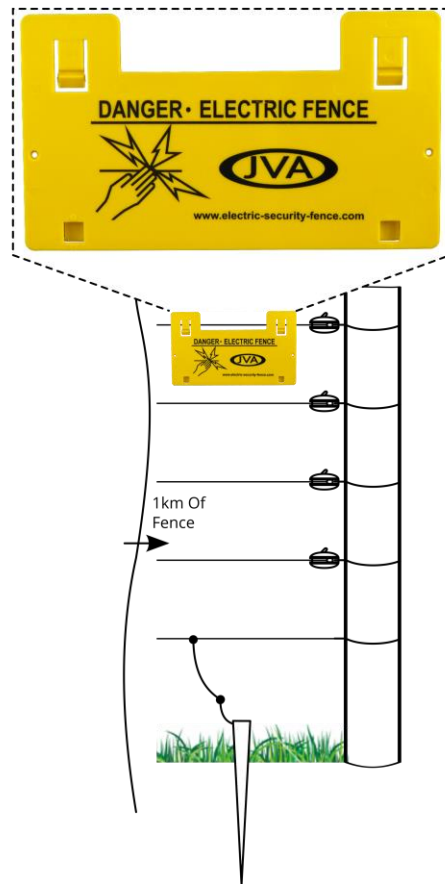

Figure 7

Cabinet Mounting

Choose a location permanently in the sun, close to where the fence starts.
Use a **thick-walled galvanized pole, 60mm outside diameter**. Cement it into the
ground deep enough to sustain the expected wind force on the 300W panel. The top of
the pole should be approximately 2m above ground height.

Mount the cabinet to the pole, **facing south**. This is so it is best shaded by the solar
panel.

Clamp mounting is as following:

1. Slide clamps into the cabinet rail from either side of the pole.
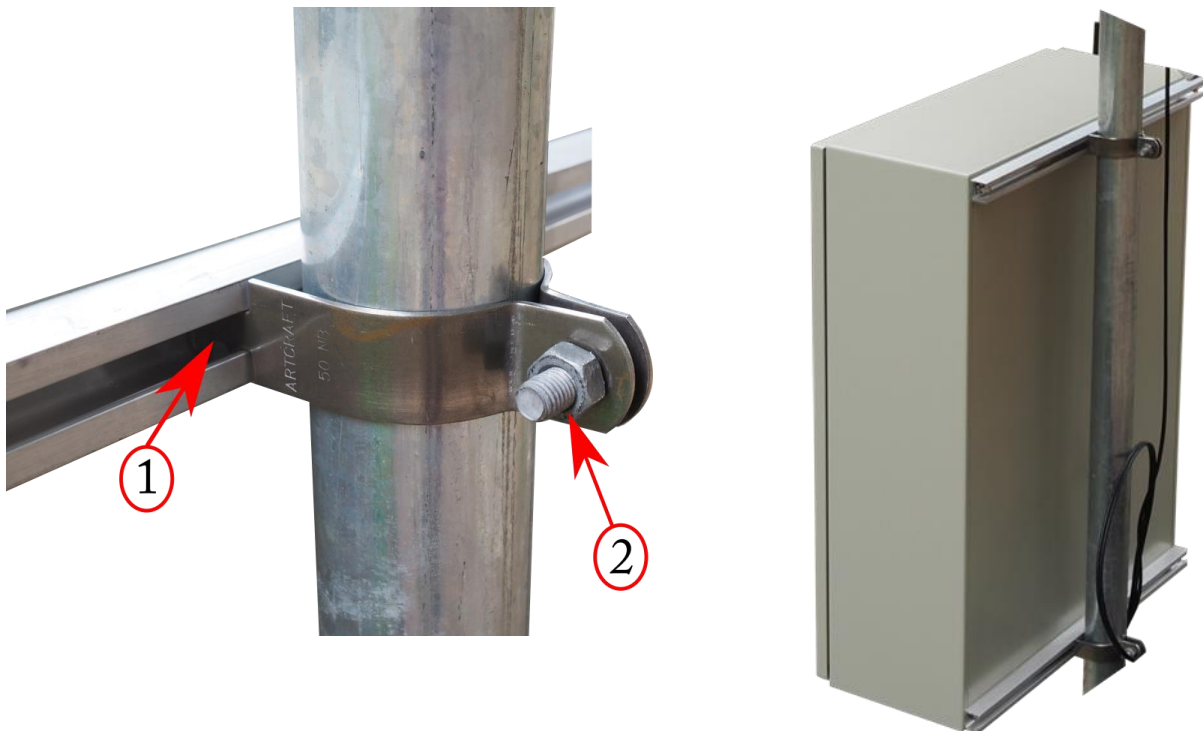2. Bolt the clamps together.

Figure 8

Mount the battery tray under the cabinet, off the ground. See the video at
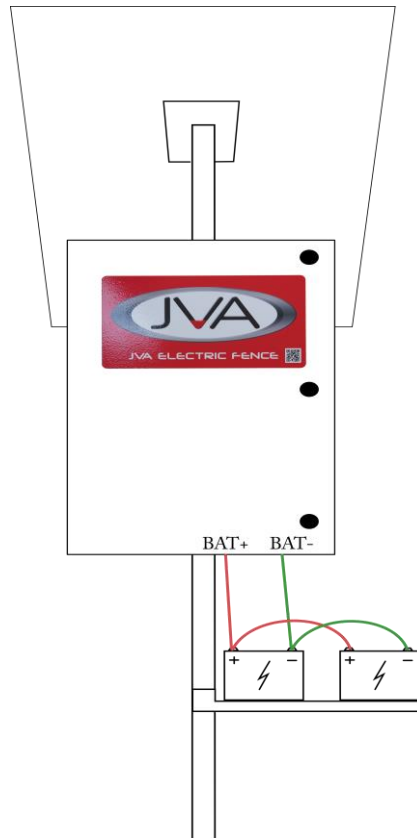www.exclusionfence.com

Figure 9

Solar Panel Mounting

Once you have mounted the cabinet to the mounting pole you should now be ready to mount the solar panel.

The solar panel will slide in at the top of the pole (as state in the Cabinet mounting section the diameter of the mounting pole needs to be **60 mm**). The solar panel needs to **face north**. This is so it gets the most sun all year round. Fit a pin through the solar panel bracket and pole to stop the bracket from rotating. The pin hole has a diameter of **10 mm** and is **50 mm** from the pole insertion section. Please see the below image for what a solar panel bracket looks like:
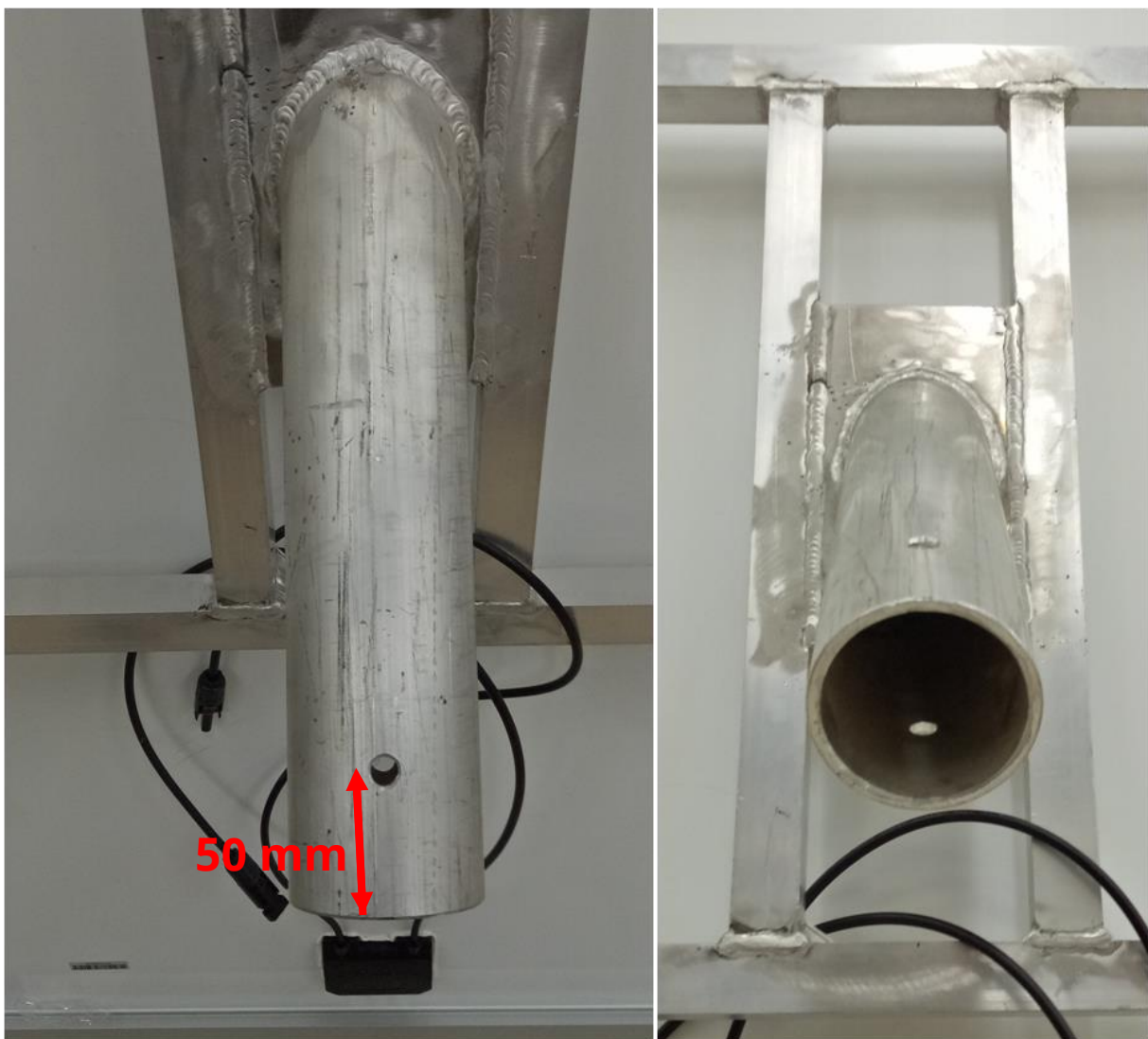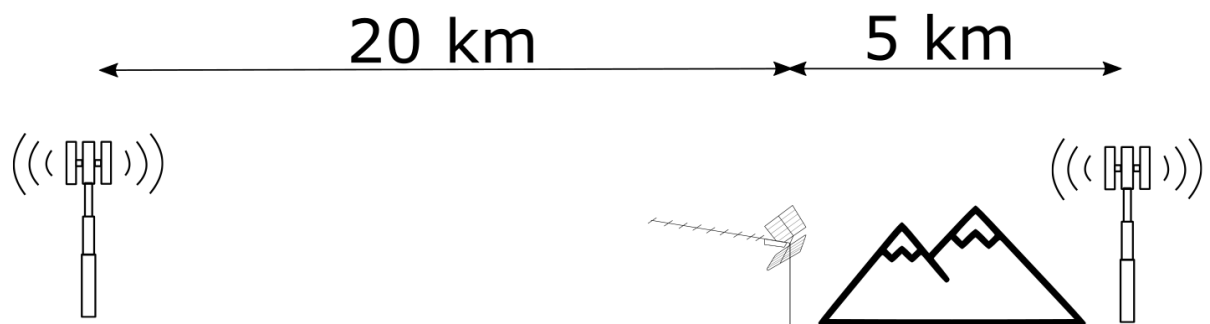
Antenna Mounting

The GSM gateway in the Fence Station (PTE0320_3G) operates on the 3G cellular network.

If the cell phone signal strength at the site is at least one bar on your phone, then the basic duck antenna provided with the Fence Station is usually good enough. If it is not, then JVA has two other optional antennas. If you need to search for signal with your phone, by standing on the back of your ute, for example. Then a magnetic base whip antenna (MHX034) will usually work. Finally, if the signal strength is very low, a long-range Yagi antenna (MHX041) can be connected to the Electric Fence Station. Basic instructions for mounting the Yagi are:

1. Check that there is a cell phone tower within 20km of your site and that a "line of sight" view of this tower is possible. JVA can help with this.

2. Fix a pole in the ground for the Yagi antenna. It should ideally be 3-5 metres in length, with a diameter of 25-30mm. The antenna pole should be placed approximately 2m to the south of the Fence Station mounting pole, so that the shadow cast by the antenna pole doesn't fall on the solar panel.
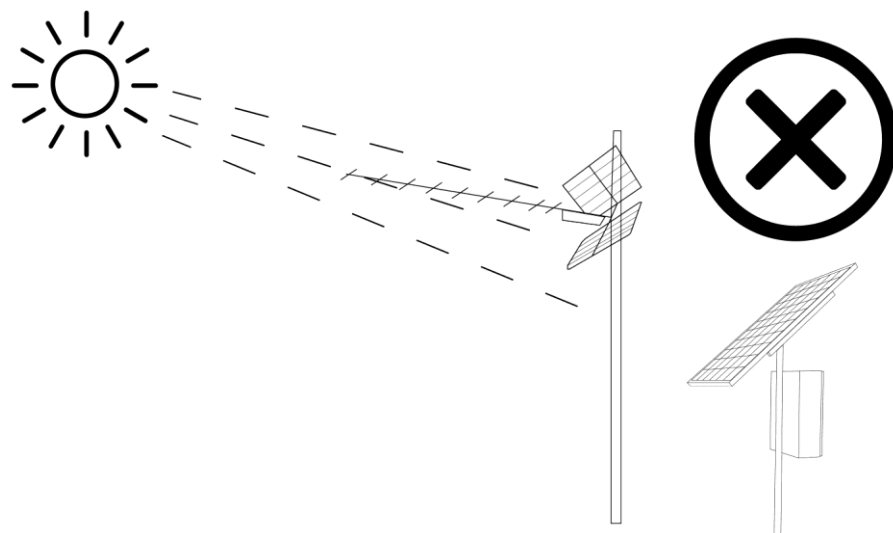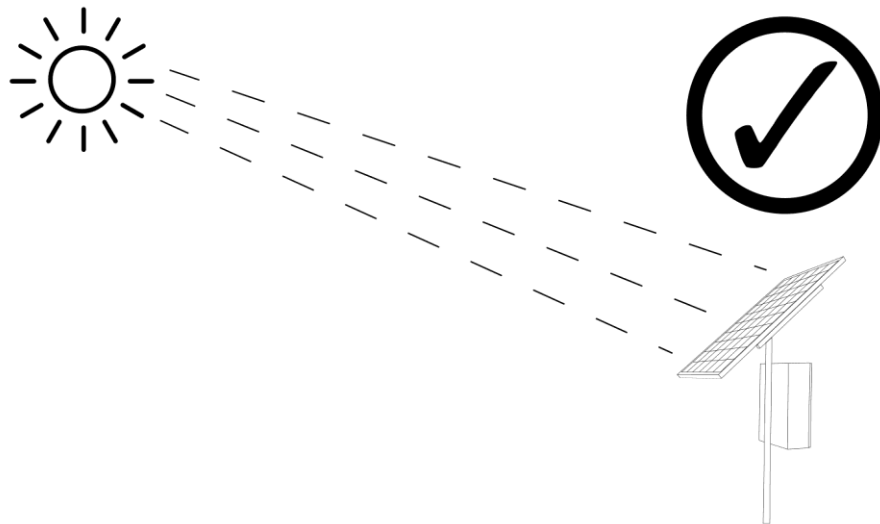
3. Fix the Yagi to the pole using the provided U bolts and bracket.
4. Connect the antenna to the station's GSM gateway via the provided cable and SMA plug. The Fence Station antenna socket is located on the underside of the cabinet.
5. The antenna should be pointed towards the nearest unobstructed cell tower.
6. Assuming the station is powered up and has a registered SIM card, send it a SMS of 1234 g using your phone. If the antenna is working the station GSM gateway will reply with the signal strength.
7. Signal strength of around 25% or more is usually acceptable.

Solar and Battery wiring

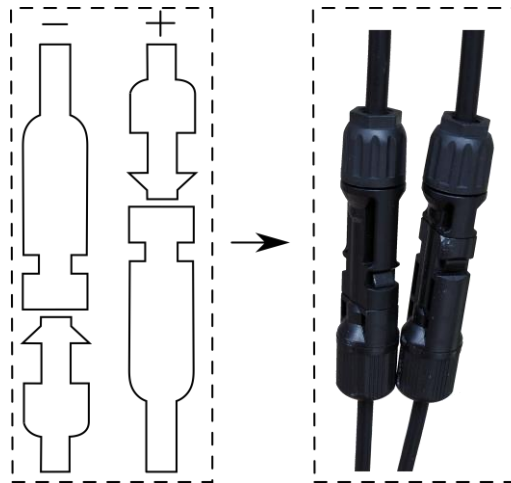The cabinet comes pre-wired with battery and solar leads. Connect the solar lead plugs together.

Figure 10

If you are using two 12V batteries, connect both battery **positive terminals together**. Connect both battery **negative terminals together**. Connect the cabinet positive lead to one battery positive terminal. Connect the cabinet negative lead to one battery negative terminal.
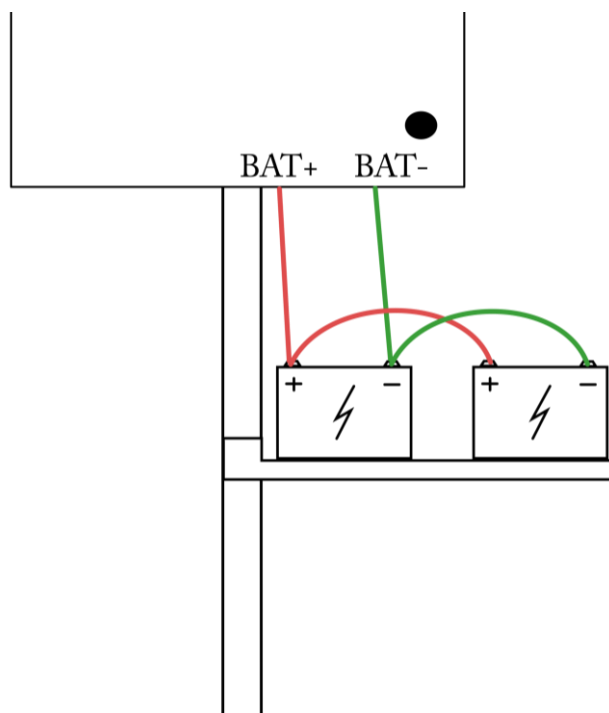

Figure 11

Siren and Strobe wiring

Optional strobe lights (N354) or sirens (N527) can be connected to the Fence Station monitor. These will be triggered when the Fence Station detects a short on one of the fences. Refer to the ZM2 manual for information.
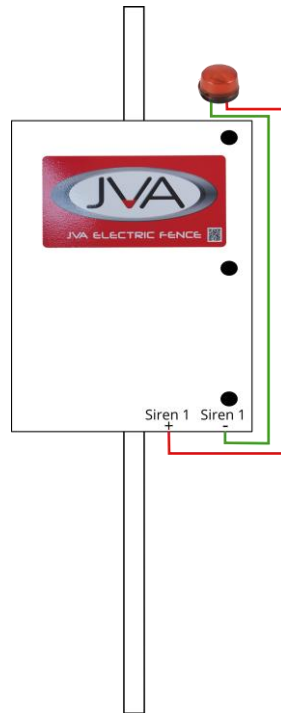

Figure 12

Fence Wiring

Three fence wires are required to connect the fence to the Fence Station. Use double insulated fence lead-out cable, AKA under gate cable (N730L), run this from the lightning diverter terminals out through the cable glands in the bottom of the cabinet. Note that standard PTE2500A's ship with these cables connected and labelled. Remember to tighten the cable glands to stop ants entering the cabinet.
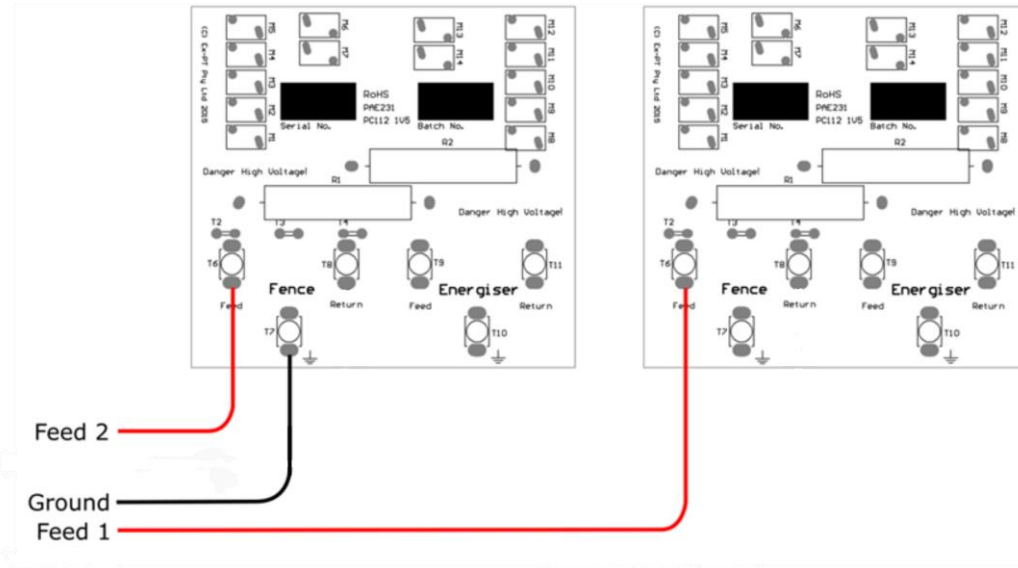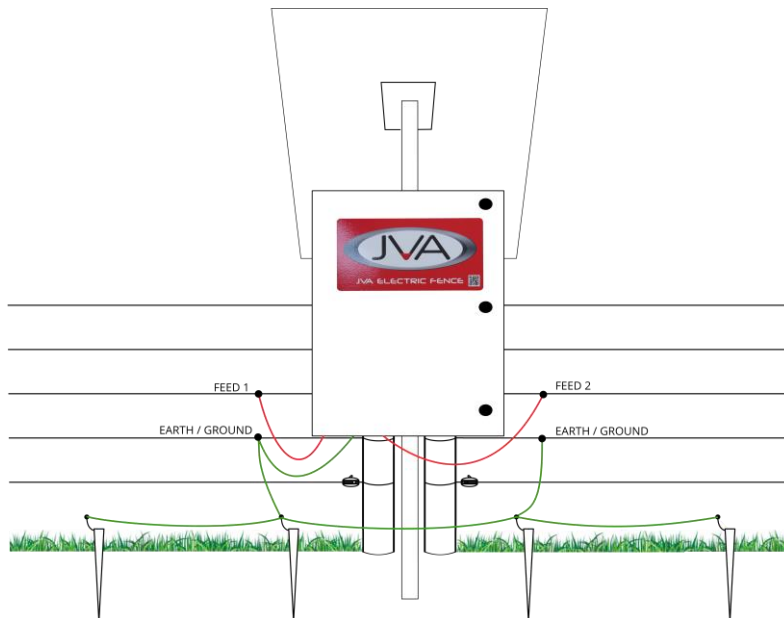

Figure 13

Figure 14

Power On

The system is now ready to be switched on. Make sure no-one is working on or touching the fence.

Turn on the battery circuit breaker. You should see the energizer, keypad and GSM gateway turn on. The energizer will not be armed yet.
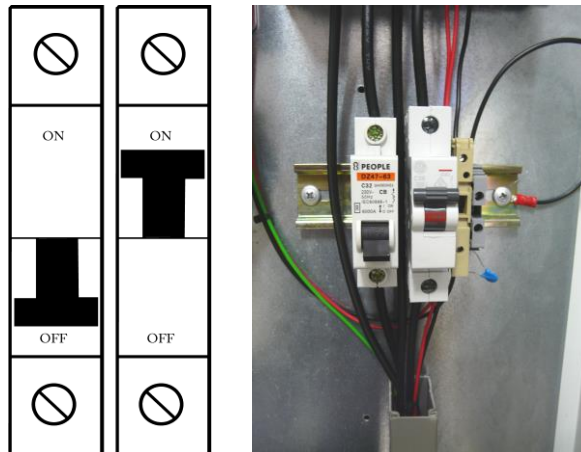

Figure 17

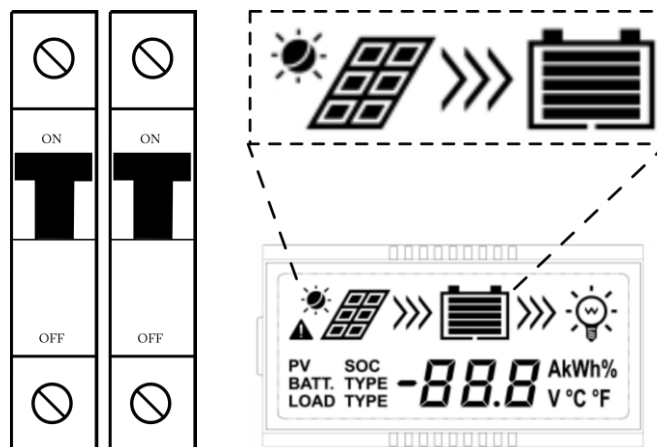Turn on the solar circuit breaker. Check the solar regulator shows the batteries are charging.

Figure 18

Cellular Gateway Setup

Turn the power back off again at the circuit breakers.

Screw on the antenna to the SMA connector on underneath (or left side) of the cabinet.

Unclip the front of the Cellular Gateway. Unclip the circuit board by the top clip. Insert a micro-SIM card of a network that gives the best reception in that location. If possible, **Test the SIM in your phone first**, to make sure it has reception and can connect to the internet.
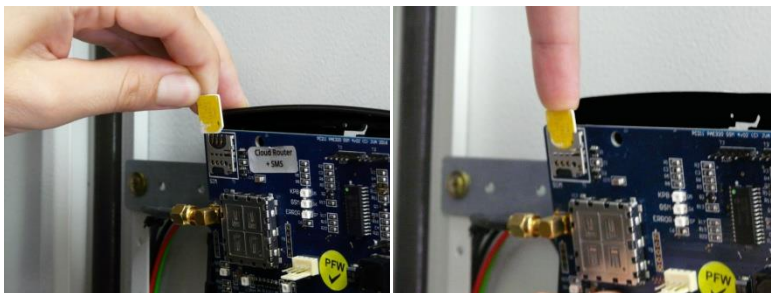
Plug the circuit board back in.

Turn the solar and battery circuit breakers on again.

Ensure the GSM light turns on after a few minutes. Refer to the Troubleshooting section of the Cellular Gateway manual if the error light is flashing.

Send an SMS to the SIM card's phone number, 1234 g. The Gateway should respond with a message confirming it is connected to the network.

Log onto the [Cloud Router](#)® website from your phone or PC and register your email address. You will need to pay for a Pro account to use the advanced features.

Configure the site as per the online [help page](#).

Checking the Fence

Ensure no-one is touching the fence. Arm the system by typing 1234# into the keypad.

If there is an alarm, you can stop the keypad from beeping by pressing the # key.

If the energizer fails to arm, please contact JVA for support.

Check your fence from start to end using a JVA Fault Finder. The fence needs to be free of shorts or open circuits before proceeding to the next section. Refer to the JVA Fault finder (Power Probe) manual for fault finding tips.

The keypad or virtual keypad should be displaying above 6.0kV.

Figure 19

If there were problems with the fence, clear any alarms by entering *1# on the keypad.

Setting up the monitors

Once the fence is working correctly and there are no short circuits on the system you are ready to check that the fence station will respond to a short anywhere on the fence.

Arm the system. Go to the end of each fence section and attach short out leads between live and ground wires. See Figure 21.

The fence current reading for this section (zone) should increase. The default setting for the over current alarm is 20A (will alarm if current exceeds 20A).

 Confirm the fence goes into alarm after the delay (usually set at 1 minute).
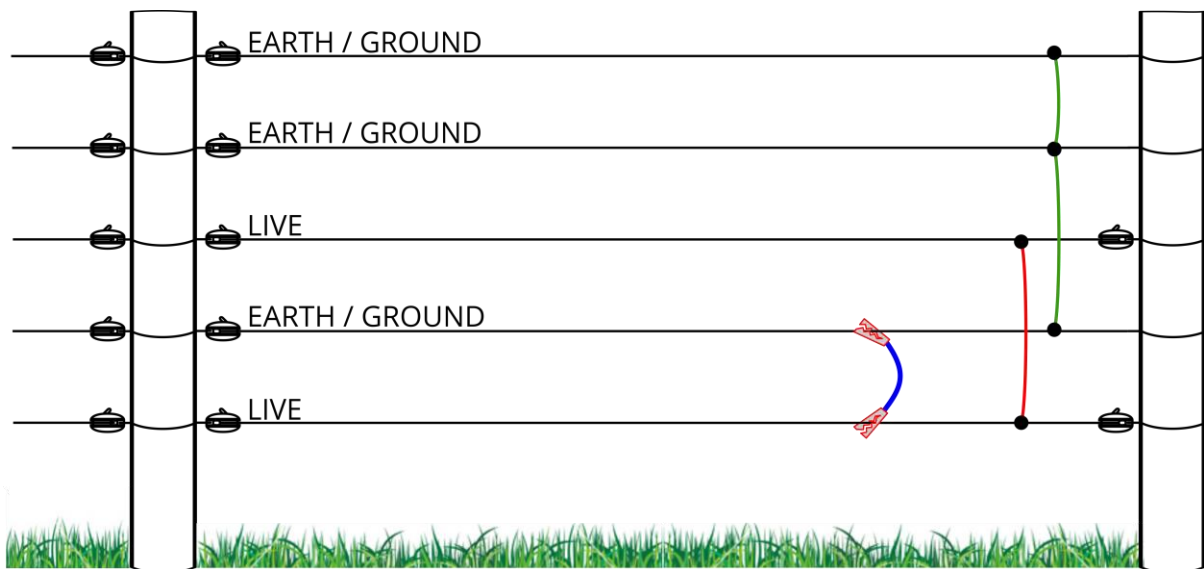

Figure 20

If the current did not rise and cause a fence alarm, then there are several possibilities.

- There was already a short or break on the fence
- The Monitor's settings are not correct for your system

Contact JVA for support.

Maintenance

Once the system has been properly commissioned it will report any fence or system faults via Cloud Router®.

Check your fence regularly by checking that the Cloud Router reports a bold padlock symbol (armed) and a Green Tick (all OK). Get used to the numbers your system reports, you may find that the currents (Amps) increases in wet weather or in Spring.

There should be no need to check the actual fence with a Fault Finder unless an alarm is reported to you by email or SMS. If the batteries get low due to overcast weather, a low battery notification will be sent. Any shorts in the fence will cause an alarm to be sent. If the GSM gateway loses signal or runs out of credit, a notification will be sent.