PATHFINDER MK 8 PORTABLE HV OVERHEAD LINE FAULT INDICATOR
SENSING THE ELECTRO-MAGNETIC FIELD

On an HV overhead line each conductor will radiate an electro-magnetic field. Due to the phase separation one field will be in a positive direction, the other in a negative direction, and the third at zero. Therefore the field will be balanced, only the load imbalance on the phases giving rise to any residual field. As we move away from the line the physical separation of the conductors becomes less of an influence and at ground level, about 5 metres from the conductors the residual field is insignificant.

If an earth fault occurs on one conductor it has a strong effect on the electro-magnetic field which can be detected by the MK8 fault passage indicator. If a phase to phase fault occurs the fault current values may be higher, but the electro-magnetic influence is less than for an earth fault. However, we rotate the detection coil to 30° from the horizontal in Pathfinder which increases its response to the phase to phase fault, whilst retaining almost the same response to earth faults.
On an overhead HV network we are getting repetitive tripping at PMAR 2. MK8 Pathfinders are deployed at points A, B & C to find out which leg of the network has the transient fault.
When the fault occurs PMAR 2 trips. The MK8 at C flags. The instruments at A and B do not trip. He knows that the fault lies between the MK8 at C and the Normally Open Point (NOP).
FAULT FINDING ON AN OVERHEAD H.V. NETWORK

Trying to locate a fault due to a cracked insulator can be very difficult. The MK8’s can be re-deployed down the main line a few poles apart to divide the network up into the smallest sections.
Pathfinder MK8 – FIELD SETUP

The Rightway Pathfinder MK8 has two switches. The one on the right is OFF/Reset – ON.

Switch to ON and it will perform a battery test, where, with a satisfactory battery, the flag will flip from BLACK to RED to BLACK so long as you are not standing in an area of high electro-magnetic field. (in close proximity to a PC or fluorescent lights).

The left hand switch defines the sensitivity. Set at HIGH it will respond to a current of 14 amps at 5 metres, or at LOW it will respond to 70 amps of current at 5 metres. When selecting sensitivity thought must be given to anticipated fault levels, so for a suspected fault near to the source, where the fault level is high, then LOW sensitivity should be used. For more remote faults some distance from the source HIGH sensitivity should be used.

For faults with a very low current value Pathfinder can be moved up the pole to make it more sensitive. The relationship is linear, so at 4 metres on HIGH sensitivity it will respond to a current of 11 amps.
The Mk8 Pathfinder is designed to be used as a fault engineer’s tool, to be deployed following an HV fault. It will respond to fault current when re-energising onto a faulty line, it will also respond to fault current starting with a live line which trips on fault. The instrument, although sealed to IP67 it is not designed to be left out for very long periods of time.

The MK8 can be mounted on a clean pole, at approximately eye level using either a bungee cord or nylon zip strap provided. Alternatively if no clean pole is readily available it can be placed on the ground at mid span or on a convenient hedge.

When the line is energised the 50msec built in delay will allow the magnetising, or charging current to dissipate before being sensitive to the electro-magnetic out of balance caused by the fault current.

If a fault current has flowed in the conductors above the Pathfinder it will flip the flag to red, and remain in that state until it is reset manually by turning the instrument off.
Pathfinder MK 8 – APPLICATION

Pathfinder MK8 is not voltage dependant, and so can be used on 6.6 to 66KV lines so long as it is a radial system, and of suitable construction. It will operate on three phase or single phase, or indeed on SWER (single wire earth return) lines.

Pathfinder MK8 must be orientated so that the instrument is at right angles to the line, and horizontal, as in the picture. Locations to avoid putting Pathfinder are termination poles with cables going to ground, transformer poles, tee off poles, poles in close proximity to another HV line of any voltage, poles with either LV or earth wire under-build, or any heavy magnetic influence.

Pathfinder is available in a convenient hard ABS box with three instruments. These can be used to monitor main line or key spur lines to determine the passage of fault current. Set the sensitivity, switch the unit on, and instruct control to re-energise the line. Inspect the Pathfinders to see which have tripped.
Pathfinder MK8 is powered from a Lithium Thionyl Chloride battery which under normal operating conditions will give a life of approximately 6 years. It is very important that the instrument is switched off after every field outing to prevent shortening its life. The battery is soldered to the PCB, and so if it fails the battery test, we would recommend the instrument is returned to us for a replacement battery, an enclosure re-seal, and a calibration check.

**Specification**
- **Description:** Pathfinder MK8
- **Size:** 120 x 80 x 60 mm
- **Weight:** 330 gms
- **Enclosure:** IP67
- **Battery:** Lithium Thionyl Chloride 3.7V. 2.2 AH
- **Usage:** Approx 6 year life.
- **Sensitivity:**
  - High - 14 amps @ 5 metres
  - Low - 70 amps @ 5 metres
  - Linear if moved closer to the conductors
- **Mag inrush Delay:** 50msecs nominal
- **Temperature:** -20° to +70° C