Megger

# M-THUMP5

## Integrated fault identification and location system for low voltage and some medium voltage cables

- 9 fault locating technologies in one box
- 3 fault location technologies for branched LV cables
- E-TRAY software with automated, workflow-driven pull-through guidance
- System voltage up to 6.6 kV


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# M-THUMP5

The M-THUMP5 portable cable fault locating system provides safe, efficient, and extremely easy-to-use solutions for quickly identifying, prelocating, and pinpointing various types of cable faults in low and some medium voltage power cables. The M-THUMP5 was developed to meet the requirements for typical low and lower medium voltage distribution cable fault location markets. The unit features a light weight aluminium enclosure, equipped with handles as a portable unit, or as a permanently installed vehicle mount unit.

**Circuit parameters include:**

- Circuit voltage up to 6.6 kV
- Insulation of EPR, XLPE, PILC, PVC
- Typical conductor sizes between 34 $mm^2$ to 250 $mm^2$
- Typical circuit lengths from 100 m up to 5000 m

**Check out all the features**

Open datasheet

Typical end users include: operations department of power utility companies, electrical departments within municipalities including street light maintenance, private network operators, high voltage electrical contractors, service companies, port authorities, mining, airports, military bases, petrochemical and paper companies. The M-THUMP5 unit incorporates Megger's "E-TRAY" technology, a concept that has been already proven in other products (EZ-THUMP, SMART THUMP) and which will be carried forward into future Megger products. The E-TRAY adds the unique capability to access and operate every function through an innovative and intuitive user interface, without the need to make adjustments and the software suggesting the next procedural step.

## WHO BENEFITS FROM IT?

RAIL Industrial plants UTILITIES STEEL REFINERY MINING SOLAR PV PLANT Electrical contractors

The M-THUMP5 represents a new generation of advanced underground cable fault locating systems that require less training than a traditional thumper-only system. It is the only fault locator on the market with built-in intelligence to interpret the results of the initial test sequence. The "turn&click" rotary button operation lets the user automatically proof test, prelocate, pinpoint and sheath test the fault from one convenient control panel. No adjustments are required, unless the operator chooses otherwise.

The M-THUMP5 features an automatic safety check to protect the user from incorrect or faulty ground and return connections (F-Ohm).


## FOR WHICH CABLES?
## FOR WHICH FAULTS?

PVC XLPE EPR
**CABLES**
PILC insulated
**LV CIRCUITS**
**MV circuits up to 6.6 kV**

EARTH low resistance
**FAULTS**
high resistance

# 9 fault locating techniques in one box

A total of 9 fault identification, conversion, prelocation and pinpointing methods in one (tool) box, and all are integrated in one common and easy-to-use software interface (E-TRAY; see page 06 & 07).

**output up to 5 kV**

1. DC breakdown detection and proof test
2. Insulation resistance readout
3. Fault conversion by DC burning with burn current up to 500 mA

Fault identification

4. Prelocation with cable radar/TDR, including phase comparison
5. Arc Reflection (ARM) with inductive ARM filter, including BestPicture® Multishot
6. ARM Live Burning (Burn Arc Reflection) including BestPicture® Multishot

Fault prelocation

7. Current decoupling ICE
8. Main insulation high resistance faults by surging/thumping with up to 1000 J at up to 5 kV
9. Pinpointing of earth faults by voltage gradient method (step voltage method) e.g., LV earth faults or MV sheath faults

Fault pinpointing


LOCAL TX-1
DANGER
415 volts
Megger
M-THUMP
E-1000
Test
CAUTION!
HIGH VOLTAGE DEVICE

# What does E-TRAY mean?

**Innovative UX concept**

The E-TRAY was originally introduced by HDW Electronics in 2010 as a digital hardware and software solution for the purpose of radically streamlining cable fault location. Its operation concept was unique in the market upon its release, and over a decade later no competitor has caught up to it yet.

All E-TRAY products have an identical front panel, graphic user interface, and software version regardless of the product or language.


**User-friendly and automated**

The E-TRAY's main focus is the by far biggest group amongst field crews: less experienced users and outright laymen. Instead of overwhelming users with methods and parameters, the E-TRAY reduces complexity by showing only relevant information, and by following only a narrowed-down and pre-defined decision tree. The E-TRAY software guides users through the entire fault location process using a pull-through sequence. This allows users to direct most of their attention on finding the fault without needing in-depth knowledge about individual fault location methods and without having to remember the cumbersome operation as known from outdated manual analogue units from the competition.

**Fault identification //** Insulation resistance, DC breaktown test

**Fault prelocation //** Cable radar/TDR, Arc Reflection ARM with Multishot

**Fault conversion //** Burning

**Advanced prelocation //** Burn Arc Reflection, current decoupling ICE

**Fault pinpointing //** Magnetic-acoustic coincidence method, voltage gradient method

## User guidance and assistance

The E-TRAY software pulls users through a standardised decision tree which consists of the classic fault location sequence in three major steps: fault identification, fault prelocation, fault pinpointing.

The software always proposes the next logical action. The user need not to select but just to confirm the next step. No further adjustments are needed. To address experienced users, there is an expert mode giving full access to all parameters and settings.

**Fault identification**

Tell apart and identify different typs of faults

**Fault prelocation**

Get a distance to the fault and learn where best to start pinpointing

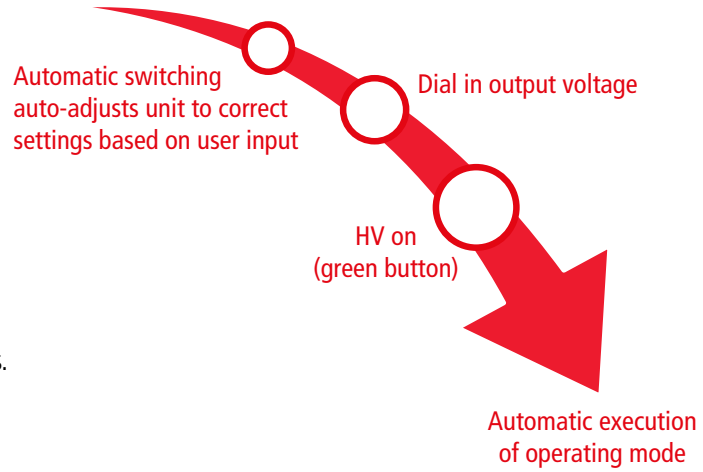
**Fault pinpointing**

Discover the exact position of the fault down to 0.1-0.2 $m^2$

## Uniform operation

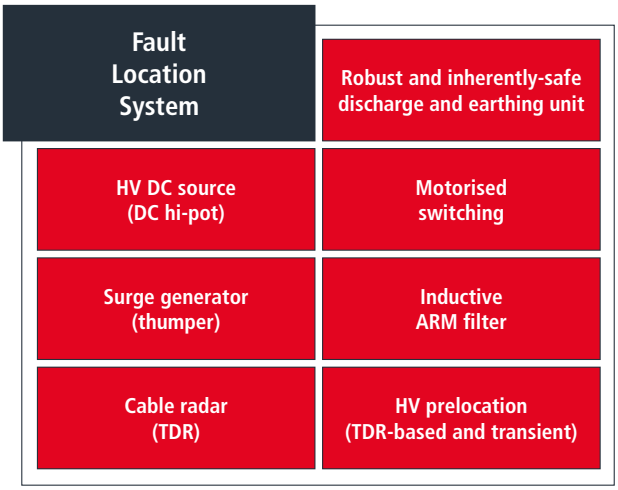
Know one, know them all. All E-TRAY products operate identically, offering a standardised high voltage turn-on sequence across the board. Once a user becomes familiar with one E-TRAY product, they can easily use any other product from the E-TRAY family.

The training burden on personnel is significantly reduced, and onboarding new people to a crew is quick and effortless.




## Physical and functional integration

The E-TRAY is based on the integration of all essential components that a modern cable fault location system must have. This includes DC source, discharge and earthing device, surge generator, TDR/ cable radar, inductive arc reflection filter, sensor for current decoupling etc. Physical integration means that all of those components are mounted and wired inside of the one and the same enclosure. Functional integration means that all of those components are operated in an automated fashion by the common controller.

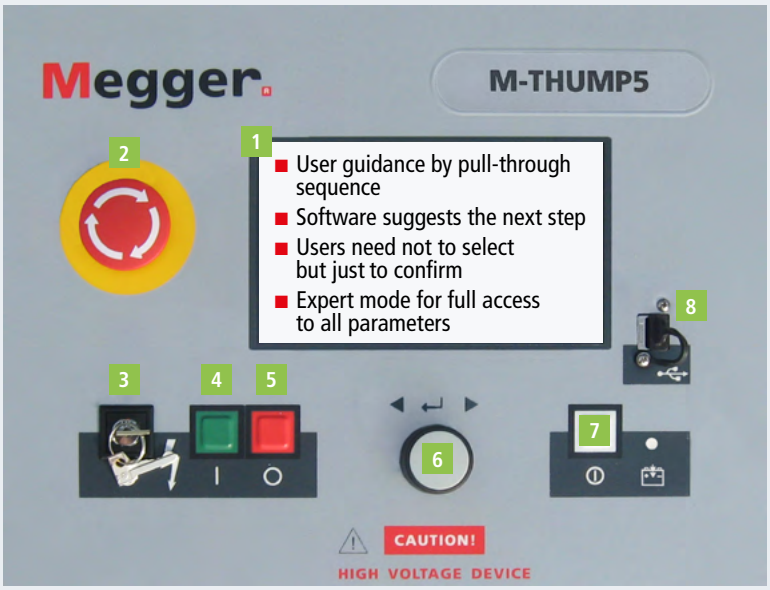


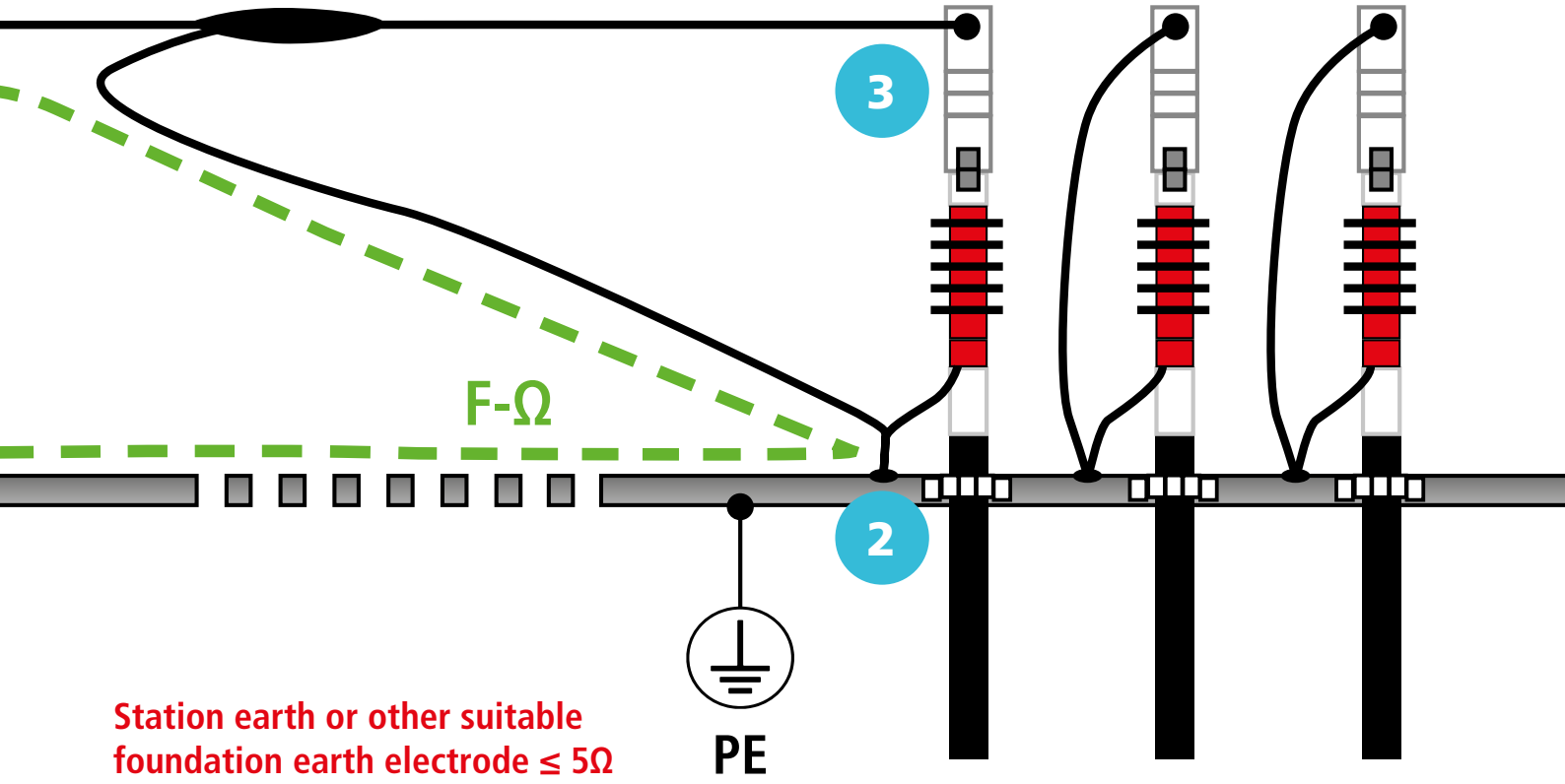
# Connection diagram


# Control elements

| No. | Description (control) |
|---|---|
| 1 | 7 inch high-brite color display |
| 2 | Emergency stop button |
| 3 | HV key switch |
| 4 | "HV ON" button |
| 5 | "HV OFF" button |
| 6 | Rotary control knob |
| 7 | "ON / OFF" button |
| 8 | USB port |

| No. | Description (back of the device) |
|---|---|
| 9 | External safety device connector |
| 10 | AC power connector |
| 11 | Fuse holders for AC input power |
| 12 | Safety ground connector |



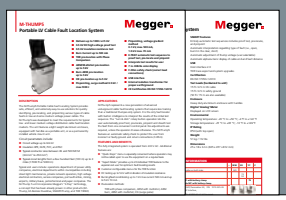



## Connection sequence

1. Connect the safety ground lead
2. Connect the HV return lead
3. Connect the HV lead
4. Connect the supplied power cord

# Product comparison of the E-TRAY family

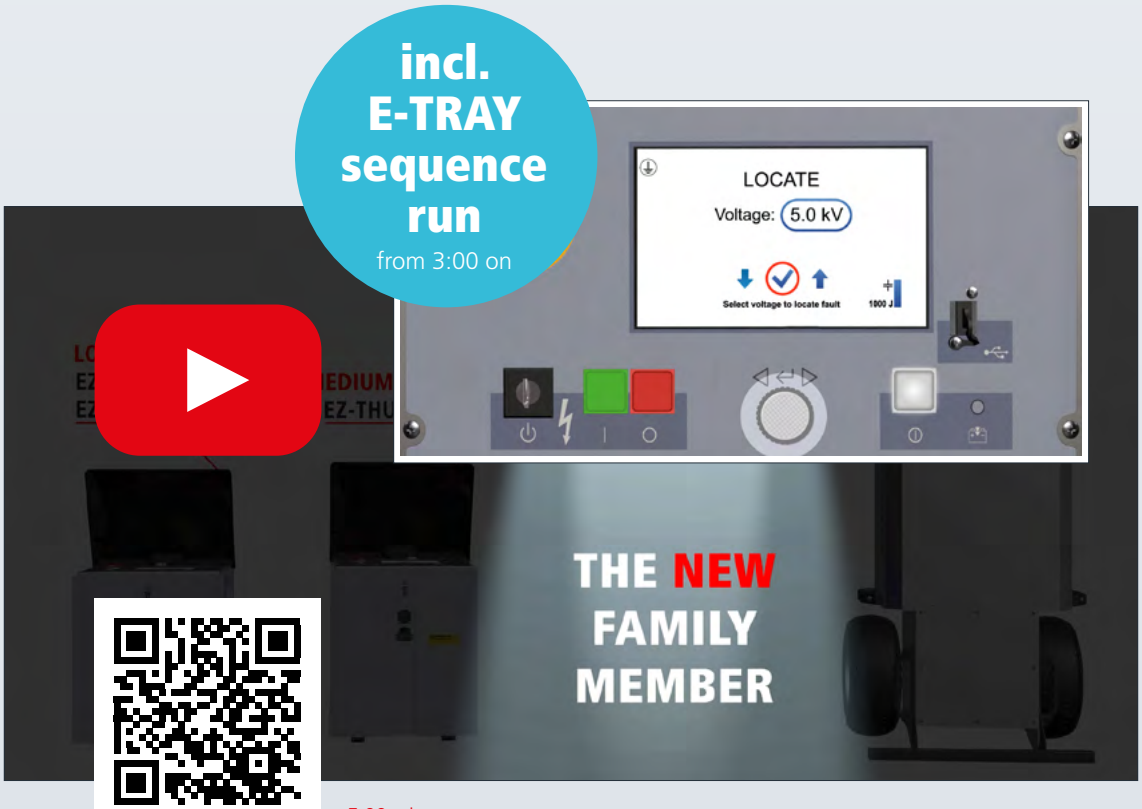

| Device/specifiactions | M-THUMP5-1000 | SPG5-1000-1 | EZ-THUMP 3 kV |
|---|---|---|---|
| **Voltage class** | LV & some MV cables | LV cables | LV cables |
| **Outdoor capable** | Yes, IP53 | Limited, IP20 | Yes, IP53 |
| **Weight incl. cables** | 51 kg (112 lbs) incl. cables and internal isolation transformer | 50 kg (110 lbs.) excl. cables | 32 kg |
| **Connection cables (HV, earth/HV return)** | 4.5 m (15 ft) 15 m (50 ft) optional | 5, 10, 20 m (16, 33, 66 ft) | 4.5 m (15 ft) 15 m (50 ft) optional |
| **Operating temperature** | -20°C…+50°C (-4°F … +122°F) | -10°C…+50°C (+14°F … +122°F) | -20°C…+50°C (-4°F … +122°F) |
| **F-Ohm safety interlock** | Yes | Yes | Yes |
| **F-U safety interlock** | Yes (optional) | Yes | – |
| **Rotary knob operation** | Yes | Yes | Yes |
| **Graphic user interface** | E-TRAY | SPG40 | E-TRAY |
| **Controller display** | 17.8 cm (7 inch) colour TFT LCD | 14.5 cm (5.7 inch) black & white LCD | 17.8 cm (7 inch) colour TFT LCD |
| **Max. DC voltage** | 5 kV | 5 kV | 3 kV |
| **Max. current** | 500 mA | 1000 mA | 94 mA |
| **Insulation resistance** | Yes | Yes | Yes |
| **Max. surge voltage** | 5 kV | 4 kV | 3 kV |
| **Max. surge energy** | 1000 J | 1000 J | 500 J |
| **Surge levels** | Single stage 0…5 kV | Dual stage 0…2 / 0…4 kV | Dual stage, 0…1.5 / 0…3 kV |
| **Cable radar / TDR** | Yes 52 km (180 000 ft) | – | Yes 52 km (180 000 ft) |
| **HV prelocation** | ARM, ICE, ARM Live Burning | ICEplus | ARM |
| **Inductive ARM filter** | Yes | – | Yes |
| **USB port** | Yes | – | Yes |
| **Mains input** | 230 V ± 15% | 230 V ± 10% | 100/230 V |
| **Datasheet** *(scan or click)* | | | |






| EZ-THUMP 4 kV | EZ-THUMP 12 kV | SMART THUMP 16/20 kV | SMART THUMP 25/30 kV |
|---|---|---|---|
| LV cables | MV cables | MV cables | MV cables |
| Yes, IP53 | Yes, IP53 | Yes, IP53 | Yes, IP53 |
| 32 kg | 32 kg | 67-120 kg | 67-120 kg |
| 4.5 m (15 ft)<br>15 m (50 ft) optional | 4.5 m (15 ft) | 3.5-30.5 m<br>(12-100 ft) | 3.5-30.5 m<br>(12-100 ft) |
| -20°C…+50°C<br>(-4°F … +122°F) | -20°C…+50°C<br>(-4°F … +122°F) | -20°C…+50°C<br>(-4°F … +122°F) | -20°C…+50°C<br>(-4°F … +122°F) |
| Yes | Yes | Yes | Yes |
| – | – | – | – |
| Yes | Yes | Yes | Yes |
| E-TRAY | E-TRAY | E-TRAY | E-TRAY |
| 17.8 cm (7 inch)<br>colour TFT LCD | 17.8 cm (7 inch)<br>colour TFT LCD | 17.8 cm (7 inch)<br>colour TFT LCD | 17.8 cm (7 inch)<br>colour TFT LCD |
| 4 kV | 12 kV | 20 kV | 30 kV |
| 47 mA | 12 mA | 60 mA | 40 mA |
| Yes | Yes | Yes | Yes |
| 4 kV | 12 kV | 16 kV | 25 kV |
| 500 J | 500 J | 1500 J | 1600 J |
| Single stage<br>0…4 kV | Single stage<br>0…12 kV | Dual stage<br>0…8 / 0…16 kV | Dual stage<br>0…12.5 / 0…25 kV |
| Yes<br>52 km (180 000 ft) | Yes<br>52 km (180 000 ft) | Yes<br>52 km (180 000 ft) | Yes<br>52 km (180 000 ft) |
| ARM | ARM | ARM, ICE | ARM, ICE |
| Yes | Yes | Yes | Yes |
| Yes | Yes | Yes | Yes |
| 100/230 V | 100/230 V | 110/230 V | 120/230 V |

# Everything summarised in one video

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