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POWER CABLE TEST VAN HVT-35

The power cable test van performs the following functions:

1. DC high voltage up to 40 kV for withstand testing of power cables
2. Burning down defective insulation of power cables
3. Pre-locating high voltage cable faults by the impulse reflection method (TDR), the arc reflection method, the arc reflection plus method, the voltage decay method and the impulse current method
4. Locating cable faults by the acoustic method and inductive method
5. Audio frequency cable route tracing and cable depth evaluation



A. POWER CABLE TEST/FAULT LOCATION

1 CABLE FAULT LOCATION AND HIGH VOLTAGE TEST

The CFL40A cable fault location system has been developed to provide quick, effective, accurate and safe fault location, reducing system outages and “customer minutes lost”. The system comes as two separate modules, making it suitable for mounting in a vehicle. The HV module contains all of the High Voltage elements. Control of all of the HV elements and CFL methods is by a separate control panel, which also houses the large screen colour TDR.

HV Testing (proof testing)

The system proves the integrity, identifies and confirms fault conditions in cable networks. It can be used for sheath testing at 5 or 10 kV. The selectable over-current trip levels provide protection, and leakage current is shown on the analogue metering.

Fault Pre-location

After identifying the type of fault, low or high voltage methods of pre-locations are used to

determine the fault position. TDR pre-locate cable faults using pulse echo, arc reflection, impulse current (ICE) or the voltage decay method. In pulse echo mode, a real time trace and a stored trace are viewed simultaneously on the large colour display, allowing comparison and difference measurements to be made.

The MTDR1 features auto-ranging, auto distance to fault and operator assist functions that guide the operator through the fault locating process. In the Arc Reflection mode, faults are stabilised by creating a temporary “bridge” to earth. During this condition, a standard pulse echo measurement is taken into what is effectively a short circuit fault. Arc Reflection plus, lets you view and analyse up to 14 traces, taken during the period of the arc. ICE and Voltage Decay methods are both transient analysis methods of pre-location which uses either a linear coupler or voltage divider.

Fault Conditioning

Fault conditioning is used to stabilise unstable, flashing or high resistance faults. The Fault Locator system incorporates both Proof/Burn and ARC Reflection modes. Proof/Burn using the high voltage output and following a breakdown of the cable under test, a high current is applied, creating a carbon bridge, stabilising the fault condition. This allows pre-location and pinpoint location of unstable faults. ARC Reflection, not widely recognised as a fault condition method, the Arc Reflection method stabilises faults by creating a temporary “bridge” to earth, enabling standard pulse echo techniques of pre-location to be used.



TECHNICAL SPECIFICATIONS

Testing

Output:	0 – 40 kV (negative wrt earth) 25 mA constant
Resolution:	Resolution: 1 mA
Trip:	Adjustable current trip
Metering:	Analogue and digital metering of current and voltage

Pre-location

MTDR

Range:	60 m – 50 km
Pulse width:	40, 80, 160, 320, 640 ns 1, 2, 5, 10 µs, and auto
Display:	8 in., full VGA, colour
Cursors:	Dual independent control
Gain:	Auto and selectable, x1, 2, 3, 4, 5, 10, 20, 50, 100
Input:	Impedance 50 ohm
Inputs:	1 pulse echo, 1 current impulse/voltage decay

Ports:	1 serial, 2 parallel (printer/USB memory device) Software Included COMLink for downloading trace
High Voltage Prelocation	
Arc Reflection:	8/16/34 kV, 2000 Joules
ICE:	8/16/34 kV
Voltage decay:	0 – 40 kV
Fault Conditioning	
Arc Reflection:	8/16/34 kV
Proof/Burn:	0 – 40 kV 0 – 8 kV, 120 mA 0 – 16 kV, 60 mA 0 – 34 kV, 30 mA
Pinpoint Fault Location	
Surge:	0 – 8/16/34 kV, 2000 Joules
Impulse Sequence:	Adjustable 2 – 12 seconds Single Shot
Environmental	
Operating Temp:	-20 ° to +50 °C
Storage Temp:	-20 ° to +70 °C
Humidity:	50 to 95 % RH non-condensing
Weight	
HV Module:	145 kg
Control Module:	9 kg
Dimensions	
HV Module:	1000 mm (H) x 536 mm (W) x 501 mm (D)
Control Module:	480 mm (H) x 490 mm (W) x 180 mm (D)

FEATURES

- Separate HV and control modules
- High voltage cable dc testing up to 40 kV
- 8/16/34 kV, 2000 Joules surge output
- 34 kV Arc Reflection Method and Arc Reflection plus
- Proof/Burn up to 34 kV
- 34 kV Impulse current (ICE)
- 40 kV Voltage decay
- Menu driven Large Screen Colour TDR

B. ADDITIONAL TEST EQUIPMENT

2 ACOUSTIC DETECTOR PINPOINTER MPP 2000

The Megger Pinpointer model MPP2000 is specifically designed to accurately and quickly pinpoint faults in underground cable networks. Easy-to-access menus provide advanced users the flexibility and features they desire. The MPP2000 is housed in a lightweight,



ergonomically designed, rugged case that is IP54 rated. The unit can be easily carried “hands free” using the adjustable neck strap. The MPP2000 is used to detect the acoustic and electromagnetic fields. Both fields are generated by the flashover at the point of fault, which has been generated by the HV impulse caused by a surge generator. Detection is via a lightweight ground microphone, which has a physical shield to reduce external wind noise. For easy interpretation, the receiver’s display shows clear, unambiguous readings. The user interface features standard directional and select arrow keys for easy navigation.

For operator comfort, and for use when the operator is wearing a safety helmet, the MPP2000 is supplied with “behind-the-head” headphones. Active noise-cancelling headphones are available as an optional accessory. Additionally the unit has a built-in “auto mute,” eliminating all ambient noise, which is activated when the ground microphone is raised from the ground. The unit has an integral loudspeaker, the volume of which can be adjusted for user comfort via the touchpad controls. A single pushbutton “mutes” the output both on the headphones and loudspeaker simultaneously.



TECHNICAL SPECIFICATIONS

Operating Mode:	Acoustic and electromagnetic pinpoint fault location — coincidence or time delay — pinpoint fault location — relative distance to fault — direction to fault indication
Range:	0 to 99.9 ms
Resolution:	0.1 ms
Outputs:	Loudspeaker, 1 x jack for headphones
Volume:	Adjustable for both headphone and loudspeaker
Acoustic Gain:	Manual
Electromagnetic Gain:	Manual
Noise Canceling	Digital: (3) HPF, (1) BPF, none
Acoustic Filters:	
Acoustic Bands:	125 Hz to 1.8 kHz
Amplification	>0 to 100 dB
Acoustic Channel:	
Magnetic Channel:	>0 to 100 dB
Display Range:	00.0 ms to 99.9 msec
Overflow	“OVFL” for distance values > 100 ms
Display:	
Frequency Range:	120 Hz to 1.8 kHz (acoustic)
Display:	Large, easy-to-read 3.5” color LCD with

	backlight
Power:	8 standard alkaline or replaceable lithium AA cell batteries
Battery Life:	24 hours continuous usage, alkaline; 30 hours continuous usage, lithium (equates to several weeks/months of normal usage) >150 hours intermittent, less with backlight enabled
Temperature Range:	Operating: -20 to +50° C Storage: -40 to +70° C
Environmental:	Rated to IP54
Humidity:	95% noncondensing
Dimensions:	203 L x 165 W x 83 H mm
Weight:	0.98 kg

FEATURES

- Ergonomic, rugged, weather resistant case
- Electromagnetic, acoustic and time delay fault location methods
- Displays relative distance and direction to the fault
- Large backlit LCD
- Background interference suppression using selectable filters

3 AUDIO FREQUENCY CABLE TRACER SET L1070

Capable of locating long or short ranges, inductive or conductive, active or passive, the L1070 delivers quick and accurate results with a user-friendly interface. A special design feature on the L1070 allows the user to select and compare receiver information on two frequencies simultaneously, without having to return to the transmitter. The L1070 features push-button depth measurements up to 15 feet to quickly identify service depths prior to digging. A passive 60 Hz detection services as an excellent safety feature for identifying live underground primary and secondary utility cables. An optional ground return probe allows ground fault detection on unshielded electric services or sheath faults on telephone services through the technique of voltage gradient.

TECHNICAL SPECIFICATIONS TRANSMITTER

Operating Frequency	82 kHz, 8 kHz, 815 Hz, and BOTH (815 Hz/82 kHz) simultaneously
Indicators	AC Load Resistance Measurement, Low Bat Indicator, Low Bat warning modulated on output signal every 20 seconds
Load Matching	Automatic from 5 to 2000 Ohm
Output Power	Normal 0.6 W High 2.0 W





815 Hz and 8 kHz
82 kHz
BOTH (815 Hz/82 kHz)
Battery Type Disposable
Battery Life Disposable
Continuous
Intermittent

Normal 0.2 W High 1.0 W
 Normal 0.12 W + .06 W
 HIGH 1.33 W + 0.67 W
 Eight 1.5 V D size alkaline
 8 to 15 hours depending on load,
 frequency and power setting
 40 to 60 hours depending on load,
 frequency and power setting. 25%
 duty cycle average

Operating Temperature
Range
Dimensions
Weight

-4° to +133° F (-20° to +55° C)
 15.2 H x 12.7 W x 40.6 L cm
 3.6 kg with alkaline D cell



RECEIVER

Operating Frequency
Antenna Mode
Current Measurement

815 Hz, 8 kHz, 82 kHz,
 50/60~(PASSIVE)
 Null-responding vertical coil
 Peak-responding horizontal coil
 Display indicated relative current
 simultaneously between any two
 selected cables for target cable
 verification in a multi-conductor
 environment

Operating and Storage
Temperature Range
Battery Type
Battery Life
Continuous
Intermittent

-20° to +55° C
 Six 1.5 V C size alkaline
 40 hours

Signal Strength

82 hours
 Auto power shutoff after 10
 minutes of nonuse
 Analog LCD Bargraph. Absolute
 Digital Signal Strength readout
 from 0 to 999

Gain Control

Up/Down button for automatic
 centering and manual control

Manual

Bubble-level triangulation for
 verification of automatic readout
 in congested environments

Note

Accuracy is dependent on site
 conditions, nonconcentric
 conductor shape, number of
 nearby conductors, and soil return
 currents

Dynamic Range
Depth Measurement
Automatic

126 dB
 Push-button 3 digit readout to 15
 ft in feet/inches, (optional
 meter/centimeters to 4.6 m)

Dimensions
Weight

23.8 W x 9.3 W x 76.9 L cm
 1.36 kg

FEATURES

- Multiple transmit/receive frequencies provide accurate long or short range locates
- Push-button depth measurements up to 4.6 m quickly identify service depths prior to digging
- Passive 60 Hz detection serves as an excellent safety feature for identifying live underground primary and secondary utility cables
- Passive detection also allows convenient locating of energized electric services
- High power at low frequency solves the difficult multipoint grounded utility locating problem

C. HIGH VOLTAGE CONNECTING DEVICES

4 MAIN SWITCH HVS/3



The main 3-phase high voltage switch along with the control panel form the heart of the testing process of the power cable test van. The unit is air-insulated with a reliable and simple design. The switch once it receives power through the control panel it selects and gets locked to a particular instrument. Once the test is completed the unit automatically connects to ground making the operation of the power cable test van safe.

5 CABLE DRUM RACK

External connections for the power cable test van are provided with a power feeding cable drum, a grounding cable drum and three high voltage cable drums.



Cable drums

- drum with power feeding cable, length of cable 30 m
- drum with grounding cable with a cross-section 25 mm², length of cable 30 m
- drums with high voltage EPR shielded cable, length of cable 30 m
- auxiliary ground cable, length of cable 15 m

D. ELECTRICAL SAFETY SYSTEM

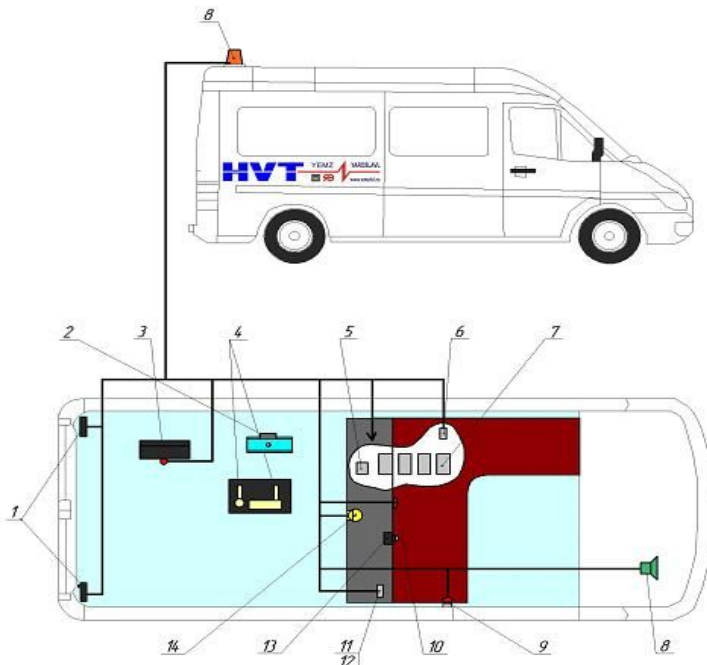
6 ELECTRICAL SAFETY CHECK SYSTEM

The electrical safety system provides protection to the operating personnel as follows:



- by monitoring the potential on the car (switching off if the potential is higher than 24V)
- by monitoring the earth resistance (switching off if the resistance is higher than 25 Ohm)
- by monitoring the door of the high voltage compartment (switching off if the door is open)
- with a manual emergency STOP
- with an automatic grounding of all high voltage test devices
- by testing objects after the completion of testing and in emergency cases
- with a visible break load switch
- by a sound signal and strobe-light when the laboratory is switch on

Location scheme of safety elements in Power Cable Test Van



№	The name of a kind of protection
1	Blocking of external doors of a high-voltage compartment
2	The control of a continuity of a circuit of grounding and emergency potential on a body of laboratory
3	Blocking of a socket on a drum with a cable of protective grounding
4	Automatic an output(exit) on the main switch
5	Automatic замыкатель an output(exit) in the generator of high-voltage pulses GVI
6	Blocking from excess of a target pressure(voltage) in block GVI
7	The automatic category of memory capacities in block GVI
8	Presence of the protective signal system
9	Presence of the readily available button of emergency switching-off
10	Blocking of the switch of a choice of works on the network board
11	Blocking from excess of a current of outflow through object of tests
12	Blocking from excess of a target pressure(voltage) in block BVI
13	Application entrance with seen break of contacts
14	Blocking of initial position of a regulator of a pressure(voltage)

E. POWER SUPPLY

7 STANDBY POWER GENERATOR

This modern gasoline generator is ideal for independent work on construction sites and for industrial, commercial or private operation. With a large fuel tank it guarantees up to 8 hours running time and offers excellent performance and at the same time it is very safe to use.



TECHNICAL SPECIFICATIONS

Engine:	Honda GX 390 Super Silent
Cylinder:	1
Speed:	3000 rpm
Fuel:	Gasoline
Engine oil capacity:	1.3 l
Cooling (Eng./Generator):	Air / Air
Electr. capacity 1~ ϕ 1.0:	6450 VA
Voltage 1~:	230 V
Max. Current 1~:	28 A
Current 1~ (CEE):	28 A
Current 1~ (Schuko):	16 A
Max. starting current cos ϕ 0,6:	16 A
Starting current with 20% voltage drop:	45 A
Frequency:	50hz
Tank capacity:	20 l
Weight:	95.5/104.5 kg incl. batt.
Dimensions (L x W x H) :	740x500x530 mm
Acoustic power L_{WA}:	97 dB(A)
Acoustic pressure (10m no load):	69 dB(A)

F. PROTECTIVE EQUIPMENT

8 VOLTAGE DETECTOR



Voltage Detectors are used to verify live or de-energized conductors. These testers may be used with rubber insulating gloves or hot sticks using the splined universal end fitting. Testers indicate the presence of voltage with an extra bright LED light and a distinctive audible signal. It is recommended that the tester be moved closer to conductor until warning is indicated, or it touches conductor, apparatus, or test point. Test the unit on a nearby energized conductor.

9 PERSONNEL PROTECTIVE EQUIPMENT/TOOL KIT

1	Earthing rod for discharging the high voltage cabin	1 unit
2	Dielectric gloves	2 pair
3	Dielectric boots	1 pair
4	Protective helmet	2 units
5	Grounding probe	1 unit
6	Tool Kit	1 unit

G. VEHICLE

10 IVECO 35C15 VAN



TECHNICAL SPECIFICATIONS

Engine	FIC E048I – 4 STROKE -2287cc, Euro 3, Turbo Intercooler, Common Rail Injection System
Rated Output	146 HP @ 3000 rpm
Rated Torque	350 Nm @ 1400- 2750 rpm
Manual Transmission	IVECO 6+1 Speed synchronized
Fuel Type	Diesel
Tank Capacity	Approx. 70 l
Battery	12/110 [V/Ah]
GVW	3,500 kg
Payload	1045 kg
Cargo Volume	15.6 m ³
Wheelbase	3,950 mm

11 VEHICLE BODY

The power cable test van is designed to be easy to operate and service. It is equipped with high quality insulated wall panelling and air conditioning. The body is divided into technical and operator compartments separated by a partition wall. The technical compartment includes all the necessary tools and equipment for carrying out testing and inspections. Safety is an important feature of the mobile laboratory and hence all equipment is properly mounted and secured for transit. The operator compartment provides a pleasant environment to work in with more room and plenty of storage. It is equipped with cabinetry and workbenches that increase the operators' efficiency and productivity.

FEATURES

- Roof mounted air conditioner
- Internal lighting 230 VAC & 12V DC
- Insulated walls and roof for thermal and noise
- Special antistatic floor in operator area



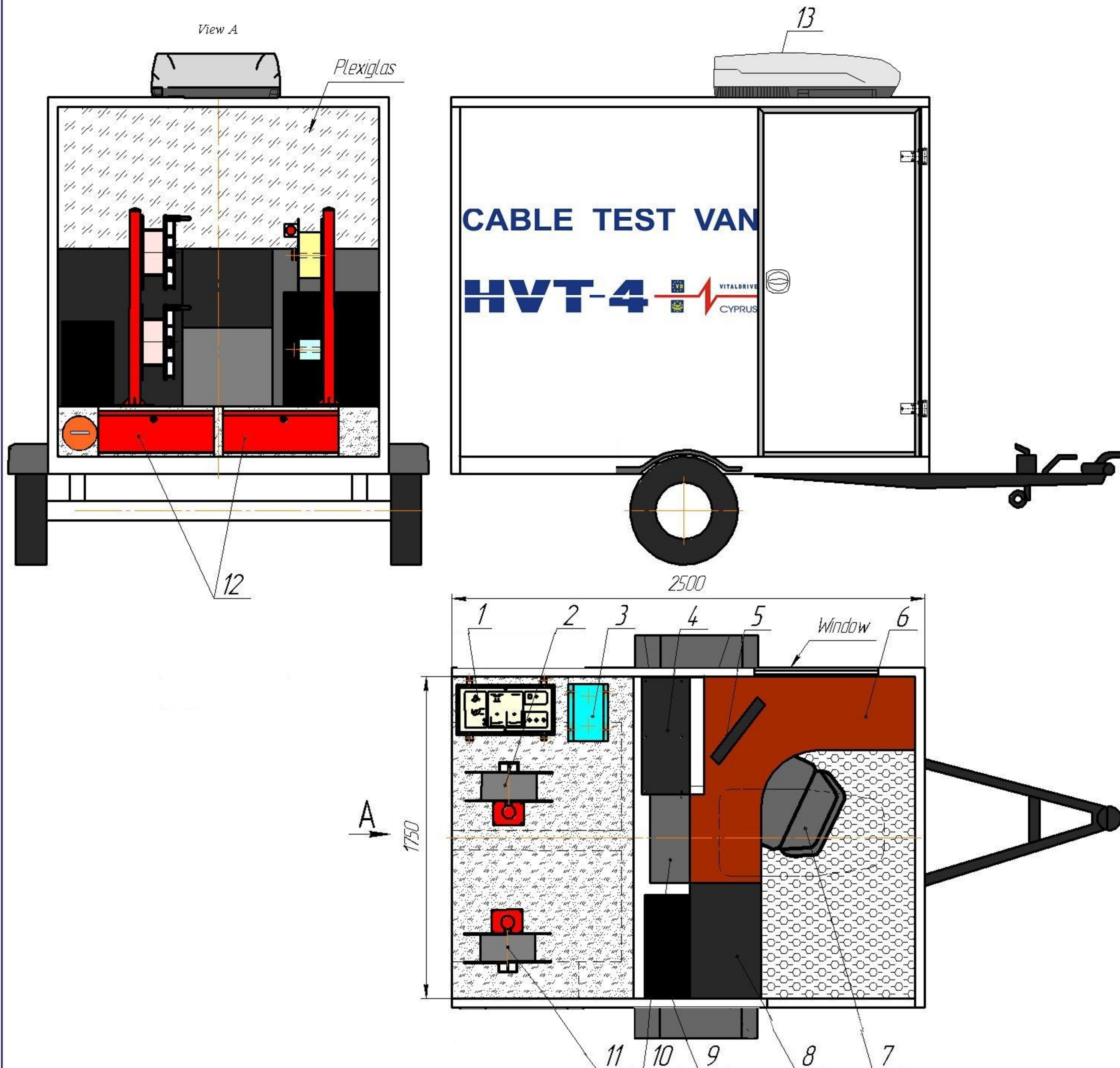
- Special aluminium tread plate suitable for rough loading in high voltage area
- Partition wall, Operating desk & chair
- Drawers for storage of accessories

H. TRAINING

12 Training Seminars

Full training is provided for the cable test van personnel. Their training includes the full use of the equipment and covers the basic test van operations such as safety management, routine and preventative maintenance of equipment, high voltage testing and validation and test result recording. The training is highly participatory and experimental and trainees obtain hands on experience.

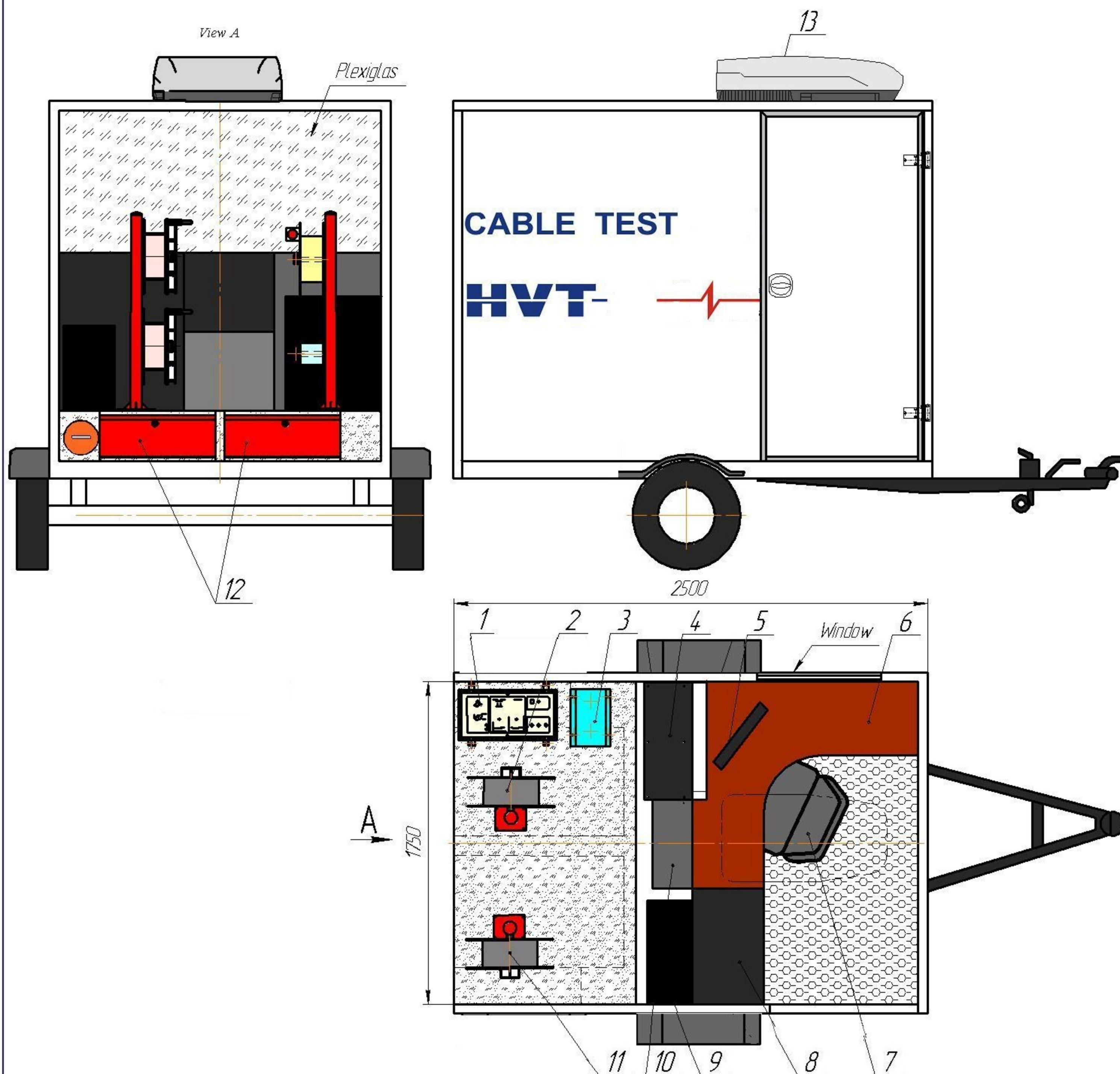
Cable Test Van HVT-4



Nº	Equipment specification	Nº	Equipment specification	Nº
1	L1070	1	9 Decay	1
2	HV Cable/ Return	1	10 Automatic module	1
3	Safety Module	1	11 Power supply/ Earth cable	1
4	Control module	1	12 Tools boxes	2
5	MTDR	1	13 Air Conditioner	1
6	Table-top of Eurodesk type	1		
7	Operator chair	1		
8	Storage Cabinet	1		

				Cable Test Van		
				HVT-4		
Client Sheet	Idocum.	Signature	Date	Lit.	Mass	Scale
Designed by	Checked by					
Dr. V. Gnatko						
T. contr.				Sheet	Sheets	
N. contr.				Vitaldrive Ltd		
Sanction						

Cable Test Van HVT



Nº	Equipment specification	Nº	Equipment specification	Nº
1	L1070	1	9 Decay	1
2	HV Cable/ Return	1	10 Automatic module	1
3	Safety Module	1	11 Power supply/ Earth cable	1
4	Control module	1	12 Tools boxes	2
5	MTDR	1	13 Air Conditioner	1
6	Table-top of Eurodesk type	1		
7	Operator chair	1		
8	Storage Cabinet	1		

CFL40A2000**Vehicle Mountable Cable Fault Location and High Voltage Test Solution**

- **Separate HV and control modules**
- **HV insulation testing to 40 kV**
- **8/16/34 kV, 2000 Joules surge output**
- **4 kV, 1500 Joules range (optional)**
- **34 kV arc reflection, arc reflection plus and differential arc reflection**
- **Proof/burn up to 40 kV**
- **34 kV impulse current (ICE)**
- **Voltage decay (optional)**
- **Menu driven large screen color TDR**

DESCRIPTION

The CFL40A vehicle-mountable cable fault location system has been developed to provide quick, effective, accurate and safe fault location, reducing system outages and “customer minutes lost.” The system is a valuable addition to the existing range of highly successful, field proven family of cable fault locating systems available from Megger.

The CFL40A system comes as two separate modules, making it suitable for mounting in a vehicle or trailer. The HV module contains all of the high voltage elements. Control of all of the HV elements and CFL methods is by a separate control panel, which also houses the large screen color TDR.

Standard Scope of Supply

Operator control panel

- HMI selection and control of all HV and CFL methods
- Analog metering of outputs and leakage current
- Menu driven large screen color TDR
- Emergency “Off”

HV Control

- PFF - Fault locator module
- HV insulation/proof testing
- Surge generator
- Arc reflection filter
- Transient ICE/Voltage decay couplers
- Proof/Burn
- Ground safety interlock

HV Testing (proof testing)

Proves the integrity, identifies and confirms fault conditions in cable networks. They can be used for sheath testing at 5 or 10 kV. The selectable over-current trip levels provide protection, and leakage current is shown on the analog metering.

Fault Pre-location

After identifying the type of fault, low or high voltage methods of pre-locations are used to determine the fault position.

- **TDR** pre-locate cable faults using pulse echo, arc reflection, impulse current (ICE) and the optional voltage decay method. In pulse echo mode, a real time trace and a stored trace are viewed simultaneously on the large color display, allowing comparison and difference measurements to be made.
- **MTDR100** features auto-ranging, auto distance to fault and operator assist functions that guide the operator through the fault locating process.
- In the **Arc Reflection** mode, faults are stabilized by creating a temporary ‘bridge’ to earth. During this condition, a standard pulse echo measurement is taken into what is basically a short circuit fault.
- **Arc Reflection plus** provides the operator with the added advantage of having the ability to view and analyze up to 1024 traces (range dependent) taken during the period of the arc.
- During **Differential arc reflection** mode unwanted and confusing reflection is removed leaving a clean trace with only the fault position, point being displayed by a positive pulse. This method is especially suited in locating high-resistance faults in complex cable systems.
- **ICE** and **Voltage Decay** methods are both transient analysis methods of pre-location which utilize either a linear coupler or voltage divider.

Fault Conditioning

Fault conditioning is used to stabilize unstable, flashing or high resistance faults. The Megger fault locator system incorporates both proof/burn and arc reflection modes.

■ Proof/Burn

Using the high voltage output and following a breakdown of the cable under test, a high current is applied, creating a carbon bridge, stabilizing the fault condition. This allows prelocation and pinpoint location of unstable faults.

■ Arc Reflection

Not widely recognized as a fault condition method, a high current is applied to the cable under test, creating a carbon bridge and stabilizing the fault condition. This allows pre-location and pinpoint location of unstable faults.

Acoustic pinpoint fault location

Accurate pinpoint fault location is achieved using the acoustic method, whereby the powerful surge generator (thumper) and a receiver (MPP2000) are used. The Megger acoustic and electromagnetic pinpointer shows direction and distance to fault.

SPECIFICATIONS

Testing

Output: 0 – 40 kV (negative with regard to earth) 25 mA constant

Resolution: 1 mA

Trip: Adjustable current trip

Metering: Analogue and digital metering of current and voltage

Low Voltage Pre-location

MTDR

Range: 10 ranges; 100 m – 55 km (328 ft - 34 miles)

100 m - 220 km (328 ft - 137 miles) - transient methods

Pulse width: 50, 100, 200, 500 ns 1, 2, 5, 10 μ s, and auto

Display: 26.4 mm (10.4 in.), full XGA, color display

Resolution: ($V_p = 55\%$) 0.82 m (2.8 ft)

Cursors: Dual independent control

Gain: 60 dB range in 5 dB steps

Input: Impedance 50 Ω

Inputs: 1 x TDR/ARC, 1 x current impulse

Ports: 1 x printer/USB memory device

Software: CAS1 (cable analysis software)

High Voltage Prelocation

Arc Reflection: 8/16/34 kV at 2000 J

4 kV at 1500 J (optional)

ICE: 8/16/34 kV

4 kV at 1500 J (optional)

Voltage decay: 0 – 40 kV (optional)

Fault Conditioning

Arc Reflection: 8/16/34 kV (optional 4 kV)

Proof/burn: 0 – 8 kV, 120 mA

0 – 16 kV, 60 mA

0 – 40 kV, 30 mA

0 – 4 kV, 240 mA (optional)

Pinpoint Fault Location

Surge: 0 – 8/16/34 kV at 2000 J

0 – 4 kV/1500 Joules

2000 Joules (dependent on model)

Impulse Sequence : Adjustable 2 – 12 seconds Single Shot

Cables CFL40A cable set

Environmental

Operating Temperature: -20 ° to +50 °C (-4 ° to 122 °F)

Storage Temperature: -20 ° to +70 °C (-4 ° to 158 °F)

Elevation: 1500 m (5000 ft) Derate voltages at higher altitudes

Humidity: 50 to 95 % RH non-condensing

Supply: Universal AVSM 2-ranges: 108 - 132 V ac and

208 - 265 V ac 47 - 63 Hz

Weight

HV module: 145 kg (320 lb)

Control module: 9 kg (20 lb)

Dimensions

HV module: 1000 mm (H) x 536 mm (W) x 501 mm (D)

39 in. (H) x 21 in. (W) x 20 in. (D)

Control module: 480 mm (H) x 490 mm (W) x 180 mm (D)

19 in. (H) x 19 in. (W) x 7 in. (W)

ORDERING INFORMATION

Item	Cat. No.	Item	Cat. No.
40 kV dc, 3-range 0...8/16/34 kV, 2000 Joule surge (AVSM 108-132V ac and 208-265V ac 47-63 Hz)	CFL40A2000-23	Optional Accessories	
40 kV dc, 4-range 0...4/8/16/34 kV, 2000 Joule surge (AVSM 108-132V ac and 208-265V ac 47-63 Hz)	CFL40A2000-31	Acoustic/electromagnetic receiver	MPP2000
Included Accessories		Voltage decay coupler	36569
HV module	PFF40A	70-kV Earthing/discharge Stick	222070-62
Earth safety monitor/interlock		Two stand-alone cable reels, HV and GND, 100ft (30.5m) each	CBL100HV
Control module & integrated MTDR		For information on other manual and motorized cable drum assemblies please contact your local Technical Sales Office	
CFL40A cable kit			
Interlock shorting plug	10226-1		
Cable bag	18313		
Instruction manual	AVTMPFL40		

Award Winning Products (PFL40 and MFT1553)

Megger makes it 4 prestigious awards in 2007



Megger makes it 4 prestigious awards in 2007

Megger has scooped yet another award to add to the two prestigious trophies it picked up at the Electrical Industry Awards 2007 in early October and the AECI best new product award taken earlier in the year.

The latest award was presented at the Select Electrotechnical awards 2007 in Glasgow. The MFT1553 On-site won the best new product category.

Earlier in the month megger took two prizes at the Electrical Industry Awards. These Awards have long been the annual focal point for the electrical industry recognising as they do the outstanding achievements of companies in the field. To win any of the awards is accolade, but to take the top prizes in both the Power and Test and Measurement categories is remarkable.

Power Product of the Year went to Megger PFL40. The PFL40 range provides all of the facilities needed for cable testing, cable fault diagnosis, pre-location of cable faults, fault conditioning and pinpoint location of faults.



SELECT Electrotechnical Awards 2007

New Product of the Year was won by Megger MFT1553. Downloading test results from a tester to a laptop computer is nothing new – but the new MFT1553 On-site package takes this a step further. Now, it is no longer necessary to have a cabled connection between the tester and the computer and the certificate is filled out on-site.

Electrical Industry Awards 2007

Test and Measurement Product of the Year was won by Megger MFT1553. Instruments that transfer test results automatically to a laptop computer are nothing new – but the new MFT1553 On-site package takes this a step further. Now, it is no longer necessary to have a cabled connection between the test instrument and the computer. With the MFT1553 package, all data is transferred via a wireless Bluetooth connection.

The Awards were judged by a panel of independent experts from such respected bodies as the NICEIC, BEAMA and the ECA, as well as editorial representatives from Electrical Times magazine.

Association of Electrical Contractors (Ireland)

In May the MFT1553 On-site won the Best New Product Award at the AECl in Athlone.

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MPP2000

Megger Pinpointer



- **Universal pinpoint fault location system**
- **Ergonomic, rugged, weather resistant case**
- **Electromagnetic, acoustic and time delay fault location methods**
- **Displays magnetic and acoustic signal levels**
- **Displays relative distance and direction to the fault**
- **Large backlit LCD**
- **Background interference suppression using selectable filters**

DESCRIPTION

The Megger Pinpointer model MPP2000 is specifically designed to accurately and quickly pinpoint faults in underground cable networks. Easy-to-access menus provide advanced users the flexibility and features they desire.

The MPP2000 is housed in a lightweight, ergonomically designed, rugged case that is IP54 rated. The unit can be easily carried “hands free” using the adjustable neck strap. In addition, the instrument can be used with any manufacturer’s surge generator (thumper).

The MPP2000 is used to detect the acoustic and electromagnetic fields. Both fields are generated by the flashover at the point of fault, which has been generated by the HV impulse caused by a surge generator. Detection is via a lightweight ground microphone, which has a physical shield to reduce external wind noise.

For easy interpretation, the receiver’s display shows clear, unambiguous readings. The user interface features standard directional and select arrow keys for easy navigation.

For operator comfort, and for use when the operator is wearing a safety helmet, the MPP2000 is supplied with “behind-the-head” headphones. Active noise-cancelling headphones are available as an optional accessory. Additionally the unit has a built-in “auto mute,” eliminating all ambient noise, which is activated when the ground microphone is raised from the ground.

The unit has an integral loudspeaker, the volume of which can be adjusted for user comfort via the touchpad controls. A single pushbutton “mutes” the output both on the headphones and loudspeaker simultaneously.

The MPP2000 provides:

- Detection of the acoustic discharge (“thump”) and measurement of acoustic signal strength.

- Detection and indication of the electromagnetic signal strength.
- Measurement of time delay between acoustic and electromagnetic signals.
- Indication of the direction to fault.
- Calculated relative distance to fault.

APPLICATIONS

The MPP2000 pinpoints faults in underground power cables using acoustic, electromagnetic and time delay methods, enabling quick and accurate pinpoint location of underground cable faults.

The location of the buried cable is indicated by the intensity of the electromagnetic field produced by the HV pulses of a surge generator. The bargraph indicator of the MPP2000 shows a maximum intensity of the magnetic field directly above the cable, reducing as the operator moves away from the route of the cable.

Accurate and fast fault locating is accomplished using the coincidence measurement of the acoustic signal, in time relation to the electromagnetic signal produced at the “flashover” or point of fault.

The receiver’s display shows the acoustic signal strength and the time delay between the electromagnetic surge and acoustic event.

When directly over the fault, the time difference is at a minimum and the acoustic level is at a maximum. This is especially useful when the cable is in a duct or pipe where the acoustic signal could mislead the operator.



Behind-the-head headphones fit comfortably even when worn with safety helmet.

FEATURES AND BENEFITS

- Lightweight receiver with durable weather-resistant enclosure.
- Comfortable neck strap allowing two-handed operation and “hands-free” carrying of the unit.
- Easy-to-read graphical display of acoustic and electromagnetic signal levels.
- Measures distance to cable fault by calculating electromagnetic surge/acoustic emission, providing fast, accurate fault pinpointing.
- Bargraph magnetic field strength indicator.
- Backlit LCD visible in direct sunlight.
- Behind-the-head headphones.
- A sturdy yet flexible wind guard insulates the ground microphone from ambient noises.
- Durable carrying case holds all components.
- Optional noise-cancelling headphones are available.

SPECIFICATIONS

Operating Mode

Acoustic and electromagnetic pinpoint fault location — coincidence or time delay — pinpoint fault location — relative distance to fault — direction to fault indication

Range

0 to 99.9 ms

Resolution

0.1 ms

Outputs

Loudspeaker
1 x jack for headphones

Volume

Adjustable for both headphone and loudspeaker

Acoustic Gain

Manual

Electromagnetic Gain

Manual

Noise Canceling Acoustic Filters

Digital: (3) HPF, (1) BPF, none

Acoustic Bands

125 Hz to 1.8 kHz

Amplification Acoustic Channel

> 0 to 100 dB

Magnetic Channel

> 0 to 100 dB

Display Range

00.0 ms to 99.9 msec

Overflow Display

“OVFL” for distance values > 100 ms

Frequency Range

120 Hz to 1.8 kHz (acoustic)

Display

Large, easy-to-read 3.5” color LCD with backlight

Power

8 standard alkaline or replaceable lithium AA cell batteries

Battery Life

24 hours continuous usage, alkaline; 30 hours continuous usage, lithium (equates to several weeks/months of normal usage)
>150 hours intermittent, less with backlight enabled

Temperature Range

Operating: -4 to 122° F (-20 to +50° C)
Storage: -40 to 158° F (-40 to +70° C)

Environmental

Rated to IP54

Humidity

95% noncondensing

Dimensions

8 L x 6.5 W x 3.25 H in. (203 L x 165 W x 83 H mm)

Weight

2.15 lb (.98 kg)

ORDERING INFORMATION

Item (Qty)	Cat. No.
MPP2000 Pinpointer	
Included Accessories	
Ground microphone	1001-809
Behind-the-head headphones	90003-250
Carry strap	6220-780
MPP2000 (complete) Carry Case	2002-119
“AA” battery (8 required)	23415
Instruction manual MPP2000	81395
Optional Accessory	
Noise-cancelling headphones	36162

ISO STATEMENT

Registered to ISO 9001:2000 Reg. No. Q 09250
Registered to ISO 14001 Reg. No. EMS 61597

MPP2000_DS_US_V01

Megger is a registered trademark.
Specifications subject to change
without notice.

L1070 and L1071 Portable Locator



- **Multiple frequencies**
- **Transmit/receive frequency (815 Hz, 8 kHz, 82 kHz)**
- **SONDE support**
- **Peak and null detection**
- **Passive 60 Hz**
- **Measures current flow in buried conductors**
- **Transmitter variable output power levels**
- **Push-button depth measurement**

DESCRIPTION

Unparalleled in capability, the L1070 and L1071 Portable Locators locate buried cable and pipe in various situations. Capable of locating long or short ranges, inductive or conductive, active or passive, the units deliver quick and accurate results with a user-friendly interface. Whereas the L1070 uses a disposable battery type, the L1071 requires a rechargeable one.

Operating the receiver at multiple frequencies optimizes performance for the specific needs of the user. Low frequency of 815 Hz provides longer range and reduced errors from adjacent cables, ideal for electric power services. High 82 kHz frequency will path locate past bad telephone bonds, locate underground stubs and permit inductive locating with either the optional flexible coupler or direct soil induction. A special design feature on both units allow the user to select and compare receiver information on two frequencies simultaneously, without having to return to the transmitter. Excellent passive 50/60 Hz locating will pinpoint active power lines and other utilities where AC is present without the use of the transmitter.

The portable locator also features SONDE detection and locating. By selecting this feature, the user is able to choose a SONDE that will match the same frequency and the receiver.

APPLICATIONS

Flexibility remains the key strength of reaching difficult, multi-point, grounded utility locating applications. Combining high power at low frequency virtually eliminates the false coupling into adjacent objects and allows the high transmitter power to burn a signal past

several grounds and into multiple distributed grounds. Multi-grounded electrical distribution service, continuously grounded water pipes, multi-grounded telephone shield wiring, highly capacitive, cathodically protected coated gas pipes and CATV systems all benefit from the flexibility of the L1070 and L1071.

Conductor current readout on the units give the user information on the amount of current flowing on the target conductor with correction for changes in depth. To trace the direction where the transmitter signal is divided or where it goes into the soil at an insulation ground fault, press the CURRENT button. This feature is useful in cathodically protected systems with ground faults.

An optional ground return probe allows ground fault detection on unshielded electric services or sheath faults on telephone services through the technique of voltage gradient.

FEATURES AND BENEFITS

- Multiple transmit/receive frequencies provide accurate long or short range locates.
- Push-button depth measurements up to 15 ft (4.6 m) quickly identify service depths prior to digging.
- Passive 60 Hz detection serves as an excellent safety feature for identifying live underground primary and secondary utility cables.
- AC circuits in common trench situations. Passive detection also allows convenient locating of energized electric services.
- High power at low frequency solves the difficult multi-point grounded utility locating problem.

SPECIFICATIONS

Transmitter

Operating Frequency: 82 kHz, 8 kHz, 815 Hz, and BOTH (815 Hz/82 kHz) simultaneously

Indicators

AC Load Resistance Measurement, Low Bat Indicator, Low Bat warning modulated on output signal every 20 seconds

Load Matching: Automatic from 5Ω to 2000Ω

Output Power

815 Hz and 8 kHz

Normal 0.6 W

High 2.0 W

82 kHz

Normal 0.2 W

High 1.0 W

BOTH (815 Hz/82 kHz)

Normal 0.12 W + .06 W

HIGH 1.33 W + 0.67 W

Battery Type

Disposable (Used in L1070)

Eight 1.5 V D size alkaline

Rechargeable (Used in L1071)

12 V, 7 Amp-Hour maintenance free, sealed lead-acid includes 120 V ac wall-mount charger for overnight charging. Optional 12 V automotive power pack for fast charging, or powering unit from a vehicle cigarette lighter jack.

Battery Life

Disposable

Continuous: 8 to 15 hours depending on load, frequency and power setting

Intermittent: 40 to 60 hours depending on load, frequency and power setting, 25% duty cycle average.

Rechargeable

Continuous: 10 to 20 hours depending on load, frequency and power setting

Intermittent: 50 to 70 hours depending on load, frequency and power setting, 25% duty cycle average.

Operating Temperature Range

-4° to +133° F (-20° to +55° C)

Dimensions

6.5 H x 6.32 W x 16 L in.

(15.2 H x 12.7 W x 40.6 L cm)

Weight

8 lb (3.6 kg) with alkaline D cells

11.5 lb (5.2 kg) with rechargeable batteries

Receiver

Operating Frequency: 815 Hz, 8 kHz, 82 kHz, 50/60~(PASSIVE)

Antenna Mode

Null-responding vertical coil

Peak-responding horizontal coil

Audio Indication: Variable pitch response on all frequencies

Current Measurement

Display indicated relative current simultaneously between any two selected cables for target cable verification in a multi-conductor environment

Operating and Storage Temperature Range

-4° to +133° F (-20° to +55° C)

Battery Type: Six 1.5 V C size alkaline

Battery Life

Continuous: 40 hours

Intermittent: 82 hours

Auto power shutoff after 10 minutes of nonuse

Signal Strength

Analog LCD Bargraph. Absolute Digital Signal Strength readout from 0 to 999

Gain Control: Up/Down button for automatic centering and manual control

Manual

Bubble-level triangulation for verification of automatic readout in congested environments. **Note:** Accuracy is dependent on site conditions, nonconcentric conductor shape, number of nearby conductors, and soil return currents.

Dynamic Range: 126 dB

Depth Measurement

Automatic: Push-button 3 digit readout to 15 ft in feet/inches, (optional meter/centimeters to 4.6 m)

Dimensions

9.4 H x 3.75 W x 30.3 L in.

(23.8 W x 9.3 W x 76.9 L cm)

Weight: 3 lb (1.36 kg)

ORDERING INFORMATION

Item (Qty)	Cat. No.
L1070 Portable Locator	651070
L1071 Portable Locator	651071

Included Accessories

L1070: Receiver, transmitter, red/black cord, batteries, ground rod, instruction manual and soft carrying case

L1071: Receiver, rechargeable transmitter, red/black cord, batteries, ground rod, AC charger, instruction manual and soft carrying case

Optional Accessories

Folding ground return probe (grounded fault locator)	651075
Flexible coupler (Inductive Coupler)	651076
DC charger (automotive) used with 651071	651078

TRAILER BASED CABLE TESTING UNIT

POWER SUPPLY

1 Standby Power Generator EISEMANN (OPTION)

This modern gasoline generator with electronic control unit is ideal for independent work on construction sites and for industrial, commercial or private operation. With a large fuel tank it guarantees up to 16 hours running time and offers excellent performance and at the same time it is very safe to use. Isolation control with cut-off in cases of emergency and a test button ensure that the safety requirements according to civil engineering standard GW 308 are met. It also complies with ecological standards. Reduced exhaust emission and low fuel consumption as well as its very silent operation make it a highly efficient generator.



TECHNICAL SPECIFICATIONS

Engine	Honda GX 390 Super Silent
Cylinder	1
Speed	3000 rpm
Fuel	Petrol
Engine capacity	1.3 l
Cooling (Engine/Generator)	Air / Air
Electr. capacity 3~ ϕ 1.0	6000VA
Electr. capacity 1~ ϕ 1.0	5000VA
Voltage 3~	400V
Voltage 1~	230V
Max. Current 3~	9A
Max. Current 1~	22,5A
Current 1~ (CEE)	22,5A
Current 1~ (Schuko)	16A
Max. starting current $\cos \phi$ 0,6	16A
Starting current with 20% voltage drop	40A
Frequency	50hz
Protection	IP 54
Tank capacity	20 l
Weight	108 kg
Weight including battery	117 kg
Dimensions (L x W x H)	740x500x350 mm
Acoustic power L_{WA}	98 dB(A)
Acoustic pressure (10m no load)	70 dB(A)

ELECTRICAL SAFETY SYSTEM

2 Electrical Safety Check System



The high voltage safety system provides protection to the operating personnel as follows:

- by monitoring the potential on the car (switching off if the potential is higher than 24V)
- by monitoring the earth resistance (switching off if the resistance is higher than 25 Ohm)

- by monitoring the door of the high voltage compartment (switching off if the door is open)
- with a manual emergency STOP
- with an automatic grounding of all high voltage test devices
- with a visible break load switch
- by a sound signal and strobe-light when the laboratory is switch on

3 Voltage Detector



Voltage Detectors are used to verify live or de-energized conductors. These testers may be used with rubber insulating gloves or hot sticks using the splined universal end fitting. Testers indicate the presence of voltage with an extra bright LED light and a distinctive audible signal. It is recommended that the tester be moved closer to conductor until warning is indicated, or it touches conductor, apparatus, or test point. Test the unit on a nearby energized conductor.

4 Personnel Protective Equipment / Tool Kit

1	Earthing rod for discharging the high voltage cabin	1 unit
2	Dielectric gloves	2 pair
3	Dielectric boots	1 pair
4	Protective helmet	2 units
5	Grounding probe	1 unit
6	Tool Kit	1 unit

TRAILER

5



FEATURES

- One-axle trailer with 13” wheels with suitable dimensions
- Gross Axle Weight Rating 1300Kg
- Over run brake
- Heat insulation construction
- Two rear doors, opening up to 270 degrees
- One Side door
- One Side window
- Height adjustable with tow coupling
- Spare wheel

6 Trailer Body

The trailer based testing unit is designed to be easy to operate and service. It is equipped with high quality insulated wall panelling and air conditioning. The body is divided into technical and operator compartments separated by a partition wall. The technical compartment includes all the necessary tools and equipment for carrying out testing and inspections. Safety is an important feature of the laboratories and hence all equipment is properly mounted and secured for transit. The operator compartment provides a pleasant environment to work in with more room and plenty of storage. It is equipped with cabinetry and workbenches that increase the operators' efficiency and productivity.

FEATURES

- Roof mounted air conditioner
- Internal lighting 230 VAC & 12V DC
- Insulated walls and roof for thermal and noise
- Special antistatic floor in operator area
- Special aluminium tread plate suitable for rough loading in high voltage area
- Partition wall, Operating desk & Swivel chair
- Drawers for storage of accessories





CFL40A2000**Vehicle Mountable Cable Fault Location and High Voltage Test Solution**

- Separate HV and control modules
- HV insulation testing to 40 kV
- 8/16/34 kV, 2000 Joules surge output
- 4 kV, 1500 Joules range (optional)
- 34 kV arc reflection, arc reflection plus and differential arc reflection
- Proof/burn up to 40 kV
- 34 kV impulse current (ICE)
- Voltage decay (optional)
- Menu driven large screen color TDR

DESCRIPTION

The CFL40A vehicle-mountable cable fault location system has been developed to provide quick, effective, accurate and safe fault location, reducing system outages and “customer minutes lost.” The system is a valuable addition to the existing range of highly successful, field proven family of cable fault locating systems available from Megger.

The CFL40A system comes as two separate modules, making it suitable for mounting in a vehicle or trailer. The HV module contains all of the high voltage elements. Control of all of the HV elements and CFL methods is by a separate control panel, which also houses the large screen color TDR.

Standard Scope of Supply

Operator control panel

- HMI selection and control of all HV and CFL methods
- Analog metering of outputs and leakage current
- Menu driven large screen color TDR
- Emergency “Off”

HV Control

- PFF - Fault locator module
- HV insulation/proof testing
- Surge generator
- Arc reflection filter
- Transient ICE/Voltage decay couplers
- Proof/Burn
- Ground safety interlock

HV Testing (proof testing)

Proves the integrity, identifies and confirms fault conditions in cable networks. They can be used for sheath testing at 5 or 10 kV. The selectable over-current trip levels provide protection, and leakage current is shown on the analog metering.

Fault Pre-location

After identifying the type of fault, low or high voltage methods of pre-locations are used to determine the fault position.

- **TDR** pre-locate cable faults using pulse echo, arc reflection, impulse current (ICE) and the optional voltage decay method. In pulse echo mode, a real time trace and a stored trace are viewed simultaneously on the large color display, allowing comparison and difference measurements to be made.
- **MTDR100** features auto-ranging, auto distance to fault and operator assist functions that guide the operator through the fault locating process.
- In the **Arc Reflection** mode, faults are stabilized by creating a temporary ‘bridge’ to earth. During this condition, a standard pulse echo measurement is taken into what is basically a short circuit fault.
- **Arc Reflection plus** provides the operator with the added advantage of having the ability to view and analyze up to 1024 traces (range dependent) taken during the period of the arc.
- During **Differential arc reflection** mode unwanted and confusing reflection is removed leaving a clean trace with only the fault position, point being displayed by a positive pulse. This method is especially suited in locating high-resistance faults in complex cable systems.
- **ICE** and **Voltage Decay** methods are both transient analysis methods of pre-location which utilize either a linear coupler or voltage divider.

Fault Conditioning

Fault conditioning is used to stabilize unstable, flashing or high resistance faults. The Megger fault locator system incorporates both proof/burn and arc reflection modes.

■ Proof/Burn

Using the high voltage output and following a breakdown of the cable under test, a high current is applied, creating a carbon bridge, stabilizing the fault condition. This allows prelocation and pinpoint location of unstable faults.

■ Arc Reflection

Not widely recognized as a fault condition method, a high current is applied to the cable under test, creating a carbon bridge and stabilizing the fault condition. This allows pre-location and pinpoint location of unstable faults.

Acoustic pinpoint fault location

Accurate pinpoint fault location is achieved using the acoustic method, whereby the powerful surge generator (thumper) and a receiver (MPP2000) are used. The Megger acoustic and electromagnetic pinpointer shows direction and distance to fault.

SPECIFICATIONS

Testing

Output: 0 – 40 kV (negative with regard to earth) 25 mA constant

Resolution: 1 mA

Trip: Adjustable current trip

Metering: Analogue and digital metering of current and voltage

Low Voltage Pre-location

MTDR

Range: 10 ranges; 100 m – 55 km (328 ft - 34 miles)

100 m - 220 km (328 ft - 137 miles) - transient methods

Pulse width: 50, 100, 200, 500 ns 1, 2, 5, 10 μ s, and auto

Display: 26.4 mm (10.4 in.), full XGA, color display

Resolution: ($V_p = 55\%$) 0.82 m (2.8 ft)

Cursors: Dual independent control

Gain: 60 dB range in 5 dB steps

Input: Impedance 50 Ω

Inputs: 1 x TDR/ARC, 1 x current impulse

Ports: 1 x printer/USB memory device

Software: CAS1 (cable analysis software)

High Voltage Prelocation

Arc Reflection: 8/16/34 kV at 2000 J

4 kV at 1500 J (optional)

ICE: 8/16/34 kV

4 kV at 1500 J (optional)

Voltage decay: 0 – 40 kV (optional)

Fault Conditioning

Arc Reflection: 8/16/34 kV (optional 4 kV)

Proof/burn: 0 – 8 kV, 120 mA

0 – 16 kV, 60 mA

0 – 40 kV, 30 mA

0 – 4 kV, 240 mA (optional)

Pinpoint Fault Location

Surge: 0 – 8/16/34 kV at 2000 J

0 – 4 kV/1500 Joules

2000 Joules (dependent on model)

Impulse Sequence : Adjustable 2 – 12 seconds Single Shot

Cables CFL40A cable set

Environmental

Operating Temperature: -20 ° to +50 °C (-4 ° to 122 °F)

Storage Temperature: -20 ° to +70 °C (-4 ° to 158 °F)

Elevation: 1500 m (5000 ft) Derate voltages at higher altitudes

Humidity: 50 to 95 % RH non-condensing

Supply: Universal AVSM 2-ranges: 108 - 132 V ac and

208 - 265 V ac 47 - 63 Hz

Weight

HV module: 145 kg (320 lb)

Control module: 9 kg (20 lb)

Dimensions

HV module: 1000 mm (H) x 536 mm (W) x 501 mm (D)

39 in. (H) x 21 in. (W) x 20 in. (D)

Control module: 480 mm (H) x 490 mm (W) x 180 mm (D)

19 in. (H) x 19 in. (W) x 7 in. (W)

ORDERING INFORMATION

Item	Cat. No.	Item	Cat. No.
40 kV dc, 3-range 0...8/16/34 kV, 2000 Joule surge (AVSM 108-132V ac and 208-265V ac 47-63 Hz)	CFL40A2000-23	Optional Accessories	
40 kV dc, 4-range 0...4/8/16/34 kV, 2000 Joule surge (AVSM 108-132V ac and 208-265V ac 47-63 Hz)	CFL40A2000-31	Acoustic/electromagnetic receiver	MPP2000
Included Accessories		Voltage decay coupler	36569
HV module	PFF40A	70-kV Earthing/discharge Stick	222070-62
Earth safety monitor/interlock		Two stand-alone cable reels, HV and GND, 100ft (30.5m) each	CBL100HV
Control module & integrated MTDR		For information on other manual and motorized cable drum assemblies please contact your local Technical Sales Office	
CFL40A cable kit			
Interlock shorting plug	10226-1		
Cable bag	18313		
Instruction manual	AVTMPFL40		

Award Winning Products (PFL40 and MFT1553)

Megger makes it 4 prestigious awards in 2007



Megger makes it 4 prestigious awards in 2007

Megger has scooped yet another award to add to the two prestigious trophies it picked up at the Electrical Industry Awards 2007 in early October and the AECI best new product award taken earlier in the year.

The latest award was presented at the Select Electrotechnical awards 2007 in Glasgow. The MFT1553 On-site won the best new product category.

Earlier in the month megger took two prizes at the Electrical Industry Awards. These Awards have long been the annual focal point for the electrical industry recognising as they do the outstanding achievements of companies in the field. To win any of the awards is accolade, but to take the top prizes in both the Power and Test and Measurement categories is remarkable.

Power Product of the Year went to Megger PFL40. The PFL40 range provides all of the facilities needed for cable testing, cable fault diagnosis, pre-location of cable faults, fault conditioning and pinpoint location of faults.



SELECT Electrotechnical Awards 2007

New Product of the Year was won by Megger MFT1553. Downloading test results from a tester to a laptop computer is nothing new – but the new MFT1553 On-site package takes this a step further. Now, it is no longer necessary to have a cabled connection between the tester and the computer and the certificate is filled out on-site.

Electrical Industry Awards 2007

Test and Measurement Product of the Year was won by Megger MFT1553. Instruments that transfer test results automatically to a laptop computer are nothing new – but the new MFT1553 On-site package takes this a step further. Now, it is no longer necessary to have a cabled connection between the test instrument and the computer. With the MFT1553 package, all data is transferred via a wireless Bluetooth connection.

The Awards were judged by a panel of independent experts from such respected bodies as the NICEIC, BEAMA and the ECA, as well as editorial representatives from Electrical Times magazine.

Association of Electrical Contractors (Ireland)

In May the MFT1553 On-site won the Best New Product Award at the AECl in Athlone.

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London W10 6TR, England
Fax.:+44-20-73133191/
E-Mail: mti@multitekintl.com

MPP2000

Megger Pinpointer



- **Universal pinpoint fault location system**
- **Ergonomic, rugged, weather resistant case**
- **Electromagnetic, acoustic and time delay fault location methods**
- **Displays magnetic and acoustic signal levels**
- **Displays relative distance and direction to the fault**
- **Large backlit LCD**
- **Background interference suppression using selectable filters**

DESCRIPTION

The Megger Pinpointer model MPP2000 is specifically designed to accurately and quickly pinpoint faults in underground cable networks. Easy-to-access menus provide advanced users the flexibility and features they desire.

The MPP2000 is housed in a lightweight, ergonomically designed, rugged case that is IP54 rated. The unit can be easily carried “hands free” using the adjustable neck strap. In addition, the instrument can be used with any manufacturer’s surge generator (thumper).

The MPP2000 is used to detect the acoustic and electromagnetic fields. Both fields are generated by the flashover at the point of fault, which has been generated by the HV impulse caused by a surge generator. Detection is via a lightweight ground microphone, which has a physical shield to reduce external wind noise.

For easy interpretation, the receiver’s display shows clear, unambiguous readings. The user interface features standard directional and select arrow keys for easy navigation.

For operator comfort, and for use when the operator is wearing a safety helmet, the MPP2000 is supplied with “behind-the-head” headphones. Active noise-cancelling headphones are available as an optional accessory. Additionally the unit has a built-in “auto mute,” eliminating all ambient noise, which is activated when the ground microphone is raised from the ground.

The unit has an integral loudspeaker, the volume of which can be adjusted for user comfort via the touchpad controls. A single pushbutton “mutes” the output both on the headphones and loudspeaker simultaneously.

The MPP2000 provides:

- Detection of the acoustic discharge (“thump”) and measurement of acoustic signal strength.

- Detection and indication of the electromagnetic signal strength.
- Measurement of time delay between acoustic and electromagnetic signals.
- Indication of the direction to fault.
- Calculated relative distance to fault.

APPLICATIONS

The MPP2000 pinpoints faults in underground power cables using acoustic, electromagnetic and time delay methods, enabling quick and accurate pinpoint location of underground cable faults.

The location of the buried cable is indicated by the intensity of the electromagnetic field produced by the HV pulses of a surge generator. The bargraph indicator of the MPP2000 shows a maximum intensity of the magnetic field directly above the cable, reducing as the operator moves away from the route of the cable.

Accurate and fast fault locating is accomplished using the coincidence measurement of the acoustic signal, in time relation to the electromagnetic signal produced at the “flashover” or point of fault.

The receiver’s display shows the acoustic signal strength and the time delay between the electromagnetic surge and acoustic event.

When directly over the fault, the time difference is at a minimum and the acoustic level is at a maximum. This is especially useful when the cable is in a duct or pipe where the acoustic signal could mislead the operator.



Behind-the-head headphones fit comfortably even when worn with safety helmet.

FEATURES AND BENEFITS

- Lightweight receiver with durable weather-resistant enclosure.
- Comfortable neck strap allowing two-handed operation and “hands-free” carrying of the unit.
- Easy-to-read graphical display of acoustic and electromagnetic signal levels.
- Measures distance to cable fault by calculating electromagnetic surge/acoustic emission, providing fast, accurate fault pinpointing.
- Bargraph magnetic field strength indicator.
- Backlit LCD visible in direct sunlight.
- Behind-the-head headphones.
- A sturdy yet flexible wind guard insulates the ground microphone from ambient noises.
- Durable carrying case holds all components.
- Optional noise-cancelling headphones are available.

SPECIFICATIONS

Operating Mode

Acoustic and electromagnetic pinpoint fault location — coincidence or time delay — pinpoint fault location — relative distance to fault — direction to fault indication

Range

0 to 99.9 ms

Resolution

0.1 ms

Outputs

Loudspeaker
1 x jack for headphones

Volume

Adjustable for both headphone and loudspeaker

Acoustic Gain

Manual

Electromagnetic Gain

Manual

Noise Canceling Acoustic Filters

Digital: (3) HPF, (1) BPF, none

Acoustic Bands

125 Hz to 1.8 kHz

Amplification Acoustic Channel

> 0 to 100 dB

Magnetic Channel

> 0 to 100 dB

Display Range

00.0 ms to 99.9 msec

Overflow Display

“OVFL” for distance values > 100 ms

Frequency Range

120 Hz to 1.8 kHz (acoustic)

Display

Large, easy-to-read 3.5” color LCD with backlight

Power

8 standard alkaline or replaceable lithium AA cell batteries

Battery Life

24 hours continuous usage, alkaline; 30 hours continuous usage, lithium (equates to several weeks/months of normal usage)
>150 hours intermittent, less with backlight enabled

Temperature Range

Operating: -4 to 122° F (-20 to +50° C)
Storage: -40 to 158° F (-40 to +70° C)

Environmental

Rated to IP54

Humidity

95% noncondensing

Dimensions

8 L x 6.5 W x 3.25 H in. (203 L x 165 W x 83 H mm)

Weight

2.15 lb (.98 kg)

ORDERING INFORMATION

Item (Qty)	Cat. No.
MPP2000 Pinpointer	
Included Accessories	
Ground microphone	1001-809
Behind-the-head headphones	90003-250
Carry strap	6220-780
MPP2000 (complete) Carry Case	2002-119
“AA” battery (8 required)	23415
Instruction manual MPP2000	81395
Optional Accessory	
Noise-cancelling headphones	36162

ISO STATEMENT

Registered to ISO 9001:2000 Reg. No. Q 09250
Registered to ISO 14001 Reg. No. EMS 61597

MPP2000_DS_US_V01

Megger is a registered trademark.
Specifications subject to change
without notice.

L1070 and L1071 Portable Locator



- **Multiple frequencies**
- **Transmit/receive frequency**
(815 Hz, 8 kHz, 82 kHz)
- **SONDE support**
- **Peak and null detection**
- **Passive 60 Hz**
- **Measures current flow in buried conductors**
- **Transmitter variable output power levels**
- **Push-button depth measurement**

DESCRIPTION

Unparalleled in capability, the L1070 and L1071 Portable Locators locate buried cable and pipe in various situations. Capable of locating long or short ranges, inductive or conductive, active or passive, the units deliver quick and accurate results with a user-friendly interface. Whereas the L1070 uses a disposable battery type, the L1071 requires a rechargeable one.

Operating the receiver at multiple frequencies optimizes performance for the specific needs of the user. Low frequency of 815 Hz provides longer range and reduced errors from adjacent cables, ideal for electric power services. High 82 kHz frequency will path locate past bad telephone bonds, locate underground stubs and permit inductive locating with either the optional flexible coupler or direct soil induction. A special design feature on both units allow the user to select and compare receiver information on two frequencies simultaneously, without having to return to the transmitter. Excellent passive 50/60 Hz locating will pinpoint active power lines and other utilities where AC is present without the use of the transmitter.

The portable locator also features SONDE detection and locating. By selecting this feature, the user is able to choose a SONDE that will match the same frequency and the receiver.

APPLICATIONS

Flexibility remains the key strength of reaching difficult, multi-point, grounded utility locating applications. Combining high power at low frequency virtually eliminates the false coupling into adjacent objects and allows the high transmitter power to burn a signal past

several grounds and into multiple distributed grounds. Multi-grounded electrical distribution service, continuously grounded water pipes, multi-grounded telephone shield wiring, highly capacitive, cathodically protected coated gas pipes and CATV systems all benefit from the flexibility of the L1070 and L1071.

Conductor current readout on the units give the user information on the amount of current flowing on the target conductor with correction for changes in depth. To trace the direction where the transmitter signal is divided or where it goes into the soil at an insulation ground fault, press the CURRENT button. This feature is useful in cathodically protected systems with ground faults.

An optional ground return probe allows ground fault detection on unshielded electric services or sheath faults on telephone services through the technique of voltage gradient.

FEATURES AND BENEFITS

- Multiple transmit/receive frequencies provide accurate long or short range locates.
- Push-button depth measurements up to 15 ft (4.6 m) quickly identify service depths prior to digging.
- Passive 60 Hz detection serves as an excellent safety feature for identifying live underground primary and secondary utility cables.
- AC circuits in common trench situations. Passive detection also allows convenient locating of energized electric services.
- High power at low frequency solves the difficult multi-point grounded utility locating problem.

SPECIFICATIONS

Transmitter

Operating Frequency: 82 kHz, 8 kHz, 815 Hz, and BOTH (815 Hz/82 kHz) simultaneously

Indicators

AC Load Resistance Measurement, Low Bat Indicator, Low Bat warning modulated on output signal every 20 seconds

Load Matching: Automatic from 5Ω to 2000Ω

Output Power

815 Hz and 8 kHz

Normal 0.6 W

High 2.0 W

82 kHz

Normal 0.2 W

High 1.0 W

BOTH (815 Hz/82 kHz)

Normal 0.12 W + .06 W

HIGH 1.33 W + 0.67 W

Battery Type

Disposable (Used in L1070)

Eight 1.5 V D size alkaline

Rechargeable (Used in L1071)

12 V, 7 Amp-Hour maintenance free, sealed lead-acid includes 120 V ac wall-mount charger for overnight charging. Optional 12 V automotive power pack for fast charging, or powering unit from a vehicle cigarette lighter jack.

Battery Life

Disposable

Continuous: 8 to 15 hours depending on load, frequency and power setting

Intermittent: 40 to 60 hours depending on load, frequency and power setting, 25% duty cycle average.

Rechargeable

Continuous: 10 to 20 hours depending on load, frequency and power setting

Intermittent: 50 to 70 hours depending on load, frequency and power setting, 25% duty cycle average.

Operating Temperature Range

-4° to +133° F (-20° to +55° C)

Dimensions

6.5 H x 6.32 W x 16 L in.

(15.2 H x 12.7 W x 40.6 L cm)

Weight

8 lb (3.6 kg) with alkaline D cells

11.5 lb (5.2 kg) with rechargeable batteries

Receiver

Operating Frequency: 815 Hz, 8 kHz, 82 kHz, 50/60~(PASSIVE)

Antenna Mode

Null-responding vertical coil

Peak-responding horizontal coil

Audio Indication: Variable pitch response on all frequencies

Current Measurement

Display indicated relative current simultaneously between any two selected cables for target cable verification in a multi-conductor environment

Operating and Storage Temperature Range

-4° to +133° F (-20° to +55° C)

Battery Type: Six 1.5 V C size alkaline

Battery Life

Continuous: 40 hours

Intermittent: 82 hours

Auto power shutoff after 10 minutes of nonuse

Signal Strength

Analog LCD Bargraph. Absolute Digital Signal Strength readout from 0 to 999

Gain Control: Up/Down button for automatic centering and manual control

Manual

Bubble-level triangulation for verification of automatic readout in congested environments. **Note:** Accuracy is dependent on site conditions, nonconcentric conductor shape, number of nearby conductors, and soil return currents.

Dynamic Range: 126 dB

Depth Measurement

Automatic: Push-button 3 digit readout to 15 ft in feet/inches, (optional meter/centimeters to 4.6 m)

Dimensions

9.4 H x 3.75 W x 30.3 L in.

(23.8 W x 9.3 W x 76.9 L cm)

Weight: 3 lb (1.36 kg)

ORDERING INFORMATION

Item (Qty)	Cat. No.
L1070 Portable Locator	651070
L1071 Portable Locator	651071
Included Accessories	
L1070: Receiver, transmitter, red/black cord, batteries, ground rod, instruction manual and soft carrying case	
L1071: Receiver, rechargeable transmitter, red/black cord, batteries, ground rod, AC charger, instruction manual and soft carrying case	
Optional Accessories	
Folding ground return probe (grounded fault locator)	651075
Flexible coupler (Inductive Coupler)	651076
DC charger (automotive) used with 651071	651078