

SMART THUMP SERIES

Cable fault location system

Megger



M1, M2, M3

M4, M5

M8, M9

M10

- Delivers 1,500 J at 8/16 kV & 1,600 J at 12.5 / 25 kV
- 20 kV or 30 kV DC high voltage proof/burn and displays insulation resistance
- E-TRAY automatic test sequence and data interpretation
- Automatic cable end identification
- Automatic ARM fault pre-location with multishot technology
- ARC & ICE MV cable prelocation
- Earth gradient LV fault locating and sheath fault locating
- IP53 rating for wet environments
- Portable with battery and AC line operation or truck mountable
- F-OHM safety feature ensures operator safety
- 7" HiBrite color display for outdoor visibility

DESCRIPTION

The SMART THUMP series are portable or vehicle-mounted Cable Fault Locating Systems that provide safe, efficient and extremely easy-to-use solutions for quickly identifying, prelocating and pinpointing various types of cable faults in power cables.

The SMART THUMP series is developed to meet the requirements of the medium-voltage distribution cable fault location market from 11 to 35 kV.

The SMART THUMP line incorporates E-TRAY technology. This technology guides the operator through the fault locating process. A step by step methodology that starts with a Hipot test, that identifies the type of fault as well as the breakdown voltage. The E-TRAY then proceeds to a TDR test that automatically identifies the length of the cable. Then the E-TRAY automatically proceeds to a prelocating. Automatically identifying the location of the fault. Then it automatically proceeds to surge testing, allowing you to pinpoint the fault. Simple, easy cable fault locating that reduces the time to locate a fault. This reduces the amount of surges on the cable which reduces the stress on the cable.

The SMART THUMP series also supports, sheath testing, LV cable fault locating as well as network sectionization. One product can perform many functions.

FEATURES

- Fully integrated system can be operated from either its internal battery/inverter, external 12 V_{DC} or 120/230 V_{AC}
- E-TRAY Quick-step mode provides simple GUI. Ideal for operators who do not use the equipment on a regular basis.
- E-TRAY Expert mode supports maximum functionality and versatility. Ideal for expert operators.
- E-TRAY provides an automatic fault locating procedure. Starting with hipot testing, continuing with the prelocation and pinpointing.
- Simple E-TRAY controller operation with a single rotary control knob.
- Automatic end of cable and distance to fault detection.
- Automatic optional sectionalizing. Quickly identify what section of cable has the fault in downtown branched networks.
- Automatic breakdown detection.
- Sheath fault testing
- LV ground fault locating in sheath mode.
- Rugged, lightweight, high impact and weather resistant IP53 designed enclosure.
- Key switch safety interlock standard (available also without).
- F-OHM feature ensures operator safety.

APPLICATIONS

Safety

Performing cable fault locating can be hazardous. Working with high voltages at high energies can be life threatening when not performed properly. The SMART THUMP not only has safety interlocks and requires the user to knowingly activate high voltage, but it also has an F-Ohm feature. This feature ensures there is no difference of potential between earth and return. Areas with poor grounds can lead to a difference of potential between the earth and return. This can lead to an operator being shocked! The F-Ohm feature identifies this potential and prevents the operator from being exposed to this hazard.

Insulation testing

The built in Hipot feature is used to test the dielectric strength of the cable or sheath insulation. An insulation test helps determine the type of fault a cable may have; shorted, open, a flashing fault, or excessive leakage. If the cable has a flashing fault, the SMART THUMP will automatically identify the breakdown voltage.

Prelocation

After identifying the type of fault, the SMART THUMP automatically starts a prelocating process. A TDR test will be run. The SMART THUMP will automatically identify the end of the cable and report the cable's length.

This can identify the location of shorted or open cables. Once the end of the cable is identified, the SMART THUMP will automatically proceed to performing an ARC reflection test. A pulse is released into the cable. This creates a flashover at the point of failure. The TDR, using a Multishot technology,

then automatically identifies the distance to the fault. The Multishot technology allows the TDR to take hundreds of reflection measurements. The software will then automatically identify the best trace, and will identify the location of the fault. This multishot technology provides a more accurate prelocating, reduces the possibility of poor trace results with difficult interpretations.

Pinpointing

Once the fault has been prelocated, the SMART THUMP will automatically proceed to the pinpointing function. A surge current is pulsed through the cable, which creates a "thumping" sound. This allows operators to pinpoint the location of the fault.

The optional digiPHONE+2 can be used to locate the fault more accurately and quicker. The quicker the fault is located, the less the cable is stressed. When surge currents are injected in a cable, this not only creates a flashover at the point of the fault, but it will create small amounts of partial discharge across voids in the cable insulation. This overtime will degrade the cable, eventually leading to more faults. The faster the pinpointing the better for the cable.

The digiPHONE+2 uses the "Thunder & Lightning" method. It first picks up the magnetic wave caused by the surge, then it picks up the acoustic wave. Since both of these waves move at different predictable speeds, the digiPHONE+2 can measure the time interval between them and determine the distance to the fault. This way, reflected sound waves, such as those in conduits do not affect its measurements.

Applications	SMART THUMP 16	SMART THUMP 25
MV buried cable fault locating	up to 35 kV	up to 35 kV
EPR, XLPE, PILC and mixed	✓	✓
Sizes between #2 and 1000 MCM (34 mm ² to 500 mm ²)	✓	✓
Circuit lengths from a few hundred feet up to a max of 170,000 ft (52 km)	✓	✓
LV shielded buried cable fault locating	✓	✓
LV unshielded cable fault locating	✓	✓
Sectionalizing networks	up to 16 kV	up to 25 kV
Solar buried and tray cable fault locating	best	good
Insulation testing	20 kV	30 kV
TDR (Time Domain Reflectometry)	✓	✓
Burning cables	60 mA	40 mA
Sheath testing	✓	✓

Specifications	SMART THUMP 16 8 kV / 16 kV	SMART THUMP 25 12.5 kV / 25 kV
Supply		
AC supply	AC line: 120/230 V, 60/50 Hz	
Power consumption	700 W	
Battery	Battery: Internal 12 V, 74 Ah deep cycle	
Battery charge	>90 min (pinpointing at full energy)	45 min (pinpointing at full energy)
Battery charger	Internal	
Battery recharge	10 - 12 h	
External 12V DC	✓	
Features		
Hipot	20 kV	30 kV
Burning	60 mA	40 mA
TDR	On-screen comparison of upto 256 pairs	
TDR range	Up to 170,000 ft / 52 km	
TDR sampling rate	100 Mhz	
TDR resolution	2.5 ft @ 250 ft / fs (0.8m @ 80 m/μs)	
Automatic end of cable and distance to fault indication	✓	
Arc Reflection	Single shot surge, multishot TDR, 0 - 8 / 0 - 16 kV	
ARM and ICE	✓	
Surge	0 - 8 / 16 kV @ 1,500 J	0 - 12.5 / 25 kV @ 1,600 J
Impulse sequence	5 - 9 seconds	
Sectionalization	Optional	
Sheath testing and sheath fault locating	✓	
E-TRAY (<i>step by step customizable fault locating</i>)	✓	
Hardware		
Display	7in (17.78 cm) HiBrite TFT color LCD 1280 x 800 pixel	
Memory	100 traces	
Interface	USB port	
Terminations	T9	
Termination Kits		
North American hot line clamps	✓	
Vice grip clamps	✓	
Battery clamps	✓	
Dimensions (W x H x D) (<i>include top-mounted cable pouch</i>)	M1/3 model: 27 x 49 x 24 in. (686 x 1244 x 609 mm) M4/5 model: 20 x 39 x 16 in. (508 x 990 x 406 mm) M8 model: 20 x 432 x 14 in. (508 x 794 x 356 mm) M9 model: 20 x 32 x 18 in. (508 x 794 x 457mm) M10 model: 20 x 27 x 14 in. (508 x 686 x 356 mm)	
Weight	M8/M10 model 147 lbs (67 kg) M5 model 210 lbs (95 kg) M1 model 270 lbs (120 kg)	
Safety		
Emergency OFF mushroom button	✓	
Key-switch interlock, Standard (available without)	✓	
F-Ohm interlock detection/indication "safe connections"	✓	
Interface for remote EMERGENCY OFF box	✓	
Environmental		
Operating temperature	-20°C to +50°C (-4°F to +122°F)	
Storage temperature	-25°C to +65°C (-13°F to +149°F)	
IP rating	IP53 (with top open)	

SMART THUMP 16-20 PART NUMBER CONFIGURATOR

Example: ST16V2 - M M1 50 T9 S

Model # ST16V2 - M M1 50 T9 S

Base model

ST16V2 -

Enclosure configuration / mounting

M1 = Cart mounted, 15" air tires, AC, internal 12V battery and inverter, external DC, integrated E-TRAY control / TDR
M2 = Cart mounted, 15" air tires, AC, Isolation transformer, internal inverter external DC, integrated E-TRAY control / TDR. No battery
M3 = Cart mounted, 15" air tires, AC only, Isolation transformer, internal inverter external DC, integrated E-TRAY control / TDR.
M4 = Truck mount, AC, with isolation transformer, internal inverter, external DC, integrated E-TRAY control / TDR
M5 = Truck mount, AC only, with isolation transformer
M8 = Flat top truck mount, AC only, no isolation transformer, integrated E-TRAY control / TDR
M9 = Flat bottom portable, AC only, no isolation transformer, integrated E-TRAY control / TDR
M10 = M10 Low profile truck mount, AC only, 12ft (3.6m) remote TDR / E-TRAY in pelican case.

Optional - S/W functionality

S = Transformer sectionalizing*

* Only application with North American networks

Test lead termination style

T9 = 10 mm MC connectors

HV Test / Safety ground lead cable length

12 = 12ft (3.6m) cable length.
(Not available with M1-M3 variants)

25 = 25ft (7.6m) cable length

50 = 50ft (15.2m) cable length

100 = 100ft (30.4m) cable length

NOTE: M8 and M10 truck mount in 12 foot (3.6m) only and M9 portable in 25ft (7.6m) only

SMART THUMP 25-30 PART NUMBER CONFIGURATOR

Example: ST25 - M M1 50 T9 M S

Model # ST25 - M M1 50 T9 M S

Base model

ST25 -

Output voltage control

M = Manual mode*

* Factory default setting (no option)

Enclosure configuration / mounting

M1 = Cart mounted, 15" air tires, AC, internal 12V battery and inverter, external DC, integrated E-TRAY control / TDR
M2 = Cart mounted, 15" air tires, AC, Isolation transformer, internal inverter external DC, integrated E-TRAY control / TDR. No battery
M3 = Cart mounted, 15" air tires, AC only, Isolation transformer, internal inverter external DC, integrated E-TRAY control / TDR.
M4 = Truck mount, AC, with isolation transformer, internal inverter, external DC, integrated E-TRAY control / TDR
M5 = Truck mount, AC only, with isolation transformer
M8 = Flat top truck mount, AC only, no isolation transformer, integrated E-TRAY control / TDR
M9 = Flat bottom portable, AC only, no isolation transformer, integrated E-TRAY control / TDR
M10 = M10 Low profile truck mount, AC only, 12ft (3.6m) remote TDR / E-TRAY in pelican case.

Optional - S/W functionality

S = Transformer sectionalizing*

* Only application with North American networks

Test lead termination style

T9 = 10 mm MC connectors

HV Test / Safety ground lead cable length

12 = 12ft (3.6m) cable length.
(Not available with M1-M3 variants)

25 = 25ft (7.6m) cable length

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100 = 100ft (30.4m) cable length

NOTE: M8 and M10 truck mount in 12 foot (3.6m) only and M9 portable in 25ft (7.6m) only

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Model	M1	M2	M3	M4	M5	M8	M9	M10
Mount	Portable cart mount 15" air tires			Truck mount		Flat bot- tom truck mount	Flat bottom portable	Low profile truck mount
Internal 12 V battery	✓	✗	✗	✗	✗	✗	✗	✗
Internal inverter	✓	✓	✗	✓	✗	✗	✗	✗
External AC	✓	✓	✓	✓	✓	✓	✓	✓
External DC	✓	✓	✗	✓	✗	✗	✗	✗
Isolation transformer	✗	✓	✓	✓	✓	✗	✗	✗
Integrated E-TRAY	✓	✓	✓	✓	✓	✓	✓	✓
Integrated TDR	✓	✓	✓	✓	✓	✓	✓	✓
								

Required accessories – YOU MUST CHOOSE ONE TERMINATION KIT!		Order No.
North America (US,CA,MX) termination kit		1015-525-US
All other countries termination kit		1015-526-AOC
Vice grip termination kit		1015-525-VG

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Optional accessories		Order No.
Elbow adapter 15kv 10 mm connector for T9 terminations		1013-514
Elbow adapter 25kv 10 mm connector for T9 terminations		1013-515
Elbow adapter 35kv 10 mm connector for T9 terminations		1013-516
Elbow adapter 35kv 10 mm connector for T9, ESNA		1013-517
15 kV probe adapter, w/10 mm male MC connector for T9 terminations		1013-518
25 kV probe adapter, w/10 mm male MC connector for T9 terminations		1013-519
35 kV probe adapter, w/10 mm male MC connector (fits Elastomold bushing), compatible with HV "T9" terminations		1013-520
35 kV probe adapter, w/10 mm male MC connector for T9, Cooper bushing.		1013-521
Portable equipment safety ground cable reel 13" high X 10-1/2". 130 ft		P1G130T9
Portable equipment safety ground cable reel 13" high X 10-1/2". 50 ft		P1G50T9
Portable equipment safety ground cable reel 13" high X 10-1/2". 85 ft		P1G85T9
Portable high voltage cable reel with HV return, 18" high X 20". effective width with 130' of HV cable. Compatible with T9 terminations.		P1H130T9
Portable high voltage cable reel with HV return, 18" high X 20". effective width with 50' of HV cable. Compatible with T9 terminations.		P1H50T9
Portable high voltage cable reel with HV return, 18" high X 20". effective width with 85' of HV cable. Compatible with T9 terminations.		P1H85T9
Large hastings clamp for large conductor sizes, with pigtail and 10 mm male MC connector compatible with HV T9 terminations		1013-526
Remote emergency OFF box*		2010012
*Connecting cable for remote emergency OFF box (required for remote emergency box)		890024896

Optional accessories		Order No.	
2-reel cable rack for vehicle mounting. Reels for HV cable, safety ground or AC line cord. 130 ft for T9 terminations.		R2H130T9G130	
2-reel cable rack for vehicle mounting. Reels for HV cable, safety ground or AC line cord. 85 ft for T9 terminations.		R2H85T9G85	
3-reel cable rack for vehicle mounting. Reels for HV cable, safety ground and AC line cord. 130 ft for T9 terminations.		R3H130T9G130A130	
3-reel cable rack for vehicle mounting. Reels for HV cable, safety ground and AC line cord. 85 ft for T9 terminations.		R3H85T9G85A85	
T9 Adapter		The kit includes	Order No.
T9 unit with T1 reel This is a kit of 2 adapters that will allow an operator to use T1 cable reels with a T9 CFL unit.		10mm Male to 14mm Male (1008-201)	1017-134
		10mm Female to C Ring (1013-729)	
T1 unit with T9 reel This is a kit of 2 adapters that will allow an operator to use T9 cable reels with a T1 CFL unit.		14mm Female to 10mm Female (1008-203)	1017-135
		Stud to 10mm Male (1017-133)	
T9 Unit with T4 reel This is a single adapter that is required when the operator wants to use a T4 reel with a T9 CFL unit.		10mm Female to 10mm Female	1016-605
T4 unit with T9 reel This is a single adapter that is required when the operator wants to use a T9 reel with a T4 CFL unit.		10mm Male to 10mm Male	1017-132
T9 unit to 14mm T1 Elbow This adapter is required when the operator wants to use a T9 CFL unit		10mm Male to 14mm Male	1008-201
T1 to 10mm T4 Elbow This adapter is required when the operator wants to use a T1 CFL unit with a 10mm T4 elbow.		14mm Female to 10mm Female	1008-203