



**VERY LOW FREQUENCY AC HIPOT**

# Diagnostic testing for cables rated to 25kV

## TD-34E

### Features and Benefits

The High Voltage, Inc. TD-34E Tan Delta bridge is designed to work with and communicate wirelessly via the XBee protocol to the VLF-34E to form a complete cable diagnostic system. Together they offer high end features such as wireless communication, data acquisition, and report generation using the supplied E-Link PC software. This system is designed to perform Tan Delta testing, also known as Tan  $\delta$ , Dissipation Factor or Loss Angle on 5 to 25kV primary cables to the worlds standards; IEEE 400, IEEE 400.2, IEEE 433, DIN VDE 0276, CENELEC HD620 S1, NEETRAC CDFI, & others. Tan Delta testing is a non-destructive diagnostic test performed to measure the degree of deterioration of shielded MV/HV cable insulation. The results reveal how contaminated, damaged, or water tree strewn the insulation has become. Tan Delta testing is performed with the cable off-line where an AC power source, in this case a very low frequency (0.1Hz) hipot, provides the test voltage to the cable while the Tan Delta device records the results. The test voltage is increased in steps while readings are monitored to avoid possible cable failure should the TD numbers indicate severe degradation.



**Model TD-34E**



**Model VLF-34E**

Intuitive menu driven user interface.



TD-34E VLF-34E VLF-65E TD-65E

### Specifications



<b>Input</b>	Two Alkaline "D" cell batteries required – Four supplied NiMH rechargeable "D" cell batteries acceptable – Not included
<b>Metering</b>	Voltage: 1-34kVp(24kVrms), $\pm 1\%$ Accuracy, 0.1kV Resolution Current: 0-21mA <sub>p</sub> (15mA <sub>rms</sub> ), $\pm 1\%$ Accuracy, 1uA Resolution Tan Delta: 0.1Hz -0.01Hz, 5nF-10uF, $1.0 \times 10^{-4}$ Accuracy, $1.0 \times 10^{-5}$ Resolution
<b>PC Interface</b>	XBee 802.15.4 (wireless, ~30ft range)
<b>PC Software</b>	E-Link remote control and report generation software
<b>Cable Lengths</b>	20ft/6.1m VLF output cable terminated with MC connector, 10ft/3m TD output lead terminated with red banana clip, 20ft/6.1m green/yellow test lead, 2in/51mm x 5in/127mm toroid, 1 1/2in/38mm aluminum ball with banana socket
<b>Size</b>	TD Transducer: 10in/254mm x 4.5in/114mm x 3in/76mm TD Carrying Case: 14in/355mm x 12in/305mm x 6in/152mm Accessory bag w/ Tripod: 15in/381mm x 5in/127mm x 12in/305mm
<b>Weight</b>	TD Transducer: 7lb/3.2kg TD w/ Carrying Case: 12lb/5.5kg Accessory bag w/ Tripod: 10lb/4.5kg

### Condition Assessment Criteria

Condition Assessment	No Action Required			Further Study Advised			Action Required		
	No Action Required	Further Study Advised	Action Required	No Action Required	Further Study Advised	Action Required	No Action Required	Further Study Advised	Action Required
Insulation Type	PE Based Insulation (PE, XLPE, WTRXLPE)			Unidentified Filled Insulation (EPR)			Mineral Filled Insulation (EPR)		
Stability for TD (Standard Deviation)	< 0.05	0.05 to 0.5	> 0.5	> 0.1	0.1 to 1.3	> 1.3	< 0.1	0.1 to 1	> 1
	And	Or		And	Or		And	Or	
Tip Up (TD1.5U0 – TD0.5U0)	< 5	5 to 80	> 80	< 5	5 to 100	> 100	< 4	4 to 120	> 120
	And	Or		And	Or		And	Or	
Mean TD @ U0	< 4	4 to 50	> 50	< 35	35 to 120	> 120	< 20	20 to 100	> 100

\*All numerals are  $10^{-3}$  per Section 5, Tables 4 & 5 of IEEE 400.2-2013