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MEDTEQ
Medical Device
Test Equipment
Education
Qualification

MEDTEQ High Frequency Insulation Tester – HFIT 7.0

Introduction

Designed according to IEC60601-2-2:2009, the MEDTEQ HFIT 7.0 outputs a variety of high frequency high voltage waveforms for testing HF dielectric strength and HF cable leakage current.

Five microprocessor controlled modes are provided, three with adjustable crest factors, allowing the unit to cover voltages from 200Vrms to 7200Vpeak, and crest factors from 1.4 to 7.0.

The output waveforms are similar to the cut, burst and coagulation waveforms from a typical electrosurgical device, but with far greater stability and range of adjustment. This makes testing to the standard not only simple, but allows the manufacturer to carefully investigate the properties of insulating materials at high frequency. Some properties such as dielectric heating can be very different at high frequency comparing to tests at mains frequency.

The equipment also incorporates a 1000:1 high voltage divider, specially designed for high accuracy in the 300-500kHz region, and a current shunt to allow monitoring of the HF leakage. This eliminates the need for expensive and often inaccurate external probes.

Scope of tests

The test in IEC 60601-2-2 covered by the HFIT 7.0 are:

Clause 201.8.8.3.102 Active Accessory HF leakage (cords / cables)
Clause 201.8.8.3.103 Active Accessory HF dielectric strength
Clause 201.15.101.4 NE cord insulation (HF cable leakage, HF dielectric strength)

Tests for active electrodes are also referred to in the standard IEC 60601-2-18 for endoscopic equipment. The equipment is also suitable for testing older versions of IEC 60601-2-2 and IEC 60601-2-18.

Key Features / benefits:

- Output up to 7200Vp (covers insulation ratings up to 6000Vp)
- Test loads up to 100pF[1] (typically equivalent to around 40-80cm cable in saline)
- Five modes: Sine / Modified Sine / Burst / Pulse Low / Pulse High
- Overlapping modes, adjustable crest factors ensuring required crest factors easily obtained
- Inbuilt 1000:1 high voltage high frequency divider, accurate to ±2%
- Inbuilt 1Ω high frequency current shunt, for leakage current monitoring
- Customized versions available with lower peak / higher capacitive load (e.g. 3.5kVp, 400pF)
- Overvoltage, overload, short circuit and overtemperature protection
- Zero start interlock (for operator protection)
- External 48Vdc 3A power supply, worldwide approvals (100-240Vac input / 50-60Hz)

[1] Higher load capacity with lower voltage available

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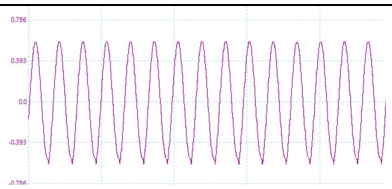
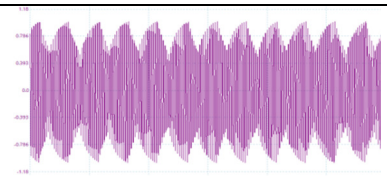
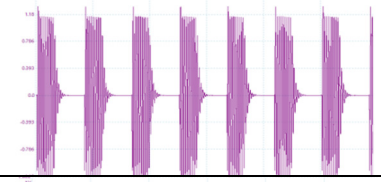
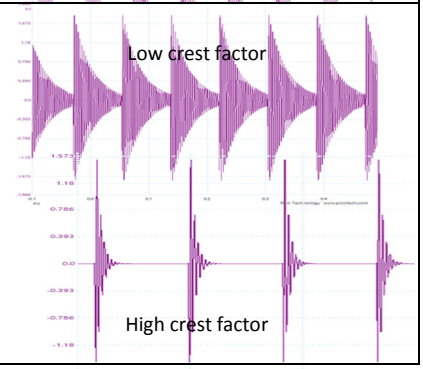
Key waveforms

Mode	Peak voltage (Vp)	Crest factor (range*)	Description	Waveform
Sine	1600 (1200 Vrms)	1.4	Essentially sinusoidal, intended for cable leakage The low crest factor also allows study of dielectric heating independent of other effects like corona discharge.	
Modified sine	2000	1.8	Amplitude modulated to obtain a slightly higher crest factor than a sine wave, to fit insulation ratings between 1400Vp and 1600Vp.	
Burst	3500	2.0-6.0	Bursts of sine waves, with adjustable duty cycle to create a wide range of crest factors. The burst repetition rate is fixed at 12kHz	
Pulse Low	5000	4.0 - 6.0	Decaying sine waves, pulse repetition rate fixed at 12kHz, with adjustable “damping” time to create low and high crest factors.	
Pulse High	7200	4.0 - 6.0	Decaying sine waves, pulse repetition rate fixes at 11.7kHz, with adjustable “damping” time to create low and high crest factors.	

Other specifications

- 1000:1 high voltage divider, frequency range 300-500kHz, ±2% accuracy
- 1Ω±2% shunt, bandwidth
- Overvoltage monitor (trigger point 1250Vrms)
- Overload detection (output remains on, but audible alarm indicated)
- Over temperature protection (also triggers on extended short circuit, 30s or more)
- 100-240Vac, 150W external power supply (48Vdc 3A)

Contact details

For sales and technical: equipment@medteq.jp