JP30A: 30kV DC Insulation Tester

Non-Destructive
Compact and light-weight with testing voltages up to 30 kV

Test & Measurement

Danbridge

- ***Minimal Discharge Energy:***
  Output current limited to protect personnel
- ***Guard Terminal:***
  Prevents stray currents from Influencing leakage current measurements
- ***Adjustable Output Voltage:***
  The test voltage is continuously variable from almost zero to maximum output voltage
- ***Audible Ionisation Detection:***
  With Active LP-Filter and Built-in loudspeaker
- ***Effective Output Ionisation Limitation:***
  Essential for testing delicate circuits. No damage to the material if partial break-down or flash-over should occur
- ***External Output:***
  For meter voltage indication and recording.
- ***External HV switch:***
  Panel connector for external switching
- ***Useable as kV Meter***

General:
The use of DC high-voltage testing has a lot of advantages compared to AC testing when used in production for quality control, for design and component evaluation and also for maintenance and fault location in the service department.

DC testing indicates the quality of the insulation, thereby predicting the lifetime of the DUT (Device Under Test).

When equipment breaks down during a DC high-voltage test, the failure takes place at the defective part of the insulation. Because of the limited current (150-200 uA) the JP30A will deliver only a few watts of energy at the faulty place, and the DC test is therefore truly non-destructive.

Types of DC High-Voltage Tests:
High voltage tests may be classified according to the point in the lifetime of the device when the test is performed. Design and factory tests are undertaken to ensure an adequate level of quality. The factory tests must both meet the design and the production requirements. When the equipment is installed and put into service an acceptance test and a proof test can be carried out. Finally, high voltage tests such as maintenance tests and fault location tests are made to service the equipment or to pinpoint the location of a hidden defect.

Insulation Failure:
Insulation failure is a normal result of ageing. Electrolytic and chemical destruction may take place; absorption of moisture, and physical damage may cause insulation break-down, or dirt, metallic dust or other foreign materials may contaminate the insulation surface. High operating temperature is another typical cause of rapid insulation ageing.

The Immediate Effect of Poor insulation:
The immediate effect of poor insulation is either an increase in leakage current or a decrease in insulation break-down strength. Increased leakage current through weakened or damaged insulation causes increased heating, which in turn accelerates insulation break-down. Voltage transients can cause complete failure or break-down. Insulation may be tested in several ways, namely by measuring the leakage current, the break-down voltage or by determining whether the insulation can withstand greater than normal operating voltages.

Break-down and Ionisation Phenomena
An easy way to check the quality of insulation material is to expose it to a high DC voltage. In all kinds of insulation material there is a number of free electrons, which accelerates under influence of the electrical field created by the high DC voltage. A weak current in the material occurs, the so-called leakage current. Finally, when the DC voltage exceeds a certain value, the electrons gain velocity and energy to such an extend, that they are able to generate more free electrons. This is termed the ionisation phenomenon. The number of free electrons rises exponentially with time, and if there were no current limitation incorporated in the test instrument, the current would rapidly become so great, that the insulation material would be destroyed.

JP30A: 30kV DC Insulation Tester

Specifications

A typical leakage current vs. test voltage diagram

Fig. 1 The curve is linar from 0 to A. Beyond A, ionisation begins and raises. Breakdown accors at C.

Fig. 2 In some insulation materials the breakdown point is as shown in fig. 2, where no ionisation can be detected and break down occurs without warning

Fig. 1

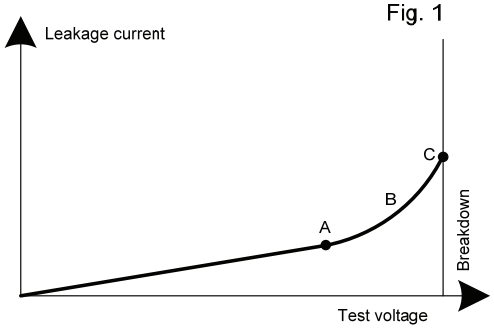
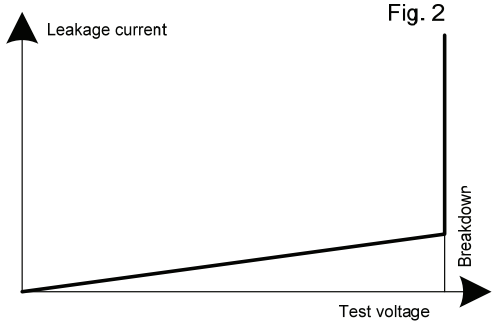


Fig. 2



General	
Stability	Output voltage varies less than ±1% for supply voltage variations of ± 10%
Ionisation Indication	An active L.P. Filter in series with an integrated audio amplifier feeds a loudspeaker providing an audible ionisation indication. Amplifier gain is adjusted with a potentiometer. An output panel connector provides external indication on headphones or on an oscilloscope. Min. load 100Ω
Meter Outputs	5V full-scale meter outputs are provided on a panel connector min. load 10kΩ
Guard terminal	For connection to guard electrode. Current to this terminal bypasses the current meter
Specifications	
Test Voltage	0-3kV, 0-10kV and 0-30kV DC, adjusted by the means of a 10-turn potentiometer. Test voltage is applied to an insulated test probe via a shielded coaxial cable. Two interchangeable probe tips are supplied with the test probe. One ball pointed for the use from 10kV and one Arrow straight tip for 0-12kV applications. + voltage on the tip is standard
Test Voltage Switch	The high tension is switched on with the H.T. switch located on the front panel. A panel connector for external switching is also located on the front panel
Voltmeter	Three ranges 3kV, 10kV and 30kV full scale. Accuracy ± 5%
Max. Output Current	Approximately 150µA @ 30kV increasing to 200µA @ 8kV, decreasing to 100µA @ 2kV And decreasing to ≥ 2µA when shortened
Current Meter	Three ranges 1µA - 10µA - 100µA full scale . Accuracy ± 5%
Resolution	10nA (1nA with 9400400 Modification JP3X w. x10 Amplification)
Output Resistance	Approximately 600kΩ from 30kV to 10kV, 200kΩ from 10kV to 3kV, 60kΩ from 3kV to 2kV measured by Iout = 100µA
Power supply	100-130V and 200-260V AC 45-400Hz, 15-30VA, depending on output voltage and current
Environment	10- 30 Degrees Celsius
Ordering information	
JP30A	Item no: 8360406 30kV DC Insulation Tester for 110-240V AC NATO Stock No: 6625-22-305-8880
Options	Item no: 5902700 Carrying Bag JP3X (requires 3754600) Item no: 3754600 19" Rack-mounting kit for JP3X Item no: 9400200 Modification JP30A Negative Voltage (HV output) Item no: 9400300 Modification JP3X Current Limiter (for pos. HV output) 1) Item no: 9400900 Modification JP30A Current Lim. and Neg. Out. Voltage 1) Item no: 9400400 Modification JP3X w. x10 Amplification (current meter, 100nA FS) 1): current limit: 25% - 50% - 75% and 100% of standard limit.
Spare parts	Item no: 9316200 Test Cable w. Probe JP3X - 6k8ohm (incl. 5760100 and 5760200) Item no: 9316500 Test Cable w. Probe JP3X - 100Mohm (incl. 5760100 and 5760200) Item no: 5760100 Probe Tip Pointed for test probe Item no: 5760200 Probe Tip Round for test probe Item no: 9316600 Crocodile Clip 4mm w. Protection Tube for Test probe
Dimensions	Instrument: HxWxD: 148mm × 438mm × 300mm Net. Weight: 6.2kg Export Packing HxWxD: 30cm × 56cm × 51cm Weight: 14 kg

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JP36A: 36kV DC Insulation Tester

Non-Destructive
Compact and light-weight with testing voltages up to 36 kV

Test & Measurement

Danbridge

- ***Minimal Discharge Energy:***
  Output current limited to protect personnel
- ***Guard Terminal:***
  Prevents stray currents from Influencing leakage current measurements
- ***Adjustable Output Voltage:***
  The test voltage is continuously variable from almost zero to maximum output voltage
- ***Audible Ionisation Detection:***
  With Active LP-Filter and Built-in loudspeaker
- ***Effective Output Ionisation Limitation:***
  Essential for testing delicate circuits. No damage to the material if partial break-down or flash-over should occur
- ***External Output:***
  For meter voltage indication and recording.
- ***External HV switch:***
  Panel connector for external switching
- ***Useable as kV Meter***

General:
The use of DC high-voltage testing has a lot of advantages compared to AC testing when used in production for quality control, for design and component evaluation and also for maintenance and fault location in the service department.

DC testing indicates the quality of the insulation, thereby predicting the lifetime of the DUT (Device Under Test).

When equipment breaks down during a DC high-voltage test, the failure takes place at the defective part of the insulation. Because of the limited current (150-200 uA) the JP36A will deliver only a few watts of energy at the faulty place, and the DC test is therefore truly non-destructive.

Types of DC High-Voltage Tests:
High voltage tests may be classified according to the point in the lifetime of the device when the test is performed. Design and factory tests are undertaken to ensure an adequate level of quality. The factory tests must both meet the design and the production requirements. When the equipment is installed and put into service an acceptance test and a proof test can be carried out. Finally, high voltage tests such as maintenance tests and fault location tests are made to service the equipment or to pinpoint the location of a hidden defect.

Insulation Failure:
Insulation failure is a normal result of ageing. Electrolytic and chemical destruction may take place; absorption of moisture, and physical damage may cause insulation break-down, or dirt, metallic dust or other foreign materials may contaminate the insulation surface. High operating temperature is another typical cause of rapid insulation ageing.

The Immediate Effect of Poor insulation:
The immediate effect of poor insulation is either an increase in leakage current or a decrease in insulation break-down strength. Increased leakage current through weakened or damaged insulation causes increased heating, which in turn accelerates insulation break-down. Voltage transients can cause complete failure or break-down. Insulation may be tested in several ways, namely by measuring the leakage current, the break-down voltage or by determining whether the insulation can withstand greater than normal operating voltages.

Break-down and Ionisation Phenomena
An easy way to check the quality of insulation material is to expose it to a high DC voltage. In all kinds of insulation material there is a number of free electrons, which accelerates under influence of the electrical field created by the high DC voltage. A weak current in the material occurs, the so-called leakage current. Finally, when the DC voltage exceeds a certain value, the electrons gain velocity and energy to such an extend, that they are able to generate more free electrons. This is termed the ionisation phenomenon. The number of free electrons rises exponentially with time, and if there were no current limitation incorporated in the test instrument, the current would rapidly become so great, that the insulation material would be destroyed.

JP36A: 36kV DC Insulation Tester

Specifications

A typical leakage current vs. test voltage diagram

Fig. 1 The curve is linar from 0 to A. Beyond A, ionisation begins and raises. Breakdown accors at C.

Fig. 2 In some insulation materials the breakdown point is as shown in fig. 2, where no ionisation can be detected and break down occurs without warning

Fig. 1

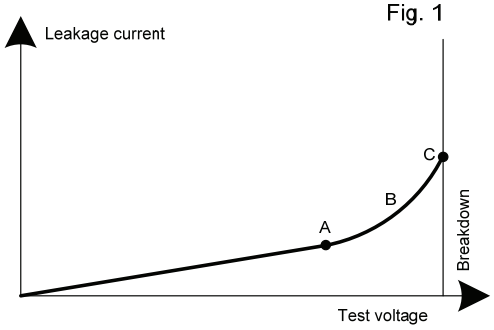
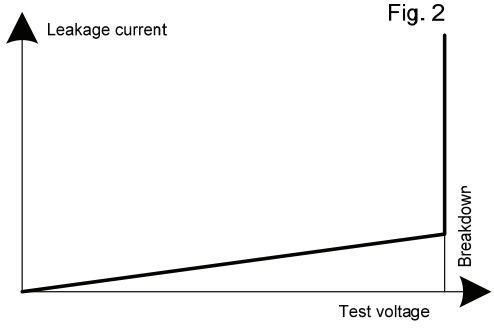


Fig. 2



General	
Stability	Output voltage varies less than ±1% for supply voltage variations of ± 10%
Ionisation Indication	An active L.P. Filter in series with an integrated audio amplifier feeds a loudspeaker providing an audible ionisation indication. Amplifier gain is adjusted with a potentiometer. An output panel connector provides external indication on headphones or on an oscilloscope. Min. load 100Ω
Meter Outputs	5V full-scale meter outputs are provided on a panel connector min. load 10kΩ
Guard terminal	For connection to guard electrode. Current to this terminal bypasses the current meter
Specifications	
Test Voltage	0-4kV (max. 3.6kV), 0-16kV (max. 14.4kV) and 0-40kV (max. 36kV) DC, adjusted by the means of a 10-turn potentiometer. Test voltage is applied to an insulated test probe via a shielded coaxial cable. Two interchangeable probe tips are supplied with the test probe. One ball pointed for the use from 10kV and one Arrow straight tip for 0-12kV applications. + voltage on the tip is standard
Test Voltage Switch	The high tension is switched on with the H.T. switch located on the front panel. A panel connector for external switching is also located on the front panel
Voltmeter	Three ranges 4kV, 16kV and 40kV full scale. Accuracy ± 5%
Max. Output Current	Approximately 150µA @ 30kV increasing to 200µA @ 8kV, decreasing to 100µA @ 2kV And decreasing to ≥ 2µA when shortened
Current Meter	Three ranges 1µA - 10µA - 100µA full scale . Accuracy ± 5%
Resolution	10nA (1nA with 9400400 Modification JP3X w. x10 Amplification)
Output Resistance	Approximately 600kΩ from 30kV to 10kV, 200kΩ from 10kV to 3kV, 60kΩ from 3kV to 2kV measured by Iout = 100µA
Power supply	100-130V and 200-260V AC 45-400Hz, 15-30VA, depending on output voltage and current
Environment	10- 30 Degrees Celsius
Ordering information	
JP36A	Item no: 8360906 36kV DC Insulation Tester for 110-240V AC
Options	Item no: 5902700 Carrying Bag JP3X (requires 3754600) Item no: 3754600 19" Rack-mounting kit for JP3X Item no: 9400800 Modification JP36A Negative Voltage (HV output) Item no: 9400300 Modification JP3X Current Limiter (for pos. HV output) 1) Item no: 9401000 Modification JP36A Current Lim. and Neg. Out. Voltage 1) Item no: 9400400 Modification JP3X w. x10 Amplification (current meter, 100nA FS) 1): current limit: 25% - 50% - 75% and 100% of standard limit.
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	Export Packing HxWxD: 30cm × 56cm × 51cm Weight: 14 kg

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