Kingrun Instrument Co.,Ltd.

GTD-1001D

Insulating Oil Breakdown Voltage Tester

Kingrun Transformer Instrument Co., Ltd
2024

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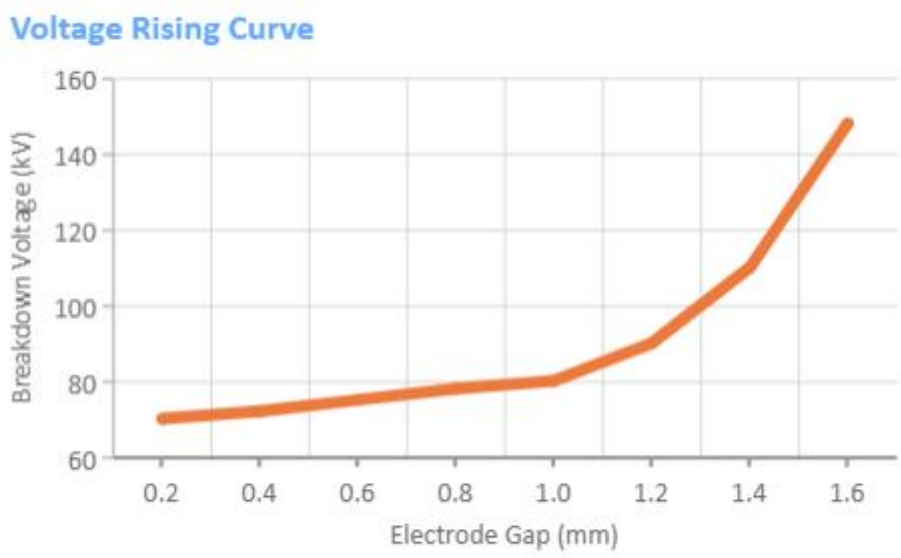
GTD-1001D Insulating Oil Breakdown Voltage Tester

- A NEW---Advanced intelligent CPU weak current control system to prevent system crashes.
- B NEW - Equipped with an advanced electronic inverter sine wave
- C Accurate voltage rising by ± 1%
- D 6 Pre-loaded test standards
- E Ultra-fast HV switch off time
- F Suitable for mineral, ester and silicone oils

The GTD-1001D Insulating Oil Tester is a series of automatic oil testers capable of performing precise dielectric breakdown voltage tests on mineral, ester, and silicone insulating liquids. This critical test indicates the fluid's ability to withstand electrical stress. The tester's voltage regulator power supply uses an advanced inverter sine wave generator, providing accurate breakdown voltage output and high-quality waveform. Unlike traditional stabilizers, it is unaffected by power grid voltage fluctuations and waveform distortions, resulting in more certain and accurate test results.



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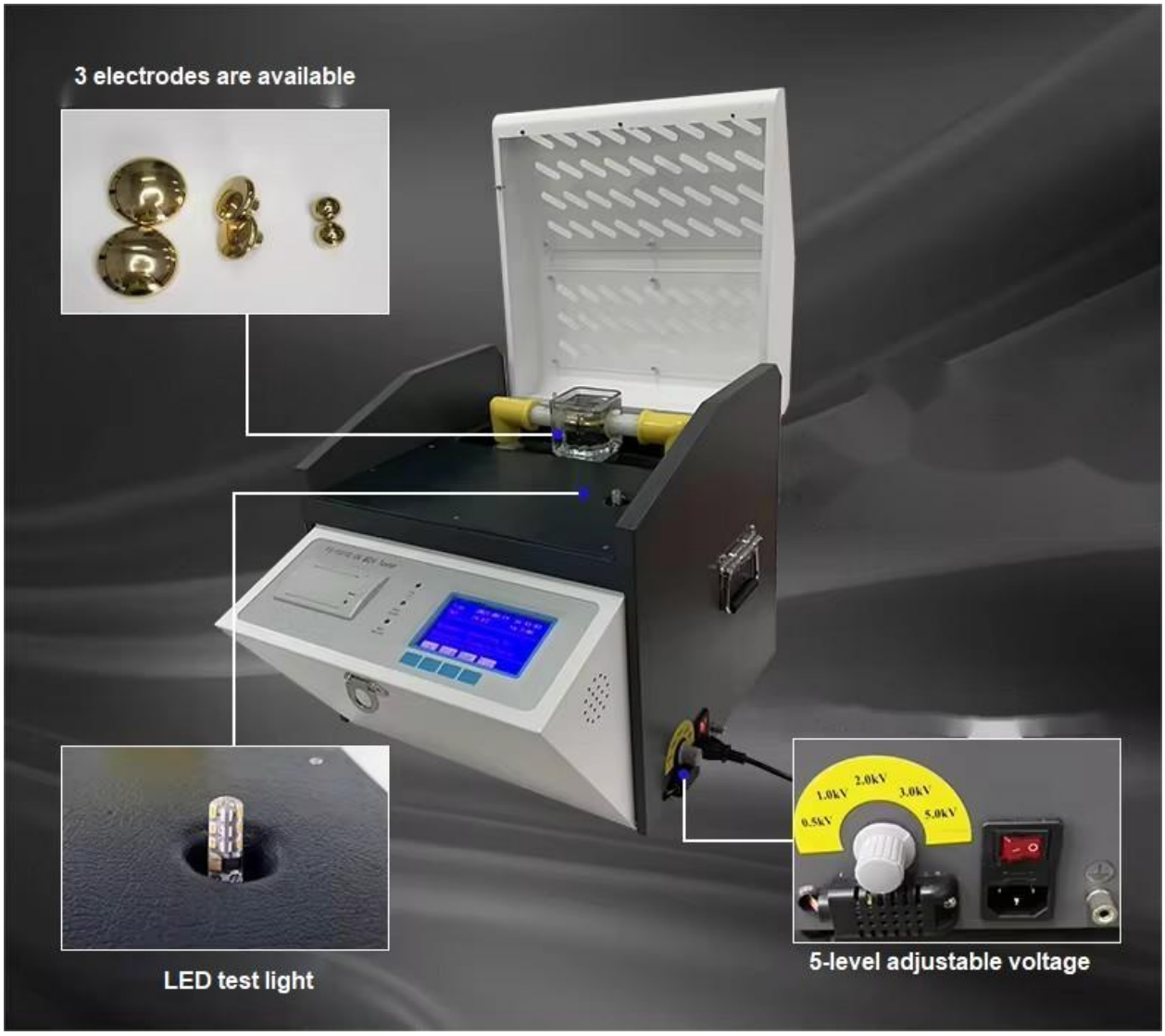
The instrument utilizes a microprocessor to automatically perform operations such as voltage boosting, maintaining, stirring, static, calculating, and printing, allowing for oil circulation withstand voltage tests in the range of 0-100kV. The instrument adopts single-chip control for constant speed voltage boosting, with a voltage frequency that can be precisely set to 50Hz. The GTD-1001D comes pre-loaded with 6 of the most commonly used test standards for easy automatic operation.

The GTD-1001D is equipped with a precise and shatterproof test container, which is easy to clean and provides reproducible results whether used in the field or in the laboratory. The instrument features multiple protection devices to ensure the absolute safety of both the operator and the instrument itself in cases of poor oil breakdown, empty cup breakdown, and other situations.



Option Function:

RS232 Blue-teeth USB Wireless Transmission

Technical Specification

Output voltage	0~80kV
Accuracy	±(2%×reading±0.2kV)
Voltage rise time	0.5 kV/s, 1kV/s , 2.0kV/s, 3.0kV/s for option
Breakdown time	≤1ms
Test times	1~6 for option
Volume of the oil cup	200ml(standard) 300ml or 500ml (option)
The distance between two electrodes	2.5mm (adjustable)
Operation power	AC220V±10%, 50 Hz±1Hz or custom
Operation Temperature	0 °C ~ 40°C
Test standards	IEC60156 / ASTM D877 / ASTM1816
Relative humidity	≤85% non-condensing conditions
Volume	409 mm× 393 mm× 388 mm
Net Weight	29kg

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Types of testable insulating oils：

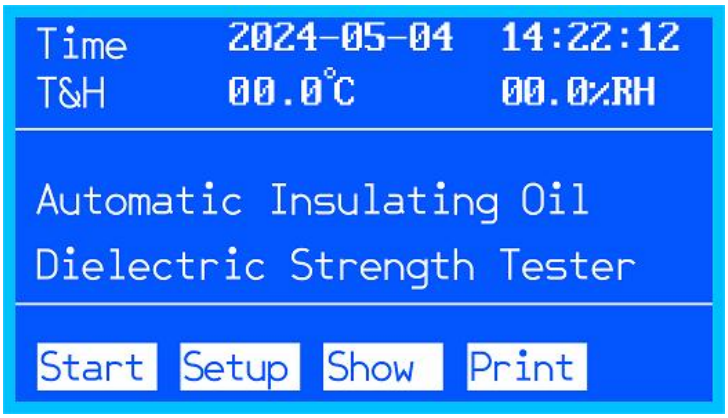
Equipment	Fluid Type		Example/Sub-type	Can be tested with GTD-1001D range?
Capacitors	Synthetic aromatic hydrocarbons		PXE	Yes
	Aromatic esters		Various types	Yes
Medium and high voltage cables	New	Synthetic hydrocarbons	Polybutenes	Yes
	Old	Mineral oil	Various types	Yes
Bushings	Mineral oil		Various types	Yes
Oil filled circuit breakers	Mineral oil		Various types	Yes
Transformers	Mineral oil		Shell Diala AX	Yes
	Perflurocarbon (PFC)		3M PF-5060	Yes
	Low flammability fluids	High molecular weight (HMW) oil	Various types	Yes
		Silicone	Dow Corning 561	Yes
		Synthetic hydrocarbons	Polyalohaolefins (PAOs)	Yes
		Synthetic polyolesters	Envirotemp® 200	Yes
		Vegetable oils - natural ester	Envirotemp® FR3	Yes
		Hydroflurocarbon	Vertrel® VX	Yes
	Old fluids	PCBs - Polychlorinated biphenyls	Askarel® Pyranol® Phenochlor®	No - Harzardous - requires special handling
		Tetrachloroethylene/ perchloroethylene (PCE)	Askarel® (contained 50%) Wecosol®	No - Harzardous - requires special handling
	Gases	Sulphur Hexafluoride	SF6	No
	Old gases	Freon R-113	Vapotrans	No
LTC (Load Tap Changers)	Mineral oil		Various types	Yes

Main differences between the ASTM and IEC standards:

Standards		ASTM D1816	ASTM D 877		IEC 60156	
			Procedure A	Procedure B		
Origin		USA	USA	USA	Europe	
Electrodes	Shape					
	Gap size	2 mm or 1 mm*	2.54 mm	2.54 mm	2.5 mm	
Oil sample stirring	Impeller	yes	not stirred	not stirred	optional	
	Magnetic bead	no option			optional	
Laboratory test temperature	Liquid	At ambient - must record	20 - 30 ºC must record temperature as collected and when tested	20 - 30 ºC must record temperature as collected and when tested	15 - 25 ºC for referee tests	
	Ambient	20 - 30 ºC	Must record	Must record	Within 5 ºC of oil sample	
Outside test temperature	Liquid	At ambient - must record	Must record	Must record	15 - 25 ºC	
	Ambient	Referee tests 20 - 30 ºC	Must record	Must record	Within 5 ºC of oil sample	
Test voltage	Rise rate	0.5 kV/s	3 kV/s	3 kV/s	2 kV/s	
	Frequency	45 - 65	45 - 65	45 - 65	45 - 62	
Breakdowns	Definition	<100 V	<100 V	<100 V	4 mA for 5 ms	
	Number in sequence	5**	5*	1 - 5 different samples	6	
	Time between breakdown	1 to 1.5 min	1 min	n/a	2 min	
Test voltage switch off time following breakdown	Normal (e.g. mineral oil)	Not specified	Not specified	Not specified	<10 ms	
	Silicon oil	Not specified	Not specified	Not specified	<1 ms	
Time between filling and start of test		3 - 5 min	2 - 3 min	2 - 3 min	2 min	
Equivalent standards (adopted into)		None	None	None	BS EN 60156 CEI EN 60156 IRAM 2341 UNE EN 60156 FN EN 6056	SABE EN 60156 VDE0370 part 5 AS1767.2.1 PA SEV EN 60156 NRS 079-1* IS6729*
Notes on testing silicon oil		Can be used provided discharge energy in sample <20 mj		Can be used if modified in accordance with D2225 if procedure A cannot be used	OK if test instrument can comply with voltage switch off time requirements	
Special conditions		* If breakdown does not occur at 2 mm, reduce gap to 1 mm ** Tests must be repeated if range of BD voltages recorded are more than 120% of mean with 1 mm electrode gap and 92% of mean with 2 mm electrode gap	*Tests must be repeated if range of BD voltages recorded are more than 92% of mean. If range of 10 BD voltages is more than 151% investigate why		Expected range of standard deviation/ mean ratio as a function of the mean provided as a chart	
Comments		Test vessel requires cover or baffle to prevent air from contacting circulating oil	Used if any insoluble breakdown products in oil completely settle between breakdown tests	Used if any insoluble breakdown products do not settle between breakdown tests	*With some stand/stir timing differences. Test cell/vessel must be transparent. Reconditioned/reclaimed oil to BS148 is tested to IEC60156 following update in 2009.	

Operating Steps

1. Power on the device, the LCD screen displays date, time, temperature, humidity, the full name of device, and main menu.



Picture 1 Main Menu

2. Press setup and enter into frame (picture2)

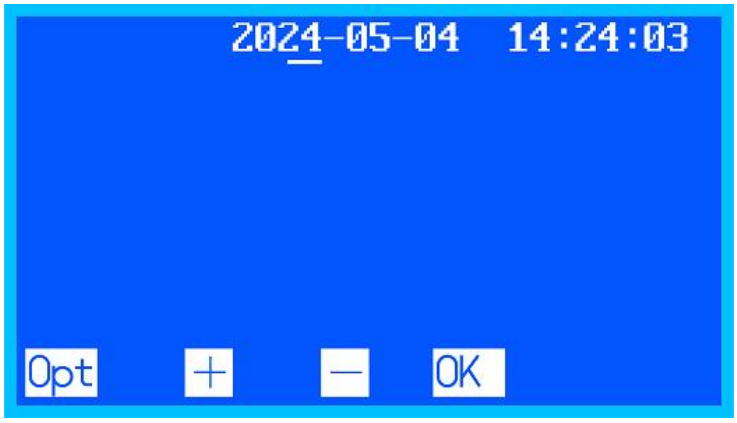
Picture2 select standards and customize set up

3 .Press opt to select test standards , press OK to enter into *ASTM D877* Voltage set up (picture3).

Picture 3 ASTM D877 MTV set up

Press opt and move cursor to MTV (maximum test voltage), to press + or - to set figure of MTV, the default is 80kV, The optional scope is 10 kV～80 kV (the increment *Δ=10 kV*). After the choice, to press OK to return the main menu, press start , then it automatically testing.

4. Picture 2 ,press opt , and move cursor √ to time set , to press OK to confirm(picture 4).



picture 4 time set

To press opt , and move cursor __ to year month day hour minute. to press + or – for true time.After the choice, to press OK , to return the starting-up frame.

5. Picture 2, press opt and move cursor √ to user's set , to press OK , to enter into the user's set . (picture 5)

Picture 5 user's set

Wait time default 15min scope 1-15 min (the increment *Δ=1*)
Pause default 5min scope 1-10 min (the increment *Δ=1*)
Stir default 10s scope 5-90s (the increment *Δ=5s*)
MTV (maximum test voltage)
default 80KV scope 10-80KV (the increment *Δ=10KV*)
instrument will stop raising voltage, when voltage has been raised MTV (maximum test voltage) ,to hold mode, go on 50 seconds with no breakdown, the default of MTV (maximum test voltage) is the breakdown voltage of the electric

insulating oil

Breakdowns default 6 times

scope 1-6 times (the increment *Δ=1*)

After the choice, to press OK , to return the starting-up frame, to press start , it is testing.

Safety Precautions

1. Please read the operation manual carefully before using the instrument.
2. The instrument operators should have a good knowledge of the electrical equipment and the analytical instrument.
3. This instrument can be used both indoors and outdoors, but should avoid places such as rain, corrosive gas, high concentration of dust, high temperature or direct sunlight.
4. Keep oil vessel dry and clean. During un-energize period, sufficient amount of dry and qualified insulating oil should be added to keep the oil cup free from moisture and electrode oxidation
5. The electrodes should be check periodically and do necessary maintenance. Keep the electrode gap confirm to standards.
6. Instrument maintenance and debugging must be done by professionals.
7. Before the power on , please check if the wire connected well or not. And the shell of instrument must be grounding.
8. After the power on , the operators strictly prohibit to touch the case cover, refrain dangerous shock.
9. If any abnormal, Please power off and contact to supplier.

Trouble Shooting

1	Not working when power on	Check the power line and fuse
2	Voltage do not rise	Check if the cover closed or not
3	Rising voltage but not withstand	Check your set up voltage
4	No results display after breakdown	Check the oil vessel
5	Don’t print	Check the print paper

Standard Packing List

1	Instrument	1 set
2	Oil Vessel	1 unit
3	Power Line	1 unit
4	Go and no-go Gauge	1 unit
5	Fuse	2 pc (3A)
6	Stir	2 pc
7	Tweezers	1
8	Print Paper	1
9	User Manual	1
10	Warranty Card	1
11	Factory Test Report	1

After-sales Service

There are product quality problems within one year from the date of purchase ,it is free warranty. We can provide maintenance and technical services all instrument's life. If it is found that the instrument is not normal or defective, please contact with our company, In order to arrange scheme of the most convenient and effective treatment.

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