

JY6611

Insulating Oil Breakdown Voltage Tester



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oil breakdown voltage tester



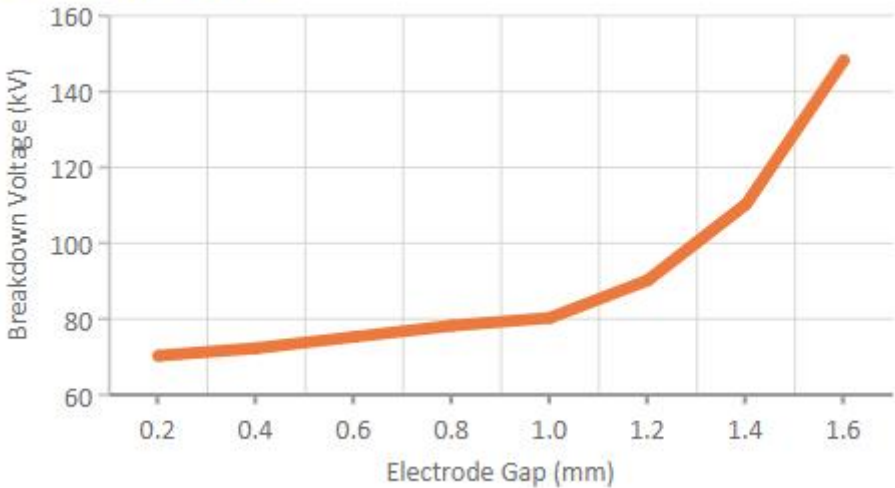
JY6611 Insulating Oil Breakdown Voltage Tester



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

The JY6611 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.

Voltage Rising Curve



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 JY6611 comes pre-loaded with 6 of the most commonly used test standards for easy automatic operation.

The JY6611 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.







JY6611 Technical Specification

Output voltage	0~80kV/100kV
Min. resolution	Up to 5kV/s: 0.1kV +/- 1% +/-2 digits 5kV/s up to 10kV/s: 0.1kV +/- 1% +/-4 digits
Accuracy	± 2%
Voltage rise time	1.0\2.0\3.0kV/s depending on selected test standard
Breakdown time	≤1ms
Test times	1~6 for option
Temperature testing range	10 °C to 65 °C (ASTM D877 requires oils to be within 20 °C and 30 °C) (IEC 60156 required oil to be within 15 °C and 25 °C)
Volume of the oil cup	400ml(standard) / 200ml(accessory)
The distance between two electrodes	2.5mm (adjustable)
Operation power	AC220V±10%, 50 Hz±1Hz or custom
Operation Temperature	0 °C ~ 40°C
Pre-loaded international test standards.	IEC60156 / ASTM D877 / ASTM1816 VDE0370/GBT507
Operating temperature range and humidity	0 °C to +50 °C / 80% RH at 40 °C non-condensing conditions
Protection and Safety	Dual safety micro switches on chamber cover Designed in accordance with IEC61010
Volume	L310mm*W420mm*H360mm
Net Weight	22kg

Types of testable insulating oils:

Equipment	Fluid Type		Example/Sub-type	Can be tested with JY6611 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	
	Perfluorocarbon (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
		Hydrofluorocarbon		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 °C must record temperature as collected and when tested	20 - 30 °C must record temperature as collected and when tested	15 - 25 °C for referee tests
	Ambient	20 - 30 °C	Must record	Must record	Within 5 °C of oil sample
Outside test temperature	Liquid	At ambient - must record	Must record	Must record	15 - 25 °C
	Ambient	Referee tests 20 - 30 °C	Must record	Must record	Within 5 °C 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 SABE EN 60156 VDE0370 part 5 CEI EN 60156 AS1767.2.1 IRAM 2341 PA SEV EN 60156 UNE EN 60156 NRS 079-1* FN EN 6056 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. General
2. Brief introduction of function
3. Main technical parameter
4. Structure description
5. Menu application description
6. Standard test
7. User-defined test
8. Points for attention
9. Maintenance and servicing
10. Cleaning method of oil cup
11. Cleaning method of stirring paddle
12. Storage of oil cup
13. Verification of instrument
14. Complete set of instrument
15. After sale service

Please carefully read the operation manual before application of the instrument. It is the responsibility of the customer to secure the safety.

Version number of the manual: 7.29-2008

Sorry for no further notification in case the manual is modified.

1. General

A large quantity of electric devices is equipped in the factories, mines and enterprises in the power system. Their inner insulation is mostly oil-filled insulation type. The dielectric strength testing of the insulation oil is the conventional testing item which must be carried out. In order to meet rapid development demand of the power industry, our company has developed, designed and manufactured this instrument according to international standards IEC 156 ,ASTM D877,ASTM D1816,VDE0370,GB/T507-2002,DL429.9-91, DL/T846, 7-2004 and Custom test method available. The system applies microcomputer control, mechanical-electrical integration and full automation, testing accuracy is high, which completely overcomes the problem of the similar product that is easy to be breakdown under high voltage. The system has the function of automatic detection, automatic stirring, automatic handling, automatic printing, data storage, calendar etc and the advantage of electric-mechanic interlocking protection, grounding protection etc. It is also characterized with high testing accuracy, convenient operation, safety and reliability.

2. Brief introduction of function

1. This model applies single oil cup structure, which applies microcomputer control and automatically carries out a series operations such as booster, holding, deboster, stirring, static displacement, display and calculation, print etc. It can make insulation oil breakdown voltage test in the range from 0 to 100KV.
2. A large LCD screen is applied, equipped with backlight system, it is clearly visible even at night.
3. The operation of the instrument is simple, the operator only inputs simple instruction according to the application description, the instrument can automatically complete insulation oil breakdown voltage test according to setting. Each breakdown voltage value is automatically stored. Each breakdown voltage value and the average value can be printed out after test is completed.
4. The instrument has strong adaptability and is convenient for carrying, which can be used for laboratory and outdoor field testing. The instrument is also available with strong anti-interference capability, which can normally operate on the strong electro-magnetic field environment.
5. The instrument is equipped with the protection devices for over voltage, over current, automatic return-to-zero and grounding etc. The safety of the instrument itself and operation personnel are absolutely secured on normal application condition.
6. The voltage boosting speed and static displacement, interval time can be selected according to different test standards.
7. The instrument is compatible with international standards. The testing condition can be user-defined according to the requirement.

3. Main technical parameter

1. Output voltage: 0~100kV (optional).
2. Resolution: 0.1KV
3. Measuring accuracy: $\pm(2\% \times \text{reading} + 0.2\text{kV})$

4. Voltage boosting speed: 0.5,1.0, 2.0, 3.0kV/S (Optional)
5. Breakdown cutting time: $\leq 1\text{ms}$
6. Test times: 6 times (Optional from 1 to 6 times)
7. Capacity of oil cup 400ml;200ml.
8. Distance between electrodes 2.5mm (Clearance between electrodes is adjustable)
9. Working environment:
 Ambient temperature: $0^{\circ}\text{C}\sim+40^{\circ}\text{C}$ Relative humidity: $<80\%\text{RH}$ no dew
 Voltage of power supply: AC $220\text{V}\pm 10\%$ or customized.
 Frequency of power supply: $50\text{HZ}\pm 1\text{HZ}$
10. Exterior size: $310\times 420\times 360$ (mm)
11. Weight: 22kg

4. Structure description

1. See diagram 1 for front panel.

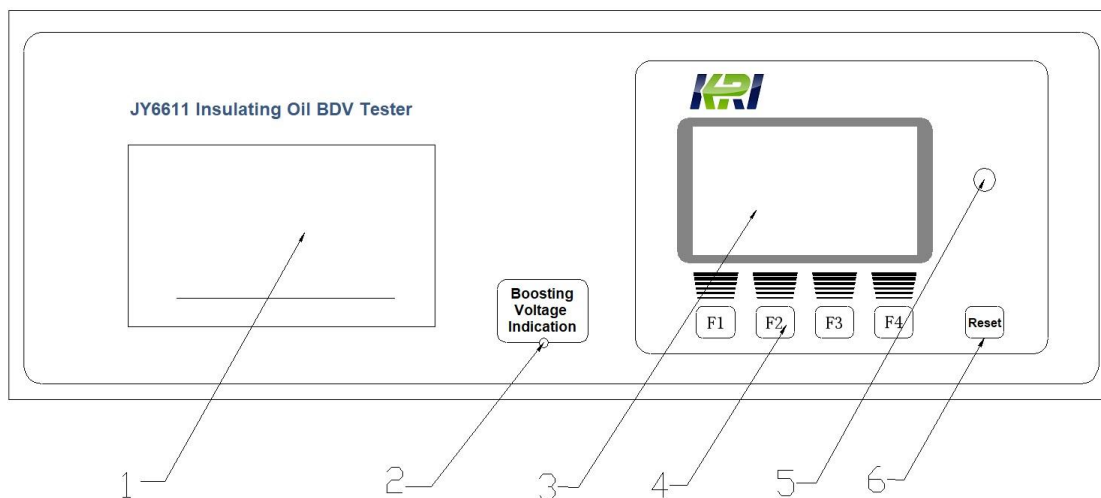


Diagram 1

- (1) Printer
- (2) Voltage boosting indication lamp
- (3) Liquid crystal displayer
- (4) Function key
- (5) Adjustment of liquid crystal contrast ratio
- (6) Reset key

5. Menu application description

The whole process and the test result of the test are displayed on the display screen with

the complete Chinese wording operation description, the interface of human-machine is friendly.

1. Boot-strap menu (diagram 2)

Pull out front panel, i.e. open power supply.
Directly enter into main menu in 2 seconds.

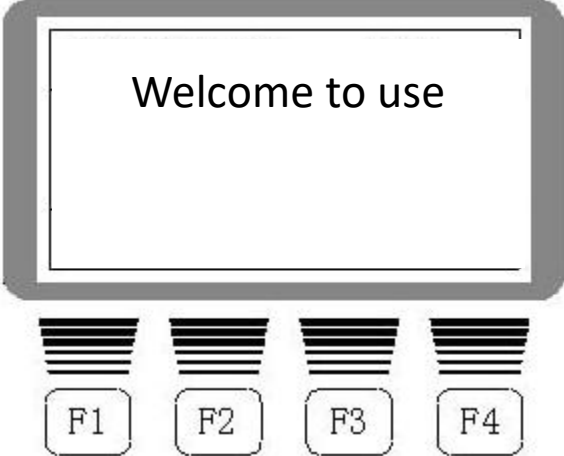


Diagram 2

2. Main menu (Diagram 3)

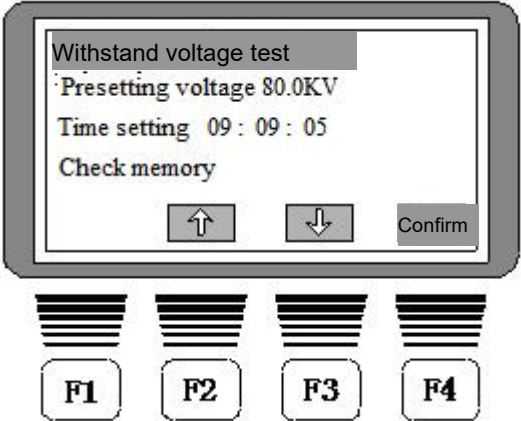


Diagram 3

Move cursor with "↑" key or "↓" key, after the function is selected, push down "Confirmed" key, and then carry out testing or other function setting.

- (1) Withstand voltage test: Push down "F4" key for confirmation, enter into testing menu, select testing method for testing. See diagram 4.

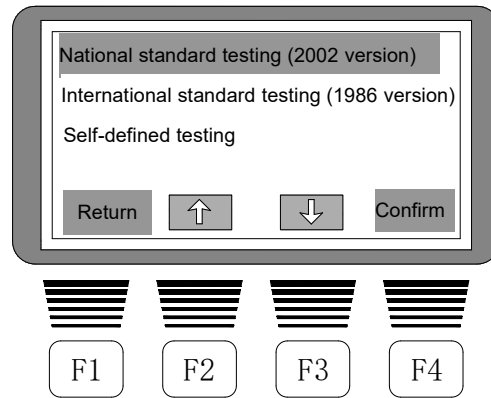


Diagram 4

- (2) Presetting voltage: Push down “F4” key for confirmation, enter into sub-menu, see diagram 5, set highest test voltage.

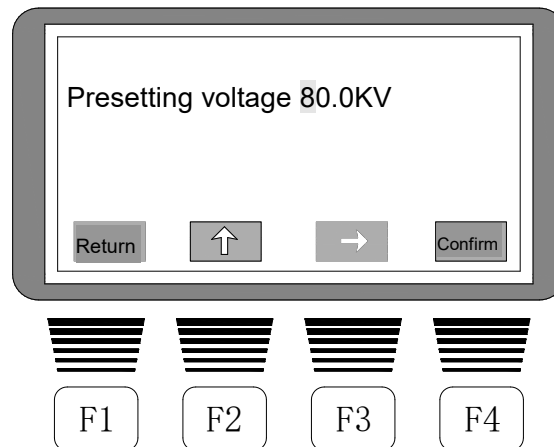


Diagram 5

Push down “↑” and “→” to modify voltage value. Push down “Confirmed” key or “Return” key for exit.

- (3) Time setting: Push down “F4” key for confirmation, enter into submenu, see diagram 6, modify date and time.

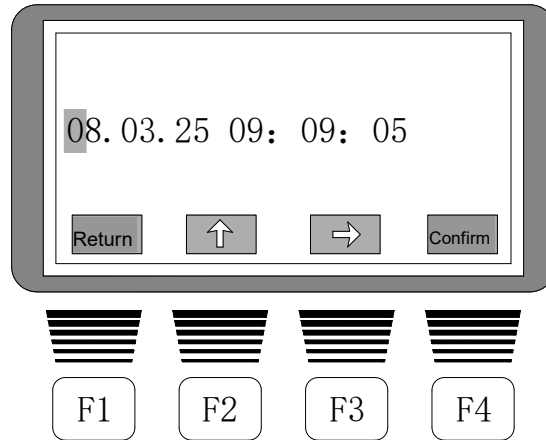


Diagram 6

Push down “Confirmed” key or “Return” key for exit.

- (4) Check memory: push down “F4” for confirmation, enter into submenu, see diagram 7, the stored testing results can be reviewed.
 Push down “↑” or “↓” key to check different records. Push down “Return” key to return main menu. Push down “print” key to print out record.

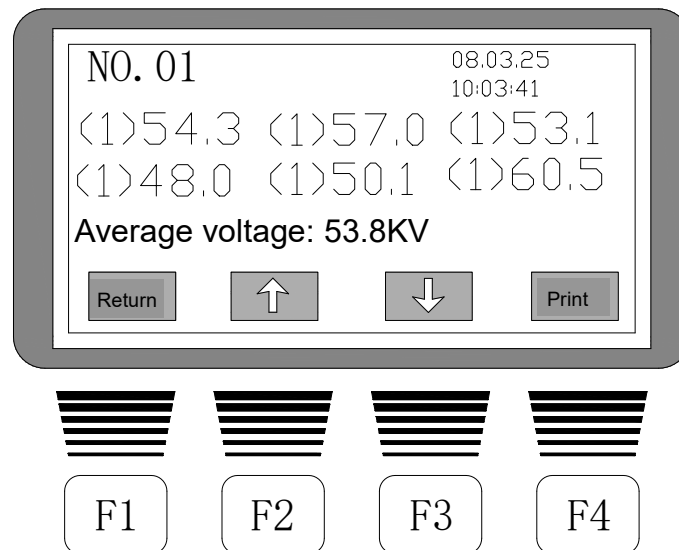


Diagram 7

6. Test preparation

1. Firstly, firmly connect the grounding terminal with the earth line before application of the instrument, pay special attention to no virtual connection is allowed.
2. Clean and dry the oil cup: open the oil cup cover, completely clean and dry the oil cup.
3. Adjust distance between electrodes:
 - (1) Set vernier gauge to zero.
 - (2) Adjust the knob on the other side until the distance between the electrodes is zero.
 - (3) Set the vernier gauge to the required distance between the electrodes

(rotation of one circle = 1mm).

- (4) Check the distance between the electrodes with the standard ruler (2.5 mm).

4. Fill insulation oil.

- (5) Oil discharging cup, open oil cup cover.
- (6) Slowly fill insulation oil into the oil cup in order to avoid bubble.
- (7) Place the oil cup filled with insulation oil on the electrode frame.
- (8) Close oil cup cover.
- (9) Close the protective case.

5. After above items are confirmed, connect to AC 220V power supply, ready for testing.

Standard test

1. National standard testing (2002 version) test

(1) Select stirring: Enter “Self-defined testing” menu option, confirm stirring according to test requirement.

(2) Select “National testing (2002 version)” from testing menu, push down “Confirm” and enter into testing process. See diagram 8

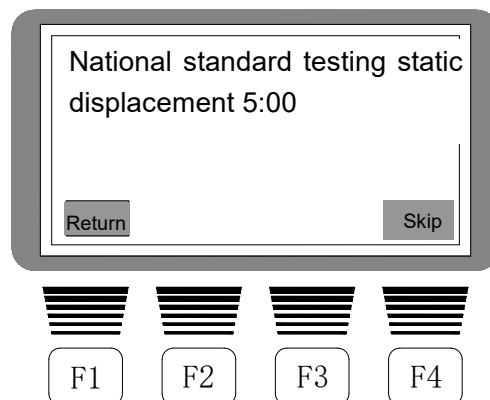


Diagram 8

Push down “Return” key and return back to testing menu, stop testing. Push down “Skip” key and directly enter into testing.

(3) Test interface, push down “Return” key and directly exit measuring during measuring process. See diagram 9.

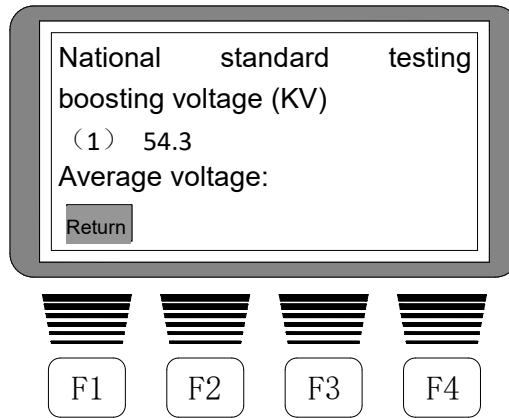


Diagram 9

(4) Interval time menu, see diagram 10

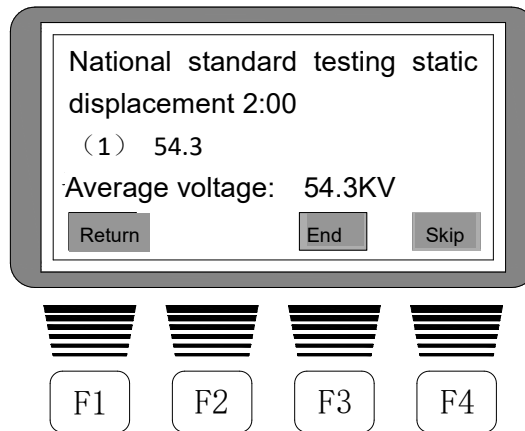


Diagram 10

Push down "Return" key and directly exit testing. Push down "Finish" key to stop testing, enter into finish menu. Push down "Skip" key and directly enter into next boosting testing.

(5) Complete testing, see diagram 11

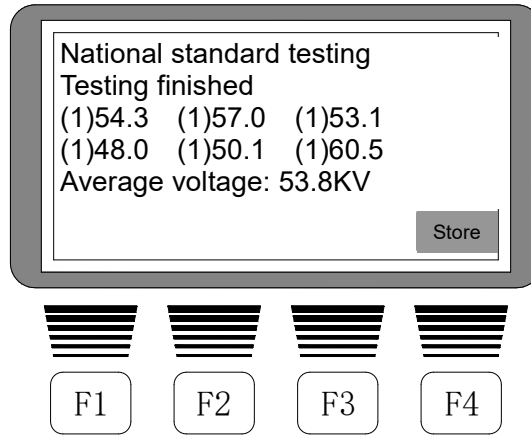


Diagram 11

The instrument would automatically print out data.
 Push down “Store” key to store the data of the test.

2.National standard testing (1986 version)

The testing process is same as that of 2002 version testing.

7. Self-defined testing

Select “Self-defined testing”, push down confirmation key, enter into parameter setting menu, see diagram 12

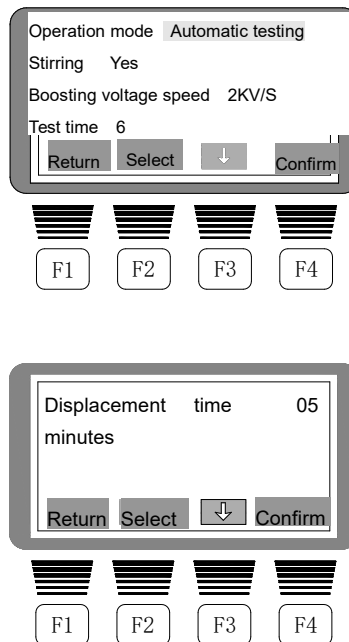


Diagram 12



Push down “↓” key to select modification item, push down “Select” key to modify selected items. Push down “Confirm” key to enter into testing process after selection is completed. The testing process is same as that of national standard testing.

8. Points for attention

1. The instrument must be reliably grounded before operation.
2. In case any abnormality is found during application of the instrument, the power supply should be immediately cut off to stop test.

9. Maintenance and servicing

1. Avoid exposing the instrument on damp environment.
2. Keep the oil cup and the electrode clean. Filling with new transformer oil for protection during outage period. Periodically check change of electrode distance and looseness between the electrode head and the electrode bar thread. Please tighten timely in case there is looseness.

10. Cleaning method of oil cup

- (1) Repeatedly wipe the surface of the electrode surface and the electrode bar with clean silk.
- (2) Adjust the distance between the electrodes well with the standard ruler.
- (3) Clean three times with petroleum ether (other organic solvents are prohibited), following methods must be followed in each time:
 - ① Pour petroleum ether into the oil cup, occupied 1/4~1/3 capacity of the oil cup.
 - ② Cover the oil cup opening with a glass plate which is cleaned with petroleum ether, swag evenly for one minute. Please have certain strength.
 - ③ Pour petroleum ether out, dry for 2~3 minutes with a blower.
- (4) Clean with pending tested oil sample for 2~3 times.
 - ① Pour pending tested oil sample into the oil cup, occupied about 1/4~1/3 capacity.
 - ② Cover the oil cup with the dried glass plate, swag evenly for 1~2 minutes, please have a certain strength.
 - ③ Pour out the remained oil sample, then carry out withstand voltage test.

11. Cleaning method of stirring paddle

- (1) Repeatedly wipe the stirring paddle with clean silk until no fine particle exists on the surface. Touching the surface of the stirring paddle with hand is prohibited.
- (2) Clamp the stirring paddle with a nipper, immerse in petroleum ether for repeated washing.
- (3) Clamp the stirring paddle with the nipper, dry it up with hot wind.
- (4) Clamp the stirring paddle with the nipper, immerse in the pending tested oil sample for repeated washing.

12. Storage of oil cup

Method 1: Fully fill the oil cup with insulation oil in high quality after the testing is completed, store the oil cup in a case, lock the case cover.

Method 2: Place in vacuum drier for storage after dried up and cleaned following above method.

Note: The oil cup and the stirring paddle must be cleaned following above methods before first testing and after testing of oil in bad quality.

13. Verification of instrument

1. Preparation before verification

(1) Open left side plate of the instrument

(2) Close switch at the internal coping joint shaft of the instrument left side plate.

(3) Open the upper cover, place special verification device on the high voltage electrode, the led high voltage line is separately connected to the high voltage electrodes the standard instrument with suspending.

2. Verification process of instrument

(1) Select main menu (See diagram 3), “Presetting voltage” submenu (See diagram 5), the modified voltage value is boosted high voltage value.

(2) Return back to main menu, enter into “Withstand voltage test” submenu, enter into “Static placement” menu after any testing method is selected (See diagram 8). Push down “F4” key (“Skip”), directly enter into boosting voltage process. After enter into the following menu, read figures (Diagram 13).

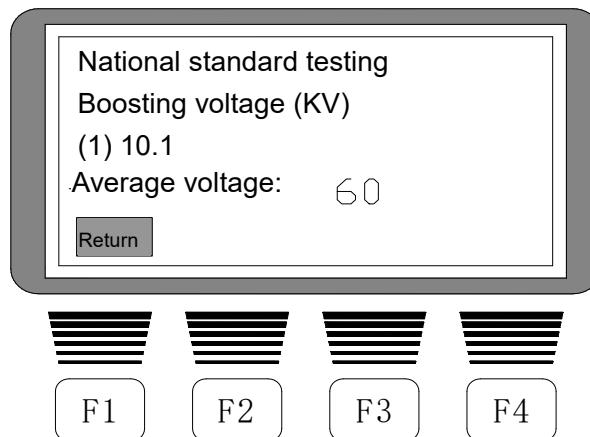


Diagram 13

(3) Push down “Reset” key to return main menu after data are recorded, enter into testing of next group data (Process is same as above).

3. Resume the instrument to normality after verification is completed.

14. Complete set of instrument



Kingrun Instrument Co.,Ltd.

1. Main machine	1
2. Adjustable oil cup	1
3. Stirring magnet	2
4. Ruler (2.5mm)	1
5. Nipper	1
6. Blower	1
7. Power supply line	1
8. Print paper (thermographic)	1 reel
9. Fuse	2 pieces
10. Operation manual	1 copy
11. Certificate/guarantee card	1 copy

15. After sale service

The instrument would be replaced and repaired free of charge in 24 months since purchasing date because of quality issue of the product, repair and technical service would be provided for the whole life. In case any abnormality or fault is found in the instrument, please contact the company in time so as to organize the most convenient handling solution.