CZ20053
Operating Manual

I. Safety Warning

This operating manual contains warning information and safety regulations. Please read them carefully and observe them strictly to ensure the safety of the user and instrument.

Note:

1. Please read and understand the contents of the manual before using the instrument.
2. Please use the instrument in strict accordance with the test procedure described in the manual.
3. Please be sure to understand the safety aspects of the manual in detail.
4. This instrument must be operated by a trained and qualified technician and used under the conditions specified in the manual.
5. Aegis is not responsible for any damages caused by improper use or violation of the safety regulations in the manual.

Safety symbol ⚠ has three meanings in the manual. Users should pay special attention to the operation for the symbol when reading.

⚠ Danger---identifies conditions and actions that are likely to pose serious or fatal hazards.

⚠ Warning---identifies conditions and actions that may pose serious or fatal hazards.

⚠ Caution-----identifies conditions and actions that may pose minor injury or damage the instrument.

⚠ Danger

- The RCD test function of this instrument is only applicable to single-phase 230V /50Hz (power voltage range: 195~253V) circuits;
- The measuring voltage range of this instrument is 30V~600V, 45Hz~65Hz.
- Before using the instrument, please check the test lead carefully. If the test lead is cracked and the metal wires are exposed, do not use it. Otherwise, serious or fatal hazards are likely to be posed.
- When testing, only under safe conditions can you touch the test lead.
- When testing, do not touch any exposed leads.
- After completing the test, please disconnect the test lead from the power immediately.

⚠ Warning

- During the test, never open the casing of the instrument because of the dangerous voltage in it. In the event of a malfunction, please refer it to a professional for inspection and repair.
- If there are any anomalies (such as imperfect display, unexpected test value, damaged casing, noise during testing, etc.) of the instrument, please hand it over to a professional for repair before use.
- Do not use the instrument if your hands are wet.

⚠ Caution

- To ensure safety, please use the certified test lead provided by Aegis. It is not recommended to use a third party test lead probe in the CZ20053 instrument.
- Do not expose the instrument to harsh environments such as the sun, extreme temperatures and humidity.
- Please clean the instrument with a dry cloth. Do not use a damp cloth, abrasive or solvent to clean it.
- If the instrument is wet, dry the instrument before storage.

Warnings:

1. A possible voltage between the protective conductor and earth will influence the measurements.
2. The instrument tests the connection between the neutral point of the distribution system and earth before the test is started. A possible voltage between the conductor and the earth may influence the measurements.
3. The leakage currents in the circuit following the residual current protection device may influence the measurements.
4. When the fault voltage is over 50V, "Uf Hi" will be displayed and the test will stop. The voltage relates to the residual operating current of the protective device.
5. The earth electrode resistance of the measuring circuit probe cannot surpass 5Ω.
6. The potential fields of other earthing installations may influence the measurement.
7. Special conditions in residual current protective devices shall be taken into consideration.
8. Equipment is connected downstream of a residual current protective device

The meaning of the symbols associated with this instrument:

⚠	Danger, warning or caution	⧈	Double or reinforced insulation
⏚	Grounding		

II. Features

1. Intelligent microprocessor chip control: High accuracy, reliability and stability
2. RCD Test Wiring Check:

1) When the wiring is correct, the L-PE and **L-N** symbols on the left side of the LCD are always on.
2) If the power is abnormal or no power, the L-PE and L-N symbols on the left side of the LCD will flash simultaneously.
3) If the power socket is not well grounded or not grounded, the L-PE and N-PE symbols on the left side of the LCD will flash simultaneously.
4) If the neutral line of the power socket is not well connected or not connected, the N and N-PE symbols on the left side of the LCD will flash simultaneously.
5) If the live wire and neutral line of the power socket are inversely connected, the L-PE, **L-N,** and N-PE symbols on the left side of the LCD will flash simultaneously.

Item	Scene	L-PE	L-N	N-PE
1	If the wiring is correct	on	on	off
2	If the power is abnormal or no power,	flash	flash	off
3	If the power socket is not well grounded or not grounded	flash	off	flash
4	If the neutral line of the power socket is not well connected or not connected	off	flash	flash
5	If the live wire and neutral wire of the power socket are inversely connected	flash	flash	flash

3. Phase angle selection: The RCD test can be selected to start from a positive (0°) or a negative (180°) half cycle.
4. Contact voltage alarm: The contact voltage can be limited to UL25V or UL50V. When the contact voltage is larger than the selected limit value during the RCD test, the RCD test will be stopped and the LCD will display "Hi" and "Uf".
5. Auto data hold: After RCD test, the measurement results are kept displayed until a button press or rotatory switch change.
6. Over range indication: When the test value exceeds the maximum or minimum value of the current test range, the LCD will display "> current maximum value" (such as >300ms) or "< current minimum value" (such as <30V).
7. AUTO RAMP test: Test the trip current and trip time simultaneously.
8. Battery powered: 6 x 1.5V AA alkaline battery. There will be low voltage indication when the battery voltage falls below 7.2V.
9. Auto Power Off function: The instrument will be power off automatically after no operation for 5 minutes.
10. Fuse safeguard
11. Double or reinforced insulation for safe design.
12. Backlight function: Press the "LIGHT" key and power on the instrument to tum the backlight on; In the "VOLTS" position, press the "LIGHT" key to turn the backlight on/off.
13. L-N voltage measurement: Display L-N input voltage. The display range is 30V~600V. "---" is displayed when there is no input or the input is extremely low, "<30V" is displayed when the input is less than 30V, and ">600V" is displayed when the input is larger than 600V. Press the "L- N/L-PE" button to switch to L-PE voltage display.
14. L-PE voltage measurement: Display L-PE input voltage. The display range is 30V-600V. "----" is displayed when there is no input or the input is extremely small, "<30V" is displayed when the input is less than 30V, and ">600V" is displayed when the input is larger than 600V. Press the "L-N/L-PE" key to switch to L-N voltage display.
15. Frequency measurement: Display the input frequency of the L-PE terminal. In the "VOLTS" position, press the 'VOLT/FREQ" button to switch the voltage/frequency display.

III. Technical Specifications

1. Measurement Range and Measurement Accuracy (Temperature: 23±5°C; Humidity: 45%-75% RH; Altitude ≤2000m)

Voltage measurement function:

Function	Voltage Range	Frequency Range	Display Resolution	Accuracy Error
VOLTS	30V~600V	45Hz~65Hz	1V/1Hz	±3%rdg ±3dgt (Frequency display is for reference only)

RCD test function:

Function	Voltage (AC)	Trip Current (IΔn)	Trip Time (MAX)	Accuracy	
				Trip Current	Trip Time
×½	230V Tolerance: -15%~+10% Frequency: 50Hz	10/20/30/100/300/500mA	2000mS	Tolerance: -10%~0%	±2%rdg ±2dgt
×1		10/20/30/100/300 mA	1000mS	Tolerance: 0%~+10%	
		500mA	300mS	Tolerance: 0%~+ 10%	
×5		10/20/30mA	40mS (RAMP increase step 10%) I n from 20%~110% 300*10 mS	Tolerance: -10%~+10%	
AUTO RAMP Test		10/20/30/100/300/500mA			

Factors that might affect the measurement results:

No.	Designation code	Variable descriptions
1	A	Intrinsic uncertainty
2	E1	Reference position ±90°
3	E2	Voltage supply at the limits stated by the manufacturer
4	E3	0°C and 35°C temperature
5	E5	Resistance of the probes within the limits stated by the manufacturer
6	E8	85% to 110% of the nominal system voltage

2. Measurement Range (Function)

VOLTS ---------- --Voltage measurement, 30V~600V, 45Hz~65Hz
x1/2 ---------- Non-tripping, check RCD sensitivity
x1 ---------- Measure trip time
x5 ---------- Measure fast trip time at IΔn x 5 trip current
AUTO RAMP test------- Measure trip current

3. Application Standard:
IEC 61010-1;
EN 61326-1; EN 61326-2-2
Cat III 600V

4. RCD Test Operating Voltage:
230V/50Hz (voltage range: 195~253V)

5. Working Environment: Temperature:
0°C~40°C
Relative humidity: ≤80%RH
Altitude: ≤ 2000 metre

6. Storage Condition:
Temperature: -20°C~60°C
Relative humidity: ≤75%RH

7. Product Size:
160mm x 71mm x 100mm

8. Product Weight:
400g

9. Standard Accessories:
3 terminals test lead (1.5 meter) ------ 1pc
User manual ---------- 1pc
Shell/strap/cloth bag ---------- 1pc
Test lead ---------- 1pc

IV. Instrument Appearance and Main Accessory (See Figure 1,2,3)

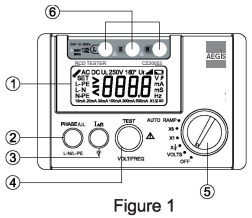

Figure 1

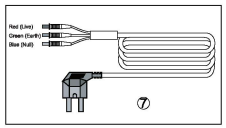

Figure 2

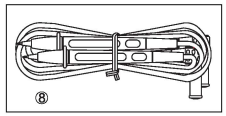

Figure 3

1. LCD
2. PHASE/UL key (RCD function) L-N/L-PE button (voltage measurement function)
3. IΔn button (RCD function) LIGHT button (Backlight function)
4. TEST button (RCD function) VOLT/FREQ button
5. Function selection switch
6. Test ports
7. Three terminals test lead
8. Test lead

V. Voltage/Frequency Measurement

1. Please use the supplied test leads to test the voltage (The maximum voltage which being tested should be less than 600V).
   Test Lead connection method: Insert the red test lead into L port and black test lead into N port of the instrument. *Note: If the voltage is less than 250V, you can use the 3 terminals test lead but it is not recommended.*
   Three terminals test lead connection method: Insert the three terminals of the test lead into the three corresponding ports of the instrument. Red into L, Green into E and Blue into N.
2. Turn the function switch to the 'VOLTS' position, then power up the instrument.
3. Press the "L-N/L-PE" button to switch between L-N/L-PE voltage display.
4. Press the "VOLT/FREQ" button to switch between voltage/frequency display.

VI. RCD Test

1. Test Lead Connection:
   Insert the three terminals of the test lead into the three corresponding ports of the instrument. Red into L, Green into E and Blue into N. Turn the function switch to the desired current multiplier (x1/2, x1, x5 or AUTO RAMP) of the RCD test function. Then connect the plug of the test lead into the circuit to be tested (power socket 230V/50Hz).
2. Wiring Check:
   Verify the wiring status by observing the L-PE, L-N and N-PE symbols. When the wiring is correct, the L-PE and L-N symbols on the left side of the LCD are always on and the N-PE is off. Otherwise, the wiring is incorrect; check and correct the relevant wiring until correct wiring indication is obtain.
   Caution: Reverse connection between E and N ports during wiring check may cause RCD to trip. In this case, please check and correct the relevant wiring until the wiring indication is obtained before you proceed to next operation.

⚠ Danger
If the wiring is incorrect, do not proceed with the test (press the TEST button). Otherwise, it very likely causes false test results or other hazards.

3. Press the "IΔn" button to switch between the trip currents (IΔn) until it matches the rated trip current indicated on the RCD (residual current device). The set trip current value will be displayed at the bottom of the LCD.
   Default value: IΔn---------30mA
   0/180°-----0°
4. Taking RCD Test

1) Set test parameters
   Non-tripping test ---------- x1/2: Maximum trip time up to 2000ms
   Tripping test ---------- x1: Maximum trip time up to 1000ms (except 500mA)
   Tripping test ---------- x1(500mA): Maximum trip time up to 300ms
   Fast tripping test ---------- x5(only for 10, 20, 30mA): Maximum trip time up to 40ms
   AUTO RAMP test ---------- 20%-110% of rated trip current (IΔn): Maximum trip time up to 300ms

2) Press the "TEST" button
   Non-tripping test --------- The RCD should not trip
   Tripping test ---------- The RCD should trip
   x5 fast tripping test ------ The RCD should trip
   AUTO RAMP test -------- The RCD should trip; trip time and trip current should be displayed simultaneously
3) Press the "PHASE/UL" button to alter the phase and repeat step 2 above to determine the fastest trip time (When the "PHASE/UL" button is pressed, the set value is cyclically switched in the oreder of UL25V 0°, UL25V 180°, UL50V 180° and UL50V 0°)
4) Press the "PHASE/UL" key to alter the phase and repeat step 2) again
5) After completing the test, please disconnect the test lead from the power immediately.

⚠ Danger

- **Do not touch any exposed metal or leads during the operation of these tests.**
- **Internal components in the instrument may get hot during testing. If the instrument is operated continuously for a long time, it very likely causes damage to the device or other hazards. Therefore, it is not recommended to use the instrument for a long period of continuous testing on production lines in RCD factories. It is only suitable for sampling precision testing.**
- **Trip current of 300mA/500mA test (high current tripping test) only can be conducted every five minutes.**

VII. Maintenance and Repair

1. Cleaning the casing:
   Clean the surface of the instrument with a dry cloth. DO NOT USE alcohol or solvents as it may cause corrosive damage to the instrument, especially the LCD. Protect the instrument from any moisture.
2. Repair:
   Please contact you Aegis sales representative if the following issues occur:
   A. The instrument's casing is broken or the components are damaged.
   B. LCD displays abnormally.
   C. Unexpected test data occur under normal use.
   D. The buttons do not function normally.
   E. Noise occurs during the test.

This instruction manual is subject to change without notice.

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