Wound Component Testing Solution

The quality verification tests for wound components consist mainly of AC/DC Hipot tests and Insulation Resistance (IR) tests. The Chroma 19035 Wound Component EST Scanner Series perform safety tests for motor, transformer, and heater related wound products. Reliable quality control and efficient product control are obtained when implementing this scanner for quality verification by wound component manufacturers.

The Chroma 19035 Series supports 5kV/ac & 6kV/dc high voltage output to conform with withstand voltage test requirements for wound components, and has a maximum output current up to 30mA. The Insulation Resistance (IR) test measurement ranges from 1MΩ to 50GΩ, and voltage output can be up to 5kV, while the DCR test can measure the resistance parameter of wound components and test the circuit connection (contact check) before the withstand voltage test.

The 19035 Series also has powerful functions for Flashover detection and Open/Short Check (OSC), as well as programmable voltage and time parameters for various characteristics of DUTs for increased testing reliability and product quality.

Applications

The 19035 Series is a comprehensive safety tester designed for motor, transformer, and heat related wound component tests. Most wound components have multiple windings, such as 3-phase motors and dual winding transformers. With 8-channel scanning ability the 19035 can measure multiple test points in one test instead of switching test points manually. This reduces test time and labor cost immensely.

The built in OSC and DCR functions verify poor contact or short circuits that occur during test, and solves the contact problems with wound components improving test quality and prolonging test equipment lifespans.

Motor, Fan : 19035-M  
Electric Heater Tube : 19035-M  
Transformer : 19035  
Switch, Wire : 19035  
Camera Micro Motor, Coil : 19035-S
MEASUREMENT TECHNOLOGY

FLASHOVER DETECTION
The 19035 has the same flashover detection as other Chroma EST testers. Flashover is the electrical discharge generated by high electrical fields inside or on the surface of insulation materials that cause the DUT to lose its insulation characteristics and form a transient or discontinuous discharge. It can cause a carbonized conductive path through insulation materials or damage the product under test. Flashover cannot be detected by monitoring leakage current only. The change rates of test voltage and leakage current must be monitored in order to detect flashover, as its detection is one of the most indispensable test items for electrical safety testing.

GROUND FAULT INTERRUPT (GFI)
The requirements for test environments indicate that test equipment should be equipped with an auto interrupt device, thus Chroma developed the Ground Fault Interrupt (GFI) function to protect users. When the current difference $i_1 - i_2$ between $i_1$ and $i_2$ detected by current meters $A_1$ and $A_2$ is too high, the GFI device will immediately cut off the power supply to protect the human body from electrical shock. GFI is not only compliant with safety standards but is also a safeguard for operating personnel.

OPEN / SHORT CHECK (OSC)
OSC function check for Open (bad connection) or Short (DUT short circuited) occurring during test. If a DUT has an open circuit during test, the unit might be misjudged for a good one. If a DUT has a short circuit, OSC function can filter it out to diminish the damage to the fixture and save test costs.

In general, products under Hi-pot test have capacitance ($C_x$). $C_x$ could be tens of pF to several nF under normal conditions. When the circuit connection is interrupted, a small capacitance will be formed on the broken interface, usually lower than 10pF. This makes the entire capacitance of the product lower than the normal value. The capacitance of a product may be higher than normal when the product is short-circuited or near short circuit. Thus the high/low limit of capacitance variation can be used to identify short circuit problems.

![Diagram of flashover detection]

HIGH SPEED CONTACT CHECK (HSCC)
HSCC mode is a new measurement technology for contact checks. It scans the circuit contact with multiple test points in a very short period of time. With this new feature, contact checks can be performed quickly prior to the Hipot test.

![Diagram of high speed contact check]

DCR MEASUREMENT 2W/4W
DCR measurement for two-wire/four-wire is one of the standard test items. The two-wire measurement is suitable for major DCR, whereas the four-wire measurement is suitable for minor DCR since it is more accurate.

Temp Compensation
Problems caused by temp differences will usually occur while measuring minor DCR values, when the temp difference and the measured resistance value will be different. With the Temp Compensation function that has been added to the 19035, the DCR is converted to the measured value under standard temp via temp coefficient conversion. Thus, the measured difference generated by temp differences will be reduced.

DCR Balance
Checking DCR balance of motor windings is just as important as checking inductance balance of the windings. When the EMF drive of different windings are not matched the rotational torque force will be unbalanced causing additional shaft wobble, vibration and bearing wear which affects long term life of the motor. The DCR Balance calculates the difference between the max and min DCR of the windings and compares that value to an acceptable programmable level, which in turn gives a PASS/FAIL output result for DCR balance. The DCR Balance Test is an auxiliary test tool for motors which helps establish long-term reliability of motors.

Contact Check
DCR tests not only measure the resistance of a winding, but also check the connections before the Hipot test. Chroma 19035 can perform DCR measurement on windings to check for external contact, and specifically for capacitance lower than 20 pF between the test points in a wound component.
MOTOR/DC FAN SEMI-FINISHED PRODUCTS ELECTRICAL TESTING
Motor, DC fan and other semi-finished products of electrical rotating machinery including stator and rotor require Hipot, DC resistance and layer short tests.

The 19035-M can offer four-wire DCR measurement without computer control. Users can scan test two DUTs at a time via 8 test terminals which have separate Drive and Sense terminals to increase productivity.

CH 1, 2, 3, 5, 6, 7 can be set High/Off
CH 4, 8, can be set Low/Off

APPLICATIONS

SUB-STEP FUNCTION FOR MULTI-UUT TESTING
Parallel testing is often used as a solution for enhancing the efficiency of withstand voltage tests during production. However, if current high/low limit are not set correctly, defective products may be released, and good products may be misjudged as defective and sent to subsequent stations for unnecessary retesting.

In order to solve the parallel test problem and reduce the number of stations and cost, the 19035 Series provides a Sub-Step function. The fail condition can be set as a Sub-Step activation condition by editing the program sequence when parallel testing is required for production. This means that the Sub-Step test will be conducted only when the main test item (parallel) failed and will determine which DUT is faulty. With the implementation of this function, the efficiency of withstand voltage test is improved significantly on the production line.

Example:

STEP 1: AC Hipot / pin1 to pin5, 6, 7
Sub step A: AC Hipot / pin1 to pin5
Sub step B: AC Hipot / pin1 to pin6
Sub step C: AC Hipot / pin1 to pin7

40-CHANNEL SCAN FOR WOUND COMPONENT HIPOT TEST
The new, optional A190359 16CH HV External Scanning Box provides 16 test channels. Each channel can be set as H (High Voltage Output), L (Return Low), or Off. With a 19035 and A190359 combination, the efficiency of wound component tests can be improved. With one 19035 and two A190359 units, up to 40 test channels are available. In addition, the contact check and tests of multi-pin components or products can all be done at once.

PANEL DESCRIPTION
### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Model</th>
<th>19035</th>
<th>19035-M</th>
<th>19035-S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode</td>
<td>ACV / DCV / IR / DCR -8CH</td>
<td>ACV / DCV / IR / DCR -8CH</td>
<td>ACV / DCR -8CH</td>
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<tr>
<td>Channel Programming</td>
<td>H/L/X in 8CHs</td>
<td>H/X in CH 1,2,3,5,6,7, L/X in CH 4,8</td>
<td>H/L/X in 8CHs</td>
</tr>
</tbody>
</table>

#### Withstanding Voltage Test
- Output Voltage: AC 0.05 ~ 5KV, DC: 0.05 ~ 6KV
- Load Regulation: ±(1% of setting + 0.1% of full scale)
- Voltage Resolution: 2V
- Voltage Accuracy: ±(1% of setting + 0.1% of full scale)
- Cutoff Current: AC: 30mA, DC: 10mA
- Current Resolution: AC: 0.1 μA, DC: 0.1 μA
- Current Accuracy: ±(1% of reading + 0.5% of range)
- Output Frequency: 50Hz / 60Hz
- Test / Ramp / Fall / Dwell Time: 0.3 ~ 999 sec., continue / 0.1 ~ 999 sec., off / 0.1 ~ 999 sec., off
- Waveform: Sine wave

#### Insulation Resistance Test
- Output Voltage: DC: 0.05 ~ 5KV
- Voltage Resolution: 2V
- Voltage Accuracy: ±1% of setting + 0.1% of full range
- IR Range: 0.1MΩ ~ 50GΩ
- Resistance Resolution: 0.1MΩ

#### DC Resistance Measurement
- Test Signal: ±DC 10V, < DC 140mA
- Measurement mode: 2 terminals (2W) / 4 terminals (4W) measurement selectable; Range: 50mΩ ~ 500kΩ

#### Flashover Detection
- Setting Mode: Programmable setting
- Detection Current: AC: 1mA ~ 15mA, DC: 1mA ~ 10mA

#### Secure Protection Function
- Fast Output Cut-off: 0.4ms after NG happen
- Ground Fault Interrupt: 0.5mA ± 0.25mA AC, ON/OFF
- Panel Operation Lock: Present password
- Interlock: YES

#### GO/NG Judgment Window
- Indication, Alarm: GO: Short sound, Green LED; NG: Long sound, Red LED
- Data Hold: Least tests data memories
- Memory Storage: 50 instrument setups with up to 20 test steps

#### Interface
- RS-232*1 (Standard), RS-232*1 or GPIB & Handler & Temperature interface (Optional)

#### General
- Operation Environment: Temperature: 0°C ~ 45°C, Humidity: 15% to 95% R.H @40°C
- Power Consumption: 500VA
- Power Requirements: 90~132Vac or 180~264Vac, 47~63Hz
- Dimension (H x W x D): 133x430x470mm/5.24x16.93x18.50 inch
- Weight: Approx.20 kg/44.09 lbs

All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

### ORDERING INFORMATION

- **19035**: Wound Component EST Tester
- **A190347**: GPIB & Handler & Temperature Interface
- **A190348**: RS232 Interface
- **A190351**: 8ch-16ch HV box for 19035
- **A190358**: Handler Indicator
- **A190359**: 16ch HV External Scanning Box
- **A190512**: Auto Control TR. Scan Box(3002B)
- **A190702**: 40KV HV Test Probe

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