CURRENT INJECTION RELAY TESTER

CR-100

(Code 7 70 081)

INSTRUCTIONS MANUAL

(M 981 329 / 00A)

CURRENT INJECTION RELAY TESTER CR-100

1.- CR-100 DESCRIPTION

CR-100 is a current source specially designed for testing the current/time curves of automatic switches and indirect protection relays.

The CR-100 consists of an adjustable current source, a control circuit and a measurement unit.

- The current source is supplied by the mains, at 230V ac and is provided with an adjustable autotransformer, a separation transformer with three independent outputs and corresponding output terminals. This circuit is protected by 6A automatic breaker .

- The control circuit consists of an ON/OFF element, indications and voltage free external terminals to be connected to the contact (NC or NO) of the relay to be tested.

- The measurement unit is synchronised with the start and stop of the current circuit. It consists of a digital ammeter and chronometer. The measurement unit and the control circuit are protected by a fuse.

2.- MAIN CHARACTERISTICS

SUPPLY:

- Voltage 230Vac + 10% - 15 %, single phase - 50.....60 Hz
- 6 A maximum

ADJUSTABLE CURRENT SOURCE

- Current adjustment by turning control knob
- Outputs: **0 - 60 V 10 A max - 600 VA**
  0 - 12 V 50 A max - 600 VA
  0 - 6 V 100 A max - 600 VA

- Isolated circuit
- Maximum overcurrent : 2,5 In - 10 s (6 V output)
  1,5 In - 1 min (6 V and 12 V output)

CURRENT MEASUREMENT

- Digital ammeter with following scales:
  19,99A 199,9A 999A
- Preselection of the scales by scale selector
- Out of scale indication
- Protection against over current
- Accuracy : 0.5 % of readout ± 1 digit

TEST TIME MEASUREMENT

Digital chronometer up to **9999,99** seconds

TEST CONTROL

- Start : By means of ‘ON’ button
- Stop : Automatic by external NC contact
  Automatic by external NO contact
  Manual by ‘OFF’ button

- The time of the test is shown in the chronometer display until the "Reset" button is pressed.

DIMENSIONS, WEIGHT

- Dimensions : 430 x 312 x 265 mm
- Approximate weight : 22 kg.

ACCESSORIES (included)

2 cables of 6 m for test up to 30 A
1 cable for control of the chronometer
1 instruction manual

3.- INSTALLATION AND START-UP

3.1.- INITIAL CONSIDERATIONS

The manual you hold in your hands contains information and warnings that the user should respect in order to guarantee a proper operation of all the instrument functions and keep its safety conditions.

Whether the instrument is not used as manufacturer's specifications, the protection of the instrument can be damaged.

When any protection failure is suspected to exist (for example, it presents external visible damages), the instrument must be immediately powered off. In this case contact a qualified service representative.

3.2.- CONNECTION TO THE SUPPLY

The power supply must be 230 V , and the maximum current 6 A . The nominal frequency is 50 Hz (or 60 Hz depending of the model)) . It is important to use the ground connection.

The automatic breaker located in the front part serves as general switch. It is recommended not to connect it until all other connections have been established.

3.3.- CHOOSING CURRENT METER SCALE

The current meter scale can be chosen independently of the output to be used. Only the maximum current to be measured has to be taken into account.

3.4.- CHOOSING THE CURRENT OUTPUT

The terminals are chosen according to the required current (up to 10A , up to 50 A or up to 100A), the common is the same for both current ranges.

The test have always started with the relay under test connected to the "COMMON" and "100 A" (6 V) contacts. In this way, the highest accuracy will be achieved. If with the regulator knob in 100 % position, the necessary current can't be obtained, this connection has to be changed to "COMMON" and "50 A" (12 V); A higher output voltage (up to 12 V) can be obtained this way ; the output current may not be higher than 50 A. If the necessary current can't be obtained, this connection has to be changed to "COMMON" and "10 A" (60 V) ; the maximum current is 10 A .

3.5.- CHOOSING THE CONNECTION CABLES

Once the necessary test current is determined, the CR-100 can be connected to the relay to be tested.

- For current of 30 A or lower, the 6 mm^2 section cable have to be used.

- If the necessary current is higher than 30A, adequate section cables have to be used (aren' t delivered)

3.6.- CONNECTION OF THE EXTERNAL AUXILIARY CONTACT

If it is assumed that the **Stop** at the end of the test is done automatically, it is necessary also to connect two cables at the ‘EXTERNAL CONTACT-NC/NO **’** terminals and at the contacts of the relay under test.

Also the switch has to be set according to the function of the contacts of the relay under test :

NC: normally closed (stops when opening)
NO: normally open (stops when closing)

- In case the stop has to be done manually, the ‘OFF’ button has to be used. In this case no cable need to be connected to the ‘EXTERNAL CONTACT-NC/NO**’** terminals and the switch has to be set to the ‘ADJUST’ position.

4.- TEST ADJUSTMENT

4.1.- PREVIOUS ADJUSTMENT

- The ammeter has to be set to the adequate scale
- The switch is set to the ‘ADJUST’ position.
- With the turning knob in the 0% position, the ‘ON’ button is pressed and the required current can be adjusted.

☞ **THE ADJUSTMENT TIME HAS TO BE AS SHORT AS POSSIBLE TO AVOID PREVIOUS WARMING OF THE RELAY. IN ANY CASE, A CERTAIN COOLING DOWN TIME HAS TO BE PASSED BEFORE EXECUTING THE TEST.**

4.2.- CALCULATED ADJUSTMENT

When checking the magnetically switching of a relay, the time can be so short that it isn' t possible to adjust the current adequately. In such a case it is necessary to use calculated adjustment although this is not as accurate as real adjustment.

This method is based on adjusting the regulator at a current 3, 4 or 5 times lower than to be used during the test. Once this adjustment has been realised, the % value has to be read in the display. Next this % value has to be multiplied by 3, 4 or 5 according to the previously chosen value. Put the regulator in the new position and continue executing the test.

Example :

Supposing the test of the magnetically switch (8 In ; 120 A) of the relay with the nominal 15 A When adjusting it, the relay switches at not determined point of the regulator, without time to read the reached current.

Realisation :

- Select the adequate output : ' common ' and '50 A ' .
- Put the selector in the 'ADJUST' position.
- Adjust the current 4 times lower than the test current (3 A)
- The value in % that is indicated by the regulator (15 %) has to be multiplied by 4 (indicating 15 % , this will be 60 %)
- Adjust the regulator at the previously obtained value (60 %)
- Continue the test in the same way as if the real adjustment had been used (put the selector in NC or NO position, press ' ON ' , etc).

5.- TEST EXECUTION

- The " NC/ ADJUST/ NO" switch is set to the required position (NC or NO).
- The correct setting of the ammeter has to be set in order to get the maximum accuracy in the read-out.
- The RESET button has to be pressed to set the chronometer to'0'

- Now the 'ON' button can be pressed that starts the flow of the selected current and the chronometer will start to count.

☞ If the CR-100 is not starting to test, probably the "NC/ ADJUST/ NO" switch is in the wrong position.

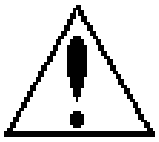
DURING THE TEST, AS THE TEMPERATURE OF THE RELAY UNDER TEST WILL CHANGE, ALSO THE FLOWING CURRENT WILL CHANGE. IT IS THEREFORE NECESSARY TO READJUST THE CURRENT FREQUENTLY TO MAINTAIN THE CURRENT AT THE REQUIRED VALUE.

If the stop is automatically, the test is stopped when the relay contact trips. In case the stop has to be manual, the 'OFF' button has to be pressed immediately when the relay trips.
In both cases, the duration of the test will be indicated in the chronometer display until the 'RESET' button is pressed.

6.- INTERPRETATION OF THE RESULTS

The goal of the test is to know tripping time of a relay for a previous set over-current. The CR-100 relay tripping tester from CIRCUTOR allows the read-out of this time by means of a digital chronometer. The result is given in seconds, decimals and hundreds of seconds. It is the responsibility of the operator that the current stays stable on the set value during the whole test.

7.- SAFETY CONSIDERATIONS



All installation specification described at the previous chapters named INSTALLATION AND START-UP, INSTALLATION MODES and SPECIFICATIONS.

Note that with the instrument powered on, the terminals could be dangerous to touching and cover opening actions or elements removal may allow accessing dangerous parts. This instrument is factory-shipped at proper operation condition.

8.- MAINTENANCE

The **CR-100** does not require any special maintenance. No adjustment, maintenance or repairing action should be done over the instrument open and powered and, should those actions are essential, high-qualified operators must perform them.

Before any adjustment, replacement, maintenance or repairing operation is carried out, the instrument must be disconnected from any power supply source.

When any protection failure is suspected to exist, the instrument must be immediately put our of service. The instrument's design allow a quick replacement in case of any failure.

8.- TECHNICAL SERVICE

For any inquiry about the instrument performance or whether any failure happens, contact to CIRCUTOR's technical service.

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ANNEX A

MAIN ELEMENTS (FRONT PART)