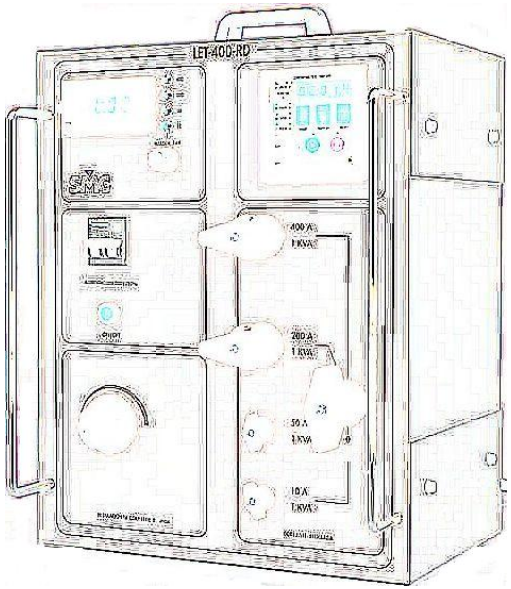
TESTING SET FOR CURRENT AND VOLTAGE RELAYS UP TO 400 A

USER'S MANUAL



LET-400-RD

REFERENCE:ABCVMV02

EDITION: March 1, 2007

VERSION: 4

Quality is the core reference for EuroSMC's activities, aimed to fully satisfy our customers' needs and expectations.

DISCLAIMER

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LET-400-RD PACKING LIST

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INTRODUCTION

The LET-400-RD relay testing set has been designed to optimize the tests required to check the sensitivity of electronic and electromechanical overload relays and their response on the corresponding I/t curve. A combination of different equipment sets has traditionally been used to run this type of test, with consequent loss of time and possibility of error. The LET-400-RD contains all the systems required of such tests in a single unit of small size and weight and can easily be handled by two people. As all the component systems are connected internally to connect, all that is needed is to connect the power supply and the correct output terminals on the receiver, thus eliminating any chance of improper connection.

In general, it is a modern unit with high accuracy and able to assist in the majority of economic and technical problems the older systems traditionally used to make this type of test.

DESCRIPTION

The LET-400-RD set consists of the following systems:

CURRENT REGULATION AND PRODUCTION.

MEASUREMENT OF OUTPUT MAGNITUDES.

TIMING ACTION OF RELAY UNDER TEST.

The above elements are contained in one case made of aluminum with a high-quality baked enamel finish. The front panel where the control, regulating and connecting devices are mounted, is made of bakelite of high dielectric rigidity. There are two metal handles located at the sides, of the right height and strength to protect the front panel and its components. On top of the set there is a plastic handle, designed to offer a safe and convenient means of carriage. On the back is a 1m long power cable with two conductors of suitable section.

Following, there is a detailed description of each of the items listed above.

CURRENT REGULATION AND PRODUCTION

The current regulation and production system consists of a continuous-regulation autotransformer which drives a toroidal transformer designed for short-circuit duty so that the desired current is produced. The technical characteristics of the system are as follows:

- Power supply: 230V. 50Hz.± 10%.
- Output terminals:
  - 10A 0-100-V
  - 50A 0-20V
  - 200A 0-5V
  - 400A 0-2,5V
- Power: 1000VA. in each output terminal.

Power is fed to the circuit via a relay, which also sends a logical (YES/NO) signal to the timer circuit to start the chronometer.

The system is protected by a suitable automatic thermal magnetic cut out switch accessible on the front panel.

The current outputs taps are terminals of more than enough section to take the corresponding outputs; these taps and the output for each are indicated on the front panel.

Each output field from 0 to maximum value indicated and is regulated manually via the autotransformer mentioned earlier; this is equipped with a duly-marked minimum-maximum dial control.

MEASUREMENT OF OUTPUT MAGNITUDES

In order to save space and weight, there is a manual switching system for reading all the output magnitudes with a single instrument. Each of the circuits is described below.

Measurement of current output

The circuit for measuring current output consists of a rotating switch which must be set for the appropiated range as marked by LED diodes. Whenever no other measurement is selected, the display automatically shows current. The technical characteristics of the system are as follows:

Measurement ranges:

- 0 - 10A
- 0 - 50A
- 0 - 200A
- 0 - 400A

Accuracy: ± 0,5% of the reading ± 5 digits.

IMPORTANT: Each range ONLY WORK with the correspondent tap. If you have selected the 50A range in the ammeter and you are connected in the 200A tap the ammeter will not be metering the output in the 200A tap.

TIMING MEASUREMENT

Timing of the electrical protection and control relays is vital in determining proper functioning, and therefore and action timing measurement system is included as an integral part of the LET-400-RD set. Timing is measured by a digital electronic system with start and stop commands activated by logical signals, or if need be by the presence or absence of voltage in the coil.

For more information see Annex 1. Multifunction timer TM-01-MC.

OPERATING INSTRUCTIONS

The LET-400-RD is simple and handy to use for any operator possessing the minimum electromechanical knowledge required for verification work of this kind. These instructions are divided into the following sections:

CONNECTING AND SWITCHING ON

REGULATING CURRENT.

In view of the diverse applications to which this set is suited, we do not include practical cases. These instructions therefore indicate only how to obtain the desired current and voltage measurements and how to interpret these.

CONNECTING AND SWITCHING ON

Before the apparatus is switched on, the following checks should be made:

1. Ensure that the input voltage is 230V 50Hz. Higher input voltage may result in severe damage to the apparatus.

2. Before connecting, check that the automatic cut-off is set at 0.

3. Check that the current regulator is turned fully to the left (0 mark).

4. Ensure that the apparatus is free of moisture and is not in contact with any conductors not involved in measurement.

After these checks, the cable at the back can be connected to the 220V outlet. With the power supply connected, the breaker located on the front panel can be switched from 0 (OFF) to 1 (ON); the current measurement instrument and timer display should light up, although there is no power to the control circuit, an hence to the output terminals, while the green button is lit. The impulse from switching on may cause the timer to start counting; if this happens, pressing the RESET button will return it to 0, ready to start again.

REGULATING THE CURRENT

With the apparatus set as described above, regulation of the current can begin as follows:

1. Having determined the current range required, select the output from those available (10, 50, 200, 400A) and connect the test receiver between the 0 terminals and the target terminal using cables of appropiate section for the current used. The operator should ensure that the terminals are properly tightened particularly in the higher fields, in order to avoid loss of power and undue heating.

2. Next, the measuring apparatus must be set in the correct range via the rotating switch located below. In the left position the light marked "10A" (10A output) should be lit. As the selector is turned to the right, the other lights should come on successively up to 400A. Each measurement range has a corresponding output field, as shown in the following table:

INSTRUMENT	OUTPUT
10	0 - 10 A
50	0 - 50 A
200	0 - 200 A
400	0 - 400 A

In the event that the measurement and output ranges should not coincide, the instrument will not show the measurement. This will not cause any harm.

On completion of the foregoing operations the apparatus is ready to inject the required current level in the receiver being tested. This done by simply pressing the "ON" button on the front panel, having first made sure once again that the control marked "REGULATION" is at minimum setting - that is, turned fully to the left -. When the "ON" button is pressed, it will light up, indicating that the power circuit is energized and the regulation process can be initiated by simply moving the "REGULATION" control to the right until the instrument shows the desired output level.

Care should be taken when augmenting the output current in this way since, in the regulating system used by the LET-400-RD, the voltage put into the generating transformer primary in order to obtain a given output amperage varies according to the load connected, thus to obtain the same output value, it may be enough to turn the regulator only a little or it may have to be turned through a considerable arc.

It will be seen that immediately after the "ON" button is pressed, the timer starts up. If this is not desired (most cases), the "RESET" button should be pressed so that the timer returns to 0, ready for a new measurement.

SPECIFICATION

TECHNICAL CHARACTERISTICS

- Power supply.....220V 50/60Hz.
- Output.....Selectable in 4 ranges.

  0 - 10A 0-100V.

  0 - 50A 0-20V.

  0 - 200A 0-5V.

  0 - 400A 0-2.5V.

  - Nominal Power.....1000VA in each output

CURRENT MEASUREMENT

- Ammeter.Digital,3 ½ digits LED type (96x48 mm).
- Measurement 4 ranges.. 0-10/50/200/400A 50Hz.
- Accuracy ..... ± 0.5%

Duty cycle:

MAX. CONTINOUS CURRENT	MAX. CURRENT 60 MIN	MAX. CURRENT 15 MIN	MAX. CURRENT 3 MIN.	MAX. CURRENT 1 MIN.	MAX. CURRENT 1 SEC.	OPEN CIRCUIT VOLTAGE
400 A	600 A	800 A	1,100 A	1,400 A	2.5 kA	3.45 V
200 A	350 A	400 A	550 A	700 A	1.5 kA	6.90 V
50 A	175 A	100 A	138 A	175 A	325 A	27.5 V
10 A	25 A	20 A	27,5 A	35 A	65 A	138 V
Cooling Time	15 min	20 min	20 min	30 min		
MAX. CONTINOUS CURRENT	MAX. CURRENT 60 MIN	MAX. CURRENT 15 MIN	MAX. CURRENT 3 MIN.	MAX. CURRENT 1 MIN.	MAX. CURRENT 1 SEC.	OPEN CIRCUIT VOLTAGE

*Guaranteed values at ambient temperature < 25° C

DIMENSIONS

- Height.....460 mm.
- Width. .....374 mm.
- Depth..... .....250 mm

WEIGHT ..... 23 Kg.

NOTE: Proper cable size must to be used to ensure that the current limitsa are achieved

AFTER SALES SUPPORT

WARRANTY

This is an expression of trust that our products obtain. based on the reliability and functionality standards that our customers expect.

The warranty covers the free replacement or repair of defective components for one year in the terms specified in the supplied warranty statement and registration card.

Damages resulting from improper handling of the product. use outside the scope and limits of the product's specifications. negligence. installation not in accordance with the standards or warnings listed in the Instructions Manual and servicing or manipulation by unauthorized persons are not covered by the warranty.

CUSTOMER SUPPORT

EUROSMC guarantees the supply of materials and components for its products up to 3 years after discontinuation. This support is extendable to 5 years for technical service.

OTHER EUROSMC PRODUCTS

Portable Relay Test Equipment and Software

Medium & High Voltage Circuit Breaker Analyzer

Primary injection units up to 20.000 A

Digital handheld chronometer.

Digital handheld phase angle meter

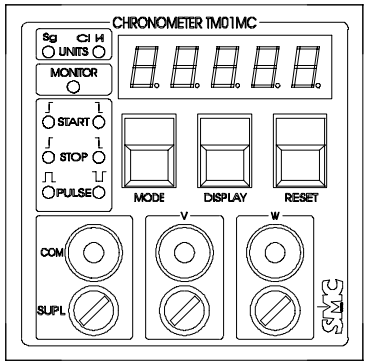
Digital Portable microhmeter up to 100 A Test current.

Test systems for automatic miniature circuit breakers.

Voltage and current regulation equipment.

Step & Touch Voltage measurement equipment

ADDENDUM 1: "TM-01-MC MULTIFUNCTION TIMER"



1. INTRODUCTION

This timer was designed as an instrument necessary in our current injection test set for testing relays. Its function is to determine of the most important parameters in relay testing, the timing reaction of the trip time. This timer is incorporated in the unit, with the intention of minimizing the number of test instruments needed to be carried for tests in field use.

2. CONTROLS AND FUNCTION DESCRIPTION

2.1. MEASUREMENT DISPLAY

This display is made up to 5 digits of 7 segments, with the decimal point on the right hand side.

2.1.1. INDICATORS

UNITS: This group is made by 2 LED's, which indicate the measurement shown

Sg Measurement in seconds from 00.000 to 99999,and automatically changes the decimal point.

Ci/Hz Measurement in cycles, the frequency measurement in Hertz, works as a frequency meter. Frequencies from 20.000 to 4000.0 Hz., can be measured

MONITOR: This LED indicates the input state of the timer

If the LED is lit, the input is closed between W and COM (common) or the presence of voltage between V and COM (common)

2.2.2. FUNCTION MODES

The various function modes are selected by the press button key marked MODE; and determines the various combinations that can be used to start and to stop the timer. As well it selects, if the timer, is the timer mode or frequency mode.

START: These 2 LED's indicate the type of operation of the injection control in which the timer will start

- Start with current Injection

- Start with injection cut off

STOP: These 2 LED's indicate the type of signals received in the input tap, in which the timer will stop and hold the timing measurement

- Stop with the circuit (tap COM and W) or the presence of voltage (tap COM and V)

- Stop with the circuit open (tap COM and W) or the absence of voltage (tap COM and V)

PULSE: These 2 LED's indicate the type of signal in the Input tap of the timer, which will stop or start the timer

- Starts with the circuit closed or with the presence of voltage

- Stops with the circuit open or the absence of voltage

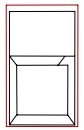
- Starts with the circuit open or the absence of voltage

- Stops with the circuit closed or the presence of voltage

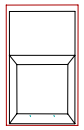
FREQUENCY: If the LED Ci/Hz is lit it measures the frequency input in the tap COM and V

2.2.3. PRESS BUTTON CONTROLS

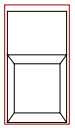
These are made up of 3 press button switches:



MODE: Each time this button is pressed it will automatically change the function mode. The total function modes are 7, in which 4 modes are to start and stop the timer, 2 for the pulse mode, and 1 for the frequency measurement



DISPLAY: This mode selects time measure in either seconds or cycles



RESET: When this button is pressed, it stops and resets the timing reading displayed, having the unit ready to start the following test. If the press button remains pressed for more than 2 seconds "..." appears in the display, which deactivates the timer and it's internal functions of HOLD and TRIP of the unit which is installed.

2.2.4. INTERNAL FUNCTIONS

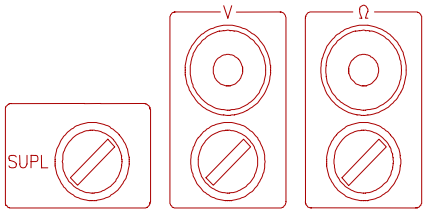
These are the internal chronometer functions which the timer has over the unit it is installed in. These are:

HOLD This retains the ammeter reading of the injection instrument. This is produced in the moment the timer stops. The injection set is free and ready to work again when the RESET button is pressed.

TRIP Approximately 1 second from the timer stopping, it also stops the current output. It is not possible the inject again until the TIMER is RESET.

2.2.5. PROTECTIONS

All fuses are located on the front panel of the timer, and clearly marked.



INDICATION	PROTECTION	FUSE
SUPL	Voltage Supply	50mA/250V fast 5x20mm.
V	Voltage Input	32mA/250V fast 5x20mm.
W	Contact Input	32mA/250V fast 5x20mm.

Replace only with fuses of the same type and rating. Otherwise, the warranty will be void.

SPECIFICATIONS			
Working temperature	Absolute Range Relative Range	0-40ª C 20 – 30ª C	
Accuracy	Time measurements	± 0.01% Rd± 1 ms	
Resolution	Maximum (in all modes) In the pulse mode, times of less than 5 ms cannot be measured	1 ms/0.05 Cycles/0.001 Hz.	
Inputs	Contact	Voltage in open circuit Current in short circuit	10.2 V. 13mA
	Voltage	Input Range Frequency Impedance Input	5-250V(ac, dc) 20-4000 HZ. 19 KW