



# I SERIES

# “I” SERIES

## TEST SYSTEMS AND WINDINGS CEMENTATION



- COMPLETE TESTING: RESISTANCE - RIGIDITY - SURGE - SENSE OF ROTATION
- CEMENTATION
- RE-TESTING (RIGIDITY - SURGE)
- MARKING

### FEATURES OF THE TESTS

#### OHMIC RESISTANCE:

- 'KELVIN' four-wire measuring system
- Measurement range: from 0.001  $\Omega$  to 2 k $\Omega$  in 8 automatic scales
- Minimum resolution 0.05 m $\Omega$
- Accuracy: better than 0.5% of f.s.
- Compensation of the measured resistance value at room temperature, by means of a thermometric probe (option)

#### INSULATION RESISTANCE (OPTION):

- Test voltage: 500 V d.c.
- Measurement range: from 200 K $\Omega$  to 1 G $\Omega$
- Maximum current: 3 mA
- Reading accuracy: 1%

#### ELECTRIC RIGIDITY:

- Test voltage: 0 - 3.000 V a.c. (5.000 V a.c. in option)
- Tripping current: 0.5 - 30 mA
- Test time: 0.5 - 100 sec.
- Short circuit current greater than 200 mA

#### TEST DIRECTION OF ROTATION:

The test is carried out by means of a static field detector

#### CYCLE TIME:

For three-phase stators with 3 windings: 12 sec. max.

#### PULSE TEST (SURGE TEST):

- Adjustable voltage between 0 and 3.000 V (5.000 V a.c. in option)
- Pulse energy 0,25 J - 1.2 J (option)
- Pulse frequency: 20 msec.
- Maximum peak current: 300 A
- Kneadable tolerance: 0 - 30%
- Sampling tolerance better than 0.1%
- Minimum measurable inductance 20  $\mu$ H
- Tolerances that can be mixed separately for errors of:
  - Impedance L (wrong turns, wrong connections, reverse windings, iron difference, etc.)
  - Quality factor Q (cortospire, short hank, etc.)
- Display on the monitor, always present, of the sample curve and the one under examination superimposed for an analysis of the type and entity of the defect

### GENERAL FEATURES

- Industrial Panel PC
- 32GB or higher removable solid-state HD
- 15" TFT display with touch-screen
- Virtual keyboard
- WINDOWS 10 EMBEDDED
- Possibility of TEAM VIEWER remote assistance
- 40 column printer for test receipt
- Visualization on the monitor of the connection diagram and image of the test object
- SELF-TEST
- Data archive and parameterization under password
- Production batch and serial number management
- Results recording on DATA-BASE with search filters in Excel or Access format
- Indication of partial results on the monitor and final result by means of LED indicators and a rejection acoustic warning device
- STOP CYCLE button for testing interruption or cancellation of the outcome
- Selectable multilingual SW

### OPTIONS

- Printer and impact (pad printing or laser)
- Conditioner



#### O6/C Test diecast motors

Detection of all possible defects: interruption of bars, blowing, porosity, angle of inclination, quality of aluminum, bonding of bars / iron, etc.



#### N1/NCP Automatic system to detect leaks in the stator pack

Detect changes in iron losses due to:

- Burrs in the cut of the foils
- Too great thickness of the foils
- High pressure on the edges
- DI Insufficient insulation between the foils
- Errors in the assembly procedure of the stator pack
- Wrong steel alloy used in the foils
- Type of lamellar nozzle: welding, stapling, nailing, shortening, etc.

Suitable for both laboratory and production tests. Possibility of automatic loading and unloading of inclination, quality of aluminum, bonding of bars / iron, etc.



#### H3/CPS Multifunctional tester for laboratory and service

Multifunctional tester for laboratory and service: Surge tests, ohmic resistance, insulation resistance, rigidity, IP, DAR, partial discharges, rotor tests, etc.

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# AUTOMATIC TESTING AND CEMENTATION SYSTEMS OF STATORS OF MOTORS AND OF WINDINGS IN GENERAL

Our machines are made to perform the following operations:

1. Complete testing of the object (stator, coils, etc.)
2. Cementation by JOLE effect
3. Re-testing of rigidity and SURGE to highlight any gaps that have occurred



## I10/NCP MANUAL CEMENTING

for single windings

Depending on the characteristics of the windings to be cemented (coils, relays, single coils), a current is circulated such as to cause the winding to be cemented in the foreseen time.

## CHARACTERISTICS OF “CEMENTATION”

It consists of a direct current generator controlled by a PC, of adequate power to deliver the current which, due to the Joule effect, causes the windings to heat up to the desired temperature in a few seconds.

This temperature, around 200 °, causes the softening of the surface enamel of the copper wire and the consequent polymerization of the same with gluing of the coils to each other and to the internal surfaces of the cavities (see our specific technical file).

The parameters to be set are:

- Wire diameter
- Current density (A / mmq)
- Final temperature

The ohmic resistance value is automatically acquired from the previous resistance measurement.

The equipment carries out the necessary calculations to obtain the resistance value at the final temperature ( $\Delta T$ ) and calculate the power supply voltage suitable for circulating the right current.

The generator is constant current in order to speed up the operation.

Special checks detect if faults occur during the cementation operation and, in this case, immediately interrupt the process, reporting it to the operator. The windings are cemented in parallel or in series with each other, according to convenience.



## I12/NCP

Version with 2 alternating workstations. Suitable for single and three-phase stators up to about 2KW of power. Total cycle time (masked loading and unloading) 30 - 40 sec.

Complete work cycle:

- Measure ohmic resistance
- Dielectric strength tests
- SURGE
- Survey of the sense of rotation field
- Cementation of the windings
- Dielectric strength and SURGE re-testing
- Voucher marking (OPTION)

Cementation current generators: they can be 1,2 or 3 depending on the number of windings, the required current values and the ohmic resistance. These can be connected in series or parallel to optimize both the powers involved and the total cost.



## I14/NCP-RT

Rotary table testing and cementing system for high production - up to 240 pieces per hour -

The type of measurement and tests are the same as those of the I12 / NCP machine, but distributed over several stations, typically:

- Station 1 - Manual loading and unloading (can be automated by robots)
- Station 2 - Testing ohmic resistance and direction of rotation
- Station 3 - Stiffness and SURGE testing
- Station 4 - Cementation
- Station 5 - Stiffness and SURGE re-testing
- Station 6 - Marking: Pad printing or Laser

