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UNIT FOR FAULT DIAGNOSTICS ON INDUSTRIAL ELECTRICAL WIRING

TROUBLESHOOTING THE CONTROL CIRCUIT AND THE POWER SECTION

ref. ESSAI-DIAG2

TEACHING RESSOURCES + PRATICAL WORKS

400VAC power supply via 3 meter cord and HYPRA-16A type plug

12 available breakdowns accessible with a key by the instructor.

Three-phase asynchronous motor for the power section.

TROUBLESHOOTING THE CONTROL CIRCUIT ONLY

ref. ESSAI-DIAG

TEACHING RESSOURCES + PRATICAL WORKS

230VAC power supply via 3 meter cord and 2P+T mains plug.

10 breakdowns available accessible with key by the teacher.

ESSAI-DIAG is a model that allows troubleshooting at different points on a wiring grid. The wiring on the grid represents the Star/Delta starting of an asynchronous machine with two rotation directions. The **ESSAI-DIAG2** version is a complete system, consisting of a control section and a power section with 3 x 24 VAC, controlling a three-phase asynchronous motor. Troubleshooting is performed on the entire circuit. On the **ESSAI-DIAG** version, only the control circuit is wired and allows troubleshooting.
Faults are selected by the instructor using switches located under a hatch at the rear of the model.
The operating voltage is 24 VAC. Students can therefore safely perform measurements and tests regardless of the type of fault.

EDUCATIONAL OBJECTIVES

- ***Understand and understand motor starter wiring***
- ***Create an industrial wiring diagram***
- ***Simulate the most common faults in an industrial installation***
- ***Visualize the effects of a coupling change on a motor (ESSAI-DIAG2)***
- ***Perform measurements of various electrical quantities***
- ***Take a voltage and current reading on the power section (ESSAI-DIAG2)***
- ***Analyze and interpret the results***
- ***Troubleshoot a relay installation***
- ***Replace a faulty component***

Practical works

- Identifying the various components
- Creating electrical diagrams
- Starting the motor (TESTING-DIAG2)
- Recording currents and voltages in the control circuit
- Recording currents and voltages in the power circuit (TESTING-DIAG2)
- Troubleshooting various circuit faults using measuring instruments
- Replacing a contactor

Examples of available faults

- Emergency stop always engaged
- Push button power supply disconnected
- Defective contactor coil
- Defective contactor NO auxiliary contact
- Defective contactor NC auxiliary contact
- Defective indicator light
- "Forward" control fault
- Defective motor leakage
- Defective motor phase (ESSAI-DIAG2 version only)
- Defective thermal relay (ESSAI-DIAG2 version only)

Model composition

- 1 chassis on casters (two with brakes) measuring H1800 x 800 x 700mm
- 1 melamine shelf measuring 750x400mm
- 1 wiring grid equipped with:
  - 1 two-pole fuse protection (four-pole ESSAI-DIAG2 version)
  - 1 4-pole 24VAC auxiliary contactor
  - 1 4-pole time-delay 24VAC auxiliary contactor
  - 4 4-pole contactors
  - 1 thermal relay
  - 1 three-phase asynchronous motor 3 x 24V / 42V (ESSAI-DIAG2 version)
- 1 PVC panel containing:
  - 1 emergency stop button
  - 1 On/Off button with indicator light
  - 2 On pushbuttons
  - 1 Off pushbutton
  - 3 white indicator lights
  - 3 green indicator lights
  - 1 red indicator light
  - 1 emergency stop for the Teacher

All the LED and button connections are connected to industrial terminals flush with the front panel. Students can then easily use test probes to read the voltage or check if the circuit is broken.

- 1 cabinet closed by a hatch containing:
  - 10 switches for creating faults (12 for ESSAI-DIAG2)
  - 1 main disconnect switch
  - 1 30mA-16A thermal-magnetic residual current circuit breaker
  - 1 key-operated switch with indicator light to activate the grid power supply

info@langlois-france.com CE PRODUCTS 2 YEARS GUARANTEE