ICMET Craiova has the **Quality Management System** implemented according to the **Standard ISO 9001:2000**, the **Environment Management System** implemented according to the **Standard 14001:2004** and **Occupational Safety and Health Management System** according to the **Standard OHSAS 18001:2007**

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NATIONAL INSTITUTE FOR RESEARCH, DEVELOPMENT AND TESTING IN ELECTRICAL ENGINEERING

AUTOMATIC INSTALLATION FOR POWER FACTOR COMPENSATION

GENERAL

The automatic installation for power factor compensation has the role to keep the power factor at the value desired by the user.

A reduced power factor has negative consequences on the energy system, among which it numbers:

- high absorbed current (for $\cos\varphi = 0,5$ the current through the load will be two times higher than the necessary one, for $\varphi = 0,9$ the current being only with 10% higher than the necessary one);
- high loss by Joule effect (they are present in all the circuits as connection cables, windings of distribution transformers, protection and contro devices);
- high voltage loss (they lead to an insufficient supply power of consumers);
- the diminishing of capacity of energy stations (especially in the case of distribution transformers).

The offered installation has the following advantages:

» it eliminates the above negative consequences
» it is mounted on low voltage side where the effect of the compensation is maximum
» it automatically diminishes the reactive energy consumption, keeping the power factor at the preset value
» it does not necessitates specialized personnel for the exploitation
» it assures step operation, performing a maximum compensation
» each saved kvar will lead to the saving of approx. 0,2 kW

TECHNICAL DATA

- Nominal voltage: 415 V, three-phase 50 Hz
- Supply voltage of control circuit: 230 V/ 50 Hz
- Insulation level: 660 V dielectric strength 50 Hz, 1min., 2,5 kV
- Short-circuit capacity: Idc = 30 kA, 1 sec..
- Maximum allowed current: 1,3 I_N (400 V)
- Maximum allowed voltage: 450 V (8 up to 24 h according to 60831 IEC)
- Temperature conditions:
  - maximum: 40^0 C
  - the average within 24 h: 35^0 C
  - the yearly average: 25^0 C
  - minimum: -5^0 C
- Protection degree: IP 20

DESCRIPTION OF COMPENSATION INSTALLATION

The compensation of power factor is performed with an automatic installation composed of: reactive power regulator, ecological capacitor batteries, contactors for each step connection and fuses.

The reactive power regulator has the role to connect and disconnect the steps of the capacitor depending on the necessary reactive power during the operation of compensation installation with capacitors.

Thanks to an optimization program, the regulation is performed faster at higher differences between the rated value and the measured one and more slowly at lower differences, to avoid supplementary switchings.