AUTOMATIC ELECTRIC CONTROL PANEL

FOR GENERATING SET

GENERAL INFORMATION: The electric control board, herewith mentioned, is designed to control emergency automatic Generating Sets. This equipment has to ensure delivery of electric energy within 5 15 sec. from the mains failure.

CARPENTRY: 15/10 bent and welded steel sheet, epoxy resin painting. The colour tone is RAL 7032. Protection degree IP 44.

THE PANEL PERFORMANCES ARE:

- **Control of the mains** by three-phase voltage relay adjustable from 85 and 100 % of the main voltage. The control is even on one phase only.
- **Automatic starting** of the Generating Set with adjustable delay-action (table 1) and with min. 4 starting attempts programmable by software at the order placement (table 2)
- **Automatic connection** of the gen. set contactor (or pre-arrangements for the changeover) with the loads when the rated parameters of the machine are reached. Connection time (table 2);
- **Automatic monitoring** of the engine and alternator by means of suitable protections;
- **Automatic Gen. Set disconnection** from the loads at the mains' return after a certain delay adjustable directly on the card (table 1);
- Prompt **Automatic Gen. Set stop** in the case of breakdown or alarm, and adjustable delayed one as soon as the time lag of the gen. set cooling passes;
- **Pre-arrangement** for a new intervention;
- Engine pre-heating **control and protection** to facilitate the Generating Set starting and to ensure an immediate power supply.

THE FOLLOWING CONTROL EQUIPMENT IS PROVIDED:

1 MARGEN control and signalling unit type microprocessor ***GM 2000 Basic***, fixed on the front side for:

- *Feed card*
- *Mains presence*
- *Gen. set running*
- *Load on mains*
- *Load on gen. Set*
- *Low oil pressure*
- *High engine temperature*
- *Low fuel level*
- *Overspeed*

- *Overload*
- *Starting*
- *Stop*
- *Starting failure*
- *Battery undervoltage*
- *Preheating failure*
- *Alternator battery charger*
- *Emergency*
- *General alarm*

and the following functions:

- *Manual running push button*
- *Manual stop push button*
- *Alarm reset push button*
- *Failure reset push button*
- *Work hour meter*
- *Siren*

- *Push buttons selecting the gen. set's operations:* **LOCKED, MANUAL, AUTOMATIC, TEST**.

LOCKED: Any function, either manual or automatic, is locked; if the gen. set is running, it is stopped

MANUAL: the user manually selects the starting and stop operations by means of STARTING and STOP push buttons. In this position the engine's protections are connected.

AUTOMATIC: all the operations of starting, stop, changeover and alarm are automatically selected

TEST: it allows the gen. set starting and the relative control operations but it is not possible to operate

the mains/gen.set commutation; during the test running a possible mains failure will induce the automatic mains / gen.set changeover

- N° 1 emergency push button
- N° 1 automatic battery charger
- N° 1 Control card interface with emergency system
- N° 1 Inner led testing button
- Contacts on terminal board for emergency stop;

INSTRUMENTS:

The main parameters are displayed on a **MARGEN** multifunctional digital instrument type **SD_Basic** fixed on the front side, at any moment it is possible to check the following parameters:

- Mains line voltage (reading of voltage between two chosen phases)
- Gen. set line voltage (reading of voltage between two chosen phases)
- Gen. set current (reading of current between two chosen phases)
- Active power
- Gen. set frequency
- Fuel level

EMERGENCY SYSTEM: *In the case of GM 2000 card failure, an interface inside the control board enables the gen. set's starting and stop and the changeover system's control with the exception of the alarms.*

POWER CIRCUIT :

Quadripole magnetic thermal switch with magnetic regulation suitable for the alternator's short circuit current, fixed directly on the gen. set or in separate cabinet.

For some types of gen. sets the changeover system can be included either in the control board or in separate box.

Table 1. Parameters and times programming by the user on the GM 2000 Basic control card.

Parameter	range	default value
Starting time	0-20 sec	5
Stop time	0-30 sec	10
Gen. set starting delay	0-120 sec	0
Mains return delay	1-120 sec	30
Cooling time	0-240 sec	30
Time to reach the steady running	0-60 sec	2

Table 2. Parameters and times programming on the GM 2000 Basic control card during the acceptance test

Parameter	range	default value
Changeover time	0-1000 sec	1
Alarm delay	0-100 sec	2
Pre-alarm delay	0-100 sec	2
Low oil pressure delay	0-100 sec	5
Starting attempt number	0-100 sec	4
Delay between startings	0-100 sec	5
Min. battery Voltage	0-30V	7
Overfrequency	50-70 Hz	60