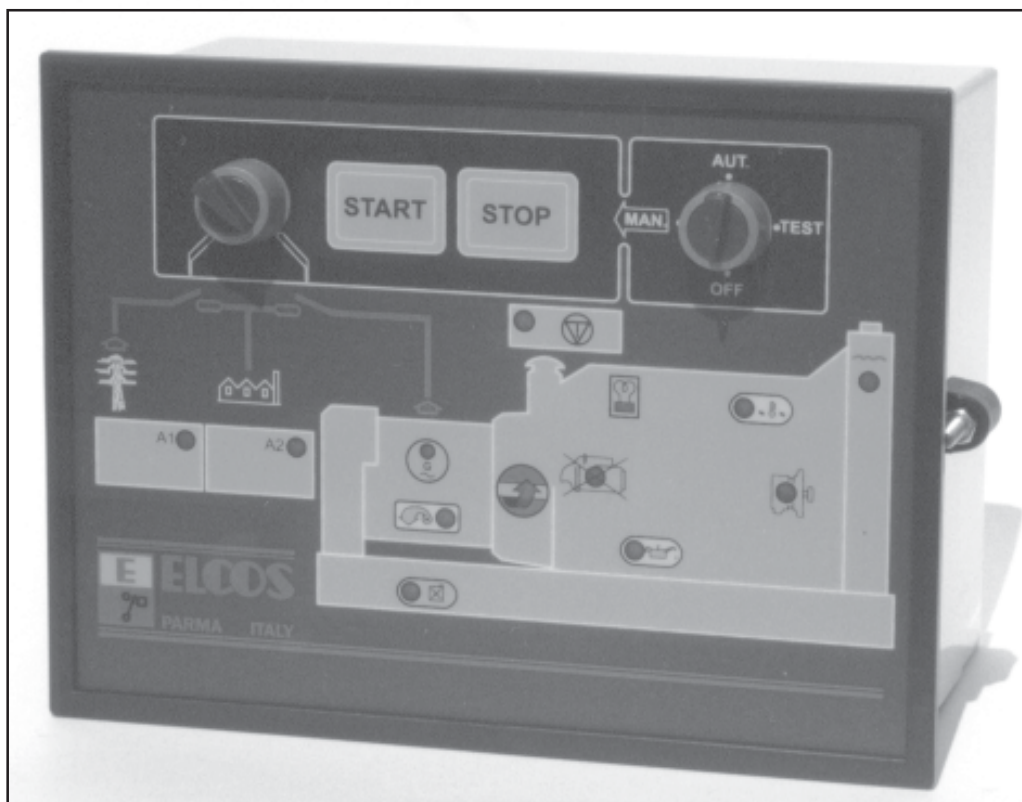


CONTROL PANEL FOR GENERATING SET

TYPE CAM - 530/20



CREATED TO EQUIP AUTOMATIC EMERGENCY INTERVENTION EQUIPMENT

- AUTOMATIC STARTING WITH 4 IMPULSES
- GLOW-PLUG THERMO-STARTER CONTROL
- AUTOMATIC SURVEILLANCE OF GENERATOR UNIT
- CONTROL FOR GENERATOR RUNNING AT TOO HIGH FREQUENCY
- IMMEDIATE OR DELAYED STOP WHEN MAINS RETURNS
- ENGINE COOLING
- MANUAL SELECTOR SWITCH FOR MAINS-GENSET CONTACTORS
- POSSIBILITY FOR REMOTE CONTROL OF START, BLOCK, STOP, TEST
- SINGLE-PHASE VOLTMETERIC SURVEY OF GENERATOR
- SURVEY OF MAINS POWER VIA THE INSTALLATION OF AN EXTERNAL RELAY

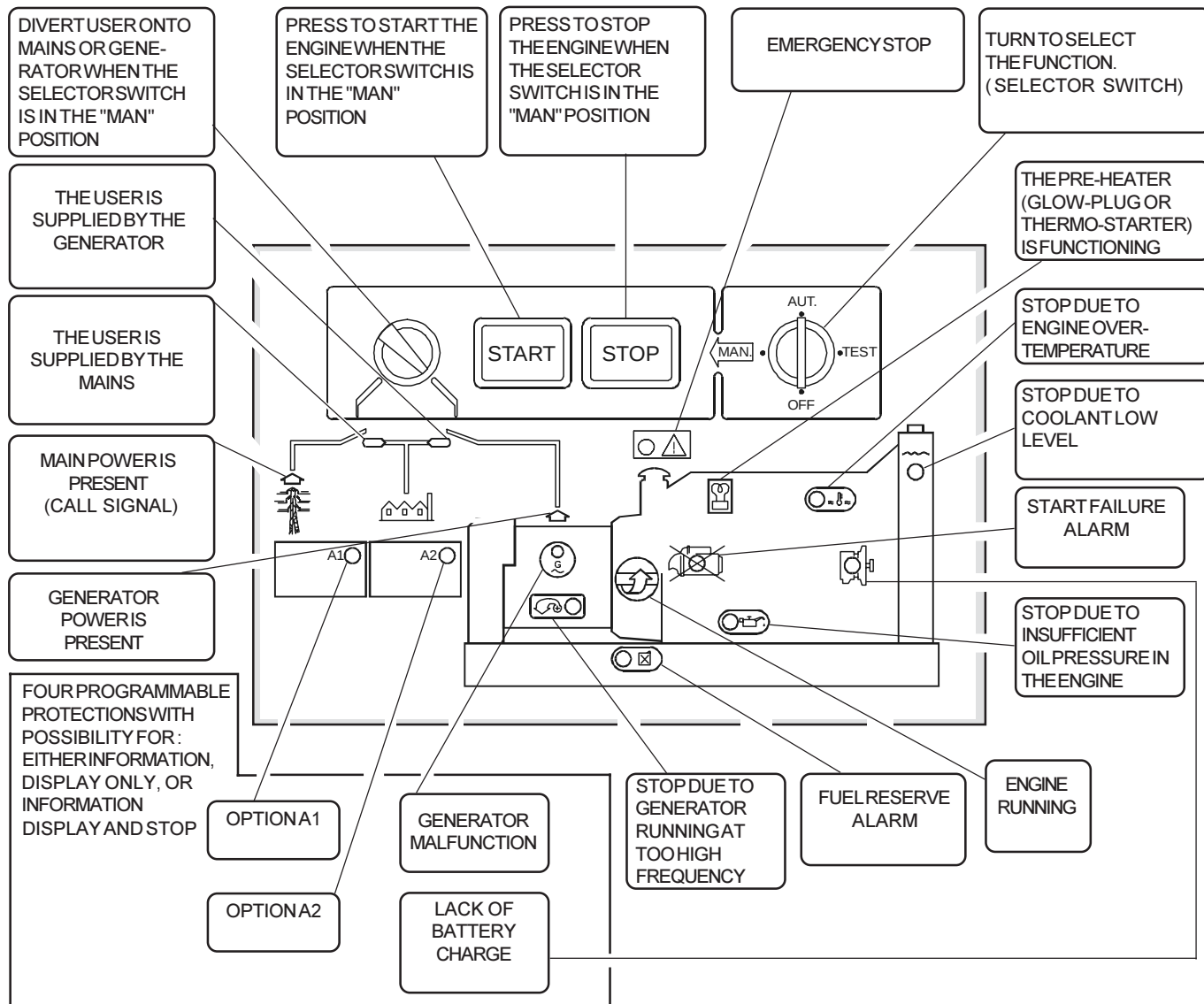
THE ENGINE CAN BE STOPPED BOTH BY A SOLENOID OR BY AN ELECTROVALVE, FOR ENGINES EQUIPPED WITH PERMANENT MAGNET OR PRE-EXCITATION CHARGE ALTERNATORS

PARMA

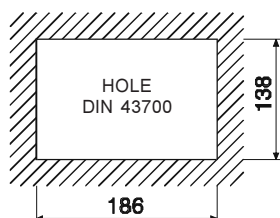
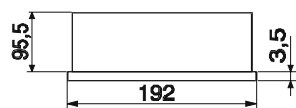
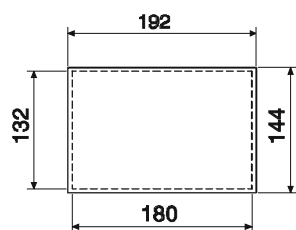
**ELCOS®**

ITALY

BRIEF INSTRUCTIONS



DIMENSIONS



TECHNICAL DATA

BATTERY POWER SUPPLY	12VDC and 24VDC
VOLTAGE SUPPLY	8 ÷ 32 VDC
FOR GENERATOR WITH ENGINE STATIONARY	220÷415 VAC ±10%
FREQUENCY	50 ÷ 60 Hz
CIRCUIT LOADING WITH ENGINE STATIONARY	48 mA
INSULATION	
NOMINAL VOLTAGE	
- TERMINAL BOARD AT MAINS/GENSET VOLTAGE	250 V
- TERMINAL BOARD 12/24 V	32 V
TEMPERATURE RANGE	-10 ÷ 60°C
DEGREE OF PROTECTION FRONT / REAR	IP40 / IP00
WEIGHT	1450 g

CONNECTIONS TO THE CONTACTORS

(71-72) (73-74)

CONTACTS CAPACITY	5A - 250 VAC MAX
TERMINAL BOARD	4 POLES WITH SCREWS

CONNECTIONS TO THE VOLTMETRIC RELAY OF THE GENERATOR (96-97)

VOLTAGE	250 VAC MAX
TERMINAL BOARD	2 POLES WITH SCREWS

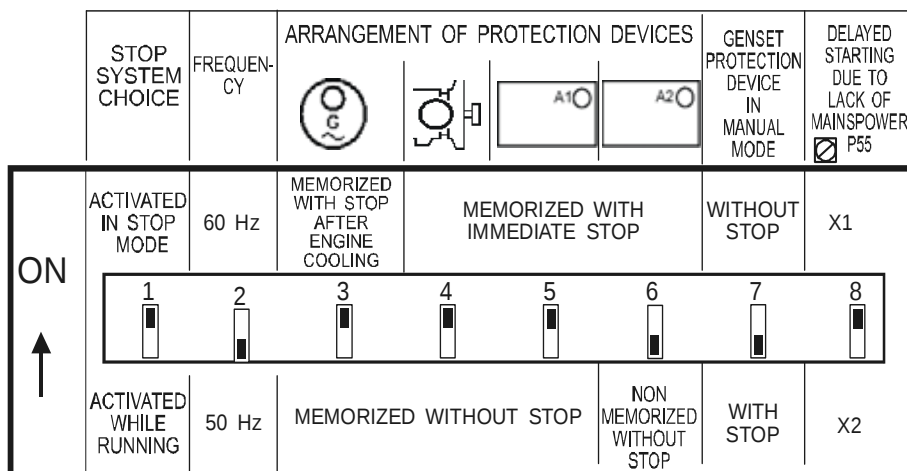
CONNECTIONS TO THE ENGINE

OUTPUTS (5-19-70)	0,25 A MAX
OUTPUTS (15-17)	1 A MAX
CONNECTORS (MOBIL SOCKET)	FASTON 6,3 x 0,8

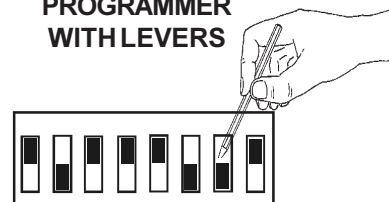
PROGRAMMING

The functioning of the control panel can be modified by changing the positions of the programmer levers.

THIS OPERATION IS PERFORMED WITH THE POWER TO THE CONTROL PANEL DISCONNECTED.

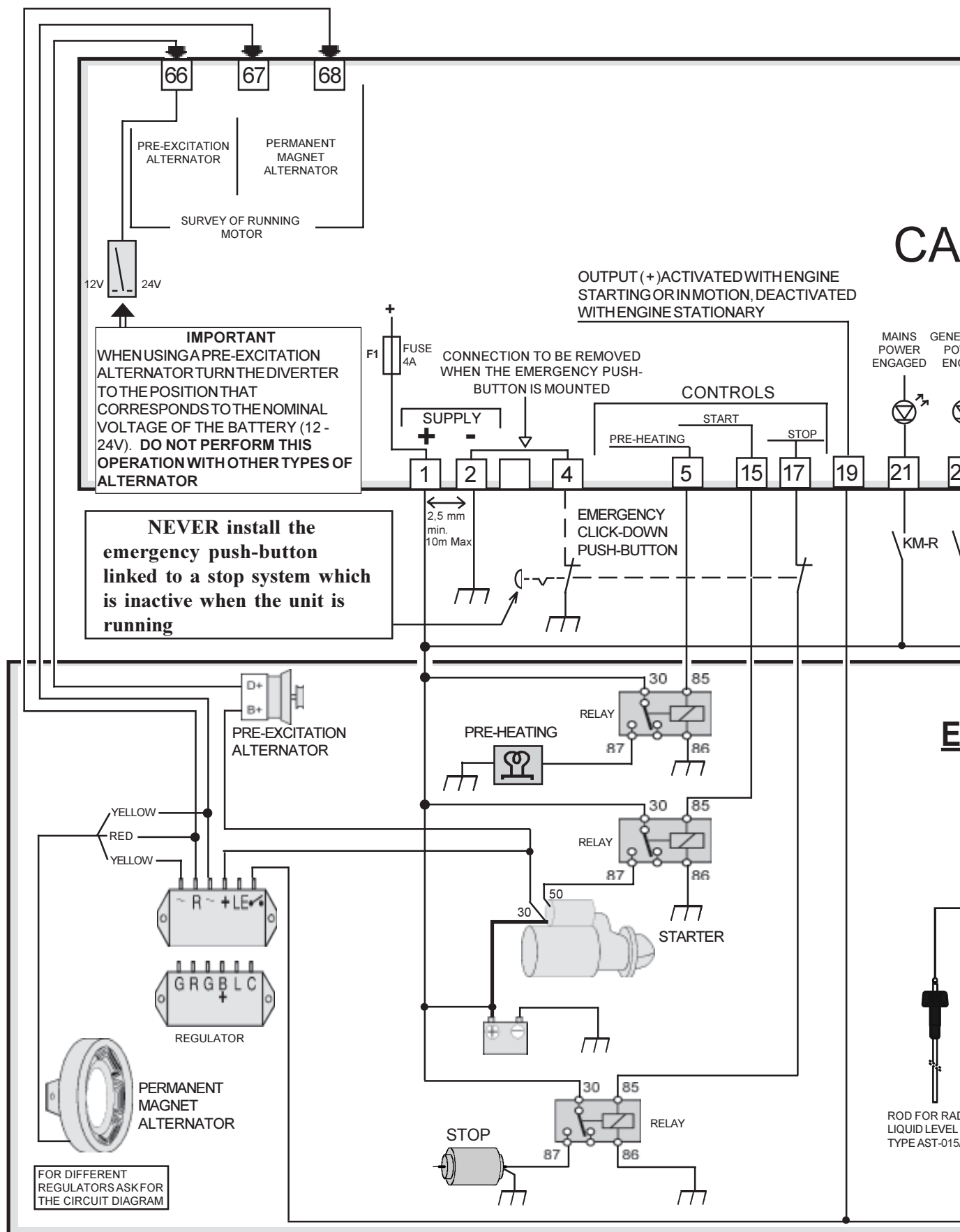


PROGRAMMER WITH LEVERS



ADJUSTMENTS

		REGULATION RANGE	REGULATION	SINGLE-PHASE VOLTMETERIC SURVEY OF GENERATOR
P 5	PRE-HEATING	0" ÷ 30"	0"	The survey has a circuit which makes the calibration operations easier: the values set on the power generator are measured via a DIGITAL TESTER on the points of the TEST (TP1 and TP2).
P 10	STARTING CYCLE PAUSE	1,5" ÷ 20"	5"	
P 20	STOP TIME	10" ÷ 20"	16"	
P 30	MAINS RE-ESTABLISHMENT DELAY	3" ÷ 180"	100"	TENSION PRESENT IN GENERATOR (P100) - With the generator stationary, insert the points of the digital tester (capacity 20 VDC) into the special TEST points: TP1 and TP2 - Turn the potentiometer P100 to obtain the desired voltage value, divided by 100 on the digital tester (eg. If the desired voltage value is 215V, 2,15V is seen on the tester)
P 40	DELAY IN ENGAGING GENERATOR TO USER	2" ÷ 15"	7"	
P 50	COOLING TIME	6" ÷ 360"	120"	
P 55	LACK OF MAINS SUPPLY START DELAY	X1	0,6" ÷ 30"	GENERATOR UNDER TENSION (P90) - Start the generator manually. - Check that the tension in generator indicator light is on, and then rotate the potentiometer P90 until the desired value is shown on the digital tester.
		X2	1,2" ÷ 60"	
P 60	THRESHOLD OF ENGINE RUNNING	see P 60 adjustment		OVER-FREQUENCY SURVEY This circuit uses the same adjustment method as the single-phase voltmeteric survey of the generator, but uses the TEST points TP3 and TP4 to display the frequency threshold set.
P 65	OVER-FREQUENCY	50 Hz with 60 HZ	51 ÷ 70 HZ	
			61 ÷ 85 HZ	
P 90	GENERATOR UNDER TENSION	80 ÷ 97% of the value set for voltage present	195 V	OVER-FREQUENCY ADJUSTMENT (P65) Turn the potentiometer until the desired threshold value, divided by 100, is shown on the digital tester (capacity 20V DC) when inserted between the TEST points TP3 and TP4. (Eg. If the desired frequency value is 57Hz, 0.57V is seen on the tester).
P 100	TENSION IN GENERATOR	185 ÷ 220 V	205 V	
ADJUSTMENT P60 THRESHOLD OF RUNNING ENGINE Usually, no calibration is needed. If, however, it should prove necessary, perform the following operations: - Start the engine manually and turn it to minimum. - Turn the potentiometer P60 anti-clockwise until the indicator light turns on, then bring the engine up to working speed.				



REMOTE CONTROL
(50 m. MAX.)
WITH CONTROL PANEL
IN AUTOMATIC MODE

NORMAL
CONDITION

CAM - 530/20 30

CALL SIGNAL
(mains relay)

TEST
THE OPERATIONS
DESCRIBED IN
THE "TEST"
PARAGRAPH ARE
OBTAINED

CAM - 5

CONSULT STANDARDS CEI 44-5 (EN 60204) FOR INFORMATION CONCERNING PROTECTION AGAINST OVERLOAD CURRENTS IN THE ELECTRICAL EQUIPMENT USING BATTERY VOLTAGE.

M - 530 / 20

GENERATOR
POWER
GAGED

CALL SIGNAL

TEST

START BLOCK

REMOTE
STARTING

50 51 52 53 54 55 56 70 71 72 73 74

30 31 32 33

2

KM-G

MAINS
RELAY

REMOTE CONTROL
(50 m MAX)
ONLY IN AUTOMATIC MODE

PROTECTION PROBE INPUTS

GENERATOR
OVERLOADED

A1 O A2 O

GENERAL
ANOMALY
OPTIONS

R-T

CONTACTS CAPACITY 5A - 250 VAC MAX

MAINS
CONTACTOR
CONTROL

GENERATOR
CONTACTOR
CONTROL

96 N3 97 U3

SURVEY OF
GENERATOR
RUNNING
250VAC MAX
50 ÷ 60 Hz

GENERAL ALARM
OUTPUT (+)
3W MAX 100m MAX

ENGINE

OIL PRESSURE
SWITCH

INSUFFICIENT
LIQUID IN
RADIATOR
OUTPUT (-)

THERMOSTAT

FUEL LEVEL
SWITCH

33 50 2 1

TYPE
MOL-015/00

UNIT FOR RADIATOR
LIQUID LEVEL PROBE

DIATOR

00

30/20 31

TEST

START
FUNCTIONS AS IF
MAINS FAILURE
OCCURS

CAM - 530/20 32

START

BLOCK
STOP THE STARTING
OR THE RUNNING OF
THE GENSET

15 CAM - 530/20 33

BLOCK

TO THE STARTING

U1 V1 W1 N1

MAINS

U2 V2 W2 N2

USER

U3 V3 W3 N3

UNIT

OPERATION

AUTOMATIC "AUT"

When the CALL SIGNAL contact is closed (lack of mains power detected by the externally connected relay), and the START DELAY (P55) time having elapsed, the control panel orders the opening of the mains contactor and starts (if set up with this function) the engine PRE-HEATING (P5) period  and then starts the GENSET.

With the engine running , after the GENERATOR-USER ENGAGEMENT DELAY period (P40), the generator contactor closes. While running, the GENSET is protected against malfunction.

When the mains power returns, after the MAINS RE-ESTABLISHMENT DELAY period (P30), the control panel opens the generator contactor and, after a fixed delay period of 1.5 seconds, closes the mains contactor. The ADJUSTABLE COOLING period (P50) allows one to easily cool the engine before stopping it.

MANUAL "MAN"

The control panel controls are activated: the pre-heating/start button  and the stop button  of the engine, and the mains-generator diverter for contactors control.

When the diverter is in the generator position, the mains contactor is opened and, when the voltage is regular, the generator contactor is closed.



When the diverter is in the mains position, the opposite happens.



The GENSET PROTECTION function can be programmed (see page.3 for programming) in two ways:

- Only with visual display and general alarm.
- Stopping of the GENSET as described in the PROGRAMMABLE PROTECTIONS paragraph; in the latter case the protection system  stops the GENSET immediately, without waiting for the cooling time to elapse.

"TEST"

Allows one to test the running of the GENSET.

The start cycle operates as if the engine were in automatic, but the user continues to be supplied from the mains. If the CALL SIGNAL contact closes during the test (lack of mains power detected by the externally connected relay), the control panel closes the generator contactor, remaining in this condition even when the mains power returns.

"OFF"

The engine cannot be started and, if it is running, it is stopped. The mains contactor remains closed.

START

In manual mode using the  button, and immediately in test mode.

In automatic mode, when the CALL SIGNAL contact closes, the START DELAY PERIOD (P55) DUE TO LACK OF MAINS POWER having elapsed. To make starting easier, a special circuit produces a series of four 5 second impulses (P10), with 5 second intervals.

PRE-HEATING

In manual mode, the  button having been pressed until the engine starts. In automatic and in test mode, it is activated immediately.

The pre-heating action also continues during the start impulse and is shown by a special indicator light .

ENGINE RUNNING SURVEY

Obtained with surveyance (P60 adjustable) of the voltage of battery charging alternator, and that of the generator.

The starter motor disengages and the indicator light  turns on.

OPERATION

SINGLE-PHASE VOLTMETERIC SURVEY

This allows the relevant contactor to be closed whenever the voltage rises above the GENERATOR VOLTAGE value (P100).

When the voltage falls below the GENERATOR UNDER TENSION value (P90), the contactor is opened.

STOP

In manual mode using the  button.

In TEST mode when the protection systems or the remote controls intervene.

In AUTOMATIC mode when the mains power returns, or when the protection systems or remote controls intervene.

Stopping can occur in two ways:

- With the solenoid deactivated; while the engine is running and activated when stopped. This condition is maintained during the STOP TIME (P20) after the engine stopped detection.
- With solenoid or electrovalve activated; while the engine is running and deactivated when stopped. This condition is maintained even when the engine is stationary.

PROTECTION SYSTEMS

For the following anomalies:

- OVER-FREQUENCY  always active, memorized with engine stopped.

The systems are activated with the engine running  and are memorized with engine stopped for anomalies.

- INSUFFICIENT OIL PRESSURE



- OVERTEMPERATURE



- LOW COOLING LIQUID LEVEL



- OTHER PROTECTION SYSTEMS, if programmed with stopping (programming on page.3)

ALARMS

They are not memorized and do not stop the engine when the fuel reserve  is being used or when other protection systems are activated, if programmed without stopping.

PROGRAMMABLE PROTECTION SYSTEMS

It is possible to programme four protection systems  -  - A1 - A2, so as to stop (or not) the GENSET.

WITH STOPPING:

- Activated with the engine running, and they are memorized.

The intervention of the protection system  is programmed with stopping, deactivates the generator contactor, and stops the engine after the cooling time (P50) has elapsed.

WITHOUT STOPPING:

- Non-memorized: A2 (option).

- Memorized: A1 (option), problem with battery charger alternator  or generator overloaded .

START FAILURE

The starting cycle is blocked if the engine fails to start after the fourth impulse.

RESETTING

BY TURNING THE SELECTOR SWITCH TO THE OFF POSITION FOR A MOMENT, the protection systems are reactivated and the start cycle is unblocked.

EMERGENCY STOP

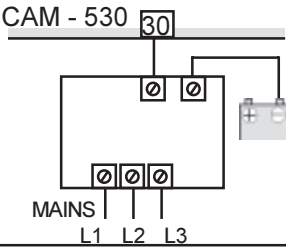
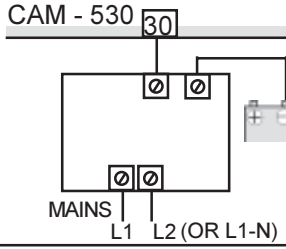
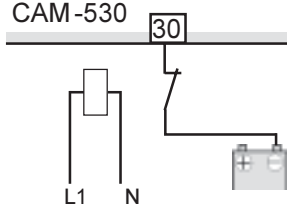
The emergency stop can be activated in all working conditions, by mounting one or more click down push buttons linked to a stop system which is active while the unit is running.

GENERAL ALARM

This is produced by mounting an external acoustic signal, linked to the appropriate terminal. The alarm goes off if the protection systems or alarms intervene, or if the engine fails to start.

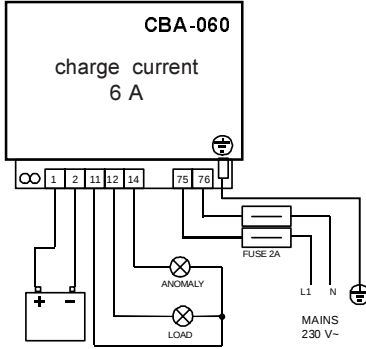
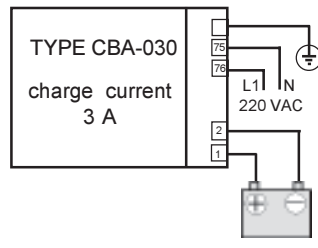
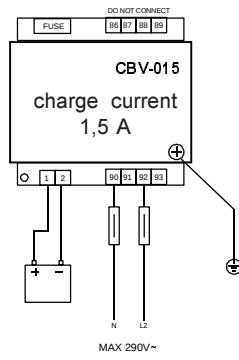
VOLTMETERIC MAINS SURVEY

THE PLANT MUST BE EQUIPPED WITH A MAINS SURVEY SYSTEM. ONE OF THE FOLLOWING RELAYS CAN BE USED:

THREE-PHASE ELECTRONIC RELAY		SINGLE-PHASE ELECTRONIC RELAY	ELECTRO-MECHANICAL RELAY
 CAM - 530 30 MAINS L1 L2 L3		 CAM - 530 30 MAINS L1 L2 (OR L1-N)	 CAM-530 30 L1 N
RET 100/00	RET 200/00	REM 100/00	REM 200/00
CHECKS THE VOLTAGE IN THE LINE AND INTERVENES IF THERE IS A LACK, OR A LOWERING OF THE VOLTAGE, EVEN IF THE PROBLEM IS ONLY IN ONE PHASE.	CHECKS THE VOLTAGE IN THE LINE AND INTERVENES IF THERE IS A LACK, A LOWERING OR AN INCREASE OF THE VOLTAGE, EVEN IF THE PROBLEM IS ONLY IN ONE PHASE.	CHECKS THE VOLTAGE IN THE LINE AND INTERVENES IF THERE IS A LACK, OR A LOWERING OF THE VOLTAGE.	CHECKS THE VOLTAGE IN THE LINE AND INTERVENES IF THERE IS A LACK, A LOWERING OR AN INCREASE OF THE VOLTAGE.

BATTERY CHARGERS

THE PLANT SHOULD BE EQUIPPED WITH ONE OF THE FOLLOWING BATTERY CHARGING SYSTEMS

 CBA-060 charge current 6 A MAINS 230 V~	 TYPE CBA-030 charge current 3 A MAINS 220 VAC	 CBV-015 charge current 1,5 A MAX 290V~
RAPID CURRENT CONTROL CHARGING INTERMEDIATE AND MAINTENANCE VOLTAGE CONTROLLED CHARGING SELF-PROTECTION AGAINST: - SHORT CIRCUITING - POLARITY INVERSION - DECREASE (50%) OF THE BATTERY CHARGE REMOTE REPETITION OF INDICATOR LIGHTS AMMETER AND VOLTMETER CAN BE CONNECTED	RAPID CURRENT CONTROL CHARGING INTERMEDIATE AND MAINTENANCE VOLTAGE CONTROLLED CHARGING SELF-PROTECTION AGAINST: - SHORT CIRCUITING - POLARITY INVERSION - DECREASE (50%) OF THE BATTERY CHARGE	RAPID CURRENT CONTROL CHARGING INTERMEDIATE AND MAINTENANCE VOLTAGE CONTROLLED CHARGING SELF-PROTECTION AGAINST: - SHORT CIRCUITING - POLARITY INVERSION

ACCESSORIES AVAILABLE ON REQUEST

VOLTMETERIC MAINS SURVEYS

THREE-PHASE VOLTMETERIC SURVEY	
Type RET-100/00 380V	code 35.44.28
Type RET-200/00 400V	code 35.44.43
THREE-PHASE VOLTMETERIC SURVEY	
Type RET-100/00 220V	code 35.44.24
SINGLE-PHASE VOLTMETERIC SURVEY	
Type REM-100/00 220V	code 35.44.34
Type REM-200/00 230V	code 35.44.41

COOLANT LEVEL PROBE FOR METAL RADIATORS (see page 4)
TYPE SOL - 015/00 code 24.10.20

PROBE SOL-015/00 COMPRISES THE FOLLOWING PARTS:

ROD	TYPE AST-015/00	code 24.10.12
UNIT	TYPE MOL-015/00	code 24.10.02

BATTERY CHARGE

BATTERY CHARGER			
TYPE	CBA-060	12V	code 01.04.23
	CBA-060	24V	code 01.04.24
	CBA-030	12V	code 01.04.13
	CBA-030	24V	code 01.04.14
	CBV-015	12V	code 01.04.03
	CBV-015	24V	code 01.04.04

EQUIPMENT ACCESSORIES

MOBILE SOCKETS TYPE:	
PMO-117/00	code 80.42.22
PMO-118/00	code 80.42.23



ORDERING INFORMATION

GENERATOR UNIT CONTROL PANEL

Type CAM - 530/20 code 24.21.97