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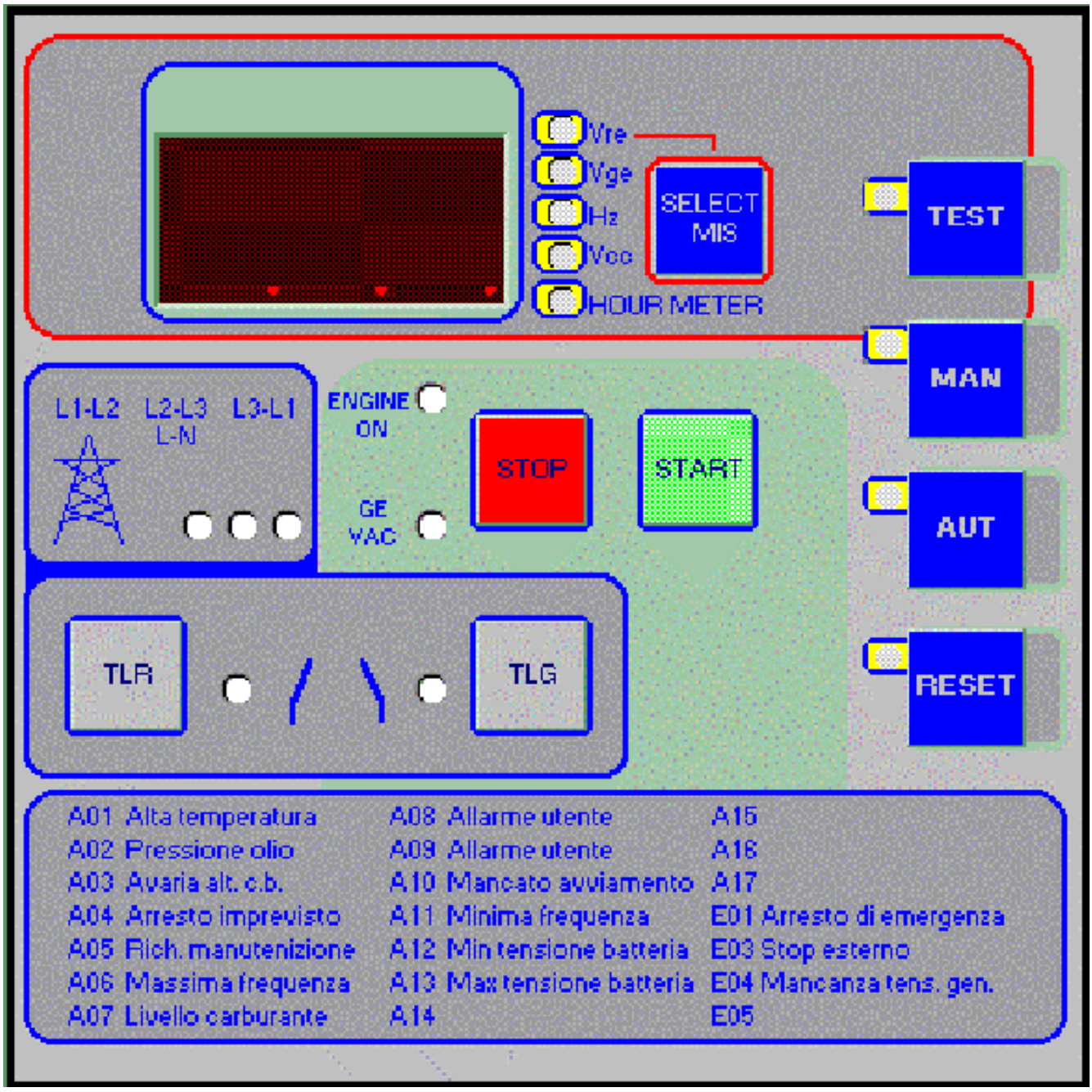
# X803 ELECTRONIC CARD
# Control unit for generating sets

# OPERATING MANUAL




The technical data and description in the operation manual is subject to alterations and changes at any time and have no contractual value. The X803 device should be used by skilled and qualified personnel and in compliance with the regulations in force for electrical systems in order to avoid damages to persons and property.

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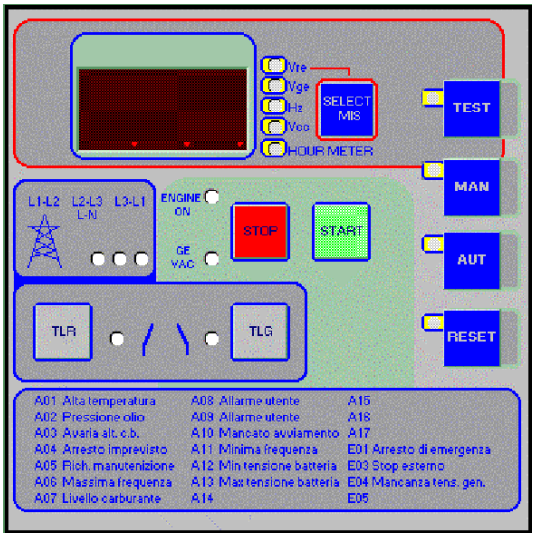
## DESCRIPTION

The digital control unit X803 is a device able to conduct RMS voltage reading and accurate timely controls of all the necessary functions, to obtain the optimum operation of the generating set. The extensive programming of input and output functions as well as the numerous operating parameters contribute to the X803 unit a flexibility so that it is easily adaptable to different application requirements.
The version with RS485 serial interface provides the generating set to be remotely supervised without any limitation.

***Front Plate***

- 3-digit display for reading, alarm, message or error indication
- RESET-MAN-AUT-TEST keys for operating mode selection
- SELECT-MIS key for display selection
- START-STOP keys for engine starting and stopping in manual mode
- MAINS (TLR)-GEN(TLG) keys for mains and generator contact change-over in manual mode
- RESET- AUT - MAN -TEST LED's for indication of selected operating mode
- MAINS(VRE)-GEN(VGE)-Hz-BATT(Vcc)-HOUR LED's for indication of selected reading
- ENGINE ON LED to indicate engine running
- Mains (L1-L2, L2-L3/L-N, L3-L1) and generator voltage indication LED's
- Generator and mains contact status LED's




## OPERATING MODE DESCRIPTION

**Note** In this manual, all underlined texts refer to those parameters that can be programmed through access to the two menus named OPTION and SETUP. See the corresponding section for further information.

- The X803 unit can operated in four different operating modes: RESET, AUT, MAN and TEST
- By pressing one of the operating mode keys, the relative LED switches on indicating the exact operating mode selected. The change from one operating mode to another is possible at any time.
- The operating mode remains stored even if the supply is removed.
- The flashing operating mode LED indicates that the unit is controlled by a supervising system. Since the controls can be remotely conducted, it is essential to operate with care.

***RESET Mode***

- When the unit is in RESET mode, all outputs are de-energized, in other words in the same condition as when the set is unpowered, except for the global alarm output that continues to operate as normal.
- In this mode the mains remote control relay stays on standby, with the contact closed.
- In addition, the control inputs and siren output are disabled.
- Whereas the warning LED's, reading display and alarms are active.
- When passing from MAN/AUT/TEST mode to RESET mode and the generating set is running, the unit proceeds to stop it automatically without waiting for the cooling time (option P.09).

***AUTOMATIC Mode***

- In AUT mode, when there is no mains voltage after the delay for mains voltage absence (option P.03), the mains contact output is de-energized and the starting cycle of the generating set is begun.
- When the generating set is running and the generator voltage is available, after generator voltage presence delay (delay for generator contact closing (option P.08)) has lapsed, the generator contact output is energized.
- At the return of mains voltage and after the delay for mains voltage presence (option P.04), the generator contact output is de-energized, the mains contact output is energized and then, the stop cycle of the generating set is activated.
- The external controls of the emergency stop and remote starting are enabled.

***MANUAL Mode***

- In MAN, the generating set can be started or stopped by pressing START or STOP keys. An unrequired STOP control can be invalidated at once by pushing the START key.
- It is possible, to change the contactor MAINS(TLR)or GENERATOR(TLG) or vice versa, for to make this it's necessary pressing the MAN button together button (TLR)MAINS or (TLG)GENERATOR
- The control of the generator contact output is inhibited if the generating set is not running.
- A mains/generator interlock time (set up -15) is always imposed at each load changeover control, between the de-energizing of one output and the energizing of another.
- The passage from AUT or TEST to MAN mode leaves the operating state of the generating set unchanged.

***TEST Mode***

- The start cycle of the generating set takes place whenever TEST mode is selected.
- The load is automatically switched over to the generator only with the lack of mains voltage. At its return, the load remains on the generator.
- Reinstating AUT mode, in presence of mains voltage, the changeover to the mains can take place and the generating set is stopped.

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## OPERATING DESCRIPTION

***Start-up cycle of the generating set***

The generating set start-up cycle includes the following operations in MAN, AUT, TEST modes or by remote starting facility:

- If preset, glow plug preheat output is energized.
- The fuel solenoid valve output is energized two seconds before the lapsing of glow-plug preheat time (set up -19),
- After these two seconds, the glow plug preheat output is de-energized and the start output is simultaneously energized for a time equal to the starting attempt duration (set up -11).
- If the glow plug preheat output is not programmed, the fuel solenoid value output energizes always for two seconds before the start output is.
- During the starting attempt if the engine starts, the start output is instantly de-energized.
- If the engine running signal is not detected within the starting attempt duration (set up -11), the interval between starting attempts (set up -12) begins.
- In case of false start-up, another equal number of starting attempts (set up -10) is repeated as per the preset value.
- After the engine starts if the engine-started signal is no longer detected, the start output is re-energized once again after the delay between false start and the subsequent start (set up -13) (if preset). This starting is not included in the starting attempts count.
- The actual interval between starting attempts is equal to the total time of the starting attempt interval (set up -12) and, if preset, also the time for glow plug preheat duration (set up -19). During this interval, the fuel solenoid valve output is de-energized and, if preset, the stop magnet output is energized to assure engine stopping before the subsequent starting attempt.
- "StA" (Start) is indicated on the display during the start-up cycle and until the engine is running.
- If the engine has not started after the preset number of starting attempts (set up -10), the audible alarm is energized and "A10" (STARTING FAILURE) alarm is displayed.
- The alarm is reset by means of /RESET key.

***Stop cycle of the generating set***

The stop cycle of the generating set comprises the following operations in MAN or AUT modes:

- "StO" (Stop) appears on the display.
- The generator contact output is de-energized, the cooling time (option P.09) of the engine starts.
- At the end of the cooling time (option P.09), the fuel valve output is de-energized and the stop magnet output is energized, if preset.
- Once the engine-started signal is no longer detected and after the subsequent energizing time of stop magnet (option P.09) has lapsed, the stop magnet output is de-energized.
- In case of alarm that provides for the stopping of the generating set or when in RESET mode, the cooling time (option P.09) is not conducted.

***Engine started signal***

- The voltage threshold for the started motor detection can be applied either to the voltage supplied by the battery-charger alternator or to the voltage supplied by the generating set. This choice can be made through the following parameter: started motor signal choice (set-up -05).
- If set-up -05 is programmed onto 0, then the system will detect the started motor signal from the inlet of the battery-charger alternator (permanent magnets or pre-excited type), thus applying the threshold specified by the following parameter: alternator voltage started motor threshold (set-up -06).
- On the contrary, if set-up -05 is programmed onto 1, then the system will detect the started motor signal directly from the generating set voltage, thus applying the threshold specified by the following parameter: generating set voltage started motor threshold (set-up -07).
- In every case, for safety reasons, the started motor signal is also detected by overcoming the generating set minimum voltage intervention threshold (option p.05). If there is generating set voltage, the motor is considered as started.
- The started motor signal is visualized by led "ENGINE ON".

***Mains voltage present***

- If the three-phase/single-phase mains voltage control (set up -37) is programmed as three-phase, it is conducted on the three voltages between lines. An asymmetry control is carried out in addition to the voltage one.
- The mains voltage is considered present when the voltages between lines L1-L2, L2-L3 and L3-L1 are within the minimum mains voltage trip threshold (option P.01), maximum mains voltage trip threshold (option P.02) and maximum mains asymmetry (set up -42) limits. The presence of voltage is indicated by the L1-L2, L2-L3 and L3-L1 LED's when switched on.
- In AUT mode, mains contact output is energized after mains voltage presence delay (option P.04).
- The mains voltage is considered absent when one or more voltages between line, L1-L2, L2-L3 and L3-L1, are not within limits indicated above. The absence of voltage is shown when the L1-L2, L2-L3 and L3-L1 are switched off if the relative voltage between lines is not within the preset minimum and maximum threshold limits. Otherwise the LED's are flashing if the voltage is within the limits but asymmetry is higher than the pre-set value.
- In AUT mode, mains contact output is de-energized after the lapsing of the mains voltage absence delay (option P.03).
- In the case of single-phase mains voltage, the set must be programmed as a single-phase control. IN this case the control will only be made on the voltage at terminals 22-21, in the same manner as the three-phase control. In this case the LED involved in the control is L2-L3/L-N, whereas the others will be off.

***Generator voltage presence***

- Generator voltage control is only single phase.
- Generator voltage is considered present when its value falls within minimum generator voltage trip threshold (option P.05), maximum generator voltage trip threshold (option P.06). The presence of voltage is indicated when the relative LED GE VAC is switched on.
- The alarm for the lack of generator voltage can be tripped at the absence of the generator voltage failure delay (option P.07) after the engine-started signal. This delay time can eventually include slow-running time (set up -18), if preset.
- In AUT mode, generator contact output is energized after the generator voltage presence delay (option P.08), which thereby takes on the function of a delay for putting a load on the motor (contact closing delay).
- The generator voltage is considered absent when it is not within the limits mentioned previously. The voltage absence is indicated when the LED is switched off.
- In AUT mode, after the absence of generator voltage failure delay (option P.07), the mains contact output is de-energized.
- If the motor is detected as running by the battery-charger alternator signal, but the generator voltage is not present for longer than the no generator voltage alarm time (set up -38) alarm E04 is generated. This alarm can be disabled with the no generator voltage alarm disabling parameter (set up -35).

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***Mains/Generator and Generator/Mains changeover***

- A mains/generator interlock time (set up -15) is imposed between the mains contact output de-energizing and the generator contact energizing and vice versa.
- In MAN mode, the load can be changed over to the mains or to the generator by pressing MAINS(TLR) or GEN(TLG) key. Press them together with the MAN button in order to avoid accidental movements. By pressing one of these repeatedly, the relative contact is closed or opened.
- The mains contact output is permanently energized when the control unit is not supplied.

***Alarm tripping***

- The display normally shows one of the readings indicated by the MAINS(Vre), GEN(Vge), Hz, BATT(Vcc) or HOURS LED's.
- In case of alarm, the display indicates the alarm code, the meaning of which is given in the table on the X803 front plate.
- Depending on the alarm importance, this can trip the generating set operation or energize the audible alarm output.
- In case more than one alarm is present at the same time, they are visualized on the display one after another.
- Almost all the alarms are retentive and remain in this status even if the conditions that have generated the alarm no longer persist. Under these circumstances, the user is obliged to identify the faults and remove the alarm state. For further details see the alarm table.
- The alarms are reset by pushing RESET, which has effect on both the alarms and on the operating mode of X803. If the alarm situations persist, resetting the unit is not possible.
- In case the alarm situation cannot be resolved immediately, it is possible to have access to the readings by pressing the SELECT-MIS key for 2 seconds. After 20 seconds since last being pressed, the display reinstates the situation of the previous alarm condition.
- More details on the alarms and their properties are given in "Alarms Table".

***Siren relay***

- The siren relay is activated when there is an alarm. It stays activated for a programmable time through the siren alarm time parameter (option P.10). Afterwards, it is inactivated.
- Furthermore, this relay is activated before starting up the motor (due to an automatic test or to an external start or to an EJP start). In this case the sound has a fixed length corresponding to 5 seconds and is followed by a 3-second pause before the real start-up. This will help maintenance operators realize that the group is going to be started up even if the mains are plugged in.
- If you want the siren relay not to be activated for reasons other than an alarm, it is possible to specifically program the following parameter: siren signal activation before start-up (set-up -02).
- If the unit is in the reset mode, the siren will never be activated even if an alarm is going on.

***Global alarm relay***

- The global alarm relay is activated when there is an alarm situation and it stays activated until all alarm situations are terminated and until the operator has switched them off by pushing the reset button.
- The only alarms that do not require the closing of the global alarm relay are the external EO3 stop and, possible, the programmable alarms, provided that they have been programmed in order to be visible alarms only.
- For the global alarm relay we have provided a separate common switch and an exchange contact.
- This relay can be used for the gas solenoid valve function (please see set-up -29). In that case, the global alarm signal is not available.

***Readings display***

- MAINS(Vre), GEN(Vge), Hz, BATT (Vcc) and HOURS LED's are switched on by pushing the /MIS key,. indicating the relative reading on the display.
- The displayed readings are: mains voltage, generator voltage, generator frequency, battery voltage and the operating hours of the generating set. Mains and generator voltages are expressed as RMS (root-mean-square) values.
- The reading accuracy of the mains and generator voltages is 1VAC, 0.1Hz for generator frequency, 0.1VDC for battery voltage while 1 hour for the operating hours (true accuracy is 1 minute but it is not displayable).
- To display the voltages between line of the three-phase line, SELECT/MIS key is to be pressed three times. At each pressing, the LED corresponding to the voltage between lines will flash along with MAINS(Vre) LED.
- Usually the display visualizes the system voltage. When the motor is started up, the display automatically goes to the generating set voltage and vice versa. It is always possible to select the desired reading through the SELECT-MIS button.
- In case of alarm and temporary impossibility to remove the alarm, the readings can be displayed by pressing SELECT/MIS key for 3seconds. If it is not pressed again for 20 seconds, the display shows the previous alarm situation.

***Operating hour counter of the generating set***

- Each time the engine is started, the hour counter for the operating minutes is activated.
- The operating time is however displayed in hours.
- The control unit keeps the accumulated operating time stored in lack of supply voltage.
- It is possible to modify and/or to alter the operating hours count through the following procedure:
- 1. Select reading "Operating hours" through button SELECT-MIS (LED HOUR on).
- 2. Push the RESET button for more than 5 seconds until HOU appears on the display.
- 3. With buttons START and STOP you can increase or decrease the count. By pushing them together, you automatically set the count to zero.
- 4. Push RESET to store and exit.

***Maintenance interval***

- Each time the engine is started, the hour counter for the operating minutes for the maintenance requested interval (set up -16) of the generating set, expressed in minutes, is activated.
- Alarm code "A05" (Maintenance requested) is displayed and the audible alarm output is energized when the generating set reaches the programmed operating hours for the maintenance requested interval (set up -16).
- In presence of this alarm, the generating set can continue to operate normally but at each new starting the audible alarm output is energized.
- After having carried out maintenance on the generating set, the alarm is reset with the RESET button. This also zeroes the maintenance hour counter.
- If there is a power failure, the set keeps the operating time of the generating set relative to the maintenance interval in memory.

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## FUNCTIONS

***Automatic test***

- Automatic test is the periodic start-up testing of the generating set at fixed intervals programmable by means of the automatic test interval time (option P.11). It has the purpose of checking operation and/or keeping the generating set efficient. The duration of the testing is determined by the automatic test duration (option P.12), at the end of which the generating set is stopped.
- The beginning of automatic test is displayed by "A.tE" (Automatic test), if enabled and if programmed to energize the audible alarm output for 5 seconds. At its de-energizing and after a 3-second interval, the start-up cycle begins.
- During the test cycle, the load normally stays connected to the mains and there is no switchover.
- In the event of there being no mains voltage, the control unit automatically changes over the load to the generator. At the return of the mains voltage, the load remains on the generator.
- At the end of the automatic test, in the presence of mains voltage, the load is changed over to the mains and the generating set is stopped.
- Automatic test can take place if the unit is in AUT mode and is enabled.

***Enabling and disabling the automatic test***

- The enable or disable function of automatic test does not influence the unit operation. Therefore, it can be done, at any moment, independent of the operating mode of the control unit.
- At the moment automatic test is enabled, a chronometer for the automatic test interval (option P.11), expressed in days, is activated. In this way, automatic test will regularly take place at its exact enabling time.
- To enter automatic test enable or disable function, push SELECT/MIS and keeping it pressed, then push TEST key. Either "OFF" will be displayed if the automatic test is disabled or, if pre-set, the number of days of the programmed automatic test interval (option P.11). Automatic test is enabled pressing START or disabled pushing STOP.
- If you want to change the test interval, please read the option menu chapter.
- Press RESET to exit the enable/disable functions of automatic test.
- During this function if no keys are pressed for 120 seconds, the control unit will automatically exit this function.

***Emergency stop***

- The emergency stop input is to be connected to a NC contact otherwise the control unit will prevent all start attempts of the generating set.
- The emergency stop control (opening of the input contact) causes the immediate stopping of the generating set, independently of the operating state of the unit, without cooling time (option P.09), E01 alarm code (Emergency stop) appears on the display and the audible alarm output is energized.
- For alarm reset and audible alarm mute, the input contact of the emergency stop is to be necessarily pressing RESET.

***Remote starting***

- In AUT mode, remote or external starting is enabled.
- The remote starting control of the generating set is shown with "E.St" (External start) display and, if preset, the audible alarm output is energized for 5 seconds. When the audible alarm output is de-energized after a 3-second interval, the start-up cycle begins.
- The control unit automatically changes the load over to the generator when the generating set is running and there is a lack of mains voltage.
- By removing the remote starting control, with mains voltage present, the load is changed over to the mains and the generating set is stopped. On the other hand, if the mains voltage is absent, the generating set continues to regularly operate supplying the load.

***Remote stop***

- When, in the AUT mode, the remote start-up inlet is closed, the equipment carried out the instantaneous opening of the generating set switch and the stop of the cooling cycle group.
- The automatic start-up is inhibited. The display visualizes the corresponding code (E03 External stop).
- Automatic re-activation with inlet opening.
- For the operations requiring a connection of a floating contact, this inlet avail itself of an anti-bounce filter that allows for the signal to be changed over with a time not lower than 5 seconds.

***EJP function***

- The EJP function can be activated through the set-up -03 parameter.
- When this function is activated, the remote start-up inlet is reprogrammed as EJP start ; the stop inlet is reprogrammed as EJP change-over approval.
- When the start inlet is activated, the motor start-up delays after EJP start (option P13) is also activated. At the end of it, the start-up cycle is carried out. During that time, the display will visualize EJP.
- Then, when the changeover approval arrives (only if the motor has started up regularly), the mains/generator exchange is carried out.
- The load comes back to the mains after the changeover approval opening; the group performs the stop cycle at the opening of the start inlet.
- The EJP function is only enabled when the system is in automatic mode.
- Protection devices and alarms work as usual.

***EJP/T function***

- The EJP function is a simplified version of the preceding EJP. The motor start-up is controlled in the same way but the load changeover is carried out through a time delay and not through a special external signal. This function only uses one digital entry (external start).
- The delay time in order for the changeover to be performed starts when the start-up control is closed; it is programmable through the following parameter: changeover delay for EJP/T (option P14).
- In order to select the EJP/T function please program parameter set-up -03.

***SCR function***

- The SCR function is very much like the preceding EJP function; you can program it by setting the set-up -03 value to 2.
- In this mode the external start entry allows for the start-up of the group as in EJP but without waiting for the delay time.
- The stop entry still has the changeover approval function; the difference with the EJP function is that changeover takes place after the generating set voltage presence delay (option P08).

***Motorized pump operation***

- In the motorized pump applications it is possible to use the following parameter: no mains intervention disabling (set-up -04). It disables the mains voltage control and the generating set no voltage alarm.
- With this kind of operation, the motorized pump group start-up can be controlled either through the MAN mode (with START or STOP buttons) or through the AUT mode (with the external start signals and external stop).
- It is also possible to program the set-up -04 parameter so that the equipment detects alarms as usual or in such a way as to be able to visualize alarms without ever stopping the group

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***Decelerator function***

- If the deceleration exit is available, this is activated as soon as the motor has started up; it is inactivated at the end of the decelerated operation time (set-up -18).
- This function can be enabled as an alternative to the stop magnet and to the pre-heat spark plugs. The choice is made through the following parameter: programmable relay 1 function (set-up -17).

***Gas solenoid valve function***

- During the starting cycle, if a gas solenoid valve output has been provided for, this is activated after the gas solenoid valve energizing delay (set up -30) by the activation of the starting output. The gas solenoid valve output stays activated while the motor is running.
- When the motor needs to be stopped, the gas solenoid valve output is deactivated 3 seconds before running approval is removed (fuel solenoid valve).

***Starter function***

- The starter function relay is activated with the excitation of the gas solenoid valve during the first attempt to start the motor only.
- It stays excited for a time that can be adjusted through the following parameter: starter time length (set-up -31).
- This function can be programmed onto the programmable relay 2 as an alternative to the fuel solenoid valve or air function (through parameter set-up -28).

***Air function***

- The air function relay is activated two seconds before activating the starter (only for the first three start-up attempts). It stays closed for a maximum tine that can be adjusted through parameter airtime length (set-up -32).
- If the motor starts up, the air relay is inactivated as soon as the generating set voltage goes over the air inactivation threshold (set-up -33).
- This function can be programmed onto the programmable relay 2 as an alternative to the fuel solenoid valve and to the starter function (through parameter set-up -28).

## REMOTE CONTROL

- X803 in its version with serial interface RS485 (ordering code .....), is capable of talking to a PC (or intelligent terminal) to carry on functions of remote control and supervision.
- To ensure correct operation and reliability in an industrial environment, the set's RS485 interface is galvanically isolated.
- The link between the PC and RS485 interface of the X803 is made with a galvanically isolated RS232-RS485 converter with automatic control of the enable line.
- X803. /RC is supplied with: PC/Windows supervision software diskette, supervision software user manual and communication protocol manual.
- The RS232-RS485 converter can be supplied separately, code: 4XC22348T
- Technical data of the RS485 serial interface:
  - Half-Duplex communication with 2 wires (braided pair with end resistors)
  - Mutidrop configuration with the possibility of linking up to 32 stations
  - Transmission format 9600 baud, 8 bit data, 1 stop bit, no parity
  - Maximum length of communication line 1000m
- Main technical features of supervision software:
  - Total control of operator panel (front of X803)
  - Possibility of remote control by modem with no restriction
  - Graphic and numerical display of all readings
  - Alarm status display
  - Display of status of all inputs and outputs
  - Display of events with data and time (events-log)
  - Possibility of displaying, editing, saving and/or loading the set up and option data from files
  - Possibility of accessing the operating manual on-line.

## INFORMATION - ALARMS - ERRORS

**Information**

The information codes on the display indicate a few of the most important activities of the control unit.

**Messages table**

| Code | Meaning | Display condition |
|---|---|---|
| **StA** | Start | During the start-up cycle of the generating set |
| **Sto** | Stop | During the stopping of the generating set after the cooling time |
| **A.tE** | Automatic test | During the automatic test cycle |
| **E.St** | Remote starting | With remote starting signal |
| **EJP** | EJP function | When the EJP start entry is active and the system is in automatic mode |
| **Scr** | SCR function | When the SCR start entry is active and the system is in automatic mode |

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**Alarms**
The alarm codes on the display indicate conditions or situations why the generating set can or could not provide energy.

**A01 HIGH TEMPERATURE**
When the engine is running, it is displayed, after alarm trip delay (set up -08), when the input contact of the engine temperature is closed. The tripping de-energizes the generator contact output and immediately stop the generating set, without any cooling.

**A02 LOW OIL PRESSURE**
With the engine is running, it is displayed, after alarm trip delay, when the input contact of the pressure switch is closed. The tripping de-energizes the generator contact output and immediately stops the generating set, without any cooling.

**A03 BATTERY CHARGER ALTERNATOR FAILURE**
This is activated with motor running (voltage and/or frequency of generator). The alternator battery charge signal remains under the motor running voltage threshold (set up -06) for longer than the battery charger alternator fault delay (set up -14). This alarm stops the generating set.

**A04 UNEXPECTED STOP**
This alarm is activated when the motor stops without external intervention having caused the shut down

**A05 MAINTENANCE REQUESTED**
This is enabled when the minute counter of the maintenance interval reaches the programmed Maintenance interval duration (set up -16). To reset the alarm and counter, go into the RESET mode. With this alarm the set continues to run properly.

**A06 GENERATOR OVER FREQUENCY**
This is activated when the generating set frequency (depending on the motor's number of revolutions) is 10% higher than the nominal value. This condition has to last for a time whose length is inversely proportional to the importance of the over frequency. This time interval can last for a maximum of 4 seconds (frequency +10% if compared with nominal value) down to a minimum of 0 seconds (immediate intervention when frequency is + 20% if compared with the nominal value). We remind you that the nominal frequency can be chosen between 50 and 60 Hertz through the following parameter: nominal frequency (set-up -01). The intervention of this alarm inactivates the output of the generating set's disconnecting switch and the immediately stops the generating set without cooling down. This alarm can also be inactivated through the following parameter: top frequency alarm inactivation (set-up -34).

**A07 LOW FUEL LEVEL**
This is caused by the contact closing of fuel level input. The alarm can be configured to stop the set or not with the external alarm A07 (set up -22).

**A08 - USER ALARM**
This is generated by the closing of the contact on the relevant input. This alarm can be programmed in order to stop the set or not through the external alarm A08 (set-up -23).

**A09 - USER ALARM**
This is generated by the closing of the contact on the relevant input.
This alarm can be programmed in order to stop the set or not through the external alarm A09 (set-up -24).

**A10 STARTING FAILURE**
This is displayed when the number of starting attempts (set up -10) are carried out and the engine is not yet running.

**A11 GENERATOR UNDER FREQUENCY**
Activates when, with the alarms on (the motor running for longer than the alarm delay set up -08) and with the decelerator output deactivated, the generator frequency (depending on the number of motor spins) is inferior to the minimum frequency alarm threshold (set up -41) that lasts longer than the generator voltage absence delay (option P.07). Activation deactivates the generator contact output and immediately stops the generator set without cooling.

**A12 LOW BATTERY VOLTAGE**
This is displayed when battery voltage is below the low battery voltage alarm threshold (set up -39). During the starting output energizing, this alarm is temporarily disabled. The alarm resetting threshold is 5% higher than the preset value. The battery voltage is controlled at the unit supply terminals. Any disparity between the displayed voltage and the one detected at the battery terminals is to be attributed to a voltage drop in the supply cables.

**A13 HIGH BATTERY VOLTAGE**
Activates when the battery voltage increases over the maximum battery voltage alarm threshold (set up -40). The alarm threshold resets at 5% inferior to that which is programmed. Battery voltage is controlled on the machine terminals. A contingent discordance between the voltage visualized and that controlled on the terminals is due to a voltage drop in the supply wires.

**E01 EMERGENCY STOP**
Activated by one of the following causes:
1) Opening of the contact connected to the emergency stop input.
2) Opening of the contact connected to the external stop input, if this has been programmed NC on the parameter set up -25.
3) Pressing the STOP button on the front panel when the system is in AUT mode

This alarm causes the set to stop immediately without cooling.

**E03 EXTERNAL STOP**
This is activated when the contact on the external stop is closed in AUT mode. This alarm provokes the immediate functioning of the generator remote control switch and main stop with cooling cycle. For applications that provide a connection with a floating device, an anti-ricochet filter has been inserted that permits the commutation of the signal with a maximum time of 5 seconds.

**E04 GENERATOR VOLTAGE FAILURE**
Activates when the generator voltage is not within the provided limits of the alarm enable delay E04 (set up –38) with the generator set functioning in a non-decelerating mode. Activation disables the generator contact output and immediately stops the generator set without cooling.

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| ALARM SUMMARY TABLE | | | | | | |
|---|---|---|---|---|---|---|
| **Code** | **Description** | **Retentive** | **Immediate Stop** | **Cooling Stop** | **Alarm G activated** | **Siren activated** |
| **A01** | High temperature | YES | YES | | YES | YES |
| **A02** | Low oil pressure | YES | YES | | YES | YES |
| **A03** | Alt charge B. 500 failure | YES | YES | | YES | YES |
| **A04** | Unexpected Stop (MECHANICAL ALARM) | YES | YES | | YES | YES |
| **A05** | Maintenance requested | YES | | | YES | YES |
| **A06** | Generator over frequency | YES | YES | | YES | YES |
| **A07** | Prog. 7/feul level | Prog | Prog. | Prog. | Prog | Prog |
| **A08** | Prog. 8 | Prog | Prog. | Prog. | Prog | Prog |
| **A09** | Prog. 9 | Prog | Prog. | Prog. | Prog | Prog |
| **A10** | Starting failure | YES | YES | | YES | YES |
| **A11** | Generator under frequency | YES | YES | | YES | YES |
| **A12** | Low battery voltage | YES | | | YES | YES |
| **A13** | High battery voltage | YES | | | YES | YES |
| **E01** | Emergency Stop | YES | YES | | YES | YES |
| **E03** | External Stop | | | YES | | |
| **E04** | Generator voltage failure | YES | YES | | YES | YES |

**Errors**

The displayed error codes indicate an operation fault or anomaly of the program memories and of the preset parameters.

| ERRORS TABLE | | |
|---|---|---|
| **Code** | **Meaning** | **Display condition** |
| **IE1** | Internal error, incorrect program | Alteration of the program memory. Return the X803 to Miami Breaker for repair; ask for authorization beforehand. |
| **IE2** | Internal error, incorrect parameters | Alteration of parameter memory. Remove X803 supply; resupply and check all parameters. In case the IE2 error persists, return the X803 to Miami Breaker for repair; ask for authorization beforehand. |

## INPUTS AND OUTPUTS

| Inputs table (alarm and control) | | | | | |
|---|---|---|---|---|---|
| **Terminal No.** | **Function** | **Alternative function No. 1** | **Alternative function No. 2** | **Alternative function No. 3** | **Parameter reference** |
| 3 | High temperature sensors | | | | |
| 4 | Oil pressure sensor | | | | |
| 5 | External stop | EJP COMMUT. | SCR COMMUT. | EMERGENCY STOP | SETUP 03<br>SETUP 25 |
| 6 | External Start | EJP START | SCR START | | SETUP 03 |
| 35 | Low fuel level A07 | PROG. | PROG. | | SETUP 22 |
| 36 | Programmable Alarm A08 | PROG. | PROG. | | SETUP 23 |
| 37 | Programmable Alarm A09 | PORG. | PROG. | | SETUP 24 |
| 41 | Emergency Stop | | | | |

| OUTPUT TABLE | | | | |
|---|---|---|---|---|
| **Terminal No.** | **Function** | **Alternative function No. 1** | **Alternative function No. 2** | **Parameter Reference** |
| 14 | Start | | | |
| 16 | Stop | Deceleration | Glow plug | Setup 17 |
| 17 | Fuel Valve | Starter function | Air | Set up 28 |
| 18 | Siren | | | |
| 29,30 | Mains Contactor | | | |
| 31,32 | Generator Contactor | | | |
| 33,34,34C | General Alarm | Gas SV-EV | | Set up -29 |

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## PROGRAMMING

- The parameter setting is done by accessing two different menus: option and set up.
- **Option:** In this menu the parameters are set in relation to the mains characteristics and user requirements. Normally, the setting of these parameters is done by the installer of the generating set.
- To access the Option menu, place the unit in RESET mode and keep the RESET key pressed then push the SELECT/MIS key for 5 seconds. Access to the Option menu is displayed with “P.01” indicating the setting to be modified.
- **Set up:** In this menu the parameters are set in close relation to the generating set characteristics. Normally, setting these parameters is reserved to the manufacturer of the generating set and/or control panel.
- To access the Set up menu, place the unit in RESET mode and, keeping the RESET key pressed, press the START button twice, the STOP button 3 times and SELECT/MIS 4 times. Now release the RESET button. The display will show Set. Press Start to access the first parameter, indicated by code -01.
- In the set up function, to access the subsequent parameter, press GEN(TLG), while for the previous one, presses MAINS(TLR). After having selected the required parameter, to increase the value, press STOP or, to decrease, press START. The variation can be made only within the foreseen limits. To store the set parameters, press the RESET key.

## PARAMETERS

The following tables group the Option and Set up parameters. RANGE indicates the field of possible settings, DEFAULT the classic setting of a board straight after leaving the factor. It is recommended to attach a table to each electrical panel showing the settings associated with that type of panel.

**Menu Option**

| Option | Description | Range | Default |
|---|---|---|---|
| **P.01** | Minimum mains voltage trip threshold | 80 – 480 VAC (3 phase)<br>160 – 230 VAC (Mono phase) | 340 VAC (three phase) |
| **P.02** | Maximum mains voltage trip threshold | 110 – 600 VAC (three phase)<br>253 – 345 VAC (mono phase) | 480 VAC (three phase) |
| **P.03** | Mains voltage absence delay | 0-120 sec | 5 sec |
| **P.04** | Mains voltage presence delay | 0-240 sec | 10 sec |
| **P.05** | Minimum generator voltage trip threshold | 80 – 480 VAC (three phase)<br>160 – 230 VAC (mono phase) | 340 VAC (three phase) |
| **P.06** | Maximum generator voltage trip threshold | 110 – 600 VAC (three phase)<br>253 – 345 VAC (mono phase | 480 VAC (three phase) |
| **P.07** | Generator voltage absence delay | 1-180 sec | 5 sec |
| **P.08** | Generator voltage presence delay (generator contact closing delay) | 1-180sec | 20 sec |
| **P.09** | Cooling duration | 1 – 300 sec | 30 sec |
| **P.10** | Audible alarm duration | 0-60 sec | 20 sec |
| **P.11** | Automatic test interval | 1 - 7 days | 3 days |
| **P.12** | Automatic test duration | 1-30 min | 10 min |
| **P.13** | Engine start delay after EJP start | 0 – 99 min | 25 min |
| **P.14** | EJP/T commutation delay (1 wire) | 0-30 min | 5 min |

**Set up menu (the password is only for skilled personnel)**

| Set up | Description | Range | Default |
|---|---|---|---|
| **-01** | Rated frequency generator | 0(50Hz)-(60 Hz) | 0 |
| **-02** | Started engine signal source | 0(disabled)-1(activated) | 1 |
| **-03** | Normal function EJP-SCR-EJP/T | 0(nor)<br>1(EJP)<br>2(SCR)<br>3(EJP/T) | 0 |

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| Set up | Description | Range | Default |
|---|---|---|---|
| **-04** | Voltage control exclusion (for pump) | 0(nor) – 1(alarm stop pump)-2(no alarm stop p.) | 0 |
| **-05** | 500RPM signal select (C.B. alternator or generator) | 0 (alt) – 1(gen) | 0 |
| **-06** | Alternator tension threshold for motor start up | 6 – 60V | 10 V |
| **-07** | Generator tension threshold for motor start up | 5 – 200 VAC | 10 VAC |
| **-08** | Alarm enable delay at engine starting | 1 – 60 sec | 15sec |
| **-09** | Stop duration | 1-30sec | 20 sec |
| **-10** | Number of starting attempts | 1-10 | 5 |
| **-11** | Starting attempt duration | 1-30sec | 5 sec |
| **-12** | Interval between starting attempts | 1-20sec | 10 sec |
| **-13** | Delay between interrupted and subsequent startings | 2 - 5sec | 3 sec |
| **-14** | Delay 500 RPM failure enable | 2 – 5 sec | 3 sec |
| **-15** | Mains/Generator interlock delay | 0-10sec/10 | 5 sec/10 |
| **-16** | Maintenance interval | 10 – 250 hours | 50 hours |
| **-17** | Function exit born 16-0(electromanet1 (accelerator) 2(preheating) | 0 (nor) – 1(acc) 2(preheating) | 0 |
| **-18** | Deceleration duration | 1 – 180 sec | 60 |
| **-19** | Spark plug heating time | 1 – 60 sec | 10 sec |
| **-20** | Automatic test activation with external stop activated | 0 (disabled) – 1(activated) | 0 |
| **-21** | Disable AUT and TEST (paper functions only in MAN or OFF) | 0 (nor) – (disabled) | 0 |
| **-22** | External alarm A07 (disable /alarm only/alarm and stop) | 0(disabled) 1(alarm) 2(stop) | 0 |
| **-23** | External alarm A08 (disable /alarm only/alarm and stop) | 0(disabled) 1(alarm) 2(stop) | 0 |
| **-24** | External alarm A09 (disable /alarm only/alarm and stop) | 0(disabled) 1(alarm) 2(stop) | 0 |
| **-25** | External stop NF over ride NO | 0(NO) 1 (NF) | 0 |
| **-26** | Additional delay for alarm A08 (from alarm start) | 0 – 120 sec | 0 |
| **-27** | Serial communications address | 01 - 32 | 01 |
| **-28** | Program 2 (fuel/Advance/Air) | 0(fuel) 1 (Ad) 2 (Air) | 0(fuel) |
| **-29** | Program 3 (general alarm/Gas) | 0 (alarm) – 1 (Gas) | 0(alarm) |
| **-30** | Gas delay (after start) | 1 – 5 sec | 2 sec |
| **-31** | Advance duration | 1 – 10 sec | 5sec |
| **-32** | Air duration | 0 – 10 sec | 8 sec |
| **-33** | Air transmission brake threshold | 0 – 200 V | 8 V |
| **-34** | Maximum frequency alarm disable (A06) | 0 (act) 1 (disable) | 0 (act) |
| **-35** | Disable alarm with generator voltage absence (E04) | 0 (act 1(disable) | 0 (act) |
| **-36** | New commutation main block during EJP alarm | 0 (nor) 1 (block) | 0 (nor) |
| **-37** | Mono phase / Three phase line | 0 (mono) 1 (three) | 1 (three) |
| **-38** | Alarm enable E04 (generator voltage absence) | 15 – 240 sec | 240 sec |
| **-39** | Minimum battery voltage | 7 – 12 VDC (12V)<br>13 – 24 VDC (24V) | 9V (12V)<br>18V (24V) |
| **-40** | Maximum battery voltage | 13 – 17 VDC (12V)<br>26 – 34 VDC (24V) | 16V (12V)<br>32V (24V) |
| **-41** | Minimum frequency alarm threshold | 20-50/60Hz | 40Hz |
| **-42** | Maximum main asymmetry | 5 – 20 % | 15% |

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## TECHNICAL CHARACTERISTICS

| - Supply circuit | |
|---|---|
| Battery supply (Us) | 12Vcc o 24Vcc<br>12Vdc or 24Vdc |
| Maximum current consumption | ≈160mA (250mA con RS485)<br>≈160mA (250mA with RS485) |
| Stand-by current | ≈110mA (200mA con RS485)<br>≈110mA (200mA with RS485) |
| Operating range 12V | 6,2÷16,5 Vcc<br>6.2-16.5Vdc |
| Operating range 24V | 13÷33 Vcc<br>13-33Vdc |
| Immunity time for micro breakings | ≈150ms |
| Maximum ripple | 10% |

| - Mains voltage control circuit (single or three phase) | |
|---|---|
| | |
| Rated voltage (Ue) | 100÷480Vca<br>100-480Vac |
| Operating range | 70÷624Vca<br>70-624Vac |
| Rated frequency (keyboard adjusted) | 50/60Hz |
| Minimum voltage tripping (keyboard adjusted) | 0,7÷1Ue<br>0.7-1Ue |
| Maximum voltage tripping (keyboard adjusted) | 1÷1,5Ue<br>1-1.5Ue |
| Asymmetry tripping (only three-phase) | 5÷20% Ue<br>5-20Ue |
| Resetting hystersis | 5% |
| Precision<br>Accuracy | ±1% |

| - Generator voltage control circuit (single phase) | |
|---|---|
| Rated voltage (Ue) | 100÷480Vca<br>100-480Vac |
| Operating range | 70÷624Vca<br>70-624Vac |
| Rated frequency (keyboard adjusted) | 50/60Hz |
| Minimum voltage tripping (keyboard adjusted) | 0,7÷1Ue<br>0.7-1Ue |
| Maximum voltage tripping (keyboard adjusted) | 1÷1,5Ue<br>1-1.5Ue |
| Resetting hysteresis | 5% |
| Accuracy | ±1% |

| - Remote control circuit | |
|---|---|
| Input | negative |
| Voltage applied at contacts | 12Vcc (24Vcc)<br>12Vdc (24Vdc) battery |
| Maximum current | 8mA |

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| **- Started engine control circuit** | | |
|---|---|---|
| - Battery charger permanent magnet alternator | | |
| Operating range | | 0-40Vca<br>0-40Vac |
| Adjustment range | | 6-30Vca<br>6-30Vac |
| Input current | | <10mA |
| - Battery charger energised alternator | | |
| Operating range | | 0-40Vcc<br>0-40Vdc |
| Adjustment range | | 6-30Vcc<br>6-30Vdc |
| Maximum input current | | <10mA |
| +D Circuit voltage | | 12Vcc (24Vcc)<br>12Vdc (24Vdc) battery |
| Energising current | Ue 12Vcc<br>Ue 12Vdc | 170mA |
| Energising current | Ue 24Vcc<br>Ue 24Vdc | 130mA |

| **- Output relay contacts to exclude mains, Generator and Audible Alarm** | |
|---|---|
| arrangement | 1 NO contact |
| Rated operational voltage | 24Vdc |
| Maximum operational voltages | 30Vdc |
| Rated capacity Ith | 5A |
| Rated capacity DC13 (or DC14) | 5A-24Vdc |

| **- Ouput relay contacts of common alarm** | |
|---|---|
| Contact arrangement | 1 changeover contact |
| | |
| Rated operational voltage | 24Vcc<br>24Vdc |
| Maximum operational voltage | 125Vac 30Vdc |
| Rated capacity Ith | 5A |
| Rated capacity DC13 (or DC14) | 5A-24Vdc |

| **- Output contacts of Mains and Generator contactors** | |
|---|---|
| Mains contactor control | 1 NC contact<br>1 NO contact |
| Generator contactor control | 1 NO contact |
| Rated operational voltage | 250Vac |
| | |
| Maximum operating voltage | 440Vac |
| Rated capacity Ith | 5A |
| Rated capacity AC15 | 2A 220Vac |
| Contacts/coil insulation | 5kVac 1min |
| Open contacts insulation | 1kVac 1min |

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## Other characteristics

| - Enclosure | |
|---|---|
| Version | Incasso<br>Flush mount |
| Overall dimensions lxhxd | 144x144x125mm |
| Degree of protection without protective cover | IP41 |
| Degree of protection with protective cover | IP54 |
| Weight | ≈880g |

| - Operating ambient conditions | |
|---|---|
| Operating temperature | 0÷60°C<br>0-60°C |
| Storage temperature | -30÷80°C<br>-30 to +80°C |

| - Connections | |
|---|---|
| Type of terminals | Estraibile<br>Plug in |
| Cable cross-section | 2,5mmq<br>2.5mmsq |

## REFERENCE STANDARDS

- **Dielectric test (IEC255-5)**

Industrial frequency (50Hz) : 2.5kV for one minute
Impulse (1.2/50ms): 5kV (3 positive and 3 negative at intervals longer than 5 seconds)

- **Climatic sequence (IEC 68-2-61)**

Method 1: hot dry, hot damp, cold, hot damp

- **Vibration test (IEC 68-2-6 or according to Lloyd's Register specifications)**
  Fc test (sinusoidal vibrations)
- **Damp-saline ambient test (RINA specifications)**
- **Electromagnetic compatibility test (EN 50081-1, EN 50082-2)**
  Electrostatic discharge immunity (EN 61000-4-2)
  Fast transient / burst immunity (EN 61000-4-4)
  Radiated radio-frequency electromagnetic field immunity (ENV 50140)
  Conducted radio disturbance electromagnetic field immunity (ENV 50141)
  Emission level of radiated electromagnetic fields (EN 55011)
  Emission level of conducted electromagnetic fields (EN 55011)

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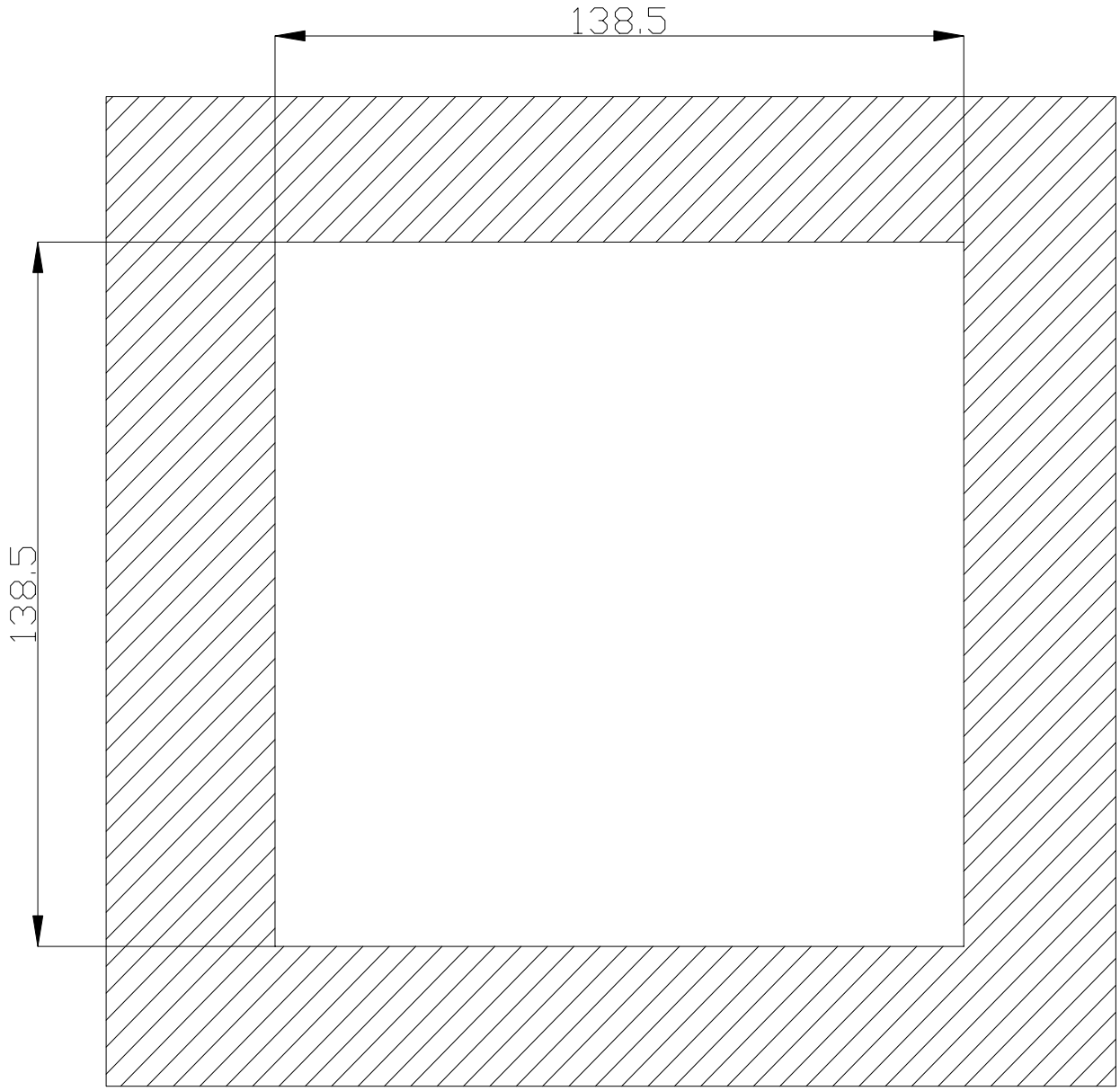

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