



**Electronic Voltage Regulator
Frequency Converter
Mod. EPS/CO-FR0-11**

OPERATING MANUAL



READ CAREFULLY THE HANDBOOK BEFORE USING THE EQUIPMENT



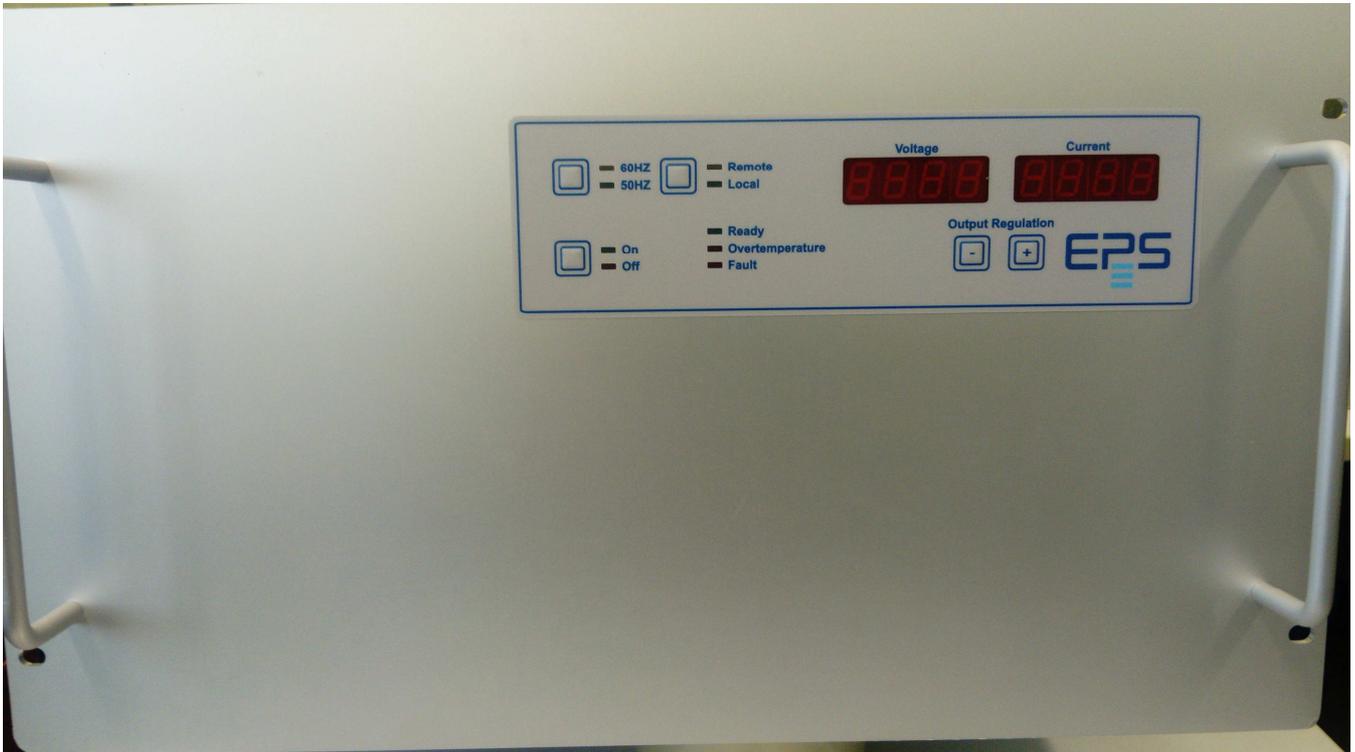
THE USE AND INSTALLATION OF THIS EQUIPMENT ARE RESERVED TO QUALIFIED USERS



WARNING:

**DANGEROUS VOLTAGE IS PRESENT INSIDE THE EQUIPMENT.
DISCONNECT THE CONVERTER BEFORE OPENING THE DOORS.
INSTALLATION MUST BE PROVIDED BY A QUALIFIED OPERATOR.
USE ONLY ISOLATED AND PROFESSIONAL TOOLS**

Note: this manual refers to the standard model based on 400VAC mains. The models are available for different voltages on demand. Please check the rated voltage of the product corresponds to the one used in the country where it is installed and verify its characteristics on the rear panel nameplate.



1. Installation



The instrument cannot be used in areas that are potentially flammable or explosive.



**Use instruments within environment specification only!
Improper use could damage electronic circuit.**

- protection degree IP 20
- ambient operating temperature 0°C - +40°C
- max. humidity without condensation 85%
- working environment indoor use

The unit may be installed on the floor, on a laboratory bench or mounted in a rack. Place the instrument away from any heat sources. A distance of at least 10 cm must be left between the sides of the unit and adjacent walls to ensure sufficient air flow to the cooling fan. If the instrument is installed inside a cabinet, the latter must be provided with vents capable of ensuring adequate air exchange between the inside and the outside.

2. Initialization

During the first start-up the system will verify its internal consistency. It will take 30 seconds to 1 minute and the red “off” led on the front panel will be on while the red “ready” led will be off. During this phase, the product will not accept any local or remote command.

At the end of this check, the product will be ready for operation.

An important voltage drop on the supply side will shut the product off and it will switch on automatically when the supply comes back: the consistency check will be repeated each time it is switched on and the parameters set previously to the voltage drop will be maintained.

3. Front panel

Voltmeter and Ammeter, control pushbuttons and led status signals are located on the front panel.



3.1. Analogic measurements

Voltmeter: it shows the output voltage with a 2% ± 4 digit precision

Ammeter: it shows current absorbed by the output load with a 2% ± 4 digit precision

3.2. Led signals

50HZ: Green led. If on, the regulator will supply voltage at a 50Hz frequency. If flashing contextually with the 60Hz, Local and Remote leds, it shows a wrong connection to the supply network (see par. 7.3).

60HZ: Yellow led. If on, the regulator will supply voltage at a 60Hz frequency. If flashing contextually with the 50Hz, Local and Remote leds, it shows a wrong connection to the supply network (see par. 7.3).

ON: Green led. If on, it shows correct running operation. This led switches on only after initialization procedure.

OFF: Red led. If on, it shows no operation. This led is on during full initialization procedure.

LOCAL: Green led. If on, it shows that the command is local. Remote output signals are available but remote input signals are not accepted or interpreted. If flashing contextually with 50Hz, 60Hz and Remote leds, it shows a wrong connection to the supply network (see par. 7.3).

REMOTE: Yellow led. If on, it shows that the command is remote. Front panel pushbuttons are not active.

If flashing contextually with 50Hz, 60Hz and Local leds, it shows a wrong connection to the supply network (see par. 7.3).

READY: Green led. If on, it shows that the converter is ready to accept local or remote commands; during initialization procedure this led is off and the converter will not accept any command.

OVERTEMPERATURE: Red led. If on, it shows that the product temperature is over 70°C (158°F): the converter will therefore be stopped. The user must wait for the led to switch off to be able to reset by switching off and on again the converter.
If the problem arises more than once, please check positioning of the unit and correct operation of the cooling vent.

FAULT: Red led. If on, it shows a serious fault on the converter that can be due to a strong perturbation of the supply line or an internal fault. If this led switches on immediately after a reset, it shows an internal fault of the converter.

3.3 Pushbuttons

ON/OFF: This button switches on and off the converter. It is active only after the initialization procedure and if in Local mode.

50/60HZ: This button changes output frequency alternatively to 50Hz or 60Hz. It is active only in Local mode.

REMOTE/LOCAL: Pressure of this button for a time greater than 7 seconds will switch operation mode from Local to Remote and vice versa. Remote command deactivates all other front panel buttons.

UP/DOWN: "Up" and "Down" buttons allow regulation of output voltage. A quick pressure allows fine regulation while keeping the button pressed will quickly cover the full regulation scale in about 5 seconds.

3.4 Keyboard lock

KEYBOARD LOCK: Press Remote/Local button till "Remote" and "Local" led flash. Press the Remote/Local button three times. Keyboard will be locked.

KEYBOARD UNLOCK: Press Remote/Local button till "Remote" and "Local" led flash. Keep pressing the Remote/Local button and the "Down" button for 1 second. Keyboard will be unlocked.

3.4. Keypad lock

In order to prevent accidental tampering of the selections set on the controller, you can activate the keypad lock using the following procedure:

- press the REMOTE / LOCAL button until the two LED (REMOTE and LOCAL) start flashing.
- Within 3 seconds, press 3 times the same button.

The keyboard is thus blocked and will not accept any control,

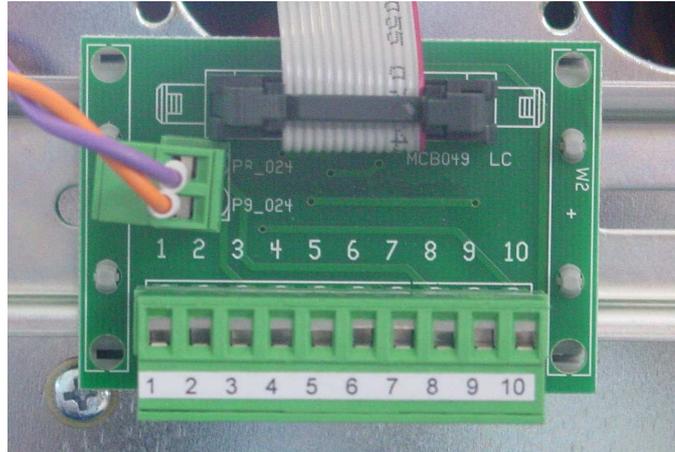
To unlock:

- Press the REMOTE / LOCAL button;
- When the two LED (REMOTE and LOCAL) start flashing, pressing and holding the button, press the "DOWN" button for 1 second.

4. Rear panel terminal

On the rear panel, below the protective cover, the terminal for signals and connections is located.

4.1 Signal clamps



Pin 1:	Positive control 0..10 Vdc input, 5mA min current.
Pin 2:	Common control 0..10 Vdc input.
Pin 3 / 4:	If short-circuited, they activate converter switching on.
Pin 5 / 6:	If short-circuited, frequency is set to 50Hz, if open to 60Hz.
Pin 7:	Emitter of signal "Variac on" repetition from optocoupler
Pin 8:	Collector of signal "Variac on" repetition from optocoupler
Pin 9:	Emitter of signal "Fault" repetition from optocoupler
Pin 10:	Collector of signal "Fault" repetition from optocoupler

Max current available by optocouplers on digital output is 20 mA at 30 Vdc.
 Max current absorbed by analogic interface 0-10 Vdc is 10 mA.

4.2. Connection clamps

Clamp (L1):	Converter supply phase
Clamp (N):	Converter supply neutral
Clamp (U1):	Output phase on load
Clamp (N1):	Output neutral on load
Yellow/green clamps (PE):	Ground connection: this connection is absolutely necessary for personal and instruments protection.

5. **Protections**

The product is electronically protected against overload, short-circuit and overtemperature as to avoid irreversible faults to the product. Should the temperature be higher than 70°C (158°F) or should the current be higher than the maximum rated current for more than 6 (six) seconds, the converter will stop itself.

6. **Reset after overtemperature or overload protection lock**

To reset the converter, one must switch it off and on again. After an overtemperature protection, the converter can be reset only when the heat sink temperature achieves 60°C (140°F). An overload will be solved only by lowering requested current below the rated one and therefore by changing the load.

7. Operating conditions and anomalies

7.1. Problems and anomalies according to led signalling

Front panel leds will alert the user in case of anomalies and faults, as per par. 2 of this manual. Most anomalies will switch the "Fault" led on: below here you can check the possible faults.

1. Unbalanced load
2. Faulty IGBT driver
3. Faulty IGBT
4. Fault on supply board
Heat sink overtemperature: in this case the "Overtemperature" led will switch on and it will switch off again after a temperature lower than 60°C (140°F) is reached; "Fault" led still continues. The user must confirm the overtemperature fault by resetting the converter.
5. Overload: in this case the "Overtemperature" led and "Fault" led will both switch on without switching off. The user must confirm the overload fault by resetting the converter.

7.2. Problems and anomalies that cannot be revealed by leds

Some problems cannot be signaled on the front panel:

1. Faulty front panel
2. Fault on rectifier (the converter cannot be supplied)
3. Fault of sinusoidal generator on the board

In remote mode, the same led signals, such as at the terminal, be passed through the device.

7.3. Problems caused by wrong connection to supply line

The converter must be connected to grid supply according to instructions as per par. 4.2. Should the connection be not conform, the front panel 50Hz, 60Hz, Local and Remote leds will flash. Probable solution to the problem is the inversion of the plug or of the connections.

GUARANTEE

This guarantee is offered as an extra benefit and does not affect your legal rights.

All the converters are guaranteed by the Company for one year against faulty material or workmanship. If any part is found to be defective in this way within the first twelve months from the purchase date, we or our authorised service agents, we will replace or at our option repair that part without any charge for materials or labour, provided that the appliance has been used only in accordance with the instruction provided with each converter and that it has not been connected to an unsuitable electricity supply, or subjected to misuse, neglect or damage or modified or repaired by any person not authorised by us.

The correct electricity supply voltage and frequency is shown on the rating plate on the appliance. This guarantee is normally available only to the original purchaser of the appliance, but the company will consider written applications for transfer.

Should any defect arise in any converter a claim under guarantee become necessary, the appliance should be carefully packed and returned to your local service agent. This copy of the guarantee should be attached to the appliance. Guarantee is applied only if the equipment is returned F.O.B. to our company. No technical intervention may be claimed for any reason at the place of installation under guarantee.

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