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Instruction manual

Driver Mod. CBN06 version AP24G206



Revision: 1.1
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1 Safety instructions



Before operating the power supply, carefully read this manual.

Warning: To reduce the risk of fire, electric shock, or injury, it is necessary to observe some fundamental safety rules whenever using an electrical device, as outlined below:

- Always keep the installation area of the power supply clean and ensure that it is not subject to vibrations.
- Do not use in excessively humid areas or in the presence of flammable gases or liquids.
- Have the power supply installed and operated by qualified or experienced personnel capable of recognizing and preventing potential accidents.
- De-energize the device and wait a few minutes (to discharge capacitors) before installing or opening it for wiring or maintenance.
- Ensure that all electrical connections are secure and protected.
- Ensure that ground connections are well-executed, and power protections are in accordance with safety regulations.
- Verify that the local mains voltage matches the power supply voltage.
- Check for no ground leaks both in the connections to the mains and in those to the load (use shielded cable for the connection to the vibratory conveyor)



Warning: Dangerous Voltage

Failure to follow these instructions may result in serious injury to people or damage to property.

1.a) CE Declaration



Gasco group Srl



SISTEMI DI ALIMENTAZIONE PER L'AUTOMAZIONE

DECLARATION OF INCORPORATION
(All. IIb Dir. 2006/42/CE)

THE MANUFACTURER

GASCO group s.r.l.

Azienda / Company

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SV

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under its sole responsibility,
STATES THAT THE ALMOST MACHINE

- Designated **VIBRATING FEEDING SYSTEM**;
- Description _____;
- Serial number _____;
- _____

FAC-SIMILE

It meets the following applied essential requirements:

1; 1.1; 1.1.1; 1.1.2; 1.1.3; 1.1.5; 1.3; 1.3.1; 1.3.2; 1.3.4; 1.4; 1.4.1; 1.4.2; 1.4.2.1; 1.5; 1.5.4; 1.5.9; 1.5.10; 1.6; 1.6.1; 1.6.5; 1.7; 1.7.1; 1.7.1.1; 1.7.2; 1.7.4; 1.7.4.1; 1.7.4.2

The relevant technical documentation was compiled in accordance with Annex VII B of Directive 2006/42/EC, and the manufacturer undertakes to transmit, in response to a duly justified request from the national authorities, information relevant to the quasi-machine.

FORBID

commissioning until the final machine into which it is to be incorporated has been declared compliant, if applicable, alle requirements of Directive 2006/42/EC.

The legal entity authorised to establish the relevant technical documentation is: GASCO GROUP Srl, based in

Vado Ligure (SV), Via alla Costa, 18, Italy.

Luogo e data del documento / Place and date of document

Vado Ligure, _____

Il Fabbricante / The Manufacturer: GASCO group s.r.l.

Nominativo firmatario / Signatory Name: Ing. Adriano Rosso

Firma / Signature:

2 General Information

2.a) *Technical Specifications*

Here below Technical Specifications for CBN06 Drive, AP24G206 version.

Power Supply:	230Vac \pm 10%, frequency 50 or 60 Hz
Output Voltage:	from 40 to 220Vca (with mains 230Vca)
Output compensation:	compensation of mains variation (if the output voltage is not higher than 95% of input voltage)
Output frequency:	Full wave (vibrating frequency = mains frequency x 2) Half wave (vibrating frequency = mains frequency)
Current:	maximum value 16 Ampere peak (about 6A Arms), limited by electronic circuit with auto-reset and signal that the maximum current value has been exceeded
Fuses:	6,3 A fast action 250Vac; dimensions 5x20 mm
Load feeding:	soft-start/stop with adjustable ramp from 0,1 to 4,5 seconds, in steps of 0,5 seconds
Remote commands:	Stop/Run with PNP/NPN voltage, optically isolated 12 \div 24 Vdc, current 20 mA, or potential-free contact (optional, wiring at customer's charge) Sensor (Overflow/Overempty) with PNP/NPN voltage, optically isolated 12 \div 24 Vdc, current 20 mA, or potential-free contact, with JS3 jumper open (optional, wiring at customer's charge) reference voltage 0-10 Vdc, with JS1 jumper closed (optional, wiring at customer's charge)
IP Protection:	IP 54
EMI Protection:	compliant with following regulations: LVD CEI EN60439-1 EMC CEI EN50082-2 EMC CEI EN50081-2 provided that wiring instructions are rigorously observed
Working Temperature:	max ambient temperature 45° C
Connections:	<u>POWER:</u> IN mains: 2m cable + Shuko socket OUT power to vibrator: 4 pole ILME connector

Dimensions/Weight: - 160 x 123 x 100 mm (height x width x depth) / 1,0 Kg
fixing with M6 screws; distance between fixing holes 135 mm
(leave 50/100 mm at the bottom for the connector or for cables
bending)

2.b) Functional Description

The CBN06 devices are drivers for electromagnetic vibrating base transport and/or partitioning systems. These drives operate at a fixed frequency: they can work at the same frequency as the mains voltage (using one half-wave), or at twice the frequency (using both half-waves). The vibration amplitude can be adjusted by cutting the half-wave to modulate the output current.

The electronics are housed in an aluminium case, designed by Gasco group Srl to protect the electronics and simultaneously dissipate the heat produced by the internal power devices. Different versions are available with an IP20 container or IP00 rack version for panel mounting, or with a closed container with IP54 protection for on-board assembling.

The CBN06 drives can be fastened to a panel with two M6 screws (standard for the IP54 version) or with an omega guide (standard for the IP20 version or upon request for the IP54 version). Electrical connections are provided with a removable terminal block and cable gland or snap-in connectors on the bottom panel.

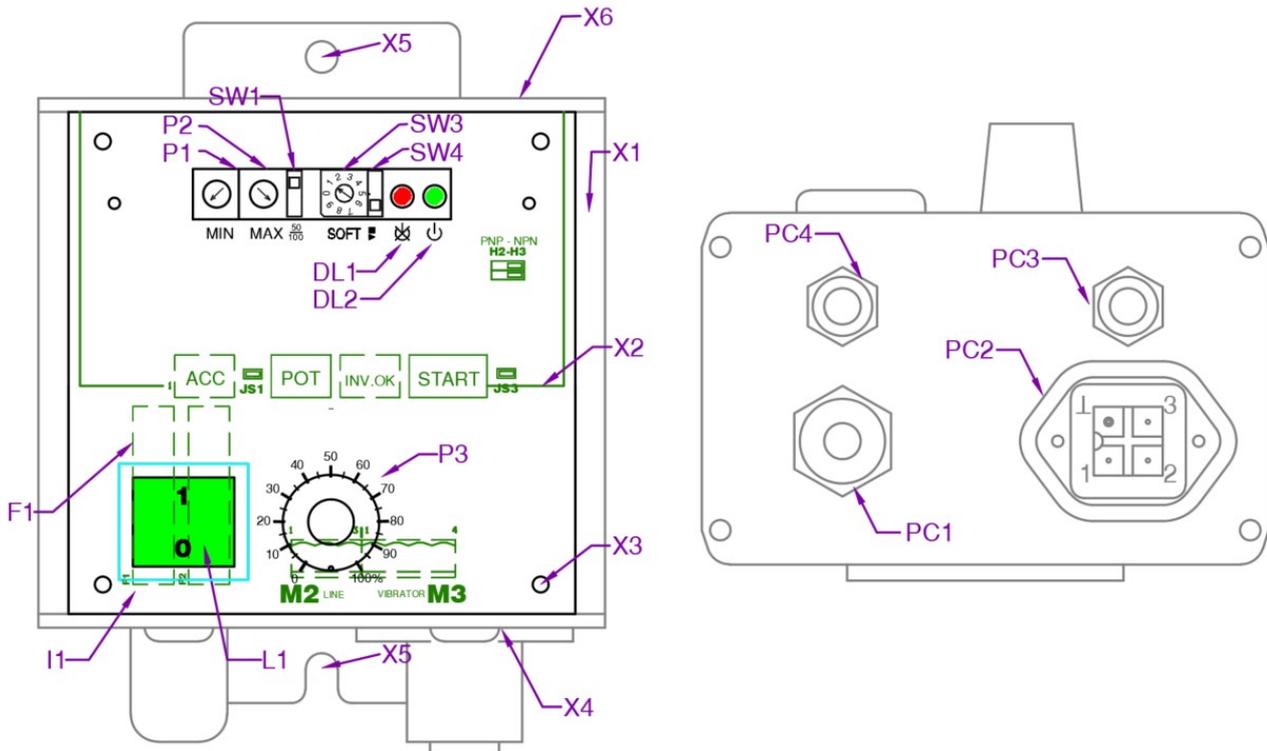
The power supply is protected by fuses on the board. In the IP54 versions, power supply can be isolated via a luminous switch located on the front panel, while in the IP20 versions via connection to the customer's thermomagnetic contactor.

Overload is indicated by a red LED (DL1) and is managed by an electronic protection with auto-reset that limits the capacity to the maximum value; after ten consecutive auto-resets, the drive remains in a blocked state, and it is necessary to give the START command to restart the device, after that overload problems have been solved.

The running status is indicated by a green LED (DL2).

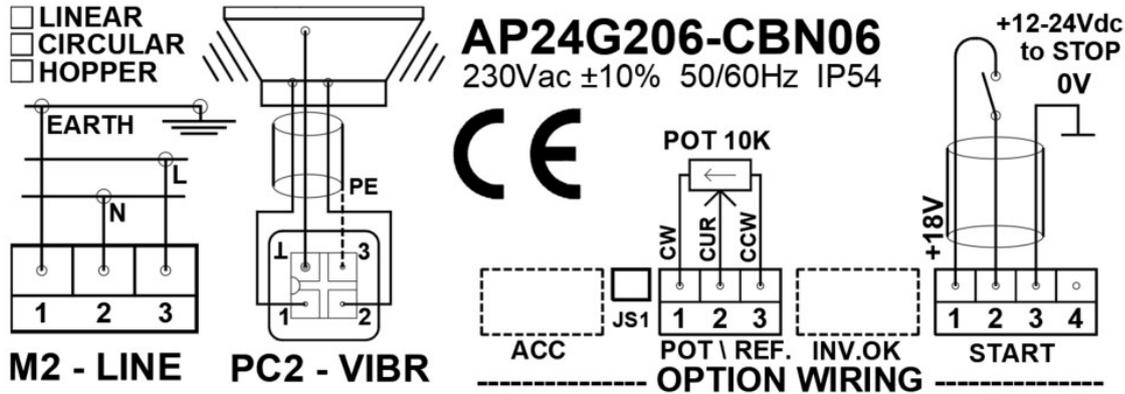
3 Wiring and Start-up Istructions

3.a) Parts identification



AP24G206		
PART	REF.	FUNCTION
Cable gland PG11	PC1	Mains input 230Vac with Shuko socket
ILME Connector	PC2	Load feeding with extractable ILME connector
Cable gland PG7	PC3	Input for Stop/Start command and sensor (optional)
Cable gland PG7	PC4	Input for 10k remote potentiometer or voltage reference (optional)
Breaker	I1	Mains switch
Green lamp	L1	Signal – power supply available
Internal fuses	F1	Protection against short circuits of the vibrator and to ground
Trimmer	P1	Setting of the minimum threshold for the potentiometer/reference
Trimmer	P2	Setting of the maximum threshold for the potentiometer/reference
Potentiometer 10K	P3	Adjustment of output voltage
Switch	SW1	Selection of output frequency (same as input or double)
Rotary switch	SW3	Selection of start/stop ramp from 0,1 to 4,5 seconds
Switch	SW4	Selection of normally running/normally stopped mode
Red Led	DL1	Signal of blocked power supply
Green Led	DL2	Signal of running driver
Case	X1	Anodized aluminium profile – protection and heat sink
Panel	X2	Front closure in anodized aluminium
Screws	X3	Fixing of front closure to the case
Panel	X4	Lower closure in anodized aluminium
Hole	X5	Fixing of case
Panel	X6	Upper closure in anodized aluminium
Jumper	JS1	Enable 0-10V voltage reference

3.b) Wiring Table



**Checked: 10/12/24
Serial Num 244950**

POWER WIRING

PIN REF.	SIGNAL DESCRIPTION	WIRE SECTION mm ²	CABLE COLOR	CONNECT TO:
M2-1	GROUND CONNECTION	3x1	YELLOW-GREEN	EARTH
M2-2	MAINS INPUT (NEUTRAL)	3x1	BLUE	Neutral 230 Vac
M2-3	MAINS INPUT (PHASE)	3x1	BROWN	Phase 230 Vac
PC1-3 (M3-1)	SHIELD		SHEATHING	Do not connect
PC1-T (M3-2)	GROUNDING	3x1	YELLOW-GREEN	VIBRATOR BODY
PC1-1 (M3-3)	OUTPUT SUPPLY FOR VIBRATOR	3x1	BLUE	VIBRATOR
PC1-2 (M3-4)	OUTPUT SUPPLY FOR VIBRATOR	3x1	BROWN	VIBRATOR

SIGNALS WIRING

PIN REF.	SIGNAL DESCRIPTION	WIRE SECTION mm ²	CABLE COLOR	CONNECT TO:
POT-1	+5V TO SUPPLY POTENTIOMETER CW	3x0,5	RED	CW pot. 10K
POT-2	INPUT REFERENCE VOLTAGE 0-10V or CURSOR POTENTIOM.	3x0,5	GREEN	CURSOR or Input reference voltage
POT-3	0V FOR REFERENCE VOLTAGE, or CCW POTENTIOMETER	3x0,5	BLACK	CCW pot. or 0V reference voltage
START-3 (M4-1)	OUTPUT +12/24V POTENTIAL FREE CONTACT or SENSOR SUPPLY	0,5		POTENTIAL FREE CONTACT or +12/24Vdc sensor
START -T (M4-2)	INPUT +12/24V (10 mA) STOP/START COMMAND	0,5		POTENTIAL FREE CONTACT or output STOP/START PNP/NPN
START -1 (M4-3)	0V REF. STOP/START COMMAND	0,5		0V output STOP/START PNP/NPN or 0V ref. sensor
START -2 (M4-4)	SENSOR FOR STOP/START COMMAND ENABLE (with JS3=open)	0,5		Sensor PNP/NPN (overflow/overempty)

The pre-wired cables consist of an unshielded 3x1 mm² cable equipped with a SHUKO plug for the mains input (M2-PC1). The 4-pole ILME connector (M3-PC2) is used to connect the vibrator. The stop/start signal is available as an option, including any overfull/overempty sensor, with wiring at customer charge with 0.5 mm² cable, as follows:

- to control stop/start with potential free contact:** connect the START-1 (M4-1) pin and the START-2 (M4-2) pin.
- to control stop/start with external reference voltage:** connect the 0V in START-3 (M4-3) pin to the +12-24V in START-2 (M4-2) pin.
- to control stop/start with an overflow/overempty sensor:** connect the 0V in START-3 (M4-3) pin to the START-1 (M4-1) pin and the sensor output in START-4 (M4-4) pin, then open JS3 jumper.



Beware:

The body of the vibrator must be properly grounded with a specific cable as described in the table and with external cable for suspended parts.

Before powering the device, make sure there are no ground leakages in the cables connecting the drive to the vibrator, because they can cause serious damage to the drive and the load.

3.c) Start-up

Make sure to install the **CBN06** drive, **in case version**, in a clean, dry area, and ensure that it is not subject to vibrations.



PLEASE NOTE: It is advisable to repeat the commissioning procedure, going through each envisaged operation:

- Every time the drive is connected to a new load,
- In case of replacement of the hopper or coil,
- Whenever the product to be handled is changed.

It may be useful to repeat the procedure even in the event of performance setting problems, to reset the driver.

COMMISSIONING PROCEDURE:

- Ensure that the equipment is mounted in a vertical position.
- Check that the device is not powered (mains switch in OFF position).
- Use switch SW1 to determine the operating frequency:

Mains Frequency (f)	50Hz	60 Hz
Vibrator Frequency with Switch = 50	3000 strokes/min	3600 strokes/min
Vibrator Frequency with Switch = 100	6000 strokes/min	7200 strokes/min

- It is crucial that during the initial startup, the load is not immediately powered with the maximum voltage. To do this, check that:
 - The MIN trimmer is rotated all the way counterclockwise

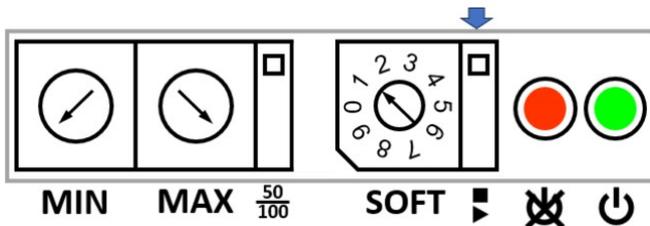
- The MAX trimmer is set at 50%
- The voltage reference is at the minimum.
- Verify that the equipment is securely closed, and all screws are tightened.
- Ensure that all connectors are plugged and/or locked.
- Connect the drive to the power supply (230 Vac or 400 Vac depending on drive version) and to the load.
- Close the network switch: the red LED lights up for one second while internal voltage stabilizes, then the load is powered at the frequency set with switch SW1 and at the voltage defined by voltage reference.
- Using the potentiometer or the voltage reference, gradually increase the flow rate of the vibrating system until it reaches the desired performance. If necessary, increase the maximum voltage limit by gradually rotating the MAX Trimmer clockwise.

Now you can increase or decrease the flow of the vibrating system as desired by changing the voltage value.

4 Setting of working parameters

The setting of all working parameters can be carried out from the front panel, without the need to open the equipment, using the selectors available under the Plexiglas window. Instructions for each parameter follow here below.

4.a) Stop/start command PNP/NPN



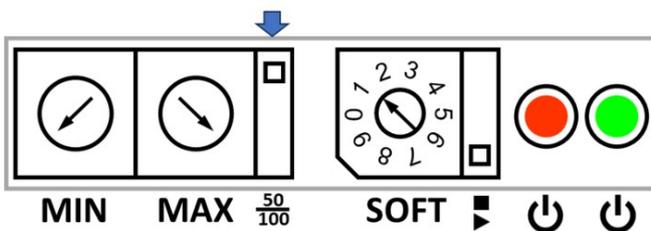
The device is supplied ready to receive the external running command (normally in stop), i.e. with SW4 Switch positioned upwards. It is possible to change this setting via switch SW4, as follows:

Switch SW4 downwards Normally running: the drive starts as soon as it is powered, the stop command cuts off the power to vibrator.

Switch SW4 upwards (factory setting) Normally stopped: the drive does not start automatically when powered, it is necessary to give the start command.

The start/stop command is normally PNP (H2 jumper to the right); NPN can be set by moving jumper H2 to the left (NPN position).

4.b) Working Frequency



It is possible to set the frequency via switch SW1, which determines whether the drive uses the half wave or the full wave, doubling the strokes/minute.

Based on the network frequency and the position of the switch, we will therefore have:

Mains frequency (f)	50Hz	60 Hz
Vibrator frequency with Switch = 50	3000 strokes/min	3600 strokes/min
Vibrator frequency with Switch = 100	6000 strokes/min	7200 strokes/min

The device is supplied with the switch positioned on 50 (operating frequency equal to the mains frequency). Frequency is usually set during start up procedure (see cap. 3 of this manual).

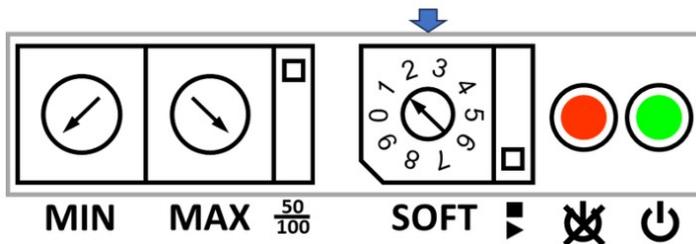
4.c) Reference voltage value

The vibration intensity can be adjusted by changing the voltage value: this can be carried out manually through the 10K potentiometer located on the front panel of the drive. The action thresholds of the potentiometer can be restricted on both the minimum and maximum levels with the two trimmers P1 and P2, called MIN and MAX, accessible with a screwdriver from the front.

As an option, with wiring at the customer's charge, the voltage reference can be remoted through the PC4 opening:

<p>In case of remoted potentiometer.</p>	<p>Disconnect local potentiometer and connect the remote one. Keep JS1 jumper open.</p>
<p>If you want to remote a 0-10V voltage reference from an external PLC.</p>	<p>Disconnect the potentiometer. The JS1 jumper must be closed; the internal connection of PC3-2 pin must be moved to pin 2 of POT. Connect the 0V in PC3-3 and the reference in pin PC3-2.</p>
<p>If you want to control with a 0-20 mA current reference.</p>	<p>Follow the same procedure as above. Add a 250 Ω resistance between pin 2 and pin 3 of POT.</p>

4.d) Stop/start ramp



Through this function it is possible to set the starting/stopping ramp (soft start/stop) for the voltage, when commanding the start and stop of the load. The equipment is supplied with start/stop ramp at 0.1 sec. This setting can be adjusted via Rotary Switch SW3, as follows:

Position	Ramp
0	0,1 sec (factory setting)
1	0,5 sec
2	1,0 sec
3	1,5 sec
4	2,0 sec
5	2,5 sec
6	3,0 sec
7	3,5 sec
8	4,0 sec
9	4,5 sec

5 Device working modes

5.a) *Continuous cycle operation*

The temperature inside the drive tends to rise during the first 15-30 minutes of operation. Especially in the case of continuous operation and at current values close to the maximum value, critical temperatures can be reached for both the coil and the drive.

Continuous operation with currents close to the maximum current (of the power supply and the coil) could lead to thermal drift phenomena in the inductance and drive, which can bring the current beyond the maximum value. For this reason, short interruptions in operation could occur, due to the overcurrent protection circuit (see also LED signal in the following paragraph).

5.b) *LED Visual signals*

STATUS	RED LED	GREEN LED	
Run	off	on	● ●
Stop	off	off	● ●
Saturation	on	on	● ●

The “Saturation” status indicates that the device is working with output voltage close to the maximum voltage: this means that in the event of a drop in the mains voltage the drive would not be able to compensate (see also what specified in par. 2.a) Technical Specifications).

6 Troubleshooting for most common issues

Issue	Probable root cause	What to do
Turning the mains switch (I1) on, the internal lamp (L1) does not turn on and the RED LED (DL1) turns on for a moment	Broken lamp (L1)	Replace switch
Turning the mains switch (I1) on, the internal lamp (L1) does not turn on and the RED LED (DL1) <u>does not</u> turn on for a moment	Driver not properly supplied	- check the power supply voltage - check if the fuses are faulty (to access fuses, see instructions for opening the device) - check the mains switch
Turning the mains switch (I1) on, the internal lamp (L1) turns on and the RED LED (DL1) turns on momentarily, the GREEN LED (DL2) turns on but the vibration does not start	Connection to vibrator not properly made	Check wiring between driver and load; if the problem persists there might be a failure in the device (contact the manufacturer)
Turning the mains switch (I1) on, the internal lamp (L1) turns on and the RED LED (DL1) turns on repeatedly	Output voltage too high or overload	Rotate the potentiometer knob counterclockwise or check the load wiring; if the problem persists there might be a failure in the device (contact the manufacturer)
The load gets very hot	Air gap too high	Check that voltage and frequency of feeding to the load are correct, check air gap; if the problem persists change the magnet
Operation too noisy or magnet and moving part hitting one against the other	Air gap too high or wrong feeding to the load	Lower the MAX voltage reference rotating P2 Trimmer or potentiometer counterclockwise. Check for breakage or loosening of a spring.
The device is in blocked state after 10 auto-reset due to overload. Giving the START command to restart the device, the problem continue to occur.	Voltage reference too high or problem in the load.	Lower the voltage reference and repeat the start-up procedure. Check that there are no problems with the load.
Maximum flow rate not reachable	Maximum voltage value too low	Gradually increase the MAX voltage reference rotating P2 Trimmer clockwise

If the corrective actions specified in the above table do not solve the issues, contact the technical assistance service (e-mail gasco@gascogroup.it).



BEWARE! ISTRUCTIONS FOR OPENING THE DEVICE

To prevent electrocution, open the mains switch and disconnect the mains cable.

WAIT SOME MINUTE BEFORE OPENING, to allow the capacitors to discharge.

To avoid spoiling the seal and preserve IP protection of the device, loosen the 8 fixing screws for upper and lower panels (X4 and X6) before removing X3 screws of front panel (X2).

*WHEN CONTACTING THE TECHNICAL ASSISTANCE, PLEASE MENTION THE DATA SPECIFIED
ON THE LABEL PLACED ON THE BOX:
MODEL AND VERSION, SERIAL NUMBER, LOAD TYPE AND SIZE, MAINS FEEDING, REMOTE
CONTROLS*
