



ELECTRONIC FREQUENCY CONVERTERS



Instruction manual

INDEX

1	INTRODUCTION	2
2	SPECIFICATIONS OF THE CONVERTERS	3
	2.1 FREQUENCY CONVERTERS.....	3
3	USAGE CONDITIONS.....	5
4	OPERATION AND MAINTENANCE	8
	4.1 GETTING STARTED	8
	4.2 VIBRATING POKER CONNECTION TO THE CONVERTERS	8
	4.3 CONVERTER CONNECTION TO THE SYSTEM	8
	4.4 PERIODIC MAINTENANCE	9
	4.5 STORAGE.....	9
	4.6 TRANSPORTATION.....	9
	4.7 MAINTENANCE OF THE VIBRATING POKERS	9
5	LOCATING MALFUNCTIONS	10
6	INSTRUCTIONS TO ORDER SPARE PARTS.....	10
	6.1 INSTRUCTIONS TO ORDER SPARE PARTS.....	10
	6.2 WARRANTY CONDITIONS	10
7	ELECTRIC SCHEME.....	11

1 INTRODUCTION

Thank you for trusting the **ENAR** brand

For the maximum performance of the equipment, we recommend to read carefully the safety recommendations, maintenance, and usage listed in this manual

Defective parts should be replaced immediately to avoid major problems.

The effective longevity of the equipment will increase if the manual instructions are followed.

We will glad to help you with any comments or suggestions in reference to our equipment.

2 SPECIFICATIONS OF THE CONVERTERS

TYPE:

It is composed of an electronic frequency converter and transformer.

FUNCTION:

Transform the intake voltage and frequency into an issue voltage of 42 V -200 Hz (triple phase) to supply the vibrators with internal motor ref. ENAR M38AF, M5AF, M6AF, M7AF and M8AF and other vibrators working at this voltage and frequency.

EXTENSION CABLES:

5m long, standard machine with connexion plugs type Schuko.

CONNECTION POSSIBILITIES:

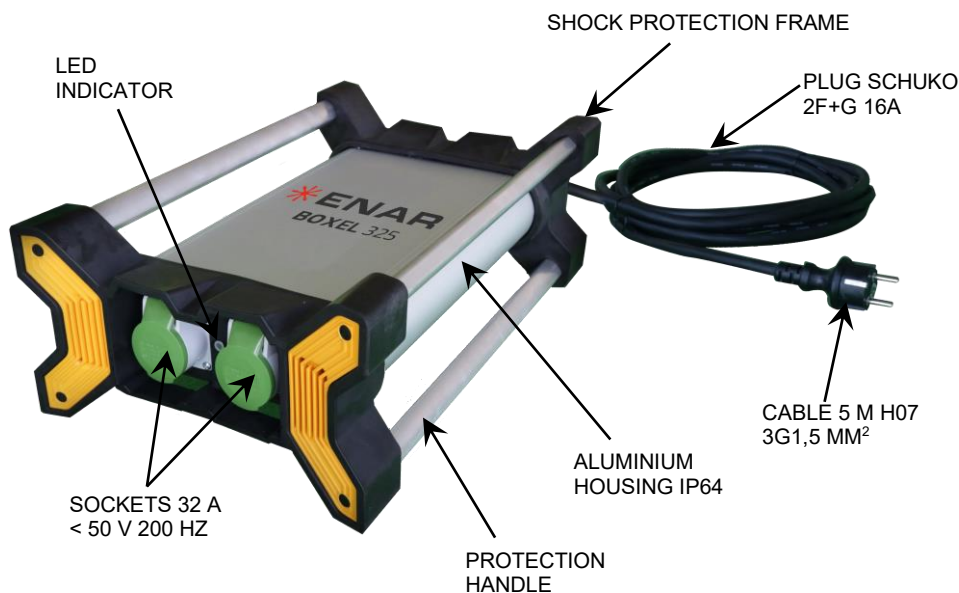
The consumption in load of the vibrators must not be over the amperes specified in the characteristics table.

HOUSING:

Electronic board in aluminium housing with rubber closings and aluminium handles.

2.1 FREQUENCY CONVERTERS

MODEL: Single phase: BOXEL 215, 225 and 325



Model	Dimensions [cm]			Weight Kg	N° outlets	Possibility of connection vibrators ENAR				
	length	width	height			M38AF	M5AF	M6AF	M7AF	M8AF
BOXEL 215	48	31	18	10,5	2	2	2	1	1	1
BOXEL 225	53	31	18	11,8	2	2	2	2	1	2
BOXEL 325	53	31	18	12	3	3	3	2	1	2

ELECTRIC CHARACTERISTIC						
Model	INPUT			OUTPUT		
	POWER	AMPERES	VOLTAGE	POWER	AMPERES	VOLTAGE
BOXEL 215	1,7 KW	7,5 A	230V 1-/50-60Hz	1,5KVA	21 A	42V 3-/200Hz
BOXEL 225	2,8 KW	12,5 A	230V 1-/50-60Hz	1,5KVA	35 A	42V 3-/200Hz
BOXEL 325	2,8 KW	12,5 A	230V 1-/50-60Hz	1,5KVA	35 A	42V 3-/200Hz



ELECTRONIC FREQUENCY CONVERTERS

BOXEL 215 / 225 / 325

3 USAGE CONDITIONS



ATTENTION!



Keep these instructions for future reference

The term "power tool" in the warnings refer to your mains operated (corded) power tool or battery operated (cordless) power tool.

1) Work area safety

a) **Keep work area clean and well lit.** Cluttered and dark areas invite accidents.



b) **Do not operate power tools in environments with explosive materials such as flammable liquids and gases.** Power tools create sparks which may ignite the liquid or fumes.

c) **Keep children and bystanders away while operating a power tool.** Distractions can cause you to lose control.

2) Electrical safety

a) **Power tool plugs must match the outlet. Never modify the plug in any way. Do not use any adapter plugs with earthed (grounded) power tools.** Unmodified plugs and matching outlets will reduce risk of electric shock.

b) **Avoid body contact with earthed or grounded surfaces such as pipes, radiators, oven ranges and refrigerators.** There is an increased risk of electric shock if your body is earthed or grounded.

c) **Do not expose power tools to rain or wet conditions.** Water entering a power tool will increase the risk of electric shock.

d) **Do not abuse the cord. Never use the cord for carrying, pulling or unplugging the power tool. Keep cord away from heat, oil, sharp edges or moving parts.** Damaged or entangled cords increase the risk of electric shock.

e) **When operating a power tool outdoors, use an extension cord suitable for outdoor use.** Use of a cord suitable for outdoor use reduces the risk of electric shock.

f) **If operating a power tools in a damp location is unavoidable, use a residual current device (RCD) protected supply.** Use of an RCD reduces the risk of electric shock.

3) Personal safety



a) **Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use a power tool while you are tired or under the influence of drugs, alcohol or medication.** A lapse in concentration while operating power tools may result in serious personal injury.

b) **Use safety equipment. Always wear eye protection.** Safety equipment such as a dust mask, non-skid safety shoes, hard hat, or hearing protection used for appropriate conditions will reduce personal injuries.

- c) **Avoid accidental starting. Ensure the switch is in the off position before plugging in.** Carrying power tools with your finger on the switch or plugging in power tools that have the switch on invites accidents.
- d) **Remove any adjusting key or wrench before turning the power tool on.** A wrench or a key left attached to a rotating part of the power tool may result in personal injury.
- e) **Do not overreach. Keep proper footing and balance at all times.** This enables better control of the power tool in unexpected situations.
- f) **Dress properly. Do not wear loose clothing or jewellery. Keep your hair, clothing and gloves away from moving parts.** Loose clothes, jewellery or long hair can be caught in moving parts.
- g) **If devices are provided for the connection of dust extraction and collection facilities, ensure these are connected and properly used.** Use of these devices can reduce dust related hazards.

4) Use of Power Tool

- a) **Do not force the power tool. Use the correct power tool for your application.** The correct power tool will do the job better and safer at the rate for which it was designed.
- b) **Do not use the power tool if the switch does not turn it on and off.** Any power tool that cannot be controlled with the switch is dangerous and must be repaired
- c) **Disconnect the plug from the power source before making any adjustments, changing accessories, or storing power tools.** Such preventive safety measures reduce the risk of starting the power tool accidentally.
- d) **Store power tools out of the reach of children and do not allow people unfamiliar with the power tool or these instructions to operate the power tool.** Power tools are dangerous in the hands of untrained users.
- e) **Look after your power tools. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the power tools operation. If damaged, have the power tool repaired before use.** Many accidents are caused by poorly maintained power tools.
- f) **Keep cutting tools sharp and clean.** Properly maintained cutting tools with sharp cutting edges are less likely to bind and are easier to control;
- g) **Use the power tool, accessories and tool bits etc., in accordance with these instructions and in the manner intended for the particular type of power tool, taking into account the working conditions and the work to be performed.** Use of the power tool for operations different from intended could result in a hazardous situation.

5) Service

- a) **Have your power tool serviced by a qualified repair person using only identical replacement parts.** This will ensure that the safety of the power tool is maintained.

SPECIFIC SAFETY RULES



For the proper operation of the converter, MAKE SURE that operators have been instructed in the proper management of this machine.

The converter **SHOULD ONLY BE USED** in the specific jobs.



Before connecting the converter to the electrical system, MAKE SURE that the voltage and frequency coincide with the ones stated in the characteristics equipment name plate, located on the bottom of the machine.

ENSURE that all box screws are tight before starting work.

Be sure that the parts of the poker are tight before starting work (welding points).

The plug should not be used to start or stop the equipment.

AVOID the flattening of the cable by heavy machinery which could cause breakage.



Keep the converter clean and dry.

Make sure that the electrical cable extension is with the proper section and functioning properly.

Before doing any work of maintenance, disconnect the motor from the electrical system.

When connecting to a generator, make sure that the out tension and frequency is stable, right and has the proper power. (the feeding voltage should not vary than +/- 10% as stated on the converter plate)



The level of acoustic pressure is less than 80 dB (see table point 2). Proper protective equipment should be used.



The vibration that transmits to the operator does not exceed $2,5\text{m/s}^2$ of acceleration. See table in point 2.

The vibrating pokers should not be working out of concrete more than 5 minutes.

When finishing the job or when taking a break, the operator should switch off, disconnect it from the electrical system, place it in a such way that should not fall or tip.

IN ADDITION, LOCAL COUNTRY STABLISHED ORDINANCES SHOULD BE RESPECTED.

4 OPERATION AND MAINTENANCE

4.1 GETTING STARTED



1.- Before starting the job, check the correct working of all handling and safety devices



2.- Inspect regularly the good conditions of the feeding cables.

3.- Inspect regularly the connection voltage.



4.- The converter should only be used in conjunction with all safety elements.

5.- Check the screws

6.- If defects are found in the safety devices or other defects which could reduce the safe handling of the equipment, notify immediately the proper responsible person.

4.2 VIBRATING POKER CONNECTION TO THE CONVERTERS

The converter has a socket to connect the vibrating pokers.

Connection possibilities:

The input current of the pokers connected in load shall not exceed the out current specified in the electrical characteristic table.

Always you must switch on the converter and after that you connect the vibrator pokers

4.3 CONVERTER CONNECTION TO THE SYSTEM

Check the converter switch is off before connecting to the system.

Unless otherwise stated at the time of ordering, the frequency converters will be connected at the factory as 240VAC 50/60 Hz single phase charge.

DISCONNECTING THE EQUIPMENT:

First, stop the vibrating pokers by turning off the proper switch, second stop the converter by turning off the proper switch, and finally remove the feeding cable from the system.

EARTH CONNECTION.

To protect the user from an electrical shock, the converter should be correctly connected to earth.

The converters are equipped with three cables (single phase) or four cables (three phase) and their respective plugs. The adequate earth socket should be used to connect the converters. If the socket with earth is not available, an earth adapter should be used before connecting the plugs.

EXTENSION CABLES.

Always use extension cables with earth wire and its respective plug with earth in the female and male plug.

Do not use damaged or worn out cables.

Avoid heavy loads on cables.

To determine the transversal section, follow the following procedure:

PROCEDURE TO DETERMINE THE NECESSARY TRANSVERSAL SECTION IN CABLE EXTENSION

Do the following verifications and take the highest section of cable:

1. The ohmic resistance and inductive resistance of the cable with the permitted loss of voltage of 5%, $\cos\phi=0.8$ trough the frequency and voltage curve

I.e: Voltage nominal:..... 1- 220 V 50 Hz

Nominal current:..... 10 A

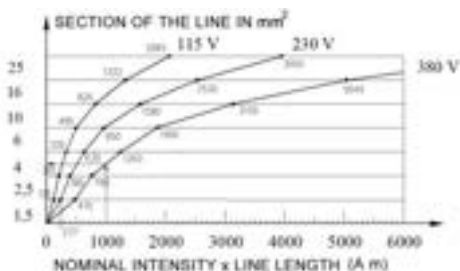
Cable length:..... 100 m

Entering the curve with the product: Intensity x Length=10x100=1000 Am We obtain a 4 mm² section

2. The permitted heating of the cable according to VDE standard (minimum transversal section table required).

I.e: For 10 A, according to table for 15 A or less, the section is of 1 mm².

Therefore, the section chosen is equal to 4 mm², always choose the highest transversal section of the two verifications



Minimum section according VDE rules		
Line (mm ²)	Maximum (A)	Max fuse(A)
1	15	10
1,5	18	10/3-16/1-
2,5	26	20
4	34	25
6	44	35
10	61	50
16	82	63
25	108	80

4.4 PERIODIC MAINTENANCE



1.- If necessary open the converter, you must wait at least 2 minutes after removing the plug from the outlet besides the light signal on the LED indicator must be off, since that period of time is necessary to allow the discharge capacitors incorporated into team. Never perform work inside the converter while this is connected to the network or led is on



2.- Only an expert shall work on the electrical parts.

3.- Make sure that the current is off during repairs.

4.- In all maintenance operations, original parts will be used.

5.- The electrical earth wire (green-yellow) should be longer to avoid being the first one in cutting in case of breaking of wires. After maintenance, control the current through the earth cable .

6.- Clean the ventilation vents in the front and back part of the converter periodically to avoid overheating.

7.- After maintenance job and service, all safety devices should be assembled correctly.

8.- After working 40 hours inspect the frame holding bolts.

9.- Every 12 months or more frequently, depending on the usage conditions, it is recommended an inspection be done by an authorized dealer.

10.- During the maintenance, secure that the device is disconnected from the power source.

4.5 STORAGE

When the converter has not been used for long periods of time, it should always be stored in clean, dry, and protected areas.

4.6 TRANSPORTATION

When transporting by vehicles, ensure the converter is safe against slipping, overturning and blows.

4.7 MAINTENANCE OF THE VIBRATING POKERS

See instruction manual of the high frequency vibrating pokers (AF_x_mu_01).

5 LOCATING MALFUNCTIONS

Same led: 2 light signals: green and red

LED	Description	Corrective action
Green	Normal working	None
Yellow blinking	Over temperature	Clean the housing, if the problem continues send to an authorized technical service.
Yellow	Over voltage	Check the input voltage 230 V+- 10%
Red blinking	Over current	Excess of power of the vibrators connected to the converter. Check the connected vibrators.
Red	Short circuit	Vibrator or converter damaged

6 INSTRUCTIONS TO ORDER SPARE PARTS

6.1 INSTRUCTIONS TO ORDER SPARE PARTS



1. All spare parts request must include PART CODE NUMBER AS STATED IN THE PART LIST. We recommend to include ITEM'S MANUFACTURE NUMBER.
2. The identification plate with manufacture and model number is located in the top part of the motors' plastic frame. The transmission and pokers have the manufacture number engraved outside.
3. Let us to know the correct shipping instructions, including the wished route and the address and consignee's complete name.
4. Do not return the parts without authorization, the return are done freight prepaid.

6.2 WARRANTY CONDITIONS



Enarco S.A.U. for its products, it grants one year warranty from the date of purchase of the product subject to the following conditions:

1. In accordance with the conditions indicated here (No. 2-7), we will repair non-conformities in the product free of charge, if it is verified that they are a consequence of a defective component and/or manufacturing fault, and provided that the same is notified without delay after its appearance.
2. The warranty will not apply to damage resulting from improper use. Likewise, the guarantee will not apply to defects in the product caused by damage in transport for which we are not responsible.

The warranty will be void if repairs or interventions are carried out by persons not authorized by the manufacturer. The same will happen for machines in which the periodic maintenance recommended in the instruction manual has not been carried out.

3. The application of the guarantee means that defective components are repaired or replaced free of charge by components without faults. Consumables and wear parts are excluded from the warranty except in cases of excessive or premature wear not attributable to normal use of the machine.

The replaced components will become our property.

4. In the case of sealed original spare parts, returns will not be accepted once the seal is removed.

5. To exercise the rights derived from this warranty, you must contact our Technical Assistance Service. Therefore, the following contact options are available to the client:

- Telephone: (+34) 976 464 094
- Email: sat@enar.es

*For Mexico, Colombia and Poland, please review the page (Contact Addresses) of the document.

In the event that the guarantee assessment is positive, Enarco will adopt the most convenient option:

- Carrying out the repair at ENARCO.
- Replacement with a new machine.
- Sending the defective part for repair to an authorized workshop.

Enarco will assume the shipping of machines or components in any of the above cases. Enarco will never assume downtime costs, rental costs for replacement equipment or other responsibilities for equipment failure during the warranty period.

If it is considered non-guarantee, it will be treated as a normal repair, issuing a quote for approval by the client. In this case, the round trip shipping costs will be borne by the customer, as well as the cost of the repair or the cost of preparing the estimate if the customer does not accept it.

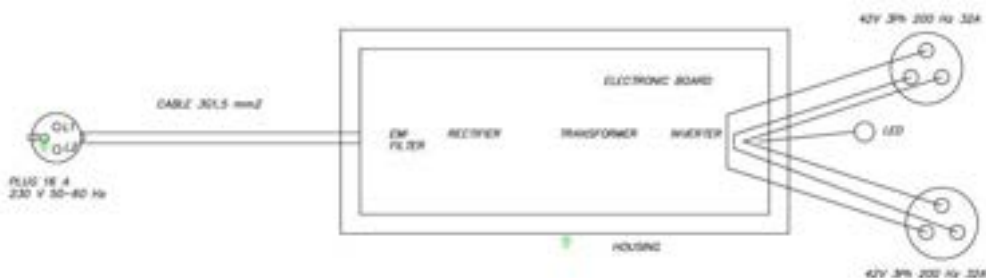
6. Warranty repair of a machine does not extend the initial warranty period.

7. If for any reason any of the conditions for having a guarantee on a product conflict with any regulation of any country or locality, said condition will be nullified and the local regulation will prevail, but the rest of the conditions will remain in force.

The different contact addresses for each market/country are detailed at the end of this manual.

NB: ENARCO, S.A., reserves the right to modify any part of this manual without prior notice.

7 ELECTRIC SCHEME



DIRECCIONES DE CONTACTO / CONTACT ADDRESSES

(ES) A continuación se detallan las diferentes direcciones de contacto para cada mercado/país:

(EN) Please, find below the different contact addresses for each market/country:

(DE) Nachfolgend finden Sie die verschiedenen Kontaktadressen für die jeweiligen Märkte/Länder

(PT) Abaixo estão os diferentes endereços de contacto para cada mercado/país:

(PL) Poniżej znajdują się różne adresy kontaktowe dla każdego rynku/kraju:

ENARCO, S.A. (G International):

- Teléfono/Phone: (+34) 976 464 090/091
- FAX: (+34) 976 471 470
- Email: comercial@enar.es
- Teléfono SAT/Phone Technical Assistance Service: (+34) 976 464 094
- Email SAT/Technical Assistance Service: sat@enar.es
- Address: Calle Burtina, 16 - 50197 Zaragoza (Spain)

ENARPOL:

- Telefon: (+48) 12 418-9151
- Telefon Servis: (+48) 12 414-4141
- Email: serwis@enarpol.pl
- Adres: Portowa 22, 30-709 Kraków (Polska)

MOPYCSA, S.A. de CV

- Teléfono: (+52) 442 245 7915 / 442 210 9081 / 442 210 9082
- Email: comercial@mopycsa.com.mx
- Email SAT: sat@mopycsa.com.mx
- Dirección: Acceso II N°5 INT. 1 -Complejo Santa Lucía - Fraccionamiento Ind, Benito Juárez - 76120 Santiago de Querétaro, Qro., (México)

ENAR COLOMBIA

- Teléfono: (+57) 313 851 0656
- Email sat: satcolombia@enar.es

WEB

- (ES) Para realizar cualquier consulta sobre los despieces y listas de piezas de nuestras máquinas consulte nuestra página web.
- (EN) For any requirement about the part list of our machines consult our web page.
- (FR) Pour consulter tous les renseignements des pièces detachées ou la liste de nos machines voir notre site.
- (DE) Um die verschiedene explosionszeichnungen so wie die ersatzteillisten einzusehen, besuchen sie bitte unsere internet-seite.
- (PT) Para fazer qualquer inquérito sobre as listas de peças e peças de nossas máquinas, consulte a nossa página web.

www.enargroup.com



**DECLARACIÓN DE CONFORMIDAD**

CONFORMITY CERTIFICATE ~ CERTIFICAT DE CONFORMITÉ
INSTEMMING VERKLARING ~ KONFORMITÄTS BESCHEINIGUNG
KONFORMITETS BEVIS ~ CERTIFICATO DE CONFORMIDADE ~ CERTIFICATO DI CONFORMITA'
ATITIKTIES DEKLARACIJA ~ CERTYFIKAT ZGODNOŚCI ~ СЕРТИФИКАТ СООТВЕТСТВИЯ
CERTIFICAT DE CONFORMITATE ~ СЕРТИФИКАТ ЗА СЪОТВЕТСТВИЕ

ENARCO, S.A.**certifica que la máquina especificada**

hereby certify that the equipment specified below ~ atteste que le equipment
verklaart hierbij dat onderstaand gespecificeerde ~ bescheinigt, daß das Baugerät
bekræfter, at følgende maskine ~ certifica que o equipamento especificação
certifica che la macchina specificata ~ šiuo sertifikatu patvirtina, kad žemiau nurodytas prietaisas, t.y.
Zaświadcza, że wyszczególniona maszyna ~ Подтверждает, что нижеописанная машина
Certifica si declara ca echipamentul mentionat mai jos ~ Потвърждаваме, че оборудването, описано по-долу

ha sido fabricada de acuerdo con las siguientes normas

has been manufactured according to the following standards ~ est produit conforme aux dispositions des directives ci-apres
in overeenstemming met de volgende voorschriften gefabriceerd is ~ in übereinstimmung mit folgenden richtlinien hergestellt worden ist
er blevet fremstillet i overensstemmelse med følgende retningslinier ~ é fabricado conforme as seguintes normas
è stata fabbricata secondo le norme vigenti ~ buvo pagamintas laikantis toliau išvardintų standartų
została wyprodukowana zgodnie z następującymi normami ~ Произведена в соответствии со следующими нормами
este fabricat cu respectarea urmatoarelor standarde ~ е произведено в съответствие със следните стандарти

**2006/42/CE, 2000/14/CE, EN-60204
2014/30/UE*, 2014/35/UE*, 2011/65/UE*, 2012/19/UE***

***Applicable for machines with electric motor**

RESPONSABLE DOCUMENTACIÓN TÉCNICA..... Jesus Tabuenca (ENARCO, S.A.U. Burtina, 16, 50197 Zaragoza)
Technical documentation responsible ~ Responsable of the Documentation Technique ~ zuständigen technischen Dokumentation

Zaragoza, 07.07.2017

David Gascón
General Manager
ENARCO, S.A.U.