



ENARCO, S.A.

AFE – AFG – AFD

*CONVERTIDORES DE FRECUENCIA  
FREQUENCY CONVERTERS  
CONVERTISSEURS DE FREQUENCE  
FREQUENZ UMFORMER*



**Manual de instrucciones  
Instruction manual  
Manuel d'instructions  
Gebrauchsanweisungen**

es  
en  
fr  
de



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## 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:

Mechanic converter

It is composed of a motor and a generator with magnetic induced circuit (without brushes)

### FUNCTION:

Transform the intake voltage and frequency into a issue voltage of 42 V -200 Hz (triple phase) to supply the vibrating pokers with internal motor ref. ENAR M38AF, M5AF, M6AF, M7AF and M8AF

### EXTENSION CABLES:

5m length, standard machine with connexion plugs type CE, insulation 750V

### CONNECTION POSSIBILITIES:

The consumption in charge of the connecte pokers do not increase the issue voltage specified in the electronic characteristics table.

### 2.1 FREQUENCY CONVERTERS

#### MODEL PLASTIC SUITCASE:

Three phase: **AFE 2000 P, AFE 1000 P**

Single phase: **AFE 2000M P, 1000M P**

P, HEAVY DUTY PLASTIC, with a protection against dust and splash

#### MODEL TUBULAR FRAME:

Three phase: **AFE 2000 T, AFE 2500**

Single phase: **AFE 2000MT, AFE2000MT 230V**

T, TUBULAR FRAME

#### MODEL HIGH RESISTANCE TUBULAR STEEL FRAME WITH CARRIEGE

Three phase: **AFE3500, AFE4500, AFE6000**

#### HOUSING:

HIGH RESISTANCE STEEL FRAME, with WHEELS



Models	Weight Kg	Nb of Outputs	Possibilities of connections of vibrating pokers ENAR			
			M38A	M5AF	M6AF	M7AF/M8AF
AFE 2000P	25	2	2	2	1	1
AFE 1000P	15	1	1	1	1	-
AFE 2000MP	27	2	2	2	1	1
AFE 1000MP	17	1	1	1	-	-
AFE 2500T	34	3	5	3	2	2
AFE 3500	70	4	8	4	3	2
AFE 4500	74	4	9	5	4	4
AFE 6000	83	4	10	6	5	4
AFE 1000MT	20	1	1	1	-	-
AFE 2000T	28	2	2	2	1	1
AFE 2000MT	30	2	2	2	1	1
AFE 2000MT 230V	30	2	This converter uses 230V Pokers			

ELECTRICAL CHARACTERISTICS							Sound press. Level $L_{PA} *$
MODEL	INPUT			OUTPUT			
	KW	AMP	V	KW	AMP	V	
AFE2000 P	2,8KW	4,0A	400V 3-/50Hz	1,6KVA	23 A	42V 3-/200Hz	64
AFE1000 P	1,7KW	2,5A	400V 3-/50Hz	1,0KVA	13 A	42V 3-/200Hz	62
AFE2000M P	2,0KW	9A	230V 1-/50Hz	1,6KVA	23 A	42V 3-/200Hz	66.5
AFE2000M P 60 Hz	2,0KW	9A	230V 1-/60Hz	1,6KVA	23 A	42V 3-/240Hz	66,5
AFE2000MT 230V	2,0KW	9A	230V 1-/50Hz	1,6KVA	23 A	230V 3-/200Hz	64
AFE1000M P	1,3KW	6A	230V 1-/50Hz	1,0KVA	13 A	42V 3-/200Hz	62
AFE2000T	2,8KW	4,0A	400V 3-/50Hz	1,6KVA	23 A	42V 3-/200Hz	64
AFE2000MT	2,0KW	9A	230V 1-/50Hz	1,6KVA	23 A	42V 3-/200Hz	64
AFE1000MT	1,3KW	6A	230V 1-/50Hz	1,0KVA	13 A	42V 3-/200Hz	62
AFE2500T	4KW	6A	400V 3-/50Hz	2,5KVA	35 A	42V 3-/200Hz	66
AFE3500	6KW	8A	400V 3-/50Hz	3,5KVA	50 A	42V 3-/200Hz	68,5
AFE4500	7KW	10A	400V 3-/50Hz	4,5KVA	61 A	42V 3-/200Hz	70
AFE6000	8KW	12A	400V 3-/50Hz	6KVA	82 A	42V 3-/200Hz	70

\* at 1 m of distance of the converter,  $K = 2$



SOCKET TO CONNECT  
VIBRATORS 200 Hz < 50 V

SWITCH (START-STOP)

DATA PLATE

PLUG 2F+E or 3F+E  
AND CABLE 5 m

PLASTIC HOUSING



AFE 2000P, AFE 2000MP, AFE 1000P, AFE 1000MP PLASTIC HOUSING

CONNECTION BOX

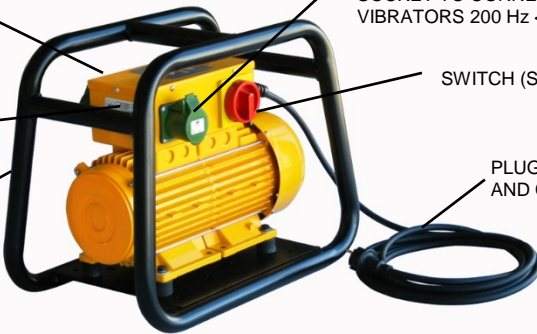
SOCKET TO CONNECT  
VIBRATORS 200 Hz < 50 V

SWITCH (START-STOP)

DATA PLATE

PLUG 2F+E or 3F+E  
AND CABLE 5 m

TUBULAR FRAME



AFE 2000T, AFE 2500T, AFE 2000MT, AFE 1000MT TUBULAR FRAME

HANDLE

SWITCH (START-STOP)

WHEELS



AFE 3500, AFE 4500 AND AFE6000 CARRIAGE WHEEL FRAME

## FREQUENCY CONVERTERS

AFG, AFD, AFE



## 2.2 FREQUENCY CONVERTER WITH PETROL ENGINE

MODEL	WEIGHT	OUTPUTS	ENGINE	GENERATOR	POKERS	Sound press. Level LPA *	Sound power Level LPA *
AFGH2000	38Kg	2	5.5HP HONDA	42V / 200HZ	2M5AF / 1M6AF / 1M7AF / 1M8AF	85	96
DIESEL							
AFDY2000	48Kg	2	4.7 HP YANMAR	42V / 200HZ	2M5AF / 1M6AF / 1M7AF / 1M8AF	87	99

MODEL	GX 160K1	YANMAR L48
STROKES	4, 163cc	4, 211cc
POWER	5.5HP/3600rpm	4.7HP/3600rpm
TORQUE	m	1.25Kgm/2800rpm
RPM	3900rpm	3600rpm
IGNITION	TRANSISTOR	INJECTION
COMBUST	GASOLINA	DIESEL
WEIGHT	15Kg	26Kg
OIL	0.61	0.81

## 3 USAGE CONDITIONS



**WARNING!**



Read and understand all instruction

### 3.1 WORKING AREA



KEEP your working area clean and well lit. Cluttered benches and dark areas invite accidents.

DO NOT OPERATE power tools in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust.

KEEP AWAY from standers, children, and visitors while operating a power tool. Distractions can cause to loose control.

18

Machine must be operated by **reliable operators who read and understand the operation manual of age above 18.**

### 3.2 ELECTRICAL SAFETY



GROUNDING TOOLS MUST BE PLUGGED INTO an outlet properly installed and grounded in accordance with all codes and ordinances.

NEVER REMOVE the grounding prong or modify the plug in any way.

DO NOT USE any plug adaptor.



CHECK with a qualified electrician if you are in doubt as to whether the outlet is properly grounded.  
AVOID body contact with grounded surfaces such as pipes, radiators, ranges and refrigerators.  
DO NOT EXPOSE power tools to rain or wet conditions.  
DO NOT ABUSE the cord.  
NEVER USE the cord to carry the tools or the plug from an outlet.  
KEEP cord away from heat, oil, sharp edges or moving parts.  
REPLACE damaged cords immediately. Damaged cords increase the risk of electric shock.  
WHEN OPERATING a power tool outside, use an outdoor extension cord marked "W-A", "W" or "H07RN-F".

### 3.3 PERSONAL SAFETY



STAY ALERT, watch what you are doing and use common sense when operating a power tool.  
DO NOT USE TOOL while tired or under the influence of drugs, alcohol, or medication.  
DRESS PROPERLY.  
DO NOT WEAR loose clothing or jewellery.  
CONTAIN long hair. KEEP your hair, clothing, and gloves away from moving parts.  
AVOID accidental starting.  
BE SURE switch is off before plugging in.  
REMOVE adjusting keys or switches before turning the tool on.  
DO NOT overreach.  
KEEP proper footing and balance at all times.  
USE safety equipment.  
Always WEAR eye protection.

### 3.4 TOOL USE AND CARE

USE clamps or other practical way to secure and support the work piece to a stable platform.  
DO NOT FORCE tool.  
USE the correct tool for your application.  
DO NOT USE tool if switch does not turn it on or off.  
DISCONNECT the plug from the power source before making any adjustments, changing accessories, or storing the tool.  
STORE idle tools out of reach of children and other untrained persons.  
MAINTAIN tool with care.  
CHECK for misalignment or binding of moving parts, breakage of parts, and any other condition that may affect the tools operation. If damaged, have the tool serviced before using.  
USE only accessories that are recommended by the manufacturer for your model.

### 3.5 SERVICE



Tool service **MUST BE PERFORMED** only by qualified repair personnel.  
When servicing a tool, USE only identical replacement parts.  
FOLLOW instructions in the Maintenance section of this manual.

### 3.6 ESPECIFIC 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 for with it the help of this manual.  
Before connecting the converter to the electrical system, **MAKE SURE** that the voltage and frequency coincide with the ones stated in the characteristics equipment plate, located in the top part of the plastic housing.



**ENSURE** that all frame screws are tight before starting work.  
The motor plug should not be used to start or stop the equipment.  
The electrical feeding cable should not be used to remove the plug from the socket.  
Protect the electrical feeding cable against heat, oil or sharp edges.



**DO NOT WORK CLOSE** to flammable liquids or in areas exposed to flammable gases.





TO AVOID the flattening of the cable by heavy machinery with could cause breakage.  
Do not permit untrained personnel to operate the motor or connexion.

Maintain free ventilation of air.

Keep the converter clean and dry.

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 converter feeding voltage should not vary than +/- 5% as stated on the converter plate.



The level of acoustic pressure is less than 70 dB. Proper protective equipment should be used when the noise level gets to be more than 70 dB.

Respect the maximum number of vibrating pokers that can be connected to the converter.

Avoid having the converter working unloaded during long periods of time. The vibrating pokers should not be working out of concrete. Switch on the poker before starting working an disconnecting them immediately after finishing the vibrating operation.

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

This screed can be used only under the applications for which it has been designed and according to these safety instructions.

When working with a petrol engine:

- Read the motor manufacturer's manual before working.
- Do not work in closed rooms, the exhaust fumes may be toxic.
- Wait 2 minutes for the petrol refill until the motor get colder.

The acoustic power level of this machine can reach 95 dB. Proper protective equipment should be used.

**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. If is necessary change the cord, check section **Extension 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.



### 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 three phase will be connected at the factory as three phase, 400V 50 Hz. The models single phase, will go out of the factory to be used as 230V 50 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

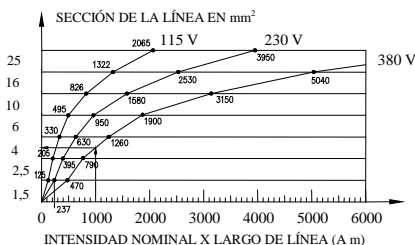
Cable length:..... 100 m

Entering the curve with the product: Intensity x Length=10x100=1000 Am We obtain a 4 mm<sup>2</sup> 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 mm<sup>2</sup>.

Therefore, the section chosen is equal to 4 mm<sup>2</sup>, Always choose the highest transversal section of the two verifications



Secciones mínimas según normas VDE		
Sección (mm <sup>2</sup> )	Carga máx. (A)	Fusible máx. (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 PETROL ENGINE

Read the motor manufacturers' manual.

Do not work in rooms with scarce ventilation.

Make sure there is no flammable good near to the escape.

Check the petrol level in the reservoir.

Check the oil reservoir of the motor is full (see motors' manual) and the oil reservoir in the vibrating group that also contains the exciter (10W 40 non foaming).

1- **ELECTRIC GENERATOR**

Make sure the cables are in good condition.

- 2- When a defect or a malfunction has been detected, endangering the use of this machine or not, stop the work and make the correspondent maintenance to avoid any danger or bigger damage.

#### 4.5 INSPECTION

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

Inspect regularly the good conditions of the feeding cables.

Inspect regularly the connection voltage.

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

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.

#### 4.6 PERIODIC MAINTENANCE

-Only an expert shall work on the electrical parts.

-Make sure that the current is off during repairs.

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

-A periodic lubrication of the converter bearings is not necessary.

-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 .

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

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

-After working 40 hours inspect the frame holding bolts.

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

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

#### 4.7 MAINTENANCE WITH PETROL ENGINE

1. **Daily (8 hours).**

Clean the motor and the beams, check the bolts & nuts, check and fill the exciters' and motors' reservoir with the respective oils.

2. **Weekly (50 hours).**

Change the motor oil (first 20 hours), clean the sparking plugs and the air filter.

3. **Monthly (200 hours).**



- Clean the oil filter, clean and adjust the sparks plugs.
- 4. **Every 500 hours.**  
Clean and set the carburettor, clean the cylinders' head, set the valves.
- 5. Always use original parts by every maintenance operation.
- 6. The safety fittings have to be checked after every maintenance.
- 7. The screed has to be sent to an authorized workshop for service every 12 months or more frequently according to the intensity of the usage.
- 8. Do not fill the petrol reservoir while smoking or near any other potential source of danger.  
Lock the petrol admission key when filling, use unleaded gas, clean the gas spelt.
- 9. See the motors' manual to set the motors' speed, starting and stopping.

#### 4.8 STORAGE

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

#### 4.9 TRANSPORTATION

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

#### 4.10 MAINTENANCE OF THE VIBRATING POKERS

See instruction manual of the high frequency vibrating pokers (AF\_x\_mu\_01).

## 5 LOCATING MALFUNCTIONS

### 5.1 ELECTRIC CONVERTERS

<b>ROBLEM</b>	<b>CAUSE/SOLUTION</b>
<b>The converter is not working</b> .....	See if it has power Plug in need of repair Defective switch Converter is broken down (motor or generator)
<b>The motor works but it overheats</b> .....	Clean the in and out of frame air vents The connecting vibrating pokers exceed the converters capacity.
<b>The motor works slowly and it overheats</b> .....	Verify the voltage of the electrical system The converter might be working at two phases Check the cable specifications Check the voltage in the voltage switch (if apply)



**The converter makes excessive noise.....**Defective bearings  
 The rotor might touching the stator  
 The frame is broken or has loose

## 5.2 PETROL CONVERTERS

PROBLEM	CAUSES/SOLUTIONS
<b>The motor doesn't work</b>	1.- Check the gas level.
	2.- Check the gas admission key is open.
	3.- Check the choke position .
<b>The electric generator is overheating</b>	1.- Clean the air ventilation (inlet and outlet).
	2.- The connecting vibrating pokers exceed the converters

## 6 INSTRUCTIONS TO ORDER SPARE PARTS

### 6.1 INSTRUCTIONS TO ORDER SPARE PARTS

- i** 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 NSTRUCTIONS TO REQUEST WARRANTIES

- i** The warranty is valid 1 year after the purchasing of the machine, The warranty will cover parts with manufactures' defects. In no case the warranty will cover a malfunction due to improper usage of the equipment. Labour and shipping fees will always be paid by the customer.
2. In all warranty requests THE MACHINE MUST BE SENT TO ENARCO, S.A. or to an AUTHORIZED SHOP, always including the complete address and name of the consignee.
3. The Technical Assistance Service will immediately notify you if it accepts the warranty and if requested, it will send a technical report.
4. The warranty will be void if any equipment has been previously handled by personnel outside of ENARCO, S.A. or not authorized by it.

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