2 CONVERTER CHARACTERISTICS

MODEL	SPYDER PRO
TYPE	Electronic frequency converter Transform the input frequency 50/60Hz to three phase frequency of 200Hz to feed the motor-in –head pokers type ENAR MB3, MB5, MB6, MB7. Class I
APPLICATION	Compacting of concrete
CONNECTION CABLE TO CONVERTER	Standard: 15 m length type H07 3x1,5mm^2 shucko type (230 V) For 115 V available plug IEC and NEMA.
PROTECTION HOSE	Standard: 5m length of rubber hose. 1m (MP)
IP PROTECTION	IP 67

Model	Box Weight	Voltage / Frequency input	Voltage / Frequency output	Power
SPYDER PRO 2V	3 Kg	230 V 1~ 50/60 Hz	220 V 3~ 200 Hz	1,5 kW
SPYDER PRO 1V	3 Kg	115 V 1~ 50/60 Hz	110 V 3~ 200 Hz	1,5 KW

MODELO MODEL MODÈLE MODELL MODELO	Ø (mm)	Longitud Length Longeur Länge Comprimento (mm)	Potencia Power Puissance Leistung Potência (W)	Vibración por min. Vibrations per min. Vibrations par min. Vibrieren min. Vibrações por min. (vpm)	Fuerza centrífuga Centrifugal force Force centrifuge Fliehkraft Força centrífuga (Kp)
SPYDER PRO 1V, 2V 38	38	370	580	12.000	175
SPYDER PRO 1V, 2V 50	50	365	850	12.000	375
SPYDER PRO 1V, 2V 60	58	403	1000	12.000	575
SPYDER PRO 2V 70	65	365	1500	12.000	720

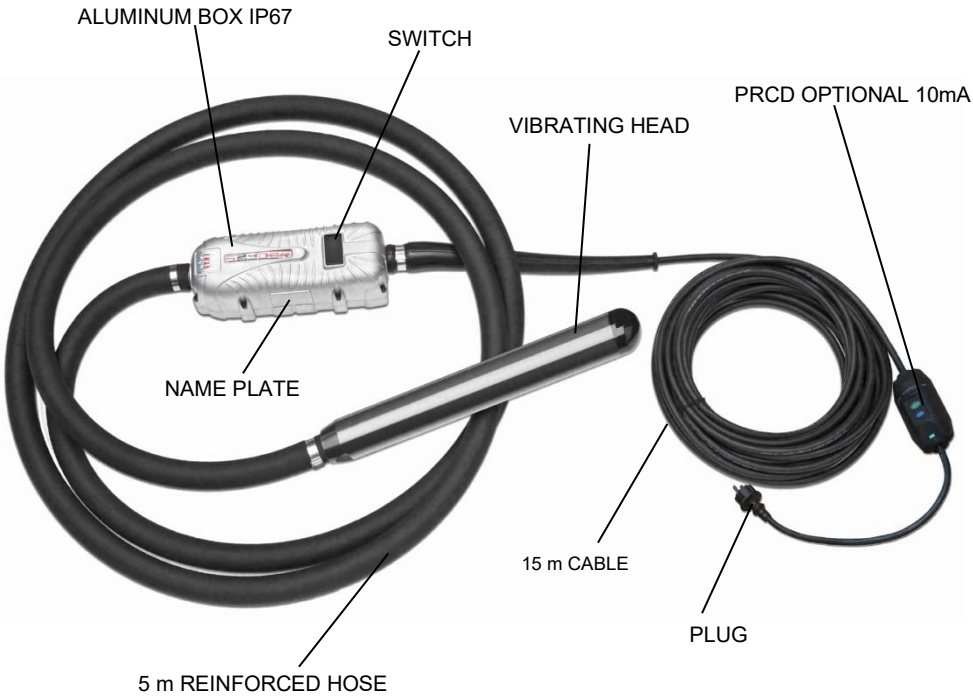
MODELO MODEL MODÈLE MODELL MODELO	Capacidad de vibrado Compacting capacity Capacité de vibration Vibrationsleistung Capacidade vibratória (m^3 /h)	Presión acústica Accoustic pressure Pression acoustique Schalldruckpegel Pressão acústica (dB A) **	Potencia acústica Sound power Acoust. puissance Schallmachtpegel Potência acústica (dB A) **
SPYDER PRO 1V, 2V 38	20	74.5	81
SPYDER PRO 1V, 2V 50	30	77	83.5
SPYDER PRO 1V, 2V 60	35	78.5	85
SPYDER PRO 2V 70	40	80	86.5

**Test done without load at 1,5 m from the poker acc. to EN-ISO 3744. K=2 dB

For an effective compaction, use the converter with enough power for the power of the poker.
All the pokers include thermal protection motor.
All the tubes and caps are hardened to protect from hits.

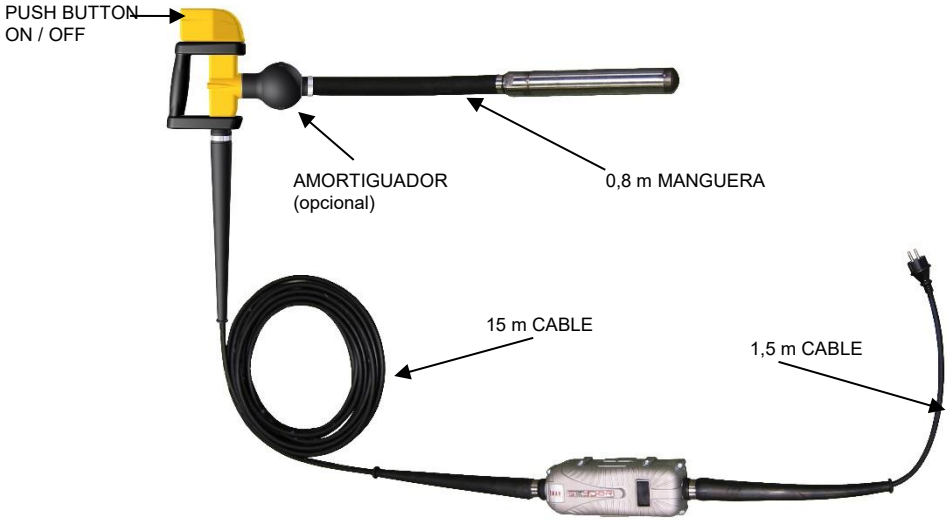
MODELO MODEL MODÈLE MODELL MODELO	Peso / Weight Poids / Gewicht / Peso (Kg)			Aceleración / Acceleration Accélération / Beschleunigung / Aceleração (m/s²) *		
	standard	Pistol	Pistol Anti vibration	standard	Pistol	Pistol Anti vibration
SPYDER PRO 38	14	11	12	1,73	1,18	0,34
SPYDER PRO 50	18	13	14	2,34	2,02	0,46
SPYDER PRO 60	20	15	16	1,99	1,95	0,39
SPYDER PRO 70	21	16	17	2,50	2,44	0,49
K				0,5	0,2	0,2
method for acceleration measure				on the hose at 2m, vibrator on the air	on handle vibrator on the air	on handle vibrator on the air

*According to ISO5349, hanging the hose at 2m. of the poker and working unloaded the poker.



Other lengths of hose and cable under enquiry

GUN VERSION



3 SAFETY RULES

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.

3.1 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.

3.2 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.

3.3 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.

3.4 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.

3.5 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.

3.6 SPECIFIC SAFE 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 2,5m/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

Read item 3 USAGE CONDITIONS

4.2 CONVERTER CONNECTION TO THE SYSTEM

The model SPYDER PRO 2V is connected to the main 230V +-5% / 50-60Hz (single phase) and the model SPYDER PRO1V is connected to the main 115V / 50-60Hz (single phase).

Use a residual current device (“rcd”) with a rated tripping current of 30mA for each converter. Rcd should be installed either at the distribution board which feeds the mains supply sockets or at the fixed main supply socket. Do not plug others electric tools to the rcd where is plugged the converter.

4.3 DISCONNECTING THE EQUIPMENT.

Stop the converter by disconnecting the proper switch, and finally remove the plug from the main.

4.4 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 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.

4.5 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%, cosphi=0.8 trough the frequency and voltage curve

I.e. Voltage nominal:.....380 V / 50 Hz

Nominal current:..... 10 A

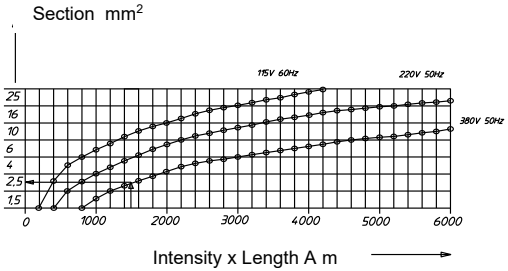
Cable length:.....150 m

Entering the curve with the product: =10x150=1500 Am We obtain a 2.5 mm^2 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^2.

Therefore, the section chosen is equal to 2.5 mm^2, Always choose the highest transversal section of the two verifications.



Line	Maximum	Max Fuse
mm2	A	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

Table 1: Minimum section according VDE rules

4.6 INSPECTION

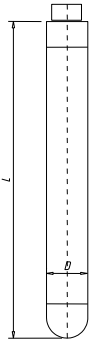
1. Before starting the job, check the correct working of all handling and safety devices.
2. Inspect regularly the good conditions of the feeding cables.
3. Inspect regularly the connection voltage.
4. The converter should only be used in conjunction with all safety elements.
5. If defects are found in the safety devices or other defects which could reduce the safe handling of the equipment, notify immediately the proper responsible person.

4.7 PERIODIC MAINTENANCE

1. Only an expert shall work on the electrical parts.
2. Make sure that the current is off during repairs.
3. In all maintenance operations, original parts will be used.

4. **For changing the cord**, look at the spare parts, the earth wire (green-yellow) should be longer to avoid being the first one in cutting in case of breaking wires. If the earth wire is broken, there is electrical After maintenance, control the earth cable. Put in new cable gland. Tighten its nut.
5. **For changing the switch**, look the spare parts, put the seals and finally, tighten the bolts.
6. Every 24 months or 500 hours of working a lubrication of the bearings of the vibrating pokers is recommended. An expert should dismantle the vibrating poker. Clean with solvent the bearings and when this is dry fill in with the oil recommended (107512 spare part). If you note an excessive play in the bearings proceed to change it. When you reassemble place the sealant in all the threads (PTFE tape). It is important all the parts are tighten (200 to 400 Nm of torque) to avoid the water does not penetrate in the head. Finally, apply two weld spots to secure the parts do not loose. Test working 10 minutes on the air and check no leak of oil (no touch after the test it is very hot).
7. After maintenance jobs all the parts must be assembled correctly.
8. Every 12 month or more frequently, depending on the use, it is recommended an inspection be done by an authorised dealer.
9. Check the wear of the poker controlling the outside diameter and length of the poker. Replace the housing or cap when the diameter or length in the least point is less than the specified in the table according to the model:

Model	Diameter(mm)	Length (mm)
M38 AFP	**36,5** (38)	**365** (370)
M5 AFP	**48** (50)	**360** (365)
M6 AFP	**56** (58)	**395** (400)
M7 AFP	**63** (65)	**395** (400)



a. The minimum dimensions are bold printed
b. The dimensions into brackets are the original dimensions
c. Replace the housing when reach the minimum diameter
d. Replace the cap when reach the minimum length

4.8 STORAGE

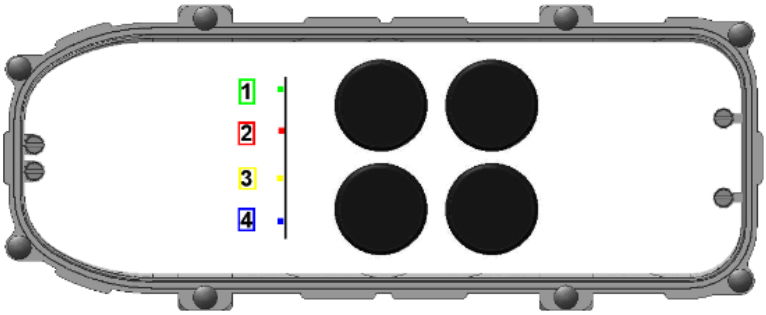
When the converter has not been used for long periods of time, it should be stored in clean, dry and protected areas.

4.9 TRANSPORTATION

When transporting by vehicles, ensure the equipment is safe against slipping, overturning and blow

5 LOCATING MALFUNCTIONS

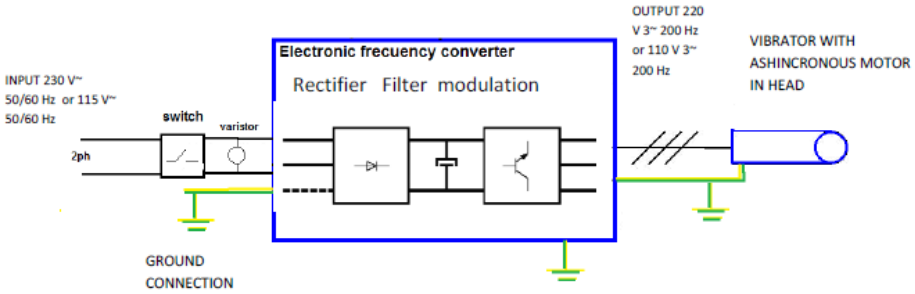
With the open lid, check the light is on. Follow the table to identify the problem. During this operation follow of the safety recommendations.



Make sure that the current is off during repairs.

PROBLEM	CAUSE
Not working, green led (1) OFF	See if it has power
	Check cord
	Check plug
	Converter burnt out
Red led (2) ON	Stator poker burnt out
	Converter burnt out
Yellow led (3) ON	Earth leakage current (check poker, connections)
	Water inside converter or poker
Blue led (4) ON	Lack of phase in poker (3 phase motor). Check connections and cables
Led (2+3+4) ON	Overtemperature (check converter's cleanness and remove sticked concrete and any unnecessary cover)
The poker is noisier	Bearings are not in good conditions.
The vibrating poker works correctly but it overheats	Check the poker is not working out of concrete.
	Verify the input voltage of the converter.
	Bearings in bad conditions or without lubrication

- ELECTRIC DIAGRAM



6 INSTRUCTIONS TO ORDER SPARE PARTS AND TO REQUEST WARRANTIES

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 serial number and model number is located on the side of the housing. If it is not visible, inside the house it is possible to find.
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 authorisation..

6.2 INSTRUCTIONS TO REQUEST WARRANTIES

1. 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.
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 authorised by it.

7 RECOMENDATIONS OF USE

1. choose the type of vibrator adequate to the dimensions of the structure to vibrate, the distance among the reinforcement and the slump cone. It is recommendable to have an additional concrete vibrator.
2. Before starting check that the concrete vibrator is in good use and it works correctly. Use the means of safety and protection.
3. Pour the concrete in the structure avoiding high heights. Try to pour levelled the concrete. The thickness of every layer should be less than 50 cm, it is recommendable between 30 and 50 cm.
4. Introduce the vibrator vertically in the concrete mass without moving it horizontally. Do not use the vibrator to push the concrete horizontally. The concrete vibrator should be introduced into the mass at regular intervals. The interval should be from 8 to 10 times the diameter of the poker. See the concrete in the process of vibrating to determine the field of action of the vibrator. This field should be overlapped to avoid areas without vibrating. To obtain an optimum compacting of the concrete, plunge it 10 cm into the precedent layer to assure a good adherence. The time in vibrating the different layers should not be big to avoid cold joints. Do not push or force the vibrator into the mass, it could be stuck in the reinforcements.
5. The time of vibration in each point depends on the type of the concrete, the size of the vibrator and other factors. This time can be from 5 to 15 seconds after the immersion in each point. The time is shorter for a fluid mass, a vibration in excess can produce segregation. It is considered the concrete to be well vibrated when the surface around the poker is shiny and compact and there is no more air bubbles, as well a change in the noise of the vibrator is produced. So much defects in structures are produced due to perform the vibration in an unmethodical way and in a hurry.
6. Do not push or force the vibrator against the reinforcement. Keep a distance of 7 cm minimum from the walls.
7. Always remove the poker vertically with movements upwards and downwards so the concrete fills the empty space again. Do not switch off until you stop the vibration completely. The speed of removing is approximately 8 cm per second. When the vibrator is nearly out extract quickly to avoid shaking the surface.
8. In order to vibrate slabs, the poker has to be kept oblique so that the contact superficies with mass is bigger and the compacting effect is better.
9. Do not keep the concrete vibrator out of the concrete during long periods. If you do not continue vibrating stop it.
10. Follow the maintenance instructions.

The concrete has to be carefully prepared to get the best effects of the vibration in terms of consistency and resistance.