

CCL-CB3 CHARGING SYSTEM FOR TWO WHEELS ELECTRIC VEHICLE

INSTALLATION AND USER MANUAL



CCL-CB3 MANUAL

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CONTENTS:

1	OVERVIEW	4
2	SYSTEM DESCRIPTION	5
3	SAFETY INFORMATION	7
4	INSTALLATION	8
4.1	PRIOR VERIFICATIONS	8
4.2	ANCHORING AND DIMENSIONS.....	8
4.3	ELECTRICAL INSTALLATION. GENERAL CONSIDERATIONS	10
5	USER GUIDE	11
5.1	NORMAL CHARGE OPERATIVE.....	11
5.1.1	<i>Start of charge cycle</i>	12
5.1.2	<i>End of charge cycle (Normal end)</i>	12
5.1.3	<i>End of charge cycle (end of credit)</i>	12
5.2	MISSING CREDIT OPERATIVE	13
5.2.1	<i>Start of charge cycle</i>	13
5.2.2	<i>Display indications</i>	13
6	MAINTENANCE	14
6.1	GENERAL DESCRIPTION.....	14
6.2	DISASSEMBLY	16
6.3	ASSEMBLING.....	18
6.4	PREVENTIVE MAINTENANCE.....	19
6.5	CORRECTIVE MAINTENANCE.....	20
6.5.1	<i>Problems – Causes – Solutions.</i>	20
6.6	SPARE PARTS AND RECOMMENDED TOOL.....	20
7	AUTO-DIAGNOSTIC. DISPLAY CODE	21
8	ELECTRICAL WIRING	22
9	TECHNICAL DATA	23
10	APPENDIX	24
10.1	RECOMMENDED SECTION CABLE.....	24
11	ASOCIATIONS	25

1 OVERVIEW

This user manual provides basic information about the electric vehicle charging unit: the CCL-CB3.

Important instructions will be shown inside a box. In some cases, these will include special symbols. Their meaning is explained next:



IMPORTANT INSTRUCTION!



WARNING! DANGER! ELECTRICAL RISK!

2 SYSTEM DESCRIPTION

This equipment controls the commissioning of three power connections for charging motorcycles through a user identification system using RFID cards.

That functions are the following:

- Start and stop control charge of each output.
- Output selection.
- RFID card reset.
- Charge time restricted.
- General reset.

The CB single-phase charge units provide to electrical vehicles a plug base, up to 16A, 240Va.c., in MODE 1 according to EN 61851-1.

Comparing with a simple plug CCL-CB3 offers the following:

- Safe collection of energy for the installation's operator. Prevents fraud and misuse.
- Protects end user against electrical risks. Current is only present in a non-interrupted charging cycle. The system is not powered during all other cycles.
- Intelligent charging process (off-peak hours, distribution of power available, etc.) when complemented with the PC and in hourly discrimination periods

The system is complemented with:

- Pre-paid cards. Available without credit (to recharge later) and pre-charged with 5, 20, 50 or 99 units of credit.
- Pre-paid card writer. There are three models available:
 - Integral model, capable of accepting credit cards and notes, CCL-Cash
 - Compact, CCL-Term
 - software version with USB peripheral, CCL-Soft

The CCL-CB3 complies with the CE requirements, and the current European Union directives for this type of equipments.

The main standards that have been taken into account during the design phase are as follows:

UNE EN 62196-1: Bases, sockets, vehicle coupling devices and vehicle access points. Electric vehicle conductive charging. Part 1: Charging electrical vehicles of up to 250A in alternating current and 400A in direct current.

UNE EN 61851-1: Electric Vehicle Conductive Charging System. Part 1: General requirements.

UNE EN 61851-21: Electric Vehicle Conductive Charging System. Part 21: Requirements of the electric vehicle for its conductive connection to the main in *A.C. and D.C.*

UNE EN 61851-22: Electric Vehicle Conductive Charging System. Part 22: A.C. charging station for electric vehicles.

Other Standards: IEC61000, IEC60364-4-41, IEC60884-1, IEC61010, UNE-EN55011, ISO14443A

In accordance with these Standards, the MULTIPOINT SYSTEM has been designed for MODE 1 charging system, as described in the 61851 Standard:

Mode 1 charging: A residual circuit breaker protection system with 30mA sensitivity is obligated for these systems. Vehicles can not be charged if this system is not installed.

This unit has been designed for outdoor use. It has an IP54 protection degree, in accordance with ANSI/IEC 60529-2004.

3 SAFETY INFORMATION



- Do not use connection cables that are not in perfect working order.
- Do not use the CCL- CB3 for other uses that have not been specified in its design, i.e., for any application that is unrelated to charging electric vehicles.
- Do not modify the CCL- CB3 unit. In case the unit is modified, the warranty will be void and CIRCONTROL shall not be liable for any future malfunction.
- Strictly follow the current safety regulations.
- Do not repair or install elements while the unit is powered.
- Only authorised and trained personnel can access the elements powered with voltages inside the unit.
- Check the operation of the earth leakage relay periodically (at least once a month) and always after maintenance operations.
- The installation must be checked once a year by qualified personnel.
- Any unit with defects or faults that could represent a risk to the user must be removed from service (broken plugs, lids that do not close, etc.).
- Do not use spare parts that are not original of CIRCONTROL.

4 INSTALLATION

4.1 Prior verifications

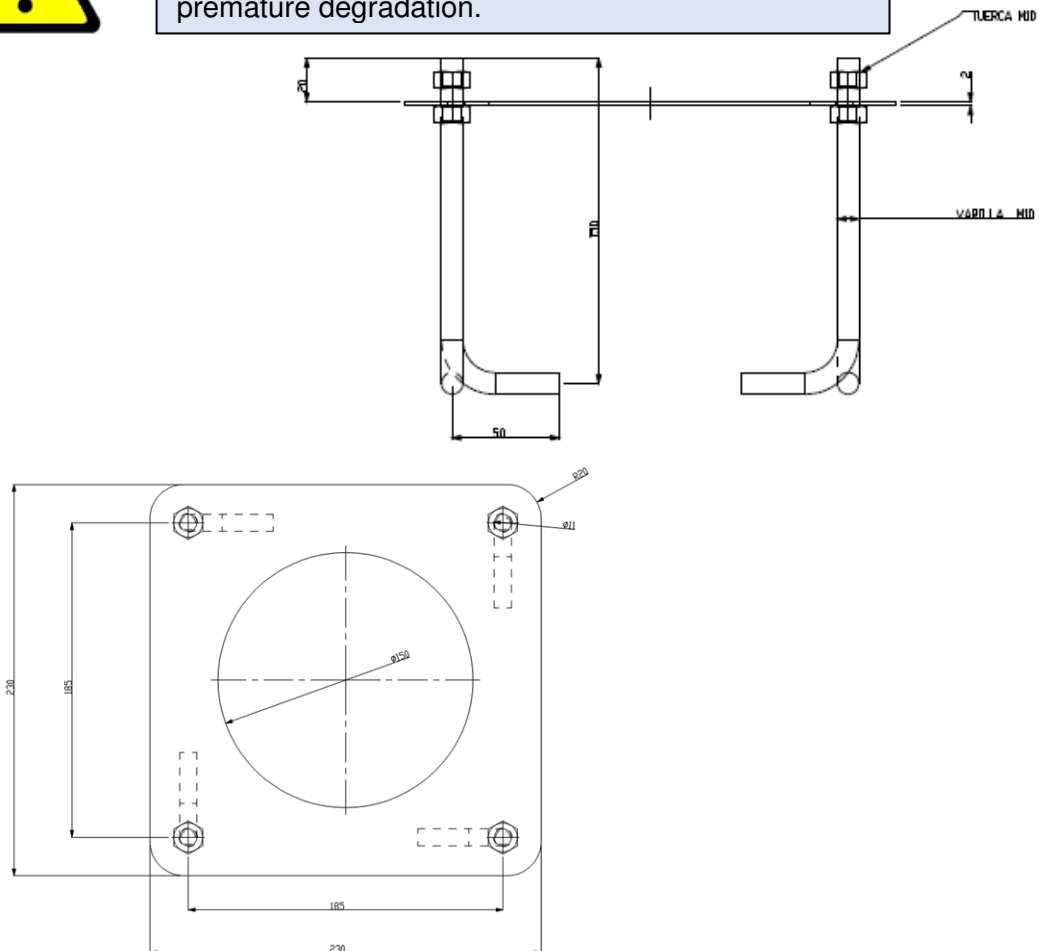
- Make sure that the materials have not been damaged during transport.
- Make sure that the voltage used on the board is suitable for the place/country where it will be operating.
- Make sure that the connection bases are suitable for the place/country where the unit will be operating.

4.2 Anchoring and dimensions

The CCL-CB3 is a charge system designed to be anchored on floor. For the anchoring is provided two templates and eight nuts with bolts to leveling. The bolts provided for the anchor must be inserted into a concrete base resistance equal to or greater than IK8, It is recommended to leave overhang surface bolts from [20-25]mm for a good anchor with the post.

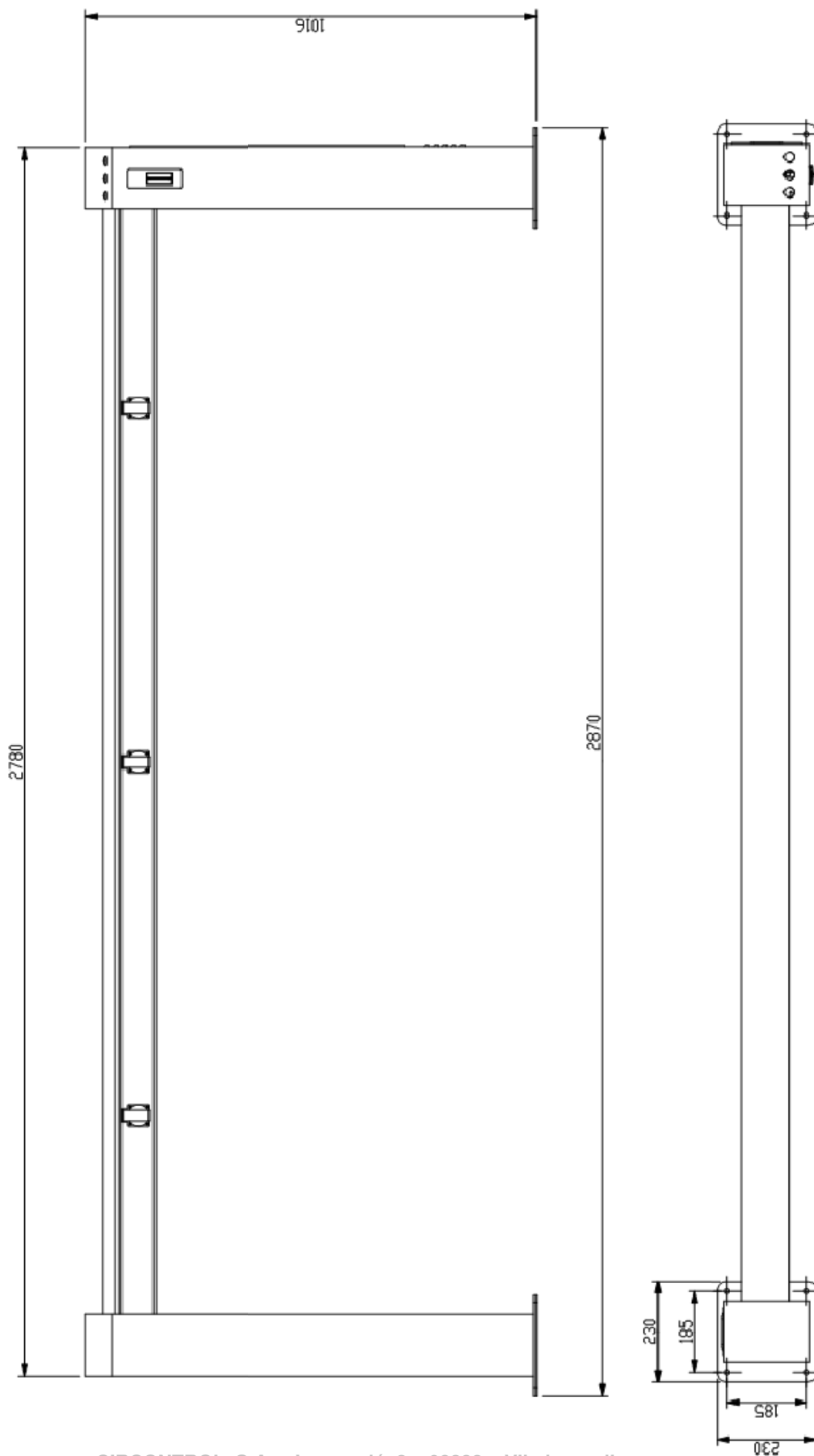


NOTE: Must use Allen wrench to screw supplied appliances for proper maintenance and do not cause premature degradation.





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4.3 Electrical installation. General considerations

Qualified professionals must undertake all activities related to the electrical installation, regardless of whether a project is needed or not, depending on the power installed.

This unit has been designed for its use in a single-phase 230Va.c. with a $\pm 10\%$ tolerance.



In any case, the end user must be protected against indirect contact with a residual voltage relay (DDR or differences) with a sensitivity of 30mA.

The device already includes 30mA differential protection required, so if it's necessary to protect upstream, it must be selective or time sensitivity. The choice must be made by responsible for the design of the facility, so that REBT is met and to ensure maximum system availability.

This device can not be installed in places where there is a risk of explosion (explosive atmosphere).

The minimum breaking power of the automatic header switch (circuit breaker) must be 4500A.



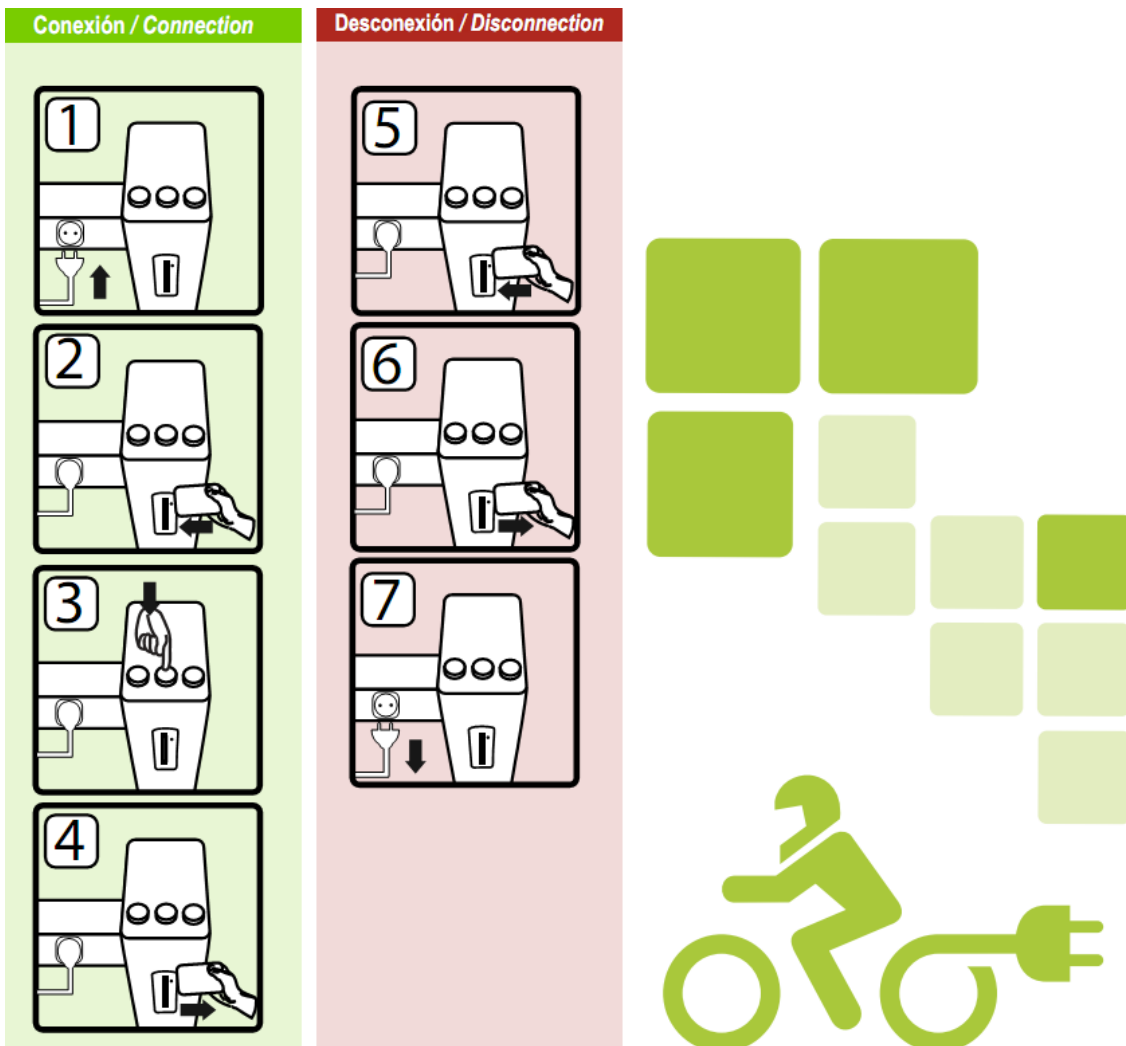
This information is for informational purposes only, not accepting any responsibility for any damage or injury that the installation can cause. The final installer who must choose (under his responsibility) the method of installation based on these variables, especially in the country legally enforceable.

There is a ground terminal that must be properly wired to the conductor with the minimum section of 6mm². IT IS VERY IMPORTANT ITS RIGHT CONNECTION AND ITS DIMENSIONS.

The minimum section of the conductors must be 6mm², but that will be in function of the installation conditions (length, ducts,...) may be higher. Consult REBT or the appendices. The responsibility for the installation corresponds to the authorized installer that designs and makes.

Diagrams and technical information can be found in paragraph 6 of Maintenance.

5 USER GUIDE



5.1 Normal charge operative

The following explanation refers to loans used but as a symbol €.

In countries where the currency has a similar magnitude to the EURO (€) can be considered as 1 € or 1 credit.

In countries where the currency is very different order of magnitude to the EURO (€), a conversion can be easily calculated, which for example is 1 credit = 1000 local units. In that case, speaking of credit makes more sense.

5.1.1 Start of charge cycle

1. Present the RFID card to the reader.
2. After a while displays the credit value.
3. If the claim is correct, a deposit is deducted from the card and transferred to the charge.
4. Select the charging shocked
5. Connect the charge.
6. Remove the card.
7. The system connects the power and starts the control of credit as the energy consumed.
8. The display shows a segment simulating a twisting motion with a speed proportional to power output.

5.1.2 End of charge cycle (Normal end)

1. Present the RFID card to the reader.
2. Cycle is interrupted.
3. Disconnect the charge.
4. The credit not consumed is retrieved to the card. "xx"€
5. Displays the credit. "xx"€
6. Remove the card.

5.1.3 End of charge cycle (end of credit)

1. If it's displayed "o" stopped, indicate that the system has stopped the charging cycle.

Digit 1, channel one NO active. Digit 2, channel two NO active.
2. Present the RFID card to the reader.
3. Disconnect the charge.
4. The credit is retrieved to the card. "00"€
5. Displays the credit. "00"€.
6. Remove the card.

5.2 Missing credit operative

5.2.1 Start of charge cycle

1. Present the RFID card to the reader.
2. After a while it displays the credit value.
3. If the credit is not correct, the display show “00”€ during 2s and doesn’t start any new cycle.
4. Remove the card.

5.2.2 Display indications

“rC” – credit retrieve.

“Ex” – Error x.

“ . ” – Channel indication that it is on resting time. (During this time there is no reading card for this channel.

“ o ” - The output is on charge cycle if oscillates vertically. Stationary cycle, while it’s standing.

6 MAINTENANCE

6.1 General description

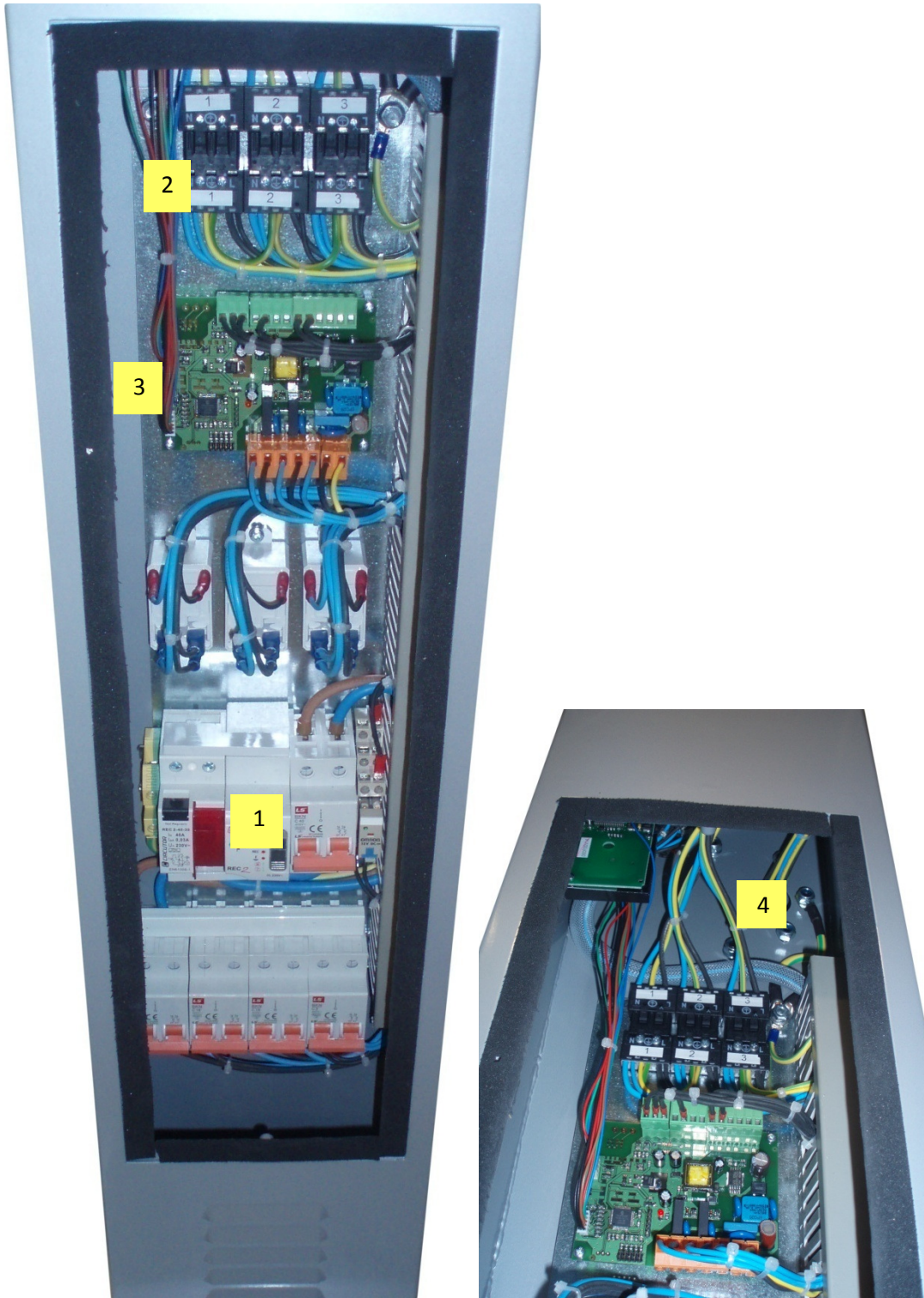
The vehicles charge system CCL-CB3 is an electrical and mechanical set able to offer charge service safely both indoors and public places and hold a continuous use recharge service. To accommodate this use and conditions the main body is stainless steel with quality painting and coating anti-graffiti. Overall protection is IP54.

In the horizontal bar there are the three outputs that allow access to the connection, and the vertical bar or the card reader, push buttons for selecting the plug and inside the electrical switchgear.

Interior highlights of the charging posts CCL-CB3:

- 1 System protection with a 30mA 40A RCCB, obligated for any EV recharging point.
- 2 Three phases connection of post-CCL-CB3 CCL charge.
- 3 Card CB.
- 4 Ground connection for user protection against overload contact with the post.

Electrical charging system CCL-CB3 image:



6.2 Disassembly

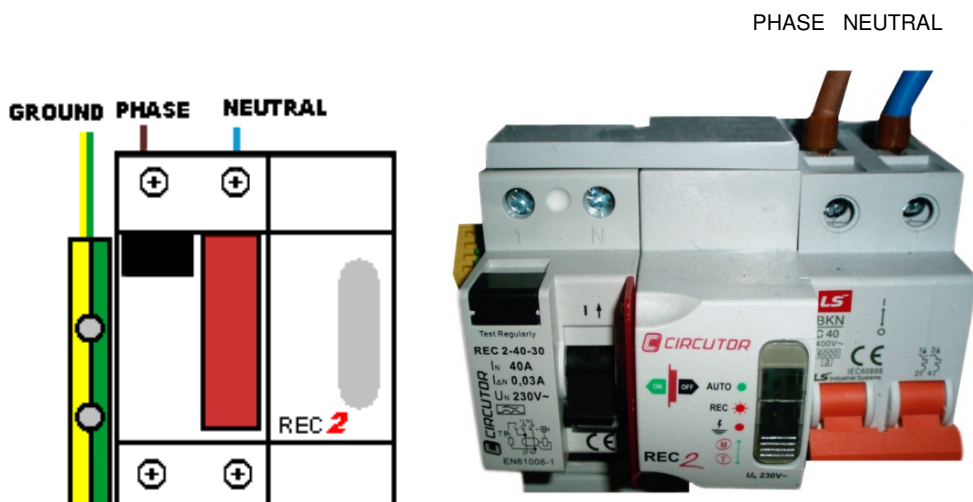
To get access inside the CCL-CB3 charger is necessary to open the back lid, depending on model, with Allen screws.

NOTE: Must use Allen wrench to screw supplied appliances for proper maintenance and do not cause premature degradation.

Once CCL-CB3 is opened the electrical devices are able to be manipulated and the guidance system hat.

To continue with the removal, follow the following sequence:

1. Disconnect the power supply before disconnect electrical intervention. Only trained personnel are authorized, and with the precautions and appropriate personal protective equipment. Lock the main switch on the distribution main to avoid the self-reclosing of it or by others inadvertently. If necessary, include a warning note.
2. If it's not possibly to take the whole power supply, for example because there are others posts on charge, disconnect the power supply from local area through de RCCB REC2.

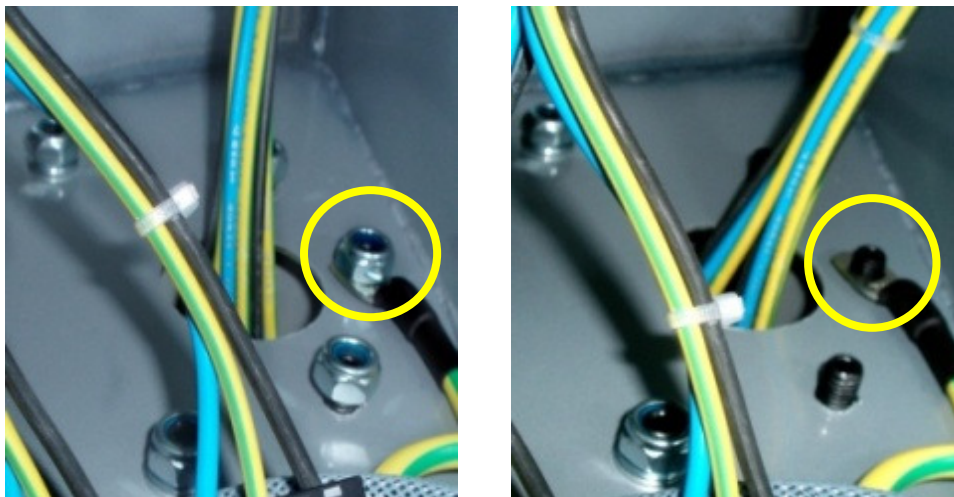


3. ATTENTION WITH THE REC2 DISCONNECTION PROCESS!



- a. It has to be active removing the protection cover to the right (in that way it wont restart), and then pressing the test button. This test will show if the RCCB works correctly (sensibility). Is recommended to do in each intervention.
- b. If the RCCB has not jumped, stop until the fault has been repaired by trained personnel. Remember that the test button does not work if the residual circuit breaker is not powered.
- c. Leave the REC2 red cover on the right during the operation.
- d. Remember that the REC2 input terminals can be powered so it has to be careful to avoid manipulation closer it. Do not do any operation if there are faulty cables, insulation damage or vulnerability of any party liable to be powered.

4. Disconnect the ground cable [4] with ring terminal connected at the end of the post as shown on the following figure.



6.3 Assembling

1. DO NOT FORGET THE GROUND CABLE RECONNECTION [4].
2. To proceed to testing REC2 should be reconnected again [1].
3. ATTENTION WITH THE REC2 CONNECTION PROCESS!



- a. If the power supply was cut upstream, supply the devices to test the RCCB. If it is not possible to supply it just raise the handle to rearm the REC2 and move the red protection cover to the left.
- b. Replace the cover and set it correctly. If there is power, we will use to test the function of the REC2 reset before the end of the operation. After a few seconds, the REC2 should reset itself.
- c. If long time passed between the disconnection operations REC2, should do the sensitivity REC2 test again as indicated in the previous section. Proceed to press the test button. If all is correct, the REC2 automatically reset after a few seconds.
- d. If keeps not running, treat the incident as a failure, with the protocol established by those.

4. Replace the lid and set it correctly.

6.4 Preventive maintenance

The recommended preventive maintenance and his frequency is the following:

MONTHLY:

- Sensibility test.

Make sure that the RCCB works correctly. We recommend test it causing a current leakage in one plug (is not necessary to test it on both).

The test can be done to different ways to choose:

1- Open the lid and get into de REC2. Press the test button, if it reset itself it runs correctly.

2- By a deliberated leak through a special device able on request. This works by a switch which causes a current leakage. When the pilot is lit, pressing the button for approximately 1s, the REC2 should be jumped. Then give up the button. The hat has to be moved up so you can remove it without problems. After a few seconds REC2 restart and will be displayed the two-digit display version number of firmware. Move down the hat. The test is finished.

YEARLY:



REMEMBER TO REMOVE POWER!

- Do the monthly REC2 preventive maintenance.
- Check the electrical wiring is correctly, there are no obvious faults in the insulation or defects on the components.
- Check the proper tightening of the screws on the power components, especially the REC2 and circuit breakers to which access is provided. Use the right tool on each case.
- Move down and leave the hat to get up. Look at the shock absorber if it's soft enough and his movement too. If necessary do a test twice. Check the movement peaces and the shock absorber.
 - o If the shock absorber is not enough, proceed to replace it
 - o It is not necessary use a lubricant in any movement parts.
- General cleaning on the electrical components area and the lower hat area. Remove with a brush the dust. Clean inside the card reader with the brush or o tissue.
- Check the connection state base is correct.

6.5 Corrective maintenance

6.5.1 Problems – Causes – Solutions.

- If there is nothing displayed when a valid card is introduced probably there is no voltage. The REC2 jumped or the power supply has been interrupted upstream.
- When charge is required and there is a rC on the display it is not a real problem. The charge does not start because the card is recovering the credit. That credit was saved because the previous load that card ended incidents.
- Once pressed the selector output button of current there is no reaction. *Solution: Replace de switch.*
- If there is a card introduced and the system has recognized it but there is no flashing light in any switch. *Solution: replace the corresponding led.*
- Replace the protector plastic of the switches when you notice a deterioration of it.

6.6 Spare parts and recommended tool

The required tools to perform proper preventive or corrective maintenance are the normal installation electrician. The PPE (Personal Protective Equipment) are also common, and should be designed by the Prevention Service employee responsible who makes the assistance.

The following mentioned tools are the only not commonly used:

- Flat brush with long hair.
- Special tool to cause a current leakage.

The amount and type of recommended spare parts are described in the following list:

- Main card control. If this card is replaced, also replace the toroidal. The spare card brings its own toroidal. We recommend having 1 unit per 10 CCL-CB3.
- Auxiliary card. If it is replaced, also replace his toroidal. The spare card brings its own toroidal. We recommend having 1 unit per 10 CCL-CB3.
- REC2. Check the sensibility of the RCCB is 30mA. (=0,030A). We recommend having 1 unit per 10 CCL-CB3.
- Power relay. We recommend having 2 units per 10 CCL-CB3.
- Allen screws of the lid. We recommend having 30 units per 10 CCL-CB3.

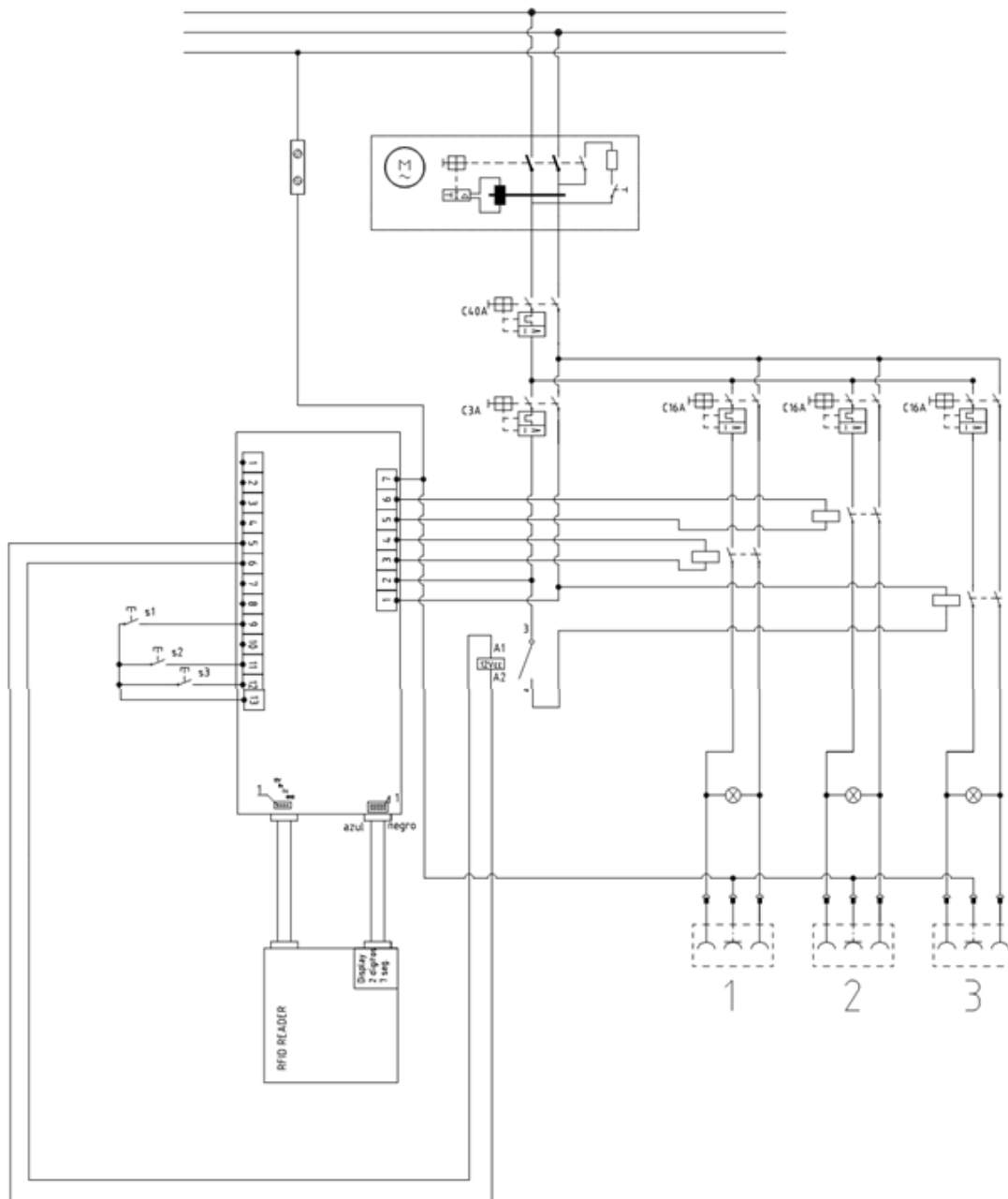
7 AUTO-DIAGNOSTIC. DISPLAY CODE

2 9	Software version is displayed for 1 second after unit is connected to the electrical supply
8 8	Indicates credit available when the RFID card is presented to the card reader. Example '88'
9 9	When the credit number is flashing '99' this indicates that the credit value is greater than 99
L	Socket 1. Allows charging regardless of available credit. This option only works with a suitably formatted card and the correct software upgrade in the charging equipment
L	Socket 2. Allows charging regardless of available credit. This option only works with a suitably formatted card and the correct software upgrade in the charging equipment
H	Socket 1. 'H' indicates that the charging unit has reached the preset time limit. This feature can be enabled or disabled by the factory using the charging equipment software
H	Socket 2. 'H' indicates that the charging unit has reached the preset time limit. This feature can be enabled or disabled by the factory using the charging equipment software
0	Socket 1. '0' flashing indicates the charging unit has reached the preset time allowed for a minimum charge
0	Socket 2. '0' flashing indicates the charging unit has reached the preset time allowed for a minimum charge
.	It draws a card of the channel 1, properly updated or insert a card that is not correct
.	It draws a card of the channel 2, properly updated or insert a card that is not correct
-	Socket 1. A segment fixed in one position indicates there is no load. When the segment is rotating it indicates charging. The speed of the rotation indicates the amount of load
-	Socket 2. A segment fixed in one position indicates there is no load. When the segment is rotating it indicates charging. The speed of the rotation indicates the amount of load
r C	Credit recovery failed in a previous cycle. Reset the system
E 1	Communication failed with RFID card reader
E 2	RFID Reader unable to read card
E 3	<i>Not Used</i>
E 4	RFID Reader unable to write to card

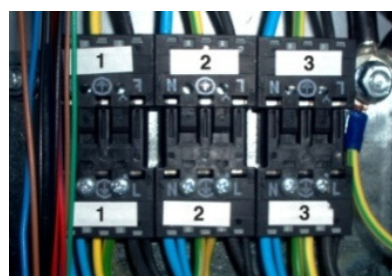
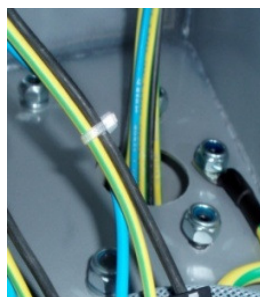
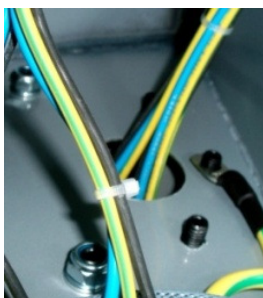
The information that appears briefly in the card reader display shows the firmware version number, i.e. 29 is version 2.9.

Errors "E1, E2, E4" have automatic recovery.

8 ELECTRICAL WIRING



Ground connection wire to protect the user equipment and phase connection for the three outputs.



9 TECHNICAL DATA









Input voltaje	85~ 264Vc.a., L+N+PE
Rate input frequency	47 / 63 Hz
Relay output contacts	16A / 250Vc.a.
Residual current of opened contact relay	16mA / 230Vc.a.
Dielectric strength	2500Vc.a.
Insulation resistor	> 500MΩ
Time limit per cannel service	10h
Output voltage	= input voltage
Current metering	average 1kW
RCCB	30mA 40A reclosable
Maximum consumption per output	3,6kW
Maximum consumption (3 outputs)	11kW
Connector	SCHUKO 16A
RFID reader	ISO 14443A
Temperature range	-10 / 60 °C
IP protection	IP54
Enclosure	FE ST37 2mm thickness and anti-graffiti coat
Surface	RAL 9006 gray polyester paint
Anchor	floor fixing
Dimensions	2,9m; 0,3m
Weight	46 Kg

Any characteristic mentioned is susceptible to change. Only are listed for informative purposes.

10 APPENDIX

10.1 Recommended section cable

Tabla 1. Intensidades admisibles (A) al aire 40 °C. N.º de conductores con carga y naturaleza del aislamiento

			3x PVC	2x PVC		3x XLPE o EPR	2x XLPE o EPR						
A		Conductores aislados en tubos empotrados en paredes aislantes											
A2		Cables multiconductores en tubos empotrados en paredes aislantes	3x PVC	2x PVC		3x XLPE o EPR	2x XLPE o EPR						
B		Conductores aislados en tubos ² en montaje superficial o empotrados en obra				3x PVC	2x PVC			3x XLPE o EPR	2x XLPE o EPR		
B2		Cables multiconductores en tubos ² en montaje superficial o empotrados en obra			3x PVC	2x PVC		3x XLPE o EPR		2x XLPE o EPR			
C		Cables multiconductores directamente sobre la pared ³				3x PVC	2x PVC		3x XLPE o EPR	2x XLPE o EPR			
E		Cables multiconductores al aire libre ⁴ . Distancia a la pared no inferior a 0,3 D ⁵					3x PVC		2x PVC	3x XLPE o EPR	2x XLPE o EPR		
F		Cables unipolares en contacto mutuo ⁴ . Distancia a la pared no inferior a D ⁵						3x PVC				3x XLPE o EPR ¹	
G		Cables unipolares separados mínimo D ⁵								3x PVC ¹		3x XLPE o EPR	
Cobre	mm ²		1	2	3	4	5	6	7	8	9	10	11
	1,5	11	11,5	13	13,5	15	16	—	18	21	24	—	—
	2,5	15	16	17,5	18,5	21	22	—	25	29	33	—	—
	4	20	21	23	24	27	30	—	34	38	45	—	—
	6	25	27	30	32	36	37	—	44	49	57	—	—
	10	34	37	40	44	50	52	—	60	68	76	—	—
	16	45	49	54	59	66	70	—	80	91	105	—	—
	25	59	64	70	77	84	88	96	106	116	123	166	—
	35		77	86	96	104	110	119	131	144	154	206	—
	50		94	103	117	125	133	145	159	175	188	250	—
	70				149	160	171	188	202	224	244	321	—
	95				180	194	207	230	245	271	296	391	—
	120				208	225	240	267	284	314	348	455	—
150				236	260	278	310	338	363	404	525	—	
185				268	297	317	354	386	415	464	601	—	
240				315	350	374	419	455	490	552	711	—	
300				360	404	423	484	524	565	640	821	—	

¹ A partir de 25 mm² de sección.
² Incluyendo canales para instalaciones —canaletas— y conductos de sección no circular.
³ O en bandeja no perforada.
⁴ O en bandeja perforada.
⁵ D es el diámetro del cable.

11 ASOCIATIONS

Our group belongs to and is actively involved in various committees on the Electric Vehicle:

- CHAdeMO Association (International Association works for the standardization of charging stations for electric vehicles). Certified members.
- ASESGA (Spanish Association of Car Parks and Garages). Technology Committee.
- AFME (Association of Electrical Manufacturers). Electric Vehicle Working Group.
- CEEC (Cluster Energy Efficiency Catalunya). Electric Mobility Group.
- AMEC URBIS (Spanish Association of Urban Equipment and Traffic). Electric Vehicle Commission.
- Forever (Spanish Forum Electric Vehicle).
- AEDIVE (Association of Business Innovative Electric Vehicle Infrastructure).

