Ingeteam

INGEREV E.V. Charging Station

Installation and user manual

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Important safety precautions

This manual contains important instructions concerning the installation, handling and use of INGEREV model ABA7001 Electric Vehicle Charging Stations.

General warnings

The entire manual must be read and understood in full prior to manipulating, installing or operating the unit.

Keep this manual for later reference.

All applicable safety-related for electrical work must be complied with. Danger of electric shock.

The operations described in the manual may be performed only by qualified personnel.

The status of qualified personnel referred to in this manual will be, as a minimum, that which meets all the standards, regulations and laws regarding safety applicable to the tasks of installing and operating this unit.

The responsibility for designating qualified personnel will always fall to the company to which the personnel belong. It is necessary to decide which workers are suitable or not for carrying out specific work to preserve their safety at the same time as complying with occupational safety legislation.

These companies are responsible for providing appropriate training in electrical equipment to their personnel and for familiarising them with the contents of this manual.

Opening the housing does not necessarily mean there is no voltage inside.

Only qualified personnel may open it, following the instructions in this manual.

Compliance with the safety instructions set out in this manual or in the suggested legislation does not imply exemption from other specific standards for the installation, place, country or other circumstances that affect the unit.

Category II measuring instruments must be used for checking for the absence of voltage.

Ingeteam is not liable for any damages caused by improper use of their equipment.

Carry out all control and handling without voltage.

As a minimum security measure in this operation, the so-called five golden rules should always be followed:

1. Disconnect.
2. Prevent any possible resupply.
3. Check there is no voltage.
4. Ground and short circuit.
5. Protect from live elements, if any, and put up safety signs around the work zone.

Until these five steps are completed, the work area cannot be considered voltage-free and any work performed will be considered to be work on live equipment.

Following is a list of the basic obligatory safety standards for each country:

- *RD 614/2001* in Spain.
- *CEI 11-27* in Italy.
- *DIN VDE 0105-100* and *DIN VDE 1000-10* in Germany.
- *UTE C15-400* in France.

Potential hazards for people

Bear in mind the following warnings concerning personal safety.

DANGER: Crushing and joint injuries.

Always follow the indications in the manual on moving and placing the unit.

The weight of this unit can cause injury if not handled correctly.

Potential hazards for the equipment

Bear in mind the following warnings for the protection of your equipment.

CAUTION: Ventilation.

The unit requires quality air flow while it is operating.

Keeping the unit in the upright position and the inlets free of obstacles is essential for this air flow to reach the inside.

CAUTION: Electrical damage.

Do not touch boards or electronic components. The most sensitive components can be damaged or destroyed by static electricity.

CAUTION: Operation.

Do not disconnect or connect any terminal while the unit is operating. Disconnect and check for absence of voltage first.

Personal protection equipment (PPE)

Use all items comprising the personal protection equipment.

Section “4. Safety instructions” contains references to the use of this equipment depending on the situation.

The standard personal protective equipment is:

- Safety goggles for mechanical hazards
- Safety goggles for electrical hazards
- Safety footwear
- Helmet

Table of Contents

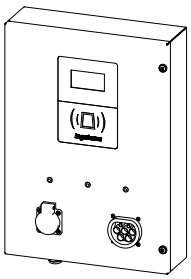
1. Overview

The purpose of this manual is to describe the INGEREV Electric Vehicle Charging Stations and provide information concerning its correct reception, installation, commissioning, maintenance and operation.

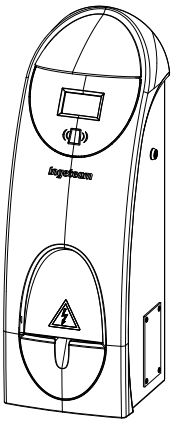
1.1. Equipment description

1.1.1. Models

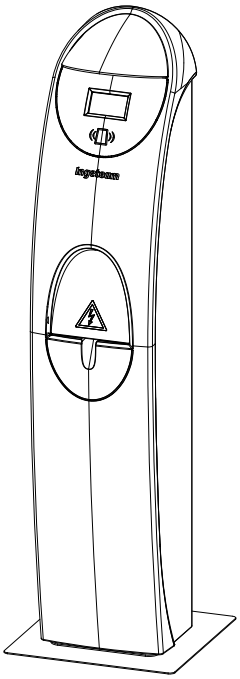
The main models in the INGEREV range are:



INGEREV GARAGE



INGEREV CITY (wall-mounted)



INGEREV CITY (floor-mounted)

1.2. Compliance with regulations

1.2.1. CE marking

CE marking is mandatory for the sale of any product within the European Union, without prejudice to standards or laws. INGEREV units have CE marking by reason of their compliance with the following directives:

- *Low Voltage Directive 2006/95/EC.*
- *Electromagnetic Compatibility Directive 2004/108/EC.*

To comply with each directive, compliance with the parts applicable to our units of the appropriate harmonised standards is sufficient.

Low Voltage Directive

INGEREV units comply with this directive by means of compliance with the applicable parts of harmonised standard *EN 61851 Electric Vehicle Conductive Charging System*.

Electromagnetic Compatibility Directive

INGEREV units comply with this directive by means of compliance with the applicable parts of harmonised standards:

- *EN 61000-6-2 Electromagnetic Compatibility*. Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments.
- *EN 61000-6-3 Electromagnetic Compatibility*. Part 6-3: Generic standards - Emission for residential, commercial and light-industrial environments.

Compliance with these standards calls for compliance with limits and procedures in other standards of the same series.

2. Equipment description

2.1. Location

The INGEREV units must be installed in environments with specific characteristics.

Guidelines are provided in this section for choosing a suitable environment and adapting the unit to it properly.

2.1.1. Environment

CAUTION

Install the units in a location accessible for installation and maintenance.

CAUTION

Avoid corrosive environments that may affect the proper operation of the unit.

2.1.2. IP grade

INGEREV GARAGE

INGEREV GARAGE units have an IP21 level of protection against external agents.

This unit is designed for indoor use.

INGEREV CITY

INGEREVCity units have a IP55 level of protection against external agents.

This unit is designed for indoor and outdoor use.

2.1.3. Ambient temperature

INGEREV GARAGE

These units are designed to operate in a temperature range from -5 °C to 40 °C.

INGEREV CITY

These units are designed to operate in a temperature range from -25 °C to 40 °C.

2.1.4. Atmospheric conditions

The ambient air must be clean and relative humidity must be between 5% and 95%.

It should be borne in mind that moderate condensation may occasionally occur as a consequence of temperature variations. For this reason, apart from the unit's own protection, vigilance of these units is necessary once they have been started up on sites where the conditions described above are not expected to be present.

In the event of condensation, never apply voltage to the unit.

2.1.5. Contamination class

INGEREV GARAGE

The pollution class for which the units have been designed is grade PD2.

INGEREV CITY

The pollution class for which the units have been designed is PD3.

2.1.6. Support surface and fastening

The surface on which the unit is mounted, either on the floor or a wall, should be firm enough to support its weight.

Note the weight of the equipment specified in paragraph “2.3. Main features” to assess the suitability of the anchoring surface.

2.2. Environmental characteristics

The environmental conditions for operation are:

Ambient conditions	INGEREV GARAGE	INGEREV CITY
Minimum temperature	-5 °C	-25 °C
Minimum surrounding air temperature	-5 °C	-25 °C
Minimum surrounding air temperature	40 °C	40 °C
Maximum relative humidity without condensation	95%	95%

For further information see “3. Operating, conservation and transport conditions”.

2.3. Main features

INGEREV GARAGE

Equipment	INGEREV GARAGE
Model	WM3
IEC 61851 charging modes	
Modes 1 and 2	●
Mode 3	●
Variant	
Power supply	Single phase 230 V / 50 Hz (2P+T)
Maximum Current (A)	16
Current outlets	
Connector mode 1 (Schuko) CEE 7/4 Type F	●
60309-2 2P+T 16 A	○
60309-2 3P+N+T 32 A	○
IEC 62196-2 Tipo 2 (Mennekes)	●
Max. output power (kW)	3.7
IEC 61851 connection type	Connection case B
Operating temperature	-5 °C - 40 °C
Relative humidity	< 95%
Protections	
Overcurrents	Thermomagnetic circuit breaker with automatic reset*
Differential current	30 mA Class A with automatic reset*
Overvoltages	Class II (optional)
Energy measurement	Class A active / Class B reactive
RFID reader	ISO 14443 A / Mifare - 13,56 MHz
Communications	RS-485, Ethernet, CAN, GPRS
Environmental protection class	IP21
Anti-tamper protection class	IK10
Directives	Low voltage: 2006/95/CE EMC: 2004/108/CE
Dimensions (H x W x D)	470 x 335 x 105 mm
Weight	8 kg

● Available/ ○ Not available
Notes: * Ask about the availability of each model.

INGEREV CITY

Equipment	INGEREV CITY (floor-mounted)				INGEREV CITY (wall-mounted)			
Model	GM1		GM3		WM1		WM3	
IEC 61851 charging modes								
Modes 1 and 2	●		●		●		●	
Mode 3	○		●		○		●	
Variant								
Maximum Current (A)	16	32	16	32	16	32	16	32
Single phase 230 V / 50 Hz (2P+T)	●	○	●	●	●	○	●	●
Three-phase 400 V / 50 Hz (3P+N+T)	○	●	●	●	○	●	●	●
Current outlets								
Connector mode 1 (Schuko) CEE 7/4 Type F	●	○	●	●	●	○	●	●
60309-2 2P+T 16 A	●	○	○	○	●	○	○	○
60309-2 3P+N+T 32 A	○	●	○	○	○	●	○	○
IEC 62196-2 Tipo 2 (Mennekes)	○	○	●	●	○	○	●	●
Max. output power (kW)	3.7	22	3.7/11	3.7/22	3.7	3.7/22	3.7/11	3.7/22
IEC 61851 connection type	Connection case B							
Operating temperature	-25 °C to 40 °C							
Relative humidity	< 95%							
Protections								
Overcurrents	Thermomagnetic circuit breaker with automatic reset*							
Differential current	30 mA Class A with automatic reset*							
Overvoltages	Class II (optional)				○			
Energy measurement	Class A active / Class B reactive							
RFID reader	ISO 14443 A / Mifare - 13,56 MHz							
Communications	RS-485, Ethernet, CAN, GPRS							
Environmental protection class	IP55							
Anti-tamper protection class	IK10							
Directives	Low voltage: 2006/95/CE EMC: 2004/108/CE							
Operating autonomy (no AC supply)	1 hour in battery mode							
Dimensions (H x W x D)	1250 x 255 x 250 mm				757 x 255 x 250 mm			
Weight	30 kg				18 kg			

● Available/ ○ Not available

Notes: * Ask about the availability of each model.

3. Operating, conservation and transport conditions

CAUTION

Failure to follow the instructions provided in this section may lead to damage to the equipment.

Ingeteam accepts no liability for damage resulting from the failure to follow these instructions.

3.1. Equipment reception

Reception

Upon receipt of the shipment, check the terms specified in the *Delivery Note*, sign the *Signature Receiver Goods* field and return the copy to the return address.

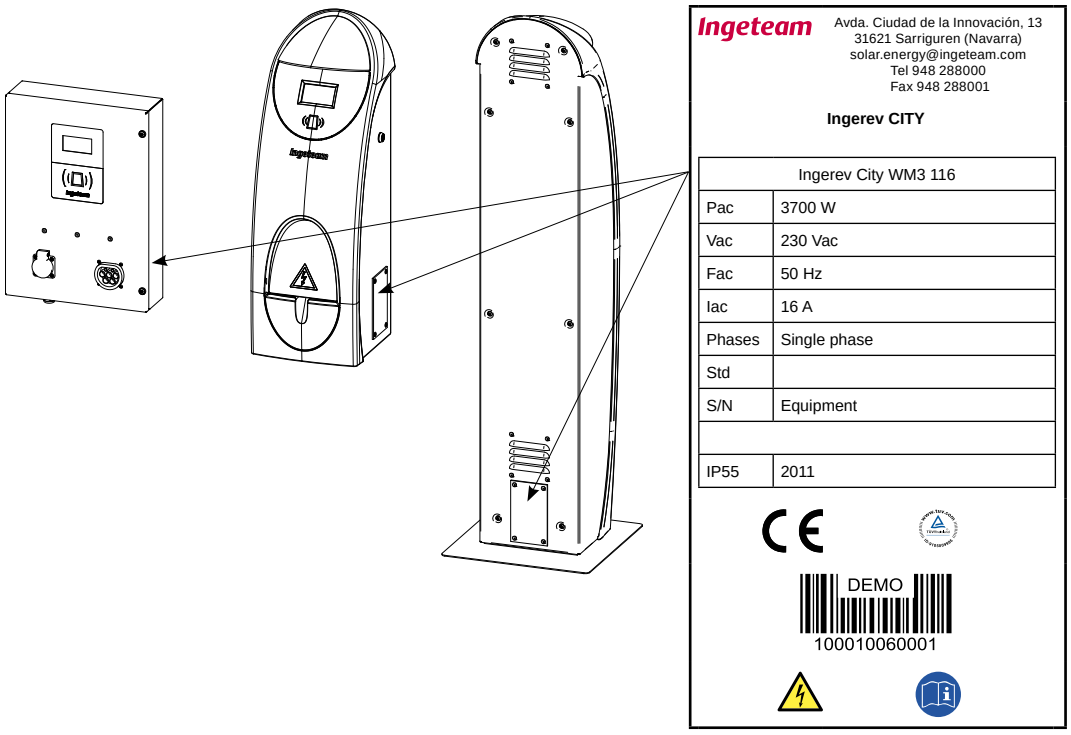
Keep the unit in its packaging until immediately before installation. Maintain the unit upright (INGEREV CITY) or horizontal (INGEREV GARAGE) at all times.

The unit is delivered with the following features:

Model	Packaging	Weight (kg)	Length x Depth x Height (mm)
INGEREV GARAGE	Cardboard box	10	600 x 400 x 235
INGEREV CITY (floor-mounted)		32	1285 x 265 x 265
INGEREV CITY (wall-mounted)		19	785 x 265 x 265

Identifying the unit

The serial number of the equipment is its unique identifier. This number must be referenced in any communication with Ingeteam.



Location of the name plate for each model.

Transport damage

If the equipment has been damaged during transport, proceed as follows:

1. Do not proceed with the installation.
2. Notify the distributor immediately within 5 days of receipt of the equipment.

If ultimately the unit has to be returned to the manufacturer, you must use the same original packaging.

3.2. Handling and unpacking

Correct handling of the units is vitally important in order to:

- Prevent damage to the packaging which enables them to be kept in optimum condition from shipping until they are unpacked.
- Avoid knocks and/or falls which may harm their mechanical characteristics, e.g. cause incorrect closure of doors, loss of IP rating, etc.
- Avoid, as far as possible, vibrations which may cause subsequent malfunction.

If you observe any anomaly, please contact Ingeteam immediately.

Recycling the Packaging

All the packaging can be delivered to a non-hazardous waste management company.

In any event, each part of the packaging may be recycled as follows:

- Plastic (polystyrene, bag and bubble wrap): the appropriate container.
- Cardboard: the appropriate container.

3.3. Storage

If the unit is not installed immediately after receipt, the following points should be taken into account in order to prevent damage:

- Store the package upright (INGEREV CITY) or horizontal (INGEREV GARAGE).
- Keep the unit free of dirt (dust, shavings, grease, etc) and away from rodents.
- Keep away from water splashes, welding sparks, etc.
- Cover the unit with a breathable protective material in order to prevent condensation due to ambient humidity.
- Units in storage must not be subjected to climate conditions other than those indicated in Section “2.3. Main features”.
- It is very important to protect the unit from chemical products which can cause corrosion, as well as from salty atmospheres.
- Do not store the unit outdoors.

3.4. Conservation

In order to permit correct conservation of the units, they must not be removed from their original packaging until it is time to install them.

In case of prolonged storage, the use of dry places avoiding, as far as possible, sharp changes in temperature is recommended.

Damage to the packaging (cuts, holes, etc) prevents the units from being kept in optimum conditions before installation. Ingeteam accepts no liability for inconvenience or damage arising in the case of failing to observe this condition.

3.5. Waste handling

During the various processes for installation, start-up and maintenance, waste is generated which must be handled appropriately according to the regulations in the corresponding country.

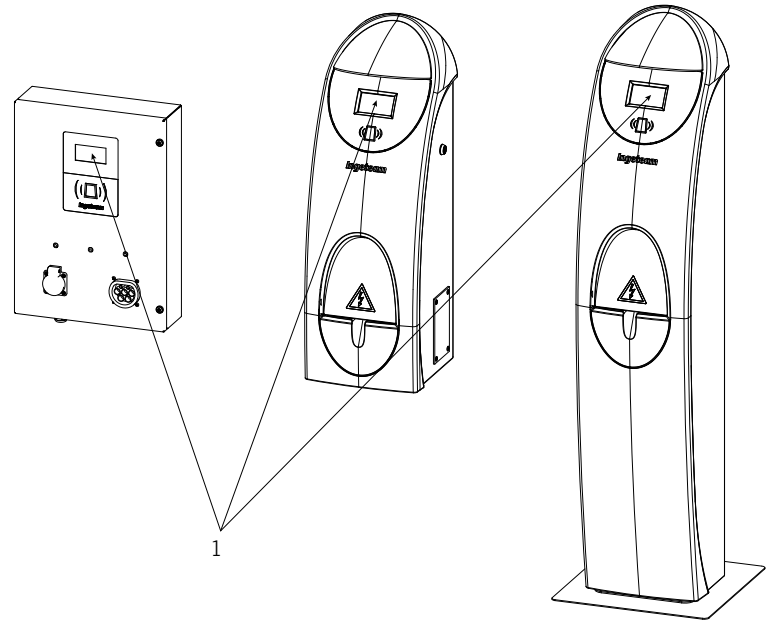
At the end of the unit's life, the waste must be processed by an authorised waste management company.

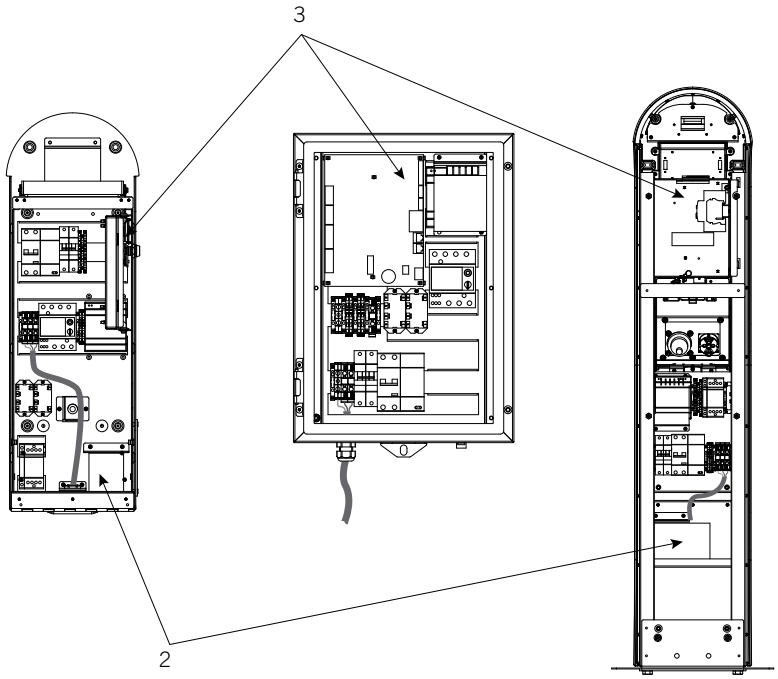
Ingeteam, in accordance with its policy of respect for the environment, will inform the authorised manager, via this Section, of the location of components to be decontaminated.

The elements within the unit that must be handled individually are:

1. Liquid crystal displays.
2. Batteries or accumulators.
3. Printed circuit cards.

Their location is shown in the following images.





Waste that can be handled by conventional waste collection means

Most of this waste is from the unit's packaging, which must be properly separated and processed.

All the packaging can be delivered to a non-hazardous waste management company.

In any event, each part of the packaging may be recycled as follows:

- Plastic (polystyrene, bag and bubble wrap): Appropriate container (plastic and bottles).
- Cardboard: Appropriate container (paper and cardboard).

4. Safety instructions

This section contains safety instructions which must be followed when installing, operating and accessing the unit.

Failure to comply with the “Safety instructions” may cause injury or even death or cause damage to the unit.

Read the “Safety instructions” carefully before working on the unit.

4.1. Symbols

The warnings advise of conditions which may cause serious injury or death and/or damage to the equipment. The means of avoiding the hazard to both people and the unit is indicated along with the warning.

The symbols and an explanation of their meaning can be seen below.

DANGER: High voltage

Warning of high voltage: Warns of high voltage which can cause injury or even death and/or damage to the equipment

General warning. Warns of conditions which can cause injury and/or damage to the equipment.

Please read this information carefully as it is written for your personal safety and to ensure the longest possible service life for the unit.

4.2. General safety precautions

Installation, start-up, inspection and maintenance operations may only be carried out by personnel appropriately qualified and trained in electrical subjects (hereinafter qualified personnel). You are reminded of the obligation to comply with safety regulations applicable to electrical work.

Opening the housings in no way implies the absence of voltage, and only qualified personnel following the safety guidelines described in this document may access the compartments.

The set of conditions listed below should be considered as minimum requirements. It is always preferable to shut off the main power supply. Installation defects may result in unwanted feedback. Danger of electric shock.

In addition to the safety measures indicated in this manual, the general measures that apply in this area (specific to the installation, country, etc) must be taken into account.

The electrical installation must not involve a risk of fire or explosion. Workers must be duly protected against accident risks from direct or indirect contact. The electrical installation and protection devices must take the voltage, the external determining factors and the competence of the people who have access to parts of the installation into account.

In compliance with basic safety legislation, all equipment must be appropriate to protect exposed workers against the risk of direct or indirect contacts. In any case, the electrical parts of the work equipment must comply with that laid down in the corresponding specific regulations.

In compliance with Electric Risk basic legislation, all workers who carry out work outdoors will suspend their work in the case of storms, rain or strong winds, snow or any other unfavourable environmental condition which makes visibility or handling tools difficult. Work on installations directly connected to overhead electricity lines must be interrupted in the case of storms.

Ingeteam is not liable for any damages caused by improper use of equipment. Any work carried out on any equipment which implies a modification of the original electrical arrangements must be proposed in advance to Ingeteam. These must be reviewed and approved by Ingeteam.

The necessary means must be arranged to prevent people from outside the installation approaching or handling the equipment.

These instructions must be easily accessible close to the unit and located within reach of all users.

Before installation and start-up, please read these safety instructions and warnings carefully as well as all the notices located on the unit. Ensure that all the notices are perfectly legible and that those which are damaged or have disappeared are restored.

4.3. General

This section defines the preventive measures to take to carry out all types of tasks on the unit, working safely and controlling risks which cannot be avoided.

Protection against direct contact is by means of the housing, which has IP20 protection class.

The unit has been tested according to the applicable regulations to comply with the safety requirements, the values for insulation distances and leakage paths for the voltages used.

The tools and/or equipment used in handling tasks must as a minimum have double reinforced insulation (Class II).

4.3.1. General risks existing and preventive measures

Impact against immovable objects

- Inform workers of the risk
- Adequate lighting
- Work with care

Knocks, punctures and cuts from objects and/or tools

- Keep the lid closed if not working on the equipment
- Adequate lighting
- Order and cleanliness
- Mandatory use of hard hat, safety footwear and gloves when necessary.

Electrical risk

- Comply with that laid down in the PPE section and in “4.2. General safety precautions”
- Inform the worker of the risk
- Comply with *R.D.614/2001* and *REBT*.

4.3.2. Additional risks and measures in handling tasks

Thermal Contact

- Inform workers of the risk.
- Recommended use of gloves.

- Disconnect the power and wait 10 minutes for the hot parts inside the unit to cool down.

4.4. Type of tasks to be carried out

The preventive maintenance tasks for the electrical panels involve Inspection, Control and Handling actions, depending on the case.

Accessing the housing through any other cubicle other than that described in this manual is strictly prohibited.

To open any of the covers of the enclosure (side, rear, top or door) the main power supply outside of the box must be switched off.

4.4.1. Inspection tasks

Definition: Involves opening the enclosure for visual inspection tasks.

4.4.2. Configuration tasks

Definition: Tasks relating to software, voltage checks at safe measuring points, etc.

Preventive maintenance tasks of the unit, carried out from the man-machine interface.

Control tasks related to testing and changing circuit breaker settings, under no circumstances will the any part thereof (terminals, cables, protections) be accessed or subject to control tasks during this operation, except to the specific control to verify and/or modify the settings.

4.4.3. Handling tasks

Definition: Tasks relating to component installation and/or replacement. Any task that does not fall under Inspection or Control is considered Handling.

It is always necessary to fir disconnect and check for absence of voltage.

The “5 Golden Rules” must be adhered to.

5 GOLDEN RULES

1. Disconnect.

Switching on the possible voltage sources. Bear in mind that any capacitors or other elements powered from uninterruptible power supplies are still live.

2. Prevent any possible resupply.

The switching devices used to switch off the equipment must be protected against any possible disconnection.

3. Check there is no voltage.

Check that there is no voltage in all the active elements of the electrical system or as close as possible to the work area.

4. Ground and short-circuit.

In the low voltage installations that by induction or for other reasons may be accidentally live.

5. Rope off and mark the work area.

4.4.4. Personal Protection Equipment (PPE)

Inspection

The use of safety footwear to standard *EN 345-1:1992* is mandatory and work clothing should be cotton and be free of conductor/metallic elements.

Control

The use of helmets compliant with standard *EN 397:1995* and safety footwear compliant with standard *EN 345-1:1992*

is mandatory. The use of standard safety gloves is also mandatory for voltage-free tasks.

It is also mandatory to use dielectric gloves meeting standard *EN-60903-1992* and protective face mask against electric shock for voltage testing tasks and opening or closing automatic switches under load.

Handling

The use of helmets compliant with standard *EN 397:1995* and safety footwear compliant with standard *EN 345-1:1992* is mandatory.

It is also mandatory to use dielectric gloves meeting standard *EN-60903-1992* and protective face mask against electric shock for voltage testing tasks and opening or closing automatic switches under load.

5. Installation

Before installing the unit, the packaging must be removed, taking special care not to damage the housing.

Check that there is no moisture inside the packaging. If there are signs of moisture, the unit must not be installed until you are sure it is completely dry.

All installation operations must comply with current regulations.

5.1. General requirements for installation

Ventilation and the space for work, which must be suitable for maintenance tasks according to current regulations.

The external connection devices, which must be suitable and sufficiently close as set forth in current regulations.

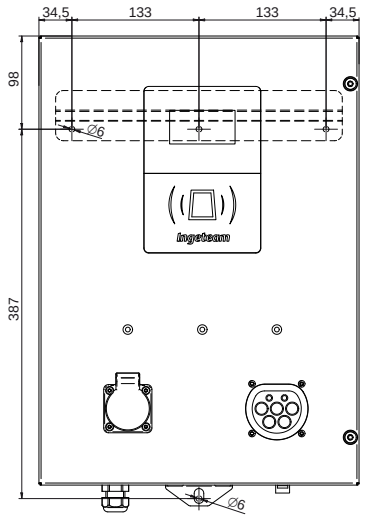
The connecting cables must be of the appropriate section for the maximum current.

Special care must be taken to ensure that there are no external elements near the air inlets and outlets to obstruct proper ventilation of the unit.

5.2. INGEREV GARAGE

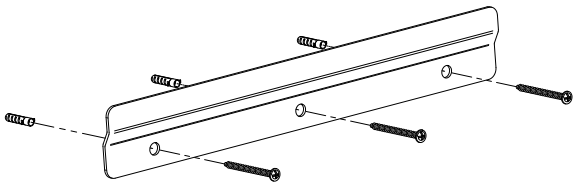
5.2.1. Fixing the unit

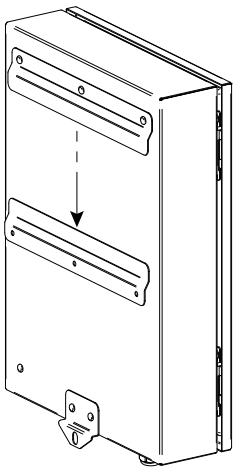
1. Together with the unit you will find a full-size paper drilling template to mark the holes on the wall needed for mounting the equipment. After you have marked the points on the wall, proceed to drill the holes.



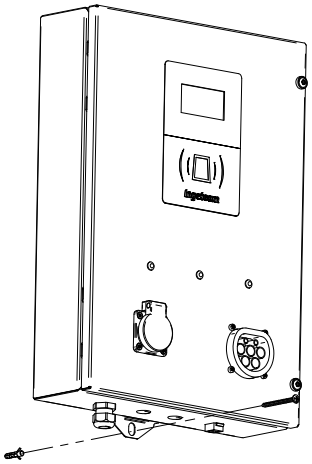
Template

2. To mount the INGEREV GARAGE unit a bracket must be fastened to the wall with three screws. Then hang the unit on the support fixture.





3. Once the wall bracket in in place, it is fully anchored with a screw through the hole for this purpose at the bottom of the station.



4. Check that the unit is properly secured.

5.2.2. Electrical connection

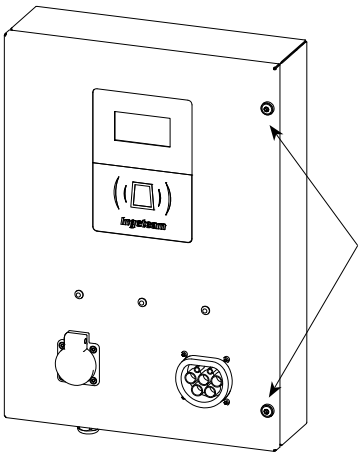
Once the unit has been mounted in its final position and has been solidly secured, make the electrical connections to it.

Wiring must be carried out by qualified technical personnel.

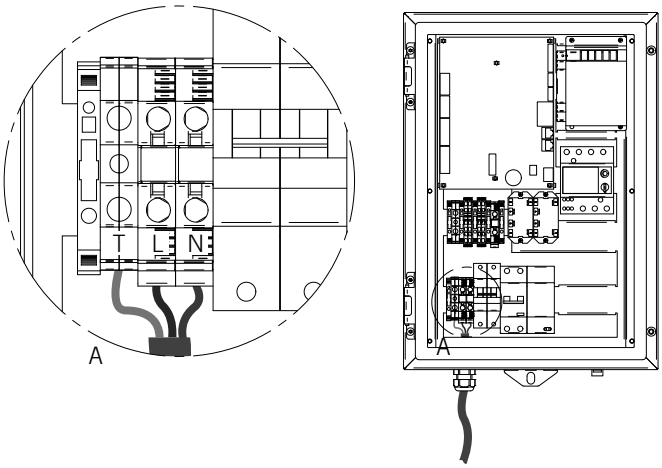
Care must be taken to ensure the equipment is not live when accessing its interior.

When checking that there is no voltage, wearing dielectric gloves and safety goggles approved for electrical hazards is required.

1. To proceed with connection, you must open the unit by removing the 2 tamper-proof T30-type Torx screws located on the right of the charging station.



2. Once the unit is open, proceed with the electrical connection. Connect the feed cables to the terminals as shown in the figure below:

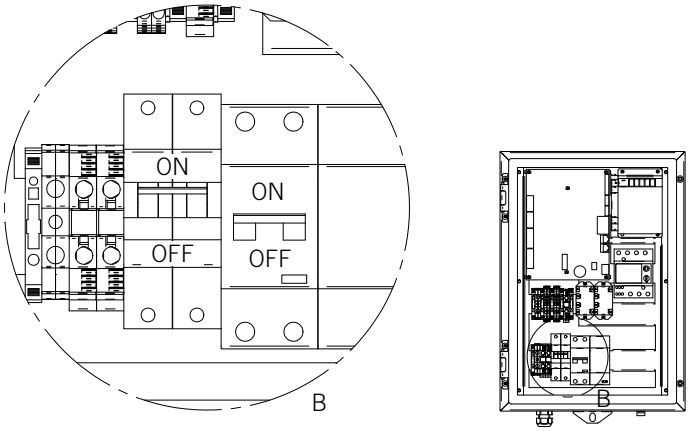


- T: Ground
- L: Line
- N: Neutral

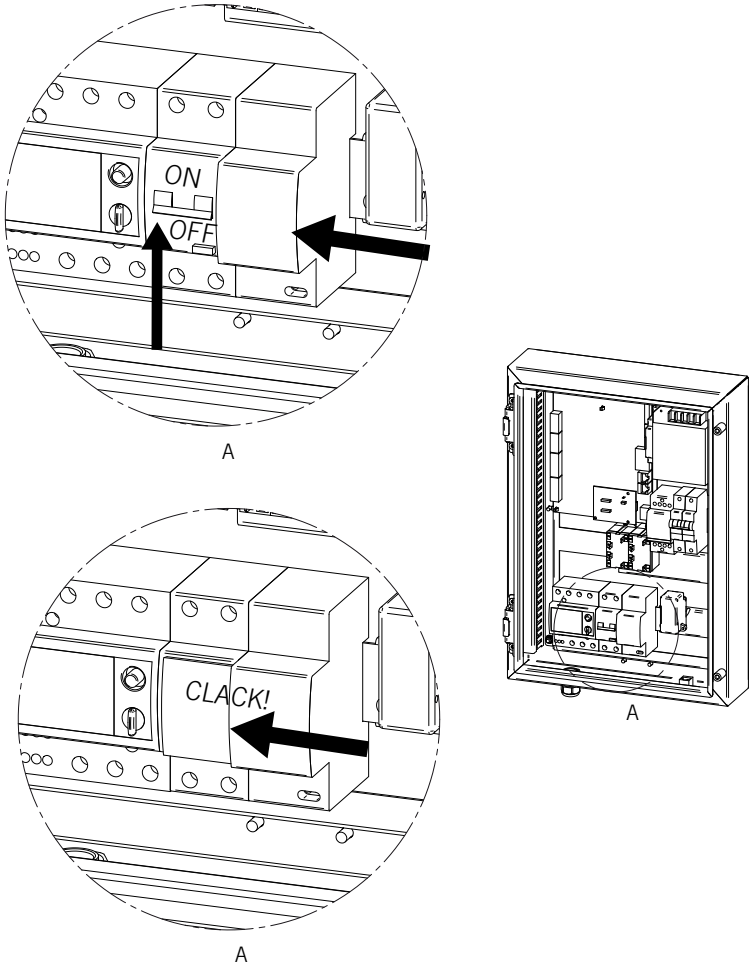
The supply connection must meet certain requirements:

Supply connection specification	
Connection type	Single phase
Number of wires	2P + T
Rated current	16 A
Maximum wire diameter	10 mm^2 (2 x 6 mm^2)

3. Once the above steps have been completed, proceed to feed the charging station, for which the differential and breaker protection must be switched *ON* (up):



Optionally, the station can be equipped with a self-resetting differential protection block. In this case the differential protection must be turned on (turn the switch up to *ON*) and then slide the tab to the left as shown in the figure.



4. Once the connections have been made, close the unit with the tamper-proof Torx screws mentioned above.

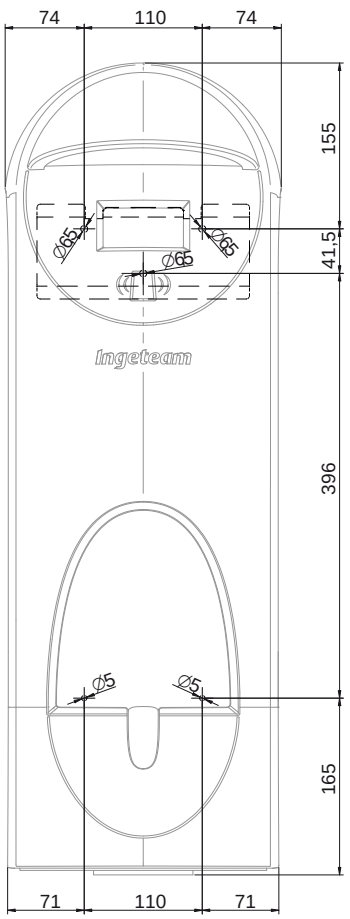
5. When the charging station is powered up for two seconds it will light up in red, blue and green. After a brief status verification, the light will turn green and the display will show an electric vehicle and the current time. The station is ready and awaits user ID to begin charging.

If the station identifies an operation fault, the light would turn red and the display would show the type of fault (see section ““6. Operation”).

5.3. INGEREV CITY (wall-mounted)

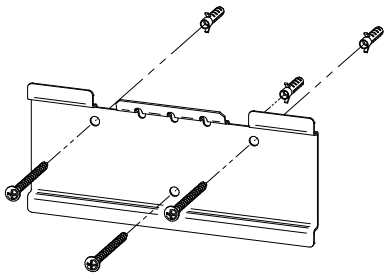
5.3.1. Fixing the unit

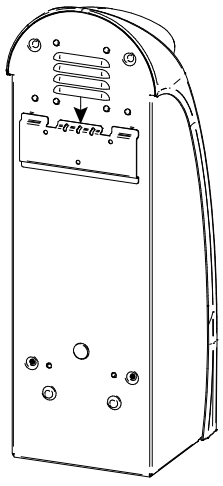
1. Together with the unit you will find a full-size paper drilling template to mark the holes on the wall needed for mounting the equipment. After you have marked the points on the wall, proceed to drill the holes.



Template

2. To mount the INGEREV CITY unit (wall-mounted) you must first fasten a bracket to the wall with three screws, as seen in the figure below.

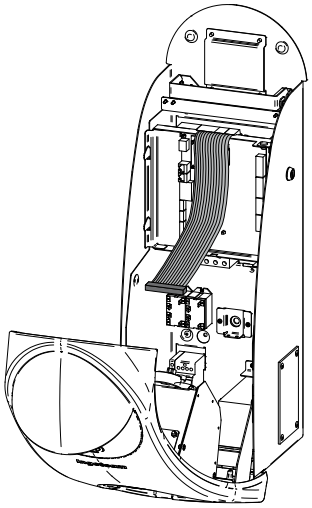




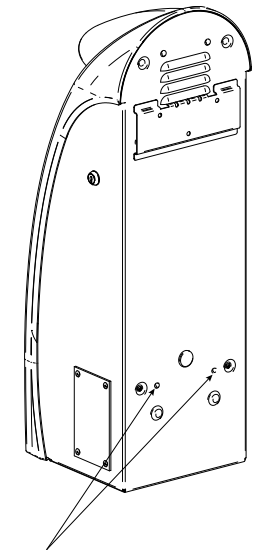
3. Once hung on the wall bracket, you must open the front enclosure. The side lock will open with the key supplied.

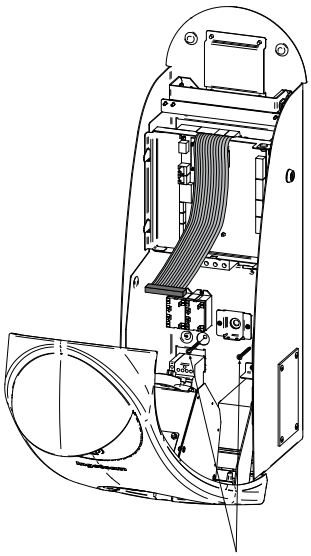
4. Upon opening the enclosure you will find that the ribbon cable is loose as a security measure to avoid pulling

on the internal components.



5. Finish installing the station by inserting the two screws from the inside into the wall. You will see two plastic caps on the holes for that purpose. Remove them and proceed to insert the screws.





6. Check that the unit is properly secured.

5.3.2. Electrical connection

Once the unit has been mounted in its final position and has been solidly secured, make the electrical connections to it.

Wiring must be carried out by qualified technical personnel.

Care must be taken to ensure the equipment is not live when accessing its interior.

When checking that there is no voltage, wearing dielectric gloves and safety goggles approved for electrical hazards is required.

1. With the front door still open, open the metal plate which houses the electronic card to access the feed terminal block.

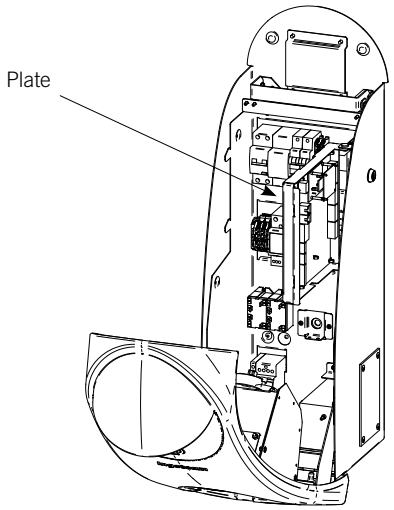
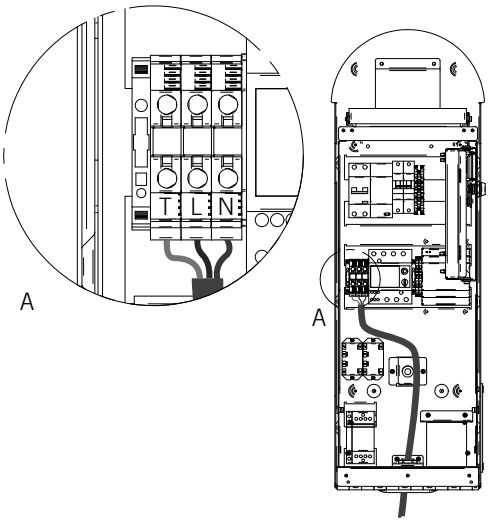


Plate opening

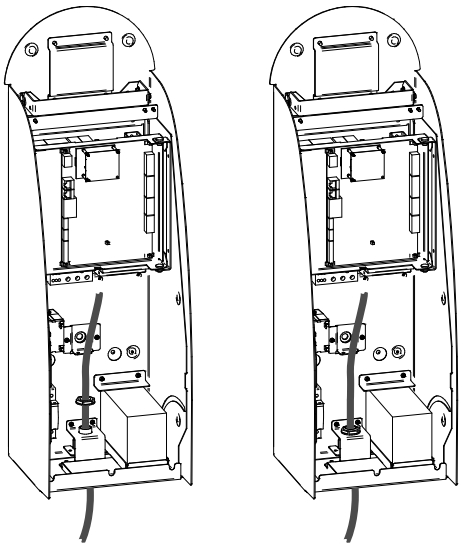


T: Ground

L: Line

N: Neutral

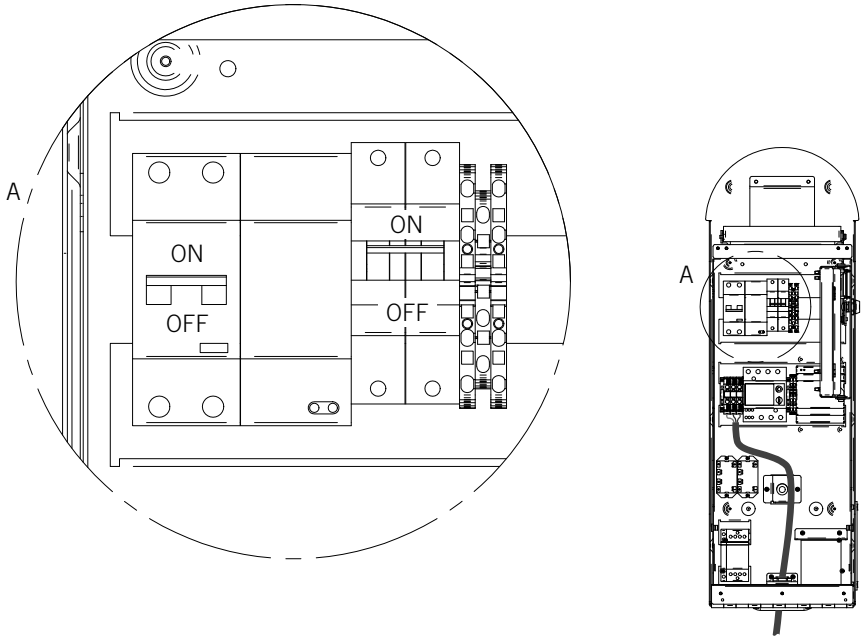
Terminal strip details



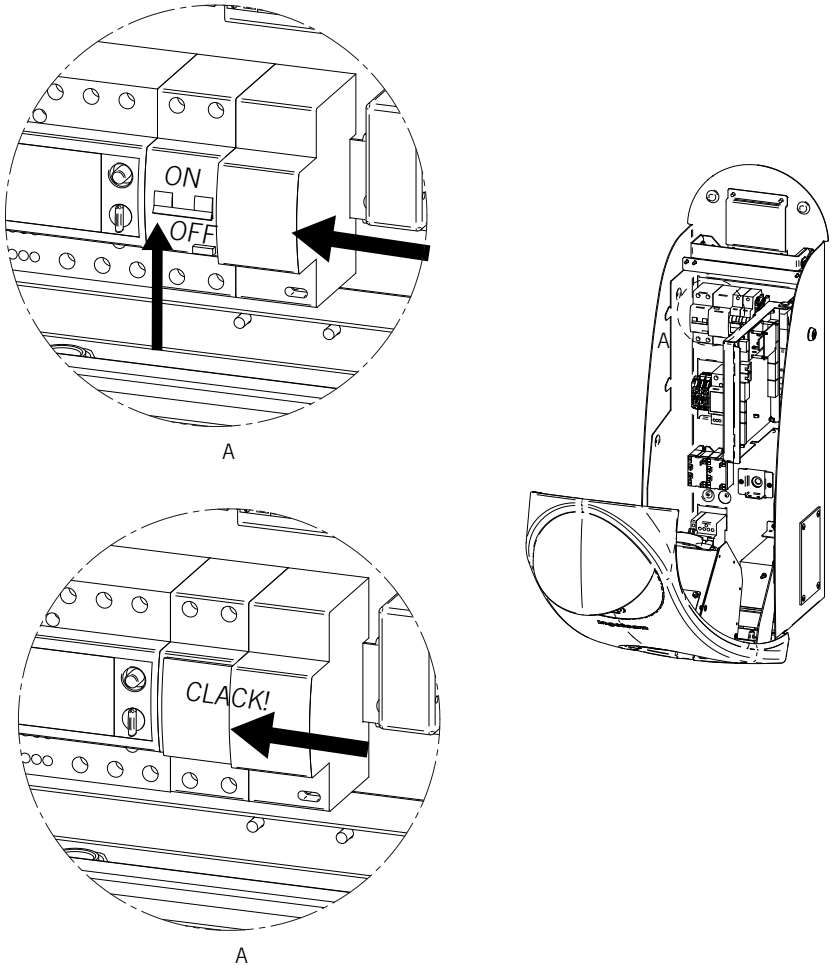
The supply connection must meet certain requirements:

Supply connection specification		
Connection type	Single phase	Three-phase
Number of wires	2P + T	3P + N + T
Rated current	16 A	Up to 32 A
Maximum wire diameter	10 mm^2 (2 x 6 mm^2)	

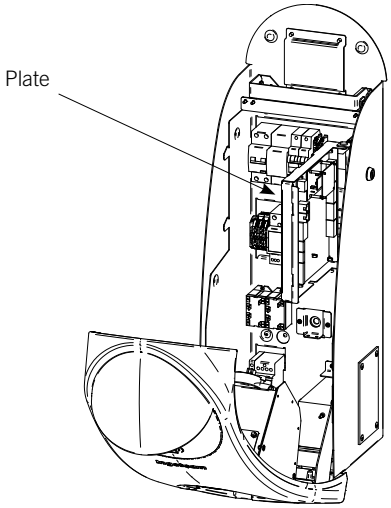
2. Switch the differential and breaker protection *ON* (up):



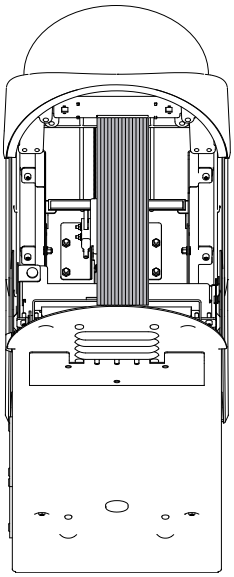
Optionally, the station can be equipped with a self-resetting differential protection block. In this case the differential protection must be turned on (turn the switch up to *ON*) and then slide the tab to the left as shown in the figure.



3. Close the metal plate where the electronic card is stored.



Once the connection has been made, proceed to connect the ribbon cable from the display as shown in the image below:



4. You may then proceed to close the charging station using the lock on the top right.

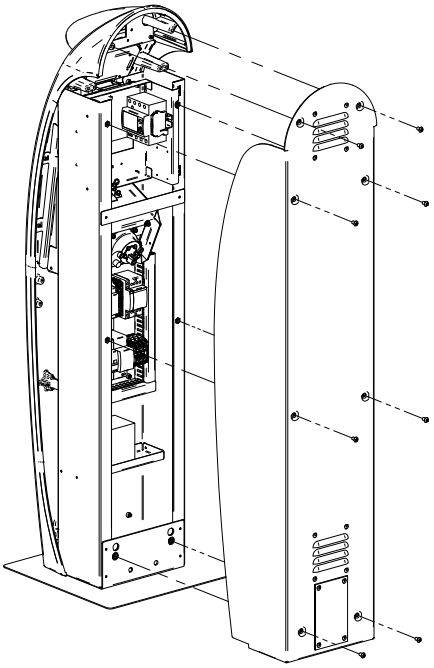
5. When the charging station is powered up for two seconds it will light up in red, blue and green. After a brief status verification, the light will turn green and the display will show an electric vehicle and the current time. The station is ready and awaits user ID to begin charging.

If the station identifies an operation fault, the light would turn red and the display would show the type of fault “6. Operation”.

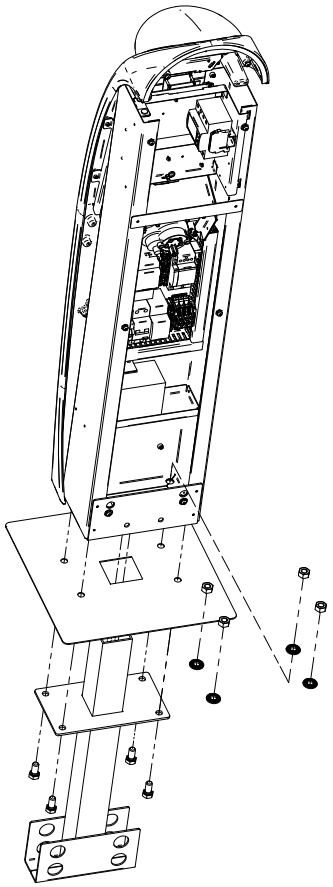
5.4. INGEREV CITY (floor-mounted)

5.4.1. Fixing the unit

1. Open the back enclosure by removing the 8 T30-type Torx tamper-proof screws



2. Proceed to fastening the unit to the ground by using a clamping plate, supplied by Ingeteam, such as the plate shown in the figure below.



The connection hose or cable must be passed through the rectangular tube to later connect the station to the mains.

A trim unit is available, provided by Ingeteam, which must be placed between the bolts or studs and the M12 nuts anchoring the post to them.

3. Check that the unit is properly secured.

5.4.2. Electrical connection

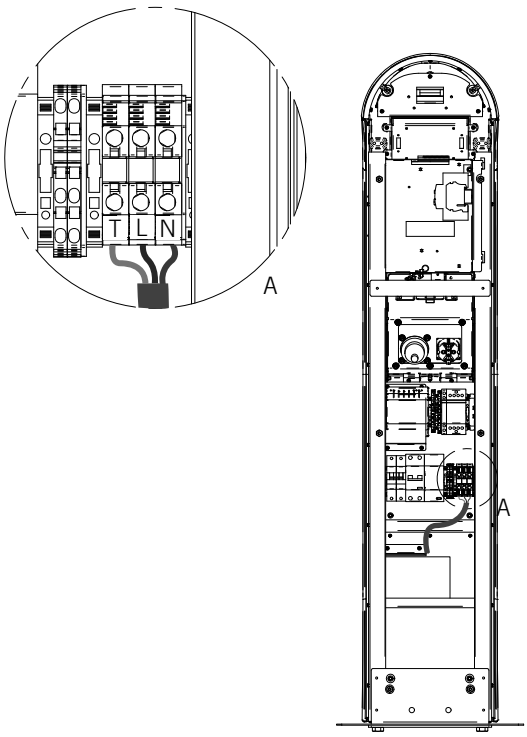
Once the unit has been mounted in its final position and has been solidly secured, make the electrical connections to it.

Wiring must be carried out by qualified technical personnel.

Care must be taken to ensure the equipment is not live when accessing its interior.

When checking that there is no voltage, wearing dielectric gloves and safety goggles approved for electrical hazards is required.

1. With the back enclosure open, as stated in the previous section, proceed to connect the feed cables to the terminal strip as shown in the figure below:



T: Ground

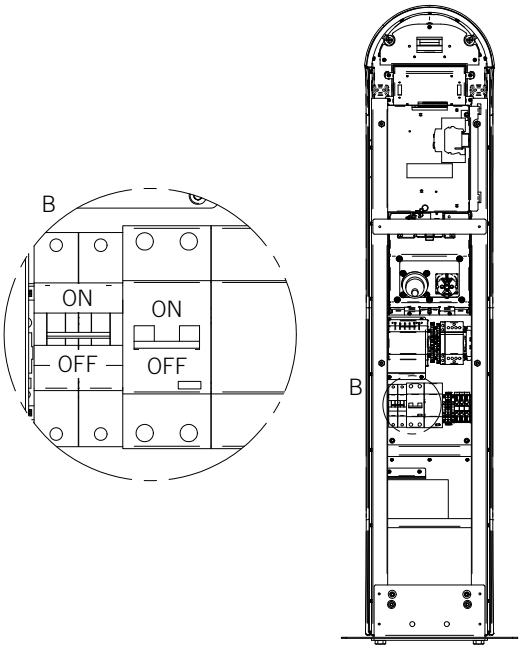
L: Line

N: Neutral

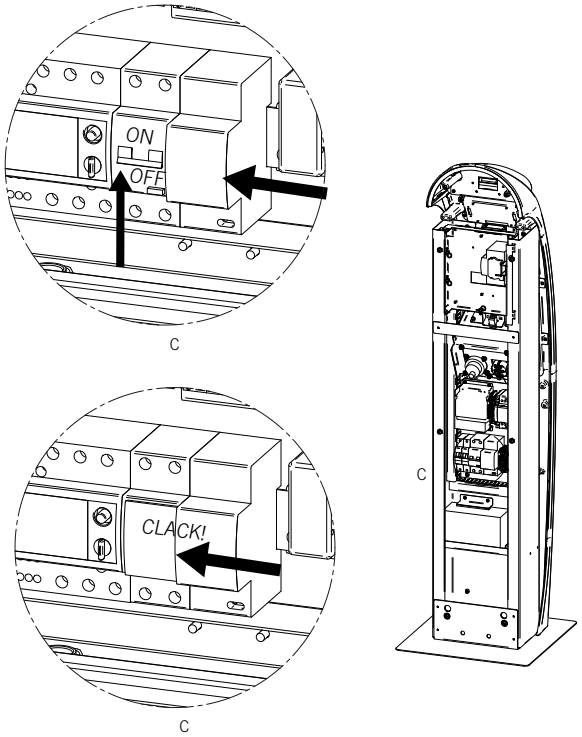
The supply connection must meet certain requirements:

Supply connection specification	
Connection type	Single phase
Number of wires	2P + T
Rated current	16 A
Maximum wire diameter	10 mm^2 (2 x 6 mm^2)

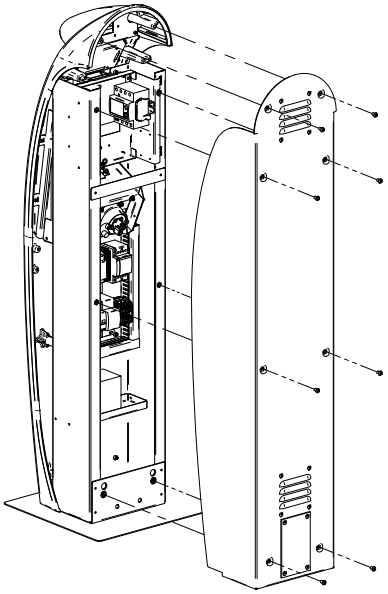
2. Switch the differential and breaker protection *ON* (up):



Optionally, the station can be equipped with a self-resetting differential protection block. In this case the differential protection must be turned on (turn the switch up to *ON*) and then slide the tab to the left as shown in the figure.



3. Close the back enclosure by screwing in the 8 T30-type Torx tamper-proof screws

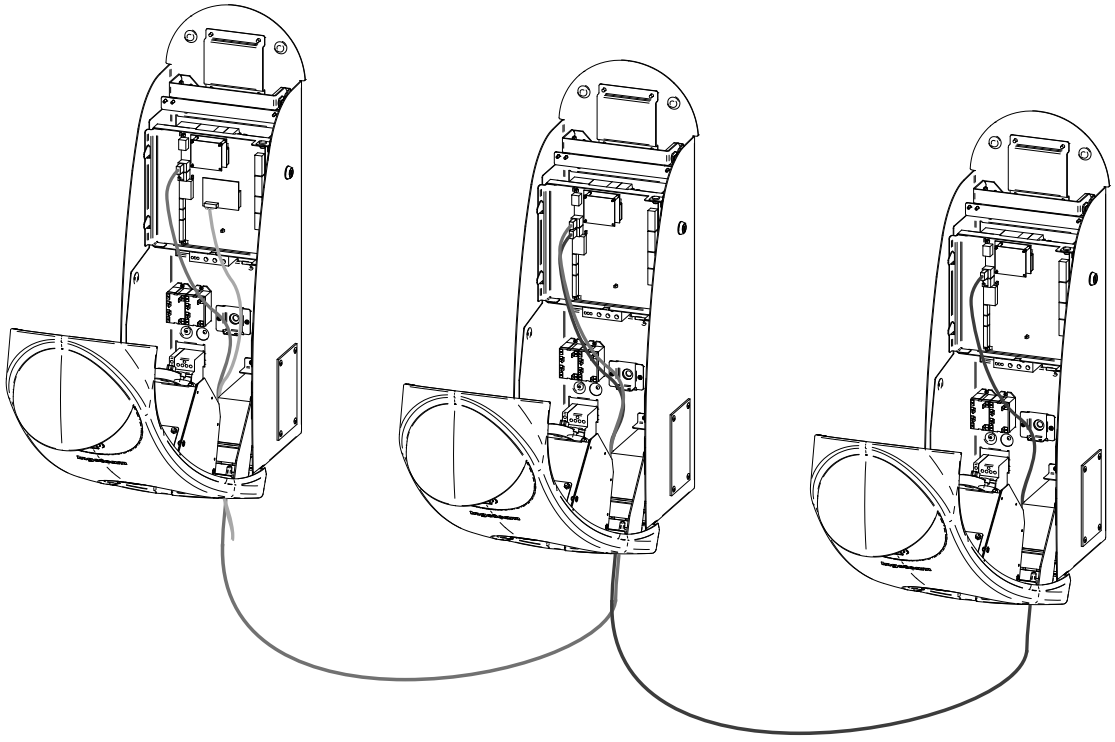


4. When the charging station is powered up for two seconds it will light up in red, blue and green. After a brief status verification, the light will turn green and the display will show an electric vehicle and the current time. The station is ready and awaits user ID to begin charging.

If the station identifies an operation fault, the light would turn red and the display would show the type of fault (see section “6. Operation”).

5.5. Data bus

All INGEREV charging stations include a local RS485 data bus. This data bus can be used both to extract local data with the INGECON SUN Manager software provided by Ingeteam and to for various charging stations to communicate between themselves. In the latter case, the bus configuration allows access both locally and remotely to the data of each and every one of the charging stations that are connected to each other. In other words, it allows communication between all charging stations that are part of the installation using a single communications channel or modem.

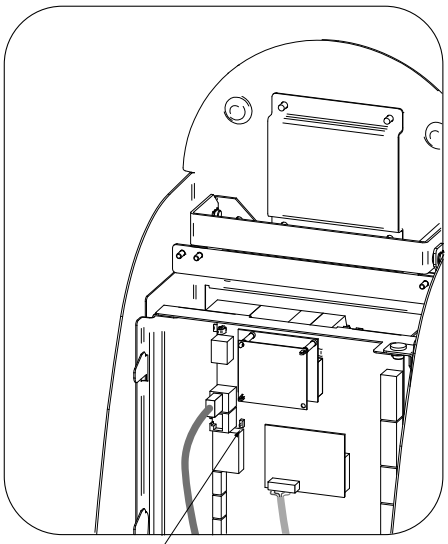


A maximum of 10 units can be connected to each other; any one of those which are located at the ends of the data bus may be the charging station fitted with a modem.

The RS-485 data bus is fitted with end-of-line jumpers in each of the control cards.

If you wish to have charging stations communicate with each other, the jumper must be removed from all the intermediate stations, so that it remains only at the end ones.

If one of the stations is fitted with a modem, the end-of-line jumper must also be removed from this station.

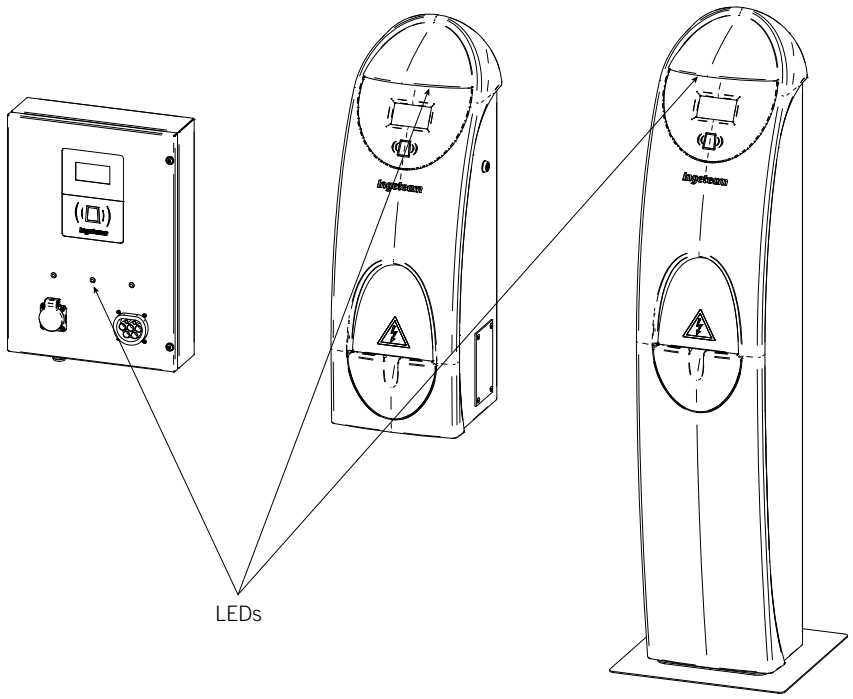


6. Operation

The main function of the post is to supply and measure power for users previously authorized via an RFID card reader.

6.1. Status indication

The charging post shows its status on multi-LED display. The location of these LEDs will vary by model.



LED locations.

INGEREV GARAGE

Status	Lighting	Description
Waiting for vehicle	Steady green	The charging post is waiting for a vehicle to be plugged in for charging.
Waiting to charge	Flashing green	A user has swiped the card over the reader and the post is waiting for a vehicle to be plugged in.
Charging	Flashing green	A vehicle has been plugged into the charging post. Only the green LED located at the top of the selected connector will light up.
Low current	Flashing green and steady red	Reduced current.
Charging ended	Flashing green	After charging, the user has swiped the card and the post is in standby for the vehicle to be unplugged.
Error	Steady red	The charging process is not occurring properly due to some problem.
Fault	Steady red	The charging position is not operating correctly.
Stand-by	None	The post has been disconnected remotely.

INGEREV CITY

Status	Lighting	Description
Waiting for vehicle	Green	The charging post is waiting for a vehicle to be plugged in for charging.
Waiting to charge	Flashing yellow	A user has swiped the card over the reader and the post is waiting for a vehicle to be plugged in.
Charging	Steady blue	A vehicle has been plugged into the charging post.
Low current	Flashing blue	Reduced current.
Charging ended	Flashing yellow	After charging, the user has swiped the card and the post is in standby for the vehicle to be unplugged.
Error	Steady red	The charging process is not occurring properly due to some problem.
Fault	Steady red	The charging position is not operating correctly.
Stand-by	None	The post has been disconnected remotely.

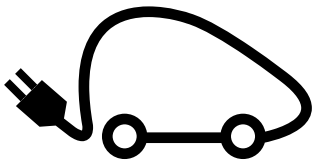
6.2. Charging process

6.2.1. INGEREV GARAGE

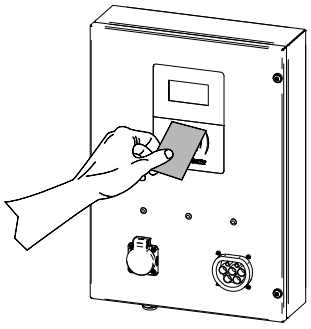
The power plug should not be removed from the vehicle while it is being charged.

Start of charging process

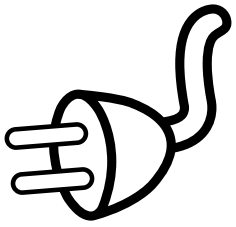
1. Make sure the station is in "*waiting for vehicle*" status, with the electric vehicle icon shown on the display.



2. Hold the card close to the card reader located below the display.



If the card is read correctly, the charging post goes into "*awaiting charge*" status. The display will show a flashing plug icon.



3. Plug the cable into the desired outlet.

If the power connector selected is the mode 3 connector, the station automatically detects the connection and continues the charging sequence stipulated by the *IEC61851* standard.

If the power connector selected is the mode 1 connector (Schuko), the station automatically detects the connection and continues the charging sequence stipulated by the *IEC61851* standard.

The station does not allow and is not designed for simultaneous use of both power outlets. Only the selected outlet remains active.

4. Upon connection, the station shall block the connector if load is selected via connector 3 and at the start of power supply, changing the status to *charge*.

End of charging process

5. To conclude the charge cycle, re-swipe the card over the reader. The station interrupts power supply and unlocks connector mode 3 if that is what has been used.

6. Pull the plug

The station will go back to *awaiting vehicle* status.

Loss of power supply

If the charging station loses power during the charging process, it automatically unlocks the mode 3 connector, if this has been the mode selected, and it remains inactive until the supply is restored.

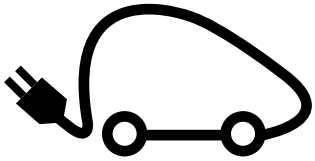
Once power is restored, the station automatically restarts and goes into *awaiting vehicle* status waiting for the next user.

6.2.2. INGEREV CITY (wall and floor)

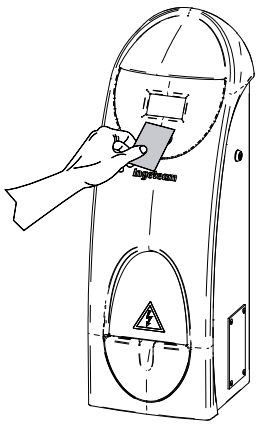
The power plug should not be removed from the vehicle while it is being charged.

Start of charging process

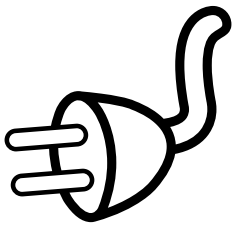
1. Make sure the station is in a*waiting vehicle* status, with the electric vehicle icon shown on the display.



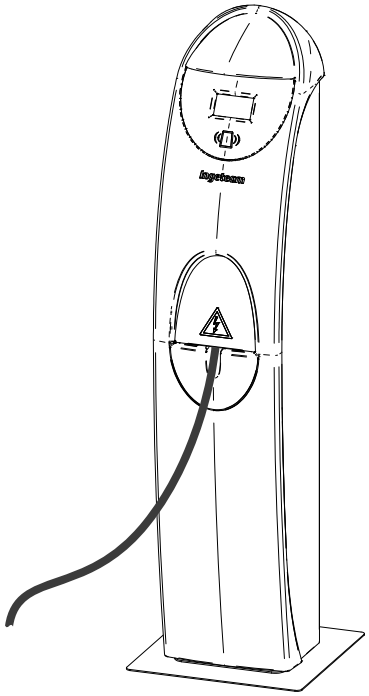
2. Hold the card close to the card reader located below the display.



If the card is read correctly, the charging post goes into *awaiting charge* status. The display will show a flashing plug icon.



3. Lift the cover manually and plug the cord into the desired electrical outlet. Position the cable so that it comes out the hole in the bottom center of the bay, allowing the cover to close shut.



If the power connector selected is the mode 3 connector, the station automatically detects the connection and continues the charging sequence stipulated by the *IEC61851* standard.

If the power connector selected is the mode 1 connector (Schuko), the station automatically detects the connection and continues the charging sequence stipulated by the *IEC61851* standard.

The station does not allow and is not designed for simultaneous use of both power outlets. Only the selected outlet remains active.

4. When the cover is closed shut, the station will be blocked and power supply will be switched on, changing the status to *charge*.

End of charging process

5. To conclude the charge cycle, re-swipe the card over the reader. The station interrupts power supply and unlocks the bay cover.

6. Open the lid, remove the connector and the cable and close the lid. The station will block the cover and will go back to *awaiting vehicle* status.

Loss of power supply

The station has an auxiliary power supply (INGEREV CITY models) that allows it to continue basic operation in spite of power losses. In this situation the unit shows the anomaly on its display.

In the event that the station is in standby in *awaiting vehicle* status and loses power, the message displayed is:

"SUPPLY FAILURE"

If the power supply is lost while a vehicle is being charged, the message would be:

"SUPPLY FAILURE ID YOURSELF AGAIN TO UNLOCK THE COVER"

In this situation, users would have to swipe their ID badge over the reader to unlock the cover and unplug their vehicle. After this, the station would shut down.

A *Master User* will be able to unlock the cover to remove the connector and may, after further identification, turn off the station with guard locking active.

When power is restored after an earlier power loss, the charging station will return to its pre-disconnection status.

6.3. Languages

The information for each user session is displayed in the language set on each card, regardless of the station's default language.

The station user may change the default language with a Master card.

Users without a pre-cofnigured language preference will see the information displayed in the station's default language.

6.4. Incidence/Alarms

In case of fault, the station switches to *fault* status, indicating the reason on the display:

Installation defect

The station's protection devices have been triggered.

The station detects that the fault persists and will not proceed to resetting the protections until it is resolved.

The electrical installation must then be inspected by qualified personnel.

Supply failure

- No electrical grid. No electrical supply. The station re-boots when it is restored.
- The protection devices have been triggered. The protection devices have been triggered but the root fault has disappeared.

The station will then reset the protections shortly thereafter.

Energised connector

There is current in the plug when ther should not be.

Notify technical service about the issue.

Power meter communication fault

Internal communication with the energy meter is faulty.

Notify technical service about the issue.

RFID communication fault

Internal communication with the card reader is faulty.

Notify technical service about the issue.

Connector not energised

There is no current in the plug when there should be. Charging is not possible.

Notify technical service about the issue.

If you have any problems with the performance of the station please call the tech support hotline.

6.5. Station shutdown

INGEREV GARAGE

The station will shut down when the power supply is disconnected.

INGEREV CITY

If you wish to turn off or uninstall the charging station, disconnecting it from the power supply directly is not sufficient due to the backup power supply. In this case the station will display the following alarm message:

SUPPLY FAILURE

To completely turn off the station, a Master-type card should be swiped over the reader. You may then proceed to fully disconnect the charging station.

It is strongly recommended to perform a complete shutdown of the charging station to prolong the life of the auxiliary power supply.

7. Preventive maintenance

7.1. Differential current devices

An annual inspection is recommended for checking the residual current device located inside the station. Press the reset button on the device and wait for the reset.

When opening the back cover (for the sole purpose of testing both differential current devices), avoid contact with any other device or cable at all times.

The worker who accesses the bottom of the access door to the protection devices must be properly trained and authorised by the employer (the charging station operator) to perform these tasks.

7.2. Grounding

An annual inspection is recommended for checking the proper connection of the metal housing and other metal components located outside the charging station to the unit's ground installation.

The back cover is opened for the sole reason of performing a continuity test between the arrival of the ground conductor from the installation and the metal housing and other metal components located outside of the charging station.

The worker who accesses the bottom of the access door to the protection devices must be properly trained and authorised by the employer (the charging station operator) to perform these tasks.

7.3. Air filters

We recommend an annual inspection of the air filters located in the the charging station's vents.

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