



DC Charging Station

NB 120 series Installation Manual



NB 120 series

Installation Manual

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NB120HW02EI Rev. E

ABOUT THIS MANUAL

PURPOSE

This manual contains important instructions for the installation, configuration, and maintenance of the **NB 120 series** electric vehicle chargers, which manage the power transformation and main control for the charge. From now on, this manual refers to **Standalone NB 120 series** with the term “equipment” or “charger”.

Please notice the **NB 120** range includes the chargers **NB 60 / NB 90 / NB 120**.

The manufacturer reserves the right to modify product features.

TARGET AUDIENCE

This manual is intended for qualified personnel who will install, configure, and operate the chargers.

Only qualified technical personnel validated by the manufacturer may install and start up the equipment.

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REVISIONS CONTROL		
DATE (DD/MM/YYYY)	REVISION	DESCRIPTION
30 / 06 / 2023	A	First edition.
05 / 10 / 2023	B	Important safety instructions. Introduction. Handling and transportation. Cable access and connections. Start up procedure. Emergency stop and restart.
22 / 11 / 2023	C	Preparation for installing the equipment. Anchoring of the equipment: added <i>Removal of the counterweights fixing bracket of the charging cable management system</i> .
28 / 02 / 2024	D	Updated the <i>Cable access plate</i> subsection in section 6. <i>Cable access and connections</i> .
29 / 07 / 2024	E	Cover page. Update of the <i>Equipment overview / Charger</i> sub-section in section 1. <i>Introduction</i> . Technical characteristics. Dimensions and weight. <i>Charging cable maneuverability</i> and <i>Ventilation system</i> sub-sections updated in section 5. <i>Preparation for installing the equipment</i> . <i>Controls sub-section</i> updated in section 8. <i>Interface</i> . Emergency stop and restart.

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The equipment and technical documentation are periodically updated. The manufacturer reserves the right to modify all or part of the contents of this manual without previous notice. The reproduction or distribution of the present manual is strictly forbidden unless express authorization from the manufacturer.

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ACRONYMS

The terms commonly used in the documentation are listed in the table below.

Please notice this is a general series of terms and it encompasses different product divisions (industrial, solar, storage, and electric mobility), thus, some of the following expressions may not apply to this particular manual.

ACRONYM	MEANING
AASS	Auxiliary Services
AC	Alternating Current
AI	Analogue Input
AO	Analogue Output
BESS	Battery Energy Storage System
BMS	Battery Manager Solution
CCID	Charge circuit interrupting device
CCL	Charge Current Limit.
CCS	Combined charging system – charging and communications protocol following the standard IEC 61851-23 Annex CC
CPU	Central Processing Unit
DC	Direct Current
DCL	Discharge Current Limit
DI	Digital Input
DSP	Digital Signal Processor
DO	Digital Output
EMS	Energy Management System
EV	Electric Vehicle
FPGA	Programmable device (Field-Programmable Gate Array)
FRU	Field Replaceable Unit
GFDI	Ground Fault Detector Interrupter
GPRS	General Packet Radio Services, a data transmission system
HVAC	Heating, Ventilation, and Air Conditioning
IGBT	Insulated Gate Bipolar Transistor
IMI	Insulation monitoring device
IT	Grid system where the power supply is kept isolated and the electrical equipment system is grounded.
LOTO	Lock Out – Tag Out
MCB	Miniature Circuit Breaker
MCCB	Moulded Case Circuit Breaker
MPCS	Multi Power Conversion System
MID	Measuring Instrument Directive
MV	Medium Voltage. This term is used to refer to high voltage in general
PE	Ground connection
PI	Proportional and Integral
POI	Point Of Interconnection
PPE	Personal Protection Equipment
PV	Photovoltaic energy
RCD	Residual Current Device




ACRONYM	MEANING
RCM	Residual Current Monitor
RFID	Radio Frequency Identification
SOC	State Of Charge – referred to battery
SOH	State Of Health – referred to battery. It compares the actual state of the battery to its initial condition. It is measured in percentage
STO	Safe Torque Off
TN	Grid system where the power supply is grounded, and the electrical equipment system is brought to the same ground through the neutral connector.
TT	Grid system where both the power supply and the electrical devices are connected to the ground via separate connections
UPS	Uninterruptible Power Supply
VSD / VFD	Variable Speed Drive, Variable Frequency Drive. Both terms are used

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SAFETY SYMBOLS

Always follow safety instructions to prevent accidents and potential hazards from occurring.

In this manual, safety messages are classified as follows:

	WARNING	Identifies potentially hazardous situations where dangerous voltage may be present, which if not avoided, could result in minor personal injury, serious injury or death. Be extremely careful and follow the instructions to avoid the risk of electrical shocks.
	CAUTION	Identifies potentially hazardous situations, which if not avoided, could result in product damage, or minor or moderate personal injury. Read the message and follow the instructions carefully.
	NOTICE	Identifies important measures to take in order to prevent damage equipment and warranty lost, as well as encouraging good use and environmental practices.

Other symbols used in this manual for safety messages are the following:

	Hot surface. Be careful and follow the instructions to avoid burns and personal injuries.
	Risk of fire. Be careful and follow the instructions to prevent causing an unintentional fire.
	Caution, risk of electric shock. Energy storage timed discharge. Wait for the indicated time to avoid electrical hazards.

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IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

Read carefully all documentation before handling the equipment and pay special attention to safety recommendations to maximize the performance of this product and ensure its safe use and installation.

This document covers the most important and frequent potential causes of damage to equipment or personnel. It is the responsibility of the installer to follow the instructions provided in this manual, follow good electrical practices, and identify all warnings and recommendations before starting up and operating the electric vehicle chargers.



WARNING

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FIRST CONSIDERATIONS

The operations detailed in this manual must only be performed by qualified personnel.

The condition of qualified personnel referred to in this manual shall be at least the condition that meets the standards, regulations and safety laws applied to the installation and operation of this equipment.

Read and retain the Installation Manual for future reference.

Before assembling the equipment, read all instructions, caution signs and other sections of this manual. Failure to follow these warnings can result in severe electrical shock or death. Pay attention at all times to prevent possible accidents.

In addition to the recommendations in this manual, **local and site-specific safety procedures should be observed.** Additionally, local and national electrical regulations must be followed to avoid personal injury and/or equipment damage.

The electric vehicle charging system may cause an ELECTRICAL DISCHARGE if the warnings indicated in this manual are not followed.

Make sure the equipment is completely disconnected from the power supply and grounded before handling or servicing. Otherwise, there is a risk of electric shock. To avoid electrical hazards, disconnect the input supply, ground the equipment, remove control voltages before performing any tasks, and ensure that busbars are completely discharged. Warning and safety labels must be properly affixed to terminals, cabinets, and control panels in accordance with local regulations.

When working on electrical installations, always remember to apply the FIVE GOLDEN RULES:

1. Visible shutdown of all live sources.
2. Mechanical lock out of all electrical services elements.
3. Verify the absence of voltage by using the appropriate tools for the voltage of the installation.
4. Ground and short-circuit all possible voltage sources.
5. Mark the working area and keep out zone.



MODIFICATION WILL VOID WARRANTY

Do not modify the equipment in any way. Modification definition includes and is not limited to drilling holes, puncturing equipment, adding, or retrofitting with components etc. If you do so, the manufacturer will not assume any liability and the product warranty will be voided.



WARNING



The housing must be properly closed, otherwise it may not adequately protect people or property from any abnormal situation inside the equipment.

Always follow the instructions in the manual to move and position the equipment. The weight of this equipment can cause injuries, serious injuries and even death if not handled correctly.

The exhaust airflow can reach high temperatures during charging sessions, especially when the outdoor temperature and power demand are high.

Electric shock danger. The steps to isolate the equipment must be carefully followed before performing any task or opening any cover of the equipment. Avoid inappropriate actions that may cause electric shock.

Always wear the appropriate personal protective equipment (PPE) for each task and work in electrical areas with dry hands. Otherwise, you may get an electric shock.

Do not use cables with damaged insulation. Do not subject cables to abrasion, excessive stress, heavy loads, or pinching. Otherwise, you may get an electric shock.

Do not supply power to a damaged equipment or with missing parts, even if the installation is complete. Otherwise, you may get an electric shock.

In the event that the equipment stops due to a loss of power, do not do any work on it. The auto-restart function may be enabled, and you may receive an electric shock.



The equipment has capacitors. Wait until the capacitors have discharged before performing any maintenance task.

USE

Do not use this equipment for purposes other than the electric vehicle charging with the modes provided for this product and defined in this manual.

Do not disconnect or connect any terminals while the equipment is running. Otherwise, you may get an electric shock and the equipment may be damaged.

Do not use this product if its enclosure or electric vehicle connector(s) (on both the equipment and vehicle sides) are broken, cracked or otherwise damaged. Otherwise, you may get an electric shock.

CONNECTION TO GROUND

Prevention of electric shock:

- The equipment chassis must be properly grounded to prevent a possible electrical shock if a leakage current flows through the enclosure. Disconnect all power supplies before proceeding with maintenance operations inside the equipment.
- Only connect the grounding device to the equipment's grounding plate. Do not use the enclosure or chassis screws for grounding.
- The protective ground cable must be first to connect and last to disconnect.

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CAUTION

Install the equipment, both the power station and the recharging posts, on a solid, level surface in a location where there is no risk of explosion, flooding, or impact damage. Follow the recommendations on how to build the foundation of this manual. Otherwise, there is a risk of malfunction and even permanent damage.

Never clean the surfaces or the inside of the equipment with abrasive liquids, solvents or cleaning products that could damage it. Water should not be applied under excessive pressure.



Disconnect the input power in case the equipment gets damaged.
Otherwise, it could result in a secondary accident or a fire.

Do not allow lint, paper, wood chips, dust, metallic chips, or other foreign matter into the equipment. Otherwise, a fire or an accident could occur.



After the input power is applied or removed, the equipment will remain hot for a few minutes. Touching internal hot parts could result in skin burns

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IMPORTANT RECOMMENDATIONS FOR CHARGING ELECTRIC VEHICLES:



CAUTION

Follow at all times the charging process described by the electric vehicle manufacturer.

This device should be monitored when used near children.

Do not handle the vehicle or equipment during the loading process (washing of the vehicle, intervention in the vehicle engine compartment, handling of the loading post, etc.).

Do not modify or interfere with the electrical installation while charging the vehicle.
Failure to do so could result in electric shock.

Do not charge the vehicle in the event of water, signs of corrosion or foreign matter on the charger cable connector or vehicle charging socket. Otherwise, there is a risk of fire and electric shock.

Do not attempt to touch the terminals of the charging station connector cable or the vehicle charger socket, nor insert objects into them. Failure to do so could result in electric shock.

Do not attempt to disassemble, repair, alter or modify the charging connector or any part of the charger.
The connector is not a user-serviceable device. Contact the manufacturer.

Always be careful with the charger's cable and connector: treat it carefully, do not crush it, immerse it in water, pull it out, or hit it, etc.

Follow the directions given by the vehicle manufacturer regarding the suitability of charging the vehicle when you or the vehicle are exposed to intense rain, heavy electrical storm, or other severe weather.

PERSONAL PROTECTIVE EQUIPMENT (PPE from now on) REQUIRED

The use of PPE in accordance with standards is required to repair and maintain the equipment. Follow applicable instructions at the installation site to comply with national and local regulations.

In the case of tasks with voltage present, it is mandatory to use an Electric Arc Safety Kit (gloves, clothing, and face protection).

A detailed example of the PPE used is shown below. The installer must specify in their safety instructions (hazard statement and work procedure) which PPE is required and when and how they should be used according to his electric arc studies, the characteristics of the site, the chargers, the installation, and the country.

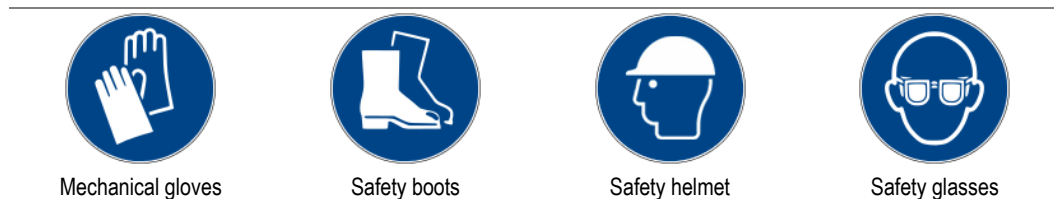
The manufacturer assumes no liability for damage resulting from improper use of the equipment or failure to comply with local or national regulations.

Always follow local regulations / NEC Health & Safety standards.

The following table shows an example of commonly used PPE:

ITEM	DESCRIPTION
Safety glasses	Eye protection according ANSI Z87.1.
Electric gloves	Gloves with mechanical, dielectric and against arc flash. Class according to voltage. ASTM D120 specifications and NFPA 70E standards.
Safety footwear	S3 class complying with ASTM F2413-11.
Insulation carpet	Insulation carpet according to ASTM Class 4. The insulation carpet must be used when there is voltage inside the equipment or when checking the voltage absence.
Safety kit arc flash	Arc flash personal protective equipment kit (including arc flash protective face shield & hard hat), fire resistant 40 cal/cm ² .
Padlock set	Padlock and auxiliary elements set to lock out dangerous equipment.
HI-VIS vest	Fr VIS vest 9 cal/cm ² .
MV stool	Medium Voltage insulation stool.
Rescue pole	Insulated body rescue pole.

PPE FOR INSTALLATION



Additional PPE for commissioning and maintenance tasks



The following table shows **the protection class type**, depending on the working voltage.

ELECTRICAL INSULATED GLOVES

Class	AC (V _{AC})	DC (V _{DC})
00	500	750
0	1000	1500
1	7500	11250
2	17000	25500
3	26500	39750
4	36000	54000

ELECTRICAL SAFETY MATTING

Class	AC (V _{AC})	DC (V _{DC})
0	1000	1500
1	7500	11250
2	17000	25500
3	26500	39750
4	36000	54000

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NOTICE

PPE should be checked according to the manufacturer's instructions.

The electrical gloves must have thermal, electric, and mechanical protection. If the gloves only have dielectric protection, it is mandatory to use under fireproof gloves and over gloves cover to work safely.



NOTICE

RECEPTION

- Electric vehicle chargers are supplied after passing strict performance tests and are carefully packed for shipment.
- In case of damage to the unit during transportation, notify the shipping agency and the manufacturer or your nearest agent within 24 hours of receipt of the merchandise.

RECYCLING

Packaging equipment must be recycled. Separate all different materials (plastic, paper, cardboard, wood...) and place them in the corresponding containers. Ensure waste collection is properly managed with a Non-Hazardous Waste Agent.

If you have any questions about the electric and electronic equipment waste, please contact the manufacturer.



NOTICE

CYBERSECURITY DISCLAIMER

This product is designed to be connected to and to communicate information and data via a network interface. Access to the system is restricted to those employees who legitimately need it for reasons of maintenance and/or updating of the system.

It is the installer's sole responsibility for providing and continuously ensuring a secure connection between the product and network. Installer shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of antivirus programs, etc.) to protect the product, the network, its system, and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information.

The manufacturer and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

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TORQUE AND SCREW SIZING

The following table shows, broadly speaking, the recommended torque for both mechanical and electrical connections, applicable to all cabinets ^[1,2].

SCREW SIZE		RECOMMENDED TORQUE			
METRIC (mm)	IMPERIAL (in.)	DIN (Nm)		ASTM (ft*lb)	
		6.9 QUALITY ^[a]	8.8 QUALITY ^[a]	A449 TYPE 1 ^[a]	A325 TYPE 1 ^[a]
M3	1/8	1	1.3	-	-
M4	5/32	2.5	3		
M5	3/16	4	6		
M6	1/4	5	8	4	-
M8	5/16	20	20	9	
M10	7/16	40	40	25	
M12	1/2	60	60	38	50 – 58
M14	9/16	100	120	54	-
M16	5/8	150	210	75	99 – 120

[a] For other qualities, follow the screw's manufacturer guidelines.



CAUTION

For all screwing that holds a **particular component** such as a bus, contactor, etc. it will be necessary to **apply the tightening torque indicated by the manufacturer** of the same component

Screwing should be tightened correctly only, when necessary, i.e., when the factory marks are not in place. For small screws that do not have marks follow common electrical practice.

¹ The manufacturer recommends the use of Zinc Steel quality 8.8 bolts for internal connections in general, DC and ground connections included.

² The manufacturer recommends the use of A2-70 stainless bolts for external connections in general, AC connections included.

1. INTRODUCTION

1

NB 120 series comprises of sub-systems that includes power transformation, charge control system, connectivity to EV, remote monitoring, and driver interface. Sub-systems work in synchronization to provide a seamless charging experience to the site host and EV drivers.

The charger has an integrated cable management system has 20 ft of cable and a docking means for connectors when not in use. This feature address ease of use and manageability

The power modules, FRU concept (Field Replaceable Units), are designed to be easily replaceable in the field without the need of advanced technical service personnel lowering operating costs.

The charger offers fast charging up to 120 kW, ideal for commercial, destination, public or fleet charging.

The charger has up to two independent charging cables compatible with CCS-1 electric vehicle standard.

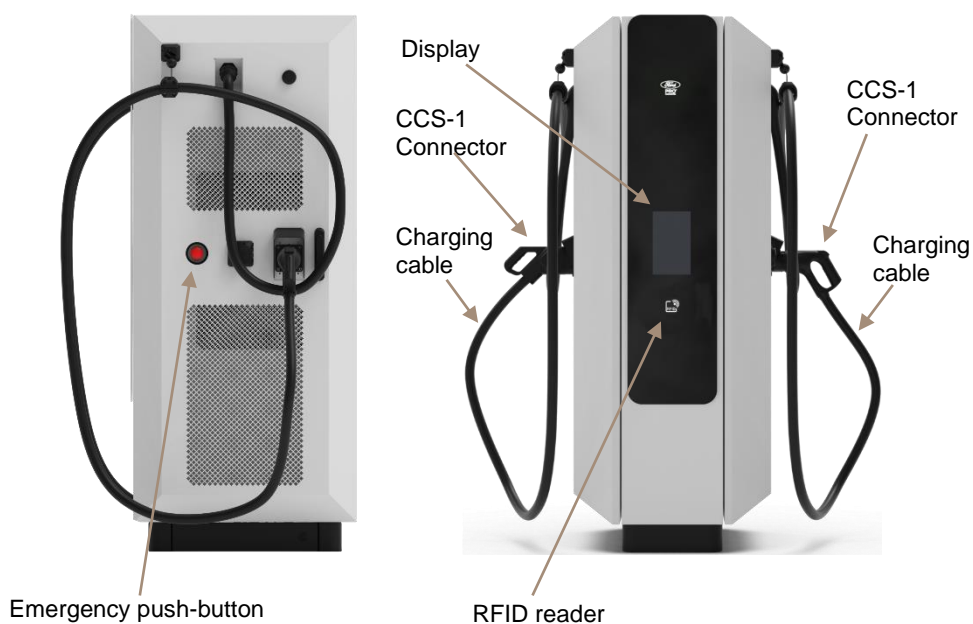
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Equipment overview

The following sections describe the different components of the EV charger.

Charger

The **NB 120 series** is provided with two independent charging cables with connectors for DC charging of electric vehicles with CCS-1 standard for DC. The possible installation and combination of connectors depends on the application of local regulations. Each post has a user-interactive touch screen display and an RFID card reader to be used when carrying out a charging session. The right and front view, from left to right, with the charger's main components are shown below:



Connectors

The charger has up to two independent charging cables with the standard CCS-1 connectors. The connector brackets are located on each side of the equipment.

The following sections describe the parts of each type of connector.

CCS-1 connector



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Charging process

The user must follow the instructions given below when performing a charging session:

1. If the charger is available, activate the charging session from the display, mobile app, credit card or RFID contact (depending on available options).
2. Pick the corresponding connector referenced as A or B on the display.
3. Connect the charger to the EV using the corresponding connector.
4. Ensure that the charger side connector is securely locked in place on the vehicle side of the connector.
5. If the session and communication between the charger and vehicle are established correctly, the charging process will begin.
6. Stop charging. The charging can be stopped in different ways:
 - When the vehicle has reached 100% the charge session stops automatically.
 - Through the display by selecting "Stop session".
 - Through RFID / payment card.
 - Through the vehicle control system.
 - By the operator CPO charge point operator.
7. Once the charging has stopped, the connector will be released.
8. Replace the connector back to the appropriate dock on the charger.

Advanced charge functionality

Simultaneous charging

Each charger allows simultaneous charging up to two electric vehicles. If one EV is connected to the charger, all power blocks that the vehicle can receive are delivered to the EV. If two EVs are connected, the power blocks will be distributed evenly to the EVs provided each EV can accept that output.

Open door detection

Door contact switches are used to detect if the front access door of the power cabinet is open. If the door is open a charge session cannot be initiated, and an on-going session will terminate.



WARNING

The power cabinet door must be correctly locked after installation, service, or repair operations.

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Regulatory framework

The **NB 120 series** are devices that are connected to the AC low-voltage network and provides a DC power supply at a variable voltage of 150 to 1000 V for charging electric vehicles.

Its certification as a product in accordance with current US legislation is carried out through the evaluation, where applicable, of compliance with the following standards:

- **UL 2202:** Electric Vehicle (EV) Charging System Equipment.
- **NEC - Article 625:** Electric Vehicle Charging Systems.
- **FCC part 15 - class A:** Unintentional radiators - industrial application.

2. TECHNICAL CHARACTERISTICS

2

Depending on the regulation to be followed, the equipment will fulfill different technical characteristics.

Standalone NB 120 series – UL

REFERENCE	NB060SU	NB090SU	NB120SU
DC OUTPUT	Maximum power [kW]	60	90
	Voltage range [V]	150 – 1000	
	Available connectors	CCS-1	
	Maximum continuous current CCS [A]	200	300
	Peak current CCS [A] ¹	200	300
	CCS nominal current [A]	Standard: 200. Optional: 300	
	Maximum number of EVs charging simultaneously	2	
AC INPUT FOR DC OUTPUT	Voltage [V]	480 (3ph + N + PE) ± 10%	
	Input rated current [A]	79	119
	Power factor	> 0.99	
	Frequency [Hz]	60	
	Efficiency	95%	
GENERAL	Interface	10" Touchscreen	
		E-stop pushbutton	
		Credit / debit card reader (optional)	
	RFID reader	ISO14443 A/B, MIFARE, Calypso, ISO18092, ISO15693 and more	
	Protections	Isolation monitoring device	
	Energy measurement	Internal DC energy measurement	
		DC meter for DC output (optional)	
	Cable length [m/ft]	6.1 / 20 with cable management system.	
	Enclosure / foot / glass color	White (RAL 9016) / Grey (RAL 7016) / Black	
	Customization ²	Enclosure / Foot / Glass / Logo / Display	
	Protection rating	NEMA 3R IP54 IK10 (IK08 for ventilation grilles)	
	Operating temperature range [°C/°F]	-30 to 50 / -22 to 122	
	Relative humidity	From 4% to 95%	
	Maximum altitude above sea [m/ft]	Without derating: 2000 / 6561. Max: 3000 / 9842	
	Communications	Ethernet (10/100) + Wi-Fi	
		Cellular data: 4G	
	Charge Protocols	Autocharge, ISO 15118, 1.1, OCPP 1.6J, DIN 70121	
	Dimensions (WxDxH) [mm/ft]	670 x 750 x 1800 / 2.2 x 2.5 x 5.9	
	Regulation	UL 2202, NEC 625, FCC Part 15 Class A	

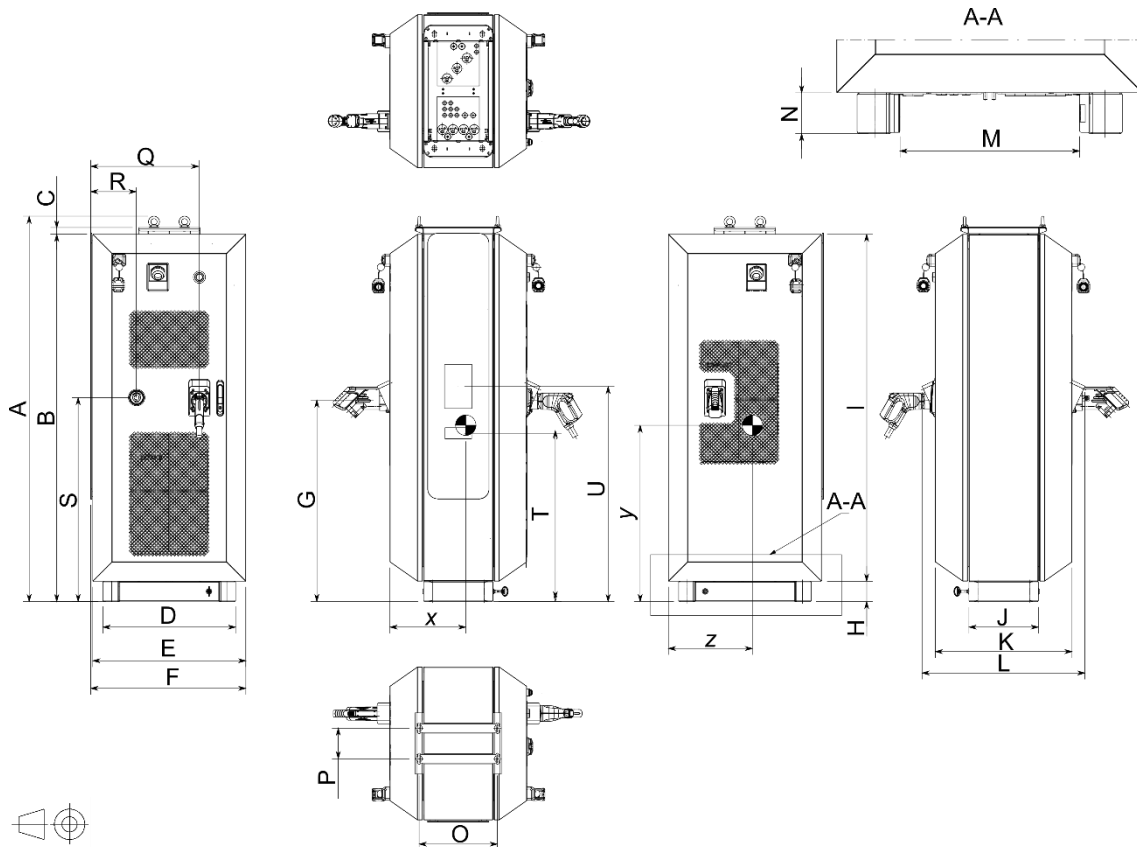
¹ Consult with the manufacturer for more information about the connector overload capability.

² Consult with the manufacturer for further information.

3.DIMENSIONS AND WEIGHT

3

The dimensions, gravity center and the weight of the **NB 120 series** are detailed in this section.



NB120DTD001B

GENERAL DIMENSIONS

	A	B	C	D	E	F	G	H	I	J	K
mm	1888.5	1800	33.5	650	750	760	988	100	1700	340	670
in.	74.35	70.87	1.32	25.59	29.52	29.92	38.89	3.94	66.93	13.85	26.38

GENERAL DIMENSIONS

GRAVITY CENTER

	L	M	N	O	P	x	y	z
mm	798	440	100	383	150	371	864	412
in.	31.42	17.32	3.94	15.08	5.91	14.60	34.02	16.22

ACCESSIBLE ELEMENTS

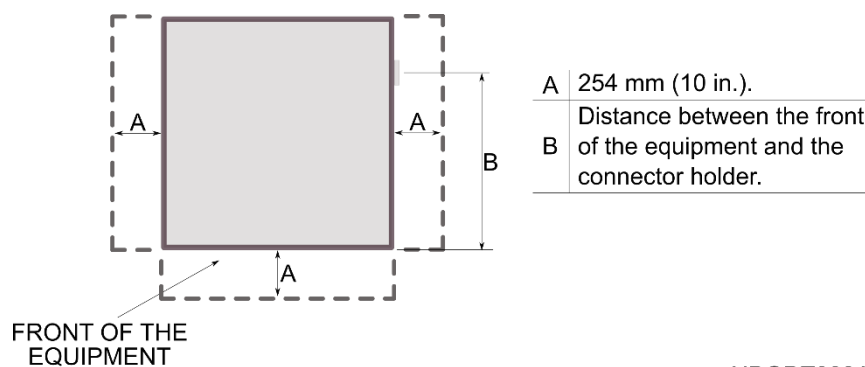
	Q	R	S	T	U
mm	532	225	1000	825	1019
in.	20.96	8.86	39.37	32.48	40.12

! NOTICE

ADA regulation (ANSI A117-1 2009) specifies that user operable parts must be located at a height no greater than 1220 mm (48 in.). provided that the project design allocates the clear access space in the front of the charger and to each side of the charger, where the edge of the access space is not greater than 254 mm (10 in.) from the charger. Therefore, the maximum curb height must be less than 200 mm (7.9 in.).

If the layout of the access space includes an obstruction or the edge of the access space is greater than 254 mm (10 in.) from the charger, then the maximum high-reach distance to the operable components may require to be reduced to 1170 mm (46 in.) or less. **It is the responsibility of the installer to consult with local authorities on the applicable regulation details and to provide a clear floor space in front of the charger and to each side of the charger, and curb height, so that maximum horizontal and vertical reach distances follow the current absolute limits.**

The following picture (top view) shows an example of the layout:



NBGDT009AI

Note: Front access to the connector handle can be achieved if the maximum reach is maintained to be less than 609,6 mm (24 in.) and height is less than 1168,4 mm (46 in.) although the manufacturer still recommends the installer to leave proper access to the side of the charger.

The approximate weight for the **NB 120 series** is 420 kg (926 lb.)¹. The weight of each charging cable is detailed in the following table:

CCS1			
Amperage	A	200	300
Length	m	6,1	6,1
	ft	20	20
Max. Effective length	m	5,7	5,7
	ft	18.7	18.7
Weight	kg	14,2	26,05
	lb	31.3	57.43

¹This is an indicative value. For other equipment of the **NB 120** range, consider the weight of each power module as of approximately 22.5 kg (496 lb.) or consult with the manufacturer.

4. HANDLING AND TRANSPORTATION

4



CAUTION

Please read the following transport and installation instructions carefully.

Failure to follow the transport and installation instructions could result in damage to the equipment or injury to persons.

Reception

The equipment is delivered packed. Upon receipt, inspect the equipment. **In the event of damage to the equipment, notify the logistics agent and the manufacturer within 24 hours of receipt.** Verify that the goods received correspond to the delivery note, models, and serial numbers.

Standard storage



NOTICE

Standard storage is defined as the expected time period from the time the equipment arrives at its location until its commissioning occurs.

Installer is responsible of deciding if the posts are installed within the standard period or otherwise, the installation date is to be defined.

Please see product warranty terms which dictates warranty start date and storage requirements.

Whenever possible, the equipment should be unloaded at its place of installation and operation.

If it is necessary to store the equipment, it must be kept in its original packaging and the following must be followed to keep it in proper condition:

- Store the equipment indoors in a place protected against elements such as rodents, animals, excess moisture (inside and outside the equipment), thermal radiation, direct solar radiation, contact with chemicals, corrosive gases, etc.
- Store the equipment on a flat, level surface. Never rest the equipment on wooden beams
- Store equipment away from passageways where it may be damaged.
- Keep the covers on during storage.
- Keep the equipment packed until the time of installation.
- The temperature in the storage location must be between -40°C and +60°C and the relative humidity at <95% without condensation.

Extended storage

If the equipment is stored for an extended period of time (6 months or more) before installation, new considerations should be taken in addition to the recommendations in the previous section "[Storage](#)":

- The equipment shall be protected under cover, by means of an external protector or by the method adapted to the local conditions which prevents condensation and humidity inside the equipment.
- Desiccant must be included inside the equipment to prevent moisture from damaging electronic components. These shall be replaced when storage conditions require it.
- Clearance must be left around the equipment so that inspections can be undertaken.
- Periodic inspections should be performed when possible. Proper internal cleanness must also be checked.



WARNING

Tasks shown above are standard and **they are not applicable to all weather conditions**. In those plants where the installer considers extreme weather conditions, these requisites should be adjusted for each particular case, as well as the maximum storage time for these conditions.

EN

Unpackaging

During the unpackaging, carefully remove the packaging (do not use sharp tools). After removing the packaging, check the material inside. If you receive replacement parts with the product, please separate and store it in a safe place.



NOTICE

Waste disposal is installer's responsibility, and it is **not within the manufacturer's scope**.

Handling and transportation



CAUTION

Follow the handling and transportation requirements described here. Any other method of transport or handling could damage the unit or void the warranty.

During handling and transport, the goods must not be exposed to moisture, overturned, inverted, inclined, or impacted.

The elevation angle should be less than 90°.

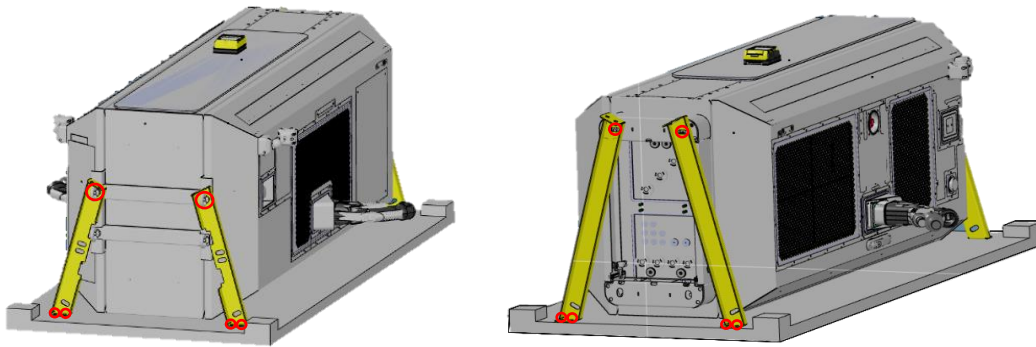
Avoid sudden movements and jerking during lifting. Stop the load just before placing it on the ground and then lower the equipment slowly to avoid knocks. Otherwise, the equipment may get damaged.

The equipment has a lifting tool with hoist rings located at the upper part of the tool. To lift them, slings must be attached to each ring. Also, the slings must be firmly attached to the crane.

The equipment fixed on the pallet is ready to be handled by forklift truck and be transported by truck or container. Keep in mind the load distribution and center of gravity.

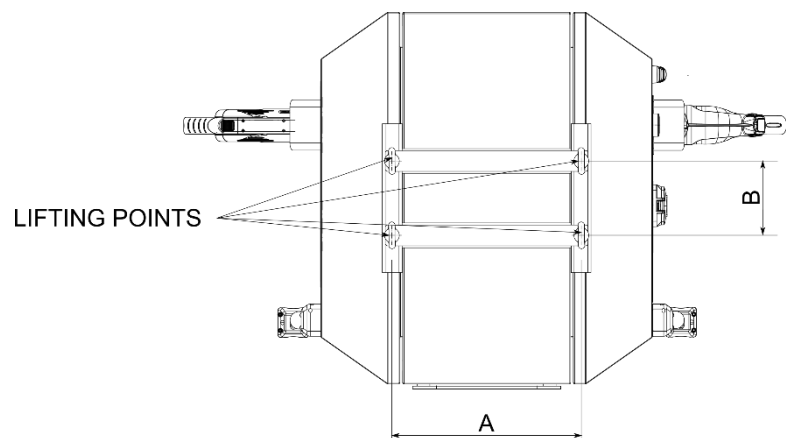
For sea freight, the equipment is packed assembled vertically, in a cardboard box and fixed on a pallet base with screws at four steel brackets. Externally, the box is strapped and shrink-wrapped.

In case of air shipment, the charger is shipped lying down in a wooden box and fixed on a pallet base using screws and four steel brackets, as shown in the following picture. Use an electric screwdriver to remove the M10 bolts that hold the brackets.



Once the brackets have been removed, lift the equipment **on the pallet** taking care that the foot is properly supported, and place it vertically to avoid possible damages caused by friction with the ground.

For handling and lifting the charger, it is equipped with four rings at the top. The image below (top view) shows the location of the four lifting points.



NB120DTD006AI

DIMENSIONS

	A	B
mm	383	150
in.	15.08	5.9

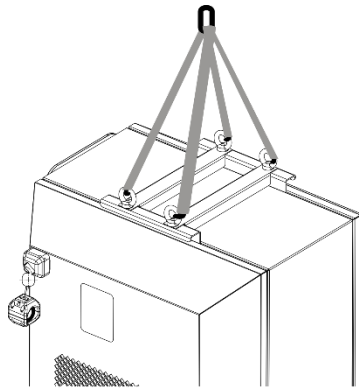


CAUTION

Be aware of all caution and warning messages before lifting the equipment.

To lift the equipment, a sling or a chain must be attached to each ring and securely fastened to the crane.

The following image shows an example of lifting the equipment with slings:

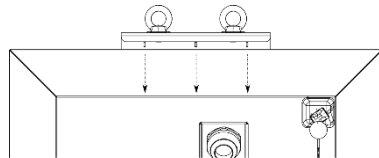


NB120DTG005A

Removal of the lifting tools

Once the equipment has been anchored, the lifting tool must be removed by following these steps:

1. Open the two side doors of the equipment¹.
2. Once both doors are open, remove both lifting tools by unscrewing the three M6 screws of each one.



NB120DTG006A

3. Close the doors again by following the reverse procedure.



NOTICE

If the methods described here cannot be applied, please contact the manufacturer.

It is the installer's responsibility to ensure unhindered access of vehicles to the final site or location, considering their movement and handling at the unloading site.

It is important to keep the equipment in the packaging and place them as close as possible to the final location for installation.

Ensure that loading/lifting equipment has a greater capacity than the weight of the equipment plus the auxiliary elements and the loading/lifting task is carried out in a way that ensures the stability of the equipment.

¹ For more information about the opening equipment doors, refer to the "[Access](#)" section.

5. PREPARATION FOR INSTALLING THE EQUIPMENT

5

Site recommendations

When deciding the location of the equipment and planning its installation, it is recommended to follow a series of guidelines derived from its characteristics.



CAUTION

To guarantee proper electrical installation, it is very important to comply with the bend radius of the cable. The personnel must ensure the cables enter the equipment perpendicularly and the spacing between them is appropriate.

Avoid corrosive environments that may affect the equipment's proper functioning.



NOTICE

The instructions given in this section must not replace in any way the mandatory regulations of the country in which the equipment will be installed.

Prior to installation, a geotechnical study of the terrain where the equipment will be installed must be carried out to determine its characteristics and to decide the most suitable type of foundation.

It is the installer's responsibility to design and build concrete foundations with the necessary piping and ground network in accordance with the applicable regulatory requirements.

Proper installation is absolutely necessary, and it is not within the scope of the manufacturer's responsibility.

Soil

The soil should have the following characteristics:

- The soil must be dry, compacted, stable and homogeneous.
- The land will be gravel, ballast, or pebbles.
- The soil must have hard or medium harshness characteristics.
- The calculation of the maximum permissible pressure on the ground must comply with local and national standards, as well as with any other requirements regarding natural disasters (hurricanes, earthquakes, etc.) that may apply to the place of installation.
- Do not install on floodplains, neither in places where objects can fall on.
- The land should be provided with a drainage system, especially in locations with high water tables and/or heavy rainfall.

- It is recommended that the ground should not exceed the level of the foundation.
- Soil compaction degree of 98%.
- Maximum land unevenness of 0.25%.

Site basis

The manufacturer recommends making a concrete foundation slab to support the charger. **The support surface for the equipment must be perfectly level. The client is responsible for the correct dimensioning and construction of the foundation in accordance with current regulations.** The foundation must meet the following characteristics:

- It is recommended that a layer of cleaning concrete be installed between the ground and the foundation.
- The sizing should be appropriate for the weight of the equipment and the characteristics of the soil.
- It must be thick enough to support the equipment.
- It must have trenches wide enough to ensure proper wiring passage (the suggested cable access size is shown below).



NOTICE

The client is responsible for building a solid concrete base perfectly leveled and elevated with respect to the user's floor height.

The equipment is not designed for mobile installations. In case of installing the equipment over a mobile platform, the warranty may be voided.
For further information on this kind of applications, please contact the manufacturer.

In case of specification of variable actions such as snow, wind or earthquake, the slab must comply with the following requirements, **not excluding those indicated by the specific regulations of the country of installation:**

- Ability to withstand compression forces of 3626 psi.
- Steel reinforcement capable of withstanding tensile forces of 72519 psi.
- Considering severe wind conditions (134.216 mph), the reinforcement should be dimensioned as follows:
 - The longitudinal side of the reinforcement must be able to withstand forces of up to 17985 lbf.
 - The transverse side of the reinforcement must be able to withstand forces of up to 2248 lbf.

Note that the thickness of the slab must be determined from the results of the geotechnical study.

See anchor recommendations at the "[Anchoring of the equipment](#)" section.



NOTICE

Each charger must be anchored to a foundation which guarantees its stability towards vertical and horizontal actions.

It is installer's responsibility to design and build the foundation to guarantee stability of each equipment.

Minimum working distances

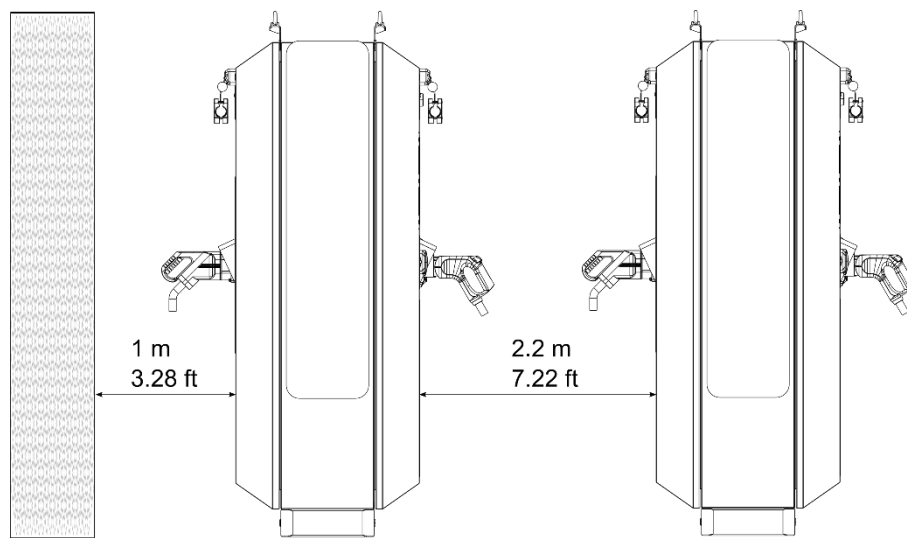


CAUTION

When installing the equipment, keep the minimum safety distances. Be aware of all the minimum insulation requirements established by the applicable electrical code, as well as the thermal, safety and accessibility requirements. The safety distances given in this section must not replace in any way the mandatory regulations of the country in which the equipment will be installed.

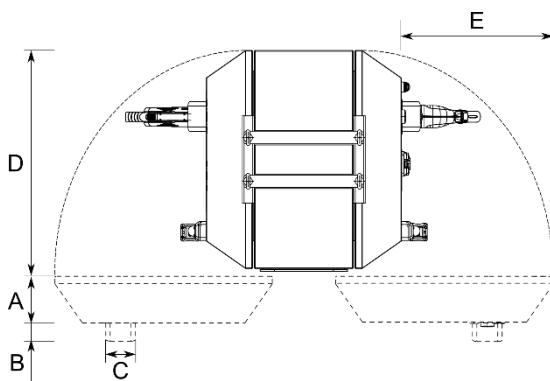
For proper inspection and correct handling, it is important to leave clearance around the equipment. The following image shows the recommended minimum distances:

Side to side distance:



NB120DTG001A

Front side distance: As depicted in the following picture (top view), there is an additional space needed to open the device doors, necessary for proper internal manipulation. For the necessary space regarding accessibility, read de ADA regulation described in "Dimensions and weight" section.



NB120DTG008A

DIMENSIONS					
	A	B	C	D	E
mm	190	65	140	750	690
in.	7.5	2.6	5.5	29.5	27.2

Although this is the minimum distance between chargers, the distance between parking spaces to be able to maneuver between two cars must also be considered, as well as the maximum range of the charging cable.

Rear side distance: It does not require a special rear space; it can be installed in touch with a wall or other element.



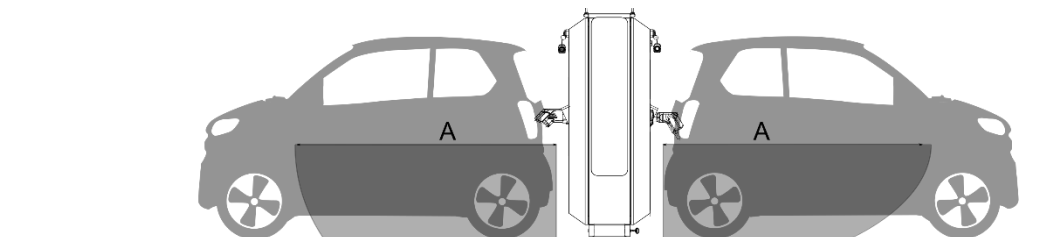
NOTICE

The distances shown are minimum safety distances¹. Greater distances may be necessary for adequate ventilation.

Charging cable maneuverability

To ensure the adequate maneuverability of both charging cables, when installing the equipment, note that the maximum effective charging cable length is $A = 5,7$ m (18.7 ft).

The following figure (front view) shows an example of the cable range area in a parking lot where cars are parked next to the post:



NB120DTD007A

EN

¹ Please note that this distance corresponds to outdoor and well-ventilated equipment.

Anchoring of the equipment

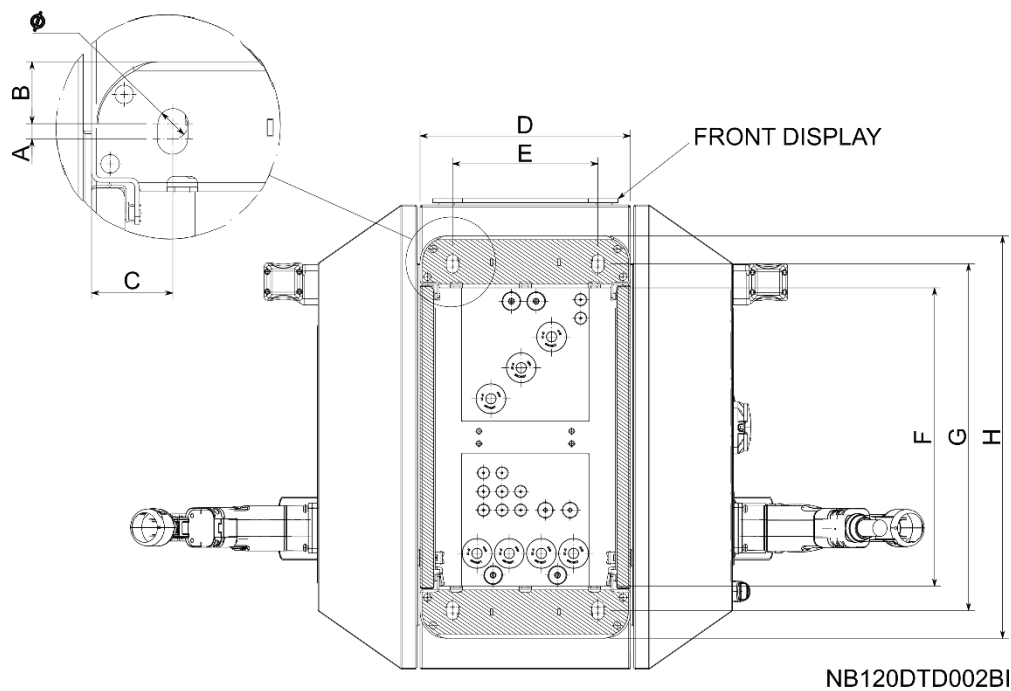


NOTICE

It is the installer's responsibility to correctly dimension posts anchoring to the foundation, guaranteeing stability towards horizontal actions.

The equipment must be anchored to a solid and leveled surface (slab), see slab recommendations at the "[Site basis](#)" section.

The following image (bottom-up view) shows the location and diameter of the charger's anchoring holes. They are located at the foot of the charger.



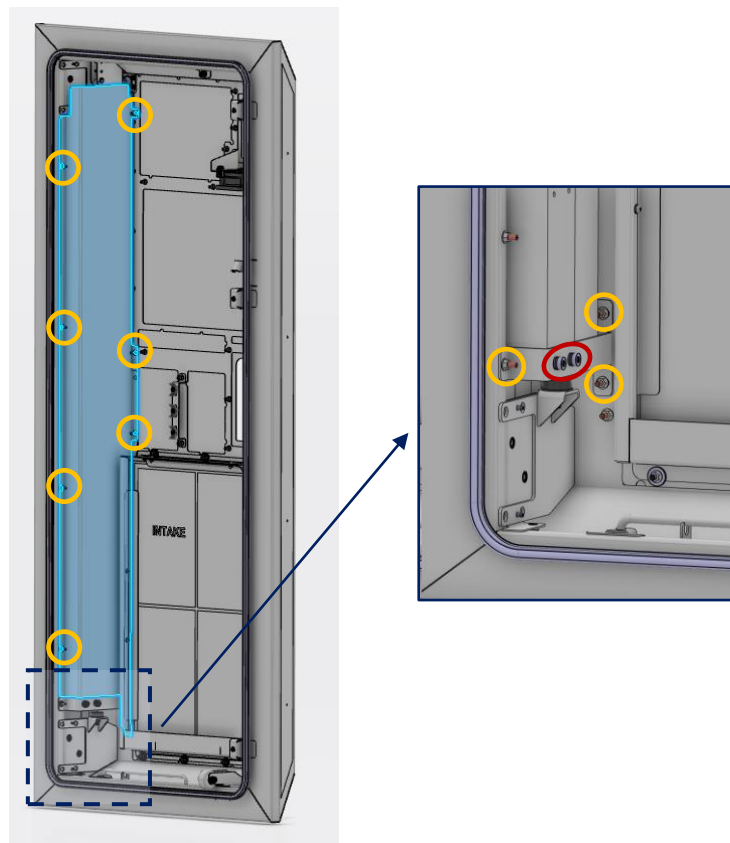
	A	B	C	D	E	F	G	H	Ø
mm	10	40	52.5	340	235	482	560	650	20
in.	0.39	1.57	20.67	13.39	9.25	18.98	22.05	25.59	0.79

It is recommended to use an expansive anchoring M16x145, with a tightening torque of 120 Nm (manufacturer's recommendation). To guarantee the proper fixing of the equipment, install a total of 4 anchors.

Removal of the counterweights fixing bracket of the charging cable management system

For each charging cable installed, the charger has a cable management system with counterweights to automatically retract the charging cable. For safe transport, a fixing bracket is installed to secure the counterweights and prevent them from moving during transport. Once the charger has been anchored and before commissioning, the counterweight fixing bracket of each charging cable manage system must be removed by following the steps below (figures are included for illustrative purposes only):

1. Open each door that has a charging cable installed.
2. Remove the polycarbonate protector (marked in blue in the left figure). Use a 8mm wrench (or a ratchet spanner with a 8mm vase) to remove the seven M5 nuts and washers (marked in yellow in the left figure) that secure the polycarbonate protector to the structure of the charger. Save the nuts and washers for reassembly.
3. Use a T30 torx screwdriver to unscrew the two M6 screws (marked in red in the right figure) that secure the counterweights to the fixing bracket.
4. Use a 8mm wrench (or a ratchet spanner with a 8mm vase) to remove the three M5 nuts and washers (marked in yellow in the right figure) that secure the fixing bracket to the structure of the charger.
5. Release and remove the counterweight fixing bracket.
6. Reassemble the polycarbonate protector removed in step 2 to prevent entrapment and interferences with the cable management system. Use a 8mm wrench (or a ratchet spanner with a 8mm vase) to secure the polycarbonate protector will all the nuts and washers previously removed.
7. Close the doors of the charger that were opened in step 1.



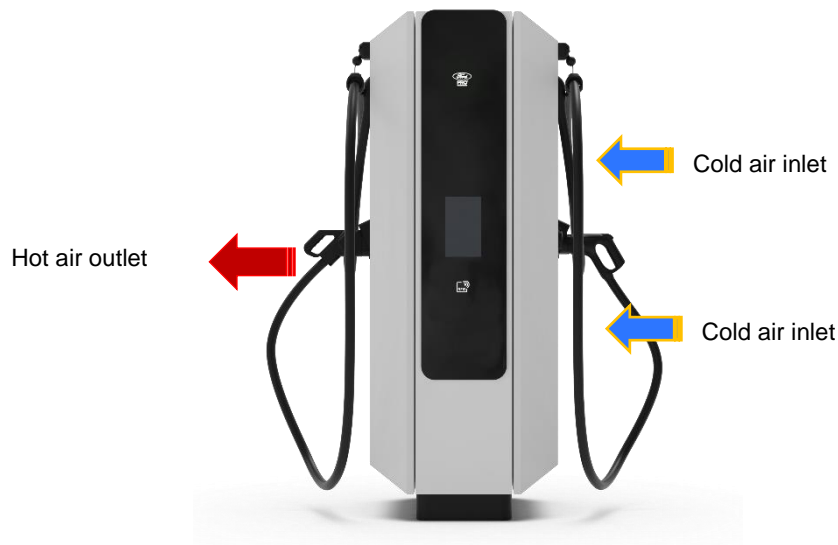
Ventilation system



CAUTION

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

The equipment has a forced ventilation system with two inlets located on the right side of the equipment (front view) and a hot air outlet on the opposite side.

**EN**

Noise level

The NB120 (and all its power levels) noise level is below 60 dB at 1 meter from the charger and below 56 dB at 2 meters. Consult with Ford for more information.

6. CABLE ACCESS AND CONNECTIONS

6



WARNING

Before opening any door, the equipment must be completely isolated, without any voltage. Make sure to follow the insulation guidelines and all safety instructions indicated in the "[Safety instructions](#)" section. Otherwise, you may get an electric shock. Please use all the indicated PPE.

During the connection, you must ensure the proper cable installation in the terminals of the equipment so that there are no voltage parts accessible in this wiring and the polarity is respected.



CAUTION

To guarantee proper electrical installation, it is very important to comply with the bend radius of the cable. The installer must ensure that the trenches are deep enough and consistent with the section "[Site recommendations](#)".



NOTICE

Refer to the recommended tightening torque for mechanical and electrical connections in the "[Torque and screw sizing](#)" section.

The manufacturer is not responsible for damages resulting from an incorrect connection.

The dimensioning of the input power cable of the charging point must be checked by a qualified electrician. The installer is responsible for the correct sizing and execution of the corresponding connections in accordance with the regulatory requirements applicable in the country of installation.

The installer is responsible for choosing and installing the communication cables.

The installer is responsible for the correct sizing and execution of the corresponding ground networks in accordance with the regulatory requirements applicable in the country of installation.

Power, ground, auxiliary and communication cables are not included within the manufacturer's scope.

MATERIAL WITHIN INSTALLER'S RESPONSIBILITY:

The following cables and elements are not provided by the manufacturer, they are installer's responsibility.

- AC input power cables and terminal lugs (as applicable).
- Ground input cable and terminal lug to site local ground system (as applicable).
- +/- DC power cables and terminal lugs to each Dispenser or pantograph (as applicable).
- Ground cables and terminal lugs to each Dispenser or pantograph (as applicable).
- MV switchgear wiring terminals (as applicable).
- Control optical fiber to each Dispenser or pantograph (as applicable).
- Ethernet cable (CAT5e or CAT6) with RJ45 terminals OR optional multimode optical fiber to each Dispenser (as applicable).

Several factors can influence the choice of cable, including the distance between the distribution board and the power cabinet, the maximum input current, and the installation mode.

Access



WARNING



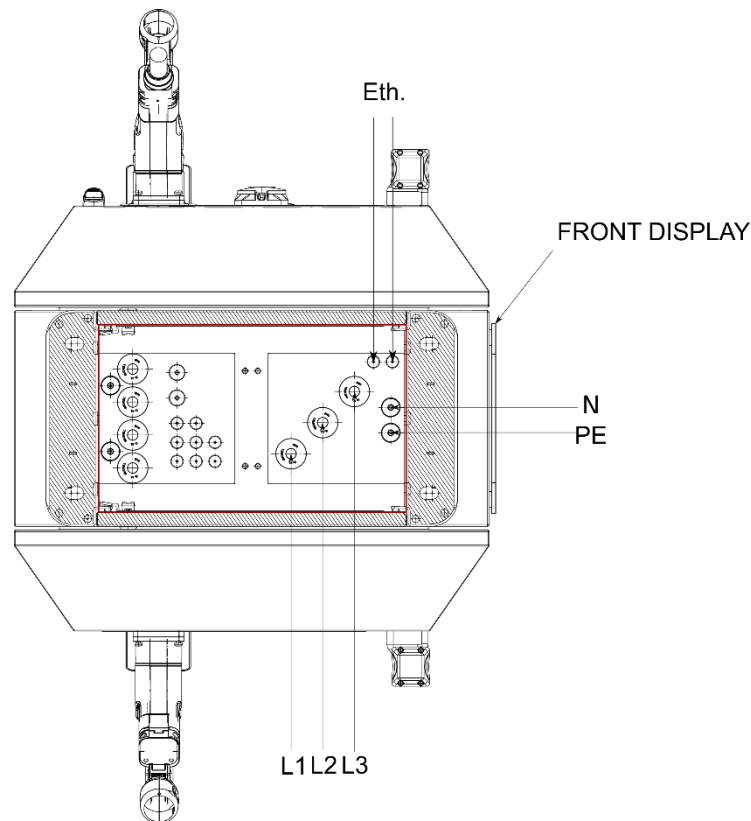
MODIFICATION WILL VOID WARRANTY

Do not modify the equipment in any way. Modification definition includes and is not limited to drilling holes, puncturing equipment, adding, or retrofitting with components etc. If you do so, the manufacturer will not assume any liability and the product warranty will be voided.

The power and communication cables must enter through the bottom part on the equipment.

To access the lower part, remove the front and rear bezel, see "[Anchoring of the equipment](#)".

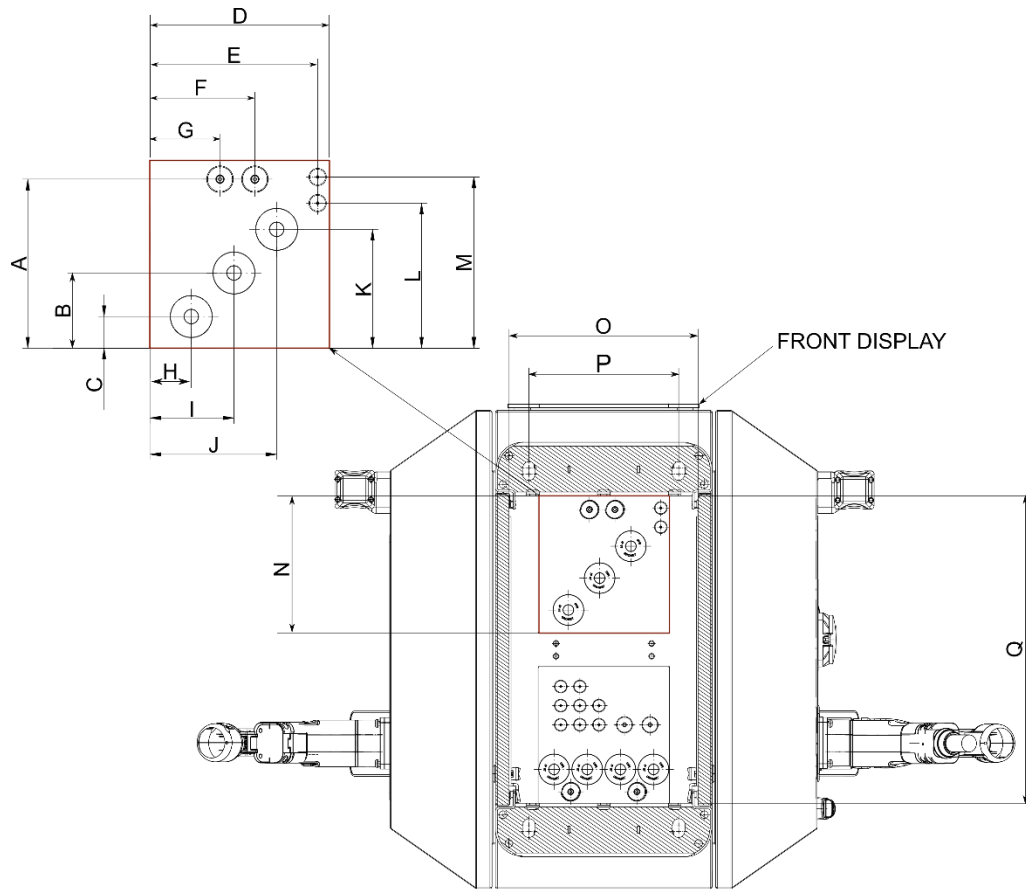
The space provided for the entry of the power and communications cables is shown in the following image (bottom view):



NB120DTG002BI

Note: Use only the amount of cable glands needed for the project.

The power and communication cables enter and exit through the lower part of the charger by using the space marked in red shown in the image below (**bottom-up view**):



NB120DCD003BI

	A	B	C	D	E	F	G	H	I	J
mm	193.7	86.2	36.2	206	192.5	120.5	80.5	47.5	96.5	145.5
in.	7.62	3.39	1.42	8.11	7.58	4.74	3.17	1.87	3.79	5.73

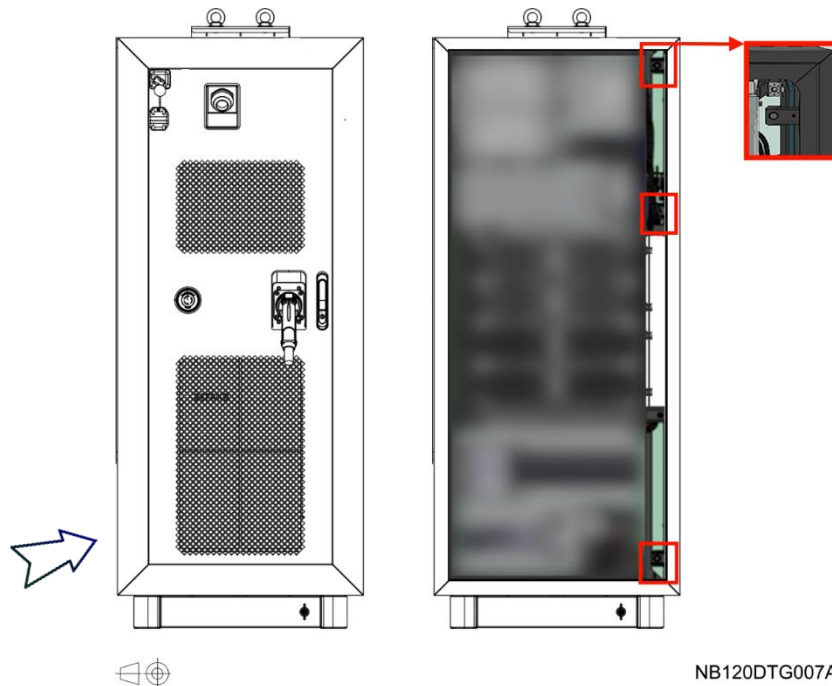
	K	L	M	N	O	P	Q
mm	136.2	166.2	196.2	217.5	206	235	482
in.	5.36	6.54	7.72	8.56	8.11	9.25	18.98



NOTICE

For the entry of the AC power cables of the equipment, an additional vertical wiring space below the cable gland plate (marked in red in the image above) may be required to allow the correct alignment of the cables. It is recommended to construct a small vault or pit in the foundation under the gland plates. This construction should not interfere with the anchoring of the charger.

To access the AC connections located on the left-side of the equipment, it is necessary to open the right-side door, which has a handle. To do this, it is necessary to unscrew three internal M8 screws and unhook the fastening located at the height of the second screw. It is recommended to use an electric screwdriver with an extension and a 13 mm socket bit. Use the following image as a guide.

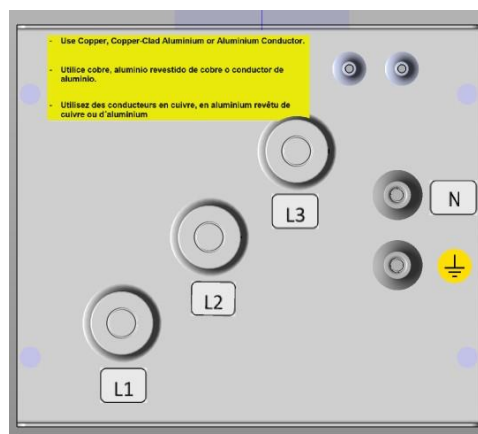


EN

Cable access plate

The following images show the standard cable entry plate. Only the amount of cable glands needed for the project must be used. It is configured as follows:

- On the right side the AC connection is located. It is composed of three phases, ground wire and the neutral wire. The plate is labeled with their identification letter so that, at the time of connection, the cables go directly to their plates, avoiding excessive crossings and twists. For the equipment communications, two small glands have been arranged at the top to pass the Ethernet or fiber optic cable. An optional blank plate may be purchased to suit individual site needs. Ford always recommends following the holes pattern shown below. If this is not possible, it is customer's responsibility to meet wire bending requirements.



Connections

This section details the input and output connections that must be performed in the equipment. There are several factors that can influence the choice of cable, including the distance between the distribution board and the charger, the maximum input current, and the installation mode.



NOTICE

The dimensioning of the cables must be checked by a qualified electrician. The installer is responsible for the correct sizing and execution of the corresponding connections in accordance with the regulatory requirements applicable in the country of installation.

To guarantee proper insulation, it is very important the cable diameter is within the tolerable range of the cable gland. Make sure that there is no space between the cable and the cable gland to prevent water or dust from entering the interior of the equipment.

The power cables and RJ45 connector must be inserted into the equipment without crimping the terminal, or they will not be able to pass correctly through all the expected spaces. Forcing them could affect the sealing of the equipment.

The cable terminals can be either single / standard or double / long crimp barrel length depending on the requirements of the project. The installer must consider the bending radius of the input power connections when performing the crimping.

The AC connection is composed of three phases, ground wire and the neutral wire. Both, the power supply input/output, and the communication connections input/output will be introduced through one of the accesses and will pass through their corresponding space in the internal cable entry plate to reach the connection panel.

Note: The equipment does not require auxiliary power supply input, because it includes an internal transformer.

AC input power connections

Cable size:

The tables below show the input rated current, as well as the recommended cable size for the NB 120 range equipment. Installer must dimension the wiring taking into consideration the minimum and maximum diameter, as well as the particularities of the project:

	INPUT RATED CURRENT	MINIMUM RECOMENDED INPUT CIRCUIT BREAKER (*)
NB60	79 A	100 A
NB90	117 A	150 A
NB120	155 A	200 A

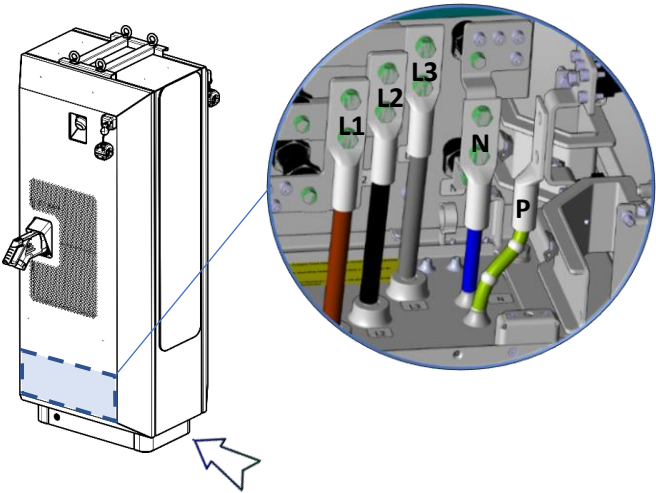
(*) This value is defined according with NEC 625.4. Installer must dimension the input circuit breaker according to local codes.

INPUT POWER SUPPLY (L1, L2, L3)		
	CABLE GLAND	MAXIMUM DIAMETER PERMITTED BY THE CABLE GLAND
NB60	M40 (1-1/2")	28 mm (1.1 in.)
NB90	M40 (1-1/2")	28 mm (1.1 in.)
NB120	M40 (1-1/2")	28 mm (1.1 in.)

GROUND AND NEUTRAL (PE, N)		
	CABLE GLAND	MAXIMUM DIAMETER PERMITTED BY THE CABLE GLAND
NB60	M25 (1")	17 mm (0.67 in.)
NB90	M25 (1")	17 mm (0.67 in.)
NB120	M25 (1")	17 mm (0.67 in.)

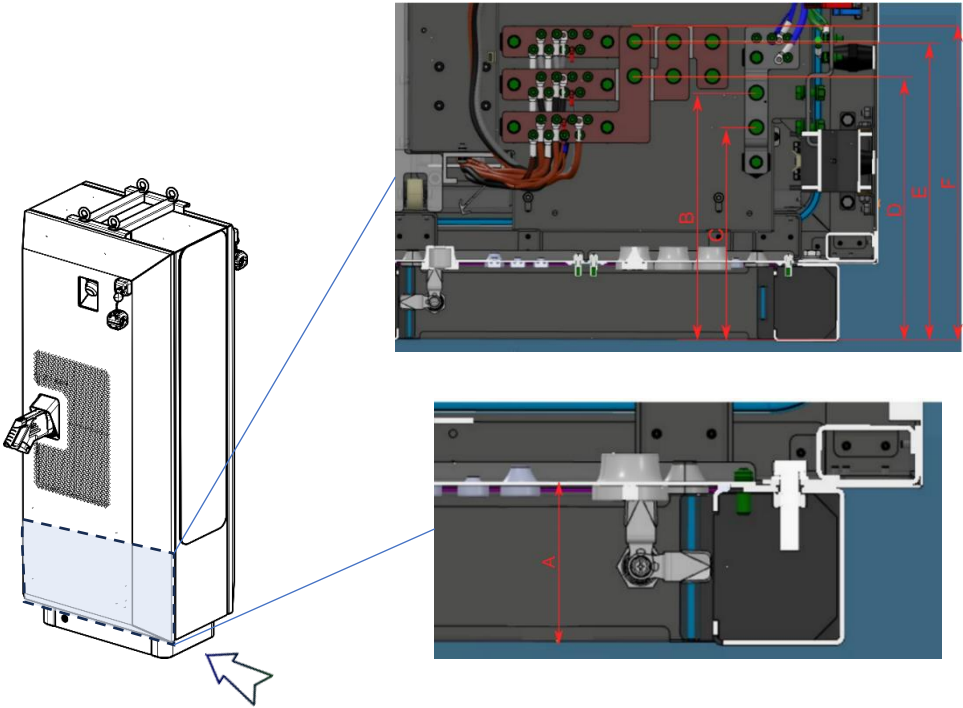
Connections:

The following picture shows the conductors for phases (L1, L2 and L3), neutral (N) and ground (PE).



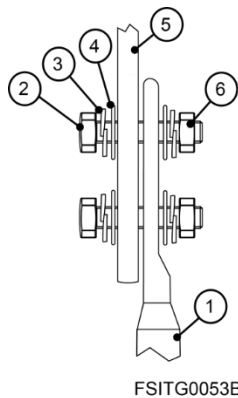
EN

The following pictures show the distance from base to power terminals and from ground to the gland plates of the equipment.



	A	B	C	D	E	F
mm	101.5	318.5	274	341.5	386	405.5
in.	3.99	12.54	10.79	13.44	15.19	15.96

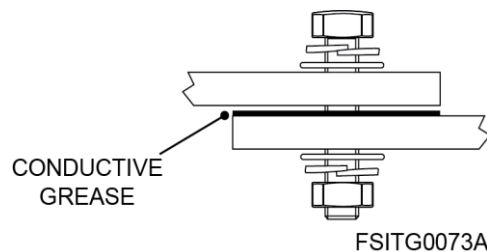
The following figure shows the correct connection:



REF.	ELEMENT
1	Terminal lug
2	M12 (1/2") bolt
3	Spring washer
4	Fender washer
5	Plate
6	M12 (1/2") nut

Note: If the terminal is a single-hole terminal, it is recommended to connect it to the upper hole in the busbar, so that the contact area is maximized.

- Use copper, aluminum or copper-clad aluminum 75 °C (167 °F) cables with conductor size according to the National Electrical Code, ANSI/NFPA 70 for this Temperature rating of wire. As an alternative, use copper, aluminum or copper-clad aluminum 90 °C (194 °F) cables with conductor size according to the same NEC requirement. In all cases, cables must have a minimum rated voltage of 600 V.
- Before connecting the cable, clean the contact surfaces with a clean cloth and ethanol cleaner. Once cleaned, apply conductive grease.
- It is recommended to use Ø11 mm (7/16") copper, aluminum, or copper-clad aluminum terminal lugs with a maximum width of 45 mm (1-3/4").
- Use M10 (7/16") bolts and nuts and apply the recommended torque according to the quality (See ["Torque and screw sizing"](#)).
- Use a spring washer and a fender washer between the nuts or bolts head and the busbar or terminal lug.



Communications connection

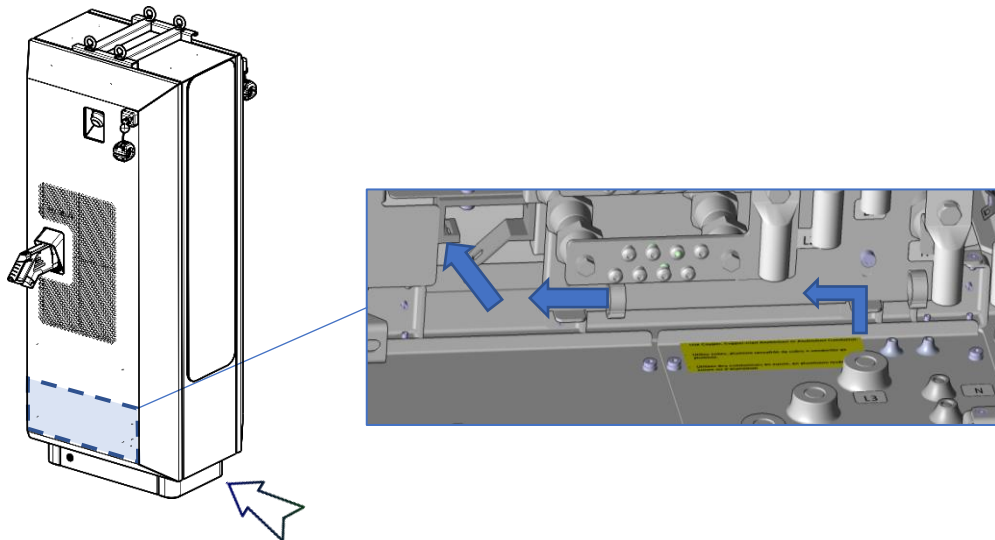
Ford recommends connecting the equipment via 4G as the preferred option, Wi-Fi as the second option and Ethernet as the last option.

Ethernet requirements (if needed)

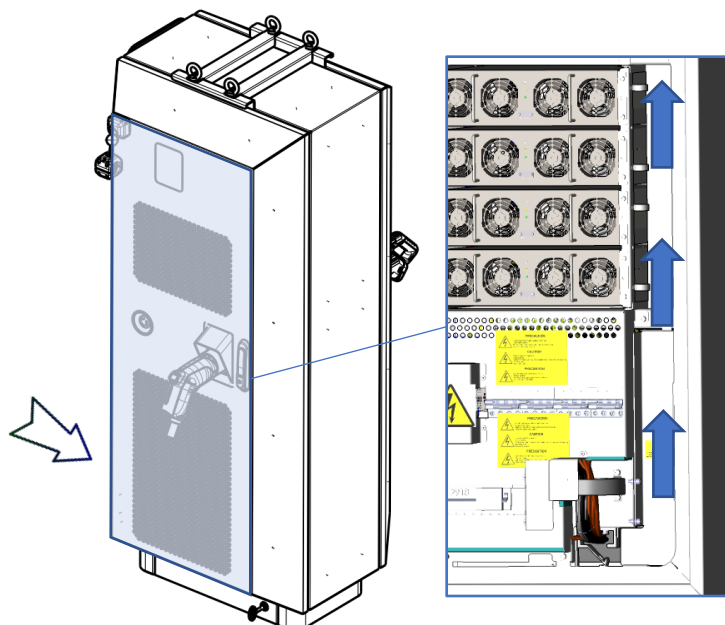
- **Recommended cable size:** Ethernet CAT 5e or CAT 6 UTP - RJ45 Connection Switch.
- **Maximum cable diameter:** 7 mm (cable gland M16).

Ethernet connections:

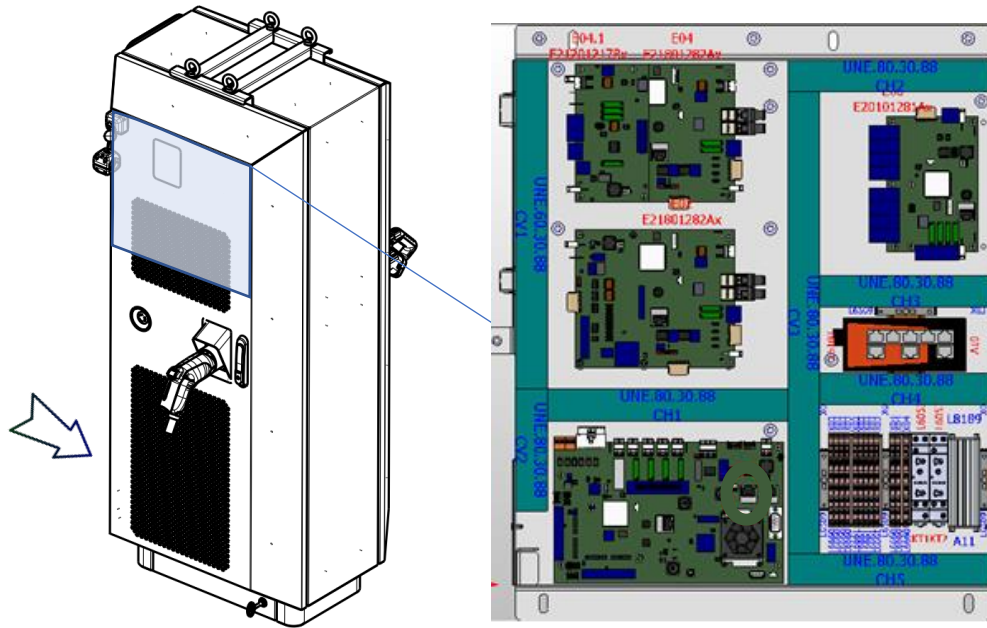
Enter the cable inside the equipment through the cable gland. Refer to "[Cable access plate](#)" section for further information. Use the clamps to hold the cable and pass it to the right side of the charger.



- Once the cable is inside the equipment, pull the cable up:
 - First, through the interior of the polycarbonate element located on the bottom panel, as shown in the figure.
 - Then, through the cable clamps located on the inner side part of the enclosure.



- Remove the polycarbonate cover that encloses the electronic. Introduce the Ethernet cable through the side slot of the main polycarbonate panel to access the Ethernet port of the All in one board.



WARNING

Before opening any door, the equipment must be completely isolated, without any voltage. Be sure to follow the insulation guidelines and all safety instructions indicated in the "[Safety instructions](#)" section. Please use the indicated PPE to prevent an electric shock.

7.PROTECTIONS

7

This section describes the different protections available to the equipment.

Insulation monitoring

The equipment has an insulation monitor to detect possible insulation faults in DC charge.

Overcurrent and short circuit protection

The equipment includes the following protections:

	Type	Nominal current (I_n)	Nominal voltage (U_n)	Breaking capacity (kA)
Power modules	3-phases	63 A	480 V _{AC}	6 kA
Auxiliary circuit	2P	10 A	480 V _{AC}	10 kA

EN

8.INTERFACE

8

Controls

The electric vehicle user interacts with the charger primarily through a touch screen (*display*).

The charger has different forms of authentication: by an optional POS system (Point of Sale), by RFID card or through a mobile application.



RFID reader

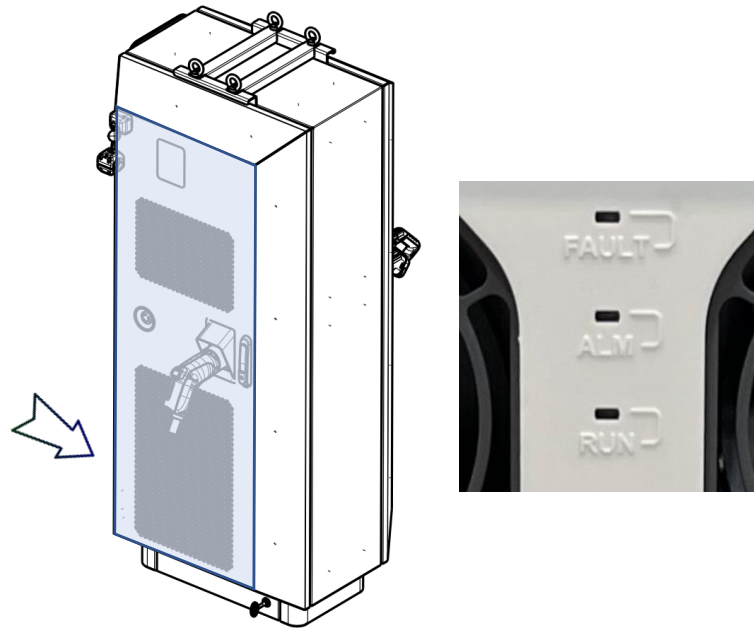
EN

LED indicators

The following control elements and indicators can be found in each charger:

- **RFID card reader:** Allows the user to be identified by an RFID card.
- **POS system (optional):** Allows the user to pay by credit / debit card.
- **Touch screen:** Allows selecting some characteristics of the charger and the charging options, ending the session, as well as displaying the charging status or fault messages.
- **Charger status indicator:** It is displayed on the display, located on the glass face of each charger.

- Inside the cabinet, every power module has three LED indicators. Picture illustrates LEDs in the power module when the door is open:



LED INDICATOR	NORMAL STATE	ABNORMAL STATE	DESCRIPTION
FAULT (red)	Off	On	If ON, it indicates a fault has been triggered in the power module. In that case, the equipment will run without using this power module.
ALM (yellow)	Off	On	If ON, it indicates a warning has been triggered in the power module. In that case, the equipment will run without using this power module. If this warning disappears, the equipment will run using this power module again. The normal status of the "ALM" LED is "Off". When the charger is in stand-by (no vehicle charging) the LED will flash until vehicle charging begins. At this point, the LED will no longer be illuminated and will switch to the "Off" state. If the "ALM" LED is fix or flashing, this indicates an abnormal state.
RUN (green)	On	Off	If ON, it indicates the power module is being energized.

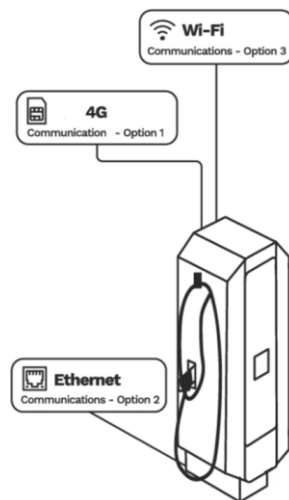
9.COMMUNICATIONS

9

The equipment features multiple connectivity options. Each one has its own aim and purpose, described in this section.

There are three ways to connect the equipment for remote monitoring and control; 4G (most preferred), Wi-Fi and Ethernet (as least preferred).

The following image summarizes the different types of communications.

**EN**

Refer to "[Communication connections](#)" section for further information about connections to enable these communications.



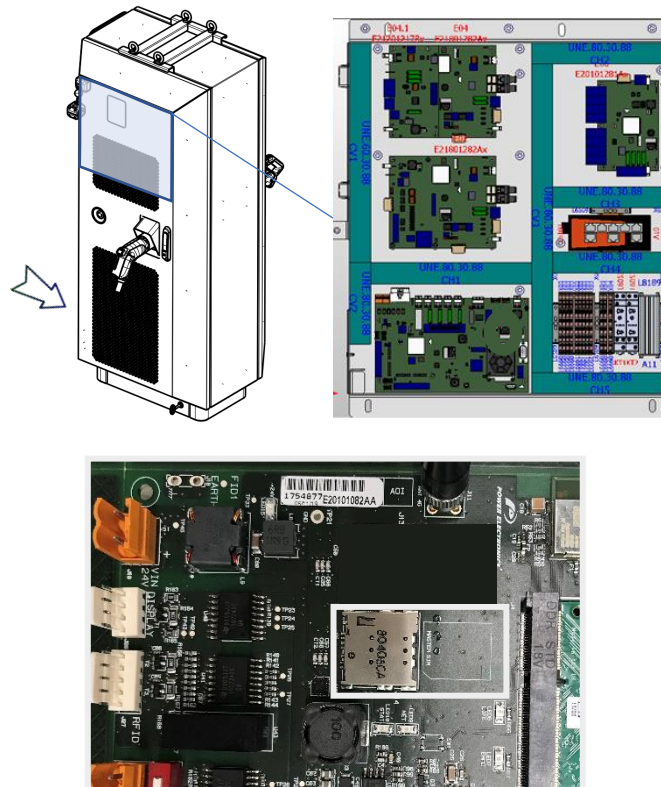
WARNING

Before opening any door, the equipment must be completely isolated, without any voltage. Be sure to follow the insulation guidelines and all safety instructions indicated in the "[Safety instructions](#)" section. Please use all the indicated PPE.

Otherwise, you may get an electric shock.

4G Communication

For communication via 4G a MicroSIM card is pre-installed into the indicated charger control card slot:



If it is necessary to replace the MicroSIM, consult Ford for further information regarding its configuration. The following table shows the main 4G communication characteristics:

Network mode	Frequency band
LTE-FDD	B1 / B2 / B3 / B4 / B5 / B7 / B8 / B12 / B13 / B18 / B19 / B20 / B25 / B26 / B28
LTE-TDD	B38 / B39 / B40 / B41
WCDMA	B1 / B2 / B4 / B5 / B6 / B8 / B19

Wi-Fi communication

The communication of the equipment can be done wirelessly via Wi-Fi, it is designed to facilitate the user's access to the charger. The equipment is compatible with both 2.4 GHz and 5GHz networks. In case the Wi-Fi router is located at a long distance, it is advisable to choose the 2.4GHz frequency band: The connection will be slower but more reliable. The manufacturer recommends scanning the channel frequency bands available to set the Wi-Fi channel in the least used spectrum.

Nevertheless, it is recommended that the equipment receives the Internet connection via a physical transmission line through the RJ-45 (Ethernet) connection, to avoid problems related to reception or interference that may affect the signal.

Once configured, the user can start a charging session through any of the possible identification methods.

Ethernet communication

The equipment requires an Ethernet entry connection for OCPP1.6 communications and internet connection. Note that this connection is not necessary if communication is established via 4G, or Wi-Fi, for more information see section "[Communication via 4G](#)".

EN

10. LOTO PROCEDURE

10

The aim of the lockout / tagout or LOTO procedure is to protect the user towards unintended reconnections and to avoid risks associated with the control of energy sources.

This involves isolating, locking, and tagging the dangerous energy sources to avoid accidents / incidents mainly derived from dangerous movements, unexpected energizations, or stored energy discharges.

Appropriate devices must be used, possible residual energies must be eliminated and, finally, the absence of energies must be verified.



NOTICE

LOCKOUT / TAGOUT (LOTO)

Lockout / tagout standards establish procedures to protect personnel from hazardous energy sources on equipment during service and maintenance.

Lockout/tagout disables equipment from producing hazardous amounts of electrical energy, allowing service and maintenance personnel to safely perform their jobs. Employees must be trained to understand and follow the hazardous energy control procedures.

Use only lockout/tagout devices authorized for particular equipment.

Lockout / tagout devices must be durable, standardized, and individual.

PPE is required according to standards while executing LOTO actions. Refer to section "[Safety instructions](#)" for further information and recommendations.



CAUTION

The shutdown of the equipment must only be carried out by personnel qualified. Read these instructions and all safety recommendations carefully. Otherwise, the equipment could get damaged, and personnel get seriously injured.

The instructions in this manual do not replace or local or national regulations. It is the user's responsibility to comply with all safety standards that apply at the installation site.

Equipment status

Before working with the equipment, it is convenient to define two possible status.

NB 120 SERIES STATUS	
STATUS 1	<ul style="list-style-type: none"> Charger energized. Equipment running (no action required from safe stop).
	Check points for absence of voltage: No measuring in Status 1.
STATUS 2	<ul style="list-style-type: none"> Charger without power. The equipment with no voltage is completely stopped, isolated, discharged, and locked. Follow the complete process from “LOTO actions” subsection. Make sure there is no independent auxiliary supply coming from outside the charger.
	Check points for absence of voltage: Follow the complete process.



CAUTION

The absence of voltage must be verified once an equipment has been isolated, with the necessary means and PPE.

In addition, the equipment specific diagrams of the installation should be reviewed.

The multimeter is working properly before taking any measure, especially to prove that there is no voltage inside the equipment. This might be damaged and show false values.

Use a commercial proving unit to check it.

Use appropriate equipment for DC power measures.

It is responsibility of the technical personnel to have their tools calibrated and in good conditions.

Always wear the PPE according to electric risk and to the current Health and Safety regulations.

EN

LOTO actions

This section shows the LOTO actions that must be carried out, as part of the safety actions, every time the equipment is started or stopped.

It is responsibility of the installer to carry out maneuvers at the low voltage facility network and on the post to guarantee a safe scenario for maintenance and operation routines inside the charger.

Follow the indications on "[Commissioning](#)" or "[Safe stop](#)" sections before applying any LOTO action.

Disconnect all charging processes following the safe stop instructions or wait until all charging sessions are finished.

Then, limit the access to the charger, so no one can start a new charging process.



Disconnect and lock with padlocks all LV facility network connections to eliminate power completely before the charger input.

The installer must disconnect and lock the LV supply connections. When there is more than one installer working, all keys must be stored in a locked box.



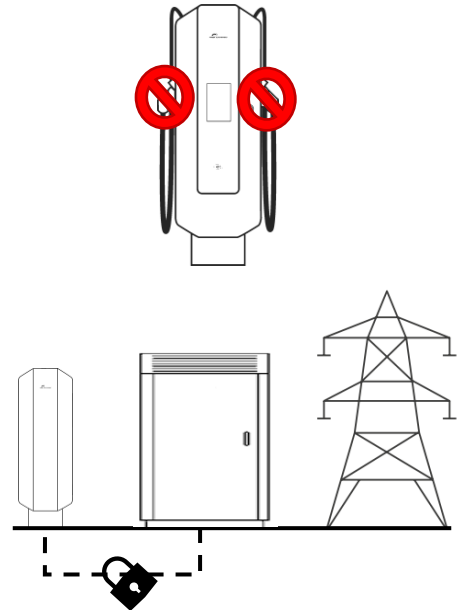
Once the equipment is shut down, wait until the different storage buses are discharged (4 or 5 min).



Open all the circuit breakers inside the equipment.

Although the supply to the AC switch was removed, this step confirms and locks it, then reconnection is not possible until the LOTO actions are removed.

Follow the "[check points for absence of voltage](#)".

**EN**

After all these actions, status 2 is reached on the charger. Refer to "[Equipment status](#)" section for further information about equipment status.

Check points for absence of voltage

Follow this procedure after LOTO actions to reach status 2 in the equipment.

CHECK POINTS FOR ABSENCE OF VOLTAGE

1. Wear the appropriate PPE based on the electrical arc studies and the risk assessment carried out by the installer.
2. Ensure the correct operation of the multimeter.
3. Once the equipment is stopped, wait until the different storage buses are discharged (4 or 5 min).
4. Check that power module LEDs are NOT illuminated.



5. Check the absence of voltage, both in the plates upstream of the circuit breakers and in the plates downstream of the circuit breakers.
6. Check that there is no voltage in the DC output plates.
7. There will be no voltage in the equipment.



CAUTION

The absence of voltage must be verified once an equipment has been isolated, with the necessary means and PPE.

In addition, the charger specific diagrams of the installation should be reviewed.

Even the multimeters have scheduled revisions, it is convenient always to check the multimeter is working fine before taking any measure, especially to prove dead. This might be damaged and show false values. Use a commercial proving unit to check it.

Use appropriate equipment for DC power measures.

It is responsibility of the technical personnel to have their tools calibrated and in good condition.

Always wear the PPE according to electric risk and to the current OSHA regulations.

Remove LOTO actions



CAUTION

Auxiliary supply must be disconnected last and connected first when possible.



Electric shock hazard. Auxiliary supply power layout is a characteristic of each plant and may vary from one installation to another. Check the latest electrical schematics of the plant and make sure no voltage is present by confirming with a multimeter.



Electric shock hazard. Wait until all capacitors of the **equipment** are discharged under 30 V. Check it with a multimeter.

Before any maintenance operation, verify that **the equipment is completely stopped** before maneuvering any cutting element. This applies to elements with load-breaking capacity (circuit breakers and switches) as well as those with no capacity (disconnectors). **Under no circumstances** any of these components must be **manually** operated when the equipment is energized.

Follow the LOTO actions in the inverse order to remove LOTO actions.

EN

11. START UP PROCEDURE

11



CAUTION

Commissioning may only be carried out by personnel authorized by the manufacturer.

Read these instructions and all safety recommendations carefully. Failure to do so could result in damage to the equipment and serious injury to personnel.

Make sure that no voltage is present at the power terminals. Make sure that no voltage source can be unexpectedly connected.

The instructions in this manual do not replace local or national regulations. It is the responsibility of the user to comply with all applicable safety standards at the installation site.

After installation, please use computer, tablet or mobile device to visit <http://tinyurl.com/goDCfast> and complete the Start Up Checklist for confirmation of installation, prior to remote commissioning.

Contact Ford prior to starting up the equipment for commissioning.

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12. SAFE STOP

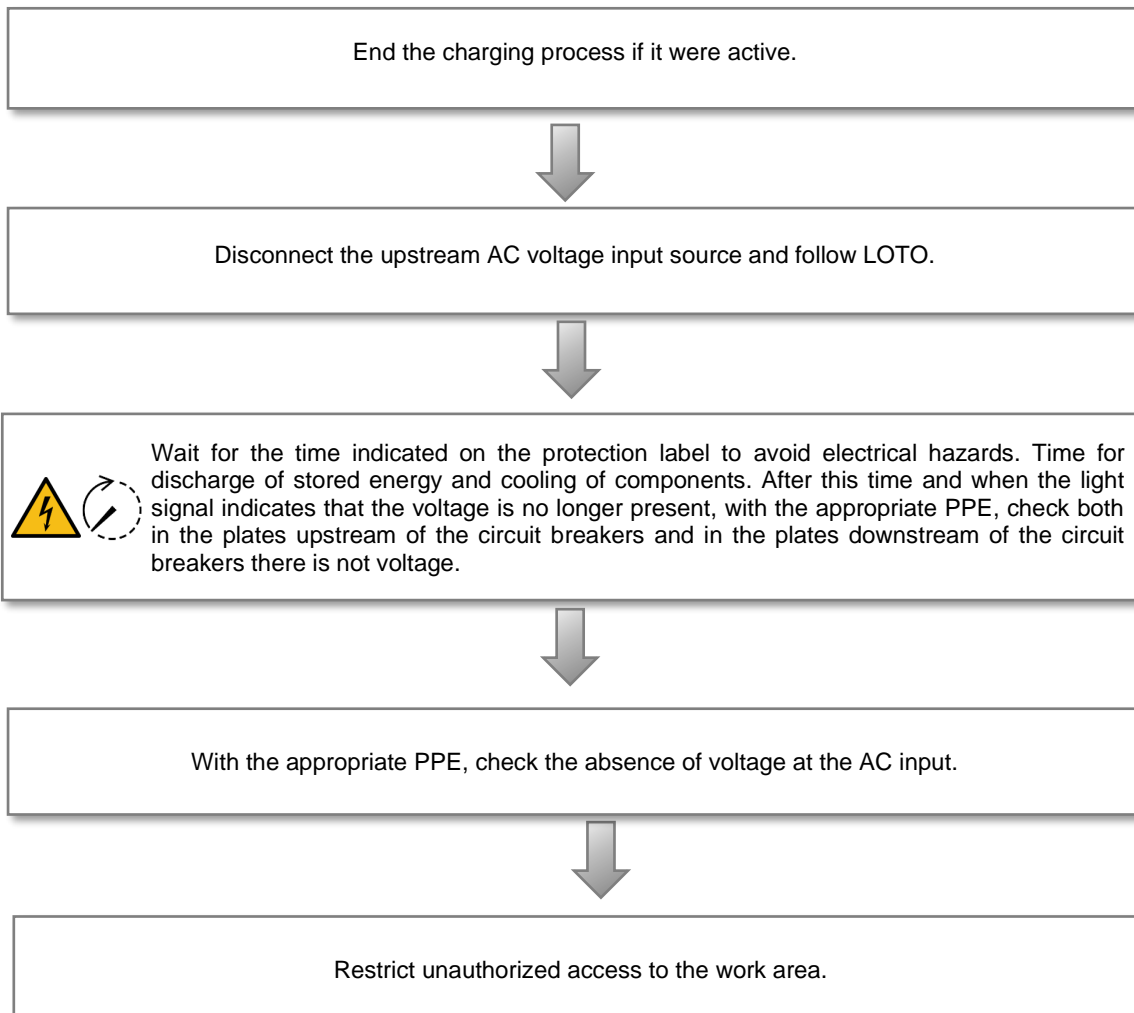
12

CAUTION

The shutdown of the equipment must only be carried out by personnel qualified. Read these instructions and all safety recommendations carefully. Otherwise, the equipment could be damaged and seriously injured personnel.

The instructions in this manual do not replace or replace local or national regulations. It is the user's responsibility to comply with all safety standards that apply at the installation site.

The following steps describe the process to follow for disconnecting the equipment.

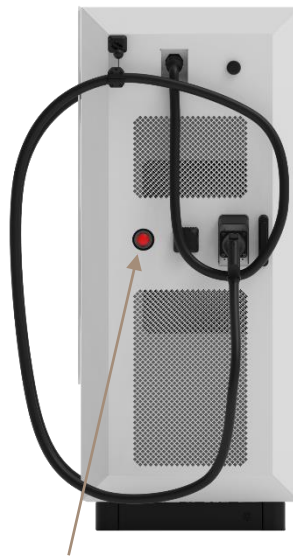
**EN**

13. EMERGENCY STOP AND RESTART

13

The following steps must be taken to activate the emergency stop, and subsequent restart, of the equipment:

1. Press the emergency stop pushbutton, located on the right side of the equipment.
2. Verify that the reason for the hazard or emergency has been resolved.
3. Reset the emergency pushbutton manually by rotating counterclockwise after verifying that everything is normal.



Emergency push-button



EN

4. Verify the equipment has been successfully restarted.



NOTICE

Do not use the emergency stop pushbutton to perform regular stops on the charger. It should only be used when an emergency occurs.

Otherwise, longevity of the main components could be shortened and result in equipment damage.

14. MAINTENANCE

14

The **NB 120 series** have been developed based on a revolutionary design concept that significantly simplifies the tasks and reduces preventive and corrective maintenance times. Nonetheless, there are some actions and revisions required.

Equipment statuses

Before detailing the maintenance procedure, it is convenient to define 2 possible statuses to carry out the maintenance tasks. For more information, consult "[Equipment statuses](#)" section.



CAUTION

Maintenance tasks must only be performed by qualified personnel and approved by the manufacturer. Otherwise, the equipment may get damaged, and personnel could suffer severe injuries.

Use the necessary PPE according to the electrical risk and the OSHA regulations



WARNING

Before opening any door, be sure to follow insulation guidelines and all safety instructions. Failure to do so may result in electric shock.

Make sure to follow the insulation guidelines and all safety instructions before opening any door or handling the equipment internally. Otherwise, you may get an electric shock.

To carry out maintenance tasks or any activity inside the charger, the user must verify that there is no voltage present in the equipment, as well as carry out the procedure of a [safe stop](#). Always apply the [five golden rules](#) to ensure that there are no dangerous voltages.

In addition to the recommendations given in this manual, local safety procedures and those specific to the installation site must be taken into account. Also, local and national electrical regulations must be followed to avoid personal injury and/or damage to the equipment.

Failure to comply with safety instructions and electrical codes may void the warranty.

Checklist

The list of tasks detailed below should be carried out annually. The time of each task is an estimate.

MAINTENANCE	TIME
GLOBAL OPERATION TIME	1 h and 55 min

STATUS 1	TIME (MINUTES)	OK
1 Environmental condition – Visual check.	5	
2 Enclosure state – Visual check.	5	
3 Make sure the equipment can be accessed remotely - connection to the PC if it exists.	5	
4 Display operation - visual and manual check.	5	
5 Ventilation system and absence of vibrations - visual and auditory check.	5	
6 Charge connector operation - visual and manual check.	5	
7 Charge test recommended (optional).	10	
8 Operation of the differential switch - Visual and manual check (optional).	5	

The following tasks must be performed with the equipment completely off (no voltage at all, stopped, uncharged and isolated):

STATUS 2	TIME (MINUTES)	OK
1 Internal cleaning.	15	
2 Filters - visual check and replacement.	15	
3 Doors condition.	10	
4 Cables and conductors - visual and manual check.	10	
5 External and internal tightening torques - manual check.	10	
6 Control circuit and protections - manual check.	10	

Status 1

1. Environmental condition

Verify that the equipment environment complies with the specifications. Verify that the humidity is adequate.



CAUTION

This task should be carried out annually. However, it should be done more frequently if climate condition require so. **This also affects tasks 1 and 2 of the dead revision (state 2).**

Also, in installations with a high level of contamination, it may be necessary to carry out this task more frequently. The review criteria are the following:

- Whenever pruning, mowing, grazing or similar tasks are carried out in the vicinity of the equipment, which may produce the presence of plant or animal debris suspended in the air.
- When, due to human activities, climatic or biological reasons, the presence of solid remains in the air susceptible to accumulate on the filters is detected in the area. In this case, it will be enough to inspect the equipment that due to their location have been more exposed, and if dirt is detected in them, the inspection will be generalized to the rest of the equipment at the plant.

EN

2. Enclosure state

Check the enclosure is in good general state and no traces of corrosion or impacts are present. Check the posts anchoring.

3. Remote access

Verify that the equipment can be accessed remotely. If it exists, verify the connection with a PC.

4. Display operation

Check if the operation of the display is correct: Check the good condition of the screen, cleanliness, deterioration, or signs of any damage (impacts or breakage). Verify that the touch screen works on its entire surface. Check that the lighting is correct and verify the interaction with the menu is smooth.

5. Ventilation system and absence of vibrations

Verify that there are no abnormal noises or oscillations in the ventilation system.

6. Charge connector operation

Check the condition of the charging cables and charging connectors, check that they are in good condition and have no impact, cut or other marks.

7. Charge test

It is recommended to perform a complete charge on an electric vehicle to verify that it is finished correctly, and the communications are working fine.

If the charge test is performed, **it is the personnel responsibility** to ensure the presence of an electric vehicle to perform the charging procedure with each connector.

If the charge test is performed, **the costs derived from it must be assumed by the customer.**

8. Operation of the differential switch (optional)

If the optional differential switch has been requested, check the correct operation of it using the test button enabled for this purpose on the differential itself. Open the unit without voltage, then energize it without any load, carry out the test and finally close the door. May wear the PPE needed for this task.

Status 2

1. Internal cleaning

Check that the equipment does not show signs of dust, moisture, oxidation, or presence of animals. If dust is found in the control electronics, use a specific vacuum cleaner for electronic boards. Otherwise, the electronic components may be damaged.

2. Filters

Visual inspection of air filters. Use a set of screwdrivers to access the filters and take them off. Check that they are clean and unobstructed. Clean them if they are dirty. It is not necessary to replace the air filters unless they show signs of saturation.

3. Doors condition

Check that each door closes correctly, seals and closures are in good condition. Check hinges, gaskets, closures, and doors.

4. Cables and conductors

Visual inspection of cables and terminals. Check the cables are in good condition and sealed. Check that the connectors and terminals are correctly inserted and there are no visual signs of overheating.

5. External and internal tightening torques

Check the accessible connections of the Low Voltage circuit and **retighten correctly only if necessary**. To do so, check that all tightening marks are in place. In the case of small screws that do not have marks, good electrical practice will determine if a screw is loose.

Pay special attention to the input connections of the equipment, check the torque, and **retighten**.

6. Control circuit and protections

Check if overvoltage protectors are operational.

Visually check the fuses to guarantee they are not blown.

Check the good condition of the control cards, as well as its connections.

