

INDRA Smart PRO

Installation Guide

Smart Pro

Installation Guide

Manual Applies to Models:

190105A101 Type 1 Tethered

190105A102 Type 2 Tethered

190105A103 Type 2 Socketed



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Warning

This is a class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

General Description

This manual describes the method of installation and hardware operation of the 'Smart Pro', where the Smart Pro is a permanently installed electric vehicle charging solution for resistive domestic and commercial loads of at least 6A and up to 32A at 230V, 50Hz.

Smart Pro has 3 build variants:

- Smart Pro Type 1 (190105A101) has a SAE J1772 (Type 1) tethered charging connector to be used with Type 1 socket fitted EVs
- Smart Pro Type 2 (190105A102) has an IEC 62196 (Type 2) tethered charging connector to be used with Type 2 socket fitted EVs
- Smart Pro Type 2 Socket (190105A103) can be used with multiple types of charging cables, provided at least one end of the cable is fitted with an IEC 62196 male connector

Overview and Intended use environment

The Smart Pro can be classified as a 'smart' electric vehicle charging solution because of its communications infrastructure which allows charging to be remotely optimised by the 'Kaluza' smart grid platform; where charging can take place when electricity is cheapest; or if immediate charging is required, its 'Boost' functionality overrides any smart grid criteria and provides instantaneous charging capability.

Charging using the Smart Pro can take place at up to 7kW, but due to modulation capability *(measured by the external CT clamp)* this power output level can also be reduced.

The Smart Pro is intended for both indoor and outdoor installation, securely mounted to any retaining wall.

In its operating environment, the temperature must be between -20 and 50°C, with humidity between 10% to 85% non-condensing. Supply voltage should be 230V AC at 50Hz, rated up to 32Amps, to allow for maximum charging capability.

Protective Earth, Simultaneous Touch (PESTs) Protection

The SCv4's PEST solution can operate under four of the indents of BS 7671:2018+A1:2020 Amendment 1; section 722.411.4.1, for the purposes of design/installation we have two modes of operation which Indra call A & B. Mode A can be configured with or without a reference electrode.

The safest installation configuration is always mode A with reference electrode

- Mode A with reference electrode – Indent iii – PME (Protective Multiple Earthing) as CPC with a TT reference electrode and the only method for imbalanced 3 phase installations (3 phase installations that do not meet the requirements of indent i)

(iii) Protection against electric shock is provided by a device which electrically disconnects the vehicle from the live conductors of the supply and from protective earth in accordance with Regulation 543.3.3.101(ii) within 5 s in the event of the voltage between the circuit protective conductor and Earth exceeding 70 V rms due to an open-circuit fault in the PEN conductor of the low voltage network. The device need not operate if the voltage exceeds 70 V rms for less than 4 s. The device shall provide isolation and be selected in accordance with Table 537.4. Closing or resetting of the device shall be possible only if the voltage between the circuit protective conductor and Earth does not exceed 70 V rms. Equivalent means of functionality could be included within the charging equipment.
NOTE 4: Annex 722, item A722.4 gives guidance on (iii).

- Mode A without reference electrode – For installations that do not fall under the requirements of 722.411.4, TT installations, indoor installations, balanced 3 phase installations (indent i), installations where PME is bonded to Earth in accordance with indent ii and installations where protection is provided by a third party device (e.g. matt:e).

722.411.4 TN system

722.411.4.1 A PME earthing facility shall not be used as the means of earthing for the protective conductor contact of a charging point located outdoors or that might reasonably be expected to be used to charge a vehicle located outdoors unless one of the following methods is used:

(i) The charging point forms part of a three-phase installation that also supplies loads other than for electric vehicle charging and, because of the characteristics of the load of the installation, the maximum voltage between the main earthing terminal of the installation and Earth in the event of an open-circuit fault in the PEN conductor of the low voltage network supplying the installation does not exceed 70 V rms.
NOTE 1: Annex 722, item A722.2 gives some information relating to (i).
NOTE 2: See also Regulation 641.5 when undertaking an addition or alteration to an existing installation.

(ii) The main earthing terminal of the installation is connected to an installation earth electrode by a protective conductor complying with Regulation 544.1.1. The resistance of the earth electrode to Earth shall be such that the maximum voltage between the main earthing terminal of the installation and Earth in the event of an open-circuit fault in the PEN conductor of the low voltage network supplying the installation does not exceed 70 V rms.
NOTE 3: Annex 722, item A722.3 gives guidance on determining the maximum resistance required for the earth electrode in (ii).

- Mode B - PME as CPC with trip on L-N voltage measurement. No reference electrode. For installations where an Earth Rod is not possible and/or there are no simultaneous contact or touch voltage risks present. Consideration should be given to nuisance trips where the line to neutral voltage may regularly exceed 253v, especially where local renewables are present, Mode A is less sensitive to nuisance tripping.

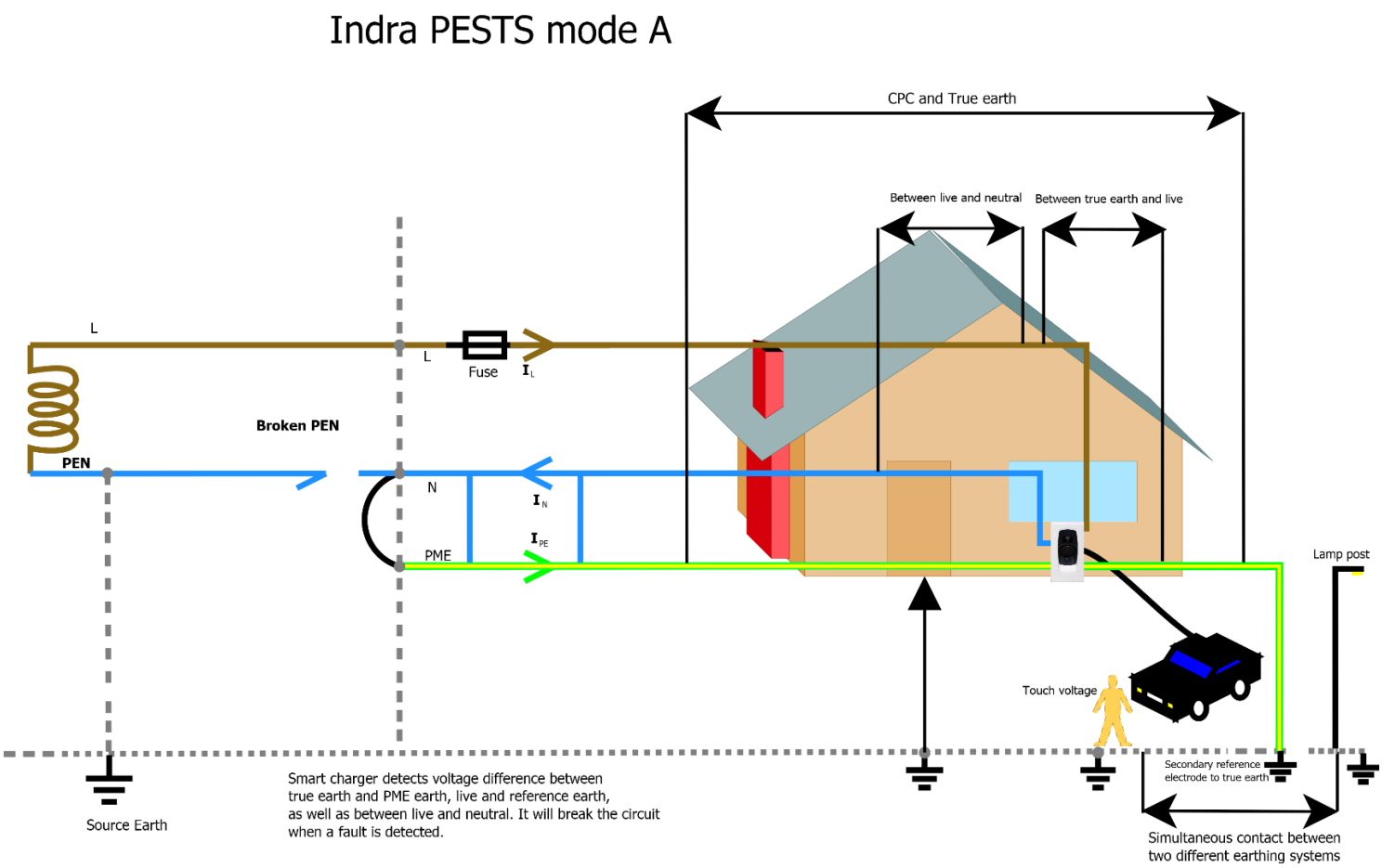
(iv) Protection against electric shock in a single-phase installation is provided by a device which electrically disconnects the vehicle from the live conductors of the supply and from protective earth in accordance with Regulation 543.3.3.101(ii) within 5 s in the event of the utilisation voltage at the charging point, between the line and neutral conductors, being greater than 253 V rms or less than 207 V rms. The device shall provide isolation and be selected in accordance with Table 537.4. Equivalent means of functionality could be included within the charging equipment. Closing or resetting of the device shall be possible only if the voltage between line and neutral conductors is in the range 207 to 253 V rms.

PESTs Mode A essentially works by comparing three voltage readings:

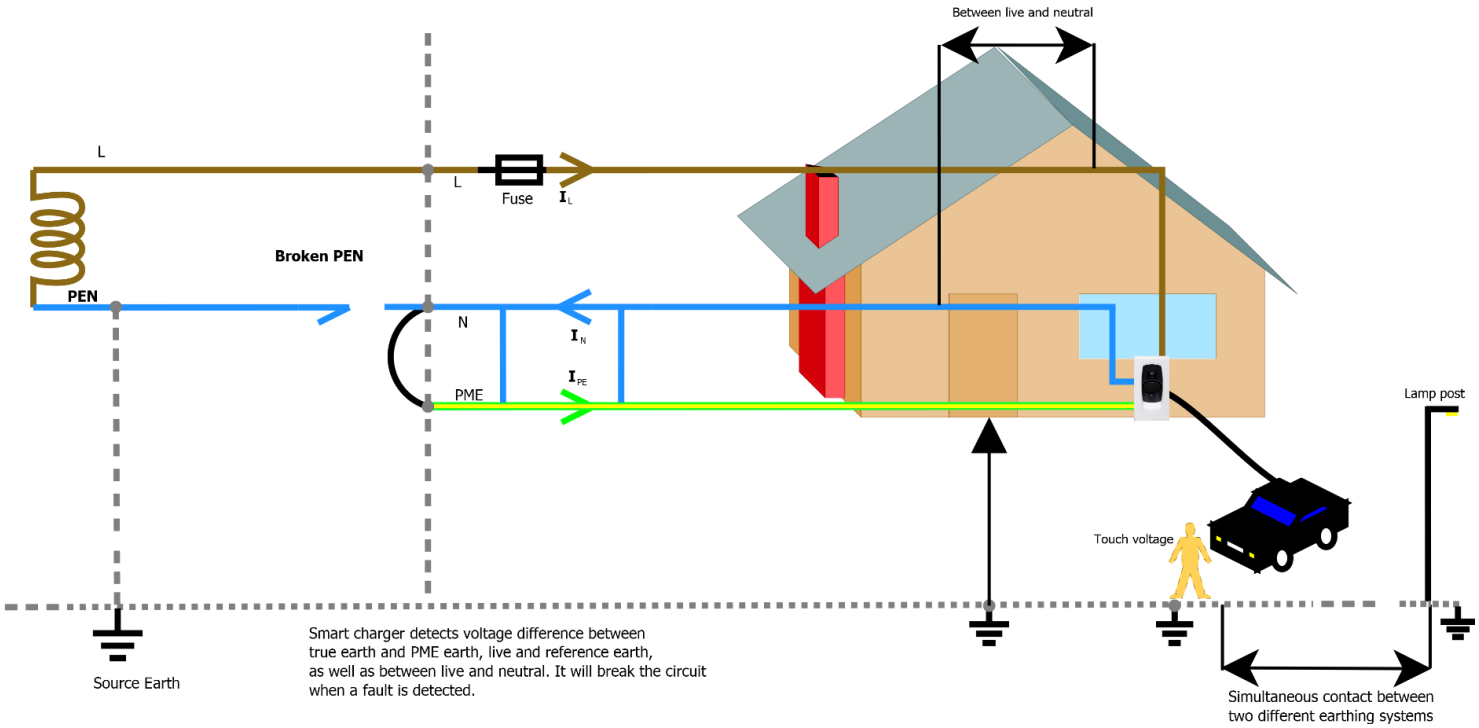
1. L - N
2. L - TT Ref
3. CPC (PME) – TT Ref

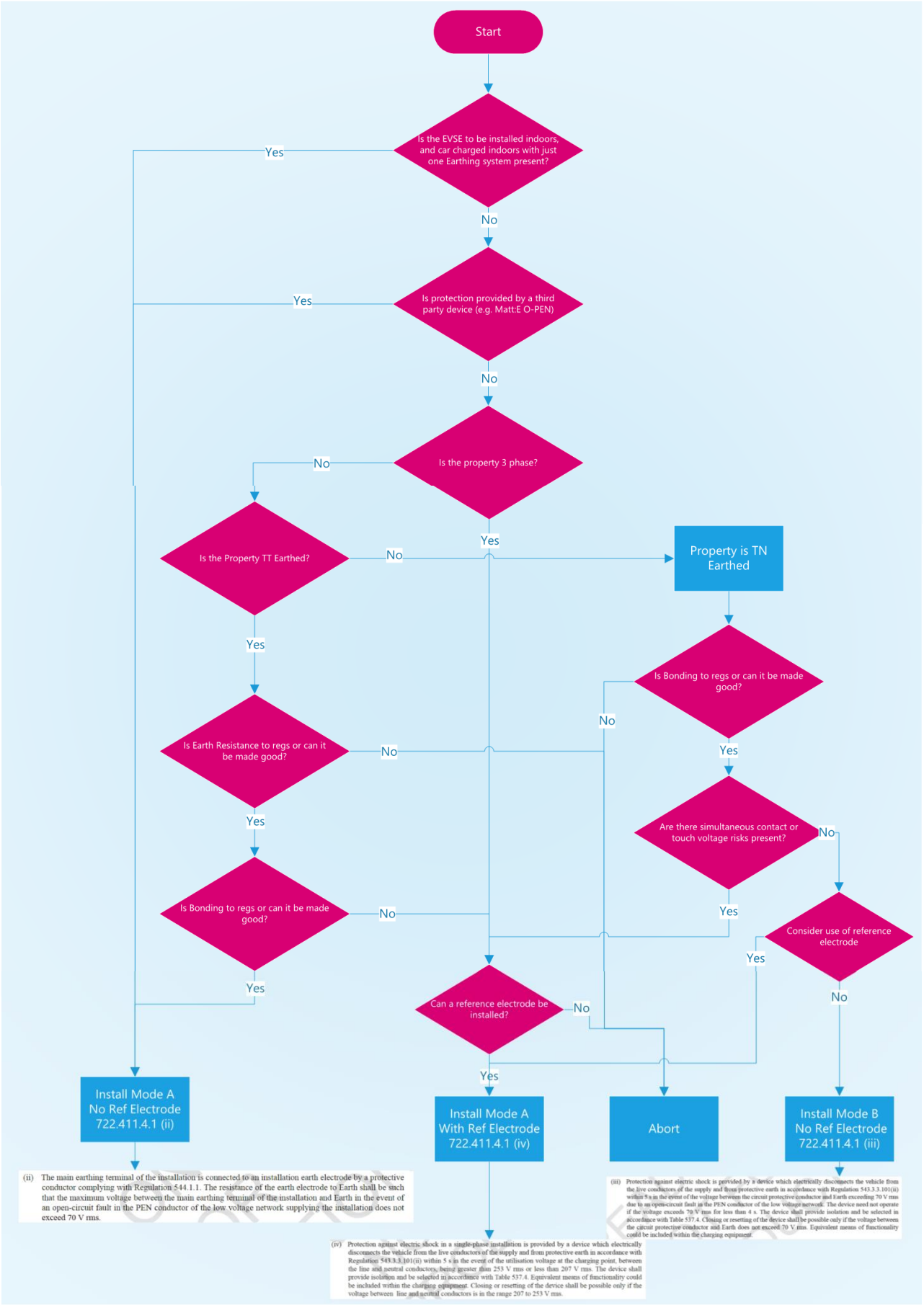
Install Method / Operation Mode	**Mode A with Electrode**	**Mode A without Electrode**	**Mode B**
BS7671. 18th Ed Am1	722.411.4.1 (iii)	722.411.4.1 (i) 722.411.4.1 (ii) any install not under section 722.411.4	722.411.4.1 (iv)
PEN Fault	Full protection	Limited protection	Limited protection
Ref Earth Electrode	Required – COPv4	Not required	Not required
Dedicated CPC Earth Electrode	Not required	Not Required	Not required
Touch Voltage	Full protection	Manual management of risk	Manual management of risk
Simultaneous Contact	Full protection	Manual management of risk	Manual management of risk
Phase Imbalance	Full protection	Limited protection	Limited protection
3 phase property capable	Yes	Yes	No
(1) L – N Trip	230 +/- 12% RMS	230 +/- 12% RMS	230 +/- 10% RMS
(2) L – TT Ref Trip	230 +/- 12% RMS	Faults not detected	Faults not detected
(3) PME – TT Ref Trip	30v RMS	Faults not detected	Faults not detected
Relay Weld detection	Full protection	Full protection	Full protection
DC 6mA Protection	Full protection	Full protection	Full protection
Protection for installs with three independent earthing systems (rare)	Manual management of risk	Manual management of risk	Manual management of risk

The below scenarios show these two mode cases in the event of a fault arising on the combined Protective Earth and neutral (PEN) conductor, leading to a potentially dangerous voltage arising on the installation earth conductor, and any conductive surfaces connected to the (protective) earth. In this case, the user touching the EV (and outside tap or lamp post etc) completes the circuit back to source earth.



Indra PESTS mode B




Start
Is the EVSE to be installed indoors, and car charged indoors with just one Earthing system present?
Yes
No
Is protection provided by a third party device (e.g. Matt:E O-PEN)
Yes
No
Is the property 3 phase?
No
Yes
Is the Property TT Earthed?
No
Property is TN Earthed
Yes
Is Earth Resistance to regs or can it be made good?
No
Yes
Is Bonding to regs or can it be made good?
No
Yes
Is Bonding to regs or can it be made good?
No
Yes
Can a reference electrode be installed?
No
Yes
Are there simultaneous contact or touch voltage risks present?
No
Yes
Consider use of reference electrode
Yes
No
Install Mode A No Ref Electrode 722.411.4.1 (ii)
Install Mode A With Ref Electrode 722.411.4.1 (iv)
Abort
Install Mode B No Ref Electrode 722.411.4.1 (iii)
(ii) The main earthing terminal of the installation is connected to an installation earth electrode by a protective conductor complying with Regulation 544.1.1. The resistance of the earth electrode to Earth shall be such that the maximum voltage between the main earthing terminal of the installation and Earth in the event of an open-circuit fault in the PEN conductor of the low voltage network supplying the installation does not exceed 70 V rms.
(iii) Protection against electric shock is provided by a device which electrically disconnects the vehicle from the live conductors of the supply and from protective earth in accordance with Regulation 543.3.3.101(ii) within 5 s in the event of the voltage between the circuit protective conductor and Earth exceeding 70 V rms due to an open-circuit fault in the PEN conductor of the low voltage network. The device need not operate if the voltage exceeds 70 V rms for less than 4 s. The device shall provide isolation and be selected in accordance with Table 537.4. Closing or resetting of the device shall be possible only if the voltage between the circuit protective conductor and Earth does not exceed 70 V rms. Equivalent means of functionality could be included within the charging equipment.
(iv) Protection against electric shock in a single-phase installation is provided by a device which electrically disconnects the vehicle from the live conductors of the supply and from protective earth in accordance with Regulation 543.3.3.101(ii) within 5 s in the event of the utilisation voltage at the charging point, between the line and neutral conductors, being greater than 253 V rms or less than 207 V rms. The device shall provide isolation and be selected in accordance with Table 537.4. Equivalent means of functionality could be included within the charging equipment. Closing or resetting of the device shall be possible only if the voltage between line and neutral conductors is in the range 207 to 253 V rms.

General Installation Notes

Pre-Installation Checks and Warnings



WARNING: FAILURE TO COMPLY WITH THESE INSTRUCTIONS COULD PRESENT A HAZARD

A) Read these instructions fully before installing or using the Smart Pro and keep these instructions for future reference
B) The Smart Pro is designed for permanent installation and is suitable for operation on an AC electricity supply having the same voltage and current rating as shown on the product label.
C) The Smart Pro should be installed in accordance with the 18th edition of BS 7671:2018; providing protection against voltage disturbances or current overload (circuit breaker), along with shock and DC fault detection.
D) A qualified professional electrician must be used for all installation and servicing of the Smart Pro. Any servicing or tampering by a non-qualified professional electrician will void the warranty.
E) The supply to the Smart Pro MUST be isolated before installation.
WARNING: Protection against electric shock shall not be automatically reset.
F) The Smart Pro MUST be connected to CPC reference
G) The installation location MUST be structurally sound and MUST NOT be subject to excessive dust, vibration, lint or other material build-up which could affect the Smart Pro's proper operation.

Installation Procedure

Installation Kit and Tools

The Smart Pro is supplied with the general screws and wall fixings that are required to permanently fix it in position. However, it remains the responsibility of the installer to evaluate the suitability of the installation surface and use the appropriate fixings when appropriate.

Tools, materials and equipment

- Drill for permanent wall mounting (as applicable for wall construction)
- Wire strippers
- Smartphone, tablet or laptop to operate the "Installer App"
- Hand-held Multimeter/ Clamp meter
- UK EV Charging Station Test Adaptor Kit (including a three-pin plug socket)
- Wall fixings (as applicable for wall construction)
- Tri-Rated 3 Core (2P+E) Electrical cables
- 4mm^2 or 6mm^2 Solar Cable (EN5061), with double insulation
- Copper plated 3/8^{ths} 4ft electrode with lug clamping terminals
- CAT5E Cable
- Torque driver (1N/m minimum setting & calibrated)

- Torx T20 Screwdriver bit
- RJ45 male connectors
- RJ45 Crimping tool
- 6 mm Bootlace Ferrule Crimps
- 6 mm Ferrule Crimping tool
- Cable (LAN Network) tester
- Armeg Holesaw for adding mains cable gland
- IP Rated Mains cable gland
- Krone/ IDC Punch-down tool
- Hacksaw *(optional)*

Procedure

Existing cables **MUST** be inspected for damage and ensure they are suitably rated for the Smart Pro.

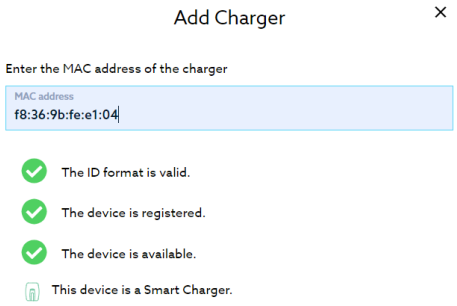
NOTE: ANY DAMAGED OR UNSUITABLE CABLES MUST BE REPLACED

Inspect the Smart Pro to ensure the charger has not been damaged in transit, not compromised and is safe to connect.

As a precautionary step, to ensure the device has been pre-registered on the Indra platform and that you are unlikely to fall into commissioning difficulties where the device is not recognised. A device check can be carried out within the Installer App ahead of proceeding with the install.

In the Installer app, once you have selected/ input the customer details, the QR code on the side of the device can be scanned and will verify:

1. Device format is valid
2. Device is registered
3. Device is available (not registered to somebody else)



If all three scenarios are green ticked, the installation can proceed. Else an alternative device should be sought.

Ensure there is an Earth Connection to the Smart Pro.

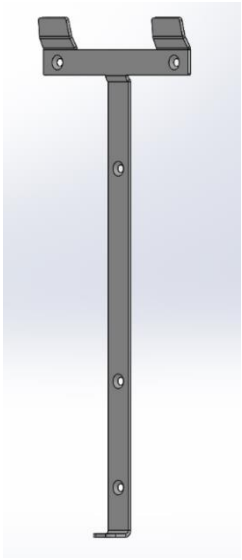
Isolate all electrical circuits and ensure they cannot be reconnected whilst installation or servicing work is being completed. Use a proving device where necessary.

Choosing a location

- Select an installation location that ensures future servicing of the Smart Pro, where the back plate can be mounted flush to the wall and screws can be used to permanently secure the charger in position.
- Make sure that all ventilation channels on the Smart Pro are free from obstruction and that the install location will not allow any flammable material to come within 100 mm of the unit.
- The socket/ cable holster of the unit must be installed between 0.75-1.20m above ground level at the location of installation.

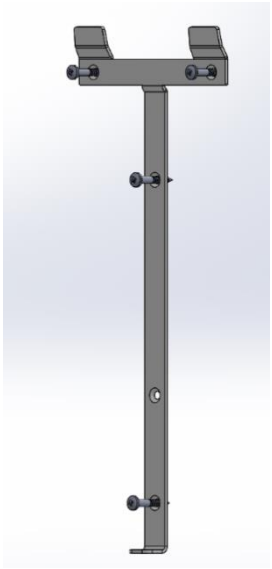
Mounting the station

- Take out the mounting bracket. Using a spirit level, position the top of the bracket horizontally. Then, using the bracket as a guide, mark out the four holes for drilling and/or screwing.



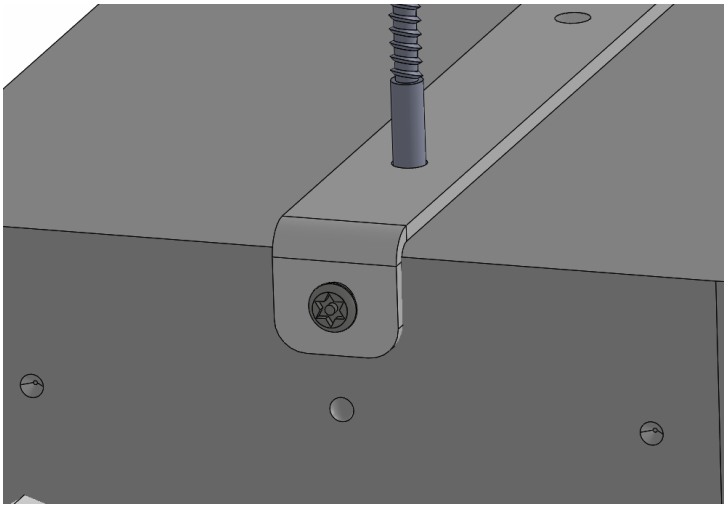
Installing the bracket

- Using a screwdriver secure and firmly torque four 5x35mm Pozi Countersunk head screws through the holes of the bracket. Keep the remaining screws for later.

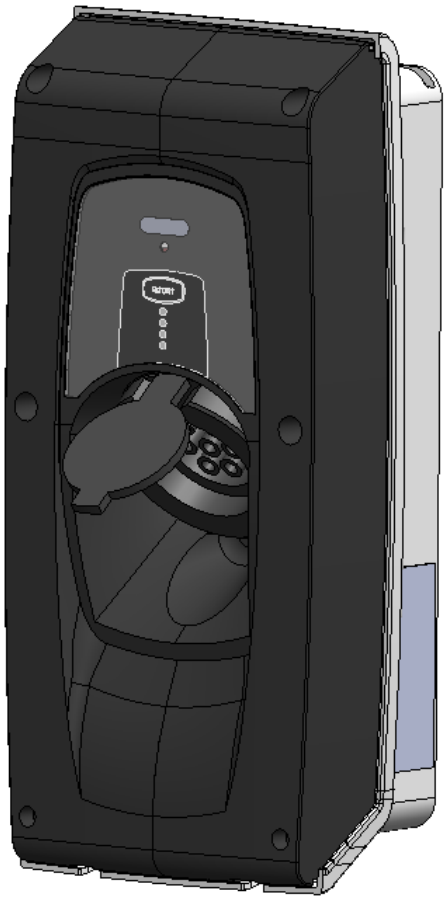


Hanging the Smart Pro Unit

- Hang the Smart Pro onto the bracket (using the top grooves in the back of the unit) and fix to the bracket using the M4 torx bolt, threaded into the bottom of the unit.

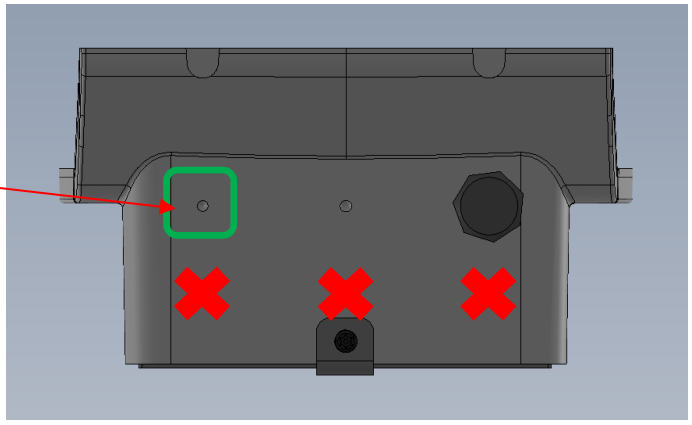


- Carefully remove and swing the front body to the left-hand side, ensuring the front user interface ribbon cable is not tensioned.
  Cable tethers prevent the front body from being completely removed.



Drilling hole for mains cable gland

ONLY DRILL ON THE TOP LEFT DIMPLE



After assessing what size of cable is needed to connect to the property's electrical supply, using an appropriate diameter Armeg Holesaw, drill a hole carefully into the unit using the TOP LEFT dimple as a guide ONLY.

Care must be taken when drilling the hole, as the circuit board could be easily damaged. Especially if the above advise is ignored!

DO NOT use the bottom three or top right-hand dimples for drilling

Remove all shavings/ swarf from the unit and deburr the hole.

Add the gland and feed the cables through.

Connecting Mains, Ethernet cable and External CT clamp

NOTE: ALWAYS ENSURE THE EARTH CONNECTION IS SLIGHTLY LONGER THAN THE OTHER WIRES. THIS ENSURES IT'S THE LAST WIRE TO TAKE ANY STRAIN.

NOTE: ALL CABLES SHOULD BE ROUTED TO MAKE USE OF ANY PRE-EXISTING CABLE ROUTES WHERE POSSIBLE AND SO AS NOT TO PRESENT ANY TRIP HAZARDS

Installing the TT Reference Electrode

- When operating under PEST Mode A, a secondary reference electrode to true earth is required. This is a Copper plated 3/8", 4ft electrode with lug clamping terminals.
  This electrode is not providing a fault path, instead it is to provide a stable voltage measurement
- If installing straight into soil or equivalent soft terrain, then the electrode can be cut in half, to reduce the necessary length driven into the ground. For hard aggregate, the full four-foot length may have to be maintained.
- Using a lump hammer, or similar, drive the electrode straight into the ground. Leaving enough length at its tip to secure the clamping terminal.

NOTE: BEFORE DRIVING IN THE ELECTRODE, ENSURE A SUBTERRAIN CHECK IS CARRIED OUT ON THE SUROUNDING AREA; SCANNING FOR EXISTING CABLES & PIPES

- Attach the lug clamp terminal and run a length of cable (*clipping against walls where necessary*) back to the Smart Pro unit; terminate with a bootlace ferrule in the second from right push-down terminal.
  Suggested cable use either 4mm² or 6mm² Solar Cable (EN5061), with double insulation
- Using a multimeter, measure the resistance of the newly installed TT electrode. Expected resistance is 600 Ohms at 1 metre.

NOTE: The resistance of the TT Reference Electrode is not to be confused with the CPC Ground resistance which MUST be less than 100 OHMS to function with EV's which would otherwise reject charge based on High Earth Resistance.

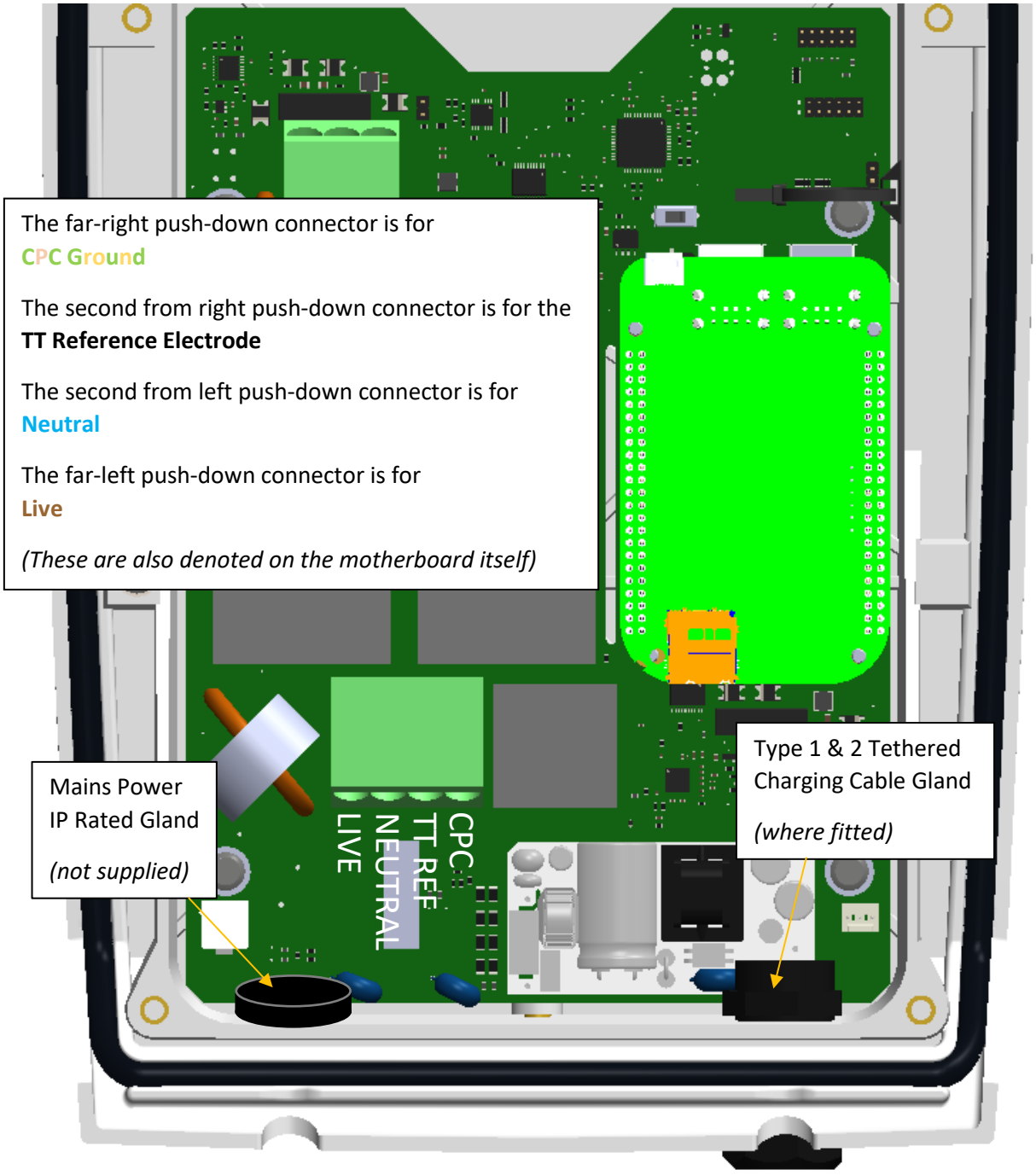




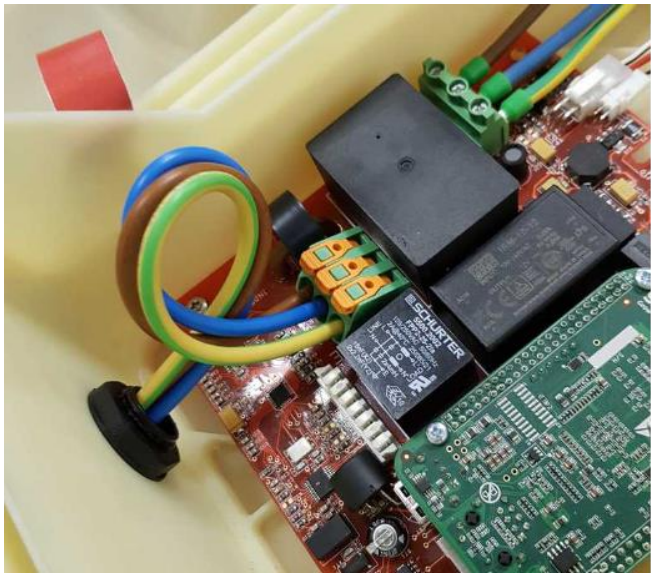
Example reference electrode including 4-foot rod, mechanical protection and EN5061 cable clipped direct to the wall

Connecting the Mains cable

- Feed the mains power cable (L, N & CPC) through the left-hand mains power gland.
- It is advised to crimp the ends of these three wires using bootlace ferrules and connect the Live, Neutral and CPC wires to their respective Push-Down Terminal Block.



NOTE: Installation best practice, which we've found eases cable routing and increases space around the IDC connections, is to 'pig-tail' the three cores of the mains input cable, as shown below:





Images of 'pig-tailed' mains cables into the charger unit

Attaching the External CT Clamp.

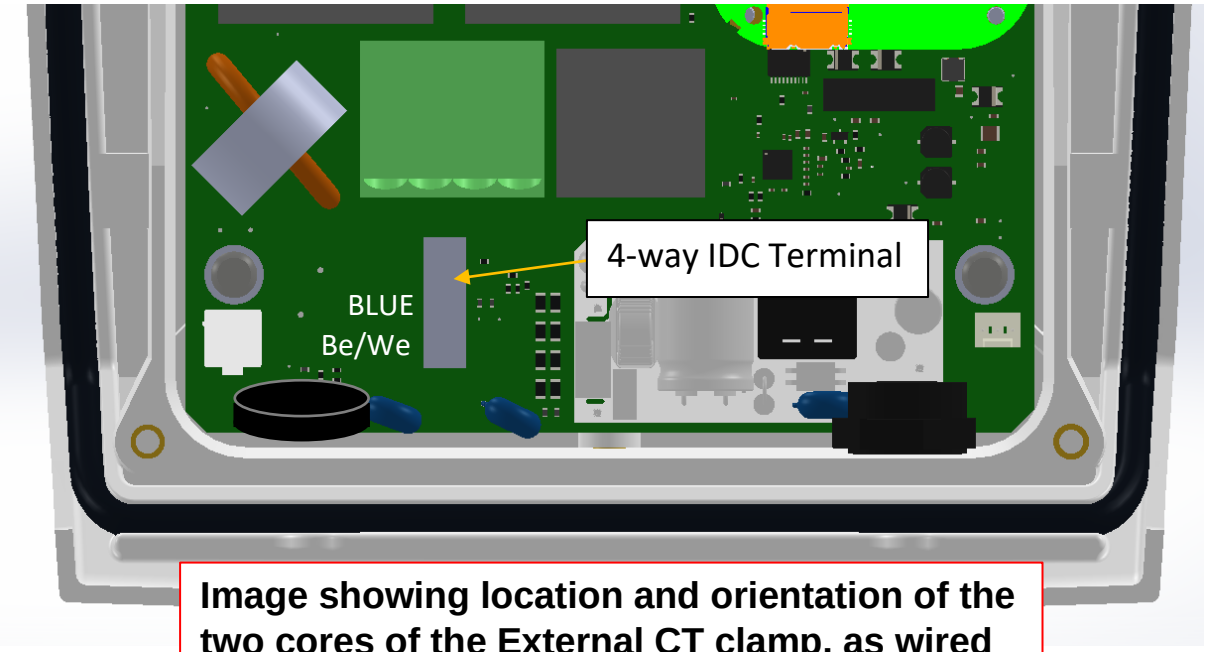
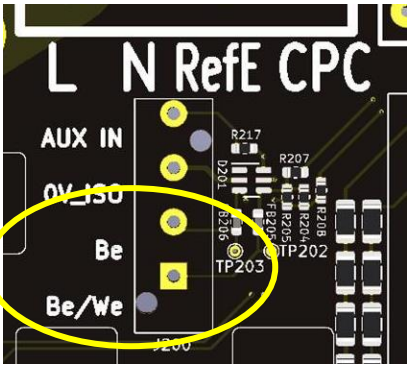


Image showing location and orientation of the two cores of the External CT clamp, as wired into the IDC terminal on the Smart Pro



To connect the external CT clamp, you must push a length of CAT5e cable through the gland and then separate the cores.

Of the eight wire cores inside the CAT5e cable, attach ***the blue wire*** and the ***blue/white wire*** **to the lower two terminals of the 4-way IDC terminal,** using an appropriate Krone tool. These core locations are also indicated via text on the PCB.

On the other end of the wire (within the DNO incoming feed/ smart meter box), after measuring and cutting to length, attach an RJ45 male connector and plug into the external CT clamp provided.

Tie the CT clamp ethernet cable to the Mains Cable using cable ties, unless routed within conduit back to the Smart Pro unit.



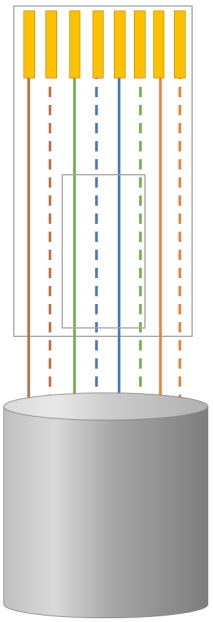
The External CT clamp should be placed so that the **Yellow label of the clamp is facing towards the house's Mains Supply.** This ensures correct polarity of any house load readings.

The External CT clamp location shall be left to the installer's discretion, depending on installation. However, it must be clipped around the Live main grid supply cable.

Hardwired Ethernet Link

If the customer hasn't opted for the cellular wireless option, the below section relates to hardwiring a CAT5e connection back to the properties' router.

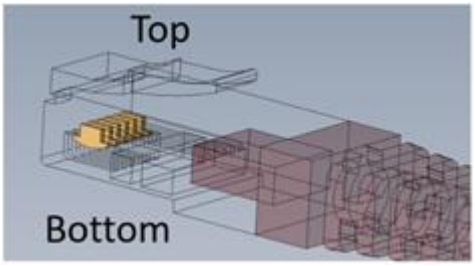
- Push a length of the ethernet (CAT5e) cable through the left-hand gland and then attach an RJ45 connector to its end.
- When setting up the RJ45 you must connect it in the manner below:



Looking at the male RJ45 connector from the top, going from left to right, the wires must be in this order

Brown
Brown with white
Green
Blue with white
Blue
Green with white
Orange
Orange with white

It is vital that the ends of the CAT5E wires are in contact with the golden terminals at the end of RJ45 connector





The other end of the ethernet cable should then be run to the house's internet router and cut to length.

Fit another RJ45 connector to this new end in the same manner as the previous end and **USE A NETWORK CABLE TESTER** to ensure the ethernet cable is functioning across all contacts.

If it doesn't pass the test, then re-crimp. If it does pass, plug one end of the cable into the female RJ45 connector on the Beaglebone within the Smart Pro and the other end into the house's router port.

Clip the CAT5E cable to the tethered charging cable inside the unit, to prevent risk of crushing or damage to the Motherboard



Attaching the Wireless Cellar Dongle *(optional)*

The below section relates to where a cellular 3G dongle has been opted for, rather than a hardwired ethernet connection.
Within the cellular dongle box, there should be a USB extension (460mm), a Huawei 3G Cellular Dongle, Cable Tie Pad and 100mm Cable Tie.

- Ensure the Cellular dongle is firmly pushed into the USB extension female end



Push the free, 90-degree male end of the USB cable into the USB socket of the Green Beaglebone inside the Smart Pro unit *(Noting orientation of the 90-degree tail)*



CRITICAL CARE POINT - Avoid knocking any components on the PCB as serious damage may occur

- Peel off the 3M backing from the adhesive mount and firmly push the cellular dongle into the top left-hand corner of the rear enclosure.



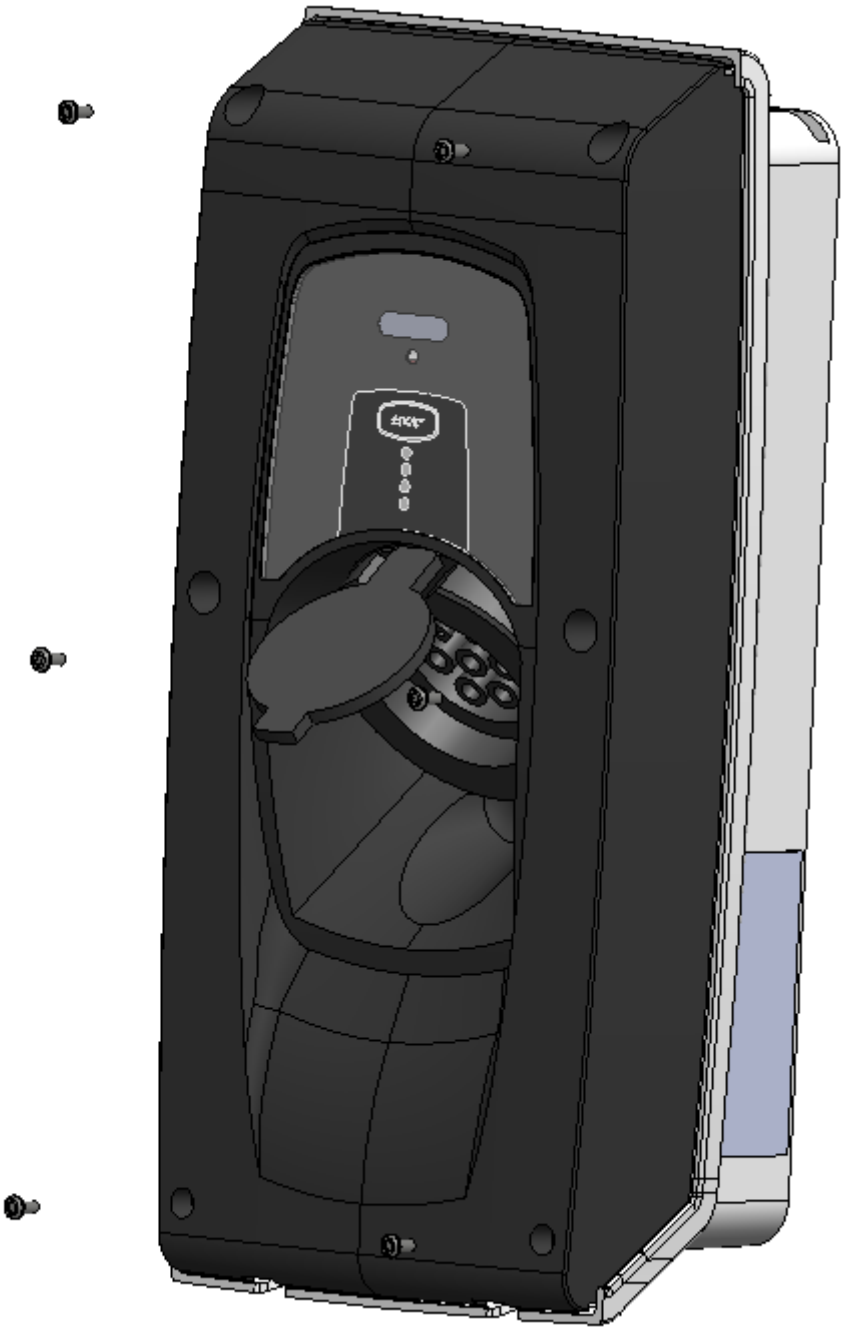
- Ensure the USB extension cable is neatly and tightly routed down the right-hand side



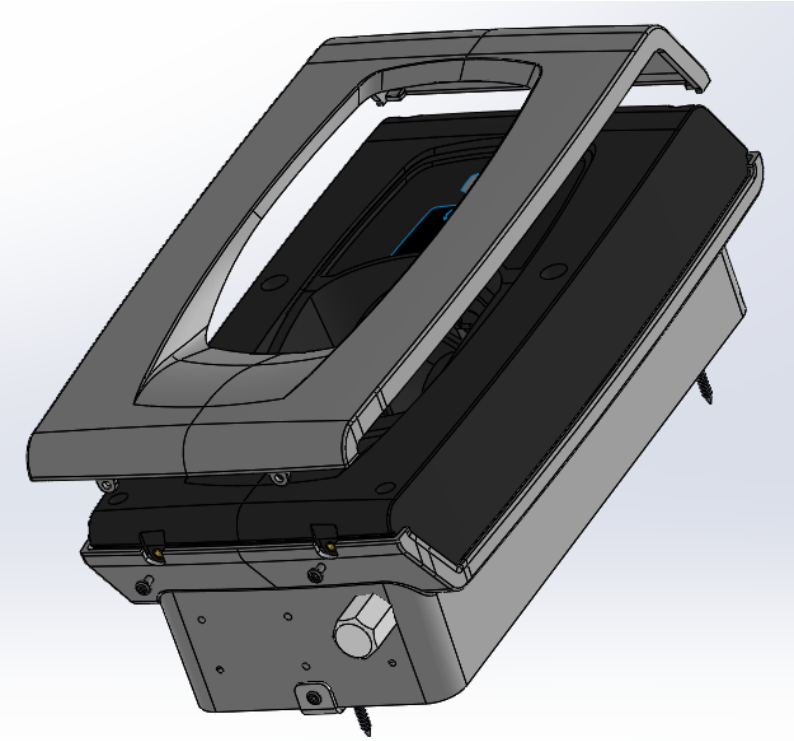
CRITICAL CARE POINT – Ensure the USB cable is routed tight to the right-hand side to avoid crushing and damage when placing and securing the enclosure front body

Replace the Front of the Unit.

- Screw in the six M4x10 Torx on the front body, these should be tightened to a torque of 2.0N/m, no tighter.

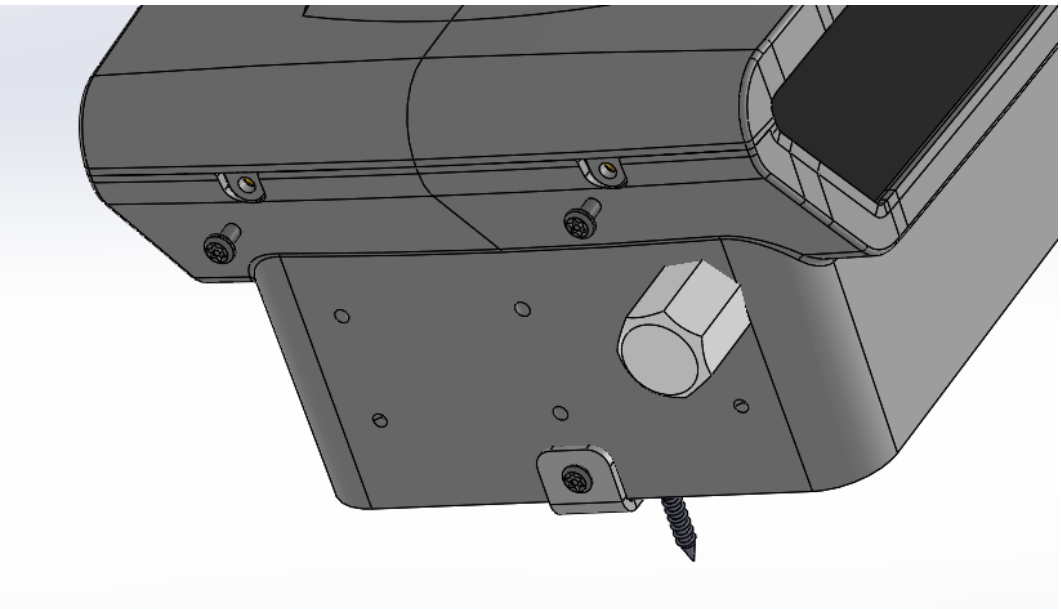


Attach the Fascia



- Clip the top two tabs of the fascia into their recess of the grey front body.
- Screw in the two M4x8 Security torx in the bottom of the unit. Tightening to a torque of 1.0N/m

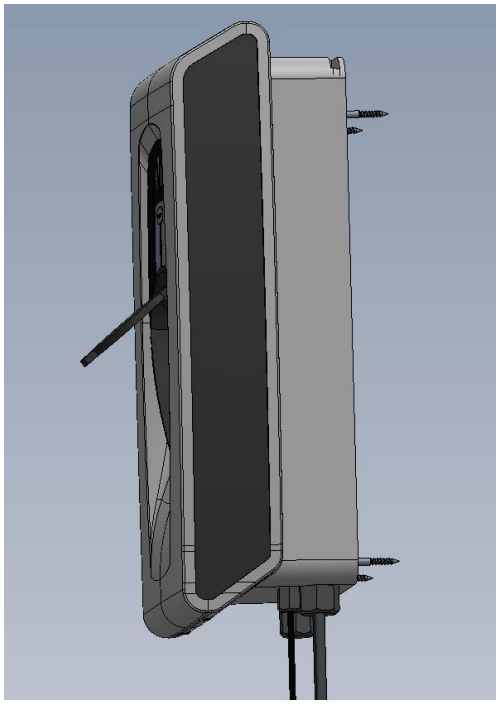
DO NOT over-tighten as damage to the plastic tabs will occur



Turning on the unit

MAKE SURE ALL COVERS AND FIXINGS ARE IN PLACE; ALSO, THE SMART PRO IS SECURED PRIOR TO ENERGIZING THE CIRCUIT

- Turn the power on at the consumer unit /breaker to the Smart Pro.



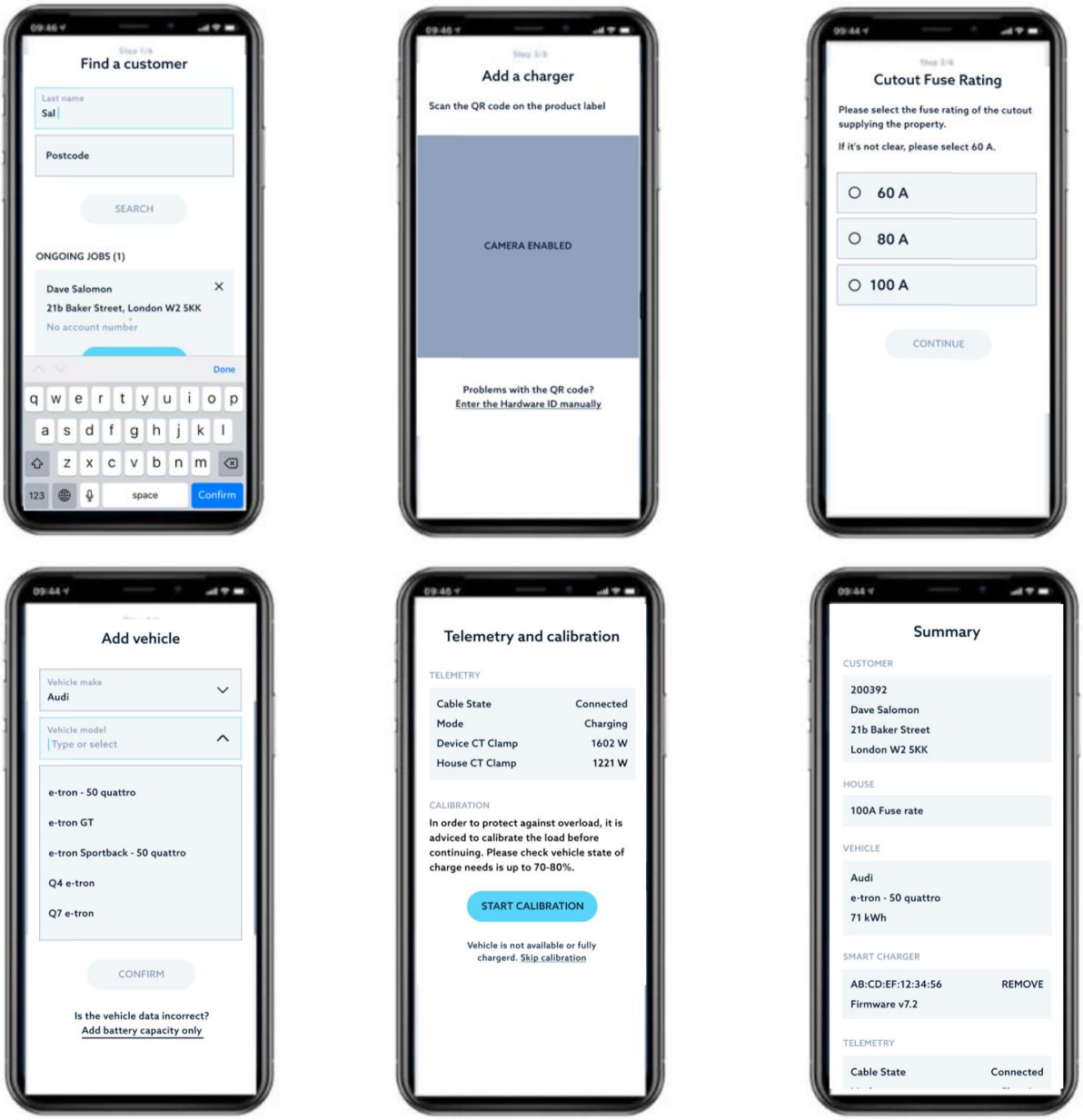
Note: If internet connectivity is not able to be established, then after 10 mins the device will go into 'home alone' mode. At this point the logo will flash purple twice every four seconds.

The device can be tested in this state for basic car charging functionality only. Smart features will not activate whilst the device is in 'Home Alone' mode and telemetry will not be received within the Installer App detailed below. In this instance re-check all ethernet RJ45 connections and router/ firewall restrictions.

Commissioning the Unit - Smart Charging Control

Accessing Smart Control Installer Application

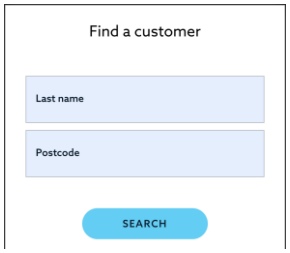
To enable smart control of the Smart Pro EV charging unit, it is necessary to confirm the commissioning of the device using the Installer Application. Installers should have received login credentials to access the following: https://platform.kaluza.com/install.
If you are having trouble accessing the above, please contact whomever scheduled the job for you.



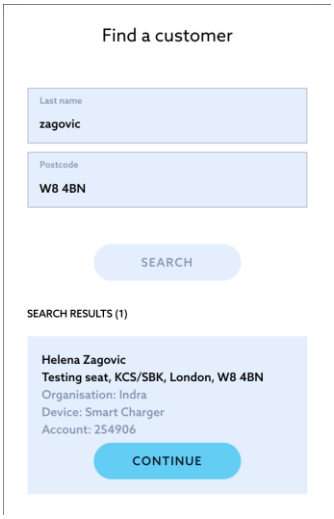
Installer App Pages

Find your Customer

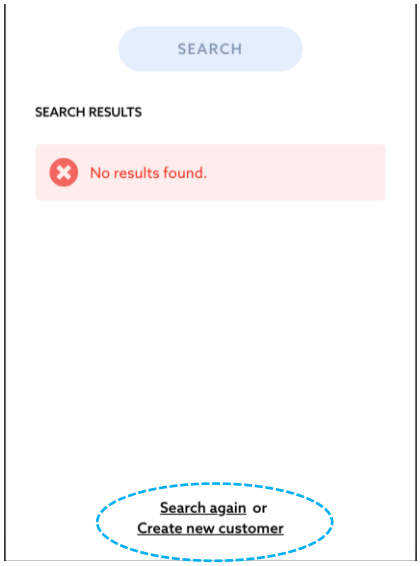
- In the Installer App, “Find a Customer” homepage, click on the appropriate box and enter the customer’s Last Name **and** the Address Postcode; then click ‘Search’.



- If previously populated, the customer information should show under “Search Results”.

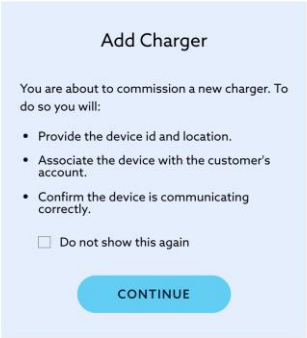


- Click “Continue”.
- If the search results are blank, and you are sure that you have entered details correctly, it is possible that a customer record has not been created for this installation.
  In that case, please contact whomever scheduled the job for you.
  Note: The correct permissions are required in order to add customer information into the Installer App (This permission will be assigned to a company representative who will have the option to “Create New Customer” as below)

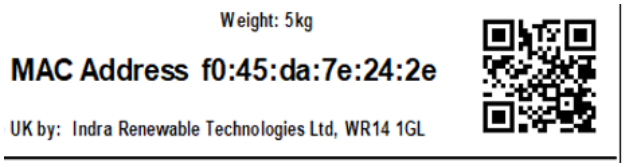


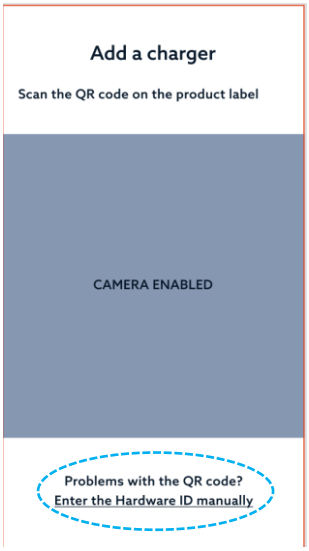
Next you will be asked to associate a device with the customer account.

Add a Charger

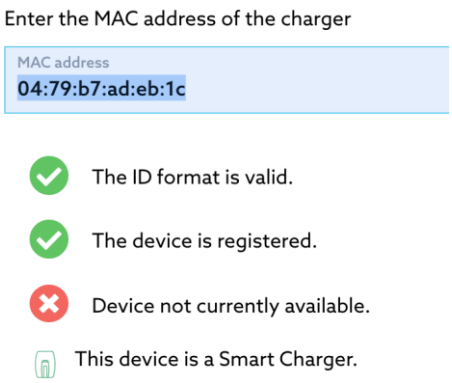


- Check the side of the unit for the serial number label. On this label there will be the QR code and corresponding MAC address printed**.** To associate the installed device to the customer account, a unique MAC Address needs to be added.
  If the device you are driving the 'Installer app' from has a camera, then the QR code on the product label should be scanned.

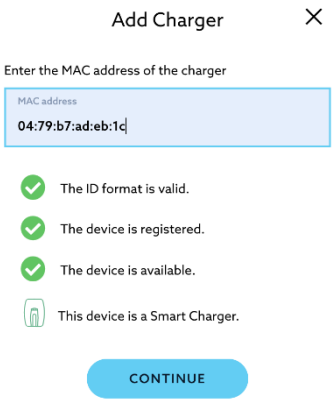




- If your camera is not working, select "Enter the Hardware ID Manually", in which case the 12-digit alpha-numerical MAC address must be typed into the box.



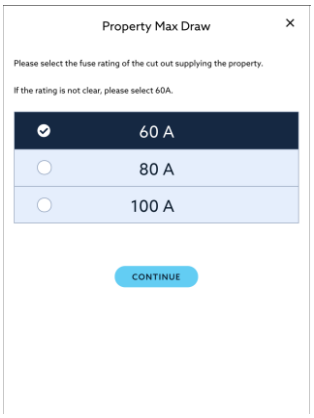
- This action will perform a few checks:
  - That the format you have entered is correct
  - That the device has been pre-registered for Smart Charging
  - The device is not currently associated with another customer account
    (*This may be true in an instance where the unit is recycled and has not been decommissioned from an old customer account)*
- Assuming these checks are successful, click “Continue”



Set Max House Load

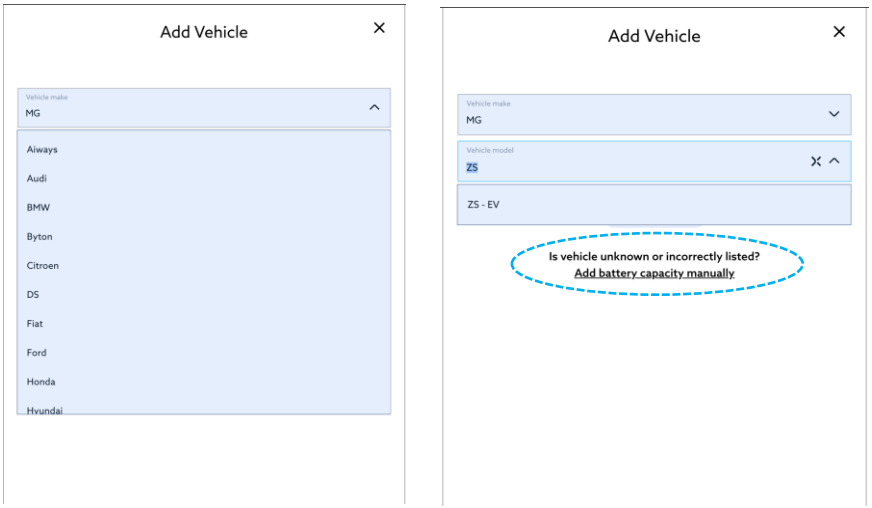
- The next stage is to input the “Property Max Draw” based on the DNO fuse rating at the property. Select either 60, 80 or 100A and click “Continue”.

If the DNO fuse rating is not clear, select 60A to prevent any inadvertent damage to/ failure of the fuse.

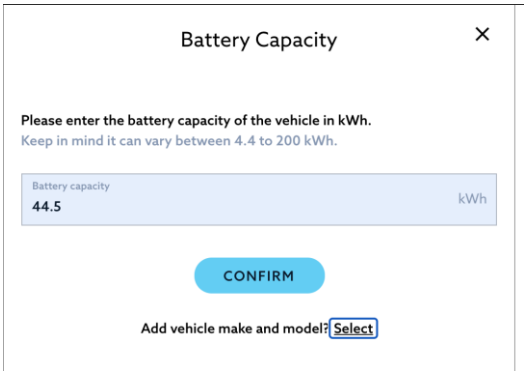


Enter Vehicle Information

- To ensure ready-by times/ scheduling are met, the associated battery capacity of the EV must be added. We ask that installers capture the customer's vehicle make and model information so that smart charging algorithms consider the correct dimensions.



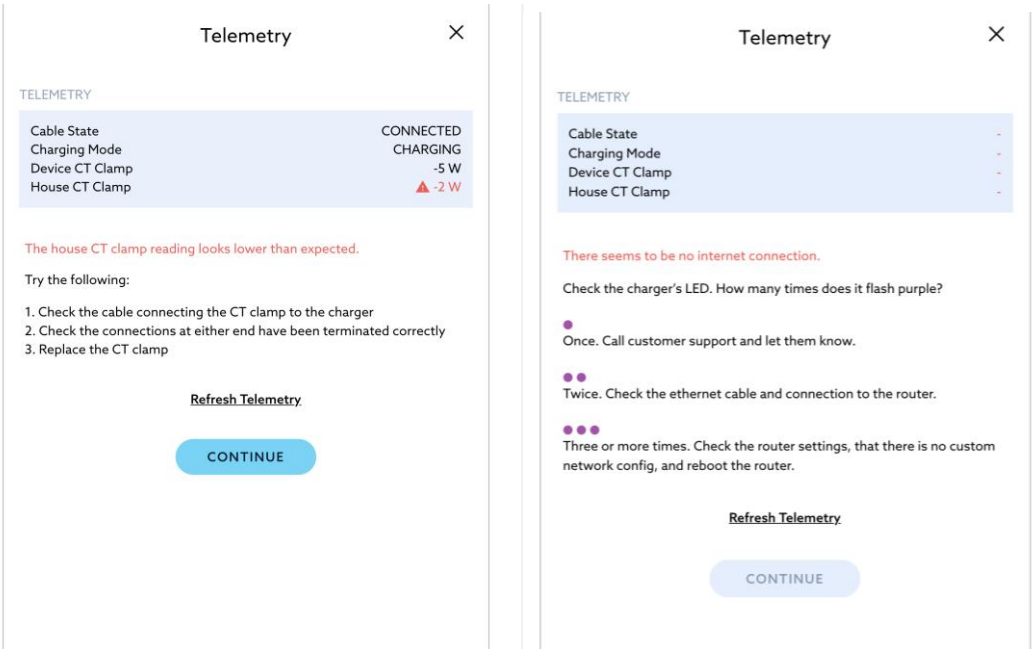
- Under "Add Vehicle" there is a "Vehicle Make" drop down list. Select the appropriate vehicle manufacturer and then the specific model of EV. Click "Confirm".
    - *Ensure the correct battery capacity option is chosen*
    - *If the vehicle cannot be found in the list, you will need to "Add battery capacity manually"*



- *NOTE: If you are unsure about Vehicle information, please remind the customer at handover that they will need to enter this information in the Customer Application for smart charging control*

Telemetry

The Smart Control Installer Application will present information about the telemetry being read from the device, specifically Cable State, Charging Mode, Device CT clamp and House CT clamp information:

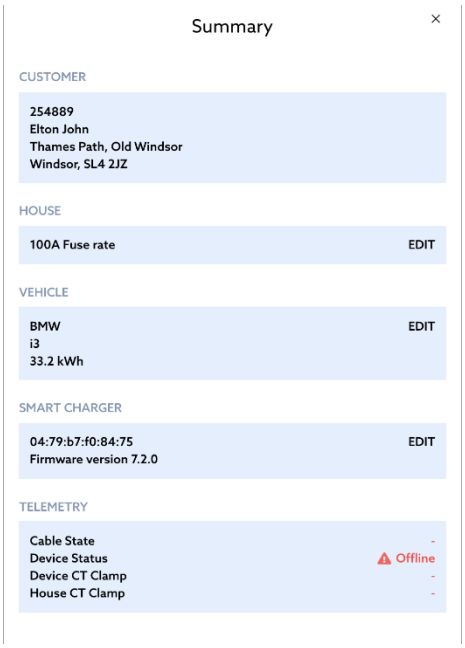


A representation of the platform receiving telemetry, along with a potential issue where no telemetry is being read from the Charger

Commission Summary

Installers are presented with a final summary before commissioning a device to a customer account. Here you can validate that the information you have input is correct.

- Where there are changes that need to be made, you can 'EDIT' each section.
- If you are happy with the information that has been entered, complete the job



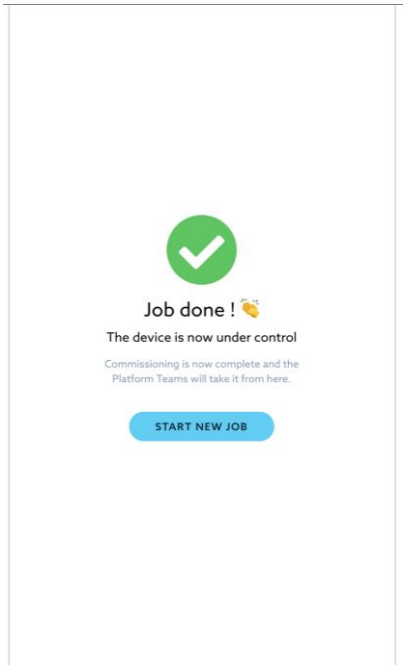
Confirmation of readiness for Smart Control

Once the calibration process has been worked through via the app and the commissioning successfully completed from the above Job "Summary" page; the customer will then receive a welcome email directing them to the "Customer App".

The customer should have:

1. Received a welcome email from support@indra.co.uk with onboarding links *(check any Junk/ Spam folders if necessary)*
2. The ability to login to https://app.indra.co.uk and set a password.

Please check this has been received and help with the set-up of this if necessary.



Load Curtailment and Calibration

The Smart Pro supports curtailment in line with BS7671 18th edition A1 section 722.311.201. a minimum of 6A is required on a maximum demand calculation even when implementing curtailment. 32A is required if curtailment is not configured or calibration is not possible.

Curtailment works by monitoring the external CT clamp placed around the tails between the DNO fuse and the first consumer unit or henley block. This CT clamp must then be checked for accuracy and calibrated if necessary.

722.311 Maximum demand and diversity

722.311.201 Load curtailment, including load reduction or disconnection, either automatically or manually, may be taken into account when determining maximum demand of the installation or part thereof.

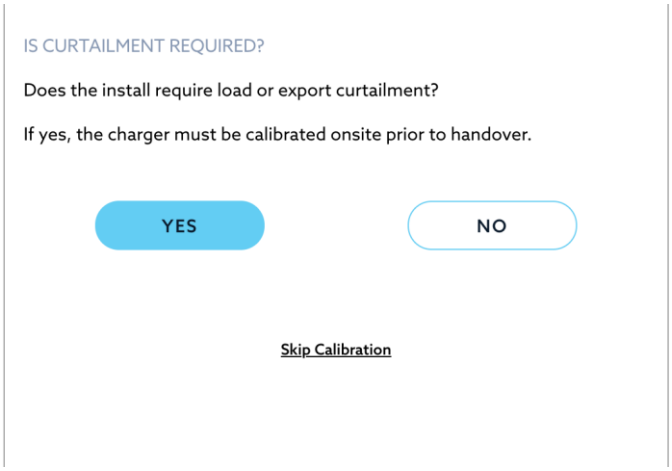
Calibration check

It is important for an Installer to check that the device and house CT clamp readings do not differ considerably from the manual readings taken with a calibrated handheld clamp meter/ multimeter (or a reading from a smart meter).

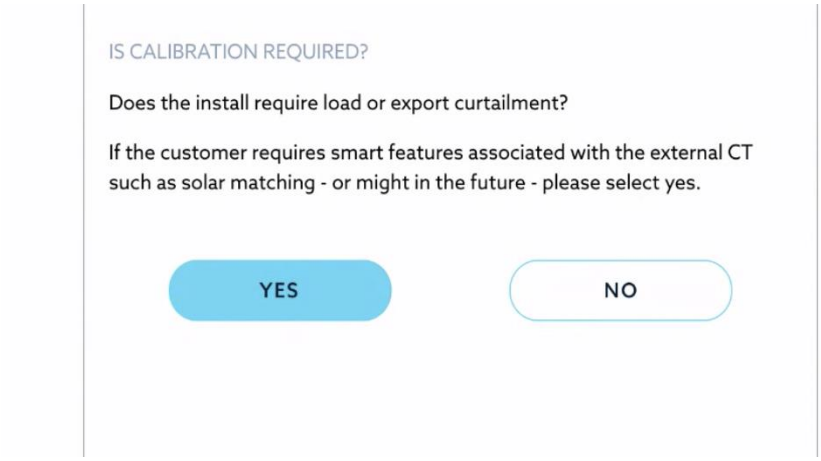
Load curtailment functionality in the Smart Charger devices enables a varied rate of charging to optimise use of fuse capacity. Where there are multiple devices with high electrical demands on a property, it is particularly important for Smart Charger Installers to validate that calibration has been performed. This is in order to comply with safety regulations of the DNOs and situations where the house fuse may blow, resulting in an expensive, time consuming site visit from a DNO to change the fuse and/ or restrict charging to priority devices. It may also result in penalties from DNOs.

If the customer has bought the Smart Pro specifically to use the solar charging or data collection features, it is vital that an external CT clamp is installed.
It is important that the instructions in "Connecting Mains, Ethernet cable and CT Clamp" are followed precisely. If CT clamps are installed incorrectly, there will be inaccuracies in readings which will invariably result in customer support queries being raised.

Assuming the steps for installation have been completed successfully, Installers are prompted with a check for whether or not **Load Curtailment is required**, or if a customer has/ is planning on having microgeneration. **If any of these are required, the charger needs to be calibrated**!



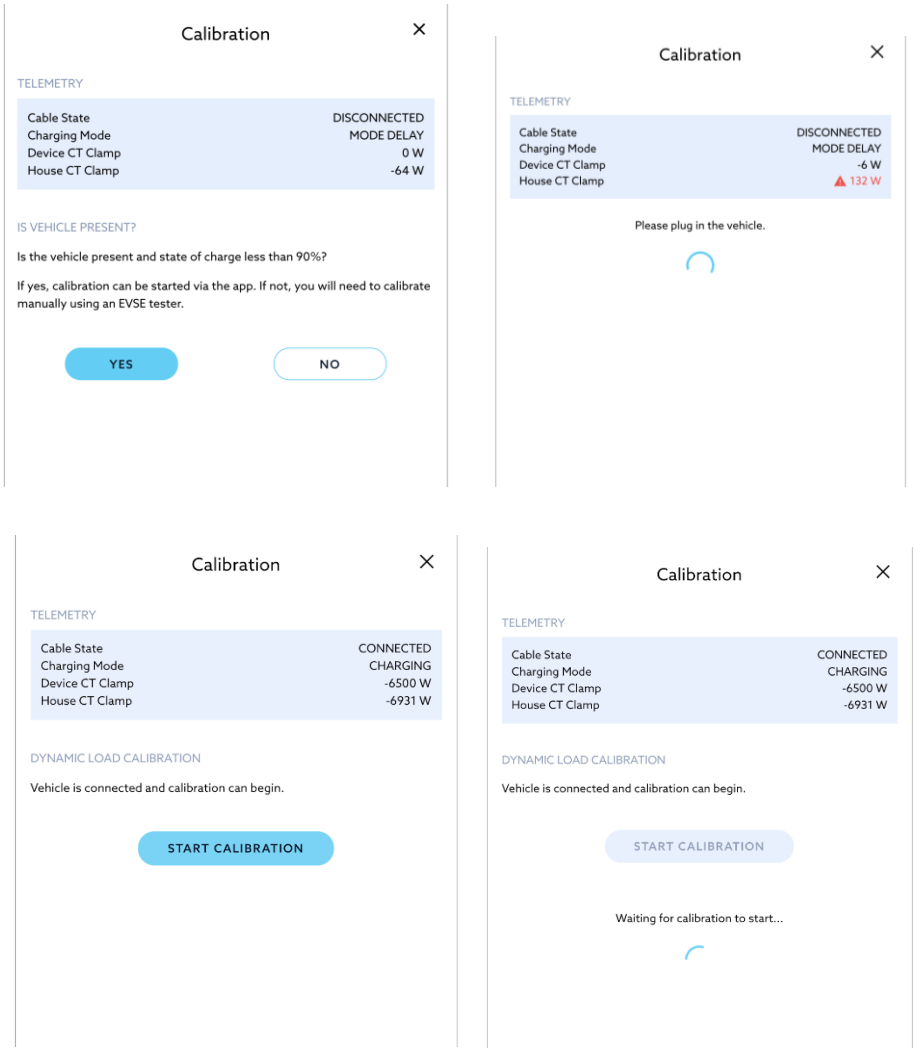
There are 3 possible routes for calibration to occur. This manual documents the options by order of preference: **Dynamic load calibration** (where an EV is present), **Fixed load calibration** (where the EV is not present) and **Calibration post commissioning** (where readings from a handheld clamp meter/ multimeter show that readings in the Smart Control Installer Application are within 50% of the truth)



Dynamic Load Calibration - When load curtailment is required, and an EV is present

In order to complete Dynamic Load calibration, the following conditions need to be true:

1. An EV is present
2. Smart Pro is connected to the customer's (*or your own*) electric vehicle *(for socketed variants the customer's intermediate charging cable will be required)*
3. EV Battery State of Charge is less than 90%

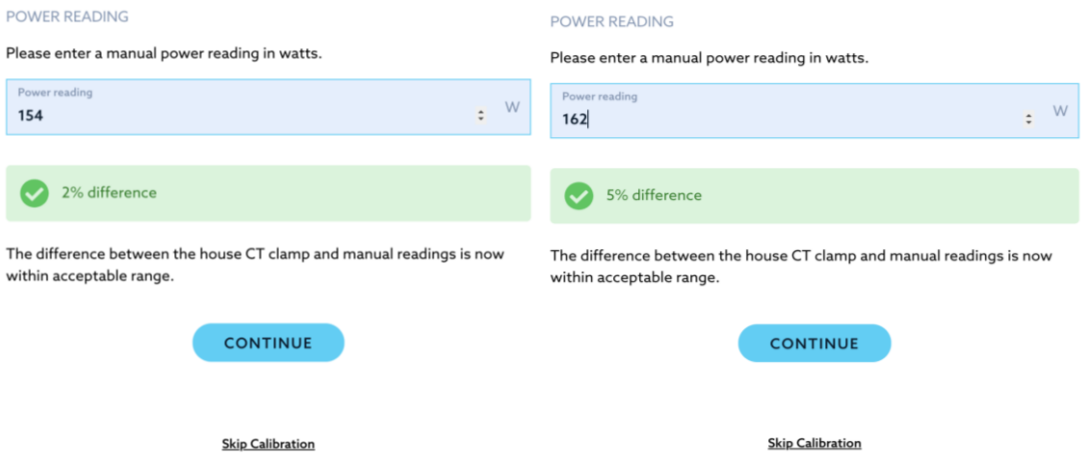


Dynamic Calibration can be triggered by clicking “Start Calibration” within Smart Control Installer App.

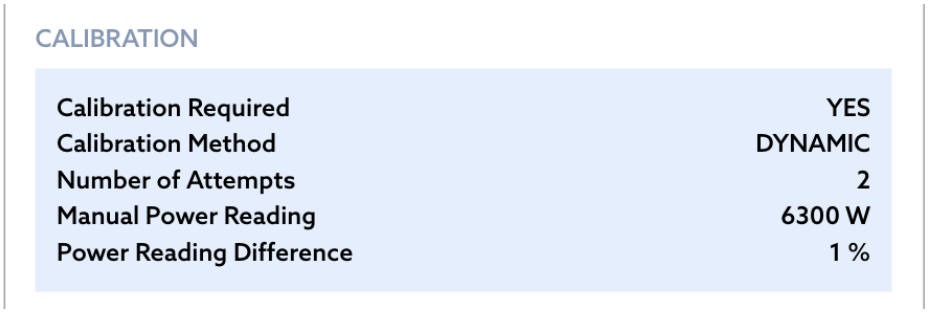
This Calibration cycle can take up to 5 minutes to complete

Once completed, you will be prompted to enter a new reading from the handheld clamp meter/ multimeter.

Note: The in-app telemetry power readings may take up to 30 seconds to refresh, to ensure you are comparing updated readings



This action should have reduced the difference between the power readings to be within 5% of the truth. Where successful, the install summary page will reflect an audit of actions related to Dynamic load calibration and relevant telemetry information:



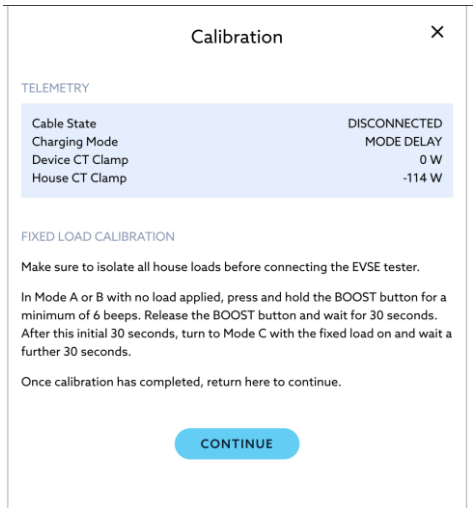
Getting a 5% difference in readings is ideal but may not always be possible due to the length of cable run or similar influences.

In this event, installers are advised of the need for further calibration, or rework, to reduce the difference in readings. Where all best endeavours have been made to complete this step but with no reduction in variance, there is an option to skip calibration.

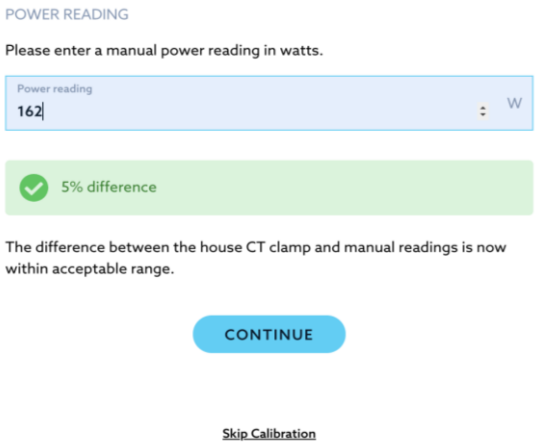
Fixed Load Calibration- When load curtailment is required, but no EV is present

In order to complete Fixed Load calibration, the following conditions need to be true:

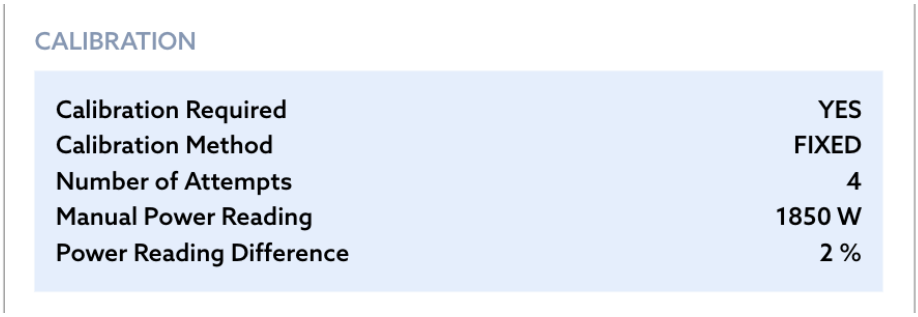
1. An EV is not present
2. All house loads, other than the Smart Pro, are isolated.
3. You have an EV Charging Station Test Adapter with a 3-pin plug output
4. You have a minimum 2kW fixed load such as a Fan Heater or Kettle
5. Smart Pro is plugged into the EV Test Adapter *(either via the tethered cable or the customer's own intermediate charging cable)*



- To initiate Fixed Load Calibration:
  - First isolate all house loads at the consumer unit, other than the Smart Pro.
  - Plug in the EV Charging Station Test Adapter to either the Smart Pro's in-built socket or the tethered charging cable.
  - Plug into the test adapter's three-pin socket either a fan heater or kettle (of 2kW load or greater).
  - Set the "CP Signal Output" to either Mode A or B (no load applied).
  - Trigger calibration by pressing and holding the 'BOOST' button for a minimum of 6 beeps. This will trigger the fixed load calibration. Release the Boost button and time a minimum of 30 seconds.
  - After this initial 30 seconds, turn the "CP Signal Output" to Mode C (with the fixed load turned on) and wait a further 30 seconds.
  - Re-energise any house load and then measure/ verify whether calibration was successful against the external CT clamp reading within the Installer App (5% tolerance).



This action should have reduced the difference between the readings to be within 5% of the truth. Where successful, the install summary page will reflect an audit of actions related to Fixed load calibration and relevant telemetry information:

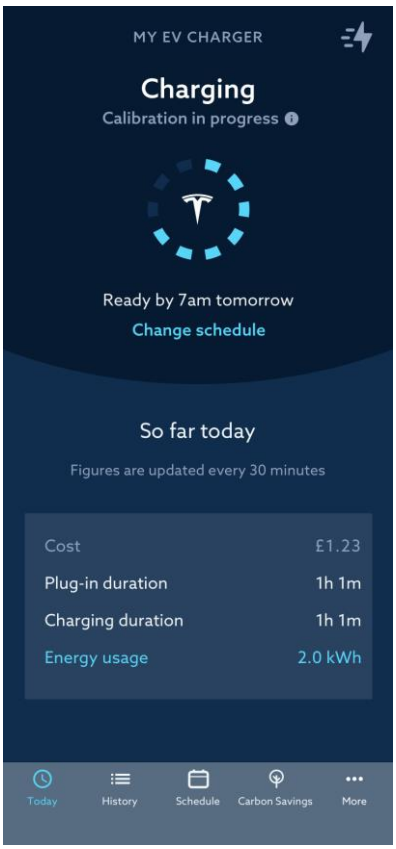


Getting less than 50% difference in readings for fixed load calibration will mean that calibration can happen post commissioning. In the meantime, an Installer in this situation should mention to the customer that getting their readings to fall within an exact threshold has not been possible onsite, but that a remote calibration cycle should happen, which will rectify this problem.
The customer will need to know this as they may encounter errors when using some of the smart charging features and may have issues with the accuracy of their data.

Getting more than 50% difference in readings for fixed load calibration will mean that subsequent re-work of the CAT5E cable terminations, along with ensuring the CT clamp is positioned correctly on the Live incoming feed (as per section “Attaching the External CT Clamp”)
In this event, installers are advised of the need for further calibration or rework to reduce difference in readings.
At this stage there is also an option to skip calibration. However it should be noted that if power variance is left above 50%, subsequent site visits may be required to rectify, where post commissioning calibration is unable to bring this variance down. Or if the customer opts into microgeneration/ curtailment in the future.

Calibration Post Commissioning

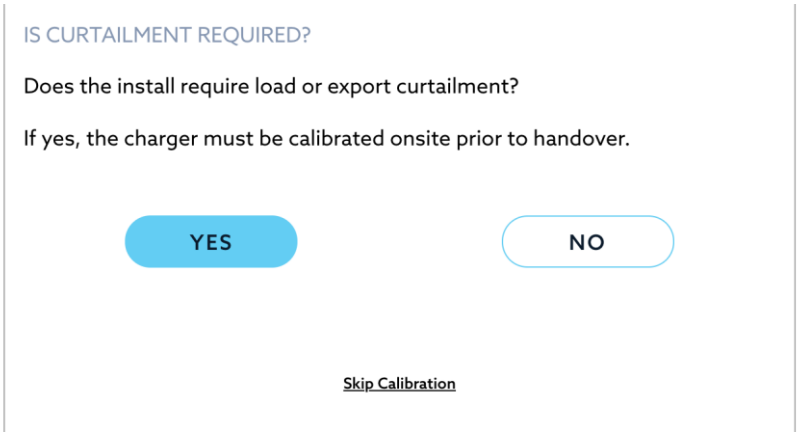
All devices have an automated calibration that will happen at a time when a customer is typically not using their Smart Pro and will not notice. If calibration does happen at a time when a customer is in their Smart Charging Customer App, they will see a warning, similar to the following:



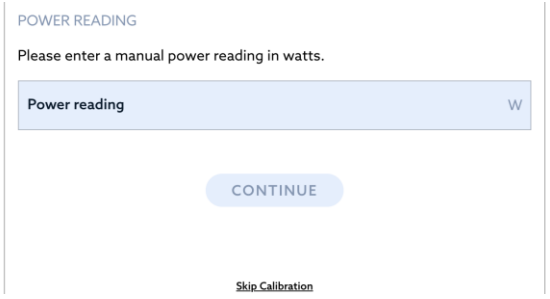
Where calibration has not happened onsite, Installers should mention to the customer that an update should happen within 3 weeks to rectify any problem with readings. **The customer will need to know this as they may encounter errors when using some of the smart charging features and may have issues with the accuracy of their data.**

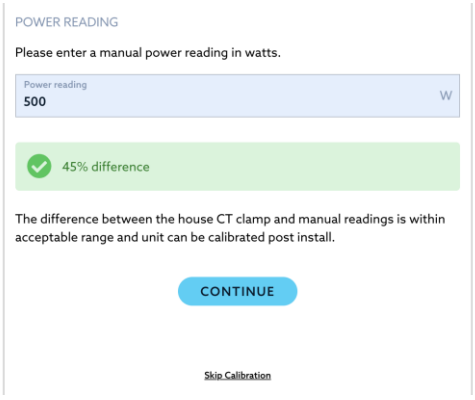
No Onsite Calibration Required

There is a **preference for external CT clamps to be installed and for calibration to occur onsite.** However, where Load Curtailment is not required, and the customer is not interested in smart charging features - including solar matching and data gathering - calibration does not need to happen onsite.



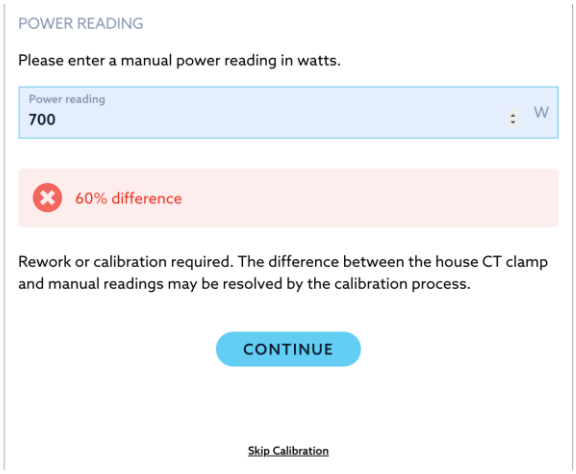
Selecting **No** will prompt an Installer to enter a new reading from the handheld clamp meter/ multimeter.
Note: The in-app telemetry power readings may take up to 30 seconds to refresh, to ensure you are comparing updated readings





Where readings from a handheld clamp meter/ multimeter show that readings in the Smart Control Installer App are within 50% of the truth, it is possible for calibration to happen automatically post commissioning.

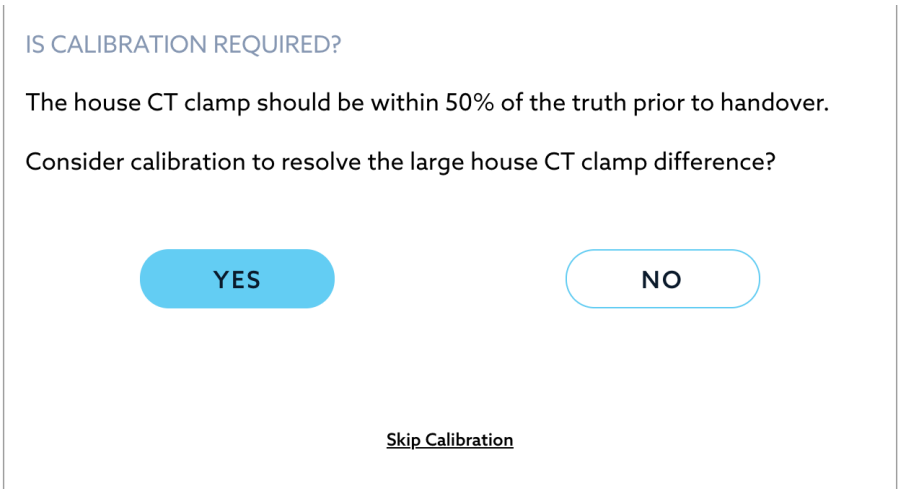
Getting a difference in readings that is lower than 50% is ideal but is not always possible.



In this event, installers are advised of the need for further calibration or rework to reduce difference in readings. Where all best endeavours have been made to complete this step, but with no corresponding reduction in variance, there is an option to skip calibration. However it should be noted that if power variance is left above 50%, subsequent site visits may be required to rectify, if the customer wishes to opt into microgeneration/ curtailment in the future.

Skip Calibration

At any stage of the commissioning and calibration flow, where all best endeavours have been made, there is an option to skip calibration.



This will be reflected in the Summary of the installation

Charging Cable Stowage

NOTE: APPROPRIATE CHARGING CABLE STOWAGE IS ESSENTIAL TO PREVENT INADVERTENT TRIPS/ FALLS OR DAMAGE TO THE EV CONNECTOR

- Once commissioning has successfully been completed, disconnect the Smart Pro from the customer's EV. S*eek customer guidance on how to do so, as this is manufacturer specific (Nissan Leaf disconnection is via the EV's key fob*)
- Coil the 5metre long charging cable around the circumference of the rear body of the Smart Pro, several times, leaving a very short tail *(only applicable for tethered type 1 & type 2 variants, 190105A101 & 190105A102)*
- Push the male charging connector into the blank holster recess of the Smart Pro unit, so that it clips/ latches into position and is held
- Ensure that no part of the coiled charging lead is trailing on the ground prior to leaving site; also, the customer should be shown this safe stowage routine

Technical Specifications and Ratings

General Specification	
Model Name	**Smart Pro**
Mode	Mode 3: Type 2 socket, Type 1 or Type 2 tethered cable
Overall Dimensions	200mm x 130mm x 420mm
Weight	3.5kg *(excluding cable)*
Operating temperature	-20℃ to 50℃
Charging Cable Length	Up to 5m
Storage temperature	-20℃ to 80℃
Operating humidity	10% to 85%
Installation	Indoor / Outdoor wall mounted
Communications	Ethernet or Cellular Network (optional)
Communication Protocol	Kaluza proprietary, TLS
User Interface	● Capacitive Touch Panel *(logo customisable)* ● Indra Customer App
Certification	● CE certified
Electrical Specification	
Max. output power	7kW (1P)
Input voltage	230V, AC ± 10% (1P)
Output current	Variable up to 32A
Nominal frequency	50Hz
Metering	Accuracy to 0.2s
Degree of protection	IP64 protection
Overvoltage category	CAT III

Certification:

CE Marking

OLEV Accreditation under Electric Vehicle Home Scheme

Compliance:

- Smart Pro permits installations to meet BS 7671:2018+A1:2020 Requirements for Electrical Installations
- BS EN 61851-1:2019 Electric vehicle charging system – general requirements †
- BS EN 61851-21:2017 Electric vehicle charging system – electric vehicle off-board charger EMC requirements for connection to an AC/DC supply
- BS EN 61851-22:2002 Electric vehicle charging system – AC electric vehicle charging station
- IEC 61024-3:2016 Low voltage switch mode power supplies – Electromagnetic compatibility (EMC)
- BS EN 62311:2008 Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0-300GHz)
- BS EN 60529:2013 Degrees of protection provided by enclosures
- BS EN 50581:2012 Technical documentation for the assessment of electrical and electronic products with respect to RoHS
- BS EN 50419 Marking of waste electrical and electronic equipment
- BS EN 61010-1:2010 Safety requirements for Electrical equipment for Measurement, Control and laboratory use – General Requirements

† Section 7.2 Digital communication - Supplied components independently tested by manufacturers

Directives:

- 2014/35/EU Low voltage directive
- 2014/30/EU Electromagnetic Conductivity (EMC)
- 2012/19/EU Waste Electrical & Electronic Equipment (WEEE)
- 2011/65/EU Restrictions of certain Hazardous Substances (RoHS)

Safety Markings and Labels

The following are examples and will need a final version for the label and the symbols used on it

Caution Label –
Where shown, exposed and potentially live conductors are present with a maximum voltage of 230VAC



Figure 3: Caution/ High voltage label

Product Label –
Gives electrical ratings, model number, CE mark, serial number and product information in English. There is also a QR code, which contains the encoded serial number for use during the installation

process with the installation app. The label is mounted on the exterior side of the enclosure.

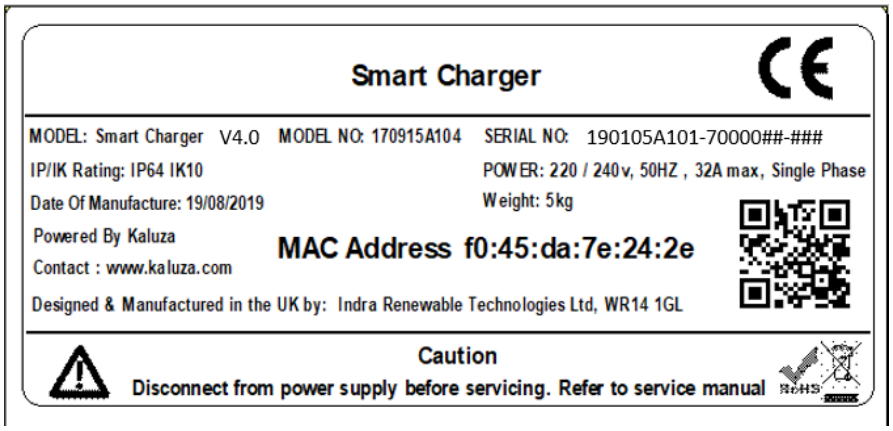


Figure 4: Example label



Warning symbol –
Ensure product is disconnected from power supply before servicing



QR code - Containing serial number information



CE conformity marking logo - Confirming the product is CE compliant
The outer enclosure is marked with the model information



WEEE Symbol -

ALL END OF LIFE SMART ENERGY PRODUCTS MUST BE RETURNED TO INDRA RENEWABLE TECHNOLOGIES LTD FOR APPROPRIATE RECOVERY & RECYCLING.

If this cannot be achieved, then the customer must take the end of life product to a designated collection facility (DCF) as detailed by their local authority (LA). Such facilities include civic amenity and waste collection sites.

IT IS THE SUB-CONTRACTED INSTALLER'S OBLIGATION TO ENSURE THAT ALL PACKAGING AND PACKAGING WASTE IS RECYCLED AND DISPOSED OF PROPERLY during initial installation of the Smart Pro products.

Troubleshooting

LED Signal Descriptions:

	LED state	Description
1	All LEDs off	Unit is in a powered OFF state. The unit has no power. Check the wiring and make sure that all connections are correct. Ensure that all switches are in the correct state. If the connections are correct and checked twice contact customer support.
2	Primary LED White, lit in Steady State	Operational mode. The unit is connected to the Kaluza platform. The unit is will charge based on customer defined schedule and Kaluza platform commands.
3	Primary LED Blue, lit in Steady State	Override mode. The 'Boost' button has been pressed. The unit is now charging at full power.
4	Primary LED Orange, lit in Steady State	Solar Match Mode The unit is using micro-generated on-site electricity to charge the EV
5	Primary LED Red, lit in Steady State	Fault mode – permanent. The unit has encountered a major error. Perform a hard restart on the unit by turning the rotary isolator switch on and off or but flipping the RCD inside the house consumer unit. If the steady red light persists, contact Customer Support.
6	Primary LED Purple, Flashing on Start-up/ immediately after a Power Cycle	Booting. The unit is now powering up and running its start-up sequence, this will last for a period of approximately 10 seconds.
7	Primary LED Blue, Flashing**	Software update in progress. The unit is now downloading a software update from Kaluza. Ensure that the unit is not disconnected from the internet during this period/ procedure.
8	Primary LED Purple, Flashing** *(continuing after Start-up sequence)*	The charger cannot communicate with Kaluza. The repeating flashing pattern gives an indication of the fault: **1 flash, repeating** - Connected to the internet but unable to connect to Kaluza. Contact Customer Support. **2 flashes, repeating** - There is a problem with the connection to your router. Check all cables are plugged in, that the ethernet cable functions and that other devices in the home are connected to the internet or try restarting the router. **3 or more flashes, repeating** - There is likely a problem with the router. Check that other devices in the home are connected to the internet and try restarting the router.
9	Primary LED Red, Flashing**	The charger has a temporary fault. Try resetting the charger by turning it off and on at the fuse box / rotary switch. Contact support if this does not resolve the problem.

Servicing and Maintenance

The Smart Pro MUST NOT be repaired by the customer. Repair of the charger is to be carried out ONLY by the manufacturer or their approved installation partners.

In the case that any Smart Pro system safety component (defined as any breaker, fuse, limit cut out, enclosure, grounding equipment) fails completely or partially; maintenance or replacement of the charger may be required.

Support and Contact Information

For technical support, product queries and information please contact:

E-mail: support@indra.co.uk

Telephone: 01684 770631



INDRA

Contact INDRA

For more information, please contact us;

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