

NETWORKS

# Overview of Public On-Street Electric Vehicle Charging ≤49 KVA (71 A)



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# i. Scope

The aim of this document is to provide additional information to Electric Vehicle (EV) charge point installers and operators, Local Authority staff, Registered Electrical Contractors (REC) and any other professionals involved in the design and installation of whole current metering solutions for multiple on-street Electric Vehicle Supply Equipment (EVSE) or as they are commonly known as EV charge point infrastructure installations in public spaces. (i.e., On Street Charging as per Table 1 – Category 2). This guide is primarily intended for the design and installation of electrical infrastructure for connecting EVSEs in public spaces such as public roads, public footpaths, etc.

It may not always be possible to have the information regarding the ownership (public or private) of the space, land, or ground where the electrical infrastructure may need to be run underground. The ESB Networks designing Engineering Officer should clarify with the customer if the space is private/public. If the customer cannot provide clarity, it is advisable to follow the guidelines provided in this document as this may prevent further complications and delays in connecting the required EVSE installation(s).

The maximum whole current metering capacity of ESB Networks is currently 49 kVA (c. 71 Amps) and the solutions contained in this document takes cognisance of this.

There are three solutions detailed:

Figure 1: Solution A – Decentralised Metering Layout Drawing

Figure 2: Solution B - Centralised Metering Layout Drawing

Figure 3: Solution C - Residential and Neighbourhood Charging

Table 1 below highlights the various electric vehicle recharging technologies available.

Table 1: Currently available electric vehicle charging technology

Category	Charge Point Type	Power Rating	Approximate time to charge
1	Residential (Home) Charging	3-7 kW	7- 16 hours
2	On-Street Charging	>7-49 kW	1-2 hours
3	Destination Charging	50 kW – 100 kW	30 minutes
4	Fast Charging	>50 kW	30 minutes or less

Zero Emissions Vehicles Ireland (ZEVI) has published a <u>Regional and Local Charging Plan 2024-</u> 2030. which contains further relevant reference material.



### ii. Mandatory References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced documents apply.

ESB Networks Company Standard - National Code of Practice for the Customer Interface

**Electricity Regulation Act** 

### 1. Solutions for Connection of Public On-Street Charging EV Infrastructure

The Code of Practice for the Customer Interface provides for Electric Vehicle (EV) On-Street Charging Solutions with Annex I On-Street Charging specifically referring to this issue.

The three technical solutions presented in Sections 1.1, 1.2 and 1.3 of this Guide enable compliance with the <u>Electrification Act of 1999.</u>

#### 1.1 Solution A – Decentralised ESB Networks Metering





- This solution may be utilised on public streets and public spaces.
- The customer interface point is established at the EVSE.
- ESB Networks to install cable from mini pillar or overhead line to EVSE.
- EVSE fed from the local Low Voltage (LV) network via a standard ESB Networks mini-pillar or overhead network.
- Each individual EVSE can accommodate a Maximum Import Capacity (MIC) of up to 49 kVA. (Three Phase, 71 A).
- The MIC of combined EVSE fed from a single ESB Networks mini-pillar or overhead network is limited by the LV capacity and voltage drop of the feeding network.
- ESB Networks cabling, cut out and meter are contained in a separate dedicated compartment at the EVSE as per Annex I of the Code of Practice for the Customer Interface.
- The EVSE installation should have suitable protective measures in line with Irish Wiring Rules set by NSAI on the customers side of the EVSE to detect any faults, or broken conductors and disconnect the EV load.
- As each EVSE is metered separately, different suppliers/owners/charge point operators can operate individual charge points on the same street.
- The earth rod(s) at the EVSE is installed by the customer like any other LV installation in line with IS10101.
- All civil works should be carried out in line with current ESB Networks standards (If in doubt, please consult with local ESB Networks office) between the mini-pillar/overhead line and the EVSE. The customer should make all necessary arrangements for the civil works from ESB Networks connection point to the customer interface point at their own expense. See <u>ESB Networks Basis of Charges for Connection to the Distribution System</u> for information.
- All ducting housing ESB Networks cables should be sourced from ESB Networks approved material suppliers.
- All ducting installed as per <u>Housing Schemes: Guidelines for ESB Networks Standards for</u> <u>Electrical Services</u>.

#### 1.2 Solution B – Centralised ESB Networks Metering





- This solution may be utilised on public streets and public spaces.
- The customer interface point is established at the DSO isolator located within the midi pillar in the immediate vicinity of the EVSE. The customer metering pillar is an enclosure supplied by the customer which complies with National Code of Practice for Customer Interface. In Figure 2 above, the 15-metre earth at the customer metering pillar is owned and installed by ESB Networks. The frame of the metering pillar should be bonded to the 15-metre earth as per the above drawing.
- The earth rod(s) at the EVSE is installed by the customer like any other LV installation in line with IS10101.
- ESB Networks to install cable from mini pillar or overhead line to customer metering pillar and from customer metering pillar to midi pillar. The customer metering pillar and midi pillar are supplied by the customer.
- For each customer metering pillar, the total MIC should not exceed 49 kVA (71 A.). The
  maximum distance between customer metering pillar and standard midi pillar should not
  exceed 20 metres. It is advised to locate the customer metering pillar and EVSE on the same
  side of the street as per current ESB Networks practices.

- The MIC of combined EVSE fed from a single ESB Networks mini pillar or overhead network is limited by the LV capacity and voltage drop of the feeding network.
- The EVSE installation should have suitable protective measures in line with Irish Wiring Rules set by NSAI on the customers side of the EVSE to detect any faults, or broken conductors and disconnect the EV load.
- Neutralising is undertaken at the midi pillar located immediately adjacent to EVSE and not in the main metering cubicle.
- Midi pillars should be located max. 50cm from the EVSE.
- Customer to provide the cross-bonding earth wire (via 16 mm2 earth wire) between midi pillar and EVSE as enclosures are within 2 metres of each other. Customer is responsible for the earthing arrangement of EVSE.
- Standard current ESB Networks stocked equipment is installed in the midi pillar i.e., 100 Amp three phase cut out and isolator.
- Cable between the Customer Metering Pillar and midi pillar are an ESB Networks asset.
   ESB Networks staff install all ESB Networks cables.
- All civil works carried out in line with current ESB Networks standards between the minipillar/overhead line and the EVSE. The customer should make all necessary arrangements for the civil works from the ESB Networks connection point to the customer interface point at their own expense. It is advisable to install the duct from the mini pillar/overhead line directly into the metering pillar.
- All ducting housing ESB Networks cables should be sourced from ESB Networks approved material suppliers.
- All ducting installed as per <u>Housing Schemes: Guidelines for ESB Networks Standards for</u> <u>Electrical Services</u>.

The customer metering pillar contains ESB Networks equipment only. The cut-out, meter and the distribution busbar are located in a single door customer metering cubicle.

#### 1.3 Solution C – Residential and Neighbourhood Charging

#### Figure 3: Solution C – Residential and Neighbourhood Charging Drawing



Figure 4: Solution C – Residential and Neighbourhood Charging Associated Ducting Layout



- EVSE can either have a built-in dedicated ESB Networks compartment or, as an alternative solution, a midi-pillar could be located adjacent to the EVSE
- This solution may be utilised in publics spaces, typically within residential housing estates to comply with ZEVI guidelines on Residential and Neighbourhood charging available here.
- The customer interface point is established at the EVSE or immediately adjacent to it. As can be seen from figure 3 and 4 above, the customer has two options, EVSE containing a separate ESB Networks compartment or EVSE with adjacent midi pillar containing ESB Networks equipment.
- The customer metering pillar is an enclosure supplied by the customer which complies with the latest Code of Practice for Customer Interface.
- In Figure 3 above, the 15 metre earth at the customer metering pillar is owned and installed by ESB Networks. The frame of the metring pillar should be bonded to the 15 metre earth as per the above drawing.
- The earth rod(s) at the EVSE is installed by the customer like any other LV installation.
- ESB Networks to install cable from mini pillar or overhead line to customer metering pillar and from customer metering pillar to the EVSE. The customer metering pillar and EVSE with separate dedicated ESB Networks compartment are supplied by the customer.
- For each customer metering pillar, the total MIC should not exceed 49 kVA (71 A). Typically, six EVSE can be connected per customer metering pillar. The maximum distance between ESB Networks mini pillar and most remote EVSE connected is 110 metres. It is advised to locate the customer metering pillar and EVSE on the same side of the street as per current ESB Networks practices.
- The MIC of combined EVSE fed from a single ESB Networks mini pillar or overhead network is limited by the LV capacity and voltage drop of the feeding network.
- To allow multiple EVSE circuits, a busbar arrangement is required in the customer metering pillar as per Figure 3 above. This busbar allows for the connection of up to three outgoing 3 phase cables. This is installed by ESB Networks with 3 X 25/16 sqmm cables being used to connect the EVSE to the busbar and 16 sqmm PVC/PVC cables are used to connect the meter to the busbar.
- The enclosure for DSO equipment in the customer owned EVSE should meet the spacing requirements set out in latest Code of Practice for Customer Interface.
- The EVSE installation should have protective measures in line with Irish Wiring Rules set by NSAI on the customers side of the EVSE to detect any faults, or broken conductors and disconnect the EV.
- Neutralising is undertaken at the EVSE and not in the main metering cubicle.
- Standard current ESB Networks stocked equipment is installed in ESB Networks compartment of EVSE i.e., 100 Aamp three phase cut out and isolator.

- Cables between the customer metering pillar and all EVSEs are ESB Networks assets.
   ESB Networks staff install all ESB Networks cables
- All civil works carried out in line with current ESB Networks standards between the minipillar/overhead line and the EVSE. The customer should make all necessary arrangements for the civil works from the ESB Networks connection point to the customer interface point at their own expense, as per the document <u>Basis of Charges for Connection to the</u> <u>Distribution System</u>.
- All ducting sourced from <u>Approved Material Suppliers for LV, MV, 38kV and 110kV Associated</u> <u>Works</u>.
- All ducting installed to <u>Housing Schemes: Guidelines for ESB Networks Standards for</u> <u>Electrical Services</u>.

The customer metering pillar contains ESB Networks equipment only. The cut-out, meter and the distribution busbar are located in a single door customer metering cubicle.

# Derogations

No derogations are recorded against the requirements of this document.

### Terms, Definitions and Symbols Used

For the purposes of this document, the following terms and definitions apply.

#### Table 2: Terms & Definitions

LI ranking	Definition
AC	Alternating Current
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
LV	Low Voltage
MIC	Maximum Import Capacity
PL	Public Lighting
ESBN	ESB Networks
NSAI	National Standards Authority of Ireland



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