



Pure energy from Statkraft

Commercial EV charging supply and commission guide for contractors

Alfen Charging equipment. V1.2

This document has been produced for customers of Mer Fleet Services to provide guidance for their contractors on the supply and commission requirements for electric vehicle charge points.

Groundworks:

- Cable trenches should be dug to a minimum of 450mm or 600mm (to top of ducting) if on public highways. This depth may increase in different areas depending on the local DNO.
- Ducting inspection chambers should be installed whenever the trench needs to change direction. This makes it a lot easier when pulling cables through.
- PVC cable ducting should always be used when cables are to be buried.
- Cable duct sizes should be selected to have a fill factor capacity of less than 40% considering any future proofing measures.
- Power and data cables should be kept in separate ducts to adhere to BS7671.
- It is good practice to install a spare rope inside a duct.
- Ducting should be covered with sand and electrical warning tape similar to the image on the right:



Charger mounting options:

All Alfen chargers are designed for either wall or post mounting.

Where the charger is to be post mounted, a prefabricated concrete base should be used. We recommend using the Alfen prefabricated which can be purchased through Mer Fleet Services.

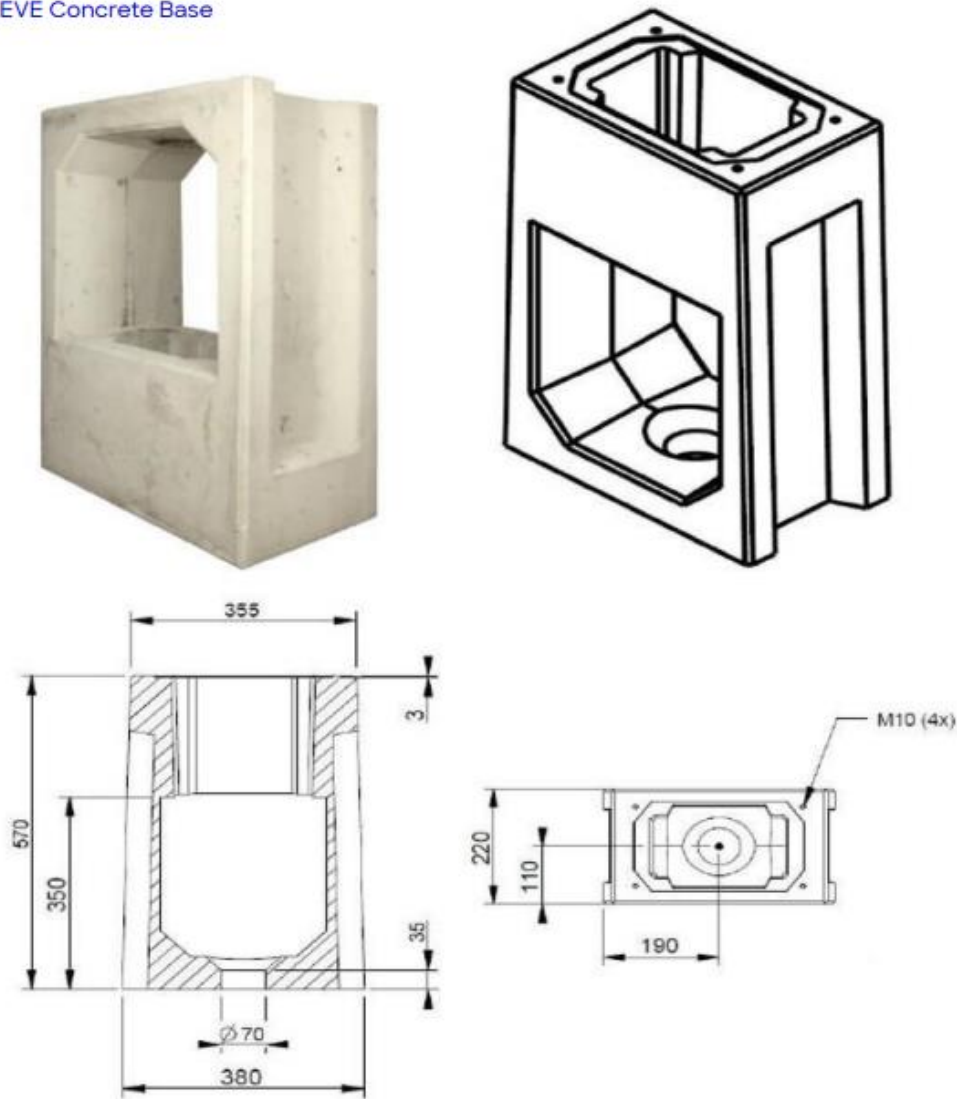
However, it is also possible to build your own concrete base/plinth if preferred.

Details for both options are explained on the following pages.

In all circumstances it is the responsibility of the client to ensure a suitable base is installed. Please use the information in the following pages of this document for guidance.

Alfen prefabricated concrete base installation:

Alfen EVE Concrete Base



The Alfen prefabricated concrete base is extremely simple to install and saves a lot of time compared to building a DIY base. The base weighs around 40kg so great care and attention must be taken when manoeuvring and lifting into place.

Basic instructions and guidance for installing the bases can be found on the following pages of this guide.

For Alfen EVE Dual Proline chargers:

- The long edge of the base should always be set parallel with the kerb/front of the parking space. The front of the base should be approx. 300mm behind the back edge of the kerb.
- Where practicable the full depth of the prefabricated base should be set below ground. Where this is not possible, the base can be cut shorter. However, the base should never be cut shorter than 500mm.
- The concrete base should be set into the ground with the top edge being around 10-20mm above ground level.
- A hole should be dug to approx. 600mm (L) X 400mm (W) x 630mm (D).
- Approx. 30mm of sharp sand should be placed in the hole to help with bedding and levelling the base.
- The cable duct(s) should be in place before setting the base. The duct(s) pass through the centre of the base and should be left approx. 200mm above the top of the base.
- The base should be placed in the hole and levelled using a spirit level and mallet.
- Screw four M10 bolts in the 4 fixing holes on the top of the base. This is to prevent them filling with cement during installation and causing damage to the threads.
- Once the base is square and level it should be set in place using postcrete mixed with water. An appropriate number of bags should be used in relation to the depth of the base if cut down). Around 6 bags of postcrete should be used for a full-size base.
- Hardcore/MOT can be used with the postcrete to bring the mix up to the top of the base.
- Ensure that any cement/postcrete is washed off the top face of the base after being set in place. Take extra care with the threaded holes in the top of the base to ensure no concrete gets inside them. The holes should have M10 bolts put in them during installation to prevent ingress of concrete.



For Alfen Eve Single Proline charger (1 charger):

- The long edge of the base should always be set parallel with the kerb/front of the parking space. The front of the base should be approx. 300mm behind the back edge of the kerb.
- Where practicable the full depth of the prefabricated base should be set below ground. Where this is not possible, the base can be cut shorter. However, the base should never be cut shorter than 500mm.
- The concrete base should be set into the ground with the top edge being around 10-20mm above ground level.
- A hole should be dug to approx. 600mm (L) X 400mm (W) x 630mm (D).
- Approx. 30mm of sharp sand should be placed in the hole to help with bedding and levelling the base.
- The cable duct(s) should be in place before setting the base. The duct(s) pass through the centre of the base and should be left approx. 200mm above the top of the base.
- The base should be placed in the hole and levelled using a spirit level and mallet.
- Screw four M10 bolts in the 4 fixing holes on the top of the base. This is to prevent them filling with cement during installation and causing damage to the threads.
- Once the base is square and level it should be set in place using postcrete mixed with water. An appropriate number of bags should be used in relation to the depth of the base if cut down). Around 6 bags of postcrete should be used for a full-size base.
- Hardcore/MOT can be used with the postcrete to bring the mix up to the top of the base.
- Ensure that any cement/postcrete is washed off the top face of the base after being set in place. Take extra care with the threaded holes in the top of the base to ensure no concrete gets inside them. The holes should have M10 bolts put in them during installation to prevent ingress of concrete.



For 2 x Alfen Eve Single Proline chargers (on a back-to-back post):

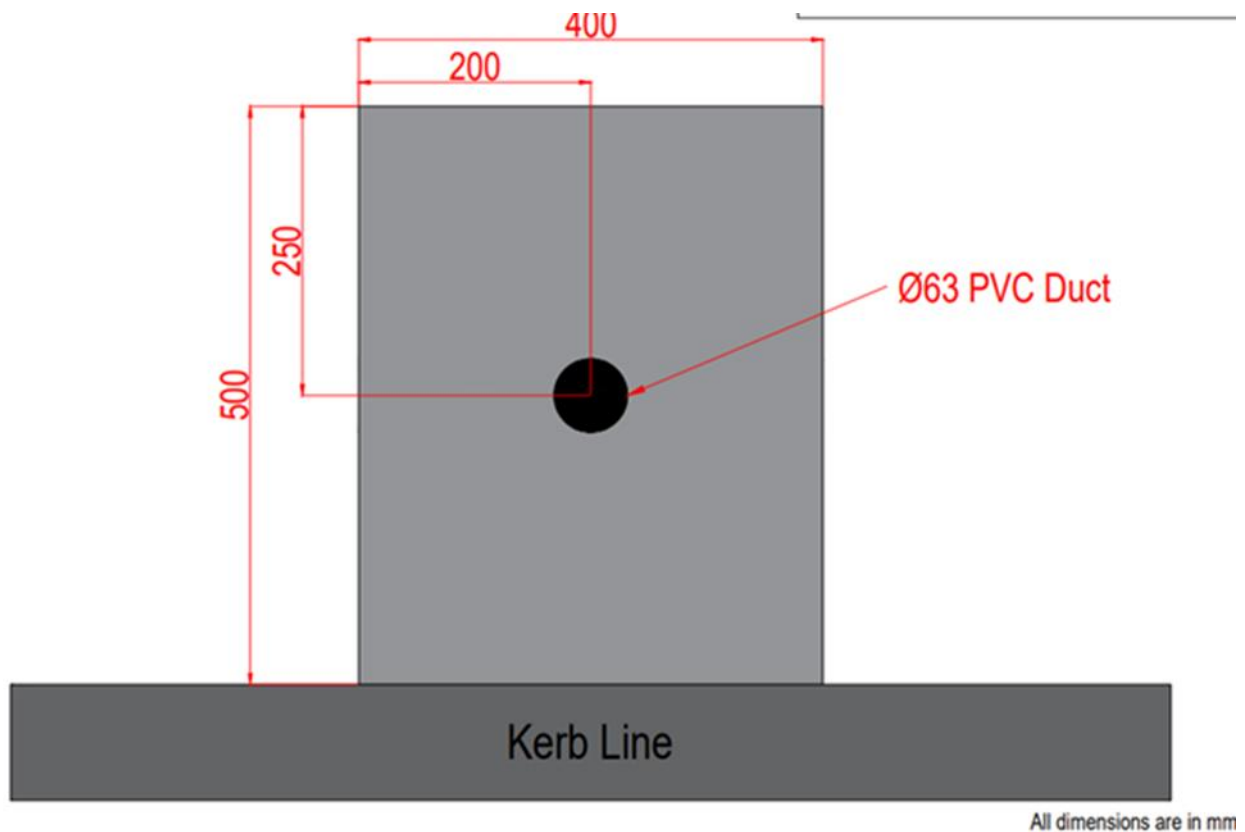
- The side edge (short edge) of the base should always be set parallel with the kerb/front of the parking space. The side edge of the base should be approx. 100mm behind the back edge of the kerb.
- Where practicable the full depth of the prefabricated base should be set below ground. Where this is not possible, the base can be cut shorter. However, the base should never be cut shorter than 500mm.
- The concrete base should be set into the ground with the top edge being around 10-20mm above ground level.
- A hole should be dug to approx. 600mm (L) X 400mm (W) x 630mm (D).
- Approx. 30mm of sharp sand should be placed in the hole to help with bedding and levelling the base.
- The cable duct(s) should be in place before setting the base. The duct(s) pass through the centre of the base and should be left approx. 200mm above the top of the base.
- The base should be placed in the hole and levelled using a spirit level and mallet.
- Screw four M10 bolts in the 4 fixing holes on the top of the base. This is to prevent them filling with cement during installation and causing damage to the threads.
- Once the base is square and level it should be set in place using postcrete mixed with water. An appropriate number of bags should be used in relation to the depth of the base if cut down). Around 6 bags of postcrete should be used for a full-size base.
- Hardcore/MOT can be used with the postcrete to bring the mix up to the top of the base.
- Ensure that any cement/postcrete is washed off the top face of the base after being set in place. Take extra care with the threaded holes in the top of the base to ensure no concrete gets inside them. The holes should have M10 bolts put in them during installation to prevent ingress of concrete.



Building your own concrete base:

- A concrete base/plinth can be built/cast on site using concrete and timber shuttering etc.
- **The base should be at least 500mm (L) x 400mm (W) x 450mm (D).**
- The cable duct(s) should pass through the centre of the base.
- The maximum size of PVC ducting to be used should not exceed 65mm.
- The base should be completely flat and level.
- It is recommended for the base to be built to be flush with the path/kerb etc.
- If bollards are to be installed in front of the charger, extend the base length to 600mm and install the bollards tight to the back of the kerb.

Below: This is the recommended measurements and layout to be followed when building a DIY base/plinth.



Where the EV charger is to be wall mounted:

All Alfen EVE Proline chargers are designed to be wall or post mounted. If the charger is to be wall mounted, please follow the steps below to ensure the site is ready when Mer FS engineers arrive to carry out the commissioning of the charger:

Alfen EVE Dual Proline chargers:

- The charge point is typically mounted approx. 900mm – 1000mm from the finished floor level.
- Dual socket charge points should usually be mounted in the centre of 2 parking bays, on the line (where applicable).
- The cable entry is always from underneath the charge point.
- If the cable is to be supplied from above the charge point, please route the cable down either side. The cable should be routed at least 350mm from the centre line of the parking bay to allow the charge point to sit centrally. It is recommended to use cable tray for fixing the cable.
- Where data cable is to be installed for load balancing or signal purposes, please route the data cable in the same manner as the SWA. The data cable could be contained within PVC or galvanized conduit for protection or fastened to cable tray.
- **IMPORTANT! – Please leave at least 1.5m of excess length on the cable to aid with final terminations.**



Alfen EVE Single Proline chargers:

- The charge point is typically mounted approx. 900mm – 1000mm from the finished floor level.
- Single socket charge points should usually be mounted in the centre 1 parking bay. (Where applicable).
- The cable entry is always from underneath the charge point.
- If the cable is to be supplied from above the charge point, please route the cable down either side. The cable should be routed at least 250mm from the centre (charge point location) of the parking bay to allow the charge point to sit centrally. It is recommended to use cable tray for fixing the cable.
- Where data cable is to be installed for load balancing or signal purposes, please route the data cable in the same manner as the SWA. The data cable could be contained within PVC or galvanized conduit for protection or fastened to cable tray.
- Where data cable is to be installed for load balancing or signal purposes, please route the data cable in the same manner as the SWA. The data cable could be contained within PVC or galvanized conduit for protection or fastened to cable tray.
- **IMPORTANT! – Please leave at least 1.5m of excess length on the cable to aid with final terminations.**



Electrical requirements

General Electrical requirements:

- **Mains power** – it is essential that there is power on site and that the charger can be energised on the day of commissioning.
- **Charge point installation** – It is expected that Mer FS engineers will fix the charge point(s) in place on the day of commissioning.
- **Cable terminations** – It is expected that the client/client's contractor terminate all cables into distribution boards.
 - Mer FS engineers will terminate the cables into the chargers.
- **Switchgear** – All MCB's, MCCB's and RCDs are to be supplied by the client prior to Mer FS engineers attending site.
- **Earthing arrangements** – It is expected that the client identifies the earthing system adopted by their site. By following the guidance in this document along with IET wiring regulations BS7671 18th Edition amendment 2:2022 the client selects the appropriate method of earthing for the chargers being installed.
- **Access** – Access to the local distribution boards and main supply will be required on the day of commissioning. It is strongly advised to have an electrician on site during the commissioning day and all keys that may be required.
- **Electrical installation certificate** – Where possible please can an EIC be provided for the new circuit. Mer FS understands it isn't always practical or possible to test the new circuit(s) without the charger being installed. But, if the cable could be temporarily terminated into an IP box or isolator for testing, this would be advantageous.

Alfen EVE Double Pro Line - 22KW with in-built load balancing:

- 1 x 40A TPN supply required.
- 5 core SWA cable is recommended.
- The cross-sectional area of the cable(s) required should be determined by the contractor's design engineers.
- The SWA cable should not exceed 16mm.
- 2m of excess cable to be left at the charger location.
- The circuit should be protected by a 40A TP C curve MCB.
- The charger has in-built 30mA RCD protection. **No external RCD protection required.**
- 100mA or 300mA RCD protection may be required if supplied from a TT feeder pillar.
- If the charger is located outdoors, a TT earth is to be provided from a local earth electrode in all cases, unless O-PEN protection is being installed.
- 16mm earth cable to be used from the earth electrode to the charger.
- The maximum Zs electrode reading should not exceed 100 Ohms.
- The charger has an in-built Sim card which means data cables are not usually required.
- 1 x Cat6 data cable required if the charger requires advanced load balancing or ethernet connection (poor signal areas).



Alfen EVE Double Pro Line - 22KW with dual incomer. (No in-built load balancing):

- **2 x 40A TPN supplies required - IMPORTANT!**
- 5 core SWA cable is recommended for each circuit.
- The cross-sectional area of the cable(s) required should be determined by the contractor's design engineers.
- The SWA cable should not exceed 16mm.
- 2m of excess cable to be left at the charger location.
- Each circuit should be Protected by a 40A TP C curve MCB.
- The charger has in-built 30mA RCD protection. **No external RCD protection required.**
- 100mA or 300mA RCD protection may be required if supplied from a TT feeder pillar.
- If the charger is located outdoors, a TT earth is to be provided from a local earth electrode in all cases, unless O-PEN protection is being installed.
- 16mm earth cable to be used from the earth electrode to the charger.
- The maximum Zs electrode reading should not exceed 100 Ohms.
- The charger has an in-built Sim card which means data cables are not usually required.
- 1x Cat6 data cable required if the charger requires advanced load balancing or ethernet connection (poor signal areas).



Alfen EVE Double Pro Line - 7KW with in-built load balancing:

- 1 x 40A SP supply required.
- 3 core SWA cable is recommended.
- The cross-sectional area of cable(s) required should be determined by the contractor's design engineers.
- The SWA cable should not exceed 16 mm.
- 2m of excess cable to be left at the charger location.
- The circuit should be protected by a 40A SP C curve MCB.
- The charger has in-built 30mA RCD protection. **No external RCD protection required.**
- 100mA or 300mA RCD protection may be required if supplied from a TT feeder pillar.
- If the charger is located outdoors, a TT earth is to be provided from a local earth electrode in all cases, unless O-PEN protection is being installed.
- 16mm earth cable to be used from the earth electrode to the charger.
- The maximum Zs electrode reading should not exceed 100 Ohms.
- The charger has an in-built Sim card which means data cables are not usually required.
- 1 x Cat6 data cable required if the charger requires advanced load balancing or ethernet connection (poor signal areas).



Alfen EVE Double Pro Line - 7KW with dual incomer. (No in-built load balancing):

- **2 x 40A SP supplies required – IMPORTANT!**
- 3 core SWA cable is recommended.
- The cross-sectional area of the cable(s) required should be determined by the contractor's design engineers.
- The SWA cable should not exceed 16mm.
- 2m of excess cable to be left at the charger location.
- Each circuit should be Protected by a 40A SP C curve MCB.
- The charger has in-built 30mA RCD protection. **No external RCD protection required.**
- 100mA or 300mA RCD protection may be required if supplied from a TT feeder pillar.
- If the charger is located outdoors, a TT earth is to be provided from a local earth electrode in all cases, unless O-PEN protection is being installed.
- 16mm earth cable to be used from the earth electrode to the charger.
- The maximum Zs electrode reading should not exceed 100 Ohms.
- The charger has an in-built Sim card which means data cables are not usually required.
- 1 x Cat6 data cable required if the charger requires advanced load balancing or ethernet connection (poor signal areas).



Alfen EVE SINGLE Pro Line - 22KW:

- 1 x 40A TPN supply required.
- 5 core SWA cable is recommended.
- The cross-sectional area of the cable(s) required should be determined by the contractor's design engineers.
- The SWA cable should not exceed 16mm.
- 2m of excess cable to be left at the charger location.
- The circuit should be protected by a 40A TP C curve MCB.
- **30mA, 4 pole A-Type RCD protection is required for this charger.**
- 100mA or 300mA RCD protection may also be required if supplied from a TT feeder pillar.
- If the charger is located outdoors, a TT earth is to be provided from a local earth electrode in all cases, unless O-PEN protection is being installed.
- 16mm earth cable to be used from the earth electrode to the charger.
- The maximum Zs electrode reading should not exceed 100 Ohms.
- The charger has an in-built Sim card which means data cables are not usually required.
- 1 x Cat6 data cable required if the charger requires advanced load balancing or ethernet connection (poor signal areas).



Alfen EVE SINGLE Pro Line - 7KW:

- 1 x 4A SP supply required.
- 3 core SWA cable is recommended.
- The cross-sectional area of the cable(s) required should be determined by the contractor's design engineers.
- The SWA cable should not exceed 16mm.
- 2m of excess cable to be left at the charger location.
- The circuit should be protected by a 40A SP C curve MCB.
- **30mA, Double pole, A-Type RCD protection is required for this charger.**
- 100mA or 300mA RCD protection may also be required if supplied from a TT feeder pillar.
- If the charger is located outdoors, a TT earth is to be provided from a local earth electrode in all cases, unless O-PEN protection is being installed.
- Installed. 16mm earth cable to be used from the earth electrode to the charger.
- The maximum Zs electrode reading should not exceed 100 Ohms.
- 16mm earth cable to be used from the earth electrode to the charger.
- The charger has an in-built Sim card which means data cables are not usually required.
- 1 x Cat6 data cable required if the charger requires advanced load balancing or ethernet connection (poor signal areas).



Earthing arrangements:

TN-S Earthing system:

- If an earthing system can be identified to be a dedicated TN-S system and forms part of a balanced system, then the EV charger can be connected direct to the supply earth. An EIC or EICR would be required as evidence of TN-S system. Alternatively, confirmation from your local DNO would be more than adequate.

TN-C-S or PME Earthing system:

When connecting to a TN-C-S or PME earthing system there are 2 options available

- If **O-PEN protection** must be installed if connecting direct to the **PME** or **TN-C-S** supply of the building.

Remember, if the site is supplied by a 3-phase system, then a 3 Phase O-PEN device must be used.

Check out the range of O-PEN monitoring devices from Matt:e for a suitable product.

<https://matt-e.co.uk/three-phase-product-data-sheets/>

Also available from a wide range of wholesalers including CEF and Replenishh:

<https://www.cef.co.uk/catalogue/products/search?q=matt%3Ae>

<https://www.replenishh.com/Catalogue/Search?Query=matt%3Ae&Size=60>

If you are unsure of which type of O-PEN device you require, please contact the team at Mer UK.

- **Earth rod** — The second option is to install an earth rod local to the charge point location with a 16mm earth cable from the earth rod to the charge point. Care must be taken before deciding to install an earth rod and certain criteria must be met.
 - Any extraneous conductive materials must be more than 2.5m away from the charge point location and parking bays where charging vehicles will be parked.
 - Extraneous conductive materials could be metal fences, street lighting posts etc. connected to the PME earthing system.
 - No underground services are present in the immediate location.
 - A Zs Electrode reading of less than 100 Ohms is achievable.

TT Earthing system:

- If the installation earthing system is a TT system, then the charger can be connected direct to the main earth of the building. However, please check that the **Ze reading is below 100 Ohms**.

Document control

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V1.2	10/03/2023	SB	CG	PW
V1.1	21/2/2022	SB	CG	PW

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