

Technical File

The Electric Vehicles (Smart Charge Points) Regulations 2021

This template is provided to assist sellers of relevant charge points that are subject to the Electric Vehicles (Smart Charge Points) Regulations 2021 (“the Regulations”) in meeting the requirements of Regulation 13.

This requires the seller to have a technical file for any relevant charge point that they sell and to supply a copy of the technical file to any purchaser on request. In the event of bulk purchases, a single technical file can be provided for all identical charge points. However, separate technical files are required if there are any differences in make, model, software version, etc. between charge points sold.

The seller is not mandated to use this template, but any alternative format must meet the requirements of the Regulations.

This document is the technical file for the following charge point:

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| Charge point make: | Humax |
| Charge point model: | EH-A01-A0704/GB EH-A01-A0707/GB |
| Software version at point of sale: | 1.4.976 |
| Seller: <i>Person responsible for compliance with the Regulations</i> | Humax Electronics Co.LTD |
| Manufacturer(s): <i>If different to seller</i> | Humax Electronics Co.LTD |
| Last update to technical file: | 1 st April 2024 |

Description of the smart charge point

This page outlines the general description of the charge point, including a description of its design, manufacture, and operation.

(Note: all descriptions must be written in plain English, including written descriptions of any diagrams or drawings used or referred to)

The HUMAX 7kW EV AC charger is an intelligent charge point designed specifically for residential applications compliant with the EVSCP regulations 2021. The charge point has its own type 2 charging cable, ready for use. It communicates to the internet through Wi-Fi connection or Ethernet, and is compliant with OCPP 1.6 protocol. The charge point is equipped with built-in 6mA RDC-DD and PEN fault protection. The end-user can authorize a charging session using a mobile application or an RFID card.

Operating manual

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| Copy of operating manual as available at point of sale can be found (cross as appropriate): | | Attached to this document (hard copy) |
| | | Attached to this document as a digital file (soft copy) |
| | | Available online via hyperlink (soft copy) |
| Link if available online: | | |
| Version of file received at point of sale if available online: | | |

Technical solutions implemented to meet the requirements of the Regulations.

This section provides descriptions in plain English of the solutions adopted to meet the requirements of the Regulations, including descriptions and explanations in plain English of any diagrams or drawings used.

Information provided here may be appended if appropriate, but any appendages should be listed here clearly indicating which specific requirement(s) they evidence.

Smart functionality

| Requirement | Technical solution adopted to meet the requirement |
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| Charge point is able to send and receive information via a communications network | The charge point can connect to the internet through Wi-Fi or ethernet. It can send and receive information based on the OCPP 1.6 protocol. |
| Charge point can respond to signals or other information received by it by: <ul style="list-style-type: none"> Increasing or decreasing the rate of electricity flowing through the charge point Changing the time at which electricity flows through the charge point | The charge point can respond to signals sent by the OCPP server to control the rate and timing of the current flow through the charge point based on the OCPP 1.6 protocol. |
| Charge point can use this functionality to provide demand-side response services, including response DSR services | The charge point can utilise the electricity flow and timing control for demand side response service once it is available on Humax software |
| Charge point has at least one user interface, incorporated in the charge point or otherwise made available to the owner | The charge point has the Humax mobile app, its access point web page, LED indicator, and RFID card available as a user interface |

Electricity supplier interoperability

| Requirement | Technical solution adopted to meet the requirement |
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| The charge point is configured such that it will not cease to have smart functionality if the owner changes their electricity supplier | The charge point smart functionality depends on the availability of an accessible 2.4GHz Wi-Fi with an internet connection and minimum signal strength of -60dBm/ethernet connection or on the availability of 4G network connectivity. Change in electricity supplier does not influence the charge point smart functionality |

Loss of communications network access

| Requirement | Technical solution adopted to meet the requirement |
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| <p>The charge point is configured such that, in the event it ceases to be connected to a communications network, it will remain capable of charging an electric vehicle</p> | <p>The charge point can be paired to the HUMAX RFID card through the Humax app as a Charge Key which can be used when the network is offline.</p> |

Safety

| Requirement | Technical solution adopted to meet the requirement |
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| <p>The charge point is configured such that it will not allow a relevant person to carry out a specified operation where to do so would or may result in a risk to the health or safety of persons.</p> <p>“Relevant persons” means the owner or an end-user of the relevant charge point who is not the owner.</p> <p>“Specified operation” means:</p> <ul style="list-style-type: none"> • Overriding the default mode of charging during the default charging hours • Overriding the provision of demand-side response services • Overriding the random delay | <p>The charge point operation is changeable through a secure authorized access of its user interface. The charge point is also equipped with well-designed automated electrical protection which along with the externally required electrical protection device, such as type A or type F RCD, protects the end-user and other person in the vicinity from health and safety hazards.</p> |

Measuring system

| Requirement | Technical solution adopted to meet the requirement |
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| <p>On each occasion it is used, the charge point measures or calculates:</p> <ul style="list-style-type: none"> • The electricity it has imported or exported (in watt-hours or kilowatt-hours) • The amount of time for which it is importing or exporting electricity | <p>The charge point measures the electricity flow using a current transformer and voltage sensor and records the time of the charging session accordingly. These data are then processed to calculate the electrical power in watt-hours and sent to the Humax server.</p> |
| <p>The charge point is configured such that the owner can view the information in reference to:</p> <ul style="list-style-type: none"> • Any occasion on which it was used to import or export electricity within the past 12 months | <p>All charging sessions are stored in the Humax servers. The owner of the charge point can retrieve all relevant information since the charge point was connected to Humax.</p> |

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| <ul style="list-style-type: none"> • Any month within the past 12 months • The entirety of the last 12-month period | |
| <p>The charge point is configured such that it can:</p> <ul style="list-style-type: none"> • On each occasion it is used, measure or calculate every one second the electrical power it has imported or exported (in watts or kilowatts) • Provide this information via a communications network | <p>The charge point calculates the power from the measurement of current and voltage. The current and voltage are measured in real time using an analog sensing device which is then sampled digitally. The measurement is then sampled accordingly to optimize user experience and system performance. When needed, the charge point can measure and send the electrical power data to the OCPP server every second.</p> |
| <p>The charge point is configured such that:</p> <ul style="list-style-type: none"> • The figures measured or calculated are accurate to within 10% of the actual figure • Any inaccuracies are not systematic | <p>The charge point is equipped with a power measurement device with $\pm 2\%$ accuracy.</p> |

Off-peak charging

| Requirement | Technical solution adopted to meet the requirement |
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| <p>The charge point:</p> <ul style="list-style-type: none"> • Has pre-set default charging hours which are outside of peak hours • Offers the owner the opportunity to accept, remove, or change the default charging hours on first use • Offers the owner the ability to change, remove, or set default charging hours any time after first use <p>unless the charge point is sold with a DSR agreement, configured to comply with the requirements of this agreement, and details of the agreement are included in the statement of compliance</p> | <p>When the Humax charge point is added to Humax platform during the first setup, it automatically set up charging schedule sessions at off peak hours. The user is also presented with an option to modify the default schedule outside off peak hours.</p> |
| <p>The charge point is configured:</p> <ul style="list-style-type: none"> • To charge a vehicle during the default charging hours (if any), unless the owner overrides the | <p>The owner has the option to disable and enable peak-hours charging at any later time in the Humax mobile application.</p> |

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| <p>default mode of charging during this time</p> <ul style="list-style-type: none"> • Such that the owner can override the provision of demand side response services | |
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Randomised delay

| Requirement | Technical solution adopted to meet the requirement |
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| <p>The charge point is configured such that it must operate, at each relevant time, with a delay of random duration up to 600 seconds, determined to the nearest second each time</p> | <p>Humax app configures random delay up to 600s when each charging session is initiated. The delay is applied randomly for each session and is independent to other sessions.</p> |
| <p>The charge point is configured such that the maximum duration of this delay can be remotely increased to up to 1800 seconds if required</p> | <p>As the random delay is handled by the Humax server, Humax will be able to implement a forced longer random delay in the backend if required.</p> |
| <p>The charge point is configured such that the random delay will not operate where:</p> <ul style="list-style-type: none"> • The owner or another relevant end-user has manually overridden it • An equivalent random delay has already been applied to the operation of the relevant charge point • The charge point is responding to a response DSR service | <p>The random delay is implemented immediately once the user initiates the charging session. The user can override the random delay by using the “Charge Now” option.</p> <p>The random delay will not operate if a DSR service is used.</p> |

Security

[Information in this section is only required from 30 December 2022. Before this date, completing this section is optional.]

| Requirement | Technical solution adopted to meet the requirement |
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| <p>General principles</p> <p>The charge point is designed, manufactured, and configured to provide appropriate protection:</p> <ul style="list-style-type: none"> • Against the risk of harm to or disruption of the electricity system • Against the risk of harm to or disruption of the charge point | <ol style="list-style-type: none"> 1) If a charge point is in any way in unsafe condition, as defined by IEC 61851, it will switch to fault mode. The user will not be able to override the specified operation. 2) OCPP J1.6 whitepaper profile 2 or above is implemented on the communication between the charge point and the OCPP platform |

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| <ul style="list-style-type: none"> For the personal data of the owner and any other end-user of the relevant charge point | |
| <p>Passwords</p> <p>The charge point is configured such that passwords are used on it:</p> <ul style="list-style-type: none"> The password is unique to the charge point and not derived from, or based on, publicly available information, or is set by the owner The password cannot be reset to a default password applying to both the charge point and other charge points | <p>The charge point emits a local access point for the first 15 minutes the charge point is powered up. The user's smartphone can connect to the local access point Wi-Fi connection using a generic password. However, the configuration page can only be accessed with a password unique to each charge point. These passwords cannot be changed by the user.</p> <p>Humax mobile application as the main user interface are protected by a password set by the owner of the charge point.</p> |
| <p>Software</p> <p>The charge point incorporates software that can be securely updated using adequate cryptographic measures to protect against cyber attack</p> | <p>The charge point can be upgraded with the OCPP framework through a WebSocket Secure connection which is an encrypted communication.</p> |
| <p>Software</p> <p>The charge point is configured such that:</p> <ul style="list-style-type: none"> It checks for security updates available when first set up by the owner and periodically after It verified the authenticity and integrity of each prospective software update by reference to both the data's origin and its contents and only applies the update if the authenticity and integrity of the software have been validated By default, it provides notifications to the owner about prospective software updates The owner can implement software updates without undue difficulty | <p>The secure firmware upgrade is done as per use case L01 in section 4 of the OCPP 1.6 security white paper. Humax provides,</p> <p>Humax update server with firmware files that are signed with the Manufacturer Root Certificate. The charge point will verify the certificate when update server sends a SignedUpdateFirmware.req command. A firmware upgrade can only be done if the certificate is validated.</p> <p>The user will receive a notification in the portal and the app if there is new firmware available for upgrade. The user will then be able to update the firmware directly through the Humax portal and app with a click of a button.</p> |
| <p>Software</p> <p>The charge point is configured such that:</p> <ul style="list-style-type: none"> It verifies via secure boot mechanisms that its software has not been altered other than in | <p>A dedicated security chip is used to ensure the secure boot and secure storage on the MCU. The network communication chip also provides secure boot and storage.</p> <p>The charge point will send either InvalidFirmwareSignature or InvalidFirmwareSigningCertificate message if there is</p> |

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| <p>accordance with a validated software update</p> <ul style="list-style-type: none"> • If unauthorised change to the software is detected, it notifies the owner and does not connect to a communications network other than for purposes of this notification | <p>an unauthorised firmware upgrade. Humax user app will notify the owner of this security event via app.</p> |
| <p>Sensitive security parameters</p> <p>The charge point is configured such that:</p> <ul style="list-style-type: none"> • Security credentials stored on the charge point are protected using robust security measures. • Software does not use hard-coded security credentials | <p>A dedicated security chip is used to ensure the secure boot and secure storage on the MCU. The network communication chip also provides secure boot and storage.</p> |
| <p>Secure communication</p> <p>The charge point is configured such that communications it sends are encrypted</p> | <p>The charge point communicates with the Humax server through a Websocket Secure connection which is an encrypted communication.</p> |
| <p>Data inputs</p> <p>The charge point is configured such that:</p> <ul style="list-style-type: none"> • Data inputs are verified so that the type and format of the data are consistent with that expected for the function. • If such data cannot be verified, it is discarded or ignored by the charge point in a relevant manner | <p>OCPP 1.6J is used for communication between Humax server and the charge point. Non-compliant messages to OCPP standard will be ignored.</p> |
| <p>Ease of use</p> <p>The charge point is configured to minimise the inputs required from the owner in connection with its set-up and operation</p> | <p>The charge point configuration can be accessed through the local access point which is open for the first 15 minutes after it is powered up.</p> <p>Separate Humax installation app is provided to configure the charge point in simpler step by step method.</p> |
| <p>Ease of use</p> <p>The charge point is configured such that any personal data can be deleted from it by the owner without undue difficulty</p> | <p>All personal data stored by Humax can be deleted by contacting Humax support.</p> |
| <p>Protection against attack</p> <p>The charge point is designed and manufactured to provide an adequate</p> | <p>The charge point enclosure has an impact protection rating of IK10 and an ingress protection rating of IP65</p> |

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| <p>level of protection against physical damage to the charge point</p> | |
| <p>Protection against attack The charge point incorporates a tamper-protection boundary to protect the internal components of the charge point</p> | <p>The charge point provides an enclosure that is protected by an enclosure alarm using an infrared sensor.</p> <p>If there is an attempt to breach the tamper-protection boundary, Humax server will receive a TamperDetectionActivated message from the charge point and Humax will notify the owner via app notification.</p> |
| <p>Protection against attack The charge point is designed and manufactured to provide an adequate level of protection to its user interfaces and against use or attempted use of the charge point other than through the user interface</p> | <p>The charge point can be used through a password-protected user interface either from the app or the registered RFID. The configuration page, accessible from the local access point, is protected with a unique password.</p> <p>The charge point is protected by a tamper protection boundary and encrypted communication to protect against unauthorized use.</p> |
| <p>Protection against attack The charge point is configured such that:</p> <ul style="list-style-type: none"> • If there is an attempt to breach the tamper-protection boundary, the owner is notified • Its software runs with only the minimum level of access privileges required to deliver functionality • Any logical or network interfaces that are not required for the normal operation of the charge point or otherwise comply with the Regulations are disabled • Software services are not available to the owner unless necessary for the relevant charge point to operate • Any hardware interfaces that are used for the purposes of testing or development, but not otherwise during the operation of the charge point are not exposed | <p>An attempt to breach the tamper protection boundary will trigger Humax to notify the owner of the charge point through app notification.</p> <p>The charge point configuration page from the charge point Wi-Fi interface is only accessible within 15 minutes after the charge point power is turned on.</p> <p>All hardware interfaces are disabled, or password protected (log debug interface).</p> |
| <p>Security log The charge point incorporates a security log – an electronic record that includes attempts (whether or not successful) to:</p> | <p>Such security events will be logged as per OCPP 1.6 security white paper. The log is stored in the Humax server.</p> |

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| <ul style="list-style-type: none">• Breach the tamper-protection boundary• Tamper with the relevant charge point• Gain unauthorised access to the charge point <p>These entries must record the time and date the event occurred (by reference to Coordinated Universal Time).</p> | |
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