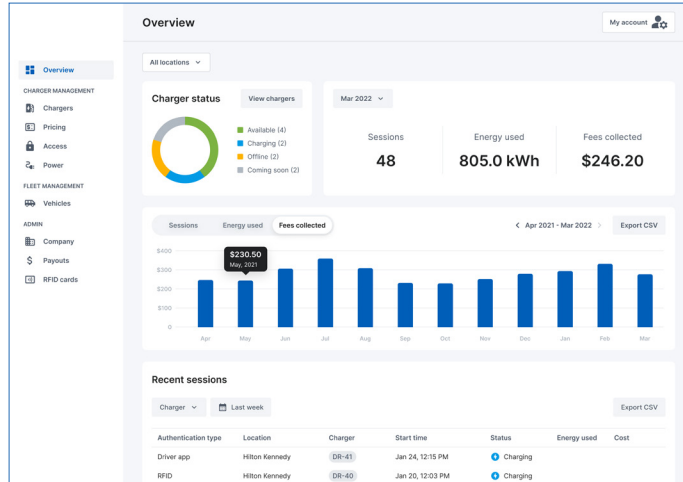


Guide to integrating Eaton chargers with different CNMs V1.0



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Introduction

This document serves as a guide for the integration of Eaton Green Motion Pro and non-Pro chargers with a third-party Charge Network Management (CNM) system utilizing the OCPP 1.6j protocol. Within the scope permitted by the protocol, we have incorporated customized content into some of the OCPP messages to enhance the utility of our charger. Please consider this document as a reference for your integration process.

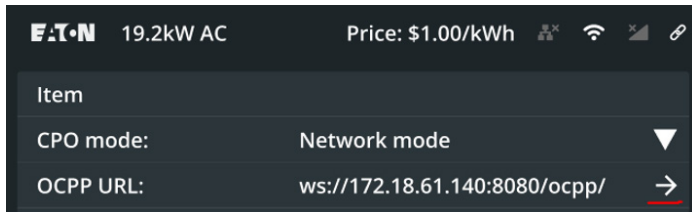
Reconfigure CNM

We provide support for Ethernet and 2.4 GHz Wi-Fi across all units (2.4 GHz only, no 5 GHz). Additionally, a cellular connection is available for 4G SKUs. For non-Pro units, the Ethernet connection is always prioritized. For Pro units, the charger will exclusively use the selected connection method for internet access.

To switch to CNM on Green Motion Pro chargers:

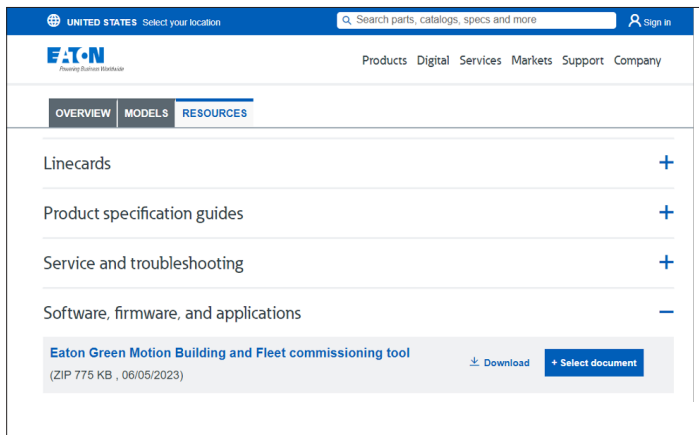
Log in to "Admin Menu" -> "Connectivity Settings" -> "CPO Settings" and modify the OCPP URL from here.

Both SKUs can connect to WS and WSS servers. The AMAZON_ROOT_CA.cer and some other common certificates are pre-installed out of the factory.



Switch CNM for Green Motion non-Pro chargers:

We use a TCP app on PC to configure the non-Pro charger via Ethernet connection. The TCP tool can be found on the Eaton website along with the instruction—[Green Motion Fleet | Eaton](#).



Message format example

1. Boot notification (message to CNM)

```
[2, "3be300e3-f9b4-4d77-a753-6a401a2d43cf", "BootNotification", {"chargePointVendor": "Eaton", "chargePointModel": "GMEV48CMC1-WC", "chargePointSerialNumber": "EVB-05B-0016", "firmwareVersion": "004654-01G-005225-01G", "iccid": "*****"}]
```

- The ICCID will only be displayed in boot notification if it is a 4G charger.
- EVSE uses boot notification and heartbeat to sync the time.

2. Start transaction (to CNM)

```
[2, "443089f9-7851-4195-85ae-d87397364458", "StartTransaction", {"connectorId": 1, "idTag": "*****", "meterStart": 556677, "reservationId": 0, "timestamp": "2024-07-02T15:51:19Z"}]
```

- meterStart value in StartTransaction is always 0.
- ConnectorId 1 is for the status of the connector, while 0 represents the whole EVSE.
- For operations initiated by the Central System, ConnectorId 0 is reserved for addressing the entire Charge Point.
- For operations initiated by the Charge Point (when reporting), ConnectorId 0 is reserved for the Charge Point main controller.

3. Remote start transaction (message from CNM)

```
[2, "04e06ff1-f91b-4d8e-950a-1bb3c6665afa", "RemoteStartTransaction", {"connectorId": 1, "idTag": "*****"}]
```

- ConnectorID should be 1 to remote start the charging session.

4. Stop transaction (to CNM)

```
[2, "37c77116-b6a2-4a69-8e4c-a9218272bdc", "StopTransaction", {"idTag": "*****", "meterStop": 588097, "timestamp": "2024-07-02T21:32:58Z", "transactionId": -2055407864, "reason": "EVDIsconnected", "transactionData": [{"timestamp": "2024-07-02T21:32:58Z", "sampledValue": [{"value": "0.0", "context": "Transaction.End", "format": "Raw", "measurand": "Current.Import", "location": "Outlet", "unit": "A"}, {"value": "588.09790", "context": "Transaction.End", "format": "Raw", "measurand": "Energy.Active.Import.Register", "location": "Outlet", "unit": "kWh"}, {"value": "0.00000", "context": "Transaction.End", "format": "Raw", "measurand": "Power.Active.Import", "location": "Outlet", "unit": "kW"}, {"value": "40.0", "context": "Transaction.End", "format": "Raw", "measurand": "Temperature", "location": "Body", "unit": "Celsius"}, {"value": "0.0", "context": "Transaction.End", "format": "Raw", "measurand": "Voltage", "location": "Outlet", "unit": "V"}]}]}
```

- For Green Motion Pro units, meterStop value is the value of the totalizer when the current session ends.
- For Green Motion non-Pro units, meterStop value is the total energy usage for the current session.
- CNM will calculate the price (meterStop - meterStart) and send the final cost message back to the charger for display.

5. Final cost (from CNM)

```
[2, "9691e0b4-11b7-4fd0-8e34-fb4bfa07cf4f", "DataTransfer", {"vendorId": "org.openchargealliance.costmsg", "messageId": "FinalCost", "data": {"transactionId": "484675156", "cost": 0.0, "priceText": "$0.00 @ $0.0/hr, Total kWh: 6.0308, Time: 02:56:03, Cost: $0.00. Scan QR code for receipt.", "qrCodeText": "https://charge.id/receipts/284b829b-6fec-4849-bb21-655e77f9fb15"}]}
```

- EVSE will parse this message and display the value of "Total kWh" and "Cost" from this message on HMI/LCD.

6. Charging price (from CNM)

```
[2, "77d2a4c3-f885-446a-a3d2-f9f68916f23a", "ChangeConfiguration", {"key": "DefaultPrice", "value": {"priceText": "0.00 $/kWh", "priceTextOffline": "0.00 $/kWh", "chargingPrice": {"kWhPrice": 0.0, "hourPrice": 0.0, "flatFee": 0.0}}]}
```

- EVSE will parse this message and display the price on the HMI/LCD.

7. Running cost (from CNM)

```
[2, "50e6aef6-1cde-48de-913d-e8b6a42bb58c", "DataTransfer", {"vendorId": "org.openchargealliance.costmsg", "messageId": "RunningCost", "data": {"transactionId": "484675156", "timestamp": "2024-07-01T13:12:03.000+00:00", "meterValue": 6031, "cost": 0.0, "state": "IDLE", "chargingPrice": {"kWhPrice": 0.0, "hourPrice": 0.0, "flatFee": 0.0}}]}
```

- EVSE will display the running cost of the transaction.

8. Meter values (to CNM) while charging

```
[2, "836289d5-122d-46ea-8f3b-4b2709891301", "MeterValues", {"connectorId": 1, "transactionId": 2055407864, "meterValue": [{"timestamp": "2024-07-02T17:35:28Z", "sampledValue": {"value": 40.6, "context": "Sample.Periodic", "format": "Raw", "measurand": "Current.Import", "location": "Outlet", "unit": "A"}, {"value": 573.52380, "context": "Sample.Periodic", "format": "Raw", "measurand": "Energy.Active.Import.Register", "location": "Outlet", "unit": "kWh"}, {"value": 9.75610, "context": "Sample.Periodic", "format": "Raw", "measurand": "Power.Active.Import", "location": "Outlet", "unit": "kW"}, {"value": 48.0, "context": "Sample.Periodic", "format": "Raw", "measurand": "Temperature", "location": "Body", "unit": "Celsius"}, {"value": 240.3, "context": "Sample.Periodic", "format": "Raw", "measurand": "Voltage", "location": "Outlet", "unit": "V"}]}]}
```

9. Set charging profile (from CNM) to do power management

```
[2, "0e994c30-74b0-4267-874f-0dd77d7ae8fa", "SetChargingProfile", {"connectorId": 1, "csChargingProfiles": {"chargingProfileId": 1, "stackLevel": 1, "chargingProfilePurpose": "TxDefaultProfile", "chargingProfileKind": "Relative", "chargingSchedule": {"chargingRateUnit": "A", "chargingSchedulePeriod": [{"startPeriod": 0, "limit": 6.0, "numberPhases": 1}]}]}
```

- Recommend not to send charging profile to non-Pro units too often (15 s interval). Due to RTOS resource constrain, however, this is not an issue for Green Motion Pro chargers.

10. Reset (from CNM)

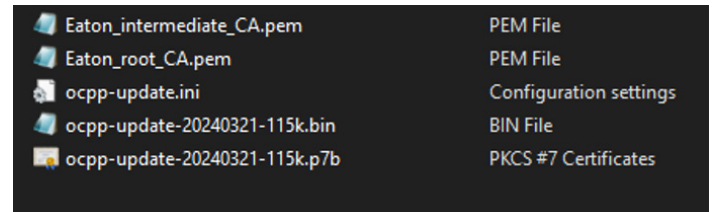
```
[2, "c6ae3d19-9c0a-453a-ac4d-563b8d6aa79b", "Reset", {"type": "Hard"}]}
```

- For Green Motion Pro chargers, this will only reboot the control board and the OCPP stack on Linux system without powering down the whole unit.
- For Green Motion non-Pro chargers, this will power cycle the whole EVSE.

11. Update firmware (from CNM)

```
[2, "94c65c0b-a501-4da5-b764-f5c6478b33df", "UpdateFirmware", {"location": "ftp://*****@***/***/***.rb1", "retrieveDate": "2024-07-02T12:33:43.757+00:00"}]}
```

- For the Green Motion Pro charger: The firmware update package contains five files (see below)—CNM needs to put these files under a folder and store it on an accessible FTP server, then point the charger to this folder for the firmware update.



- For the Green Motion non-Pro charger: CNM needs to store the firmware on an accessible FTP server and provide the path of that firmware file to the EVSE. It cannot just be the folder that contains the firmware file.
- The EVSE will check the signature and firmware version of the file. For example, an 80 A charger will not install the firmware for a 40 A charger and a firmware with an invalid signature will not be installed. For non-Pro units, please make sure not to provide a random file to the EVSE via this message. It can cause the charger to be stuck in an "unavailable" state; however, it can be changed via ChangeAvailability.req from CNM.

12. Get diagnostics (from/to CNM)

```
[2, "54dba0b1-0059-40f9-9b5b-f8b78d0d0333", "GetDiagnostics", {"location": "ftp://192.168.68.57:2221"}]}
```

```
[3, "54dba0b1-0059-40f9-9b5b-f8b78d0d0333", {"fileName": "EJD-12B-0115_240702152726.log"}]}
```

- Once again, the FTP address needs to be accessible by the EVSE, then it will upload the log file to the specified location.
- This file can store approximately 3 days' worth of system logs.

13. An example of configuration key/values that EVSE typically uses

```
3, "1d28de7e-b676-4423-8b6a-e78983f3c1cc", { "configurationKey": [{"key": "AllowOfflineTxForUnknownId", "readonly": false, "value": "false"}, {"key": "AuthorizationCacheEnabled", "readonly": false, "value": "true"}, {"key": "AuthorizeRemoteTxRequests", "readonly": false, "value": "true"}, {"key": "ClockAlignedDataInterval", "readonly": false, "value": "900"}, {"key": "ConnectionTimeout", "readonly": false, "value": "90"}, {"key": "ConnectorPhaseRotation", "readonly": false, "value": ""}, {"key": "GetConfigurationMaxKeys", "readonly": true, "value": "42"}, {"key": "HeartbeatInterval", "readonly": false, "value": "120"}, {"key": "LocalAuthorizeOffline", "readonly": false, "value": "true"}, {"key": "LocalPreAuthorize", "readonly": false, "value": "true"}, {"key": "MeterValuesAlignedData", "readonly": false, "value": "Current.Import,Energy.Active.Import.Register,Power.Active.Import,Temperature,Voltage"}, {"key": "MeterValuesAlignedDataMaxLength", "readonly": true, "value": "1"}, {"key": "MeterValuesSampledData", "readonly": false, "value": "Current.Import,Energy.Active.Import.Register,Power.Active.Import,Temperature,Voltage"}, {"key": "MeterValuesSampledDataMaxLength", "readonly": true, "value": "1"}, {"key": "MeterValueSampleInterval", "readonly": false, "value": "60"}, {"key": "NumberOfConnectors", "readonly": true, "value": "1"}, {"key": "ResetRetries", "readonly": false, "value": "3"}, {"key": "StopTransactionOnEVSidDisconnect", "readonly": false, "value": "true"}, {"key": "StopTransactionOnInvalidId", "readonly": false, "value": "true"}, {"key": "StopTxnAlignedData", "readonly": false, "value": "Current.Import,Energy.Active.Import.Register,Power.Active.Import,Temperature,Voltage"}, {"key": "StopTxnAlignedDataMaxLength", "readonly": true, "value": "1"}, {"key": "StopTxnSampledData", "readonly": false, "value": "Current.Import,Energy.Active.Import.Register,Power.Active.Import,Temperature,Voltage"}, {"key": "StopTxnSampledDataMaxLength", "readonly": true, "value": "1"}, {"key": "SupportedFeatureProfiles", "readonly": true, "value": "Core,FirmwareManagement,LocalAuthListManagement,Reservation,SmartCharging,RemoteTrigger"}, {"key": "SupportedFeatureProfilesMaxLength", "readonly": true, "value": "6"}, {"key": "TransactionMessageAttempts", "readonly": false, "value": "3"}, {"key": "TransactionMessageRetryInterval", "readonly": false, "value": "10"}, {"key": "UnlockConnectorOnEVSidDisconnect", "readonly": false, "value": "true"}, {"key": "LocalAuthListEnabled", "readonly": false, "value": "true"}, {"key": "LocalAuthListMaxLength", "readonly": true, "value": "1000"}, {"key": "SendLocalListMaxLength", "readonly": true, "value": "1000"}, {"key": "ReserveConnectorZeroSupported", "readonly": true, "value": "true"}, {"key": "ChargeProfileMaxStackLevel", "readonly": true, "value": "4"}, {"key": "ChargingScheduleAllowedChargingRateUnit", "readonly": true, "value": ""}, {"key": "ChargingScheduleMaxPeriods", "readonly": true, "value": "10"}, {"key": "MaxChargingProfilesInstalled", "readonly": true, "value": "5"}, {"key": "SecurityProfile", "readonly": false, "value": "2"}, {"key": "CpoName", "readonly": false, "value": "00000"}, {"key": "Rssi", "readonly": true, "value": "-103"}, {"key": "OfflineAutoCharging", "readonly": false, "value": "false"}, {"key": "CustomDisplayCostAndPrice", "readonly": false, "value": "true"}, {"key": "OCPPIdentity", "readonly": true, "value": "05B-ZBYS-EVB"}], "unknownKey": [] }
```

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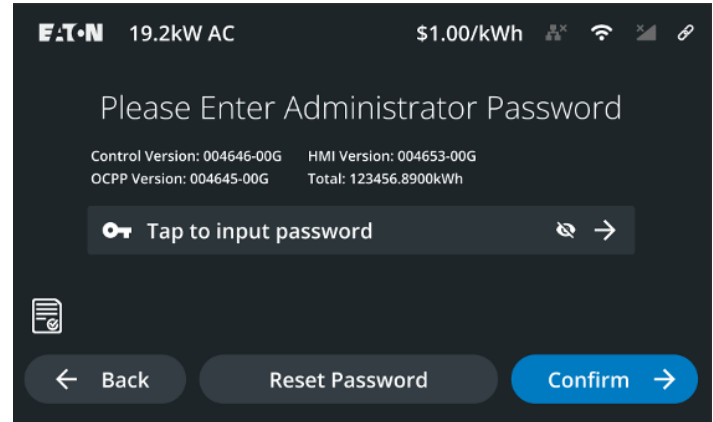
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Version control

Green Motion Pro chargers

Firmware is divided into three parts:

- **Control:** Electronic control firmware that can be updated Over The Air (OTA)
- **HMI:** Human Machine Interface firmware that cannot be updated OTA
- **OCPP:** The software stack on top of the system, which can be updated OTA



The first six digits (before the hyphen) of the version number will always remain the same, unless there is a major structural change. The last three characters of each firmware version will increment by one upon each update. For example, a version might change from 004646-00G (before the update) to 004646-01G (after the update).

Charger supports full system-level OTA updates if needed. Fallback/failsafe mechanism is also implemented.

Green Motion non-Pro chargers

The firmware version is displayed on the bottom left of the LCD, starting with 'V.'. For example, the firmware version in this figure is N1-3P1_C_1.2.1C6_R4690. The R4690 part will increment if there are minor updates, and the 1.2.1 part will also increment if there are major updates. Please contact Eaton Tech Support team (techsupport@eaton.com) for a new firmware package if your device is running on R4690.



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