



OCPP 2.1

Part 2 - Appendices

v2.1, 2025-12-03

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Version History

NOTE

The appendix can be updated independently of the OCPP release. As a result the version numbering of the Appendix is not the same as the OCPP release.

| Appendix version | Date | OCPP Version | Description |
|------------------|------------|----------------------|--|
| 2.1 | 2025-12-03 | OCPP 2.1 Edition 2 | Appendix version for OCPP 2.1. Updated parts are marked with " <i>(Updated in v2.1)</i> " |
| 2.0 | 2025-01-23 | OCPP 2.1 Edition 1 | Appendix version for OCPP 2.1 Updated parts are marked with " <i>(Updated in v2.0)</i> " |
| 1.4 | 2024-05-06 | OCPP 2.0.1 Edition 3 | Appendix version for Edition 3 Updated parts are marked with " <i>(Updated in v1.4)</i> " |
| 1.3 | 2022-12-15 | OCPP 2.0.1 | Appendix version for Errata 2 (2022) Updated parts are marked with " <i>(Updated in v1.3)</i> ". |
| 1.2 | 2021-10-01 | OCPP 2.0.1 | Appendix version for Errata 1 (2021) Appendix 3: Updated components are marked with " <i>(Updated in v1.2)</i> ". Appendix 3: Added ConnectedEV component for info from ISO15118 and CHAdeMO. Appendix 5: Added reason MissingDeviceModelInfo |
| 1.1 | 2020-03-23 | OCPP 2.0.1 | Update for OCPP 2.0.1 |
| 1.0 | 2018-04-11 | OCPP 2.0 | First release of this Appendix for OCPP 2.0 |

Chapter 1. Security Events

The table below provides a list of security events. Security events that are implemented SHALL be stored at the security log and security events that are implemented and marked as critical SHALL also be pushed to the CSMS.

This is a non-exhaustive list of security events, when a security event matches the *description* of one of the Security Events in this section, for interoperability reasons, the Security Event from this section SHALL be used, instead of adding a new (proprietary) Security Event. Some security events like; *InvalidCsmsCertificate*, *InvalidChargingStationCertificate*, etc. are mandatory to be implemented. Please refer to Part 2 - Specification for which security events are mandatory to be implemented.

(Updated in v2.0)

| Security Event | Description | Critical |
|-------------------------------------|---|----------|
| FirmwareUpdated | The Charging Station firmware is updated | Yes |
| FailedToAuthenticateAtCsms | The authentication credentials provided by the Charging Station were rejected by the CSMS | No |
| CsmsFailedToAuthenticate | The authentication credentials provided by the CSMS were rejected by the Charging Station | No |
| SettingSystemTime | The system time on the Charging Station was changed more than <code>ClockCtrlr.TimeAdjustmentReportingThreshold</code> seconds | Yes |
| StartupOfTheDevice | The Charging Station has booted | Yes |
| ResetOrReboot | The Charging Station was rebooted or reset | Yes |
| SecurityLogWasCleared | The security log was cleared | Yes |
| ReconfigurationOfSecurityParameters | Security parameters, such as keys or the security profile used, were changed | No |
| MemoryExhaustion | The Flash or RAM memory of the Charging Station is getting full | Yes |
| InvalidMessages | The Charging Station has received messages that are not valid OCPP messages, if signed messages, signage invalid/incorrect | No |
| AttemptedReplayAttacks | The Charging Station has received a replayed message (other than the CSMS trying to resend a message because it there was for example a network problem) | No |
| TamperDetectionActivated | The physical tamper detection sensor was triggered | Yes |
| InvalidFirmwareSignature | The firmware signature is not valid | Yes |
| InvalidFirmwareSigningCertificate | The certificate used to verify the firmware signature is not valid | Yes |
| InvalidCsmsCertificate | The certificate that the CSMS uses was not valid or could not be verified | Yes |
| InvalidChargingStationCertificate | The certificate sent to the Charging Station using the <code>CertificateSignedRequest</code> message is not a valid certificate | Yes |
| DiscardedRenewedClientCertificate | The Charging Station discarded the renewed client certificate, because it was unable to successfully establish a connection using it. | Yes |
| InvalidTLSVersion | The TLS version used by the CSMS is lower than 1.2 and is not allowed by the security specification | Yes |
| InvalidTLSCipherSuite | The CSMS did only allow connections using TLS cipher suites that are not allowed by the security specification | Yes |
| MaintenanceLoginAccepted | Successful login to the local maintenance interface. It is recommended to include information like the user identification and the origin of the login attempt, which can be an ip-address or a touch screen for example, to the <code>techInfo</code> field. For this the following format is strongly recommended: <code>'{\user': '\...', \origin': '\...}'</code> | Yes |
| MaintenanceLoginFailed | Failed login attempt to the local maintenance interface. It is recommended to include information like the user identification and the origin of the login attempt, which can be an ip-address or a touch screen for example, to the <code>techInfo</code> field. For this the following format is strongly recommended: <code>'{\user': '\...', \origin': '\...}'</code> | Yes |

Chapter 2. Standardized Units of Measure

The standardized values for Unit of Measure. Default value of "unit" is always "Wh".

| Value | Description |
|-------------------|--|
| A | Amperes (current) |
| ASU | Arbitrary Strength Unit (Signal Strength) |
| B | Bytes |
| Celsius | Degrees (temperature) |
| dB | Decibel (for example Signal Strength) |
| dBm | Power relative to 1mW ($10\log(P/1\text{mW})$) |
| Deg | Degrees (angle/rotation) |
| Fahrenheit | Degrees (temperature) |
| Hz | Hertz (frequency) |
| mHz | milliHertz (frequency) |
| K | Degrees Kelvin (temperature) |
| lx | Lux (Light Intensity) |
| m | Meter (length) |
| ms2 | m/s^2 (Acceleration) |
| N | Newtons (Force) |
| Ohm | Ohm (Impedance) |
| kPa | kiloPascal (Pressure) |
| Percent | Percentage |
| RH | Relative Humidity% |
| RPM | Revolutions per Minute |
| s | Seconds (Time) |
| V | Voltage (DC or r.m.s. AC) |
| VA | Volt-Ampere (apparent power) |
| kVA | kiloVolt-Ampere (apparent power) |
| VAh | Volt-Ampere-hours (apparent energy) |
| kVAh | kiloVolt-Ampere-hours (apparent energy) |
| var | vars (reactive power) |
| kvar | kilovars (reactive power) |
| varh | var-hours (reactive energy) |
| kvarh | kilovar-hours (reactive energy) |
| W | Watts (power) |
| kW | kilowatts (power) |
| Wh | Watt-hours (energy). Default |
| kWh | kilowatt-hours (energy) |

Chapter 3. Standardized Components

This appendix provides a list of all standardized component names for OCPP 2.1 for controller components and for physical components. A summary table listing just all components without variables is provided at the end of this appendix in [Summary List of Standardized Components](#).

3.1. Controller Components

This is the list of Standardized Controller Components for OCPP 2.1 and typical Variables that might be associated with them.

IMPORTANT

This list does not imply that these Components are required, nor does it imply that the listed Variables are required for a Component or no other Variables are allowed to be associated with a Component.

3.1.1. AlignedDataCtrlr

| Description | | |
|--|------------|---|
| Logical Component responsible for configuration relating to the reporting of clock-aligned meter data. | | |
| Variables | Type | Description |
| Enabled | boolean | If this variable reports a value of true, Aligned Data is enabled. |
| Available | boolean | If this variable reports a value of true, Aligned Data is supported. |
| Interval | integer | Size (in seconds) of the clock-aligned data interval, intended to be transmitted in the MeterValuesRequest message. |
| Measurands | MemberList | Clock-aligned measurand(s) to be included in MeterValuesRequest, every AlignedDataInterval seconds. |
| SendDuringIdle | boolean | If set to true, the Charging Station SHALL NOT send clock aligned meter values when a transaction is ongoing. |
| SignReadings | boolean | If set to true, the Charging Station SHALL include signed meter values in the TransactionEventRequest to the CSMS. |
| TxEndedInterval | integer | Size (in seconds) of the clock-aligned data interval, intended to be transmitted in the TransactionEventRequest (eventType = Ended) message. |
| TxEndedMeasurands | MemberList | Clock-aligned periodic measurand(s) to be included in the meterValues element of TransactionEventRequest (eventType = Ended) for every TxEndedAlignedDataInterval of the transaction. |

3.1.2. AuthCtrlr (*Updated in v1.2*)

| Description | | |
|--|---------|--|
| Logical Component responsible for configuration relating to the use of authorization for Charging Station use. | | |
| Variables | Type | Description |
| Enabled | boolean | If set to <i>false</i> , then no authorization is done before starting a transaction or when reading an idToken. If an idToken was provided, then it will be put in the <i>idToken</i> field of the TransactionEventRequest. If no idToken was provided, then <i>idToken</i> in TransactionEventRequest will be left empty and type is set to NoAuthorization. |
| AdditionalInfoItemsPerMessage | integer | Maximum number of AdditionalInfo items that can be sent in one message. |
| AuthorizeRemoteStart | boolean | Whether a remote request to start a transaction in the form of RequestStartTransactionRequest message should be authorized beforehand like a local action to start a transaction. |
| DisableRemoteAuthorization | boolean | When set to <i>true</i> this instructs the Charging Station to not issue any AuthorizationRequests, but only use Authorization Cache and Local Authorization List to determine validity of idTokens. |
| LocalAuthorizeOffline | boolean | Whether the Charging Station, when Offline, will start a transaction for locally-authorized identifiers. |
| LocalPreAuthorize | boolean | Whether the Charging Station, when online, will start a transaction for locally-authorized identifiers without waiting for or requesting an AuthorizeResponse from the CSMS. |

| Description | | |
|------------------------------|---------|--|
| MasterPassGroupId | string | IdTokens that have this id as groupId belong to the Master Pass Group. |
| OfflineTxForUnknownIdEnabled | boolean | If this key exists, the Charging Station supports Unknown Offline Authorization. |

3.1.3. AuthCacheCtrlr (*Updated in v2.1*)

| Description | | |
|--|------------|--|
| Logical Component responsible for configuration relating to the use of a local cache for authorization for Charging Station use. | | |
| Variables | Type | Description |
| Enabled | boolean | If this variable exists, the Charging Station supports an Authorization Cache. |
| Available | boolean | If this variable reports a value of true, Authorization Cache is supported. |
| LifeTime | integer | Indicates in seconds how long it takes until a token expires in the authorization cache since it is last used. |
| Policy | OptionList | Cache Entry Replacement Policy: (LRU,LFU) LeastRecentlyUsed or LeastFrequentlyUsed. Allowed values: LRU, LFU. |
| DisablePostAuthorize | boolean | When set to <i>true</i> this variable disables the behavior to request authorization for an idToken that is stored in the cache with a status other than Accepted, as stated in C10.FR.03 and C12.FR.05. |
| Storage | integer | Indicates the number of bytes currently used by the Authorization Cache. MaxLimit indicates the maximum number of bytes that can be used by the Authorization Cache. |
| Entries | integer | Amount of IdTokens currently in the Authorization Cache. |

3.1.4. CHAdemoCtrlr (*Updated in v1.2*)

| Description | | |
|--|---------|--|
| A CHAdeMO Controller component communicates with an EV using the wired CANbus protocol to exchange information and control charging using the CHAdeMO protocol | | |
| Variables | Type | Description |
| Enabled | boolean | CHAdeMO controller enabled |
| Active | boolean | Connected |
| Complete | boolean | Protocol session ended normally |
| Tripped | boolean | CHAdeMO protocol terminated abnormally |
| Problem | boolean | CHAdeMO controller fault |
| SelftestActive(Set) | boolean | Start self-test by setting to true |
| SelftestActive | boolean | Self-test running when reported as true |
| Specific CHAdeMO interface data from vehicle: | | |
| CHAdeMOProtocolNumber | integer | CHAdeMO protocol number (H'102.0) |
| VehicleStatus | boolean | Vehicle status (H'102.5.3) |
| DynamicControl | boolean | Vehicle is compatible with dynamic control (H'110.0.0) |
| HighCurrentControl | boolean | Vehicle is compatible with high current control (H'110.0.1) |
| HighVoltageControl | boolean | Vehicle is compatible with high voltage control (H'110.1.2) |
| AutoManufacturerCode | integer | Auto manufacturer code (H'700.0) <i>A single byte manufacturer code assigned by CHAdeMO association</i> |

3.1.5. ClockCtrlr

| Description | | |
|--|----------|-------------------------------------|
| Provides a means to configure management of time tracking by Charging Station. | | |
| Variables | Type | Description |
| DateTime | dateTime | Contains the current date and time. |

| Description | | |
|--------------------------------------|----------|--|
| NtpServerUri | string | This contains the address of the NTP server. Multiple NTP servers can be configured as backups, etc. If the NTP client supports it, it can also connect to multiple NTP servers simultaneous to get a more reliable time source. Variable instance value is single digit NTP priority (1=highest). |
| NtpSource | string | When an NTP client is implemented, this variable can be used to configure the client: Use the NTP server provided via DHCP, or use the manually configured NTP server. |
| TimeOffset | string | Configured local time offset in the format: "+01:00", "-02:00" etc. |
| NextTimeOffsetTransitionDateT ime | dateTime | Date time of the next time offset transition. |
| TimeSource | string | Via this variable, the Charging Station provides the CSMS with the option to configure a clock source, if more than 1 are implemented. |
| TimeZone | string | Configured current local time zone in the format: "Europe/Oslo", "Asia/Singapore" etc. |
| TimeAdjustmentReportingThres hold | integer | If set, then time adjustments with an absolute value in seconds larger than this need to be reported as a security event SettingSystemTime. |

3.1.6. CustomizationCtrlr (New in v1.2)

| Description | | |
|---|-------------|--|
| Logical Component responsible for configuration relating to custom vendor-specific implementations, using the DataTransfer message and CustomData extensions. | | |
| Variables | Type | Description |
| CustomImplementationEnabled | boolean | This standard configuration variable can be used to enable/disable custom implementations that the Charging Station supports. The instance name of the variable matches the <i>vendorId</i> of the customization in CustomData or DataTransfer messages. |
| CustomTriggers | MemberList | This variable defines the names of custom triggers that Charging Station supports in a <i>customTrigger</i> field of Triggermessagerequest. |

3.1.7. DeviceDataCtrlr

| Description | | |
|---|-------------|---|
| Logical Component responsible for configuration relating to the exchange and storage of Charging Station Device Model data. | | |
| Variables | Type | Description |
| BytesPerMessage | integer | Message Size (in bytes) - maxLimit used to report constraint on message size. Which message is specified in the instance. |
| ItemsPerMessage | integer | Maximum number of entries that can be sent in one message. Which entries in which message is specified in the instance. |
| ValueSize | integer | Can be used to limit the following fields: SetVariableData.attributeValue, GetVariableResult.attributeValue, VariableAttribute.value, VariableCharacteristics.valuesList and EventData.actualValue. |

3.1.8. DisplayMessageCtrlr

| Description | | |
|--|-------------|--|
| Logical Component responsible for configuration relating to the display of messages to Charging Station users. | | |
| Variables | Type | Description |
| Enabled | boolean | Whether Display Message is enabled. |
| Available | boolean | Whether Display Message is supported. |
| DisplayMessages | integer | Amount of different messages that are currently configured in this Charging Station, via SetDisplayMessageRequest. |
| SupportedFormats | MemberList | List of message formats supported by this Charging Station. Possible values: See MessageFormatEnumType. |

| Description | | |
|---------------------|------------|---|
| SupportedPriorities | MemberList | List of the priorities supported by this Charging Station. Possible values: See MessagePriorityEnumType. |
| SupportedStates | MemberList | List of the states during which to display a message supported by this Charging Station. Possible values: See MessageStateEnumType. |
| Language | OptionList | The default language of this Charging Station (per RFC 5646 language code). Supported languages are reported in the <i>valuesList</i> . |

3.1.9. ISO15118Ctrlr (*Updated in v1.3*)

| Description | | |
|--|-------------|--|
| Communicates with an EV to exchange information and control charging using the ISO 15118 protocol. | | |
| Variables | Type | Description |
| Enabled | boolean | ISO15118 controller enabled |
| Active | boolean | Connected |
| Tripped | boolean | ISO15118 communication session aborted |
| Complete | boolean | ISO15118 communication session ended |
| Problem | boolean | ISO15118 controller fault |
| SeccId | string | The name of the SECC in the string format as required by ISO 15118. |
| SelftestActive(Set) | boolean | Start self-test by setting to true |
| SelftestActive | boolean | Self-test running when reported as true |
| ContractValidationOffline | boolean | Supports validation of a contract certificate when offline |
| CentralContractValidationAllowed | boolean | Contract certificates can be validated by the CSMS |
| PnCEnabled | boolean | If this variable is <i>true</i> , then ISO 15118 plug and charge as described by use case C07 - Authorization using Contract Certificates is enabled. If this variable is <i>false</i> , then ISO 15118 plug and charge as described by use case C07 - Authorization using Contract Certificates is disabled. |
| V2GCertificateInstallationEnabled | boolean | If this variable is <i>true</i> , then ISO 15118 V2G Charging Station certificate installation as described by use case A02 - Update Charging Station Certificate by request of CSMS and A03 - Update Charging Station Certificate initiated by the Charging Station is enabled. If this variable is <i>false</i> , then ISO 15118 V2G Charging Station certificate installation as described by use case A02 - Update Charging Station Certificate by request of CSMS and A03 - Update Charging Station Certificate initiated by the Charging Station is disabled. |
| ContractCertificateInstallationEnabled | boolean | If this variable is <i>true</i> , then ISO 15118 contract certificate installation/update as described by use case M01 - Certificate installation EV and M02 - Certificate Update EV is enabled. If this variable is <i>false</i> , then ISO 15118 contract certificate installation/update as described by use case M01 - Certificate installation EV and M02 - Certificate Update EV is disabled. |
| RequestMeteringReceipt | boolean | If this variable is <i>true</i> , then Charging Station shall request a metering receipt from EV before sending a fiscal meter value to CSMS. |
| OrganizationName | string | The organizationName of the CSO operating the charging station. It is used as the organizationName (O) of the SECC leaf certificate. Example: "John Doe Charging Services Ltd" Note: This value will usually be identical to SecurityCtrlr.OrganizationName, but it does not have to be. |
| CountryName | string | The countryName of the SECC in the ISO 3166-1 format. It is used as the countryName (C) of the SECC leaf certificate. Example: "DE" |
| Specific ISO15118 interface data from vehicle: | | |
| MaxScheduleEntries | integer | MaxEntriesSAScheduleType (15118-2) or MaximumSupportingPoints (15118-20) Number of allowed schedule periods |
| RequestedEnergyTransferMode | OptionList | RequestedEnergyTransferMode "AC_single_phase_core", "AC_three_phase_core", "DC_core", "DC_extended", "DC_combo_core", "DC_unique" |

3.1.10. LocalAuthListCtrlr (*Updated in v1.2*)

| Description | | |
|--|---------|---|
| Logical Component responsible for configuration relating to the use of Local Authorization Lists for Charging Station use. | | |
| Variables | Type | Description |
| Enabled | boolean | Whether Local Authorization List is enabled. |
| Entries | integer | Amount of IdTokens currently in the Local Authorization List. The maxLimit of this variable SHALL be provided to report the maximum number of IdTokens that can be stored in the Local Authorization List. |
| Available | boolean | Whether Local Authorization List is supported. |
| ItemsPerMessage | integer | Maximum number of identifications that can be sent in a single SendLocalListRequest. |
| BytesPerMessage | integer | Message Size (in bytes) - puts a constraint on SendLocalListRequest message size. |
| Storage | integer | Indicates the number of bytes currently used by the Local Authorization List. MaxLimit indicates the maximum number of bytes that can be used by the Local Authorization List. |
| DisablePostAuthorize | boolean | When set to <i>true</i> this variable disables the behavior to request authorization for an idToken that is stored in the local authorization list with a status other than Accepted, as stated in C14.FR.03. |
| SupportsExpiryDateTime | boolean | When set to <i>true</i> Charging Station will disregard idTokens for authorization as if not present in the Local Authorization List when current date/time is past the value of <i>cacheExpiryDateTime</i> . |

3.1.11. MonitoringCtrlr (*Updated in v1.3*)

| Description | | |
|--|------------|--|
| Logical Component responsible for configuration relating to the exchange of monitoring event data. | | |
| Variables | Type | Description |
| Enabled | boolean | Whether Monitoring is enabled. |
| Available | boolean | Whether Monitoring is supported. |
| ItemsPerMessage | integer | Maximum number of items. |
| BytesPerMessage | integer | Message Size (in bytes) - puts constraint on message size. |
| MonitoringBase | optionList | Currently used MonitoringBase. (readonly) |
| MonitoringLevel | integer | Currently use MonitoringLevel (readonly) |
| OfflineQueuingSeverity | integer | When set and the Charging Station is offline, the Charging Station shall queue any notifyEventRequest messages triggered by a monitor with a severity number equal to or lower than the severity configured here. Value ranging from 0 (Emergency) to 9 (Debug). |
| ActiveMonitoringBase | OptionList | Shows the currently used MonitoringBase. Valid values according MonitoringBaseEnumType: All, FactoryDefault, HardwiredOnly. (readonly) |
| ActiveMonitoringLevel | integer | Shows the currently used MonitoringLevel. Valid values are severity levels of SetMonitoringLevelRequest: 0-9. (readonly) |

3.1.12. OCPPCommCtrlr (*Updated in v1.4*)

| Description | | |
|---|------------|--|
| Logical Component responsible for configuration relating to information exchange between Charging Station and CSMS. | | |
| Variables | Type | Description |
| ActiveNetworkProfile | integer | Indicates the configuration profile the station uses at that moment to connect to the network. |
| FileTransferProtocols | MemberList | List of supported file transfer protocols. |
| HeartbeatInterval | integer | Interval in seconds of inactivity (no OCPP exchanges) with CSMS after which the Charging Station should send HeartbeatRequest. |
| MessageAttempts | integer | How often the Charging Station should try to submit a TransactionEventRequest message when the CSMS fails to process it. |

| Description | | |
|----------------------------------|---------|---|
| MessageAttemptInterval | integer | How long in seconds the Charging Station should wait before resubmitting a TransactionEventRequest message that the CSMS failed to process. |
| MessageTimeout | integer | Message timeout in seconds. The message timeout setting in a Charging Station can be configured in the messageTimeout field in the NetworkConnectionProfile. |
| MinimumStatusDuration | integer | Minimum duration that a Charging Station or EVSE status is stable before StatusNotificationRequest is sent to the CSMS. |
| NetworkConfigurationPriority | string | A comma separated ordered list of the priority of the possible Network Connection Profiles. |
| NetworkProfileConnectionAttempts | integer | Specifies the number of connection attempts the Charging Station executes before switching to a different profile. |
| OfflineThreshold | integer | When the offline period in seconds of a Charging Station exceeds the OfflineThreshold it is recommended to send a StatusNotificationRequest for all its Connectors when the Charging Station is back online. |
| PublicKeyWithSignedMeterValue | boolean | This Configuration Variable can be used to configure whether a public key needs to be sent with a signed meter value. |
| QueueAllMessages | boolean | When this variable is set to true, the Charging Station will queue all message until they are delivered to the CSMS. |
| RetryBackOffRepeatTimes | integer | When the Charging Station is reconnecting, after a connection loss, it will use this variable for the amount of times it will double the previous back-off time. |
| RetryBackOffRandomRange | integer | When the Charging Station is reconnecting, after a connection loss, it will use this variable as the maximum value for the random part of the back-off time. |
| RetryBackOffWaitMinimum | integer | When the Charging Station is reconnecting, after a connection loss, it will use this variable as the minimum back-off time, the first time it tries to reconnect. |
| UnlockOnEVSideDisconnect | boolean | When set to true, the Charging Station SHALL unlock the cable on the Charging Station side when the cable is unplugged at the EV. For an EVSE with only fixed cables, the mutability SHALL be ReadOnly and the actual value SHALL be false. For a charging station with fixed cables and sockets, the variable is only applicable to the sockets. |
| WebSocketPingInterval | integer | Number of seconds between pings. |
| FieldLength | integer | This variable is used to report the length of <field> in <message> when it is larger than the length that is defined in the standard OCPP message schema. |

3.1.13. WebPaymentsCtrlr (New in v2.0)

| Description | | |
|---|------------|---|
| Logical Component to configure the creation of URLs for web payment, e.g. via dynamic QR codes. | | |
| Variable | Type | Description |
| URLTemplate | string | URL template |
| URLParameters | MemberList | List of supported URL parameters valuesList: "maxtime", "maxenergy", "maxcost" |
| TOTPVersion | string | Version of TOTP algorithm. valuesList: list of supported TOTP versions, e.g. "v1" |
| ChargingStationId | string | (Optional) Charging station Id to use in URL. When absent will default to Charging Station identity, as defined in SecurityCtrlr.Identity. |
| ValidityTime | integer | Time in seconds to show QR, e.g. 30 |
| SharedSecret | string | <random text> set to a random value on first boot |
| Length | integer | Length of TOTP, e.g. 8 |
| QRCodeQuality | OptionList | Low, Medium, Quartile, High |

3.1.14. ReservationCtrlr

| Description | | |
|---|------|-------------|
| Logical Component responsible for configuration relating to reservations. | | |
| Variables | Type | Description |

| Description | | |
|--------------------|---------|--|
| Enabled | boolean | Whether Reservation is enabled. |
| Available | boolean | Whether Reservation is supported. |
| NonEvseSpecific | boolean | If this configuration variable is present and set to true: Charging Station supports Reservation without specifying an EVSE. |

3.1.15. SampledDataCtrlr

| Description | | |
|--|-------------|---|
| Logical Component responsible for configuration relating to the reporting of sampled meter data. | | |
| Variables | Type | Description |
| Enabled | boolean | If this variable reports a value of true, Sampled Data is enabled. |
| Available | boolean | If this variable reports a value of true, Sampled Data is supported. |
| SignReadings | boolean | If set to true, the Charging Station includes signed meter values in the MeterValuesRequest to the CSMS. |
| TxEndedMeasurands | MemberList | Sampled measurands to be included in the meterValues element of TransactionEventRequest (eventType = Ended), every TxEndedSampleInterval seconds from the start of the transaction. |
| TxEndedInterval | integer | Interval in seconds between sampling of metering (or other) data, intended to be transmitted in the TransactionEventRequest (eventType = Ended) message. |
| TxStartedMeasurands | MemberList | Sampled measurand(s) to be taken at the start of any transaction to be included in the meterValues field of the first TransactionEventRequest message send at the start of a transaction (eventType = Started). |
| TxUpdatedMeasurands | MemberList | Sampled measurands to be included in the meterValues element of every TransactionEventRequest (eventType = Updated), every SampledDataTxUpdatedInterval seconds from the start of the transaction. |
| TxUpdatedInterval | integer | Interval in seconds between sampling of metering (or other) data, intended to be transmitted via TransactionEventRequest (eventType = Updated) messages. |
| RegisterValuesWithoutPhases | boolean | If this variable reports a value of <i>true</i> , then meter values of measurand Energy.Active.Import.Register will only report the total energy over all phases without reporting the individual phase values. If this variable is absent or <i>false</i> , then the value for each phase is reported, possibly also with a total value (depending on the meter). |

3.1.16. SecurityCtrlr (*Updated in v2.0*)

| Description | | |
|---|-------------|--|
| Logical Component responsible for configuration relating to security of communications between Charging Station and CSMS. | | |
| Variables | Type | Description |
| BasicAuthPassword | string | The basic authentication password that is used for HTTP Basic Authentication. The string is a passwordString (see Part 2: 2.1.4) consisting of minimum 16 and a maximum as defined by the <i>maxLimit</i> of BasicAuthPassword , which must be at least 40 characters. The password SHALL be sent as a UTF-8 encoded string (NOT encoded into octet string or base64). This configuration variable is write-only, so that it cannot be accidentally stored in plaintext by the CSMS when it reads out all configuration variables. This configuration variable is required unless only "security profile 3 - TLS with client side certificates" is implemented. |
| Identity | string | The Charging Station identity. The string is an identifierString string (see Part 2: 2.1.4), so it SHALL only contain characters that are allowed for identifierString. Maximum length was chosen to ensure compatibility with EVSE ID from [EMI3] "Part 2: business objects". |
| OrganizationName | string | This configuration variable is used to set the organization name of the CSO or an organization trusted by the CSO. It is used to set the O (organizationName) RDN in the subject field of the client certificate. |
| CertSigningWaitMinimum | integer | Seconds to wait before generating another CSR in case CSMS does not return a signed certificate. |
| CertSigningRepeatTimes | integer | Number of times to resend a SignCertificateRequest when CSMS does nor return a signed certificate. |

| Description | | |
|-------------------------------|---------|--|
| AllowSecurityProfileDowngrade | boolean | If this variable is implemented and set to <i>true</i> , then the Charging Station allows downgrading the security profile from 3 to 2. For security reasons it is not allowed to revert from profile 2 or profile 3 to security profile 1 using OCPP. |

3.1.17. SmartChargingCtrlr

| Description | | |
|---|------------|---|
| Logical Component responsible for configuration relating to smart charging. | | |
| Variables | Type | Description |
| Enabled | boolean | Whether Smart Charging is enabled. |
| Available | boolean | Whether Smart Charging is supported. |
| ACPhaseSwitchingSupported | boolean | If defined and true, this EVSE supports the selection of which phase to use for 1 phase AC charging. |
| ProfileStackLevel | integer | Maximum acceptable value for <i>stackLevel</i> in a ChargingProfile. Since the lowest <i>stackLevel</i> is 0, this means that if SmartChargingCtrlr.ProfileStackLevel = 1, there can be at most 2 valid charging profiles per Charging Profile Purpose per EVSE. |
| RateUnit | MemberList | A list of supported quantities for use in a ChargingSchedule. Allowed values: 'A' and 'W'. |
| PeriodsPerSchedule | integer | Maximum number of periods that may be defined per ChargingSchedule. |
| ExternalControlSignalsEnabled | boolean | Indicates whether a Charging Station should respond to external control signals that influence charging. |
| NotifyChargingLimitWithSchedules | boolean | Indicates if the Charging Station should include the externally set charging limit/schedule in the message when it sends a NotifyChargingLimitRequest message. This might increase the data usage significantly, especially when an external system sends new profiles/limits with a short interval. Default is false when omitted. |
| Phases3to1 | boolean | If defined and true, this Charging Station supports switching from 3 to 1 phase during a transaction. |
| Entries | integer | Amount of Charging profiles currently installed on the Charging Station. MaxLimit used to limit number of Charging profiles installed at any time. |
| LimitChangeSignificance | integer | If at the Charging Station side a change in the limit in a ChargingProfile is lower than this percentage, the Charging Station MAY skip sending a NotifyChargingLimitRequest or a TransactionEventRequest message to the CSMS. It is RECOMMENDED to set this key to a low value. See Smart Charging signals to a Charging Station from multiple actors. |

Updated in v2.1

3.1.18. TariffCostCtrlr

| Description | | | |
|--|-------------|---------|---|
| Logical Component responsible for configuration relating to tariff and cost display. | | | |
| Variables | Instance | Type | Description |
| Available | Tariff | boolean | Whether TariffType structure is supported. |
| Available | Cost | boolean | Whether local cost calculation is supported. |
| Enabled | Tariff | boolean | Whether support for TariffType structure is enabled. |
| Enabled | Cost | boolean | Whether local cost calculation is enabled. |
| Enabled | RunningCost | boolean | Whether Charging Station will provide running cost updates. |
| Interval | Tariff | integer | Maximum interval in seconds to use when evaluating tariff conditions. |
| Interval | Cost | integer | Interval to use for running cost updates. |
| MaxElements | Tariff | integer | Maximum number of <i>prices</i> elements supported in each TariffEnergy/Time/FixedType. |
| ConditionsSupported | Tariff | boolean | Whether Charging Station supports conditions in TariffType. |

| Description | | | |
|------------------------------|--------------------|------------|---|
| HandleFailedTariff | Tariff | OptionList | Deauthorize, UseDefaultTariff or CentralCost when tariff cannot be processed. |
| OfflineTariffFallbackMessage | <rfc5646 language> | string | Message to be shown when Charging Station is offline. |
| TariffFallbackMessage | | string | Message (and/or tariff information) to be shown to an EV Driver when there is no driver specific tariff information available. |
| TotalCostFallbackMessage | | string | Message to be shown to an EV Driver when the Charging Station cannot retrieve the cost for a transaction at the end of the transaction. |
| Currency | | string | Currency used by this Charging Station in a ISO 4217 formatted currency code. |

3.1.19. TxCtrlr

| Description | | |
|--|-------------|--|
| Logical Component responsible for configuration relating to transaction characteristics and behaviour. | | |
| Variables | Type | Description |
| EVConnectionTimeOut | integer | Interval in seconds from between "starting" of a transaction until incipient transaction is automatically canceled, due to failure of EV driver to (correctly) insert the charging cable connector(s) into the appropriate socket(s). The Charging Station SHALL go back to the original state, probably: 'Available'. "Starting" might be the swiping of the RFID, pressing a start button, a RequestStartTransactionRequest being received etc. |
| TxBeforeAcceptedEnabled | boolean | With this configuration variable the Charging Station can be configured to allow charging before having received a BootNotificationResponse with RegistrationStatus: Accepted. See: Transactions before being accepted by a CSMS. |
| TxStartPoint | MemberList | Defines when the Charging Station starts a new transaction: first transactioneventRequest: eventType = Started. When any event in the given list occurs, the Charging Station SHALL start a transaction. The Charging Station SHALL only send the Started event once for every transaction. It is advised to put all events that should be part of a transaction in the list, in case the start event never occurs. Because the possible events don't always have to come in the same order it is possible to provide a list of events. Which ever comes first will then cause a transaction to be started. For example: EVConnected, Authorized would mean that a transaction is started when an EV is detected (Cable is connected), or when an EV Driver swipes his RFID card en the CSMS successfully authorizes the ID for charging. |
| TxStopPoint | MemberList | Defines when the Charging Station ends a transaction: last transactioneventRequest: eventType = Ended. When any event in the given list is no longer valid, the Charging Station SHALL end the transaction. The Charging Station SHALL only send the Ended event once for every transaction. |
| MaxEnergyOnInvalidId | integer | Maximum amount of energy in Wh delivered when an identifier is deauthorized by the CSMS after start of a transaction. |
| StopTxOnInvalidId | boolean | whether the Charging Station will stop an ongoing transaction when it receives a non- Accepted authorization status in TransactionEventResponse for this transaction. |
| StopTxOnEVSideDisconnect | boolean | When set to true, the Charging Station SHALL administratively stop the transaction when the cable is unplugged from the EV. |

3.2. Physical Components

This is a non-exhaustive list of Standardized Physical Components that SHALL be used when mapping a real Charging Station to the Device Model (for monitoring purposes).

When the physical component that is to be mapped, matches the *description* of one of the Standardized Components in this section, for interoperability reasons, the Standardized Component from this section SHALL be used, instead of adding a new (proprietary) component.

The list of typically used variables that is given for each Component is also non-exhaustive and all variables are optional. See also Part 1, paragraph 4.5. If a description of a variable is empty, please refer to the description in [Standardized Variables](#).

3.2.1. AccessBarrier

| Description | |
|---|--------------------|
| Allows physical access of vehicles to a charging site to be controlled. | |
| Typically used variables | Description |
| Enabled | |
| Active | Open |
| Problem | |

3.2.2. AcDcConverter

| Description | |
|---|---|
| Provides a variable DC current source to force energy directly into an EV battery stack, under tight control of the EV's battery management system. | |
| Typically used variables | Description |
| Enabled | (not commanded Out of Service) |
| Problem | some problem/fault exists |
| Tripped | A problem requiring intervention has occurred |
| Overload | Excessive current/power consumption |
| DCVoltage | measured DC voltage |
| DCCurrent | measured DC current |
| Power | measured power |
| Temperature | temperature of converter |
| FanSpeed | Speed of cooling fan(s) |

3.2.3. AcPhaseSelector

| Description | |
|---|--------------------|
| Allows a specific AC phase to be selected (typically at EVSE tier) for single phase vehicle charging in order to lower overall (e.g. site) phase imbalance. | |
| Typically used variables | Description |
| Enabled | |
| Active | Changing |
| Problem | |
| PhaseRotation | |

3.2.4. Actuator

| Description | |
|--|--------------------|
| A general purpose electro-mechanical output system, with optional completion tracking sensing. Each output should use a Variable instance key indicating the nature of the output. | |
| Typically used variables | Description |
| Enabled | |
| Active | Non-Default |
| Problem | |
| State | |

3.2.5. AirCoolingSystem

| Description | |
|---|--|
| Fans (or equivalent devices) used to provide cooling. | |

| Description | |
|---------------------------------|-------------------------------|
| Typically used variables | Description |
| Enabled | Cooling system enabled to run |
| Active | Cooling |
| Problem | fault: e.g. fan stalled/slow |
| FanSpeed | Speed of cooling fan(s) |

3.2.6. AreaVentilation

| Description | |
|---------------------------------|------------------------------|
| Typically used variables | Description |
| Enabled | Area ventilation enabled |
| Active | Ventilating |
| Problem | fault: e.g. fan stalled/slow |
| FanSpeed | Speed of cooling fan(s) |

3.2.7. BayOccupancySensor

| Description | |
|---------------------------------|--|
| Typically used variables | Description |
| Enabled | Sensor is sensing for occupancy |
| Active | Occupied |
| Percent | percentage obstruction (for analogue sensors). |

3.2.8. BeaconLighting

| Description | |
|---------------------------------|-------------------------------|
| Typically used variables | Description |
| Enabled | Beacon Lighting operational |
| Enabled(Set)=0 | Disable beacon lighting |
| Active | On |
| Problem | Beacon lighting fault |
| Percent | Lighting Level (% of maximum) |
| Percent(Set)=x% | Lighting Level (% of maximum) |
| Power | Lighting Wattage |
| Color | Displayed color/intensity |

3.2.9. CableBreakawaySensor

| Description | |
|--|---|
| Typically used variables | Description |
| A sensor that detects when a charging cable (captive or removable) has been forcibly pulled from the Charging Station. | |
| Enabled | Breakaway sensor operational |
| Active | Tripped |
| Tripped | Breakaway detected: manual check/fix required |

3.2.10. CaseAccessSensor

| Description | |
|---|--|
| Reports when an access door/panel is open | |
| Typically used variables | Description |
| Enabled | Access sensor is enabled to detect/report opening/closing of access door/panel |
| Enabled(Set)=0 | Disable reporting of access |
| Active | Open |
| Tripped | An access door/panel that needs manual reset action has been activated |
| Problem | A fault exists in the Sensor mechanism itself |

3.2.11. ChargingStation

| Description | |
|---|--|
| The entire Charging Station as a logical entity | |
| Typically used variables | Description |
| Enabled | Available for use (not commanded Out of Service) |
| Problem | Some problem/fault exists |
| Tripped | A problem requiring local/manual intervention has occurred. |
| Overload | Excessive current/power consumption |
| SupplyPhases | Number of AC supply phases connected |
| SupplyPhases(MaxLimit) | Number of AC supply phases supported |
| PhaseRotation | AC wiring phase rotation |
| ACVoltage | Measured incoming AC voltage [per phase] |
| ACVoltage(MaxLimit) | Designed maximum operating AC voltage |
| ACCCurrent | Measured total AC current [per phase] |
| Power | Measured/calculated total power being consumed, including standby/ancillary loads |
| Power(MaxLimit) | Designed total operating load power, including standby/ancillary loads |
| VoltageImbalance | voltage imbalance in three phase supply |
| CurrentImbalance | current imbalance in three phase supply |
| VendorName | Charging Station vendor name (as reported in BootNotification) |
| Model | Charging Station model (as reported in BootNotification) |
| ECVariant | Engineering Change Variant |
| SerialNumber | Charging Station serial number |
| OperatingTimes | recurring operating times |
| ChargeProtocol | Charging Control Protocol applicable to the Charging Station |
| AvailabilityState | Indicates if the Charging Station is available or not (replaces the Charging Station Status values reported by the StatusNotification) |
| AllowNewSessionsPendingFirmwareUpdate | Indicates whether new sessions can be started on EVSEs, while Charging Station is waiting for all EVSEs to become Available in order to start a pending firmware update. |

3.2.12. ChargingStatusIndicator

| Description | |
|---|--------------------|
| The Charging Status Indicator, provides visible feedback to the user about the connection and charging status of an EVSE/Connector. This is commonly in the form of multi-colored lighting. | |
| Typically used variables | Description |
| Active | Lighted |
| Color | Displayed color |

3.2.13. ConnectedEV (*Updated in v2.0*)

| | | |
|--|---------------|-----------------------------------|
| Required | no | |
| Component | componentName | ConnectedEV |
| | evse | * (EVSE to which EV is connected) |
| Description | | |
| ConnectedEV is a component that represents a connected vehicle for which data is received via an ISO 15118 or CHAdeMO interface. The information that is received, is represented as variables of ConnectedEV. | | |

NOTE

In below tables the notation "<variable>(type)" refers to the *attributeType* <type> of the variable. For example, "ACCurrent(MinSet)" refers to value of the *attributeType* MinSet of the variable ACCurrent. "DCCurrent(Target)" refers to the value of the *attributeType* Target of the variable DCCurrent.

ConnectedEV for ISO 15118

| Variable | Unit | ISO 15118-2 value | ISO 15118-20 value |
|---|-----------------------|---|--|
| Available | boolean | When true this means an EV is connected. When false, all other fields are meaningless and should be empty strings. | |
| Protocol and static vehicle information | | | |
| VehicleId | string | EVCCID (from SessionSetupReq) <i>Six bytes, represented as hexbinary encoded string, e.g. "010203040A0B", containing the EVCC MAC address.</i> | EVCCID (from SessionSetupReq) <i>Max 255 bytes with the first 3 bytes containing the WMI as defined in ISO 3780:2009.</i> |
| VehicleCertificate["Leaf"] | string | n/a | The PEM encoded X.509 Leaf certificate of the vehicle certificate chain |
| VehicleCertificate["SubCA1"] | string | n/a | The PEM encoded X.509 intermediate SubCA1 certificate when present in the vehicle certificate chain |
| VehicleCertificate["SubCA2"] | string | n/a | The PEM encoded X.509 intermediate SubCA2 certificate, when present in the vehicle certificate chain |
| VehicleCertificate["Root"] | string | n/a | Optional. The PEM encoded X.509 Root certificate of the vehicle certificate chain |
| ProtocolAgreed | multi-instance string | A string with the following comma-separated items: "<uri>,<major>,<minor>". This is the protocol uri and version information that was agreed upon between EV and EVSE in the supportedAppProtocolReq handshake from ISO 15118. Example for ISO 15118-2: "urn:iso:15118:2:2013:MsgDef,1,0" (1,0 = version 1.0) For DIN SPEC 70121: "urn:din:70121:2012:MsgDef" | Same definition. Example for ISO 15118-20: "urn:iso:std:iso:15118:-20:DC,1,0" (or AC, ACDP, WPT, etc.) |
| ProtocolSupportedByEV["1"] to ProtocolSupportedByEV["20"] | string | A string with the following comma-separated items: "<uri>,<major>,<minor>". This is information from the SupportedAppProtocolReq message from ISO 15118 This variable has 20 instances; one for each priority number. Priority is a number from 1 to 20 as a string, i.e. "1", "2", etc. Example: - ConnectedEV.ProtocolSupportedByEV["1"] = "urn:iso:15118:2:2013:MsgDef,2,0" - ConnectedEV.ProtocolSupportedByEV["2"] = "urn:iso:15118:2:2010:MsgDef,1,0" | Same definition. Example for ISO 15118-20: "urn:iso:std:iso:15118:-20:DC,1,0" (or AC, ACDP, WPT, etc.) |

| Variable | Unit | ISO 15118-2 value | ISO 15118-20 value |
|---|------------------------------------|--|--|
| Voltage and current values: (from ChargeParameterDiscoveryReq unless stated otherwise) | | | |
| ACCurrent(MinSet) | A | EVMinCurrent | - |
| ACCurrent(MaxSet) | A | EVMaxCurrent | - |
| ACVoltage(MaxSet) | V | EVMaxVoltage | - |
| DCCurrent(MinSet) | A | - | EVMinimumChargeCurrent |
| DCCurrent(MaxSet) | A | EVMaximumCurrentLimit | EVMaximumChargeCurrent |
| DCCurrent(Target) | A | EVTTargetCurrent (CurrentDemandReq) | EVTTargetCurrent (DC_ChargeLoopReq) |
| DCVoltage(MinSet) | V | - | EVMinimumVoltage |
| DCVoltage(MaxSet) | V | EVMaximumVoltageLimit | EVMaximumVoltage |
| DCVoltage(Target) | V | EVTTargetVoltage (CurrentDemandReq) | EVTTargetVoltage (DC_ChargeLoopReq) |
| Power, energy and time values: | | | |
| Power(MaxSet) | W | EVMaximumPowerLimit (DC) | EVMaximumChargePower (AC/DC) All phases combined. |
| DischargePower(MaxSet) | W | - | EVMaximumDischargePower (AC/DC) Rated maximum, all phases combined (Actual discharging power is reported via EVSE) |
| DischargePower | W | - | EVMaximumDischargePower (AC/DC) (BPT ChargeLoopReq) Actual maximum, all phases combined |
| EnergyImport(MaxSet) | Wh | EVEnergyCapacity (DC) | EVMaximumEnergyRequest (ScheduleExchangeReq, AC/DC_ChargeLoopReq) |
| EnergyImport(MinSet) | Wh | - | EVMinimumEnergyRequest (ScheduleExchangeReq, AC/DC_ChargeLoopReq) |
| EnergyImport(Target) | Wh | EVEnergyRequest (DC) EAmount (AC) | EVTTargetEnergyRequest (ScheduleExchangeReq, AC/DC_ChargeLoopReq) |
| BatteryCapacity | Wh | EVEnergyCapacity (DC) | BatteryCapacity (AC/DC_ChargeLoopReq.DisplayParameters) |
| DepartureTime | dateTime | DepartureTime <i>Provided as seconds since message receipt. Converted to absolute time.</i> | DepartureTime (ScheduleExchangeReq, AC/DC_ChargeLoopReq) <i>Provided as seconds since message receipt. Converted to absolute time.</i> |
| RemainingTimeBulk | s | RemainingTimeToBulkSoC (CurrentDemandReq) | - |
| RemainingTimeFull(MaxSet) | s | - | - |
| RemainingTimeFull | s | RemainingTimeToFullSoC (CurrentDemandReq) | RemainingTimeToMaximumSOC (AC/DC_ChargeLoopReq.DisplayParameters) |
| StateOfChargeBulk | % | BulkSoC | - |
| StateOfCharge(MaxSet) | % | FullSoC | MaximumSOC (AC/DC_ChargeLoopReq.DisplayParameters) |
| StateOfCharge | % | DC_EVStatus.EVRESSSOC | PresentSOC (AC/DC_ChargeLoopReq.DisplayParameters) |
| ChargingCompleteBulk | boolean | BulkChargingComplete | - |
| ChargingCompleteFull | boolean | ChargingComplete | ChargingComplete (AC/DC_ChargeLoopReq.DisplayParameters) |
| Error status values: | | | |
| ChargingState with a memberlist consisting of the following values: | | | |
| * BatteryOvervoltage | - | | <EVTerminationCode> |
| * BatteryUndervoltage | - | | ... |
| * ChargingCurrentDeviation | FAILED_ChargingCurrentDifferential | | ... |
| * BatteryTemperature | FAILED_RESSTemperatureInhibit | | ... |

| Variable | Unit | ISO 15118-2 value | ISO 15118-20 value |
|---------------------------------|------|--------------------------------------|--------------------|
| * VoltageDeviation | | FAILED_ChargingVoltageOutOfRange | ... |
| * ChargingSystemError | | FAILED_EVRESSMalfunction | ... |
| * VehicleShiftPosition | | FAILED_EVShiftPosition | ... |
| * VehicleChargingEnabled | - | | ... |
| * ChargingSystemIncompatibility | | FAILED_ChargingSystemIncompatibility | ... |
| * ChargerConnectorLockFault | | FAILED_ChargerConnectorLockFault | ... |

ConnectedEV for CHAdeMO

| Variable | Unit | CHAdeMO value |
|--|----------|--|
| Available | boolean | Is true when an EV is connected |
| Protocol and static vehicle information | | |
| VehicleId | string | Vehicle ID (H'710 + H'711 + H'712) <i>Three times 8 bytes, represented as hexbinary encoded string, e.g. "010203040A0B0C0D111213141A1B1C1D212223242A2B2C2D". A concatenation of H'710 + H'711 + H'712.</i> |
| ProtocolAgreed | string | Lowest of Chademo protocol number from EV (H'102.0) and charger (H'109.0) Example for CHAdeMO 2.0.1: "CHAdeMO,3" (3 = version reported by CHAdeMO for v2.0.1) |
| ProtocolSupportedByEV["1"] | string | Chademo protocol number (H'102.0) supported by EV A string with the following comma-separated items: "CHAdeMO,<version>". Example for CHAdeMO 2.0.1: - ConnectedEV.ProtocolSupportedByEV = "CHAdeMO,3" |
| Voltage and current values: | | |
| ACCurrent(MinSet) | A | - |
| ACCurrent(MaxSet) | A | - |
| ACVoltage(MaxSet) | V | - |
| DCCurrent(MinSet) | A | Minimum charge current (H'100.0) |
| DCCurrent(MaxSet) | A | - |
| DCCurrent(Target) | A | Charging current request (H'102.3) <i>If HighCurrentControl is true, use the value from Charging current request (extended) (H'110.1,2).</i> |
| DCVoltage(MinSet) | V | Minimum battery voltage (H'100.2,3) |
| DCVoltage(MaxSet) | V | Maximum battery voltage (H'100.4,5) |
| DCVoltage(Target) | V | Target battery voltage (H'102.1,2) |
| Power, energy and time values: | | |
| Power(MaxSet) | W | - |
| EnergyImport(MaxSet) | Wh | Total capacity of traction battery * 100 (H'101.5,6) |
| EnergyImport(Target) | Wh | - |
| DepartureTime | dateTime | - |
| RemainingTimeBulk | s | - |
| RemainingTimeFull(MaxSet) | s | Maximum charging time * 60 (H'101.2) |
| RemainingTimeFull | s | Estimated charging time * 60 (H'101.3) |
| StateOfChargeBulk | % | - |
| StateOfCharge(MaxSet) | % | Charged rate reference constant (H'100.6) |
| StateOfCharge | % | State of charge (H'102.6) |
| ChargingCompleteBulk | boolean | - |
| ChargingCompleteFull | boolean | - |
| Error status values: | | |
| ChargingState with a memberlist consisting of the following values: | | |

| Variable | Unit | CHAdemo value |
|---------------------------------|------|---------------------------------------|
| * BatteryOvervoltage | | Battery overvoltage (H'102.4.0) |
| * BatteryUndervoltage | | Battery undervoltage (H'102.4.1) |
| * ChargingCurrentDeviation | | Battery current deviation (H'102.4.2) |
| * BatteryTemperature | | High battery temperature (H'102.4.3) |
| * VoltageDeviation | | Battery voltage deviation (H'102.4.4) |
| * ChargingSystemError | | Charging system error (H'102.5.2) |
| * VehicleShiftPosition | | Vehicle shift position (H'102.5.1) |
| * VehicleChargingEnabled | | Vehicle charging enabled (H'102.5.0) |
| * ChargingSystemIncompatibility | | - |
| * ChargerConnectorLockFault | | - |

ConnectedEV for WPT

The following parameters coming from the WPT_ChargeLoopReq messages can be represented in the ConnectedEV component. This information might be useful for troubleshooting, but is not required for normal operation.

| Variable | Unit | ISO 15118-20 value |
|----------------------------------|------------|--|
| WPT_EVPCPowerRequest | decimal | Power the EVPC would like to have as output in Watt. |
| WPT_EVPCPowerOutput | decimal | Power measured at the output of the EVPC electronics in Watt. |
| WPT_EVPCChargeDiagnostics | OptionList | Values are: "EVPCNoIssue", "EVPCTempOverheatDetected", "EVPCPowerTransferAnomalyDetected", "EVPCAnomalyDetected" |
| WPT_EVPCOperatingFrequency | decimal | EVPC measured MF-WPT operating frequency. |
| WPT_EVPCCoilCurrentRequest | decimal | EVPC wants the primary device to set a specific (preferred) coil current value. |
| WPT_EVPCCoilCurrentInformation | decimal | Secondary device coil current (AC). |
| WPT_EVPCCurrentOutputInformation | decimal | DC current supplied to the EV. |
| WPT_EVPCVoltageOutputInformation | decimal | DC bus or battery voltage. |

ConnectedEV for ACDP

The following parameters from ACDP_VehiclePositioningReq, ACDP_ConnectReq, ACDP_DisconnectReq and ACDP_SystemStatusReq can be represented in the ConnectedEV component. This information might be useful for troubleshooting, but is not required for normal operation.

| Variable | Unit | ISO 15118-20 value |
|---------------------------------------|------------|---|
| ACDP_EVMobilityStatus | boolean | Is true when an EV is immobilized |
| ACDP_EVPositioningSupport | boolean | Is true when EV has positioning support |
| ACDP_EVElectricalChargingDeviceStatus | OptionList | Values are: "State_A" (disconnected), "State_B", "State_C", "State_D" (connected) |
| ACDP_EVReadyToCharge | boolean | Element signalizes if the EV is READY or NOT READY to charge. |
| ACDP_EVImmobilizationRequest | boolean | Represents the request of immobilization of the EV. This may be related to the hand brake status. |
| ACDP_EVImmobilized | boolean | The immobilization of the EV is a mandatory precondition to activate the pantograph. |
| ACDP_WLANStrength | decimal | Element signalizes EV WiFi reception signal strength (-dBm) |
| ACDP_EVCPStatus | OptionList | Values are: "State_A", "State_B", "State_C", "State_D", "State_E". Refer to IEC 61851-23-1. |

| Variable | Unit | ISO 15118-20 value |
|------------------|------------|--|
| ACDP_EVSOC | decimal | For operation usable SOC status in %. This value may differ from physical SOC of the battery. This parameter can be same as PresentSOC in DisplayParameter. |
| ACDP_EVErrorCode | OptionList | One of: "OK_NoEVError", "FAILED", "FAILED_EmergencyEvent", "FAILED_Breaker", "FAILED_RESSTemperatureInhibit", "FAILED_RESS", "FAILED_ChargingCurrentDifferential", "FAILED_ChargingVoltageOutOfRange", "FAILED_Reserved1", "FAILED_Reserved2" |
| ACDP_EVTimeout | boolean | Indicates the occurrence of a timeout in the EVCC. |

3.2.14. Connector

| Description | |
|---|---|
| A means to connect an EV to a Charging Station with either a socket, an attached cable & inline connector, or any wireless power transfer device. | |
| Typically used variables | Description |
| Enabled | Connector available for use (not commanded Out of Service) |
| Problem | problem/fault exists (e.g. over-temperature) |
| Tripped | A problem requiring intervention has occurred. |
| ConnectorType | A value of ConnectorStringEnumType (See Appendix 7). Specific type of connector, including sub-variant information. Note: Distinct and orthogonal to Charging Protocol, Power Type, Phases. |
| SupplyPhases | AC phases connected |
| SupplyPhases(MaxLimit) | AC phases Max |
| PhaseRotation | AC wiring phase rotation |
| ChargeProtocol | Charging Control Protocol applicable to the Connector |
| AvailabilityState | Indicates if the Connector is available or not (replaces the Status values reported by the StatusNotification) |

3.2.15. ConnectorHolsterRelease

| Description | |
|--|-----------------------------|
| A mechanism present in a connector holster to prevent the connector from being removed inappropriately: typically unlocks connector after authorization. | |
| Typically used variables | Description |
| Enabled | |
| Active | Unlocked for removal/return |
| Problem | |
| State | |

3.2.16. ConnectorHolsterSensor

| Description | |
|---|--------------|
| A mechanism to report when a tethered cable connector has been removed from its normal stowage position. May be used for detection of connectors left un-holstered, and possible penalty billing. | |
| Typically used variables | Description |
| Enabled | |
| Active | Un-Holstered |
| Problem | |

3.2.17. ConnectorPlugRetentionLock

| Description | |
|--|-----------------------------------|
| Locking mechanism to retain an inserted plug, both to prevent on-load disconnection, and to prevent theft of charging cables | |
| Typically used variables | Description |
| Enabled | Retention mechanism enabled |
| Active | Locked |
| Problem | Locking Failed |
| Tripped | Stall protection fuse blown, etc. |
| Tries | (Re)tries taken on last attempt |
| Tries(SetLimit) | Configured auto retry count |
| Tries(MaxLimit) | Maximum auto retry count |

3.2.18. ConnectorProtectionRelease

| Description | |
|--|--|
| External protective mechanism (e.g. an external shutter or a connector holster lock mechanism) to prevent contact with conductors that may become "live" under other failure modes | |
| Typically used variables | Description |
| Enabled | Protection in effect (locked except when in use) |
| Active | Unlocked |
| Problem | Lock/Unlock mechanism fault |
| Tripped | protective mechanism triggered (fuse) |

3.2.19. Controller

| Description | |
|---------------------------------|--|
| An embedded logic controller | |
| Typically used variables | Description |
| Active | Running |
| Problem | Controller fault |
| Interval[Heartbeat] | Heartbeat interval |
| Manufacturer | Controller manufacturer name |
| Model | Controller model number |
| ECVariant | Engineering Change variant |
| SerialNumber | Controller hardware serial number |
| VersionNumber | Hardware version number |
| VersionDate | Hardware version date |
| FirmwareVersion | Firmware version number (as reported in BootNotification) |
| MaxMsgElements | Array of implementation-defined limits to the number of elements of specific type that the Charging Station can accept in one message. |
| SelftestActive(Set) | Start self-test |
| SelftestActive | Self-test running |

3.2.20. ControlMetering

| Description | |
|--|---------------------------------|
| Energy, Power, Electricity meter, used to measure energy, current, voltages etc. | |
| Typically used variables | Description |
| Power | Measured power |
| ACCurrent | Measured AC current [per phase] |

| Description | |
|--------------------|---------------------|
| DCCurrent | Measured DC current |
| DCVoltage | Measured DC voltage |

3.2.21. CPPWMController

| Description | |
|---|---------------------------------------|
| Control Pilot PWM Controller: provides and senses the IEC 61851-1 / SAE J1772 low voltage DC and PWM signalling between an EVSE and EV over a control pilot line. | |
| Typically used variables | Description |
| Enabled | |
| Active | Connected |
| Problem | CP PWM controller fault |
| DCVoltage | Control Pilot wire DC Voltage (0-12V) |
| State | IEC 61851-1 states ("A" to "E") |
| Percentage | 1kHz Duty Cycle |
| SelftestActive(Set) | Start self-test |
| SelftestActive | Self-test running |

3.2.22. DataLink

| Description | |
|--|---|
| Provides a communications link from a Charging Station to a CSMS. It may use fixed infrastructure, mobile telephony data services, WiFi, or other connectivity channels. | |
| Typically used variables | Description |
| Enabled | Data link enabled |
| Active | Connected |
| Fallback | Using Backup SIM/Network Preference |
| Complete | Link connection terminated |
| Problem | Communications module or link connection fault |
| IMSI | International Mobile Subscriber Identity number of mobile data SIM card |
| ICCID | Integrated Circuit Card IDentifier of mobile data SIM card. |
| NetworkAddress | Current network address |
| SignalStrength | Data signal strength/quality |

3.2.23. Display

| Description | |
|--|--|
| Provides information and feedback to the user. | |
| Typically used variables | Description |
| Enabled | Display configured to show information |
| Problem | Display fault |
| Color | Display color (monochrome/backlighting) |
| Count[HeightInChars] | Display height (characters) |
| Count[WidthInChars] | Display width (characters) |
| LabelText[Visible] | Current Display Contents |
| State | Alphanumeric code indicating current message purpose |

3.2.24. ElectricalFeed

| Description | |
|---|-------------|
| Represents an incoming electrical connection to a Charging Station, that may be a grid/distribution network connection, or a connection to local power generation and/or storage. Each electrical feed can record the electrical and other characteristics of that feed, including power rating, fusing, upstream metering, etc. When a Charging Station has more than one electrical feed, it must represent which feed supplies each EVSE, and which feed supplies the house load of the Charging Station itself. Simple Charging Stations with only a single electrical feed may omit all electrical feed information, in which case it is inferred that all power is supplied from a single feed, and what would otherwise be ElectricalFeed data (Variables) may be reported as being associated with the ChargingStation component. | |
| Typically used variables | Description |
| Enabled | |
| Active | Connected |
| Problem | |
| PowerType | |
| Power | |
| Energy | |
| DCVoltage | |
| SupplyPhases | |
| PhaseRotation | |
| ACVoltage | |

3.2.25. ELVSupply

| Description | |
|---|---|
| Represents the low voltage power supply (typically 12V DC and often other ELV voltages) that provides operating power for controllers, relays, and other electrical components. | |
| Typically used variables | Description |
| EnergyImportRegister | Standby/house energy meter register reading |
| Power | instantaneous standby power consumption |
| Power(MaxLimit) | Design maximum standby power consumption |
| Fallback | Running on backup energy; |
| Fallback(MaxLimit): =1 | has backup |
| StateOfCharge | backup battery SOC |
| Time | (estimated) operating time on backup energy |

3.2.26. EmergencyStopSensor

| Description | |
|---|-----------------------------|
| An "Emergency Stop" button that should be pressed by the user or other nearby persons if serious faulty behavior is observed (e.g. smoke/flames from EV or Charging Station). | |
| Typically used variables | Description |
| Enabled | Emergency Stop action armed |
| Active | Pressed/Latched |
| Tripped | Needs manual reset |

3.2.27. EnvironmentalLighting

| Description | |
|---|------------------------------------|
| Provides reporting/control of general illumination lighting in use at Charging Station. | |
| Typically used variables | Description |
| Enabled | Environmental Lighting operational |
| Enabled(Set)=0 | Disable Environmental lighting |
| Active | On |
| Problem | Environmental lighting fault |

| Description | |
|--------------------|-------------------------------|
| Percent | Lighting Level (% of maximum) |
| Percent(Set)=x% | Lighting Level (% of maximum) |
| Power | Lighting Wattage |
| Color | Displayed color/intensity |

3.2.28. EVRetentionLock

| Description | |
|--|---|
| A locking mechanism on the EV side as a safety measure to prevent it being disconnected while high currents are flowing. | |
| Typically used variables | Description |
| Enabled | Retention locking detection in effect |
| Active | Locked to EV |
| Complete | Has unlocked |
| Problem | Lock Problem (e.g. failed to lock/unlock) |

3.2.29. EVSE

| Description | |
|---|---|
| The entire chain of components responsible for transporting energy from the incoming supply to the electric vehicle (or vice versa) | |
| Typically used variables | Description |
| Enabled | Ready for use (not commanded Out of Service) |
| Problem | some problem/fault exists |
| Tripped | A problem requiring intervention has occurred |
| Overload | Excessive current/power consumption |
| SupplyPhases | AC phases connected |
| PhaseRotation | AC wiring phase rotation |
| AllowReset | When true: EVSE can be reset individually |
| ACVoltage | Measured total AC voltage [per phase] |
| ACCcurrent | Measured total AC current [per phase] |
| DCVoltage | Measured total DC voltage [per phase] |
| DCCurrent | Measured total DC current [per phase] |
| Power | Measured Power |
| VoltageImbalance | voltage imbalance in three phase supply |
| CurrentImbalance | current imbalance in three phase supply |
| ChargeProtocol | Charging Control Protocol applicable to the EVSE |
| ChargingTime | Total time duration that EV is taking energy from an EVSE. Short pauses in charging (e.g. battery pre-, post-conditioning) are included |
| PostChargingTime | Total time since EV has taken energy from EVSE |
| Count[ChargingProfiles] | Charging Profiles present |
| Count[ChargingProfiles](MaxLimit) | Maximum Charging Profiles supported |
| ISO15118Evseld | The name of the EVSE in the string format as required by ISO 15118 and IEC 63119-2. Example: "DE*ICE*E*1234567890*1" |

3.2.30. ExternalTemperatureSensor

| Description | |
|---------------------------------|------------------------------------|
| Reports ambient air temperature | |
| Typically used variables | Description |
| Active | Temperature above MaxSet or MinSet |
| Problem | Temperature sensor fault |

| Description | |
|--------------------|---------------------|
| Temperature | Ambient temperature |

3.2.31. FiscalMetering

| Description | |
|---|--|
| Provides energy transfer readings that are the basis for billing. | |
| Typically used variables | Description |
| Problem | Metering Fault (e.g. read error) |
| EnergyImport | Energy transferred to EV during session |
| EnergyImportRegister | Cumulative import reading |
| EnergyExport | Energy transferred from EV during session |
| EnergyExportRegister | Cumulative export reading |
| Manufacturer[Meter] | Meter manufacturer name |
| Manufacturer[CT] | Current transformer manufacturer name |
| Model[Meter] | Meter model number |
| Model[CT] | CT model number |
| ECVariant | Meter engineering change variant |
| SerialNumber[Meter] | Meter serial number |
| SerialNumber[CT] | CT serial number(s) |
| Certificate | |
| OptionsSet [MeterValueAlignedData] | Set of measurands to read and report at clock-aligned time intervals while charging. |
| OptionsSet [TxnStoppedAlignedData] | Set of measurands to be read at clock-aligned time intervals while charging and reported in TransactionStopped |

3.2.32. FloodSensor

| Description | |
|--|--|
| A sensor reporting whether the Charging Station is experiencing water ingress/pooling. | |
| Typically used variables | Description |
| Enabled | Water presence/level sensing in effect |
| Active | Flooding |
| Tripped | Water level safety sensor tripped |
| Height | Absolute water height above reference (ground) level. |
| Percent | Height as percentage between reference minimum (0%) and maximum allowable (100%). Values below 0% and above 100% are possible. |

3.2.33. GroundIsolationProtection

| Description | |
|---|--------------------------------------|
| An Isolation Tester as part of their own self-test mechanisms, to confirm the isolation of floating circuitry when no EVs are connected | |
| Typically used variables | Description |
| Enabled | Electrical isolation testing enabled |
| Active | Leakage |
| Complete | Isolation test completed |
| Problem | Isolation fault |
| Impedance | Isolation resistance/impedance |

3.2.34. Heater

| Description | |
|--|-----------------------------------|
| Heater to ensure reliable operation in cold environments | |
| Typically used variables | Description |
| Enabled | Heater hardware operation enabled |
| Active | Heating |
| Problem | Heater fault |
| Tripped | Heater equipment permanent fault |
| Power | Instantaneous heater power level |
| Power(MaxLimit) | Maximum heater power |
| Power(MaxSet) | Configured heater power |
| Temperature(MinSet) | Cut-in temperature |
| Temperature(MaxSet) | Cut-out temperature |

3.2.35. HumiditySensor

| Description | |
|---------------------------------|-----------------------|
| Reports relative air humidity | |
| Typically used variables | Description |
| Enabled | |
| Problem | Humidity sensor fault |
| Humidity | RH(%) |

3.2.36. LightSensor

| Description | |
|---------------------------------|-------------------------|
| Reports ambient light levels. | |
| Typically used variables | Description |
| Enabled | |
| Problem | Lighting sensor fault |
| Light | The ambient light level |

3.2.37. LiquidCoolingSystem

| Description | |
|--|-------------------------------|
| A liquid based cooling system, typically used to cool the connector cables of very high power Charging Stations. | |
| Typically used variables | Description |
| Enabled | Cooling system enabled to run |
| Active | Liquid circulating |
| Problem | |
| Temperature | |

3.2.38. LocalAvailabilitySensor

| Description | |
|---|---|
| Accepts local signal inputs controlling whether new Charging Sessions can start and/or whether ongoing sessions should continue. Typically connected to a site/building power supply, to automatically report unavailability when closed. | |
| Typically used variables | Description |
| Enabled | Local Availability input sensing in operation |
| Active | Out of Service |

| Description | |
|--------------------|--|
| Problem | Local Availability sensing circuit error |

3.2.39. LocalController

| Description | |
|---|---|
| The entire Local Controller as a logical entity | |
| Common Variables | Description |
| Enabled | Available for use (not commanded Out of Service) |
| Problem | Some problem/fault exists |
| Identity | Local Controller identity |
| Tripped | A problem requiring local/manual intervention has occurred. |
| Manufacturer | Local Controller manufacturer name |
| Model | Local Controller manufacturer model |
| ECVariant | Engineering Change Variant |
| SerialNumber | Local Controller serial number |
| ChargingStation | List of Charging Stations Identities connected to this LocalController. (not to be confused with the ChargingStation Component) |

3.2.40. LocalEnergyStorage (*updated in v1.3*)

| Description | |
|---------------------------------|-------------------------------|
| Local energy storage device | |
| Typically used variables | Description |
| EnergyCapacity | Maximum storage capacity |
| Identity | Local Energy Storage identity |

3.2.41. OverCurrentProtection

| Description | |
|--|--|
| Protects equipment by disconnecting the electrical supply when the current drawn (on any phase) exceeds the rated value to a substantial degree. | |
| Typically used variables | Description |
| Active | Tripped. Trip when over MaxSet/MaxLimit. |
| Operated | Breaker opened and auto-reclosed |
| ACCurrent | Measured total AC current [per phase] |

3.2.42. OverCurrentProtectionRecloser

| Description | |
|---|--------------------------------------|
| Recloser mechanism of an OverCurrentProtection to perform re-arm retries after a trip, or may be set for remotely controlled rearming on command. | |
| Typically used variables | Description |
| Enabled | Auto reclosing enabled |
| Active | Reclosing |
| Active(Set) | Initiate manual reclose |
| Complete | Reclose cycle completed |
| Problem | Recloser Fault |
| Mode | Reclose Mode (None, Auto, Commanded) |
| Tries | (Re)tries taken on last attempt |
| Tries(SetLimit) | Configured auto retry count |

| Description | |
|--------------------|--------------------------|
| Tries(MaxLimit) | Maximum auto retry count |

3.2.43. PowerContactor

| Description | |
|---|-----------------------------------|
| Switches on and off the power to the EV after all authorization and safety requirements have been met. May have secondary contacts to report closure state. | |
| Typically used variables | Description |
| Active | Closed |
| Tripped | Mirror contact protection tripped |
| Problem | Close/Open failed |

3.2.44. RCD

| Description | |
|--|--|
| A Residual Current Device (US: ground fault breaker) protects human life and/or downstream equipment by quickly detecting abnormal current flows (usually indicative in earth faults) in the Charging Station, cable, or EV during charging. | |
| Typically used variables | Description |
| Tripped | Breaker opened (manual reset required) |
| Operated | Breaker opened and auto-reclosed |

3.2.45. RCDRecloser

| Description | |
|---|---------------------------------|
| A motorized recloser mechanism of an RCD that may be configured to perform re-arm retries after a trip, or may be set for remotely controlled re-arming on command. | |
| Typically used variables | Description |
| Enabled | Auto reclosing enabled |
| Active | Reclosing in progress |
| Active(Set) | Initiate manual reclose |
| Complete | Reclose cycle completed |
| Problem | Recloser Fault |
| Tries | (Re)tries taken on last attempt |
| Tries(SetLimit) | Configured auto (re)try count |
| Tries(MaxLimit) | Maximum auto (re)try count |

3.2.46. RealTimeClock

| Description | |
|--|------------------------------------|
| Represents realtime clock hardware that can maintain accurate date & time information in a Charging Station, even in the case of simultaneous CSMS uncontactability and power outages or resets. | |
| Typically used variables | Description |
| Active | RTC running OK |
| DCVoltage | Battery voltage |
| Fallback | Battery failing |
| Fallback(MaxLimit) | RTC has backup-power. MaxLimit = 1 |
| Problem | RTC fault |

3.2.47. ShockSensor

| Description | |
|--|-------------------------|
| Measures impact forces/accelerations experienced, indicative of possible damage. | |
| Typically used variables | Description |
| Enabled | Shock sensing enabled |
| Active | Shock |
| Force | detected force (vector) |

3.2.48. SpacesCountSignage

| Description | |
|---|------------------------------|
| Electronic signage allowing a charging controller for a large charging facility to advertise counts of available spaces to passing traffic. | |
| Typically used variables | Description |
| Enabled | Spaces count signage enabled |
| Active | Not Blank |
| Count | |

3.2.49. Switch

| Description | |
|--|-------------|
| A general purpose electromechanical input device, with optional remote defaulting/resetting of values. Each input should use a Variable instance key indicating the nature of the input. | |
| Typically used variables | Description |
| Enabled | |
| Active | Non-Default |
| State | |

3.2.50. TemperatureSensor

| Description | |
|--|-----------------------------------|
| Temperature sensor at a point inside the Charging Station; multiple sensing points for a single sensing controller. Multiple sensing points for a single sensing controller may be reported using distinct Variable instance keys. | |
| Typically used variables | Description |
| Active | High temperature (over MaxSet) |
| Problem | Internal temperature sensor fault |
| Temperature | Enclosure temperature |

3.2.51. TiltSensor

| Description | |
|---|--------------------------------------|
| Measures Tilt angle from normal reference position (normally 90 degree vertical). | |
| Typically used variables | Description |
| Enabled | Tilt sensing enabled |
| Active | Tilted |
| Angle | Measured tilt (vector) from vertical |

3.2.52. TokenReader

| Description | |
|---|--|
| An authorization token reader (e.g. RFID) | |
| Typically used variables | Description |
| Enabled | Token reader enabled |
| Enabled(Set)=0 | Token reader disabled: allow charging without token authentication/authorization |
| Operated | token data read event |
| Problem | token reader fault |
| Token | String read by TokenReader |
| TokenType | Type of Token. Value is one of IdTokenEnumStringType (See Appendix 7). |

3.2.53. UpstreamProtectionTrigger

| Description | |
|---|---|
| Circuitry designed to trigger the disconnection of power to the structure by an upstream protection device after a severe problem has been detected | |
| Typically used variables | Description |
| Enabled | Upstream protection enabled |
| Active(Set) | Force triggering of upstream protection |
| Tripped | Upstream protection triggered |
| Problem | Upstream protection fault |

3.2.54. UIInput

| Description | |
|--|------------------|
| A logical input mechanism (e.g. set of buttons) that is part of a UI whose use may be communicated to the CSMS (in near real time). May support momentary inputs ("Operated") or modal state ("Active"). Multiple input sources should use explicit Variable instance keys (where the input function is key name). | |
| Typically used variables | Description |
| Enabled | UI input enabled |
| Operated | |
| Active | |

3.2.55. VehicleIdSensor

| Description | |
|--|-------------------------|
| Reports an identifier associated with a vehicle occupying a charging bay. The identifier may be a vehicle registration number via ANPR hardware, a VIN, or other local identifier of the vehicle based on medium range/active RFID, or any other relevant technology and result. | |
| Typically used variables | Description |
| Enabled | VehicleIdSensor enabled |
| Active | Processing |

3.3. Summary List of Standardized Components

Following is a list that sums up all above-mentioned standardized component names.

| Component | Description |
|------------------|---|
| ACDERCtrlr | Responsible for configuration relating to DER capabilities that the EVSE of the Charging Station can emulate by using ISO 15118-20 ChargeLoop messages to control the inverter in the EV. The component is located at the EVSE level, since it represents the DER capabilities of the EVSE. |
| AlignedDataCtrlr | Logical Component responsible for configuration relating to the reporting of clock-aligned meter data. |
| AuthCacheCtrlr | Logical Component responsible for configuration relating to the use of a local cache for authorization for Charging Station use. |

| Component | Description |
|-------------------------|--|
| AuthCtrlr | Logical Component responsible for configuration relating to the use of authorization for Charging Station use. |
| BatterySwapCtrlr | Responsible for configuration relating to Battery swapping. |
| CHAdeMOCtrlr | A CHAdeMO Controller component communicates with an EV using the wired CANbus protocol to exchange information and control charging using the CHAdeMO protocol |
| ClockCtrlr | Provides a means to configure management of time tracking by Charging Station. |
| CustomizationCtrlr | Responsible for configuration relating to custom vendor-specific implementations, like the DataTransfer message and CustomData extensions or CustomTriggers. |
| DCDERCtrlr | Responsible for configuration relating to DER capabilities of the DC inverter of the EVSE in the Charging Station. The component is located at the EVSE level, since it represents the DER capabilities, also referred to as nameplate information, of the EVSE. |
| DeviceDataCtrlr | Logical Component responsible for configuration relating to the exchange and storage of Charging Station Device Model data. |
| DisplayMessageCtrlr | Logical Component responsible for configuration relating to the display of messages to Charging Station users. |
| ISO15118Ctrlr | Communicates with an EV to exchange information and control charging using the ISO 15118 protocol. |
| LocalAuthListCtrlr | Logical Component responsible for configuration relating to the use of Local Authorization Lists for Charging Station use. |
| MonitoringCtrlr | Logical Component responsible for configuration relating to the exchange of monitoring event data. |
| PaymentCtrlr | Logical Component responsible for configuration relating to payment terminals. |
| OCPPCommCtrlr | Logical Component responsible for configuration relating to information exchange between Charging Station and CSMS. |
| ReservationCtrlr | Logical Component responsible for configuration relating to reservations. |
| SampledDataCtrlr | Logical Component responsible for configuration relating to the reporting of sampled meter data. |
| SecurityCtrlr | Logical Component responsible for configuration relating to security of communications between Charging Station and CSMS. |
| SmartChargingCtrlr | Logical Component responsible for configuration relating to smart charging. |
| TariffCostCtrlr | Logical Component responsible for configuration relating to tariff and cost display. |
| TxCtrlr | Logical Component responsible for configuration relating to transaction characteristics and behaviour. |
| V2XChargingCtrlr | Responsible for configuration relating to V2X charging/discharging. This component exists on the EVSE tier hierarchy. |
| WebPaymentsCtrlr | Responsible for configuration of a dynamic QR code for ad hoc payments. |
| AccessBarrier | Allows physical access of vehicles to a charging site to be controlled. |
| AcDcConverter | Provides a variable DC current source to force energy directly into an EV battery stack, under tight control of the EV's battery management system. |
| AcPhaseSelector | Allows a specific AC phase to be selected (typically at EVSE tier) for single phase vehicle charging in order to lower overall (e.g. site) phase imbalance. |
| Actuator | A general purpose electro-mechanical output system, with optional completion tracking sensing. Each output should use a Variable instance key indicating the nature of the output. |
| AirCoolingSystem | Fans (or equivalent devices) used to provide cooling. |
| AreaVentilation | Fans (or equivalent devices) used to ensure that EVs that require ventilation during charging |
| BatteryCartridge | BatteryCartridge represents the battery cartridge that is currently inserted into the EVSE of a battery swap station |
| BayOccupancySensor | Sensor (optical, ground loop, ultrasonic, etc.) to detect whether the associated parking/charging bay is physically vacant, or is occupied by a vehicle or other obstruction |
| BeaconLighting | Beacon Lighting to help EV drivers to locate nearby charging places, and/or to determine charging availability state, usually by color variation. |
| CableBreakawaySensor | A sensor that detects when a charging cable (captive or removable) has been forcibly pulled from the Charging Station. |
| CaseAccessSensor | Reports when an access door/panel is open |
| ChargingStation | The entire Charging Station as a logical entity |
| ChargingStatusIndicator | The Charging Status Indicator, provides visible feedback to the user about the connection and charging status of an EVSE/Connector. This is commonly in the form of multi-colored lighting. |

| Component | Description |
|----------------------------|---|
| ConnectedEV | ConnectedEV is a component that represents a connected vehicle for which data is received via an ISO 15118 or CHAdeMO interface. The generic information that is received, is represented as variables of ConnectedEV. Any protocol-specific information is represented in variables of the ISO15118Ctrlr or CHAdeMOCtrlr component. |
| Connector | A means to connect an EV to a Charging Station with either a socket, an attached cable & inline connector, or any wireless power transfer device. |
| ConnectorHolsterRelease | A mechanism present in a connector holster to prevent the connector from being removed inappropriately: typically unlocks connector after authorization. |
| ConnectorHolsterSensor | A mechanism to report when a tethered cable connector has been removed from its normal stowage position. May be used for detection of connectors left un-holstered, and possible penalty billing. |
| ConnectorPlugRetentionLock | Locking mechanism to retain an inserted plug, both to prevent on-load disconnection, and to prevent theft of charging cables |
| ConnectorProtectIonRelease | External protective mechanism (e.g. an external shutter or a connector holster lock mechanism) to prevent contact with conductors that may become 'live' under other failure modes |
| Controller | An embedded logic controller |
| ControlMetering | Energy, Power, Electricity meter, used to measure energy, current, voltages etc. |
| CPPWMController | Control Pilot PWM Controller: provides and senses the IEC 61851-1 / SAE J1772 low voltage DC and PWM signalling between an EVSE and EV over a control pilot line. |
| DataLink | Provides a communications link from a Charging Station to a CSMS. It may use fixed infrastructure, mobile telephony data services, WiFi, or other connectivity channels. |
| Display | Provides information and feedback to the user. |
| DistributionPanel | Defines the Distribution Panel, with it's fuses and connections to both Charging Stations and other Distribution Panel's. |
| ElectricalFeed | Represents an incoming electrical connection to a Charging Station, that may be a grid/distribution network connection, of a connection to local power generation and/or storage. Each electrical feed can record the electrical and other characteristics of that feed, including power rating, fusing, upstream metering, etc. When a Charging Station has more than one electrical feed, it must represent which feed supplies each EVSE, and which feed supplies the house load of the Charging Station itself. Simple Charging Stations with only a single electrical feed may omit all electrical feed information, in which case it is inferred that all power is supplied from a single feed, and what would otherwise be ElectricalFeed data (Variables) may be reported as being associated with the ChargingStation component. |
| ELVSupply | Represents the low voltage power supply (typically 12V DC and often other ELV voltages) that provides operating power for controllers, relays, and other electrical components. |
| EmergencyStopSensor | An 'Emergency Stop' button that should be pressed by the user or other nearby persons if serious faulty behavior is observed (e.g. smoke/flames from EV or Charging Station). |
| EnvironmentalLighting | Provides reporting/control of general illumination lighting in use at Charging Station. |
| EVRetentionLock | A locking mechanism on the EV side as a safety measure to prevent it being disconnected while high currents are flowing. |
| EVSE | The entire chain of components responsible for transporting energy from the incoming supply to the electric vehicle (or vice versa) |
| ExternalTemperatureSensor | Reports ambient air temperature |
| FiscalMetering | Provides energy transfer readings that are the basis for billing. |
| FloodSensor | A sensor reporting whether the Charging Station is experiencing water ingress/pooling. |
| GroundIsolationProtection | An Isolation Tester as part of their own self-test mechanisms, to confirm the isolation of floating circuitry when no EVs are connected |
| Heater | Heater to ensure reliable operation in cold environments |
| HumiditySensor | Reports relative air humidity |
| LightSensor | Reports ambient light levels. |
| LiquidCoolingSystem | A liquid based cooling system, typically used to cool the connector cables of very high power Charging Stations. |
| LocalAvailabilitySensor | Accepts local signal inputs controlling whether new Charging Sessions can start and/or whether ongoing sessions should continue. Typically connected to a site/building power supply, to automatically report unavailability when closed. |
| LocalController | The entire Local Controller as a logical entity |
| LocalEnergyStorage | Energy storage |

| Component | Description |
|-------------------------------|--|
| NetworkConfiguration | The instances of component NetworkConfiguration represent network connection configurations. |
| OverCurrentProtection | Protects equipment by disconnecting the electrical supply when the current drawn (on any phase) exceeds the rated value to a substantial degree. |
| OverCurrentProtectionRecloser | Recloser mechanism of an OverCurrentProtection to perform re-arm retries after a trip, or may be set for remotely controlled re-arming on command. |
| PowerContactor | Switches on and off the power to the EV after all authorization and safety requirements have been met. May have secondary contacts to report closure state. |
| RCD | A Residual Current Device (US: ground fault breaker) protects human life and/or downstream equipment by quickly detecting abnormal current flows (usually indicative in earth faults) in the Charging Station, cable, or EV during charging. |
| RCDRecloser | A motorized recloser mechanism of an RCD that may be configured to perform re-arm retries after a trip, or may be set for remotely controlled re-arming on command. |
| RealTimeClock | Represents realtime clock hardware that can maintain accurate date & time information in a Charging Station, even in the case of simultaneous CSMS uncontactability and power outages or resets. |
| ShockSensor | Measures impact forces/accelerations experienced, indicative of possible damage. |
| SpacesCountSignage | Electronic signage allowing a charging controller for a large charging facility to advertise counts of available spaces to passing traffic. |
| Switch | A general purpose electromechanical input device, with optional remote defaulting/resetting of values. Each input should use a Variable instance key indicating the nature of the input. |
| TemperatureSensor | Temperature sensor at a point inside the Charging Station, multiple sensing points for a single sensing controller. Multiple sensing points for a single sensing controller may be reported using distinct Variable instance keys. |
| TiltSensor | Measures Tilt angle from normal reference position (normally 90 degree vertical). |
| TokenReader | An authorization token reader (e.g. RFID) |
| UpstreamProtectionTrigger | Circuitry designed to trigger the disconnection of power to the structure by an upstream protection device after a severe problem has been detected |
| UIInput | A logical input mechanism (e.g. set of buttons) that is part of a UI whose use may be communicated to the CSMS (in near real time). May support momentary inputs ('Operated') or modal state ('Active'). Multiple input sources should use explicit Variable instance keys (where the input function is key name). |
| VehicleIdSensor | Reports an identifier associated with a vehicle occupying a charging bay. The identifier may be a vehicle registration number via ANPR hardware, a VIN, or other local identifier of the vehicle based on medium range/active RFID, or any other relevant technology and result. |

Chapter 4. Standardized Variables

This is a non-exhaustive list of Standardized Variables that SHALL be used when the Charging Station and CSMS want to exchange information about a Variable. See also Part 1, paragraph 4.5.

Variables that are specific to a Controller Component are not included in this list, but are part of section 3.1 Controller Components.

| Name | DataType | Unit | Description |
|---------------------------------------|------------|------|---|
| ACCCurrent | decimal | A | RMS AC Current (in amperes). For 3-phase circuits, each phase (and optional neutral) is represented by a Variable instance equal to a value of the PhaseEnumType (e.g. L1,N). Unkeyed values reported for a Component declared to be multi-phase are assumed to be an average of all per-phase readings and written values are common per-phase settings. Example(s): ChargingStation: Total AC current consumption (all EVSE's, ancillaries), EVSE: Total current consumed by EVSE: includes losses (AC-DC) and EVSE specific ancillaries (e.g. fans), ElectricalFeed: Inflow AC current on feed |
| ACPhaseSwitchingSupported | boolean | | If defined and true, this EVSE supports the selection of which phase to use for 1 phase AC charging. |
| ACVoltage | decimal | V | RMS AC Voltage (in volts). For 3-phase circuits, each phase (and optional neutral) is represented by a Variable instance equal to a value of the PhaseEnumType (e.g. L1,N). Unkeyed values reported for a Component declared to be multi-phase are assumed to be an average of all per-phase readings and written values are common per-phase settings. Example(s): ElectricalFeed: Input Voltage |
| Active | boolean | | Component is in its non-resting / active state: e.g: On, Engaged, Locked. Some Components may have secondary functions that have corresponding Active Variables with an explicit Variable instance., Note: Monitoring of changes in the Active state of any Component can be specified by setting Delta monitoring on the boolean value with a delta values of 1. Setting/clearing an Active Variable activates/stops the associated functionality, where remotely controllable. Only components that are Available and Enabled can be in the Active state. |
| ActiveMonitoringBase | OptionList | | Shows the currently used MonitoringBase. |
| ActiveMonitoringLevel | integer | | Shows the currently use MonitoringLevel. |
| ActiveNetworkProfile | boolean | | Indicates the configuration profile the station uses to connect to the network. |
| ActiveTransactionId | string | | Active transaction on charging station or EVSE. |
| AdditionalInfoItemsPerMessage | integer | | Maximum number of additionalInfo items that can be sent in one message. |
| AdditionalRootCertificateCheck | boolean | | When set to true, only one certificate (plus a temporarily fallback certificate) of certificateType CSMSRootCertificate is allowed to be installed at a time. |
| AllowEnergyTransferResumption | boolean | | This variable defines whether energy transfer is allowed to be resumed when the transaction is resumed after a reset or power outage. |
| AllowNewSessionsPendingFirmwareUpdate | boolean | | Indicates whether new sessions can be started on EVSEs, while Charging Station is waiting for all EVSEs to become Available in order to start a pending firmware update. |
| AllowReset | boolean | | Component can be reset. Can be used to announce that an EVSE can be reset individually. |
| AllowSecurityProfileDowngrade | boolean | | If this variable is implemented and set to <i>true</i> , then the Charging Station allows downgrading the security profile from 3 to 2. |
| Angle | decimal | Deg | Angle(s) relative to normal/design idle position. Multiple Variable instance values may be used to indicate angular position in multiple axes (e.g. Left-Right, Forward-Back). |
| Attempts | integer | | Number of attempts (INCLUDING the original attempt) in the last successful or attempted, cycle of operation. Applies typically to self-monitoring motorized electro-mechanical equipment, etc. {Null}: Unknown, 0: Not Attempted/Not allowed, 1: Single attempt/No retries [allowed], 2-N: [up to] N tries [allowed] |

| Name | DataType | Unit | Description |
|----------------------------------|------------|------|--|
| AuthorizeRemoteStart | boolean | | Whether a remote request to start a transaction in the form of RequestStartTransactionRequest message should be authorized beforehand like a local action to start a transaction. |
| AvailabilityState | OptionList | | A value of ConnectorStatusEnumType (See part 2): replicates ConnectorStatus values reported in StatusNotification messages. |
| Available | boolean | | The Component exists and is locally configured/wired for use, but might not be (remotely) Enabled. |
| BasicAuthPassword | string | | The basic authentication password is used for HTTP Basic Authentication. |
| BytesPerMessage | integer | | Message Size (in bytes) - puts constraint on GetReportRequest, GetMonitoringReportRequest or GetVariableRequest message size. |
| CentralContractValidationAllowed | boolean | | If this variable exists and has the value <i>true</i> , then Charging Station can provide a contract certificate that it cannot validate, to the CSMS for validation as part of the AuthorizeRequest. |
| CertSigningRepeatTimes | integer | | This variable can be used to configure the amount of times the Charging Station SHALL double the previous back-off time, starting with the number of seconds configured at CertSigningWaitMinimum, every time the back-off time expires without having received the CertificateSignedRequest containing the from the CSR generated signed certificate. |
| CertSigningWaitMinimum | integer | | This configuration variable defines how long the Charging Station has to wait before generating another CSR, in the case the CSMS accepts the SignCertificateRequest, but never returns the signed certificate. |
| Certificate | string | | Digital Certificate (in Base64 encoding) |
| CertificateEntries | integer | | Amount of Certificates currently installed on the Charging Station. |
| CertificateStatusSource | string | | When present, this variable tells CSMS whether Charging Station uses OCSP or CRL to check for revoked certificates. |
| ChargeProtocol | string | | The Charging Control Protocol applicable to a Connector. CHAdeMO: CHAdeMO protocol, ISO15118: ISO15118 V2G protocol (wired or wireless) as used with CCS, CPPWM: IEC61851-1 / SAE J1772 protocol (ELV DC & PWM signalling via Control Pilot wire), Uncontrolled: No charging power management applies (e.g. Schuko socket), Undetermined: Yet to be determined (e.g. before plugged in), Unknown: Not determinable, NOTE: ChargeProtocol is distinct from and orthogonal to connectorType. |
| ChargingCompleteBulk | boolean | | Charging up to StateOfChargeBulk has completed. |
| ChargingCompleteFull | boolean | | Charging up to StateOfCharge.maxSet has completed. |
| ChargingProfilePersistence | boolean | | If an instance of this variable is true, then charging profiles with the <i>chargingProfilePurpose</i> mentioned in the variableInstance are persistent, i.e. they are stored persistently and will still exist after a reboot. |
| ChargingState | OptionList | | This variable reports the current transaction charging state for an EVSE. |
| ChargingTime | decimal | s | Time from earliest to latest substantive energy transfer |
| Color | string | | Standard 24 bit hexadecimal RGB values. Reg Green Blue color intensity, expressed as standard 24 bit hexadecimal RGB values: 3 00-FF (0-255, in order RRGGBB). E.g. 000000: Black, FF0000: Red, 00FF00: Green, 0000FF: Blue, FFFF00:Yellow, FFFFFF: White, 008000: Medium intensity green. |
| CommunicationParent | string | | Points to a communication parent component (data flow source), to allow rendering the communication hierarchy in a UI. |
| Complete | boolean | | Component's operation cycle has completed. Used only in event notifications, where it is always true. |
| ConditionsSupported | boolean | | If set to true the Charging Station supports tariffs with conditions. |
| ConfigurationValueSize | integer | | This Configuration Variable can be used to limit the following fields: SetVariableData.attributeValue and VariableCharacteristics.valuesList. |
| ConnectedTime | decimal | s | Time since logical connection established |
| ConnectorType | OptionList | | A value of ConnectorStringEnumType (See Appendix 7). Specific type of connector, including sub-variant information. Note: Distinct and orthogonal to Charging Protocol, Power Type, Phases. |

| Name | DataType | Unit | Description |
|--|------------|---------|--|
| ContractCertificateInstallationEnabled | boolean | | If this variable is <i>true</i> , then ISO 15118 contract certificate installation/update as described by use case M01 - Certificate installation EV |
| ContractValidationOffline | boolean | | If this variable is <i>true</i> , then Charging Station will try to validate a contract certificate when it is offline. |
| Count | integer | | General purpose integer count variable for Component state reporting |
| CountryName | string | | The countryName of the SECC in the ISO 3166-1 format. |
| Currency | string | | Currency in a ISO 4217 formatted currency code. |
| CurrentImbalance | decimal | Percent | Percentage current imbalance in an AC three phase supply. |
| CustomImplementationEnabled | boolean | | This standard configuration variable is used to enable/disable the custom implementation named in the variableInstance . |
| CustomTriggers | MemberList | | This variable defines the names of custom triggers that Charging Station supports in a <i>customTrigger</i> field of TriggerMessageRequest. |
| DCCurrent | decimal | A | DC Current (in amperes). May be an instantaneous measurement, or a period average, depending on context/equipment. |
| DCInputPhaseControl | boolean | | When DCInputPhaseControl is true, then the values of <i>numberPhases</i> and <i>PhaseToUse</i> in a ChargingSchedulePeriodType will select the input phases from the grid to be used by the DC EVSE. |
| DCVoltage | decimal | V | DC Voltage (volts). May be an instantaneous measurement, or a period average, depending on context/equipment. |
| DataText | string | | Text associated with a Component, e.g. a Display. |
| DateTime | dateTime | | Point in time value, in [RFC3339] datetime format. Time zone optional. |
| DepartureTime | dateTime | | Time in [RFC3339] datetime format, when an EV intends to leave the charging station. |
| DisablePostAuthorize | boolean | | When set to <i>true</i> this variable disables the behavior to request authorization for an |
| DisableRemoteAuthorization | boolean | | When set to <i>true</i> this instructs the Charging Station to not issue any AuthorizationRequests, but only use Authorization Cache and Local Authorization List to determine validity of idTokens. |
| DischargePower | decimal | | The variableCharacteristic <i>maxLimit</i> holds the maximum rated discharge power that this EVSE can provide. The variableCharacteristic <i>maxSet</i> holds the maximum configured discharge power that this EVSE can provide. The <i>Actual</i> value of the instantaneous (real) discharge power is recommended to be supported, but not required. Discharge power is represented by a positive value. |
| DisplayMessages | integer | | Maximum number of different messages that can be configured in this Charging Station simultaneous, via SetDisplayMessageRequest. |
| ECVariant | string | | Production series variants reflecting internal design changes or sub-component substitutions not affecting external functionality. |
| EVConnectionTimeOut | integer | s | Interval from between 'starting' of a transaction until incipient transaction is automatically canceled, due to failure of EV driver to (correctly) insert the charging cable connector(s) into the appropriate socket(s). |
| ElectricalParent | string | | Points to a electrical parent component (energy flow source), to allow rendering the electrical hierarchy in a UI. |
| Enabled | boolean | | The Component is Enabled for operation. For Available components that cannot be selectively (remotely) enabled / disabled, this value is always true. Note: Available cannot be false if Enabled is true, so during inventory reporting, Enabled=1 also logically states Available=true |
| Energy | decimal | Wh | Energy quantity (in Wh) for reporting/configuring values related to stored energy (i.e. not transferred energy). |
| EnergyCapacity | decimal | Wh | Energy capacity in Wh of an energy storage device. |
| EnergyExport | decimal | Wh | Total energy transferred: e.g. from EV during (ongoing or terminated) charging session (in wH by default) |
| EnergyExportRegister | decimal | Wh | Cumulative export kWh register value, such as from a (certified) fiscal energy meter. |
| EnergyImport | decimal | Wh | Total energy transferred. |

| Name | DataType | Unit | Description |
|--------------------------------------|------------|---------|--|
| EnergyImportRegister | decimal | Wh | Cumulative export kWh register value, such as from a (certified) fiscal energy meter. |
| Entries | integer | | General purpose variable for reporting/managing numbers of entries in repetitive data structures. maxLimit characteristic reports maximum possible entries. |
| ExternalConfigChangeDate | DateTime | | Date/time when the configuration was changed externally, i.e. outside of CSMS, for example by a local service action. |
| ExternalConstraintsProfileDisallowed | boolean | | Indicates whether a Charging Station allows an external system to submit a ChargingStationExternalConstraints charging profile. |
| ExternalControlSignalsEnabled | boolean | | Indicates whether a Charging Station is able to respond to external control signals that influence charging. If the variable is true, but CSMS has set [configkey-external-constraints-profile-disallowed] = true, then external control signals are only allowed during a charging profile with a chargingProfilePeriod = ExternalLimits or ExternalSetpoint. |
| Fallback | boolean | | Component is operating in a fallback, or backup mode. In inventory reports, a Value of 1 for the maxLimit characteristic indicates that the component can enter a fallback state (i.e. a fallback mode is present). |
| FanSpeed | decimal | RPM | Fan Speed (in RPM). A value of 0 represents stopped/stalled. An empty value indicates that fan speed cannot be read. |
| FieldLength | integer | | This variable is used to report the length of <field> in <message> when it is larger |
| FileTransferProtocols | MemberList | | List of supported file transfer protocols. |
| FirmwareVersion | string | | Version number of firmware. |
| Force | decimal | N | Reports (impact) force/ acceleration values (estimates) in one or more directions, in units of Newtons or "g". Multiple force readings in different (orthogonal) dimensions may be reported using Variable instance values, such as Down, Right, Forward. |
| Formats | MemberList | | List of message formats supported by this Charging Station. Possible values: ASCII, HTML, URI, UTF-8. |
| Frequency | decimal | Hz | Frequency of AC power, signal, or component operation. |
| FrequencySchedule | string | | A JSON-formatted string with an array of { time, freq } pairs, in which time is |
| FuseRating | decimal | A | Current rating of a fuse/breaker. Variable instances keyed by phase identifier (L1/L2/L3/N). |
| HandleFailedTariff | OptionList | | This configuration determines how to act when a driver-specific tariff is received, which cannot be processed. |
| HeartbeatInterval | integer | s | Interval of inactivity (no OCPP exchanges) with CSMS after which the Charging Station should send HeartbeatRequest. |
| Height | decimal | m | Height above(+)below(-) reference level (ground level unless context demands otherwise). |
| Humidity | decimal | RH | The relative humidity in %. |
| Hysteresis | decimal | Percent | Specifies the width of a 'dead band' (as a percentage of the threshold) around the central value of a threshold setting (e.g. MinSet, MaxSet, monitor thresholds) to avoid repeated triggering when the measured quantity lies close to the threshold and is subject to small variations. |
| ICCID | string | | ICCID (Integrated Circuit Card IDentifier) of mobile data SIM card. |
| IMSI | string | | IMSI (International Mobile Subscriber Identity) number of mobile data SIM card |
| ISO15118Evseld | string | | EVSE ID in string format as used in ISO 15118 and IEC 63119-2 |
| IdToken | string | | The IdToken used to authorize a charging transaction. |
| Identity | string | | The Charging Station identity. |
| Impedance | decimal | Ohm | Impedance: Primary value is real (resistive only) impedance. Where a complex impedance is to be reported, the imaginary part (reactance) must be represented with a separate Variable instance value of 'reactance'. Reactance values are expressed at the (nominal) relevant operating frequency of the Component (e.g. 50/60Hz for mains electricity feed). |

| Name | DataType | Unit | Description |
|-------------------------------|------------|------|--|
| Interval | integer | s | Minimum Interval (in seconds) between (attempted) operations. |
| ItemsPerMessage | integer | | Maximum number of ComponentVariable entries that can be sent in one GetReportRequest or GetMonitoringReportRequest message. |
| Label | string | | Label for a component. Specifies a non-unique label to be used in a hierarchy UI rendering, in place of the unique component name and instance |
| Language | OptionList | | Default language code, per RFC 5646, of this Charging Station. |
| Length | decimal | m | General Purpose linear distance measure. |
| LifeTime | integer | s | Indicates how long it takes until a token expires in the authorization cache since it is last used. |
| Light | decimal | lx | (Ambient) light level. The value is in Lux. |
| LimitChangeSignificance | decimal | | If at the Charging Station side a change in the limit in a ChargingProfile is lower than this percentage, the Charging Station MAY skip sending a NotifyChargingLimitRequest or a TransactionEventRequest message to the CSMS. |
| LocalAuthorizeOffline | boolean | | Whether the Charging Station, when Offline, will start a transaction for locally-authorized identifiers. |
| LocalFrequencyUpdateThreshold | integer | mHz | The amount of change in net frequency in mHz is needed to trigger a recalculation of the setpoint. |
| LocalLoadBalancing | decimal | | Variable with instances to control local load-balancing. |
| LocalPreAuthorize | boolean | | Whether the Charging Station, when online, will start a transaction for locally-authorized identifiers without waiting for or requesting an AuthorizeResponse from the CSMS. |
| LogicalParent | string | | Points to a logical parent component, to allow rendering a comprehensive overview of the Charging Station components in a UI. |
| Manufacturer | string | | Component Manufacturer name |
| MasterPassGroupId | string | | IdTokens that have this id as groupId belong to the Master Pass Group. |
| MaxCertificateChainSize | integer | | This configuration variable can be used to limit the size of the 'certificateChain' field from the CertificateSignedRequest PDU. |
| MaxElements | integer | | For TariffCostCtrlr: Specifies the maximum number of <i>prices</i> elements that the Charging Station supports in each <i>energy</i> , <i>chargingTime</i> , <i>_idleTime</i> and <i>fixedFee</i> of a TariffType. |
| MaxEnergyOnInvalidId | integer | Wh | Maximum amount of energy in Wh delivered when an identifier is deauthorized by the CSMS after start of a transaction. |
| MaxExternalConstraintsId | integer | | Defines the highest value that a charging profile id of a ChargingStationExternalConstraints profile in the Charging Station can have. |
| MaxPeriodicEventStreams | integer | | The maximum number of open periodic event streams that Charging Station supports. |
| MaxPriceElements | integer | | For ISO15118Ctrlr: The maximum number of <i>priceRuleStacks</i> and <i>priceLevelScheduleEntries</i> that Charging Station is able to accept in a ChargingScheduleType. |
| MaxSoc | integer | | The maximum state of charge that a battery will be charged to. |
| Measurands | MemberList | | Measurand(s) to be included in MeterValuesRequest or TransactionEventRequest |
| Message | string | | Specific stored message for display. |
| MessageAttemptInterval | integer | s | How long the Charging Station should wait before resubmitting a TransactionEventRequest message that the CSMS failed to process. |
| MessageAttempts | integer | | How often the Charging Station should try to submit a TransactionEventRequest message when the CSMS fails to process it. |
| MessageTimeout | integer | s | The purpose of the message timeout is to be able to consider a request message as not sent and continue with other tasks when the message did not arrive due to communication errors or software failure. |
| MinimumStatusDuration | integer | s | Minimum duration that a Charging Station or EVSE status is stable before StatusNotificationRequest is sent to the CSMS. |

| Name | DataType | Unit | Description |
|----------------------------------|--------------|---------|--|
| Mode | string | | Operating mode string from among valid options (communicated by OptionList, etc. during capability/configuration discovery). |
| Model | string | | Manufacturer's Model code/number of Component, including suffixes etc. to identify functional, regional or linguistic variation, but NOT engineering change level internal variation not affecting external behaviour, etc. |
| NetworkAddress | string | | Current network address of a Component. |
| NetworkConfigurationPriority | SequenceList | | A comma separated ordered list of the priority of the possible Network Connection Profiles. The list of possible available profile slots for the network configuration profiles SHALL be reported, via the valuesList characteristic of this Variable. |
| NetworkProfileConnectionAttempts | integer | | Specifies the number of connection attempts the Charging Station executes before switching to a different profile. |
| NextTimeOffsetTransitionDateTime | DateTime | | Date time of the next time offset transition. On this date time, the clock displayed to the EV driver will be given the new offset as configured via TimeOffsetNextTransition. |
| NonEvseSpecific | boolean | | For ReservationCtrlr: If this configuration variable is present and set to true: Charging Station supports reservation where EVSE id is not specified. |
| NotificationMaxDelay | integer | s | For ISO15118Ctrlr: The SECC (EVSE) uses the NotificationMaxDelay element in the EVSEStatus to indicate the time in seconds until it expects the EVCC (EV) to react on the action request indicated in EVSENNotification. |
| NotifyChargingLimitWithSchedules | boolean | | Indicates if the Charging Station should include the externally set charging limit/schedule in the message when it sends a NotifyChargingLimitRequest message. |
| NtpServerUri | string | | This contains the address of the NTP server. |
| NtpSource | OptionList | | Use the NTP server provided via DHCP, or use the manually configured NTP server. |
| OfflineQueueingSeverity | integer | | When set and the Charging Station is offline, the Charging Station shall queue any NotifyEventRequest messages triggered by a monitor with a severity number equal to or lower than the severity configured here. |
| OfflineTariffFallbackMessage | string | | Message (and/or tariff information) to be shown to an EV Driver when Charging Station is offline. |
| OfflineThreshold | integer | s | When the offline period of a Charging Station exceeds the offlineThreshold it is recommended to send a StatusNotificationRequest for all its Connectors when the Charging Station is back online. |
| OfflineTxForUnknownIdEnabled | boolean | | If this key exists and is true, the Charging Station supports Unknown Offline Authorization. |
| Operated | boolean | | The Component operated in an instantaneous, transient, or immediately self-resetting pattern. Used only in event notifications, where it is always true. |
| OperatingTimes | string | | Recurring operating times in iCalendar RRULE format. |
| OrganizationName | string | | The organizationName of the CSO operating the charging station. |
| Overload | boolean | | Component is in Overload state. |
| Percent | decimal | Percent | Generic dimensionless value reporting/setting value. |
| PeriodsPerSchedule | integer | | Maximum number of periods that may be defined per ChargingSchedule. |
| PhaseRotation | string | | This variable describes the phase rotation of a Component relative to its parent Component, using a |
| Phases3to1 | boolean | | If defined and true, this Charging Station supports switching from 3 to 1 phase during a transaction. |
| PhysicalParent | string | | Points to a physical parent component (container), to allow rendering an overview of the Charging Station component locations in a UI. |
| PnCEnabled | boolean | | If this variable is true, then ISO 15118 plug and charge as described by use case C07 - Authorization using Contract Certificates is enabled. |
| Policy | OptionList | | Cache Entry Replacement Policy: least recently used, least frequently used, first in first out, other custom mechanism. |

| Name | DataType | Unit | Description |
|-------------------------------|------------|------|--|
| PostChargingTime | decimal | s | Elapsed time in seconds since last substantive energy transfer |
| Power | decimal | W,kW | Instantaneous (real) Power (measured/calculated, including power factor for AC). Where a component (e.g. AC to DC Power Converter) has multiple power measurements, the default (unkeyed) instance is "input" power. |
| Present | boolean | | Component exists, but might not be locally configured/wired for use, nor (remotely) Enabled. |
| Problem | boolean | | Component itself has a 'Problem' condition that impacts in any significant way on its normal operation. By definition, 'Problem' state includes (logical OR) 'Fault' state. 'Problem' specifically INCLUDES inability to operate that is propagated (up/down/sideways) from any other associated/connected/containing/contained Component. |
| ProfileStackLevel | integer | | Maximum acceptable value for stackLevel in a ChargingProfile. |
| Protecting | boolean | | Applies to 'sensor' type Components that have an associated protection capability, whereby they can disconnect power (e.g. using the main PowerContactor) if the sensed quantity is outside preset/configured limits. If Protecting is true, the Component is actively preventing/interrupting charging. |
| ProtocolAgreed | string | | For ConnectedEV: A string with the following comma-separated items: "<uri>,<major>,<minor>". This is the protocol uri and version information that was agreed upon between EV and EVSE in the supportedAppProtocolReq handshake from ISO 15118. |
| ProtocolSupported | string | | For ISO15118Ctrlr: A string with the following comma-separated items: "<uri>,<major>,<minor>". <uri> is in the format as used in the SupportedAppProtocolReq message from ISO 15118-2 and ISO 15118-20. This variable has at most 20 instances, one for each supported protocol version. |
| ProtocolSupportedByEV | string | | For ConnectedEV: A string with the following comma-separated items: "<uri>,<major>,<minor>". This is information from the SupportedAppProtocolReq message from ISO 15118. Each priority is given its own variable instance. Priority is a number from 1 to 20 as a string. |
| PublicKey | string | | Configuration variable that can be used to retrieve the public key for a meter connected to a specific EVSE. |
| PublicKeyWithSignedMeterValue | boolean | | This Configuration Variable can be used to configure whether a public key needs to be sent with a signed meter value. |
| QueueAllMessages | boolean | | When this variable is set to <i>true</i> , the Charging Station will queue all message until they are delivered to the CSMS. |
| RateUnit | string | | A list of supported quantities (A, W) for use in a ChargingSchedule. |
| RegisterValuesWithoutPhases | boolean | | If this variable reports a value of <i>true</i> , then meter values of measurand Energy.Active.Import.Register will only report the total energy over all phases without reporting the individual phase values. |
| RemainingTimeBulk | integer | s | Number of seconds remaining to charge to bulk state of charge, given by StateOfChargeBulk. |
| RemainingTimeFull | integer | s | Number of seconds remaining to charge to 100% state of charge. |
| ReportingValueSize | integer | | This Configuration Variable can be used to limit the following fields: GetVariableResult.attributeValue, VariableAttribute.value and EventData.actualValue. |
| RequestMeteringReceipt | boolean | | For ISO15118Ctrlr: If this variable is <i>true</i> , then Charging Station shall request a metering receipt |
| ResetRetries | integer | | Number of times to retry a reset of the Charging Station when a reset was unsuccessful. |
| ResumptionTimeout | integer | s | This variable defines the maximum number of seconds that a transaction may be interrupted by a power outage and still be resumed afterwards. |
| SampledMeasurands | MemberList | | The set of measurands to be sampled by the DataCollector component. |
| SamplingInterval | decimal | s | The sampling interval in seconds . |
| SeccId | string | | The name of the SECC in the string format as required by ISO 15118. |

| Name | DataType | Unit | Description |
|------------------------------|------------|---------|---|
| SecurityProfile | integer | | This configuration variable is used to report the security profile used by the Charging Station. |
| SendDuringIdle | boolean | | For AlignedDataCtrlr: If set to <i>true</i> , the Charging Station SHALL only send clock aligned meter values when there is no transaction ongoing. |
| SerialNumber | string | | Serial number of Component. |
| ServiceRenegotiationSupport | boolean | | For ISO15118Ctrlr: If set to 'True' the SECC (EVSE) is capable of ServiceRenegotiation. |
| SetpointPriority | OptionList | | Defines which <i>setpoint</i> shall be used when a ChargingStationExternalConstraints profile |
| SignReadings | boolean | | If set to <i>true</i> , the Charging Station SHALL include signed meter values in the TransactionEventRequest(Ended). |
| SignStartedReadings | boolean | | If set to <i>true</i> , the Charging Station SHALL include signed meter values for context = Transaction.Begin in the metervalues field in the TransactionEventRequest(Started or Updated). |
| SignUpdatedReadings | boolean | | If set to <i>true</i> , the Charging Station SHALL include signed meter values in the metervalues field in the TransactionEventRequest(Updated). |
| SignalStrength | decimal | dBm | (Radio/Wired/Optical) data signal strength, in ASU (typically 0-31 or 99 for unknown). Or dbmW (typically -140 to -50). |
| SlotStatus | OptionList | | This variable represents the status of the door of the battery slot. |
| SoC | integer | Percent | SoC of the component BatteryCartridge which refers to the battery that is inserted at the EVSE. |
| SoH | integer | Percent | SoH of the component BatteryCartridge which refers to the battery that is inserted at the EVSE. |
| State | string | | A state code or name identifier string, to allow the internal state of components to be reported and/or controlled |
| StateOfCharge | decimal | Percent | Energy Storage Device (e.g. battery) state of charge, expressed as a percentage of nominal design 0-100% operating range. The value of StateOfCharge.maxSet represents the maximum state of charge for a full battery and is usually at or near 100%. |
| StateOfChargeBulk | decimal | Percent | Energy Storage Device (e.g. battery) state of charge up to which fast charging is possible. Above this percentage charging speed will drop significantly. |
| StopTxOnEVSideDisconnect | boolean | | When set to <i>true</i> , the Charging Station SHALL deauthorize the transaction when the cable is unplugged from the EV. |
| StopTxOnInvalidId | boolean | | Whether the Charging Station will deauthorize an ongoing transaction when it receives a non- Accepted authorization status in TransactionEventResponse for this transaction. |
| Storage | integer | B | In bytes. Amount of storage occupied. Storage(maxLimit) specifies absolute limit Storage(MaxSet) restricts usage to specified Max, if supported. |
| SupplyPhases | integer | | Number of alternating current phases connected/available. 1 or 3 for AC, 0 means DC (no alternating phases). Null value indicates that the number of phases (e.g. in use) is unknown. |
| SupportedAdditionalPurposes | MemberList | | This configuration variable lists the additional charging profile purposes, that have been introduced in OCPP 2.1, that are supported by the Charging Station. |
| SupportedEnergyTransferModes | MemberList | | Lists the energy transfer services that are supported by the Charging Station. |
| SupportedFormats | MemberList | | For DisplayMessageCtrlr: List of message formats supported by this Charging Station. |
| SupportedIdTokenTypes | MemberList | | The subset of the list of supported IdTokenTypes as defined in Appendix 7. |
| SupportedLimits | MemberList | | This variable defines which transaction limits in TransactionLimitType are supported by the Charging Station. |
| SupportedOperationModes | MemberList | | Lists the V2X operation modes that are supported by the Charging Station. |
| SupportedPriorities | MemberList | | For DisplayMessageCtrlr: List of the priorities supported by this Charging Station. |

| Name | DataType | Unit | Description |
|----------------------------------|--------------|---------------------|---|
| SupportedProviders | string | | A comma-separated list of all providers (eMSPs) that are supported on this Charging Station. The providers are listed using country and provider ID from the EMAID, as defined in ISO 15118-20. |
| SupportedStates | MemberList | | For DisplayMessageCtrlr: List of the states during which to display a message supported by this Charging Station. |
| SupportsDynamicProfiles | boolean | | When this variable has value True, then the Charging Station supports charging profiles of type Dynamic. |
| SupportsEvseSleep | boolean | | When reported as true the Charging Station supports the evseSleep flag in a ChargingSchedulePeriod, which requests the EVSE electronics to go to sleep during operationMode = 'Idle'. |
| SupportsExpiryDateTime | boolean | | For LocalAuthListCtrlr: When set to true Charging Station will disregard idTokens for authorization as if not present in the Local Authorization List when current date/time is past the value of cacheExpiryDateTime. |
| SupportsLimitAtSoC | boolean | | When this variable has value True, then the Charging Station supports the field limitAtSoC in ChargingSchedule, which will cap the limit or setpoint in the ChargingSchedulePeriodType by the value of limitAtSoC.limit. |
| SupportsMaxOfflineDuration | boolean | | When this variable has value True, then the Charging Station supports the fields maxOfflineDuration and invalidAfterOfflineDuration in ChargingProfile. |
| SupportsRandomizedDelay | boolean | | When this variable has value True, then the Charging Station supports the field randomizedDelay in ChargingSchedule, which will delay the start of each charging schedule period by a random number between 0 and randomizedDelay. |
| SupportsUseLocalTime | boolean | | When this variable has value True, then the Charging Station supports the field useLocalTime in ChargingSchedule. |
| Suspending | boolean | | If Suspending is true, the Component can is currently suspending charging. |
| Suspension | boolean | | Applies to 'sensor' type Components that have a charging suspension capability, typically for safety or equipment protection reasons. If Suspension is true, the component can suspend charging when the sensed quantity is outside preset/configured limits. |
| TargetSoc | integer | Percent | For BatterySwapCtrlr: The state of charge that a battery must have in order to be eligible for swapping. |
| TariffFallbackMessage | string | | Message (and/or tariff information) to be shown to an EV Driver when there is no driver specific tariff information available. |
| Temperature | decimal | Celsius, Fahrenheit | Temperature(s) of component (in Celsius, by default). Components may have multiple indexed temperature sensors. |
| Time | dateTime | | Point in time value, in ISO 8601 datetime format. Time zone optional. |
| TimeAdjustmentReportingThreshold | integer | s | When the clock time is adjusted forwards or backwards for more than TimeAdjustmentReportingThreshold number of seconds, a SecurityEventNotification ('SettingSystemTime') is sent by the charging station. |
| TimeOffset | string | | A Time Offset with respect to Coordinated Universal Time (aka UTC or Greenwich Mean Time) in the form of an [RFC3339] time (zone) offset suffix, including the mandatory "+" or "-" prefix. |
| TimeSource | SequenceList | | Via this variable, the Charging Station provides the CSMS with the option to configure a clock source. |
| TimeZone | string | | Configured current local time zone in the format: 'Europe/Oslo', 'Asia/Singapore' etc. |
| Timeout | decimal | s | Generic timeout value for Component operation (in seconds). |
| Timeout | integer | s | For BatterySwapCtrlr: Timeout in seconds in which a set of batteries must be inserted or removed after successful authorization. |
| Token | string | | String of bytes representing an ID token. |
| TokenType | OptionList | | Type of Token. Value is one of IdTokenEnumStringType (See Appendix 7). |
| TotalCostFallbackMessage | string | | Message to be shown to an EV Driver when the Charging Station cannot retrieve the cost for a transaction at the end of the transaction. |
| Tries | integer | | Number of attempts done by a Component. |

| Name | DataType | Unit | Description |
|-----------------------------------|------------|---------|--|
| Tripped | boolean | | Single-shot device requires explicit intervention to re-prime/activate to normal. |
| TxBeforeAcceptedEnabled | boolean | | With this configuration variable the Charging Station can be configured to allow charging before having received a BootNotificationResponse with status: Accepted. |
| TxEndedInterval | integer | s | Interval between sampling of metering (or other) data, intended to be transmitted in the TransactionEventRequest(Ended) message. |
| TxEndedMeasurands | MemberList | | Sampled measurands to be included in the <i>meterValues</i> element of TransactionEventRequest(Ended). |
| TxStartPoint | MemberList | | Start points for a transaction. |
| TxStartedMeasurands | MemberList | | Sampled measurands to be included in the <i>meterValues</i> element of TransactionEventRequest(Started). |
| TxStopPoint | MemberList | | Stop points of a transaction. |
| TxUpdatedInterval | integer | s | Interval between sampling of metering (or other) data, intended to be transmitted in the TransactionEventRequest(Updated) message. |
| TxUpdatedMeasurands | MemberList | | Sampled measurands to be included in the <i>meterValues</i> element of TransactionEventRequest(Updated). |
| UnlockOnEVSideDisconnect | boolean | | When set to true, the Charging Station SHALL unlock the cable on the Charging Station side when the cable is unplugged at the EV. |
| UpstreamInterval | integer | s | Interval between sampling of metering (or other) data, intended to be transmitted via TransactionEventRequest(Updated) messages for location = Upstream only. |
| UpstreamMeasurands | MemberList | | Sampled measurands to be included in the <i>meterValues</i> element of every TransactionEventRequest(Updated) for location = Upstream only. |
| V2GCertificateInstallationEnabled | boolean | | If this variable is <i>true</i> , then ISO 15118 V2G Charging Station certificate installation as described by use case A02 - Update Charging Station Certificate by request of CSMS |
| VehicleCertificate | string | | For ConnectedEV: The PEM encoded X.509 leaf/intermediate/root certificate when present in the vehicle certificate chain. |
| VehicleId | string | | ID that EV provides to charging station. Encoded as a hexbinary string. In ISO 15118 the EVCCID is 6 bytes (MAC address), in CHAdeMO the vehicle id can be 24 bytes. |
| VersionDate | dateTime | | [RFC3339] |
| VersionNumber | string | | Version number of hardware |
| VoltageImbalance | decimal | Percent | Percentage voltage imbalance in three phase supply. |
| WorkingMode | OptionList | | This variable represents the current working mode of the battery in BatteryCartridge component. |

Chapter 5. Reason Codes

The table below provides a list of standardized reason codes that can be used in the optional `statusInfo` element (of type `StatusInfoType`) of a response.

For each reason code, some messages that might typically return them are shown. This is not an exhaustive list and only indicative.

`StatusInfo` is optional. Any implementation should be able to function properly without `statusInfo`, because every message has the response code values that are essential to perform the function. The `reasonCode` and `additionalInfo` in `StatusInfoType` are meant to provide more insight on what is happening and maybe allow for some automatic recovery.

The grouping of the `reasonCodes` in the table below is only to make it easier to look-up codes for certain situations. The grouping does not affect the meaning of the `reasonCode`.

IMPORTANT

The existence of a reason code in this table does not imply a requirement to use it nor does it imply a requirement to any of the mentioned messages.

(Updated in v2.0)

| Group | Reason code | Description | Typically used for |
|-------------------|----------------------|---|---|
| Charging Profiles | | | |
| | DuplicateProfile | A charging profile with same <code>stackLevel</code> - <code>chargingProfilePurpose</code> combination already exists on the Charging Station and has an overlapping validity period. | SetChargingProfile |
| | InvalidProfile | Provided <code>chargingProfile</code> contains invalid elements. | SetChargingProfile, RequestStartTransaction |
| | InvalidProfileId | Provided <code>chargingProfile</code> has an id that is within an invalid range. | SetChargingProfile, RequestStartTransaction |
| | InvalidSchedule | Provided <code>chargingSchedule</code> contains invalid elements. | SetChargingProfile, RequestStartTransaction |
| | InvalidStackLevel | Provided value for <code>stackLevel</code> is invalid. | SetChargingProfile |
| | InvalidOperationMode | Provided <code>operationMode</code> is invalid for this <code>chargingProfilePurpose</code> | SetChargingProfile |
| | NoFreqWattCurve | A frequency-watt curve is missing in a charging schedule period with operation mode = LocalFrequency. | SetChargingProfile |
| | NoPhaseForDC | Phase selection for a DC EVSE is not supported | SetChargingProfile |
| | PhaseConflict | Phase conflict between applicable charging profiles | SetChargingProfile |
| | NoSignalWattCurve | A signal-watt curve is missing in a charging schedule period when an AFRRSignalRequest is received. | AFRRSignal |
| | RateLimitExceeded | A charging profile of the same purpose is submitted too frequently | SetChargingProfile |
| | UnsupportedKind | The requested charging profile kind is not supported | SetChargingProfile |
| | UnsupportedPurpose | The requested charging profile purpose is not supported | SetChargingProfile |
| | UnsupportedRateUnit | A <code>chargingRateUnit</code> is provided that is not supported. | SetChargingProfile |
| Charging Station | | | |
| | CSNotAccepted | BootNotification of Charging Station has not (yet) been accepted by CSMS. | RequestStartTransaction, RequestStopTransaction |
| | FixedCable | The connector has its own fixed cable that cannot be unlocked. | UnlockConnector |
| | NoCable | No cable is connected at this time. | UnlockConnector |
| | UnknownConnectorId | Connector Id is not known on EVSE | ChangeAvailability, UnlockConnector |

| Group | Reason code | Description | Typically used for |
|----------------------------|----------------------|---|--|
| | UnknownConnectorType | Connector type is not known on EVSE | ReserveNow |
| | UnknownEvse | EVSE is not known on Charging Stations | ChangeAvailability, ReserveNow, RequestStartTransaction |
| Swap Station | | | |
| | BatterySoHLow | Battery State of Health is too low | BatterySwap |
| | BatterySoC | Battery State of Charge has unacceptable value | BatterySwap |
| | BatteryDamaged | Battery is damaged | BatterySwap |
| | BatteryUnknown | Battery has unknown serial number | BatterySwap |
| | BatteryType | Battery type not accepted | BatterySwap |
| | NoBatteryAvailable | No battery available for swapping | BatterySwap, RequestBatterySwap |
| Network Configuration | | | |
| | PriorityNetworkConf | A network configuration variable of an NetworkConfiguration instance present in NetworkConfigurationPriority is not allowed to be changed | SetVariablesRequest of NetworkConfiguration |
| | InvalidConfSlot | A value for configurationSlot is used that is not present in NetworkConfigurationPriority.valuesList | SetNetworkProfileRequest |
| | InvalidNetworkConf | Some values in NetworkConfiguration instance are invalid | SetVariablesRequest of NetworkConfigurationPriority, SetNetworkProfileRequest |
| | NoSecurityDowngrade | Security profile downgrade is not allowed | SetVariablesRequest of SecurityProfile, SetNetworkProfileRequest |
| Miscellaneous | | | |
| | DuplicateRequestId | A <i>requestId</i> is provided, that has already been used for this type of request. | UpdateFirmware, PublishFirmware and requests for reports. |
| | InvalidMessageSeq | Message should not be sent at this moment in current scenario. | (generic), SetChargingProfile with ISO15118 |
| | MissingDevModelInfo | Information needed for operation is missing from Device Model | (generic) |
| | NoError | No error has occurred, but some extra information is in <i>additionalInfo</i> . | (generic) |
| | NotFound | No object(s) found that match a provided ID or criteria. | ClearVariableMonitoring, CustomerInformation, GetChargingProfiles, GetDisplayMessages, GetInstalledCertificateIds, GetReport |
| | Unspecified | No reason is specified, but some extra information is in <i>additionalInfo</i> | (generic) |
| | UnsupportedRequest | This request is not supported. | (generic) |
| Operations and Permissions | | | |
| | FwUpdateInProgress | Operation is not possible, because a firmware update is in progress. | Reset |
| | NotEnabled | Feature is not enabled. | ClearCache |
| | ReadOnly | Targeted variable is read-only and cannot be set. | SetVariables |
| | WriteOnly | Targeted variable is write-only and cannot be read. | GetVariables |
| Security | | | |
| | InvalidCSR | Provided CSR is invalid | SignCertificate |

| Group | Reason code | Description | Typically used for |
|-------------------|---------------------|---|---|
| | InvalidCertificate | Provided certificate is invalid. | CertificateSigned, InstallCertificate |
| | InvalidURL | Provided URL is invalid. | UpdateFirmware, PublishFirmware |
| | RedirectNotAllowed | HTTP Redirection is not allowed | LogStatusNotification |
| System Errors | | | |
| | InternalError | Operation cannot be completed due to an internal error. | (generic) |
| | OutOfMemory | Operation not possible, because system does not have enough memory. | (generic) |
| | OutOfStorage | Operation not possible, because system does not have enough storage. | (generic) |
| Transactions | | | |
| | InvalidIdToken | Provided <i>idToken</i> is not valid. | RequestStartTransaction |
| | TxInProgress | A transaction is in progress. | ChangeAvailability, Reset, RequestStartTransaction |
| | TxNotFound | There is no such transaction. | RequestStopTransaction, SetChargingProfile, GetVehicleCertificate |
| | TxStarted | A transaction had already started (e.g. due to cable being plugged in). | RequestStartTransaction |
| Values and Ranges | | | |
| | InvalidValue | An invalid value has been provided. | (generic) |
| | MissingParam | A parameter that is required for the request is missing. | (generic) |
| | TooLargeElement | Provided element is too large to handle. | CertificateSigned, InstallCertificate |
| | TooManyElements | Too many elements have been provided. | SetChargingProfile, SetVariables, SendLocalList |
| | UnsupportedParam | A parameter was provided that is not supported. | (generic) |
| | ValueOutOfRange | Provided value is out of range. | SetVariables, SetVariableMonitoring |
| | ValuePositiveOnly | Provided value is not greater than zero. | (generic) |
| | ValueTooHigh | Provided value is too high. | (generic) |
| | ValueTooLow | Provided value is too low. | (generic) |
| | ValueZeroNotAllowed | Provided value cannot be zero. | (generic) |

Chapter 6. Standardized additionalInfo types

(Updated in v2.0)

Standardized and recommended names (types) for `idToken.additionalInfo` that can be used to provide additional information related to an ID token. For interoperability reasons, these types must be used if the data to be transmitted matches the description.

`additionalInfo` consists of:

- `idToken.additionalInfo.type`: specifies the type of content
- `idToken.additionalInfo.additionalIdToken`: specifies the value

6.1. Generic

`AdditionalInfo` fields can be used to provide additional information about an RFID card.

| <code>additionalInfo.type</code> | Description |
|----------------------------------|--|
| EVCCID | The EVCCID of EV is added as <code>additionalInfo</code> to an <code>idToken</code> for ISO 15118-20 sessions. |
| ISO14443SubType | The subtype of an ISO 14443 RFID card. For example: 'VDE-AR-E-2532-100' (a secure variant of ISO 14443). |

6.2. Ad hoc payment

A number of `AdditionalInfo` fields are prescribed to be used for ad hoc payment (use case C18). The configuration variable [PaymentCtrlr.PaymentDetails](#) determines which values the payment terminal provides that need to be included in `idToken.additionalInfo` for an ad hoc authorization.

| <code>additionalInfo.type</code> | Description |
|----------------------------------|--|
| PspRef | Payment Service Provider reference id for payment session. Only use when PspRef is not in <code>idToken</code> . |
| SessionRef | Payment session reference id from terminal (not the same as pspRef) |
| MerchantRef | Merchant (CSO) reference id for payment session |
| PaymentBrand | Brand of ad hoc payment card. See predefined list of values in table below. |
| ReadingMethod | Contactless / Contact / Magstripe |
| PaymentRecognition | Credit/debit card or digital wallet. See predefined list of values in table below. |
| CardBin | Card first 6 digits |
| CardLast4Digits | Card last 4 digits |
| CardExpiryDate | The expiry date of the card. Format: YYYY/MM |
| HashedCardNr | The hashed card number. |
| WalletUserId | User ID for a digital wallet, e.g. Alipay. |

6.2.1. Predefined values for PaymentBrand

| <code>PaymentBrand</code> | Description |
|---------------------------|-------------|
| AMEX | |
| ApplePay | |
| Bancontact | |
| BankAxept | |
| Carnet | |
| CartesBancaires | |
| Dankort | |
| Diners | |
| Discover | |

| PaymentBrand | Description |
|-----------------|-------------|
| EftposAustralia | |
| Elo | |
| Girocard | |
| GooglePay | |
| Hipercard | |
| Interac | |
| JCB | |
| Maestro | |
| Mastercard | |
| SamsungPay | |
| UnionPay | |
| VPay | |
| Visa | |

6.2.2. Predefined values for PaymentRecognition

| PaymentRecognition | Description |
|--------------------|-------------|
| CC | Credit card |
| Debit | Debit card |
| Alipay | |
| ApplePay | |
| GooglePay | |
| GrabPay | |
| PayPal | |
| SamsungPay | |
| WeChatPay | |

Chapter 7. Standardized values for enumerations as string

7.1. IdTokenEnumStringType

Standardized values for *idToken.type*.

Before OCPP 2.1 this used to be an enumeration. This has been changed to a predefined set of strings for more flexibility.

(Updated in v2.0)

| Value | Description |
|-----------------|---|
| Central | A centrally, in the CSMS (or other server) generated id (for example used for a remotely started transaction that is activated by SMS). No format defined, might be a UUID. |
| DirectPayment | IdToken from a payment terminal that authorized a payment card. Usually a reference id from payment service provider. |
| eMAID | Electro-mobility account id as defined in ISO 15118 |
| EVCCID | EVCCID of EV. For ISO 15118-2 this is the MAC address. For ISO 15118-20 this is an identifier up to 255 characters. |
| ISO14443 | ISO 14443 UID of RFID card. It is represented as an array of 4 or 7 bytes in hexadecimal representation. |
| ISO15693 | ISO 15693 UID of RFID card. It is represented as an array of 8 bytes in hexadecimal representation. |
| KeyCode | A private key-code to authorize a charging transaction. For example: Pin-code. |
| Local | A locally generated id (e.g. internal id created by the Charging Station). Needs no checking by CSMS. No format defined, might be a UUID |
| MacAddress | MacAddress of the EVCC (Electric Vehicle Communication Controller) that is connected to the EVSE. Used when MAC address is used for authorization (Autocharge). |
| NoAuthorization | Transaction is started and no authorization possible. Charging Station only has a start button or mechanical key etc. IdToken field SHALL be left empty. |
| VIN | Vehicle Identification Number of EV. |

7.2. ChargingLimitSourceEnumStringType

Standardized values for a *chargingLimitSource* field.

Before OCPP 2.1 this used to be an enumeration. This has been changed to a predefined set of strings for more flexibility.

(Updated in v2.0)

| Value | Description |
|-------|--|
| EMS | Indicates that an Energy Management System has sent a charging limit. |
| Other | Indicates that an external source, not being an EMS or system operator, has sent a charging limit. |
| SO | Indicates that a System Operator (DSO or TSO) has sent a charging limit. |
| CSO | Indicates that the CSO has set this charging profile. |

7.3. ConnectorEnumStringType

Standardized values for a *connectorType* field.

- Fixed cable connections have a name that starts with "c" for captive cabled.
- Socket connections have a name that starts with "s" for socket.
- Wireless connections have a name that starts with "w" for wireless.
- Swappable battery types have a name that starts with "b" for battery.

Before OCPP 2.1 this used to be an enumeration. This has been changed to a predefined set of strings for more flexibility.

(Updated in v2.0)

| Value | Description |
|-----------------|---|
| bBatterySlot | Slot of a battery swap station to accept battery cartridges (type unspecified) |
| cCCS1 | Combined Charging System 1 (captive cabled) a.k.a. Combo 1 |
| cCCS2 | Combined Charging System 2 (captive cabled) a.k.a. Combo 2 |
| cChaoJi | ChaoJi (captive cabled) a.k.a. CHAdeMO 3.0 |
| cG105 | JARI G105-1993 (captive cabled) a.k.a. CHAdeMO (captive cabled) |
| cGBT-DC | GB/T 20234.3 DC connector (captive cabled) |
| cLECCS | Light Equipment Combined Charging System IS17017 (captive cabled) |
| cMCS | Megawatt Charging System (captive cabled) |
| cNACS | North American Charging Standard J3400 (captive cabled) |
| cNACS-CCS1 | Built-in NACS to CCS1 adapter (captive cabled) |
| cCCS1-NACS | Built-in CCS1 to NACS adapter (captive cabled) |
| cTesla | Tesla Connector (captive cabled) |
| cType1 | IEC62196-2 Type 1 connector (captive cabled) a.k.a. J1772 |
| cType2 | IEC62196-2 Type 2 connector (captive cabled) a.k.a. Mennekes connector |
| cUltraChaoJi | Ultra-ChaoJi for megawatt charging (captive cabled) |
| s309-1P-16A | 16A 1 phase IEC60309 socket |
| s309-1P-32A | 32A 1 phase IEC60309 socket |
| s309-3P-16A | 16A 3 phase IEC60309 socket |
| s309-3P-32A | 32A 3 phase IEC60309 socket |
| sBS1361 | UK domestic socket a.k.a. 13Amp |
| sCEE-7-7 | CEE 7/7 16A socket. May represent 7/4 and 7/5 a.k.a Schuko |
| sType1 | IEC62196-2 Type 1 socket a.k.a. J1772 |
| sType2 | IEC62196-2 Type 2 socket a.k.a. Mennekes connector |
| sType3 | IEC62196-2 Type 3 socket a.k.a. Scame |
| wInductive | Wireless inductively coupled connection (generic) |
| wResonant | Wireless resonant coupled connection (generic) |
| OppCharge | Pantograph down connector |
| Other1PhMax16A | Other single phase (domestic) sockets not mentioned above, rated at no more than 16A. CEE7/17, AS3112, NEMA 5-15, NEMA 5-20, JISC8303, TIS166, SI 32, CPCS-CCC, SEV1011, etc. |
| Other1PhOver16A | Other single phase sockets not mentioned above (over 16A) |
| Other3Ph | Other 3 phase sockets not mentioned above. NEMA14-30, NEMA14-50. |
| Pan | Pantograph up connector |
| Undetermined | Yet to be determined (e.g. before plugged in) |
| Unknown | Unknown/not determinable |

7.4. SigningMethodEnumStringType

Standardized values for the *signingMethod* in a SignedMeterValueType.

Columns Algorithm, Curve, Key Length and Hash Algorithm are for information only and not part of the standardized value.

(Updated in v2.0)

| SigningMethod | Algorithm | Curve | Key Length | Hash Algorithm |
|------------------------|-----------|-----------|------------|----------------|
| ECDSA-secp192k1-SHA256 | ECDSA | secp192k1 | 192 bits | SHA-256 |
| ECDSA-secp256k1-SHA256 | ECDSA | secp256k1 | 256 bits | SHA-256 |
| ECDSA-secp192r1-SHA256 | ECDSA | secp192r1 | 192 bits | SHA-256 |
| ECDSA-secp256r1-SHA256 | ECDSA | secp256r1 | 256 bits | SHA-256 |

| SigningMethod | Algorithm | Curve | Key Length | Hash Algorithm |
|-----------------------------|------------------|----------------|-------------------|-----------------------|
| ECDSA-brainpool256r1-SHA256 | ECDSA | brainpool256r1 | 256 bits | SHA-256 |
| ECDSA-secp384r1-SHA256 | ECDSA | secp384r1 | 384 bits | SHA-256 |
| ECDSA-brainpool384r1-SHA256 | ECDSA | brainpool384r1 | 384 bits | SHA-256 |