OCPP 2.0.1

Table of Contents

Part 2 - Appendices

Edition 3 v1.4 FINAL, 2024-05-06

Disclaimer

Version History

Appendix version	Date	OCPP Version	Description
1.4	2024-05-06	OCPP 2.0.1 Edition 3	Appendix version for Edition 3 Updated parts are marked with "*(Updated in v1.4)*"
1.3	2022-12-15	OCPP 2.0.1	Appendix version for Errata 2 (2022) Updated parts are marked with "*(Updated in v1.3)*".
1.2	2021-10-01	OCPP 2.0.1	Appendix version for Errata 1 (2021) Appendix 3: Updated components are marked with "*(Updated in v1.2)*". 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.
1.0	2018-04-11	OCPP 2.0	First release of this Appendix for OCPP 2.0

Appendix 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 v1.3)

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 `ClockCtrlr.TimeAdjustmentReportingThreshold` 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 CertificateSignedRequest message is not a valid certificate	Yes
InvalidTLSVersion	The TLS version used by the CSMS is lower than 1.2 and is not allowed by the security specification	Yes

Security Event	Description	Critical
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 techInfo field. For this the following format is strongly recommended: '{₩'user₩': ₩'…₩', ₩'origin₩': ₩'…₩'}'	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 techInfo field. For this the following format is strongly recommended: '{₩'user₩': ₩'…₩', ₩'origin₩': ₩'…₩'}'	Yes

Appendix 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 ($10 \log(P/1mW)$)
Deg	Degrees (angle/rotation)
Fahrenheit	Degrees (temperature)
Hz	Hertz (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)

Value	Description
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)

Appendix 3. Standardized Components

This appendix provides a list of all standardized component names for OCPP 2.0.1 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 2.0.1. and typical Variables that might be associated with them.

IMPORT ANT	This list does not imply that these Components are required, nor does it imply that the listed Variables arerequired 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

		Description
Enabled	boolean	If set to *false*, 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 *idToken* field of the TransactionEventRequest. If no *idToken* was provided, then *idToken* 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 true 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.
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 v1.2)*

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 true 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.

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:

Variables	Type	Description
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) *A single byte manufacturer code assigned by CHAdeMO association*

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.
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.
NextTimeOffsetTransitionDateTime	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.
TimeAdjustmentReportingThreshold	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 *vendorId* of the customization in CustomData or DataTransfer messages.

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.valueList 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

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.
PersonalMessageSize	integer	Max size (in characters) of the personal message element of the IdTokenInfo data (0 specifies no personal data may be stored).
SupportedFormats	MemberList	List of message formats supported by this Charging Station. Possible values: See MessageFormatEnumType.

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 *true*, then ISO 15118 plug and charge as described by use case C07 - Authorization using Contract Certificates is enabled. If this variable is *false*, then ISO 15118 plug and charge as described by use case C07 - Authorization using Contract Certificates is disabled.
V2GCertificateInstallationEnabled	boolean	If this variable is *true*, 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 *false*, 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.

Description		
ContractCertificateInstallationEnabled	boolean	If this variable is *true*, 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 *false*, 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 *true*, 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 © 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 *true* 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.

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.
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. ReservationCtrlr

Description

Logical Component responsible for configuration relating to reservations.

Variables	Type	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.

3.1.14. 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 *true*, 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 *false*, then the value for each phase is reported, possibly also with a total value (depending on the meter).

3.1.15. SecurityCtrlr *(Updated in v1.4)*

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 maximum 40 characters (alpha-numeric characters and the special characters allowed by passwordString). 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.

3.1.16. 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 *stackLevel* in a ChargingProfile. Since the lowest *stackLevel* 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.

Description		
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.

3.1.17. TariffCostCtrlr

Description

Logical Component responsible for configuration relating to tariff and cost display.

Variables	Type	Description
Enabled	boolean	Whether Tariff/cost is enabled.
Available	boolean	Whether Tariff/cost is supported.
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.

3.1.18. 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	

Description	
Active	Non-Default
Problem	
State	

3.2.5. AirCoolingSystem

Description

Fans (or equivalent devices) used to provide cooling.

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

Fans (or equivalent devices) used to ensure that EVs that require ventilation during charging

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

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

Typically used variables	Description
Enabled	Sensor is sensing for occupancy
Active	Occupied

Description	
Percent	percentage obstruction (for analogue sensors).

3.2.8. BeaconLighting

Description

Beacon Lighting to help EV drivers to locate nearby charging places, and/or to determine charging availability state, usually by color variation.

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

A sensor that detects when a charging cable (captive or removable) has been forcibly pulled from the Charging Station.

Typically used variables	Description
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

Description	
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
ACCurrent	Measured total AC current [per phase]
Power	Measured/calculated total power being consumed, including standby/ancilliary loads
Power(MaxLimit)	Designed total operating load power, including standby/ancilliary 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

Description	
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 v1.3)*

Description

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.

Variable	Unit	ISO 15118-2 value	CHAdeMO value
Available	boolean	Is true when an EV is connected	
Vehicle:			
VehicleId	string	EVCCID (from SessionSetupReq) *Six bytes, represented as hexbinary encoded string, e.g. "010203040A0B"*	Vehicle ID (H'710 + H'711 + H'712) *Three times 8 bytes, represented as hexbinary encoded string, e.g. "**010203040A0B0C0D**111213141A1B1C1D**212223242A2B2C2D**". A concatenation of **H'710** + H'711 + **H'712**.*

Variable	Unit	ISO 15118-2 value	CHAdeMO value
ProtocolAgreed	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: "urn:iso:15118:2:2013:MsgDef,2,0"	Lowest of Chademo protocol number from EV (H'102.0) and charger (H'109.0)
ProtocolSupportedByEV	string	A string with the following comma-separated items: "<uri>,<major>,<minor>". This is information from the supportedAppProtocolReq message from ISO 15118. Variable has multiple instances, one for each priority. Example: "urn:iso:15118:2:2013:MsgDef,2,0"	Chademo protocol number (H'102.0)
Voltage and current values:			
ACCurrent.minSet	A	EVMinCurrent	-
ACCurrent.maxSet	A	EVMaxCurrent	-
ACVoltage.maxSet	V	EVMaxVoltage	-
DCCurrent.minSet	A	-	Minimum charge current (H'100.0)
DCCurrent.maxSet	A	EVMaximumCurrentLimit	-
DCCurrent.target	A	EVTargetCurrent	Charging current request (H'102.3) If HighCurrentControl is true, use the value from Charging current request (extended) (H'110.1,2).
DCVoltage.minSet	V	-	Minimum battery voltage (H'100.2,3)
DCVoltage.maxSet	V	EVMaximumVoltageLimit	Maximum battery voltage (H'100.4,5)
DCVoltage.target	V	EVTargetVoltage	Target battery voltage (H'102.1,2)
Power, energy and time values:			
Power.maxSet	W	EVMaximumPowerLimit	-
EnergyCapacity	Wh	EVEnergyCapacity	Total capacity of traction battery * 100 (H'101.5,6)
EnergyImport.target	Wh	EVEnergyRequest (DC) EAmount (AC)	-

Variable	Unit	ISO 15118-2 value	CHAdeMO value
DepartureTime	dateTime	DepartureTime *Provided as seconds since message receipt. Convert to absolute time.*	-
RemainingTimeBulk	s	RemainingTimeToBulkSoC	-
RemainingTimeFull.maxSet	s	-	Maximum charging time * 60 (H'101.2)
RemainingTimeFull.actual	s	RemainingTimeToFullSoc	Estimated charging time * 60 (H'101.3)
StateOfChargeBulk	%	BulkSoC	-
StateOfCharge.maxSet	%	FullSoC	Charged rate reference constant (H'100.6)
StateOfCharge.actual	%	DC_EVStatus.EVRESSSOC	State of charge (H'102.6)
ChargingCompleteBulk	boolean	BulkChargingComplete	-
ChargingCompleteFull	boolean	ChargingComplete	-

Status values:

ChargingState
with a memberlist consisting of the following values:

* *BatteryOvervoltage*		-	Battery overvoltage (H'102.4.0)
* *BatteryUndervoltage*		-	Battery undervoltage (H'102.4.1)
* *ChargingCurrentDeviation*		FAILED_ChargingCurrentDifferential	Battery current deviation (H'102.4.2)
* *BatteryTemperature*		FAILED_RESSTemperatureInhibit	High battery temperature (H'102.4.3)
* *VoltageDeviation*		FAILED_ChargingVoltageOutOfRange	Battery voltage deviation (H'102.4.4)
* *ChargingSystemError*		FAILED_EVRESSMalfunction	Charging system error (H'102.5.2)
* *VehicleShiftPosition*		FAILED_EVShiftPosition	Vehicle shift position (H'102.5.1)
* *VehicleChargingEnabled*		-	Vehicle charging enabled (H'102.5.0)
* *ChargingSystemIncompatibility*		FAILED_ChargingSystemIncompatibility	-
* *ChargerConnectorLockFault*		FAILED_ChargerConnectorLockFault	-

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	Type of connector as defined by ConnectorEnumType in "Part 2 - Specification" plus additionally: cGBT, cChaoJi, OppCharge.
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

Description	
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

Description

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]
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	

Description	
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

Description	
Problem	Display fault
Color	Display color (monochrome/backlighting)
Count[HeightInChars]	Display height (characters)
Count[WidthInChars]	Display width (characters)
DataText[Visible]	Current Display Contents
State	Alphanumeric code indicating current message purpose

3.2.24. DistributionPanel

Description

Defines the Distribution Panel, with it's fuses and connections to both Charging Stations and other Distribution Panel's.

Common Variables	Description
InstanceName	Name of the distribution box
Fuse	Fuse (index n) is the fuse for phase Ln in Ampere.
ChargingStation	The Identity of Charging Station (index n) which is connnected to this DistributionPanel. Note: this is an indexed list of Charging Station Identities, not to be confused by the Charging Station component.
ChargingStation	List of Charging Stations Identities connected to this LocalController. (not to be confused with the ChargingStation Component)
DistributionPanel	List of Distribution Panels InstanceNames connected to this LocalController. (not to be confused with the DistributionPanel Component) See the LocalController component for an example.

3.2.25. ElectricalFeed

Description

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.

Typically used variables	Description
Enabled	
Active	Connected

Description	
Problem	
PowerType	
Power	
Energy	
DCVoltage	
SupplyPhases	
PhaseRotation	
ACVoltage	

3.2.26. 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

3.2.27. 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

3.2.28. 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
Percent	Lighting Level (% of maximum)
Percent(Set)=x%	Lighting Level (% of maximum)
Power	Lighting Wattage
Color	Displayed color/intensity

3.2.29. 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)

3.2.30. 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

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]
ACCurrent	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
ISO15118EvseId	The name of the EVSE in the string format as required by ISO 15118 and IEC 63119-2. Example: "DE*ICE*E*1234567890*1"

3.2.31. ExternalTemperatureSensor

Description	
Reports ambient air temperature	

Typically used variables	Description
Active	Temperature above MaxSet or MinSet

Description	
Problem	Temperature sensor fault
Temperature	Ambient temperature

3.2.32. 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

3.2.33. FloodSensor

Description

A sensor reporting whether the Charging Station is experiencing water ingress/pooling.

Typically used variables	Description

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.

3.2.34. 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

3.2.35. 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

Description	
Temperature(MinSet)	Cut-in temperature
Temperature(MaxSet)	Cut-out temperature

3.2.36. HumiditySensor

Description
Reports relative air humidity

Typically used variables	Description
Enabled	
Problem	Humidity sensor fault
Humidity	RH(%)

3.2.37. LightSensor

Description
Reports ambient light levels.

Typically used variables	Description
Enabled	
Problem	Lighting sensor fault
Light	The ambient light level

3.2.38. 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	

3.2.39. 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
Problem	Local Availability sensing circuit error

3.2.40. 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)

Description	
	List of Distribution Panels InstanceNames connected to this LocalController. (not to be confused with the DistributionPanel Component) This can be used to describes the electrical connections in the site controlled by the Local Controller. An example. The incoming fuses are all 120A. Each floor has a set of 80A fuses. On the first floor, there's also a group of Charging Stations that are behind a set of 32A fuses. DistributionPanel.Fuse[1] = 120 DistributionPanel.Fuse[2] = 120 DistributionPanel.Fuse[3] = 120 DistributionPanel.DistributionPanel[0] = "Level-1" DistributionPanel.DistributionPanel[1] = "Level-2" DistributionPanel["Level-1"].Fuse[1] = 80 DistributionPanel["Level-1"].Fuse[2] = 80 DistributionPanel["Level-1"].Fuse[3] = 80 DistributionPanel["Level-1"].ChargingStation[0] = "NLCP013" DistributionPanel["Level-1"].ChargingStation[1] = "NLCP014" DistributionPanel["Level-1"].ChargingStation[2] = "NLCP015" DistributionPanel["Level-1"].DistributionPanel[0] = "Level-1a" DistributionPanel["Level-1a"].Fuse[1] = 32 DistributionPanel["Level-1a"].Fuse[2] = 32 DistributionPanel["Level-1a"].Fuse[3] = 32 DistributionPanel["Level-1a"].ChargingStation[0] = "NLCP130" DistributionPanel["Level-1a"].ChargingStation[1] = "NLCP136" DistributionPanel["Level-1a"].ChargingStation[2] = "NLCP132" DistributionPanel["Level-2"].Fuse[1] = 80 DistributionPanel["Level-2"].Fuse[2] = 80 DistributionPanel["Level-2"].Fuse[3] = 80 DistributionPanel["Level-2"].ChargingStation[0] = "NLCP023" DistributionPanel["Level-2"].ChargingStation[1] = "NLCP024"

The left-column label for the above row is: DistributionPanel

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

Description
Local energy storage device

Typically used variables	Description
EnergyCapacity	Maximum storage capacity
Identity	Local Energy Storage identity

3.2.42. 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]

3.2.43. 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
Tries(MaxLimit)	Maximum auto retry count

3.2.44. 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

3.2.45. 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

3.2.46. 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

3.2.47. 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

Description	
Fallback(MaxLimit)	RTC has backup-power. MaxLimit = 1
Problem	RTC fault

3.2.48. 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)

3.2.49. 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	

3.2.50. 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	

3.2.51. 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

3.2.52. 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

3.2.53. 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 as IdTokenEnumType

3.2.54. 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

3.2.55. 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	

3.2.56. 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
AlignedDataCtrlr	Logical Component responsible for configuration relating to the reporting of clock-aligned meter data.

Component	Description
AuthCtrlr	Logical Component responsible for configuration relating to the use of authorization for Charging Station use.
AuthCacheCtrlr	Logical Component responsible for configuration relating to the use of a local cache for authorization for Charging Station use.
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.
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.
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.
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.

Component	Description
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.
AirCooling System	Fans (or equivalent devices) used to provide cooling.
AreaVentilation	Fans (or equivalent devices) used to ensure that EVs that require ventilation during charging
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.
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.
Connector HolsterRelease	A mechanism present in a connector holster to prevent the connector from being removed inappropriately: typically unlocks connector after authorization.
Connector HolsterSensor	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.
Connector PlugRetentionLock	Locking mechanism to retain an inserted plug, both to prevent on-load disconnection, and to prevent theft of charging cables
Connector Protection Release	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

Component	Description
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

Component	Description
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
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)

Component	Description
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.

Appendix 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
ACCurrent	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
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.
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 ofall per-phase readings and written values are common per-phase settings. Example(s): ElectricalFeed: Input Voltage AllowReset boolean Component can be reset. Can be used to announce that an EVSE can be reset individually.
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]
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.
Certificate	string	Digital	Certificate (in Base64 encoding)
ChargeProtocol			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.

Name	DataType	Unit	Description
ChargingCompleteBulk	boolean		Charging up to StateOfChargeBulk has completed.
ChargingCompleteFull	boolean		Charging up to StateOfCharge.maxSet has completed.
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.
Complete	boolean		Component's operation cycle has completed. Used only in event notifications, where it is always true.
ConnectedTime	decimal	s	Time since logical connection established ConnectorType OptionList A value of ConnectorEnumType (See part 2) plus additionally: cGBT, cChaoJi, OppCharge. Specific type of connector, including sub-variant information. Note: Distinct and orthogonal to Charging Protocol, Power Type, Phases.
Count	integer		General purpose integer count variable for Component state reporting
Currency	string		Currency in a ISO 4217 formatted currency code.
CurrentImbalance	decimal	Percent	Percentage current imbalance in an AC three phase supply.
DataText	string		Text associated with a Component, e.g. a Display.
DateTime	dateTime		Point in time value, in [RFC3339] datetime format. Time zone optional.
DCCurrent	decimal	A	DC Current (in amperes). May be an instantaneous measurement, or a period average, depending on context/equipment.
DCVoltage	decimal	V	DC Voltage (volts). May be an instantaneous measurement, or a period average, depending on context/equipment.
DepartureTime	dateTime		Time in [RFC3339] datetime format, when an EV intends to leave the charging station.
ECVariant	string		Production series variants reflecting internal design changes or sub-component substitutions not affecting external functionality.
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 of 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.

Name	DataType	Unit	Description
EnergyImport	decimal	Wh	Total energy transferred.
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.
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.
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.
FuseRating	decimal	A	Current rating of a fuse/breaker. Variable instances keyed by phase identifier (L1/L2/L3/N).
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.
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).
IMSI	string		IMSI (International Mobile Subscriber Identity) number of mobile data SIM card
Interval	integer	s	Minimum Interval (in seconds) between (attempted) operations.
ISO15118EvseId	string		EVSE ID in string format as used in ISO 15118 and IEC 63119-2

Name	DataType	Unit	Description
Length	decimal	m	General Purpose linear distance measure.
Light	decimal	lx	(Ambient) light level. The value is in Lux.
Manufacturer	string		Component Manufacturer name
Message	string		Specific stored message for display.
MinimumStatusDuration	integer	s	Minimum duration that a Charging Station or EVSE status is stable before StatusNotificationRequest is sent to the CSMS.
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.
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.
Overload	boolean		Component is in Overload state.
Percent	decimal	Percent	Generic dimensionless value reporting/setting value.
PhaseRotation	OptionList		The phase wiring of Component, relative to it's upstream feed Component/device. This variable describes the phase rotation of a Component relative to its parent Component, using a three letter string consisting of the letters: R, S, T and x. The letter 'R' can be identified as phase 1 (L1), 'S' as phase 2 (L2), 'T' as phase 3 (L3). The lower case 'x' is used to designate a phase that is not connected. An empty string means that phase rotation is not applicable or not known.
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.
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.
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.
RemainingTimeBulk	integer	s	Number of seconds remaining to charge to bulk state of charge, given by StateOfChargeBulk.

Name	DataType	Unit	Description
RemainingTimeFull	integer	s	Number of seconds remaining to charge to 100% state of charge.
SeccId	string		The name of the SECC in the string format as required by ISO 15118.
SerialNumber	string		Serial number of Component.
SignalStrength	decimal	dBm	(Radio/Wired/Optical) data signal strength, in ASU (typically 0-31 or 99 for unknown). Or dbmW (typically -140 to -50).
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.
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.
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.
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.
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.
Timeout	decimal	s	Generic timeout value for Component operation (in seconds).
Token	string		String of bytes representing an ID token.
TokenType	OptionList		Type of Token. Value is one of IdTokenEnumType.
Tries	integer		Number of attempts done by a Component.
Tripped	boolean		Single-shot device requires explicit intervention to re-prime/activate to normal.

Name	DataType	Unit	Description
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.

Appendix 5. Reason Codes

The table below provides a list of standardized reason codes that can be used in the optional StatusInfo element 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 StatusInfo are meant to provide more insight on what is happening and maybe allow for some automatic recovery.

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

Reason Code	Description	Typically used for
CSNotAccepted	BootNotification of Charging Station has not (yet) been accepted by CSMS.	RequestStartTransaction, RequestStopTransaction
DuplicateProfile	A charging profile with same *stackLevel - chargingProfilePurpose* combination already exists on the Charging Station and has an overlapping validity period.	SetChargingProfile
DuplicateRequestId	A requestId is provided, that has already been used for this type of request.	UpdateFirmware, PublishFirmware and requests for reports.
FixedCable	The connector has its own fixed cable that cannot be unlocked.	UnlockConnector
FwUpdateInProgress	Operation is not possible, because a firmware update is in progress.	Reset
InternalError	Operation cannot be completed due to an internal error.	(generic)
InvalidCertificate	Provided certificate is invalid.	CertificateSigned, InstallCertificate
InvalidCSR	Provided CSR is invalid	SignCertificate
InvalidIdToken	Provided *idToken* is not valid.	RequestStartTransaction
InvalidMessageSeq	Message should not be sent at this moment in current scenario.	(generic), SetChargingProfile with ISO15118
InvalidProfile	Provided *chargingProfile* contains invalid elements.	SetChargingProfile, RequestStartTransaction
InvalidSchedule	Provided *chargingSchedule* contains invalid elements.	SetChargingProfile, RequestStartTransaction
InvalidStackLevel	Provided value for *stackLevel* is invalid.	SetChargingProfile
InvalidURL	Provided URL is invalid.	UpdateFirmware, PublishFirmware
InvalidValue	An invalid value has been provided.	(generic)
MissingDevModelInfo	Information needed for operation is missing from Device Model	(generic)

Reason Code	Description	Typically used for
MissingParam	A parameter that is required for the request is missing.	(generic)
NoCable	No cable is connected at this time.	UnlockConnector
NoError	No error has occurred, but some extra information is in *additionalInfo*.	(generic)
NotEnabled	Feature is not enabled.	ClearCache
NotFound	No object(s) found that match a provided ID or criteria.	ClearVariableMonitoring, CustomerInformation, GetChargingProfiles, GetDisplayMessages, GetInstalledCertificateIds, GetReport
OutOfMemory	Operation not possible, because system does not have enough memory.	(generic)
OutOfStorage	Operation not possible, because system does not have enough storage.	(generic)
ReadOnly	Targeted variable is read-only and cannot be set.	SetVariables
TooLargeElement	Provided element is too large to handle.	CertificateSigned, InstallCertificate
TooManyElements	Too many elements have been provided.	SetChargingProfile, SetVariables, SendLocalList
TxInProgress	A transaction is in progress.	ChangeAvailability, Reset, RequestStartTransaction
TxNotFound	There is no such transaction.	RequestStopTransaction, SetChargingProfile
TxStarted	A transaction had already started (e.g. due to cable being plugged in).	RequestStartTransaction
UnknownConnectorId	Connector Id is not known on EVSE	ChangeAvailability, UnlockConnector
UnknownConnectorType	Connector type is not known on EVSE	ReserveNow
UnknownEvse	EVSE is not known on Charging Stations	ChangeAvailability, ReserveNow, RequestStartTransaction
UnknownTxId	Provided *transactionId* is not known.	RequestStopTransaction
Unspecified	No reason is specified, but some extra information is in *additionalInfo*	(generic)
UnsupportedParam	A parameter was provided that is not supported.	(generic)
UnsupportedRateUnit	A *chargingRateUnit* is provided that is not supported.	SetChargingProfile
UnsupportedRequest	This request is not supported.	(generic)

Reason Code	Description	Typically used for
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)
WriteOnly	Targeted variable is write-only and cannot be read.	GetVariables