OCPP 2.1

Part 2 - Appendices

v2.0, 2025-01-23

Table of Contents

Disclaimer

Version History

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

Appendix version	Date	OCPP Version	Description
2.0	2025-01-22	OCPP 2.1 Edition 1	Appendix version for OCPP 2.1 Updated parts are marked with "*(Updated in v2.0)*"
1.4	2024-04-30	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
1.0	2018-04-11	OCPP 2.0	First release of this Appendix for OCPP 2.0

Chapter 1. Security Events

The table below provides a list of security events. Security events that are implemented SHALL be stored at the security log and security events that are implemented and marked as critical SHALL also be pushed to the CSMS.
This is a non-exhaustive list of security events, when a security event matches the *description* of one of the Security Events in this section, for interoperability reasons, the Security Event from this section SHALL be used, instead of adding a new (proprietary) Security Event. Some security events like; *InvalidCsmsCertificate*, *InvalidChargingStationCertificate*, etc. are mandatory to be implemented. Please refer to Part 2 - Specification for which security events are mandatory to be implemented.

(Updated in v2.0)

Security Event	Description	Critical
FirmwareUpdated	The Charging Station firmware is updated	Yes
FailedToAuthenticateAtCsms	The authentication credentials provided by the Charging Station were rejected by the CSMS	No
CsmsFailedToAuthenticate	The authentication credentials provided by the CSMS were rejected by the Charging Station	No
SettingSystemTime	The system time on the Charging Station was changed more than `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
DiscardedRenewedClientCertificate	The Charging Station discarded the renewed client certificate, because it was unable to successfully establish a connection using it.	Yes
InvalidTLSVersion	The TLS version used by the CSMS is lower than 1.2 and is not allowed by the security specification	Yes
InvalidTLSCipherSuite	The CSMS did only allow connections using TLS cipher suites that are not allowed by the security specification	Yes
MaintenanceLoginAccepted	Successful login to the local maintenance interface. It is recommended to include information like the user identification and the origin of the login attempt, which can be an ip-address or a touch screen for example, to the 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

Chapter 2. Standardized Units of Measure

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

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

Chapter 3. Standardized Components

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

3.1. Controller Components

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

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

3.1.1. AlignedDataCtrlr

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

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

Description		
Logical Component responsible for configuration relating to the use of authorization for Charging Station use.		
Variables	**Type**	**Description**
Enabled	boolean	If set to *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.

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

3.1.3. AuthCacheCtrlr *(Updated in 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:		
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).

Description		
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.
CustomTriggers	MemberList	This variable defines the names of custom triggers that Charging Station supports in a *customTrigger* field of Triggermessagerequest.

3.1.7. DeviceDataCtrlr

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

3.1.8. DisplayMessageCtrlr

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

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

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.
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** (C) of the SECC leaf certificate. Example: "DE"
Specific ISO15118 interface data from vehicle:		
MaxScheduleEntries	integer	MaxEntriesSAScheduleType (15118-2) or MaximumSupportingPoints (15118-20) *Number of allowed schedule periods*
RequestedEnergyTransferMode	OptionList	RequestedEnergyTransferMode *"AC_single_phase_core", "AC_three_phase_core", "DC_core, "DC_extended", "DC_combo_core", "DC_unique"*

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

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

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

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

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

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

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

3.1.13. WebPaymentsCtrlr (*New in v2.0*)

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

3.1.14. ReservationCtrlr

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

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

3.1.15. SampledDataCtrlr

Description		
Logical Component responsible for configuration relating to the reporting of sampled meter data.		
Variables	**Type**	**Description**
Enabled	boolean	If this variable reports a value of true, Sampled Data is enabled.
Available	boolean	If this variable reports a value of true, Sampled Data is supported.
SignReadings	boolean	If set to true, the Charging Station includes signed meter values in the MeterValuesRequest to the CSMS.
TxEndedMeasurands	MemberList	Sampled measurands to be included in the meterValues element of TransactionEventRequest (eventType = Ended), every TxEndedSampleInterval seconds from the start of the transaction.
TxEndedInterval	integer	Interval in seconds between sampling of metering (or other) data, intended to be transmitted in the TransactionEventRequest (eventType = Ended) message.
TxStartedMeasurands	MemberList	Sampled measurand(s) to be taken at the start of any transaction to be included in the meterValues field of the first TransactionEventRequest message send at the start of a transaction (eventType = Started).
TxUpdatedMeasurands	MemberList	Sampled measurands to be included in the meterValues element of every TransactionEventRequest (eventType = Updated), every SampledDataTxUpdatedInterval seconds from the start of the transaction.
TxUpdatedInterval	integer	Interval in seconds between sampling of metering (or other) data, intended to be transmitted via TransactionEventRequest (eventType = Updated) messages.
RegisterValuesWithoutPhases	boolean	If this variable reports a value of *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).

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

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

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

3.1.17. SmartChargingCtrlr

Description		
Logical Component responsible for configuration relating to smart charging.		
Variables	**Type**	**Description**
Enabled	boolean	Whether Smart Charging is enabled.
Available	boolean	Whether Smart Charging is supported.
ACPhaseSwitchingSupported	boolean	If defined and true, this EVSE supports the selection of which phase to use for 1 phase AC charging.
ProfileStackLevel	integer	Maximum acceptable value for *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.
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.

3.1.18. 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.

3.1.19. TxCtrlr

Description		
Logical Component responsible for configuration relating to transaction characteristics and behaviour.		
Variables	**Type**	**Description**

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.

Description	
Typically used variables	**Description**
Enabled	(not commanded Out of Service)
Problem	some problem/fault exists
Tripped	A problem requiring intervention has occurred
Overload	Excessive current/power consumption
DCVoltage	measured DC voltage
DCCurrent	measured DC current
Power	measured power
Temperature	temperature of converter
FanSpeed	Speed of cooling fan(s)

3.2.3. AcPhaseSelector

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

3.2.4. Actuator

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

3.2.5. AirCoolingSystem

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

Description	
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
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
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
OperatingTimes	recurring operating times
ChargeProtocol	Charging Control Protocol applicable to the Charging Station
AvailabilityState	Indicates if the Charging Station is available or not (replaces the Charging Station Status values reported by the StatusNotification)
AllowNewSessionsPendingFirmwareUpdate	Indicates whether new sessions can be started on EVSEs, while Charging Station is waiting for all EVSEs to become Available in order to start a pending firmware update.

3.2.12. ChargingStatusIndicator

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

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

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

ConnectedEV for ISO 15118

Variable	Unit	ISO 15118-2 value	ISO 15118-20 value
Available	boolean	When true this means an EV is connected. When false, all other fields are meaningless and should be empty strings.	
Protocol and static vehicle information			
VehicleId	string	EVCCID (from SessionSetupReq) *Six bytes, represented as hexbinary encoded string, e.g. "010203040A0B", containing the EVCC MAC address.*	EVCCID (from SesstionSetupReq) *Max 255 bytes with the first 3 bytes containing the WMI as defined in ISO 3780:2009.*
VehicleCertificate["Leaf"]	string	n/a	The PEM encoded X.509 Leaf certificate of the vehicle certificate chain
VehicleCertificate["SubCA1"]	string	n/a	The PEM encoded X.509 intermediate SubCA1 certificate when present in the vehicle certificate chain
VehicleCertificate["SubCA2"]	string	n/a	The PEM encoded X.509 intermediate SubCA2 certificate, when present in the vehicle certificate chain
VehicleCertificate["Root"]	string	n/a	Optional. The PEM encoded X.509 Root certificate of the vehicle certificate chain
ProtocolAgreed	multi-instance string	A string with the following comma-separated items: “<uri>,<major>,<minor>”. This is the protocol uri and version information that was agreed upon between EV and EVSE in the supportedAppProtocolReq handshake from ISO 15118. Example for ISO 15118-2: "urn:iso:15118:2:2013:MsgDef,1,0" (1,0 = version 1.0) For DIN SPEC 70121: "urn:din:70121:2012:MsgDef"	Same definition. Example for ISO 15118-20: "urn:iso:std:iso:15118:-20:DC,1,0" (or AC, ACDP, WPT, etc.)
ProtocolSupportedByEV["1"] to ProtocolSupportedByEV["20"]	string	A string with the following comma-separated items: “<uri>,<major>,<minor>”. This is information from the SupportedAppProtocolReq message from ISO 15118 This variable has 20 instances; one for each priority number. Priority is a number from 1 to 20 as a string, i.e. "1", "2", etc. Example: - ConnectedEV.ProtocolSupportedByEV["1"] = "urn:iso:15118:2:2013:MsgDef,2,0" - ConnectedEV.ProtocolSupportedByEV["2"] = "urn:iso:15118:2:2010:MsgDef,1,0"	Same definition. Example for ISO 15118-20: "urn:iso:std:iso:15118:-20:DC,1,0" (or AC, ACDP, WPT, etc.)
Voltage and current values: (*from ChargeParameterDiscoveryReq unless stated otherwise*)			
ACCurrent.minSet	A	EVMinCurrent	-
ACCurrent.maxSet	A	EVMaxCurrent	-
ACVoltage.maxSet	V	EVMaxVoltage	-
DCCurrent.minSet	A	-	EVMinimumChargeCurrent
DCCurrent.maxSet	A	EVMaximumCurrentLimit	EVMaximumChargeCurrent
DCCurrent.target	A	EVTargetCurrent (*CurrentDemandReq*)	EVTargetCurrent (*DC_ChargeLoopReq*)
DCVoltage.minSet	V	-	EVMinimumVoltage
DCVoltage.maxSet	V	EVMaximumVoltageLimit	EVMaximumVoltage
DCVoltage.target	V	EVTargetVoltage (*CurrentDemandReq*)	EVTargetVoltage (*DC_ChargeLoopReq*)
Power, energy and time values:			
Power.maxSet	W	EVMaximumPowerLimit (DC)	EVMaximumChargePower (AC/DC) *All phases combined.*

Variable	Unit	ISO 15118-2 value	ISO 15118-20 value
DischargePower.maxSet	W	-	EVMaximumDischargePower (AC/DC) *Rated maximum, all phases combined* (Actual discharging power is reported via EVSE)
DischargePower.actual	W	-	EVMaximumDischargePower (AC/DC) (*BPT ChargeLoopReq*) *Actual maximum, all phases combined*
EnergyImport.maxSet	Wh	EVEnergyCapacity (DC)	EVMaximumEnergyRequest (*ScheduleExchangeReq, AC/DC_ChargeLoopReq*)
EnergyImport.minSet	Wh	-	EVMinimumEnergyRequest (*ScheduleExchangeReq, AC/DC_ChargeLoopReq*)
EnergyImport.target	Wh	EVEnergyRequest (DC) EAmount (AC)	EVTargetEnergyRequest (*ScheduleExchangeReq, AC/DC_ChargeLoopReq*)
BatteryCapacity	Wh	EVEnergyCapacity (DC)	BatteryCapacity (*AC/DC_ChargeLoopReq.DisplayParameters*)
DepartureTime	dateTime	DepartureTime *Provided as seconds since message receipt. Converted to absolute time.*	DepartureTime (*ScheduleExchangeReq, AC/DC_ChargeLoopReq*) *Provided as seconds since message receipt. Converted to absolute time.*
RemainingTimeBulk	s	RemainingTimeToBulkSoC (*CurrentDemandReq*)	-
RemainingTimeFull.maxSet	s	-	-
RemainingTimeFull.actual	s	RemainingTimeToFullSoc (*CurrentDemandReq*)	RemainingTimeToMaximumSOC (*AC/DC_ChargeLoopReq.DisplayParameters*)
StateOfChargeBulk	%	BulkSoC	-
StateOfCharge.maxSet	%	FullSoC	MaximumSOC (*AC/DC_ChargeLoopReq.DisplayParameters*)
StateOfCharge.actual	%	DC_EVStatus.EVRESSSOC	PresentSOC (*AC/DC_ChargeLoopReq.DisplayParameters*)
ChargingCompleteBulk	boolean	BulkChargingComplete	-
ChargingCompleteFull	boolean	ChargingComplete	ChargingComplete (*AC/DC_ChargeLoopReq.DisplayParameters*)
Error status values:			
ChargingState *with a memberlist consisting of the following values:*			
* *BatteryOvervoltage*		-	<EVTerminationCode>
* *BatteryUndervoltage*		-	…
* *ChargingCurrentDeviation*		FAILED_ChargingCurrentDifferential	…
* *BatteryTemperature*		FAILED_RESSTemperatureInhibit	…
* *VoltageDeviation*		FAILED_ChargingVoltageOutOfRange	…
* *ChargingSystemError*		FAILED_EVRESSMalfunction	…
* *VehicleShiftPosition*		FAILED_EVShiftPosition	…
* *VehicleChargingEnabled*		-	…
* *ChargingSystemIncompatibility*		FAILED_ChargingSystemIncompatibility	…
* *ChargerConnectorLockFault*		FAILED_ChargerConnectorLockFault	…

ConnectedEV for CHAdeMO

Variable	Unit	CHAdeMO value
Available	boolean	Is true when an EV is connected
Protocol and static vehicle information		

Variable	Unit	CHAdeMO value
VehicleId	string	Vehicle ID (H'710 + H'711 + H'712) *Three times 8 bytes, represented as hexbinary encoded string, e.g. "**010203040A0B0C0D**11213141A1B1C1D**212223242A2B2C2D**". A concatenation of **H'710** + H'711 + **H'712**.*
ProtocolAgreed	string	Lowest of Chademo protocol number from EV (H'102.0) and charger (H'109.0) Example for CHAdeMO 2.0.1: "CHAdeMO,3" (3 = version reported by CHAdeMO for v2.0.1)
ProtocolSupportedByEV["1"]	string	Chademo protocol number (H'102.0) supported by EV A string with the following comma-separated items: “CHAdeMO,<version>”. Example for CHAdeMO 2.0.1: - ConnectedEV.ProtocolSupportedByEV = "CHAdeMO,3"
Voltage and current values:		
ACCurrent.minSet	A	-
ACCurrent.maxSet	A	-
ACVoltage.maxSet	V	-
DCCurrent.minSet	A	Minimum charge current (H'100.0)
DCCurrent.maxSet	A	-
DCCurrent.target	A	Charging current request (H'102.3) *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	Maximum battery voltage (H'100.4,5)
DCVoltage.target	V	Target battery voltage (H'102.1,2)
Power, energy and time values:		
Power.maxSet	W	-
EnergyImport.maxSet	Wh	Total capacity of traction battery * 100 (H'101.5,6)
EnergyImport.target	Wh	-
DepartureTime	dateTime	-
RemainingTimeBulk	s	-
RemainingTimeFull.maxSet	s	Maximum charging time * 60 (H'101.2)
RemainingTimeFull.actual	s	Estimated charging time * 60 (H'101.3)
StateOfChargeBulk	%	-
StateOfCharge.maxSet	%	Charged rate reference constant (H'100.6)
StateOfCharge.actual	%	State of charge (H'102.6)
ChargingCompleteBulk	boolean	-
ChargingCompleteFull	boolean	-
Error 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*		Battery current deviation (H'102.4.2)
* *BatteryTemperature*		High battery temperature (H'102.4.3)
* *VoltageDeviation*		Battery voltage deviation (H'102.4.4)
* *ChargingSystemError*		Charging system error (H'102.5.2)
* *VehicleShiftPosition*		Vehicle shift position (H'102.5.1)
* *VehicleChargingEnabled*		Vehicle charging enabled (H'102.5.0)
* *ChargingSystemIncompatibility*		-
* *ChargerConnectorLockFault*		-

ConnectedEV for WPT

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

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

ConnectedEV for ACDP

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

Variable	Unit	ISO 15118-20 value
ACDP_EVMobilityStatus	boolean	Is true when an EV is immobilized
ACDP_EVPositioningSupport	boolean	Is true when EV has positioning support
ACDP_EVElectricalChargingDeviceStatus	OptionList	Values are: "State_A" (disconnected), "State_B", "State_C", "State_D" (connected)
ACDP_EVReadyToCharge	boolean	Element signalizes if the EV is READY or NOT READY to charge.
ACDP_EVImmobilizationRequest	boolean	Represents the request of immobilization of the EV. This may be related to the hand brake status.
ACDP_EVImmobilized	boolean	The immobilization of the EV is a mandatory precondition to activate the pantograph.
ACDP_WLANStrength	decimal	Element signalizes EV WiFi reception signal strength (-dBm)
ACDP_EVCPStatus	OptionList	Values are: "State_A", "State_B", "State_C", "State_D", "State_E". Refer to IEC 61851-23-1.
ACDP_EVSOC	decimal	For operation usable SOC status in %. This value may differ from physical SOC of the battery. This parameter can be same as PresentSOC in DisplayParameter.
ACDP_EVErrorCode	OptionList	One of: "OK_NoEVError", "FAILED", "FAILED_EmergencyEvent", "FAILED_Breaker", "FAILED_RESSTemperatureInhibit", "FAILED_RESS", "FAILED_ChargingCurrentDifferential", "FAILED_ChargingVoltageOutOfRange", "FAILED_Reserved1", "FAILED_Reserved2"
ACDP_EVTimeout	boolean	Indicates the occurrence of a timeout in the EVCC.

3.2.14. Connector

Description
A means to connect an EV to a Charging Station with either a socket, an attached cable & inline connector, or any wireless power transfer device.

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

3.2.15. ConnectorHolsterRelease

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

3.2.16. ConnectorHolsterSensor

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

3.2.17. ConnectorPlugRetentionLock

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

3.2.18. ConnectorProtectionRelease

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

3.2.19. Controller

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

3.2.20. ControlMetering

Description	
Energy, Power, Electricity meter, used to measure energy, current, voltages etc.	
Typically used variables	**Description**
Power	Measured power
ACCurrent	Measured AC current [per phase]
DCCurrent	Measured DC current
DCVoltage	Measured DC voltage

3.2.21. CPPWMController

Description	
Control Pilot PWM Controller: provides and senses the IEC 61851-1 / SAE J1772 low voltage DC and PWM signalling between an EVSE and EV over a control pilot line.	
Typically used variables	**Description**
Enabled	
Active	Connected
Problem	CP PWM controller fault
DCVoltage	Control Pilot wire DC Voltage (0-12V)

Description	
State	IEC 61851-1 states ("A" to "E")
Percentage	1kHz Duty Cycle
SelftestActive(Set)	Start self-test
SelftestActive	Self-test running

3.2.22. DataLink

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

3.2.23. Display

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

3.2.24. ElectricalFeed

Description	
Represents an incoming electrical connection to a Charging Station, that may be a grid/distribution network connection, 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
Problem	
PowerType	
Power	
Energy	

Description	
DCVoltage	
SupplyPhases	
PhaseRotation	
ACVoltage	

3.2.25. ELVSupply

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

3.2.26. EmergencyStopSensor

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

3.2.27. EnvironmentalLighting

Description	
Provides reporting/control of general illumination lighting in use at Charging Station.	
Typically used variables	**Description**
Enabled	Environmental Lighting operational
Enabled(Set)=0	Disable Environmental lighting
Active	On
Problem	Environmental lighting fault
Percent	Lighting Level (% of maximum)
Percent(Set)=x%	Lighting Level (% of maximum)
Power	Lighting Wattage
Color	Displayed color/intensity

3.2.28. EVRetentionLock

Description	
A locking mechanism on the EV side as a safety measure to prevent it being disconnected while high currents are flowing.	
Typically used variables	**Description**
Enabled	Retention locking detection in effect
Active	Locked to EV

Description	
Complete	Has unlocked
Problem	Lock Problem (e.g. failed to lock/unlock)

3.2.29. EVSE

Description	
The entire chain of components responsible for transporting energy from the incoming supply to the electric vehicle (or vice versa)	
Typically used variables	**Description**
Enabled	Ready for use (not commanded Out of Service)
Problem	some problem/fault exists
Tripped	A problem requiring intervention has occurred
Overload	Excessive current/power consumption
SupplyPhases	AC phases connected
PhaseRotation	AC wiring phase rotation
AllowReset	When true: EVSE can be reset individually
ACVoltage	Measured total AC voltage [per phase]
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"

3.2.30. ExternalTemperatureSensor

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

3.2.31. FiscalMetering

Description	
Provides energy transfer readings that are the basis for billing.	
Typically used variables	**Description**
Problem	Metering Fault (e.g. read error)
EnergyImport	Energy transferred to EV during session
EnergyImportRegister	Cumulative import reading
EnergyExport	Energy transferred from EV during session
EnergyExportRegister	Cumulative export reading

Description	
Manufacturer[Meter]	Meter manufacturer name
Manufacturer[CT]	Current transformer manufacturer name
Model[Meter]	Meter model number
Model[CT]	CT model number
ECVariant	Meter engineering change variant
SerialNumber[Meter]	Meter serial number
SerialNumber[CT]	CT serial number(s)
Certificate	
OptionsSet [MeterValueAlignedData]	Set of measurands to read and report at clock-aligned time intervals while charging.
OptionsSet [TxnStoppedAlignedData]	Set of measurands to be read at clock-aligned time intervals while charging and reported in TransactionStopped

3.2.32. FloodSensor

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

3.2.33. GroundIsolationProtection

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

3.2.34. Heater

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

3.2.35. HumiditySensor

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

3.2.36. LightSensor

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

3.2.37. LiquidCoolingSystem

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

3.2.38. LocalAvailabilitySensor

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

3.2.39. LocalController

Description	
The entire Local Controller as a logical entity	
Common Variables	**Description**
Enabled	Available for use (not commanded Out of Service)
Problem	Some problem/fault exists
Identity	Local Controller identity
Tripped	A problem requiring local/manual intervention has occurred.
Manufacturer	Local Controller manufacturer name
Model	Local Controller manufacturer model
ECVariant	Engineering Change Variant
SerialNumber	Local Controller serial number

Description	
ChargingStation	List of Charging Stations Identities connected to this LocalController. (not to be confused with the ChargingStation Component)

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

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

3.2.41. OverCurrentProtection

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

3.2.42. OverCurrentProtectionRecloser

Description	
Recloser mechanism of an OverCurrentProtection to perform re-arm retries after a trip, or may be set for remotely controlled re-arming 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

3.2.43. PowerContactor

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

3.2.44. RCD

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

3.2.45. RCDRecloser

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

3.2.46. RealTimeClock

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

3.2.47. ShockSensor

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

3.2.48. SpacesCountSignage

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

Description	
Count	

3.2.49. Switch

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

3.2.50. TemperatureSensor

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

3.2.51. TiltSensor

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

3.2.52. TokenReader

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

3.2.53. UpstreamProtectionTrigger

Description	
Circuitry designed to trigger the disconnection of power to the structure by an upstream protection device after a severe problem has been detected	
Typically used variables	**Description**
Enabled	Upstream protection enabled

Description	
Active(Set)	Force triggering of upstream protection
Tripped	Upstream protection triggered
Problem	Upstream protection fault

3.2.54. UIInput

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

3.2.55. VehicleIdSensor

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

3.3. Summary List of Standardized Components

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

Component	Description
AlignedDataCtrlr	Logical Component responsible for configuration relating to the reporting of clock-aligned meter data.
AuthCacheCtrlr	Logical Component responsible for configuration relating to the use of a local cache for authorization for Charging Station use.
AuthCtrlr	Logical Component responsible for configuration relating to the use of 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.
CustomizationCtrlr	Responsible for configuration relating to custom vendor-specific implementations, like the DataTransfer message and CustomData extensions or CustomTriggers.
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.

Component	Description
SmartChargingCtrlr	Logical Component responsible for configuration relating to smart charging.
TariffCostCtrlr	Logical Component responsible for configuration relating to tariff and cost display.
TxCtrlr	Logical Component responsible for configuration relating to transaction characteristics and behaviour.
V2XChargingCtrlr	Responsible for configuration relating to V2X charging/discharging. This component exists on the EVSE tier hierarchy.
DCDERCtrlr	Responsible for configuration relating to DER capabilities of the DC inverter of the EVSE in the Charging Station. The component is located at the EVSE level, since it represents the DER capabilities, also referred to as nameplate information, of the EVSE.
ACDERCtrlr	Responsible for configuration relating to DER capabilities that the EVSE of the Charging Station can emulate by using ISO 15118-20 ChargeLoop messages to control the inverter in the EV. The component is located at the EVSE level, since it represents the DER capabilities of the EVSE.
BatterySwapCtrlr	Responsible for configuration relating to Battery swapping.
WebPaymentsCtrlr	Responsible for configuration of a dynamic QR code for ad hoc payments.
AccessBarrier	Allows physical access of vehicles to a charging site to be controlled.
AcDcConverter	Provides a variable DC current source to force energy directly into an EV battery stack, under tight control of the EV's battery management system.
AcPhaseSelector	Allows a specific AC phase to be selected (typically at EVSE tier) for single phase vehicle charging in order to lower overall (e.g. site) phase imbalance.
Actuator	A general purpose electro-mechanical output system, with optional completion tracking sensing. Each output should use a Variable instance key indicating the nature of the output.
AirCoolingSystem	Fans (or equivalent devices) used to provide cooling.
AreaVentilation	Fans (or equivalent devices) used to ensure that EVs that require ventilation during charging
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.
ConnectorHolsterRelease	A mechanism present in a connector holster to prevent the connector from being removed inappropriately: typically unlocks connector after authorization.
ConnectorHolsterSensor	A mechanism to report when a tethered cable connector has been removed from its normal stowage position. May be used for detection of connectors left un-holstered, and possible penalty billing.
ConnectorPlugRetentionLock	Locking mechanism to retain an inserted plug, both to prevent on-load disconnection, and to prevent theft of charging cables
ConnectorProtectionRelease	External protective mechanism (e.g. an external shutter or a connector holster lock mechanism) to prevent contact with conductors that may become 'live' under other failure modes
Controller	An embedded logic controller
ControlMetering	Energy, Power, Electricity meter, used to measure energy, current, voltages etc.
CPPWMController	Control Pilot PWM Controller: provides and senses the IEC 61851-1 / SAE J1772 low voltage DC and PWM signalling between an EVSE and EV over a control pilot line.
DataLink	Provides a communications link from a Charging Station to a CSMS. It may use fixed infrastructure, mobile telephony data services, WiFi, or other connectivity channels.
Display	Provides information and feedback to the user.

Component	Description
DistributionPanel	Defines the Distribution Panel, with it's fuses and connections to both Charging Stations and other Distribution Panel's.
ElectricalFeed	Represents an incoming electrical connection to a Charging Station, that may be a grid/distribution network connection, of a connection to local power generation and/or storage. Each electrical feed can record the electrical and other characteristics of that feed, including power rating, fusing, upstream metering, etc. When a Charging Station has more than one electrical feed, it must represent which feed supplies each EVSE, and which feed supplies the house load of the Charging Station itself. Simple Charging Stations with only a single electrical feed may omit all electrical feed information, in which case it is inferred that all power is supplied from a single feed, and what would otherwise be ElectricalFeed data (Variables) may be reported as being associated with the ChargingStation component.
ELVSupply	Represents the low voltage power supply (typically 12V DC and often other ELV voltages) that provides operating power for controllers, relays, and other electrical components.
EmergencyStopSensor	An 'Emergency Stop' button that should be pressed by the user or other nearby persons if serious faulty behavior is observed (e.g. smoke/flames from EV or Charging Station).
EnvironmentalLighting	Provides reporting/control of general illumination lighting in use at Charging Station.
EVRetentionLock	A locking mechanism on the EV side as a safety measure to prevent it being disconnected while high currents are flowing.
EVSE	The entire chain of components responsible for transporting energy from the incoming supply to the electric vehicle (or vice versa)
ExternalTemperatureSensor	Reports ambient air temperature
FiscalMetering	Provides energy transfer readings that are the basis for billing.
FloodSensor	A sensor reporting whether the Charging Station is experiencing water ingress/pooling.
GroundIsolationProtection	An Isolation Tester as part of their own self-test mechanisms, to confirm the isolation of floating circuitry when no Evs are connected
Heater	Heater to ensure reliable operation in cold environments
HumiditySensor	Reports relative air humidity
LightSensor	Reports ambient light levels.
LiquidCoolingSystem	A liquid based cooling system, typically used to cool the connector cables of very high power Charging Stations.
LocalAvailabilitySensor	Accepts local signal inputs controlling whether new Charging Sessions can start and/or whether ongoing sessions should continue. Typically connected to a site/building power supply, to automatically report unavailability when closed.
LocalController	The entire Local Controller as a logical entity
LocalEnergyStorage	Energy storage
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.

Component	Description
TiltSensor	Measures Tilt angle from normal reference position (normally 90 degree vertical).
TokenReader	An authorization token reader (e.g. RFID)
UpstreamProtectionTrigger	Circuitry designed to trigger the disconnection of power to the structure by an upstream protection device after a severe problem has been detected
UIInput	A logical input mechanism (e.g. set of buttons) that is part of a UI whose use may be communicated to the CSMS (in near real time). May support momentary inputs ('Operated') or modal state ('Active'). Multiple input sources should use explicit Variable instance keys (where the input function is key name).
VehicleIdSensor	Reports an identifier associated with a vehicle occupying a charging bay. The identifier may be a vehicle registration number via ANPR hardware, a VIN, or other local identifier of the vehicle based on medium range/active RFID, or any other relevant technology and result.

Chapter 4. Standardized Variables

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

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

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

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

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

Name	DataType	Unit	Description
EnergyImportRegister	decimal	Wh	Cumulative export kWh register value, such as from a (certified) fiscal energy meter.
Entries	integer		General purpose variable for reporting/managing numbers of entries in repetitive data structures. maxLimit characteristic reports maximum possible entries.
ExternalConfigChangeDate	DateTime		Date/time when the configuration was changed externally, i.e. outside of CSMS, for example by a local service action.
ExternalConstraintsProfileDisallowed	boolean		Indicates whether a Charging Station allows an external system to submit a `ChargingStationExternalConstraints` charging profile.
ExternalControlSignalsEnabled	boolean		Indicates whether a Charging Station is able to respond to external control signals that influence charging. If the variable is true, but CSMS has set [configkey-external-constraints-profile-disallowed] = true, then external control signals are only allowed during a charging profile with a *chargingProfilePeriod* = `ExternalLimits` or `ExternalSetpoint`.
Fallback	boolean		Component is operating in a fallback, or backup mode. In inventory reports, a Value of 1 for the maxLimit characteristic indicates that the component can enter a fallback state (i.e. a fallback mode is present).
FanSpeed	decimal	RPM	Fan Speed (in RPM). A value of 0 represents stopped/stalled. An empty value indicates that fan speed cannot be read.
FieldLength	integer		This variable is used to report the length of <field> in <message> when it is larger
FileTransferProtocols	MemberList		List of supported file transfer protocols.
FirmwareVersion	string		Version number of firmware.
Force	decimal	N	Reports (impact) force/ acceleration values (estimates) in one or more directions, in units of Newtons or “g”. Multiple force readings in different (orthogonal) dimensions may be reported using Variable instance values, such as Down, Right, Forward.
Formats	MemberList		List of message formats supported by this Charging Station. Possible values: ASCII, HTML, URI, UTF-8.
Frequency	decimal	Hz	Frequency of AC power, signal, or component operation.
FrequencySchedule	string		A JSON-formatted string with an array of { *time, freq* } pairs, in which *time* is
FuseRating	decimal	A	Current rating of a fuse/breaker. Variable instances keyed by phase identifier (L1/L2/L3/N).
HandleFailedTariff	OptionList		This configuration determines how to act when a driver-specific tariff is received, which cannot be processed.
HeartbeatInterval	integer	s	Interval of inactivity (no OCPP exchanges) with CSMS after which the Charging Station should send HeartbeatRequest.
Height	decimal	m	Height above(+)/below(-) reference level (ground level unless context demands otherwise).
Humidity	decimal	RH	The relative humidity in %.
Hysteresis	decimal	Percent	Specifies the width of a 'dead band' (as a percentage of the threshold) around the central value of a threshold setting (e.g. MinSet, MaxSet, monitor thresholds) to avoid repeated triggering when the measured quantity lies close to the threshold and is subject to small variations.
ICCID	string		ICCID (Integrated Circuit Card IDentifier) of mobile data SIM card.
IMSI	string		IMSI (International Mobile Subscriber Identity) number of mobile data SIM card
ISO15118EvseId	string		EVSE ID in string format as used in ISO 15118 and IEC 63119-2
IdToken	string		The IdToken used to authorize a charging transaction.
Identity	string		The Charging Station identity.
Impedance	decimal	Ohm	Impedance: Primary value is real (resistive only) impedance. Where a complex impedance is to be reported, the imaginary part (reactance) must be represented with a separate Variable instance value of 'reactance'. Reactance values are expressed at the (nominal) relevant operating frequency of the Component (e.g. 50/60Hz for mains electricity feed).

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

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

Name	DataType	Unit	Description
PostChargingTime	decimal	s	Elapsed time in seconds since last substantive energy transfer
Power	decimal	W,kW	Instantaneous (real) Power (measured/calculated, including power factor for AC). Where a component (e.g. AC to DC Power Converter) has multiple power measurements, the default (unkeyed) instance is “input” power.
Present	boolean		Component exists, but might not be locally configured/wired for use, nor (remotely) Enabled.
Problem	boolean		Component itself has a 'Problem' condition that impacts in any significant way on its normal operation. By definition, 'Problem' state includes (logical OR) 'Fault' state. 'Problem' specifically INCLUDES inability to operate that is propagated (up/down/sideways) from any other associated/connected/containing/contained Component.
ProfileStackLevel	integer		Maximum acceptable value for *stackLevel* in a ChargingProfile.
Protecting	boolean		Applies to 'sensor' type Components that have an associated protection capability, whereby they can disconnect power (e.g. using the main PowerContactor) if the sensed quantity is outside preset/configured limits. If Protecting is true, the Component is actively preventing/interrupting charging.
ProtocolAgreed	string		For ConnectedEV: A string with the following comma-separated items: “<uri>,<major>,<minor>”. This is the protocol uri and version information that was agreed upon between EV and EVSE in the supportedAppProtocolReq handshake from ISO 15118.
ProtocolSupported	string		For ISO15118Ctrlr: A string with the following comma-separated items: “<uri>,<major>,<minor>”. <uri> is in the format as used in the SupportedAppProtocolReq message from ISO 15118-2 and ISO 15118-20. This variable has at most 20 instances, one for each supported protocol version.
ProtocolSupportedByEV	string		For ConnectedEV: A string with the following comma-separated items: “<uri>,<major>,<minor>”. This is information from the SupportedAppProtocolReq message from ISO 15118. Each priority is given its own variable instance. Priority is a number from 1 to 20 as a string.
PublicKey	string		Configuration variable that can be used to retrieve the public key for a meter connected to a specific EVSE.
PublicKeyWithSignedMeterValue	boolean		This Configuration Variable can be used to configure whether a public key needs to be sent with a signed meter value.
QueueAllMessages	boolean		When this variable is set to *true*, the Charging Station will queue all message until they are delivered to the CSMS.
RateUnit	string		A list of supported quantities (A, W) for use in a ChargingSchedule.
RegisterValuesWithoutPhases	boolean		If this variable reports a value of *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.
RemainingTimeBulk	integer	s	Number of seconds remaining to charge to bulk state of charge, given by StateOfChargeBulk.
RemainingTimeFull	integer	s	Number of seconds remaining to charge to 100% state of charge.
ReportingValueSize	integer		This Configuration Variable can be used to limit the following fields: GetVariableResult.attributeValue, VariableAttribute.value and EventData.actualValue.
RequestMeteringReceipt	boolean		For ISO15118Ctrlr: If this variable is *true*, then Charging Station shall request a metering receipt
ResetRetries	integer		Number of times to retry a reset of the Charging Station when a reset was unsuccessful.
ResumptionTimeout	integer	s	This variable defines the maximum number of seconds that a transaction may be interrupted by a power outage and still be resumed afterwards.
SampledMeasurands	MemberList		The set of measurands to be sampled by the DataCollector component.
SamplingInterval	decimal	s	The sampling interval in **seconds**.
SeccId	string		The name of the SECC in the string format as required by ISO 15118.

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

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

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

Chapter 5. Reason Codes

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

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

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

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

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

(Updated in v2.0)

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

Group	Reason code	Description	Typically used for
Swap Station			
	BatterySoHLow	Battery State of Health is too low	BatterySwap
	BatterySoC	Battery State of Charge has unacceptable value	BatterySwap
	BatteryDamaged	Battery is damaged	BatterySwap
	BatteryUnknown	Battery has unknown serial number	BatterySwap
	BatteryType	Battery type not accepted	BatterySwap
	NoBatteryAvailable	No battery available for swapping	BatterySwap, RequestBatterySwap
Miscellaneous			
	DuplicateRequestId	A *requestId* is provided, that has already been used for this type of request.	UpdateFirmware, PublishFirmware and requests for reports.
	InvalidMessageSeq	Message should not be sent at this moment in current scenario.	(generic), SetChargingProfile with ISO15118
	MissingDevModelInfo	Information needed for operation is missing from Device Model	(generic)
	NoError	No error has occurred, but some extra information is in *additionalInfo* .	(generic)
	NotFound	No object(s) found that match a provided ID or criteria.	ClearVariableMonitoring, CustomerInformation, GetChargingProfiles, GetDisplayMessages, GetInstalledCertificateIds, GetReport
	Unspecified	No reason is specified, but some extra information is in *additionalInfo*	(generic)
	UnsupportedRequest	This request is not supported.	(generic)
Operations and Permissions			
	FwUpdateInProgress	Operation is not possible, because a firmware update is in progress.	Reset
	NotEnabled	Feature is not enabled.	ClearCache
	ReadOnly	Targeted variable is read-only and cannot be set.	SetVariables
	WriteOnly	Targeted variable is write-only and cannot be read.	GetVariables
Security			
	InvalidCSR	Provided CSR is invalid	SignCertificate
	InvalidCertificate	Provided certificate is invalid.	CertificateSigned, InstallCertificate
	InvalidURL	Provided URL is invalid.	UpdateFirmware, PublishFirmware
	RedirectNotAllowed	HTTP Redirection is not allowed	LogStatusNotification
System Errors			
	InternalError	Operation cannot be completed due to an internal error.	(generic)
	OutOfMemory	Operation not possible, because system does not have enough memory.	(generic)
	OutOfStorage	Operation not possible, because system does not have enough storage.	(generic)
Transactions			
	InvalidIdToken	Provided *idToken* is not valid.	RequestStartTransaction
	TxInProgress	A transaction is in progress.	ChangeAvailability, Reset, RequestStartTransaction

Group	Reason code	Description	Typically used for
	TxNotFound	There is no such transaction.	RequestStopTransaction, SetChargingProfile, GetVehicleCertificate
	TxStarted	A transaction had already started (e.g. due to cable being plugged in).	RequestStartTransaction
Values and Ranges			
	InvalidValue	An invalid value has been provided.	(generic)
	MissingParam	A parameter that is required for the request is missing.	(generic)
	TooLargeElement	Provided element is too large to handle.	CertificateSigned, InstallCertificate
	TooManyElements	Too many elements have been provided.	SetChargingProfile, SetVariables, SendLocalList
	UnsupportedParam	A parameter was provided that is not supported.	(generic)
	ValueOutOfRange	Provided value is out of range.	SetVariables, SetVariableMonitoring
	ValuePositiveOnly	Provided value is not greater than zero.	(generic)
	ValueTooHigh	Provided value is too high.	(generic)
	ValueTooLow	Provided value is too low.	(generic)
	ValueZeroNotAllowed	Provided value cannot be zero.	(generic)

Chapter 6. Standardized additionalInfo types

(Updated in v2.0)

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

additionalInfo consists of:

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

6.1. Generic

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

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

6.2. Ad hoc payment

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

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

6.2.1. Predefined values for PaymentBrand

PaymentBrand	Description
AMEX	
ApplePay	
Bancontact	
BankAxept	
Carnet	
CartesBancaires	
Dankort	
Diners	
Discover	

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

6.2.2. Predefined values for PaymentRecognition

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

Chapter 7. Standardized values for enumerations as string

7.1. IdTokenEnumStringType

Standardized values for *idToken.type*.

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

(Updated in v2.0)

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

7.2. ChargingLimitSourceEnumStringType

Standardized values for a *chargingLimitSource* field.

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

(Updated in v2.0)

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

7.3. ConnectorEnumStringType

Standardized values for a *connectorType* field.

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

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

(Updated in v2.0)

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

7.4. SigningMethodEnumStringType

Standardized values for the *signingMethod* in a SignedMeterValueType.
Columns Algorithm, Curve, Key Length and Hash Algorithm are for information only and not part of the standardized value.

(Updated in v2.0)

SigningMethod	Algorithm	Curve	Key Length	Hash Algorithm
ECDSA-secp192k1-SHA256	ECDSA	secp192k1	192 bits	SHA-256
ECDSA-secp256k1-SHA256	ECDSA	secp256k1	256 bits	SHA-256
ECDSA-secp192r1-SHA256	ECDSA	secp192r1	192 bits	SHA-256
ECDSA-secp256r1-SHA256	ECDSA	secp256r1	256 bits	SHA-256
ECDSA-brainpool256r1-SHA256	ECDSA	brainpool256r1	256 bits	SHA-256
ECDSA-secp384r1-SHA256	ECDSA	secp384r1	384 bits	SHA-256

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