

# EVlink Pro AC

## Modbus

### Connectivity Guide

GEX1969300-04  
06/2023



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As part of a group of responsible, inclusive companies, we are updating our communications that contain non-inclusive terminology. Until we complete this process, however, our content may still contain standardized industry terms that may be deemed inappropriate by our customers.

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# Safety Information

## Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

<b>⚠ DANGER</b>
<b>DANGER</b> indicates a hazardous situation which, if not avoided, <b>will result in</b> death or serious injury.
<b>⚠ WARNING</b>
<b>WARNING</b> indicates a hazardous situation which, if not avoided, <b>could result in</b> death or serious injury.
<b>⚠ CAUTION</b>
<b>CAUTION</b> indicates a hazardous situation which, if not avoided, <b>could result in</b> minor or moderate injury.
<b>NOTICE</b>
<b>NOTICE</b> is used to address practices not related to physical injury.

## Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

# About the Book

## Purpose of this Document

The purpose of this document is to guide you with the connectivity of EVlink Pro AC system communicating through Modbus TCP.

## Document Version History

Document Reference–Revision	Release Date	Software Version	Evolution
GEX1969300–04	June 2023	1.3.0	Registers between 2999 and 3222 are reserved.  Registers between 4000 and 4079 are also reserved.  If you read these registers, value <b>0xFFFF</b> is automatically sent back.
GEX1969300–03	April 2023	1.2.1	Exception code <b>Illegal data address</b> is returned when a read request is made to an invalid address.
GEX1969300–02	March 2023	1.2.1	All Modbus addresses from 1211 to 1213 and from 4003 to 4011 have been incremented by 1.
GEX1969300–01	November 2022	1.1.6	
GEX1969300–00	May 2022		Document creation

## Terminology

Anacronym	Designation
EVSE	Electrical Vehicle Supply Equipment (charging station compliant with OCPP standard)
EVCE	Electrical Vehicle Charging Expert
OCPP	Open Charge Point Protocol (communication protocol used between the charging stations and a central system)

## Related Documents

Document Title	Document Reference–Revision	Author	Release Date	Link
EVlink Pro AC Installation Guide	NNZ1940301–04	Schneider Electric	01/2022	<a href="https://www.se.com/ww/en/download/document/NNZ1940301/">https://www.se.com/ww/en/download/document/NNZ1940301/</a>
EVP3MM Modem Instruction Sheet	NNZ26782–06	Schneider Electric	09/2021	<a href="https://www.se.com/ww/en/download/document/NNZ2678201/">https://www.se.com/ww/en/download/document/NNZ2678201/</a>
Open Charge Point Protocol 1.6	1.6	Open Charge Alliance	12/2019	<a href="https://www.openchargealliance.org/">https://www.openchargealliance.org/</a>

www.se.com

# Safety Precautions

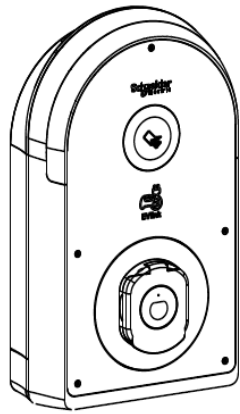
## **NOTICE**

### **HAZARD OF INCORRECT USE**

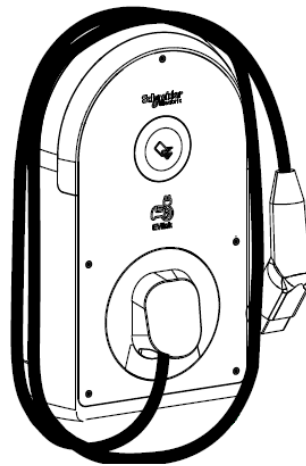
- This document contains general descriptions and/or general technical specifications of the products mentioned. It cannot be used to determine the suitability or reliability of these products for specific user applications. It is the responsibility of each user or integrator to conduct the appropriate risk analysis in full, assessing and testing products as regards the application in which they will be used and the execution of this application. Neither Schneider Electric nor any of its affiliated companies or subsidiaries can be held responsible for incorrect use of the information contained in this document. If you have any suggestions for improvements or correction, or have found errors in this publication, please notify us.
- All relevant state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to ensure compliance with documented system data, only the manufacturer should perform repairs to components. When equipment is used for applications with technical safety requirements, follow the relevant instructions.

**Failure to follow these instructions can result in equipment damage.**

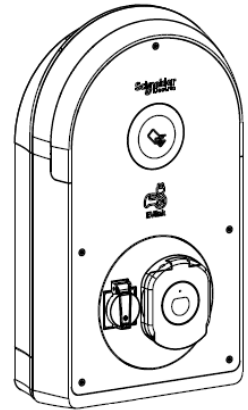
# Product Family



Charging stations with a T2S socket



Charging stations with an attached cable



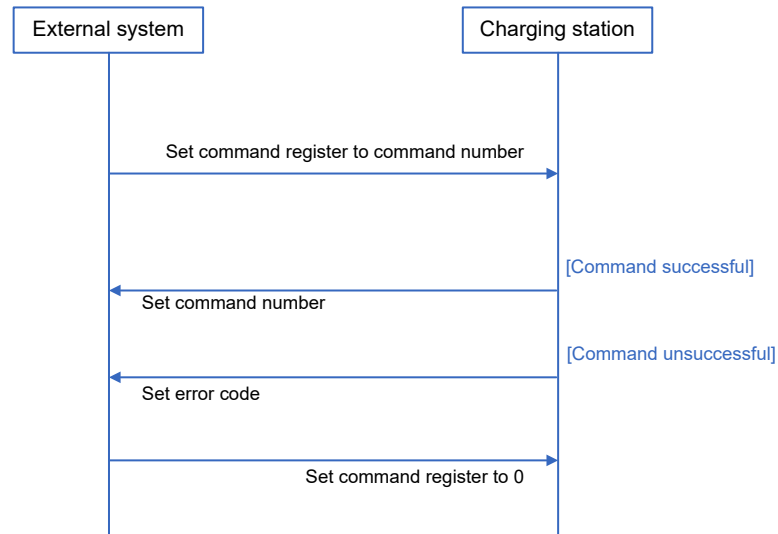
Charging stations with a T2S socket and a domestic socket



# Supported Commands

## Command

Command sequence between external system and charging station :

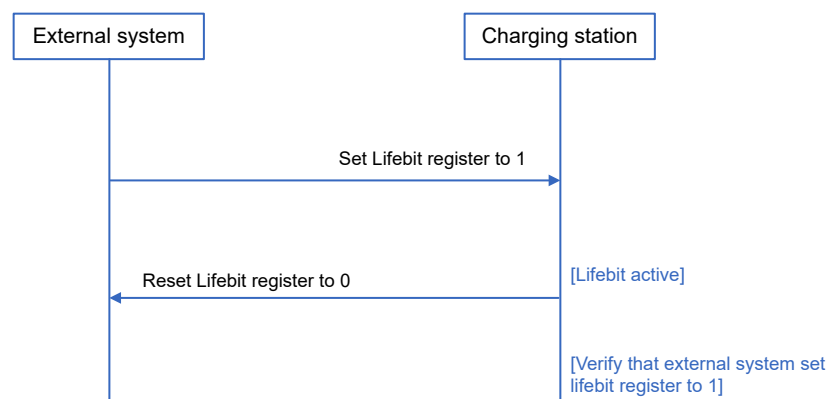


Commands list:

- 3 = STOP\_CHARGE = command that stops an ongoing charging session.
- 7 = SUSPEND\_CHARGE = command that suspends an ongoing charging session.
- 8 = RESTART\_CHARGE = command that restarts a suspended charging session.
- 9 = REBOOT = command that restarts the charging station.
- 40 = SET\_AVAILABLE = command that switches charging station to available status.
- 41 = SET\_UNAVAILABLE = command that switches charging station to unavailable status.

## Lifebit

The Lifebit data allows the monitoring of the communication between external system and charging station, it is activated as described in the following sequence:



To deactivate the Lifebit data, the external system sets Lifebit data register to 2.

When activated, Modbus communication is considered as lost if Lifebit data is not refreshed within configured communication timeout.

## EVlink Pro AC Modbus Interface

EVlink Pro AC Modbus interface can be used to limit the charging power of the charging station.

This limitation is managed as follows:

- The external system writes current setpoint at address 4004. The maximum current setpoint sent by the charging station to the vehicle is limited by this value. Any setpoint change is considered with max. delay of 15 seconds.
- Additionally, in case of communication loss between the charging station and the external system, a default current limitation is applied: this limitation is set by writing register 4005 for single phase charging, and 4006 for triphase charging.
- The Server ID is 255.

**NOTE:** The detection of communication loss is managed through the Lifebit data, page 9.

# Registers

**NOTE:** A request to read a register address that is not in the following table triggers the **Illegal data address** exception code.

The table below contains the list of registers accessible to the client on base 0.

Register name	Address	RW/RO	Range	Type	Unit	Comment
evState	1	RO	[0; 11]	uint16		State of the vehicle S1 (EV is connected) and S2 (load is authorized) + detected error 0: State E: 0V 1: State F: Not available (-12V) 2: State A1: Available, not ready to charge (12V) 3: State B1: EV connected, not ready to charge (9V) 4: State C1: Charging EV, stopping charge requested by EVSE (6V) 5: State D1: Charging EV with ventilation required, stopping charge requested by EVSE (3V) 6: State A2: Available, ready to charge (12V PWM) 7: State B2: EV connected, ready to charge (9V PWM) 8: State C2: Charging EV (6V PWM) 9: State D2: Charging EV with ventilation required (3V PWM) 10: State Control Pilot Wire invalid 11: State Control Pilot Wire Symetric - Fault on the control circuit
OCPP Status	150	RO	[0; 9]	uint16		OCPP state of the charging station 0: Init 1: Available 2: Preparing 3: Charging 4: SuspendedEV 5: SuspendedEVSE 6: Finishing 7: Reserved 8: Unavailable 9: Faulted
evPresence	1150	RO	[0; 1]	uint16		Updated only when not charging 0: EV not present 1: EV present
EVSEglobal_major	1212	RO	NA	uint16		Global release version
EVSEglobal_minor	1213	RO	NA	uint16		Global release version
EVSEglobal_build	1214	RO	NA	uint16		Global release version
Current Phase 1	2999	RO	[0; Max]	float32	A	Current on phase 1
Current Phase 2	3001	RO	[0; Max]	float32	A	Current on phase 2
Current Phase 3	3003	RO	[0; Max]	float32	A	Current on phase 3

Register name	Address	RW/RO	Range	Type	Unit	Comment
Current Phase AVG	3009	RO	[0; Max]	float32	A	Average current
Voltage Phase 1	3027	RO	[0; Max]	float32	V	Voltage on phase 1
Voltage Phase 2	3029	RO	[0; Max]	float32	V	Voltage on phase 2
Voltage Phase 3	3031	RO	[0; Max]	float32	V	Voltage on phase 3
Voltage Phase AVG	3035	RO	[0; Max]	float32	V	Average voltage
Power Active Phase 1	3053	RO	[Min; Max]	float32	kW	Active power on phase 1
Power Active Phase 2	3055	RO	[Min; Max]	float32	kW	Active power on phase 2
Power Active Phase 3	3057	RO	[Min; Max]	float32	kW	Active power on phase 3
Power Active Phase TOT	3059	RO	[Min; Max]	float32	kW	Total active power
Power Apparent TOT	3075	RO	[Min; Max]	float32	kVA	Total apparent power
Power factor	3083	RO		float32		Power factor
Frequence	3109	RO		float32	Hz	Frequency
Energy Active TOT	3203	RO	[0; Max]	int64	Wh	Total active energy counter
Energy Reactive TOT	3219	RO	[0; Max]	int64	kVARh	Total reactive energy counter
Lifebit	4000	RW	{0; 1; 2}	uint16		Lifebit data enables monitoring of communication between the external system and the charging station. Refer to Lifebit data, page 9.
Set command	4001	RW	{3; 7; 8; 9; 40; 41}	uint16		Set remote command. Refer to Set command, page 9.
Command status	4002	RO		uint32		Previous remote command status
Set Point	4004	RW	[0 32]	uint16	A	Remote energy management setpoint in Amps 99: No charge in progress
Degraded Set Point Mono	4005	RO	[0 32]	uint16	A	Degraded setpoint applied when the Modbus communication is lost (configured via eSetup)
Degraded Set Point Tri	4006	RO	[0 32]	uint16	A	Degraded setpoint applied when the Modbus communication is lost (configured via eSetup)
Contacting charging time	4007	RO		uint32	s	Current charging time (duration since contactor closed)
Session charging time	4009	RO		uint32	s	Current session charging time (duration since transaction started)
Last stop cause	4011	RO	{1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11}	uint16		Reason of last charge session ending (or charge session start rejection) 0: None 1: EmergencyStop 2: EVDisconnected 3: HardReset 4: Local 5: Other 6: PowerLoss 7: Reboot 8: Remote 9: SoftReset 10: UnlockCommand 11: DeAuthorized

Register name	Address	RW/RO	Range	Type	Unit	Comment
Session energy	4012	RO	[0; Max]	uint32	Wh	Consumed energy during charging session
Error group bitfield	4020	RO		uint32		Currently raised error groups (one bit per group)
Error code bitfield	4022	RO		uint32		Currently raised error codes (one bit per error)
Last event n°0 - event code	4024	RO		uint16		Last event n°0 code
Last event n°0 - event start time	4025	RO	Seconds	uint16		Last event n°0 start time
Last event n°0 - event end time	4026	RO	Seconds	uint16		Last event n°0 end time
Last event n°1 - event code	4027	RO		uint16		Last event n°1 code
Last event n°1 - event start time	4028	RO	Seconds	uint16		Last event n°1 start time
Last event n°1 - event end time	4029	RO	Seconds	uint16		Last event n°1 end time
Last event n°2 - event code	4030	RO		uint16		Last event n°2 code
Last event n°2 - event start time	4031	RO	Seconds	uint16		Last event n°2 start time
Last event n°2 - event end time	4032	RO	Seconds	uint16		Last event n°2 end time
Last event n°3 - event code	4033	RO		uint16		Last event n°3 code
Last event n°3 - event start time	4034	RO	Seconds	uint16		Last event n°3 start time
Last event n°3 - event end time	4035	RO	Seconds	uint16		Last event n°3 end time
EVSE Model	4040	RO		Hex		EVSE model (2 characters per register)
EVSE Model	...	RO		Hex		EVSE model (2 characters per register)
EVSE Model	4049	RO		Hex		EVSE model (2 characters per register)
EVSE Commercial Reference	4060	RO		Hex		EVSE commercial reference (2 characters per register)
EVSE Commercial Reference	...	RO		Hex		EVSE commercial reference (2 characters per register)
EVSE Commercial Reference	4069	RO		Hex		EVSE commercial reference (2 characters per register)

All exchanged data through Modbus interface is refreshed every second.

The table below contains the list of Modbus data formats.

Format Type	Description
SINT16	A 16-bit signed value in 2-1 (or big ENDIAN) format. The high-order byte is first, the low-order byte is second.
UINT16	A 16-bit unsigned value in 2-1 (or big ENDIAN) format. The high-order byte is first, the low-order byte is second.
SINT32 or S32-4321	A 32-bit signed value returned in two consecutive 16-bit registers. The high-order word is returned in the first register, the low-order word in the second register. The 4 bytes are returned in 4-3-2-1 (or big ENDIAN) format.
UINT32 or U32-4321	A 32-bit unsigned value returned in two consecutive 16-bit registers. The high-order word is returned in the first register, the low-order word in the second. The 4 bytes are returned in 4-3-2-1 (or big ENDIAN) format.
S32-2143	A 32-bit signed value returned in two consecutive 16-bit registers. Contrary to S32_4321, the high-order word is returned in the second register, the high-order word in the first register. The 4 bytes are returned in 2-1-4-3 format.
U32-2143	A 32-bit unsigned value returned in two consecutive 16-bit registers. Contrary to U32_4321, the high-order word is returned in the second register, the low-order word in the first register. The 4 bytes are returned in 2-1-4-3 format.

Format Type	Description
S32-MFP or S32-M10k-4321	A 32-bit signed value returned in two consecutive 16-bit registers. The word stored in the first 16-bit register is multiplied by 10000 and added to the word stored in the second 16-bit register. Also known as <b>signed Modulo 10000</b> .
U32-MFP or U32-M10k-4321	A 32-bit unsigned value returned in two consecutive 16-bit registers. The word stored in the first 16-bit register is multiplied by 10000 and added to the word stored in the second 16-bit register. Also known as <b>unsigned Modulo 10000</b> or <b>mod-10K</b> .
S32-M10k-2143	A 32-bit signed value returned in two consecutive 16-bit registers. Contrary to S32_M10k_4321, the word stored in the second 16-bit register is multiplied by 10000 and added to the word stored in the first 16-bit register.
U32-M10k-2143	A 32-bit unsigned value returned in two consecutive 16-bit registers. Contrary to U32_M10k_4321, the word stored in the second 16-bit register is multiplied by 10000 and added to the word stored in the first 16-bit register.
S48-M10k-21-65	A 48-bit signed value returned in three consecutive 16-bit registers. $R3 \times 10,000^2 + R2 \times 10,000 + R1$ , where R3 is the last register and R1 is the first register. Each registers range is -9,999 to +9,999.
U48-M10k-21-65	A 48-bit unsigned value returned in three consecutive 16-bit registers. $R3 \times 10,000^2 + R2 \times 10,000 + R1$ , where R3 is the last register and R1 is the first register. Each registers range is 0 to +9,999.
S64-M10k-21-87	A 64-bit signed value returned in four consecutive 16-bit registers. $R4 \times 10,000^3 + R3 \times 10,000^2 + R2 \times 10,000 + R1$ , where R4 is the last register and R1 is the first register. Each registers range is -9,999 to +9,999.
U64-M10k-21-87	A 64-bit unsigned value returned in four consecutive 16-bit registers. $R4 \times 10,000^3 + R3 \times 10,000^2 + R2 \times 10,000 + R1$ , where R4 is the last register and R1 is the first register. Each registers range is 0 to +9,999.
S64-87-21	A 64-bit signed value returned in four consecutive 16-bit registers. The highest order word is returned in the first register, the lowest order word in the fourth. The 8 bytes are returned in 8-7-6-5-4-3-2-1 (or big ENDIAN) format.
U64-87-21	A 64-bit unsigned value returned in four consecutive 16-bit registers. The highest order word is returned in the first register, the lowest order word in the fourth. The 8 bytes are returned in 8-7-6-5-4-3-2-1 (or big ENDIAN) format.
S64-21-87	A 64-bit signed value returned in four consecutive 16-bit registers. The highest order word is returned in the fourth register, the lowest order word in the first. The 8 bytes are returned in 2-1-4-3-6-5-8-7 (or little ENDIAN) format.
U64-21-87	A 64-bit unsigned value returned in four consecutive 16-bit registers. The highest order word is returned in the fourth register, the lowest order word in the first. The 8 bytes are returned in 2-1-4-3-6-5-8-7 (or little ENDIAN) format.
S16-1-15	A 16-bit signed value. Bits 1 to 15 bits are unsigned data. If bit 16 is 0, the value is positive, if bit 16 is 1, the value is negative.
IEEEFloat or F32-4321	A 32-bit IEEE floating point value returned in two consecutive 16-bit registers. The high-order word is returned in the first register and the low order word in the second. The 4 bytes are returned in 4-3-2-1 format.
SwappedFloat or F32-2143	A 32-bit IEEE floating point value returned in two consecutive 16-bit registers. Contrary to F32_4321, the high-order word is returned in the second register and the low order word in the first. The 4 bytes are returned in 2-1-4-3 format.
MaskedBool or PackedBool	A 16-bit value that is interpreted according to the bit pattern described by the Mask attribute. Bits exposed by the mask can be read or written without affecting the value of other bits. Unmasked bits are interpreted as 0 on a read and are unaffected on a write. Undeclared bits of a mask are interpreted as unmasked (i.e., mask="0x7F" is interpreted as 0x007F). The value that is read or written is determined by using enumeration ordinals, described below. If used for read-only Boolean data, enumerations are not required. If no mask is specified, all bits are relevant.
PF-Nexus	A 16-bit unsigned value, range 0 to 3999, representing 3 decimal places of accuracy.
BCD (Binary Coded Decimal)	A number is expressed as a sequence of decimal digits and then each decimal digit is encoded as an 8-bit binary number. For example, decimal 92 is encoded as 00001001 00000010.
The following data types can have their length specified by the <b>Number of Registers to Request</b> setting.	
Packed BCD	A number is expressed as a sequence of decimal digits and then each decimal digit is encoded as a 4-bit binary number (nibble). For example, decimal 92 is encoded as 1001 0010.
ASCII	A sequence of bytes representing the ASCII character set. Each word stores two ASCII characters. Trailing spaces are removed.
ASCII-Reverse	Same as ASCII except every second character is in the reverse order.

# Vendor Error Codes

The table below details all error codes that can be raised by the charging station.

Generic error name	Specific error name	Error code	Error description	OCPP code
Software Configuration	Capacity out of range	1.0	Bad configuration of the microswitch.	InternalError
	Firmware downgrade	1.1	Charging station detects that the software version is lower than expected.	
	Software downgrade	1.2	Charging station detects that the software version is lower than expected.	
Hardware Configuration	Mother board issue	2.0	Issue with EVSE hardware.	InternalError
	Physical derating issue	2.1	Invalid physical derating configuration OR change of physical derating configuration during charge. Configure the microswitch according to the <i>EVlink Pro AC Installation Guide</i> (NNZ1940301).	InternalError
	Plug issue 6mA	2.2	6mA plug missing.	InternalError
	Plug issue 15118	2.3	15118 plug missing.	InternalError
	Front cover opened	2.4	Front cover opened.	InternalError
	Issue on temperature sensor	2.5	Issue with the temperature sensor. Only for Eichrecht commercial references.	InternalError
Upstream Protection Devices	MNX tripping	3.0	Trip of MNX / Contactor discordance.	OverCurrentFailure
RDC_DD	RDC DD (6mA) measurement board error	4.0	RDC DD internal device reports an internal error.	InternalError
6mA_Detection	6mA DC leakage detected	5.0	DC leakage value higher than 6mA.	OtherError
Metering	Input voltage issue	6.0	Phase synchronization defect or input voltage or frequency error.	InternalError
	Internal metering card issue	6.1	At least one metering fault has been detected.	InternalError
PowerMeter	Internal power meter communication loss	7.0	Loss of communication with Modbus power meter for metering (either internal or external), for 3 consecutive unsuccessful attempts.	InternalError
	Dataset issue	7.1	Verification of the dataset signature failed or Others dataset error.	InternalError
Bluetooth	Bluetooth communication issue	8.0	Issue with Bluetooth processor: communication lost or update impossible.	InternalError
Badge reader	Badge reader issue	9.0	Loss of communication with the RFID, NFC reader.	ReaderFailure
EV_ISSUES	EV issue: Control Pilot (CP)	10.0	Communication fault with a Mode 3 / T2 vehicle ( <b>CP</b> (Control Pilot) error).	EVCommunicationError
	Plug Presence (PP) conformity	10.1	Cable status wrong (the value of the coding resistor "PP" is wrong).	EVCommunicationError
	EV issue: short-circuit CPW	10.2	Charging fault short-circuit on Control Pilot Wire.	EVCommunicationError
Outlet	Lock/Unlock cable failure	11.0	Wrong handling during the plug/unplug of the socket, or motor blocked.	ConnectorLockFailure
Contactor	Contactor discordance	12.0	Contactor is not in the requested state: welded or blocked in open position.	InternalError
Phase_discordance	Load three-phase compliancy	13.0	Three phases charging not allowed in simplified mode 3.	OtherError
Overcurrent	EV overcurrent	14.0	Overcurrent or overload charging fault due to EV.	OverCurrentFailure

Generic error name	Specific error name	Error code	Error description	OCPP code
VENTILATION_NOT_ALLOWED	Ventilation not allowed	15.0	Battery gas leakage risk. Car asking ventilation that is not compatible with our products.	OtherError
EVCE	EVCE communication loss	16.0	Supervision communication lost between EV Charging Expert and the charging station.	OtherError
OCPP	Supervision (OCPP) issue	17.0	Communication or configuration of Supervision (OCPP) issue.	OtherError
OCPP	CPO communication lost	17.1	The communication between the CPO and the charging station is lost but the Charging station is not in error. Load is authorized when offline.	
EM	Dynamic Energy Management communication loss: TIC	18.0	Communication lost with external device for energy management (TIC).	OtherError
	Dynamic Energy Management communication loss: Modbus meter	18.1	Communication lost with external device for energy management (Modbus meter).	OtherError
Temperature	Temperature out of the authorized range	19.0	Temperature too high or too low. Only for Eichrecht commercial references.	OtherError





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