EV Net 7kW SERIES

Type EVNET-7KW-S/T2-1PH: 32A

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PRODUCT HIGHLIGHTS

The EVNET-7KW-S/T2-1P:32A, EVNET for short, is a single-phase electric vehicle charging station, available in socketed and tethered models. With a compact design, advanced smart charging and safety features, and a maximum current of 32A (7.4 kW supplied power), the EVNET is ideally suited for home and public charging of EVs and PHEVs. This smart charger supports remote monitoring and configuration via a mobile app, which allows the user to control how and when their vehicle is being charged

TECHNICAL SPECIFICATION

Model	EVNET-7KW-S-1PH: 32A	EVNET-7KW-T2-1PH: 32A
Power	7360 W	
Nominal voltage V_n Working voltage range Power consumption (max.)	230 VAC, 1-phase ± 20 % deviation from V_n 5.2 W, 8.2 VA	
Maximum charging current I_{max}	32A	
Protection features	· RCD Type A + DC sense (6mA) · Neutral voltage (70 V_{rms}) · Overcurrent (Overcurrent protection trip when I_L> 1.2 x I_{max}) · Temperature (limiting 72°C -78°C, fault at 79°C) · Undervoltage (shutdown at 115V_{rms}±10 V_{rms}) · Overvoltage(shutdown at 300V_{rms}±10 V_{rms}) · Reverse phase or phase-to-phase: the hardware can safely handle mains misconnection ·Tamper sensor: the hardware can detect unauthorized opening of the charger body	
LED Indication	· RGB LED light ring around the type II connector or tethered cap	
Vehicle connection	Type II EU Socket with cover and electromechanical actuator lock	Tethered cord, terminated by EV plug Type II (5m length)
Backend Connectivity	**WLAN:** 802.11 b/g/n/e/i (2.4GHz) **Ethernet:** via internal RJ45 port **GSM:** 2G (optional: 3G, LTE CAT M1, CAT NB1)	
Backend protocol and smart charging capabilities	OCPP 1.6J - Power profiles supported:Default, TxProfile, MaxProfile	
Auxiliary connectivity	**Bluetooth (BLE 4.0)**: for configuration and diagnostics only	
Wireless capabilities	**Access Point:** integrated web server for settings and diagnostics (web client)	
	Station: for backend connectivity	
	Note: Supports simultaneous Access point and Station functionality	
RFID	NFC ("smart card") protocol 13.56kHz	RFID 125kHz

Earth disconnection (PEN conductor)	Neutral-to-Earth fault: V_{N-PE}> $70V_{rms}$ Line to Neutral 207V up to 253V	
Measurements	RMS Voltage, RMS current, Active power, Active energy	
Model	EVNET-7KW-S-1PH: 32A	EVNET-7KW-T2-1PH: 32A
Dimensions (**H**x**W**x**D**)	187 x 122 x 118 mm 7.4 x 4.8 x 4.6 in	187 x 122 x 104 mm 7.4 x 4.8 x 4.1 in
Weight	1.1 kg / 2.4 lb	0.9 kg / 2 lb (without cord)
IP Rating	IP54	
Temperature	Operational Limiting Range: -40°C - +70°C	
	Transportation Limiting Range: -40°C - +85°C	
	Storage Limiting Range: -40°C - +85°C	
Humidity	Annual: <95% non-condensing	
Mechanical Class	M1	
Electromagnetic Class	E2	
Environmental Class	3K7	

Remote Diagnostic and Management Features
Error detection and auto restore
Remote Reset
Remote compensation of RCD offset
Remote Firmware Update

Compliance
General: IEC 61851-1:2019 Part 1, BS 7671:2018
EMC: Directive 2014/30/EU IEC 61851-21-2:2021 Part 21-2 (Emissions Class B, Immunity – Residential Environments); Class B for EN 55032:2015, EN 61000-3-2: 2014, EN 61000-3-3: 2013, EN 61000-4-2: 2009, EN 61000-4-4: 2004, EN 61000-4-5:2014; EN 61000-4-8: 2009, EN 61000-4-11: 2004
Safety: Directive 2014/35/EU IEC 60950-1:2005, IEC 61508, IEC61810-1 (contactors),EN 60947-2:2017/A1:2020, ISO 13849-1:2015, IEC60364-4-41, IEC 61008-1:2012 (RCD)
Radio equipment: Directive 2014/53/EU EN 62311:2008; GSM module - EN 60950-1:2006 & A11:2009 & A1:2010 & A12:2011 & A2:2013, ETSI EN 301 489-1 V2.2.0, EN 301 511 V12.5.1 (2017-03); WiFi module - EN 301 489-1 V2.2.0 (2017-03), EN 301 489-17 V3.2.0 (2017-03), EN 300 328 V2.1.1 (2016-11)

Working and Storage Environment	
Electrical	OVC III, PD2
IP Rating	IP54
IK Rating	IK08 (base model)
Temperature	Operational: -25°C ÷ +55°C(3K6) Transportation: -40°C ÷ +85°C (2K4 modified)
Cooling	Natural air cooling
Storage Temperature	-40°C to 70°C (1K5)
Humidity	10% ÷100% Relative humidity, non-condensing
Altitude	-50 to +2000 m

RS-485 peripherals (CT clamp/E-meter)

CT Clamp

For connection with CT clamp no specific settings are needed. Both the EVNET-7KW and the CT clamp are pre-set to operate together.

E-meter

- Baud rate: 9600bps.
- Start bit: 1
- Data bits: 8
- Parity: None
- Stop bits: 1
- MODBUS device address: 0x01

The following table provides the register set that must be implemented in a compatible MID meter (parameters marked with an asterix * are required for three-phase measurements):

Address (Register)	Parameter Number	Modbus Input Register Parameter	Units	Hi Byte Addr	Lo Byte Addr
30073	37	Total Import kWh	kWh	00	48
30075	38	Total Export kWh.	kWh	00	4A
30001	1	Phase 1 line to neutral volts	Volts	00	00
30003	2				
30005	3				
30007	4	Phase 1 current	Amps	00	06
30009	5		Amps	00	08
30011	6				
30013	7	Phase 1 power	Watts	00	0C
30015	8				
30017	9				

1. Appendix I: Light state description with error codes and light indication explained

EVNET RGB Light Ring Status Indicators					
Status	**Online Illumination**		**Offline Illumination**		**Description**
Available					Device is available to start a charging session. In the online state, it is connected to the OCPP backend. Offline, it may be set up as Plug-in Charge"
Preparing					The charger is preparing to start a charging session. Occurs when an EV is plugged in and the charger is waiting for authorization to being charging.
Charging					The EVNET is charging the EV as per app settings.
SuspendedEV					The EV has caused the EVNET to stop the charging session.
SuspendedEVSE					The EVNET has stopped the charging session.
Finishing					The EVNET is preparing to terminate the charging session.
Unavailable					The charger is not available. This may have been set by the OCPP backend for diagnostic or service purposes.
Faulted					The EVNET has encountered a problem and is in a fault state. More information can be accessed via the web client (see 2.5.1).

Note: The two adjacent patches indicate whether the status lights are constantly lit (identical colors) or blinking - switching between the two different colors

Temperature Current Limit Thresholds The EVNET-7KW monitors its internal temperature at two locations. If the temperature exceeds values considered to be dangerous to the electronics and safety, the charger will first limit its maximum charging current to lower its power dissipation. If the temperature still increases beyond that set-point (79°C), the charger will stop the session and enter a “Fault” state.	
Temperature≤, °C	Current limit, A per phase
72	31.8
73	29.4
74	26.8
75	24
76	20.8
77	17
78	12
79	6

VendorID1 : EVSE Limits EVSE Limits - the reasons why the current offered is limited. If there are multiple active limits, then the one that limits the system the most will have the highest priority.			
Code	**Name**	**Description**	**Detailed Description**
0	DeviceCurrentLimit	Max device limit	Default principal current limit, defined by the charger's hardware and set to 32A per phase
1	ProximityPilotLimit	Limit set due to cable's proximity pilot	This event has occurred because the charger is limiting the charging current to the EV, due to a low charging cable ampacity. Every cable has its own maximum allowable current, that can pass through it. It's called ampacity. This ampacity is encoded into the cable plug by PP line. The charger reads the cable ampacity and offers to the EV, current not exceeding that cable ampacity.
2	DeviceTemperatureLimit	Limit set due to high temperature	This event has occured because the temperature of the charging station reaches 72°C. Then the charging station will start adjusting the current to lower the temperature, where for each degree above 72°C, the current will continue to drop down..
3	ExtTransformerCurrentLimit	Limit set by external transformer	In order to protect the total household overloading condition, the current to your EV car has been reduced. The charger monitors the total household current consumption by external current transformer (CT clamp). When the overloading condition is removed, the charger will correct (restore) the EV charge current to the maximum allowed.
4	OCPPGridLimit	Limit set by OCPP grid operator	This event has occured because the charging station is limited by a smart charging profile like the configuration "Charge Point Max Current (A)" in the backend.
5	FuseLimit	Limit set by fuse	This event has occured because the charger is limited to the maximum capacity of the main fuse in your household.

VendorID2 :RTM Errors RTM errors are generated by the EVNET-7KW when an error occurs and the charging is stopped. They can be found as “RTM err code” in the Diagnostics tab of the web client.			
Code	**Name**	**Description**	**Detailed Description**
0x0001	EVSE_FAULT_RCD	RCD protection error	This error has occured because the AC RCD protection is tripped. An RCD is residual current protection hardware used to protect the user from electrical injury due to a higher leakage current being detected.
0x0002	EVSE_FAULT_NEUTRAL	Neutral line error - PEN fault	This error code is sent when one of the following occurs: The line terminals 'L' and 'N' are swapped during the charge point installation. There are more than 70 Vrms between the 'N' and 'PE' lines. It happened due to increased resistance on the PE and/or Neutral line of your electrical installation
0x0004	EVSE_FAULT_OVERCURRENT	Overcurrent error	This error has occurred because your EV car draws a much higher current than offered by the charge point. As long as the EV draws current, that exceeds more than 10% of the charger's offered current and it lasts more than 6 seconds the overcurrent protection will trip.
0x0008	EVSE_FAULT_RCD_DC	RCD DC protection error	This error has occurred because the DC RCD protection is tripped. An RCD is residual current protection hardware used to protect the user from electrical injury due to a higher leakage current being detected.
0x0010	EVSE_FAULTS_POWER_RELAY	Stuck power relay	This error occurred because the EV charger's main relay was stuck. The EV charger main relay has two positions - active and inactive. When the charger detects that the relay position has not changed as expected, it trips that fault.
0x0020	EVSE_FAULT_ACT_LOCK_FAULT	Actuator lock malfunction	The error occurred because the internal actuator mechanism in the charge point failed to lock the EV plug to the EV socket. This error is available only to socket-type chargers
0x0040	EVSE_FAULT_ACT_UNLOCK_FAULT	Actuator unlock malfunction	This error occurred because the internal actuator mechanism in the charge point failed to unlock the EV plug from the EV socket. This error is available only to socket-type chargers.
0x0060	EVSE_FAULT_MISSING_PCM	PCM module missing	The RT module in charge point is unable to detect the internal PCM module. The PCM is optional module in the charge point configuration, and it is responsible for actuator control and NFC reader. This error is available only to socket type chargers
0x0080	EVSE_FAULT_CP_STATE	Unknown CP state	This error has occured because the state of the control pilot line (CP) is in an undefined state. The CP is a communication line between the EV and charger. The

			positive level of this signal should be either 3, 6, 9 or 12V, which represents the states A, B, C, D or E.
0x0100	EVSE_FAULT_DIODE_UNPRESENT	EV communication error	This error occurred because a communication error was detected with the EV.
0x0200	EVSE_FAULT_PP_UNPRESENT	Proximity pilot not detected	This error occurred because the charger couldn't detect the charge cable ampacity, encoded into the EV plug. The charging session will not start.
0x0400	EVSE_FAULT_MISSING_HOST	Internal host error	This error indicates that the internal interconnection communication error of the chargers has occurred. Lost communication between the RTM (Real-time module) and application processor. In this case, the RTM won't be able to send the error (since it has no connection to the cloud server) until communication is restored. So the application CPU can read this error from the RTM when the first connection is established. The CPU then sends this event to the cloud server. The periodical beep should be generated by the RTM.
0x0800	EVSE_FAULT_TEMPERATURE	Overheating error	This error occurred because the temperature of the charging station reaches more than 79°C. This will cause the charger to stop the current charging session.
0x1000	EVSE_FAULT_OVERVOLTAGE	Overvoltage error	This error occurred because the grid voltage has reached above the nominal voltage threshold. The charging session is currently suspended, due to a higher voltage level detected. In case the grid voltage returns back to a normal voltage level, the charging session will resume automatically. Note that the voltage margin is configurable by a custom OCPP key 'c_VoltageProtectionOffset'.
0x2000	EVSE_FAULT_UNDERVOLTAGE	Undervoltage error	This error occurred because the grid voltage dropped below the nominal voltage threshold. The charging session is currently suspended, due to a lower voltage level detected. In case the grid voltage returns back to a normal voltage level, the charging session will resume automatically. Note that the voltage margin is configurable by a custom OCPP key 'c_VoltageProtectionOffset'.
0x4000	EVSE_FAULTS_AUTO_RECOVERY	Auto Recovery	This error occurred because some of the AutoRecovery errors occurred. The charging session is currently suspended, due to some of AutoRecovery error trips.
0x8000	EVSE_FAULT_CAL	EVSE calibration data error	This error occurred because the charger is unable to read the manufacturer parameters data from its internal NV memory. The charger has parameters, loaded during the manufacturing process. These are the calibration data for Voltage, Current, Power, Energy, and RCD as well as a Serial Number.
0x10000	EVSE_FAULT_VN_OUT_OPEN	Power Relay	This error occurred because the Neutral contact of the main relay was detected to be closed when it was expected to be open.
0x20000	EVSE_FAULT_VN_OUT_CLOSE	Power Relay	This error has occured because the Neutral contact of the main relay was detected to be open, when it was expected to be closed.
0x40000	EVSE_FAULT_VL_OUT_OPEN	Power Relay	This error occurred because the Live contact of the main relay was detected to be closed when it was expected to be open.

0x80000	EVSE_FAULT_VL_OUT_CLOSE	Power Relay	This error occurred because the Live contact of the main relay was detected to be open when it was expected to be closed.
0x100000	Main cover opening detected	Device open cover detected by tamper switch	It has been detected an event of opening the chargers main cover. You can check the tamper event timestamp in the backend log.
0x200000	EVSE_FAULT_TAMPER2_EVENT	Service cover opening detected	It has been detected an event of opening the service cover. You can check the tamper event timestamp in the backend log.
0x400000	EVSE_FAULT_MISSING_EXT_EMETER	There is no connection with external meter	This error occurred because a loss of communication with an external meter was detected, while the charger is configured to use an external meter.

VendorID3 : Main MCU errors Debugging information related to the EVNET-7KW's main CPU.			
Code	**Name**	**Description**	**Detailed Description**
0	CC_RST_UNKNOWN	Reset reason cannot be determined	This event has occured because the reset of application processor was happened, with unknown orgin.
1	CC_RST_POWERON	Reset due to power-on event	This event occurred because the reset of the application processor was detected at the power-on event. It shows a normal startup event at power-on.
2	CC_RST_EXT	Reset by external pin	This event occurred because the reset of the application processor was triggered from the reset pin.
3	CC_RST_SW	Software reset via esp_restart	Reset due to a command sent via the OCPP (Soft Reset) or the web UI (the web client of the charger). This can also be an internal software reason like after a firmware update.
4	CC_RST_PANIC	Software reset due to exception/panic	This event occurred because the reset happened due to an exception that the application processor could not handle (stack overflow, memory corruption, etc).
5	CC_RST_INT_WDT	Reset (software or hardware) due to interrupt watchdog	This event has occured because the reset happened due to the firmware malfunction of the application processor.
6	CC_RST_TASK_WDT	Reset due to task watchdog	This event occurred because the reset happened due to the firmware malfunction of the application processor.

7	CC_RST_WDT	Reset due to other watchdogs	This event occurred because the reset happened due to the firmware malfunction of the application processor.
8	CC_RST_DEEPSLEEP	Reset after exiting deep sleep mode	This event occurred because the application process starts executing code when exiting from deep sleep mode.
9	CC_RST_BROWNOUT	Brownout reset (software or hardware)	This event occurred because the reset happens due to the system power supply drops below the minimum required level of the application processor core voltage.
10	CC_RST_SDIO	Reset over SDIO	This event occurred because the reset happened due to an internal system SDIO bus error.

2. Appendix II: OCPP and Manufacturer Configuration Keys

Configuration Key	Custom Key	In use	Example Value	Description
AllowOfflineTxForUnknownId		**yes**	TRUE	When offline, the device can be set to allow automatic authorization of any "unknown" identifiers that cannot be explicitly authorized by Local Authorization List or Authorization Cache entries.
AuthorizationEnabled			TRUE	
AuthorizeRemoteTxRequests			TRUE	
ChargeProfileMaxStackLevel			100	
ChargingScheduleAllowed ChargingRateUnit		**yes**	A,W	Configures the units of "charge power" to be used in a charging schedule.
ChargingScheduleMaxPeriods			60	
ClockAlignedDataInterval			0	
ConnectionTimeOut			90	Interval of time from status “Preparing” until the transaction is automatically canceled, due to failure of the EV driver to insert the charging cable into the charger or vehicle. The charger will revert to the original state.
ConnectorSwitch3to1PhaseSupported			FALSE	Configures the three phase chargers to work on a single-phase grid as single-phase charger.
c_ChargingVentilatedEnabled	**yes**	**yes**	FALSE	Allows the charger to offer charge when the vehicle enters in state "D"
c_DeviceLimit_I	**yes**	**yes**	320	Sets a hard limit on the maximum current the device will offer in 1/10ths of an ampere. The limit cannot be overridden by profiles.
c_MainFuseLimit	**yes**	**yes**	600	CT clamp current limit, fuse set in 1/10ths of an ampere
c_RCDProtectionType	**yes**	**yes**	0	Configures RCD protection type. Permitted states: 0 - Both AC + DC protection is on 2 - Only AC protection is on
c_VoltageProtectionOffset	**yes**	**yes**	0	Enables configuration of expanded voltage

				protection limits. The default range with the key set to "0" is +-10% of the nominal supply (207-253VAC). Values of 1-23 are allowed, which expand both lower and upper threshold by the respective amount in VAC.
GetConfigurationMaxKeys		**yes**	5	The number of OCPP configuration keys that can be acquired from a single get configuration command.
HeartbeatInterval		**yes**	60	The interval between each heartbeat PDU.
LightIntensity		**yes**	100	The light intensity of the LED ring of the charger in % of maximum.
LocalAuthListEnabled			FALSE	
LocalAuthListMaxLength			0	
LocalAuthorizeOffline			TRUE	
LocalPreAuthorize			FALSE	
MaxChargingProfilesInstalled			10	
MeterValueSampleInterval		**yes**	60	The time interval between each meter value during a session.
MeterValuesSampledData		**yes**	Voltage.L1-N,Voltage.N,Temperature,Current.Offered.L1,Current.Import.L1,Power.Active.Import.L1,Energy.Active.Import.Register.L1	A list of measurands sent for each meter value during a session.
NumberOfConnectors			1	
SendLocalListMaxLength			0	
StopTransactionOnEVSideDisconnect			TRUE	
StopTransactionOnInvalidId			TRUE	
UnlockConnectorOnEVSideDisconnect		**yes**	TRUE	When set to TRUE the Charge Point SHELL unlock the connector on Charge Point side when the cable is unplugged at the EV
c_MainOfflineTimeout	**yes**	**yes**	null	Defines the timeout value for the main communication network interface
c_FallbackOfflineTimeout	**yes**	**yes**	null	Defines the timeout value for the fallback communication network interface
c_FallbackOnlineTimeout	**yes**	**yes**	null	Defines the duration for which the fallback network interface is active before

				reverting to the main network interface
C_OCPPNetLog	**yes**	**yes**	FALSE	Configures whether diagnostic network data logs are sent via OCPP
c_ChargeOffPeriod1	**yes**	**yes**	enable,08:00,11:00	Defines the first standard period for offline charging
c_ChargeOffPeriod2	**yes**	**yes**	enable,16:00,22:00	Defines the second standard period for offline charging
c_MaxStartDelay	**yes**	**yes**	600	Defines the maximum value for the randomized delay functionality for offline charging
c_LockerDisengage	**yes**	**yes**	TRUE	Defines whether the built-in locker is enabled or disabled.
c_CTClamp	**yes**	**yes**	FALSE	Presence or absence of a CT clamp
c_CTClampValue	**yes**	**yes**	65535	Defines the value range of the CT clamp measurand data
c_MainNetworkInterface	**yes**	**yes**	0	Defines the main network interface
c_FallbackNetworkInterface	**yes**	**yes**	0	Defines the fallback network interface
c_APN	**yes**	**yes**	0	Sets or gets the APN used for cellular network interface