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# Electric Vehicle Communication Controller
# MODEL NO. AT-EVCC-500

## 1. OVERVIEW

AT-EVCC-500 is an Electric Vehicle Communication Controller (EVCC) within the EV for rapid charging in accordance with the international standard DIN SPEC 70121 and the ISO/IEC 15118 that are core parts of the Combined Charging System (CCS). For charging communication between EV and Electric Vehicle Supply Equipment (EVSE), it supports Control Pilot (CP), Proximity Pilot (PP) as well as PWM signaling including Home Plug Green PHY communication. Moreover, the charging CAN-BUS control and IEC-61851 functionality has already been integrated to offer optimal flexibility and efficiency.

Figure 1: Image of AT-EVCC-500

## 2. FUNCTIONS

2.1 The original vehicle charging is controlled via GB charging protocol, and an electricvehicle charging communication controller (EVCC) is established and developed to control electric vehicles DC charging communications between the vehicle and charging equipment.
2.2 This controller provides two-way communication or conversion between GB and CCS1/CCS2.
2.3 With this function, the entire capacity of 4KB EEPROM can be used as space for storingfault code freeze frames, and has storable memory 800BYTE.
2.4 AT-EVCC-500 complies with CCS1 and CCS2 regulations/GB regulations interface conversion and handover function.

## 3. SPECIFICATIONS

### 3.1 Supported Standards

3.1.1 Home Plug Green PHY™ 1.1 (IEEE 1901)
3.1.2 ISO/IEC 15118-2, DIN SPEC 70121
3.1.3 IEC61851-1, IEC 61851-23, IEC 61851-24
3.1.4 GB/T 27930-2015, GB/T 18487.1-2015 (Physical Layer conforming to this standardshall refer to ISO 11898-1:2003 and SAE. J1939-11: 2006. The communication between charger and BMS is within this standard)

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## 3.2 Technical Data

### 3.2.1 Communications

| No. | Item | Description |
|---|---|---|
| 1 | 2 x CAN | 1 x CAN 2.0B, 250Kbps or 500Kbps Charging CAN (INTL CAN between EVCC & BMS) |
| | | 1 x CAN-FD, CAN 2.0B, 500Kbps, Diagnostic CAN (PT CAN between EVCC & VCU) |
| 2 | 1 x Power Line Communication((Spectrum: 2~30MHz) | |

### 3.2.2 Wake-Up Mechanisms

| | |
|---|---|
| 1 | Vehicle CAN |
| 2 | Control Pilot |
| 3 | Real Time Clock |
| 4 | Reserved digital IO |

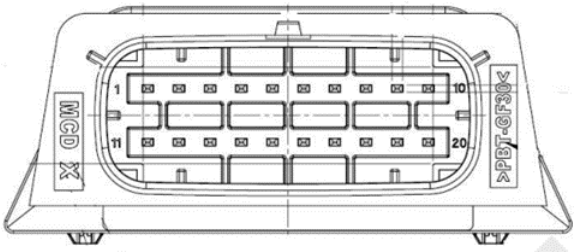
### 3.2.3 Connector Interlocking

| | |
|---|---|
| 1 | Support 3-wire/ 4- wire socket actuator |
| 2 | Interlocking of the connector with the socket during charging process |
| 3 | Read-back channel to check if connector is properly plugged and locked |

### 3.2.4 Power Dissipation

| | |
|---|---|
| 1 | Active: 145mA (Vin 12VDC) |
| 2 | Standby: 60uA |

### 3.25 Pin Out Definition




AT-EVCC-500 Customer Interface MOLEX 0348302001

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| KL30 | | INT-CANL | | LOCK-F | LOCK-R | AUX-PWR | CC2 | PP | CP |
| KL31 | | INT-CANH | | LOCK-P | LOCK-G | AUX-PWR-RETURN | | | PE |

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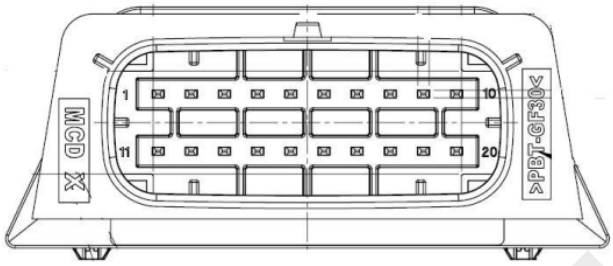
# 4. INTERFACE

## 4.1 Definition: CAN ID

CAN BUS Speed: 250 / 500 Kbps (Optional)




| AT-EVCC-500 Interface MOLEX 0348302001 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| KL30 | KL15/ ACC | INT-CANL | PT-CANL | LOCK-F | LOCK-R | AUX-PWR | CC2 | PP | CP |
| KL31 | KL31 | INT-CANH | PT-CANH | LOCK-P | LOCK-G | AUX-PWR-Return | DO | DI* | PE |

*DI: The design supports DI/AI/GND/CC modes; the default is set at GND

| Pin | Symbol | Type | Description |
|---|---|---|---|
| 1 | KL30 | Analog Input | Auxiliary Battery Power supply (12V or 24V) |
| 2 | KL15/ACC | Digital Input | Ignition (ACC ON) is used to stop charging |
| 3 | INT-CANL | Digital Input/output | INTL CAN Low (Low battery connected to BMS L) |
| 4 | PT-CANL | Digital Input/output | PT CAN Low (Diagnostics and recording process) |
| 5 | LOCK-F | Digital Output | Lock– Forward, Lock; Connected to E-Lock (12V/24V) |
| 6 | LOCK-R | Digital Output | Lock – Reverse, Unlock; Connected to E-Lock (12V/24V) |
| 7 | AUX-PWR | Digital Output | Auxiliary power output - 12V@50mA （GB Detection）; BMS wake-up |
| 8 | CC2 | Digital Output | GB/T connect CC2 & BMS; BMS wake-up confirm |
| 9 | PP | Digital Input | Proximity Detection connected to the socket |
| 10 | CP | Analog/Digital Input | Control Pilot connected to the socket |
| 11 | KL31 | GND | Auxiliary Battery GND |
| 12 | KL31 | GND | Auxiliary Battery GND |
| 13 | INT-CANH | Digital Input/output | INTL CAN High; INTL CAN High BMS CAN H |
| 14 | PT-CANH | Digital Input/output | PT CAN High |
| 15 | LOCK-P | Digital Input | Lock-Feedback; Connect to E-Lock |
| 16 | LOCK-G | GND | Lock-GND; Connect to E-Lock |
| 17 | AUX-PWR-Return | GND | Auxiliary power GND |
| 18 | DO | Digital Output | Wake-up other ECU，use High-SideSwitch |
| 19 | DI* | Digital Input | Reserved; only used in PT1000 1 channel |
| 20 | PE | GND | Chassis ground connected to charging socket |

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# 5. TECHNICAL CHARACTERISTICS

## 5.1 Physical Features

| Description | |
|---|---|
| Operation Voltage | +9V~ 32V DC |
| Operation Temperature | -40℃ ~ +85℃ |
| Storage Temperature | -40℃ ~ +105℃ |
| Operation Humidity | 0 ~ 90%RH |
| Housing Degree of Protection | IP67 |
| Flame Rating | V-0 |
| E-Lock | Support 3 wire / 4 wire E-Lock |
| Charging Method | DC Charging |
| Firmware Upgrade | Supported |
| Dimensions (L*W*H) | 147mm * 140mm * 31mm |
| US/ Europe Standards | IEC 61851-1/IEC 61851-23/IEC 61851-24<br>DIN 70121/ ISO 15118/ SAE 2847-2 |
| Header and Connector | SOCKET: 0348302001<br>PLUG: 0334722001 |

## 5.2 Molex Connectors

| PART NAME | MODEL NUMBER | REFERENCE |
|---|---|---|
| SOCKET | 0348302001<br>https://www.molex.com/webdocs/datasheets/pdf/en-us/0348302001_PCB_HEADERS.pdf |  |
| PLUG | 0334722001<br>https://www.digikey.cn/zh/products/detail/molex/0334722001/1756781?amp%3BWT.z_header=search_go&s=N4IgTCBcDaIMxwCwHYxgAzoIwgLoF8g |  |

## 5.3 Wiring Harness Recommendations

| Wiring Harness | Rate Voltage | Peak Current | Type | Diameter ($mm^2$) |
|---|---|---|---|---|
| CP/PE | 12V | 0.1A | Twisted-Pair | 0.75 |
| PT_CAN | 5V | 0.3A | Twisted-Pair | 0.75/0.5 |
| INT_CAN | 5V | 0.3A | Twisted-Pair | 0.75/0.5 |

| | | | | |
|---|---|---|---|---|
| KL30 | 24V | 0.5A | | 0.75 |
| KL31 | 24V | 0.5A | | 0.75 |

### 5.4 EVCC Vehicle Recommendations Wiring Harness Requirement

| Connector Pins | Pin Definitions | Cable Harness Type | Twisted Pair | Twist Pitch |
|---|---|---|---|---|
| 1 | KL30 | AWM1332-AWG-18 | × | / |
| 2 | KL15/ACC | AWM1332-AWG-18 | × | / |
| 5 | LOCK-F | AWM1332-AWG-18 | × | / |
| 6 | LOCK-R | AWM1332-AWG-18 | × | / |
| 7 | AUX-PWR | AWM1332-AWG-18 | × | / |
| 8 | CC2 | AWM1332-AWG-18 | × | / |
| 9 | PP | AWM1332-AWG-18 | × | / |
| 11 | KL31 | AWM1332-AWG-18 | × | / |
| 12 | KL31 | AWM1332-AWG-18 | × | / |
| 15 | LOCK-P | AWM1332-AWG-18 | × | / |
| 16 | LOCK-G | AWM1332-AWG-18 | × | / |
| 17 | AUX-PWR-Return | AWM1332-AWG-18 | × | / |
| 18 | DO | AWM1332-AWG-18 | × | / |
| 19 | DI*（GND) | AWM1332-AWG-18 | × | / |
| 3 | INT-CANL | AWM1332-AWG-18 | √ | 25±5mm*③ |
| 13 | INT-CANH | | | |
| 4 | PT-CANL | AWM1332-AWG-18 | √ | 25±5mm*③ |
| 14 | PT-CANH | | | |
| 10 | CP | AWM1332-AWG-18*①② | √ | 25±5mm*③ |
| 20 | PE | | | |

Notes：

① CP&PE wiring should be routed as close as possible to the vehicle-end charging socket. LLimit <2 m; Figure 1

② CP&PE wiring should be kept away from noisy equipment, such as motors or high-power power supply conversion modules. If sharing CP lines with other ECUs, the distance between the EVCC device and other ECU CP lines should be greater than 60cm; Figure 2

③ Referring to Figure 3

### 5.5 CP&PE Wiring Topology

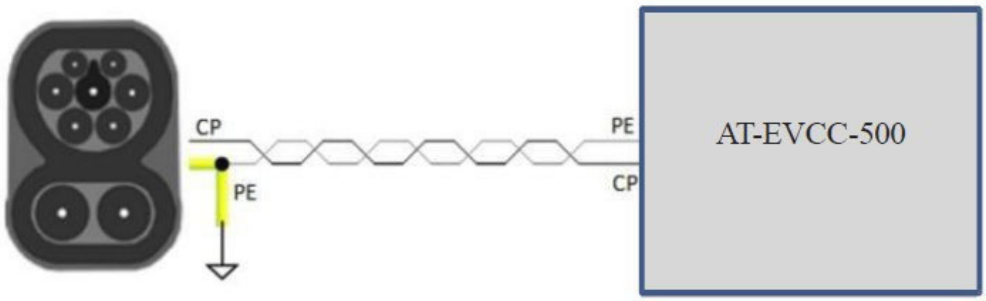


Figure 1 PE should be grounded near the vehicle charging port

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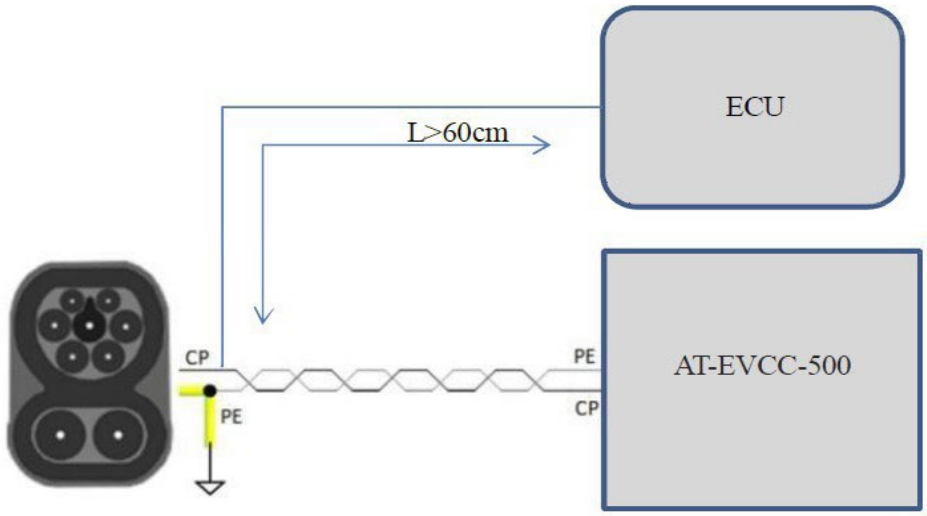


Figure 2

### 5.6 Twisted Pair Cable Pitch

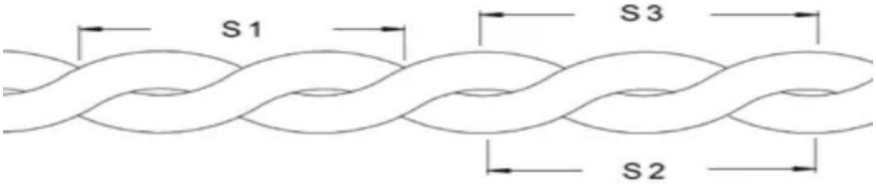


Figure 3 S1=S2=S3=2

### 5.7 Equipment Installation

should be kept away from exhaust pipes, engines, DC-DC converters, chargers, motor controller, compressors, high-pressure air conditioning pipes, and other heat sources. Additionally, they should be kept away from flammable parts such as oil lines, water lines, and gas lines.

5.7.2 EVCC equipment should be kept away from moving parts. In the front compartment, this includes moving parts such as windshield wiper linkages and vacuum pumps. In the rear compartment, it includes shock absorbers and motors.

5.7.3 Connector terminal connections for wiring harnesses must meet the requirements of QC/T 29106.

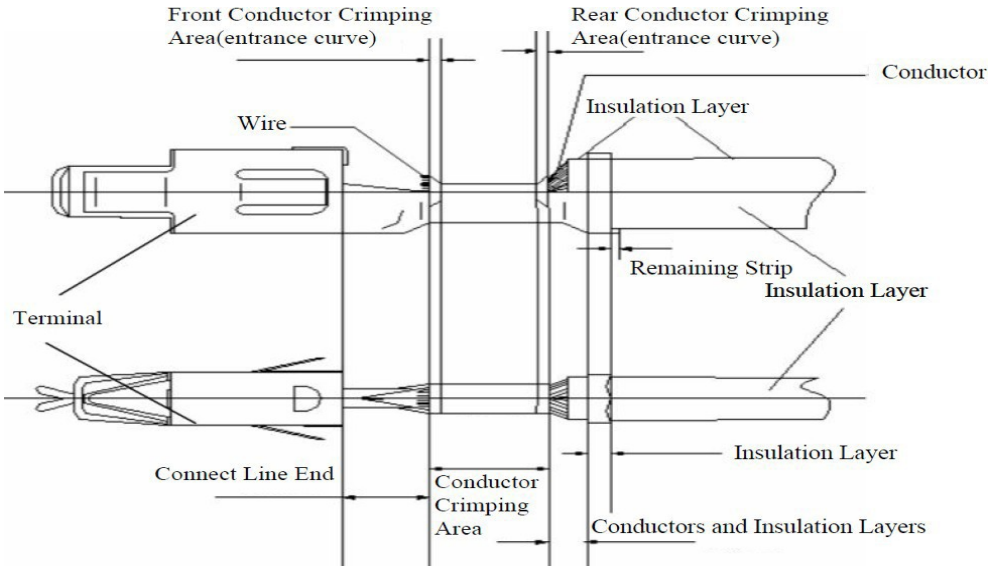


Figure 4 Terminal Connection Diagram

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## 6. Typical System Wiring Scenario

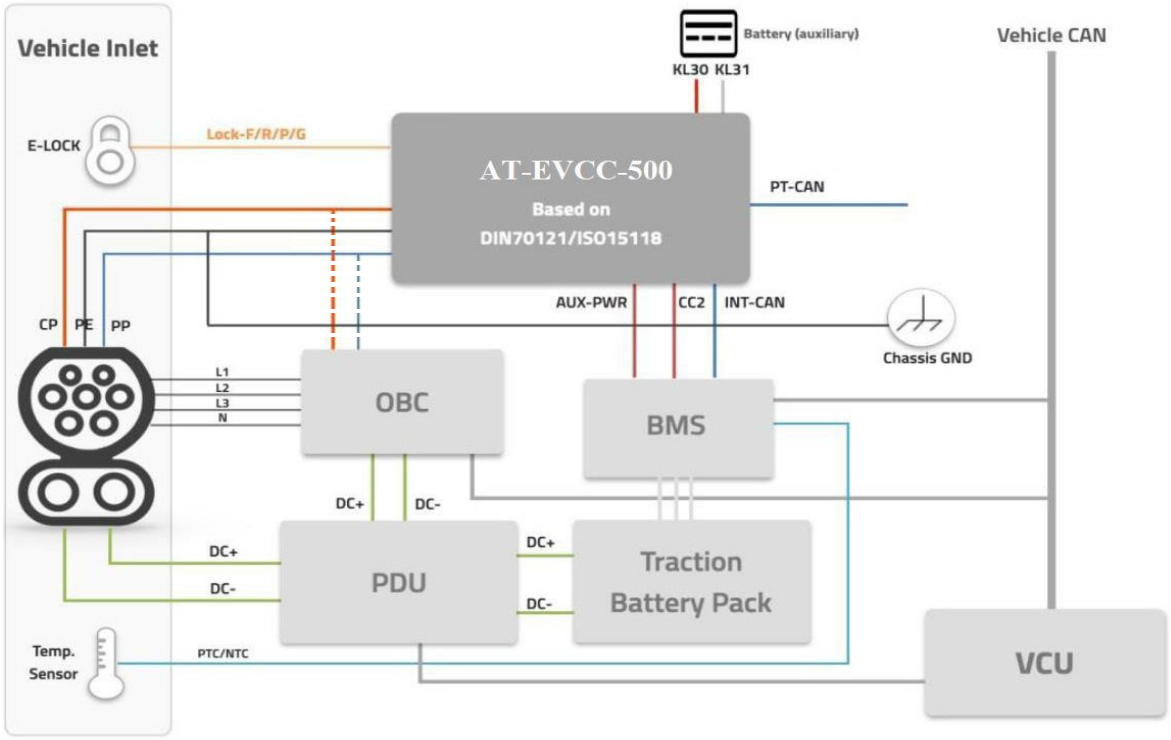


Figure 1 Typical System Wiring Scenario of AT-EVCC-500