



APPROPRIATE  
POWERCON  
EQUIPMENTS

# **ELECTRIC VEHICLE ENERGY DISTRIBUTION & MANAGEMENT SYSTEM**

SPiNE





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# 01

# INTRODUCTION

In today's electric vehicles, a power distribution unit(PDU) is inadequate as multiple parameters must be monitored and controlled to give enough control to the Vehicle Control Unit(VCU).

# What is SPiNE?

## SPiNE

*/spɪn/*

noun

Also called the backbone, is a central part of any body which is vital in connecting the brain and other parts.

Our automotive engineers set out to create something central to the modern electric vehicle that could not only connect various systems in an ev but also monitor and control some key parameters.

02

# PRODUCT OVERVIEW

*SPiNE* is an energy distribution & management solution for high voltage electric vehicles like electric buses, electric commercial vehicles and some high performance sports/utility electric vehicles.

*SPiNE* provides the functionality of Power Distribution Unit(PDU), Vehicle Charge Control Unit (VCCU), Smart Pre-Charge Circuit and Demand Charge Control Unit (DCCU) all as a single unit.

# PROTECT, MONITOR & CONTROL



## PROTECT

INRUSH CURRENT  
VOLTAGE SPIKES  
PRE CHARGE



## MONITOR

ISOLATION  
VOLTAGES  
CURRENTS  
HVIL

TEMPERATURE  
FUSE LIFE  
THERMAL DEGRADATION  
AUXILIARY LOAD LIFE



## CONTROL

POWER DISTRIBUTION  
BATTERY  
CHARGING CURRENT

SERVICE ACCESS  
CAN/CAN-FD COMM.  
POWER-LINE COMM.

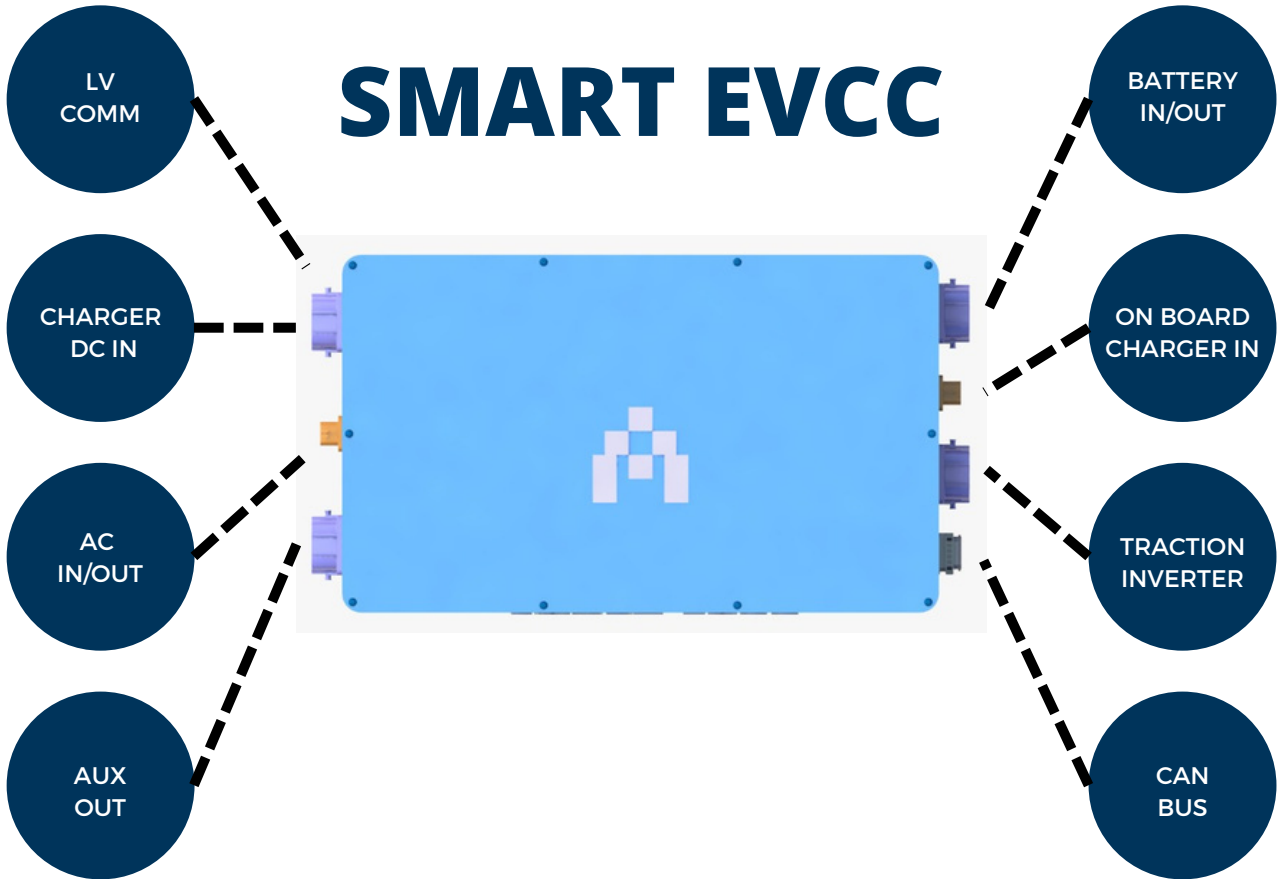
**03**

# **CONNECTIONS**

*SPiNE* is designed to be versatile and is capable of connecting multiple auxiliary and high power devices. The product is divided into two parts - Smart EVCC & Auxiliary Control Unit.



# SMART EVCC



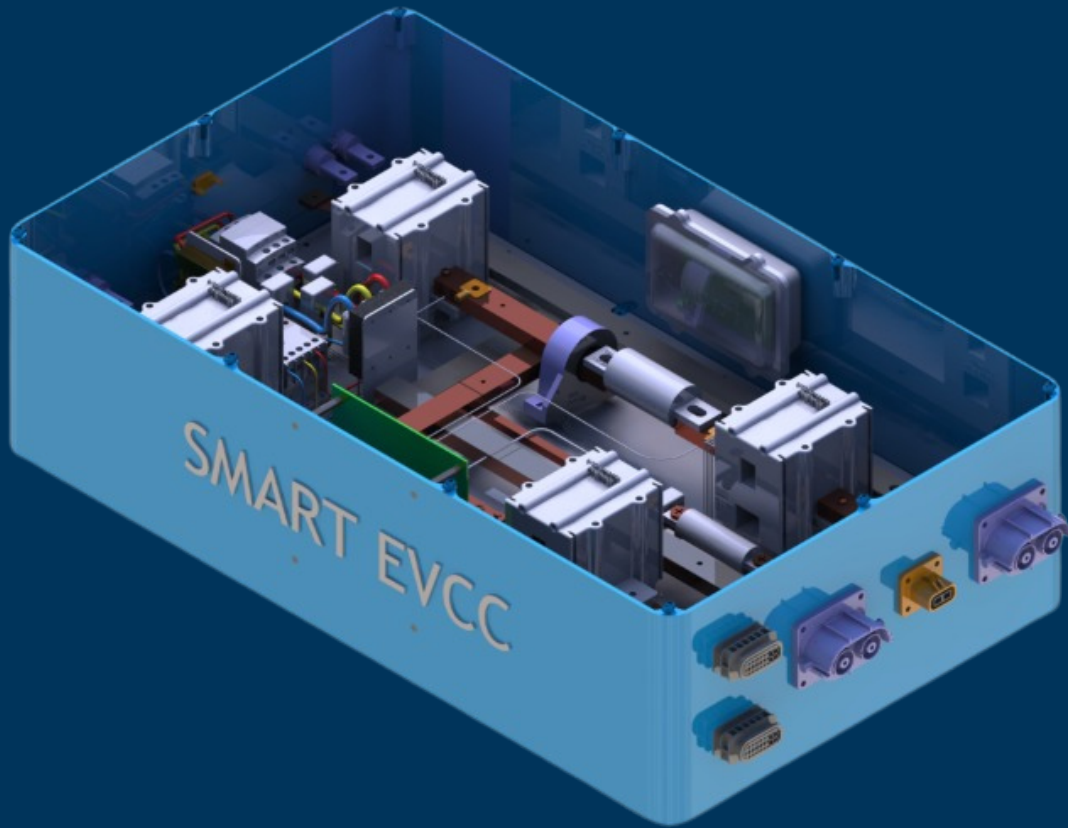
# AUXILIARY CONTROL UNIT



# 04

## **SMART EVCC**

SMART EVCC is the backbone of an EV, it provides intelligent interface by using an automotive grade microprocessor between charger, battery, traction motor, on-board charger and auxiliary load. It manages power to all critical loads in electric vehicle while protecting the vehicle with reliable circuit protection solutions.



OPERATING  
VOLTAGE

**200-1000 V**

VCCU

**OPTIONAL**

CONTINUOUS  
CURRENT

**250 A**

CONTACTOR

**SCHALTBAU**  
C10A/300 24i-V1

TEMPERATURE  
RANGE

**0-45 °C**

CONNECTORS

**AMPHENOL**  
HVC2P10MVx01

CHARGER  
INTERFACE

**CCS2**

INGRESS  
PROTECTION

**IP 67**

FUSE

**IN BUILT**

BODY  
METTALURGY

**ALUMINIUM**

MECHANICAL  
DIMENSIONS

**750 x 450 x 200**  
width x depth x height

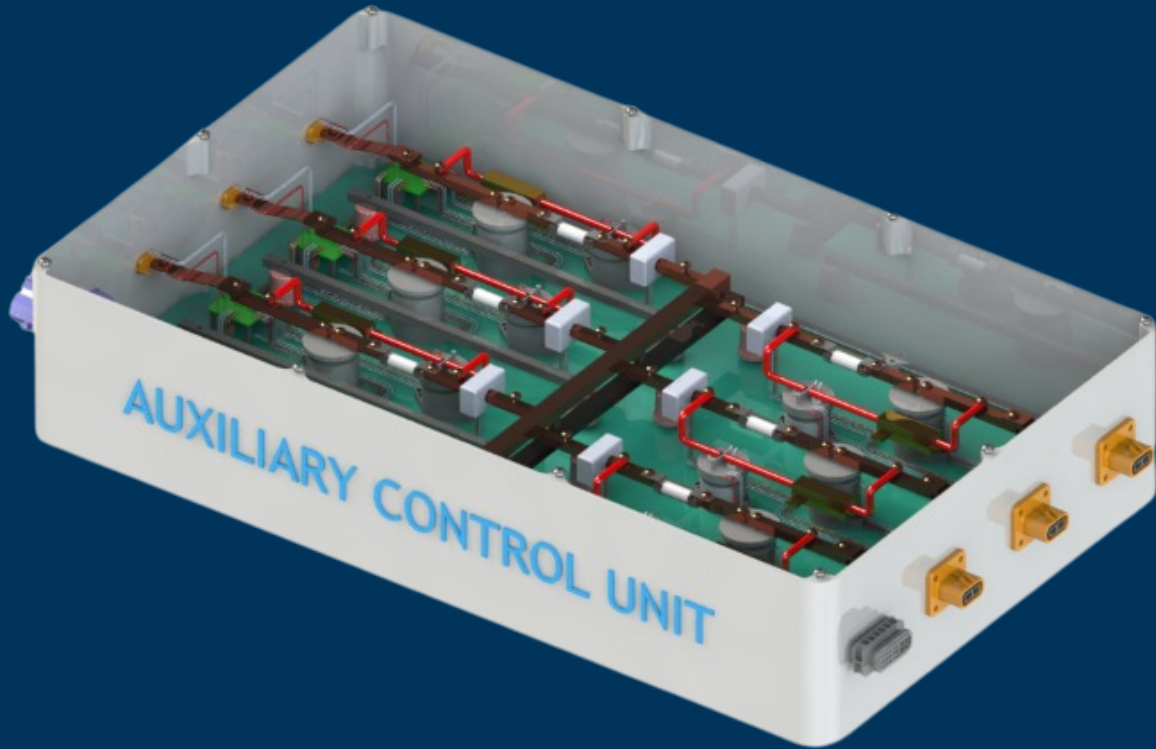
WEIGHT

**~34 kg**

# 05

# AUXILIARY CONTROL UNIT

Auxiliary Control Unit(ACU) is a customizable unit that delivers power to auxiliary loads like air compressor, climate control, battery cooling, EHPS system etc. Pre charge circuitry is integrated in the system, protecting the auxiliary loads from heavy inrush of current.



OPERATING  
VOLTAGE

**200-1000 V**

PRE CHARGE  
TIME SPAN

**PROGRAMMABLE**

MAXIMUM  
CURRENT

**50 A**

CONTACTOR

**LITTLE FUSE**  
DCNLEV50-CA

TEMPERATURE  
RANGE

**0-45 °C**

CONNECTORS

**AMPHENOL**  
HVC2P36MVx06

COMMUNICATION  
INTERFACE

**CAN 2.0**

INGRESS  
PROTECTION

**IP 67**

FUSE

**IN BUILT**

BODY  
METTALURGY

**ALUMINIUM**

MECHANICAL  
DIMENSIONS

**750 x 450 x 150**  
width x depth x height

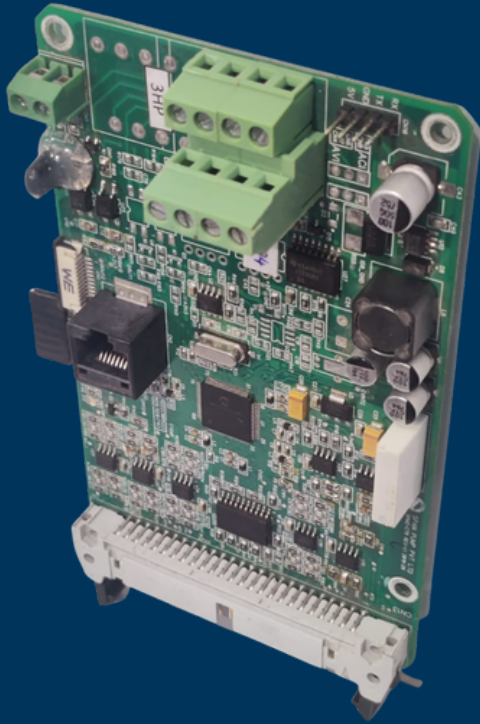
WEIGHT

**~21 kg**

# 06

# VEHICLE CHARGE CONTROL UNIT

Vehicle Charge Control Unit(VCCU) is a *optional* feature of *SPiNE* which handles standardized communication between electric buses and the charging infrastructure via Powerline Communication (PLC). The VCCU is designed for the CCS2 protocol, charging gun latch control & supports DIN70121 and ISO15118 Vehicle-to-Grid Communication.



# ISO 15118

## analog

**3 Temperature  
Sensor Inputs  
(+Ve,-Ve & AC)**

**Charging Gun Latch  
Motor Feedback**

## digital

**2 High-side Driver  
1 Low-side Driver**

**1 H Bridge Driver  
12V 5A**

**STOP Switch - Charging**

## comm.

**Customized CAN DBC**

**Internal Dedicated  
CANBUS**

**Power Line Communication  
CP,PE**

## features

**Integrated Flash  
Bootloader**

**Baud Rate Adjustment  
from 250kBaud to 1MBaud**

**AC/DC Charging Support**



# APPROPRIATE POWERCON EQUIPMENTS

We at Appropriate Powercon Equipment LLP, are a team of engineers with backgrounds in electric vehicles, power electronics, IoT, motor controls and storage solutions; who deliver unmatched high tech custom built solutions to a energy hungry world.

Some keywords associated to our products & services are as follows.



## INNOVATION

Our mantra is to innovate daily and come up with solutions that push boundaries consistently.



## DESIGN

Understanding the user requirement and keeping it simple is our motto towards designing any new product.



## RELIABLE

Reliability is a key virtue, we strive for, in each project we take. Quality control is extremely stringent and testing, rigorous.



## EFFICIENCY

We push the envelope of design in reducing the power required or increase the pace at every step of design & development.



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