EV2274KAH
Datasheet

V 3.3

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Chapter 1 System Introduction

1.1 VCU Introduction

VCU (Vehicle Control Unit) is the master controller for electric vehicles.
The VCU receives the driver's input signals, such as pedal signals, vehicle speed signals, gear signals, and other input signals. The VCU coordinates the motor, battery pack, and other accessory systems to meet the driving torque requirements. The VCU realizes fault diagnosis and resolution, vehicle status monitoring, vehicle mode conversion and other functions.
The VCU is the vehicle network control or main control unit based on CAN bus network.

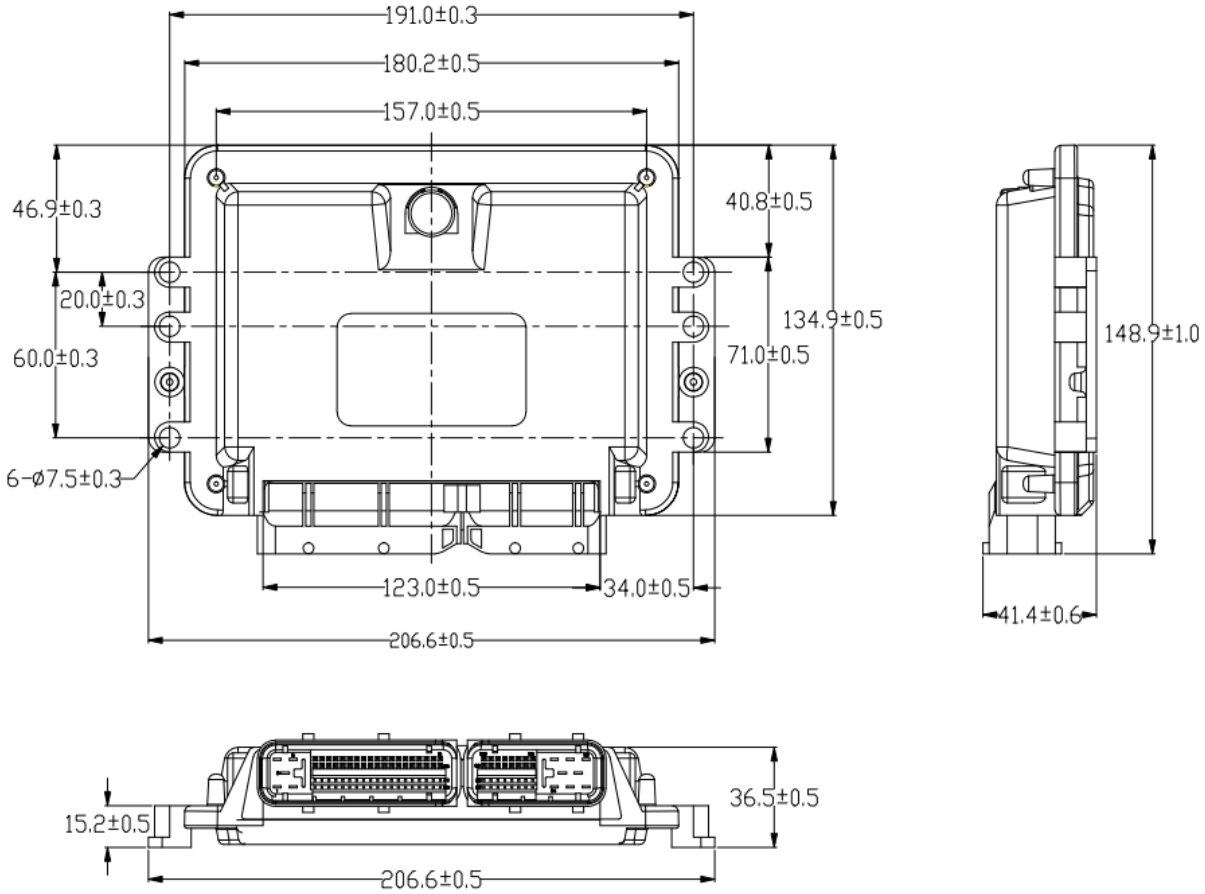
1.1.1 Functions

EV2274KAH has the following functions:

Feature
1 – key signal (KEYON)
2 – hard-wired wake-up signal (DI_WAKEUP1, DI_WAKEUP2)
2 – supply voltage (BATT)
2 – High and low side power supplies
3 – 5V output: maximum single channel output current 100mA
3 – CAN communication interface: supports CAN flashing and CANA arbitrary frame wake-up
16 – digital signal input: 10 Active-high, 6 Active-low
23 – analog signal input: 17 – channels 0~5V resistive input 6 – channels 0~32V input
6 – frequency signal input: active low
6 – high-side driver control output: single-channel output rated current is 1A, single-channel maximum output current is 1.5A, 4 channels can be configured as PWM outputs
18 – low-side driver control output: single-channel output rated current is 0.25A, single-channel maximum output current is 1A, 4 channels can be configured as PWM outputs

1.1.2 Mechanical Properties

The housing of the VCU is die-cast aluminum and assembled with a silicone seal. There is no special treatment or plating on the outside of the housing, no sharp burrs, and sharp edges. The nominal dimensions of the housing shape of the VCU are as follows (excluding the female end of the VCU connector, in mm):



The appearance of the housing is as follows:

Please use Torx T15 screwdriver to disassemble and assemble the housing.
The SCU housing is affixed with a product identification label containing the product identification code, including customer information, production date, batch number, serial number, etc.

1.1.3 Processor Specs

Feature	Detail
Micro Control Core	32-bit ST SPC574K72E7
Maximum Frequency	160MHz
Flash	2624K
RAM	208K
Float Point Capability	Yes

1.1.4 Recommended Software

Controller	EV2274AKAH
Main Chip	ST SPC574K72E7
Integrated Development Environment	HighTec PowerPC Tool Chain
EcoCoder Version	EcoCoder-v2.9.12 R7 or newer
EcoFlash Version	EcoFlash-v1.1.6.7 or newer
EcoCAL Version	EcoCAL-V2.1.8.3 or newer

1.1.5 Power Supply

The EV2274KAH requires four continuous power supplies (PIN1, PIN3, PIN116, PIN119). VCU power-on is controller via a KEYON switch (PIN59).
A 5A fuse in series with PIN1 and PIN3, and a 5A fuse in series with PIN116 and PIN119 are recommended for EV2274KAH power supply.

1.1.6 Description of Bootloader

The EV2274KAH bootloader supports the CCP protocol by factory default.

Chapter 2 Technical Performance

2.1 Electrical Characteristic Parameters

Characteristic	Design Specification
Operating Voltage	DC 12/24V (9~32V)
Operating Temperature	-40~85 °C
Operating Humidity	0~95%, no condensation
Storage Temperature	-40~85 °C
Quiescent Current	<3mA
Rated Power Consumption	3W (not including load power)
Protection Level	IP67
Weight	⩽600g
Dimensions	207×149×41mm
Housing Material	Die-cast Aluminum
Housing Characteristics	Equipped with waterproof ventilation valve, good heat dissipation

2.2 Electrical Performance Test Standards

Item	Test Standard
DC Supply Voltage	ISO 16750-2
Overvoltage (12V, high temperature)	ISO 16750-2
Supply Voltage Ramp Down and Ramp Up	ISO 16750-2
AC Voltage Superposition Test	ISO 16750-2
Reverse Voltage	ISO 16750-2
Low Voltage Reset Feature	ISO 16750-2
Low Voltage Startup Feature	ISO 16750-2
Open Circuit Experiment - Single-Line Interruption	ISO 16750-2
Open Circuit Experiment - Multi-Line Interruption	ISO 16750-2
Short Circuit Protection	ISO 16750-2
Withstand Voltage	ISO 16750-2
Insulation Resistance	ISO 16750-2

2.3 Environmental Test Standards

Item	Test Standard
Waterproof (IP67)	IEC/EN 60529
Dustproof (IP67)	ISO 20653
Salt Spray Leak Function and Corrosion Test	ISO 16750-4
Mechanical Vibration Shock Test	ISO 16750-3
Vibration Test	ISO 16750-3
Drop Test	ISO 16750-3
Temperature Shock	ISO 16750-4
Electrical Operation at Cycling Ambient Temperatures	ISO 16750-4
High and Low Temperature Operation Experiment	ISO 16750-4
High and Low Temperature Experiment	ISO 16750-4
Temperature and Humidity Cycle	IEC 60068-2-30
Constant Temperature and Humidity	ISO 16750-4

2.4 EMC Test Standards

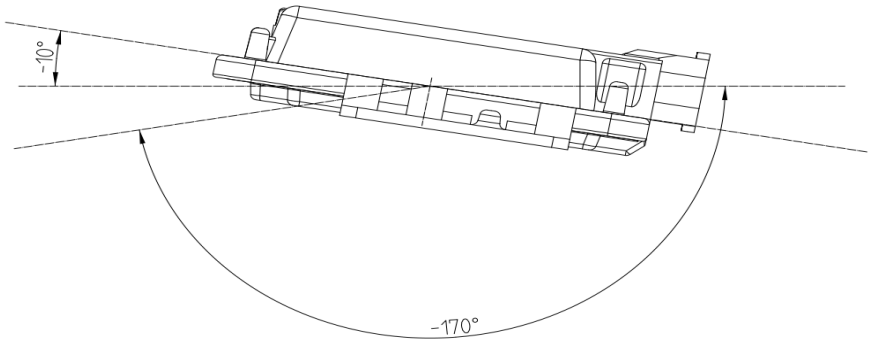
Item	Test Standard
Transient Conducted Emission	ISO 7637-2
Conducted Emission Experiment CE-V	CISPR25
Conducted Emission Experiment CE-C	CISPR25
Radiation Emission Experiment RE-ALSE Method	CISPR25
Radiation Immunity Test (I/O)-ICC Method	ISO 7637-3
Radiated Immunity Test BCI-substitution Method	ISO 11452-4
Radiation Immunity Experiment RI	ISO 11452-2
Low Frequency Magnetic Field Immunity	ISO 11452-8
Electrostatic Discharge (ESD)	GMW3097

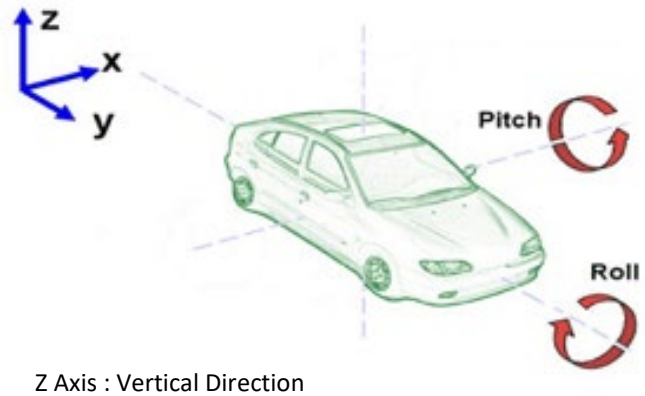
Chapter 3 Installation Requirements

It is recommended to install the VCU in the cabin. If the vehicle manufacturer wants to install the VCU at another location, the alternative installation location should be evaluated by Ecotron's engineers and the vehicle manufacturer's engineers.

The precautions for VCU installation are as follows:

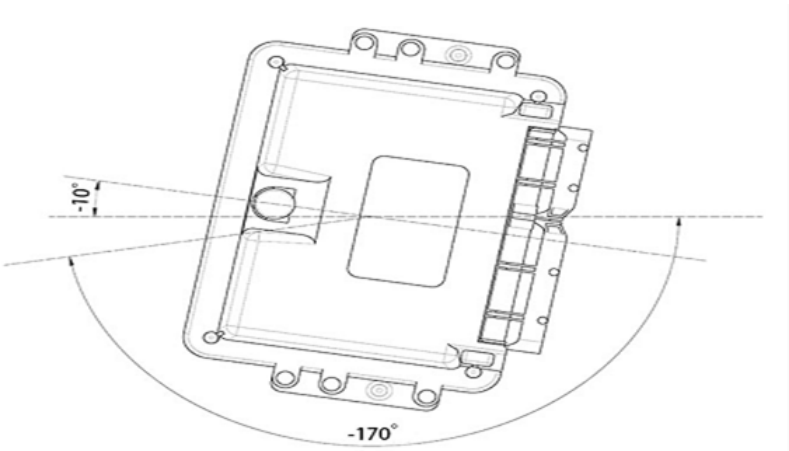
1. The VCU and wiring harness installation should be firm and reliable, and there should be no looseness. Avoid supporting the wiring harness by VCU. At the same time, the arrangement of the VCU wiring harness should prevent and protect all wires in the wiring harness from damage due to wear and to overheat.
2. Avoid installing the VCU in places where dust is likely to gather. A large amount of dust accumulation will affect the reliability of the VCU.
3. Avoid installing the VCU in locations where the temperature of the housing itself may exceed 85°C. It should also not be installed in a location where the surrounding components transfer heat onto the VCU.
4. Avoid installing the VCU in locations where oil, moisture, and water droplets are likely to splash on it.
5. Avoid the possibility of additional mechanical shock and external impact due to the installation position and fixing method of the VCU and avoid installing the VCU at the resonance point of the car body.
6. Avoid installing the VCU where it may come into contact with the battery or other parts that are prone to seepage of acid and alkaline solutions and near the VCU power terminal.
7. Avoid installing the VCU near the positive terminal of the battery and the ignition power supply terminal where it might make contact.
8. VCU should be installed in the horizontal and vertical position according to the connector downwards and maintain a certain angle to prevent water from entering the connector. In the horizontal direction, the recommended installation angle is -170° to -10°, as shown in Figure 13 below. In the vertical direction, the recommended installation angle is -170°~ -10°, as shown in Figure 14 below.





Z Axis : Vertical Direction

X Y Axes : Horizontal Direction



Ecotron recommends using the six mounting holes on the VCU for installation. It is recommended to use metal materials such as aluminum alloys for the mounting bracket. The housing should have a reliable electrical connection with the vehicle body through the bracket. If other materials are used, the customer must ensure that they can meet the requirements of VCU for vibration, heat dissipation, temperature, EMC, etc. If there is any deviation, it needs to be confirmed with Ecotron.

The VCU connects to ground through the vehicle's body. The specific requirement is to directly connect the ground wire in the wiring harness to the vehicle's body and ensure reliable electrical connections.

9. Mechanical installation recommendations: (The user can modify depending on the vehicle)
    1. Recommended specification for installation bolts: M6 nut and bolt, bolt length of approximately 25mm.
    2. Recommended tightening torque for installation: 7 Nm.
    3. Recommended size and parameters for additional anti-vibration pads: inner diameter 6mm, outer diameter 20mm, thickness 15mm.