ET82367A

Datasheet

V1.1

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Revision History

Modified Date	Version	Description
Feb, 2025	V1.0	Initial release
Apr, 2025	V1.1	Modified 2.2.11 EEPROM rate to 550 kHz. Modified Figure 2 appearance diagram.

Contact Us:

Web: http://www.ecotron.ai
Email: info@ecotron.ai
support@ecotron.ai

Address: 2942 Columbia Street
Torrance, CA 90503
United States

Tel: +1 562-758-3039
+1 562-713-1105

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1. System Description

TCU (Transmission Control Unit) – An Integrated Controller Combining VCU (Vehicle Control Unit) and TCU (Transmission Control Unit)

The TCU is a core power domain controller designed for next generation centralized Electrical/Electronic Architecture (EEA). By deeply integrating the vehicle-level control and energy management functions of the VCU with the transmission control capabilities of the TCU, the TCU enables efficient, coordinated powertrain control, thereby enhancing vehicle dynamics, energy efficiency, and reliability.

The TCU supports integrated control of the powertrain, coordinated torque management and intelligent shifting, energy management and optimization, vehicle mode management, thermal management, and accessory control. It also supports connectivity and intelligence features, enabling remote OTA updates, remote diagnostics, and vehicle operations management via telematics box. Additionally, it can function as an intelligent driving controller or a gateway.

By combining hardware integration with software fusion, the TCU addresses the three main challenges of traditional separate VCU and TCU setups: high latency, high cost, and poor coordination. It also extends capabilities in connectivity and intelligence, making it particularly suitable for power domain innovation in new energy vehicles and intelligent connected vehicles.

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1.1 Functionality

ET82367A mainly has the following functions:

Table 1. ET82367A Features

Function
1 Key Signal Input (KEYON) 1 Hardwired Wake-up Signal (Start) 1 System Power Supply Input (SYS_BATT) 1 High-side Power Supply Input (HS_BATT) 4 H-Bridge Power Supplies (BATT1) 7 Channels of 5V Voltage Output 1 Channel of 12V Voltage Output **6 CAN Communication Interfaces** (supports CAN FD, supports CAN-based flashing); 2 of which support specific frame/any frame wake-up **1 LIN Communication Interface**, master mode only **18 Analog Signal Inputs**: 14 channels for 0–5V voltage input, 4 channels for 0–5V resistance input; 4 of these support PT1000 sensor input **22 Digital Signal Inputs**: 11 active-high inputs, 11 active-low inputs **6 Frequency Signal Inputs**, compatible with voltage-type wheel speed sensors **18 High-side Driver Outputs**, 10 of which are multiplexed as OPWM outputs **10 Low-side Driver Outputs**, 4 of which are multiplexed as OPWM outputs 4 H-Bridge Outputs: rated 20A, peak 50A (duration ≤ 2s) Built-in Six-Axis Gyroscope Hardware watchdog

1.2 Mechanical

The TCU Housing is made of aluminum die-casting and assembled with silicone seal. There is no special treatment or coating on the outside of the shell, and there are no sharp burs or sharp edges.

The nominal dimensions of the TCU housing are as follows (excluding the female end of the TCU connector, in mm):

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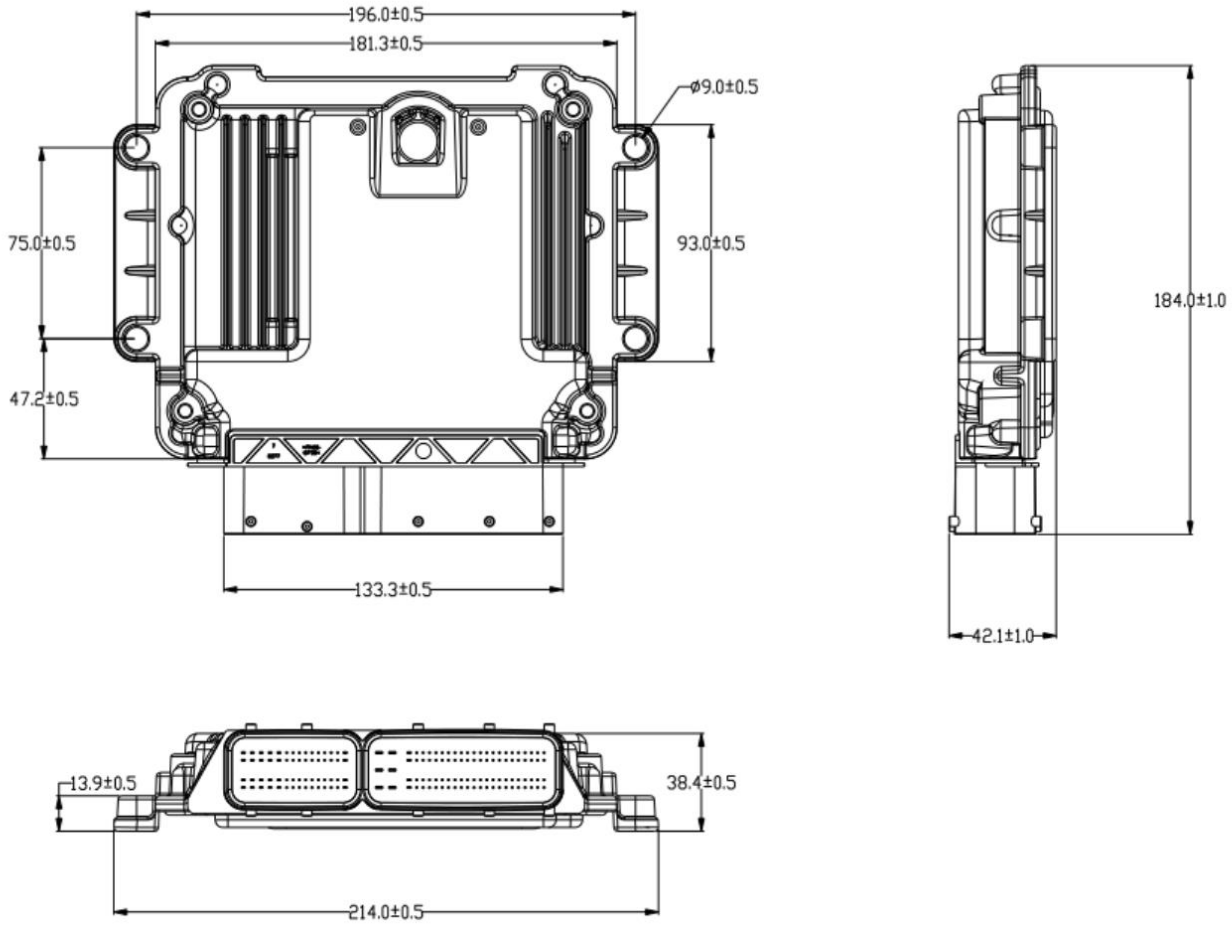

Figure 1 TCU Housing Dimensions

The appearance of the housing is as follows:

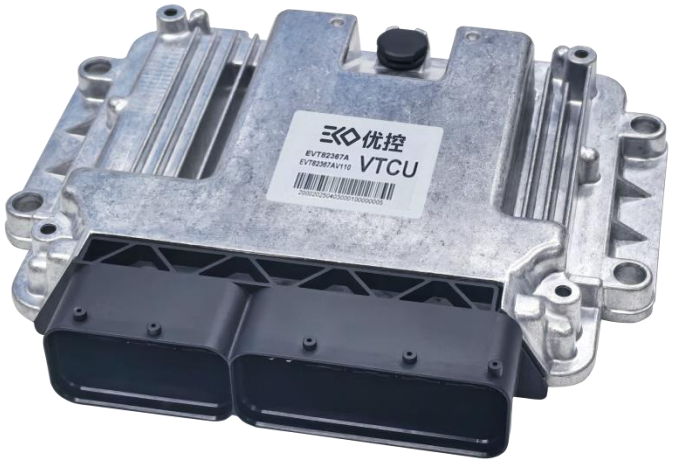

Figure 2 TCU Housing Appearance

Please use Torx T15 screwdriver to disassemble and assemble the housing.

The TCU housing is affixed with a product identification label containing the product identification code, including customer information, production date, batch number, serial number, etc.

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The plug-in connector is shown in the figure below:

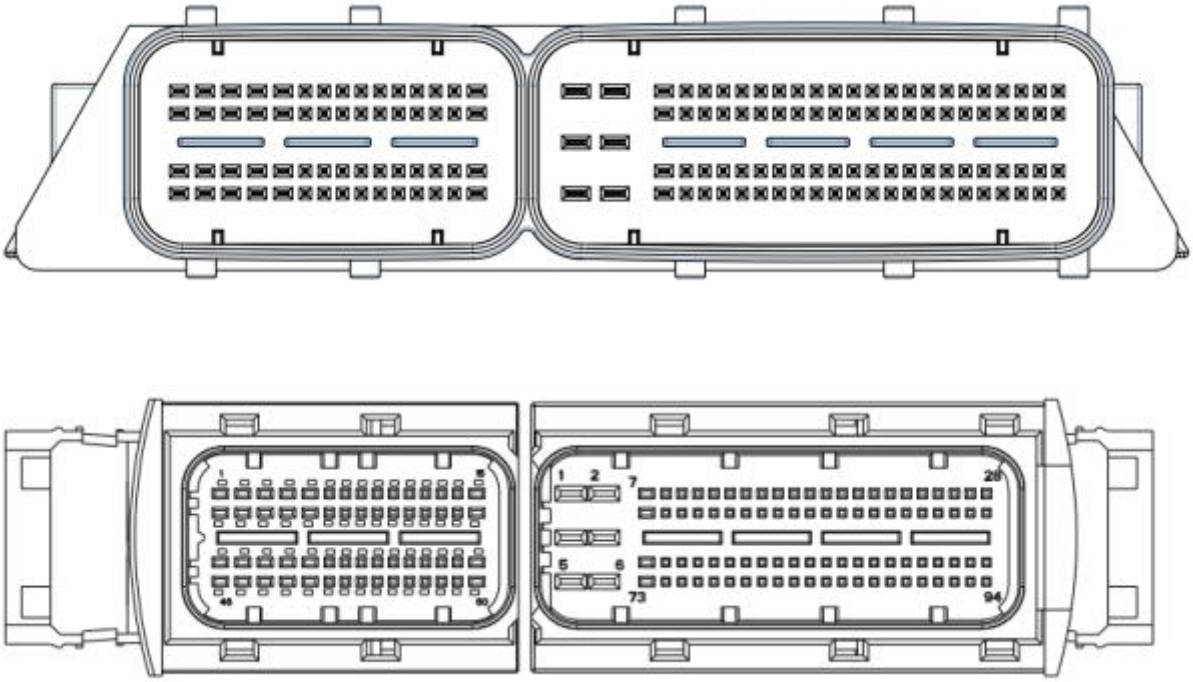

Figure 3 Connector and Pinout Diagram

1.3 Connectors

1.4 Tech Specs

Table 2 Chip Resources

Feature	**Detail**
Micro Control Core	32-bit Infineon TC367
System Basis Core (SBC)	TLF35584
Maximum Frequency	300MHz
Flash	4M
EEPROM	64K
SRAM	672K
Floating Point Capability	Yes

1.5 Recommended Software Tools

Controller Model	EVT82367A

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Main chip	Infineon TC367TP
Integrated Development Environment	HighTec Tricore Tool Chain
EcoCoder Version	EcoCoder-v2.9.15 R2 or above
EcoFlash Version	EcoFlash-v1.1.8.8 or above
EcoCAL Version	EcoCAL-V2.1.8.10 or above

1.6 Factory Configuration

The ET82367A bootloader supports the UDS protocol by default.

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3. Technical Performance

3.1 Electrical Characteristics Parameters

Characteristic	Design Specification
Operating voltage	DC 12V/24V (9~32V)
Operating temperature	-40 ℃ ~85 ℃
Operating humidity	0~95%, no condensation
Storage temperature	-40 ℃ ~85 ℃
Quiescent Current	≤3 mA
Rated power consumption	3W (excluding load power)
Protection level	IP67
Weight	≤ 550g
Dimensions	207 × 203 × 38 mm
Material	Die-cast aluminum
Housing Characteristics	Equipped with waterproof breathable valve, good heat dissipation

3.2 Electrical Performance Test Standards

Item	Test Standard
Overvoltage (high temperature)	ISO 16750-2
Jump voltage	ISO 16750-2
AC voltage superposition test	ISO 16750-2
Supply voltage ramp down and ramp up	ISO 16750-2
The supply voltage drops momentarily	ISO 16750-2
Reset performance for voltage sag	ISO 16750-2
Startup Features	ISO 16750-2
Reverse voltage	ISO 16750-2
Reference Ground and Supply Offsets	ISO 16750-2
Open circuit experiment-single line open circuit	ISO 16750-2

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Open circuit experiment-multi-line open circuit	ISO 16750-2
Short circuit protection	ISO 16750-2
Withstand voltage	ISO 16750-2
Insulation resistance	ISO 16750-2

3.3 Environmental Test Standards

Item	Test Standard
Waterproof (IP67)	IEC/EN 60529
Dustproof (IP67)	ISO 20653
Salt spray leakage function and	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 cyclic ambient	ISO 16750-4
High and low temperature operation	ISO 16750-4
High and low temperature	ISO 16750-4
Temperature and humidity cycle	IEC 60068-2-30
Constant temperature and humidity	ISO 16750-4

3.4 EMC Test Standards

Item	Test Standard
Transient Conducted Emissions	ISO7637-2
Conducted emission test CE-V	CISPR25
Conducted emission test CE-C	CISPR25

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Radiated emission experiment RE-ALSE method	CISPR25
Radiated immunity test (I/O) - ICC method	ISO7637-3
Radiated Immunity Test BCI-Substitution Method	ISO11452-4
Radiated immunity test RI	ISO11452-2
Low frequency magnetic field immunity	ISO11452-8
Electrostatic Discharge (ESD)	GMW3097

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4. Installation Requirements

It is recommended to install the TCU in the cockpit. If the OEM wants to assemble the VCU in another location, Ecotron's engineers and the OEM's engineers should evaluate the corresponding installation location together. Precautions for TCU installation are as follows:

1) The installation of TCU and harness shall be firm and reliable without looseness, and please avoid supporting the harness through VCU. At the same time, the layout of TCU harness shall prevent and protect all wires in the harness from damage due to wear and overheating.

2) Try to avoid installing it in the place where dust is easy to gather. A large amount of dust accumulation will affect the reliability of TCU work.

3) It shall be kept away from the position where the temperature of its shell may exceed 85 ° C as far as possible, and the heat released by surrounding parts shall be prevented from radiating to VCU.

4) Avoid installing TCU in places where oil, moisture and water droplets are easy to splash.

5) Avoid the possibility of additional mechanical vibration and external force impact due to the installation position and fixing method of TCU and avoid installing TCU at the resonance point of vehicle body.

6) Avoid installing the TCU near the parts that may contact the battery or other acid-base solutions that are easy to seep out, and the places where the TCU is easy to be corroded.

7) Avoid installing the TCU near the positive terminal of the battery and the terminal of the ignition power supply.

8) The TCU shall be installed at a certain angle to avoid the inflow of water from the connector. In the horizontal direction, the recommended installation angle is - 170 ° to - 10 °. In the vertical direction, the recommended installation angle is - 170 ° ~ - 10 °. As shown in the figure below.

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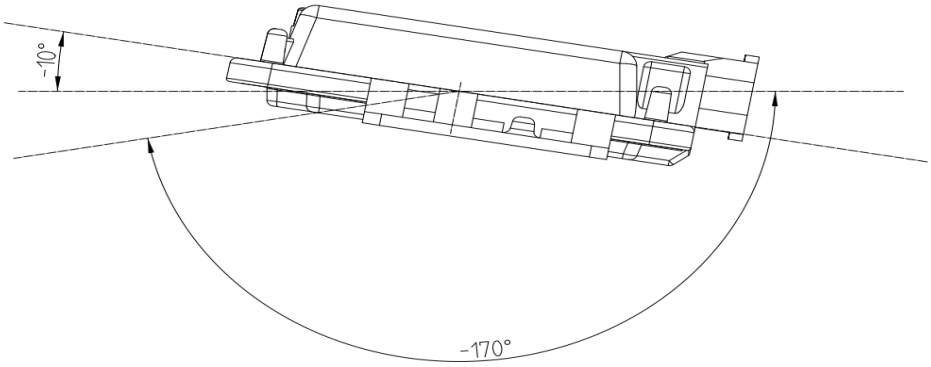
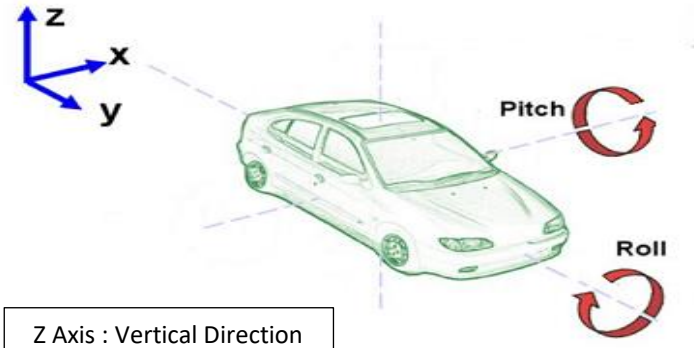


Figure 13 Horizontal Installation Angle



Z Axis : Vertical Direction
X Y Axes : Horizontal Direction

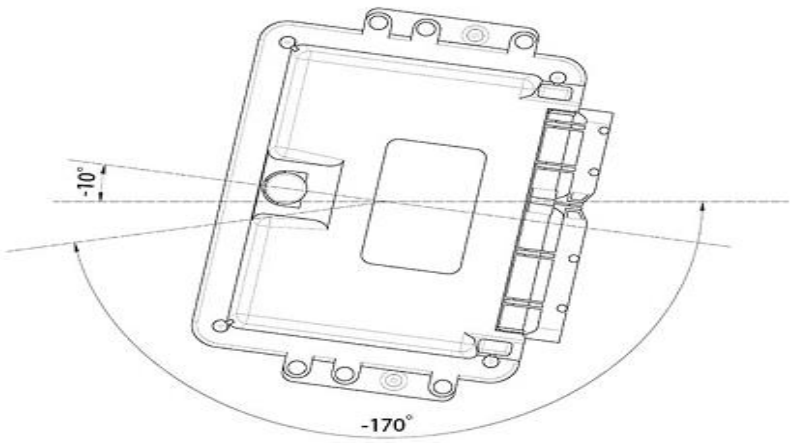


Figure 14 Vertical Installation Angle

ECOTRON recommends using the four mounting holes on the TCU for installation. It is recommended to use metal materials such as aluminum alloy 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

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customer must ensure that they can meet the requirements of TCU for vibration, heat dissipation, temperature, EMC, etc. If there is any deviation, it needs to be confirmed with ECOTRON.

The TCU system connects to the 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.

Mechanical Installation Recommendations: (Users can modify according to their vehicle requirements)

Recommended screw specifications for installation: M6 nut, M6*25 screw.

Recommended tightening torque: 7 N·m.

Recommended dimensions and parameters for additional vibration-damping pads: inner diameter 6mm, outer diameter 20mm, thickness 15mm.

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