ES1274A
Datasheet

V 3.6

Revision History

Date	Version	Note
Jul. 2018	V1.0	Initial version
Nov. 2019	V1.8	Updated Section 4.7 Bootloader Reset
May 11, 2020	V1.9	Updated contact info
Jun. 2020	V2.0	Updated connector info
Jun. 2020	V2.1	Updated frequency input info
Oct. 2020	V2.2	Updated part no. of connector parts
Oct. 2020	V2.3	Updated LSO and HSO diagnostic functions
Nov. 2020	V2.4	Updated pinout table, DTC functions
Feb. 2020	V2.5	Updated connector pin label image
Mar. 2021	V2.6	Updated temperature
Feb. 2020	V2.7	Revision
Feb. 2022	V2.9	Updated the descriptions related to the use of EcoCoder in some chapters: added Bootloader default factory instructions: added CAN channel flashing function descriptions
Oct. 2023	V3.0	1.1.5 Added the corresponding compiler model for the controller chip
Dec. 2023	V3.1	1.1.2 Mechanical drawing: Corrected the casing size tolerance
Mar. 2024	V3.2	2.1 Added 'not supported for diagnostics' in the remarks for the high and low-side output pins that could be reused as OPWM function pins Pin Definitions 2.2.5, 2.2.6 Removed the content 'All channels have fault diagnosis function' from the descriptions of high-side in 2.2.6 and low-side in 2.2.5 drive functions; removed LSO1, LSO2, HSO3, HSO4 from the fault diagnosis tables for high-side and low-side drive 1.1.2 updated mechanical casing dimensions

May 2024	V3.3	3.1 Changed the static current of the electrical characteristic parameters from <1mA to ≤3mA
Jun. 2024	V3.4	2.1 Modified the pin definitions of the High-side output HSO01 and HSO02 to be rated at 3A, peak 4.5A; HSO03 and HSO04 to be rated at 0.8A, peak 1A; LSO01 to LSO08 peak 1A Added 9) Mechanical installation recommendations to the installation requirements
Jul. 2024	V3.5	Added the remark 'Only supports host mode' for LIN
Nov. 2024	V3.6	2.1 Added the remark 'Has a 15k pull-up resistor to the power supply, provides voltage output when VCU is in sleep mode, no load-driving capability' for LSO09 and LSO10 in Pin Definitions.

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Chapter 1 System Introduction

1.1 SCU Introduction

SCU (Supervisory Control Unit) is the auxiliary power controller of electrical/hybrid vehicles. The SCU is an additional energy storage component installed on the vehicle to increase the mileage of the series hybrid electric vehicle.

The SCU receives the input information fed back by the engine ECU, generator MCU and the SCU (such as engine speed, generator torque, requested power, etc.) to judge the vehicle's operating conditions. According to the MAP efficiency diagram of the engine and generator, the SCU selects the best operating point of them to achieve the maximum efficiency and meet the product design requirements.

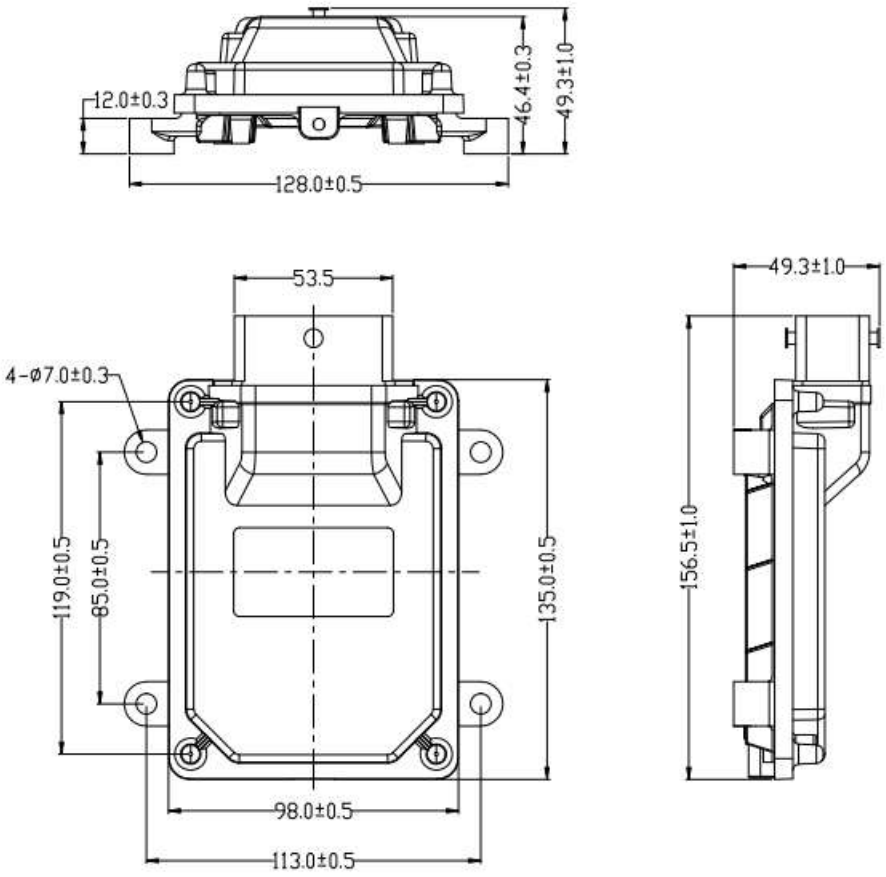
1.1.1 Functions

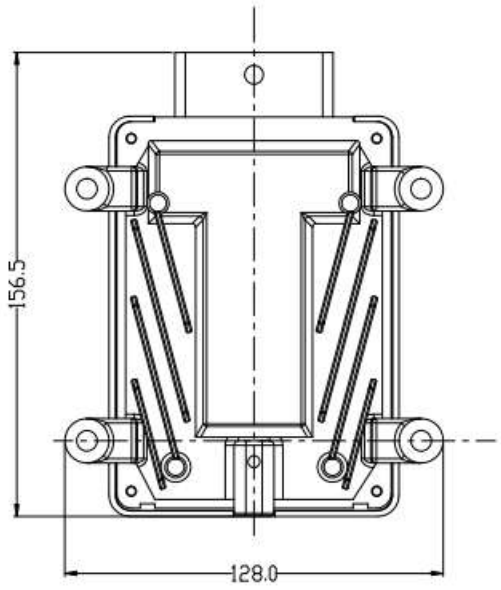
ES1274A has the following functions:

Functions
1 – key signal (KEYON) 4 – supply voltage (BATT) 2 – 5V output 3 – CAN communication interface: supports CAN flashing and CANA arbitrary frame wake-up 1 – LIN communication interface: supports wake-up, only supports host-mode 10 – digital signal input: 5 Active-high, 5 Active-low 8 – analog signal input: 3 – channels 0~5V voltage type input 2 – channels 0~5V resistive input 3 – channels 0~32V input 2 – frequency signal input 4 – high-side driver control output: 2 can be configured as PWM output 10 – low-side driver control output: 2 can be configured as PWM output Hardware watchdog

1.1.2 Mechanical Specifications

The housing of the SCU 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 SCU are as follows in mm (excluding the female end of the SCU connector):





The appearance of the housing is as follows:

Please use a Torx inner hexagon 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 Connectors

Ecotron SCU, shown below, uses automotive grade connectors, which meet the automotive safety requirements. Customers can contact Ecotron to purchase them.

The connector diagram is as follows:

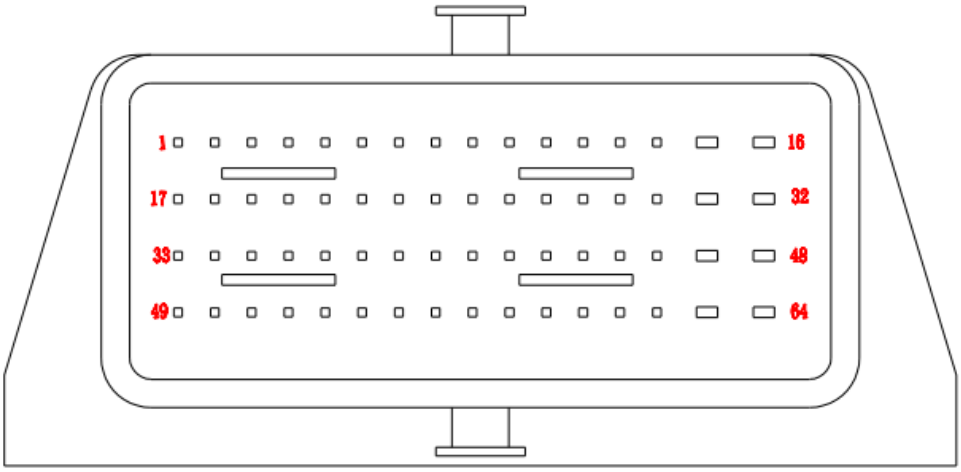


Figure: Pin ID Diagram

No.	Name	Type	Supplier
1	PCB Header	F932300	Aptiv (formerly Delphi)
2	Large Terminal	PPI0001484	Aptiv (formerly Delphi)
3	Small Terminal	PPI0000489	Aptiv (formerly Delphi)
4	64P Connector	PPI0001501	Aptiv (formerly Delphi)
5	64P Connector Protector	PPI0001526	Aptiv (formerly Delphi)

1.1.4 Chip Resources

Feature	Detail
Micro Control Core	32-bit NXP SPC5744P
Maximum Frequency	200MHz
Flash	2.5M
SRAM	384K
SPI Serial EEPROM	64K
Float Point Capability	Yes
SBC Microprocessor	MC33CFS6500

1.1.5 Recommended Tools & Software

Controller	ES1274A

Main Chip	NXP SPC5744P
Integrated Development Environment	S32DS_Power_Win32_v2017.R1_b171019
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

1.1.6 Power Supply

The ES1274A requires four continuous power supplies (PIN10, PIN11, PIN26, PIN27) to power on the SCU via a key switch (PIN18).

A 5A fuse in series with PIN10 and PIN11, and a 5A fuse in series with PIN26 and PIN27 are recommended for ES1274A power supply.

1.1.7 Description of Bootloader

The ES1274A 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	≤350g
Dimensions	157×128×49mm
Housing Material	Die-cast Aluminum
Housing Characteristics	Equipped with waterproof and ventilated 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

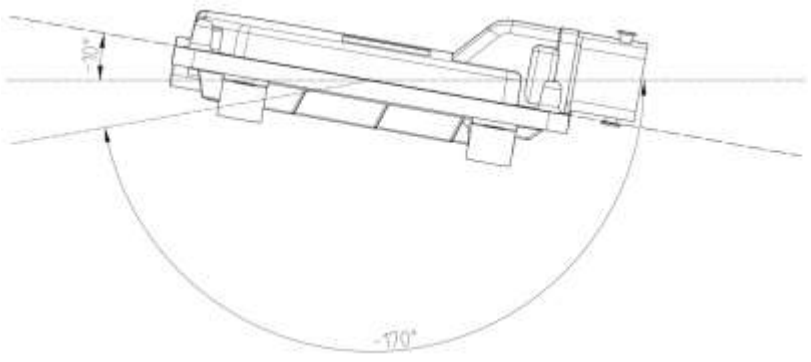
Item	Test Standard
Transient Conducted Emission	ISO 7637-2
Conducted Emission Experiment CE-V	CISPR25
Conducted Emission Experiment CE-C	CISPR25
Radiation Emission Experiment RE-ALSE Method	CISPR25
Radiation Immunity Test (I/O)-ICC Method	ISO 7637-3
Radiated Immunity Test BCI-substitution Method	ISO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

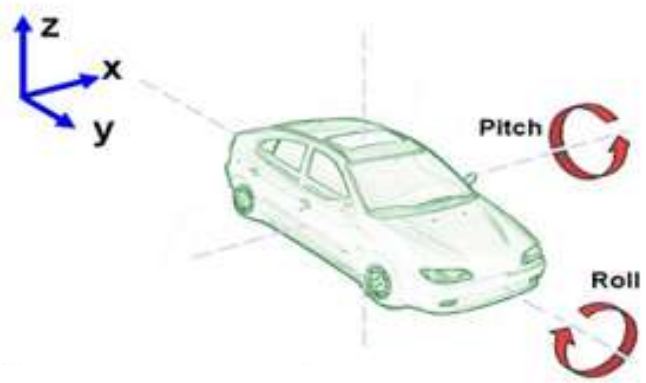
Chapter 3 Installation Requirements

It is recommended to install the SCU 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.

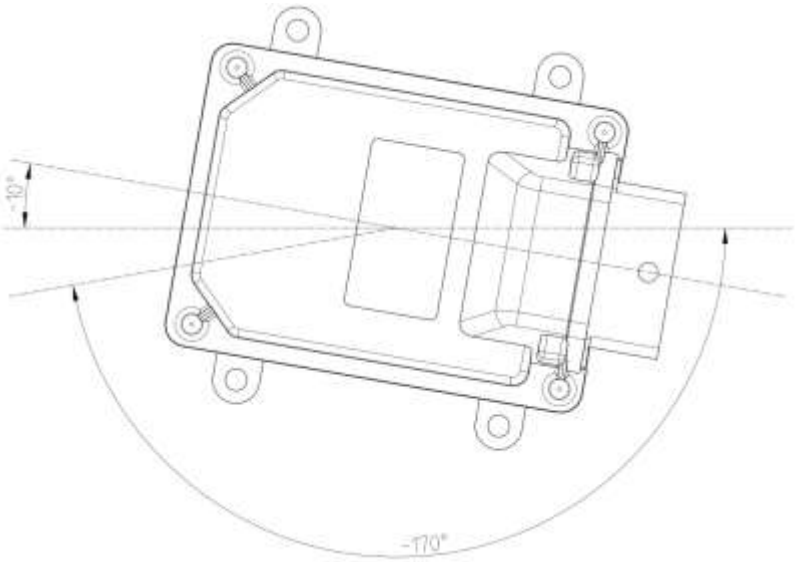
The precautions for SCU installation are as follows:

1. The SCU and wiring harness installation should be firm and reliable, and there should be no looseness. Avoid supporting the wiring harness by SCU. At the same time, the arrangement of the SCU wiring harness should prevent and protect all wires in the wiring harness from damage due to wear and to overheat.
2. Avoid installing the SCU in places where dust is likely to gather. A large amount of dust accumulation will affect the reliability of the SCU.
3. Avoid installing the SCU 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 SCU.
4. Avoid installing the SCU 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 SCU and avoid installing the SCU at the resonance point of the car body.
6. Avoid installing the SCU 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 SCU power terminal.
7. Avoid installing the SCU near the positive terminal of the battery and the ignition power supply terminal where it might make contact.
8. SCU 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 the figure 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.