



Class 1

ISO 9001 CERTIFIED

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SUITABLE FOR EXTERNAL DISTRIBUTION

TECHNICAL PRODUCT DATASHEET

ES-Key Climate Control Module

P/N 610-00029




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					BY	GMC

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1. Revision Log

Rev	Date	Changes
1.00	8-23-2006	Initial requirements
1.10	10-11-2013	Updated datasheet to reflect new hardware with three fan outputs
1.20	04-03-2014	Changed datasheet to reflect part number change from 114942 to 610-00029 for hardware with three fans
1.30	01-05-2015	Added section 4 for legacy replacement setup

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2. Module Overview

2.1. Scope

The ES-Key™ Climate Control Module (C1 p/n 610-00029) is an ES-Key node that controls a vehicle's air conditioning clutch, heating valve, and fan motor speed with high current digital outputs based upon received J1939 CAN commands from a supported ES-Key control device. The Climate Control Module has dedicated inputs/outputs for two analog temperature sensors (C1 p/n 108121) to determine internal and external vehicle temperatures.

The Climate Control Module has two modes of operation: automatic and manual.

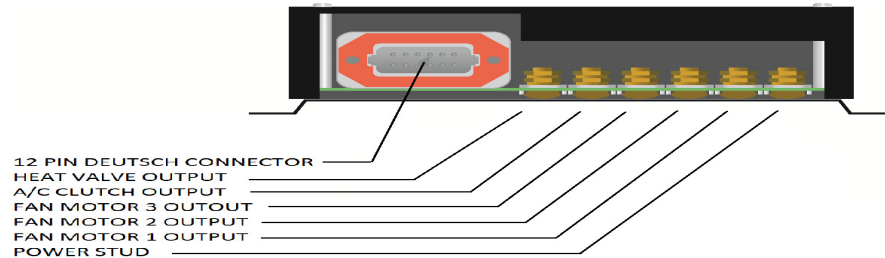


Figure 1. *Parts identification.*

2.2. Heat valve control output

The heat valve control output is a high current (25 Amps) positive polarity digital output used to activate the vehicle's heating system when applicable. This output is fully protected against shorts to ground and current overloads. The physical output is a #10 stud configured for ring terminal installation (16ga wire recommended).

2.3. Air conditioning clutch output

The air conditioning clutch output is a high current (25 Amps) positive polarity digital output used to activate the vehicle's A/C clutch when applicable. This output is fully protected against shorts to ground and current overloads. The physical output is a #10 stud configured for ring terminal installation (16ga wire recommended).

2.4. Fan motor speed output


The 3 fan motor speed outputs are a high current (25 Amps) positive polarity digital Pulse Width Modulated (PWM) output used to drive the vehicle's blower fan at variables speeds. This output is fully protected against shorts to ground and current overloads. The physical output is a #10 stud configured for ring terminal installation (14ga wire recommended).

2.5. Temperature sensor inputs/outputs

The Climate Control Module utilizes two Class 1 temperature sensors (C1 p/n 108121) to determine the external and internal vehicle temperatures. The Climate Control Module's embedded firmware adjusts the fan speed and heat/cool operation based on the internal temperature detected while in the automatic mode of operation. The external temperature data is transmitted to supported ES-Key modules for display purposes.

2.6. Main input power stud

Main power for the high current outputs is supplied through this stud (configured for a #10 screw and ring terminal) (8ga wire recommended).

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3. Operation

3.1. Automatic mode

The Climate Control Module receives the desired set temperature from a supported ES-Key control module and evaluates against the detected internal temperature. Software algorithms then set the appropriate fan speed PWM output and heat/cool output to maintain the desired temperature.

3.2. Manual mode

The Climate Control Module strictly uses the commands from a supported ES-Key control module when setting the heat/cool output and fan speed PWM outputs. In manual mode the Climate Control Module does not attempt to maintain a certain temperature.

3.3. Operation Mode Selection

The Climate Control Module can be operated in two modes Standard and Legacy.

3.3.1. Jumper Selection


- Placing the shunt in position 1 on J2 will select Legacy Mode
- Placing the shunt in position 2 on J2 will select Standard Mode
- Placing the shunt in position 1 on J1 will select Legacy address 0x78
- Placing the shunt in position 2 on J1 will select Legacy address 0x79
- Placing the shunt in position 1 on J3 will select the Aux Output selection
- Placing the shunt in position 2 on J3 will select the Aux Input selection



Figure 2. *Jumper Identification.*

3.3.2. Standard Mode

In Standard Mode the device works like a ES-Key I/O module with an address range of 0x40 to 0x4F by selecting the needed address 0-15 from SW1.

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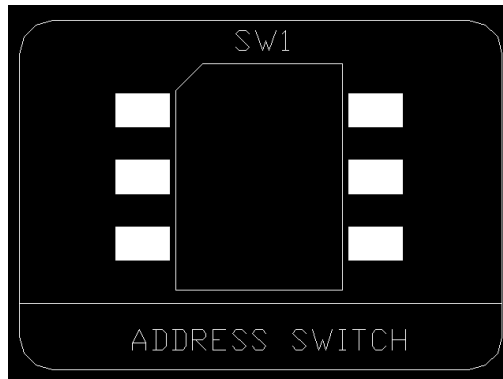


Figure 3. *Address Switch.*

3.3.3. Legacy Mode


In Legacy Mode the device works like a ES-Key I/O module with an address range of 0x78 for address 1 and 0x79 for address 2 (see section 3.3.1).

3.3.4. Auxiliary I/O operation

The Climate Control Module pin 10 can be selected for either a positive digital input or a grounded low current output by selecting J3 (see section 3.3.1).

If the auxiliary function is selected as an input it will be active when the input voltage is more than 70% of what system voltage is and will turn off when it falls below 70% of system voltage.

If the auxiliary function is selected as an output it will turn on from a system CAN message and is rated for .250 amps. (See section 9.1.3 for message information).

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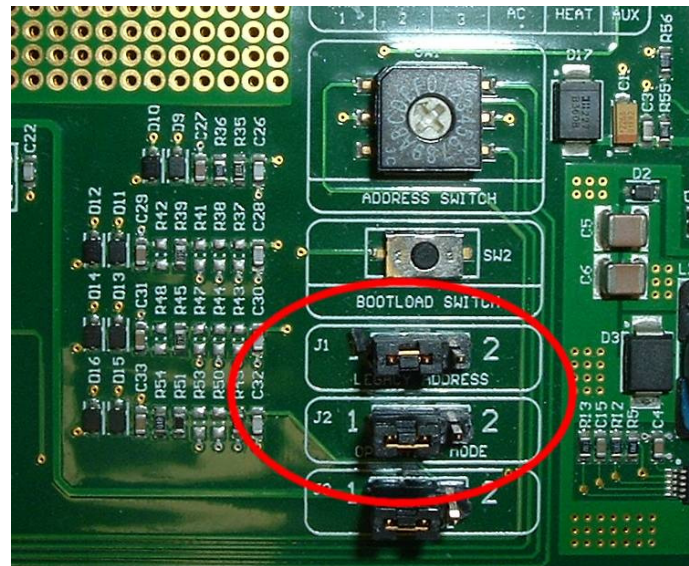
4. Replacing a PN 114942 module in standard ambulance systems


4.1. Systems using either PN 115300/115301 or PN 115491/115727/115492 control panels

Jumper J1 Legacy Address - set to position 1

Jumper J2 Operating Mode - set to position 1

The SW1 Address Switch and Jumper J3 do not have to be set for this application.



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5. System diagram

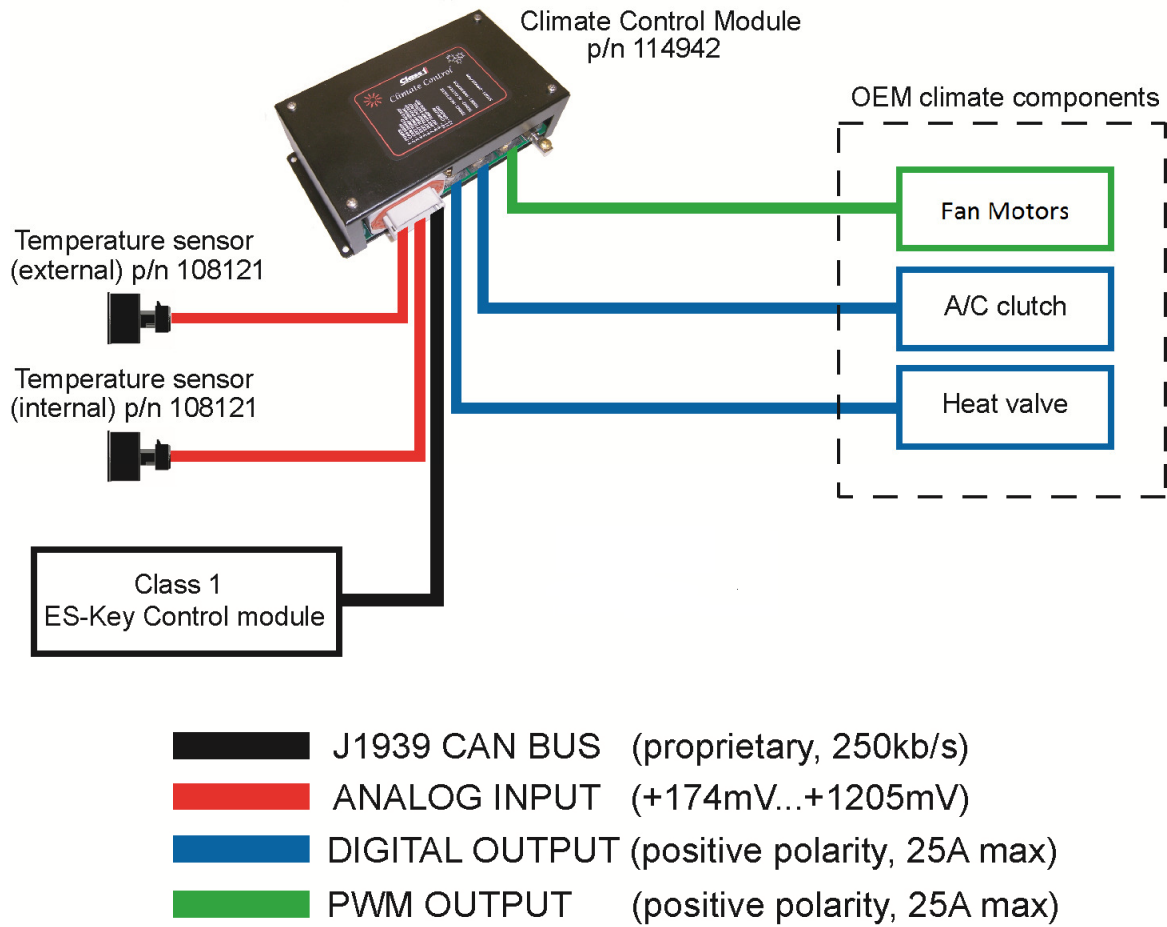



Figure 4. System diagram.

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6. Connector Description

The Climate Control Module has one connector and the following definitions apply:

Mating connector: Deutsch DT06-12SA GRAY		
Mating sockets: 0462-201-16141		
Wedge lock: W12S		Recommended wire gage: 16-18 AWG
PIN	CIRCUIT	DESCRIPTION
1	Supply +	Module supply (+9VDC...+16VDC) [fused 2.5A]
2	CAN High	ES-Key CAN, SAE J1939 Proprietary, 250 kbits/S
3	CAN Shield	ES-Key CAN, SAE J1939 Proprietary, 250 kbits/S
4	Temp Ref (-) EXT	External temperature ground reference
5	Temp Signal EXT	External temperature signal input (+174mV...+1205mV)
6	Temp Ref (+) EXT	External temperature positive reference (+5VDC regulated)
7	Temp Ref (+) INT	Internal temperature positive reference (+5VDC regulated)
8	Temp Signal INT	Internal temperature signal input (+174mV...+1205mV)
9	Temp Ref (-) INT	Internal temperature ground reference
10	AUX I/O	Aux Input or Aux Output
11	CAN Low	ES-Key CAN, SAE J1939 Proprietary, 250 kbits/S
12	Supply -	Module supply (vehicle ground)

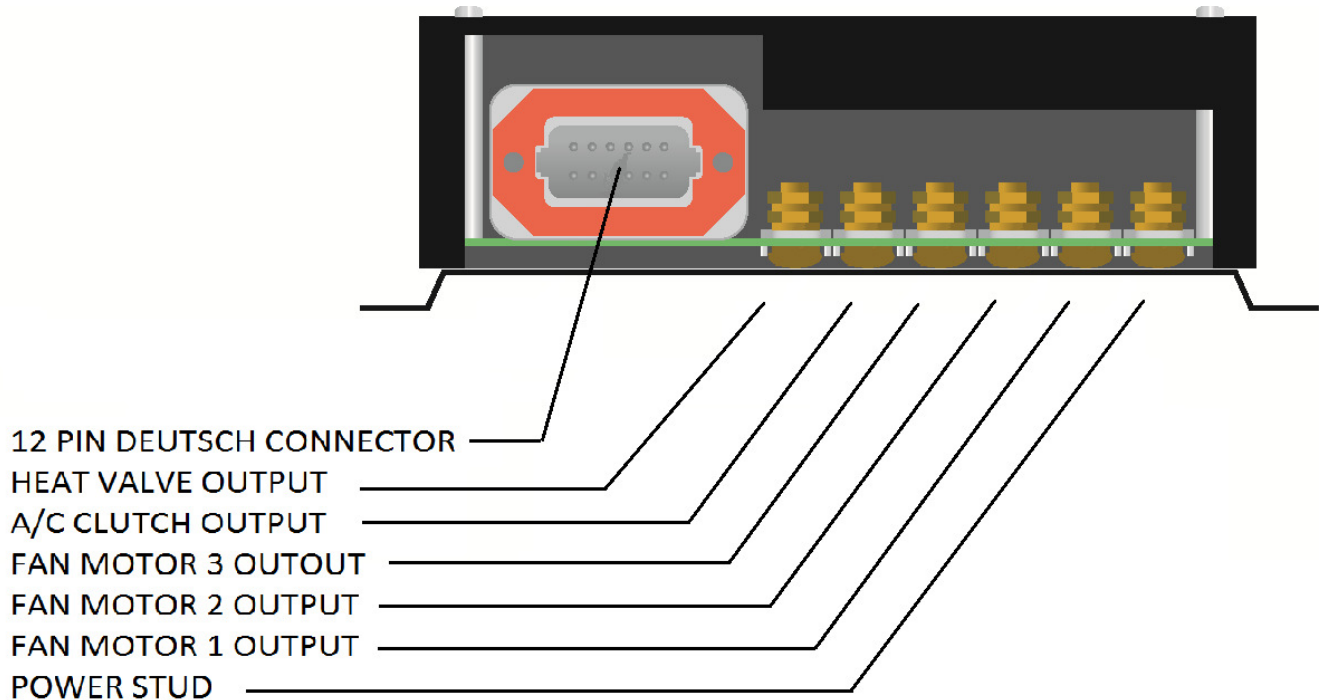



Figure 5. Connector/stud identification.

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7. Diagnostic LEDs

The Climate Control Module has seven diagnostic LEDs located beneath the protective metal enclosure.

LED	COLOR	FUNCTION	STATUS
DRV PWR	yellow	Shows status of the Main Input Power Stud	ON when voltage is present
PWR	yellow	Shows status of the logic supply power (pins 1 & 12)	ON when voltage is present
VCC	red	Shows status of internal voltage (after internal fuse)	ON when voltage is present
COMM	green	Shows the communication status of the module	ON solid = communicating Flashing slow = not communicating Flashing fast = CAN bus error Double flash = CAN bus shorted or Missing terminating resistor
NORM MODE	green	Shows the state of the unit in Normal Operating Mode	ON when mode is active
LGCY MODE	green	Shows the state of the unit in Legacy Operating Mode	ON when mode is active
FAN 1	green	Shows the state of the fan motor 1 output	ON when output is active
FAN 2		Shows the state of the fan motor 2 output	ON when output is active
FAN 3		Shows the state of the fan motor 2 output	ON when output is active
AC	green	Shows the state of the A/C clutch output	ON when output is active
HEAT	green	Shows the state of the heat valve output	ON when output is active
AUX	green	Shows the state of the AUX output	ON when output is active

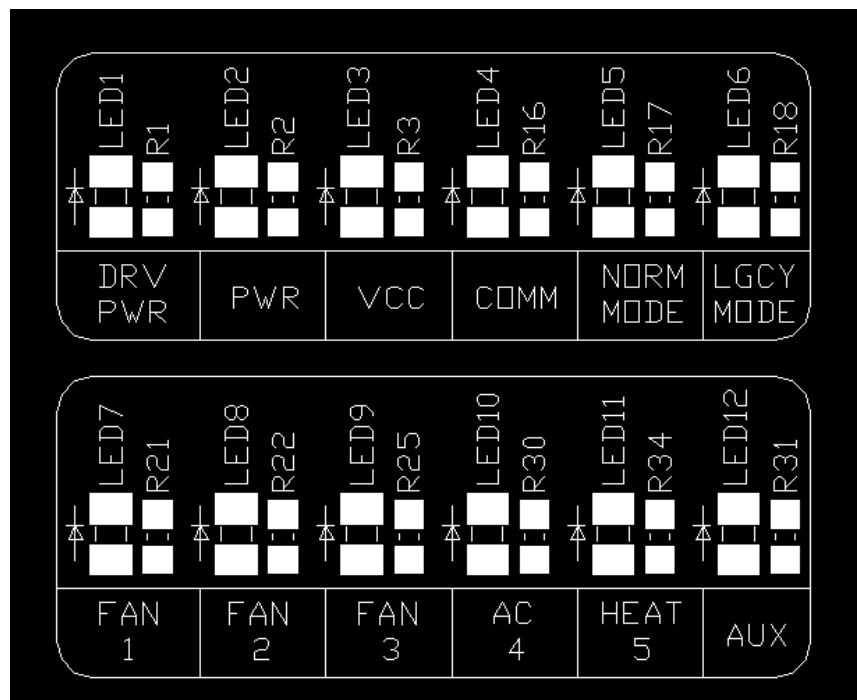



Figure 6. Diagnostic LED identification.

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8. Mounting

The Climate Control Module is mounted with four #8 screws.

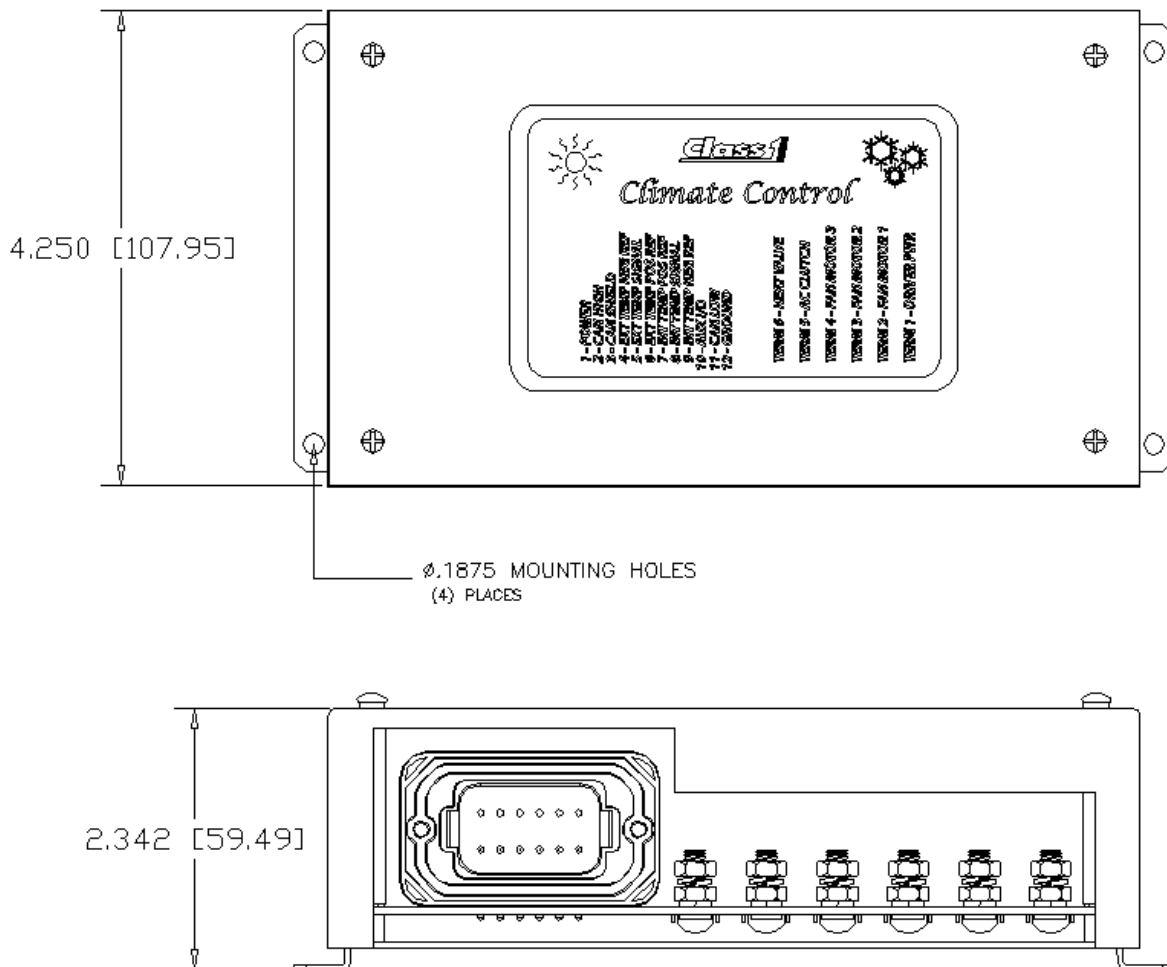



Figure 7. Mounting dimensions – inches [millimeters].

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9. Technical details

Product category	ES-KEY
Voltage range	+9VDC...+16VDC
Power consumption @13.8VDC	Logic supply+ input (pin 1) 72mA
Output power	
Fan motors	25A Max
A/C clutch	15A Max
Heat valve	15A Max
AUX Output	.250 Max
Operational temperature range	-40°C...+85°C
Environmental range	IP 10
CAN specification	SAE J1939 proprietary, 250 Kbits/second
	Internal thermal fuse (750mA on pin 1)
	Reverse voltage protection (pins 1 and 12)
	CAN buses protected to 24V
Protection	ESD voltage protected to SAE J1113 specification for heavy duty trucks (12V)
	Transient voltage protected to SAE J1113 specification for heavy duty trucks (12V)
	Load dump voltage protected to SAE J1113 specification for heavy duty trucks (12V)
	Outputs protected for short circuit and thermal overload
Dimensions (W x L x H) in inches [mm]	7.850 [199.39] x 4.250 [107.95] x 2.35 [59.50]