

E-Bus A/C Controller

Operation Manual



THERMO KING

3E53545H01/3E53545_A

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Overview

NEV-B23 Controller is used for E-Vehicle A/C system, which includes: ventilation, cooling, heating, temperature adjustment, Internal and external circulation switching and LED display interface and so on. It has strong anti-interference ability, concise appearance, and easy operation and so on.

1. Application scope

The control system is developed for E-bus air-conditioner, which includes ECU (Electrical Control Unit) and HMI (Human Machine Interface). ECU and HMI are linked via CAN bus. Unit have many functions such as auto, cooling, heating ,ventilation, auto defrost, fresh air, alarm management and so on, equipped with evaporating fans controlled by PWM with 9 steps, VF compressor, condensing fan controlled by PWM with 2 steps, PTC and LED display.

2. Technical parameters

Nominal voltage:	DC 24V
Working voltage range:	DC18V~DC32V
Setpoint temperature range:	15℃~32℃
Temperature display range:	Return temp.: -20℃~60℃ (resolution: 0.5℃)
Storage Temperature:	-40℃~85℃
Working Temperature:	-40℃~85℃
Relative humidity:	0%~85%
Atmospheric pressure:	86~106Kpa
Temperature sensor numbers:	5

3. Main signal of control system

E-BUS CONTROL SYSTEM	
Power supply	DC24V (18V~32V)
Compressor Enable	Compressor enable signal(spare)
HP&LP Switch	Normal when closed, Fault when open
Compressor temperature protection switch	Normal when closed, Fault when open
DC/DC power input	Check DC/DC voltage of output
Inverter Fault	Normal when closed, Fault when open

4. Control panel instruction

Keyboard and LED display



5. Basic function instruction

Function	Instruction
Unit Start/Stop	Press ON/OFF key  to start the unit when the unit is off. The indicator LED  is displayed when the unit is on. Press the ON/OFF key  to stop the unit when the unit is on. The indicator LED is off and the unit is shut off. Then the unit will run the mode which be recorded in the memory, AUTO mode and fresh air damper state are not recorded. All parameters will be stored in memory after press key .
Mode Selection	When unit is powered on, press operation mode key: AUTO , heating , cooling , the indicator LED will be energized as AUTO , heating , cooling  correspondingly. When unit is under cooling or heating mode, press cooling key or heating key, the system will go to ventilation mode.
Temperature Setup	When unit is powered on, the indicator LED displays return air temperature. Press temperature set key , indicator will show temperature set value. The set value ranges 15~32℃ and changes in steps of 1℃. For any change of set value will be saved after 5s and LED return to return air temperature.
Fan Speed Selection	Press  key to set blower speed on manual mode.
Temperature Display	When unit is powered on, press diagnose key  to enter temperature display mode, temperature value will be displayed on LED. Press key  to select the temperature you want (right-side air supply, left-side air supply, defrost, ambient). When showing the ambient temperature, “OUT”  LED will be ON. If some temperature exceeds the limit, “H” or “L” will display instead of an incorrect value.
AUTO Mode	Press , then  will be lightened and unit will run on AUTO mode. Procedure: 1. If change COOLING mode into AUTO mode, evaporating fan will run automatically. 2. According to the return temperature, controller will decide running mode once AUTO be set. If return temperature is greater than 20℃, the unit will run AUTO COOL mode, or run AUTO HEAT mode. When running AUTO mode, if return temperature sensor fails, system will exit AUTO mode. 3. Set point is fixed to 20℃ and can't be modified by panel in AUTO mode, and set point key is locked.
Alarms	When some alarms are active, after press “AUTO”  key 3 seconds, alarm code will be displayed, after press “AUTO” key again, the system will exit from fault mode.
Cooling/Heating Interlock	If current mode is heating, meanwhile PTC or compressor is running, then “COOLING” key will be locked; If current mode is cooling, and compressor is running, then “Heating” key will be locked.
Manual Defrost	Long press key  for 3s, then after a short beep, manual defrost will be active, if long press key  again, quit defrost.
Compressor Protection	For starting up with load is not allowed, so compressor will be off for at least 3 minutes after shutting off except in defrost status.

6. Alarm

When some alarm are active, LED display can show user alarm code to help them check problems, meanwhile the alarm  led turns to blink. At this moment, long press the key “AUTO” to scan alarm codes, if long press the key “AUTO” again, will go back to main mask. See detailed information in below table.

Table.1: Alarm list

Code	Fault Description	HVAC Action
E01	R1 air supply temperature sensor shortage	Compressor switch off
E02	R1 air supply temperature sensor open	PTC switch off
E21	L1 air supply temperature sensor shortage	Compressor switch off
E22	L1 air supply temperature sensor open	PTC switch off
E41	Return air temperature sensor shortage	Default 25℃
E42	Return air temperature sensor open	
E51	Ambient temperature sensor shortage	<Heating> -5℃
E52	Ambient temperature sensor open	<Cooling> or <Ventilation> 25℃
E61	Defrost temperature sensor shortage	Compressor switch off
E62	Defrost temperature sensor open	
oH1	Supply temperature is more than 55℃ on PTC mode	PTC off (fault unlocked when repowered)
Err	Inverter Fault	Compressor switch off
Erp	Pressure sensor open	Compressor switch off
Eot	Overheat Fault	Compressor switch off
dcH	DC/DC supply power voltage exceed 32V	Cut off all outputs
dcL	DC/DC supply power voltage below 18V	Cut off all outputs
PoH	Battery voltage above 32V	Cut off all outputs
PoL	Battery voltage below 18V	Cut off all outputs
Cn1	ECU CAN Communication fault	Cut off all outputs
Cn2	Bus CAN communication fault	Cut off all outputs
Cn3	Compressor CAN communication fault	Cut off all outputs

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