GOLDAIR®MVC EEV Controller

EEV has been applied in refrigeration industry for a long time, and it is well known that EEV can improve the performance of the refrigerator, however, the EEV should work with pressure sensor and temperature sensor, gather all kinds of running data and combine the complex logic calculation to drive the opening of the valve, own complex control formats, and need many parts, so the application of the EEV is limited.

As professional manufacture of the control system, GOLDAIR has been devoted to the development of the advanced control technique of the refrigerator all along. Starting with the core of the control, we developed the MVC EEV controller to make SEV EEV can be convenient as same as the heat expansion valve.

MVC EEV controller is the one integrating of data collecting, logic calculation, and current-limit drive. Working with EEV, this controller can adapt to the dynamic changes of the environment load and regulate the opening of the valve automatically, so that the refrigerating system runs in the best state. The precision of superheat controller can up to 0.5℃, which owns the functions of manual operation and LED displaying the opening of the valve, you can set different parameters to meet the need of every kind of refrigerant and model.

Features

- Applicable in each series of SEV EEV of GOLDAIR
- LED shows the opening of the valve and alarm signal
- Overheat of cooling and heating can be set separately
- MOP control
- Exhaust temperature control
- Support the flow need of the reversal thaw.
- Function of Pump-collection
- Applicable in the refrigeration occasion with low temperature (evaporation temperature -40℃)
- Have standby battery, closing the valve completely while power is cut off suddenly.
- Software can download on line, flexible and convenient

Functions

The controller controls the overheat and the suction pressure (evaporation/coil temperature). GOLDAIR EEV can offer the better close function than traditional electromagnetism valve, as long as the compressor stops, no refrigerant flows through SEV. While the EEV needs the cool capacity and the compressor is starting, the EEV automatically accepts the signal feedback from the controller. Under different running conditions, the controller can exactly control the opening of the EEV via PID to control the flow of refrigerator.

1、MOP control

When the load of the evaporator is higher than the cooling capacity it may reach, the controller can automatically check out and reduce the flow of refrigerant to make the evaporation pressure limited in some range.

2、Overheat control

According to the data measured by pressure sensor and temperature sensor, the controller automatically calculates the fact degree of superheat and compares it with the one set in advance, adopts the increment blur logic output, and sends different statement to EEV so that the controller keeps on the degree of superheat expected under different running states.

(For example, the controller of heat pump unit needs a digital signal input both of cooling and heating)

3、Complete close

The controller can close the EEV completely at any time even if the power is off.

When the compressor stops, the controller automatically closes the EEV according to the inner program.

When the exterior power is cut off, the controller will automatically connect to the standby battery to close the EEV completely.

(The controller needs a digital signal input both of on and off, generally it uses the digital signal of the refrigerating water pump)

4、Manual operation

You can regulate the opening of the valve via buttons, which can provide the works like pumping vacuum, filling Freon or test before the valve leaves the company.

5、Self-recognition in defrosting state

The controller automatically recognize the defrosting state according to the digital state D13 signal, when it is in the defrosting state, the controller will automatically regulate the opening of the valve to 80%, after the defrosting ends, the opening of the valve returns to the set opening and then automatically delay and regulate.

(The controller needs a digital input of defrosting signal, and the digital signal of 4-way valve can be used.)

6、Regulation of exhaust temperature

When the exhaust temperature is too high (more than 120℃), the stop-valve will be limited automatically (when the exhaust temperature sensor isn't installed, this function is in of no effect).

7、Evaporation under low temperature

Evaporation pressure sensor tests the suction pressure and change it to the evaporation temperature, however, when the resolution of the evaporation pressure under low temperature is very low and can't be exactly measured overheat, use the temperature sensor to measure the evaporation temperature, which should be more exact.

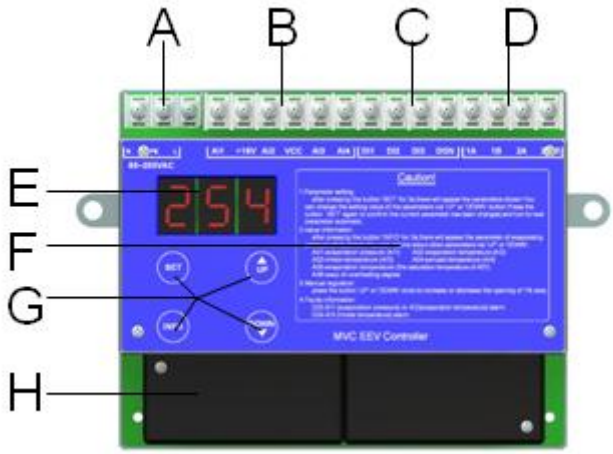
Required Pressure transducer: Range-0.5～10Bar, Output single 4-20mA with precision± 0.5FS%

Required Temperature sensor: R_{25}=10K±1% $B_{25/85}$=3977±1%

We recommend the pressure sensor and temperature sensor from GOLDAIR to ensure the exact precision.

Operation specification of the controller

1. The specification of buttons and relative connections (see the simple sketch map)



A、The input connection of the power of the controller: the power when the controller works normally is 85~260VAC 50/60Hz.

B、The analog input connection: 4-way analog input.

C、Digital signal input connection: Include on and off, cooling/heating mode, and defrosting signal.

D、Drive connection of the expansion valve: Connect the EEV directly.

E、 Digital tube: 3 bits, show the opening of the valve (%), temperature, parameters (refer to the specification of the setting parameters)

F、The location for the nameplate of the controller

G、Buttons: four sets of buttons, used for parameters' setting or inquiry and forced on/off of the valve.

H、Standby power of the valve: 2 batteries (6F22 （9V）) offer the standby power-18V, you need to open the cover of the controller to change the batteries.

2. Parameter set and inquiry

1、 Parameter setting: press the button 'SETTING'in the controller for 3s, there will appear the parameters shown in the first line of the table. Here, if you press this button again, this means checking downwards the relative parameters, during the process, you can change the relative value of the parameters via UP and DOWN buttons, after you finish the changes, please press the button 'SETTING' again to confirm that the parameter has been changed and set. If you keep the buttons free for 10s, the opening of the expansion valve will be shown automatically. The relative parameters are shown as following:

number	3-bit digital tube (left to right)			Define of parameters	range	default value
1	**1**	**4**	**0**	Original opening of cooling	20—80	40%
2	**2**	**3**	**0**	Original opening of heating	10—70	30%
3	**3**	**5**	**0**	superheat of cooling	-4.9—9.9	5.0℃
4	**4**	**2**	**0**	superheat of heating	-4.9—9.9	2.0℃
5	**5**	**5**	**0**	the opening recover at the end of defrost	20—70	50%
6	**6**	**0**	**7**	MOP pressure setting	03—10	7Kg
7	**7**	**0**	**0**	password	16	
8	**8**	**1**	**E**	Sampling period	5-255	30S
9	**9**	**1**	**0**	Proportion Degree Kp	2-255	16 steps/℃
10	**A**	**2**	**8**	Integral degree Ki	2-255	40 steps/℃
11	**B**	**1**	**E**	Differential degree Kd	2-255	30 steps/℃

12	**C**	**7**	**d**	Evaporating Temprature Setting	50-150	125℃
13	**D**	**1**	**0**	Minimal opening setting	0-50	10%
14	**E**	**0**	**3**	Delay the regulation time	01-30	3 Min
15	**F**	**0**	**1**	Refrigerantor sort	01-06	2
16	**0**	**0**	**0**	Controller/Driver	00/25	00

Note：1.the parameters of item 15: 01-06 separately indicate “R134a、R22、 R404A、R407C、R410A、R507”sorts.

2. if the setting of the parameters are out of the range, they will become the default value automatically.

3.the parameters of item 3 and 4 are indicated with decimal bit，“⊣ ⌜ ⌟ ⊣ ”separately indicate“-1”、“-2”、“-3”、“-4”

4.First bit display of LED and second or third bit display of item 8、9、10、11、12 are in hexadecimal.

5.password:16

3、 The value of parameters inquiry:

Press the button ‘INFO’ in the controller for 3s, there will appear the parameters shown in the first line of the table. Here, the relative analog value of the parameters can be shown via UP and DOWN buttons, if you press the button ‘UP’ again (if there are faults existing, the faults code will be shown) or keep the buttons free for 1 min, the opening of the expansion valve will be shown automatically. The relative parameters are shown as following:

number	3-bit LED (left to right)			define of the parameters
1	**R**	**0**	**1**	AI1（pressure）sensor
2	**0**	**5**	**4**	Evaporation pressure=5.4Bar
3	**R**	**0**	**2**	AI2（temperature of the evaporator）sensor
4	**⊣**	**0**	**4**	Evaporation temperature=-10.4℃
5	**R**	**0**	**3**	AI3（suction temperature）sensor
6	**⌜**	**1**	**2**	Inspiration temperature=-21.2℃
7	**R**	**0**	**4**	AI4（exhaust temperature）sensor
8	**0**	**5**	**8**	Exhaust temperature=58℃
9	**R**	**0**	**5**	Saturation temperature related with suction pressure(AI1)
10	**0**	**7**	**2**	Saturation temperature value=7.2℃
11	**R**	**0**	**6**	Overheat deviation
12	**⌟**	**3**	**4**	Overheat value=-33.4℃
Note: “⊣ ⌜ ⌟ ⊣ ”separately indicate“-1”、“-2”、“-3”、“-4”				

4、Faults inquiry

When there are faults existing in the controller, the digital tube will display ‘**E⌜⌜**‘with not-stop flash after the controller is power on. Here, press the button ‘INFO’ in the controller for 3s, the ‘AO1’ will appear, if you press the button ‘INFO’ again, the relative fault code will appear, press this button again to return the state of fault inquiry.

The relative fault codes are as following:

E01——the display no-preset refrigerant type

E02——AI1 fault of inspiration pressure sensor; AI2 fault of evaporation temperature sensor

E04——AI3 fault of inspiration temperature sensor

Note: when the fault ‘E01’exists, the valve won’t work, it needs setting again and powering again.

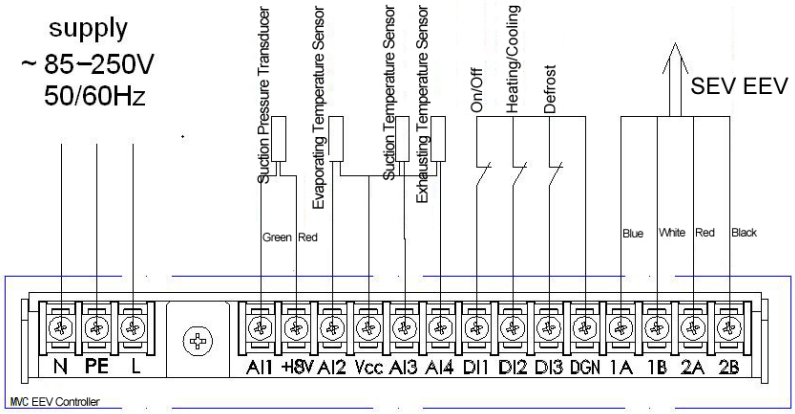
5. Manually regulate the opening of EEV

Touch the buttons ‘UP’ and ‘DOWN’ to regulate the opening of the EEV (manual regulation viable during the progress both of standby and running), press once to increase or decrease the opening of 1% step (continuous press also viable), not limited by the max numbers of the steps.

6 Operation notice of the controller

- Please check all the connected circuitries to confirm they are right before the controller is power on.
- Please check all the setting of the parameters to confirm they are consistent with the real application after the controller is power on.
- Please cut off all the supplies before connection
- Please make the connection according to the local electric standard.

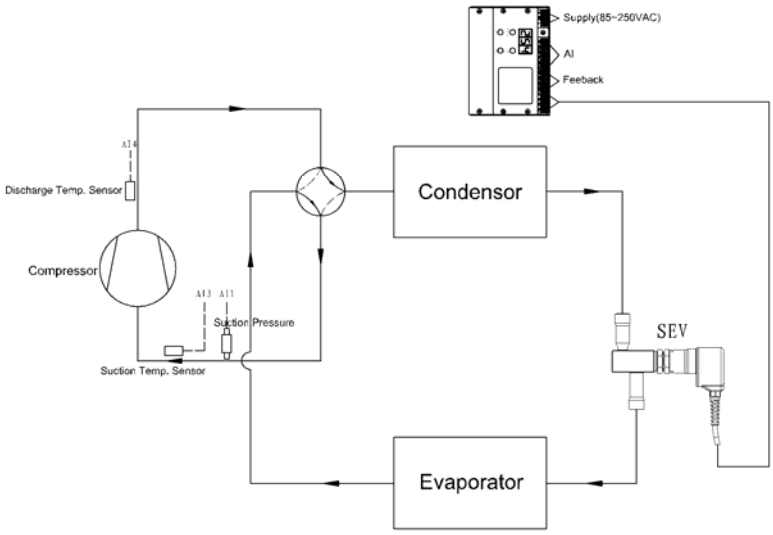
Connection Diagram



Heating/Cooling: On for heating; Off for cooling.
On/Off: From Off to On, means On signal; Opposite, means Off signal.
Defrost:From off to On, means on Defrost; Opposite, means exit from Defrost state.

Typical application

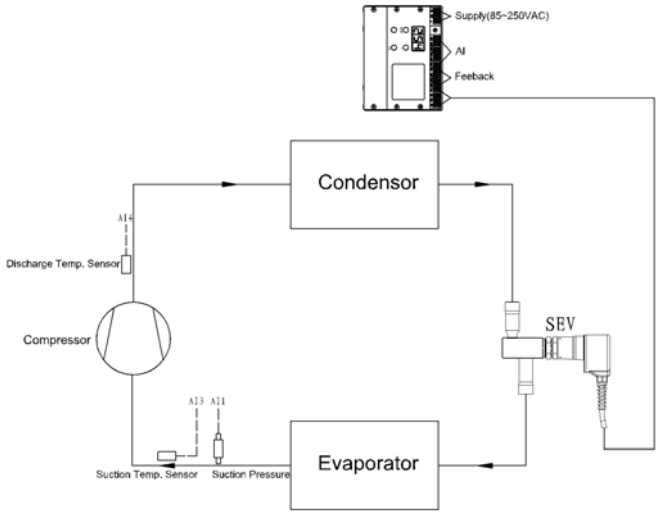
Case 1 (single cold)



Model specification: the evaporation temperature: 0~15℃

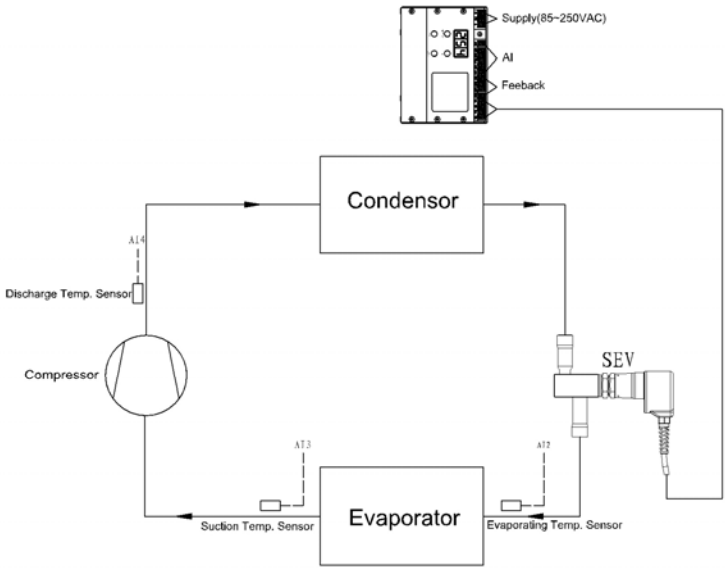
Water-cool cold water unit (exhaust temperature sensor maybe not installed), wind-cool cold water unit, water-source heat pump unit (exchange in the side of water), and wind-cooling direct evaporation single-cold unit

Case 2 (heat pump)



Model specification: the evaporation temperature: 0~15℃
Wind-cool heat pump cold and hot water unit, wind-cool heat pump direct evaporation unit.
(The flow in the picture is the work condition of the refrigeration)

Case 3 (low temperature)



Model specification: evaporating temperature: -50~-15℃
Water-cooling brine unit, wind-cooling brine unit, brine-cooling hot water unit, water-cooling direct evaporation single-cold unit, wind-cooling direct evaporation single-cold unit
Evaporation temperature sensor should be located close to the entrance of the evaporator.