DIN-S

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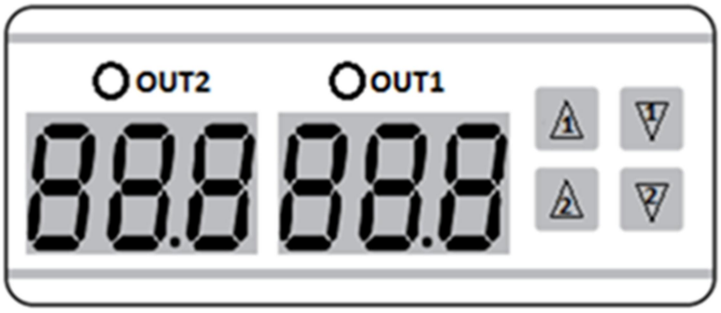
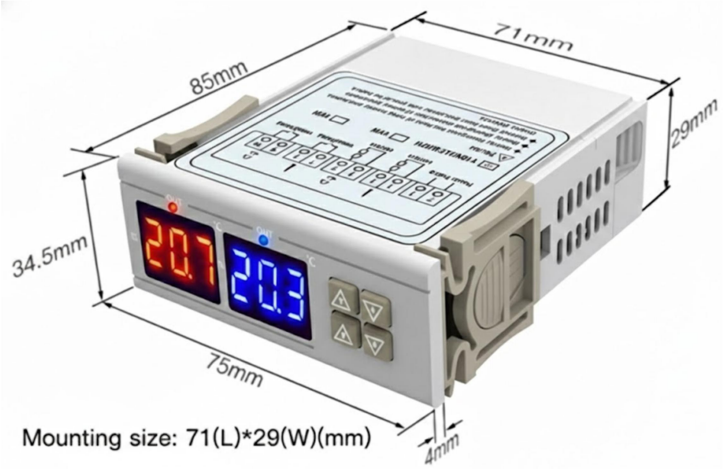


Technical Parameters:

- **Power consumption:** 3W
- **Accuracy:** 0.1 Degree
- **Temperature range:** -50 to 120 °C (-58 to 248 °F)
- **Sensors:** Two temperature sensors with 2m and 4m wire length
- **Power supply:** DC 12V, DC 24V, AC 100-240V (check the model no.)
- **Output:** 2 outputs with 10 Amp load



Features:

- This controller has two differential modes (F2, F3), reverse output (F4) and two-zone separate mode(F1).
- 2-color display (red and blue) for each zone.
- Records maximum and minimum temperature for 2 sensors.
- Selectable between Celsius and Fahrenheit.
- Set high/low alarm limits for 2 zones to protect against overheating or freezing, with buzzer and flashing alerts.
- 2 timer output delay for Out1 and Out2.
- Temperature calibration for each sensor.
- Memorizes settings and includes a factory default setting option.

Parameter Setting:

Please define parameter **P1** first, as any changes to this parameter may affect the values of other parameters. The factory default setting for P1 is **F2**, which is the most commonly used function for solar systems.

For setup the parameters press ▲¹ ▲² for 3 second:
By pressing ▲² or ▼² find the suitable parameter and by pressing ▲¹ or▼¹ change the value of each parameter.

Parameters Table:

P	Description	Default
P0	Select Fahrenheit or Celsius (F/C)	C
P1	Differential mode function (F1, F2, F3, F4)	F2
P2	Lower differential value LD (0.1 to HD)	5
P3	Higher differential value HD (LD to 120)	10
P4	High-temperature Alarm limit 1	120
P5	Low-temperature Alarm limit 1	-55
P6	High-temperature Alarm limit 2	120
P7	Low-temperature Alarm limit 2	- 55
P8	Delay start 1	0
P9	Delay start 2	0
P10	Record maximum temperature T1	-
P11	Record minimum temperature T1	-
P12	Record maximum temperature T2	-
P13	Record minimum temperature T2	-

Setup the Programs from P0 to P13:

P0: Change the temperature measuring unit to °C or °F.

P1: Differential mode function (F1, F2, F3, F4).

F1: Thermostat Mode (Series Output or Independent Zones):

- In this mode, each zone can act separately like a thermostat.
- To use this function for solar systems, connect **Out1** and **Out2** in series (please check the wiring section).
- If **P1 = F1**, configure these parameters:
  - **Press▲¹** for 3 seconds → Set Start Temp Zone 1
  - **Press▲²** for 3 seconds → Set Start Temp Zone 2
  - **Press▼¹** for 3 seconds → Set Stop Temp Zone 1
  - **Press▼²** for 3 seconds → Set Stop Temp Zone 2

The controller automatically recognizes heating or cooling mode:

- **Heating Mode:** Start temperature < stop temperature
- **Cooling Mode:** Start temperature > stop temperature

F2: Differential Mode:

This mode is commonly used for solar systems.

- Water from the solar collector is pumped to the required area based on the differential temperature settings.

Out2 is the differential output, and **Out1** works as a thermostat (heating mode)), based on the reading from sensor 1 (T1), which measures the temperature of zone 1, the cooler zone.

- See wiring section F2 for more information.

F3: Differential Mode:
This mode functions similarly to F2, but Out1 serves as the differential output (refer to the wiring section for details). Out2 operates as a thermostat (heating mode), based on the reading from sensor 2 (T2), which measures the temperature of zone 2, the hotter zone.
It can be used with series outputs (see wiring section F3).

F4: Differential Value (Reverse Outputs):
This mode can control a 2-way electric valve (where one path closes as the other opens). For example, in a pool heating system,
the 2-way valve can redirect water from the collector to the pool according to the set values of LD and HD. This mode works with both
Out1 and Out2 (useful for connecting a 2-way valve switch). When Out1 is closed, Out2 is open, and vice versa.

P2, P3: Lower and Higher Differential Values (LD, HD):
Sensor 2 is the high-temperature sensor (T2), and sensor 1 is the low-temperature sensor (T1). The difference between these sensors, (T2-T1),
is the differential temperature. "P3 = HD" refers to the higher differential value, and "P2 = LD" refers to the lower differential value.
You can adjust these parameters as needed. By setting P3 (higher range of HD = T2-T1) and P2 (lower range of LD = T2-T1), you define the range in which the pump will operate in a solar system. HD will work after one cycle.

To adjust P2 or P3, enter the parameter settings by pressing ▲¹ ▲² keys together. Use the ▲¹ or ▼¹ keys to navigate to the desired parameter (P2 or P3), and press ▲² or ▼² to modify the value.

For instance, if "P3 = HD" is set to 10 and "P2 = LD" is set to 5, the pump will activate when T2-T1 exceeds 10 degrees and deactivate when it drops to 5 degrees.
"P2 = LD" can be set to any value between 0.1 and the "HD" value. "P3 = HD" can be set higher than "P2 = LD" but should not exceed 120°C.

P4, P5, P6, P7 High and Low Temperature Alarm Settings for T1 and T2 (to protect against overheating or freezing for each zone):

You can set high and low alarm limits for T1 and T2. If the temperature exceeds or falls below the set limits, the controller will emit a beep and flash indicators for each sensor.
The default settings for zone 1 are P4 = 120°C and P5 = -55°C, while for zone 2, they are P6 = 120°C and P7 = -55°C. Once the temperatures reach these limits, the controller's protective function activates, shutting off outputs and triggering sound and light alarms. This function is essential for preventing damage from temperature extremes, ensuring optimal performance and equipment longevity.

P8, P9: Delay Protection:

In cooling mode, this parameter protects the cooling system from frequent startups. The default delay is 0 minutes, but you can set a delay between 0 and 60 minutes.

P10, P11, P12, P13: Record Maximum and Minimum Temperatures (T1 and T2):

The maximum and minimum temperatures for sensors 1 and 2 are stored in P10 to P13. When the controller is turned off and back on, it will be ready to log new temperature data. These records help you set optimal parameters for efficient operation.

Factory Reset:

All parameter settings remain in the controller's memory even when it is powered off. But you can restore factory default settings if needed.
Press ▼¹▼² for 3 seconds to restore back factory default settings.

Calibration:

If the temperature sensors readings are not very accurate, use this function to calibrate temperature readings. Calibration values can range from -10 to +10.
Press ▼¹▲¹ or ▼²▲² for 3 seconds to calibrate sensor 1 or 2.

Understanding Out1 and Out2 as Switches (Dry Contacts):

Out1 and **Out2** work like **switches** that don't provide power themselves but instead **control the flow of electricity** to external devices (such as a pump, fan, or heater). These outputs are referred to as **dry contacts** because they are isolated from the power source.

Error Messages and Troubleshooting:

1) If the display shows "---", the sensor is disconnected. The controller will emit a beep, and the output relay will shut off for safety.
2) If the display shows "LLL" or "HHH", the measured temperature is outside the controller's temperature range.

Cautions:

- Ensure the heating or cooling system's current load does not exceed the relay's capacity, as this may cause damage or fire.
- Check the wiring diagram before installation. Incorrect wiring may damage the controller or cause fire hazards.
- Do not apply excessive force when tightening terminal screws, as this could break the base.
- For safety, always turn off the power supply before wiring the controller.

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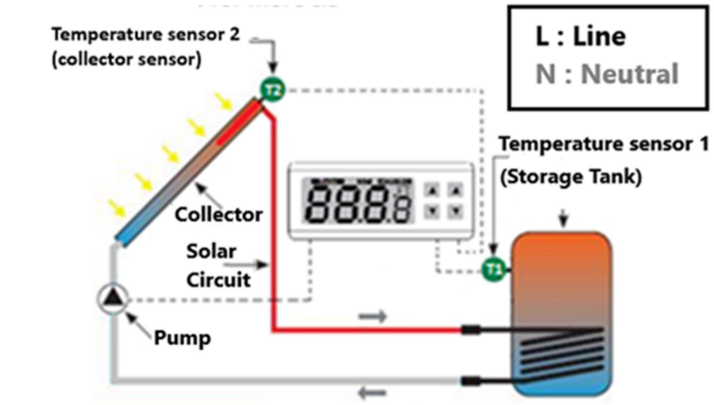
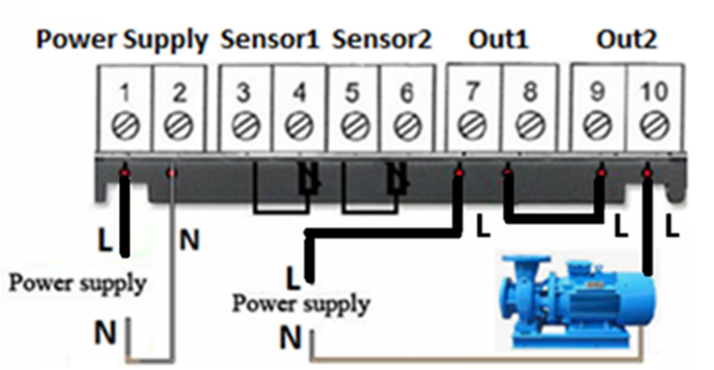
F1

Wiring Diagram for Series Output:

1. **Configuration:** Set **P1 = F1**. In this mode, **T2** represents the higher temperature and **T1** the lower temperature.
2. **Application:** Use **Out1** and **Out2** in series for systems like **solar water heaters**. This setup helps manage both the water heater storage tank (T1) and the solar panel collector (T2) together.
3. **Example Operation:** The solar pump turns **ON** when **T1** drops to 40°C, and **T2** reaches 65°C.The pump turns **OFF** when **T1** reaches 55°C or **T2** drops to 58°C.

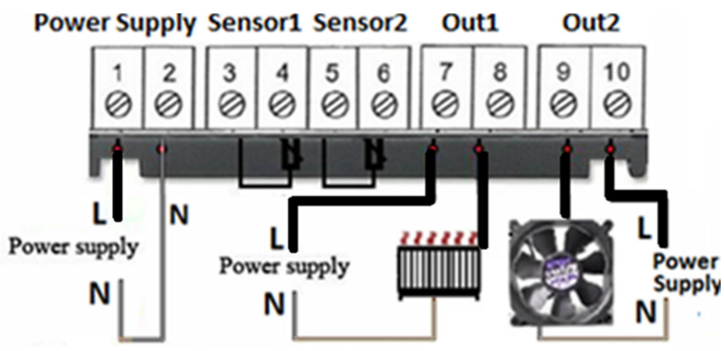




Combining **series** and **parallel** outputs allows for greater flexibility, enabling the controller to handle more complex or specialized applications.

Wiring Diagram, Two Independent Zones:

This setup is activated when **P1 = F1**. It is useful for controlling heating and cooling in **two independent zones**. This wiring is not recommended for solar systems. It is designed for special applications where two zones need separate temperature control.



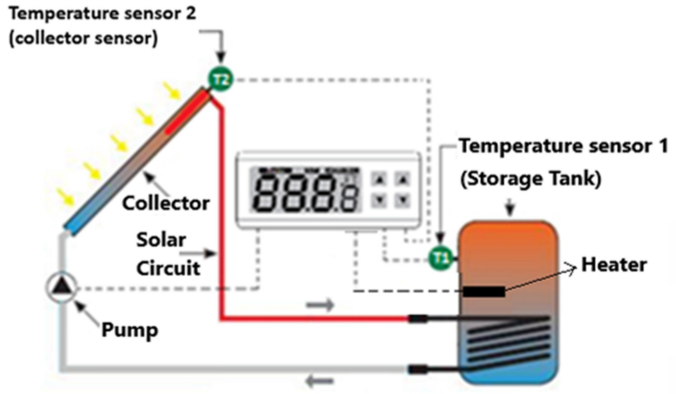
F2

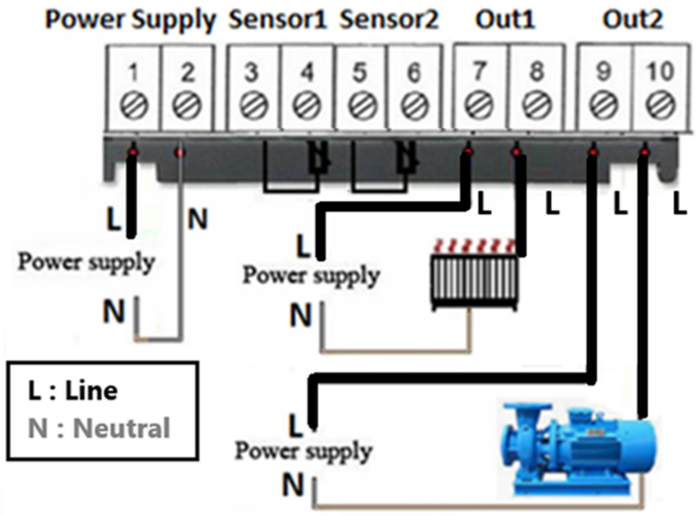
Wiring Diagram for Differential Value (Heating):

1. **Configuration:** Set **P1 = F2** and define **P2** (LD) and **P3** (HD) as the **lower** and **higher differential values** respectively. The difference between the sensors is represented as **T2 - T1**.
2. **Function:**
   - **T2** is the **higher temperature sensor** (e.g., collector sensor).
   - **T1** is the **lower temperature sensor** (e.g., storage tank).

The **pump** operates based on the differential value **(T2 - T1)**, with **Out2** controlling the differential output that is connected to the pump to control the circulation of heated water from collector to storage tank.

Out1 acting as a thermostat for **T1**. **Out1** can be used to control a **heating element** or another device. If the temperature of **T1** falls below a certain threshold, **Out1** will turn on the heating element to bring the temperature of the storage tank back to the desired level.





Combining **series** and **parallel** outputs allows for greater flexibility, enabling the controller to handle more complex or specialized applications.

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F3

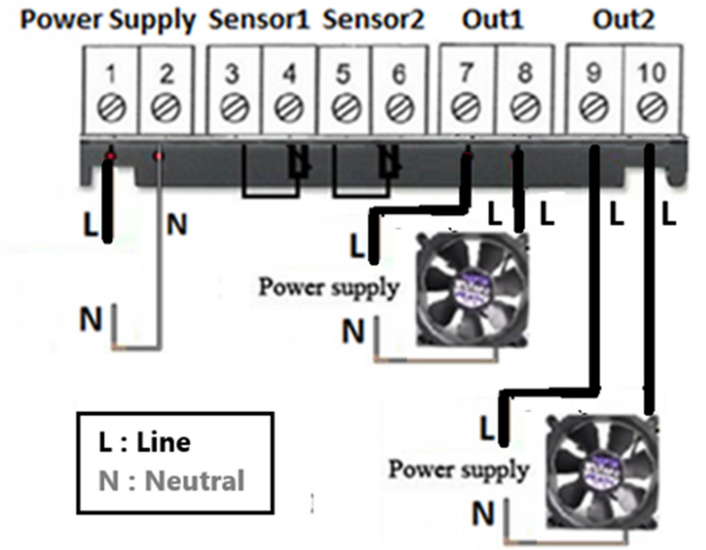
Wiring Diagram for Differential Value:

1. **Configuration:**

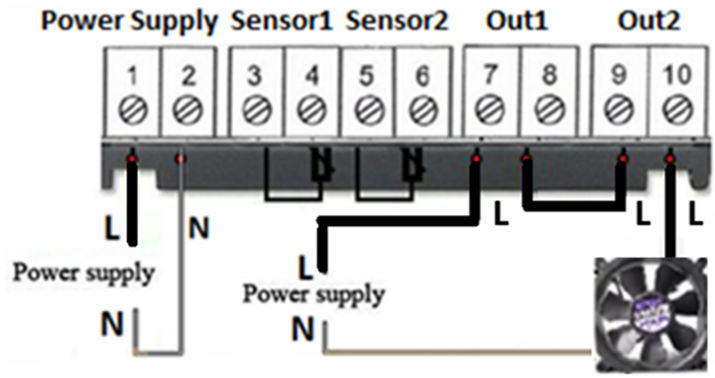
Set **P1 = F3** and define **P2** (LD) and **P3** (HD) as the **lower** and **higher differential values** respectively. The difference between the sensors is represented as **T2 - T1**.

2. **Function:**
   - **T2** is the **higher temperature sensor** (e.g., greenhouse or house attic).
   - **T1** is the **lower temperature sensor** (e.g., outside).

The **fan** operates based on the differential value **(T2 - T1)**, with **Out1** controlling the differential output that is connected to the fan to control the circulation of cold air from outside to greenhouse. **Out2** acting as a thermostat (heating mode) for **T2**. **Out2** can be used to control another device.



Combining **series** and **parallel** outputs allows for greater flexibility, enabling the controller to handle more complex or specialized applications. For example, if you want the heater to **start working** when the **T2 temperature drops to 16°C**, you can use **series outputs** to achieve this control.



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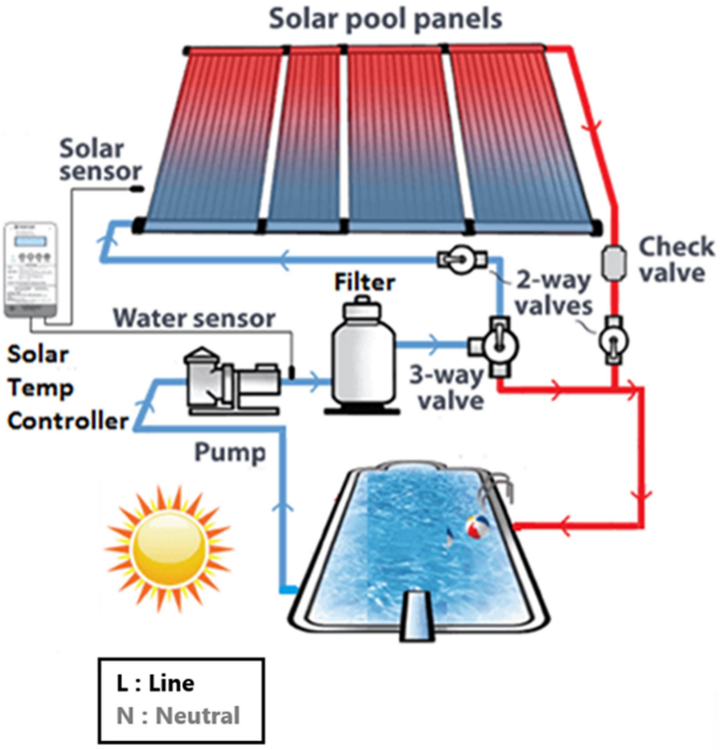
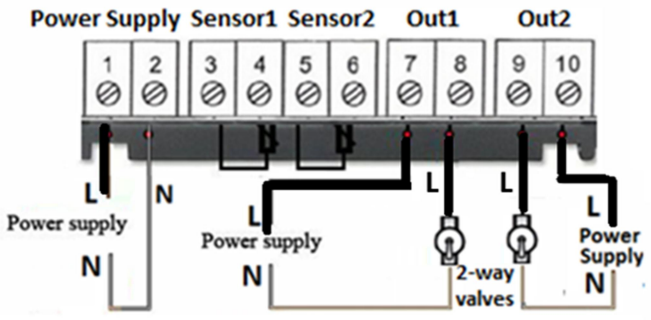
F4

Wiring Diagram for Differential Value (Reverse Outputs):

1. To enable reverse outputs, set **P1 = F4** and adjust **P2** and **P3** as the **lower differential value (LD)** and **higher differential value (HD)**, respectively.
2. In this mode, **Out1** will be **off** when **Out2** is **on**, and vice versa.
3. This function can control a **2-way electric valve** to manage water flow. For example, in a pool heating system, the valve can switch water between the solar collector and the pool, based on the LD and HD settings.
4. Both **Out1** and **Out2** can operate in reverse, where one is open while the other is closed.





DIN-S Differential Solar Temperature Controller Manual

For current product information, availability, and compatible options, use the verified ThermoMart links below. The preceding pages remain the original manual content.

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