MICROSOL

DIFFERENTIAL THERMOSTAT FOR SOLAR HEATING

Ver. 06

MCSOLV6-01T-10846

1. DESCRIPTION

The **MICROSOL** is a differential thermostat for solar heating that commands a water circulation pump through the temperature differential that exists between the solar collector panels and the thermal reservoir or pool in solar heating systems.

MICROSOL has functions protected by an access code that improve the absorption of solar energy, prevent the freezing in the pipes during winter and control the overheating.

2. TECHNICAL SPECIFICATIONS

- **Power Supply:** 127/220 Vac ±10% (50/60 Hz) or 12/24 Vac/dc
- **Temperature control:** -9.9 a 99.9°C
- **Resolution:** 0.1°C
- **Load current:** 16(8)A / 250 Vac 1HP
- **Dimensions:** Diameter → 60mm / Depht → 40mm
- **Operation temperature:** 0 to 50 ºC
- **Operation humidity:** 10 to 90% RH (without condensation)

3. CONFIGURATIONS

3.1 - To access the function menu

a) Press the key SET for 2 seconds until Fun appears, release it after that.
b) When COd appears, press SET (short touch) and insert the access code (123) through the keys ▼ and ▲. To confirm press SET.
c) Through the keys ▼ and ▲ access the other functions and do the same to adjust them.
d) To reset the menu and return normal operation, press SET (long touch) until --- appears.

3.2 - Parameters table

Function	Description
COd	Access code 123 (one hundred and twenty-three)
Ind	Preferential indication
dOn	Differential (t1-t2) to turn on the pump (*)
dOF	Differential (t1-t2) to turn off the pump (*)
ICE	Temperature of anti-freeze (S1) in the collectors to turn on the pump
Ht1	Overheating temperature (S1) to turn off the pump
Ht2	Overheating temperature (S2) to turn off the pump
Ht3	Overheating temperature (S3) to turn off the pump
rES	Cooling (S3) (**)
HY2	Overheating temperature hysteresis of S2 sensor
HY3	Overheating temperature hysteresis of S3 sensor
OF1	S1 Display offset
OF2	S2 Display offset
OF3	S3 Display offset (**)

3.3 - Parameters description

COd Access code (123)
This code is required to change configuration parameters, while it is not required to display the parameters.

Ind Preferential indication (what will be displayed)
- dIF Sensors differential (S1 - S2)
- t-1 Collector temperature (S1)
- t-2 The thermal reservoir or pool (S2)
- t-3 Surface temperature.

The other temperatures can be quickly checked by holding down ▼ or ▲ keys for a few seconds and then returning automaticly to the indication that was select in Ind as preferential.

dOn Differential of temperature (T1-T2) to turn on the pump
While the solar collectors receive energy, the sensor 1 temperature will increase. When this temperature is higher then the sensor S2 temperature, the pump is turned on and circles down the heated water, storing in the thermal reservoir, for example.

dOF Differential of temperature (T1-T2) to turn off the pump
With the pump on, the hot water circles down and the cold water circle up. Then the diference between S1 and S2 temperature tends to decrease.
When the temperature decreases to a determined value, the pump is turned off, stopping the water circulation.

ICE Temperature of anti-freeze (S1) in the collectors to turn off the pump
When the collectors temperature (sensor S1) is low (winter nights, ex.), the pump is turned on, periodically, to avoid water from freezing in the hoses. The hysteresis is fixed in 2°C.
To disable this function set the adjustment to the minimum until appears nOP.

Ht1 Overheating temperature (S1) to turn the pump off
When temperature in collectors (sensor S1) will be above of a determinable value, the pump is turned off to hinder that the overheated water circulates for the pipes and it damages them (case PVC pipes are used). The fixed hysteresis is in 2°C.

Ht2 Overheating temperature (S2) to turn the pump off
When the temperature in sensor S2 reaches a determinable value, the pump is turned off to prevent thermal discomfort . This function is used in heating systems for pools that do not use the third sensor. The hysteresis can be adjusted from 0,1 to 5,0 °C. (See function HY2).

Ht3 Overheating temperature (S3) to turn the pump off
When the temperature in sensor S3 reaches a determinable value, the pump is turned off to prevent the thermal discomfort. This function is used in heating systems for pools that use the third sensor to measure temperature in surface. The hysteresis can be adjusted from 0,1 to 5,0 °C. (See function HY3).
Note: This function also serves to disable sensor S3 (when it is not used), being enough to dislocate the adjustment for maximum until appearing the indication nOP.

rES Cooling
This function only appears if S3 sensor will be qualified. It has the purpose to cool the pool during the night always that overheating temperature of this sensor will be exceeded and the difference of temperature between S1 and S2 to reach -4°C. Then the pump is turned on using the collector as radiator to coll the water of pool.
When the difference (S1-S2) lower or the temperature in the S3 sensor to reset overheating, the pump is off.

HY2 Overheating temperature hysteresis of S2 and S3 sensors
HY3 Case the pump will be off for overheating in sensors S2 or S3, through these functions a time interval can be defined where the pump will keep off.

OF1 Indication locking of sensors (S1, S2, S3)
OF2 It allows to compensate eventual shunting lines in the reading of sensors S1 (collectors), S2
OF3 (reservoir) and S3 (surface), proceeding from the exchange of the sensor or alteration of cable lenght. (It only can be visualized if third sensor will be qualified).

PS: To disable the third sensor see explanation in the function Ht3.

IMPORTANT: (*) The adjusted value in the function dOn must be bigger than the value adjusted in the function dOF. Thus being, MICROSOL does not allow that invalid adjustments are made similar to guarantee its perfect functioning.

Ex.: Current configuration { dOn 10,0°C ; dOF 5,0°C } You want to change for { dOn 4,0°C ; dOF 2,0°C }

First adjust dOF for 2,0°C and after soon adjust dOn for 4,0°C.
(**) They only can be visualized if the third sensor is enabled.

4. SIGNALLING

P signal the pump status.
T1 and **T2** indicate which temperature is being displayed.

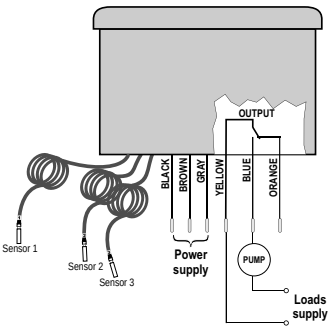
T1	T2	Indication
●	○	Sensor 1
○	●	Sensor 2
●	●	Differential S1-S2
○	○	Sensor 3

While programming, parameters T1 and T2 keep blinking.
If the sensors are disconected or out of the specified range, a message will appear on the display, indicating the sensor..

Er1 Sensor 1 irregular
Er2 Sensor 2 irregular
Er3 Sensor 3 irregular

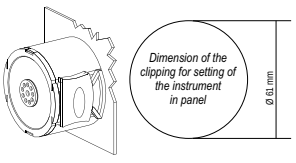
If the instrument shows in the display the message PPP, it means that was detected some parameter value outside the acceptable range and it needs to be corrected.

5. WIRING DIAGRAM



BLACK and BROWN: 220 Vac (24 Vac/dc)
BLACK and GRAY: 127 Vac (12 Vac/dc)
YELLOW: Common
BLUE: NO
ORANGE: NC

Over the specifield current use a contactor



Note: The sensor cable length can be increased by the user until 200 meters using the PP 2 x 24 AWG cable. For immersion in water use thermometric well.

IMPORTANT

According to the chapters from the IEC60364 standard:

1. Install protectors against over voltage on power supply.

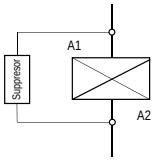
2. Sensor cables and computer signals can be together, however not at the same place where power supply and load wires pass for.

3. Install suppresors of transients (RC filters) in parallel to loads to increase the usefull life of the relays.

4. The withdrawal or substitution of the adhesive panel frontal as well as alterations in the electronic circuit on the part of the user implies in the cancellation of guarantee.

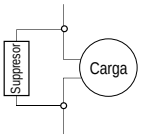
For more information contact our application eng. department through e-mail ***support@fullgauge.com*** *or dial +55 51 3475.3308.*

Wiring diagram of suppresor in contactors



A1 and A2 are the contactor coil.

Wiring diagram of suppresor linking in loads direct drive



For direct drive, consider the maximum load current specified.