

# Differential temperature controllers iSolar

257 series

**CALEFFI  
SOLAR**



## Function

A multi-functional temperature differential controller with add-on system functions, the iSolar series can be used for a wide variety of applications and has inputs for four PT1000 sensors. Preset factory defaults are defined for control of a standard solar water heating system with a second relay (some models) to divert any surplus heat. The auxiliary relay can be used to maintain the tank temperature, protect the system from overheating, or use another source to heat the storage tank.

This controller features a large Liquid Crystal Display (LCD) user interface with three function keys. The easy-to-use icons assist to operate and customize a solar heating system.



Tested and Approved by TÜV Rheinland as an approved U.S. Nationally Recognized Testing Laboratory (NRTL) Exceeds or is equivalent to:  
UL 60730-1A  
CAN/CSA E60730-1

## Product range

- Code 257210A iSolar1 controller with 1 standard output relay for pump control, includes 3 temperature sensors
- Code 257220A iSolar2 controller with 1 electronic output relay for pump speed control, includes 3 temperature sensors
- Code 257230A iSolar3 controller with 2 standard output relays for pump control, plus valve or second pump control, includes 3 temp. sensors
- Code 257260A iSolarPlus controller with 2 electronic output relays for pump speed control, plus valve or second pump control, includes 3 sensors

## Technical specifications

Housing plastic:	PC-ABS
Protection type:	Indoor only
Mounting:	wall or in 255 series pump station
Display:	LCD with symbols and text
Interface:	three soft push buttons
Inputs:	4 temperature sensors
Outputs:	1 or 2 electronic or standard relays
Switching relay capacities:	2 (1) A 115V
Power supply:	115 V - 60 Hz
Bus interface:	V-Bus

## Performance

ΔT adjustment range:	2...40° Ra (1...20°K)
Min. temperature differential	2° Ra (1°K)
Hysteresis:	2° Ra, ± 1° Ra (1°K, ± .5°K)
Max. tank temperature range:	35...205°F (2...95°C)
Max. collector temperature range:	210...375°F (100...190°C)
Emergency shut down of the collector:	230...395°F (110...200°C)
Min. collector temperature range:	50...195°F (10...90°C)
Antifreeze temperature option:	15...50°F (-10...10°C)
kWh (BTU) flow input:	0...5 gpm (0...20 lpm)
Agency approvals	cTÜVus

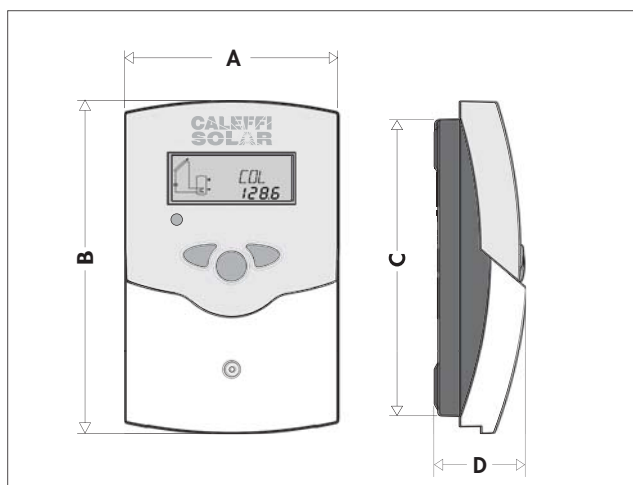
## Temperature sensors

Platinum RTD type:	1,000 ohm
Collector sensor working range:	-58...355°F (-50...180°C)
Tank sensor working range:	15...175°F (-10...80°C)
Length of collector cable:	60 in. (1.5 m)
Length of tank sensor cable:	95 in. (2.5 m)

## Resistance values for sensors subject to the temperature

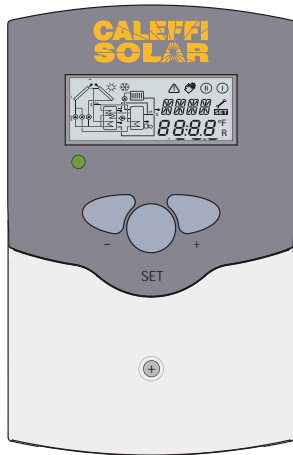
°F	14	23	32	41	50	59	68	77	86
Ω	961	980	1000	1019	1039	1058	1078	1097	1117
°F	95	104	113	122	131	140	149	158	167
Ω	1136	1155	1175	1194	1213	1232	1252	1271	1290
°F	176	185	194	203	212	221	230	239	248
Ω	1309	1328	1347	1366	1385	1404	1423	1442	1461

## Dimensions



Code	A	B	C	D	Weight (lb)
250041A	4 3/8"	6 3/4"	6"	2"	0.9

## Characteristics



### User-friendly operation

System screen LCD display with 16-segment display and 8 symbols for system status

Operating LED control lamp

3 push-button controls

Attractive design and compact dimensions

Easy to install

## Standard operation functions

**$\Delta T$  control** - When the switch-on difference is reached, the pump is activated until the differential temperature drops below.

**Maximum tank temperature** - When the adjusted maximum tank temperature is exceeded, the pump switches off.

**Collector emergency shutdown** - If adjusted collector temperature is exceeded, the solar pump is switched off.

**System cooling** - If the temperature rises to the maximum collector temperature the solar pump remains on until this temperature drops.

**Minimum collector temperature** - a minimum set temperature which must be exceeded before the solar pump is switched-on.

**Antifreeze function** - If the adjusted temperature drops, the solar pump is switched on to protect the fluid from freezing.

**Tank cooling function** - In the evening, the solar pump continues running until the storage tank is cooled down.

**Tube collector function** - The controller measures an increase of heat rise in the collector and adjusts operating time for maximum efficiency.

**Heat generation measurement kWh (BTU)** - The heat generated is measured by the volume flow and the temperature of feed and return sensors.

**Operating hours counter** - Operating hours counter stores the solar operating hours of the respective relay.

**Manual operating mode** - For control and servicing, the operating mode of the controller can be switched manually.

## Advanced operation functions (some two-relay models)

**Heat dumping function** - Heat dumping function works independently from the solar operation and activates the second relay.

**Backup heating function** - Backup heating function works independently from the solar operation and activates the second relay.

**Second independent  $\Delta T$  control** - The switch on and off temperatures can be adjusted separately.

**Priority tank / tank rotation** - The controller checks the tank temperatures and rotates or gives priority to charging tanks.

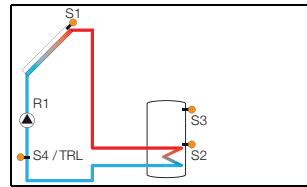
**East / West collectors** - Two separate  $\Delta T$  controls activate each solar pump based on collectors and the one-tank differential temperature.

## Pump speed control functions

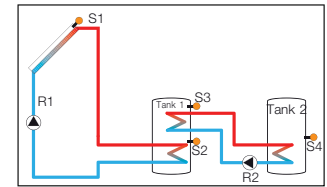
Pump speed control can improve system efficiency by reducing the flow to the collectors on cloudy days to improve solar thermal transfer and reduce electrical consumption. This is achieved by the differential temperature value between the collectors and storage tank.

If the value for the  $\Delta T$  switch-on is reached (e.g.  $\Delta T$  on =  $9^\circ$ ), the pump will start with 100% pump speed for 10 seconds, then reduce the speed to the adjusted minimum pump speed (min. pump speed = 30 %, adjustable). If the temperature difference reaches the set value (e.g.  $\Delta T$  Set =  $18^\circ$ ), pump speed will increase by 10 %. At any further rise of  $3^\circ$   $\Delta T$  the pump speed will increase by 10% until the maximum of 100% is reached.

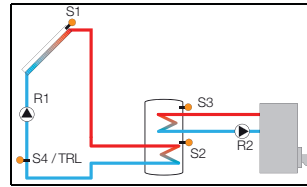
## Selectable systems



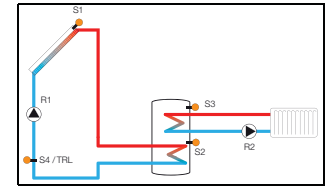
Standard system with 1 tank, 1 pump and 3 sensors. S4 / TRF can be used as BTU meter



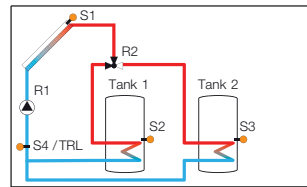
System and heat exchange with an existing tank with 1 tank, 4 sensors and 2 pumps



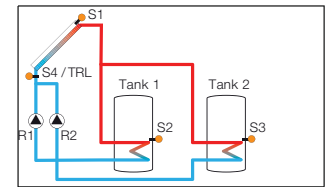
Solar system and backup heating with 1 tank, 3 sensors. S4 / TRF can be used as BTU meter



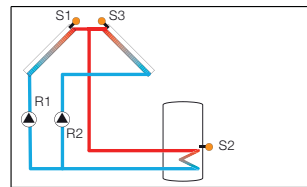
Solar system and heat dumping with 1 tank, 3 sensors. S4 / TRF can be used as BTU meter



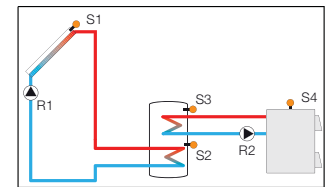
2-tank-solar system with valve logic, 3 sensors, 1 solar pump and 3-way valve. Sensor S4 / TRF can be used as BTU meter



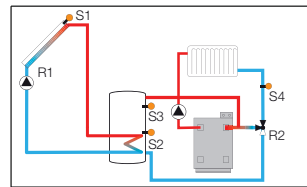
2-tank solar system with pump logic, 3 sensors and 2 solar pumps



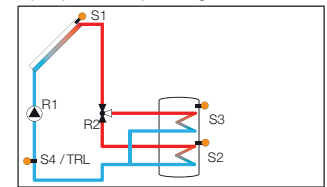
Solar system with east-west collectors, 1 tank, 3 sensors and 2 solar pumps.



System with backup heating by wood boiler with 1 tank, 4 sensors, 1 solar pump and 1 pump for backup heating.



System and heating circuit pre-heat with 1 tank, 4 sensors, 1 solar pump and 3-way valve for heating circuit.



System and tank charge in layers with 1 tank, 3 sensors, 1 solar pump and 3-way valve. Sensor S4 / TRF can be used as BTU meter

## Model selection

	iSolar 1	iSolar 2	iSolar 3	iSolar Plus
Selectable programs	1	1	2	9
Electronic relay	0	1	0	2
Standard relay	1	0	2	0
Pump speed control	no	yes	no	yes
Operating hours counter	yes	yes	yes	yes
kWh (BTU) measurement	yes	yes	yes	yes
V-bus for data recorder	yes	yes	yes	yes
PC-interface RS232	yes	yes	yes	yes
Heat dumping function	no	no	yes	yes
Backup heat function	no	no	yes	yes
Additional $\Delta T$ control	no	no	no	yes
Two-tank priority	no	no	no	yes
Clock with scheduling	no	no	no	yes
Code	257210A	257220A	257310A	257260A