Thank you for buying this product.  
Read this manual carefully to get the best performance from this unit.
Safety advice
Please pay attention to the following safety advice in order to avoid danger and damage to people and property.

Appropriate usage
This product is to be used in solar thermal systems in compliance with the technical data specified in these instructions (see p. 3).

Improper use excludes all liability claims

Instructions:
Attention should be paid to
- valid local regulations
- the statutory provisions for prevention of industrial accidents,
- the statutory provisions for environmental protection,
- the Health and Safety at Work Act 1974
- Part P of the Building Regulations 2005
- BS7671 Requirements for electrical installations and relevant safety regulations of DIN, EN, DVGW, TRGI, TRF and VDE.

These instructions are exclusively addressed to authorised skilled personnel.
- Only qualified electricians should carry out installation and maintenance work.
- Initial installation should be carried out by named qualified personnel.

Subject to change without prior notice. Errors excepted

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Declaration of conformity
We, CALEFFI NORTH AMERICA, Inc., declare under our sole responsibility that our product iSolar 2 complies with the following standards:
EN 55 014-1
EN 60 730-1

According to the regulations of the above directives, the product is labelled with:
89/336/EWG
73/23/EWG
The iSolar 2 is a controller for standard solar thermal systems. It provides a clear operating concept and is equipped with a system-monitoring display. Flashing symbols for sensors, pumps and valves show temperatures, temperature differences and active actuators.

**Technical data**

**Housing:**
plastic, PC-ABS and PMMA

**Protection type:** IP 20 / DIN 40050

**Ambient temp.:** 32 ... 104 °F

**Dimensions:** 172 x 110 x 46 mm

**Mounting:** wall mounting, mounting into patch-panels is possible

**Display:** System screen for systems visualisation, 16-segment display, 7-segment display, 8 symbols for system status and operating control lamp

**Operation:** 3 push buttons at the front of the housing

**Functions:** Differential temperature controller with optional system functions. Function control according to BAW-guidelines, operating hours counter for solar pump, tube collector function, pump speed control as well as heat quantity measurement.

**Inputs:**
for 4 temperature sensors Pt1000

**Outputs:** 1 Semiconductor relay

**Bus:** VBus®

**Power supply:**
115 V~

**Mode of operation:**
Type 1.y

**Switching capacity:**
semiconductor relay: 1 (1) A (115) V~

---

Scope of delivery:

1 x iSolar 2

1 x accessory bag

1 x fuse T4A

2 x screws and dowels

4 x strain relief and screws

Additionally enclosed in the full kit:

1 x sensor FKP6

1 x sensor FRP6

---

- system-monitoring display
- up to 4 temperature sensors Pt1000
- heat quantity measurement
- function control
- VBus®
- user-friendly operation through simple handling
- pump speed control, solar operating hours counter
Examples iSolar 2

For detailed connection diagrams see chapter 1.
1. **Installation**

1.1 **Mounting**

- The unit must only be located in dry interior locations. It is not suitable for installation in hazardous locations and should not be placed close to any electromagnetic fields. The controller must additionally be supplied from a double-pole switch with contact gap of at least 3 mm. Please pay attention to separate routing of sensor cables and mains cables.

1. Unscrew the cross-head screw from the cover and remove it along with the cover from the housing.

2. Mark the upper fastening point on the wall and drill and fasten the enclosed wall plug and screw leaving the head protruding.

3. Hang the housing from the upper fastening point and mark the lower fastening point through the hole in the terminal box (centres 130 mm). Drill and insert the lower wall plug.

4. Fasten the housing to the wall with lower fastening screw and tighten.

1.2 **Electrical connection**

The power supply to the controller must be carried out via an external power switch (last step!) and the supply voltage must be 115 V~ (50 ... 60 Hz). Flexible cables must be attached to the housing with the enclosed strain relief and the corresponding screws.

The controller is equipped with either 1 relay to which loads such as pumps, valves, etc. can be connected:

- **Relay 1**
  - 18 = conductor R1
  - 17 = neutral conductor N
  - 13 = ground clamp

**Temperature sensors** (S1 to S4) have to be connected to the following terminals (either polarity):

1. 1 / 2 = sensor 1 (e.g. sensor collector 1)
2. 3 / 4 = sensor 2 (e.g. sensor tank 1)
3. 5 / 6 = sensor 3 (e.g. tank top sensor)
4. 7 / 8 = sensor 4 (e.g. return temperature sensor)

The **power supply connection** has to be carried out via the following terminals:

- 19 = neutral conductor N
- 20 = conductor L
- 12 = ground clamp

---

**WARNING!**
Always switch-off power supply and disconnect the controller from the mains before opening the housing!

Electrostatic discharge can lead to damage to electronic components!

Dangerous voltage!
1.2.1 Data communication / Bus

The controller comes with a VBus® for data communication and energy supply of external modules. The connection is effected with optional polarity at the clamps marked with „VBus®“. Via this data Bus you can install one or more VBus® modules, e.g.:

- heat quant. measurement module WMZ-M1
- large display GA3
- Data logger, DL1
- Smart Display SD3

Additionally, the controller can be connected to the PC with the help of a RS-COM adapter. With the Service Center Software (RCS) the controller parameters can be changed, measurements can be read out, processed and visualised. The software enables an easy function control and adjustment of the system.

1.2.2 Allocation of terminals for system 1

**Standard solar system** with 1 tank, 1 pump and 3 sensors. The sensor S4 / TR can be optionally used for heat quantity measurement.
2. Operation and function

2.1 Buttons for adjustment

The controller is operated via the 3 push buttons below the display. The forward-button (1) is used for scrolling forward through the display menu or to increase the adjustment values. The backward-button (2) is similarly used for scrolling backwards and reducing values.

In order to access the adjustment mode, scroll down in the display menu and press the forward button (1) for approx. 2 seconds after you have reached the last display item. If an adjustment value is shown on the display, the „SET“ icon is displayed. Now, you can access the adjustment mode by using button 3.

- Press buttons 1 and 2 in order to select a channel
- Briefly press button 3, „SET“ will flash
- Adjust the value by pressing buttons 1 and 2
- Briefly press buttons 3, so that „SET“ permanently appears, the adjusted value will be saved.

The system monitoring display consists of 3 blocks: channel display, tool bar and system screen (active arrangement).

2.2 System monitoring display

The channel display consists of two lines. The upper line is an alpha-numeric 16-segment display (text display) for displaying channel names and menu items. In the lower 7-segment display, the channel values and the adjustment parameters are displayed. Temperatures and temperature differences are indicated in °C or K respectively.

The additional symbols in the tool bar indicate the actual system status.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Standard</th>
<th>Flashing</th>
</tr>
</thead>
<tbody>
<tr>
<td>📂</td>
<td>relay 1 active</td>
<td></td>
</tr>
<tr>
<td>☀️</td>
<td>tank maximum limitation active / maximum tank temp exceeded</td>
<td>collector cooling function or recooling function active</td>
</tr>
<tr>
<td>⦨</td>
<td>antifreeze function activated</td>
<td>collector minimum limitation or antifreeze function active</td>
</tr>
<tr>
<td>⚠️</td>
<td>collector emergency shutdown or tank emergency shutdown active</td>
<td></td>
</tr>
<tr>
<td>🚫⚠️</td>
<td>sensor defect</td>
<td></td>
</tr>
<tr>
<td>🚫ضيف</td>
<td>manual operation active</td>
<td></td>
</tr>
<tr>
<td>⦨</td>
<td>SET-mode, change of adjustment value is possible</td>
<td></td>
</tr>
</tbody>
</table>
2.2.3 System screen

The system screen (active arrangement) shows the scheme which has been selected. The screen consists of several system component symbols, which are - depending on the current status of the system - either flashing, permanently shown or „hidden“.

![System screen diagram]

- **sensors**
- **tank top sensor**
- **collector 1**
- **pumps**
- **tank heat exchanger**
- **tank**
- **tank 2 or after-heating (with additional symbol)**
- **additional symbol: operation of the burner**
- **collectors**
  - with collector sensor
- **tank 1 and 2**
  - with heat exchanger
- **temperature sensor**
- **pump**
- **After-heating**
  - with burner symbol

2.3 Flashing codes

2.3.1 System screen codes

- Pump symbols are flashing during initialisation phase
- Sensor symbols are flashing if the corresponding sensor display channel is selected.
- Sensor symbols are flashing in the case of a sensor fault.
- Burner symbol is flashing if the after-heating is active

2.3.2 LED flashing codes

- **green**: everything OK
- **red/green flashing**: initialisation phase
- **manual operation**
- **red flashing**: sensor fault
  - (sensor symbol is flashing quickly)
3. Commissioning

When the controller is commissioned for the first time, the arrangement has to be selected first.

1. Switch on power supply. During the initialisation phase, the operating control lamp flashes red and green. After initialisation, the controller is in the automatic mode with typical settings. The pre-programmed system scheme is Arr 1.

2. - select adjustment channel Arr
   - change to the SET-mode (see 2.1)
   - select the arrangement via the Arr-index number
   - save the adjustment by pressing the SET button

Now the controller is ready for operation with typical settings to suit that system and normally the factory settings will give close to optimum operation.

Overview of arrangements:

Arr 1: standard solar system
4. Control parameters and display channels

4.1 Overview of channels

Legend:

- Corresponding channel is available.
- Corresponding channel is available when the corresponding option is enabled.

Please note:
Only if temperature sensors are connected, will S3 and S4 be displayed.

<table>
<thead>
<tr>
<th>channel</th>
<th>description</th>
<th>page</th>
</tr>
</thead>
<tbody>
<tr>
<td>COL</td>
<td>Temperature collector 1</td>
<td>11</td>
</tr>
<tr>
<td>TST</td>
<td>Temperature tank 1</td>
<td>11</td>
</tr>
<tr>
<td>TSTL</td>
<td>Temperature tank 1 base</td>
<td>11</td>
</tr>
<tr>
<td>TSTU</td>
<td>Temperature tank 1 top</td>
<td>11</td>
</tr>
<tr>
<td>S3</td>
<td>Temperature sensor 3</td>
<td>11</td>
</tr>
<tr>
<td>TRF</td>
<td>Temperature return sensor</td>
<td>11</td>
</tr>
<tr>
<td>S4</td>
<td>Temperature sensor 4</td>
<td>11</td>
</tr>
<tr>
<td>n %</td>
<td>Pump speed relay 1</td>
<td>11</td>
</tr>
<tr>
<td>h P</td>
<td>Operating hours relay 1</td>
<td>11</td>
</tr>
<tr>
<td>kWh</td>
<td>Heat quantity kWh</td>
<td>12</td>
</tr>
<tr>
<td>MWh</td>
<td>Heat quantity MWh</td>
<td>12</td>
</tr>
<tr>
<td>Arr</td>
<td>Arrangement</td>
<td>9</td>
</tr>
<tr>
<td>DT O</td>
<td>Switch-on temperature difference</td>
<td>13</td>
</tr>
<tr>
<td>DT F</td>
<td>Switch-off temperature difference</td>
<td>13</td>
</tr>
<tr>
<td>DT S</td>
<td>Set temperature difference</td>
<td>13</td>
</tr>
<tr>
<td>RIS</td>
<td>Rise</td>
<td>13</td>
</tr>
<tr>
<td>S MX</td>
<td>Maximum temperature tank 1</td>
<td>13</td>
</tr>
<tr>
<td>EM</td>
<td>Emergency temperature collector 1</td>
<td>14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>channel</th>
<th>description</th>
<th>page</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCE</td>
<td>Option collector cooling collector 1</td>
<td>14</td>
</tr>
<tr>
<td>CMX</td>
<td>Maximum temperature collector 1</td>
<td>14</td>
</tr>
<tr>
<td>OCN</td>
<td>Option minimum limitation collector</td>
<td>14</td>
</tr>
<tr>
<td>CMN</td>
<td>Minimum temperature collector 1</td>
<td>14</td>
</tr>
<tr>
<td>OFR</td>
<td>Option antifreeze collector 1</td>
<td>14</td>
</tr>
<tr>
<td>CFR</td>
<td>Antifreeze temperature collector 1</td>
<td>14</td>
</tr>
<tr>
<td>OREC</td>
<td>Option recooling</td>
<td>15</td>
</tr>
<tr>
<td>DTC</td>
<td>Option tube collector</td>
<td>15</td>
</tr>
<tr>
<td>OHQM</td>
<td>Option heat quantity measurement</td>
<td>12</td>
</tr>
<tr>
<td>FMAX</td>
<td>Maximum flowrate</td>
<td>12</td>
</tr>
<tr>
<td>MEDT</td>
<td>Antifreeze type</td>
<td>12</td>
</tr>
<tr>
<td>MED%</td>
<td>Antifreeze concentration</td>
<td>12</td>
</tr>
<tr>
<td>nMN</td>
<td>Minimum pump speed relay 1</td>
<td>16</td>
</tr>
<tr>
<td>HND1</td>
<td>Manual operation relay 1</td>
<td>16</td>
</tr>
<tr>
<td>HND2</td>
<td>Manual operation relay 2</td>
<td>16</td>
</tr>
<tr>
<td>LANG</td>
<td>Language</td>
<td>16</td>
</tr>
<tr>
<td>UNIT</td>
<td>Change over °FAH / °CEL</td>
<td>16</td>
</tr>
<tr>
<td>PROG</td>
<td>Program number</td>
<td>16</td>
</tr>
<tr>
<td>VERS</td>
<td>Version number</td>
<td>16</td>
</tr>
</tbody>
</table>
4.1.1 Collector temperature

**COL:**
Collector temperature
Display range: -40 ... +482 °F

Display of the current collector temperature.

- COL : collector temperature (1-collector system)

4.1.2 Tank temperatures

**TST, TSTL, TSTU:**
Tank temperatures
Display range: -40 ... +482 °F

Display of the current tank temperature.

- TST : tank temperature (1-tank system)
- TSTL : tank base temperature,
- TSTU : tank top temperature

4.1.3 Sensor 3 and sensor 4

**S3, S4:**
Temperatures at the sensors S3 and S4
Display range: -40 ... +482 °F

Display of the current temperature at the corresponding additional sensor (without control function).

- S3 : temperature - sensor 3
- S4 : temperature - sensor 4

**Please note:**
Only if the temperature sensors are connected (displayed), will S3 and S4 be displayed.

4.1.4 Other temperatures

**TR:**
other measured temperatures
Display range: -40 ... +482 °F

Display of the current temperature at the sensor.

- TR : temperature - return

4.1.5 Current pump speed

**n %:**
current pump speed
Display range: 30 ... 100 %

Display of the current pump speed of the corresponding pump.

- n % : current pump speed (1-pump system)

4.1.6 Operating hours counter

**h P / h P1 / h P2:**
Operating hours counter
Display channel

The operating hours counter accumulates the solar operating hours of the respective relay (h P / h P1 / h P2). Full hours are displayed.

The accumulated operating hours can be set back to zero. As soon as one operating hours channel is selected, the symbol SET is displayed. Press the SET (3) button for approx. 2 seconds in order to access the RESET-mode of the counter. The display symbol SET will flash and the operating hours will be set to 0. Confirm the reset with the SET button in order to finish the reset.

In order to interrupt the RESET-process, do not press a button for about 5 seconds. The display returns to the display mode.
4.1.7 Heat quantity measurement option

**OHQM**: Heat quantity measurement
Adjustment range: OFF ... ON
Factory setting: OFF

**FMAX**: Flow rate in l/min
Adjustment range 0 ... 20 in 0.1-steps
Factory setting: 6.0

**MEDT**: Antifreeze type
Adjustment range: 0 ... 3
Factory setting: 1

**MED%**: Antifreeze concentration (Vol-) %
When MEDT 0 or 3 is used, the parameter MED% is 'hidden'.
Adjustment range: 20 ... 70
Factory setting: 45

**kWh/MWh**: Heat quantity in kWh / MWh
Display channel

Heat quantity measurement is possible if a flowmeter is used. For this purpose, the heat quantity measurement option (OHQM) has to be enabled.

The flow rate should be read from the flowmeter (l/min) and has to be adjusted in the channel FMAX. Antifreeze type and concentration of the heat transfer medium have to be adjusted in the channels MEDT and MED%.

**Antifreeze type:**
0 : water
1 : propylene glycol
2 : ethylene glycol
3 : Tyfocor® LS / G-LS

The flow rate as well as the reference sensors S1 (flow) and S4 (return) are used for calculating the heat quantity supplied. It is shown in kWh in the channel kWh and in MWh in the channel MWh. The overall heat quantity results from the sum of both values.

The accumulated heat quantity can be reset. As soon as one of the display channels of the heat quantity is selected, the symbol SET is permanently shown on the display. Press button SET (3) for about 2 seconds in order to access the RESET mode of the counter. The display symbol SET will flash and the heat quantity value will be set to 0. In order to finish this process, press the SET button to confirm.

In order to interrupt the RESET process, no button should be pressed for about 5 seconds. The controller automatically returns to the display mode.
4.1.8 ΔT-regulation

**DT O:**
Switch-on temperature diff.
Adjustment range: 2.0 ... 40.0 °Ra
Factory setting: 12.0

**DT F:**
Switch-off temperature diff.
Adjustment range: 1.0 ... 38 °Ra
Factory setting: 8.0 °Ra

**Please note:** Switch-on temperature difference DO must be at least 2 °Ra higher than the switch-off temperature difference DF.

**DT S:**
Set temperature difference
Adjustment range: 3.0 ... 60.0 °Ra
Factory setting: 20.0 °Ra

**RIS:**
Rise
Adjustment range: 2 ... 40 °Ra
Factory setting: 4 °Ra

4.1.9 Maximum tank temperature

**S MX:**
Maximum tank temp.
Adjustment range: -40 ... +480 °F
Factory setting: 140 °F

This function is a standard differential control. If the switch-on differential is reached (DT O), the pump is operated. The pump runs at 100% speed for 10 seconds. After this period, the pump runs at minimum pump speed (nMN = 30 %). If the temperature difference reaches the adjusted set value (DT S), pump speed will increase by one step (10%). If the difference increases by 2 K (RIS), pump speed will increase by 10 % respectively until the maximum pump speed of 100 % is reached. The response of the controller can be adapted via the parameter „Rise“. If the temperature difference falls below the adjusted switch-off temperature difference (DT F), the controller switches off.

If the adjusted maximum temperature is exceeded, the tank will no longer be loaded in order to avoid damage caused by overheating. If the maximum tank temperature is exceeded, * will be shown.

**Please note:** The controller is equipped with a tank emergency shutdown function, which prevents the tank from being loaded when the tank temperature exceeds 295°F.
4.1.10 Collector emergency shutdown temperature

EM: Collector emergency shutdown temperature
Adjustment range: 230 ... 400 °F
Factory setting: 285 °F

If the adjusted collector emergency shutdown temperature (EM) is exceeded, the controller will switch off the solar pump (R1) in order to protect the system against overheating (collector emergency shutdown). The factoring setting is 285 °F but it can be changed within the adjustment range of 230 ... 400 °F. (flashing) is displayed.

4.1.11 System cooling

OCX: System cooling option
Adjustment range: OFF ... ON
Factory setting: ON

CMX: Collector maximum temp.
Adjustment range: 210 ... 380 °F
Factory setting: 250 °F

When the adjusted maximum tank temperature is reached, the system stagnates. If the collector temperature increases to the adjusted maximum collector temperature (CMX), the solar pump is activated until the collector temperature falls below the maximum collector temperature. The tank temperature may increase (subordinate active maximum tank temperature), but only up to 203 °F (emergency shut-down of the tank).

If OREC is additionally enabled:

4.1.12 Minimum collector function

OCN: Minimum collector function
Adjustment range: OFF / ON
Factory setting: OFF

CMN: Minimum collector temperature
Adjustment range: 14 ... 195 °F
Factory setting: 50 °F

The minimum collector temperature is the minimum temperature which must be exceeded for the solar pump (R1) to switch on. The minimum temperature prevents the pump from being switched on too often at low collector temperatures. If the temperature falls below the minimum temperature, (flashing) is shown on the display.

4.1.13 Antifreeze function

OCF: Antifreeze function
Adjustment range: OFF / ON
Factory setting: OFF

CFR: Antifreeze temperature
Adjustment range: 14 ... 50 °F
Factory setting: 40 °F

The antifreeze function activates the loading circuit between the collector and the tank when the temperature falls below the adjusted antifreeze temperature. This will protect the fluid against freezing or coagulating. If the adjusted antifreeze temperature is exceeded by 2 °F, the loading circuit will be deactivated.

Please note:
Since this function uses the limited heat quantity of the tank, the antifreeze function should be used in regions with few days of temperatures around the freezing point.
4.1.14 Recooling function

**OREC:**
recooling function option
Adjustment range:
OFF...ON
Factory setting: OFF

If the adjusted maximum tank temperature ($S_{MX}$) is reached, the controller keeps the solar pump running in order to prevent the collector from being overheated. The tank temperature may increase but only up to 203 °F (emergency shutdown of the tank).

The solar pump is switched on once the collector temperature is lower than the tank temperature. It is switched off when the tank is cooled down to the adjusted maximum temperature via the collector and the pipework.

4.1.15 Tube collector function

**OTC:**
Tube collector function
Adjustment range:
OFF...ON
Factory setting: OFF

If the controller detects an increase in collector temperature by 4 °Ra compared to the previously stored collector temperature, the solar pump will be switched-on at 100 % for about 30 seconds in order to detect the fluid temperature. The current collector temperature will be saved as a new reference value. If the measured temperature (new reference value) is exceeded by 4 °Ra, the solar pump will run for 30 seconds. If the switch-on difference between the collector and the tank is exceeded during the runtime of the solar pump or the standstill of the system, the controller will automatically switch to solar loading.

If the collector temperature decreases by 4 °Ra during standstill, the switch-on value for the tube collector function will be recalculated.
4.1.16 Pump speed control

nMN:
Pump speed control
Adjustment range: 30...100
Factory setting: 40

A relative minimum pump speed is allocated to the output R1 via the adjustment channel nMN.

Attention:
When loads which are not speed controlled (e.g., valves) are used, the value must be changed to 100% in order to deactivate pump speed control.

4.1.17 Operating mode

HND1 / HND2:
Operating mode
Adjustment range: OFF, AUTO, ON
Factory setting: AUTO

For control and service work, the operating mode of the controller can be manually adjusted. For this purpose, select the adjustment value HND1 / HND2. The following adjustments can be carried out:

- **HND1 / HND2**
  - OFF: relay off (flashing) +
  - AUTO: relay in automatic operation
  - ON: relay on (flashing) +

4.1.18 Language

LANG:
Language choice
Adjustment range: dE, En, It, Fr
Factory setting: En

In this channel, different languages are available.

- dE: German
- En: English
- It: Italiano
- Fr: French

4.1.19 Unit

UNIT:
Adjustment of unit
Adjustment range: °FAH, °C
Factory setting: °FAH

The menu unit can be adjusted:

- °FAH
- °C
5. Troubleshooting

If a malfunction occurs, a message is displayed in the display of the controller:

- Operating control lamp flashes red. The symbol ↕ and the Δ are shown.
- Operating control lamp off

Sensor fault. An error code instead of a temperature is shown on the sensor display channel.
- 88.8
- - 88.8

- Cable is broken. Check the cable.
- Short-circuit. Check the cable.

Disconnected Pt1000 temperature sensors can be checked with an ohmmeter. In the following table, the resistance values corresponding to different temperatures are listed.

<table>
<thead>
<tr>
<th>°F</th>
<th>Ω</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>961</td>
</tr>
<tr>
<td>23</td>
<td>980</td>
</tr>
<tr>
<td>32</td>
<td>1000</td>
</tr>
<tr>
<td>41</td>
<td>1019</td>
</tr>
<tr>
<td>50</td>
<td>1039</td>
</tr>
<tr>
<td>59</td>
<td>1058</td>
</tr>
<tr>
<td>68</td>
<td>1078</td>
</tr>
<tr>
<td>77</td>
<td>1097</td>
</tr>
<tr>
<td>86</td>
<td>1117</td>
</tr>
<tr>
<td>95</td>
<td>1136</td>
</tr>
<tr>
<td>104</td>
<td>1155</td>
</tr>
<tr>
<td>113</td>
<td>1175</td>
</tr>
<tr>
<td>122</td>
<td>1194</td>
</tr>
</tbody>
</table>

Resistance values of the Pt1000-sensors

Check the power supply

Short-circuit. Check the cable.

The fuse of the controller could be blown. It can be replaced after the front cover has been removed (spare fuse is enclosed in the accessory bag).
5.1 Various:

Pump is overheated, but no heat transfer from the collector to the tank, flow and return have the same temperature; perhaps also bubble in the lines.

- **Air in the system?**
  - no
  - yes

- **Is the collector circuit blocked at the dirt trap?**
  - yes
  - Clean the dirt trap

Pump starts up very late..

- **Switch-on-temperature difference ΔT_on too large?**
  - no
  - yes

- **Non-ideal position of collector sensor (e.g. flatscrew sensor instead of sensor in immersion sleeves?)**
  - yes
  - no

- **Activate tube collector function if necessary.**
  - o.k.

Pump starts for a short moment, switches-on/off again, etc.

- **Is the temperature difference at the controller too small?**
  - no
  - yes

- **Change ΔT_on and ΔT_off correspondingly.**
  - no
  - o.k.

- **Wrong position of the collector sensor?**
  - yes
  - no

- **Plausibility control of the tube collector function**
  - o.k.

Pump is overheated, but no heat transfer from the collector to the tank, flow and return have the same temperature; perhaps also bubble in the lines.

- **Vent the system; increase system pressure to at least static primary pressure plus 0.5 bar; if necessary increase the pressure, switch the pump on and off for a short time**

- **Change ΔT_on and ΔT_off correspondingly.**

- **Mount the collector sensor at solar flow (warmest collector output); use the immersion sleeve of the respective collector.**

The temperature difference between the tank and the collector increases enormously during operation; the collector circuit cannot divert the heat.

- **Collector circuit pump defective?**
  - no
  - yes

- **Check / replace it**

- **Heat exchanger calcified?**
  - no
  - yes

- **Decalify it**

- **Heat exchanger blocked?**
  - yes
  - no

- **Clean it**

- **Heat exchanger too small?**
  - yes
  - no

- **Replace with correctly sized one**
Tanks cool down at night.

Does the collector circuit pump run in the night?
- No
- Yes

Check controller.

At night, the collector temperature is higher than the outdoor temperature.
- No
- Yes

Check the non-return valve in flow and return pipe with regard to the functional efficiency.

Sufficient tank insulation?
- Yes
- No

Increase insulation.

Insulation close enough to the tank?
- Yes
- No

Replace insulation or increase it.

Are the tank connections insulated?
- Yes
- No

Insulate the connections.

Warm water flow upwards?
- No
- Yes

Change connection and let the water flow sideward or through a siphon (bow downwards): less tank losses now?
- No
- Yes

Use the circulation pump with timer and switch-off thermostat (energy efficient circulation)

Does warm water circulation run for a very long time?
- No
- Yes

Check whether the pumps of the after-heating circuit runs at night, check non-return valve; problem solved?

Circulation pump and blocking valve should be switched-off for 1 night; less tank losses?
- Yes
- No

Are the controller fuses o.k.?
- No
- Yes

Check the non-return valve in warm water circulation- o.k.

Does the control LED flash?
- Yes
- No

No current; check fuses / replace them and check power supply.

Does the pump start up in manual operation?
- No
- Yes

The adjusted temperature difference for starting the pump is to high; choose a value which makes more sense.

Is the pump current released by the controller?
- No
- Yes

The solar circuit pump does not run although the collector is significantly warmer than the tank.

Is the pump stuck?
- Yes
- No

Turn the pump shaft using a screwdriver; now passable?

Are further pumps which are connected to the solar tank must also be checked.

Further pumps which are connected to the solar tank must also be checked.

Clean or replace

Controller might be defective - replace it.
6. Accessory

Sensors

Our product range includes high-precision platin temperature sensors, flatscrew sensors, outdoor temperature sensors, indoor temperature sensors, cylindrical clip-on sensors and irradiation sensors, also as complete sensors with immersion sleeve.

Overvoltage protection device

In order to avoid overvoltage damage at collector sensors (e.g. caused by local lightning storms), we recommend installing the overvoltage protection SP1.

Flowmeter

If you wish to carry out a heat quantity measurement, you need a flowmeter for measuring the flow rate in your system.

Important notice:

We took a lot of care with the texts and drawings of this manual and to the best of our knowledge and consent. As faults can never be excluded, please note: Your own calculations and plans, under consideration of the current standards and DIN-directions should only be basis for your projects. We don’t offer a guarantee for the completeness of the drawings and texts of this manual - they only represent some examples. They can only be used at your own risk. No liability is assumed for incorrect, incomplete or false information and / or any resulting damages.

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Distributed by:

CALEFFI NORTH AMERICA, Inc.
3883 W. Milwaukee Rd.
Milwaukee, WI 53208
Tel.: +1 414.238.2360
Fax: +1 414.238.2366
www.caleffi.us
sales@caleffi.com

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