

Hamworthy Trigon
Technical Specification Manual

IMPORTANT NOTE

**THESE INSTRUCTIONS MUST BE READ
AND UNDERSTOOD BEFORE INSTALLING
& COMMISSIONING THE EQUIPMENT IN
THE TRIGON PRODUCT RANGE**



Heating *at work.*

Customer After Sales Services

Telephone: **0845 450 2866** E-mail: **aftersales@hamworthy-heating.com** Fax: **01202 662522**

Technical Enquiries

To supplement the detailed technical brochures, technical advice on the application and use of products in the Hamworthy Heating range is available from our technical team in Poole and our accredited agents.

Site Assembly

Hamworthy offer a service of site assembly for many of our products in instances where plant room area is restricted. Using our trained staff we offer a higher quality of build and assurance of a boiler built and tested by the manufacturer.

Commissioning

Commissioning of equipment by our own engineers, accredited agents or specialist sub – contractors will ensure the equipment is operating safely and efficiently.

Maintenance Agreements

Regular routine servicing of equipment by Hamworthy service engineers inspects the safety and integrity of the plant, reducing the risk of failure and improving performance and efficiency. Maintenance agreements enable our customers to plan and budget more efficiently.

Breakdown service, repair, replacement

Hamworthy provide a rapid response breakdown, repair or replacement service through head office at Poole and accredited agents throughout the UK.

Spare Parts

A comprehensive spare parts service is operated from our factory in Poole, providing replacement parts for both current and discontinued products. Delivery of parts and components is normally from stock within seven days. However, a next day delivery service is available for breakdowns and emergencies.

Hamworthy Trigon

Technical Specification Manual

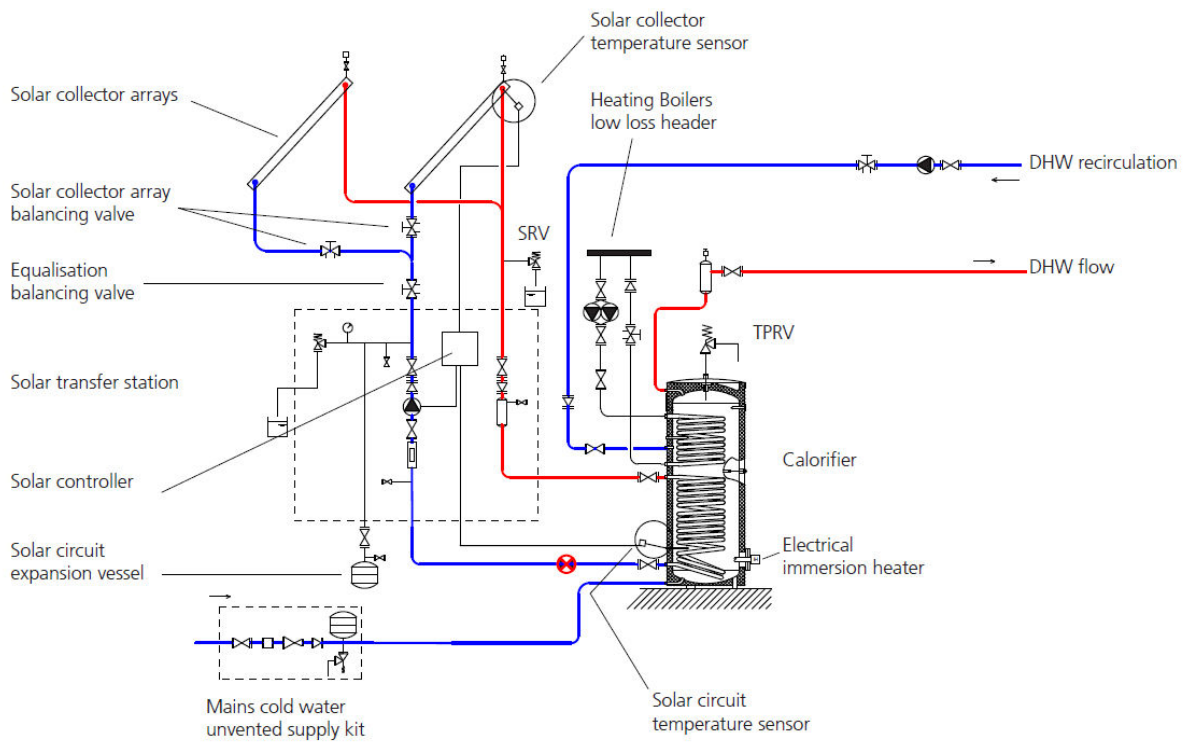
NOTE: THE INSTRUCTIONS CONTAINED IN THIS MANUAL MUST BE READ AND UNDERSTOOD BEFORE INSTALLING & COMMISSIONING THE EQUIPMENT IN THE TRIGON PRODUCT RANGE.

THE TRIGON PRODUCT RANGE COMPLIES WITH ALL RELEVANT EUROPEAN DIRECTIVES.

**PUBLICATION NO. 500001293
ISSUE 'A'**

**TRIGON SOLAR
COMMERCIAL SOLAR WATER HEATING SYSTEM**

TRIGON SOLAR – TECHNICAL SPECIFICATION



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Hamworthy Heating Limited
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Dorset BH17 0HH
Telephone: 0845 450 2866**








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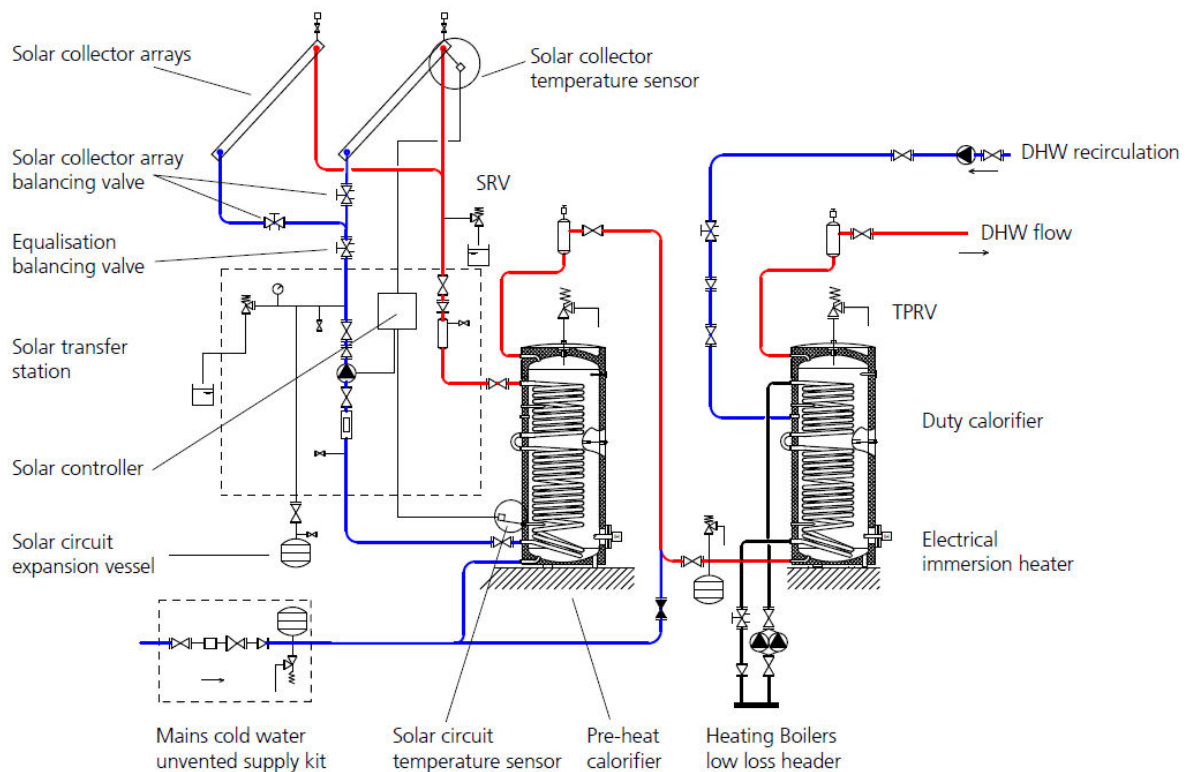
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General information concerning the Trigon Solar offer

- The Trigon Solar systems are supplied with a BS2 or M controller.
- All the regulation options require an M controller (discharge, solar loop, 2 collector arrays with different orientation, light sensor).
- With a BS2 controller, all of the metering functions are handled by WMZ metering modules.
- With an M controller, the domestic hot water demand is metered directly on the M controller. The M controller has two metering systems, a first metering function between the cold water and the outlet of the additional supply tank, and a second metering function between the cold water and the outlet of the solar preheating tank (this latter tank is not used when combined solar + additional supply tanks are used).

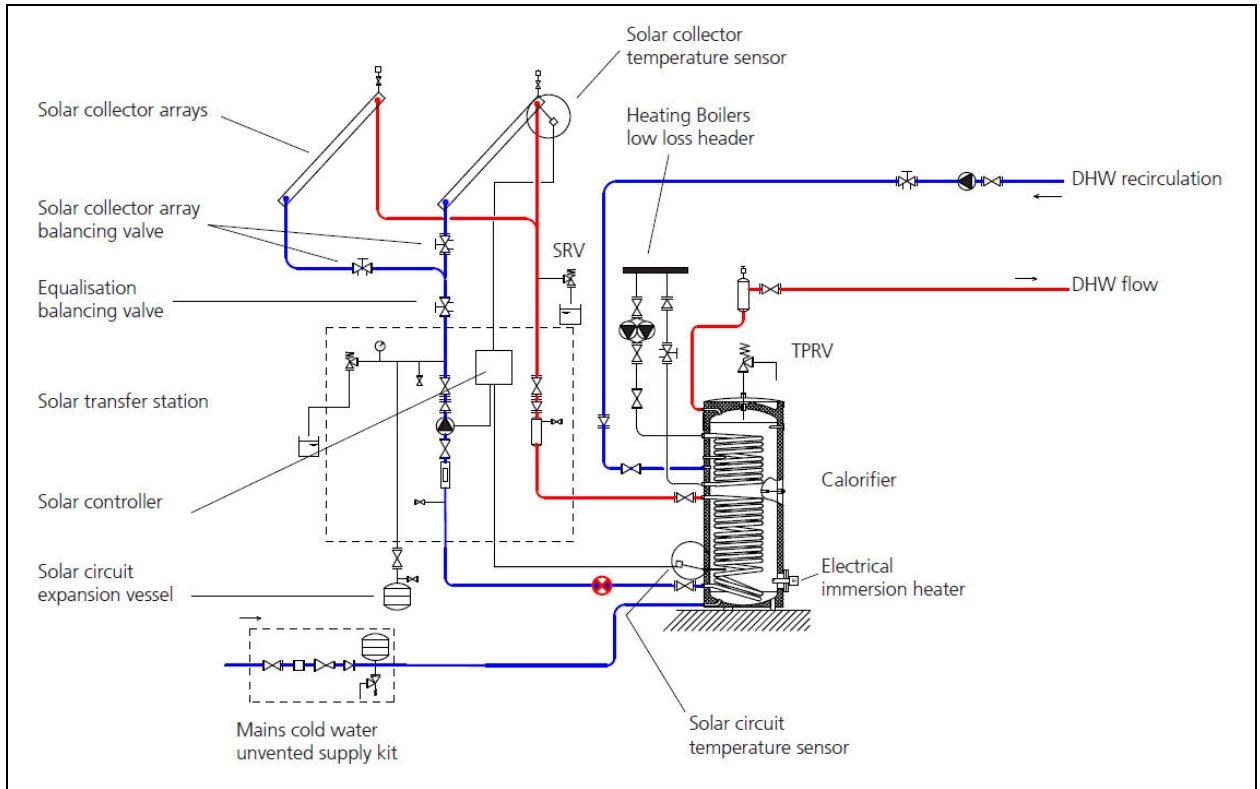
How to use this specification

Symbol	Function	Symbol	Function
	Isolating valve open		Temperature sensor
	Isolating valve closed		V40 Flow sensor
	Balancing valve		Automatic air vent / de-aerator
	Check valve		



TRIGON SOLAR: COMBINED SOLAR + INDIRECT FIRED HOTWATER CALORIFIER

1. Hydraulic Scheme 1

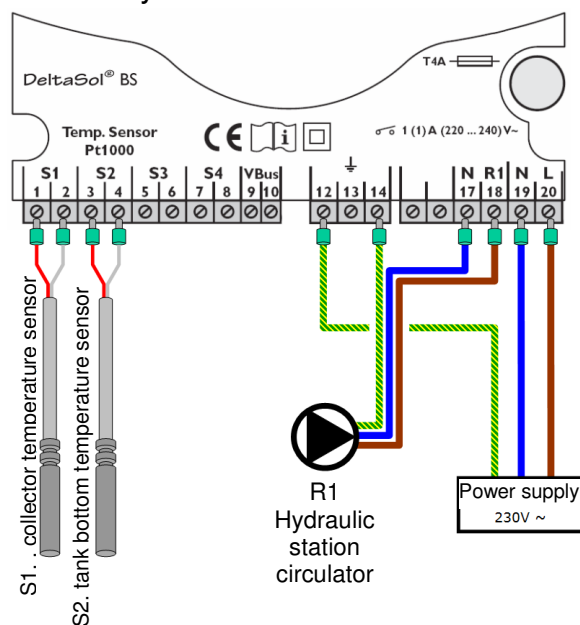


Scheme 1 – Trigon Solar: Combined solar + indirect fired hotwater calorifier

2. Electrical connection and configuration of controller

✓ Control by BS2 controller:

Electrically connect the sensors and the circulator.

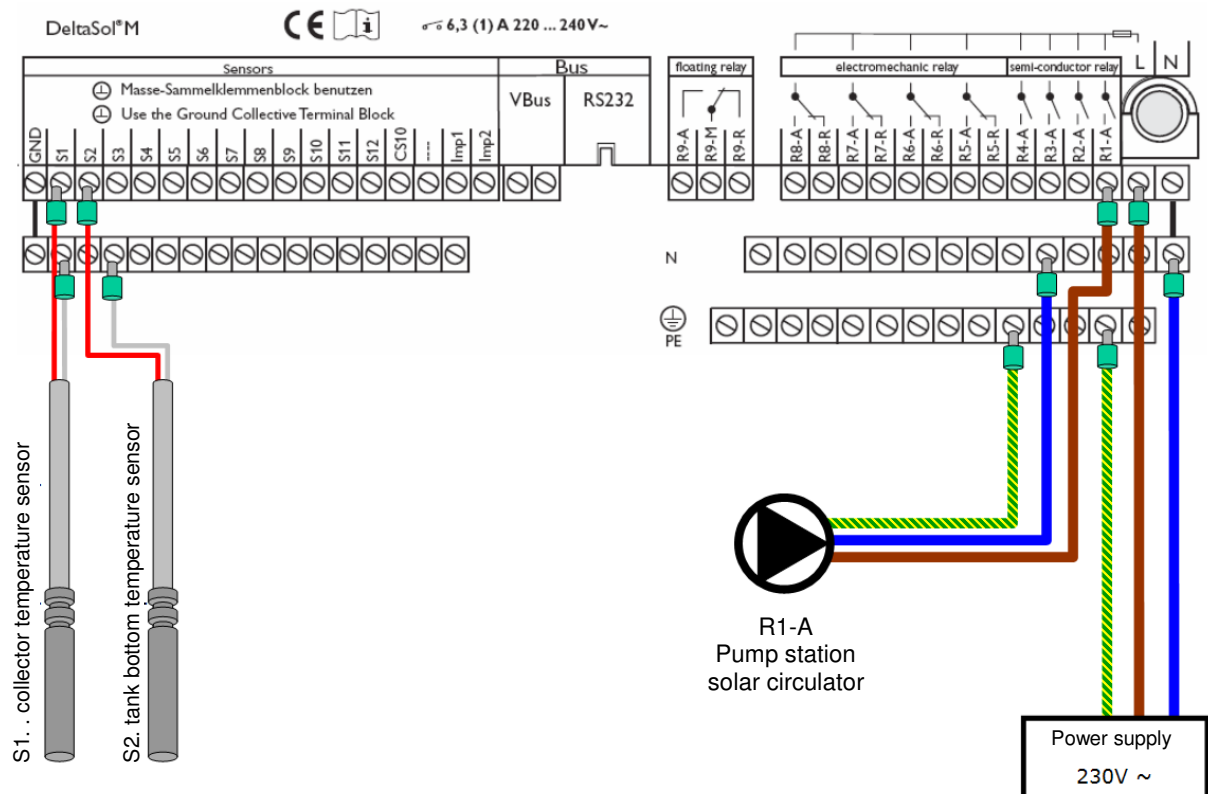


Configure the BS2 controller:

DT 0	6.0 K	Circulator startup differential.
DT F	4.0 K	Circulator stop differential.
DT N	10.0 K	Start of variable speed minimum differential.
AUG	2 K	No 10% increase in variable speed.
R MX	65 °C	Tank temperature setpoint.
LIM	140 °C	Maximum collector safety temperature which stops system.
ORC	ON	Option, collector cooling.
CMX	105 °C	Start of collector cooling setpoint.
OCN	ON	Option, minimum collector temperature before startup.
CMN	20.0 °C	Minimum temperature setpoint for collectors.
OFA	OFF	Option, antifreeze protection.
OREF	ON	Option, tank cooling after overheat cycles.
O CT	OFF	Option, collector sensor irrigation.
OCAL	OFF	Option, calorie metering.
nMN	30	Minimum rpm speed of circulator in variable speed mode.
MAN1	Auto	Automatic, stop or forced operation mode for circulator.
LANG	Fr	Menu language.

✓ **Control by M controller:**

Electrically connect the sensors and the circulator.



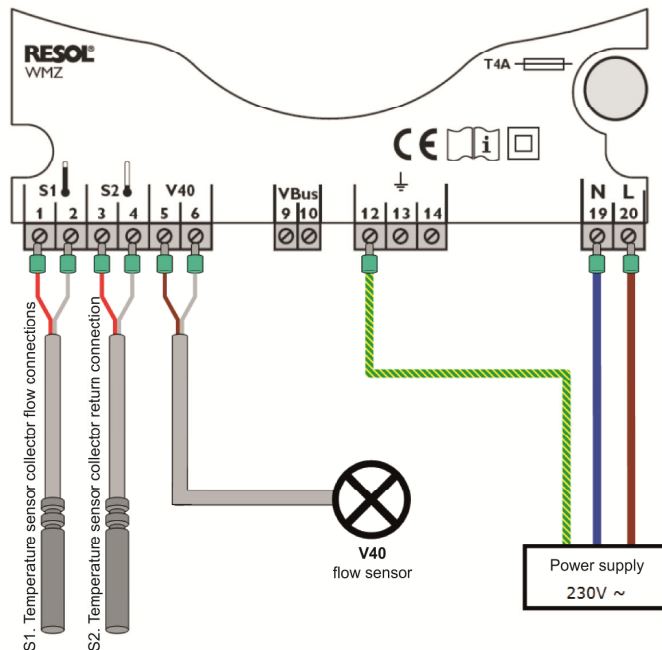
Configure the M controller:

Solar / Options / System	1	System with only 1 collector array controlled.
Solar / Options / Ext. exchanger	No	Trigon Solar: No.
Solar / Options / Collector cooling	Yes	Option, collector cooling.
Solar / Options / Ext. cooling	Yes	Option, tank cooling.
Solar / Setting / MaxTankT	65 °C	Tank temperature setpoint.
Solar / Setting / ΔTon	6.0 K	Circulator startup differential.
Solar / Setting / ΔToff	4.0 K	Circulator stop differential.
Solar / Setting / ΔTsetpoint	10.0 K	Start of variable speed, minimum differential
Solar / Setting / T coll. cooling	105 °C	Collector cooling setpoint.
Solar / Setting / T stop collector	140 °C	Maximum collector safety temperature.
Solar / Expert / T min. coll.	20.0 °C	Minimum collector temperature setpoint.
Solar / Expert / ΔMaxTankT	2.0 K	No 10% increase in pump speed.

3. Electrical connection and configuration of options.

✓ Option - Metering of solar contribution on BS2 controller:

Electrically connect the sensors and the flowmeter on the WMZ module.
Wire the power supply of the WMZ module.

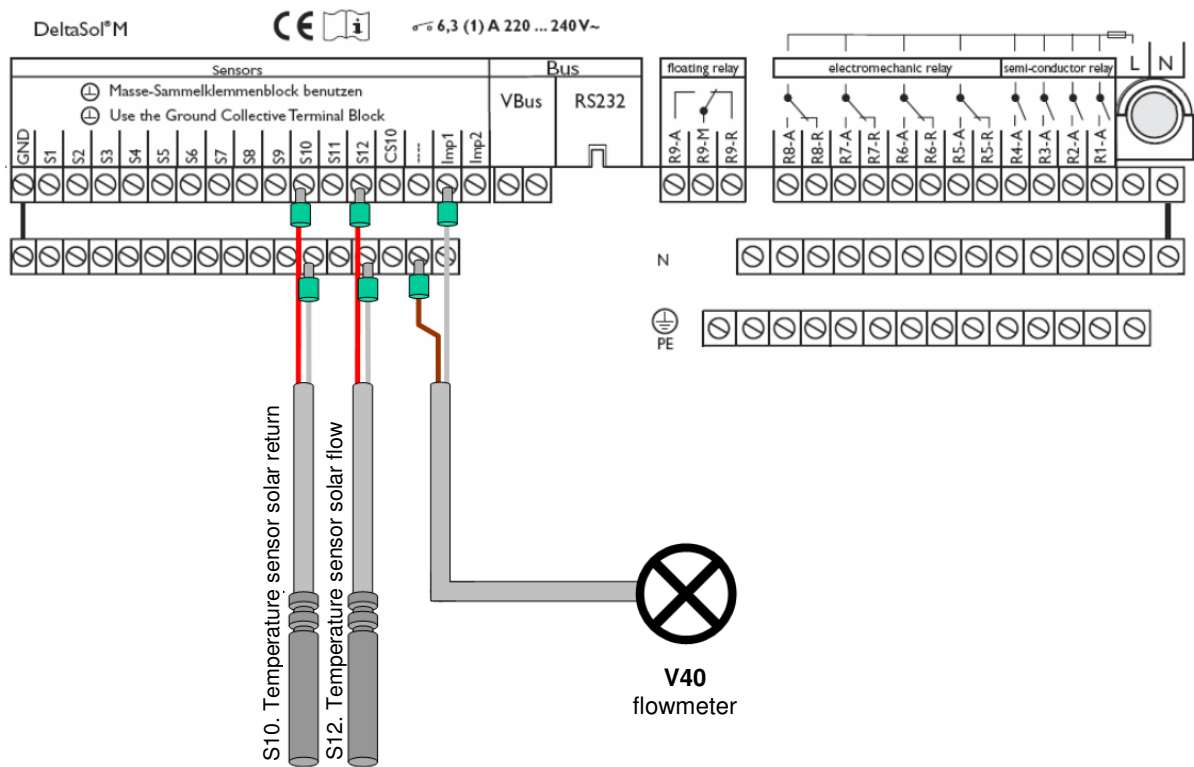


Configure the WMZ meter:

Antifreeze type	water	See value on V40 flowmeter plate on cold water line.
Flowmeter	V40	
Pulse rate	X	
Sensor 1	0.0 K	
Sensor 2	0.0 K	
Language	French	

✓ **Option - Metering of solar contribution on M controller:**

Electrically connect the sensors and the flowmeter on the M controller.

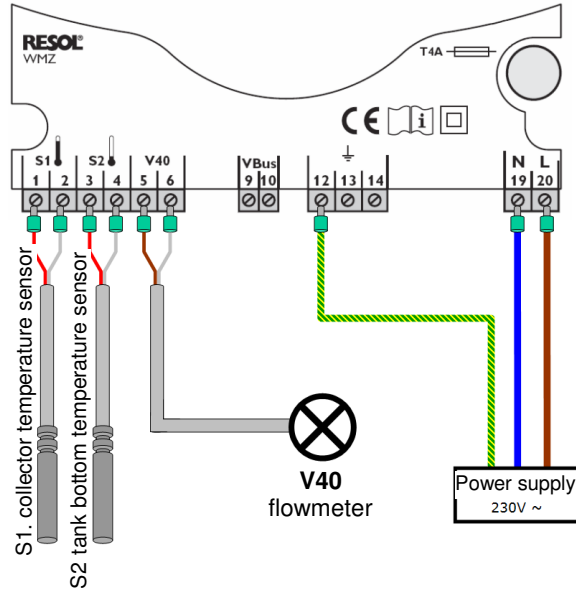


Configure the M controller:

Calorimeter / Options / WMZ1	Yes	
Calorimeter / WMZ 1 / Expert / Adv. sensor	12	
Calorimeter / WMZ 1 / Expert / Ret. sensor	10	
Calorimeter / WMZ 1 / Expert / Antifrze type	0	
Calorimeter / WMZ 1 / Expert / Vol. transm.	Yes	
Calorimeter / WMZ 1 / Expert / Val/Pulse	X	See value on V40 flowmeter plate on cold water line

✓ **Option – Solar Contribution Metering:**

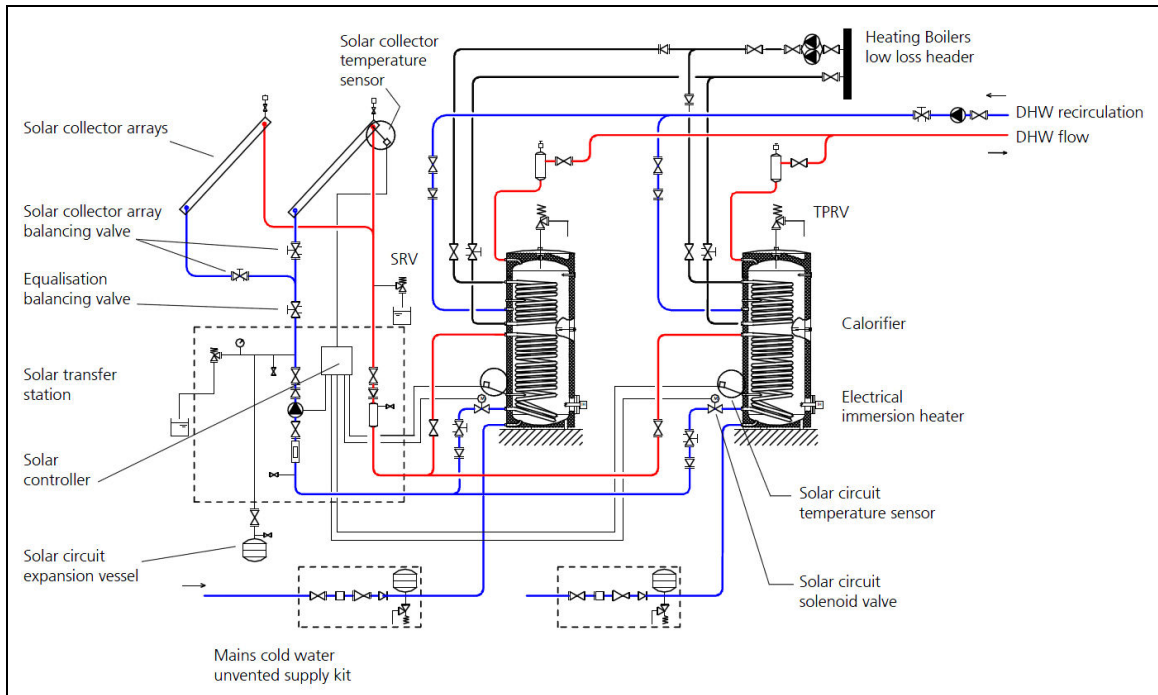
Electrically connect the sensors and the flowmeter on the WMZ module.
Wire the power supply of the WMZ module.



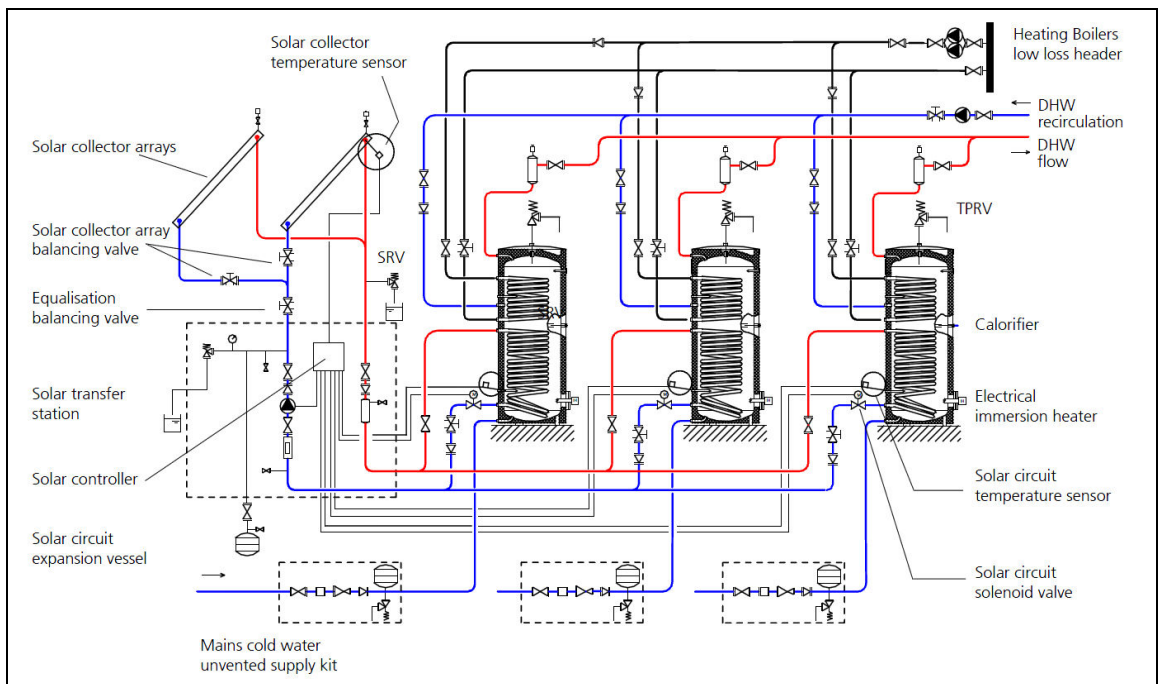
Configure the WMZ meter:

Antifreeze type	water	See value on V40 flowmeter plate on loop circuit.
Flowmeter	V40	
Pulse rate	X	
Sensor 1	0.0 K	
Sensor 2	0.0 K	
Language	English	

4. Diagrams identical to main configuration.



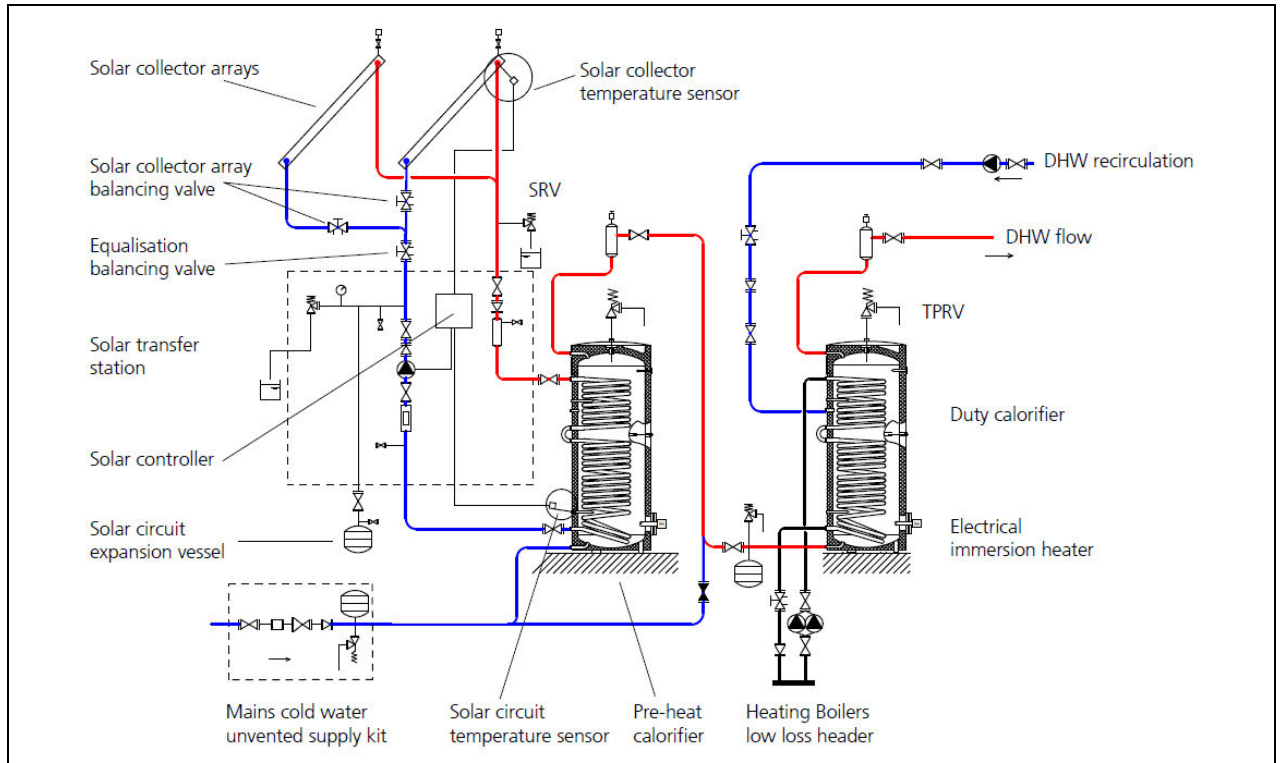
Scheme 2 – Trigon Solar: Twin Indirect Fired Hotwater Calorifiers



Scheme 3 – Trigon Solar: 3 Indirect Fired Hotwater Calorifiers

TRIGON SOLAR: INDEPENDENT SOLAR CALORIFIER

1. Hydraulic Scheme 8

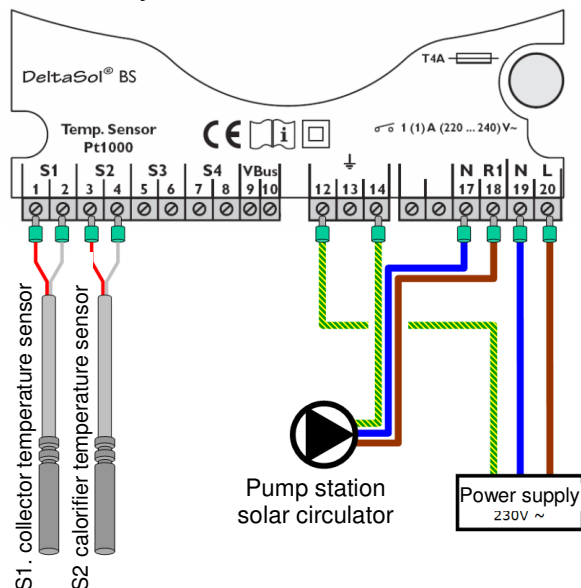


Scheme 8 – Trigon Solar: Solar pre-heat hotwater calorifier + indirect fired hotwater calorifier in series

2. Electrical connection and configuration of controller

✓ **Control by BS2 controller:**

Electrically connect the sensors and the circulator.

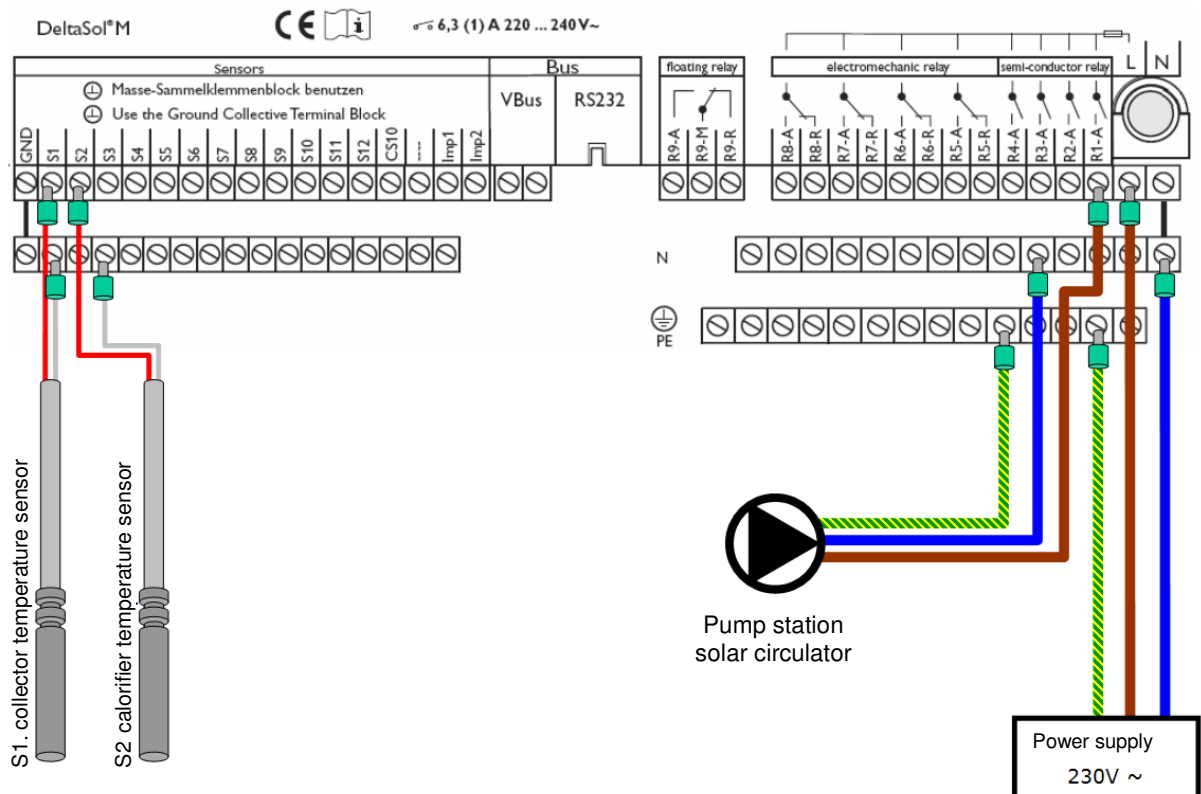


Configure the BS2 controller:

DT 0	6.0 K	Circulator startup differential.
DT F	4.0 K	Circulator stop differential.
DT N	10.0 K	Start of variable speed, minimum differential
AUG	2 K	No 10% increase in variable speed.
R MX	65 °C	Tank temperature setpoint.
LIM	140 °C	Maximum collector safety temperature which stops system
ORC	ON	Option, collector cooling.
CMX	105 °C	Start of collector cooling setpoint.
OCN	ON	Option, minimum collector temperature before startup.
CMN	20.0 °C	Minimum temperature setpoint for collectors.
OFA	OFF	Option, antifreeze protection.
OREF	ON	Option, tank cooling after overheat cycles.
O CT	OFF	Option, collector sensor irrigation.
OCAL	OFF	Option, calorie metering.
nMN	30	Minimum rpm speed of circulator in variable speed mode.
MAN1	Auto	Automatic, stop or forced operation mode for circulator.
LANG	Fr	Menu language.

✓ **Control by M controller:**

Electrically connect the sensors and the circulator.



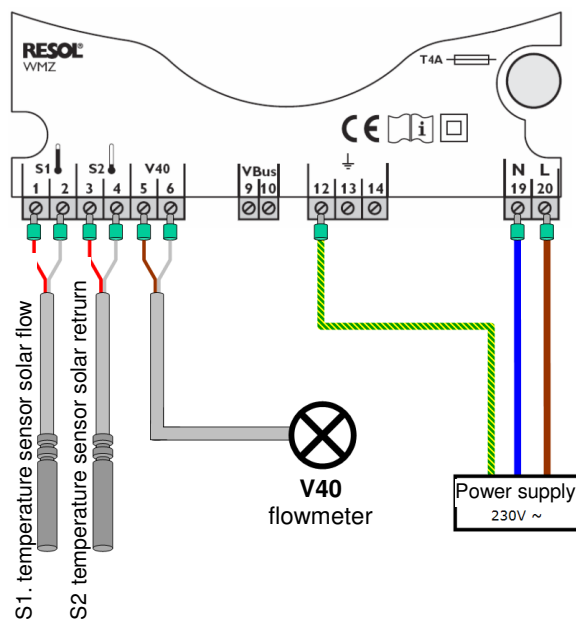
Configure the M controller:

Solar / Options / System	1	System with only 1 collector array controlled.
Solar / Options / Ext. exchanger	No	Trigon Solar: No.
Solar / Options / Collector cooling	Yes	Option, collector cooling.
Solar / Options / Ext. cooling	Yes	Option, tank cooling.
Solar / Setting / MaxTankT	65 °C	Tank temperature setpoint.
Solar / Setting / ΔTon	6.0 K	Circulator startup differential.
Solar / Setting / ΔToff	4.0 K	Circulator stop differential.
Solar / Setting / ΔTsetpoint	10.0 K	Start of variable speed, minimum differential
Solar / Setting / T coll. cooling	105 °C	Collector cooling setpoint.
Solar / Setting / T stop collector	140 °C	Maximum collector safety temperature.
Solar / Expert / T min. coll.	20.0 °C	Minimum collector temperature setpoint.
Solar / Expert / ΔMaxTankT	2.0 K	No 10% increase in pump speed.

3. Electrical connection and configuration of options.

✓ Option - Metering of solar contribution on BS2 controller:

Electrically connect the sensors and the flowmeter on the WMZ module.
Wire the power supply of the WMZ module.

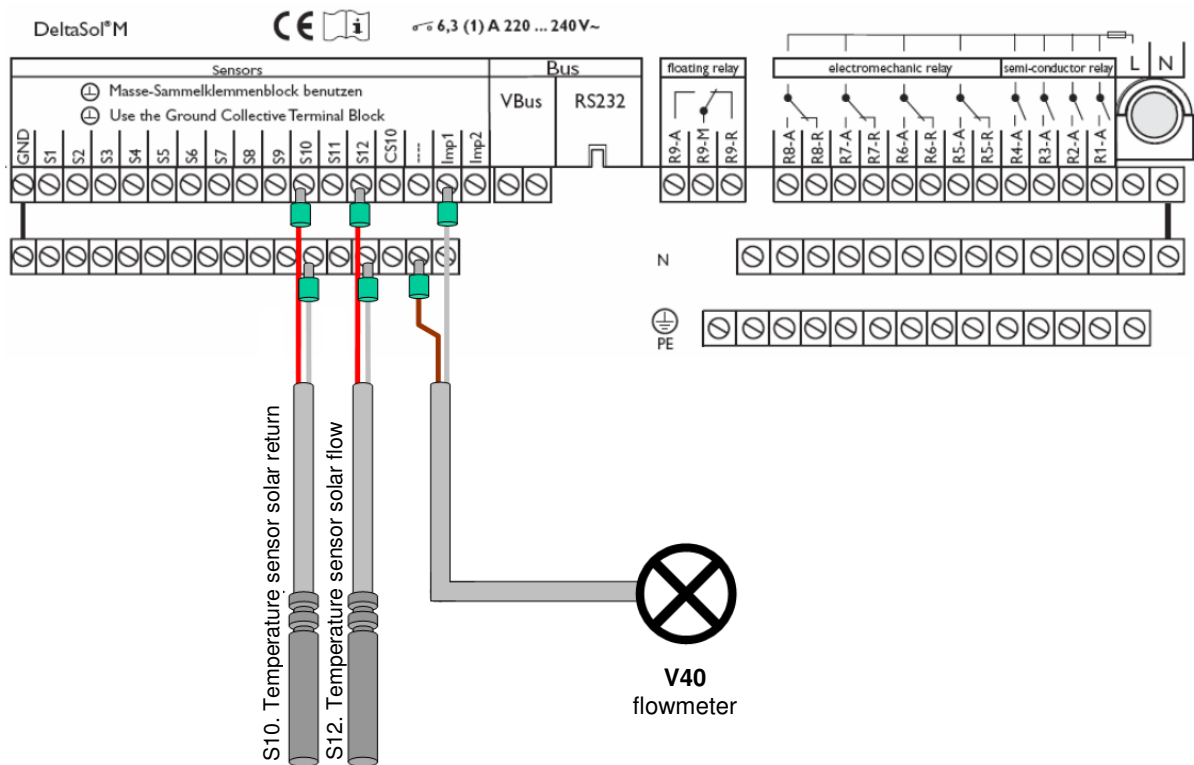


Configure the WMZ meter:

Antifreeze type	water	See value on V40 flowmeter plate on cold water line.
Flowmeter	V40	
Pulse rate	X	
Sensor 1	0.0 K	
Sensor 2	0.0 K	
Language	English	

✓ **Option - Metering of solar contribution on M controller:**

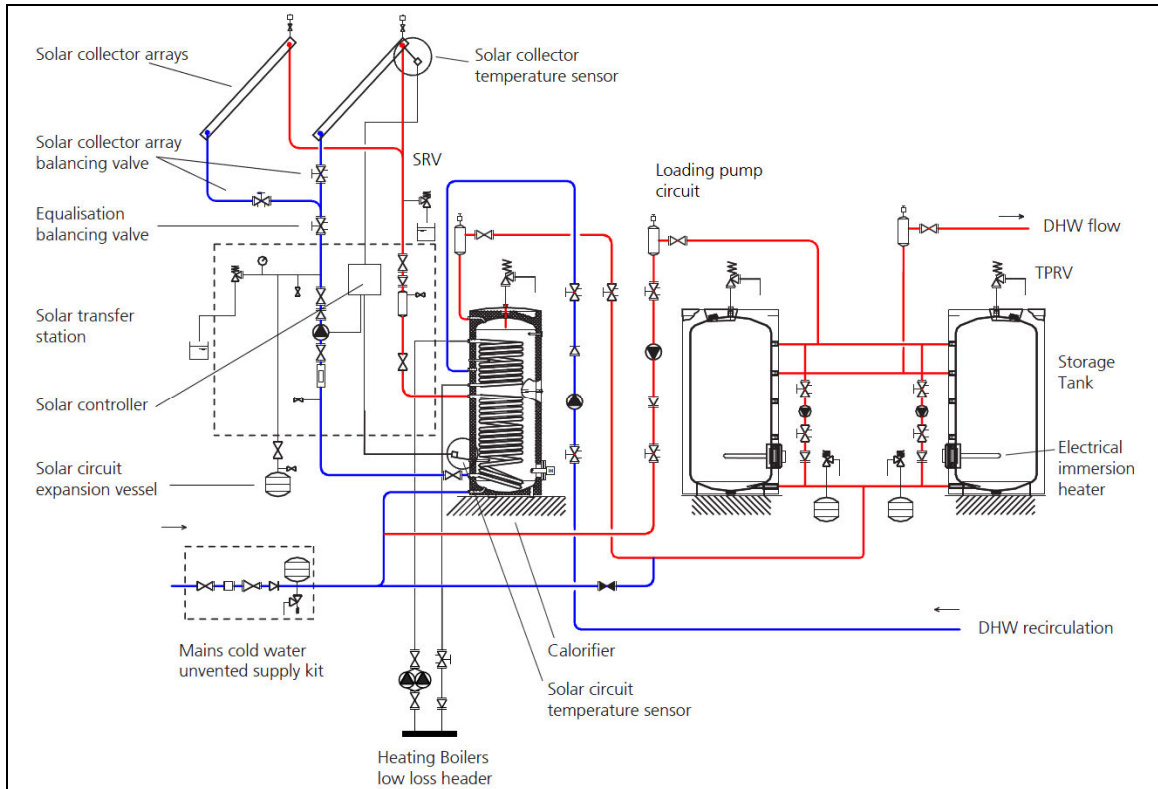
Electrically connect the sensors and the flowmeter on the M controller.



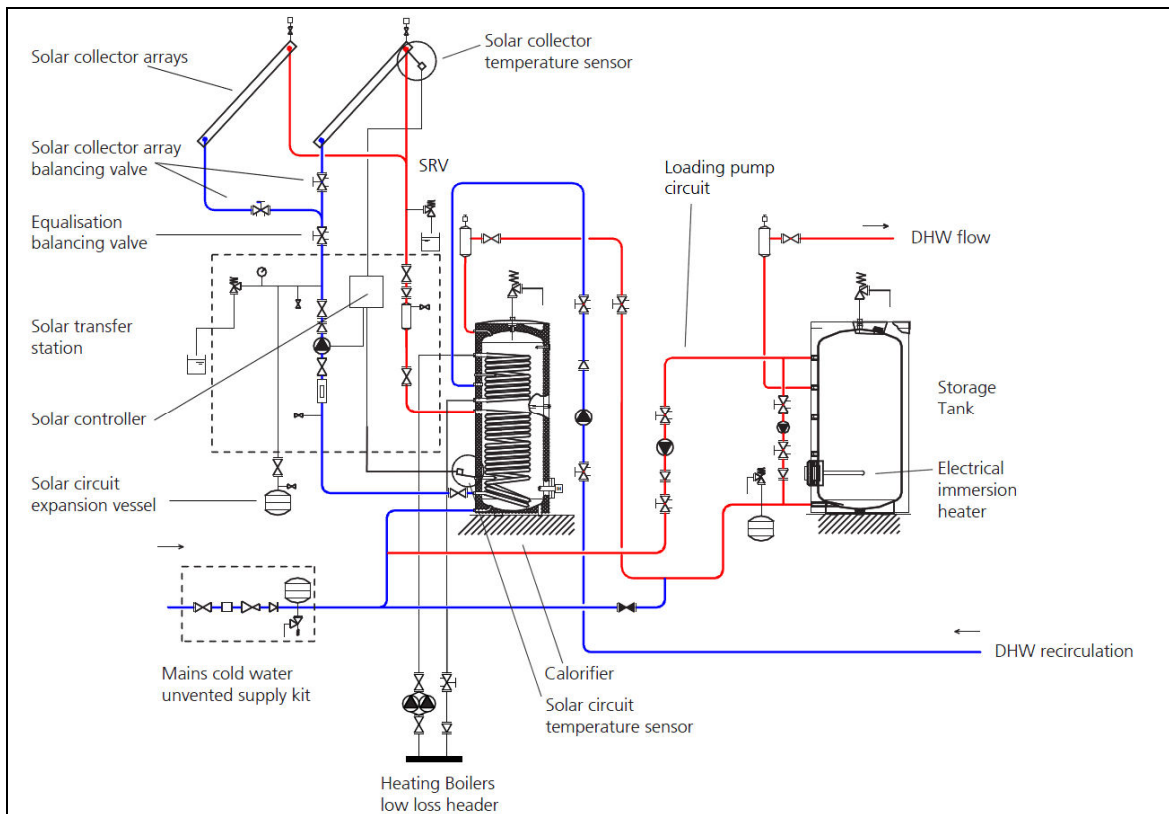
Configure the M controller:

Calorimeter / Options / WMZ1	Yes	
Calorimeter / WMZ 1 / Expert / Adv. sensor	12	
Calorimeter / WMZ 1 / Expert / Ret. sensor	10	
Calorimeter / WMZ 1 / Expert / Antifrze type	0	
Calorimeter / WMZ 1 / Expert / Vol. transm.	Yes	
Calorimeter / WMZ 1 / Expert / Val/Pulse	X	See value on V40 flowmeter plate on cold water line

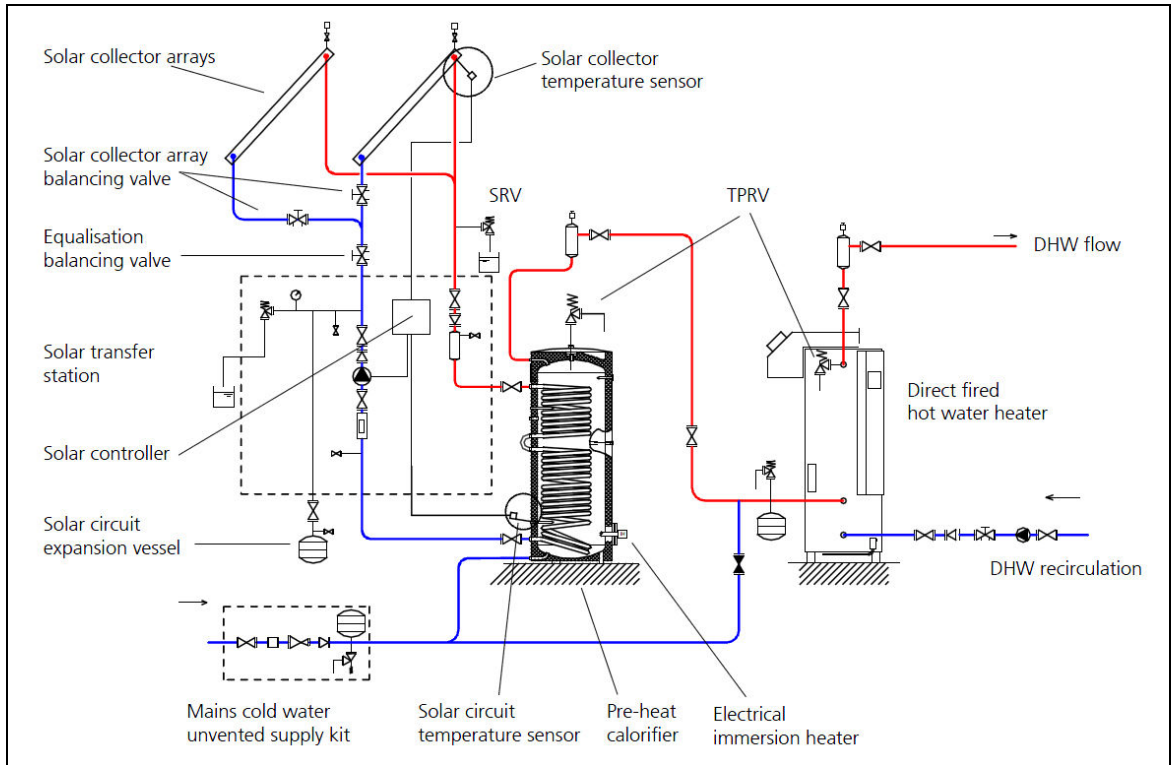
4. Diagrams identical to main configuration.



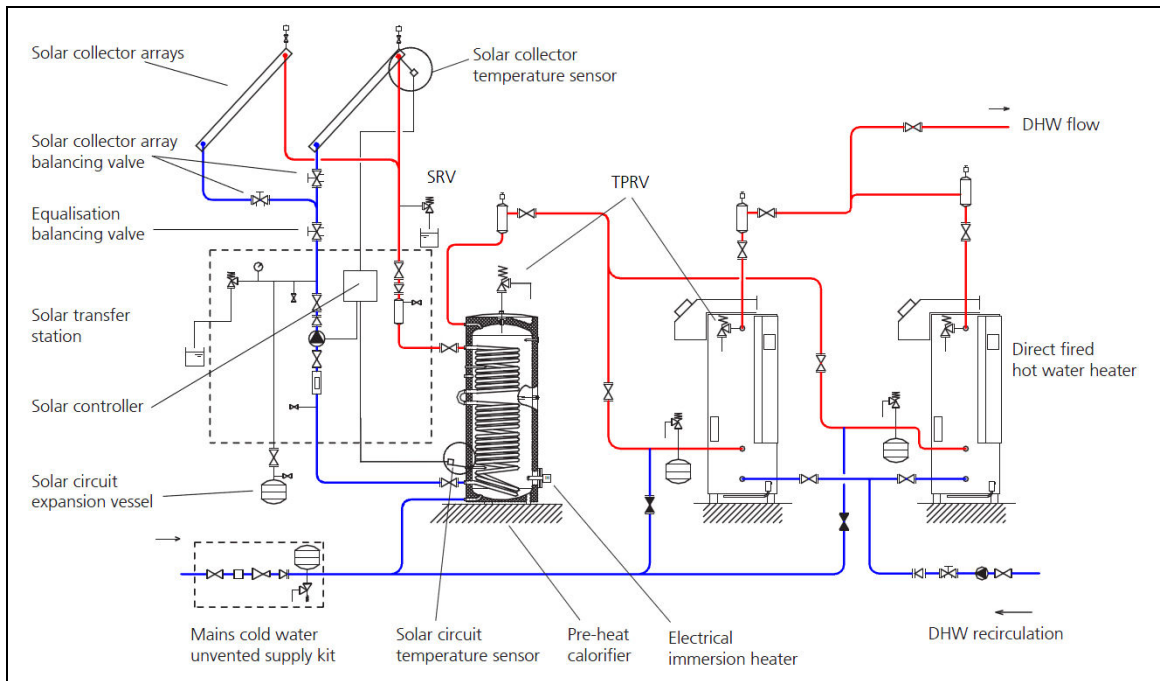
Scheme 4 – Trigon Solar: Independent solar hotwater calorifier, 2 additional storage tanks



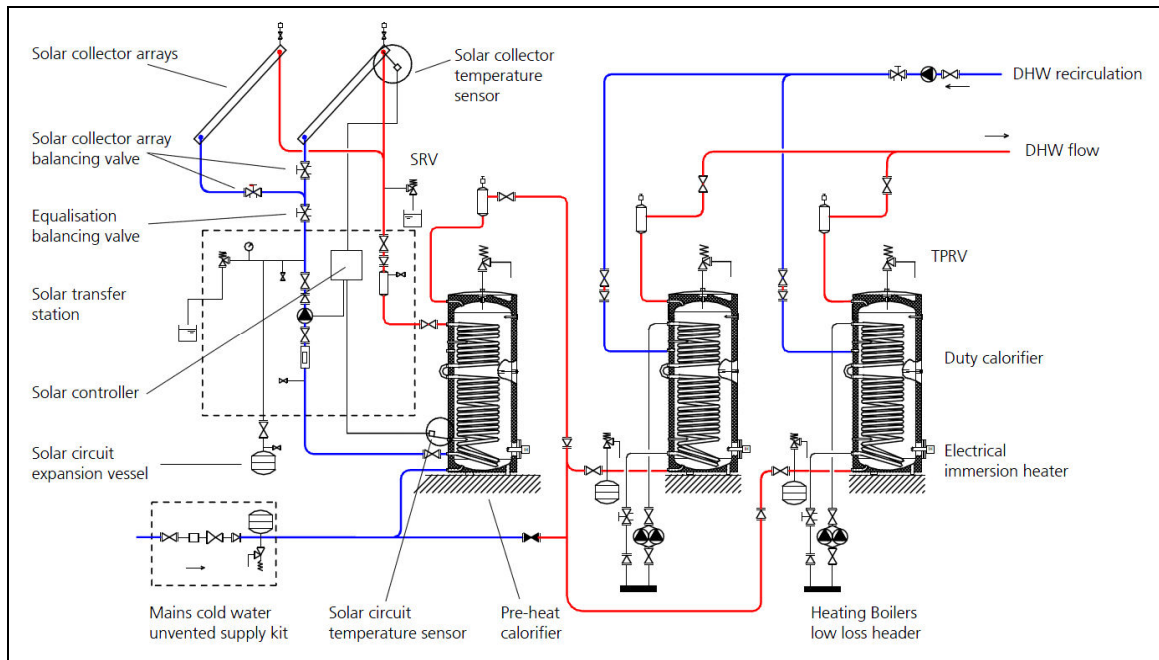
Scheme 5 – Trigon Solar: Independent solar hotwater calorifier, additional storage tank



Scheme 6 – Trigon Solar: Solar pre-heat hotwater calorifier and direct fired water heater



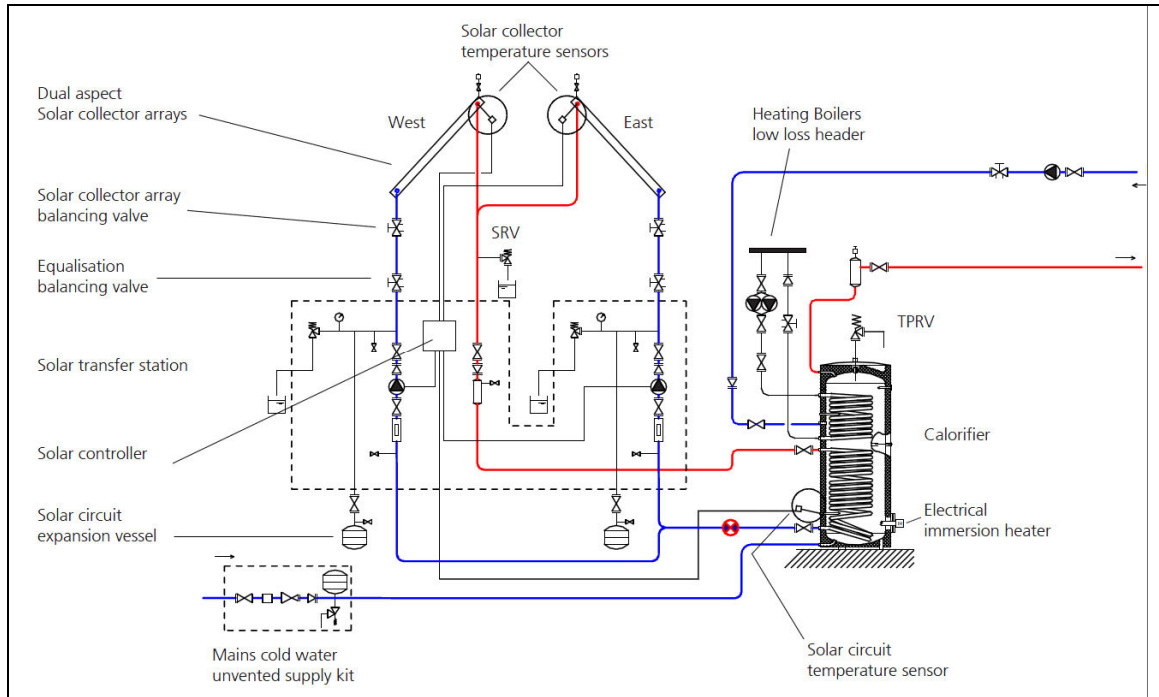
Scheme 7 – Trigon Solar: Solar pre-heat hotwater calorifier and two direct fired water heaters



Scheme 9 – Trigon Solar: Solar pre-heat hotwater calorifier and two indirect fired hotwater calorifiers

TRIGON SOLAR: SYSTEM WITH 2 COLLECTOR ARRAYS WITH EAST-WEST ORIENTATION

1. Hydraulic Scheme 10

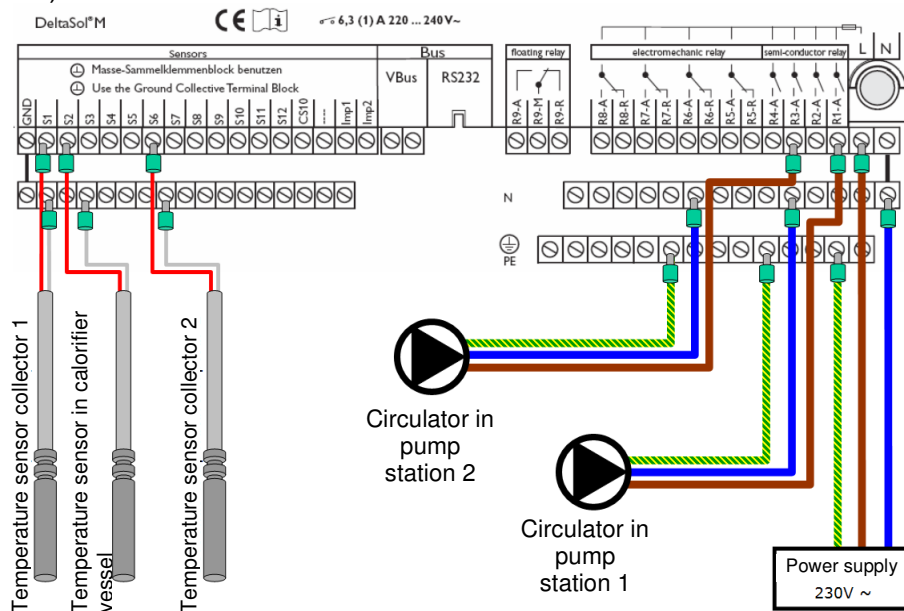


Scheme 10 – Trigon Solar: System with 2 collector arrays with East-West orientation feeding bottom coil of hot water calorifier and indirect heating on top coil

2. Electrical connection and configuration of controller.

✓ **Control by M controller only:**

Electrically connect the sensors and the circulators (S1 controls R1, S6 controls R3).

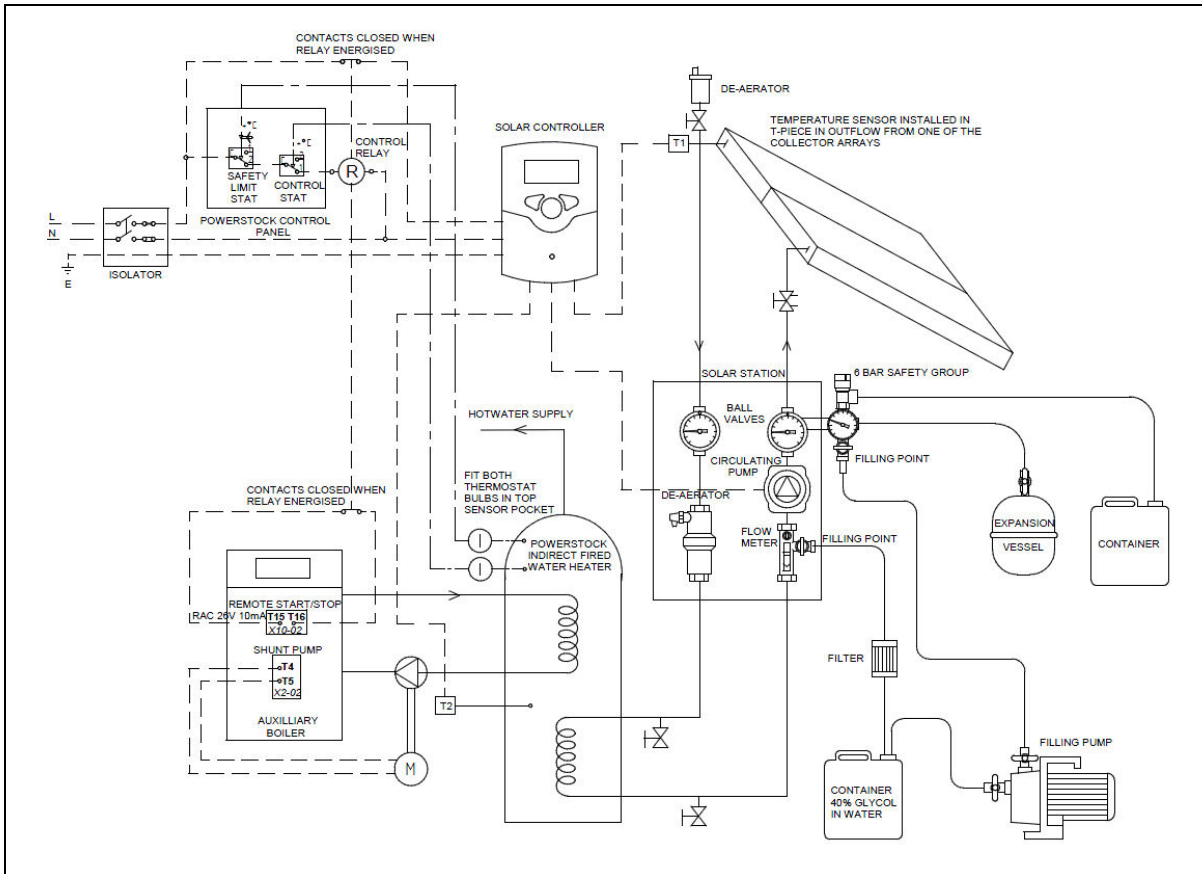


Configure the M controller:

Solar / Options / System	2	System with 2 collector arrays.
Solar / Options / Ext. exchanger	No	
Solar / Options / Collector cooling	Yes	Option, collector cooling.
Solar / Options / Ext. cooling	Yes	Option, tank cooling.
Solar / Setting / MaxTankT	65 °C	Tank temperature setpoint.
Solar / Setting / ΔTon	6.0 K	Circulator startup differential.
Solar / Setting / ΔToff	4.0 K	Circulator stop differential.
Solar / Setting / ΔTsetpoint	10.0 K	Start of variable speed, minimum differential
Solar / Setting / T coll. cooling	105 °C	Collector cooling setpoint.
Solar / Setting / T stop collector	140 °C	Maximum collector safety temperature.
Solar / Expert / T min. coll.	20.0 °C	Minimum temperature setpoint for collector 1.
Solar / Expert / T coll2 min.	20.0 °C	Minimum temperature setpoint for collector 2.
Solar / Expert / ΔMaxTankT	2.0 K	No 10% increase in pump speed.

INTERLOCKING A CALORIFIER LIMIT THERMOSTAT WITH SOLAR CONTROLS AND BOILER CONTROLS

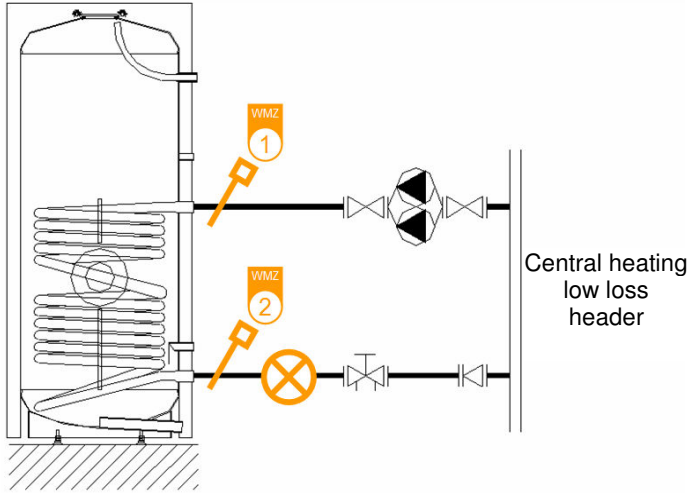
1. Wiring diagram



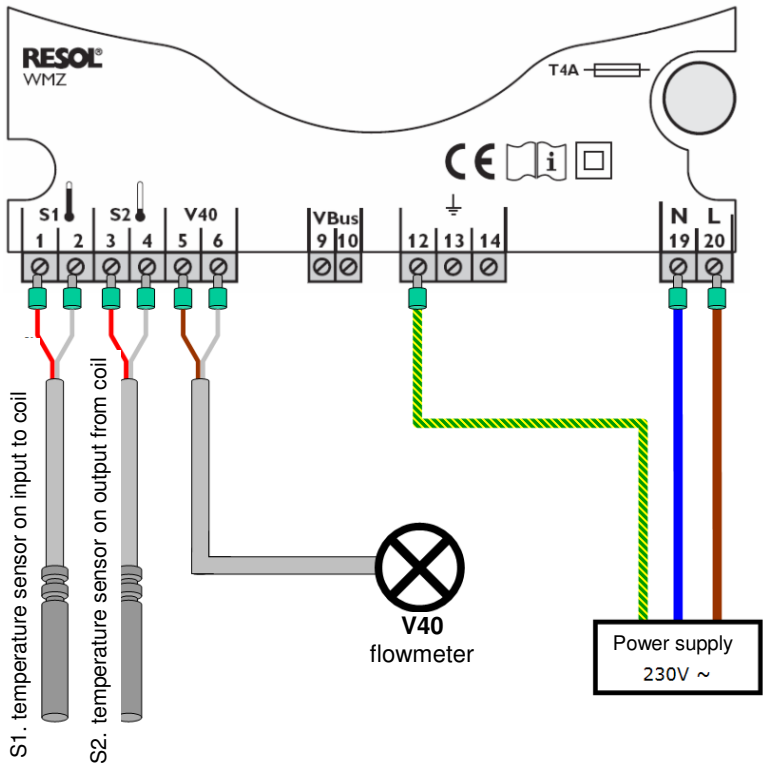
Scheme 11 – Limit-stat of hot water calorifier interlocked to the mains supply of a trigon solar controller & auxillary heat boiler

This wiring diagram shows how the high temperature limit-stat of a hot water calorifier is interlocked with the electrical mains supply of a Trigon Solar controller and also with the remote start/stop of Hamworthy Heating Ltd gas boiler with Siemens LMU control.

Metering of an additional hydraulic supply



Electrically connect the sensors and the flowmeter on the WMZ module.
Wire the power supply of the WMZ module.

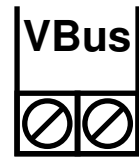


Configure the WMZ meter:

Antifreeze type	water	See value on V40 flowmeter plate on loop circuit.
Flowmeter	V40	
Pulse rate	X	
Sensor 1	0.0 K	
Sensor 2	0.0 K	
Language	French	

Bus link for data recording devices

The controller (BS2 or M) and the WMZ calorimeters must be connected to the datalogger DL2 to allow it to record the system information. The various devices are connected via VBus connectors.



Connection WITHOUT WMZ calorimeter

Connect the VBus wire of the recorder directly to the VBus terminal strip of the controller.



Connection WITH WMZ calorimeter(s)

- Connect the various devices using the VBus connectors.



- Check that the WMZ calorimeters are equipped with « slave » panels (identified by a white « J » stamp). If they are equipped with “master” panels (identified by a white “B” stamp), proceed as instructed in the manual for the WMZ calorimeter to replace the panel.

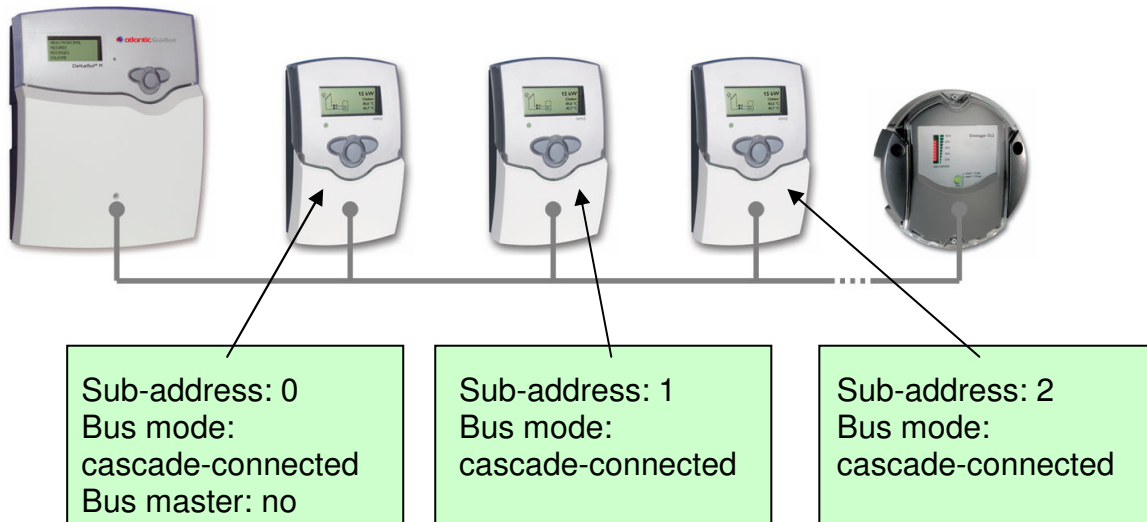
- Configure the WMZ calorimeters:

1 st WMZ calorimeter		following WMZ meters	
Sub-address	0	Sub-address	1...15 *
Bus mode	Cascade-connected	Bus mode	Cascade-connected
Bus master	no		

* The sub-addresses must always follow each other.

Configuration example:

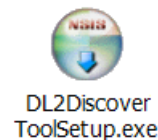
M controller connected to 3 WMZ calorimeters (loop metering, solar loop metering, discharge metering).



Connection to datalogger DL2

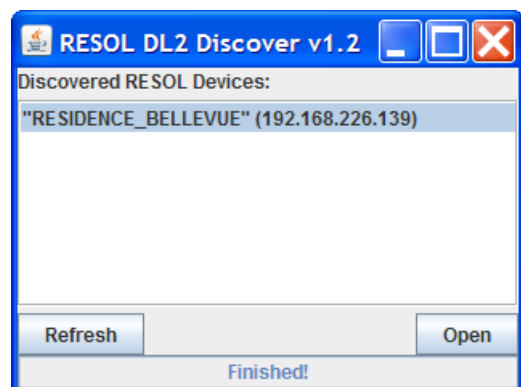
This operation requires a computer equipped with a CD-ROM drive and an RJ45 network connector.

On the computer, install the datalogger detection software by opening the « DL2DiscoverToolSetup.exe » program located in the « DL2DiscoverTool » folder at the root of the CD-ROM.



Connect the RJ45 network cable between the datalogger DL2 and the computer. Run the « DL2-Discover-Tool » application installed on the computer.

The application searches for the datalogger DL2 connected to the computer. Once found, the datalogger DL2 is displayed in the window (close and relaunch the application several times as may be required if the application does not find the datalogger DL2). Select the datalogger by clicking (here « Residence_Bellevue ») then click on « Open ».



The default web browser opens and requests authentication. Enter « admin » as user name and password.

The datalogger homepage opens. Click on the English flag to display the menus in English. Then, click on the « Configuration » tab to configure the datalogger.

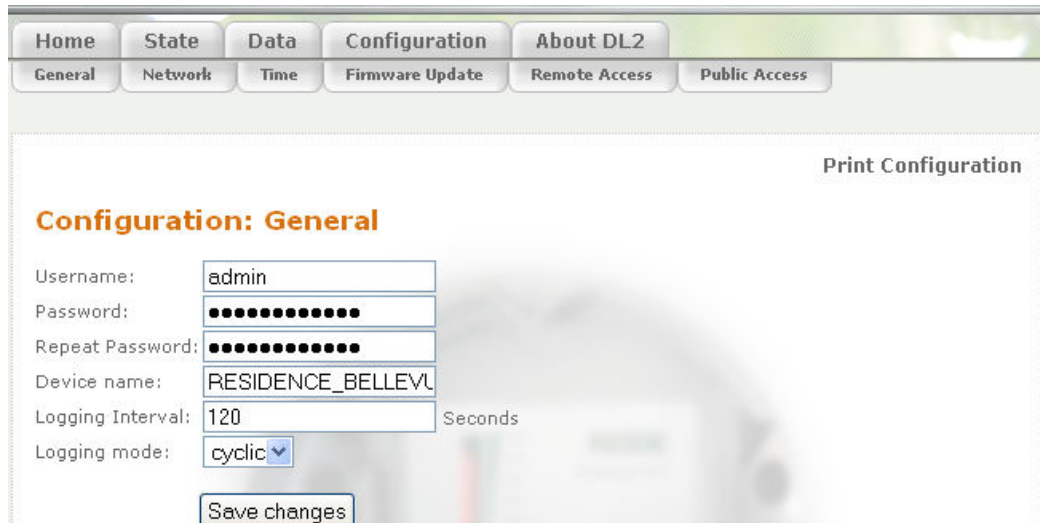
Configuration of datalogger DL2

In the « Configuration » tab, click « General ».

Enter the name of the unit (for example « Residence Bellevue »).

Set the recording interval; the shorter the interval, the more the memory is used. An interval of 3600 seconds is sufficient to have a look at how the temperatures evolve in the system and to read the energy meters.

Click « Save changes ». The save is confirmed by a message.

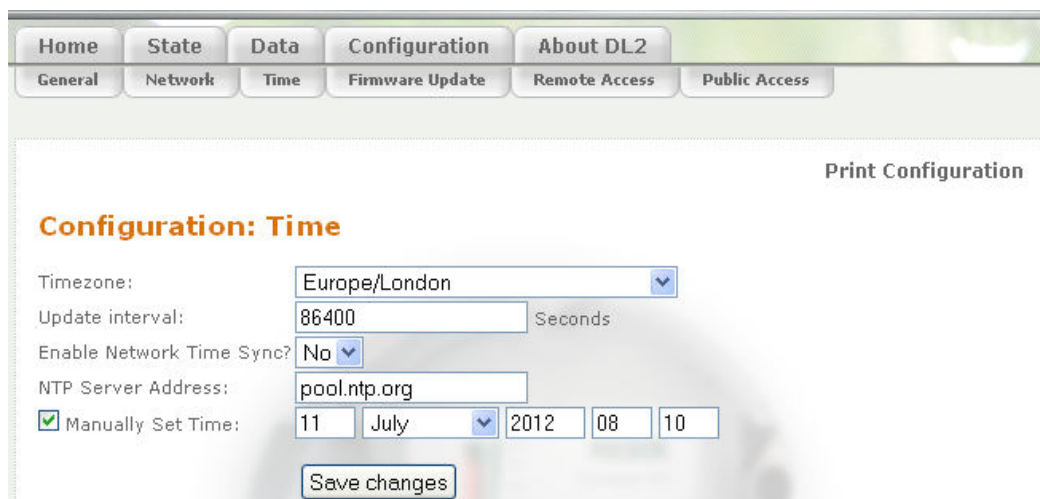


The screenshot shows the configuration interface for the datalogger DL2. The 'Configuration' tab is selected, and the 'General' sub-tab is active. The interface includes a navigation bar with tabs for Home, State, Data, Configuration, and About DL2. Under the Configuration tab, there are sub-tabs for General, Network, Time, Firmware Update, Remote Access, and Public Access. The 'General' configuration page is titled 'Configuration: General' and features a 'Print Configuration' link. The form contains the following fields: Username (admin), Password (masked with dots), Repeat Password (masked with dots), Device name (RESIDENCE_BELLEVL), Logging Interval (120 Seconds), and Logging mode (cyclic). A 'Save changes' button is located at the bottom of the form.

In the « Configuration » tab, click « Time ».

Set the time zone.

Manually set the time: tick « manual set time » then enter the current date and time.



The screenshot shows the configuration interface for the datalogger DL2, specifically the 'Time' sub-tab. The 'Configuration' tab is selected, and the 'Time' sub-tab is active. The interface includes a navigation bar with tabs for Home, State, Data, Configuration, and About DL2. Under the Configuration tab, there are sub-tabs for General, Network, Time, Firmware Update, Remote Access, and Public Access. The 'Time' configuration page is titled 'Configuration: Time' and features a 'Print Configuration' link. The form contains the following fields: Timezone (Europe/London), Update interval (86400 Seconds), Enable Network Time Sync? (No), NTP Server Address (pool.ntp.org), and a 'Manually Set Time' checkbox which is checked. The date and time are set to 11 July 2012, 08:10. A 'Save changes' button is located at the bottom of the form.

Click the « Data » tab; the navigator displays the installation data. Check that all the data appears: controller data (BS2 or M) and WMZ calorimeter data if applicable.

Recovering data recorded using an SD card

The data recorded in the DL2 memory can be recovered using an SD card.

1. Insert the SD card in the slot.
2. The status LED flashes green. This means that the card has been detected and that the data is automatically being transferred to the card.
3. Once the data has been transmitted to the SD card, the status LED stays on steady (green); the SD card can be removed.

Processing data recovered using an SD card

The data on the SD card is encoded. You must install the RESOL Service Center software (supplied on CDROM with datalogger DL2) to convert the data:

1. Launch the « Service Center » software,
2. Click the « VBus recording » tab,
3. Insert the SD card in the card reader of the computer,
4. Click the « Process DL2 SD-card data » button,
5. Indicate the location of the SD card in « Source filename »,
6. Indicate the location of the destination file in « Output filename »,
7. The data are converted into a text file (TXT type).

Column title meanings:

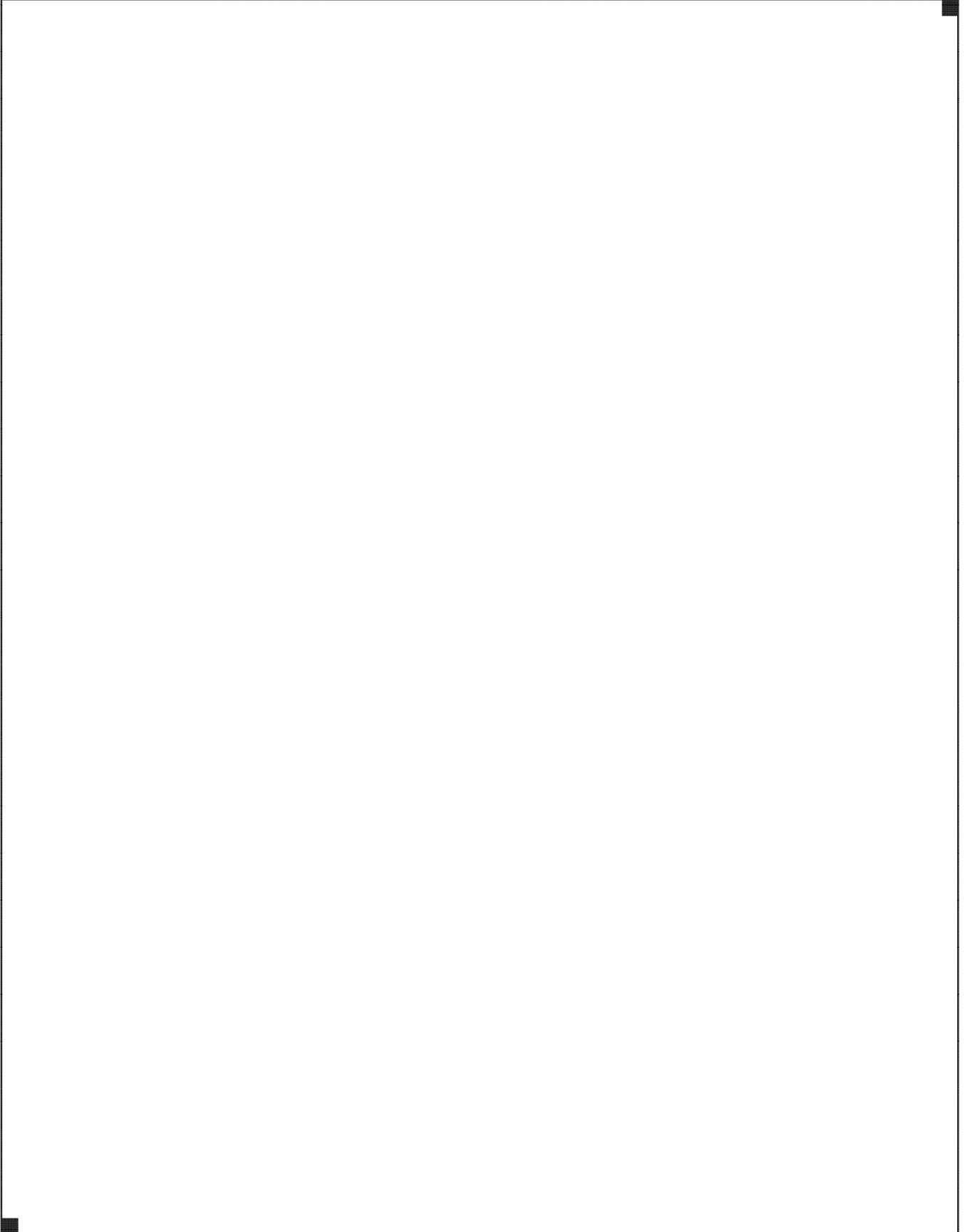
Date	Data record date (controller date),
Temperatur Sensor X	Temperature of sensor number X,
Einstrahlung	Sunlight on twilight sensor CS10,
Impulseingang	- not used -
Sensorbruchmaske	- not used -
Sensorkurzschlussmaske	- not used -
Sensorbenutzungsmaske	- not used -
Drehzahl Relais X	Speed of circulator X (percentage of max. speed)
Relaisbenutzungsmaske	- not used -
Fehlermaske	- not used -
Warnungsmaske	- not used -
Reglerversion	controller program version
Systemzeit	data record date (DL2 date),
Vorlauftemperatur	outlet sensor temperature (calorimeter)
Rücklauftemperatur	return sensor temperature (calorimeter)
Volumenstrom	instantaneous flowrate at time of recording
Wärme	Combined quantity of heat (in Wh, kWh and MWh)

Notes

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Hamworthy Heating Accredited Agents

North West England (Sales & Service)

Gillies Modular Services
210-218 New Chester Road, Birkenhead, Merseyside L41 9BG
tel: **0151 666 1030** fax: **0151 647 8101**

Southern Ireland (Sales & Service)

HEVAC Limited
Naas Road, Dublin 12, Ireland
tel: **00 353 141 91919** fax: **00 353 145 84806**

Northern Ireland (Sales & Service)

HVAC Supplies Limited
Unit 12 forty 8 north, 48 Duncrue Street, Belfast BT3 9BJ
tel: **02890 747737** fax: **02890 741233**

Scotland (Sales & Service)

McDowall Modular Services
14-46 Lomond Street, Glasgow, Scotland G22 6JD
tel: **0141 336 8795** fax: **0141 336 8954**

North East England (Service)

Allison Heating Products
12 Sunnyside Lane, Cleadon Village, Sunderland SR6 7XB
tel: **0191 536 8833** fax: **0191 536 9933**

For all other areas, please contact Hamworthy Heating Customer Service Centre in Poole.



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