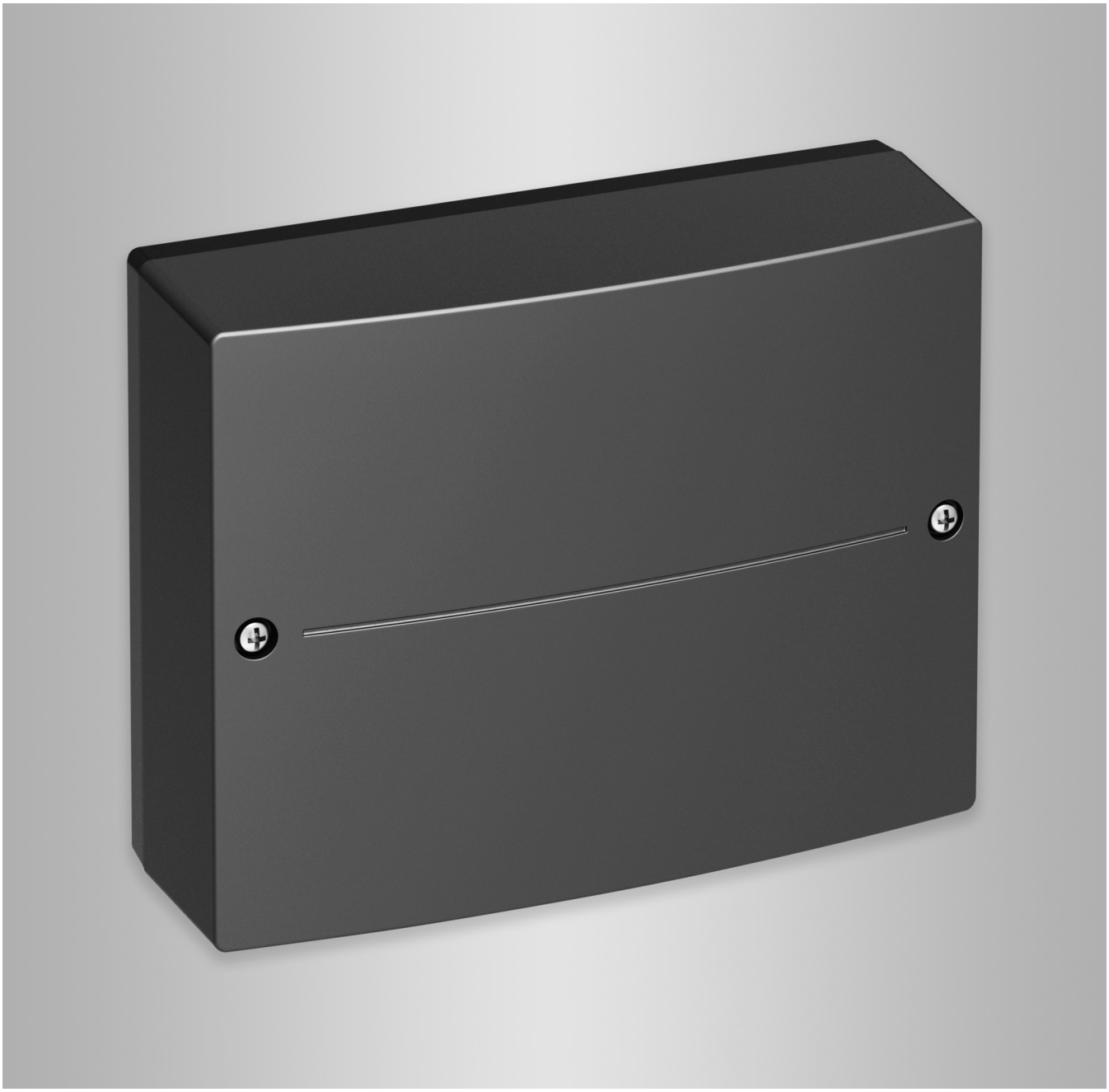
Installation and service instructions

for contractors

SDIO/SM1A electronics module

- In conjunction with the Vitotronic control unit or HMU heat management unit
- For controlling and regulating a solar DHW heating system
- Solar functions:
  - With central heating backup
  - With preheating of 2nd cylinder/DHW cylinder
  - With thermostat function
  - With interval function

SDIO/SM1A electronics module



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Please keep safe.

Safety instructions

⚠ Please follow these safety instructions closely to prevent accidents and material losses.

Safety instructions explained

⚠ **Danger**
This symbol warns against the risk of injury.

! **Please note**
This symbol warns against the risk of material losses and environmental pollution.

Note
Details identified by the word "Note" contain additional information.

Target group

These instructions are exclusively intended for qualified contractors.

- Work on gas installations may only be carried out by a registered gas fitter.
- Work on electrical equipment may only be carried out by a qualified electrician.
- The system must be commissioned by the system installer or a qualified person authorised by the installer.

Regulations to be observed

- National installation regulations
- Statutory regulations for the prevention of accidents
- Statutory regulations for environmental protection
- Codes of practice of the relevant trade associations
- Relevant country-specific safety regulations

Safety instructions for working on the system

Working on the system

- Where gas is used as the fuel, close the main gas shut-off valve and safeguard it against unintentional reopening.
- Isolate the system from the power supply, e.g. by removing the separate fuse or by means of a mains isolator, and check that it is no longer live.
- Safeguard the system against reconnection.
- Wear suitable personal protective equipment when carrying out any work.

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Safety instructions (cont.)

⚠ **Danger**
Hot surfaces and fluids can lead to burns or scalding.
- Before maintenance and service work, switch OFF the appliance and let it cool down.
- Never touch hot surfaces on the boiler, burner, flue system or pipework.

! **Please note**
Electronic assemblies can be damaged by electrostatic discharge. Prior to commencing work, touch earthed objects such as heating or water pipes to discharge static loads.

Repair work

! **Please note**
Repairing components that fulfil a safety function can compromise the safe operation of the system. Replace faulty components only with genuine Viessmann spare parts.

Auxiliary components, spare and wearing parts

! **Please note**
Spare and wearing parts that have not been tested together with the system can compromise its function. Installing non-authorised components and making non-approved modifications or conversions can compromise safety and may invalidate our warranty.
For replacements, use only original spare parts supplied or approved by Viessmann.

Safety instructions (cont.)

Safety instructions for operating the system

If you smell gas

Danger
Escaping gas can lead to explosions which may result in serious injury.
- Do not smoke. Prevent naked flames and sparks. Never switch lights or electrical appliances on or off.
- Close the gas shut-off valve.
- Open windows and doors.
- Evacuate any people from the danger zone.
- Notify your gas or electricity supply utility from outside the building.
- Have the power supply to the building shut off from a safe place (outside the building).

If you smell flue gas

Danger
Flue gas can lead to life threatening poisoning.
- Shut down the heating system.
- Ventilate the installation site.
- Close doors to living spaces to prevent flue gases from spreading.

What to do if water escapes from the appliance

Danger
If water escapes from the appliance there is a risk of electrocution.
Switch OFF the heating system at the external isolator (e.g. fuse box, domestic distribution board).

Danger
If water escapes from the appliance there is a risk of scalding.
Never touch hot heating water.

Condensate

Danger
Contact with condensate can be harmful to health.
Never let condensate touch your skin or eyes and do not swallow it.

Flue systems and combustion air

Ensure that flue systems are clear and cannot be sealed, for instance due to accumulation of condensate or other external causes.
Ensure an adequate supply of combustion air.
Inform system users that subsequent modifications to the building characteristics are not permissible (e.g. cable/pipework routing, cladding or partitions).

Danger
Leaking or blocked flue systems, or an inadequate supply of combustion air can cause life threatening poisoning from carbon monoxide in the flue gas.
Ensure the flue system is in good working order. Vents for supplying combustion air must be non-sealable.

Extractors

Operating appliances that exhaust air to the outside (extractor hoods, extractors, air conditioning units, etc.) can create negative pressure. If the boiler is operated at the same time, this can lead to a reverse flow of flue gas.

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Safety instructions (cont.)

⚠ **Danger**
The simultaneous operation of the boiler and appliances that exhausts air to the outside can result in life threatening poisoning due to a reverse flow of flue gas.
Fit an interlock circuit or take suitable steps to ensure an adequate supply of combustion air.

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Index (cont.)

Disposal of packaging

Please dispose of packaging waste in line with statutory regulations.

Symbols

Symbol	Meaning
	Reference to other document containing further information
	Step in a diagram: The numbers correspond to the order in which the steps are carried out.
	Warning of material losses and environmental pollution
	Live electrical area
	Pay particular attention.
	▪ Component must audibly click into place. or ▪ Acoustic signal
	▪ Fit new component. or ▪ In conjunction with a tool: Clean the surface.
	Dispose of component correctly.
	Dispose of component at a suitable collection point. Do **not** dispose of component in domestic waste.

The steps in connection with commissioning, inspection and maintenance are found in the "Commissioning, inspection and maintenance" section and identified as follows:

Symbol	Meaning
	Steps required during commissioning
	Not required during commissioning
	Steps required during inspection
	Not required during inspection
	Steps required during maintenance
	Not required during maintenance

Intended use

The device serves to control heating systems with solar DHW heating.

Commercial or industrial use for a purpose other than heating the solar circuit shall be deemed inappropriate.

Intended use presupposes that a permanent installation in conjunction with permissible components designed for this purpose has been carried out.

All other use is deemed inappropriate. Any resulting losses are excluded from the manufacturer's liability.

Any usage beyond this must be approved by the manufacturer in each individual case.

Intended use also includes adherence to maintenance and inspection intervals.

System examples

Available system examples: See **www.viessmann-schemes.com**.

Spare parts lists

Information about spare parts can be found at **www.viessmann.com/etapp** or in the Viessmann spare part app.

Overview of electrical connections

Danger
Incorrect wiring can lead to serious injury from electrical current and result in appliance damage.
- Route extra low voltage (ELV) leads < 42 V and > 42 V/230 V~ cables separately.
- Only strip the minimum of insulation from cables as close as possible to the terminals and bundle tightly to the corresponding terminals.
- Secure cables with cable ties.

SDIO/SM1A electronics module

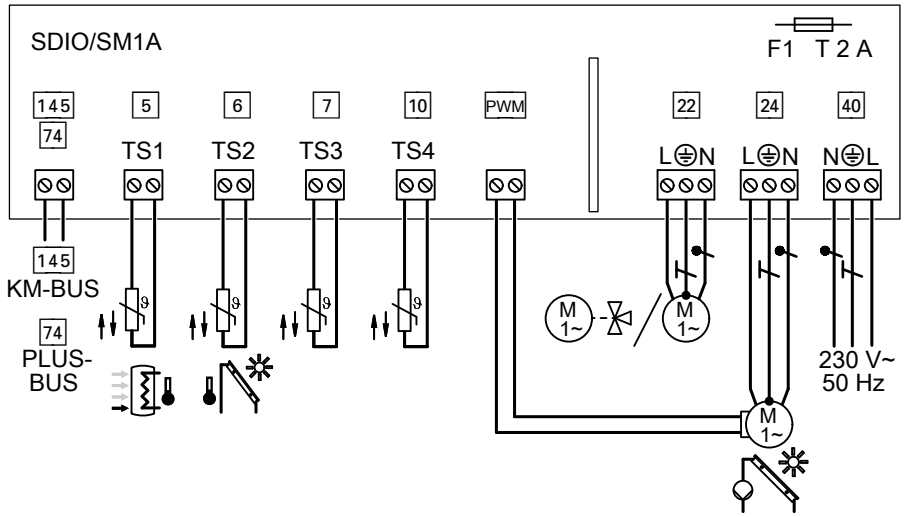

Fig. 1

- 5 Cylinder temperature sensor, NTC 10 kΩ (TS1, standard delivery) with plug 5
- 6 Collector temperature sensor, NTC 20 kΩ (TS2, standard delivery)
- 7 Temperature sensor, NTC 10 kΩ (TS3)
- 10 Temperature sensor, NTC 10 kΩ (TS4)
- 22 Transfer pump or 3-way diverter valve
- 24 Solar circuit pump (only with PWM signal)
- 40 Power supply
- 74 PlusBus for connection to HMU heat management unit, DIO electronics module or ADIO electronics module
- 145 KM-BUS for connection to the Vitotronic boiler control unit
- PWM Solar circuit pump speed control

Please note
Electronic assemblies can be damaged by static loads.
Before beginning work, touch an earthed object such as a heating or water pipe to discharge any static.

Note
Apply strain relief to on-site cables.
Seal any unnecessary apertures with cable grommets (not cut open).

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Power supply

Connecting heat generator accessories to a power supply

- Oil or gas boiler:
  Plug 96 or 156 on the Vitotronic boiler control unit/HMU heat management unit:
  Observe max. connected load of all accessories (400 W). If required, connect the SDIO/SM1A electronics module **directly** to the mains supply: See installation and service instructions for the boiler or the Vitotronic control unit.
- Heat pumps:
  Terminal X3.1 on the cross connect PCB or at the luster terminals:
  Observe max. connected load of the heat pump control unit. If required, connect the SDIO/SM1A electronics module **directly** to the mains supply: See installation and service instructions for the heat pump.

Danger
Incorrectly executed electrical installations can result in injuries from electrical current and damage to the appliance.

Connect the power supply and implement all safety measures (e.g. RCD circuit) in accordance with the following regulations:
- IEC 60364-4-41
- VDE regulations
- TAR medium voltage VDE-AR-N-4110
- Protect the power cable with a fuse/MCB of up to 16 A.

Danger
The absence of component earthing can lead to serious injury from electric current if an electrical fault occurs.
The appliance and pipework must be connected to the equipotential bonding of the building.

Isolators for non-earthed conductors

- Install an isolator in the power cable to provide omnipolar separation from the mains for all active conductors. This should correspond to overvoltage category III (3 mm) for full isolation. The isolator must be fitted in the permanent electrical installation, in line with installation requirements.
- We additionally recommend installing an AC/DC-sensitive RCD, type B, for DC (fault) currents that can occur with energy efficient equipment.

Power supply for accessories and external components

- Recommendation: For accessories and external components that are not connected to the Vitotronic control unit/HMU heat management unit, connect the power supply to the same fuse. However, at least make the connection in phase with the Vitotronic control unit/HMU heat management unit.
- Connection to the same MCB/fuse provides additional safety in the event of the power being switched off. Observe the power consumption of the connected consumers.

Danger
Incorrect core assignment can result in serious injury and damage to the appliance.
Never interchange cores "L" and "N".

Please note
Incorrect phase sequence can cause damage to the appliance.
Ensure phase equality with the control unit power supply.

Configuring the SDIO/SM1A electronics module

Automatic detection

The SDIO/SM1A electronics module is automatically detected as a KM-BUS subscriber (SM1) or PlusBus subscriber (HMU heat management unit).
In order for the bus system to be detected, it needs to have been connected at the time of **initial commissioning**.

After detection, the bus system remains stored, even after disconnection from the mains. When restarting, it starts with the same bus system.

Changing the configured bus system

1. Remove the bus connection and all sensor connections. Only leave the power supply connected.
2. Switch on the SDIO/SM1A electronics module.
   The LED on the top left of the PCB flashes for 1 min.
   After 1 min the LED is illuminated continuously.
   The SDIO/SM1A electronics module is now reset to the factory setting.
3. Restart the SDIO/SM1A electronics module as described above. In the process, the connected bus system will be detected.
   This commissioning process then corresponds to the **initial commissioning** process described above.

Setting codes/parameters

The codes/parameters for the SDIO/SM1A electronics module are set at the heat generator control unit.

Service instructions for the heat generator or the Vitotronic control unit

Heat pump control unit Vitotronic 200, type WO1C

Service instructions for the Vitotronic 200, type WO1C

1. At coding level 1 call up parameter group **"Solar"**.
2. Set parameter **"Type solar control unit 7A00"** to "3".
3. Invoke parameter **C0xx**.
4. In the two last places (xx) of the parameter **"C0xx"**, enter the required coding address.

   Note
   xx corresponds to coding addresses "00:..." to "28:...".

Heat generator with PlusBus data cable (plug 74)

Relevant parameters:

Installation and service instructions for the respective heat generator

Note
For a function description and further details about the parameters: *See page 20 22.*

Configuring the SDIO/SM1A electronics module for KM-BUS (overview of codes/parameters)

Note
*Parameter values in **bold** are factory settings.*

00 Start temperature differential, solar circuit pump

Display	Value	Explanations
8 K	**00:8**	
... K	00:2 to 00:30	

Configuring the SDIO/SM1A electronics module (cont.)

01 Stop temperature differential, solar circuit pump

Display	Value	Explanations
4 K	**01:4**	
... K	01:1 to 01:29	

02 Speed control, solar circuit pump

Display	Value	Explanations
Without	02:0	Without speed control
Do not adjust	02:1	
With PWM control	**02:2**	With PWM control

Note
Changed display on Vitotronic 200 heat pump control unit, type WO1C: ***"Speed control solar circuit pump"***

03 Temperature differential for start of speed control

Display	Value	Explanations
10 K	**03:10**	
... K	03:5 to 03:20	

04 Controller amplification of speed control

Display	Value	Explanations
4 %/K	**04:4**	
... %/K	04:1 to 04:10	Controller amplification adjustable from 1 to 10 %/K

05 Min. speed, solar circuit pump

Display	Value	Explanations
10 %	**05:10**	Min. speed of the solar circuit pump 10 % of max. speed
... %	05:2 to 05:100	

06 Max. speed, solar circuit pump

Display	Value	Explanations
75 %	**06:75**	Maximum speed of solar circuit pump 75 % of max. speed
... %	06:2 to 06:100	

Configuring the SDIO/SM1A electronics module (cont.)

07 Interval function, solar circuit pump

Display	Value	Explanations
OFF	**07:0**	Interval function of solar circuit pump switched off
ON	07:1	To capture the collector temperature more accurately, the solar circuit pump periodically starts for a short duration.

08 Maximum cylinder temperature

Display	Value	Explanations
60 °C	**08:60**	Set DHW temperature (maximum cylinder temperature) 60 °C
... °C	08:10 to 08:90	

! **Please note**
For DHW cylinders with an immersion heater EHE:
This maximum cylinder temperature can be set to a maximum of 80 °C. This prevents the temperature limiter from responding unnecessarily.

09 Maximum collector temperature

Display	Value	Explanations
130 °C	**09:130**	Maximum collector temperature (to protect system components) 130 °C
... °C	09:20 to 09:200	

0A Stagnation time reduction

Display	Value	Explanations
		Temperature differential for stagnation time reduction: Reduction in the speed of the solar circuit pump to protect system components and heat transfer medium
None	0A:0	Stagnation time reduction disabled
5 K	**0A:5**	
... K	0A:1 to 0A:40	

0B Frost protection function for solar circuit

Display	Value	Explanations
OFF	**0B:0**	
ON	0B:1	Not required in conjunction with Viessmann heat transfer medium

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Configuring the SDIO/SM1A electronics module (cont.)

0C Delta T monitoring

Display	Value	Explanations
OFF	0C:0	
ON	**0C:1**	No flow rate captured in the solar circuit, or flow rate too low.

0D Night DHW circulation monitoring

Display	Value	Explanations
OFF	0D:0	
ON	**0D:1**	Unintentional flow rate in the solar circuit (e.g. at night) is captured.

0E Calculation of solar yield

Display	**Value**	**Explanations**
OFF	0E:0	
Calculation of solar yield with Viessmann heat transfer medium	**0E:1**	
Calculation of solar yield with water as heat transfer medium	0E:2	Do not adjust!

0F Flow rate, solar circuit at max. pump speed

Display	Value	Explanations
7 l/min	**0F:70**	
... l/min	0F:1 to 0F:255	Flow rate adjustable from 0.1 to 25.5 l/min 1 step ≙ 0.1 l/min

10 Target temperature control

Display	Value	Explanations
OFF	**10:0**	
ON	10:1	See parameter "11"

11 Set DHW temperature, solar

Display	**Value**	**Explanations**
		▪ Target temperature control is switched on (parameter "10:1"): Temperature at which the water heated by the solar thermal system is to be stratified into the DHW cylinder. ▪ Heating of 2 DHW cylinders is set (parameter "20:9"): When the set cylinder temperature is achieved in one DHW cylinder, the 2nd DHW cylinder is heated.
50 °C	**11:50**	
... °C	11:10 to 11:90	Set solar cylinder temperature adjustable from 10 to 90 °C.

Configuring the SDIO/SM1A electronics module (cont.)

! **Please note**
For DHW cylinders with a solar thermal system: This maximum cylinder temperature can be set to a maximum of 80 °C. This prevents the temperature limiter from responding unnecessarily.

12 Minimum collector temperature

Display	Value	Explanations
None	12:0	Minimum temperature limit disabled
10 °C	**12:10**	Minimum start temperature for solar circuit pump 10 °C
... °C	12:1 to 12:90	

20 Extended control function

Display	Value	Explanations
None	**20:0**	No extended control function enabled
Additional function, increased DHW hygiene	20:1	
Differential temperature control 2	20:2	Do not adjust in conjunction with Vitocell 100-W, type CVUB-A
Differential temperature control 2 and auxiliary function for increased DHW hygiene	20:3	Do not adjust in conjunction with Vitocell 100-W, type CVUB-A
Differential temperature control 2 for central heating backup	20:4	Do not adjust in conjunction with Vitocell 100-W, type CVUB-A
Thermostat function	20:5	Do not adjust in conjunction with Vitocell 100-W, type CVUB-A
Thermostat function and auxiliary function for increased DHW hygiene	20:6	Do not adjust in conjunction with Vitocell 100-W, type CVUB-A
Solar heating via external heat exchanger without additional temperature sensor	20:7	
Solar heating via external heat exchanger with additional temperature sensor	20:8	Do not adjust in conjunction with Vitocell 100-W, type CVUB-A
Solar heating of 2 DHW cylinders	20:9	Do not adjust in conjunction with Vitocell 100-W, type CVUB-A

Note
Changed display on Vitotronic 200 heat pump control unit, type WO1C: ***"Extended solar control functions"***

22 Start temperature differential for central heating backup

Display	Value	Explanations
		Parameter "20:4" must be set.
8 K	**22:8**	
... K	22:2 to 22:30	

Configuring the SDIO/SM1A electronics module (cont.)

23 Stop temperature differential for central heating backup

Display	Value	Explanations
		Parameter "20:4" must be set.
4 K	**23:4**	
... K	23:1 to 23:29	

24 Start temperature for thermostat function

Display	Value	Explanations
		Parameter "20:5" or "20:6" must be set.
40 °C	**24:40**	
... °C	24:0 to 24:100	

25 Stop temperature for thermostat function

Display	Value	Explanations
		Parameter "20:5" or "20:6" must be set.
50 °C	**25:50**	
... °C	25:0 to 25:100	

26 Priority for DHW cylinder

Display	Value	Explanations
		Parameter "20:9" must be set.
Priority for DHW cylinder 1 – without cyclical heating	26:0	
Priority for DHW cylinder 1 – with cyclical heating	**26:1**	
Priority for DHW cylinder 2 – without cyclical heating	26:2	
Priority for DHW cylinder 2 – with cyclical heating	26:3	
Cyclical heating without priority for any of the DHW cylinders	26:4	Cyclical heating without priority for one of the DHW cylinders

27 Cyclical heating time

Display	Value	Explanations
		The DHW cylinder **with** priority is heated first. Then the DHW cylinder **without** priority is heated for a maximum duration equal to the set cyclical heating time.
15 min	**27:15**	
... min	27:5 to 27:60	

Configuring the SDIO/SM1A electronics module (cont.)

28 Cyclical pause time

Display	Value	Explanations
		After the set cyclical heating time for the DHW cylinder without priority has expired (parameter "27"), the rise in collector temperature is captured during the cyclical pause time.
3 min	**28:3**	
... min	28:1 to 28:60	

Configuring the SDIO/SM1A electronics module for PlusBus

If using the SDIO/SM1A electronics module in conjunction with PlusBus (plug 74), the parameters are listed in the installation and service instructions for the heat generator.

Heat generator installation and service instructions

Faults displayed with a fault code

Fault codes
Service instructions for the heat generator or the Vitotronic control unit

Errors without fault code display

Fault	Cause	Remedy
Solar energy yield is too low.	Temperature sensors have been interchanged.	Check temperature sensor connections.
	Air in the solar circuit	Vent the solar circuit. Check flow rate.
	Flow rate is too low.	▪ Check flow rate. ▪ Check connection of output 24 (see page 20). Check coding address "02". ▪ Check hydraulic connections. ▪ Ensure check valves are operating correctly.
	Incorrect circulation	Check the system characteristics (see page 21).
Solar circuit pump not running or runs constantly.	Temperature sensors have been interchanged.	Check temperature sensor connections. Check coding address "20".
	Solar circuit pump is faulty or incorrectly connected.	Check solar circuit pump connection (see page 20). Check coding address "02". Carrying out a relay/actuator test. See the service instructions for the heat generator or the Vitotronic control unit.
Output 22 not switched or permanently switched.	Incorrect function configured.	Check setting of coding address "20".
	SDIO/SM1A electronics module is faulty.	Check connection of output 22 (see page 20). Carrying out a relay/actuator test. See the service instructions for the heat generator or the Vitotronic control unit.
Solar control unit is not operational.	MCB F1 has responded.	Check fuse F1 (see page 32). Disconnect consumers. Reconnect consumers one after the other. While doing so, observe the behaviour of fuse F1.

Repairs

Check function of connected components by means of a relay/actuator test:

Service instructions for the heat generator or the Vitotronic control unit

Repairs (cont.)

Check solar circuit pump at output 24

Characteristics of the circulation pump (see also the following chapter):

- Pump always off:
  - High limit safety cut-out has responded. Reset the high limit safety cut-out.
  - Output 24 faulty
    Replace the SDIO/SM1A electronics module.
  - Solar circuit pump faulty
    Replace solar circuit pump.
- Pump always on:
  - Coding address "02" incorrectly set
  - PWM connection faulty
  - Output 24 always 'live'.
    Replace the SDIO/SM1A electronics module.

Multi stage circulation pump

The multi stage circulation pump is switched on and off via output 24.

Code/parameter "02:0" must be set.

Variable speed circulation pump with PWM control

Output 24 must indicate a permanent voltage of 230 V~. The pump speed is governed by means of a control signal via PWM connection.
Code/parameter "02:2" must be set.
If the PWM signal is interrupted, the circulation pump must be switched off. If the circulation pump runs at maximum speed when the PWM signal is interrupted, an incorrect circulation pump has been installed.

Check connection at output 22

Subject to system scheme, a circulation pump or a 3-way diverter valve can be connected to output 22. When output 22 is on, a voltage of 230 V~ must be present.

If output 22 functions correctly during the relay/actuator test but not in normal operation, check setting of coding address "20".

Check temperature sensors

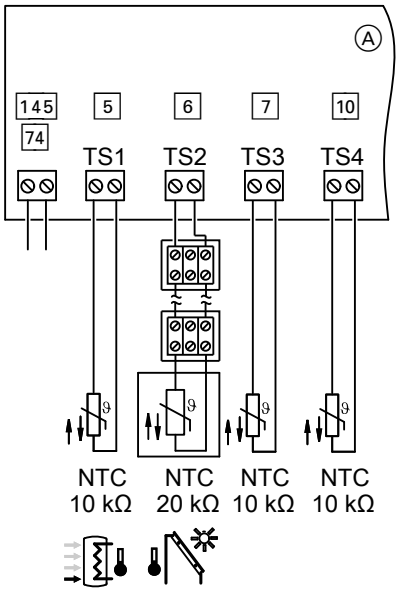

Fig. 2

1. Pull plug of relevant temperature sensor from SDIO/SM1A electronics module Ⓐ and check the sensor resistance.
2. Compare the sensor resistance to the curve (see Fig. 3).
3. In the event of severe deviation replace the sensor.

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Repairs (cont.)

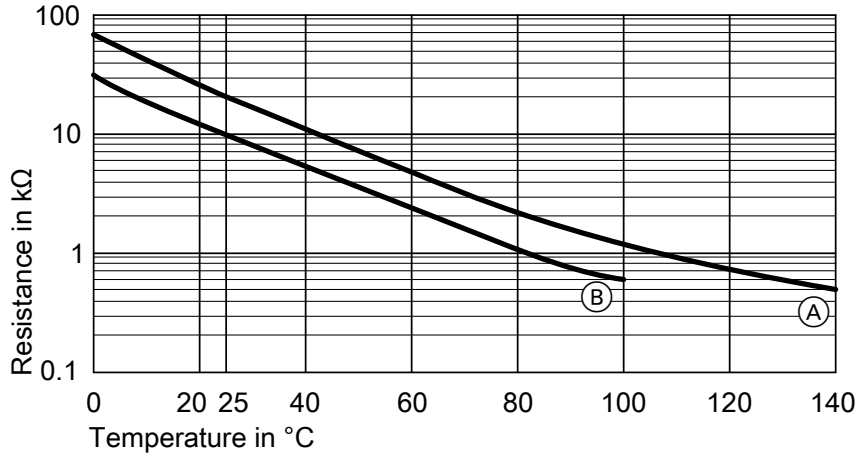

Fig. 3

Ⓐ Collector temperature sensor 6 (TS2, sensor type: NTC 20 kΩ)

Ⓑ
- Cylinder temperature sensor 5 (TS1)
- Temperature sensor 7 (TS3)
- Temperature sensor 10 (TS4)

(sensor type: NTC 10 kΩ)

Incorrect circulation in the solar circuit

If code/parameter "0D:1" has been set (delivered condition), unwanted DHW circulation (e.g. at night) is captured. In **"Diagnosis solar"** (weather-compensated control unit) or **"Brief scan"** (constant temperature control unit), the number of instances where incorrect circulation was captured can be scanned.

- Check time shown at the control unit; adjust if necessary.
- Check current collector temperature and cylinder temperature via diagnosis.
  If the collector temperature is too low and the cylinder temperature too high, then the sensors have been interchanged.
- Switch off all actuators via a relay/actuator test.
  If the solar circuit pump continues to run, see "Check solar circuit pump at output 24".
  If the flow and return temperature rises when the solar circuit pump is switched off, there may be recirculation via gravity.
  Check any installed check valves or install them if necessary.

Version with KM-BUS (solar DHW heating)

Note
Function description when using the SDIO/SM1A electronics module in conjunction with PlusBus (plug 74), see from page 28.

Solar DHW heating

The solar circuit pump is switched on under the following conditions, resulting in the DHW being heated:
- The temperature differential between the collector temperature and the cylinder temperature is greater than the start temperature differential set in coding address "00".
- The minimum collector temperature set in coding address "12" is exceeded.

The solar circuit pump is switched off under the following conditions:
- The temperature differential between the cylinder temperature and the collector temperature is smaller than the stop temperature differential set in coding address "01".
- The maximum cylinder temperature (set DHW/cylinder temperature) set in coding address "08" is exceeded.
- The maximum collector temperature set in coding address "09" is exceeded.
- The temperature set at the high limit safety cut-out (if installed) is exceeded.

Variable speed solar circuit pump

The speed control is activated in coding address "02". It can only be activated for relay output 24.

Suitable pumps:
- Multi-stage solar circuit pump
- Pumps with PWM input (only use solar circuit pumps)

Variable speed control

The speed of the solar circuit pump is controlled by means of the temperature differential between the collector temperature and the cylinder temperature (coding address "03").

Note
Recommendation: Operate the solar circuit pump at max. speed while the solar thermal system is being vented.

Version with KM-BUS (solar DHW heating) (cont.)

Suppression of DHW cylinder reheating by the heat generator

In systems with boilers

As soon as the solar circuit pump is switched on, reheating of the DHW cylinder by the boiler is suppressed.

- **Complete reheating suppression:**
  The solar circuit pump is switched on for **more than** 2 h:
  The DHW cylinder is only heated by the boiler if the "set DHW temperature for solar reheating suppression" is undershot.
  Reheating suppression ends as soon as the solar circuit pump is switched off.
- **Semi-reheating suppression:**
  The solar circuit pump is switched on for **less than** 2 h:
  The DHW cylinder is only heated by the boiler if the average of the set DHW temperature (e.g. 50 °C) and the "set DHW temperature for solar reheating suppression" (e.g. 40 °C) is undershot. Example: The average of 50 °C and 40 °C is 45 °C.
  After the solar circuit pump has been switched off, suppression remains active for a certain time.

The "set DHW temperature for solar reheating suppression" is specified in coding address "67" (**"DHW"** group). This value must be **below** the 1st set DHW temperature.

In systems with heat pumps

During solar DHW heating, the **"Set DHW temperature"** for heating by the heat pump is reduced by 5 K.

Suppression of reheating by the boiler in relation to central heating backup (not in conjunction with heat pumps)

Reheating by the boiler is suppressed if a sufficiently high temperature for heating the heating circuits is available in the multi mode heating water buffer cylinder. The temperature is dependent on the required flow temperature of the heating circuits.

Maximum collector temperature

If the maximum collector temperature set in coding address "09" is exceeded, the solar circuit pump is switched off to protect the system components (emergency collector shutdown).

If the collector temperature falls 20 K below the set value, the solar circuit pump starts again.

Minimum collector temperature limit

The solar circuit pump is started when the minimum collector temperature set in coding address "12" is exceeded.

Version with KM-BUS (solar DHW heating) (cont.)

Reducing the stagnation time

If there is an excess of solar energy, the speed of the solar circuit pump is reduced before the maximum cylinder temperature is reached (coding address "08"). This causes an increase in the differential between collector temperature and cylinder temperature. The heat transfer to the DHW cylinder is reduced, which delays stagnation.

The temperature differential for reducing the stagnation time is adjustable in coding address "0A".

Target temperature control

System with one DHW cylinder

Set code/parameter "10:1" (target temperature control switched on).
As well as depending on the selected start temperature differential, the solar circuit pump is only started if the collector temperature exceeds the value set in coding address "11".

System with 2 DHW cylinders

Set code/parameter "10:1" (target temperature control switched on).
When the temperature of a DHW cylinder has exceeded the value set in coding address "11", solar heating is transferred to the second DHW cylinder.

Monitoring the flow rate

If the solar circuit pump is running, the collector temperature is > 100 °C for longer than 30 min and the differential to the cylinder temperature is > 50 K, fault message "9E" will be issued.

Monitoring of night circulation (not in conjunction with heat pumps)

Code "0D:1".
Unwanted flow rates in the solar circuit (e.g. at night) are captured. For this, the night-time collector temperature must exceed the outside temperature by 10 K.
The captured situations with unwanted flow are reported to the control unit of the heat source.

The situations can be called up under **"Diagnosis solar"** (weather-compensated control unit) or **"Brief scan"** (constant temperature control unit).

Heat statement (solar yield)

The following factors are taken into consideration when calculating the amount of heat produced by the solar thermal system:
- Differential from collector and cylinder temperature
- Flow rate
- Type of heat transfer medium
- Runtime of solar circuit pump

Note
The displayed values cannot be used for billing by the power supply utility.

Interval function

Set code/parameter "07:1".
Activate the interval function in systems where the collector temperature sensor is not in an ideal location, to prevent a time delay in capturing the collector temperature.

Version with KM-BUS (solar DHW heating) (cont.)

Collector frost protection function

Viessmann collectors are filled with Viessmann heat transfer medium. Consequently, this function does not need to be enabled.
Only enable it if water is used as the heat transfer medium.

To prevent damage to the collectors, the solar circuit pump is switched on if the collector temperature falls below +5 °C. At +7 °C the pump is switched off again. See coding address "0B".

Extended functions

The extended functions are set in coding address "20".

Note
Extended control functions can only be used in relation to the selected system example and the system components listed there.

Additional function for DHW heating

With the additional function for DHW heating (boiler circuit control unit function), the solar preheat stage can be heated at the selected times.

Required settings on the Vitotronic control unit for the system:
- Select a 2nd set DHW/cylinder temperature in coding address "58" or parameter "03" (**"DHW"** group).
- Activate a 4th DHW phase for DHW heating.
- Set the additional function (in conjunction with the required further function) in coding address "20" (**"Solar"** group).

Note
*In coding address "56" or parameter "01" (**"DHW"** group), the setting range for the set DHW/cylinder temperature can be adjusted to between 10 and over 60 °C.*

This signal is then relayed via the KM-BUS/PlusBus to the SDIO/SM1A electronics module. The de-stratification pump starts.

Differential temperature control 2

Set code/parameter "20:2" or "20:3".
If the temperature captured by temperature sensor [7] is higher by a value equal to the selected start/stop temperature differential (coding address "22" and "23") than the temperature captured by temperature sensor [10], then output [22] will be live.

Differential temperature control for central heating backup

Set code/parameter "20:4".

If the following conditions are met, output [22] is 'live':
- There is a heat demand from one of the connected heating circuits.
- The temperature captured by temperature sensor [7] is higher than the temperature captured by temperature sensor [10] by a value equal to the selected start/stop temperature differential (coding address "22" and "23").

Thermostat function

Set code/parameter "20:5" or "20:6".
The thermostat function can be used independently of solar operation.

Version with KM-BUS (solar DHW heating) (cont.)

Different modes of operation can be achieved by determining the thermostat start temperature (coding address "24") and stop temperature (coding address "25"):

- Start temperature < stop temperature:
  Thermostat function e.g. for reheating.
  Output 22 is switched on if the temperature at sensor 7 falls below the start temperature.
  Output 22 is switched off if the temperature at sensor 7 exceeds the stop temperature.
- Start temperature > stop temperature:
  Thermostat function, e.g. for the use of surplus heat.
  Output 22 is switched on if the temperature at sensor 7 exceeds the start temperature.
  Output 22 is switched off if the temperature at sensor 7 falls below the stop temperature.

External heat exchanger

Set code/parameter "20:7" or "20:8".

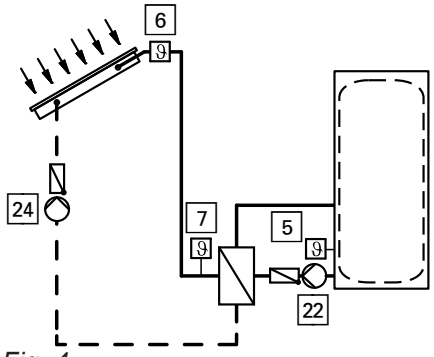

Fig. 4

- Code/parameter "20:7":
  The cylinder is heated via an external heat exchanger. Secondary pump 22 starts in parallel with solar circuit pump 24.
- Code/parameter "20:8":
  If an additional temperature sensor 7 is used, secondary pump 22 starts if solar circuit pump 24 is running and the required temperature differential between sensors 5 and 7 is present.

Cylinder priority control

Set code/parameter "20:9".
In systems with 2 DHW cylinders, it is possible to set the order in which the DHW cylinders are heated. The order is set in coding address "26".
Additionally, cyclical heating can be set (see next chapter).

To enable priority control, the actual temperatures of both DHW cylinders are compared with the actual collector temperature. If the DHW cylinder without priority is heated, output 22 will be live.
See coding addresses "10", "11", "26".

Cyclical heating

Set code/parameter "20:9".
In systems with 2 DHW cylinders:
If the DHW cylinder with priority cannot be heated, the DHW cylinder without priority is heated for a cyclical heating time that can be set in coding address "27".
After this time has expired, the solar control unit checks the rise in collector temperature during a cyclical pause time that can be set in coding address "28".

As soon as the start conditions for the cylinder with priority are met, that cylinder is heated again. Otherwise, heating of the DHW cylinder without priority is continued.
See coding addresses "26", "27", "28".

Version with KM-BUS (solar DHW heating) (cont.)

Relay kick

To prevent the pumps and valves from seizing up, all connected pumps and valves are started for about 10 s every 24 h.

Version with PlusBus

Solar DHW heating

Note
*Set the functions described below in the parameters in the **"Solar"** group.*

The solar circuit pump is switched on under the following conditions, resulting in the DHW being heated:
- The temperature differential between the collector temperature and the cylinder temperature is greater than the start temperature differential set in parameter 1492.0.
  And
- The minimum collector temperature set in parameter 1126.0 is exceeded.

The solar circuit pump is switched off if **one** of the following conditions is met:
- The temperature differential between the cylinder temperature and the collector temperature is smaller than the stop temperature differential set in parameter 1492.1.
- The maximum cylinder temperature (max. set cylinder temperature) set in parameter 1125.0 is exceeded.
- The maximum collector temperature set in parameter 1126.1 is exceeded.
- The temperature set at the high limit safety cut-out is exceeded.

Variable speed solar circuit pump

Suitable pumps:
Pumps with PWM input (only use solar circuit pumps)

Note
Recommendation: Run the solar circuit pump at max. speed when venting the solar thermal system (see actuator test).

Suppression of DHW cylinder reheating by the heat generator

In systems with boilers

As soon as the solar circuit pump is switched on, reheating of the DHW cylinder by the boiler is suppressed.

- **Complete reheating suppression:**
  The solar circuit pump is switched on for **more than** 2 h:
  The DHW cylinder is only heated by the boiler if the "set DHW temperature for solar reheating suppression" is undershot.
  Reheating suppression ends as soon as the solar circuit pump is switched off.
- **Semi-reheating suppression:**
  The solar circuit pump is switched on for **less than** 2 h:
  The DHW cylinder is only heated by the boiler if the average of the set DHW temperature (e.g. 50 °C) and the "set DHW temperature for solar reheating suppression" (e.g. 40 °C) is undershot. Example: The average of 50 °C and 40 °C is 45 °C.
  After the solar circuit pump has been switched off, suppression remains active for a certain time.

The "set DHW temperature for solar reheating suppression" is specified in parameter 1394.0 (**"DHW"** group). This value must be **below** the 1st set DHW temperature.
Reheating by the boiler is suppressed if a sufficiently high temperature for heating the heating circuits is available in the multi mode heating water buffer cylinder. The temperature is dependent on the required flow temperature of the heating circuits.

In systems with heat pumps

During solar DHW heating, the **"Set DHW temperature"** for heating by the heat pump is reduced by 5 K.

Maximum collector temperature

If the maximum collector temperature set in parameter 1126.1 is exceeded, the solar circuit pump is switched off to protect the system components (emergency collector shutdown).

The solar circuit pump will restart when the collector temperature falls to 20 K below the set value.

Version with PlusBus (cont.)

Minimum collector temperature limit

The solar circuit pump is started when the minimum collector temperature set in parameter 1126.0 is exceeded.

Reducing the stagnation time

If there is an excess of solar energy, the speed of the solar circuit pump is reduced before the maximum cylinder temperature is reached (parameter 1125.0). This causes an increase in the differential between collector temperature and cylinder temperature. The heat transfer to the DHW cylinder is reduced, which delays stagnation.

The temperature differential for reducing the stagnation time can be adjusted in parameter 1505.0.
This function can only be implemented in systems with a variable speed solar circuit pump.

Monitoring the flow rate

If the solar circuit pump is running, the collector temperature is > 100 °C for longer than 30 min and the differential to the cylinder temperature is > 50 K, fault message "9E" will be issued.

Heat statement (solar yield)

The following factors are taken into consideration when calculating the heat amount:
- Differential from collector and cylinder temperature
- Flow rate
- Type of heat transfer medium
- Runtime of solar circuit pump

Determine the flow rate with the solar circuit pump at maximum speed and set this in parameter 950.0. To operate the solar circuit pump at the maximum speed, change the set value for speed to 100 % in the actuator test. 1 step ≙ 0.1 l/h.

Note
The flow rate must be readjusted each time the parameter for the maximum speed of the solar circuit pump is changed.

In the delivered condition, parameter 1136.3 is set to a value of 1 (operation with Viessmann heat transfer medium).

Note
The displayed values cannot be used for billing by the power supply utility.

Interval function

Set parameter 1719.0.
Activate the interval function in systems where the collector temperature sensor is not in an ideal location, to prevent a time delay in capturing the collector temperature.
To correctly capture the collector temperature, the interval function cyclically switches on the solar circuit pump for brief periods.

Parameter 1118.0

Minimum speed of the solar circuit pump adjustable in %.
Delivered condition: 23 %

Parameter 1118.1

Maximum speed of the solar circuit pump adjustable in %.
Delivered condition: 84 %

Version with PlusBus (cont.)

Collector frost protection function

Viessmann solar collectors are filled with Viessmann heat transfer medium. Consequently, this function does not need to be enabled.
Only enable it if water is used as the heat transfer medium.

With a collector temperature below +5 °C, the solar circuit pump will be started to avoid damage to the collectors. The pump is switched off when +7 °C is reached.
Note parameter 1127.0.

Auxiliary function for DHW heating

With the auxiliary function for DHW heating (boiler control unit function), the solar preheating stage can be heated at the selected times.

Note
Function can only be set during commissioning.

The transfer pump **cannot** be switched on with these operating modes of the solar thermal system:
- Solar function with central heating backup
- Solar function with preheating, 2nd cylinder/DHW cylinder
- Solar function with thermostat function

Differential temperature control 2

If the temperature captured at temperature sensor 7 (TS3) is higher, by the selected start/stop temperature differential (parameters 1599.0 and 1599.1), than the temperature captured at temperature sensor 10 (TS4), then output 22 is live.

Note
Function can only be set during commissioning.

Differential temperature control for central heating backup

If the following conditions are met, output 22 is live:
- There is a heat demand from one of the connected heating circuits.
- The temperature captured at temperature sensor 7 (TS3) is higher, by the selected start/stop temperature differential (parameters 1599.0 and 1599.1), than the temperature captured at temperature sensor 10 (TS4).

Note
Function can only be set during commissioning.

Thermostat function

Different modes of operation can be achieved by determining the thermostat start temperature (parameter 1598.0) and stop temperature (parameter 1598.1):
- Start temperature < stop temperature:
  Thermostat function e.g. for reheating.
  Output [22] is switched on if the temperature at sensor [7] TS3 falls below the start temperature.
  Output [22] is switched off if the temperature at sensor [7] TS3 exceeds the stop temperature.
- Start temperature > stop temperature:
  Thermostat function, e.g. for the use of surplus heat.
  Output [22] is switched on if the temperature at sensor [7] TS3 exceeds the start temperature.
  Output [22] is switched off if the temperature at sensor [7] TS3 falls below the stop temperature.

Version with PlusBus (cont.)

Solar function with central heating backup

The heating circuit return is channelled through the solar cylinder, where it is preheated. If sufficient heat is available from the collectors, reheating of the DHW cylinder does not take place, and the preheated return water flows directly into the heating circuit. If insufficient solar heat is available for the return water to flow straight into the heating circuit, it is reheated to the required flow temperature by the heat generator.

The temperature level is additionally monitored by sensors 7 (TS3) and 10 (TS4).
If the temperature differential between the heating circuit return and the solar cylinder is ≥ 8 K (differential between TS3 and TS4), the heat is made available for central heating backup. If this temperature differential falls below 4 K, central heating backup is no longer possible.

Solar function with preheating of 2nd cylinder

In a hydraulic scheme with 2 cylinders/DHW cylinders, the first cylinder/DHW cylinder is only heated by the solar thermal system. The 2nd cylinder/DHW cylinder is heated by activating the transfer pump if sufficient heat is available in the first cylinder/DHW cylinder.

If no solar heat is available, only the 2nd cylinder/DHW cylinder is heated by the heat generator.
The transfer pump is started and stopped via the temperature differential between sensors 7 (TS3) and 10 (TS4).

Solar function with thermostat function

This function always requires a 2nd cylinder/DHW cylinder as a preheating cylinder, which is preheated by a solar thermal system or a wood heating system, for example. The temperature of the preheating cylinder is captured via sensor 7 (TS3).

When the temperature for the preheating cylinder set at the thermostat is reached, the transfer pump is activated to transfer heat to the main cylinder.

Relay kick

To prevent the circulation pumps and valves from seizing up, all connected circulation pumps and valves are started for about 10 s every 24 h.

Specification

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	2 A
Power consumption – electronics	2 W
Power consumption	8.5 mA
Protection class	I
IP rating	IP 20D to EN 60529; ensure through design/ installation.
Permissible ambient temperature	
▪ Operation	0 to +40 °C
▪ Storage and transport	–20 to +65 °C
Rated relay output breaking capacity	
▪ Output [24]	1(1) A 230 V~
▪ Output [22]	1(1) A 230 V~

Connection and wiring diagram

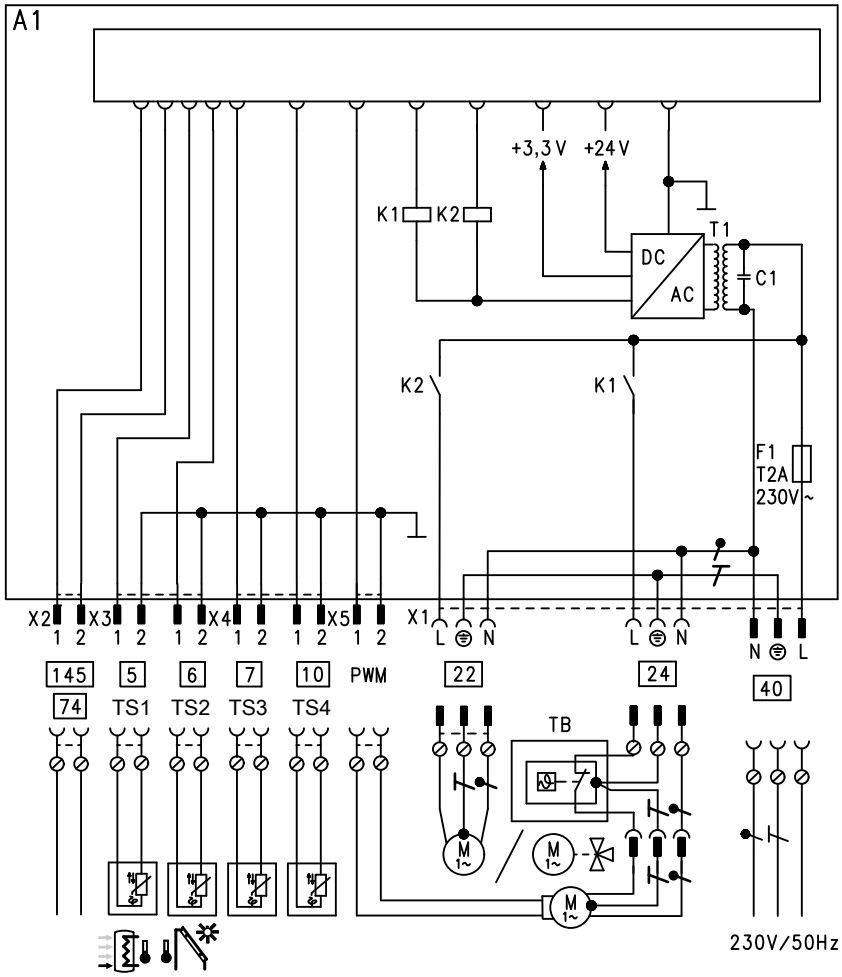

Fig. 5

A1 Main PCB
F1 Fuse T 2 A (slow)
PWM Speed control, solar circuit pump (if circulation pump with PWM control installed)
TB Maximum temperature limiter
X... Electrical interfaces
[5] Cylinder temperature sensor, NTC 10 kΩ (TS1)
[6] Collector temperature sensor, NTC 20 kΩ (TS2)
[7] Temperature sensor, NTC 10 kΩ (TS3, if installed)

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Connection and wiring diagram (cont.)

10 Temperature sensor, NTC 10 kΩ (TS4, if installed)
22 Transfer pump or 3-way diverter valve
24 Solar circuit pump
40 Power supply
74 PlusBus for connection to HMU heat management unit, DIO electronics module or ADIO electronics module
145 KM-BUS to the Vitotronic control unit

Final decommissioning and disposal

Viessmann products can be recycled. Components and substances from the system are not part of ordinary domestic waste.

For decommissioning, isolate the system from the power supply and allow components to cool down where appropriate.
All components must be disposed of correctly.

Declaration of Conformity

We, Viessmann Werke GmbH & Co. KG, D-35107 Allendorf, declare as sole responsible body that the named product complies with the European directives and supplementary national requirements in terms of its design and operational characteristics.

Using the serial number, the full Declaration of Conformity can be found on the following website:
www.viessmann.co.uk/eu-conformity

Keyword index

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Viessmann Climate Solutions SE
35108 Allendorf
Telephone: +49 6452 70-0
Fax: +49 6452 70-2780
www.viessmann.com

Viessmann Limited
Hortonwood 30, Telford
Shropshire, TF1 7YP, GB
Telephone: +44 1952 675000
Fax: +44 1952 675040
E-mail: info-uk@viessmann.com