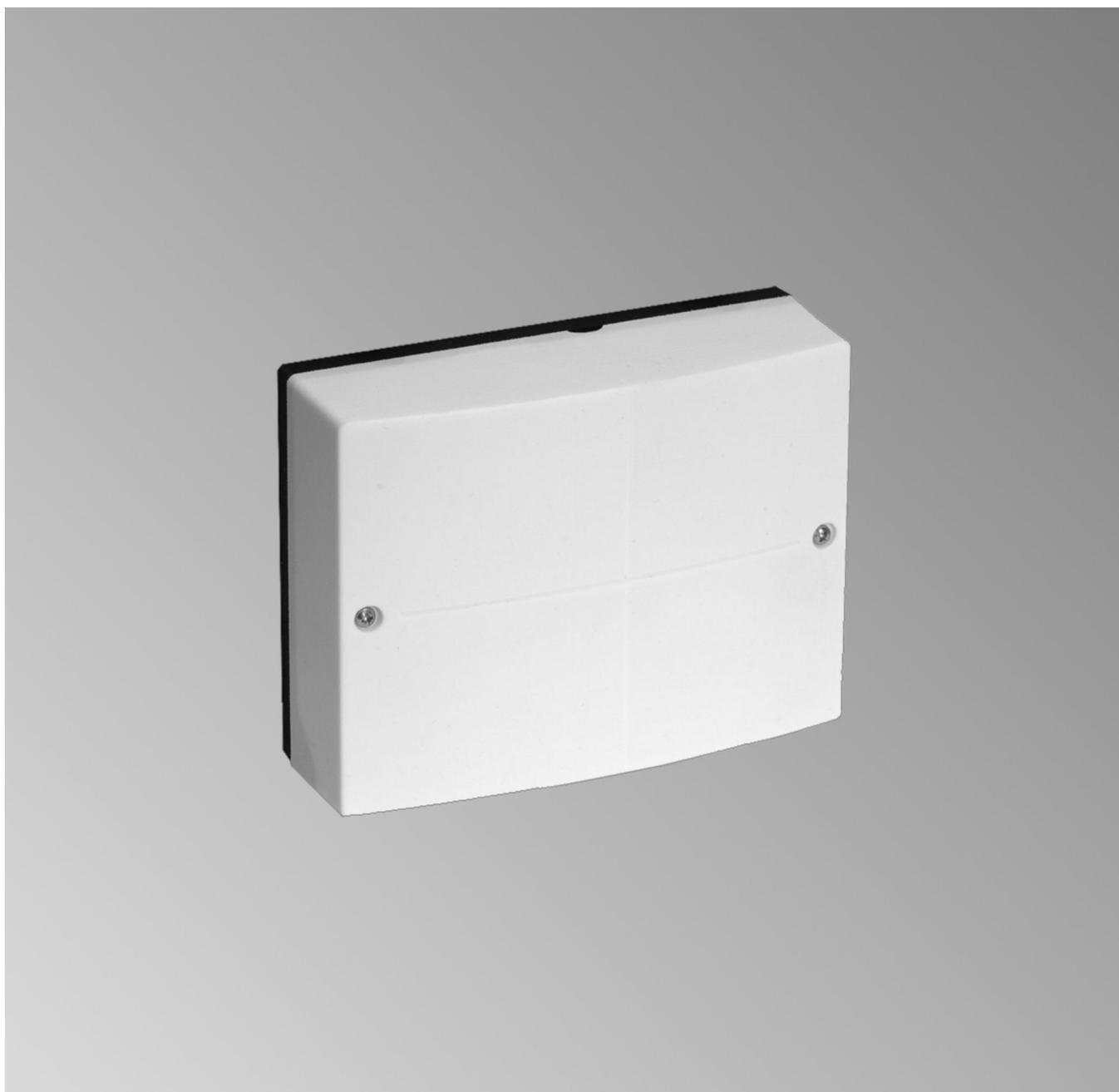


Solar control module
Type SM1
for wall mounting

For applicability, see the last page

Solar control module



Safety instructions

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
- All current safety regulations as defined by DIN, EN, DVGW, TRGI, TRF, VDE and all locally applicable standards
- Ⓐ ÖNORM, EN, ÖVGW G K directives, ÖVGW-TRF and ÖVE
- Ⓒ SEV, SUVA, SVGW, SVTI, SWKI, VKF and EKAS guideline 1942: LPG, part 2

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.



Danger

Hot surfaces can cause burns.

- 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.

Safety instructions (cont.)**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-authorized 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 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.

Avoid continuous condensate disposal with a wind protector.

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.

**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.

1. Information	Disposal of packaging	6
	Symbols	6
	Intended use	6
	System examples	7
2. Installation sequence	Mounting on the wall	8
	Overview of electrical connections	8
	Power supply	9
3. Commissioning	Configuring the solar control module	10
	Overview of coding addresses	10
	■ 00 Start temperature differential, solar circuit pump	10
	■ 01 Stop temperature differential, solar circuit pump	10
	■ 02 Speed control, solar circuit pump	10
	■ 03 Temperature differential for start of speed control	10
	■ 04 Controller amplification of speed control	11
	■ 05 Min. speed, solar circuit pump	11
	■ 06 Max. speed, solar circuit pump	11
	■ 07 Interval function, solar circuit pump	11
	■ 08 Maximum cylinder temperature	11
	■ 09 Maximum collector temperature	11
	■ 0A Stagnation time reduction	12
	■ 0B Frost protection function for solar circuit	12
	■ 0C Delta T monitoring	12
	■ 0D Night DHW circulation monitoring	12
	■ 0E Calculation of solar yield	12
	■ 0F Flow rate, solar circuit at max. pump speed	12
	■ 10 Target temperature control	13
	■ 11 Set DHW temperature, solar	13
	■ 12 Minimum collector temperature	13
	■ 20 Extended control function	13
	■ 22 Start temperature differential for central heating backup	14
	■ 23 Stop temperature differential for central heating backup	14
	■ 24 Start temperature for thermostat function	14
	■ 25 Stop temperature for thermostat function	14
	■ 26 Priority for DHW cylinder	14
	■ 27 Cyclical heating time	15
	■ 28 Cyclical pause time	15
4. Troubleshooting	Faults displayed with a fault code	16
	Errors without fault code display	16
	Repairs	16
	■ Check solar circuit pump at output 24	17
	■ Check connection at output 22	17
	■ Check temperature sensors	17
	■ Incorrect circulation in the solar circuit	18
5. Parts lists	Parts list	19
6. Function description	Function description	22
	■ Solar DHW heating	22
	■ Variable speed solar circuit pump	22
	■ Suppression of DHW cylinder reheating by the heat generator	23
	■ Suppression of reheating by the boiler in relation to central heating backup (not in conjunction with heat pumps)	23
	■ Maximum collector temperature	23
	■ Minimum collector temperature limit	23
	■ Reduction of stagnation time	24
	■ Target temperature control	24
	■ Flow rate monitoring	24

Index (cont.)

	■ Monitoring of night circulation (not in conjunction with heat pumps) ..	24
	■ Heat statement (solar yield)	24
	■ Interval function	25
	■ Collector frost protection	25
	■ Extended functions	25
	■ Additional function for DHW heating	25
	■ Differential temperature control 2	25
	■ Differential temperature control for central heating backup	26
	■ Thermostat function	26
	■ External heat exchanger	26
	■ Cylinder priority control	26
	■ Cyclical heating	27
	Relay kick	27
7. Specification	Specification	28
	Connection and wiring diagram	28
8. Declaration of Conformity	Declaration of conformity	29
9. Keyword index	30

Disposal of packaging

Please dispose of packaging waste in line with statutory regulations.

DE: Use the disposal system organised by Viessmann.

AT: Use the ARA statutory disposal system (Altstoff Recycling Austria AG, licence number 5766).

CH: Packaging waste is disposed of by the HVAC contractor.

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.
	<ul style="list-style-type: none"> Component must audibly click into place. or Acoustic signal
	<ul style="list-style-type: none"> 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 and solar central heating backup.

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.

Intended use (cont.)

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-schemen.com

Installation sequence

Mounting on the wall

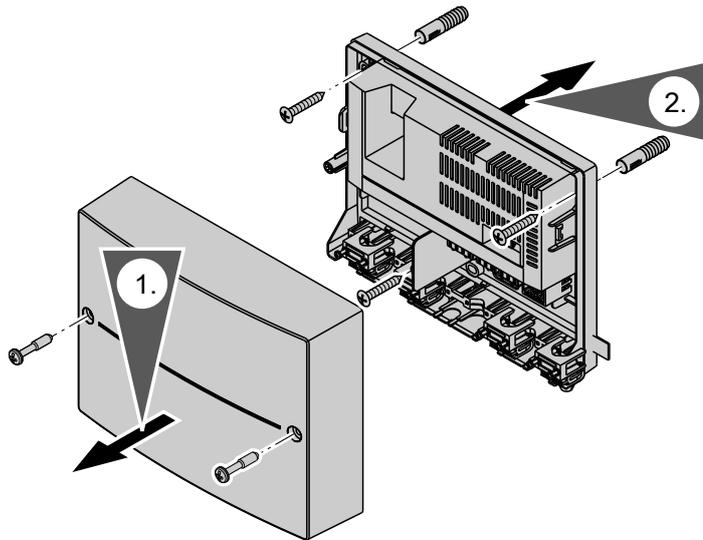


Fig. 1

Overview of electrical connections

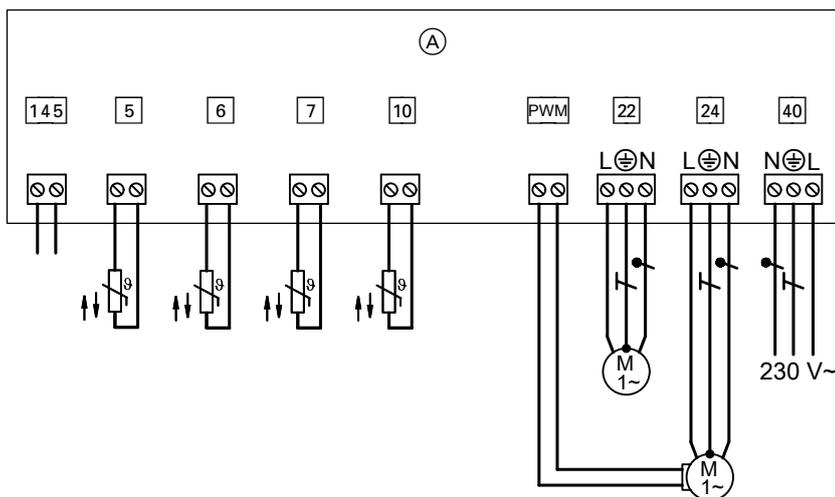


Fig. 2

- | | | | |
|---|--|-----|--|
| Ⓐ | Solar control module | 10 | Temperature sensor NTC 10 kΩ (if installed) |
| 5 | Cylinder temperature sensor NTC 10 kΩ (standard delivery)
With plug 5 | 22 | Transfer pump or 3-way diverter valve |
| 6 | Collector temperature sensor NTC 20 kΩ (standard delivery) | 24 | Solar circuit pump |
| 7 | Temperature sensor NTC 10 kΩ (if installed) | 40 | Power supply |
| | | 145 | KM BUS to boiler control unit |
| | | PWM | Speed control, solar circuit pump (if circulation pump with PWM control installed) |

! **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).

Power supply

Connecting heat generator accessories to a power supply

- Oil or gas boiler:
Plug  or  on boiler control unit:
Observe max. connected load of all accessories (400 W). If required, connect the solar control module, type SM1, **directly** to the mains supply: See installation and service instructions for the boiler or 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 solar control module, type SM1, **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
- Connection requirements specified by your local power supply utility
- 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 control unit, make the power connection to the same MCB/fuse. At the very least, connect them in phase with the control 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 solar control module

The solar control module is automatically detected as a KM-BUS subscriber by some Vitotronic control units. The codes/parameters for the solar control module are set at the Vitotronic control unit for the heat generator.

Note

For a function description and further details on coding addresses: See page 22.



Service instructions for the heat generator or the Vitotronic control unit

Vitotronic control units for heat pumps (type WO1C)

In the two last places (xx) of the parameter "C0xx", enter the required coding address.

Overview of coding addresses

Note

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

00 Start temperature differential, solar circuit pump

Display	Value	Explanations
8 K	00:8	Start temperature differential adjustable from 2 to 30 K
... K	00:2 to 00:30	

01 Stop temperature differential, solar circuit pump

Display	Value	Explanations
4 K	01:4	Stop temperature differential adjustable from 1 to 29 K
... 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	Temperature differential adjustable from 5 to 20 K
... K	03:5 to 03:20	

Overview of coding addresses (cont.)

04 Controller amplification of speed control

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

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	Minimum speed of the solar circuit pump adjustable from 2 to 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	Maximum speed of solar circuit pump adjustable from 2 to 100 %

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	Set DHW temperature adjustable from 10 to 90 °C

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	Maximum collector temperature adjustable from 20 to 200 °C

Overview of coding addresses (cont.)**0A Stagnation time reduction**

Display	Value	Explanations
None	0A:0	Stagnation time reduction not active
5 K	0A:5	Temperature differential for stagnation time reduction 5 K Reduction in the speed of the solar circuit pump to protect system components and heat transfer medium.
... K	0A:1 to 0A:40	Temperature differential adjustable from 1 to 40 K

0B Frost protection function for solar circuit

Display	Value	Explanations
OFF	0B:0	
ON	0B:1	Not required for Viessmann heat transfer medium

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 \triangleq 0.1 l/min

Overview of coding addresses (cont.)

10 Target temperature control

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

11 Set DHW temperature, solar

Display	Value	Explanations
50 °C	11:50	<ul style="list-style-type: none"> ▪ Target temperature control switched on (parameter "10:1"): Temperature at which the solar heated water is to be stratified into the DHW cylinder. ▪ If parameter "20:9" (heating of 2 DHW cylinders) is set: When the set cylinder temperature is achieved in one DHW cylinder, the 2nd DHW cylinder is heated.
... °C	11:10 to 11:90	Set solar cylinder temperature adjustable from 10 to 90 °C.

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	Minimum start temperature adjustable from 1 to 90 °C

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 CVUC-A
Differential temperature control 2 and auxiliary function for increased DHW hygiene	20:3	Do not adjust in conjunction with Vitocell 100-W, type CVUC-A
Differential temperature control 2 for central heating backup	20:4	Do not adjust in conjunction with Vitocell 100-W, type CVUC-A
Thermostat function	20:5	Do not adjust in conjunction with Vitocell 100-W, type CVUC-A
Thermostat function and auxiliary function for increased DHW hygiene	20:6	Do not adjust in conjunction with Vitocell 100-W, type CVUC-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 CVUC-A
Solar heating of 2 DHW cylinders	20:9	Do not adjust in conjunction with Vitocell 100-W, type CVUC-A

Overview of coding addresses (cont.)**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
8 K	22:8	Parameter "20:4" must be set.
... K	22:2 to 22:30	Start temperature differential adjustable from 2 to 30 K

23 Stop temperature differential for central heating backup

Display	Value	Explanations
4 K	23:4	Parameter "20:4" must be set.
... K	23:1 to 23:29	Stop temperature differential adjustable from 1 to 29 K

24 Start temperature for thermostat function

Display	Value	Explanations
40 °C	24:40	Parameter "20:5" or "20:6" must be set.
... °C	24:0 to 24:100	Start temperature for thermostat function adjustable from 0 to 100 °C

25 Stop temperature for thermostat function

Display	Value	Explanations
50 °C	25:50	Parameter "20:5" or "20:6" must be set.
... °C	25:0 to 25:100	Stop temperature for thermostat function adjustable from 0 to 100 °C

26 Priority for DHW cylinder

Display	Value	Explanations
Priority for DHW cylinder 1 – without cyclical heating	26:0	Parameter "20:9" must be set.
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

Overview of coding addresses (cont.)

27 Cyclical heating time

Display	Value	Explanations
15 min	27:15	Once the DHW cylinder with priority is heated up, the DHW cylinder without priority is heated for a maximum duration equal to the set cyclical heating time.
... min	27:5 to 27:60	Cyclical heating time adjustable from 5 to 60 min

28 Cyclical pause time

Display	Value	Explanations
3 min	28:3	After the set cyclical heating time for the DHW cylinder without priority has expired, the rise in collector temperature is captured during the cyclical pause time.
... min	28:1 to 28:60	Cyclical pause time adjustable from 1 to 60 min

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 yield too low	Temperature sensors interchanged.	Check temperature sensor connections.
	Air in the solar circuit	Vent the solar circuit. Check flow rate.
	Inadequate flow rate	<ul style="list-style-type: none"> ▪ Check flow rate. ▪ Check connection of output 24 (see page 17). Check coding address "02". ▪ Check hydraulic connections. ▪ Ensure check valves are operating correctly.
	Incorrect circulation	Check the system characteristics (see page 18).
Solar circuit pump not running or runs constantly.	Temperature sensors interchanged.	Check temperature sensor connections. Check coding address "20".
	Solar circuit pump faulty or incorrectly connected	Check solar circuit pump connection (see page 17). Check coding address "02". Carry out a relay test.
Output 22 not switched or permanently switched.	Incorrect function configured	Check setting of coding address "20".
	Solar control module faulty	Check connection of output 22 (see page 17). Carry out a relay test.
Solar control unit switched off	MCB F1 has responded.	Check fuse F1. See page 28. Disconnect consumers. Connect again in sequence. During this, observe the behaviour of MCB F1.

Repairs

Check function of connected components by means of a relay test (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 solar control 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 solar control module.

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 connection is interrupted the circulation pump must be switched off. If the circulation pump runs at maximum speed when the PWM connection is interrupted, an incorrect circulation pump has been installed.

Multi stage circulation pump

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

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 test but not in normal operation, check setting of coding address "20".

Check temperature sensors

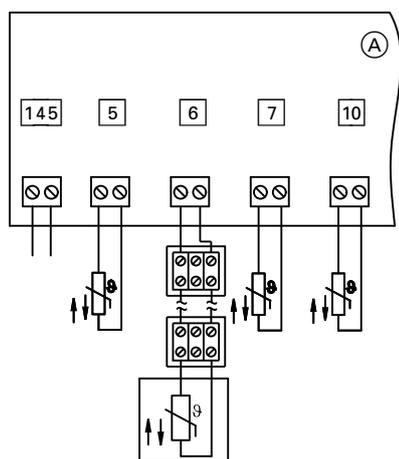


Fig. 3

1. Pull plug from relevant temperature sensor (A) and check the sensor resistance.
2. Compare the sensor resistance with the curve (see the following diagram).
3. In the event of severe deviation replace the sensor.

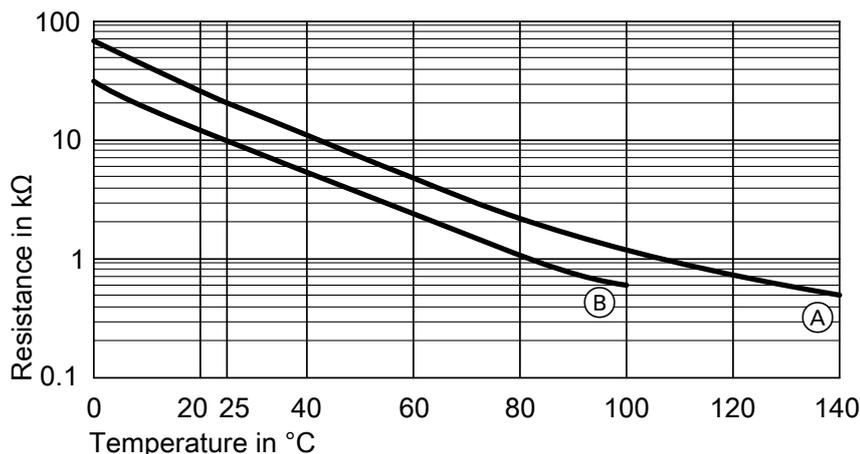


Fig. 4

- Ⓐ Collector temperature sensor [6] (sensor type: NTC 20 kΩ)
- Ⓑ ■ Cylinder temperature sensor [5]
 - Temperature sensor [7]
 - Temperature sensor [10] (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 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.

Parts list

The following details are required when ordering parts:

- Serial no. (see type plate)
- Position number of the individual part within the assembly (from this parts list)

Parts list (cont.)

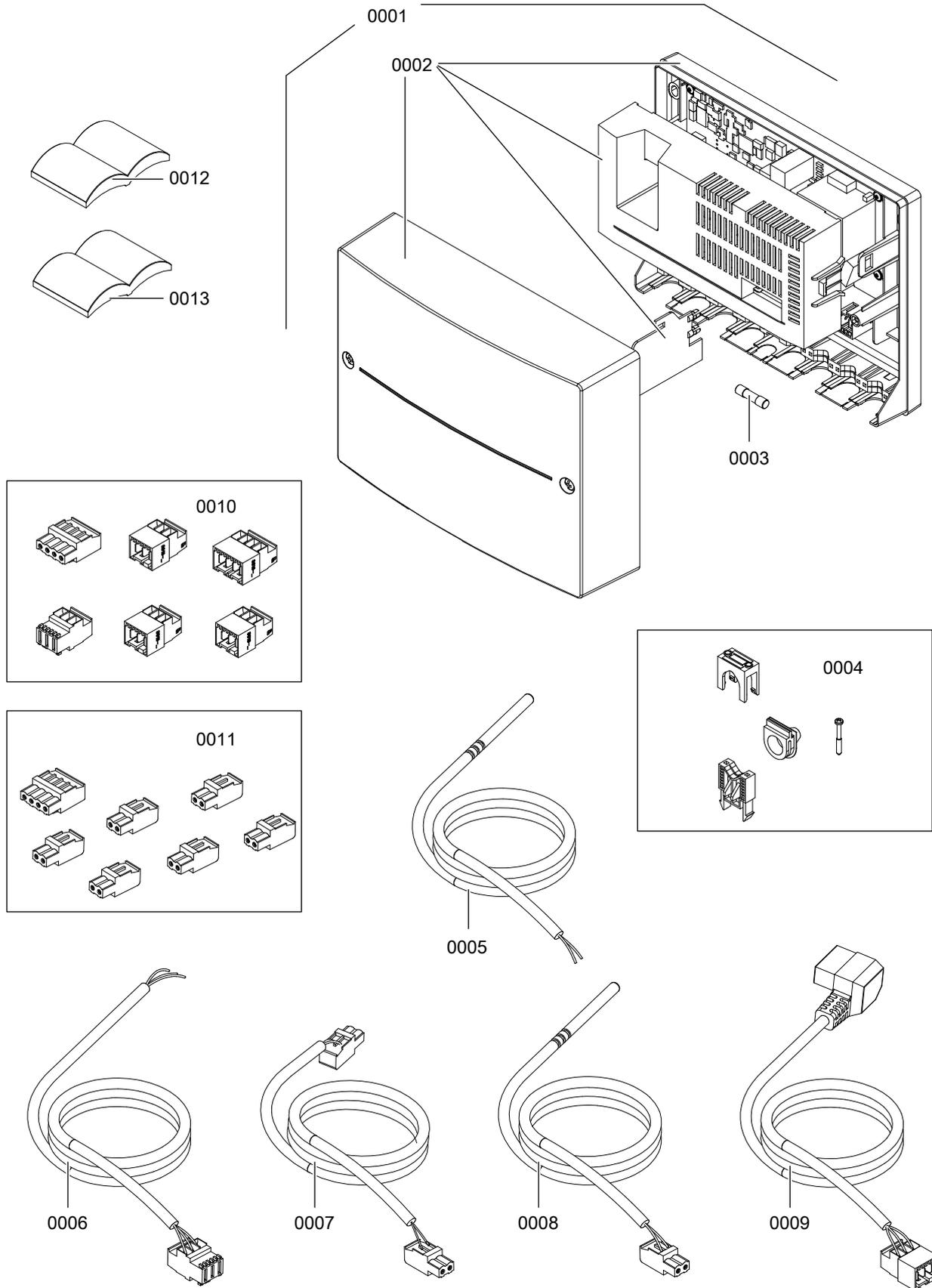


Fig. 5

Parts list (cont.)

Pos.	Part
0001	Solar control module
0002	Plastic parts of casing module
0003	Fuse, 2.0 A (slow) 250 V (10 pce)
0004	Strain relief fittings
0005	Collector temperature sensor NTC
0006	Connecting cable 40
0007	KM-BUS cable with plug 145
0008	Temperature sensor NTC 10 k Ω
0009	Connecting cable, solar circuit pump
0010	Plug set, 230 V
0011	LV plug set, 2-pole
0012	Installation and service instructions
0013	System examples, solar control unit

Function description

Solar DHW heating

The solar circuit pump starts according to the following criteria, resulting in the DHW being heated.

- The temperature differential between the cylinder temperature and the collector 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 according to the following criteria:

- 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 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 cylinder temperature and the collector temperature (coding address "03"). In the case of active target temperature control (code/parameter "10:1"), the speed is also influenced by the temperature differential between the set solar cylinder temperature (coding address "10") and the collector temperature.

The speed of the solar circuit pump is additionally influenced by the following settings:

- Controller amplification (coding address "04")
- Minimum speed (coding address "05")
- Maximum speed (coding address "06")

Note

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

Function description (cont.)**Suppression of DHW cylinder reheating by the heat generator****In systems with boilers**

Reheating is suppressed in 2 stages:

- Reheating of the DHW cylinder by the boiler is suppressed as soon as the solar circuit pump starts up. For this, half the suppression becomes effective in stage 1 (example: Set DHW temperature of 50 °C and set DHW temperature for solar reheating suppression of 40 °C results in a reduced enabled set value of 45 °C). If the DHW temperature falls below the reduced enabled set value, the boiler carries out reheating. After the solar circuit pump has been switched off, suppression remains active for a certain time.
- In the case of uninterrupted heating by the collectors (> 2 h), full suppression is activated. The reduced set DHW temperature now applies. If the DHW temperature falls below the reduced enabled set value, the boiler carries out reheating. Reheating suppression ends as soon as the solar circuit pump is switched off.
The reduced set DHW temperature is specified in coding address "67" or parameter "0C" in the "**DHW**" group. This value must be **below** the first set DHW temperature.

In systems with heat pumps

During solar DHW heating, the "**Set DHW temperature**" 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.

Function description

Function description (cont.)

Reduction of 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". This function can only be implemented in systems with a variable speed solar circuit pump.

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.

Flow rate monitoring

Code 0C:1.

If the solar circuit pump is running, the collector temperature is $> 100\text{ }^{\circ}\text{C}$ for longer than 30 min and the differential to the cylinder temperature is $> 50\text{ K}$, 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 heat amount:

- Differential from collector and cylinder temperature
- Flow rate
- Type of heat transfer medium
- Runtime of solar circuit pump

For Vitodens 300-W with Vitocell 100 type CVUC-A and Vitosolar 300-F with Vitodens 300-W, the temperature differential between solar flow and solar return is captured. For this purpose, the temperature sensors [7] and [10] are positioned at the connectors of the solar heat exchanger.

Determine the solar circuit flow rate and set it in coding address "0F". Each step $\cong 0.1\text{ l/h}$.

In the delivered condition, coding address "0E" 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.

Function description (cont.)

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.

Collector frost protection

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. The pump is stopped when a temperature of +7 °C is reached.

See coding address "0B".

Extended functions

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

Note

Extended control functions can be used only 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.

Boiler control unit settings:

- Set a 2nd set DHW 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 DHW set temperature can be adjusted to between 10 and over 60 °C.*

This signal is then relayed via the KM BUS to the solar control unit 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'.

Function description

Function description (cont.)

Differential temperature control for central heating backup

Set code/parameter "20:4".

If the following conditions are met, output $\overline{22}$ is 'live':

- There is a heat demand from one of the connected heating circuits.
- The temperature captured by temperature sensor $\overline{7}$ is higher than the temperature captured by temperature sensor $\overline{10}$ 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.

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 $\overline{22}$ is switched on when the temperature at sensor $\overline{7}$ falls below the start temperature.
Output $\overline{22}$ is switched off when the temperature at sensor $\overline{7}$ exceeds the stop temperature.
- Start temperature > stop temperature:
Thermostat function e.g. for utilising excess heat.
Output $\overline{22}$ is switched on when the temperature at sensor $\overline{7}$ exceeds the start temperature.
Output $\overline{22}$ is switched off when the temperature at sensor $\overline{7}$ falls below the stop temperature.

External heat exchanger

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

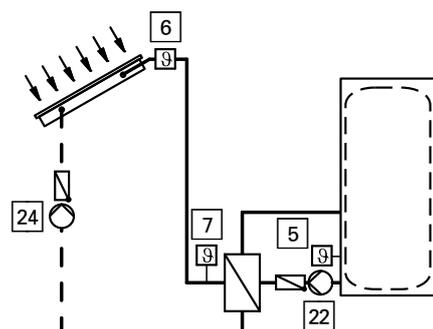


Fig. 6

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

For this, a distinction can be drawn between operation with and without cyclical heating (see the following chapter).

To enable priority control, the actual temperatures of both DHW cylinders are compared with the actual collector temperature. Output $\overline{22}$ will be 'live' if the secondary cylinder is being heated.

Coding addresses "10", "11", "26".

Function description (cont.)**Cyclical heating**

Set code/parameter "20:9".

In systems with 2 DHW cylinders:

If the DHW cylinder with priority cannot be heated, the secondary cylinder 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, the secondary cylinder continues to be heated.
Coding addresses "26", "27", "28".

Relay kick

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

Specification

Specification

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	2 A
Power consumption	1.5 W
Protection class	I
IP rating	IP 20D to EN 60 529, 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

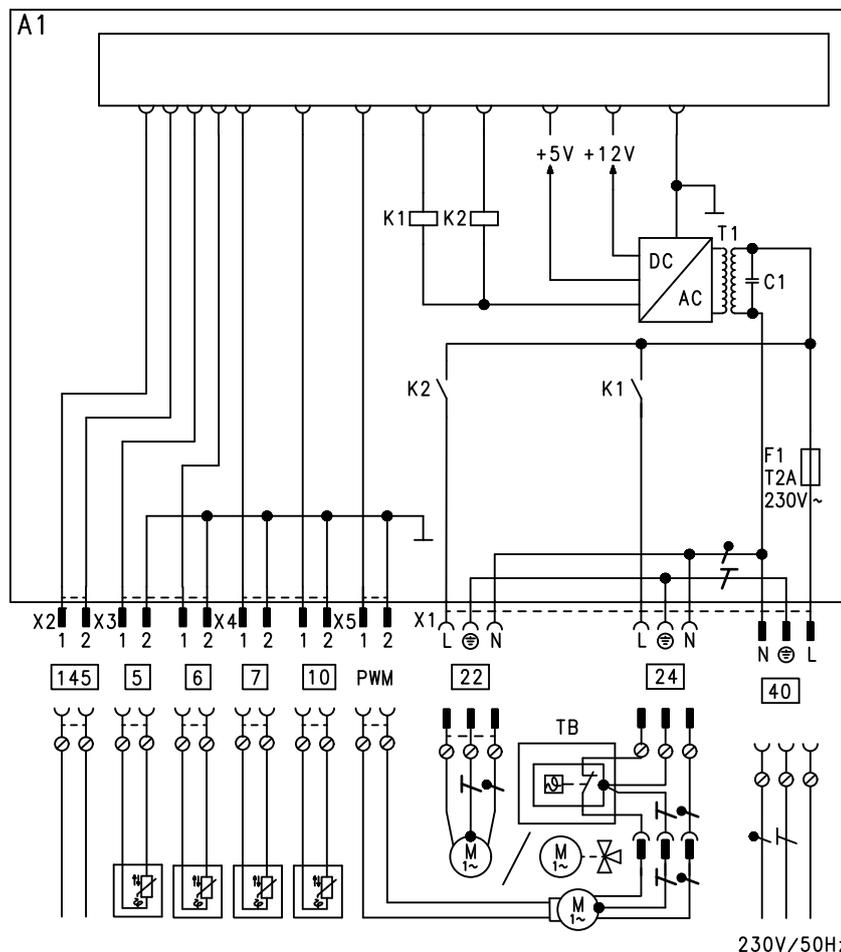


Fig. 7

- | | | | |
|---|--|---|---|
| A1 | Main PCB | 7 | Temperature sensor NTC 10 kΩ (if installed) |
| PWM | Speed control, solar circuit pump (if circulation pump with PWM control installed) | 10 | Temperature sensor NTC 10 kΩ (if installed) |
| TB | Maximum temperature limiter | 22 | Transfer pump or 3-way diverter valve |
| X... | Electrical interfaces | 24 | Solar circuit pump |
| 5 | Cylinder temperature sensor NTC 10 kΩ | 40 | Power supply |
| 6 | Collector temperature sensor NTC 20 kΩ | 145 | KM BUS to boiler control unit |

Declaration of conformity**Solar control module, type SM1**

We, Viessmann Werke GmbH & Co. KG, D-35107 Allendorf, declare as sole responsible body that the named product complies with the provisions of the following directives and regulations:

2014/35/EU Low Voltage Directive
2014/30/EU EMC Directive
2011/65/EU RoHS II

Applied standards:

EN 55014-1:2006+A1:2009+A2:2011
EN 55014-2:2015
EN 60730-1:2011
EN 60730-2-9:2010

In accordance with the listed directives, this product is designated with **CE**.

Allendorf, 04 July 2017

Viessmann Werke GmbH & Co. KG



Authorised signatory Reiner Jansen
Head of Strategic Quality Management

Keyword index

A		M	
Additional function, DHW heating.....	25	Maximum collector temperature.....	23
C		Minimum collector temperature.....	23
Capturing the collector temperature.....	25	Minimum temperature.....	23
Central heating backup.....	26	N	
Configuration.....	10	Night circulation monitoring.....	24
Connection and wiring diagram.....	28	P	
Cyclical heating.....	27	Power supply.....	9
D		Priority control.....	26
Differential temperature control.....	25	R	
E		Reduction of stagnation time.....	24
Electrical connections.....	8	Reheating suppression.....	23
Extended functions.....	25	Repairs.....	16
External heat exchanger.....	26	S	
F		Sensor curves.....	17
Fault codes.....	16	Setting functions.....	10
Fault messages.....	16	Solar DHW heating.....	22
Fault removal.....	16	Solar harvest.....	24
Faults.....	16	Solar yield.....	24
Flow rate monitoring.....	24	Specification.....	28
Frost protection.....	25	Suppression of reheating.....	23
Function description.....	22	System examples.....	7
H		T	
Heat statement.....	24	Temperature sensors.....	17
I		Thermostat function.....	26
Incorrect circulation.....	18	Troubleshooting.....	16
Indirect cylinder heating.....	26	V	
Installation.....	8	Variable speed solar circuit pump.....	22
Interval function.....	25		
Isolators.....	9		



Applicability

Serial No.:

7571088

Viessmann Werke GmbH & Co. KG
D-35107 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

5699 407 GB Subject to technical modifications.