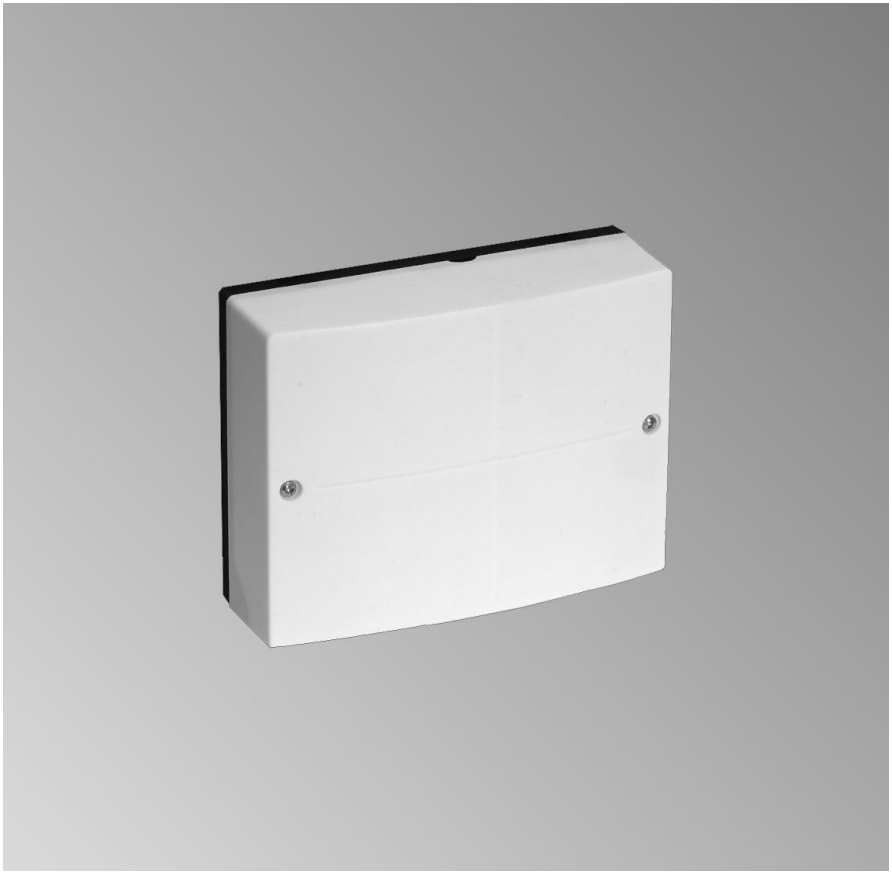
Installation and service instructions

for contractors

Solar control module
Type SM1
for wall mounting, part no. 7429 073

Solar control module



5724 071 GB 2/2010

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 designed for qualified personnel.
- Work on gas equipment must only be carried out by a qualified gas fitter.
- Work on electrical equipment must 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

Observe the following when working on this system
- all legal instructions regarding the prevention of accidents,
- all legal instructions regarding environmental protection,
- the Code of Practice of relevant trade associations,
- all current safety regulations as defined by DIN, EN, DVGW, TRGI, TRF, VDE and all locally applicable standards,
- Gas Safety (Installation & Use) Regulations
  - the appropriate Building Regulation either the Building regulations, the Building Regulation (Scotland), Building Regulations (Northern Ireland),
  - the Water Fittings Regulation or Water Bylaws in Scotland,
  - the current I.E.E. Wiring Regulations.

If you smell gas

Danger
Escaping gas can lead to explosions which may result in serious injury.
- Never 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.
- Remove all people from the danger zone.
- Notify your gas or electricity supplier from outside the building.
- Shut off the electricity supply to the building from a safe place (outside the building).

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Safety instructions (cont.)

If you smell flue gas

Danger
Flue gas can lead to life-threatening poisoning.
- Shut down the heating system.
- Ventilate the boiler room.
- Close all doors leading to the living space.

Working on the system

- When using gas as fuel, also close the main gas shut-off valve and safeguard against unauthorised reopening.
- Isolate the system from the power supply and check that it is no longer 'live', e.g. by removing a separate fuse or by means of a main isolator.
- Safeguard the system against unauthorised reconnection.

Please note
Electronic modules can be damaged by electro-static discharges.
Touch earthed objects, such as heating or water pipes, to discharge static loads.

Repair work

Please note
Repairing components which fulfil a safety function can compromise the safe operation of your heating system.
Replace faulty components only with original Viessmann spare parts.

Ancillary components, spare and wearing parts

Please note
Spare and wearing parts which have not been tested together with the heating system can compromise its function. Installing non-authorised components and non-approved modifications/conversion can compromise safety and may invalidate our warranty.
For replacements, use only original spare parts from Viessmann or those which are approved by Viessmann.

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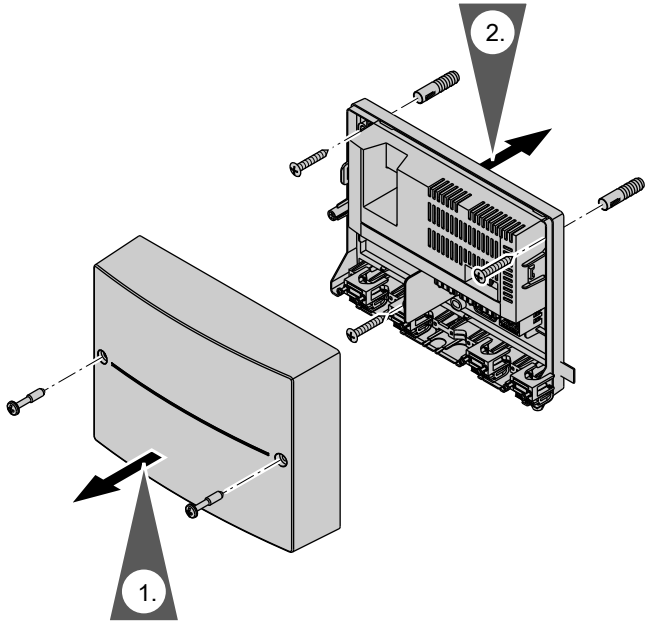
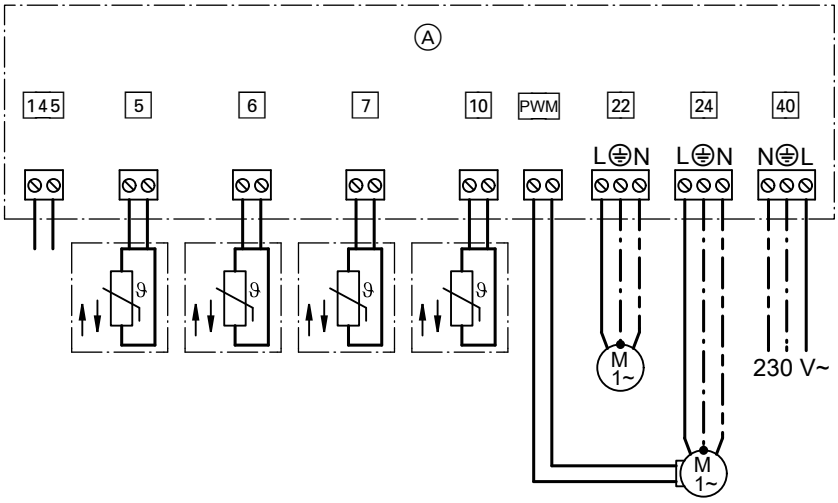
Mounting on the wall



Overview of electrical connections



Ⓐ Solar control module
5 Cylinder temperature sensor
6 Collector temperature sensor
7 Temperature sensor (if installed)
10 Temperature sensor (if installed)
22 Transfer pump or 3-way diverter valve
24 Solar circuit pump
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 modules can be damaged by electrostatic charges. Before beginning work, touch earthed objects, such as heating or water pipes, to discharge static loads.

Note
Apply a strain relief to all on-site cables. Close any unnecessary knock-outs with cable grommets (not cut open).

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System example 1

DHW heating with dual mode DHW cylinder

Function description

DHW heating with solar energy

If the temperature differential between collector temperature sensor ㉛ and cylinder temperature sensor ⑪ is greater than the start temperature differential (coding address 00), solar circuit pump ㉝ is started and DHW cylinder ⑩ is heated.
Solar circuit pump ㉝ stops if:

- Actual temperature drops below stop temperature differential (coding address 01)
- Maximum cylinder temperature is exceeded (coding address 08)
- The temperature selected at high limit safety cut-out ⑫ (if installed) is reached

Additional function for DHW heating

The requirements for the additional function are achieved through circulation pump ⑮.

Suppression of DHW cylinder reheating by the boiler

Reheating suppression takes place in two stages.

Reheating of DHW cylinder ⑩ by boiler ① is suppressed as soon as DHW cylinder ⑩ is heated by collectors ㉚. For this, the set cylinder temperature for reheating is reduced by boiler ①. After solar circuit pump ㉝ has been switched off, suppression remains active for a certain time.
In the case of uninterrupted heating by the collectors ㉚ (> 2 h), boiler ① will only reheat if the set DHW temperature selected at boiler control unit ② (coding address "67") is not achieved.
A third set DHW temperature can be specified via coding address "67" (setting range 10 to 95 °C). This value must be **below** the first set DHW temperature.
DHW cylinder ⑩ will only be heated by boiler ① if this set value cannot be achieved by the solar thermal system.

DHW heating without solar energy

The upper section of DHW cylinder ⑩ is heated by boiler ①. The cylinder thermostat with cylinder temperature sensor ⑯ of boiler control unit ② regulates cylinder heating.

Required codes at the oil/gas boiler control unit

Boiler installation and service instructions

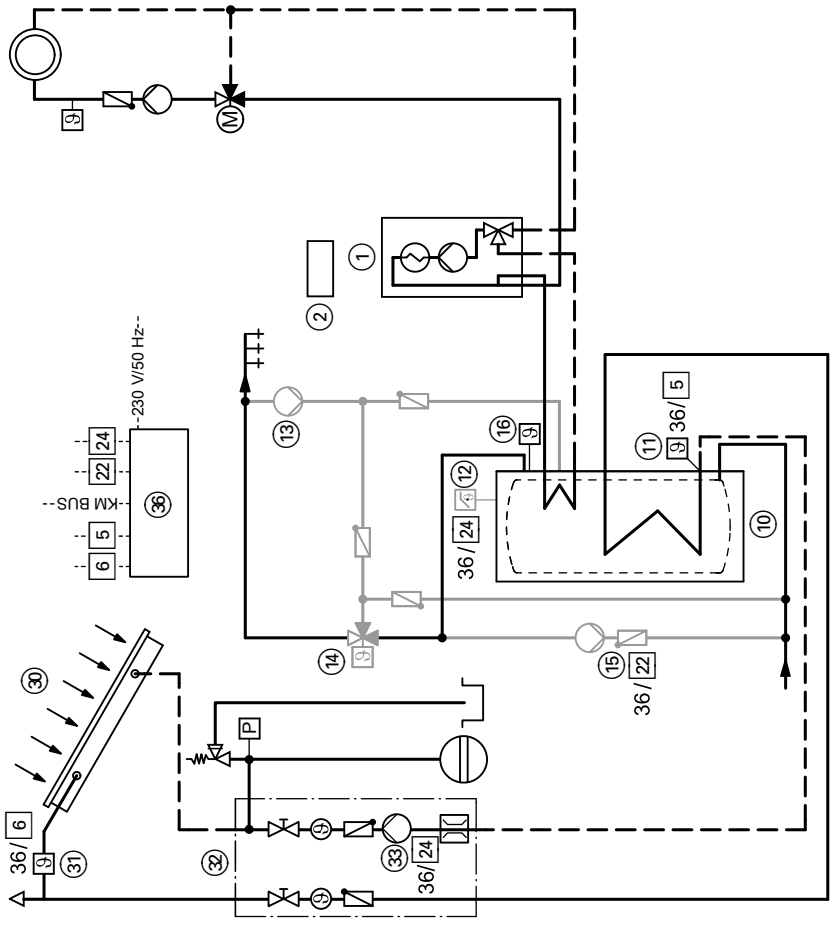
System example 1 (cont.)

Function/system components	Code in solar group	
	Adjust	Delivered condition
Start temperature differential for solar circuit pump at connection 24 (delivered condition 8 K)	00:...	00:8
Stop temperature differential for solar circuit pump at connection 24 (delivered condition 4 K)	01:...	01:4
Solar circuit pump type:		
■ Solar circuit pump is not speed-controlled	—	02:0
■ Solar circuit pump is speed-controlled with wave pack control	02:1	02:0
■ Solar circuit pump is speed-controlled with PWM control	02:2	02:0
Maximum cylinder temperature (delivered condition 60 °C)	08:...	08:60
Additional DHW heating function:		
■ Without additional function for DHW heating	—	20:0
■ With additional function for DHW heating	20:1	20:0

Note
*Coding address **00** can be set to min. 0.5 K above coding address **01**.*
*Coding address **01** can be set to max. 0.5 K below coding address **00**.*

System example 1 (cont.)

Hydraulic installation scheme



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System example 1 (cont.)

Equipment required

Pos.	Description
①	**Wall mounted oil/gas boiler**
	with
②	Boiler and heating circuit control unit
⑩	Dual mode DHW cylinder
⑪	Cylinder temperature sensor [5] (solar control module)
⑫	High limit safety cut-out (accessory)
⑬	DHW circulation pump (on site)
	(accessories may be required for connection)
⑭	Thermostatic mixing valve (accessory)
⑮	Circulation pump [22] (transfer of heat, on site)
⑯	Cylinder temperature sensor [5] (boiler)
㉚	Solar collectors
㉛	Collector temperature sensor [6]
㉜	Solar-Divicon (accessory)
	with
㉝	Solar circuit pump [24]
㊱	Solar control module, type SM1
㊲	Junction box (on site)

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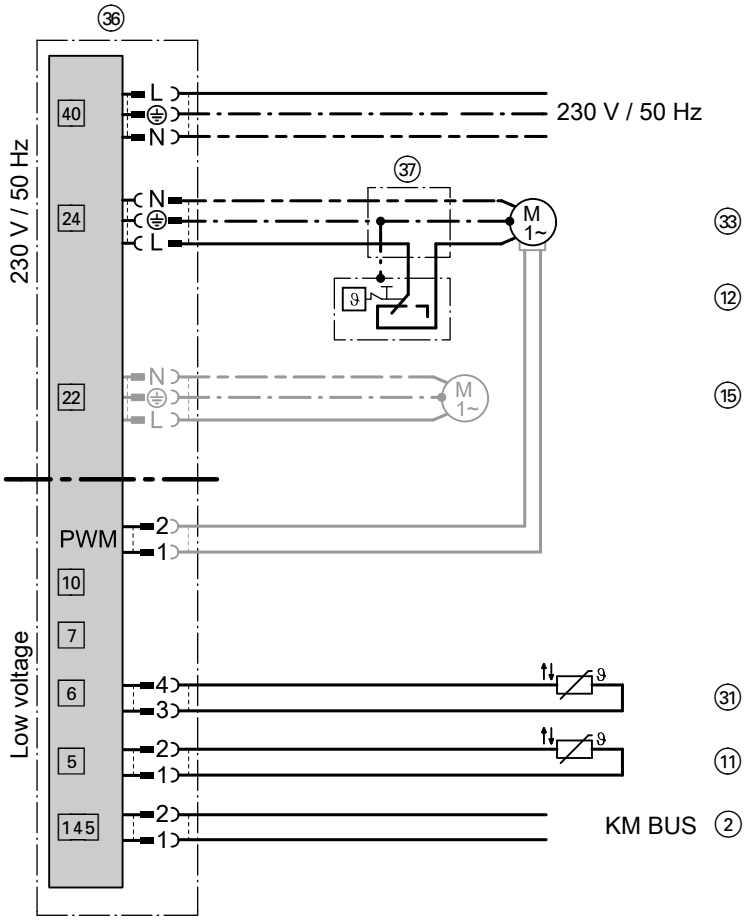
System example 1 (cont.)

Electrical installation scheme

Solar control module, type SM1



System example 2

DHW heating and central heating backup with a multi mode heating water buffer cylinder

Function description

DHW heating with solar energy

If the temperature differential between collector temperature sensor ㉛ and cylinder temperature sensor ⑪ is greater than the start temperature differential (coding address 00), solar circuit pump ㉝ starts and heating water buffer cylinder ⑩ is heated.
Solar circuit pump ㉝ stops if:

- Actual temperature drops below stop temperature differential (coding address 01)
- Maximum cylinder temperature is exceeded (coding address 08)
- The temperature selected at high limit safety cut-out ⑫ (if installed) is reached

Entire heating water buffer cylinder ⑩ is heated by the solar thermal system if the insolation is adequate.
The upper part of heating water buffer cylinder ⑩ will only be reheated by boiler ① if the actual water temperature falls below that selected as set temperature at boiler control unit ②.
If the solar energy is inadequate to cover the entire heating demand, the DHW in the lower part of heating water buffer cylinder ⑩ will be preheated by solar energy. The DHW in the upper part of the cylinder is heated to the required temperature by boiler ①.

The burner starts and 3-way diverter valve ⑦ switches to position "AB-A" via cylinder temperature sensor ⑯ of the boiler control unit. When the set DHW temperature has been reached, the burner stops and 3-way diverter valve ⑦ switches to position "AB-B".

Suppression of heating water buffer cylinder reheating by the boiler with DHW heating

Reheating suppression takes place in two stages.
Reheating of heating water buffer cylinder ⑩ by boiler ① is suppressed as soon as heating water buffer cylinder ⑩ is heated by collectors ㉚. For this, the set cylinder temperature for reheating is reduced by boiler ①. After solar circuit pump ㉝ has been switched off, suppression remains active for a certain time.
In the case of uninterrupted heating by the collectors ㉚ (> 2 h), boiler ① will only reheat if the set DHW temperature selected at boiler control unit ② (coding address "67") is not achieved.
A third set DHW temperature can be specified via coding address "67" (setting range 10 to 95 °C). This value must be **below** the first set DHW temperature.
Heating water buffer cylinder ⑩ will only be heated by boiler ① if this set value cannot be achieved by the solar thermal system.

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System example 2 (cont.)

DHW heating without solar energy

The upper area of heating water buffer cylinder ⑩ is heated by boiler ①. The integral instantaneous water heater/ standby section is heated by the surrounding buffer cylinder water.
The cylinder thermostat with cylinder temperature sensor ⑯ of boiler control unit ② controls 3-way diverter valve ⑦.

Central heating with solar energy

If the temperature at sensor ⑮ is high enough, central heating is provided via the heating water buffer cylinder (area between HV2/HR1 and HR2).

Central heating without solar energy

If the temperature at sensor ⑮ is not high enough, the burner and circulation pump in the Vitodens are started. The heating circuits are heated up to the set value for weather-compensated mode.

Required codes at the oil/gas boiler control unit

Boiler installation and service instructions

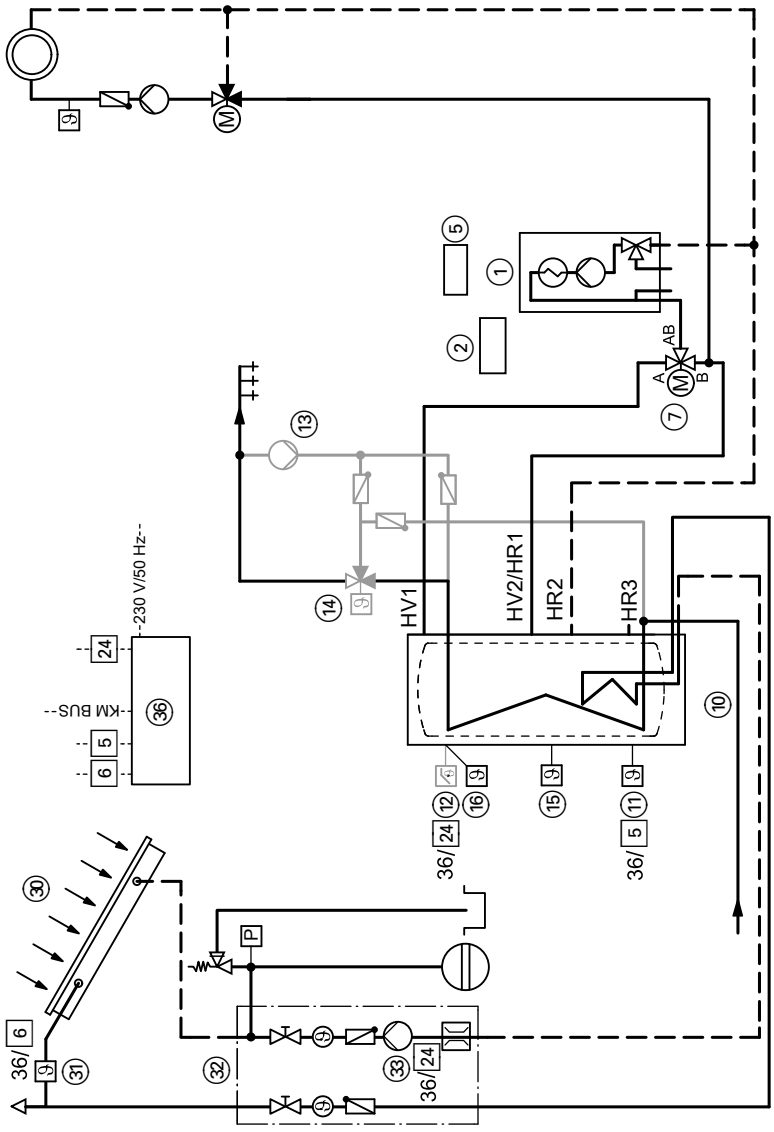
Function/system components	Code in solar group	
	Adjust	Delivered condition
Start temperature differential for solar circuit pump at connection 24 (delivered condition 8 K)	00:...	00:8
Stop temperature differential for solar circuit pump at connection 24 (delivered condition 4 K)	01:...	01:4
Solar circuit pump type:		
■ Solar circuit pump is not speed-controlled	—	02:0
■ Solar circuit pump is speed-controlled with wave pack control	02:1	02:0
■ Solar circuit pump is speed-controlled with PWM control	02:2	02:0
Maximum cylinder temperature (delivered condition 60 °C)	08:...	08:60

System example 2 (cont.)

Note
*Coding address **00** can be set*
*at least 0.5 K above coding address **01**.*
*Coding address **01** can be set to*
*max. 0.5 K below coding address **00**.*

System example 2 (cont.)

Hydraulic installation scheme



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System example 2 (cont.)

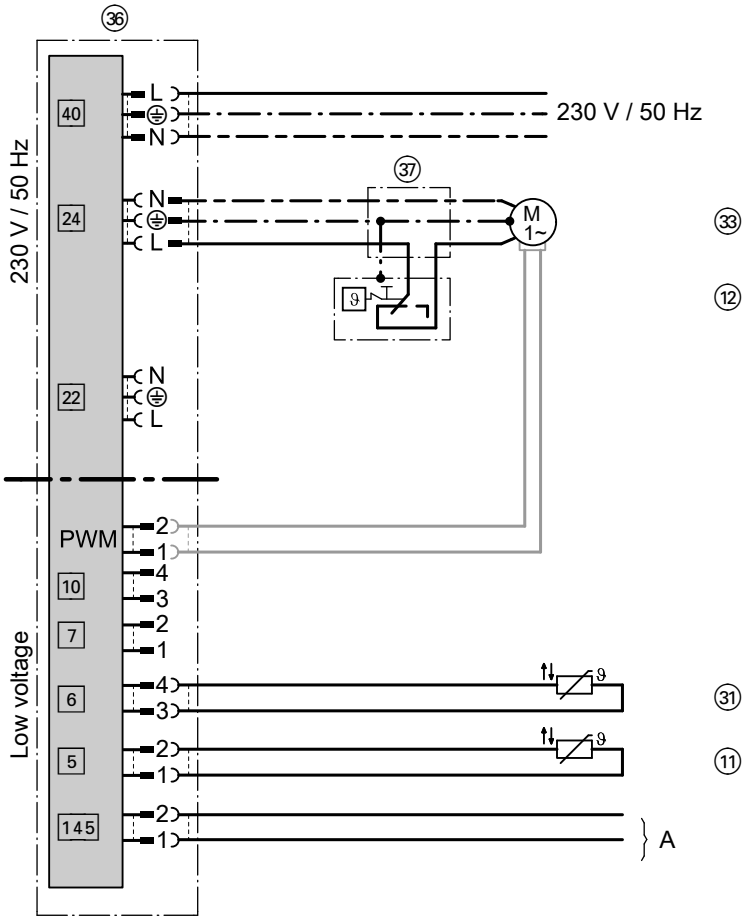
Equipment required

Pos.	Description
①	**Wall mounted oil/gas boiler**
	with
②	Boiler and heating circuit control unit
⑦	3-way diverter valve (accessory)
	(accessories may be required for connection)
⑩	Heating water buffer cylinder
⑪	Cylinder temperature sensor [5] (solar control module)
⑫	High limit safety cut-out (accessory)
⑬	DHW circulation pump (on site)
	(accessories may be required for connection)
⑭	Thermostatic mixing valve (accessory)
⑮	Flow temperature sensor [2] in heating water buffer cylinder (accessory)
⑯	Cylinder temperature sensor [5] (boiler)
㉚	Solar collectors
㉛	Collector temperature sensor [6]
㉜	Solar-Divicon (accessory)
㉝	Solar circuit pump [24] (standard delivery, Solar-Divicon)
㊱	Solar control module, type SM1
㊲	Junction box

System example 2 (cont.)

Electrical installation scheme

Solar control module, type SM1



A KM BUS to boiler control unit

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System example 3

DHW heating and central heating backup with a multi mode heating water buffer cylinder with differential temperature control

Function description

DHW heating with solar energy

If the temperature differential between collector temperature sensor ㉛ and cylinder temperature sensor ⑪ is greater than the start temperature differential (coding address 00), solar circuit pump ㉝ starts and heating water buffer cylinder ⑩ is heated.
Solar circuit pump ㉝ stops if:

- Actual temperature drops below stop temperature differential (coding address 01)
- Maximum cylinder temperature is exceeded (coding address 08)
- The temperature selected at high limit safety cut-out ⑫ (if installed) is reached

Entire heating water buffer cylinder ⑩ is heated by the solar thermal system if the insolation is adequate.
The upper part of heating water buffer cylinder ⑩ will only be reheated by boiler ① if the actual water temperature falls below that selected as set temperature at boiler control unit ②.
If the solar energy is inadequate to cover the entire heating demand, the DHW in the lower part of heating water buffer cylinder ⑩ will be preheated by solar energy. The DHW in the upper part of the cylinder is heated to the required temperature by boiler ①.

The burner and circulation pump for cylinder heating ⑦ are started via cylinder temperature sensor ⑯ of the boiler control unit. The burner and circulation pump for cylinder heating ⑦ are stopped once the set DHW temperature has been reached.

Suppression of heating water buffer cylinder reheating by the boiler with DHW heating

Reheating suppression takes place in two stages.
Reheating of heating water buffer cylinder ⑩ by boiler ① is suppressed as soon as heating water buffer cylinder ⑩ is heated by collectors ㉚. For this, the set cylinder temperature for reheating is reduced by boiler ①. After solar circuit pump ㉝ has been switched off, suppression remains active for a certain time.
In the case of uninterrupted heating by the collectors ㉚ (> 2 h), boiler ① will only reheat if the set DHW temperature selected at boiler control unit ② (coding address "67") is not achieved.
A third set DHW temperature can be specified via coding address "67" (setting range 10 to 95 °C). This value must be **below** the first set DHW temperature.
Heating water buffer cylinder ⑩ will only be heated by boiler ① if this set value cannot be achieved by the solar thermal system.

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System example 3 (cont.)

DHW heating without solar energy

The upper area of heating water buffer cylinder ⑩ is heated by boiler ①. The integral instantaneous water heater/ standby section is heated by the surrounding buffer cylinder water.
The cylinder thermostat with cylinder temperature sensor ⑯ of boiler control unit ② controls circulation pump for cylinder heating ⑦.

Central heating with solar energy

If the temperature differential between sensor ⑮ and sensor ㉟ is greater than the differential temperature of coding address 22, 3-way diverter valve ㊻ is switched to direction "AB-A". The heating circuit return water is routed through the heating water buffer cylinder (area between HV2/HR1 and HR2) and heated by solar energy.

Suppression of reheating by the boiler in the case of central heating backup with solar energy

If a sufficiently high temperature is available in heating water buffer cylinder ⑩ to heat the heating circuits, reheating by boiler ① can be suppressed.
For this, set coding address 20 accordingly.

Central heating without solar energy

If the temperature differential between sensor ⑮ and sensor ㉟ is less than the temperature differential of coding address 23, 3-way diverter valve ㊻ is switched to direction "AB-B". The heating circuit return water is routed directly into low loss header ㊿ and only heated by the boiler.

Required codes at the oil/gas boiler control unit

Boiler installation and service instructions

Function/system components	Code in solar group	
	Adjust	Delivered condition
Start temperature differential for solar circuit pump at connection 24 (delivered condition 8 K)	00:...	00:8
Stop temperature differential for solar circuit pump at connection 24 (delivered condition 4 K)	01:...	01:4
Solar circuit pump type:		
■ Solar circuit pump is not speed-controlled	—	02:0
■ Solar circuit pump is speed-controlled with wave pack control	02:1	02:0
■ Solar circuit pump is speed-controlled with PWM control	02:2	02:0

System example 3 (cont.)

Function/system components	Code in solar group	
	Adjust	Delivered condition
Maximum cylinder temperature (delivered condition 60 °C)	08:...	08:60
Differential temperature control 2 with central heating backup	20:4	20:0
Start temperature differential with central heating backup (delivered condition 8 K)	22:...	22:8
Stop temperature differential with central heating backup (delivered condition 4 K)	23:...	23:4

Note
*Coding address **00** can be set*
*at least 0.5 K above coding address **01**.*
*Coding address **01** can be set to*
*max. 0.5 K below coding address **00**.*

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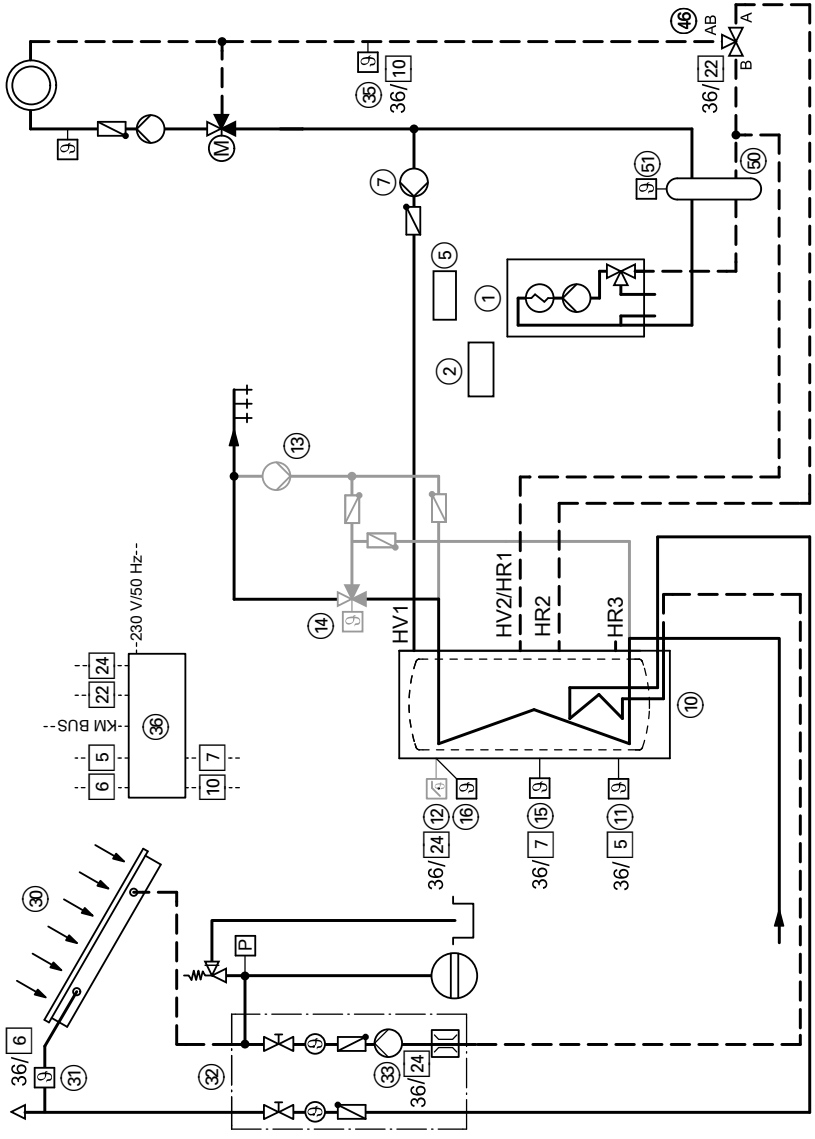
System example 3 (cont.)

Hydraulic installation scheme



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System example 3 (cont.)

Equipment required

Pos.	Description
①	**Wall mounted oil/gas boiler**
	with
②	Boiler and heating circuit control unit
⑦	Circulation pump for cylinder heating (on site)
	(accessories may be required for connection)
⑩	Heating water buffer cylinder
⑪	Cylinder temperature sensor [5] (solar control module)
⑫	High limit safety cut-out (accessory)
⑬	DHW circulation pump (on site)
	(accessories may be required for connection)
⑭	Thermostatic mixing valve (accessory)
⑮	Temperature sensor [7] (flow temperature sensor in heating water buffer cylinder, accessory)
⑯	Cylinder temperature sensor [5] (boiler)
㉚	Solar collectors
㉛	Collector temperature sensor [6]
㉜	Solar-Divicon (accessory)
㉝	Solar circuit pump [24] (standard delivery, Solar-Divicon)
㉟	Temperature sensor [10] (return temperature sensor in heating circuit, accessory)
㊱	Solar control module, type SM1
㊲	Junction box (on site)
㊻	3-way diverter valve [22] (accessory)
㊿	Low loss header (accessory)
㊿①	Flow temperature sensor, low loss header [2] (accessory)

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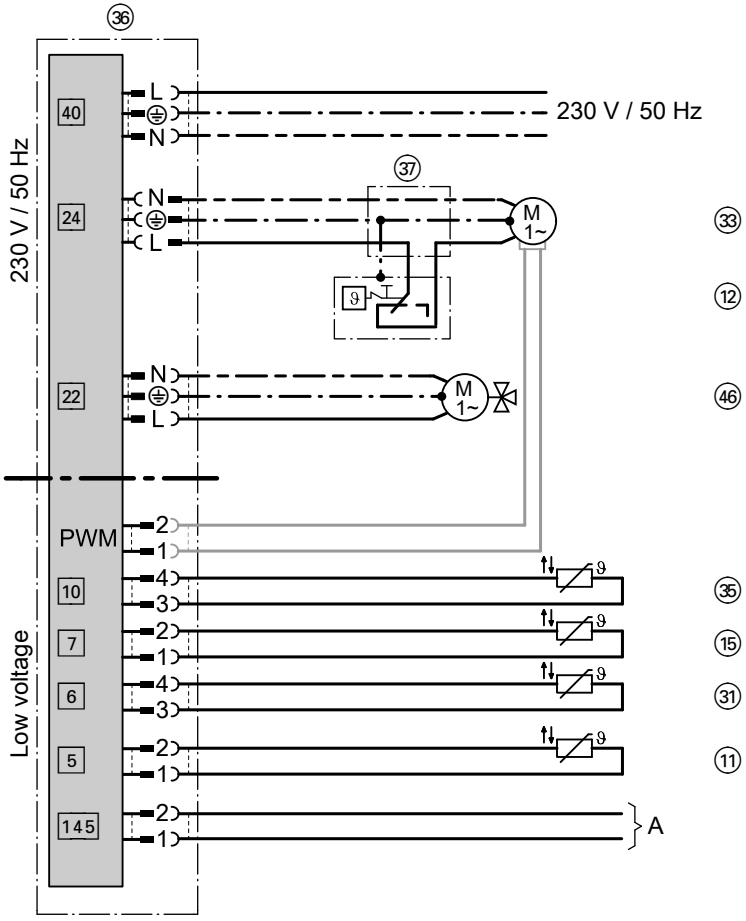
System example 3 (cont.)

Electrical installation scheme

Solar control module, type SM1



A KM BUS to boiler control unit

System example 4

DHW heating and central heating backup with heating water buffer cylinder with freshwater module

Function description

Freshwater module ⑩ heats DHW when hot water is drawn. The energy supply to freshwater module ⑩ is provided via heating water buffer cylinder ㊵. Heating water buffer cylinder ㊵ is heated by the solar thermal system or, in the upper area, by boiler ①.
The DHW is heated in freshwater module ⑩ according to the instantaneous water heater principle. An internal pump transports the heating water from heating water buffer cylinder ㊵ into the freshwater module ⑩. This heats the DHW in the heat exchanger of the freshwater module ⑩ according to the countercurrent principle. The freshwater module ⑩ is regulated by its internal control unit.
When utilising the freshwater module with integral DHW circulation pump, the 3-way diverter valve ⑪ in conjunction with sensors ⑬ and S4 ⑫ of the freshwater module can be regulated by its control unit to provide an optimum stratification of the return water into the heating water buffer cylinder ㊵.

DHW heating with solar energy

If the temperature differential between collector temperature sensor ㉛ and cylinder temperature sensor ㊶ is greater than the start temperature differential (coding address 00), solar circuit pump ㉝ starts and heating water buffer cylinder ㊵ is heated.

Solar circuit pump ㉝ stops if:
- Actual temperature drops below stop temperature differential (coding address 01)
- Maximum cylinder temperature is exceeded (coding address 08)
- The temperature selected at high limit safety cut-out ㊹ (if installed) is reached

Entire heating water buffer cylinder ㊵ is heated by the solar thermal system if the insolation is adequate.
The upper part of heating water buffer cylinder ㊵ will only be reheated by boiler ① if the actual water temperature falls below that selected as set temperature at boiler control unit ②.
If the solar energy is inadequate to cover the entire heating demand, the DHW in the lower part of heating water buffer cylinder ㊵ will be preheated by solar energy. The DHW in the upper part of the cylinder is heated to the required temperature by boiler ①.
The burner starts and 3-way diverter valve ⑦ switches to position "AB-A" via cylinder temperature sensor ㊷ of the boiler control unit. When the set DHW temperature has been reached, the burner stops and 3-way diverter valve ⑦ switches to position "AB-B".

Suppression of heating water buffer cylinder reheating by the boiler with DHW heating

Reheating suppression takes place in two stages.

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System example 4 (cont.)

Reheating of heating water buffer cylinder ㊵ by boiler ① is suppressed as soon as heating water buffer cylinder ㊵ is heated by collectors ㉚. For this, the set cylinder temperature for reheating is reduced by boiler ①. After solar circuit pump ㉝ has been switched off, suppression remains active for a certain time.
In the case of uninterrupted heating by the collectors ㉚ (> 2 h), boiler ① will only reheat if the set DHW temperature selected at boiler control unit ② (coding address "67") is not achieved.
A third set DHW temperature can be specified via coding address "67" (setting range 10 to 95 °C). This value must be **below** the first set DHW temperature.
Heating water buffer cylinder ㊵ will only be heated by boiler ① if this set value cannot be achieved by the solar thermal system.

DHW heating without solar energy

The upper area of heating water buffer cylinder ㊵ is heated by boiler ①.
The cylinder thermostat with cylinder temperature sensor ㊷ of boiler control unit ② controls 3-way diverter valve ⑦.

Central heating with solar energy

If the temperature at sensor ㊸ is sufficiently high, central heating is provided via the heating water buffer cylinder (area between HV3/HR1 and HR2).

Central heating without solar energy

If the temperature at sensor ㊸ is not high enough, the burner and circulation pump in the Vitodens are started.The heating circuits are heated up to the set value for weather-compensated mode.

Required codes at the oil/gas boiler control unit

Boiler installation and service instructions

Function/system components	Code in solar group	
	Adjust	Delivered condition
Start temperature differential for solar circuit pump at connection 24 (delivered condition 8 K)	00:...	00:8
Stop temperature differential for solar circuit pump at connection 24 (delivered condition 4 K)	01:...	01:4
Solar circuit pump type:		
■ Solar circuit pump is not speed-controlled	—	02:0
■ Solar circuit pump is speed-controlled with wave pack control	02:1	02:0

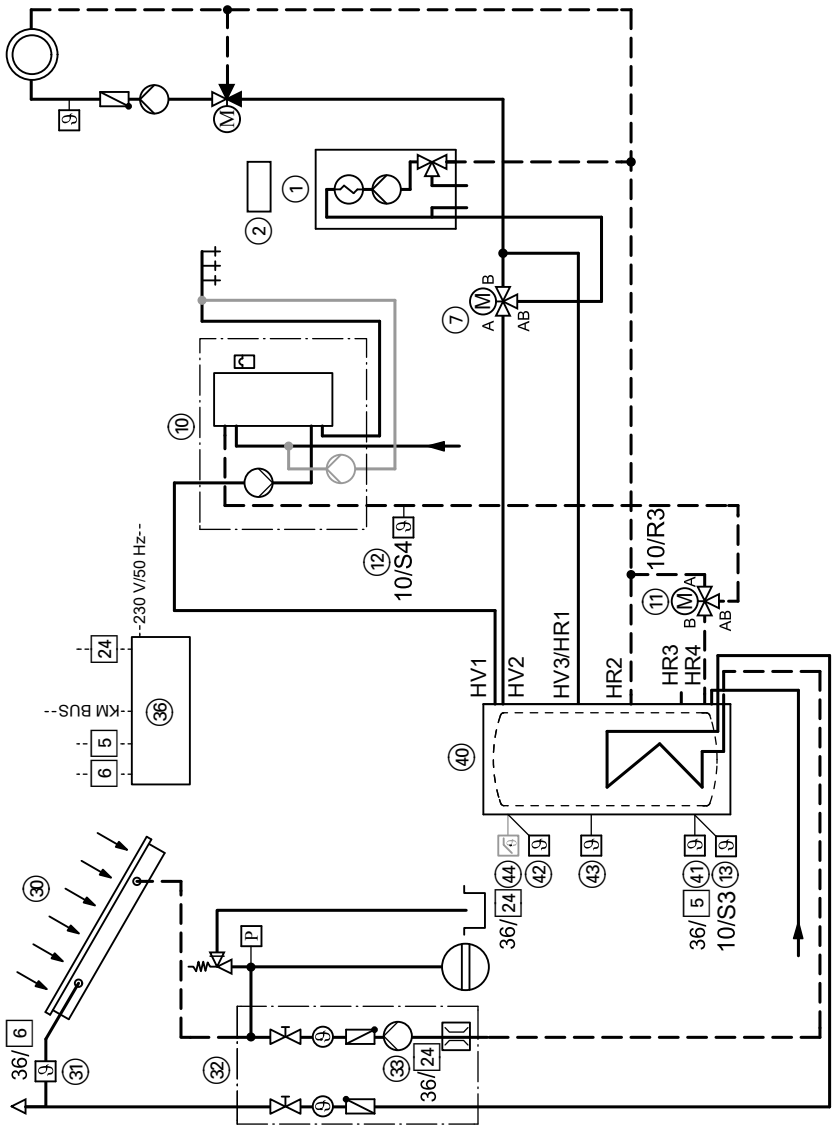
System example 4 (cont.)

Function/system components	Code in solar group	
	Adjust	Delivered condition
■ Solar circuit pump is speed-controlled with PWM control	02:2	02:0
Maximum cylinder temperature (delivered condition 60 °C)	08:...	08:60

Note
*Coding address **00** can be set*
*at least 0.5 K above coding address **01**.*
*Coding address **01** can be set to*
*max. 0.5 K below coding address **00**.*

System example 4 (cont.)

Hydraulic installation scheme



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System example 4 (cont.)

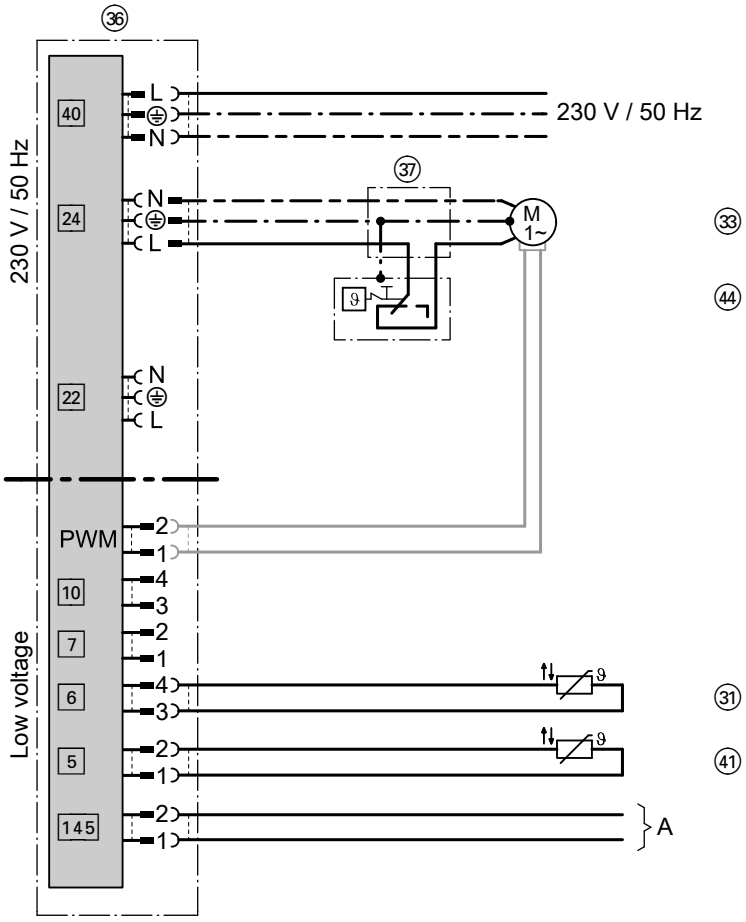
Equipment required

Pos.	Description
①	**Wall mounted oil/gas boiler**
	with
②	Boiler and heating circuit control unit
⑦	3-way diverter valve (accessory)
	(accessories may be required for connection)
⑩	Freshwater module
⑪	3-way diverter valve (freshwater module accessory)
⑫	Temperature sensor S4 (freshwater module accessory)
⑬	Temperature sensor S3 (freshwater module accessory)
㊵	Heating water buffer cylinder
㊶	Cylinder temperature sensor [5] (solar control module)
㊷	Cylinder temperature sensor [5] (boiler)
㊸	Flow temperature sensor [2] in heating water buffer cylinder (accessory)
㊹	High limit safety cut-out (accessory)
㉚	Solar collectors
㉛	Collector temperature sensor [6]
㉜	Solar-Divicon (accessory)
㉝	Solar circuit pump [24] (standard delivery, Solar-Divicon)
㊱	Solar control module, type SM1
㊲	Junction box

System example 4 (cont.)

Electrical installation scheme

Solar control module, type SM1



A KM BUS to boiler control unit

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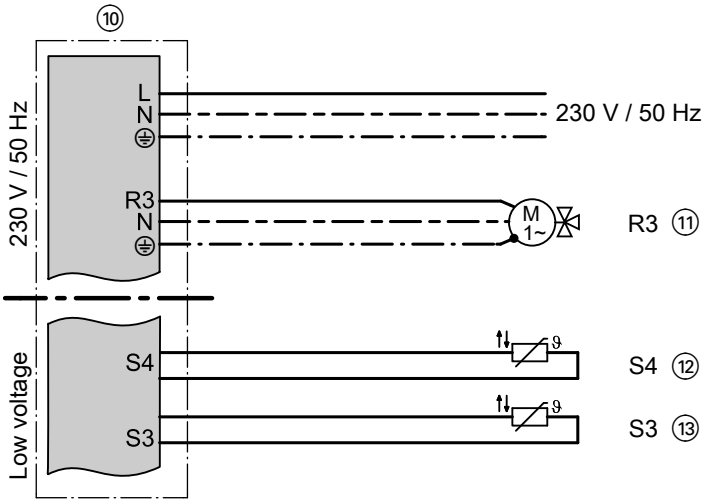
System example 4 (cont.)

Control unit, freshwater module



System example 5

DHW heating with two mono mode DHW cylinders

Function description

DHW heating with solar energy

If the temperature differential between collector temperature sensor ㉛ and cylinder temperature sensor ⑪ is greater than the start temperature differential (coding address 00), solar circuit pump ㉝ starts and DHW cylinder 1 ⑩ is heated.
Solar circuit pump ㉝ stops if:

- Actual temperature drops below stop temperature differential (coding address 01)
- Maximum cylinder temperature is exceeded (coding address 08)
- The temperature selected at high limit safety cut-out ⑫ (if installed) is reached

Transfer pump ⑮ starts if the temperature at temperature sensor ⑯ has reached the start temperature differential of the differential temperature control 2 (code 22).
The water heated in DHW cylinder 1 ⑩ is supplied to DHW cylinder 2 ⑱. This means DHW cylinder 2 ⑱ is also heated by solar energy.

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System example 5 (cont.)

Transfer pump ⑮ stops if the temperature at temperature sensor ⑯ has fallen below the stop temperature differential of the differential temperature control 2 (code 23).

Additional function for DHW heating

The requirements for the additional function are achieved through circulation pump ⑮.

Suppression of DHW cylinder 2 heating by the boiler with DHW heating

Reheating suppression takes place in two stages.
Heating DHW cylinder 2 ⑱ by boiler ① is suppressed as soon as DHW cylinder 1 ⑩ is heated by collectors ㉚. For this, the set cylinder temperature for reheating is reduced by boiler ①. After solar circuit pump ㉝ has been switched off, suppression remains active for a certain time.

In the case of uninterrupted heating by the collectors ㉚ (> 2 h), boiler ① will only heat if the set DHW temperature selected at boiler control unit ② (coding address "67") is not achieved.
A third set DHW temperature can be specified via coding address "67" (setting range 10 to 95 °C). This value must be **below** the first set DHW temperature.
DHW cylinder 2 ⑱ will only be heated by boiler ①, if this set value is not achieved by the solar thermal system.

DHW heating without solar energy

DHW cylinder 2 ⑱ is heated by boiler ①.
The cylinder thermostat with cylinder temperature sensor ⑲ of boiler control unit ② starts the internal circulation pump and changes the 3-way diverter valve to DHW heating.

Required codes at the oil/gas boiler control unit

Boiler installation and service instructions

Function/system components	Code in solar group	
	Adjust	Delivered condition
Start temperature differential for solar circuit pump at connection 24 (delivered condition 8 K)	00:...	00:8
Stop temperature differential for solar circuit pump at connection 24 (delivered condition 4 K)	01:...	01:4
Solar circuit pump type:		
■ Solar circuit pump is not speed-controlled	—	02:0
■ Solar circuit pump is speed-controlled with wave pack control	02:1	02:0

System example 5 (cont.)

Function/system components	Code in solar group	
	Adjust	Delivered condition
■ Solar circuit pump is speed-controlled with PWM control	02:2	02:0
Maximum cylinder temperature (delivered condition 60 °C)	08:...	08:60
Start temperature differential with central heating backup (delivered condition 8 K)	22:...	22:8
Stop temperature differential with central heating backup (delivered condition 4 K)	23:...	23:4

Note
*Coding address **00** can be set*
*at least 0.5 K above coding address **01**.*
*Coding address **01** can be set to*
*max. 0.5 K below coding address **00**.*

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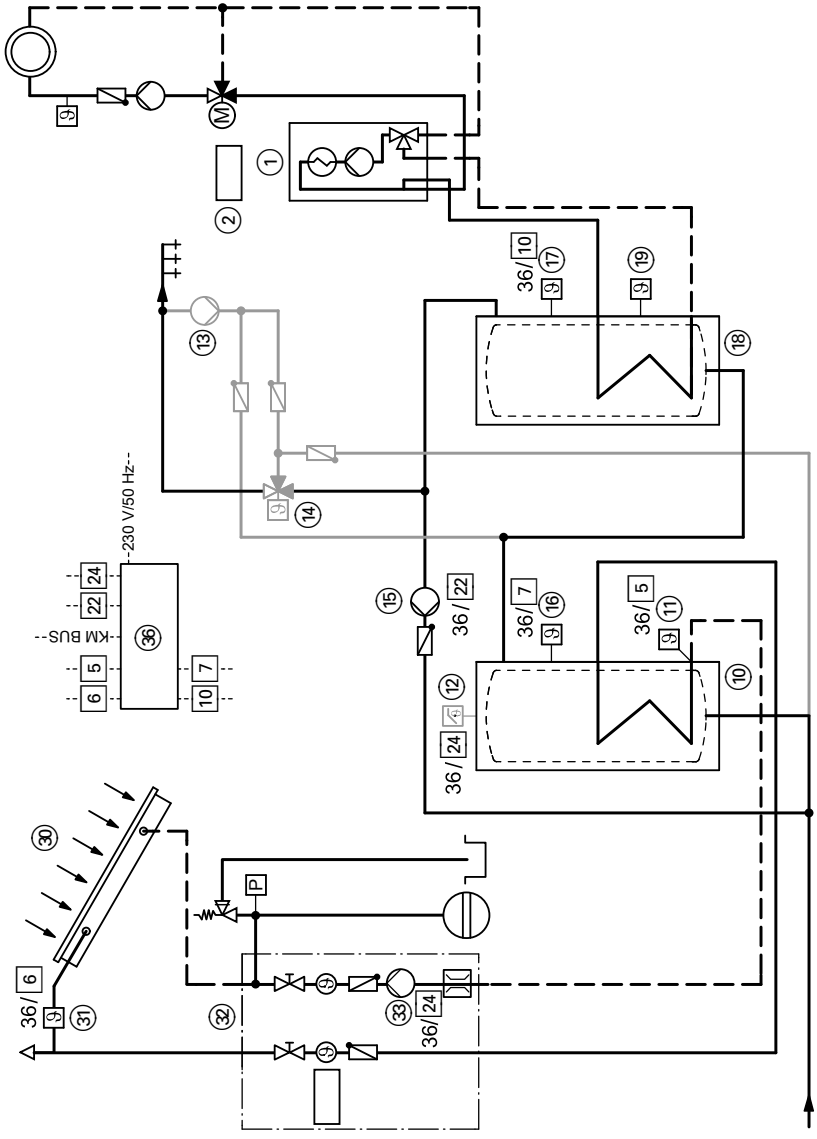
System example 5 (cont.)

Hydraulic installation scheme



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System example 5 (cont.)

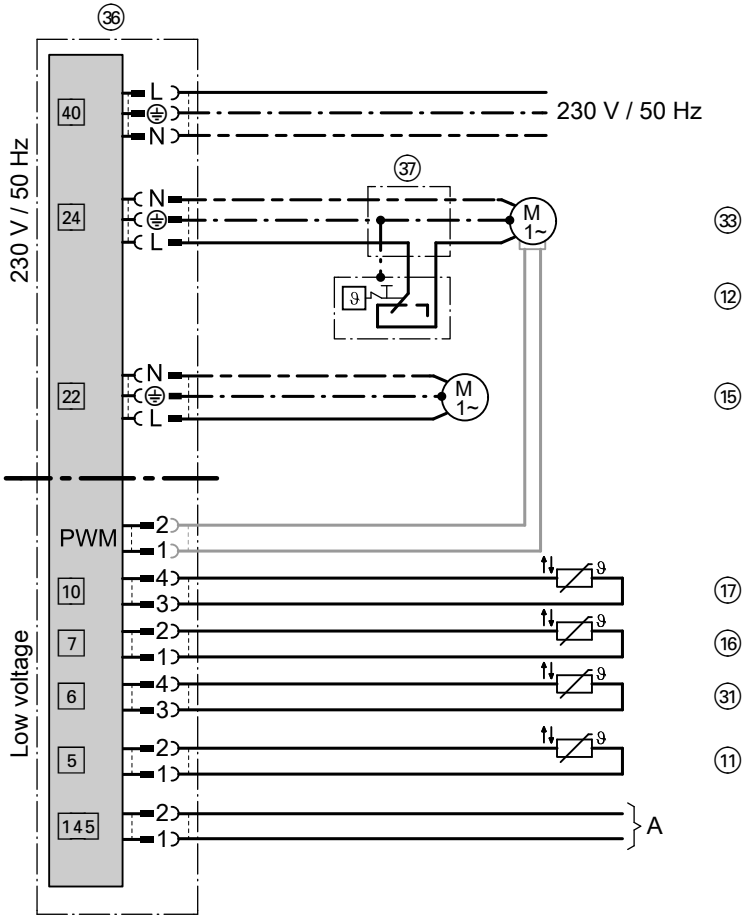
Equipment required

Pos.	Description
①	**Wall mounted oil/gas boiler**
	with
②	Boiler and heating circuit control unit
⑩	DHW cylinder 1, mono mode
⑪	Cylinder temperature sensor [5] (solar control module)
⑫	High limit safety cut-out (accessory)
⑬	DHW circulation pump (on site)
	(accessories may be required for connection)
⑭	Thermostatic mixing valve (accessory)
⑮	Transfer pump (on site)
⑯	Temperature sensor [7] (accessory)
⑰	Temperature sensor [10] (accessory)
⑱	DHW cylinder 2, mono mode
⑲	Cylinder temperature sensor [5] (boiler)
㉚	Solar collectors
㉛	Collector temperature sensor [6]
㉜	Solar-Divicon (accessory)
㉝	Solar circuit pump [24] (standard delivery, Solar-Divicon)
㊱	Solar control module, type SM1
㊲	Junction box

System example 5 (cont.)

Electrical installation scheme

Solar control module, type SM1



A KM BUS to boiler control unit

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System example 6

DHW heating with mono mode DHW cylinder and central heating backup with multi mode heating water buffer cylinder with differential temperature control

Function description

DHW heating with solar energy

If the temperature differential between collector temperature sensor ㉛ and cylinder temperature sensor ㊶ is greater than the start temperature differential (coding address 00), solar circuit pump ㉝ starts and heating water buffer cylinder ㊵ is heated.
Solar circuit pump ㉝ stops if:
- Actual temperature drops below stop temperature differential (coding address 01)
- Maximum cylinder temperature is exceeded (coding address 08)
- The temperature selected at high limit safety cut-out ㊹ (if installed) is reached

Entire heating water buffer cylinder ㊵ is heated by the solar thermal system if the insolation is adequate.
If there is insufficient solar energy, the DHW is preheated by the solar energy available in heating water buffer cylinder ㊵, and is brought up to the required temperature in DHW cylinder ⑩ via boiler ①.
The burner and circulation pump for cylinder heating ⑦ are started via cylinder temperature sensor ⑪ of the boiler control unit.

Suppression of heating water buffer cylinder reheating by the boiler with DHW heating

Reheating suppression takes place in two stages.
Heating of DHW cylinder ⑩ by boiler ① is suppressed as soon as heating water buffer cylinder ㊵ is heated by collectors ㉚. For this, the set cylinder temperature for reheating is reduced by boiler ①. After solar circuit pump ㉝ has been switched off, suppression remains active for a certain time.
In the case of uninterrupted heating by the collectors ㉚ (> 2 h), boiler ① will only reheat if the set DHW temperature selected at boiler control unit ② (coding address "67") is not achieved.
A third set DHW temperature can be specified via coding address "67" (setting range 10 to 95 °C). This value must be **below** the first set DHW temperature.
DHW cylinder ⑩ will only be heated by boiler ① if this set value cannot be achieved by the solar thermal system.

DHW heating without solar energy

DHW cylinder⑩ is heated by boiler ①.

The cylinder thermostat with cylinder temperature sensor ⑪ of boiler control unit ② controls circulation pump for cylinder heating ⑦.

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System example 6 (cont.)

Central heating with solar energy

If the temperature differential between sensor ㊷ and sensor ㊺ is greater than the temperature differential of coding address 22, 3-way diverter valve ㊻ is switched to direction "AB-A". The heating circuit return water is routed through heating water buffer cylinder ㊵ and heated by solar energy.

Suppression of reheating by the boiler in the case of central heating backup with solar energy

If a sufficiently high temperature is available in heating water buffer cylinder ㊵ to heat the heating circuits, reheating by boiler ① can be suppressed.

Central heating without solar energy

If the temperature differential between sensor ㊷ and sensor ㊺ is less than the temperature differential of coding address 23, 3-way diverter valve ㊻ is switched to direction "AB-B". The heating circuit return water is routed directly into low loss header ㊿ and only heated by the boiler.

Required codes at the oil/gas boiler control unit

Boiler installation and service instructions

Function/system components	Code in solar group	
	Adjust	Delivered condition
Start temperature differential for solar circuit pump at connection [24] (delivered condition 8 K)	00:...	00:8
Stop temperature differential for solar circuit pump at connection [24] (delivered condition 4 K)	01:...	01:4
Solar circuit pump type:		
■ Solar circuit pump is not speed-controlled	—	02:0
■ Solar circuit pump is speed-controlled with wave pack control	02:1	02:0
■ Solar circuit pump is speed-controlled with PWM control	02:2	02:0
Maximum cylinder temperature (delivered condition 60 °C)	08:...	08:60
Differential temperature control 2 with central heating backup	20:4	20:0

System example 6 (cont.)

Function/system components	Code in solar group	
	Adjust	Delivered condition
Start temperature differential with central heating backup (delivered condition 8 K)	22:...	22:8
Stop temperature differential with central heating backup (delivered condition 4 K)	23:...	23:4

Note
*Coding address **00** can be set*
*at least 0.5 K above coding address **01**.*
*Coding address **01** can be set to*
*max. 0.5 K below coding address **00**.*

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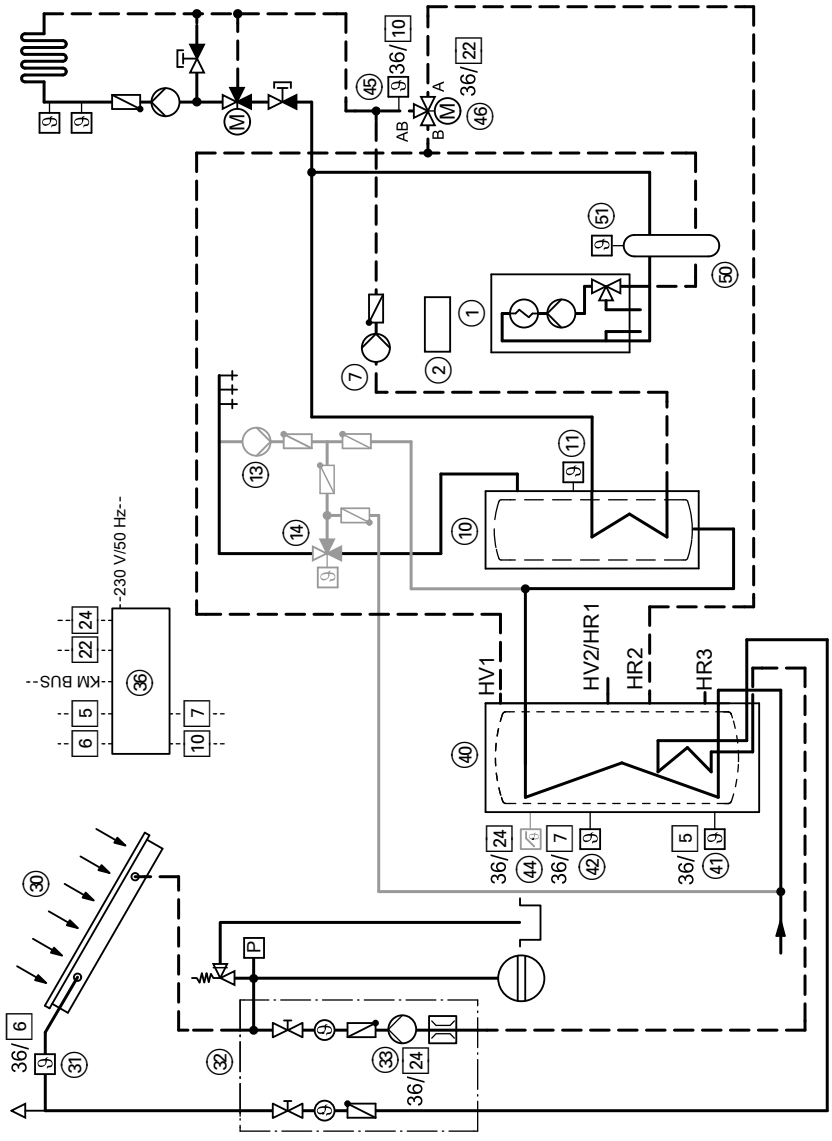
System example 6 (cont.)

Hydraulic installation scheme



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System example 6 (cont.)

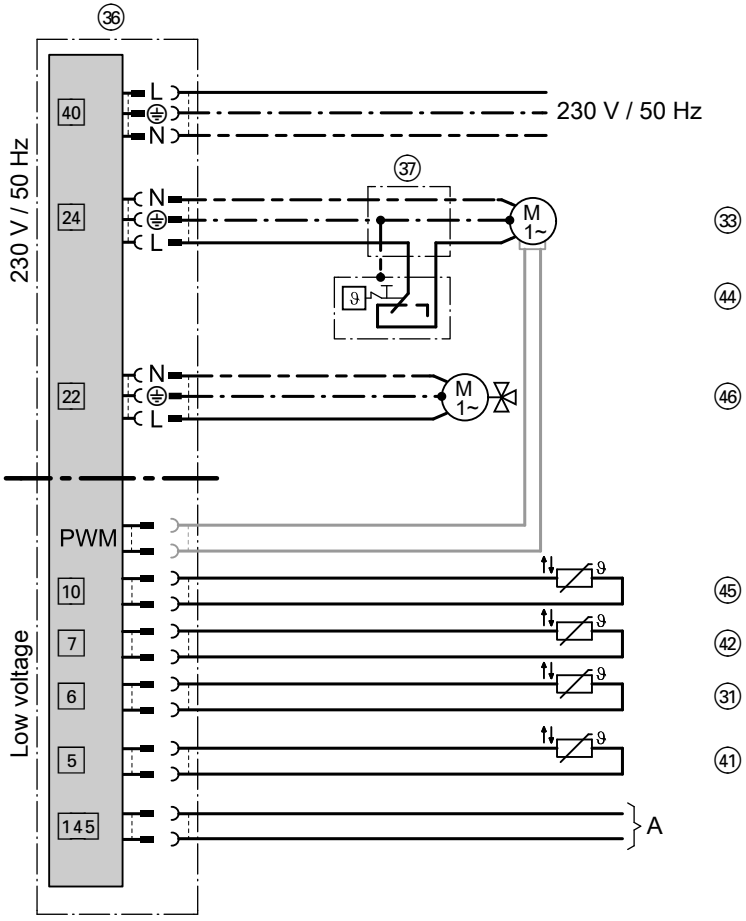
Equipment required

Pos.	Description
①	**Wall mounted oil/gas boiler**
	with
②	Boiler and heating circuit control unit
⑦	Circulation pump for cylinder heating (on site)
	(accessories may be required for connection)
⑩	Mono mode DHW cylinder
⑪	Cylinder temperature sensor [5] (boiler)
⑬	DHW circulation pump (on site)
	(accessories may be required for connection)
⑭	Thermostatic mixing valve (accessory)
㉚	Solar collectors
㉛	Collector temperature sensor [6]
㉜	Solar-Divicon (accessory)
㉝	Solar circuit pump [24] (standard delivery, Solar-Divicon)
㊱	Solar control module, type SM1
㊲	Junction box (on site)
㊵	Heating water buffer cylinder
㊶	Cylinder temperature sensor [5] (solar control module)
㊷	Temperature sensor [7] (flow temperature sensor in heating water buffer cylinder, accessory)
㊹	High limit safety cut-out (accessory)
㊺	Temperature sensor [10] (return temperature sensor in heating circuit, accessory)
㊻	3-way diverter valve [22] (accessory)
㊿	Low loss header (accessory)
㊿①	Flow temperature sensor, low loss header [2] (accessory)

System example 6 (cont.)

Electrical installation scheme

Solar control module, type SM1



A KM BUS to boiler control unit

Power supply

Connect accessories with a total wattage **above 400 W directly** to the mains power supply.

Danger
Incorrectly executed electrical installations can lead to injury from electrical current and result in equipment damage.

Make the power connection (see page 6) and implement all earthing measures (e.g. RCD circuit) in accordance with the following regulations:
- IEC 60364-4-41
- VDE requirements
- Requirements specified by your local power supply utility
- Protect the power cable with 16 A max.

Danger
The absence of component earthing in the system can lead to serious injury from electrical current if an electrical fault occurs. The equipment and the pipework must be connected to the earth bonding of the house in question.

- The main isolator (if installed) must simultaneously isolate all non-earthed conductors from the mains with a minimum contact separation of 3 mm. We additionally recommend installing an AC/DC-sensitive RCD (RCD class B ⏦ ⎓) for DC (fault) currents that can occur with energy efficient equipment.
- If **no** main isolator is installed, all non-earthed cables must be isolated from the mains by the upstream breaker with at least 3 mm contact separation.

Danger
Incorrect core termination can cause severe injuries and damage to the equipment.
Never interchange cores "L" and "N".

Please note
An incorrect phase sequence can cause damage to the unit.
Check for phase equality with the power supply connection of the control unit.

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Function description

Note
Set or alter the functions described below in coding levels 1 and 2 (solar group) at the boiler control unit.


Boiler service instructions

Reduction of stagnation time

If there is excess solar energy, the speed of the solar circuit pump will be reduced before the maximum cylinder temperature is reached. This increases the difference between collector temperature and cylinder temperature. The heat transfer to the DHW cylinder is reduced, which delays stagnation.
Coding address 0A.

Maximum collector temperature

If the maximum collector temperature is exceeded, the solar circuit pump is shut down to protect the system components (emergency collector shutdown).
Coding address 09.

Minimum collector temperature limit

If the actual temperature falls below the minimum collector temperature, the solar circuit pump is shut down.
Coding address 12.

Interval function

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.
Coding address 07.

Collector frost protection function

Viessmann collectors are filled with Viessmann heat transfer medium. This function does not have to be enabled. Activate only when using water as 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 will be stopped when a temperature of +7 °C has been reached.
Coding address 0b.

Thermostat function

The thermostat function can be used independently of the solar operation.

Different effects can be achieved by determining the thermostat start and stop temperatures:
- Start temperature < stop temperature: e.g. reheating
- Start temperature > stop temperature: e.g. utilisation of excess heat

Coding addresses 20, 24, 25.

Speed control

The speed control is disabled in the delivered condition. It can only be enabled for relay output 24.

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Function description (cont.)

Possible pumps:
- Standard solar pumps with and without their own speed control
- High efficiency pumps
- Pumps with PWM input (only use solar pumps)
  E.g. Grundfos Solar PM 15 - 85

Coding addresses 02 to 06.

Note
We recommend operating the solar circuit pump at max. output while the solar thermal system is being vented.

Heat statement

When determining thermal yields, the difference between the collector and cylinder temperature, the set throughput, the type of heat transfer medium and the operating time of the solar circuit pump are taken into account.
Coding addresses 0E and 0F.

Suppression of DHW cylinder reheating by the boiler

Reheating suppression takes place in two stages.
Reheating of the DHW cylinder by the boiler is suppressed as soon as the DHW cylinder is heated by the collectors. For this, the set cylinder temperature for reheating is reduced by the boiler. 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), the boiler will only reheat if the set cylinder temperature selected at the boiler control unit (coding address "67") is not achieved.

A third set DHW temperature can be specified via coding address "67" (setting range 10 to 95 °C). This value must be **below** the first set DHW temperature.
The DHW cylinder will only be heated by the boiler, if this set value cannot be achieved by the solar thermal system.

Suppression of reheating by the boiler in case of central heating backup

If a sufficiently high temperature is available in the multi mode heating water buffer cylinder to heat the heating circuits, reheating by boiler can be suppressed.

Additional function for DHW heating

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

Boiler control unit settings:
- Set DHW temperature 2 must be encoded. Coding address 58 (DHW group)
- The fourth DHW phase for DHW heating must be enabled
- Coding address 20 (solar group)

This signal will be transmitted to the solar control module via the KM BUS, and the transfer pump will be started.

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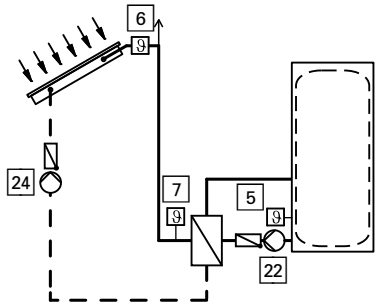
Function description (cont.)

External heat exchanger



The DHW cylinder is heated via the heat exchanger. Secondary pump 22 is started in parallel with solar circuit pump 24.
If an additional temperature sensor 7 is used, secondary pump 22 is switched on when solar circuit pump 24 is running and the required temperature differential between 5 and 7 is available.
Coding address 20.

Cylinder priority control

In systems with two consumers.
It is possible to determine the order for heating the consumers.
Coding addresses 10, 11, 26.

Cyclical heating

In systems with several consumers.

If the consumer cannot be heated with priority, the next consumer in line will be heated for an adjustable cycle time. After this time has expired, the solar control unit checks the rise of the collector temperature during the adjustable cyclical pause. As soon as the start conditions for the consumer with priority have been met, that consumer will be heated again. Otherwise, the next-in-line consumers will continue to be heated.
Coding addresses 26, 27, 28.

Relay kick

If the pumps and valves have been switched off for 24 h, they are started for approx. 10 s to prevent them seizing up.

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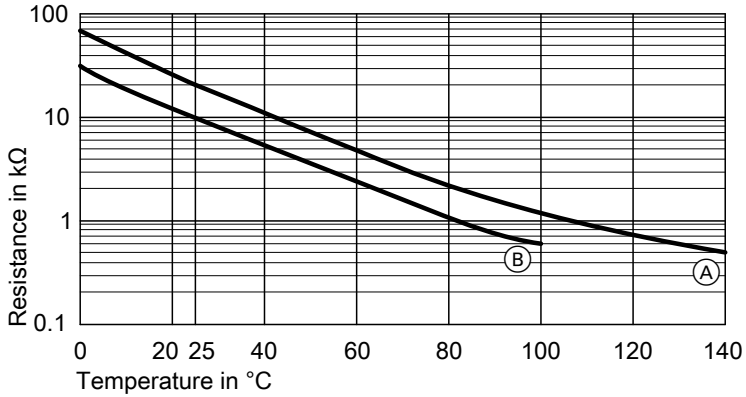
Specification

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	2 A
Power consumption	1.5 W
Protection class	I
IP rating	IP 20 D to EN 60 529, ensure through design/installation
Permissible ambient temperature	
■ During operation	0 to +40 °C
■ During storage and transport	–20 to +65 °C
Rated relay output breaking capacity	
■ Solar circuit pump [24]	1 (1) A 230 V~
■ Transfer pump [22]	1 (1) A 230 V~

Sensor curves



Ⓐ Collector temperature sensor [6]
Ⓑ ■ Cylinder temperature sensor [5]
■ Temperature sensor [7]
■ Temperature sensor [10]

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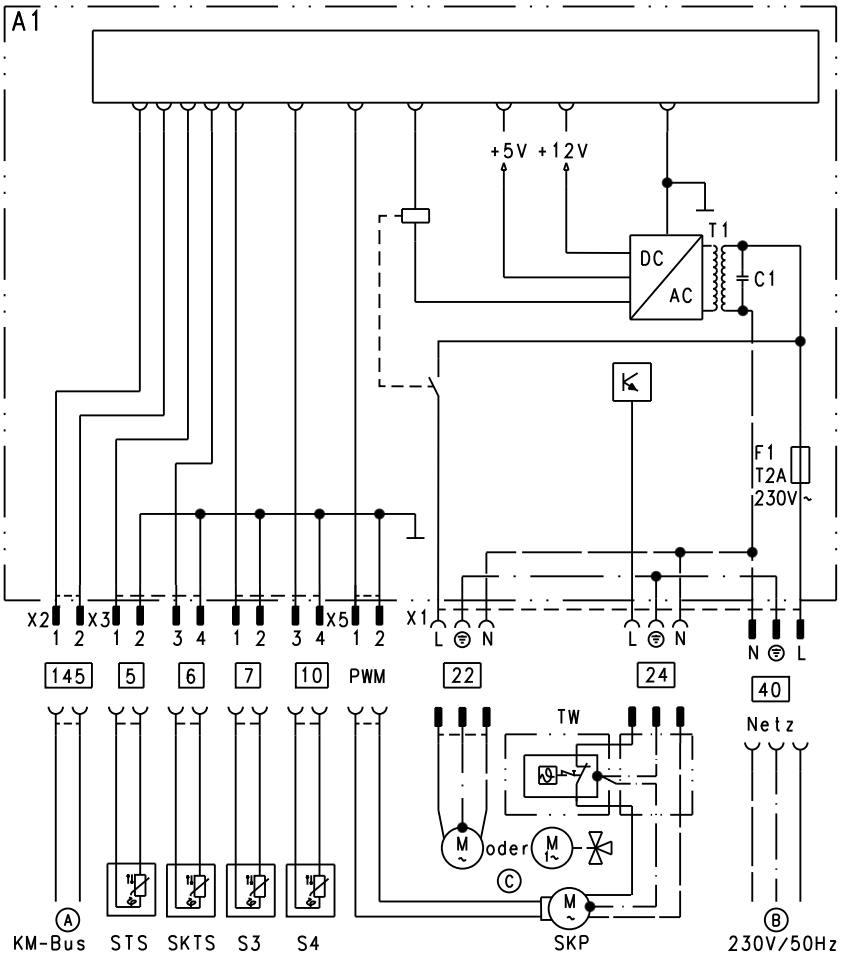
Connection and wiring diagram



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

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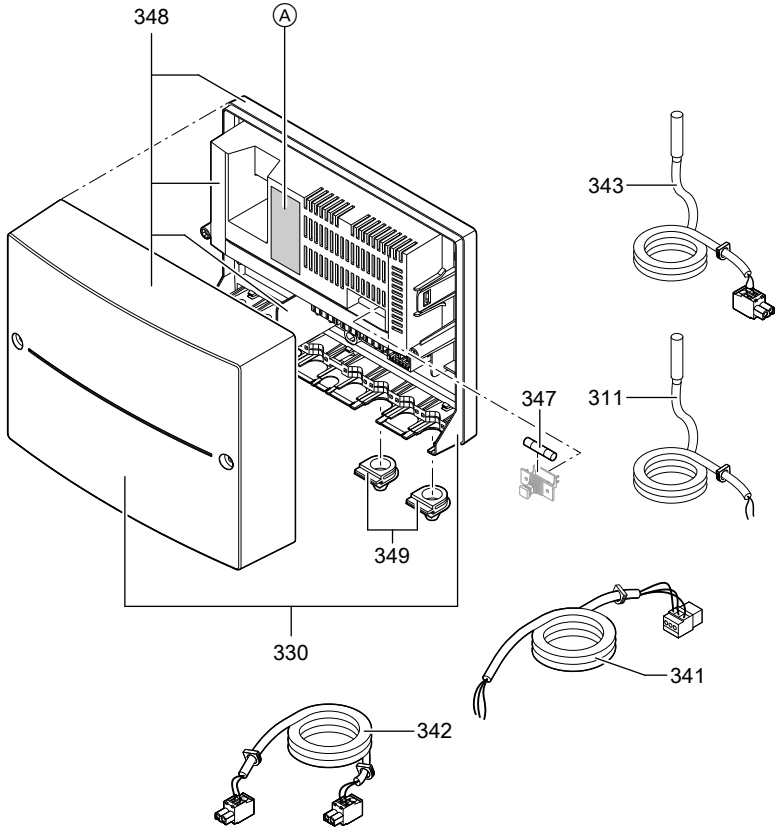
Parts list

When ordering spare parts
Quote the part and serial numbers (see type plate) as well as the position number of the required part (as per the parts list).
Obtain standard parts from your local supplier.

Parts
311 Collector temperature sensor
330 Solar control module SM1
341 Power cable [40]
342 KM BUS cable
343 Cylinder temperature sensor
347 Fuse 4 A (slow)
348 Plastic module casing
349 Strain relief

Parts not shown
345 Plug set, 230 V
346 LV plug set, 2-pole
350 Installation and service instructions
Ⓐ Type plate



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Declaration of Conformity

We, Viessmann Werke GmbH&Co KG, D-35107 Allendorf, declare as sole responsible body, that the product **Solar control module, type SM1**, complies with the following standards:

EN 50 366
EN 55 014-1
EN 55 014-2
EN 60 335-1
EN 60 335-2-102
EN 61 000-3-2
EN 62 233

In accordance with the following Directives, this product is designated with CE:

2004/108/EC
2006/95/EC

Allendorf, 1 February 2010

Viessmann Werke GmbH&Co KG

pp. Manfred Sommer

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Keyword index

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