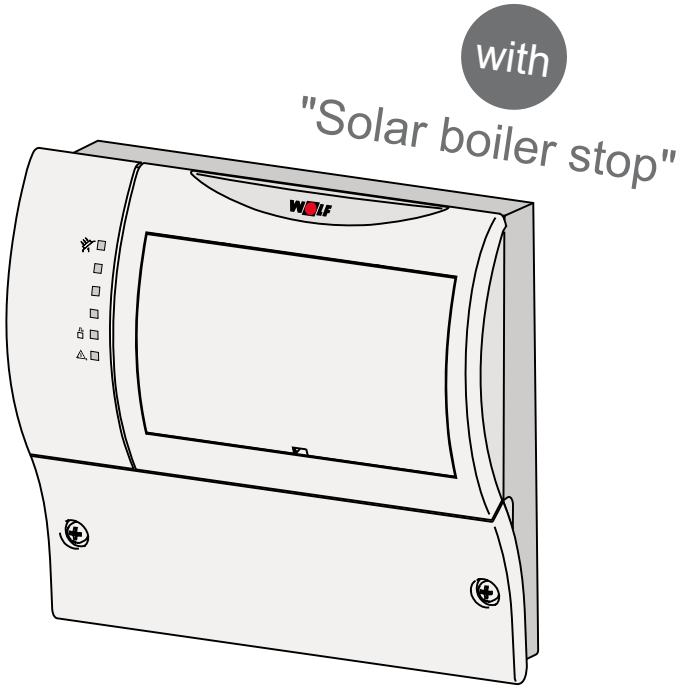
Installation and operating instructions

Solar module SM1



Wolf GmbH · Postfach 1380 · D-84048 Mainburg · Tel. +49-8751/74-0 · Fax +49-8751/741600 · Internet: www.wolf-heiztechnik.de

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Index

Safety instructions

The following symbols are used in conjunction with these important instructions concerning personal safety as well as operational reliability.

"Safety instructions" are instructions with which you must comply exactly, to prevent injury and material losses.

Danger through 'live' electrical components.
NB Switch OFF the ON / OFF switch before removing the casing.

Never touch electrical components or contacts when the ON / OFF switch is in the ON position. This brings a risk of electrocution, which may cause injury or death.

The main supply terminals are 'live' even when the ON / OFF switch is in the OFF position.

NB This indicates technical instructions that you must observe to prevent material losses and boiler malfunctions.

Disposal and recycling

Observe the following information regarding the disposal of faulty system components or the system at the end of its service life:
Dispose of all components in accordance with applicable regulations, i.e. separate material groups correctly. The aim should be the maximum possible amount of basic materials recycled and the lowest possible environmental impact.
Never throw electrical or electronic scrap into the household waste, but recycle it appropriately.

Generally, dispose of materials in the most environmentally responsible manner according environmental, recycling and disposal standards.

Standards / Regulations

Standards / Directives

The appliance and control unit accessories comply with the following regulations:

EC Directives
- 2006/95/EC Low Voltage Directive
- 2004/108/EC EMC Directive

EN Standards
- EN 60730-1
- EN 55014-2 Resistance to jamming
- EN 55014-1 Interference emissions
- EN 60529

Installation / Commissioning

- According to DIN EN 50110-1, only qualified electricians may carry out the installation and commissioning of the heating control unit and connected accessories.
- Observe all regulations stipulated by your local power supply utility and all VDE or local regulations.
- DIN VDE 0100 regulations regarding the installation of high voltage systems up to 1000 V
- DIN VDE 0105-100 operation of electrical systems

Warnings

- Never remove, bypass or disable safety and monitoring equipment.
- Only operate the system in perfect technical condition. Immediately remove / remedy any faults and damage that may impact on safety.
- If the DHW temperature is set above 60 °C, always ensure that cold water is mixed in with the hot water (risk of scalding).

Maintenance / Repair

- Regularly check the perfect function of all electrical equipment.
- Only qualified personnel may remove faults or repair damage.
- Only replace faulty components or equipment with original Wolf spare parts.
- Always maintain prescribed electrical protection values (see specification).

NB Any damage or loss resulting from technical modifications to Wolf control units is excluded from our liability.

Terminology

Collector temperature
The collector temperature is the medium temperature that is generated by solar irradiation at the collector.
The collector temperature is measured at the flow outlet of the collector or collector array.

Cylinder temperature
The cylinder temperature is the temperature that is measured in the lower area of the cylinder at the level of the solar heat exchanger.

Flow rate
The flow rate is the volume of medium that is transported by the solar circuit pump through the solar circuit. The flow rate is quoted in l/min.

Yield
This is the volume of heat generated by the solar heating system. It is calculated from the flow rate and the temperature differential between the collector and the return temperature. This is a value that is added up over a certain period (day) or given as overall total. The yield is quoted in Wh, kWh or MWh.

Output
The heat output represents the volume of heat generated during a certain period. This value represents a momentary value and is quoted in kW.

Solar cylinder
The solar cylinder is the cylinder that is heated up by the solar heating system.

Solar heating
Heating up of the cylinder via the solar circuit pump.

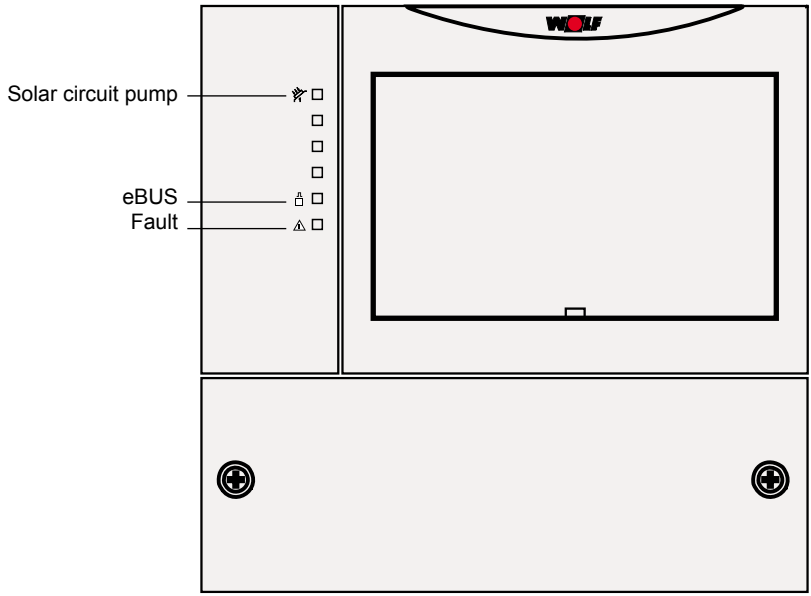
Solar circuit pump
The pump that circulates the medium in the solar circuit.

Abbreviations

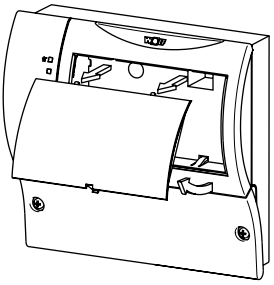
SKP - Solar circuit pump
SFK - Solar sensor – collector
SFS - Solar sensor – cylinder
RLF - Return sensor
DFG - Flow rate transducer

Device description

The solar module (SM1) regulates a single circuit solar thermal system by means of a temperature differential controller.
This compares the cylinder and collector temperatures and depending on the temperature differential, starts or stops the solar circuit pump.
The amount of heat generated can be captured either by means of internal (SM1) or external (heat meter) yield capturing. Internal yield capturing utilises either the actual flow rate recorded by the heat meter set (accessory) or the flow rate entered (requires a return sensor).
Parameters can be modified and values as well as fault codes can be displayed with the BM or BM-Solar programming module, or the ISM1 interface module with Comfort-Soft software.
The SM1 has an eBUS interface and can therefore be integrated into the Wolf control system.

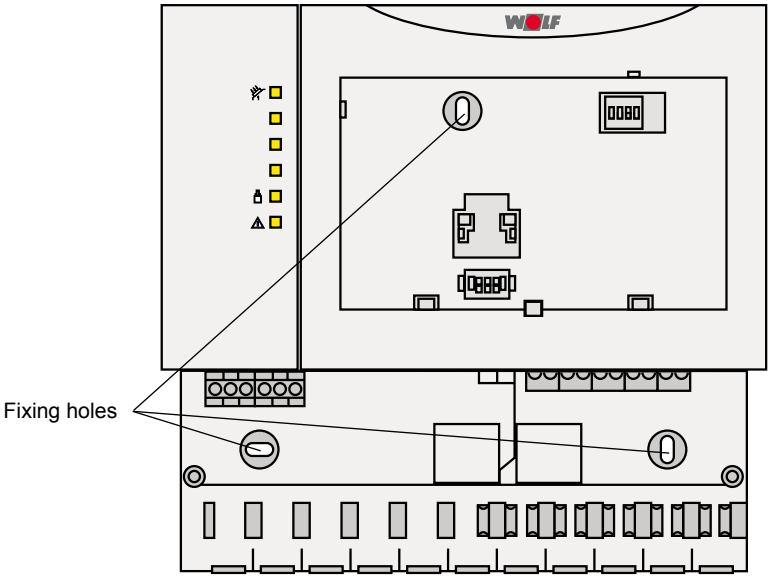


Solar module installation



- Remove the solar module from its packaging.
- Secure the solar module on a flush-mounting box (Ø 55 mm) or directly to the wall.
- Wire up the solar module SM1 in accordance with the installation diagram.

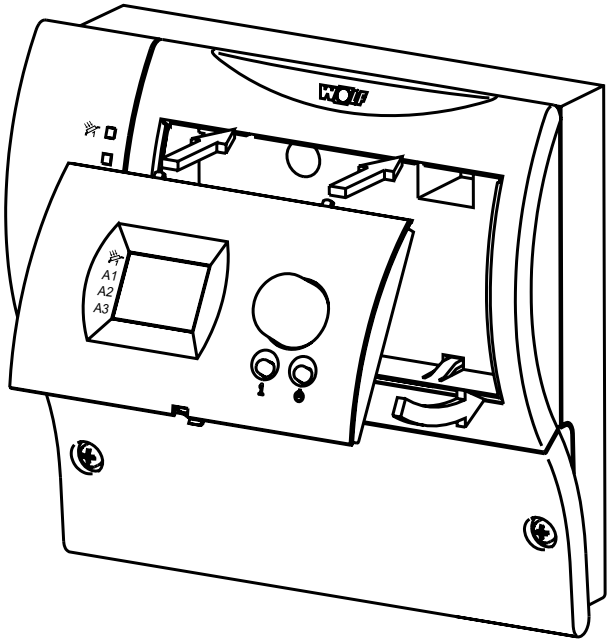
Note: Never route on-site cables / leads for cylinder, collector, return sensors and flow rate transducer with power cables.



Installation, BM-Solar

A BM or BM-Solar programming module can be clicked into the solar module. As an alternative, the programming module can also be used as remote control unit in conjunction with a wall mounting base.
No separate programming module is required if the solar module is integrated into a Wolf control system that already contains a BM programming module.

For further details, see the operating instructions of the BM or BM-Solar programming module.



Flow rate transducer

The flow rate transducer is required for determining the yield by means of the actual flow rate. Connect this to the terminals designated DFG. The flow rate transducer is part of the heat meter set (accessories).

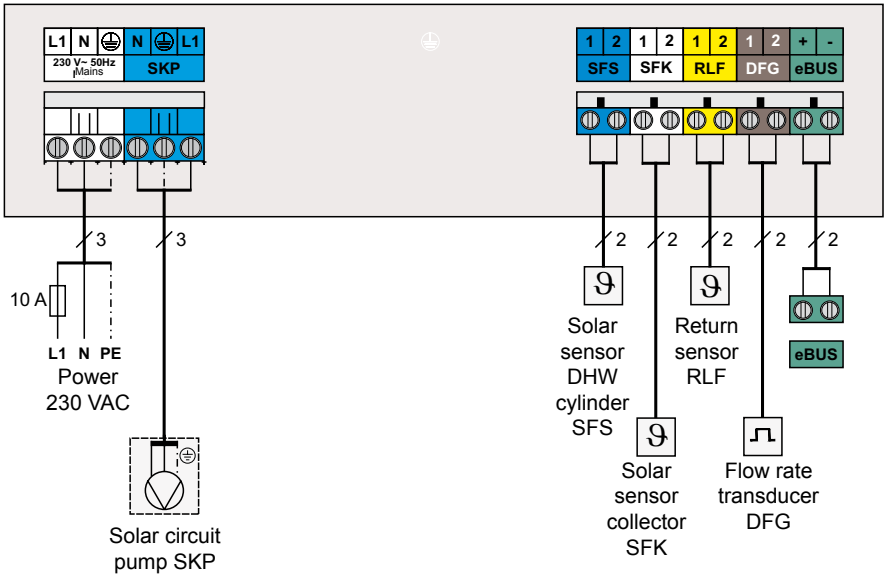
Return sensor

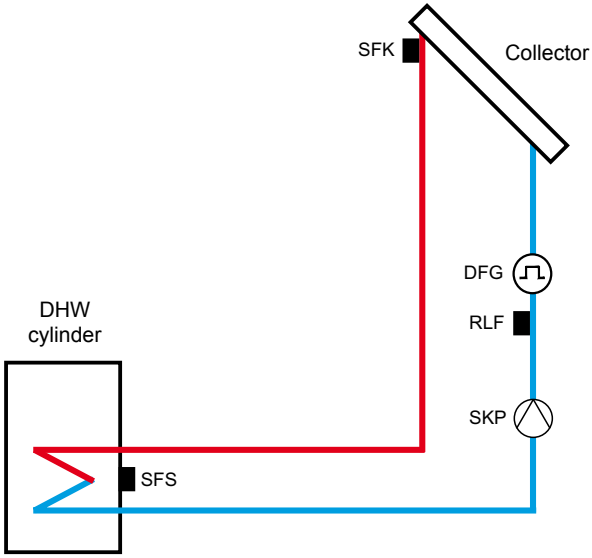
The return sensor is required for determining the yield from the measured flow rate and for calculating the yield using the specified flow rate value. When measuring the yield, the return sensor is part of the heat meter set; the sensor is available separately when estimating the yield. Connect the return sensor to the terminals designated RLF.

Recommended cables and cable cross-sections:

H005VV 3 x 1.0 mm²	Power supply cable
H05VV 3 x 0.75 mm²	Solar circuit pump
H05VV 2 x 0.5 mm²	BUS cable
H05VV 2 x 0.5 mm²	Sensor leads up to 15 m
H05VV 2 x 0.75 mm²	Sensor leads up to 50 m

During service work, isolate the entire system from the power supply, otherwise there will be a risk of electrocution.


L1
N
N
L1
230 V~ 50Hz
Mains
SKP
1
2
1
2
1
2
1
2
+
-
SFS
SFK
RLF
DFG
eBUS
3
3
2
2
2
2
2
10 A
L1 N PE
Power
230 VAC
Solar circuit
pump SKP
Solar
sensor
DHW
cylinder
SFS
Return
sensor
RLF
eBUS
Solar
sensor
collector
SFK
Flow rate
transducer
DFG


SFK
Collector
DFG
RLF
SKP
DHW
cylinder
SFS

DIP switch settings
Switching the solar module ON / OFF

Factory setting:

Dip 1-4

A 4-pole DIP switch is located inside the solar module enclosure. This becomes accessible after removing the cover or the programming module.

DIP switch 1 enables the module to be switched on and off. The anti-seizing pump protection continues to be active even when the module is off.

DIP switch 2 has no effect.

DIP switch 3 enables the values for hours run and yield to be reset. For this to be effective, set DIP switch 3 first ON and then OFF again.
All LEDs illuminate briefly following a reset.

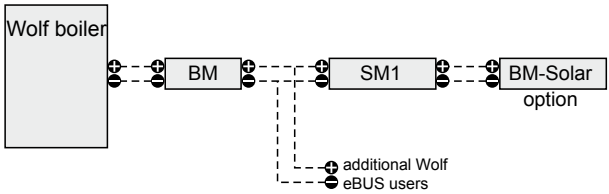
DIP switch 4 enables the standard values for all parameters **(= reset)** to be loaded. For this to be effective, set DIP switch 4 first OFF and then ON again. All LEDs illuminate briefly following a reset.

Possible arrangements

The SM1 solar module can be used in different arrangements.

a) SM1 as part of a Wolf control system

The SM1 solar module can be integrated into a Wolf control system. In that case, the solar module will be controlled from the BM programming module with address 0. An optional BM-Solar programming module can also be connected to the SM1. In that case, control can be exerted from the BM with address 0 and from the BM-Solar.

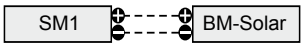


If the solar cylinder is allocated to another BM, control can be exerted from that BM (see parameter description SOLOT / POT).

Note:
Only **one** solar module, either SM1 or SM2, can be integrated into a Wolf control system.

b) SM1 (stand alone) with BM-Solar programming module

The module will be controlled by the BM-Solar programming module.



The BM-Solar can be clicked into the solar module SM1 or can be used as remote control on a wall mounting base (accessories).

c) SM1 (stand alone) without programming module

The solar module is operated without programming module. This enables the control and calling up of values exclusively with the ISM1 interface module, programmed with the Comfort Soft software.

The operation of the solar circuit pump and faults can be identified by the LEDs in the enclosure front.

All parameters can be adjusted via the BM or BM-Solar programming module.

With the BM, access is provided via control level 2 at the menu level "Contractor → solar" (see BM operating instructions).

With the BM-Solar, turning the rotary selector lets you change to the parameter level (see BM-Solar operating instructions).

Parameter BM	Parameter BM-Solar	Explanation	Setting range min.	Setting range max.	Factory setting
SOL 01	P 01	Start differential solar cylinder	5 K	30 K	8 K
SOL 02	P 02	Stop differential solar cylinder	2 K	20 K	4 K
SOL 03	P 03	Collector cooling function	0 (OFF)	1 (ON)	0
SOL 04	P 04	Critical collector temperature	90 °C	150 °C	110 °C
SOL 05	P 05	Maximum collector temperature	100 °C	150 °C	130 °C
SOL 06	P 06	Maximum cylinder temperature, solar cylinder	15 °C	90 °C	60 °C
SOL 07	P 07	Assignment, solar cylinder	0	8	0
SOL 08	P 08	Capturing the amount of heat	0 (OFF)	4	0
SOL 09	P 09	P 08 = 0 → P 09 Not adjustable P 08 = 1 → Pulse value, pulse generator P 08 = 2 → Constant flow rate P 08 = 3 or 4 → Pulse value external heat meter	 0 l/pulse 0 l/min -2	 99.5 l/pulse 99.5 l/min 1	 1 l/pulse 1 l/min 0
SOL 10	P 10	Glycol selection: 0 = Water 1 = Tyfocor L (Anro) 2 = Tyfocor LS (Anro LS) 3 = Propylene glycol 4 = Ethylene glycol	0	4	1
SOL 11	P 11	BUS feed	0	2	2
SOL 27	P 27	Tube collector function	0 (OFF)	2	0
SOL 28	P 28	Frost protection function	0 (OFF)	1 (ON)	0
SOL 33	P 33	Hysteresis, solar cylinder	0.5 K	5 K	1 K
SOL 36	P 36	Solar cylinder emergency shutdown	60 °C	95 °C	95 °C
SOL 39	P 39	Minimum collector limit	-25 °C	90 °C	10 °C
SOL 41	P 41	Function check, flow rate	0 (OFF)	1 (ON)	0
SOL 42	P 42	Function check, gravity brake	0 (OFF)	60 °C	40 °C
SOL 44	P 44	Reverse cooling function	0 (OFF)	1 (ON)	0
SOL 51	P 51	Proportion of glycol in water P 10 = 0 → P 51 Not adjustable P 10 = 1 : Tyfocor L (Anro) P 10 = 2 → P 51 Not adjustable P 10 = 3 → P 51 Not adjustable P 10 = 4 → Ethylene glycol	 ---- 20 % ---- ---- 20 %	 ---- 75 % ---- ---- 80 %	 ---- 45 % ---- ---- 45 %
SOL 60	P 60	Relay test	1	5	1

SOL01 / P01
Start differential

The SM1 measures the temperature at the collector and in the lower cylinder area at the level of the solar indirect coil. The solar circuit pump is started when the collector temperature exceeds the cylinder temperature by the start differential.

Collector temperature >= cylinder temperature + start differential - > pump ON

To safeguard a reliable function, the start differential is always held at least 3 K above the stop differential (start differential >= stop differential + 3 K), even if a lower value has been entered.

SOL02 / P02
Shutdown differential

The solar circuit pump is switched OFF when the collector temperature falls below the total of cylinder temperature and shutdown differential.

Collector temperature < cylinder temperature + shutdown differential - > pump OFF

SOL03 / P03
Collector protection function

The collector protection function and reverse cooling are active if parameter 3 is set to 1.

SOL04 / P04
Critical collector temperature

Collector cooling function:
The solar circuit pump is started as soon as the collector temperature exceeds the critical collector temperature. The pump stops again when the collector temperature = critical collector temperature - 20 K or cylinder temperature > cylinder emergency shutdown (SOL 36).

Please note: The collector cooling function raises the solar cylinder to temperatures above a selected maximum cylinder temperature (max. 95 °C).
Therefore, always ensure that cold water is mixed in with hot water if the collector cooling function is active (risk of scalding from hot water!).

SOL05 / P05
Maximum collector temperature

The solar circuit pump is switched off to protect the system when the maximum collector temperature is exceeded.
Consequently, the collector cooling function ceases to be effective. The pump starts again when the collector temperature falls 10 K below the maximum collector temperature (collector cooling function becomes effective again).

SOL06 / P06
Maximum cylinder temperature

NB

The water inside the cylinder is heated up to the maximum cylinder temperature. Cylinder heating ends when the cylinder temperature > maximum cylinder temperature.
Risk of scalding from hot water!
Hot water temperatures in excess of 60 °C can result in scalding. Install a thermostatic mixing valve if DHW temperatures in excess of 60 °C are selected.

SOL07 / P07
Cylinder assignment

This parameter is **only** relevant when using the solar module as part of a Wolf control system.

Note: Never change the factory settings in systems with only a single cylinder that is linked to a heating appliance.

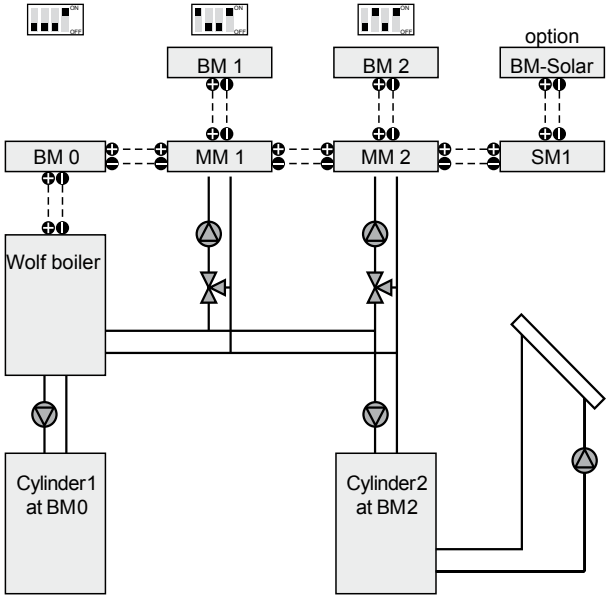
Up to 8 cylinders and several BM programming modules can be included in one system. In conjunction with the SM1 solar module, one of the cylinders is used as the solar cylinder.
One BM programming module must be assigned to the solar cylinder to safeguard the functions "Blocking cylinder reheating" or "Blocking pasteurisation" (see description of auxiliary functions). This assignment is determined by parameter 07:

SOL07 / P07 = 0: The solar cylinder is assigned to BM 0
SOL07 / P07 = 1: The solar cylinder is assigned to BM 1
SOL07 / P07 = 2: The solar cylinder is assigned to BM 2
SOL07 / P07 = 3: The solar cylinder is assigned to BM 3
SOL07 / P07 = 4: The solar cylinder is assigned to BM 4
SOL07 / P07 = 5: The solar cylinder is assigned to BM 5
SOL07 / P07 = 6: The solar cylinder is assigned to BM 6
SOL07 / P07 = 7: The solar cylinder is assigned to BM 7
SOL07 / P07 = 8: Not assigned

The address is set on the BM using the DIP switches (see BM operating instructions).

eBUS setting	
Address 0	
Address 1	
Address 2	
Address 3	
Address 4	
Address 5	
Address 6	
Address 7	

Cylinder allocation example:



Note: MM = mixer module

In this example, the solar cylinder is allocated to the programming module with address 2 (BM 2). This requires the following setting:

SOLO7 / P07 = 2

The setting can be made via the BM with address 0 (BM 0) or via the BM-Solar.

The solar module can then also be operated from the allocated programming module.

SOL08 / P08
Capturing the amount of heat

Parameter 08 lets you choose whether the yield is determined internally with the actual or specified flow rate, or with external yield capturing.
In the case of internal yield determination, output and yield are calculated by the SM1.
In the case of external yield determination, output and yield are calculated by the external heat meter:

SOL08 / P08 = 0: Heat amount capture disabled
SOL08 / P08 = 1: Internal yield determination with the actual flow rate
SOL08 / P08 = 2: Internal yield determination with the specified flow rate
SOL08 / P08 = 3: External yield determination on the solar side
SOL08 / P08 = 4: External yield determination on the consumer side

Internal yield determination with the actual flow rate:
The yield determination with the actual flow rate is carried out via the collector sensor, flow rate transducer and return sensor. This always calculates the yield and the output with the flow rate actually captured. This requires the heat meter set (part no. 2744392).

Internal yield determination with a specified flow rate:
For the yield determination using a specified value, the flow rate must be captured and entered once. The yield is then determined using that value, the collector sensor and the return sensor (part no. 2792022).
The yield cannot, therefore, be calculated accurately if the flow rate changes.

External yield determination on the solar side:
The pulse generator of the external heat meter transfers the yields in kWh/pulse via the pulse input on the SM1. The yields are captured by the SM1 as soon as the solar cylinder is being heated.

External yield determination on the consumer side:
The pulse generator of the external heat meter transfers the yields in kWh/pulse via the pulse input on the SM1.

SOL09 / P09
Flow rate

To determine the yield internally, enter the calculated flow rate or the pulse value of the flow rate transducer used here.
For external yield determination, enter the pulse value of the external heat meter here.

The entry is subject to the settings of parameter SOL08 / P08

SOL08 / P08 = 1:
Enter the pulse value of the flow rate transducer used in l/pulse (flow rate per pulse).
The value for the heat meter set of 1 l/min is pre-selected at the factory.

SOL08 / P08 = 2:
Enter the determined flow rate in l/min.

SOL08 / P08 = 3 or 4:
Enter the pulse value of the external heat meter. The pulse value is determined as follows:

Pulse value [kWh/pulse] = $10^{\wedge SOL09/P09}$

SOL09 / P09	Pulse value [kWh/pulse]
1	10
0	1
-1	0,1
-2	0,01

SOL10 / P10
Medium selection

Select the heat transfer medium here. Only applicable if SOL08 / P08 = 1 or 2.

SOL10 / P10	Medium
0	Water
1	Tyfocor L (Anro)
2	Tyfocor LS (Anro LS)
3	Propylene glycol
4	Ethylene glycol

For Tyfocor L or ethylene glycol, the glycol concentration can be set using SOL051 / P51.

SOL11 / P11
BUS feed

Factory setting = 2; **never change this parameter.**
The BM-Solar no longer shows anything on the display if this parameter is accidentally changed. In such cases, turn DIP switch 4 OFF and ON again (reset).

SOL27 / P27
Tube collector function

To enable the correct collector temperature to be captured when tube collectors are idle, the medium flows through the collector array for a short time.
In parameter SOL27 / P27 the following settings are available for selection:

SOL27 / P27 = 0: Tube collector function disabled (factory setting)
SOL27 / P27 = 1: Tube collector function via temperature increase
SOL27 / P27 = 2: Tube collector function over time

Tube collector function via temperature increase:
When the actual collector temperature increases by 2 K, the medium will be pumped through the collector array for 30 s.

Tube collector function over time:
The medium will be pumped through the collector array for 30 s every 30 minutes. This function is disabled between 20:00 h and 06:00 h in Wolf control systems that are equipped with a BM programming module or in conjunction with a radio clock receiver.

SOL28 / P28
Frost protection function

In systems filled with water instead of the heat transfer medium specific to Wolf, a frost protection function can be enabled (application in southern countries):

SOL28 / P28 = 1: Frost protection function enabled
SOL28 / P28 = 0: Frost protection function disabled (factory setting)

With the frost protection function enabled, the medium flows through the collector array if the collector temperature falls below 5 °C. This function remains enabled until the collector temperature has increased again by 5 K.

SOL33 / P33
Cylinder hysteresis

Start and stop criteria for heating the solar cylinder.

SOL36 / P36
Cylinder emergency shutdown

The solar cylinder is heated during the tube collector and collector cooling function until the actual cylinder temperature >= cylinder emergency shutdown.

SOL39 / P39
Minimum collector limit

The collector is deemed to be blocked for solar operation if it has not exceeded the specified minimum collector temperature. The minimum collector limit does not apply to the frost protection function, collector cooling function, anti-seizing pump protection or relay test.

Collector enabled:	Collector temperature > minimum collector limit
Collector blocked:	Collector temperature < minimum collector limit - 3 K

SOL41 / P41
Function check, flow rate

The flow rate is monitored directly by means of the collector temperature. The flow rate is monitored exclusively during solar operation and the relay test. Fault code 62 is displayed if the collector temperature exceeds the critical collector temperature (parameter 04). The fault code is reset when the collector temperature has dropped 5 K below the critical collector temperature.

Note:
On starting the solar circuit pump, excess temperatures above the critical collector temperature can occur for short times, even if the flow rate of the solar thermal system corresponds to requirements.

SOL42 / P42
Function check, gravity brake

Fault code 63 is displayed if the solar circuit pump does not achieve a flow throughout the collector array, and the collector temperature rises above the value in the SOL42/P42 parameter between 23:00 h and 05:00 h. This fault code can be reset either by means of the BM-Solar or by restarting the SM1.

Additional conditions for the function check gravity brake:

a) a BM or/and a DCF receiver must be integrated in the system,

b) the reverse cooling function and tube collector function 1 must not be activated and

c) there must be no flow through the collector array.

SOL44 / P44
Reverse cooling function

The collector cooling function increases the cylinder temperature. To reduce that temperature again after the collector temperature has dropped sufficiently, the solar circuit pump will start when the collector temperature > cylinder temperature - 15 K

SOL51 / P51
Proportion of glycol

With Tyfocor L (Anro) or ethylene glycol, the glycol concentration (= proportion of glycol in water) can be adjusted.

SOL60 / P60
Relay test

When activating this parameter

on the BM-Solar - *P60*
the output relay A1 (solar circuit pump SKP) will be switched directly. Outputs A2 - A5 have no function.

on the BM - *SOL60*
the output relay rEL1 (solar circuit pump SKP) will be switched directly. Outputs rEL2 - rEL5 have no function.

NB

The collector pump will not be switched, even during the relay test, if the collector temperature is higher than that of parameter 05 "Maximum collector temperature" (factory setting 130 °C). This protects components against excessively high temperatures.

Blocking cylinder reheating

This function is only effective if the solar module is operated as part of a Wolf control system.
The set cylinder temperature is immediately set to minimum cylinder temperature at the associated BM, if solar heating was successfully completed in the 24 hours preceding 14:00 h (actual cylinder temperature by the SM1 > set cylinder temperature).
The cylinder will be regulated to the set cylinder temperature by the boiler if, within the last 24 hours, solar heating was not successfully completed.
A successful solar heating operation can be scanned at the associated BM and BM-Solar.

Blocking pasteurisation

This function is only effective if the solar module is operated as part of a Wolf control system.
The pasteurisation function via the boiler will be blocked if the solar yield has achieved a cylinder temperature in excess of 65 °C for at least one hour (captured by the solar cylinder sensor SFS). Blocking the pasteurisation function of the boiler is indicated at the associated BM.
To safeguard this function, set the maximum cylinder temperature (SOLO6 / P06) higher than 65 °C:
SOLO6 / P06 **> 65 °C!**

The pasteurisation function at the boiler can be selected via the associated BM programming module. For this, daily or weekly activation can be selected.

Daily pasteurisation
The pasteurisation function via the boiler will be blocked if, by 18:00 h, the cylinder temperature captured by the solar cylinder sensor (SFS) exceeds 65 °C for at least one hour.

Weekly pasteurisation
The pasteurisation function via the boiler will be blocked if, by 18:00 h on the day for which pasteurisation has been scheduled, the cylinder temperature captured by the solar cylinder sensor (SFS) exceeds 65 °C for at least one hour.

Anti-seizing pump protection

To prevent the solar circuit pump from seizing because of long idle periods, it will be operated daily (at 12:00 h) for approximately five seconds (after it has been idle for more than 24 hours). This function will only become effective, if the maximum collector temperature (SOLO5 / P05) has been exceeded.

Loading the standard values

To return to the standard values, set DIP 4 to OFF and back to ON. This also resets the hours run and yield values.

Maximum cylinder and collector temperature over 24 h

The maximum cylinder and collector temperature achieved during a day (0:00 h to 24:00 h) are captured. These are saved daily at 24:00 h and can be scanned at the BM or BM-Solar.

Hours run

The hours run by the solar circuit pump are captured and saved. They are displayed at the BM and BM-Solar.

Resetting values

The values for hours run, daily and total yield can be reset via the BM and BM-Solar by holding down the rotary selector for at least 10 s.

Fault codes:

If the SM1 detects a fault, the red LED flashes and the fault code of the solar module is displayed in the associated BM or BM-Solar. If using the SM1 as part of a Wolf control system, the fault code will also be displayed in the central BM programming module with address 0.

The following fault messages can occur on the SM1:

Fault code	Fault	Cause	Remedy
FC62	Function check, flow rate (no flow)	Too little or no throughput	Check solar circuit pump
FC63	Function check, gravity brake	Faulty gravity brake	Check gravity brake
FC64 only applicable for P08 = 1	Pulse generator faulty	Pulse generator or cable faulty	Check pulse generator and cable; replace if required
FC71	Terminal SFS, solar cylinder sensor faulty	Faulty sensor or lead	Check sensor and lead; replace if required
FC72	Terminal connection RLF, return sensor faulty	Faulty sensor or lead	Check sensor and lead; replace if required
FC74	DCF signal or reception interference	No BUS connection; no DCF reception	Check eBUS connection/DCF reception
FC79	Terminal SFK, solar collector sensor faulty	Faulty sensor or lead	Check sensor and lead; replace if required
FC81	EEPROM fault	Parameter values outside valid range	Reset to standard values by briefly interrupting the power supply, and check values

Note:
Fault codes 71, 79, 72, 64, 62 and 74 are reset automatically as soon as their cause has been removed. Fault codes 63 and 81 must be reset (acknowledged) explicitly by restarting the SM. Alternatively, FC63 can be reset via the BM-Solar (by holding down the rotary selector for at least 5 seconds).

Changing the fuse

Changing the fuse:

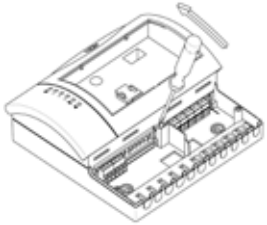
If the SM1 indicates no function at all and there is no LED indication although power is on, check the appliance fuse and replace if required.

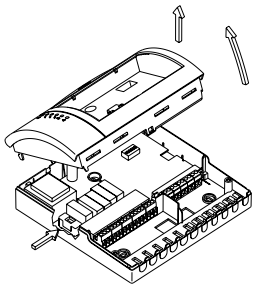
Note: If the SM1 is operated as part of the Wolf control system, the display of one of the existing BM or BM-Solar programming modules is retained, as this is supplied via the eBUS link to the other control components.

Before opening the enclosure, isolate the solar module from the power supply.

How to change the fuse:

1. Isolate the unit from the power supply
2. Remove the cover from the wiring chamber by undoing both screws
3. Remove the enclosure top with a screwdriver
4. The fuse is located on the l.h. side of the PCB below the transformer (fine-wire fuse 5x20 / 6.3 A/M)





Sensor resistances

NTC Solar cylinder sensor (SFS)
Sensor resistances Return sensor (RLF)

Temp.	Resist.	Temp.	Resist.	Temp.	Resist.	Temp.	Resist.
°C	Ohm	°C	Ohm	°C	Ohm	°C	Ohm
-21	51393	14	8233	49	1870	84	552
-20	48487	15	7857	50	1800	85	535
-19	45762	16	7501	51	1733	86	519
-18	43207	17	7162	52	1669	87	503
-17	40810	18	6841	53	1608	88	487
-16	38560	19	6536	54	1549	89	472
-15	36447	20	6247	55	1493	90	458
-14	34463	21	5972	56	1438	91	444
-13	32599	22	5710	57	1387	92	431
-12	30846	23	5461	58	1337	93	418
-11	29198	24	5225	59	1289	94	406
-10	27648	25	5000	60	1244	95	393
-9	26189	26	4786	61	1200	96	382
-8	24816	27	4582	62	1158	97	371
-7	23523	28	4388	63	1117	98	360
-6	22305	29	4204	64	1078	99	349
-5	21157	30	4028	65	1041	100	339
-4	20075	31	3860	66	1005	101	330
-3	19054	32	3701	67	971	102	320
-2	18091	33	3549	68	938	103	311
-1	17183	34	3403	69	906	104	302
0	16325	35	3265	70	876	105	294
1	15515	36	3133	71	846	106	285
2	14750	37	3007	72	818	107	277
3	14027	38	2887	73	791	108	270
4	13344	39	2772	74	765	109	262
5	12697	40	2662	75	740	110	255
6	12086	41	2558	76	716	111	248
7	11508	42	2458	77	693	112	241
8	10961	43	2362	78	670	113	235
9	10442	44	2271	79	649	114	228
10	9952	45	2183	80	628	115	222
11	9487	46	2100	81	608	116	216
12	9046	47	2020	82	589	117	211
13	8629	48	1944	83	570	118	205

PT1000 Solar collector sensor (SFK)
Sensor resistances

Temp.	Resist.	Temp.	Resist.	Temp.	Resist.	Temp.	Resist.
°C	Ohm	°C	Ohm	°C	Ohm	°C	Ohm
-30	882	20	1077	70	1271	140	1535
-20	921	30	1116	80	1309	160	1610
-10	960	40	1155	90	1347	200	1758
0	1000	50	1194	100	1385	-	-
10	1039	60	1232	120	1461	-	-

Specification

Power supply	230 VAC (+10/-15 %) / 50 Hz
PCB power consumption	< 5 VA
Max. power consumption, pump output	250 VA
IP rating to EN 60529	IP30
Safety category	I I
Permiss. ambient temperature during operation	0 to 50 °C
Permiss. ambient temperature during storage	-20 to +60 °C
Data retention	EEPROM, non-volatile
Fuse	Fine-wire fuse 5x20 / 6.3 A/M