Skill Centre

Documentation

- solar thermal
- photovoltaic

Written by Manfred Haider

Technical documentation skill centre

Version of this document

Version	Date	Autor	Modification
'1.00	19.06.12	Manfred Haider	New document
'1.01	26.06.12	Manfred Haider	Incl. Emerceny off
'1.10	15.03.14	Manfred Haider	Refill / bleeding procedure

About this document:

It is written using open office 3.2 as an open document text file (odt)
Until the skill centre (or anybody else) takes responsibility

- feel free to report errors to Manfred.Haider@gmx.de
- feel free to suggest modifications to Manfred.Haider@gmx.de
- download the latest version.pdf from www.EMVvorOrt.de/downloads

Table of contents

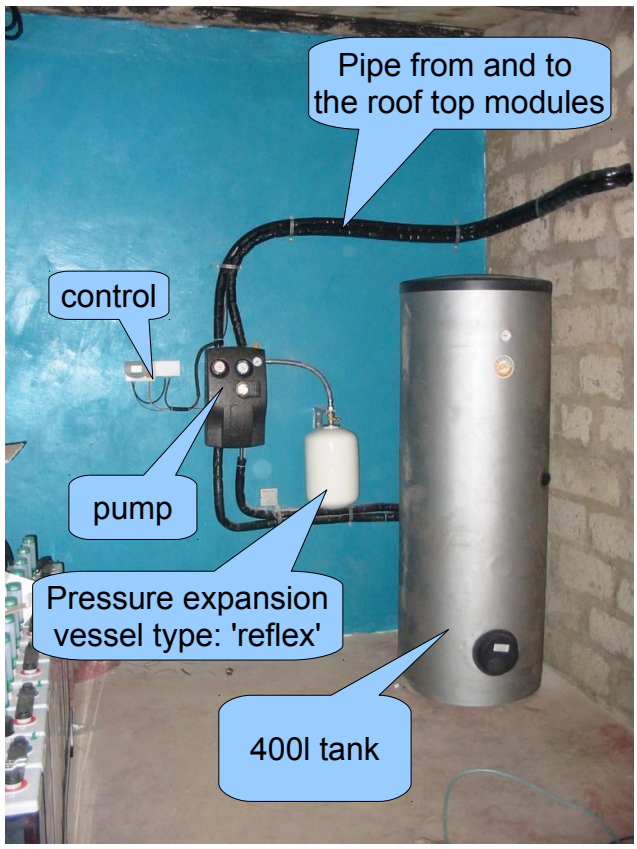
1 Introduction

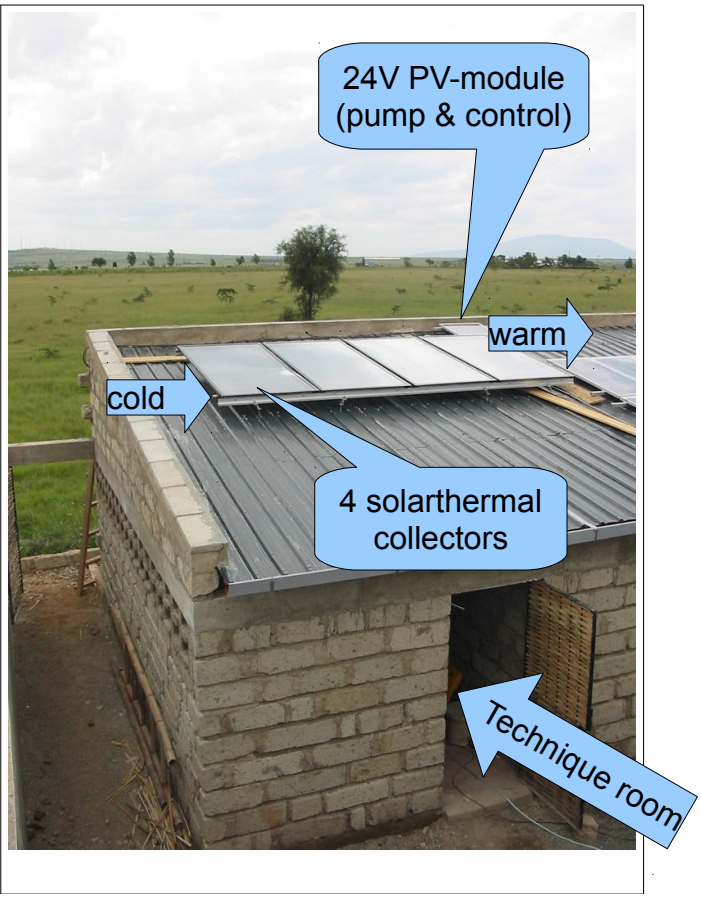
There is no public infra structure at the skill centre. An independent photovoltaic system provides electrical power. A solarthermal system provides warm water. This documentation describes both systems.

2 Solar thermal system

It consists of:

- solar thermal collectors on the roof
- 400l warm water tank
- photovoltaic driven pump
- control unit UVR61-PV





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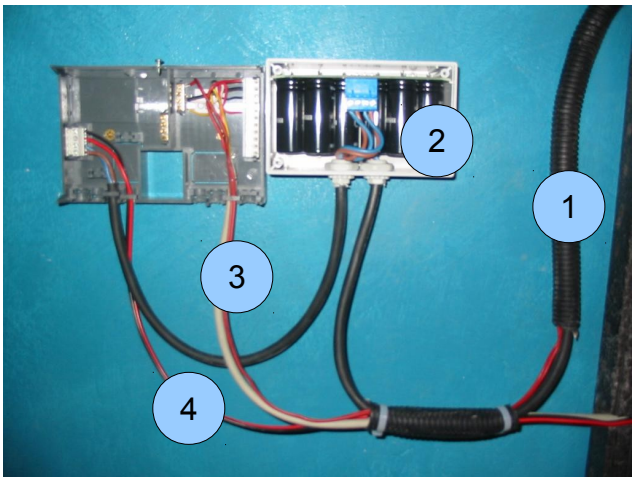
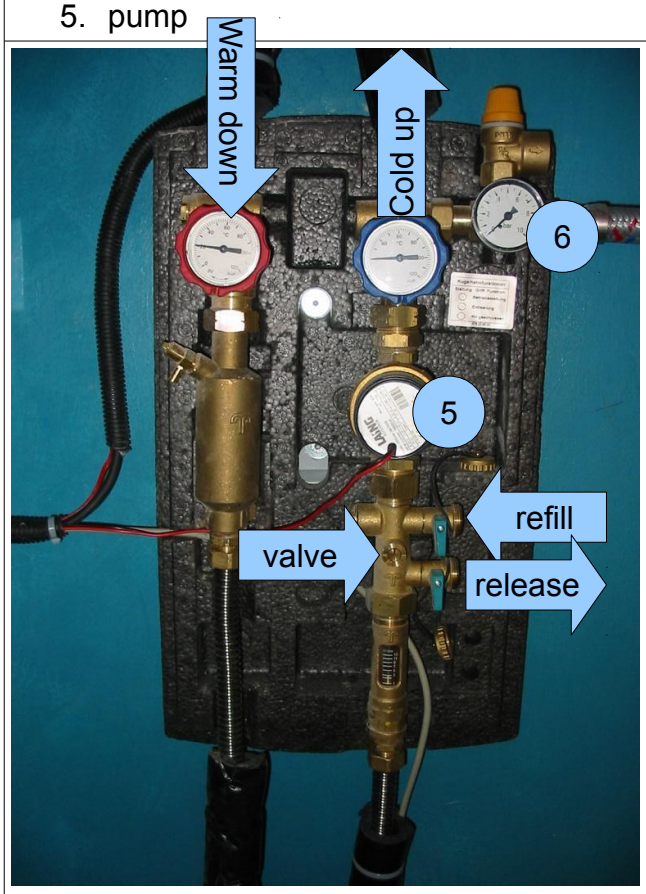
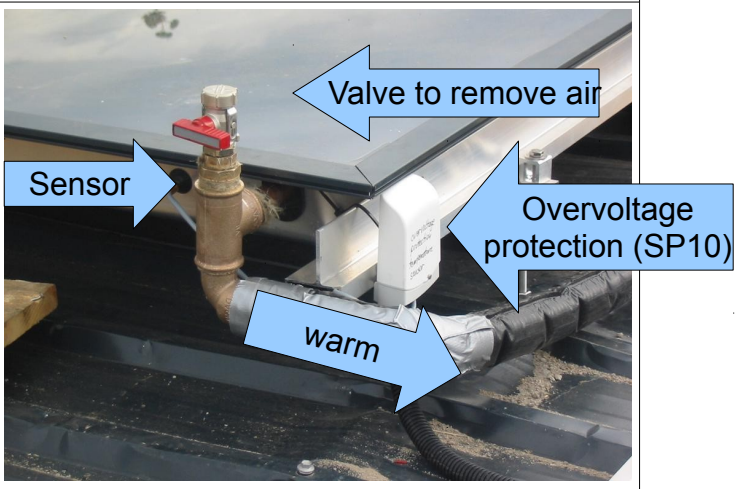


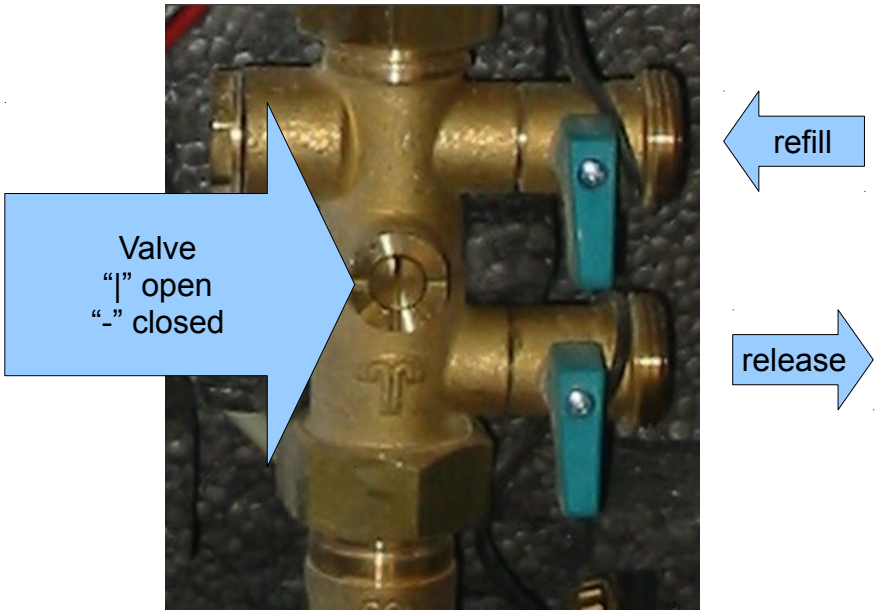
1. 24V power from the PV-module on the roof and temperature sensor from the solarthermal collector.
2. DC capacitor box
3. 3 temperature sensors (2 from tank, 1 from roof)
4. DC power supply from the pump (A1)
5. pump

Temperature sensor interface box
there are 2 temperature sensors in the 400l tank.
Upper Sensor: red / yellow
Lower sensor: black / white





Refill the primary circuit / bleeding procedure

6	If the system pressure in the primary circuit is low, try the following procedure	Wenn der Systemdruck im Primärkreislauf abgefallen ist, folge diesen Anweisungen:
		
1	Shut the valve using a screw driver to the horizontal position “-”	Nimm einen Schraubendreher und schließe das Ventil, sodaß der Schlitz waagrecht steht “-”
2	Connect a water hose (flexible tube) to the upper tab (“refill”)	Schließe einen Wasserschlauch an den oberen Anschluß (“refill”)
3	Connect another water hose to the lower tab. This one shall be open to releave the water from the flushing process (there is a yellow water hose, that is applicable)	Schließe eine weiteren Schlauch (z.B. den Gelben) an den unteren Anschluß. Dieser sollte offen sein, denn da läuft das Wasser aus dem Spühlvorgang heraus.
4	Open both taps.	Öffne beide Hähne (Ventile)
5	Flush for at least one minute until there are no bubbles / air coming out the lower hose.	Spüle nun für mindestens eine Minute, bis keine Blasen / Luft mehr aus dem unteren Schlauch entweichen.
6	Close the lower tab. The system pressure shall rise.	Schließe den unteren Hahn. Der Systemdruck steigt jetzt.
7	Close the upper tab, when the system pressure is between 2 .. 3 bar.	Schließe den oberen Hahn, wenn der Systemdruck zwischen 2 ..3 bar liegt.
8	Remove both hoses and open the valve to the vertical position “|” as the photograph above shows.	Entferne die Schläuche und öffne das Ventil, sodaß der Schlitz senkrecht steht “wie im Photo abgebildet.
	Now, you have finished the procedure and it shall operate normally	Jetzt bist Du fertig und es sollte wieder funktionieren.

In times ,when less warm water is needed (December; School is closed):
release the primary water circuit to prevent damage.

There is no documentation about an additional pump that increases the pressure in the secondary circuit. It has been inserted “anywhere” between the tank the showers (2013).

3 Photovoltaic system

The electrical power system consists of:

- step down inverter “Sunny boy SB4000TL-20”, SN2100555251 connected to the 28 photovoltaic modules SolarWorld 130W R6A
- step up inverter “Sunny island SI5048”, SN1260013348G connected to 24 batteries 6OPzS solar.power 910 (Hoppecke)
- power distribution system (fuse box, cable installation)

Fuse box and Sunny boy

Sunny island and batteries

As well the “sunny boy” as the “sunny island” provide a 230V AC Output. Both of these outputs are connected together (in the fuse box, after the AC input fuses).

Standard operation :

- sunny island provides 230V converted from 48V battery power
- sunny boy “sees” these 230V and converts the (rated 14 x 17,4 = 243,6V) photovoltaic voltage to 230V AC
- both AC outputs are parallel
- there is a power management for loading the batteries and/or providing energy to the users
- without daylight (of course) the pv-modules do not deliver energy and all the 230V AC is converted from 48V battery power.

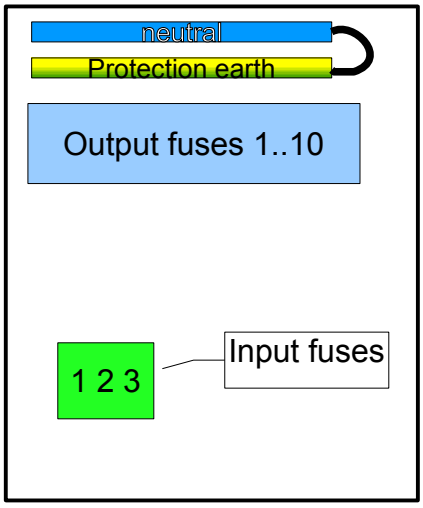
Emercency off

In case of any

- trouble
- smoke
- doubt about safty

the production of AC can be stopped by switching off the sunny island

Fuse Box



AC Output fuses:

1. technique room light
2. technique room AC outlets
3. well pump
4. pupil's sleeping rooms and sanitary
5. teacher's sleeping rooms
6. training rooms
7. kitchen
8. WS2 light (what ever it is)
9. not used
10. not used

AC Input fuses:

1. sunny island
2. not used
3. sunny boy

Important note: there is a connection from N(blue) to PE(yellow/green) inside the fuse box.

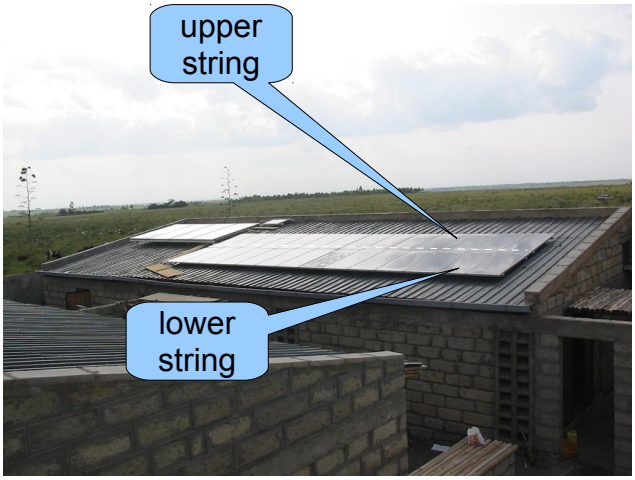
Grounding / PE

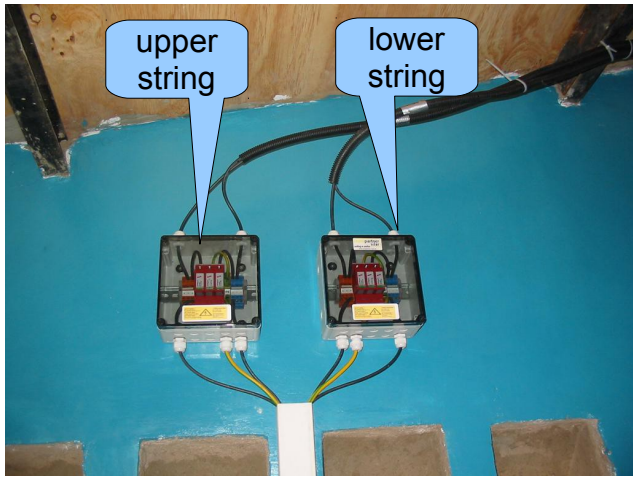
Common grounding point

Grounding rod

Photovoltaic modules

There are 2 strings each 14 modules.





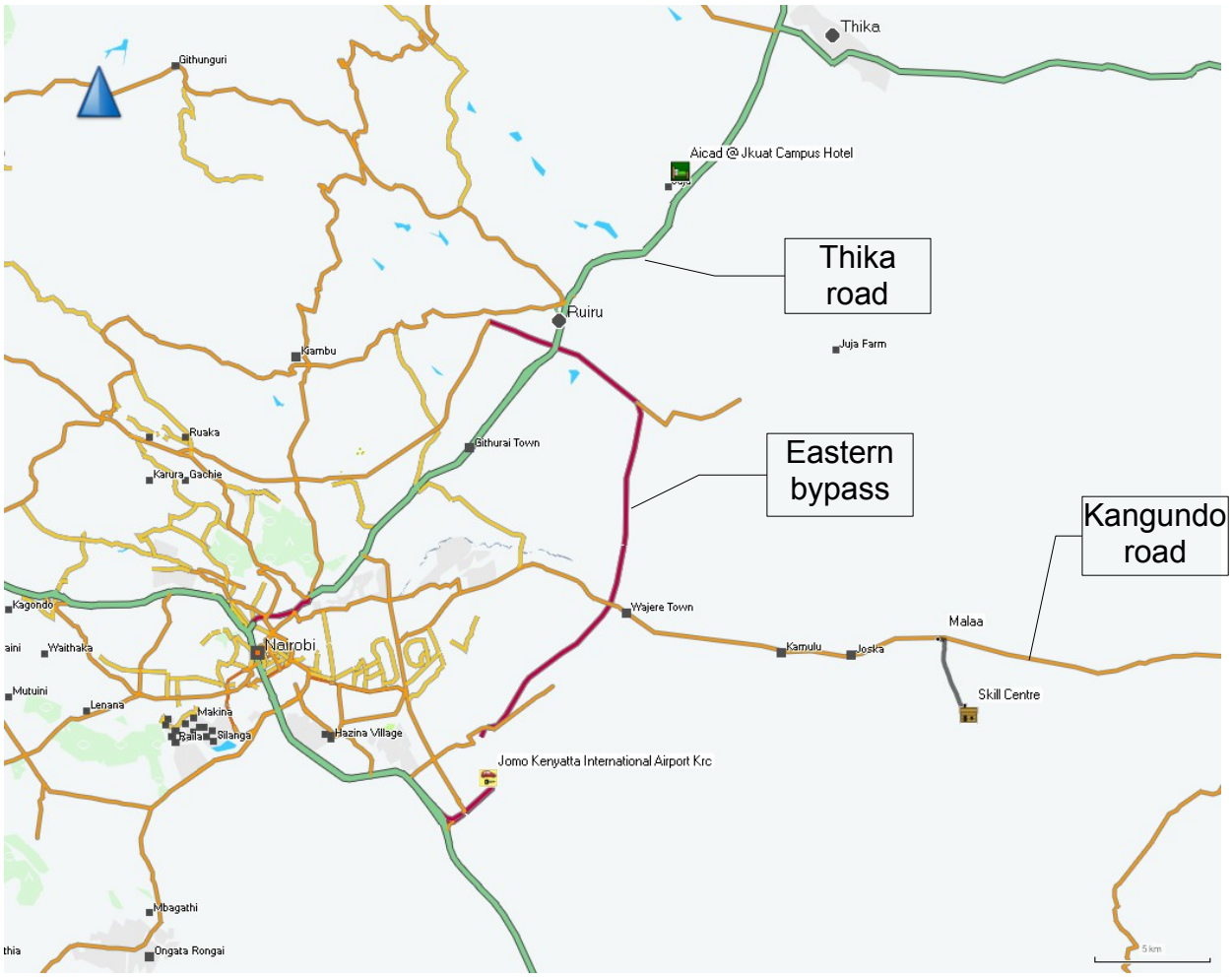
Overvoltage protection

4 Misc

Indicator above technique room door

There is a 4 core cable to the sunny island, but the indicator are not in use now.

5 How to get there



This map is avaliable at: www.openstreetmap.org

Installation took place June 12th through June 23rd 2012 by Leonhard Hinterholzer and Manfred Haider, sent by Ruth Paulig (Promote Africa) and kindly supported by:

- Jimmy
- Jacob
- George
- Kioko
- Patric
- Joseph
- Steven
- Ben
- Anne & daugther
- and others

Thank you to all !