

Solar Process Heat (SOPro) India

**Measures of Solar Thermal Industry
to enhance the System Quality**

----Presented By----

M. D. Akole

Managing Director,

Akson's Solar Equipments Pvt. Ltd.

Chairman, Solar Thermal Federation of India(STFI)

Over View

- **Industrial Process Heating Solutions:**
- **Below 100 Degree C : Mainly using solar flat plate and evacuated tube collectors**
- **Potential : Very High – can save up to 15million MT of oil per year**
- **Factors :**
 - a) **Good Solar Radiation up to 300 days per year.**
 - b) **Large number of small and medium industries.**
 - c) **Sharp Rise in fuel / Energy prices.**
 - d) **Increased awareness about environment protection**
 - e) **Stricter implementation of pollution norms**
 - f) **Recession added by global competition**

Applications

Process	Industry Sector	Food	Textile / Garments	Building Material	Galvanizing Electroplating	Fine Chemicals	Pharmaceuticals and bio chemical	Service industry	Paper Industry	Automobile Industry	Tanning	Painting	Wood and wood Products	Meat processing	Electronics / White Goods
Cleaning		X	X	x	X	x	X	X		x	x	X		X	
Drying		X	X	x		x	X	X	x	x	X	X	X		
Evaporation and Distillation		X				x	X								
Pasteurization		X					X								
Sterilization		X					X							X	
Cooking		X						x							
General Process Heating		x	X	x	X	x	x	X		X			x		X
Boiler feed water Preheating		X	X	x		X	X	X	X		x			X	
Heating Production Halls		x	X		x	x	x	x		x	x	x	X		
Solar Absorption Cooling		X			x		X	X							

Hurdles in Acceptance

- Lack of awareness.
- Lack of confidence in technology.
- Lack of strict control on use of fire wood as fuel.
- Lack of proven pilot projects / improper solutions in the past.
- Lack of interest in maintaining.
- Factory shades not designed to take system loads(old SSI Units / New PEB's).
- Aggressive industrial environment threatening system performance & Life.
- Limited competence in system design engineering.
- Lack of monitoring equipments / systems.
- Issues of integration with existing systems.
- SoPro investment vis a vis plant cost.
- Manual intervention requirement.
- Inadequate policies for encouragement

Quality issues - the following factors affect the SoPro system quality

- Solar manufacturing industry mainly in bathing hot water systems.
- Use of same collectors affecting system efficiency.
- Innovative solutions for system upkeep and monitoring missing.
- Special solutions / developments to meet working condition challenges missing.
- Lack of reliable / relevant solar radiation data affecting system design.
- Customers too investment sensitive forcing quality compromise.

Measures to be taken to enhance the system quality

- Training and capacity building for system design / engineering.
- Introduction to design and simulation software's.
- Identifying special grade collectors with higher efficiency.
- Development of low cost monitoring equipments locally.
- Establish pilot systems for each niche industry.
- Explore and Promote RESCO mode.
- Sharing of knowledge / resource pool - national & international.
- Recognition for quality SoPro systems (CREDAI pattern).

Contributions expected from different Agencies

- MNRE to pursue for strict control on tree cutting.
- Central Pollution Control Board (CPCB) to act to curtail use of fire wood as industrial fuel.
- Express approval and release of incentives / subsidy to buyer.
- Guidelines for financing SoPro systems separately.
- Ministry of industry to issue guidelines for structural designs of factory shades to take SoPro system load.
- Installation of solar radiation data center in all industrial areas.
- SoPro to be mandatory for food processing industry.
- Inclusion under MNRE PoA for availing Carbon Credit benefits .
- SoPro systems recorded out put to be considered as RPO for HT consumers and REC benefits.

Locally Developed monitoring equipment

HMD II

Electronic Heat Meter Display (with BAFA-approval) for monitoring and display of calorimetric measurement categories.



Applications

- Energy Management
- Heat metering in solar thermal systems (ST)
- Heat metering in heat pump systems (HP)
- Heat metering in CHP & Multi User systems
- Monitoring of domestic hot-water (DHW) systems
- Industrial Process Control

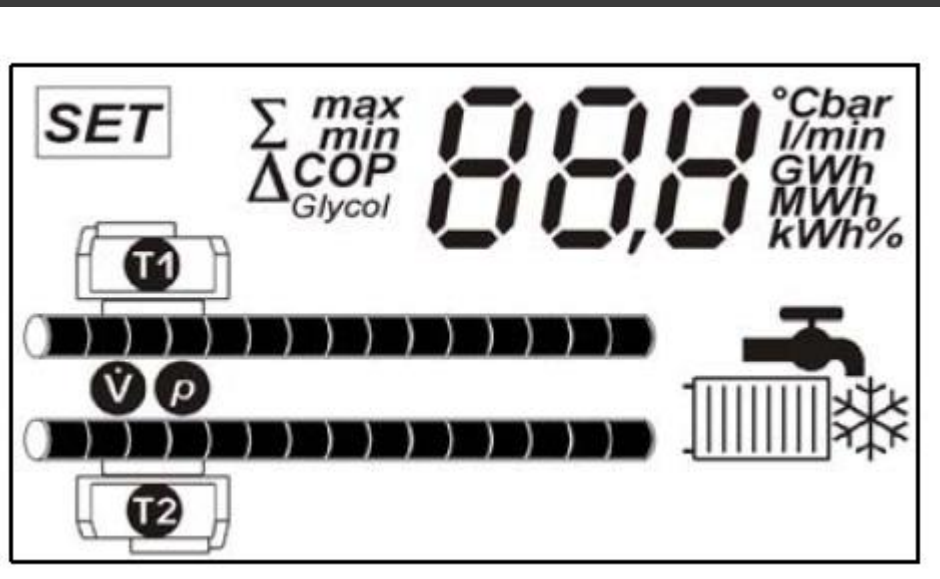
Product features

- Heat metering (with BAFA-approval for ST and HP)
- Calculation of the Seasonal Performance Factor (SPF)
- Automatic detection Heating or Cooling Mode (HP)
- Operating mode display: DHW, heating or cooling
- „Multimeter function“, all relevant data of a hydraulic circuit can be displayed and monitored:
flow, pressure, supply and return temperature,
heat output, accumulated heat quantity distinguished
between DHW, heating or cooling

Example of use



- Automatic correction of the specific heat capacity by inputting the mix ratio of water/anti-freeze
- Impulse input for an external electricity meter to calculate and display the Seasonal Coefficient of Performance (SCOP)
- Impulse output: 1 impuls / kWh_{th} or alarm contact
- Function check (e.g. minimum pressure control or dry running protection of the circulator)
- Flow-animation
- Power supply (5 Vdc) for 2 Grundfos Direct Sensors™
- Compatible with all Grundfos Direct Sensors™ of types: VFS, RPS und DPS
- Rapid and easy installation thanks to sensor connector plugs



Technical overview

Grundfos Direct Sensors™ are making an important contribution to HVAC & renewable energy systems providing improved efficiency, greater comfort and enhanced safety. Thanks to the 2 **combined sensors Grundfos VFS & RPS** all relevant data for Heat Metering is available by measuring flow, supply & return temperature but also system pressure. An additional impulse signal input can be used to calculate the **Seasonal Coefficient of Performance (SCOP)**, distinguishing in domestic hot water mode, central heating or cooling. The heat dissipated in heat exchangers from external heating sources (e.g. hybrid systems) can also be displayed and retransmitted as a pulse output.

Electrical sensor connections



Case overview



Technical Data *

System Voltage	230 V, 50 Hz
Own Consumption	< 1,2 W
Sensor-inputs	2 x Grundfos Direct Sensor™ (VFS, RPS or DPS)
Other Inputs	<ul style="list-style-type: none"> • Heating / DHW-mode • SPF-correction (heating rod) • Impulse-input for external electricity meter
Output	<ul style="list-style-type: none"> • Pulse-output 1 Impulse / kWh_{th}
Display	LCD-Display (48 segments)
Ambient temperature	0 to +45 °C
Degree of protection	IP 20 / DIN 40050
Installation	Wall-mounted
Weight	250 g
Case	recyclable 3-piece plastic case
Sensor Power Supply	2 x 5 Vdc for 2 Grundfos Direct Sensors™
Dimensions L x W x H [mm]	137 x 134 x 38

Thank You

mdakole@gmail.com