PV monitoring solutions

Outdoor monitoring system for PV modules

Accurate

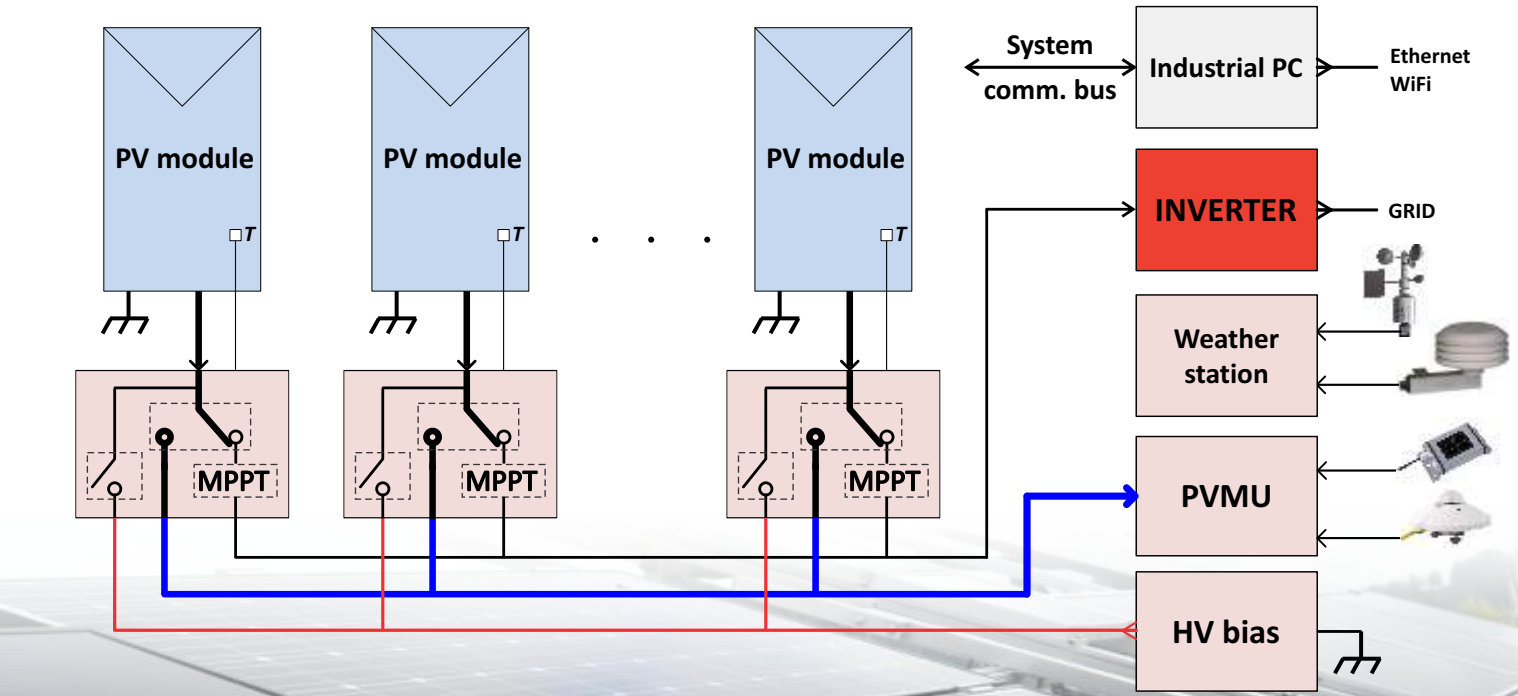
- Four wire connection for each PV module
- Simultaneous IV curve & irradiance measurement
- Spectrally macthed reference irradiance sensors
- Adjustable IV scan time per each PV module

Versatile

- Configurations of multiple of 16 input channels for PV modules
- Open/Short circuit or MPP load conditions
- Bias voltage source for PID testing up to ±1500 V
- MODBUS® interface for pyranometers

Powerful

- MPP tracking of PV modules up to 200 V / 10 A / 300 W
- Grid connected system – no energy is wasted
- Simultaneous parameters acquisition of all PV modules
- Fast consecutive IV curve scanning



MAIN SYSTEM PROPERTIES

- Each PV module is connected to a MPP tracker. Energy is fed to the grid via inverters.
- Simultaneous MPP tracking and current, voltage and temperature data logging of all PV modules.
- Sequential IV curve scanning with PV measurement unit on time intervals.
- System configuration is in multiple of 16 input channels (one channel per PV module).
- Selectable spectrally matched reference sensor and IV scan time per each PV module.
- Simultaneous IV scan and reference irradiance measurement per each IV point.
- Adjustable high voltage supplies up to ±1500 V for PID testing. Selectable per each PV module.
- MODBUS® interface for pyranometers.
- Windows control software with SQL database data storage for post analyses.

PV MEASUREMENT UNIT (PVMU)

Measurement	Range	Resolution	Uncertainty	Temperature coefficient
PV voltage	250 V	3.8 mV	± (0.1 mV + 0.1% FS)	< 0.005% / °C
PV current	20 A	152 µA	± (2 mA + 0.1% FS)	< 0.01% / °C
	2 A	15.2 µA	± (0.2 mA + 0.1% FS)	< 0.01% / °C
Irradiance sensors (6 channels)	1 V	7.63 µV	± (10 µV + 0.1% FS)	< ±2 µV / °C
	40 mV	0.3 µV	± (10 µV + 0.2% FS)	< ±2 µV / °C
Irradiance sensor temperatures	10 kΩ NTC, PT1000	1 °C	± 0.2% FS	
IV curve scanning	Adjustable time from 10 ms to 1 s, with maximal of 400 points per IV curve			

MPP TRACKERS (MPPT)

		MP0610F	MP1010F–1	MP2005F
Power input	Voltage	0 – 60 V	0 – 95 V	0 – 200 V
	Current	10 A	10 A	4.2 A
	Power	300 W	300 W	300 W
	Connection	2-wire (4-wire for bypass)	4-wire	2-wire (4-wire for bypass)
	Max. reverse current	10 A	10 A	6 A
Bias input	Voltage	–1500 – +1500 V		
	Max. Current	±25 mA		
Power Output	Voltage	40 – 300 V, 250 V nominal		
	Current	1.6 A max		
Bypass output	Voltage	220 V max		
	Current	current pins: 10 A max, voltage pins: 2 A max		
Measurements	Input Voltage	0 – 81.9 V, res.: 20 mV	0 – 102.4 V, res.: 25 mV	0 – 204.8 V, res.: 50 mV
	Input Current	0 – 10.2 A, res.: 2.5 mA	0 – 10.2 A, res.: 2.5 mA	0 – 5.1 A, res.: 1.25 mA
	Output Voltage	0 – 410 V ± 15%, resolution: 100 mV		
	Bias Current	–1024 – +1024 µA, resolution: 0.5 µA		
	Internal Temperature	–25 – +120 °C, resolution: 1 °C		
	External Temperature	DS18B20 1-wire digital temperature sensors, –55 – +125 °C, res.: 0.0625 °C, up to 8 sensors		

WEATHER STATION

Measurement	Range	Resolution	Uncertainty
Air temperature	–40 – +123.8 °C	0.01 °C	±0.4 °C
Air humidity	0 – 100% RH	0.05% RH	±3% RH
Air pressure	920 – 1150 hPa	1 hPa	±1.5%
Wind speed	0.5 – 60 m/s	0.1 m/s	±0.5 m/s
Wind direction	0 – 360 °	5 °	±5 °

HIGH VOLTAGE BIAS SOURCE

Parameter	Range	Uncertainty
Output voltage	–1500 V – +1500 V (software limited)	40 mV noise + 0.5% FS
Current limit	20 mA (hardware limited) , software adjustable	1 mA
Output current measurement	0 - 20 mA	1% FS

REFERENCES

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