TS4-R-M / TS4-R-O

TS4-R MODULE TECHNOLOGY COMPATIBLE WITH ALL MAJOR INVERTER BRANDS.

System optimization

- Yields boosted in partial shading and different module configurations
- Module-level shutdown
- Module-level monitoring

Ultimate flexibility

- Selective Deployment of DC optimizers as needed
- Compatible with all standard modules

Fast installation

- Faster installation thanks to fewer components
- Easy installation on the ground reduces roof time

Maximum reliability

- Reduced operation and maintenance costs thanks to less components
- Long service life due to demand-specific bypass operation
- Comprehensive SMA service for the entire system

TS4-R MODULE TECHNOLOGY

Optimization redefined

The TS4-R module technology is a cost-effective system that fits into any PV module design, making it the right solution for every application. TS4-R ensures maximum energy yields and configuration flexibility; only fit the modules affected by partial shading or output loss. Tool free installation and selective deployment saves you time and risk whilst allowing for simple upgrades at any time. With TSR-4 you can be sure of maximum energy yields, system reliability and minimum maintenance costs. Whether for shading, shutdown, different module configurations and other challenges, TS4-R is the ultimate solution.

TS4-R Progressive Functionality

The TS4-R platform offers integrated power electronics with various functions. Functionality increases with each unit.

With the **Monitoring** function, the entire PV system can be monitored at the module level. Faults on individual modules, such as those caused by dirt, are displayed and can be rectified quickly. The **Shutdown** function enables the PV system to be switched off at the module level. Using the **Optimization** function, the power of the PV system can be boosted even in partial shading or with different module configurations.

Monitoring	Shutdown	Optimization
M	S	O
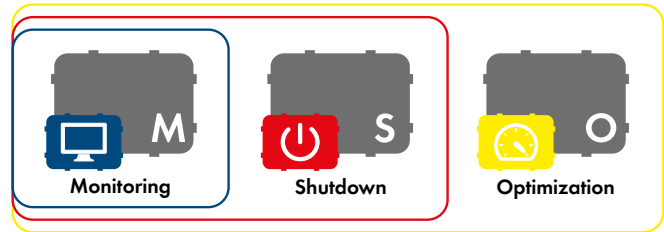
Technical data	TS4-R-M	TS4-R-S	TS4-R-O
Electrical ratings			
Nominal DC input power	375 W	475 W	475 W
Max. PV module open-circuit voltage (V_{OC}) at STC	52 V	75 V	75 V
Max. current	12 A	12 A	12 A
Min. V_{MPP}	16 V	16 V	16 V
Output			
Output power range	0 W to 375 W	0 W to 475 W	0 W to 475 W
Output voltage range	0 V to V_{OC}	0 V to V_{OC}	0 V to V_{OC}
Communication	802.15.4, 2.4 GHz	802.15.4, 2.4 GHz	802.15.4, 2.4 GHz
Impedance matching capability	No	No	Yes
Output voltage limit	No	No	No
Maximum system voltage	1000 V	1000 V	1000 V
Max. series fuse rating	15 A	15 A	15 A
Mechanical			
Operating temperature range	−40°C to +75°C (−40°F to +167°F)		
Storage temperature range	−40°C to +75°C (−40°F to +167°F)		
Cooling method	Natural convection		
Dimensions (with cover)	195.5 mm x 158 mm x 23 mm		
Weight (with cover)	670 g	670 g	720 g
Degree of protection	IP65 / IP67, NEMA 3R		
Cabling			
Cabling type	PV1-F		
Output cable length	1.0 m; other lengths upon request		
Connector	MC4		
UV resistance	500 h with UVB light between 300 and 400 nm at 65°C		
Max. string voltage	600 V UL / 1000 V IEC	1000 V UL / 1000 V IEC	1000 V UL / 1000 V IEC
Outer cable diameter	6.25 mm ± 0.25 mm (600 V UL) / 7.15 mm ± 0.25 mm (1000 V UL)		
Conductor cross-section	4.0 mm^2 (12 AWG)		
Functions			
Monitoring[1]	●	●	●
Shutdown[1]		●	●
Optimization			●
Warranty		25 years	

[1] Cloud Connect Advanced and Gateway are required

	TS4-R-M	TS4-R-S	TS4-R-O
Type designation	TS4-R-M	TS4-R-S	TS4-R-O

CLOUD CONNECT ADVANCED (CCA)*

The Cloud Connect Advanced communication unit connects the TS4-R components with the SMA Sunny Portal monitoring solution via WLAN or Ethernet. This means that operators can keep an eye on their systems via remote monitoring and can respond quickly in the event of irregularities. Cloud Connect Advanced can communicate with up to six gateways. Via Cloud Connect Advanced, the TS4-R and gateway components of the PV system can be configured easily using a smartphone app.

| Technical data	Cloud Connect Advanced
CCA power consumption	
Input voltage	6–25 VDC (at least 12 VDC when gateways are used; 24 VDC for two or more gateways)
Input current	Maximum 1.8 A (internally protected, independent reserve)
Power consumption	Typical (at 1 GTWY): less than 3 W, max. 16 W, plus max. 0.5 W per additional gateway
Max. 5 W for mobile phone option	
Available ports	
RS485-1 AND RS485-2 for inverters/AC meters/MODBUS etc.	
USB 2.0, output power 5 W, output current 1 A	
Power supply unit	
Input voltage	100 V–240 VAC, 50 Hz–60 Hz
Mounting type	DIN carrier rail
Capacity	
Number of supports modules	up to 360
Internet connection options	
Ethernet interface	10/100Base-T with detection of straight-through or crossover cables
Wireless interface	WLAN, IEEE 802.11 b/g/n 2.4 GHz One WLAN antenna: 2.4–2.5 GHz, 50 Ω (RP SMA connector)
Mechanical data	
Top hat rail assembly dimensions (with enclosure, without antennae, W x H x D)	31 mm x 115.51 mm x 71.54 mm
Weight (CCA + enclosure)	126 g
Operating temperature range	–20°C to +70°C (–40°F to 158°F)
Cooling method	Convection cooling
User interface	
Mobile app	iOS and Android (directly connected to the CCA via WLAN)
Multifunction LED display	Red/green/orange
Warranty	5 years

GATEWAY (GTWY)*

The Gateway enables wireless communication for up to 120 TS4-R components. It can be installed easily on the rear of the module or the substructure and has a range of up to 15 meters. The connection to Cloud Connect Advanced is a wired RS485 connection.

Technical data	Gateway
Communication	
Communication with TS4-R	Wireless (802.15)
Communication with Cloud Connect Advanced (CCA)	RS-485 cable connection; connected in series with other gateways
Range of wireless communication	15 m within line of sight (50 ft)
Max. number of TS4-Rs per gateway	120
Installation	
Installation position	Center of the system
Installation method	On the rear of the module or on the frame Clamps are supplied for installation on the frame
Mechanical data	
Dimensions including retaining bracket	200 mm x 200 mm x 73 mm
Weight	900 g
Operating temperature range	–30°C to +70°C
Environmental rating of enclosure	IP65
Warranty	10 years

* Necessary only if Monitoring and Shutdown functions are used.

SYSTEM DIAGRAM
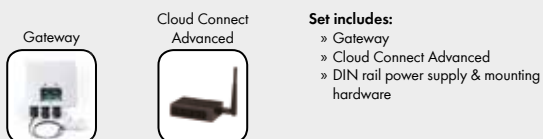

—— DC	—— AC	—— Ethernet	—— RS485
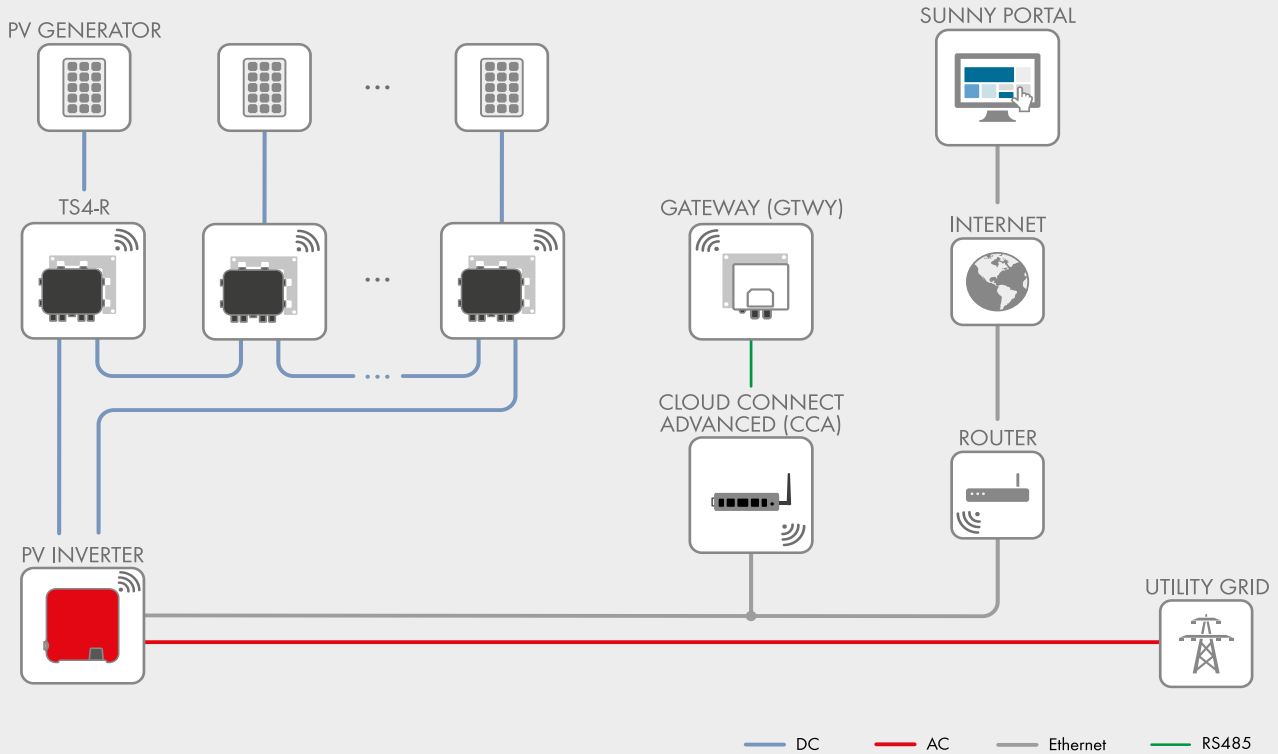
Communication set

The communication set enables the TS4-R to be connected to the SMA inverter quickly and easily. The outdoor communications set is perfectly suited to installation outdoors, where the communications technology is installed in a separate enclosure.
Module-based data are transmitted via WLAN across the rooftop from the TS4-R optimizers to the Gateway, which is connected via RS485 to Cloud Connect Advanced (CCA). The relevant performance data can be viewed on Sunny Portal.
The communication set is necessary only if the Monitoring and/or Shutdown functions are used.

Communication set for installation indoors

Gateway   Cloud Connect Advanced

Set includes:
» Gateway
» Cloud Connect Advanced
» DIN rail power supply & mounting hardware

Outdoor communication set for installation outdoors

Gateway   Cloud Connect Advanced   Outdoor enclosure

Set includes:
» Gateway
» Cloud Connect Advanced
» Outdoor enclosure
» DIN rail power supply & mounting hardware

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