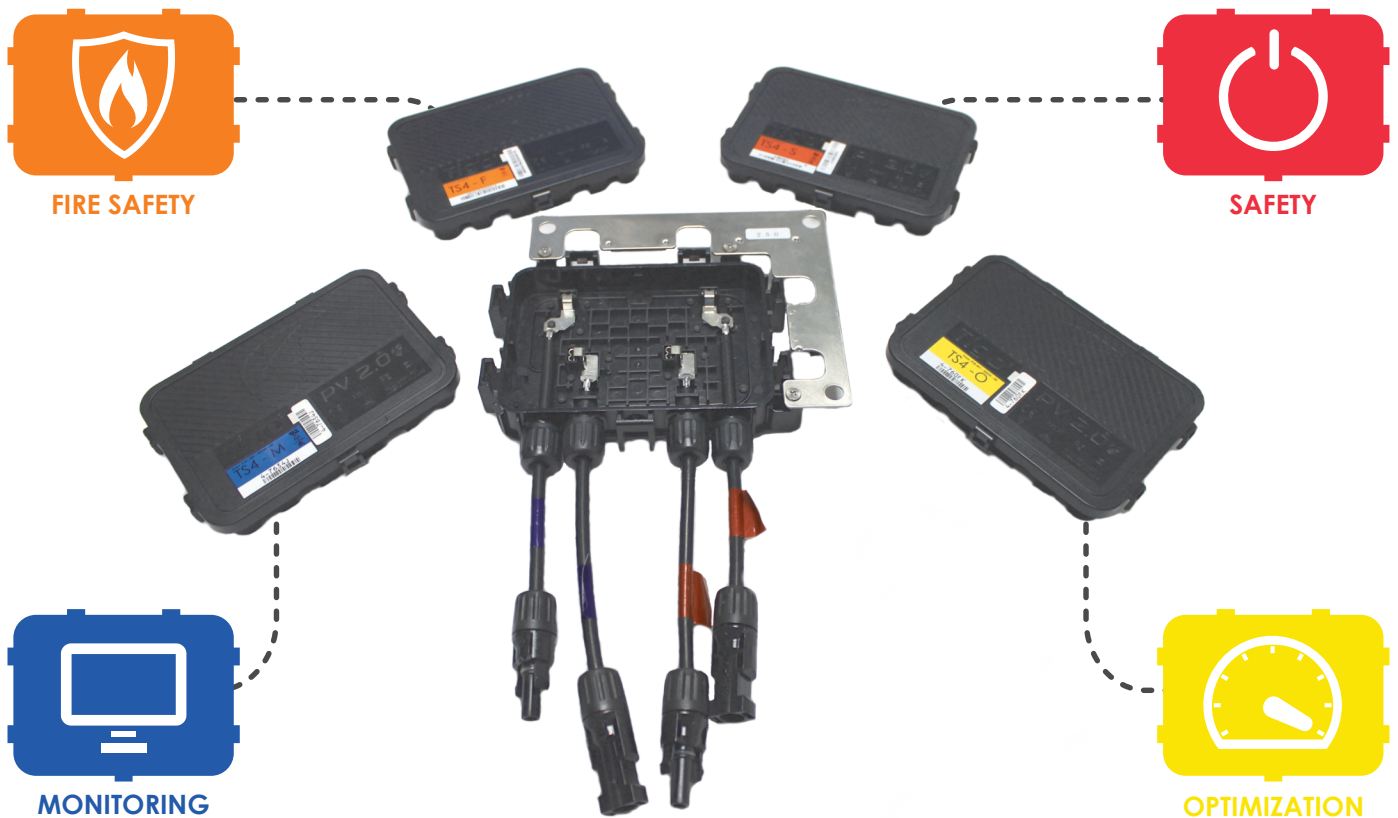# SMART MODULE RETROFIT PLATFORM

The TS4-R is a retrofit solution that brings smart module functionality to standard PV modules, for upgrading underperforming PV systems or adding smart features to new installations. The TS4-R retrofit base can be matched with one of several electronic covers to address a range of functions and budgets. Together they form a new generation of module-level power electronics: flexible, replaceable, upgradeable, and accompanied by a powerful PV 2.0 communication backend.
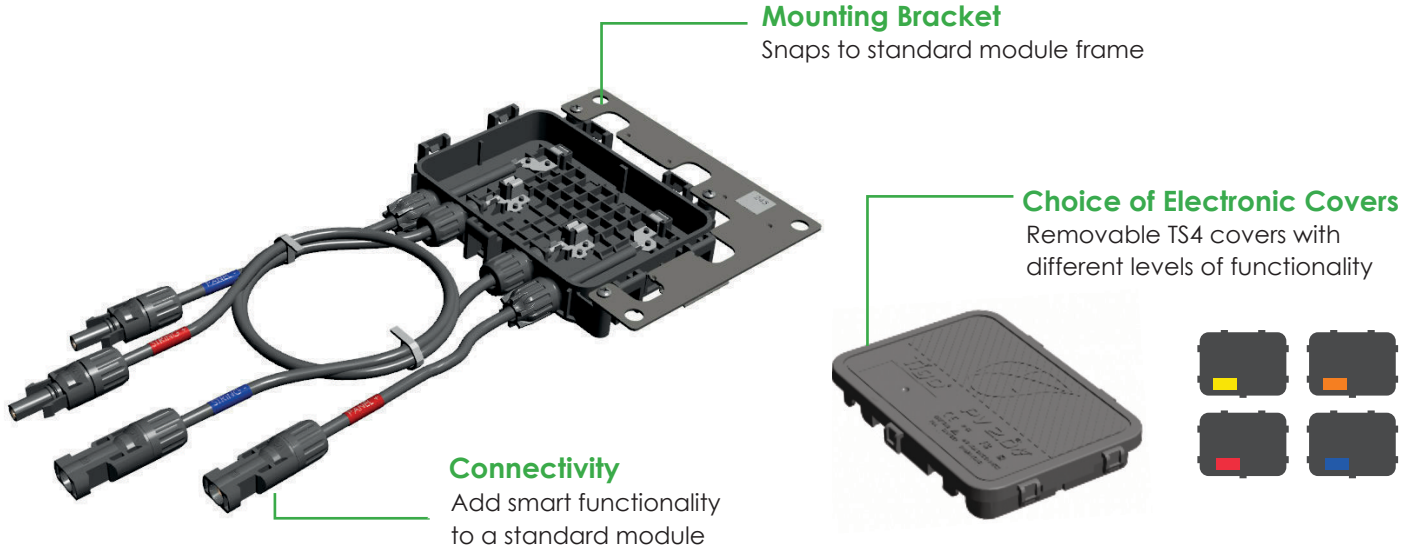

FIRE SAFETY

SAFETY

MONITORING

OPTIMIZATION

PV 2.0

RETROFIT MODULAR PLATFORM

TS4-R

Type: TS4-R (base up to 1500V)

RETROFIT ADD-ON BASE

Mounting Bracket
Snaps to standard module frame

Choice of Electronic Covers
Removable TS4 covers with different levels of functionality

Connectivity
Add smart functionality to a standard module
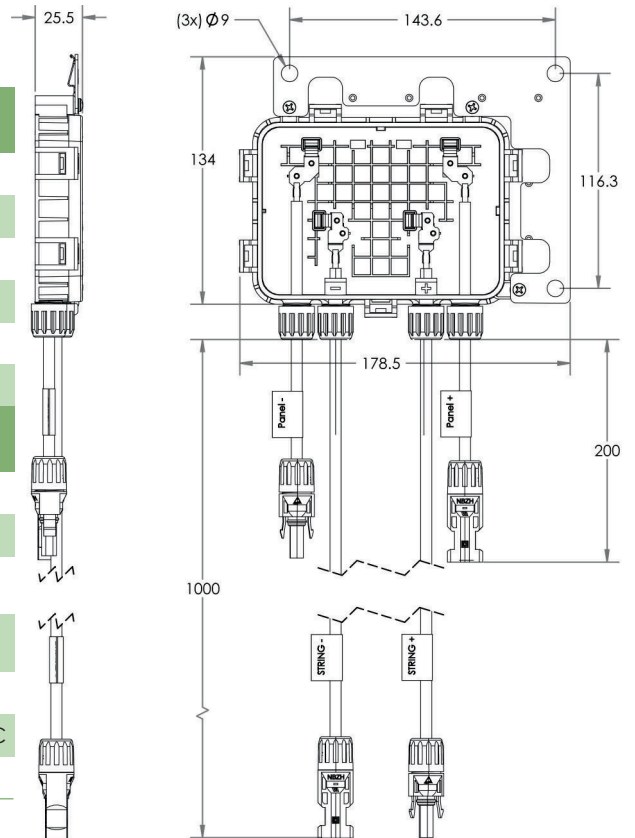
MECHANICAL SPECIFICATIONS

Mechanical	
Operating Temperature Range	-40°C to +70°C (-40°F to +158°F)
Storage Temperature Range	-40°C to +70°C (-40°F to +158°F)
Cooling Method	Natural Convection
Dimensions (with cover)	152.5mm x 108mm x 25.3mm
Weight (base and cover)	610g (M or S cover), 670g (O cover)
Outdoor Rating	IP67, NEMA 3R

Cabling	
Type	H1Z2Z2-K
Output Length	Standard 1.0m, other lengths on request
Cable Options	1000V rated 1500V rated
Cable Cross-Section	7.15 ± 0.25 mm (1000V) 6.4 ± 0.2mm, 7.05 ± 0.2mm (1500V)
Connectors	MC4, MC4 compatible, Amphenol, EVO2
UV Resistance	500hr with UV light between 300-400nm @65°C
Maximum String Voltage	1500V UL/IEC[1]

[1] All TS4 covers are 1500V compatible. Specify max system voltage when ordering TS4-R bases for appropriate cables & connectors.

*All dimensions are in mm

UPGRADE YOUR FLEET WITH TS4-R

Tigo has expanded its smart module retrofit platform to provide multiple levels of customization. With a universal base and a range of covers containing the Flex MLPE, TS4 increases your freedom of choice when selecting features for a particular project and budget. TS4 retrofit cover options include monitoring, safety, and optimized performance features.

OPTIMIZATION
TS4-O

Monitoring   Safety   Optimization

- Shade and mismatch tolerance
- Enhanced energy yield
- Greater design flexibility

- Maximized roof usage
- Plus all the benefits of Safety and Monitoring

SAFETY
TS4-S

Monitoring   Safety

- NEC 2014 & 2017 690.12 rapid shutdown compliant
- Module-level deactivation

- Automatic or manual shutdown
- Plus all the benefits of Monitoring

FIRE SAFETY
TS4-F

Fire Safety

- NEC 2014 & 2017 690.12 rapid shutdown compliant
- Module-level deactivation

- Automatic or manual shutdown
- SunSpec signaling

MONITORING
TS4-M

Monitoring

- Reduced O&M costs
- PV-2.0 data synchronization
- Module bar code tracking

- CRM integration
- Warranty tracking
- Fleet management

TS4 COVERS

ELECTRICAL RATINGS

	MONITORING TS4-M	FIRE SAFETY TS4-F	SAFETY TS4-S	OPTIMIZATION TS4-O
INPUT				
Rated DC Input Power	475W	475W	475W	475W
Maximum Input Voltage	90V	90V	90V	90V
Maximum Continuous Input Current (I_{MAX})	12A	12A	12A	12A
Maximum V_{OC} @ STC	75V	75V	75V	75V
Minimum V_{MP}	16V	16V	16V	16V
OUTPUT				
Output Power Range	0 - 475W	0 - 475W	0 - 475W	0 - 475W
Output Voltage Range	0 - V_{OC}	0 - V_{OC}	0 - V_{OC}	0 - V_{OC}
Communication Type	802.15.4 2.4GHz	SunSpec	802.15.4 2.4GHz	802.15.4 2.4GHz
Rapid Shutdown UL Listed[1] (NEC 2014 & 2017 690.12)	No	Yes	Yes	Yes
Impedance Matching Capability	No	No	No	Yes
Output Voltage Limit	No	No	No	No
Maximum System Voltage	1500V	1500V	1500V	1500V
Recommended Fuse Rating	15A	15A	15A	15A

[1] Cloud Connect and Gateway required for rapid shutdown compliance.

ORDERING INFORMATION

Add-on / Retrofit Unit	
TS4-R	1000V TÜV / UL, MC4 compatible, 1m cable
Options	
☐	Connectors (1000V TÜV / UL): MC4, Amphenol, EVO2
☐	1500V TÜV / UL, EVO2 or MC compatible
Pre-Assembled	**Features**
TS4-R-M	Monitoring
TS4-R-F	Fire Safety
TS4-R-S	Safety
TS4-R-O	Optimization

All TS4 covers are 1500V compatible. Specify max system voltage when ordering TS4-R bases for appropriate cables & connectors.

For sales info:
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For product info:
Visit www.tigoenergy.com/products

For technical info:
http://support.tigoenergy.com

For additional info and product selection assistance, use Tigo's online design tool at www.tigoenergy.com/design