



# MLPE Module-Level PV Safety Solutions

Fonrich (Shanghai) New Energy Technology Co., Ltd.



A LEADER IN CLEAN ENERGY SAFETY

Fonrich Smart Safety Protector (Rapid Shutdown with AFCI) solution provides dual protection of module-level shutdown and AFCI protection. Compliant with international safety standards, it supports module-level rapid shutdown, AFCI protection and remote monitoring, effectively avoiding property loss and personal injury caused by PV fire hazards.



## ◆ Module-Level AFCI Safety Solution

PVMS Series Shutdown · AFCI Protection · Monitoring

### ■ Three-in-One Premium Rapid Shutdown

Supports module-level rapid shutdown, AFCI protection and data monitoring.

### ■ Compatible With Mainstream Inverters

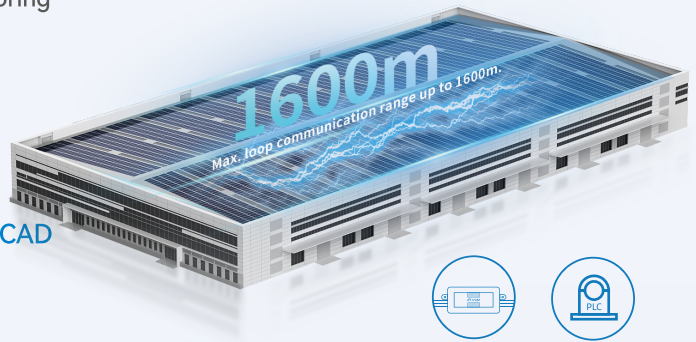
Compatible with mainstream inverters, full-power adaptation for diverse application scenarios.

### ■ View Module Data Accurately Via Digital Twin CAD

Real-time control of core power station data, easy fault location.

### ■ International Authoritative Certification

Compliant with NEC, UL and other certification standards, with international-level safety endorsement.



## Smart Safety Protector



Automatic Protection  
Manual Shutdown



Remote Data  
Monitoring



Module-Level  
AFCI Protection



1600m PLC  
Communication



### Smart Safety Protector (Smart RSD)

Model	FR-PVMS-					
	TTCB	TTQB	TTCC	TTQC	THCJ	THQJ
Supported PV Channel / Modules	2/2	2/2	2/2	2/2	1/2	1/2
Max. Input Voltage	70 V DC × 2	70 V DC × 2	70 V DC × 2	70 V DC × 2	140 V DC	140 V DC
Max. Continuous Input / Output Current	20 A DC	20 A DC	23 A DC	23 A DC	25 A DC	25 A DC
PV Module Arc Fault Detection	-	✓	-	✓	-	✓
Max. System Voltage	1500 V DC					
Max. Cable Loop Length	1600 m					
Operating Ambient Temperature Range	-40°C ~ +85°C					
Installation Method	PV Rail					
Protection Rating	IP68 / NEMA Type 6P					
Size (W/O Cables and Connectors)	120 × 68 × 26 mm					

\*Specifications listed for product models are subject to the latest official datasheet.

Fonrich module-level smart power optimizer integrates generation optimization and rapid shutdown protection. It solves installation area loss from orientation differences and minimizes power generation drop caused by shading. The product supports data monitoring via the SafeSolar Cloud Platform.



\*MSPT: Most Suitable Power Point Tracking (Fonrich proprietary technology)

## ◆ Module-Level Power Optimization & Safety Solution

PVMB Series Shutdown · Optimization · Monitoring

### ■ Three-in-One Premium Power Optimizer

Supports module-level rapid shutdown, power optimization and data monitoring.

### ■ Up to 30% Higher Power Generation

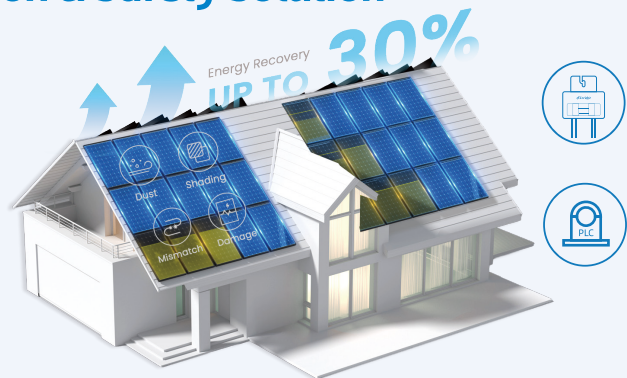
Self-developed module-level MSPT technology ensures optimized string power generation.

### ■ Flexible Design, Higher Installed Capacity

Not affected by shading and orientation, enabling full rooftop installation potential.

### ■ International Authoritative Certification

Compliant with NEC, UL and other certification standards, with international-level safety endorsement.



## Smart Power Optimizer

## HOT Optimizer



Module-Level Power Optimization



Remote Data Monitoring



Automatic Protection Manual Shutdown



1600m PLC Communication



Smart Power Optimizer

Model	FR-PVMB-C80H	FR-PVMB-C140J
Supported PV Channel / Modules	1/1	1/2
Max. Input Power	800W	1400W
Max. Continuous Input / Output Current	20 A DC	21 A DC
MSPT Voltage Range	17 ~ 60 V DC	17 ~ 105 V DC
Max. System Voltage	1500 V DC	
Max. Cable Loop Length	1600 m	
Operating Ambient Temperature Range	-30°C ~ +85°C	
Installation Method	PV Rail	
Protection Rating	IP68	
Size (W/O Cables and Connectors)	120 × 132 × 45 mm	

\*Specifications listed for product models are subject to the latest official datasheet.

## ◆ Mixed Installation Solution

**Domestic Projects: 500+**


Smart RSD & Power Optimizer Mixed Installation Solution

Focus on domestic market, adapt to local PV policies and application needs. More than 500 mixed projects put into use, covering C&I factories, parks and distributed power stations. Conform to grid access and safety standards, promote steady development of domestic photovoltaic industry.

**Overseas Projects: 1100+**

Smart RSD & Power Optimizer Mixed Installation Solution

Expand global layout to comply with regional PV standards and application demands. Over 1100 mixed projects have been deployed across Europe, America, Southeast Asia and other regions. With stable performance and full compliance, it stands as the preferred solution for overseas PV projects.



### Smart Safety Protector

- Array Internal Arc**  
Supports arc detection inside PV modules
- Cable Tray Internal Arc**  
Supports arc detection in cable tray wiring
- String Internal Arc**  
Supports arc detection inside PV strings

## Common Functions


Smart RSD & Power Optimizer

### Module-Level Monitoring

Module-Level Data Monitoring  
CAD Physical View Fault Location  
Anomaly Diagnosis and Analysis

### Module-Level Shutdown













Active Over-Temperature & Over-Current Shutdown  
Local Manual Shutdown



### Smart Power Optimizer

- Module-Level MSPT Power Optimization**  
+5~30% Yield in shaded areas
- Flexible Design, Higher Installed Capacity**  
Not affected by shading and orientation, enabling full rooftop installation potential.

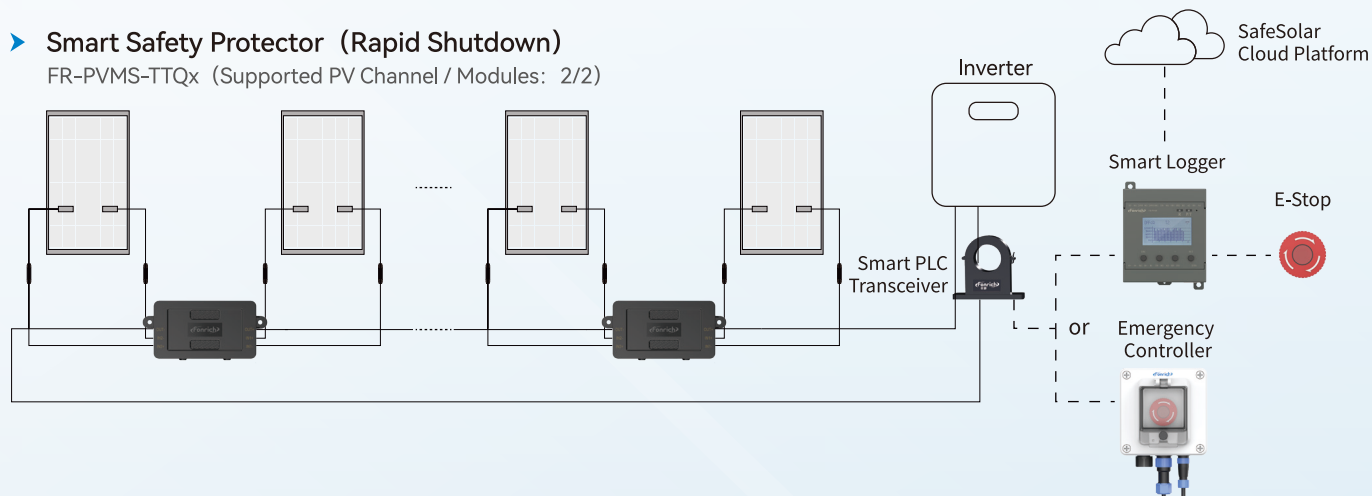
## ◆ Featured Projects

 <p>Shanghai</p> <p>Smart Safety Protector Robotics Super Factory</p>	 <p>Guangdong</p> <p>Smart Safety Protector Conghua Racecourse</p>	 <p>Jiangsu</p> <p>Smart Safety Protector Changshu Lightweight PV</p>	 <p>Beijing</p> <p>Smart Power Optimizer Center Group Rooftop PV</p>
 <p>Thailand</p> <p>Smart Safety Protector Suvarnabhumi Airport</p>	 <p>Thailand</p> <p>Smart Safety Protector Thailand GWM Plant</p>	 <p>Thailand</p> <p>RSD &amp; Power Optimizer Mixed Project Thailand C&amp;I Rooftop</p>	 <p>Thailand</p> <p>Smart Safety Protector Lotus's Supermarket</p>
 <p>Malaysia</p> <p>Smart Safety Protector DHL Logistics Center</p>	 <p>Malaysia</p> <p>Smart Safety Protector Malaysia C&amp;I Rooftop</p>	 <p>Philippines</p> <p>Smart Safety Protector C&amp;U PHILS Solar Power Station</p>	 <p>Singapore</p> <p>Smart Power Optimizer Singapore C&amp;I Rooftop</p>

## ◆ Standard Topology Diagram

### ▶ Smart Safety Protector (Rapid Shutdown)

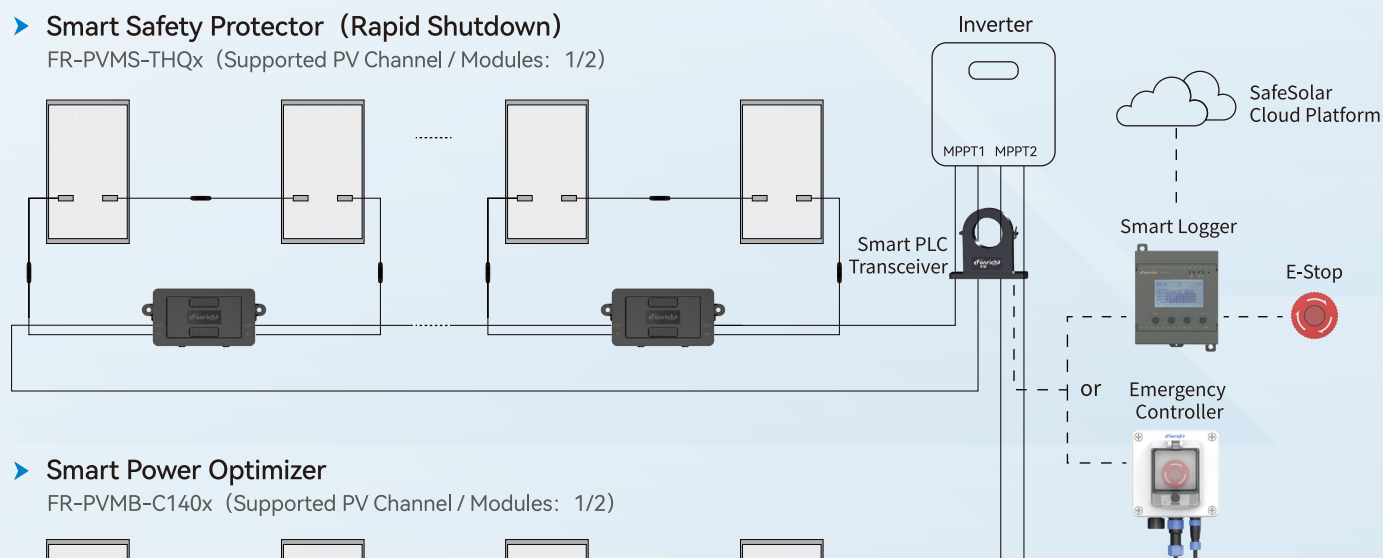
FR-PVMS-TTQx (Supported PV Channel / Modules: 2/2)



## ◆ Mixed Solution Topology Diagram

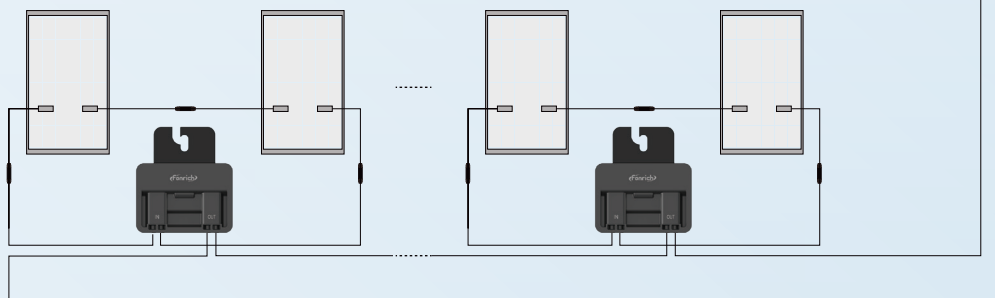
### ▶ Smart Safety Protector (Rapid Shutdown)

FR-PVMS-THQx (Supported PV Channel / Modules: 1/2)




### ▶ Smart Power Optimizer

FR-PVMB-C140x (Supported PV Channel / Modules: 1/2)



\* 1: Mixed installation of Smart Safety Protectors (Rapid Shutdown) and Smart Power Optimizers is supported to meet functional combination requirements of different projects.  
 2: Mixed installation of Smart Safety Protectors (Rapid Shutdown) and Smart Power Optimizers is not allowed in the same MPPT channel.  
 3: Uniform channel specifications are required for mixed installation. Mixed layout of 1-to-1 and 1-to-2 devices between Smart Safety Protectors and Smart Power Optimizers is prohibited.  
 4: The system topology diagram is for reference only. The actual configuration shall be subject to the specific project scheme.



**Guard Energy Security  
Empower Green Development**

## **FONRICH NEW ENERGY**

The Leader in DC AFCI Technology

Backed by 100+ Invention Patents

Safeguarding Global Renewable Energy Systems

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