

IMO

FireRaptor

Solar Panel Rapid Shutdown Solution



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EUROPE

Keeping Solar Safe



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PATENT
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Solar Panel Rapid Shutdown & Alarm

- Manual Panel Shutdown to 0V Operated from Ground Level
- Automatic Panel Shutdown to 0V at $>85^{\circ}\text{C}$ (185°F) Temperature
- Automatic Panel Shutdown to 0V on External Power Loss
- Hardwire or Mobile Communication Alarm Signalling
- Compliant with NEC 2014 & NEC 2017
- Suitable for New Installations or Retro-Fit



FireRaptor Overview

The IMO FireRaptor shuts down DC supply at panel level to ZERO VOLTS in case of emergency. Shut-down is initiated in three ways - Manual Operation, External Power Loss or Temperature Rise Trigger as follows:

• MANUAL OPERATION

Manual shutdown is initiated within less than 1 second of operation by pressing the emergency pushbutton on the Emergency Rapid Shutdown Switch (Part no FRS-ESWx). The Emergency Switch can be conveniently located at ground level for easy access or multiple switches can be installed in different multi-level building zones.

• EXTERNAL POWER LOSS

Disconnection of the external AC supply, by whatever means, causes automatic remote operation of the Emergency Rapid Shutdown Switch and panel shutdown.

• TEMPERATURE RISE TRIGGER

Automatic shutdown occurs if the temperature sensor onboard the FireRaptor detects an ambient temperature rise above 85°C (185°F). The two FireRaptor versions available shutdown in different ways.

The **FRS-01** shuts down only the panel(s) connected to it upon sensing an ambient temperature rise above 85°C (185°F). Provided the temperature does not exceed 92°C (198°F), the unit will re-engage the panel(s) if the temperature drops back below 85°C (185°F), otherwise a manual reset of the Emergency Switch is required.

The **FRS-02** shuts down the entire string connected to it upon sensing an ambient temperature rise above 92°C (198°F) and resetting of the Emergency Switch by a professional installer is then required. The shut-down signal can be configured to provide connection to the building's central alarm system or notification via mobile communication (SMS, email etc.).



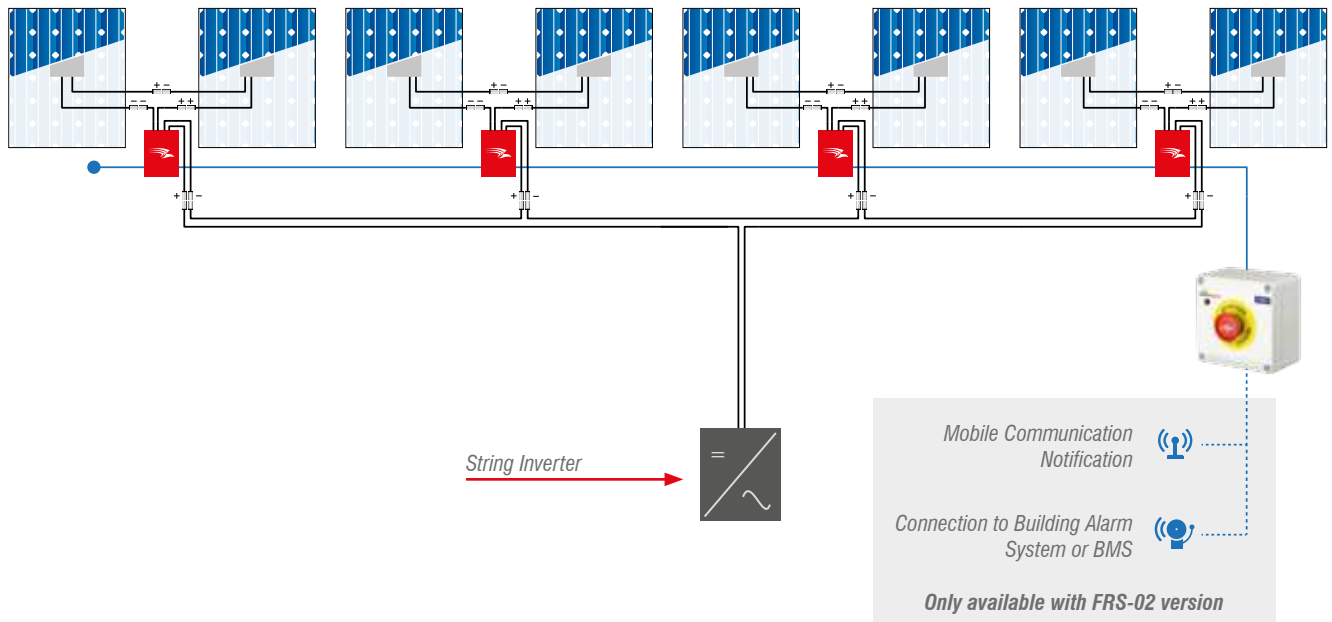
Inverter Compatibility

The FireRaptor operates in the same way as an isolator/disconnect switch but is located at solar panel level. Like an isolator/disconnect, the FireRaptor is compatible with all string inverters and does not affect their operation or performance in any way.

FireRaptor Installation

The FireRaptor is easy to install, requires no set-up and is suitable for both new and retro-fit installations. It is designed to shutdown two panels or it can be mounted in single panel configuration if preferred. The diagram below shows a typical two-panel installation.

The FireRaptor is manufactured using original MC4 connectors on the DC cables ensuring high quality integration and compatibility. The Emergency Switch control cable is fitted with Tyco SuperSeal connectors ensuring quick and easy (plug & play) installation.



Note: If two panel installation is used in accordance with NEC 2017, each panel must be <40V.

Ordering Information

Part Number	Description
FRS-01	FireRaptor Rapid Shutdown Unit - suitable for connection to two solar panels
FRS-02	FireRaptor Monitored Rapid Shutdown Unit - suitable for connection to two solar panels
FRS-ESW1	Emergency Rapid Shutdown Switch IP66 (for FRS-01) - includes 24VDC power supply
FRS-ESW1-K	Emergency Rapid Shutdown Switch IP66 (for FRS-01) with Key Lock - includes 24VDC power supply
FRS-ESW2	Emergency Rapid Shutdown Switch IP66 (for FRS-02) - includes 24VDC power supply
FRS-ESW2-K	Emergency Rapid Shutdown Switch IP66 (for FRS-02) with Key Lock - includes 24VDC power supply
FRS-SIGCAB1.8-F	1.8m (70") Signal Cable terminated at one end with Tyco female connector for use at end of PV String



Emergency Shutdown Switches

The Emergency Shutdown Switches for both the FRS-01 and the FRS-02 are supplied with a 24VDC power supply suitable for up to 40 panel operation. They are available with either a “twist-to-release” pushbutton or keylock pushbutton, both with LED indicator to signal FireRaptor supply status (ON indicates the 24VDC supply is live).

For larger installations, the Emergency Shutdown Switch is available in custom format with:

- Larger power supply options for increased number of panels (FRS-01 & FRS-02)
- Multi connection terminals for increased number of strings (FRS-01 & FRS-02)
- Temperature monitoring unit with hardwire or mobile communication alarm signalling (FRS-02)

Contact IMO for further information on any of these options.



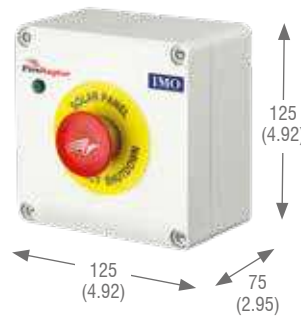
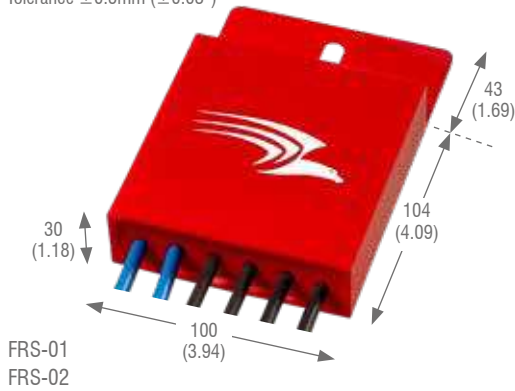
Technical Specification

Emergency Shutdown Cable	2x1mm ² cable + Tyco SuperSeal 2-pole plug/connector (male/female)
DC Power Supply*	24VDC suitable for up to 20 FireRaptor units (40 panels)
Maximum System Input Power	700W (350W per panel)
Maximum System Input Voltage	150V (75V per panel)
Maximum System Input Current	12A
Maximum Isolation Voltage	1500V
Input Protection	Over voltage & transient voltage suppression
Maximum System Output Current	12A (99.5% efficiency)
Breakdown Voltage	1500VAC for 1 minute
Maximum System Output Voltage	150V (75V per panel)
Output Protection	Over voltage, over current & transient voltage suppression
Max. Input Short Circuit Current	15A
Operating Temperature	-30°C to +95°C
Ambient Operating Temperature	-30°C to +55°C
IP Class Protection	> IP68 (designed to comply with NEMA 4X)
PV Casing	Flame retardant ABS - UL94-V0
Weight (without cables)	400g
Panel Cable Length	120mm
String & Signal Cable Length	1800mm
Standard Compliance	EN 61000, EN 61646, EN 61215, IEC 62716 draft C (NH ₃ resistant), VDE-AR-E 2100-712, BS 7671-712, UL 1741
PV Connectors	Multi contact MC4

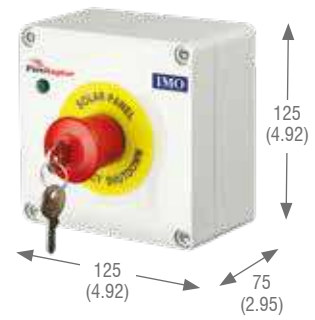


Dimensions mm (inches)

Tolerance $\pm 0.5\text{mm}$ ($\pm 0.03''$)



FRS-ESW1
FRS-ESW2



FRS-ESW1-K
FRS-ESW2-K

COMPLETE SAFETY

LOW COST

PEACE OF MIND



The Ultimate Emergency Solar Panel Rapid Shutdown Solution

The FireRaptor from IMO is an innovative solar panel rapid shutdown solution which takes your safety seriously. Offering three ways to shut down your solar panels to ZERO volts and a TWENTY YEAR WARRANTY, the FireRaptor is the most efficient solution, easy to install and operate, fully compliant with NEC2014 & NEC2017 and is also now available with temperature monitoring and hardwire or mobile communication alarm signalling (SMS, email etc.).

FireRaptor

IMO

**Protected by
FireRaptor
Solar Panel
Rapid Shutdown
System**

Engage emergency
stop or disconnect
AC supply to
activate shutdown



Keeping Solar Safe



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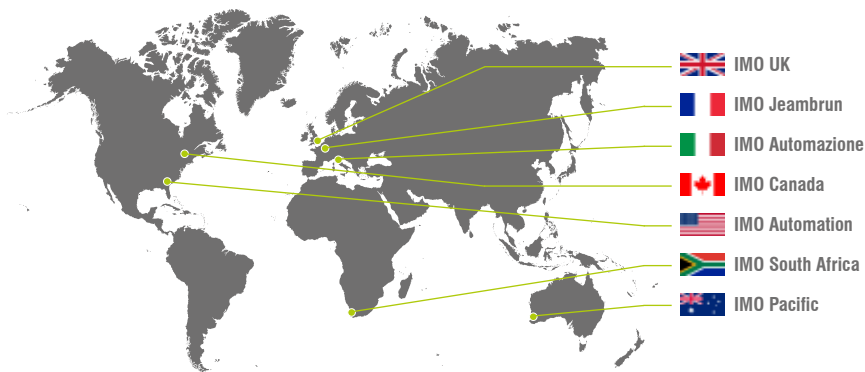
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