

IRM READER

Critical Asset
Monitoring



IRM READER Critical Asset Monitoring

The IntelliSAW IRM Reader is a remote monitoring unit providing temperature, partial discharge, and humidity sensing for predictive condition-based monitoring of electrical power critical assets such as switchgear, circuit breakers, and bus ducts.

Multiple IRM Readers can be bussed to a CAM-5 system providing immediate data display and alarming, or easily integrated into an existing substation SCADA system.

- 12 SAW (passive) Temperature sensors
- 4 Partial Discharge air interfaces
- 8 Humidity sensors
- Industry standard Modbus RTU communications
- Type tested for electrical power asset installations

Applications

- MV and LV Switchgear
- Bus Ducts
- Ring Main Units
- Rectifier Stacks
- Generator Circuit Breakers
- Transformers
- Motor Control Center (MCC)

Industries

Power Generation

- Hydroelectric
- Fossil Fuels (Oil, Natural Gas)
- Coal
- Renewables (Wind, Solar)

Transmission and distribution

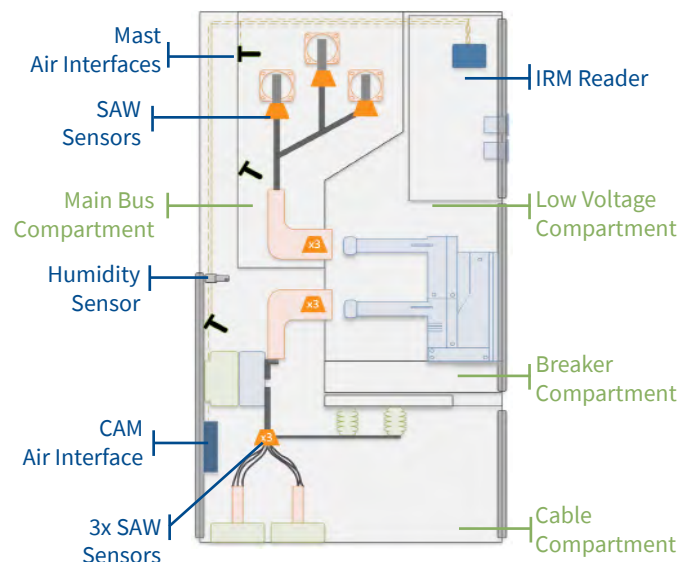
- Step-up Substations
- Step-down Substations
- Collector Substations

Industrial / Commercial

- Refineries
- Steel and Aluminum Plants
- Mining
- Petrochemical
- Data Centers

Typical Installation

A medium voltage switchgear cabinet is a typical application where the IRM reader is installed in the low voltage compartment while the sensors and air interfaces are installed in the high potential compartments.



Medium Voltage Switchgear

Specifications

TEMPERATURE

Operating Frequency ¹	425 to 442 MHz
SAW Sensors	1 to 12
Redundancy Model	Up to 4 redundant antennas
RF Transmit Power	Pulsed, -6 to + 10 dBm
RF Receive Sensitivity	-86 dBm
RF Receive Frequency Stability	± 700 Hz
RF Interrogation Distance ²	Up to 1.75 m with Mast and 2.5 m with TPD air interface
RF Interrogation Time	≤ 160 mSec

PARTIAL DISCHARGE

Number of channels	Up to 4 IntelliSAW CAM Air Interfaces (TPD)
Measurement Method	Ultra High Frequency (UHF)
Selectable Bands (Center Frequency)	300MHz, 600MHz, or 1200MHz
Measurement Types	Noise Floor, Surface Discharge (Corona), Internal Discharge (PD)
Measurement Scale	dB scale, capability to calibrate to reference source
Measurement Sensitivity	100pC Qpk demonstrated in 24kV switchgear, installation dependent.
Response Time	100 mS

HUMIDITY

Number of channels	8 IntelliSAW IH-10 sensors (bussed)
Measurement Types	Relative Humidity, Ambient Temperature

COMMUNICATION INTERFACES

Data Bus Interface	RS485 (half duplex)
Data Bus Baud Rate	4800, 9600, 19200, 38400, 57600, or 115200 baud
Data Protocol	Modbus-RTU device
Response Time	500 mS or longer timeout recommended. (typically < 100 mSec)
Configuration Interface	USB
Configuration Protocol	IntelliSAW Native

PHYSICAL

Operating Power	48 Vdc typical (24 to 60 Vdc), 3.5 W
Dimensions	81 W × 142.5 L × 46 mm H
Weight	0.3 kg (10 oz)
Ingress Protection (IEC 60529)	IP 20
Mounting Style	DIN rail mounted
Operating Conditions	-25°C to +70°C 10 - 95% RH non-condensing 5000m elevation max

1. Operation may be limited by local regulatory rules regarding radio frequency transmissions.
2. Interrogation distance depends on the sensors, air interfaces, the RF environment and the air interface and sensor orientations.

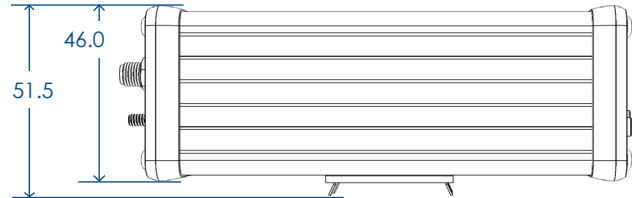
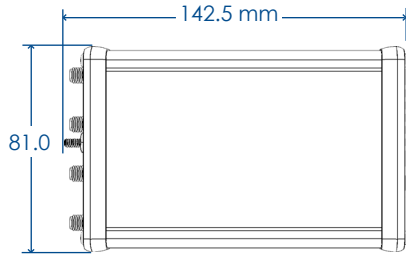
Compliance

TYPE TESTING

UL/cUL 61010-1 Registered	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1
IEC61000-6-5	Level 4 substation EMC/EMI per IEC61000-4-x below
IEC 61000-4-2	ESD, ±8kV contact & ±15kV air discharge
IEC 61000-4-3	RFI, 10V/m
IEC 61000-4-4	EFT, ±4kV (power, humidity, and RS485)
IEC 61000-4-5	Surge, ±2kV line-line, ±4kV line-PE, Criteria B
IEC 61000-4-6	CRFI, 10Vrms (power, humidity, and RS485)
IEC 61000-4-8	Magnetic immunity, 100V/m, 50 & 60Hz, three axes
IEC 61000-4-9	Pulse magnetic field immunity test, 300A/m
IEC 61000-4-10	Damped oscillatory magnetic field immunity, 30A/m
IEC 61000-4-11	Voltage dips and interrupts, DC power
IEC 61000-4-12	Ring wave immunity 5kV common mode, 1kV differential (power & signal)
IEC 61000-4-16	Conducted frequency immunity 30V cont. and 300V/1s diff., common mode to earth (power) 30V cont. and 300V/1s, common mode to earth (signal)
IEC 61000-4-17	Ripple on DC supply
IEC 60255-5	Dielectric strength, 500Vrms per IEC61010-1 for 24Vdc equipment
IEC 60255-5	Impulse voltage, 806V per IEC61010-1 for 24Vdc equipment
EN 300 220	Conducted spurious and EMI spurious (restricted frequency ranges)
EN 55011	Conducted Spurious, Class A

Mechanical

The IRM readers have a standard DIN rail clip for easy mounting in the critical asset low voltage compartment.



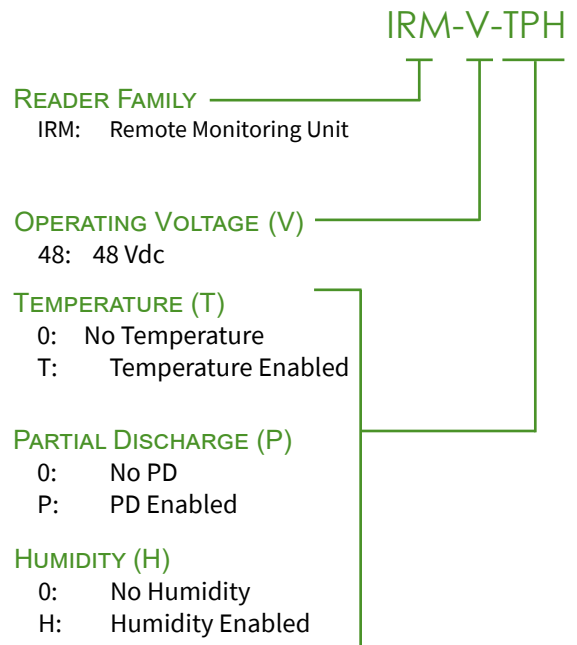
Safety

IntelliSAW systems are installed in close proximity to medium and high voltage electric power equipment. Qualified personnel need to observe industry standard safety practices that will protect the systems and operators from harm due to induced voltages. Proper antenna installation and system safety grounding is crucial to operator safety and system reliability.

Homologation

System integrators and installers are responsible for adhering to all regional regulations concerning the import, installation and operation of IntelliSAW Critical Asset Monitoring systems.

Model Numbers



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