Optimal Performance

IntelliSAW Air Interfaces provide optimal signal performance for measuring passive SAW temperature sensors and detecting Partial Discharge (PD). All air interfaces were designed to provide immunity from induced power frequencies and offer reading distances compatible with basic insulation level (BIL) to 185kV and withstand voltages to 95kV. A combination of air interfaces can be used with the IntelliSAW Critical Asset Monitoring (CAM) platform units and temperature sensors to complete a system for continuous monitoring of electrical power critical assets.

Features:

- Multiple masts to meet asset BIL requirements
- Air interface for Partial Discharge detection (UHF)
- Impedance matched for IntelliSAW systems
- Immunity from induced power frequencies
- Multiple mounting options
MAST AIR INTERFACES

The collection of mast air interfaces were selected for optimal measurement of the frequency bands (425 to 442 MHz) when interfacing with the IntelliSAW passive SAW temperature sensors for installation in many applications.

SPECIFICATIONS

**5cm MAST**
- **Span**: 425 – 442 MHz
- **Return Loss**: -5 dB maximum, see Figure 1 for typical data
- **Gain**: -1 dBi, typical
- **Height**: 62 mm (includes base)
- **Recommended Applications**: SAW sensors: Compact assets

**9cm MAST (STANDARD)**
- **Span**: 425 – 442 MHz
- **Return Loss**: -10 dB maximum, see Figure 2 for typical data
- **Gain**: +1 dBi, typical
- **Height**: 99 mm (includes base)
- **Recommended Applications**: SAW sensors: Variety of Assets - Standard Mast

**17cm MAST**
- **Span**: 425 – 442 MHz
- **Return Loss**: -7 dB, maximum, see Figure 3 for typical data
- **Gain**: +3.3 dBi, typical
- **Height**: 185 mm (includes base)
- **Recommended Applications**: SAW sensors: High BIL, high current assets; extended range

**MAST MOUNT**
- **Impedance**: 50 Ω, nominal
- **Material**: ABS UL 94 V-0, black
- **Dimensions**: 52 W × 60 L × 24 mm H
- **Interface Connectors**: To Mast: RP-SMA Female
  To monitoring unit: SMA Female
- **Mounting**: Magnetic: 4 magnets, > 15 lbf pull strength each
  Bolt-mount: metric M3 or ANSI #6 bolt
- **Operating Condition**: -20°C to +70°C, 10 - 95% RH non-condensing

**TYPE TESTING**
- **IEC 62271-1**: MV Switchgear, Voltage withstand: 95kV/1m, 185kV pulse
RETURN LOSS

Figure 1: 5 cm mast
-12.8 dB, 425 MHz
-5.9 dB, 442 MHz

Figure 2: 9 cm mast
-11.5 dB, 442 MHz
-17.5 dB, 425 MHz

Figure 3: 17 cm mast
-12.7 dB, 425 MHz
-9.0 dB, 442 MHz

MECHANICAL

Mast Length Dependent

60 mm
52
26

24 mm
52
35
8.5
The Critical Asset Monitoring (CAM) Air Interface combines SAW temperature sensing and Partial Discharge detection. This broad band antenna is optimized for UHF radio detection methods at three distinct bands with center frequencies of 300MHz, 600MHz, and 1200MHz while still providing capabilities for SAW sensor detection at 433MHz. The CAM air interface affords multiple opportunities to recognize internal and surface discharges associated with the onset of critical asset insulation failures and to distinguish these events from noise sources.

### SPECIFICATIONS

**CAM (PD AND TEMPERATURE) AIR INTERFACE**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Span</td>
<td>200 MHz – 2 GHz</td>
</tr>
<tr>
<td>Return Loss</td>
<td>See Figure 4 for details</td>
</tr>
<tr>
<td>(1) At 300 MHz</td>
<td>Reflective</td>
</tr>
<tr>
<td>(2) At 425 MHz</td>
<td>-16 dB, max</td>
</tr>
<tr>
<td>(3) At 442 MHz</td>
<td>-10 dB, max</td>
</tr>
<tr>
<td>(4) At 600 MHz</td>
<td>Reflective</td>
</tr>
<tr>
<td>(5) At 1200 MHz</td>
<td>-3 dB, max</td>
</tr>
<tr>
<td>Reflective</td>
<td>-10 dB, max</td>
</tr>
<tr>
<td>Reflective</td>
<td>-3 dB, max</td>
</tr>
<tr>
<td>Gain</td>
<td>+3.5 dBi, typical</td>
</tr>
<tr>
<td>Impedance</td>
<td>50 Ω, nominal</td>
</tr>
<tr>
<td>Dimensions</td>
<td>198 W × 174 L × 43 mm H</td>
</tr>
<tr>
<td>Material</td>
<td>ABS UL 94 V-0, black</td>
</tr>
<tr>
<td>Interface Connector</td>
<td>SMA</td>
</tr>
<tr>
<td>Mounting</td>
<td>Magnetic: 4 magnets, &gt; 28 lbf pull strength each</td>
</tr>
<tr>
<td></td>
<td>Bolt mount: 6x 4.8mm eyelets (magnets must be removed)</td>
</tr>
<tr>
<td>Operating Condition</td>
<td>-20°C to +70°C, 10 - 95% RH non-condensing</td>
</tr>
<tr>
<td>Recommended Applications</td>
<td>Partial Discharge Detection, SAW temperature sensing</td>
</tr>
</tbody>
</table>

### TYPE TESTING

IEC 62271-1

MV Switchgear, Voltage withstand: 95kV/1m, 185kV pulse

[Images of regulatory compliance markings]
RETURN LOSS

Figure 4: CAM Air Interface

MECHANICAL
CAPACITIVE COUPLING AIR INTERFACE

The Capacitive Coupling (CC) Air Interface is ideal for temperature monitoring of Low Voltage systems which often require higher sensor densities with smaller spacing between conductors and enclosure. At voltages below 4kV, the BIL levels are typically below 50kV and the required air gaps are below 60mm, allowing measurements at the reduced spacing while being immune to other nearby sensors. Coupling ranges to CC sensors are up to 60mm (4kV) while coupling to IS sensors are reliable up to 120mm (12kV). Sensors are placed directly in front of the air interface coupling pads, requiring customization of an air interface for each class of equipment.

EXISTING DESIGNS

CC AIR INTERFACE: ASIATIC AND INDO-ASIAN LVDB FUSE HOLDERS

<table>
<thead>
<tr>
<th>Description</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Span</td>
<td>425 MHz – 445 MHz</td>
</tr>
<tr>
<td>Return Loss</td>
<td>Capacitive</td>
</tr>
<tr>
<td>Dimensions</td>
<td>40 W × 470 H × 12 mm D</td>
</tr>
<tr>
<td>Interface Connector</td>
<td>SMA</td>
</tr>
<tr>
<td>Mounting</td>
<td>Three Clips</td>
</tr>
<tr>
<td>Operating Condition</td>
<td>-25°C to +70°C, 10 - 95% RH non-condensing</td>
</tr>
</tbody>
</table>

CUSTOM DESIGNS

Additional designs could include Low Voltage 3 and 4 phase motor control center (MCC) bus bars, compact switchgear (up to 12kV), and other equipment with tight spacing requirements. Contact your local sales representative for details on how to request a quote for a custom capacitive coupled air interface design.
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.

RF CABLES
IntelliSAW uses the highest quality double-shielded coaxial cables to ensure no signal degradation during data acquisition. The cables are assembled with the required SMA connectors to interface from an air interface to IntelliSAW Critical Asset Monitoring (CAM) units and IS485 Readers.

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
Not all model combinations are stocked, please contact sales before ordering.

IA-M-T-C

AIR INTERFACE FAMILY
   IA: IntelliSAW Air Interface

MOUNTING (M)
   MM: Magnetic mount
   BM: Bolt mount
   AF: Asiatic LVDB Fuse Holder Clips

TYPE (T)
   5:  5 cm Mast
   9:  9 cm Mast
   17: 17 cm Mast
   TPD: CAM Air Interface (temperature & PD)
   CC: Capacitive Coupling (temperature)

CABLE LENGTH (C)
   3:  3 meter cable
   5:  5 meter cable
   7:  7 meter cable

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