



## ISG500 SUBSTATION HARDENED INTELLIGENT SENSOR GATEWAY

### FEATURES

- Small Form Factor
- Designed for harsh substation environments (IEC61850-3, IEEE1613)
- Wide operating temperature (- 40°C to +75°C), no fans
- Edge processing analytics, data storage and protocol conversion
- Alarm and event notification

### KEY BENEFITS

- Easy to install
- Connects with existing SCADA, analytics and dashboard systems
- Monitor condition and operation of remote assets
- Track and predict potential problems before failures occur
- Reduce system outages and downtime

The Systems With Intelligence Intelligent Sensor Gateway (ISG500) is a reliable and compact platform that records data from multiple sensing devices and incorporates a suite of sophisticated analytic algorithms for automated monitoring. The ISG500 features flexible networking capabilities and provides automated alarm and event notification to reduce the need for continuous monitoring. Local archiving capacity up to 1 Terabytes allows for over 30 days of local data storage.

The ISG500 is easy to use, with simple “plug-n-play” functionality that minimizes installation time and costs. The ISG500 is ideal for applications at remote sites that are managed from a central location. It can be powered from alternatives sources (e.g. solar panels) and its small form factor makes it perfect for stand alone installations.

The ISG500 has been designed specifically for harsh environments found in electric utility applications, considering the presence of high levels of EMI, voltage fluctuations and wide temperature ranges.

# FRONT & REAR DIAGRAM

## Dimensions (HxWxD):

- 6.34in (161mm) x 3.72in (94.5mm) x 5.44in (138.2mm)

## HDMI

- HDMI Interface

## USB

- 2 x USB 2.0 Ports

## Ethernet

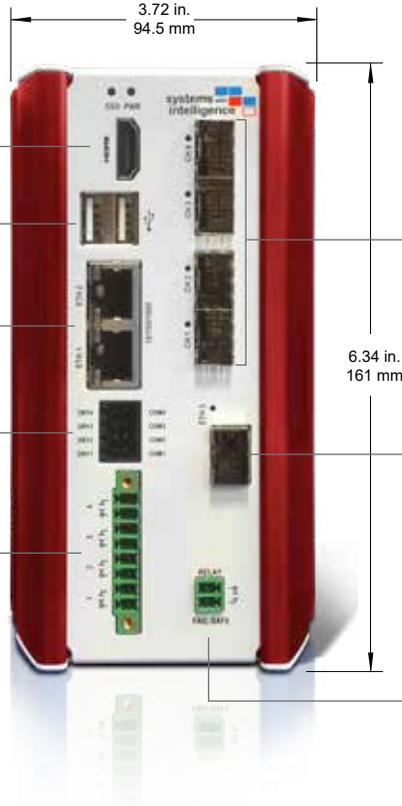
- 2 x 10/100/1000 BaseTX Ethernet Ports

## Digital Inputs

- 4 x Digital Inputs

## Digital Outputs

- 4 x Digital Outputs



## Substation Hardened

- IEC 61850-3, IEEE 1613, C37.90
- -40°C to +75°C

## Ethernet Ports

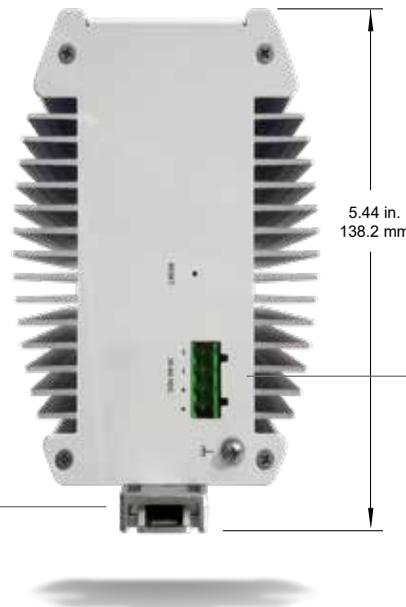
- Ethernet Ports for Sensor Support

## Wide Area Network

- 10/100/1000 BaseFX Ethernet Port
- WiFi Interface\*
- Cellular Interface\*
- LORA Radio\*

## FAIL SAFE

- Fail Safe Relay



## Mounting

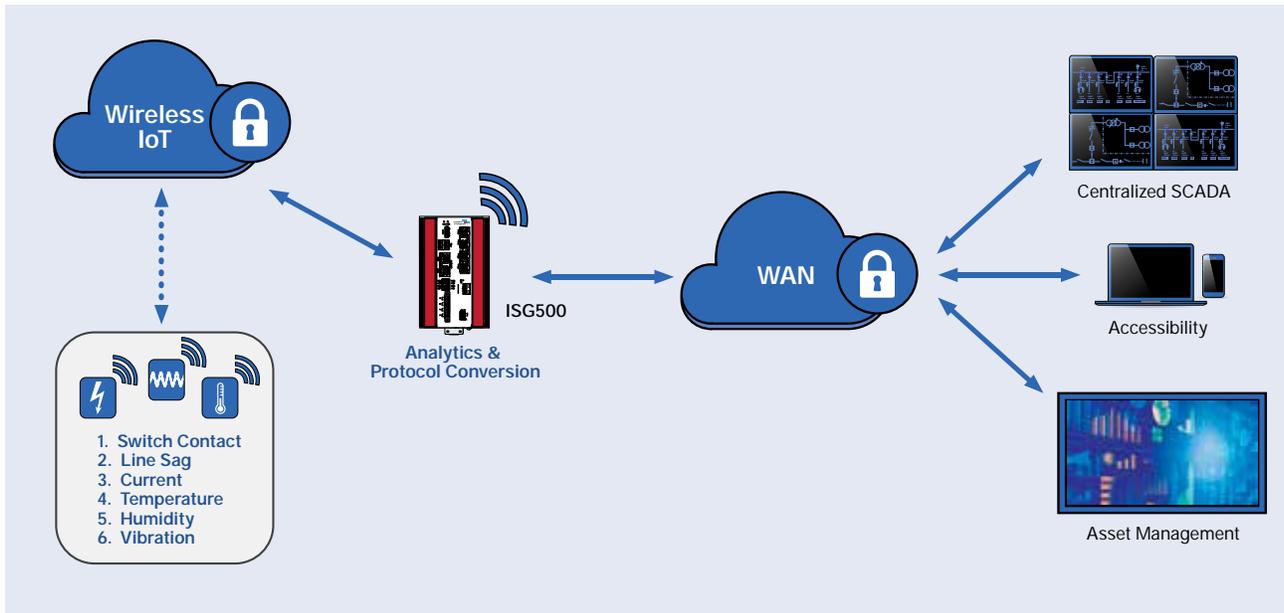
- DIN rail mounts

## Redundant Power Input

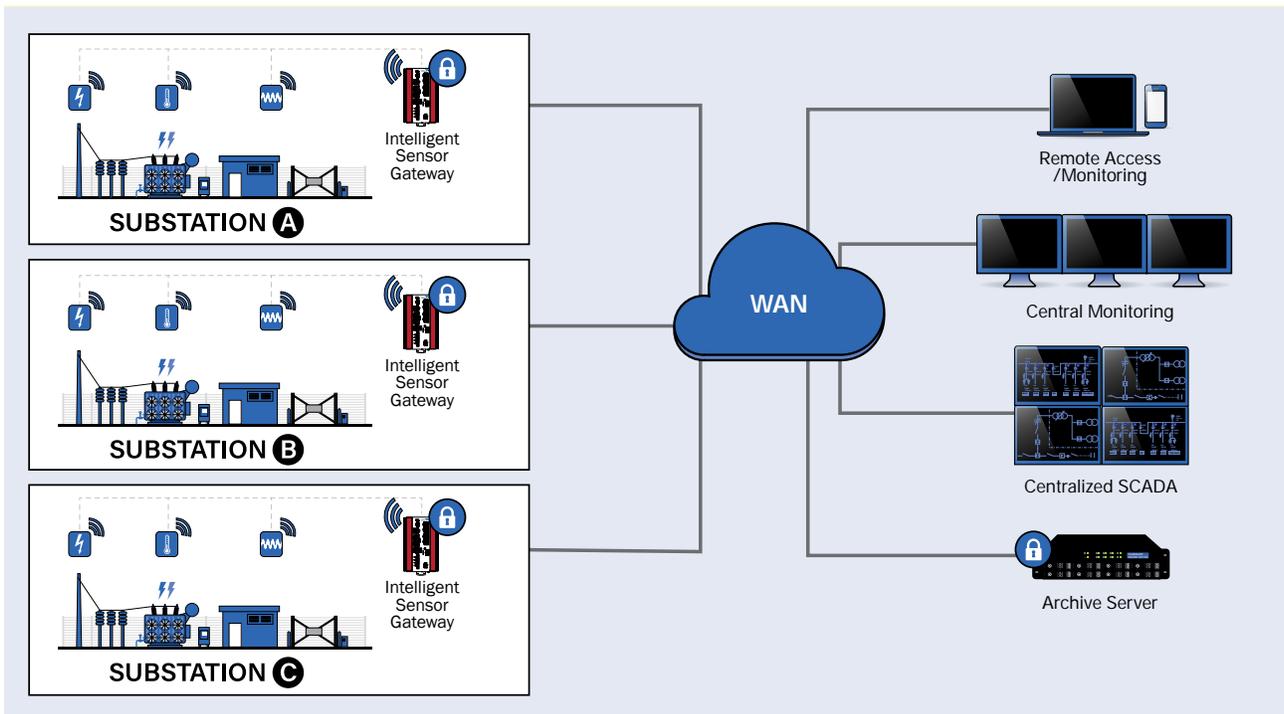
- 20VDC-60VDC

\* Future option available soon.

# SUBSTATION MONITORING ARCHITECTURE



# DISTRIBUTED ARCHITECTURE



## IS2000

The IS2000 Sensor and Data Management System is the server software that resides on the Intelligent Sensor Gateway. The IS2000 provides the interface between remote sensor devices and central monitoring and control platforms. The protocol conversion provides a common interface from the edge devices to SCADA, GIS, maintenance / operations analytics and dashboards. The IS2000 software records sensor data, processes it using local analytics, determines if a rule has been broken, then sends real-time alerts to the operator through email or the management system. The data is stored in the local ISG database for archiving and post event investigation. The IS2000 software provides the control and management of the digital I/O interfaces to allow integration of other peripheral devices and monitoring equipment.

### KEY FEATURES INCLUDE:

#### **Real-time monitoring over the network**

- The IS2000 software can capture real time data from multiple sensors that can be monitored over any IP network. It provides an interface that can connect to central management, GIS and O&M systems to analyze and store data and present it in a graphical format.

**Alarm and Event Notification** • The IS2000 software has a comprehensive set of configurable analytic alarms and can be configured for each sensor. An extensive set of system event and alarms are provided to help in the overall system management. When an alarm event occurs, the IS2000 software performs one or more of the following actions:

1. Update the alarms database with a record of the time, alarm message and event data..
2. Send an alarm notification to the management systems.
3. Send an email notification with the absolute values and metadata of the event.

#### **SCADA / GIS / Management Integration**

- A DNP interface is available to enable seamless integration of alarms into third party management, control and visualization applications.

**Digital I/O** • Utilize 4 digital inputs and 4 digital outputs available on the ISG. The user can then incorporate control logic into the monitoring system. Input analytics can be included in the rule sets, while outputs can be used to control other devices or interact with a Remote Terminal Unit (RTU).

## ANALYTICS

The IS2000 software incorporates a wide range of analytics designed to support the operations in electrical substations.

Analytics monitor the feeds from the sensors and triggers alarms based on user defined rules. For example:

- Monitor for gas leaks from breakers and switches
- Monitor the vibration on a transformer
- Monitor the status of a switch
- Monitor the temperature of components in a substation

A lot of attention and time is required to keep track of events 24/7. Systems With Intelligence analytics introduces a way to manage tasks and automate them to free up operators' time and make monitoring more efficient.

All the tasks mentioned above (and more) can be tracked by the IS2000 software. The operator can set up rules that describe what it is going to be monitored. Rules are simple sets of specifications that say what to look for, where to look for it, and what to do if it happens. If, for example, the operator sets up a rule to watch for an operating temperature range, the IS2000 software will analyze the data and notify the operator if the threshold has been crossed.

Analytics work by looking at data, and analyzing it in real-time. This means that there is no delay between an event and the reaction to it. In other words, the analytics process data on the fly, the same way as would an operator looking at a SCADA monitor.

## OTHER BENEFITS WITH VIDEO AND THERMAL ANALYTICS

**Reduce Network Bandwidth** • Streaming data over a network gives rise to many bandwidth and network resource issues. In many cases, and in particular for remote locations, continuously transmitting data over a wide area network is not practical. In this case, local analytics can be used to decide when to transmit data. For example, when a switch contact is closed, the data can be transmitted to an operator to confirm the operation. Bandwidth and network resources are preserved and only used when an event of interest occurs. Analytics can provide effective monitoring of remote locations that may only have limited network connectivity available.

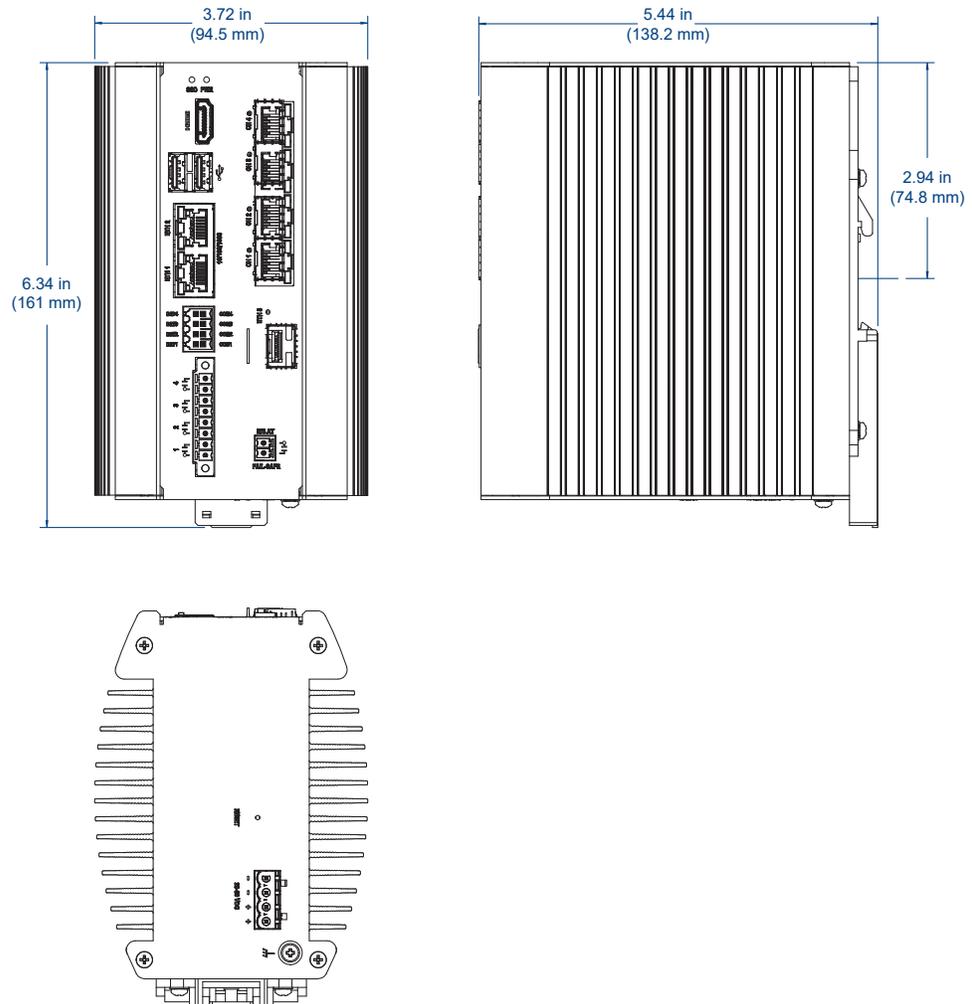
**Proactive Maintenance** • Analytics can be used to constantly monitor operations and detect anomalies that could lead to problems in electrical substations or industrial sites. Temperature analytics, for example, can flag issues with critical components at an early stage, like loose or dirty connections in the bushing of a breaker or a transformer, providing operation managers with enough time to prepare a maintenance plan for that component. Temperature measurements can also be used to create models that help predict when a component might fail. A proactive maintenance plan, instead of a reactive one, will reduce operational costs as it optimizes valuable company resources and reduce operation downtime.

# TECHNICAL SPECIFICATIONS

SPECIFICATIONS	
Video Output	<ul style="list-style-type: none"> <li>• 1 HDMI interface for computer monitor</li> </ul>
USB	<ul style="list-style-type: none"> <li>• 2 USB 2.0 Ports</li> </ul>
Storage	<ul style="list-style-type: none"> <li>• Up to 1TB</li> </ul>
LAN Interface	<ul style="list-style-type: none"> <li>• Included: 2-port 10/100/1000TX RJ45 Interface</li> <li>• Optional: 4-ports 10/100TX RJ45 or 100FX Fiber Interface</li> </ul>
Optional Modules	<ul style="list-style-type: none"> <li>• Ethernet: 1-port 1000FX Fiber Interface</li> <li>• Wireless: 802.11 b/g*, Cellular Modem*, LORA radio*</li> </ul>
Power Supply	<ul style="list-style-type: none"> <li>• 20VDC - 60VDC</li> </ul>
Operating Temperature	<ul style="list-style-type: none"> <li>• -40 °C to +75 °C; no cooling fans</li> </ul>
EMC/EMI	<ul style="list-style-type: none"> <li>• IEC 61850-3; IEEE 1613; IEC 61000-6-2; IEC 61800-3</li> </ul>
Mounting/Dimensions	<ul style="list-style-type: none"> <li>• DIN mountable</li> </ul>
Warranty	<ul style="list-style-type: none"> <li>• 2 Years</li> </ul>

\* Future option available soon.

## DIMENSIONS Unit: inches (mm)



# CONFIGURATION

## ISG500 INTELLIGENT SENSOR GATEWAY

**Example:** ISG500-MO-HD-S1-S2

### BASE UNIT and all standard items (not listed in the options):

ISG500	Base Unit and all standard items (not listed in the options):
	<ul style="list-style-type: none"> <li>• 1 HDMI interface for computer monitor</li> <li>• 2 USB ports</li> <li>• 2 x 10/100/1000 BaseTX Ethernet Port</li> <li>• 4 dry contact, current loop inputs</li> <li>• 4 relay switch output (30VDC, 1 Amp / 50VAC, 5 Amp)</li> <li>• Fail Safe Relay</li> </ul>

### MO - Mounting Option

DM	DIN mounting bracket
XX	None

### HD - Drive for Storage

HD001*	256GB Drive
HD002*	500GB Drive
HD003*	1TB Drive
XXX	None

\* Drive sizes are approximate and subject to change without notice. Contact factory for exact size.

### S1 - Input Module

4C01	4x 10/100TX Port IP Input card (RJ45)
4F01	4x 100FX Port IP Input Card (LC, Multimode, 850nm)
4F00	4x 100FX Port IP Input Card (Blank SFP Slots)

### S2 - WAN Interface

F000	1x 1000FX Port (SFP - Blank)
F010	1x 1000FX Port (LC, Multimode, 1300nm)

## IS2000 SERVER SOFTWARE

### INTELLIGENT SENSOR MANAGEMENT SOFTWARE

IS2000	Sensor Management Software that resides on the ISG
--------	--





Systems With Intelligence Inc.  
6889 Rexwood Road, Unit #9  
Mississauga, Ontario, CANADA  
L4V 1R2

Tel: +1-289-562-0126  
Fax: +1-289-562-0152

**General Inquiries:**  
[info@SystemsWithIntelligence.com](mailto:info@SystemsWithIntelligence.com)

**Sales Inquiries:**  
[sales@SystemsWithIntelligence.com](mailto:sales@SystemsWithIntelligence.com)

**Product Support:**  
[support@SystemsWithIntelligence.com](mailto:support@SystemsWithIntelligence.com)

All specifications in this document are subject to change without notice.

© Copyright 2017 Systems With Intelligence Incorporated. All rights reserved.