

# SCADA Security System Solution

Emerson Process Management is taking a leadership role in addressing the need for cost effective solutions for security management in the Water, Wastewater and energy industries. There is an increasing demand for these solutions resulting from government regulations regarding security and the general awareness of facility security issues by company management and engineers. In an effort to meet these regulations most public companies have already tightened physical security by installing fences, improving lighting and locking doors. Many have increased the number of manned patrols.

Now, as new plants are built and existing plants are upgraded or expanded, engineers are looking at ways to improve and integrate security with operations. They are finding that the most effective and economical way to do this is by integrating the security and operation functions into the SCADA system.

Emerson provides an integrated solution to meet these requirements with the following components:

- Bristol® ControlWave® or ControlWave Micro PLC/RTU
  - Packaged PLC/RTU with optional communication interfaces
  - Time-stamped alarming, audit logging and historical data storage
- Security Vision application package
  - Pre and post event video capture and replay
  - Pre-programmed function block provides all video file/folder manipulation
- Facility access control, database management and reporting
  - OpenBSI Utility for collection and replay of captured events
- IP enabled network video camera with FTP server
- Keyless door entry access control with proximity card readers

- Intrusion/motion detection and reporting
- Selection of common motion sensors

## ControlWave Micro Package

The ControlWave Micro Security Package has been designed, built and wired to minimize installation time and cost. It includes a 4 or 8 slot ControlWave Micro, power and distribution system, industrial Ethernet switch and optional communication system in an outdoor enclosure.

The package also includes a power supply with outputs for 12V and 24Vdc. The 24V output is used to power the RTU/PLC and external field devices. The 12V output can be used to power external radios and also the cameras. Fourteen Amp Hour battery backup is provided to ensure security function operation, including video storage, in the event of AC power disruption.



## Security Vision Solution CD

Security Vision is a complete video capture, logging, and replay application for ControlWave and ControlWave Micro. It includes a ControlWave Designer User Defined Function Block allowing the application to be easily added to any ControlWave program. This function block automatically handles all folder and file manipulation as well as facility access control.

Security Vision also includes the OpenBSI Utility to view the captured event images. Upon receiving the time stamped event alarm notification, the entry will be added to the event list in the Security Vision window. Selecting the event will initiate scrolling of the event file images.

## IP Network Camera

There are numerous compatible cameras available. Selection of a video camera really depends on the specific application. The main factor to consider is whether it will be mounted indoors or outdoors. The camera must support FTP via IP and Ethernet is the preferred communication media between the camera and the ControlWave. In addition to FTP of the periodic snapshot, most cameras also provide live video display via web browser with a provided Active X control.

Security Vision was tested with the Axis 210 (indoor), 211 (outdoor) and 221 Day/Night (outdoor) cameras. Specifications are available at [www.axis.com](http://www.axis.com).

One or more AXIS cameras can be networked to a single ControlWave via Ethernet. A typical application will utilize from one to four cameras in a location. In an application with a single camera connected to a ControlWave, an Ethernet crossover cable can be used for the physical connection. However, whenever there is more than one camera, or any additional Ethernet communication connections are required, an Ethernet Hub or switch is used with standard Cat 5 cables.



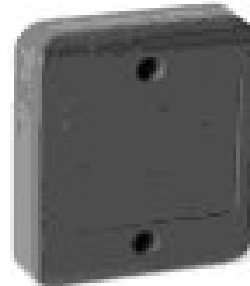
## Proximity Card Readers

Emerson and ISONAS Security Systems, have partnered to integrate real-time facility access control to the ControlWave SCADA system. Security Vision supports the ISONAS serial, Ethernet IP and wireless IP Proximity card readers.

Serial Readers connect to an RS485 2-wire network. This model offers point-to-point and multi-drop connections directly to the ControlWave RS485 ports.

Wired and wireless IP readers communicate on the network using an industry-standard TCP/IP protocol. They are compatible with whatever is already connected and running on the network because they behave like all other IP network devices.

Additional information is available from ISONAS at [www.ISONAS.com](http://www.ISONAS.com).



## Motion Detectors

Motion detectors come in a very wide range of products with varying features. Emerson has selected some commonly used sensors for indoor wide angle detection and outdoor narrow angle detection. These sensors provide a discrete contact closure output that is wired directly to a ControlWave digital input to initiate a time-stamped alarm, trigger the Security Vision logging of event images and launch process control or security measures.



## Intrusion Detection and Contact Switches

The most basic security measures are in the form of contact and magnetic switches (or “intrusion sensors”) for a gate, building door and the RTU enclosure door. These alarm devices are widely available and can be easily wired to digital inputs on the RTU. Multiple switches may also be wired in series to a single ControlWave digital input, with a normally closed contact. They simply allow the RTU to report an alarm if any switch is opened. Since there are literally hundreds of switches to choose from depending on the location, position and mounting method, Emerson recommends careful evaluation of the location and mounting requirements for these switches and purchasing from a security system supplier.

## Useful resources

[www.SecurityIdeas.com](http://www.SecurityIdeas.com)

Video, motion detection CATV, etc.

[www.AXIS.com](http://www.AXIS.com)

IP Network cameras

[www.ExtremeCCTV.com](http://www.ExtremeCCTV.com)

IR Illuminators

[www.ISONAS.com](http://www.ISONAS.com)

IP Network cameras

[www.AlarmContacts.com](http://www.AlarmContacts.com)

Door and window intrusion switches

[www.PlantData.com](http://www.PlantData.com)

Cyber security specialists

**AXIS Cameras**



	<b>AXIS 210</b>	<b>AXIS 211*</b>	<b>AXIS 221*</b>
Image sensor	1/4" Sony Wfine progressive scan RGB CCD	1/4" Sony Wfine progressive scan RGB CCD	1/3" Sony Wfine progressive scan RGB CCD
Day & Night functionality			√
Lens	4.0 mm/F2.0, fixed iris, CS mount	Varifocal3.0-8.0 mm/ F1.0 DC-iris lens, CS mount	Varifocal3.0-8.0 mm/ F1.0 DC-iris lens, CS mount
Light sensitivity (lux)	3-10,000	0.75	0.65 (Color)0.08 (B/W)
Video compression	Motion JPEG,MPEG-4	Motion JPEG,MPEG-4	Motion JPEG,MPEG-4
Max video resolution(pixels)	640x480	640x480	640x480
Frames per second	Up to 30, for all resolutions	Up to 30, for all resolutions	Up to 45, for all resolutions
Audio support			
Alarm inputs/ outputs	1/1	1/1	2/1
Motion detection	√	√	√
Security	Multi-level password, IP address filtering	Multi-level password, IP address filtering	Multi-level password, IP address filtering, HTTPS encryption
Lens changeable			
Ethernet networks	10BaseT/100BaseTX	10BaseT/ 100BaseTX	10BaseT/ 100BaseTX,
Power over Ethernet(IEEE 802.3af)		√	√
Modem support			
Serial Connectors			RS-232,RS-485/422

IR Illuminators

Emerson offers two different LED-based IR illuminators for use with the Day/Night Cameras. LED illuminators are recommended over bulb type illuminators to lower maintenance and bulb replacement cost. IR illuminators emit infrared light that is invisible to the naked eye. IR illuminators improve image quality in low-light situations and in complete darkness. They are recommended in low light locations where it would be difficult to read a book or newspaper.

The 850 nm LEDs display a faint red hue. The faint red hue is only visible at the illuminator bulb and is not projected into the coverage area.

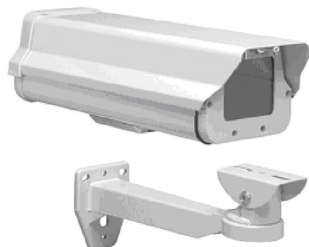
Illuminator model	Type	Range AXIS 221 Day & Night
LED IR Illuminator 850nm 30°	semi-covert	60 feet(23.6 m)
LED IR Illuminator 850nm 60°	semi-covert	45 feet(17.7 m)

nm = nanometer wavelength of LED, light emitting diode



Outdoor Housing

Emerson offers Wall mount housings for the AXIS indoor and outdoor cameras providing flexibility in mounting location. Outdoor packaging includes the optional heater and blower to extend the operating temperature range.



Indoor/Outdoor Camera housing. Wall mount with optional heater/blower.

Proximity Card Readers

ISONAS card readers operate with RFID proximity cards. There are two popular card types. The first is a credit card size plastic card and the second is a Keyfob card.

The RFID cards contain no personal information so there is no way to obtain security information from a lost or stolen card.

Cards and card readers are available from ISONAS standard format and also a widely used standard HID format.



Keyfob

Isonas IP Readers

Wired and wireless IP readers communicate on the network using an industry-standard TCP/IP protocol. They are compatible with whatever is already connected and running on the network because they behave like all other IP network devices.

Wired IP Readers connect to any Ethernet network with a standard RJ45 connector. These IP readers are usually selected by organizations who are using standard copper or fiber optic Ethernet networks in their buildings and demand access control consistent with the reliability, simplicity and speed afforded by the network.

The Wireless IP Reader connects to any WiFi network utilizing the IEEE 802.11b standard. These wireless readers can be used at any time, any place within range of a wireless router and are well suited for customers who want powerful door control but do not want the additional cost and complication associated with hard wiring.

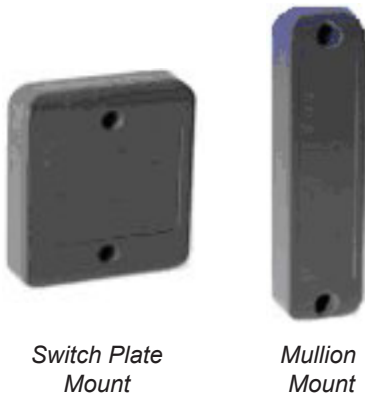
## Isonas Serial Readers

Serial Readers connect to an RS485 2-wire network. This model offers point-to-point and multi-drop connections directly to the ControlWave RS485 ports.

## Mounting Styles

ISONAS card readers are available in Switch Plate and Mullion mounting styles. The Switch Plate style conveniently mounts to a standard electrical box while the Mullion style is designed to mount to a Mullion (door frame). Both styles are intended for indoor and outdoor use. The card readers include tamper switch, door open sensor, remote exit and AUX inputs. All provide notification through Security Vision.

Both styles come with pigtailed wires for wiring into a terminal strip in an electrical panel.



## Motion Detectors

Optex's LX-402 and LX-802N are ideal for Outdoor annunciation, activation, and automation applications. Available in 40'x50' (120°) or 80'x6' patterns, these detectors feature special UV resistant lenses and casings for outdoor use. LX Detectors also feature an easy Pet Alley adjustment, selectable sensitivity and pulse count, extra strong Sunlight & RFI Immunity, built-in photocell, and Form C relay output.

The Optex VX-402 is suitable for almost all outdoor applications because it combines two PIRs, creating extra high immunity against false alarms caused by small animals, cars, and other outdoor disturbances. Easy wiring and a 90° wide angle detection pattern with 180° aiming are significant advantages that VX-402 brings to outdoor security. VX-402 also includes temperature compensation circuitry, high RFI and Sunlight immunity, Form C relay, adjustable photocell, sequential logic circuit, and many other features for quality outdoor performance.

For increased flexibility, the VX-402REC version allows the user to record a customized voice message and play it back whenever motion is detected. By using either the built-in microphone or external recording equipment such as a PC, the VX-402REC can be easily programmed in any language, and is suitable for various detection sequences, guaranteeing the best voice message for each application.

The VX-402R version is a wireless, multi-stabilized outdoor detector with 100 lb. pet immunity. The VX-402R is compatible with most manufacturers' wireless technology and comes with a weatherized back box for easy installation. This battery operated detector provides a 40 ft by 40 ft detection pattern and is completely weatherized for direct exposure to harsh weather conditions.



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