



DVS500 SUBSTATION HARDENED DIGITAL VIDEO SERVER

FEATURES

- Small Form Factor
- Designed for harsh substation environments (IEC61850-3, IEEE1613)
- Wide operating temperature (- 40°C to +75°C), no fans
- Integrated analytics for automatic monitoring
- Alarm and event notification

KEY BENEFITS

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

The Systems With Intelligence Digital Video Server (DVS500) is a reliable and compact platform that records data from multiple video and thermal cameras and incorporates a suite of sophisticated analytic algorithms for automated monitoring. The DVS500 features flexible networking capabilities and provides automated alarm and event notification to reduce the need for continuous monitoring. Local archiving capacity up to 1 terabyte allows for over 30 days of local data and video storage.

The DVS500 is easy to use, with simple “plug-n-play” functionality that minimizes installation time and costs. The DVS500 is ideal for applications at small remote sites that are managed from a central location. It can be powered from alternative sources (e.g. solar panels) and its small form factor makes it perfect for stand alone installations.

The DVS500 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

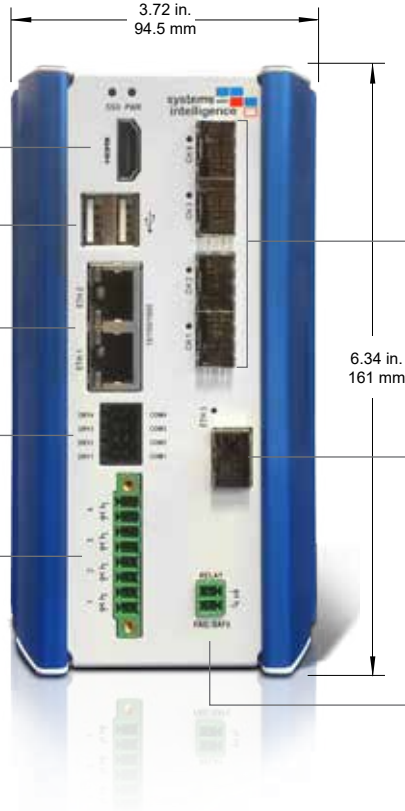
- 2 x 10/100/1000 BaseTX Ethernet Ports

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

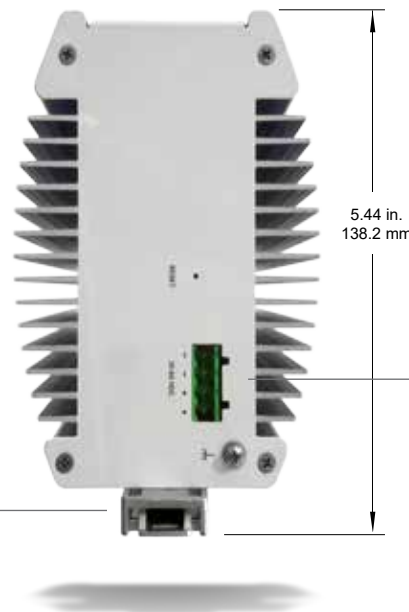
- Ethernet Ports for IP Camera Support

Wide Area Network

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

FAIL SAFE

- Fail Safe Relay



Redundant Power Input

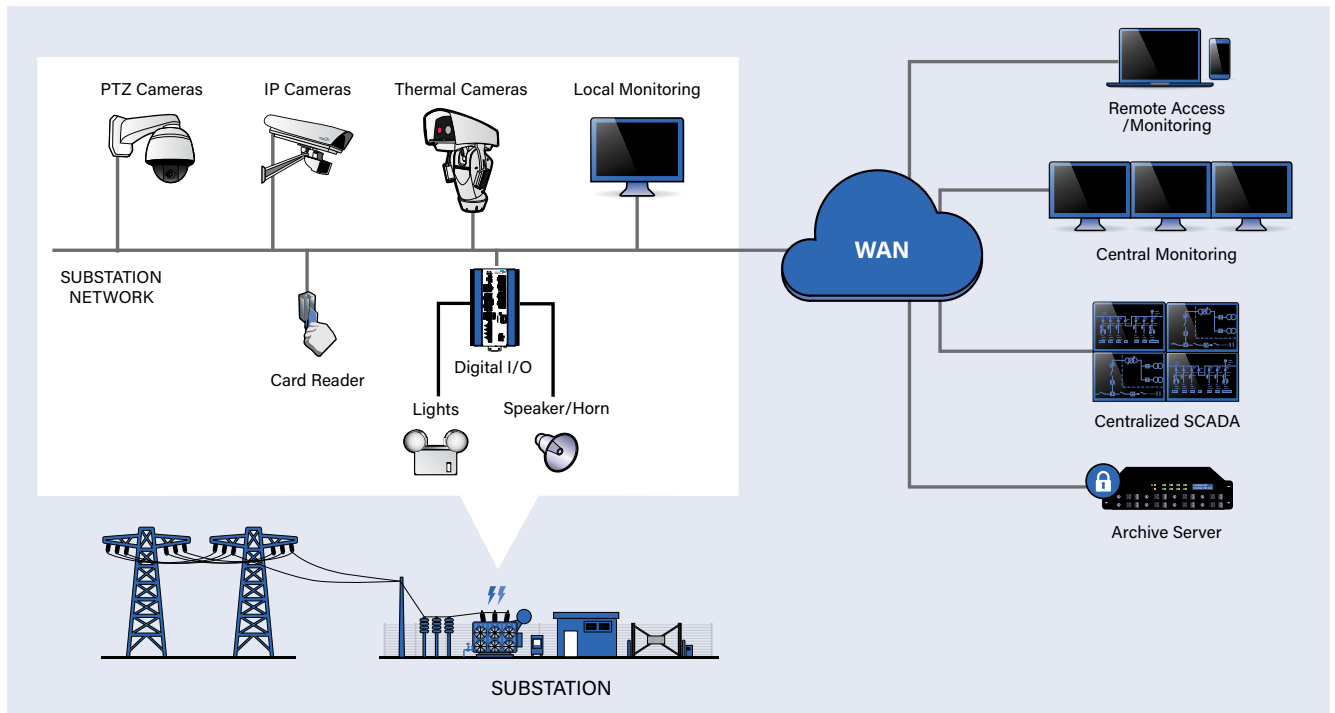
- 20VDC-60VDC

Mounting

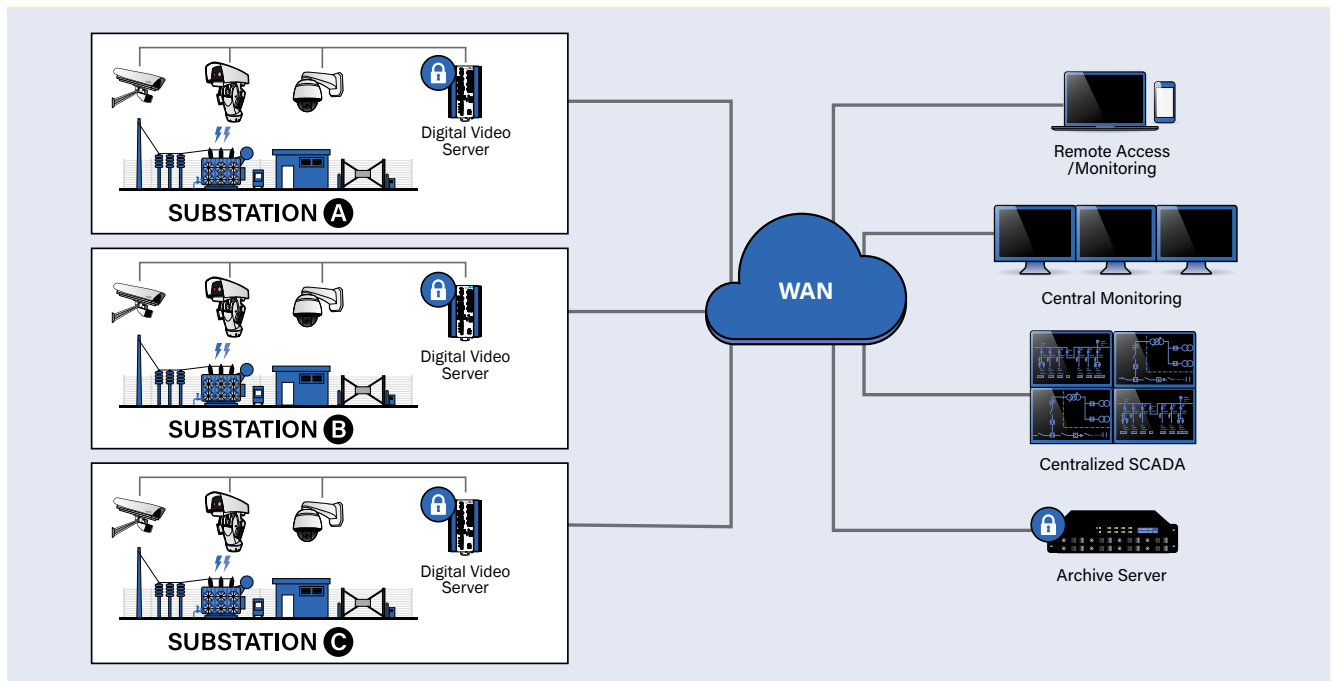
- DIN rail mounts

* Future option available soon.

SUBSTATION MONITORING ARCHITECTURE



DISTRIBUTED ARCHITECTURE



VMS2000 SOFTWARE

The VMS2000 Video and Data Management System is the software behind the monitoring solution that consists of Server software on the Digital Video Server , (DVS), and Client software on a remote Windows PC. VMS2000 Server software records video and thermal images, analyzes them using unique analytics, determines if a rule has been broken, then sends real-time alerts with an image to the operator. The video and data are also stored in the DVS for archiving and investigation. The VMS Server software is also responsible for streaming the video feeds to the VMS Client, providing PTZ control and managing digital I/O interfaces to allow integration of physical security devices and other monitoring systems..

KEY FEATURES INCLUDE:

Real-time monitoring and remote control over network • The VMS2000 software can capture live video from up to 4 cameras and real time data from multiple sensors, that can be monitored over any IP network. It also provides a graphical management interface to remotely control and configure connected devices.

H.264 Compression Technology • The VMS2000 supports H.264 AVC/SVC and JPEG encoding. H.264 compression provides the best image quality at the lowest possible bandwidth and storage requirement.

Alarm and Event Notification • The VMS2000 software has a comprehensive set of configurable analytic alarms and can be configured for up to ten rule sets per channel. An extensive set of system event and alarms are provided to help in the overall system management. When an alarm event occurs, the VMS2000 software performs one or more of the following actions.



VMS2000 Client Main Screen.

1. Update the alarms database with a record of the time, alarm message and event image.
2. Send an alarm notification to the VMS clients.
3. Send an email notification with a snapshot of the event.

SCADA Integration • A DNP interface is available to enable seamless integration of alarms into third party SCADA applications.

Digital I/O • Utilize 4 digital inputs and 4 digital outputs available on the DVS. 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 (such as turning on lights or sounding a horn) or interact with a Remote Terminal Unit (RTU).

ANALYTICS

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

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

- Position of disconnect switches
- Transformer bushings, cooling fans and radiators
- Connections points on current and voltage transformers, arrestors and insulators
- Solar panel arrays
- Motion detection

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 VMS2000 software. The operator can set up rules that describe what 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 monitor a transformer temperature, the VMS2000 software will analyze thermal data and notify the operator when the temperature crosses the threshold.

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.

AVAILABLE ANALYTICS FUNCTIONS			
Motion Detection	Detect motion in a specified field of view	Arc Flash	Determine if an Arc Flash has occurred
Directional Motion	Monitor a perimeter for any intrusion (one direction)	Switch Operation	Determine if a switch has operated
Bidirectional Motion	Monitor a perimeter for any intrusion (both directions)	Absolute Temperature	Determine if temperature passes a threshold
Loitering Detection	Determine if people are loitering near a restricted area	Delta Temperature	Compare the temperature between two objects
Camera Tampering	Determine if a camera has been compromised	Temperature Fluctuation	Alarm when the temperature changes too fast

OTHER BENEFITS WITH VIDEO AND THERMAL ANALYTICS

Reduce Network Bandwidth • Streaming video over a network gives rise to many bandwidth and network resource issues. In many cases, and in particular for remote locations, continuously streaming video over a wide area network is not practical. In this case, video analytics can be used to decide when to transmit video. For example, when a person enters a field of view where no one should be present, a small video clip can be transmitted to an operator for remote viewing. Bandwidth and network resources are preserved and only used when an event of interest occurs. Video analytics can provide effective monitoring of remote locations that may only have limited network connectivity available.

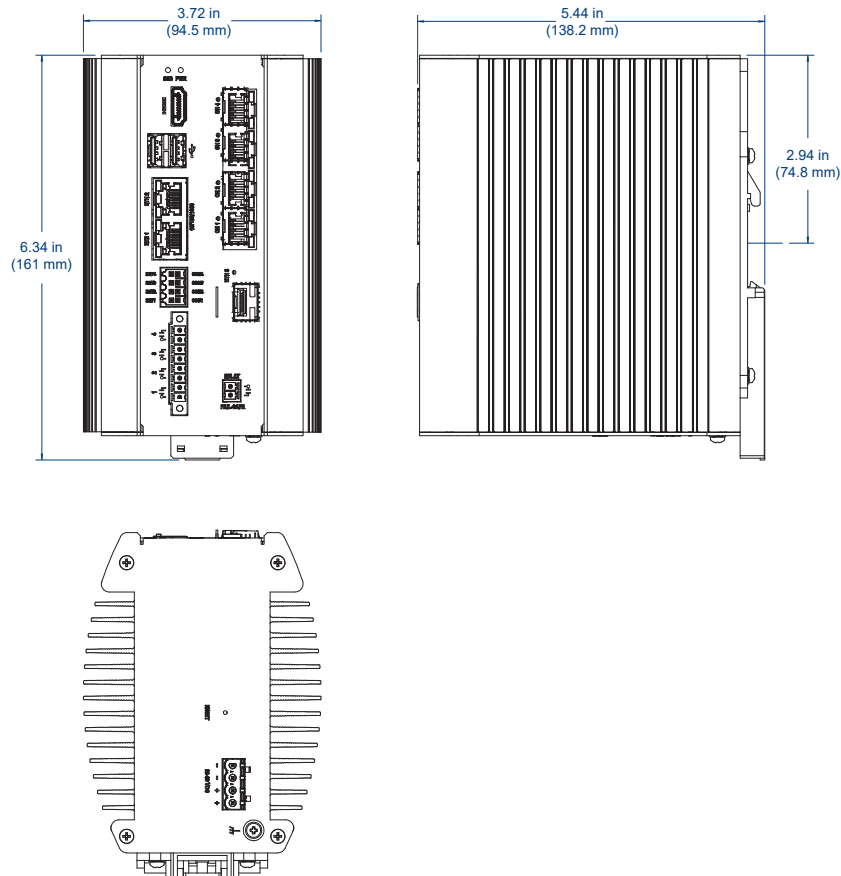
Proactive Maintenance • Video and thermal analytics can be used to constantly monitor operations, detecting anomalies that could lead to problems in electrical substations or industrial sites. Thermal analytics, for example, can flag issues with critical components at an early stage, like loose or dirty connections in the bushing of a breaker or a transformer, providing operation managers with enough time to prepare a maintenance plan for that component. Thermal 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 reduces operational downtime.

TECHNICAL SPECIFICATIONS

SPECIFICATIONS	
IP Cameras	<ul style="list-style-type: none"> Up to 4 IP cameras can be connected to the DVS IP Camera support for leading manufacturers (Contact Systems With Intelligence for the latest list of supported IP Cameras) H.264 video streaming Resolution and frame rate dependant on IP camera used HD and megapixel images supported ONVIF IP Camera Support
CPU	<ul style="list-style-type: none"> Atom E3845, 1.91GHz**
RAM	<ul style="list-style-type: none"> 4GB DDR3L**
Power	<ul style="list-style-type: none"> 30W Max.
Video Output	<ul style="list-style-type: none"> 1 HDMI interface for computer monitor
USB	<ul style="list-style-type: none"> 2 USB 2.0 Ports
Storage	<ul style="list-style-type: none"> Up to 1TB
LAN Interface	<ul style="list-style-type: none"> Included: 2-port 10/100/1000TX RJ45 Interface Optional: 4-ports 10/100TX RJ45 or 100FX Fiber Interface
Optional Modules	<ul style="list-style-type: none"> Ethernet: 1-port 1000FX Fiber Interface Wireless: 802.11 b/g*, Cellular Modem*
Power Supply	<ul style="list-style-type: none"> 20VDC - 60VDC
Operating Temperature	<ul style="list-style-type: none"> -40 °C to +75 °C; no cooling fans
EMC/EMI	<ul style="list-style-type: none"> IEC 61850-3; IEEE 1613; IEC 61000-6-2; IEC 61800-3
Mounting/Dimensions	<ul style="list-style-type: none"> DIN mountable
Warranty	<ul style="list-style-type: none"> 2 Years

* Future option available soon.
 ** Other CPU models and RAM are available. Please contact Systems with Intelligence for more information.

DIMENSIONS Unit: inches (mm)



CONFIGURATION

DVS500 DIGITAL VIDEO SERVER

Example: DVS500-MO-HD-S1-S2

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

DVS500	Base Unit and all standard items (not listed in the options):
	<ul style="list-style-type: none"> • 1 HDMI interface for computer monitor • 2 USB ports • 2 x 10/100/1000 BaseTX Ethernet Port • 4 dry contact, current loop inputs • 4 relay switch output (30VDC, 1 Amp / 50VAC, 5 Amp) • Fail Safe Relay

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⁽¹⁾ - Camera Input Module

4C01	4x 10/100TX Port IP Camera Input card (RJ45)
4F01	4x 100FX Port IP Camera Input Card (LC, Multimode, 850nm)
4F00	4x 100FX Port IP Camera Input Card (Blank SFP Slots)
SXXX	None

S2 - WAN Interface

F000	1x 1000FX Port (SFP - Blank)
F010	1x 1000FX Port (LC, Multimode, 1300nm)
XXXX	None

VMS2000 SERVER SOFTWARE

VIDEO MANAGEMENT SOFTWARE

VMS2000S	VMS2000 Server Software that resides on the DVS
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Contact Systems With Intelligence for VMS2000 Server software camera licensing options.

⁽¹⁾ IP CAMERA NOTES:

- The IP Camera Input Module in the S1 option will provide direct connection from an IP camera directly to the DVS which will reduce overall network bandwidth requirements.
- Contact Systems With Intelligence for the latest list of supported IP cameras.



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