

Services+ Remote Engineering

Visor Remote Monitoring & Diagnostics for Drives & Automation Systems



DIGITAL

gepowerconversion.com



If you're looking for ways to reduce downtime and enhance the performance of operations and assets, GE Power Conversion's simple suite of clever software applications can help. Its flexibility includes 'on-prem' and cloud-based options which help to optimize operations and energy, and enable predictive maintenance and cyber-secure service solutions.

Services+ Access remote services and experts for on-tap asset health support.

Services+ helps to extend your organization's capability and resource with a 'lean' mindset. It's about tapping into GE expertise at the point you need it, and includes our remote engineering solution for remote monitoring, diagnostics and support

Services+ is how we integrate the best of digital technology for a quicker, smarter way of accessing GE's Power Conversion business regular range of service and support capabilities.



Safe and Secure

GE's Power Conversion business already provides you with drives and automation control systems. Now, your systems can be remotely monitored—and issues diagnosed—safely and securely through Services+ Visor Remote Monitoring & Diagnostics (RM&D) system.

Services+ Visor RM&D consists of:

- Visor Connect Box (VCB). The compact VCB is installed at your site to monitor control system devices. It hosts integrated Data Historian and Engineering servers that provide a repository for control system data as well as project and engineering information. GE Engineers can access all of this information remotely via a secure site connection.
- Visor Service Portal (VSP). GE's VSP provides GE engineers a secure gateway for remote support and monitoring of assets.

Our system security follows best practices, including the use of hardware firewalls to create a demilitarized zone (DMZ) to isolate the control networks from external networks. Remote connectivity is performed via a single secure encrypted tunnel to the site.



VISOR SYSTEM ARCHITECTURE



VISOR SERVICE PORTAL (VSP) MAP VIEW



FLEET DATA FED BY VSP

Help Meet Your Complete Needs, Visor is Available in Three Versions:

- **Read-Only Visor.** This version allows GE engineers remote viewing of application software and extraction of files. To comply with some industry practices.
- **Dedicated Write-Enabled.** This version of RM&D is for customers who would like GE to conduct remote changes—when necessary and following strict access protocols.
- Visor Switchable Read/Write. Providing the security of Read-Only with the functionality of Write-Enabled leaves the Visor Connect Box in a read-only state as default, but allows you to enable the write-enabled mode with the press of a button that is located on the hardware. By doing this, Visor 2.10 offers the functionality and cost-reducing features of the write-enabled Visor.

In addition the Visor solution allows for the optional inclusion of a VCB DMZ PC for hosting local analytics on premise together with the option of a second VCB Control PC that can be used for hosting 3rd party logging applications, such as IBA Server.

Note: Based on GE Power Conversion's RXi-142 controller hardware, the VCB is a robust and compact solution. If your control system requires enterprise storage and processing capabilities such as large storage capacity or server redundancy, please refer to the Operations+ Process and Maintenance+ Optimization solutions.



Key Benefits

- Worldwide remote service support. Customer sites are accessible via the Visor Service Portal (VSP) and can be securely accessed globally from any internet-enabled location. Multiple GE Engineers can access simultaneously depending on the type of Visor and deployment options.
- **Increased security.** Strict user access management is controlled by workflows that require multi-level approval. Limited personnel access to sites and SSO authentication required at all times.
- **Reduced response time.** Drive trips or Marine vessel black outs or drift offs are highlighted by GE's Data Historian through the automatic incident detection and notification system, together with incident data upload (including drive trip histories). GE's service engineers and specialists then can quickly analyze the incident data and remotely connect to the installed site system to further help with diagnostics, if required.
- **Compact and cost-effective.** Visor brings the hardware into one cubical, reducing Visor's physical footprint and allowing expansion inside the cubical for optional DMZ or Control PCs.
- Fast tag processing. The integrated VCB site Data Historian is capable of handling up to 250,000 tags per second, together supporting the OPC-UA (HA & DA) standard for access from third-party clients.

- **Single, onsite repository**. An integrated engineering server holds and manages all project information in one place on site.
- Automatic remote data analysis. Integrated Cloud support is provided for remote analytics. Time-series data can be streamed to the VSP to support automatic remote data analysis.
- **Third-party application support.** Third-party logging and analytic applications can be hosted within the Visor cubicle.
- **On-prem support for embedding solutions.** For instance, Operations+ Energy tool can be embedded into the Visor system.

Data Access Using OPC-UA

Visors onboard Historian features a dedicated OPC-UA server providing access to its time series data and file based data, which can be accessed by end user OPC-UA clients. Time-series data is accessed via DA and HA, and file based data can be accessed via the OPC-UA Temporary File Transfer model. Access to OPC-UA data is dependent on this functionality being provided by the end-user's OPC-UA client.

Visors onboard Historian also features an OPC-UA client enabling data collection from both GEPC and 3rd party assets.







Achilles Level 1 Certified

Visor Basic Features

Cyber Security	Integrated hardware firewalls to customer WAN and to control network Site initiated connection to VSP over encrypted IPsec secure tunnel. VSP access control using GE identity (SSO)/site with access logging. Achilles Level 1 certified.				
Configuration	Via P80-Pilot Engineering Software				
Historian Logging Rate	>250,000 tags/s				
Historian Logged Data Classes	Time series analogues and digitals Alarms and events Trip histories (up to 150 drives) Generic files (logs, reports, office docs, third-party logger, CCTV)				
Historian Logging Rate	512 GB SSD (supports 3-6 months storage on typical system)				
Control Network Interface	Single or Dual Ethernet connection to Control Network				
Customer WAN Interface	Single network connection via integrated firewall				
Automatic VSP Event Notification	On incident detection: Automatic notification, associated logged time series and alarms/events data upload				
Data Streaming	Streaming of time-series data to GE Cloud for remote analytics				
Access to VCB Historian Data	Web-based user interface OPC-UA clients may extract data via the VCB OPC-UA server (HA & DA access) Manual selection and storage on USB storage device				
Logged Data Archive	Automatic archive of logged data to USB connected storage device				
Remote Engineering Access	Full RDP access to engineering tool suite hosted/managed by P80-Pilot View of operator screens (read-only screen sharing) View controller and HMI web pages View all historian data				
Access Control	Dependent on system variant, the method to gain remote access to a site varies. For Read-Only units, authorized engineers can gain access at any time to troubleshoot and collect logs. For Write-Enabled variants and Switchable Read/Write variants the engineer must gain customer approval prior to connecting. This is done via a robust workflow requiring written approvals.				
Operating System	Windows 10 IOT				

Drive Trip Alerts

Regardless of application GE's drive and control systems are designed and developed in co-ordination with the GE Visor platform, Visor will process all fault files (Pertu files) relating to GE's HPCI based systems and send them back to the GE 24/7 Service team for analysis when a system enters a faulty state.

Rising Edge Alerts

Harnessing the power of the onboard Data Historian, the GE Visor system can detect a multitude of rising edge events based on real time information with detection happening immediately after event occurrence. With the continuous monitoring of these various signals it allows the GE Service center to react timely and concisely enabling true data driven reaction and decisions.

Vessel Dynamic Positioning (DP) Drift Off Alerts

The DP drift off alert feature within Visor monitors the DP systems position and heading, triggering an event log workflow when the DP system flags an off-position warning for general position or heading. This file contains DP critical data, such as PME/ DGPS and power system information for a set period before the event and a set period after.

Vessel Automation Blackout Alerts

When a vessel blackout or partial blackout occurs the Automation system automatically starts an internal process of restarting devices and managing UPS power. In parallel to this process the Visor system1 will collect key power management system data in the form of an event log file and will send this back to GE providing the vessel internet is still powered. If the internet is not connected due to the blackout, the file will wait in a buffer and be sent immediately on re-connection.

Post Event Processing

Fault data and event information will be automatically transferred from the GE Visor Connect Box to the GE Visor Service Portal hosted in the GE Cloud environment. Following this data transfer the GE Service team will be automatically notified of the event and subject to contract status the GE 24/7 response team will be notified and assigned to the event for investigation.



Visor Cloud Dashboards

Data driven decisions are critical to plant/infrastructure up time and that is why GE has extended its powerful Data Historian to enable data monitoring by end users in a webbased cloud environment.

Visors powerful cloud dashboards allow near real time monitoring of assets deployed on the site or installation. Visor will collect and aggregate data from all compatible control system devices, including supported 3rd party devices. The powerful inbuilt Data Historian will process this data and provides the ability to select 30 key KPIs that will be streamed to the Visor Service Portal Cloud Dashboard environment for near real time viewing of the data.

Features of the Dashboard include:

- · Near real time monitoring of selected KPIs
- Configurable alarm limits with email alerts
 when limit is exceeded
- Historic timeline view of data for up to 30 days
- Export raw data to CSV for offline analysis



Custom Cabinet Enclosure

- Featuring a touchscreen HMI front panel. This front panel displays Data Historian information and Visor status as well as indicating the mode the Visor box is set to—read or write. Visor is also available as a standalone controller or mounted on a 24" monitor.
- On-prem analytics PC (VCB DMZ PC). An optional analytics PC can be added into the Visor box for use with other products such as Operations+ Energy app or other Maintenance+ Asset Performance Management (APM) solutions.
- Engineering PC (VCB Control PC). Mandatory for the Visor Switchable Read/Write functionality, an Engineering PC added to the Visor box is used for write-enabled activities but also will be available for all product variants when there is a need for onsite engineering.

Remote Data Access, Enhanced Tech Support

The ability to connect your data to the cloud for customized analytics, enabling data-driven decisions and performance measuring in real time. Connecting your data to the cloud—the key to driving down OPEX—allows you to intelligently plan maintenance and monitor your asset's health. At the heart of GE's digital eco-system, Visor collects and processes data and provides you with remote access and enhanced technical support.





Visor Compatibility Matrix

Equipment	Engineering Tools	Logging Protocols	Time Series Data	Alarms & Events	Trip Histories	Files	HMI View	Web Pages	Monitor
НРСі	P80i	Ethernet: WDDE, KPI, OPC UA , Monipert	•		•			•	•
PECe / -Lite	P80i, HDM, Pertu	Ethernet: WDDE, KPI, OPC UA , Monipert	•		•			•	•
CDC					•#1				
AMCx (DP)	DP toolkit, ISaGRAF	Ethernet: proprietary, serial	•		•			•	•
AMCx (AVC)	EMS, Marine toolkit, ISaGRAF	Ethernet: proprietary	•					•	•
PcVue	Proprietary	NetBIOS, HTTP		•			•		
HMI PCs		Various Proprietary Protocols		•			•	•	
Third Party		Shared network drive, OPC-UA and EGD for RX3i			•	•		•	
HPC		WDDE	•						
PEC		WDDE	•						
Logidyn		File logging			•#2	•#2		•#2	•#2
SunlQ	P80i, HDM, Pertu	Various protocols	•		•	•	•	•	•

#1 via a separate data gatherer PC

#2 via separate gateway PC



Services

With a comprehensive global network of service engineers and technicians, GE is uniquely positioned to provide the knowledge, experience and skills to help you protect your assets, maintain critical processes, lower risk and increase productivity.

GE delivers original equipment spare parts around the world and repairs, refurbishes and upgrades customer systems with our latest technology. GE offers risk protection through contractual services based on system experience and sophisticated application calculations.

About GE's Power Conversion Business

GE's Power Conversion business applies the science and systems of power conversion to help drive the electric transformation of the world's energy infrastructure. It does so by making and delivering advanced motor, drive and control technologies that evolve today's industrial processes for a cleaner, more productive future. Serving specialized sectors such as energy, marine, renewables and industry through customized solutions and advanced technologies, GE's Power Conversion business works with customers to increase efficiency.

Conceived for Operators

GE Power Conversion's Digital Suite is built on GE's industry wide expertise in IT, OT (operating technology) and IIoT (the industrial internet of things). Above all we believe it should be intuitive, visual and customized for your operational needs. Featuring simple, clear interfaces it provides organizations of all sizes with access to GE's powerful data analytics, made accessible and usable by providing better intel and situational awareness. Genuine performance improvements are within reach, to help your organizations work with increased efficiency and profitability.

To find out more: contactus.powerconversion@ge.com

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