



GE VERNOVA

gevernova.com/power-conversion

SERVICES+ REMOTE ENGINEERING

Visor for Drives & Automation Systems

DIGITAL





GE VERNOVA

SERVICES+

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

If you're looking for ways to reduce downtime and enhance the performance of operations and assets, Power Conversion, a business of GE Vernova 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+ helps to extend your organization's capability and resource with a 'lean' mindset. It's about tapping into Power Conversion 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 Power Conversion business regular range of service and support capabilities.





SAFE AND SECURE

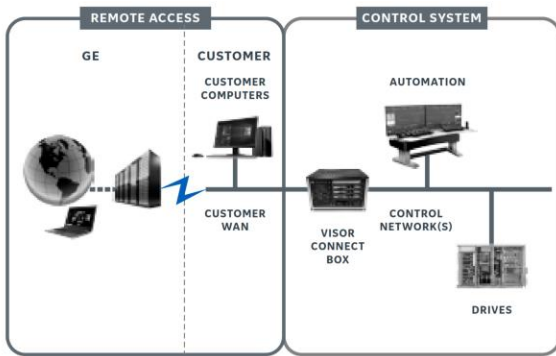
Power Conversion business already provides you with drives and automation control systems. Now, your systems can be remotely monitored—and issues diagnosed—safely and securely through Services+ Visor Remote Monitoring & Diagnostics (RM&D) system.

Services+ Visor RM&D consists of:

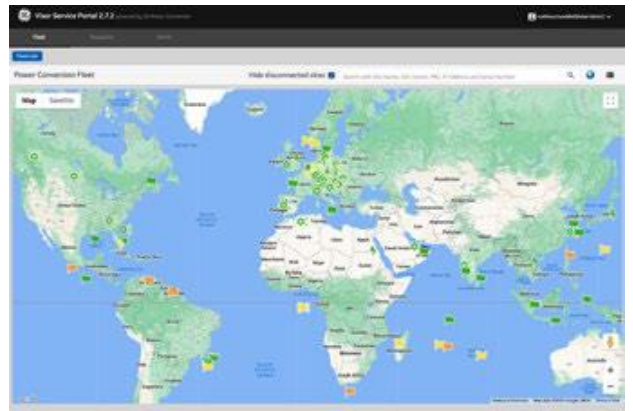
Visor Connect Box (VCB). The compact VCB is installed at your site to monitor control system devices. It hosts integrated Data Historian and Engineering servers that provide a repository for control system data as well as project and engineering information. Once you grant access, Power Conversion Engineers can access all of this information remotely via a secure site connection.

Visor Service Portal (VSP). Power Conversion’s VSP provides Power Conversion 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





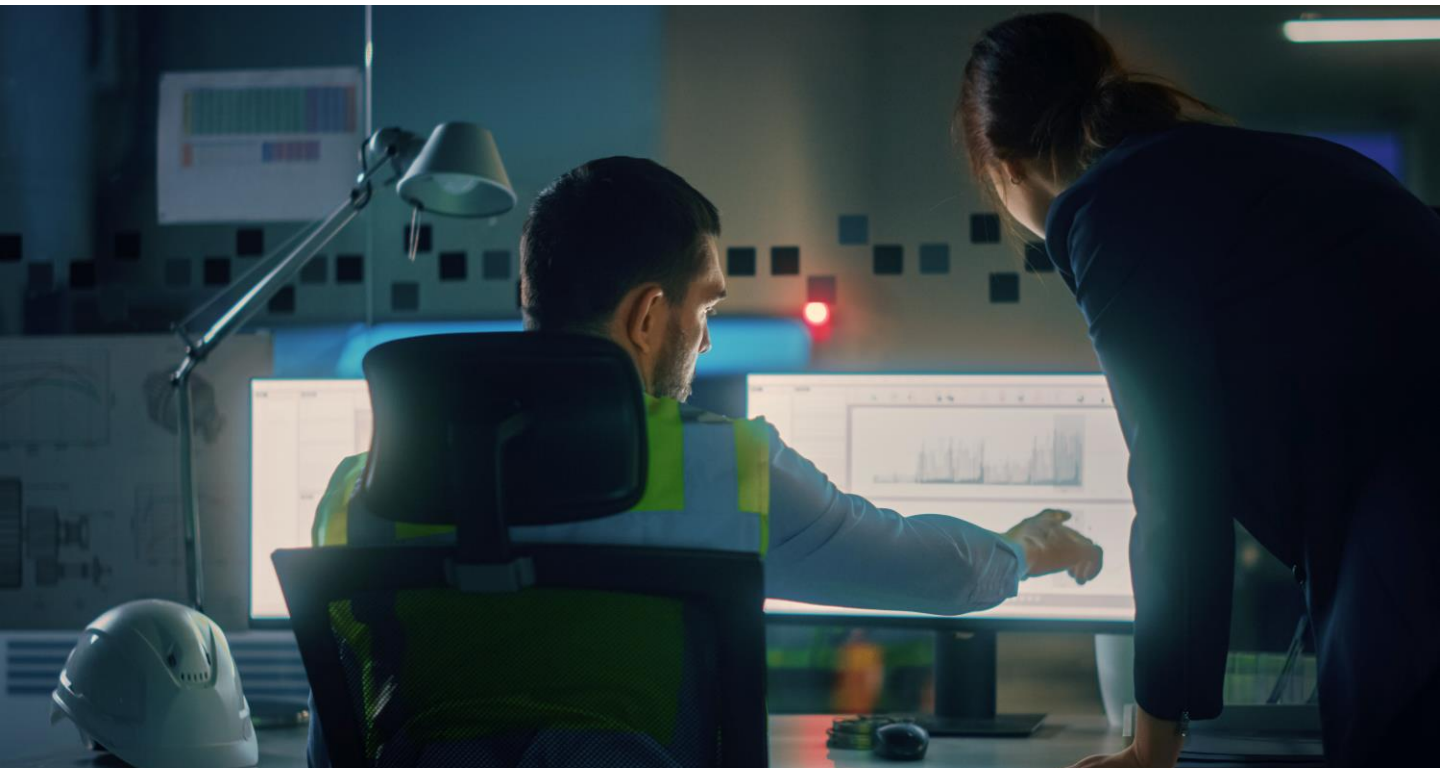
HELP MEET YOUR COMPLETE NEEDS

Visor is Available in Three Versions

- **Read-Only Visor.** This version allows Power Conversion 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 Power Conversion 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 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 Power Conversion Engineers can access simultaneously depending on the type of Visor and deployment options.
- **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.
- **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.
- **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.
- **Reduced response time.** Drive trips or Marine vessel blackouts or drift offs are highlighted by Power Conversion's Data Historian Visor system through the automatic incident detection and notification system, together with incident data upload (including drive trip histories). Power Conversion'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 cubicle, reducing Visor's physical footprint and allowing expansion inside the cubicle 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.



VISOR CONNECT BOX (VCB)



Achilles Level 1 Certified

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 PC and 3rd party assets.

* Depending on system/ data type



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 PC identity (SSO)/site with access logging. Achilles Level 1 certified.
Configuration	Via P80-Pilot Engineering Software
Historian Logging Rate	Up to 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)
Storage Capacity	512 GB SSD (supports 3-6 months storage on typical system)
Customer WAN Interface	Single network connection via integrated firewall
Control Network Interface	Single or Dual Ethernet connection to Control Network
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 PC 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, based on access approval, 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

* Depending on system/ data type



Drive Trip Alerts

Regardless of application PC's drive and control systems are designed and developed in co-ordination with the PC Visor platform, Visor will process all fault files (Pertu files) relating to PC's HPCI based systems and send them back to the PC 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 PC 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 PC Service center to react timely and concisely enabling true data driven reaction and decisions.

Vessel Dynamic Positioning (DP) Drift Off Alerts

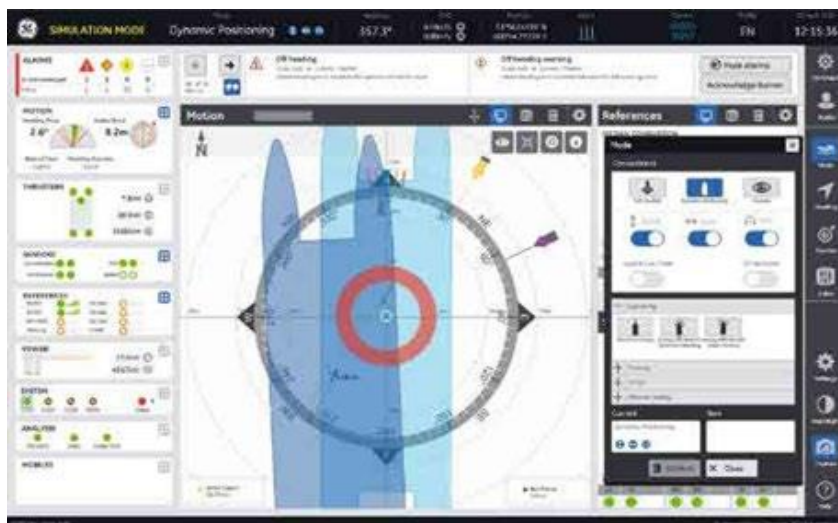
The DP drift off alert feature within Visor monitors the DP systems position and heading, triggering an event log workflow when the DP system flags an off-position warning for general position or heading. This file contains DP critical data, such as PME/ DGPS and power system information for a set period 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 Power Conversion provided 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 PC Visor Connect Box to the PC Visor Service Portal hosted in the PC Cloud environment. Following this data transfer the PC Service team will be automatically notified of the event and subject to contract status the PC 24/7 response team will be notified and assigned to the event for investigation.





VISOR CLOUD DASHBOARDS

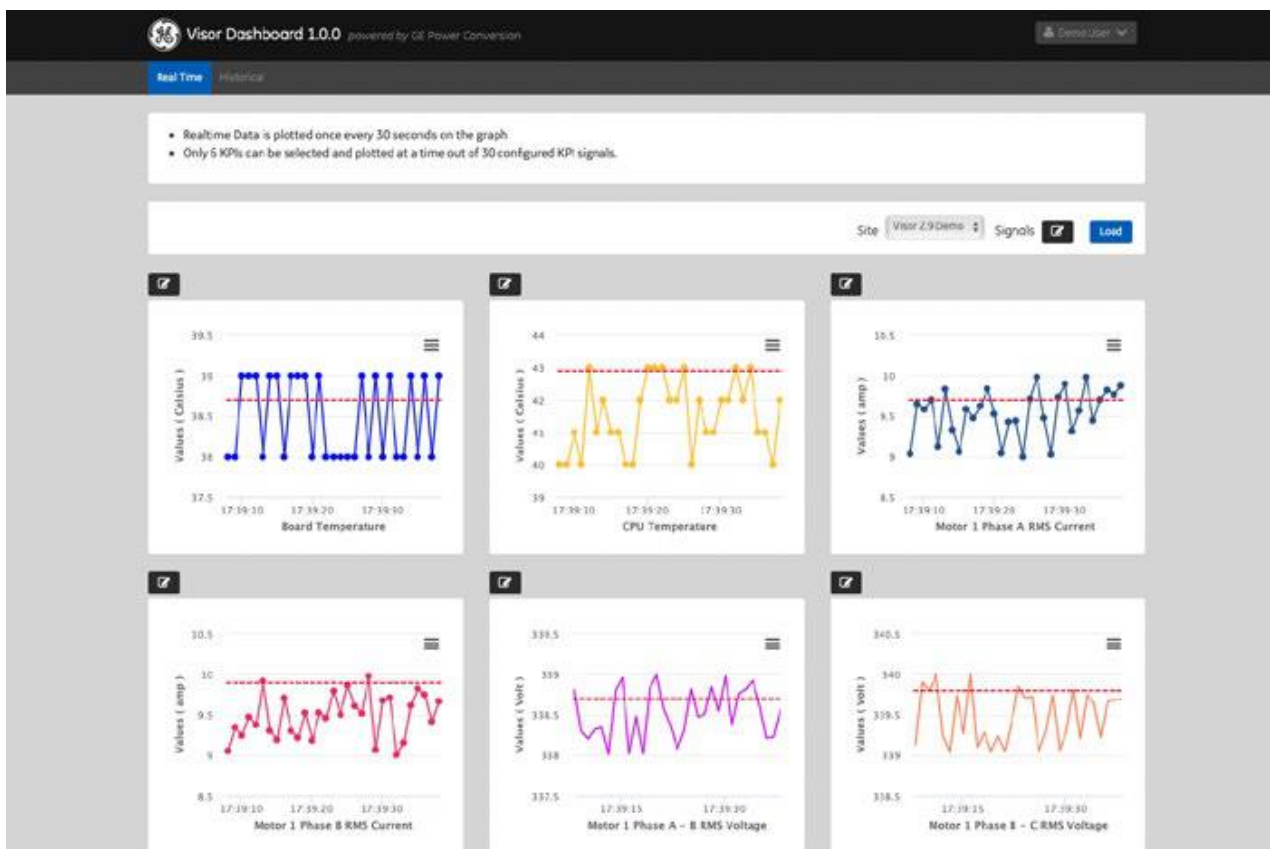
Data driven decisions are critical to plant infrastructure up time and that is why Power Conversion has extended its powerful Data Historian to enable data monitoring by end users in a web based cloud environment.

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





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 Power Conversion's digital eco-system, Visor collects and processes data and provides you with remote access and enhanced technical support.

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 streamed to the Visor Service Portal Cloud Dashboard environment for near real time viewing of the data.
- **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.





VISOR COMPATIBILITY MATRIX

Equipment	Engineering tools	Logging Protocols	Time Series Data	Alarms & Events	Trip histories	Files	HMI View	Web pages	Monitor
HPCi	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
SunIQ	P80i, HDM, Pertu	Various protocols	✓		✓	✓	✓	✓	✓

#1 via a separate data gatherer PC

#2 via separate gateway PC



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About GE Vernova's Power Conversion Business

GE Vernova'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 Vernova's Power Conversion business works with customers to increase efficiency.

To find out more:

www.gepowerconversion.com

contactus.powerconversion@ge.com