



Remote Operations Power Generation Solution

Ensure operations continuity and workforce flexibility with secure remote/mobile plant controls

Power Generators are re-evaluating emergency preparedness, control procedures, and the need to operate reliably with reduced on-site staff.

GE Digital Remote Operations is a secure and scalable solution to rapidly enact and permanently adopt remote/mobile control procedures that ensure business continuity and optimal workforce flexibility.

What is Remote Operations?

Remote Operations is a packaged software and appliance solution that provides remote/mobile operator access to essential on-site HMI monitoring and control functions. A unique secure network system, hard-token credentials and granular access controls ensure that remote, mobile and on-site operators can work independently or together in a secure and NERC-CIP compliant environment.

Remote Operations is available in several packages, accommodating needs from urgent continuity to fault tolerant fleet-wide operations centers.

Operators Anywhere

Remote and mobile operators have secure and managed access to equivalent on-site HMI visualizations and essential operational controls regardless of HMI solutions in production. Zero-trust security, control room managed access rights, and operational safeguards provide secure and failsafe operational flexibility across remote, mobile and on-site staff.

Secure and Compliant, End-to-End

Remote Operations is built around a secure connection broker appliance featuring two-factor authentication; role, time and equipment-based access controls; session logging and recording; and encrypted pixel-only data transfer. The solution meets compliance standards for NERC-CIP and many others.

Remote Operations Benefits

-  Ensure operational reliability
-  Empower a flexible workforce
-  Guard personnel health & safety
-  Remain secure & compliant
-  Act with urgency

Remote Operations Response

An immediate answer for operations continuity

Remote Operations Response is a special packaged offer that immediately enables remote/mobile monitoring and assistance for plant operations. Rapid remote installation can be done in a single day without unit shutdown.

Remote Operations Solution Packages

Remote Operations is available in three upwardly compatible packages RO Response, RO Standard, and RO Advanced. All include the core end-to-end security and compliance features.

Remote Operations RESPONSE

Remote/mobile HMI monitoring and assistance
Immediate deployment

Remote Operations Response

is a special packaged offer to rapidly enable remote/mobile monitoring and assistance for on-site HMI systems. It is compatible with existing systems, and requires only the addition of a pre-configured secure network appliance and firewall. Upon equipment arrival, installation can be done in a single working day with remote support from GE. No unit shutdown is required.

Features

- Remote/mobile HMI monitoring
- Emergency HMI controls access
- Rapid, non-disruptive deployment

Remote Operations STANDARD

Rich remote/mobile HMI operational controls. Tailored mobile user experience.

Remote Operations Standard

delivers enhanced remote/mobile functions guarded by permitting and policy controls. Mobile workers have a tailored mobile-first experience. Central operators can control remote/mobile worker access by time, equipment and more. An interactive interface ensures that remote, mobile and on-site staff can work independently or together in a secure and compliant environment.

Additional Features

- HMI permitting and controls
- Tailored mobile device experience
- Optional features and customization

Remote Operations ADVANCED

High availability remote operations
Advanced optional features

Remote Operations Advanced

provides full remote/mobile controls and additional optional operating capabilities in a high availability configuration with failover. Remote E-Stop and advanced communications options make RO Advanced the best choice for generators adopting remote and distributed controls as a standard, failsafe operating model for one or more plants.

Additional Features

- High availability / failover deployment
- Remote E-Stop (GE Mark VIe & later only)
- Rich optional features & customization

Remote Operations – Solution Options

| <i>Security-first, zero-trust design NERC-CIP+ compliant Across all options</i> | Response <i>Immediate operations continuity Remote monitoring & assistance Emergency & contingent controls</i> | Standard <i>Fully enabled workforce flexibility Location independent ops Staff flexibility & safety</i> | Advanced <i>Failsafe operations & rich options A pillar of operations strategy Capable of full remote operations</i> |
|---|--|---|--|
| Remote Connection Broker security appliance | ✓ | ✓ | ✓ |
| Secure Firewall appliance | ✓ | ✓ | ✓ |
| Two-factor authentication via supplied hard tokens | ✓ | ✓ | ✓ |
| Remote/mobile HMI* access | ✓ | ✓ | ✓ |
| Remote/mobile HMI permitting | | ✓ | ✓ |
| Purpose-built mobile user experience | | ✓ | ✓ |
| High availability with failover | | | ✓ |
| Remote E-Stop** | | | ✓ |
| Command Center (optional) | | | ✓ |
| Communications Platform (optional) | | | ✓ |
| Automated Rounds (optional; requires APM software) | | | ✓ |
| Install, configure, customize, test (Add shipping time of 1-3 weeks) | 2 - 4 hours No shutdown required | 10 - 12 weeks estimated | 12 - 14 weeks estimated |

* Required: Windows XP or later; RDP or VNC enabled ** Available only for GE Mark VIe and later controllers

Optional Additions for Remote Operations Advanced

Remote Operations Advanced delivers a robust solution for customers employing remote/distributed operations as a core pillar of their business strategy. It can be further enhanced with centralized, single-console monitoring, advanced communications and automated data collection.

Remote Operations Command Center

Centralized supervisory monitoring across equipment and plants

RO Command Center enables remote operations centers to perform centralized, single console monitoring of equipment across plants. Fully customizable dashboards can include HMI data and alarm summaries and analysis drilldowns. With RO Command Center, a remote operator can easily monitor a fleet of equipment or plants, identifying activities that can then be executed and orchestrated via standard Remote Operations product capabilities.

Features

- Powerful centralized monitoring and analysis
- Access to most OT/IT data sources via standard APIs
- Simple drag/drop screen building

Remote Operations Communications Platform

1:1 and group messaging platform
Voice, video, text & content across devices

RO Communications Platform provides a secure and highly available cloud-based platform for multi-media communications between workers and across teams. Mission-critical features include targeted broadcasting, hotline groups, location tracking and hands-free use. Recording and usage analytics provide tracking and insights into operations. The secure solution is certified by: HIPAA, ISO 27001, SOC2 Type II, FIPS and more.

Features

- Multi-media 1:1 and group communications
- Mission-critical features and management
- Support for standard mobile and desktop devices

Remote Operations Automated Rounds

Automated data collection using cameras or sensors reduces operator workloads

RO Automated Rounds uses cameras, remote sensors and more to continuously collect equipment data readings without physical operator inspections. Data is automatically uploaded into the GE APM software system where it can be used alongside historian and other collected data to trigger policy-driven and analytics-based predictive or urgent maintenance procedures.

Features

- Low cost monitoring equipment
- Automatic reading digitization and interpretation
- Integrated into a holistic health & reliability solution

Mobile HMI Features

The purpose-built mobile HMI software provides a rich and failsafe user experience across standard devices. Key features include:

- Familiar HMI experience in compact, mobile-first form
- View-only access as default operational mode
- Interactive control switching with control room
- Unlocking and pop-out features to confirm intent
- Support for tablets with stylus
- ATEX cases and lanyards support



Secure and Compliant Remote Operations

GE Digital Remote Operations is designed from the ground-up to meet the stringent security and compliance requirements required of power generators.

Key Features

System or application access control

System access auditing

User authentication via token-based MFA

Timed user access permissions

Live user monitoring

User session screen recording

Moderated unidirectional file transfer

VNC-based access (no data in transit)

IPSec or SSL encryption

Network segmentation

NERC-CIP, ISA 99/62443, HIPAA, NIST 800-53 compliant

Remote Connection Broker

The unique Remote Connection Broker provides the core security and operational functions of Remote Operations, delivering a set of secure and compliant features that are unavailable with either custom-built IT projects or standard commercial communications products.

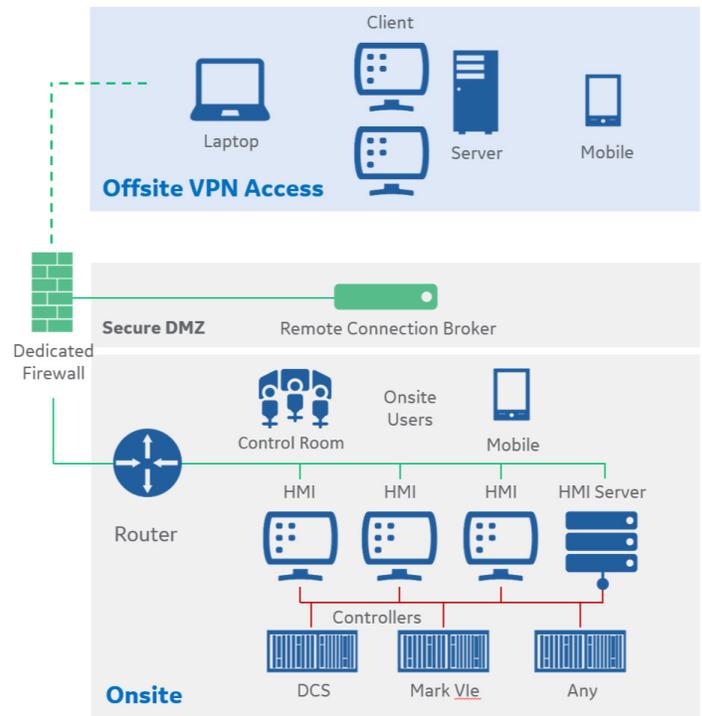
The Remote Connection Broker serves as the intermediate system for network and protocol isolation, reducing the attack surface by securely streaming applications and converting remoting protocols into an encrypted display which can be presented into any browser.

Administrators control granular user access policies by time, equipment and more, but control room operators retain interactive permission-based transfer of control. Remote/mobile staff authenticate via registered hard tokens. Live monitoring and session recording features provide additional safeguards and historical records.

Network Architecture

The recommended architecture incorporates the Remote Connection Broker as a hardened jump server with VNC access plus a GE-supplied secure firewall to create a dedicated network connection spanning the control zone, DMZ, and VPN access to remote users. Updates and maintenance of the system can be conducted through a standard web browser using MFA.

Standard Solution Architecture



Additional Specifications

- Remote Operations Response is intended for contingency operations in conjunction with a qualified on-site operator. Appropriate communication and hand-off processes should be in place.
- HMIs must be based on Windows 10 or later, and support RDP or VNC communications
- GE Cimplicity HMIs may require custom screen creation for remote usage
- Each Remote Connection Broker can support up to 25 remote sessions
- Remote Operations packages include 10 Yubikeys. Additional available.
- Firewall appliance sourced from Fortinet Corporation
- Remote Connection Broker sourced from Xona Corporation