Perception™

Transformer Monitoring & Diagnostic Software

Power transformers are mission critical assets for utility and industrial customers. Transformer failures often lead to revenue loss, placing further demand on already strained networks. Dissolved gas analysis (DGA) was developed to determine the condition of assets as part of an on-going maintenance program, originally through manual sampling, then evolving to online monitoring via permanently mounted monitors capable of providing real-time DGA in transformers. The addition of model analysis and bushing monitoring has further increased the information available for examination.

Tracking more parameters with increased frequency and moving towards fleet wide asset monitoring has created a new challenge, collecting and dissecting the large volume of data generated.

GE’s range of Perception software has been designed to address this issue. Perception allows both the maintenance engineer and asset manager to monitor and diagnose transformer data collected by GE’s Monitoring & Diagnostics range of on-line monitoring units. The data includes DGA, calculated models, bushing and other transformer measurements. By providing access to this valuable data along with powerful diagnostic tools, Perception delivers clear transformer condition information. This enables decisions to be made quickly and reliably, helping to extend the life of transformers, reduce unplanned outage, and avoid catastrophic failure.

There are three versions of Perception available, scaled from local use by maintenance crews, up to a fleet wide enterprise monitoring solution. Each version uses the same intuitive and configurable interface with unique benefits tailored to operation, monitoring, and maintenance needs.

**Perception Express**
- Asset Tree/Network Overview
- Alarm Visualization and Synchronization from Units
- Intuitive/Configurable Interface
- Simplified Trending (DGA Results, Inputs)
- Data Table View
- Import Manually Sampled DGA Data

**Perception Desktop Express Features Plus:**
- Multi-Unit Monitoring
- Advanced DGA Diagnostics (Duval’s Triangles, Key Gas Analysis, 3D Gas, Rogers & Dørenburg Ratios, Japanese ETRA, TDCG)
- One Page Transformer Overview Report
- Gas Ratio Trending and Alarm Information

**Perception Server Desktop Features Plus:**
- Automatic Results Downloading
- Wallboard Fleet Overview
- Centralized Database (MS SQL Server)
- Secure Multiple Users Access (OPC UA)
- Email Alarm Notification
- TOA4 Data Export Facility
- OPC UA Server

**Diverse Data Collection**
- Data collection from Kelman Transfix, Taptrans, Dualtrans, Multitrans, Minitrans, Hydran M2, Intellix MO150, Intellix BMT 300
- Time-saving scheduled downloading
- Single, unified solution, providing a comprehensive view of the transformer’s condition
- Suitable for applications from a single user or unit to a full enterprise

**Dependable Alerts and Protection**
- Discrete and rate of change email alerts based on monitor conditions
- User access control built on a secure OPC UA architecture
- User configurable wallboards providing network status overviews with visual fault warnings, updated live

**Flexible Views and Analysis**
- Customizable transformer reports
- Correlated bushing parameters, PD activity, DGA trends, transformer load temperatures, and other measured variables
- Adjustable trending of measurement points

**Integrated Solution**
- Automatic import of files from Transport X
- Data collection and export functionality for integrating with third-party systems
- Large data storage capacity (100 devices with 2 years of data averages in a 2.5 GB database)
Applications

Power utilities, metals and petrochemical plants across the world can benefit from the insight that Perception gives into their transformer conditions. Perception enhances confidence in the everyday operation of businesses, by providing the information required to plan and implement contingency procedures. In addition to disaster and critical failure preventative benefits, Perception helps utilities establish condition-based maintenance programs, supplying information on the unique characteristics of transformers during day-to-day running. This helps prolong the life of transformers, reduces costs, and protects the business's reputation with customers.

Scalable Network Solution

Perception is designed for scalability. It can be installed on laptop computers for portable DGA, set up for local access to monitors, configured for single sites with one user, or deployed on an enterprise wide corporate roll out with multiple sites, units, and users.

Perception Server provides time saving scheduled downloading, collecting measurement data from devices automatically, and storing it in a central database for simultaneous user access. The centralized location increases data integrity, by creating a single point for data backup.

OPC UA architecture provides secure network communication between client and server. Access control prevents unauthorized access to monitoring devices, limiting unit and configuration setting changes to designated personnel.

Integrated System

Perception has the ability to connect and download results from the entire range of GE's Monitoring & Diagnostic devices.

Perception Server’s mass export folder enables automatic export of measurement data in TOA4 format, to a known folder location for acquisition by third party systems.

Visual Network Analysis

An asset network can be built by adding monitoring units using Perception’s intuitive graphical user interface. This can be transferred to a customizable wallboard screen, which displays the units on the network, automatically refreshing the status as measurements are collected. The network health can be quickly analyzed to identify problematic units or sites. Wallboard screens can also be configured for sites and assets.

Perception’s Asset Explorer can then be used to investigate the unit or site where the alert was raised. The user can select an asset, view the status of the unit including the current gas levels and check the alarm limits set.

Trending & Diagnostics

Gas levels can be automatically plotted using the trend chart facility within Perception. Customized graphs can be created using the collected DGA and bushing measurements, along with the model calculations.

Further analysis can be carried out using the built-in international diagnostics, such as IEC 60599 and IEEE C57.104, including Duval’s triangles, Rogers, Doernenburg and Japanese ETRA gas ratios, and key gas analysis.

Bushing polar plots and models worksheets can also be easily created to provide an in-depth analysis on the overall health of the transformer being monitored.

Email Alerts

If a discrete, ratio or rate of change alarm is triggered on the device, Perception will automatically send an email alert to notify the user of the change. The email notification system provides details on the current asset state, including gas levels and historical measurements.

When exceeded, caution and alarm limits are highlighted, using a predefined color coding system. Email alerts can be configured at a unit level for critical transformers.

Transformer Reports

Perception enables users to automatically generate tailored transformer overview reports.

Upon selection, the report creation wizard will guide the user through the report generation process, automatically populating information regarding the transformer, status, measurements and diagnostics.

Space for editable text enables the user to comment on the assets, graphs and diagnostics. The report can be further adapted by adding a company logo for presentation.
Application Example: Using Perception In a Large Geographically Distributed Company

Caution alarms triggered on device: Maintenance Engineer alerted via relay on device. Email sent to designated people. Global wallboard displays location of device.

Device that triggered alarm identified.

Local wallboard displays the location of the device. Site Maintenance Engineer selects asset.

Perception diagnostic analysis using built-in international standards. Corrective action identified.

Corrective Action Implemented

Initial analysis with Perception to identify the problem.

Perception report generated with details of incident: fault found, corrective action taken and preventative action initiated to avoid similar situation.
Desktop Network
Perception Desktop enables a single user to connect to multiple devices from a local database.

Server Network
Perception Server enables multiple users to connect to many units using a single database.

Technical Specifications

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RECOMMENDED SYSTEM REQUIREMENTS

PERCEPTION EXPRESS AND DESKTOP:
- 2 GHz 32-bit (x86) or 64-bit (x64) processor
- 1 GB RAM
- At least 20 GB of available hard disk space
- Microsoft® .NET Framework 3.5 sp1 and 4.0
- Windows XP, Vista or 7

PERCEPTION SERVER:
- 3 GHz 32-bit (x86) or 64-bit (x64) Xeon Processor
- 4 GB RAM
- At least 100 GB of available hard disk space
- Microsoft® .NET Framework 3.5 sp1 and 4.0
- Windows Server 2003 or 2008
- Microsoft SQL Server 2005 or 2008

AVAILABLE LANGUAGES
- English
- Spanish
- Portuguese
- Chinese (simplified)
- German
- French
- Russian