MONITORING
CONTROL
COMMUNICATION

IMPROVE SYSTEM RELIABILITY:
Advanced monitoring diagnostics catch problems earlier.

DATA CONSOLIDATION:
Consolidates control, monitoring, data acquisition and analysis into a single device.

COMMUNICATION:
Multiple communication options. Integrated web server pages provide graphical interface. Provides multiple data security solutions.

OPEN ARCHITECTURE:
Connectivity and data consolidation from a wide variety of sensors. All functions are provided in the control cabinet, on the transformer. No PC or special software required.

CONTROL UNIT (CU)

Modular, Expandable Design
Modular design allows economical and easy expansion. Expansion modules can be ordered initially or added later as transformer monitoring needs change.

PROCESSOR MODULE (CPU):
- Data storage for 52 weeks (rolling) saved at one minute intervals
- Utilizes industrial hardened flash memory card
- Ethernet

COMMUNICATION MODULE (8 SERIAL PORTS):
- Consolidate data from other transformer IEDs
- Supports DNP 3.0, Modbus and TCP/IP
- Serial connections: RS-232, RS-485 or Fiber
- Expansion cards for: 4C Voltage/Current, Dual RTD or Dual CT input

DIGITAL OUTPUT MODULE(S):
- Up to 4 per control
- (8) Configurable general purpose digital outputs

DIGITAL INPUT MODULE(S):
- Up to 4 per control
- (12) Configurable general purpose digital inputs

UNIVERSAL POWER SUPPLY:
- 48 - 264 VDC
- 60 - 264 VAC

ANALOG MODULE(S):
- Up to 4 per control
- Available as input or output
- (2) PT100 input
- (2) Analog input 4-20mA or 0-10 VDC
- (2) CT input
- (4) 4-20mA Output (on input/output version only)

BUSHING MONITORING:
- Monitor 3 or 6 bushings per module

FIBER OPTIC TEMPERATURE PROBE INPUT (OPTIONAL):
- 4 probes per module – up to 3 modules per control

For more information please contact:
DYNAMIC RATINGS Inc.
1273 E. Wisconsin Ave.
Pewaukee, WI 53072 USA
Tel: (262) 746-1230
Fax: (262) 746-1232
www.dynamicratings.com

DYNAMIC RATINGS Pty Ltd
PO. Box 5, Wilson Road, Glen Waverley
VIC, 3150 Australia
Tel: +61 3 9574 7722
Fax: +61 3 9560 0793
sales@dynamicratings.com
www.dynamicratings.com
**Monitoring**

**Thermal:**
- Top oil temperature
- Ambient temperature
- Winding hot spot calculation (for each winding)
- Direct winding temperature from fiber optic sensors
- Cooling system top & bottom temperatures
- Bottom oil temperature
- Insulation loss of life

**Cooling System:**
- Fan/pump failure
- Fan/pump run hours
- Loss of cooling power
- Cooling contactor fail
- Cooling breaker trip
- Cooling switch position

**Alarm Contacts & Ancillaries:**
- Sudden pressure
- Pressure relief
- Gas accumulation
- Low/High oil level
- Nitrogen pressure

**Winding, core and oil:**
- On-line DGA with key gas or multi-gas analyzers
- Moisture in oil
- Partial discharge

**Load:**
- Load current for 1 or 3 ph
- Voltage for 1 or 3 ph
- Watts and VARs

**Bushings:**
- Power factor
- Capacitance

**Dynamic Transformer Rating:**
- MAX LOAD indicates the maximum load the transformer can safely carry given the ambient, cooling system health and your allowable overload limits.
- TIME REMAINING provides a forecast of how long an overload can be maintained.
- “What IF” calculations allow engineers to plan for alternative contingencies.

**Control**

**LTC Voltage Control:**
- Line drop compensation
- Paralleling capabilities
  - Master follower
  - Circulating current
  - Reverse reactance
  - VAR sharing

**Cooling Control:**
- Integrated monitoring & control
- Predictive cooling control
- Fan/pump exercise

**Built-in Web Server**

**Typical Communication Options**

(Other Options Available)

- Fiber, RS-485
- RS-232 or Wireless
- Modbus or DNP
- Ethernet
- Hyper Terminal
- Modem
- Remote PC
- Data Download, Configuration & View Web Pages
**Monitoring**

**Thermal:**
- Top oil temperature
- Ambient temperature
- Winding hot spot calculation (for each winding)
- Direct winding temperature from fiber optic sensors
- Cooling system top & bottom temperatures
- Bottom oil temperature
- Insulation loss of life

**Cooling System:**
- Fan/pump failure
- Fan/pump run hours
- Loss of cooling power
- Cooling contactor fail
- Cooling breaker trip
- Cooling switch position

**Alarm Contacts & Ancillaries:**
- Sudden pressure
- Pressure relief
- Gas accumulation
- Low/high oil level
- Nitrogen pressure

**Load:**
- Load current for 1 or 3 ph
- Voltage for 1 or 3 ph
- Watts and VARs

**Winding, core and oil:**
- On-line DGA with key gas or multi-gas analyzers
- Moisture in oil
- Partial discharge

**LTC Voltage Control:**
- Line drop compensation
- Paralleling capabilities
  - Master follower
  - Circulating current
  - Reverse reactance
  - VAR sharing

**LTC Tap Changer:**
- Tap position indication
- Tap counter (per position)
- Time since last through Neutral
- Delta temperature
- Oil level high/low
- LTC contact wear

**Bushings:**
- Power factor
- Capacitance

**Dynamic Transformer Rating:**
- MAX LOAD indicates the maximum load the transformer can safely carry given the ambient, cooling system health and your allowable overload limits.
- TIME REMAINING provides a forecast of how long an overload can be maintained.
- What-if calculations allow engineers to plan for alternative contingencies.

**Control**

**LTC Voltage Control:**
- Line drop compensation
- Paralleling capabilities
  - Master follower
  - Circulating current
  - Reverse reactance
  - VAR sharing

**LTC Tap Changer:**
- Tap position indication
- Tap counter (per position)
- Time since last through Neutral
- Delta temperature
- Oil level high/low
- LTC contact wear

**Bushings:**
- Power factor
- Capacitance

**Dynamic Transformer Rating:**
- MAX LOAD indicates the maximum load the transformer can safely carry given the ambient, cooling system health and your allowable overload limits.
- TIME REMAINING provides a forecast of how long an overload can be maintained.
- What-if calculations allow engineers to plan for alternative contingencies.

**Communication**

**Typical Communication Options**

- Fiber, RS-485
- RS-232 or Wireless

**Local or remote user display**
- SCADA (RTU)
- Modbus or DNP
- Ethernet
- LAN/HMI
- RS-232
- Hyper Terminal
- Modem

**Built-in Web Server**

- Data Download, Configuration & View Web Pages
- Ethernet/LAN
- SCADA (RTU)
- (RTU)
- RS-232
- Modbus or DNP
- Data Download, Configuration & View Web Pages
**MONITORING CONTROL COMMUNICATION**

**IMPROVE SYSTEM RELIABILITY:**
Advanced monitoring diagnostics catch problems earlier.

**ACTIONABLE INFORMATION:**
General alarms provide alerts of equipment trouble. Detailed alarms allow better management of labor resources. Dynamic rating calculations improve contingency planning.

**EXCEPTIONAL PRODUCT SUPPORT:**
Developed by a leading transformer company. Product support provided by a team dedicated exclusively to transformer monitoring, control and communication.

**DATA CONSOLIDATION:**
Consolidates control, monitoring, data acquisition and analysis into a single device.

**COMMUNICATION:**
Multiple communication options. Integrated web server pages provide graphical interface. Provides multiple data security solutions.

**OPEN ARCHITECTURE:**
Connectivity and data consolidation from a wide variety of sensors. All functions are provided in the control cabinet, on the transformer. No PC or special software required.

**Modular, Expandable Design**
Modular design allows economical and easy expansion. Expansion modules can be ordered initially or added later as transformer monitoring needs change.

**Control Unit (CU)**

- **Processor Module (CPU):**
  - Data storage for 52 weeks (rolling) saved at one minute intervals
  - Utilizes industrial hardened flash memory card
  - Ethernet

- **Communication Module (8 Serial Ports):**
  - Consolidate data from other transformer IEDs
  - Supports DNP 3.0, Modbus and TCP/IP
  - Serial connections: RS-232, RS-485 or Fiber
  - Expansion cards for: 4C Voltage/Current, Dual RTD or Dual CT input

- **Bushing Monitoring:**
  - Monitor 3 or 6 bushings per module

- **Fiber Optic Temperature Probe Input (optional):**
  - 4 probes per module – up to 3 modules per control

- **Digital Output Module(s):**
  - Up to 4 per control
  - (8) Configurable general purpose digital outputs

- **Digital Input Module(s):**
  - Up to 4 per control
  - (12) Configurable general purpose digital inputs

- **Universal Power Supply:**
  - 48 - 264 VDC
  - 60 - 264 VAC

- **Optional Expansion Modules:**
  - Expandable by adding modules.

- **Analog Module(s):**
  - Up to 4 per control
  - Available as input or input/output
  - (2) RTD input
  - (2) Analog input 4-20mA or 0-10 VDC
  - (2) CT input
  - (4) 4-20mA Output (on input/output version only)

- **Analog Module(s):**
  - Available as input or input/output
  - (2) RTD input
  - (2) Analog input 4-20mA or 0-10 VDC
  - (2) CT input
  - (4) 4-20mA Output (on input/output version only)

- **Digital Output Module(s):**
  - Up to 4 per control
  - (8) Configurable general purpose digital outputs

- **Digital Input Module(s):**
  - Up to 4 per control
  - (12) Configurable general purpose digital inputs

- **Universal Power Supply:**
  - 48 - 264 VDC
  - 60 - 264 VAC

- **Optional Expansion Modules:**
  - Expandable by adding modules.

- **Analog Module(s):**
  - Available as input or input/output
  - (2) RTD input
  - (2) Analog input 4-20mA or 0-10 VDC
  - (2) CT input
  - (4) 4-20mA Output (on input/output version only)

**For more information please contact:**

**DYNAMIC RATINGS Inc.**
1273 E. Wisconsin Ave.
Pewaukee, WI 53072 USA
Tel: (262) 746-1230
Fax: (262) 746-1232
www.dynamicratings.com

**DYNAMIC RATINGS Pty Ltd**
PO. Box 5, Wilson Road, Glen Waverley
VIC, 3150 Australia
Tel: +61 3 9574 7722
Fax: +61 3 9560 0793
sales@dynamicratings.com
www.dynamicratings.com