DYNAMIC RATINGS

C50 SERIES

CONDITION MONITORING AND CONTROL SOLUTION

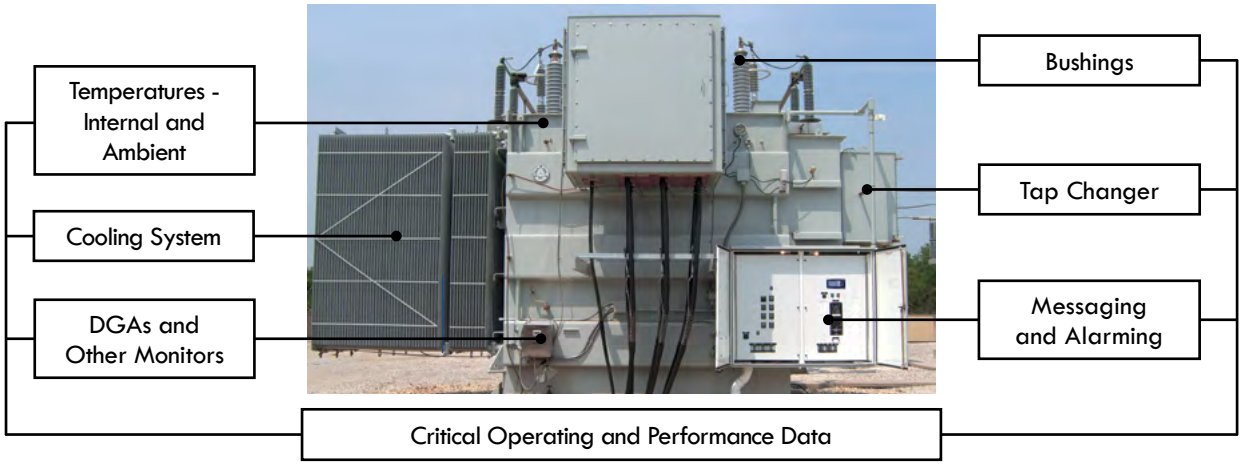
NOW AVAILABLE WITH INTEGRATED BUSHING MONITORING

RESPONSIVE

ASSET HEALTH SOLUTIONS

AFFORDABLE. EFFECTIVE. CONVENIENT.

ASSET MONITORING MADE EASY.



MONITORING

- **Temperatures**
  - Top & Bottom Oil
  - Winding Hot Spots
  - Ambient
- **Bushing Health**
- **Cooling System**
  - Fan/Pump Current
  - Status Inputs
  - Loss of Power
- **Data Logging**
- **System Health Monitoring**
  - Internal Self-Checking
- **Tap Changer**
  - Position
  - Operation Counters
  - Temperature Differential
  - Drive Motor Monitoring
  - Contact Wear
  - Reversing Switch Operation
  - Hunting
- **Communications to Third Party Devices**
  - DGA and Moisture
  - Fiber Optic Temp.

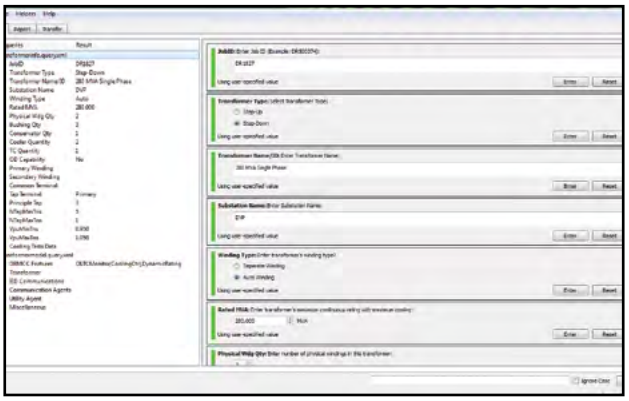
CONTROL

- **Cooling Control**
  - Automatic Control
    - Winding Temp
    - Top Oil Temp
  - Form C Relay Output for Fail-Safe Control
  - Cooling Stage Sequencing
  - Automated Cooler Exercising
- **Device Control**
  - Local (User Display or Hardwired Controls)
  - Remote (via SCADA)
- **Voltage Control**
  - Paralleling Options
    - Master/Follower
    - Reverse Reactance
    - Circulating Current
  - Line Drop Compensation
- **Alarms**
  - Standard Alarms and Trips
  - Configurable Misc. Alarms
  - Major/Minor Groups

COMMUNICATIONS

- **iBridge Networking Solution**
  - Use snap-on inductive couplers to transmit data over existing wires
  - Seamlessly transmit and deliver data from the C50, IEDs, RTUs, cameras, and more
  - 128-bit encryption for enhanced security
- **USB Connectivity**
  - USB connection for local device configuration
  - Automatic config & data download to USB drive
- **Ability to Test SCADA**
  - Serial (Half or Full Duplex)
    - Fiber, RS-485, RS-232
    - Protocols: DNP 3.0, Modbus, IEC 61850
  - Ethernet
    - Copper, 10/100 Base T; Fiber, 100 Base FX; Ethernet over USB
    - Protocols: IEC-61850, DNP 3.0, Modbus
  - SCADA Test Utility

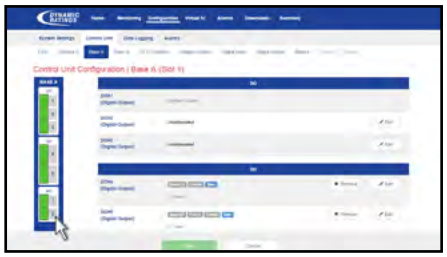
CONFIGURATION

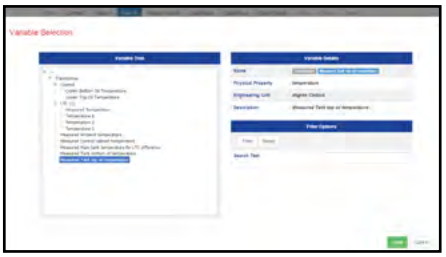


The C50 performs a variety of self-checks on power-up, automatically detecting newly installed modules.

The configuration process is streamlined to ensure you only spend time configuring functions and settings that are relevant to your application. You can copy configurations from other C50s you've programmed, allowing for easy large-scale deployment.

After a C50 has been configured for the first time, you can further change settings by clicking the image of a module in the C50's webpages. Each module has its own screen and offers clear configuration options.





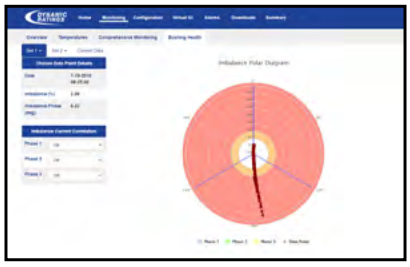
Click a module → Configure to your needs → Apply changes

REVIEW REAL TIME DATA

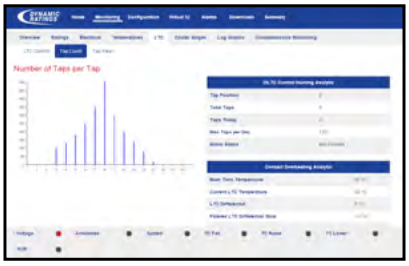
The built-in dashboard provides real-time data to track system status and alarms, no software tool required. You can view data history, and configure responses and reactions to changing conditions of your asset. The C50 can be configured to communicate with and retrieve information from major DGA brands.

Electrical Data

Measured and Calculated Temperatures



Bushing Health



Tap Wear Data

DGA IED Analytics

Alarms

CONTROL UNIT

Two frame sizes offered:

- C54 supports four expansion cards
- C59 supports nine expansion cards

Each C50 control unit is comprised of:

- CPU module
- Communications module
- One or more expansion cards (I/O)
- Universal input power supply module

CPU MODULE

- USB port allows configuration using a standard cable
- 10/100 Base T (RJ45) and fiber optic (FX) with a built in switch allowing connection to a PC without disrupting the second connection

COMMS MODULE

- Two RS-485 ports and one optional port that can be RS485, RS232 or serial fiber.
- Can simultaneously operate as either a master or a slave, consolidating information from other devices. This is frequently used for connection to DGA sensors.

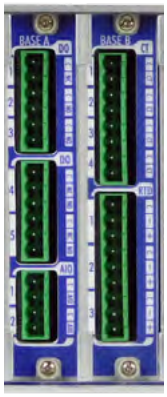
POWER SUPPLY

- 110-240 VDC or 110-250 VAC
- 48 VDC and other voltages available on request
- 24 VDC output to provide the wetting voltage to 4-20 mA sensors

USER DISPLAY

Review alarms and historical data, change settings or modes, and perform control through this hardened interface unit.

- High contrast backlit display provides easy visibility, even in direct sunlight
- Large 1/4" tall text is easy to read
- Shortcut keys provide quick access to inspection information including min/max temperatures and tap position
- Graphical capabilities provide an easy-to-understand display of voltage or temperature information
- Extended temperature range for operation -40°C / -40°F to 70°C / 158°F
- Password protection capability offers additional security of control or alarm settings



COOLING CONTROL / MONITORING

- Monitor top oil temperature and up to three winding temperatures
- Cooling control utilizes Form C relays, offering a fail-safe system design
- Monitor fans and pumps allowing remove indication of cooling system failures
- Analog input/output - typically used for OLTC tap position monitoring or other transducer inputs/outputs

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ANNUNCIATOR / DATA CONSOLIDATION

- Monitor alarm and other status points on the transformer
- Simplify substation wiring by consolidating all alarm indications and transmitting to SCADA over a single communications connection
- Supports multiple SCADA connections offering the ability to send critical alarms to operations and less critical alarms or diagnostic information to the maintenance or asset health team

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ADDITIONAL ALARM / CONTROL CONTACTS

- Expand the basic control system by adding additional form C relay output
- Retransmit alarms to SCADA via hard-wired connections
- Connect local indicator lights or alarm horns to quickly indicate desired conditions

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OLTC MONITORING

- Monitoring OLTC differential temperature to identify tap changer problems
- OLTC motor current monitoring to identify problems with the drive mechanism or the motor
- OLTC contact wear calculated for each tap position
- OTLC counter including a counter for each fixed tap position and total tap count
- Reversing switch alarm indicates when the reversing switch has not operated within a specified time
- Resettable electronic drag hands make monthly inspections easier

BUSHING HEALTH MONITORING

Continuous on-line monitoring of bushings provides real-time information of bushing capacitance and power factor which can result in early detection of possible failure.

Temperature Correlation: The bushing module collects top oil temperature, and load current to provide a correlation with the bushing condition. This allows the system to reveal whether there is a specific inception point where the equipment deterioration accelerates.

Discrete Readings: The bushing module provides a discrete reading for each bushing.

Diagnostic Web Pages: Data trends and diagnostic information available via the built-in web pages. Further detail analysis available via free software tool.

Diagnostic Software: Each system is provided with diagnostic software capable of providing polar plots, trending and data correlation making it easy to diagnose the severity, rate of change and whether the deterioration has a correlation to temperature or load.

Superior Sensor Design: Robust, weatherproof sensor has three levels of protection including a fail-safe protective circuit which grounds the test tap at the bushing.

VOLTAGE CONTROL

Voltage control can be integrated into the system with the addition of the voltage control module.

- Line drop compensation using R and X settings
- Time delay in either definite or inverse
- Inter-tap delay feature

Paralleling is supported using any of the following methods:

- Circulating current
- Reverse reactance
- Master follower with the advantage that the inter-transformer communications are achieved through one fiber connection.

HARDWARE GUIDE

DR-C54

DR-C59

	Base System	Expansion Cards									Serial Communications
		1	2	3	4	5	6	7	8	9	
C5 -											-

Base System

4	Base system and up to four optional expansion cards.	4
9	Base system and up to nine optional expansion cards.	9

Optional Expansion Cards

N	None: One blank slot cover.	N	N	N	N	N	N	N	N	N
A	Base A: Two form A relay outputs, one form B, two form C, and two DC analog inputs/outputs.	A	A	A	A	A	A	A	A	A
B	Base B: Three RTD inputs and four CT inputs.	B	B	B	B	B	B	B	B	B
C	Digital Input: Thirteen digital inputs.	C	C	C	C	C	C	C	C	C
D	Digital Output: Five form C relay outputs.	D	D	D	D	D	D	D	D	D
E[1]	Voltage Control: One voltage transformer (VT) input, three current transformer (CT) inputs, three digital inputs, and two form A outputs.	E	E	E	E	E	E	E	E	E
F[1]	OLTC Monitoring: Two RTD inputs, four digital inputs, and OLTC motor current.	F	F	F	F	F	F	F	F	F
G[1,2]	Bushing Health Monitoring: Six BAU sensor inputs with ability to monitor 3 or 6 bushings (requires two slots).	G	G	G	G	G	G	G	G	G

Serial Communications Options

0	Two RS-485 ports	0
1	Two RS-485 ports and fiber optic serial	1
2	Two RS-485 ports and RS-232	2
4	Three RS-485 ports	4

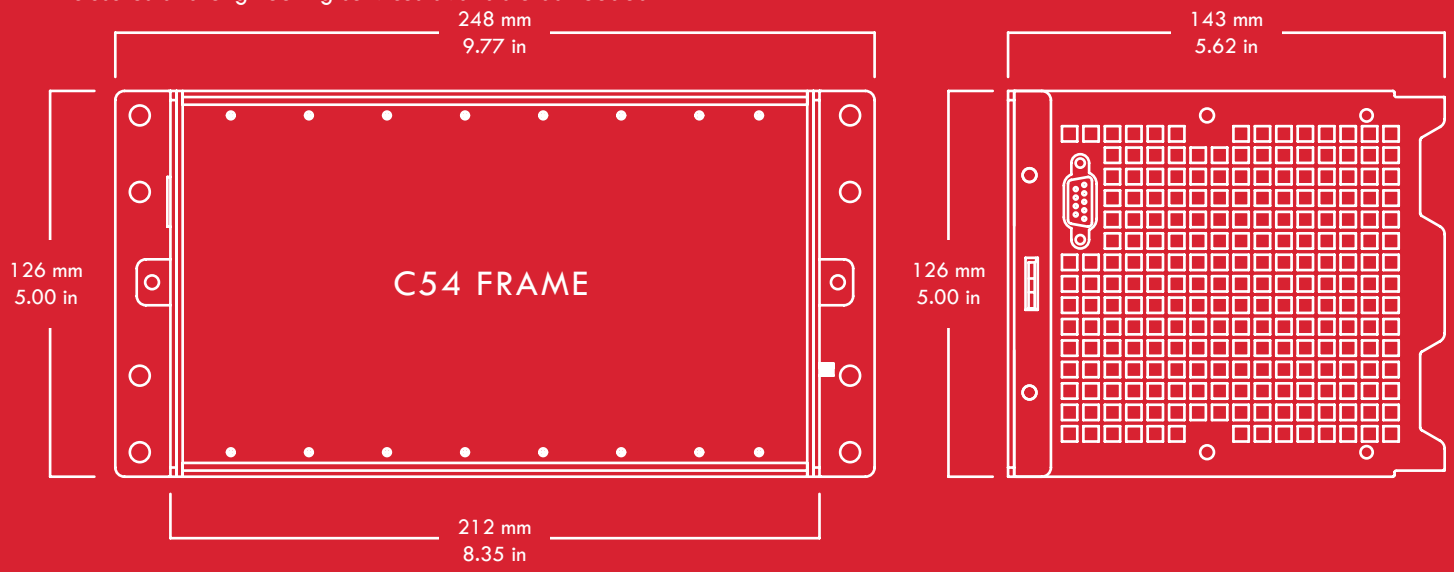
[1]Select no more than one of each card per system.
[2]This module occupies two card slots.

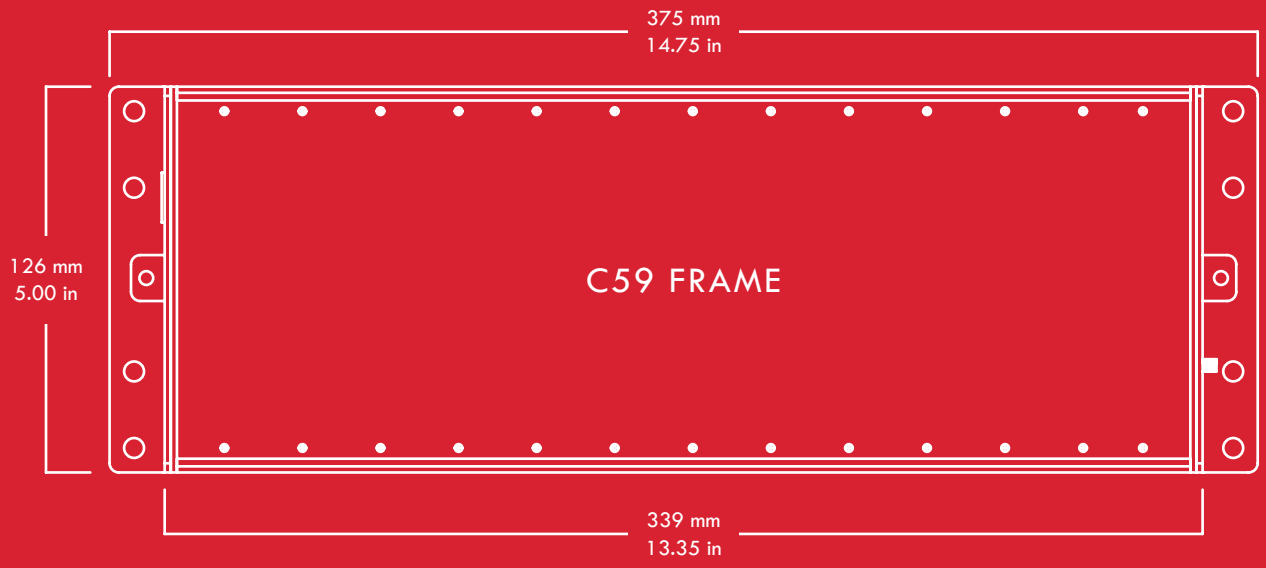
SPECIFICATIONS

Power Requirement:	110-240 VDC or 110-250 VAC 50/60 Hz
Control Unit Temperature Range:	-40°C to +70°C / -40°F to +158°F
User Interface Temperature Range:	-40°C to +70°C / -40°F to +158°F (includes built in heater)
Control Unit Mounting Options	DIN rail, panel mount
Interface Unit Mounting Options	DIN rail, panel mount, 19" rack mount

DIMENSIONS

Enclosures and engineering services available as needed.





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ISO 9001 Quality Management

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