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C50 SERIES CONDITION MONITORING AND CONTROL SOLUTION

NOW AVAILABLE WITH INTEGRATED BUSHING MONITORING AND PD SUPPORT

PQE

POWERSYSTEM SDNBHD ۲

ASSET HEALTH SOLUTIONS

AFFORDABLE. EFFECTIVE. CONVENIENT.

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ASSET MONITORING MADE EASY.



MONITORING		
 Temperatures 	Tap Changer	
 Top & Bottom Oil 	• Position	
 Winding Hot Spots 	 Operation Counters 	
 Ambient 	 Temperature Differential 	
 Bushing Health Partial Discharge 	 Drive Motor Monitoring Contact Wear Reversing Switch 	
Monitoring	Operation	
 Cooling System 	• Hunting	
 Fan/Pump Current 	Communications to	

- DGA and Moisture
- System Health Monitoring
 - Internal Self-Checking

Status Inputs

Loss of Power

• Data Logging

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Third Party Devices

- Fiber Optic Temp.
- Smart Device

Integraton

CONTROL Cooling Control

- Voltage 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)

- Paralleling Options - Master/Follower **Reverse Reactance**
 - Circulating Current

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- Line Drop
 - Compensation

• Alarms

- Standard Alarms and Trips
- Configurable Misc. Alarms
- Major/Minor 0
- 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
 - DNS
- SCADA Test Utility

CONFIGURATION

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s Helpers Help			
Report Transfer			
whites	Repult		
noformerinfo.gueryami		JohID: Enter Job ID (Example: DR500374):	
JobiD	DR1827	DR1827	
Transformer Type	Step-Down		
Transformer Name/ID	280 MVA Single Phase	Using user-specified value	Enter Reset
Substation Name	DVP		(
Winding Type	Auto	Transformer Turner Falset Transformer Turner	
Rated MVA	280.000	The second	
Physical Wdg Qty	2	© 5182-00	
Bushing Qty	3	Step-Dean	
Conservator Qty	1	Drive merumented value	Enter Denat
Cooler Quantity	2		
TC Quantity	1	I Transformer Henry ODE Takes Transformer Henry	
OD Capability	No	tradiumiter same/autorite rationale	
Primary Winding		280 MilA Single Phase	
Secondary Winding			
Common Terminal		Lang user-specified value	Enter Report
Tap Terminal	Primary		
Principle Tap	3	Substation Name: Enter Substation Name:	
NTepMinTrs	5	20	
NTepMaxTos	1	U.F	
VpuMinTns	0.950		
VpuMaxTro	1.050	Gaing user-specified value	Enter Reset
Cooling Tests Data			
nsformermodeLquerycomi		Winding Type: Enter transformer's winding type?	
DRMCC Features	OLTCMonitor, CookingCtrl, DynamicRating	Separate Winding	
Transformer		R Auto Window	
IED Communications			
Communication Agents		Using user-specified value	Enter Reset
Utility Agent			
Miscellaneous		Rated HVA: Enter transformer's maximum continuous rating with maximum cooling:	
		280,000 O MVA	
		La	
		Using user-specified value	Enter Reset
		Physical Wdg Qby: Enter number of physical windings in this transformer:	
		2 1	
			Sprore Case
			-

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. It tracks, stores and reports installed firmware revision levels.

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 web pages. Each module has its own screen and offers clear configuration options.



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.



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
 - $\ ^{\bullet}$ 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

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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

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

Top Oil	47.00 'C 🕤	
Wdg Hot Spot	54.92 'C	F2 ENTER
Load	581.15 A .	
RESTALM PAN SVO	00.48 AM	F4)

- 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

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- Monitor top oil temperature and up to three winding temperatures
- Cooling control utilizes Form C relays, offering a failsafe 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

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 critical conditions

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
- OLTC 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



BUSHING HEALTH MONITORING

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

- Temperature Correlation
- Discrete Readings
- Diagnostic Web Pages
- Diagnostic Software
- Superior Sensor Design



PARTIAL DISCHARGE MONITORING

Continuous online partial discharge monitoring provides real-time data about PD occurrences and magnitude. Compliments DGA data analysis by adding more information for context and correlation.

- Temperature Correlation
- Discrete Readings

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- Diagnostic Web Pages
- Diagnostic Software
- Superior Sensor Design



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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





C59

HOW TO ORDER

To order contact your regional sales office. Contact information is found on the back page.



Base System

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

Optional Expansion Cards³

- None: One blank slot cover.
- A Base A: Two form A relay outputs, one form B, two form C, and two DC analog inputs/outputs.
- **B** Base B: Three RTD inputs and four CT inputs.
- C Digital Input: Thirteen digital inputs.
- D Digital Output: Five form C relay outputs.
- E¹ Voltage Control: One voltage transformer (VT) input, three current transformer (CT) inputs, three digital inputs, and two form A outputs.
- **F**¹ OLTC Monitoring: Two RTD inputs, four digital inputs, and OLTC motor current.
- **G**^{1,2} Bushing Health Monitoring: Six BAU sensor inputs with ability to monitor 3 or 6 bushings (requires two slots).

Serial Communications Options

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

¹Select no more than one of each card per system.

²This module occupies two card slots.

³For PD and Bushing Monitoring, contact your local sales office for order information

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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 $+70^{\circ}$ C / - 40°F to $+158^{\circ}$ F (includes built in heater)
Control Unit Mounting Options	DIN rail, panel mount
Interface Unit Mounting Options	DIN rail, panel mount, 19" rack mount

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DIMENSIONS

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Enclosures and engineering services available as needed.



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