QUALITROL BCM Breaker condition monitor

TECHNICAL SPECIFICATIONS - PERFORMANCE

BCM front panel LEDs
User defined LEDs 1, 2, 3, 4
User defined monitored condition status
SF6 Low
Low density/pressure for SF6 gas
Recording
Confusion SF, density, due to to shock, pressure, temperature, humidity (leakpage)

Storage
Data storage memory 8 GBytes standard

Comms
Hardware media types
SD-450 copper or fiber Ethernet, 2 x USB ports, 2 x RS-485 ports
for remote USB information
Protocols
DHCP over web or over TFTP: ICMP, SNMP, Secure File Transfer Protocol (SFTP)
Time sync inputs
1 MHz burst immunity to noise, 2.5 kV EMI / RFI immunity

Environmental
Ambient operating temperature
-40° C to +85° C [-40° F to +257° F]
Storage temperature
-55° C to +125° C [-67° F to +257° F]
Humidity
5 - 97% Non-Condensing
Enclosure rating
IP50 (for installations inside breaker control cabinet)
Optional IP67 enclosure for external mounting

Integrity
EMC test compliance
Confirms to relevant standards for monitoring / control equipment in HV substations

Mechanical
Dimensions (not inc. sweepline)
200mm (W) x 375mm (L) x 63.5mm (H)
[8" x 14.75" x 2.5"
Weight
1.4 kg (3.08 lbs)

QUALITROL BCM Breaker condition monitor

**Comprehensive next generation breaker condition monitor**

- 18 analog and 10 digital input channels to monitor all important parameters of breaker condition
- Enable condition based maintenance based on real time condition monitoring of the circuit breaker
- Standard analytics performed on every breaker operation depicting accurate condition of the circuit breaker including key conditions: breakdown, damaged trip and close coils
- Sticking coil anomalies
- Mid-adjusted trip levers
- Slow breaker mechanisms
- Auxiliary contacts out of adjustment
- Battery charging and CC supplies problems
- Excessive arcing time and re-strike detection

**Smart and quick real time alarming & alerting mechanisms**

- Extreme environment support for wide operating temperature range -40°C to +60°C
- Types tested for all substation level EMC and environmental standards
- Maintenance free – with no replaceable batteries, solid state storage with no moving parts. No periodic testing and calibration requirements

- 3 analog relay outputs for integration into SCADA, local reclosers
- Built-in alarm logging and reporting engine with advancd trend and heat maps
- All alarms and events are stored in a log to be retrieved by remote users
- Standard web browser based alarm configuration

**Advanced monitoring software**

- Automatic and manual review of the recorded, recent summaries and alarm data
- Graphical manipulation of records based on time and magnitude zoom
- Multiple records can be overlaid for comparison purposes
- Mobile communication hardware using GPRS (GPS, 3G, UMTS), RS-485 for wired use, Fiber or TCP/IP for wireless use
- Built-in for support of OPC, OPC-UA and IEC 61850 protocols

**Other key benefits**

- Support for built-in IEEE 1588 PTP and NTP time synchronization protocols
- Added benefit of fault recording
- Built-in 128 samples per cycle waveform capture for all channels provides an added benefit of fault recording
- Support for built-in IEEE 1588 PTP and NTP time synchronization protocols
- 1-MHz accurate clock accurate to time-stamped samples and events
- Recording high resolution fault records can be used to validate the magnitude and duration of faults
- Built-in support for travel transducers measuring precise breaker mechanism movement. An alternative virtual travel transducer features calculates the breaker motion between breakers lacking a travel transducer interface.

**The BCM records the signals that are common to every control circuit and breaker mechanism movement for breakers lacking a travel transducer interface**

**Continuous monitoring of key parameters providing early diagnostic for faults**

- Avoid catastrophic failure and the associated costs of outages by monitoring conditions daily over time to discover changing and unusual patterns in breaker behavior.
- The BCM system acquires and trends data continuously and stores it for future analysis. The system can acquire the following information:
  - Auxiliary contact opening and closing times
  - Auxiliary contact bouncing times
  - Trip and close coil current profiles
  - Mechanism operating speed
  - Maximum and minimum battery voltage
  - Battery charger problems including ripple
  - 3 phase fault currents
  - Heated stroke and pressure data

**Flexible breaker monitoring, identifying specific breaker need monitoring attention**

- User defined alarm outputs helps in detecting the criterion for breaker condition assessment
- Easy and automatic reporting at breaker level to station level
- Tight integration with Qualitrol’s iSGM and S-12 software for centralized, comprehensive SP, and breaker trend monitoring

**Provide forensic evidence to help prioritize bad-actor replacement programs**

- Provides evidence for replacements or relamping based on real-time monitoring of breakers from various OEMs and utilities
- Repetitive pattern recognition for bad conditions using centralised SensorSoft software
- Records deviations from OEM’s stated breaker nameplate information

**Long life design to withstand harsh UHV breaker environments**

- Designed to be suitable for EHV and UHV substation environment
- Designed for easy retrofit and new installations
- IPSV rated enclosures for easy mounting inside existing breaker control cabinet. Optional enclosure options available for standalone installations

**Technical specifications - Power Supply**

- Universal power supply
  - Input range: 85 - 264 VAC, 50 - 60 Hz
  - Line frequency: 45 - 55 Hz and 55 - 60 Hz operating range

**Technical specifications - Inputs**

- Analog inputs
  - 3-phase current: 3 channels, line, low energy inputs using external split core CTs
  - Close coils: 3 channels, 0 - 1 VDC, Coil P/N 200311 or Hall Effect equivalent
  - Trip coils: 3 channels, 0 - 1 VDC, Coil P/N 200311 or Hall Effect equivalent
  - Battery voltage: 85 - 264 VAC, 50 - 60 Hz operating range
  - 3-phase voltages (optional): 2 channels with isolation transformers, 283 VAC, 120 VAC, 60 VAC
  - Travel transducer (optional): 1 channel, quadrature input
  - 1 channel, pressure/temperature input
  - 3 channels using Modbus RS-485 multi-functional sensors
  - Express values in bars, gr/ft, kgpm, relating temperature and power density
  - Inside inlet and outlet temperature: 1 channel, -59°C to +126°C (RTD or ± 20 VDC)
  - Motor currents: 3 channels using Modbus RTU RS-485
  - Motor currents: 3 channels, split-core CT or Hall Effect sensor equivalent

**Digital inputs for travel for analysis**

- Motor run time (optional): 1 channel, 1 - 16 second DC-stroke current through trip coils
  - Motor currents: 3 channels, split-core CT or Hall Effect sensor equivalent
  - Motor run time (optional): 1 channel, 1 - 16 second DC-stroke current through trip coils
  - Motor currents: 3 channels, split-core CT or Hall Effect sensor equivalent
  - Motor run time: 1 channel, adjustable between 1 second and 16 seconds per cycle

**User configurable alarm (optional)**

- Dry contact 0.5 A at 250 V AC / 0.2 A at 125 VDC

**Technical specifications - Outputs**

- Analytic output channel
  - BCM failure alarm (Relay #1): Dry contact 0.5 A at 250 V AC / 0.2 A at 125 VDC
  - Current failure alarm (Relay #2): Dry contact 0.5 A at 250 V AC / 0.2 A at 125 VDC
  - User configurable alarm (Relay #3): Dry contact 0.5 A at 250 V AC / 0.2 A at 125 VDC
Continuous monitoring of key parameters providing early diagnostic for failures

Accurate and early incipient fault detection, increasing circuit breaker availability

Comprehensive next generation breaker condition monitor

- 16 analog and 10 digital input channels to monitor all important parameters of breaker condition
- Enable condition based maintenance based on real time condition monitoring of the circuit breaker
- Standard analytics performed on every breaker operation depicting accurate condition of the circuit breaker involving key conditions:
  - Burned or damaged trip and close coils
  - Sticking coil annulments
- Multi-adjusted trip latches
- Slope breaker mechanisms
- Auxiliary contacts out of adjustment
- Battery charging and CD supplying problems
- Excessive arcing time and EMI detection

Advanced monitoring software

- Automatic and manual reviews of digital records, recent summaries and alarm data
- Graphical manipulation of records based on time and magnitude zoom
- Multiple records can be overlaid for comparison purposes
- Multiplex communication hardware using Ethernet (LAN) or Fiber, RS-485 via using copper cables or built-in Fiber and RS-232
- Built-in support for DNP3.0 and IEC 61850 protocols

Key other benefits

- 3 alarm relay outputs for integration into SCADA, local Annunciator, and/or Control Room
- Built-in support for IEEE 1588 PTP and NTP time synchronization protocols
- Built-in 128 samples per cycle waveform capture for all channels provides an accurate representation of the circuit breaker mechanism movement for breakers lacking a travel transducer interface
- Built-in support for travel transducers measuring precise breaker mechanism and duration of faults
- Resulting high resolution fault records can be used to validate the magnitude and duration of faults
- Built-in support for travel transducers measuring precise breaker mechanism movement. An alternative virtual travel transducer feature calculates the desired motion for breakers lacking a travel transducer interface
- BCM integrates the records that are common to each control circuit and therefore can be applied to any breaker regardless of manufacturer, type or size

Flexible breaker monitoring, identifying specific breaker, needing maintenance attention

- User defined alarm outputs helps in deciding the criteria for breaker condition assessment
- Easy and automatic reporting at breaker level to station level
- Tight integration with Qualitrol’s GISnet and Qualisys software for centralized, comprehensive SF6, and breaker monitoring

PROVEN TECHNICAL EVIDENCE TO HELP PRIORITIZE BREAKER REPLACEMENT PROGRAMS

- Provides evidence for replacements or retorfits based on fault monitoring of breakers from various Utilities and utilities
- Repetitive pattern recognition for failed conditions using centralized Qualisys software
- Records deviations from GISnet viewed breaker nameplate information

Long life design to withstand harsh UHV breaker environments

- Designed to be suitable for GIS and UHV substation environment
- Designed for easy retrofit and new installations
- IP67 rated enclosure for easy mounting inside existing breaker control cabinet. Optional enclosure options available for standalone installations

Extends environment support for wide operating temperature range -40°C to +70°C

- Types tested for all substation level EMc and environmental standards
- Maintenance free with no replaceable batteries, solid state storage with no moving parts. No periodic testing and calibration requirements

- 3 analog relay outputs for integration into SCADA, local Annunciator
- Built-in alarm logging and reporting engine with advodgede and reset functions
- All alarms and events are stored in log to be retrieved by remote users
- Standard web browser based alarm configuration
- Automatic and manual reviews of digital records, recent summaries and alarm data

Other technical specifications

- Analogue inputs: 6 channels, 0-5 VDC, 130 VAC, 260 VAC Split-Core CT, 80 VAC
- Digital inputs: 3 channels with isolation transformers
- Motor currents: supplied with breakers
- Trip coil current: 1 channel, trip coil current, 3-phase currents (optional)
- Heater currents: supplied with breakers
- Battery charging: supplied with breakers
- DC power requirements: 1 channel, battery voltage (optional)
- Air-gap temperature: supplied with breakers
- Inside control cabinet temperature: supplied with breakers
- Battery voltage: supplied with breakers
- Interfaces: Ethernet (LAN), Fiber, RS-485, Modbus, DNP3.0, IEC 61850
- User selectable threshold values: 3 channels, 1 - 10 mA, universal S/W selectable ranges
- 1 channel, quadrature input: 0-50 Ampere AC or DC Switch
- Battery voltages: supplied with breakers
- Motor currents: supplied with breakers
- Auxiliary contact bouncing times: supplied with breakers
- Auxiliary contact opening and closing times: supplied with breakers
- SF6 gas density: supplied with breakers
- SF6 pressure: supplied with breakers
- SF6 humidity: supplied with breakers
- Motor currents: supplied with breakers
- Backup trip initiation: supplied with breakers
- Digital encoder: 2 channels, quadrature input
- Analog inputs: 1 channel, quadrature input
- Analog outputs: 3 channels, 0-1 VDC, Coil P/N 9723701 or Hall Effect equivalent
- DC power: supplied with breakers

TECHNICAL SPECIFICATIONS - POWER SUPPLY

Universal power supply

- Input range: 85 - 306 VAC, 85 - 440 VDC

TECHNICAL SPECIFICATIONS - INPUTS

Analog inputs

- 3-phase currents
- 3 channels, line energy inputs using external split-core CTs
- Close coils
- 3 channels, 0 - 1 VDC, Coil P/N 9723701 or Hall Effect equivalent
- Trip coils
- 3 channels, 0 - 1 VDC, Coil P/N 9723701 or Hall Effect equivalent
- Battery voltage
- 3A/120VAC, 500VDC (100VDC - 600VDC)
- 5-pole voltages (optional)
- 2 channels with isolation transformers: 260 VAC, 130 VAC, 80 VAC
- Motor currents: supplied with breakers
- Inside control cabinet temperature: supplied with breakers
- Battery voltage: supplied with breakers
- Interfaces: Ethernet (LAN), Fiber, RS-485, Modbus, DNP3.0, IEC 61850
- User selectable threshold values: 3 channels, 1 - 10 mA, universal S/W selectable ranges
- 1 channel, quadrature input: 0-50 Ampere AC or DC Switch
- Battery voltages: supplied with breakers
- Motor currents: supplied with breakers
- Auxiliary contact bouncing times: supplied with breakers
- Auxiliary contact opening and closing times: supplied with breakers
- SF6 gas density: supplied with breakers
- SF6 pressure: supplied with breakers
- SF6 humidity: supplied with breakers
- Motor currents: supplied with breakers
- Backup trip initiation: supplied with breakers
- Digital encoder: 2 channels, quadrature input
- Analog inputs: 1 channel, quadrature input
- Analog outputs: 3 channels, 0-1 VDC, Coil P/N 9723701 or Hall Effect equivalent
- DC power: supplied with breakers

TECHNICAL SPECIFICATIONS - OUTPUTS

Analog outputs

- BCM failure alarm (Relay #1)
- BCM failure alarm (Relay #2)
- BCM failure alarm (Relay #3)
- User configurable alarm (Relay #4)
- User configurable alarm (Relay #5)
- User configurable alarm (Relay #6)

Motor run timer 1
- 1 channel, quadrature input
- User configurable alarm (Relay #1)
- User configurable alarm (Relay #2)
- User configurable alarm (Relay #3)
- User configurable alarm (Relay #4)
- User configurable alarm (Relay #5)
- User configurable alarm (Relay #6)

Motor run timer 2
- 1 channel, quadrature input
- User configurable alarm (Relay #1)
- User configurable alarm (Relay #2)
- User configurable alarm (Relay #3)
- User configurable alarm (Relay #4)
- User configurable alarm (Relay #5)
- User configurable alarm (Relay #6)

Motor run timer 3
- 1 channel, quadrature input
- User configurable alarm (Relay #1)
- User configurable alarm (Relay #2)
- User configurable alarm (Relay #3)
- User configurable alarm (Relay #4)
- User configurable alarm (Relay #5)
- User configurable alarm (Relay #6)

Heater current 1 (optional)
- 1 channel, quadrature input
- User configurable alarm (Relay #1)
- User configurable alarm (Relay #2)
- User configurable alarm (Relay #3)
- User configurable alarm (Relay #4)
- User configurable alarm (Relay #5)
- User configurable alarm (Relay #6)

Heater current 2 (optional)
- 1 channel, quadrature input
- User configurable alarm (Relay #1)
- User configurable alarm (Relay #2)
- User configurable alarm (Relay #3)
- User configurable alarm (Relay #4)
- User configurable alarm (Relay #5)
- User configurable alarm (Relay #6)

User configurable alarm (Relay #7)
- 1 channel, quadrature input
- User configurable alarm (Relay #1)
- User configurable alarm (Relay #2)
- User configurable alarm (Relay #3)
- User configurable alarm (Relay #4)
- User configurable alarm (Relay #5)
- User configurable alarm (Relay #6)

User configurable alarm (Relay #8)
- 1 channel, quadrature input
- User configurable alarm (Relay #1)
- User configurable alarm (Relay #2)
- User configurable alarm (Relay #3)
- User configurable alarm (Relay #4)
- User configurable alarm (Relay #5)
- User configurable alarm (Relay #6)

User configurable alarm (Relay #9)
- 1 channel, quadrature input
- User configurable alarm (Relay #1)
- User configurable alarm (Relay #2)
- User configurable alarm (Relay #3)
- User configurable alarm (Relay #4)
- User configurable alarm (Relay #5)
- User configurable alarm (Relay #6)

User configurable alarm (Relay #10)
- 1 channel, quadrature input
- User configurable alarm (Relay #1)
- User configurable alarm (Relay #2)
- User configurable alarm (Relay #3)
- User configurable alarm (Relay #4)
- User configurable alarm (Relay #5)
- User configurable alarm (Relay #6)

User configurable alarm (Relay #11)
- 1 channel, quadrature input
- User configurable alarm (Relay #1)
- User configurable alarm (Relay #2)
- User configurable alarm (Relay #3)
- User configurable alarm (Relay #4)
- User configurable alarm (Relay #5)
- User configurable alarm (Relay #6)

User configurable alarm (Relay #12)
- 1 channel, quadrature input
- User configurable alarm (Relay #1)
- User configurable alarm (Relay #2)
- User configurable alarm (Relay #3)
- User configurable alarm (Relay #4)
- User configurable alarm (Relay #5)
- User configurable alarm (Relay #6)
UHV breaker environments needing maintenance attention prioritize bad-actor replacement. Long life design to outlast harsh conditions. Provide forensic evidence to help diagnostic for failures. Continuous monitoring of key breaker condition monitor.

Qualitrol BCM Breaker condition monitor

Comprehensive next generation breaker condition monitor

- 16 analog and 10 digital input channels to monitor all important parameters of breaker condition
- Enable condition based maintenance based on real time condition monitoring of the circuit breaker
- Standard analytics performed on every breaker operation depicting accurate condition of the circuit breaker including key conditions: bottled or damaged trip and close coils
- Bonding coil anomalies
- Mis-set trip/limit
- Slow breaker mechanisms
- Auxiliary contacts out of adjustment
- Battery monitoring and CC supply problems
- Excessive arcing time and re-strike detection.

Accurate and early apparent fault detection, increasing circuit breaker availability

- Avoid catastrophic failure and the associated costs of outage by monitoring condition history to time to discover changing state and prevent potential issues before they escalate.
- The BCM system acquires and trends data continuously and stores it for long-term analysis.
- The system can acquire the data from any breaker in the substation environment and manages time for planned scheduling of repairs or replacement.
- Automatic comparison of each Trip and Close operation against a master ‘trip fingerprint’ and ‘close fingerprint’ of an acceptable Trip/Close operation to detect changes in breaker performance.
- The BCM system acquires and trends data continuously and stores it for future analysis. The system can acquire the data from any breaker in the substation environment.
- Auxiliary contact opening and closing time
- Auxiliary contact bouncing times
- Trip and close coil current profiles
- Mechanism operating speed
- Maximum and minimum battery voltage
- Battery charger problems including ripple
- 3 phase fault currents
- Breaker detection
- Accurate fault current sensing time (Tf) calculated for every pole
- A flexible solid state Platform provides data storage for every breaker application.

Comprehensive next generation breaker condition monitor

- Designed to be suitable for the D3/D2 and LVN substation environment
- Designed for easy retrofit and new installations
- IEC 61850 ready for easy mounting inside existing breaker control cabinet. Optional enclosure options available for standalone installations.

Smart and quick real time alarming / alerting mechanism

- Extreme environment support for wide operating temperature range: -40°C to +85°C
- Type tested for all substation level EMC and environmental standards
- Maintenance free – with no replaceable batteries, solid-state storage with no moving parts. No periodic testing and calibration requirements
- 3 serial relay outputs for integration into SCADA, local visualization
- Built-in alarm logging and reporting engine with advanced knowledge and fault diagnosis
- All alarms and events are stored in a log to be retrieved by remote users.
- Standard web browser based alarm configuration

Advanced monitoring software

- Automatic and manual review of the records, record summaries and alarm data.
- Graphical manipulation of records based on time and magnitude zoom
- Multiple records can be overlaid for comparison purposes
- Predictive combination hardware using Charger (BCM) or Fiber, RS-485 serial using copper cables or built-in Fiber and RS-232
- Built-in support for DNP3.0 and IEC 61850 protocols

Other key benefits

- Time synchronized per cycle waveform capture for each channel provides an added benefit of fault recording.
- Support for built-in IEEE 1648-2011 and STP four time phase synchronization with 1 millisecond accurate clock for time stamped samples and events.
- Resulting high resolution fault records can be used to validate the magnitude and duration of faults.
- Built-in support for travel transducers measuring precise breaker mechanism movement. An alternative virtual travel transducer feature calculates the position movement for breakers lacking a travel transducer interface.
- The BCM records the signals that are common to every contact point of the breaker and therefore can be applied to any breaker regardless of manufacturer, type or size.

Continuous monitoring of key parameters providing early diagnostic for failures

- Data from the BCM system can be used to provide real-time condition assessment of the breaker.
- 8 GBytes solid state storage provides lifetime data storage for each breaker.
- The BCM system acquires and trends data continuously and stores it for long-term analysis.
- Battery charging and DC supply problems
- Excessive arcing time and re-strike detection
- Slow breaker mechanisms
- Mal-adjusted trip latches
- Burned or damaged trip and close coils

Fluidic breaker monitoring, identifying specific breakers needing maintenance attention

- User defined alarm outputs helps in decelerating the criticism for breaker condition assessment.
- Easy and automatic reporting at breaker level to station level
- Tight integration with Qualitrol’s OMC and GSS2 software for centralized, comprehensive SP, and breaker monitoring.

Provide forensic evidence to help prioritize bad actor replacement programs

- Provides evidence for replacements or retirements based on fault monitoring of breakers from various OEMs and utilities.
- Repetitive pattern recognition for high volume cases using centralized GSS2 software.
- Records deviations from OEM’s stated breaker nameplate information.

Long life design to withstand harsh UHV breaker environments

- Designed to be suitable for the D3/D2 and LVN substation environment
- Designed for easy retrofit and new installations
- IEC 61850 ready for easy mounting inside existing breaker control cabinet. Optional enclosure options available for standalone installations.

Continuous monitoring of key parameters providing early diagnostic for failures

- Provides evidence for replacements or retirements based on fault monitoring of breakers from various OEMs and utilities.
- Repetitive pattern recognition for high volume cases using centralized GSS2 software.
- Records deviations from OEM’s stated breaker nameplate information.

Electrical input encoder for travel analysis

- Breaker mechanism travel stroke and velocity configuration
- Channel, stroke measured in mm, inches or degrees.
- Velocity calculated in meters/sec, feet/sec or degrees/sec
- 1 channel, quadrature input
- 2-phase voltages (optional)
- Battery voltage
- Heater current 1 (on/off)
- Heater current 2 (on/off)

Technical specifications - power supply

- Universal power supply
- Input range: 85 - 300 VAC & 80 - 400 VDC
- Line frequency: 45 - 55 Hz and 55 - 65 Hz operating range

Technical specifications - outputs

- Analog outputs
- BCM failure alarm (Relay #1)
- BCM trip alarm (Relay #2)
- User configurable alarm (Relay #3)

- Communication protocols
- DNP3.0, IEC 61850 Protocol
- Serial interfaces
- MODBUS RTU, MODBUS TCP, NTP, 10/100 Ethernet

- Built-in support for IEEE 1588-2008, NTP protocol
- Support for built-in IEEE 1648-2011 and STP four time phase synchronization with 1 millisecond accurate clock for time stamped samples and events.
- Resulting high resolution fault records can be used to validate the magnitude and duration of faults.
- Built-in support for travel transducers measuring precise breaker mechanism movement. An alternative virtual travel transducer feature calculates the position movement for breakers lacking a travel transducer interface.
- The BCM records the signals that are common to every contact point of the breaker and therefore can be applied to any breaker regardless of manufacturer, type or size.

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**TECHNICAL SPECIFICATIONS - PERFORMANCE**

**BCM front panel LEDs**
- User default LEDs 1, 2, 3, 4
- User defined monitored condition status
- SF6 Low
- Low density/pressure for SF6 gas

**Record Recall**
- New record available in BCM memory

**Breaker Warning**
- Breaker warning based on defined deviation from operating limits

**Breaker Alarm**
- Breaker failure alarm, duplicating the output contact, Relay 47

**BCM Health**
- BCM failure alarm, duplicating the output contact, Relay 48

**Recording Parameters**
- Continuous SF6 density, days to lockout, pressure, temperature, humidity (dewpoint)

**Storage**
- Data storage memory: 8 GBytes standard

**Comms**
- IEEE1588 PTP, NTP
- Secure File Transfer Protocol (SFTP)
- DNP3.0 over serial or over TCP/IP, IEC61850
- 1 x serial DB-9 connection
- RJ-45 copper or fiber Ethernet, 2 x USB ports, 2 x RS-485 ports

**Data storage Memory**
- 8 GBytes standard

**Environmental**
- Ambient operating temperature: -40°C to < +65°C [-40°F to +150°F]
- Storage temperature: -55°C to +125°C [-67°F to +257°F]
- Humidity: 5 - 97% Non-Condensing

**Enclosure rating**
- Optional IP67 enclosure for external mounting

**Frequency**
- 50 - 60 Hz Non-Condensing

**Enclosure**
- IP66, IEC60529 2-6-2

**Accuracy**
- BSM test compliance

**Compatibility**
- Conforms to relevant specifications for monitoring / control equipment in HV substations
- BS-IEC-EN 61850-3-4 (2008), BS-IEC-EN 61850-4-3
- BS-IEC-EN 61850-4-4
- BS-IEC-EN 61850-4-5
- BS-IEC-EN 61850-4-6
- BS-IEC-EN 61850-4-7

**Other**
- BS EN 61850-5-4 sections 8 and 7 (declassified, topic: IEC 60802-2-1)
- 1 MHz band immunity to noise, 20 mA VXI / VXI immunity

**Mechanical**
- Dimensions (not inc. mounting): 260mm (W) x 355mm (L) x 63.5mm (H) [10.03" x 12.4" x 2.5"]
- Weight: 1.4 kg (3.08 lbs)

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**About QUALITROL**
- Established in 1945, with continual improvement at the core of our business, QUALITROL provides smart utility asset monitoring and reporting.
- QUALITROL’s engineering and research team is comprised of over 100 experts using optional SmartSUB substation management software.
- We provide forensic evidence to help prioritize bad-actor replacement programs.
- Fleetwide breaker monitoring, identifying specific breakers needing maintenance attention.
- Long life design to outlast harsh UHV breaker environments.

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**Product Summary**
- Description: QUALITROL’s BCM is a continuous (on-line) condition monitoring system for 11kv to 1200kV Circuit Breakers.
- Our solution can provide monitoring for a single breaker to multi-site for thousands of breakers with centralized comprehensive monitoring and reporting.
- Application: The BCM system provides continuous monitoring for the overall health of circuit breakers.
- Allows corrective actions to be taken before any failure occurs.
- Optimize maintenance skills based on actual condition.
- Option to reduce replacement or repair expenditures.
- Ensure compliance to EPA SF6 monitoring expenditures.

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**Quality Assured**
- QUALITROL is a leading condition monitoring technology for Electric utilities assets.
- QUALITROL is a leading condition monitoring technology for Electric utilities assets.
- QUALITROL is a leading condition monitoring technology for Electric utilities assets.

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**Visitor Site Details**
- Visitors are invited to discuss our complete range of products and services with their local QUALITROL representative.
- Please contact your representative for an appointment or for further details.
- QUALITROL reserves the right to withdraw this offer at any time without notice.

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QUALITROL BCM Breaker condition monitor

**TECHNICAL SPECIFICATIONS - PERFORMANCE**

**BCM front panel LEDs**
- User defined LEDs 1, 2, 3, 4
- User defined monitored condition status

**Panel LEDS**
- Low density/pressure for SF₆ gas

**Record Hold**
- New record available in BCM memory

**Breaker Warning**
- Breaker warning based on defined deviation from operating limits

**Breaker Alarm**
- Breaker failure alarm, duplicating the output contact, Relay 40

**REO 1**
- REM 1 alarm, duplicating the output contact, Relay 91

**Recording Parameters**
- Continuous SF₆ density, days to lockout, pressure, temperature, humidity (dewpoint)

**Storage**
- Data storage memory: 8 GBytes standard

**Reporting**
- SF₆ emission forecast
- Automatic ‘fingerprint’ comparison of breaker characteristic
- Analysis and reporting by Qualitrol experts using optional SWARTM substation management software
- IEEE 1379-1999 COMTRADE export of graphics files

**Breaker characteristic**
- Continuous monitoring of key parameters providing detail diagnostic for failures
- Application of breakers with centralized comprehensive monitoring and reporting.
- Long life design to outlast harsh UHV breaker environments
- Provide forensic evidence to help prioritize bad-actor replacement programs
- Fleetwide breaker monitoring, identifying specific breakers needing maintenance attention
- Accurate and early incipient fault detection, increasing circuit breaker availability
- Continuous monitoring of key parameters providing detailed diagnostic for failures
- Optimize maintenance visits based on actual breaker condition
- Ensure compliance to EPA SF₆ monitoring expenditures
- Optimize or reduce replacement or repair expenditures
- Allows corrective actions to be taken before any failure occurs
- Option to reduce replacement or repair expenditures
- Available for 11kv to 1200kV Circuit Breakers.

**About QUALITROL**
- Established in 1945, with continual improvement at the core of our business, QUALITROL provides smart utility asset monitoring across the globe. We are the largest and most trusted global leader for partial discharge monitoring, asset protection equipment and information products across generation, transmission and distribution. At QUALITROL, we are redefining condition monitoring technology for Electric utilities assets.

**Product Summary**
- Description: Qualitrol’s BCM is a continuous (24x7) on-line condition monitoring system for single breaker to multi-site for thousands of breakers with centralized comprehensive monitoring and reporting.
- Application: The BCM system provides continuous monitoring for the overall health of circuit breakers.
- Allows corrective actions to be taken before any failure occurs
- Option to reduce replacement or repair expenditures
- Meets compliance to EPA SF₆ monitoring.

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**Dimensions (not inc. baseplate)**
- 500mm (W) x 575mm (H) x 260mm (D)
- Weight: 18 kg (40 lbs)