

BWatch

Digital Bay Monitoring for GIS up to 800 kV

Grid Solutions at GE Vernova makes the most of more than 75 years of experience in design, material selection, development, engineering, manufacturing, and servicing of Gas-Insulated Substations (GIS) and Lines (GIL).

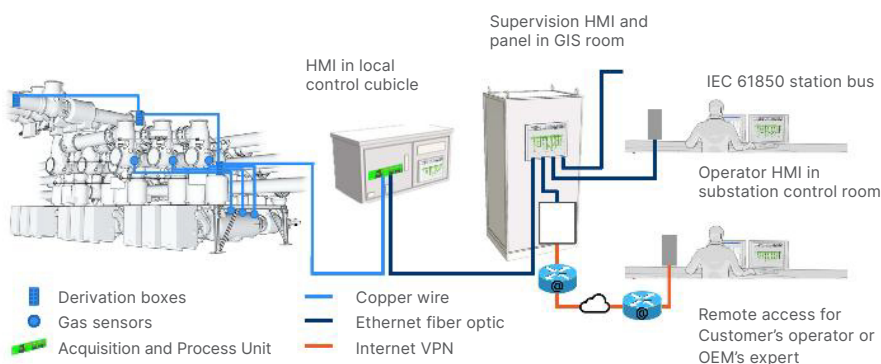
BWatch3 monitors gas density and switchgear status during operation and maintenance.

Environmental Friendliness

- Continuous monitoring, valid for leakage rates down to 0.1 % per year
- Valid for SF₆ and gas mixtures such as g³

High Reliability and Availability

- Extensive experience: 18,000 compartments monitored with BWatch3
- Internal arc localization for shortest unavailability
- Digital sensor and communication for real-time monitoring and auto-control
- Direct (pipeless) enclosure-to-sensor connection for accurate metering
- Phase-by-phase monitoring for faster event localization
- Recording of gas losses and top-ups for trend analysis



Advanced Modularity

- User-adjustable products (optimum / system) with a large range of features
- Several types of alarms and thresholds for maintenance scheduling
- Monitoring of switchgear (circuit breaker, disconnector, earthing switch)

Smart Grid Features

- Digital communication with SCADA
- Remote access for customer's and OEM's experts
- IEC 61850 capabilities
- Possible coupling with PDWatch (partial discharge assessment system)

Customer Benefits

- Personnel safety
- Savings via continuous gas monitoring
- Substation availability
- Asset management
- User-friendly HMI
- Remote access

B3Watch3 Range

BWatch3 Optimum enables condition-based asset management, through gas monitoring.

BWatch3 System goes a step forward with remote supervision, advanced data analysis and switchgear condition monitoring.

		OPTIMUM	SYSTEM
General Features			
Gas density monitoring		✓	✓
Gas temperature monitoring		✓	✓
Embedded GIS parameter setting		✓	✓
Density recording period	Day	30	Infinite
Density analysis period	Year	-	1 / Infinite*
Event recording period	Day	-	Infinite
Modbus/RTU communication to DCS		Optional	Optional
Ethernet communication (OPC server)		-	Optional
Internal arc localization		Optional	Optional
Time synchronization		-	Optional
Switchgear monitoring		-	Optional

ACQUISITION AND PROCESS UNIT (APU)			
Maximum number of connected sensors		3 × 10	Up to 64
Digital inputs		-	Up to 16
Digital outputs		-	Up to 128
Output setting		16	✓
Density sets		2	Up to 8

HMI			
Local		✓	Optional
Mobile PDA			Optional
• Bluetooth		Optional	Optional
• Wired		-	Optional
Mobile tablet (wired or Wi-Fi)		-	Optional
Supervision panel		-	✓
Remote (substation room/OEM's expert)		-	Optional



Local HMI



Supervision HMI



Mobile PDA



Mobile Tablet



BWatch3 Optimum APU with relays



Gas sensor - Indoor



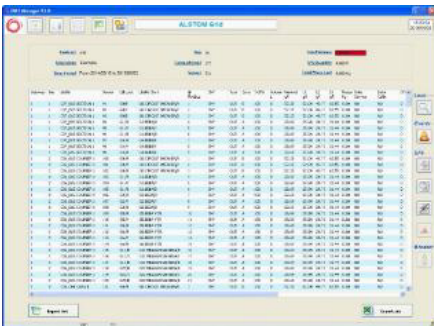
Gas sensor - indoor



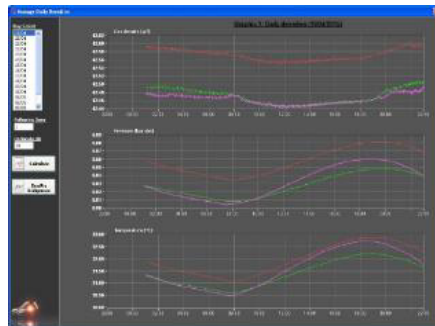
Derivation box - Indoor



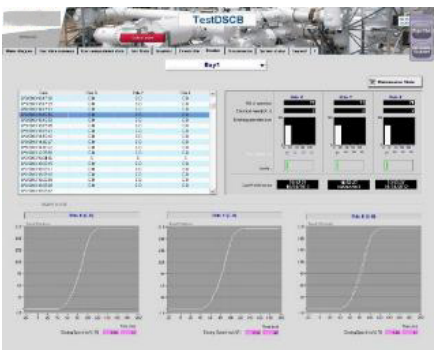
Derivation box - Outdoor



Event overview



Daily variations calculated from temperature and pressure monitoring



Circuit-breaker monitoring screen

Digital Gas Sensors

Each sensor, which measures both pressure and temperature, is installed directly on the enclosure. It guarantees the best accuracy and prevents major failure.

Our gas sensors are compatible with all GIS products on the market, be they single- or three-phase, and can be installed on existing substations (retrofit).

Derivation Box

Gas sensors are gathered by derivation boxes in daisy chain. They form a field bus connected to the APU, greatly simplifying wiring.

The APU, in the local control cubicle, can be connected to up to 30 sensors. Derivation box can be used to check any sensor with a reference sensor, without removing / unplugging any sensor.

Expert Manager Tool

To ensure the best asset management, BWatch3 users can also rely on our expert manager tool.

Lowest density variations are assessed with sophisticated algorithms. For instance phase data are analyzed to avoid temperature impact.

Switchgear Monitoring

BWatch3 monitors CB mechanical operations and electrical wear:

- Travel curve recording of each operation, including time and speed calculation
- Electrical wear computation (I2.t)
Operation counting by current range

Technical Features

EMC IMMUNITY STANDARDS	EMISSIONS STANDARD	COMMUNICATION STANDARDS
IEC 61000-4-2, 4, 5, 8, 16 Level 4	ENS5022 Class A	IEC 61869-1, -6, -7, -8, -9
IEC 61000-4-3, 6, 17 Level 3		

TEST DESCRIPTION	SOURCE STANDARD	GAS SENSOR	TRAVEL SENSOR	APU
Low Temperature	IEC 60068-2-1	-40°C	-20°C	-40°C
Dry heat	IEC 60068-2-2	110°C outdoor	80°C	55°C inside cubicle
Protection index	IEC 60068-2-30	IP67 indoor/IP68 outdoor	IP65	IP20
Shocks	IEC 60068-2-27	50g	40 g	25 g
Vibrations	IEC 60068-2-6	1 g/10 - 150Hz	1 g/10 - 150Hz	1 g/10 - 150Hz

Ratings*

GAS SENSOR		
Pressure		
Full measurement scale (FS)	abs bars	0-16
1 minute overpressure withstand	abs bars	20
Measurement resolution	% of FS	≤0.01
Long-term stability	% of FS	0.1
Accuracy	% of FS	≤0.01
Repeativity at 25°C	% of FS	<0.05
Endurance (0...100 % of FS at 25°C)	Nb of cycles	1,000,000
Temperature Measurement resolution	°C	0.1

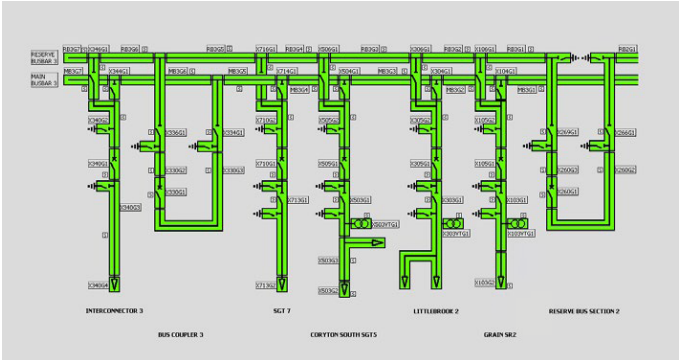
TRAVEL SENSOR		
Measurement angle	°	0-90
Independant linearity (at 20°C)	%	±0.25

APU		
Sensor bus length	m	up to 800
Acquisition cycle time		
Pressure	ms	300
Temperature	min	1
Density calculation time	s	2
Alarm forecast time	days	90
Communication speed (Modbus/RTU)		
Gas sensors	kbyte/s	115
Local HMI	kbyte/s	19.2
Distributed control system (optional)	kbyte/s	9.6

* Other data available

Internal Arc Localization

BWatch3 provides reliable localization of internal flashover if any. Most of the substation can be safely re-energized within a few minutes for optimum GIS availability.



Internal arc localization