B100

Transformer monitoring

Replaces up to five mechanical gauges, calculates the hot spot and controls staged cooling

B100

Electronic Temperature Monitor for Transformers

amperis

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General description and mechanical gauge replacement

IP66/NEMA-4 enclosure: stand-alone installation on the transformer tank.

Through-panel mounting in an existing cabinet (IP31/NEMA-2).

Surface panel mounting in an existing cabinet (IP31/NEMA-2).

All-in-one monitoring solution

The B100 is a complete monitoring solution for any distribution, transmission or generation transformer, whether new or retrofit. It replaces analogue indicators and gives an accurate picture of problems inside the transformer.

Replaces up to five mechanical gauges

Mechanical gauge needles for top oil, LTC oil and up to three winding hot spots stick over time, leaving the transformer without real protection. The B100 replaces these five gauges and stores the complete temperature and alarm history.

Improved reliability

If a problem occurs, the unit raises an alert that allows it to be corrected in time, instead of staying silent like a stuck needle. The cast aluminium enclosure withstands water, dirt, dust and temperature extremes, with a service life beyond twenty years and no recalibration.

Configuration without a computer

The four front-panel pushbuttons let you configure alarms and setpoints in the field or remotely, with no software installation: the unit is up and running within minutes. It is available in a stand-alone IP66/NEMA-4 enclosure or in a compact IP31/NEMA-2 panel format.

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Measurement, hot spot and thermal ageing

The B100 installed on a distribution transformer, calculating the hot spot and the ageing of the insulating paper in real time.

Measurement with RTD probes and current transformers

Two Pt100 RTD inputs measure top oil and ambient temperature, and up to three current transformers record the load of each winding, with an additional digital input for the dual-winding gradient.

Real-time hot-spot calculation

From the oil temperature and the load current, the firmware continuously calculates the hot-spot temperature of up to three windings, anticipating deterioration before a fault occurs.

Thermal ageing of the insulating paper

The B100 accumulates the estimated thermal ageing of each winding from the calculated hot spot, expressed as a fraction of the transformer's normal life, to help plan maintenance before a failure.

A service life beyond twenty years

The cast aluminium enclosure and the magnetic top-oil sensor need no recalibration or periodic maintenance, with a service life beyond twenty years even in ambient conditions from -40°C to +70°C.

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Staged cooling control, alarms and data logging

The B100 installed in a transformer control cabinet, alongside other auxiliary equipment.

Staged cooling control

The six configurable output relays drive staged cooling based on oil temperature, winding temperature or load current, and let you schedule periodic fan exercise cycles to prevent seizing.

Alarms, trips and voltage-free contacts

Each temperature input supports up to four configurable alarm levels, with tripping and remote notification, plus an additional relay dedicated solely to the general system alarm.

Historical logging and trends

The unit logs the complete history of temperatures, currents and alarm events, available in real time or for later download, making it possible to analyse trends and anticipate maintenance.

Readable display and simplified configuration

The backlit LCD display cycles through critical temperatures and is clearly readable from up to 60 feet, in bright sunlight or at night. LEDs under each relay make testing easy, and the configuration screens show a picture of the terminals alongside the settings.

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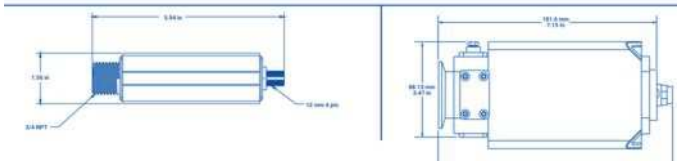
Hydrogen and moisture options

Hydrogen sensor installed on the transformer's oil sampling valve.



Dimensions of the hydrogen sensor (left) and the combined hydrogen and moisture sensor (right).

Detects insulating-paper deterioration early.

Early warning of gas-related faults

Hydrogen is the first fault gas generated inside the transformer, and its volume increases with the severity of the problem. The optional hydrogen sensor adds this early detection to the B100's temperature monitoring.

Fuel-cell and thin-film sensors

Fuel-cell sensors consume the hydrogen in the oil, while thin-film sensors do not alter its concentration and give more accurate readings; both can be installed in the oil phase or in the upper gas space, with a faster response in the latter case.

Moisture option: protects the insulating paper

Excess moisture reduces the dielectric strength of the insulating paper and the partial-discharge inception voltage. The combined hydrogen and moisture sensor also adds oil pressure and temperature measurement, with an RS-485 Modbus output.

Simple installation

The combined sensor's IP68 stainless-steel housing withstands extreme substation climates, with a ½″ NPT connection and adapters available for new or retrofit installations.

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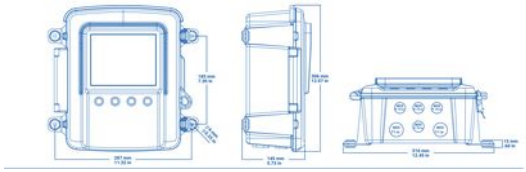
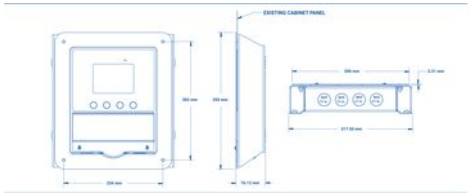
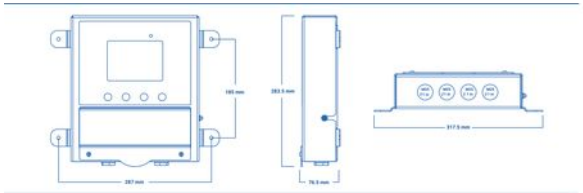
Installation and mounting



IP66/NEMA-4 enclosure: 287 × 296 × 129 mm, M20/M25 cable entries.



IP31/NEMA-2 through-panel mounting: 254 × 303 mm cut-out, 76 mm depth.



IP31/NEMA-2 surface panel mounting: 287 × 185 × 76.5 mm.

Magnetic mounting kit

The magnetic mounting kit for the instrument and the magnetic top-oil sensor make retrofit installations fast and simple, with no need to drill the transformer tank.

Threaded cable entries

The M20 and M25 cable entries take 3/4″ and 1″ glands depending on the model, with up to six entries available on the base depending on the configuration chosen.

Four fixing points with dampers

The enclosure is fixed at four points with dampers that absorb the transformer's vibration, extending the service life of the unit and its connections.

Existing panel or stand-alone enclosure

The IP31/NEMA-2 versions make use of an existing cabinet or panel, while the IP66/NEMA-4 enclosure is installed stand-alone directly on the transformer tank.

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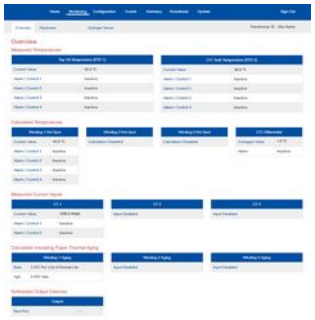
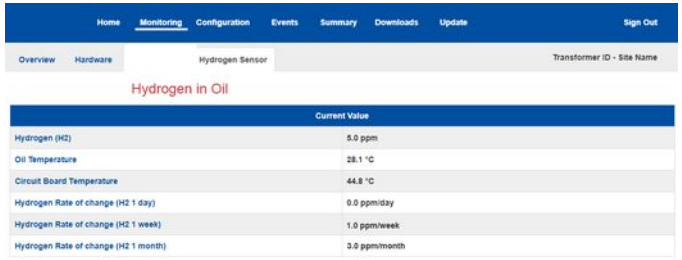
Web dashboard and communications



Web dashboard: measured and calculated temperatures, load currents and insulating-paper ageing in real time.



Hydrogen sensor tab: H2 reading, oil temperature and the rate of change per day, week and month.

Built-in web dashboard, no licences

The web dashboard embedded in the unit lets you view measured and calculated temperatures, alarms and the event history in real time from any browser on the customer's secure network, with no software installation or per-user licences.

Four alarm levels per input

Each measured temperature supports up to four configurable alarm levels from the dashboard itself, with the current value, the status of each relay and the activation history available for review.

Hot-spot calculation and trends

The dashboard shows the calculated hot spot of up to three windings, the LTC Delta T and the accumulated thermal ageing of the insulating paper as a fraction of the transformer's normal life.

SCADA communications over Ethernet and serial link

The B100 integrates with the control system via the DNP3, Modbus and IEC 61850 protocols, over copper or fibre Ethernet or an RS-485 serial link, and supports the iBridge system to transmit data over existing power wiring.

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B100 — TECHNICAL SPECIFICATIONS

Inputs	2 Pt100 RTDs (top oil and ambient); up to 3 CTs for load current; 1 digital input for gradient
Outputs	6 configurable digital relays (alarms, trips, cooling); 2 analogue outputs; 1 system alarm relay
Calculations	Hot spot for up to 3 windings; LTC Delta T; thermal ageing of the insulating paper
Communications	USB; copper/fibre Ethernet; optional RS-485; DNP3, Modbus and IEC 61850; optional iBridge over power wiring
Display	Backlit LCD, FSTN tempered glass with anti-UV coating; 30 mm digits; 15-segment bar graph; 20x4 character menu
Power supply	48-240 VDC or 110-240 VAC (50-60 Hz)
Environmental conditions	-40°C to +70°C; enclosure rated IP66/NEMA-4 (stand-alone) or IP31/NEMA-2 (panel)
Mounting	4-point with dampers; M20/M25 cable entries; optional magnetic mounting kit
Dimensions	287 x 296 x 129 mm (IP66/NEMA-4 enclosure); panel variants on the installation and mounting page

Optional hydrogen and hydrogen + moisture sensors (by variant)

Parameter	H2 dissolved in oil	H2 in gas space	H2 + Moisture
Measuring range	25-5000 ppm	25-5000 ppm (liquid equiv.)	H2: 25-5000 ppm
Accuracy	20% of reading or 25 ppm (greater)	500 to 25 ppm	20% of reading or ±25 ppm (greater)
Repeatability	10% of reading or 15 ppm (greater)	300 to 15 ppm	—
Operating temperature	-40 to +70°C	-40 to +70°C	-40 to +70°C
Storage temperature	-40 to +85°C	-40 to +85°C	-40 to +70°C
Oil temperature range	-40 to +105°C	N/A	—
Cross-sensitivity	< 1%	< 2%	—

The hydrogen and moisture sensor also adds oil temperature (-40 to +125°C, ±0.1°C), moisture (0-95% RS or 1-10,000 ppm, ±2% RS) and pressure (0-205 kPa, ±2% FS), with an RS-485 Modbus output and an IP68 stainless-steel housing.
Available accessories: CT-054 and CT-055 current transformers (1000:1, 5 A); MMTS-3C and MMTS-3W magnetic-mount temperature sensors; SE-060 RTD probe for a 1/2″ NPT thermowell; MMK-B100 magnetic mounting kit; CAB-0012 shielded cable; HDW-107 and HDW-108 DGA adapters.

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