Astute HV Monitoring® Technical Specifications

Astute HV Monitoring®

Our Astute HV Monitoring® service continually looks for issues within switchgear and cables. In particular Partial Discharge (PD), which is an early indicator of degradation, enabling users to take proactive action and avoid costly shutdowns.

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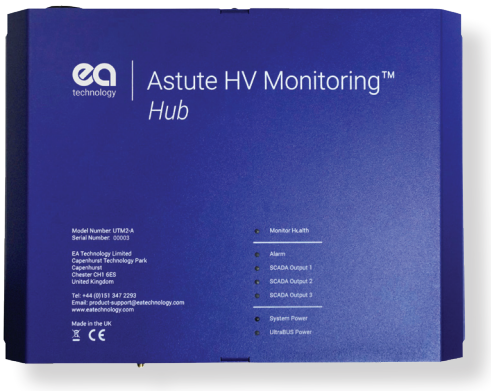
Technical Specification

Astute HV Monitoring®

Hub



The Astute® HV Monitor is a fully integrated, modular system that collects data on the condition of HV assets through a cohort of specialised sensors. This scalable system consists of multiple multi-sensor nodes connected to a central processing hub for monitoring and alerts.

The Astute® hub manages the data from up to 40 nodes and securely manages the processing and communication of the data to a central Astute® server for full analysis. The monitor, depending on configuration, can detect all types of partial discharge activity from within HV switchgear and cables, providing early identification of asset deterioration thus allowing developing faults to be addressed before they lead to failure.

The monitor is completely non-intrusive and requires no outage to install and no disruption to normal operation of the switchgear.

The Astute® HV Monitor hub sits at the centre of the monitoring system providing power, communication, data storage and analysis facilities. Each hub can support two separate mixed strings of up to 20 nodes in length. The system manages power and communication to these nodes allowing nanosecond accuracy in event location across each node.

- Provides power and communications to the Nodes
- Receives, collates, and analyses data from the Nodes
- Can support up to 80 TEV measuring points
- Can support up to 80 Ultrasonic measuring points
- Produces data display screens including:- Phase Resolved Partial Discharge (PRPD), TEV, Ultrasonic, HFCT and Environmental Level Trending, HFCT Waveform Capture, Ultrasonic Sound Files
- Indicates location and severity of all PD activity
- Multiple configurable alarms
- Windows® 10 operating system
- 8GB RAM
- 120GB SSD + 320GB data HDD
- Power supply 110/240V 50/60Hz
- Modbus TCP alarm integration available

Astute HV Monitoring® Hub
Technical Specification

POWER SUPPLY INPUT	
Voltage	100-240V AC (nominal)
Frequency	50-60 Hz (nominal)
Maximum Combined Power	370W
Fusing	2x Anti-surge (T) 5A Double Pole Fusing 1x Fast (F) 100mA

POWER SUPPLY OUTPUT	
Hub Unit Power	12V DC, Maximum 10A
Node Power	48V DC, Maximum 5.2A
Phase Reference	9V AC, Maximum 100mA, Short-circuit Protected
Fusing 12V DC	1x Anti-surge (T) 7A Fuse
Fusing 48V DC	1x Anti-surge (T) 8A Fuse

HUB INDICATORS	
System Power	1x Green LED
UltraBUS Power	1x Green LED
Monitor Health	1x Green LED
Alarm, SCADA Outputs 1-3	4 x Red LED

POWER SUPPLY INDICATORS	
System Power	1x Green Neon

CONNECTORS	
UltraBUS	4x RJ45
Ethernet	2x RJ45 Connector 10/100/1000Mb
USB	3x USB Type-A Socket
Auxiliary Power Comms	1x 6 Pin Lemo 1B
Power In	1x Neutrik 8 Pin speakON
VGA	1x Standard Female three row DE-15
RS485	1x Male DB9
RS232	1x Male DB9
SCADA/Alarm Volt Free Output	Header Weidmuller SL 3.5 - 6 pin
SCADA/Isolated Inputs	Header Weidmuller SL 3.5 - 4 pin
Chassis Earth	1x M4 Stud

POWER SUPPLY CONNECTORS	
Power Out	1x Neutrik 8 Pin speakON
Power In	1x Neutrik powerCON TRUE1

HUB VOLTS FREE CONTACTS	
Type	4x Fully isolated SPDT
Switching Voltage	AC/DC 5V – 48V
Switching Current	AC/DC 10mA – 5A
Connector	2x Weidmuller BL 3.5/4, Socket Block, Screw Terminals

HUB ISOLATED INPUTS	
Type	2x Opto-Isolated
Switching Voltage	12V – 90V DC
Connector	1x Weidmuller BL 3.5/4, Socket Block, Screw Terminals

ENVIRONMENTAL	
Operating Temperature	0 to +50 degrees C
Humidity	0 – 90% RH non-condensing
IP Rating	30

DIMENSIONS	
Size W x L x D	382mm x 260mm x 100mm (15 x 10.2 x 3.9 inches)
Hub Unit Weight	2.5kg (5.5lbs)
Power Supply Weight	4.2kg (9.2 lbs)

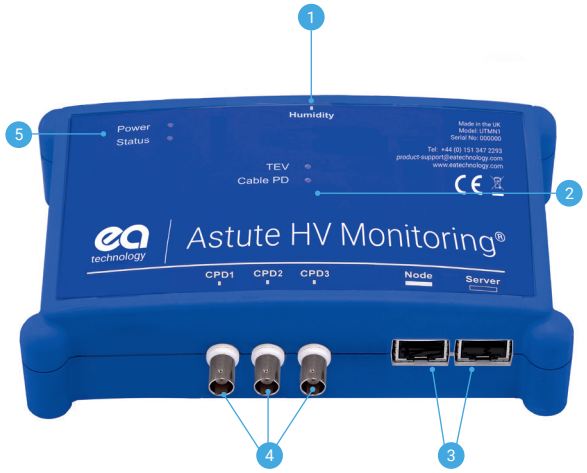
EMC / SAFETY	
Electrogmagnetic Compatibility (EMC)	EN 61326-1:2013 (Electrical equipment for measurement, control and lab use EMC requirements) EN 55032:2015 (Electromagnetic compatibility of multimedia equipment emission requirements) ETSI EN 301 489-17 V3.1.1 (EMC standard for radio equipment - Broadband Data Transmission Systems)
Safety	EN 61010-1:2010+A1:2019 (Safety requirements for electrical equipment for measurement, control and laboratory use)

Astute HV Monitoring®

Cable PD Node

The Astute HV Monitoring® Cable PD node brings the advanced capability of the market leading CableData® Collector to the monitoring world. Building and improving on the proven technology the Cable PD node provides connectivity for three HFCT sensors, each sampled at up to 160MHz with no multiplexing. Advanced, remotely configurable digital filtering enables detection of partial discharge from along the cable route.

The node also incorporates a TEV and contact temperature sensor for further testing of the switchgear panel. A further port allows environmental conditions to be monitored via an external temperature / humidity sensor.



1. External environmental sensor connection
2. Measurement alarm indicators
3. UltraBUS communication ports
4. Cable PD inputs
5. Power & status indicators
6. Cable tie slots
7. Magnetic mounting points
8. Internal TEV sensor
9. Contact temperature sensor

Astute HV Monitoring® Cable PD Node
Technical Specification

CABLE PD MEASUREMENT	
Sensor	3x HFCT
Maximum Cable Length Monitored	Cable construction dependent
Measurement Range	5pC to 144,000pC (with HFCT1-F50)
Measurement Type	Single-phase or Three-phase
Gain Ranges	4 (Auto-ranging)
Phase Reference	Automatic from Hub power supply
Sampling Rate	160MHz
Pass Band	3kHz to 41MHz
Precedence Resolution	25ns
Accuracy	±1 dB

TEV MEASUREMENT	
Sensor	Internal capacitive sensor
Measurement Range	0 to 60dBmV
Pass Band	3 to 80MHz
Resolution	1dB
Accuracy	±1dB
Precedence Resolution	1ns
Phase Reference	Automatic from Hub power supply

POWER SUPPLY	
Voltage	48 V dc
Power Supply	Powered through UltraBUS connection

ENVIRONMENTAL	
Operating Temperature	-20 to +50 degrees C
Humidity	0 to 90% non-condensing non-condensing
IP Rating	42 (EN 60529)

PHYSICAL	
Size	194 mm x 128 mm x 50 mm
Weight	0.52kg (1.1lbs)
Enclosure	Self-coloured injection moulded plastic case

INDICATORS / CONNECTORS	
Power LED	Tri-colour Red/Green/Amber LED
Status LED	Tri-colour Red/Green/Amber LED
TEV State	Tri-colour Red/Green/Amber LED
Cable PD State	Tri-colour Red/Green/Amber LED
Connectors	2x RJ45(UltraBUS communication) 3x BNC (Cable PD measurement) 1x Mini-USB (External temperature/humidity)

EMC	
Electromagnetic compatibility (EMC)	EN 61326-1:2013 (Electrical equipment for measurement, control and lab use – EMC requirements) EN 61000-6-2:2019 (EMC Immunity for industrial environments) EN 55011:2016+A1:2017 (ISM equipment – radio-frequency disturbance characteristics – limits and methods of measurement)

Astute HV Monitoring®

Node

The Astute HV Monitoring® node is ideal for monitoring HV switchgear, incorporating two transient earth voltage (TEV) sensors, two Ultrasonic sensors, along with an HFCT, environment and contact temperature sensor.

1. External environmental sensor connection
2. Measurement alarm indicators
3. UltraBUS communication ports
4. Aux power input
5. Cable PD input
6. Ultransonic input
7. External TEV input
8. Power and status indicators
9. Magnetic mounting points
10. Internal TEV sensor
11. Contact temperature sensor
12. Cable tie slots

Astute HV Monitoring® Node
Technical Specification

TEV	
Measurement Range	0 – 60 dBmV
Pass Band	3 to 80 MHz
Pulse Polarity	Positive or negative
Resolution	1dB
Accuracy	±1dB
Precedence Resolution	1ns
Number of Channels	2 per node

INDICATORS	
Power LED	Bi-colour Red/Green LED
Status LED	Bi-colour Red/Green LED
TEV State	Bi-colour Red/Green LED
Ultrasonic State	Bi-colour Red/Green LED
Cable PD State	Bi-colour Red/Green LED

ENVIRONMENTAL	
Operating Temperature	-20 to +50 degrees C
Humidity	0 – 90% RH non-condensing
IP Rating	42

DIMENSIONS	
Size	155 x 135 x 55mm
Weight	0.45kg (1lbs)

ULTRASONIC	
Measurement Range	-7 dBµV to 68dBµV
Resolution	1dB
Accuracy	±1dB
Transducer Sensitivity	-65 dB (0dB = 1volt/ µbar rms SPL)
Transducer Centre Frequency	40 kHz
Transducer Diameter	16mm
Number of Channels	2 per node

CONNECTORS	
Power and Comms Signals	2x RJ45
External TEV Sensor	1x BNC socket
Ultrasonic Sensor	2x 5-pin Lemo socket
Cable PD Sensor	1x 3-pin Lemo socket
Relative Humidity Sensor	1x mini USB
Aux Power Connector	1x 2-pin Lemo socket

POWER SUPPLY	
Low Voltage DC	48V, 80 mA

EMC	
Electromagnetic Compatibility (EMC)	EN 61000-6-3:2007+A1:2011 (EMC Emission standard for residential, commercial and light-industrial environments) EN 61000-6-2:2005 (EMC Immunity for industrial environments)

Global Footprint

EA Technology is an engineering and technology business that provides intelligent energy solutions for designers, installers, operators, and owners of power network assets.

Founded in 1966 we have over 50 years' experience in the industry and 5 regional offices around the world to support our global customer base.

We work with a lot of our clients on a long-term basis to help them safeguard their power networks.

We advise our clients on strategy and implementation of a range of technology solutions to manage power assets, delivering maximum life and minimise cost.

For further information and advice please contact us on

+61 (0) 7 3256 0534 or **au.sales@eatechnology.com / www.eatechnology.com.au**

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EA Technology Australia
381 MacArthur Avenue,
Hamilton, QLD, 4007
PUBLIC

t +61 (0) 7 3256 0534
e au.sales@eatechnology.com
www.eatechnology.com.au
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