GE VERNOVA

FACT SHEET

MARK VIe* UCSE

Outcome optimizing control for power plants

Key Benefits

- **Reduced risk.** Built on the strong foundation of GE Vernova's 40 years' experience providing real-time, deterministic controls for the world's industrial assets. The controller is secure by design, enabling secure operations.
- **Reduced lifecycle cost.** Advanced capabilities simplify system architecture and reduce applied engineering costs. Further costs are reduced with embedded PROFINET, allowing for dedicated I/O to be chosen for application specific needs.
- **Optimized business outcomes.** Embedded Field Agent technology allows for secure connection to the Industrial Internet, leveraging data to analyze and optimize business operations

Designed for Real-world Demands

GE Vernova's Mark VIe control system is an integrated control system that is widely used in a diverse range of applications including gas and steam turbines, safety systems, wind turbines, gasification, hydro, nuclear, and combined cycle power plants. These diverse applications require a controller that can deliver the high performance and flexibility needed to run application specific control reliably.

The Mark VIe UCSE is a stand-alone controller that uses QNX® Neutrino, a real-time, multi-tasking operating system (OS), to run application-specific control system logic.

The UCSE controller offers the following advantages:

- Single module
- No battery
- No jumper settings required
- ToolboxST programmatically updates the host application board programmable devices

The UCSE controller mounts in a panel and communicates with I/O modules through on-board I/O network (IONet), PROFINET, High-speed Serial Link (HSSL), and/or other interfaces.

The available versions of the UCSE controller are: UCSEH2A for Mark VIe, UCSEH2B for Mark VIe, LS2100e Static Starters, and EX2100e Voltage Regulators, and UCSEH2C for EX2100e Static Exciters.

Reliable, High-Speed Performance

The UCSE Mark VIe controller is designed for high-speed, high-reliability industrial applications. It is loaded with software specific to its application. As a turbine or balance of plant (BoP) controller, it runs the Mark VIe firmware and blockware applications and utilizes Mark VIe IONet interfaces. IONet is a private special-purpose Ethernet that only supports Mark controls I/O packs and controllers. IEEE 1588 protocol is used through the IONet interfaces to synchronize the clock of the I/O modules and controllers to within ±100 microseconds. External data is transferred to and from the IO Packs the controller over the IONet Ethernet interfaces. This includes process inputs/outputs to the I/O modules. Unlike traditional controllers where I/O is on a backplane, the UCSE controller does not host any application I/O. In a redundant set, all I/O networks are attached to each controller, providing them with all input data. This hardware and software architecture guarantees that no single point of application input is lost if a controller is powered down for maintenance or repair.

Application Specific Control

Outcome Optimizing Controls offer advanced capabilities that simplify system architecture and dramatically reduce applied engineering costs.

MarkVIe UCSE's flexible design allows for it to be used not only for turbine control applications, but also for DCS applications, especially in steam and gas power plants.

The native PROFINET capability on the UCSEH2A provides productivity and performance advantages necessary for DCS and BoP control applications for power generation.

Advanced Security

In today's Internet age, industrial controls are constant targets of cyber threats. We at GE Vernova understand the risk involved in securing our customer's most important assets; we believe in defense in depth architecture to secure the asset from potential cyber threats.

The MarkVIe UCSE has been developed to be secure by design, incorporating technologies such as a Trusted Platform Module and secure, trusted, and measured boot firmware. A centralized configuration allows encrypted firmware updates to be executed from a secure central location. A broad suite of cybersecurity technology and tools help prevent unauthorized updates while built-in security protocols help protect against man- in-the-middle and denial of service attacks.

Specifications

Input Power

- UCSEH2A : 42-61 Watts
- UCSEH2B : 23-37 Watts
- UCSEH2C: 27-41 Watts

Input Voltage

- 18- 50 VDC

Operating Temperature

- UCSEH2A: -40 to 65°C with 0.5 m/s vertical airflow
- UCSEH2A: -40 to 52°C with convection cooling
- UCSEH2B: -40 to 58°C with convection cooling
- UCSEH2C: -40 to 60°C with convection cooling

Storage Temperature

- -45°C to 85°C

Humidity

- 5% to 95% non-condensing

Microprocessor

- UCSEH2A: quad core, 2.8 GHz 11th Gen Intel® CoreTM i7
- UCSEH2B: dual core, 1.2 GHz 11th Gen Intel® CoreTM i7
- UCSEH2C: quad core, 1.2 GHz 11th Gen Intel® CoreTM i7

Memory

- 8 GB DDR4-2400

Non Volatile Memory

- 6139 non-volatile program variables, 338 forces, and 128 totalizers

Storage

- 80 GB NVME SSD (18GB allocated)

Required Software

- ControlST V07.10.02C or later

Ports

UCSEH2A, UCSEH2B:

- 8 Ethernet ports on front panel
- 1 USB-C port (labeled USB) only used to initially set up UDH network IP address or for restore function
- 1 USB-C port (labeled COM) is 115200 bit/s, 8N1, no Flow-Control, serial redirection

UCSEH2C:

- 12 Ethernet ports on front panel
- 1 USB-C port (labeled USB) only used to initially set up UDH network IP address or for restore function
- 1 USB-C port (labeled COM) is 115200 bit/s, 8N1, no Flow-Control, serial redirection

Dimensions

- UCSEH2A, UCSEH2C: 166.36 × 168.28 × 85.00 mm
- UCSEH2A, UCSEH2C with mounting: 203.48 x 171.45 × 85.00 mm
- UCSEH2B: 166.35 × 168.28 × 56.00 mm
- UCSEH2B with mounting: 203.48 × 169.88 x 56.00 mm

Interoperability

- Can communicate with all previous generation Mark Vie Controllers
- Interoperable within a redundancy set with UCSBH1A, UCSBH4A, UCSCH2A refer to GEI-100871

Mounting

- Direct mount to base using two to four mounting screws.
- Vertical mount with unobstructed air flow through fins.
- 100 mm minimal air gap above the UCSE.
- Parallel mounting requirements differ between models and redundancy – refer to GEH-6721 Vol II
- Ambinet temperature envelope is 25 mm from any point in UCSE.

Miscellaneous

- 121T8700P0002 UCSB to UCSC/UCSE Power Cable Adapter
- 127T2669P0001 UCSB/CSLA to UCEC/UCSE Module Power Cable Adapter

EU

- CE Mark
- EMC Directive
  - EN 61000-6-2:2019
  - IEC/EN 61000-6-4:2019 (reference CISPR 32)
  - CISPR 11:2015 / EN 55011:2016+A11:2020
  - IEC 61000-4-18:2019 / EN 61000-4-18:2019
  - IEC 61326-3-1:2017
  - 2011/65/EU + 2015/863
- ATEX Directive
  - Category 3 equipment - II 3 G
  - EN IEC 60079-0:2018
  - EN IEC 60079-7:2015/A1:2018]
- RoHS Directive
- REACH Regulation
- WEEE Directive

US

- FCC 47 CFR 15 Subpart B, Class A
- Hazardous Locations
  - UL 61010-1 Ed. 3, CSA C22.2 No. 61010-1 Ed. 3
  - UL 61010-2-201 Ed. 2, CSA C22.2 No. 61010-2-201 Ed. 2
  - UL 121201 Ed. 9, CSA C22.2 No. 213-17 Ed. 3
  - UL 60079-0 Ed. 7, CSA C22.2 No. 60079-0 Ed. 4
  - UL 60079-7 Ed. 5, CSA C22.2 No. 60079-7 Ed. 2

Canada

- ICES-003:2016 (Class A)
- Hazardous Locations
  - CSA C22.2 No. 213-15
  - CAN/CSA-C22.2 NO. 60079-0:15, Class I, Zone 2
  - CAN/CSA-C22.2 NO. 60079-15:12
- WEEE & Battery Regulations

Environmental

Hot Temperature: IEC 60068-2-2:2007 Test Be

- (UCSEH2A: 65°C, UCSEH2B: 58°C, UCSEH2C: 60°C for 16 hrs, powered)
- Cold Temperature: IEC 60068-2-1: 2007 Test Ae (-40°C for 16 hrs, powered)
- Damp Heat: IEC 60068-2-30:2005 Test Cab (55°C for 2 cycles of 12 hrs)
- Sinusoidal Vibration: IEC 60068-2-6:2007 Test Fc
- Shock: IEC 60068-2-27 Test Ea

UCSE Version	IS220UCSBH1A/H3A/H4A	IS220UCSAH1A	UCCA/UCCC
			
Processor	Intel EP80579	Power QUICC II PRO	UCCA: Intel Ultra Low Voltage Celeron UCCC: Intel Pentium M processor
CPU Frequency	H1A: 600 Mhz H3A 1200 Mhz H4A 1066 Mhz	667 Mhz	UCCA: 650 Mhz UCCC: 1.6 Ghz
CPU Cores	1	1	1
Mark VIe Cores	1	1	1
L2 Cache	256 K	64 K	256 K
Qnx Version	6.5 or 7.1	6.5	6.5
Profinet	No	No	No
Ethernet Ports Total	5	5	UCCA: 4. UCCC: 5
Ethernet Ports 100 MB	5	5	UCCA: 4. UCCC: 5
Console	RJ-45 (Adaptor sold separately)	RJ-45 (Adaptor sold separately)	UCCA: micro-miniature 9-pin D UCCC: RJ-45 (Adapter Sold Separately)
Additional Ports	USB 1.1	USB 1.1	None
Power input - Non redundant	1 - Top	1 - Top	1 - Bottom
Orientation Capability	Vertical	Vertical	Vertical
Max Power Consumption	UCSBH1A and UCSBS1A: 26.7 W peak, 15.6 W nominal UCSBH3A: 28.7 W peak, 17.3 W nominal UCSBH4A: 28.7 W peak, 17.3 W nominal	12.5 W typical	UCCA: 18 W UCCC: 50 W
Minimum Voltage	18 V	18 V	20 V
Nominal Voltage	28 V	28 V	28 V
Maximum Voltage	32 V	32 V	36 V
Memory Type	DDR2	DDR	DDR
Memory Size	256 M	256 M	128 M
ECC Memory	Yes	No	No
Flash Storage	2 GB	Conpact Flash up to 2 GB	128 MB Compact Flash
NVRAM Capabilities	ControlST V07.05 and higher supports 3067 non-volatile program variables, 338 forces, and 128 totalizers ControlST V07.04 and lower supports 3067 non-volatile program variables, 338 forces, and 64 totalizers		
Chassis Dimensions			
Dimensions - Width	50 mm	40 mm	131 mm
Dimensions - Depth (Excluding mounting bracket)	160 mm	160 mm	235 mm
Dimensions - Height (Excluding mounting bracket)	169 mm	169 mm	389 mm

UCSE Version	IS220UCSBH1A/H3A/H4A	IS220UCSAH1A	UCCA/UCCC
			
Mounting Bracket Dimensions			
Width	42 mm	42 mm	-
Height	204 mm	204 mm	-
Thickness	5 mm	5 mm	-
Operating Temperature			
Min	H1A, H4A: -30°C H3A: 0°C	0°C	0°C
Max	+ 65°C	60°C	UCCA: 60°C UCCC: 50°C
Max with 0.5 m/s airflow	-	-	-
Storage Temp			
Min	-40°C	-40°C	-40°C
Max	+85°C	+85°C	+85°C
Altitude	1000 m Nominal	1000 m Nominal	1000 m Nominal
Cooling	Convection	Convection	Convection
Reverse Polarity Protection	Provided	Provided	No
Weight	UCSBH1A and UCSBS1A: 2.4 lbs (1 Kg) UCSBH3A: 2.9 lbs (1.3 Kg) UCSBH4A: 2.4 lbs (1 Kg)	2 lb	
Surge Protection	No	Yes	No
Humidity	95% non-condensing	95% non-condensing	95% non-condensing