Mark VIe* UCSC

Outcome optimizing control for power plants

Designed for Real-world Demands

GE's MarkVIe 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 compact controller that can deliver the high performance and flexibility needed to run application specific control reliably.

The MarkVIe* UCSC, part of GE's Industrial Internet Control System, is the industry's first outcome optimizing controller. It augments real-time deterministic control with embedded Field Agent technology, delivering near-real time advice through market analysis, fleet and enterprise data, or asset/process knowledge to optimize the outcomes that today's businesses require. The Predix™ enabled UCSC provides reliable, secure communication and analytics using either cloud-based or edge-based outcome optimizing apps. Controls can now be programmed to dynamically influence business outcomes, generate new forms of revenue, and improve profitability.

Reliable, High-Speed Performance

The MarkVIe UCSC runs on a real time operating system for high-speed, reliable, industrial applications. It can be configured for simplex, dual, or triple redundant operation, at incremental frame rates as fast as 10ms in any configuration. Since synchronization is important for high performance turbine control applications, the UCSC synchronizes the local processor clocks on the I/O modules.

Application Specific Control

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

MarkVIe UCSC'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 UCSC provides productivity and performance advantages necessary for DCS and BoP control applications for power generation.

Industrial Internet Enabled

Outcome Optimizing controllers use real time hypervisor technology to run real time deterministic control applications concurrently with the embedded Field Agent* technology (EFA) without any adverse impact of one over the other. EFA technology is a platform for securely applying Predix applications and secure connectivity to the Predix Cloud as well as run edge apps. Running the Field Agent concurrently with the real-time control applications allows the UCSC to rapidly leverage external data. External monitoring may be used to analyze and optimize entire business operations. The analysis can then be used to dynamically adjust real-time industrial controls to align with changing business objectives in today's Industrial Internet age.

Advanced Security

In today's Internet age, industrial controls are constant targets of cyber threats. We at GE 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 UCSC has been developed to be secure by design, incorporating technologies such as Trusted Platform Modules, secure, trusted, and measured boot. A centralized configuration allows encrypted firmware updates to be executed from a secure central location. A broad suite of cyber-security technology and tools help prevent unauthorized updates while built-in security protocols help protect against man-in-the middle and denial of service attacks.

Key Benefits

Reduced risk. Built on the strong foundation of GE's 40 years' experience providing real-time, deterministic controls for the world's industrial assets. The controller is secure by design, enabling secure operations and connectivity from edge to cloud.

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.

Specifications

Input Power
- 30Watts

Input Voltage
- 18-30VDC

Operating Temperature
- -30°C to 65°C

Storage Temperature
- -40°C to 85°C

Humidity
- Up to 95% non-condensing

Microprocessor
- IS420UCSCH1 - Quad core, 1.2GHz AMD G -Series
- IS420UCSCH2 - Dual core, 1.6GHz AMD G-Series

Memory
- IS420UCSCH1 - 4GB DDR3-1333 SDRAM
- IS420UCSCH2 - 2GB DDR3-1066 SDRAM

NVSRAM
- 32KB supporting 3067 saved variable, 338 forces and 64 totalizers

HMI
- ControlST Software Suite

Ports
- 5 Ethernet
- 1 Ethernet IICS Cloud – Dedicated Cloud Port
- 2 USB – Disabled after boot
- 1 Com – No customer connection
- 1 Display – Disabled after boot
- 1 microSD – Not supported

Dimensions
- UCSC module – 168 x 150 x 55 mm (H x D x W)
- UCSC with mounting – 204 x 152 x 55 mm (H x D x W)

Mounting
- Vertical with unobstructed air flow through fins
- Direct mount to base via two screws
- Thermal
  - 100mm minimal air gap above and below UCSC
  - Parallel mounted UCSC to UCSC minimal spacing 50mm (no temperature derating)
  - Ambient temperature envelope is 25mm from any point on UCSC

Miscellaneous
- 121T8700P0002 – UCSB to UCSC power cable adapter part number
- 121T6659P0001 – UCSC COM port adapter

EU
- CE Mark
- EMC Directive
  - IEC/EN 61131-2: 2007(sections 8-10, Zone B)
  - IEC/EN 61000-6-2: 2005 Ed 2.0
  - IEC/EN 61000-6-4: 2006 Ed 2.0
  - CISPR 11:2009 +A1: 2010 / EN 55011: 2009 +A1: 2010
  - CISPR 22: 2010 / EN55022: 2010/AC:2011, (Class A)
  - CISPR 24: 2010 / EN55024: 2010
  - IEC/EN 61131-2: 2007 (sections 4 & 6)
  - IEC 61000-4-18: 2006 / EN 61000-4-18: 2007 (refer to IEC61131-2: 2007 Annex D for levels)
- ATEX Directive
  - Category 3 equipment - [II 3 G]
  - EN 60079-0: 2012 A+11:2013
  - EN 60079-7: 2015 [Type of Protection Ex ec]
- RoHS Directive
- REACH Regulation
- WEEE Directive

US
- FCC 47 CFR 15 Subpart B, Class A
- Hazardous Locations
  - ISA 12.12.01: 2015, Class I Div. 2 Groups ABCD
  - UL 60079-0 Ed 6.0 (2013), Class I, Zone 2 Gas Group ABCD
  - UL 60079-15 Edition 4.0 (2013), [Ex nA]

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
- IEC/EN 61131-2: 2007 (sections 5 & 6)
- Storage
  - Dry Heat - IEC 60068-2-2: 1974 test Bb (70C @16hrs, unpowered)
  - Cold Temp - IEC 60068-2-1: 2007 test Ab (-40C @16hrs, unpowered
- Damp Heat
  - IEC 60068-2-30: 2005 test Db (unpowered, 55C, 2x)
- Marine Damp Heat
  - IEC 60068-2-30: 2005 test Db (powered & unpowered, 55C, 95%RH, 12hr x 2cycles)
- Sinusoidal Vibration
  - IEC 60068-2-6: 1995 (test Fc)
- Shock
  - IEC 60068-2-27: 1987 (test Ea)

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