GE UCSA Controllers

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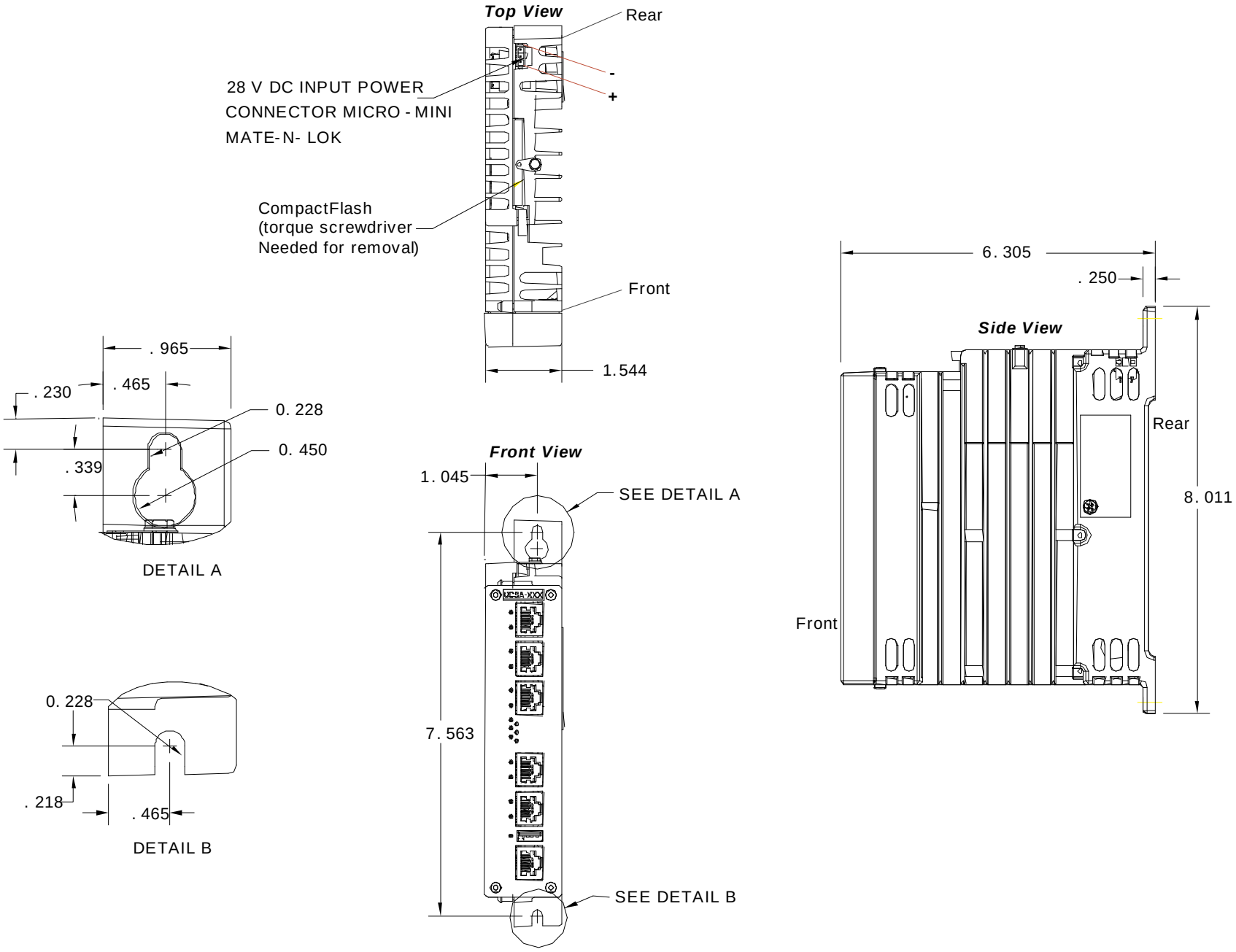
1.3 UCSA Controllers

The UCSA controllers are stand-alone computers that run the application code. The controller mounts in a panel and communicates with the I/O packs through on-board I/O network (IONet) interfaces. The I/O networks are private special-purpose Ethernet that support only the I/O modules and the controllers. The controller operating system (OS) is QNX Neutrino, a real-time multitasking OS designed for high-speed, high-reliability industrial applications.

Unlike traditional controllers where I/O is on a backplane, the UCSA controller does not host any application I/O. Also, all I/O networks are attached to each controller providing them with all input data. The hardware and software architecture guarantees that no single point of application input is lost if a controller is powered down for maintenance or repair. The UCSA controller uses CompactFlash.

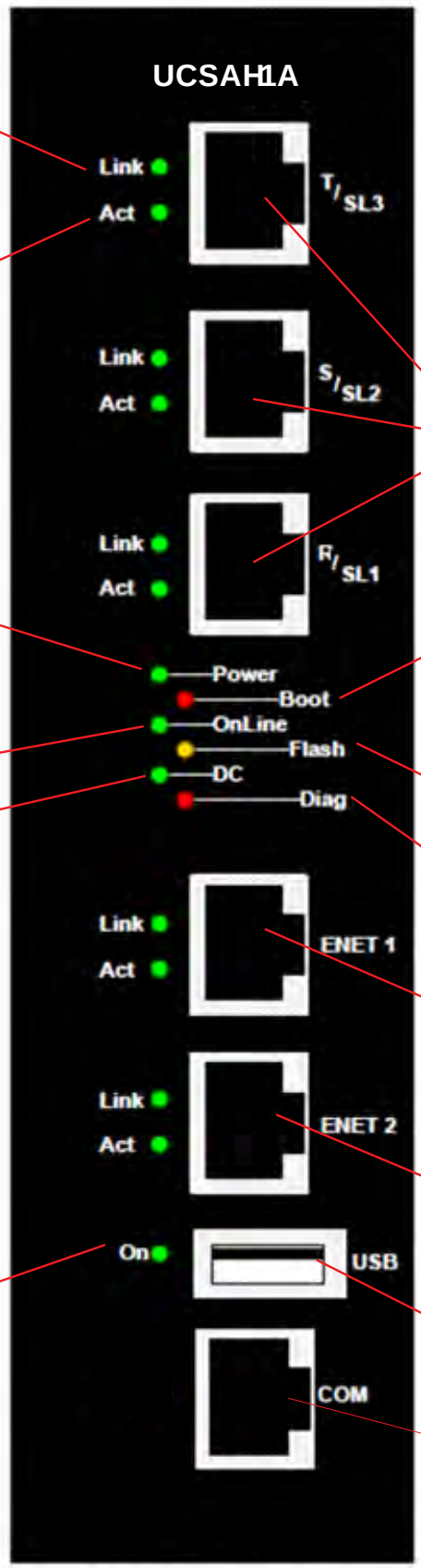
The UCSA controller platform is available for use in many Mark VIe control system applications, including balance of plant controls and some retrofits. It does not have enough processing power, however, for some advanced model-based controls application. The UCSA controller not certified for IEC 61508 Safety Loop usage.

The following figure displays the installation envelope and mounting dimensions for the UCSA controller.



Mark VIe UCSA Controller Envelope and Mounting Dimensions

1.3.1 UCSA LEDs and Connections



Link **solid green** = Ethernet PHY has established a link with an Ethernet switch port

Act **solid green** = there is packet traffic on an Ethernet interface
Flashing green = traffic is low

Power **solid green** = Internal 5 V supply is up and regulating
The UCSA converts the incoming 28 V dc to 5 V dc. All other internal power planes are derived from 5 V.

OnLine **solid green** = controller is online and running application code

DC **solid green** = this is the designated controller

On **solid green** = USB is active

Ethernet connections for R, S, and T I/O networks (IONet)

Boot **solid red** = startup in process
off = startup has completed
flashing red = an error is detected
flashes red once every 3 seconds = Baseload signature verification has failed

Flash flashes **amber** = a flash device is being accessed

Diag **flashing red** = active diagnostic alarm

Ethernet connection to UDH for communication with HMI

Optional **CDH**

USB connection

COM1 RS-232C used during initial controller setup

1.3.2 UCSA Boot LED Flash Codes

# of Flashes	Description
1	Failed Serial Presence Detect (SPD) EEPROM
2	Failed to initialize DRAM or DRAM tests failed
3	Failed NOR flash file system check
4	Failed to load FPGA or PCI failed
5	CompactFlash device not found
6	Failed to start IDE driver
7	CompactFlash image not valid

1.3.3 UCSA Specifications

Item	UCSA Specification
Microprocessor	Freescale Power (Power QUICC II PRO 667 MHz)
Memory	256 MB DDR SDRAM Flash-backed SRAM
NVRAM	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
Flash	128 MB CompactFlash module (GE part #336A5196AAP8) 2 GB CompactFlash module (GE part #336A5196AAP9)
Operating System	QNX Neutrino
Programming	Control block language with analog and discrete blocks; Boolean logic represented in relay ladder diagram format. Supported data types include: • Boolean • 16-bit signed integer • 16-bit unsigned integer • 32-bit signed integer • 32-bit unsigned integer • 32-bit floating point • 64-bit long floating point
Primary Ethernet Interface (2)	Twisted pair 10Base-TX/100Base-TX, RJ-45 connectors: TCP/IP protocol used for communication between controller and the ToolboxST application TCP/IP protocol used for alarm communication to HMIs EGD protocol for application variable communication with CIMPLICITY HMI and Series 90-70 PLCs Ethernet Modbus protocol supported for communication between controller and third-party DCS
IONet Ethernet Interface (3 ports)	Twisted pair 10Base-TX/100Base-TX, RJ-45 connectors: TCP/IP protocols used to communicate between controllers and I/O modules
COM port	One accessible through RJ-45 connector on front panel For cabling use GE-provided Ethernet cables, which are specifically designed for use in the Mark controller product line (GE part #342A4944P1)
Power Requirements	32 V dc to 18 V dc (12.5 W typical preliminary)
Weight	2 lbs (0.9 Kg)
† Ambient rating for enclosure design	0 to 65°C (32 to 149 °F)
† Refer to GEH-6721_Vol_I, the chapter Technical Regulations, Standards, and Environments for additional equipment rating information depending on application requirements.	

1.3.4 UCSA Controller Replacement

Warning

To prevent personal injury or equipment damage caused by equipment malfunction, only adequately trained personnel should modify the following equipment.

Caution

Verify the controller being replaced has a RED LED. A RED LED indicates the controller is in a fault condition and is the one that needs to be replaced. Ensure the remaining two control loops are free of faults or alarms before proceeding. A failure on one of the remaining loops could cause a turbine trip.

Attention

If the Mark* VIe controller interfaces with a SecurityST* platform and Secure Mode is implemented on the controller, then the controller cores should be taken out of Secure Mode prior to executing this maintenance procedure. Once maintenance has been completed, the Mark VIe controller cores should be placed back into Secure Mode.

Note Maintenance of this component may cause loss of communication, loss of power, and a small change in valve position. When the portion of the null bias for the PSVO or PSVP I/O pack is lost, the valve might move slightly in the direction of the spring bias.

➢ To replace the Mark VIe UCSA Controller

1. Disconnect the power plug JCR on the associated JPDC (or other power distribution board) (for example, UCSA R/JPDC/JCR).
2. Disconnect the IONet cables.
3. Disconnect the VLAN cable.
4. Loosen the screws holding the controller in place. The mounting is a keyhole design. Refer to *Detail A* on the UCSA drawing.
5. Remove the UCSA by lifting to align the large portion of the keyhole with the mounting screws and pull forward.
6. If still functional, remove the CompactFlash® from the old UCSA, and install it into the new UCSA.
7. Reinstall the new UCSA by reversing steps 1 through 5.
8. If using new flash memory, configure the new controller's TCP/IP address for use as a Mark VIe controller. For instructions, refer to the *ToolboxST User Guide for Mark Controls Platform* (GEH-6700 or GEH-6703), the section *Configure and Transfer IP Address to UCCA / UCCC / UCSA Controller.*
9. From the ToolboxST application, verify the status of the controller. It should be in the controlling state with no warnings or errors and online.
10. From the ToolboxST application, if the controller does not go online or the controller is not in the controlling state, download to the controller using the Download Wizard.