



PACSystems* RX3i CPx400 series

Outcome optimizing controls



Designed for Real-world Demands

GE's PACSystems RX3i is a flexible and high-performance control system used in a range of applications including water/wastewater, metro, industrial steam, automotive, chemical,

oil and gas, discrete manufacturing and modular machine designs. These diverse applications require a compact controller that can deliver the high performance and flexibility needed to reliably run application-specific control.

The PACSystems RX3i CPx400 series of controllers, part of GE's Industrial Internet Control System, is the industry's first outcome optimizing controller. It augments real-time deterministic control with Edge 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 Edge-enabled CPx400 series of controls 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 PACSystems RX3i CPx400 series of controls runs on a real-time operating system for delivering reliable, secure industrial applications. It offers premier high-speed

performance and secure data handling for any multi-disciplined control system.

A large working memory accommodates large programs and extensive data storage. The quad-core high-speed microprocessor executes programs faster than ever before. It supports industry-standard PROFINET with I/O update rates as fast as 8ms for

16 devices. With Ethernet interface rates up to 1Gpbs, the CPx400 series of controls are built for rapid, reliable data interchange.

Industrial Internet Enabled

Outcome optimizing controllers use real-time hypervisor technology to run real-time deterministic control applications concurrently with the embedded Edge without any adverse impact of one over the other.

The outcome optimizing controllers come with 2 choices for embedded Edge:

- Predix*-enabled Embedded Field Agent (EFA) - A platform for securely applying Predix applications and secure connectivity to the Predix Cloud as well as run Edge apps.
- PACEdge over Linux- An open Linux implementation with HTML5 compatible web server and Python support to help customers develop and run Edge apps.

Running the Edge technology concurrently with the real-time control applications allows the CPx400 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.

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. Costs are further reduced with embedded PROFINET, allowing for dedicated I/O to be chosen for application-specific needs.

Optimized business outcomes. Embedded Edge technology allows for secure connection to the Industrial Internet, leveraging data to analyze and optimize business operations.

Maximum uptime. Built on our market-leading PACSystems high-availability solutions, CPx400 offers best-in-class high-availability control system for concurrent maintainability and elimination of single points of failure, maximizing uptime.

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 customers' most important assets. We believe in defense-in-depth architecture to help secure the asset from potential cyber threats.

The RX3i CPx400 has been developed to be secure by design, incorporating technologies such as Trusted Platform Modules and 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.

Flexible Redundancy Tailored to Your Needs

Building on GE's market leadership and decades of expertise in mission critical backup power and critical cooling solutions, PACSystems High Availability with PROFINET is a flexible and intelligent high-availability control system that ensures maximum uptime while reducing total cost of ownership (TCO) through easier configuration, operation and maintenance.

Built on a scalable, synchronized, hot-standby redundancy control platform, our PACSystems High Availability on CPx400 solutions ensure uninterrupted control of your applications and processes with total transparency.

Specifications

- Microprocessor Specification – 1.2 GHz AMD G Series Quad Core
- Operating System – VxWorks

Temperature Range

- -40°C to 70°C

Power Requirements

- Input Power (Max) – 20 Watts
- Input Voltage (Min) – 18 Vdc
- Input Voltage (Max) – 30 Vdc
- Memory Backup Mechanism – Energy Pack: IC695ACC403

Firmware Upgrade

- CPU Firmware Upgrade Mechanism – Web Interface/Ethernet Port

Display

- OLED Display – Yes

Program Portability

- RX3i PACSystems Applications using Family Type Conversion

Program Security

- Secure Boot – Yes
- Trusted Platform Module (TPM) – Yes

Program Storage

- RAM – 64 Mbytes
- Non-Volatile Flash – 64 Mbytes
- Life Expectancy, Energy Pack Capacitors – 5 years

Auxiliary Storage

- Micro SD – Pending
- Remote Data Storage Device (RDSD) – USB - pending

Marine

- ABS, DNV-GL, BV, LR

Communications

- LAN1 – 10/100/1000 Mbps supported by unswitched RJ-45
- LAN2/LAN3 – 10/100/1000 Mbps supported by a pair of unswitched RJ-45 connectors
- Edge: 10/100/1000 Mbps supported by unswitched RJ-45
- Ethernet RJ-45 Switch – 2-Port Switch 10/100/1000 x2
- Embedded Edge Ethernet RJ-45 – 10/100/1000 x1
- USB – USB-A 3.0 x2 (functionality pending)

Protocols

- SRTP
- Modbus TCP
- Ethernet Global Data (EGD)
- PROFINET – Yes
- MRP – Yes
- OPC-UA Server¹ – Y15

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

¹ For a discussion of OPC UA, refer to PACSystems RX7i & RX3i TCP/IP Ethernet Communications User Manual, GFK-2224M Chapter 10.