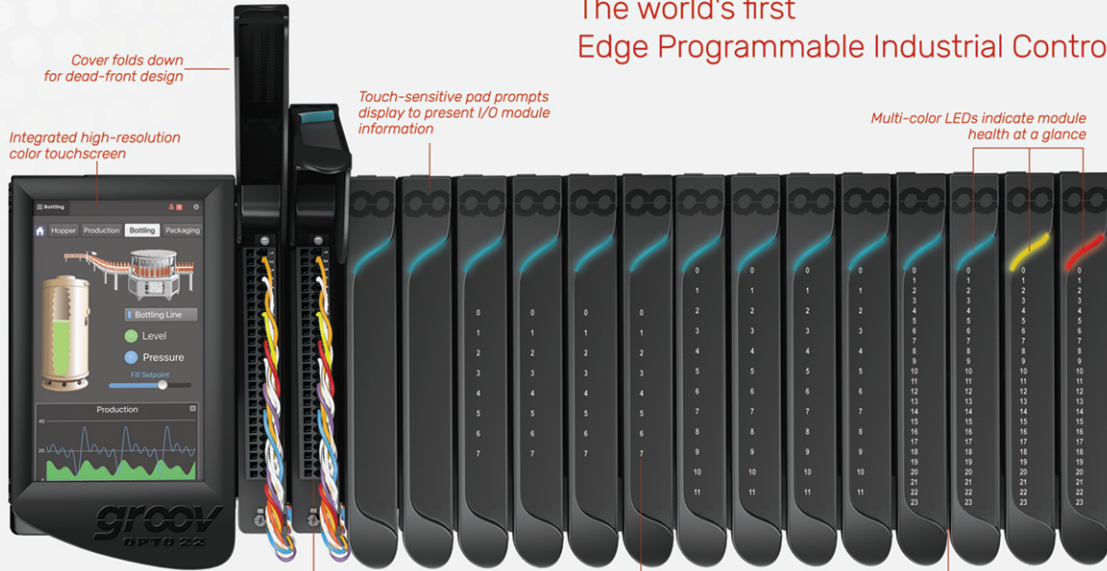# Edge Programmable Industrial Controller

OPTO 22
The Future of Automation.

This is EPIC.

The world's first
Edge Programmable Industrial Controller

Cover folds down for dead-front design

Touch-sensitive pad prompts display to present I/O module information

Multi-color LEDs indicate module health at a glance

groov EPIC processor

Integrated high-resolution color touchscreen

Real-time, open-source Linux® OS

Industrial quad-core ARM® processor

Configuration, troubleshooting, and HMI on touchscreen or remotely through web browser

Dual, independent Gigabit Ethernet network interfaces for designing secure systems

Dual USB ports for serial communications, touchscreen monitors, or Wi-Fi adapters

HDMI output for optional external monitor

Wide -20 to 70 °C operating temperature range

groov I/O

4 to 24 channels per module

4, 8, or 16 position stainless-steel chassis

Hot-swappable I/O

Multi-featured analog output with voltage, current, and loop sourcing in one module

Analog inputs offer 20-bit resolution at 0.1% accuracy over span

DC outputs: load switching at 0.4 amps per channel @ 70°C

AC outputs: load switching at 0.5 amps per channel @ 70°C; blown-fuse detection

AC/DC outputs: mechanical relay at 5 amps per channel @ 70 °C

Channel-to-channel isolation available

UL Hazardous Locations approved and ATEX compliant

Guaranteed-for-life I/O

Integrated wireway with hinged 2-position cover

Discrete channel indicators

Stainless-steel DIN-rail or panel-mounted chassis

groov I/O module

Spring-clamp removable connector with captive hold-down screw

Single module retention screw and strain relief tab

What is EPIC?

Edge – Collect, process, view, and exchange data where it's produced—at the edge of the network. Securely share data among databases, cloud services, Allen-Bradley® and Siemens® PLC systems, and other equipment, using tools like Ignition Edge® by Inductive Automation®, Node-RED™, and MQTT. Visualize data on the integral touchscreen, an external HDMI monitor, or from any web browser or mobile device.

Programmable – Options for control programming include flowcharting with PAC Control™ or IEC-61131-3 standard languages with CODESYS. Secure shell access lets you build your own custom-developed applications with Python, C/C++, and other languages and run them on an open, Linux-based automation system.

Industrial – From plant floors to remote sites, the edge demands industrially hardened equipment—like a wide operating temperature range, solid-state drives, UL Hazardous Locations approval, and ATEX compliance.

Controller – Reliable real-time control—with flowchart, Ladder Diagram, Function Block Diagram, Structured Text, Sequential Function Charts, and custom programming options—plus guaranteed-for-life I/O provide the solid base for all other functions.

Learn more about *groov* EPIC. Speak to an application engineer at 800-321-OPTO, email us at systemseng@opto22.com, or visit us on the web at opto22.com.

groov® EPIC™

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groov EPIC™ Software

groov MANAGE

groov Manage is the central command to your groov EPIC® system, helping you configure, troubleshoot, and commission your groov EPIC processor, I/O modules, and network interfaces. You can use this browser-based application locally on the EPIC processor's high-resolution color touchscreen, or on your computer, smartphone, or tablet.

PAC Control

PAC Control, part of the PAC Project Software Suite, is an intuitive tool for programming industrial automation, process control, remote monitoring, data acquisition, and industrial internet of things (IIoT) applications. Flowchart-based with optional scripting, PAC Control lets you create and debug control programs and then download and run them on a groov EPIC processor.

CODESYS ⬛ 61131-3

Use CODESYS® Development System V3 to create IEC 61131-3 compliant control programs that run on a groov EPIC processor. You can choose among Function Block Diagram (FBD), Structured Text (ST), Sequential Function Charts (SFC), and Ladder Diagram (LD). And you can expand functionality even more using products from the CODESYS Store.

ssh

Build your own custom applications using languages you know like Python, C/C++, and others, and run them on an open, Linux®-based automation system with Secure Shell access.
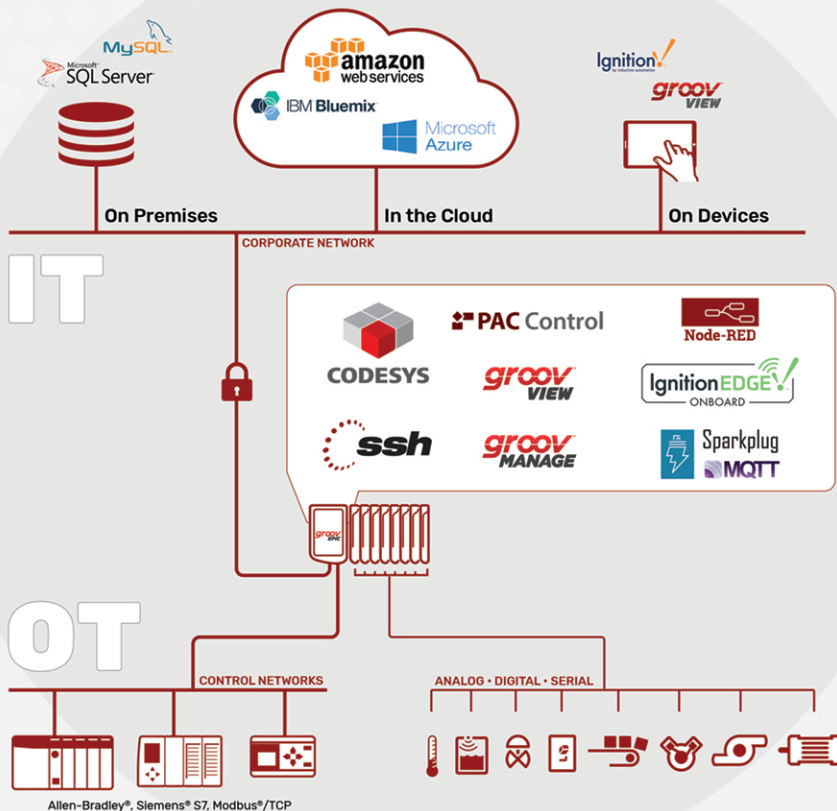
groov VIEW

Use groov View to build operator interfaces to monitor and manage your system from the EPIC processor, and from any device with a web browser. User authentication and data encryption keep systems secure. groov View has easy drag-drop-tag construction, no tag or user limits, and includes trends, events, and user notifications.

Ignition EDGE

A product of Inductive Automation®, Ignition Edge® extends the Ignition Platform to the edge of your network. Ignition Edge includes drivers to Allen-Bradley®, Siemens®, and Modbus®/TCP devices, eliminating the cost and complexity of a Microsoft Windows OPC UA server for translating PLC and device data to groov View and MQTT. Optional modules for Enterprise Administration and Edge Panel are available.

Sparkplug MQTT

Improve communications efficiency and reduce reliance on IT networking resources with MQTT, a secure, lightweight transport protocol with a publish/subscribe architecture that decouples devices from applications. The Sparkplug payload definition for industrial applications also manages field device states for easier implementation.

Node-RED

Build simple data flows to wire together databases, cloud applications, and APIs using Node-RED. This open-source, multi-platform IIoT development tool gives you a large library of 600+ prebuilt nodes, so you can leverage existing software code and use it directly in your applications.

MySQL · Microsoft SQL Server · amazon web services · IBM Bluemix · Microsoft Azure · Ignition · groov VIEW

On Premises · **In the Cloud** · **On Devices**

CORPORATE NETWORK

IT

PAC Control · Node-RED · CODESYS · groov VIEW · Ignition EDGE ONBOARD · ssh · groov MANAGE · Sparkplug MQTT

OT

CONTROL NETWORKS · ANALOG · DIGITAL · SERIAL

Allen-Bradley®, Siemens® S7, Modbus®/TCP

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groov EPIC™ Architecture Example using MQTT/Sparkplug

MQTT Transmission with Sparkplug messaging offers advantages for both on-premises and remote data communication.

groov EPIC systems in industrial areas connect to sensors and actuators through their own I/O and through other PACs, PLCs, and RTUs, and publish and subscribe to data through the MQTT broker.

At the main site, Ignition Edge and groov View also publish and subscribe data through the broker, while providing database connectivity and system visualization.
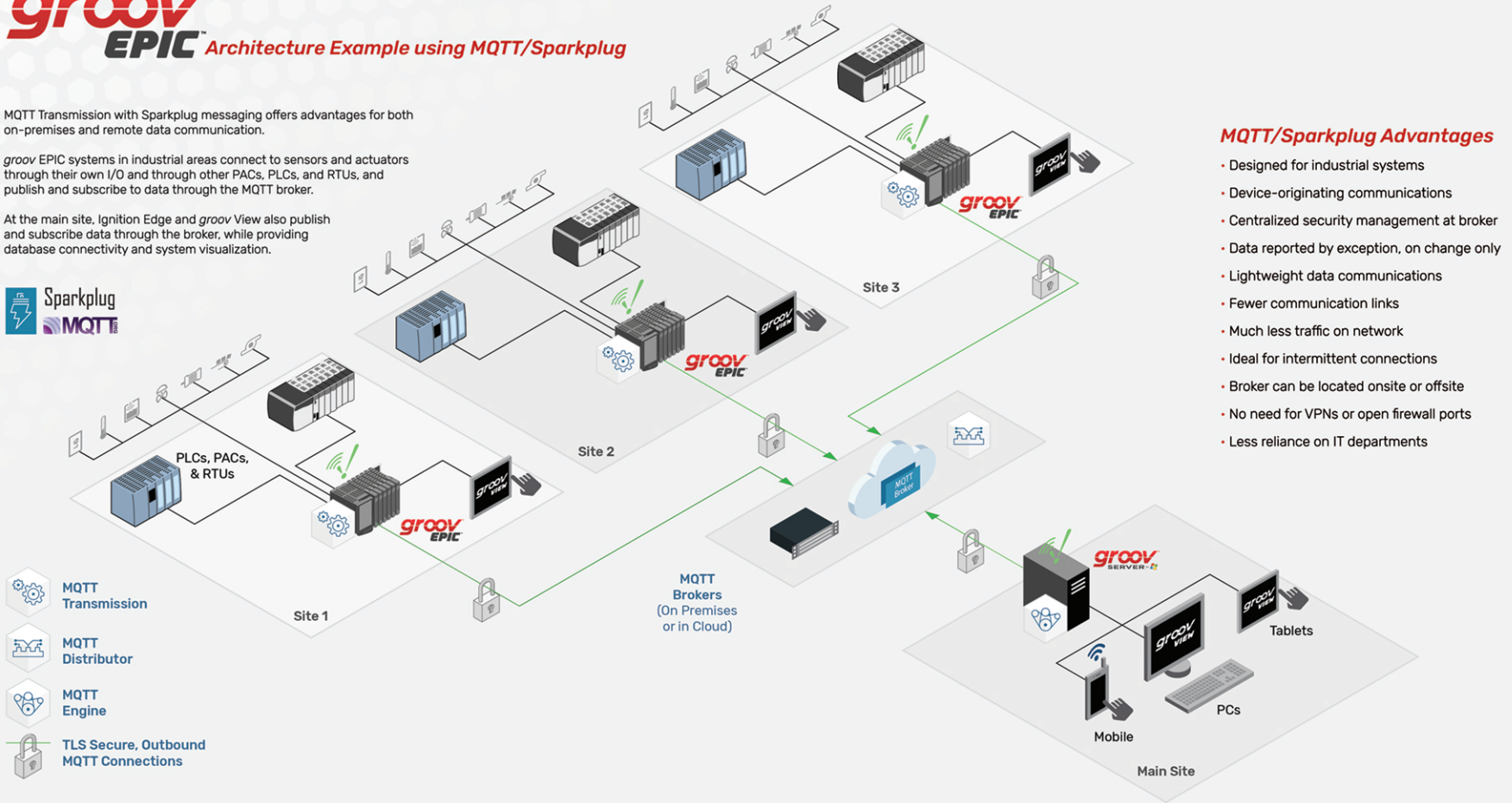
Sparkplug
MQTT

MQTT/Sparkplug Advantages

- Designed for industrial systems
- Device-originating communications
- Centralized security management at broker
- Data reported by exception, on change only
- Lightweight data communications
- Fewer communication links
- Much less traffic on network
- Ideal for intermittent connections
- Broker can be located onsite or offsite
- No need for VPNs or open firewall ports
- Less reliance on IT departments

Site 3

Site 2

Site 1

PLCs, PACs, & RTUs

MQTT Brokers
(On Premises or in Cloud)

MQTT Broker

groov SERVER

groov VIEW

Mobile

PCs

Tablets

Main Site

MQTT Transmission

MQTT Distributor

MQTT Engine

TLS Secure, Outbound MQTT Connections

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groov EPIC® Processors
GRV-EPIC-PR1   Edge Programmable Industrial Controller

groov EPIC Chassis
GRV-EPIC-CHS4   4-module analog/digital/serial mounting chassis
GRV-EPIC-CHS8   8-module analog/digital/serial mounting chassis
GRV-EPIC-CHS16   16-module analog/digital/serial mounting chassis

groov EPIC Power Supplies
GRV-EPIC-PSAC   Power supply, 110-240 VAC
GRV-EPIC-PSDC   Power converter, 24-48 VDC
GRV-EPIC-PSPT   Pass-through power adapter, 10–15 VDC

Software
Note: *groov* Manage, *groov* View, PAC Control Runtime, and Node-RED are included with the GRV-EPIC-PR1. CODESYS Runtime, Ignition Edge, and Secure Shell are pre-installed, but require a license (order part number shown below):

GROOV-LIC-CRE   *groov* EPIC activation key for CODESYS Runtime
GROOV-LIC-EDGE   *groov* EPIC activation key for Ignition Edge
GROOV-LIC-SHELL   *groov* EPIC activation key for Secure Shell access

groov Discrete Input Modules
GRV-IAC-24   AC input, 24 ch, 85-140 VAC
GRV-IACS-24   AC input, 24 ch, 85-140 VAC, on/off state only
GRV-IACI-12   AC input, 12 ch, 85-140 VAC, ch-to-ch isolation
GRV-IACIS-12   AC input, 12 ch, 85-140 VAC, ch-to-ch isolation, on/off state only
GRV-IACHV-24   AC input, 24 ch, 180-280 VAC
GRV-IACHVS-24   AC input, 24 ch, 180-280 VAC, on/off state only
GRV-IACIHV-12   AC input, 12 ch, 180-280 VAC, ch-to-ch isolation
GRV-IACIHVS-12   AC input, 12 ch, 180-280 VAC, ch-to-ch isolation, on/off state only
GRV-IDC-24   DC input, 24 ch, 15-30 VDC
GRV-IDCS-24   DC input, 24 ch, 15-30 VDC, on/off state only
GRV-IDCI-12   DC input, 12 ch, 10-30 VDC, ch-to-ch isolation
GRV-IDCIS-12   DC input, 12 ch, 10-30 VDC, ch-to-ch isolation, on/off state only
GRV-IDCIFQ-12   DC input, 12 ch, 2.5-30 VDC, ch-to-ch isolation
GRV-IACDCTTL-24   AC/DC input, polarity insensitive, 24 channels, 2-16 V AC/DC
GRV-IACDCTTLS-24   AC/DC input, polarity insensitive, 24 channels, 2-16 V AC/DC, on/off state only

groov Discrete Output Modules
GRV-OAC-12   AC output, 12 ch, 12-250 VAC
GRV-OACS-12   AC output, 12 ch, 12-250 VAC, on/off state only
GRV-OACI-12   AC output, 12 ch, 12-250 VAC, ch-to-ch isolation
GRV-OACIS-12   AC output, 12 ch, 12-250 VAC, ch-to-ch isolation, on/off only
GRV-ODCI-12   DC output, 12 ch, 5-60 VDC, ch-to-ch isolation
GRV-ODCIS-12   DC output, 12 ch, 5-60 VDC, ch-to-ch isolation, on/off only
GRV-ODCSRC-24   DC output, 24 ch, 5-60 VDC, sourcing
GRV-OMRIS-8   AC/DC output, 8 ch, mechanical relay, 0-250 VAC/5-30 VDC, 5 A

groov Analog Input Modules
GRV-IICTD-12   Analog input, 12 ch, temperature, ICTD
GRV-IMA-24   Analog input, 24 ch, configurable input ranges of 4-20 mA, 0-20 mA, -20 mA to +20 mA
GRV-IMAI-8   Analog input, 8 ch, ch-to-ch isolation, 0-20 mA, field or chassis-powered loop
GRV-ITMI-8   Analog input, 8 ch, thermocouple or mV, ch-to-ch isolation
GRV-ITR-12   Analog input, 12 ch, temperature/thermistor or resistor
GRV-IV-24   Analog input, 24 ch, 8 configurable input ranges from ±1.25 VDC to ±160 VDC

groov Analog Output Modules
GRV-OVMAILP-8   Analog output, 8 ch, voltage or current, ch-to-ch isolation, field or chassis-powered loop
GRV-OVMALC-8   Analog output, 8 ch, voltage or current, chassis-powered loop

groov Serial Modules
GRV-CSERI-4   Serial communication, 4 ch, RS-232 or RS-485, ch-to-ch isolation

03.2019

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