Edge Programmable Industrial Controller

OPTO 22

Your Edge in Automation.™

This is EPIC.

The world's first Edge Programmable Industrial Controller

groov EPIC processor

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

groov I/O module

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 IEC 61131-3

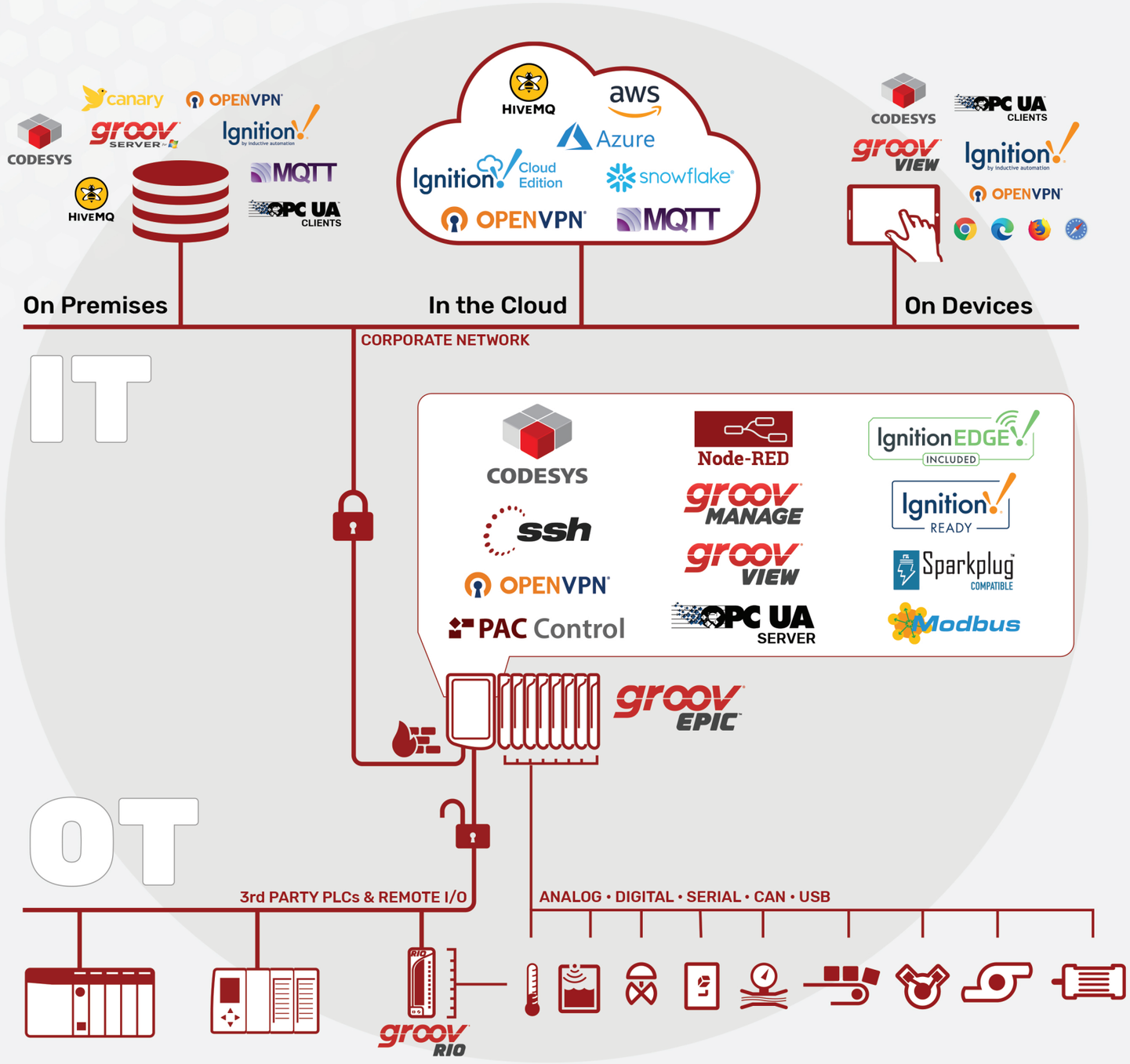
Use CODESYS® Development System V3 to create IEC 61131-3 compliant control programs that run on a *groov* EPIC processor. You can choose among Function Block Diagram (FBD), Structured Text (ST), Sequential Function Charts (SFC), and Ladder Diagram (LD). And you can expand functionality even more using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

OPC UA SERVER

With the OPC UA server on board, *groov* EPIC offers a familiar, platform-independent way to exchange data among devices and software within your OT network. Smoothly integrate your PAC Control and I/O tags into SCADA and HMI software using OPC UA–no special drivers required.



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.

IgnitionEDGE INCLUDED · Ignition READY

groov EPIC extends the Ignition® Platform to the edge of your network, eliminating the need for a Microsoft Windows computer. Run Ignition directly on the EPIC processor and gain access to data on Allen-Bradley®, Siemens®, and Modbus®/TCP PLCs and devices with the built-in OPC UA server and drivers. Choose either Ignition Edge® or full Ignition, both products of Inductive Automation®. Utilize the full array of Ignition modules including MQTT, database support, reporting, MES connectivity, and more.

Sparkplug COMPATIBLE

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.

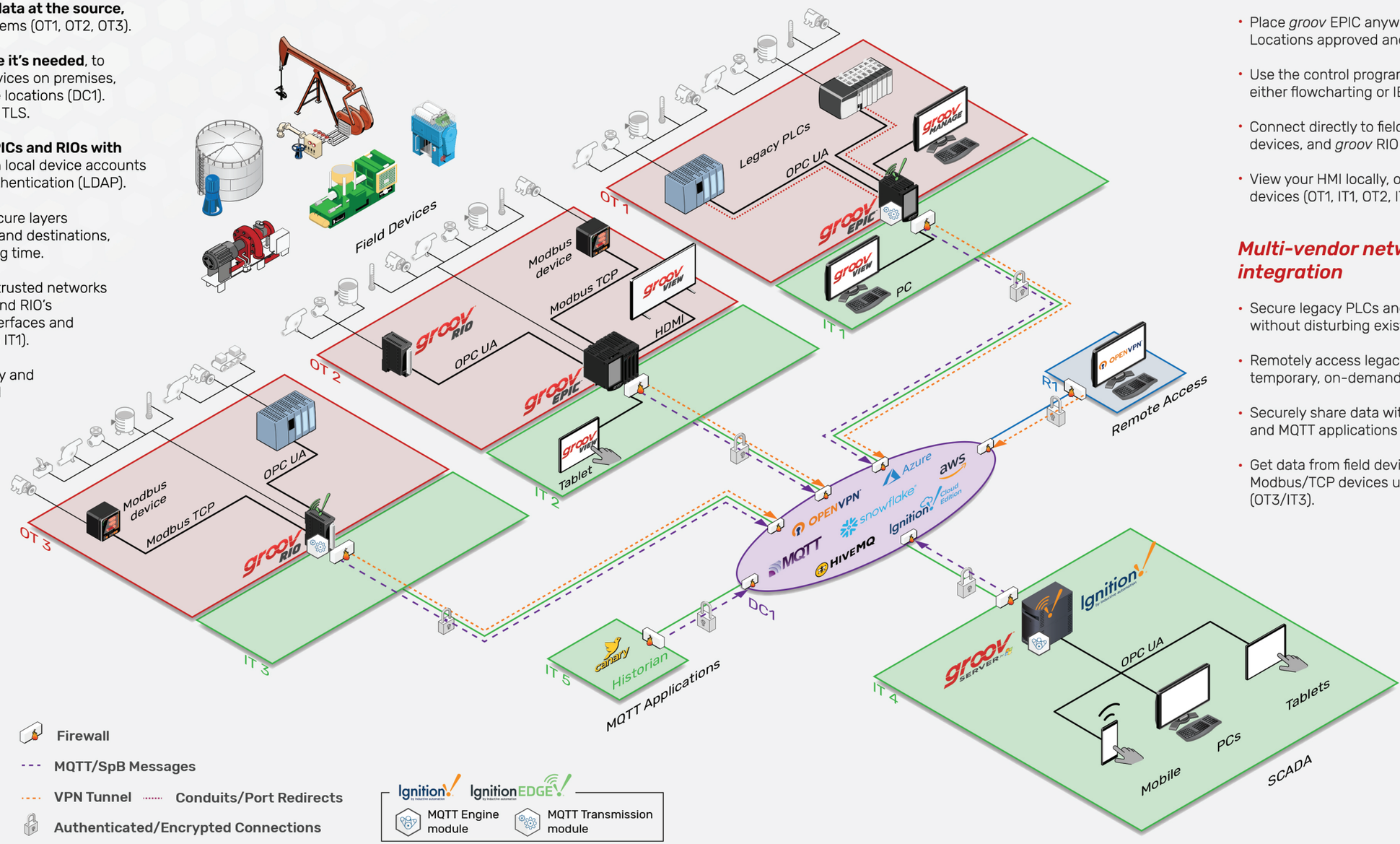
IIoT System Architecture

Acquire and process OT data at the source, from field devices and systems (OT1, OT2, OT3).

Communicate data where it's needed, to software, services, and devices on premises, in the cloud, and at remote locations (DC1). All data is encrypted using TLS.

Secure access to your EPICs and RIOs with user authentication, both local device accounts and centrally managed authentication (LDAP).

- Avoid complex and unsecure layers between data resources and destinations, reducing costs and saving time.
- Segment trusted and untrusted networks into zones using EPIC's and RIO's independent network interfaces and device firewalls (OT1 from IT1).
- Improve system efficiency and scalability with MQTT and Sparkplug B (DC1, IT5).
- Allow secure remote access to your OT systems with VPN.



OT Network Zone
IT Network Zone
DMZ or Cloud Zone
Remote Zone

Firewall
MQTT/SpB Messages
VPN Tunnel
Conduits/Port Redirects
Authenticated/Encrypted Connections

Ignition / IgnitionEDGE
MQTT Engine module
MQTT Transmission module

Real-time I/O sensing and control

- Place *groov* EPIC anywhere. UL Hazardous Locations approved and ATEX compliant.
- Use the control programming language you prefer, either flowcharting or IEC 61131.
- Connect directly to field devices, Modbus/TCP devices, and *groov* RIO edge I/O modules (OT2).
- View your HMI locally, on PCs, and on mobile devices (OT1, IT1, OT2, IT2, IT4).

Multi-vendor network and software integration

- Secure legacy PLCs and acquire their data without disturbing existing systems (OT1).
- Remotely access legacy PLCs with VPN and temporary, on-demand conduits. (R1)
- Securely share data with SCADA systems (IT4) and MQTT applications (IT5).
- Get data from field devices, legacy PLCs, and Modbus/TCP devices using *groov* RIO edge I/O (OT3/IT3).

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groov EPIC Product Overview

groov EPIC® Processors

GRV-EPIC-PR1	Controller, HMI and gateway with Ignition 7, 2 GB RAM, 6 GB user space
GRV-EPIC-PR2	Controller, HMI and gateway with Ignition 8, 3.75 GB RAM, 22 GB user space

groov EPIC Chassis

GRV-EPIC-CHS0	Processor and power supply only mounting 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 v7
GROOV-LIC-EDGE8	*groov* EPIC activation key for Ignition Edge v8
GROOV-LIC-SHELL	*groov* EPIC activation key for Secure Shell access

groov EPIC Mixed Signal, Multifunction Modules

GRV-MM1001-10	8 multifunction, mixed signal channels; 2 form C electromechanical relay output channels

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	AC/DC input, 12 ch, 10–30 VDC, 10–25 VAC, 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-IDCSW-12	DC input, 12 channels, switch status
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

groov Discrete Output Modules

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-IRTD-8	Analog input, temperature (RTD) or resistor, 8 channels
GRV-ITMI-8	Analog input, 8 ch, thermocouple or mV, ch-to-ch isolation
GRV-ITM-12	Analog input, thermocouple or mV, 12 channels
GRV-ITR-12	Analog input, 12 ch, temperature/thermistor or resistor
GRV-IV-24	Analog voltage input, 24 ch, 8 configurable input ranges from ±Like1.25 VDC to ±160 VDC
GRV-IVAPM-3	Input, power monitoring, 3 phase, 600 V with 0.333 V, 1 V, 1 A or 5 A CT
GRV-IVI-12	Analog voltage input, 12 ch, configurable input ranges from ±1.25 to ±160 VDC, ch-to-ch isolation
GRV-IVIRMS-10	Analog RMS voltage input, 10 channels, 0–300 VAC/VDC, channel-to-channel isolation

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-CCANI-2	Serial communication, 2 ch, CAN, ch-to-ch isolation
GRV-CSERI-4	Serial communication, 4 ch, RS-232 or RS-485, ch-to-ch isolation

groov Accessories

GRV-TEX-26F6	26-wire cable for *groov* I/O modules. Straight-through; no common terminals. Flying leads
GRV-TERM26-5	*groov* I/O module terminal, 5 pack
GRV-TERMG26-5	*groov* I/O module terminal, gray, for thermocouple modules, 5-pack
GRV-TERMPM13-5	*groov* I/O power monitoring module terminal, 5 pack
GRV-TEX-SCTOOL	*groov* spring clamp terminal tool
GRV-TEX-RCTM-5	*groov* RIO cable tie push mount, 5 pack
GRV-ENC-POLY-SM	*groov* EPIC/RIO enclosure, 1–2 devices/chassis, polycarbonate, wall or panel mount, IP65
GRV-ENC-POLY-MD	*groov* EPIC/RIO enclosure, 1–4 devices/chassis, polycarbonate, wall or panel mount, IP69
GRV-EPIC-PSAC-FUSE-5	Pack of 5 2-amp 250 V slow fuses for the GRV-EPIC-PSAC power supply
GRV-EPIC-PSDC-FUSE-5	Pack of 5 4-amp 250 V slow fuses for the GRV-EPIC-PSDC power converter
GRV-EPIC-PSPT-FUSE-5	Pack of 5 10-amp 125 V fast fuses for the GRV-EPIC-PSPT power adapter

groov RIO

A family of intelligent, independent I/O units that can work as remote I/O units through PAC Control strategies, Node-RED flows, CODESYS applications, and custom control programs:

GRV-R7-MM1001-10	Remote I/O; 8 multi-signal, multifunction channels; 2 form C electromechanical relay output channels
GRV-R7-MM2001-10	Remote I/O; 8 multi-signal, multifunction channels; 2 form C electromechanical relay output channels, Ignition Edge 8
GRV-R7-I1VAPM-3	Energy monitoring edge I/O; 3-phase energy monitoring, 18 power and energy channels per phase plus 10 accumulation channels

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