groov BOX EDGE APPLIANCE

Features

- Compact industrial Internet of Things (IoT) appliance suited to harsh environments at the network's edge
- Industrial hardware with web-based, Internet-standard software to build your IIoT projects
- *groov* View for browser-based data visualization, monitoring, and control from any brand computer or mobile device
- Node-RED for rapid application development and data handling
- Ignition Edge for connectivity using OPC UA and MQTT
- Security with TLS/SSL encryption plus username/password authentication

IgnitionEDGE ONBOARD

Node-RED

DESCRIPTION

The *groov*® Edge Appliance (*groov* Box) is Opto 22's Internet of Things (IoT) and operator interface appliance that provides *visualization, data handling,* and *connectivity* to automation systems, software, databases, and devices of all kinds—all in a compact, industrially hardened box suited to the edge of the network.

Visualization: From pumps and processes, to production data, to the weather, your world is full of things you need to view, monitor, or control. With browser-based *groov* View, you can easily build an operator interface to see and interact with exactly what you need. Show data from sensors and automation systems, cloud applications, databases, web services, and more. Securely view the interface you build on any brand device, from a smartphone to a computer to a web-enabled big-screen TV.

To build your interface, just drag, drop, and tag. No tag limits; no user licenses required. Set up authorized users and groups. Define events based on one or more conditions, and automatically alert selected personnel anywhere when events occur. *groov* can augment existing human-machine interfaces (HMIs) and SCADA systems by making specific data visible to authorized users at any time and in any location.

Data Handling: The key to IoT usefulness is getting the data out of where it's trapped and into the systems and software where it's needed. With the *groov* Edge Appliance, you can use standard Internet and IT-compatible tools to manipulate and move data between things in the real world and computer systems and software on premises or in the cloud.

Key tools are built into the *groov* Box and ready for use: Node-RED, an IoT rapid application development environment; RESTful APIs to *groov* View Data Stores; and Ignition Edge® from Inductive Automation®, with OPC UA and MQTT/Sparkplug. You can place the secure *groov* Box appliance at the network's edge in harsh industrial environments and know you have the tools right there to acquire data, move it, and act on it.

Connectivity: The *groov* Edge Appliance simplifies the connections you need to accomplish your IoT goals. Connect to all kinds of devices and systems to monitor and control them and move data between them.

- Connect directly to Modbus/TCP devices, Opto 22 *groov* EPIC® and SNAP PAC controllers, and SNAP PAC I/O units to access their data.
- Use Node-RED (included) to create logical flows for data. Exchange data with cloud applications, IoT platforms,

Part Numbers

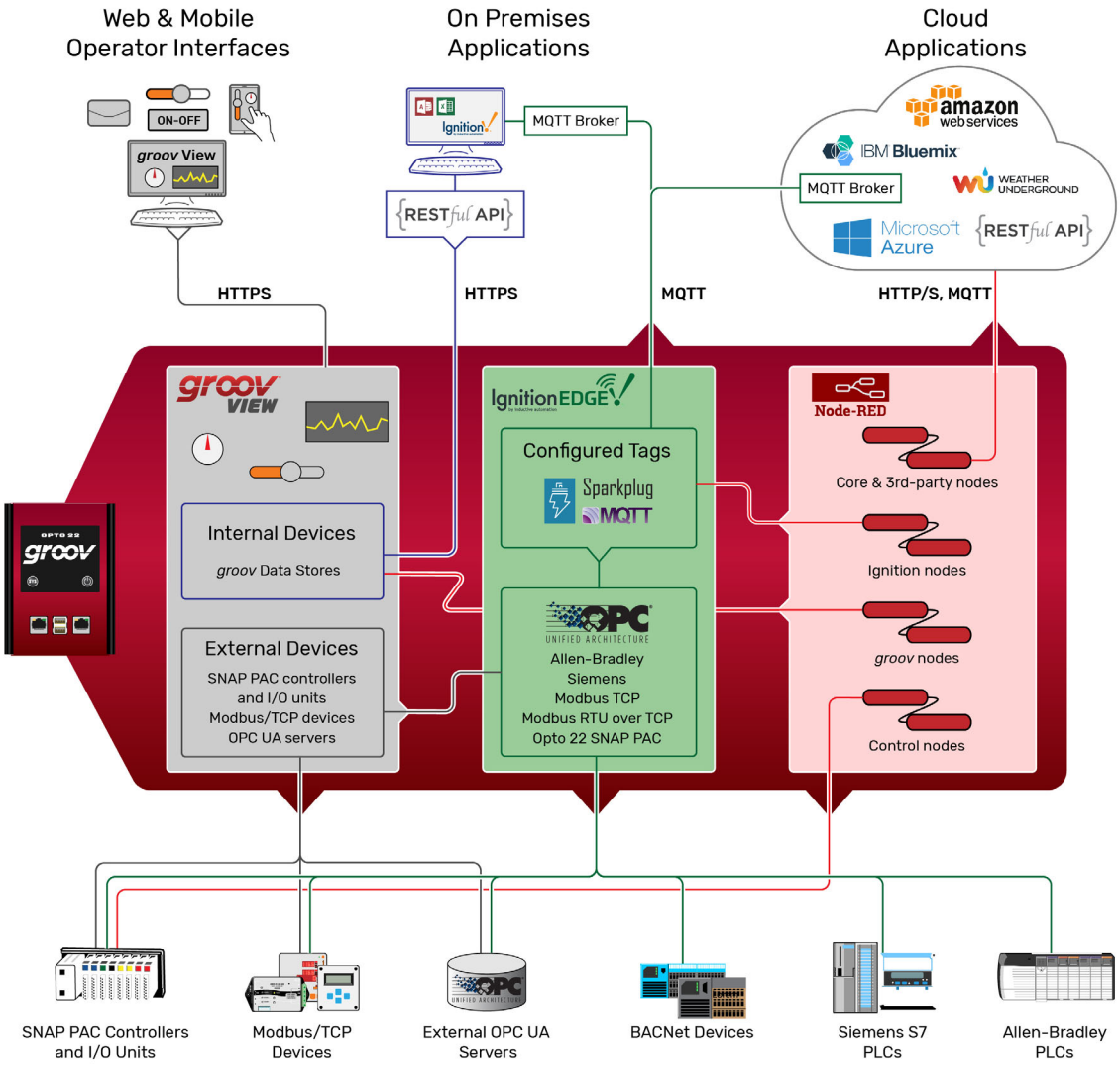
Part	Description
GROOV-AR1-BASE	*groov* Box for Modbus/TCP devices, *groov* EPIC processors, SNAP PAC controllers and I/O units, and *groov* View Data Stores; includes *groov* View and Node-RED
GROOV-LIC-EDGE	License for Ignition Edge in *groov* Edge Appliance (*groov* Box)
GROOV-SVR-WIN-BASE	*groov* Server for Windows for Modbus/TCP devices, *groov* EPIC processors, SNAP PAC controllers and I/O units, and *groov* View Data Stores; includes *groov* View only.
GROOV-MNT-1YR	*groov* View one-year maintenance
GROOV-MNT-3YR	*groov* View three-year maintenance
GROOV-MNT-10YR	*groov* View ten-year maintenance

MADE IN THE USA

on-premises databases, and external web services. Also connect to serial devices—Modbus RTU/ASCII, weigh scales, and more—via a USB-to-serial converter and Node-RED.

- Use our secure RESTful API from your database, cloud service, or business application to place data in or read data from a *groov* Data Store, where you can access it for your use.
- Connect to PLCs and PACs from other automation manufacturers using OPC UA:
  - With the internal Ignition Edge server and drivers, connect to Allen-Bradley® and Siemens® PLC systems, plus others (requires Ignition Edge license, GROOV-LIC-EDGE).
  - With an external OPC-UA server such as Kepware Technologies' KepServerEX®, connect to any system or database your server and drivers support.
- Publish and subscribe data from devices connected to the *groov* Box to brokers, using the lightweight MQTT transport protocol with Sparkplug payload. MQTT creates a high-performance communications architecture ideal for getting the data that's trapped behind firewalls into SCADA software like Ignition Enterprise (requires Ignition Edge license, GROOV-LIC-EDGE).

groov brings data from process control, OEM machines, manufacturing and building systems, and the Internet of Things (IoT) to the people and systems that need it.



WHAT'S IN THE BOX

The *groov* Box edge appliance includes:

***groov* View**—an easy-to-use tool for building and using your own custom operator interface to the sensors, data, devices, and systems you need to see, monitor, and control. The browser-based interface you build can be viewed on any brand smartphone, tablet, laptop, computer, or even a web-enabled HDTV. Includes trending, event logging, and operator notifications.

Node-RED—an open-source, multi-platform software tool for wiring together databases, cloud applications, and APIs to produce IoT applications quickly and inexpensively. Through Node-RED the *groov* Box can also use a USB-to-serial converter with FTDI chipset to connect to serial devices like weigh scales, Modbus RTU/ASCII devices, and more.

Ignition Edge (requires an Ignition Edge license)—a product of Inductive Automation®, Ignition Edge provides an internal OPC-UA server and drivers for connecting to Allen-Bradley® and Siemens® PLCs, Modbus/TCP devices, and other systems. Also included is an MQTT Transmission module, so you can use the lightweight MQTT protocol with Sparkplug payload in your IIoT applications.

***groov* Admin**—a utility application for configuring networks and security, backing up and restoring your *groov* and Node-RED projects, using Node-RED, configuring Ignition Edge, updating *groov* software, and viewing system status.

With all these IoT tools in the same box, your IoT application is easier to configure and security is streamlined. To make sure you have all the features you need, see "groov Feature comparison" on page 4.

NOTE: *If you need realtime control in addition to connectivity, data handling, and visualization, see the groov EPIC system.*

WINDOWS PC-COMPATIBLE OPTION

If you already have a Microsoft® Windows® PC and want to use it for your IoT projects, you can get *groov* Server for Windows (part number GROOV-SVR-WIN-BASE) instead of the *groov* Box.

groov Server for Windows includes *groov* View software for building and viewing operator interfaces. It comes ready for installation on a Windows PC, and once installed, runs as a service on your computer.

You will need to download your own IIoT software, such as Node-RED (available from nodered.org) and Ignition Edge (available from Inductive Automation), and provide your own security.

Compare features for the *groov* Box and *groov* Server for Windows in the table on the following page.

SECURITY

When you're sending data to and receiving data from automation equipment and devices, security is critical. In addition to the security you provide in your network and firewall, *groov* View offers four important ways to keep your data safe.

Encryption. All communications between your users and the *groov* Box or Server are encrypted using the latest TLS/SSL methods. This is the same encryption your bank uses.

Authentication. Usernames and passwords (or API keys for software users) are required for all users and are set up in *groov* View by an Admin user. Make sure your users understand the importance of keeping their passwords and API keys secret.

Access limitations. In *groov* View, security levels for users (Admin, Editor, Operator, and Kiosk User) determine what each of your users can and cannot see and do in the operator interface. You also have the option to hide gadgets for users on phones while showing them to users on desktops and tablets, or vice versa.

In addition, you can assign your users to groups and limit each group's access to specific pages in your *groov* interface. For example, pages for a group called Supervisors could show KPIs for production, while pages for a group called Operators might include controls.

Passcodes for mobile apps. If you use the free mobile device apps *groov* View for iOS and *groov* View for Android, you can also set up a passcode. Even if an unauthorized person has the phone or tablet, they have to know the passcode to see the *groov* View interface.

groov Feature comparison

Feature	GROOV-AR1-BASE	GROOV-SVR-WIN-BASE
Format:		
Industrially hardened computing device	●	
Two independent Ethernet network interfaces	●	
Software that runs on Windows PC		●
Connect to:		
Multiple Modbus/TCP devices, *groov* EPIC processors, SNAP PAC controllers and I/O units, and *groov* Data Stores	●	●
OPC-UA devices	●	●
- Using Ignition Edge internal OPC-UA server and drivers	●	
- Using external OPC-UA server	Optional	Required
Handle data:		
Node-RED and admin utility	●	
groov and Opto 22 PAC control nodes	●	
API to *groov* Data Stores	●	●
MQTT/Sparkplug	●	
Data Simulator	●	●
Visualize:		
Browser-based operator interface creation for PCs and mobile devices	●	●
Drag-drop-tag construction with built-in gadget library	●	●
Users and groups	●	●
Event logging with email and text notifications	●	●
Trending (up to 5 years)	●	●
Interface viewable on all sizes/brands	●	●
Security: HTTPS/TLS encryption & authentication	●	●
Self-signed or Certificate Authority certificates	●	●
Unlimited users	●	●

groov VIEW: BUILD AND VIEW YOUR INTERFACE

To build your *groov* View operator interface, you have a library of pre-built gadgets you can simply drag and drop onto the screen. Then you import and use tags from a variety of systems and equipment, including Modbus/TCP devices, Opto 22 *groov* EPIC processors, SNAP PAC controllers and I/O units, and many other manufacturers' systems, equipment, and databases. You can also manage user accounts and set up email or text message event notifications in Build mode.

The *groov* View operator interface you build resides on a *groov* EPIC controller, a *groov* Edge Appliance, or *groov* Server. Your human users access the interface using any device with a web browser and a network connection to *groov*, or using the free *groov* View app on an iOS or Android smartphone or tablet.

Using Gadgets

To build your project, you use *groov*'s ready-made gadgets. Here are just a few examples; many other gadgets are included:

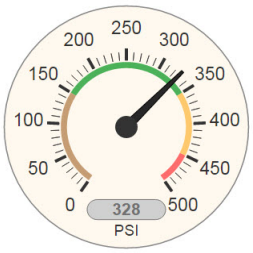
- A Round Gauge displays a value using a rotating needle and decimal numerical display.
- A Command Button sends a command.
- A Slider adjusts a variable.
- A Trend shows how variables change in real time.

To set up a gadget, you import tags from your system or device, select one of the tags from your tag database, and then associate it with a gadget available for that tag. Once you have set gadget-specific properties and saved your project, a gadget is immediately ready to use in your operator interface.

A number of gadgets give you display choices. For example, a button can be skinned with an image. Or a link to another page or a URL can appear as a text link, a button, or an image. The Image Indicator gadget uses multiple images to display current status or value.

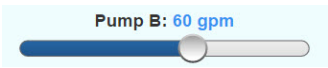
Gadgets and text in your interface default to usable sizes and colors, so you can build it rapidly. But you also have full control over graphic and text sizes and appearance. You can alter layouts to suit a PC/tablet or a smartphone. You can also brand your operator interface with your own logo and colors.

Changing the interface is as easy as building it, and both interface changes and software updates are automatically pushed out to users.

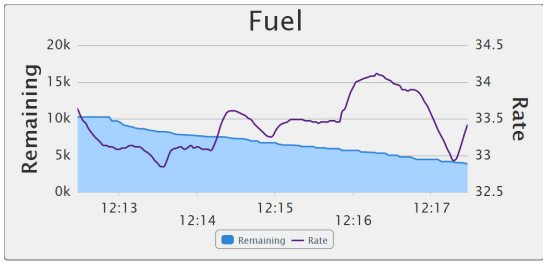


Round Gauge

Command Button



Slider



Trend

Image Library

All images used in your *groov* project are stored in the Image Library. The same image can be used in multiple places, and if you change the image, it is updated everywhere it is used.

It's easy to add images to the Library or delete them when no longer needed. The Image Library accepts many kinds of image files, including photos, drawings, and logos with file types BMP, GIF, PNG, JPG, and SVG. For each image, the Library includes the image itself plus filename, size, and date added. You can also add notes if you wish.

Many useful drawings (manufacturing, processing, building, and commercial equipment; field sensors and devices; and much more) are available in the free SVG Image Library on the Opto 22 website (follow link or search on Demo: SVG Image Library). Select the drawing you want, choose colors, rotate if necessary, and download it ready to use in your *groov* interface.

groov View on a tablet and a smartphone

Event Logging and Notifications

groov logs events you configure, and you can view the current status of events as well as the event log. You can sort and filter what you want to see in the log and also download it as a text file. The log holds 200 MB of the most recent events (typically over a million entries).

Each event you configure is based on one or more conditions, such as a value equal to a value you specify, or a value outside a range you determine. When you set up multiple conditions for one event, the event can be configured to occur when all of them are true or when any one is true.

You can also choose to alert selected personnel when an event occurs. These event-based notifications are sent via email (or text message, through most carriers).

Event messages can be customized and sent to groups or individuals.

Messages can include equipment data, time/date stamps, other key information, and even links back to the *groov* operator interface for one-click access to real-time, visual data for further investigation.

For example, if a machine overheats, stops working, or otherwise meets or exceeds one or more predefined criteria, a maintenance technician can receive a notification and click right to the *groov* screen for more data.

With email available at almost any time or location thanks to mobile devices such as smartphones, notifications can get critical data into the right hands right away.

Trending

Trending in *groov* is real time, but can extend over a long period of time. When you create a trend, you choose Classic or Interactive. Both types of trends can include up to 4 pens on 2 axes.

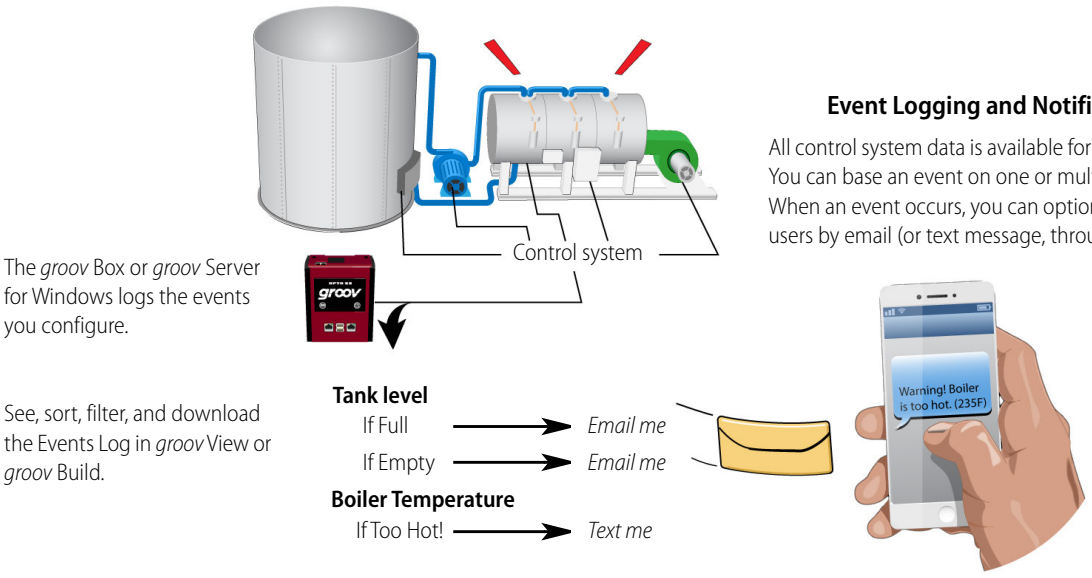
- *Classic* trends show up to 7 days' worth of data.
- *Interactive* trends can show much more data over a period of up to 5 years, with the ability to zoom in on a smaller set of data to see details.

Trend data can be downloaded for logging.

groov operator interfaces work on computers, smartphones, tablets, even web-enabled HDTVs, and can be branded with your own logo and colors.

Mobile Device Apps

***groov* View for iOS** and ***groov* View for Android** are free native apps for your tablet or smartphone. You can run *groov* View in your browser, but these apps display your interface in full-screen mode.



Event Logging and Notifications

All control system data is available for configuring events. You can base an event on one or multiple conditions. When an event occurs, you can optionally notify selected users by email (or text message, through some carriers).

View in browser View in app

These native apps add other advantages as well. You can add another layer of security by setting up passcodes in the app. If you have more than one *groov,* you can easily access all of them from the app. The iOS app is also ideal for OEMs and machine builders who want to use a tablet as an operator interface to a machine. You can lock the device so it runs only *groov* View.

Get groov View for iOS.
Get groov View for Android.

NODE-RED

Included in your *groov* Box is Node-RED, an open-source software program you can use to wire together devices, databases, cloud applications, and APIs (application program interfaces) with simple logic flows. Many people use Node-RED for Internet of Things (IoT) applications.

Node-RED provides engineers with an easy way to connect edge computing systems, such as industrial automation controllers, to cloud services such as Amazon Web Services™ (AWS) IoT, IBM Watson IoT™, and Microsoft® Azure®.

In Node-RED you connect prebuilt nodes (provided by device manufacturers or software developers) together to make a flow. The flow provides the logic to accomplish your goal. You can also add function nodes containing JavaScript.

Because Node-RED is a general-purpose programming environment, you have the freedom to create the flows you like using any nodes you choose. Opto 22 PAC Control nodes (for *groov* EPIC processors and SNAP PAC controllers), *groov* Data Store nodes, and a wide variety of other nodes are easy to install.

For more information about Node-RED and code samples to help you get started, see developer.opto22.com and our Node-RED OptoForum.

IGNITION EDGE

Ignition Edge in the *groov* Box gives you two key connectivity pieces for your IoT applications: OPC UA and MQTT/Sparkplug.

OPC UA

(Requires an Ignition Edge license, part number GROOV-LIC-EDGE) Included with Ignition Edge in the *groov* Box are an internal OPC-UA server and drivers for some of the most popular automation PLCs and devices: Allen-Bradley, Siemens, and Modbus, as well as SNAP PACs.

That means you do not have to buy, configure, and maintain an industrial PC in order to view and act on data from these systems. Because the *groov* Box is built for industrial use, you can place it where you need it—in harsh environments or remote locations—and have the tools you need right there.

The following OPC-UA drivers are included with Edge in the *groov* Box:

Allen-Bradley PLCs:
- Logix
- SLC
- PLC-5®
- MicroLogix™

Siemens PLCs:
- S7-300
- S7-400
- S7-1200
- S7-1500

- Modbus/TCP devices
- Devices that support Modbus RTU over TCP
- Other drivers you have purchased

MQTT

(Requires an Ignition Edge license, part number GROOV-LIC-EDGE) Also included with Ignition Edge is an MQTT Transmission module. MQTT (Message Queue Telemetry Transport) MQTT is a publish-subscribe (pub-sub) protocol that's suited to many IoT applications because of its architecture.

In a pub-sub architecture, a central source, called a broker, handles all data. MQTT clients can publish data to the broker or subscribe to get data from it (or both). Clients who publish data send it only when the data changes (report by exception). Clients who subscribe to data automatically receive it from the broker only when it changes.

Contrast this with a request-response architecture. There the client and server must be connected, because the client requests data directly from the server. The client doesn't know when the data changes, so it must request it at regular intervals.

MQTT pub-sub offers three main advantages over request-response for IoT applications:

- Network traffic is reduced overall, because data is published and sent only when it changes, rather than at regular intervals.

- Because the broker is a central source for data, servers don't have to strain to serve multiple clients. And even remote devices with irregular connections or low bandwidth can publish or subscribe to data.
- For data publishers, there's another important advantage: data is published using an outbound connection. Most firewalls block inbound traffic (for example, an external client requesting data from an internal server), but they allow outbound connections.

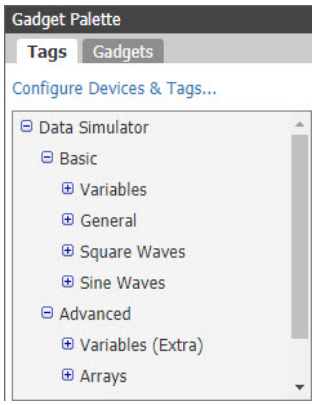
With MQTT in the *groov* Box, you can use the Sparkplug payload specification. Sparkplug defines the messages that move over MQTT and gives you a way to make sure that data from remote devices and applications is current and valid.

With both OPC UA and MQTT/Sparkplug in the *groov* Box, you can move data to and from A-B, Siemens, Modbus, and SNAP PAC systems in a non-intrusive way, without requiring an industrial PC, additional firewalls, or expensive network connections.

Note that you must have an Ignition Edge license (GROOV-LIC-EDGE) to use Ignition Edge and MQTT with Sparkplug.

DATA SIMULATOR

A Data Simulator built into *groov* provides simulated dynamic and fixed values for onscreen gadgets, so you can explore or test before connecting to real-world systems and equipment.



For instance, a Graph gadget can use a simulator tag that provides changing values for a sine wave, or a gauge can use a simulator tag with an integer moving between high and low values.

This feature can help test onscreen gadgets or simulate tags and variables during screen development.

DATA STORE

Another way to visualize and use data from IoT devices, databases, cloud services, and more in your *groov* operator interface is to use a Data Store. You can create a Data Store device in *groov* and securely place or access data there using the Data Store's RESTful API and the programming language of your choice.

Your *groov* users can then view, control, see trends, and receive notifications on this data. You can also use Node-RED as an easy way to wire these data sources together.

TRY BEFORE YOU BUY

See the Demo

See *groov* in action at demo.groov.com. Log in using the username `trial` and password `opto22`

Explore the demo and then download the *groov* Demo Project for examples and help building your own interface elements.

Try it yourself

A fully functional version of *groov* Server for Windows is available to download and try, so you can see your system data on a smartphone, tablet, or computer. Connect to a Modbus/TCP device, SNAP PAC controller, SNAP PAC I/O unit, or *groov* Data Store; or use the built-in Data Simulator to evaluate *groov* without connecting to a live machine or system.

If you want to connect to real data from an external OPC-UA server and don't have one, Kepware Technologies' KEPServerEX® communication platform is available for trial at www.kepware.com.

To try *groov* View, download and install groov Server for Windows. Simple instructions walk you through software setup, connecting to one or more systems, and building a simple interface so you can quickly see realtime data on a mobile device.

NOTE: You must log into your computer as an administrator to install groov Server for Windows.

groov Server operates for two hours without a license key. You can restart it as needed. When you purchase *groov,* the project you built during the trial will continue to work. You can also develop your *groov* View operator interface on *groov* Server and later move your project to a *groov* Box Edge Appliance or *groov* EPIC.

SYSTEM REQUIREMENTS

To build operator interfaces with *groov* View, you'll need:

- Any computer with a web browser (does not have to be a Windows PC)
- One or more of the following:
  - A Modbus/TCP device
  - A database, online service, or software program to get data from or put data into a Data Store using the *groov* API
  - An Opto 22 *groov* EPIC or SNAP PAC controller (SNAP PAC S-series, R-series, or SoftPAC, with firmware R9.2a or newer), running a PAC Control strategy
  - An Opto 22 SNAP PAC I/O unit
  - (*groov* EPIC or *groov* Box only) A database, cloud application, API, or serial device accessible via a Node-RED node. (Serial

device with a *groov* Box requires a USB-to-serial converter with FTDI chipset, *groov* Admin R1.570.46 or higher, and Node-RED for *groov* Box version 3 or higher.)

  - OPC UA-compatible automation system or equipment. Ignition Edge supplies an internal server and drivers for *groov* EPIC or a *groov* Box. Additional drivers or an external OPC-UA server may be required for your equipment.

groov Server for Windows

To install and run *groov* Server for Windows, you'll need:

- A PC on the same network as your control device, with one of the following Microsoft operating systems. If you're using an OPC-UA server, it can be the same or a different computer.
  - Windows® 10, 8, or 7 Professional (32-bit or 64-bit)
  - Windows Server® 2012 or Windows Server 2008 R2

  NOTE: .NET Framework 3.5 or greater is required for all operating systems. Use the "Add roles and features" option for Windows Server 2012.

- A minimum of 250 MB available disk space to install *groov* Server for Windows. Additional disk space is required for the project you build.

If you are using *groov* Server to build an interface for an OPC UA compatible system and don't have an OPC UA server installed, the KEPServerEX communication platform from Kepware Technologies is recommended by Opto 22 and tested to work with *groov*. For more information: www.kepware.com/Products/products_OPCServers.asp. Also see: www.kepware.com/Support_Center/doc_auto_tag.asp

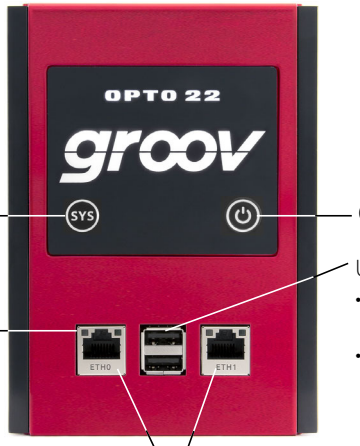
groov MAINTENANCE

groov maintenance lets you get *groov* updates for free, including new features, enhancements, and bug fixes. One year of maintenance is included with your purchase of either a *groov* Box or *groov* Server for Windows. You can purchase additional maintenance for one year, three years, or 10 years. For more information about *groov* maintenance, see the *groov Maintenance Technical Note* (form 2130).

groov BOX (GROOV-AR1-BASE) SPECIFICATIONS

Ethernet Communication (wired)	Two independent 10/100/1000 Mbps RJ-45 connectors, each with a separate IP address (separate subnets)
Ethernet Comm (wireless)	802.11 b/g/n (optional; requires purchase of a third-party commercial USB WiFi adapter that has been tested and approved by Opto 22)
Security (wireless)	WEP64 WEP128 WPA PSK (also called WPA Personal) WPA2 PSK (also called WPA2 Personal)
Backup battery	BR2032 button cell lithium battery with a nominal voltage of 2.8 volts. Lasts 8 years at 25 °C. This battery maintains the date and time.
Power Consumption	8-36 VDC, 24 VDC @ 500mA (Power supply included; input 100-240 VAC. Use international adapter if needed.)
Housing	Compact and sturdy metal. Fanless operation.
USB	USB 2.0 (three: used for backing up, restoring, WiFi, and connecting to serial devices via a USB-to-serial converter with an FTDI chipset)
Indicators	Ethernet interfaces (2): Link/Activity and Speed System: SYS & PWR
Operating Temperature	0 to 70 °C (32 to 158° F)
Storage Temperature	-20 to +80 °C (-4 to 176° F)
Operating Humidity	10% to 90% relative humidity, non-condensing
Storage Humidity	5% to 95% relative humidity, non-condensing
Agency Approvals	CE, RoHS, DFARS
Warranty	30 months

groov BOX CONNECTORS AND INDICATORS



System LED

On/off button and LED

USB connectors. Can be used for:

- Backing up and restoring groov using a flash drive
- Connecting to serial devices using a USB-to-serial converter and Node-RED

Ethernet LEDs

Independent 10/100/1000 Mbps Ethernet interfaces (RJ-45 connectors)

Top

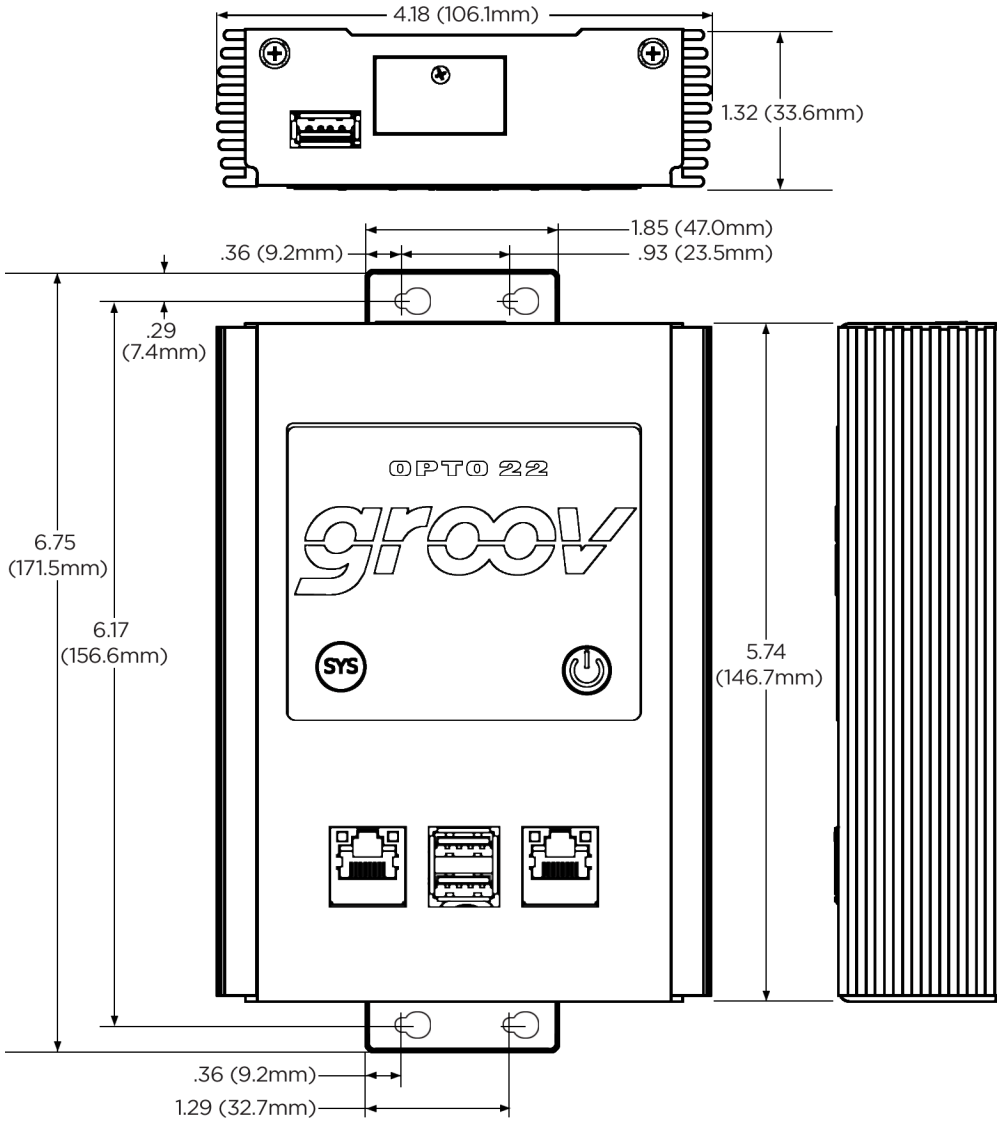
USB connector, used for:

- Connecting an approved WiFi adapter
- Connecting to serial devices using a USB-to-serial converter and Node-RED

Bottom

Power connector

groov BOX DIMENSIONS



More about Opto 22

OPTO 22

PRODUCTS

Opto 22 develops and manufactures reliable, easy-to-use, open standards-based hardware and software products.

Industrial automation, process control, building automation, industrial refrigeration, remote monitoring, data acquisition, and industrial internet of things (IIoT) applications worldwide all rely on Opto 22.

groov EPIC® System

Opto 22's *groov* Edge Programmable Industrial Controller (EPIC) system is the culmination of over 40 years of experience in designing products for the automation industry.

groov EPIC gives you an industrially hardened system with guaranteed-for-life I/O, a flexible Linux®-based controller with gateway functions, and software for your IIoT application or any application.

groov EPIC I/O

I/O provides the local connection to sensors and equipment. *groov* I/O offers up to 24 channels on each I/O module, with a spring-clamp terminal strip, integrated wireway, and swing-away cover.

Opto 22 I/O is so reliable, we can afford to guarantee it for life. *groov* I/O is hot swappable, UL Hazardous Locations approved, and ATEX compliant.

groov EPIC Controller

The heart of the system is the *groov* EPIC controller. It handles a wide range of digital, analog, and serial functions for data collection, remote monitoring, process control, and discrete and hybrid manufacturing.

In addition, the EPIC provides secure data communications among physical assets, control systems, software applications, online services, and more, both on premises and in the cloud.

Configuring and troubleshooting I/O and networking is easier with the EPIC's integrated high-resolution touchscreen. Authorized users can see your *groov* View HMI locally on the touchscreen or on a monitor connected via the HDMI or USB ports.

groov EPIC Software

Software includes:

- Flowchart-based PAC Control for control programming, or build your own custom application with optional secure shell access
- *groov* View for building and viewing your own device-independent HMI
- Node-RED for creating simple logic flows from pre-built nodes
- Ignition Edge® from Inductive Automation®, with OPC-UA drivers to Allen-Bradley®, Siemens®, and other control systems, and MQTT/Sparkplug communications for efficient IIoT data transfer

groov Edge Appliance

Visualization, data handling, and connectivity in a compact, industrial box: that's the *groov* Edge Appliance. Included are:

- *groov* View for building and viewing operator interfaces on PCs and mobile
- Node-RED for building simple logic flows
- Ignition Edge from Inductive Automation, for OPC-UA drivers and MQTT/Sparkplug IIoT communications

Older products

From solid state relays (our first products) to world-famous G4 and SNAP I/O, to SNAP PAC controllers, Opto 22 products last a long time. You can count on us to give you the reliability and service you expect.

QUALITY

Founded in 1974, Opto 22 has established a worldwide reputation for high-quality products. All are made in the U.S.A. at our manufacturing facility in Temecula, California.

Because we test each product twice before it leaves our factory rather than testing a sample of each batch, we can guarantee most solid-state relays and optically isolated I/O modules for life.

FREE PRODUCT SUPPORT

Opto 22's California-based Product Support Group offers free, comprehensive technical support for Opto 22 products from engineers with decades of training and experience. Support is available in English and Spanish by phone or email, Monday–Friday, 7 a.m. to 5 p.m. PST.

Support is always available on our website, including how-to videos, user's guides, the Opto 22 KnowledgeBase, troubleshooting tips, and OptoForums. In addition, free hands-on training is available at our Temecula, California headquarters, and you can register online.

PURCHASING OPTO 22 PRODUCTS

Opto 22 products are sold directly and through a worldwide network of distributors, partners, and system integrators. For more information, contact Opto 22 headquarters at **800-321-6786** (toll-free in the U.S. and Canada) or **+1-951-695-3000**, or visit our website at www.opto22.com.

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