



**groov RIO EMU** ENERGY MONITORING UNIT

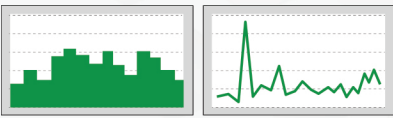
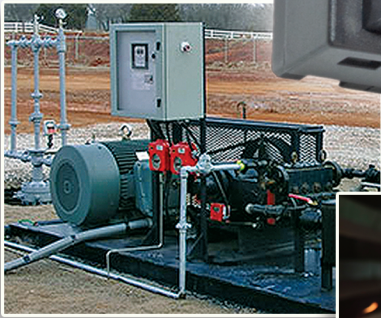
**OPTO 22**  
Your Edge in Automation.™





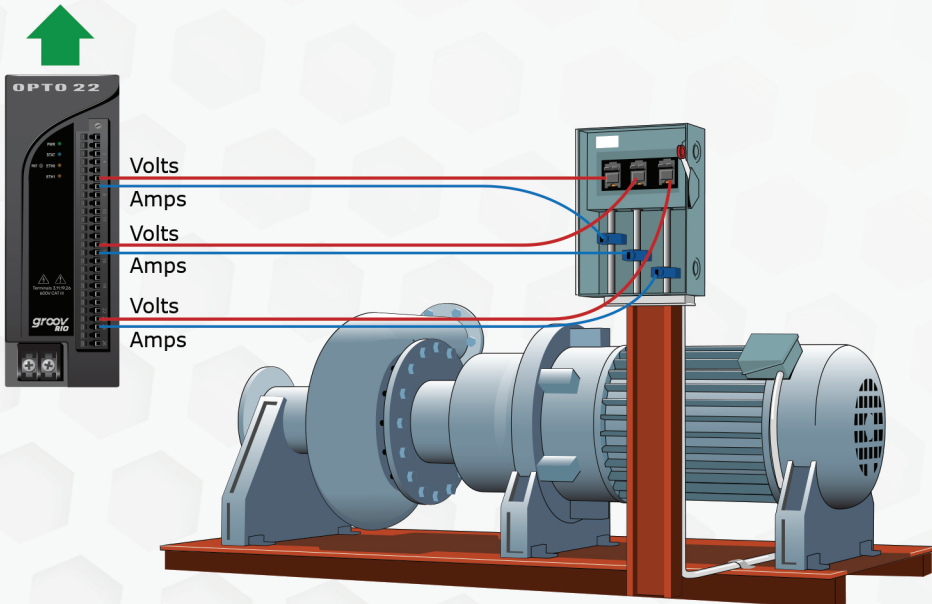
# groov<sup>®</sup> RIO EMU

ENERGY MONITORING UNIT



Energy Data

Power Data



## Monitor machine health with precise power data

### groov RIO EMU (energy monitoring unit)

- Monitor category III 3-phase AC power up to 600 V in Delta or Wye configurations
- Capture 18 data values per phase—voltage, current, true power, power factor, and frequency—plus 10 3-phase totals
- Measure power and energy at the point of use to detect downtime predictors like high power consumption
- Easily share real-time data with analytics software, databases, and dashboards using the built-in MQTT/Sparkplug client
- Secure the system and data with user accounts, configurable firewall, TLS certificates, HTTPS, and VPN client
- Quickly power for standalone operation with 802.3af PoE Class 0 switches or use 10-32 VDC line power

### Use groov RIO EMUs in two ways:

As an edge energy monitoring unit, communicating data between loads and data destinations.

- Push data directly to on-premises or cloud apps, databases, or other software, typically using the included Node-RED
- Publish data to an MQTT broker
- Respond to Modbus/TCP requests for data
- Configure with browser-based *groov* Manage software
- Manage local user accounts and permissions, or from a central location through an LDAP server

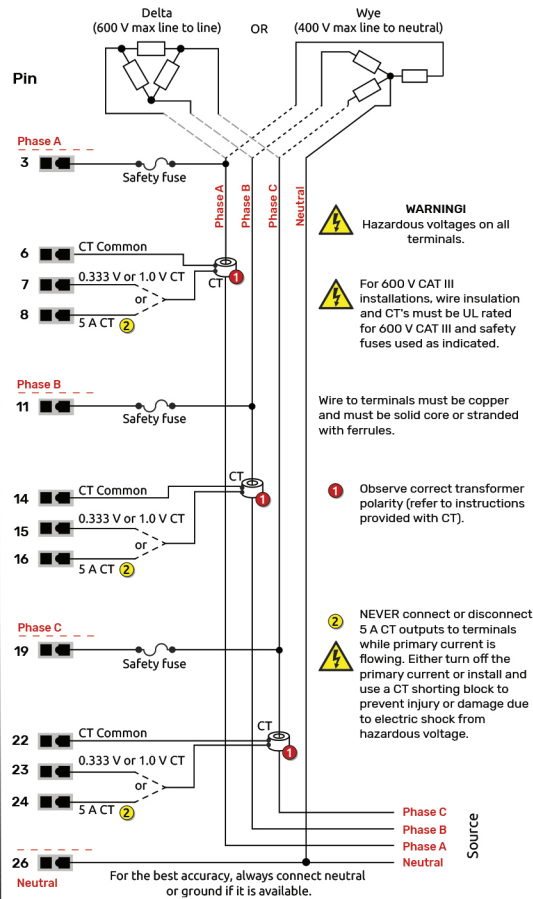
As a traditional energy monitoring unit, configuring channels through your control program:

- With a *groov* EPIC processor running a PAC Control strategy; add a *groov* RIO EMU as an I/O unit
- With a *groov* EPIC processor running a CODESYS application, download and install the Opto 22 CODESYS Library Package to the CODESYS Development System, then add a *groov* RIO EMU as an Ethernet device
- With a custom control program through either *groov* RIO's OptoMMP memory map, its REST API, or through secure shell access (requires free GROOV-LIC-SHELL license)



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Power Data	Units
Data (power) values are provided through channels 0-12 for phase A, 18-30 for phase B, and 36-48 for phase C. For each phase, the module provides:	
True Power	W
Reactive Power	VAR
Apparent Power	VA
Frequency	Hz
Harmonic True Power	W
Power Factor	%
Peak Voltage	V
Peak Current	A

Energy Data	Units
Accumulated energy values for Net, Positive, Negative, Net Reactive, and Apparent energy are provided through channels 13-17 for phase A, 31-35 for phase B, and 49-53 for phase C.	
Summation values for Net, Positive, Negative, Net Reactive, and Apparent energy are provided through channels 57-62.	
Total True Power	W
Total Reactive Power	VAR
Total Apparent Power	VA
Total Net Energy	kWh, mWh
Total Unsigned Energy	kWh, mWh
Total Positive Energy	kWh, mWh
Total Negative Energy	kWh, mWh
Total Net Reactive Energy	kVARh, mVARh
Total Net Apparent Energy	kVAh, mVAh
Average Power Factor	%



**OPTO 22**

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