Wireless Backup for ERPS v2 Network by the LTE/WLAN PoE Routing Switch

WR316GPS Series

Industrial Cellular /WLAN PoE Routing Switch

The LTE/WLAN PoE router WR316GPS supports latest G.8032 ERPS v2 ring technology with 6 Giga ports, 2-port 100/1000M fiber ports, and simultaneous high-speed LTE or WLAN 802.11ac routing. The wireless can backup the network in case of ring failure and works as a redundant gateway. Dual SIM in WR316GPS-LTE standby enables auto switch to secondary cellular network if primary network disconnects. The rugged router is with enhanced routing functionality such as static routing, IPSec VPN, DMZ and a powerful firewall in order to segregate networks and protect mission-critical data. With support for Network Address Translation (NAT) and port-forwarding, it isolates the threats from the Internet. The 4 Gigabit PoE/PoE+ ports connect and feed PoE to IP camera or wireless AP up to 30W/port. The USB port for configuration file can help mass installation and site support. Compact size and ruggedized design bring reliable deployment under the harshest conditions.

Features & Benefit

Cellular High speed 4G LTE or Wireless LAN

- LTE Cat.4, 2x2 MIMO, 150M downlink and 50M uplink
- LTE Cat.6 with 2CA, 2T2R MIMO provides 300M downlink and 50M uplink
- 4G/3G/2G full cellular network compatibility
- GPS/BDS/GLONASS/Galileo location services
- IEEE 802.11ac compliant & backward compatible with 802.11a/b/g/n
- Selectable 5G/2.4G Wi-Fi for local coverage, up to 866Mbps bandwidth

Extreme PoE Capability

- Provides 4-port IEEE 802.3af/at compliance PoE, up to **30W** per port
- Up to 120W PoE power budget
- Complete PoE management including per-port Power **Budget Control**, PoE **Scheduling and** PoE Status

ITU-T G.8032 v1/v2 ERPS Ring Redundancy

- An ITU standard Ring redundancy Protocol
- Provide sub-50ms protection and recovery switching for Ethernet traffic
- Interoperate with 3rd party industrial switch and still remain fast recovery time STP/RSTP
- Efficient network interconnection and topology with ERPS Chain, multiple chains

Cloud Management Service

- Support Amazon AWS & Microsoft Azure cloud service
- Support proprietary ThingsMaster cloud service
- Interactive monitoring dashboard and map shows the status, signal strength, location etc.

Enhanced Cyber Security for Critical Application

- Firewall for traffic classification
- DMZ, port forwarding, NAT for LAN protection
- OpenVPN, Ipsec, L2TP for secure connection
- Port Security
- HTTPs/SSH secure login, TACACS+

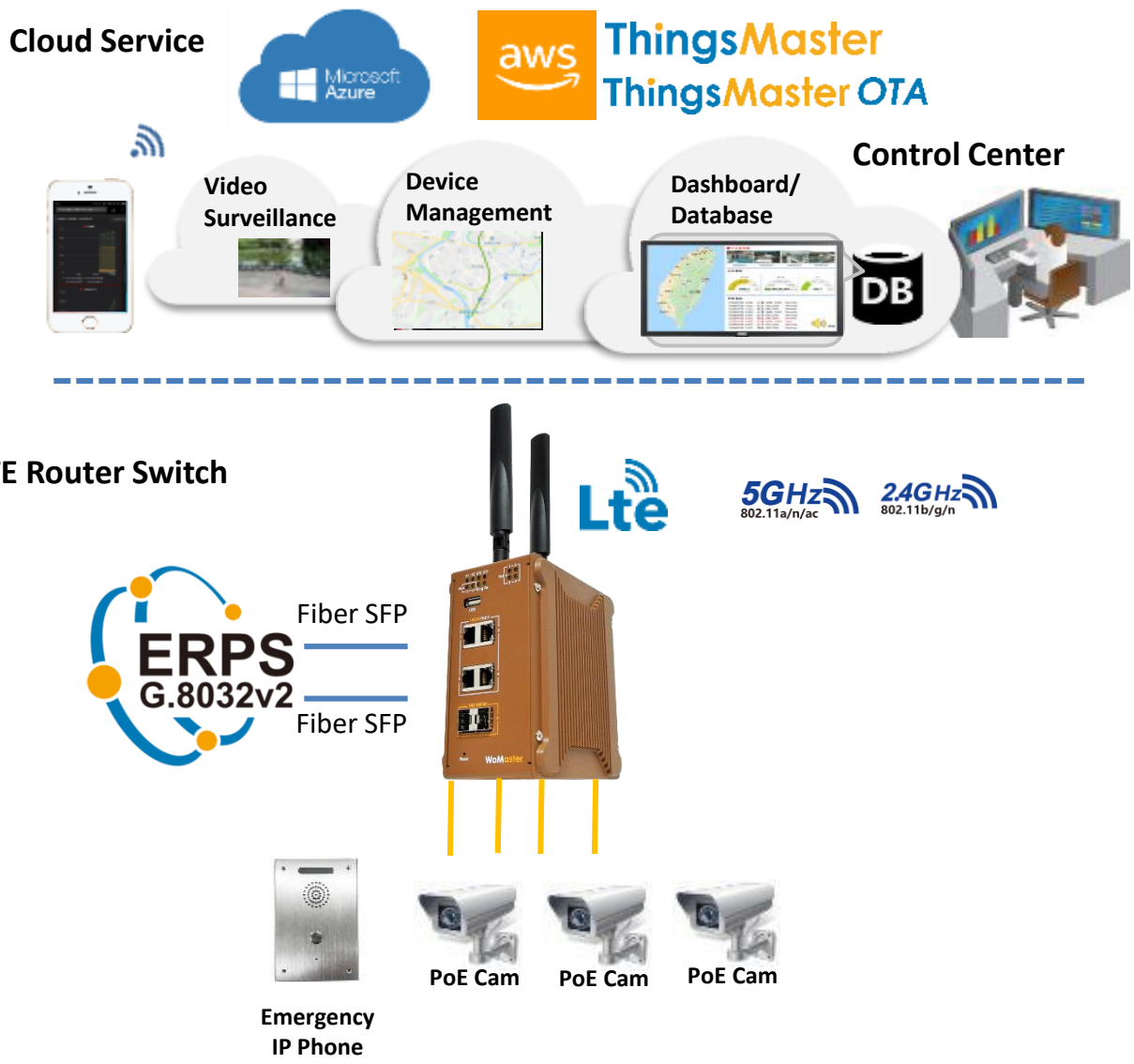
Management Features

- Various configuration paths, including WebGUI, CLI and SNMP
- LLDP topology control
- Support **VLAN**, **IGMP snooping**, **QoS**, rate control, port mirror
- NetMaster- NMS system for individual node monitoring
- ViewMaster- Remote configuration software utility for distributed management

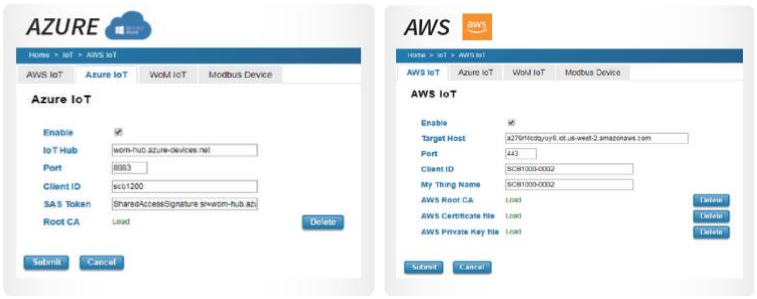
Rugged Design for Wayside Surveillance, ITS Application

- NEMA TS2 compliance for ITS application
- Effective heat dissipation design for operating in **-40~75°C** environments
- Railway EMC: **EN50121-4** compliance
- CE Marking
- IEC61000-6-2/IEC61000-6-4 heavy industrial EMC
- Emission: FCC part 15 B Class A

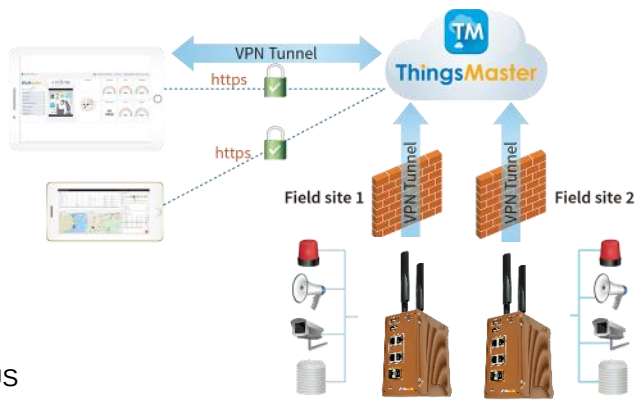
✓ Ready Total Solution for IoT



✓ Built-in Microsoft Azure and Amazon AWS agent



Secured Multi-sites Management
N to N VPN
Latest TLS encryption and X.509 authentication



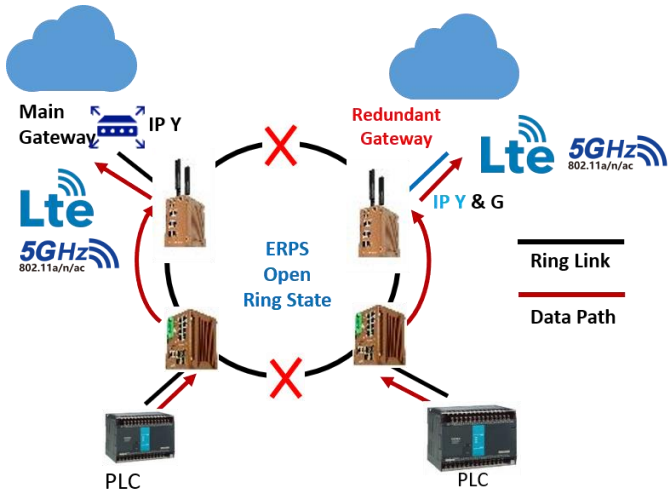
✓ Multi-Level User Passwords

Different centralized authentication servers are supported such as RADIUS and TACACS+. Using a central authentication server simplifies account administration, when you have more than one switches in the network.

Authentication Chain is also supported. An authentication chain is an ordere list of authentication methods to handle more advanced authentication scenarios. For example, you can create an authentication chain which first contacts a RADIUS server, and then looks in a local database if the RADIUS server does not respond.

✓ Exclusive Redundant Gateway for Industrial Ethernet ERPS/Ring Network

In addition to the advanced ERPS v2 redundancy support, WR316GPS can also acts as the gateway for WAN. The unique redundant gateway design ensures even the ring link has multiple breaks; the network can be seamlessly connected.



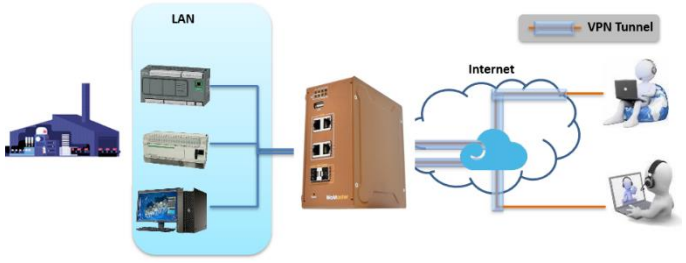
✓ Exclusive Advanced Managed Switch plus IoT and Router Features

Normal routers have no support for managed switch features, ex. VLAN routing, LAN security, or ERPS v2 Redundant Ring. However, the managed switches doesn't support WAN/NAT/VPN/Firewall security features. With unique routing switches that combines features of WAN/NAT/VPN/Firewall and VLAN routing, advanced cyber security with full network redundancy, the management time and cost can be reduced while delivery better network performance.

	Traditional L3 Switch	Routing Switch
Routing Performance	HW based. Wire speed.	SW based CPU Routing
L3 Routing Protocol	RIPv2, OSPFv2, Static Multicast Route, DVMRP, PIM, VRRPv2	RIPv2, OSPFv2, Static Multicast Route, DVMRP, PIM, VRRPv2
NAT/WAN	NA	NAT: 1-1 NAT, NAPT(SNAT/DNAT)
Firewall	NA	Stateful Inspection firewall, DMZ
VPN	NA	IPsec, OpenVPN, GRE, L2TP

✓ Secured Remote Access by VPN*

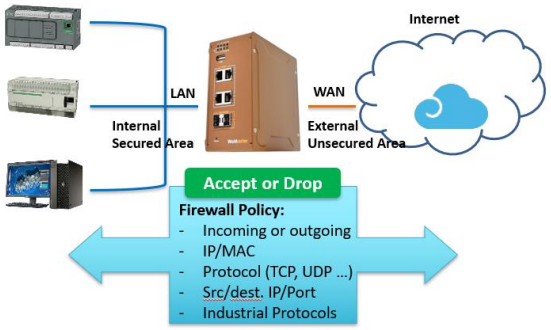
WR316GPS Routing Switch can act as VPN server for data encryption and dynamic remote access. Multiple VPN protocols are supported such as IPSec, OpenVPN, GRE, and L2TP. The channels between multiple networks, ex. private/public/hybrid networks are fully secured and with authentication features.



✓ Cyber Security Guard*

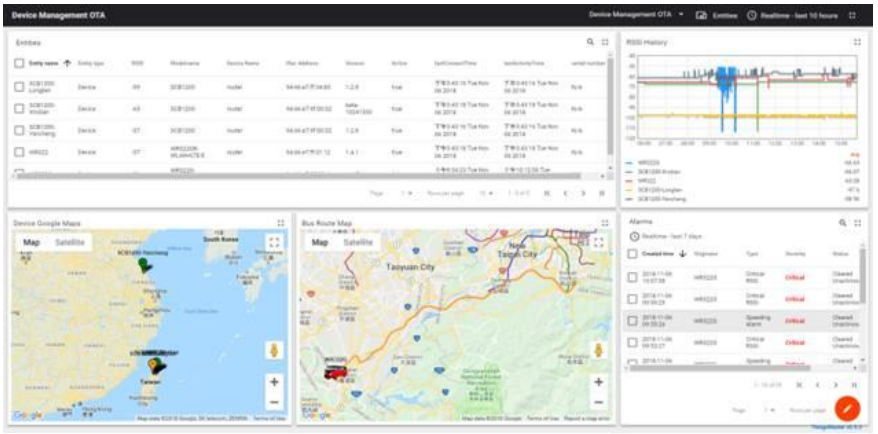
A stateful firewall monitor is in place to monitor the state of the connection at all time. Multiple industrial fieldbus protocols, ex. Modbus TCP*, EtherNet/IP* are also supported for factory automation applications.

*by Request



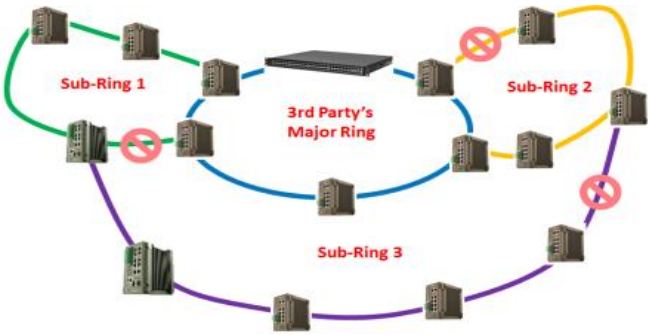
✓ ThingsMaster OTA (device management over the air)

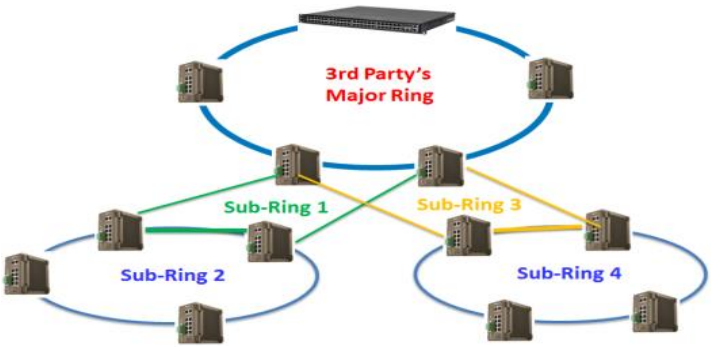
The OTA agent embedded in WR316GPS routing switches upgrades device management over the air, anywhere you are and any time you want over your mobile devices. ThingsMaster OTA is a secured local OTA software that can be installed in a private or public server or even QNAP NAS (network attached storage). With OTA, all device information such as location, warning event can be shown in real time. The maintenance such as configuration reload, or device reboot can also be run by group.



✓ ITU-T G.8032 ERPSv2 gives ultimate Inter-Operability, Flexibility, and Scalability

G.8032 v.2 ERPS is becoming the most common standard for redundancy on industrial networks and replacing proprietary ring redundancy and standard Ethernet Ring Switching, as it provides stable protection of the entire Ethernet Ring from any loops and open standard for 3rd party devices. The ITU-T G.8032 v2 ERPS recovers the network break within less than 20ms recovery time thus significantly increases network reliability for critical IIoT applications, such as heavy industrial automation (power substation and oil and gas vertical markets), ITS (traffic control, public transportation), railway networks, and other smart city applications concerning public safety.

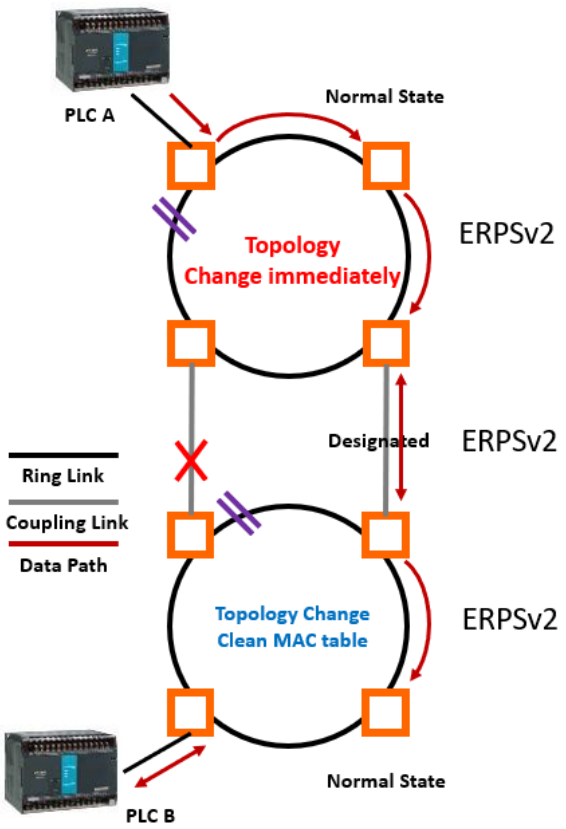




G.8032 v1 only supports single ring topology, whilst G.8032 version 2 additionally features recovery switching for Ethernet traffic in Multiple Ring (ladder) of conjoined Ethernet Rings by one or more interconnections which saves deployment costs by providing wide-area multipoint connectivity with reduced number of links. Deploying switches with support of G.8032 v2 ERPS ensures highly resilient Ethernet infrastructure whilst simultaneously saving costs, as they can interoperate with third-party switches and still guarantee fast network recovery time without any data loss.

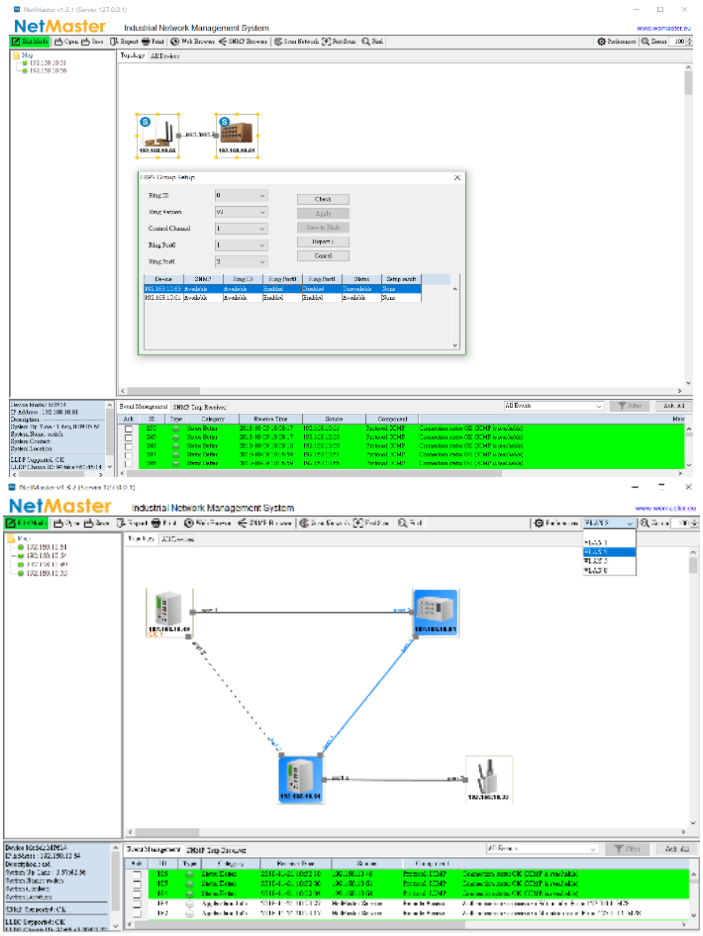
✓ ITU-T G.8032 ERPSv2 reduces coupling Ring failure recovery time

The G.8032 ERPS v2 technology effectively saves the recovery time for coupling ring link breakdown from 300 sec to less than 20ms by immediately change topology of both major ring and sub ring.

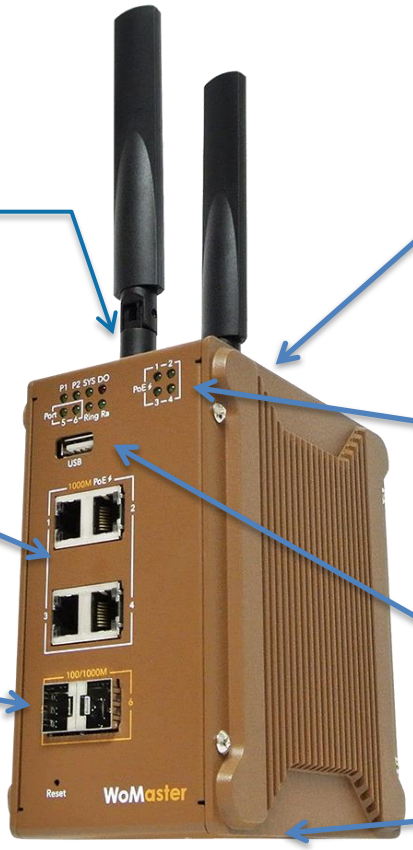


✓ NMS NetMaster Made Easy Deploy and Visualize Large Scale of ERPS Ring and VLAN

It is very time consuming and technical to set up a large group of ERPS v2 ring. However, NetMaster NMS provides a smart way to configure a group of ERPS ring and visualize ERPS major/sub ring in purple/yellow color. With VLAN visualization, devices, ports, and links with the VLAN ID will be colored-coded.



Interfaces



SMA Antenna Socket
- Up to 2 SMA

***WR316GPS-LTE**
Dual SIM Redundancy
- 2 x SIM with tray holder

System LED
- 2 x Power
- 1 x System Status
- 1 x DO
- 2 x Fiber Port
- 1 x Ring
- 1 x Radio
- 4 x PoE

Gigabit Ethernet
- 4-port 100/1000M RJ45
- IEEE 802.3af/at

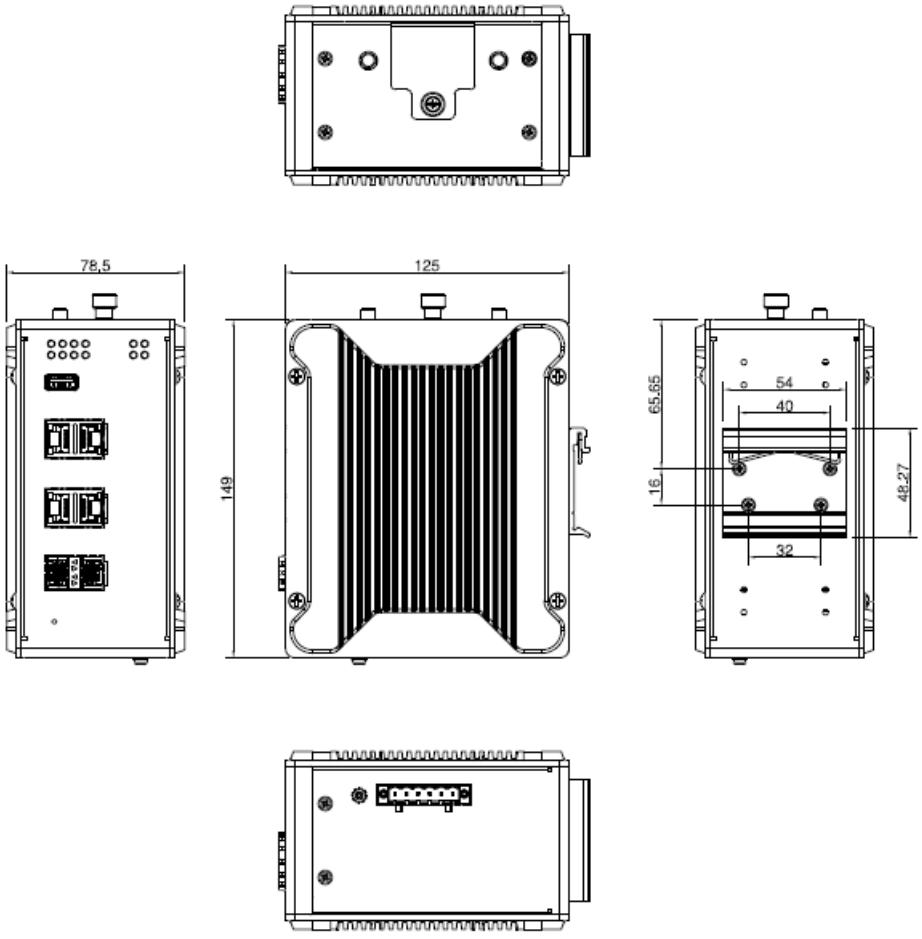
USB Extension Port
- USB for Configuration/ Firmware update
- External Storage

Fiber Ethernet
- 2 x 100/1000M SFP Connector

Integrated Power Connector
- 1 x 6-pin terminal block
  4 pin booster power input
  2 pin DO
- Front Panel easy installation

Dimensions

(mm)



Technology	
Standard	3GPP Release 11 Long Term Evolution (LTE), fallback 3GPP Release 7,8,9 for HSPA/UMTS
	IEEE 802.11ac wireless local area network (WLAN), Backward support 802.11a/b/g/n Wireless LAN
	IEEE 802.3 10Base-T Ethernet
	IEEE 802.3u 100Base-TX Fast Ethernet
	IEEE 802.3u 100Base-FX Fast Ethernet Fiber
	IEEE 802.3x Flow Control and back-pressure
	IEEE 802.3ab 1000Base-T Gigabit Ethernet copper
	IEEE 802.3z Gigabit Ethernet Fiber
	IEEE 802.3af/at Power-over-Ethernet
	IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
	IEEE 802.1p Class of Service (CoS)
	IEEE 802.1Q VLAN
	ITU-T G.8032 Ethernet ring protection switching (ERPS)
	IEEE 802.1D-2004 Rapid Spanning Tree Protocol (RSTP)
Interface	
Ethernet Port	4 x 100/1000MBase-T RJ45, Auto Negotiation 2 x 100/1000MBase SFP
System LED	2 x Power: Green On 1 x SYS: Ready: (Green On), Firmware Updating: (Green Blinking) 1 x DO: Red On 2 x Fiber: Link (Green On), Activity (Green Blinking) 1 x Ring: Off: Ring disabled, Green On: Ring normal (Not RPL Owner), Green Blinking: Ring normal (RPL Owner), Amber On: Ring abnormal, Amber Blinking: Ring port fail 1 x Radio Ra: Radio status, Green ON: 4G connection(Cellular) / AP mode(WLAN) Green Blinking: 2/3G connection(Cellular) / Station mode connected (WLAN) Off: Disconnected / Station mode(WLAN) Off 4 x PoE status: Green On
Ethernet Port LED	Link (Green On), Activity (Green Blinking)
Reset	System Reset(2~6 Seconds) / Default Settings Reset(over 7 Seconds)
USB	1 x USB for Configuration/Firmware Update
Power Input, Digital Output	6-Pin Removable Terminal Block Connector 4 Pin for Redundant Power 2 Pin for DO (Relay Alarm) DO: Dry Relay Output with 0.5A/24V DC
Cellular Properties	**(LTE Cat. 4)**
Standard	GSM/GPRS/EDGE 3GPP Release 6 UMTS/HSPA 3GPP Release 8 LTE 3GPP Release 11
Data Rate	GPRS: DL: max. 85.6 kbps, UL: max. 85.6 kbps EDGE: DL: max. 236.8 kbps, UL: max. 236.8 kbps HSPA: DL: max. 42 Mbps, UL: max. 5.76 Mbps LTE-FDD Cat.4: DL: max. 150 Mbps, UL: max. 50 Mbps, 2x2 DL MIMO LTE-TDD Cat.4: DL: max. 130 Mbps, UL: max. 35 Mbps, 2x2 DL MIMO
Band Information: LTE-EUX	LTE: FDD B1/B3/B7/B8/B20/B28A LTE: TDD B38/B40/B41 WCDMA: FDD B1/B8, GSM: B3/B8
Band Information: LTE-ECGA	LTE: FDD B1/B3/B7/B8/B20/B28A WCDMA: FDD B1/B8, GSM: B3/B8
Band Information: LTE-AU	LTE: FDD B1/B2*/B3/B4/B5/B7/B8/B28 LTE: TDD B40 WCDMA: FDD B1/B2/B5/B8, GSM: B2/B3/B5/B8
Band Information: LTE-G (By MoQ Request)	LTE: FDD B1/B2/B3/B4/B5/B7/B8/B12/B13/B18/B19/B20/B25/B26/B28 LTE: TDD B38/B39/B40/B41 WCDMA: FDD B1/B2/B4/B5/B6/B8/B19, GSM: B2/B3/B5/B8

Cellular Properties	(LTE Cat. 6)
Standard	UMTS/HSPA 3GPP Release 8 LTE 3GPP Release 12 (LTE Cat.6)
Data Rate	TD-SCDMA: DL Max 4.2Mbps, UL: Max 2.2Mbps HSPA: DL: Max. 42 Mbps, UL: Max. 5.76 Mbps WCDMA: DL: Max 384Kbps, UL: Max 384Kbps LTE-FDD: DL: Max. 300 Mbps, UL: Max. 50 Mbps, 2x2 DL MIMO LTE-TDD: DL: Max. 226 Mbps, UL: Max. 28 Mbps, 2x2 DL MIMO
Band Information: LTE-E	LTE-FDD: B1/B3/B5/B7/B8/B20/B28/B32 (2100/1800/850/2600/900/800/700/1500MHz) LTE-TDD: B38/B40/B41 (2600/2300/2500MHz) WCDMA: B1/B3/B5/B8 (2100/1800/850/900MHz)
Band Information: LTE-U	LTE-FDD: B2/B4/B5/B7/B12/B13/B17/B25/B26/B29/B30/B66 (1900/1700/700/2600/700/700/700/1900/850/700/2300/1700MHz) LTE-TDD: B41 (2500MHz) WCDMA: B2/B4/B5 (1900/1700/850MHz)
Band Information: LTE-AP	LTE-FDD: B1/B3/B5/B7/B8/B18/B19/B21/B26 (2100/1800/850/2600/900/850/850/1500/850MHz) LTE-TDD: B38/B39/B40/B41 (2600/1900/2300/2500MHz) WCDMA: B1/B5/B6/B8/B9/B19 (2100/850/UMTS only/900/1800/850MHz) TD-SCDMA: B39 (1900MHz)

GPS Properties	
GNSS	GPS/GLONASS/BeiDou/Galileo
Performance	Cold start: 18s, Warm start: 2.2s, Hot start: 1.8s
Sensitivity	Cold start: -146dBm, Reacquisition: -157dBm, Tracking: -157dBm
Accuracy	<1.5M
GNSS Frequency	GPS/Galileo: 1575.42±1.023 MHz GLONASS: 1597.5~1605.8 MHz BeiDou: 1561.098±2.046 MHz
Antenna (Optional Accessory- A-GPS-27-RSM-3M)	Frequency range: 1561~1615MHz Polarization: RHCP or linear VSWR: <2 (Typ.) Passive antenna gain: >0dBi

Wi-Fi Properties	
Standard	IEEE 802.11ac/a/b/g/n (2T2R) 802.11ac: OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM)
Data Rate	802.11ac: MCS0 ~ 9, max. 866Mbps 802.11b: 11Mbps / 802.11a/g: 54Mbps / 802.11n: MCS0 ~ 15, max. 300Mbps
Frequency	IISM Band, 2.412GHz ~ 2.472GHz, 5.180MHz ~ 5.825MHz(Band 1,4)
MIMO	2T2R, 2xAntennas (Optional Accessory)
RSSI	≦20db, compliant with CE request

Output Power & Receive Sensitivity

Operating Frequency: 2.412~2.472GHz, Max. MIMO: 2T2R				
Standard	Bandwidth	TX (dBm)		RX (dBm)
		1 Channel	2 Channels	
802.11b	1Mbps	20	23	-95
	11Mbps	20	23	-90
802.11g	6Mbps	21	24	-94
	54Mbps	18	21	-80
802.11n HT20	MCS0	21	24	-93
	MCS7	16	19	-76
802.11n HT40	MCS0	20	23	-92
	MCS7	16	19	-73

Operating Frequency: 5.180G~5.825GHz Max. MIMO: 2T2R				
Standard	Bandwidth	TX (dBm)		RX (dBm)
		1 Channel	2 Channels	
802.11a	6Mbps	20	23	-94
	54Mbps	15	18	-80
802.11an/ac HT20	MCS0	19	22	-93
	MCS8	13	16	-71
802.11an/ac HT40	MCS0	18	21	-90
	MCS9	13	16	-66
802.11an/ac HT80	MCS0	18	21	-88
	MCS9	13	16	-65

Antenna	
LTE Default Antenna (WR316GPS-LTE)	Frequency: 704~960/1710~2690 MHz
	Gain: 2 dBi
Wi-Fi Default Antenna (WR316GPS-WLAN)	Frequency: 2400~2500/ 4900~5900 MHz
	Gain: 2.4GHz: 2.5 dBi, 5GHz: 3dBi
	Direction: Omni-directional

PoE	
Power forwarding mode	Alternative A
PoE Power Budget	System: Max. 120W@75°C Per Port: Max. 30W
PoE Standard	IEEE 802.3af/at
Management	System/Port Power Budget Control, PD Alive Check, PoE Scheduling, PoE Status
Software	
Management Interface	CGI WebGUI, Command Line Interface (CLI), Telnet, SNMP
User Management	Radius client, TACACS+, local database
Time Management	SNTP, Cellular Time
IoT	AWS Agent, Azure Agent, ThingsMaster Agent
Network Management	IPv4, DDNS, SNMP v1/v2c/v3/Trap, MIB II, Entity MIB, MIBs, LLDP, DHCP server/client, TFTP, System Log, ARP response over 802.2 LLC SNAP, Proxy ARP, DNS (client/proxy)
Traffic Management	NAT Routing, NAPT(SNAT/DNAT), Flow Control, VLAN, Class of Service, QoS, Rate Control, IGMP Snooping v2, Port Mirror
Routing	Static Route
Security	Firewall, DMZ, Port Forwarding, HTTPs, SSH, Port Security
Redundancy Protocol	ITU-T G.8032 v1/v2 Ethernet Ring Protection Switching (ERPS) Rapid Spanning Tree Protocol (RSTP), VRRP
VPN	IPsec, OpenVPN, L2TP
Cellular Configuration	Radio on/off, 4G LTE/3G HSPA Configuration, SIM Security, Connection Status, Cellular to Eth-WAN Redundancy, GPS positioning(by model)
WLAN Configuration	WLAN: Radio on/off, AP/Client/WDS-AP/WDS-Client operation mode, 2.4G 11n/5G 11ac mode, Channel and Frequency selection, SSID/Multi-SSID configuration, SSID broadcast, Maximum Output Power, Data Rate, VLAN ID, WLAN to LAN Link fault pass-through, Advanced WLAN settings WLAN Security: Share Key, WPA/WPA2 with Radius, WPA/WPA2-PSK(Pre-Share Key), MAC Access Control, Radius Server WLAN Encryption: 64/128bits WEP, TKIP(WPA-PSK), AES(WPA2-PSK)
Utility	ViewMaster, NetMaster, Ping, Traceroute
Power Requirement	
Input Voltage	48VDC(46~57VDC, 50~57VDC suggested for IEEE802.3at)
Reverse Polarity Protect	Yes
Input Current	2.36A@54VDC
Power Consumption	Max 8.64W@54VDC full traffic without PD Loading, suggest to reserve 15% tolerance
Mechanical	
Installation	DIN Rail
Enclosure Material	Steel Metal with Aluminum
Dimension	78.5 x 149 x 125 mm(W x H x D) / without DIN Rail Clip
Ingress Protection	IP30
Weight	1.2Kg with package
Environmental	
Operating Temperature & Humidity	-40°C~75°C , 5%~95% Non- Condensing
Storage Temperature	-40°C~85°C
MTBF	>200,000 hours
Warranty	3 years

Approval	
EMI	CISPR 22, FCC part 15B Class A
EMS	EN61000-4-2 ESD, EN61000-4-3 RS, EN61000-4-4 EFT, EN61000-4-5, EN61000-4-6 CS, EN61000-4-8 Magnetic Field
Radio	R&TTE / RED Safety EN62368-1 EN50385/EN62311 MPE assessment EN 55022/55024 EN 301 489-1/52 EN 301 908-1 FCC Part 15B
Railway	EN50121-4 Compliance

Ordering Information

Model Name	Description
WR316GPS-WLAN	Industrial 6GbE WLAN PoE Routing Switch, USB, 2SFP, WLAN 802.11ac/n WLAN
WR316GPS-LTE-(Region)	Industrial 6GbE Cellular PoE Routing Switch, USB, 2SFP, LTE-EUX/ECGA/AU/G*(choose one by region)
	Package List
	1 x Product Unit (Without SFP transceiver)
	1 x 6-pin Removable Terminal Connector
	1 x Attached Din Clip
	1 x Quick Installation Guide
	Default Enclosed Antenna: **WR316GPS-LTE**: 2 x LTE Antennas, Black WR316GPS-WLAN- 2 x WLAN Antennas, White

Optional Accessory

Item	
SFPGEM05	SFP, 1000Mbps, LC, multi, 550M, 0~70°C
SFPGEM05T	SFP, 1000Mbps, LC, multi, 550M, -40~85°C
SFPGEM05D	SFP, 1000Mbps, LC, multi, DDM, 550M, 0~70°C
SFPGEM05DT	SFP, 1000Mbps, LC, multi, DDM, 550M, -40~85°C
SFPGEM2	SFP, 1000Mbps, LC, multi, 2KM, 0~70°C
SFPGEM2T	SFP, 1000Mbps, LC, multi, 2KM, -40~85°C
SFPGEM2D	SFP, 1000Mbps, LC, multi, DDM, 2KM, 0~70°C
SFPGEM2DT	SFP, 1000Mbps, LC, multi, DDM, 2KM, -40~85°C
SFPGES10	SFP, 1000Mbps, LC, single, 10KM, 0~70°C
SFPGES10T	SFP, 1000Mbps, LC, single, 10KM, -40~85°C
SFPGES10D	SFP, 1000Mbps, LC, single, DDM, 10KM, 0~70°C
SFPGES30	SFP, 1000Mbps, LC, single, 30KM, 0~70°C
SFPGES30T	SFP, 1000Mbps, LC, single, 30KM, -40~85°C
SFPGES30D	SFP, 1000Mbps, LC, single, DDM, 30KM, 0~70°C
SFPXGM03D	SFP+, 10Gbps, LC, multi, DDM, 300M, 0~70°C
SFPXGS10D	SFP+, 10Gbps, LC, single, DDM, 10KM, 0~70°C
SFPGES10-A	SFP, 1000Mbps, LC, single, 10KM, BiDi TX-1310nm RX-1550nm, 0~70°C
SFPGES10-B	SFP, 1000Mbps, LC, single, 10KM, BiDi TX-1550nm RX-1310nm, 0~70°C
SFPGES10T-A	SFP, 1000Mbps, LC, single, 10KM, BiDi TX-1310nm RX-1550nm, -40~85°C
SFPGES10T-B	SFP, 1000Mbps, LC, single, 10KM, BiDi TX-1550nm RX-1310nm, -40~85°C
SFPGES10D-A	SFP, 1000Mbps, LC, single, DDM, 10KM, BiDi TX-1310nm RX-1550nm, 0~70°C
SFPGES10D-B	SFP, 1000Mbps, LC, single, DDM, 10KM, BiDi TX-1550nm RX-1310nm, 0~70°C

Outdoor WLAN Directional Antennas

- 2.4Ghz / 5.8Ghz Wireless Access Point to Point
- High Gain, Long Distance Coverage
- Vertical Polarization, 50Ω **Input Impedance**
- IP65 Protection Enclosure and Prevention of Rust
- -40˚C ~ +60˚C operation temperature
- 190 * 190*30 mm (L x W x H)
- N Type Female Connector
- Two 1-meter RF Cables (C-RF-LMR200-NM_NM-1M)

Model	Frequency	Transmission	Gain	Max. Distance	Beam
A-D1T1R-2.4GHZ-14DB-6KM-NF	2.4 GHz	1T1R	14dBi	6KM	30˚ for Horizontal Plane and 28˚ Vertical
A-D1T1R-5GHZ-12DB-5KM-NF	5.8Ghz	1T1R	12dBi	5KM	40˚ for Horizontal Plane and 38˚ Vertical
A-D2T2R-5GHZ-15DB-6KM-NF	5.8Ghz	2T2R	15dBi	6KM	35˚ for Horizontal Plane and 16˚ Vertical
A-D2T2R-5GHZ-19DB-8KM-NF	5.8Ghz	2T2R	19dBi	8KM	90˚ for Horizontal Plane and 4˚ Vertical

Outdoor Omni Antennas

Model		Frequency	Gain	Enclosure	Dimension	RF Cable
A-2.4/5GHZ-2-RSM-2Mx2		2400-2500/5150~5850	2dBi	IP67	Φ80×15mm	Two 2-meter RG174 cables RP SMA male connector
A-LTE-2-SM-2M		700~960/1710~2690 /2900~3600	2dBi	IP67	Φ80×15mm	Two 2-meter RG174 cables SMA male connector
A-GPS-38-SM-3M		GPS 1575	38dBi	outdoor	50×38×17mm	3M RG174 cable SMA male
A-LORA433-7-SM-3M		433	7dBi	outdoor	Φ30×175mm	3M RG174 cable SMA male
A-LORA850-925-7-SM-3M		850~925	7dBi	outdoor	Φ30×290mm	3M RG174 cable SMA male

Outdoor Combo Antennas

Model		Frequency (MHz)	Gain (dBi)	Connector	Dimension (mm)	Cable (M)
A-LTE_WLAN_G-4_4-RSM-2M		LTE: 698~960/1710~2690/2900~3600 WLAN: 2400~2483.5/4900~5825 GNSS: 1561.1~1610 (GPS/GLONASS/GALILEO/BEIDOU)	4 4 28	3x SMA Male (LTE/GPS) 2x RP-SMA Male (Wi-Fi)	189x182x107	2
A-LTE_WLAN_G-3_2-RSM-2M		LTE: 698~960/1710~2690 WLAN: 2400~2483.5/4900~5825 GNSS: 1575.42~1610 (GPS/GLONASS)	3 2 28	3x SMA Male (LTE/GPS) 2x RP-SMA Male (Wi-Fi)	110x110x80	2
A-LTE_WLAN_G-5_5-RSM-1M		LTE: 700~2700 WLAN: 2400~2500 GNSS: 1575.42	5 5 28	2x SMA Male (LTE/GPS) 1x RP-SMA Male (Wi-Fi)	70x70x15	1