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Communication Networks

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**netwave**<sup>®</sup>

*Wireless Ethernet Transmission*



## Industrially Hardened Wireless Ethernet Transmission

Power, Point and Play.

Power up and point the units and start transmitting Ethernet.

The ComNet NetWave® line consists of an easy, pre-packaged Point-to-Point kit that contains everything you need to establish remote connectivity to Ethernet edge devices. Also available are Point-to-Multipoint models that allow multiple client/camera/networked edge device locations to connect to a single access point.

NetWave® will support throughput of up to 500 Mbps in a single radio version and up to 240 Mbps in the dual radio models. It supports a wide range of Ethernet devices. NetWave® is secure and uses encryption to prevent unauthorized access to the network. These industrially hardened units with Ethernet Interfaces offer the option to be powered by a PoE switch or a Midspan Power Injector.



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### Features

- › Industrially hardened 5GHz solutions for outdoor applications
- › Up to +30 dBm RF output power
- › Distances up to 2 mi (FCC) or 2km (ETSI)
- › Internal directional antenna:
  - › 19dBi 17° beamwidth for full size units
  - › 16dBi 30° beamwidth for mini units
- › External antennas available for added configuration flexibility
- › Secure transmission: WPA2 - AES or TKIP encryption
- › Exclusive ComNet antenna alignment feature eases installation and setup
- › Distance adjustments for long-range transmission
- › IEEE 802.3at (PSE) compliant support (NW7[E], NW9[E], NW10[E], NW10DR models)
- › Ruggedized heavy duty enclosures meet class IP67 dust and water ingress protection standards
- › Lifetime Warranty

## NetWave Kits: A Complete Hardened Point-to-Point Wireless Ethernet Solution

These preconfigured industrial kits include a factory-paired Access Point and Client, plus the power supplies and mounting equipment to install and connect them.

The NetWave® NWK series offers a complete package solution containing everything you need to transmit a single Ethernet data stream between a Client remote location and the Access Point or head end. A simple antenna alignment feature provides easy to read visual indicators that show when the antennas are correctly aligned and the link is established.

### Kit Includes

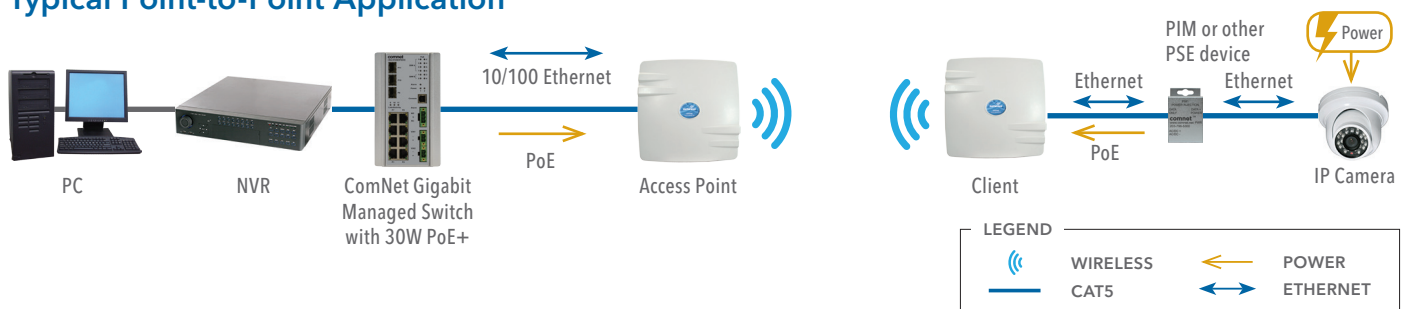
- › Client (Remote) and Access Point (Head End) in ruggedized IP67 rated heavy duty enclosures
- › Internal Dual Polarized Directional Antenna
- › Distances up to 2 mi (FCC) or 2km (ETSI)
- › Two mounting hardware assemblies
- › Units can optionally be powered by an IEEE 802.3at/ IEEE 802.3af PoE switch
- › Lifetime Warranty

### NetWave® Wireless Ethernet Point-to-Point Kits

Product Group	NWK1	NWK1/M	NWK7	NWK7/M	NWK9	NWK10
Operating Temp Range	-40° to +75° C	-40° to +75° C	-40° to +70° C	-40° to +70° C	-40° to +70° C	-40° to +75° C
Power	48 VDC Passive Power Injector or PoE					
Internal Dual Polarized Directional Antenna / Beamwidth	19dBi / 17°	16dBi / 30°	19dBi / 17°	16dBi / 30°	19dBi / 17°	19dBi / 17°
Throughput (Under Ideal Conditions)	95 Mbps	95 Mbps	240 Mbps Total Throughput	240 Mbps Total Throughput	500 Mbps Total Throughput	240 Mbps Total Throughput

*This chart references FCC NetWave models. For ETSI models, please refer to the appropriate data sheets or contact ComNet's International Design Center.*

### Typical Point-to-Point Application





## NW1/NW2 Point-to-Multipoint



The NetWave® NW1 and NW2 user-configurable units can be set up through the embedded User Interface as a Client or as an Access Point. Available as region-specific models for North America and Europe in both standard and small-size enclosures, these hardened point-to-multipoint models allow multiple Ethernet endpoints to be connected to a central Access Point. An easy to read LED array displays unit operational status along with received signal strength ensuring optimal installation and operation. These units may be powered from an IEEE 802.3af PoE source.

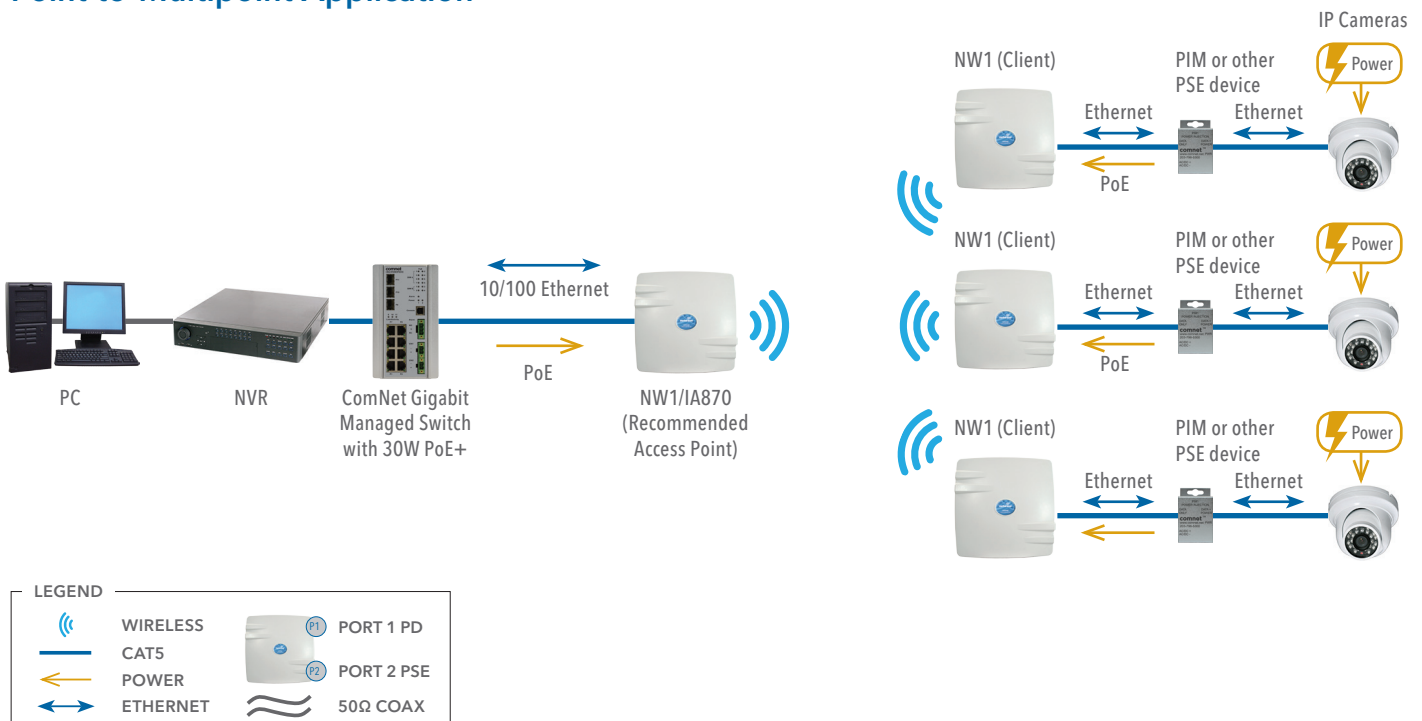
### Features

- › Internal Dual Polarized Directional Antenna
- › 5 GHz operating bandwidth
- › Transmit power: +26 dBm
- › Includes power injector

### Ordering Information

Part No.	Description
NW1	Industrial Point-to-Multipoint Unit, 19 dBi 17° beamwidth directional antenna (FCC NA Region)
NW2	Industrial Point-to-Multipoint Unit, 19 dBi 17° beamwidth directional antenna (ETSI EU Region)
NW1/M	Mini Industrial Point-to-Multipoint Unit, 16 dBi 30° beamwidth directional antenna (FCC NA Region)
NW2/M	Mini Industrial Point-to-Multipoint Unit, 16 dBi 30° beamwidth directional antenna (ETSI EU Region)

### Point-to-Multipoint Application



## NW7[E][/M] High Throughput

The NetWave® NW7[E][/M] environmentally hardened High Throughput (HT) wireless Ethernet transmission device can be configured through the embedded User Interface as a Client or as an Access Point. This single radio model was designed for high throughput point-to-point or multi-point applications and comes with an integrated directional antenna.



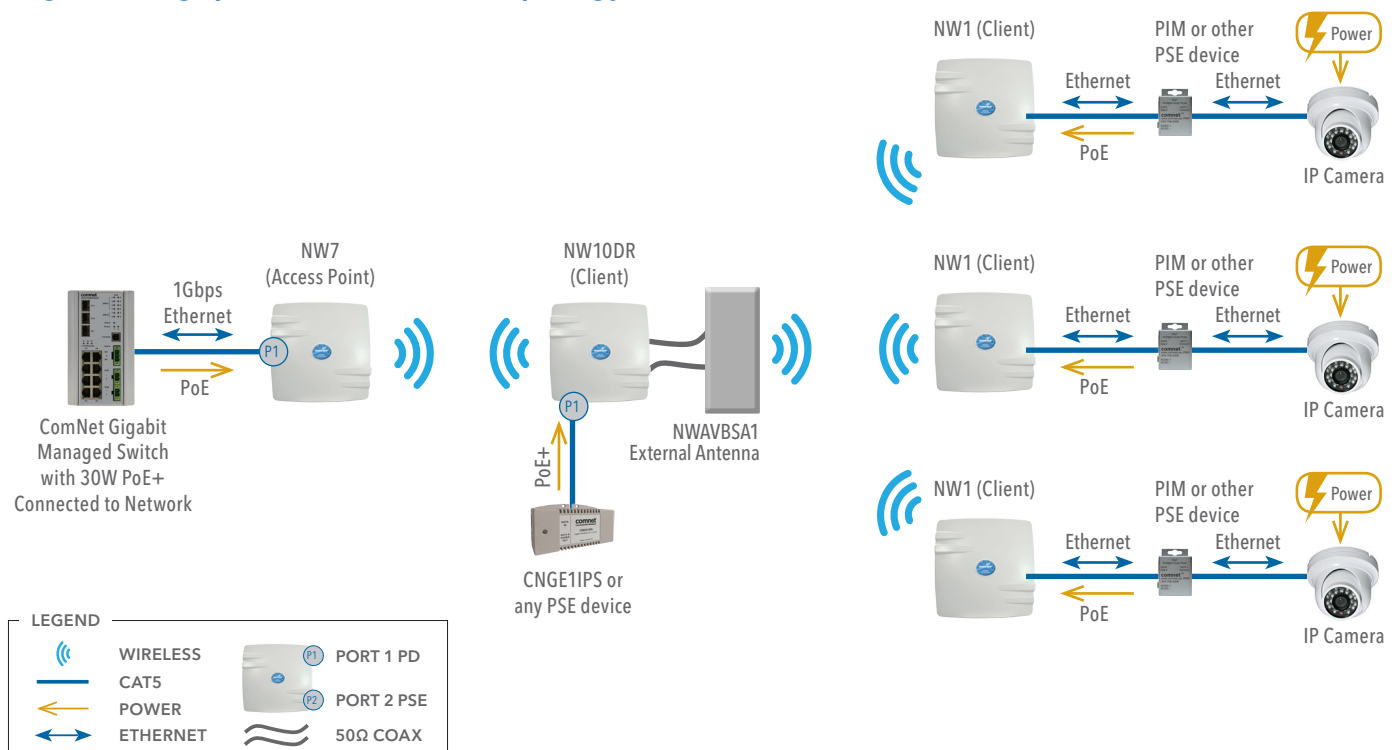
### Features

- › High throughput using MIMO technology:
  - › Up to 180 Mbps in one direction
  - › Up to 240 Mbps total full duplex
- › Over current protection and 3 layers of Ethernet surge suppression on the PD port
- › High Throughput Back Haul Link (full size units only) for installations that require connecting to more than one Ethernet device
- › Port 1 supports 802.3at PD PoE power, Port 2 (full size units only) provides IEEE802.3at PSE PoE power

### Ordering Information

Part No.	Description
NW7	Industrial Single Radio, 2 × Gbps Ethernet Ports, 19 dBi 17° beamwidth directional antenna (FCC NA Region)
NW7E	Industrial Single Radio, 2 × Gbps Ethernet Ports, 19 dBi 17° beamwidth directional antenna (ETSI EU Region)
NW7/M	Mini Industrial Single Radio, 1 × Gbps Ethernet Port, 16 dBi 30° beamwidth directional antenna (FCC NA Region)
NW7E/M	Mini Industrial Single Radio, 1 × Gbps Ethernet Port, 16 dBi 30° beamwidth directional antenna (ETSI EU Region)

### High Throughput Point-to-Point Topology



## NW9[E] Ultra-High Throughput, Impact-Resistant Wireless Ethernet



The NetWave® NW9[E] ultra-high throughput, impact-resistant hardened wireless Ethernet transmission devices that can be configured as a Client or as an Access Point. Simple to deploy and cost-effective alternative to physical connections to Ethernet edge equipment, this single radio model was designed for high throughput point-to-point or multi-point applications and comes standard with an integrated 19dBi, 17° beam-width antenna. The NW9[E] supports up to 500 Mbps throughput using 802.11ac MIMO technology. The units can be powered by an 802.3af/at PoE compliant device or through a sold-separately PoE injector with the second Ethernet port serving as an IEEE802.3at power source.

### Features

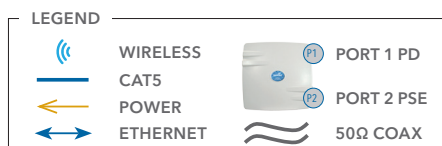
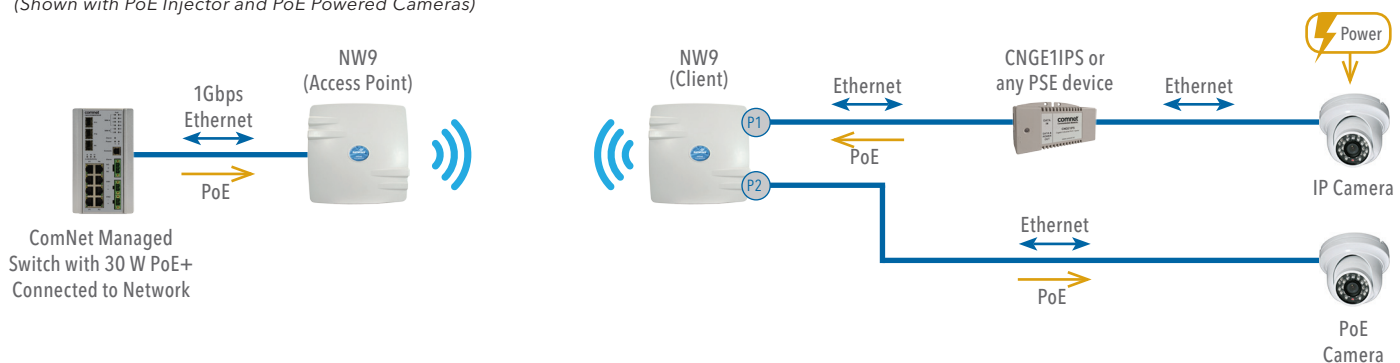
- › Sturdy cast aluminum enclosure
- › 5GHz wireless radio
- › Up to 500 Mbps throughput
- › IEEE802.3at PoE Compliant PD and PSE
- › Distances up to 2 mi (FCC) with MAC Lock enabled
- › Ruggedized heavy duty IP67 rated enclosures

### Ordering Information

Part No.	Description
NW9	Individual Hardened Single Radio, 2 × Gbps Ethernet Ports (FCC NA Region)
NW9E	Individual Hardened Single Radio, 2 × Gbps Ethernet Ports (ETSI EU Region)

### Point-to-Point Topology

(Shown with PoE Injector and PoE Powered Cameras)





## NW10[E] High Performance Wireless for High Density Environments



The NetWave® NW10[E] wireless radio is ideal for high-capacity and scalable deployments where channel overlapping and interference typically causes instability in competitive radios. The wide range of available channel spectrum widths gives you the option of narrowing channel bandwidths as the network grows, to increase the number of non-overlapping channels and improve stability. These units can be powered by an IEEE 802.3af/at PoE compliant switch or a sold-separately PoE injector. The NW10[E] comes standard with an integrated antenna and an IP67 rated impact resistant ABS enclosure that is designed to survive the most extreme conditions.

### Features

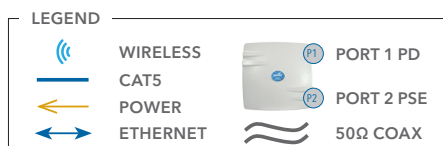
- › Scalable - Narrow Channel 5 and 10 MHz Bandwidths
- › Expand your WLAN without losing reliability
- › Up to 240 Mbps Throughput
- › IEEE802.3at PoE Compliant PD on port 1
- › IEEE802.3af power source (PSE) available on port 2

### Ordering Information

Part No.	Description
NW10	Industrially Hardened Narrow Bandwidth Wireless Radio (FCC NA Region)
NW10E	Industrially Hardened Narrow Bandwidth Wireless Radio (ETSI EU Region)

### Redundant Ring Topology

(Shown with PoE and 24VAC Powered Cameras)



## NW10DR High Throughput and Scalable Dual Radio Wireless Bridge



The NetWave® industrially hardened narrow bandwidth dual wireless radio is used for redundant ring and drop & repeat topologies when used with an external antenna. Radio 1 is an internal antenna while radio 2 has dual connectors for an external antenna. The wide range of channel spectrum widths available on the NW10DR series of radios gives user options for either high throughput or more non-overlapping channel options commonly required for noisy or dense radio deployments. Using the NW10DR will increase the number of available non-overlapping channels while improving stability in crowded RF environments. The NW10DR is FCC certified for use in North America.

### Features

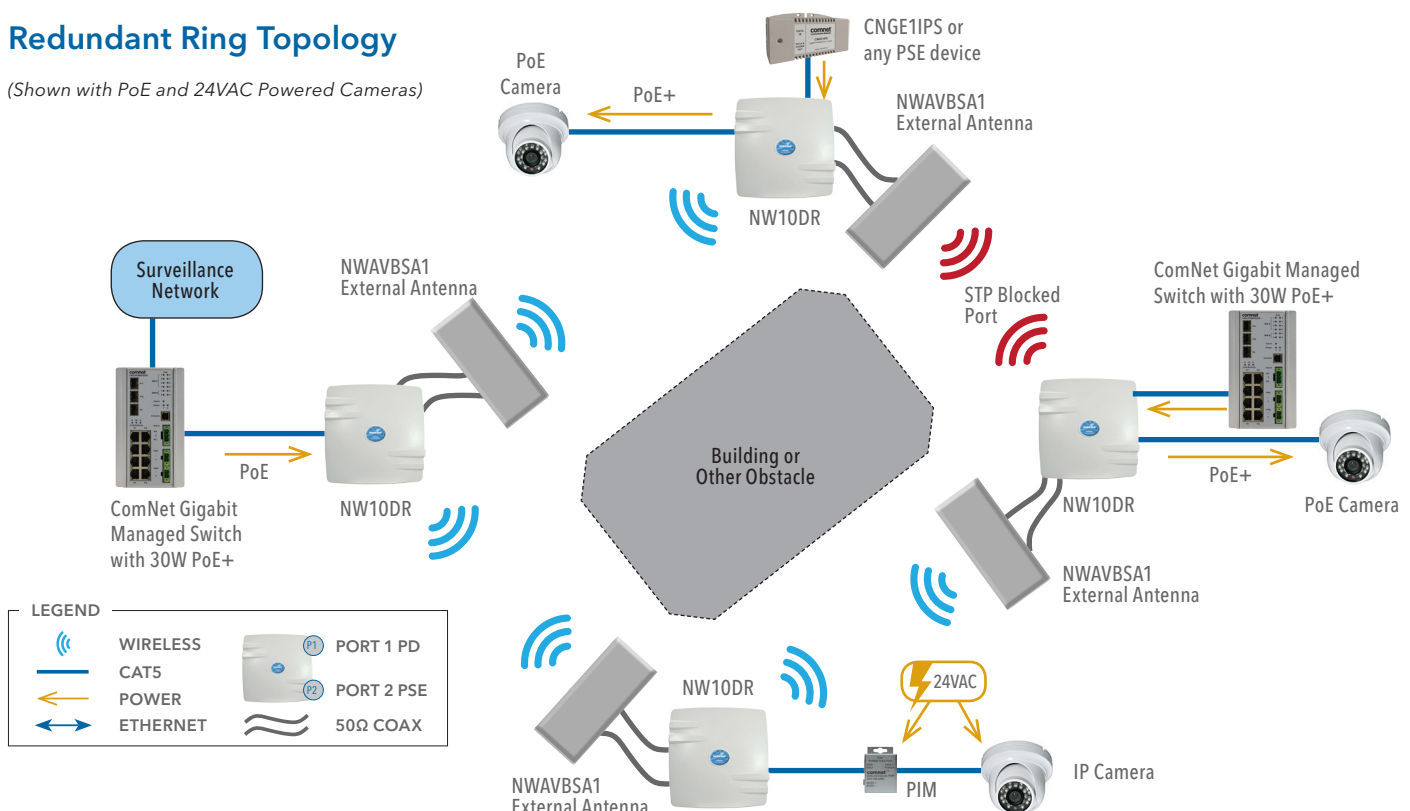
- › Scalable - Narrow Channel 5 and 10 MHz Bandwidths
- › Expand your WLAN without losing reliability
- › Up to 240 Mbps Throughput
- › IEEE802.3at PoE Compliant PD on port 1
- › IEEE802.3af power source (PSE) available on port 2

### Ordering Information

Part No.	Description
NW10DR	Industrially Hardened Dual Radio Narrow Bandwidth Wireless Bridge, (FCC NA Region)

### Redundant Ring Topology

(Shown with PoE and 24VAC Powered Cameras)





## NWKSP(X) Solar Power for Wireless Ethernet



NetWave® Solar kits provide remote power to networked edge equipment, and include a high quality photovoltaic solar panel, outdoor enclosure with gasketed hinged door and tamper proof locks, power controller and power injection module, all the mounting hardware and is available with or without sealed lead acid batteries. The equipment can be mounted to a two-to-four inch (five to ten centimeter) pole or to a wall with the included mounting hardware. The included controller protects against overcharge and over discharge while optional high performance batteries give the best available deep discharge and temperature performance.

### Solar Power Kit Comparison

	NWKSP1	NWKSP2	NWKSP3	NWKSP4
Continuous Power	15 W	15 W	30 W	30 W
Peak Sunlight	6 Hours	3 Hours	6 Hours	3 Hours
Battery Capacity	110 Ah	110 Ah	220 Ah	220 Ah
Battery Voltage	12 V	12 V	24 V	24 V
Reserve Time	40 Hours <sup>1</sup>	40 Hours <sup>1</sup>	40 Hours <sup>1</sup>	40 Hours <sup>1</sup>
PoE Output Voltage	48 V	48 V	48 V	48 V
System Weight with Batteries <sup>2</sup>	162 lb / 73 kg	179 lb / 81 kg	299 lb / 135 kg	418 lb / 189 kg

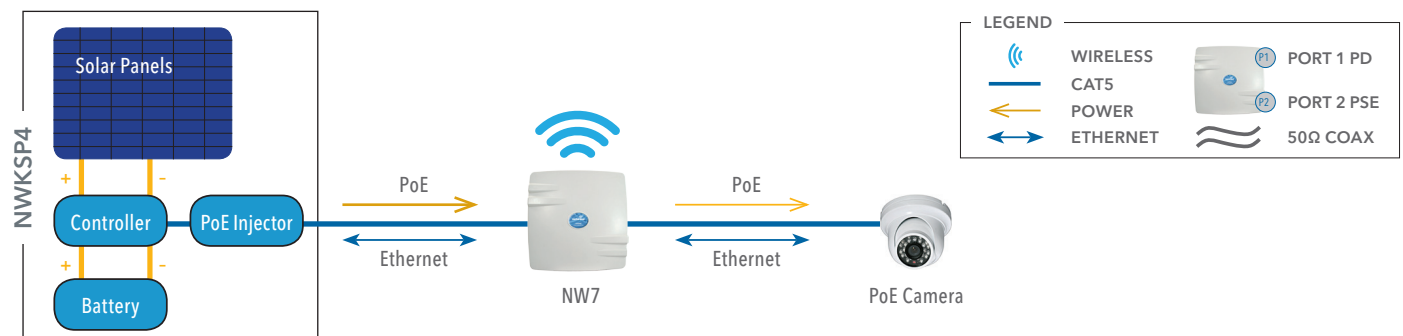
[1] Includes 25% battery derating for moderately low temperatures.

[2] Kits are optionally available without batteries included.

### Ordering Information

Part No.	Description
NWKSP1	15 W continuous power solution with 120 W Solar Panel
NWKSP2	15 W continuous power solution with 240 W Solar Panel
NWKSP3	30 W continuous power solution with 240 W Solar Panel
NWKSP4	30 W Continuous power solution with 480 W Solar Panel
Included	Enclosure, Controller, Solar Panel, Cables, Mounting hardware for the Solar Panel and Enclosure

### Typical Solar Power Topology



## NWKBB100/NWKBB200 DC-Battery Power Management System

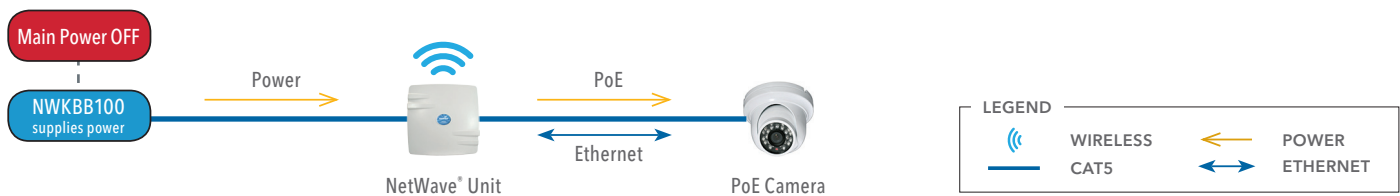


The NetWave® DC-Battery Power Solutions provide consistent power for your devices in locations where power is on a timer or they have frequent blackouts or brownouts. Includes Smart Controller, Enclosure, Batteries and Mounting Kit

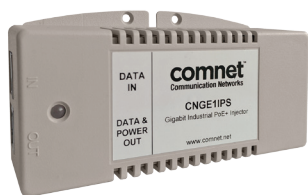
### Ordering Information

Part No.	Description
NWKBB100	Individual DC-Battery Backup system with 4 × 24Ah 12V batteries
NWKBB200	Individual DC-Battery Backup system with 4 × 50Ah 12V batteries

### Backup Power Topology



### Optional Accessories



CNGE1IPS



NWAVBSA1



NWADA1



NWBKT

### Ordering Information and Compatibility

Part No.	Description	Compatibility (Includes any applicable ETSI models)						
		NW1	NW1/M	NW7	NW7/M	NW9	NW10	NW10DR
/IA870	Internal 8 dBi, 70° beam width 5 GHz antenna	-	•	-	•	-	-	-
NWAVBSA1	External Dual Polarization 4.9-5.8 GHz 16dBi Variable Beam Sector Antenna	†	-	†	-	-	†	•
NWAODA1	External Omni Directional Dual Band (2dBi@2.4GHz / 5dBi@5GHz) Antenna, N-type Connector, 45° and 90° Articulating Joint	†	-	†	-	-	†	•
NWADA1	External Dual Polarization 4.9-5.8GHz 19dBi 17° Beamwidth Directional Antenna	-	-	-	-	-	-	•
/EXA	External N-type Antenna Option	•	-	•	-	-	•	-
CNGE1IPS	35W PoE Injector	-	-	•	•	•	•	•
NWBKT	Articulating Wall Mount Bracket	•	-	•	-	-	•	•

[†] Compatible, requires /EXA model option.

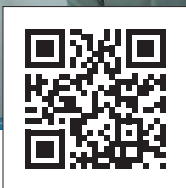
## NetWave Resources

The NetWave® DC-Battery Power Solutions provide consistent power for your devices in locations where power is on a timer or they have frequent blackouts or brownouts. Includes Smart Controller, Enclosure, Batteries and Mounting Kit



### Case Study: Vietnam Veterans Wall

ComNet supports a traveling memorial installation. Scan this QR Code to read the full case study, or visit <http://bit.ly/ComNet-case-studies>



### Installation Video: Power Point and Play

With a NetWave® NWK point-to-point kit, it really is that simple! Scan this QR Code to view a video of the quick and easy installation process, or visit <http://bit.ly/NWK-setup>



### ComNet.net Has Complete Product Documentation

The complete NetWave® product line is listed on ComNet's website, along with data sheets, quick start guides, and instruction manuals. Scan this QR Code or visit <http://bit.ly/NetWave-Products>

### The Possibilities Are Endless

ComNet's NetWave® wireless Ethernet Products create a network that's as flexible as you need it to be. There are too many possible applications to show them all in this brochure!

Scan this QR Code to access the NetWave® Wireless Network Application Design Guide, or visit <http://bit.ly/Wireless-Design-Guide>



## Technical Support

The ComNet Technical Support and Design Center provides pre-sale and post-sale support for Ethernet transmission network and fiber optic system design. The department is staffed by some of the most highly experienced, regarded and recognized experts in the industry. Our direct Design Center phone number is **1-888-678-9427** or you can call **1-203-796-5300** in the US or **+44 (0)113 307 6409** throughout Europe and ask for the Design Center, or contact us by E-mail at [designcenter@comnet.net](mailto:designcenter@comnet.net)

## LIFETIME WARRANTY

We're so confident in the long-term reliability of our products, we back them with a no-questions-asked Lifetime Warranty.

## Delighting the Customer

ComNet's Customer Care Center is here to provide solutions. Staffed by experienced, knowledgeable, and courteous representatives, the ComNet Customer Care team is there to help. Customer Care representatives are available to answer your questions concerning pricing, product availability, order status, shipping dates, returns, warranty claims and so much more.

## Product Training and Education

ComNet offers a full curriculum of fiber optic and Ethernet product training designed to educate you to make the right choices when selecting transmission equipment for your projects. Available online or in person, ComNet training qualifies for CEU credit.



## Travel light!

This brochure and other ComNet product literature is available online. Scan this QR Code with your mobile device, or visit <http://bit.ly/ComNet-Product-Literature>

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 **Low Power Consumption**

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