Wireless I/O and Ethernet Connectivity
Catalog

Industrial Data Connectivity

Weidmüller ⹃

Product Portfolio

DATA

Automation Device
Signal or power electronics

PCB terminals

PCB connectors

Power supplies

Surge protection

Switches

Media converter

IE-LINE plug-in connectors

Terminal rail outlet

FrontCom® Micro Service interface

IE-LINE Connection components

JACKPAC® IP68

Active sensor-actuator-interfaces

Electronics housings

Signal converters

Solid-state relays

Relay modules

Fieldbus distributors

Passive sensor-actuator-interfaces and cables

SIGNAL

Modular Terminal Blocks

Interface Units

Surge protection for Instrumentation & Control equipment

Cable glands

Enclosures and accessories

POWER

Stud terminals

Cabinet

FieldPower®

Heavy-duty connectors

Tools and identification systems

Cutting tools

Stripping tools

Crimping tools

More tools

Software

Printer

Markers

Wireless I/O and Ethernet Connectivity
Catalog 12

Weidmuller Catalogs at a Glance

Catalog 1:
Modular Terminal Blocks

- P-Series (Push-in)
- Power Distribution Blocks and Fuse Blocks
- Stud Style (Screw clamp)
- Z-Series (Tension clamp)
- W-Series (Screw clamp)

Catalog 2:
PCB Terminals and Connectors

- Space Saving Technologies
- Wide Variety of Clamping Technologies
- Pitches Ranging from 3.50 mm to 15.00 mm
- Orientations Ranging from 90˚ to 270˚

Catalog 3:
RockStar® – Heavy Duty Connectors

- Inserts
- Modular System
- Housings IP65 and IP68
- Cable Glands

Catalog 4.1:
Analog Signal Conditioning

- Intrinsically Safe Conditioners
- Signal Converters and Monitoring Devices
- Indicators and Configurable Displays

Catalog 4.2:
Relays and Optocouplers

- Mechanical Relays
- Solid-State (opto) Relays
- Power Solid-State Relays
- Multifunction Relays and Timers

Catalog 4.3:
Power Delivery

- Power Supplies
- UPS control units/battery back up units
- AC outlet DIN-Rail Mountable Receptacles

Catalog 4.4:
Surge Protection

- Surge Protection for Low-Voltage
- Surge Protection for Instrumentation and Control
- Surge Protection for Data Interfaces
- Surge Protection for Photovoltaic Systems

Catalog 4.5:
Interface Units and PLC Solutions

- Interface Units
- PLC Interfaces – H-, R- and S-System
- Byte Precabling Solution

Catalog 5:
Enclosures and Cable Glands

- Enclosures
- Cable Glands
- Cabtite (Cable Entry System)

Catalog 6:
Tools

- Cutting
- Stripping
- Crimping
- Screwdrivers
- Automatic Machines
- Ferrules

Catalog 7:
Marking Systems

- Terminal Markers
- Wire and Cable Markers
- Device and Equipment Markers
- Printing Systems and Software

Catalog 8:
Sensor Actuator Interface

- SAI Passive Blocks
- SAI Universal
- SAI ASI
- Cables and Connectors
- JACKPAC® IP67

Catalog 9:
Industrial Ethernet

- Unmanaged Switches
- Managed Switches
- Routers
- Media Converters
- SteadyTEC®
- IE Connectors
- Accessories

Catalog 10:
Industrial Connectivity

- Short Form Catalog
- Product Overview

Catalog 11:
Circuit and Surge Protection

- Circuit Breakers
- Overvoltage Protection
- AC Receptacles
- GFCI Outlets

Catalog 12:
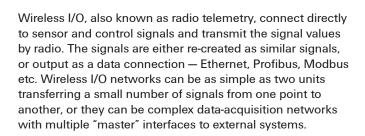## Wireless I/O and Ethernet Connectivity

- Wireless I/O and Ethernet
- Wireless Gateways
- Wireless Transceivers
- Antennas and Accessories

Types of Wireless Products

Product Overview

Weidmuller industrial wireless products provide secure and reliable solutions for a wide range of industries and applications, as an alternative for signal and data wiring. These products fall into four groups:

Wireless Meshing I/O, combines multi I/O and/or gateway functionality with the reliability of secure, scalable mesh distance communications. The IP-based addressing provides mesh/self-healing of network communications, multi-hop repeating and remote over the air re-configuration and diagnostics. The Meshing I/O units further complemented by its ease of commissioning and integration into existing plant infrastructure plus seamless interface with non-meshing systems.

Wireless Meshing I/O

Wireless I/O, also known as radio telemetry, connect directly to sensor and control signals and transmit the signal values by radio. The signals are either re-created as similar signals, or output as a data connection — Ethernet, Profibus, Modbus etc. Wireless I/O networks can be as simple as two units transferring a small number of signals from one point to another, or they can be complex data-acquisition networks with multiple "master" interfaces to external systems.

Wireless I/O

Wireless Gateways provide wireless connectivity between data buses - connectivity between devices using the same data bus, or between different data buses (Ethernet to Profibus to DeviceNet to Modbus etc). Wireless gateways are similar in operation to wireless modems, however gateways only provide a register interface to the data bus, transferring I/O registers only.

Wireless Gateways

Wireless Modems transmit serial or Ethernet data, providing a wireless extension of the data link. Example applications are PLC to PLC connections (point-to-point), connecting SCADA to a group of PLCs (point-to-multipoint), or forming a wireless PLC LAN (multidrop). Wireless modems transmit the data with minimal transformation.

Wireless Modems
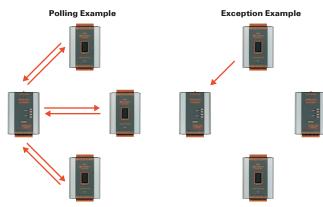
Wireless System Architecture

Weidmuller's solutions enable innovative WIB-net™ communications protocol specifically designed for highly reliable and secure operation on open license-free radio bands. Weidmuller wireless units form a WIB network— Wireless Information Backbone. A WIB is an effective plant-wide wireless information network for transferring data and connecting signals and data- buses in a highly efficient exception-reporting, peer-to-peer network. WIB-net provides the following features:

- **Exception-reporting transmissions for maximum wireless efficiency**

  Wireless messages are only transmitted whenever a signal value changes, yielding effective real-time performance. Integrity check messages ensure reliable operation of the wireless network as well as signal link accuracy. Exception-reporting reduces signal traffic to messages of only real significance.

- **Error-checking with automatic re-transmission for high reliability operation**

  Every radio message has a probability of corruption, so automatic error detection, acknowledgement and re-transmission is critical to reliable operation.
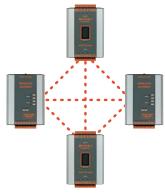

Polling Example   **Exception Example**

Event-driven communication

WIB-net will send and then re-transmit up to five times. After the fifth attempt, a communication failure status is logged and an alarm set externally.

- **Listen-before transmit wireless operation to maximize the chance of successful message transmission**

- **Peer-to-peer networking for maximum network flexibility**

  Each Weidmuller wireless gateway and transceiver unit can transmit/receive directly to/from any other wireless gateway and transceiver, and can transmit/receive to/from multiple
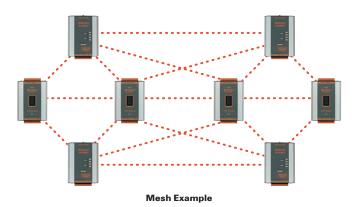

Peer-to-Peer Example

wireless units. There are no master units and no slaves. Any module in a network can talk to any other. Input signals can be transmitted to multiple destinations.

- **Wireless mesh structure**

  WIB-net enables every Weidmuller wireless gateway/ transceiver to act as a repeater to optimize wireless message propagation. Messages can hop through multiple gateway/transceiver units to reach a destination. If these units have a reliable wireless link to at least one other gateway/transceiver, a wireless mesh forms to enable reliable links to the whole network.

Mesh Example

- **High security encryption**

  WIB-net uses a highly secure data encryption technique to protect against misuse of wireless data. Weidmuller wireless networks security matches or exceeds that of wired networks.

Input/Output Mapping

Process signals or sensors convey the value of an input value to a designated output channel:

- System address (15-bit, 1 – 32768)
- Source module address (1 – 127)
- Destination module address (1 – 127)
- Repeater addresses (up to 5 addresses)
- Output channel number
- I/O signal value (16-bit)
- CRC error-checking (16-bit)

All modules in the same system share a unique system address to avoid cross-talk between systems in the same radio environment. The configuration software automatically generates a random system address for each system.

Destination or repeater modules automatically acknowledge messages when received with a correct error-check value, except for messages from transmit-only units. If an acknow-ledgement is not received within 500 milliseconds, the message is re-transmitted. The message will be transmitted up to five times with random re-try times. After the fifth attempt, a "comms-fail" event will be set, which can be used to trigger an output alarm or register.

Block Messages

Block messages are similar to other transmissions. However, signal information is condensed into "blocks" and these blocks are sent at programmed intervals. Each block message contains up to 64 x 16-bits of values. Block messages are only transmitted or repeated by the wireless gateway product range (D2 W GMD).

Discrete/digital values can be packed [i.e. up to 1024 (64 x 16)] into a block message and unpacked at the destination gateway.

Block messaging creates a more robust, reliable and efficient system by reducing the chance that messages will become corrupt and by minimizing radio frequency congestion.

Message Control

The WIB-net™ protocol is based on exception-reporting for optimum performance. Messages can be triggered by any of the following:

- Exception – change in input value compared to user-configurable "sensitivity" values
- Update time – user-configurable time period since the last message, individually configured for each I/O register
- Real time – block mappings only; messages transmitted on real time values
- On demand – block mappings only; poll command from another wireless unit or write command by a connected databus device
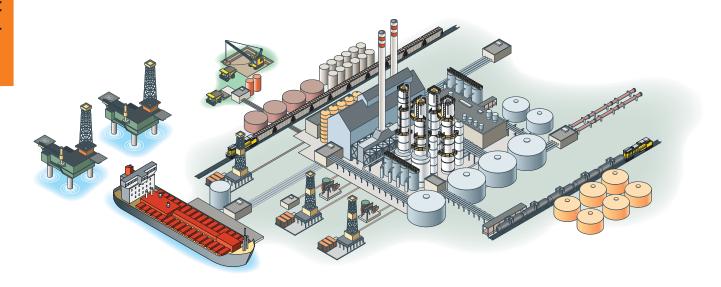
Before a message is transmitted, the radio channel is checked to ensure it is clear (listen-before-transmit). The message is preceded by a lead-in transmission; the length depends on the radio model to allow all other units to lock onto the transmitted message.

Security Encryption

Security encryption of wireless messages is user-selectable. A 64-bit secure proprietary encryption algorithm is used. The 64-bit key is randomly generated by the configuration software and is never disclosed to the user or transmitted by radio. Configuration files are protected by password, up to 256 characters.

Oil and Gas Applications

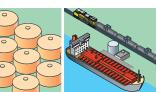From the control room to the field, wireless solutions provide a wireless control infrastructure for productivity and safety gains in oil and gas applications.

Wireless benefits:

- **Long range:** Current frequencies allow for 20–50 km LoS between clients

- **High speed:** Up to 50 Mbps bandwidth

- **Secure:** Military-grade security encryption

- **Rugged:** Weatherproof casing

- **Reliable:** Advanced, self-healing meshing technology provides high availability

- **Easy deployment:** Deploys more easily and can be redeployed more quickly when compared to wired installation

- **Cost-effective:** Lower installation costs and longer, faster equipment uptime

More than Wireless
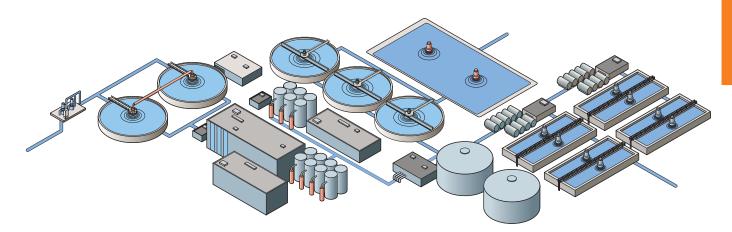
	Production	Separation / Refining	Storage	Distribution	Upgrading
Circuit Protection	●			●	●
Industrial Ethernet				●	
Intrinsic Safety		●		●	
Junction Boxes			●		
Marshalling Solutions		●			
Mechanical and Solid State Relays		●			
Power Supplies and UPS		●			
Printing / Marking Systems	●				●
Signal Isolation and Conditioning		●	●		
Surge and Lightning Protection	●		●	●	●
Terminal Blocks	●		●		●
Wireless Communication	●	●	●		●
Wireless Monitoring			●		●
Wireless Technology				●	

Water and Waste Water Applications

Wireless solutions reduce remote installation costs up to 70% and communicate reliable, secure EPA compliance data for system locations including:

- Head Works, Main Lift Stations, Remote Lift or Pumping Stations
- Storm Sewer Overflow, Sanitary Sewers and Collection Pits
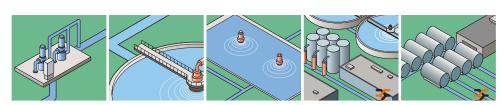- Effluent Discharge Points: River, Lake and Wetlands Re-use
- Transportation and Paved Runoff Areas
- Potable Water Storage and Processing
- Security and Surveillance

Wireless benefits:

- Optimizes response times and immediately indicates critical diagnostic information
- Improves monitoring and control of water flow over extended distances
- Improves operator safety and efficiency by eliminating travel time to remote site locations
- Reduces labor expenses and maximizes efficiency
- Simplifies installation and commissioning of network with reduced infrastructure required
- Provides enhanced reliability through a flexible network topology that can self-heal, while easing future expansion

More than Wireless

|	Head Works	Influent	Aeration	Treatment	Effluent
Circuit and Surge Protection	•		•		
Distribution Blocks				•	
Engineered Systems				•	
Industrial Ethernet Networks		•			•
Interface Systems		•			
Intrinsic Safety	•		•	•	
Mechanical and Solid State Relays					•
Power Supplies and Battery Backup	•	•			•
Printing / Marking Systems / Ferrules			•		
Signal Conversion and Isolation			•	•	
Terminal Blocks		•			
Wireless Communication			•		•
Wireless Systems		•			
Wireless Technology	•			•	

Application Notes
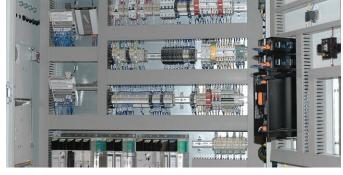
Factors Affecting Distance & E.R.P

- Frequency (as frequency increases, distance decreases proportionally)
- Receiver sensitivity, antenna gain, cable loss
- Noise / interference (the noisier the environment the more careful you have to be with antenna placement)
- Transmitter power, antenna gain, cable loss
- Attenuation of radio signal
- Heights of antennas, Obstructions in radio path
- Other factors Atmospheric, Ground Mineralization

In most applications it is desirable to have an overall dB gain as opposed to a loss to ensure good communication between radios.

Gain Sources	
Radios	1 W radio = 30dB Gain
	300mW radio = 24dB Gain
	100mW radio = 20dB Gain
Antennas	(see antenna selection chart for Antenna dB Gains)

Points of Loss	
Connection points	~0.1dB loss per connection
Jumper cables	see cable selection section (p. 64)
Surge Protection	see surge protection section (p. 65)
Bulkhead adapters	see Bulkhead Adapter section (p. 65)

*Sample assembly showing radios, power supply, surge arrestor (bottom of cabinet), terminals & relays.

WIBnet

WIBnet makes use of all the standard features of the Weidmuller Wireless radios.

- Exception-reporting transmission for maximum wireless efficiency.

Wireless messages are only transmitted whenever a signal value changes, yielding effective real-time performance.

- Error-checking with automatic re-transmission for high reliability operation.
- Listen-before-transmit wireless operation to maximize the chance of successful transmission.
- Peer-to-peer networking, giving the maximum network flexibility.
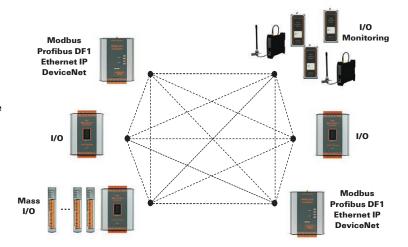
WIBnet communications protocol is specifically designed for highly reliable and secure operation on open license-free radio bands.

WIBnet provides the following features:

- Any of the 900Mhz I/O or Gateway radios can be used on the WIBnet system
- Up to 95 radios can be put into one network

Messages can hop through multiple units to reach a destination providing each Wireless I/O unit has a reliable wireless link to at least one other unit. A wireless mesh forms to ensure reliable links are established within the whole network.

Wireless system flexibility and scalability

Modbus Profibus DF1 Ethernet IP DeviceNet

I/O Monitoring

I/O

I/O

Mass I/O

Modbus Profibus DF1 Ethernet IP DeviceNet

Application Examples
Remote Wastewater Overflow Protection

Company: JEA, City of Jacksonville, Florida

Introduction

JEA is the municipal utilities provider for Jacksonville Florida. They were facing a problem with sanitary sewer overflows (SSO) in the downtown section of Jacksonville. Avoiding sewage overflow, aside from being a safety, environmental and public relations necessity, is good business for JEA.

Objective

The engineers at JEA needed a way to monitor underground sewer levels throughout the city.The plan involved the placement of measuring devices in strategically located manholes around the city in order to monitor the various fluid levels at each location.

This approach required the city to install power and control circuits at the strategic locations. Since the manholes were proven to be a very harsh Class1, Division 1 environment, they knew that the solution was not going to be easy. JEA had already invested in a very robust SCADA system to control and monitor over 1200 lift stations. The end goal was to locate a monitoring system from the sewer manhole to the existing SCADA system.

About

The issue faced by Jacksonville in establishing a monitoring system is that the city itself is physically in the way– buildings, bridges, communication lines, power lines and other typical city fixtures. They would need to dig up most of the downtown at a cost of millions of dollars and months of traffic congestion and delays. The idea was proposed to monitor the manholes and their levels wirelessly. This solution could provide the city with a quick way to install a solution that would not require the demolition of the entire city.

A search was conducted to determine who could provide a solution that fit a very specific list of requirements. These requirements included the necessary power to send signals through the ground and steel manhole covers wirelessly to receivers located in control cabinets within the city; the need for ultra low power consumption; the ability to power the solution via batteries; be contained in a Class 1, Division 1 enclosure; the ability to send both analog and discrete signals; and be portable so it could be moved to different locations in the city as needed. After extensive field tests and evaluations for signal strength and durability, along with careful evaluation of different types of equipment, a Weidmuller wireless solution was selected.

The components of the solution include a compact, easy-to-use wireless transmitter (WI-I/O-9-K), coupled with its matching battery pack (WI-BP-I/O-9-K), which does not require any special OEM batteries. The wireless transmitter sends analog and discrete signals to a wireless transceiver (WI-I/O 9-4). This unit collects the data from each transmitter and forwards it via a wired connection into the JEA's SCADA application. The receiver works very well with the existing SCADA system. The programming software for the devices is provided for free via web down load and is easy to use and understand.

The software that is included with each device makes it simple for JEA to map the transmission of signals and control transmit schedules, thus prolonging battery life. Based on the level of power consumption, JEA could replace the batteries once a year, however, they have implemented a proactive battery maintenance program to change out the batteries (standard AA sized Alkaline) every 6 months.
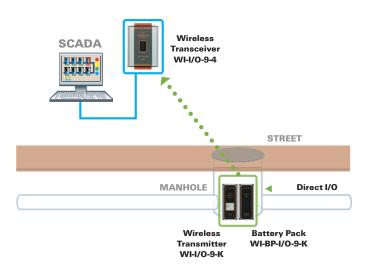
These wireless devices are mounted in a Class 1, Division 1 explosion proof enclosure with a small external antenna. Each enclosure unit is then placed in a cradle within the manhole. Portability is an important feature because it allows JEA to redeploy each wireless radio in other locations in the city as needed.

The transmitter sends signals from each underground manhole installation to set receivers through the downtown area. JEA teamed with a local distributor and packaged the Weidmuller radio system, enclosure, terminals and equipment needed to meet application requirements of this monitoring system.

Outcome

This wireless manhole monitoring system has been used in 17 manholes in Jacksonville. It was implemented in just six months at a savings of millions of dollars and many months of time, versus a wired solution.

The system has proven to be a very successful solution to an important problem. Since the implementation of the manhole monitoring system, JEA has successfully prevented numerous manhole sanitary sewer overflows (SSO), thus protecting the public and the environment– a top priority for JEA and the city.

SCADA

Wireless Transceiver
WI-I/O-9-4

STREET

MANHOLE

Direct I/O

Wireless Transmitter
WI-I/O-9-K

Battery Pack
WI-BP-I/O-9-K

Remote Pumping Station Monitoring

Company: Pemex, Coatzacoalcos, Mexico

Introduction

Petroleos Mexicanos (PEMEX) is Mexico's state-owned petroleum company. It is the tenth largest oil company in the world in terms of revenue and ranked thirty-fourth in Fortune 500 companies. The company controls the entire oil industry for the nation of Mexico. This includes extraction, storage, refining and marketing to the public.

Objective

The engineers at PEMEX needed to monitor 200+ different remote pumping stations and compressors. The pumping stations are scattered over a 180 square mile area that is covered in very dense forest growth, making the transmission of wireless signals a real challenge. The pumping stations are physically clustered into four groups. Each group has approximately 50 pumping/monitoring locations. These groups are Reforma, Castano, Planta de Agua Samaria and Comalcalo. Each of the remote pumping locations covers an area of 37 square miles. These four remote areas with pumping stations need to send signals back to a central office location.
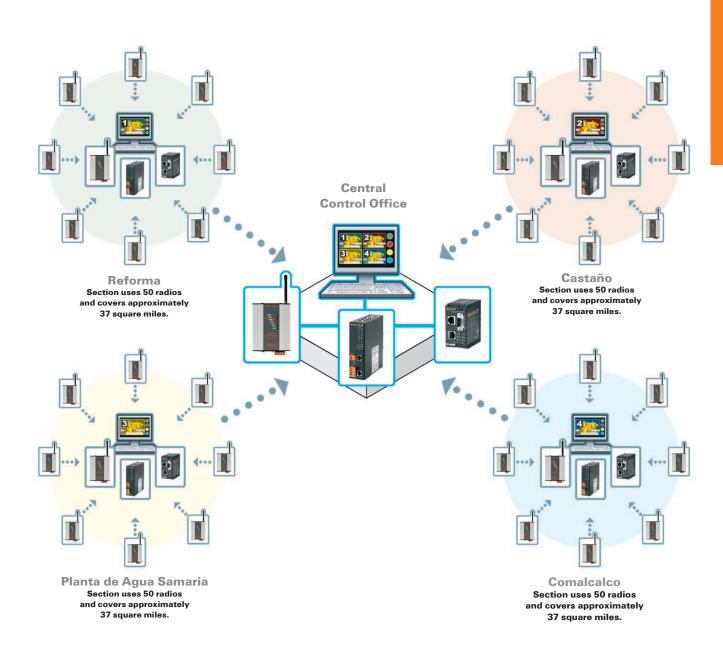
Solution

Weidmuller designed a solution that uses wireless Ethernet modems (WI-MOD-E) at each pumping location (Level 3) to acquire and transmit the requested information to a central point in each of the four pumping areas (Level 2). Another identical Ethernet modem is used to transmit all the needed information from each central point in each pumping area back to the Central Control office (Level 1). The Weidmuller modems, with 300mW broadcast power, were the only ones with a powerful enough transmitter to penetrate the dense forest growth with a clear and reliable wireless signal.

Each wireless Ethernet modem communicates between each pump location (Level 3) to each central pumping section (Level 2) and back to the Central Office (Level 1) via ModBus TCP. The components used in this installation include 250 Ethernet modems (WI-MOD-E), 5 unmanaged Ethernet switches, 5 Ethernet routers, 250 DC-DC converting power supplies (to isolate radios from the rest of the system) and all necessary terminal and fuse blocks to complete the system connectivity.

Outcome

PEMEX now has a simple easy-to-use solution for monitoring their remote pumping stations. They were able to deploy this solution quickly and it was up and running in a matter of months. Training and maintenance is streamlined because the solution employs one type of product, using one software interface for all three levels of their system, from 200+ remote stations to the central office location. The wireless products were coupled with other Weidmuller components, providing a complete and seamless system that is easy for PEMEX to maintain and support.

Reforma
Section uses 50 radios
and covers approximately
37 square miles.

**Central
Control Office**

Castaño
Section uses 50 radios
and covers approximately
37 square miles.

Planta de Agua Samaria
Section uses 50 radios
and covers approximately
37 square miles.

Comalcalco
Section uses 50 radios
and covers approximately
37 square miles.

Wireless Remote Vehicle Control

Company: Meggitt Training Systems, Inc.

Company Profile

Meggitt Training Systems, Inc.(MTSI), a part of Meggitt Plc, provides training systems used by militaries, law enforcement and security agencies around the world. They develop, manufacture, market and service high quality virtual and live fire training systems. MTSI employs over 500 people at their headquarters in Atlanta and in other facilities in Australia, Canada, Singapore, the Netherlands, the UAE and the United Kingdom. They are the industry leader of interactive simulation systems for the handling and use of small and supporting arms training.

Overview

Meggitt designed and installed one of the most advanced live fire ranges ever provided to the U.S. Military. The range, installed and operating in Fort Carson, Colorado, is a digitally controlled heavy armor range. It is comprised of 14 moving targets located across a 60 square kilometer area. Each of the 14 moving targets includes one bunker location and a separate remote vehicle or mover. The bunkers are made of reinforced concrete and contain the technology to operate the movers including a wireless Ethernet modem.

The mover is a 3000 lb. vehicle that is mounted onto a raised metal track. This remote vehicle has four lift arms that enable it to raise and lower a target, which is a silhouette of an armored vehicle. A control box located on the mover contains another wireless modem and the circuitry to operate the drive motors and the lift arms of the vehicle. The raised metal tracks vary in length from 300 to 500 meters, depending on the range. Each of the 14 moving target ranges is controlled via Ethernet signals from a central Range Operations Center (ROC).

Problem

Meggitt faced two major problems at the Fort Carson, Colorado range. The first challenge was environmental. Operating conditions on a live fire heavy armor range are not favorable to electronic equipment– especially highly sensitive, high technology wireless devices. The temperature inside the control box on each mover varies from -40°C (-40°F) in the winter to +65°C (+149°F) in the summer months. In addition to temperature issues, operating on a range with tanks firing live ammunition necessitated a wireless device that withstands shock and vibration.

The second challenge was to secure reliable and stable wireless communication between each bunker location and its respective mover. The mover needs to be controlled at every point along its track so it can move in either direction, stop, raise and lower the target. The mover rolls on a set of raised tracks that extend away from the bunker at a distance of 300 to 500 meters, with various elevation changes and turns. Normally, a large antenna placed at each bunker and on each mover would solve any signal communication issues. However, the antennas at Fort Carson could not extend beyond the protective wall that guarded each mover from the live ammunition.
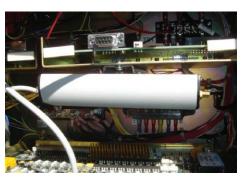
Solution

Weidmuller's WI-MOD-E-300 modems were tested and selected for the application because of their ability to operate within the required temperature ranges. They were also the most powerful production 802.11b modems available. Weidmuller sent a team to Fort Carson to install ten WI-MOD-E-300 wireless modems at 5 bunker-mover locations. The modems were installed using antenna and connecting cables that were already on-site from a previous vendor. Signal strength was improved and the Weidmuller team was able to get four of the five ranges communicating successfully.

The new installations were tested for several months after installation and it was determined that communications were not as consistent as desired. The Weidmuller team returned to Fort Carson and performed extensive site surveys at each of the 14 different bunker-mover locations. This information enabled an accurate diagnosis of each installation and the results determined that the previously installed cables and antennas were at fault. They had not been properly installed by the previous vendor and in some cases incorrect cables and antennas had been used. The Weidmuller team developed a solution to correct the communication issues at each range location. The recommended solution was accepted by Meggitt Training Systems and installed.

In order to streamline the support and spare parts management for the Fort Carson range, all of the components and equipment used for each bunker-mover location are identical. The technology solution includes a WI-MOD-E-300 wireless Ethernet modem, WI-ACC-LMR400-55FT jumper cable and a WI-ANT24GHz-4DB ONMI antenna. Each mover is equipped with a matching WI-MOD-E-300 wireless Ethernet modem, WI-ACC-LMR195-3FT jumper cable and a WI-ANT-24GHZ-4DB OMNI antenna.

Wireless Ethernet Modem mounted within an enclosure located inside bunker
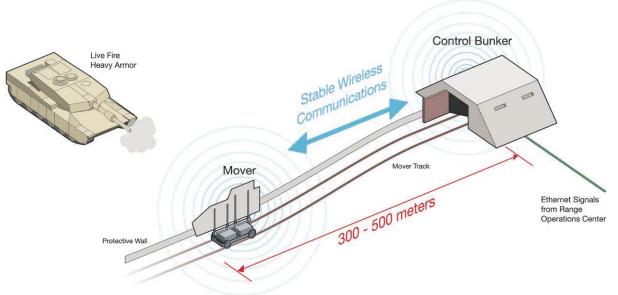
Wireless Ethernet Modem mounted inside control box on a mover

Outcome

Weidmuller and Meggitt Training Systems have replaced all of the original faulty modems from a previous vendor and installed all new connecting cables and Omni antennas in each bunker and on each mover. The entire range is up and fully operational, providing solid data and control connections for each of the 14 bunker-mover locations. MTSI considers their Fort Carson digital range installation a complete success and the U.S. military is actively using the range as a testing facility for tanks and other armored vehicles.

Mover with target raised

Weidmuller Wireless Ethernet

Company: Targa Energy

Overview

Targa Energy owns and/or operates over 11,300 miles of natural gas gathering pipelines and Liquefied Natural Gas (NGL) pipelines through the states of Texas and Louisiana. These pipelines cover a total area of over 14,400 square miles. Targa also operates 22 natural gas processing plants, with a total of over 10,250 MMcf/d of gross processing capacity. In addition to these gathering systems and processing plants, Targa manages an onshore plant facility that provides access to natural gas supplies in the Permian Basin, Fort Worth/Bend Arch Basin, South Louisiana Basin, deepwater and deep shelf Gulf of Mexico.

Problem

The Targa Energy gas plant in Chico, Texas is a multi function location that performs pumping, storage and processing for the natural gas industry. This location covers several square miles, and includes a compressor station and multiple remote pumping stations located around the plant. Most of the pumping stations are very remote and have no access to the plant's communication network. Some of the pumping stations have a satellite uplink that is only used for processing data, production logistics and safety information.

Targa required a solution that could provide network access to their compressor station and numerous pumping station locations, and make a significant section of their gas plant a "Hot Spot" for broadband Ethernet access. Targa's field technicians would require access to this broadband network to conduct system monitoring, access data files and connect with other offices or company resources via the company's Intranet network. The field technicians use laptop computers, therefore a 2.4GHz (WiFi) wireless frequency was necessary.

Targa was having difficulty achieving reliable and stable connections due to the distance between the pumping stations, the compressor station, and the plant (over 3.5 miles in some cases) and the need to use the 2.4GHz (WiFi) spectrum for field technician access.
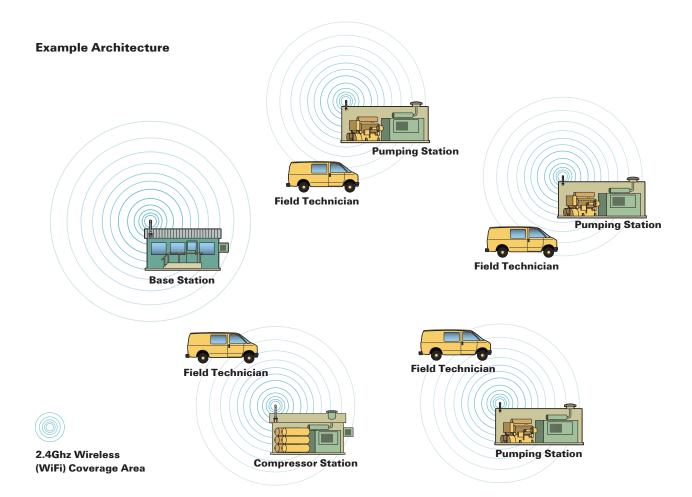
Solution

At Targa's request, Weidmuller's application engineer visited the plant location and performed a wireless Ethernet site survey. After the site survey was completed, a solution was proposed that included a combination of wireless Ethernet modems (WI-MOD-E-300) and dipole antennas with 3dbi of gain. The Ethernet modems provided the needed level of powerful signal transmission, and combined with a sensitive high performance signal receiver, Targa was able to receive the necessary signal strength and reliability required for their locations.

Compressor Station

This wireless solution provides the required "Hot Spots" for service technicians to access the Intranet network with their laptops, as well as enabling connectivity between Targa's base station locations and several remote pumping stations for an added level of communication and information exchange.

Example Architecture

Pumping Station

Field Technician

Pumping Station

Field Technician

Base Station

Field Technician

Field Technician

2.4Ghz Wireless (WiFi) Coverage Area

Compressor Station

Pumping Station

Wireless I/O

Unidirectional Transmitter/ Receiver Units – Introduction

Wireless Input/Output (I/O)

Wireless I/O connects directly to analog, discrete and pulse transducer signals. The signals are transmitted by radio and either re-created as output signals, or output via serial link or field-bus.

Weidmuller Wireless I/O units have the ability to form sophisticated peer-to-peer networks, with event-reporting messaging to optimize wireless density. Weidmuller products are designed for high reliability operation on open license-free radio bands.

WI-I/O 9-L Unidirectional Transmitter/Receiver Units

The Unidirectional Wireless I/O range of products is suitable for connecting to a single sensor or group of sensors and provides an economical solution for remote monitoring systems. The Unidirectional L products can also be used in more complex networks as signal transmitters or receivers.

- Frequency hopping spread spectrum 902-928 MHz 1W license-free USA/Canada/Mexico
- Configurable sub-bands license-free South America, Australia/NZ, Asia, Europe

Applications

- Wireless connection of flowmeters or energy meters
- Monitoring storage tanks
- Monitoring cathodic protection on pipelines
- Wireless alarms from power reticulation fault relays

Digital Analog Thermocouple   Digital Analog

Features
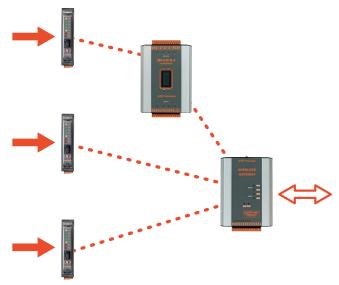
Matched transmitter/receiver pair of modules, or individual transmitter and receiver units

- Peer-to-peer communications. Exception reporting. Reliable self-checking messages. Highly secure data encryption.
- Multi-hop repeater functions - up to 5 intermediate units can be configured in any input-output link
- Factory configured as a matched Transmitter/Receiver pair or user-configurable with E-Series Windows configuration program
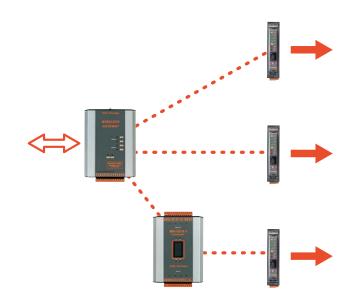
Transmitter unit

- Input-only transmitter unit - two digital/pulse inputs, one analog input and one thermocouple mV input
- Transmits to Receiver unit as a matched pair where the input signals are re-created as output signals, or can transmit to a Multi-I/O or Gateway unit
- Class 1 Div 2 hazardous areas approval
- Up to 3000 wireless units per network
- External inputs plus internally calculated values - analog setpoint status, pulse count, power supply voltage
- Thermocouple input –20 to +100mV with cold-junction compensation and linearization for J, K or T-type
- Setpoints status generated by comparing analog input to high and low setpoints
- Digital inputs can also be used as pulse count inputs
- Power supply 9 – 30VDC, measured and available as a transmitted variable
- 24VDC analog loop supply internally provided
- RS232 Configuration and diagnostics port

Receiver unit
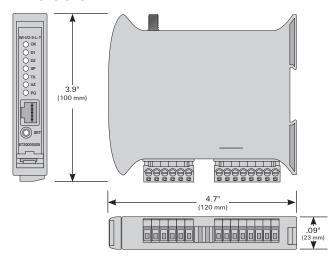
- Output-only receiver unit - three digital contact outputs and one analog output
- Receives radio commands from Transmitter unit as a matched pair where the input signals are re-created as output signals, or can receive commands from a Multi-I/O or Gateway unit
- Class 1 Div 2 hazardous areas approval
- Up to 3000 wireless units per network
- Power supply 9 – 30VDC; 24VDC analog loop supply internally provided
- Communications failure indication and configurable output
- Outputs can be configured as retained or reset (fail-safe) on communications failure
- LED indication of radio signal strength
- RS232 Configuration and diagnostics port

Transmitter/Receiver Unit Ordering Information

Unit	Description
WI-I/O 9-L-T	Wireless Transmitter (900 MHz)
WI-I/O 9-L-R	Wireless Receiver (900 MHz)
WI-I/O 9-L-P1	900 MHz Wireless Transmitter/ Receiver Pair with two -2 dB Dipole Antennas
WI-I/O 9-L-P2	900 MHz Wireless Transmitter/ Receiver Pair with two 0 dB Dipole Antennas

Dimensions

3.9"
(100 mm)

4.7"
(120 mm)

.09"
(23 mm)

WI-I/O 9-L-T
OK
D1
D2
SP
TX
AZ
PG
SET
87200005005

General

- **Frequency:** frequency hopping spread spectrum 902-928MHz, sub-bands available, 1W
- **Sensitivity:** line-of-sight range 20 miles (4W ERP - "effective radiated power"), 15km (1W ERP); 3000 ft /1000 m in obstructed industrial environments; radio distances can be increased by up to 5 intermediate transceiver or gateway units
- **Antenna Connector:** SMA connector for antenna or coaxial cable connection
- **Temperature:** -40 to 60°C / -40 to 140°F

- **Humidity:** 0 - 99% RH
- **Regulatory Approvals:** EMC compliant 89/336 EEC, EN 301 489, AS3548, FCC Part 15, Approved to FCC Part 15.247, RS210
- **Housing:** DIN-rail thermo-plastic enclosure 100 x 22 x 120 mm / 3.9 x 0.9 x 4.7 inches
- **Transmitter Unit:** Power/OK, radio TX, DIN1, DIN2, analog set-point status
- **Receiver Unit:** Power/OK, radio RX, DO1, DO2, DO3, communications fail LEDs also used to provide radio signal strength indication

Transmitter Inputs

Input Type	Source	Function
Digital	external	status
Pulse Total	external	count
Analog	external	analog
Thermocouple	external	analog
Set Point	internal	status
Supply Voltage	internal	analog

Input values transmitted as per WIB-net (see page 8) protocol - exception-reporting on signal change, and update time. Up to 5 repeater addresses, configurable.

Digital / Pulse Inputs

- Two inputs, suitable for voltage-free contacts / NPN, or voltage input 0-1 VDC on / >3 VDC off pulse input max. rate 10 Hz, 50 msec on time. Pulse counted as 16-bit register.

Analog Inputs

- 0-20 mA (4-20mA)
- "Floating" differential input, resolution 16-bit, accuracy < 0.1 %

Thermocouple Inputs

- Millivolt (-20mV to +100mV), J, K, or T type linearization with on-board cold-junction compensation
- Accuracy better than 1°C

Power Supply

- **Normal Supply:** 9 - 30 VDC, power consumption @12VDC - receiver normal 70mA, max. 250mA
- Transmitter normal 70mA, transmitting max. 600mA
- Analog loop supply internally generated, 24VDC 35mA
- Internal monitoring of supply voltage may be transmitted as an "input" (transmitter unit only)

Set-point Status

- High and low set-points generate internal digital status- set-point status sets (on) when analog value < low set- point and resets (off) when analog value > high set-point. Status is transmitted as per digital input, set-point values are set via the front panel rotary switch or configuration software.
- Separate set-points for (4-20 mA), thermocouple and supply inputs are configurable

Receiver Outputs

Digital Outputs

- Three relay contact outputs, 260V 1A

Analog Outputs

- 0-20mA, source output, 12-bit resolution, 0.1% accuracy

Communication Failure

- Internal status based on configurable time-out value
- "Comms-fail" status can be configured to a local output

Fail-Safe

- On "comms-fail," outputs user-configurable as retained last correct value or reset (fail-safe)

Serial Port

- RS232 RJ45 female DCE, used for configuration and diagnostics

LED Indication

Transmitter Unit

- Power/OK, radio TX, DIN1, DIN2, analog set-point status

Receiver Unit

- Power/OK, radio RX, DO1, DO2, DO3, communications fail
- LEDs also used to provide radio signal strength indication

Configuration and Diagnostics

- Factory configuration transmitter/receiver matched pair, AI to AO, 2DI to 2DO, SP status to DO3 via RS232 - RJ45 cable
- User configuration via serial port. Unidirectional units can be configured to network with multi-I/O and gateway units.
- Diagnostics features: read input values, write output values, radio signal strength, monitor communication messages

WI-I/O 9-L-T Transmitter

WI-I/O 9-L-R Receiver

C1D2
C US

Technical Data

Transmitter Inputs		
Digital	two inputs, suitable for voltage free contacts / NPN, or voltage input 0-1 VDC on / >3 VDC off	
Pulse	max rate 10 Hz, 50 msec on time. Pulse counted as 16 bit register.	
Analog	0-20 mA (4-20mA)	
"floating" differential input:		
resolution	16 bit	
accuracy	< 0.1 %	
Thermocouple	Millivolt (-20mV to +100mV), J, K or T type linearization with on-board cold-junction compensation	
Accuracy	greater than 1°C	
Receiver Outputs		
Digital		three relay contact outputs, 260V 1A
Analog		0-20mA
resolution		12 bit
accuracy		0.10%
Comms-Fail		Internal status based on configurable time-out value. Comms-fail status can be configured to a local output.
Fail-safe		On "comms-fail", outputs user-configurable as retained (last correct value) or reset (fail-safe)
Power Supply	9-30 VDC	9-30 VDC
Power consumption @12VDC	Receiver 100mA, Transmitter 40mA quiescent, during radio transmission (50 msec) 300mA	Receiver 100mA, Transmitter 40mA quiescent, during radio transmission (50 msec) 300mA
Analog loop supply internally generated	24VDC 30mA	24VDC 30mA
Internal monitoring of supply low voltage status	may be transmitted as an "input" (Transmitter unit only)	
Power consumption increases for pulse inputs > 10Hz.		
Serial Port	RS232 RJ45 female DCE, used for configuration and diagnostics	RS232 RJ45 female DCE, used for configuration and diagnostics
General Data		
Operating Temperature	-40 to 60°C (-40 to 140°F)	-40 to 60°C (-40 to 140°F)
Humidity	0 - 99% RH	0 - 99% RH
EMC Standards	FCC Part 15.247, RS210	FCC Part 15.247, RS210
Mounting	DIN-rail mounting	DIN-rail mounting
LED indication: Transmitter Unit	Power/OK, Radio TX, DIN1, DIN2, Analog Setpoint status	
LED indication: Receiver Unit		Power/OK, Radio RX, DO1, DO2, DO3, Communications Fail.
frequency hopping spread spectrum	902-928MHz, sub-bands available	902-928MHz, sub-bands available
Transmit power	1W	1W
Maximum line of sight range	20 miles (4W ERP), 15km (1W ERP); 3000 ft / 1000 m in obstructed industrial environments. Radio distances can be increased by up to 5 intermediate repeater units. Each transmission may be configured to be sent 1 to 5 times.	20 miles (4W ERP), 15km (1W ERP); 3000 ft / 1000 m in obstructed industrial environments. Radio distances can be increased by up to 5 intermediate repeater units. Each transmission may be configured to be sent 1 to 5 times.
Antenna connector	SMA female coaxial	SMA female coaxial
Dimensions mm (in)	100 x 23 x 120 (3.9 x 0.9 x 4.7)	100 x 23 x 120 (3.9 x 0.9 x 4.7)
Configuration	User configuration via serial port. Unidirectional units can be configured to network with Multi-I/O and Gateway units.	User configuration via serial port. Unidirectional units can be configured to network with Multi-I/O and Gateway units.
Diagnostics	Diagnostics features - read input values, write output values, radio signal strength, monitor communication messages.	Diagnostics features - read input values, write output values, radio signal strength, monitor communication messages.

Ordering Data

	Type	Part No.
	WI-I/O 9-L-T	**6720005005**
Accessories: DB9 Female-RJ45 Serial configuration cable	WI-CSER-RJ45	**6720005108**

	Type	Part No.
	WI-I/O 9-L-R	**6720005006**
	WI-CSER-RJ45	**6720005108**

Wireless I/O

C1D2
C US

WI-I/O 9-L-P1
Set - 1 Transmitter, 1 Receiver

WI-I/O 9-L-P2
Set with 2 WI-ANT-DPL-0-8

Technical Data

Transmitter Inputs			
Digital		two inputs, suitable for voltage free contacts / NPN, or voltage input 0-1 VDC on / >3 VDC off	two inputs, suitable for voltage free contacts / NPN, or voltage input 0-1 VDC on / >3 VDC off
Pulse		max rate 10 Hz, 50 msec on time. Pulse counted as16 bit register.	max rate 10 Hz, 50 msec on time. Pulse counted as16 bit register.
Analog		0-20 mA (4-20mA)	0-20 mA (4-20mA)
"floating" differential input:			
resolution		16 bit	16 bit
accuracy		< 0.1 %	< 0.1 %
Thermocouple		Millivolt (-20mV to +100mV), J, K or T type linearization with on-board cold-junction compensation	Millivolt (-20mV to +100mV), J, K or T type linearization with on-board cold-junction compensation
Accuracy		greater than 1°C	greater than 1°C
Receiver Outputs	Digital	three relay contact outputs, 260V 1A	three relay contact outputs, 260V 1A
	Analog	0-20mA	0-20mA
	resolution	12 bit	12 bit
	accuracy	0.10%	0.10%
	Comms-Fail	Internal status based on configurable time-out value. Comms-fail status can be configured to a local output.	Internal status based on configurable time-out value. Comms-fail status can be configured to a local output.
Fail-safe		On "comms-fail", outputs user-configurable as retained (last correct value) or reset (fail-safe)	On "comms-fail", outputs user-configurable as retained (last correct value) or reset (fail-safe)
Power Supply		9-30 VDC	9-30 VDC
Power consumption @12VDC		Receiver 100mA, Transmitter 40mA quiescent, during radio transmission (50 msec) 300mA	Receiver 100mA, Transmitter 40mA quiescent, during radio transmission (50 msec) 300mA
Analog loop supply internally generated		24VDC 30mA	24VDC 30mA
Internal monitoring of supply low voltage status		may be transmitted as an "input" (Transmitter unit only)	may be transmitted as an "input" (Transmitter unit only)
Power consumption increases for pulse inputs > 10Hz.			
Serial Port		RS232 RJ45 female DCE, used for configuration and diagnostics	RS232 RJ45 female DCE, used for configuration and diagnostics
General Data			
Operating Temperature		-40 to 60°C (-40 to 140°F)	-40 to 60°C (-40 to 140°F)
Humidity		0 - 99% RH	0 - 99% RH
EMC Standards		FCC Part 15.247, RS210	FCC Part 15.247, RS210
Mounting		DIN-rail mounting	DIN-rail mounting
LED indication: Transmitter Unit		Power/OK, Radio TX, DIN1, DIN2, Analog Setpoint status	Power/OK, Radio TX, DIN1, DIN2, Analog Setpoint status
LED indication: Receiver Unit		Power/OK, Radio RX, DO1, DO2, DO3, Communications Fail.	Power/OK, Radio RX, DO1, DO2, DO3, Communications Fail. LEDs also used to provide radio signal strength indication
frequency hopping spread spectrum		902-928MHz, sub-bands available	902-928MHz, sub-bands available
Transmit power		1W	1W
Maximum line of sight range		20 miles (4W ERP), 15km (1W ERP); 3000 ft / 1000 m in obstructed industrial environments.Radio distances can be increased by up to 5 intermediate repeater units. Each transmission may be configured to be sent 1 to 5 times.	20 miles (4W ERP), 15km (1W ERP); 3000 ft / 1000 m in obstructed industrial environments. Radio distances can be increased by up to 5 intermediate repeater units. Each transmission may be configured to be sent 1 to 5 times.
Antenna connector		SMA female coaxial	SMA female coaxial
Dimensions mm (in)		100 x 23 x 120 (3.9 x 0.9 x 4.7)	100 x 23 x 120 (3.9 x 0.9 x 4.7)
Configuration		Factory configuration transmitter/receiver matched pair, AI to AO, 2DI to 2DO, SP status to DO3. User configuration via serial port. Unidirectional units can be configured to network with Multi-I/O and Gateway units.	Factory configuration transmitter/receiver matched pair, AI to AO, 2DI to 2DO, SP status to DO3. User configuration via serial port. Unidirectional units can be configured to network with Multi-I/O and Gateway units.
Diagnostics		Diagnostics features - read input values, write output values, radio signal strength, monitor communication messages.	Diagnostics features - read input values, write output values, radio signal strength, monitor communication messages.

Ordering Data

	Type	Part No.	Type	Part No.
Kit Contents	WI-I/O 9-L-P1 • Two -2 dB Dipole antennas (6720005086) • Two 3 ft. antenna connecting cables/brackets • One configuration cable	**6720005007**	WI-I/O 9-L-P2 • Two 0 dB Dipole antennas (6720005080) • Two 15 ft. antenna connecting cables/brackets • One configuration cable	**6720005008**

WI-I/O 9-K Transmitter (Single Sensor Units)

The Single Sensor Wireless I/O range of products is suitable for connecting to a single sensor or group of sensors and provides an economical solution for remote monitoring systems. Capable of being powered by battery-only supplies, these products are particularly suitable where power is not available.

- Frequency hopping spread spectrum 902-928 MHz 1W, license-free USA/Canada/Mexico
- Configurable sub-bands license-free South America, Australia/NZ, Asia, Europe available on request

Applications
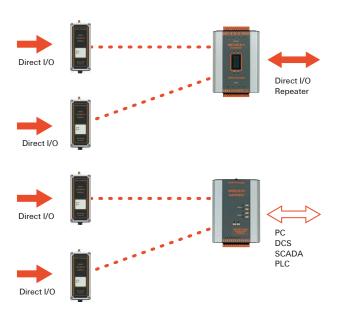
- Wireless connection of flowmeters or energy meters
- Monitoring of storage tanks
- Monitoring cathodic protection on pipelines
- Wireless alarms from power reticulation fault-relays

Digital Analog Pulse

Digital Analog Pulse

Features

- Input-only unit - two digital/pulse one analog
- Networks with Multi-I/O and Gateway units
- Analog Loop Supply for field devices
- Sensor signals (inputs) are transmitted to a Multi-I/O module where the signals are re-created as output signals, or passed via serial or Ethernet data bus to a host device such as a PLC or SCADA system.
- Extremely low power consumption by reverting to "sleep" mode
- Multiple power supply options including battery-only supply
- Weatherproof IP66 / NEMA 4 enclosures
- Class 1 Div 2 hazardous areas approval
- Up to 3000 wireless units per network
- Any input on any unit can be wirelessly linked to any output on any unit. Inputs can be linked to multiple outputs.
- Peer-to-peer communications. Exception reporting. Reliable self-checking messages. Highly secure data encryption.
- Multi-hop repeater functions - up to 5 intermediate units can be configured in any input-output link

- External inputs plus internally calculated values - analog setpoint status, pulse rate and pulse total, power supply voltage, power supply alarm
- Setpoint status generated by comparing analog input to high and low setpoints.
- Pulse inputs generate separate pulse count value and a pulse rate value. Pulse rates are treated as internal analog registers with a configurable maximum value.
- Power supply generates internal I/O values that can be transmitted–low normal supply voltage status, low battery voltage status and battery voltage (analog)
- Can connect to up/down counter transducers such as shaft-encoders
- Easily configured to repeat the transmission several times to ensure that the transmission is received correctly
- Easy-to-use E-Series Windows configuration available at **www.weidmuller.ca** or **weidmuller.com**

Direct I/O

Direct I/O

Direct I/O Repeater

Direct I/O

Direct I/O

PC DCS SCADA PLC

Direct I/O

WI-I/O 9-K Transmitter Ordering Information

Unit	Description
WI-I/O-9-K	Wireless Transmitter (900 MHz)

Wireless I/O

Dimensions

5.1"
(150 mm)

6.7"
(170 mm)

1.4"
(36 mm)

2.5"
(64 mm)

General Specifications

- **Frequency:** frequency hopping spread spectrum 902-928MHz, sub-bands available
- **Power:** 1W
- **Max. Range (line-of-sight):** 20 miles (4 ERP), 15km (1 ERP); 3000 ft / 1000 m in obstructed industrial environments
- **Antenna Connector:** SMA connector
- **Temperature:** -40 to 60°C / -40 to 140° F
- **Humidity:** 0-99% RH
- **Regulatory Approvals:** approved to FCC Part15.247, RS210; EMC compliant 89/336 EEC, EN 300 683, AS3548, FCC Part 15
- **Housing:** weatherproof (IP66) painted aluminum enclosure 170 x 64 x 36mm/ 6.7 x 2.5 x 1.4 inches; weatherproof connector for external connections
- **Each transmission may be configured** to be sent 1 to 5 times
- LED indicators - radio TX, operation OK
- **High and low set-points generate internal digital status.** Set-point status sets (on) when analog value <low set-point and resets (off) when analog value > highset-point status transmitted as per digital input.

Input Type	Source	Function
Digital	external	status
Pulse Total	external	count
Pulse Rate	internal	analog
Analog	external	analog
Set-point	internal	status
Supply Voltage	internal	analog
Supply Low Voltage	internal	status

Digital Inputs

- Two inputs, suitable for voltage-free contacts / NPN, or voltage input 0-1.5 VDC (ON) / 3.5-13 VDC (OFF)
- Status transmission on change of input signal and on time elapsed since last transmission - update time period 10 sec. - 5 days, a separate update time can be configured when the discrete input is "on"

Pulse Inputs

- Pulse input max. rate 10KHz, 3 msec on time (50KHz available using a 1/10 divider). Pulse counted as 16-bit register with a 16-bit overflow register (total count 32-bit). Transmissions occur when count change exceeds configured increase or on time elapsed since last transmission. Update time 10 sec. - 5 days. Change-of-state transmissions may be suspended if increase exceeds a configured value to reduce radio traffic.
- **Up/Down Pulse Count:** the two pulse inputs may be configured to a single count to suit quadrature or incremental shaft encoder transducers.
- **Pulse Rate:** calculated from rate of pulse input and treated as an internal analog input. Configurable scaling. Transmitted as per analog input.

Analog Inputs

- 0-24mA (4-20mA) available all models, 0-10V also available "floating" differential input, resolution 12-bit, accuracy < 0.1 % measurement continuous or sampled, sample time configurable 0 -9.1 hours, transducer warm-up time configurable 0.5-127 sec.
- Analog value transmitted on change of input signal or time elapsed since last transmission, change sensitivity configurable from 0.7-75%, update time configurable from 0.1 min. - 5 days

Power Supply

- **Battery Supply:** WI-BP-I/O-9-K Battery pack, 6 x AA batteries, 9 VDC
- **Normal Supply:** 6-30 VDC, power consumption @12VDC - quiescent (sleep mode) 120µA, operating mode 10mA + analog loop during radio transmission (50 - 100 msec.)
- 300mA @ 1W
- Analog loop supply internally generated (24VDC)
- Internal monitoring of supply low voltage status maybe transmitted to remote modules as an "input"
- Power consumption increases for pulse inputs > 10Hz

Set-point Status

- High and low set-points generate internal digital status. Set-point status sets (on) when analog value <low set-point and resets (off) when analog value > high set-point. Status transmitted as per digital input.

Serial Port

- RS232 DB9 female DCE used for configuration and diagnostics

Battery Pack

The WI-BP-I/O-9-K is a battery pack for the WI-I/O-9-K wireless device. The battery pack is used in applications where power lines are either not installed or not allowed.

WI-BP-I/O-9-K
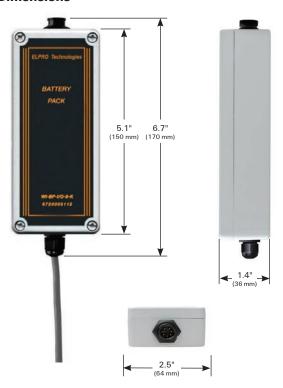
Applications

- Used to power WI-I/O-9-K units atop of water tanks for monitoring fluid level
- Used to power WI-I/O-9-K units to monitor pipeline cathodes
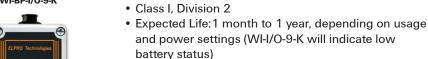
Features

- 9V, 6 AA alkaline batteries
- Housed in a weatherproof (IP66) enclosure

Dimensions

5.1"
(150 mm)

6.7"
(170 mm)

1.4"
(36 mm)

2.5"
(64 mm)

Specifications

- Class I, Division 2
- Expected Life: 1 month to 1 year, depending on usage and power settings (WI-I/O-9-K will indicate low battery status)
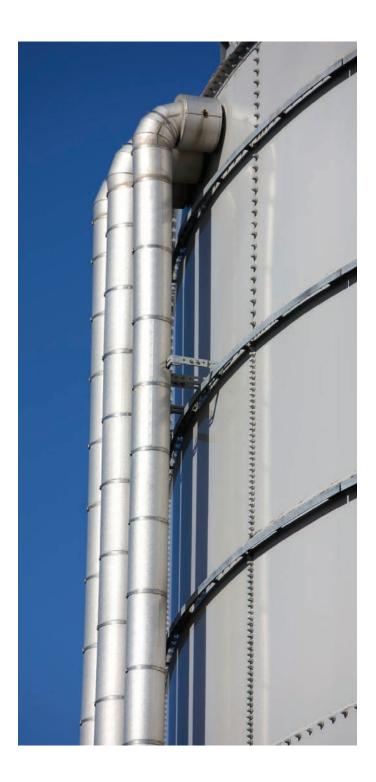
WI-BP-I/O 9-K Battery Pack Ordering Information

Unit	Description
WI-BP-I/O-9-K	Battery Pack for WI-I/O-9-K

Transmitter (Single Sensor Units)

WI-I/O-9-K

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Technical Data

Inputs	two digital/pulse inputs, suitable for voltage free contacts / NPN, or voltage input 0-1.5 VDC (ON) / 3.5-13 VDC (OFF)
Digital	status transmission on change of input signal and on time elapsed since last transmission - update time period 10 sec - 5days, a separate update time can be configured when the discrete input is "on"
Pulse	Pulse rate up to 1000 Hz, 3 msec on time. Pulse counted as 16 bit register with a 16 bit overflow register (total count 32 bit). Transmissions occur when count change exceeds configured increase, or on time elapsed since last transmission; update time 10 sec - 5 days ; change transmissions may be suspended if increase exceeds a configured value to reduce radio traffic.
Up/Down Pulse Count	the two pulse inputs may be configured to a single count, to suit quadrature or incremental shaft encoder transducers.
Pulse Rate	calculated from rate of pulse input and treated as an internal analog input. Configurable scaling. Transmitted as per analog input.
Analog	one analog input 0-25 mA (4-20mA) 0-10V also available "floating" differential input
resolution	12 bit
accuracy	< 0.1 % measurement continuous or sampled
sample time configurable	1 min - 5 days
transducer warm-up time configurable	0.5-127 sec
analog value transmitted on change of input signal or time elapsed since last transmission,	
change sensitivity configurable	0.7-75%
update time configurable	0.1min - 5 days
Setpoint Status	high and low setpoints generate internal digital status setpoint status sets (on) when analog value < low setpoint and resets (off) when analog value > high setpoint status transmitted as per digital input
Power Supply	6 - 30VDC
Power consumption @12VDC	quiescent (sleep mode) 120µA, operating mode 10mA + analog loop
Power consumption during radio transmission (50 - 100 msec)	300mA @ 1W, 220µA @ 500mW 100mA @ 100mW, 50mA @ 10mW
Analog loop supply internally generated	Yes
Internal monitoring of supply low voltage status	may be transmitted to remote modules as an "input"
Power consumption increases for pulse inputs > 10Hz.	
General Data	
Operating Temperature	-40 to 60°C (-40 to 140°F)
Humidity	0 - 99% RH
EMC Standards	compliant 89/336 EEC, EN 300 683, AS3548, FCC Part 15
Approvals	Housing - IP66 NEMA4; FCC Part 15.247, RS210, Class 1, Div. 2 ⓢ
Mounting	
LED indication	Radio TX, Operation OK
frequency hopping spread spectrum	902-928MHz, sub-bands available
Transmit power	1 W
Maximum line of sight range	20 miles (4W ERP), 15 km (1W ERP)
Receiver data sensitivity	-108 dBm
Data rate	19.2 Kbs with forward error correction
Antenna connector	SMA female coaxial
Dimensions mm (in)	170 x 64 x 36 (6.7 x 2.5 x 1.4)

Ordering Data

	Type	Part No.
	WI-I/O-9-K	6720005004
Battery Pack (optional)	WI-BP-I/O-9-K	6720005112
Plug and Lead-1 meter (included w/ radio)	WI-PLI-9-K	6720005113

Wireless Meshing I/O Units

Weidmuller's WI-I/O-9-U2 combines multi I/O and/or gateway functionality with the reliability of secure, scalable mesh distance communications. The WI-I/O-9-U2 IP-based addressing provides mesh/self-healing of network communications, multihop repeating and remote over the air re-configuration and diagnostics. The WI-I/O-9-U2 is further complemented by its ease of commissioning and integration into existing plant infrastructure.

Features:

- 902-928MHz Frequency Shift Keying (FSK): Frequency Hopping Spread Spectrum Channels/Hop Sets: 50 x 250kHz; 2 frequency channels.
- IP Based Wireless MESH Technology @ 1 Watt transmit power.
- Self-healing, repeatable, secure communications to 128bit AES
- User friendly operation with self discovery of radio path and expansion I/O
- Remote over the air re-configuration, firmware upgrade and fault analysis
- Scalable, simple to complex, and point to multipoint network design
- Block Mapping and Block Messaging technology for ease of system integration
- I/O and/or gateway functionality via feature key upgrade
- System wide view, localized I/O referencing, and printing/exporting of configuration

WI-I/O-9-U2 TC

The WI-I/O-9-U2 TC is a thermocouple adapter interface for the WI-I/O-9-U2 product. The WI-I/O-9-U2 TC provides greater accuracy by allowing calibration between the adapter, measurement devices and ambient temperatures. Temperature measurement accuracy depends on the measured temperature and ambient temperature. Errors are a result of both errors in cold junction temperature and thermocouple voltage measurement. The WI-I/O-9-U2 TC provides for greater accuracy by allowing calibration of the cold junction temperature offset value and thermocouple temperature (i.e. offset calibration).

Supported Thermocouple: Type T

Measurement ranges: -200 to +30°C and 0 to +390°C

Basic Accuracy (Un-calibrated): +/- 3.5°C at -200 to +30°C +/- 2°C at 0 to +390°C

Calibrated Accuracy: +/- 1°C over ambient temperature range +/- 0.5°C at calibration temperature

Security and Configuration

Data encryption: 64bit; 128bit AES
Password: https accessibility
User Configuration: Web page; software configuration

Dimensions
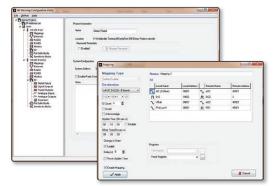
6.49" (168 mm) 6.97" (177 mm)

1.38" (35 mm)

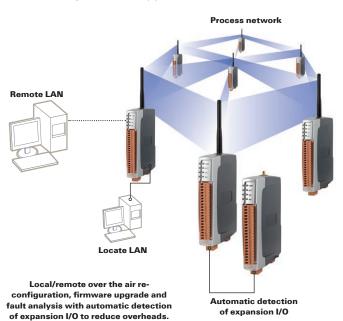5.91" (150 mm)

WI-I/O-9-U2 Meshed Multi I/O and Gateway

Configuring and commissioning time/effort on the WI-I/O-9-U2 has been designed for ease of customer use and cost savings during commissioning. The configuration utility allows for simple nomination of I/O points origin and destination with automatically detecting and routing the most efficient path to the destination node. This is complemented by periodic interrogation for optimal path verification, quick recovery of network communications and automatic detection of expansion I/O (Weidmuller's WI-I/O-EX-1-S). It also incorporates efficient 'change of state' radio communications and user configurable I/O or register periodic reporting of link status (ie update time). All combine to ensure the user is in charge of network communications.

Configuration is user friendly by nominating and labelling origin and destination points, and IP-based addressing finds the most efficient route.

Remote/local configuration, upgrade and analysis.

Weidmuller's IP-based addressing further aids in cost reduction providing remote analysis and/or upgrade. A user may perform remote or local over the air re-configuration and interrogation of nodes for diagnostics and firmware upgrade. User nominated localized referencing of I/O and system wide network viewing aids in fault analysis and exporting/printing of node configuration is supported.

Process network

Remote LAN

Locate LAN

Local/remote over the air re-configuration, firmware upgrade and fault analysis with automatic detection of expansion I/O to reduce overheads.

Automatic detection of expansion I/O
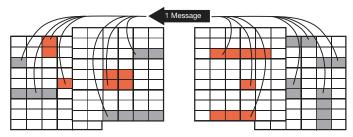
Quicker, more cost effective commissioning.

Radio network efficiency and commissioning of the WI-I/O-9-U2 into legacy process control/automation networks is aided with block mapping and block messaging technology.

Block mapping technology allows end-users to gather related, non-contiguous data points/registers, into a single radio message structure and scatter these points at receiving devices for ease of integration (eg PLC logic, SCADA tags).

Block Mapping Technology

1 Message

Block mapping technology enables non-contiguous data to be transferred between network devices reducing re-programming time and associated costs.

Block mapping technology is complemented by block messaging technology allowing end users to select continuous, related, I/O and registers for forwarding to receiving devices in a single message. Both block mapping and block messaging combine with highly efficient 'change of state', dense capacity radio messaging capabilities in providing scalable system design for ever growing application needs.

Block Messaging Technology

2nd Block Message

1st Block Message

Block messaging communicates continuous blocks of data improving the efficiency of radio band use and even more scalable network design.

Cost effective, distance IP based mesh networks.

The WI-I/O-9-U2 combines distance, 900MHz, IP mesh communications with ease of configuration, local/remote over the air re-configurability, firmware upgrade and diagnoses of nodes in the network.

Featuring Weidmuller's IP-based addressing technology with its innovations in network communications efficiency, the WI-I/O-9-U2 provides for scalable network design for process control and automation base applications.

WI-I/O-9-U2

C1D2

C US

Technical Data

Inputs	
Digital: opto-isolated (5kV) inputs suitable for voltage free contacts or NPN transistor	Up to 8 DI (Configurable), On-state Voltage <2.1V Wetting, Current 5mA
Analog: "floating" differential inputs, common mode voltage 27V, 24VDC for powering external loops provided, digital filtering 1 sec.	4 AI (2 differential: 2 single ended) resolution 14bits; accuracy 0.1% Current Range - 0-24mA Voltage Range: AI 1,2: 0-25V, AI 3,4: 0-5V
Pulse: (configurable Digital Inputs)	4 PI DI 1,2: Max. Pulse rate 50kHz, Pulse width min 10us DI 3,4: Max. Pulse rate 1kHz, Pulse width min 0.2ms

Outputs	
Digital	Up to 8 DO (Configurable) FET (30V DC @ 200mA max.) On-state Voltage - DO Max: 30 V DC Wetting Current - DO Max: 200mA
Analog: current sink to common, max loop voltage 27V, max loop resistance 1000 ohms	2 AO 0-24mA; resolution 13bits; accuracy 0.1%
Pulse: FET 30VDC 200mA max 10kHz	4 PO DO 1, 2 Max. Pulse rate 50kHz, Pulse width min. 10μs DO 3, 4 Max. Pulse rate 1kHz, Pulse width min 0.2ms

Power Supply	
Battery supply	12-15V DC
Normal supply	15-30V DC, over-voltage and reverse power protected
Battery charging circuit	included for 1.2-12 AHr sealed battery
Average Current Draw	220mA @ 12V DC (Idle), 110mA @ 24V DC (Idle)
Transmit Current Draw	500mA @ 12V DC (1W), 250mA @ 24V DC (1W)
Internal monitoring	power fail and battery voltage
Notes	An internal DC/DC converter provides 24V DC 150mA for analog loop supply.

Connections	
RS232/RS485	serial port 9600 baud, 8 bits, no parity, 1 stop bit
RS232 connection	EIA-562 (RJ45 connector)
RS485 connection	max cable distance 2000 m terminal connections
Ethernet Port	10/100 BaseT; RJ45 - IEEE 802.3
USB Port	USB-B connector for configuration

General Data	
Frequency	902-982MHz
Transmit Power	1mW (+0dBm) to 1W (+30dBm)
Transmission	Frequency Hopping Spread Spectrum (FHSS)
Modulation	Frequency Shift Keying (FSK)
Receive Sensitivity	-109dBm @ 19.2Kbps (3% FER)
Channel Spacing	50 x 250 KHz
Data Rate	19.2-115.2 Kbps "Auto Mode" selects fastest rate possible relative to RSSI
Range (LoS)	32Km (20 mi.) @ 1W
Operating Temperature	-40 to 60°C (-40 to 140°F)
Humidity	0-99%RH
EMC Standards	EN 300 683; FCC Part 15; AS 3548; 89/336/EEC
Approvals	Class 1 Div 2 ⑤ , CE, IEC60950, IECex
Mounting	DIN-rail mounting
LED indication	Power, RF, RS232, RS485, D I/O (P I/O), A I/O
Antenna connector	1 x SMA female coaxial
Dimensions mm (in)	180 x 150 x 35 (5.91 x 7.09 x 1.38)

Ordering Data

	Type	Part No.
Wireless Mesh I/O 8 DI/O, 4AI, 2AO, 1-4 PI/O	WI-I/O-9-U2	**6720005011**
Wireless Mesh Radio + Modbus Gateway software (Preloaded)	WI-I/O-9-U2-MODTCP-900US	**6720005014**
Modbus TCP/RTU Gateway (software Add-on)	WI-I/O 9-U2-GTWY*	**6720005012**
TCP Adaptor (Type T Thermocouple Add-on)	WI-I/O 9-U2 TC	**6720005013**

*Note: Gateway Software Add-on is licensed to a single WI-I/O-9-U2 Radio Serial number & is not intended for use on multiple radios. When ordering WI-I/O-9-U2-GTWY alone, please include existing WI-I/O-9-U2 radio Serial Number (printed on the side of the unit).
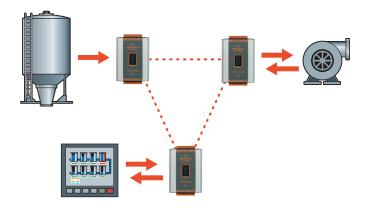
WI-I/O 9 Multi I/O Units

A transceiver is a wireless device made up of a transmitter and receiver. Since each module can manage both input and output signals, it can be used to monitor transducers and control industrial processes. This module can also be used as a repeater to relay another wireless device's transmission, thus increasing the overall range of the system.

Typical Applications
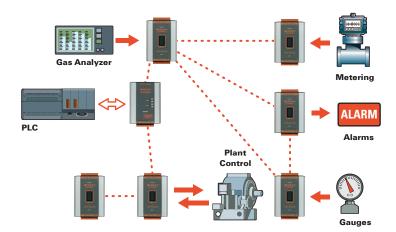
- Wireless junction box in a process plant to connect a large number of signals to other parts of the plant and to the plant control center
- Simple Remote Terminal Unit (RTU) in a SCADA system, connecting sensors/instrumentation/process signals in pump stations, sub-stations, pipeline regulator stations, etc.
- Machine-to-Machine wireless connectivity in factories

Features

- Class I, Division 2 hazardous areas approved (USA/Canada); (CSA certified)
- Multiple inputs/output channels for monitoring and control functions
- Up to 95 wireless units per network
- Each wireless unit can connect to input/output expansion modules via RS485 multi-drop with up to 31 expansion modules per wireless unit
- Sensor signals connected at one module; input signals are transmitted to another module where the signals are re-created as output signals or passed via serial to a host device such as a PLC or SCADA system

- Short distance and long distance applications with license-free and licensed products
- Multi-hop repeater functions – up to 5 intermediate units can be configured in any input/output link
- Four versions available
- Any input on any unit can be wirelessly linked to any output on another unit. Inputs can be linked to multiple outputs.
- Inputs and outputs can be added via additional serial units
- The units can be pre-programmed to consider analog set-points, pulse rate and pulse total, power supply voltage, power supply alarm
- Set-point status generated by comparing analog inputs to high and low set-points. Available on AI1 of -1 units, and AI1-4 of -2 units.
- Pulse inputs generate a separate pulse count value and a pulse rate value. Pulse rates are treated as internal analog registers with a configurable maximum value.
- Wide voltage power supply, with integral UPS battery charger and solar regulator
- Power supply generates internal signal values which can be transmitted, low normal supply voltage status, low battery voltage status and battery voltage (analog)
- Multiple communication failure diagnostics with output status. Fail-to-transmit alarm and fail-to-receive alarm status.
- Radio receives signal and background RF noise measurement / logging diagnostics
- Input measurement display and output "forcing" diagnostics
- Communication logging diagnostics
- Easy-to-use E-Series Windows configuration available at **www.weidmuller.ca** or **www.weidmuller.com**

Multi-I/O Unit Ordering Information

WI-I/O 9	-1	-2	-3	-4
Digital inputs	4 Voltage-free contacts	4 Voltage-free contacts	0 Voltage-free contacts	4 – 16 Voltage-free contacts
Digital outputs	1 + 3 Relay + FET	1 FET	8 FET	4 - 16 FET
Analog inputs	2 4-20mA	6 0-20mA/0-10V	0	0
Analog outputs	2 4-20mA	0	8 0-20mA/0-10V	0
Pulse inputs	1 100Hz	4 1 x 1KHz, 3 x 100Hz	0	4 1 x 1KHz, 3 x 100Hz
Pulse outputs	1 100Hz	0	4 1 x 1KHz, 3 x 100Hz	4 1 x 1KHz, 3 x 100Hz

Note: Pulse and digital inputs are same connection point.   **FET** = Field Effect Transistor

Dimensions

6.57"
(167 mm)

7.4"
(188 mm)

2.16"
(55 mm)

2.4"
(60 mm)

5.1"
(130 mm)

General

- **Frequency:** frequency hopping spread spectrum 902-908 MHz, sub-bands configurable
- **Power:** transmit power 1W, approved to FCC Part 15.247, RSS210
- **Sensitivity:** receiver data sensitivity –108dBm
- **Max. Range (line-of-sight):** USA/Canada - 4W ERP, 20+ miles. Other countries - 1W ERP, 15+ km depending on local conditions
- **Data Rate:** 19.2 Kb/s with forward-error correction
- **Antenna Connector:** SMA female coaxial
- **Temperature:** -40 to 60°C / -40 to 140°F
- **Humidity:** 0-99% RH

- **Regulatory Approvals:** EMC FCC Part 15, AS3548, 89/336/EEC, EN 301 489
- **Certifications:** CSA Class I, Division 2 hazardous areas (USA/Canada)
- **Housing:** extruded aluminum case, 5.1" x 7.4" x 2.4" (130 x 188 x 60mm) with DIN-rail mounting
- **Removable terminals** up to 2.5 mm² (12 gauge) wires
- **LED indication** for power supply, module status, digital I/O

Inputs and Outputs*

Digital Inputs

- Opto-isolated (5000V) inputs suitable for voltage-free contacts or NPN transistor, contact wetting current 5mA
- **Type-1 & -2 -** four inputs
- **Type-4 -** up to 16 inputs (4 inputs + 12 selectable I/O). The 12 selectable inputs are surge protected, but not isolated.

Digital Outputs

- **Type-1 -** four relay, contacts, Form A, AC 50V 5A / DC 30V 2A
- **Type-2 -** 1 FET output 30VDC 500mA
- **Type-3 -** 8 FET output 30VDC 500mA
- **Type-4 -** up to 16 FET output (4 outputs + 12 selectable I/O)

Analog Inputs

- "Floating" differential inputs, common mode voltage 27V. 24VDC for powering external loops provided. Digital filtering 1 sec.
- **Type-1 -** two 4-20mA resolution 15-bit, accuracy 0.1% (over range indication 2-25mA)
- **Type-2 -** six 0-20mA resolution 12-bit, accuracy 0.1% (over range indication 0-25mA)

* See table above for Input/Output summary

Analog Outputs

- Current sink to common, max. loop voltage 27V, max. loop resistance 1000 ohms
- **Type-1 -** two 4-20 mA resolution 15-bit, accuracy 0.1% (over range indication 0.5-25mA)
- **Type-3 -** eight 0-20 mA resolution 12-bit, accuracy 0.1% (over range indication 0-20.5mA)

Pulse Inputs

- Specifications as per digital inputs, max. pulse rate 100Hz, pulse width min. 5 ms
- **Type-1 -** one input (DI1)
- **Type-2 -** four inputs (DI1-4) - first pulse input (DI1) max. 1000Hz, pulse width min. 0.5 ms
- **Type-4 -** four inputs (DI1-4) - first pulse input (DI1) max. 1000Hz, pulse width min. 0.5 ms

Pulse Outputs

- FET 30VDC 500mA max. 100Hz
- **Type-1 -** one
- **Type-3 & -4 -** four

Power Supply

- **Battery Supply:** 11.5-15.0 VDC
- **Normal Supply:** 12-24 VAC or 15-30 VDC, over-voltage and reverse power protected
- Internal monitoring of power fail, solar charge status and battery voltage. These values may be transmitted to remote modules for monitoring.
- Internal DC/DC converter provides 24VDC 150mA for analog loop supply
- Battery charging circuit included for 1.2-12 AHr sealed battery
- Solar regulator for direct connection of solar panel (up to 30W) and solar battery (100AHr)

Serial Port

- A serial port can be used to configure transceivers and to hard wire one transceiver to another when desired. This connection avoids the need to add wireless nodes to circumvent impenetrable obstructions and provides a redundant path for critical applications.
- RS232/RS485 serial port 9600 baud, 8 bits, no parity, 1 stop bit
- RS232 9 pin DB9 female connector
- RS485 terminal connections (max. cable distance 2000m)

WI-I/O 9-1

WI-I/O 9-2

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Technical Data

Inputs		
Digital: opto-isolated (5000V) inputs suitable for voltage free contacts or NPN transistor, contact wetting current 5 mA	four inputs	four inputs
Analog: "floating" differential inputs, common mode voltage 27V, 24VDC for powering external loops provided, digital filtering 1 sec.	two 4-20mA resolution 15 bit, accuracy 0.1%	six 0-20mA/0-10V resolution 12 bit, accuracy 0.1%
Pulse: as per digital inputs, Max pulse rate 100Hz, pulse width min 5ms	one input (DI1)	four input(DI1-4) - first pulse input (DI1) max 1000Hz, pulse width min 0.5ms
Outputs		
Digital	4 (1 Relay Form A, AC, 50V 5A/ DC 30V 2A; 3 FET)	one FET output 30VDC 500mA
Analog: current sink to common, max loop voltage 27V, max loop resistance 1000 ohms	two 4-20 mA resolution 15 bit, accuracy 0.1%	
Pulse: FET 30VDC 500mA max 100Hz	one	
Power Supply		
Battery supply	11.5-15.0 VDC	11.5-15.0 VDC
Normal supply	12-24 VAC or 15-30 VDC, over-voltage and reverse power protected	12-24 VAC or 15-30 VDC, over-voltage and reverse power protected
Battery charging circuit	included for 1.2-12 AHr sealed battery	included for 1.2-12 AHr sealed battery
Solar regulator	for direct connection of solar panel (up to 30W) and solar battery (100AHr)	for direct connection of solar panel (up to 30W) and solar battery (100AHr)
Internal monitoring	power fail, solar charge status, and battery voltage	power fail, solar charge status, and battery voltage
Notes	An internal DC/DC converter provides 24VDC 150mA for analog loop supply.	An internal DC/DC converter provides 24VDC 150mA for analog loop supply.
Serial Port		
RS232/RS485	serial port 9600 baud, 8 bits, no parity, 1 stop bit	serial port 9600 baud, 8 bits, no parity, 1 stop bit
RS232 connection	9pin DB9 female connector	9pin DB9 female connector
RS485 connection	max cable distance 2000 m terminal connections	max cable distance 2000 m terminal connections
General Data		
Operating Temperature	-40 to 60°C (-40 to 140°F)	-40 to 60°C (-40 to 140°F)
Humidity	0-99%RH	0-99%RH
EMC Standards	FCC Part 15, AS3548, 89/336/EEC, EN 301 489	FCC Part 15, AS3548, 89/336/EEC, EN 301 489
Approvals	Class 1 Div 2	Class 1 Div 2
Mounting	DIN-rail mounting	DIN-rail mounting
LED indication	For power supply, WDT, digital I/O	For power supply, WDT, digital I/O
Antenna connector	SMA female coaxial	SMA female coaxial
Dimensions mm (in)	130 x 188 x 60 (5.1 x 7.4 x 2.4)	130 x 188 x 60 (5.1 x 7.4 x 2.4)

Ordering Data

	Type	Part No.	Type	Part No.
	WI-I/O 9-1	**6720005000**	WI-I/O 9-2	**6720005001**
Accessories: DB9 Male - DB9 Female Serial config. cable	WI-CSER-905-9	**6720005105**	WI-CSER-905-9	**6720005105**

CSA ®C1D2
C   US

	WI-I/O 9-3	**WI-I/O 9-4**

Technical Data

Inputs		
Digital: opto-isolated (5000V) inputs suitable for voltage free contacts or NPN transistor, contact wetting current 5 mA		up to 16 inputs (4 inputs + 12 selectable I/O) the 12 selectable inputs are surge protected but not isolated
Analog: "floating" differential inputs, common mode voltage 27V, 24VDC for powering external loops provided, digital filtering 1 sec.		
Pulse: as per digital inputs, Max pulse rate 100Hz, pulse width min 5ms		four input(DI1-4) - first pulse input (DI1) max 1000Hz, pulse width min 0.5ms
Outputs		
Digital	eight FET output 30VDC 500mA	up to 16 FET output (4 outputs + 12 selectable I/O)
Analog: current sink to common, max loop voltage 27V, max loop resistance 1000 ohms	eight 0-20 mA resolution 12 bit, accuracy 0.1%	
Pulse: FET 30VDC 500mA max 100Hz	four (DO1-4)	four (DO1-4)
Power Supply		
Battery supply	11.5-15.0 VDC	11.5-15.0 VDC
Normal supply	12-24 VAC or 15-30 VDC, over-voltage and reverse power protected	12-24 VAC or 15-30 VDC, over-voltage and reverse power protected
Battery charging circuit	included for 1.2-12 AHr sealed battery	included for 1.2-12 AHr sealed battery
Solar regulator	for direct connection of solar panel (up to 30W) and solar battery (100AHr)	for direct connection of solar panel (up to 30W) and solar battery (100AHr)
Internal monitoring	power fail, solar charge status, and battery voltage	power fail, solar charge status, and battery voltage
Notes	An internal DC/DC converter provides 24VDC 150mA for analog loop supply.	An internal DC/DC converter provides 24VDC 150mA for analog loop supply.
Serial Port		
RS232/RS485	serial port 9600 baud, 8 bits, no parity, 1 stop bit	serial port 9600 baud, 8 bits, no parity, 1 stop bit
RS232 connector	9pin DB9 female connector	9pin DB9 female connector
RS485 connector	max cable distance 2000 m terminal connections	max cable distance 2000 m terminal connections
General Data		
Operating Temperature	-40 to 60°C (-40 to 140°F)	-40 to 60°C (-40 to 140°F)
Humidity	0-99%RH	0-99%RH
EMC Standards	FCC Part 15, AS3548, 89/336/EEC, EN 301 489	FCC Part 15, AS3548, 89/336/EEC, EN 301 489
Approvals	Class 1 Div 2	Class 1 Div 2
Mounting	DIN-rail mounting	DIN-rail mounting
LED indication	For power supply, WDT, digital I/O	For power supply, WDT, digital I/O
Antenna Connector	SMA female coaxial	SMA female coaxial
Dimensions mm (in)	130 x 188 x 60 (5.1 x 7.4 x 2.4)	130 x 188 x 60 (5.1 x 7.4 x 2.4)

Ordering Data

	Type	Part No.	Type	Part No.
	WI-I/O 9-3	**6720005002**	WI-I/O 9-4	**6720005003**
Accessories: DB9 Male - DB9 Female Serial config. cable	WI-CSER-905-9	**6720005105**	WI-CSER-905-9	**6720005105**

WI-I/O–EX
Expansion I/O Units (Serial I/O)

The WI-I/O-EX is a wired device capable of interfacing with other Weidmuller wireless radios to increase the number of signals radios can monitor/control. They can also be used as a slave to any Modbus control system.
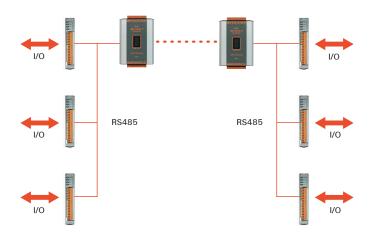
Typical Applications

Expansion I/O for WI-I/O 9 wireless units and WI-MOD units

- up to 31 x WI-I/O-EX units can be connected to each wireless unit via RS485 (up to 2 km long). Serial I/O multiplexer
- transfer I/O via RS485— up to 32 units per multi-drop link.

Expansion I/O for Modbus devices
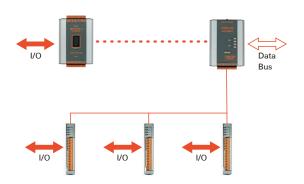
- up to 31 x WI-I/O-EX units can be connected to each Modbus master via RS485 (up to 2 km long).

RS485   RS485

I/O   I/O

Features

- Multi I/O channels— monitoring and control functions
- Connected via RS485 multi-drop
- Selectable communications via WIB-net or Modbus protocol (both RTU and ASCII formats)
- Sensor signals connected at one module (input signals) are transmitted to another module where the signals are re-created as output signals, or passed via serial to a host device such as a PLC or SCADA system
- Connect to WI-I/O 9 wireless I/O units for up to 31 serial addresses per wireless unit
- Connect WI-I/O-EX units together to form a serial multi-drop I/O system - up to 32 serial addresses per multi-drop link— no Master device is required to control communications

- Connect up to 99 x WI-I/O-EX units as multi-drop Modbus I/O (RS485 extenders/isolators required for more than 31 units per single multi-drop length)
- RS485 multi-drop up to 2 km (1 mile) depending on installation environment
- Three I/O versions available
- Peer-to-peer communications; Exception reporting; Reliable self-checking messages; Any input on any unit can be linked to any output on any unit. Inputs can be linked to multiple outputs; Serial communications 9.6Kb/s
- Alternate Modbus RTU or Modbus ASCII slave protocol, serial communications configurable up to 115.2Kb/s, 7 or 8 data bit format
- External I/O plus internally calculated values - analog setpoint status, pulse rate and pulse total, power supply voltage, power supply alarm
- Setpoint status generated by comparing analog inputs to high and low setpoints

RS485

Up to 32 Units

I/O   Data Bus

I/O   I/O   I/O

- Analog inputs selectable as "floating" dual-terminal inputs or commoned single-terminal inputs; Configurable current (0-10/0-20/4-20mA) or voltage (0-5/0-10/1-5V).
- Analog outputs selectable as single-terminal source or sink outputs. Configurable current (0-10/0-20/4-20mA) or voltage (0-5/0-10/1-5V). Configurable scaling, zero and span parameters.
- Pulse inputs generate separate pulse count value and a pulse rate value. Pulse rates are treated as internal analog registers with a configurable maximum value.

- Multiple communication-failure diagnostics with output status. Fail-to-transmit alarm and fail-to-receive alarm status.
- Class 1 Div 2 hazardous areas approval
- Input measurement display and output "forcing" diagnostics.
- Communication logging diagnostics.
- Easy-to-use E-Series Windows configuration available at **www.weidmuller.ca or weidmuller.com**

Serial Unit Ordering Information

WI-I/O-EX	67200005038 -11	67200005039 -12	67200005040 -13
Digital inputs	up to 16	up to 8 Voltage-free contacts	up to 8
Digital outputs	up to 16	up to 8	up to 8
Analog inputs	0	4 "floating"/ 8 commoned 0-20mA / 0-10V	0
Analog outputs	0	0	8 sink / source 0-20mA / 0-10V
Pulse inputs	4 1KHz	0	0
Pulse outputs	8 100Hz	8 100Hz	8 100Hz

Note: Digital inputs and outputs are combined channels. When a channel is used as an output, it is not available as an input. Pulse and digital I/O are same connection.

Dimensions

6.49" (168 mm)   6.97" (177 mm)

1.38" (35 mm)

RS232   UNIT ADDRESS
(DCE)   x10   x1

5.91" (150 mm)

General Specifications

- **Temperature:** -40 to 60°C / -40 to 140°F
- **Humidity:** 0-99% RH
- **Regulatory Approvals:** EMC FCC Part 15, AS3548, 89/336/EEC
- **Certifications:** CSA Class I, Division 2 hazardous areas (USA/Canada)
- **Housing:** high density thermo-plastic, 5.91" x 6.97" x 1.38" (150 X 177 x 35mm) with DIN-rail mounting
- **Removable terminals** up to 12 gauge (2.5 mm²) wires
- **LED indication** for power supply, processor OK, serial TX and RX, digital I/O

Inputs and Outputs

Digital Inputs

- Suitable for voltage-free contacts or NPN transistor, contact wetting current 5mA, inputs are surge protected
- **Type -11 -** up to 16 selectable I/O
- **Type -12, -13, -** up to 8 selectable I/O

Digital Outputs

- Field Effect Transistor (FET) outputs, 30VDC 200mA
- **Type -11 -** up to 16 selectable I/O
- **Type -12, -13, -** up to 8 selectable I/O

Analog Inputs

- "Floating" differential inputs, common mode voltage 27V, 24VDC for powering external loops provided, 0-20mA/0-10V, resolution 12-bit, accuracy 0.1%
- **Type-12 -** 8 input channels, selectable as 4 dual-terminal floating inputs or 8 single-terminal commoned inputs

Analog Outputs

- Selectable as current/voltage source or current sink to common, max. loop voltage 27V, max. loop resistance 1000 ohms, 0 – 20mA/0 – 10V, 12-bit, accuracy 0.1%
- **Type -13 -** 8 channels

Pulse Inputs

- Specifications as per digital inputs, max. pulse rate 1kHz, pulse width min. 0.5 ms
- **Type -11-** 4 inputs (DIO 1-4)

Pulse Outputs

- Specifications as per digital outputs, max. pulse rate 100Hz, pulse width min. 5ms
- **Type -11,-12,-13, -** 8 outputs (DIO 1-8)

Power Supply

- **Battery Supply:** 9 - 30VDC, over-voltage and reverse power protected
- Internal monitoring of supply voltage. These values may be transmitted to remote modules for monitoring.
- Internal DC/DC converter provides 24VDC 250mA for analog loop supply

Serial Port

- RS485 serial port configurable up to 115.2Kb/s, 7 or 8 data bits, none/even/odd parity, 1 or 2 stop bits
- RS232 configuration port 9 pin DB9 female connector, 9.6Kb/s, 8/n/1
- RS485 max cable distance 2000m terminal connections

WI-I/O-EX-1-S-11

WI-I/O-EX-1-S-12

C1D2

C US

Technical Data

Inputs		
Digital: suitable for voltage free contacts or NPN transistor, contact wetting current 5mA, inputs are surge protected	up to 16 selectable I/O	up to 8 selectable I/O
Analog: "floating" differential inputs, common mode voltage 27V, 24VDC for powering external loops provided, 0-20mA/0-10V resolution 12 bit, accuracy 0.1%		8 input channels, selectable as 4 dual-terminal floating inputsor 8 single-terminal commoned inputs.
Pulse: specifications as per digital inputs Max pulse rate 1kHz, pulse width min 0.5ms	4 inputs (DIO1-4)	
Outputs		
Digital: FET outputs, 30VDC 200mA	up to 16 selectable I/O	up to 8 selectable I/O
Pulse: specifications as per digital outputs Max pulse rate 100Hz, pulse width min 5ms	8 outputs (DIO1-8)	8 outputs (DIO 1-8)
Power Supply	10.8 - 30VDC, over-voltage and reverse power protected Internal monitoring of supply voltage. These values may be transmitted to remote modules for monitoring. An internal DC/DC converter provides 24VDC 250mA for analog loop supply.	10.8 - 30VDC, over-voltage and reverse power protected Internal monitoring of supply voltage. These values may be transmitted to remote modules for monitoring. An internal DC/DC converter provides 24VDC 250mA for analog loop supply.
Serial Port		
RS485	serial port configurable up to 115.2Kb/s, 7/8 data bits, n/e/o parity, 1 / 2 stop bits	serial port configurable up to 115.2Kb/s, 7/8 data bits, n/e/o parity, 1 / 2 stop bits
RS232 connector	configuration port 9pin DB9 female connector, 9.6Kb/s, 8/n/1	configuration port 9pin DB9 female connector, 9.6Kb/s, 8/n/1
RS485 connector	max cable distance 2000 m terminal connections	max cable distance 2000 m terminal connections
General Data		
Operating Temperature	-40 to 60°C (-40 to 140°F)	-40 to 60°C (-40 to 140°F)
Humidity	0-99% RH	0-99% RH
EMC Standards	FCC Part 15, AS3548, 89/336/EEC	FCC Part 15, AS3548, 89/336/EEC
Approvals	Class 1 Div 2 hazardous areas	Class 1 Div 2 hazardous areas
Mounting	DIN-rail mounting	DIN-rail mounting
LED indication	power supply, processor OK, serial TX and RX, digital I/O	power supply, processor OK, serial TX and RX, digital I/O
Dimensions mm (in)	150 x 177 x 35 (5.91 x 6.97 x 1.38)	150 x 177 x 35 (5.91 x 6.97 x 1.38)

Ordering Data

Type	Part No.
WI-I/O-EX-1-S-11	**6720005038**

Type	Part No.
WI-I/O-EX-1-S-12	**6720005039**

WI-I/O-EX-1-S-13

C1D2
C US

Technical Data

Inputs:	
Digital: suitable for voltage free contacts or NPN transistor, contact wetting current 5mA, inputs are surge protected	up to 8 selectable I/O
Outputs	
Digital: FET outputs, 30VDC 200mA	up to 8 selectable I/O
Analog: selectable as current/voltage source or current sink to common, max loop voltage 27V, max loop resistance 1000 ohms, 0 – 20mA/0 – 10V, 12 bit, accuracy 0.1%	8 channels
Pulse: specifications as per digital outputs Max pulse rate 100Hz, pulse width min 5ms	8 outputs (DIO1-8)
Power Supply	10.8 - 30VDC, over-voltage and reverse power protected. Internal monitoring of supply voltage. These values may be transmitted to remote modules for monitoring. An internal DC/DC converter provides 20VDC 250mA for analog loop supply.
Serial Port	
RS485	serial port configurable up to 115.2Kb/s, 7/8 data bits, n/e/o parity, 1 / 2 stop bits
RS232 connector	configuration port 9pin DB9 female connector, 9.6Kb/s, 8/n/1
RS485 connector	max cable distance 2000 m terminal connections
General Data	
Operating Temperature	-40 to 60°C (-40 to 140°F)
Humidity	0-99% RH
EMC Standards	FCC Part 15, AS3548, 89/336/EEC
Approvals	Class 1 Div 2 hazardous areas
Mounting	DIN-rail mounting
LED indication	power supply, processor OK, serial TX and RX, digital I/O
Dimensions mm (in)	150 x 177 x 35 (5.91 x 6.97 x 1.38)

Ordering Data

Type	Part No.
WI-I/O-EX-1-S-13	**6720005040**
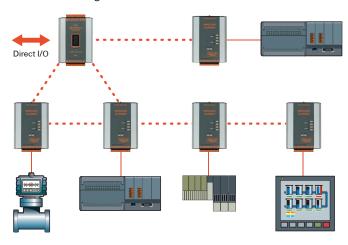
Wireless Gateways WI-GTWY-9

Wireless gateways interface between other Weidmuller wireless devices and control systems (such as PLC's, DCS and SCADA). In addition to channeling the wireless network data into one central control system, they can also act as an eight input/output transceiver.

Applications

- Wirelessly connect PLCs on a new machine to an existing factory automation system
- Interface different automation systems in different sections of a plant
- Connect protocol devices into a common wireless network
- Weidmuller wireless units are used to wirelessly transmit signals for PLCs or DCS

Direct I/O

Wireless gateways connect to popular process control and automation databuses and convert signal information to the proven WIB-net wireless protocol.
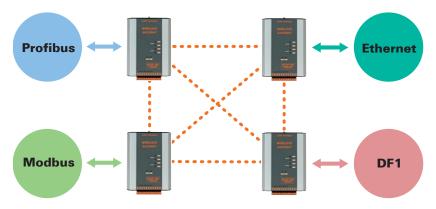
Main benefits:

- Wireless extension of factory automation, providing a high security firewall. The wireless gateway connects to a databus and transfers I/O values to another wireless gateway unit via *WIB*-net communications. The other gateway interfaces to its own databus. Multiple gateway units can communicate in a WIB peer-to-peer network.
- There is an efficient wireless protocol conversion in the modules enabling an efficient transfer of data to Modbus, Profibus, Ethernet and DeviceNet.
- Interface between PLCs, DCS, HMI, or SCADA and Weidmuller wireless units. The wireless gateway keeps an "image" of the remote wireless network in its memory and interfaces this image to the databus.
- Network wireless units and gateways to connect sensor signals and control systems

Features

- Connects to data bus at full bus speed (e.g. 12Mb/s for Profibus, 100Mb/s for Ethernet)
- Provides Protocol Conversion (Profibus, Modbus, Ethernet, DeviceNet)
- Can interconnect master-slave, slave-slave and master-master
- Interconnects different data buses - wireless protocol conversion
- Provides a peer-to-peer wireless network using WIB-net
- High security data encryption
- Automatic acknowledgment and error-correction
- Multiple path routing
- Eight on-board discrete I/O, individually configurable as input or output
- Network configuration is performed with easy-to-use free software
- Wide range power supply with integral back-up battery-charging feature
- Frequency hopping spread spectrum
- 902-928 MHz 1W license-free USA/Canada/Mexico
- Configurable sub-bands license-free South America, Australia/NZ, Asia, Europe available on request

Interconnection Flexibility

Profibus

Ethernet

Modbus

DF1

Dimensions

6.57"
(167 mm)

7.2"
(183 mm)

2.16"
(55 mm)

2.4"
(60 mm)

5.1"
(130 mm)

General Specifications

- **Frequency:** frequency hopping spread spectrum 902-928 MHz, sub-bands configurable
- **Power:** transmit power 1W, approved to FCC Part 15.247, RSS210
- **Sensitivity:** receiver data sensitivity – 108 dBm
- **Max. Range (line-of-sight):** USA/Canada, 4W ERP 20+ miles; other countries, 1W ERP, 15+ km depending on local conditions
- **Data Rate:** 19.2 Kb/s with forward-error correction
- **Antenna Connector:** SMA female coaxial
- **Temperature:** -40 to 60°C / -40 to 140°F
- **Humidity:** 0 - 99% RH
- **Regulatory Approvals:** EMC Compliant EN 301 489, FCC Part 15
- **Certifications:** Class I, Division 2 (USA, Canada)
- **Housing:** extruded aluminum case 130 x 183 x 60 mm, 5.1 x 7.2 x 2.4 inches, DIN-rail mounting, removable terminal blocks for ease of module replacement, terminals suitable for 12 gauge (2.5 mm²) wire
- **Radio communications can be configured** for combination of event-reporting (change-of-state), update time, read/write blocks and poll response. Radio message includes system addressing, unit addressing, error-checking and configurable security encryption. Communication control includes message acknowledgments and up to four re-transmissions.
- **Peer-to-peer addressing.** Messages may be routed through five intermediate repeater addresses.
- **Fail-to-transmit and fail-to-receive** alarms are configurable.
- **LED indication** for processor OK, radio TX and RX, serial TX and RX, active status
- **Modbus RTU** (binary), master / slave configurable; RS232 or RS485, 300 - 19200 bits/sec.

Inputs and Outputs

- Eight discrete I/O, individually configurable as input or output. Inputs suitable for voltage-free contacts. Outputs are FET, 30VDC 500mA.

Power Supply

- Battery Supply: battery charging circuit included for 12V back-up battery, max. charge current regulated to 0.7A (>12V supply)
- Normal Supply: 9 - 30VDC / 12 - 24VAC
- Normal current drain: 12V 150mA; 24V 90mA add 5mA per active I/O, current drain during radio transmission, add to above: 12V 350mA; 24V 200mA
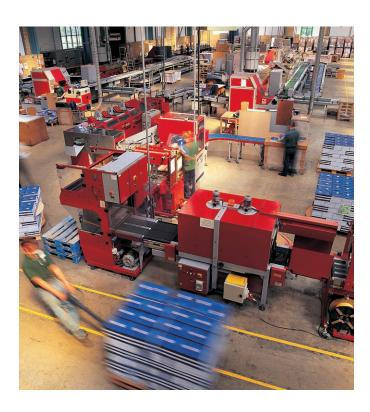
Set-point Status

- Modbus 4300 I/O points (analog plus discrete)

Serial Port

- RS232 9 pin DB9 female connector
- RS485 terminal connections

Configuration and Diagnostics

- Diagnostics include online read/write of I/O registers, radio signal strength values from remote units and off-line testing of databus protocol.

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Radio communications can be configured for combination of event reporting (change-of-value), update time, read/write blocks and poll response. Radio message includes system addressing, unit addressing, error checking and configurable security encryption.Communication control includes message acknowledgments and up to four re-transmissions. Peer to peer addressing. Messages may be routed through four intermediate repeater addresses. Fail-to-transmit and fail-to-receive alarms configurable

WI-GTWY-9-MD1
Modbus (Master and Slave), DF1

WI-GTWY-9-PR1
Profibus DP Slave

Technical Data

	WI-GTWY-9-MD1	WI-GTWY-9-PR1
Power Supply	9 - 30VDC / 12 - 24VAC	9 - 30VDC / 12 - 24VAC
	Battery charging circuit included for 12V back-up battery, max charge current regulated to 0.7A (>12V supply) Normal current drain MD1 version 12V 150mA; 24V 90mA Other version 12V 270mA; 24V 170mA Add 5mA per active I/O	Battery charging circuit included for 12V back-up battery, max charge current regulated to 0.7A (>12V supply) Normal current drain MD1 version 12V 150mA; 24V 90mA Other version 12V 270mA; 24V 170mA Add 5mA per active I/O
Current drain during radio transmission	Add 12V 350mA; 24V 200mA to above	Add 12V 350mA; 24V 200mA to above
I/O Capacity	4300 I/O points (analog plus discrete)	416 I/O bytes up to 1952 DI/1952 DO, or up to 122 AI/122 AO
Register Size	16 bit	16 bit
Number of remote WI-GTWY-9 addresses	500	500
General Data		
Operating Temperature	-40 to 60°C (-40 to 140°F)	0 to 60°C (30 to 140°F)
Humidity	0 - 99 %RH	0 - 95 %RH
EMC Standards	EN 301 489, FCC Part 15, Approved to FCC Part 15.247, RS210	EN 301 489, FCC Part 15, Approved to FCC Part 15.247, RS210
Approvals	Class 1 Div 2	Class 1 Div 2
Mounting	DIN-rail mounting,	DIN-rail mounting,
LED indication	for processor OK, radio TX and RX, serial TX and RX, active status	for processor OK, radio TX and RX, serial TX and RX, active status
Dimensions mm (in)	130 x 183 x 60 (5.1 x 7.2 x 2.4)	130 x 183 x 60 (5.1 x 7.2 x 2.4)
Wireless Communications	Modbus RTU (binary), master / slave configurable. RS232 or RS485, 300 - 19200 bits/sec.	Profibus-DP functionality according to EN 50170.
	Allen-Bradley DF1 full-duplex. RS232 only, 300 - 19200 bits/sec.	RS-485 optically isolated with on-board DC/DC converter, automatic baudrate detection (9600 bit/s - 12 Mbit/s)
On-board I/O	Eight discrete I/O, individually configurable as input or output. Inputs suitable for voltage free contacts. Outputs are FET, 30VDC 500mA.	Eight discrete I/O, individually configurable as input or output. Inputs suitable for voltage free contacts. Outputs are FET, 30VDC 500mA.
Configuration	via free Windows software	via free Windows software
Diagnostics	on-line read/write of I/O registers, radio signal strength values from remote units, and off-line testing of data bus protocol.	on-line read/write of I/O registers, radio signal strength values from remote units, and off-line testing of data bus protocol.
Radio Transceiver		
Frequency hopping spread spectrum	902-908 MHz, sub-bands configurable	902-908 MHz, sub-bands configurable
Transmit power	1W	1W
Receiver data sensitivity	-108dBm	-108dBm
Maximum line-of-sight range	USA/Canada, 4W ERP, 20+ miles	USA/Canada, 4W ERP, 20+ miles
Data rate	19.2 Kb/s with forward-error correction	19.2 Kb/s with forward-error correction
Antenna connector	SMA female coaxial	SMA female coaxial

Ordering Data

	Type	Part No.
	WI-GTWY-9-MD1	**6720005020**
Accessories: DB9 Male - DB9 Female Serial config. cable	WI-CSER-905-9	**6720005105**

Type	Part No.
WI-GTWY-9-PR1	**6720005021**
WI-CSER-905-9	**6720005105**

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Radio communications can be configured for combination of event reporting (change-of-value), update time, read/write blocks and poll response. Radio message includes system addressing, unit addressing, error checking and configurable security encryption.Communication control includes message acknowledgments and up to four re-transmissions. Peer to peer addressing. Messages may be routed through four intermediate repeater addresses. Fail-to-transmit and fail-to-receive alarms configurable

WI-GTWY-9-PR2
Profibus DP Master

WI-GTWY-9-ET1
Ethernet IP, Modbus TCP, TCP/IP functions

Technical Data

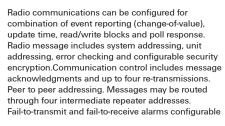|	WI-GTWY-9-PR2	WI-GTWY-9-ET1
Power Supply	9 - 30VDC / 12 - 24VAC Battery charging circuit included for 12V back-up battery, max charge current regulated to 0.7A (>12V supply) Normal current drain MD1 version 12V 150mA; 24V 90mA Other version 12V 270mA; 24V 170mA Add 5mA per active I/O	9 - 30VDC / 12 - 24VAC Battery charging circuit included for 12V back-up battery, max charge current regulated to 0.7A (>12V supply) Normal current drain MD1 version 12V 150mA; 24V 90mA Other version 12V 270mA; 24V 170mA Add 5mA per active I/O
Current drain during radio transmission	Add 12V 350mA; 24V 200mA to above	Add 12V 350mA; 24V 200mA to above
I/O Capacity	2048 bytes input and 2048 bytes output up to 4300 discrete I/O points, or up to 1024 analog in / 1024 analog out	2048 bytes input and 2048 bytes output up to 4300 discrete I/O points, or up to 1024 analog in / 1024 analog out
Register Size	16 bit	16 bit
Number of remote WI-GTWY-9 addresses	500	500
General Data		
Operating Temperature	0 to 60°C (30 to 140°F)	0 to 60°C (30 to 140°F)
Humidity	0 - 95 %RH	0 - 95 %RH
EMC Standards	EN 301 489, FCC Part 15, Approved to FCC Part 15.247, RS210	EN 301 489, FCC Part 15, Approved to FCC Part 15.247, RS210
Approvals	Class 1 Div 2	Class 1 Div 2
Mounting	DIN-rail mounting,	DIN-rail mounting,
LED indication	for processor OK, radio TX and RX, serial TX and RX, active status	for processor OK, radio TX and RX, serial TX and RX, active status
Dimensions mm (in)	130 x 183 x 60 (5.1 x 7.2 x 2.4)	130 x 183 x 60 (5.1 x 7.2 x 2.4)
Wireless Communications	Profibus-DP functionality according to EN 50170.	10/100 Mbit/s, RJ45 connector, Transformer isolated interface
	RS-485 optically isolated with on-board DC/DC converter, automatic baudrate detection (9600 bit/s - 12 Mbit/s)	Modbus/TCP class 0, class 1 and partially class 2 slave EtherNet/IP level 2 I/O Server Embedded Web system (Dynamic HTTP), on-board file system (1.4MB flash disc), user downloadable web pages through FTP server, Email functionality (SMTP)
On-board I/O	Eight discrete I/O, individually configurable as input or output. Inputs suitable for voltage free contacts. Outputs are FET, 30VDC 500mA.	Eight discrete I/O, individually configurable as input or output. Inputs suitable for voltage free contacts. Outputs are FET, 30VDC 500mA.
Configuration	via free Windows software	via free Windows software
Diagnostics	on-line read/write of I/O registers, radio signal strength values from remote units, and off-line testing of data bus protocol.	on-line read/write of I/O registers, radio signal strength values from remote units, and off-line testing of data bus protocol.
Radio Transceiver		
Frequency hopping spread spectrum	902-908 MHz, sub-bands configurable	902-908 MHz, sub-bands configurable
Transmit power	1W	1W
Receiver data sensitivity	-108dBm	-108dBm
Maximum line-of-sight range	USA/Canada, 4W ERP, 20+ miles	USA/Canada, 4W ERP, 20+ miles
Data rate	19.2 Kb/s with forward-error correction	19.2 Kb/s with forward-error correction
Antenna connector	SMA female coaxial	SMA female coaxial

Ordering Data

Type	Part No.
WI-GTWY-9-PR2	**6720005022**
Accessories: DB9 Male - DB9 Female Serial config. cable	WI-CSER-905-9	**6720005105**

Type	Part No.
WI-GTWY-9-ET1	**6720005023**
WI-CSER-905-9	**6720005105**

Wireless I/O

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Radio communications can be configured for combination of event reporting (change-of-value), update time, read/write blocks and poll response. Radio message includes system addressing, unit addressing, error checking and configurable security encryption.Communication control includes message acknowledgments and up to four re-transmissions. Peer to peer addressing. Messages may be routed through four intermediate repeater addresses. Fail-to-transmit and fail-to-receive alarms configurable

WI-GTWY-9-DE1
DeviceNet Slave

WI-GTWY-9-M+1
Modbus Plus Slave

Technical Data

	WI-GTWY-9-DE1	WI-GTWY-9-M+1
Power Supply	9 - 30VDC / 12 - 24VAC Battery charging circuit included for 12V back-up battery, max charge current regulated to 0.7A (>12V supply) Normal current drain MD1 version 12V 150mA; 24V 90mA Other version 12V 270mA; 24V 170mA Add 5mA per active I/O	9 - 30VDC / 12 - 24VAC Battery charging circuit included for 12V back-up battery, max charge current regulated to 0.7A (>12V supply) Normal current drain MD1 version 12V 150mA; 24V 90mA Other version 12V 270mA; 24V 170mA Add 5mA per active I/O
Current drain during radio transmission	Add 12V 350mA; 24V 200mA to above	Add 12V 350mA; 24V 200mA to above
I/O Capacity	512 bytes input and 512 bytes output up to 4300 discrete I/O points, or up to 256 analog in / 256 analog out	2048 bytes input and 2048 bytes output up to 4300 discrete I/O points, or up to 1024 analog in / 1024 analog out
Register Size	16 bit	16 bit
Number of remote WI-GTWY-9 addresses	500	500
General Data		
Operating Temperature	0 to 60°C (30 to 140°F)	0 to 60°C (30 to 140°F)
Storage Temperature		
Humidity	0 - 95 %RH	0 - 95 %RH
EMC Standards	EN 301 489, FCC Part 15, Approved to FCC Part 15.247, RS210	EN 301 489, FCC Part 15, Approved to FCC Part 15.247, RS210
Approvals	Class 1 Div 2 ⑤	Class 1 Div 2 ⑤
Mounting	DIN-rail mounting,	DIN-rail mounting,
LED indication	for processor OK, radio TX and RX, serial TX and RX, active status	for processor OK, radio TX and RX, serial TX and RX, active status
Dimensions mm (in)	130 x 183 x 60 (5.1 x 7.2 x 2.4)	130 x 183 x 60 (5.1 x 7.2 x 2.4)
Wireless Communications	DeviceNet 2.0 Slave, optically isolated RS422 with selectable baudrate between 125, 250 and 500 Kbit/sec.	Modbus RTU (binary), master / slave configurable. RS232 or RS485, 300 - 19200 bits/sec. Modbus Plus Slave, optically isolated RS485 with standard baudrate of 1 Mbit/sec, global data base transactions with routing for up to six networks.
On-board I/O	Eight discrete I/O, individually configurable as input or output. Inputs suitable for voltage free contacts. Outputs are FET, 30VDC 500mA.	Eight discrete I/O, individually configurable as input or output. Inputs suitable for voltage free contacts. Outputs are FET, 30VDC 500mA.
Configuration	via free Windows software	via free Windows software
Diagnostics	on-line read/write of I/O registers, radio signal strength values from remote units, and off-line testing of data bus protocol.	on-line read/write of I/O registers, radio signal strength values from remote units, and off-line testing of data bus protocol.
Radio Transceiver		
Frequency hopping spread spectrum	902-908 MHz, sub-bands configurable	902-908 MHz, sub-bands configurable
Transmit power	1W	1W
Receiver data sensitivity	-108dBm	-108dBm
Maximum line-of-sight range	USA/Canada, 4W ERP, 20+ miles	USA/Canada, 4W ERP, 20+ miles
Data rate	19.2 Kb/s with forward-error correction	19.2 Kb/s with forward-error correction
Antenna connector	SMA female coaxial	SMA female coaxial

Ordering Data

Type	Part No.	Type	Part No.
WI-GTWY-9-DE1	**6720005024**	WI-GTWY-9-M+1	**6720005025**
WI-CSER-905-9	**6720005105**	WI-CSER-905-9	**6720005105**

Accessories: DB9 Male - DB9 Female Serial config. cable

Wireless Data Modems

Wireless data modems connect to serial or Ethernet links and transmit the data wirelessly. The modem controls the wireless messages and data ports to provide a "transparent" data transfer.

Wireless Ethernet Data Modems

The Weidmuller Wireless Ethernet Modems are a robust, license-free wireless 802.11 standards compliant transceiver capable of high bandwidth communications. They are optimized for throughputs of up to 108Mbps which provides robust and secure two-way wireless communications in challenging indoor and outdoor environments typical of industrial monitoring and control applications.

The Weidmuller modems offer node to node deterministic mesh network repeatability for further range and multiple channel spacing options to increase network scalability. Integrated Modbus server capability allows seamless I/O expansion through the use of WI-I/O-EX-1-S Expansion units.

Applications

- IP Cameras
- Roaming Vehicles
- PLC Communications
- Data Logger Communications
- Serial and Ethernet Communications
- Agriculture Sprayer Control
- Water/ Waste Water Systems
- SCADA Networks

Features

- 802.11b/g and 802.11a Standard Compliant Options 902 – 928MHz; 2.412 – 2.472GHz (802.11b/g); 5.18 – 5.825GHz Frequency (802.11a)
- Up to 108Mbps Data Throughout
- Transmit and Receive Antenna Diversity
- Access Point/Client and Bridge/Router Configuration
- Serial Client/Server/Multicast Modbus TCP to RTU Gateway
- Spanning Tree (Self Healing) Support
- Deterministic AP to AP Mesh Network Repeatability
- Fast Roaming for AP to AP Handover
- IEEE 802.11i Secure 128-bit AES Encryption (WPA2)
- MAC and IP Address Filtering
- Digital I/O Channel Transfer
- Configurable Settings for High Noise Environments
- Over-The-Air Network Diagnostics and Configuration
- VLAN Tagging Supported for Bridging and Routing Modes

Wireless Serial Data Modems

The Weidmuller Wireless Serial Modem is an RS232 or RS485 data modem that enables cost effective, two-way communications between serial devices such as PLCs, RTUs and other industrial machinery to host monitoring and control systems.

Offering scalability from simple to complex deployments, coupled data rates up to 500kbps with low latency performance make them ideal for demanding Modbus or Profibus applications. Reliability is maximized through interference immune frequency hopping spread spectrum technology while security is assured via data encryption to the AES 256-bit standard.

Applications

- SCADA Systems
- Pump Control Networks
- Water/Wastewater
- PLC/RTU Interfaces
- Serial Output Instruments
- Building Automation/Security
- Embedded Machine Control

Features

- 902 – 928MHz; 2.401 – 2.4835GHz Frequency
- USB interface for ease of configuration
- Reduced transmission latency for high speed control
- Superior receiver sensitivity and rejection to cut through interference
- Adjustable output RF power to keep signals within your plant
- Voltage Test Point for RSSI measurement
- Sleep Mode and Frequency Blocking

Serial Only Data

WI-MOD-9-SER-D
Serial 900Mhz

WI-MOD-24-SER-D
Serial 2.4GHz

C1D2
C   US

Technical Data

Radio Transceiver		
Transmission	Frequency Hopping Spread Spectrum (FHSS)	Frequency Hopping Spread Spectrum (FHSS)
Frequency - USA/Canada	902 – 928MHz	2.401 – 2.4835GHz
Transmit Power	10 mW to 1W (0 - 30dBm)	1 – 100mW (0 – 20dBm)
Modulation	GFSK & MSK	GFSK & MSK
Receiver Sensitivity	-96dBm, 100dBm, -105dBM @ 900MHz	-92dBm, -98dBm, -102dBm @ 2.4GHz
Expected line-of-sight range, depending on local conditions	900Mhz: 64km (40 miles)	2.4GHz: 12km (7 miles)
RF Data Transmission Rate	900Mhz Band: 500kbps, 250kbps, 125kbps	2.4GHz Band: 250kbps, 125kbps, 19.2kbps
Range may be extended by:	Ability to construct complex networks using multiple repeaters and roaming features	Ability to construct complex networks using multiple repeaters and roaming features
Serial Ports		
Serial Settings	Baud rate, data bits, stop bits, parity, flow control	Baud rate, data bits, stop bits, parity, flow control
RS232 Connection	EIA-232 via terminal block	EIA-232 via terminal block
RS485 Connection	EIA-485 via terminal block with selectable termination resistor	EIA-485 via terminal block with selectable termination resistor
Protocols & Configuration		
System Address	4.2 x 109 possible addresses	4.2 x 109 possible addresses
Protocols Supported	Modbus RTU, DF1, Profibus	Modbus RTU, DF1, Profibus
User Configuration	USB Interface	USB Interface
Configuration Parameters	Master/Slave, Repeater, Serial Data Items	Master/Slave, Repeater, Serial Data Items
Security	AES 128, 192 and 256-bit	AES 128, 192 and 256-bit
General Data		
Power Supply	9 - 30 VDC, over voltage and reverse wiring protected	9 - 30 VDC, over voltage and reverse wiring protected
Normal current drain	150mA @ 24 VDC (900Mhz)	100mA @ 24 VDC (2.4GHz)
Current when transmitting	200mA @ 24 VDC (900MHz)	125mA @ 24 VDC (2.4GHz)
Low power mode current drain		
Operating Temperature	-40 to 70°C (-40 to 158°F)	-40 to 70°C (-40 to 158°F)
Humidity	10% to 90% non-condensing	10% to 90% non-condensing
Weight	240g (0.55lbs)	240g (0.55lbs)
EMC Standards	FCC Part 15; EN 301 489	FCC Part 15; EN 301 489
RF (Radio)	FCC Part 15.247; ETSI EN 300-328	FCC Part 15.247; ETSI EN 300-328
Approvals	cUL, Class I Div 2, Groups A, B, C, D, Temp Code: T5 ATEX Zone 2, EEx nL IIC T5 II 3G, IECEX Ex nL IIC T5 EN/UL 60950-1 (pending)	cUL, Class I Div 2, Groups A, B, C, D, Temp Code: T5 ATEX Zone 2, EEx nL IIC T5 II 3G, IECEX Ex nL IIC T5 EN/UL 60950-1 (pending)
Mounting	DIN-rail mounting	DIN-rail mounting
Dimensions mm (in)	116mm x 60mm x 66mm (4.57″ x 2.36″ x 2.60″)	116mm x 60mm x 66mm (4.57″ x 2.36″ x 2.60″)
Antenna connection	SMA Female coaxial	SMA Female coaxial
Housing	Plastic with aluminum base, IP20 rated	Plastic with aluminum base, IP20 rated
Terminal Blocks	16 - 22 AWG (16 - 20AWG for power)	16 - 22 AWG (16 - 20AWG for power)
Reported Diagnostics	RF, Serial	RF, Serial
LED indication	RF Link, RF TX & RX, RS232 TX & RX, RS485 TX & RX	RF Link, RF TX & RX, RS232 TX & RX, RS485 TX & RX
Network Management	Via master radio to all remotes	Via master radio to all remotes
Discrete Output	RF Link Status 0.5A @ 30 VDC Relay	RF Link Status 0.5A @ 30 VDC Relay

Ordering Data

Type	Part No.	Type	Part No.
WI-MOD-9-SER-D	**6720005055**	WI-MOD-24-SER-D	**6720005056**

Serial Only Data

WI-MOD-9-D
Serial 900MHz

C1D2

C   US

Technical Data

Radio Transceiver	
Transmission	Frequency Hopping Spread Spectrum Transceiver
Frequency - USA/Canada	902 - 928 MHz
Transmit Power	1W (30dBm)
Modulation	Frequency Shift Keying
Receiver Sensitivity	-106dBm @ 19.2kbps, -103dBm @ 115.2kbps (1%FER)
Expected line-of-sight range, depending on local conditions	USA/Canada 32kms (20+ miles) @ 4W ERP
RF Data Transmission Rate	19200 baud, 57600 baud, 115200 baud (selectable)
Range may be extended by:	up to five intermediate repeaters in controlled mode unlimited repeaters in transparent mode
Serial Ports	
Serial Settings	7 or 8 data bits, even/odd/Parity Bits Configurable
RS232 Connection	DB9 Female DCE; RTS/CTS/DTR/DCD (Hardware Signals Provided)
RS485 Connection	2-Pin Terminal Block (Max Distance 1.2km (4000') - Non Isolated)
Protocols & Configuration	
System Address	Configurable 8 Bit Value (0 - 255)
Protocols Supported	Operating Mode, Radio and Serial Settings
User Configuration	Windows Software or AT Hayes Commands Via Serial Port
Configuration Parameters	Transparent Mode / Control Mode
Security	-
General Data	
Power Supply	10 - 30 VDC or 10 - 24 VAC
Normal current drain	70mA/12 VDC or 50mA/24 VDC
Current when transmitting	350mA/12V or 250mA/ 24V
Low power mode current drain	20mA/12 VDC or 15mA/24 VDC
Operating Temperature	-40 to +60°C (-40 to +140°F)
Humidity	0 - 99% RH Non-Condensing
Weight	0.5kg (1.1lbs)
EMC Standards	FCC Part 15 Class A
RF (Radio)	AS/NZS 4268, FCC 15.247
Approvals	CSA Class I Division 2, AS/NZS 60950, IEC 60950
Mounting	DIN-rail mounting
Dimensions mm (in)	114 x 168 x 30mm (4.5" x 6.7" x 1.2")
Antenna connection	SMA female coaxial
Housing	Powder-Coated Aluminum
Terminal Blocks	Removable; Max conductor 12 AWG (2.5mm²)
Reported Diagnostics	RSSI Measurement (dBm), Bit Error Ratio (BER)
LED indication	Power/OK, Radio TX/RX, Serial TX/RX, DCD
Network Management	-
Discrete Output	Voltage Free Contact

Ordering Data

	Type	Part No.
	WI-MOD-9-D	**6720005050**

	6720005054 WI-MOD-E-G	6720005057 WI-MOD-E-A	1242110000 IE-WL-AP-BR-CL-ABG-US	6720005015 WI-MOD-945-E	6720005051 WI-MOD-9-E
Frequency	2.412 - 2.472GHz	5.18 - 5.825GHz[1]	2.4Ghz / 5.8Ghz	902-928MHz[1]	902 - 928MHz[1]
Modulation	802.11b/g + OFDM	802.11a + OFDM	802.11 a/b/g	802.11 g + OFDM	802.11-FHSS
TX Power	15 - 400mW[2]	15 - 400mW[2]	15-100mW	15 - 1000mW	100mW - 1W[2]
Data Rate	108Mbps	108Mbps	54Mbps	54Mbps	200Kbps
WDS (AP-AP)	Yes	Yes	Yes	Yes	No
Self Heal (Spanning Tree)	Yes	Yes	Yes	Yes	Yes
Serial Client/ Server/ Multicast	Yes	Yes	Yes	Yes	Yes
Encryption Security Level (Maximum level highlighted)	WPA2 /802.11i	WPA2 /802.11i	WPA / WPA2/802.1X	WPA2/802.11i	128 bit AES Encryption
MAC / IP Filtering	Yes	Yes	Yes	Yes	Yes
Network Function	AP /Client Bridge /Router	AP /Client Bridge /Router	AP/Client/Bridge	AP /Client Bridge /Router	AP /Client Bridge /Router
Online Diagnostics	Yes	Yes	Yes	Yes	Yes
Online Configuration	Yes	Yes	Yes	Yes	Yes

[1]Frequency availability - country regulatory dependant.
[2]Configurable TX Power option available - country regulations apply.

Ethernet and Serial Data

CSA ® C1D2
C US

WI-MOD-9-E
Serial and Ethernet 900Mhz (FHSS)

WI-MOD-945-E
Serial and Ethernet 900MHz (DSSS)

Technical Data

Radio Transceiver		
Transmission	Frequency Hopping Spread Spectrum Transceiver	Direct Sequence Spread Spectrum (DSSS)
Frequency - USA/Canada	902 - 928 MHz	902 – 928MHz
Transmit Power	0.1 – 1W (20 – 30 dBm) configurable	250mW (+24dBm) to 1W (+30dBm)
Modulation	Frequency Shift Keying	802.11g Orthogonal Frequency Data Modulation (OFDM)
Receiver Sensitivity	-108 dBm @ 10-6 BER	-95dBm @ 0.25Mbps - 71dBm @ 54Mbps (8% FER)
Channel Spacing	16 x 50	9 x 1.25MHz; 9 x 2.5MHz; 4 x 5MHz; 4 x 10MHz; 2 x 20MHz
RF Data Transmission Rate	19.2, 57.6, 115.2Kb/s or auto rate selection	1 – 54Mbps "Auto Mode" Selects Fastest Rate Possible Relative to RSSI"
Expected line-of-sight range, depending on local conditions	up to 60 miles / 100 km line-of-sight using high gain antennas (*up to 4W ERP permitted in USA/Canada) Range may be extended using repeater features	6+ miles @ 630mW/30Km (18 mi.) @ 1W (*up to 4W ERP permitted in USA/Canada) Range may be extended using repeater features
Range may be extended by:	up to five intermediate repeaters in controlled mode unlimited repeaters in transparent mode	Ability to construct complex networks using multiple repeaters and roaming features
Ethernet/Serial Port		
Ethernet	10/100baseT; Auto MDX Bridge/router functions work with all Ethernet protocols	10/100 BaseT RJ45, IEEE 802.3 compliant. Bridge/router functions work with all Ethernet protocols
Embedded Protocols:	TCP/IP, UDP ARP, PPP, ICMP, HTTP, FTP, TFTP, TELNET	TCP/IP, UDP ARP, PPP, ICMP, HTTP, FTP, TFTP, TELNET, SNMP, RADIUS/802.1X, DHCP, OFDM
Serial		
RS232 V.24 DCE	DB9 Female DCE; RTS/CTS/DTR/DCD (Hardware Signals Provided)	DB9 Female DCE; RTS/CTS/DTR/DCD
RS485	2-Pin Terminal Block (Configurable Termination) Serial server, PPP, Modbus to Modbus TCP conversion	2-Pin Terminal Block – Non-Isolated Serial server, PPP, Modbus to Modbus TCP conversion
Serial Settings	7/8 Data Bits; Stop/Start/Parity (Configurable)	7/8 Data Bits; Stop/Start/Parity (Configurable)
Data Rate (Bps)	1.2 to 115.2 Kb/s	1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 76800, 115200, 230400
Protocols/Configuration		
System Address	ESSID; 1 – 31 Character Text String	ESSID; 1 – 31 Character Text String
Protocols supported	TCP/IP, UDP, ARP, Radius/802.1x, DHCP, DNS, PPP, ICMP, HTTP, FTP, TFTP, TELNET, MODBUS-RTU and MODBUS-TCP	TCP/IP, UDP, ARP, Radius/802.1x, DHCP, DNS, PPP, ICMP, HTTP, FTP, TFTP, TELNET, MODBUS-RTU and MODBUS-TCP
Network/Configurable Parameters	Configurable as Access Point or Client, Bridge or Router Point-to-point, Point-to-multipoint, user configurable addressing Repeater functionality MAC Filtering - whitelist or blacklist	Access Point/Client/Bridge/Router/VLAN Point-to-Point, Point-to-Multi-point Wireless Distribution System (AP - AP Repeater) Modbus TCP/RTU Gateway Serial Client/Server/Multicast Simultaneous RS232/485 Connection Embedded Modbus Master/Slave for I/O Transfer
User Configuration	Remote Access - Over-the-Air Network Access - Ethernet	User Configurable Parameters via HTTPS Embedded Web Server Network Access - Ethernet
Security	128 bit AES encryption	Data Encryption – 802.11i with CCMP 128-bit AES Support for 802.1x Radius Server Secure HTTP Protocol
Bandwidth Protection	MAC Address – Whitelist/Blacklist IP Filtering – Whitelist/Blacklist	MAC Address – Whitelist/Blacklist IP Filtering – Whitelist/Blacklist ARP/GARP Filtering – Whitelist/Blacklist
General Data		
Antenna connection	Single Female SMA 50Ω	2 x Female SMA Standard Polarity 50Ω Supports signal diversity or high-gain antenna
Operating Temperature	-40 to 60°C (-40 to 140°F)	-40 to +60°C ; -40 to +140°F
Humidity	99% non-condensing	0 – 99% RH Non-condensing
Power Supply	9 to 30 VDC; Under/Over Voltage Protection	9 to 30 VDC; Under/Over Voltage Protection
Current consumption Idle:	280mA (12V), 150mA (24V)	270mA @ 12 VDC; 140mA @ 24 VDC
Transmit:	(1W) 500mA (12V), 300mA (24V)	500mA @ 12V (+30dBm), 250mA @ 24V (+30dBm)
EMC	FCC CFR47 Part 15; EN 301 489-3; EN 301 489-5	FCC Part 15; EN 301 489 – 17; AS/NZS CISPR22
RF (Radio)	FCC 15.247, RS210	EN 300 328; FCC Part 15; RSS 210
Approvals	CSA Class I Division 2, AS/NZS 60950, IEC 60950	CSA Class I, Division 2; ATEX; IECEx NA IIC; IEC 60950 (RoHS Compliant); cULus Listed (pending on 1W)
Mounting	DIN-rail mounting	DIN-rail mounting
Dimensions (LxWxH) mm	114 x 168 x 30mm (4.5" x 6.7" x 1.2")	114 x 30 x 30mm (4.5" x 6.7" x 1.2")
Weight	< 0.4 kg / 0.8 lb	0.5kg (1.1lb).
Housing	Powder-Coated Aluminium	Powder-Coated Aluminium
Mounting	DIN-Rail	DIN-Rail
Terminal Blocks	Removable; Max conductor 12 AWG (2.5mm²)	Removable; Max Conductor 12 AWG (2.5 mm²)
LED indication	Power/OK; RX; TX/Link; RS232; LAN; RS485; Digital I/O Serial Activity, Digital I/O, LAN 10/100Mbit Link	Power/OK; RX; TX/Link; RS232; LAN; RS485; Digital I/O Serial Activity, Digital I/O, LAN 10/100Mbit Link
Reported Diagnostics	Diagnostics available through web pages	RSSI Measurements (dBm) Connectivity Information/ Statistics System Log File
Input/Output Configurable DI/DO/AI	Input Voltage-Free Contact Output FET 30 VDC 500mA	Input Voltage-Free Contact Output FET 30 VDC 500mA

Ordering Data

Type	Part No.
WI-MOD-9-E	**6720005051**

Type	RF Power	Part No.
WI-MOD-945-E	630mW	**6720005015**
WI-MOD-945-E-H	1W	**6720005016**

Ethernet and Serial Data

C **UL** US

Wi-Fi

WI-MOD-E-G
Serial and Ethernet 2.4GHz

WI-MOD-E-A
Serial and Ethernet 5.8GHz

Technical Data

Radio Transceiver		
Transmission	Direct Sequence Spread Spectrum (DSSS)	Direct Sequence Spread Spectrum (DSSS)
Frequency - USA/Canada	2.412–2.472 GHz	5.150–5.825 GHz
Transmit Power	15–400 mW (data rate and country-specific)	15–400 mW (data rate and country-specific)
Modulation	Orthogonal frequency data modulation (OFDM)	Orthogonal frequency data modulation (OFDM)
Receiver Sensitivity	–100 dBm @ 250 kbps, 74 dBm @ 108 Mbps (8% FER)	-100 dBm @ 250 kbps, -74 dBm @ 108 Mbps (8% FER)
Channel Spacing	5-MHz spacing (13 channels, 2.412–2.472 GHz)	20-MHz spacing (27 channels, 5.150–5.8 GHz)
RF Data Transmission Rate	1–108 Mbps "Auto Mode" selects fastest rate possible relative to RSSI	6–108 Mbps "Auto Mode" selects fastest rate possible relative to RSSI
Expected line-of-sight range, depending on local conditions	6 miles (10 km) @ 400 mW Range may be extended using repeater features	3 miles (5 km) @ 400 mW Range may be extended using repeater features
Range may be extended by:	Ability to construct complex networks using multiple repeaters and roaming features	Ability to construct complex networks using multiple repeaters and roaming features
Ethernet/Serial Port		
Ethernet	10/100 BaseT RJ45, IEEE 802.3 compliant. Bridge/router functions work with all Ethernet protocols	10/100 BaseT RJ45, IEEE 802.3 compliant. Bridge/router functions work with all Ethernet protocols
Embedded Protocols:	TCP/IP, UDP ARP, PPP, ICMP, HTTP, FTP, TFTP, TELNET, SNMP, RADIUS/802.1X, DHCP, OFDM	TCP/IP, UDP ARP, PPP, ICMP, HTTP, FTP, TFTP, TELNET, SNMP, RADIUS/802.1X, DHCP, OFDM
Serial		
RS232 V.24 DCE	DB9 Female DCE; RTS/CTS/DTR/DCD	DB9 Female DCE; RTS/CTS/DTR/DCD
RS485	2-Pin Terminal Block – Non-Isolated Serial server, PPP, Modbus to Modbus TCP conversion	2-Pin Terminal Block – Non-Isolated Serial server, PPP, Modbus to Modbus TCP conversion
Serial Settings	7/8 Data Bits; Stop/Start/Parity (Configurable)	7/8 Data Bits; Stop/Start/Parity (Configurable)
Data Rate (Bps)	1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 76800, 115200, 230400	1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 76800, 115200, 230400
Protocols/Configuration		
System Address	ESSID; 1 – 31 Character Text String	ESSID; 1 – 31 Character Text String
Protocols supported	TCP/IP, UDP, ARP, Radius/802.1x, DHCP, DNS, PPP, ICMP, HTTP, FTP, TFTP, TELNET, MODBUS-RTU and MODBUS-TCP	TCP/IP, UDP, ARP, Radius/802.1x, DHCP, DNS, PPP, ICMP, HTTP, FTP, TFTP, TELNET, MODBUS-RTU and MODBUS-TCP
Network/Configurable Parameters	Access Point/Client/Bridge/Router/VLAN Point-to-Point, Point-to-Multi-point Wireless Distribution System (AP - AP Repeater) Modbus TCP/RTU Gateway Serial Client/Server/Multicast Simultaneous RS232/485 Connection Embedded Modbus Master/Slave for I/O Transfer	Access Point/Client/Bridge/Router/VLAN Point-to-Point, Point-to-Multi-point Wireless Distribution System (AP - AP Repeater) Modbus TCP/RTU Gateway Serial Client/Server/Multicast Simultaneous RS232/485 Connection Embedded Modbus Master/Slave for I/O Transfer
User Configuration	User Configurable Parameters via HTTPS Embedded Web Server Network Access - Ethernet	User Configurable Parameters via HTTPS Embedded Web Server Network Access - Ethernet
Security	Data Encryption – 802.11i with CCMP 128-bit AES Support for 802.1x Radius Server Secure HTTP Protocol	Data Encryption – 802.11i with CCMP 128-bit AES Support for 802.1x Radius Server Secure HTTP Protocol
Bandwidth Protection	MAC Address – Whitelist/Blacklist IP Filtering – Whitelist/Blacklist ARP/GARP Filtering – Whitelist/Blacklist	MAC Address – Whitelist/Blacklist IP Filtering – Whitelist/Blacklist ARP/GARP Filtering – Whitelist/Blacklist
General Data		
Antenna connection	2 x Female SMA Standard Polarity 50Ω Supports signal diversity or high-gain antenna	2 x Female SMA Standard Polarity 50Ω Supports signal diversity or high-gain antenna
Operating Temperature	-40 to 60°C (-40 to 140°F)	-40 to +60°C ; -40 to +140°F
Humidity	0 - 99% RH non-condensing	0 - 99% RH Non-condensing
Power Supply	9 to 30 VDC; Under/Over Voltage Protection	9 to 30 VDC; Under/Over Voltage Protection
Current consumption Idle:	270 mA @ 12V (idle); 140 mA @ 24V (idle)	270mA @ 12 VDC; 140mA @ 24 VDC
Transmit:	470 mA @ 12V (400 mW), 250 mA @ 24V (400 mW)	470 mA @ 12V (400 mW), 250 mA @ 24V (400 mW)
EMC	FCC CFR47 Part 15; EN 301 489-3; EN 301 489-5	FCC Part 15; EN 301 489 – 17; AS/NZS CISPR22
RF (Radio)	FCC 15.247, RS210	EN 300 328; FCC Part 15; RSS 210
Approvals	CSA Class I, Division 2; ATEX; IECEx NA IIC; IEC 60950 (RoHS Compliant); cULus Listed	CSA Class I, Division 2; ATEX; IECEx NA IIC; IEC 60950 (RoHS Compliant); cULus Listed
Mounting	DIN-rail mounting	DIN-rail mounting
Dimensions (LxWxH) mm	4.5" x 5.5" x 1.2" (114 x 140 x 30 mm)	4.5" x 5.5" x 1.2" (114 x 140 x 30 mm)
Weight	1.0 lb (0.45 kg)	1.0 lb (0.45 kg)
Housing	Powder-Coated Aluminium	Powder-Coated Aluminium
Mounting	DIN-Rail	DIN-Rail
Terminal Blocks	Removable; Max conductor 12 AWG (2.5mm²)	Removable; Max Conductor 12 AWG (2.5 mm²)
LED indication	Power/OK; RX; TX/Link; RS232; LAN; RS485; Digital I/O Serial Activity, Digital I/O, LAN 10/100Mbit Link	Power/OK; RX; TX/Link; RS232; LAN; RS485; Digital I/O Serial Activity, Digital I/O, LAN 10/100Mbit Link
Reported Diagnostics	Diagnostics available through web pages	RSSI Measurements (dBm) Connectivity Information/ Statistics System Log File
Input/Output Configurable DI/DO/AI	Input Voltage-Free Contact Output FET 30 VDC 500mA	Input Voltage-Free Contact Output FET 30 VDC 500mA

Ordering Data

Type	Part No.
WI-MOD-E-G	**6720005054**

Type	Part No.
WI-MOD-E-A	**6720005057**

Ethernet Only Data

Industrial Wireless - Access point/bridge/client

- IEEE 802.11a/b/g compatible single radio module (2.4 GHz or 5 GHz band)
- Power input by redundant 24 V DC power inputs or Power-over-Ethernet
- Multi-SSID and VLAN support
- Turbo Roaming for seamless wireless connections
- Integrated DI/DO for on-site monitoring and warning
- QoS (WMM) support

97 mm [3.82 in]
52.85 mm [2.08 in]
135 mm [5.31 in]
151.85 mm [5.98 in]
105 mm [4.13 in]

Wi-Fi

Wireless Data Modems—WLAN

Technical Data

WLAN Interface

Standards	IEEE 802.11a/b/g/h for Wireless LAN IEEE 802.11i for Wireless Security IEEE 802.3u for 10/100BaseT(X) IEEE 802.3af for Power-over-Ethernet IEEE 802.1D for Spanning Tree Protocol IEEE 802.1w for Rapid STP IEEE 802.1Q VLAN
Spread Spectrum and Modulation (typical)	• DSSS with DBPSK, DQPSK, CCK • OFDM with BPSK, QPSK, 16QAM, 64QAM • 802.11b: CCK @ 11/5.5 Mbps, DQPSK @ 2 Mbps,DBPSK @ 11 Mbps • 802.11a/g: 64QAM @ 54/48 Mbps, 16QAM @ 36/24 Mbps, QPSK @ 18/12 Mbps, BPSK @ 9/6 Mbps

Operating Channels (central frequency)	US: 2.412 to 2.462 GHz (11 channels)
	       5.18 to 5.24 GHz (4 channels)
	EU: 2.412 to 2.472 GHz (13 channels)
	       5.18 to 5.24 GHz (4 channels)

Security	• SSID broadcast enable/disable • Firewall for MAC/IP/Protocol/Port-based filtering • 64-bit and 128-bit WEP encryption, WPA /WPA2-Personal and Enterprise (IEEE 802.1X/RADIUS, TKIP and AES)
Transmission Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps

TX Transmit Power	802.11b: Typ. 23±1.5 dBm @ 1 to 11 Mbps
	802.11g: Typ. 20±1.5 dBm @ 6 to 24 Mbps,
	       Typ. 19±1.5 dBm @ 36 Mbps,
	       Typ. 18±1.5 dBm @ 48 Mbps,
	       Typ. 17±1.5 dBm @ 54 Mbps
	802.11a: Typ. 18±1.5 dBm @ 6 to 24 Mbps,
	       Typ. 16±1.5 dBm @ 36 to 48 Mbps,
	       Typ. 15±1.5 dBm @ 54 Mbps

RX Sensitivity	802.11b: -97 dBm @ 1 Mbps, -94 dBm @ 2 Mbps,
	       -92 dBm @ 5.5 Mbps, -90 dBm @ 11 Mbps
	802.11g: -93 dBm @ 6 Mbps, -91 dBm @ 9 Mbps,
	       -90 dBm @ 12 Mbps, -88 dBm @ 18 Mbps,
	       -84 dBm @ 24 Mbps, -80 dBm @ 36 Mbps,
	       -76 dBm @ 48 Mbps, -74 dBm @ 54 Mbps
	802.11a: -90 dBm @ 6 Mbps, -89 dBm @ 9 Mbps,
	       -89 dBm @ 12 Mbps, -85 dBm @ 18 Mbps,
	       -83 dBm @ 24 Mbps, -79 dBm @ 36 Mbps,
	       -75 dBm @ 48 Mbps, -74 dBm @ 54 Mbps

Protocol Support

General Protocols:	Proxy ARP, DNS, HTTP, HTTPS, IP, ICMP, SNTP, TCP, UDP, RADIUS, SNMP, PPPoE, DHCP
AP-only Protocols:	ARP, BOOTP, DHCP, dynamic VLAN-Tags for 802.1X-Clients, STP/RSTP (IEEE 802.1D/w)

Interface

Default Antenna	2 dBi dual-band omni-directional antenna, RP-SMA (male)
Connector for External Antennas	RP-SMA (female)
LAN Port	10/100BaseT(X), auto negotiation speed (RJ45-type)

Interface (continued)

Console Port	RS-232 (RJ45-type)
LED Indicators	PWR1, PWR2, PoE, FAULT, STATE, signal strength, CLIENT MODE, BRIDGE MODE, WLAN, 10M, 100M
Alarm Contact	1 relay output with current carrying capacity of 1 A @ 24 VDC
Digital Inputs	2 electrically isolated inputs • +13 to +30 V for state "1" • +3 to -30 V for state "0" • Max. input current: 8 mA

Physical Characteristics

Housing	Metal, IP30 protection
Weight	850 g
Dimensions	53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)
Installation	DIN-Rail mounting

Environmental Limits

Operating Temperature	0 to 60° C (32 to 140° F)
Storage Temperature	-40 to 85° C (-40 to 185° F)
Ambient Relative Humidity	5% to 95% (non-condensing)

Power Requirements

Input Voltage	12 to 48 V DC, redundant dual DC power inputs or 48 V DC Power-over-Ethernet (IEEE 802.3af compliant)
Connector	10-pin Pluggable Terminal (0.2–1.5mm²) 28–14 AWG
Power Consumption	• 0.121 to 0.494 A @ 12 to 48 VDC • 0.3 A @ 24 VDC
Reverse Polarity Protection	Present

Regulatory Approvals

Safety	EN60950-1, UL60950-1
Radio	EN300 328, EN301 893,
EMC	EN301 489-1/-17, FCC Part 15 Subpart B Class B, EN55022/55024
Hazardous Location	UL/cUL Class I, Div. 2; ATEX Class I, Zone 2
MTBF	392.209 hrs

Warranty

Warranty Period	5 years

Ordering Data

Models	Model Type	Operating Temperature	Part No.
IEEE 802.11a/b/g wireless AP/ Bridge/Client (European version)	IE-WL-AP-BR-CL-ABG-EU	0 to +60° C	1242100000
	IE-WLT-AP-BR-CL-ABG-EU	-40 to +75° C	1286480000
IEEE 802.11a/b/g wireless AP/ Bridge/Client for American market	IE-WL-AP-BR-CL-ABG-US	0 to +60° C	1242110000
	IE-WLT-AP-BR-CL-ABG-US	-40 to +75° C	1286490000

Accessories	Model Type	Part No.
External Backup and Restore Module	EBR-Module RS232	1241430000
19" Rack Mounting Kit	RM-KIT	1241440000

Wireless Data Modems - Licensed Frequencies

Licensed frequencies have many advantages and are ideal for industrial applications. The Weidmuller product offers powerful long-range communications to extend Ethernet networks in difficult-to-reach locations. Flexible options available support 360 to 512MHz (MHz) as well as 930 to 960MHz (60MHz) configurations, providing users with an integrated and complete industrial Ethernet infrastructure solution.

The FCC (United Stated) and Industry Canada (Canada) has information to help you through the licensing process. You can find the basic information you need to begin the process. If you are engaged in Public Safety Radio Activities, you can go directly to:

FCC: http://wireless.fcc.gov/publicsafety
Industry Canada: http://www.ic.gc.ca/eic/site/sd-sd.nsf/eng/home

Aging Infrastructure

Process Control

Movable Machinery

Licensees in the Industrial/Business Radio Pool are issued to radio users to support business operations. Their communications systems are used for support of day-to-day business activities, such as dispatching, AVL and diverting personnel or work vehicles, coordinating the activities of workers and machines on location, or remotely monitoring and controlling equipment with data radio modems.

Applications

- Remote Well Head Monitoring
- Pipeline Leak Detection
- PLC Networks
- Environmental Monitoring
- Water Treatment Facilities
- Mining Operations Infrastructure
- Tank Farm Monitoring

The Weidmuller Wireless Ethernet Modem is a robust, licensed and license-free wireless transceiver capable of ultra-long range communications.

With models operating at 360 to 512MHz and 930 to 960MHz up to 5.0W, the modems are optimized for throughputs of up to 19.2kbps. This provides robust and secure two-way wireless communications in extremely challenging outdoor environments; over obstructed paths typical of remote monitoring and control applications.

Capable of operating in Access Point/Client configuration, functioning as a network Bridge/Router, or serving as a Serial Server (RS232/485), the devices use over-the-air data compression to ensure maximum throughput. Integrated Modbus server capability allows seamless integration with smart sensors, RTU's or I/O expansion through the use of WI-I/O-EX-1-S Expansion modules.

Features

- 10mW – 5W RF Power
- Access Point/Client and Bridge/Router Configuration
- Spanning Tree (Self Healing) Support
- Designed for Industrial, High Noise Environments
- Over-The-Air Network Diagnostics and Configuration
- VLAN Tagging Supported for Bridging and Routing Modes
- Network Management Capabilities
- Frequencies Configured Via Built-In Webserver

CSA C1D2
C US

WI-MOD-400-E
Licensed Serial and Ethernet 400MHz 5W modem

WI-MOD-950-E
Licensed Serial and Ethernet 900MHz 5W modem

Technical Data

Transmitter/Receiver		
Frequency - USA/Canada	360 – 380MHz, 380 – 400MHz, 400 – 420MHz, 420 – 440MHz, 430 – 450MHz, 450 – 470MHz, 470 – 490MHz, 490 – 512MHz	928 – 960MHz (User Set)
Transmit Power	0.5 - 5.0W(1) (+27 to +37dBm)	0.5 - 5.0W(1) (+27 to +37dBm)
Radio Transceiver/Modulation	2-level FSK or 4-level FSK	Based on 802.11 Meshing Standard, operating at lower data rates. Half Duplex UHF radio supports operation on Licensed 900MHz bands.
Channel Bandwidth	12.5 kHz / 25 kHz	12.5 kHz / 25 kHz
Receiver Sensitivity	12.5kHz: -100dBm (9600bps), -111dBm (4800bps) 25.0kHz: -99dBm (19.2kbps), -110dBm (9600bps)	12.5kHz Channel 19,200 baud @ -100 dBm; 9600 baud @ -111 dBm 25kHz Channel 19,200 baud @ -99 dBm; 9600 baud @ -110 dBm
Data Rates	12.5kHz: 4800bps, 9600bps 25.0kHz: 9600bps, 19.2kbps	12.5kHz bandwidth - 4800 baud, 9600 baud 25 kHz bandwidth - 9600 baud, 19,200 baud
Channel Spacing	12.5kHz, 25.0kHz (Supports 5 or 6.25kHz Frequency Steps)	12.5kHz, 25.0kHz (Supports 5 or 6.25kHz Frequency Steps)
Radio Range	31 miles (50 km) @ 5W / 6 miles (10 km) @ 0.5W Range may be extended using repeater features	31 miles (50 km) @ 5W / 6 miles (10 km) @ 0.5W Range may be extended using repeater features
Protocol	CSMA/CA with 32 bit CRC and auto-correction	CSMA/CA with 32 bit CRC and auto-correction
Security	WPA PSK - 80211i - 802.1x MAC Filtering; IP Filtering; ARP Filtering Password protected configuration	WPA PSK - 80211i - 802.1x MAC Filtering; IP Filtering; ARP Filtering Password protected configuration
Configuration	HTTP with remote configuration via wireless link	HTTP with remote configuration via wireless link
Diagnostics	RSSI, channel noise, BER, connection monitoring and statistics	RSSI, channel noise, BER, connection monitoring and statistics
Ethernet/Serial Port		
Ethernet	10/100baseT; Auto MDX Bridge/router functions work with all Ethernet protocols	10/100 BaseT RJ45, IEEE 802.3 compliant. Bridge/router functions work with all Ethernet protocols
Embedded Protocols:	TCP/IP, UDP ARP, PPP, ICMP, HTTP, FTP, TFTP, TELNET, SNMP, RADIUS/802.1X, DHCP, OFDM	TCP/IP, UDP ARP, PPP, ICMP, HTTP, FTP, TFTP, TELNET, SNMP, RADIUS/802.1X, DHCP, OFDM
Serial		
RS232 V.24 DCE	DB9 Female DCE	1.2 to 230.4 Kb/s
RS485	2-Pin Terminal Block (Configurable Termination) Serial server, PPP, Modbus to Modbus TCP conversion	1.2 to 230.4 Kb/s Serial server, PPP, Modbus to Modbus TCP conversion
Serial Settings	7/8 Data Bits; Stop/Start/Parity (Configurable)	
Data Rate (Bps)	1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600,115200, 230400	
Protocols/Configuration		
System Address	ESSID; 1 – 31 Character Text String	ESSID; 1 – 31 Character Text String
Protocols Supported	TCP/IP, UDP, ARP, Radius/802.1x, DHCP, DNS, PPP, ICMP, HTTP, FTP, TFTP, TELNET, MODBUS-RTU and MODBUS-TCP	TCP/IP, UDP, ARP, Radius/802.1x, DHCP, DNS, PPP, ICMP, HTTP, FTP, TFTP, TELNET, MODBUS-RTU and MODBUS-TCP
Network Parameters	Single Point to Point, Central Master with Multiple Slaves, Large Fixed Network, Network with Roaming Stations, Redundant Radio Paths, Automatic Selection of Radio Paths, Prioritization of Traffic Flows, Bandwidth Efficiency Features, Bandwidth Utilization, Routing, Bridging, VLAN	Single Point to Point, Central Master with Multiple Slaves, Large Fixed Network, Network with Roaming Stations, Redundant Radio Paths, Automatic Selection of Radio Paths, Prioritization of Traffic Flows, Bandwidth Efficiency Features, Bandwidth Utilization, Routing, Bridging, VLAN
User Configuration	Remote Access - Over-the-Air, Local Access - USB, Network Access - Ethernet	Remote Access - Over-the-Air, Local Access - USB, Network Access - Ethernet
Security	WPA-PSK, WPA-Enterprise, Password Protected	WPA-PSK, WPA-Enterprise, Password Protected
Bandwidth Protection	MAC Address – Whitelist/Blacklist IP Filtering – Whitelist/Blacklist ARP/GARP Filtering – Whitelist/Blacklist	MAC Address – Whitelist/Blacklist IP Filtering – Whitelist/Blacklist ARP/GARP Filtering – Whitelist/Blacklist
General Data		
Antenna Connection	Single Female SMA 50Ω	Single Female SMA 50Ω
Operating Temperature	-30 to 60°C (-20 to 140°F)	-30 to 60°C (-20 to 140°F)
Humidity	99% non-condensing	99% non-condensing
Power Supply	9 to 30 VDC; Under/Over Voltage Protection	9 to 30 VDC; Under/Over Voltage Protection
Current Consumption Idle:	120mA @ 13.8V; 70mA @ 24V	270mA @ 12 VDC; 140mA @ 24 VDC
Transmit:	1.5A @ 13.8V (5W); 650mA @ 24V (5W)	2.5A @ 9 VDC (5W); 0.75A @ 30 VDC (5W)
EMC	FCC CFR47 Part 15; EN 301 489-3; EN 301 489-5	FCC CFR47 Part 15; EN 301 489-3; EN 301 489-5
RF (Radio)	FCC CFR47 Part 90; IC RSS 119; EN 300 113; EN 300 220; AS/NZS4295	FCC CFR47 Part 90; IC RSS 119; EN 300 113; EN 300 220; AS/NZS4295
Approvals	Class I, Division 2; IEC EX Zone 2; ATEX Zone 2; EN/IEC 60950-1; UL Listed (pending)	UL Listed (pending)
Mounting	DIN-rail mounting	DIN-rail mounting
Dimensions (LxWxH) mm	168 x 114 x 30mm (6.7˝ x 4.5˝ x 1.2˝)	168 x 114 x 30mm (6.7˝ x 4.5˝ x 1.2˝)
Weight	< 0.55 kg / 1.2 lb	< 0.55 kg / 1.2 lb
Housing	Powder-Coated Aluminium	Powder-Coated Aluminium
Mounting	DIN-rail	DIN-rail
Terminal Blocks	Removable; Max conductor 12 AWG (2.5mm²)	Removable; Max conductor 12 AWG (2.5mm²)
LED Indication	Power/OK; RX; TX/Link; RS232; LAN; RS485; Digital I/O Serial Activity, Digital I/O, LAN 10/100Mbit Link	Power/OK; RX; TX/Link; RS232; LAN; RS485; Digital I/O Serial Activity, Digital I/O, LAN 10/100Mbit Link
Reported Diagnostics	Diagnostics available through web pages or optional Network Management System	Diagnostics available through web pages or optional Network Management System
Input/Output Configurable DI/DO/AI	FET to Ground to Activate External Circuits Max Voltage 30 VDC, Max Current 500mA ON 2.0 VDC, OFF 3.0 VDC, 30 VDC max; Single Analog Input Range 0 - 25mA, Accuracy +/- 0.5%	FET to Ground to Activate External Circuits Max Voltage 30 VDC, Max Current 500mA ON 2.0 VDC, OFF 3.0 VDC, 30 VDC max; Single Analog Input Range 0 - 25mA, Accuracy +/- 0.5%

Ordering Data

Type	Part No.		Type	Part No.
WI-MOD-400-E-5W	**6720005017**		WI-MOD-950-E-5W	**6720005018**

Note	
	Default 450–470MHz Band. Consult factory for other bands.

Enclosures

Specialty Enclosures

At Weidmuller, we have the resources and capabilities to design and build both industrial and ATEX certified enclosures. We handle every aspect of the process:

• Initial design specifications
• Assembly and installation of box elements
• Design and specification of DIN-rail modules
• Terminal wiring
• Specifying, ordering and integrating
  third-party products
• Application of special coatings
• Adding elements such as mounting plates
  and holes or knockouts for cable glands
• Providing full ATEX certification
  and documentation

Weidmuller is a Certified ATEX Installation House—ATEX licensed to design and build ATEX certified enclosures, providing you with all the required documentation and certification and reducing your risk in hazardous locations.

All this means that you don't have to spend your time specifying, ordering and managing inventory for your projects. Design-Build-Deliver Services and Solutions does all this and more.

Upon completion, we'll ship your industrial or ATEX certified enclosure to any location you specify–on time and on budget.

Weidmuller is a licensed ATEX manufacturer—our ATEX certified enclosures meet multiple global standards and regulations and ensure that you have certified hazardous location protection.

Pre-configured
Wireless Enclosures

Weidmuller is pleased to offer three pre-configured and assembled Wireless Enclosure Solutions. These three wireless enclosures feature plastic or metal enclosures with either Wireless Ethernet Modems or Radio Frequency (RF) Transmitters/Receivers. Just connect power and your signals and you are wireless!

The Ethernet solution is available in both a stainless steel or plastic enclosure and features a Weidmuller wireless Ethernet (WiFi) 2.4Ghz modem, which can function as an access point, bridge, client or router.

In addition to the modem technology, the enclosure comes complete with the following components: power supply, circuit protection, surge protection, terminal blocks, ground blocks, antenna, antenna connection cables and through panel cable glands.

This complete, preassembled solution provides all the necessary elements for a remote wireless Ethernet installation.

Ordering Data

	Part No.
Wireless Ethernet Enclosure – Stainless Steel Solution	**6760004616**
Dimensions mm/in (h x w x d)	458 x 382 x 205 / 18.03 x 15.04 x 8.07

Features:

- NEMA4X Stainless Steel Enclosure
- 2.4GHz (WiFi) Wireless Ethernet modem
- Operate as a Client/Bridge/Access Point/Router
  with a 400mW transmit power
- Built in Security/Encryption including AES
  and WEP with matching antenna and all cabling
- Assembled, wired and tested!
- Surge protection included
- Transmit range up to 3 miles with appropriate antenna
- Data transmission rates up to 54Mbps

Ordering Data

	Part No.
Wireless Ethernet Enclosure - Plastic Solution	**6760004617**
Dimensions mm/in (h x w x d)	356 x 305 x 212 / 14.02 x 12.01 x 8.35

Features:

- NEMA 4X Plastic Enclosure
- 2.4GHz (WiFi) Wireless Ethernet modem
- Operate as a Client/Bridge/Access Point/Router
  with a 400mW transmit power
- Built in Security/Encryption including AES
  and WEP with matching antenna and all cabling
- Assembled, wired and tested!
- Surge protection included
- Transmit range up to 3 miles with appropriate antenna
- Data transmission rates up to 54Mbps

Enclosures

The I/O version is comprised of two pre-assembled plastic enclosures. Each enclosure contains a power supply, circuit protection, surge protection, antenna, antenna connection cables and terminal blocks.

In addition to these components, one enclosure houses a transmitter and the second enclosure houses a receiver. The transmitter and receiver operate on 900Mhz radio bands and are preconfigured to send and receive multiple I/O signals. The I/O solution can transmit and receive two digital signals and one analog signal over a range of several miles.
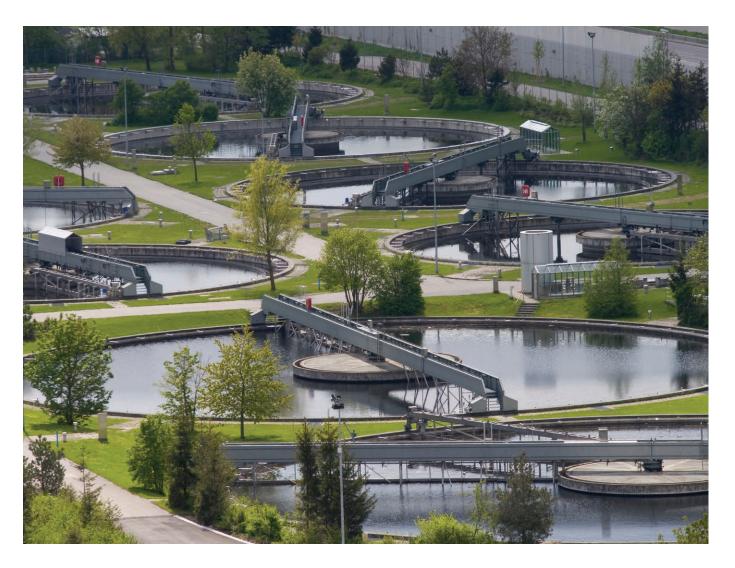
This self-contained solution is designed for quick and easy set-up. The pre-installed terminals make I/O and power connections fast and easy, for "out of the box" operation.

Ordering Data

	Part No.
Wireless I/O 900MHz - Plastic Solution	**6760004618**
Dimensions mm/in (h x w x d)	307 x 256 x 162 / 12.08 x 10.09 x 6.38

Features:

- Two pre-assembled NEMA4x Plastic Enclosures and Full IP67 Ingress protection
- 900MHz (Frequency Hopping) Transmitter and Receiver with a 1W transmit power
- Preconfigured and mapped I/O with matching antenna and all cabling
- Surge protection included
- Cable glands included for signal and power access
- Assembled, wired and tested!
- Transmit range up to 20 miles with appropriate antenna
- Transmitter accepts up to 1 analog and 2 digital intputs
- Receiver accepts up to 1 analog and 2 digital outputs
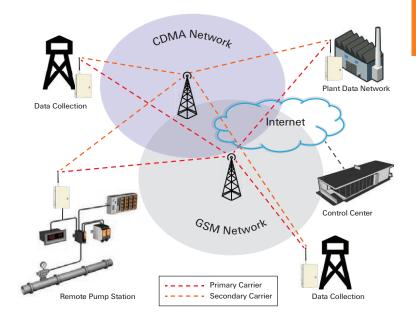
Applications for cellular routers are not designed for just one vertical market

Typical Applications:

- Networking Wind Turbines and Solar Collectors
- Electricity Network Control
- Tank Farm Monitoring
- Water Distribution Network
- Environmental Monitoring

CDMA Network

Data Collection

Plant Data Network

Internet

Control Center

GSM Network

Remote Pump Station

Data Collection

- - - - Primary Carrier
- - - - Secondary Carrier

Features	Benefits
5 Band Multicarrier Cellular Modem	Speeds of up to 21 Mbps
Receiver Antenna Diversity	Weak Signal Strength is less of an issue
Integrated VPN Capability	Monitoring & Control of Communications
IPsec & GRE Tunneling	Ensures Secure Transmission
Built-in DHCP Server & Port Forwarding	Simplifies Networking
Dual Ethernet ports	Adds flexibility
Over the Air Network Diagnostics & Configuration	Optimizes Operational Performance

Connection of Communications Networks
Maximum security with the Industrial Ethernet Router
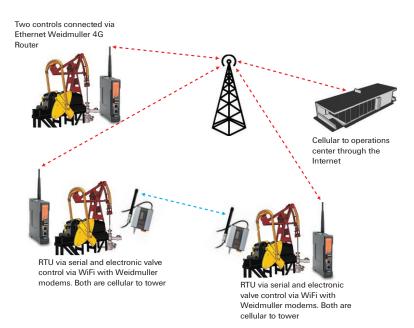
Communication networks used for office applications and for automation are converging. The advantages that result from this process are put into practice more and more frequently because they make procedures more transparent and facilitate data exchange substantially.

Weidmuller's Industrial Ethernet Router ensures that different networks interoperate in unison and with top-level security.

Application example:
Well maintenance and real time data collection. Cellular to main office; WiFi connection locally between wells.

Two controls connected via Ethernet Weidmuller 4G Router

Cellular to operations center through the Internet

RTU via serial and electronic valve control via WiFi with Weidmuller modems. Both are cellular to tower

RTU via serial and electronic valve control via WiFi with Weidmuller modems. Both are cellular to tower
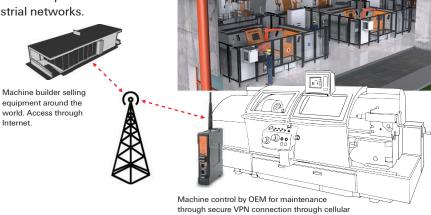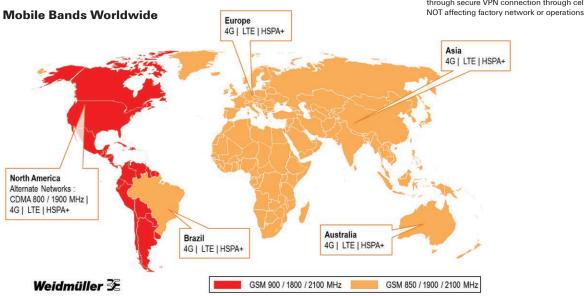
Intelligent firewall: Stateful packet inspection

Our routers ship with a firewall with configurable filter functions that adapt automatically to the network traffic they see (stateful package inspection). This firewall recognizes the messages that are stateful, i.e. legitimized and let them pass. Unidentified packets are kept out of your industrial networks.

Application example:
Device Monitoring of OEM equipment

Machine builder selling equipment around the world. Access through Internet.

Machine control by OEM for maintenance through secure VPN connection through cellular NOT affecting factory network or operations.

Mobile Bands Worldwide

Europe
4G | LTE | HSPA+

Asia
4G | LTE | HSPA+

North America
Alternate Networks :
CDMA 800 / 1900 MHz |
4G | LTE | HSPA+

Brazil
4G | LTE | HSPA+

Australia
4G | LTE | HSPA+

Weidmüller

| GSM 900 / 1800 / 2100 MHz | GSM 850 / 1900 / 2100 MHz |

Want to be able to communicate with machinery and systems securely, reliably and from anywhere?

The router can translate between the addresses of various networks with protocols like port forwarding and 1:1 NAT masquerading.

These functions conceal all of the machine's IP address downstream of the router.

Internet TCP/IP

Weidmuller
(Router)

GSM/GPRS

Weidmuller
(Serial Modem)

GSM/GPRS

Weidmuller
(Serial Modem)

GSM/GPRS

Weidmuller
(Serial Modem)

Internet TCP/IP

Production network

Machine network 1

Machine network 2

Communication between networks is done securely via the two Gigabit ports on the LAN/WAN interface.

The integrated VPN is also ideally suited to secure remote access to the LAN, via either a wired or wireless 3G/UMTS Internet connection.

Gigabit Industrial Security Router

- 2 Gigabit ports (LAN/WAN)
- Integrated firewall
- NAT masquerading, 1:1 network mapping and port forwarding
- Remote access via VPN (OpenVPN, IPsec, L2TP)
- Key switch function for activation/deactivation of WAN/ VPN connection
- Variant with integrated 3G/UMTS modem for rapid, Internet-based wireless access
- Back-up and recovery of device configuration using SIM card
- Full Layer 2/3 Router

Technical data

Modes	
IP-Router	Static or dynamic routing, supporting RIPv2 / OSPF
Transparent Bridge	2-port switch with additional layer-2 filter

Network Services	
	• DHCP server / DHCP relay • DNS relay • NTP client • DynDNS (DHCP client by RFC 2136)

Firewall	
	• IPv4 Stateful inspection Firewall (incoming/outgoing) • NAT-Masquerading, 1:1 NAT, Portforwarding • Layer-2/3-Filter (VLAN ID, VLAN, QoS tag, MAC address, Ethertype frame) • "Auto learning" feature to create packet filter rules (analysis of network traffic) • Layer 2/3-based packet prioritization (Ethernet frame, IP header, VLAN tag)

VPN	
OpenVPN	• Configurable as OpenVPN server or client (Layer 2 and Layer 3) • Authentication with X.509 Certificates • Tunnel support via HTTP proxy • Maximum of 10 different client or server configurations • Unlimited number of client connections in server mode
IPsec	• Can be configured as an IPsec server or client • PSK authentication (user ID, password) or X.509 certificates • Hardware-based encryption for faster data throughput • A maximum of 64 simultaneous connections (subnet to subnet or as an IPsec server) • Encryption algorithms DES-56, 3DES-168, AES 128, AES 192, AES-256

Management	
	• Configuration via WEB interface (HTTP / HTTPS) • Web interface in German or English • Configuration support through detailed help information (tooltip) • Configurable multi-user access with definable rights mask • Support of SNMP v1/v2/v3, event log / syslog

Other	
Modbus/TCP	Integrated Modbus TCP Server for status queries, and software-based activation / de-activation of VPN connections
Diagnosis	"Remote Capture" feature for network diagnostics via a connected PC (Wireshark)
Monitoring	Client Monitoring (via ICMP) with alarm function in case of error

Interfaces	
RJ45 ports	2x10/100/1000BaseT(X)
USB port	Option for future expansion
SCM card reader	Save and restore of the configuration using a smart card (memory chip)
LED indicators	Signaling states for power, status, cut, alert, active VPN connection and an active UMTS connection
Digital outputs	• "Alarm" —> Indicates a configurable network status or error (24 V out) • "VPN-active" —> Indicates an active VPN connection (24 V out)

Interfaces (continued)	
Digital inputs	• "Cut" —> Disconnects physically (link down) the WAN port (24 V) • "VPN-initiate" —> Enables a pre-configured VPN connection (24 V)
Reset button	Restoring the factory default

Power requirements	
Input Voltage	1x 24 V DC (7 to 36 volts)
Current consumption	max. 600 mA @ 24 V DC

Technical data (housing)	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	35 x 159 x 134 mm (without antenna) 35 x 255 x 134 mm (with UMTS SMA female antenna)
Installation	TS 35

Environmental Limits	
Operating temperature	–20 °C to +70 °C
Storage Temperature	–20 °C to +85 °C
Ambient humidity	6 to 90 % not condensing

DSL and UMTS/HSPA	
DSL	Connection to the DSL modem via LAN or WAN port Free configuration of the PPPoE login
DynDNS	Support automatic registration
UMTS/3G	• Built-in quad-band UMTS / HSPA modem (only variant IE-SR-2GT-UMTS/3G) • 21.1 Mbps peak downlink, uplink 5.8 Mbps peak • WCDMA 850/1900/2100 MHz GSM/GPRS/EDGE 850/900/1800/1900 MHz • FCC, IC, CE, GCF, PTCRB, A-Tick, AT&T, Telstra, NTT, DoCoMo, Softbank, Bell

Approvals	
Security	cULus Listed
EMC	FCC Part 15 Class A, EN 55022 Class A, EN61000-4-2 (ESD), EN61000-4-3 (RS) EN61000-4-4 (EFT), EN61000-4-5 (Surge), EN61000-4-6 (CS)
Shock	DIN EN 60068-2-27
Vibration	DIN EN 60068-2-6

Warranty	
Warranty Period	3 years

Ordering data

Models	Type	Part No.
LAN/WAN router	IE-SR-2GT-LAN	**1345270000**
LAN/WAN router with integrated UMTS/3G modem	IE-SR-2GT-UMTS/3G	**1345250000**

Multi-Service Provider Cellular Modem and Router

The 615M-1 is a powerful Multi-Service Provider Cellular Broadband Router that delivers wireless data connectivity for up to two LAN connections and one serial port through public cellular networks at 3G network speeds.

- High Speeds - Speeds up to 14.4Mbps with backward compatibility
- Multicarrier Compatibility and Carrier Redundancy - GPRS/EDGE, UMTS/HSPA; EVDO Rev0/A, 1xRTT
- VPN Functionality - Internal PPTP VPN Server and Client
- Supports Industrial Networking Protocols
- Meets Key Certifications and Compliance - UL Listed, Class I Division 2, FCC Part 15, Industry Canada, CE, A-Tick, IEC 60950-1, PTCRB
- Carrier Specific Approvals: AT&T, Verizon, Sprint, Rogers, Telstra, Optus, Vodaphone
- DIN-rail mount or panel mount, Simple and fast installation

Technical data

Transceiver/Receiver

Frequency	Quad-band 850/900/1900/2100MHz/AWS(1,2)
	Quad-band 850/900/1800/1900MHz(3,4)
	800MHz Cellular/1900MHz PCS/2100MHz(5)
	800MHz Cellular/1900MHz PCS/2100MHz(6)
	800MHz Cellular/1900MHz PCS(7)
Transmit Power (Max)	250mW(1,2); 2W(3,4); 250mW(5,6,7)
Transmission	UMTS, HSPA, EDGE, GPRS, EVDO Rev A (IS-856-A), 1xEVDO Rev 0 (IS-856), 1xRTT (IS-2000)
Modulation	UMTS, HSPA, EDGE, GPRS, EVDO Rev A (IS-856-A), 1xEVDO Rev 0 (IS-856), 1xRTT (IS-2000)
Receive Sensitivity	-109dBm(1); -109dBm(2); -105dBm(3,4); -107dBm(5,6,7)
Channel Spacing	5MHz(1,2); 10MHz(2); 1.25MHz(5,6,7)
Data Rate	Downlink up to 384kbps; Uplink up to 384kbps(1)
	Downlink up to 14.4Mbps ; Uplink up to 5.76Mbps(2)
	Downlink up to 236kbps; Uplink up to 236kbps(3)
	Downlink up to 115kbps; Uplink up to 115kbps(4)
	Downlink up to 3.1Mbps; Uplink up to 1.8Mbps(5)
	Downlink up to 2.4Mbps; Uplink up to 153.6kbps(6)
	Downlink up to 153.6kbps; Uplink up to 153.6kbps(7)
Range (LoS)	Cellular Depends on Service Provider
Antenna Connector	2 x Female SMA Standard Polarity(1,2,3,4,5,6,7)

Input/Output

Discrete Input	ON 2.3 VDC, OFF 0.7 VDC, 5.5 VDC max(8)
Discrete Output	NPN Transistor Close to Digital Ground, Pull Down 100ohm(8)
Relay Outputs	Max Voltage 30 VDC, Max Current 1A(8)
Analog Inputs	Voltage Input Range 0 – 30 VDC, Accuracy +/-0.2 VDC(8)

Interfaces

Ethernet Port	10/100baseT; RJ45 Connector – 2 x IEEE 802.3 (Auto MDIX)
Link Activity	Activity LED
Serial Port RS232	DB9 Female DCE
Data Rate (Bps)	1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 76800, 115200
Serial Settings	8 Data Bits; No Stop/1 Start/Parity (Configurable)

Protocols and Configuration

Protocols Supported	TCP/IP, UDP, ARP, ICMP, FTP, TFTP, TELNET, PING, GPS-NMEA (optional), DHCP; MAC Filtering (Whitelist), IP Filtering (Blacklist), DMZ, Dynamic RADIUS/802.1x DNS, Port Forwarding; SNMP, HTTP Embedded Web Server; IPsec, GRE Tunneling, PPTP, VPN,

Protocols and Configuration (continued)

User Configuration	Configuration and Firmware Upgrades via HTTP/OTA (Over-The-Air)
Configurable	Client/Router, Serial Client Server
Parameters	Simultaneous RS232 Connection
Security	VPN, SIM Card PIN, RADIUS, IPsec
Bandwidth	MAC Address – Whitelist/Blacklist, IP Filtering – Protection Whitelist/Blacklist Network Management SNMP V2c, V3

Approvals

EMC	FCC Part 15; Industry Canada; CE; A-Tick
RF (Radio)	EN 300 328; FCC Part 15
Hazardous Area	Class I, Division 2; cULus
Safety	IEC 60950-1
UL	cULus Listed
Environmental	MIL-STD-810F
Approvals	PTCRB, Carrier Specific Approvals

General

Dimensions	109 x 153 x 45mm (4.3" x 6" x 1.8")
Housing	Powder-coated Aluminum
Mounting	DIN-rail, Panel Mount (Optional)
Terminal Blocks	I/O: Removable Terminal Block, Screwless-Push in Wire, 18 - 28AWG
Temperature Rating	-30 to +70°C; -22 to +158°F
Humidity Rating	5 – 95% RH Non-condensing
Weight	1.13kg (2.5lb)
LED Indication	RSSI; SVC; NET; GPS; AUX
Reported Diagnostics	Diagnostics Available Through Web Pages

Power Supply

Nominal Supply	9 to 28 VDC; Under/Over Voltage Protection & Reverse Polarity Molex 43025-0400 4-Pin Locking Connector
Average Current Draw	130mA @ 13.8 VDC (Idle)
Transmit Current Draw	350mA @ 13.8 VDC

Ordering data

Type	Part No.
3G MODEM RS232 2DI 2DO 2AI 2AO	615M-1
Notes	(1) UMTS, (2) HSPA, (3) EDGE, (4) GPRS, (5) EVDO Rev A (IS-856-A), (6) 1xEVDO Rev 0 (IS-856), (7) 1xRTT (IS-2000), (8) Access via SNMP only

Gigabit Industrial Security Router

- 2 Gigabit ports (LAN/WAN)
- Integrated firewall
- NAT masquerading, 1:1 network mapping and port forwarding
- Key switch function for activation/deactivation of WAN/VPN connection
- Back-up and recovery of device configuration using SIM card
- Full Layer 2/3 Router

Technical data

Modes	
IP-Router	Static or dynamic routing, supporting RIPv2 / OSPF
Transparent Bridge	2-port switch with additional layer-2 filter
Network Services	
	• DHCP server / DHCP relay • DNS relay • NTP client • DynDNS (DHCP client by RFC 2136)
Firewall	
	• IPv4 Stateful inspection Firewall (incoming/outgoing) • NAT-Masquerading, 1:1 NAT, Portforwarding • Layer-2/3-Filter (VLAN ID, VLAN, QoS tag, MAC address, Ethertype frame) • "Auto learning" feature to create packet filter rules (analysis of network traffic) • Layer 2/3-based packet prioritization (Ethernet frame, IP header, VLAN tag)
Management	
	• Configuration via WEB interface (HTTP / HTTPS) • Web interface in German or English • Configuration support through detailed help information (tooltip) • Configurable multi-user access with definable rights mask • Support of SNMP v1/v2/v3, event log / syslog
Other	
Modbus/TCP	Integrated Modbus TCP Server for status queries
Diagnosis	"Remote Capture" feature for network diagnostics via a connected PC (Wireshark)
Monitoring	Client Monitoring (via ICMP) with alarm function in case of error
Interfaces	
RJ45 ports	2x10/100/1000BaseT(X)
USB port	Option for future expansion
SCM card reader	Save and restore of the configuration using a smart card (memory chip)
LED indicators	Signaling states for power, status, cut, alert, active VPN connection and an active UMTS connection
Digital outputs	"Alarm" —> Indicates a configurable network status or error (24 V out)
Digital inputs	"Cut" —> Disconnects physically (link down) the WAN port (24 V)
Reset button	Restoring the factory default

Power requirements	
Input Voltage	1x 24 VDC (7 to 36 volts)
Current consumption	max. 600 mA @ 24 VDC
Technical data (housing)	
Housing	Metal, IP 30 protection
Dimensions (W x H x D)	35 x 159 x 134 mm (without antenna) 35 x 255 x 134 mm (with UMTS antenna)
Installation	TS 35
Physical Dimensions	
Housing	Metal, IP 30 protection
Dimensions (WxHxD)	35 x 159 x 134 mm
Installation	TS 35
Environmental Limits	
Operating Temperature	–20 °C to +70 °C
Storage Temperature	–20 °C to +85 °C
Ambient Humidity	6 to 90 % not condensing
DSL	Connection to the DSL modem via LAN or WAN port Free configuration of the PPPoE login
DynDNS	Support automatic registration
Approvals	
Security	cULus Listed
EMC	FCC Part 15 Class A, EN 55022 Class A, EN61000-4-2 (ESD), EN61000-4-3 (RS) EN61000-4-4 (EFT), EN61000-4-5 (Surge), EN61000-4-6 (CS)
Shock	DIN EN 60068-2-27
Vibration	DIN EN 60068-2-6
Warranty	
Warranty Period	3 years
MTBF	135,270 hrs

Ordering data
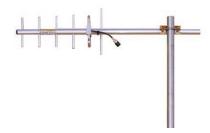
Models	Type	Part No.
LAN/WAN router (Firewall and NAT Only)	IE-SR-2GT-FN	**1489940000**

Wireless Accessories

900 MHz Antennas

Representative Photo   Representative Photo   Representative Photo

Whip and Dipole

Gain	Type	Frequency Range	Description	Connector Type	Part No.
-2dBd	WI-ANT-900MHZ-0DBDUCKSMAM	806-960MHz	Direct attach	SMA male	6720005232
-2dBd	WI-ANT-DPL-DG900-1	900-930MHz	Mount Bkt & 3ft cable	SMA male	6720005086
0dBd	WI-ANT-DEMO-900	900-930MHz	Direct attach	SMA male	6720005089
0dBd	WI-ANT-DPL-0-16	853-930Mhz	Mount Bkt & 15ft cable	SMA male	6720005080
3dBd	WI-ANT-900MHZ-3DBSTUBMAG	896-940MHz	Only use with MAG Base 6720005263	Determined by MAG BASE	6720005230
3dBd	WI-ANT-0.9/2.4GHZ-3/4DBMOBILE	902-928Mhz (Dual Band)	Only use with thru- panel base 6720005277	Determined by Base (NFemale)	6720005276

Omni

Gain	Type	Frequency Range	Description	Connector Type	Part No.
0dBd	WI-ANT-900MHZ-0DBOMNINF	902-925MHz	Inc. 6720005271 clamp/brkt	N-Type Female	6720005233
3dBd	WI-ANT-900MHZ-3DBOMNINF	902-925MHz	Inc. 6720005271 clamp/brkt	N-Type Female	6720005234
5dBd	WI-ANT-900MHZ-5DBOMNINF	902-925MHz	Inc. 6720005271 clamp/brkt	N-Type Female	6720005235
7dBd	WI-ANT-900MHZ-7DBOMNINF	902-925MHz	Inc. 6720005272 clamp/brkt	N-Type Female	6720005236
3dBd	WI-ANT-950Mhz-3dbdOMNINF	890-960MHz	Inc. attached clamp/brkt	N-Type Female	6720005273
5dBd	WI-ANT-950Mhz-5dbdOMNINF	890-960MHz	Inc. attached clamp/brkt	N-Type Female	6720005274
7dBd	WI-ANT-950Mhz-7dbdOMNINF	890-960MHz	Inc. attached clamp/brkt	N-Type Female	6720005275

Directional

Gain	Type	Frequency Range	Description	Connector Type	Part No.
3dBd	WI-ANT-900MHZ-3DBYAGINF	890-960Mhz	Inc. 6720005266 clamp/brkt	N-Type Female	6720005219
6.5dBd	WI-ANT-900MHZ-6.5DB-2′YAGINF	890-960Mhz	Inc. 6720005266 clamp/brkt	N-Type Female	6720005221
10dBd	WI-ANT-900MHZ-10DB-2′YAGINF	890-960Mhz	Inc. 6720005266 clamp/brkt	N-Type Female	6720005223
12dBd	WI-ANT-900MHZ-12DB-2′YAGINF	890-960Mhz	Inc. 6720005266 clamp/brkt	N-Type Female	6720005225
14dBd	WI-ANT-900MHZ-14DB-2′YAGINF	890-960Mhz	Inc. 6720005267 clamp/brkt	N-Type Female	6720005226

2.4 GHz Antennas

Representative Photo   Representative Photo   Representative Photo

Whip and Dipole

Gain	Type	Frequency Range	Description	Connector Type	Part No.
0dBi	WI-ANT-DEMO-2400	2.2-2.5GHz	Direct attach	SMA male	6720005099
2dBi	WI-ANT-24GHZ-2DB DUCK SMA-M	2.2-2.5GHz	Direct attach	SMA male	6720005207
3dBi	WI-ANT-24GHZ-3DB FOR MAG BASE	2.2-2.9GHz	Use with MAG base 6720005263	N-Type Female	6720005208
4dBd	WI-ANT-0.9/2.4GHZ-3/4DB MOBILE	2.4-2.5GHz (Dual Band)	Only use with thru-panel base 6720005277	Determined by Base (N Female)	6720005276

Omni

Gain	Type	Frequency Range	Description	Connector Type	Part No.
4dBi	WI-ANT-24GHZ-4DB OMNI NF	2.4-2.5GHz	Inc. 6720005210 clamp/brkt	N-Type Female	6720005200
6dBi	WI-ANT-24GHZ-6DB OMNI NF	2.4-2.5GHz	Inc. 6720005210 clamp/brkt	N-Type Female	6720005201
6dBi	IE-ANT-O-BG-360-6-NF	2.4-2.5GHz	Inc. clamp/brkt	N-Type Female	1367090000
7dBi	IE-ANT-O-ABG-360-7-NF	2.4-5.8GHz (Dual Band)	Low Profile - Inc. clamp/brkt	N-Type Female	1367130000
8dBi	WI-ANT-24GHZ-8DB OMNI NF	2.4-2.5GHz	Inc. 6720005210 clamp/brkt	N-Type Female	6720005204
10dBi	WI-ANT-24GHZ-10DB OMNI NF	2.4-2.5GHz	Inc. 6720005210 clamp/brkt	N-Type Female	6720005202
12dBi	WI-ANT-24GHZ-12DB OMNI NF	2.4-2.5GHz	Inc. 6720005211 clamp/brkt	N-Type Female	6720005203

Directional

Gain	Type	Frequency Range	Description	Connector Type	Part No.
9dBi	IE-ANT-P-ABG-75-9-NF	2.4-5.8GHz (Dual Band)	Inc. attached clamp/brkt	N-Type Female	1367140000
9dBi (60°)	WI-ANT-24GHZ-9DB DFP 2′NF	2.3-2.5GHz	Inc. attached clamp/brkt	N-Type Female	6720005212
10dBi	WI-ANT-24GHZ-10DB YAGI NF	2.4-2.5GHz	Inc. attached clamp/brkt	N-Type Female	6720005205
13dBi (35°)	WI-ANT-24GHZ-13DB DFP 2′NF	2.3-2.5GHz	Inc. attached clamp/brkt	N-Type Female	6720005213
14dBi	WI-ANT-24GHZ-14DB YAGI NF	2.4-2.5GHz	Inc. attached clamp/brkt	N-Type Female	6720005206
18dBi (18°)	WI-ANT-24GHZ-18DB DFP 2′NF	2.3-2.5GHz	Inc. attached clamp/brkt	N-Type Female	6720005214

5.8 GHz Antennas

Representative Photo   Representative Photo   Representative Photo

Whip and Dipole

Gain	Type	Frequency Range	Description	Connector Type	Part No.
4dBi	WI-ANT-5.8GHZ-4DB MOBILE	4.9-5.9GHz	Only use with thru-panel base 6720005277	Determined by Base (N Female)	6720005278

Omni

Gain	Type	Frequency Range	Description	Connector Type	Part No.
5dBi	IE-ANT-O-AH-360-5-NF	5.1-5.875GHz	Inc. clamp/brkt	N-Type Female	1367120000
7dBi	IE-ANT-O-ABG-360-7-NF	2.4-5.8GHz (Dual Band)	Low Profile - Inc. clamp/brkt	N-Type Female	1367130000
7dBi	WI-ANT-5.8GHZ-7DB OMNI NF	5.15-5.875GHz	Inc. attached clamp/brkt	N-Type Female	6720005283
10dBi	WI-ANT-5.8GHZ-10DB OMNI NF	5.15-5.875GHz	Inc. attached clamp/brkt	N-Type Female	6720005284

Directional

Gain	Type	Frequency Range	Description	Connector Type	Part No.
9dBi	IE-ANT-P-ABG-75-9-NF	2.4-5.8GHz (Dual Band)	Inc. attached clamp/brkt	N-Type Female	1367140000
9dBi	WI-ANT-5.8GHZ-9DB DFP 2'NF	4.9-5.85GHz	Inc. attached clamp/brkt	N-Type Female	6720005280
11dBi	WI-ANT 5.8GHZ 11DB FLAT PATCH	5.7-5.875GHz	Inc. attached clamp/brkt	N-Type Female	6720005130
13dBi	WI-ANT-5.8GHZ-13DB DFP 2'NF	4.9-5.85GHz	Inc. attached clamp/brkt	N-Type Female	6720005281
18dB / 20dB	WI-ANT-5.8GHZ-20DB DFP 2'NF	4.9-5.85GHz	Inc. attached clamp/brkt	N-Type Female	6720005282

300-500MHz Antennas

Omni

Gain	Type	Frequency Range	Description	Connector Type	Part No.
5dBd	WI-ANT-440MHZ-5DB OMNI NF	430-470MHz	Inc. attached clamp/brkt	N-Type Female	6720005439
3dbd	WI-ANT-450MHZ-3DB OMNI NF	450-460MHz	Inc. attached clamp/brkt	N-Type Female	6720005440
5dBd	WI-ANT-450MHZ-5DB OMNI NF	450-460MHz	Inc. attached clamp/brkt	N-Type Female	6720005436

Directional

Gain	Type	Frequency Range	Description	Connector Type	Part No.
10dBd	WI-ANT-390Mhz-10dbdYAGINF	375-403Mhz	Inc. attached clamp/brkt	N-Type Female	6720005441
6.5dBd	WI-ANT-420Mhz-6dbdYAGINF	406-440Mhz	Inc. attached clamp/brkt	N-Type Female	6720005442
9dBd	WI-ANT-420Mhz-9dbdYAGINF	406-440Mhz	Inc. attached clamp/brkt	N-Type Female	6720005443
6.5dBd	WI-ANT-470Mhz-6dbdYAGINF	440-490MHZ	Inc. attached clamp/brkt	N-Type Female	6720005444
9dBd	WI-ANT-470Mhz-9dbdYAGINF	440-490MHZ	Inc. attached clamp/brkt	N-Type Female	6720005445
10dBd	WI-ANT-450MHZ-10DB YAGI	450-470MHz	Inc. attached clamp/brkt	N-Type Female	6720005435
9dBd	WI-ANT-470Mhz-9dbdYAGINF	470-512MHz	Inc. attached clamp/brkt	N-Type Female	6720005446

Cellular Band Antennas

Whip and Dipole

Gain	Type	Frequency Range	Description	Connector Type	Part No.
0dBi	WI-ANT-900MHZ-0DBDUCKSMAM	806-960/ 1710-2170MHz	0dB STUB GSM ANT 806/2017MHz SMA	SMA Male	6720005232
2dBi	WI-ANT-GSM-2DB LP	824-896MHz / 1710-1990MHZ	LOW-PROF GSM w/ 5m SMA-M CBL	SMA Male	6720005451
3dBi	WI-ANT-GSM-LTE-3DB MOBILE	698-2700MHz	LTE 698-2700Mhz ANT - Base 6720005277	Determined by Base (N Female)	6720005450

Omni

Gain	Type	Frequency Range	Description	Connector Type	Part No.
2dBi	IE-ANT-3G-806-2170-2-NF	806-960/ 1710-2170MHz	Omni (GSM / UMTS) Inc. attached clamp/brkt	N-Type Female	1491160000
4dBi	IE-ANT-3G-806-2500-4-NF	806-960/ 1710-2170MHz	Omni thru-panel IP66	N-Type Female	1491170000

Cables

Detailed cable specifications on pages 90 and 91.

Cable Length (ft)	Connector Type	dB Loss 900Mhz	dB Loss 2.4GHz	dB Loss 5.8GHz	Cable Type	Type	Part No.
1	SMA male - SMA male	0.1	0.2	0.3	PFP 195	WI-ACC-TYP195-1FT SMA M-SMA M	6720005243
2	SMA male - SMA male	0.2	0.4	0.7	PFP 195	WI-ACC-TYP195-2FT SMA M-SMA M	6720005244
3	SMA male - SMA male	0.3	0.6	1.0	PFP 195	WI-ACC-TYP195-3FT SMA M-SMA M	6720005245
1	SMA male - N male	0.1	0.2	0.3	PFP 195	WI-ACC-TYP195-1FT SMA M-NM	6720005270
2	SMA male - N male	0.2	0.4	0.7	PFP 195	WI-ACC-TYP195-2FT SMA M-NM	6720005260
3	SMA male - N male	0.4	0.6	1.0	PFP 195	WI-ACC-TYP195-3FT SMA M-NM	6720005259
10	SMA male - N male	1.2	2.0	3.4	PFP 400	WI-ACC-TYP400-10FT SMA M-NM	6720005240
25	SMA male - N male	2.8	4.8	8.2	PFP 400	WI-ACC-TYP400-25FT SMA M-NM	6720005241
40	SMA male - N male	4.5	7.7	13.1	PFP 400	WI-ACC-TYP400-40FT SMA M-NM	6720005242
1	N male - N male	0.1	0.2	0.2	PFP 400	WI-ACC-TYP195-1FT NM-NM	6720005246
2	N male - N male	0.2	0.4	0.4	PFP 400	WI-ACC-TYP195-2FT NM-NM	6720005247
3	N male - N male	0.3	0.6	0.6	PFP 400	WI-ACC-TYP195-3FT NM-NM	6720005248
10	N male - N male	0.4	0.7	1.1	PFP 400	WI-ACC-TYP400-10FT NM-NM	6720005251
25	N male - N male	1.0	1.7	2.7	PFP 400	WI-ACC-TYP400-25FT NM-NM	6720005252
40	N male - N male	1.6	2.7	4.3	PFP 400	WI-ACC-TYP400-40FT NM-NM	6720005253
55	N male - N male	2.1	3.7	5.9	PFP 400	WI-ACC-TYP400-55FT NM-NM	6720005254
75	N male - N male	3.0	5.2	8.1	PFP 400	WI-ACC-TYP400-75FT NM-NM	6720005255
100	N male - N male	3.8	6.7	10.8	PFP 400	WI-ACC-TYP400-100FT NM-NM	6720005256
200	N male - N male	5.0	9.6	N/A	PFP 600	WI-ACC-TYP600-200FT NM-NM	6720005257

Other Cables

Length	Description	Type	Connector Type	Part No
2m (6 ft.)	Cable	IE-CC-NM-RPSMAM-2M	RP-SMA to N male	1367110000
4m (12 ft.)	Cable	IE-CC-NM-RPSMAM-4M	RP-SMA to N male	1367100000
2m (6 ft.)	Cable	IE-CC-NM-SMAM-2M	SMA male to N male	1491180000
4m (12 ft.)	Cable	IE-CC-NM-SMAM-4M	SMA male to N male	1491190000
6m (18 ft.)	Cable	IE-CC-NM-SMAM-6M	SMA male to N male	1491210000

Hardware

Description	For use with	Type	Part No.
DB9 Female RJ45 Serial Configuration Cable	WI-I/O 9-L units	WI-CSER-RJ45	6720005108
Antenna Mounting Brackets			
Angled Bracket for 4, 6, and 10 dBi 2.4 MHz Omnis	2.4 GHz antennas	WI-ACC-24GHZ-4610DB-ANG-BRKT	6720005209
Straight Bracket for 4, 6, and 10 dBi 2.4 MHz Omnis	2.4 GHz antennas	WI-ACC-24GHZ-4610DB-STR-BRKT	6720005210
Mounting Bracket for part number 6720005203	2.4 GHz antennas	WI-ACC-24GHZ-12DB-STR-BRKT	6720005211
Antenna MAG Base with 12' SMA male cable	2.4 GHz & 900 MHz antennas	WI-ACC-MAGBASE 12 RG58 SMA MALE	6720005263
Mounting Bracket for parts 6720005228 and 6720005229	900 MHz antennas	WI-ACC-900MHZ-OMNI-STR-BRKT	6720005268
Mounting Bracket for 900MHz 6.5, 10, 12 dBd Yagis	900 MHz antennas	WI-ACC-900MHZ-YAGI-STR-BRKT	6720005266
Mounting Bracket for part number 6720005226	900 MHz antennas	WI-ACC-900MHZ-14YAGI-STR-BRKT	6720005267
Mounting Bracket for part numbers 6720005233, 6720005234, 6720005235	900 MHz antennas	WI-ACC-900MHZ-035OMNI-STR-BRKT	6720005271
Mounting Bracket for part number 6720005236	900 MHz antennas	WI-ACC-900MHZ-7OMNI-STR-BRKT	6720005272
Thru-panel mounting base for low profile antennas	6720005276 & 6720005278	WI-ACC-BH-BASE 5/8 HOLE NF	6720005277
Surge Protection & Bulkhead Mounts			
125-1000 MHz Surge Polyphaser N female - N female	Bulkhead & Surge ≤ 1 GHz	WI-ACC-125-1000MHZ SURGE NF-NF	6720005261
2-6 GHz Surge Polyphaser N female - N female	Bulkhead & Surge ≥ 2 GHz	WI-ACC-2-6GHZ SURGE NF-NF	6720005262
Bulkhead Adapter N female -N female	Bulkhead	WI-ACC-BULK-ADAPT NF-NF	6720005250
Bulkhead Adapter SMA female - SMA female	Bulkhead	WI-ACC-BULK SMA F - SMA F	6720005296
Class 1 Division 1 Bulkhead SMA male - SMA female	Bulkhead	WI-ACC-BULK-C1D1 SMA M - SMA M	6720005298
Class 1 Division 1 Bulkhead SMA male - N male	Bulkhead	WI-ACC-BULK-C1D1 SMA M - NM	6720005299
SMA male to SMA female <2.5Ghz (direct radio connection)	2.4 GHz & 900 MHz antennas	WI-DIV-CCMA	6720005111
Bandpass Filters			
Outdoor rated 900Mhz Band Pass Filter	900 MHz antennas	WI-ACC 900MHZ BAND PASS FILTER	6720005120
Outdoor rated 2.4Ghz Band Pass Filter	2.4 GHz antennas	WI-ACC 2.4GHZ BAND PASS FILTER	6720005121
Outdoor rated 5.8Ghz Band Pass Filter	5.8 GHz antennas	WI-ACC 5.8GHZ BAND PASS FILTER	6720005122
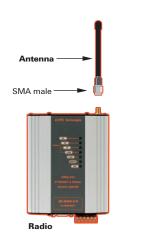
Adapters

Description	Type	Part No.
Reverse-Polarity SMA Male – SMA Female	WI-ACC-ADAPT RP-SMA M - SMA F	6720005289
SMA male - SMA male Adapter	WI-ACC-ADAPT SMA M - SMA M	6720005290
SMA female - SMA female Adapter	WI-ACC-ADAPT SMA F - SMA F	6720005291
N male - N male Adapter	WI-ACC-ADAPT NM - NM	6720005292
N female - N female Adapter	WI-ACC-ADAPT NF - NF	6720005293
SMA female - N male Adapter	WI-ACC-ADAPT SMA F - NM	6720005294
SMA male - N female Adapter	WI-ACC-ADAPT SMA M - NF	6720005295
SMA female - SMA male Angled Adapter	WI-ACC-ADAPT SMA F - SMA M ANGL	6720005297
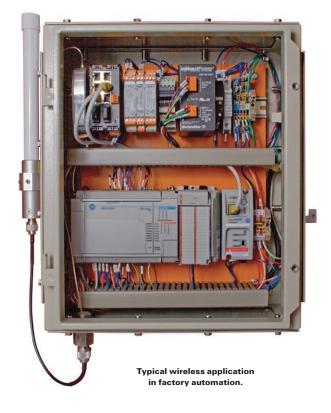
Connection Diagrams

Direct Connect

Antenna

SMA male

Radio

SMA male

Typical wireless application
in factory automation.
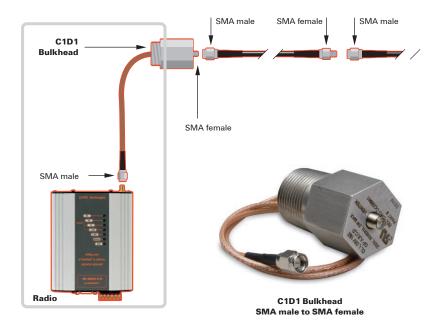
Enclosure with C1D1 Bulkhead

C1D1
Bulkhead

SMA male   SMA female   SMA male

SMA female

SMA male

Radio

C1D1 Bulkhead
SMA male to SMA female
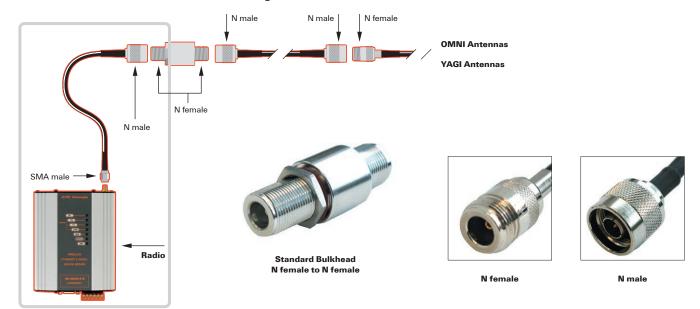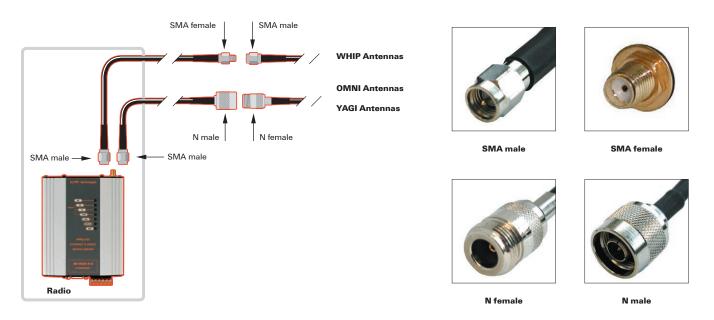
SMA male

SMA female

Enclosure with Standard Bulkhead & Surge Arrestor

N male

N male

N female

OMNI Antennas

YAGI Antennas

N female

N male

SMA male

Radio

**Standard Bulkhead
N female to N female**

N female

N male
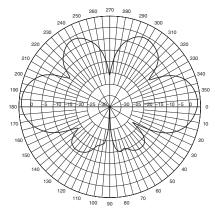
Enclosure without Bulkhead (non-direct)

SMA female

SMA male

WHIP Antennas

OMNI Antennas

YAGI Antennas

N male

N female

SMA male

SMA male

Radio

SMA male

SMA female

N female

N male
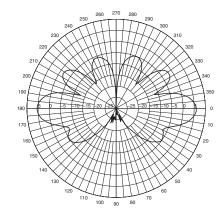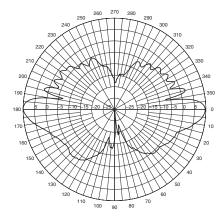
Radiation Patterns
2.4 GHz Omni Antennas
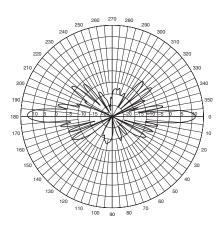
6720005200 Elevation Pattern
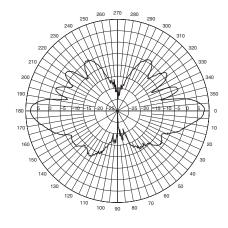
6720005201 Elevation Pattern

6720005202 Elevation Pattern
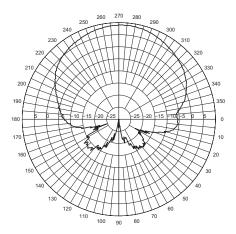
6720005203 Elevation Pattern
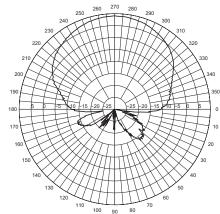
6720005204 Elevation Pattern

2.4 GHz Directional Antennas
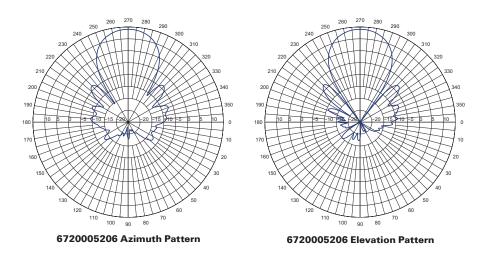
6720005212 Azimuth Pattern
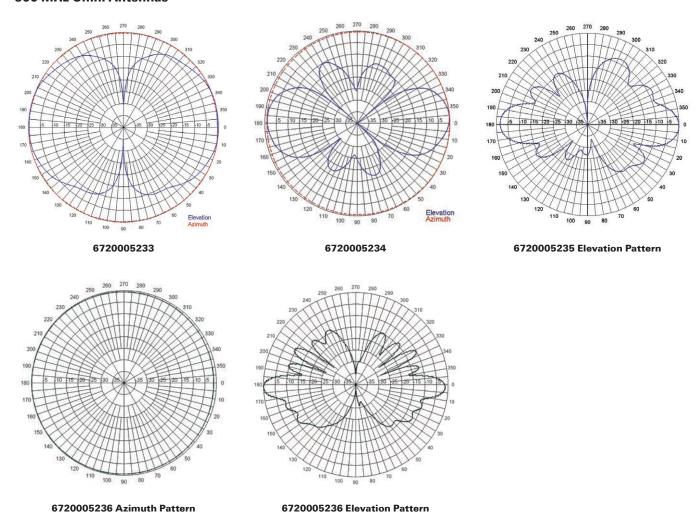
6720005212 Elevation Pattern
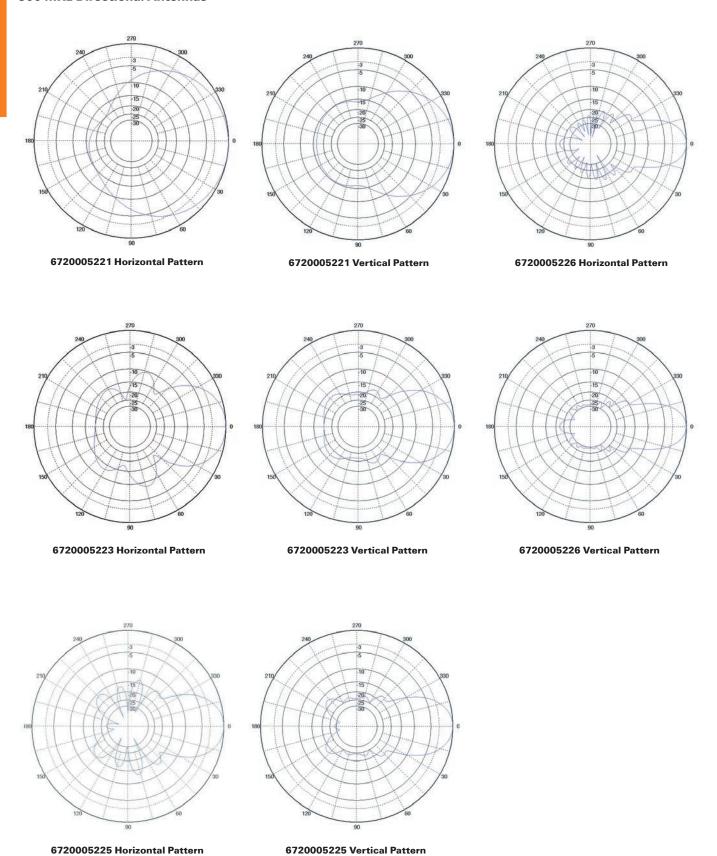
2.4 GHz Directional Antennas (continued)

6720005206 Azimuth Pattern

6720005206 Elevation Pattern

900 MHz Omni Antennas

6720005233

6720005234

6720005235 Elevation Pattern

6720005236 Azimuth Pattern

6720005236 Elevation Pattern

900 MHz Directional Antennas

6720005221 Horizontal Pattern

6720005221 Vertical Pattern

6720005226 Horizontal Pattern

6720005223 Horizontal Pattern

6720005223 Vertical Pattern

6720005226 Vertical Pattern

6720005225 Horizontal Pattern

6720005225 Vertical Pattern

Antennas

	WI-ANT-5.8GHZ-4DB MOBILE	**WI-ANT-5.8GHZ-7DB OMNI NF**	**WI-ANT-5.8GHZ-10DB OMNI NF**
	Representative Photo	Representative Photo	Representative Photo

Technical Data

Maximum Power	150 Watts	25 watts	25 watts
Polarization	Vertical	Vertical Linear	Vertical Linear
Nominal Impedance	50 Ohms	50 Ohms	50 Ohms
VSWR across the band	< 1.5:1	< 2.0	< 2.0
Radome Material	PVC	PVC	PVC
Termination	Determined by thru-panel base	N Female	N Female
Mounting Base Diameter	Compatible with most 1-1/8" - 18 thread mounts, including 3/4" hole mounts	1-5/16"	1-5/16"
Electrical Specifications			
Frequency Range	4.9-5.9 GHz	5.15-5.875 GhHz	5.15-5.875 GhHz
Gain	4dBi	7dBi	10dBi
Half Power Vertical Beamwidth		15°	10°
Mechanical Specifications			
Antenna Type	Low Profile Whipless	Omni	Omni
Connector Type	For use with thru-panel base (6720005277)	N Female	N Female
Antenna Height	1.79"	10.2"	18.38"
Bending Moment at Rated Wind		1.1 ft-lbs	5.6 ft-lbs
Max wind load @ rated velocity		3.1 lbs	6.8 lbs
Equivalent Flat Plate Area	1.5" OD	0.04ft^2	0.08ft^2
Rated Wind		125 mph	125 mph
Weight lbs (kg)	0.34 (0.15)	0.3 (0.14)	0.35 (0.16)
Temperature Range	-40 to +70℃	-40 to +70℃	-40 to +70℃

Ordering Data

Type	Part No.
WI-ANT-5.8GHZ-4DB MOBILE	**6720005278**

Type	Part No.
WI-ANT-5.8GHZ-7DB OMNI NF	**6720005283**

Type	Part No.
WI-ANT-5.8GHZ-10DB OMNI NF	**6720005284**

Antennas

IE-ANT-O-AH-360-5-NF

Representative Photo

Technical Data

Electrical Data	
Frequency (Mhz)	5150 - 5875 (Mhz)
VSWR	< 1.7
Gain	5 dBi
3dB beamwidth (horizontal)	360°
3dB beamwidth (vertical)	25°
Front to back ratio	-
Vertical electrical tilt	0°
General Data	
Radiation	Omnidirectional
Nominal Impedance	50 Ohm
Polarisation	Vertical
Connector type	1 x N-Type female
Connector position	Bottom
Composite power max.	6 W
Mechanical Data	
Dimensions	160 x 16 mm (Height x Diameter)
Weight	300 g
Wind load	frontal: 7N @ 160 km/h, lateral 7N @ 160 Km/h
Mast Diameter min.	38.1 mm
Mast Diameter max.	76.2 mm
Environmental Limits	
Environmental Conditions	outdoor
Operating Temperature	-45°C to 70°C
Storage Temperature	-45°C to 70°C
IP Rating	IP64
Material Data	
Radome Color	RAL 9002 (grey-white)
Radome Material	PP
Back plate/base plate material	-

Ordering Data

Model	802.11 a/h Wireless Antenna; Omni-directonal
Type	IE-ANT-O-AH-360-5-NF
Part No.	**1367120000**
Note:	Mounting material included

Antennas

WI-ANT-5.8GHZ-9DB DFP 2'NF	**WI-ANT 5.8GHZ 11DB FLAT PATCH**	**WI-ANT-5.8GHZ-13DB DFP 2'NF**	**WI-ANT-5.8GHZ-20DB DFP 2'NF**

	Representative Photo	Representative Photo	Representative Photo	Representative Photo

Technical Data

Maximum Power	25 watts	25 watts	25 watts	25 watts
Polarization	Linear, Vertical/horizontal	Linear, Vertical/horizontal	Linear, Vertical/horizontal	Linear, Vertical/horizontal
Nominal Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms
VSWR across the band	< 2.0:1	< 1.5:1	< 1.5:1	< 2.0:1
Radome Material	UL 94-V0 Plastic	UL 94HB Polymer	UL 94-V0 Plastic	UL 94-V0 Plastic
Termination	N Female	SMA-Female	N Female	N Female
Mounting Method	adjustable	Four 1/4" Holes	adjustable	Indoor/Outdoor articulating; heavy duty adjustable
Electrical Specifications				
Frequency Range	4.94-5.85 (2.40-2.48) GHz	5.725 - 5.875 GHz	4.9-5.9 GHz	4.94-5.85 (2.40-2.48) GHz
Gain	9dBi (8dBi)	11 dBi	13 dBi	20dBi (18dBi)
Half Power Vertical Beamwidth	60°	60°	27°	21° (9°)
Half Power Horizontal Beamwidth	60°	30°	40°	21° (9°)
Front to Back Ratio	>15 dB (>22dB)	>25 dB	> 25 dB	>25 dB (>30dB)
Mechanical Specifications				
Antenna Type	Directional Panel	Directional Panel	Directional Panel	Directional Panel
Connector Type	N Female	SMA-Female	N Female	N Female
Dimensions	5.1" x 4.7" x 1.5"	4.5" x 4.5" x 1"	5.1" x 4.7" x 1.5"	15.1" x13.9" x 1.9"
Max Wind Load @ Rated Velocity	9.3 lbs		9.3 lbs	85 lbs
Equivalent Flat Plate Area				
Rated Wind	125 mph	>150 mph	125 mph	125 mph
Weight lbs (kg)	0.5 (0.23)	<0.4 (<0.2)	0.5 (0.23)	3.9 (1.8)
Temperature Range	-40 to +70°C	-40 to +85°C	-40 to +70°C	-40 to +70°C

Ordering Data

	Type	Part No.	Type	Part No.	Type	Part No.	Type	Part No.
	WI-ANT-5.8GHZ-9DB DFP 2'NF	**6720005280**	WI-ANT 5.8GHZ 11DB FLAT PATCH	**6720005130**	WI-ANT-5.8GHZ-13DB DFP 2'NF	**6720005281**	WI-ANT-5.8GHZ-20DB DFP 2'NF	**6720005282**

Antennas

	IE-ANT-P-ABG-75-9-NF	**IE-ANT-O-ABG-360-7-NF**
	Representative Photo	Representative Photo

Technical Data

Electrical Data		
Frequency (Mhz)	**Band 1:** 2400 - 2500 (Mhz)	**Band 1:** 2400 - 2500 (Mhz)
	Band 2: 5150 - 5875 (Mhz)	**Band 1:** 5150 - 5875 (Mhz)
		Band 3: 3400 - 3700 (Mhz)
		Band 4: 4900 - 5470 (Mhz)
		Band 5: 5470 - 5935 (Mhz)
VSWR	< 2	**Band 1:** < 1.8
		Band 2: < 2
		Band 3: < 2
		Band 4: < 1.8
		Band 5: < 1.8
Gain	9 dBi Band 1/2	**Band 1:** 6 dBi
		Band 2: 6 dBi
		Band 3: 7 dBi
		Band 4: 8 dBi
		Band 5: 8 dBi
3dB beamwidth (horizontal)	75° Band 1 ; 55° Band 2	-
3dB beamwidth (vertical)	55° Band 1/2	-
Front to back ratio	15 dB Band 1/2	-
Vertical electrical tilt	0° Band 1/2	-
General Data		
Radiation	Directional	Omnidirectional
Nominal Impedance	50 Ohm	50 Ohm
Polarisation	Vertical	Vertical
Connector type	1 x N-Type female	1 x N-Type female
Connector position	Bottom	Bottom
Composite power max.	10 W	75 W
Mechanical Data		
Dimensions	101 x 80 x 35 mm (Height x Width x Depth)	50.6 x 86 mm (Height x Diameter)
Weight	110 g	300 g
Wind load	frontal: 7N @ 160 km/h, lateral 7N @ 160 Km/h	frontal: 10N @ 160 km/h
Mast Diameter min.	40 mm	-
Mast Diameter max.	60 mm	-
Environmental Limits		
Environmental Conditions	outdoor	outdoor
Operating Temperature	-40°C to 80°C	-40°C to 80°C
Storage Temperature	-40°C to 80°C	-40°C to 80°C
IP Rating	IP67	IP68
Material Data		
Radome Color	RAL 7044 (grey)	RAL 7043 (dark-grey)
Radome Material	PC	ASA_SAN
Back plate/base plate material	-	Stainless Steel

Ordering Data

Model	802.11 a/b/g/h Wireless Antenna; Directional	802.11 a/b/g/h Wireless Antenna; Omni-directonal
Type	IE-ANT-P-ABG-75-9-NF	IE-ANT-O-ABG-360-7-NF
Part No.	**1367140000**	**1367130000**
Note:	Mounting material included	Mounting material included

Antennas

WI-ANT-DEMO-2400

Representative Photo

WI-ANT-24GHZ-2DB DUCK SMA-M

Representative Photo

WI-ANT-24GHZ-3DB FOR MAG BASE

Representative Photo

Technical Data

	WI-ANT-DEMO-2400	WI-ANT-24GHZ-2DB DUCK SMA-M	WI-ANT-24GHZ-3DB FOR MAG BASE
Maximum Power	1 watt	50 watts	200/150/100 watts
Polarization	Vertical	Vertical, Linear	Vertical
Nominal Impedance	50 ohms	50 ohms	50 ohms
VSWR across the band	1.5:1	< 1.5:1	< 1.5:1
Radome Material	Polyurethane	Polyurethane	Stainless steel
Termination	SMA male	SMA male	N female
Mounting Base Diameter	N/A	N/A	N/A
Electrical Specifications			
Frequency Range	2.4 GHz	2.4 GHz	2.2 - 2.9 GHz
Gain	0dB	2 dBi	3 dBi
Half Power Vertical Beamwidth	N/A	50°	30°
Mechanical Specifications			
Antenna Type	Whip	Whip	ISM mobile with WLAN
Connector Type	SMA male	SMA male	N female
Antenna Height	54 mm	114.3 mm	5.25" (133.35 mm)
Bending Moment at Rated Wind	N/A	N/A	N/A
Max Wind Load @ Rated Velocity	N/A	N/A	N/A
Equivalent Flat Plate Area	N/A	N/A	N/A
Rated Wind	N/A	N/A	N/A
Weight lbs (kg)	0.019 (0.009)	0.15 (0.068)	0.25 (0.113)
Temperature Range	N/A	-40°C to +85°C	-40°C to +70°C

Ordering Data

Type	Part No.
WI-ANT-DEMO-2400	6720005099

Type	Part No.
WI-ANT-24GHZ-2DB DUCK SMA-M	6720005207

Type	Part No.
WI-ANT-24GHZ-3DB FOR MAG BASE	6720005208

Antennas

| WI-ANT-24GHZ-4DB OMNI NF | WI-ANT-0.9/2.4GHZ-3/4DB MOBILE | WI-ANT-24GHZ-6DB OMNI NF |

Representative Photo   Representative Photo   Representative Photo

Technical Data

	WI-ANT-24GHZ-4DB OMNI NF	WI-ANT-0.9/2.4GHZ-3/4DB MOBILE	WI-ANT-24GHZ-6DB OMNI NF
Maximum Power	25 watts	100 watts	25 watts
Polarization	Vertical	Vertical	Vertical
Nominal Impedance	50 ohms	50 ohms	50 ohms
VSWR across the band	< 1.5:1	< 2.0:1	< 1.5:1
Radome Material	UV resistant pultruded fiberglass	PVC	UV resistant pultruded fiberglass
Termination	N female	Determined by Thru-panel base	N female
Mounting Base Diameter	1.25"	Compatible with most 1-1/8" - 18 thread mounts, including 3/4" hole mounts	1.25"

Electrical Specifications			
Frequency Range	2.4 - 2.48 GHz	902-928 MHz / 2400-2500 MHz	2.4 - 2.48 GHz
Gain	4 dBi	4 dBi	6 dBi
Half Power Vertical Beamwidth	30°		20°

Mechanical Specifications			
Antenna Type	Omni	Low Profile Whipless	Omni
Connector Type	N female	For use with thru-panel base (6720005277)	N female
Antenna Height	8.1" (205.7 mm)	2.4" (60.9 mm)	11.6" (294.6 mm)
Bending Moment at Rated Wind	0.7 ft-lbs		1.4 ft-lbs
Max wind load @ rated velocity	2.1 lbs		3.0 lbs
Equivalent Flat Plate Area	.02 ft^2	1.5" OD	.04 ft^2
Rated Wind	125 mph		125 mph
Weight lbs (kg)	0.34 (0.154)	0.29 (0.13)	0.38 (0.172)
Temperature Range	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C

Ordering Data

	Type	Part No.	Type	Part No.	Type	Part No.
	WI-ANT-24GHZ-4DB OMNI NF	6720005200	WI-ANT-0.9/ 2.4GHZ-3/4DB MOBILE	6720005276	WI-ANT-24GHZ-6DB OMNI NF	6720005201

Antennas

WI-ANT-24GHZ-8DB OMNI NF

WI-ANT-24GHZ-10DB OMNI NF

WI-ANT-24GHZ-12DB OMNI NF

Representative Photo | Representative Photo | Representative Photo

Technical Data

	WI-ANT-24GHZ-8DB	WI-ANT-24GHZ-10DB	WI-ANT-24GHZ-12DB
Maximum Power	25 watts	25 watts	25 watts
Polarization	Vertical	Vertical	Vertical
Nominal Impedance	50 ohms	50 ohms	50 ohms
VSWR across the band	< 1.5:1	< 1.5:1	< 1.5:1
Radome Material	UV resistant pultruded fiberglass	UV resistant pultruded fiberglass	UV resistant pultruded fiberglass
Termination	N female	N female	N female
Mounting Base Diameter	1.25"	1.25"	1.5"
Electrical Specifications			
Frequency Range	2.4 - 2.48 GHz	2.4 - 2.48 GHz	2.4 - 2.5 GHz
Gain	8 dBi	10 dBi	12 dBi
Half Power Vertical Beamwidth	13°	9°	7°
Mechanical Specifications			
Antenna Type	Omni	Omni	Omni
Connector Type	N female	N female	N female
Antenna Height	20.2" (513.1 mm)	36.0" (914.4 mm)	44.0" (1118 mm)
Bending Moment at Rated Wind	4.4 ft-lbs	14.7 ft-lbs	41 ft-lbs
Max Wind Load @ Rated Velocity	5.2 lbs	10.1 lbs	22.4 lbs
Equivalent Flat Plate Area	.06 ft²	.11 ft²	.25 ft²
Rated Wind	125 mph	125 mph	125 mph
Weight lbs (kg)	0.50 (0.226)	0.65 (0.295)	3.00 (1.400)
Temperature Range	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C

Ordering Data

Type	Part No.	Type	Part No.	Type	Part No.
WI-ANT-24GHZ-8DB OMNI NF	**6720005204**	WI-ANT-24GHZ-10DB OMNI NF	**6720005202**	WI-ANT-24GHZ-12DB OMNI NF	**6720005203**

Antennas

IE-ANT-O-BG-360-6-NF

Representative Photo

Technical Data

Electrical Data	
Frequency (Mhz)	2400 - 2500 (Mhz)
VSWR	1.8
Gain	6 dBi
3dB beamwidth (horizontal)	360°
3dB beamwidth (vertical)	30°
Front to back ratio	-
Vertical electrical tilt	0°
General Data	
Radiation	Omnidirectional
Nominal Impedance	50 Ohm
Polarisation	Vertical
Connector type	1 x N-Type female
Connector position	Bottom
Composite power max.	25 W
Mechanical Data	
Dimensions	250 x 22 mm (Height x Diameter)
Weight	300 g
Wind load	frontal: 3N @ 160 km/h, lateral 3N @ 160 Km/h
Mast Diameter min.	-
Mast Diameter max.	-
Environmental Limits	
Environmental Conditions	outdoor
Operating Temperature	-40°C to 80°C
Storage Temperature	-40°C to 80°C
IP Rating	IP67
Material Data	
Radome Color	RAL 7035 (light grey)
Radome Material	Glass Fiber
Back plate/base plate material	-

Ordering Data

Model	802.11 b/g Wireless Antenna; Omni-directonal
Type	IE-ANT-O-BG-360-6-NF
Part No.	**1367090000**
Note:	Mounting material included

Antennas

WI-ANT-24GHZ-9DB
DFP 2′ NF

WI-ANT-24GHZ-10DB
YAGI NF

WI-ANT-24GHZ-13DB
DFP 2′ NF

Representative Photo

Representative Photo

Representative Photo

Technical Data

Maximum Power	20 watts	5 watts	20 watts
Polarization	Linear	Linear	Linear
Nominal Impedance	50 ohms	50 ohms	50 ohms
VSWR across the band	<1.6: 1	<1.5: 1	<1.6: 1
Radome Material	UV stable plastic	UV stable plastic	UV stable plastic
Cable Length and type	12" RG58/U	36" coax	12" RG58/U
Termination	N female	N female	N female
Mounting Method	Indoor/outdoor articulating; heavy duty outdoor adjustable	heavy duty outdoor adjustable	Indoor/outdoor articulating; heavy duty outdoor adjustable
Electrical Specifications			
Frequency Range	2.3 - 2.5 GHz	2.4 - 2.485 GHz	2.3 - 2.5 GHz
Gain	9 dBi	10 dBi	13 dBi
Half Power Horizontal Beamwidth	60°	55°	35°
Half Power Vertical Beamwidth	60°	55°	35°
Front to Back Ratio	>15 dB	>23 dB	>18 dB
Mechanical Specifications			
Antenna Type	Directional Panel	Directional Yagi	Directional Panel
Connector Type	N female	N female	N female
Dimensions	5.1"x4.7"x1.5"	4.5" x 3"	8.8"x8.1"x1.6"
Max Wind Load @ Rated Velocity	9.3 lbf	5.8 lbf	27.9 lbf
Equivalent Flat Plate Area		0.060 ft²	
Rated Wind	125 mph	125 mph	125 mph
Weight lbs (kg)	0.5 (0.227)	1.0 (0.5)	1.2 (0.544)
Temperature Range	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C

Ordering Data

	Type	Part No.	Type	Part No.	Type	Part No.
	WI-ANT-24GHZ-9DB DFP 2′ NF	**6720005212**	WI-ANT-24GHZ-10DB YAGI NF	**6720005205**	WI-ANT-24GHZ-13DB DFP 2′ NF	**6720005213**

Antennas

WI-ANT-24GHZ-14DB YAGI NF

WI-ANT-24GHZ-18DB DFP 2' NF

Representative Photo

Representative Photo

Technical Data

	WI-ANT-24GHZ-14DB YAGI NF	WI-ANT-24GHZ-18DB DFP 2' NF
Maximum Power	5 watts	20 watts
Polarization	Linear	Linear
Nominal Impedance	50 ohms	50 ohms
VSWR across the band	<1.5: 1	<1.6: 1
Radome Material	UV stable plastic	UV stable plastic
Cable Length and type	36" coax	12" RG58/U
Termination	N female	N female
Mounting Method	Heavy duty outdoor adjustable	Indoor/outdoor articulating; heavy duty outdoor adjustable
Electrical Specifications		
Frequency Range	2.4 - 2.485 GHz	2.3 - 2.5 GHz
Gain	14 dBi	18 dBi
Half Power Horizontal Beamwidth	30°	18°
Half Power Vertical Beamwidth	30°	19°
Front to Back Ratio	>30 dB	>25 dB
Mechanical Specifications		
Antenna Type	Directional Yagi	Directional Panel
Connector Type	N female	N female
Dimensions	14" x 3"	15.1"x13.9"x1.9"
Max wind load @ rated velocity	18.3 lbf	85 lbf
Equivalent Flat Plate Area	0.20 ft^2	
Rated Wind	125 mph	125 mph
Weight lbs (kg)	1.0 (0.5)	3.9 (1.77)
Temperature Range	-40°C to +70°C	-40°C to +70°C

Ordering Data

Type	Part No.	Type	Part No.
WI-ANT-24GHZ-14DB YAGI NF	6720005206	WI-ANT-24GHZ-18DB DFP 2' NF	6720005214

Antennas

WI-ANT-900MHZ-0DB DUCK SMA M

WI-ANT-DPL-DG900-1

WI-ANT-DEMO-900

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Technical Data

	WI-ANT-900MHZ-0DB DUCK SMA M	WI-ANT-DPL-DG900-1	WI-ANT-DEMO-900
Maximum Power	5 watts		
Polarization	Tertical, Linear		
Nominal Impedance	50 ohms	50 ohms	50 ohms
VSWR across the band	<2.0:1		
Radome Material			
Termination	SMA male	SMA male	SMA male
Mounting Base Diameter			
Electrical Specifications			
Frequency Range	806-960 MHz/1710-2170 MHz	900-930 MHz	900-930 MHz
Gain	0 dBi	-2 dBi	0 dBi
Half Power Vertical Beamwidth			
Mechanical Specifications			
Antenna Type	Portable whip	Ground independent dipole	1/4 wave whip
Connector Type	SMA male	SMA male	SMA male
Antenna Height	6.5" (16.5 cm)	6" (15 cm)	3.5" (9 cm)
Bending Moment at Rated Wind			
Max Wind Load @ Rated Velocity			
Equivalent Flat Plate Area			
Rated Wind			
Weight lbs (kg)			
Temperature Range	-40°C to +85°C		

Ordering Data

Type	Part No.	Type	Part No.	Type	Part No.
WI-ANT-900MHZ-0DB DUCK SMA M	6720005232	WI-ANT-DPL-DG900-1	6720005086	WI-ANT-DEMO-900	6720005089

Antennas

	WI-ANT-DPL-0-16	WI-ANT-900MHZ-3DB STUB MAG	WI-ANT-0.9/2.4GHZ-3/4DB MOBILE	WI-ANT-900MHZ-0DB OMNI NF
	Representative Photo	Representative Photo	Representative Photo	Representative Photo

Technical Data

Maximum Power	10 watts	100 watts	100 watts	150 watts
Polarization	Vertical	Vertical	Vertical	Vertical
Nominal Impedance	50 ohms	50 ohms	50 ohms	50 ohms
VSWR across the band	<1.5: 1	<1.5:1	< 2.0:1	
Radome Material	Fiberglass	Stainless Steel	PVC	Fiberglass
Termination	SMA male	Determined by MAGBASE	Determined by thru-panel base	N female
Mounting Base Diameter		Determined by MAGBASE	Compatible with most 1-1/8" - 18 thread mounts, including 3/4" hole mounts	1-5/16"

Electrical Specifications				
Frequency Range	853-930 MHz	896-940 MHz	902-928 MHz / 2400-2500 MHz	902-928 MHz
Gain	0 dBi	3 dB	3 dBi	Unity
Half Power Vertical Beamwidth				75°

Mechanical Specifications				
Antenna Type	Half wave dipole	5/8 wave over 1/4 wave	Low Profile Whipless	Omni
Connector Type	SMA male	Determined by MAGBASE	For use with thru-panel base (6720005277)	N female
Antenna Height	16" (40 cm)	11" (27.9 cm)	2.4"	14" (35.6 cm)
Bending Moment at Rated Wind				1.4 ft-lbs
Max Wind Load @ Rated Velocity				2.3 lbs
Equivalent Flat Plate Area			1.5" OD	0.06 ft²
Rated Wind				100 mph
Weight lbs (kg)	0.5 (0.2)		0.29 (0.13)	0.75 (0.34)
Temperature Range		-40°C to +70°C	-40°C to +70°C	-40°C to +70°C

Ordering Data

	Type	Part No.	Type	Part No.	Type	Part No.	Type	Part No.
	WI-ANT-DPL-0-16	6720005080	WI-ANT-900MHZ-3DB STUB MAG	6720005230	WI-ANT-0.9/2.4GHZ-3/4DB MOBILE	6720005276	WI-ANT-900MHZ-0DB OMNI NF	6720005233

Antennas	WI-ANT-900MHZ-3DBD OMNI NF	WI-ANT-900MHZ-5DBD OMNI NF	WI-ANT-900MHZ-7DBD OMNI NF
	Representative Photo	Representative Photo	Representative Photo

Technical Data

Maximum Power	150 watts	150 watts	150 watts
Polarization	Vertical	Vertical	Vertical
Nominal Impedance	50 ohms	50 ohms	50 ohms
VSWR across the band			
Radome Material	Fiberglass	Fiberglass	Fiberglass
Termination	N female	N female	N female
Mounting Base Diameter	1-5/16"	1-5/16"	1-5/16"
Electrical Specifications			
Frequency Range	902-928 MHz	902-928 MHz	902-928 MHz
Gain	3 dB	5 dB	7 dB
Half Power Vertical Beamwidth	40°	22°	17°
Mechanical Specifications			
Antenna Type	Omni	Omni	Omni
Connector Type	N female	N female	N female
Antenna Height	23.25" (59.1 cm)	48" (121.9 cm)	96" (243.8 cm)
Bending Moment at Rated Wind	4.7 ft-lbs	14.2 ft-lbs	62.5 ft-lbs
Max Wind Load @ Rated Velocity	4.3 lbs	8.0 lbs	15.8 lbs
Equivalent Flat Plate Area	0.12 ft^2	0.22 ft^2	0.44 ft^2
Rated Wind	100 mph	100 mph	100 mph
Weight lbs (kg)	1.25 (0.57)	1.75 (0.79)	4 (1.81)
Temperature Range	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C

Ordering Data

	Type	Part No.	Type	Part No.	Type	Part No.
	WI-ANT-900MHZ-3DB OMNI NF	**6720005234**	WI-ANT-900MHZ-5DB OMNI NF	**6720005235**	WI-ANT-900MHZ-7DB OMNI NF	**6720005236**

Antennas

WI-ANT-900MHZ-3DBD YAGI NF	WI-ANT-900MHZ-6.5DB-2′ YAGI NF	WI-ANT-900MHZ-10DB-2′ YAGI NF
Representative Photo	Representative Photo	Representative Photo

Technical Data

Maximum Power	200 watts	200 watts	200 watts
Polarization	Linear	Linear	Linear
Nominal Impedance	50 ohms	50 ohms	50 ohms
VSWR Across the band	<1.5:1	<1.5:1	<1.5:1
Radome Material	Aluminum 6061-T6	Aluminum 6061-T6	Aluminum 6061-T6
Termination	N female	N female	N female
Mounting Method	Includes mounting hardware	Includes mounting hardware	Includes mounting hardware
Electrical Specifications			
Frequency Range	890-960 MHz	890-960 MHz	890-960 MHz
Gain	3 dBd	6.5 dBd	10 dBd
Half Power Horizontal Beamwidth	168°	100°	56°
Half Power Vertical Beamwidth	78°	62°	46°
Front to Back Ratio	>10 dB	>15 dB	>20 dB
Mechanical Specifications			
Antenna Type	Directional Yagi	Directional Yagi	Directional Yagi
Antenna Dimensions (L x W)	13" x 6.8"	13" x 6.8"	24" x 6.8"
Weight lbs (kg)	1.3 (0.59)	2 (0.9)	6.8 (3.08)
Cross Sectional Area	0.11 ft^2	0.12 ft^2	0.24 ft^2
Max Wind Load @ Rated Velocity	2.75 lbf	3 lbf	6 lbf
Rated Wind	125 mph	125 mph	125 mph
Elements	2	3	7
Cable Type	LMR400	RG213	RG213
Cable Length	2 ft.	2 ft.	2 ft.
Connector Type	N female	N female	N female
Temperature Range	-40°C to +85°C	-40°C to +70°C	-40°C to +70°C

Ordering Data

	Type	Part No.	Type	Part No.	Type	Part No.
	WI-ANT-900MHZ-3DB YAGI NF	**6720005219**	WI-ANT-900MHZ-6.5DB-2′ YAGI NF	**6720005221**	WI-ANT-900MHZ-10DB-2′ YAGI NF	**6720005223**

Antennas

WI-ANT-900MHZ-12DB-2' YAGI NF

WI-ANT-900MHZ-14DB-2' YAGI NF

Representative Photo

Representative Photo

Technical Data

Maximum Power	200 watts	200 watts
Polarization	Linear	Linear
Nominal Impedance	50 ohms	50 ohms
VSWR Across the band	<1.5:1	<1.5:1
Radome Material	Aluminum 6061-T6	Aluminum 6061-T6
Termination	N female	N female
Mounting Method	Includes mounting hardware	Includes mounting hardware
Electrical Specifications		
Frequency Range	890-960 MHz	890-960 MHz
Gain	12 dBd	14 dBd
Half Power Horizontal Beamwidth	40°	32°
Half Power Vertical Beamwidth	34°	26°
Front to Back Ratio	>20 dB	>25 dB
Mechanical Specifications		
Antenna Type	Directional Yagi	Directional Yagi
Antenna Dimensions (L x W)	37" x 6.6"	63" x 6.6"
Weight lbs (kg)	2.5 (1.3)	3.5 (1.58)
Cross Sectional Area	0.35 ft²	0.67 ft²
Max wind load @ rated velocity	8.75 lbf	16.75 lbf
Rated Wind	125 mph	125 mph
Elements	11	18
Cable Type	RG213	RG213
Cable Length	2 ft.	2 ft.
Connector Type	N female	N female
Temperature Range	-40°C to +70°C	-40°C to +70°C

Ordering Data

	Type	Part No.	Type	Part No.
	WI-ANT-900MHZ-12DB-2' YAGI NF	**6720005225**	WI-ANT-900MHZ-14DB-2' YAGI NF	**6720005226**

**Antennas–
900 MHz Omni
(Licensed)**

	WI-ANT-950Mhz-3DBD OMNI NF	WI-ANT-950Mhz-5DBD OMNI NF	WI-ANT-950Mhz-7DBD OMNI NF
	Representative Photo	Representative Photo	Representative Photo

Technical Data

Maximum Power	150 Watts	150 Watts	150 Watts
Polarization	Vertical Linear	Vertical Linear	Vertical Linear
Nominal Impedance	50 Ohms	50 Ohms	50 Ohms
VSWR across the band	<1.5:1 (70 MHz)	<1.5:1 (70 MHz)	<1.5:1 (40 MHz)
Radome Material	1.0″ OD pultruded white fiberglass	1.0″ OD pultruded white fiberglass	1.0″ OD pultruded white fiberglass
Termination	N Female	N Female	N Female
Mounting Base Diameter	1-5/16"	1-5/16"	1-5/16"
Electrical Specifications			
Frequency Range	890-960 MHz	890-960 MHz	890-940 MHz
Gain	3 dBd	5 dBd	7 dBd
Half Power Vertical Beamwidth	40°	22°	17°
Mechanical Specifications			
Antenna Type	Omni	Omni	Omni
Connector Type	N Female	N Female	N Female
Antenna Height	23"	48"	96"
Bending Moment at Rated Wind	4.7 ft-lbs	14.2 ft-lbs	62.5 ft-lbs
Max Wind Load @ Rated Velocity	4.3 lbs	8.0 lbs	15.8 lbs
Equivalent Flat Plate Area	0.12 ft^2	0.22 ft^2	0.44 ft^2
Rated Wind	100 mph	100 mph	100 mph
Weight lbs (kg)	1.25 lbs	1.75 lbs	4.00 lbs
Temperature Range	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C

Ordering Data

Type	Part No.	Type	Part No.	Type	Part No.
WI-ANT-950Mhz-3DBD OMNI NF	**6720005273**	WI-ANT-950Mhz-5DBD OMNI NF	**6720005274**	WI-ANT-950Mhz-7DBD OMNI NF	**6720005275**

Antennas–300-500 MHz

WI-ANT-440MHZ-5DB OMNI NF

WI-ANT-450MHZ-3DB OMNI NF

WI-ANT-450MHZ-5DB OMNI NF
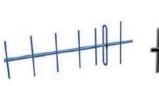
Representative Photo | Representative Photo | Representative Photo

Technical Data

	WI-ANT-440MHZ-5DB	WI-ANT-450MHZ-3DB	WI-ANT-450MHZ-5DB
Maximum Power	250 Watts	250 Watts	250 Watts
Polarization	Vertical Linear	Vertical Linear	Vertical Linear
Nominal Impedance	50 Ohms	50 Ohms	50 Ohms
VSWR across the band	<1.5:1 (70 MHz)	<1.5:1 (10 MHz)	<1.5:1 (10 MHz)
Radome Material	2.0″ OD pultruded white fiberglass	Pultruded white fiberglass	Pultruded white fiberglass
Termination	N Female	N Female	N Female
Mounting Base Diameter	1-5/16"	1-5/16"	1-5/16"
Electrical Specifications			
Frequency Range	430-470 MHz	450-460 MHz	450-460 MHz
Gain	5 dBd (7 dBi)	3 dBd	5 dBd
Half Power Vertical Beamwidth	18°	38°	27°
Mechanical Specifications			
Antenna Type	Omni	Omni	Omni
Connector Type	N Female	N Female	N Female
Antenna Height	83"	71"	77"
Bending Moment at Rated Wind	250 ft-lbs	29.0 ft-lbs	40.4 ft-lbs
Max Wind Load @ Rated Velocity	45 lbs	10.8 lbs	12.6 lbs
Equivalent Flat Plate Area	1.125 ft^2	0.30 ft^2	0.35 ft^2
Rated Wind	125 mph	100 mph	100 mph
Weight lbs (kg)	7.0 lbs	4.0 lbs	4.50 lbs
Temperature Range	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C

Ordering Data

Type	Part No.	Type	Part No.	Type	Part No.
WI-ANT-440MHZ-5DB OMNI NF	**6720005439**	WI-ANT-450MHZ-3DB OMNI NF	**6720005440**	WI-ANT-450MHZ-5DB OMNI NF	**6720005436**

Antennas– 300-500 MHz

	WI-ANT-390Mhz-10DBD YAGI NF	WI-ANT-420Mhz-6DBD YAGI NF	WI-ANT-420Mhz-9DBD YAGI NF	WI-ANT-470Mhz-6DBD YAGI NF
	Representative Photo	Representative Photo	Representative Photo	Representative Photo

Technical Data

Maximum Power	250 Watts	150 Watts	150 Watts	150 Watts
Polarization	Linear	Linear	Linear	Linear
Nominal Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms
VSWR across the band	<1.5:1 (70 MHz)	<1.5:1 (34 MHz)	<1.5:1 (34 MHz)	<1.5:1 (40 MHz)
Radome Material	3/8" solid 6061-T6 aluminum	3/8" solid 6061-T6 aluminum	3/8" solid 6061-T6 aluminum	3/8" solid 6061-T6 aluminum
Termination	N Female	N Female	N Female	N Female
Mounting Pipe Diameter	1-5/16"	1.9″ OD	1.9″ OD	1.9″ OD
Electrical Specifications				
Frequency Range	375-403 MHz	406-440 MHz	406-440 MHz	440-480 MHz
Gain	10 dBd	6.5 dBd	9 dBd	6.5 dBd
Half Power Vertical Beamwidth	46°	62°	45°	62°
Half Power Horizontal Beamwidth	52°	71°	52°	71°
Front to Back Ratio	>20 dB	>15 dB	>15 dB	>15 dB
Mechanical Specifications				
Antenna Type	Directional Yagi	Directional Yagi	Directional Yagi	Directional Yagi
Connector Type	N Female	N Female	N Female	N Female
Antenna Length (Boom OD)	44" x 14.3"	22" (.75")	34" (.75")	22" (.75")
Number of Elements	7	3	5	3
Bending Moment at Rated Wind	12.75 ft-lbs	12.75 ft-lbs	32.4 ft-lbs	12.75 ft-lbs
Max wind load @ rated velocity	20.84 lbs	14.8 lbs	24.2 lbs	14.8 lbs
Equivalent Flat Plate Area	0.53 ft^2	0.19 ft^2	0.31 ft^2	0.19 ft^2
Rated Wind	100 mph	125 mph	125 mph	125 mph
Weight lbs (kg)	3.5 lbs	1.2 lbs	2 lbs	1.2lbs
Temperature Range	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C

Ordering Data

	Type	Part No.	Type	Part No.	Type	Part No.	Type	Part No.
	WI-ANT-390Mhz-10DBD YAGI NF	6720005441	WI-ANT-420Mhz-6DBD YAGI NF	6720005442	WI-ANT-420Mhz-9DBD YAGI NF	6720005443	WI-ANT-470Mhz-6DBD YAGI NF	6720005444

Antennas– 300-500 MHz

WI-ANT-470Mhz-9DBD YAGI NF	WI-ANT-450MHZ-10DB YAGI	WI-ANT-470Mhz-9DBD YAGI NF
Representative Photo	Representative Photo	Representative Photo

Technical Data

Maximum Power	150 Watts	250 Watts	150 Watts
Polarization	Linear	Linear	Linear
Nominal Impedance	50 Ohms	50 Ohms	50 Ohms
VSWR across the band	<1.5:1 (40 MHz)	<1.5:1 (70 MHz)	<1.5:1 (40 MHz)
Radome Material	3/8" solid 6061-T6 aluminum	3/8" solid 6061-T6 aluminum	3/8" solid 6061-T6 aluminum
Termination	N Female	N Female	N Female
Mounting Pipe Diameter	1.9″ OD	1.9″ OD	1.9″ OD
Electrical Specifications			
Frequency Range	440-480 MHz	450-470 MHz	470-512 MHz
Gain	9 dBd	10 dBd	9 dBd
Half Power Vertical Beamwidth	45°	45°	45°
Half Power Horizontal Beamwidth	52°	0°	52°
Front to Back Ratio	> 15 dB	> 20 dB	> 15 dB
Mechanical Specifications			
Antenna Type	Directional Yagi	Directional Yagi	Directional Yagi
Connector Type	N Female	N Female	N Female
Antenna Length (Boom OD)	34" (.75")	42" x 11.8"	34" (.75")
Number of Elements	5	7	5
Bending Moment at Rated Wind	32.4 ft-lbs	250 ft-lbs	32.4 ft-lbs
Max wind load @ rated velocity	24.2 lbs	11.5 lbs	24.2 lbs
Equivalent Flat Plate Area	0.31 ft^2	0.46 ft^2	0.31 ft^2
Rated Wind	125 mph	150 mph	125 mph
Weight lbs (kg)	2 lbs	3 lbs (1.36kg)	2 lbs
Temperature Range	-40°C to +70°C	-40°C to +70°C	-40°C to +70°C

Ordering Data

	Type	Part No.	Type	Part No.	Type	Part No.
	WI-ANT-470Mhz-9DBD YAGI NF	**6720005445**	WI-ANT-450MHZ-10DB YAGI	**6720005435**	WI-ANT-470Mhz-9DBD YAGI NF	**6720005446**

Antennas–Cellular

WI-ANT-GSM-LTE-3DB Mobile

WI-ANT-GSM-2DB LP

Representative Photo

Representative Photo

Technical Data

	WI-ANT-GSM-LTE-3DB Mobile	WI-ANT-GSM-2DB LP
Maximum Power	100 Watts	8 Watts
Polarization	Vertical	Linear
Nominal Impedence	50 Ω	50 Ω
VSWR across the band	<2.0:1	<2.5:1
Radome Material	PVC (IP66)	PVC
Termination	Determined by thru-panel base	Male SMA c/w 17 ft (5 meter) RG-174 cable
Mounting Base Diameter	Compatible with most 1/8″-8 thread mounts, including 3/4″ hole mounts	1-1/2″ through hole mount. Mount assembly includes flat adapter shim for installations or larger cutouts
Electrical Specifications		
Frequency Range	698-2700 MHz	824-896 MHz 1710-1990 MHZ
Gain	3 dBi	2 dBi +/- 1 dB@900 MHz, 1 dB +/-1 dB@1800 MHz
Mechanical Specifications		
Antenna Type (Radiation)	Low Profile Whipless	GSM Multi-band Through Hole Low Profile
Connector Type	For use with thru-panel base (6720005277)	Male SMA
Antenna Height	2.4"	0.59" (1.5cm)
Equivalent Flat Plate Area	1.5" OD	3.1" (8cm)
Weight lbs (kg)	0.29 (0.13)	0.45 (0.24)
Temperature Range	-40°C to +70°C	-40°C to +70°C

Ordering Data

	Type	Part No.	Type	Part No.
	WI-ANT-GSM-LTE-3DB Mobile	**6720005450**	WI-ANT-GSM-2DB LP	**6720005451**

Antennas–Cellular

	WI-ANT-900MHZ-0DBDUCKSMAM	**IE-ANT-3G-806-2170-2-NF**	**IE-ANT-3G-806-2500-4-NF**
	Representative Photo	Representative Photo	Representative Photo

Technical Data

Maximum Power	5 Watts	25 W	
Polarization	Vertical Linear	Vertical, Linear	Vertical, Linear
Nominal Impedence	50 Ω	50 Ω	50 Ω
VSWR across the band	<2.0:1	< 2.5	< 2.0:1
Radome Material	PVC	PVC	PVC (IP66)
Termination	Male SMA	1x N-type female, bottom	1x N-type female, bottom
Mounting Base Diameter	Direct connection 180° swivel, 0°-90° knuckle	1 x antenna, 1 x mounting bracket, 2 x clamps for mast assembly	1 x antenna, 1 x Screw connector and mouting material for vandal proof mounting
Electrical Specifications			
Frequency Range	806-960 MHz / 1.71-2.17 GHz	806-960 (MHz), 1710-2170 (MHz)	806-960 MHz / 1.71-2.5 GHz
Gain	0 dBi	2dBi	4dBi
Mechanical Specifications			
Antenna Type (Radiation)	Low Profile Whip	Omni	Omni
Connector Type	Male SMA	1x N-type female, bottom	1x N-type female, bottom
Antenna Height	7-5/8" (19.4 cm)	7.9" (200 mm)	2.1" (48 mm)
Equivalent Flat Plate Area		1" (22 mm)	1.5" (36 mm)
Weight lbs (kg)	0.15 (0.06)	1.0 (0.430)	1.0 (0.3)
Temperature Range	-40°C to +70°C	-40 to +70°C	-40 to +70°C

Ordering Data

Type	Part No.	Type	Part No.	Type	Part No.
WI-ANT-900MHZ-0DBDUCKSMAM	6720005232	IE-ANT-3G-806-2170-2-NF	1491160000	IE-ANT-3G-806-2500-4-NF	1491170000

Cables

- Impedance: 50 ohms
- Foamed Polyethylene
- 100% Bonded Aluminum Foil
- Tinned Copper Braid - CuSn
- Flame-retardant PVC
- Polyethylene Jacket

PFP195

PFP400

PFP600

Technical Data

Electrical Specifications	PFP195	PFP400	PFP600
Cutoff Frequency	41 GHz	16.2 GHz	10.3 GHz
Velocity of Propagation	80%	85%	87%
Dielectric Constant	1.56	1.38	1.32
Time Delay nS/ft (nS/m)	1.27 (4.17)	1.20 (3.92)	1.17 (3.83)
Impedance	50 ohms	50 ohms	50 Ohms
Capacitance (pF/m)	79.7	78.4	76.8
Inductance uH/ft (uH/m)	0.064 (0.21)	0.060 (0.20)	0.058 (0.19)
Shielding Effectiveness	>90 dB	>90 dB	>90 dB
DC Resistance:			
Inner Conductor ohms/ 1000ft (/km)	7.6 (24.9)	1.39 (4.6)	0.53 (1.7)
Outer Conductor ohms/ 1000ft (/km)	4.9 (16.1)	1.65 (5.4)	1.2 (3.9)
Voltage Withstand	1000 VDC	2500 VDC	4000 VDC
Jacket Spark	3000 Vrms	8000 Vrms	8000 Vrms
Peak Power	2.5 kW	16 kW	40 kW
Mechanical Specifications			
Bend Radius: installation in. (mm)	0.5 (12.7)	1.00 (25.4)	1.50 (38.1)
Bend Radius: repeated in. (mm)	2.0 (50.8)	4.0 (101.6)	6.0 (152.4)
Bending Moment ft-lb (N-m)	0.2 (0.27)	0.5 (0.68)	2.75 (3.73)
Weight lb/ft (kg/m)	0.021 (0.03)	0.068 (0.10)	0.131 (0.20)
Tensile Strength lb (kg)	40 (18.2)	160 (72.6)	350 (158.9)
Flat Plate Crush lb/in. (kg/mm)	15 (0.27)	40 (0.71)	60 (1.07)
Center Conductor (mm)	0.94 Solid BC	2.74 Solid CCA	4.47 Solid CCA
Insulation (mm)	2.8	7.24	11.56
Binder	Bonded Aluminum Foil	Bonded Aluminum Foil	Bonded Aluminum Foil
Shield (mm)	0.11 x 112 CuSn	0.15 x 192 CuSn	0.18 x 240 CuSn
Insulation Jacket (mm)	4.95	10.29	14.99
Environmental Specifications			
Installation Temperature Range	-40° to +185° F / -40° to +85° C	-40° to +185° F / -40° to +85° C	-40° to +185° F / -40° to +85° C
Storage Temperature Range	-94° to +185° F / -70° to +85° C	-94° to +185° F / -70° to +85° C	-94° to +185° F / -70° to +85° C
Operating Temperature Range	-40° to +185° F / -40° to +85° C	-40° to +185° F / -40° to +85° C	-40° to +185° F / -40° to +85° C

Ordering Data

Type	Part No.	Type	Part No.	Type	Part No.
PFP195	6720005243	PFP400	6720005240	PFP600	6720005257
PFP195	6720005244	PFP400	6720005241		
PFP195	6720005245	PFP400	6720005242		
PFP195	6720005259	PFP400	6720005246		
PFP195	6720005270	PFP400	6720005247		
PFP195	6720005260	PFP400	6720005248		
		PFP400	6720005251		
		PFP400	6720005252		
		PFP400	6720005253		
		PFP400	6720005254		
		PFP400	6720005255		
		PFP400	6720005256		

Cable lengths and part numbers on page 62.

IE-CC-NM-RPSMAM-2M   **IE-CC-NM-RPSMAM-4M**

Technical Data

Electrical Data		
Impedance	50 Ohm +/- 2	50 Ohm +/- 2
Max. operating frequency	6 Ghz	6 Ghz
Signal delay	4.08 ns/m	4.08 ns/m
Attenuation @ 2.4 Ghz	approx. 0.55 dB/m	approx. 0.55 dB/m
Attenuation @ 5 Ghz	approx. 0.87 dB/m	approx. 0.87 dB/m
Mechanical Data		
Length	2 m	4 m
Weight	6.3 kg/100m	6.3 kg/100m
Min. Bending radius (static)	28 mm	28 mm
Connector type	Connector 1: N-type male Connector 2: RP-SMA male	Connector 1: N-type male Connector 2: RP-SMA male
Environmental Limits		
Operating Temperature	-40°C to 85°C	-40°C to 85°C
Installation Temperature	-20°C to 60°C	-20°C to 60°C
Flammability	IEC 60332-1, UL 1581 § 1080 (VW-1)	IEC 60332-1, UL 1581 § 1080 (VW-1)
Halogen free	IEC 60754	IEC 60754
UV resistance	ISO 4892-2A	ISO 4892-2A
Material Data		
Jacket	LSFH (modified polyethylene)	LSFH (modified polyethylene)
Outer Diamter	5.7 mm	5.7 mm

Ordering Data

Models	Antenna cable, 2m length N-type (male) –> RP-SMA (male), Impedance 50 Ohm	Antenna cable, 4m length, N-type (male) –> RP-SMA (male), Impedance 50 Ohm
Type	IE-CC-NM-RPSMAM-2M	IE-CC-NM-RPSMAM-4M
Part No.	**1367110000**	**1367100000**

Mounts

WI-ACC-24GHZ-4610DB-ANG-BRKT

WI-ACC-24GHZ-4610DB-STR-BRKT

WI-ACC-24GHZ-12DB-STR-BRKT

Technical Data

Description			
	Stainless steel "L" bracket mount for wall or pipe mount. For mounting omnidirectional antenna to 2" maximum diameter mast.	Aluminum MFB mount bracket. For mounting 1-1/4" diameter antenna to 2-1/2" maximum diameter mast.	Heavy duty MFB mount bracket

Ordering Data

Type	Part No.	Type	Part No.	Type	Part No.
WI-ACC-24GHZ-4610DB-ANG-BRKT	**6720005209**	WI-ACC-24GHZ-4610DB-STR-BRKT	**6720005210**	WI-ACC-24GHZ-12DB-STR-BRKT	**6720005211**

WI-ACC-MAGBASE 12 RG58 SMA MALE

WI-ACC-900MHZ-OMNI-STR-BRKT

WI-ACC-900MHZ-YAGI-STR-BRKT

Technical Data

Description			
	Low frequency magnetic mount (for antennas operating 800-3000 MHz)	Light duty parallel or perpendicular pipe to pipe clamp, fits 1.5 - 2.4" to 1.5 - 2.4" OD pipewith 1.25 - 2.4" OD	Yagi clamp, fits mast OD of 0.5 - 0.84". Mounts to legs, towers, accessories

Ordering Data

Type	Part No.	Type	Part No.	Type	Part No.
WI-ACC-MAGBASE 12 RG58 SMA MALE	**6720005263**	WI-ACC-900MHZ-OMNI-STR-BRKT	**6720005268**	WI-ACC-900MHZ-YAGI-STR-BRKT	**6720005266**

WI-ACC-900MHZ-14YAGI-STR-BRKT

WI-ACC-900MHZ-035OMNI-STR-BRKT

WI-ACC-900MHZ-7OMNI-STR-BRKT

Technical Data

Description			
	Yagi clamp, fits mast OD of 0.75 - 1". Mounts to legs, towers, accessories with 1.25 - 2.4" OD	Aluminum MFB mount bracket. For mounting 1-5/16" diameter antenna to 2-1/2" maximum diameter mast.	Heavy duty fiberglass base station mount. For mounting an antenna with 2-1/2" maximum diameter onto 2-1/2" maximum diameter mast.

Ordering Data

Type	Part No.	Type	Part No.	Type	Part No.
WI-ACC-900MHZ-14YAGI-STR-BRKT	**6720005267**	WI-ACC-900MHZ-035OMNI-STR-BRKT	**6720005271**	WI-ACC-900MHZ-7OMNI-STR-BRKT	**6720005272**

Surge Suppressor

	WI-ACC-125-1000MHZ SURGE NF-NF	WI-ACC-2-6GHZ SURGE NF-NF	WI-DIV-CCMA SMA M – SMA F

Technical Data

Connector	N female to N female	N female to N female	SMA Male to SMA Female
Frequency Range	125 - 1000 MHz	2.0 - 6.0 GHz	<1200 MHz
VSWR	<1.1 over frequency range	1.3: 1	
Insertion Loss	<0.1 dB over frequency range	0.1 dB	<0.2dB over range
Turn-on	600fb VDC +/- 20%		

Ordering Data

	Type	Part No.	Type	Part No.	Type	Part No.
	WI-ACC-125-1000MHZ SURGE NF-NF	6720005261	WI-ACC-2-6GHZ SURGE NF-NF	6720005262	WI-DIV-CCMA SMA M-SMAF	6720005111

Antenna Coupler

	WI-ACC-BULK-C1D1 SMA M - SMA F	WI-ACC-BULK-C1D1 SMA M - NF

Technical Data

Maximum Fault Voltage	250 VDC, 250 VAC 50-60 Hz	250 VDC, 250 VAC 50-60 Hz
Maximum Antenna Power Output	2 watts or 33 dB	2 watts or 33 dB
Maximum Capacitance	5.64 nF	5.64 nF
Frequency Range	260 to 2483 MHz	260 to 2483 MHz
Impedenance	50 Ohms	50 Ohms
Approximate Signal Attenuation (1):		
@ 425 MHz	0.6 dB	3.2 dB
@ 915 MHz	2.2 dB	2.4 dB
@ 2.4 GHz	2.6 dB	4.1 dB
Approximate Weight	0.5 lb (0.23 kg)	0.5 lb (0.23 kg)
Housing Material	300 Series Stainless Steel	300 Series Stainless Steel
Ambient Temperature Range	-40°/+85° C	-40°/+85° C
Connector	SMA male to SMA female	SMA male to N female
Approvals		
	Class 1 Div 1, group A, B, C, D	Class 1 Div 1, group A, B, C, D

Ordering Data

	Type	Part No.	Type	Part No.
	WI-ACC-BULK-C1D1 SMA M - SMA F	6720005298	WI-ACC-BULK-C1D1 SMA M - NF	6720005299

Adapters

WI-ACC-ADAPT SMA M - SMA M

WI-ACC-ADAPT SMA F - SMA F

WI-ACC-ADAPT NM - NM

Technical Data

	Adapter
Connector	SMA male to SMA male

	Adapter
	SMA female to SMA female

	Barrel Adapter
	N male to N male

Ordering Data

Type	Part No.
WI-ACC-ADAPT SMA M - SMA M	6720005290

Type	Part No.
WI-ACC-ADAPT SMA F - SMA F	6720005291

Type	Part No.
WI-ACC-ADAPT NM - NM	6720005292

WI-ACC-ADAPT NF - NF

WI-ACC-ADAPT SMA F - NM

WI-ACC-ADAPT SMA M - NF

Technical Data

	Barrel Adapter
Connector	N female to N female

	Adapter
	SMA female to N male

	Adapter
	SMA male to N female

Ordering Data

Type	Part No.
WI-ACC-ADAPT NF - NF	6720005293

Type	Part No.
WI-ACC-ADAPT SMA F - NM	6720005294

Type	Part No.
WI-ACC-ADAPT SMA M - NF	6720005295

WI-ACC-BULK SMA F - SMA F

WI-ACC-ADAPT SMA F - SMA M ANGL

Technical Data

	Bulkhead Adapter
Connector	SMA female to SMA female with D-flat

	Right Angle Adapter
	SMA male to SMA female

Ordering Data

Type	Part No.
WI-ACC-BULK SMA F - SMA F	6720005296

Type	Part No.
WI-ACC-ADAPT SMA F - SMA M ANGL	6720005297

Filters

- Ultra-High Quality Microwave Cavity Filter
- Ultra Low Insertion Loss (0.5 dB nominal)
- Industrial Grade
- Rugged Aluminum Weatherproof Construction for Outdoor or Indoor Use

WI-ACC 900MHZ BAND PASS FILTER

WI-ACC 2.4GHZ BAND PASS FILTER

WI-ACC 5.8GHZ BAND PASS FILTER

Technical Data

Electrical Specifications			
Center Frequency	915 Mhz	2448 MHz	5800 MHz
Bandwidth	35 Mhz	100 Mhz	150 MHz
Out of Band Rejection	> 40 dB @ 815 Mhz	> 80 dB @ < 2000 Mhz	> 6 dB @ 5570 Mhz
	> 40 dB @ 1015 MHz	> 60 dB @ > 2700 MHz	> 6 dB @ 6030 MHz
Insertion Loss	0.5 dB	0.25 dB	0.5 dB
Passband Ripple	< 0.25 dB	< 0.25 dB	< 1.0 dB
Return Loss	> 15 dB	> 15 dB	> 10 dB
Impedance	50 Ohms	50 Ohms	50 Ohms
Number of Cavaties	4	4	4
Power Handling	50 Watts	50 Watts	50 Watts
Connectors	N Female (2)	N Female (2)	N Female (2)
Operating Temp	-40 to 85°C (-40 to 185°F)	-40 to 85°C (-40 to 185°F)	-40 to 85°C (-40 to 185°F)
Dimensions mm (in)	74 x 74 x 50 (2.9 x 2.9 x 1.9)	78 x 78 x 31 (3.0 x 3.0 x 1.2)	58 x 58 x 28 (2.3 x 2.3 x 1.1)
Weight Kg (lbs.)	0.38 (0.84)	0.38 (0.84)	0.31 (0.69)

Ordering Data

	Type	Part No.	Type	Part No.	Type	Part No.
	WI-ACC 900MHZ BAND PASS FILTER	6720005120	WI-ACC 2.4GHz BAND PASS FILTER	6720005121	WI-ACC 5.8GHZ BAND PASS FILTER	6720005122

Ethernet

Unmanaged Fast Ethernet Switches

- 10/100BaseT(X) (RJ45 connector), 100BaseFX (multi/singlemode, SC or ST connector)
- Redundant dual 12/24/48 V DC, 18 to 30 V AC power inputs
- IP30 aluminum housing
- Rugged hardware design well suited for hazardous locations (Class I Div. 2 /ATEX) and maritime environments (DNV/GL)
- -40 to 75° C operating temperature range (T models)

78.8 mm (3.1 in)   30.0 mm (1.2 in)   50.0 mm (2.0 in)

115.0 mm (4.5 in)   125.0 mm (4.9 in)

70.0 mm (2.8 in)   IE-SW-BL05-Series   IE-SW-BL08-Series

Technical data

Technology

Standards	IEEE 802.3 for 10BaseT
	IEEE 802.3u for 100BaseT(X) and 100BaseFX
	IEEE 802.3x for Flow Control
Processing Type	Store and Forward
Flow Control	IEEE 802.3x flow control, back pressure flow control

Switch Properties

MAC Table Size	1 K
Packet Buffer Size	512 Kbit

Interface

Fiber Ports	100BaseFX ports
	(SC/ST connector, multimode, singlemode)
RJ45 Ports	10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
DIP Switches	Enable/Disable broadcast storm protection
LED Indicators	Power, 10/100M (TP port), 100M (fiber port)

Optical Fiber

	100BaseFX	
	multimode	singlemode
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km (50/125 µm multimode cable) 4 km (62,5/125 µm multimode cable)	40 km (9/125 µm singlemode cable)
Saturation	-6 dBm	-3 dBm

Power Requirements

Input Voltage	12/24/48 V DC (9.6 to 60 V DC), 18 to 30 V AC (47 to 63 Hz), redundant dual inputs
Input Current	IE SW BL05 5TX: 0.1 A @ 24 V IE SW BL05 SC/ST/SCS: 0.11 A @ 24 V IE SW BL08 8TX: 0.13 A @ 24 V IE SW BL08 2SC/2ST: 0.22 A @ 24 V IE SW BL08 SCS: 0.17 A @ 24 V
Overload Current Protection	1.1 A
Connection	1 removable 4-contact terminal block
Reverse Polarity Protection	Present

Physical Characteristics

Housing	Aluminum, IP30 protection
Dimensions	IIE-SW-BL05-Series: 30 x 115 x 70 mm (1.18 x 4.52 x 2.76 in) IE-SW-BL08-Series: 50 x 115 x 70 mm (1.96 x 4.52 x 2.76 in)
Weight	IE-SW-BL05-5TX: 175 g IE-SW-BL08-8TX: 275 g
Installation	DIN-Rail mounting

Environmental Limits

Operating Temperature	Standard Models: -10 to 60° C (14 to 140° F) Wide Temp. Models: -40 to 75° C (-40 to 167° F)
Storage Temperature	-40 to 85° C (-40 to 185° F)
Ambient Relative Humidity	5 to 95 % (non-condensing)

Regulatory Approvals

Safety	UL508
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C and D; ATEX Zone 2, Ex nC IIC
EMI	FCC Part 15, CISPR (EN55022) class A
EMS	EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3; EN61000-4-8; EN61000-4-11
Maritime	DNV, GL (IE-SW-BL05-4TX-1SCS/SC/ST: pending)
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

MTBF (meantime between failures)

Time	425,000 hrs
Database	Telcordia (Bellcore), GB

Warranty

Warranty Period	5 years

Ordering Data

Port Variants	Model Type	Operating Temperature	Part No.
5 * RJ45	IE-SW-BL05-5TX	-10 to +60° C	**1240840000**
	IE-SW-BL05T-5TX	-40 to +75° C	**1240850000**
4 * RJ45, 1 * SC-Multimode	IE-SW-BL05-4TX-1SC	-10 to +60° C	**1240890000**
	IE-SW-BL05T-4TX-1SC	-40 to +75° C	**1286550000**
4 * RJ45, 1 * ST-Multimode	IE-SW-BL05-4TX-1ST	-10 to +60° C	**1240880000**
	IE-SW-BL05T-4TX-1ST	-40 to +75° C	**1286540000**
4 * RJ45, 1 * SC-Singlemode	IE-SW-BL05-4TX-1SCS	-10 to +60° C	**1240870000**
	IE-SW-BL05T-4TX-1SCS	-40 to +75° C	**1286530000**
8 * RJ45	IE-SW-BL08-8TX	-10 to +60° C	**1240900000**
	IE-SW-BL08T-8TX	-40 to +75° C	**1286560000**
6 * RJ45, 2 * SC-Multimode	IE-SW-BL08-6TX-2SC	-10 to +60° C	**1240910000**
	IE-SW-BL08T-6TX-2SC	-40 to +75° C	**1240920000**
6 * RJ45, 2 * ST-Multimode	IE-SW-BL08-6TX-2ST	-10 to +60° C	**1240930000**
	IE-SW-BL08T-6TX-2ST	-40 to +75° C	**1286570000**
7 * RJ45, 1 * SC-Singlemode	IE-SW-BL08-7TX-1SCS	-10 to +60° C	**1240950000**
	IE-SW-BL08T-7TX-1SCS	-40 to +75° C	**1286580000**

Accessories

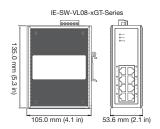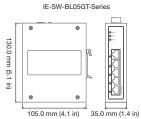|	Model Type	Part No.
19" Rack Mounting Kit	RM-KIT	**1241440000**

For more port counts, please see Weidmuller Industrial Ethernet Catalogue: **www.weidmueller.com**

Unmanaged Gigabit Ethernet Switches

- Fiber-optic options for extending distance and electrical noise immunity
- Redundant dual 12/24/48 V DC power inputs
- Relay output warning for power failure and port break alarm
- Broadcast storm protection
- Supports jumbo frame transmission (up to 9.6 KB)

IE-SW-VL08-xGT-Series

135.0 mm (5.3 in)
105.0 mm (4.1 in) 53.6 mm (2.1 in)

IE-SW-BL05GT-Series

130.0 mm (5.1 in)
105.0 mm (4.1 in) 35.0 mm (1.4 in)

Technical data

Technology	
Standards	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X) and 100BaseFX IEEE 802.3ab for 1000BaseT(X) IEEE 802.3z for 1000BaseX IEEE 802.3x for Flow Control
Processing Type	Store and Forward
Flow Control	IEEE 802.3x flow control, back pressure flow control
Switch Properties	
MAC Table Size	8 K
Packet Buffer Size	1088 Kbit (IE-SW-BL05-5GT), 1408 Kbit (IE-SW-VL08-xGT)
Interface	
Fiber Ports	100/1000BaseSFP slot (IE-SW-VL08-6GT-2GS)
RJ45 Ports	10/100/1000BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
DIP Switches	One for port break alarm, one for Enable/Disable broadcast storm protection
LED Indicators	PWR1, PWR2, FAULT, 10/100/1000M
Alarm Contact	1 relay output with current carrying capacity of 1 A @ 24 V DC
Power Requirements	
Input Voltage	12/24/48 V DC (9.6 to 60 V DC), redundant dual inputs
Input Current	IE-SW-BL05-5GT: 0.20 A @ 24 V IE-SW-VL08-8GT: 0.32 A @ 24 V IE-SW-VL08-6GT-2GS: 0.34 A @ 24 V
Connection	1 removable 6-contact terminal block
Reverse Polarity Protection	Present
Physical Characteristics	
Housing	Metal, IP30 protection
Dimensions	IE-SW-BL05-5GT: 35 x 130 x 105 mm (1.37 x 5.12 x 4.13 in) IE-SW-VL08-xGT: 53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)
Weight	IE-SW-BL05-5GT: 290 g IE-SW-VL08-xGT: 630 g
Installation	DIN-Rail mounting
Environmental Limits	
Operating Temperature	Standard Models: 0 to 60° C (32 to 140° F) Wide Temp. Models: -40 to 75° C (-40 to 167° F) (on request)
Storage Temperature	-40 to 85° C (-40 to 185° F)
Ambient Relative Humidity	5 to 95 % (non-condensing)
Regulatory Approvals	
Safety	UL508
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C, and D; ATEX Zone 2, Ex nC IIC
EMI	FCC Part 15, CISPR (EN55022) class A

Regulatory Approvals	
EMS	EN61000-4-2 (ESD), level 3; EN61000-4-3 (RS), level 3; EN61000-4-4 (EFT), level 3; EN61000-4-5 (Surge), level 3; EN61000-4-6 (CS), level 3
Maritime	DNV, GL
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
MTBF (meantime between failures)	
Time	478,000 hrs (IE-SW-BL05-5GT series) 325,000 hrs (IE-SW-VL08-XGT series)
Database	Telcordia (Bellcore), GB (IE-SW-VL08-xGT series)
Warranty	
Warranty Period	5 years

Ordering Data

Port Variants	Model Type	Operating Temperature	Part No.
5 * RJ45 10/100/1000BaseT(X)	IE-SW-BL05-5GT	0 to +60° C	**1241250000**
	IE-SW-BL05T-5GT	-40 to +75° C	**1286850000**
8 * RJ45 10/100/1000BaseT(X)	IE-SW-VL08-8GT	0 to +60° C	**1241270000**
	IE-SW-VL08T-8GT	-40 to +75° C	**1286860000**
6 * RJ45 10/100/1000BaseT(X), 2 Combo-Ports (10/100/1000 BaseT(X) or 100/1000BaseSFP)	IE-SW-VL08-6GT-2GS	0 to +60° C	**1241280000**
	IE-SW-VL08T-6GT-2GS	40 to +75° C	**1286870000**

Accessories

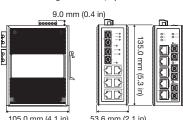|	Model Type	Part No.
19" Rack Mounting Kit	RM-KIT	**1241440000**

For more port counts, please see Weidmuller Industrial Ethernet Catalogue:
www.weidmueller.com

Ethereum *(sidebar)*

Managed Entry-level Ethernet Switches

- Turbo Ring and Turbo Chain with fast recovery time (under 20 ms)
- IGMP snooping, QoS, port- and tag-based VLAN
- Configurable error messages via SNMP trap, e-mail or relay output
- User-friendly web-based configuration and management
- External Backup and Restoring Module for easy system reconfiguration (optional accessory)

9.0 mm (0.4 in)

135.0 mm (5.3 in)

105.0 mm (4.1 in)   53.6 mm (2.1 in)

Technical data

Standards
IEEE 802.3 for 10BaseT • IEEE 802.3u for 100BaseT (X) and 100BaseFX • IEEE 802.3x for Flow Control • IIEEE 802.1D for Spanning Tree Protocol • IEEE 802.1w for Rapid STP • IEEE 802.1p for Class of Service • IEEE 802.1Q for VLAN Tagging

Protocols
IGMPv1/v2 • GMRP • GVRP • SNMPv1/v2c/v3 • DHCP Server/Client • TFTP • SNTP • SMTP • RARP • RMON • HTTP • Telnet • Syslog • DHCP Option 66/67/82 • BootP • LLDP • Modbus/TCP • IPv6

MIB
MIB-II • Ethernet-Like MIB • P-BRIDGE MIB • Bridge MIB • RSTP MIB • RMON MIB Group 1, 2, 3, 9

Flow Control
IEEE 802.3x flow control • back pressure flow control

Switch Properties
MAC Table Size	8 K
Packet Buffer Size	1 MBit

Interface
Fiber Ports	100BaseFX ports (SC/ST connector)
RJ45 Ports	10/100BaseT(X) auto negotiation speed, Full/Half duplex mode, and auto MDI/MDI-X connection
Console Port	RS-232 (RJ45 connector)
DIP Switches	Turbo Ring, Master, Coupler, Reserve
LED Indicators	PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL, 10/100M
Alarm Contact	1 relay output with current carrying capacity of 1 A @ 24 V DC

Optical Fiber
	100BaseFX	
	multimode	singlemode
Wavelength	1300 nm	1310 nm
Max. TX	-10 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm
Link Budget	12 dB	29 dB
Typical Distance	5 km[a]	40 km[c]
	4 km[b]	
Saturation	-6 dBm	-3 dBm

[a] 50/125 μm, 800 MHz*km fiber optic cable
[b] 62.5/125 μm, 500 MHz*km fiber optic cable
[c] 9/125 μm singlemode fiber optic cable

Power Requirements
Input Voltage	24 V DC (12 to 45 V DC), redundant dual inputs
Input Current	IE-SW-VL08M-8TX: 0.26 A @ 24 V
	IE-SW-VL08M-6TX-2ST/SC: 0.35 A @ 24 V
	IE-SW-VL08M-5TX-3SC: 0.32 A @ 24 V

For more port counts, please see Weidmuller Industrial Ethernet Catalogue: **www.weidmueller.com**

Power Requirements (continued)
Overload Current Protection	Present
Connection	1 removable 6-contact terminal block
Reverse Polarity Protection	Present

Physical Characteristics
Housing	Metal, IP30 protection
Dimensions	53.6 x 135 x 105 mm (2.11 x 5.31 x 4.13 in)
Weight	IE-SW-VL08M-...8TX/6TX-2SC/ 6TX-2ST: 650 g
	IE-SW-VL08M-5TX-3SC: 890 g
Installation	DIN-Rail mounting

Environmental Limits
Operating Temperature	-40 to 75° C (-40 to 167° F)
Storage Temperature	-40 to 85° C (-40 to 185° F)
Ambient Relative Humidity	5 to 95 % (non-condensing)

Regulatory Approvals
Safety	UL508, UL60950-1, CSA C22.2 No. 60950-1, EN60950-1
Hazardous Location	UL/cUL Class I, Division 2, Groups A, B, C, and D; ATEX Zone 2, Ex nC IIC
EMI	FCC Part 15, CISPR (EN55022) class A
EMS	EN61000-4-2 (ESD), level 3;
	EN61000-4-3 (RS), level 3;
	EN61000-4-4 (EFT), level 3;
	EN61000-4-5 (Surge), level 3;
	EN61000-4-6 (CS), level 3;
	EN61000-4-8
Maritime	DNV, GL
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

MTBF (meantime between failures)
Time	IE-SW-VL08M-...Series:
	363,000 hrs
Database	Telcordia (Bellcore), GB

Warranty
Warranty Period	5 years

Ordering Data
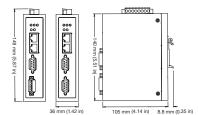| Port Variants	Model Type	Operating Temperature	Part No.
8 * RJ45	IE-SW-VL08MT-8TX	-40 to +75° C	**1240940000**
5 * RJ45, 3*SC-Multimode	IE-SW-VL08MT-5TX-3SC	-40 to +75° C	**1240970000**
6 * RJ45, 2*ST-Multimode	IE-SW-VL08MT-6TX-2ST	-40 to +75° C	**1240990000**
6 *RJ45, 2*SC-Singlemode	IE-SW-VL08MT-6TX-2SCS	-40 to +75° C	**1241020000**

Accessories
	Model Type	Part No.
External Backup and Restore Module	EBR-Modul RS232	**1241430000**
19" Rack Mounting Kit	RM-KIT	**1241440000**

1 and 2- port Serial/Ethernet Converter
for industrial automation

- High surge protection for the serial ports, LAN ports and power supply connection
- Rugged screw-type terminal blocks for power and serial connectors
- Cascading Ethernet ports for easy wiring
- Redundant DC power inputs
- Warning by relay output and email
- Low power consumption

For more converters, please see
Weidmuller Industrial Ethernet Catalogue:
www.weidmueller.com

Technical data

Ethernet Interface	
Number of Ports	2
Speed	10/100 Mbps, auto MDI/MDIX
Connector	8-pin RJ45
Magnetic Isolation Protection	1.5 KV built-in
Ethernet Line Protection	1 KV (level 2) surge protection
Serial Interface	
Number of Ports	IE-CS-2TX-1RS232/485: 1, IE-CS-2TX-2RS232/485: 2
Serial Standards	RS-232/422/485
Connector	IE-CS-2TX-1RS232/485: DB9 for RS-232, terminal block for RS-422/485 IE-CS-2TX-2RS232/485: DB9 for RS-232/422/485
Serial Line Protection	• 15 KV ESD protection for all signals • 1 KV (level 2) surge protection
RS-485 Data Direction Control	ADDC® (automatic data direction control)
Serial Communication Parameters	
Data Bits	5, 6, 7, 8
Stop Bits	1, 1.5, 2
Parity	None, Even, Odd, Space, Mark
Flow Control	RTS/CTS and DTR/DSR (RS-232 only), XON/XOFF
Baud rate	50 to 921.6 Kbps
Serial Signals	
RS-232	TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422	Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w	Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w	Data+, Data-, GND
Software	
Network Protocols	ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, Rtelnet, DNS, SNMP, HTTP, SMTP, SNTP, IGMP
Configuration Options	Web Console, Serial Console, Telnet Console, Windows Utility
Windows Real COM Drivers	Windows 95/98/ME/NT/2000, Windows XP/2003/Vista/2008/7 x86/x64
Physical Characteristics	
Housing	Metal, IP30 protection
Weight	IE-CS-2TX-1RS232/485: 475 g IE-CS-2TX-2RS232/485: 485 g
Dimensions	36 x 105 x 140 mm (1.42 x 4.13 x 5.51 in)
Environmental Limits	
Operating Temperature	Standard Models: 0 to 60° C (32 to 140° F) Wide Temp. Models: -40 to 75° C (-40 to 167° F)
Operating Humidity	5 to 95% RH
Storage Temperature	-40 to 85° C (-40 to 185° F)
Power Requirements	
Input Voltage	12 to 48 V DC
Power Consumption	IE-CS-2TX-1RS232/485: 12 to 48 V DC; 220 mA @ 12 V DC, 110 mA @ 24 V DC IE-CS-2TX-2RS232/485: 12 to 48 V DC; 250 mA @ 12 V DC, 125 mA @ 24 V DC

Regulatory Approvals	
EMC	CE (EN55022 Class A, EN55024), FCC Part 15 Subpart B Class A
Safety	UL508
Hazardous Location	UL/cUL Class 1 Division 2 Groups A, B, C and D
ATEX	Class I, Zone 2 (Pending)
EMS	EN61000-4-2 (ESD), Level 3 EN61000-4-3 (RS), Level 3 EN61000-4-4 (EFT), Level 4 EN61000-4-5 (Surge), Level 3 EN61000-4-6 (CS), Level 3 EN61000-4-8 EN61000-4-11
Shock	IEC60068-2-27
Freefall	IEC60068-2-32
Vibration	IEC60068-2-6
Reliability	
Alert Tools	Built-in buzzer and RTC (real-time clock)
Automatic Reboot Trigger	Built-in WDT (watchdog timer)
Warranty	
Warranty Period	5 years

Pin Assignment

RS-232/422/485 DB9 male port

PIN	RS-232	RS-422/RS-485-4w	RS-485-2W
1	DCD	TxD-(A)	-
2	RXD	TxD+(B)	-
3	TXD	RxD+(B)	Data+(B)
4	DTR	RxD-(A)	Data-(A)
5	GND	GND	GND
6	DSR	-	-
7	RTS	-	-
8	CTS	-	-

Pin Assignment

RS-422/485 Terminal Block Wiring

PIN	RS-422/RS-485-4w	RS-485-2W
1	TxD+(B)	-
2	TxD-(A)	-
3	RxD+(B)	Data+(B)
4	RxD-(A)	Data-(A)
5	GND	GND

Ordering Data
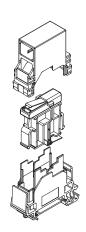
Models	Type	Operating Temperature	Part No.
Two RJ45; One serial (RS232: Sub-DB9, RS422/485: terminal block)	IE-CS-2TX-1RS232/485	0 to +60° C	**1242080000**
	IE-CST-2TX-1RS232/485	-40 to +75° C	**1285830000**
Two RJ45; Two serial (RS232/422/485: Two SubDB9)	IE-CS-2TX-2RS232/485	0 to +60° C	**1242090000**
	IE-CST-2TX-2RS232/485	-40 to +75° C	**1285840000**

Accessories

	Model Type	Part No.
19" Rack Mounting Kit	RM-KIT	**1241440000**

Mounting rail outlet RJ45

- Cat.6A
- IP 20
- TS35

RJ45-C   RJ45-FJ-A   RJ45-FJ-B   RJ45-FJ-P

Mounting rail outlet RJ45

Application:

Weidmuller mounting rail outlets should be your first choice in the switchgear cabinet when you need to connect

- installation cables
- RJ45 cables

Variations:

- 8946920000: RJ45 coupling
- 8946930000: Outlet RJ45 A-coded
- 8946940000: Outlet RJ45 B-coded
- 8946950000: Outlet RJ45 ProfiNet-coded

Technical Data

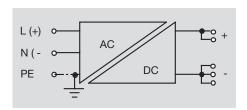|	
Category	Cat. 6A / Class EA (IEC 11801 PDAM Am 1.2 2007)
Protection class	IP 20
Housing material	PA UL94 VO
Color	light gray (RAL 7035)
Installation	for terminal rail TS35
Configuration	Switchable voltage connection from module / coupling to mounting rail
Plugging cycles	750 plugging cycles for plugs to IEC 60603-7
Operating temperature, min. / max.	-25° C / 70° C

Ordering Data

RJ45	Type	Part No.
RJ45 coupling	IE-TO-RJ45-C	**8946920000**
Outlet RJ45 A-coded	IE-TO-RJ45-FJ-A	**8946930000**
Outlet RJ45 B-coded	IE-TO-RJ45-FJ-B	**8946940000**
Outlet RJ45 PROFINET-coded	IE-TO-RJ45-FJ-P	**8946950000**

Accessories

	Type	Part No.
9*11 mm, white	ESG 9/11K MC NEUTRAL	**1857440000**
9*11 mm, white	LM MT DIN A5 9/11 WS	**1964070000**
9*11 mm, blue	LM MT DIN A5 9/11 BL	**1964100000**
9*11 mm, yellow	LM MT DIN A5 9/11 GE	**1964110000**
9*11 mm, gray	LM MT DIN A5 9/11 GR	**1964080000**
9*11 mm, green	LM MT DIN A5 9/11 GN	**1964120000**
9*11 mm, orange	LM MT DIN A5 9/11 OR	**1964090000**

CP T SNT 70W 12V 6A

CP T SNT 90W 24V 3.8A

Technical Data

Input Specifications		
Input voltage	115VAC/230VAC autoselect	115VAC/230VAC autoselect
Input voltage range	85-132/187-264 VAC autoselect (output current derating below 100VAC)	85-132/187-264 VAC autoselect (output current derating below 100VAC)
Input voltage frequency	47Hz - 63Hz	47Hz - 63Hz
Harmonic limits	EN 61000-3-2, Class A (for limited output power)	EN 61000-3-2, Class A (for limited output power)
Hold up time	20ms min. 115/230 VAC	20ms min. 115/230 VAC
Inrush current	<12A @ 115VAC; <20A @ 230VAC	<12A @ 115VAC; <20A @ 230VAC
Recommended Circuit breaker, Curve 1 or fuse, slow blow type	6A	6A
Efficiency	87% typ.	87% typ.
Output Specifications		
Output voltage	12 VDC	24 VDC
Output voltage adj. range	12-14 VDC	24-28 VDC
Output current	6.5A	3.75A
Output power max.	70W	90W
Regulation – Input variation – Load variation (10–100 %)	0.5 % max. 0.5 % max.	0.5 % max. 0.5 % max.
Ripple and Noise (20MHz Bandwidth)	100 mV pk-pk typ. (200 mV pk-pk max. at Imax)	100 mV pk-pk typ. (200 mV pk-pk max. at Imax)
Electronic short circuit protection	Current limitation at Imax., constant current, automatic recovery	Current limitation at Imax., constant current, automatic recovery
Output overvoltage protection	20V	35V
Overload protection	electronic overload protection	electronic overload protection
Overtemperature protection	Switch off at overtemperature, automatic restart	Switch off at overtemperature, automatic restart
Status indicator	Dual color LED (green: DC ok: red: DC off)	Dual color LED (green: DC ok; red: DC off)
Power OK signal – trigger threshold: – active output signal: (reference to –Vout) – relay output	9–11 V 11.0 V ±1.0 V (20 mA max.) rated: 30 VDC/1.0 A	18-22 V 22.0 V ±2.0 V (10 mA max.) rated: 30 VDC/1.0 A
General Specifications		
Operating temperature range	−25° C to +70° C max. (−13° F to +158°F)	−25° C to +70° C max. (−13° F to +158°F)
Cooling	convection cooling, no internal fan	convection cooling, no internal fan
Mounting	TS35 DIN-rail (Horizontal) to allow for cooling	TS35 DIN-rail (Horizontal) to allow for cooling
Storage temperature	−25° C to +85° C (− 13°F to +185°F)	−25° C to +85° C (− 13°F to +185°F)
Humidity (non condensing)	95 % rel. H max.	95 % rel. H max.
Pollution degree	2	2
Temperature coefficient	0.02 %/K	0.02 %/K
Reliability, calculated MTBF @ 25°C acc. to IEC 61709	>1.8 Million hours, max. load	>1.8 Million hours, max. load
Remote On/Off **(See LIT0917 - Installation Instructions)**	by ext. contact. DC on: -S contact open DC off: -S connected via 1Kohm to -Vout	by ext. contact. DC on: -S contact open DC off: -S connected via 1Kohm to -Vout
Isolation	according to IEC/EN 60950-1, UL 60950-1, UL 508	according to IEC/EN 60950-1, UL 60950-1, UL 508
Environment – Vibration acc. IEC 60068-2-6 – Shock acc. IEC 60068-2-27	3 axis, sine sweep, 10–55 Hz, 1 g, 1 oct/min 3 axis, 15 g half sine, 11 ms	3 axis, sine sweep, 10–55 Hz, 1 g, 1 oct/min 3 axis, 15 g half sine, 11 ms
Dimension (W x D x H)	35 x 110 x 110 mm	35 x 110 x 110 mm
Clearances – Above/Below – Sides	80 mm (3.15 in) 10 mm (0.39 in)	80 mm (3.15 in) 10 mm (0.39 in)
Weight	0.5kg	0.5kg
Approvals		
	cULus Listed to UL508, CSA C22.2 No. 14	cULus Listed to UL508, CSA C22.2 No. 14
	cRUus to ANSI/UL60950, CSA60950	cRUus to ANSI/UL60950, CSA60950
	CSA to C22.2 No. 107.1	CSA to C22.2 No. 107.1
	cCSAus to CSA60950, ANSI/UL60950	cCSAus to CSA60950, ANSI/UL60950
	cCSAus C1D2 to C22.2 No. 213	cCSAus C1D2 to C22.2 No. 213
	cCSAus C1Z2 to CSA60079-15 & ANSI/ISA 12.012.01	cCSAus C1Z2 to CSA60079-15 & ANSI/ISA 12.012.01
	CE marked	CE marked

Ordering Data

	Type	Part No.	Type	Part No.
	CP T SNT 70W 12V 6A	**1105430000**	CP T SNT 90W 24V 3.8A	**1105790000**

PROeco

PRO ECO 72W 24V 3A

PRO ECO 120W 24V 5A

L (+)
N (-)
PE

AC DC

+
-
-
13
14

Pay attention to polarity of DC connection

L (+)
N (-)
PE

AC DC

+
+
-
-
13
14

Pay attention to polarity of DC connection

Technical Data

Input	PRO ECO 72W 24V 3A	PRO ECO 120W 24V 5A
Rated input voltage	100 ... 240 V AC	100 ... 240 V AC
AC input voltage range	85 ... 264 V AC (Derating @ 100 V AC)	85 ... 264 V AC (Derating @ 100 V AC)
AC frequency range	47 ... 63 Hz	47 ... 63 Hz
DC input voltage range	80 ... 370 DC (Derating @ 120 V DC)	80 ... 370 DC (Derating @ 120 V DC)
AC current consumption	0.55 A @ 230 V AC / 1.04 A @ 110 V AC	1.26 A @ 230 V AC / 2.24 A @ 110 V AC
DC current consumption	0.22 A @ 370 V DC / 0.68 A @ 120 V DC	0.39 A @ 370 V DC / 1.16 A @ 120 V DC
Input fuse (internal) / inrush current	Yes / max. 40	Yes / max. 40
Recommended back-up fuse	2 A / DI, Safety fuse	4 A / DI, Safety fuse
	6 A, Char. B, Circuit breaker	6 A, Char. B, Circuit breaker
	2...4 A, Char. C, Circuit breaker	3...5 A, Char. C, Circuit breaker

Output		
Rated output voltage	24 V DC ± 1 %	24 V DC ± 1 %
Output voltage	22...28 V DC (adjustable via potentiometer on front)	22...28 V DC (adjustable via potentiometer on front)
Ramp-up time / residual ripple, switching peaks	< 100 ms / < 50 mVSS @ 24 V DC, I_R	< 100 ms / < 50 mVSS @ 24 V DC, I_R
Rated output current @ U_{rated}	3 A up to 55 °C	5 A up to 55 °C
Continuous output current @ 24 V DC	3 A @ 55 °C, 2.25 A @ 70 °C	5 A @ 55 °C, 3.75 A @ 70 °C
Capacitive load	Unrestricted	Unrestricted
Protection against reverse voltages from the load	30...35 V DC	30...35 V DC
Protection against internal surge voltage	35 V DC	35 V DC

Signalling		
DC OK	LED Green (U_{output} > 21.6 V DC)	LED Green (U_{output} > 21.6 V DC)
Alarm	LED Yellow (I_{output} > 90 % I_R)	LED Yellow (I_{output} > 90 % I_R)
Error	LED Red (Overload, overtemperature, short-circuit, U_{output} < 20.4 V DC)	LED Red (Overload, overtemperature, short-circuit, U_{output} < 20.4 V DC)
Voltage monitoring / no-voltage contact / contact load	Yes / NO contact / max. 30 V AC/DC 1 A	Yes / NO contact / max. 30 V AC/DC 1 A
On/Off relay	Output voltage > 21.6 V DC / < 20.4 V DC	Output voltage > 21.6 V DC / < 20.4 V DC

General data		
Efficiency	> 87 % @ 230 V AC & 3 A	> 87 % @ 230 V AC & 5 A
Power loss @ idling / nominal load	4 W / 9.5 W	4 W / 15 W
Earth discharge current	< 1 mA	< 1 mA
Power factor (approx.)	> 0.42 @ 230 V AC / > 0.45 @ 115 V AC	> 0.47 @ 230 V AC / > 0.56 @ 115 V AC
Mains buffering @ I_{rated}	> 100 ms @ 230 V AC / > 20 ms @ 115 V AC	> 80 ms @ 230 V AC / > 20 ms @ 115 V AC
Parallel connection option	yes, max. 5	yes, max. 5
Height x width x depth / weight	125 / 34 / 100 mm / 0.5 kg	125 / 40 / 100 mm / 0.6 kg

Approvals		
Approvals	CE, TÜV (EN/IEC 60950-1), cULus	CE, TÜV (EN/IEC 60950-1), cULus

Connection data	Input	Output	Input	Output
Conductor connection system	Screw connection	Screw connection	Screw connection	Screw connection
Number of terminals	3 for L/N/PE	5 (13,14,+, - -)	3 for L/N/PE	6 (13,14,+,+, - -)
Wire cross-section, rigid min/max mm²	0.5/6	0.5/6	0.5/6	0.5/6
Wire cross-section, flexible min/max mm²	0.5/2.5	0.5/2.5	0.5/2.5	0.5/2.5
Wire cross-section, AWG/kcmil min/max	26/12	26/12	26/12	26/12
Min./max. tightening torque range Nm	0.5/0.6	0.5/0.6	0.5/0.6	0.5/0.6
Stripping length mm	6	6	6	6

Ordering Data

Type	Qty.	Part No.
PRO ECO 72W 24V 3A	1	**1469470000**

The internal varistor found in a switch-mode power unit does not replace the necessary surge protection in a system.

Type	Qty.	Part No.
PRO ECO 120W 24V 5A	1	**1469480000**

The internal varistor found in a switch-mode power unit does not replace the necessary surge protection in a system.

Note

PROeco

	PRO ECO 240W 24V 10A	PRO ECO 480W 24V 20A

L (+) N (−) PE — AC / DC — + + − − 13 14
Pay attention to polarity of DC connection

L (+) N (−) PE — AC / DC — + + − − 13 14
Pay attention to polarity of DC connection

Technical Data

Input		
Rated input voltage	100 ... 240 V AC	100 ... 240 V AC
AC input voltage range	85 ... 264 V AC (Derating @ 100 V AC)	85 ... 264 V AC (Derating @ 100 V AC)
AC frequency range	47 ... 63 Hz	47 ... 63 Hz
DC input voltage range	80 ... 370 DC (Derating @ 120 V DC)	80 ... 370 DC (Derating @ 120 V DC)
AC current consumption	1.23 A @ 230 V AC / 2.47 A @ 110 V AC	2.37 A @ 230 V AC / 5.2 A @ 110 V AC
DC current consumption	1.18 A @ 370 V DC / 2.4 A @ 120 V DC	1.55 A @ 370 V DC / 4.65 A @ 120 V DC
Input fuse (internal) / inrush current	Yes / max. 15 A	Yes / max. 3 A
Recommended back-up fuse	4 A / DI, Safety fuse	6 A / DI, Safety fuse
	10 A, Char. B, Circuit breaker	16 A, Char. B, Circuit breaker
	3...4 A, Char. C, Circuit breaker	6...8 A, Char. C, Circuit breaker

Output		
Rated output voltage	24 V DC ± 1 %	24 V DC ± 1 %
Output voltage	22...28 V DC (adjustable via potentiometer on front)	22...28 V DC (adjustable via potentiometer on front)
Ramp-up time / residual ripple, switching peaks	< 100 ms / < 50 mVSS @ 24 V DC, I_R	< 100 ms / < 50 mVSS @ 24 V DC, I_R
Rated output current @ U_{rated}	10 A up to 55 °C	20 A up to 55 °C
Continuous output current @ 24 V DC	10 A @ 55 °C, 7.5 A @ 70 °C	20 A @ 55 °C, 15 A @ 70 °C
Capacitive load	Unrestricted	Unrestricted
Protection against reverse voltages from the load	30...35 V DC	30...35 V DC
Protection against internal surge voltage	35 V DC	35 V DC

Signalling		
DC OK	LED Green (U_{output} > 21.6 V DC)	LED Green (U_{output} > 21.6 V DC)
Alarm	LED Yellow (I_{output} > 90 % I_R)	LED Yellow (I_{output} > 90 % I_R)
Error	LED Red (Overload, overtemperature, short-circuit, U_{output} < 20.4 V DC)	LED Red (Overload, overtemperature, short-circuit, U_{output} < 20.4 V DC)
Voltage monitoring / no-voltage contact / contact load	Yes / NO contact / max. 30 V AC/DC 1 A	Yes / NO contact / max. 30 V AC/DC 1 A
On/Off relay	Output voltage > 21.6 V DC / < 20.4 V DC	Output voltage > 21.6 V DC / < 20.4 V DC

General data		
Efficiency	> 90 % @ 230 V AC & 10 A	> 91 % @ 230 V AC & 20 A
Power loss @ idling / nominal load	3 W / 24 W	5 W / 43 W
Earth discharge current	< 1 mA	< 1 mA
Power factor (approx.)	> 0.93 @ 230 V AC / > 0.99 @ 115 V AC	> 0.97 @ 230 V AC / > 0.99 @ 115 V AC
Mains buffering @ I_{rated}	> 20 ms @ 230 V AC / > 20 ms @ 115 V AC	> 20 ms @ 230 V AC / > 20 ms @ 115 V AC
Parallel connection option	yes, max. 5	yes, max. 3
Height x width x depth / weight	125 / 60 / 100 mm / 1 kg	125 / 100 / 120 mm / 1.6 kg

Approvals		
Approvals	CE, TÜV (EN/IEC 60950-1), cULus	CE, TÜV (EN/IEC 60950-1), cULus

Connection data			Input	Output		Input	Output
Conductor connection system			Screw connection	Screw connection		Screw connection	Screw connection
Number of terminals			3 for L/N/PE	6 (13,14,+,+, - -)		3 for L/N/PE	7 (13,14,+,+, - -,-)
Wire cross-section, rigid min/max	mm²		0.5/6	0.5/6		0.5/6	0.18/6
Wire cross-section, flexible min/max	mm²		0.5/2.5	0.5/2.5		0.5/2.5	0.5/2.5
Wire cross-section, AWG/kcmil	min/max		26/12	26/12		26/12	26/10
Min./max. tightening torque range	Nm		0.5/0.6	0.5/0..6		0.5/0.6	0.5/0.6
Stripping length	mm		6	6		6	7

Ordering Data

Type	Qty.	Part No.	Type	Qty.	Part No.
PRO ECO 240W 24V 10A	1	**1469490000**	PRO ECO 480W 24V 20A	1	**1469510000**

Note The internal varistor found in a switch-mode power unit does not replace the necessary surge protection in a system.

The internal varistor found in a switch-mode power unit does not replace the necessary surge protection in a system.

Glossary

ACK Acknowledgment.

Access point An access point is the connection that ties wireless communication devices into a network. Also known as a base station, the access point is usually connected to a wired network.

Antenna Gain Antennae don't increase the transmission power, but focus the signal more. So instead of transmitting in every direction (including the sky and ground) antenna focus the signal usually either more horizontally or in one particular direction. This gain is measured in decibels.

Bandwidth The amount of "transportation" space an Internet user has at any given time.

Bridge A hardware component used to connect two or more network segments which are physically and logically separated.

Collision avoidance A network node characteristic for proactively detecting that it can transmit a signal without risking a collision.

Crossover cable A special cable used for networking two computers without the use of a hub. Crossover cables may also be required for connecting a cable or DSL modem to a wireless gateway or access point. Instead of the signals transferring in parallel paths from one set of plugs to another, the signals "crossover." If an eight-wire cable was being used, for instance, the signal would start on pin one at one end of the cable and end up on pin eight at the other end. They "cross-over" from one side to the other.

CSMA/CA CSMA/CA is a "listen before talk" method of minimizing (but not eliminating) collisions caused by simultaneous transmission by multiple radios. IEEE 802.11 states collision avoidance method rather than collision detection must be used, because the standard employs half duplex radios—radios capable of transmission or reception—but not both simultaneously. Unlike conventional wired Ethernet nodes, a WLAN station cannot detect a collision while transmitting. If a collision occurs, the transmitting station will not receive an ACKnowledge packet from the intended receive station. For this reason, ACK packets have a higher priority than all other network traffic. After completion of a data transmission, the receive station will begin transmission of the ACK packet before any other node can begin transmitting a new data packet. All other stations must wait a longer pseudo randomized period of time before transmitting. If an ACK packet is not received, the transmitting station will wait for a subsequent opportunity to retry transmission.

CSMA/CD A method of managing traffic and reducing noise on an Ethernet network. A network device transmits data after detecting that a channel is available. However, if two devices transmit data simultaneously, the sending devices detect a collision and retransmit after a random time delay.

DHCP A utility that enables a server to dynamically assign IP addresses from a predefined list and limit their time of use so that they can be reassigned. Without DHCP, an IT Manager would have to manually enter in all the IP addresses of all the computers on the network. When DHCP is used, whenever a computer logs onto the network, it automatically gets an IP address assigned to it.

Dial-up A communication connection via the standard telephone network, or Plain Old Telephone Service (POTS).

DNS A program that translates URLs to IP addresses by accessing a database maintained on a collection of Internet servers. The program works behind the scenes to facilitate surfing the Web with alpha versus numeric addresses. A DNS server converts a name like mywebsite.com to a series of numbers like 107.22.55.26. Every website has its own specific IP address on the Internet.

DSL Various technology protocols for high-speed data, voice and video transmission over ordinary twisted-pair copper POTS (Plain Old Telephone Service) telephone wires.

Encryption key An alphanumeric (letters and/or numbers) series that enables data to be encrypted and then decrypted so it can be safely shared among members of a network. WEP uses an encryption key that automatically encrypts outgoing wireless data. On the receiving side, the same encryption key enables the computer to automatically decrypt the information so it can be read.

Firewall Keeps unauthorized users out of a private network. Everything entering or leaving a system's internal network passes through the firewall and must meet the system's security standards in order to be transmitted. Often used to keep unauthorized people from using systems connected to the Internet.

Hub	A multiport device used to connect PCs to a network via Ethernet cabling or via WiFi. Wired hubs can have numerous ports and can transmit data at speeds ranging from 10 Mbps to multigigabyte speeds per second. A hub transmits packets it receives to all the connected ports. A small wired hub may only connect 4 computers; a large hub can connect 48 or more.
HZ	The international unit for measuring frequency, equivalent to the older unit of cycles per second. One megahertz (MHz) is one million hertz. One gigahertz (GHz) is one billion hertz. The standard US electrical power frequency is 60 Hz, the AM broadcast radio frequency band is 535—1605 kHz, the FM broadcast radio frequency band is 88—108 MHz and wireless 802.11b LANs operate at 2.4 GHz.
IEEE	Institute of Electrical and Electronics Engineers, New York, www.ieee.org. A membership organization that includes engineers, scientists and students in electronics and allied fields. It has more than 300,000 members and is involved with setting standards for computers and communications.
Infrastructure mode	A client setting providing connectivity to an AP. As compared to Ad-Hoc mode, whereby PCs communicate directly with each other, clients set in Infrastructure Mode all pass data through a central AP. The AP not only mediates wireless network traffic in the immediate neighborhood, but also provides communication with the wired network. See Ad-Hoc and AP.
I/O	The term used to describe any operation, program or device that transfers data to or from a computer.
Internet appliance	A computer that is intended primarily for Internet access is simple to set up and usually does not support installation of third-party software. These computers generally offer customized web browsing, touch-screen navigation, e-mail services, entertainment and personal information management applications.
IP	A set of rules used to send and receive messages at the Internet address level.
IP (Internet Protocol) telephony	Technology that supports voice, data and video transmission via IP-based LANs, WANs and the Internet. This includes VoIP (Voice over IP).
IP address	A 32-bit number that identifies each sender or receiver of information that is sent across the Internet. An IP address has two parts: an identifier of a particular network on the Internet and an identifier of the particular device (which can be a server or a workstation) within that network.
IPX-SPX	IPX, short for Internetwork Packet Exchange, a networking protocol used by the Novell NetWare operating systems. Like UDP/IP, IPX is a datagram protocol used for connectionless communications. Higher-level protocols, such as SPX and NCP, are used for additional error recovery services. Sequenced Packet Exchange, SPX, a transport layer protocol (layer 4 of the OSI Model) used in Novell Netware networks. The SPX layer sits on top of the IPX layer (layer 3) and provides connection-oriented services between two nodes on the network. SPX is used primarily by client/server applications.
ISA	A type of internal computer bus that allows the addition of card-based components like modems and network adapters. ISA has been replaced by PCI and is not very common anymore.
ISDN	A type of broadband Internet connection that provides digital service from the customer's premises to the dial-up telephone network. ISDN uses standard POTS copper wiring to deliver voice, data or video.
ISO Network Model	A network model developed by the International Standards Organization (ISO) that consists of seven different levels, or layers. By standardizing these layers and the interfaces in between, different portions of a given protocol can be modified or changed as technologies advance or systems requirements are altered. The seven layers are: Physical, Data Link, Network, Transport, Session, Presentation and Application.
LAN	A system of connecting PCs and other devices within the same physical proximity for sharing resources such as an Internet connection, printers, files and drives.
MAC Address	A MAC address, short for Media Access Control address, is a unique code assigned to most forms of networking hardware. The address is permanently assigned to the hardware, so limiting a wireless network's access to hardware – such as wireless cards – is a security feature employed by closed wireless networks. But an experienced hacker – armed with the proper tools – can still figure out an authorized MAC address, masquerade as a legitimate address and access a closed network.
	Every wireless 802.11 device has its own specific MAC address hard-coded into it. This unique identifier can be used to provide security for wireless networks. When a network uses a MAC table, only the 802.11 radios that have had their MAC addresses added to that network's MAC table would be able to get onto the network.

Modbus

Modbus is a serial communications protocol for use with its programmable logic controllers (PLCs). Simple and robust, it has since become a de facto standard communication protocol, and it is now amongst the most commonly available means of connecting industrial electronic devices.

Modbus RTU

This is used in serial communication & makes use of a compact, binary representation of the data for protocol communication. The RTU format follows the commands/data with a cyclic redundancy check checksum as an error check mechanism to ensure the reliability of data. Modbus RTU is the most common implementation available for Modbus. A Modbus RTU message must be transmitted continuously without inter-character hesitations. Modbus messages are framed (separated) by idle (silent) periods.

Modbus TCP

Also called Modbus TCP/IP. This is a Modbus variant used for communications over TCP/IP networks, connecting over port 502. It does not require a checksum calculation as lower layers already provide checksum protection.

NAT

Network Address Translation: A network capability that enables a houseful of computers to dynamically share a single incoming IP address from a dial-up, cable or xDSL connection. NAT takes the single incoming IP address and creates new IP address for each client computer on the network.

NIC

A type of PC adapter card that either works without wires (Wi-Fi) or attaches to a network cable to provide two-way communication between the computer and network devices such as a hub or switch. Most office wired NICs operate at 10 Mbps (Ethernet), 100 Mbps (Fast Ethernet) or 10/100 Mbps dual speed. High-speed Gigabit and 10 Gigabit NIC cards are also available. See PC Card.

OFDM

Orthogonal frequency-division multiplexing (OFDM) is a method of encoding digital data on multiple carrier frequencies. OFDM has many advantages over DSSS (more bandwidth over less spectrum, better multi-path immunity, better Doppler shift immunity and greater resilience to interference.) The radios use DSSS when downgraded to data rates of: 1, 2, 5.5 and 11Mbps. OFDM is used when the radio is transmitting at data rates of 6, 9, 12, 18, 24, 36, 48 and 54Mbps. The data rate depends on the RSSI.

Proxy server

Used in larger companies and organizations to improve network operations and security, a proxy server is able to prevent direct communication between two or more networks. The proxy server forwards allowable data requests to remote servers and/or responds to data requests directly from stored remote server data.

RJ-45

Standard connectors used in Ethernet networks. Even though they look very similar to standard RJ-11 telephone connectors, RJ-45 connectors can have up to eight wires, whereas telephone connectors have only four.

Receive Sensitivity

The minimum signal strength required to pick up a signal. Higher bandwidth connections have less receive sensitivity than lower bandwidth connections.

Router

A device that forwards data from one WLAN or wired local area network to another.

Server

A computer that provides its resources to other computers and devices on a network. These include print servers, Internet servers and data servers. A server can also be combined with a hub or router.

Site survey

The process whereby a wireless network installer inspects a location prior to putting in a wireless network. Site surveys are used to identify the radio- and client-use properties of a facility so that access points can be optimally placed.

SSL

Commonly used encryption scheme used by many online retail and banking sites to protect the financial integrity of transactions. When an SSL session begins, the server sends its public key to the browser. The browser then sends a randomly generated secret key back to the server in order to have a secret key exchange for that session.

SNR

Signal to Noise Ratio. The number of decibels difference between the signal strength and background noise.

Subnetwork or Subnet	Found in larger networks, these smaller networks are used to simplify addressing between numerous computers. Subnets connect to the central network through a router, hub or gateway. Each individual wireless LAN will probably use the same subnet for all the local computers it talks to.
Switch	A type of hub that efficiently controls the way multiple devices use the same network so that each can operate at optimal performance. A switch acts as a networks traffic cop: rather than transmitting all the packets it receives to all ports as a hub does, a switch transmits packets to only the receiving port.
TCP	A protocol used along with the Internet Protocol (IP) to send data in the form of individual units (called packets) between computers over the Internet. While IP takes care of handling the actual delivery of the data, TCP takes care of keeping track of the packets that a message is divided into for efficient routing through the Internet. For example, when a web page is downloaded from a web server, the TCP program layer in that server divides the file into packets, numbers the packets and then forwards them individually to the IP program layer. Although each packet has the same destination IP address, it may get routed differently through the network. At the other end, TCP reassembles the individual packets and waits until they have all arrived to forward them as a single file.
TCP/IP	The underlying technology behind the Internet and communications between computers in a network. The first part, TCP, is the transport part, which matches the size of the messages on either end and guarantees that the correct message has been received. The IP part is the user's computer address on a network. Every computer in a TCP/IP network has its own IP address that is either dynamically assigned at startup or permanently assigned. All TCP/IP messages contain the address of the destination network as well as the address of the destination station. This enables TCP/IP messages to be transmitted to multiple networks (subnets) within an organization or worldwide.
Transmit Power	The power usually expressed in mW or db that the wireless device transmits at.
VoIP	Voice transmission using Internet Protocol to create digital packets distributed over the Internet. VoIP can be less expensive than voice transmission using standard analog packets over POTS (Plain Old Telephone Service).
VPN	A type of technology designed to increase the security of information transferred over the Internet. VPN can work with either wired or wireless networks, as well as with dial-up connections over POTS. VPN creates a private encrypted tunnel from the end user's computer, through the local wireless network, through the Internet, all the way to the corporate servers and database.
WAN	A communication system of connecting PCs and other computing devices across a large local, regional, national or international geographic area Also used to distinguish between phone-based data networks and Wi-Fi. Phone networks are considered WANs and Wi-Fi networks are considered Wireless Local Area Networks (WLANs).
WEP	Basic wireless security provided by Wi-Fi. In some instances, WEP may be all a home or small-business user needs to protect wireless data. WEP is available in 40-bit (also called 64-bit), or in 108-bit (also called 128-bit) encryption modes. As 108-bit encryption provides a longer algorithm that takes longer to decode, it can provide better security than basic 40-bit (64-bit) encryption.
Wi-Fi	Wireless Fidelity: An interoperability certification for wireless local area network (LAN) products based on the Institute of Electrical and Electronics Engineers (IEEE) 802.11 standard.

Notes

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As experienced experts we support our customers and partners around the world with products, solutions and services in the industrial environment of power, signal and data. We are at home in their industries and markets and know the technological challenges of tomorrow. We are therefore continuously developing innovative, sustainable and useful solutions for their individual needs. Together we set standards in Industrial Connectivity.