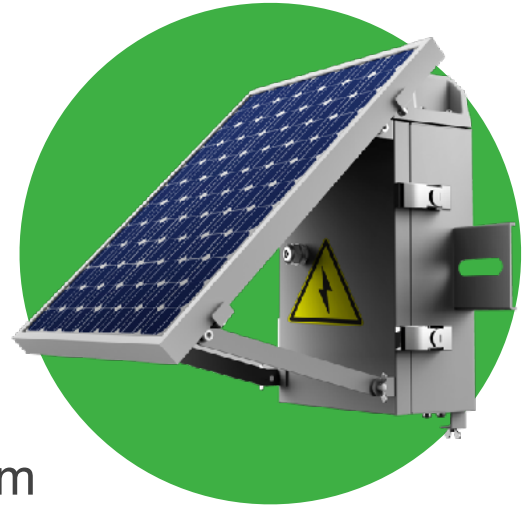




**InHand Networks**



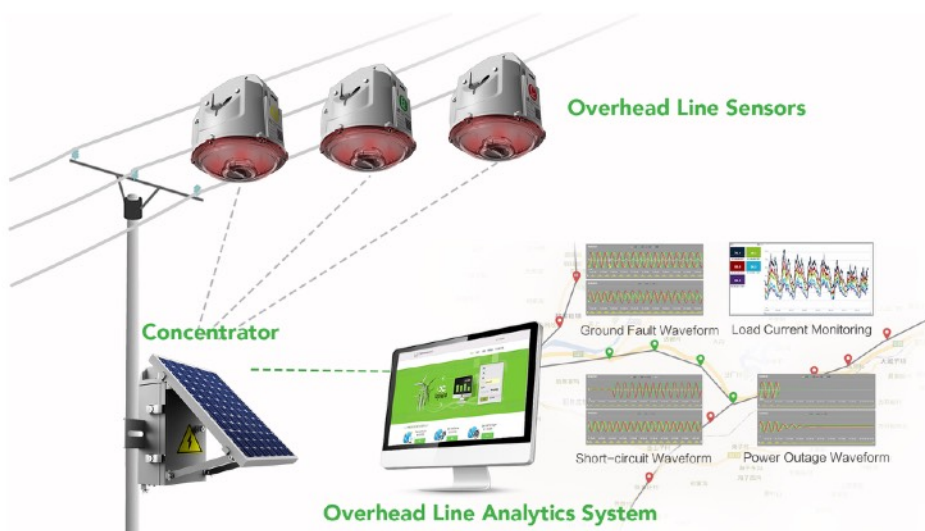
Reliable Main & Backup Power,  
High-precision Sync, Remote Maintenance

## InHand Wireless Overhead-lines System **Concentrator** (Pole-mounted)

Smart power distribution is an important sector of smart grid. One great challenge faces the operation team of distribution networks is how to quickly and accurately locate the faulty section when power line faults, especially low-current ground faults occur. Existing distribution automation, feeder automation, and fault indicating technologies have the problems of high investment, requiring power off for deployment, low accuracy, etc. InHand Wireless Overhead-lines System, the smart distribution lines monitoring system launched by InHand Networks, can accurately identify the type of power line faults and quickly locate the faulty section based on innovative technologies of high-precision measurement and high-speed wave-recording of line currents, thus significantly shorten response and processing time of power line faults, improve power supply reliability.

The concentrator is the communication bridge between overhead line sensors and main station. By a hybrid of short and long range wireless networking, the system has the functions of channel monitoring, switching, and fault alarming, supports system diagnosing, self-recovery, and transmission breakpoint resuming. The high-reliability power supply consisting solar panel as main and maintenance-free accumulator as backup power can ensure continuous stable operation, allowing utilities to monitor status of power lines and line faults in real-time. With big-data based comprehensive analysis of the status of distribution lines, the system can generate power line status analysis, including line faults, load current, energy quality, etc., and provide solid data support for the structural optimization of distribution network.

### **Application Case**



## Features and Advantages

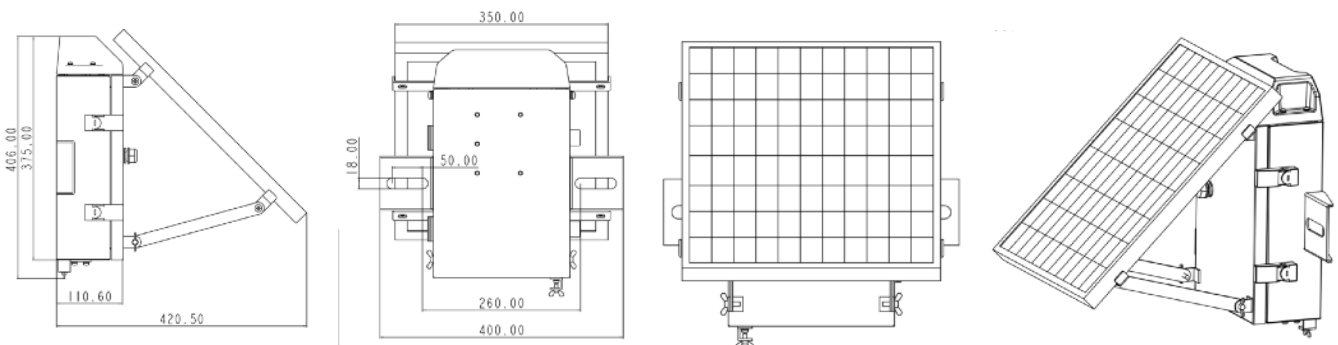
- + High-reliability power supply system, with solar panel as main and maintenance-free accumulator as backup power
  - + Real-time two-way communication between concentrator and main station, by hybrid of short and long range wireless networking
  - + High precision (20 $\mu$ s) wireless three-phase time synchronization
  - + Accurate on-site detection and locating of ground faults, with transient zero sequence current and electric field signal by three phase synthesis
  - + Precision (1 $\mu$ s) GPS Timing based absolute timescale
  - + Channel monitoring, fault alarming, system diagnosing and self-recovery, safeguarding reliable communications
  - + Industrial-grade design, IP55, support remote wireless maintenance and upgrade, text message management.
- **Flexible Networking, Safe Transmission**  
The concentrators build short range wireless network in-between, supporting star topology; and establish communication with the main station monitoring platform through 2.5G/3G/4G cellular network based utility VPN, to upload data to main station and realize the monitoring of faults and operation status of distribution networks.
  - **Precision GPS Timing Based Accurate Absolute Timescale**  
The concentrator is embedded with a GPS timing module and installed with a high gain active antenna, precision of time service reaching 1 $\mu$ s. By time service through short-range wireless connection, the overhead line sensors can acquire an absolute timescale with a precision of 20 $\mu$ s.
  - **Accurate On-site Detection and Locating of Ground Faults with Three-phase Synthesized Zero Sequence Current and Electric Field Signal**  
The system can realize accurate on-site detection and locating of ground faults by acquiring transient zero sequence current and electric field signal through three phase synthesis. It can also upload the waveform of the faulty moment recorded by overhead line sensors to the main station for fault analysis, retracing and sourcing.
  - **Reliable and Stable Communications**  
Reliable industrial-grade design, industrial-grade cellular communication module from major brand. Support channel monitoring, channel switching and fault alarming; system diagnosing and self-recovery; and transmission breakpoint resuming when communication recovers from interruption, avoiding loss of data.
  - **Ultra-low Power Consumption**  
Motherboard of the concentrator adopts low power consumption CPU and industrial-grade cellular communication module. By special programming technology, the concentrator achieves real-time two-way communication with the monitoring platform software and overhead line sensors on ultra-low power consumption.
  - **High-reliability Power Supply System**  
The concentrator uses solar panel as main, and a maintenance-free long-service rechargeable accumulator as backup power when solar energy is unavailable. The backup accumulator can supply for continuous operation of the Concentrator for 15 days (depending on selected capacity of the battery). The embedded high-performance processor will switch between the main and backup power according to real-time detection of the two.
  - **Remote Maintenance and Upgrade**  
Support remote maintenance and upgrade, either batch or automatically one-by-one, making maintenance safe and convenient. Also support text message management.
  - **Solid Shell That's Dust-proof, Waterproof, and Anti-rust**  
Solid anti-rust shell combining with sealing ring and waterproof joints, passed IP55 protection rating, ensures long hours of safe and stable operation in challenging environments.

## Product Specifications

IWO-HD Wireless Communication Specifications			
Short-range Wireless Communication			
Communication Distance	≥ 100m	Transmission Rate	250kbps
Transmit Power	≤ 10mW (10dBm)	Network Topology	Star
RX Sensitivity	≥ -90dBm	Directionality	All directions
Wireless Communication			
Network Access	Wireless DDN (APN) /VPDN		
Network Authentication	Support CHAP, PAP authentication		
UIM/SIM Card	1.8V/3V, flip card slot		
GPS Timing Module			
Antenna Gain	26 ~ 28dB	First-time Startup Time	35 seconds
Time Service Precision	1μs	Startup Time (non first-time)	1 second
Regulations and Protocols			
Electric Power Regulation	Support DL / T 634.5 101-2002, and DL / T 634.5 104-2002		
Network Security			
Device Management Security	Support login by user types: administrator, maintainer		
Service Life			
Service Life	> 8 years		
MTBF	27.3 years (whole system, incl. sensors and concentrator)		

IWO-HD Hardware Specifications			
Power Supply and Consumption			
Main Power Supply	Solar panel		
Battery	12V maintenance-free long-service rechargeable accumulator		
Average Hibernating Consumption (offline, system hibernating)	≤ 1mA @ 12V	Average Standby Consumption (offline, no communication)	≤ 15mA @ 12V
Average Operating Consumption (Online, regular communication)	≤ 20mA @ 12V	Max. Operating Consumption (Online, continuous communication)	≤ 100mA @ 12V
Mechanical Specifications			
Dimensions (WxHxD)	400mm x 420mm x406mm		
Weight	≤ 10kg	Protection Rating	IP55
Operating Environment			
Operating Temperature	-40 ~ +70 °C	Storage Temperature	-40 ~ +70 °C
Ambient Humidity	5% ~ 95% (non-condensing)		
EMC			
ESD Immunity	Level 4	RF Field Radiation Immunity	Level 4
Surge Immunity	Level 4	Fast Transient Pulse Train Immunity	Level 4
Power Frequency Magnetic Field Immunity	Level 5	Damped Oscillatory Electric Field Immunity	Level 5
Pulse Magnetic Field Immunity	Level 5		

## Dimensions (mm)



# Ordering Guide

Concentrator Model	Model code: IWO-HD/HX-<WMNN>-<C/U/M/S>-<5/6>-<A/B/C/D/E/F>-<2/3/N>				
	<WMNN>: Cellular Type & Module	<C/U/M/S>: Short-range Frequency	<5/6>: Line Frequency	<A/B/C/D/E/F>: Battery	<2/3/N>: Solar Power
IWO-HD/HX-<TL00>-<C/U/M/S>-<5/6>-<A/B/C/D/E/F>-<2/3/N>	China - LTE CAT4: LTE-FDD Band1/3/5/8 LTE-TDD Band38/39/40/41 TD-SCDMA Band34/39 UMTS(DC-HSPA+) Band 1/5 EDGE/GPRS/GSM 850/900/1800/1900MHz				
IWO-HD/HX-<FH20>-<C/U/M/S>-<5/6>-<A/B/C/D/E/F>-<2/3/N>	Europe, Asia Pacific - LTE CAT4: LTE-FDD Band 1/2/3/4/5/7/8/20 UMTS(DC-HSPA+) Band1/2/5/8 EDGE/GPRS/GSM 850/900/1800/1900MHz	C: 470-510MHz China, Thailand		A: 7.2Ah Lead-acid B: 12Ah Lead-acid	
IWO-HD/HX-<FB53>-<C/U/M/S>-<5/6>-<A/B/C/D/E/F>-<2/3/N>	Europe - LTE CAT1: LTE-FDD Band 3/7/20 EDGE/GPRS/GSM 900/1800/MHz	U: 915-928MHz North America, New Zealand	5: 50Hz 6: 60Hz	C: 40Ah Li-phosphate D: 40Ah Gel	2: 20W 3: 30W
IWO-HD/HX-<FB78>-<C/U/M/S>-<5/6>-<A/B/C/D/E/F>-<2/3/N>	Australia, South America - LTE CAT4: LTE-FDD CAT4 Band 1/3/5/7/8/28 UMTS(DC-HSPA+) 850/900/1900/2100	M: 866MHz Middle East S: 919-923MHz Malaysia		E: 12Ah Li-phosphate F: 3.3Ah Li-phosphate	N: No solar power
IWO-HD/HX-<FB13>-<C/U/M/S>-<5/6>-<A/B/C/D/E/F>-<2/3/N>	North America, AT&T, T-Mobile - LTE CAT1: LTE-FDD Band2/4/12				
IWO-HD/HX-<FB02>-<C/U/M/S>-<5/6>-<A/B/C/D/E/F>-<2/3/N>	Global, North America AT&T, Verizon Wireless: LTE CAT-M & NB1				
Example	IWO-HD-FH20-C5B2: Concentrator, pole-mounted, supports Europe and Asia Pacific networks, short-range communication frequency is 470-510MHz, applicable to 50Hz 10KV power lines, packaged with 12Ah lead-acid battery, 20W solar panel.				

## About Us

InHand Networks is a global leader of Industrial IoT, with a record of tremendous success following groundbreaking innovation since our inception in 2001.

InHand serves world-class partners and customers with industrial M2M routers, gateways, industrial Ethernet switches, rugged computers and IoT management platforms. We provide IoT solutions for various vertical markets including Smart Grid, Industrial Automation, Remote Machine Monitoring, Smart Vending, Smart City, Retail and more.

Proudly bearing the marks of AWS Select Technology Partner, Schneider Electric TPP Certified Technology Partner, and Rockwell Automation Encompass Product Partner in Asia-Pacific, InHand Networks defines industrial innovation and reliability.



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