Concentrator

- Concentrating Unit

Key Features

- High-reliability power supply system, with solar panel as main and maintenance-free accumulator as backup power supply
- Real-time two-way interaction between the Concentrator and main station with hybrid networking of short and long range wireless connection
- High precision (±100μs) wireless three-phase time synchronization
- Accurate on-site ground fault detection and locating with transient zero sequence current and electric field signal acquired with three-phase synthesis
- Precision GPS (1us) Timing based absolute timescale
- Channel monitoring, fault alarming, system diagnosing and self-recovery functions, safeguarding reliable communications
- Industrial-grade design, IP55, support remote wireless maintenance and upgrade, and text message management.

Product Description

As an important sector in the building of smart grids, the operation of smart distribution networks faces the great challenge of quick and accurate locating of power lines faults, especially low-current ground faults. Existing distribution automation, feeder automation, and fault indicating technologies have the problems of requiring high investment, power off for construction, low accuracy of detection, etc. With high-precision measurement and high-frequency wave-recording of line current, the InHand Wireless Overhead-line Monitoring System, an innovative smart distribution lines monitoring product launched by InHand Networks, can accurately identify fault types and quickly locate the faulty section on power lines, largely shorten response and processing periods of power line faults and improving power supply reliability.

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

Features & Advantages

- **Flexible Networking, Safe Transmission**

  The concentrators build short range wireless networks 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, realizing monitoring of faults and operation status of the distribution network.

- **Precision GPS Timing Based Accurate Absolute Timescale**

The Concentrator is embedded with GPS Timing module* and installed with high gain active antenna, precision of time service reaching 1us. By time service from the Concentrator through short-range wireless connection, the Overhead Line Sensors can acquire a high precision absolute timescale with precision of ±100us.

(Note: Embedded *GPS Timing module of the Concentrator is an optional part.)

- **Accurate On-site Detection and Locating of Ground Faults with Three-phase Synthesized Zero Sequence Current and Electric Field Signal**

  The concentrator acquires transient zero sequence current and electric field signal by three-phase synthesis to realize accurate on-site detection and locating of ground faults. It can also upload the waveform of the faulty moment recorded by Overhead Line Sensors to the main station for fault analyzing, retracing and sourcing.

- **Reliable and Stable Communications**

  Reliable industrial-grade design, adopted industrial-grade cellular communication chip of major international manufacturer. Support channel monitoring, channel switching and fault alarming; system diagnosing and self-recovery; and transmission breakpoint resuming when communication recovers from interruption, to avoid loss of data.

- **Ultra-low Power Consumption**

  Adopted low power consumption CPU and industrial-grade cellular module on the motherboard, and with special programming technology, the concentrator supports 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 power supply, and a maintenance-free long service life chargeable accumulator as backup when the solar energy supply is unavailable. The backup accumulator can supply for continuous operation for 15 days of the Concentrator (depending on the selected capacity of backup battery). The embedded high-performance processor will switch between solar panel and accumulator according to the result of real-time detection.

- **Remote Maintenance and Upgrade**

  Safe and convenient remote maintenance and upgrade, support batch and one-by-one auto maintenance or upgrade of multiple terminals. Support text message management.

- **Solid Shell, Dustproof, Waterproof, and Anti-rust**

  Solid anti-rust shell combined with sealing ring and waterproof joints, passes IP55 protection rating, ensuring long hours of safe and stable operation in outdoor environments.

Product Specifications

Wireless Communication Specifications

Short-range Wireless Communication	Operating Frequency	470~510MHz
	Transmit Power	≤10mW (10dBm)
	RX Sensitivity	≥ -90dBm
	Transmission Rate	250kbps
	Communication Distance	≥100m
	Network Topology	Star
	Directionality	All directions
Wireless Communication	Network Access	Support wireless DDN (APN) /VPDN
	Network Authentication	Support CHAP, PAP authentication
	Network Types	Support GPRS/EDGE: 900/1800 MHz; Support WCDMA/HSPA: 900/2100MHz
	UIM/SIM Card	3V, drawer slot installation
GPS Timing Module	Antenna Gain	26~28dB
	First Start-up Time	35 seconds
	Restart Time	1 second
	Precision of Time Service	1us
Standards and Protocols	Electric Power Standard	Support DL / T 634.5 101-2002, DL / T 634.5 104-2002
Network Security	Device Management Security	Support login by user types: Administrator, Maintainer

Hardware Specifications

Power Supply and	Main Power Supply	Solar panel supply

Consumption	Battery	12V maintenance-free long service life chargeable accumulator
	Average Hibernating Consumption (Offline, system hibernation)	≤ 1mA @ 12V
	Average Standby Consumption (Online, no communication)	≤ 15mA @ 12V
	Average Operating Consumption (Online, regular communication*)	≤ 20mA @ 12V
	Maximum Operating Consumption (Online, continuous communication)	≤ 100mA @ 12V
Mechanical Specs	Dimensions (W x H x D)	400mm x 420mm x406mm
	Weight	≤ 5kg
	Shell	
	Protection Rating	IP55
Operating Environment	Operating Temperatures	-40 ~ +70 °C
	Storage Temperatures	-40 ~ +70 °C
	Ambient Relative Humidity	5%~95% (non-condensing)
EMC	ESD Immunity	Level 4
	RF Radiated Fields Immunity	Level 4
	Surge Immunity	Level 4
	Rapid Transient Pulse Train Immunity	Level 4
	Power Frequency Magnetic Field Immunity	Level 5
	Pulse Magnetic Field Immunity	Level 5
	Damped Oscillatory Electric Field Immunity	Level 5
Service Life and Warranty	Service Life	>8 years
	Warranty Period	1 year

Note: *Regular communication means to communicate with main station once every minute, lasting no longer than 2 seconds each time.

Dimensions(mm)