

TECHNICAL DATA SHEET

PMCN - LON 312 POWER LINE CARRIER AC POWER MEASUREMENT SYSTEM

ENERNET Corporation has developed a LonWorks® based AC Power Line Telemetry System consisting of independently addressable, three phase, distributed Power Measurement and Control nodes (PMCN). Each node is designed to function as an interoperable component in an intelligent building energy measurement, management and control network system, or, as a stand-alone, wireless, power measurement solution. Through the use of data acquisition Power Measurement Receivers (PMR), traditional data loggers and recorders and energy management systems, can make use of this powerful PLC power measurement technology.

PMCNs intercommunicate over existing building power wiring using LonWorks networking technology and an interoperability design guideline standard known as LonMark™. This collection of hardware and software development tools and standards allow application designers to build intelligent network instrumentation and control products without concern for network communication issues, which historically have consumed inordinate amounts of a designer's engineering time. By developing with LonWorks, each node inherently includes the capability to communicate with other nodes through Lontalk™, an embedded firmware protocol. LonWorks allows ENERNET to develop PMCN technology independently, yet with assurance that it will operate with network equipment developed by others. ENERNET offers its PMCN system with one of two error-correcting PLC communication technologies; the PLT-10A spread-spectrum-based power line carrier or the PLT-22 narrow band option.

Each PMCN can measure kW and kWh, maintain kWh accumulation and Peak Demand. Data is directly accessible for upload to a network supervisory system as Standard Network Variable Types (SNVTs) Optionally, each PMCN device provides 2 channels of load control.

Some applications may not involve interoperation of components over a LonWorks network; an example is monitoring power usage for performance contracts, utility program evaluation/customer services, sub-metering or EMCS. In such cases, existing monitoring and recording devices can be utilized through the use of a PMR. The PMR is a sister device that receives power usage information from PMCNs, then generates a standard instrumentation pulse signal for reading by a recorder or other measuring device. One (1) PMR can receive power information from up to eight (8) PMCNs. Each PMR, and its eight associated PMCNs is defined as a group. Up to sixteen (16) groups can operate on a common PLC network, accommodating as many as 128 Power Measurement and Control Nodes. The system facilitates the accurate submetering of electric power in residences and businesses with single- or poly-phase 120/208/240/277 electric service. Electrical loads to be monitored are physically connected to a PMCN through an extension of the building's electric power wiring, simultaneously providing instrument operating power, load reference voltage, and a communications media. External current transformers sample the load's operating current.

Figure 1 - Power Measurement Board Overview

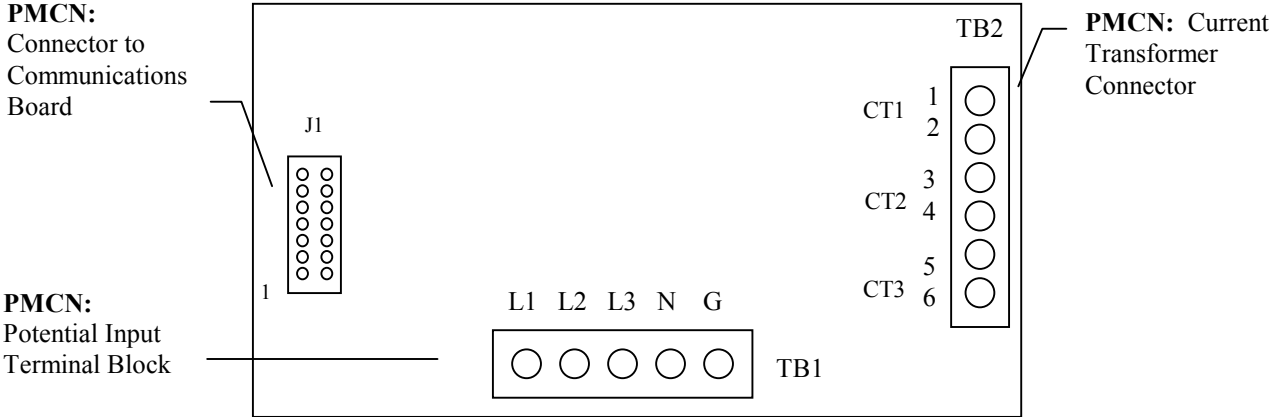
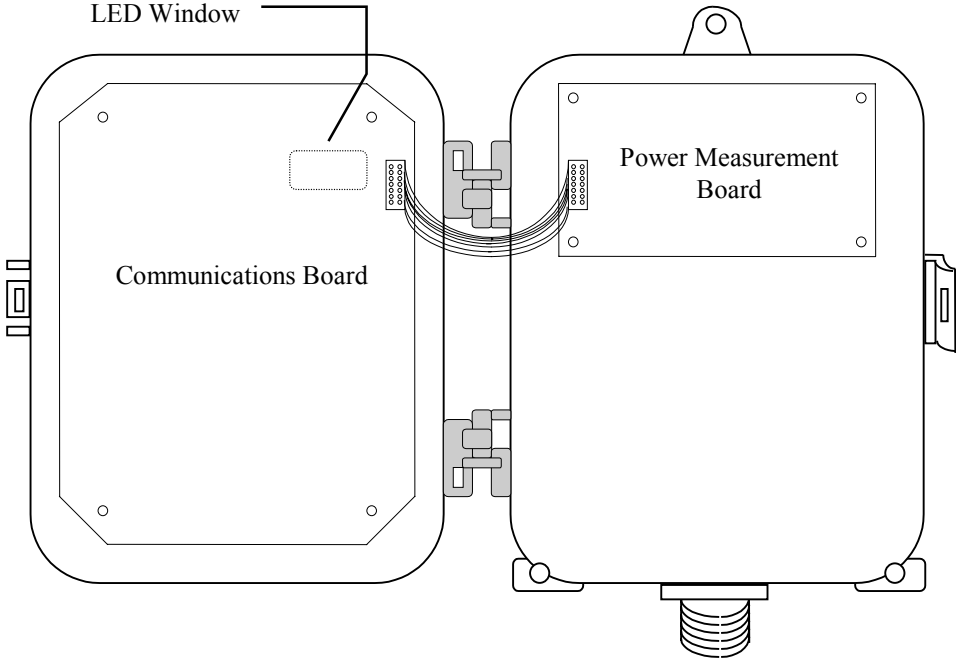


Figure 2 - Enclosure/PC Board Location



At the receiver, the PMR connects to any data recorder or EMS that accepts form A contact closure/open collector signals. Up to sixteen independent groups can communicate on a single power line (limited in scope to electric services delimited by a common distribution transformer). Each PMCN has configurable unit and group address switches, simplifying the installation of multiple meter groups without the need of network installation tools. Several diagnostic lamps provide the user with information regarding communication status, performance and general system operation.

SPECIFICATIONS:

Measures one (1) single or polyphase 120/208/240/277 VAC electrical load (user configurable) stores and transmits energy consumption data over building power lines as Standard Network Variables Types.

GENERAL

Enclosure:

High impact plastic, UL approved
7" x 7.5" x 3" flange mounted

Interoperability:

LonMark™ Compliant

Indicator Lamps:

Green — Power
Amber — Communication Status
Red — Microprocessor Active
Red — Coded Response

Pushbuttons:

Reset - Register Address change
Announce - Generates Test Message
Diagnostics - Runs communications diagnostic routine

ELECTRICAL

Power Measurement Configuration:

Three Element Power Meter

- Single Phase
- Split Phase
- Network
- Three Wire Three phase
- Four Wire Three phase

Stored Data:

Accumulated Energy — kWh
Peak Demand — kW
Alarm Set-point

Accuracy:

± .5% of Reading (excluding CT error)

Displacement Power Factor:

0.5 lagging to Unity

Control Output Signal:

Output Form — Solid State Form A
Maximum Applied Voltage — 50Vdc
Maximum Applied Current — 50mA

Instrument Operating Voltage:

102 to 300 VAC

Operating Power:

Transmit: 6.5 Watts, maximum
Receive: 1.5 Watts, maximum

AC Leakage to Earth Ground @ 60 Hz:

3.5mA max (per device)

ESD Withstand Voltage for No Hard Failures:

2.0 kV

Standards Assoc. Compliance by Design:

UL 1950, 508, 916
FCC Part 15
CSA C22.2 No. 950

ENVIRONMENTAL

Temperature Range:

Operating: 0° to +70°C

Storage: -40° to +85°C

Humidity Range:

10% to 95% RH, non-condensing at 70°C

COMMUNICATION

PLC Modulation Method:

PLT-10A

Direct Sequence Spread Spectrum,
31 chips/bit, 100 kHz to 450 kHz.

PLT-20

125k-140kHz

Packet Communications Protocol:

Modified CSMA (Ref. OSI 7-layer model)

Communication Rate:

PLT-10A — 9.4kbps net bit rate

PLT-22 — 4.0kbps net bit rate

PMR COMPATIBLE LOGGERS

Model K20 Energy Meter/Recorder:

Measurements:	Volts/Amps
	kVA/kVAh
	Power/kWh
	Analog
	Digital

Other:

Loggers accepting Form A, open collector pulse.

FOR MORE INFORMATION CONTACT

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