Applications Cookbook
Metering Solutions
Version 5.0

FOR REFERENCE ONLY
METERING SOLUTIONS COOKBOOK NOTES

Measurement & Verification - Data Collection

GENERAL NOTES

1. Refer to installation instructions for device-specific terminations.
2. Refer to device data sheets for device-specific data transfer types.
3. Install current transformers (CTs), voltage sensors, and other required hardware associated with the proper operation of the metering equipment per NEC and best practices.
4. Current transformers and voltage sensors not shown for clarity.
5. Leviton recommends the following use of isolated pulse outputs:
   A. Tenant Billing
      1. Use kWh (1000) output in most applications.
      2. If 15 minute interval demand data is required, use 10 watt-hour output. For high energy applications, (meters rated 800A or higher), use kWh pulse output.
   B. Energy Monitoring
      1. Use kWh pulse output for most applications. This will provide better data resolution when using pulse accumulations to track 15 minute interval demand.
      2. For high energy applications (meters rated 800A or higher), use kWh pulse output.
6. An Energy Monitoring Hub and Series 4000/4100 Meters may be on the same ModBus RTU loop. One type per loop shown for simplicity.
7. BACnet MS/TP as it relates to meters shown. Media conversion and transport are part of facility BAS/BMS system, not shown for clarity.
8. Facility Ethernet may include media conversion between devices. UTP shown for simplicity. Industry standard distances apply.
9. ModBus IP and BACnet IP are transported via Ethernet.
10. Maximum number of ModBus devices per system (one HUB and devices) is 32 total devices of any type.

WIRE RUNS BY SYMBOL

1. Line: 15Amp, 120VAC, 2 wire plus ground, 60Hz direct from service panel, do not switch.
2. (1) Ethernet cable equal to Belden 2412A, labeled per drawing.
3. (1) ModBus RTU cable equal to Belden 1120A, labeled per drawing. Maximum length 1200m (3935 ft.).
5. Communication wire: Equal to (2) #18-22 AWG THHN per meter. Maximum length 200 ft.
6. CT Wire harness as noted by manufacturer and as scheduled. Max 500’ except for Series 8000 which is max 300’.
7. Reference and power circuit: (1) -phase, 4-wire, plus ground circuit and the metered voltage. Feed from dedicated 15A 3-pole breaker.
8. Power wire: By factory.
9. Communication wire: By factory.

NOTES BY SYMBOL

1. Configure high density pulse module to associated device(s). Maximum 23 meters.
2. Configure meter(s) to associated loads. Reference general note 5 for recommended use and panel scheduled for monitored loads.
3. Configure emergency hub as required.
4. Power supply, cord and plug provided as a complete assembly.
5. Configure HubLite as required. Maximum 4 meters.
6. Managed Ethernet switch, 10/100/1000.
   A. Provide minimum two (2) spare ports. Assume at least one (1) billing computer per switch in calculations.
   B. Switch shall have a link feature.
   C. Multiple switches shall be linked together.
7. Configure ModHoppers as required. Maximum 2 meters, directly connected.
8. Configure EMH+ as required.
   A. Meter to associated loads.
   B. Pulse inputs to associated device(s). Maximum 8 devices.

SYMBOLS

- Connector Body - Female (Cable Mt’g)
- Plug - Male (Cable Mt’g)
- Crossing wires, no connection
- Connected wires
- Separate wires as part of a bundle
- Receptacle - Female (Panel Mt’g)
- Inlet - Male (Panel Mt’g)
- Wire runs not by Leviton
- Reference to notes, does not transcend drawings
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INDIVIDUAL MINI METER TO HIGH DENSITY PULSE MODULE, MONITORING SYSTEM

[Diagram showing the connection between a mini meter, pulse module assembly, energy monitor hub (EMH), 12-24VDC power supply, and high density pulse module assembly.]
SERIES 2000 MMU TO HIGH DENSITY PULSE MODULE, MONITORING SYSTEM
INDIVIDUAL SERIES 3500 METER TO HIGH DENSITY PULSE MODULE, MONITORING SYSTEM
INDIVIDUAL SERIES 3500 METER TO MODBUS IP

INDIVIDUAL SERIES 3500 METER TO BACNET IP
INDIVIDUAL SERIES 4000 METER TO MODBUS RTU

INDIVIDUAL SERIES 4100 METER TO MODBUS RTU

INDIVIDUAL SERIES 4100 METER TO BACNET MS/TP
SERIES 7000/7100 METER—MODBUS RTU OPTION

Note: No more than 4 Series 7000/7100 Meters per Energy Monitoring Hub. Consult factory for additional information.

SERIES 7000/7100 METER—MODBUS TCP/IP OPTION

SERIES 7000/7100 METER—BACNET MS/TP OPTION

SERIES 7000/7100 METER—BACNET IP OPTION
SERIES 8000 METER TO MODBUS RTU OPTION

SERIES 8000 METER TO MODBUS TCP/IP OPTION

SERIES 8000 METER TO BACNET IP OPTION
INDIVIDUAL EMH+ TO MONITORING SYSTEM VIA ETHERNET

INDIVIDUAL EMH+ MODBUS RTU DEVICES TO MONITORING SYSTEM VIA ETHERNET
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SERIES 7000/7100/EMH+ METER AND HUB TO BACNET IP
MINI METERS PULSE OUTPUT TO HIGH DENSITY PULSE MODULE, MODBUS TO MODHOPPER

MINI METERS TO MODHOPPER ONBOARD PULSE INPUT TERMINALS
SERIES 2000 METER MMU PULSE OUTPUT TO HIGH DENSITY PULSE MODULE, MODBUS TO MODHOPPER

SERIES 2000 METERS TO MODHOPPER ONBOARD PULSE INPUT TERMINALS
SERIES 3500 METER PULSE OUTPUT TO MODHOPPER ONBOARD PULSE INPUT TERMINALS

SERIES 3500 METER MODBUS TO MODHOPPER
SERIES 4x00 METER PULSE OUTPUT TO MODHOPPER ONBOARD PULSE INPUT TERMINALS

SERIES 4x00 METER MODBUS TO MODHOPPER
SERIES 7000/7100 METERS TO MODHOPPER MONITORING SYSTEM

NOTE: MAXIMUM OF 4 7000/7100 METERS PER MODHOPPER. CONSULT FACTORY FOR ADDITIONAL DESIGN INFORMATION.

EMH+ MODBUS TO MODHOPPER

CIRCUIT 1 LINE FEED (120V)
SERIES 8000 METERS TO MODHOPPER, MONITORING SYSTEM

NOTE: NO MORE THAN 8 SERIES 8000 METERS PER ONE MODHOPPER

EMH+ MODBUS TO MODHOPPER