LEVITON

# Applications Cookbook

## Metering Solutions

Version 3.0

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 10Wh 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. Energy Monitoring Hubs and Series 3300 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 interconnected ModHoppers is 250. Consult factory for suggested optimal ModHopper distribution in your facility

### 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.)
4. (1) BACnet MS/TP cable: EIA-485 compliant cable, wiring in compliance with ANSI/ASHRAE 135-2004
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

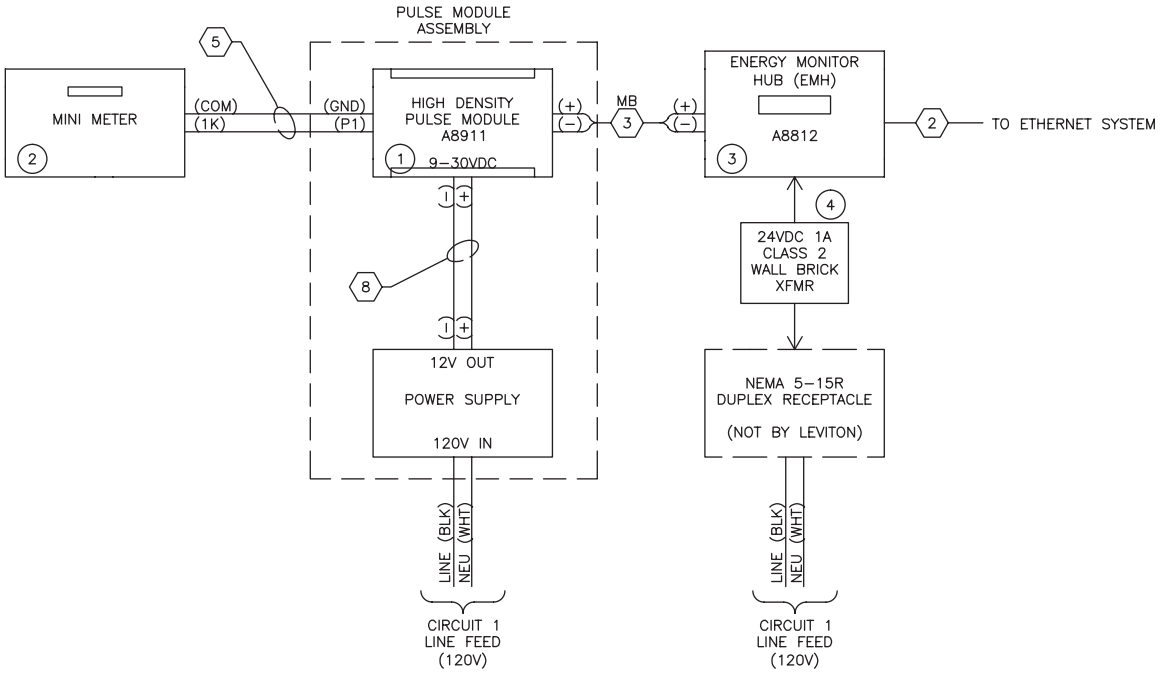

Receptacle - Female (Panel Mt'g)

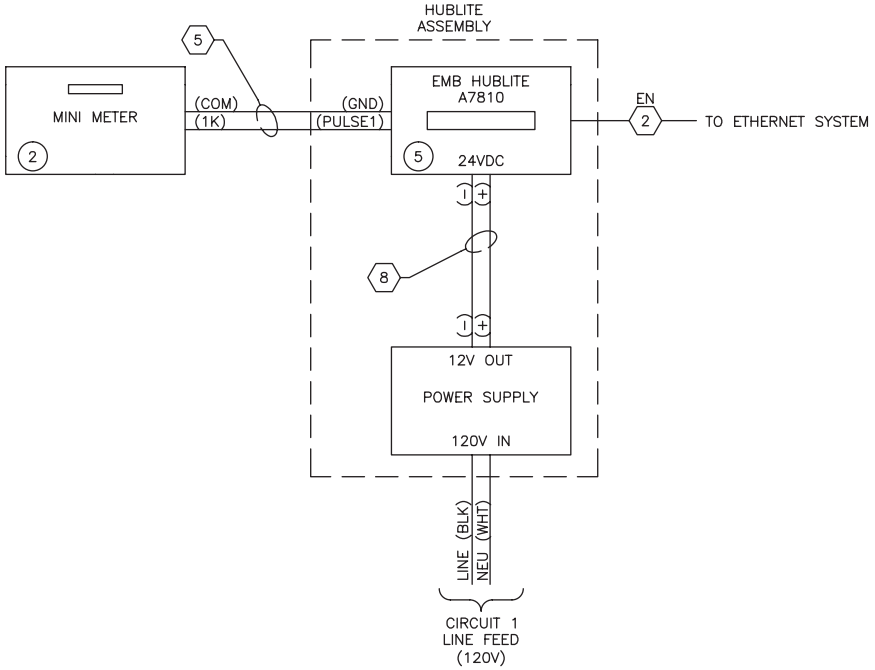

Inlet - Male (Panel Mt'g)

Wire runs not by Leviton

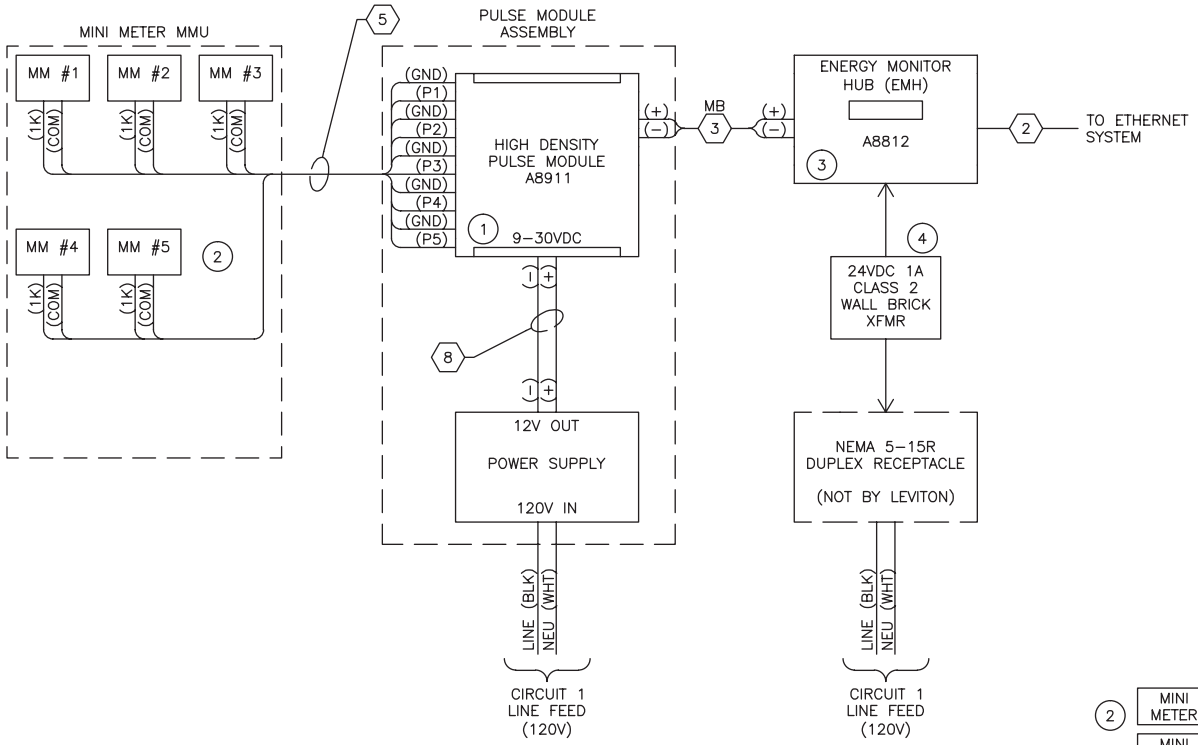
Reference to notes, does not transcend drawings

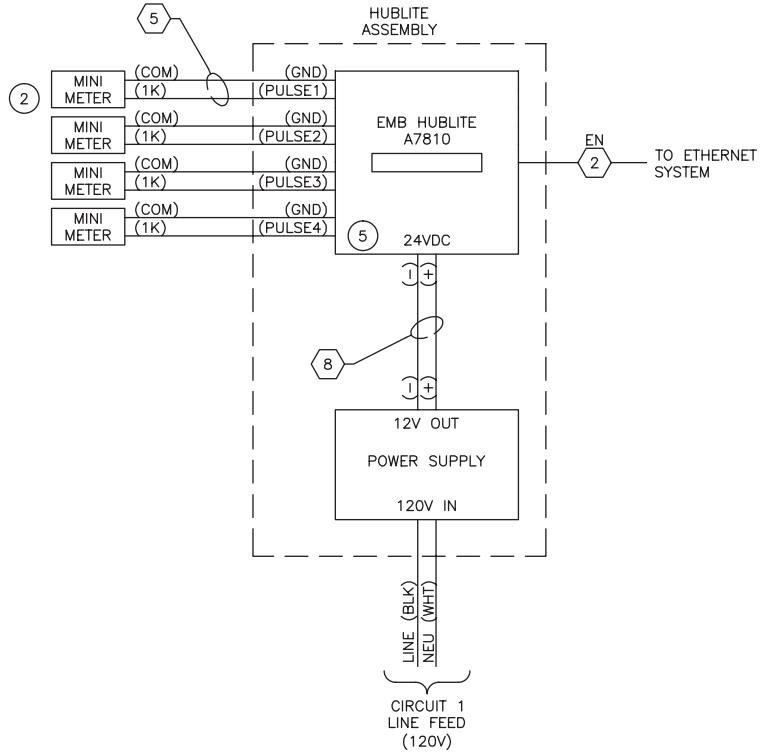
# INDIVIDUAL MINI METER TO HIGH DENSITY PULSE MODULE, MONITORING SYSTEM



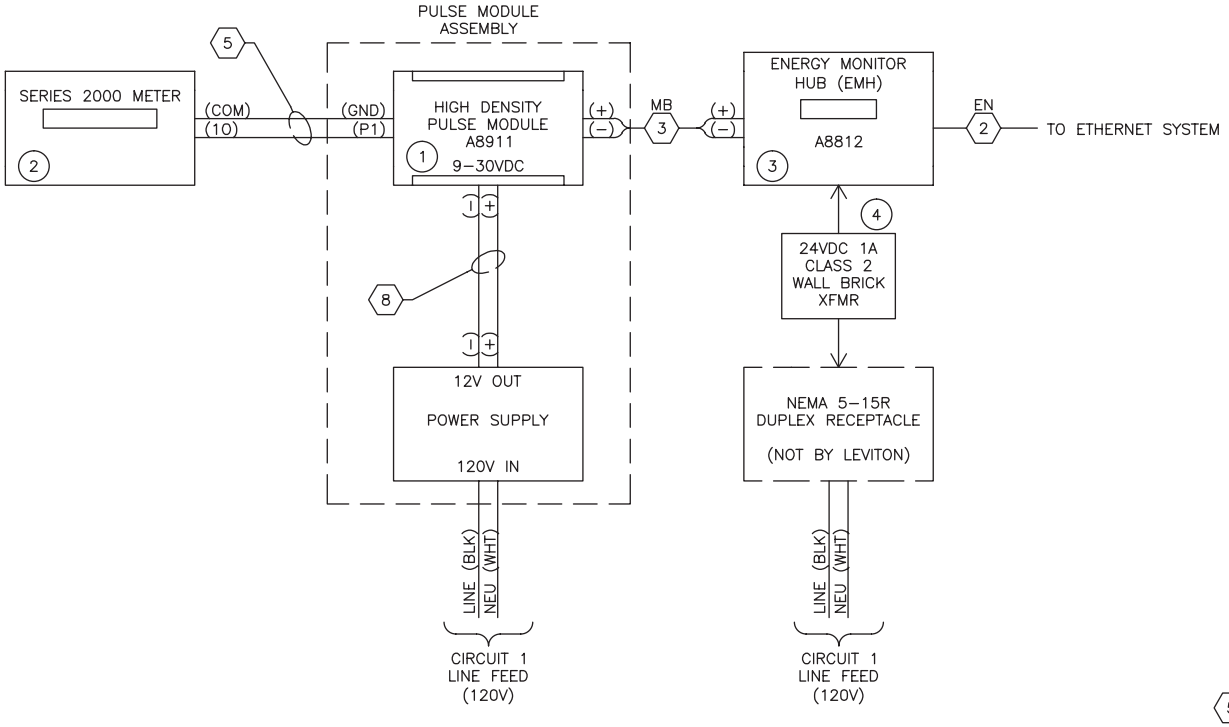



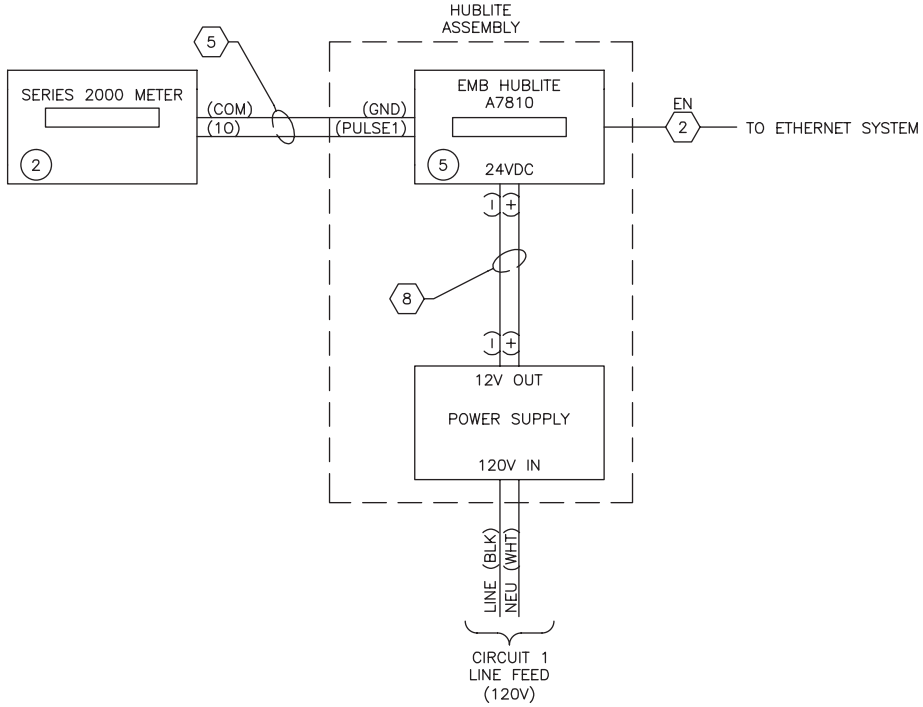
# MINI METER MMU TO HIGH DENSITY PULSE MODULE, MONITORING SYSTEM



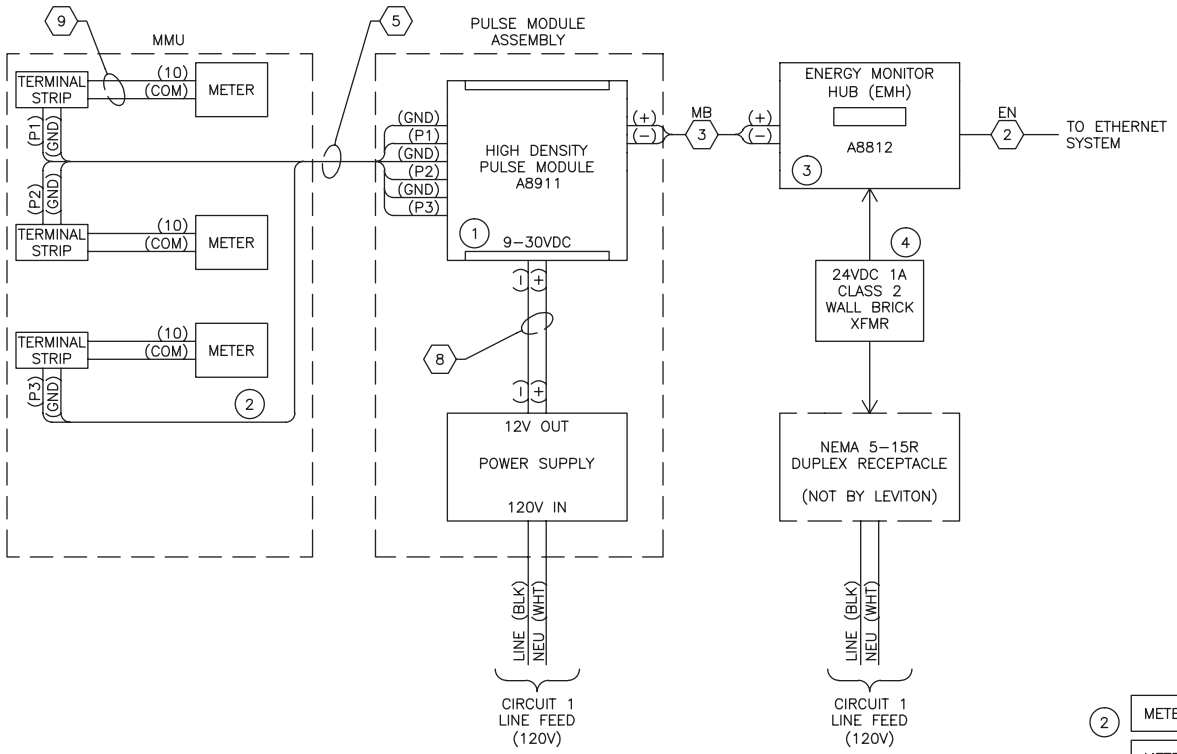



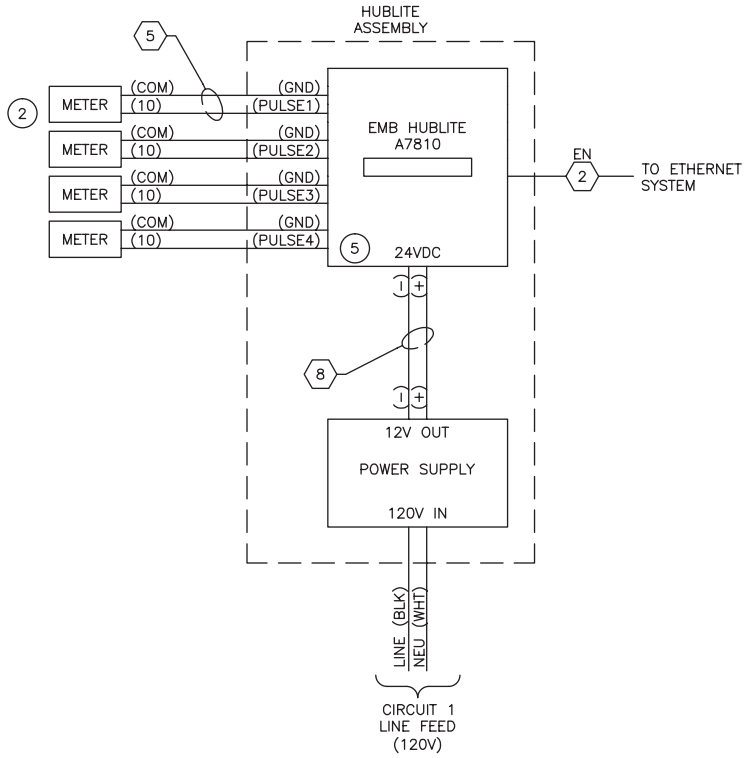
# INDIVIDUAL SERIES 2000 METER TO HIGH DENSITY PULSE MODULE, MONITORING SYSTEM



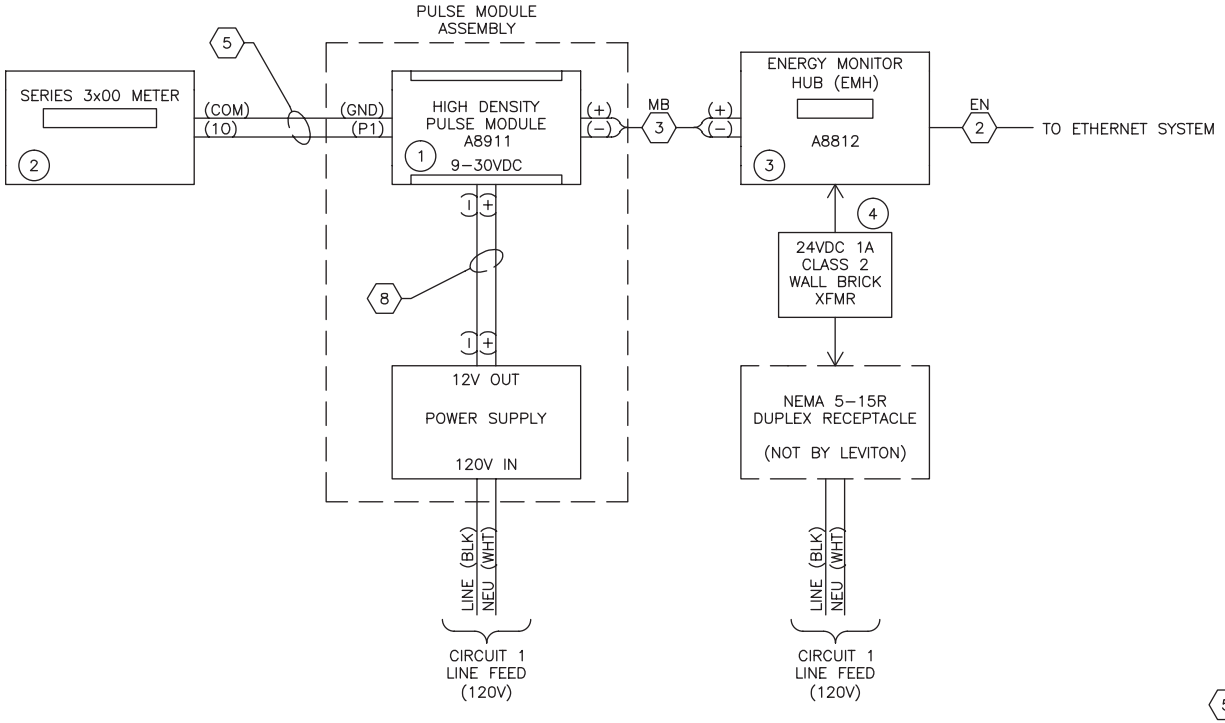



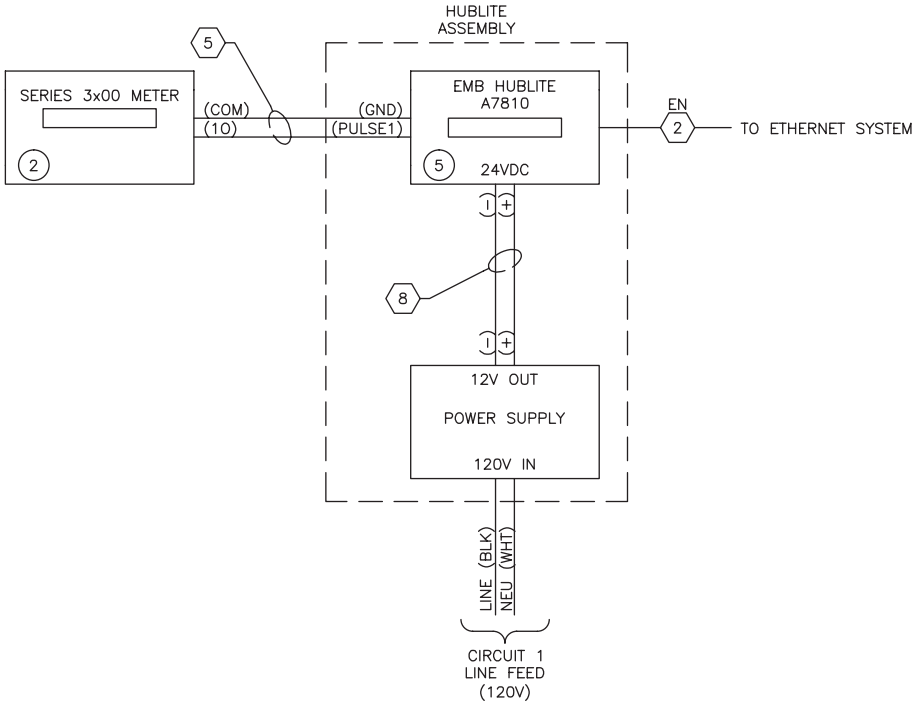
# SERIES 2000 MMU TO HIGH DENSITY PULSE MODULE, MONITORING SYSTEM



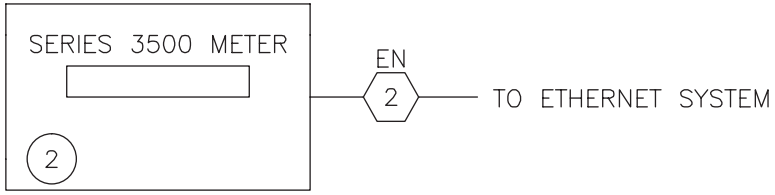



# INDIVIDUAL SERIES 3500 METER TO HIGH DENSITY PULSE MODULE, MONITORING SYSTEM

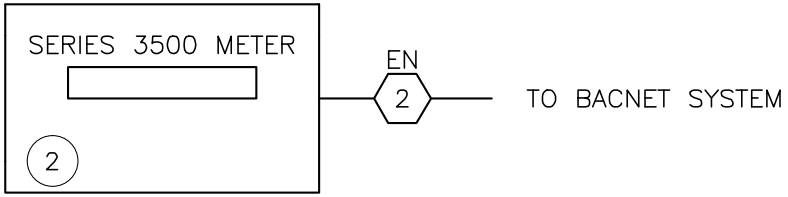


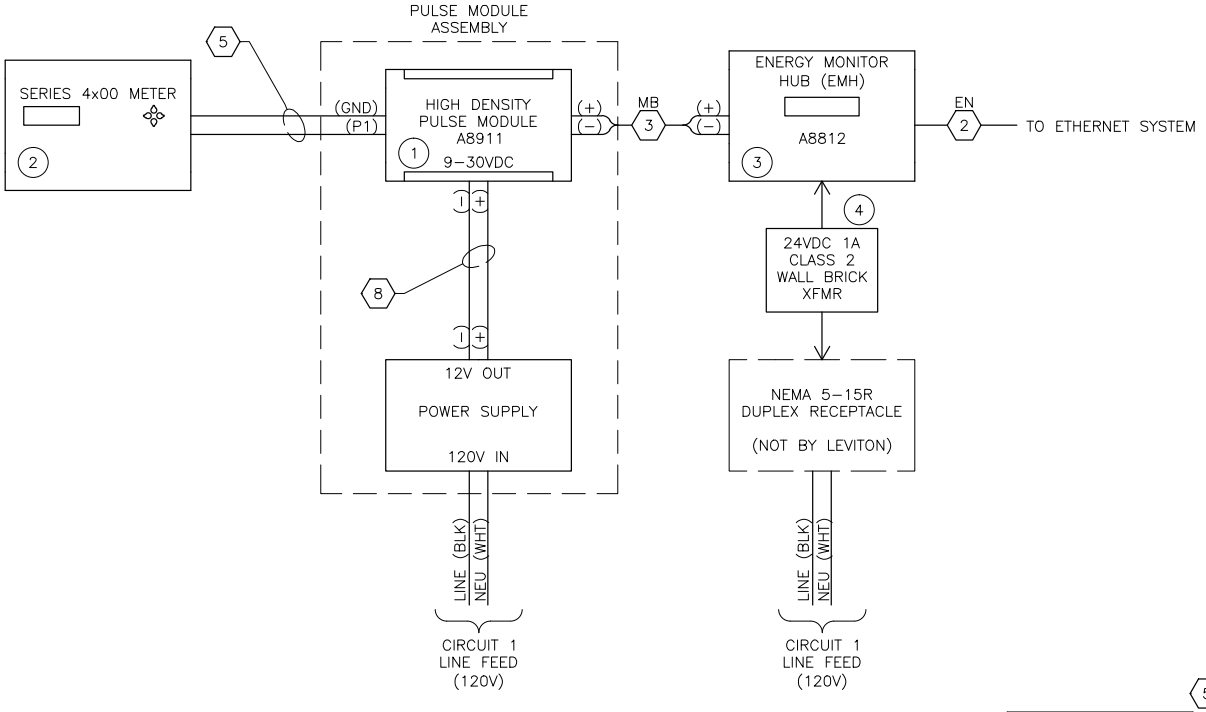
## INDIVIDUAL SERIES 3500 METER TO MODBUS IP

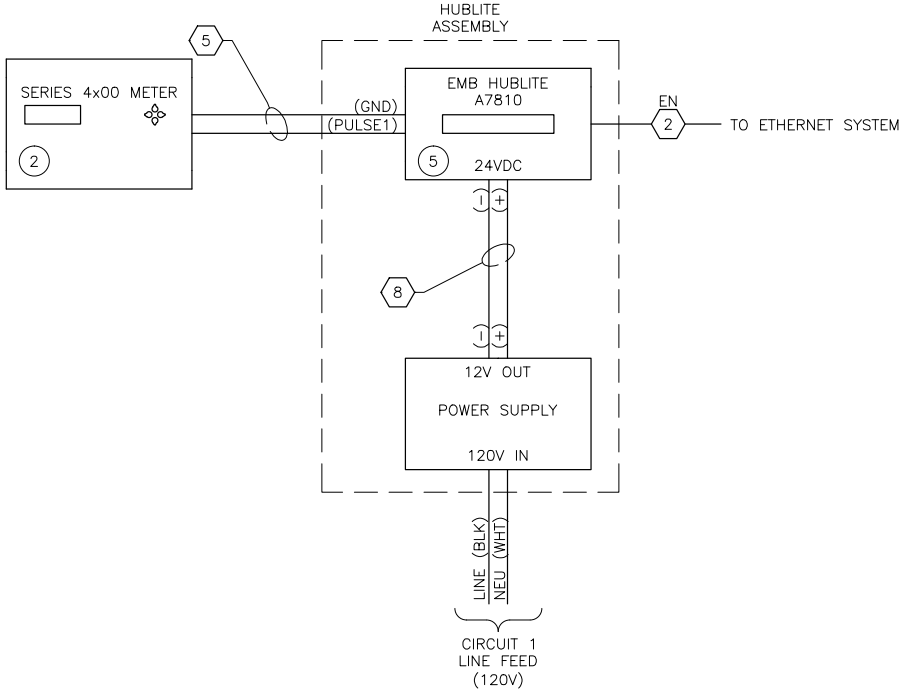



## INDIVIDUAL SERIES 3500 METER TO BACNET IP

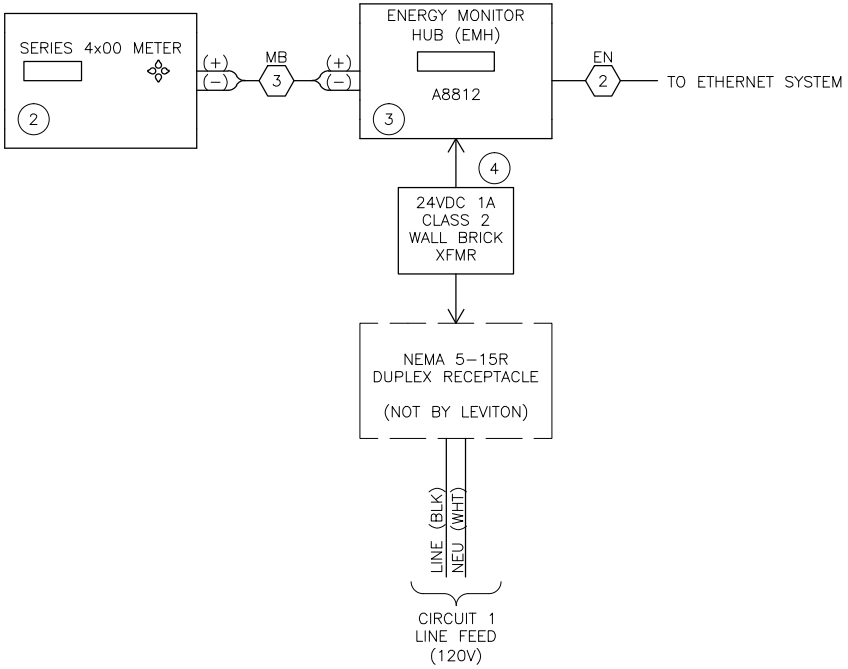


# INDIVIDUAL SERIES 4x00 METER TO HIGH DENSITY PULSE MODULE, MONITORING SYSTEM

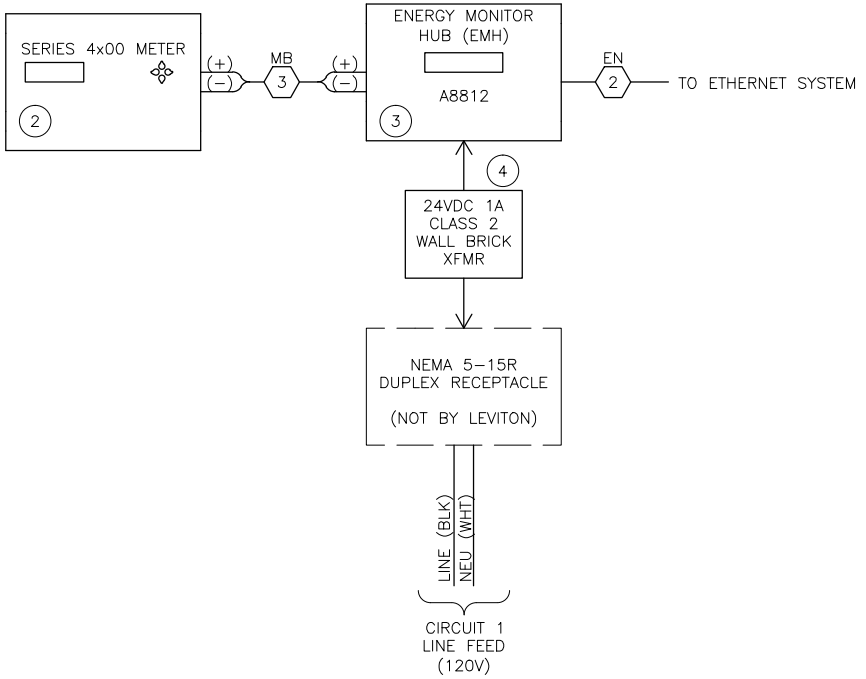


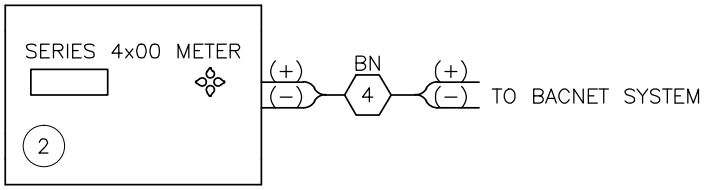
## INDIVIDUAL SERIES 4000 METER TO MODBUS RTU



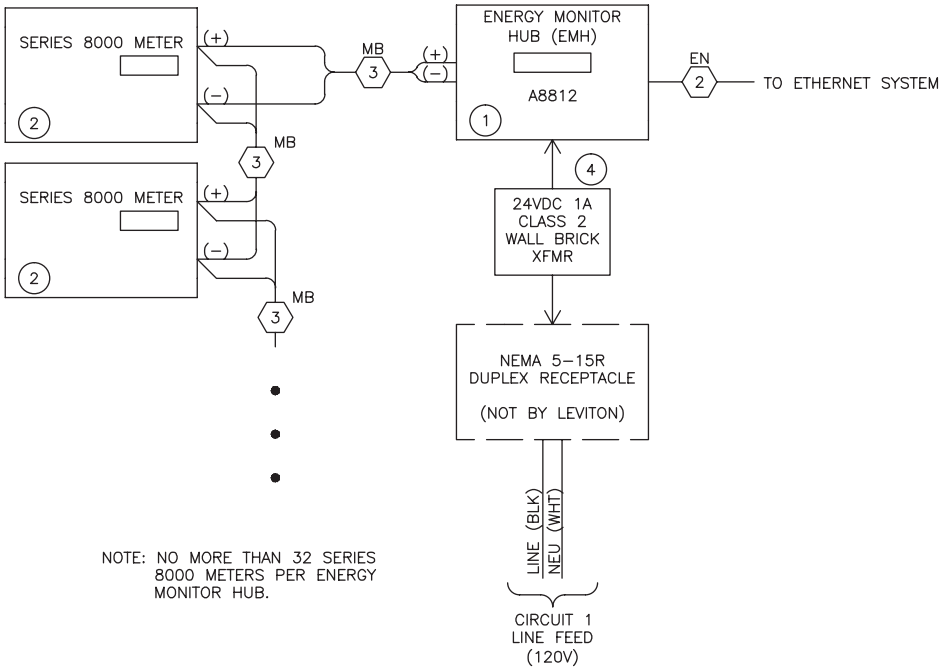

## INDIVIDUAL SERIES 4100 METER TO MODBUS RTU




## INDIVIDUAL SERIES 4100 METER TO BACNET MS/TP

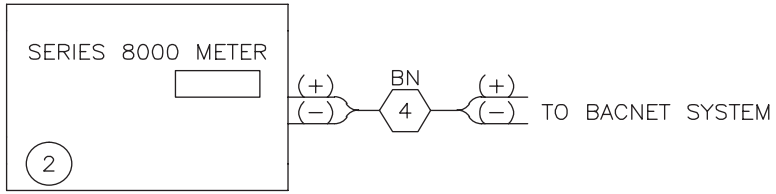


## SERIES 8000 METER TO MODBUS RTU OPTION

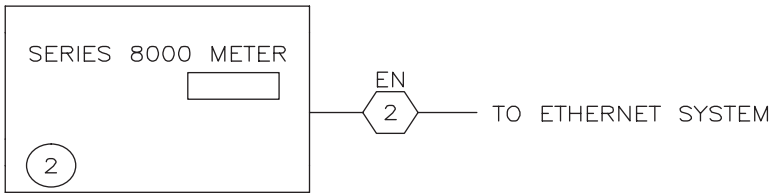



NOTE: NO MORE THAN 32 SERIES 8000 METERS PER ENERGY MONITOR HUB.

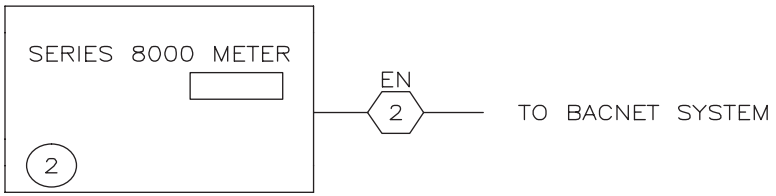
## SERIES 8000 METER TO BACNET MS/TP OPTION



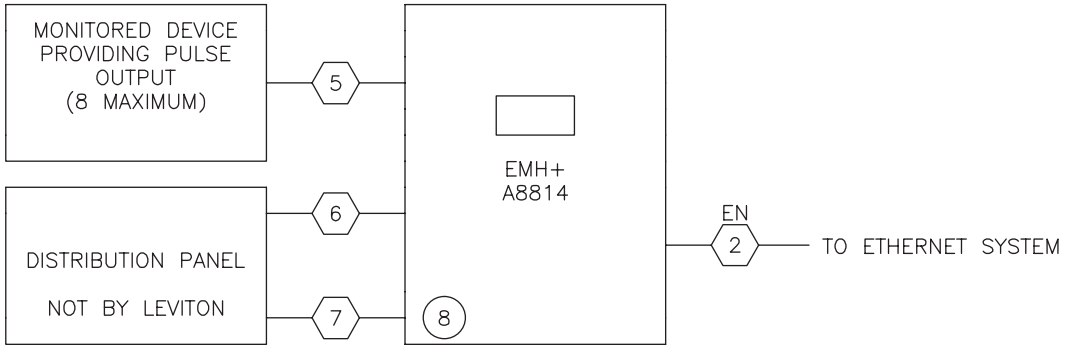

## SERIES 8000 METER TO MODBUS TCP/IP OPTION



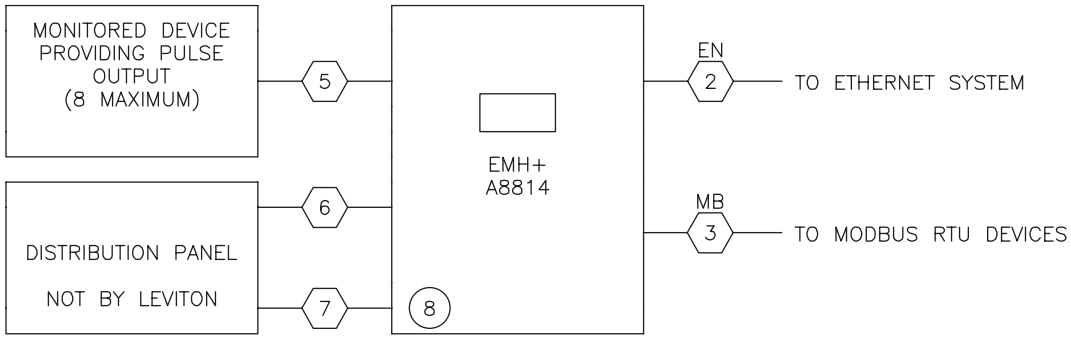

## SERIES 8000 METER TO BACNET IP OPTION



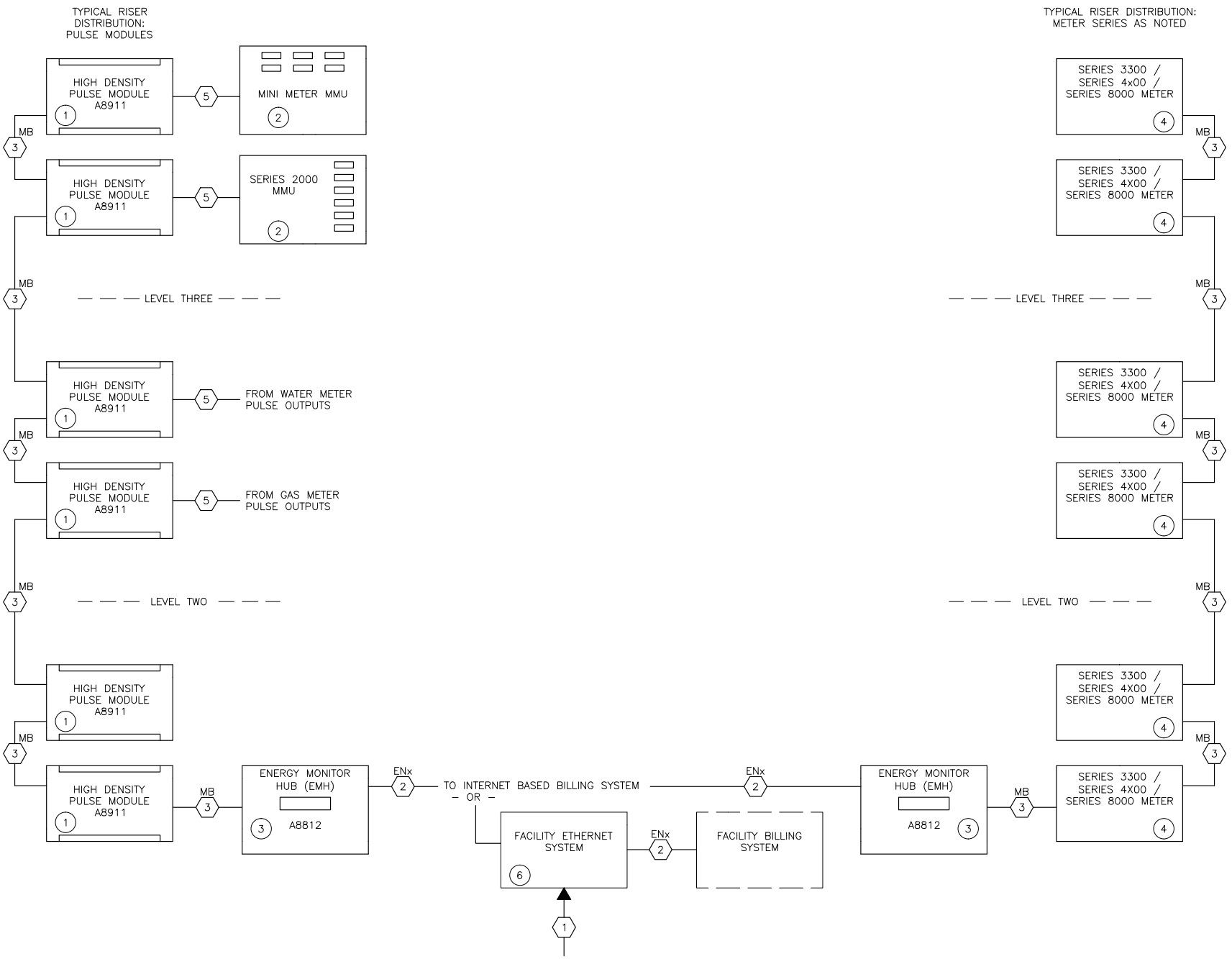
## INDIVIDUAL EMH+ TO MONITORING SYSTEM VIA ETHERNET



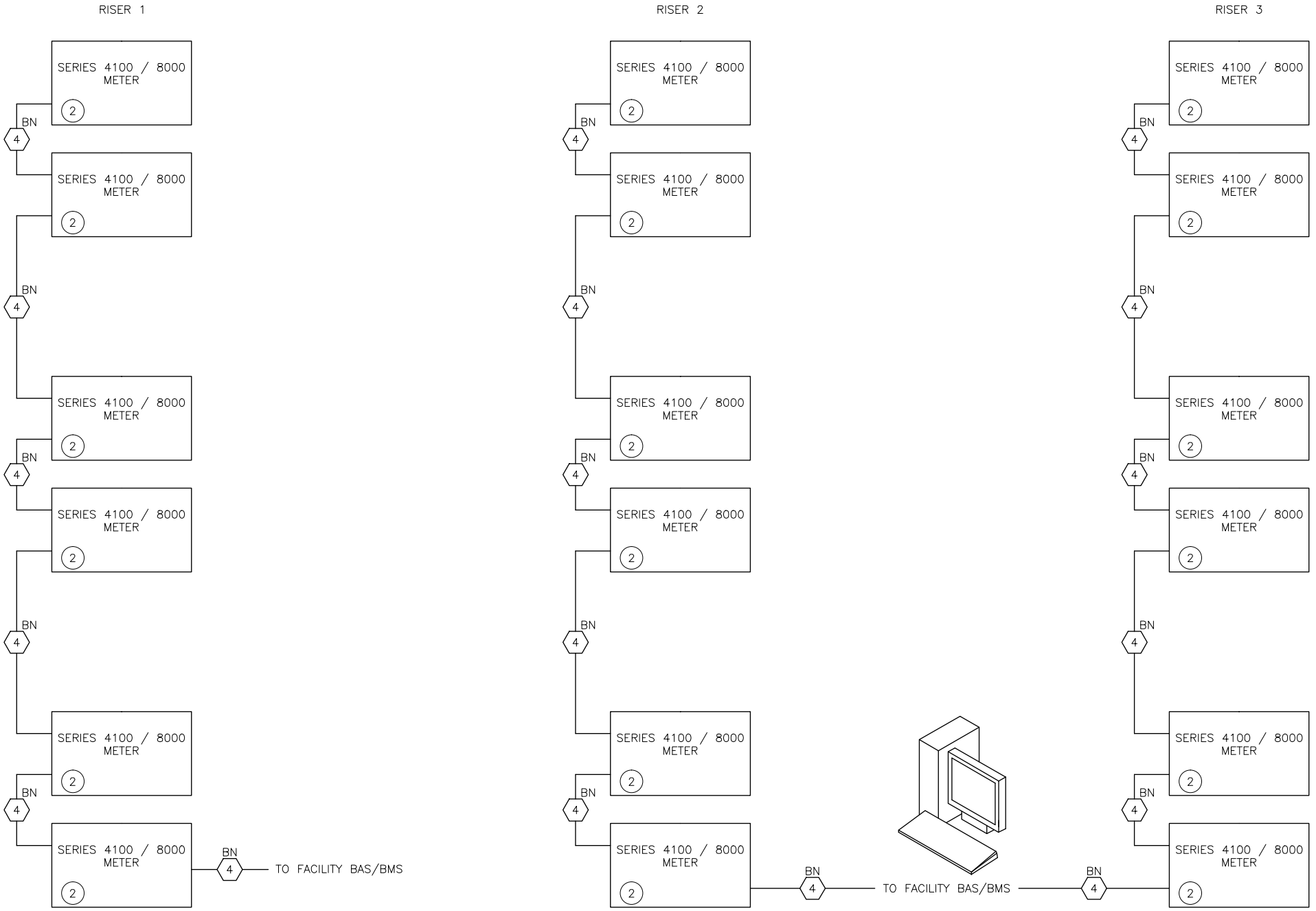

## INDIVIDUAL EMH+ MODBUS RTU DEVICES TO MONITORING SYSTEM VIA ETHERNET



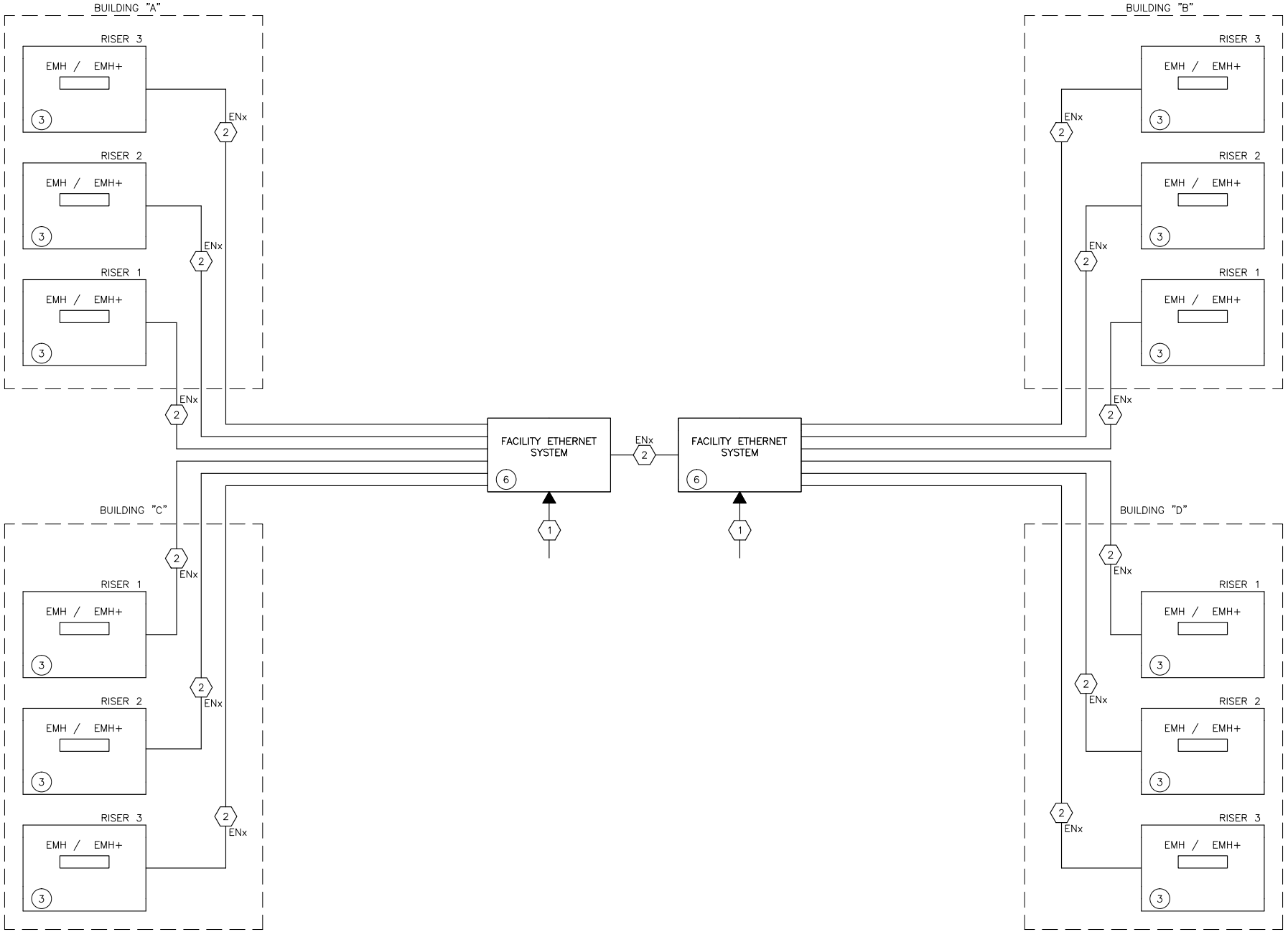
# METERS - SYSTEM BACKBONE - MODBUS RTU TO ETHERNET



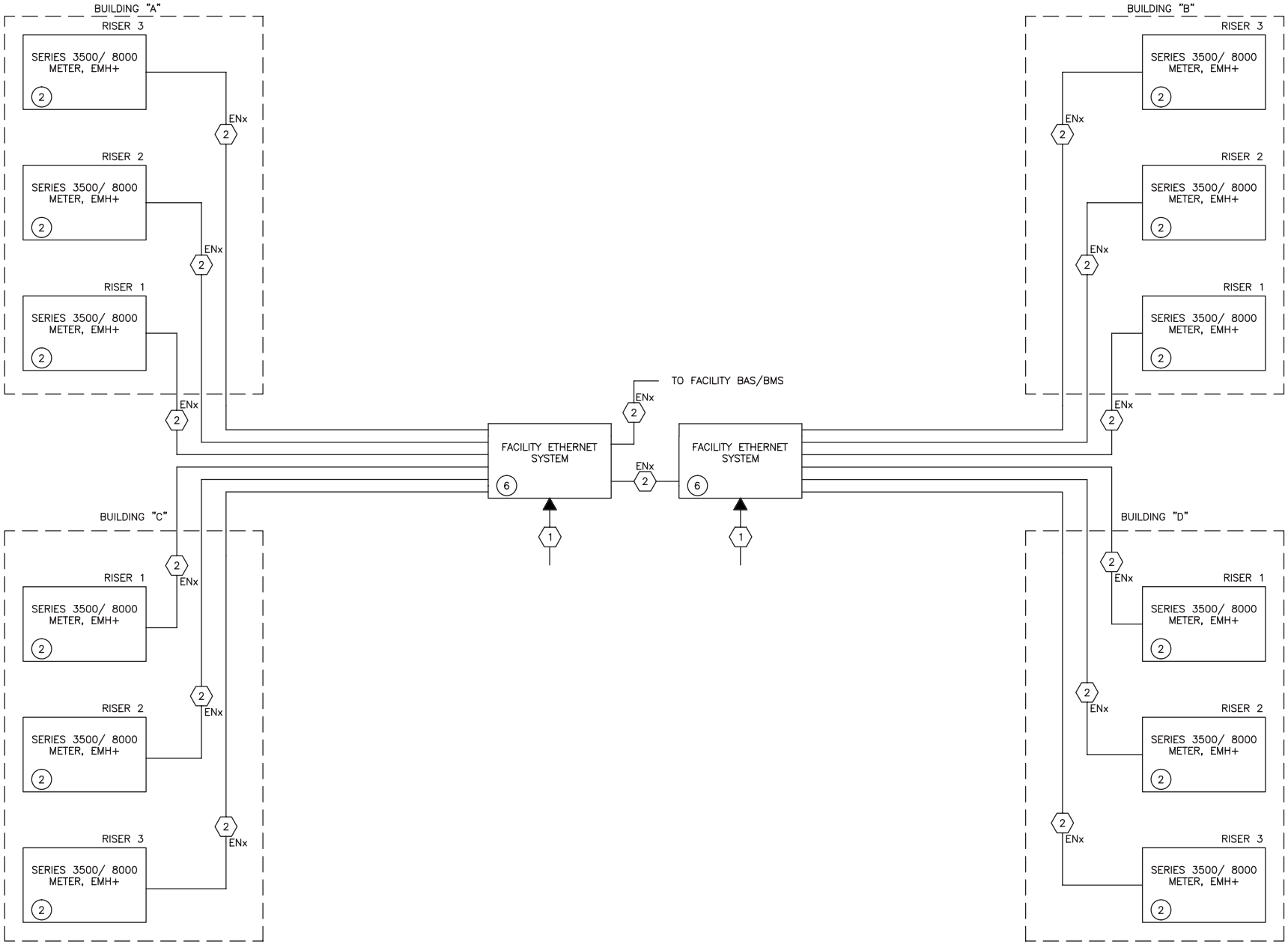
# METERS - SYSTEM BACKBONE - BACNET MS/TP



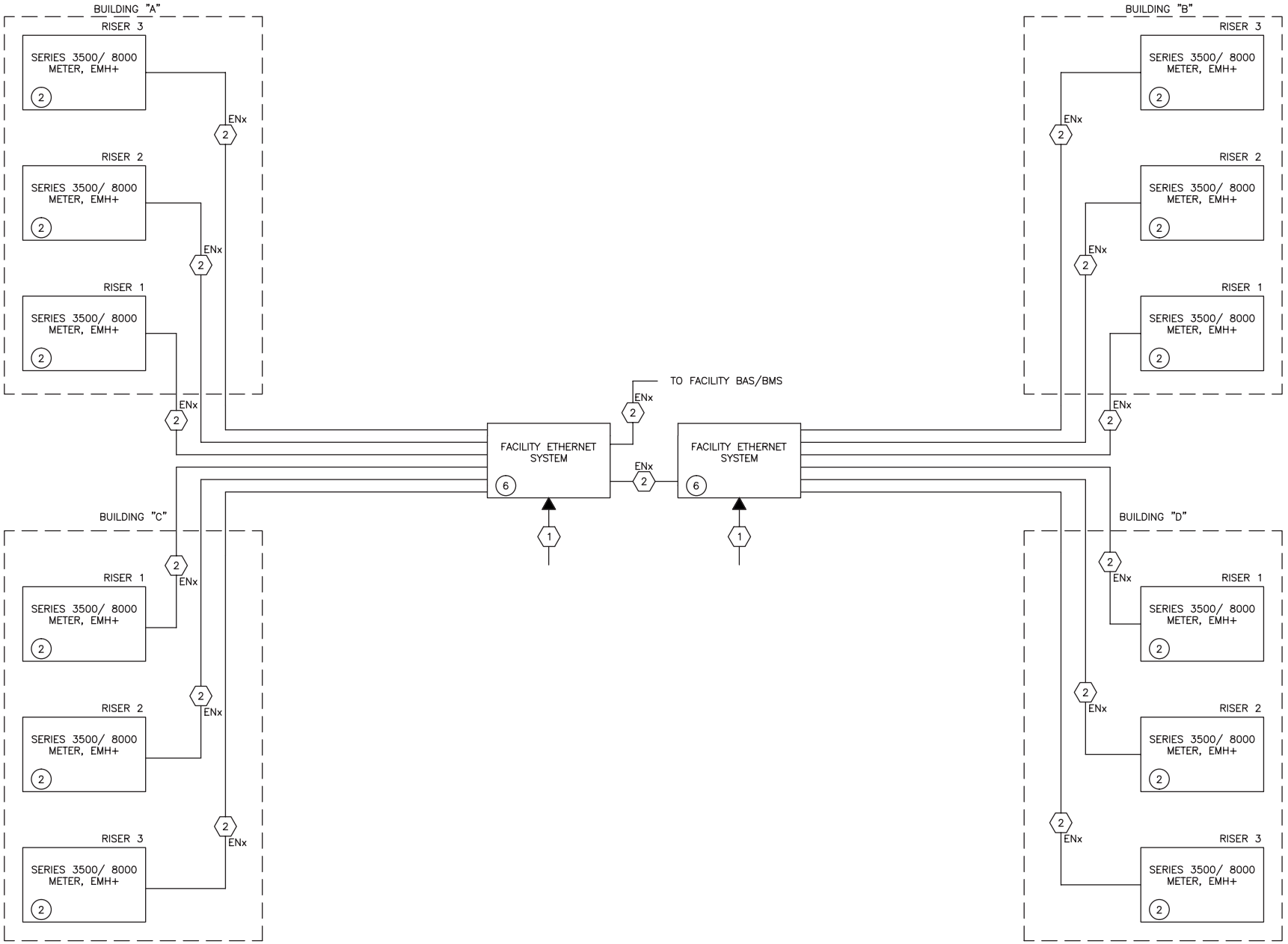
# METERS - SYSTEM BACKBONE - ENERGY MONITORING HUBS (EMH)/EMH+ METER AND HUB TO ETHERNET



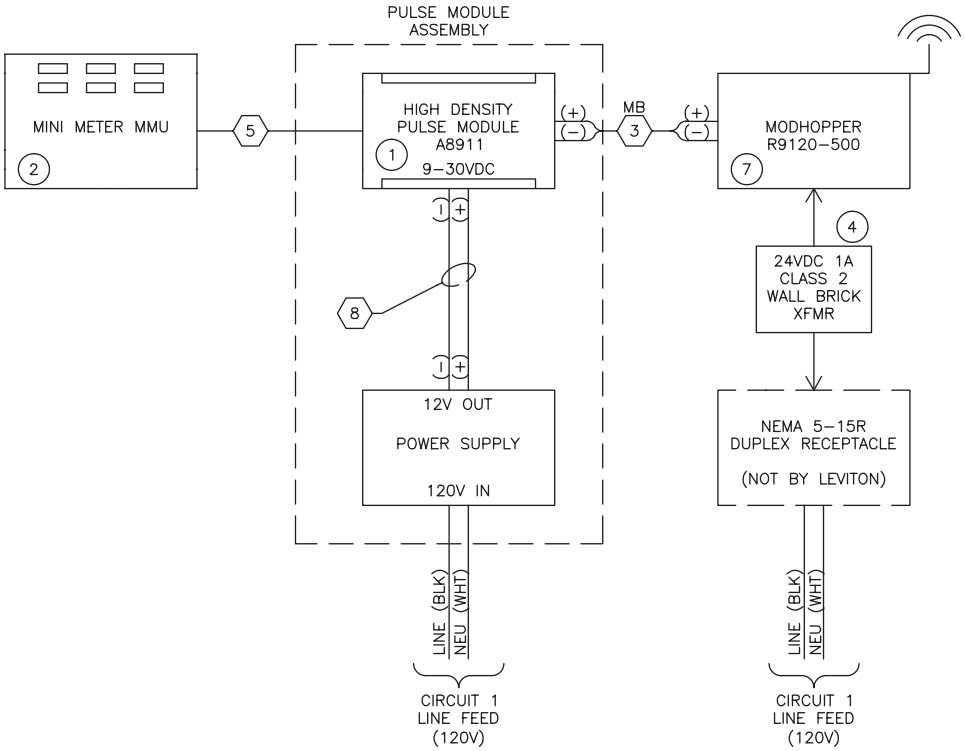
# METERS - SYSTEM BACKBONE - SERIES 3500 METER/SERIES 8000 METER/ EMH+ METER AND HUB TO MODBUS TCP/IP



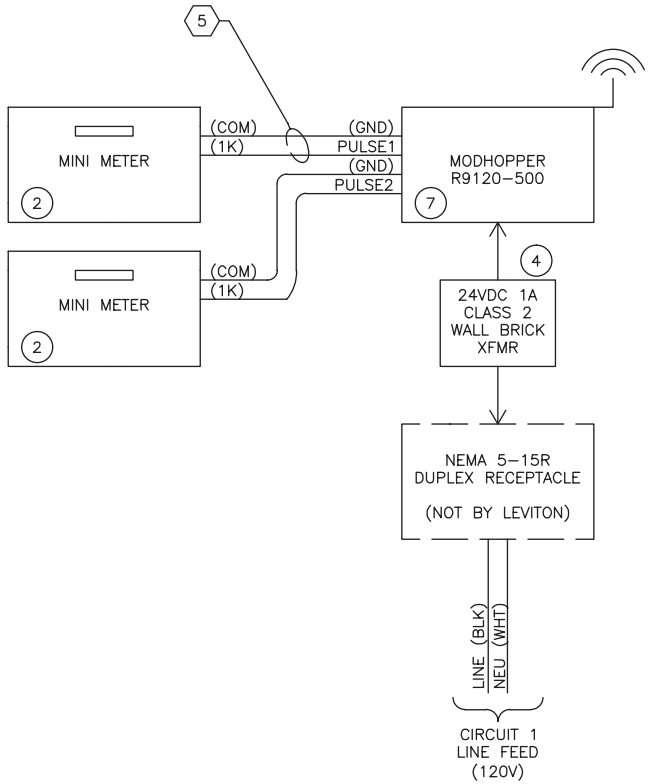
# METERS - SYSTEM BACKBONE - SERIES 3500 METER/SERIES 8000 METER/ EMH+ METER AND HUB TO BACNET IP



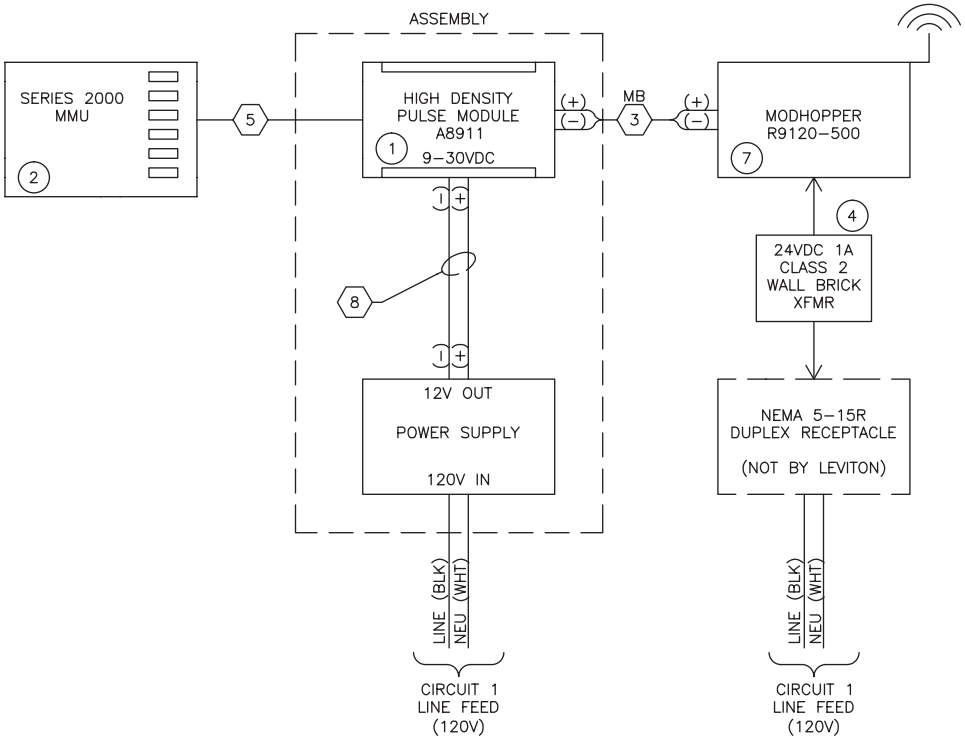
## MINI METERS PULSE OUTPUT TO HIGH DENSITY PULSE MODULE, MODBUS TO MODHOPPER



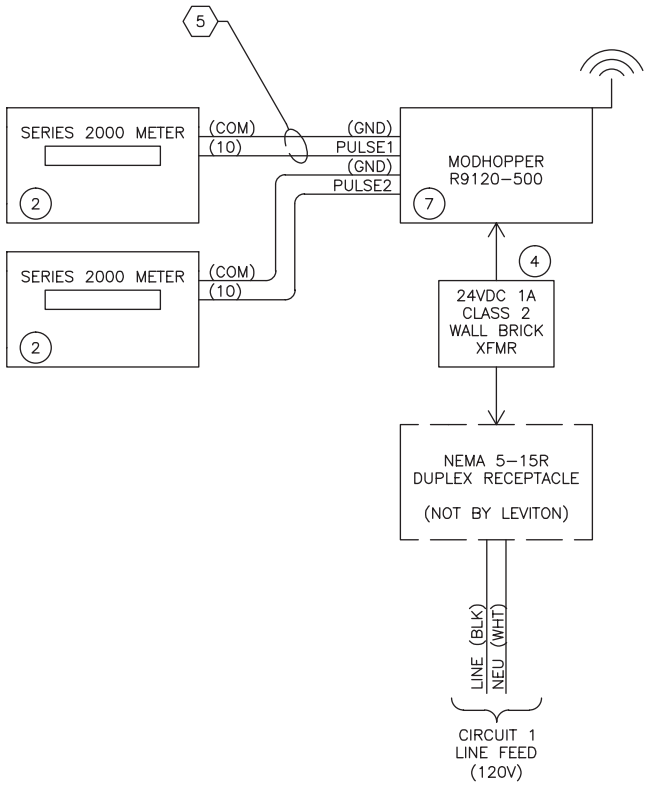

## MINI METERS TO MODHOPPER ONBOARD PULSE INPUT TERMINALS



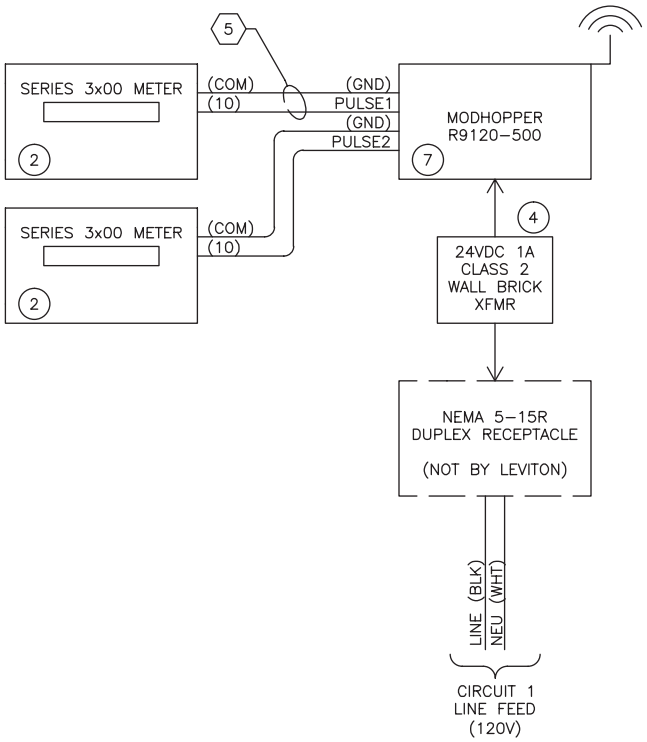
## SERIES 2000 METER MMU PULSE OUTPUT TO HIGH DENSITY PULSE MODULE, MODBUS TO MODHOPPER



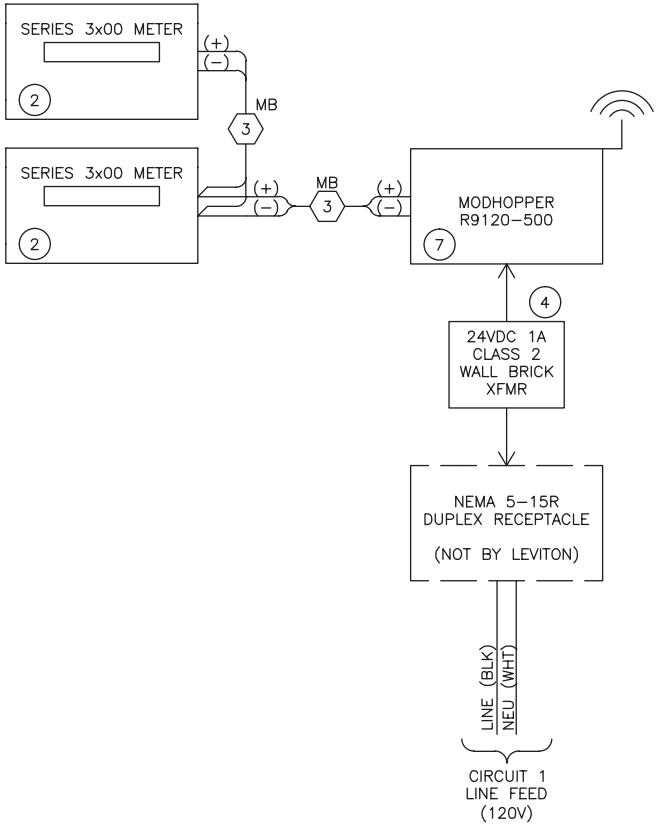

## SERIES 2000 METERS TO MODHOPPER ONBOARD PULSE INPUT TERMINALS



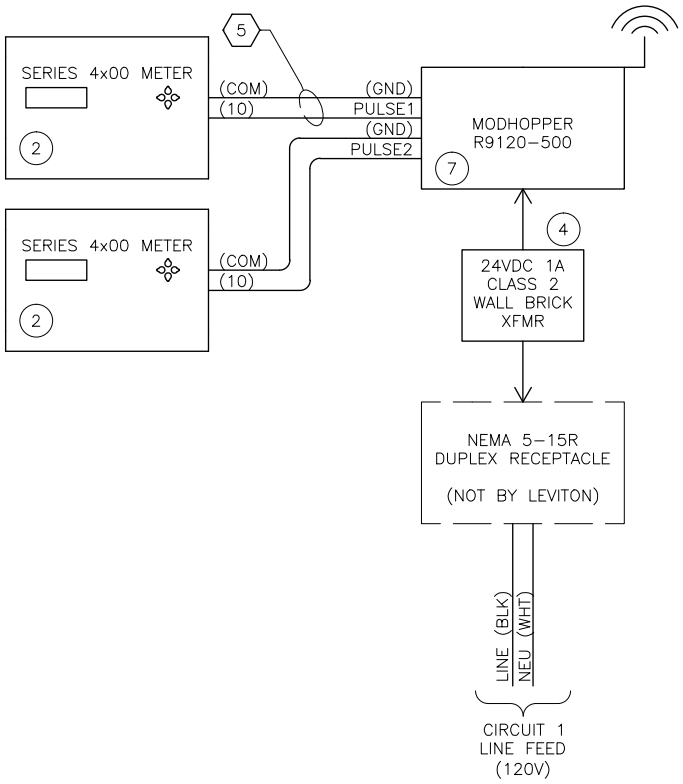
# SERIES 3500 METER PULSE OUTPUT TO MODHOPPER ONBOARD PULSE INPUT TERMINALS



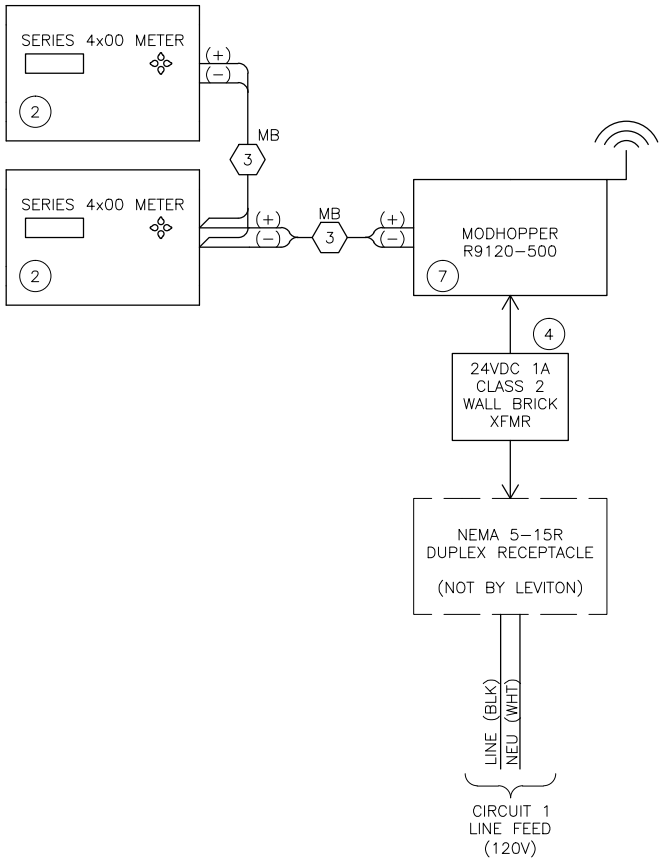

# SERIES 3500 METER MODBUS TO MODHOPPER



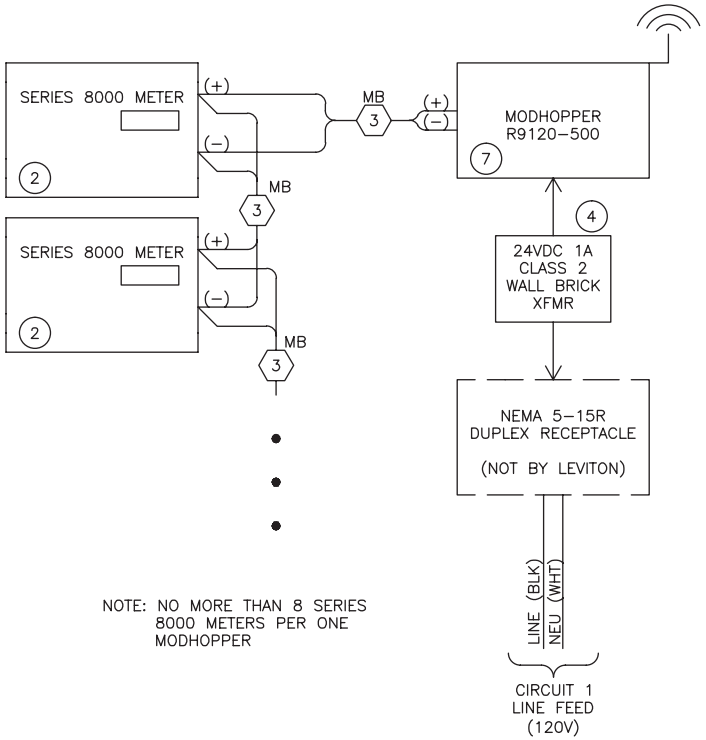
## SERIES 4x00 METER PULSE OUTPUT TO MODHOPPER ONBOARD PULSE INPUT TERMINALS




## SERIES 4x00 METER MODBUS TO MODHOPPER

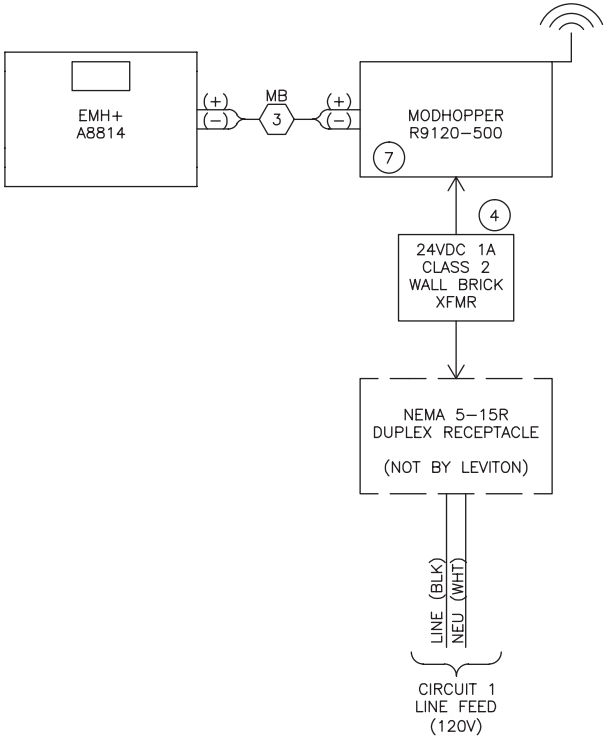


# SERIES 8000 METERS TO MODHOPPER, MONITORING SYSTEM

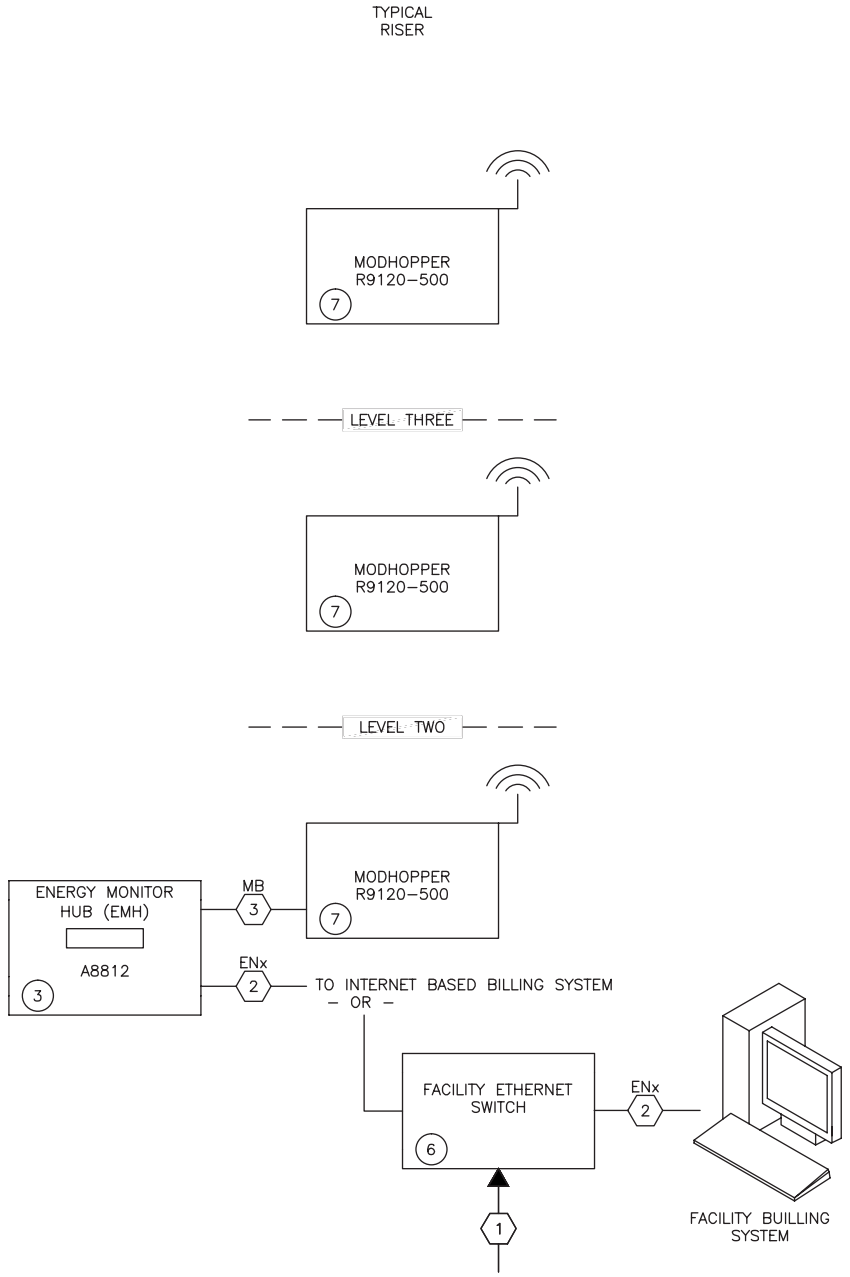



NOTE: NO MORE THAN 8 SERIES 8000 METERS PER ONE MODHOPPER

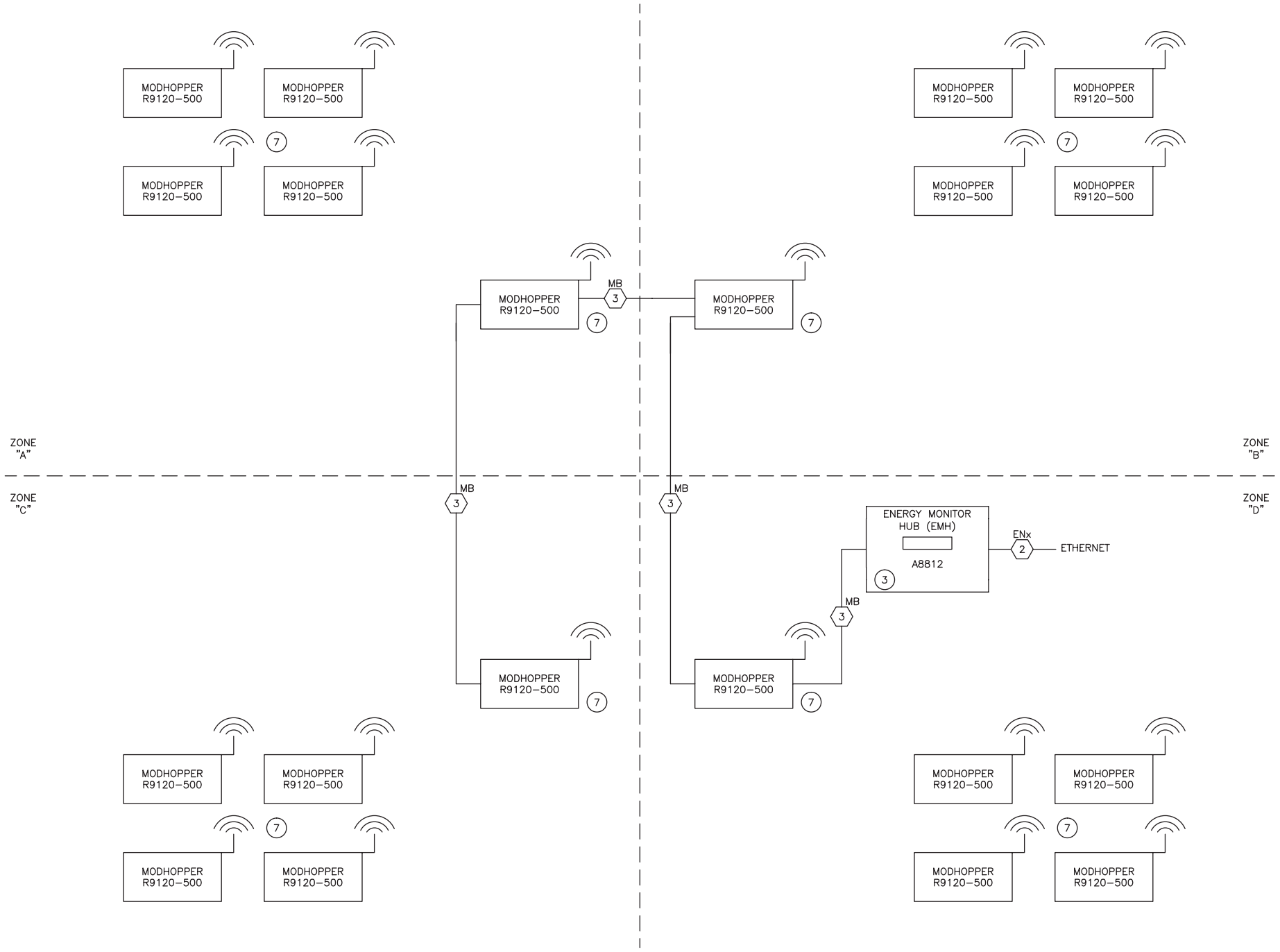
# EMH+ MODBUS TO MODHOPPER



# METERS - SYSTEM BACKBONE - MODHOPPER



# METERS - SYSTEM BACKBONE - MODHOPPER



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G-8978C/A17-tb
REV JAN 2017