



Installation Guide

SERIES 1000/2000 METERS

Models beginning with BL, S1, S2, 2N or 2R
Individual Meters



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1. Product Description

1.1 General Description

The Leviton Series 1000 and 2000 meters are self-powered; current transformer (CT) rated electronic kilowatt-hour (kWh) meters designed for permanent connection to an electrical service. Series 1000 meters are designed for 1-phase, 2-wire and 1 or 2-phase, 3-wire services, whereas Series 2000 meters are designed for 3-phase, 4-wire services. In addition to metering capabilities, Series 1000 and 2000 meters come with an RS485 communications interface that transmits kWh readings every 5 minutes. This guide is for use with individual Series 1000 and 2000 units.

1.2 Meter Features

- Revenue-grade accuracy with solid-core or easy to install split core CTs
- Built in LCD that displays total kWh and optional demand
- Multiple load monitoring with a single meter
- RS485 communications port
- AMR compatible isolated pulse outputs
- Reverse-phase LED indicator
- 10-year limited warranty

1.3 Meter Certifications

- UL listed in the US and Canada
- Conforms to accuracy requirements set forth in ANSI C12.1

1.4 Physical Description

Single Series 1000 and 2000 meters are available in two enclosures:

1. Industrial grade JIC steel enclosure for indoor installations, shown in Figure 1.
2. Plastic NEMA 4X enclosures, manufactured by Bud Industries, Inc, shown in Figure 2. Further specifications are available from Bud's website (www.budind.com), part number NBB-15240 with clear cover.

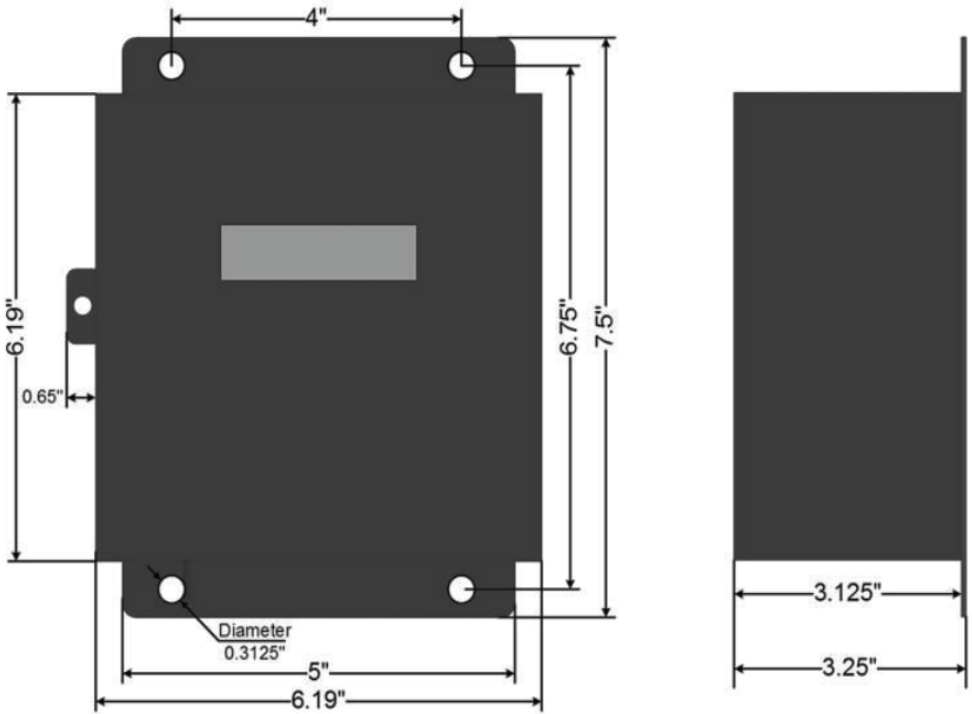


Figure 1: Steel enclosure dimensions

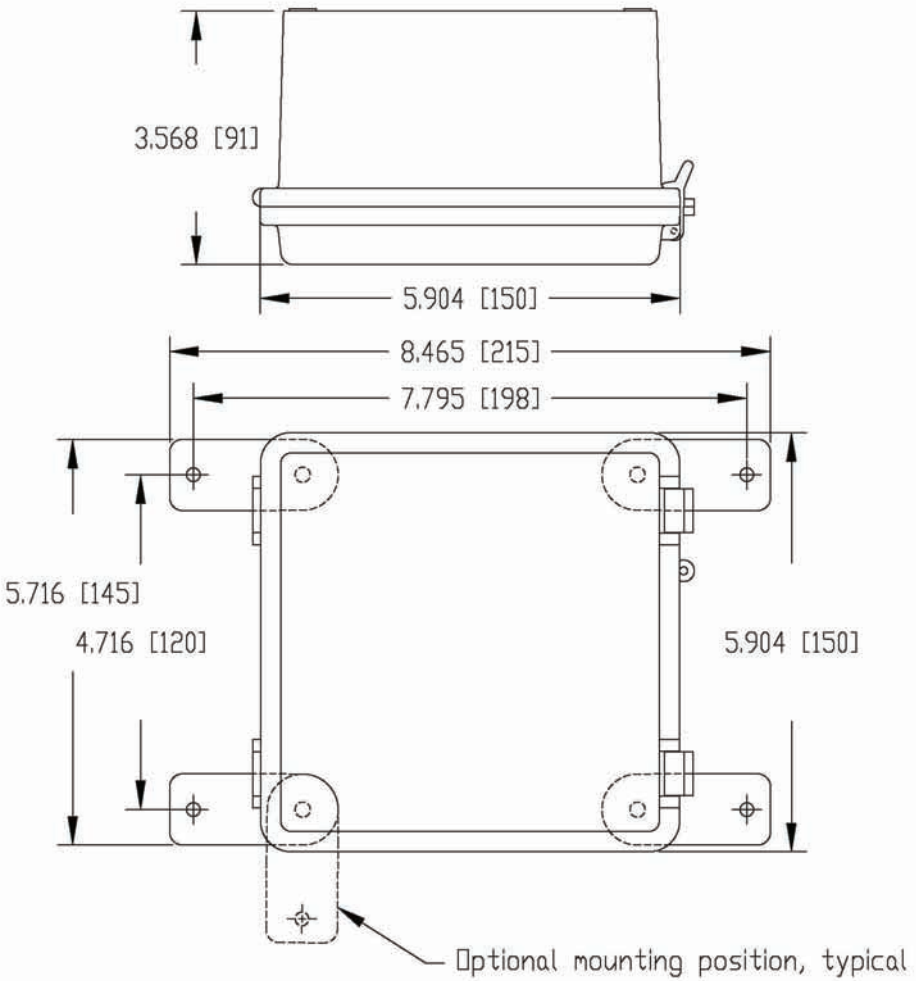


Figure 2: Plastic enclosure dimensions

2. Technical Specifications

2.1 Model Number Description

The model number format for Series 1000 and 2000 meters has changed twice since product introduction in 2008. Figure 3, 4 and 5 show three possible formats for the model numbers. For meters manufactured before 03/01/2009, refer to Figure 3; for meters manufactured from 03/01/2009 to 07/2011 refer to Figure 4. Figure 5 shows model numbers after 07/2011.

Original Model Number Format

1. Series: BL denotes a Series 1000 or 2000 (Blue) meter
2. Wires: Only appears on Series 1000 meters.
 - 2 – 1PH, 2W meter (120 or 277 V)
 - 3 – 1 or 2PH, 3W meter (120/208, 120/240, or 277/480 V)
 - Nothing – 3PH, 4W meter (Series 2000)
3. Voltage Configuration: Rated Voltage (Line to Neutral for 1-phase 2-wire meters, otherwise Line to Line)
4. CT Ratio
 - 100 – 100:0.1 600 – 600:0.1
 - 200 – 200:0.1 800 – 800:0.1
 - 400 – 400:0.1 1200 – 1200:0.1
5. Special Configurations (All meters contain PKG suffix)
 - Nothing – Normal configuration
 - GL – 4-wire Grounded Delta
6. CT Type
 - SP – Split core
 - SO – Solid core

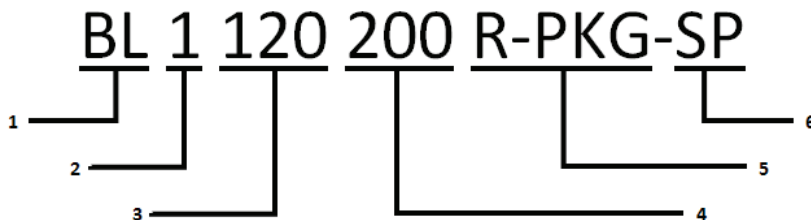


Figure 3: Series 1000/2000 original model number format

Interim Model Number Format

1. Meter Series

S1 – Series 1000 meter

S2 – Series 2000 meter

2. Voltage Configuration: Rated voltage

For Series 1000 meters; 1PH, 2W (120 or 277 V): Voltage rating is Line-to-Neutral

For Series 1000 meters; 1 or 2PH, 3W (208, 240 or 480 V): Voltage rating is Line-to-Line

For Series 2000 meters; 3PH, 4W (208, 480 or 600): Voltage rating is Line-to-Line

3. Enclosure

X – Extra Large

S – Small outdoor

L – Large

R – Small outdoor with clear lid

M – Medium

N – Indoor surface mount

4. Meter Capacity: Enclosure maximum capacity

5. Installed Meters

6. CT Rating

011 – 100:0.1

061 – 600:0.1

021 – 200:0.1

081 – 800:0.1

022 – 200:0.2

121 – 1200:0.1

041 – 400:0.1

7. Additional Options

00 – No options

01 – Demand

02 – 3 Phase Feed

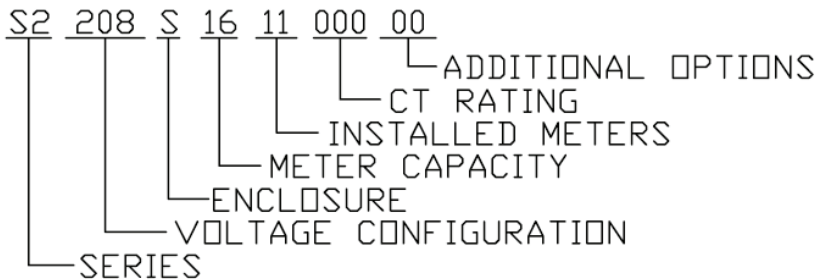


Figure 4: Series 1000/2000 new model number format

Leviton Model Number Key for Series 1000 and 2000 Meters				
Basic - First Five Digits				
Digit 1	Digit 2	Digits 3-5	Digits 6 & 7	Digit 8
Series	Enclosure	Voltage Configuration	AB = CT calibration setting in 100's (amps)	C = Option
1 = Series 1000	N = Indoor	120 = 1 pole, 2w; 120 VAC	01 = 100	1 = none
2 = Series 2000	R = Outdoor	208 = 3 pole, 4w; 120/208 VAC	02 = 200	A - Z = Variables
		240 = 2 pole, 3w; 120/208 or 120/240 VAC	04 = 400	D = Demand
		277 = 1 pole, 2w; 277 VAC	06 = 600	X = Custom
		416 = 3 pole, 4w; 240/416 VAC	08 = 800	
		480 = 2 pole, 3w; 277/480 VAC	12 = 1200	
		480 = 3 pole, 4w; 277/480 VAC	AA = Alternate	
		24G = Grounded Delta, 3w; 240V	ZZ = Custom	
		48G = Grounded Delta, 3w; 480V		

Figure 5

2.2 Electrical Specifications

Series 1000 and 2000 meters fall under UL Circuit Category III: a device for measurements performed in the building installation. The electrical and environmental specifications for Series 1000 and 2000 meters are given in Table 1 and Table 2 below.

Input Configurations	1 Phase, 2 wire (120 V or 277 V)	1 or 2 Phase, 3 Wire (120/208, 120/240 or 277/480 V)
Supply Voltage Range (Line to Neutral)	102-138 VAC 235-320 VAC	102-138 VAC 235-320 VAC
Maximum Input Power	7 VA	7 VA
Maximum Rated Current*	<u>Primary</u> : Max. Operating Current + 10% <u>Secondary</u> : 0.12 A	<u>Primary</u> : Max. Operating Current + 10% <u>Secondary</u> : 0.12 A
Line Frequency	50-60 Hz	50-60 Hz
Power Factor Range	0.5 to 1.0 leading or lagging	0.5 to 1.0 leading or lagging
Accuracy ¹	+/- 0.5% of registration @ 1.0pf, 1% to 100% of rated current +/- 0.75% of registration @ 0.5pf, 1% to 100% of rated current	+/- 0.5% of registration @ 1.0pf, 1% to 100% of rated current +/- 0.75% of registration @ 0.5pf, 1% to 100% of rated current
Meter Operating Temperature	-30 to +60 degrees C	-30 to +60 degrees C
Display Operating Temperature	-20 to +50 degrees C	-20 to +50 degrees C
Rated Pollution Degree ²	2	2
Rated Relative Humidity	80%	80%
Terminal Blocks: Voltage Terminal: CT and I/O Terminal:	12 in-lb of torque maximum 4.4 in-lb of torque maximum	12 in-lb of torque maximum 4.4 in-lb of torque maximum

Table 1: Series 1000 electrical specifications

¹Accuracy based on Leviton solid core current transformers (included), with 100 mA secondary output. Meter input burden resistance at 2 Ohms.

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²Pollution Degree 2: Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.

Input Configurations	3 Phase, 4 Wire Grounded Delta (120/208 V)	3 Phase, 4 Wire Wye (120/208 , 277/480 or 347/600 V)
Supply Voltage Range (Line to Neutral)	Line 1 and Line 2: 102-138 VAC Line 3: 175-240 VAC	102-138 VAC 235-320 VAC 295-400 VAC
Maximum Input Power	7 VA	7 VA
Maximum Rated Current*	<u>Primary</u> : Max. Operating Current + 10% <u>Secondary</u> : 0.12 A	<u>Primary</u> : Operating Current + 10% <u>Secondary</u> : 0.12 A
Line Frequency	50-60 Hz	50-60 Hz
Power Factor Range	0.5 to 1.0 leading or lagging	0.5 to 1.0 leading or lagging
Accuracy ¹	+/- 0.5% of registration @ 1.0pf, 1% to 100% of rated current +/- 0.75% of registration @ 0.5pf, 1% to 100% of rated current	+/- 0.5% of registration @ 1.0pf, 1% to 100% of rated current +/- 0.75% of registration @ 0.5pf, 1% to 100% of rated current
Meter Operating Temperature	-30 to +60 degrees C	-30 to +60 degrees C
Display Operating Temperature	-20 to +50 degrees C	-20 to +50 degrees C
Rated Pollution Degree ²	2	2
Rated Relative Humidity	80%	80%
Terminal Blocks: Voltage Terminal: CT and I/O Terminal:	12 in-lb of torque maximum 4.4 in-lb of torque maximum	12 in-lb of torque maximum 4.4 in-lb of torque maximum

Table 2: Series 2000 electrical specifications

¹Accuracy based on Leviton solid core current transformers (included), with 100 mA secondary output. Meter input burden resistance at 2 Ohms.

²Pollution Degree 2: Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.

2.3 Input/Output Connections

The input and output terminals for Series 1000 and 2000 meters are shown below in Figure 6. For hookup diagrams and wiring information refer to section 3.

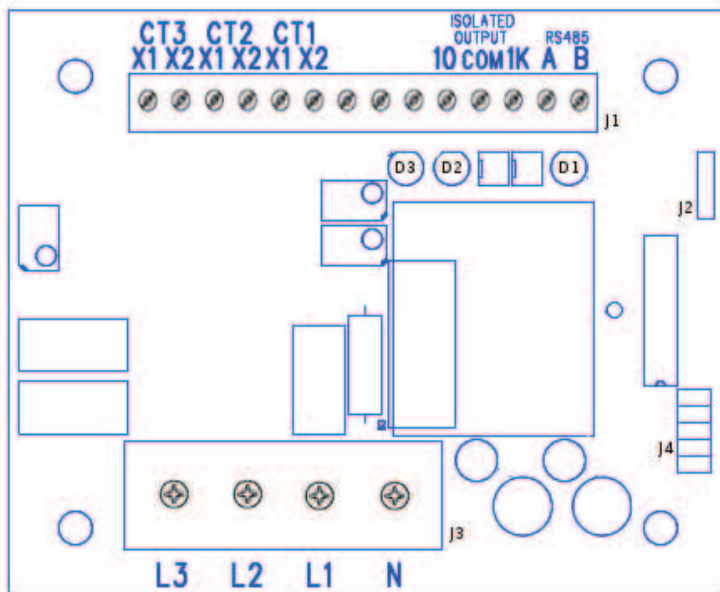


Figure 6: Series 1000/2000 I/O connections

<u>Voltage Inputs (J3)</u>	<u>Description</u>
L3	Voltage input Line 3 (3-phase models only. High leg connection on grounded Delta distributions)
L2	Voltage input, Line 2 (3-wire and 4-wire models only)
L1	Voltage input, Line 1
N	Neutral input
<u>CT Inputs (J1, Left Side)</u>	
CT3 : X1	Current Transformer input, CT3. Colored wire of CT3 (3-phase models only)

CT3 : X2	Current Transformer input, CT3. White wire of CT3 (3-phase models only)
CT2 : X1	Current Transformer input, CT2. Colored wire of CT2 (3-wire and 4-wire models only)
CT2 : X2	Current Transformer input, CT2. White wire of CT2 (3-wire and 4-wire models only)
CT1 : X1	Current Transformer input, CT1. Black or Wh/Blk (striped) wire of CT1
CT1 : X2	Current Transformer input, CT1. White wire of CT1
<u>Outputs (J1, Right Side)</u>	
10, Isolated Output (10 Wh/P, Kh = 10)	Isolated pulse output: 5 watthours on, 5 watthours off, referenced to ISOL COM
COM, Isolated Output	Isolated common for 10/1000 isolated outputs
1K, Isolated Output (1 kWh/P, Kh=1000)	Isolated pulse output: 500 watthours on, 500 watthours off, referenced to ISOL COM
RS485 A	RS485 A communications output (485+)
RS485 B	RS485 B communications output (485-)
<u>LED Indicators</u>	
1 kWh LED (D3 - Green)	50% duty cycle (at constant load) LED with a pulse rate of 1 kWh per on/off cycle (500 Wh on, 500 Wh off). In the absence of a significant load, the LED could be on or off.
10 Wh LED (D2 - Green)	50% duty cycle (at constant load) LED with a pulse rate of 10 Wh per on/off cycle (5 Wh on, 5 Wh off). In the absence of a significant load, the LED could be on or off.
Reverse Phase LED (D1 - Red)	Illuminates when a problem with meter phasing exists. In the absence of a significant load, the LED could be on or off. See section 3.7 for CT installation instructions.

Table 3: I/O connections and LEDs

2.4 Display Specifications

2.4.1 General Display Information

Series 1000 and 2000 meters are available with or without a demand feature. Meter models without the demand option display only total active energy, measured in kilowatt-hours (1 kWh resolution, non-resettable). The liquid crystal display (LCD) tests all LCD segments by simultaneously activating them for 1 second every 18 seconds. The test is used to determine if an LCD segment isn't working, in which case the displayed values would appear incorrectly. For meters with the demand option, three quantities are displayed one at a time, for six seconds each, as follows:

- Total Active Energy, in kWh (1 kWh resolution, cumulative, non-resettable)
- Instantaneous Demand, in Kilowatts (last 5 minute average, 1/100 kW resolution)
- Peak Demand: Kilowatts (15 minute rolling demand interval, 1/100 kW resolution)

A dot in the LCD aligns with an arrow on the display label to differentiate between instantaneous and peak demand. After displaying peak demand and before displaying total energy, the meter tests the LCD by activating all segments simultaneously for one second.

2.4.2 Resetting the Peak Demand

The stored peak demand is reset using the key switch. A demand reset command will only be recognized during the period when the peak demand is displayed on the LCD. In order to reset the demand, a pulse must be generated by turning the key switch from locked position (arrow up) to the right and then back to the original position. This back and forth transition triggers a demand reset. The maximum transition period is one second. Multiple key switch transitions during the peak demand display interval may be required to reset peak demand.

2.5 RS485 Specifications

2.5.1 For all Meters produced prior to 2/26/2011

The RS485 port on the Series 1000 and 2000 meters is found on J1 (see Figure 5), RS485 A and B terminals. This port transmits kWh and demand information every 5 minutes. The communication is one-way transmission only. Demand is only resettable as described in the previous section and cannot be remotely reset using the RS485 communications port.

2.5.2 Modbus Protocol - For all Models built after 2/25/2011

Series 1000 and 2000 meters use an RS485 chip that defines A as the non-inverting pin, and B as the inverting pin. If the other node(s) follow the same logic, A should be connected to A, and B connected to B. Some RS485 chips define A as inverting, and B as non-inverting. If this is the case, the connections need to be switched. If the end device connections are defined as 485+ and 485-, connect 485+ to A, and 485- to B.

The communication settings are 9600 baud, 8 data bits, 1 stop bit, and no parity check.

2.5.3 Modbus protocol on RS485 Port

The communication settings are 9600 baud, 8 data bits, 1 stop bit, and no parity check.

The series 1000 and 2000 meter responds to the following Modbus query functions:

0x03 read holding registers (multiple)

0x11 Report slave id.

0x06 preset single register

0x10 preset multiple register

Note: Meter default Modbus ID setup is 0x01, and max. response delay is less than 500ms.

Example of Modbus Query and Response to the series 1000 & 2000 meter:

0x03 - Read Holding Register:

Query meter's total positive energy (Energy from Grid) (kWh) register 40001		Response from Meter		Example response: (reading is a 32 bits integer)		
Meter Modbus ID	XX	Meter Modbus ID	0x??	0x01		
Function Code	0x03	Function Code	0x03	0x03		
Start Address High	0x00	Byte Count	0x04	0x04		
Start Address Low	0x00	Register's Data High	0x??	0x00	999998.0	kWh/10
Number of Registers High	0x00	Register's Low	0x??	0x98		
Number of Registers Low	0x02	Register's Data High	0x??	0x96		
CRC16	CRC16	Register's Low	0x??	0x6C		
		CRC16	CRC16	CRC16	CRC16	

Table 4: Meter Modbus Communication Sample

Query meter's total negative energy (Energy to Grid) (kWh)* register 40003		Response from Meter		Example response: (reading is a 32 bits integer)		
Meter Modbus ID	XX	Meter Modbus ID	0x??	0x01		
Function Code	0x03	Function Code	0x03	0x03		
Start Address High	0x00	Byte Count	0x04	0x04		
Start Address Low	0x02	Register's Data High	0x??	0x00	999998.0	kWh/10
Number of Registers High	0x00	Register's Low	0x??	0x98		
Number of Registers Low	0x02	Register's Data High	0x??	0x96		
CRC16	CRC16	Register's Low	0x??	0x6C		
		CRC16	CRC16	CRC16	CRC16	

*The negative energy reading (Energy to Grid) will provide in the future.

Query meter's Peak Demand (kW) Read Holding register 40061		Response from Meter		Example response: (reading is a 32 bits integer)		
Meter Modbus ID	XX	Meter Modbus ID	0x??	0x01		
Function Code	0x03	Function Code	0x03	0x03		
Start Address High	0x00	Byte Count	0x04	0x04		
Start Address Low	0x3C	Register's Data High	0x??	0x00	99999.80	kWh/100
Number of Registers High	0x00	Register's Low	0x??	0x98		
Number of Registers Low	0x02	Register's Data High	0x??	0x96		
CRC16	CRC16	Register's Low	0x??	0x6C		
		CRC16	CRC16	CRC16	CRC16	

Meter Also Can be read to all the registers (kWh and kW)

Query All meter's reading start register 40001 total 6 Modbus register		Response from Meter		Example response: (reading is a 32 bits integer)		
Meter Modbus ID	XX	Meter Modbus ID	0x??	0x01		
Function Code	0x03	Function Code	0x03	0x03		
Start Address High	0x00	Byte Count	0x0C	0x0C		
Start Address Low	0x00	kWh positive	0x???????	0x0098966C	999998.0	kWh/10
Number of Registers High	0x00	kWh Negative	0x???????	0x0098966C	999998.0	kWh/10
Number of Registers Low	0x06	Peak Demand	0x???????	0x0098966C	99999.8	kW/100
CRC16	CRC16	CRC16	CRC16	CRC16		

*The negative energy reading (Energy to Grid) will provide in the future.

Query Meter's up time register* 45007	Response from Meter	Example response: (reading is a 32 bits integer)

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Meter Modbus ID	XX	Meter Modbus ID	0x??	0x01	
Function Code	0x03	Function Code	0x03	0x03	
Start Address High	0x13	Byte Count	0x04	0x04	
Start Address Low	0x8E	Register's Data High	0x??	0x00	2
Number of Registers High	0x00	Register's Low	0x??	0x00	
Number of Registers Low	0x02	Register's Data High	0x??	0x00	
CRC16	CRC16	Register's Low	0x??	0x02	
		CRC16	CRC16	CRC16	CRC16

*This register will increment every second after power up. It will reset to zero when reset power to the meter.

Query Meter's Hardware version register 45002		Response from Meter			Example response: (reading is a 32 bits integer)
Meter Modbus ID	XX	Meter Modbus ID	0x??	0x01	
Function Code	0x03	Function Code	0x03	0x03	
Start Address High	0x13	Byte Count	0x02	0x02	
Start Address Low	0x89	Register's Data High	0x??	0x03	V3.2
Number of Registers High	0x00	Register's Low	0x??	0x02	
Number of Registers Low	0x01	CRC16	CRC16	CRC16	
CRC16	CRC16				

Query Meter's Software version register 45003		Response from Meter			Example response: (reading is a 32 bits integer)
Meter Modbus ID	XX	Meter Modbus ID	0x??	0x01	
Function Code	0x03	Function Code	0x03	0x03	
Start Address High	0x13	Byte Count	0x02	0x02	
Start Address Low	0x8A	Register's Data High	0x??	0x03	V3.2
Number of Registers High	0x00	Register's Low	0x??	0x02	
Number of Registers Low	0x01	CRC16	CRC16	CRC16	
CRC16	CRC16				

Query Meter's Program ID register 45004		Response from Meter			Example response: (reading is a 32 bits integer)
Meter Modbus ID	XX	Meter Modbus ID	0x??	0x01	
Function Code	0x03	Function Code	0x03	0x03	
Start Address High	0x13	Byte Count	0x02	0x02	
Start Address Low	0x8B	Register's Data High	0x??	0xFF	65535
Number of Registers High	0x00	Register's Low	0x??	0xFF	

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Number of Registers Low	0x01	CRC16	CRC16	CRC16	
CRC16	CRC16				
Query Meter's Demand Reset Counter register 45006		Response from Meter		Example response: (reading is a 32 bits integer)	
Meter Modbus ID	XX	Meter Modbus ID	XX	xx	
Function Code	0x03	Function Code	0x03	0x03	
Start Address High	0x13	Byte Count	0x02	0x02	
Start Address Low	0x8D	Register's Data High	0x??	0x00	2
Number of Registers High	0x00	Register's Low	0x??	0x02	
Number of Registers Low	0x01	CRC16	CRC16	CRC16	
CRC16					

0x11 - Report Slave Information (Meter Identification Information):

Query meter's information		Response from Meter		Example
Meter Modbus ID	0x??	Meter Modbus ID	XX	0x01
Function Code	0x11	Function Code	0x11	0x11
CRC16	CRC16	Device ID	0x31	0x31
		Operation Status	0xFF	0xFF
		ASCII code for meter P/N and Manufacturer	Leviton, Model number, hardware version-software vision,	Leviton 2N208-021, V3.2-V3.2,
		ASCII code fn (program ID)	fn	fn
		ASCII Meter's Program Number	0x????	45678
		ASCII Peak Demand Reset Counter	0x??	001
		CRC16	CRC16	CRC16

0x06 - Preset Register (Meter Peak Demand Remote Reset)

Reset Max. Demand (kW) Write 0xAA command to register 0x01F4 to reset peak demand	
Meter Modbus ID	XX
Function Code	0x06
Start Address High	0x01
Start Address Low	0xF4
Demand Reset Command High	0x00
Demand Reset Command Low	0xAA
CRC16	CRC16

0x10 - Preset Multiple registers (Setup Modbus ID)

Setup meter's Modbus ID Modbus ID Address 0x1388		Example
Meter Modbus ID	XX	XX
Function Code	0x10	0x10
Start Address High	0x13	0x13
Start Address Low	0x88	0x88
Number of registers High	0x00	0x00
Number of registers Low	0x02	0x02
Byte Count	0x02	0x02
Data 2 High (Desired Modbus ID)	0x??	0x00
Data 2 Low (Desired Modbus ID)	0x??	0x12
CRC16	CRC16	CRC16

¹The Meter program ID (fn) transmitted via the RS485 port is unique and correlated in Leviton test records to the serial number found on the meter label.

3. Installation Instructions

The following section contains installation and wiring instructions for the Leviton Series 1000 and 2000 individual meter in enclosure. If technical assistance is required at any point during the installation, contact information can be found at the end of this manual. Leviton is not responsible for damage to the meter caused by incorrect wiring.

3.1. Explanation of Warning Symbols



Indicates the need to consult the operation manual due to the presence of a potential risk.



Indicates the presence of electric shock hazards. Prior to proceeding, de-energize the circuit and consult the operation manual.



Indicates that the equipment is protected throughout by double insulation.

3.2 Safety Precautions



- **Installation of electric meters requires working with possibly hazardous voltages. These instructions are meant to be a supplement to aid trained, qualified professionals.**
- **Turn off all power supplying the equipment before performing any wiring operations and test that the power is off. Use a properly rated voltage sensing device to confirm power is off.**
- **Bonding is not automatic for metal conduit connections; separate bonding is to be provided.**
- **Installations should be done in accordance with local codes and current National Electric Code requirements.**
- **Equipment used in a manner not specified by this document impairs the protection provided by the equipment.**

Failure to follow these warnings could result in death, injury or property damage.

3.3 Preparation

1. Verify the model number and electrical specifications of the device being installed to confirm they are appropriate for the intended electrical service (see Section 2).
2. Consult local codes for any possible permits or inspections required before beginning electrical work.
3. Ensure the conduit for the installation is appropriate for the intended application. UL Type 4X conduit and conduit fittings required for outdoor applications.
4. Make sure all tools to be used during installation have proper insulation ratings.
5. Look inside the electrical panel for possible exposed wire, broken wire, damaged components or loose connections.

3.4 List of Materials

- Series 1000 or 2000 meter, enclosure and associated mounting materials.
- Line 1, Line 2, Line 3 and Neutral hook-up wires as needed for the electrical service. Wires must be 18 AWG or larger and insulated for 600 VAC min.
- Current Transformers (CTs): This product is designed for use with Leviton CTs; see Section 2.2 for details.
- Conduit and fittings as appropriate. UL Type 4X conduit and fittings must be used for outdoor applications to maintain the rating of the installation.

3.5 Mounting the Enclosure

3.5.1 Mounting Location

- Series 1000 and 2000 meters require a switch or circuit breaker as part of the building installation.
- The switch or circuit breaker must be marked as the disconnecting device for the meter.
- It is recommended that the enclosure be mounted near the disconnecting device in an area with adequate ventilation.
- The enclosure should not be positioned in a manner that makes it difficult to operate the disconnecting device.
- Ensure that the CT and voltage lead lengths (and conduit lengths) are capable of reaching the enclosure from the load center.

- If a suitable mounting location near the load center cannot be found, additional in-line fuses or circuit breaker may be required in accordance with NEC regulations.

3.5.2 Conduit Openings

Steel Enclosure

The Series 1000 and 2000 steel enclosure comes with a 1 1/16" knockout (3/4" conduit) on the bottom of the enclosure, and a 7/8" knockout (1/2" conduit) on top of the enclosure. To remove a knockout, use a flathead screwdriver (or other rigid device) to puncture the indentations first, and then pry off and discard the knockout.

Outdoor Enclosure

The bottom panel and lower half of the side panels work best for conduit opening locations in outdoor single meter enclosures. Select the location that makes wire installation easiest for the given environment. If the side panels are used, holes should be centered approximately half an inch from the bottom of the enclosure. Hole sizes must be appropriate to fittings, and large enough to fit all voltage and CT wiring (4-10 18 AWG min. wires insulated for 600 V min.). Care should be exercised to keep drill bit away from components inside the enclosure. **UL Type 4X conduit and fittings must be used in order to maintain the outdoor rating of the enclosure.**

3.5.3 Mounting Procedure and Conduit Installation

1. For outdoor enclosures, attach the mounting brackets to the back of the enclosure with the four provided screws as shown in Figure 6.
2. Fasten the enclosure to the selected surface using the provided mounting holes (steel enclosure) or mounting brackets (plastic enclosure). Figure 7 depicts the mounting holes for the steel enclosure. See Section 1.4 for mounting dimensions.
3. Verify that the enclosure is not loose and that all connections are secure.
4. Attach the conduit between enclosure and load center, routing wires as necessary for later use.

5. Make sure the conduit fittings are aligned properly and tightened securely to prevent moisture from entering the enclosure (outdoor applications).



Figure 7: Plastic enclosure mounting brackets



Figure 8: Steel enclosure mounting holes

3.6 Installation of Voltage Lines



Confirm that service is disconnected before any connections are made.

1. Connect 18 AWG min., 600 V min. insulated wiring for Line voltages and Neutral to the appropriate locations in the breaker panel, in accordance with all national and local electrical codes. See wiring diagrams in Figure 10 through Figure 13 at the end of this section.
2. Route wires through the conduit if not already done.
3. Trim the wire to the appropriate length to avoid coils of excess wiring.

4. Strip wiring to approximately .300 inches if needed and connect to the appropriate terminals. Wires should be tightened so that they are held snugly in place, but do not to over-tighten, as this may compress and weaken the conductor.

3.7 Variations and Installation of Current Transformers



To reduce risk of electric shock, always open or disconnect the circuit from the power distribution system of a building before installing or servicing current transformers.



In accordance with NEC, CTs may not be installed in any panel board where they exceed 75% of the wiring space of any cross-sectional area.

General Requirements:

- Splices on the CT leads must be within the meter enclosure, not inside the conduit. Wire insulation should be stripped so that the bare conductor length that connects to the meter terminal block does not exceed 0.300 inches.
- CTs should be securely fastened such that they will not slide down to live terminals.
- Wires should be tightened so that they are held snugly in place, but do not to over-tighten, as this may compress and weaken the conductor.
- Current and voltage inputs must be installed 'in phase' for accurate readings (e.g. CT1 on Line 1, CT2 on Line 2, CT3 on Line 3).

CT Variations

- Leviton solid core CTs (Figure 8): In accordance with CT label, the LINE side of the CT must face incoming Line. White lead connects to X2 of CT connection (CT1:X2, CT2:X2 or CT3:X2). Colored lead connects to X1 of the corresponding CT connection (CT1:X1, CT2:X1 or CT3:X1).

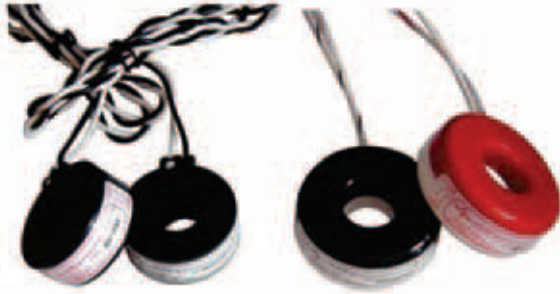


Figure 9: Leviton solid core CTs

Installing solid core CTs

1. Route CT wires through the conduit if not already done.
 2. Trim the wire to the appropriate length to avoid coils of excess wiring.
 3. At meter, strip insulation from wires to approximately .300 inches.
 4. Connect CT leads to the appropriate terminals as described above.
 5. With power turned off, disconnect each monitored conductor and slide on a CT, ensuring the CT is correctly oriented as noted above.
 6. Reconnect the conductors.
- Leviton split core CTs (Figure 9): The side with the white dot or labels as shown in Figure 10 (H1) must face the incoming LINE. White wire connects to X2 terminal, black wire connects to X1 terminal.



Figure 10: Leviton split core CTs

Installing split core CTs

1. Route CT secondary wires through conduit if not already done.
2. Trim the wire to the appropriate length to avoid coils of excess wiring.
3. Strip wiring to approximately .300 inches.
4. Connect the CT leads to the appropriate meter as described above.
5. With power to the conductors turned off, place one CT around each conductor, ensuring that the white dot is facing the line side.

Failure to install CTs in the correct orientation and on the correct phase will lead to inaccurate meter readings. Figure 10 through Figure 13 show wiring diagrams for the various voltage configurations.

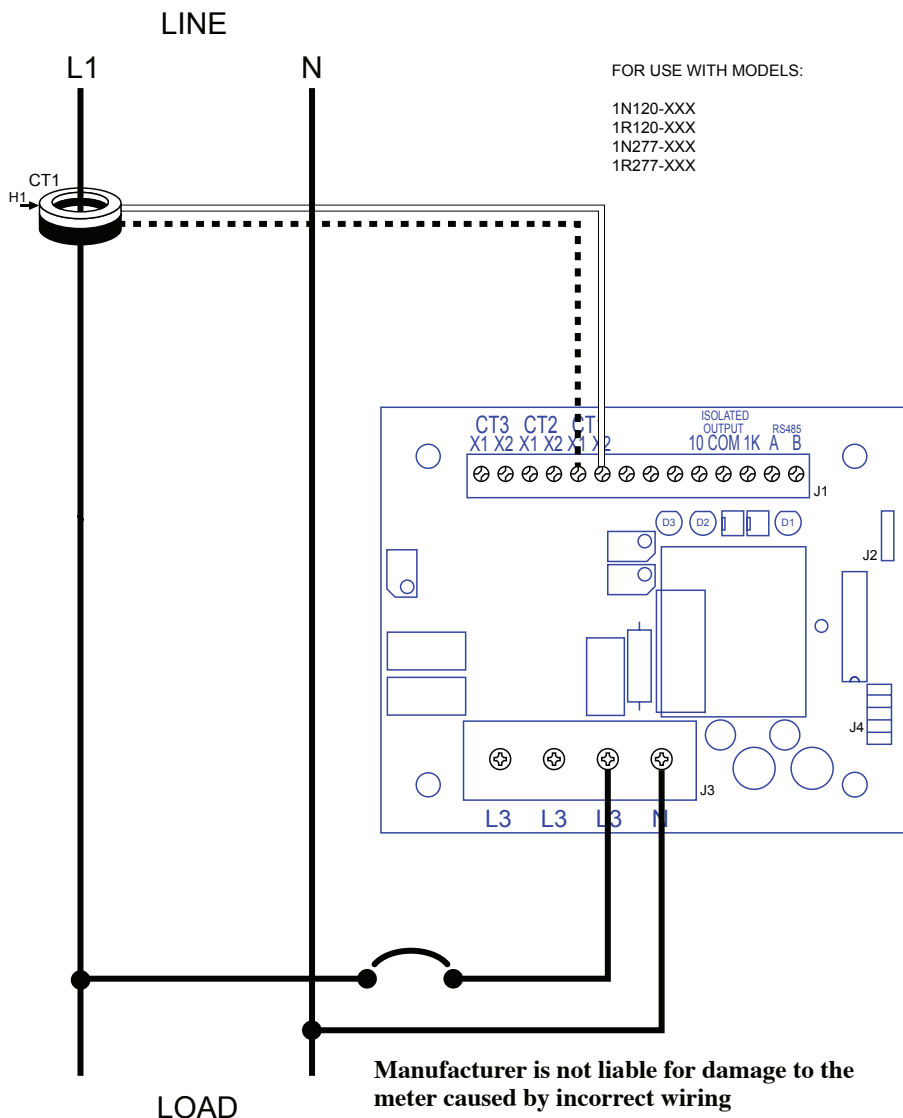


Figure 11: 1-phase, 2-wire hookup diagram

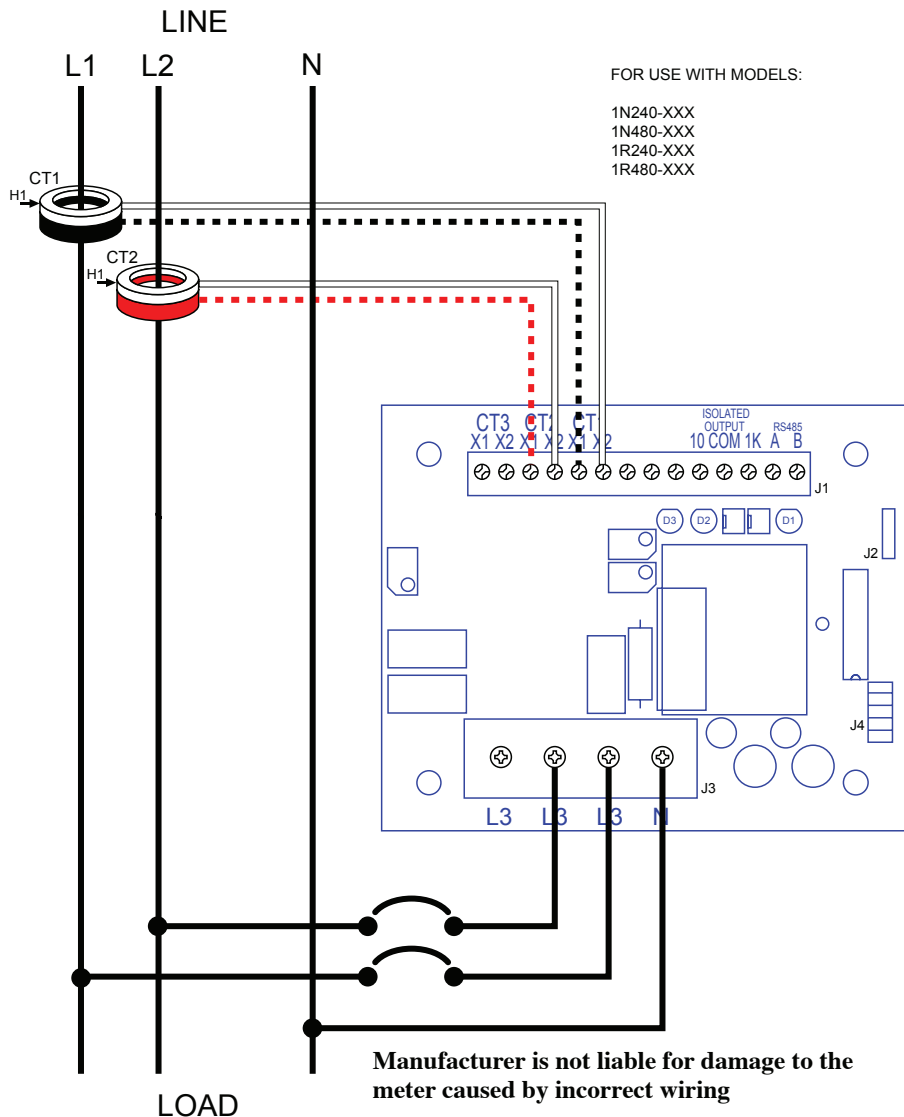


Figure 12: 1 or 2 phase, 3-wire hookup diagram

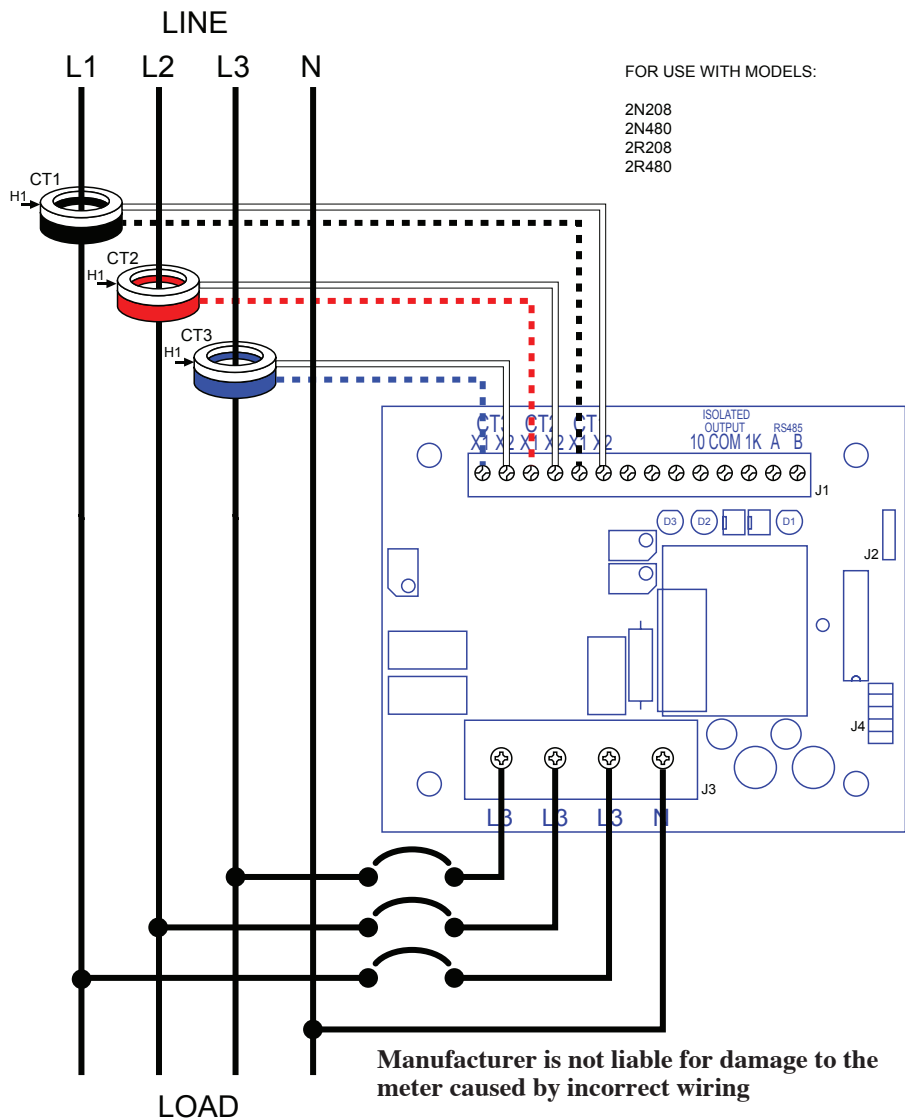


Figure 13: 3-phase, 4-wire Wye hookup diagram

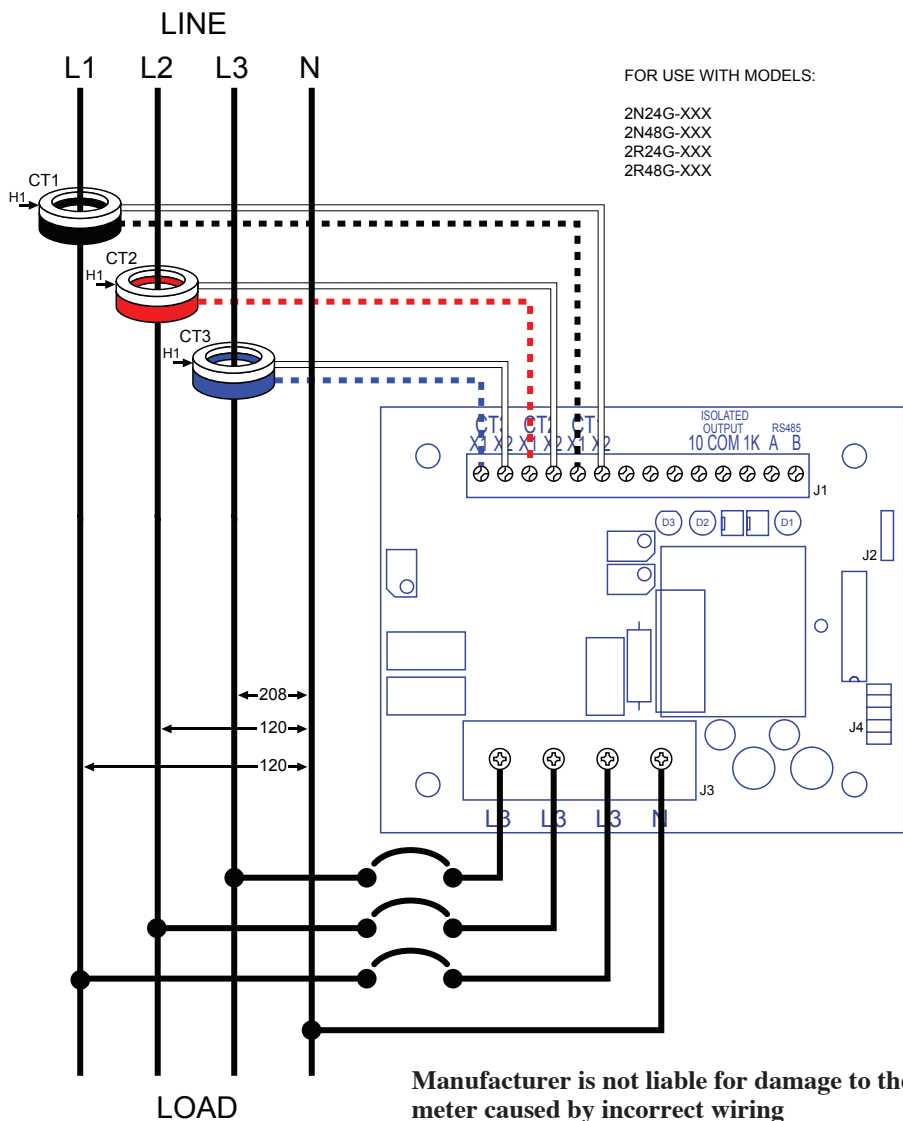


Figure 14: 3-phase, 4-wire Grounded Delta hookup diagram

3.8 Testing the Installation

Testing Voltage

Voltage should also be tested using an AC Voltmeter to verify that the voltage across voltage line terminals (L1, L2, and L3 to Neutral) is not in excess of the maximum rated voltage in section 2.2.

CT Reverse Phase Indicator

Series 1000 and 2000 meters have a red reverse phase indicator LED as described in section 2.3. **There must be a load drawing more than 1 Amp connected to the meter in order for the reverse phase LED to function correctly.** If this LED is on (with a sufficient load), power down the voltage supply and verify that all CTs are installed correctly.

Load LEDs

The load LEDs are described in section 2.3. These LEDs should be pulsing at 50% duty cycle when the meter is connected properly and a constant load is applied. Without a proper load, the load LEDs could be on or off.

LCD Display

The Series 1000 and 2000 display is described in Section 2.4. From this description, it is possible to determine if the kWh and/or demand values displayed on the LCD are consistent with the applied load. A load must be applied for the kWh value to show significant changes.

4. Maintenance

Properly installed meters with sound connections and secure conduit fittings should not require user maintenance. If the meter is functioning abnormally, consult the FAQ/Troubleshooting guide. If the answer cannot be found there, contact Leviton technical support (see Section 6).

5. Troubleshooting/FAQ

Problem

Solution

- | | |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Load LED not flashing | <ul style="list-style-type: none"> ● Verify CT connections and orientations (see Section 3.7) ● Make sure there is sufficient load to draw a significant current ● Test the voltage being supplied to the meter using an AC voltmeter |
| 2. Registered consumption low | <ul style="list-style-type: none"> ● Check to make sure the reverse phase LED is not on ● Even if the reverse phase LED is off, double-check CT orientations. One CT installed in the incorrect direction doesn't always illuminate the reverse phase LED ● Make sure that current and voltage connections are in phase (see Sections 3.6 and 3.7) ● From the LCD test screen (see Section 2.4), make sure all segments are working correctly ● Check power connections and fuses |
| 3. LCD kWh total isn't incrementing | <ul style="list-style-type: none"> ● Verify the Load LED is working ● Check to ensure the ribbon cable connecting the meter to the LCD is securely fastened |
| 4. Reverse phase LED illuminated | <ul style="list-style-type: none"> ● Verify orientation and connection of CT wires (see Section 3.7) ● Ensure that phasing is correct (CT1 on Line 1, CT2 on Line 2, CT3 on Line 3) ● Verify that a load drawing more than 1 Amp is connected to the meter |

FAQ

Q: Can you use additional sets of current transformers (CT's) with a submeter to accommodate more circuits?

A: Yes, you can use up to three sets of CT's in parallel per meter. Just make sure the current rating per phase is not exceeded. Consult Leviton technical support for more information (see Section 6).

Q: Can voltage input wires and current transformer secondary wires be routed through the same conduit?

A: Yes, provided you are using Leviton supplied CTs. Alternate CTs must have a 0.1 A max secondary rating and 18 AWG min. wires with at least 300 VAC insulation rating.

Q: Can digital output wires be routed through the same conduit as voltage input and current sensing wires?

A: No. In accordance with NEC and UL requirements, Class 2 wiring (digital outputs) must be separated from Class 1 wiring.

Q: I accidentally installed my CTs backwards; can I switch the X1 and X2 terminal connections instead of flipping the CT?

A: Meters are tested and approved for accuracy with CTs installed in the correct orientation. Installing CTs backwards and inverting the terminal connections has a slight affect on meter accuracy.

Q: Why are the current transformers color coded (Black & white, red & white, and blue & white)?

A: CT1 needs to monitor the same phase used to power the meter on line 1, CT2 needs to monitor the same phase used to power line 2. Color coding helps the installer maintain correct phasing.

Q: I have a Series 2000 demand meter, how do I reset it?

A: The demand can be reset using the key switch located next to each meter label. During the peak demand display interval, rotate the key switch clockwise and return it to its original position. The kWh total is non-resettable. For more information see

2.4 Display Specifications.

Q: Can I request information through the RS485 port?

A: The RS485 communications is one-way communication only. Every 5 minutes, the meter transmits information regarding the current readings over the RS485 port. The new Leviton Series 3000 meter offers two-way RS485 communications with Modbus protocol. For more information contact Leviton or visit our website.

6. Contact Information

Mailing Address

20497 SW Teton Avenue Tualatin, Oregon 97062

Hours

Technical Support: Mon-Fri from 6:00 AM-4:00 PM PST

Customer Service: Mon-Fri from 8:00 AM-5:00 PM PST

Telephone Numbers

1-800-959-6004 Technical Support Toll-free

1-503-404-5501 Technical Support Local Portland, OR

1-503-404-5601 Technical Support Fax

For Orders or General Sales Inquiries

1-800-736-6682 Customer Service Toll-free

1-503-404-5500 Customer Service Local Portland, OR

1-503-404-5594 Customer Service Fax

7. Returned Material Policy

After acceptance, all sales of meters are final. Leviton, in its sole discretion, authorizes product returns in appropriate circumstances, subject to such conditions as Leviton may specify. Any such return is subject to the express prior authorization and approval of Leviton. Buyer must notify Leviton at 800-736-6682 (telephone) or 503-404-5594 (fax) and request a Returned Material Authorization Number (RMA Number) and state the specific reason for return. Unauthorized returns will not be accepted.

When requesting an RMA Number please supply the following information:

1. Distributors name and address
2. Model number of meter
3. Original purchase order number
4. Reason for return

All paperwork and boxes must be marked with an RMA number issued by Leviton. All authorized returned materials must be shipped freight prepaid to Leviton to the address specified below. Leviton is not responsible for uninsured packages or packages lost by your carrier.

Leviton
20497 SW Teton Avenue
Tualatin, Oregon 97062

All returns are subject to a handling/restocking charge, except for product shipped in error or products under warranty. All charges (modification, repair, restock etc) related to returned products will be determined by Leviton upon evaluation. All shipping costs are the responsibility of the buyer.

METERS RETURNED FOR CREDIT*

Replacement meter ordered	0% Restock Charge
<i>* RMA Number requested by stocking distributor for credit must be accompanied by a purchase order for material of equal or greater value.</i>	
NO replacement meter ordered	25% Restock Charge

METERS RETURNED FOR REPAIR (STILL UNDER WARRANTY)*

No defects found	\$75.00 evaluation charge
Defects not covered under warranty	Charges upon evaluation
Defects found covered under warranty	No Charge

METERS RETURNED FOR EVALUATION (NO LONGER UNDER WARRANTY)*

Evaluation charge of \$75.00 applies
Other charges will apply depending on evaluation by Leviton

*Prices as of May 01, 2009 and subject to change



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Visit Leviton's Web site at <http://www.leviton.com>
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Specifications and Pricing Subject to Change at any time without notice

ARTWORK PRINT SPECIFICATIONS



PART NUMBER PK-93856-10-00-0A **REV** _____ **DESCRIPTION** Instruction manual

SPECIFICATIONS :

Dimensions: 5.5" x 8"
*** Thickness:** 100 lb.
*** Material:** Gloss Cover
*** Finish:** _____
 _____ :

*** For manuals - designates cover specifications**

*** Color(s):** 4 over 0

1: _____ Spot
 2: _____
 3: _____ CMYK
 4: _____

*** Fonts:**

1: _____
 2: _____
 3: _____
 4: _____

Die Line Key: - . . - Perforate

— Die Cut - - - - Fold Line - - - - Kiss Cut Cellophane ≡≡≡≡ Glue

MANUAL INTERIORS / BINDERY / FOLD SCHEME :

Body Material: Offset
Thickness: 60 lb.

Bindery

Die cut Fold Saddle Stitch
 Perfect Bind Drill Trim

Color(s): 4 over 4

1: _____ Spot
 2: _____
 3: _____ CMYK
 4: _____

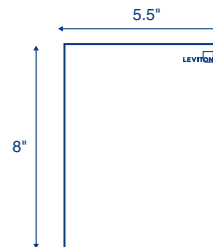
Fonts:

1: _____
 2: _____
 3: _____
 4: _____

PROCESS :

Offset Flexo
 Other _____
Line Screen: 150
Angle: _____
Resolution: 2540

FOLD SCHEME / BINDERY DIAGRAM



— Die Cut - - - - Fold Line ● Punch/Drill Hole

COMMENTS :

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Artist: D. Hunt **Artwork Release Date:** 11/16/11

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