

Mini Meter MMU (Multiple Meter Units)

Cat. No. MxTxx

Installation Manual

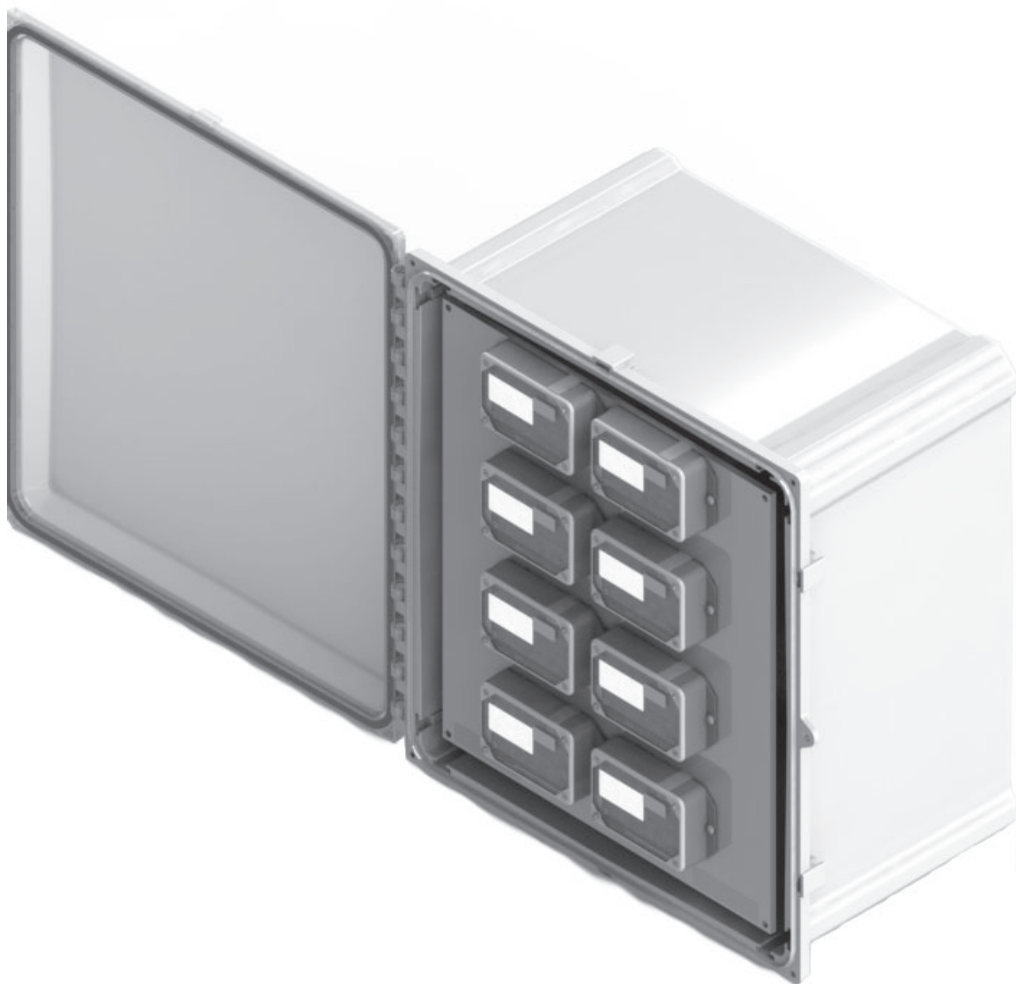


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1 PRODUCT DESCRIPTION

READ THESE INSTRUCTIONS BEFORE INSTALLING.

1.1 General Description

The Leviton Mini Meter is a self-powered meter that is current transformer (CT) rated electronic kilowatt-hours (kWh). It is designed for permanent connection to an electrical service. Mini Meters come in dual-element (3-wire) configuration. This guide is for use with Mini Meter Multiple Meter Units (MMUs).

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 demand
- Multiple load monitoring with a single meter
- Automated Meter Reading (AMR)- compatible isolated pulse outputs
- Reverse-phase indicator
- Five year warranty

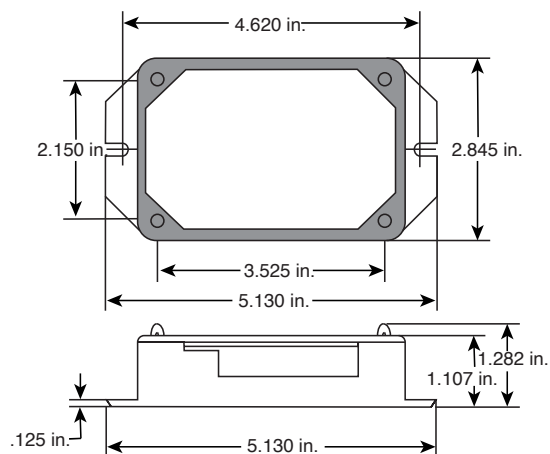
1.3 Meter Certifications

- UL Recognized Component in the US or Canada
- Certified to California Division of Measurement Standards
- Conforms to accuracy requirements set in ANSI C12.10 and C12.20

1.4 Physical Dimensions

1.4.1 Single Meter

Below shows the dimensions of a single Mini Meter case and cover.



Mini Meter Case and Cover Dimensions

2 ELECTRICAL SPECIFICATIONS

2.1 Mini Meter Specifications

Mini Meters fall under UL Circuit Category III: a device for measurements performed in the building installation. The electrical specifications for Mini Meters are given in the table below.

Specifications	
Input Configurations	1 or 2 Phase, 3 wire
Supply Voltage Range (L1 or L2 to Neutral)	Minimum 102VAC Maximum 138VAC
Maximum Input Power (L1 and L2)	8VA
Maximum Rated Current	220A primary for 200A models
Line Frequency	Minimum 102VAC Maximum 138VAC
Power Factor Range	50-60Hz
Accuracy	+/- 0.5% of registration at 1.0 PF, 2 to 200A +/- 0.75% of registration at 0.5 PF, 2 to 200A
Operating Temperature Range	-22°F to 140°F (-30°C to 60°C)
Rated Pollution Degree	2
Rated Relative Humidity	80%
Terminal Blocks: Dinkle/International Connector EK508-11P or Equivalent.	4.4 in-lb of torque maximum

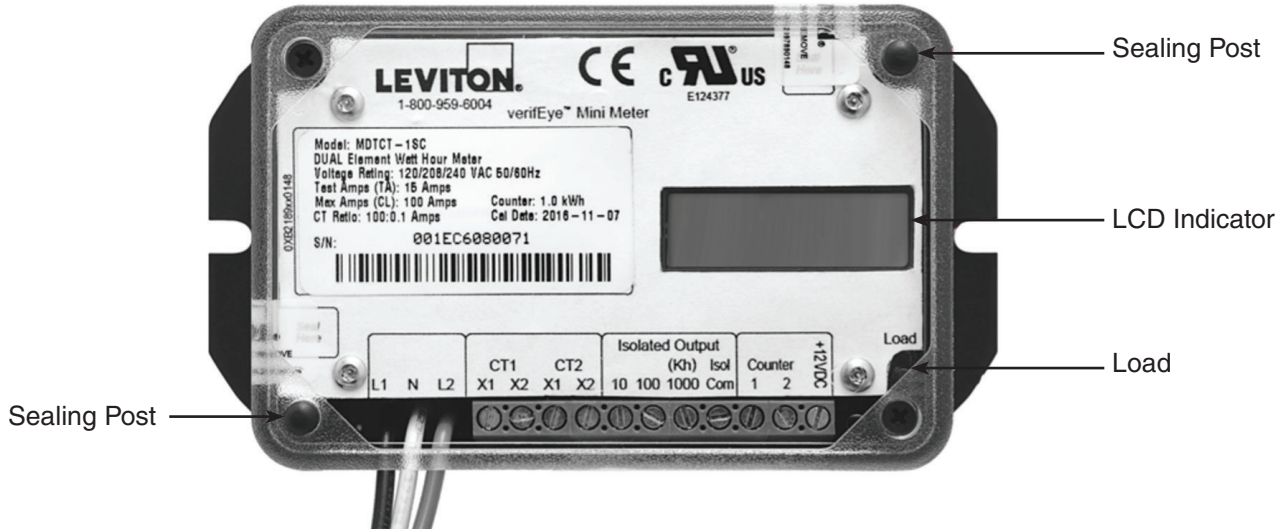
Product approved for use with Leviton Current Transformers, rated at 200A.

NOTE:

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

2 ELECTRICAL SPECIFICATIONS

2.2 Input/Output Connections and User Display



Connection Specifications	
Voltage Inputs (wire connections)	Description
L1	Black wire, voltage input, Line 1, 120V with respect to neutral
N	White wire, Neutral input
L2	Red wire, voltage input, Line 2, 120V with respect to neutral
CT Inputs	
CT1: X1	Current Transformer input, CT1. Colored wire of CT1
CT1: X2	Current Transformer input, CT1. White wire of CT1
CT2: X1	Current Transformer input, CT2. Colored wire of CT2
CT2: X2	Current Transformer input, CT2. White wire of CT2
Outputs	
10, Isolated Output (10 Wh/P, Kh=10)	Isolated pulse output: 5 watt-hours on, 5 watt-hours off, referenced to ISOL COM DO NOT USE FOR FIELD WIRING.
100, Isolated Output (100 Wh/P, Kh=100)	Isolated pulse output: 50 watt-hours on, 50 watt-hours off, referenced to ISOL COM
1000, Isolated Output (1 kWh/P, Kh=1000)	Isolated pulse output: 500 watt-hours on, 500 watt-hours off, referenced to ISOL COM
ISOL COM	Isolated common for 10/100/1000 isolated outputs
+12VDC	12VDC output; current rating is 3mA maximum
LED/LCD Indicators	
Load LED (green)	The load LED has a 10Wh pulse rate (5 watt-hours on, 5 watt-hours off). The duty cycle should be 50% when the meter is connected properly, and a constant load is applied.
LCD	The startup screens are displayed only once at power up. The meter repeatedly cycles through the runtime screens. Energy, demand and power are shown on the runtime screens as combined values for Line 1 and Line 2.

2 ELECTRICAL SPECIFICATIONS



LCD in Normal Operation (No Errors)

2.2.1 Using the Display to Determine Meter Status

The table below explains how errors are indicated on the LCD, listing error conditions in order of priority. If more than one error condition exists, the LCD error screen shows only the highest-priority error. If the same installation error condition exists on both lines, the LCD error screen reports the error only for Line 1, but both L1 and L2 symbols blink.

Display Status					
Error Category	Meter Status	LCD Error Message	Bar/Arrow	L1/L2 Symbols	Determinator of Error Condition
None	Normal	None	Animated arrow pointing right	Both off	No error or warning conditions.
Warning	Low Current	None	Bar and arrow indicators turned off	Blinking (one or both)	Power greater than or equal to -15W, but less than +15W.
Installation	Reverse Energy	Err rC1 or Err rC2	Arrow pointing left (no blink)	Blinking (one or both)	Power less than -15W.
Installation	Bad Power Factor	Err PF1 or Err PF2	Solid bar (no blink), no arrow either side	Blinking (one or both)	Checked only when current is greater than starting current level. Error when phase angle is greater than 80° and less than 90°.
Installation	Low Voltage	Err LU1 or Err LU2	Solid bar (no blink), no arrow either side	Blinking (one or both)	Voltage below 102V.
Installation	Over Voltage	Err HU1 or Err HU2	Solid bar (no blink), no arrow either side	Blinking (one or both)	Voltage above 138V.
Installation	Over Current	Err HC1 or Err HC2	Solid bar (no blink), no arrow either side	Blinking (one or both)	Current above 110A if configured for 100A CT or 220A if configured for 200A CT.
Failure	Factory Service Required	FAIL 01, FAIL 02, ... FAIL 05	Blinking bar, no arrow either side	Both off	Operational error detected.

While in a failure condition, in addition to displaying a “FAIL” code on the error screen, the screen ID (left-most digit) on every screen blinks, alternating between the screen ID and the character “F”.

If the meter reports a failure condition, contact Leviton technical assistance at 1-800-824-3005 (USA Only) or 1-800-405-5320 (Canada Only).

2 ELECTRICAL SPECIFICATIONS



CT Amperage Startup Screen,
No Error Conditions



Screen 1: Real Energy, No Error Conditions



Error Screen Showing a Failure code,
Factory Service Required



Error Screen Showing a Reverse Current
Installation Error on Line 1



Error Screen Showing a Power Factor
Installation Error on Line 2



Error Screen Showing a Low Voltage
Installation Error on Lines 1 and 2

3 INSTALLATION INSTRUCTIONS

3.1 WARNINGS

- **TO AVOID FIRE, SHOCK OR DEATH**, turn OFF all power supplying the equipment before performing any wiring operations. Use a properly rated voltage sensing device to confirm power is OFF.
- Installation of electric meters requires working with possibly hazardous voltages. These instructions are meant to be a supplement to aid trained, qualified professionals.
- 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.

3.2 Prior to Installation

- Verify the model number and electrical specifications of the device being installed to confirm they are appropriate for the intended electrical service.
- Consult local codes for any possible permits or inspections required before beginning electrical work.
- Ensure the conduit for the installation is flexible and non-metallic. For outdoor applications, conduit and conduit fittings must be rated for UL Type 4X outdoor enclosures. Failure to use the appropriate conduit and fittings invalidates the degree of equipment protection.
- Make sure all tools have proper insulation ratings.
- Look inside the MMU and electrical panel for possible exposed wire, broken wire, damaged components or loose connections.

3.3 What You Will Need

- Mini Meter MMU and associated mounting materials.
- Line 1, Line 2, Line 3 (where appropriate) and Neutral hook-up wires as needed for the electrical service. Wires must be 18 AWG or larger and insulated for 300 VAC minimum.
- Current Transformers (CTs): This product is designed for use with Leviton 200A solid core (CDA02-xxx) or split core (CTD02-xxx) CTs.
- Flexible, non-metallic conduit and fittings; UL Type 4X for outdoor applications.

3 INSTALLATION INSTRUCTIONS

3.4 Mounting the Enclosure

3.4.1 Selecting a Mounting Location

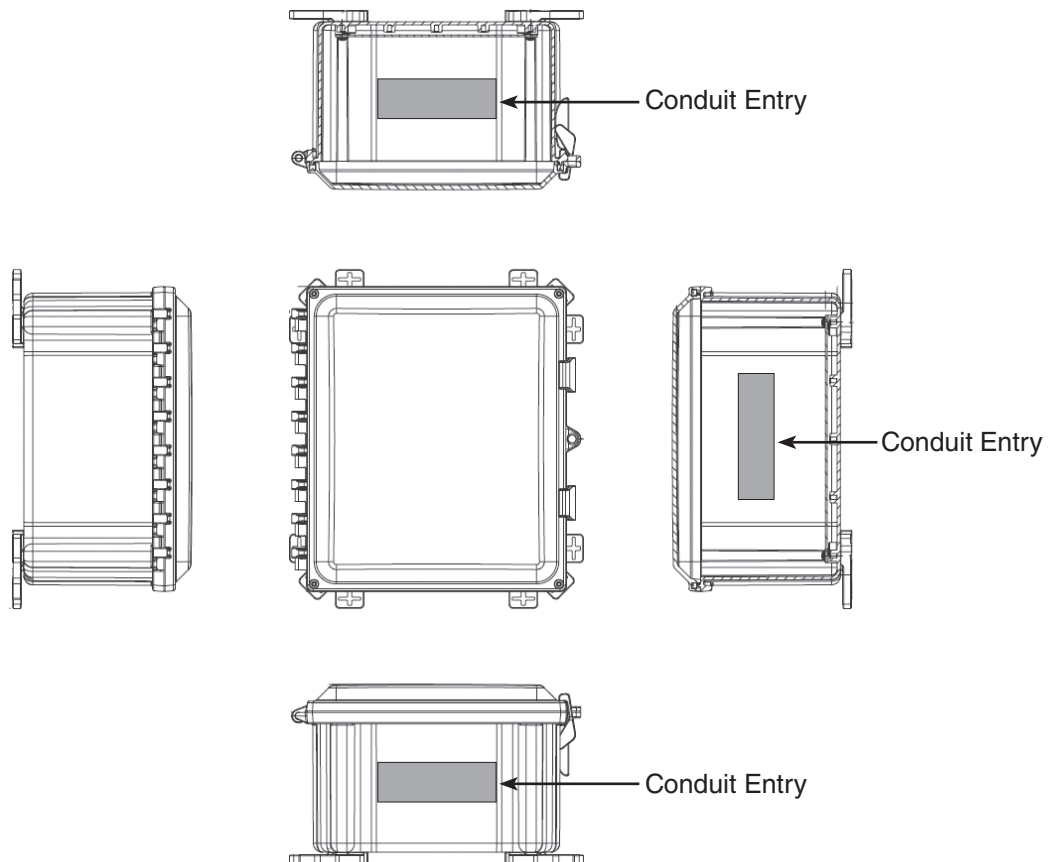
MMUs require a switch or circuit breaker as part of the building installation. The switch or circuit breaker must be marked as the disconnecting device for the MMU.

It is recommended to mount the MMU near the disconnecting device in an area with adequate ventilation. Do not position the MMU where it makes it difficult to operate the disconnecting device.

Ensure that the CT and voltage lead and conduit lengths can reach the enclosure from the breaker panel. If you cannot find a mounting location near the panel, you may need to add additional inline fuses or circuit breakers in accordance with NEC regulations.

3.4.2 Drilling Conduit Holes

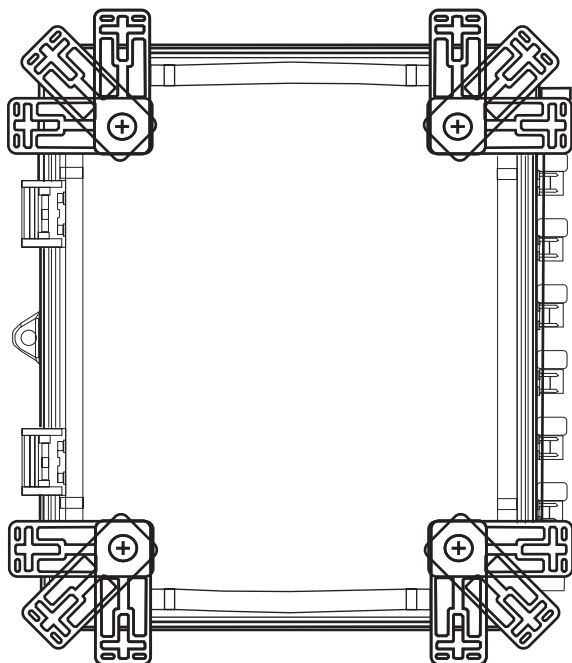
The shaded areas indicate appropriate drill area for conduit holes. **No part of the conduit hole should extend outside of the shaded area.**



3 INSTALLATION INSTRUCTIONS

3.4.3 Mounting Procedure

1. Attach the mounting brackets to the back of the enclosure with the four provided screws as shown below.



2. Secure the enclosure with fasteners to the selected surface via mounting holes.
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 (for outdoor applications).

3 INSTALLATION INSTRUCTIONS

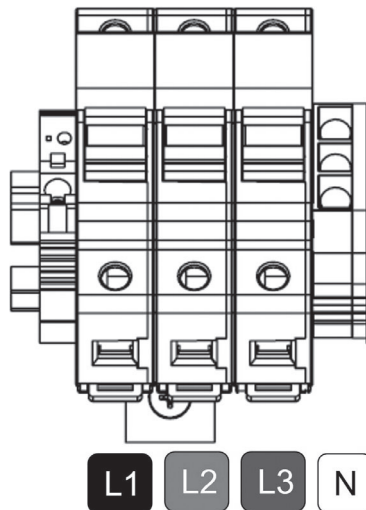
3.4.4 Conduit Installation

WARNINGS:

- To reduce risk of shock or electrocution, 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.

NOTE: A panel schedule is highly recommended for wiring MMU internal voltage connections.

1. Secure the enclosure with fasteners to the selected surface via mounting holes.
2. Verify that the enclosure is not loose and that all connections are secure.
3. Attach the conduit between enclosure and load center, routing wires as necessary for later use.
4. Make sure the conduit fittings are aligned properly and tightened securely to prevent moisture from entering in the enclosure (outdoor applications).
5. For connections to the voltage terminal block, strip wiring to approximately .3 inches and connect the wires to the appropriate terminals.



Voltage Terminal Block Connections

3 INSTALLATION INSTRUCTIONS

3.5 Installation of Current Transformers

WARNINGS:

- **TO AVOID FIRE, SHOCK OR DEATH**, make sure service is disconnected before any connections are made.
- Voltage connections must be made in accordance with NEC Section 240 and all other local electrical code requirements.

General Requirements:

- Splices on the CT leads must be within the meter enclosure, not inside the conduit. Strip the wire insulation so that the bare conductor length that connects to the meter terminal block does not exceed 0.3 inches.
- Securely fasten the CTs so that they do not slide down into live terminals. Tighten the terminal screws so that the wires are held in place, but do not to overtighten, as this may compress and weaken the conductor.
- For one- or two-phase 3-Wire electrical panels, you must install current and voltage inputs 'in phase' for accurate readings (for example, place CT1 on Line 1 and CT2 on Line 2).
- For three-phase 4-wire electrical panels, see Page 16 and follow factory-provided meter schedules for correct CT locations.

Installing Solid Core CTs

1. Turn OFF the power, disconnect each monitored conductor, and slide on a CT, ensuring the CT is correctly oriented, as noted above
2. Route CT 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 0.3 inches and connect to the appropriate terminals, as described above.
5. Reconnect the conductors.



Installing Split 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. Strip wiring to approximately 0.3 inches.
4. Connect the CT leads to the appropriate meter, as described above.
5. Turn OFF the power, place one CT around each conductor, and ensure that the white dot is facing the line side.



3 INSTALLATION INSTRUCTIONS

3.6 Wiring Management Best Practices

The wiring harness for each meter has been kept separate to avoid any confusion as to which meter they belong to. Following are the recommendations for routing and wire management:

1. Separate the reference voltage wiring from the CT wiring and pulse output wiring, before making any connections. Pulse output wiring should go to the top, the reference voltage input wiring to the middle, and the CT wiring along the bottom of the enclosure
2. Reference voltage wiring from the meters should be routed to the middle of the panel, near the power distribution terminals. These wires have ferrules on them, making it easy to insert them into the appropriate phase on the power distribution blocks.

It is critical to observe meter phasing as these connections are made. In typical 208V, 3-phase installations, the inputs from each Mini Meter will alternate between A, B & C phases, based on the panel schedule (A-B, C-A, B-C). It is much simpler in a 240V split-phase application, where all meters follow the standard A-B, A-B phasing.

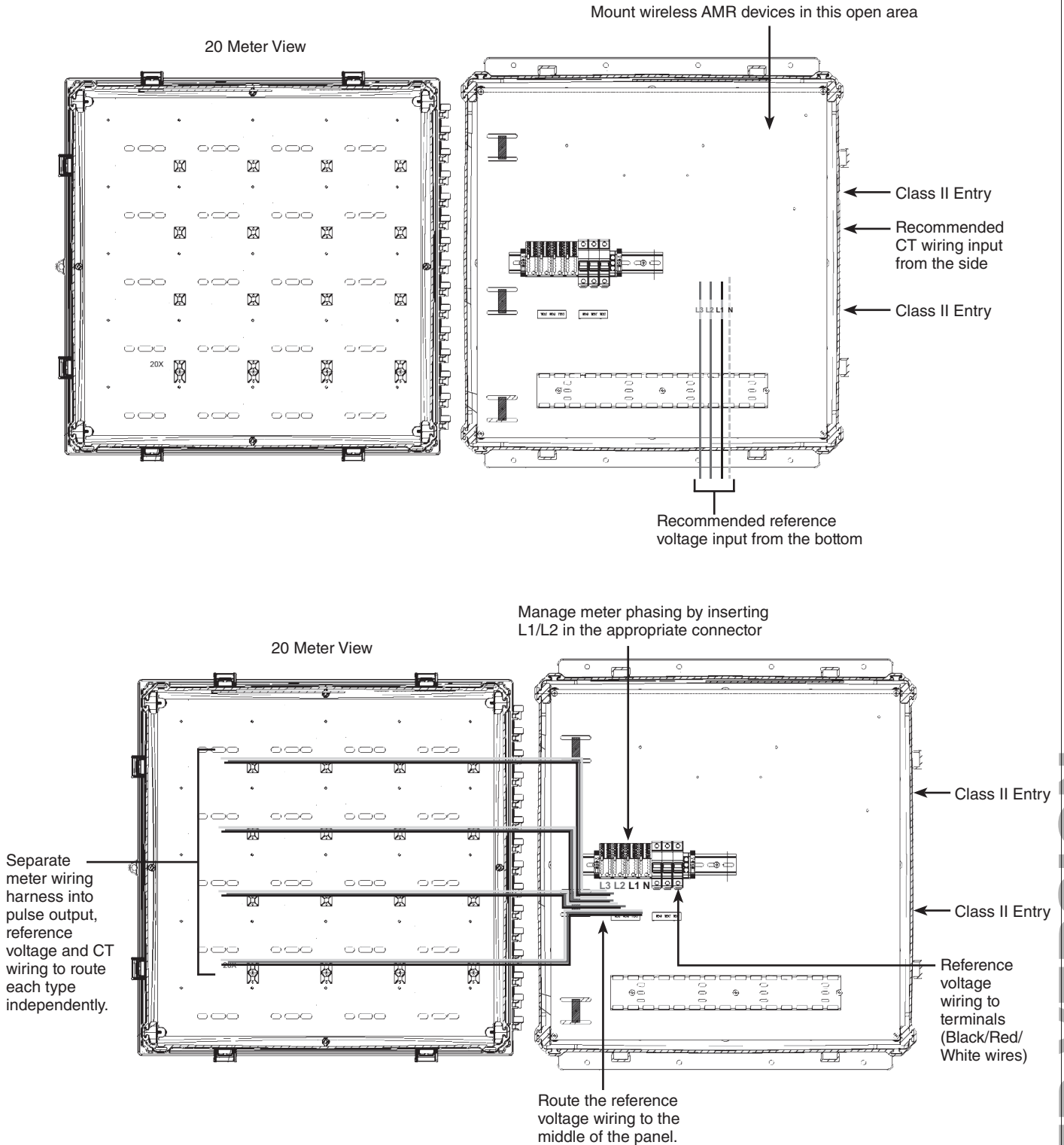
NOTE: In the XL cabinet, there is very little extra wire on the meters mounted at the far corners, so the routing of the reference voltage wiring must be as direct as possible for these to reach.

3. Pulse output wiring to either an A8911 High Density Pulse Module or wireless AMR transceivers is intended to go across the top of the back panel. When ordered with an integrated A8911, the unit will come pre-wired, with all the pulse output wiring routed to the unit.
4. CT Wiring is intended to go in the gray wiring tray at the bottom of the enclosure. Make all the CT connections first and bundle these together using zip ties to manage the routing, arrange them in the tray, and place the cover over the top.

CT wires should be labeled as they are installed to make it possible to identify which meter and CT input they are to be connected to in the MMU. Best practice would follow the following labeling scheme: Label each CT with the breaker number from the panel (1, 3, 5, 7, 9... down the left side and 2, 4, 6, 8, 10... down the right side of the panel). Wire markers like the Brady PWM-xxx labels are ideal. Velcro straps are provided on the left side of the backplate to help with routing the wiring into neatly organized bundles.

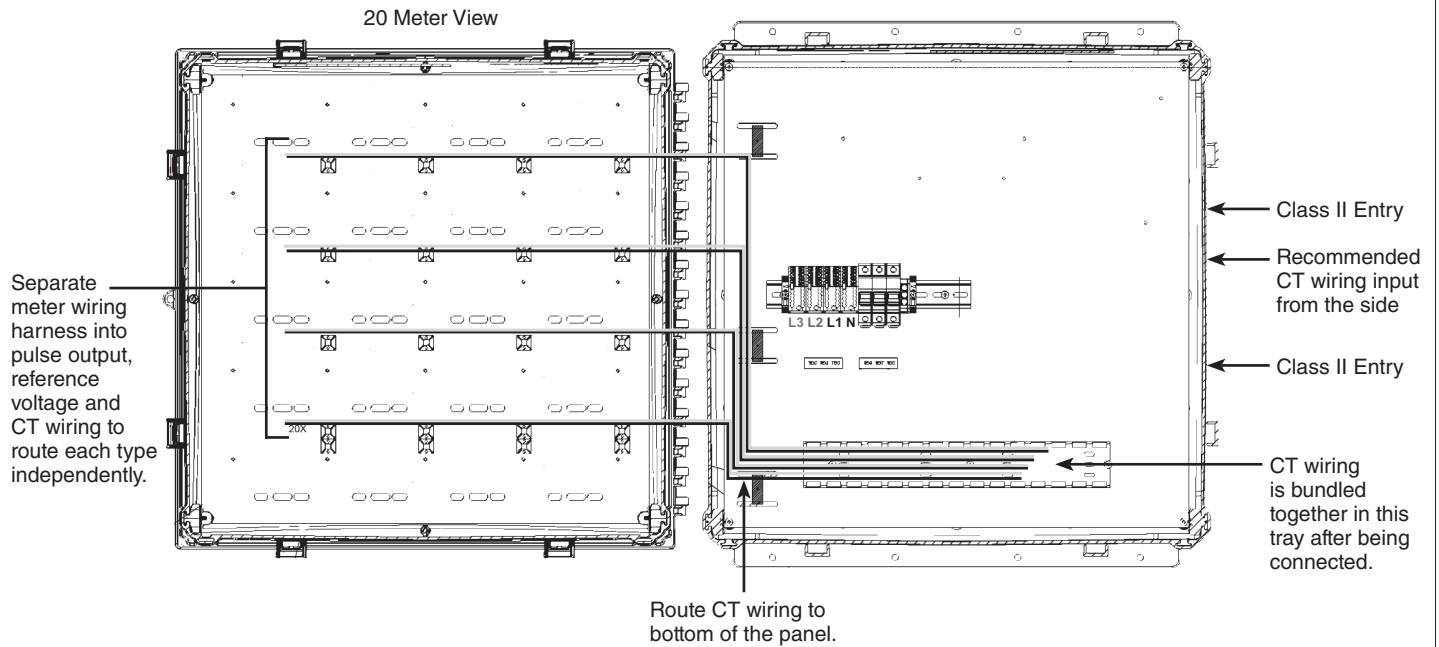
3 INSTALLATION INSTRUCTIONS

Mini Meter MMU - Reference Voltage Wiring

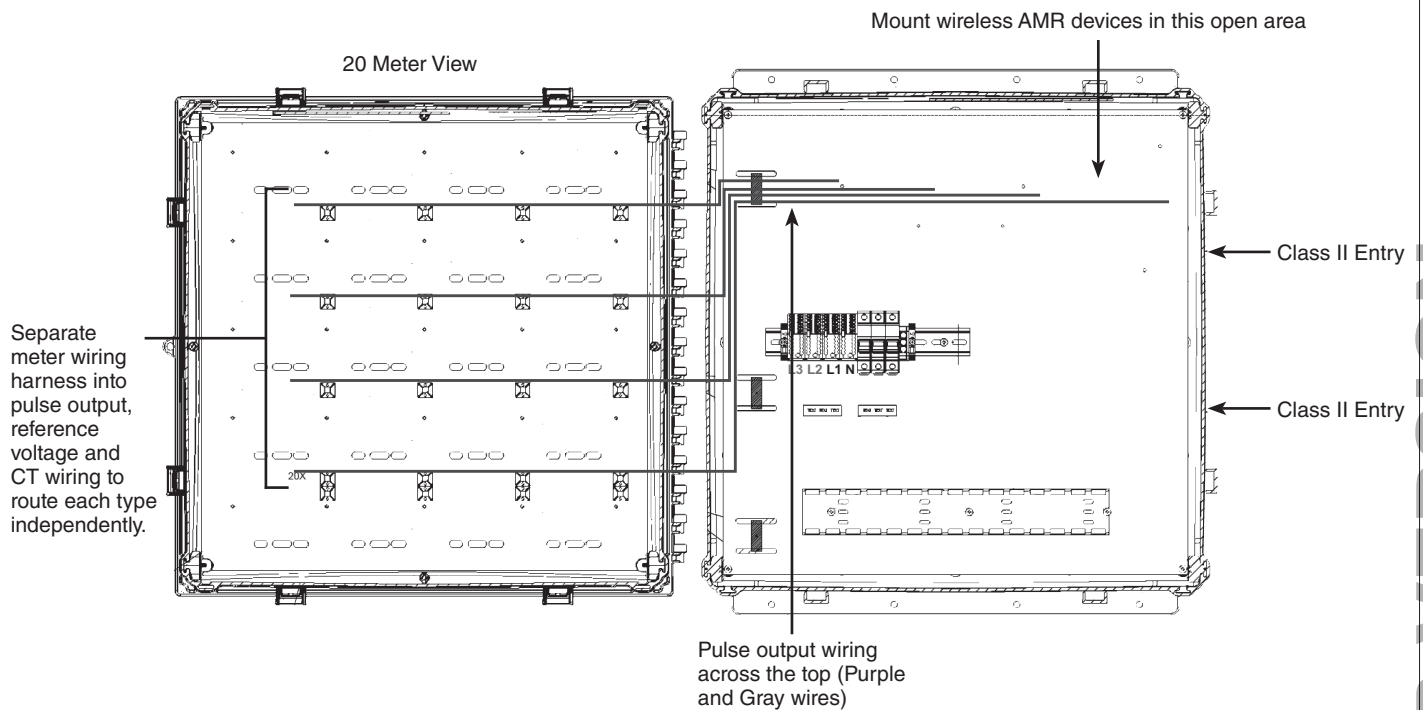


3 INSTALLATION INSTRUCTIONS

Mini Meter MMU - CT Wiring

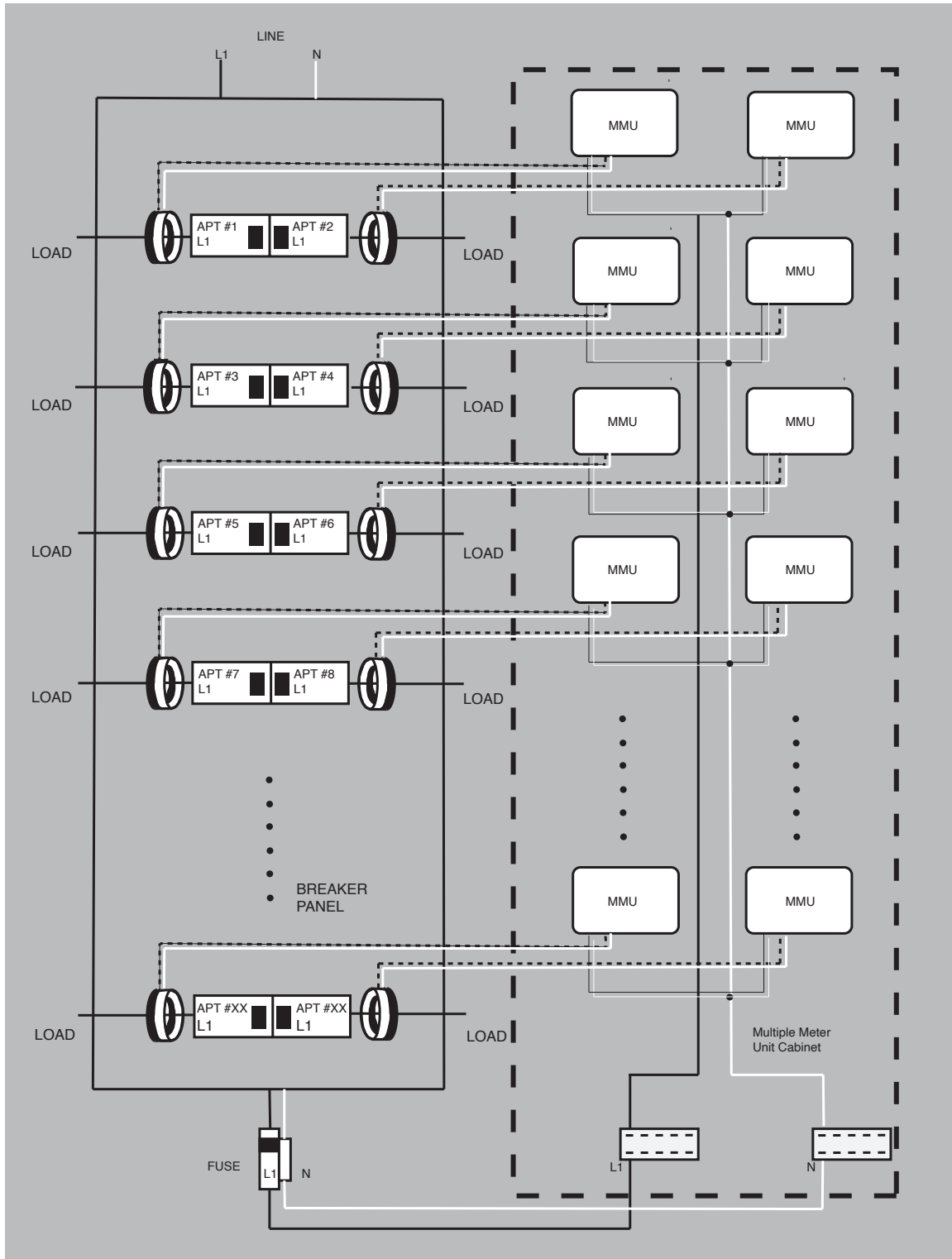


Mini Meter MMU - Pulse Output Wiring



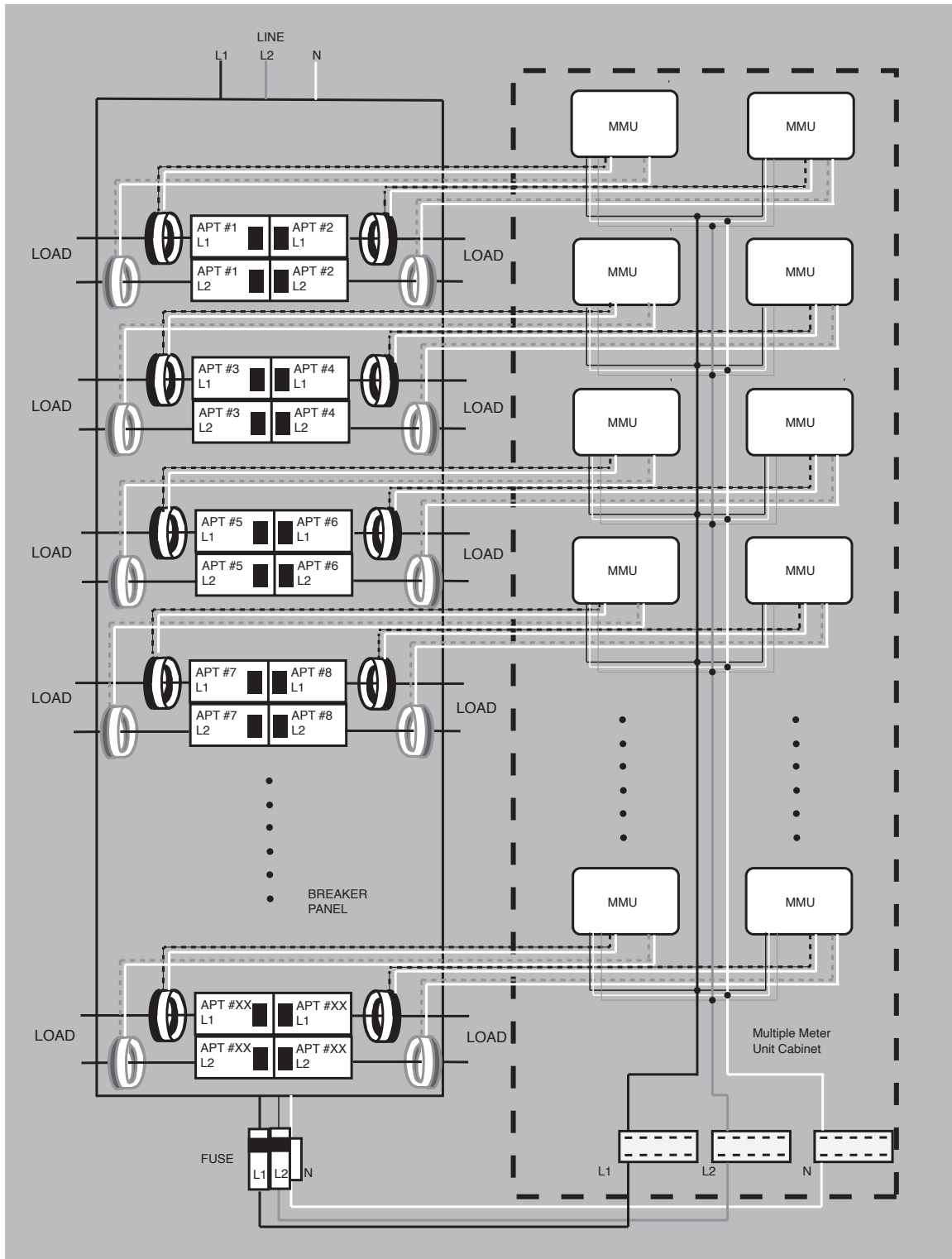
3 INSTALLATION INSTRUCTIONS

Wiring the MMU



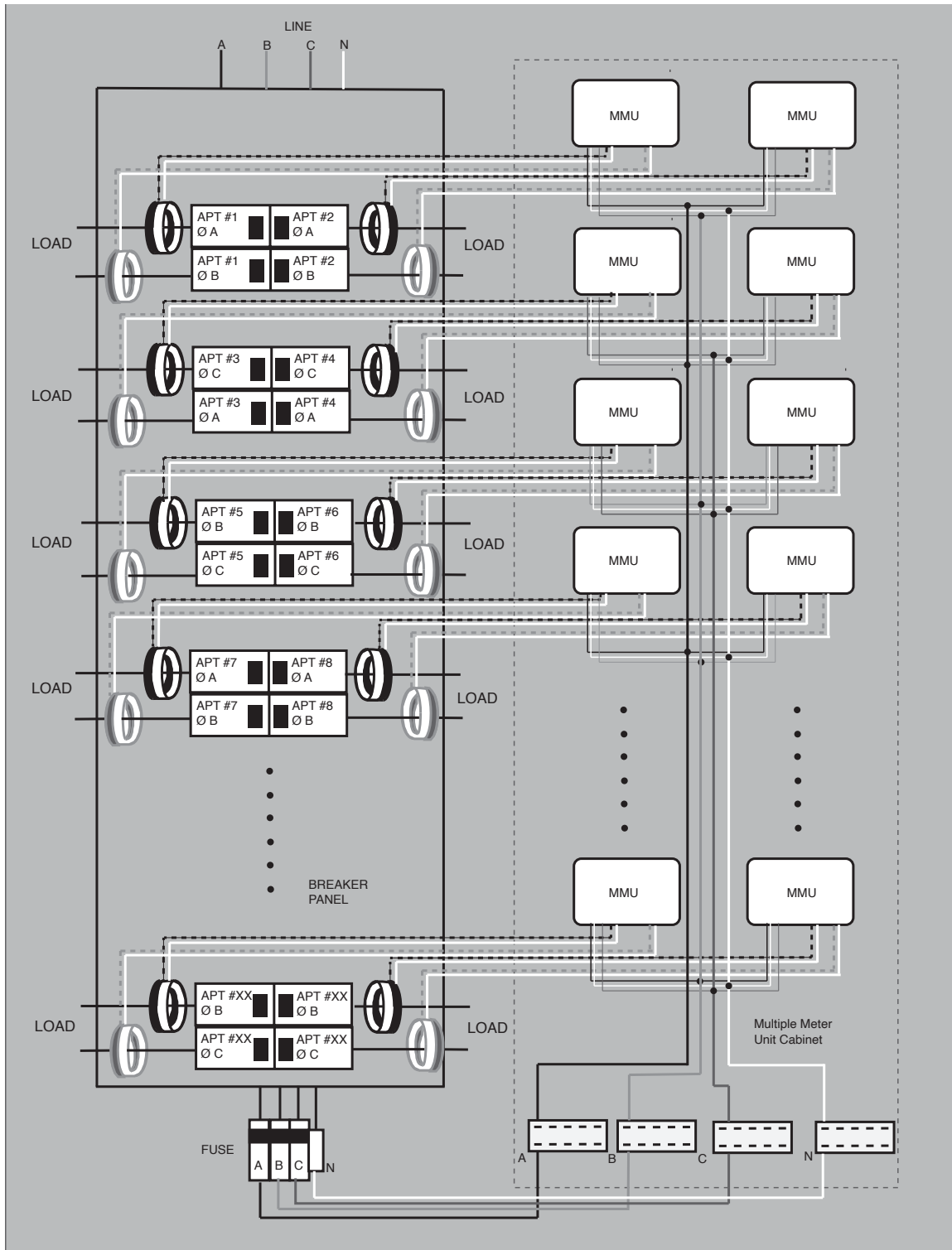
One-Phase, 2-Wire Hookup Diagram

3 INSTALLATION INSTRUCTIONS



Two-Phase (Split Phase), 3-Wire Hookup Diagram

3 INSTALLATION INSTRUCTIONS



Three-Phase, 4-Wire Hookup Diagram

4 TESTING THE INSTALLATION

4.1 Testing the Installation

Testing Voltage

The meter LCD is active when the Mini Meter has a proper power supply. Test the voltage with an AC Voltmeter to verify that the voltage across voltage line terminals (L1 to Neutral and L2 to Neutral) does not exceed maximum voltage.

CT Reverse Phase Indicator

Each Mini Meter in the MMU enclosure has a reverse phase indicator arrow on the LCD. If any of these arrows point to the left, power down the voltage supply and verify that all CTs are installed correctly.



Load LED

The load LEDs are described in section 2.3. These LEDs pulse at 50% duty cycle when the meter is connected properly and a sufficient load is applied. The load LED has a 10 Wh pulse rate (5 watt-hours on, 5 watt-hours off).

4.2 Securing the Enclosure

In accordance with safety requirements, MMUs must be secured using the provided key lock once installation is complete. The purpose of the lock is to prevent access to live parts that pose potential safety risks. To install the lock, slide it through the provided holes on the clamp side of the enclosure and fasten securely.

4 TESTING THE INSTALLATION

4.3 What to do if...

Power - LCD is not ON.

- Check to make sure all connections are wired.
- Test the voltage being supplied to the meter using an AC voltmeter.
- Turn the power OFF, remove any additional line fuses, and test with ohmmeter.

Load LED does not flash.

- Verify CT connections and orientations.
- Make sure there is sufficient load to draw a significant current.
- Test the voltage being supplied to the meter using an AC voltmeter.

Registered consumption is low.

- Check to make sure the reverse phase LED is not ON
- Even if the reverse phase light is off, double-check CT orientations. One CT installed in the incorrect direction does not always illuminate the reverse phase LED.
- Make sure that current and voltage connections are in phase.
- Check power connections and fuses.

Reverse phase indicator on LCD.

- Verify orientation and connection of CT wires.
- Ensure that phasing is correct (CT1 on Line 1, CT2 on Line 2).
- Verify that a load that draws more than 1 Amp is connected to the meter.

Properly installed meters with sound connections and secure conduit fittings should not require user maintenance. If the meter is functioning abnormally, contact Leviton technical support at 1-800-824-3005 (USA Only) or 1-800-405-5320 (Canada Only).

5 STANDARD STATEMENTS AND WARRANTY

Leviton and the Leviton logo are the registered trademarks of Leviton Manufacturing, Co.

Patents covering this product, if any, can be found on Leviton.com/patents.

Leviton Manufacturing Co., Inc.

201 North Service Road, Melville, NY 11747

Visit Leviton's website at www.leviton.com

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Specifications and price subject to change at any time without notice.

FOR CANADA ONLY

For warranty information and/or product returns, residents of Canada should contact Leviton in writing at **Leviton Manufacturing of Canada ULC** to the attention of the **Quality Assurance Department, 165 Hymus Blvd, Pointe-Claire (Quebec), Canada H9R 1E9** or by telephone at **1-800-405-5320**.

LIMITED 5 YEAR WARRANTY AND EXCLUSIONS

Leviton warrants to the original consumer purchaser and not for the benefit of anyone else that this product at the time of its sale by Leviton is free of defects in materials and workmanship under normal and proper use for five years from the purchase date. Leviton's only obligation is to correct such defects by repair or replacement, at its option. **For details visit www.leviton.com or call 1-800-824-3005.** This warranty excludes and there is disclaimed liability for labor for removal of this product or reinstallation. This warranty is void if this product is installed improperly or in an improper environment, overloaded, misused, opened, abused, or altered in any manner, or is not used under normal operating conditions or not in accordance with any labels or instructions. **There are no other or implied warranties of any kind, including merchantability and fitness for a particular purpose,** but if any implied warranty is required by the applicable jurisdiction, the duration of any such implied warranty, including merchantability and fitness for a particular purpose, is limited to five years. **Leviton is not liable for incidental, indirect, special, or consequential damages, including without limitation, damage to, or loss of use of, any equipment, lost sales or profits or delay or failure to perform this warranty obligation.** The remedies provided herein are the exclusive remedies under this warranty, whether based on contract, tort or otherwise.

For Technical Assistance Call: 1-800-824-3005 (USA Only) or 1-800-405-5320 (Canada Only) www.leviton.com

