Installation and Operation Manual

Overview

The LoRaWAN Smart Micro-Meter is a UL Listed, utility-grade energy metering device designed for sub-metering single-phase or three-phase facilities. It accurately measures energy consumption of any electrical device or equipment and transmits data to the cloud via LoRaWAN networks, eliminating the need for Wi-Fi. Users can monitor real-time energy usage remotely via www.micro-meter.com website.

Key Features:

- Supports single-phase or three-phase metering.
- Cloud connectivity via LoRaWAN (no Wi-Fi required).
- Compatible with public or private LoRaWAN gateways (typical outdoor range: 3 miles).
- **Installation Restriction:** Do not install inside electrical control panels per UL 67 requirements.

System Requirements

- **Gateway:** Indoor LoRaWAN gateway or A public or private outdoor LoRaWAN gateway within a 3-mile radius. You can purchase the indoor LoRaWAN gateway from CWS.
- **Current Transformers (CTs):**
    - Ratio: 2000:1 (Contact us for more information or to purchase these CTs)
    - Dielectric isolation: >1000 VAC (between CT case and internal winding).
    - Max current rating: ≤50 A (higher ratings reduce low-current accuracy).
    - Type: Clamp-on (recommended) or doughnut-style (if wires are accessible).
    - Certification: UL-approved.

Installation Steps

Pre-Installation Warnings

⚠ CRITICAL SAFETY NOTES

1. **TURN OFF POWER** to the target device before installation.
2. **Never install the Micro-Meter inside electrical panels** (UL Requirement 67).
3. **Secure the Micro-Meter** before connecting wiring (Figures 2 & 4).

Step-by-Step Guide

1. **Identify Equipment:** Select the device/equipment for the meter.
2. **Power Down:** Turn OFF the main power supply.
3. **Locate Wiring:** Identify power cables (L1, L2, L3), Neutral (N), and Ground (Gnd).
4. **Install CTs:**
    - Clamp CTs onto phase wires per Figure 2.
    - Connect CT secondary wires to a **7-pin connector (P/N 1986692-7)** per Figure 1, as follows:
        - Phase 1: Pins 6–7
        - Phase 2: Pins 4–5
        - Phase 3: Pins 2–3
    - **Polarity matters:** Reverse connections cause negative power factors (swap leads if needed).
5. **Tap Voltages:**
    - Use **T-tap connectors** (e.g., Wirefy, Grainger P/N 22EW67, McMaster P/N 69515K25) to tap phase voltages without disconnecting wires (Figure 3).
    - Connect voltage wires to a **4-pin connector (P/N 1986692-4)** per Figure 1, as follows:
        - Neutral: Pin 1
        - Phase 3: Pin 2
        - Phase 2: Pin 3
        - Phase 1: Pin 4

- Use color-coded wires (AWG 18–24, 300V+ UL-rated). Match phase colors if possible (white for neutral).

6. **Ground Connection:** Connect physical ground to Pin 1 (Figure 2).
7. **Single/Two-Phase Systems:**
   - Single-phase: Use Phase 1 CT/voltage only.
   - Two-phase: Use Phases 1 & 2.
8. **Mount Micro-Meter:**
   - Secure in a location **outside panels** (metal enclosures block antenna signals).
   - Optional: Extend antenna via coaxial cable (Molex P/N 89761-7851).
9. **Final Connections:**
   - Plug CT (7-pin) and voltage (4-pin) connectors into the Micro-Meter.
10. **Power On:** Restore main power. The LED flashes while connecting to LoRaWAN.

Troubleshooting

- **Negative Power Factor?** Swap CT leads for the affected phase.
- **No Data Transmission?** Ensure:
  - Outdoor Gateway is within range (≤3 miles) or use Indoor Gateway.
  - Antenna is unobstructed by metal.

Supplier References

Component	Supplier P/N	Vendor
7-pin Connector	1986692-7	Digi-Key
4-pin Connector	1986692-4	Digi-Key

Component	Supplier P/N	Vendor
T-Tap Connectors	22EW67 / 69515K25	Grainger / McMaster-Carr
Antenna Cable	89761-7851	Mouser

Figures

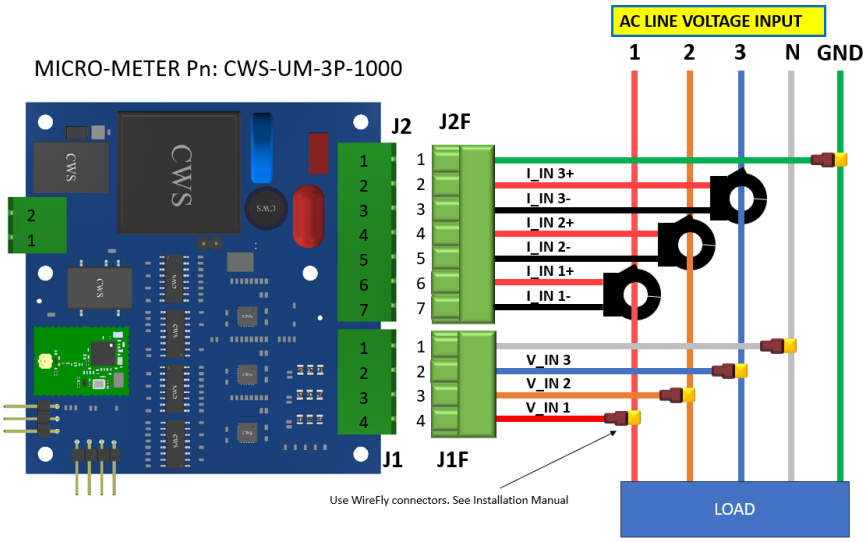

Figure 1: System Connection Overview

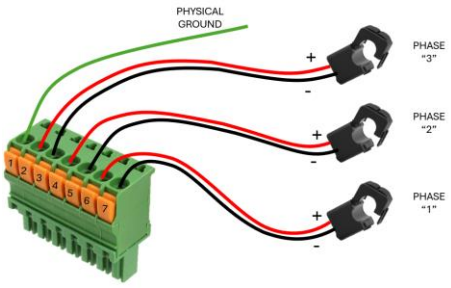

Figure 2: CT Wiring (7-pin connector)

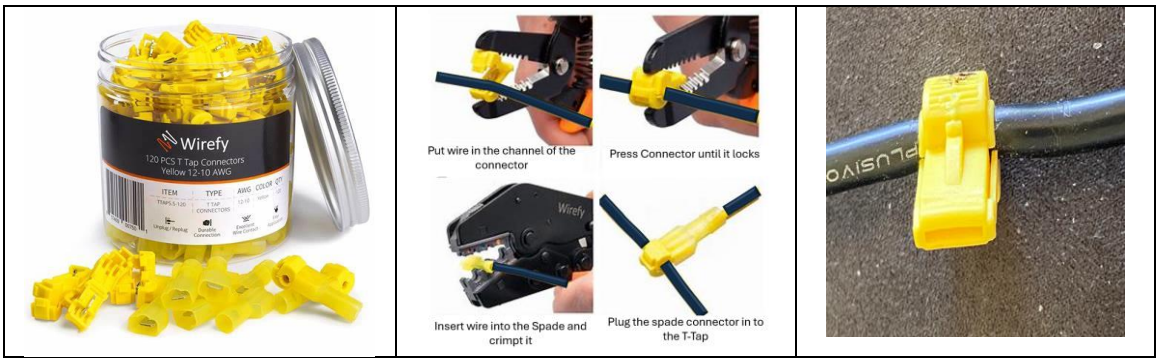

Figure 3: Voltage Tapping (T-tap method)

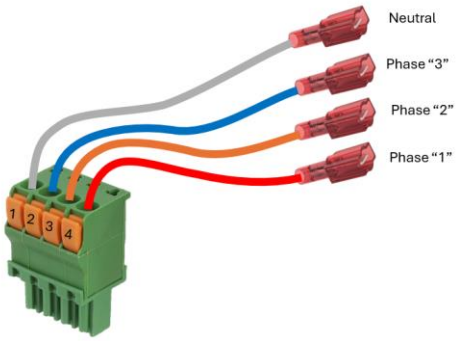

Figure 4: Voltage Wiring (4-pin connector)

NOTE: Always refer to diagrams for correct pin assignments. Incorrect wiring compromises accuracy and safety.

Compliance

- UL-certified : UL File E547857
- ANSI C12.1-2024 certification in progress
- For technical support: 1 714 279 9010. www.coilws.com. www.micro-meter.com

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www.hvac-chip.com

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