FCC Compliance

NOTE:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures;
– Reorient or relocate the receiving antenna
– Increase the separation between the equipment and receiver
– Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
– Consult the dealer or an experienced radio/TV technician
WARNING:

No party shall make any modifications or changes to the MXU Model 530E (the equipment) without the express written consent of Invensys Metering Systems. Doing so could result in the equipment becoming non-compliant with the requirements of the Federal Communication Commission Rules CFR47 Part 15 and could void the user's authority to operate the equipment.

Note: To comply with FCC RF exposure requirements in section 1.1307, a minimum separation distance of 20 cm (8 inches) is required between the antenna and all persons.

Physical Description

The iCon™ MXU 530-E Meter was designed to be assembled and disassembled without the use of tools. This modular design allows you to upgrade or repair a unit quickly and easily. The basic components of the iCon™ meter are depicted below and detailed following the diagram.
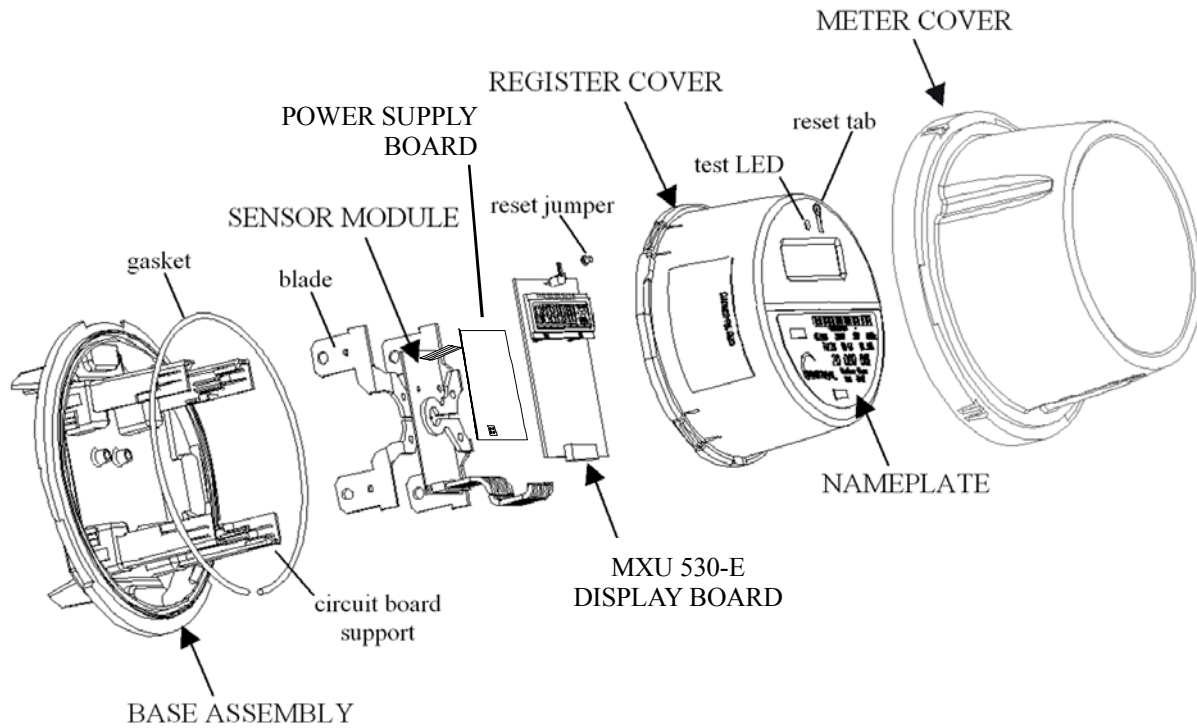
Base Assembly

The meter's Base Assembly is molded from highly durable thermoplastics that provide a stable platform for the meter's Sensor Module, Register display board and up to two additional option boards. The blades (or blade assembly) from the Sensor Module extend through the Base Assembly to connect to the service socket of the main power system.

Sensor Module

Power Supply

The iCon™ meter uses a capacitive tap to provide a regulated voltage to the Sensor Module and the LCD display portion of the MXU 530-E board. The power supply can withstand a voltage transient as described in IEEE C62.41, Level C and applied in accordance with Section 5 of the ANSI C12.20-1998.

Current Sensor

Current is measured using a proprietary air-coupled current transformer. Sensor data, quantities proportional to the time derivative of the current, is streamed to the on-board metering chip.

Metering Chip

The iCon™ meter is pre-programmed at the factory for basic residential metering where 1 Wh equals 2^{30} internal energy units. The metering chip measures voltage using a resistor divider, performs all energy calculations, and outputs billing data to the Register display board.

The metering chip multiplies instantaneous current and voltage to calculate energy usage. Energy is read and accumulated into the integer register once every line cycle. The capacity of the internal register corresponds to 1024 Wh, and the total energy capacity of the software data register before rollover is approximately ±8.5e6 kWh. Under typical conditions, the internal register has the capacity to store approximately 80 years of metering data.

The computed watthours is output in a variable frequency pulse waveform and instantaneous watt-hour. At calibration, the value of each pulse is set as close as practical to 1.0 watthours per pulse. Each pulse, measured from the rising edge of an output pulse to the rising edge of the next output pulse, is defined as the meter energy constant Ke and can be provided as a test output.

Power supply board

This board utilizes the 120/240 VAC mains to supply a regulated voltage to the radio portion of the MXU 530-E display board.

MXU 530-E display board

The LCD display portion of the board consists of a control processor (register), and LCD display. The radio portion of the board consists of a spread spectrum direct sequence radio used to transmit the electric meter data over the air. Modules for advanced options, such as AMR, are integrated into the display board in the area below the LCD display. The cable between the Register display board and the Sensor Module carries SPI, interrupt, and pulse output signals.

Control Processor (register)

The control processor accumulates the active energy register data and converts the readings to kWh. These active energy readings (or a short-term average of these readings) are defined as "Instantaneous kWh". The accumulation of these readings is defined as "Total kWh".

	NOTE
✔	During the normal operation of the meter, the Total kWh register can be cleared, but cannot be set to a specific figure. Refer to **Error! Reference source not found.** on page **Error! Bookmark not defined.**.

The Total kWh displayed on the LCD, described below, is to the decimal resolution specified at time of order. The full resolution of the Ke value is maintained in the

meter's memory for internal computation. All billing data and system information is stored in the meter's non-volatile memory. System information, compliant with ANSI C12.19a data table format, includes the following:

User Data

| Calibration Date	Set by Invensys when the meter is first calibrated
User Configuration Date	Set by the utility when the meter is configured for use
Serial Number	16 digit decimal serial number
Identification	20 decimal digits of identification data
kh	Text representation of the kh value in kWh (default 0.0010)
kt	Text representation of the kt value in kWh (default 0.0010)
Pulse Divider	Pulse divider value (default 1.0)
User Data	16 bytes of free-format data for the utility to set as required

Manufacturer Data

Manufacturer	Manufacturer ID code
Model	Meter model number
Hardware/firmware Versions	Hardware/firmware version numbers
Meter Form	Meter form (2S)
Meter Class Amps	Class amps as text string (200.0)
Meter Test Amps	Test amps as text string (30.000)
Manufacturing Status	Undefined manufacturing status information

Display

The Liquid Crystal Display (LCD) on the front of the meter shows real-time Total kWh and indicates the current operational status of the meter. Information on the LCD is visible in direct sunlight and can be read at angles of 15 degrees above and below the display window's centerline. The following graphic shows how the meter display will look when first put into service.
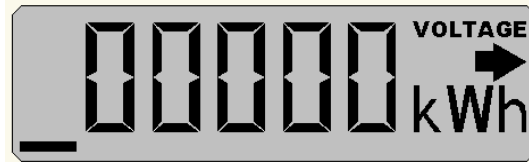
The next graphic shows all available segments on the meter's LCD and identifies the standard features. Each feature is detailed in the following paragraphs.
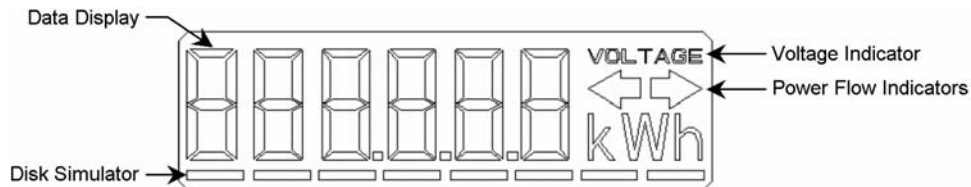
The **Data Display** is the set of large digits on the LCD screen that shows the data quantities of the selected modes. Typically, the Total kWh is displayed in whole numbers using five digits. Decimal resolution may be selected at time of order. Refer to **Error! Reference source not found.**, starting on page **Error! Bookmark not defined.**, for details on the Error and Alternate Display Mode options. During a power outage, the display screen will not be active, however, all data is preserved in non-volatile memory.

If enabled, **Power Flow Indicators**, the arrows to the upper right of the data display, indicate the *direction* of the power flow, as shown in the following table. In the event that power drops below the preset threshold of 25 watts neither arrow will be displayed.

Normal flow.
This arrow indicates that the meter has detected delivered or positive energy that was supplied to the customer from the distribution system.

Reverse flow.
This arrow indicates that the meter has detected received or negative energy that the customer has supplied to the distribution system.

The enunciator above the power-flow indicators, the **Voltage Indicator**, appears when sufficient AC volts are detected to ensure reliable operation of the meter. At lower voltages, meter operation may continue. The voltage indicator is not visible if the meter has encountered an error condition or is in alternate display mode, if these display modes were selected at time of order.

If enabled, the **Disc Simulator** is an 8-segment bar that runs under the Data Display and Voltage Indicator. In normal operating conditions, the Disc Simulator runs from left to right, and increments once every watt-hour. In reverse power conditions, it runs from right to left.

Register Cover

The Register Cover is an opaque shield that protects the meter's internal boards from external tampering and serves as the mounting surface for the nameplate. With the exception of the LCD screen and test LED, no internal components can be viewed through the Register Cover.

Nameplate

The meter's nameplate, which is compliant with ANSI C12.10 – 1997, includes a unique, factory-generated bar code that can be used in a billing database.

Meter Cover

The Meter Cover of each iCon™ meter unit is a transparent polycarbonate enclosure that is interchangeable, abrasion resistant, and contains UV inhibitors to prevent discoloration. This single-piece assembly locks with the Base Assembly to fully enclose the meter and protect the internal components from weather, the forces applied during installation and extraction, and the impact from a fall of up to five feet. After final calibration at the factory, the Meter Cover and Base Assembly are sealed with a T-bar, which will provide evidence of tampering.