

## 1.00 SCOPE

This standard covers all kilowatt-hour and kilowatt-hour demand meters to be used on Springfield Utility Board's distribution system.

## 2.00 NATIONAL STANDARDS

All meters shall be manufactured, tested and furnished according to the latest edition, revision or amendments to the applicable standards of ANSI, NEMA and IEEE, including the American National Standard Code for Electrical Metering, ANSI C12, except as modified herein.

## 3.00 GENERAL CONSTRUCTION

### 3.01 General

All meters shall be furnished complete and ready for operation. All components of equipment shall be new and not previously used.

### 3.02 Test Probe

The meter shall be easily tested with a standard optical test probe. If a special probe is needed for testing, it shall be provided with meter(s) or listed as a separate item on meter bid.

### 3.03 Calibration Adjustments

Full-load and light-load calibration points shall be readily accessible with the meter cover removed and shall be clearly marked as to function. All calibration adjustments shall have provisions to prevent change in meter adjustment under conditions of normal handling and use.

### 3.04 Nameplate

Kilowatt-hour nameplates shall contain the following information

- Form designation
- Manufacturer's name or trademark
- Manufacturer's serial number
- Manufacturer's type
- Class designation
- Volts
- Wire
- Frequency (Hertz)
- Test current
- Watt-hour constant
- Company serial number or space for company serial number (see Section 6.01)



**SPRINGFIELD UTILITY BOARD**  
ENGINEERING & CONSTRUCTION STANDARDS  
**TRANSFORMER RATED AND  
SELF-CONTAINED POLY-PHASE  
KILOWATT-HOUR DEMAND METERS  
WITH ELECTRONIC DEMAND REGISTERS**

DATE | DWN | CHK | APP  
02/19/08 | NPA | NPA |

STANDARD NUMBER  
**MSD 5001**

SHEET 1 OF 5

3.05 Base

The base plate shall be a one-piece, molded unit of phenolic material. Metal bases are not acceptable. The base plate shall be equipped with a potential disconnect link and 5,000 volt surge-protection gaps on all socket-type meters.

3.06 Cover

The meter cover shall be polycarbonate, shall make the meter weather tight and shall not inhibit a clear view of the register dials. All metal parts of the covering shall be stainless steel. The cover shall have provision for sealing to the base by means of a lead-and-wire seal, a T-type seal or equivalent. It shall leave entire faceplate visible for inspection.

All demand meters shall have a provision for a manual demand reset mechanism external to the meter cover. Reset mechanism shall be securely attached to the meter glass or cover and shall give a clear view of reset mechanism and reset operation.

3.07 Potential Indicating Lamps

All poly-phase transformer-rated meters shall have an indicating lamp, LED, or LCD display for each potential element.

**4.00 REGISTERS**

4.01 KWH Registers

KWH registers shall be generated in digital form by a solid-state electronic register.

4.02 KWH Demand Registers & Meters

The demand shall be generated in digital form by a solid-state electronic demand register. The demand meter shall be completely solid state with analog to digital converters with a sampling rate and method that will provide the following:

CT Rated Meters:

Greater than  $\pm 0.1\%$  accuracy for currents from 0.01 Amp to 20 Amp at 0.5 lead to 0.5 lagging power factor.

Self Contained Meters:

Greater than  $\pm 0.1\%$  accuracy at test amperes from 1 Amp to 200 Amp at 0.5 lead to 0.5 lagging power factor.

The electronic register shall have the capability, via an internal computer, to compute a 5, 15, 30 or hourly block demand as well as a rolling demand every sequential five-minute period of time. The highest demand computed shall be stored and displayed as the maximum demand. The cumulative demand shall be computed after each billing, reset and stored for display. The maximum and cumulative demands shall be displayed automatically or on demand of operator.



**SPRINGFIELD UTILITY BOARD**  
ENGINEERING & CONSTRUCTION STANDARDS  
**TRANSFORMER RATED AND  
SELF-CONTAINED POLY-PHASE  
KILOWATT-HOUR DEMAND METERS  
WITH ELECTRONIC DEMAND REGISTERS**

DATE | DWN | CHK | APP  
02/19/08 | NPA | NPA |

STANDARD NUMBER  
**MSD 5001**

SHEET 2 OF 5

4.03 Memory

The electronic unit shall be designed with non-volatile memory such that data accumulated will not be lost due to a power outage. Battery carry over shall not be used to retain stored data during a power outage.

4.04 Display

Electronic register displays shall be liquid crystal design. They shall have a segment check display and shall automatically or manually scroll all data available for display. Electronic display kilowatt demand with one or two digits to the left of the decimal point and three digits to the right visually displaying the following data:

4.05 Kilowatt Display

All functions listed below shall be programmable for normal or alternate display modes.

- 1) Kilowatt-hours
- 2) Highest recorded demand
- 3) Cumulative demand
- 4) Number of demand resets
- 5) Number of power interruptions
- 6) Selectable demand threshold set point for customer alert (a contact switch is not required, but shall be available at a nominal additional cost to SUB).
- 7) Register program constants  $K_h$ ,  $M_p$ , and demand threshold alert values
- 8) End-of-interval indication (a contact switch is not required, but shall be available at a nominal additional cost to SUB).

4.06 Kilovar Display

If a VAR Demand is required the meter shall also be programmable to display the functions listed in 4.05 in addition to the following functions:

- 1) KILOVAR-hour
- 2) Highest recorded VAR Demand
- 3) Cumulative VAR Demand

4.07 Output Contacts

Electronic registers shall be capable of being retro-fit with three-wire, form-C output contacts. In addition, meters with a VAR option shall be capable of being retrofit with two (2) three-wire form C output contacts.



**SPRINGFIELD UTILITY BOARD**  
ENGINEERING & CONSTRUCTION STANDARDS  
**TRANSFORMER RATED AND  
SELF-CONTAINED POLY-PHASE  
KILOWATT-HOUR DEMAND METERS  
WITH ELECTRONIC DEMAND REGISTERS**

DATE	DWN	CHK	APP
02/19/08	NPA	NPA	

STANDARD NUMBER  
**MSD 5001**

SHEET 3 OF 5

4.08 Programmable

All demand meters and registers shall be programmable via an IBM compatible computer running the proper software and with the proper cabling. Registers will allow for the following functions to be programmed.

- Type of demand
- Length of demand interval(s)
- Number of demand resets
- Meter constants (Kh, Mp, P/DR)

If a new or different cable is required for meter programming, it shall be provided with meter(s) or listed as separate item on meter bid.

4.09 Software

Software required for meter programming shall be stated on the bid. Supplied information shall include software name and version number.

When the software is new to SUB or if there is a significant update in the software package, a representative of the software distributor shall come and train necessary SUB personnel on the software operation at, or prior to, delivery of the corresponding meters.

Software shall be provided at no cost with meter(s) or listed as a separate item on meter bid if software must be purchased.

Software shall be shipped on a Compact Disk (CD) or be available from the internet for download.

It shall be completely compatible with Microsoft Windows XP and newer.

**5.00 PERFORMANCE CRITERIA**

5.01 Current

Meters shall be able to continuously measure loads up to their designated class rating in amperes with  $\pm 0.1\%$  accuracy.

5.02 Voltage

Meters shall accurately measure loads with applied voltages between 80% and 120% of the designated voltage rating with  $\pm 0.1\%$  accuracy.

5.03 Insulation

Meter elements shall be able to withstand the application of a sinusoidal voltage of 2,500 volts RMS, 60Hz for one minute and 10,000 amperes momentary through-current without damage.



**SPRINGFIELD UTILITY BOARD**  
ENGINEERING & CONSTRUCTION STANDARDS  
**TRANSFORMER RATED AND  
SELF-CONTAINED POLY-PHASE  
KILOWATT-HOUR DEMAND METERS  
WITH ELECTRONIC DEMAND REGISTERS**

DATE | DWN | CHK | APP  
02/19/08 | NPA | NPA |

STANDARD NUMBER  
**MSD 5001**

SHEET 4 OF 5

## 6.00 SPECIAL REQUIREMENTS

### 6.01 Company Serial Number

The Vendor shall supply a copy of the manufacturer's nameplate with the price proposal for SUB's approval.

Provisions for mounting ½" x 2 ½" metal meter numbers to nameplate shall be provided.

### 6.02 Meter Documentation

The manufacturer shall furnish, with shipment, a complete listing of the nameplate data as specified in Section 3.04 with each meter form shipped. The manufacturer shall supply a list of manufacturer serial numbers.

### 6.03 Testing

All meters shall be performance tested to comply with Section 5.00. After test, meter reading shall be returned to zero. Test data shall be electronically sent to the Meter Engineer: Nicholas Amann (NickA@subutil.com).

## 7.00 WARRANTY

The vendor warrants the equipment furnished is free from defects in material and workmanship and agrees to repair or replace any unit not suitable for operation or which fails during normal and proper use. The warranty shall be for a period of twelve (12) months from date of acceptance.

## 8.00 ADDITIONAL INFORMATION

Springfield Utility Board requests for quotations and purchase orders must show the following information to be complete:

- 1) Required delivery date
- 2) Reference to this standard by drawing number and date
- 3) Statement of non-conformance or deviation from this standard
- 4) On quotation of less than 96 meters, optional price for stamping/etching SUB serial number on nameplate.



**SPRINGFIELD UTILITY BOARD**  
ENGINEERING & CONSTRUCTION STANDARDS  
**TRANSFORMER RATED AND  
SELF-CONTAINED POLY-PHASE  
KILOWATT-HOUR DEMAND METERS  
WITH ELECTRONIC DEMAND REGISTERS**

DATE | DWN | CHK | APP  
02/19/08 | NPA | NPA |

STANDARD NUMBER  
**MSD 5001**

SHEET 5 OF 5