



Vision Meter

Operating Manual

Singlephase & Network

Revision 1.0
Revision Date: 7/22/2011

Contents

Contents.....	3
Product Description	4
Meter Characteristics.....	4
Nameplate Information	4
LCD Display.....	5
Available Configurations	6
Operating Parameters.....	6
Standard Operation	6
Energy Registration.....	7
Instantaneous Demand.....	7
Calibration/Accuracy testing.....	7
Meter Installation	8
Common Site Configurations	9
Meter Self-diagnostics	14
Troubleshooting.....	14
Warranty Returns.....	15
FCC Notice	15

Product Description

Vision Metering's Vision meter family is a solid state watt-hour meter line designed to provide flexible and reliable metering solutions for all residential and commercial applications. The Vision singlephase meter family offers metering solutions for all singlephase metering configurations encountered in normal utility environments.

Meter Characteristics

The Vision meter is comprised of a base assembly, bezel and cover. The base assembly contains the current transformer(s) which are used for current sensing along with the current carrying bus bars and voltage connections. The meter bezel houses the circuit board containing the metering chipset, RF communications and LCD display. The standard meter cover is a UV stabilized polycarbonate cover with opticom connection. Glass covers are also available upon request.

The Vision meter is designed to operate continuously in a temperature range of -40C to +85C with a relative humidity of 5% to 95% (non-condensing). The Vision meter is rated as an ANSI C12.20 accuracy class 0.5 meter. Typical accuracy results will fall within +/- 0.2% for singlephase Vision meters.

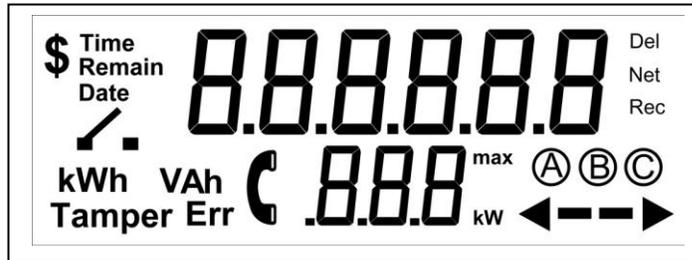
Nameplate Information

The Vision Meter nameplate can be customized to each utility's labeling specifications. Some information is standard on all meter nameplate templates. Typical meter nameplate information includes:

1. Utility name area
2. Utility company number barcode
3. Voltage-Rated operating voltage
4. Meter Class-Full load current rating
5. Form-Meter service form
6. K_h -Watthours per disk revolution (not used in Vision meter disk emulator)
7. K_t -Watthours per test pulse
8. TA-Full load test amps
9. Vision Metering serial number
10. Type-Meter type
11. Date of manufacture

LCD Display

The Vision meter LCD display consists of a 6 digit alphanumeric display along with numerous fixed data displays for indication of the many energy values and conditions the Vision meter may encounter. A fully illuminated LCD segment check is pictured below (descriptions begin top center and continue clockwise):



1. Energy register-configurable to display 4 or 5 digits for kWh and 3-6 digits for demand registers
2. DEL/REC/NET Indicators:
 - a. DEL-Indicates energy consumed in forward direction
 - b. REC-Indicates energy consumed in reverse direction
 - c. NET-Delivered minus received energy
3. Phase Indicators-Indicates voltage present on A, B or C phase
4. Energy direction indicator-Indicates direction of energy flow
5. Max Indicator-Illuminates "max" indicator when displaying demand values (kW, kVA or kVAR)
6. Instantaneous demand-Displays instantaneous KW demand
7. Telephone Handset-indicates RF transmission in progress
8. Err-Error display illuminates when meter detects error in operation
9. VAh-Illuminates when kVAh is being displayed in main energy register
10. Tamper-illuminates when reverse current flow is detected without meter being configured to allow current flow In both directions
11. kWh-Illuminates to indicate main register is displaying kWh value
12. Open switch icon-Indicates service disconnect is open if equipped, also indicates phase error if incorrect phase connections detected
13. Time-indicates time displayed on main register
14. Remaining-Not used currently
15. Date-Indicates date is displayed on main register display
16. \$-Not used currently, prepay functionality in future models

Available Configurations

The Vision singlephase/network meter is available in all standard utility configurations.

Available forms include:

Type	Form	Voltage	Class	K _h	TA
V1S	1S	120V	100	1.0	15
V2S	2S	240V	200	1.0	30
V2S	2S	240V	320	1.0	50
V2SD	2S	120-480V	200	10.0	30
V3S	3S	240V	20	1.0	2.5
V3SD	3S	120-480V	20	1.0	2.5
V4S	4S	240V	20	1.0	2.5
V4SD	4S	120-480V	20	1.0	2.5
V12S	12S	120V	200	1.0	30
V12S	12S	120V	320	1.0	50
V12SD	12S	120-480V	200	10.0	30

Operating Parameters

The Vision meter is fully compliant with ANSI C12.1, C12.10 and C12.20. Operating parameters for the Vision meter are as follows:

1. Temperature-Operates in temperatures between -40C to +85C within the accuracy limits of ANSI C12.1 and C12.20. The LCD display will not function below -25C but meter operation is unaffected and LCD operation resumes once temperature goes above -25C.
2. Humidity-Operates normally within a humidity range of 5 to 95% (non-condensing)
3. Voltage- Operating voltage for the Vision meter is nameplate voltage +/- 20%. For example, a 240V meter will operate normally from 192V to 288V.
4. Frequency-Vision meters operate normally at a rated frequency of 60Hz +/-5%
5. Maximum current-Maximum allowable current is annotated by the Class rating on the meter nameplate.

Standard Operation

The Vision meter ships pre-programmed from the factory ready for installation. Meter settings and configuration can be modified after shipment using the Vision 20/20 software program. No initial programming is required to begin using the meter under normal circumstances.

When power is applied to the Vision meter, the startup sequence will commence. The LCD will indicate the firmware version of the meter for approximately 3 seconds. This firmware version should be noted when modifying settings using our Vision 20/20 software because previous

software versions may not be compatible with later firmware configurations. In order to ensure full functionality, please match software and firmware version when modifying meter configuration.

Energy Registration

The Vision meter can be configured to display kWh consumption in a number of different manners. The options for kWh accumulation are:

1. kWh Delivered (Unidirectional) - Energy is only accumulated in the forward direction only. If current flow is reversed through the meter, the kWh value still increments in the forward direction. This is the default setting and most secure configuration.
2. kWh Delivered – Energy is only accumulated in the forward direction. Reverse current flow is not included in the display. This option is enabled by selecting “Reverse Allowed” in the Vision 20/20 software and only displaying kWh delivered.
3. kWh Received-Reverse current is accumulated and displayed as a separate register.
4. kWh Net-Meter displays kWh Delivered minus kWh Received

Instantaneous Demand

The Vision meter can be configured to display Instantaneous Demand in the center of the bottom row of the LCD display. This is a real time kW indication that is updated once per second. This display auto ranges from 0 to 3 decimals depending on the magnitude of the instantaneous demand value.

Calibration/Accuracy testing

Vision meters are calibrated to +/-0.2% prior to shipment therefore no user calibration is required. Accuracy testing can be accomplished using standard watthour test equipment which utilizes LED pickups.

Watthours per pulse output from the LED is shown on the meter nameplate as K_T . Meters may have both a K_T and a K_h value in some cases. When only one value is present, K_T and K_h are equivalent. Full load accuracy testing is performed at the nameplate test amps (TA). Light load testing is performed at 1/10 the full load value.

Once the test board is set up using the nameplate parameters, the meter can be tested by following the manufacturer’s recommended test procedure. The Vision meter should never require calibration after initial factory calibration.

Meter Installation

Meter installation should only be performed by a trained meter technician. The wiring diagrams contained within this manual are not intended to replace utility guidelines or installation guides. These diagrams are provided to assist in determining the proper service type only.

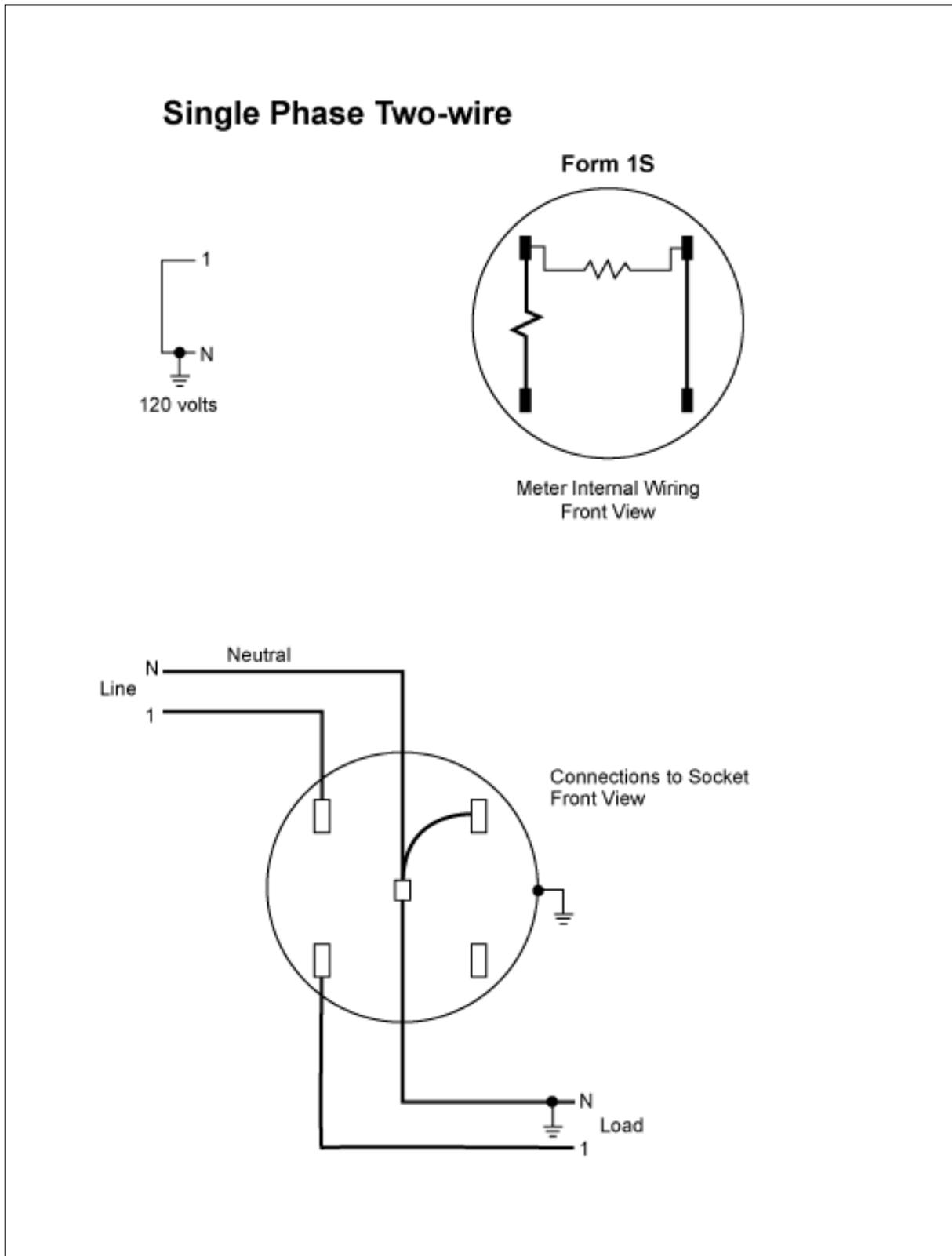
The Vision meter is designed to be inserted into a standard ANSI style meter socket. Forms 1S, 2S and 12S meters are self-contained meters which are rated to pass full load current through the meter. Forms 3S and 4S meters are transformer rated devices which are only rated to pass current flow from the secondary of a current transformer through the meter.

When inserting a meter into an ANSI socket care should be taken to examine the socket jaws to ensure that proper tension is present in the meter jaws to avoid high resistance connections when the meter is inserted. High resistance connections in the meter jaws can lead to increased temperatures within the socket and may lead to shortened meter life expectancy.

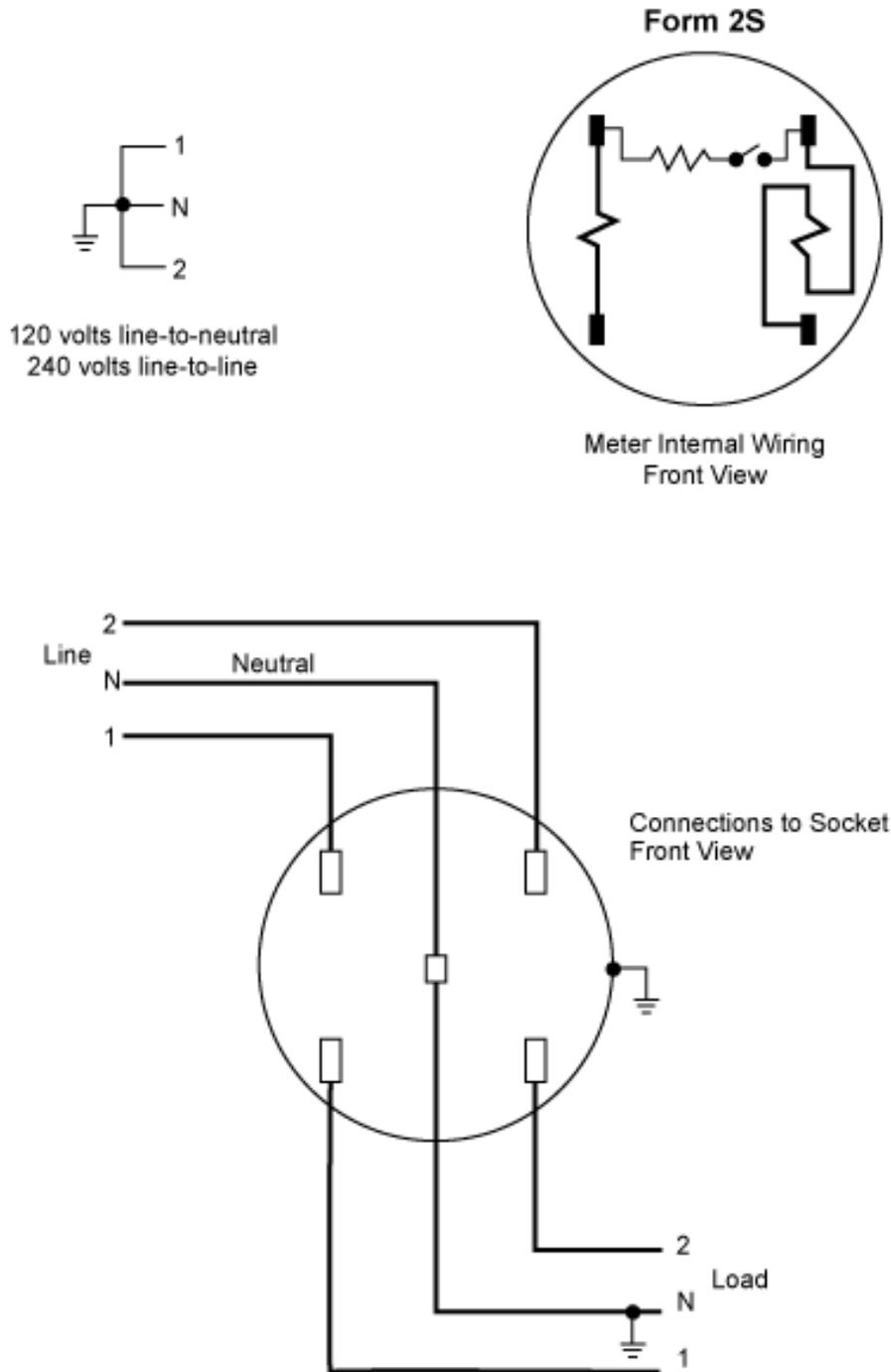
Once the meter is inserted into the meter socket and power is applied the following sequence occurs:

1. Meter firmware version is displayed for approximately 3 seconds
2. LCD segment check is displayed for 8 seconds
3. Normal scrolling of programmed display parameters commences

Common Site Configurations

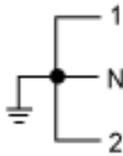


Single Phase Three-wire

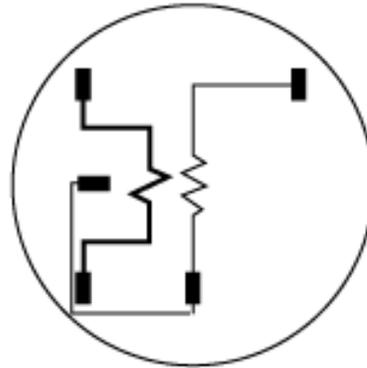


Single Phase Three-wire with CT

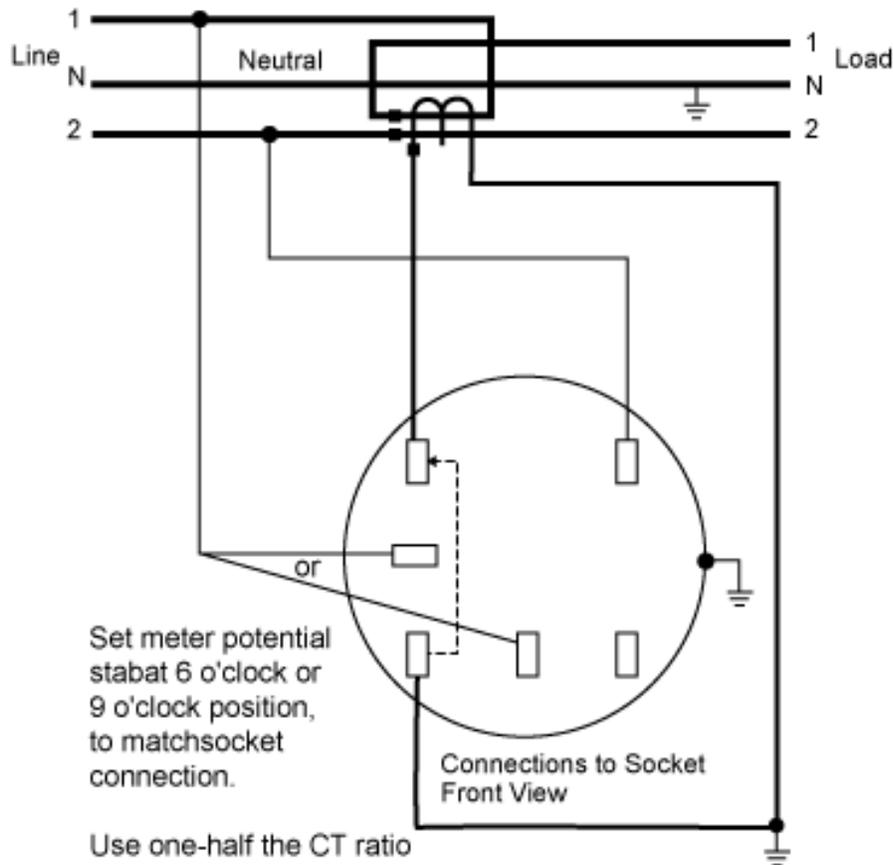
Form 3S



120 volts line-to-neutral
240 volts line-to-line



Meter Internal Wiring
Front View

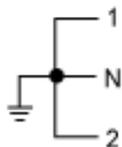


Set meter potential
stabat 6 o'clock or
9 o'clock position,
to match socket
connection.

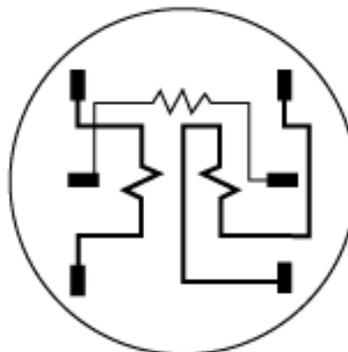
Use one-half the CT ratio
as the transformer factor
in determining the meter
multiplier.

Single Phase Three-wire with Two CTs

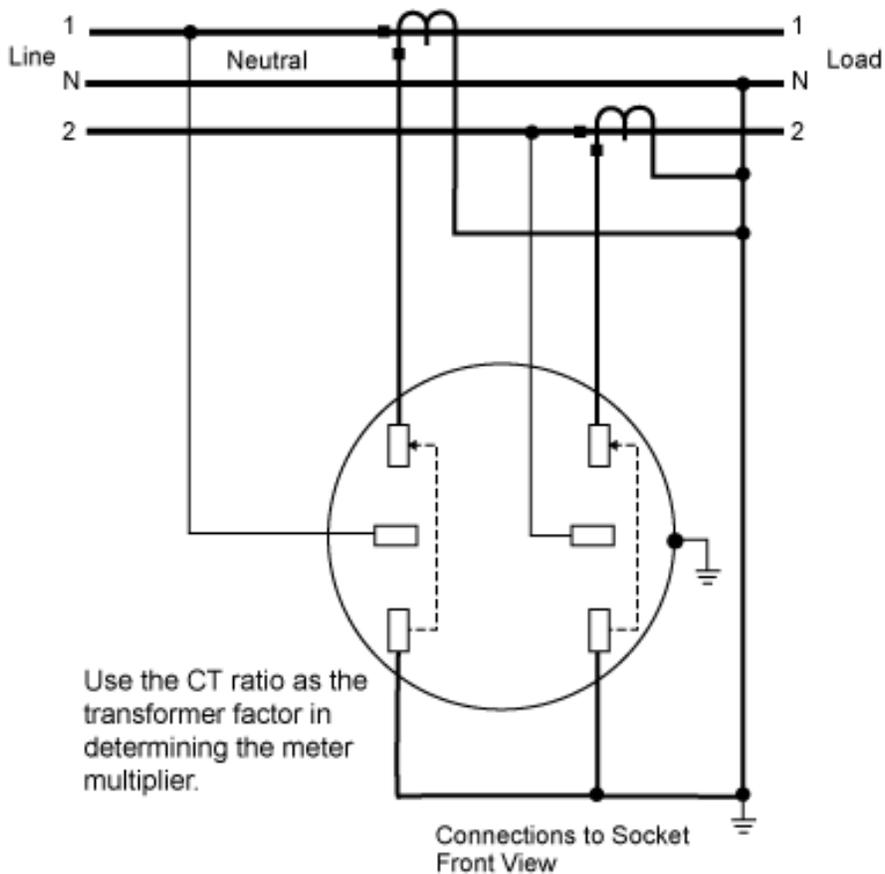
Form 4S



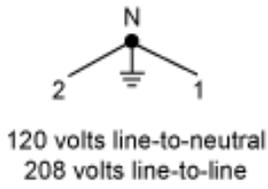
120 volts line-to-neutral
 240 volts line-to-line



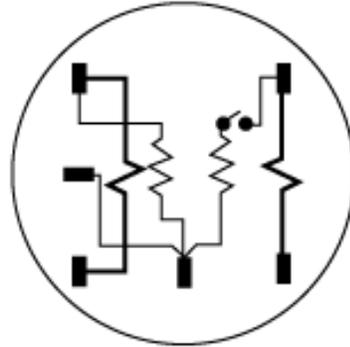
Meter Internal Wiring
 Front View



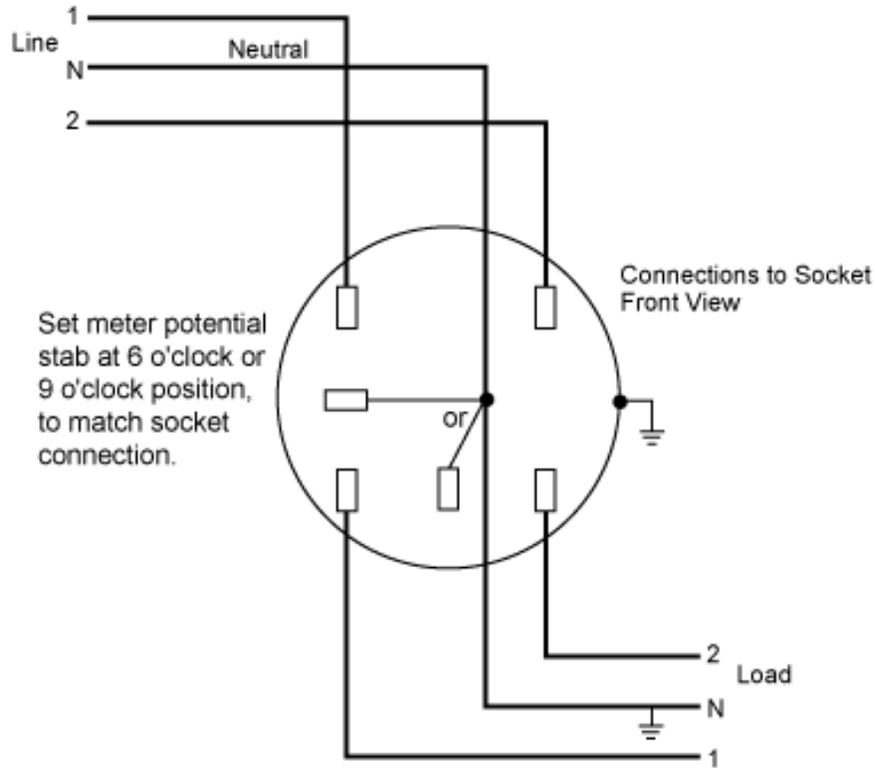
Three-wire Network



Form 12S



Meter Internal Wiring
Front View



Meter Self-diagnostics

The Vision Meter runs self diagnostics upon startup and every 3 minutes during normal operation. There are two error indications that are displayed on the LCD display.

1. Wiring fault - The service disconnect indicator will flash every one second if a wiring fault is detected based on expected voltage and current configuration by meter form.
2. EEPROM Error – The “Err” indicator will illuminate on the bottom left corner of the LCD display if the Vision meter detects a problem writing data to the EEPROM during normal operation.

Troubleshooting

Condition	Possible Cause	Solution
No Display	<ol style="list-style-type: none"> 1. Meter not energized 2. Potential link open (if equipped) 3. Defective meter 	<ol style="list-style-type: none"> 1. Verify socket wired properly and energized 2. Close potential link to complete internal circuit 3. Replace meter
Meter runs fast/slow	<ol style="list-style-type: none"> 1. Wiring error in meter socket 2. Calibration error 3. Defective meter 	<ol style="list-style-type: none"> 1. Verify proper wiring in socket 2. Test meter accuracy, re-calibrate if necessary. 3. Replace meter
Meter Overheats	<ol style="list-style-type: none"> 1. Loose connection in meter socket 2. Improper jaw tension 3. Improperly rated socket 4. Internal high resistance connection 	<ol style="list-style-type: none"> 1. Verify proper connections within meter socket. 2. Replace meter socket 3. Replace meter socket 4. Verify voltage and current connections inside meter 5. Replace meter

Condition	Possible Cause	Solution
No Radio Transmission	<ol style="list-style-type: none"> 1. Meter not equipped with Airpoint or Data on Demand radio 2. Meter not programmed correctly 3. Signal strength low 4. Transmission interval too long 5. Defective meter 	<ol style="list-style-type: none"> 1. Verify meter equipped with Airpoint or Data on Demand radio 2. Verify meter is programmed for SCM or Data on Demand transmission 3. Verify radio signal strength programmed to 15 or higher 4. Verify proper transmission interval programming, normally 30 seconds or less 5. Replace meter

Warranty Returns

Vision meters that are suspected to be defective during their warranty period should be returned to Vision Metering for repair or replacement. Please contact the factory directly to receive a Return Merchandise Authorization number prior to returning any meters. Meter serial numbers, quantity and suspected problem should be provided with RMA request.

FCC Notice

Vision meters that are equipped with Airpoint or Data on Demand radio modules emit radio frequency energy. The Vision meter has been tested and independently verified to comply with limits listed in CFR 47, Part 15-Radio Frequency Devices, Subparts A-General and B-Unintended Radiators issued by the FCC for class 'B' digital devices.

This equipment complies with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.