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Manual

3-Phase kWh

3-Phase Demand

Single-Phase kWh



Power Line Communications Metering Systems

RSM-5c RSM-5 Installation Manual



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Thank you for purchasing a power meter manufactured by Quadlogic Controls Corporation. Quadlogic has been designing, manufacturing, and selling digital electric metering systems for over 25 years. We appreciate your business.

CONTACT INFORMATION

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WARNING

This manual is for persons who have received training and are qualified to work with electricity and electrical metering equipment. All applicable national and local electrical codes and standards must be followed. Failure to follow proper procedures may result in damage to the equipment and/or serious bodily harm including death.

DISCLAIMER

The information in this manual has been compiled with care, however, Quadlogic Controls Corporation makes no warranty as to the accuracy or completeness of this material. Furthermore, the product(s) described herein may be changed or enhanced from time to time. This information does not constitute commitments or representations by Quadlogic Controls Corporation, and is subject to change without notice.

SYMBOLS

	WARNING
 NOTE	NOTE
	CAUTION

THE RSM-5c AND RSM-5

The RSM-5c and RSM-5 products are single-tenant digital electric meters used for commercial, residential or industrial applications. The meters record interval data from hourly down to 15 minutes which allows flexible load profiling and Time-of-Use (TOU) billing options. They also measure four-quadrant energy, power-down events, frequency, etc. enabling the user to analyze power quality.

Using a Pulse Datalogger the RSM-5c and RSM-5 are capable of collecting pulse data from any device capable of dry contact outputs, such as water, gas, or BTU meters. The Pulse Datalogger can count pulses for up to 4 discrete meters, even during power loss events.

POWER LINE COMMUNICATIONS (PLC)

Power Line Communications, or PLC, is a method of transferring meter data via the existing electric power wires that serve each tenant in a building. Quadlogic employs a patented method of PLC to move large amounts of metered data for residential and commercial and industrial (C&I) customers to a central collection point. All Quadlogic meters can communicate over power lines. For more information about Quadlogic's PLC please visit our website at www.quadlogic.com.

INSTALLATION CAUTIONS AND WARNINGS

- Do not install if the device is damaged. Inspect the meter box for obvious defects such as dents or cracks in the housing.
- If the device is installed or used in a manner not specified by the accompanying documents, the safety of the device may be impaired.
- If the device functions abnormally, proceed with caution. The safety of the device may be impaired.
- Do not install the meter in the presence of explosive or combustible gas or gas vapor.
- Do not install the meter on an electrical service with current or voltage outside of the specified limits of the device.
- Do not operate the meter with the cover removed.
- To avoid electric shock, disconnect mains before replacing fuses.
- Beware of working around the meter when the voltage is live. There is a risk of electric shock.
- For protection against fire, replace only with fuses of the specified voltage and current rating.
- Installation should be done by persons who have received training and are qualified to work with electricity and electrical metering equipment. All applicable national and local electrical codes and standards must be followed. Failure to follow proper procedures may result in damage to the equipment and/or serious bodily harm including death.
- See instructions for connection diagrams.

**Protective Conductor Terminal**

Securely fasten one end of the grounding wire (#12 AWG recommended) so that the grounding screw cuts the paint on the back box. Securely fasten other end of the wire to true ground connection. When grounding to the electrical conduit, use continuous metallic pipes, bending when necessary instead of using couplers.

Step 1: Mount the box

The RSM-5c or RSM-5 back box is the enclosure for the meter head. The back box is supplied with the RSM-5c or RSM-5 fuse block installed in the box.

1. Choose a section of wall to mount the meter. This should be as close as possible to the distribution panel (preferably within 24"). The RSM-5c and RSM-5 meters mount in a single metal box that must be attached to the wall and connected by conduit.



NOTE

It is recommended that the RSM-5c and RSM-5 meters be mounted on a concrete wall with the appropriate screws long enough to hold the box in place. If the only choice is to mount the meter on a drywall or plaster wall, make sure that the boxes are properly screwed on the studs of the wall.

2. Mount the RSM-5c or RSM-5 back box to the wall, with mounting screws. Connect the distribution panel box to the RSM-5c or RSM-5 back box with a metal conduit. This conduit will be used for the voltage taps and current transformer (CT) secondary wiring. There will be between 2 and 4 #12AWG wires in this conduit, connected to the hot line(s) and neutral (if present). There will also be between 2 and 6 #16 AWG stranded wires connected to the CT secondary wiring. The conduit should be sized to accommodate this.
3. The RSM-5c or RSM-5 metal boxes must be grounded. Either a ground wire may be run and attached to one of the box mounting screws, or the boxes may be grounded by the conduit.
4. Securely fasten one end of the grounding wire so that the screw cuts the paint on the back box. Securely fasten the other end of the wire to true earth ground connection. When grounding to the electrical conduit, use continuous pipes, bending when necessary instead of using couplers.

Step 2: Connect voltage taps



Power must be off when connecting these wires!

1. Locate the incoming feeder phase (hot) wires in the distribution panel. Tape the incoming feeder wires with colored electrical tape according to phase, for identification purposes.
2. Tap the feeder wires with #12 AWG stranded wires. The color of the insulation on these wires must match the color of the tape on the feeder wire to which they are connected. If neutral is required, tap the neutral connection with a #12 AWG stranded wire with white insulation. These voltage connections can be made in any way that meets local codes and requirements.



NOTE

A service disconnect switch for the hot wires is required. It is

recommended that the disconnect switch should be placed as near as possible to the meter. If fused, no less than a 15-A fast-acting fuse must be used.

3. Run the #12 AWG feeder phase tap wires through the conduit to the back box.

Step 3: Install and connect Current Transformers (CTs)



Power must be off when connecting these wires!



Un-terminated CT secondary wires will produce hazardous electrical potentials if any current is flowing through the CT. While connecting the CTs, POWER MUST BE OFF until the CTs have all been connected to the fuse block.

1. Each CT is supplied with two secondary wires. One wire is colored black, red, or blue, and the other wire is white. Connect these 2 wires to the screw terminals on the fuse block.
2. If the wires that are supplied with the CTs are too short to reach the fuse block screw terminals, they must be extended. Extend the CT wires with #16 AWG stranded wire. This should be black, red, or blue wire to match the existing CT wire. Extend the white wire of each CT with a white wire. It is very important to maintain the association of a particular CT's secondary wires. One must keep track of which white wire goes with each individual colored wire. It may be helpful to tape them together before pulling them through the conduit.



NOTE

Wire color coding may vary depending on local codes and regulatory standards within certain jurisdictions.

3. Locate the branch circuit that supplies current from the distribution panel to the metered load. Disconnect these wires one (or two) at a time and properly run each wire (or pair of wires) through a CT as shown in Figure 2-1. The colors of the CT leads must correspond to the color of the tape on the phase feeder wires that supply this load.

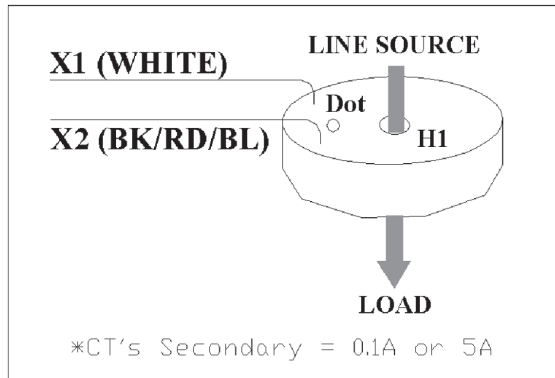


Figure 2-1. Correct CT orientation: H1, dot, or white side facing the line source.

4. Run the CT secondary wires through the conduit to the fuse block. The secondary wires of the CT may be extended different lengths depending upon the gauge of the wire as shown in Table 2-1. For wire runs over 50' use a shielded, twisted pair. Connect each CT to its proper pair of screw terminals: X1->I and X2->N.



It is very important that the 2 wires from a particular CT go to the corresponding pair of screw terminals on the fuse block. For example, if the black wire (X2) from a CT goes to terminal "NA", then the white wire (X1) from that same CT must go to terminal "IA". The actual arrangement of the CT connections depends on the installation configuration. Diagrams of specific installations are located on the following pages.

Wire Size (AWG)	Length (feet)	
	0.1A CT	5A CT
#24	35	3
#22	55	5
#20	88	8
#18	140	13
#16	223	21
#14	355	34
#12	562	53
#10	893	85

Table 2-1: CT wire extension lengths

5. Repeat items 3 and 4 (above) for each CT until all CTs have been installed and connected to the MCI screw terminals.

The following diagrams show the necessary fuse block connections for RSM-5 and RSM-5c meters. Figures 3-1, 3-2, and 3-3 show RSM-5c 3-phase 4-wire wye, 3-phase 3-wire delta, and 1-phase 3-wire (120/208V, 120/240V, or 277/480V network configuration) respectively.

Figures 3-4 and 3-5 show RSM-5 CL10 3-phase 4-wire wye and 3-phase 3-wire delta both with High Current Adapters (HCA), respectively. Figure 3-6 shows the RSM-5 CL10 3-Phase 4-wire wye configuration when using six current transformers. This allows you to measure two separate electric loads, providing one set of meter readings. Current transformers must be placed around the metered wires according to the instructions above to produce accurate readings.



For specific product offerings please refer to Chapter 9: Ordering Information.

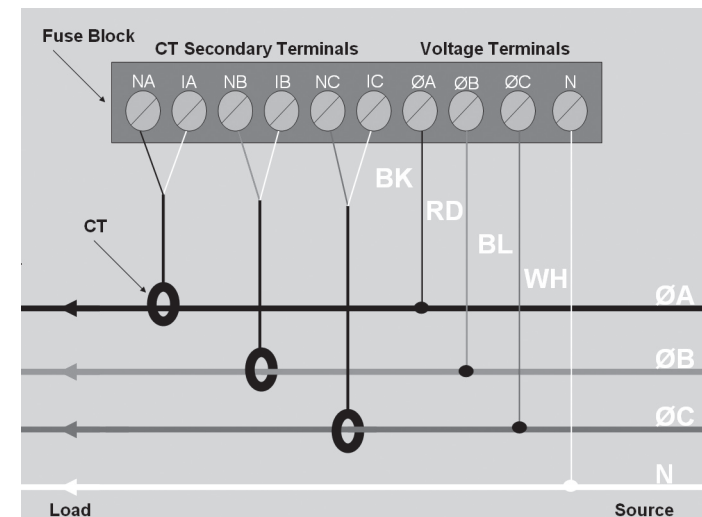


Figure 3-1. 3-Phase 4-Wire Wye Fuse Block Connections.

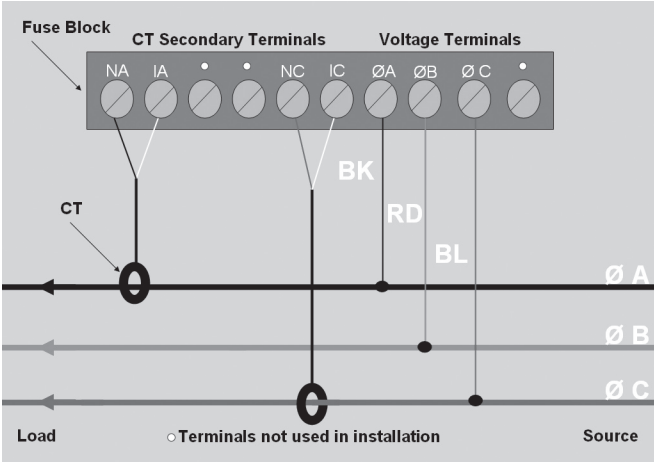


Figure 3-2. 3-Phase 3-Wire Delta Fuse Block Connections.

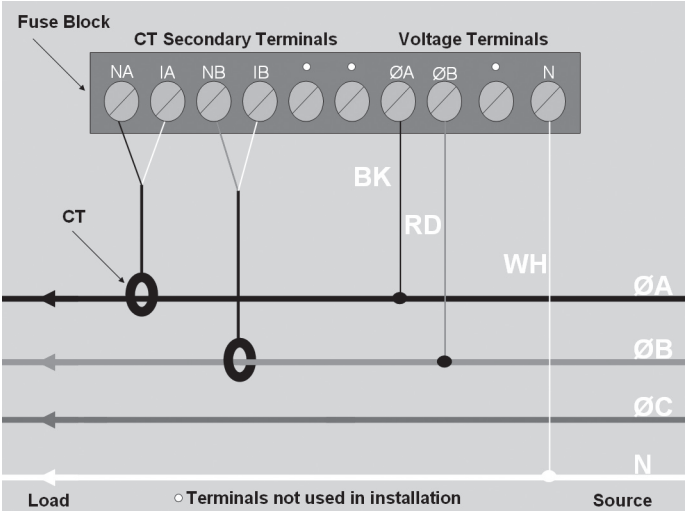


Figure 3-3. 1-Phase 3-Wire 120/240V, 120/208V, or 277/480V Network Fuse Block Connections.

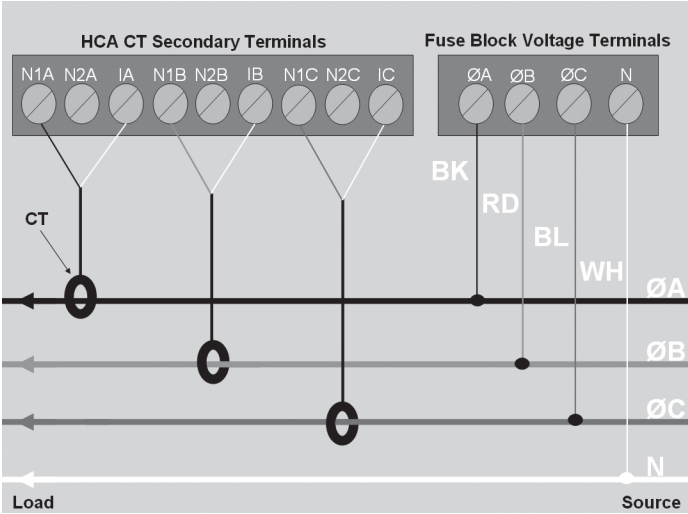


Figure 3-4. RSM-5 3-Phase 4-Wire Wye with High Current Adapter (HCA) (1600-3200 Amps). For use with 5 Amp secondary CTs.

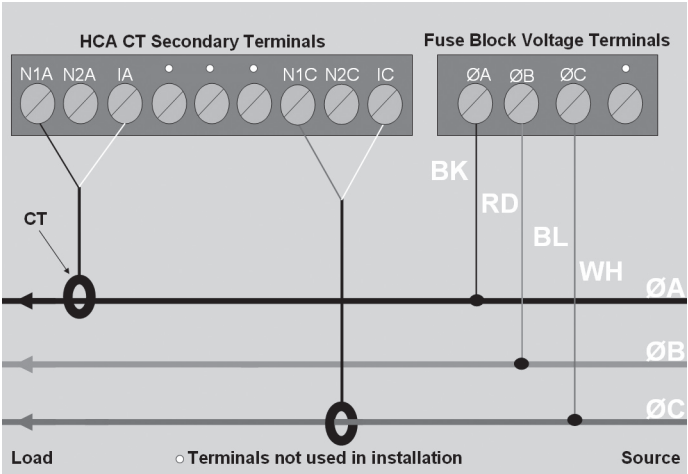


Figure 3-5. RSM-5 3-Phase 3-Wire Delta with High Current Adapter (HCA). For use with 5 Amp secondary CTs.

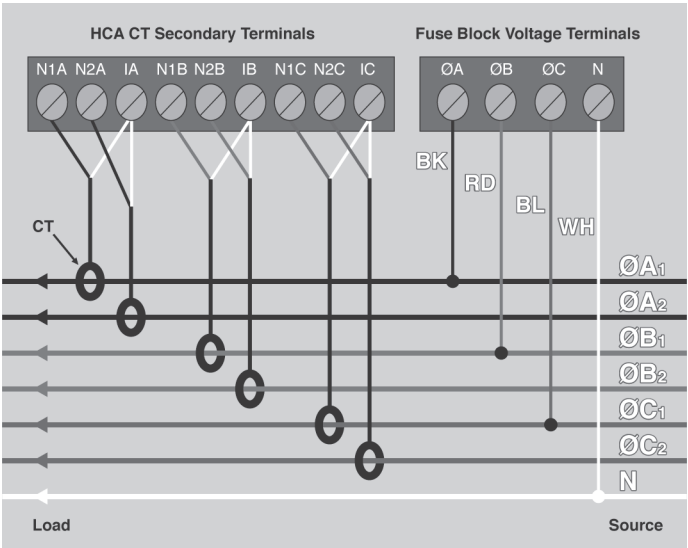


Figure 3-6. RSM-5 3-Phase 4-Wire Wye with High Current Adapter (HCA).
All CTs must be the same primary amperage and secondary amperage must be 5 Amp.

The RSM-5c and RSM-5 user interface (LCD window) is located on the front panel of the meter. It is easy to navigate the various sub-menus to read metering data, reset values and view configuration data. See Figure 4-1.

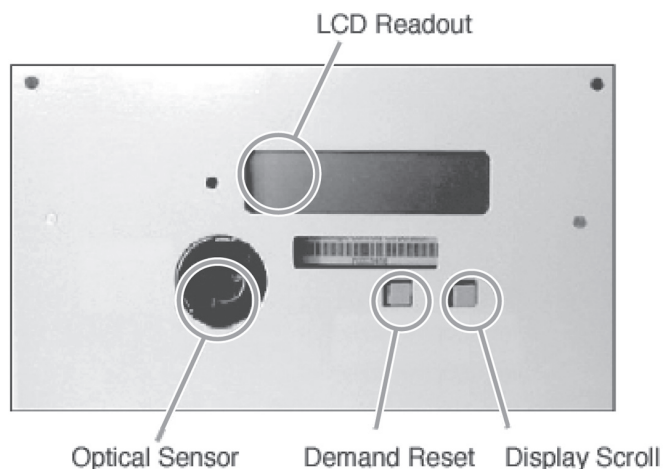


Figure 4-1. RSM-5c and RSM-5 Front Panel Display.

! When reading the meter display, all consumption and demand values must be multiplied by the correct multiplier to calculate actual value. Please refer to the **Reading the Display** section for more details.

Press and hold the "Display Scroll" button, which is the small square button on the right side when one is facing the meter. After two seconds, the LCD will display, REVERSE. If the user continues to hold down the Display Scroll button, after another two seconds the LCD will display FORWARD. These are simply directional indicators that one can use to navigate through the different sub-menu registers as shown in figure 4-3. Each main menu heading will be displayed in two-second intervals. Note that the RSM-5c and RSM-5 default to the kWh register.

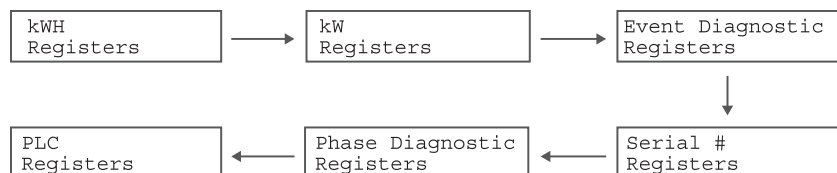


Figure 4-2. Meter LCD Main Menu headings.

Releasing the display scroll button at a given menu heading will allow the user to cycle through the registers listed under the selected menu heading as shown in Figure 4-4. For example, if the meter is in FORWARD mode and the Display Scroll button is released when the LCD reads "Serial # Registers", each subsequent depression of the Display Scroll button will show the following, in the order it appears below:

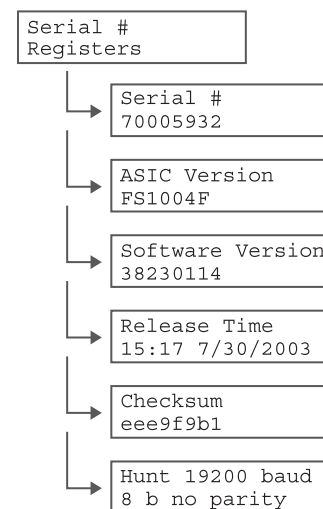


Figure 4-3. Serial Registers sub-menu.

To reverse scrolling direction at either the heading level or within a submenu, press and hold the display scroll button. When REVERSE is displayed after two seconds, release the display scroll button. The user can now go backwards through the menu selections by pressing and releasing the display scroll button. To go back to the forward scrolling option, follow the same procedure, except release the display scroll button when FORWARD is displayed.

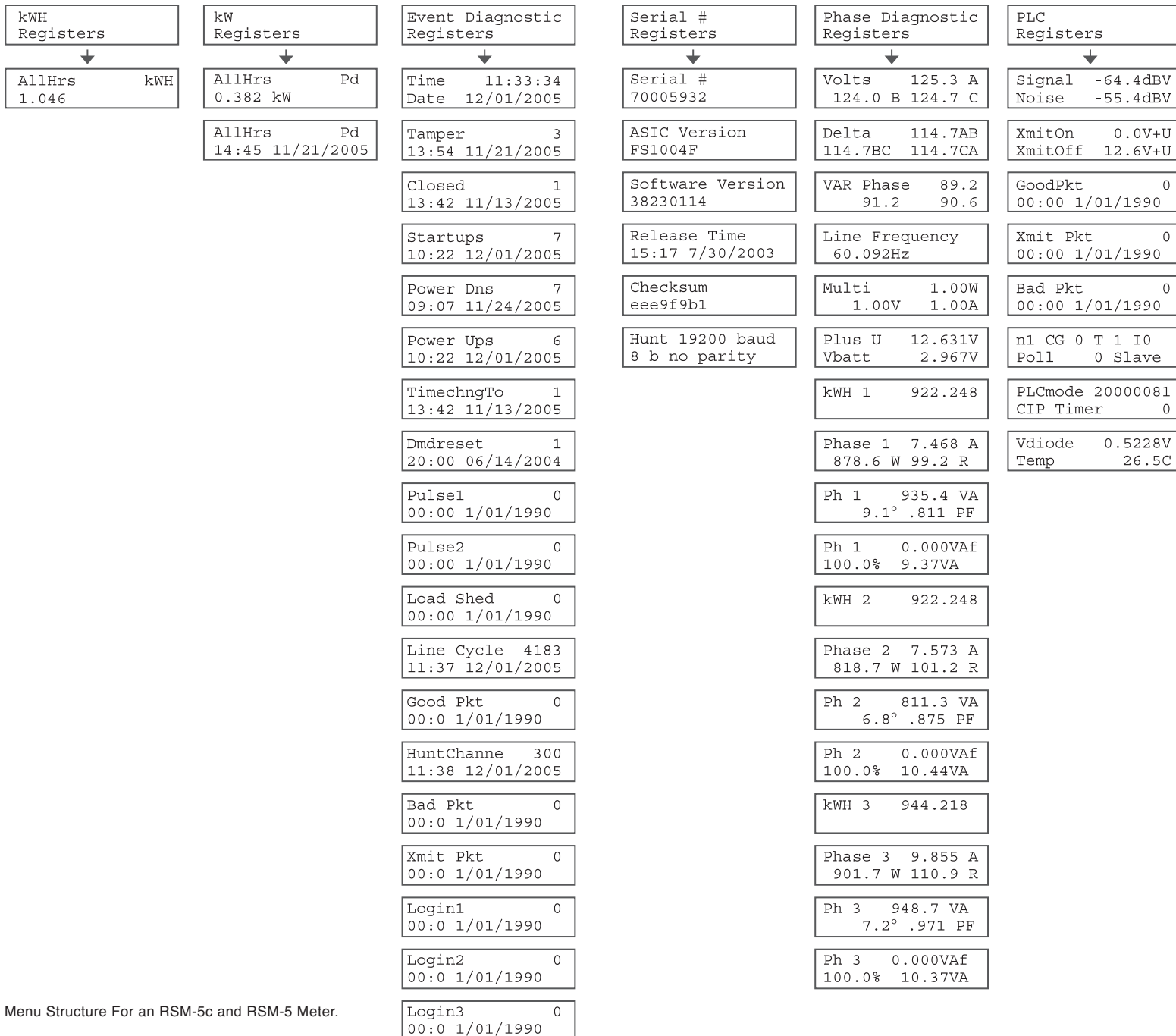


Figure 4-4. Display Menu Structure For an RSM-5c and RSM-5 Meter.

It is very important to verify that the CTs of the RSM-5c and RSM-5 are properly installed. Follow the steps below to verify the voltage, kWh reading, current, and power.

I. Verifying Voltage

- 1) Press and hold the Display Scroll button until the following menu heading is displayed:

Phase Diagnostic Registers

- 2) Release the Display Scroll button. Scroll down by pressing and releasing the Display Scroll button until the "Volts" screen is displayed (examples shown for 120V, 277V, and 347V):

Volts	125.3 A
124.0 B	124.7 C

Volts	276.3 A
277.0 B	277.7 C

Volts	348.5 A
347.1 B	347.7 C

- 3) Verify that phases A, B, and C are displaying voltages within normal range, which is -10% to +10% of the rated voltage.

II. Verifying kWh Reading

1. Press and hold the Display Scroll button until the following menu is displayed:

kWh Registers

2. Release the Display Scroll button. Scroll down by pressing and releasing the Display Scroll button until the following screen is displayed, indicating the All Hours kWh reading for the meter:

AllHrs	kWh
1.046	

3. Verify that the kWh value increases on the LCD (assumes active load).

III. Verifying Current and Power

1. Press and hold the Display Scroll button. Scroll down by pressing and releasing the Display Scroll button until the following menu heading is displayed:

Phase Diagnostic Registers

2. Release the Display Scroll button. Scroll down by pressing and releasing the Display Scroll button until the following screen is displayed:

Phase 1	7.468 A
878.6 W	99.2 R

The A(mperage) reading is the indication of current. The A(mperage) reading in the display above will always be a positive number, even if the CT was incorrectly installed. Check the reading, and using the correct multiplier, see if it indicates the approximate expected current. Remember that this applies to Phase 1 only. If all the numbers on the multiplier screen (under the Phase Diagnostics menu in the Display Menu Structure) were 1.00 and the current transformers are 100:0.1, the correct multiplier is 1 and the readings are the actual values seen on the LCD. If the CT's are 200:0.1, multiply the LCD reading by 2.

The W(att) reading is the indication of power. The W(att) reading counts forward when viewed on the LCD. A negative power reading is indicative of an incorrectly installed CT, or one that is cross-phased with the wrong voltage (phase) leg. The R(eactive) reading can be negative, depending on the nature of the load. Negative values indicate a capacitive load while positive values indicate an inductive load.

3. Scroll down by pressing and releasing the Display Scroll button until the following screen is displayed:

Ph 1	935.4 VA
9.1°	.811 PF

Under normal conditions the phase angle (x.x°) should be between -30° and +30° (refer to Figure 5-1) and the power factor should be a number between 0.80 and 1.0.

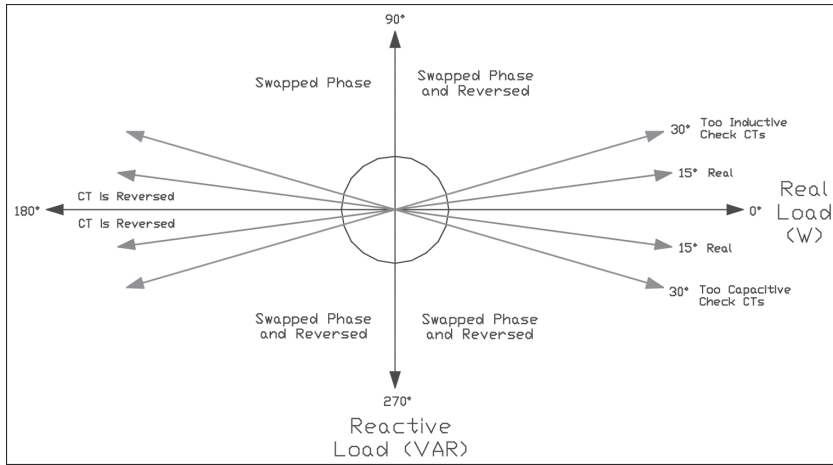


Figure 5-1. Four-Quadrant Energy Graph.



NOTE Power factor for inductive loads will typically be lower than that of resistive loads, typically between 0.60 and 0.80.

If the phase angle on the lower left is a number close to 180° it indicates the CT was installed backwards, or is 180° out-of-phase. If the angle is close to 120° , at least two CTs have been cross-phased, and a similar number will appear in the phase angle data in Phase 2.

4. To view screens for Phase 2 and 3, repeat steps 1 to 3 as above.



BE CERTAIN TO RECORD THE CURRENT PEAK DEMAND (WITH THE TIME AND DATE), BEFORE RESETTING THE DEMAND. Once the user resets the demand according to the instructions below, he/she cannot retrieve any prior demands locally. If one is unsure of using the above instructions, scroll through to the demand (kW) and record the demand value (kW).

Use the following procedure to reset the Demand registers to zero:

1. Press and hold the Demand Reset button shown in Figure 4-1.
2. The LCD will initially display the Quadlogic Copyright message.
3. The LCD will then display the Dmdreset event screen:

Dmdreset	1
20:00	06/14/2004

4. Keep the Demand Reset button depressed until the screen updates and displays the current date and time. This signifies that the demand has been reset.



When reading the meter display, all consumption and demand values must be multiplied by the correct multiplier to calculate actual value. This includes all register values (kWh, kW, kVARHLg, kVARHLd, etc.) and phase diagnostic values (real time Amps, Watts, etc.).

Volts, phase angle, frequency and power factor are displayed on the LCD as actual values and should not be multiplied.

The multiplier value is dependent upon the ratio of the external Current Transformers (CTs) and can be different for different meter points. Table 7-1 (using 0.1 AMP CTs) and Table 7-2 (using 5.0 AMP CTs) MUST be used to obtain actual consumption and demand readings.

Meter Catalog Numbers	CT Rating	Multiplier for 0.1A CT
RSM-5c RSM5c XXX	50A	x0.5
RSM5c XXX D	100A	x1.0
RSM5c XXX PD	200A	x2.0
RSM5c 480DTA	400A	x4.0
RSM5c 480DTA D	600A	x6.0
RSM5c 480DTA PD	800A	x8.0
RSM5c XXX 2PH	1200A	x12.0
All RSM5c Kits	1500A	x15.0
RSM-5 RSM5 XXX 01A	1600A	x16.0
RSM5 XXX 01A D	2000A	x20.0
RSM5 XXX 01A M D	3000A	x30.0
RSM5 XXX 01A RS D	3200A	x32.0
RSM5 XXX 01A PD	4000A	x40.0
RSM5 480DTA01A D		
RSM5 480DTA01AMD		
RSM5 480DTA01ARSD		
RSM5 480DTA01A PD		

Table 7-1. Multiplier table for RSM-5c and RSM-5 meter with 0.1 AMP CTs. "XXX" represents voltage.

Meter Catalog Numbers	CT Rating	Multiplier for 5.0A CT
RSM5 XXX CL10	50A	x10.0
RSM5 XXX CL10 D	100A	x20.0
RSM5 XXX CL10 M D	200A	x40.0
RSM5 XXX CL10 RS D	400A	x80.0
RSM5 XXX CL10 PD	600A	x120.0
RSM5 480DTACL10 D	800A	x160.0
RSM5 480DTACL10MD	1200A	x240.0
RSM5 480DTACL10RSD	1500A	x300.0
RSM5 480DTACL10 PD	1600A	x320.0
All RSM5 Kits	2000A	x400.0
	3000A	x600.0
	3200A	x640.0
	4000A	x800.0

Table 7-2. Multiplier table for RSM-5 meter with 5.0 AMP CTs. "XXX" represents voltage.

How CT multipliers are calculated

0.1 Amp CTs

The multiplier values for CTs with 0.1A secondary ratings are derived by dividing the primary side rating by 100. For example, a 50:0.1A-rated CT will have a multiplier of $50 \div 100$, which is 0.50. A 100:0.1A rated CT will have a multiplier of $100 \div 100$ which is 1.

5.0 Amp CTs

For CTs with 5.0A secondary ratings, the multipliers are derived by dividing the primary side rating by 5. For example, a 200:5.0A-rated CT will have a multiplier of $200 \div 5$, which is 40.

Example:

Meter point with 400:0.1A CT

LCD reading for meter is 3422.119kWh

The correct cumulative consumption (kWh) for this meter is **13688.476** kWh. ($400 \div 100 = 4$. Multiply face value, for consumption and demand values by 4. $3422.119 \times 4 = 13688.476$)

The multiplier must be applied when calculating both kW and kWh readings on every screen displayed on the LCD.



Failure to use the appropriate multiplier will result in an incorrect diagnosis of the meter's functionality and incorrect revenue billing.

Some features vary by model. Contact manufacture for details.

Metered Voltage:

- 120, 208, 220, 230, 240, 277, 347, 380, 400, 480, 600 VAC Delta or Wye 50/60 Hz

Fusing:

- (1) 1/4-A 250V (T) and (3) 4-A 250V (F)
- (1) 1/8-A 600V (T) and (3) 4-A 600V (F)

Secondary Current Input:

- 0.1 Amp or 5 Amp CT inputs available

Four Quadrant Consumption & Demand:

- Delivered and received: kW, kVARLeading, kVARLagging, kVA, Volts-squared hours, and amp-squared hours

Programmable Interval Data & Peak Demand:

- 15 minutes to hourly time window
- Meter total and/or by phase
- Programmable to user-determined specific time blocks or rolling time block demand

Demand Reset:

- Allows local reset of peak demand (kW) register ("D" models only)

Real-time data per Phase:

- Voltage, current, phase angle, power factor, THD, watts, VARs, VA, and frequency

Time-of-Use (TOU):

- Up to 16 blocks per day available for all metering parameters (Exception: Pulse input data received by the RSM-5c and RSM-5 are not available in time-of-use blocks.)

Pulse Datalogger:

- Collects data from up to 4 water, gas, or BTU meters
 - Max. Distance: 300 feet from external pulse meter to RSM-5(18 gauge min.)
 - Min. Pulse Width: Power on-50msec
Power off-500msec
 - Max. Pulse Rate: Power on-10pulses/sec max.
Power off-1 pulse/sec max.

- When RSM-5 loses power, the pulse accumulator still has the capability to record pulses but the sample rate is reduced
 - Peak voltage: 5.5V
 - Peak current: not applicable
 - Isolation: 2.5kV isolation between pulse output and AC line
 - Max. signal debounce tolerance: 20msec

Data Collection Options:

- IQ Software
- MV-90 TIM Module
- ASCII-based, open-data protocol
- Open-source data conversion program

Accuracy:

- $\pm 0.5\%$ at unity power factor at any measured load between 1% and 100% of full-scale (excluding external CT error)
- $\pm 0.75\%$ at at 0.5 power factor (lead or lag)

Liquid Crystal Display:

- Push button scroll
- 32-digit liquid crystal display (16 digits x 2 rows)
- 6 whole digit consumption register
- Data digit height: 0.31"
- Programmable display scroll & decimal place display

Operating Range:

- Rated Voltage: 90% to 110%
- Temperature: -20°C to +60°C

Memory:

- 512 kilobyte non-volatile flash memory retains daily and interval data
- During power outage:
 - Flash memory retains daily and interval data
 - Long-life lithium battery maintains time, logs incoming pulses and retains data acquired within the incompleted interval at the time of the outage

Shipping Weight and Dimensions:

- RSM-5 Enclosure: 13.5"H x 8.5"W x 4.5"D
Shipping weight: 1 meter assembly: 29.1-31.3 lbs
- RSM-5c Enclosure: 6.9"H x 9.8"W x 4.9"D
Shipping weight: 1 meter assembly: 8.4-13.8 lbs

Environment:

- Enclosure: NEMA 1 rated for indoor use only. (Outdoor NEMA 4X optional.)
- Temperature: -20°C to +60°C
- Humidity: 0-95% relative humidity (non-condensing)
- Pollution Degree: 2
- Maximum Altitude: 2000 meters

Type Tests:

- Transient/surge suppression: ANSI C37.90.1-1989
- Installation Category: III. This product falls under Installation Category III because of its distribution level, fixed installation, and has smaller transient over-voltage rating than an Installation Category IV.

Metering Industry Standards:

Meets ANSI: C12.1 for accuracy
UL and CUL: Listed under E204142

Meter Kits (CTs included).....pages 25-28

Meter Kits are available for the RSM-5c and RSM-5 products and include the complete meter assembly (meterhead, fuse block and back box) as well as the required current transformers (CTs) for operation.

Meters (CTs not included).....pages 29-34

Stand-alone meters include the complete meter assembly (meterhead, fuse block and back box). Current Transformers (CT) are not included.

Options:**Communication (for RSM-5 models only)**

"M D" Models: Stand-alone meter models ending in "M D" include modem, RS-485 and RS-232 connection for communications. These models are also demand meters.

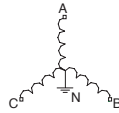
"RS D" Models: Stand-alone meter models ending in "RS D" include a RS-485 connection for communication. These models are also demand meters.

**Gas, Water, BTU Pulse Data Collection
(for RSM-5 and RSM-5c models)**

"PD" Models: Stand-alone meter models ending in "PD" or "P D" include 4 pulse inputs for gas, water, BTU or other dry contact pulses. These models are also demand meters.

RSM-5c Meter Kits: kWh Meters

Kits include meterhead, fuse block, back box and required current transformers.
Enclosure: 6.9"H X 9.8"W X 4.9"D



3-Phase kWh Meter - Wye

Catalog #	Volts	Amps	kWh Only	CTs included	Diagram
RSM5c 120100-3	120/208V	100	✓	3 SPLIT CORE*	Figure 3-1
RSM5c 120200-3		200	✓		
RSM5c 120400-3		400	✓	3 SPLIT CORE	
RSM5c 120800-3		800	✓		
RSM5c 277100-3	277/480V	100	✓	3 SPLIT CORE*	
RSM5c 277200-3		200	✓		
RSM5c 277400-3		400	✓	3 SPLIT CORE	
RSM5c 277800-3		800	✓		

For 1600 AMP or 3200 AMP, see page 28.

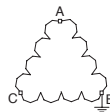
*Kits with solid core current transformers are also available:

RSM5c 120100-3SL (includes 3 **SOLID** CORE CTs)

RSM5c 120200-3SL (includes 3 **SOLID** CORE CTs)

RSM5c 277100-3SL (includes 3 **SOLID** CORE CTs)

RSM5c 277200-3SL (includes 3 **SOLID** CORE CTs)



3-Phase kWh Meter – DELTA ("DTA")

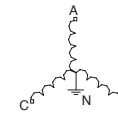
Catalog #	Volts	Amps	kWh Only	CTs included	Diagram
RSM5c 480DTA100-2	480V	100	✓	2 SPLIT CORE	Figure 3-2
RSM5c 480DTA200-2		200	✓		
RSM5c 480DTA400-2		400	✓		
RSM5c 480DTA800-2		800	✓		

All meters have built-in Power Line Communications capability.

RSM-5 Meter Kits: kWh for Large Service Meters

For 1600Amp & 3200Amp Only

Kits include meterhead, fuse block, back box and required current transformers.
Enclosure: 13.5"H X 8.5"W X 4.5W



3-Phase kWh Meter - Wye

Catalog #	Volts	Amps	kWh Only	CTs included	Diagram
RSM5 1201600-3	120/208V	1600	✓	3 SPLIT CORE	Figure 3-4
RSM5 1203200-3		3200	✓		
RSM5 2771600-3	277/480V	1600	✓		
RSM5 2773200-3		3200	✓		

RSM-5c Meter Kits: kWh Meters

Kits include meterhead, fuse block, back box and required current transformers.
Enclosure: 6.9"H X 9.8"W X 4.9"D

Single-Phase kWh Meter – Wye

Catalog #	Volts	Amps	kWh Only	CTs included	Diagram
RSM5c 120100-2SL	120V/208V or 120/240V	100	✓	2 SOLID CORE	Figure 3-3
RSM5c 120200-2SL		200	✓		
RSM5c 277100-2SL	277/480V	100	✓		
RSM5c 277200-2SL		200	✓		

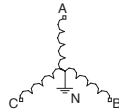
All meters have built-in Power Line Communications capability.

RSM-5c Meter Kits: Demand Meters

Kits include meterhead, fuse block, back box and required current transformers.

Enclosure: 6.9"H X 9.8"W X 4.9"D

Three-Phase Demand Meter - Wye



Catalog #	Volts	Amps	kWh and Demand	CTs included	Diagram
RSM5c 120100-3D	120/208V	100	√√	3 SPLIT CORE	Figure 3-1
RSM5c 120200-3D		200	√√		
RSM5c 120400-3D		400	√√		
RSM5c 120800-3D		800	√√		
RSM5c 277100-3D	277/480V	100	√√		
RSM5c 277200-3D		200	√√		
RSM5c 277400-3D		400	√√		
RSM5c 277800-3D		800	√√		

For 1600 AMP or 3200 AMP, see page 28.

Catalog #	Volts	Amps	kWh and Demand	CTs included	Diagram
RSM5c 480DTA100-2D	480V	100	√√	2 SPLIT CORE	Figure 3-2
RSM5c 480DTA200-2D		200	√√		
RSM5c 480DTA400-2D		400	√√		
RSM5c 480DTA800-2D		800	√√		

For 1600 AMP or 3200 AMP, see page 28.

All meters have built-in Power Line Communications capability.

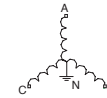
RSM-5 Meter Kits: kWh & Demand Meters for Large Service

For 1600Amp & 3200Amp Only (High Current Adapter included)

Kits include meterhead, fuse block, back box and required current transformers.

Enclosure: 13.5"H X 8.5"W X 4.5W

3-Phase Demand Meter - Wye



Catalog #	Volts	Amps	kWh and Demand	CTs included	Diagram
RSM5 1201600-3D	120/208V	1600	√√	3 SPLIT CORE	Figure 3-4
RSM5 1203200-3D		3200	√√		
RSM5 2771600-3D	277/480V	1600	√√		
RSM5 2773200-3D		3200	√√		

3-Phase Demand Meter - Delta ("DTA")



Catalog #	Volts	Amps	kWh and Demand	CTs included	Diagram
RSM5 480DTA1600-2D	480V	1600	√√	2 SPLIT CORE	Figure 3-5
RSM5 480DTA3200-2D		3200	√√		

"2 in 1" 3-Phase kWh Meter - Wye

Catalog #	Volts	Amps	kWh only	CTs included	Diagram
RSM5 120100-6	120/208V	100	√	6 SPLIT CORE	Figure 3-6
RSM5 120200-6	120/208V	200	√		
RSM5 120400-6	120/208V	400	√		
RSM5 277100-6	277/480V	100	√		
RSM5 277200-6	277/480V	200	√		
RSM5 277400-6	277/480V	400	√		

"2 in 1" 3-Phase kWh & Demand Meter - Wye

(includes High Current Adapter - HCA)

Catalog #	Volts	Amps	kWh and Demand	CTs included	Diagram
RSM5 120100-6D	120/208V	100	√√	6 SPLIT CORE	Figure 3-6
RSM5 120200-6D	120/208V	200	√√		
RSM5 120400-6D	120/208V	400	√√		
RSM5 277100-6D	277/480V	100	√√		
RSM5 277200-6D	277/480V	200	√√		
RSM5 277400-6D	277/480V	400	√√		

All meters have built-in Power Line Communications capability.

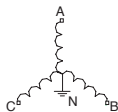
RSM-5c: 3-Phase and Single-Phase Meters

External CTs sold separately.



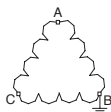
Dimension:
6.9”H x 9.8”W x 4.9”D

3-Phase Meter - Wye



Catalog #	Volts	Amps	kWh Only	kWh & Demand**	kWh, Demand & 4 Pulse Inputs**	Diagram
RSM5c 120	120/208V	0.1A	√			Figure 3-1
RSM5c 277	277/480V		√			
RSM5c 120 D	120/208V			√√		
RSM5c 277 D	277/480V			√√		
RSM5c 120 PD	120/208V				√√√	
RSM5c 277 PD	277/480V				√√√	

3-Phase Meter – DELTA (“DTA”)



Catalog #	Volts	Amps	kWh Only	kWh & Demand**	kWh, Demand & 4 Pulse Inputs**	Diagram
RSM5c 480DTA	0.1A	480V	√			Figure 3-2
RSM5c 480DTA D				√√		
RSM5c 480DTA PD					√√√	

Single-Phase kWh Meter - Wye

Catalog #	Volts	Amps	kWh Only	Diagram
RSM5c 120 2PH	120/208V	0.1A	√	Figure 3-3
RSM5c 277 2PH	277/480V		√	

*Standard Configuration for kWh only models: kWh register and 1-hour data logging (intervals).
Customized programming not available for kWh models.

**Standard Configuration for Demand models ("D"): kWh register, peak demand (kW) register with date and time stamp and 15-minute data logging (intervals). Customized programming available for demand models only. Contact Manufacturer for details.

RSM-5: 3-Phase Meters

External CTs sold separately.



Dimension:
13.5" X 8.5" X 4.5"

*Standard Configuration for kWh only models: kWh register and 1-hour data logging (intervals).

Customized programming not available for kWh models.

**Standard Configuration for Demand models ("D"): kWh register, peak demand (kW) register with date and time stamp and 15-minute data logging (intervals). Customized programming available for demand models only. Contact Manufacturer for details.

3-Phase Meter - Wye - 0.1Amp



Catalog #	Volts	Amps	kWh Only	kWh & Demand**	kWh, Demand & Modem**	kWh, Demand & RS - 485**	kWh, Demand & 4 Pulse Inputs**	Diagram
RSM5 120 01A	120/208V	0.1A	√					Figure 3-1
RSM5 277 01A	277/480V		√					
RSM5 120 01A D	120/208V			√√				
RSM5 277 01A D	277/480V			√√				
RSM5 120 01A M D	120/208V				√√√			
RSM5 277 01A M D	277/480V				√√√			
RSM5 120 01A RS D	120/208V					√√√		
RSM5 277 01A RS D	277/480V					√√√		
RSM5 120 01A PD	120/208V						√√√	
RSM5 277 01A PD	277/480V						√√√	

3-Phase Meter - DELTA ("DTA") - 0.1Amp



Catalog #	Volts	Amps	kWh & Demand**	kWh, Demand & Modem**	kWh, Demand & RS - 485**	kWh, Demand & 4 Pulse Inputs**	Diagram
RSM5 480DTA01A D	480V	0.1A	√√				Figure 3-2
RSM5 480DTA01AMD				√√√			
RSM5 480DTA01ARSD					√√√		
RSM5 480DTA01A PD						√√√	

RSM-5: 3-Phase Meters

External CTs sold separately.

3-Phase Meter - Wye - CL10 (accepts one or two sets of 5Amp CTs)



Catalog #	Volts	Amps	kWh Only	kWh & Demand**	kWh, Demand & Modem**	kWh, Demand & RS - 485**	kWh, Demand & 4 Pulse Inputs**	Diagram
RSM5 120 CL10	120/208V	10A	✓					Figure 3-4
RSM5 277 CL10	277/480V		✓					
RSM5 120 CL10 D	120/208V			✓✓				
RSM5 277 CL10 D	277/480V			✓✓				
RSM5 120 CL10 M D	120/208V				✓✓✓			
RSM5 277 CL10 M D	277/480V				✓✓✓			
RSM5 120 CL10 RS D	120/208V					✓✓✓		
RSM5 277 CL10 RS D	277/480V					✓✓✓		
RSM5 120 CL10 PD	120/208V						✓✓✓	
RSM5 277 CL10 PD	277/480V						✓✓✓	

3-Phase Meter - DELTA ("DTA") – CL10 (accepts one or two sets of 5Amp CTs)



Catalog #	Volts	Amps	kWh & Demand**	kWh, Demand & Modem**	kWh, Demand & RS - 485**	kWh, Demand & 4 Pulse Inputs**	Diagram
RSM5 480DTACL10 D	480V	10A	✓✓				Figure 3-5
RSM5 480DTACL10MD				✓✓✓			
RSM5 480DTACL10RSD					✓✓✓		
RSM5 480DTACL10 PD						✓✓✓	

*Standard Configuration for kWh only models: kWh register and 1-hour data logging (intervals).

Customized programming not available for kWh models.

**Standard Configuration for Demand models ("D"): kWh register, peak demand (kW) register with date and time stamp and 15-minute data logging (intervals). Customized programming available for demand models only. Contact Manufacturer for details.

Release Dates

	MANUAL	QLC PART NO.	REVISION NO.	RELEASE DATE
(1)	RSM-5c kit and RSM-5 kit Installation Manual	RSM5/5c MANR1.0.R	1.0.R	11.17.06
(2)	RSM-5c and RSM-5 Installation Manual	RSM5/5c MANR1.1.R	1.1.R	1.2.07
(3)	RSM-5c and RSM-5 Installation Manual	RSM5/5c MANR1.2.R	1.2.R	6.19.07
(4)	RSM-5c and RSM-5 Installation Manual	RSM5/5c MANR2.0.R	2.0.R	10/27/08

Notable Revision History

DATE	PAGE	DESCRIPTION
1/2/7	1	• Pulse Datalogger functions during power loss events
	3	• Requirements for conduit size
	9	• Main menu navigates forward only
	17	• Separated table 7-1 into two tables for 0.1 AMP multipliers and 5 AMP multipliers
	29	• Included catalog numbers for reference
6/18/07	(preface page)	• Corrected heading to RSM-5 Three-Phase Meters
	5	• Updated: Quadlogic new address/copyright 2007
	8	• Inserted table of maximum lead length
	20	• Added clarifying note
	21	• Correction of memory size to 512 kilobyte
	26	• Meets ANSI C12.1
10/28/08	4	• Correction of voltage to 480V (Delta)
	5	• Qualified fuse type
	6	• Use shielded, twisted pair for 50' + CT extensions
	9, 28	• Deleted amperage designation where not necessary
	23	• Added RSM-5 "2 in 1" : diagram and model numbers
	26	• Added NEMA enclosure
	27 & 28	• Corrected amperage to 100 and 200
		• Corrected chart to indicate "kWh & Demand" where applicable

Preventive Maintenance

Preventative maintenance is not required.

Use a soft dry cloth to clean the meter.

A Toshiba CR2032 coin battery is used in each device ONLY for the clock when power is lost, and is intended to be good for decades before replacement. The meter does not rely on the battery, and the meter data is stored in non-volatile FLASH memory.

Product Limited Warranty

Quadlogic Controls Corporation warrants its equipment for 3 years from the ship date against defects in material or workmanship when installed in accordance with manufacturer's instructions by qualified personnel.

This warranty does not cover installation, removal, reinstallation or labor costs and excludes normal wear and tear. The warranty does not cover product which has been altered from its original manufactured condition due to faulty installation, tampering, accident, neglect, abuse, force majeure or abnormal conditions of operation.

Obligation under this warranty is limited to repair and/or replacement, at Quadlogic's option, of the manufactured product and in no event shall Quadlogic be liable for consequential or incidental damages.

QUADLOGIC

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Long Island City, NY 11101

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3-Phase kWh

RSM-5c Meter Kits

- Single-Phase kWh
- 3-Phase Demand
- 3-Phase kWh and Demand (1600 and 3200 AMP service only)

• 3-Phase kWh (100A, 200A, 400A, 800A)



Specifications:

- 3-phase kWh meter with CTs
- 120/208V, 120/240V, 277/480V and 480V DELTA
- 100 amp, 200 amp, 400 amp and 800 amp*
- Split or Solid core CTs included
- 6.9"H x 9.8"W x 4.9"D
- *1600 amp and 3200 amp also available

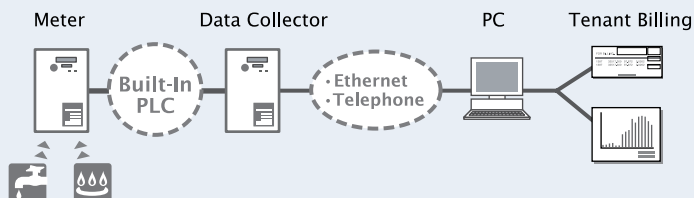
The **RSM-5c** 3-phase kWh meter is an accurate and reliable digital electric kilowatt-hour meter. It is easy to install and operate and it also delivers real-time power diagnostics by phase. All metering data are securely stored in a non-volatile flash memory.

Features/Benefits

- Commercial / Industrial utility-grade kWh meter; Revenue-grade accuracy (ANSI C12.1)
- Real-time power diagnostics by phase (Voltage, current, phase angle, power factor, THD, watts, VARs, VA and frequency)
- Event reporting (power downs, demand resets, tampers, etc.)
- Non-volatile flash memory
- Built-in Power Line Communications (PLC) for optional remote meter reading
- Communicates through distribution transformers (480/120V)
- Easy to install with mounting provisions
- Rugged steel enclosure with pad lock hasp
- Installation verification at the meter
- On site: optical port for downloading meter data
- Three-year manufacturer's warranty
- UL, UL-C, Approved by California Div. Of Measurement Standards, Maryland Public Service Commission
- Options: Pulse data inputs for water, gas, BTU

PLC System Option for Remote Reading

All of Quadlogic's metering devices function as stand-alone units or can be used for remote reading with the simple addition of a Scan Transponder (data collector) and communication software. No additional wiring is required. Contact your representative for more information.



Catalog Numbers

Includes meterhead, fuse block, back box and required current transformers.

Meter Type Volts Amps # of CTs included
RSM5c 120 400 -3 (All CTs are split core unless followed by "SL", indicating solid core.)

3-Phase kWh Meter - Wye 3P/4W

Catalog #	Volts	Amps	kWh Only	CT Model
RSM5c 120100-3	120/208V	100	✓	CTSP2
RSM5c 120200-3	120/208V	200	✓	CTSP2
RSM5c 120400-3	120/208V	400	✓	CTSP4
RSM5c 120800-3	120/208V	800	✓	CTSP6
RSM5c 277100-3	277/480V	100	✓	CTSP2
RSM5c 277200-3	277/480V	200	✓	CTSP2
RSM5c 277400-3	277/480V	400	✓	CTSP4
RSM5c 277800-3	277/480V	800	✓	CTSP6
RSM5c 120100-3SL	120/208V	100	✓	CTSL3
RSM5c 120200-3SL	120/208V	200	✓	CTSL3
RSM5c 277100-3SL	277/480V	100	✓	CTSL3
RSM5c 277200-3SL	277/480V	200	✓	CTSL3

3-Phase kWh Meter - DELTA 3P/3W

Catalog #	Volts	Amps	kWh Only	CT Model
RSM5c 480DTA100-2	480V	100	✓	CTSP2
RSM5c 480DTA200-2		200	✓	CTSP2
RSM5c 480DTA400-2		400	✓	CTSP4
RSM5c 480DTA800-2		800	✓	CTSP6

Outdoor Enclosure (NEMA 4X)

Catalog #
RSM5c 4X ENC



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RSM5cKit_3P kWh_Rev5.0.R

RSM-5c Meter Wiring

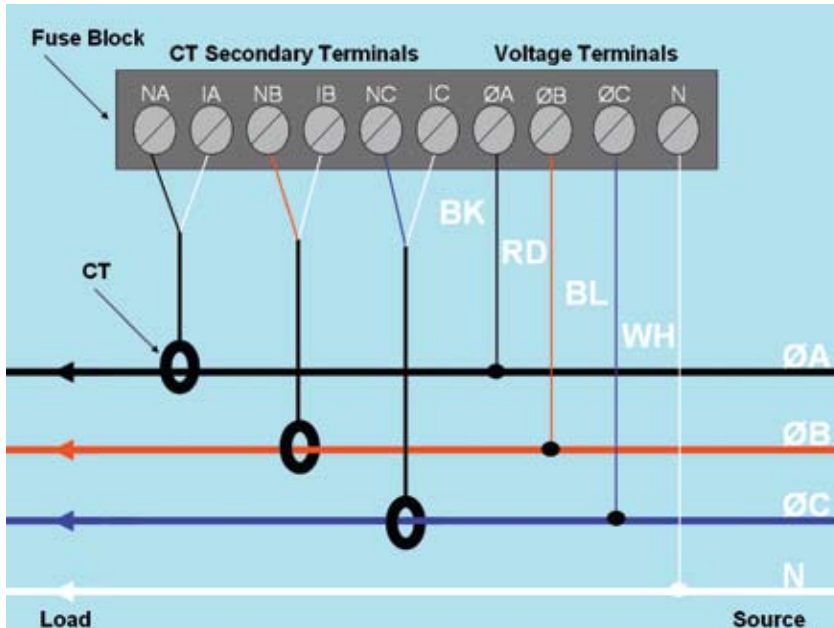
- Single-Phase kWh
- 3-Phase Demand
- 3-Phase kWh and Demand (1600 and 3200 AMP service only)

• 3-Phase kWh

3-Phase 4-Wire Wye



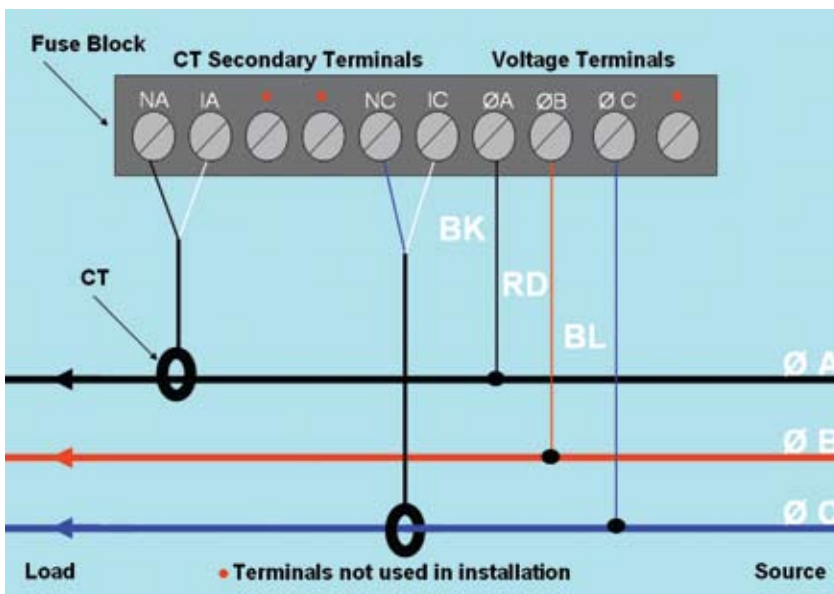
Fuse Block Connections: RSM- 5c 3-Phase 4-Wire Wye



3-Phase 3-Wire Delta



Fuse Block Connections: RSM- 5c 3-Phase 3-Wire Delta



Diagrams are for reference only.

For complete installation instructions, please read the **RSM-5c Kit & RSM-5 Kit Installation Manual**.

3-Phase Demand

RSM-5c Meter Kits

- Single-Phase kWh (100A and 200A)
- 3-Phase kWh
- 3-Phase kWh and Demand (1600 and 3200 AMP service only)
- **3-Phase kWh and Demand (100A, 200A, 400A, 800A)**



Specifications:

- 3-phase kWh and Demand meter with CTs
- 120/208V, 120/240V, 277/480V and 480V DELTA
- 100 amp, 200 amp, 400 amp and 800 amp*
- Split core CTs included
- 6.9"H x 9.8"W x 4.9"D
- *1600 amp and 3200 amp also available

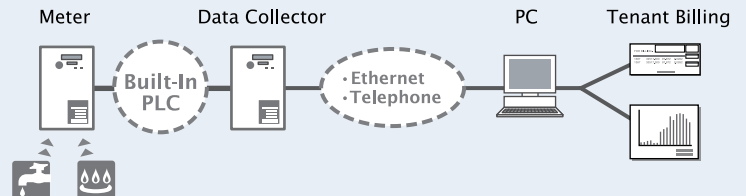
The **RSM-5c** 3-phase demand meter is an accurate and reliable digital electric meter. This compact device provides kWh registers, peak demand registers and 15-minute data-logging. It is easy to install and operate and it also delivers real-time power diagnostics by phase. All metering data are securely stored in a non-volatile flash memory.

Features / Benefits

- Commercial / Industrial utility-grade kWh meter; Revenue-grade accuracy (ANSI C12.1)
- 15-minute interval data; peak demand with date and time stamp
- Real-time power diagnostics by phase (Voltage, current, phase angle, power factor, THD, watts, VARs, VA and frequency)
- Event reporting (power downs, demand resets, tamper, etc.)
- Non-volatile flash memory
- Built-in Power Line Communications (PLC) for optional remote meter reading
- Communicates through distribution transformers (480/120V)
- Easy to install with mounting provisions
- Rugged steel enclosure with pad lock hasp
- Installation verification at the meter
- On site: optical port for downloading meter data
- Three-year manufacturer's warranty
- UL, UL-C, Approved by California Div. Of Measurement Standards, Maryland Public Service Commission
- Options: Pulse data inputs for water, gas, BTU
- Factory programmable Time-of-Use / Time-of-Day ("TOU" "TOD")

PLC System Option for Remote Reading

All of Quadlogic's metering devices function as stand-alone units or can be used for remote reading with the simple addition of a Scan Transponder (data collector) and communication software. No additional wiring is required. Contact your representative for more information.



Model Numbers

Includes meterhead, fuse block, back box and required current transformers.

Meter Type Volts Amps # of split core CTs included

RSM5c 120 400 -3 D Demand Meter

3-Phase kWh and Demand Meter - Wye 3P/4W

Catalog #	Volts	Amps	kWh & Demand	CT Model
RSM5c 120100-3D	120/208V	100	✓✓	CTSP2
RSM5c 120200-3D		200	✓✓	CTSP2
RSM5c 120400-3D		400	✓✓	CTSP4
RSM5c 120800-3D		800	✓✓	CTSP6
RSM5c 277100-3D	277/480V	100	✓✓	CTSP2
RSM5c 277200-3D		200	✓✓	CTSP2
RSM5c 277400-3D		400	✓✓	CTSP4
RSM5c 277800-3D		800	✓✓	CTSP6

3-Phase kWh and Demand Meter - DELTA 3P/3W

Catalog #	Volts	Amps	kWh & Demand	CT Model
RSM5c 480DTA100-2D	480V	100	✓✓	CTSP2
RSM5c 480DTA200-2D		200	✓✓	CTSP2
RSM5c 480DTA400-2D		400	✓✓	CTSP4
RSM5c 480DTA800-2D		800	✓✓	CTSP6

Outdoor Enclosure (NEMA 4X)

Catalog #
RSM5c 4X ENC



QUADLOGIC

Tel (212) 930-9300

Fax (212) 930-9394

RSM5cKit_3PD_Rev5.0.R

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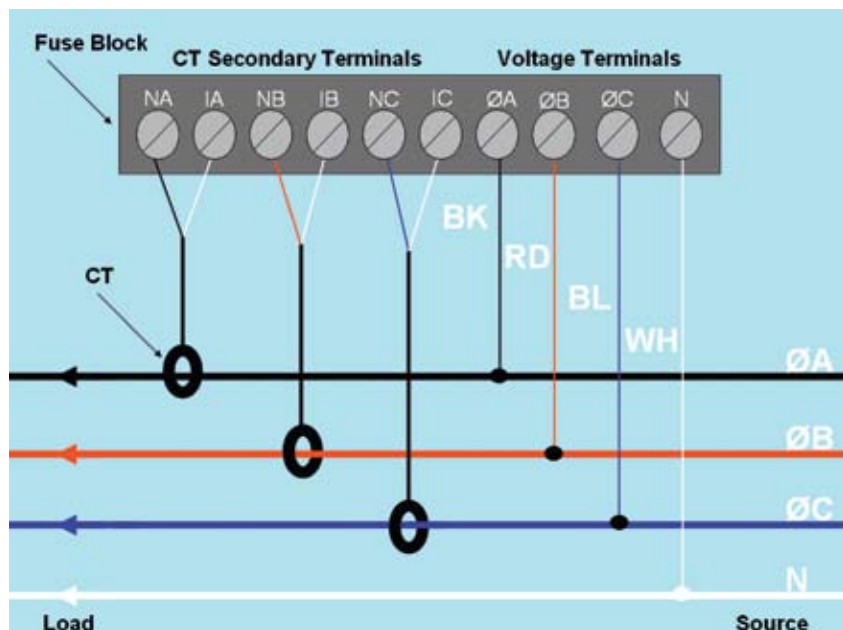
RSM-5c Meter Kits

- Single-Phase kWh (100A and 200A)
- 3-Phase kWh
- 3-Phase kWh and Demand (1600 and 3200 AMP service only)
- **3-Phase kWh and Demand (100A, 200A, 400A, 800A)**

3-Phase 4-Wire Wye



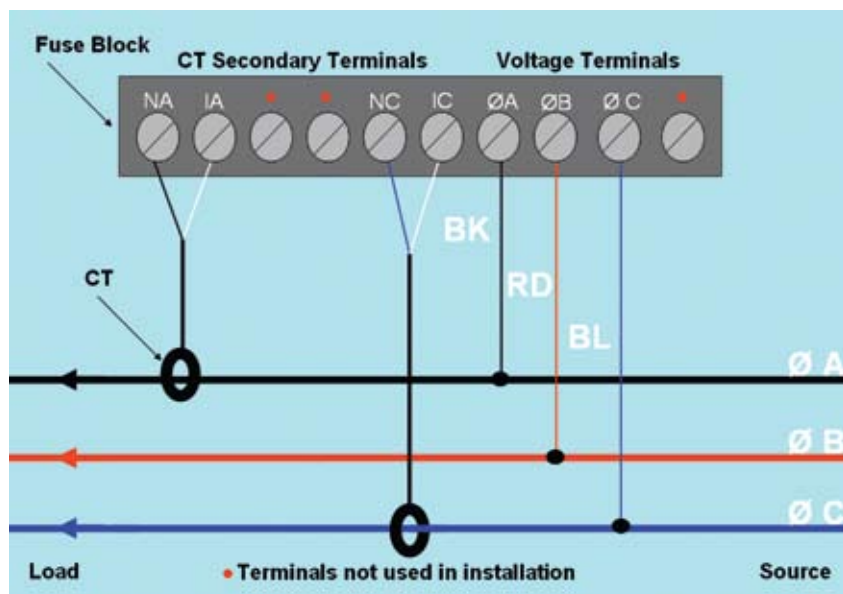
Fuse Block Connections: RSM- 5c 3-Phase 4-Wire Wye



3-Phase 3-Wire Delta



Fuse Block Connections: RSM- 5c 3-Phase 3-Wire Delta



Diagrams are for reference only.

For complete installation instructions, please read the **RSM-5c Kit & RSM-5 Kit Installation Manual**.

Single-Phase kWh

RSM-5c Meter Kits

- 3-Phase kWh
- 3-Phase kWh and Demand (100A, 200A, 400A, 800A)
- 3-Phase kWh and Demand (1600 and 3200 AMP service only)

• Single-Phase kWh (100A and 200A)



Specifications:

- Single-phase kWh meter with CTs
- 120/208V, 120/240V and 277/480V
- 100 amp and 200 amp
- Solid core CTs included
- 6.9"H x 9.8"W x 4.9"D

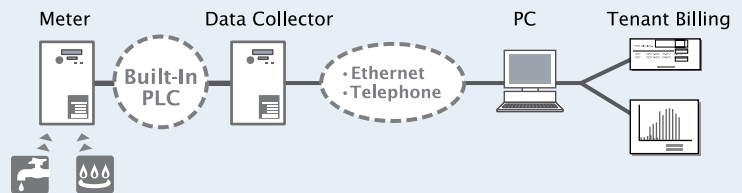
The **RSM-5c** single-phase kWh meter is an accurate and reliable digital electric kilowatt-hour meter. It is easy to install and operate and it also delivers real-time power diagnostics. All metering data are securely stored in a non-volatile flash memory.

Features/Benefits

- Commercial / Industrial utility-grade kWh meter; Revenue-grade accuracy (ANSI C12.1)
- Real-time power diagnostics (Voltage, current, phase angle, power factor, THD, watts, VARs, VA and frequency)
- Event reporting (power downs, demand resets, tampers, etc.)
- Non-volatile flash memory
- Built-in Power Line Communications (PLC) for optional remote meter reading
- Communicates through distribution transformers (480/120V)
- Easy to install with mounting provisions
- Rugged steel enclosure with pad lock hasp
- Installation verification at the meter
- On site: optical port for downloading meter data
- Three-year manufacturer's warranty
- UL, UL-C, Approved by California Div. Of Measurement Standards, Maryland Public Service Commission

PLC System Option for Remote Reading

All of Quadlogic's metering devices function as stand-alone units or can be used for remote reading with the simple addition of a Scan Transponder (data collector) and communication software. No additional wiring is required. Contact your representative for more information.



Model Numbers

Includes meterhead, fuse block, back box and required current transformers.

Meter Type	Volts	Amps	# of CTs included	
RSM5c	120	200	-3	SL — CTs are Solid Core

Single-Phase kWh Meter - Wye

Catalog #	Volts	Amps	kWh Only	CT Model
RSM5c 120100-2SL	120V/208V or	100	✓	CTSL3
RSM5c 120200-2SL	120V/240V	200	✓	CTSL3
RSM5c 277100-2SL	277/480V	100	✓	CTSL3
RSM5c 277200-2SL	277/480V	200	✓	CTSL3

Outdoor Enclosure (NEMA 4X)

Catalog #
RSM5c 4X ENC



QUADLOGIC

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RSM5cKit_1PkWh_Rev4.0.R

RSM-5c Meter Kits

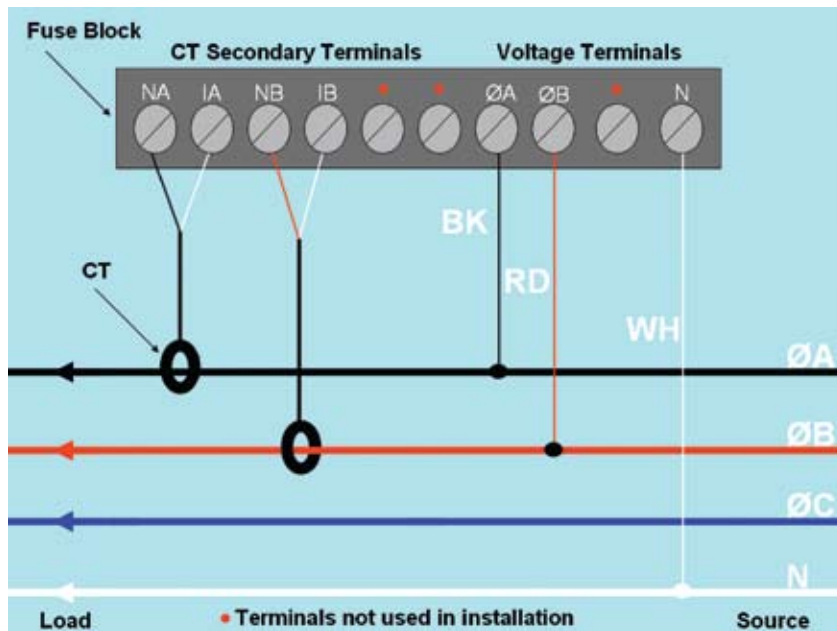
- 3-Phase kWh
- 3-Phase kWh and Demand (100A, 200A, 400A, 800A)
- 3-Phase kWh and Demand (1600 and 3200 AMP service only)

● Single-Phase kWh (100A and 200A)

Single-Phase 3-Wire Wye



Fuse Block Connections: RSM- 5c Single-Phase 3-Wire Wye



Diagrams are for reference only.

For complete installation instructions, please read the **RSM-5c Kit** & **RSM-5 Kit** Installation Manual.