PMC- S963-C
Intelligent Multifunction Meter
User Manual
Version: V1.0

October 8, 2023

$$C \epsilon$$

Standards Compliance

DANGER

This symbol indicates the presence of danger that may result in severe injury or death and permanent equipment damage if proper precautions are not taken during the installation, operation or maintenance of the device.

CAUTION

This symbol indicates the potential of personal injury or equipment damage if proper precautions are not taken during the installation, operation or maintenance of the device.

⚠️DANGER

Failure to observe the following instructions may result in severe injury or death and/or equipment damage.

➢ Installation, operation and maintenance of the meter should only be performed by qualified, competent personnel that have the appropriate training and experience with high voltage and current devices. The meter must be installed in accordance with all local and national electrical codes.

➢ Ensure that all incoming AC power and other power sources are turned OFF before performing any work on the meter.

➢ Before connecting the meter to the power source, check the label on top of the meter to ensure that it is equipped with the appropriate power supply, and the correct voltage and current input specifications for your application.

➢ During normal operation of the meter, hazardous voltages are present on its terminal strips and throughout the connected potential transformers (PT) and current transformers (CT). PT and CT secondary circuits are capable of generating lethal voltages and currents with their primary circuits energized. Follow standard safety precautions while performing any installation or service work (i.e. removing PT fuses, shorting CT secondaries, …etc).

➢ Do not use the meter for primary protection functions where failure of the device can cause fire, injury or death. The meter should only be used for shadow protection if needed.

➢ Under no circumstances should the meter be connected to a power source if it is damaged.

➢ To prevent potential fire or shock hazard, do not expose the meter to rain or moisture.

➢ Setup procedures must be performed only by qualified personnel familiar with the instrument and its associated electrical equipment.

➢ DO NOT open the instrument under any circumstances.

Limited warranty

➢ CET Inc. (CET) offers the customer a minimum of 12-month functional warranty on the meter for faulty parts or workmanship from the date of dispatch from the distributor. This warranty is on a return to factory for repair basis.

➢ CET does not accept liability for any damage caused by meter malfunctions. CET accepts no responsibility for the suitability of the meter to the application for which it was purchased.

➢ Failure to install, set up or operate the meter according to the instructions herein will void the warranty.

➢ Only CET's duly authorized representative may open your meter. The unit should only be opened in a fully anti-static environment. Failure to do so may damage the electronic components and will void the warranty.

Table of Contents

Chapter 1 Introduction

This manual explains how to use the PMC-S963-C Intelligent Multifunction Meter. Throughout the manual the term "meter" generally refers to all models.

This chapter provides an overview of the PMC-S963-C meter and summarizes many of its key features.

1.1 Overview

The PMC-S963-C Intelligent Multifunction Meter is CET's latest offer for the low-cost digital power/energy metering market. Housed in a standard DIN form factor measuring 96x96x92mm, it is perfectly suited for industrial, commercial and utility applications. The PMC-S963-C features quality construction, multifunction measurements and a large, backlit, 7-Segment LCD that is easy to navigate and user friendly. Compliance with the IEC 62053-22 Class 0.5S Standard, it is a cost-effective replacement for analog instrumentation that is capable of displaying 3-phase measurements at once. It comes standard with four Digital Inputs for status monitoring. In addition, it optionally provides 2xDO, 1xSS Pulse Output and 1xAO for different applications. The standard RS-485 port and Modbus RTU protocol support make the PMC-S963-C a smart metering component of an intelligent, multifunction monitoring solution for any Energy Management System.

You can setup the meter through its front panel or via our free software. The meter is also supported by our PecStar® iEMS Integrated Energy Management System. Following is a list of typical applications for the PMC-S963-C:

- Industrial, Commercial and Utility Substation Metering
- Building, Factory and Process Automation
- Sub-metering and Cost Allocation
- Energy Management and Power Quality Monitoring

Contact CET Technical Support should you require further assistance with your application.

1.2 Features

Ease of use
- Large, backlit, 7-Segment LCD display with wide viewing angle
- Intuitive user interface
- LED indicators for Energy Pulsing and Communication activities
- Password protected setup via Front Panel or our free software
- Easy installation with mounting clips, no tools required

Basic Measurements
- True RMS @ 64 Samples/Cycle
- ULN, ULL per Phase and Average
- Current per Phase and Average with calculated Neutral
- P, Q, S, PF per Phase and Total
- Total RMS kWh, kvarh Import/Export/Net/Total and kVAh Total
- Per-phase kWh, kvarh Import/Export
- Frequency

Advanced Measurements
- U and I THD, TOHD, TEHD, TH (RMS) and Individual Harmonics up to 31st
- Current TDD, TDD Odd, TDD Even and Crest Factor
- U and I Sequence, Unbalance and Phase Angle
- Fundamental U and I per Phase
- kvarh Q1-Q4
- P Present and Predicted Demands as well as Max. Demands with Timestamp for This Month & Last Month (or Since Last Reset & Before Last Reset)
- One TOU schedule providing
    - 4 Seasons
    - 4 Daily Profiles, each with 14 Periods in 15-minute interval
    - 4 Tariffs, each providing kWh Import
- 12 monthly recording of kWh/kvarh Import/Export/Total/Net, kVAh Total, kvarh Q1-Q4 as well as kWh Import per Tariff

Setpoints
- 9 user programmable setpoints with extensive list of monitoring parameters including Voltage, Current, Power, P Demand, Unbalance, Phase Reversal and THD, etc.
- Configurable thresholds, time delays and DO triggers

SOE Log
- 32 events time-stamped to ±1ms resolution
- Setup changes, Setpoint and DI status changes and DO operations

Max./Min. Log
- Max./Min. Log with Timestamp for Real-time measurements such as Voltage, Current, In (Calculated), Freq., P, Q, S, PF, Unbalance and THD
- Configurable for This Month & Last Month (or Since Last Reset & Before Last Reset)

Diagnostics
- Loss of Voltage / Current
- P Direction per Phase and Total
- Incorrect U & I Phase Sequence

Inputs and Outputs
- **Digital Inputs**
  - 4 channels, volt free dry contact, 24VDC internally wetted
  - 1000Hz sampling for status monitoring with programmable debounce
- **Digital Outputs**
  - 2 Form A Mechanical Relays for alarming and general purpose control
- **Pulse Output**
  - 1 Form A Solid-State Relay for kWh and kvarh pulsing
- **Analog Output (Optional)**
  - One channel 0/4-20mA DC output with programmable zero and full scales

Communications
- Optically isolated RS-485 port at max. 38,400 bps
- Standard Modbus RTU Support

Real-Time Clock
- Equipped with a battery-backed Real-Time Clock with 25ppm accuracy (<2s per day)

System Integration
- Supported by CET's PecStar® iEMS
- Easy integration into 3rd-party Energy Management, Automation, SCADA or BMS systems via Modbus RTU

1.3 PMC-S963-C application in Power and Energy Management Systems

The PMC-S963-C can be used to monitor Wye or Delta connected power system. Modbus communications allow real-time data, DI status and other information to be transmitted across a RS-485 network to an Integrated Energy Management system such as PecStar® iEMS.
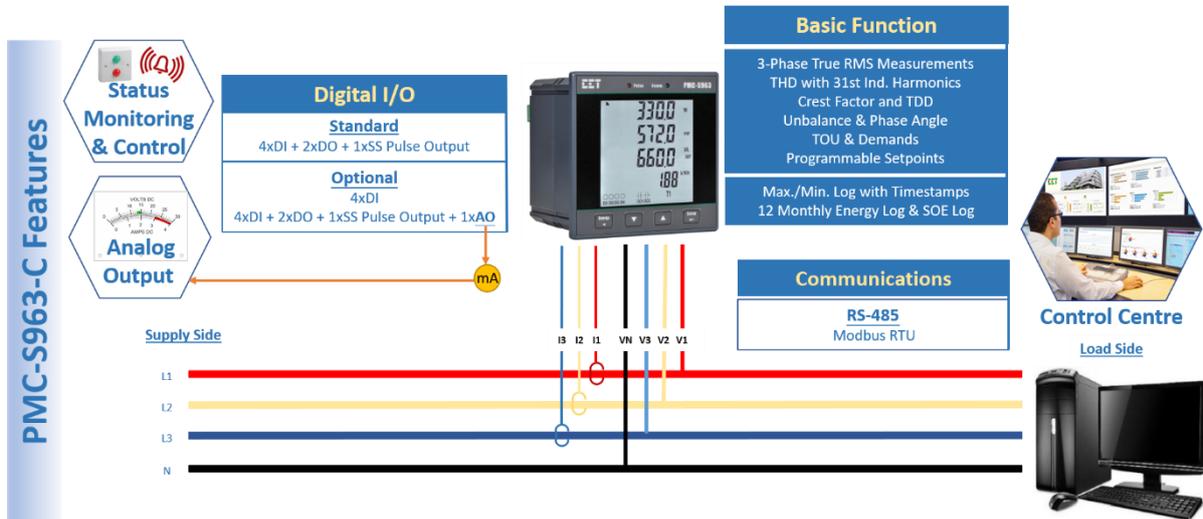
1.4 Getting more information

Additional information is available from CET via the following sources:

- Visit **www.cet-global.com**
- Contact your local representative
- Contact CET directly via email at support@cet-global.com

Chapter 2 Installation

⚠ Caution

Installation of the PMC-S963-C should only be performed by qualified and competent personnel who have the appropriate training and experience with high voltage and current devices. The meter must be installed in accordance with all local and national electrical codes.

During the operation of the meter, hazardous voltages are present at the input terminals. Failure to observe precautions can result in serious or even fatal injury and equipment damage.

2.1 Appearance

1　kWh/kvarh LED Pulse Output

2　Front Panel

3　Buttons

4　Communication Indicator

5　Units

6　Measurements

a　RS-485 Terminals

b　Digital Input Terminals

c　Current Input Terminals

d　Power Supply Terminals

e　Digital Output Terminals

f　Solid-State Pulse Output Terminals

g　Voltage Input Terminals

Figure 2-1 Appearance

2.2 Unit Dimensions

Unit: mm

Front View   Slide View
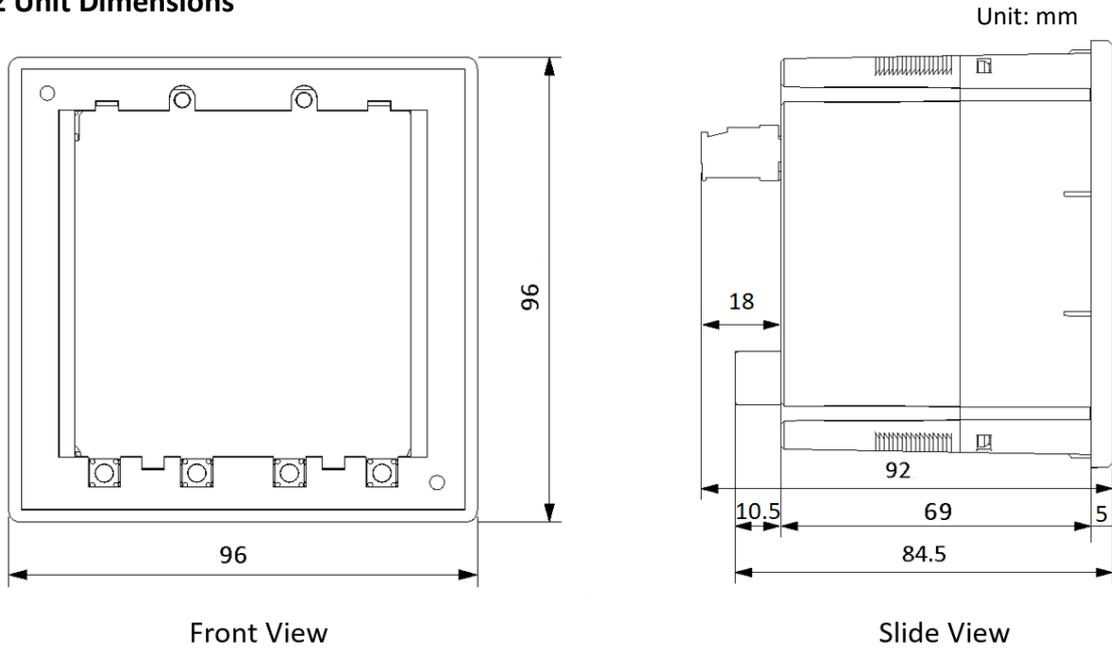
Figure 2-2 Unit Dimensions

2.3 Terminal Dimensions

Unit: mm
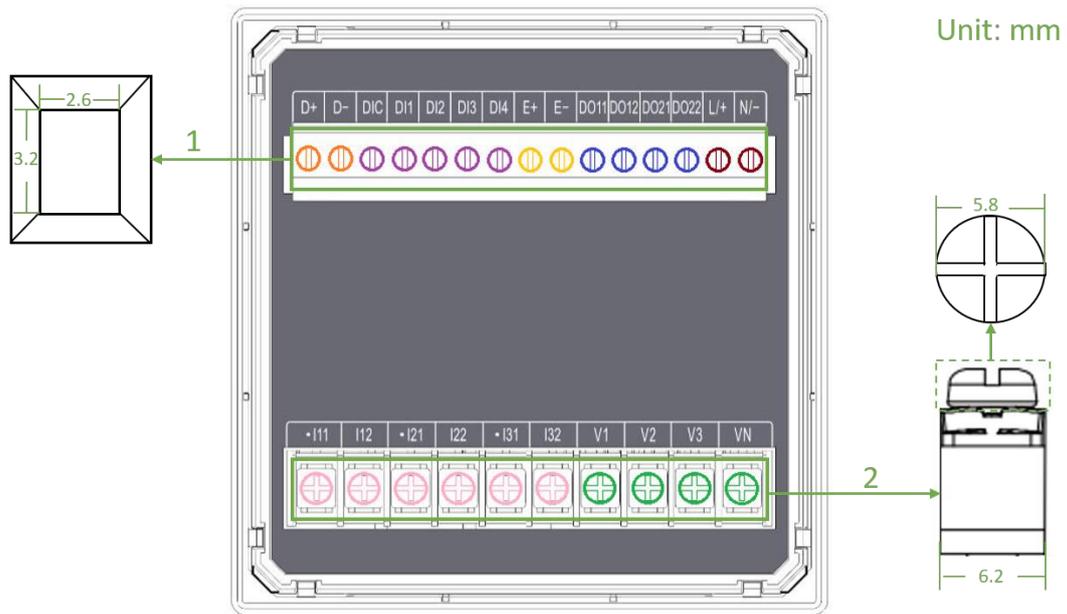
Figure 2-3 Terminal Dimensions

No.	Terminal	Terminal Dimensions	Wire Size	Max. Torque
1	RS-485	2.6mm x 3.2mm	1.5mm^2	5 kgf.cm/M3 (5 lb-in)
	Digital Input			
	Solid-State Pulse Output			
	Digital Output			
	Power Supply			
2	Voltage Input	5.8mm x 5.8mm	1.0 mm^2 -2.5 mm^2 14-22AWG	8.0 kgf.cm/M3 (6.9lb-in)
	Current Input			

Table 2-1 Terminal Dimensions

2.4 Mounting

The PMC-S963-C should be installed in a dry and dust-free environment and kept away from heat, radiation and electrical noise sources.

Installation steps:

▪ Remove the installation clips from the meter
▪ Fit the meter through a 96mmx96mm cutout as shown in Figure 2-4
▪ Re-install the installation clips and push the clips tightly against the panel to secure the meter
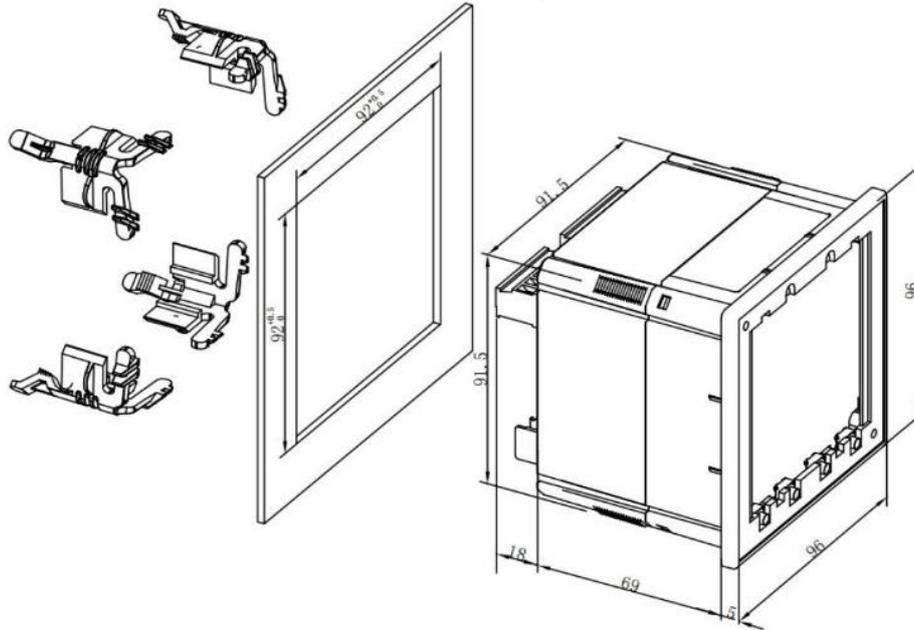
Figure 2-4 Panel Cutout Mounting

2.5 Wiring connections

PMC-S963-C can satisfy almost any three phase power systems. Please read this section carefully before installation and choose the correct wiring method for your power system. The following Wiring Modes are supported:

▪ 3-Phase 4-Wire (3P4W) Wye Direct Connection with 3CTs
▪ 3-Phase 4-Wire (3P4W) Wye with 3PTs and 3CTs
▪ 3-Phase 3-Wire (3P3W) Direct Delta Connection With 3CTs
▪ 3-Phase 3-Wire (3P3W) Direct Delta Connection with 2CTs
▪ 3-Phase 3-Wire (3P3W) Delta with 2PTs and 3CTs
▪ 3-Phase 3-Wire (3P3W) Delta with 2PTs and 2CTs

> ⚠ **Caution**
>
> Under no circumstances should the PT secondary be shorted.
>
> Under no circumstances should the CT secondary be open when the CT primary is energized. CT shorting blocks should be installed to allow for easy maintenance.

2.5.1 3-Phase 4-Wire (3P4W) Wye Direct Connection with 3CTs

Please consult the serial number label to ensure that the rated system phase voltage is less than or equal to the meter's rated phase voltage input specification. Set the **Wiring Mode** to **3P4W**.
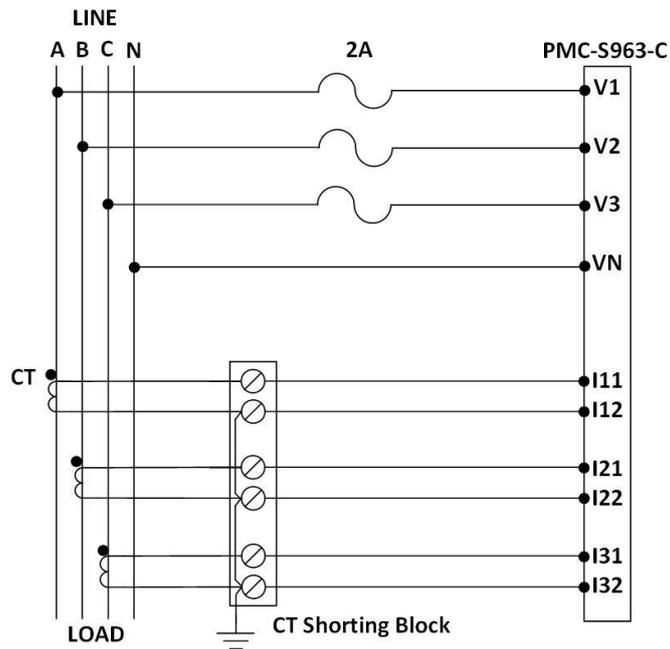
Figure 2-5 3P4W Direct Connection with 3CTs

2.5.2 3-Phase 4-Wire (3P4W) Wye with 3PTs and 3CTs

Please consult the serial number label to ensure that the rated PT secondary voltage is less than or equal to the meter's rated phase voltage input specification. Set the **Wiring Mode** to **3P4W**.
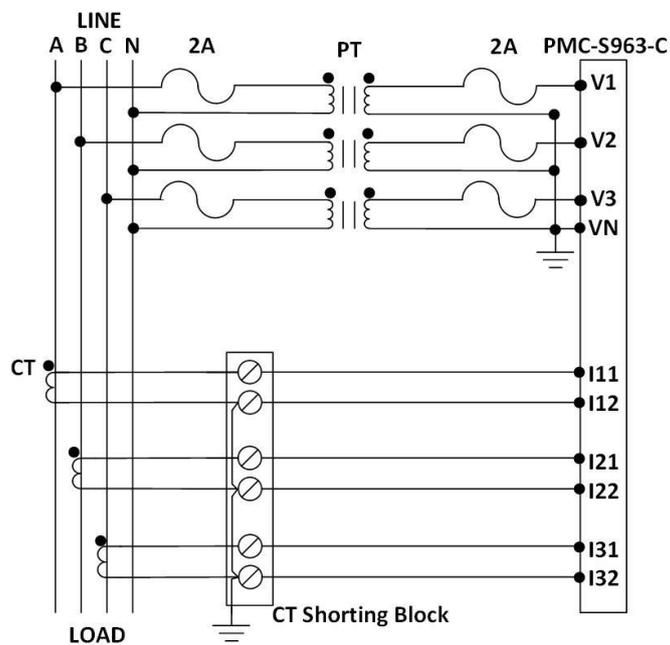
Figure 2-6 3P4W with 3PTs and 3CTs

2.5.3 3-Phase 3-Wire (3P3W) Direct Delta Connection with 3CTs

Please consult the serial number label to ensure that the rated system line voltage is less than or equal to the meter's rated line voltage input specification. Set the **Wiring Mode** to **3P3W**.
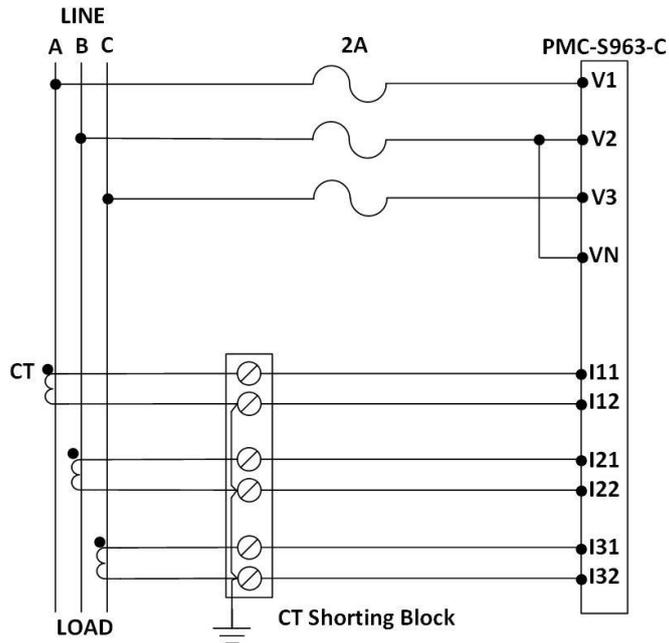
Figure 2-7 3P3W Direct Connection with 3CTs

2.5.4 3-Phase 3-Wire (3P3W) Direct Delta Connection with 2CTs

Please consult the serial number label to ensure that the rated system line voltage is less than or equal to the meter's rated line voltage input specification. Set the **Wiring Mode** to **3P3W**.
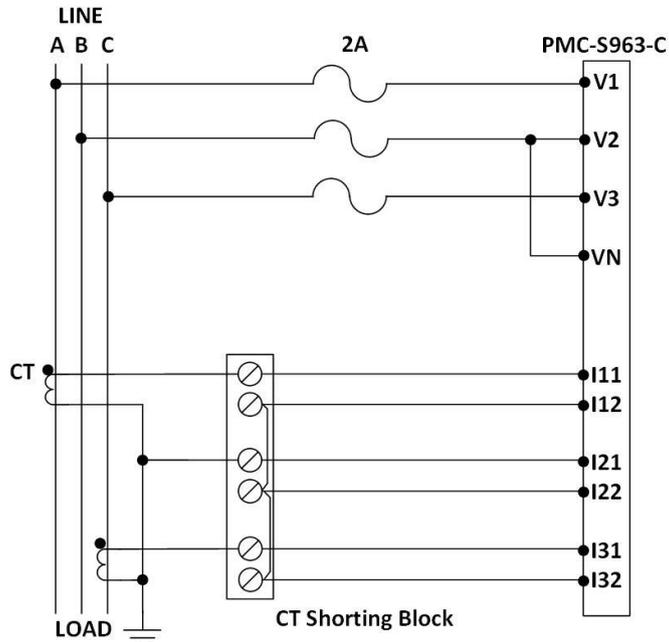
Figure 2-8 3P3W Direct Connection with 2CTs

2.5.5 3-Phase 3-Wire (3P3W) Delta with 2PTs and 3CTs

Please consult the serial number label to ensure that the rated PT secondary voltage is less than or equal to the meter's rated phase voltage input specification. Set the **Wiring Mode** to **3P3W**.
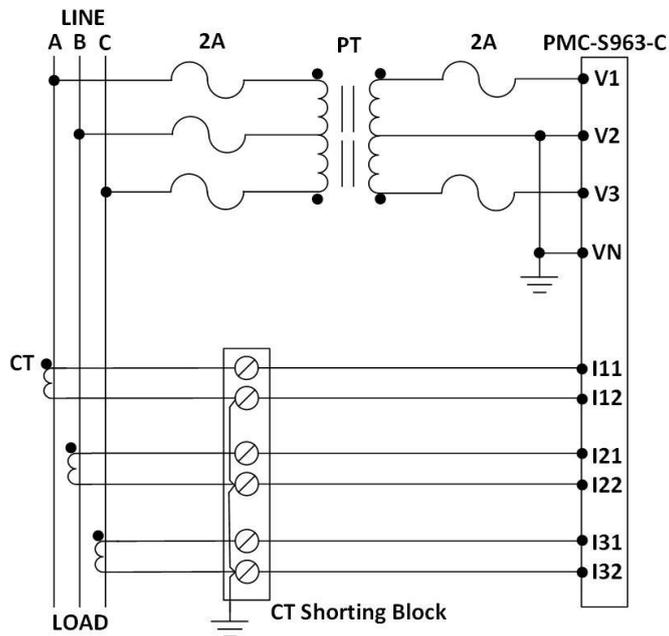
Figure 2-9 3P3W Delta with 2PTs and 3CTs

2.5.6 3-Phase 3-Wire (3P3W) Delta with 2PTs and 2CTs

Please consult the Serial Number Label to ensure that the rated PT secondary voltage is less than or equal to the meter's rated phase voltage input specification. Set the **Wiring Mode** to **3P3W**.
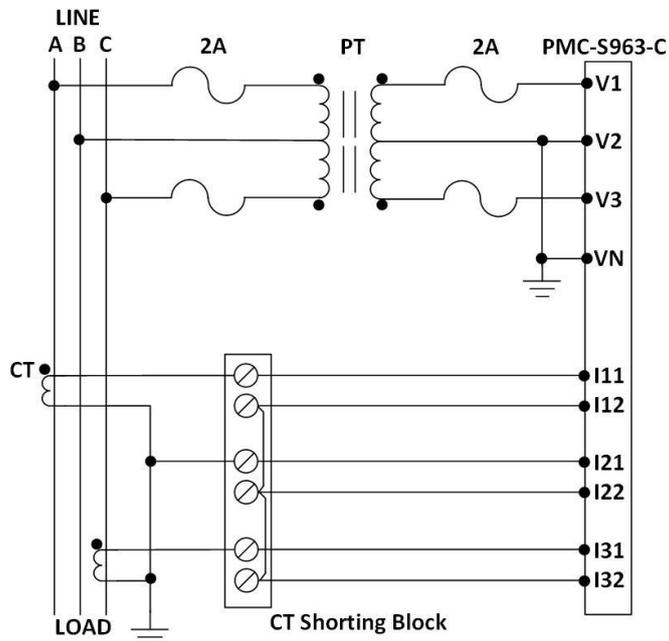
Figure 2-10 3P3W Delta with 2PTs and 2CTs

2.6 Communications Wiring

The PMC-S963-C provides one standard RS-485 port which supports the Modbus RTU protocol. Up to 32 devices can be connected on a RS-485 bus. The overall length of the RS-485 cable connecting all devices should not exceed 1200m.

If the master station does not have a RS-485 communications port, a RS-232/RS-485 or USB/RS-485 converter with optically isolated output and surge protection should be used.

The following figure illustrates the RS-485 communications connections on the PMC-S963-C:
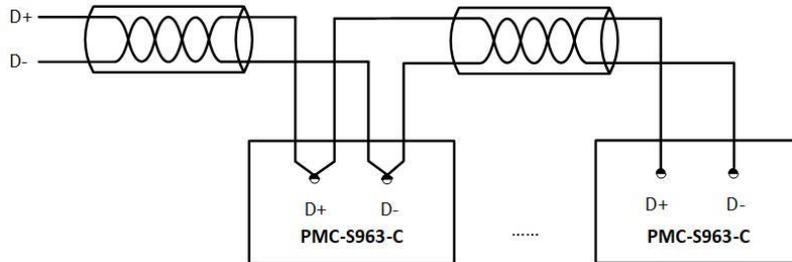
Figure 2-11 Communications Connections

2.7 Digital Input Wiring

The following figure illustrates the Digital Input connections on the PMC-S963-C:
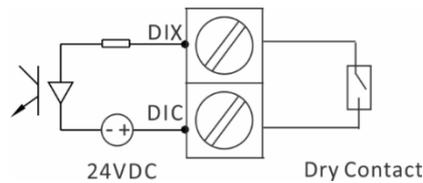
Figure 2-12 DI Connections

2.8 Digital Output Wiring

The following figure illustrates the Digital Output connections on the PMC-S963-C:
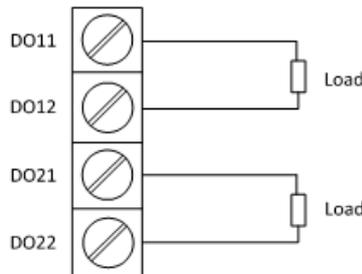
Figure 2-13 DO Connections

The following figure illustrates the Digital Output connections when the DO is used for controlling circuit breaker.
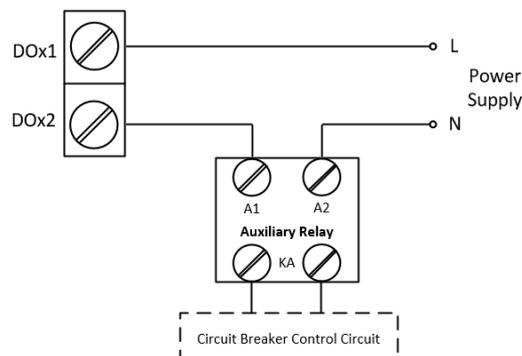
Figure 2-14 DO Connections for Controlling Circuit Breaker

2.9 Solid-State Pulse Output Wiring

The following figure illustrates the Solid-State Pulse Output connections on the PMC-S963-C:
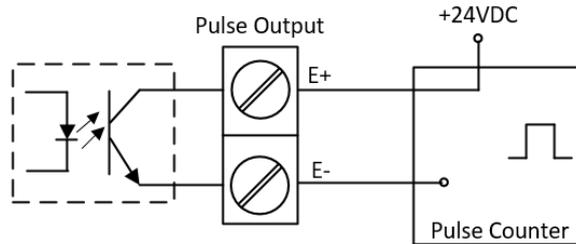
Figure 2-15 Solid-State Pulse Output Connections

2.10 Analog Input Wiring

The following figure illustrates the Analog Input connections on the PMC-S963-C:
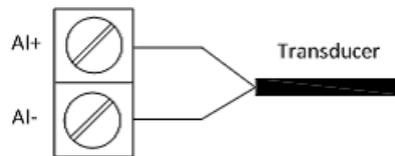
Figure 2-16 AI Connections

2.11 Power Supply Wiring

For AC supply, connect the live wire to the L/+ terminal and the neutral wire to the N/- terminal.

For DC supply, connect the positive wire to the L/+ terminal and the negative wire to the N/- terminal.
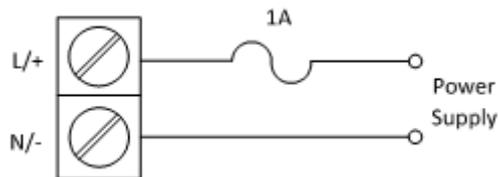
Figure 2-17 Power Supply Connections

Chapter 3 Front Panel

The PMC-S963-C has a large, easy to read LCD display with backlight and four buttons for data display and meter configuration. This chapter introduces the front panel operations.

1	kWh/kvarh LED Pulse Output
2	Enclosure
3	Front Panel
4	Buttons
5	Communication Indicator
6	Units
7	Measurements

Figure 3-1 Front Panel

3.1 Display

This section provides a description of the LCD display areas which can generally be divided into 5 areas:
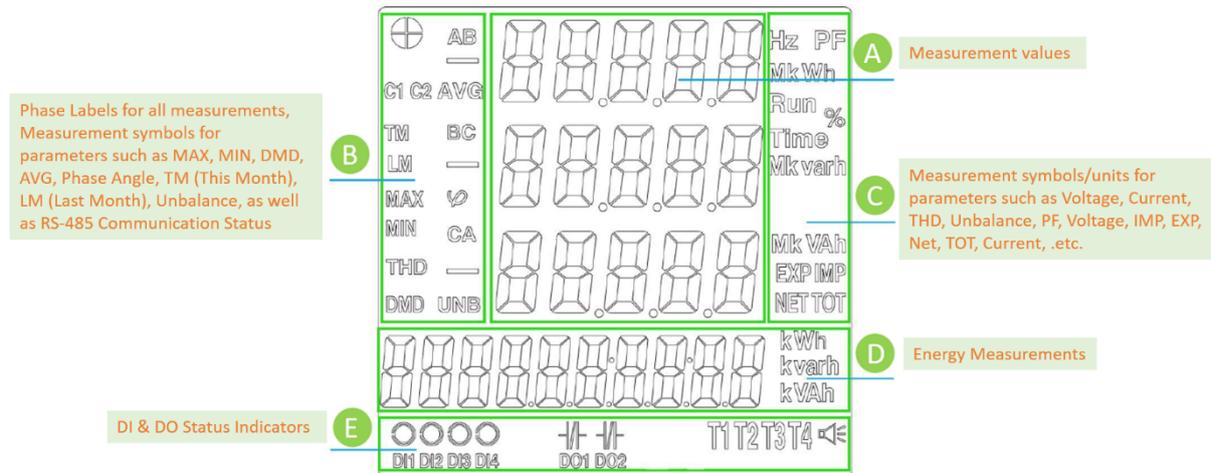
Figure 3-2 LCD Display

The following table shows the special LCD display symbols:

Area	Label	Description					
A		A	B	C	D	E	F
		G	H	I	J	K	L
		M	N	O	P	Q	R
		S	T	U	V	W	Y
		0	1	2	3	4	

B	⊕ AB C1 C2 AVG TM BC LM MAX ∠φ MIN CA THD DMD UNB	Q2/Q1/Q3/Q4 PF Quadrant-Q1/Q2/Q3/Q4	C1 C2 C1: RS-485 Communication status C2: Reserved	
		AB BC CA Phase AB/BC/CA/A/B/C	TM This Month LM Last Month	MAX Maximum MIN Minimum
		AVG Average	Negative Symbol	∠φ Phase Angle Symbol
		THD THD	DMD Demand	UNB Unbalance
C	Hz PF Mk Wh Run % Time Mk varh Mk VAh EXP IMP NET TOT	Hz Mk Wh Mk varh Mk VAh % Measurement Units for Frequency, Power (P, Q, S) and THD		
		PF PF	NET TOT Net, Total	Run Time Reserved
D	kWh kvarh kVAh	kWh kvarh kVAh Measurement Units for kWh, kvarh and kVAh		
E	DI1 DI2 DI3 DI4 DO1 DO2 T1 T2 T3 T4 🔊	● DI Closed	○ DI Open	
		⊣/⊢ DO Released	⊣⊢ DO Operated	
		T1 T2 T3 T4 Tariff 1- 4	🔊 Reserved	

Table 3-1 Special LCD display symbols

3.2 Using the Front Panel Buttons

The PMC-S963-C's front panel has been designed with a 4-button user-friendly interface that allows users to quickly scroll through most of the available measurements. **The default password is 0 (one zero).**

Buttons	Data Display Mode	Setup Configuration Mode
<Energy/◄>	Pressing this button toggles between **Real-time Measurements*** and **Energy Measurements**.	• Once a numeric parameter is selected, pressing this button moves the cursor to the left by one position. Otherwise, this button is ignored.
<▼>	Pressing this button advances to the next measurement page.	• Before a parameter is selected for modification, pressing this button advances to the next parameter or menu. • If a parameter is already selected, pressing this button decrements a numeric value or advances to the next enumerated value in the selection list.
<▲>	Pressing this button returns to the previous measurement page.	• Before a parameter is selected for modification, pressing this button returns to previous parameter or menu. • If a parameter is already selected for modification, pressing this button increments a numeric value or goes back to the last enumerated value in the selection list.
<Setup/◄┘>	Pressing this button returns to the	• Once inside the **Setup Configuration** mode,

	default page (P/Q/S Total). Pressing this button for more than 2 seconds enters the **Setup Configuration** mode.	pressing this button selects a parameter for modification or chooses whether to enter a sub-menu. • After changing the parameter, pressing this button again saves the new setting into memory. • Pressing this button for more than 2 seconds returns to previous menu or exits **Setup Configuration** mode.
<Energy/ ◄ > & **<Setup/◄─↵ >**	Pressing this combination for 2 seconds enters or exits the **Quick Setup** mode which provides quickly configuration for parameters CT1, CT2, PT1, PT2 and ID (Unit ID).	

* The **Real-time Measurements** include P/Q/S per Phase and Total, ULN/ULL/I/PF per Phase and Average, In (Calculated) as well as Freq., P Present and Predicted Demands as well as This/Last Max. Demand, U & I Phase Angle, Unbalances, THD/TOHD/TEHD per Phase and Individual Harmonics from 2nd to 31st.

Table 3-2 Button Function

3.3 Data Display

The following sections illustrate the available measurements for each display option. Depending on the **Wiring Mode** selected, certain measurements may not be available. For example, the per-phase ULN, ULN Average, per-phase P, Q, S and PF measurements are not available when the **Wiring Mode** is set to 3P3W.

3.3.1 Real-Time Measurement

Display Screens	1st Row	2nd Row	3rd Row	4th Row
Display 1	P Total	Q Total	S Total	kWh
Display 2[1]	Uan	Ubn	Ucn	kWh
Display 3	Uab	Ubc	Uca	kWh
Display 4	Ia	Ib	Ic	kWh
Display 5	-	-	In	kWh
Display 6	Pa	Pb	Pc	kWh
Display 7	Qa	Qb	Qc	kWh
Display 8	Sa	Sb	Sc	kWh
Display 9	PFa	PFb	PFc	kWh
Display 10	-	PF Total	-	kWh
Display 11	-	-	Frequency	kWh
Display 12			P Present Dmd.	kWh
Display 13			P Predicted Dmd.	kWh
Display 14	P Max. Demand of This Month (Since Last Reset)			
Display 15	P Max. Demand of Last Month (Before Last Reset)			
Display 16	Uan Phase Angle	Ubn Phase Angle	Ucn Phase Angle	kWh
Display 17	Uab Phase Angle	Ubc Phase Angle	Uca Phase Angle	kWh
Display 18	Ia Phase Angle	Ib Phase Angle	Ic Phase Angle	kWh
Display 19	U Unbalance			
Display 20	I Unbalance			
Display 21	Uan THD	Ubn THD	Ucn THD	
Display 22	Uan TOHD	Ubn TOHD	Ucn TOHD	
Display 23	Uan TEHD	Ubn TEHD	Ucn TEHD	
Display 24	Ia THD	Ib THD	Ic THD	
Display 25	Ia TOHD	Ib TOHD	Ic TOHD	
Display 26	Ia TEHD	Ib TEHD	Ic TEHD	
Display 27	Uan/Uab HD02	Ubn/Ubc HD02	Ucn/Uca HD02	
Display 28	Uan/Uab HD03	Ubn/Ubc HD03	Ucn/Uca HD03	
...	...	...	...	...
Display 56	Uan/Uab HD31	Ubn/Ubc HD31	Ucn/Uca HD31	
Display 57	Ia HD02	Ib HD02	Ic HD02	
Display 58	Ia HD03	Ib HD03	Ic HD03	
...	...	...	...	
Display 86	Ia HD31	Ib HD31	Ic HD31	

Table 3-3 Default Display

Notes:
1) This screen is not shown if the Wiring Mode is set to 3P3W.

3.3.2 Energy

Display Screens	1st Row	2nd Row	3rd Row	4th Row
Display 1	kWh Import			
Display 2	kWh Export			

Display 3	kvarh Import
Display 4	kvarh Export
Display 5	kVAh
Display 6[1]	Phase A kWh Import
Display 7[1]	Phase A kWh Export
Display 8[1]	Phase A kvarh Import
Display 9[1]	Phase A kvarh Export
Display 10[1]	Phase B kWh Import
Display 11[1]	Phase B kWh Export
Display 12[1]	Phase B kvarh Import
Display 13[1]	Phase B kvarh Export
Display 14[1]	Phase C kWh Import
Display 15[1]	Phase C kWh Export
Display 16[1]	Phase C kvarh Import
Display 17[1]	Phase C kvarh Export
Display 18[2]	T1 kWh Import
Display 19[2]	T2 kWh Import
Display 20[2]	T3 kWh Import
Display 21[2]	T4 kWh Import

Table 3-4 Energy Display

Notes:
1) This screen is not shown if the Wiring Mode is set to 3P3W.
2) This display only appears if the corresponding Tariff is enabled.

3.4 Setup Configuration via the Front Panel

3.4.1 Making Setup Changes

1) **Entering the Password:**
- Press **<Setup/◄┘>** for two seconds to enter **Setup Configuration** mode, and the LCD displays **PROG**.
- Press < ▼ > advance to the Password page.
- A correct password must be entered before changes are allowed. Press **<Setup/◄┘>** to enter the password. The factory default password is "0".
- Press <**Energy/◄**> to shift the cursor to the left by one position and press <▲> or <▼> to increment or decrement the numeric value for the password.
- When the password has been entered, press **< Setup/◄┘>** to save the password. If the entered password is correct, its value will be shown on the display. If the entered password is incorrect, the setup parameters only can be checked. Press <▲ > or < ▼ > to scroll through the list of sub-menus. Once the desired sub-menu is reached, press **<Setup/◄┘>** to select it and press **<Setup/◄┘>** again to modify it. When finished, press **<Setup/◄┘>** to return to the main menu.

2) **Selecting a parameter to change:**
- Press <▲> or <▼> to scroll to the desired parameter within a sub-menu.
- Press **< Setup/◄┘>** to select a parameter. Once a parameter has been selected, its value will blink.

3) **Changing and saving a setup parameter:**
- For a Numeric parameter, press <**Energy/◄**> to shift the cursor to the left by one position or <▲ > or <▼> to increment or decrement the numeric value.
- For an Enumerated parameter, press <▲> or <▼> to scroll through the enumerated list.
- After modification, press **<Setup/◄┘>** to save the change into memory.
- Repeat step 3) until all setup parameters have been changed.

4) **Exiting the Setup Mode**
- Press **<Setup/◄┘>** for two seconds to return to the main menu and press **<Setup/◄┘>** again to return to the **Data Display** Mode.
- Also, the **Setup Mode** will be automatically exited if there is a period of inactivity of 5 minutes or longer.

3.4.2 Setup Menu
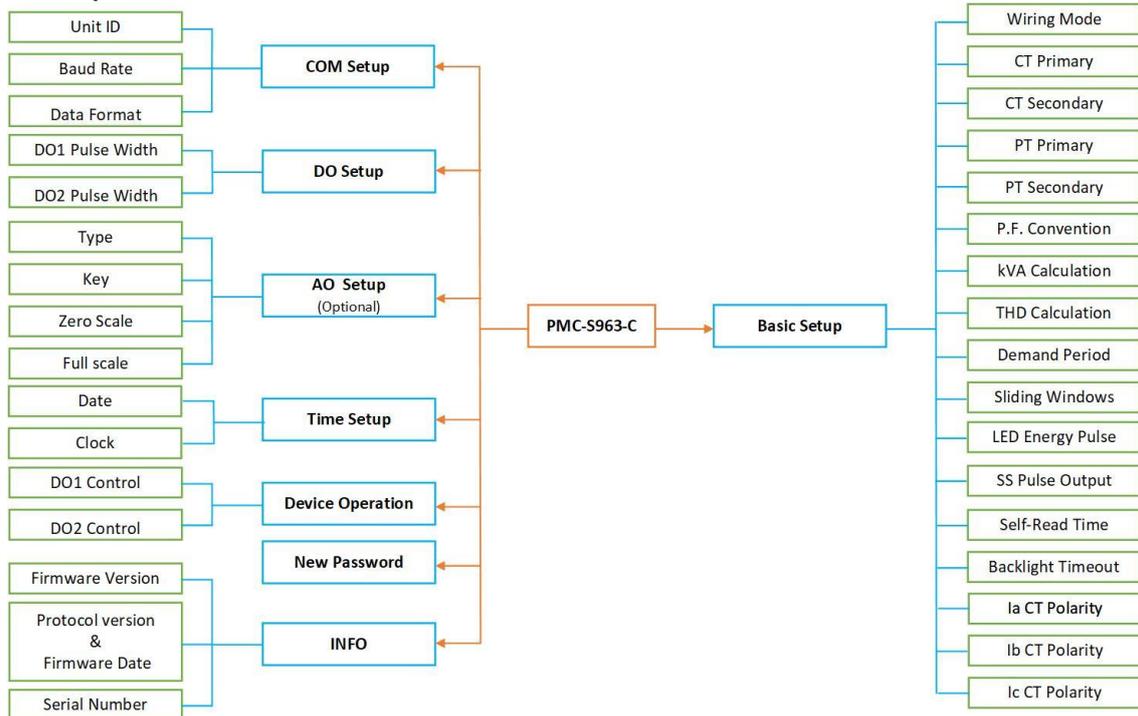
Figure 3-3 Setup Menu

3.4.3 Configuration

The Setup Configuration mode provides access to the following setup parameters:

Label		Parameters	Description	Range	Default
Menu					
Main	Sub				
PROG		Programming	Setup Configuration	/	/
Input PASS		Password	Enter Password	0 to 9999	0
BASIC SET			Enter sub menu to set basic parameters?	YES/NO	NO
	WIRE TYPE SET	Wiring Mode	Meter's Wiring Connection	DEMO/ 3P3W/3P4W	3P4W
	CT1 SET~	CT Primary	CT Primary Current	1 to 30,000A	5A
	CT2 SET~	CT Secondary	CT Secondary Current	1 to 5A	5A
	PT1 SET ~	PT Primary[1]	PT Primary Voltage	1 to 1,000,000V	380V
	PT2 SET~	PT Secondary[1]	PT Secondary Voltage	1 to 690V	380Vl
	PF SET	P.F. Convention[2]	PF Convention	IEC/IEEE/-IEEE	IEC
	kVA SET	kVA Calculation[3]	kVA Calculation Method	V/S (V=Vector, S=Scalar)	V
	THD SET	THD Calculation[4]	Select between % of Fundamental or % of RMS	THDF/THDR	THDF
	PRD TIME SET	Demand Period	Set Demand Period	1 to 60 (min)	15
	SUB NUM SET	Set No. of Sliding Windows	Set No. of Sliding Windows	1 to 15	1
	PRED RESP SET	Predicted Response	Predicted Demand Response	70 to 99 (%)	70
	LED PULSE SET	LED Pulse	Enable LED kWh/kvarh Pulsing	Disabled/kWh Tot./kvarh Tot./kWh Imp./kWh Exp./kvarh Imp./kvarh Exp.	kWh Tot.
	DO PULSE	SS Pulse Output	Enable Solid-State Pulsing Output		
	SR TIME SET	Self-Read Time	Self-Read Time for both Max. Demand, Max./Min. Log and Historical Monthly Energy Log	0/--D--H D: 1-28; H: 0-23	0
	BLTO SET	Backlight	Backlight Timeout	0 to 60 mins	5

	Timeout			
I PHS A REV	Ia CT Polarity	Reverse Ia CT Polarity	Yes/No	No
I PHS B REV	Ib CT Polarity	Reverse Ib CT Polarity	Yes/No	No
I PHS C REV	Ic CT Polarity	Reverse Ic CT Polarity	Yes/No	No
COM SET		Enter sub menu to set Comm. parameters?	YES/NO	NO
ID SET~	Meter Address	Unit ID	1-247	Last 2 digits of SN[5]
BAUD SET	Baud Rate	Data rate in bits per second	1200/2400/ 4800/9600/ 19200/ 38400bps	9600
CFG SET	Comm. Port Configuration	Data Format	8N2/8O1/8E1/8 N1/8O2/8E2	8E1
IO SET[6]				
DO1 DELAY SET	DO1 Pulse Width	Pulse Width for DO1	0 to 600 (x0.1s) (0=Latch Mode)	10
DO2 DELAY SET	DO2 Pulse Width	Pulse Width for DO2		
AO SET[6]				
AO TYPE	Type	Select between 0-20mA or 4-20mA output	4-20mA / 0-20mA	4-20mA
AO KEY[7]	Key	The parameter to which the Analog Output is proportional	See Table 3-6	Uab
AO MIN	Zero Scale	The parameter value that corresponds to the minimum Analog Output of 0 mA or 4 mA	-999,999 to 999,999	400
AO MAX	Full scale	The parameter value that corresponds to the maximum Analog Output of 20 mA	-999,999 to 999,999	2000
TIME SET	Set date and time	Enter sub menu to set time?	YES/NO	NO
DATE SET	Date	Enter the Current Date	YYYY-MM-DD	/
TIME SET	Clock	Enter the Current Time	HH:MM:SS	/
DEV OPT SET				
DO1 CTRL	DO1 Control	DO Control Mode	NRM/OFF/ON	NRM
DO2 CTRL	DO2 Control			NRM
NEW PASS SET				
NEW PASS SET	New Password	Set new password	0 to 9999	0
INFO		View Device Information (Read Only)	Yes/No	
FW	Firmware Version	Firmware Version	e.g. 1.00.00 means V1.00.00	/
PROT	Protocol Version FM Update Date	Protocol Version and Firmware Update Date	e.g. 2.1 means V2.1	/
DATE			e.g. 20160603	
SN	Serial Number	Serial Number	e.g. 1506005094	/

~ These setup parameters are also available in the **Quick Setup** mode.

Table 3-5 Setup Parameters

Notes:

1) The value of [PT Primary/PT Secondary] cannot exceeds 10000.
2) Power Factor Convention
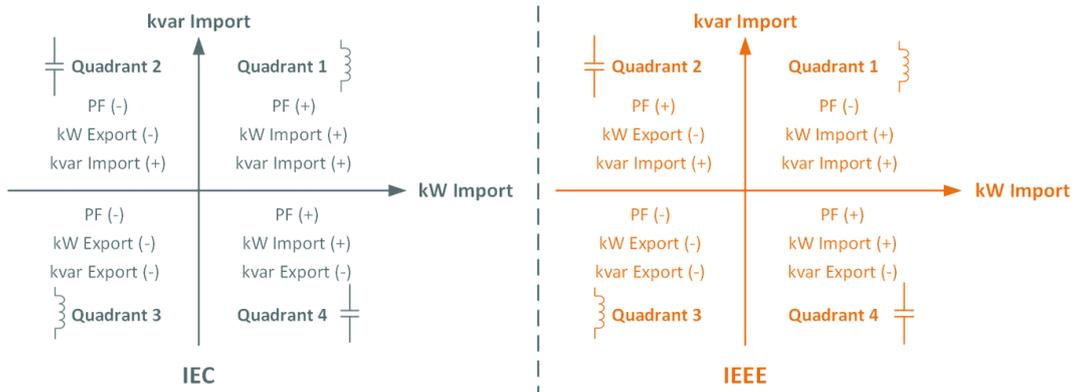
Figure 3-4 PF Convention

3) There are two ways to calculate kVA:

Mode V (Vector method**):** $\quad kVA_{total} = \sqrt{kW_{total}{}^2 + kvar_{total}{}^2}$

Mode S (Scalar method**):** $\quad kVA_{total} = kVA_a + kVA_b + kVA_c$

4) There are two ways to calculate THD:

THDf (based on Fundamental): $\quad THD = \dfrac{\sqrt{\sum\limits_{n=2}^{\infty} I_n{}^2}}{I_1} \times 100\%$

where I_n represents the RMS value for the nth harmonic and I_1 represents the RMS value of the Fundamental harmonic.

THDr (based on RMS): $\quad THD = \dfrac{\sqrt{\sum\limits_{n=2}^{\infty} I_n{}^2}}{\sqrt{\sum\limits_{n=1}^{\infty} I_n{}^2}} \times 100\%$

where I_n represents the RMS value for the nth harmonic.

5) If the last 2 digits of SN is 00, the default ID should be 100.
6) This menu only appears if the meter is equipped with the corresponding options.
7) Analog Output Parameters:

Key	Parameter	Scale	Unit	Key	Parameter	Scale	Unit
0	Uab		V	10	S Total	x1	kVA
1	Ubc		V	11	PF Total	x1000	-
2	Uca		V	12	Frequency	x100	-
3	ULL Avg.	x1	V	13	P Present Demand	x1	kW
4	Ia		A	14	Reserved		
5	Ib		A	15	Reserved		
6	Ic		A	16	Uan		V
7	I Avg.		A	17	Ubn	x1	V
8	P Total	x1	kW	18	Ucn		V
9	Q Total		kvar	19	ULN Avg.		V

Table 3-6 Analog Output Parameters

Chapter 4 Applications

4.1 Inputs and Outputs

4.1.1 Digital Inputs

The PMC-S963-C comes standard with four self-excited Digital Inputs that are internally wetted at 24 VDC with a sampling frequency of 1000Hz and programmable debounce. The Digital Inputs on the PMC-S963-C are typically used for status monitoring which can help prevent equipment damage, improve maintenance, and track security breaches. The real-time statuses of the Digital Inputs are available on the front panel LCD Display as well as through communications. Changes in Digital Input status are stored as events in the SOE Log in 1 ms resolution.

The DI parameter **DIx Debounce** specifies the minimum duration the **DI** must remain in the Active or Inactive state before a state change is considered to be valid, which can be set through communications.

4.1.2 Digital Outputs

The PMC-S963-C comes standard with two Form A Electrometrical Relays. Digital Outputs are normally used for setpoint alarming, load control, or remote control applications.

Digital Outputs on the PMC-S963-C can be used in the following applications:

1) **Front Panel Control**   Manually operated from the front panel. Please refer to the **DO Control** setup parameter in Section 3.4.3 for a detailed description.
2) **Remote Control**   Remotely operated over communications via our free PMC Setup software or PecStar® iEMS Integrated Energy Management System.
3) **Control Setpoint**   Control Setpoints can be programmed to trigger DO action upon becoming active. Please refer to **Section 4.4** for a detailed description.

The DO parameter **DOx Pulse Width** specifies the duration for which the relay output will be active when a Remote Operate or Setpoint Trigger command is received to operate it. The **DOx Pulse Width** can be programmed via the Front Panel or through communications.

Since there are multiple ways to trigger the Digital Outputs on the PMC-S963-C, a prioritized scheme has been developed to avoid conflicts between different applications. In general, Front Panel Control has the highest priority and can override other control schemes. Remote Control and Control Setpoint share the same priority, meaning that they can all be programmed to control the same Digital Output. This scheme is equivalent to having an implicit Logical OR operation for the control of a Digital Output and may be useful in providing a generic alarm output signal. However, the sharing of a Digital Output is not recommended if the user intends to generate a control signal in response to a specific setpoint condition.

4.1.3 Energy Pulse Output

The PMC-S963-C comes standard with one Front Panel LED Pulse Output and one Solid-State Relay Output for energy pulsing. Energy Pulse Outputs are typically used for accuracy testing. Both LED Pulse Output and Solid-State Pulse Output on the PMC-S963-C can be enabled via the Front Panel or through communications.

4.1.4 Analog Output

The PMC-S963-C comes optionally with one Analog Output which can be programmed as 0mA to 20mA or 4mA to 20mA output.

There are 4 setup parameters:

Type   Select between 0-20mA or 4-20mA output.

AO Zero   Defines the zero scale value of the parameter when the Analog Output is 0 or 4 mA according to the **AO Type**. The value ranges between -999,999 to +999,999.

AO Full   Defines the full scale value of the parameter when the Analog Output is 20 mA. The value ranges between -999,999 and +999,999.

Key   Defines the parameter to which the Analog Output is proportional. The Analog Output Parameters are listed in the following table.

Key	Parameter	Scale	Unit	Key	Parameter	Scale	Unit
0	Uab		V	10	S Total	x1	kVA
1	Ubc	x1	V	11	PF Total	x1000	-
2	Uca		V	12	Frequency	x100	-

3	ULL Avg.		V	13	P Present Demand	x1	kW
4	Ia		A	14	Reserved		
5	Ib		A	15	Reserved		
6	Ic		A	16	Uan		V
7	I Avg.		A	17	Ubn	x1	V
8	P Total	x1	kW	18	Ucn		V
9	Q Total		kvar	19	ULN Avg.		V

Table 4-1 Analog Output Parameters

For example, an AO of 4-20mA is required to be proportional to Phase A current. The maximum value of Phase A Current is 2000A, and the minimum value is 500A. As such, the **Type** parameter should be programmed as **4-20mA**. The **Key** parameter should be programmed with Ia (Phase A Current). The **AO FULL** parameter should be programmed with the value 2000. The **AO ZERO** parameter should be programmed with the value 500. Therefore, when Phase A Current is 500A or below, the AO output is 4mA. When Phase A Current is 2000A, the AO output is 20mA. When Phase A Current is 1250A, the AO is (1250A-500A) x (20mA-4mA) / (2000A-500A) + 4mA = 12.00 (mA).

4.2 Power and Energy

4.2.1 Basic Measurements

The PMC-S963-C provides the following basic measurements which are available through the LCD display or communications.

Parameter	Phase A	Phase B	Phase C	Total	Average
ULN	●	●	●	-	●
ULL	●	●	●	-	●
Current	●	●	●	-	●
Neutral Current	-	-	-	In (Calculated)	-
P	●	●	●	●	-
Q	●	●	●	●	-
S	●	●	●	●	-
Power Factor	●	●	●	●	-
Frequency	●	-	-	-	-
U Fundamental	●	●	●	-	-
I Fundamental	●	●	●	-	-

Table 4-2 Basic Measurements

4.2.2 Energy Measurements

The PMC-S963-C provides Energy parameters for active energy (kWh), reactive energy (kvarh) and apparent energy (kVAh) with a resolution of 0.1k and a maximum value of ±1,000,000,000.0. When the maximum value is reached, the energy registers will automatically roll over to zero. The energy can be reset manually via communications, and also can be preset to user-defined values through the front panel or communications.

The PMC-S963-C provides the following energy measurements:

3-Phase Energy	kWh Import/Export/Net/Total
	kWh Import of TOU T1-4
	kvarh Import/Export/Net/Total
	kvarh of Q1/Q2/Q3/Q4
	kVAh Total
Per-Phase Energy (Phase A/B/C):	kWh Import/Export
	kvarh Import/Export

Table 4-3 Energy Measurement

4.2.3 Demand Measurements

Demand is defined as the average power consumption over a fixed interval (usually 15 minutes) based on the sliding window method. Predicted demand is typically used for pre-alarming and to help users reduce power consumption using a Setpoint to warn that the Demand limit may be exceeded. The PMC-S963-C provides Present Demand and Predicted Demand for P Total which can be retrieved through the Front Panel or communications.

The PMC-S963-C provides the following setup parameters:

Setup Parameter	Definition	Options/Default*
Demand Period	1 to 60 minutes. For example, if the **# of Sliding Windows** is set as 1 and the **Demand Period** is 15, the demand cycle will be 1×15=15min.	1 to 60 min 15*
# of Sliding Windows	Number of Sliding Windows.	1* to 15
Self-Read Time	The **Self-Read Time** allows the user to specify the time and day of the month for the Max. Demand Self-Read operation. The **Self-Read Time** supports two options: • A zero value means that the Self-Read will take place at 00:00 of the first day of each month. • A non-zero value means that the Self-Read will take place at a specific time and day based on the formula: Self-Read Time = Day * 100 + Hour where 0 ≤ Hour ≤ 23 and 1 ≤ Day ≤ 28. For example, the value 1512 means that the Self-Read will take place at 12:00pm on the 15th day of each month.	0*
Predicted Response	The Predicated Response shows the speed of the predicted demand output. A value between 70 and 99 is recommended for a reasonably fast response. Specify a higher value for higher sensitivity.	70* to 99

Table 4-4 Demand Setup

4.3 Power Quality

4.3.1 Phase Angles

Phase analysis is used to identify the angle relationship between 3-phase Voltages and Currents.

For WYE connected systems, the per phase difference of the Current and Voltage angles should correspond to the per phase PF. For example, if the PF is 0.5 Lag and the Voltage phase angles are 0.0°, 240.0° and 120.0°, the Current phase angles should have the values of -60.0°, 180.0° and 60.0°.

4.3.2 Power Quality Parameters

The PMC-S963-C provides the following PQ parameters:

4.3.2.1 Harmonics

The PMC-S963-C provides harmonic analysis for THD, TOHD, TEHD and individual harmonics up to the 31st order. All harmonic parameters are available on the front panel and through communications. In addition, the PMC-S963-C also provides TDD and Crest Factor measurements for current.

4.3.2.2 TDD

Total Demand Distortion (TDD) is defined as the ratio of the root mean square (rms) of the harmonic current to the root mean square value of the rated or maximum demand fundamental current.

TDD of the current I is calculated by the formula below:

$$TDD = \frac{\sqrt{\sum_{h=1}^{h=\infty}(I_h)^2}}{I_L}$$

where

I_L = maximum demand of fundamental current

h = harmonic order (1, 2, 3, 4, etc.)

I_h = rms load current at the harmonic order h

4.3.2.3 Crest Factor

Crest Factor is defined as the **Peak to Average Ratio (PAR)**, and its calculation is illustrated below:

$$C = \frac{|X|_{peak}}{X_{rms}}$$

where

$|X|_{peak}$ = Peak amplitude of the waveform

X_{rms} = RMS value

The following table illustrates the available Voltage and Current Harmonics measurements on the PMC-S963-C.

	Phase A/AB	Phase B/BC	Phase C/CA
Harmonic-Voltage	THD	THD	THD
	TEHD	TEHD	TEHD
	TOHD	TOHD	TOHD
	HD02	HD02	HD02
		...	
	HD31	HD31	HD31
Harmonic-Current	THD	THD	THD
	TEHD	TEHD	TEHD
	TOHD	TOHD	TOHD
	TDD	TDD	TDD
	TDD Even	TDD Even	TDD Even
	TDD Odd	TDD Odd	TDD Odd
	Crest Factor	Crest Factor	Crest Factor
	HD02	HD02	HD02
		...	
	HD31	HD31	HD31

Table 4-5 Harmonic Measurements

4.3.3 Unbalance

The PMC-S963-C provides Voltage and Current Unbalance measurements. The calculation method of Voltage and Current Unbalances are listed below:

$$\text{Voltage Unbalance} = \frac{V2}{V1} \times 100\% \qquad \text{Current Unbalance} = \frac{I2}{I1} \times 100\%$$

where
V1, V2 are the Positive and Negative Sequence Components for Voltage, respectively.
and
I1, I2 are the Positive and Negative Sequence Components for Current, respectively.

4.3.4 Sequence Components

The PMC-S963-C provides the Voltage and Current Sequence Components measurements, which are only available via communication.

Parameters	Positive Sequence	Negative Sequence	Zero Sequence
U	U1	U2	U0
I	I1	I2	I0

Table 4-6 Sequence Parameters

4.4 Setpoints

The PMC-S963-C comes standard with 9 user programmable setpoints which provide extensive control by allowing a user to initiate an action in response to a specific condition. Typical setpoint applications include alarming, fault detection and power quality monitoring.
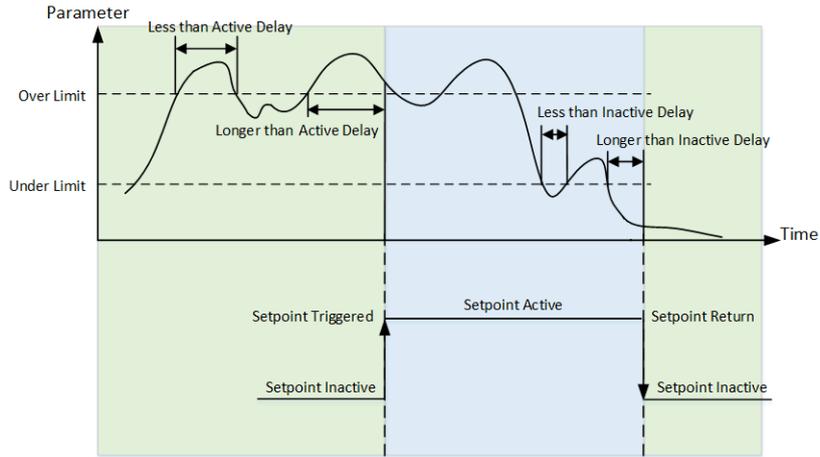
Figure 4-1 Over Setpoint
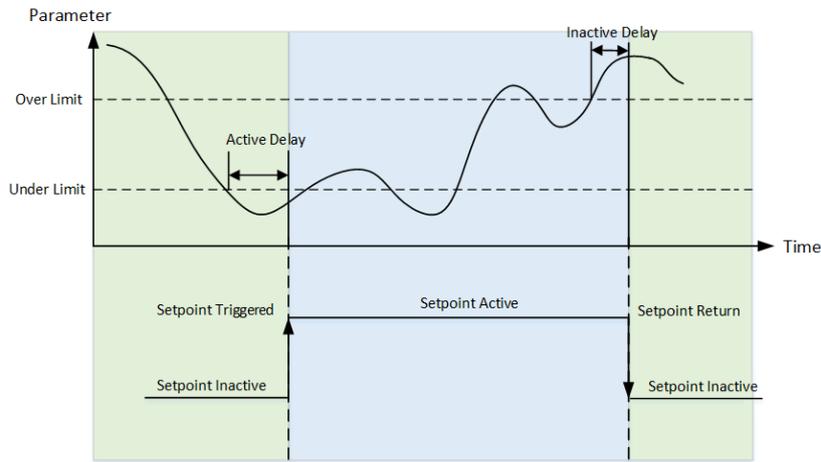
Figure 4-2 Under Setpoint

Setpoints can be programmed through communications and have the following setup parameters:

Setup Parameter	Definition	Options/Default*
Setpoint Type	Over or Under Setpoint.	0=Disabled* 1=Over Setpoint 2=Under Setpoint
Setpoint Parameter	Specify the parameter to be monitored.	See Table 4-8, 0*
Over Limit	Specify the value that the setpoint parameter must exceed for Over Setpoint to become active or for Under Setpoint to become inactive.	0*
Under Limit	Specify the value that the setpoint parameter must go below for Over Setpoint to become inactive or for Under Setpoint to become active.	0*
Active Delay	Specify the minimum duration that the setpoint condition must be met before the setpoint becomes active. An event will be generated and stored in the SOE Log. The range of the **Active Delay** is between 0 and 9999 seconds.	0* to 9999s
Inactive Delay	Specify the minimum duration that the setpoint return condition must be met before the setpoint becomes inactive. An event will be generated and stored in the SOE Log. The range of the **Inactive Delay** is between 0 and 9999 seconds.	0* to 9999s
Setpoint Trigger	Specify what action a setpoint would take when it becomes active.	See table 4-9, 0*

Table 4-7 Description for Setpoint Parameters

Key	Parameter	Scale	Unit
0	None	-	
1	ULN (Any Phase Voltage)	x1	V
2	ULL (Any Line Voltage)		V
3	Current (Any Phase Current)		A
4	Frequency		Hz

5	P Total		W
6	PF Total		-
7	P Total Present Demand		W
8	Voltage THD		100%
9	Current THD		100%
10	Voltage Unbalance		100%
11	Current Unbalance		100%
12	In (Calculated)		A
13	Q Total		var
14	S Total		VA
15	P Total Predicted Demand		W
16	Phase Reversal[1]		-

Table 4-8 Setpoint Parameters

Note:

1) When the **Setpoint Parameter** is set to **Phase Reversal**, the **Setpoint Type** must be set to **1 (Over Setpoint)**, and there is no need to set **Over Limit** and **Under Limit**. Please be informed that the Phase Reversal Setpoint assumes that the phase sequencing is based on **Positive** or **Clockwise** rotation (ABC).

Key	Action
0	None
1	DO1 Closed
2	DO2 Closed

Table 4-9 Setpoint Triggers

4.5 Logging

4.5.1 Max./Min. Log

The PMC-S963-C records the **Max. Log** and **Min. Log** of **This Month (Since Last Reset)** and **Last Month (Before Last Reset)** with timestamp for the parameters listed in **Table 4-10**. Each log includes the relevant parameter value and its timestamp. The recorded data is stored in non-volatile memory and will not suffer any loss in the event of a power failure.

Max./Min. Parameters					
Ia	Ib	Ic	I Avg.	Uan	Ubn
Ucn	ULN Avg.	Uab	Ubc	Uca	ULL Avg.
Pa	Pb	Pc	P Total	Qa	Qb
Qc	Q Total	Sa	Sb	Sc	S Total
PFa	PFb	PFc	PF Total	Frequency	In (Calculated)
Ia THD	Ib THD	Ic THD	Uan/Uab THD	Ubn/Ubc THD	Ucn/Uca THD
U Unbal.	I Unbal.				

Table 4-10 Max./Min. Log

The same **Self-Read Time** for the Max. Demand Log is used to specify the time and day of the month for the Max./Min. Self-Read operation. Please refer to **Section 4.2.3** for a complete description of the **Self-Read Time** and its operation. The Max./Min. Log of This Month can be reset manually via communications.

4.5.2 Max. Demand Log

The PMC-S963-C records the **Max. Demand** of **This Month (Since Last Reset)** and **Last Month (Before Last Reset)** with timestamp for P Total. All Max. Demand information can be accessed through the front panel as well as communications. Please refer to **Section 4.2.3** for a complete description of the **Self-Read Time** and its operation.

4.5.3 SOE Log

The PMC-S963-C's SOE Log can store up to 32 events such as Power-on, Power-off, Digital Input status changes, Digital Output status changes, Setup changes and Setpoint events in its non-volatile memory. Each event record includes the event classification, its relevant parameter values and a timestamp in ±1 ms resolution. All events can be retrieved via communications. If there are more than 32 events, the newest event will replace the oldest event on a First-In-First-Out basis. The SOE Log can be reset via communications.

4.5.4 12 Monthly Energy Log

The PMC-S963-C stores monthly energy data for the present month and the last 12 months. The **Self-read Time** setup parameter allows the user to specify the time and day of the month for the Recorder's Self-read operation via communications. The Monthly Energy Logs are stored in the meter's non-volatile memory and will not suffer any loss in the event of power failure, and they are stored on a First-In-First-Out basis where the newest log will overwrite the oldest.

The **Monthly Energy Log Self-Read Time** supports two options:

- A zero value means that the Self-Read will take place at 00:00 of the first day of each month.

- A non-zero value means that the Self-Read will take place at a specific time and day based on the formula: Energy Self-Read Time = Day x 100 + Hour where $0 \leqslant$ Hour $\leqslant 23$ and $1 \leqslant$ Day $\leqslant 28$. For example, the value 1512 means that the Self-Read will take place at 12:00pm on the 15th day of each month.

The Monthly Energy Logs can be reset manually via communications.

The PMC-S963-C provides the following energy data for the last 12 months:

Active Energy	kWh Import	kWh Export	kWh Net	kWh Total
	T1 kWh Import	T2 kWh Import	T3 kWh Import	T4 kWh Import
Reactive Energy	kvarh Import	kvarh Export	kvarh Net	kvarh Total
	kvarh Q1	kvarh Q2	kvarh Q3	kvarh Q4
Apparent Energy	kVAh			

Table 4-11 Energy Measurements for each Monthly Energy Log Record

4.6 Time of Use (TOU)

TOU is used for electricity pricing that varies depending on the time of day and season. The TOU system allows the user to configure an electricity price schedule inside the PMC-S963-C and accumulate energy consumption into different TOU tariffs based on the time of consumption. TOU programming is only supported through communications.

The TOU feature on PMC-S963-C supports:

- Up to 4 seasons
- 4 Daily Profiles, each with 14 Periods in 15-minute interval
- 4 Tariffs

The TOU has the following setup parameters and can only be programmed via communications:

Setup Parameters	Definition	Options
Daily Profile #	Specify a daily rate schedule which can be divided into a maximum of 14 periods in 15-min intervals. Up to 4 Daily Profiles can be programmed for each TOU schedule.	1 to 4, the first period starts at 00:00 and the last period ends at 24:00.
Season #	A year can be divided into a maximum of 4 seasons. Each season is specified with a Start Date and ends with the next season's Start Date.	1 to 4, starts from January 1st

Table 4-12 TOU Setup Parameters

The PMC-S963-C provides kWh Total for each Tariff. TOU data is available through the front panel and communications.

4.7 Diagnostics

The PMC-S963-C provides wiring error detection for 3P4W and 3P3W wiring modes, which allow users to check for possible problems especially during the initial commissioning stage. The following wiring errors may be detected:

- Voltage / Current Phase Loss
- Incorrect Voltage and Current Phase Sequence
- P Direction per phase and Total

Please note the detections above are based on the assumptions below:

- The Voltage and Current Phase Sequence are consistent

- P is P Import, which means the P is over 0
- The wiring is correct
- 3P4W wiring mode supports all detections
- 3P3W wiring mode does not support the detection of Voltage Phase Loss, P Direction per phase

The Diagnostic register (0101) indicates the status of the wiring error detection with a bit value of 1 meaning active and 0 meaning inactive which are illustrated in table below:

Bit	Event
B00	Summary Bit (Set if any other bit is set)
B01	Reserved
B02	Any phase voltage < 10% of PT Primary (Register 6000) (3P4W or 3P3W)
B03	Any phase current < 10% of CT Primary (Register 6004) (3P4W or 3P3W)
B04-B05	Reserved
B06	Voltage Phase Reversal (3P4W only)
B07	Current Phase Reversal (3P4W or 3P3W)
B08	Negative P Total may be abnormal (3P4W or 3P3W)
B09	Negative Pa may be abnormal (3P4W only)
B10	Negative Pb may be abnormal (3P4W only)
B11	Negative Pc may be abnormal (3P4W only)
B12-B15	Reserved

Table 4-13 Wiring Diagnostic Register

Chapter 5 Modbus Register Map

This chapter provides a complete description of the Modbus register map (**Protocol Version 1.4**) for the PMC-S963-C to facilitate the development of 3rd party communications driver for accessing information on the PMC-S963-C. For a complete Modbus Protocol Specification, please visit http://**www.modbus.org**. The PMC-S963-C supports the following Modbus functions:

1) Read Holding Registers (Function Code 0x03)
2) Force Single Coil (Function Code 0x05)
3) Preset Multiple Registers (Function Code 0x10)

The following table provides a description of the different data formats used for the Modbus registers. The PMC-S963-C uses the Big Endian byte ordering system.

Format	Description
UINT16/INT16	Unsigned/Signed 16-bit Integer
UINT32/INT32	Unsigned/Signed 32-bit Integer
Float	IEEE 754 32-bit Single Precision Floating Point Number

5.1 Real-Time Measurements

Register	Property	Description	Format	Scale	Unit
0000	RO	Uan	Float		V
0002	RO	Ubn	Float		
0004	RO	Ucn	Float		
0006	RO	ULN Average	Float		
0008	RO	Uab	Float		
0010	RO	Ubc	Float		
0012	RO	Uca	Float		
0014	RO	ULL Average	Float		
0016	RO	Ia	Float		A
0018	RO	Ib	Float		
0020	RO	Ic	Float		
0022	RO	I Average	Float		
0024	RO	Pa	Float		W
0026	RO	Pb	Float		
0028	RO	Pc	Float		
0030	RO	P Total	Float		
0032	RO	Qa	Float		var
0034	RO	Qb	Float		
0036	RO	Qc	Float		
0038	RO	Q Total	Float		
0040	RO	Sa	Float		VA
0042	RO	Sb	Float	x1	
0044	RO	Sc	Float		
0046	RO	S Total	Float		
0048	RO	PFa	Float		-
0050	RO	PFb	Float		-
0052	RO	PFc	Float		-
0054	RO	PF Total	Float		-
0056	RO	Frequency	Float		Hz
0058	RO	Uan/Uab (3P3W) Angle	Float		°
0060	RO	Ubn/Ubc (3P3W) Angle	Float		°
0062	RO	Ucn/Uca (3P3W) Angle	Float		°
0064	RO	Ia Angle	Float		°
0066	RO	Ib Angle	Float		°
0068	RO	Ic Angle	Float		°
0070	RO	In (Calculated)	Float		A
0072	RO	P Total Present Demand	Float		
0074	RO	P Total Predicted Demand	Float		-
0076~0095	RO	Reserved	Float		-
0096	RO	DI Status[1]	UINT16		-
0097	RO	Reserved	UINT16		-
0098	RO	DO Status[2]	UINT16		-
0099	RO	Reserved	UINT16		-
0100	RO	Setpoint Status[3]	UINT16		-

| 0101 | RO | Wiring Diagnostic Status[4] | UINT16 | | - |
| 0102 | RO | SOE Log Pointer[5] | UINT32 | | - |

Table 5-1 Real-Time Measurements

Notes:

1) For the **DI Status** register, the bit values of B0 to B3 represent the states of DI1 to DI4, respectively, with "1" meaning Active (Closed) and "0" meaning Inactive (Open).

2) For the **DO Status** register, the bit values of B0 to B1 represent the states of DO1 to DO2, respectively, with "1" meaning Active (Closed) and "0" meaning Inactive (Open).

3) For the **Setpoint Status** register, the bit values indicate the various Setpoint states with "1" meaning Active and "0" meaning Inactive. The following table illustrates the details of the **Alarm Status** register.

Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Reserved	Setpoint9
Bit7	**Bit6**	**Bit5**	**Bit4**	**Bit3**	**Bit2**	**Bit1**	**Bit0**
Setpoint8	Setpoint7	Setpoint6	Setpoint5	Setpoint4	Setpoint3	Setpoint2	Setpoint1

Table 5-2 Alarm Status Register

4) The following table illustrates the Wiring Diagnostic Status with 0 meaning Normal and 1 meaning Abnormal:

Bit	Event
B00	Summary Bit (Set if any other bit is set)
B01	Reserved
B02	Any phase voltage < 10% of PT Primary (Register 6000)
B03	Any phase current < 10% of CT Primary (Register 6004)
B04-B05	Reserved
B06	Voltage Phase Reversal (3P4W only)
B07	Current Phase Reversal
B08	Negative P Total may be abnormal
B09	Negative Pa may be abnormal (3P4W only)
B10	Negative Pb may be abnormal (3P4W only)
B11	Negative Pc may be abnormal (3P4W only)
B12-B15	Reserved

Table 5-3 Wiring Diagnostic Status Register

5) The PMC-S963-C has one SOE Log. The log has a Log Pointer that indicates its current logging position. The range of the Log Pointer is between 0 and 0xFFFFFFFF, and it is incremented by one for every new log generated and will roll over to 0 if its current value is 0xFFFFFFFF. If a Clear Log is performed via communications, its Log Pointer will be reset to zero, and the SOE Log Pointer will be immediately incremented by one with a new "Clear SOE" event. When the number of events is larger than the respective Log Depth, the latest 32 SOE logs is stored on a FIFO basis.

5.2 Energy Measurements

The Energy registers have a maximum value of 100,000,000,000.0 and will roll over to zero automatically when it is reached. The actual energy value is 0.1 times of the register value.

5.2.1 3-Phase Total Energy Measurements

Register	Property	Description	Format	Scale	Unit
0500	RW	kWh Import	INT32		kWh
0502	RW	kWh Export	INT32		
0504	RO	kWh Net	INT32		
0506	RO	kWh Total	INT32		
0508	RW	kvarh Import	INT32		kvarh
0510	RW	kvarh Export	INT32		
0512	RO	kvarh Net	INT32		
0514	RO	kvarh Total	INT32		
0516	RW	kVAh	INT32	x0.1	kVAh
0518	RW	kvarh Q1	INT32		kvarh
0520	RW	kvarh Q2	INT32		
0522	RW	kvarh Q3	INT32		
0524	RW	kvarh Q4	INT32		
0526	RW	kWh Import of T1	INT32		kWh
0528	RW	kWh Import of T2	INT32		
0530	RW	kWh Import of T3	INT32		
0532	RW	kWh Import of T4	INT32		

Table 5-4 3-phase Total Energy Measurements

5.2.2 Phase A Energy Measurements

Register	Property	Description	Format	Scale	Unit
0620	RW	kWh Import	INT32		kWh
0622	RW	kWh Export	INT32		
0624-0626	RO	Reserved	INT32	x0.1	
0628	RW	kvarh Import	INT32		kvarh
0630	RW	kvarh Export	INT32		

Table 5-5 Phase A Energy Measurements

5.2.3 Phase B Energy Measurements

Register	Property	Description	Format	Scale	Unit
0740	RW	kWh Import	INT32		kWh
0742	RW	kWh Export	INT32		
0744-0746	RO	Reserved	INT32	x0.1	
0748	RW	kvarh Import	INT32		kvarh
0750	RW	kvarh Export	INT32		

Table 5-6 Phase B Energy Measurements

5.2.4 Phase C Energy Measurements

Register	Property	Description	Format	Scale	Unit
0860	RW	kWh Import	INT32		kWh
0862	RW	kWh Export	INT32		
0864-0866	RO	Reserved	INT32	x0.1	
0868	RW	kvarh Import	INT32		kvarh
0870	RW	kvarh Export	INT32		

Table 5-7 Phase C Energy Measurements

5.3 Monthly Energy Log

Register	Property	Description	Format	Scale	Unit
1200	RW	Month[1]	INT16	1* to 12	
1201	RO	High-order Byte: Year (0-37) Low-order Byte: Month (1-12)	INT16	Time Stamp (20YY/MM/DD HH:MM:SS)	
1202	RO	High-order Byte: Day (1-31) Low-order Byte: Hour (0-23)	INT16		
1203	RO	High-order Byte: Minute (0-59) Low-order Byte: Second (0-59)	INT16		
1204	RW	kWh Import	INT32	x0.1	kWh
1206	RW	kWh Export	INT32		
1208	RO	kWh Net	INT32		
1210	RO	kWh Total	INT32		
1212	RW	kvarh Import	INT32	x0.1	kvarh
1214	RW	kvarh Export	INT32		
1216	RO	kvarh Net	INT32		
1218	RO	kvarh Total	INT32		
1220	RW	kVAh	INT32	x0.1	kVAh
1222	RW	kvarh Q1	INT32	x0.1	kvarh
1224	RW	kvarh Q2	INT32		
1226	RW	kvarh Q3	INT32		
1228	RW	kvarh Q4	INT32		
1230	RW	kWh Import of T1	INT32	x0.1	kWh
1232	RW	kWh Import of T2	INT32		
1234	RW	kWh Import of T3	INT32		
1236	RW	kWh Import of T4	INT32		

Table 5-8 Monthly Energy Log

Notes:

1) This register represents the Month when it is read. To read the Monthly Energy Log, this register must be first written to indicate to the PMC-S963-C which log to load from memory. The range of this register is from 1 to 12, which represents the Last 12 Months. For example, if the current month is 2023/7, "1" means 2016/06, "2" means 2023/05, … and "12" means "2022/07".

2) For each Monthly Energy Log, the time stamp shows the exact Self-Read Time (20YY/MM/DD HH:MM:SS) when the log was recorded.

5.4 Harmonic Measurements

5.4.1 Power Quality Measurements

Register	Property	Description	Format	Scale	Unit
1300	RO	Ia TH (RMS)	Float		
1302	RO	Ib TH (RMS)	Float		A
1304	RO	Ic TH (RMS)	Float		
1306	RO	Ia THD	Float		
1308	RO	Ib THD	Float		
1310	RO	Ic THD	Float		
1312	RO	Ia TOHD	Float		
1314	RO	Ib TOHD	Float		-
1316	RO	Ic TOHD	Float		
1318	RO	Ia TEHD	Float		
1320	RO	Ib TEHD	Float		
1322	RO	Ic TEHD	Float		
1324	RO	Uan TH (RMS)	Float		
1326	RO	Ubn TH (RMS)	Float		V
1328	RO	Ucn TH (RMS)	Float		
1330	RO	Uan THD	Float		
1332	RO	Ubn THD	Float		
1334	RO	Ucn THD	Float		
1336	RO	Uan TOHD	Float		
1338	RO	Ubn TOHD	Float		
1340	RO	Ucn TOHD	Float		
1342	RO	Uan TEHD	Float		
1344	RO	Ubn TEHD	Float		
1346	RO	Ucn TEHD	Float		-
1348	RO	Ia Crest Factor	Float		
1350	RO	Ib Crest Factor	Float	x1	
1352	RO	Ic Crest Factor	Float		
1354	RO	Voltage Unbalance	Float		
1356	RO	Current Unbalance	Float		
1358	RO	Uan/Uab (3P3W) Fundamental	Float		
1360	RO	Ubn/Ubc (3P3W) Fundamental	Float		V
1362	RO	Ucn/Uca (3P3W) Fundamental	Float		
1364	RO	Ia Fundamental	Float		
1366	RO	Ib Fundamental	Float		A
1368	RO	Ic Fundamental	Float		
1370	RO	U1 (Positive Sequence Voltage)	Float		
1372	RO	U2 (Negative Sequence Voltage)	Float		V
1374	RO	U0 (Zero Sequence Voltage)	Float		
1376	RO	I1 (Positive Sequence Current)	Float		
1378	RO	I2 (Negative Sequence Current)	Float		A
1380	RO	I0 (Zero Sequence Current)	Float		
1382	RO	Ia TDD	Float		
1384	RO	Ib TDD	Float		
1386	RO	Ic TDD	Float		
1388	RO	Ia TDD Odd	Float		
1390	RO	Ib TDD Odd	Float		
1392	RO	Ic TDD Odd	Float		-
1394	RO	Ia TDD Even	Float		
1396	RO	Ib TDD Even	Float		
1398	RO	Ic TDD Even	Float		

Table 5-9 Power Quality Measurements

5.4.2 Current Harmonic Measurements

Register	Property	Description	Format	Scale	Unit
1400	RO	Ia THD	Float		
1402	RO	Ib THD	Float		
1404	RO	Ic THD	Float	x1	-
1406	RO	Ia TOHD	Float		
1408	RO	Ib TOHD	Float		
1410	RO	Ic TOHD	Float		

1412	RO	Ia TEHD	Float		
1414	RO	Ib TEHD	Float		
1416	RO	Ic TEHD	Float		
1418	RO	Ia HD02	Float		
1420	RO	Ib HD02	Float		
1422	RO	Ic HD02	Float		
1424~1590	RO	...	Float		
1592	RO	Ia HD31	Float		
1594	RO	Ib HD31	Float		
1596	RO	Ic HD31	Float		

Table 5-10 Current Harmonic Measurements

5.4.3 Voltage Harmonic Measurements

Register	Property	Description	Format	Scale	Unit
1600	RO	Uan/Uab THD	Float		
1602	RO	Ubn/Ubc THD	Float		
1604	RO	Ucn/Uca THD	Float		
1606	RO	Uan/Uab TOHD	Float		
1608	RO	Ubn/Ubc TOHD	Float		
1610	RO	Ucn/Uca TOHD	Float		
1612	RO	Uan/Uab TEHD	Float		
1614	RO	Ubn/Ubc TEHD	Float		
1616	RO	Ucn/Uca TEHD	Float	x1	-
1618	RO	Uan/Uab HD02	Float		
1620	RO	Ubn/Ubc HD02	Float		
1622	RO	Ucn/Uca HD02	Float		
1624~1790	RO	...	Float		
1792	RO	Uan/Uab HD31	Float		
1794	RO	Ubn/Ubc HD31	Float		
1796	RO	Ucn/Uca HD31	Float		

Table 5-11 Voltage Harmonic Measurements

Notes:

1) When the **Wiring Mode** is **3P3W** the phase A/B/C Voltage THD/TOHD/TEHD/HD*xx* mean phase AB/BC/CA Voltage THD/TOHD/TEHD/HD*xx*.

5.5 Max. Demands

Register	Property	Description	Format	Scale	Unit
3400~3405	RO	P Max. Demand of This Month (Since Last Reset)	See Note 1)	x1	W
3406~3411	RO	P Max. Demand of Last Month (Before Last Reset)			

Table 5-12 Max. Demand Log

Notes:

1) Demand Data Structure

Offset		Description
+0	High	Year - 2000
	Low	Month
+1	High	Day
	Low	Hour
+2	High	Minute
	Low	Second
+3	-	Millisecond
+4~+5	-	Max. Demand Value

Table 5-13 Demand Data Structure

5.6 Max./Min. Log

5.6.1 Max. Log of This Month (Since Last Reset)

Register	Property	Description	Format	Scale	Unit
4000~4005	RO	Uan			
4006~4011	RO	Ubn	See 5.6.5		
4012~4017	RO	Ucn	Max./Min. Log	x1	V
4018~4023	RO	ULN Average	Structure		
4024~4029	RO	Uab			

4030~4035	RO	Ubc			
4036~4041	RO	Uca			
4042~4047	RO	ULL Average			
4048~4053	RO	Ia		x1	A
4054~4059	RO	Ib			
4060~4065	RO	Ic			
4066~4071	RO	I Average			
4072~4077	RO	Pa		x1	W
4078~4083	RO	Pb			
4084~4089	RO	Pc			
4090~4095	RO	P Total			
4096~4101	RO	Qa		x1	var
4102~4107	RO	Qb			
4108~4113	RO	Qc			
4114~4119	RO	Q Total			
4120~4125	RO	Sa		x1	VA
4126~4131	RO	Sb			
4132~4137	RO	Sc			
4138~4143	RO	S Total			
4144~4149	RO	PFa		x1	-
4150~4155	RO	PFb			
4156~4161	RO	PFc			
4162~4167	RO	PF Total			
4168~4173	RO	Frequency		x1	Hz
4174~4179	RO	In (Calculated)		x1	A
4180~4185	RO	Uan/Uab THD		x1	-
4186~4191	RO	Ubn/Ubc THD			
4192~4197	RO	Ucn/Uca THD			
4198~4203	RO	Ia THD			
4204~4209	RO	Ib THD			
4210~4215	RO	Ic THD			
4216~4221	RO	Voltage Unbalance			
4222~4227	RO	Current Unbalance			

Table 5-14 Max. Log of This Month (Since Last Reset)

5.6.2 Min. Log of This Month (Since Last Reset)

Register	Property	Description	Format	Scale	Unit
4300~4305	RO	Uan		x1	V
4306~4311	RO	Ubn			
4312~4317	RO	Ucn			
4318~4323	RO	ULN Average			
4324~4329	RO	Uab			
4330~4335	RO	Ubc			
4336~4341	RO	Uca			
4342~4347	RO	ULL Average			
4348~4353	RO	Ia		x1	A
4354~4359	RO	Ib			
4360~4365	RO	Ic			
4366~4371	RO	I Average			
4372~4377	RO	Pa	See 5.6.5 Max./Min. Log Structure	x1	W
4378~4383	RO	Pb			
4384~4389	RO	Pc			
4390~4395	RO	P Total			
4396~4401	RO	Qa		x1	var
4402~4407	RO	Qb			
4408~4413	RO	Qc			
4414~4419	RO	Q Total			
4420~4425	RO	Sa		x1	VA
4426~4431	RO	Sb			
4432~4437	RO	Sc			
4438~4443	RO	S Total			
4444~4449	RO	PFa		x1	-
4450~4455	RO	PFb			
4456~4461	RO	PFc			
4462~4467	RO	PF Total			

Register	Property	Description	Format	Scale	Unit
4468~4473	RO	Frequency		x1	Hz
4474~4479	RO	In (Calculated)		x1	A
4480~4485	RO	Uan/Uab THD			
4486~4491	RO	Ubn/Ubc THD			
4492~4497	RO	Ucn/Uca THD			
4498~4503	RO	Ia THD		x1	-
4504~4509	RO	Ib THD			
4510~4515	RO	Ic THD			
4516~4521	RO	Voltage Unbalance			
4522~4527	RO	Current Unbalance			

Table 5-15 Min. Log of This Month (Since Last Reset)

5.6.3 Max. Log of Last Month (Before Last Reset)

Register	Property	Description	Format	Scale	Unit
4600~4605	RO	Uan			
4606~4611	RO	Ubn			
4612~4617	RO	Ucn			
4618~4623	RO	ULN Average		x1	V
4624~4629	RO	Uab			
4630~4635	RO	Ubc			
4636~4641	RO	Uca			
4642~4647	RO	ULL Average			
4648~4653	RO	Ia			
4654~4659	RO	Ib		x1	A
4660~4665	RO	Ic			
4666~4671	RO	I Average			
4672~4677	RO	Pa			
4678~4683	RO	Pb		x1	W
4684~4689	RO	Pc			
4690~4695	RO	P Total			
4696~4701	RO	Qa			
4702~4707	RO	Qb	See 5.6.5	x1	var
4708~4713	RO	Qc	Max./Min. Log		
4714~4719	RO	Q Total	Structure		
4720~4725	RO	Sa			
4726~4731	RO	Sb		x1	VA
4732~4737	RO	Sc			
4738~4743	RO	S Total			
4744~4749	RO	PFa			
4750~4755	RO	PFb		x1	-
4756~4761	RO	PFc			
4762~4767	RO	PF Total			
4768~4773	RO	Frequency		x1	Hz
4774~4779	RO	In (Calculated)			
4780~4785	RO	Uan/Uab THD			
4786~4791	RO	Ubn/Ubc THD			
4792~4797	RO	Ucn/Uca THD			
4798~4803	RO	Ia THD		x1	-
4804~4809	RO	Ib THD			
4810~4815	RO	Ic THD			
4816~4821	RO	Voltage Unbalance			
4822~4827	RO	Current Unbalance			

Table 5-16 Max. Log of Last Month (Before Last Reset)

5.6.4 Min. Log of Last Month (Before Last Reset)

Register	Property	Description	Format	Scale	Unit
4900~4905	RO	Uan			
4906~4911	RO	Ubn			
4912~4917	RO	Ucn			
4918~4923	RO	ULN Average	See 5.6.5	x1	V
4924~4929	RO	Uab	Max./Min. Log		
4930~4935	RO	Ubc	Structure		
4936~4941	RO	Uca			
4942~4947	RO	ULL Average			
4948~4953	RO	Ia		x1	A

4954~4959	RO	Ib			
4960~4965	RO	Ic			
4966~4971	RO	I Average			
4972~4977	RO	Pa			
4978~4983	RO	Pb		x1	W
4984~4989	RO	Pc			
4990~4995	RO	P Total			
4996~5001	RO	Qa			
5002~5007	RO	Qb		x1	var
5008~5013	RO	Qc			
5014~5019	RO	Q Total			
5020~5025	RO	Sa			
5026~5031	RO	Sb		x1	VA
5032~5037	RO	Sc			
5038~5043	RO	S Total			
5044~5049	RO	PFa			
5050~5055	RO	PFb		x1	-
5056~5061	RO	PFc			
5062~5067	RO	PF Total			
5068~5073	RO	Frequency		x1	Hz
5074~5079	RO	In (Calculated)		x1	A
5080~5085	RO	Uan/Uab THD			
5086~5091	RO	Ubn/Ubc THD			
5092~5097	RO	Ucn/Uca THD			
5098~5103	RO	Ia THD		x1	-
5104~5109	RO	Ib THD			
5110~5115	RO	Ic THD			
5116~5121	RO	Voltage Unbalance			
5122~5127	RO	Current Unbalance			

Table 5-17 Min. Log of Last Month (Before Last Reset)

5.6.5 Max./Min. Log Structure

Offset		Description
+0	High	Year - 2000
	Low	Month
+1	High	Day
	Low	Hour
+2	High	Minute
	Low	Second
+3	-	Millisecond
+4~+5	-	Max./Min. Value

Table 5-18 Max./Min. Data Structure

5.7 SOE Log

The SOE Log Pointer points to the register address within the SOE Log where the next event will be stored. The following formula is used to determine the register address of the most recent SOE event referenced by the SOE Log Pointer value: Register Address = 10000 + Modulo(SOE Log Pointer-1/32)*8

Register	Property	Description	Format
10000~10007	RO	Event 1	
10008~10015	RO	Event 2	
10016~10023	RO	Event 3	
10024~10031	RO	Event 4	
10032~10039	RO	Event 5	
10040~10047	RO	Event 6	
10048~10055	RO	Event 7	See Table 5-20
10056~10063	RO	Event 8	SOE Log Data
10064~10071	RO	Event 9	Structure
10072~10079	RO	Event 10	
10080~10087	RO	Event 11	
10088~10095	RO	Event 12	
...		...	
10248~10255	RO	Event 32	

Table 5-19 SOE Log

Notes:

1) SOE Log Data Structure

Offset	Property	Description	Unit
+0	RO	High-order Byte: Event Classification	See Table 5-21
	RO	Low-order Byte: Sub-Classification	SOE Classification
+1	RO	Record Time: Year	0-37 (Year-2000)
	RO	Record Time: Month	1 to 12
+2	RO	Record Time: Day	1 to 31
	RO	Record Time: Hour	0 to 23
+3	RO	Record Time: Minute	0 to 59
	RO	Record Time: Second	0 to 59
+4	RO	Record Time: Millisecond	0 to 999
+5	RO	High-order Byte: Reserved	-
	RO	Low-order Byte: Status[2]	-
+6 to +7	RO	Event Value[2]	-

Table 5-20 SOE Log Data Structure

2) SOE Classification

Event Classification	Sub-Classification	Status	Event Value	Description
1=DI Changes	1	2 / 1		DI1 Active/DI1 Inactive
	2	2 / 1		DI2 Active/DI2 Inactive
	3	2 / 1		DI3 Active/DI3 Inactive
	4	2 / 1		DI4 Active/DI4 Inactive
2=DO Changes	1	2 / 1		DO1 Operated/Released by Remote Control
	2	2 / 1		DO2 Operated/Released by Remote Control
	3~10			Reserved
	11	2 / 1		DO1 Operated/Released by Setpoint
	12	2 / 1		DO2 Operated/Released by Setpoint
	13~20			Reserved
	21	2 / 1		DO1 Operated/Released by Front Panel
	22	2 / 1		DO2 Operated/Released by Front Panel
	23~30			Reserved
	31	1		DO1 Released When Pulse Time Out
	32	1		DO2 Released When Pulse Time Out
3=Setpoint	1	2 / 1	Trigger Value / Return Value	Over ULN Setpoint Active/Return
	2	2 / 1		Over ULL Setpoint Active/Return
	3	2 / 1		Over Current Setpoint Active/Return
	4	2 / 1		Over In (Calculated) Setpoint Active/Return
	5	2 / 1		Over Frequency Setpoint Active/Return
	6	2 / 1		Over P Total Setpoint Active/Return
	7	2 / 1		Over Q Total Setpoint Active/Return
	8	2 / 1		Over S Total Setpoint Active/Return
	9	2 / 1		Over PF Total Setpoint Active/Return
	10	2 / 1		Over P Total Present Demand Setpoint Active/Return
	11~12			Reserved
	13	2 / 1		Over P Total Predicted Demand Setpoint Active/Return
	14~15			Reserved
	16	2 / 1		Over Voltage THD Setpoint Active/Return
	17~18			Reserved
	19	2 / 1		Over Current THD Setpoint Active/Return
	20~21			Reserved
	22	2 / 1		Over Voltage Unbalance Setpoint Active/Return
	23	2 / 1		Over Current Unbalance Setpoint Active/Return
	24	2 / 1		Reversal Phase Setpoint Active/Return
	25~40			Reserved
	41	2 / 1		Under ULN Setpoint Active/Return
	42	2 / 1		Under ULL Setpoint Active/Return
	43	2 / 1		Under Current Setpoint Active/Return
	44	2 / 1		Under In (Calculated) Setpoint Active/Return
	45	2 / 1		Under Frequency Setpoint Active/Return
	46	2 / 1		Under P Total Setpoint Active/Return
	47	2 / 1		Under Q Total Setpoint Active/Return
	48	2 / 1		Under S Total Setpoint Active/Return

	49	2 / 1	Under PF Total Setpoint Active/Return
	50	2 / 1	Under P Total Present Demand Setpoint Active/Return
	51~52		Reserved
	53	2 / 1	Under P Total Predicted Demand Setpoint Active/Return
	54~55		Reserved
	56	2 / 1	Under Voltage THD Setpoint Active/Return
	57~58		Reserved
	59	2 / 1	Under Current THD Setpoint Active/Return
	60~61		Reserved
	62	2 / 1	Under Voltage Unbalance Setpoint Active/Return
	63	2 / 1	Under Current Unbalance Setpoint Active/Return
4=Self-diagnosis	1	2	System Parameter Fault
	2	2	Internal Parameter Fault
	3	2	TOU Parameter Fault
	4	2	Memory Fault
5=Operations	1	0	Power On
	2	0	Power Off
	3	0	Clear 3-Ø Total and Per-Phase Energy Registers via Front Panel[1]
	4	0	Clear Historical Monthly Energy Log via Front Panel
	5~8		Reserved
	9	0	Clear All Data via Front Panel[1]
	10	0	Clear SOE Log via Front Panel
	11~13		Reserved
	14	0	Set Clock via Front Panel
	15	0	Setup Changed via Front Panel
	16	0	Preset Energy Value via Front Panel
	17~29		Reserved
	30	0	Clear 3-Ø Total and Per-Phase Energy Registers via Communications
	31		Reserved
	32	0	Clear Historical Monthly Energy Log via Communications
	33	0	Clear Max. Demand of This Month (Since Last Reset) via Communications
	34	0	Clear All Demand Registers via Communications
	35	0	Clear Max./Min. Logs of This Month (Since Last Reset) via Communication
	36	0	Clear All Max./Min. Logs via Communications
	37	0	Clear All Data via Communications[2]
	38	0	Clear SOE Log via Communications
	39~41	0	Reserved
	42	0	Reset Device Setup to default via Communications
	43	0	Setup Changes via Communications
	44	0	Preset Energy Value via Communications
	45	0	Preset TOU Energy Value via Communications

Table 5-21 SOE Event Classification

3) **Clear All Data via Front Panel** or **Communication** means to clear 3-Phase Total Energy registers, Phase A/B/C Energy registers, All Max. Demands, All Max./Min. Logs, and SOE Log.

5.8 Device Setup

5.8.1 Basic Setup Parameters

Register	Property	Description	Format	Range, Default*
6000	RW	PT Primary[1]	UINT32	1 to 1,000,000 V, 380*
6002	RW	PT Secondary	UINT32	1 to 690V, 380*
6004	RW	CT Primary	UINT32	1 to 30,000A Default: 5A (5A Input Current) 1A (1A Input Current)

6006	RW	CT Secondary	UINT32	1 to 5A Default: 5A (5A Input Current) 1A (1A Input Current)
6008~6018	RW	Reserved	UINT32	
6020	RW	Wiring Mode	UINT16	0=DEMO, 1=3P3W, 2=3P4W*
6021	RW	PF Convention	UINT16	0=IEC*, 1=IEEE, 2=-IEEE
6022	RW	kVA Calculation	UINT16	0=Vector*, 1=Scalar
6023	RW	Ia Polarity	UINT16	
6024	RW	Ib Polarity	UINT16	0=Normal*, 1=Reverse
6025	RW	Ic Polarity	UINT16	
6026~6027	RW	Reserved	UINT16	
6028	RW	THD Calculation[2]	UINT16	0= THDf*, 1= THDr
6029	RW	Demand Period	UINT16	1 to 60 (minutes), 15*
6030	RW	Number of Sliding Windows	UINT16	1* to 15
6031	RW	Predicted Response	UINT16	70* to 99
6032	RW	Reserved	UINT16	
6033	RW	Self-Read Time[3]	UINT16	0
6034	RW	Reserved	UINT16	
6035	RW	Solid-State Energy Pulse Enable	UINT16	0=Disabled
6036	RW	LED Energy Pulse Enable	UINT16	1=kWh Tot.*, 2=kvarh Tot. 3=kWh Imp., 4=kWh Exp. 5=kvarh Imp., 6=kvarh Exp.
6037	RW	Backlight Timeout	UINT16	0 to 60 mins, 5*

Table 5-22 Basic Setup Parameters

Notes:

1) The value of [PT Primary/PT Secondary] cannot exceed 10000.

2) There are two ways to calculate THD:

THDf (based on Fundamental): $\mathrm{THD} = \dfrac{\sqrt{\sum\limits_{n=2}^{\infty} I_n^{\,2}}}{I_1} \times 100\%$

where I_n represents the RMS value for the nth harmonic and I_1 represents the RMS value of the Fundamental harmonic.

THDr (based on RMS): $\mathrm{THD} = \dfrac{\sqrt{\sum\limits_{n=2}^{\infty} I_n^{\,2}}}{\sqrt{\sum\limits_{n=1}^{\infty} I_n^{\,2}}} \times 100\%$

where I_n represents the RMS value for the nth harmonic.

3) The **Self-Read Time** applies to both the Max. Demand Log, Max./Min. Log as well as the Monthly Energy Log and supports the following two options:

- A zero value means that the Self-Read will take place at 00:00 of the first day of each month.
- A non-zero value means that the Self-Read will take place at a specific time and day based on the formula: Self-Read Time = (Day x 100 + Hour) where 0 ≤ Hour ≤ 23 and 1 ≤ Day ≤ 28. For example, the value 1512 means that the Self-Read will take place at 12:00pm on the 15th day of each month.

5.8.2 I/O Setup

Register	Property	Description	Format	Range, Default*
6200~6207	RW	Reserved	UINT16	
6208	RW	DI1 Debounce	UINT16	
6209	RW	DI2 Debounce	UINT16	1 to 9999 ms,
6210	RW	DI3 Debounce	UINT16	20*
6211	RW	DI4 Debounce	UINT16	
6212~6231	RW	Reserved	UINT16	
6236	RW	DO1 Pulse Width	UINT16	0 to 6000 (x0.1s), 10*
6237	RW	DO2 Pulse Width	UINT16	(0 = Latch Mode)
6238~6259	RW	Reserved	UINT16	
6260	RW	AO Type[1]	UINT16	0 = 4~20mA*, 1 = 0~20mA
6261	RW	AO Key[1,2]	UINT16	0* to 19
6262	RW	AO Zero Scale[1]	INT32	-999,999 to +999,999

				(Default = 400)
6264	RW	AO Full Scale[1]	INT32	-999,999 to +999,999 (Default = 2000)

Table 5-23 I/O Setup Parameters

Notes:
1) This register is valid only if the device is equipped with the appropriate option.
2) Analog Output Parameters:

Key	Parameter	Scale	Unit	Key	Parameter	Scale	Unit
0	Uab		V	10	S Total	x1	kVA
1	Ubc		V	11	PF Total	x1000	-
2	Uca		V	12	Frequency	x100	-
3	ULL Avg.	x1	V	13	P Present Demand	x1	kW
4	Ia		A	14	Reserved		
5	Ib		A	15	Reserved		
6	Ic		A	16	Uan		V
7	I Avg.		A	17	Ubn	x1	V
8	P Total	x1	kW	18	Ucn		V
9	Q Total		kvar	19	ULN Avg.		V

Table 5-24 Analog Output Parameters

5.8.3 Communication Setup Parameters

Register	Property	Description	Format	Range, Default*
6400	RW	Port 1 Protocol	UINT16	0=Modbus RTU*
6401	RW	Port 1 Unit ID	UINT16	1 to 247, Last 2 digits of SN*[1]
6402	RW	Port 1 Baud Rate[2]	UINT16	0=1200, 1=2400, 2=4800, 3=9600*, 4=19200, 5=38400
6403	RW	Port 1 Comm. Config.	UINT16	0=8N2, 1=8O1,2=8E1* 3=8N1, 4=8O2, 5=8E2

Table 5-25 Communication Setup

Notes:
1) If the last 2 digits of SN is 00, the default ID should be 100.
2) If the **Baud Rate** is set to an invalid value, it will default to 9600bps automatically.

5.8.4 Setpoints Setup

Register	Property	Description		Format	Range, Default*
6500	RW		Setpoint Type	UINT16	0=Disabled* 1=Over Setpoint 2=Under Setpoint
6501	RW		Parameters[1]	UINT16	0* to 16
6502	RW	Setpoint #1	Over Limit[2]	Float	0*
6504	RW		Under Limit[2]	Float	0*
6506	RW		Active Delay	UINT16	0 to 9999 s, 0*
6507	RW		Inactive Delay	UINT16	0 to 9999 s, 0*
6508	RW		Trigger Action 1[3]	UINT16	0* to 2
6509	RW		Trigger Action 2[3]	UINT16	
...			...		...
6580	RW		Setpoint Type	UINT32	0=Disabled* 1=Over Setpoint 2=Under Setpoint
6581	RW		Parameter[1]	UINT16	0* to 16
6582	RW	Setpoint #9	Over Limit	Float	0*
6584	RW		Under Limit	Float	0*
6586	RW		Active Delay	UINT16	0 to 9999 s, 0*
6587	RW		Inactive Delay	UINT16	0 to 9999 s, 0*
6588	RW		Trigger Action 1[2]	UINT16	0* to 2
6589	RW		Trigger Action 2[2]	UINT16	

Table 5-26 Setpoint Setup Parameters

Notes:
1) The PMC-S963-C provides the following setpoint parameters:

Key	Parameter	Scale	Unit
0	None	-	
1	ULN (Any Phase Voltage)	x1	V

2	ULL (Any Line Voltage)		
3	Current (Any Phase Current)		A
4	Frequency		Hz
5	P Total		W
6	PF Total		-
7	P Total Present Demand		W
8	Voltage THD		100%
9	Current THD		100%
10	Voltage Unbalance		100%
11	Current Unbalance		100%
12	In (Calculated)		A
13	Q Total		var
14	S Total		VA
15	P Total Predicted Demand		W
16	Phase Reversal[1]		-

Table 5-27 Setpoint Parameters

2) For Over Setpoint, the setpoint parameter must exceed the **Over Limit** to become active and go below the **Under Limit** to become inactive.

For Under Setpoint, the setpoint parameter must go below the **Under Limit** to become active and exceed the **Over Limit** to become inactive.

3) The PMC-S963-C provides the following Setpoint Triggers:

Key	Action
0	None
1	DO1 Closed
2	DO2 Closed

Table 5-28 Setpoint Triggers

4) When the **Setpoint Parameter** is set to **Phase Reversal**, the **Setpoint Type** must be set to **1 (Over Setpoint)**, and there is no need to set **Over Limit** and **Under Limit**. Please be informed that the Phase Reversal Setpoint assumes that the phase sequencing is based on **Positive** or **Clockwise** rotation (ABC).

5.9 TOU Setup

5.9.1 Basic

Register	Property	Description	Format	Range/Option
7000	RO	Current Tariff	UINT16	0=T1, 1=T2, 2=T3, 3=T4
7001	RO	Current Season	UINT16	0 to 3 (Season #1 to #4)
7002	RO	Current Period	UINT16	0 to 13 (Period #1 to #14)
7003	RO	Current Daily Profile No.	UINT16	0 to 3 (Daily Profile #1 to #4)

Table 5-29 TOU Basic Setup

5.9.2 Season

Offset	Property	Description	Format	Range/Default*
7100	RW	Season #1: Start Date	UINT16	0x0101*
7101	RW	Season #1: Daily Profile	UINT16	0*~3
7102	RW	Season #2: Start Date	UINT16	0xFFFF*
7103	RW	Season #2: Daily Profile	UINT16	0*~3
7104	RW	Season #3: Start Date	UINT16	0xFFFF*
7105	RW	Season #3: Daily Profile	UINT16	0*~3
7106	RW	Season #4: Start Date	UINT16	0xFFFF*
7107	RW	Season #4: Daily Profile	UINT16	0*~3

Table 5-30 Season Setup

Notes:

1) **Start Date** for Season #1 is Jan. 1st and cannot be modified.

2) Setting a Season's **Start Date** as 0xFFFF terminates the TOU's Season settings. All subsequent Seasons' setup parameters will be ignored since the previous Season's duration is from its **Start Date** to the end of the year.

3) The **Start Date** of a particular Season must be later than the previous Season's.

5.9.3 Daily Profile

Register	Property	Description	Format
7200~7227	RW	Daily Profile #1	See Table 5-32 Daily Profile Data Structure
7228~7255	RW	Daily Profile #2	
7256~7283	RW	Daily Profile #3	
7284~7311	RW	Daily Profile #4	

Table 5-31 TOU #1's Daily Profile Setup

Offset	Property	Description		Format	Note
+0	RW	Period #1 Start Time		UINT16	0x0000
+1	RW	Period #1 Tariff		UINT16	0=T1, 1=T2, 2=T3, 3=T4
+2	RW	Period #2 Start Time	High-order Byte: Hour	UINT16	0 ≤ Hour < 24
			Low-order Byte: Min		Min = 0, 15, 30, 45
+3	RW	Period #2 Tariff		UINT16	0=T1, 1=T2, 2=T3, 3=T4
+4	RW	Period #3 Start Time		UINT16	See Period #2 Start Time
+5	RW	Period #3 Tariff		UINT16	0=T1, 1=T2, 2=T3, 3=T4
+6	RW	Period #4 Start Time		UINT16	See Period #2 Start Time
+7	RW	Period #4 Tariff		UINT16	0=T1, 1=T2, 2=T3, 3=T4
+8	RW	Period #5 Start Time		UINT16	See Period #2 Start Time
+9	RW	Period #5 Tariff		UINT16	0=T1, 1=T2, 2=T3, 3=T4
+10	RW	Period #6 Start Time		UINT16	See Period #2 Start Time
+11	RW	Period #6 Tariff		UINT16	0=T1, 1=T2, 2=T3, 3=T4
+12	RW	Period #7 Start Time		UINT16	See Period #2 Start Time
+13	RW	Period #7 Tariff		UINT16	0=T1, 1=T2, 2=T3, 3=T4
+14	RW	Period #8 Start Time		UINT16	See Period #2 Start Time
+15	RW	Period #8 Tariff		UINT16	0=T1, 1=T2, 2=T3, 3=T4
+16	RW	Period #9 Start Time		UINT16	See Period #2 Start Time
+17	RW	Period #9 Tariff		UINT16	0=T1, 1=T2, 2=T3, 3=T4
+18	RW	Period #10 Start Time		UINT16	See Period #2 Start Time
+19	RW	Period #10 Tariff		UINT16	0=T1, 1=T2, 2=T3, 3=T4
+20	RW	Period #11 Start Time		UINT16	See Period #2 Start Time
+21	RW	Period #11 Tariff		UINT16	0=T1, 1=T2, 2=T3, 3=T4
+22	RW	Period #12 Start Time		UINT16	See Period #2 Start Time
+23	RW	Period #12 Tariff		UINT16	0=T1, 1=T2, 2=T3, 3=T4
+24	RW	Period #13 Start Time		UINT16	See Period #2 Start Time
+25	RW	Period #13 Tariff		UINT16	0=T1, 1=T2, 2=T3, 3=T4
+26	RW	Period #14 Start Time		UINT16	See Period #2 Start Time
+27	RW	Period #14 Tariff		UINT16	0=T1, 1=T2, 2=T3, 3=T4

Table 5-32 Daily Profile Data Structure

Notes:

1) **Daily Profile #1's Period #1 Start Time** is always 00:00 and cannot be modified.
2) Setting a Period's **Start Time** as 0xFFFF terminates the Daily Profile's settings. All subsequent Daily Profiles' setup parameters will be ignored, and the previous Period's duration is from its **Start Time** to the end of the day.
3) The minimum interval of a period is 15 minutes.
4) The **Start Time** of a particular Period must be later than the previous Period's .

5.10 Time

There are two sets of Time registers supported by the PMC-S963-C – Year / Month / Day / Hour / Minute / Second (Registers # 60000 to 60002) and UNIX Time (Register # 60004). When sending time to the PMC-S963-C over Modbus communications, care should be taken to only write one of the two Time register sets. All registers within a Time register set must be written in a single transaction. If registers 60000 to 60004 are being written to at the same time, both Time register sets will be updated to reflect the new time specified in the UNIX Time register set (60004) and the time specified in registers 60000-60002 will be ignored. Writing to the Millisecond register (60003) is optional during a Time Set operation. When broadcasting time, the function code must be set to 0x10 (Pre-set Multiple Registers). Incorrect date or time values will be rejected by the meter. In addition, attempting to write a Time value less than Jan 1, 2000 00:00:00 will be rejected.

Register		Property	Description	Format	Note
60000	9000	RW	High-order Byte: Year	UINT16	0-37 (Year-2000)
			Low-order Byte: Month		1 to 12

60001	9001	RW	High-order Byte: Day	UINT16	1 to 31
			Low-order Byte: Hour		0 to 23
60002	9002	RW	High-order Byte: Minute	UINT16	0 to 59
			Low-order Byte: Second		0 to 59
60003	9003	RW	Millisecond	UINT16	0 to 999
60004 ~ 60005	9004 ~ 9005	RW	UNIX Time	UINT32	0x386D4380 to 0x 7FE8177F The corresponding time is 2000.01.01 00:00:00 to 2037.12.31 23:59:59 (GMT 0:00 Time Zone)

Table 5-33 Time Registers

5.11 Remote Control

The DO Control registers are implemented as both "Write-Only" Modbus Coil Registers (0XXXXX) and Modbus Holding Registers (4XXXXX), which can be controlled with the Force Single Coil command (Function Code 0x05) or the Preset Multiple Hold Registers (Function Code 0x10). The PMC-S963-C does not support the Read Coils command (Function Code 0x01) because DO Control registers are "Write-Only". The DO Status register 0098 should be read instead to determine the current DO status.

Register	Property	Description	Format	Note
9100	WO	Execute DO1 Close	UINT16	Writing "0xFF00" to the register to perform the described action.
9101	WO	Execute DO1 Open	UINT16	
9102	WO	Execute DO2 Close	UINT16	
9103	WO	Execute DO2 Open	UINT16	

Table 5-34 DO Control

5.12 Clear/Reset Control

Register	Property	Description	Format	Note
9600	WO	Clear Historical Monthly Energy Log[1]	UINT16	Writing "0xFF00" to the register to execute the described action.
9601	WO	Clear 3-Ø Total and Per-Phase Energy Registers	UINT16	
9602	WO	Reserved	UINT16	
9603	WO	Clear Max. Demand of This Month (Since Last Reset)	UINT16	
9604	WO	Clear All Demand Registers[2]	UINT16	
9605	WO	Clear Max./Min. Logs of This Month (Since Last Reset)	UINT16	
9606	WO	Clear All Max./Min. Log[3]	UINT16	
9607	WO	Reserved	UINT16	
9608	WO	Clear All Data[4]	UINT16	
9609	WO	Clear SOE Log	UINT16	

Table 5-35 Clear Control

Notes:

1) Writing 0xFF00 to the **Clear Historical Monthly Energy Log** register to clear the Monthly Energy Log of the last 1 to 12 months.

2) Writing 0xFF00 to the **Clear All Demand** register to clear all Demand registers and logs, including Real-time Present Demand, Max. Demand Log of This Month (Since Last Reset) and Last Month (Before Last Reset).

3) Writing 0xFF00 to the **Clear All Max./Min. Log** register to clear both the Max./Min Log of This Month (Since Last Reset) and the Max./Min. Log of Last Month (Before Last Reset).

4) Writing 0xFF00 to the **Clear All Data** register to perform the Clear operation for the actions specified in registers # 9600 to # 9607 and register # 9609.

5.13 Meter Information

Register		Property	Description	Format	Note
60200~60219	9800~9819	RO	Meter model[1]	UINT16	See Note 1)
60220	9820	RO	Firmware Version	UINT16	e.g. 10000 shows the version is V1.00.00
60221	9821	RO	Protocol Version	UINT16	e.g. 10 shows the version is V1.0
60222	9822	RO	Firmware Update Date: Year-2000	UINT16	e.g. 140110 means January 10, 2014
60223	9823	RO	Firmware Update Date:	UINT16	

			Month		
60224	9824	RO	Firmware Update Date: Day	UINT16	
60225	9825	RO	Serial Number	UINT32	e.g. 1701030100 means the 100th PMC-S963-C that was manufactured on January 3rd, 2017
60227	9827	RO	Reserved	UINT16	
60228	9828	RO	Reserved	UINT16	
60229	9829	RO	Feature Code	UINT16	Bit1 to Bit 0: (DIDO) 0=4xDI 1=4xDI + 1xSS Pulse Output
					Bit 2: (Current Input) 0=5A 1=1A
					Bit 3: (RS-485) 0=1xRS-485 1=Reserved
					Bit 4 (AO): 0=None 1=1xAO
					Others: Reserved

Table 5-36 Meter Information

Notes:
1) The Meter Model appears from registers 60200 to 60219 and contains the ASCII encoding of the string "PMC-S963-C" as shown in the following table.

Register	Value(Hex)	ASCII
60200	0x50	P
60201	0x4D	M
60202	0x43	C
60203	0x2D	-
60204	0x53	S
60205	0x39	9
60206	0x36	6
60207	0x33	3
60208	0x2D	-
60209	0x43	C
60210-60219	0x20	Null

Table 5-37 ASCII Encoding of "PMC-S963-C"

Appendix A Technical Specifications

Voltage Inputs (V1, V2, V3, VN)	
Standard Un	240ULN/415ULL
Range	30V to 1.2Un
Overload	1.2xUn continuous
	2xUn for 1s
Burden	<0.02VA per phase @ 240ULN
Measurement Category	CAT III up to 300V
Frequency	45-65Hz
Current Inputs (·I11, I12, ·I21, I22, ·I31, I32)	
Standard In	5A (Optional 1A)
Range	0.1% to 120% In
Starting Current	0.1% In
Overload	1.2xIn continuous
	10xIn for 1s
Burden	<0.25VA per phase @ 5A
Power Supply (L/+, N/-)	
Standard	95-250VAC/DC, ±10%, 47-440Hz
Burden	<2W
Overvoltage Category	OVC III up to 300V
Digital Inputs (DI1, DI2, DI3, DI4, DIC)	
Type	Dry contact, 24VDC internally wetted
Sampling	1000Hz
Hysteresis	1ms minimum
Digital Outputs (DO11, DO12, DO21, DO22)	
Type	Form A Mechanical Relay
Loading	5A @ 250VAC or 30VDC
Load Type	Resistive
Pulse Output (E+, E-)	
Type	Form A Solid-State Relay
Isolation	Optical
Pulse Width	80ms±20ms
Max. Load Voltage	50VDC
Max. Forward Current	50mA
Optional Analog Output	
Type	0/4-20 mA
Loading	500Ω maximum
Overload	24mA maximum
Installation Torque	
Power Supply, U/I Inputs, RS-485 and I/O	5Ib-in (0.5N.m)
Environmental Conditions	
Operating Temp.	-25°C to 70°C
Storage Temp.	-40°C to 85°C
Humidity	5% to 95% non-condensing
Atmospheric Pressure	70 kPa to 106 kPa
Altitude	< 3000m
Pollution Degree	2
Mechanical Characteristics	
Panel Cutout	92x92mm (3.62"x3.62")
Unit Dimensions	96x96x92mm
LCD Display Dimensions	61x61mm
IP Rating	IP65

Accuracy

Parameters	Accuracy	Resolution
Voltage	±0.2%	0.001V
Current	±0.2%	0.001A
In (Calculated)	±1.0%	0.001A
P, Q, S	±0.5%	0.001kX
kWh	IEC 62053-22 Class 0.5S	0.1kWh
kvarh	IEC 62053-23 Class 2	0.1kvarh
PF	±0.5%	0.001
Frequency	±0.02Hz	0.01Hz
THD	IEC 61000-4-7 Class II	0.001%
AO	±1.0%	-

Appendix B Standards Compliance

Safety Requirements	
CE LVD 2014 / 35 / EU	EN 61010-1: 2010 EN 61010-2-030: 2010
Electrical Safety in Low Voltage Distribution Systems up to 1000Vac and 1500 Vdc	IEC 61557-12: 2018 (PMD)
Insulation AC Voltage: 2kV @ 1 minute Insulation Resistance: >100MΩ Impulse Voltage: 6kV, 1.2/50μs	IEC 62052-11: 2003 IEC 62053-22: 2003
Electromagnetic Compatibility **CE EMC Directive 2014 / 30 / EU (EN 61326: 2013)**	
Immunity Tests	
Electrostatic Discharge	EN 61000-4-2: 2009
Radiated Fields	EN 61000-4-3: 2006 + A1: 2008+A2: 2010
Fast Transients	EN 61000-4-4: 2012
Surges	EN 61000-4-5: 2014 + A1: 2017
Conducted Disturbances	EN 61000-4-6: 2014
Magnetic Fields	EN 61000-4-8: 2010
Voltage Dips and Interruptions	EN 61000-4-11: 2004 + A1: 2017
Ring Wave	EN 61000-4-12: 2017
Emission Tests	
Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment	EN 55011: 2016
Electromagnetic Compatibility of Multimedia Equipment - Emission Requirements	EN 55032: 2015
Limits for Harmonic Current Emissions for Equipment with Rated Current ≤16 A	EN 61000-3-2: 2014
Limitation of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems for Equipment with Rated Current ≤16 A	EN 61000-3-3: 2013
Emission Standard for Industrial Environments	EN 61000-6-4: 2007 + A1: 2011
Mechanical Tests	
Spring Hammer Test	IEC 62052-11: 2003
Vibration Test	IEC 62052-11: 2003
Shock Test	IEC 62052-11: 2003

Appendix C Ordering Guide

CET Electric Technology	Version 20231008

Product Code									Description
PMC-S963 Intelligent Multifunction Meter									
	Basic Function								
	C								DIN96 Panel Mounting with Large 7-Segment LCD display. Multifunction Measurements, Demands, Multi-Tariff TOU, Harmonics up to 31st order
		Input Current							
		5							5A
		1							1A
			Input Voltage						
			3						240ULN/415ULL
				Power Supply					
				2					95-250 VAC/DC, 47-440Hz
					Frequency				
					5				45-65Hz
						I/O			
						A			4xDI + 2xDO + 1xSS Pulse Output
						B			4xDI
						C			4xDI + 2xDO + 1xSS Pulse Output + 1xAO
							Communication		
							A		1xRS-485
								Language	
								E	English

PMC-S963	-	C	5	3	2	5	A	A	E	PMC-S963-C5325AAE (Standard Model)

Contact us

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