

PMC-521D-A5
DI/DO Monitoring Terminal
User Manual
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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.



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

- Installation, operation and maintenance of the device should only be performed by qualified, competent personnel that have the appropriate training and experience with high voltage and current devices. The device 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 device.
- Before connecting the device to the power source, check the label on top of the device to ensure that it is equipped with the appropriate power supply, and the correct voltage and current input specifications for your application.
- Do not use the device for primary protection functions where failure of the device can cause fire, injury or death. The device should only be used for shadow protection if needed.
- Under no circumstances should the device be connected to a power source if it is damaged.
- To prevent potential fire or shock hazard, do not expose the device 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 offers the customer a minimum of 12-month functional warranty on the device 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 device 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 device according to the instructions herein will void the warranty.
- Only CET's duly authorized representative may open your device. 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.

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Chapter 1 Introduction

This chapter provides an overview of the PMC-521D-A5 and summarizes many of its key features.

1.1 Overview

The PMC-521D-A5 DI/DO Monitoring Terminal is an intelligent terminal unit, featuring quality construction, DIN Rail mount and a large, easy to read LCD display. It comes standard with 21 Digital Inputs for status monitoring or utility pulse counting, 2 Analog Inputs for interfacing with external transducers, and optionally provides 6 or 20 Digital Outputs for remote control applications. Further, the SOE Log records all Power on, Power off, setup changes and DI/DO status changes in 1ms resolution. With two standard RS-485 ports and one Ethernet port support, the PMC-521D-A5 becomes a vital component in any building, factory, data center, substation or utility automation systems.

You can setup the PMC-521D-A5 through its Front Panel or via our free Setup software. The device is also supported by our PecStar® iEMS Integrated Energy Management System. Following is a list of typical applications for the PMC-521D-A5:

- Status monitoring
- Remote Control
- Utility pulse counting for WAGES applications
- Data Center, Substation, Building, Factory and Utility Automation

Contacting CET Technical Support at support@cet-global.com enable you further assistance with your application.

1.2 Features

Ease of use

- A large, backlit, easy to read Dot-Matrix LCD display
- Simple, password-protected setup via LCD Display or our free setup software
- Easy installation with DIN Rail mounting, no tools required

Digital Inputs

- 21 channels for external status monitoring or utility pulse counting with programmable scales for collecting WAGES information
- Volts free dry contact, 24VDC internally wetted or 220V AC/DC externally wetted, or 277V AC/DC externally wetted
- 1000Hz sampling
- Externally wetted DI capability of Overload and Voltage Thresholds

Digital Outputs

- 6 or 20 channels for remote control applications
- Form A Mechanical Relays

Analog Inputs

- 2xAI, 0-20/4-20 mA DC input
- Interface with external transducer signals
- Programmable zero and full scales
- Overload @ 24mA maximum

SOE Log

- 1024 events time-stamped to ± 1 ms resolution
- Power On/Off, Setup Changes and DI/DO Changes

Communications

- 1x10BaseT/100BaseTX Ethernet Port with RJ45 connector
- 2xOptically isolated RS-485 port baud rate from 1200 to 115,200bps
- Standard Modbus TCP/RTU protocol support

Real-time clock

- Battery-backed real-time clock @ 6ppm or 0.5s/day

System Integration

- Supported by our PecStar® iEMS
- Easy integration into other Automation or SCADA systems via Modbus TCP/RTU protocol

1.3 Applications

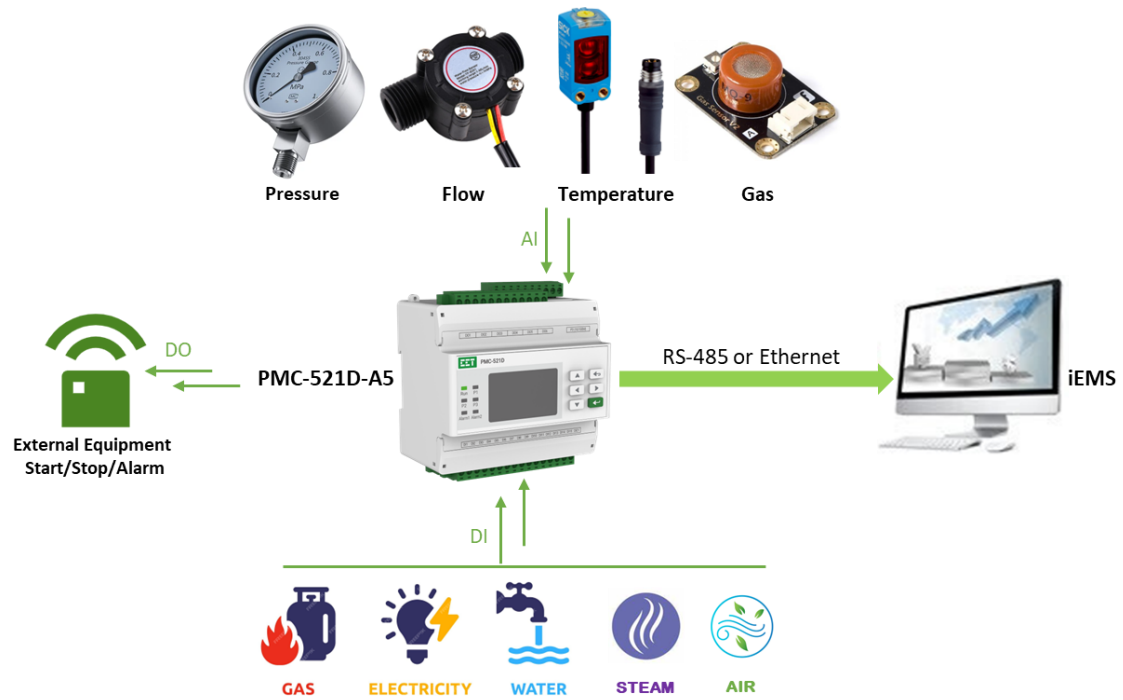


Figure 1-1 Application

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 or telephone

Chapter 2 Installation



Caution

Installation of the PMC-521D-A5 should only be performed by qualified, competent personnel that have the appropriate training and experience with high voltage and current devices. The unit must be installed in accordance with all local and national electrical codes.

During the operation of the device, 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



Figure 2-1 Appearance

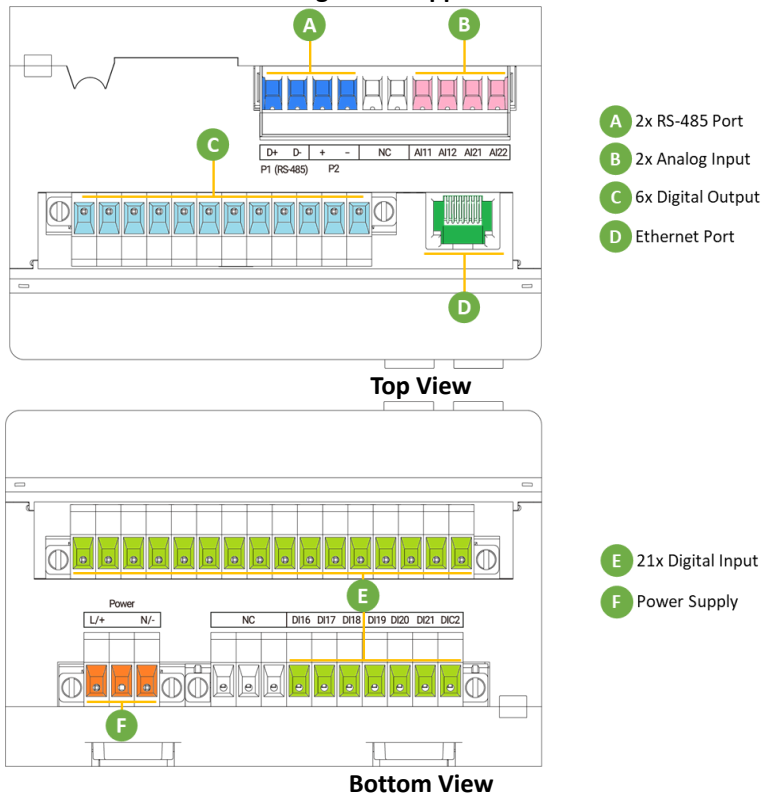
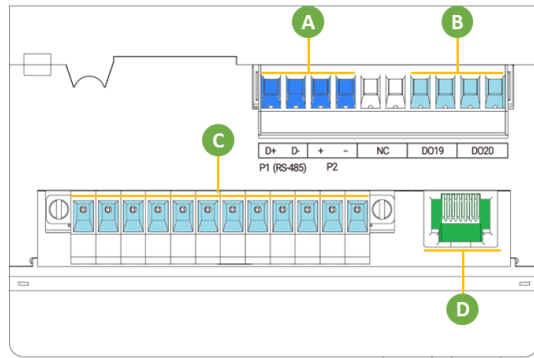
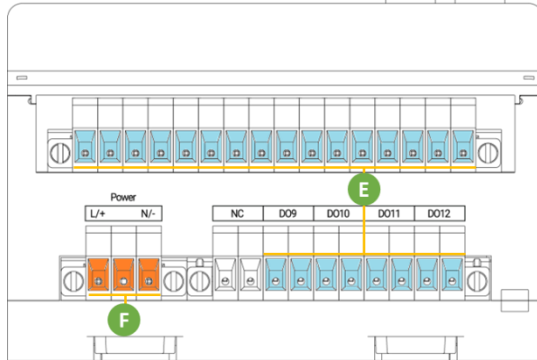


Figure 2-2 21xDI + 2xAI + 6xDO Option



Top View

- A 2x RS-485 Port
- B 2x Digital Output (DO19-DO20)
- C 6x Digital Output (DO13-DO18)
- D Ethernet Port

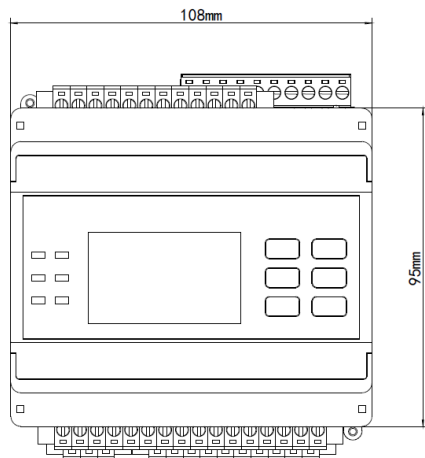


Bottom View

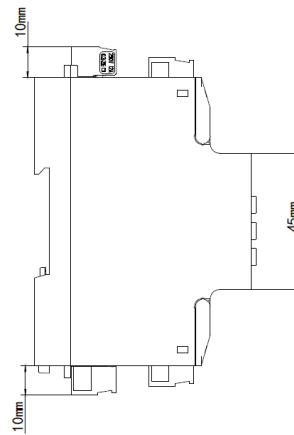
- E 12x Digital Output (DO1-DO12)
- F Power Supply

Figure 2-3 20xDO Option

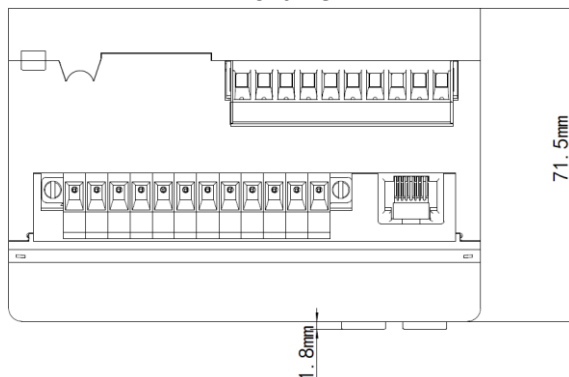
2.2 Unit Dimensions



Front View



Side View



Top View

Figure 2-4 Unit Dimensions

2.3 Mounting

The PMC-521D-A5 should be installed in a dry environment with no dust and kept away from heat, radiation and electrical noise source.

Installation steps:

- Before installation, make sure that the DIN Rail is already in place
- Move the installation clips at the back of the PMC-521D-A5
- Align the top of the mounting channel at the back of the PMC-521D-A5 at an angle against the top of the DIN Rail as shown in Figure 2-5 below
- Rotate the bottom of the PMC-521D-A5 towards the back while applying a slight pressure to make sure that the device is completely and securely fixed on to the DIN Rail
- Push the installation clips to secure the PMC-521D-A5 on to the DIN Rail

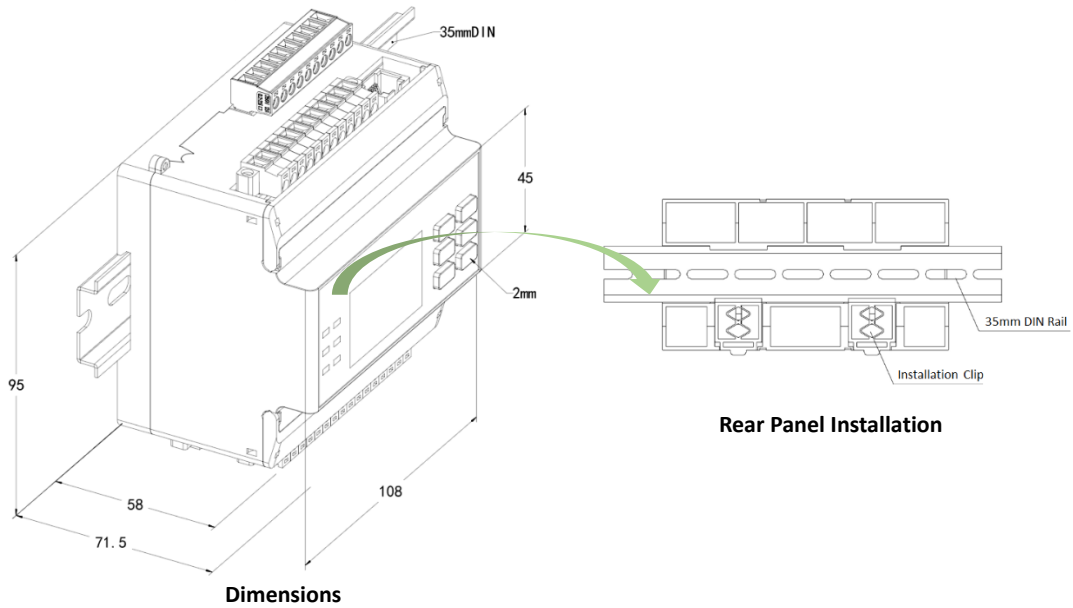


Figure 2-5 Installation

2.4 RS-485 Wiring

The PMC-521D-A5 provides two standard RS-485 port and 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 outputs and surge protection should be used. The following figure illustrates the RS-485 communications connections on the PMC-521D-A5.

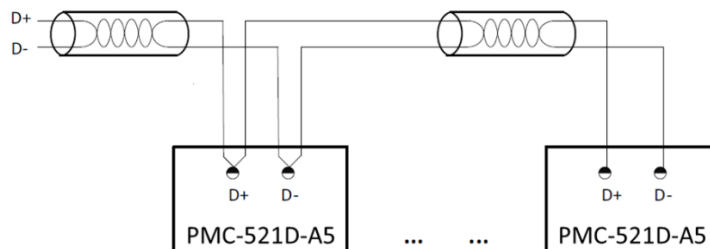


Figure 2-6 RS-485 Connections

2.5 Digital Input Wiring

The following figures illustrate the Digital Input connections on the PMC-521D-A5:



Figure 2-7 DI Connections

2.6 Digital Output Wiring

The following figures illustrate the Digital Output connections on the PMC-521D-A5:

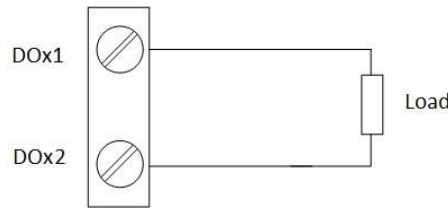


Figure 2-8 DO Connections

2.7 Analog Input Wiring

The following figure illustrates the Analog Input connections on the PMC-521D-A5:

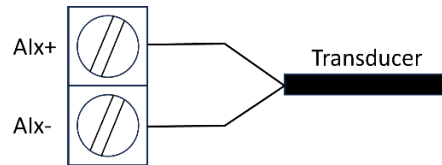


Figure 2-9 AI Connections

2.8 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.

Connect the GND terminal to ground.

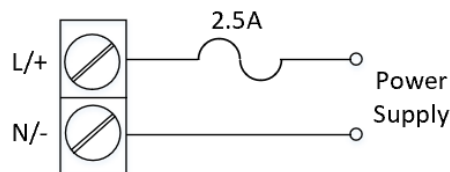


Figure 2-10 Power Supply Connections

Chapter 3 Front Panel

The PMC-521D-A5 has a large, easy to read LCD display with backlight and 6 buttons for data display and meter configuration. This chapter introduces the front panel operations.



Figure 3-1 PMC-521D-A5

3.1 LED Indicators and LCD Symbol

There are 6 LED indicators on the PMC-521D-A5's Front Panel as described below:

LED Indicator	Color	Status	Description
Run	Green	Blinking	Device is running normally.
		OFF	Device is powered off or running abnormally.
P1	Yellow	Blinking	P1 (RS-485) is receiving or transmitting data.
P2	Yellow	Blinking	P2 (RS-485) is receiving or transmitting data.
P3	Yellow	ON	The Ethernet connection is established and operates at an adaptive 10/100Mbps rate, with no data being transmitted or received.
		Blinking	P3 is transmitting or receiving data.
		OFF	Ethernet connection has not been established.
Alarm1	Red	ON	Always on when configured DI and/or DO trigger alarm.
Alarm2	Red	ON	Always on when configured DI and/or DO trigger alarm.
LCD Symbol		Description	
		SOE Log symbol. Appears when there is a DI change event and disappears when the event is checked from the Front Panel.	

Table 3-1 LED Indicators and LCD Symbol

3.2 Buttons

Buttons	Data Display Mode	Setup Configuration Mode
	<ul style="list-style-type: none"> If in the default page, press this button to enter the Main Menu. Enter the selected menu. 	<ul style="list-style-type: none"> Once inside the Setup Configuration Mode, pressing this button chooses whether to enter a sub-menu or select a parameter for modification. After changing the parameter, pressing this button again saves the new setting into memory.
	<ul style="list-style-type: none"> Press this button to scroll to the previous sub-menu. If the present sub-menu is the first sub-menu, press this button to scroll to the last one. 	<ul style="list-style-type: none"> Press this button to scroll to the previous sub-menu. If the present sub-menu is the first sub-menu, press this button to scroll to the last one. After a setup parameter has been selected, press this button to increment the numeric value or go back to the previous enumerated value in the selection list.
	<ul style="list-style-type: none"> Press this button to scroll to the next sub-menu. If the present sub-menu is the last sub-menu, press this button to scroll to the first one. 	<ul style="list-style-type: none"> Press this button to scroll to the next sub-menu. If the present sub-menu is the last sub-menu, press this button to scroll to the first one. After a setup parameter has been selected, press this button to decrement the numeric value or advance to the next enumerated value in the selection list.
	<ul style="list-style-type: none"> Pressing this button scrolls to the 	<ul style="list-style-type: none"> Press this button to shift the cursor to the left by






	previous page. If the present page is the first page, press this button to scroll to the last page.	one position.
	<ul style="list-style-type: none"> Pressing this button scrolls to the next page. If the present page is the last page, press this button to scroll to the first page. 	<ul style="list-style-type: none"> Press this button to shift the cursor to the right by one position.
	<ul style="list-style-type: none"> Pressing this button cancels the present operation or goes back to previous menu. 	

Table 3-2 Buttons Description

3.3 Default Display

The PMC-521D-A5 has a Default Display that shows the DI status and DO status. The user can press  to enter the Main Menu, and use  or  to scroll to other sub-menus.

2025/11/01 10:00:00	
DI01~DI08	0000 0000
DI09~DI16	0000 0000
DI17~DI21	0000 00xx
DO01~DO06	0000 0xxx

Figure 3-2 Default Display

3.4 Main Menu

Pressing  button enters PMC-521D-A5's Main Menu, which is shown in the figure below.

2025/10/31 15:56:33 1/2	2025/10/31 15:56:40 2/2
Present Data Setup SOE Log Maintenance	<div style="background-color: #cccccc; padding: 5px; text-align: center;">Information</div>

Figure 3-3 PMC-521D-A5's Main Menu

There are five options in the Main Menu - **Present Data**, **Setup**, **SOE Log**, **Maintenance**, and **Information**.

- **Present Data:** View DI statuses, DO statuses, DI pulse counters and AI values
- **Setup:** Configure setup parameters
- **SOE Log:** View SOE logs
- **Maintenance:** Perform maintenance operations
- **Information:** View device information

3.4.1 PMC-521D-A5's Menu

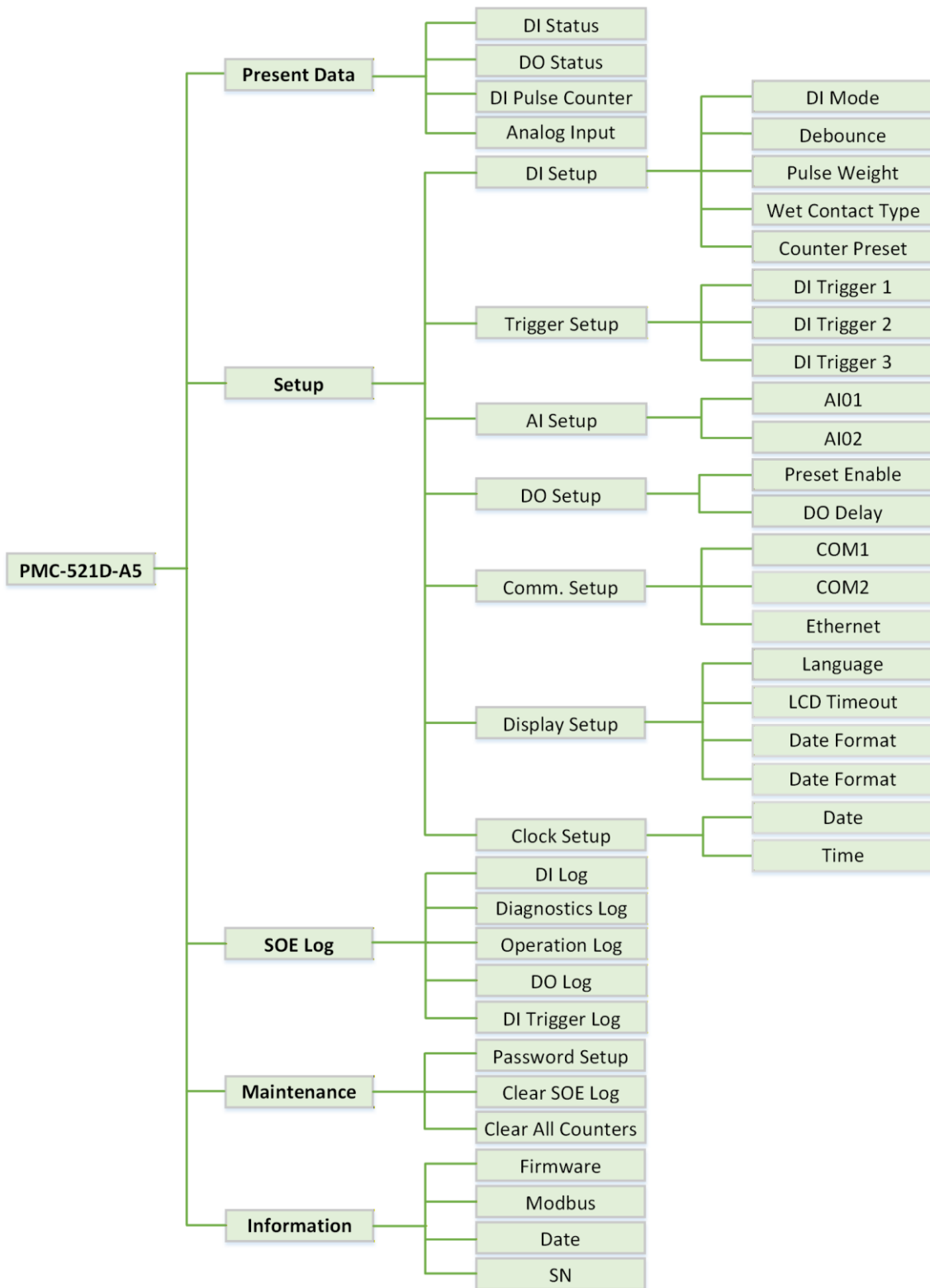


Figure 3-4 PMC-521D-A5 Menu

3.4.2 Present Data (Real-time Measurement)

Display Screens	1 st Row	2 nd Row	3 rd Row	4 th Row
Display 1	DI Status	DI01~DI08	DI09~DI16	DI17~DI21
Display 2	DO Status ¹	DO01~DO08		
Display 3	DI Pulse Counter	DI01	DI02	DI03

Display 4		DI04	DI05	DI06
Display 5		DI07	DI08	DI09
Display 6		DI10	DI11	DI12
Display 7		DI13	DI14	DI15
Display 8		DI16	DI17	DI18
Display 9		DI19	DI20	DI21
Display 10	Analog Input	AI01	AI02	

Table 3-3 Real-time Displays

Note:

- 1) For the **20 x DO** option, there are three rows under 1st Row DO Status: DO01~DO08, DO09~DO16 and DO17~DO20.

3.4.3 Setup

3.4.3.1 Making Setup Changes

1) Entering the Password:

- Press to enter **Main Menu**.
- Press to scroll to the **Setup** sub-menu and press to access the selection interface to choose **Setup** or **Browse**.
- A correct password must be entered before changing setup parameters. Press to enter the password.
- Use or to enter the password. The factory default password is "000000".
- After entering the password, press and the sub-menu interface will be shown if the entered password is correct. If the entered password is incorrect, the *Incorrect Password* prompts.

2) Viewing a parameter's setting

- Press or to scroll through the list of sub-menus and press to select the desired parameter.
- If and are shown at the top of the page, there are multiple pages for this parameter and display them in rotation by pressing or .
- Press or to scroll to the desired parameter.

3) Changing and saving a setup parameter:

- After scrolling to the desired parameter, press to enter the parameter setup mode or press to exit the present page.
- For a numeric parameter, press to shift the cursor to the left by one position and press or to increment or decrement the numeric value, respectively.
- For an enumerated parameter, press to scroll to the next option and press to return to the previous option.
- After modification, press to save the change into memory or press to exit the currently selected parameter without change.
- Repeat step 3) until all setup parameters have been changed.

4) Exiting the Setup Mode

- Press to return to the **Main Menu**.
- Also, the setup mode will be automatically exited if there is a period of inactivity of 3 minutes or longer.

3.4.3.2 Configuration

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

Label	Parameters	Description	Range	Default
Main Menu				
Enter Password	Password	Enter Password	0 to 999999	000000
DI Setup*	Enter sub-menu to set DI parameters			
DI Mode	DI1	Set DI mode	Digital Input/ Pulse Counter	Digital Input
	DI2			
	...			
	DI21			

Debounce	DI1	Set Debounce Time	1~9999 (ms)	20
	DI2			
	...			
	DI21			
Pulse Weight	DI1	Set DI Pulse Weight	1~1,000,000	1
	DI2			
	...			
	DI21			
Wet Contact Type ¹	Contact Type	Set DI Contact Type	DC/AC	DC
Counter Preset	DI1	Preset DI Pulse Counter	0~999,999,999	0
	DI2			
	...			
	DI21			
Trigger Setup*	Enter sub-menu to set DI Trigger X			
DI Trigger X (X=1, 2, 3)	DI Select	Select which DI(s) is used to trigger DO(s)	DI21 ← DI1 (0=Disable, 1=Enable)	0
	DI Reverse	Set DI(s) to trigger the DO(s) in NO/NC ² mode	DI21 ← DI1 (0=NO, 1=NC)	0
	Delay Time	Set Delay Time	1~9999 (s)	1
	Output Select	Select which DO will be triggered by DI(s)	DO6 ← DO1 (0=Disable, 1=Enable)	000001
AI Setup*	Enter sub-menu to set AI parameters			
AI01	AI Type	Select between 0-20mA or 4-20mA input	4-20mA/0-20 mA	4-20mA
	AI Zero Scale	The value that corresponds to the minimum Analog Input of 0 or 4 mA	-999,999 to 999,999	400
	AI Full Scale	The value that corresponds to the maximum Analog Input of 20 mA	-999,999 to 999,999	2000
AI02	AI Type	Select between 0-20mA or 4-20mA input	4-20mA/0-20 mA	4-20mA
	AI Zero Scale	The value that corresponds to the minimum Analog Input of 0 or 4 mA	-999,999 to 999,999	400
	AI Full Scale	The value that corresponds to the maximum Analog Input of 20 mA	-999,999 to 999,999	2000
DO Setup*	Enter sub-menu to set DO Parameters			
Preset Enable	Arm Before Execute	ARM before EXECUTE operation for the remote control of Digital Outputs	Disable/Enable	Disable
DO Delay ³	DO1	Set DOs' Pulse Width	0~600(s)	1.0s
	DO2			
	DO3			
	DO4			
	DO5			
	DO6			
Comm. Setup	Enter sub-menu to set Comm. Parameters			
COM1	ID	Set Unit ID	1-247	Last 2 digits of SN ⁴
	Baud Rate	Set Baud Rate in Bits Per Second (bps)	1200/2400/ 4800/9600/ 19200/38400/ 57600/115200	38400
	Parity	Set Comm. Port Config.	8N2/8O1/8E1/ 8N1/8O2/8E2	8E1
COM2	ID	Set Unit ID	1-247	Last 2 digits of SN+1 ⁴
	Baud Rate	Set Baud Rate in Bits Per Second (bps)	1200/2400/ 4800/9600/	38400

			19200/38400/ 57600/115200	
	Parity	Set Comm. Port Config.	8N2/8O1/8E1/ 8N1/8O2/8E2	8E1
Ethernet	IP Address	Ethernet IP Address		192.168.0.100
	Subnet Mask	Ethernet Subnet Mask		255.255.255.0
	Gateway	Ethernet Gateway IP		192.168.0.1
Display Setup Enter sub-menu to set LCD Display parameters				
Language	-	System language	English	English
LCD Timeout	-	Backlight Timeout	0 to 6 mins	5min
Date Format	-	Set Date Format	yyyy/mm/dd mm/dd/yyyy dd/mm/yyyy	yyyy/mm/dd
Contrast	-	Display Contrast	0-9	5
Clock Setup Enter sub-menu to set data and time				
Date	-	Enter the current date	20YY/MM/DD	/
Time	-	Enter the current time	HH:MM:SS	/

* Appear only if the device is equipped with the appropriate option.

Table 3-4 Setup Parameters

Notes:

- 1) For the **21xDI (Dry Contact)** option, this parameter is fixed as **DC** and no need to configure.
- 2) NO means the mode is Normally Open and NC means the mode is Normally Closed.
- 3) For the 20xDO option, there are 20 DO Delays: DO1~D020.
- 4) If the last 2 digits of SN is 00, the default ID of COM1 should be 100 and that of COM2 should be 01.

3.4.4 SOE Log

The PMC-521D-A5 supports display of the SOE Log with up to 1024 Events (2 Events per page) including: DI Log, Diagnostics Log, Operation Log, DO Log and DI Trigger Log.

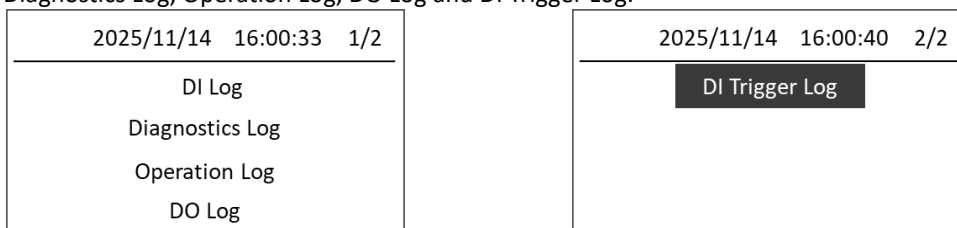


Figure 3-5 SOE Log Classification

The following figure is an example of SOE log. In addition, the SOE Log can be reset from the Front Panel.

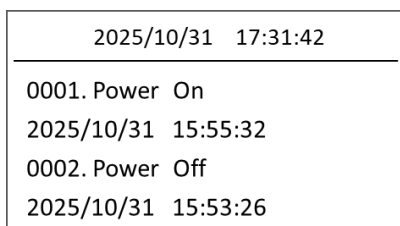


Figure 3-6 SOE Log Display

3.4.5 Maintenance

Before entering the Maintenance menu, the password should be entered correctly. The **Maintenance** menu provides the following parameters:

Sub-Menu	Parameters	Options/Range
Password Setup	New Password ¹	000000*-999999
Clear SOE Log	Clear the SOE Log	Yes/No*
Clear All Counters	Clear Counters	Yes/No*

Table 3-5 Maintenance Sub-menu

3.4.6 Information

The **Information** menu provides the following parameters:

Sub-Menu	Parameters	Options/Range
Firmware	Firmware Version	e.g. V1.00.00
Modbus	Modbus Protocol Version	e.g. V1.0
Date	Firmware Update Date	e.g. 2025.09.25
SN	Serial Number	e.g. 3500003647

Table 3-6 Information Sub-menu

Chapter 4 Application

4.1 Digital Inputs

The PMC-521D-A5 comes standard with 21 Digital Inputs with a sampling frequency of 1000Hz and Debounce. The PMC-521D-A5 provides the following functions for its digital inputs:

- 1) **Digital Input** The digital inputs 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 as well as through communications. Changes in Digital Input status are stored as events in the DI Log in ± 1 ms resolution.
- 2) **Pulse Counting** Pulse counting is supported with programmable pulse weight and facilitates WAGES (Water, Air, Gas, Electricity and Steam) information collection.
- 3) **DI Trigger DO** PMC-521D-A5 supports 3 sets of DI trigger logic. Each set of DI trigger can be configured with up to 21 DI channels. Each DI can be individually set to "Normally Open (NO)" or "Normally Closed (NC)" mode and can be linked to trigger one or multiple DOs. Besides, the DI triggered DO action will be recorded as DI Trigger Log. If no DI is configured for a DI trigger set, the trigger output will not activate, and no SOE log will be recorded.

The following table describes the DI's setup parameters:

Parameter	Definition	Options/Default*
DIx Mode	Each DI can be configured as a Digital Input or Pulse Counter.	0=Digital Input* 1=Pulse Counter
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.	1 to 9999 (ms) 20ms*
DIx Pulse Weight	Specifies the incremental value for each received pulse. This is only used when a DI is configured as a Pulse Counter.	1 to 1,000,000, 10*

Table 4-1 DI Setup Parameters

The following table provides the DO Trigger's setup parameters:

Parameter	Definition	Options/Default*
DI Select	Specifies the DI that will link to the DI Trigger X. X=1~3	0=Disabled* 1=Enabled
DI Reverse	Specifies DI(s) to trigger the DO(s) in NO/NC mode	0=NC*, 1=NO
Delay Time	Specifies the minimum duration before the DO triggered. An event will be generated and stored in the SOE Log.	0 to 9999 s, 1*
Output Select	Specifies the triggered DO(s).	DO1 to DO6

Table 4-1 DO Trigger Setup Parameters

4.2 Digital Outputs

The PMC-521D-A5 comes standard with 6 or 20 Digital Outputs (optional) with a sampling frequency of 1000Hz. Digital Outputs are normally used for remote control applications. Digital Outputs on the PMC-521D-A5 can be used in the following applications:

- 1) **Front Panel Control** Manually operated from the Front Panel.
- 2) **Remote Control** Remotely operated over communications via our free Setup software or PecStar® iEMS Integrated Energy Management System.
- 3) **Triggered by DI(s)** DI(s) can be programmed to trigger DO action upon becoming active.

In general, Front Panel Control has the highest priority and can override other applications. Remote Control and DI Trigger 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 condition.

4.3 Analog Inputs

The PMC-521D-A5 comes with two Analog Inputs which can be programmed as 0mA to 20mA or 4mA to 20mA input. There are 3 setup parameters:

- Type:** Select between 0-20mA or 4-20mA input.
- AI Zero:** This value corresponds to the minimum Analog Input of 4 mA (for 4-20mA input) and has a range of -999,999 to +999,999.
- AI Full:** This value corresponds to the maximum Analog Input of 20 mA and has a range of -999,999 to +999,999.

For example, to measure the oil temperature of a transformer, connect the outputs of the temperature sensor to the AI terminals of the PMC-521D-A5. The temperature sensor outputs 4mA when the temperature is -25°C and 20mA when the temperature is 100°C. As such, the **Type** parameter should be programmed as **4-20mA**. The **AI FULL** parameter should be programmed with the value 100, and the **AI ZERO** parameter should be programmed with the value -25. Therefore, when the output of the sensor is 20mA, the reading will be 100.00°C. When the output is 4mA, the reading will be -25.00°C. When the output is 12mA, the reading will be $(100^{\circ}\text{C} - (-25^{\circ}\text{C})) \times (12\text{mA}-4\text{mA}) / (20\text{mA}-4\text{mA}) + (-25^{\circ}\text{C}) = 37.50^{\circ}\text{C}$.

4.4 DI/DO Alarm

There are two Alarm indicators (Alarm1 and Alarm2) on the PMC-521D-A5's Front Panel. Each DI and/or DO on the PMC-521D-A5 can be set to trigger Alarm1 and/or Alarm2 via registers 6104 and 6106.

For the 21xDI option:

BIT31	BIT30	BIT29	BIT28	BIT27	BIT26	BIT25	BIT24	BIT23	BIT22	BIT21	BIT20	BIT19	BIT18	BIT17	BIT16
Reserved					DO6	DO5	DO4	DO3	DO2	DO1	DI21	DI20	DI19	DI18	DI17
BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
DI16	DI15	DI14	DI13	DI12	DI11	DI10	DI9	DI8	DI7	DI6	DI5	DI4	DI3	DI2	DI1

Table 4-1 21xDI option Alarm Setup

The above table illustrates the details of the **Alarm1 and/or Alarm2 Indicator Source** register with a bit value of 1 meaning enabled (activated) and 0 meaning disabled (inactivated). For example, setting the Alarm1 or Alarm2 Indicator source register value to 5 (binary 101) means that if either DI1 or DI3 is activated, the Alarm1 or Alarm2 indicator will be on.

For the 20xDO option:

BIT31	BIT30	BIT29	BIT28	BIT27	BIT26	BIT25	BIT24	BIT23	BIT22	BIT21	BIT20	BIT19	BIT18	BIT17	BIT16
Reserved												DO20	DO19	DO18	DO17
BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8	BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
DO16	DO15	DO14	DO13	DO12	DO11	DO10	DO9	DO8	DO7	DO6	DO5	DO4	DO3	DO2	DO1

Table 4-1 20xDO Alarm Setup

The above table illustrates the details of the **Alarm1 and/or Alarm2 Indicator Source** register with a bit value of 1 meaning enabled (activated) and 0 meaning disabled (inactivated). For example, setting the Alarm1 or Alarm2 indicator source to 3 (binary 011) indicates that if either DO1 or DO2 is activated, the Alarm1 or Alarm2 indicator will be on.

4.5 SOE Log

The PMC-521D-A5's SOE Log can store up to 1024 events such as Power On, Power Off, Digital Input/Digital Output status changes and Setup changes in its non-volatile memory. Each event record includes the event classification, its relevant parameter values and a timestamp in ±1 ms resolution. The SOE Log can be retrieved via communications or through the Front Panel. If there are more than 1024 events, the newest event will replace the oldest event on a First-In-First-Out basis. The SOE Log can be reset via communications or through the Front Panel.

Chapter 5 Modbus Register Map

This chapter provides a complete description of the Modbus register map (**Protocol Version 1.0**) for the PMC-521D-A5 to facilitate the development of 3rd party communications driver for accessing information on the PMC-521D-A5. The PMC-521D-A5 supports the following Modbus functions:

- 1) Read Holding Registers (Function Code 0x03)
- 2) Preset Multiple Registers (Function Code 0x10)

For a complete Modbus Protocol Specification, please visit <http://www.modbus.org>.

The following table provides a description of the different data formats used for the Modbus registers. The PMC-521D-A5 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

Table 5-1 Data Formats

5.1 Real-time Measurements

Register	Property	Description	Format	Scale	Unit
0000	RO	DI Status 1 ¹	UINT16		
0001	RO	DI Status 2 ²	UINT16		
0002	RO	DO Status ³	UINT32		
0004	RO	AI1 Scaled Value	INT32	x0.01	
0006	RO	AI2 Scaled Value	INT32	x0.01	
0008~0009	RO	Reserved			
0010	RO	SOE Log Pointer ⁴	UINT32		

Table 5-2 Realtime Measurements

Notes:

- 1) For the **DI Status 1** register, the bit values of B0 to B15 represent the status of DI01 to DI16, respectively, with “1” meaning Active (Closed) and “0” meaning Inactive (Open).
- 2) For the **DI Status 2** register, the bit values of B0 to B04 represent the status of DI17 to DI21, respectively, with “1” meaning Active (Closed) and “0” meaning Inactive (Open). The bit values of B05 to B15 are invalid and always “0”.
- 3) For the **DO Status** register, the bit values of B0 to B5 represent the states of DO1 to DO6, respectively, with “1” meaning Active (Closed) and “0” meaning Inactive (Open).
- 4) The PMC-521D-A5 has one SOE Log and the 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 0xFFFFFFFFH. If a Clear Log is performed through the Front Panel or 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.
- 5) DI and AI parameters are only meaningful if the meter is equipped with the corresponding options.

5.2 DI Pulse Counters

Register	Property	Description	Format	Unit/Coefficient
0900	RW	DI01 Pulse Counter	INT32	0 to 1,000,000,000 DI Pulse Counter = Pulse Counter x DI Pulse Weight
0902	RW	DI02 Pulse Counter	INT32	
0904	RW	DI03 Pulse Counter	INT32	
0906	RW	DI04 Pulse Counter	INT32	
...	RW	...	INT32	
0934	RW	DI18 Pulse Counter	INT32	
0936	RW	DI19 Pulse Counter	INT32	
0938	RW	DI20 Pulse Counter	INT32	
0940	RW	DI21 Pulse Counter	INT32	

Table 5-3 DI Pulse Counters

5.3 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-1/1024)

*8

Register	Property	Description	Format
10000~10007	RO	Event 1	See Table 5-5 SOE Log Data Structure
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	
10056~10063	RO	Event 8	
10064~10071	RO	Event 9	
10072~10079	RO	Event 10	
10080~10087	RO	Event 11	
10088~10095	RO	Event 12	
...		...	
18184~18191	RO	Event 1024	

Table 5-4 SOE Log

Notes:

1) SOE Log Data Structure

Offset	Property	Description	Unit
+0	RO	High-order Byte: Event Classification	See Table 5-6
	RO	Low-order Byte: Sub-Classification	SOE Classification
+1	RO	Record Time: Year	0-99 (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 5-5 SOE Log Data Structure

2) SOE Classification

Event Classification	Sub-Classification	Status	Event Value	Description
1=DI Changes	1	1 / 0	0	DI01 Active/DI01 Inactive
	2	1 / 0	0	DI02 Active/DI02 Inactive
	3	1 / 0	0	DI03 Active/DI03 Inactive
	4	1 / 0	0	DI04 Active/DI04 Inactive

	18	1 / 0	0	DI18 Active/DI18 Inactive
	19	1 / 0	0	DI19 Active/DI19 Inactive
	20	1 / 0	0	DI20 Active/DI20 Inactive
4=Self-diagnosis	1	0	0	System Parameter Fault
	2	0	0	Factory Setup Parameter Fault
3=Operations	1	0	0	Power On
	2	0	0	Power Off
	3	0	0	Set Clock via Front Panel
	4	0	0	System Setup Changed via Front Panel
	5	0	0	Communication Setup Changed via Front Panel
	6	0	0	Preset DI Pulse Counter via Front Panel
	7	0	0	Clear All Pulse Counters via Front Panel
	8	0	0	Clear SOE Logs via Front Panel
	9	0	0	System Setup Changes via Comm.
	10	0	0	Factory Setup Changed via Comm.
	11	0	0	Communication Setup Changed via Comm.
	12	0	0	Preset DI Counter via Comm.
	13	0	x=1 to 21	Clear Dlx Pulse Counter via Comm.
	14	0	0	Clear All DI Pulse Counters via Comm.
	15	0	0	Clear SOE Logs via Comm.
4=DO Action	1	1/0	0	DO1 Operated/Released by Front Panel
	2	1/0	0	DO2 Operated/Released by Front Panel

	...	1/0	0	...
	19	1/0	0	DO3 Operated/Released by Front Panel
	20	1/0	0	DO4 Operated/Released by Front Panel
	21~30	1/0	0	Reserved
	31	1/0	0	DO1 Operated/Released by Remote Control
	32	1/0	0	DO2 Operated/Released by Remote Control
	...	1/0	0	...
	49	1/0	0	DO3 Operated/Released by Remote Control
	50	1/0	0	DO4 Operated/Released by Remote Control
	51~60	1/0	0	Reserved
	61	1/0	0	DO1 Released by Pulse Width
	62	1/0	0	DO2 Released by Pulse Width
	...	1/0	0	...
	79	1/0	0	DO3 Released by Pulse Width
	80	1/0	0	DO4 Released by Pulse Width
	81~90	1/0	0	Reserved
	91	1/0	0	DO1 Operated/Released by DI Trigger
	92	1/0	0	DO2 Operated/Released by DI Trigger
	...	1/0	0	...
	96	1/0	0	DO6 Operated/Released by DI Trigger
7	1~3	0	1~0x1F FFFF	Event records 1-3 by DI Trigger

Table 5-6 SOE Event Classification

5.4 Device Setup

5.4.1 Basic Setup

Register	Property	Description	Format	Unit/Range
6100	RW	Backlight Timeout	UINT16	0 to 60 (mins), 3*
6101	RW	System Language	UINT16	0=Chinese, 1=English*
6102	RW	Date Format	UINT16	0=YMMDD*, 1=MMDDYY, 2=DDMMYY
6103	RW	LCD Contrast	UINT16	0 to 9, 5*
6104	RW	Alarm 1 Indicator Source ¹	UINT32	0*
6106	RW	Alarm 2 Indicator Source ¹	UINT32	0*
6108	RW	Time Zone ²	UINT16	0 to 32, 26*
6109	RW	DI Contact Type	UINT32	0=NO (Normally Open) *, 1=NC (Normally Closed)

Table 5-7 Display Setup Parameters

Notes:

1) For the **21xDI** option:

Bit31	Bit30	Bit29	Bit28	Bit27	Bit26	Bit25	Bit24
Reserved					DO6	DO5	DO4
Bit23	Bit22	Bit21	Bit20	Bit19	Bit18	Bit17	Bit16
DO3	DO2	DO1	DI21	DI20	DI19	DI18	DI17
Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
DI16	DI15	DI14	DI13	DI12	DI11	DI10	DI9
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
DI8	DI7	DI6	DI5	DI4	DI3	DI2	DI1

Table 5-8 21xDI Option for Alarm1/2 Indicator Source

The above table illustrates the details of the **Alarm1 and/or Alarm2 Indicator Source** register with a bit value of 1 meaning enabled (activated) and 0 meaning disabled (inactivated). For example, setting the Alarm1 or Alarm2 Indicator source register value to 5 (binary 101) means that if either DI1 or DI3 is activated, the Alarm1 or Alarm2 indicator will be on.

2) For the **20xDO** option:

Bit20 ~ 31				Bit19	Bit18	Bit17	Bit16
Reserved				DO20	DO19	DO18	DO17
Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
DO16	DO15	DO14	DO13	DO12	DO11	DO10	DO9
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
DO8	DO7	DO6	DO5	DO4	DO3	DO2	DO1

Table 5-9 21xDO Option for Alarm1/2 Indicator Source

For example, setting the Alarm1 or Alarm2 indicator source to 3 (binary 011) indicates that if either DO1

or DO2 is activated, the Alarm1 or Alarm2 indicator will be on.

3) The following table lists the Codes for different Time Zones.

Code	Time Zone	Code	Time Zone
0	GMT-12:00	17	GMT+03:30
1	GMT-11:00	18	GMT+04:00
2	GMT-10:00	19	GMT+04:30
3	GMT-09:00	20	GMT+05:00
4	GMT-08:00	21	GMT+05:30
5	GMT-07:00	22	GMT+05:45
6	GMT-06:00	23	GMT+06:00
7	GMT-05:00	24	GMT+06:30
8	GMT-04:00	25	GMT+07:00
9	GMT-03:30	26	GMT+08:00
10	GMT-03:00	27	GMT+09:00
11	GMT-02:00	28	GMT+09:30
12	GMT-01:00	29	GMT+10:00
13	GMT+00:00	30	GMT+11:00
14	GMT+01:00	31	GMT+12:00
15	GMT+02:00	32	GMT+13:00
16	GMT+03:00		

Table 5-10 Time Zones

5.4.2 DO Setup

Register	Property	Description	Format	Range, Default*
6150	RW	DO Arm before Execute ¹	UINT16	0=Disabled*, 1=Enabled
6151	RW	DO1 Pulse Width	UINT16	0~6000 (x0.1s), 10* (0=Latch Mode)
6152	RW	DO2 Pulse Width	UINT16	
6153	RW	DO3 Pulse Width	UINT16	
6154	RW	DO4 Pulse Width	UINT16	
6155	RW	DO5 Pulse Width	UINT16	
6156	RW	DO6 Pulse Width	UINT16	
6157	RW	DO7 Pulse Width	UINT16	
6158	RW	DO8 Pulse Width	UINT16	
6159	RW	DO9 Pulse Width	UINT16	
6160	RW	DO10 Pulse Width	UINT16	
6161	RW	DO11 Pulse Width	UINT16	
6162	RW	DO12 Pulse Width	UINT16	
6163	RW	DO13 Pulse Width	UINT16	
6164	RW	DO14 Pulse Width	UINT16	
6165	RW	DO15 Pulse Width	UINT16	
6166	RW	DO16 Pulse Width	UINT16	
6167	RW	DO17 Pulse Width	UINT16	
6168	RW	DO18 Pulse Width	UINT16	
6169	RW	DO19 Pulse Width	UINT16	
6170	RW	DO20 Pulse Width	UINT16	

Table 5-11 DO Setup Parameters

Notes:

- 1) If this register is enabled, before executing an OPEN or CLOSE command on a Digital Output, it must be "Armed" first.

5.4.3 DI Setup

Register	Property	Description	Format	Range, Default*
6200	RW	DI01 Mode ¹	UINT16	0=Digital Input*, 1=Pulse Counter ¹
6201	RW	DI01 Debounce	UINT16	1 to 9999 ms, 20*
6202	RW	DI01 Pulse Weight	UINT32	1* to 1,000,000
6204	RW	DI02 Mode ¹	UINT16	0=Digital Input*, 1=Pulse Counter ¹
6205	RW	DI02 Debounce	UINT16	1 to 9999 ms, 20*
6206	RW	DI02 Pulse Weight	UINT32	1* to 1,000,000
6208	RW	DI03 Mode ¹	UINT16	0=Digital Input*, 1=Pulse Counter ¹
6209	RW	DI03 Debounce	UINT16	1 to 9999 ms, 20*
6210	RW	DI03 Pulse Weight	UINT32	1* to 1,000,000
6212	RW	DI04 Mode ¹	UINT16	0=Digital Input*, 1=Pulse Counter ¹
6213	RW	DI04 Debounce	UINT16	1 to 9999 ms, 20*
6214	RW	DI04 Pulse Weight	UINT32	1* to 1,000,000

...		...		
6268	RW	DI18 Mode ¹	UINT16	0=Digital Input*, 1=Pulse Counter ¹
6269	RW	DI18 Debounce	UINT16	1 to 9999 ms, 20*
6270	RW	DI18 Pulse Weight	UINT32	1* to 1,000,000
6272	RW	DI19 Mode ¹	UINT16	0=Digital Input*, 1=Pulse Counter ¹
6273	RW	DI19 Debounce	UINT16	1 to 9999 ms, 20*
6274	RW	DI19 Pulse Weight	UINT32	1* to 1,000,000
6276	RW	DI20 Mode ¹	UINT16	0=Digital Input*, 1=Pulse Counter ¹
6277	RW	DI20 Debounce	UINT16	1 to 9999 ms, 20*
6278	RW	DI20 Pulse Weight	UINT32	1* to 1,000,000
6280	RW	DI21 Mode ¹	UINT16	0=Digital Input*, 1=Pulse Counter ¹
6281	RW	DI21 Debounce	UINT16	1 to 9999 ms, 20*
6282	RW	DI21 Pulse Weight	UINT32	1* to 1,000,000
6284	RW	DI Excitation Type ²	UINT16	0=DC*, 1=AC

Table 5-12 DI Setup Parameters

Notes:

- 1) If **DIx Mode** is set to **Digital Input**, the SOE will record DI Status changes instead of DI Pulse Counting, and vice versa.
When the **DI Excitation Type** (register 6284) is set to **AC**, this register is invalid and fixed as **Digital Input**.
- 2) For the **21xDI (Dry Contact)** option, this register is invalid and fixed as **DC**.

5.4.4 DI Trigger

Register	Property	Description	Format	Range, Default*
6500	RW	DI Trigger 1	DI Select ¹	UINT32 0~0x1FFFFFF, 0*
6502	RW		DI Reverse ²	UINT32 0~0x1FFFFFF, 0*
6504	RW		Delay Time	UINT16 0~9999s, 1*
6505	RW		Output Select ³	UINT16 0~0x3F, 1*
6506	RW	DI Trigger 2	DI Select ¹	UINT32 0~0x1FFFFFF, 0*
6508	RW		DI Reverse ²	UINT32 0~0x1FFFFFF, 0*
6510	RW		Delay Time	UINT16 0~9999s, 1*
6511	RW		Output Select ³	UINT16 0~0x3F, 1*
6512	RW	DI Trigger 3	DI Select ¹	UINT32 0~0x1FFFFFF, 0*
6514	RW		DI Reverse ²	UINT32 0~0x1FFFFFF, 0*
6516	RW		Delay Time	UINT16 0~9999s, 1*
6517	RW		Output Select ³	UINT16 0~0x3F, 1*

Table 5-13 DI Trigger Setup

Notes:

- 1) The following table illustrates the details of **DI Select** register, where 1 means the DI is enabled while 0 indicates the DI is disabled:

Bit31 to Bit21			Bit20	Bit19	Bit18	Bit17	Bit16
Reserved			DI21	DI20	DI19	DI18	DI17
Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
DI16	DI15	DI14	DI13	DI12	DI11	DI10	DI9
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
DI8	DI7	DI6	DI5	DI4	DI3	DI2	DI1

Table 5-14 DI Select Register

- 2) The following table illustrates the details of **DI Reverse** register, where 1 means setting the DI to NC (Normally Closed) while 0 means setting the DI to NO (Normally Open):

Bit31 to Bit21			Bit20	Bit19	Bit18	Bit17	Bit16
Reserved			DI21	DI20	DI19	DI18	DI17
Bit15	Bit14	Bit13	Bit12	Bit11	Bit10	Bit9	Bit8
DI16	DI15	DI14	DI13	DI12	DI11	DI10	DI9
Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
DI8	DI7	DI6	DI5	DI4	DI3	DI2	DI1

Table 5-15 DI Reverse Register

- 3) The following table illustrates the details of **Output Select** register, where 1 means DO is Enabled while 0 means the DO is disabled:

Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
DO6	DO5	DO4	DO3	DO2	DO1

Table 5-16 Output Select Register

5.4.5 AI Setup (Optional)

Register	Property	Description	Format	Range, Default*
6300	RW	AI1 Type ¹	UINT16	0 = 4~20mA*, 1 = 0~20mA
6301	RW	AI1 Zero Scale ¹	INT32	-999,999 to +999,999, 400*
6303	RW	AI1 Full Scale ¹	INT32	-999,999 to +999,999, 2000*
6305	RW	AI2 Type ¹	UINT16	0 = 4~20mA*, 1 = 0~20mA
6306	RW	AI2 Zero Scale ¹	INT32	-999,999 to +999,999, 400*
6308	RW	AI2 Full Scale ¹	INT32	-999,999 to +999,999, 2000*

Table 5-17 AI Setup

5.4.6 RS-485 Setup

Register	Property	Description	Format	Range, Default*
6400	RW	P1 Unit ID ¹	UINT16	1~247, Last 2 digits of SN*
6401	RW		UINT16	0=1200, 1=2400, 2=4800, 3=9600, 4=19200, 5=38400*, 6=57600, 7=115200 (bps)
6402	RW		UINT16	0=8N2, 1=8O1, 2=8E1*, 3=8N1, 4=8O2, 5=8E2
6403	RW	P2 Unit ID ¹	UINT16	1~247, Last 2 digits of SN+1*
6404	RW		UINT16	0=1200, 1=2400, 2=4800, 3=9600, 4=19200, 5=38400*, 6=57600, 7=115200 (bps)
6405	RW		UINT16	0=8N2, 1=8O1, 2=8E1*, 3=8N1, 4=8O2, 5=8E2

Table 5-18 Communication Setup

Notes:

- 1) If the last 2 digits of SN is 00, the default ID of P1 should be 100 and that of P2 should be 01.

5.4.7 Ethernet Setup

Register	Property	Description	Format	Unit/Range
6600	RW	IP Address	UINT32	192.168.0.100*
6602	RW	Subnet Mask	UINT32	255.255.255.0*
6604	RW	Default Gateway	UINT32	192.168.0.1*
6606	RW	Ethernet Port Comm. Enable	UINT16	0=No, 1=Yes*
6607	RW	Modbus TCP Port	UINT16	1~65535, 502 ²
6608	RW	Modbus RTU Port	UINT16	1~65535, 27011 ²
6609	RW	Ethernet Gateway Function Port	UINT16	1~65535, 6000 ²
6610	RW	TFTP Port	UINT16	1~65535, 69 ²
6611	RW	Web Port	UINT16	1~65535, 80 ²

Table 5-19 Ethernet Setup Parameter

Notes:

- 1) In the last segment of the IP address (host identifier), all bits cannot be all 0s or all 1s. For example, the IP address cannot be set to 192.168.8.0 or 192.168.8.255. The default values are: 192.168.0.100 (IP), 255.255.255.0 (Subnet Mask), and 192.168.0.1 (Gateway).
- 2) Port configuration must comply with port allocation rules. The port number must be unique to this device; otherwise, related functions may behave abnormally. After modifying the port number, the device must be restarted to ensure proper operation of its services.

5.5 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 Preset Multiple Hold Registers (Function Code 0x10). The PMC-521D-A5 does not support the Read Coils command (Function Code 0x01) because DO Control registers are “Write-Only”. The DO Status register 0002 should be read instead to determine the current DO status. The PMC-521D-A5 adopts the ARM before EXECUTE operation for the remote control of its Relay Outputs if this function is enabled through the Arm Before Execute Enable Setup register (6150), which is enabled by default. Before executing an OPEN or CLOSE command on a Relay Output, it must be “Armed” first. This is achieved by writing the value 0xFF00 to the appropriate register to “Arm” a particular DO operation. The DO will be “Disarmed” automatically if an “Execute” command is not received within 15 seconds after it has been “Armed”. If an “Execute” command is received without first having received an “Arm” command, the meter ignores the “Execute”

command and returns the 0x04 exception code.

Register	Property	Description	Format	Range/Notes
9100	WO	Arm DO1 Close	UINT16	Writing "0xFF00"
9101	WO	Execute DO1 Close	UINT16	
9102	WO	Arm DO1 Open	UINT16	
9103	WO	Execute DO1 Open	UINT16	
9104	WO	Arm DO2 Close	UINT16	
9105	WO	Execute DO2 Close	UINT16	
9106	WO	Arm DO2 Open	UINT16	
9107	WO	Execute DO2 Open	UINT16	
...		...		
9176	WO	Arm DO20 Close	UINT16	
9177	WO	Execute DO20 Close	UINT16	
9178	WO	Arm DO20 Open	UINT16	
9179	WO	Execute DO20 Open	UINT16	

Table 5-20 Remote Control

5.6 Clear/Reset Control

Register	Property	Description	Format	Range/Notes
9600	WO	Clear SOE Log	UINT16	Writing "0xFF00"
9601	WO	Clear All Data	UINT16	
9602	RW	Reset DI Selection	UINT16	0=None, 1~21 represents DI1~DI21
9603~9604		Reserved		
9605	WO	Clear All DI Pulse Counters	UINT16	Writing "0xFF00"
9606	WO	Clear DI01 Pulse Counter	UINT16	
9607	WO	Clear DI02 Pulse Counter	UINT16	
9608	WO	Clear DI03 Pulse Counter	UINT16	
9609	WO	Clear DI04 Pulse Counter	UINT16	
...		...		
9623	WO	Clear DI18 Pulse Counter	UINT16	
9624	WO	Clear DI19 Pulse Counter	UINT16	
9625	WO	Clear DI20 Pulse Counter	UINT16	
9626	WO	Clear DI21 Pulse Counter	UINT16	

Table 5-21 Clear/Reset Control

Notes:

- 1) Writing 0xFF00 to the **Clear All Data** register to perform the Clear operation for the actions specified in registers # 9600 and # 9605.

5.7 Time

There are two sets of Time registers supported by the PMC-521D-A5 - Year / Month / Day / Hour / Minute / Second (Register # 60000 to 60002) and UNIX Time (Register # 60004). When sending time to the PMC-521D-A5 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 device. 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	10-90 (Year-2000)
			Low-order Byte: Month	
60001	9001	RW	High-order Byte: Day	1 to 31
			Low-order Byte: Hour	0 to 23
60002	9002	RW	High-order Byte: Minute	0 to 59
			Low-order Byte: Second	0 to 59
60003	9003	RW	Millisecond	0 to 999
60004~60005	9004~9005	RW	UNIX Time	0x4B3D3B00 to 0xE398E47F The corresponding time is 2010.01.01 00:00:00 to

					2090.12.31 23:59:59 (GMT 0:00 Time Zone)
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Table 5-22 Time Registers

5.8 Device Information

Register		Property	Description	Format	Note
60200 ~ 60219	9800 ~ 9819	RO	Device 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. 250110 means January 10, 2025
60223	9823	RO	Firmware Update Date: Month	UINT16	
60224	9824	RO	Firmware Update Date: Day	UINT16	
60225	9825	RO	Serial Number	UINT32	
60227	9827	RO	Reserved	UINT16	
60228	9828	RO	Reserved	UINT16	
60229	9829	RO	Feature Code	UINT16	<ul style="list-style-type: none"> • 0=21xDI (Dry Contact) + 6xDO + 2xAI • 1=21xDI (External Excitation) + 6xDO + 2xAI • 2=20xDO

Table 5-23 Device Information

Notes:

- 1) The Device Model appears in registers 60200 to 60219 and contains the ASCII encoding of the string "PMC-521D" as shown in the following table.

Register	Value(Hex)	ASCII
60200	0x0050	P
60201	0x004D	M
60202	0x0043	C
60203	0x002D	-
60204	0x0035	5
60205	0x0032	2
60206	0x0031	1
60207	0x0044	D
60208~60219	0x0020	Null

Table 5-24 ASCII Encoding of "PMC-521D"

Appendix A Technical Specifications

Power Supply (L/+, N/- or +, -)	
Standard	95-277VAC/DC ±10%, 47-440Hz
Optional	20-60VDC
Burden	<7W
Digital Inputs (DI1 to DI21, DIC)	
Type	Dry contact, 24VDC internally wetted, 220VAC/DC externally wetted, 277VAC/DC externally wetted
Sampling	1000Hz
Hysteresis	1ms minimum
Overload	1.1xUn (305V) continuous for 277VAC/DC 1.2xUn (264V) continuous for 220VAC/DC
Voltage Thresholds	220VAC: ≥130VAC ON, ≤100VAC OFF 220VDC: ≥140VDC ON, ≤110VDC OFF 277VAC: ≥170VAC ON, ≤130VAC OFF 277VDC: ≥180VDC ON, ≤140VDC OFF
Digital Outputs (DO1 to DO6 or DO20)	
Type	Form A Mechanical Relay
Loading	5A @ 250VAC or 30VDC
Analog Inputs (AI11, AI12, AI21, AI22)	
Type	0-20mA / 4-20mA DC
Overload	24mA maximum
Communications	
RS-485 (P1, P2) Protocol	Modbus RTU
Baud Rate	1.2/2.4/4.8/9.6/19.2/38.4/57.6/115.2kbps
Ethernet (P3) Baud Rate	10BaseT/100BaseTX
Protocol	Modbus RTU/TCP, SNMP
Terminals Installation Torque	
Tightening Torque	4 kgf.cm/3.54 lb-in/0.40 N.m/M3
Max. Torque	5 kgf.cm/4.34 lb-in/0.49 N.m/M3
Wire Size	0.2-3.5 mm ² (12-26 AWG)
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
Mechanical Characteristics	
Installation	DIN Rail
Unit Dimensions	108x95x71.5mm
IP Rating	IP30

Appendix B Standards Compliance

Safety Requirements	
CE LVD 2014 / 35 / EU	EN 61010-1: 2010+A1: 2019
Insulation	EN 61010-1: 2010+A1: 2019
AC Voltage:	3kV @ 1 minute
Insulation resistance:	>100MΩ
Impulse voltage:	6kV, 1.2/50μs
Electromagnetic Compatibility	
CE EMC Directive 2014 / 30 / EC (EN IEC 61326: 2021)	
Immunity Tests	
Electrostatic discharge	EN 61000-4-2: 2009
Radiated fields	EN IEC 61000-4-3: 2020
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 IEC 61000-4-11: 2020
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 +A1: 2017+A11: 2020+A2: 2021
Electromagnetic Compatibility of Multimedia Equipment - Emission Requirements	EN 55032: 2015+A11: 2020+A1: 2020
Limits for Harmonic Current Emissions for Equipment with Rated Current ≤16 A	EN IEC 61000-3-2: 2019+A1: 2021
Limitation of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems for Equipment with Rated Current ≤16 A	EN 61000-3-3: 2013+A1: 2019+A2: 2021
Emission Standard for Industrial Environments	EN IEC 61000-6-4: 2019
Mechanical Tests	
Vibration Test	IEC 60068-2-6: 2007
Shock Test	IEC 60068-2-27: 2008
Spring Hammer Test	IEC 60068-2-75: 2014

Appendix C Ordering Guide



Version 20250925

Product Code		Description					
PMC-521D DI/DO Monitoring Terminal							
Basic Function							
A5	Dot-Matrix LCD, DI/DO monitoring						
Power Supply							
2	95-277 VAC/DC ± 10%, 47-440Hz						
3	20-60 VDC						
I/O							
A	21xDI (Dry Contact) + 2xAI + 6xDO						
B	21xDI (220VAC/DC) + 2xAI + 6xDO						
C	21xDI (277VAC/DC) + 2xAI + 6xDO						
D	20xDO						
Communication Ports							
A	2xRS-485 + 1xEthernet Port						
Language							
E	English						
PMC-521D	-	A5	2	A	A	E	PMC-521D-A52AAE (Standard Model)

Revision History Logs

Version	Date	Description of Changes
V1.0	20260104	Initial Versions
V1.1	20260605	<ul style="list-style-type: none">• Update the Overload of 21xDigital Inputs (220VAC/DC and 277VAC/DC options)• Update the Voltage Thresholds of 21xDigital Inputs (220VAC/DC and 277VAC/DC options)

Contact us

CET Electric Technology Inc.

Email: Support@cet-global.com

Web: www.cet-global.com