PM210
Modbus Protocol

Version 1.0e
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DAE Instrument Corp.

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DAE Headquarters

5F, No. 157, Xinhu 1st Road, Neihu District, Taipei 11494, Taiwan, R.O.C.

Tel：+886 (02)-2793-6123   Fax：+886 (02)-2793-6150

e-mail：info@DAEinstrument.com

http://DAEinstrument.com/

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1   General Information

The PM210 communicates using the **Modbus/RTU protocol**. The communications interface is RS485.

The default baud rate is 9600 and the default address is the serial number last 2 digits or 100 when it is 00. The PM210 uses the address 255 instead of zero as the broadcast address.

It is possible that the defaults have been changed from the original factory settings. To find out the address and baud rate, enter the settings mode through the front panel controls. To find out the same information through Modbus, query using the broadcast address 255, but make sure that only the given PM210 is connected to the host PC, no other devices must be on the same bus network.

When a command is in error, the PM210 will not respond and simply allow the host PC doing the reading to time out. The PM210 should have a maximum latency of 300 milliseconds, this is the guaranteed time in which the PM210 should respond, if this time is exceeded, the host PC should issue a time out.

A command is in error in any of these conditions:

1. The function code is not supported.
2. The data is malformed or out of range.
3. The CRC is wrong.

The PM210 conforms to the Modbus/RTU protocol and thus uses CRC16 for its error checking. The computed CRC is appended to the end of the message with the LSB first and then the MSB.

2 Introduction

2.1 Data Format

Data bits	8	8	8
Parity	n	o	e
Stop bit	1	1	1

2.2 Communication Parameters

Address	Function	Data	CRC-16
8-Bits	8-Bits	Nx8-Bits	16-Bits

3 Modbus Function Code

Function Code	Meaning	Code Definition
3	Read Data	Read Holding Registers
16	Write	Write Multiple Register

4 Modbus Register Table

4.1 Real Time Data

Register Address	Description	Length (word)	Range	Unit	Read/Write
20	Phase A Voltage				
22	Phase B Voltage	2	0~1,400,000	0.1V	R
24	Phase C Voltage				
26	Line A-B Voltage				
28	Line B-C Voltage	2	0~2,424,800	0.1V	R
30	Line C-A Voltage				

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Register Address	Description	Length (word)	Range	Unit	Read/Write
32	Phase A Current	2	0~5,000,000	0.001A	R
34	Phase B Current				
36	Phase C Current				
38	Total Active Power	2	0~999,999,999	1W	R
40	Total Reactive Power	2	0~999,999,999	1VAr	R
42	Total Apparent Power	2	0~999,999,999	1VA	R
44	Frequency	2	450~650	0.1Hz	R
46	Power Factor	2	0~1000	0.001	R
48	Total Active Energy	2	0~1,000,000,000	0.01kWh	R/W
50	Total Reactive Energy (EQ)	2	0~1,000,000,000	0.01kVArh	R/W
56	Generator Total Active Energy (GEP)*	2	0~1,000,000,000	0.01kWh	R/W
58	Generator Total Reactive Energy (GEQ)*	2	0~1,000,000,000	0.01kVArh	R/W

*Note: This Generator Energy Data is valid only for the dual source model (PM210-X).

4.2 Setup

Register Address	Description	Length (word)	Range	Unit	Read/Write
128	Configuration	1	0=3p4w 1=3p3w-2CT 2=1p3w 3=3p3w-3CT	---	R

Register Address	Description	Length (word)	Range	Unit	Read/Write
131	Device Address	1	1~254	---	R/W
132	Baud Rate	1	0=1200, 1=2400 2=4800, 3=9600	---	R/W
133	PT ratio[1]	1	1~40,000	0.01	R/W
134	CT ratio[1]	1	1~1000	1	R/W
140	Standard 5A CT[2] or Dedicated CT	1	0=5A Yes 1=5A No	---	R/W
141	Firmware Version	1	High Byte：0~100 Low Byte：0~9	1	R
143	DI status[3]	1	0=OFF, 1=ON	1	R
241	Use PTCT[4]	1	0=no, 1=yes	---	R/W

*Note:

[1] The product of the PT ratio and CT ratio should not exceed 300,000. After changing either or both the PT and CT ratio, be sure to read back the value written to make sure that it was accepted by the PM210

[2] Standard 5A CT is valid for model **PM210-STD**, **PM210-A**, **PM210-X-STD** and **PM210-X-A**.

[3] DI status is valid only for the dual source model (**PM210-X**). The DI is used to determine whether the current power source is from the utility mains or generator. When used as such, DI Off indicates utility mains power and DI On indicates generator power.

[4] The table below indicates whether the given parameter (Voltage, Current, etc.) is to be pre-multiplied by the PT, CT or both. The Use PTCT flag is the same as that which can be set from the front panel display. Both the displayed value and value read through Modbus are affected.

5A Yes/No Setting	Use PTCT Setting	Voltage	Current	kW, kWh, kVAr, kVArh, kVA
No	no	---	---	---
No	yes	pre-multiple by PT ratio	---	pre-multiple by PT ratio
Yes	no	---	---	---
Yes	yes	pre-multiple by PT ratio	pre-multiple by CT ratio	pre-multiple by PT & CT ratio

5   Additional Resources

Although every effort has been taken to ensure that this document is free from errors, some may still remain. If found please send an email to: info@daeinstrument.com, in the subject line write "Errata" and please indicate the name of this document "PM210 Modbus Reference", revision number, page number and indicate the error with its correction. Thank you.

We have made sure that this document is as clear and useful to you as possible, but any suggestions on improving this document to serve you even better would be welcome. Send comments and suggestions to: info@daeinstrument.com, in the subject line, write "Comments" and please indicate the name of this document "PM210 Modbus Reference". Questions are also welcome.

This document only covers the Modbus protocol registers as used by the PM210, for interfacing and other information please refer to the PM210 user's manual.