Chapter 6 Modbus Registers

This chapter describes how to address a specific Power Distribution Unit (PDU), Remote Power Panel (RPP) or Power Rack Module (RPM), a specific panel in a PDU, RPP, or RPM, and a specific breaker in a panel using Modbus TCP/IP.

NOTE *To obtain the panel or circuit breaker data, the PDU/RPP/RPM must have the Energy Management System (EMS) Level 3 option installed.*

A PDU/RPP/RPM distributes power through one or more circuit breaker panels. Each panel consists of several circuit breakers. Each circuit breaker contains more than 30 parameters, such as voltage, current, power, and alarms. The value of each parameter is stored in a corresponding Modbus data register.

Because there are many panels in a PDU/RPP/RPM, it is necessary to identify a specific breaker and specify the panel containing that breaker. It is likely that Breaker #5 in Panel #1 has different data than Breaker #5 in Panel #7.

The tables in this chapter list sample names of the PDU/RPP/RPM parameters and their corresponding Modbus registers for:

- PDU/RPP/RPM summary data
- Panel summary data
- Breaker data

The values of the parameters can be read over an Ethernet network by using Modbus TCP/IP building monitoring programs or Modbus TCP/IP analyzer programs.

NOTE *Some Modbus programs provide an option for zero- or one-based addressing. Select the option for zero-based addressing. The Modbus numbering scheme for the PDU/RPP/RPM starts at 0, so physical coil number 1 corresponds to Modbus register number 0, coil number 2 corresponds to Modbus register number 1, and so on.*

NOTE *If your Modbus program requires one-based addressing, add a one to the register addresses listed in Table 3 on page 66. For example, one-based addressing for the vendor name would be 1033 (1032 + 1).*

Identifying the Breakers

To identify the breakers in a PDU/RPP panel, see the following section. To identify the breakers in an RPM, see "RPM Breakers" on page 57.

PDU/RPP Breakers

A PDU/RPP panel can contain a mix of single-, two-, or three-pole breakers. Each pole takes one position (or slot) in the panel.

Figure 33 shows a partial map of a panel with a mix of breaker sizes. Unoccupied positions are shown in gray. Odd numbered positions are on the left and even numbered positions are on the right.

Panel Position	Breaker #	Breaker Rating	Phase	Breaker Rating	Breaker #	Panel Position
1	01	20	A	20	02	2
3	03	50	B	20	04	4
5			C	20	06	6
7			A	40	08	8
9	09	20	B			10
11			C			12
13			A			14
15	15	20	B			16
17			C			18

Figure 33. Sample PDU/RPP Panel Map

A single-pole breaker occupies one position; a two-pole breaker occupies two positions; and a three-pole breaker occupies three positions. The breaker number corresponds to the position in the panel. For example, Breaker 01 is in position 1 and is a single-pole, 20A breaker connected to Phase A. Breaker 02 is in position 2 and is a single-pole, 20A breaker connected to Phase A.

For multiple-pole breakers, the breaker number corresponds to the lowest number of the grouped panel positions. Because Breaker 03 is configured as a three-pole breaker, it occupies three positions (3, 5, and 7). Breaker 03 is a three-pole, 50A breaker and is connected to all three phases; positions 5 and 7 cannot be addressed as a single breaker. Breaker 08 is configured as a two-pole breaker and occupies two positions (8 and 10), so position 10 cannot be addressed.

The breaker map for your specific PDU/RPP is available from the card's Web page (see "Obtaining the Modbus Register Map" on page 58).

When reading the breaker registers, only the data associated with the configured breaker is available. Reading a single-pole breaker returns only the data associated with the single pole. In Figure 33, reading Breaker 01 returns only the data associated with Phase A. Attempting to read Breaker 01 for Phase B or Phase C data will return an error. Reading multiple-phase breakers returns the data for all connected phases. For example, Breaker 03 returns the data for Phases A, B, and C, while Breaker 08 returns data for Phases A and B.

RPM Breakers

An RPM panel can contain a maximum of 12 single-phase breakers.

Figure 34 shows a sample map of an RPM panel. Breaker positions are numbered sequentially from the bottom left. Some positions may not have a breaker and are shown in gray.

Phases	A	B	C	A	B	C	A	B	C	A	B	C
Current Rating	20A			20A			20A		60A	45A		
Breaker #	01			04			07		09	10		12

Figure 34. Sample RPM Panel

Breakers can be combined (or ganged) into one physical breaker covering two or three positions. When breakers are combined, the breaker number corresponds to the lowest number of the grouped breakers.

In Figure 34, Breaker 01 is a three-phase, 20A breaker and occupies three positions (1, 2, and 3). Data returned from Breaker 01 contains the data associated with all three phases. The next breaker is Breaker 04 (because Breaker 01 occupies three positions). Breaker 07 is a two-phase, 20A breaker. A request for data from Breaker 07 returns data covering Phases A and B. A single-phase, 60A breaker is shown in position 9. Data returned from Breaker 09 contains only data from Phase C. Position 12 is unoccupied.

The breaker map for your specific RPM is available from the card's Web page (see the following section, "Obtaining the Modbus Register Map").

Attempting to read data from a nonexistent breaker results in an error code. For example, requesting the Phase B voltage from ganged Breaker 05 results in a returned error code. The Phase B voltage from the ganged breaker is obtained by reading Breaker 04.

Pole Data

Sometimes it is advantageous to address the individual poles of a breaker instead of a ganged breaker, which returns data for all the poles in the breaker. The individual poles can be addressed using the Unit IDs for EMS Pole Data or RPM Pole Data as shown in Table 2 beginning on page 63.

To obtain a comma-separated values (*.csv) file, see the following section, "Obtaining the Modbus Register Map," and select the pole data when prompted from a device.

NOTE *Either EMS Pole Data or RPM Pole Data register maps are available on the Web page, depending on the product type, but not both.*

Obtaining the Modbus Register Map

NOTE *The Modbus file is a comma-separated values (*.csv) file that can be opened in Microsoft Excel software. Some computer configurations will automatically open the files in the Microsoft Excel software instead of prompting you to save.*

To view a list of the Modbus registers in your PDU/RPP/RPM:

1. From the card's Web page, click the **Modbus TCP Register Maps** link from the menu bar.
2. Select a location for the *modbus-tcp.csv* file (if prompted to save).

Returning Error Codes

By default, the PXGX Series 1000 Card returns an error code when it attempts to obtain the Modbus register map from an address that is not currently valid. The read command is ignored and nothing is displayed. You can disable the error code so that zeros fill in the data, which may improve performance in some situations.

To change how error codes are returned:

1. From the card's Web page, click the **Modbus-TCP** link from the menu bar.
2. Deactivate the checkbox for the **Return error on unsupported read request** to disable the error code.

   Activate the checkbox to enable the error code.

Modbus Register Addressing

This section describes Modbus function codes, data formats, and data addressing.

Modbus Function Codes

The PDU/RPP/RPM registers are read using Modbus Function Codes (FC). For most PDU/RPP/RPM registers, FC 04 is used. For alarms, FC 02 is used. The PDU/RPP/RPM supports the following hex function codes:

Table 1. Function Codes

FC	Hex	Description	Use
01	0x01	Read Coil Status	Supported for compatibility purposes
02	0x02	Read Discrete Inputs	Single input data, such as alarms and discrete contacts
03	0x03	Read Holding Registers	Supported for compatibility purposes
04	0x04	Read Input Registers	Analog data (most string and numeric data types), such as voltage
05	0x05	Write Single Coil	For future use
06	0x06	Write Single Register	For future use
0F	0x0F	Write Multiple Coils	For future use
10	0x10	Write Multiple Registers	For future use

Data Formats

Modbus programs usually provide an option for viewing various data types. Refer to your Modbus program documentation for detailed information on viewing data options.

A register is 16 bits (two bytes). The PDU/RPP/RPM supports the following data types:

- **STRING** – A string of ASCII characters (two per register). Consult the Size parameter to find the string's length for a given entry (it is a multiple of two so that entries are register-aligned).
- **FLOAT** – A 32-bit IEEE754 floating point number. FLOATs are always two registers.
- **UINT** – An unsigned integer. Consult the Size parameter to find the integer's size for a given entry (it is a multiple of two so that entries are register-aligned).
- **TIME** – The Time type (*ym dh ms*) consists of six bytes specifying the year, month, day, hour, minutes, and seconds. The bytes are stored in hexadecimal format. If your Modbus application displays the individual bytes in a register, view the bytes using the decimal option. Otherwise, the bytes are best viewed by displaying the two-byte register in a binary format and translating each byte to decimal.

  For example, if today is May 17, 2007 and the time is 10:45 and 20 seconds, viewing each hex byte in decimal would yield the following data, which is viewable as the year (07), month (05), day (17), hour (10), minutes (45), and seconds (20):

07 05	17 10	45 20

See "Time or Date (FC 04)" on page 75 for more information.

- **BOOL** – A binary (Boolean) value of 0 or 1. BOOL is usually assigned to discrete input alarms.

Data Addressing

The register addresses and sizes listed in Table 3 through Table 9, starting on page 66, specify an address for each entry. If a data type spans multiple registers (such as a FLOAT), lower addressed registers map to higher-order parts of the value. Within each register, data is in most significant bit (MSB) first format.

NOTE *A Modbus register contains two bytes. Therefore, the number of registers containing the information can be obtained by dividing the bytes by two. For example, the vendor name in Table 3 on page 66 can be obtained by reading 32 Modbus registers starting at register 1032.*

NOTE *If a register is not supported in a particular device, an exception response is returned.*

PDU/RPP/RPM Unit ID Numbers

Because the PDU/RPP/RPM consists of several panels of circuit breakers, set the Unit ID in the Modbus program to specify a specific PDU/RPP/RPM, a specific panel, or a specific breaker (see Table 2).

The PDU/RPP/RPM has a Unit ID of 0, 1, or 255. The same information can be obtained from any of these IDs. See "PDU/RPP/RPM Registers and Alarms" on page 65 for more information.

The panel Unit IDs range from 2 to 17. These summary data panel registers contain the total information for all the breakers in a specific panel. For example, the registers show the sum total current for each phase distributed by all the breakers. See "Panel Registers and Alarms" on page 68 for more information.

The breaker Unit IDs range from 18 to 33. These registers provide individual breaker data for the specified panel. See "Breaker Data and Alarms" on page 71 for more information on identifying specific breaker registers.

NOTE *Selecting panel and breaker Unit IDs that are not available will return an error code. Currently available PDU/RPP/RPM model configurations are limited to eight panels, so only eight panel Unit IDs are used. Future models may be configured for up to 16 panels.*

If there is an optional Powerware Environmental Monitoring Probe (EMP) installed, use Unit ID 254 to obtain EMP data. See "EMP (FC 04)" on page 74 for more information.

Table 2. PDU/RPP/RPM Unit ID Numbers

Unit ID	Description
0, 1, and 255	PDU/RPP/RPM Summary Data
2	Panel #1 Summary Data
3	Panel #2 Summary Data
4	Panel #3 Summary Data
5	Panel #4 Summary Data
6	Panel #5 Summary Data
7	Panel #6 Summary Data
8	Panel #7 Summary Data
9	Panel #8 Summary Data
10	Panel #9 Summary Data
11	Panel #10 Summary Data
12	Panel #11 Summary Data
13	Panel #12 Summary Data
14	Panel #13 Summary Data
15	Panel #14 Summary Data
16	Panel #15 Summary Data
17	Panel #16 Summary Data
18	Panel #1 Breaker Data
19	Panel #2 Breaker Data
20	Panel #3 Breaker Data
21	Panel #4 Breaker Data
22	Panel #5 Breaker Data
23	Panel #6 Breaker Data
24	Panel #7 Breaker Data
25	Panel #8 Breaker Data
26	Panel #9 Breaker Data
27	Panel #10 Breaker Data
28	Panel #11 Breaker Data
29	Panel #12 Breaker Data
30	Panel #13 Breaker Data

Table 2. PDU/RPP/RPM Unit ID Numbers (continued)

Unit ID	Description
31	Panel #14 Breaker Data
32	Panel #15 Breaker Data
33	Panel #16 Breaker Data
34	EMS Panel #1 Pole Data
35	EMS Panel #2 Pole Data
36	EMS Panel #3 Pole Data
37	EMS Panel #4 Pole Data
38	EMS Panel #5 Pole Data
39	EMS Panel #6 Pole Data
40	EMS Panel #7 Pole Data
41	EMS Panel #8 Pole Data
42	EMS Panel #9 Pole Data
43	EMS Panel #10 Pole Data
44	EMS Panel #11 Pole Data
45	EMS Panel #12 Pole Data
46	EMS Panel #13 Pole Data
47	EMS Panel #14 Pole Data
48	EMS Panel #15 Pole Data
49	EMS Panel #16 Pole Data
50	RPM Panel #1 Pole Data
51	RPM Panel #2 Pole Data
52	RPM Panel #3 Pole Data
53	RPM Panel #4 Pole Data
54	RPM Panel #5 Pole Data
55	RPM Panel #6 Pole Data
56	RPM Panel #7 Pole Data
57	RPM Panel #8 Pole Data
58	RPM Panel #9 Pole Data
59	RPM Panel #10 Pole Data
60	RPM Panel #11 Pole Data

Table 2. PDU/RPP/RPM Unit ID Numbers (continued)

Unit ID	Description
61	RPM Panel #12 Pole Data
62	RPM Panel #13 Pole Data
63	RPM Panel #14 Pole Data
64	RPM Panel #15 Pole Data
65	RPM Panel #16 Pole Data
254	Powerware Environmental Monitoring Probe

PDU/RPP/RPM Registers and Alarms

This section contains information for the PDU/RPP/RPM Registers (FC 04) and PDU/RPP/RPM Alarms (FC 02).

The register and alarm tables contain sample register lists and may not be the same as the registers in your PDU/RPP/RPM.

PDU/RPP/RPM Registers (FC 04)

To read the vendor name in the PDU/RPP/RPM, set the Modbus program to Unit ID 1 and register 1032:

```
IP: <IP address of PDU/RPP/RPM>
Unit ID: 1
Starting Register: 1032
Number of registers: 32
Function Code: 04
```

The PDU/RPP/RPM returns 32 registers containing up to 64 characters. There are two ASCII characters per register, so the vendor name could be displayed as `POWERWARE`.

Table 3. PDU/RPP/RPM Registers (FC 04)

Name	Register	Data Type	Bytes
Vendor Name	1032	STRING	64
Model Name	1064	STRING	64
Display Name	1096	STRING	64
Device Type	1128	STRING	64
Device ID	1192	STRING	64
Device Guid	1225	STRING	40
Serial Number	1276	STRING	64
Conn Style	1312	UINT	2
Device Comm Address	1313	STRING	64
Device Baud Rate	1345	UINT	4
Time Sync Period	1347	UINT	4
Data Update Period	1349	UINT	4
Device VAR Rating	1351	UINT	4
Device Volts In Rating	1357	UINT	4
Device Volts Out Rating	1359	UINT	4

NOTE Only sample registers are shown. They may be different from the registers in your PDU/RPP/RPM.

PDU/RPP/RPM Alarms (FC 02)

The PDU/RPP/RPM monitors the condition of several parameters and can activate an alarm status if a parameter is out of range. For example, if the input frequency is too high or too low, the PDU/RPP/RPM can set the Input Frequency Fault Alarm.

To read the Input Frequency Fault Alarm, set the Modbus program to Unit ID 1 and coil address 1008:

```
IP: <IP address of PDU/RPP/RPM>
Unit ID: 1
Starting Register: 1008
Number of Registers: 1
Function Code: 02
```

The PDU/RPP/RPM returns a single register that is a BOOL value (0 or 1), indicating if the alarm is active or not active.

Table 4. PDU/RPP/RPM Alarms (FC 02)

Name	Register	Data Type
AC Input Over Volts	1006	BOOL
AC Input Under Volts	1007	BOOL
Input Frequency Fault	1008	BOOL
AC Output Over Volts	1009	BOOL
AC Output Under Volts	1010	BOOL
AC Output Frequency Fault	1011	BOOL
Remote EPO	1012	BOOL
Building Alarm 4	1016	BOOL
Building Alarm 3	1017	BOOL
Building Alarm 2	1018	BOOL
Building Alarm 1	1019	BOOL
Output Overload	1025	BOOL
System Bus Overload	1050	BOOL
NV Memory Failure	1053	BOOL

NOTE Only sample alarms available from the Web page are shown. They may be different from the alarms in your PDU/RPP/RPM.

Panel Registers and Alarms

This section contains information for the Panel Summary Registers (FC 04) and the Panel Alarms (FC 02).

Panel Summary Registers (FC 04)

NOTE *The panel can be wired for either a wye (phase to neutral) or a delta (phase-to-phase) configuration. The registers contain only the data supported by the wired configuration. For example, if the panel is wired in a wye configuration, the voltages AN, BN, and CN are available, but the voltages AB, BC, and CA are not available (an exception code is returned). Refer to the actual panel for the wiring configuration.*

Table 5 shows the registers that contain summary data for the panel. The registers contain the total information for all the breakers in the panel.

For example, the AC Voltage between Phase A and Neutral is available in register 4010. To read the AC Voltage in Phase A at Panel #1, set the Modbus program to Unit ID 2 and register 4010:

```
IP: <IP address of PDU/RPP/RPM>
Unit ID: 2
Starting Register: 4010
Number of Registers: 2
Function Code: 04
```

To read the AC Voltage in Phase A at Panel #4, set the Modbus program to Unit ID 5 and register 4010:

```
IP: <IP address of PDU/RPP/RPM>
Unit ID: 5
Starting Register: 4010
Number of Registers: 2
Function Code: 04
```

Table 5. Panel Summary Registers (FC 04)

Name	Register	Data Type	Bytes
Display Template	1000	UINT	2
Vendor Name	1032	STRING	64
Model Name	1064	STRING	64
Display Name	1096	STRING	64
Serial Number	1276	STRING	64
Device Volts Rating	1355	UINT	4
Number of Phases	1361	UINT	2
Asset ID	1477	STRING	128
Breaker Rating	1607	UINT	2
Breaker Warning	1609	UINT	2
Breaker Overload	1610	UINT	2
Neutral Current Alarm	1612	UINT	2
Entity Admin State	3047	UINT	2
Entity Operating State	3048	UINT	2
EntityReadiness State	3049	UINT	2
EntityAlarm State	3050	UINT	2
EntityStandby State	3051	UINT	2
AC V AN	4010	FLOAT	4
AC V BN	4012	FLOAT	4
AC V CN	4014	FLOAT	4
AC V MAX AN	4296	FLOAT	4
AC V MAX BN	4298	FLOAT	4
AC V MAX CN	4300	FLOAT	4
AC I in A	5002	FLOAT	4
AC I in B	5004	FLOAT	4
AC I in C	5006	FLOAT	4
AC I in N	5010	FLOAT	4
AC I MAX A	5164	FLOAT	4

NOTE Only sample registers are shown. They may be different from the registers in your PDU/RPP/RPM.

Table 5. Panel Summary Registers (FC 04) (continued)

Name	Register	Data Type	Bytes
AC I MAX B	5166	FLOAT	4
AC I MAX C	5168	FLOAT	4
AC I MAX N	5170	FLOAT	4

NOTE Only sample registers are shown. They may be different from the registers in your PDU/RPP/RPM.

Panel Alarms (FC 02)

Table 6 lists the panel alarms. They are not registers, but are discrete inputs and are read using FC 02.

To read the Main Breaker Overload alarm at Panel #4, set the Modbus program to Unit ID 5 and coil address 1254:

```
IP: <IP address of PDU/RPP/RPM>
Unit ID: 5
Starting Register: 1254
Number of Registers: 1
Function Code: 02
```

Table 6. Panel Alarms (FC 02)

Name	Coil/Status Address	Data Type
Neutral Overload	1219	BOOL
Panel Under Voltage	1238	BOOL
Panel Over Voltage	1242	BOOL
Panel Under Over Frequency	1248	BOOL
Branch Breaker Overload Warning	1249	BOOL
Branch Breaker Overload	1250	BOOL
Main Breaker Overload Warning	1253	BOOL
Main Breaker Overload	1254	BOOL

NOTE Only sample alarms available from the Web page are shown. They may be different from the alarms in your PDU/RPP/RPM.

Breaker Data and Alarms

This section contains:

- Sample names of breaker parameters along with the register numbers for Breaker #1
- Instructions for calculating the register numbers for other breakers
- Breaker alarms

Breaker #1 Data Registers (FC 04)

To specify a specific breaker, use a Unit ID for breaker data along with the register number for the specific breaker.

For example, "Watts in Phase A" is register 1055 for Breaker #1. This statement is true for any panel. To specify a specific panel for breaker data, use the panel's Unit ID in the Modbus program. For Panel #6 (Unit ID 23), the Modbus program would be set as follows:

```
IP: <IP address of PDU/RPP/RPM>
Unit ID: 23
Starting Register: 1055
Number of registers: 2
Function code: 04
```

The Modbus program would return a value of the watts in Phase A for Breaker #1 in Panel #6 of the PDU/RPP/RPM at the specified IP address.

Table 7. Breaker #1 Data Registers (FC 04)

Name	Register	Data Type	Bytes
Display Name	1000	STRING	64
Number of Phases	1032	UINT	2
Breaker Rating	1033	UINT	4
Breaker Warning	1035	UINT	2
Breaker Overload	1036	UINT	2
AC Current Phase A	1037	FLOAT	4
AC Current Phase B	1039	FLOAT	4
AC Current Phase C	1041	FLOAT	4
AC MAX Current Phase A	1043	FLOAT	4

NOTE Only sample breaker data is shown. It may be different from the registers in your PDU/RPP/RPM.

Table 7. Breaker #1 Data Registers (FC 04) (continued)

Name	Register	Data Type	Bytes
AC MAX Current Phase B	1045	FLOAT	4
AC MAX Current Phase C	1047	FLOAT	4
Percent FL Current A	1049	FLOAT	4
Percent FL Current B	1051	FLOAT	4
Percent FL Current C	1053	FLOAT	4
Watts Phase A	1055	FLOAT	4

NOTE Only sample breaker data is shown. It may be different from the registers in your PDU/RPP/RPM.

Calculating Breaker Register Numbers

Table 7 shows the sample register numbers for Breaker #1. There can be many breakers in a panel. Determine the corresponding register numbers for other breakers in the panel by using the following formula:

Breaker register # = Breaker #1 register + ((Breaker # – 1) x 200))

For example:

Breaker #2 starts at 1200:
1000 + ((2 – 1) x 200)
1000 + (1 x 200)
1000 + 200
1200

Breaker #3 starts at 1400:
1000 + ((3 – 1) x 200)
1000 + (2 x 200)
1000 + 400
1400

Breaker #14 starts at 3600:
1000 + ((14 – 1) x 200)
1000 + (13 x 200)
1000 + 2600
3600

This formula works for any register. For example, for Breaker #1, the register number of "Watts Phase A" is 1055. The corresponding address for Breaker #18 is:

1055 + ((18 – 1) x 200)
1055 + (17 x 200)
1055 + 3400
4455

Breaker Alarms (FC 02)

There are two alarms for each circuit breaker: Overload Warning and Overload. Each alarm has a unique address similar to the data registers, but these alarms are not data registers. The alarms are discrete inputs and are read using FC 02 in the Modbus program.

Table 8. Breaker Alarms (FC 02)

Name	Coil/Status Address	Data Type
Branch Breaker 1 Overload Warning	1000	BOOL
Branch Breaker 1 Overload	1001	BOOL

Table 8 shows the alarms for Breaker #1. Determine the corresponding alarms for other breakers by using the following formula:

Breaker #5 address = ((Breaker number – 1) x 2) + Breaker #1 address

For example, to find the Overload Warning alarm address for Breaker #5:

Breaker #5 Overload Warning = ((5 – 1) x 2) + 1000
= ((4) x 2) + 1000
= (8) + 1000
= 1008

To find the Overload alarm address for Breaker #20:

Breaker #20 Overload = ((20 – 1) x 2) + 1001
= ((19) x 2) + 1001
= (38) + 1001
= 1039

To read the Overload Warning alarm for Breaker #5 in Panel #8, the Modbus program would be set as follows:

```
IP: <IP address of PDU/RPP/RPM>
Unit ID: 25
Starting Register: 1008
Number of registers: 1
Function code: 02
```

The Modbus program would return a true/false value of the Overload Warning alarm for Breaker #5 in Panel #8 of the PDU/RPP/RPM at the specified IP address.

EMP (FC 04)

The optional EMP for the PDU/RPP/RPM can measure temperature and humidity. Because the device can be located outside the PDU/RPP/RPM, the reference is to "auxiliary" data. In addition, it contains two connections for monitoring the condition of auxiliary input contacts, such as a door switch. See Table 9 for a list of EMP registers.

An exception code is returned if the EMP is not installed.

To read the temperature at the PDU/RPP/RPM, set the Modbus program to Unit ID 254 and coil address 12028:

```
IP: <IP address of PDU/RPP/RPM>
Unit ID: 254
Starting Register: 12028
Number of registers: 2
Function Code: 04
```

Table 9. EMP Registers (FC 04)

Name	Register	Data Type	Bytes
Vendor Name	1032	STRING	64
Model Name	1064	STRING	64
Display Name	1096	STRING	64
Serial Number	1276	STRING	64
Device ID	1192	STRING	64
Auxiliary Input 1	10275	UINT	2
Auxiliary Input 2	10276	UINT	2
Auxiliary Temperature	12028	FLOAT	4
Auxiliary Humidity	12030	FLOAT	4

Time or Date (FC 04)

Some PDU/RPP/RPM models support a time and/or date function. This format has a DATE data type and contains six bytes. Each byte represents the year, month, day, hour, minutes, and seconds (see page 61 for more information).

To read the PDU/RPP/RPM date and time, set the Modbus program to Unit ID 1 and register 12203:

```
IP: <IP address of PDU/RPP/RPM>
Unit ID: 1
Starting Register: 12203
Number of registers: 3
Function Code: 04
```

The PDU/RPP/RPM would return three registers containing hexadecimal data in the *ym dh ms* format (for example, May 17, 2007 at 10:45 and 20 seconds).

07 05	11 0A	2D 14

Viewing each hex byte in decimal would yield the following data, which is viewable as the year (07), month (05), day (17), hour (10), minutes (45), and seconds (20):

07 05	17 10	45 20

Viewing each hex byte as two-byte unsigned integers would yield the following data:

1797	4362	11540

Viewing each hex byte as binary would yield the following data:

00000111 00000101	00010001 00001010	00101101 00010100

Table 10. Time or Date Register (FC 04)

Parameter Name	Display Name	Register	Discrete	Units	Data Type	Bytes
mCurrentTime	Time	12203	No	No	DATE	6