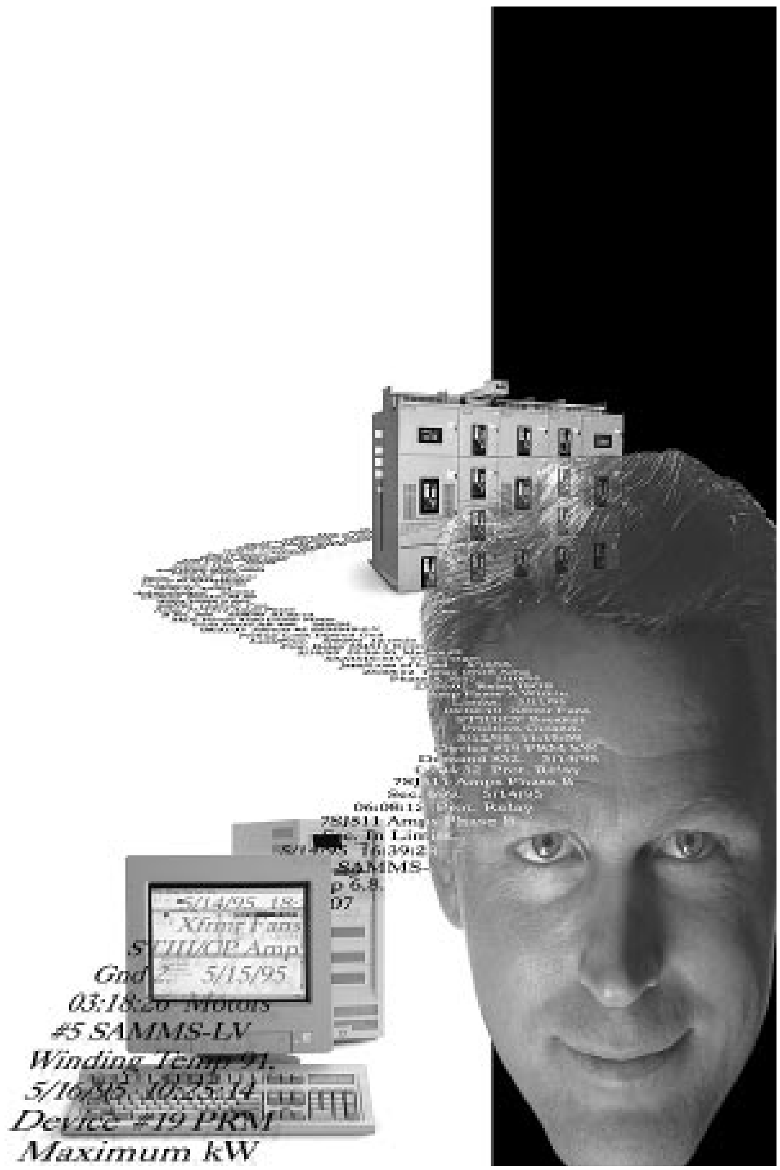
SIEMENS

4300 Power Meter

SEAbus Plus™ Protocol

Reference Manual



Manual No. SG-6353-01

Siemens maintains control of all specifications for the SEAbus and SEAbus Plus protocols. A modification to a protocol for any type of device must be approved by Siemens Energy & Automation, Inc. to guarantee compatibility. Any changes made must be backward compatible so that existing products can coexist on the communications bus without having to support the newer features of the protocol.

Siemens continuously strives to ensure backward compatibility, reliability, and easy implementation of both protocols to meet current market communications requirements. Siemens therefore reserves the right to make improvements including changes to specifications at any time without notice or obligation.

Contents

1 Introduction

The *4300 SEAbus Plus Protocol Reference Manual* (Manual No. SG-6353-00) describes the two-way exchange of information between the 4300 power meter and a remote supervisory device. The SEAbus Plus™ protocol is the software communications protocol required for two-wire, RS-485 networks under which the 4300 power meter operates. The SEAbus Plus protocol is an *open* protocol; it does not require user permission or the payment of fees for reprogramming it to suit non-Siemens devices.

1.1 About this Manual

The *4300 Power Meter SEAbus Plus Protocol Reference Manual* (Manual No. SG-6353-00) defines the SEAbus Plus protocol and its 4300 power meter data packets. The introduction of this manual offers brief summaries of 4300 power meter features, the ACCESS™ electrical distribution communication system (ACCESS system), the SEAbus Plus protocol, basic packet structure, and common packets supported by all communicating devices. For more information on these subjects, refer to the respective manuals listed below.

- *SEAbus and SEAbus Plus Protocol Reference Manual* (Manual No. SG-6213-00)
- *4300 Power Meter Operator's Manual* (Manual No. SG-6038-02)
- *ACCESS Systems Installation Guide* (Manual No. SG-6028-01)

Following the introduction, the manual describes the communications packets of the 4300 power meter SEAbus Plus protocol. These include response and request packets to read and write setup data, real-time data, real-time data with reset command, and clearing kilowatt-hour counters. The communications packets also cover baud rate, communications version, Universal Request, and address change.

1.2 About the 4300 Power Meter

The 4300 power meter is a three-phase, rms sensing power meter with a 20-character liquid crystal display allowing multiple measurements to be displayed simultaneously. The power meter is excellent for retrofit and analog replacement applications and offers

- 120 VAC or 240 VAC supply voltage
- standard 4.5 ANSI C39.1 mounting
- measured values including

  line-to-neutral voltage on three phases with averaging; line-to-line voltage on three phases with averaging; current on three phases with averaging; kW (net) and kWh total for all phases; kW demand and kW maximum demand; kVA; kVAR; power factor; and frequency

- open protocol communication (RS-485) consisting of

  an RS-485 port which provides remote communication over a shielded twisted pair wire at distances of up to 4000 ft. RS-485 communication allows the power meter to interface with remote monitoring and control systems running WinPM™ or other supervisory software.

For more information about the 4300 power meter, refer to the *4300 Power Meter Operator's Manual* (Manual No. SG-6038-02).

1.3 About the ACCESS System

The ACCESS system comprises a variety of smart devices that control, monitor, and display data from your electrical distribution system. The first level of control is in the field where microprocessor-based trip units, power meters, protective relays, and motor control devices send and receive information about your system. At a second higher level are supervisory devices that collect information from these field devices. Supervisory devices display the information and add the capabilities of programming, monitoring alarms, and logging system events. Field and supervisory devices are linked together by an industry-standard, RS-485 communications bus. The Siemens SEAbus™ communications protocol defines the exchange of information over a shielded, twisted-pair cable that links all devices. Presiding over the system is an ACCESS host personal computer (PC) monitoring an entire electrical system that may consist of more than 1,000 devices.

1.4 About the SEAbus Plus Protocol

The SEAbus Plus protocol is a software communications protocol for two-wire, RS-485 networks. An RS-485 network consists of a single bus supervisory device and up to 32 field devices. Short communication data packets (packets) consisting of 8 to 260 characters can be sent and received at various speeds. Adding SEAbus Plus communications to a device provides remote access to the information collected by the device. All configuration and setup procedures that are possible at the device can also be executed from a remote location over the communications link.

In a SEAbus Plus system, only one supervisory device is attached to the bus, but you may have up to 32 field devices. The electrical distribution and communications software installed in a supervisory device, for example WinPM, initiates all communication by sending packets addressed to field devices. The field devices do not initiate communication or send unsolicited packets under any circumstances. The packet from the supervisory device may request data, configuration information, a configuration update, or one of several other types of information, depending upon the nature of the field device. If the packet sent to the field device is a request for information (request packet), the field device responds by sending a packet with the requested information back to the supervisory device (response packet). Only one packet is sent at a time.

Information is sent as eight bits with one stop bit and no parity. You can set the baud rate to any one of several values, but you must meet certain timing constraints of the protocol.

For more information about timing specifications and the SEAbus Plus protocol, refer to the *SEAbus and SEAbus Plus Protocol Reference Manual* (Manual No. SG-6213-00).

1.5 About SEAbus Plus Packet Structure

This section briefly describes the SEAbus packet structure and identifies the general differences between request and response packets. Throughout this manual, all numbers used are in decimal unless followed by an *h*, which indicates hexadecimal. For detailed information about packets, refer to the *SEAbus and SEAbus Plus Protocol Reference Manual* (Manual No. SG-6213-00).

A packet is a predefined sequence of fields containing one or more predefined bytes. In general, the bytes of a SEAbus packet are sent in the following order: Synchronization (Sync) byte, Device Type (Devt) byte, Message Type (Msgt) byte, Length (Len) byte, Data (Data) bytes, and Longitudinal Redundancy Check (LRC) byte as illustrated below (the letter *N* in the *Data* field refers to a variable representing the actual number of bytes contained in the Data field when a packet is sent):

Packet Structure

Fields:	**Sync**	**Devt**	**Msgt**	**Len**	**Data**	**LRC**
No. of Bytes:	1	1	1	1	N	1

The bytes in a SEAbus Plus packet are defined as follows:

Sync The Sync byte indicates the direction of the data transmission. Use a value of 14h for supervisory-to-field device transmissions and a value of 27h for field-to-supervisory device transmissions.

Devt The Devt byte contains the address code of a particular type of device (indirect address). The following device type address codes are assigned to Siemens devices (see also Appendix A):

00h	Universal Request (for unknown address	F8h	Static Trip IIICP
01h...E0h	Direct address codes for Static Trip™ IIIC trip units and SAMMS motor protection and control devices	F9h	Multiplexer/Translator
E1h...F1h	Indirect address codes reserved for future device-type addresses	FAh	SCOR™
F2h	SB Energy/Comm trip unit	FBh	Local display unit
F3h	S7-I/O™ unit	FCh	ACCESS™ Host
F4h	Pulse reading meter	FDh	3600-S1 power meter
F5h	4720 power meter	FEh	4700 power meter
F6h	4300 power meter	FFh	Broadcast code
F7h	ISGS™		

Msgt The Msgt byte indicates what type of data the packet contains. For example, in a 4300 power meter packet, *01h* indicates the reading and *02h* the writing of setup data.

Len The Length byte indicates the number of bytes that follow in the Data field of the packet. Values for Len range from 3 to 255 (see also definition of *Data* field below).

Data The Data bytes contain the information of interest that is being transmitted by the communications protocol. The Data field can contain as many as 255 bytes. The SEAbus Plus protocol uses indirect addressing, the first byte in this field is the device address. The last three bytes are predefined to contain a two-byte Cyclical Redundancy Check (CRC16) and an inverted Sync (/Sync) byte (refer to the *SEAbus and SEAbus Plus Protocol Reference Manual* (Manual No. SG-6213-00) for definitions).

LRC The LRC byte is the checksum byte. It contains the sum (not the inverted sum as in the LRC of a SEAbus packet) of all bytes except the Sync byte.

The following illustration represents a typical SEAbus Plus request packet (14h) from a supervisory device to get real-time data (03h) from a 4300 power meter (F6h) that has the address *DEh* using indirect addressing. The Len byte (04h) indicates the number of information bytes contained in the Data field. The Data field starts with the local device address (DEh) and is followed by the two-byte CRC16 (41h and 34h) and the /Sync byte (EBh) for error checking. The LRC byte displays the sum of all bytes except the Sync byte (3Bh):

Example **Get Real-Time Data Request to a 4300 Power Meter**

Sync	Devt	Msgt	Len	Data	LRC
14h	F6h	03h	04h	DEh 41h 34h EBh	3Bh

The 4300 power meter (F6h) with the address DEh responds (27h) to this request with the following packet. Note the increase in the Len byte (34h). The Data field now contains a total of 52 (34h) bytes, including the device address (DEh) and the three regular error checking bytes (here, 30h, B8h, and D8h).

Example **Response to Get Real-Time Data Request Returned to Supervisory Device**

Sync	Devt	Msgt	Len	Data	LRC
27h	F6h	03h	34h	DEh 98h 03h 09h 01h 00h 00h 07h 01h 00h 00h 09h 01h 00h 00h 08h 01h 00h 00h 09h 01h 00h 00h BBh 07h 00h 00h 39h 08h 00h 00h 3Dh 08h 00h 00h F6h AAh 02h 00h 8Ah 0Ah A2h 0Ah 89h 0Ah 92h 0Ah 92h 0Ah 30h B8h D8h	19h

Note: All values that require two words are sent with the least significant word first and the most significant word second. All words are composed of two bytes. These are also sent with the least significant byte first and the most significant byte second. For example, the four-byte value 12345678h is divided into two words: the least significant word is 5678h and the most significant word is 1234h. Each word is divided into two bytes. For the least significant word, the least significant byte is 78h and the most significant byte is 56h. Therefore, the least significant word is sent as 78h 56h and the entire four-byte value is sent as 78h 56h 34h 12h.

<table>
<tr><th>Bits</th><td>31</td><td>30</td><td>29</td><td>28</td><td>27</td><td>26</td><td>25</td><td>24</td><td>23</td><td>22</td><td>21</td><td>20</td><td>19</td><td>18</td><td>17</td><td>16</td><td>15</td><td>14</td><td>13</td><td>12</td><td>11</td><td>10</td><td>9</td><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td></tr>
<tr><th rowspan="2">Words</th><td colspan="16">Most Significant Word</td><td colspan="16">Least Significant Word</td></tr>
<tr><td colspan="16">1234h</td><td colspan="16">5678h</td></tr>
<tr><th rowspan="2">Bytes</th><td colspan="8">Most Significant Byte</td><td colspan="8">Byte</td><td colspan="8">Byte</td><td colspan="8">Least Significant Byte</td></tr>
<tr><td colspan="8">12h</td><td colspan="8">34h</td><td colspan="8">56h</td><td colspan="8">78h</td></tr>
<tr><th>Order Send</th><td colspan="32">78h 56h 34h 12h (from least to most significant byte)</td></tr>
</table>

1.6 About Packet Illustrations

This manual uses two methods of illustrating a communications packet. The first method illustrates the basic packet by displaying the numerical value of each byte in hexadecimal. This method is used when a detailed description of the Data field content is irrelevant, such as for packet structure examples. The second method extends the basic packet by showing a detailed description of its Data field content. This method is used when defining a packet.

In both methods, *xx* always refers to a value that varies depending on the packet's type, size, and actual data content. The value of the LRC byte is only relevant to internal error checking calculation and is represented by lrc. The example below shows a basic packet illustration:

Example **Basic Packet Illustration**

Sync	Devt	Msgt	Len	Data	LRC
14h or 27h	xxh	xxh	xxh	xxh, xxh, ..., xxh, xxh, xxh	lrc

The next example shows an extended packet with a detailed description of its Data field content. The Data field content is displayed as a pull-down table from the Data field cell. This table lists the data byte number, its description, the possible range of values, and their unit of measure.

Example **Extended Packet Illustration**

Sync	Devt	Msgt	Len	Data	LRC
14h or 27h	xxh	xxh	xxh		lrc

Data Byte No.	Description	Range of Values	Unit
01h	Device address	1...254	---
02h	First device data	xx...xx	xx
: :	Device data (continued)	y, z y = y z = z	---
V3 xxh...xxh	Last device data	xx...xx	0.1 V
xxh...xxh	Cyclical Redundancy Check	0...65535	---
xxh	Inverted Sync byte	EBh or D8h	---

The *Data Byte No.* column contains the data bytes in the sequence in which they are assigned. They are numbered in hexadecimal. By displaying a start and end byte, the data byte number also indicates the length of a function variable (part of a complete function packet).

The *Description* column describes or names the function variable.

The *Range of Values* column provides the minimum and maximum values (possible range of values) of the function variable as well as the value definitions if applicable. Ranges are generally expressed with an ellipsis (...) to prevent confusion with a possible minus (-) sign.

The *Unit* column indicates the unit of measure that applies to the value(s) in the Range of Values column. Any part of a unit of measure is expressed in decimal.

1.7 About Common Packets

Common packets apply to all SEAbus and SEAbus Plus field devices within an ACCESS system and include the Universal Request packet and Global or Device Type Broadcast packets. Broadcast packets include Set Baud Rate and Set Date and Time packets. Common packets serve several purposes such as allowing to bring new devices on line, configuring new and existing devices, and performing routine maintenance. These common packets are defined as follows:

The **Universal Request** packet is used to determine the address of an individual unknown field device. The Universal Request address code, *00h*, is recognized by all field devices and prompts a response packet containing the device's address. Since all devices on the communications loop will respond to this request and their data would collide, only one field device can be connected to the loop at the same time.

Broadcast packets simultaneously address two or more devices on the communications loop by using the Broadcast code *FFh*. All devices on the communications loop will respond to this code by executing the information contained in the Data field. Broadcast packets are used to set devices to the same parameter(s) such as baud rate or time and date. A Broadcast packet never requires a response packet. Broadcast packets can be used to address all devices or devices of a particular type.

Global Broadcast packets address all devices regardless of type. The Broadcast code FFh is placed in the Devt byte of the packet.

Device Type Broadcast packets address all devices of a particular type. The Devt byte indicates the device type and the Broadcast code FFh is the first byte in the Data field.

Common Broadcast packets include

- Set Baud Rate
- Set Date and Time

Other common packets are

- Set Address
- Get Communications Version

For more information on common packets, refer to the *SEAbus and SEAbus Plus Protocol Reference Manual* (Manual No. SG-6213-00).

2 Packets

This chapter describes request and response packets for each of the communications packets available to read data from (get) or to write data to (set) the 4300 power meter. The device type address code for the 4300 power meter is *F6h*. All request packets, except the Set Baud Rate packet, have a corresponding response packet. All packets contain the CRC and /Sync bytes typical for the SEAbus Plus protocol.

Version differences within a packet that apply only to versions 1.3 or later are indicated by the bold-faced version abbreviation **V1.3+** in front of the relevant data byte number in the *Data Byte No.* column of the packet.

All two-byte data is sent with the least significant byte first, and all four-byte data is sent from least to most significant byte.

The following packets are available to the 4300 power meter:

- Set Address
- Set Baud Rate
- Get Communications Version
- Get Setup Data
- Set Setup Data
- Get Real-Time Data
- Get Real-Time Data with Subsequent Reset
- Clear Kilowatt Hours

Additional packets available to the 4300 power meter are packets common to all SEAbus or SEAbus Plus devices. These common packets are described in detail in the *SEAbus and SEAbus Plus Protocol Reference Manual* (Manual No. SG-6213-00); they are also summarized in section 1.7, *About Common Packets*, in the introduction of this manual.

2.1 Set Address

The Set Address packet is a request to the 4300 power meter to change its present address.

Set Address Request

Sync	Devt	Msgt	Len	Data	LRC
14h	F6h	21h	05h		lrc

Data Byte No.	Description	Range of Values	Unit
01h	Device address	1...254	---
02h	New device address	1...254	---
03h...04h	Cyclical Redundancy Check	0...65535	---
05h	Inverted Sync byte from header	EBh	---

The 4300 power meter responds to this packet by returning the following packet and then changing its address to the new address:

Response to Set Address Request

Sync	Devt	Msgt	Len	Data	LRC
27h	F6h	21h	04h		lrc

Data Byte No.	Description	Range of Values	Unit
01h	Device address (prior to the change)	1-254	---
02h...03h	Cyclical Redundancy Check	0-65535	---
04h	Inverted Sync byte from header	EBh	---

2.2 Set Baud Rate

The Set Baud Rate packet is a request to the 4300 power meter to set its baud rate to a setting indicated in the packet. The 4300 power meter also supports Global and Device Type Baud Rate packets. These are described in detail in the *SEAbus and SEAbus Plus Protocol Reference Manual* (Manual No. SG-6213-00).

Set Baud Rate Request

Sync	Devt	Msgt	Len	Data	LRC
14h	F6h	A1h	06h		lrc

Data Byte No.	Description	Range of Values	Unit
01h	Device address	1...254	---
02h...03h	Baud rate	300, 1200, 2400, 4800, 9600, 19200	baud
04h...05h	Cyclical Redundancy Check	0...65535	---
06h	Inverted Sync byte from header	EBh	---

This packet does not require a response packet.

2.3 Get Communications Version

The Get Communications Version packet is a request to the 4300 power meter to display its communications version.

Get Communications Version Request

Sync	Devt	Msgt	Len	Data	LRC
14h	F6h	FFh	04h		lrc

Data Byte No.	Description	Range of Values	Unit
01h	Device address	1...254	---
02h...03h	Cyclical Redundancy Check	0...65535	---
04h	Inverted Sync byte from header	EBh	---

The 4300 power meter responds to this request by returning the following packet containing the communications version data:

Response to Communications Version Request

Sync	Devt	Msgt	Len	Data	LRC
27h	F6h	FFh	06h		lrc

Data Byte No.	Description	Range of Values	Unit
01h	Device address	1...254	---
02h...03h	Communications version	0...65535	---
04h...05h	Cyclical Redundancy Check	0...65535	---
06h	Inverted Sync byte from header	D8h	---

2.4 Get Setup Data

The Get Setup Data packet is a request to the 4300 power meter to read its setup data.

Get Setup Data Request

Sync	Devt	Msgt	Len	Data	LRC
14h	F6h	01h	04h		lrc

Data Byte No.	Description	Range of Values	Unit
01h	Device address	1...254	---
02h...03h	Cyclical Redundancy Check	0...65535	---
04h	Inverted Sync byte from header	EBh	---

The 4300 power meter responds by returning a packet with all of its setup data.

Response to Get Setup Data Request

Sync	Devt	Msgt	Len	Data	LRC
27h	F6h	01h	18h		lrc

Data Byte No.	Description	Range of Values	Unit
01h	Device address	1...254	---
02h...03h	Software revision in binary coded decimals	1000h...9999h	binary coded decimal
04h	Hardware revision in ASCII	“A”...“Z”	ASCII
05h	Model Number	1	---
06h...09h	Voltage transformer (VT) primary	1...999999	winding
0Ah...0Bh	Voltage transformer secondary	1...347	winding
0Ch...0Dh	Current transformer (CT) primary	1...32000	winding
0Eh...0Fh	Baud rate	300, 1200, 2400, 4800, 9600, 19200	baud
10h	Voltage mode	0 = 4 Wire Wye 1 = 3 Wire Wye 2 = Single Phase 3 = Demo 4 = 4 Wire Wye, 2 VTs	---
11h...12h	Password	0...9999	---
13h	Length of demand period	1...99	minute
14h	Number of demand periods	1...15	demand period
15h	Contrast/viewing angle	-5...+5	---
16h...17h	Cyclical Redundancy Check	0...65535	---
18h	Inverted Sync byte from header	D8h	---

2.5 Set Setup Data

The Set Setup Data packet is a request to the 4300 power meter to write its setup data.

Set Setup Data Request

Sync	Devt	Msgt	Len	Data	LRC
14h	F6h	02h	11h		lrc

Data Byte No.	Description	Range of Values	Unit
01h	Device address	1...254	---
02h...05h	Voltage transformer primary	1...999999	winding
06h...07h	Voltage transformer secondary	1...347	winding
08h...09h	Current transformer primary	1...32000	winding
0Ah...0Bh	Baud rate	300, 1200, 2400, 4800, 9600, 19200	baud
0Ch	Voltage mode	0 = 4 Wire Wye 1 = 3 Wire Wye 2 = Single Phase 3 = Demo	---
0Dh	Demand period length	1...99	minute
0Eh	Number of demand periods	1...15	demand period
0Fh...10h	Cyclical Redundancy Check	0...65535	---
11h	Inverted Sync byte from header	EBh	---

The 4300 power meter responds to this request by returning the following packet:

Response to Set Setup Data Request

Sync	Devt	Msgt	Len	Data	LRC
27h	F6h	02h	05h		lrc

Data Byte No.	Description	Range of Values	Unit
01h	Device address	1...254	---
02h	Return code	0 = Configured OK 1 = Out of bounds	---
03h...04h	Cyclical Redundancy Check	0...65535	---
05h	Inverted Sync byte from header	D8h	---

2.6 Get Real-Time Data

The Get Real-Time Data packet is a request to the 4300 power meter to read its real-time data.

Request for Real-Time Data

Sync	Devt	Msgt	Len	Data	LRC
14h	F6h	03h	04h		lrc

Data Byte No.	Description	Range of Values	Unit
01h	Device address	1...254	---
02h...03h	Cyclical Redundancy Check	0...65535	---
04h	Inverted Sync byte from header	EBh	---

The 4300 power meter returns the packet illustrated below; but 4300 power meters with software versions prior to version V1.3.0.0 cannot display frequency, kilovolt-amperes (kVA), or kilovolt-amperes reactive (KVAR) as indicated in the packet.

Response to Real-Time Data Request

Sync	Devt	Msgt	Len	Data	LRC
27h	F6h	03h	48h		lrc

Data Byte No.	Description	Range of Values	Unit
01h	Device address	1...254	---
02h...03h	Power factor, where: 0...999 = Lagging PF (x10) 1000 = 100.0 PF (unity) 1001...2000 Leading PF (x10) = 2000-value	0...2000	0.1 percent
04h...07h	Voltage L-N phase A	0...999999	volt
08h...0Bh	Voltage L-N phase B	0...999999	volt
0Ch...0Fh	Voltage L-N phase C	0...999999	volt
10h...13h	Voltage L-N average	0...999999	volt
14h...17h	Voltage L-L phase A–B	0...999999	volt
18h...1Bh	Voltage L-L phase B–C	0...999999	volt
1Ch...1Fh	Voltage L-L phase C–A	0...999999	volt
20h...23h	Voltage L-L average	0...999999	volt
24h...27h	Kilowatts	-999999...999999	kilowatt
28h...2Bh	Kilowatt demand	-999999...999999	kilowatt
2Ch...2Fh	Maximum kilowatt demand	-999999...999999	kilowatt
30h...33h	Kilowatt hours (net)	-999999999...999999999	kilowatt-hour

(continued) **Response to Real-Time Data Request**

Sync	Devt	Msgt	Len	Data	LRC
27h	F6h	03h	48h		lrc

Data Byte No.	Description	Range of Values	Unit
34h...35h	Current phase A	0...999999	ampere
36h...37h	Current phase B	0...999999	ampere
38h...39h	Current phase C	0...999999	ampere
3Ah...3Bh	Current average	0...999999	ampere
V1.3+ 3Ch...3Dh	Frequency	0...32767	0.1 hertz
V1.3+3Eh...41h	Kilovolt-amperes	0...999999	kilovolt-ampere
V1.3+42h...45h	Kilovolt-amperes reactive	-999999...999999	kilovolt-ampere reactive
46h...47h	Cyclical Redundancy Check	0...65535	---
48h	Inverted Sync byte from header	D8h	---

2.7 Get Real-Time Data with Subsequent Reset

This packet contains both a request to the 4300 power meter to read its real-time data and a command to reset the power meter's maximum kilowatt demand to the present (real-time) kilowatt demand. Except for the Msgt byte code (04h), the request and response packets are identical to the Get Real-Time Data packets illustrated earlier. But reading the real-time data is now followed by the reset of the kilowatt demand.

2.8 Clear Kilowatt Hours

The Clear Kilowatt Hours packet instructs the 4300 power meter to clear its kilowatt-hour counter, resetting it to zero.

Clear Kilowatt Hours Request

Sync	Devt	Msgt	Len	Data	LRC
14h	F6h	05h	04h		lrc

Data Byte No.	Description	Range of Values	Unit
01h	Device address	1...254	---
02h...03h	Cyclical Redundancy Check	0...65535	---
04h	Inverted Sync byte from header	EBh	---

The 4300 power meter responds to this packet by clearing its kilowatt-hour counter and returning the following packet:

Response to Clear Kilowatt Hours Request

Sync	Devt	Msgt	Len	Data	LRC
27h	F6h	05h	04h		lrc

Data Byte No.	Description	Range of Values	Unit
01h	Device address	1...254	---
02h...03h	Cyclical Redundancy Check	0...65535	---
04h	Inverted Sync byte from header	EBh	---

A Address Codes

The following table lists all address codes that have been assigned by Siemens. These codes are used in the Devt byte of a communications packet. For more information on packets and addressing, refer to the *SEAbus and SEAbus Plus Protocol Reference Manual* (Manual No. SG-6213-00). For easy reference, the left side of the table lists the codes for each device in numerical order; the right side of the table lists the devices with their codes in alphanumeric order. Codes are given in (h)exadecimal and (d)ecimal.

Codes in Numerical Order			Device Types in Alphanumeric Order		
Address Codes (h/d)		Device Type	Address Codes (h/d)		Device Type
00h	0	Universal Request	FDh	253	3600-S1 power meter
01h...E0h	1...224	Direct address codes	F6h	246	4300 power meter
E1h...F1h	225...241	Indirect address codes (reserved)	FEh	254	4700 power meter
F2h	242	SB Energy/Comm trip unit	F5h	245	4720 power meter
F3h	243	S7-I/O unit	FCh	252	ACCESS Host PC
F4h	244	Pulse reading meter (PRM)	01h...E0h	1...224	Direct address codes
F5h	245	4720 power meter	FFh	255	Broadcast
F6h	246	4300 power meter	E1h...F1h	225...241	Indirect address codes (reserved)
F7h	247	ISGS	F7h	247	ISGS
F8h	248	Static Trip IIICP trip unit	FBh	251	Local display unit
F9h	249	Multiplexer Translator	F9h	249	Multiplexer Translator
FAh	250	SCOR	F4h	244	Pulse reading meter (PRM)
FBh	251	Local display unit	F3h	243	S7-I/O unit
FCh	252	ACCESS Host PC	F2h	242	SB Energy/Comm trip unit
FDh	253	3600-S1 power meter	FAh	250	SCOR
FEh	254	4700 power meter	F8h	248	Static Trip IIICP trip unit
FFh	255	Broadcast	00h	0	Universal Request

B Decimal/Hexadecimal Conversion Table

Conversion Table (d)ecimal and (h)exadecimal

d	h	d	h	d	h	d	h	d	h	d	h	d	h	d	h
0	00	32	20	64	40	96	60	128	80	160	A0	192	C0	224	E0
1	01	33	21	65	41	97	61	129	81	161	A1	193	C1	225	E1
2	02	34	22	66	42	98	62	130	82	162	A2	194	C2	226	E2
3	03	35	23	67	43	99	63	131	83	163	A3	195	C3	227	E3
4	04	36	24	68	44	100	64	132	84	164	A4	196	C4	228	E4
5	05	37	25	69	45	101	65	133	85	165	A5	197	C5	229	E5
6	06	38	26	70	46	102	66	134	86	166	A6	198	C6	230	E6
7	07	39	27	71	47	103	67	135	87	167	A7	199	C7	231	E7
8	08	40	28	72	48	104	68	136	88	168	A8	200	C8	232	E8
9	09	41	29	73	49	105	69	137	89	169	A9	201	C9	233	E9
10	0A	42	2A	74	4A	106	6A	138	8A	170	AA	202	CA	234	EA
11	0B	43	2B	75	4B	107	6B	139	8B	171	AB	203	CB	235	EB
12	0C	44	2C	76	4C	108	6C	140	8C	172	AC	204	CC	236	EC
13	0D	45	2D	77	4D	109	6D	141	8D	172	AD	205	CD	237	ED
14	0E	46	2E	78	4E	110	6E	142	8E	174	AE	206	CE	238	EE
15	0F	47	2F	79	4F	111	6F	143	8F	175	AF	207	CF	239	EF
16	10	48	30	80	50	112	70	144	90	176	B0	208	D0	240	F0
17	11	49	31	81	51	113	71	145	91	177	B1	209	D1	241	F1
18	12	50	32	82	52	114	72	146	92	178	B2	210	D2	242	F2
19	13	51	33	83	53	115	73	147	93	179	B3	211	D3	243	F3
20	14	52	34	84	54	116	74	148	94	180	B4	212	D4	244	F4
21	15	53	35	85	55	117	75	149	95	181	B5	213	D5	245	F5
22	16	54	36	86	56	118	76	150	96	182	B6	214	D6	246	F6
23	17	55	37	87	57	119	77	151	97	183	B7	215	D7	247	F7
24	18	56	38	88	58	120	78	152	98	184	B8	216	D8	248	F8
25	19	57	39	89	59	121	79	153	99	185	B9	217	D9	249	F9
26	1A	58	3A	90	5A	122	7A	154	9A	186	BA	218	DA	250	FA
27	1B	59	3B	91	5B	123	7B	155	9B	187	BB	219	DB	251	FB
28	1C	60	3C	92	5C	124	7C	156	9C	188	BC	220	DC	252	FC
29	1D	61	3D	93	5D	125	7D	157	9D	189	BD	221	DD	253	FD
30	1E	62	3E	94	5E	126	7E	158	9E	190	BE	222	DE	254	FE
31	1F	63	3F	95	5F	127	7F	159	9F	191	BF	223	DF	255	FF

Notes

SIEMENS

Siemens Energy &
Automation, Inc.
Switchgear and Motor Control
Business
P.O. Box 29503
Raleigh, NC 27626-0503

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