

# Thyro-PX™ Anybus® Modbus TCP

## Guide

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### Related Documentation

For complete information on the Thyro-PX unit, see the user manual that accompanied the system. In particular, reference the safety information in Chapter 1 of the user manual for the Thyro-PX unit.

## ANYBUS MODBUS TCP MODULE

The Anybus Modbus TCP module is an optional accessory for the Thyro-PX power controller.

### Related Links

- [“Hardware Description” on page 2](#)
- [“Configuring With Thyro-Tool Pro PC Software” on page 3](#)
- [“Default Flexible Links” on page 7](#)
- [“Installing Optional Modules” on page 8](#)
- [“Fast Process Data Communication” on page 9](#)
- [“Modbus TCP Parameter List” on page 13](#)
- [“AE Global Services” on page 34](#)

# HARDWARE DESCRIPTION

This module is compliant with the Modbus® TCP standard.

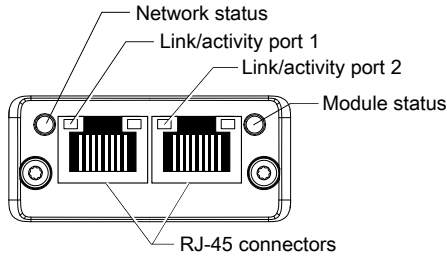


Figure 1. Hardware

Table 1. Network status LED

LED State	Description
Off	No IP address or exception state
Green	At least one Modbus message received
Green, blinking	Waiting for first Modbus message
Red	IP address conflict detected, fatal error
Red, blinking	Connection timeout. No Modbus message has been received within the configured “process active timeout” time.

Table 2. Module status LED

LED State	Description
Off	No power
Green	Normal operation
Red	Major fault, fatal error
Red, blinking	Minor fault
Alternating red/green	Firmware update in progress

If both the network status LED and the module status LED are red, a fatal error has occurred.

Table 3. Link/activity LED

LED State	Description
Off	No link
Green	100 Mbit/s link established

**Table 3.** Link/activity LED (Continued)

LED State	Description
Green, flickering	100 Mbit/s activity
Yellow	10 Mbit/s link established
Yellow, flickering	10 Mbit/s activity

**Table 4.** RJ-45 Ethernet pinout

Pin	Description
1	TD+
2	TX-
3	RX+
6	RX-
4, 5, 7, 8	Normally left unused; to ensure signal integrity, these pins are tied together and terminated to PE via a filter circuit in the module.
Housing	Cable shield

## CONFIGURING WITH THYRO-TOOL PRO PC SOFTWARE

You can configure the Thyro-PX power controller using either the Thyro-Tool Pro PC software or the Thyro-Touch display.

To configure the unit, you will:

- Adapt the Thyro-PX hardware configuration

If required, you can also:

- Select the configuration
- Configure the diagnostics
- Configure the flexible link parameters

### Adapting Thyro-PX Hardware Configuration

Open parameter file with the unit online in the **Port Explorer** tab of the Thyro-Tool Pro PC software, or use the Thyro-Touch display.

Set the Anybus module slot to **Modbus TCP** in the Thyro-PX device hardware configuration:

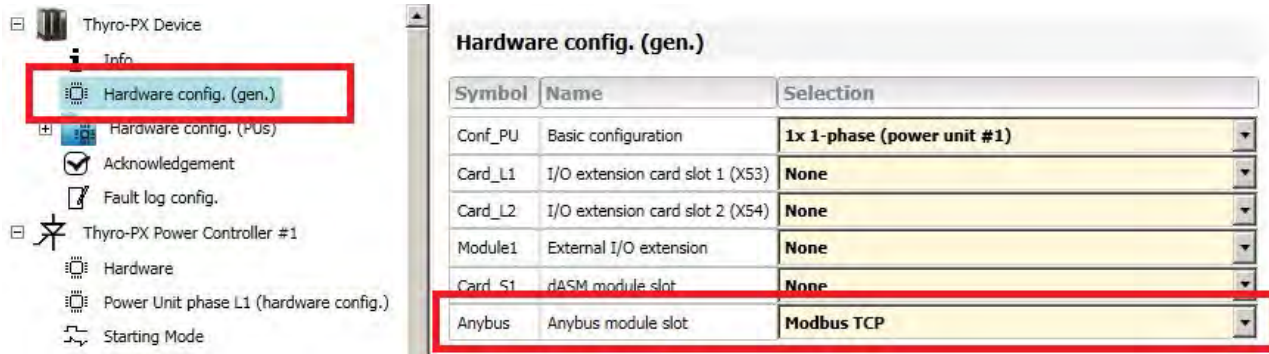


Figure 2. Menu tree

### Anybus Parameter Group

When the computer is connected to the Thyro-PX power controller, the Anybus parameter group will be added to the parameter list after updating the hardware configuration, as shown in the previous figure.

If the unit is not available for online configuration, the software can also be configured offline. Contact AE Global Services to obtain a parameter file appropriate to your hardware configuration.



Figure 3. Anybus parameter group

## Configuring Modbus TCP IP Address

Set the Modbus TCP IP address in the submenu **Modbus\_TCP**. By default, the IP address is automatically assigned through the Dynamic Host Configuration Protocol (DHCP) server.

**Modbus\_TCP**

Symbol	Name	Selection
DHCP	DHCP	IP address autommatically

Symbol	Name	Value	Minimum	Maximum
IP_Adr	IP_Adr	0.0.0.0		
Submask	Submask	0.0.0.0		
Gateway	Gateway	0.0.0.0		
Timeout	Timeout	2.00 s	0.00 s	60.00 s

Figure 4. Configure Modbus TCP IP address

## Connecting to the Modbus TCP controller

Some process control software can scan the network to automatically detect and connect to Modbus TCP devices.

To manually configure the process control software, find the MAC address for the Modbus TCP module in the **General** menu. Use the MAC address to configure the process control software.

**General**

Symbol	Name	Selection
Config	configured	Modbus TCP
Insert	existent	Modbus TCP

Symbol	Name	Value	Minimum	Maximum
ProvId	Provider ID	17	0	255
VerMajor	VerMajor	1	0	255
VerMinor	VerMinor	7	0	255
VerPatch	VerPatch	1	0	255
MAC_Adr	MAC_Adr	00-30-11-11-EC-69		

Figure 5. Modbus TCP module MAC address

## Selecting Configuration

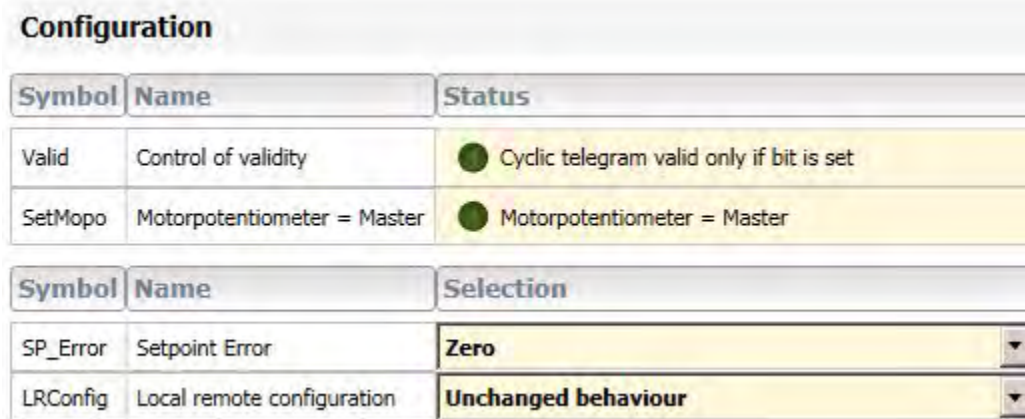


Figure 6. Select configuration

Each configuration name, status, and selection is described in the following table:

Table 5. Configuration

Name	Status/Selection	Description
<b>Control of validity</b>	<b>Cyclic telegram valid only if bit is set</b>	When enabled, the cyclic telegrams received from the master will only be considered as valid and processed if bit 15 of the Device Command (API # 41) is set. This function allows several settings to be changed one after another before enabling the complete change, thereby avoiding unwanted effects due to an incomplete change.
<b>Motorpotentiometer = Master</b>	<b>Motorpotentiometer = Master</b>	When enabled, the value of the motorpotentiometer continuously follows the master setpoint while in remote operation, so that no setpoint leap occurs during the switch-over to the local setpoint.
<b>Setpoint Error</b>	<b>Zero</b>	Zero is used as the setpoint when the master setpoint is missing.
	<b>Last valid master setpoint</b>	The last valid master setpoint is used as the setpoint when the master setpoint is missing.
	<b>Last valid error setpoint</b>	The last valid error setpoint is used as the setpoint when the master setpoint is missing.
<b>Local remote configuration</b>	<b>Unchanged behavior</b>	Configuration of the master's influence to the local remote behavior.
	<b>Automatic switch to local</b>	The unit will automatically switch to local mode when the communication with master is interrupted.
	<b>Ignore master in local</b>	When the unit is in local mode, data and commands from the master will be ignored.

## Configuring Diagnostics

Modbus TCP diagnostic information is available according to the following tables.

**Table 6.**

Input Register	Dec	Hex	
Diagnostic event count	2048	800	Number of pending diagnostic events. There may be gaps between active diagnostic events. Inactive diagnostic events return 0000h when read.
Diagnostic event #1	2049	801	High byte = severity Low byte = event code
Diagnostic event #2	2050	802	
Diagnostic event #3	2051	803	
Diagnostic event #4	2052	804	
Diagnostic event #5	2053	805	
Diagnostic event #6	2054	806	

The following two diagnostic events are supported:

**Table 7. Diagnostic events**

Event Code	Event
0x10 (= 16)	Error
0x40 (= 64)	Temperature

You can configure both events in the Thyro-Tool Pro PC software. You can add any Thyro-PX error or status message. Once an error or status message is added, the message will trigger the corresponding extended diagnosis event.

## Configuring Flexible Link Parameters

The flexible link parameters have been designed to allow access to Thyro-PX internal data, such as parameters and actual values, that are not listed in the parameter list.

There are 20 flexible link parameters for writing and 20 flexible link parameters for reading data.

The default read links are shown in the Thyro-Tool Pro PC software, and in the table “[Default Flexible Links](#)”.

Once the respective data point has been selected in the flexible link parameter configuration, it can be accessed on the Modbus TCP using the respective flexible link parameter API that is listed in the parameter list (see ).

## Default Flexible Links

**Table 8.** Default flexible links

Flexible Link	Default Link Setting
Flexible read-link 01 r	Power Controller #1: Total power - read
Flexible read-link 02 r	Power Controller #1: L1 Urms - read
Flexible read-link 03 r	Power Controller #1: L1 Irms - read
Flexible read-link 04 r	Power Controller #1: L1 Power - read
Flexible read-link 05 r	Power Controller #1: L1 Resistance - read
Flexible read-link 06 r	Power Controller #1: L1 Umains - read
Flexible read-link 07 r	Power Controller #1: L1 Temperature - read
Flexible read-link 08 r	Power Controller #1: L2 Urms - read
Flexible read-link 09 r	Power Controller #1: L2 Irms - read
Flexible read-link 10 r	Power Controller #1: L2 Power - read
Flexible read-link 11 r	Power Controller #1: L2 Resistance - read
Flexible read-link 12 r	Power Controller #1: L2 Umains - read
Flexible read-link 13 r	Power Controller #1: L2 Temperature - read
Flexible read-link 14 r	Power Controller #1: L3 Urms - read
Flexible read-link 15 r	Power Controller #1: L3 Irms - read
Flexible read-link 16 r	Power Controller #1: L3 Power - read
Flexible read-link 17 r	Power Controller #1: L3 Resistance - read
Flexible read-link 18 r	Power Controller #1: L3 Umains - read
Flexible read-link 19 r	Power Controller #1: L3 Temperature - read
Flexible read-link 20 r	Not applicable

## INSTALLING OPTIONAL MODULES



### **DANGER:**

**RISK OF DEATH OR BODILY INJURY.** Disconnect and lockout/tagout all sources of input power before working on this unit or anything connected to it.



### **DANGER:**

**RISQUE DE MORT OU DE BLESSURES CORPORELLES.** Débrancher et verrouiller/ étiqueter toutes les sources de puissance d'entrée avant de travailler sur cette unité ou sur tout élément qui y est raccordé.

The optional modules may be shipped separately.

1. Verify that the unit is disconnected from all power sources.



2. Unpack each optional module at an ESD safe work space.
3. Plug each optional module into the unit.

When an Anybus module is inserted into the unit, guide the module towards the left during insertion.

4. Secure each module with the two TORX® T8 screws provided with the module.

If an Anybus module must be removed from the unit, loosen the TORX T8 mounting screws 3 turns, and pry out the module with a small flat-bladed screwdriver, as shown in the following figure.



*Figure 7. Anybus module removal*

## FAST PROCESS DATA COMMUNICATION

For fast communication, some process data are buffered in the communication module. To read or write a buffered parameter, use the address in the following tables, rather than the API associated address in table “[Modbus TCP Parameter List](#)” on page 13.



### **Important**

The parameter assigned to each address changes depending on how the Thyro-PX power controller is configured.

## Buffered Read Addresses

The parameter assigned to each address changes with each of the following configurations:

- Single-phase (1 \* 1 phase)
- 2x single-phase (2 \* 1 phase)
- 3x single-phase (3 \* 1 phase)
- Three-phase economic circuit (two phase) (1 \* 2 phase)

- Three-phase (1 \* 3 phase)

Use the column in the following table which corresponds with your hardware configuration. For the default flexible links, see “[Default Flexible Links](#)” on page 7.

**Table 9. Buffered read addresses**

Address		Read Parameter by Thyro-PX Configuration				
Dec	Hex	1 * 1 phase	2 * 1 phase	3 * 1 phase	1 * 2 phase	1 * 3 phase
2048	800	Device Error device r	Device Error device r	Device Error device r	Device Error device r	Device Error device r
2050	802	Device Error extension r	Device Error extension r	Device Error extension r	Device Error extension r	Device Error extension r
2052	804	#1 Actual setpoint r	#1 Actual setpoint r	#1 Actual setpoint r	#1 Actual setpoint r	#1 Actual setpoint r
2054	806	#1 Output r	#1 Output r	#1 Output r	#1 Output r	#1 Output r
2056	808	#1 Error PC r	#1 Error PC r	#1 Error PC r	#1 Error PC r	#1 Error PC r
2058	80A	#1 Status PC r	#1 Status PC r	#1 Status PC r	#1 Status PC r	#1 Status PC r
2060	80C	#1 Monitoring PC r	#1 Monitoring PC r	#1 Monitoring PC r	#1 Monitoring PC r	#1 Monitoring PC r
2062	80E	Flexible link 01 r [1]	#2 Actual setpoint r	#2 Actual setpoint r	Flexible link 01 r	Flexible link 01 r
2064	810	Flexible link 02 r	#2 Output r	#2 Output r	Flexible link 02 r	Flexible link 02 r
2066	812	Flexible link 03 r	#2 Error PC r	#2 Error PC r	Flexible link 03 r	Flexible link 03 r
2068	814	Flexible link 04 r	#2 Status PC r	#2 Status PC r	Flexible link 04 r	Flexible link 04 r
2070	816	Flexible link 05 r	#2 Monitoring PC r	#2 Monitoring PC r	Flexible link 05 r	Flexible link 05 r
2072	818	Flexible link 06 r	Flexible link 01 r	#3 Actual setpoint r	Flexible link 06 r	Flexible link 06 r
2074	81A	Flexible link 07 r	Flexible link 02 r	#3 Output r	Flexible link 07 r	Flexible link 07 r
2076	81C	Flexible link 08 r	Flexible link 03 r	#3 Error PC r	Flexible link 08 r	Flexible link 08 r
2078	81E	Flexible link 09 r	Flexible link 04 r	#3 Status PC r	Flexible link 09 r	Flexible link 09 r
2080	820	Flexible link 10 r	Flexible link 05 r	#3 Monitoring PC r	Flexible link 10 r	Flexible link 10 r
2082	822	Flexible link 11 r	Flexible link 06 r	Flexible link 01 r	Flexible link 11 r	Flexible link 11 r
2084	824	Flexible link 12 r	Flexible link 07 r	Flexible link 02 r	Flexible link 12 r	Flexible link 12 r
2086	826	Flexible link 13 r	Flexible link 08 r	Flexible link 03 r	Flexible link 13 r	Flexible link 13 r
2088	828	Flexible link 14 r	Flexible link 09 r	Flexible link 04 r	Flexible link 14 r	Flexible link 14 r
2090	82A	Flexible link 15 r	Flexible link 10 r	Flexible link 05 r	Flexible link 15 r	Flexible link 15 r
2092	82C	Flexible link 16 r	Flexible link 11 r	Flexible link 06 r	Flexible link 16 r	Flexible link 16 r
2094	82E	Flexible link 17 r	Flexible link 12 r	Flexible link 07 r	Flexible link 17 r	Flexible link 17 r

**Table 9. Buffered read addresses (Continued)**

Address		Read Parameter by Thyro-PX Configuration				
Dec	Hex	1 * 1 phase	2 * 1 phase	3 * 1 phase	1 * 2 phase	1 * 3 phase
2096	830	Flexible link 18 r	Flexible link 13 r	Flexible link 08 r	Flexible link 18 r	Flexible link 18 r
2098	832	Flexible link 19 r	Flexible link 14 r	Flexible link 09 r	Flexible link 19 r	Flexible link 19 r
2100	834	Flexible link 20 r	Flexible link 15 r	Flexible link 10 r	Flexible link 20 r	Flexible link 20 r
2102	836		Flexible link 16 r	Flexible link 11 r		
2104	838		Flexible link 17 r	Flexible link 12 r		
2106	83A		Flexible link 18 r	Flexible link 13 r		
2108	83C		Flexible link 19 r	Flexible link 14 r		
2110	83E		Flexible link 20 r	Flexible link 15 r		
2112	840			Flexible link 16 r		
2114	842			Flexible link 17 r		
2116	844			Flexible link 18 r		
2118	846			Flexible link 19 r		
2120	848			Flexible link 20 r		

<sup>1</sup> See “Default Flexible Links” on page 7

## Buffered Write Addresses

The parameter assigned to each address changes with each of the following configurations:

- Single-phase (1 \* 1 phase)
- 2x single-phase (2 \* 1 phase)
- 3x single-phase (3 \* 1 phase)
- Three-phase economic circuit (two phase) (1 \* 2 phase)
- Three-phase (1 \* 3 phase)

Use the column in the following table which corresponds with your hardware configuration. For the default flexible links, see “Default Flexible Links” on page 7.

**Table 10. Buffered write addresses**

Address		Write Parameter by Thyro-PX Configuration				
Dec	Hex	1 * 1 phase	2 * 1 phase	3 * 1 phase	1 * 2 phase	1 * 3 phase
0	0	Device Commands w	Device Commands w	Device Commands w	Device Commands w	Device Commands w
1	1	#1 Fieldbus setpoint w	#1 Fieldbus setpoint w	#1 Fieldbus setpoint w	#1 Fieldbus setpoint w	#1 Fieldbus setpoint w

**Table 10. Buffered write addresses (Continued)**

Address		Write Parameter by Thyro-PX Configuration				
Dec	Hex	1 * 1 phase	2 * 1 phase	3 * 1 phase	1 * 2 phase	1 * 3 phase
3	3	#1 Error setpoint w	#1 Error setpoint w	#1 Error setpoint w	#1 Error setpoint w	#1 Error setpoint w
5	5	Flexible link 01 w <sup>[1]</sup>	#2 Fieldbus setpoint w	#2 Fieldbus setpoint w	Flexible link 01 w	Flexible link 01 w
7	7	Flexible link 02 w	#2 Error setpoint w	#2 Error setpoint w	Flexible link 02 w	Flexible link 02 w
9	9	Flexible link 03 w	Flexible link 01 w	#3 Fieldbus setpoint w	Flexible link 03 w	Flexible link 03 w
11	B	Flexible link 04 w	Flexible link 02 w	#3 Error setpoint w	Flexible link 04 w	Flexible link 04 w
13	D	Flexible link 05 w	Flexible link 03 w	Flexible link 01 w	Flexible link 05 w	Flexible link 05 w
15	F	Flexible link 06 w	Flexible link 04 w	Flexible link 02 w	Flexible link 06 w	Flexible link 06 w
17	11	Flexible link 07 w	Flexible link 05 w	Flexible link 03 w	Flexible link 07 w	Flexible link 07 w
19	13		Flexible link 06 w	Flexible link 04 w		
21	15		Flexible link 07 w	Flexible link 05 w		
23	17			Flexible link 06 w		
25	19			Flexible link 07 w		

<sup>1</sup> See “Default Flexible Links” on page 7

## MODBUS TCP PARAMETER LIST

Table 11. Parameter list

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
1	Read	4112	1010	Flexible link 01 r	UINT32 FLOAT	Flexible link number 01 - read
2	Read	4114	1012	Flexible link 02 r	UINT32 FLOAT	Flexible link number 02 - read
3	Read	4116	1014	Flexible link 03 r	UINT32 FLOAT	Flexible link number 03 - read
4	Read	4118	1016	Flexible link 04 r	UINT32 FLOAT	Flexible link number 04 - read
5	Read	4120	1018	Flexible link 05 r	UINT32 FLOAT	Flexible link number 05 - read
6	Read	4122	101A	Flexible link 06 r	UINT32 FLOAT	Flexible link number 06 - read
7	Read	4124	101C	Flexible link 07 r	UINT32 FLOAT	Flexible link number 07 - read
8	Read	4126	101E	Flexible link 08 r	UINT32 FLOAT	Flexible link number 08 - read
9	Read	4128	1020	Flexible link 09 r	UINT32 FLOAT	Flexible link number 09 - read
10	Read	4130	1022	Flexible link 10 r	UINT32 FLOAT	Flexible link number 10 - read
11	Read	4132	1024	Flexible link 11 r	UINT32 FLOAT	Flexible link number 11 - read
12	Read	4134	1026	Flexible link 12 r	UINT32 FLOAT	Flexible link number 12 - read
13	Read	4136	1028	Flexible link 13 r	UINT32 FLOAT	Flexible link number 13 - read
14	Read	4138	102A	Flexible link 14 r	UINT32 FLOAT	Flexible link number 14 - read
15	Read	4140	102C	Flexible link 15 r	UINT32 FLOAT	Flexible link number 15 - read
16	Read	4142	102E	Flexible link 16 r	UINT32 FLOAT	Flexible link number 16 - read

**Table 11. Parameter list (Continued)**

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
17	Read	4144	1030	Flexible link 17 r	UINT32 FLOAT	Flexible link number 17 - read
18	Read	4146	1032	Flexible link 18 r	UINT32 FLOAT	Flexible link number 18 - read
19	Read	4148	1034	Flexible link 19 r	UINT32 FLOAT	Flexible link number 19 - read
20	Read	4150	1036	Flexible link 20 r	UINT32 FLOAT	Flexible link number 20 - read
21	Write	4152	1038	Flexible link 01 w	UINT32 FLOAT	Flexible link number 01 - write
22	Write	4154	103A	Flexible link 02 w	UINT32 FLOAT	Flexible link number 02 - write
23	Write	4156	103C	Flexible link 03 w	UINT32 FLOAT	Flexible link number 03 - write
24	Write	4158	103E	Flexible link 04 w	UINT32 FLOAT	Flexible link number 04 - write
25	Write	4160	1040	Flexible link 05 w	UINT32 FLOAT	Flexible link number 05 - write
26	Write	4162	1042	Flexible link 06 w	UINT32 FLOAT	Flexible link number 06 - write
27	Write	4164	1044	Flexible link 07 w	UINT32 FLOAT	Flexible link number 07 - write
28	Write	4166	1046	Flexible link 08 w	UINT32 FLOAT	Flexible link number 08 - write
29	Write	4168	1048	Flexible link 09 w	UINT32 FLOAT	Flexible link number 09 - write
30	Write	4170	104A	Flexible link 10 w	UINT32 FLOAT	Flexible link number 10 - write
31	Write	4172	104C	Flexible link 11 w	UINT32 FLOAT	Flexible link number 11 - write
32	Write	4174	104E	Flexible link 12 w	UINT32 FLOAT	Flexible link number 12 - write
33	Write	4176	1050	Flexible link 13 w	UINT32 FLOAT	Flexible link number 13 - write
34	Write	4178	1052	Flexible link 14 w	UINT32 FLOAT	Flexible link number 14 - write
35	Write	4180	1054	Flexible link 15 w	UINT32 FLOAT	Flexible link number 15 - write

Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
36	Write	4182	1056	Flexible link 16 w	UINT32 FLOAT	Flexible link number 16 - write
37	Write	4184	1058	Flexible link 17 w	UINT32 FLOAT	Flexible link number 17 - write
38	Write	4186	105A	Flexible link 18 w	UINT32 FLOAT	Flexible link number 18 - write
39	Write	4188	105C	Flexible link 19 w	UINT32 FLOAT	Flexible link number 19 - write
40	Write	4190	105E	Flexible link 20 w	UINT32 FLOAT	Flexible link number 20 - write
41	Write	4192	1060	Device Commands w	UINT16	Device command - write Bit 0: Clear energy counter power controller #1 Bit 1: Clear energy counter power controller #2 Bit 2: Clear energy counter power controller #3 Bit 3: Regulator lock power controller #1 Bit 4: Regulator lock power controller #2 Bit 5: Regulator lock power controller #3 Bit 6: Pulse lock power controller #1 Bit 7: Pulse lock power controller #2 Bit 8: Pulse lock power controller #3 Bit 9: External Error 1 Bit 10: External Error 2 Bit 11: External Error 3 Bit 12: Load parameters (from EEPROM to Flash) Bit 13: Save parameters (from Flash to EEPROM) Bit 14: Fault acknowledgement (Quit) Bit 15: "Only if bit set" (special function)
42		4194	1062			
43	Read	4196	1064	Device operating hours r	FLOAT	Operating hours - read

Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
44	Read	4198	1066	Device CPU temperature r	FLOAT	CPU temperature - read
45	Read	4200	1068	Device error r	UINT32	Error - read Bit 0: Aux. supply error Bit 1: Parameter error Bit 2: Frequency error Bit 3: Internal communication error Bit 4: Temperature CPU too high Bit 8: Phase L1 missing Bit 9: Phase L2 missing Bit 10: Phase L3 missing Bit 11: Fuse 1 broken Bit 12: Fuse 2 broken Bit 13: Fuse 3 broken Bit 14: Thyristor 1 short-circuit Bit 15: Thyristor 2 short-circuit Bit 16: Thyristor 3 short-circuit Bit 17: External error 1 (customer-specific) Bit 18: External error 2 (customer-specific) Bit 19: External error 3 (customer-specific) Bit 21: Extension card X53 configuration error Bit 22: Extension card X54 configuration error Bit 23: External extension 1 configuration error Bit 24: External extension 2 configuration error Bit 25: dASM card configuration error Bit 26: Anybus configuration error Bit 27: Internal error



Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
46	Read	4202	106A	Device error extension r	UINT32	Error extension - read Bit 1: Extension card X53 error Bit 2: Extension card X54 error Bit 3: External extension 1 error Bit 4: External extension 2 error Bit 5: dASM card error Bit 6: Anybus module error Bit 8: dASM total power exceeded Bit 9: dASM count error
47		4204	106C			
48	Read	4206	106E	#1 Analog setpoint r	FLOAT	Power controller #1: Analog setpoint - read
49	Read	4208	1070	#1 Motor pot. setpoint r	FLOAT	Power controller #1: Motor potentiometer setpoint - read
50	Write	4210	1072	#1 Fieldbus setpoint w	FLOAT	Power controller #1: Fieldbus setpoint - write
51	Read	4212	1074	#1 Actual setpoint r	FLOAT	Power controller #1: Actual setpoint - read
52	Write	4214	1076	#1 Error setpoint w	FLOAT	Power controller #1: Error setpoint - write
53	Read	4216	1078	#1 Total power r	FLOAT	Power controller #1: Total power - read
54	Read	4218	107A	#1 Alpha r	FLOAT	Power controller #1: Alpha - read
55	Read	4220	107C	#1 TimeOn r	FLOAT	Power controller #1: Time on - read
56	Read	4222	107E	#1 Output r	FLOAT	Power controller #1: Output - read
57	Read	4224	1080	#1 Frequency r	FLOAT	Power controller #1: Frequency - read
58	Read	4226	1082	#1 Energy counter r	FLOAT	Power controller #1: Energy counter - read

Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
59	Read	4228	1084	#1 Error PC r	UINT32	Error PC - read Bit 4: Synchronization error Bit 5: Phase missing Bit 6: Fuse broken Bit 7: Thyristor short circuit Bit 16: Internal communication error Bit 17: U clipping Bit 18: I clipping Bit 19: Negative power Bit 20: Temperature probe error Bit 21: Overtemperature Bit 24: I/O error
60	Read	4230	1086	#1 Status PC r	UINT32	Power controller #1: Status PC - read Bit 0: Output (pulses) on Bit 1: Power controller OK) Bit 2: Mains OK Bit 3: Remote setpoint Bit 6: Pulse lock (with ack.) Bit 7: Pulse lock (auto-ack.) Bit 8: Regulator lock Bit 12: Left rotation field Bit 13: Output restricted Bit 14: Max output reached Bit 16: Active limit Bit 17: U limit Bit 18: I limit Bit 19: I <sub>peak</sub> limit Bit 20: P limit Bit 21: Temperature limit Bit 22: Limit external feedback signal Bit 24: RAMP starting mode Bit 25: MOSI starting mode Bit 26: MOSI starting mode I <sub>RMS</sub> Bit 27: MOSI starting mode I <sub>peak</sub>

Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
61	Read	4232	1088	#1 Monitoring PC r	UINT32	Power controller #1: Monitoring PC - read Bit 4: $U_{mains} < \text{minimum}$ Bit 5: $U_{mains} > \text{maximum}$ Bit 6: $U_{RMS} < \text{minimum}$ Bit 7: $U_{RMS} < \text{maximum}$ Bit 8: $U_{rect} < \text{minimum}$ Bit 9: $U_{rect} > \text{maximum}$ Bit 11: $U_{peak} > \text{maximum}$ Bit 14: $I_{RMS} < \text{minimum}$ Bit 15: $I_{RMS} > \text{maximum}$ Bit 16: $I_{rect} < \text{minimum}$ Bit 17: $I_{rect} > \text{maximum}$ Bit 19: $I_{peak} > \text{maximum}$ Bit 22: $P < \text{minimum}$ Bit 23: $P > \text{maximum}$ Bit 24: $R < \text{minimum}$ Bit 25: $R > \text{maximum}$ Bit 26: $T_{device} < \text{minimum}$ Bit 27: $T_{device} > \text{maximum}$ Bit 28: $R_{abs} < \text{minimum}$ Bit 29: $R_{abs} > \text{maximum}$ Bit 30: $R_{rel} < \text{minimum}$ Bit 31: $R_{rel} > \text{maximum}$
62		4234	108A			
63	Read	4236	108C	#1 L1 Umains r	FLOAT	Power controller #1: L1 $U_{mains}$ - read
64	Read	4238	108E	#1 L1 Urms r	FLOAT	Power controller #1: L1 $U_{RMS}$ - read
65	Read	4240	1090	#1 L1 Urect r	FLOAT	Power controller #1: L1 $U_{rect}$ - read
66	Read	4242	1092	#1 L1 Upeak r	FLOAT	Power controller #1: L1 $U_{peak}$ - read
67	Read	4244	1094	#1 L1 Irms r	FLOAT	Power controller #1: L1 $I_{RMS}$ - read
68	Read	4246	1096	#1 L1 Irect r	FLOAT	Power controller #1: L1 $I_{rect}$ - read
69	Read	4248	1098	#1 L1 Ipeak r	FLOAT	Power controller #1: L1 $I_{peak}$ - read
70	Read	4250	109A	#1 L1 Power r	FLOAT	Power controller #1: L1 Power - read

Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
71	Read	4252	109C	#1 L1 Resistance r	FLOAT	Power controller #1: L1 Resistance - read
72	Read	4254	109E	#1 L1 Temperature r	FLOAT	Power controller #1: L1 Temperature - read
73	Read	4256	10A0	#1 L1 External control r	FLOAT	Power controller #1: L1 External control - read
74		4258	10A2			
75	Read	4260	10A4	#1 L2 Umains r	FLOAT	Power controller #1: L2 U <sub>mains</sub> - read
76	Read	4262	10A6	#1 L2 Urms r	FLOAT	Power controller #1: L2 U <sub>RMS</sub> - read
77	Read	4264	10A8	#1 L2 Urect r	FLOAT	Power controller #1: L2 U <sub>rect</sub> - read
78	Read	4266	10AA	#1 L2 Upeak r	FLOAT	Power controller #1: L2 U <sub>peak</sub> - read
79	Read	4268	10AC	#1 L2 Irms r	FLOAT	Power controller #1: L2 I <sub>RMS</sub> - read
80	Read	4270	10AE	#1 L2 Irect r	FLOAT	Power controller #1: L2 I <sub>rect</sub> - read
81	Read	4272	10B0	#1 L2 Ipeak r	FLOAT	Power controller #1: L2 I <sub>peak</sub> - read
82	Read	4274	10B2	#1 L2 Power r	FLOAT	Power controller #1: L2 Power - read
83	Read	4276	10B4	#1 L2 Resistance r	FLOAT	Power controller #1: L2 Resistance - read
84	Read	4278	10B6	#1 L2 Temperature r	FLOAT	Power controller #1: L2 Temperature - read
85	Read	4280	10B8	#1 L2 External control r	FLOAT	Power controller #1: L2 External control - read
86		4282	10BA			
87	Read	4284	10BC	#1 L3 Umains r	FLOAT	Power controller #1: L3 U <sub>mains</sub> - read
88	Read	4286	10BE	#1 L3 Urms r	FLOAT	Power controller #1: L3 U <sub>RMS</sub> - read
89	Read	4288	10C0	#1 L3 Urect r	FLOAT	Power controller #1: L3 U <sub>rect</sub> - read
90	Read	4290	10C2	#1 L3 Upeak r	FLOAT	Power controller #1: L3 U <sub>peak</sub> - read
91	Read	4292	10C4	#1 L3 Irms r	FLOAT	Power controller #1: L3 I <sub>RMS</sub> - read
92	Read	4294	10C6	#1 L3 Irect r	FLOAT	Power controller #1: L3 I <sub>rect</sub> - read
93	Read	4296	10C8	#1 L3 Ipeak r	FLOAT	Power controller #1: L3 I <sub>peak</sub> - read
94	Read	4298	10CA	#1 L3 Power r	FLOAT	Power controller #1: L3 Power - read
95	Read	4300	10CC	#1 L3 Resistance r	FLOAT	Power controller #1: L3 Resistance - read
96	Read	4302	10CE	#1 L3 Temperature r	FLOAT	Power controller #1: L3 Temperature - read

Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
97	Read	4304	10D0	#1 L3 External control r	FLOAT	Power controller #1: L3 External control - read
98		4306	10D2			
99	Read	4308	10D4	#2 Analog setpoint r	FLOAT	Power controller #2: Analog setpoint - read
100	Read	4310	10D6	#2 Motor pot. setpoint r	FLOAT	Power controller #2: Motor potentiometer setpoint - read
101	Write	4312	10D8	#2 Fieldbus setpoint w	FLOAT	Power controller #2: Fieldbus setpoint - write
102	Read	4314	10DA	#2 Actual setpoint r	FLOAT	Power controller #2: Actual setpoint - read
103	Write	4316	10DC	#2 Error setpoint w	FLOAT	Power controller #2: Error setpoint - write
104	Read	4318	10DE	#2 Total power r	FLOAT	Power controller #2: Total power - read
105	Read	4320	10E0	#2 Alpha r	FLOAT	Power controller #2: Alpha - read
106	Read	4322	10E2	#2 TimeOn r	FLOAT	Power controller #2: Time on - read
107	Read	4324	10E4	#2 Output r	FLOAT	Power controller #2: Output - read
108	Read	4326	10E6	#2 Frequency r	FLOAT	Power controller #2: Frequency - read
109	Read	4328	10E8	#2 Energy counter r	FLOAT	Power controller #2: Energy counter - read
110	Read	4330	10EA	#2 Error PC r	UINT32	Power controller #2: Error PC - read Bit 4: Synchronization error Bit 5: Phase missing Bit 6: Fuse broken Bit 7: Thyristor short circuit Bit 16: Internal communication error Bit 17: U clipping Bit 18: I clipping Bit 19: Negative power Bit 20: Temperature probe error Bit 21: Overtemperature Bit 24: I/O error

Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
111	Read	4332	10EC	#2 Status PC r	UINT32	Power controller #2: Status PC - read Bit 0: Output (pulses) on Bit 2: Mains OK Bit 3: Remote setpoint Bit 6: Pulse lock (with ack.) Bit 7: Pulse lock (auto-ack.) Bit 8: Regulator lock Bit 12: Left rotation field Bit 13: Output restricted Bit 14: Max output reached Bit 16: Active limit Bit 17: U limit Bit 18: I limit Bit 19: I <sub>peak</sub> limit Bit 20: P limit Bit 21: Temperature limit Bit 22: Limit external feedback signal Bit 24: RAMP starting mode Bit 25: MOSI starting mode Bit 26: MOSI starting mode I <sub>RMS</sub> Bit 27: MOSI starting mode I <sub>peak</sub>

Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
112	Read	4334	10EE	#2 Monitoring PC r	UINT32	Power controller #2: Monitoring PC - read Bit 4: $U_{mains} < \text{minimum}$ Bit 5: $U_{mains} > \text{maximum}$ Bit 6: $U_{RMS} < \text{minimum}$ Bit 7: $U_{RMS} > \text{maximum}$ Bit 8: $U_{rect} < \text{minimum}$ Bit 9: $U_{rect} > \text{maximum}$ Bit 11: $U_{peak} > \text{maximum}$ Bit 14: $I_{RMS} < \text{minimum}$ Bit 15: $I_{RMS} > \text{maximum}$ Bit 16: $I_{rect} < \text{minimum}$ Bit 17: $I_{rect} > \text{maximum}$ Bit 19: $I_{peak} > \text{maximum}$ Bit 22: $P < \text{minimum}$ Bit 23: $P > \text{maximum}$ Bit 24: $R < \text{minimum}$ Bit 25: $R > \text{maximum}$ Bit 26: $T_{device} < \text{minimum}$ Bit 27: $T_{device} > \text{maximum}$ Bit 28: $R_{abs} < \text{minimum}$ Bit 29: $R_{abs} > \text{maximum}$ Bit 30: $R_{rel} < \text{minimum}$ Bit 31: $R_{rel} > \text{maximum}$
113		4336	10F0			
114	Read	4338	10F2	#2 L1 Umains r	FLOAT	Power controller #2: L1 $U_{mains}$ - read
115	Read	4340	10F4	#2 L1 Urms r	FLOAT	Power controller #2: L1 $U_{RMS}$ - read
116	Read	4342	10F6	#2 L1 Urect r	FLOAT	Power controller #2: L1 $U_{rect}$ - read
117	Read	4344	10F8	#2 L1 Upeak r	FLOAT	Power controller #2: L1 $U_{peak}$ - read
118	Read	4346	10FA	#2 L1 Irms r	FLOAT	Power controller #2: L1 $I_{RMS}$ - read
119	Read	4348	10FC	#2 L1 Irect r	FLOAT	Power controller #2: L1 $I_{rect}$ - read
120	Read	4350	10FE	#2 L1 Ipeak r	FLOAT	Power controller #2: L1 $I_{peak}$ - read
121	Read	4352	1100	#2 L1 Power r	FLOAT	Power controller #2: L1 Power - read

Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
122	Read	4354	1102	#2 L1 Resistance r	FLOAT	Power controller #2: L1 Resistance - read
123	Read	4356	1104	#2 L1 Temperature r	FLOAT	Power controller #2: L1 Temperature - read
124	Read	4358	1106	#2 L1 External control r	FLOAT	Power controller #2: L1 External control - read
125		4360	1108			
126	Read	4362	110A	#3 Analog setpoint r	FLOAT	Power controller #3: Analog setpoint - read
127	Read	4364	110C	#3 Motor pot. setpoint r	FLOAT	Power controller #3: Motor potentiometer setpoint - read
128	Write	4366	110E	#3 Fieldbus setpoint w	FLOAT	Power controller #3: Fieldbus setpoint - write
129	Read	4368	1110	#3 Actual setpoint r	FLOAT	Power controller #3: Actual setpoint - read
130	Write	4370	1112	#3 Error setpoint w	FLOAT	Power controller #3: Error setpoint - write
131	Read	4372	1114	#3 Total power r	FLOAT	Power controller #3: Total power - read
132	Read	4374	1116	#3 Alpha r	FLOAT	Power controller #3: Alpha - read
133	Read	4376	1118	#3 TimeOn r	FLOAT	Power controller #3: Time on - read
134	Read	4378	111A	#3 Output r	FLOAT	Power controller #3: Output - read
135	Read	4380	111C	#3 Frequency r	FLOAT	Power controller #3: Frequency - read
136	Read	4382	111E	#3 Energy counter r	FLOAT	Power controller #3: Energy counter - read
137	Read	4384	1120	#3 Error PC r	UINT32	Power controller #3: Error PC - read Bit 4: Synchronization error Bit 5: Phase missing Bit 6: Fuse broken Bit 7: Thyristor short circuit Bit 16: Internal communication error Bit 17: U clipping Bit 18: I clipping Bit 19: Negative power Bit 20: Temperature probe error Bit 21: Overtemperature Bit 24: I/O error



Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
138	Read	4386	1122	#3 Status PC r	UINT32	Power controller #3: Status PC - read Bit 0: Output (pulses) on Bit 1: Power controller OK) Bit 2: Mains OK Bit 3: Remote setpoint Bit 6: Pulse lock (with ack.) Bit 7: Pulse lock (auto-ack.) Bit 8: Regulator lock Bit 12: Left rotation field Bit 13: Output restricted Bit 14: Max output reached Bit 16: Active limit Bit 17: U limit Bit 18: I limit Bit 19: I <sub>peak</sub> limit Bit 20: P limit Bit 21: Temperature limit Bit 22: Limit external feedback signal Bit 24: RAMP starting mode Bit 25: MOSI starting mode Bit 26: MOSI starting mode I <sub>RMS</sub> Bit 27: MOSI starting mode I <sub>peak</sub>

Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
139	Read	4388	1124	#3 Monitoring PC r	UINT32	Power controller #3: Monitoring PC - read Bit 4: $U_{mains} < \text{minimum}$ Bit 5: $U_{mains} > \text{maximum}$ Bit 6: $U_{RMS} < \text{minimum}$ Bit 7: $U_{RMS} > \text{maximum}$ Bit 8: $U_{rect} < \text{minimum}$ Bit 9: $U_{rect} > \text{maximum}$ Bit 11: $U_{peak} > \text{maximum}$ Bit 14: $I_{RMS} < \text{minimum}$ Bit 15: $I_{RMS} > \text{maximum}$ Bit 16: $I_{rect} < \text{minimum}$ Bit 17: $I_{rect} > \text{maximum}$ Bit 19: $I_{peak} > \text{maximum}$ Bit 22: $P < \text{minimum}$ Bit 23: $P > \text{maximum}$ Bit 24: $R < \text{minimum}$ Bit 25: $R > \text{maximum}$ Bit 26: $T_{device} < \text{minimum}$ Bit 27: $T_{device} > \text{maximum}$ Bit 28: $R_{abs} < \text{minimum}$ Bit 29: $R_{abs} > \text{maximum}$ Bit 30: $R_{rel} < \text{minimum}$ Bit 31: $R_{rel} > \text{maximum}$
140		4390	1126			
141	Read	4392	1128	#3 L1 Umains r	FLOAT	Power controller #3: L1 $U_{mains}$ - read
142	Read	4394	112A	#3 L1 Urms r	FLOAT	Power controller #3: L1 $U_{RMS}$ - read
143	Read	4396	112C	#3 L1 Urect r	FLOAT	Power controller #3: L1 $U_{rect}$ - read
144	Read	4398	112E	#3 L1 Upeak r	FLOAT	Power controller #3: L1 $U_{peak}$ - read
145	Read	4400	1130	#3 L1 Irms r	FLOAT	Power controller #3: L1 $I_{RMS}$ - read
146	Read	4402	1132	#3 L1 Irect r	FLOAT	Power controller #3: L1 $I_{rect}$ - read
147	Read	4404	1134	#3 L1 Ipeak r	FLOAT	Power controller #3: L1 $I_{peak}$ - read
148	Read	4406	1136	#3 L1 Power r	FLOAT	Power controller #3: L1 Power - read

**Table 11. Parameter list (Continued)**

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
149	Read	4408	1138	#3 L1 Resistance r	FLOAT	Power controller #3: L1 Resistance - read
150	Read	4410	113A	#3 L1 Temperature r	FLOAT	Power controller #3: L1 Temperature - read
151	Read	4412	113C	#3 L1 External control r	FLOAT	Power controller #3: L1 External control - read
152	Write	4414	113E			
153	Write	4416	1140	I/O Int LED 1-7 rd/gr w	UINT16	Internal I/O: LED 1-7 - red/green - write Bit 0: LED 1 green Bit 1: LED 1 red Bit 2: LED 2 green Bit 3: LED 2 red Bit 4: LED 3 green Bit 5: LED 3 red Bit 6: LED 4 green Bit 7: LED 4 red Bit 8: LED 5 green Bit 9: LED 5 red Bit 10: LED 6 green Bit 11: LED 6 red Bit 12: LED 7 green Bit 13: LED 7 red

Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
154	Read	4418	1142	I/O Int LED 1-7 rd/gr r	UINT16	Internal I/O: LED 1-7 - red/green - read Bit 0: LED 1 green Bit 1: LED 1 red Bit 2: LED 2 green Bit 3: LED 2 red Bit 4: LED 3 green Bit 5: LED 3 red Bit 6: LED 4 green Bit 7: LED 4 red Bit 8: LED 5 green Bit 9: LED 5 red Bit 10: LED 6 green Bit 11: LED 6 red Bit 12: LED 7 green Bit 13: LED 7 red
155	Write	4420	1144	I/O Int Relay 1-3 w	UINT16	Internal I/O: Relay 1-3 - write Bit 0: Relay 1 Bit 1: Relay 2 Bit 2: Relay 3
156	Read	4422	1146	I/O Int Relay 1-3 r	UINT16	Internal I/O: Relay 1-3 - read Bit 0: Relay 1 Bit 1: Relay 2 Bit 2: Relay 3
157		4424	1148			
158		4426	114A			
159	Read	4428	114C	I/O Int Analog In 1 r	FLOAT	Internal I/O: Analog input 1 - read
160	Read	4430	114E	I/O Int Analog In 2 r	FLOAT	Internal I/O: Analog input 2 - read
161	Read	4432	1150	I/O Int Analog In 3 r	FLOAT	Internal I/O: Analog input 3 - read
162		4434	1152			
163	Write	4436	1154	I/O Int Analog Out 1 w	FLOAT	Internal I/O: Analog output 1 - write
164	Write	4438	1156	I/O Int Analog Out 2 w	FLOAT	Internal I/O: Analog output 2 - write
165	Write	4440	1158	I/O Int Analog Out 3 w	FLOAT	Internal I/O: Analog output 3 - write
166		4442	115A			
167		4444	115C			

Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
168	Read	4446	115E	I/O Int Digital In 1-6 r	UINT16	Internal I/O: Digital input 1-6 - read Bit 0: Digital input 1 Bit 1: Digital input 2 Bit 2: Digital input 3 Bit 3: Digital input 4 Bit 4: Digital input 5 Bit 5: Digital input 6
169		4448	1160			
170		4450	1162			
171		4452	1164			
172		4454	1166			
173	Write	4456	1168	I/O Ext1 Relay w	UINT16	I/O Extension 1: Relay - write Bit 0: Relay 1 Bit 1: Relay 2
174	Read	4458	116A	I/O Ext1 Relay r	UINT16	I/O Extension 1: Relay - read Bit 0: Relay 1 Bit 1: Relay 2
175		4460	116C			
176	Read	4462	116E	I/O Ext1 Analog In 1 r	FLOAT	I/O Extension 1: Analog input 1 - read
177	Read	4464	1170	I/O Ext1 Analog In 2 r	FLOAT	I/O Extension 1: Analog input 2 - read
178	Read	4466	1172	I/O Ext1 Analog In 3 r	FLOAT	I/O Extension 1: Analog input 3 - read
179		4468	1174			
180	Write	4470	1176	I/O Ext1 Analog Out 1 w	FLOAT	I/O Extension 1: Analog output 1 - write
181	Write	4472	1178	I/O Ext1 Analog Out 2 w	FLOAT	I/O Extension 1: Analog output 2 - write
182	Write	4474	117A	I/O Ext1 Analog Out 3 w	FLOAT	I/O Extension 1: Analog output 3 - write
183		4476	117C			
184		4478	117E			
185	Read	4480	1180	I/O Ext1 Digital In r	UINT16	I/O Extension 1: Digital input - read Bit 0: Digital input 1 Bit 1: Digital input 2
186		4482	1182			

Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
187	Write	4484	1184	I/O Ext1 Digital Out w	UINT16	I/O Extension 1: Digital output - write Bit 0: Digital output 1 Bit 1: Digital output 2
188	Read	4486	1186	I/O Ext1 Digital Out r	UINT16	I/O Extension 1: Digital output - read Bit 0: Digital output 1 Bit 1: Digital output 2
189		4488	1188			
190		4490	118A			
191		4492	118C			
192		4494	118E			
193	Write	4496	1190	I/O Ext2 Relay w	UINT16	I/O Extension 2: Relay - write Bit 0: Relay 1 Bit 1: Relay 2
194	Read	4498	1192	I/O Ext2 Relay r	UINT16	I/O Extension 2: Relay - read Bit 0: Relay 1 Bit 1: Relay 2
195		4500	1194			
196	Read	4502	1196	I/O Ext2 Analog In 1 r	FLOAT	I/O Extension 2: Analog input 1 - read
197	Read	4504	1198	I/O Ext2 Analog In 2 r	FLOAT	I/O Extension 2: Analog input 2 - read
198	Read	4506	119A	I/O Ext2 Analog In 3 r	FLOAT	I/O Extension 2: Analog input 3 - read
199		4508	119C			
200	Write	4510	119E	I/O Ext2 Analog Out 1 w	FLOAT	I/O Extension 2: Analog output 1 - write
201	Write	4512	11A0	I/O Ext2 Analog Out 2 w	FLOAT	I/O Extension 2: Analog output 2 - write
202	Write	4514	11A2	I/O Ext2 Analog Out 3 w	FLOAT	I/O Extension 2: Analog output 3 - write
203		4516	11A4			
204		4518	11A6			
205	Read	4520	11A8	I/O Ext2 Digital In r	UINT16	I/O Extension 2: Digital input - read Bit 0: Digital input 1 Bit 1: Digital input 2
206		4522	11AA			

Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
207	Write	4524	11AC	I/O Ext2 Digital Out w	UINT16	I/O Extension 2: Digital output - write Bit 0: Digital output 1 Bit 1: Digital output 2
208	Read	4526	11AE	I/O Ext2 Digital Out r	UINT16	I/O Extension 2: Digital output - read Bit 0: Digital output 1 Bit 1: Digital output 2
209		4528	11B0			
210	Read	4530	11B2	dASM Total power r	FLOAT	dASM Total power - read
211	Read	4532	11B4	dASM Count r	UINT8	dASM Count - read
212		4534	11B6			
213	Write	4536	11B8	#1 Starting mode w	UINT8	Power controller #1: Starting mode - write 0: None 1: Ramp 2: MOSI 3: MOSI and ramp
214	Write	4538	11BA	#1 Operating mode w	UINT8	Power controller #1: Operating mode - write 0: TAKT (full wave) 1: VAR (phase angle)
215	Write	4540	11BC	#1 Control mode w	UINT8	Power controller #1: Control mode - write 0: None 1: U 2: U <sup>2</sup> 3: I 4: I <sup>2</sup> 5: P
216	Write	4542	11BE	#1 PID Kp w	FLOAT	Power controller #1: PID Kp - write
217	Write	4544	11C0	#1 PID Ki w	FLOAT	Power controller #1: PID Ki - write
218	Write	4546	11C2	#1 PID Kd w	FLOAT	Power controller #1: PID Kd - write
219		4548	11C4			
220		4550	11C6			
221		4552	11C8			

Table 11. Parameter list (Continued)

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
222	Write	4554	11CA	#2 Starting mode w	UINT8	Power controller #2: Starting mode - write 0: None 1: Ramp 2: MOSI 3: MOSI and ramp
223	Write	4556	11CC	#2 Operating mode w	UINT8	Power controller #2: Operating mode - write 0: TAKT (full wave) 1: VAR (phase angle)
224	Write	4558	11CE	#2 Control mode w	UINT8	Power controller #2: Control mode - write 0: None 1: U 2: U <sup>2</sup> 3: I 4: I <sup>2</sup> 5: P
225	Write	4560	11D0	#2 PID K <sub>p</sub> w	FLOAT	Power controller #2: PID K <sub>p</sub> - write
226	Write	4562	11D2	#2 PID K <sub>i</sub> w	FLOAT	Power controller #2: PID K <sub>i</sub> - write
227	Write	4564	11D4	#2 PID K <sub>d</sub> w	FLOAT	Power controller #2: PID K <sub>d</sub> - write
228		4566	11D6			
229		4568	11D8			
230		4570	11DA			
231	Write	4572	11DC	#3 Starting mode w	UINT8	Power controller #3: Starting mode - write 0: None 1: Ramp 2: MOSI 3: MOSI and ramp
232	Write	4574	11DE	#3 Operating mode w	UINT8	Power controller #3: Operating mode - write 0: TAKT (full wave) 1: VAR (phase angle)



**Table 11. Parameter list (Continued)**

API #	Read / Write	Address		Parameter Name	Type	Parameter Description
		Dec	Hex			
233	Write	4576	11E0	#3 Control mode w	UINT8	Power controller #3: Control mode - write 0: None 1: U 2: U <sup>2</sup> 3: I 4: I <sup>2</sup> 5: P
234	Write	4578	11E2	#3 PID Kp w	FLOAT	Power controller #3: PID Kp - write
235	Write	4580	11E4	#3 PID Ki w	FLOAT	Power controller #3: PID Ki - write
236	Write	4582	11E6	#3 PID Kd w	FLOAT	Power controller #3: PID Kd - write

## AE GLOBAL SERVICES

Please contact AE Global Services if you have questions or problems that cannot be resolved by working through the provided troubleshooting. When you call Global Services, make sure to have the unit serial number and part number. These numbers are available on unit labels.



### Important

For returns and repairs, please call AE Global Services to get the correct shipping address.

**Table 12.** AE Global Services 24 X 7 contact information

Office	Contact
AE World Headquarters	Address: 1625 Sharp Point Drive Fort Collins, CO 80525 USA  Phone (24 hrs/day, 7 days/week): 800.446.9167 or +1.970.221.0108  Email: (We will respond to email by the next business day.) <a href="mailto:technical.support@aei.com">mailto:technical.support@aei.com</a>
Sekidenko thermal product support	Contact by phone or email: +1.360.694.7871 <a href="mailto:thermalapplications@aei.com">mailto:thermalapplications@aei.com</a>
Power Control Module product support	Contact by phone or email: +49 (0)2902 763 520 (technical support during German business hours) <a href="mailto:powercontroller@aei.com">mailto:powercontroller@aei.com</a>
High Voltage product support: HiTek Power, Ltd.	Contact by phone or email: +44 (0) 1903 712400 <a href="mailto:support.centre@aei.com">mailto:support.centre@aei.com</a>
High Voltage product support: UltraVolt, Inc.	Contact by phone or email: +1.631.471.4444 <a href="mailto:sales.support-uv@aei.com">mailto:sales.support-uv@aei.com</a>

*Table 12. AE Global Services 24 X 7 contact information (Continued)*

Office	Contact
Local or regional sales or service office	Visit the Advanced Energy website for current contact information:  <a href="http://www.advanced-energy.com">http://www.advanced-energy.com</a>

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