Thyro-PX™ Anybus® PROFINET

Guide

57010162-00A November 2016

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 PROFINET MODULE

The Anybus PROFINET module is an optional accessory for the Thyro-PX power controller. The module allows the power controller to be integrated into complex installations via the field network.

Related Links

Advanced Energy

HARDWARE DESCRIPTION

This module is compliant with the PROFINET standard.

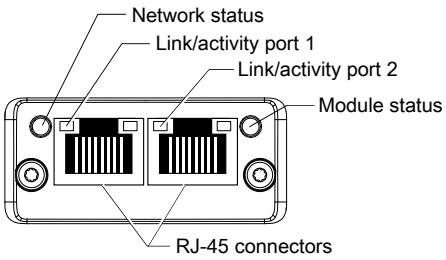

Figure 1. Hardware

Table 1. Network status LED

LED State	Description
Off	Offline
Green	Offline (run)
Green, 1 flash	Offline (stop)
Green, blinking	Used to identify the node on the network
Red	Fatal event
Red, 1 flash	Station name error
Red, 2 flashes	IP address not set
Red, 3 flashes	Configuration error

Table 2. Module status LED

LED State	Description
Off	Not initialized
Green	Normal operation
Green, 1 flash	Diagnostic event present
Red	Exception error
Alternating red/green	Firmware update

Table 3. Link/activity LED

LED State	Description
Off	No link

Table 3. Link/activity LED (Continued)

LED State	Description
Green	Ethernet link established
Green, flickering	Ethernet link established, communication present

Table 4. RJ-45 Ethernet pinout

Pin	Description
1,2,4,5	Connected to chassis ground over serial RC circuit
3	RD-
6	RD+
7	TD-
8	TD+
Housing	Cable shield

CONFIGURING PROCESS CONTROL SOFTWARE

The General Station Description (GSD) file contains information about the capabilities of the unit, which can be used to configure the process control software. Download the current GSD file from the AE website http://www.advanced-energy.com/en/Anybus_modules_ThyroPX.html.

Install GSD file in the process control software.

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
- Connect the unit to the PROFINET controller

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 **Profinet** in the Thyro-PX device hardware configuration:

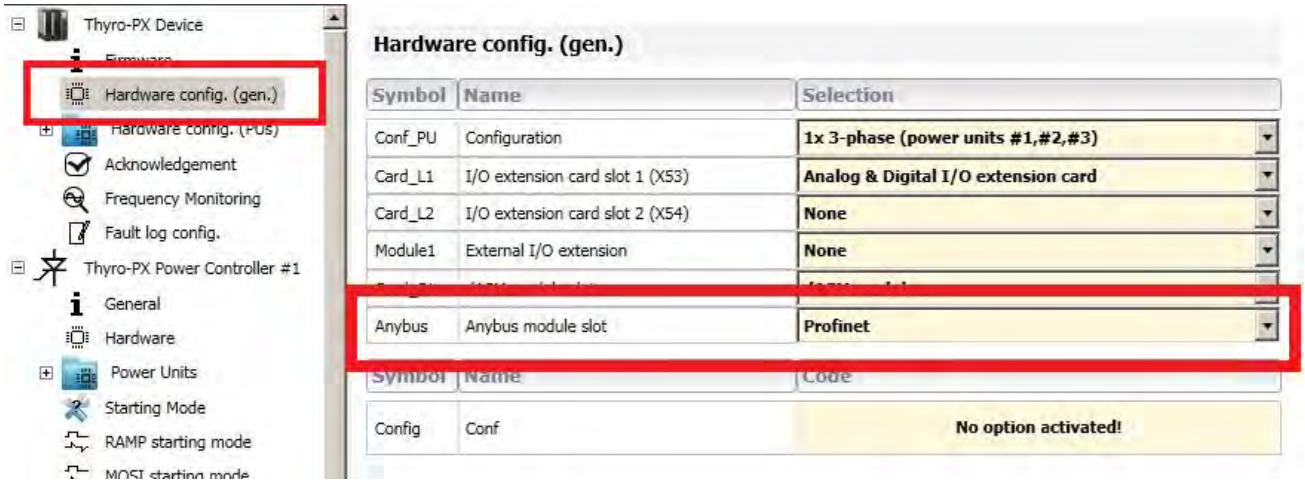

Figure 2. Menu tree

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.

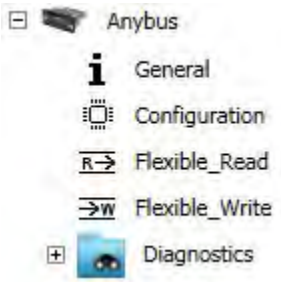

Figure 3. Anybus parameter group

Connecting to the PROFINET controller

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

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

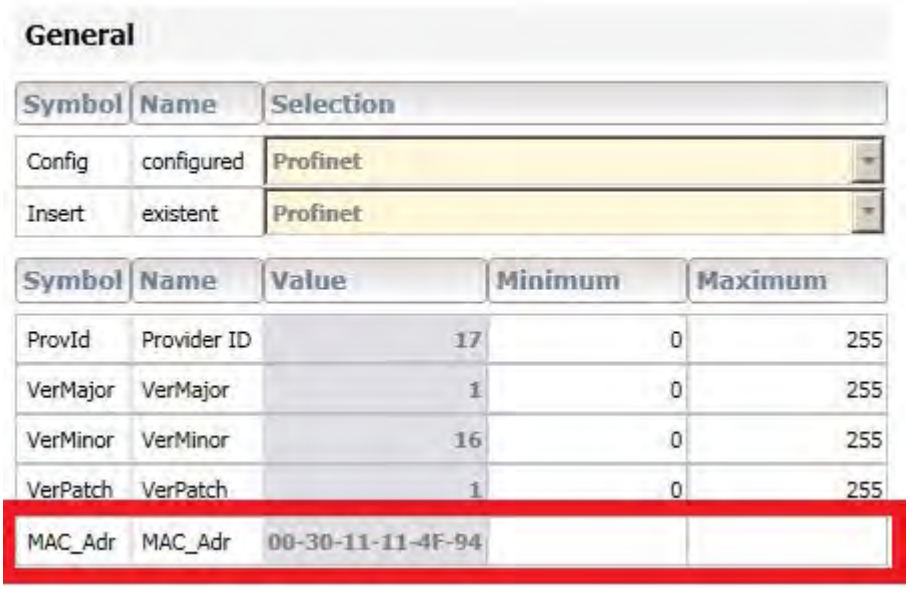

Figure 4. PROFINET module MAC address

Selecting Configuration

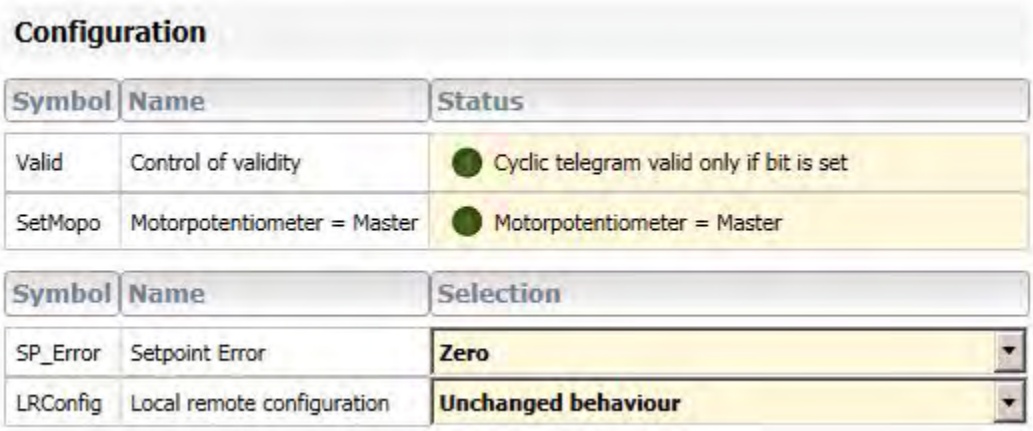

Figure 5. Select configuration

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

Table 5. Configuration

Name	Status/Selection	Description
Control of validity	**Cyclic telegram valid only if bit is set**	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.

Table 5. Configuration (Continued)

Name	Status/Selection	Description
Motorpotentiometer = Master	**Motorpotentiometer = Master**	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.
Setpoint Error	**Zero**	Zero is used as the setpoint when the master setpoint is missing.
	Last valid master setpoint	The last valid master setpoint is used as the setpoint when the master setpoint is missing.
	Last valid error setpoint	The last valid error setpoint is used as the setpoint when the master setpoint is missing.
Local remote configuration	**Unchanged behavior**	Configuration of the master's influence to the local remote behavior.
	Automatic switch to local	The unit will automatically switch to local mode when the communication with master is interrupted.
	Ignore master in local	When the unit is in local mode, data and commands from the master will be ignored.

Configuring Diagnostics

PROFINET diagnostics contain two parts: standard diagnostics and extended diagnostics.

The standard diagnostics are contained in the first 6 bytes of the diagnostics data telegram and are handled automatically. Data for extended diagnostics follow as status PDUs (Protocol Data Units).

The following two diagnostic events are supported:

Table 6. 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. These are not needed for PROFINET, because the preconfigured values are already available in the parameter list.

Once the respective data point has been selected in the flexible link parameter configuration, it can be accessed on the PROFINET using the respective flexible link parameter API that is listed in the parameter list (see “PROFINET Parameter List” on page 9).

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 6. Anybus module removal

PROFINET PARAMETER LIST

Table 7. Parameter list

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
1	Cyclic	Read	1	Flexible link 01 r	UINT32 FLOAT	Flexible link number 01 - read
2	Cyclic	Read	2	Flexible link 02 r	UINT32 FLOAT	Flexible link number 02 - read
3	Cyclic	Read	3	Flexible link 03 r	UINT32 FLOAT	Flexible link number 03 - read
4	Cyclic	Read	4	Flexible link 04 r	UINT32 FLOAT	Flexible link number 04 - read
5	Cyclic	Read	5	Flexible link 05 r	UINT32 FLOAT	Flexible link number 05 - read
6	Cyclic	Read	6	Flexible link 06 r	UINT32 FLOAT	Flexible link number 06 - read
7	Cyclic	Read	7	Flexible link 07 r	UINT32 FLOAT	Flexible link number 07 - read
8	Cyclic	Read	8	Flexible link 08 r	UINT32 FLOAT	Flexible link number 08 - read
9	Cyclic	Read	9	Flexible link 09 r	UINT32 FLOAT	Flexible link number 09 - read
10	Cyclic	Read	10	Flexible link 10 r	UINT32 FLOAT	Flexible link number 10 - read
11	Cyclic	Read	11	Flexible link 11 r	UINT32 FLOAT	Flexible link number 11 - read
12	Cyclic	Read	12	Flexible link 12 r	UINT32 FLOAT	Flexible link number 12 - read
13	Cyclic	Read	13	Flexible link 13 r	UINT32 FLOAT	Flexible link number 13 - read
14	Cyclic	Read	14	Flexible link 14 r	UINT32 FLOAT	Flexible link number 14 - read
15	Cyclic	Read	15	Flexible link 15 r	UINT32 FLOAT	Flexible link number 15 - read
16	Cyclic	Read	16	Flexible link 16 r	UINT32 FLOAT	Flexible link number 16 - read

Table 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
17	Cyclic	Read	17	Flexible link 17 r	UINT32 FLOAT	Flexible link number 17 - read
18	Cyclic	Read	18	Flexible link 18 r	UINT32 FLOAT	Flexible link number 18 - read
19	Cyclic	Read	19	Flexible link 19 r	UINT32 FLOAT	Flexible link number 19 - read
20	Cyclic	Read	20	Flexible link 20 r	UINT32 FLOAT	Flexible link number 20 - read
21	Cyclic	Write	21	Flexible link 01 w	UINT32 FLOAT	Flexible link number 01 - write
22	Cyclic	Write	22	Flexible link 02 w	UINT32 FLOAT	Flexible link number 02 - write
23	Cyclic	Write	23	Flexible link 03 w	UINT32 FLOAT	Flexible link number 03 - write
24	Cyclic	Write	24	Flexible link 04 w	UINT32 FLOAT	Flexible link number 04 - write
25	Cyclic	Write	25	Flexible link 05 w	UINT32 FLOAT	Flexible link number 05 - write
26	Cyclic	Write	26	Flexible link 06 w	UINT32 FLOAT	Flexible link number 06 - write
27	Cyclic	Write	27	Flexible link 07 w	UINT32 FLOAT	Flexible link number 07 - write
28	Cyclic	Write	28	Flexible link 08 w	UINT32 FLOAT	Flexible link number 08 - write
29	Cyclic	Write	29	Flexible link 09 w	UINT32 FLOAT	Flexible link number 09 - write
30	Cyclic	Write	30	Flexible link 10 w	UINT32 FLOAT	Flexible link number 10 - write
31	Cyclic	Write	31	Flexible link 11 w	UINT32 FLOAT	Flexible link number 11 - write
32	Cyclic	Write	32	Flexible link 12 w	UINT32 FLOAT	Flexible link number 12 - write
33	Cyclic	Write	33	Flexible link 13 w	UINT32 FLOAT	Flexible link number 13 - write
34	Cyclic	Write	34	Flexible link 14 w	UINT32 FLOAT	Flexible link number 14 - write
35	Cyclic	Write	35	Flexible link 15 w	UINT32 FLOAT	Flexible link number 15 - write

Table 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
36	Cyclic	Write	36	Flexible link 16 w	UINT32 FLOAT	Flexible link number 16 - write
37	Cyclic	Write	37	Flexible link 17 w	UINT32 FLOAT	Flexible link number 17 - write
38	Cyclic	Write	38	Flexible link 18 w	UINT32 FLOAT	Flexible link number 18 - write
39	Cyclic	Write	39	Flexible link 19 w	UINT32 FLOAT	Flexible link number 19 - write
40	Cyclic	Write	40	Flexible link 20 w	UINT32 FLOAT	Flexible link number 20 - write
41	Cyclic	Write	41	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			42			
43	Cyclic	Read	43	Device operating hours r	FLOAT	Operating hours - read
44	Cyclic	Read	44	Device CPU temperature r	FLOAT	CPU temperature - read

Table 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
45	Cyclic	Read	45	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 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
46	Cyclic	Read	46	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			47			
48	Cyclic	Read	48	#1 Analog setpoint r	FLOAT	Power controller #1: Analog setpoint - read
49	Cyclic	Read	49	#1 Motor pot. setpoint r	FLOAT	Power controller #1: Motor potentiometer setpoint - read
50	Cyclic	Write	50	#1 Fieldbus setpoint w	FLOAT	Power controller #1: Fieldbus setpoint - write
51	Cyclic	Read	51	#1 Actual setpoint r	FLOAT	Power controller #1: Actual setpoint - read
52	Cyclic	Write	52	#1 Error setpoint w	FLOAT	Power controller #1: Error setpoint - write
53	Cyclic	Read	53	#1 Total power r	FLOAT	Power controller #1: Total power - read
54	Cyclic	Read	54	#1 Alpha r	FLOAT	Power controller #1: Alpha - read
55	Cyclic	Read	55	#1 TimeOn r	FLOAT	Power controller #1: Time on - read
56	Cyclic	Read	56	#1 Output r	FLOAT	Power controller #1: Output - read
57	Cyclic	Read	57	#1 Frequency r	FLOAT	Power controller #1: Frequency - read
58	Cyclic	Read	58	#1 Energy counter r	FLOAT	Power controller #1: Energy counter - read
59	Cyclic	Read	59	#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

Table 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
60	Cyclic	Read	60	#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_{peak} 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_{RMS} Bit 27: MOSI starting mode Ipeak

Table 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
61	Cyclic	Read	61	#1 Monitoring PC r	UINT32	Power controller #1: Monitoring PC - read Bit 4: U_{mains} < minimum Bit 5: U_{mains} > maximum Bit 6: U_{RMS} < minimum Bit 7: U_{RMS} < maximum Bit 8: U_{rect} < minimum Bit 9: U_{rect} > maximum Bit 11: U_{peak} > maximum Bit 14: I_{RMS} < minimum Bit 15: I_{RMS} > maximum Bit 16: I_{rect} < minimum Bit 17: I_{rect} > maximum Bit 19: I_{peak} > maximum Bit 22: P < minimum Bit 23: P > maximum Bit 24: R < minimum Bit 25: R > maximum Bit 26: T_{device} < minimum Bit 27: T_{device} > maximum Bit 28: R_{abs} < minimum Bit 29: R_{abs} > maximum Bit 30: R_{rel} < minimum Bit 31: R_{rel} > maximum
62			62			
63	Cyclic	Read	63	#1 L1 Umains r	FLOAT	Power controller #1: L1 U_{mains} - read
64	Cyclic	Read	64	#1 L1 Urms r	FLOAT	Power controller #1: L1 U_{RMS} - read
65	Cyclic	Read	65	#1 L1 Urect r	FLOAT	Power controller #1: L1 U_{rect} - read
66	Cyclic	Read	66	#1 L1 Upeak r	FLOAT	Power controller #1: L1 U_{peak} - read
67	Cyclic	Read	67	#1 L1 Irms r	FLOAT	Power controller #1: L1 I_{RMS} - read
68	Cyclic	Read	68	#1 L1 Irect r	FLOAT	Power controller #1: L1 I_{rect} - read
69	Cyclic	Read	69	#1 L1 Ipeak r	FLOAT	Power controller #1: L1 I_{peak} - read
70	Cyclic	Read	70	#1 L1 Power r	FLOAT	Power controller #1: L1 Power - read

Table 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
71	Cyclic	Read	71	#1 L1 Resistance r	FLOAT	Power controller #1: L1 Resistance - read
72	Cyclic	Read	72	#1 L1 Temperature r	FLOAT	Power controller #1: L1 Temperature - read
73	Cyclic	Read	73	#1 L1 External control r	FLOAT	Power controller #1: L1 External control - read
74			74			
75	Cyclic	Read	75	#1 L2 Umains r	FLOAT	Power controller #1: L2 U_{mains} - read
76	Cyclic	Read	76	#1 L2 Urms r	FLOAT	Power controller #1: L2 U_{RMS} - read
77	Cyclic	Read	77	#1 L2 Urect r	FLOAT	Power controller #1: L2 U_{rect} - read
78	Cyclic	Read	78	#1 L2 Upeak r	FLOAT	Power controller #1: L2 U_{peak} - read
79	Cyclic	Read	79	#1 L2 Irms r	FLOAT	Power controller #1: L2 I_{RMS} - read
80	Cyclic	Read	80	#1 L2 Irect r	FLOAT	Power controller #1: L2 I_{rect} - read
81	Cyclic	Read	81	#1 L2 Ipeak r	FLOAT	Power controller #1: L2 I_{peak} - read
82	Cyclic	Read	82	#1 L2 Power r	FLOAT	Power controller #1: L2 Power - read
83	Cyclic	Read	83	#1 L2 Resistance r	FLOAT	Power controller #1: L2 Resistance - read
84	Cyclic	Read	84	#1 L2 Temperature r	FLOAT	Power controller #1: L2 Temperature - read
85	Cyclic	Read	85	#1 L2 External control r	FLOAT	Power controller #1: L2 External control - read
86			86			
87	Cyclic	Read	87	#1 L3 Umains r	FLOAT	Power controller #1: L3 U_{mains} - read
88	Cyclic	Read	88	#1 L3 Urms r	FLOAT	Power controller #1: L3 U_{RMS} - read
89	Cyclic	Read	89	#1 L3 Urect r	FLOAT	Power controller #1: L3 U_{rect} - read
90	Cyclic	Read	90	#1 L3 Upeak r	FLOAT	Power controller #1: L3 U_{peak} - read
91	Cyclic	Read	91	#1 L3 Irms r	FLOAT	Power controller #1: L3 I_{RMS} - read
92	Cyclic	Read	92	#1 L3 Irect r	FLOAT	Power controller #1: L3 I_{rect} - read
93	Cyclic	Read	93	#1 L3 Ipeak r	FLOAT	Power controller #1: L3 I_{peak} - read
94	Cyclic	Read	94	#1 L3 Power r	FLOAT	Power controller #1: L3 Power - read
95	Cyclic	Read	95	#1 L3 Resistance r	FLOAT	Power controller #1: L3 Resistance - read
96	Cyclic	Read	96	#1 L3 Temperature r	FLOAT	Power controller #1: L3 Temperature - read
97	Cyclic	Read	97	#1 L3 External control r	FLOAT	Power controller #1: L3 External control - read
98			98			
99	Cyclic	Read	99	#2 Analog setpoint r	FLOAT	Power controller #2: Analog setpoint - read

Table 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
100	Cyclic	Read	100	#2 Motor pot. setpoint r	FLOAT	Power controller #2: Motor potentiometer setpoint - read
101	Cyclic	Write	101	#2 Fieldbus setpoint w	FLOAT	Power controller #2: Fieldbus setpoint - write
102	Cyclic	Read	102	#2 Actual setpoint r	FLOAT	Power controller #2: Actual setpoint - read
103	Cyclic	Write	103	#2 Error setpoint w	FLOAT	Power controller #2: Error setpoint - write
104	Cyclic	Read	104	#2 Total power r	FLOAT	Power controller #2: Total power - read
105	Cyclic	Read	105	#2 Alpha r	FLOAT	Power controller #2: Alpha - read
106	Cyclic	Read	106	#2 TimeOn r	FLOAT	Power controller #2: Time on - read
107	Cyclic	Read	107	#2 Output r	FLOAT	Power controller #2: Output - read
108	Cyclic	Read	108	#2 Frequency r	FLOAT	Power controller #2: Frequency - read
109	Cyclic	Read	109	#2 Energy counter r	FLOAT	Power controller #2: Energy counter - read
110	Cyclic	Read	110	#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 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
111	Cyclic	Read	111	#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_{peak} 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_{RMS} Bit 27: MOSI starting mode I_{peak}

Table 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
112	Cyclic	Read	112	#2 Monitoring PC r	UINT32	Power controller #2: Monitoring PC - read Bit 4: U_{mains} < minimum Bit 5: U_{mains} > maximum Bit 6: U_{RMS} < minimum Bit 7: U_{RMS} > maximum Bit 8: U_{rect} < minimum Bit 9: U_{rect} > maximum Bit 11: U_{peak} > maximum Bit 14: I_{RMS} < minimum Bit 15: I_{RMS} > maximum Bit 16: I_{rect} < minimum Bit 17: I_{rect} > maximum Bit 19: I_{peak} > maximum Bit 22: P < minimum Bit 23: P > maximum Bit 24: R < minimum Bit 25: R > maximum Bit 26: T_{device} < minimum Bit 27: T_{device} > maximum Bit 28: R_{abs} < minimum Bit 29: R_{abs} > maximum Bit 30: R_{rel} < minimum Bit 31: R_{rel} > maximum
113			113			
114	Cyclic	Read	114	#2 L1 Umains r	FLOAT	Power controller #2: L1 U_{mains} - read
115	Cyclic	Read	115	#2 L1 Urms r	FLOAT	Power controller #2: L1 U_{RMS} - read
116	Cyclic	Read	116	#2 L1 Urect r	FLOAT	Power controller #2: L1 U_{rect} - read
117	Cyclic	Read	117	#2 L1 Upeak r	FLOAT	Power controller #2: L1 U_{peak} - read
118	Cyclic	Read	118	#2 L1 Irms r	FLOAT	Power controller #2: L1 I_{RMS} - read
119	Cyclic	Read	119	#2 L1 Irect r	FLOAT	Power controller #2: L1 I_{rect} - read
120	Cyclic	Read	120	#2 L1 Ipeak r	FLOAT	Power controller #2: L1 I_{peak} - read
121	Cyclic	Read	121	#2 L1 Power r	FLOAT	Power controller #2: L1 Power - read

Table 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
122	Cyclic	Read	122	#2 L1 Resistance r	FLOAT	Power controller #2: L1 Resistance - read
123	Cyclic	Read	123	#2 L1 Temperature r	FLOAT	Power controller #2: L1 Temperature - read
124	Cyclic	Read	124	#2 L1 External control r	FLOAT	Power controller #2: L1 External control - read
125			125			
126	Cyclic	Read	126	#3 Analog setpoint r	FLOAT	Power controller #3: Analog setpoint - read
127	Cyclic	Read	127	#3 Motor pot. setpoint r	FLOAT	Power controller #3: Motor potentiometer setpoint - read
128	Cyclic	Write		#3 Fieldbus setpoint w	FLOAT	Power controller #3: Fieldbus setpoint - write
129	Cyclic	Read	129	#3 Actual setpoint r	FLOAT	Power controller #3: Actual setpoint - read
130	Cyclic	Write	130	#3 Error setpoint w	FLOAT	Power controller #3: Error setpoint - write
131	Cyclic	Read	131	#3 Total power r	FLOAT	Power controller #3: Total power - read
132	Cyclic	Read	132	#3 Alpha r	FLOAT	Power controller #3: Alpha - read
133	Cyclic	Read	133	#3 TimeOn r	FLOAT	Power controller #3: Time on - read
134	Cyclic	Read	134	#3 Output r	FLOAT	Power controller #3: Output - read
135	Cyclic	Read	135	#3 Frequency r	FLOAT	Power controller #3: Frequency - read
136	Cyclic	Read	136	#3 Energy counter r	FLOAT	Power controller #3: Energy counter - read
137	Cyclic	Read	137	#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 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
138	Cyclic	Read	138	#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_{peak} 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_{RMS} Bit 27: MOSI starting mode I_{peak}

Table 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
139	Cyclic	Read	139	#3 Monitoring PC r	UINT32	Power controller #3: Monitoring PC - read Bit 4: U_{mains} < minimum Bit 5: U_{mains} > maximum Bit 6: U_{RMS} < minimum Bit 7: U_{RMS} > maximum Bit 8: U_{rect} < minimum Bit 9: U_{rect} > maximum Bit 11: U_{peak} > maximum Bit 14: I_{RMS} < minimum Bit 15: I_{RMS} > maximum Bit 16: I_{rect} < minimum Bit 17: I_{rect} > maximum Bit 19: I_{peak} > maximum Bit 22: P < minimum Bit 23: P > maximum Bit 24: R < minimum Bit 25: R > maximum Bit 26: T_{device} < minimum Bit 27: T_{device} > maximum Bit 28: R_{abs} < minimum Bit 29: R_{abs} > maximum Bit 30: R_{rel} < minimum Bit 31: R_{rel} > maximum
140			140			
141	Cyclic	Read	141	#3 L1 Umains r	FLOAT	Power controller #3: L1 U_{mains} - read
142	Cyclic	Read	142	#3 L1 Urms r	FLOAT	Power controller #3: L1 U_{RMS} - read
143	Cyclic	Read	143	#3 L1 Urect r	FLOAT	Power controller #3: L1 U_{rect} - read
144	Cyclic	Read	144	#3 L1 Upeak r	FLOAT	Power controller #3: L1 U_{peak} - read
145	Cyclic	Read	145	#3 L1 Irms r	FLOAT	Power controller #3: L1 I_{RMS} - read
146	Cyclic	Read	146	#3 L1 Irect r	FLOAT	Power controller #3: L1 I_{rect} - read
147	Cyclic	Read	147	#3 L1 Ipeak r	FLOAT	Power controller #3: L1 I_{peak} - read
148	Cyclic	Read	148	#3 L1 Power r	FLOAT	Power controller #3: L1 Power - read

Table 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
149	Cyclic	Read	149	#3 L1 Resistance r	FLOAT	Power controller #3: L1 Resistance - read
150	Cyclic	Read	150	#3 L1 Temperature r	FLOAT	Power controller #3: L1 Temperature - read
151	Cyclic	Read	151	#3 L1 External control r	FLOAT	Power controller #3: L1 External control - read
152		Write	152			
153	Cyclic	Write	153	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
154	Cyclic	Read	154	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

Table 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
155	Cyclic	Write	155	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	Cyclic	Read	156	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			157			
158			158			
159	Cyclic	Read	159	I/O Int Analog In 1 r	FLOAT	Internal I/O: Analog input 1 - read
160	Cyclic	Read	160	I/O Int Analog In 2 r	FLOAT	Internal I/O: Analog input 2 - read
161	Cyclic	Read	161	I/O Int Analog In 3 r	FLOAT	Internal I/O: Analog input 3 - read
162			162			
163	Cyclic	Write	163	I/O Int Analog Out 1 w	FLOAT	Internal I/O: Analog output 1 - write
164	Cyclic	Write	164	I/O Int Analog Out 2 w	FLOAT	Internal I/O: Analog output 2 - write
165	Cyclic	Write	165	I/O Int Analog Out 3 w	FLOAT	Internal I/O: Analog output 3 - write
166			166			
167			167			
168	Cyclic	Read	168	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			169			
170			170			
171			171			
172			172			

Table 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
173	Cyclic	Write	173	I/O Ext1 Relay w	UINT16	I/O Extension 1: Relay - write Bit 0: Relay 1 Bit 1: Relay 2
174	Cyclic	Read	174	I/O Ext1 Relay r	UINT16	I/O Extension 1: Relay - read Bit 0: Relay 1 Bit 1: Relay 2
175			175			
176	Cyclic	Read	176	I/O Ext1 Analog In 1 r	FLOAT	I/O Extension 1: Analog input 1 - read
177	Cyclic	Read	177	I/O Ext1 Analog In 2 r	FLOAT	I/O Extension 1: Analog input 2 - read
178	Cyclic	Read	178	I/O Ext1 Analog In 3 r	FLOAT	I/O Extension 1: Analog input 3 - read
179			179			
180	Cyclic	Write	180	I/O Ext1 Analog Out 1 w	FLOAT	I/O Extension 1: Analog output 1 - write
181	Cyclic	Write	181	I/O Ext1 Analog Out 2 w	FLOAT	I/O Extension 1: Analog output 2 - write
182	Cyclic	Write	182	I/O Ext1 Analog Out 3 w	FLOAT	I/O Extension 1: Analog output 3 - write
183			183			
184			184			
185	Cyclic	Read	185	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			186			
187	Cyclic	Write	187	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	Cyclic	Read	188	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			189			
190			190			
191			191			

Table 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
192			192			
193	Cyclic	Write	193	I/O Ext2 Relay w	UINT16	I/O Extension 2: Relay - write Bit 0: Relay 1 Bit 1: Relay 2
194	Cyclic	Read	194	I/O Ext2 Relay r	UINT16	I/O Extension 2: Relay - read Bit 0: Relay 1 Bit 1: Relay 2
195			195			
196	Cyclic	Read	196	I/O Ext2 Analog In 1 r	FLOAT	I/O Extension 2: Analog input 1 - read
197	Cyclic	Read	197	I/O Ext2 Analog In 2 r	FLOAT	I/O Extension 2: Analog input 2 - read
198	Cyclic	Read	198	I/O Ext2 Analog In 3 r	FLOAT	I/O Extension 2: Analog input 3 - read
199			199			
200	Cyclic	Write	200	I/O Ext2 Analog Out 1 w	FLOAT	I/O Extension 2: Analog output 1 - write
201	Cyclic	Write	201	I/O Ext2 Analog Out 2 w	FLOAT	I/O Extension 2: Analog output 2 - write
202	Cyclic	Write	202	I/O Ext2 Analog Out 3 w	FLOAT	I/O Extension 2: Analog output 3 - write
203			203			
204			204			
205	Cyclic	Read	205	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			206			
207	Cyclic	Write	207	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	Cyclic	Read	208	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			209			
210	Cyclic	Read	210	dASM Total power r	FLOAT	dASM Total power - read

Table 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
211	Cyclic	Read	211	dASM Count r	UINT8	dASM Count - read
212			212			
213	Cyclic	Write	213	#1 Starting mode w	UINT8	Power controller #1: Starting mode - write 0: None 1: Ramp 2: MOSI 3: MOSI and ramp
214	Cyclic	Write	214	#1 Operating mode w	UINT8	Power controller #1: Operating mode - write 0: TAKT (full wave) 1: VAR (phase angle)
215	Cyclic	Write	215	#1 Control mode w	UINT8	Power controller #1: Control mode - write 0: None 1: U 2: U^2 3: I 4: I^2 5: P
216	Cyclic	Write	216	#1 PID Kp w	FLOAT	Power controller #1: PID Kp - write
217	Cyclic	Write	217	#1 PID Ki w	FLOAT	Power controller #1: PID Ki - write
218	Cyclic	Write	218	#1 PID Kd w	FLOAT	Power controller #1: PID Kd - write
219			219			
220			220			
221			221			
222	Cyclic	Write	222	#2 Starting mode w	UINT8	Power controller #2: Starting mode - write 0: None 1: Ramp 2: MOSI 3: MOSI and ramp
223	Cyclic	Write	223	#2 Operating mode w	UINT8	Power controller #2: Operating mode - write 0: TAKT (full wave) 1: VAR (phase angle)

Table 7. Parameter list (Continued)

API #	Com-muni-cation	Read / Write	Slot 0 Index	Parameter Name	Type	Parameter Description
224	Cyclic	Write	224	#2 Control mode w	UINT8	Power controller #2: Control mode - write 0: None 1: U 2: U^2 3: I 4: I^2 5: P
225	Acyclic	Write	225	#2 PID Kp w	FLOAT	Power controller #2: PID Kp - write
226	Acyclic	Write	226	#2 PID Ki w	FLOAT	Power controller #2: PID Ki - write
227	Acyclic	Write	227	#2 PID Kd w	FLOAT	Power controller #2: PID Kd - write
228			228			
229			229			
230			230			
231	Cyclic	Write	231	#3 Starting mode w	UINT8	Power controller #3: Starting mode - write 0: None 1: Ramp 2: MOSI 3: MOSI and ramp
232	Cyclic	Write	232	#3 Operating mode w	UINT8	Power controller #3: Operating mode - write 0: TAKT (full wave) 1: VAR (phase angle)
233	Cyclic	Write	233	#3 Control mode w	UINT8	Power controller #3: Control mode - write 0: None 1: U 2: U^2 3: I 4: I^2 5: P
234	Acyclic	Write	234	#3 PID Kp w	FLOAT	Power controller #3: PID Kp - write
235	Acyclic	Write	235	#3 PID Ki w	FLOAT	Power controller #3: PID Ki - write
236	Acyclic	Write	236	#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 8. 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.) mailto:technical.support@aei.com
Sekidenko thermal product support	Contact by phone or email: +1.360.694.7871 mailto:thermalapplications@aei.com
Power Control Module product support	Contact by phone or email: +49 (0)2902 763 520 (technical support during German business hours) mailto:powercontroller@aei.com
High Voltage product support: HiTek Power, Ltd.	Contact by phone or email: +44 (0) 1903 712400 mailto:support.centre@aei.com
High Voltage product support: UltraVolt, Inc.	Contact by phone or email: +1.631.471.4444 mailto:sales.support-uv@aei.com

Table 8. 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: http://www.advanced-energy.com

TRADEMARKS