

Panduit ES2P PDU Modbus Register Guide

V 1.0

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1.Introduction

This document describes the register specification for the ES2P Modbus protocol interface.

Input Register – Device Level Information

This section describes the Modbus input registers for the device level information.

Modbus Register	Addr	Name	R/W	Length	Data Type	Valid Response
30001	0	App Version	R	2	UINT32	App Version: * Bits 23-16: Major * Bit 15-8: Minor * Bit7-0: Patch
30003	2	Bootloader Version	R	2	UINT32	Bootloader Version: * Bit31-24: Reserved * Bit23-16: Major * Bit15-8: Minor * Bit7-0: Patch
30005	4	Model Number	R	8	ASCII	ASCII string, end with null terminator
30013	12	Serial Number	R	8	ASCII	ASCII string, end with null terminator
30021	20	Device Name	R	8	ASCII	ASCII string, end with null terminator
30029	28	Device Location	R	8	ASCII	ASCII string, end with null terminator
30037	36	Device Contact	R	8	ASCII	ASCII string, end with null terminator
30045	44	Number of Devices	R	1	UINT16	The number of devices cascaded
30046	45	Number of Sensors	R	1	UINT16	The number of sensors attached in PDU
30047	46	Number of Phases	R	1	UINT16	The number of phases on the PDU
30048	47	Number of Metered Banks	R	1	UINT16	The number of metered banks in the PDU

Modbus Register	Addr	Name	R/W	Length	Data Type	Valid Response
30049	48	Number of Switched Outlets	R	1	UINT16	The num. of switched outlets on the PDU
30050	49	Number of Metered Outlets	R	1	UINT16	The number of metered outlets
30051	50	Current Rating	R	1	UINT16	Measured in Amps
30052	51	MAC Address	R	3	BYTE[6]	Raw stream of MAC address

Input Registers – Sensors

This section describes the Modbus input registers for sensor level information.

Modbus Register	Addr	Name	R/W	Length	Data Type	Valid Response
30064	63	Temperature 1	R	1	UINT16	Unit: 0.1 Degree C
30065	64	Humidity 1	R	1	UINT16	Unit: %RH
30066	65	TH Sensor 1 Alarm	R	1	ENUM	0 = Normal 1 = Low Humidity 2 = Over Temperature 3 = Low Humidity & Over Temperature
30067	66	Temperature 2	R	1	UINT16	Unit: 0.1 Degree C
30068	67	Humidity 2	R	1	UINT16	Unit: %RH
30069	68	TH Sensor 2 Alarm	R	1	ENUM	0 = Normal 1 = Low Humidity 2 = Over Temperature 3 = Low Humidity & Over Temperature
30070	69	Temperature 3	R	1	UINT16	Unit: 0.1 Degree C
30071	70	Humidity 3	R	1	UINT16	Unit: 1 %RH
30072	71	TH Sensor 3 Alarm	R	1	ENUM	0 = Normal 1 = Low Humidity 2 = Over Temperature 3 = Low Humidity & Over Temperature
30073	72	Temperature 4	R	1	UINT16	Unit: 0.1 Degree C

Modbus Register	Addr	Name	R/W	Length	Data Type	Valid Response
30074	73	Humidity 4	R	1	UINT16	Unit: %RH
30075	74	TH Sensor 4 Alarm	R	1	ENUM	0 = Normal 1 = Low Humidity 2 = Over Temperature 3 = Low Humidity & Over Temperature

Input Registers – Device Level Metering

This section describes the Modbus input registers for the device level metering information.

Modbus Register	Addr	Name	R/W	Length	Data Type	Valid Response
30076	75	Device Power	R	1	UINT16	Unit: W
30077	76	Apparent Power	R	1	UINT16	Unit: VA
30078	77	Power Factor	R	1	UINT16	Unit: 0.1 %
30079	78	Device Energy	R	2	UINT32	Unit: WH
30081	80	Device Frequency	R	1	UINT16	Unit: 0.1 %
30082	81	Device Alarm	R	1	ENUM	0 = Normal 1 = Alarm

Input Registers – Phase Metering Data

This section describes the Modbus input registers for the phase level metering information.

Modbus Register	Addr	Name	R/W	Length	Data Type	Valid Response
30083	82	Phase L1 Current	R	1	UINT16	Unit: mA
30084	83	Phase L1 Voltage	R	1	UINT16	Unit: 0.1 V
30085	84	Phase L1 Power	R	1	UINT16	Unit: W
30086	85	Phase L1 Apparent Power	R	1	UINT16	Unit: VA
30087	86	Phase L1 Power Factor	R	1	UINT16	Unit: 0.1 %
30088	87	Phase L1 Energy	R	2	UINT32	Unit: WH

Modbus Register	Addr	Name	R/W	Length	Data Type	Valid Response
30090	89	Phase L1 Alarm	R	1	ENUM	0 = Normal 1 = Low Load 2 = Overload
30091	90	Phase L2 Current	R	1	UINT16	Unit: mA, return 0 if single phase
30092	91	Phase L2 Voltage	R	1	UINT16	Unit: 0.1 V, return 0 if single phase
30093	92	Phase L2 Power	R	1	UINT16	Unit: W, return 0 if single phase
30094	93	Phase L2 Apparent Power	R	1	UINT16	Unit: VA, return 0 if single phase
30095	94	Phase L2 Power Factor	R	1	UINT16	Unit: 0.1 %, return 0 if single phase
30096	95	Phase L2 Energy	R	2	UINT32	Unit: WH, return 0 if single phase
30098	97	Phase L2 Alarm	R	1	ENUM	0 = Normal 1 = Low Load 2 = Overload
30099	98	Phase L3 Current	R	1	UINT16	Unit: mA, return 0 if single phase
30100	99	Phase L3 Voltage	R	1	UINT16	Unit: 0.1 V, return 0 if single phase
30101	100	Phase L3 Power	R	1	UINT16	Unit: W, return 0 if single phase
30102	101	Phase L3 Apparent Power	R	1	UINT16	Unit: VA, return 0 if single phase
30103	102	Phase L3 Power Factor	R	1	UINT16	Unit: 0.1 %, return 0 if single phase
30104	103	Phase L3 Energy	R	2	UINT32	Unit: WH, return 0 if single phase
30106	105	Phase L3 Alarm	R	1	ENUM	0 = Normal 1 = Low Load 2 = Overload

Input Registers – Circuit Breaker Metering Data

This section describes the Modbus input registers for the circuit breaker level information. For circuit breaker n the first register is 106 + 9 * (n - 1). Where n can be 1 to 12.

Modbus Register	Addr	Name	R/W	Length	Data Type	Valid Response
30107	106	Bank 1 Current	R	1	UINT16	Unit: mA, return 0 not supported

Modbus Register	Addr	Name	R/W	Length	Data Type	Valid Response
30108	107	Bank 1 Voltage	R	1	UINT16	Unit: 0.1 V, return 0 not supported
30109	108	Bank 1 Power	R	1	UINT16	Unit: W, return 0 not supported
30110	109	Bank 1 Apparent Power	R	1	UINT16	Unit: VA, return 0 not supported
30111	110	Bank 1 Power Factor	R	1	UINT16	Unit: 0.1 %, return 0 not supported
30112	111	Bank 1 Energy	R	2	UINT32	Unit: WH, return 0 not supported
30114	113	Bank 1 Breaker Status	R	1	ENUM	0 = Not Supported 1 = Off 2 = On
30115	114	Bank 1 Alarm	R	1	ENUM	0 = Normal 1 = Low Load 2 = Overload
30206	205	Bank 12 Current	R	1	UINT16	Unit: mA, return 0 not supported
30207	206	Bank 12 Voltage	R	1	UINT16	Unit: 0.1 V, return 0 not supported
30208	207	Bank 12 Power	R	1	UINT16	Unit: W, return 0 not supported
30209	208	Bank 12 Apparent Power	R	1	UINT16	Unit: VA, return 0 not supported
30210	209	Bank 12 Power Factor	R	1	UINT16	Unit: 0.1 %, return 0 not supported
30211	210	Bank 12 Energy	R	2	UINT32	Unit: WH, return 0 not supported
30213	212	Bank 12 Breaker Status	R	1	ENUM	0 = Not Supported 1 = Off 2 = On
30214	213	Bank 12 Alarm	R	1	ENUM	0 = Normal 1 = Low Load 2 = Overload
30107 + ((n - 1) * 9)	106 + ((n - 1) * 9)	Bank n Current	R	1	UINT16	Unit: mA, return 0 not supported
30108 + ((n - 1) * 9)	107 + ((n - 1) * 9)	Bank n Voltage	R	1	UINT16	Unit: 0.1 V, return 0 not supported
30109 + ((n - 1) * 9)	108 + ((n - 1) * 9)	Bank n Power	R	1	UINT16	Unit: W, return 0 not supported
30110 + ((n - 1) * 9)	109 + ((n - 1) * 9)	Bank n Apparent Power	R	1	UINT16	Unit: VA, return 0 not supported
30111 + ((n - 1) * 9)	110 + ((n - 1) * 9)	Bank n Power Factor	R	1	UINT16	Unit: 0.1 %, return 0 not supported
30112 + ((n - 1) * 9)	111 + ((n - 1) * 9)	Bank n Energy	R	2	UINT32	Unit: WH, return 0 not supported

Modbus Register	Addr	Name	R/W	Length	Data Type	Valid Response
30114 + ((n - 1) * 9)	113 + ((n - 1) * 9)	Bank n Breaker Status	R	1	ENUM	0 = Not Supported 1 = Off 2 = On
30115 + ((n - 1) * 9)	114 + ((n - 1) * 9)	Bank n Alarm	R	1	ENUM	0 = Normal 1 = Low Load 2 = Overload

Input Registers – Outlet Metering Data

This section describes the Modbus input registers for the outlet level information. For outlet n the first register is 214 + 9 * (n – 1). Where n can be 1 to 64.

Modbus Register	Addr	Name	R/W	Length	Data Type	Valid Response
30215	214	Outlet 1 Current	R	1	UINT16	Unit: mA, return 0 not supported
30216	215	Outlet 1 Voltage	R	1	UINT16	Unit: 0.1 V, return 0 not supported
30217	216	Outlet 1 Power	R	1	UINT16	Unit: W, return 0 not supported
30218	217	Outlet 1 Apparent Power	R	1	UINT16	Unit: VA, return 0 not supported
30219	218	Outlet 1 Power Factor	R	1	UINT16	Unit: 0.1 %, return 0 not supported
30220	219	Outlet 1 Energy	R	2	UINT32	Unit: WH, return 0 not supported
30222	221	Outlet 1 Status	R	1	ENUM	0 = Not Supported 1 = Off 2 = On
30223	222	Outlet 1 Alarm	R	1	ENUM	0 = Normal 1 = Low Load 2 = Overload
30782	781	Outlet 64 Current	R	1	UINT16	Unit: mA, return 0 not supported
30783	782	Outlet 64 Voltage	R	1	UINT16	Unit: 0.1 V, return 0 not supported
30784	783	Outlet 64 Power	R	1	UINT16	Unit: W, return 0 not supported
30785	784	Outlet 64 Apparent Power	R	1	UINT16	Unit: VA, return 0 not supported
30786	785	Outlet 64 Power Factor	R	1	UINT16	Unit: 0.1 %, return 0 not supported
30787	786	Outlet 64 Energy	R	2	UINT32	Unit: WH, return 0 not supported

Modbus Register	Addr	Name	R/W	Length	Data Type	Valid Response
30789	788	Outlet 64 Status	R	1	ENUM	0 = Not Supported 1 = Off 2 = On
30790	789	Outlet 64 Alarm	R	1	ENUM	0 = Normal 1 = Low Load 2 = Overload
30215 + (n * 9)	214 + ((n - 1) * 9)	Outlet n Current	R	1	UINT16	Unit: mA, return 0 not supported
30216 + ((n - 1) * 9)	215 + ((n - 1) * 9)	Outlet n Voltage	R	1	UINT16	Unit: 0.1 V, return 0 not supported
30217 + ((n - 1) * 9)	216 + ((n - 1) * 9)	Outlet n Power	R	1	UINT16	Unit: W, return 0 not supported
30218 + ((n - 1) * 9)	217 + ((n - 1) * 9)	Outlet n Apparent Power	R	1	UINT16	Unit: VA, return 0 not supported
30219 + ((n - 1) * 9)	218 + ((n - 1) * 9)	Outlet n Power Factor	R	1	UINT16	Unit: 0.1 %, return 0 not supported
30220 + ((n - 1) * 9)	219 + ((n - 1) * 9)	Outlet n Energy	R	2	UINT32	Unit: WH, return 0 not supported
30222 + ((n - 1) * 9)	221 + ((n - 1) * 9)	Outlet n Status	R	1	ENUM	0 = Not Supported 1 = Off 2 = On
30223 + ((n - 1) * 9)	222 + ((n - 1) * 9)	Outlet 1 Alarm	R	1	ENUM	0 = Normal 1 = Low Load 2 = Overload

Holding Registers

This section describes the holding registers for the ES2P PDU.

Modbus Register	Addr	Name	R/W	Length	Data Type	Valid Response
40001	0	Device Address	R/W	1	UINT16	0-255
40002	1	Baud Rate	R/W	1	ENUM	0 = 4800 1 = 9600 2 = 19200 3 = 115200 (default) 4 = 38400

Modbus Register	Addr	Name	R/W	Length	Data Type	Valid Response
40003	2	Device Reset	W	1	ENUM	1 = Reboot 2 = Reset configurations
40004	3	Energy Reset	W	1	ENUM	1 = Reset Energy
40005	4	Outlet 1 - Outlet 16 Turn Off	W	1	UINT16	Turn Off outlets if corresponding bits set
40006	5	Outlet 17 to Outlet 32 Turn Off	W	1	UINT16	Turn Off outlets if corresponding bits set
40007	6	Outlet 33 to Outlet 48 Turn Off	W	1	UINT16	Turn Off outlets if corresponding bits set
40008	7	Outlet 49 to Outlet 64 Turn Off	W	1	UINT16	Turn Off outlets if corresponding bits set
40009	8	Outlet 1 to Outlet 16 Turn On	W	1	UINT16	Turn On outlets if corresponding bits set
40010	9	Outlet 17 to Outlet 32 Turn On	W	1	UINT16	Turn On outlets if corresponding bits set
40011	10	Outlet 33 to Outlet 48 Turn On	W	1	UINT16	Turn On outlets if corresponding bits set
40012	11	Outlet 49 to Outlet 64 Turn On	W	1	UINT16	Turn On outlets if corresponding bits set
40013	12	Device Power Low Threshold	R/W	1	UINT16	Unit: kW
40014	13	Device Power High Threshold	R/W	1	UINT16	Unit: kW
40015	14	Phase Current Low Threshold	R/W	1	UINT16	Unit: A
40016	15	Phase Current High Threshold	R/W	1	UINT16	Unit: A
40017	16	Bank Current Low Threshold	R/W	1	UINT16	Unit: A
40018	17	Bank Current High Threshold	R/W	1	UINT16	Unit: A
40019	18	Outlet Current Low Threshold	R/W	1	UINT16	Unit: A
40020	19	Outlet Current High Threshold	R/W	1	UINT16	Unit: A
40021	20	Temperature High Threshold	R/W	1	UINT16	Unit: 0.1 Degree C
40022	21	Humidity Low Threshold	R/W	1	UINT16	Unit: 0.1 %RH

PDU Modbus Protocol Notes

- 16-bit registers (INT16, UINT16, ENUM) are transmitted MSB first (big-endian).
- INT32 and UINT32 use the most-significant word in n+0 and least-significant word in n+1 (big-endian).
- Reads can be performed with function codes 3 or 4. Writes can use function code 16, or function code 6 for registers with length 1.
- Modbus over TCP is supported.
- Signed numbers (INT16, INT32, ENUM) are two's-complement.
- Status bits are atomic within a single Modbus register. Consistency should not be expected across multiple registers.
- Strings are two characters per register: first character in high-order byte, second in low-order byte. Printable ASCII only.
- When writing an ASCII string, the null terminator must be included.
- Single-register reads of reserved or undefined registers return an error. Block reads beginning with a valid register return zeros for undefined registers.
- Data types: INT16 = signed 16-bit integer; UINT16 = unsigned 16-bit integer; INT32 = signed 32-bit integer; UINT32 = unsigned 32-bit integer; ENUM = signed 16-bit integer mapped to defined states.
- Bank n absolute starting register = Bank 1 parameter absolute starting register + (n-1)*9.
- Outlet n absolute starting register = Outlet 1 parameter absolute starting register + (n-1)*9.