

PowerGo Modbus_TCP/IP Protocol V1.0

- Document Version: V1.1
- Product Model: 适用于[PowerGo 2500-1208, PowerGo 5000-1208, PowerGo 5000-1208 BK]
- Protocol Type: Modbus_TCP/IP
- Release Date: 2023-10-16

§1. Document Description

1.1 Introduction

This protocol is established for TCP-based communication between the PowerGo (acting as a Server) and third-party EMS systems (acting as Clients). The data exchange format and procedures fully comply with the Modbus TCP/IP standard.

1.2 Terms and Definitions

§2. Communication Parameters

- **IP Adress:** 192.168.1.200
- **Port:** 5002
- **Slave ID:** 81 (DEC)

§3. Frame Structure Details

3.1. Supported Modbus Function Codes

The device supports the following Modbus function codes:

- 0x03: Read Holding Registers
- 0x06: Write Single Register
- 0x10: Write Multiple Registers

Operations are supported for reading from or writing to single or multiple consecutive registers. However, each operation can only be either a read or a write; the two cannot be mixed within the same command. Furthermore, the total length of a single command and its data must not exceed 100 bytes.

3.2 Common Exception Codes

- 0x01: Illegal Function
- 0x02: Illegal Data Address
- 0x03: Illegal Data Value
- 0x04: Slave Device Failure

§4. Register List

Note

	Byte Order	Character Order
INT16	Big-Endian	-
UINT16	Big-Endian	-----
INT32	Big-Endian	Little-Endian
UINT32	Big-Endian	Little-Endian
Byte Stream/String	Little-Endian	-----

4.1 PowerGo Communication Configuration Register

Register Name	Address(DEC)	RegisterType	Data Type	Length	R/W	Format	Default Value	Description
Ethernet Static IP	220	Holding_Register	UINT16	2	R/W	%d	0xC0A801C8	PowerGo's static IP defaults to 192.168.1.200. Example: The default value read from the register is 0xC0A801C8. Explanation: C0 => 192 A8 => 168 01 => 001 C8 => 200
								PowerGo Default Subnet Mask: 255.255.255.0 Example: The default value read from the register is 0xFFFFFFFF00 .

Ethernet Subnet Mask	222	Holding_Register	UINT16	2	R/W	%d	0xFFFFFFFF00	Explanation: FF => 255 FF => 255 FF => 255 00 => 0
Ethernet Gateway	224	Holding_Register	UINT16	2	R/W	%d	0xC0A80101	PowerGo Default Subnet Mask: 192.168.1.1 Example: The default value read from the register is 0xC0A80101 Explanation: C0 => 192 A8 => 168 01 => 001 01 => 001
Ethernet Mode	230	Holding_Register	UINT16	1	R/W	%d	0x0000	This register configures the operating mode of the PowerGo Ethernet port. 0x0000 => TCP(Server); 0x0100 => TCP(Client); 0x0200 => UDP(Server); 0x0300 => UDP(Client); Example: The default value read from the register is 0x0000 Explanation: The current operating status of PowerGo is TCP (Server)
Ethernet Port	231	Holding_Register	UINT16	1	R/W	%d	1000	Default port: 1000
Wifi SSID	110	Holding_Register	String	10	R/W	%d	yihui	The field has a length of 20 bytes. The first byte shall be set to 0x0000 or 0xFFFF to indicate that Wi-Fi is not connected.
Wifi Password	120	Holding_Register	String	10	R/W	%d	yihui223	20字节长度
Wifi Static IP	130	Holding_Register	UINT32	2	R/W	%d	0xFFFFFFFF	FF FF FF FF = DHCP Example: The default value read from the register is 0xC0A801C8. Explanation: C0 => 192 A8 => 168 01 => 001

								C8 => 200
Wifi Mask	132	Holding_Register	UINT32	2	R/W	%d	0xFFFFFFFF	Example: The default value read from the register is 0xFFFFFFFF. Explanation: FF => 255 FF => 255 FF => 255 FF => 255
Wifi Gateway	134	Holding_Register	UINT32	2	R/W	%d	0xFFFFFFFF	Example: The current value read from the register is 0xC0A80101. Explanation: C0 => 192 A8 => 168 01 => 001 01 => 001
Wifi DNS	136	Holding_Register	UINT16	2	R/W	%d	0xFFFFFFFF	Example: The current value read from the register is 0x08080808. Explanation: 08 => 008 08 => 008 08 => 008 08 => 008
DHCP-Assigned IP Address	138	Holding_Register	UINT32	2	R	%d	-	Once DHCP is enabled on the PowerGo, the assigned IP address may be obtained from the register.
Wifi Mode	140	Holding_Register	UINT16	1	R/W	%d	0x0003	This register configures the operating mode of the PowerGo Wifi port. 0x0000 => TCP(Server); 0x0001 => TCP(Client); 0x0002 => UDP; 0x0003 => mqtt; 0x0004 => Wi-Fi Only, Do Not Connect; Example: The default value read from the register is 0X0003 Explanation: The current connection is MQTT
Source Port	141	Holding_Register	UINT16	1	R/W	%d	5000	

Destination IP	142	Holding_Register	UINT32	2	R/W	%d	0xFFFFFFFF	Writing FFFFFFFF is interpreted as using a URL-based address instead of an IP. A URL is required for the MQTT connection.
Destination IP	144	Holding_Register	string	25	R/W	%d	"3.122.9.160"	Target URL or MQTT Server URL: Maximum Length: 50 bytes. To Disable Connection: Enter 0000 or FFFF.
Destination Port	169	Holding_Register	UINT16	1	R/W	%d	1883	Target Port or MQTT Server Port
Mqtt id	170	Holding_Register	string	10	R/W	%d	MQ123	
Mqtt name	180	Holding_Register	string	10	R/W	%d	mqtt	
Mqtt password	190	Holding_Register	string	10	R/W	%d	11	
Mqtt topic1	200	Holding_Register	UINT32	2	R/W	%d	0xF0000001	Defaults to this PowerGo's serial number.
Mqtt topic2	202	Holding_Register	UINT32	2	R/W	%d	0xF0000011	reserve
Mqtt topic3	204	Holding_Register	UINT32	2	R/W	%d	0xF0000012	reserve
Mqtt topic4	206	Holding_Register	UINT32	2	R/W	%d	0xF0000013	reserve
Wifi Signal Quality	208	Holding_Register	INT16	1	R	%d	-	
Network Configuration Deployment	265	Holding_Register	INT16	1	R	%d	-	After modifying the network configuration parameters, you must write the value 2345 to Holding Register 265 to activate the Ethernet changes or write the value 1234 to Holding Register 265 to activate the Wifi changes

4.2 Grid-Side Environmental Data Register

Register Name	Address(DEC)	RegisterType	Data Type	Length	R/W	Format	Default Value	Description
Grid-Side Voltage	573	Holding_Register	UINT16	1	R	%.1 V	-	The device samples the current grid voltage from the power grid.
								AC input/output port power, where:

Grid-Side Power	530	Holding_Register	INT16	1	R	%d W	-	• Positive values indicate power flow from grid to device • Negative values indicate power flow from device to grid
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4.3 PowerGo Status Register

Register Name	Address(DEC)	RegisterType	Data Type	Length	R/W	Format	Default Value	Description
Main Software Version	1	Holding_Register	UINT16	1	R	%d	-	Main Software Version Number
Serial Number	12	Holding_Register	UINT32	2	R	%d	-	Product serial identifier (Byte order: big-endian, Word order: little-endian)
Device Current Operating Status	306	Holding_Register	UINT16	1	R	%d	-	Charge/Discharge Status Flag (1-byte): • Bit 0: Charge enable - 0: Charging allowed - 1: Charging prohibited • Bit 1: Discharge enable - 0: Discharging allowed - 1: Discharging prohibited
Device Current Operating Time	548	Holding_Register	UINT16	1	RW	%d	-	Year(from 2000): High 8, Month: Low 8
	549	Holding_Register	UINT16	1	RW	%d	-	Day: High 8, Hour: Low 8
	550	Holding_Register	UINT16	1	RW	%d	-	Hour: High 8, Second Low 8
Sate of Charge(SOC)	529	Holding_Register	UINT16	1	R	%d	-	Remaining Battery Capacity
Backup Power (Off-Grid)	568	Holding_Register	INT16	1	R	%d	-	The PowerGo 5000 BK model with backup power (off-grid) function supports off-grid port output power.
Fault Information	508	Holding_Register	UINT16	1	R	%d	-	For details and examples, refer to the 'Fault Information Table.
	509	Holding_Register	UINT16	1	R	%d	-	
	510	Holding_Register	UINT16	1	R	%d	-	

	521	Holding_Register	UINT16	1	R	%d	-	
	522	Holding_Register	UINT16	1	R	%d	-	
	523	Holding_Register	UINT16	1	R	%d	-	
	524	Holding_Register	UINT16	1	R	%d	-	
	525	Holding_Register	UINT16	1	R	%d	-	
	526	Holding_Register	UINT16	1	R	%d	-	
Daily Cumulative Discharge Energy	540	Holding_Register	UINT16	1	R	%d.1f kWh	-	Daily Power Generation
7-Days Cumulative Discharge Energy	533	Holding_Register	UINT16	1	R	%d.1f kWh	-	Registers 533-539 store the device's energy generation data for the most recent 1-7 days respectively.
	534	Holding_Register	UINT16	1	R	%d.1f kWh	-	
	535	Holding_Register	UINT16	1	R	%d.1f kWh	-	
	536	Holding_Register	UINT16	1	R	%d.1f kWh	-	
	537	Holding_Register	UINT16	1	R	%d.1f kWh	-	
	538	Holding_Register	UINT16	1	R	%d.1f kWh	-	
	539	Holding_Register	UINT16	1	R	%d.1f kWh	-	
Total Discharge Energy	541	Holding_Register	UINT16	1	R	%.1f kWh	-	Cumulative Total Power Generation of the Equipment (Low Register)
	542	Holding_Register	UINT16	1	R	%.1f kWh	-	

4.4 PowerGo Control Register

Register Name	Address(DEC)	RegisterType	Data Type	Length	R/W	Format	Default Value	Description
Operating Mode	281	Holding_Register	UINT16	1	RW	%d	-	0: Schedule Mode, 1: Smart Meter Mode &Auto Feed with CT, 2: Smart Meter Mode & Self Consumption with CT 3: HEMS Mode, 4: Smart Meter Mode & Auto Feed with ShellyEM, 5: Smart Meter Mode &Self Consumption with ShellyEM, 6: Smart Meter Mode & Auto Feed with Shelly Plug G3, 7: Smart Meter Mode & Self Consumption with Shelly Plug G3
Grid-Side Power(DS)	532	Holding_Register	INT16	1	RW	%d W	-	HEMS updates the register with real-time household power (W). PowerGo executes charge/discharge control using this register value.
Charging Power	280	Holding_Register	UINT16	1	RW	%d W	800	Maximum Charging Power Note: Adjusting this value enables dynamic control of device charging power.
Charge Enable	551	Holding_Register	UINT16	1	RW	%d	-	Charge Enable Flag: 0: Charging disabled 1: Charging enabled Priority Rule: Charging function has higher priority than discharging When both charge and discharge areenabled (charge_en=1 ANDdischarge_en=1), the system will always execute charging
Period 1 Charging Start Time	552	Holding_Register	UINT16	1	RW	%d	-	Time Encoding Format (HH:MM): High Byte (Bits 15-8): Hour(0-23), Low Byte(Bits 7-0): Minute(0-59) Example: 23:59 = 23 * 256 + 59 = 5947(Dec) / 0x173B (Hex) Discharge Time Windows: Period 1: Start=HH1:MM1, End=HH2:MM2, Period 2: Start=HH3:MM3, End=HH4:MM4 PowerGo System will compare current time with these windows to enable/disable discharge. Default Charging Periods: Period 1: 00:00-23:59 (All-day charging allowed), Period 2: 00:00-00:00 (Disabled bydefault)

Period 1 Charging End Time	553	Holding_Register	UINT16	1	RW	%d	-	
Period 2 Charging Start Time	554	Holding_Register	UINT16	1	RW	%d	-	
Period 2 Charging End Time	555	Holding_Register	UINT16	1	RW	%d	-	
Discharging Power	543	Holding_Register	UINT16	1	RW	%d W	800	Maximum Discharge Power Note: Adjusting this value for dynamic control of device discharging power.
Discharge Enable	558	Holding_Register	UINT16	1	RW	%d	-	Discharge Enable Flag: 0: Discharging disabled 1: Discharging Enabled Please note that the charge enable signal has higher priority over the discharge enable signal. When both charge enable and discharge enable are active, the system will initiate charging. To initiate discharging, set charge enable to 0 and discharge enable to 1.
Period 1 Discharging Start Time	559	Holding_Register	UINT16	1	RW	%d	-	Time is encoded in 16-bit format: High byte (Bits 15-8): Hour (0-23), Low byte (Bits 7-0): Minute (0-59) Example: 23:59 = 23×256 + 59 = 5947 (0x173B in hex), Two configurable discharge periods: Period 1: Start=HH1:MM1, End=HH2:MM2, Period 2: Start=HH3:MM3, End=HH4:MM4 The PowerGo system automatically enables discharge when current time falls within either active period. Pre-set charging windows: Period 1: 00:00-23:59 (always enabled by default), Period 2: 00:00-00:00 (disabled by default, requires manual configuration)
Period 1 Charging End Time	560	Holding_Register	UINT16	1	RW	%d	-	

Period 2 Charging Start Time	561	Holding_Register	UINT16	1	RW	%d	-	
Period 2 Charging End Time	562	Holding_Register	UINT16	1	RW	%d	-	

§5. Fault Information Table

Bit 0-15	508-Word0	509-Word1	510-Word2
Bit0			
Bit1			
Bit2			
Bit3		Low State of Charge(SOC) Protection	
Bit4			Cell Failure Alarm
Bit5			
Bit6			
Bit7			
Bit8			
Bit9	Cell Overvoltage Protection		
Bit10			
Bit11	Cell Undervoltage Protection		
Bit12			
Bit13	Total Overvoltage Protection		
Bit14			
Bit15	Total Undervoltage Protection		

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Bit 0-15	521-Word3	522-Word4	523-Word5
Bit0	Battery Lowvoltage Alarm	Busbar Short Circuit	Control CAN Communication Fault
Bit1	Battery EOD	PV Input Overvoltage	Communication CAN Bus Fault
Bit2	Battery Current Software Overcurrent Alarm	PV Current Software Overcurrent	Parallel Mode Configuration Error
Bit3	Battery Hardware Overcurrent Alarm	PV Hardware Overcurrent	Parallel Current Sharing Fault
Bit4	Battery Open Circuit	PV Insulation Resistance Low	Parallel ID Conflict
Bit5	Battery Overvoltage Alarm	PV Heat Sink Overtemperature	Parallel Battery Inconsistency Alarm
Bit6	Low Battery Capacity Rate	Inverter Heat Sink Overtemperature	Parallel Grid Input Mismatch
Bit7	Battery Low Capacity Shutdown	Transformer Overtemperature	Parallel Communication Signal Anomaly
Bit8	Bypass Output Overload	Grid Input Relay Short Circuit	Parallel Firmware Incompatibility
Bit9	Inverter Output Overload	Output Relay Short Circuit	Parallel Cable Connection Fault
Bit10	Inverter AC Output Short Circuit	Fan Failure	Invalid Product Serial Number
Bit11	Inverter Hardware Overcurrent Alarm	EEPROM Fault	System Low Battery Voltage Shutdown
Bit12	Inverter DC Component High Alarm	SPI Communication Fault	Slave IC Abnormal Shutdown
Bit13	Busbar Hardware Overvoltage	Model Configuration Error	DC Bus Voltage Imbalance
Bit14	Busbar Software Overvoltage	Busbar Soft Start Failure	External CT Master Configuration
Error			
Bit15	Busbar Undervoltage Alarm	Leakage Current Abnormal	Grid Input Phase Abnormality

Bit 0-15	521-Word6	522-Word7	523-Word8
Bit0	BMS Communication Fault	Grid Overvoltage	Reserve
Bit1	BMS Abnormal Alarm	Grid Undervoltage	Reserve
Bit2	BMS Battery Overtemperature	Grid Overfrequency	Reserve
Bit3	BMS Battery Overcurrent	Grid Underfrequency	Reserve
Bit4	BMS Battery Overvoltage	Grid 10-Minute Average Overvoltage	Reserve

Bit5	BMS Battery Undervoltage	LVRT (Low Voltage Ride-Through) Fault	Reserve
Bit6	BMS Battery Low Temperature	HVRT (High Voltage Ride-Through) Fault	Reserve
Bit7		System Grounding Fault	Reserve
Bit8		DC Arc Fault Detection Error	Reserve
Bit9		Anti-Islanding Protection	Reserve
Bit10		Reserve	Reserve
Bit11	BMS System Fault	Reserve	Reserve
Bit12		Reserve	Reserve
Bit13		Reserve	Reserve
Bit14		Reserve	Reserve
Bit15		Reserve	Reserve