

B-Series MODBUS Specification
EPEVER Corporation

V 2.3

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Contents

Parameters	1
Supported Modbus Functions	2
Read Input Register(0x04)	2
Rated Datum (Read Only).....	2
Real-time Datum (Read Only)	3
Real-time Status (Read Only)	4
Statistical Parameters (Read Only)	6
Read Holding Register (0x03) and Write Multiple Holding Register (0x10).....	8
Setting Parameter (Read and Write).....	8
Read Coils (0x01) and Write Single Coil(0x05).....	11
Switch Value (Read and Write)	11
Read Discrete Inputs (0x02)	11
Discrete Value (Read Only)	11
Examples	12
Pin Definition.....	13
References	15

Parameters

The B-Series and A-Series controller supports communication via its serial RS-485 interface and uses the industry standard MODBUS application protocol. This document assumes the user is familiar with the MODBUS protocol and its terminology. Please refer to the documents listed in the References section for more information.

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The B-Series controller supports RTU mode only.

16bit MODBUS addresses (per the modbus.org spec)

The serial communication parameters are

- ☐ BPS: 115200 baud
- ☐ Parity: None
- ☐ Data bits: 8
- ☐ Stop bits: 1
- ☐ Flow control: None

All addresses listed are for the request PDU.

The B-Series controller defaults to server address of 0x00.

Supported Modbus Functions

Read Input Register(0x04)

Rated Datum (Read Only)

Variable name	Address	Description	Unit	Times
array rated voltage	3000	PV array rated voltage	V	100
array rated current	3001	PV array rated current	A	100
array rated power L	3002	PV array rated power (low 16 bits)	W	100
array rated power H	3003	PV array rated power (high 16 bits)	W	100
Battery rated voltage	3004	Rated voltage to battery	V	100
Battery rated current	3005	Rated current to battery	A	100
Battery rated power L	3006	Rated power to battery	W	100
Battery rated power H	3007	Rated power to battery	W	100
Charging mode	3008	0000H Connect/disconnect, 0001H PWM,0002H MPPT		
Rated current of load	300E	Rated current of load	W	100

Real-time Datum (Read Only)

Number	Variable name	Address	Description	Unit	Times
B1	PV array input voltage	3100	Solar charge controller--PV array voltage	V	100
B2	PV array input current	3101	Solar charge controller--PV array current	A	100
B3	PV array input power L	3102	Solar charge controller--PV array power	W	100
B4	PV array input power H	3103	Solar charge controller--PV array power	W	100
B7	Battery power L	3106	Battery charging power	W	100
B8	Battery power H	3107	Battery charging power	W	100
B13	Load voltage	310C	Load voltage	V	100
B14	Load current	310D	Load current	A	100
B15	Load power L	310E	Load power	W	100
B16	Load power H	310F	Load power	W	100
B17	Battery Temperature	3110	Battery Temperature	℃	100
B18	Temperature inside equipment	3111	Temperature inside case	℃	100
B27	Battery SOC	311A	The percentage of battery's remaining capacity	%	100
B28	Remote battery temperature	311B	The battery temperature measured by remote temperature sensor	℃	100
B30	Battery's real rated power	311D	Current system rated voltage. 1200, 2400, 3600, 4800 represent 12V, 24V, 36V, 48V	℃	100

Real-time Status (Read Only)

Number	Variable name	Address	Description	Unit	Times
C1	Battery status	3200	D3-D0: 01H Overvolt , 00H Normal , 02H Under Volt, 03H Low Volt Disconnect, 04H Fault D7-D4: 00H Normal, 01H Over Temp.(Higher than the warning settings), 02H Low Temp.(Lower than the warning settings), D8: Battery inner resistance abnormal 1, normal 0 D15: 1-Wrong identification for rated voltage		
C2	Charging equipment status	3201	D15-D14: Input volt status. 00 normal, 01 no power connected, 02H Higher volt input, 03H Input volt error. D13: Charging MOSFET is short. D12: Charging or Anti-reverse MOSFET is short. D11: Anti-reverse MOSFET is short. D10: Input is over current. D9: The load is Over current. D8: The load is short. D7: Load MOSFET is short. D4: PV Input is short. D3-2: Charging status. 00 No charging,01 Float,02 Boost, 03 Equalization. D1: 0 Normal, 1 Fault. D0: 1 Running, 0 Standby.		

C7	Discharging equipment status	3202	D15-D14: 00H normal, 01H low, 02H High, 03H no access Input volt error. D13-D12: output power:00-light load,01-moderate,02-rated,03-overload D11: short circuit D10: unable to discharge D9: unable to stop discharging D8: output voltage abnormal D7: input overpressure D6: high voltage side short circuit D5: boost overpressure D4: output overpressure D1: 0 Normal, 1 Fault. D0: 1 Running, 0 Standby.		
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Statistical Parameters (Read Only)

Number	Variable name	Address	Description	Unit	Time s
D0	Maximum PV voltage today	3300	00: 00 Refresh every day	V	100
D1	Minimum PV voltage today	3301	00: 00 Refresh every day	V	100
D2	Maximum battery voltage today	3302	00: 00 Refresh every day	V	100
D3	Minimum battery voltage today	3303	00: 00 Refresh every day	V	100
D4	Consumed energy today L	3304	00: 00 Clear every day		100
D5	Consumed energy today H	3305		KWH	100
D6	Consumed energy this month L	3306	00: 00 Clear on the first day of month		100
D7	Consumed energy this month H	3307		KWH	100
D8	Consumed energy this year L	3308	00: 00 Clear on 1, Jan		100
D9	Consumed energy this year H	3309		KWH	100
D10	Total consumed energy L	330A			100
D11	Total consumed energy H	330B		KWH	100
D12	Generated energy today L	330C	00: 00 Clear every day.		100
D13	Generated energy today H	330D		KWH	100
D14	Generated energy this month L	330E	00: 00 Clear on the first day of month.		100
D15	Generated energy this month H	330F		KWH	100
D16	Generated energy this year L	3310	00: 00 Clear on 1, Jan.		100
D17	Generated energy this year H	3311		KWH	100
D18	Total generated energy L	3312		KWH	100
D19	Total Generated energy H	3313			
D26	Battery voltage	331A	Battery voltage	V	100

D27	Battery current L	331B	Battery current	A	100
D28	Battery current H	331C			100

Read Holding Register (0x03) and Write Multiple Holding Register (0x10)

Setting Parameter (Read and Write)

Number	Variable name	Address	Description	Unit	Times
E1	Battery Type	9000	0001H- Sealed , 0002H- GEL, 0003H- Flooded, 0000H- User defined		
E2	Battery Capacity	9001	Rated capacity of the battery	AH	
E3	Temperature compensation coefficient	9002	Range 0-9	mV/ °C/2 V	100
E4	High Volt. disconnect	9003		V	100
E5	Charging limit voltage	9004		V	100
E6	Over voltage reconnect	9005		V	100
E7	Equalization voltage	9006		V	100
E8	Boost voltage	9007		V	100
E9	Float voltage	9008		V	100
E10	Boost reconnect voltage	9009		V	100
E11	Low voltage reconnect	900A		V	100
E12	Under voltage recover	900B		V	100
E13	Under voltage warning	900C		V	100
E14	Low voltage disconnect	900D		V	100
E15	Discharging limit voltage	900E		V	100
E20	Real time clock	9013	D7-0 Sec, D15-8 Min.(Year, Month, Day, Min, Sec. should be written simultaneously)		
E21	Real time clock	9014	D7-0 Hour, D15-8 Day		
E22	Real time clock	9015	D7-0 Month, D15-8 Year		
E24	Battery temperature warning upper limit	9017		°C	100

E25	Battery temperature warning lower limit	9018		℃	100
E26	Controller inner temperature upper limit	9019		℃	100
E27	Controller inner temperature upper limit recover	901A	After Over Temperature, system recover once it drop to lower than this value	℃	100
E31	Day TimeThreshold Volt.(DTTV)	901E	PV lower than this value, controller would detect it as sundown	V	100
E32	Light signal startup (night) delay time	901F	PV voltage lower than NTTV, and duration exceeds the Light signal startup (night) delay time, controller would detect it as night time.	Min	
E33	Light Time Threshold Volt.(NTTV)	9020	PV voltage higher than this value, controller would detect it as sunrise	V	100
E34	Light signal close (day) delay time	9021	PV voltage higher than DTTV, and duration exceeds the Light signal close (day) delay time, controller would detect it as day time.	Min	
E62	Load controlling modes	903D	0000H Manual Control 0001H Light ON/OFF 0002H Light ON+ Timer/ 0003H Time Control		
E63	Working time length 1	903E	The length of load output timer1, D15-D8,hour, D7-D0, minute		
E64	Working time length 2	903F	The length of load output timer2, D15-D8, hour, D7-D0, minute		
E67	Turn on timing 1	9042	Turn on/off timing of load output.	Sec	
E68		9043		Min	
E69		9044		Hour	
E70	Turn off timing 1	9045			
E71		9046			
E72		9047			
E73	Turn on timing 2	9048			
E74		9049			
E75		904A			
E76	Turn off timing 2	904B			
E77		904C			
E78		904D			
E100	Backlight time	9063	Close after LCD backlight light setting the number of secends	S	

E102	Length of nigh	9065	Set default values of the whole night length of time. D15-D8,hour, D7-D0, minute		
E103	Device configure of main power supply	9066	0001H Battery is main, 0002H AC-DC power mainly		
E104	Battery rated voltage code	9067	0, auto recognize. 1-12V, 2-24V ,3-36V, 4-48V, 5-60V, 6-110V, 7-120V, 8-220V, 9-240V		
E107	Default Load On/Off in manual mode	906A	0-off, 1-on		
E108	Equalize duration	906B	Usually 0-120 minutes	Min	
E109	Boost duration	906C	Usually 10-120 minutes	Min	
E110	Discharging percentage	906D	Usually 20%-80%. The percentage of battery's remaining capacity when stop charging	%	100
E111	Charging percentage	906E	Depth of charge, 100%	%	100
E113	Management modes of battery charging and discharging	9070	Management modes of battery charge and discharge, voltage compensation : 0 and SOC : 1		

Read Coils (0x01) and Write Single Coil(0x05)

Switch Value (Read and Write)

Number	Variable name	Address	Description
H1	Charging device on/off	0	1 Charging device on 0 Charging device off
H2	Output control mode manual/automatic	1	1 Output control mode manual 0 Output control mode automatic
H3	Manual control the load	2	When the load is manual mode, 1-manual on 0 -manual off
H4	Default control the load	3	When the load is default mode, 1-manual on 0 -manual off
H6	Enable load test mode	5	1 Enable 0 Disable(normal)
H7	Force the load on/off	6	1 Turn on 0 Turn off (used for temporary test of the load)
H20	Restore system defaults	13	1 yes 0 no
H21	Clear generating electricity statistics	14	1 clear. Root privileges to perform

Read Discrete Inputs (0x02)

Discrete Value (Read Only)

Number	Variable name	Address	Description
I1	Over temperature inside the device	2000	1 The temperature inside the controller is higher than the over-temperature protection point. 0 Normal
I12	Day/Night	200C	1-Night, 0-Day

Examples

Read real-time battery voltage

Device ID:0x01

Function code: 0x04

Register Address: 0x3104

Register count: 0x0001

Send command: 01 04 31 04 00 01 7E F7

Receive command: 01 04 02 04 CE 3A 64

Read Holding Register Value: 0x04CE

0x04CE (hex) = 1230 (dec)

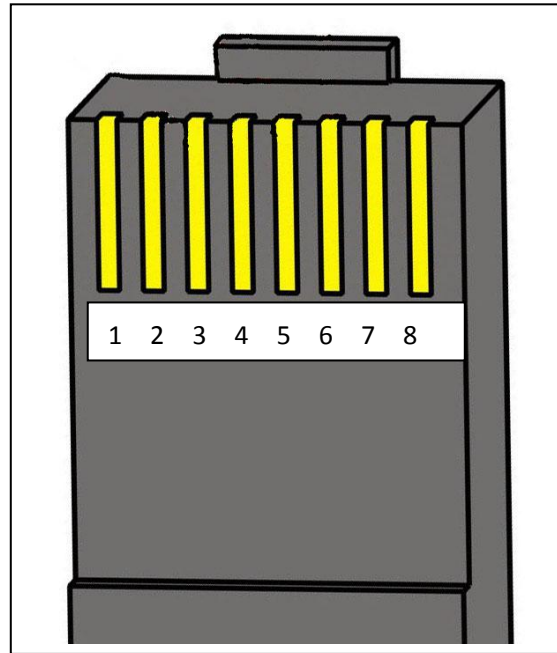
1230 / 100 = 12.3 volt

Pin Definition

1. The RJ45 interface pin define for RS485 port of LS-B、VS-B、Tracer-B series controllers is shown below:

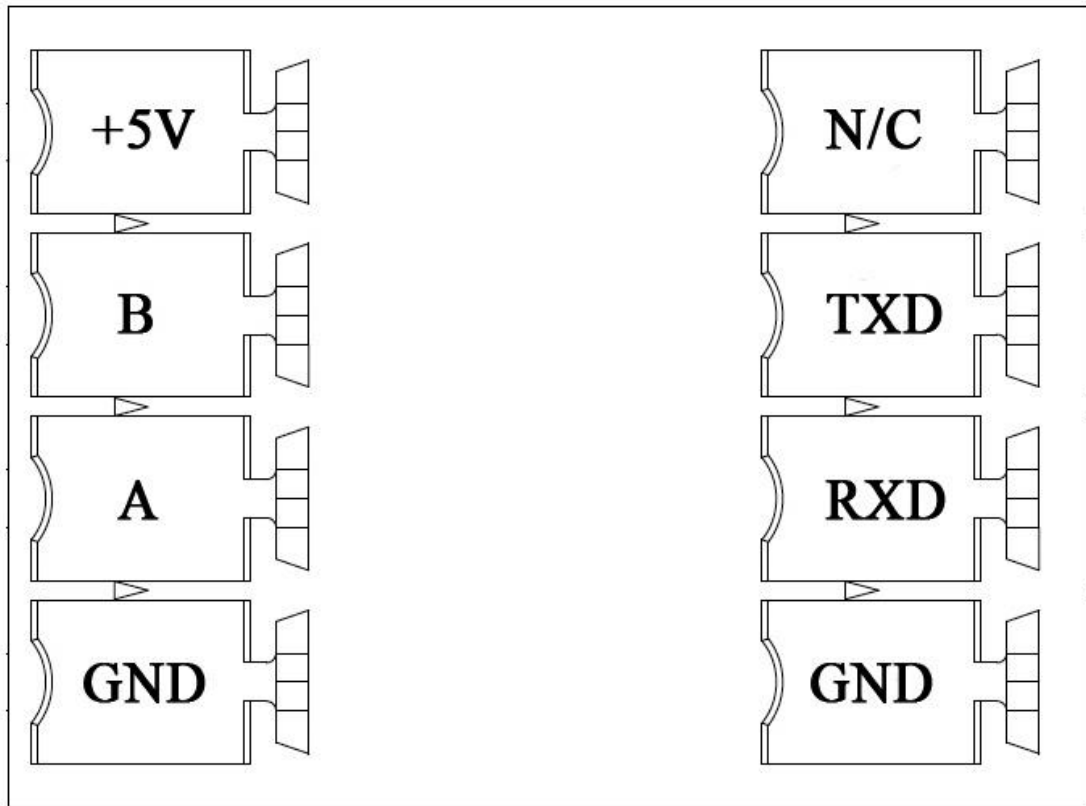
Pins define:

Pins	Define
1	Power supply output +7.5V
2	Power supply output +7.5V
3	RS-485-B
4	RS-485-B
5	RS-485-A
6	RS-485-A
7	Ground
8	Ground



RJ45 plug pins are sorted by number, the sketch map is as shown above:

2. The interface pin definition for RS485 and RS232 port of iTracer-B、eTracer-B series controllers is shown below:



Note:

(1)To improve the communication quality, the Gound pins(connected with the negative terminal of the battery) could be used if necessary. However, the user must care the common ground problem of the connected devices.

(2)Do not use the Vcc pins (+7.5v or +5v), or the controller may be damaged permanently.

References

- Modbus Protocol Reference Guide, Modicon, June 1996, PI-MODBUS-300 Rev.J
- Modbus Application Protocol Specification, modbus.org, 8May02,
- `Modbus_application_protocol_v1`