**Modbus/TCP**

1：Hardware communication parameters

|  |  |  |
| --- | --- | --- |
| Hardware | Port |  |
| Ethernet/WIFI | 502 |  |

2：Software Protocol Specification

The Modbus TCP protocol frame specification is used for communication, and the standard protocol frame format is in accordance with the standard Modbus TCP frame format:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | MBAP | |  |  | PDU |  |
| Transaction flags | protocol identifier | Data length | unit identifier | function code |  | Data |
| 2 Byte | 2Byte | 2Byte | 1 Byte | 1Byte |  | N\* Byte |

MBAP

Transaction processing flag: sourced from the host and consistent with the host at the same time

Protocol Identifier: 0 = Modbus protocol is consistent with the host at the same time

Data length: unit identifier length + PDU length

Unit Identifier : 0

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | MB | AP |  |  | PDU |  |
| transaction flag | protocol identifier | Data length | unit identifier | function code | Number of bytes (byte units) | response data |

PDU：

Function code definition

|  |  |  |
| --- | --- | --- |
| Function code definition | |  |
| write command (w) |  | 16（DEC） |
| read command (R) |  | 03（DEC） |
| response error code |  | 65535（DEC） |

Data：

|  |  |
| --- | --- |
|  | data field |
| initial address | Number of registers (operation length) |
| 1Byte | N Byte |

The charging pile operates as a slave/modbus tcp server.

request message and response log Read register log format:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | MBAP | |  |  | PDU |  |
| transaction flag | protocol identifier | Data length | unit identifier | function code | register address | read length (number of registers) |
| 2 Byte | 2Byte | 2Byte | 1 Byte | 1Byte | 2Byte | 2Byte |

Read Register log Response

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 2 Byte | 2Byte | 2Byte | 1 Byte | 1Byte | 1Byte | determined by  the number of  bytes |

Write register log format:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| MB | | AP |  |  |  | PDU |  |
| transaction flag | protocol identifier | Data length | unit identifier | function  code | register address | Number of bytes (byte unit) | Data field |
| 2 Byte | 2Byte | 2Byte | 1 Byte | 1Byte | 2Byte | 1 byte | determined by the  number of bytes |

Write Register log Response

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | MB | AP |  |  | PDU | |
| transaction flag | protocol identifier | Data length | unit identifier | function  code | register address | Number of registers  (length) |
| 2 Byte | 2Byte | 2Byte | 1 Byte | 1Byte | 2Byte | 2byte |

error reply log

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | MBAP | |  |  | PDU | |  |
| transaction flag | protocol identifier | Data length | unit identifier | function  code | register address |  | error code |
| 2 Byte | 2Byte | 2Byte | 1 Byte | 1Byte | 2Byte |  | 2byte |

3：Register Profile

（RO : Read only WO ：Write only WR：read and written ）

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| register  (HEX) | register (DEC) | Name | describe | type | Attr ibut es | unit |
| 0x00 | 0000 | Charging station state | Charging pile system status 0: Unknown state  1: idle state  2: connection status  3: Startup state  4: charging status  5: Startup failed  6: End of charging  7: System failure  8: Scheduled state  9: System upgrade  10: Power-on status | Uint16 | RO |  |
| 0x02 | 0002 | Cable state | cable status  0: EV is not connected  1: Connect to EV | Uint16 | RO |  |
| 0x04 |  |  | error code  0: The system has no fault |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | 0004 | ERRO CODE | 11: CP voltage is abnormal  12: Emergency stop fault  13: Undervoltage fault  14: Overvoltage fault  15: Over temperature fault  16: Meter failure  17: Leakage fault  18: Output short circuit  19: Overcurrent fault  21: Car response timeout  22: No diode at the vehicle end  23: Relay adhesion  24: Leakage current device failure  25: Ground fault  26: The startup process  failed | Uint16 | RO |  |
| 0x06 | 0006 | Current L1 | L1 real-time charging current should be 0 in non-charging  state | Uint16 | RO | 0.1A |
| 0x08 | 0008 | Current L2 | L2 real-time charging current should be 0 in non-charging  state | Uint16 | RO | 0.1A |
| 0x0a | 0010 | Current L3 | L3 real-time charging current should be 0 in non-charging  state | Uint16 | RO | 0.1A |
| 0x0c | 0012 | Active power | Real-time charging total power | Uint32 | RO | W |
| 0x10 | 0016 | Active power  L1 | L1 real-time charging power | Uint32 | R0 | W |
| 0x14 | 0020 | Active power  L2 | L2 real-time charging power | Uint32 | R0 | W |
| 0x18 | 0024 | Active power  L3 | L3 real-time charging power | Uint32 | R0 | W |
| 0x1c | 0028 | Energy Meter | Meter reading | Uint32 | RO | 0.1KWh |
| 0x20 | 0032 | Evse max currtent | Maximum current of charging pile (cable hardware software) | Uint16 | RO | 0.1A |
| 0x22 | 0034 | Evse min current | Charging pile minimum current  (cable hardware software) | Uint16 | RO | 0.1A |
| 0x24 | 0036 | Cable max curent | Gun wire maximum support current | Uint16 | RO | 0.1A |
| 0x26 | 0038~0069 | Charger sn | Station  Scale length up to 16 | Uinit16 | RO | MAX  lenth 32 |
| 0x48 | 0072 | Charge energy | Current charging power or last charging power | Uint16 | RO | 0.1KWH |
| 0x4a | 0074+0075+007  6 | START TIME | Charging start time | Uint16 | RO | hhmms s |
| 0x4e | 0078 | Charging time | The current charging time or | Uint32 | RO | S |
|  |  |  | the last charging time |  |  |  |
| 0x52 | 0082 | End time | Charging end time | Uint16 | RO | hhmms s |
| 0x57 | 0087 | Safe current | Maximum safe current after communication interruption | Uint16 | WR | 0.1A |
| 0x59 | 0089 | Conn timeout | Communication timeout | Uint16 | WR | S |
| 0x5b | 0091 | Limit charging current | Charge limited current | Uint16 | WR | 0.1A |
| 0x5f | 0095 | Charge cmd | Only valid when Charge control is 2  1: start  2: stop | Uint16 | WR |  |
| 0x61 | 0097 | Real time | Current real time | Uint16 | WR | YYMMD  DHHM  MSS |
| 0x6d | 0109 | L1 Voltage | L1 real-time voltage | Uint16 | RO | 0.1V |
| 0x6f | 0111 | L2 Voltage | L2 real-time voltage | Uint16 | RO | 0.1V |
| 0x71 | 0113 | L3 Voltage | L3 real-time voltage | Uint16 | RO | 0.1V |

4：Register details

|  |  |
| --- | --- |
| Register（DEC） | describe |
| 0000 | Description of charging pile system status  1: Idle state: At this time, the charging pile is not connected to the car, and the CP voltage should be in the 12V state.  2: Connection status: This status will only appear in the non-plug and charge mode, indicating that the gun is connected to the pile and the car, and the CP voltage is in the 9V state  3: Start state The pile end is ready to supply energy, waiting for the car end to respond, and the CP voltage is 9V.  4: Charging status: the car is ready to receive energy, close S2 and start charging  5: Startup failure: In the startup state, the car will respond over time (600S) or the startup process, the gun will be pulled out (CP == 12V) will enter this state  6: End of charging: When the car is in the charging state, swiping the card to stop, pulling the gun and other behaviors that stop and continue charging will enter the end state  7: System failure: internal failure will enter this state  8: Pre-order status: This function is only available when using OCPP and Weiyu APP  9: System upgrade: indicates that the firmware is currently being upgraded  10: The system is powered on: The CP is not stable when the system is powered on. |
| 0002 | cable status CASE C connection method:  0: EV not connected (CP 12V)  1: Connect EV (CP 9V or CP 6V)  CASE B connection method:  0: Charging pile and EV (12V) not connected  1: Connect the charging pile and EV (9V or 6V) |

|  |  |
| --- | --- |
| 0004 | Error code description  0: The system is not faulty  11: CP voltage is abnormal  12: Emergency stop fault: the emergency stop button is pressed  13: Undervoltage fault: External power supply voltage is too low Wiring error  14: Overvoltage fault: External power supply voltage is too high Wiring error  15: Over temperature fault: Internal temperature is too high  16: Meter failure: Internal meter failure  17: Leakage fault: output leakage  18: Output short circuit: External output short circuit  19: Overcurrent fault: The charging current exceeds the limit current of the cable or EVSE  21: Vehicle response timeout: vehicle charging response timeout  22: No diode at the vehicle end: abnormality at the vehicle end  23: Relay sticking: Internal relay sticking  24: Leakage current device failure: The leakage current detection device is abnormal  25: Ground fault: bad ground  26: Failed to start process: Failed to start |
| 0006 | Real-time charging current L1  It will be updated only in the charging state, and the value in the rest state is 0，unit 0.1A |
| 0008 | Real-time charging current L2  It will be updated only in the charging state, and the value in the rest state is 0，unit 0.1A |
| 0010 | Real-time charging current L3  It will be updated only in the charging state, and the value in the rest state is 0，unit 0.1A |
| 0012 | Real-time charging total active energy  It will be updated only in the charging state, and the value in the rest of the state is 0 , unit w |
| 0016 | Real-time charging of L1 active energy  It will be updated only in the charging state, and the value in the rest of the state is 0, unit w |
| 0020 | Real-time charging of L2 active energy  It will be updated only in the charging state, and the value in the rest of the state is 0, unit w |
| 0024 | Real-time charging of L3active energy  It will be updated only in the charging state, and the value in the rest of the state is 0, unit w |
| 0028 | Energy meter reading  Store the total charged electrical energy in 0.1kwh |
| 0032 | Maximum current of charging pile (cable hardware software)  This parameter is jointly determined by the cable, hardware and software. The minimum value of the three is used as the maximum data current of the charging pile. The final output power needs to be calculated according to the address value. |
| 0034 | Minimum current of charging pile  The default value is 6A. Modification is not supported. Unit 0.1A |
| 0036 | Maximum output current of charging pile connecting cable  Valid in CASE C mode  Valid after the gun is inserted in CASE B mode, unit 0.1A |
| 0038 | User ID This register has a maximum length of 32  Up to 32 characters |

|  |  |
| --- | --- |
| 0072 | charging energy  In charging state: update the current charging power in real time  Non-charging state: record the electric energy in the last charging state, unit 0.1kwh |
| 0074+0075+0076 | The charging time format when entering charging is: hh mm ss read length is 3  Only exists during charging, it will be automatically cleared after exiting the charging state |
| 0078 | Charging time  State of charge: how long it has been charged  Non-charging state: the duration of the last charge |
| 0082 | The charging time format when exiting charging is: hh mm ss read length is 3  Only exists during charging, it will be automatically cleared after exiting the charging state |
| 0086 | Maximum charging current after communication disconnection This value is a separately controlled current value. After the communication is disconnected, if charging is in progress, the current charging current will be automatically reduced to the set value.  The communication disconnection is not based on the disconnection of the TCP connection, and the basis is the communication timeout time. |
| 0088 | Communication timeout setting  Any communication will refresh this time to re-time  Timeout will consider communication timeout Maximum value 65535S Unit S |
| 0090 | Limit charging current:  This value can be set at any time. For example, in the charging state, the value will be issued immediately. The minimum response time of the charging pile is 4S between the two modification intervals.  In the non-charging state, the value will be modified immediately to become the output current value of the next charging |
| 0082 | Charge Mode Control  0: Plug and charge  1: Swipe card to charge |
| 0094 | Only valid when Charge control is 2  1: Start (valid in preparation phase or connection phase)  2: Stop (valid when charging) |
| 0096 | real time  The real-time time has nothing to do with the communication timeout time  Length 3 Format: yymmdd hhssmm  Device initialization time: 2020-5-2 12:2:50 |
| 0108 | L1 real-time voltage unit 0.1V |
| 0110 | L2 real-time voltage unit 0.1V |
| 0112 | L3 real-time voltage unit 0.1V |