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Technical Note

Hoymiles Modbus Protocol for DTU-Pro/Pro-S

Version: V1.2 (Applicable to software versions V00.00.22 and later)
Release Date: 2024-05-09

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1 Introdution

The Hoymiles Modbus protocol is accessible through both the RS485 and Ethernet interfaces. The two ports use Modbus RTU and Modbus TCP protocols respectively.

The Hoymiles DTU-Pro/Pro-S integrates both RS485 and Ethernet interface, facilitating seamless connectivity between the Hoymiles microinverter system and non-Hoymiles monitoring server. This integration allows direct access to module-level data and remote control of the microinverter system using the Modbus protocol. You can conveniently process the microinverter data without disrupting communication with the Hoymiles Monitoring Platform S-Miles Cloud.

This document serves as a concise introduction to Hoymiles Modbus protocols and provides a guide on how to effectively utilize them.

2 Terms

- **DTU:** DTU refers to Hoymiles Data Transfer Unit, which receives data from microinverters and meters, and uploads them to S-Miles Cloud.
- **Modbus**: Modbus is a standard serial communications protocol commonly used with the RS485 physical layer.
- **Modbus RTU**: Modbus RTU refers to a Modbus communication protocol that uses RTU transmission mode (implemented through RS485 interface).
- **Modbus TCP**: Modbus TCP refers to a Modbus communication protocol that uses TCP transmission mode (implemented through network interface).
- **Sunspec Modbus**: Sunspec Modbus is a standard serial communications protocol specifically designed to achieve interoperability between Distributed Energy Resource (DER) components and smart grid applications.

3 Hoymiles Modbus RTU Connection and Communication

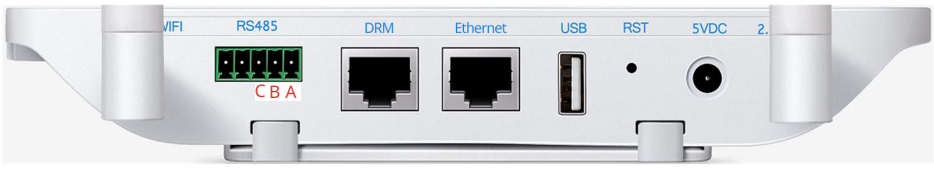
This section offers instructions on wiring and establishing communication using Hoymiles Modbus RTU. Additionally, it provides a register list for monitoring data and facilitating remote control.

3.1 Connecting via RS485 Interface

The Modbus output uses half-duplex two-wire (plus common) communication, using the same pair of wires to send and receive data.

When employing RS485 Modbus communication, adhere to the following guidelines:

- Connect the A, B, and C (common) terminals to ensure dependable communication between the master device and the slave devices.



- Avoid interchanging terminals to prevent any disruptions in communication.
- In the case of a shielded cable, connect the shielding layer to the Modbus common terminal for optimal performance.

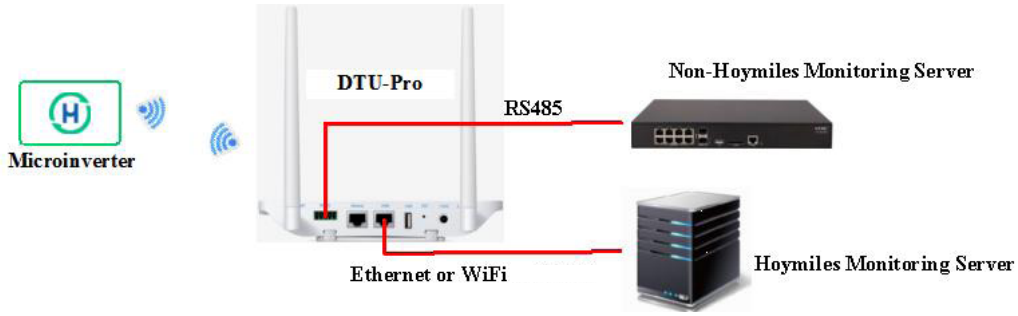
3.1.1 RS485 Cable

Use twisted-pair cable (shown as follows, the shielded one is preferred) to prevent interference.

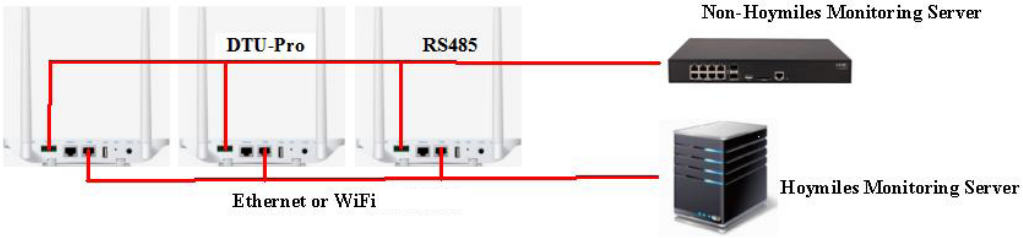
3.1.2 Connection Topology

RS485 networks should be wired in daisy-chain configuration.

In a small PV system with only one DTU, connect the RS485 interface of the DTU-Pro/Pro-S and the non-Hoymiles monitoring device using twisted-pair cable (shielded twisted-pair cable is preferred). Alternatively, you can use the Ethernet or Wi-Fi option to connect the DTU to S-Miles Cloud simultaneously.



For installations with multiple DTU devices, connect the RS485 interface of the DTU-Pro/Pro-S to the non-Hoymiles monitoring devices in a daisy-chain manner.



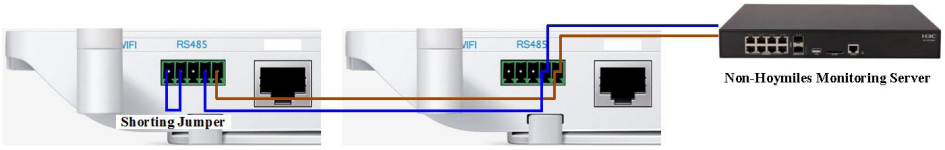
3.1.3 Connection Guideline

Scenario 1:

If there is only one DTU in a system, and the RS485 cable length exceeds 200 meters, it is recommended to use shorting jumpers on the two terminals of the RS485 interface.

Scenario 2:

If there are multiple DTU devices in a system, connect the DTU devices one by one (as shown in the figure below). If the distance between the microinverter and the final DTU exceeds 200 meters, it is recommended to use shorting jumpers on the two terminals of the RS485 interface on the final DTU.



3.2 Configuring Modbus RTU Settings

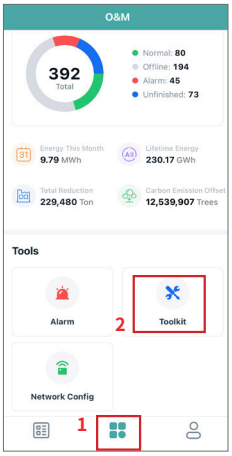
In a general Modbus protocol, the DTU-Pro/Pro-S functions as a slave device, receiving control commands from a non-Hoymiles monitoring device. Each DTU-Pro/Pro-S on the Modbus network must possess a unique address and correct serial port parameters.

3.2.1 Setting the Modbus Address

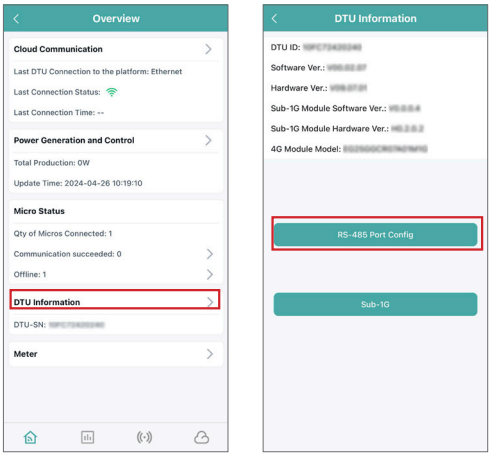
The RS485 interface on the DTU-Pro/Pro-S has two modes. One is that DTU acts as the master device to control the power export management system, and the other is that DTU acts as a slave device and the data is collected by a non-Hoymiles collector. All DTU devices within the Hoymiles microinverter system should be set to the same mode. The default function of this RS485 interface is set to power export management, and you can change the working mode through the following steps:

1. Open S-Miles Installer App and log in.

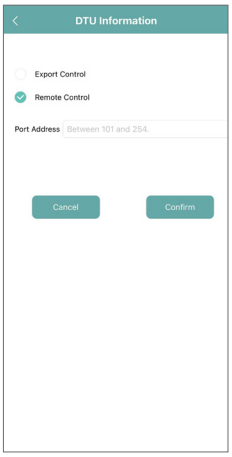
2. Tap **O&M** > **Toolkit**.



3. Tap **DTU Information** > **RS485 Port Config**.



4. Select **Remote Control**, and enter port address. Tap **Confirm**.



Notice

- *RS485 port address should be set within the range of 101 to 254. In a microinverter system with multiple DTU devices, each DTU must have a unique port address assigned.*
- *The screenshots provided in this guide are for reference only. The actual screens may vary.*

3.2.2 Setting the Serial Port Parameters

Serial port parameters refer to baud rate, data bit, parity bit, and stop bit. The parameters are preset with default values and cannot be changed.

Hoymiles DTU-Pro/Pro-S default parameters are set as follows:

Parameter	Default Value
Baud Rate	9600 bps
Data Bit	8
Check Digit	-
Stop Bit	1

3.3 Understanding Modbus RTU Function Codes

The Modbus protocol follows a master-slave structure, where there is one master device and multiple slave devices. When operating as a slave device, the DTU will respond only when queried.

In most cases, your Modbus software automatically utilizes the appropriate Modbus command for any desired action. However, the Hoymiles DTU-Pro/Pro-S only supports the following functions:

- 03 (0x03) Read Device Data (Serial Number, etc.):

Read meter serial number, CT value, microinverter serial number, microinverter on/off data, and power limit data.

- 04 (0x04) Read Device Real-Time Data:

The input registers of DTU are usually read-only and report data such as voltage, current, power, energy.

- 06 (0x06) Write Single / All Device Status:

Using this command, you can write a new value to a single status register.

- 16 (0x10) Write Multiple Device Status:

Using this command, you can write a new value to multiple status registers.

3.3.1 03 (0x03) Reading Multiple Microinverters and Meter Serial Numbers

- Command sending format

Name	Length	Value	Remark
Address	1	xx	DTU485 Address
Function Code	1	0x03	-
Register Address Code	2	xxxx	Big-Endian
Register Count	2	xxxx	Big-Endian
CRC	2	xxxx	CRC16

- Command response format (successful commands)

Name	Length	Value	Remark
Address	1	xx	DTU485 Address
Function Code	1	0x03	-
Data Length	1	xx	-
Data 1	1	xx	-
Data 2	1	xx	-
.....			
CRC	2	xxxx	CRC16

- Command response format (failed commands)

Name	Length	Value	Remark
Address	1	xx	DTU 485 Address
Function Code	1	0x83	-
Error Data Code	1	0x01	-
CRC	2	xxxx	CRC16

3.3.2 04 (0x04) Reading Multiple Microinverters and Meter Real-Time Data

- Command sending format

Name	Length	Value	Remark
Address	1	xx	DTU485 Address
Function Code	1	0x04	-
Register Address Code	2	xxxx	Big-Endian
Register Count	2	xxxx	Big-Endian
CRC	2	xxxx	CRC16

- Command response format (successful commands)

Name	Length	Value	Remark
Address	1	xx	DTU485 Address
Function Code	1	0x04	-
Data Length	1	xx	-
Data 1	1	xx	-
Data 2	1	xx	-
.....			
CRC	2	xxxx	CRC16

- Command response format (failed commands)

Name	Length	Value	Remark
Address	1	xx	DTU 485 Address
Function Code	1	0x84	-
Error Data Code	1	0x01	-
CRC	2	xxxx	CRC16

3.3.3 06 (0x06) Writing Single or All Device Status

- Command sending format

Name	Length	Value	Remark
Address	1	xx	DTU485 Address
Function Code	1	0x06	-
Register Address Code	2	xxxx	Big-Endian
Data	2	xxxx	Big-Endian
CRC	2	xxxx	-

- Command response format (successful commands)

Name	Length	Value	Remark
Address	1	xx	DTU485 Address
Function Code	1	0x06	-
Register Address Code	2	xxxx	Big-Endian
Data	2	xxxx	Big-Endian
CRC	2	xxxx	CRC16

- Command response format (failed commands)

Name	Length	Value	Remark
Address	1	xx	DTU485 Address
Function Code	1	0x86	-
Wrong Data Code	1	0x01	-
CRC	2	xxxx	CRC16

3.3.4 16 (0x10) Writing Multiple Device Status

- Command sending format

Name	Length	Value	Remark
Address	1	xx	DTU485 Address
Function Code	1	0x10	-
Register Address Code	2	xxxx	Big-Endian
Register Count	2	xxxx	Big-Endian
Data Length	1	xx	-
Data 1	1	xx	-
Data 2	1	xx	-
.....			
CRC	2	xxxx	-

- Command response format (successful commands)

Name	Length	Value	Remark
Address	1	xx	DTU485 Address
Function Code	1	0x10	-
Register Address Code	2	xxxx	Big-Endian
Register Count	2	xxxx	Big-Endian
CRC	2	xxxx	CRC16

- Command response format (failed commands)

Name	Length	Value	Remark
Address	1	xx	DTU485 Address
Function Code	1	0x90	-
Wrong Data Code	1	0x01	-
CRC	2	xx	CRC16

3.4 Understanding Modbus Registers

3.4.1 Device Information

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)	Remark
0x3000	3	DTU Serial Number	/	N/A	R	uint16	0x04	eg.,10F800000001
0x3003	1	Meter Number	1	N/A	R	uint16	0x04	eg.,1
0x3004	1	Microinverter Number	1	N/A	R	uint16	0x04	eg.,2

3.4.2 DTU Data

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x3100	4	Sum of All Microinverters' Total Production in DTU	1	Wh	R	uint64	0x04
0x3104	4	Sum of All Microinverters' Today Production in DTU	1	Wh	R	uint64	0x04
0x3108	2	Sum of All Microinverters' Active Power in DTU	0.1	W	R	uint32	0x04
0x310A	2	Sum of All Microinverters' Reactive Power in DTU	0.1	VA	R	uint32	0x04

3.4.3 Real-Time Meter Data

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x3160	3	Meter 1: Serial Number	/	N/A	R	uint16	0x04
0x3163	2	Meter 1: Total Active Power	0.01	kw	R	uint32	0x04
0x3165	2	Meter 1: Phase A Active Power	0.01	kw	R	uint32	0x04
0x3167	2	Meter 1: Phase B Active Power	0.01	kw	R	uint32	0x04
0x3169	2	Meter 1: Phase C Active Power	0.01	kw	R	uint32	0x04
0x316B	2	Meter 1: Power Factor	0.001	N/A	R	uint32	0x04
0x316D	2	Meter 1: Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x316F	2	Meter 1: Phase A Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x3171	2	Meter 1: Phase B Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x3173	2	Meter 1: Phase C Total Electricity Positive Import	0.01	kWh	R	uint32	0x04

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x3175	2	Meter 1: Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x3177	2	Meter 1: Phase A Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x3179	2	Meter 1: Phase B Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x317B	2	Meter 1: Phase C Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x317D	2	Meter 1: Phase A Voltage	0.01	V	R	uint32	0x04
0x317F	2	Meter 1: Phase B Voltage	0.01	V	R	uint32	0x04
0x3181	2	Meter 1: Phase C Voltage	0.01	V	R	uint32	0x04
0x3183	2	Meter 1: Phase A Current	0.01	A	R	uint32	0x04
0x3185	2	Meter 1: Phase B Current	0.01	A	R	uint32	0x04
0x3187	2	Meter 1: Phase C Current	0.01	A	R	uint32	0x04
0x3189	2	Meter 1: Phase A Power Factor	0.001	N/A	R	uint32	0x04
0x318B	2	Meter 1: Phase B Power Factor	0.001	N/A	R	uint32	0x04
0x318D	2	Meter 1: Phase C Power Factor	0.001	N/A	R	uint32	0x04
0x318F	1	Meter 1: Status (0: Offline; 1: Online)	/	N/A	R	uint16	0x04
0x3190	2	Meter 1: Uab Line Voltage	0.01	V	R	uint32	0x04
0x3192	2	Meter 1: Ubc Line Voltage	0.01	V	R	uint32	0x04
0x3194	2	Meter 1: Uca Line Voltage	0.01	V	R	uint32	0x04
0x3196	74	Meter 1: Reserved	/	N/A	R	uint16	0x04
0x31E0	3	Meter 2: Serial Number	/	N/A	R	uint16	0x04
0x31E3	2	Meter 2: Total Active Power	0.01	kw	R	uint32	0x04
0x31E5	2	Meter 2: Phase A Active Power	0.01	kw	R	uint32	0x04
0x31E7	2	Meter 2: Phase B Active Power	0.01	kw	R	uint32	0x04
0x31E9	2	Meter 2: Phase C Active Power	0.01	kw	R	uint32	0x04
0x31EB	2	Meter 2: Power Factor	0.001	N/A	R	uint32	0x04
0x31ED	2	Meter 2: Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x31EF	2	Meter 2: Phase A Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x31F1	2	Meter 2: Phase B Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x31F3	2	Meter 2: Phase C Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x31F5	2	Meter 2: Total Electricity Positive Export	0.01	kWh	R	uint32	0x04

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x31F7	2	Meter 2: Phase A Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x31F9	2	Meter 2: Phase B Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x31FB	2	Meter 2: Phase C Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x31FD	2	Meter 2: Phase A Voltage	0.01	V	R	uint32	0x04
0x31FF	2	Meter 2: Phase B Voltage	0.01	V	R	uint32	0x04
0x3201	2	Meter 2: Phase C Voltage	0.01	V	R	uint32	0x04
0x3203	2	Meter 2: Phase A Current	0.01	A	R	uint32	0x04
0x3205	2	Meter 2: Phase B Current	0.01	A	R	uint32	0x04
0x3207	2	Meter 2: Phase C Current	0.01	A	R	uint32	0x04
0x3209	2	Meter 2: Phase A Power Factor	0.001	N/A	R	uint32	0x04
0x320B	2	Meter 2: Phase B Power Factor	0.001	N/A	R	uint32	0x04
0x320D	2	Meter 2: Phase C Power Factor	0.001	N/A	R	uint32	0x04
0x320F	1	Meter 2: Status (0: Offline; 1: Online)	/	N/A	R	uint16	0x04
0x3210	2	Meter 2: Uab Line Voltage	0.01	V	R	uint32	0x04
0x3212	2	Meter 2: Ubc Line Voltage	0.01	V	R	uint32	0x04
0x3214	2	Meter 2: Uca Line Voltage	0.01	V	R	uint32	0x04
0x3216	74	Meter 2: Reserved	/	N/A	R	uint16	0x04
... (A single DTU supports a maximum of 10 meter units.)							
0x35E0	3	Meter 10: Serial Number	/	N/A	R	uint16	0x04
0x35E3	2	Meter 10: Total Active Power	0.01	kw	R	uint32	0x04
0x35E5	2	Meter 10: Phase A Active Power	0.01	kw	R	uint32	0x04
0x35E7	2	Meter 10: Phase B Active Power	0.01	kw	R	uint32	0x04
0x35E9	2	Meter 10: Phase C Active Power	0.01	kw	R	uint32	0x04
0x35EB	2	Meter 10: Power Factor	0.001	N/A	R	uint32	0x04
0x35ED	2	Meter 10: Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x35EF	2	Meter 10: Phase A Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x35F1	2	Meter 10: Phase B Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x35F3	2	Meter 10: Phase C Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x35F5	2	Meter 10: Total Electricity Positive Export	0.01	kWh	R	uint32	0x04

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x35F7	2	Meter 10: Phase A Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x35F9	2	Meter 10: Phase B Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x35FB	2	Meter 10: Phase C Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x35FD	2	Meter 10: Phase A Voltage	0.01	V	R	uint32	0x04
0x35FF	2	Meter 10: Phase B Voltage	0.01	V	R	uint32	0x04
0x3601	2	Meter 10: Phase C Voltage	0.01	V	R	uint32	0x04
0x3603	2	Meter 10: Phase A Current	0.01	A	R	uint32	0x04
0x3605	2	Meter 10: Phase B Current	0.01	A	R	uint32	0x04
0x3607	2	Meter 10: Phase C Current	0.01	A	R	uint32	0x04
0x3609	2	Meter 10: Phase A Power Factor	0.001	N/A	R	uint32	0x04
0x360B	2	Meter 10: Phase B Power Factor	0.001	N/A	R	uint32	0x04
0x360D	2	Meter 10: Phase C Power Factor	0.001	N/A	R	uint32	0x04
0x360F	1	Meter 10: Status (0: Offline; 1: Online)	/	N/A	R	uint16	0x04
0x3610	2	Meter 10: Uab Line Voltage	0.01	V	R	uint32	0x04
0x3612	2	Meter 10: Ubc Line Voltage	0.01	V	R	uint32	0x04
0x3614	2	Meter 10: Uca Line Voltage	0.01	V	R	uint32	0x04
0x3616	74	Meter 10: Reserved	0	N/A	R	uint16	0x04

3.4.4 Real-Time Microinverter Data

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x38E0	3	Microinverter 1: Serial Number	1	N/A	R	uint16	0x04
0x38E3	2	Microinverter 1: Total Production	1	Wh	R	uint64	0x04
0x38E5	2	Microinverter 1: Today Production	1	Wh	R	uint64	0x04
0x38E7	1	Microinverter 1: Active Power	0.1	W	R	uint16	0x04
0x38E8	1	Microinverter 1: Reactive Power	0.1	VA	R	uint16	0x04
0x38E9	1	Microinverter 1: Power Factor	0.001	N/A	R	uint16	0x04
0x38EA	1	Microinverter 1: Phase A Phase Voltage	0.1	V	R	uint16	0x04
0x38EB	1	Microinverter 1: Phase B Phase Voltage	0.1	V	R	uint16	0x04
0x38EC	1	Microinverter 1: Phase C Phase Voltage	0.1	V	R	uint16	0x04
0x38ED	1	Microinverter 1: Phase AB Line Voltage	0.1	V	R	uint16	0x04
0x38EE	1	Microinverter 1: Phase BC Line Voltage	0.1	V	R	uint16	0x04
0x38EF	1	Microinverter 1: Phase CA Line Voltage	0.1	V	R	uint16	0x04

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x38F0	1	Microinverter 1: Phase A Current	0.01	A	R	uint16	0x04
0x38F1	1	Microinverter 1: Phase B Current	0.01	A	R	uint16	0x04
0x38F2	1	Microinverter 1: Phase C Current	0.01	A	R	uint16	0x04
0x38F3	1	Microinverter 1: Grid Frequency	0.01	Hz	R	uint16	0x04
0x38F4	1	Microinverter 1: Device Temperature	0.1	℃	R	uint16	0x04
0x38F5	1	Microinverter 1: PV1 Voltage	0.1	V	R	uint16	0x04
0x38F6	1	Microinverter 1: PV1 Current	0.01	A	R	uint16	0x04
0x38F7	1	Microinverter 1: PV1 Power	0.1	W	R	uint16	0x04
0x38F8	1	Microinverter 1: PV2 Voltage	0.1	V	R	uint16	0x04
0x38F9	1	Microinverter 1: PV2 Current	0.01	A	R	uint16	0x04
0x38FA	1	Microinverter 1: PV2 Power	0.1	W	R	uint16	0x04
0x38FB	1	Microinverter 1: PV3 Voltage	0.1	V	R	uint16	0x04
0x38FC	1	Microinverter 1: PV3 Current	0.01	A	R	uint16	0x04
0x38FD	1	Microinverter 1: PV3 Power	0.1	W	R	uint16	0x04
0x38FE	1	Microinverter 1: PV4 Voltage	0.1	V	R	uint16	0x04
0x38FF	1	Microinverter 1: PV4 Current	0.01	A	R	uint16	0x04
0x3900	1	Microinverter 1: PV4 Power	0.1	W	R	uint16	0x04
0x3901	1	Microinverter 1: PV5 Voltage	0.1	V	R	uint16	0x04
0x3902	1	Microinverter 1: PV5 Current	0.01	A	R	uint16	0x04
0x3903	1	Microinverter 1: PV5 Power	0.1	W	R	uint16	0x04
0x3904	1	Microinverter 1: PV6 Voltage	0.1	V	R	uint16	0x04
0x3905	1	Microinverter 1: PV6 Current	0.01	A	R	uint16	0x04
0x3906	1	Microinverter 1: PV6 Power	0.1	W	R	uint16	0x04
0x3907	1	Microinverter 1: Microinverter Status	1	N/A	R	uint16	0x04
0x3908	1	Microinverter 1: Alarm Code 1	1	N/A	R	uint16	0x04
0x3909	1	Microinverter 1: Alarm Code 2	1	N/A	R	uint16	0x04
0x390A	1	Microinverter 1: Alarm Code 3	1	N/A	R	uint16	0x04
0x390B	1	Microinverter 1: Alarm Code 4	1	N/A	R	uint16	0x04
0x390C	1	Microinverter 1: Alarm Code 5	1	N/A	R	uint16	0x04
0x390D	1	Microinverter 1: Alarm Code 6	1	N/A	R	uint16	0x04
0x390E	50	Microinverter 1: Reserved	1	N/A	R	uint16	0x04
0x3940	3	Microinverter 2: Serial Number	1	N/A	R	uint16	0x04
0x3943	2	Microinverter 2: Total Production	1	Wh	R	uint64	0x04
0x3945	2	Microinverter 2: Today Production	1	Wh	R	uint64	0x04
0x3947	1	Microinverter 2: Active Power	0.1	W	R	uint16	0x04
0x3948	1	Microinverter 2: Reactive Power	0.1	VA	R	uint16	0x04

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x3949	1	Microinverter 2: Power Factor	0.001	N/A	R	uint16	0x04
0x394A	1	Microinverter 2: Phase A Phase Voltage	0.1	V	R	uint16	0x04
0x394B	1	Microinverter 2: Phase B Phase Voltage	0.1	V	R	uint16	0x04
0x394C	1	Microinverter 2: Phase C Phase Voltage	0.1	V	R	uint16	0x04
0x394D	1	Microinverter 2: Phase AB Line Voltage	0.1	V	R	uint16	0x04
0x394E	1	Microinverter 2: Phase BC Line Voltage	0.1	V	R	uint16	0x04
0x394F	1	Microinverter 2: Phase CA Line Voltage	0.1	V	R	uint16	0x04
0x3950	1	Microinverter 2: Phase A Current	0.01	A	R	uint16	0x04
0x3951	1	Microinverter 2: Phase B Current	0.01	A	R	uint16	0x04
0x3952	1	Microinverter 2: Phase C Current	0.01	A	R	uint16	0x04
0x3953	1	Microinverter 2: Grid Frequency	0.01	Hz	R	uint16	0x04
0x3954	1	Microinverter 2: Device Temperature	0.1	℃	R	uint16	0x04
0x3955	1	Microinverter 2: PV1 Voltage	0.1	V	R	uint16	0x04
0x3956	1	Microinverter 2: PV1 Current	0.01	A	R	uint16	0x04
0x3957	1	Microinverter 2: PV1 Power	0.1	W	R	uint16	0x04
0x3958	1	Microinverter 2: PV2 Voltage	0.1	V	R	uint16	0x04
0x3959	1	Microinverter 2: PV2 Current	0.01	A	R	uint16	0x04
0x395A	1	Microinverter 2: PV2 Power	0.1	W	R	uint16	0x04
0x395B	1	Microinverter 2: PV3 Voltage	0.1	V	R	uint16	0x04
0x395C	1	Microinverter 2: PV3 Current	0.01	A	R	uint16	0x04
0x395D	1	Microinverter 2: PV3 Power	0.1	W	R	uint16	0x04
0x395E	1	Microinverter 2: PV4 Voltage	0.1	V	R	uint16	0x04
0x395F	1	Microinverter 2: PV4 Current	0.01	A	R	uint16	0x04
0x3960	1	Microinverter 2: PV4 Power	0.1	W	R	uint16	0x04
0x3961	1	Microinverter 2: PV5 Voltage	0.1	V	R	uint16	0x04
0x3962	1	Microinverter 2: PV5 Current	0.01	A	R	uint16	0x04
0x3963	1	Microinverter 2: PV5 Power	0.1	W	R	uint16	0x04
0x3964	1	Microinverter 2: PV6 Voltage	0.1	V	R	uint16	0x04
0x3965	1	Microinverter 2: PV6 Current	0.01	A	R	uint16	0x04
0x3966	1	Microinverter 2: PV6 Power	0.1	W	R	uint16	0x04
0x3967	1	Microinverter 2: Microinverter Status	1	N/A	R	uint16	0x04
0x3968	1	Microinverter 2: Alarm Code 1	1	N/A	R	uint16	0x04
0x3969	1	Microinverter 2: Alarm Code 2	1	N/A	R	uint16	0x04
0x396A	1	Microinverter 2: Alarm Code 3	1	N/A	R	uint16	0x04
0x396B	1	Microinverter 2: Alarm Code 4	1	N/A	R	uint16	0x04
0x396C	1	Microinverter 2: Alarm Code 5	1	N/A	R	uint16	0x04

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x396D	1	Microinverter 2: Alarm Code 6	1	N/A	R	uint16	0x04
0x396E	50	Microinverter 2: Reserved	1	N/A	R	uint16	0x04
... (A single DTU supports a maximum of 99 units of 1-in-1 microinverter, 49 units of 1-in-2 microinverter, or 24 units of 1-in-4 microinverter.)							
0x5DA0	3	Microinverter 99: Serial Number	1	N/A	R	uint16	0x04
0x5DA3	2	Microinverter 99: Total Production	1	Wh	R	uint64	0x04
0x5DA5	2	Microinverter 99: Today Production	1	Wh	R	uint64	0x04
0x5DA7	1	Microinverter 99: Active Power	0.1	W	R	uint16	0x04
0x5DA8	1	Microinverter 99: Reactive Power	0.1	VA	R	uint16	0x04
0x5DA9	1	Microinverter 99: Power Factor	0.001	N/A	R	uint16	0x04
0x5DAA	1	Microinverter 99: Phase A Phase Voltage	0.1	V	R	uint16	0x04
0x5DAB	1	Microinverter 99: Phase B Phase Voltage	0.1	V	R	uint16	0x04
0x5DAC	1	Microinverter 99: Phase C Phase Voltage	0.1	V	R	uint16	0x04
0x5DAD	1	Microinverter 99: Phase AB Line Voltage	0.1	V	R	uint16	0x04
0x5DAE	1	Microinverter 99: Phase BC Line Voltage	0.1	V	R	uint16	0x04
0x5DAF	1	Microinverter 99: Phase CA Line Voltage	0.1	V	R	uint16	0x04
0x5DB0	1	Microinverter 99: Phase A Current	0.01	A	R	uint16	0x04
0x5DB1	1	Microinverter 99: Phase B Current	0.01	A	R	uint16	0x04
0x5DB2	1	Microinverter 99: Phase C Current	0.01	A	R	uint16	0x04
0x5DB3	1	Microinverter 99: Grid Frequency	0.01	Hz	R	uint16	0x04
0x5DB4	1	Microinverter 99: Device Temperature	0.1	℃	R	uint16	0x04
0x5DB5	1	Microinverter 99: PV1 Voltage	0.1	V	R	uint16	0x04
0x5DB6	1	Microinverter 99: PV1 Current	0.01	A	R	uint16	0x04
0x5DB7	1	Microinverter 99: PV1 Power	0.1	W	R	uint16	0x04
0x5DB8	1	Microinverter 99: PV2 Voltage	0.1	V	R	uint16	0x04
0x5DB9	1	Microinverter 99: PV2 Current	0.01	A	R	uint16	0x04
0x5DBA	1	Microinverter 99: PV2 Power	0.1	W	R	uint16	0x04
0x5DBB	1	Microinverter 99: PV3 Voltage	0.1	V	R	uint16	0x04
0x5DBC	1	Microinverter 99: PV3 Current	0.01	A	R	uint16	0x04
0x5DBD	1	Microinverter 99: PV3 Power	0.1	W	R	uint16	0x04
0x5DBE	1	Microinverter 99: PV4 Voltage	0.1	V	R	uint16	0x04
0x5DBF	1	Microinverter 99: PV4 Current	0.01	A	R	uint16	0x04
0x5DC0	1	Microinverter 99: PV4 Power	0.1	W	R	uint16	0x04
0x5DC1	1	Microinverter 99: PV5 Voltage	0.1	V	R	uint16	0x04
0x5DC2	1	Microinverter 99: PV5 Current	0.01	A	R	uint16	0x04
0x5DC3	1	Microinverter 99: PV5 Power	0.1	W	R	uint16	0x04
0x5DC4	1	Microinverter 99: PV6 Voltage	0.1	V	R	uint16	0x04

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x5DC5	1	Microinverter 99: PV6 Current	0.01	A	R	uint16	0x04
0x5DC6	1	Microinverter 99: PV6 Power	0.1	W	R	uint16	0x04
0x5DC7	1	Microinverter 99: Microinverter Status	1	N/A	R	uint16	0x04
0x5DC8	1	Microinverter 99: Alarm Code 1	1	N/A	R	uint16	0x04
0x5DC9	1	Microinverter 99: Alarm Code 2	1	N/A	R	uint16	0x04
0x5DCA	1	Microinverter 99: Alarm Code 3	1	N/A	R	uint16	0x04
0x5DCB	1	Microinverter 99: Alarm Code 4	1	N/A	R	uint16	0x04
0x5DCC	1	Microinverter 99: Alarm Code 5	1	N/A	R	uint16	0x04
0x5DCD	1	Microinverter 99: Alarm Code 6	1	N/A	R	uint16	0x04
0x5DCE	50	Microinverter 99: Reserved	1	N/A	R	uint16	0x04

3.4.5 Register List of Device SN

The following registers provide the device serial number register list, which can be read and written.

Registers	Length	Name	Coefficient	R/W	Type	Function Code (Supported)	Remark
0x5000	3	DTU SN	-	R	3*uint16	0x03	eg.,10F854300201
0x5003	3	Meter SN	-	R/W	3*uint16	0x03 / 0x06 / 0x10	eg.,10C012000001
0x5006	1	Meter CT Setting	-	R/W	uint16	0x03 / 0x06 / 0x10	eg.,100
0x5007	3	Meter SN	-	R/W	3*uint16	0x03 / 0x06 / 0x10	eg.,10C012000002
0x500A	1	Meter CT Setting	-	R/W	uint16	0x03 / 0x06 / 0x10	eg.,100
... (A single DTU supports a maximum of 10 meter units.)							
0x502B	3	Microinverter SN	-	R/W	3*uint16	0x03 / 0x06 / 0x10	eg.,106000050201
0x502E	3	Microinverter SN	-	R/W	3*uint16	0x03 / 0x06 / 0x10	eg.,106000050202
... (A single DTU can write a maximum of 99 microinverter units.)							

3.4.6 Register List of RS485 Port Setting

The following registers provide DTU RS485 port settings.

Registers	Quantity	Name	Decimal	Unit	R/W	Type	Function Code	Remark
0x5500	1	Power Grid Mode	-	-	R/W	uint16	0x03 / 0x06 / 0x10	0: GPRS, 1: Wi-Fi, 2: Ethernet
0x5501	1	TCP Modbus Port	-	-	R/W	uint16	0x03 / 0x06 / 0x10	e.g., 502 (Effective after restart)
0x5502	1	485 Modbus Mode	-	-	R/W	uint16	0x03 / 0x06 / 0x10	0: Power Export Limiting, 1: Hoymiles Modbus
0x5503	1	485 Modbus Address	-	-	R/W	uint16	0x03 / 0x06 / 0x10	-
0x5504	1	Reserved	-	-	-	uint16	-	-
0x5505	1	Reserved	-	-	-	uint16	-	-
0x5506	1	Reserved	-	-	-	uint16	-	-
0x5507	1	Reserved	-	-	-	uint16	-	-

⚠ *Notice*

If the port number is changed, restart the DTU.

3.4.7 Register List of Microinverter Status

Registers	Length	Name	Unit	R/W	Type	Function Code (Supported)	Remark
0xD000	1	Turn ON/OFF (All Microinverters)	-	W	uint16	0x06	0: OFF 1: ON
0xD001	1	Temporary Limit Active Power (All Microinverters)	-	W	uint16	0x06	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD002	1	Permanent Limit Active Power (All Microinverters)	-	W	uint16	0x06	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD003	1	Permanent Power Factor Control (All Microinverters)	-	W	uint16	0x06	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD004	1	Reserved	-	W	uint16	0x06	-
0xD005	1	Reserved	-	W	uint16	0x06	-
0xD006	1	Turn ON/OFF (Port 1)	-	R/W	uint16	0x03 / 0x06 / 0x10	0: OFF 1: ON
0xD007	1	Temporary Limit Active Power (Port 1)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter

Registers	Length	Name	Unit	R/W	Type	Function Code (Supported)	Remark
0xD008	1	Permanent Limit Active Power (Port 1)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD009	1	Permanent Power Factor Control (Port 1)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD00A	1	Reserved	-	R/W	uint16	0x03 / 0x06 / 0x10	-
0xD00B	1	Reserved	-	R/W	uint16	0x03 / 0x06 / 0x10	-
0xD00C	1	Turn ON/OFF (Port 2)	-	R/W	uint16	0x03 / 0x06 / 0x10	0: OFF; 1: ON
0xD00D	1	Temporary Limit Active Power (Port 2)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD00E	1	Permanent Limit Active Power (Port 2)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD00F	1	Permanent Power Factor Control (Port 2)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD010	1	Reserved	-	R/W	uint16	0x03 / 0x06 / 0x10	-
0xD011	1	Reserved		R/W	uint16	0x03 / 0x06 / 0x10	-
0xD012	1	Turn ON/OFF (Port 3)	-	R/W	uint16	0x03 / 0x06 / 0x10	0: OFF; 1: ON
0xD013	1	Temporary Limit Active Power (Port 3)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD014	1	Permanent Limit Active Power (Port 3)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD015	1	Permanent Power Factor Control (Port 3)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD016	1	Reserved	-	R/W	uint16	0x03 / 0x06 / 0x10	-
0xD017	1	Reserved	-	R/W	uint16	0x03 / 0x06 / 0x10	-
... (A single DTU supports a maximum of 99 ports.)							

Notice

- *For 4-in-1 microinverters, there are four ports available. For 2-in-1 microinverters, there are two ports available. And for 1-in-1 microinverters, there is one port available.*
- *In the case of 4-in-1 and 2-in-1 microinverters, the control settings should be consistent across all ports within a single microinverter.*

3.5 Message Examples

3.5.1 Reading Power ON/OFF Status of Multiple Microinverters

Send: 65 03 D0 06 00 24 34 95

Receive: 65 03 48 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 6B 8C

3.5.2 Master Control Shutdown

Send: 65 06 D0 00 00 00 2E B9

Receive: 65 06 D0 00 00 00 2E B9

3.5.3 Single Control Shutdown

Send: 65 06 D0 06 00 00 2F 59

Receive: 65 06 D0 06 00 00 2F 59

3.5.4 Multi Control Shutdown

Send: 65 10 D0 0C 00 06 0C 00 00 00 64 00 64 00 64 00 00 00 00 DF F3

Receive: 65 10 D0 0C 00 06 EC B0

3.5.5 Querying Microinverter Data

Send: 65 04 38 E0 00 07 B5 7A

Receive: 65 04 0E 11 61 12 34 56 78 00 01 FE CF 00 00 03 7F 76 82

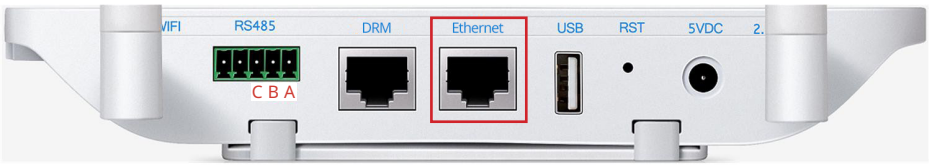
4 Hoymiles Modbus TCP Connection and Communication

This section provides the register mapping for monitoring data and remote control using the Hoymiles Modbus TCP protocol on the Ethernet interface.

4.1 Connecting via Ethernet Interface

The TCP Modbus protocol can be utilized via the Ethernet interface. To establish connectivity, use a standard Ethernet cable to connect the DTU to a network device, such as a router.

Typically, the DTU-Pro/Pro-S is intended for usage within a local area network, and its IP address can be located on the router's management page. If you wish to use the DTU-Pro/Pro-S in a wide area network, it is necessary to perform network mapping on the router.



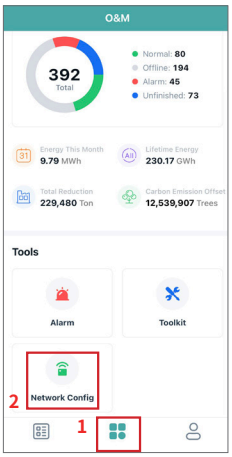
4.2 Setting Modbus TCP

In the Modbus TCP protocol, the DTU Pro/Pro-S functions as a slave device and receives commands from a non-Hoymiles monitoring device. You can typically connect an Ethernet cable directly to the Ethernet interface to utilize the Modbus TCP protocol.

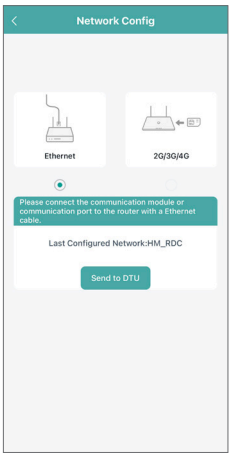
The default port number for Modbus TCP is 502. The IP address can be obtained from higher-level gateway devices such as routers. Set TCP through the following steps:

1. Open S-Miles Installer App and log in.

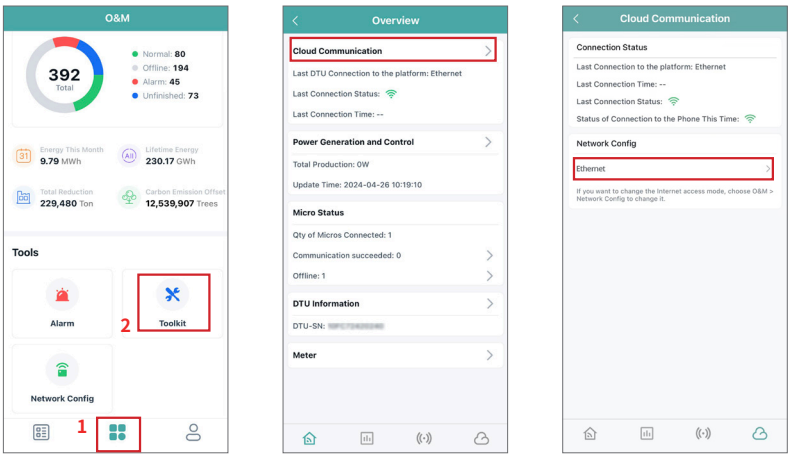
2. Tap **O&M** > **Network Config**.



3. Select **Ethernet**, and tap **Send to DTU**.

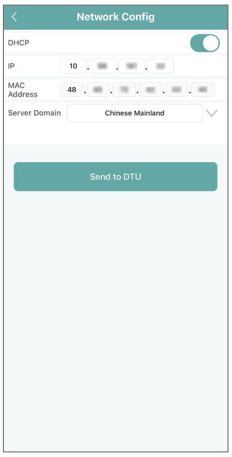


4. Go back to **O&M**, and tap **Toolkit > Cloud Communication > Ethernet**.



5. On **Network Config**, modify the network configuration information such as the IP address according to the communication needs, or enable **DHCP** to allow the DTU to automatically obtain the corresponding IP address and other information. After the modification is completed, tap **Send to DTU**.

6. If you need to set a static IP address for the DTU, it is recommended to set it on the router's management page. Then you can enable **DHCP** on **Network Config** of the App and tap **Send to DTU**.



4.3 Understanding Modbus TCP Function Codes

The Modbus protocol is a master-slave protocol with one master device and multiple slave devices. If the DTU acts as a slave device, it will respond only when queried.

In most cases, Modbus software automatically selects the correct Modbus command for any desired action. However, the Hoymiles DTU Pro/Pro-S only supports the following functions:

- 03 (0x03) Read Device Data (Serial Number, etc.):

Read meter serial number, CT value, microinverter serial number, microinverter on/off data, and power limit data.

- 04 (0x04) Read Device Real-Time Data:

The input registers of DTU are usually read-only and report data such as voltage, current, power, energy, etc.

- 06 (0x06) Write Single / All Device Status:

Using this command, you can write a new value to a single status register.

- 16 (0x10) Write Multiple Device Status:

Using this command, you can write a new value to multiple status registers.

4.3.1 03 (0x03) Reading Multiple Microinverters and Meter Serial Numbers

- Command sending format

	Name	Length	Value	Remark
Header	Transaction ID	2	xxxx	Big-Endian
	Protocol ID	2	xxxx	Big-Endian
	Length	2	xxxx	Big-Endian
	Unit ID	1	xx	-
Modbus Data	Function Code	1	0x03	-
	Address Code	2	xxxx	Big-Endian
	Number of Registers	2	xxxx	Big-Endian

- Command response format (successful commands)

	Name	Length	Value	Remark
Header	Transaction ID	2	xxxx	Big-Endian
	Protocol ID	2	xxxx	Big-Endian
	Length	2	xxxx	Big-Endian
	Unit ID	1	xx	-
Modbus Data	Function Code	1	0x03	-
	Data length	1	xx	-
	Data 1	1	xx	-
	Data 2	1	xx	-
	...			

- Command response format (failed commands)

	Name	Length	Value	Remark
Header	Transaction ID	2	xxxx	Big-Endian
	Protocol ID	2	xxxx	Big-Endian
	Length	2	xxxx	Big-Endian
	Unit ID	1	xx	-
Modbus Data	Function Code	1	0x83	-
	Error Data Code	1	0x01	-

4.3.2 04 (0x04) Reading Multiple Microinverters and Meter Real-Time Data

- Command sending format

	Name	Length	Value	Remark
Header	Transaction ID	2	xxxx	Big-Endian
	Protocol ID	2	xxxx	Big-Endian
	Length	2	xxxx	Big-Endian
	Unit ID	1	xx	-
Modbus Data	Function Code	1	0x04	-
	Address Code	2	xxxx	Big-Endian
	Number of Registers	2	xxxx	Big-Endian

- Command response format (successful commands)

	Name	Length	Value	Remark
Header	Transaction ID	2	xxxx	Big-Endian
	Protocol ID	2	xxxx	Big-Endian
	Length	2	xxxx	Big-Endian
	Unit ID	1	xx	-
Modbus Data	Function Code	1	0x04	-
	Data length	1	xx	-
	Data 1	1	xx	-
	Data 2	1	xx	-
	...			

- Command response format (failed commands)

	Name	Length	Value	Remark
Header	Transaction ID	2	xxxx	Big-Endian
	Protocol ID	2	xxxx	Big-Endian
	Length	2	xxxx	Big-Endian
	Unit ID	1	xx	-
Modbus Data	Function Code	1	0x84	-
	Error Data Code	1	0x01	-

4.3.3 06 (0x06) Writing Single or All Device Status

- Command sending format

	Name	Length	Value	Remark
Header	Transaction ID	2	xxxx	Big-Endian
	Protocol ID	2	xxxx	Big-Endian
	Length	2	xxxx	Big-Endian
	Unit ID	1	xx	-
Modbus Data	Function Code	1	0x06	_
	Address Code	2	xxxx	Big-Endian
	Number of Registers	2	xxxx	Big-Endian

- Command response format (successful commands)

	Name	Length	Value	Remark
Header	Transaction ID	2	xxxx	Big-Endian
	Protocol ID	2	xxxx	Big-Endian
	Length	2	xxxx	Big-Endian
	Unit ID	1	xx	-
Modbus Data	Function Code	1	0x06	-
	Address Code	2	xxxx	Big-Endian
	Data	2	xxxx	Big-Endian
	Data 2	2	xxxx	Big-Endian

- Command response format (failed commands)

	Name	Length	Value	Remark
Header	Transaction ID	2	xxxx	Big-Endian
	Protocol ID	2	xxxx	Big-Endian
	Length	2	xxxx	Big-Endian
	Unit ID	1	xx	-
Modbus Data	Function Code	1	0x86	-
	Error Data Code	1	0x01	-

4.3.4 16 (0x10) Writing Multiple Microinverters Status

- Command sending format

	Name	Length	Value	Remark
Header	Transaction ID	2	xxxx	Big-Endian
	Protocol ID	2	xxxx	Big-Endian
	Length	2	xxxx	Big-Endian
	Unit ID	1	xx	-
Modbus Data	Function Code	1	0x10	-
	Address Code	2	xxxx	Big-Endian
	No. of Registers	2	xxxx	Big-Endian
	Data length	1	xx	-
	Data 1	1	xx	-
	Data 2	1	xx	-
	.....			

- Command response format (successful commands)

	Name	Length	Value	Remark
Header	Transaction ID	2	xxxx	Big-Endian
	Protocol ID	2	xxxx	Big-Endian
	Length	2	xxxx	Big-Endian
	Unit ID	1	xx	-
Modbus Data	Function Code	1	0x10	-
	Address Code	2	xxxx	Big-Endian
	No. of Registers	2	xxxx	Big-Endian

- Command response format (failed commands)

	Name	Length	Value	Remark
Header	Transaction ID	2	xxxx	Big-Endian
	Protocol ID	2	xxxx	Big-Endian
	Length	2	xxxx	Big-Endian
	Unit ID	1	xx	-
Modbus Data	Function Code	1	0x90	-
	Error Data Code	1	0x01	-

4.4 Understanding Modbus Registers

4.4.1 Device Information

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)	Remark
0x3000	3	DTU Serial Number	/	N/A	R	uint16	0x04	eg.,10F800000001
0x3003	1	Meter Number	1	N/A	R	uint16	0x04	eg.,1
0x3004	1	Microinverter Number	1	N/A	R	uint16	0x04	eg.,2

4.4.2 DTU Data

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x3100	4	Sum of All Microinverters' Total Production in DTU	1	Wh	R	uint64	0x04
0x3104	4	Sum of All Microinverters' Today Production in DTU	1	Wh	R	uint64	0x04
0x3108	2	Sum of All Microinverters' Active Power in DTU	0.1	W	R	uint32	0x04
0x310A	2	Sum of All Microinverters' Reactive Power in DTU	0.1	VA	R	uint32	0x04

4.4.3 Real-Time Meter Data

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x3160	3	Meter 1: Serial Number	/	N/A	R	uint16	0x04
0x3163	2	Meter 1: Total Active Power	0.01	kw	R	uint32	0x04
0x3165	2	Meter 1: Phase A Active Power	0.01	kw	R	uint32	0x04
0x3167	2	Meter 1: Phase B Active Power	0.01	kw	R	uint32	0x04
0x3169	2	Meter 1: Phase C Active Power	0.01	kw	R	uint32	0x04
0x316B	2	Meter 1: Power Factor	0.001	N/A	R	uint32	0x04
0x316D	2	Meter 1: Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x316F	2	Meter 1: Phase A Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x3171	2	Meter 1: Phase B Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x3173	2	Meter 1: Phase C Total Electricity Positive Import	0.01	kWh	R	uint32	0x04

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x3175	2	Meter 1: Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x3177	2	Meter 1: Phase A Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x3179	2	Meter 1: Phase B Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x317B	2	Meter 1: Phase C Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x317D	2	Meter 1: Phase A Voltage	0.01	V	R	uint32	0x04
0x317F	2	Meter 1: Phase B Voltage	0.01	V	R	uint32	0x04
0x3181	2	Meter 1: Phase C Voltage	0.01	V	R	uint32	0x04
0x3183	2	Meter 1: Phase A Current	0.01	A	R	uint32	0x04
0x3185	2	Meter 1: Phase B Current	0.01	A	R	uint32	0x04
0x3187	2	Meter 1: Phase C Current	0.01	A	R	uint32	0x04
0x3189	2	Meter 1: Phase A Power Factor	0.001	N/A	R	uint32	0x04
0x318B	2	Meter 1: Phase B Power Factor	0.001	N/A	R	uint32	0x04
0x318D	2	Meter 1: Phase C Power Factor	0.001	N/A	R	uint32	0x04
0x318F	1	Meter 1: Status (0: Offline; 1: Online)	/	N/A	R	uint16	0x04
0x3190	2	Meter 1: Uab Line Voltage	0.01	V	R	uint32	0x04
0x3192	2	Meter 1: Ubc Line Voltage	0.01	V	R	uint32	0x04
0x3194	2	Meter 1: Uca Line Voltage	0.01	V	R	uint32	0x04
0x3196	74	Meter 1: Reserved	/	N/A	R	uint16	0x04
0x31E0	3	Meter 2: Serial Number	/	N/A	R	uint16	0x04
0x31E3	2	Meter 2: Total Active Power	0.01	kw	R	uint32	0x04
0x31E5	2	Meter 2: Phase A Active Power	0.01	kw	R	uint32	0x04
0x31E7	2	Meter 2: Phase B Active Power	0.01	kw	R	uint32	0x04
0x31E9	2	Meter 2: Phase C Active Power	0.01	kw	R	uint32	0x04
0x31EB	2	Meter 2: Power Factor	0.001	N/A	R	uint32	0x04
0x31ED	2	Meter 2: Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x31EF	2	Meter 2: Phase A Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x31F1	2	Meter 2: Phase B Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x31F3	2	Meter 2: Phase C Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x31F5	2	Meter 2: Total Electricity Positive Export	0.01	kWh	R	uint32	0x04

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x31F7	2	Meter 2: Phase A Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x31F9	2	Meter 2: Phase B Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x31FB	2	Meter 2: Phase C Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x31FD	2	Meter 2: Phase A Voltage	0.01	V	R	uint32	0x04
0x31FF	2	Meter 2: Phase B Voltage	0.01	V	R	uint32	0x04
0x3201	2	Meter 2: Phase C Voltage	0.01	V	R	uint32	0x04
0x3203	2	Meter 2: Phase A Current	0.01	A	R	uint32	0x04
0x3205	2	Meter 2: Phase B Current	0.01	A	R	uint32	0x04
0x3207	2	Meter 2: Phase C Current	0.01	A	R	uint32	0x04
0x3209	2	Meter 2: Phase A Power Factor	0.001	N/A	R	uint32	0x04
0x320B	2	Meter 2: Phase B Power Factor	0.001	N/A	R	uint32	0x04
0x320D	2	Meter 2: Phase C Power Factor	0.001	N/A	R	uint32	0x04
0x320F	1	Meter 2: Status (0: Offline; 1: Online)	/	N/A	R	uint16	0x04
0x3210	2	Meter 2: Uab Line Voltage	0.01	V	R	uint32	0x04
0x3212	2	Meter 2: Ubc Line Voltage	0.01	V	R	uint32	0x04
0x3214	2	Meter 2: Uca Line Voltage	0.01	V	R	uint32	0x04
0x3216	74	Meter 2: Reserved	/	N/A	R	uint16	0x04
... (A single DTU supports a maximum of 10 meter units.)							
0x35E0	3	Meter 10: Serial Number	/	N/A	R	uint16	0x04
0x35E3	2	Meter 10: Total Active Power	0.01	kw	R	uint32	0x04
0x35E5	2	Meter 10: Phase A Active Power	0.01	kw	R	uint32	0x04
0x35E7	2	Meter 10: Phase B Active Power	0.01	kw	R	uint32	0x04
0x35E9	2	Meter 10: Phase C Active Power	0.01	kw	R	uint32	0x04
0x35EB	2	Meter 10: Power Factor	0.001	N/A	R	uint32	0x04
0x35ED	2	Meter 10: Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x35EF	2	Meter 10: Phase A Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x35F1	2	Meter 10: Phase B Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x35F3	2	Meter 10: Phase C Total Electricity Positive Import	0.01	kWh	R	uint32	0x04
0x35F5	2	Meter 10: Total Electricity Positive Export	0.01	kWh	R	uint32	0x04

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x35F7	2	Meter 10: Phase A Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x35F9	2	Meter 10: Phase B Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x35FB	2	Meter 10: Phase C Total Electricity Positive Export	0.01	kWh	R	uint32	0x04
0x35FD	2	Meter 10: Phase A Voltage	0.01	V	R	uint32	0x04
0x35FF	2	Meter 10: Phase B Voltage	0.01	V	R	uint32	0x04
0x3601	2	Meter 10: Phase C Voltage	0.01	V	R	uint32	0x04
0x3603	2	Meter 10: Phase A Current	0.01	A	R	uint32	0x04
0x3605	2	Meter 10: Phase B Current	0.01	A	R	uint32	0x04
0x3607	2	Meter 10: Phase C Current	0.01	A	R	uint32	0x04
0x3609	2	Meter 10: Phase A Power Factor	0.001	N/A	R	uint32	0x04
0x360B	2	Meter 10: Phase B Power Factor	0.001	N/A	R	uint32	0x04
0x360D	2	Meter 10: Phase C Power Factor	0.001	N/A	R	uint32	0x04
0x360F	1	Meter 10: Status (0: Offline; 1: Online)	/	N/A	R	uint16	0x04
0x3610	2	Meter 10: Uab Line Voltage	0.01	V	R	uint32	0x04
0x3612	2	Meter 10: Ubc Line Voltage	0.01	V	R	uint32	0x04
0x3614	2	Meter 10: Uca Line Voltage	0.01	V	R	uint32	0x04
0x3616	74	Meter 10: Reserved	0	N/A	R	uint16	0x04

4.4.4 Real-Time Microinverter Data

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x38E0	3	Microinverter 1: Serial Number	1	N/A	R	uint16	0x04
0x38E3	2	Microinverter 1: Total Production	1	Wh	R	uint64	0x04
0x38E5	2	Microinverter 1: Today Production	1	Wh	R	uint64	0x04
0x38E7	1	Microinverter 1: Active Power	0.1	W	R	uint16	0x04
0x38E8	1	Microinverter 1: Reactive Power	0.1	VA	R	uint16	0x04
0x38E9	1	Microinverter 1: Power Factor	0.001	N/A	R	uint16	0x04
0x38EA	1	Microinverter 1: Phase A Phase Voltage	0.1	V	R	uint16	0x04
0x38EB	1	Microinverter 1: Phase B Phase Voltage	0.1	V	R	uint16	0x04
0x38EC	1	Microinverter 1: Phase C Phase Voltage	0.1	V	R	uint16	0x04
0x38ED	1	Microinverter 1: Phase AB Line Voltage	0.1	V	R	uint16	0x04
0x38EE	1	Microinverter 1: Phase BC Line Voltage	0.1	V	R	uint16	0x04
0x38EF	1	Microinverter 1: Phase CA Line Voltage	0.1	V	R	uint16	0x04

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x38F0	1	Microinverter 1: Phase A Current	0.01	A	R	uint16	0x04
0x38F1	1	Microinverter 1: Phase B Current	0.01	A	R	uint16	0x04
0x38F2	1	Microinverter 1: Phase C Current	0.01	A	R	uint16	0x04
0x38F3	1	Microinverter 1: Grid Frequency	0.01	Hz	R	uint16	0x04
0x38F4	1	Microinverter 1: Device Temperature	0.1	℃	R	uint16	0x04
0x38F5	1	Microinverter 1: PV1 Voltage	0.1	V	R	uint16	0x04
0x38F6	1	Microinverter 1: PV1 Current	0.01	A	R	uint16	0x04
0x38F7	1	Microinverter 1: PV1 Power	0.1	W	R	uint16	0x04
0x38F8	1	Microinverter 1: PV2 Voltage	0.1	V	R	uint16	0x04
0x38F9	1	Microinverter 1: PV2 Current	0.01	A	R	uint16	0x04
0x38FA	1	Microinverter 1: PV2 Power	0.1	W	R	uint16	0x04
0x38FB	1	Microinverter 1: PV3 Voltage	0.1	V	R	uint16	0x04
0x38FC	1	Microinverter 1: PV3 Current	0.01	A	R	uint16	0x04
0x38FD	1	Microinverter 1: PV3 Power	0.1	W	R	uint16	0x04
0x38FE	1	Microinverter 1: PV4 Voltage	0.1	V	R	uint16	0x04
0x38FF	1	Microinverter 1: PV4 Current	0.01	A	R	uint16	0x04
0x3900	1	Microinverter 1: PV4 Power	0.1	W	R	uint16	0x04
0x3901	1	Microinverter 1: PV5 Voltage	0.1	V	R	uint16	0x04
0x3902	1	Microinverter 1: PV5 Current	0.01	A	R	uint16	0x04
0x3903	1	Microinverter 1: PV5 Power	0.1	W	R	uint16	0x04
0x3904	1	Microinverter 1: PV6 Voltage	0.1	V	R	uint16	0x04
0x3905	1	Microinverter 1: PV6 Current	0.01	A	R	uint16	0x04
0x3906	1	Microinverter 1: PV6 Power	0.1	W	R	uint16	0x04
0x3907	1	Microinverter 1: Microinverter Status	1	N/A	R	uint16	0x04
0x3908	1	Microinverter 1: Alarm Code 1	1	N/A	R	uint16	0x04
0x3909	1	Microinverter 1: Alarm Code 2	1	N/A	R	uint16	0x04
0x390A	1	Microinverter 1: Alarm Code 3	1	N/A	R	uint16	0x04
0x390B	1	Microinverter 1: Alarm Code 4	1	N/A	R	uint16	0x04
0x390C	1	Microinverter 1: Alarm Code 5	1	N/A	R	uint16	0x04
0x390D	1	Microinverter 1: Alarm Code 6	1	N/A	R	uint16	0x04
0x390E	50	Microinverter 1: Reserved	1	N/A	R	uint16	0x04
0x3940	3	Microinverter 2: Serial Number	1	N/A	R	uint16	0x04
0x3943	2	Microinverter 2: Total Production	1	Wh	R	uint64	0x04
0x3945	2	Microinverter 2: Today Production	1	Wh	R	uint64	0x04
0x3947	1	Microinverter 2: Active Power	0.1	W	R	uint16	0x04
0x3948	1	Microinverter 2: Reactive Power	0.1	VA	R	uint16	0x04

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x3949	1	Microinverter 2: Power Factor	0.001	N/A	R	uint16	0x04
0x394A	1	Microinverter 2: Phase A Phase Voltage	0.1	V	R	uint16	0x04
0x394B	1	Microinverter 2: Phase B Phase Voltage	0.1	V	R	uint16	0x04
0x394C	1	Microinverter 2: Phase C Phase Voltage	0.1	V	R	uint16	0x04
0x394D	1	Microinverter 2: Phase AB Line Voltage	0.1	V	R	uint16	0x04
0x394E	1	Microinverter 2: Phase BC Line Voltage	0.1	V	R	uint16	0x04
0x394F	1	Microinverter 2: Phase CA Line Voltage	0.1	V	R	uint16	0x04
0x3950	1	Microinverter 2: Phase A Current	0.01	A	R	uint16	0x04
0x3951	1	Microinverter 2: Phase B Current	0.01	A	R	uint16	0x04
0x3952	1	Microinverter 2: Phase C Current	0.01	A	R	uint16	0x04
0x3953	1	Microinverter 2: Grid Frequency	0.01	Hz	R	uint16	0x04
0x3954	1	Microinverter 2: Device Temperature	0.1	℃	R	uint16	0x04
0x3955	1	Microinverter 2: PV1 Voltage	0.1	V	R	uint16	0x04
0x3956	1	Microinverter 2: PV1 Current	0.01	A	R	uint16	0x04
0x3957	1	Microinverter 2: PV1 Power	0.1	W	R	uint16	0x04
0x3958	1	Microinverter 2: PV2 Voltage	0.1	V	R	uint16	0x04
0x3959	1	Microinverter 2: PV2 Current	0.01	A	R	uint16	0x04
0x395A	1	Microinverter 2: PV2 Power	0.1	W	R	uint16	0x04
0x395B	1	Microinverter 2: PV3 Voltage	0.1	V	R	uint16	0x04
0x395C	1	Microinverter 2: PV3 Current	0.01	A	R	uint16	0x04
0x395D	1	Microinverter 2: PV3 Power	0.1	W	R	uint16	0x04
0x395E	1	Microinverter 2: PV4 Voltage	0.1	V	R	uint16	0x04
0x395F	1	Microinverter 2: PV4 Current	0.01	A	R	uint16	0x04
0x3960	1	Microinverter 2: PV4 Power	0.1	W	R	uint16	0x04
0x3961	1	Microinverter 2: PV5 Voltage	0.1	V	R	uint16	0x04
0x3962	1	Microinverter 2: PV5 Current	0.01	A	R	uint16	0x04
0x3963	1	Microinverter 2: PV5 Power	0.1	W	R	uint16	0x04
0x3964	1	Microinverter 2: PV6 Voltage	0.1	V	R	uint16	0x04
0x3965	1	Microinverter 2: PV6 Current	0.01	A	R	uint16	0x04
0x3966	1	Microinverter 2: PV6 Power	0.1	W	R	uint16	0x04
0x3967	1	Microinverter 2: Microinverter Status	1	N/A	R	uint16	0x04
0x3968	1	Microinverter 2: Alarm Code 1	1	N/A	R	uint16	0x04
0x3969	1	Microinverter 2: Alarm Code 2	1	N/A	R	uint16	0x04
0x396A	1	Microinverter 2: Alarm Code 3	1	N/A	R	uint16	0x04
0x396B	1	Microinverter 2: Alarm Code 4	1	N/A	R	uint16	0x04
0x396C	1	Microinverter 2: Alarm Code 5	1	N/A	R	uint16	0x04

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x396D	1	Microinverter 2: Alarm Code 6	1	N/A	R	uint16	0x04
0x396E	50	Microinverter 2: Reserved	1	N/A	R	uint16	0x04
... (A single DTU supports a maximum of 99 units of 1-in-1 microinverter, 49 units of 1-in-2 microinverter, or 24 units of 1-in-4 microinverter.)							
0x5DA0	3	Microinverter 99: Serial Number	1	N/A	R	uint16	0x04
0x5DA3	2	Microinverter 99: Total Production	1	Wh	R	uint64	0x04
0x5DA5	2	Microinverter 99: Today Production	1	Wh	R	uint64	0x04
0x5DA7	1	Microinverter 99: Active Power	0.1	W	R	uint16	0x04
0x5DA8	1	Microinverter 99: Reactive Power	0.1	VA	R	uint16	0x04
0x5DA9	1	Microinverter 99: Power Factor	0.001	N/A	R	uint16	0x04
0x5DAA	1	Microinverter 99: Phase A Phase Voltage	0.1	V	R	uint16	0x04
0x5DAB	1	Microinverter 99: Phase B Phase Voltage	0.1	V	R	uint16	0x04
0x5DAC	1	Microinverter 99: Phase C Phase Voltage	0.1	V	R	uint16	0x04
0x5DAD	1	Microinverter 99: Phase AB Line Voltage	0.1	V	R	uint16	0x04
0x5DAE	1	Microinverter 99: Phase BC Line Voltage	0.1	V	R	uint16	0x04
0x5DAF	1	Microinverter 99: Phase CA Line Voltage	0.1	V	R	uint16	0x04
0x5DB0	1	Microinverter 99: Phase A Current	0.01	A	R	uint16	0x04
0x5DB1	1	Microinverter 99: Phase B Current	0.01	A	R	uint16	0x04
0x5DB2	1	Microinverter 99: Phase C Current	0.01	A	R	uint16	0x04
0x5DB3	1	Microinverter 99: Grid Frequency	0.01	Hz	R	uint16	0x04
0x5DB4	1	Microinverter 99: Device Temperature	0.1	℃	R	uint16	0x04
0x5DB5	1	Microinverter 99: PV1 Voltage	0.1	V	R	uint16	0x04
0x5DB6	1	Microinverter 99: PV1 Current	0.01	A	R	uint16	0x04
0x5DB7	1	Microinverter 99: PV1 Power	0.1	W	R	uint16	0x04
0x5DB8	1	Microinverter 99: PV2 Voltage	0.1	V	R	uint16	0x04
0x5DB9	1	Microinverter 99: PV2 Current	0.01	A	R	uint16	0x04
0x5DBA	1	Microinverter 99: PV2 Power	0.1	W	R	uint16	0x04
0x5DBB	1	Microinverter 99: PV3 Voltage	0.1	V	R	uint16	0x04
0x5DBC	1	Microinverter 99: PV3 Current	0.01	A	R	uint16	0x04
0x5DBD	1	Microinverter 99: PV3 Power	0.1	W	R	uint16	0x04
0x5DBE	1	Microinverter 99: PV4 Voltage	0.1	V	R	uint16	0x04
0x5DBF	1	Microinverter 99: PV4 Current	0.01	A	R	uint16	0x04
0x5DC0	1	Microinverter 99: PV4 Power	0.1	W	R	uint16	0x04
0x5DC1	1	Microinverter 99: PV5 Voltage	0.1	V	R	uint16	0x04
0x5DC2	1	Microinverter 99: PV5 Current	0.01	A	R	uint16	0x04
0x5DC3	1	Microinverter 99: PV5 Power	0.1	W	R	uint16	0x04
0x5DC4	1	Microinverter 99: PV6 Voltage	0.1	V	R	uint16	0x04

Registers	Numbers	Name	Coefficient	Unit	R/W	Type	Function Code (Supported)
0x5DC5	1	Microinverter 99: PV6 Current	0.01	A	R	uint16	0x04
0x5DC6	1	Microinverter 99: PV6 Power	0.1	W	R	uint16	0x04
0x5DC7	1	Microinverter 99: Microinverter Status	1	N/A	R	uint16	0x04
0x5DC8	1	Microinverter 99: Alarm Code 1	1	N/A	R	uint16	0x04
0x5DC9	1	Microinverter 99: Alarm Code 2	1	N/A	R	uint16	0x04
0x5DCA	1	Microinverter 99: Alarm Code 3	1	N/A	R	uint16	0x04
0x5DCB	1	Microinverter 99: Alarm Code 4	1	N/A	R	uint16	0x04
0x5DCC	1	Microinverter 99: Alarm Code 5	1	N/A	R	uint16	0x04
0x5DCD	1	Microinverter 99: Alarm Code 6	1	N/A	R	uint16	0x04
0x5DCE	50	Microinverter 99: Reserved	1	N/A	R	uint16	0x04

4.4.5 Register List of Device SN

The following registers provide the device serial number register list, which can be read and written.

Registers	Length	Name	Coefficient	R/W	Type	Function Code (Supported)	Remark
0x5000	3	DTU SN	-	R	3*uint16	0x03	eg.,10F854300201
0x5003	3	Meter SN	-	R/W	3*uint16	0x03 / 0x06 / 0x10	eg.,10C012000001
0x5006	1	Meter CT Setting	-	R/W	uint16	0x03 / 0x06 / 0x10	eg.,100
0x5007	3	Meter SN	-	R/W	3*uint16	0x03 / 0x06 / 0x10	eg.,10C012000002
0x500A	1	Meter CT Setting	-	R/W	uint16	0x03 / 0x06 / 0x10	eg.,100
... (A single DTU supports a maximum of 10 meter units.)							
0x502B	3	Microinverter SN	-	R/W	3*uint16	0x03 / 0x06 / 0x10	eg.,106000050201
0x502E	3	Microinverter SN	-	R/W	3*uint16	0x03 / 0x06 / 0x10	eg.,106000050202
... (A single DTU can write a maximum of 99 microinverter units.)							

4.4.6 Register List of RS485 Port Setting

The following registers provide DTU RS485 port settings.

Registers	Quantity	Name	Decimal	Unit	R/W	Type	Function Code	Remark
0x5500	1	Power Grid Mode	-	-	R/W	uint16	0x03 / 0x06 / 0x10	0: GPRS, 1: Wi-Fi, 2: Ethernet
0x5501	1	TCP Modbus Port	-	-	R/W	uint16	0x03 / 0x06 / 0x10	e.g., 502 (Effective after restart)
0x5502	1	485 Modbus Mode	-	-	R/W	uint16	0x03 / 0x06 / 0x10	0: Power Export Limiting, 1: Hoymiles Modbus
0x5503	1	485 Modbus Address	-	-	R/W	uint16	0x03 / 0x06 / 0x10	-
0x5504	1	Reserved	-	-	-	uint16	-	-
0x5505	1	Reserved	-	-	-	uint16	-	-
0x5506	1	Reserved	-	-	-	uint16	-	-
0x5507	1	Reserved	-	-	-	uint16	-	-

⚠ *Notice*

If the port number is changed, restart the DTU.

4.4.7 Register List of Microinverter Status

Registers	Length	Name	Unit	R/W	Type	Function Code (Supported)	Remark
0xD000	1	Turn ON/OFF (All Microinverters)	-	W	uint16	0x06	0: OFF 1: ON
0xD001	1	Temporary Limit Active Power (All Microinverters)	-	W	uint16	0x06	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD002	1	Permanent Limit Active Power (All Microinverters)	-	W	uint16	0x06	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD003	1	Permanent Power Factor Control (All Microinverters)	-	W	uint16	0x06	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD004	1	Reserved	-	W	uint16	0x06	-
0xD005	1	Reserved	-	W	uint16	0x06	-
0xD006	1	Turn ON/OFF (Port 1)	-	R/W	uint16	0x03 / 0x06 / 0x10	0: OFF 1: ON
0xD007	1	Temporary Limit Active Power (Port 1)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter

Registers	Length	Name	Unit	R/W	Type	Function Code (Supported)	Remark
0xD008	1	Permanent Limit Active Power (Port 1)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD009	1	Permanent Power Factor Control (Port 1)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD00A	1	Reserved	-	R/W	uint16	0x03 / 0x06 / 0x10	-
0xD00B	1	Reserved	-	R/W	uint16	0x03 / 0x06 / 0x10	-
0xD00C	1	Turn ON/OFF (Port 2)	-	R/W	uint16	0x03 / 0x06 / 0x10	0: OFF; 1: ON
0xD00D	1	Temporary Limit Active Power (Port 2)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD00E	1	Permanent Limit Active Power (Port 2)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD00F	1	Permanent Power Factor Control (Port 2)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD010	1	Reserved	-	R/W	uint16	0x03 / 0x06 / 0x10	-
0xD011	1	Reserved		R/W	uint16	0x03 / 0x06 / 0x10	-
0xD012	1	Turn ON/OFF (Port 3)	-	R/W	uint16	0x03 / 0x06 / 0x10	0: OFF; 1: ON
0xD013	1	Temporary Limit Active Power (Port 3)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD014	1	Permanent Limit Active Power (Port 3)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD015	1	Permanent Power Factor Control (Port 3)	-	R/W	uint16	0x03 / 0x06 / 0x10	Percentage: 2 to 100 for Third-Generation Microinverter; 10 to 100 for Second-Generation Microinverter
0xD016	1	Reserved	-	R/W	uint16	0x03 / 0x06 / 0x10	-
0xD017	1	Reserved	-	R/W	uint16	0x03 / 0x06 / 0x10	-
... (A single DTU supports a maximum of 99 ports.)							

Notice

- *For 4-in-1 microinverters, there are four ports available. For 2-in-1 microinverters, there are two ports available. And for 1-in-1 microinverters, there is one port available.*
- *In the case of 4-in-1 and 2-in-1 microinverters, the control settings should be consistent across all ports within a single microinverter.*

4.5 Message Examples

4.5.1 Querying Microinverter Data

Send: 00 00 00 00 00 06 01 04 38 E0 00 07

Receive: 00 00 00 00 00 11 01 04 0E 11 61 12 34 56 78 00 01 FE CF 00 00 03 7F

4.5.2 Reading Status of Multiple Microinverters

Send: 00 00 00 00 00 06 01 03 D0 06 00 50

Receive: 00 00 00 00 00 A3 01 03 A0 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64 00 64 00 64 00 00 00 00 00 00 00 64

4.5.3 Writing Register of Microinverter Status

Send: 00 00 00 00 00 06 01 06 D0 00 00 01

Receive: 00 00 00 00 00 06 01 06 D0 00 00 01

Send: 00 00 00 00 00 06 01 06 D0 01 00 0B

Receive: 00 00 00 00 00 06 01 06 D0 01 00 0B

4.5.4 Writing Registers of Multiple Microinverter Status

Send: 00 00 00 00 00 20 01 10 D0 06 00 0C 18 00 01 00 50 00 50 00 50 00 00 00 00 00 01 00 50 00 50 00 50 00 00 00 00

Receive: 00 00 00 00 00 06 01 10 D0 06 00 0C