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G0306 Modbus to DP Gateway User Manual



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Caution

- 1. Please don't take off/install gateway at random.
- 2. Please check if the power of gateway meets the power request in the User Manual.

Version V1.2 Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Microcyber Corporation 2015

The technical data may change at any time.



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Section 1.Overview

Name: Modbus to DP Gateway Model: G0306

This gateway realizes the conversion function from Modbus RTU to PROFIBUS DP, making multiple slave station devices that conform to Modbus RTU communication regulation access to PROFIBUS DPnetwork. Modbus can be as master or slave, and this function can be realized by a special function button.



Figure 1 G0306 Modbus to DP Gateway

1.1 Device Classification

This gateway has two models based on Modbus interface difference (the same as actual model selection):

Model Selection	Modbus Interface
GW-MODB-DP-RS485	RS485
GW-MODB-DP -RS232	RS232

This gateway has following model selection based on communication mode (function classification, easy for file description by using following name, not actual model selection. Refer to appendix for actual model selection):

Model Selection	Modbus	PROFIBUS
G0306 -MS	Master station	Slave station
G0306 -SS	Slave station	Slave station

Note:

1) V1.0 version only realizes GW-MODB-DP-RS485 version. GW-MODB-DP-RS232 version will be added soon.

2) G0306 gateway can realize the shift between G0306-MS and G0306-SS via function button based on user requirement. Please refer to 2.27 for its method.



1.2 Structure

1.2.1 Gateway Outline Dimensional Drawing



Figure 2 Gateway Outline Dimensional Drawing (112*70*50, unit mm)

Figure 3 Gateway Structural Drawing

1	film	2	Upper cover	3	Interface board	4	Hexagona I prisms
5	Wide brim screw	6	Iron wire	7	clip	8	Wide brim screw
9	base	10	Communi cation board				



Section 2.Installation

DIN guide rail installation 2.1.



2.2. **Gateway Interface**

2.2.1 Power interface

No.	Signal	Description
1	24V	connect 24VDC+
2	G	connect 24VDC-
3	PE	connect TP shield

2.2.2 Modbus-RS485 interface (suitable for GW-MODB-DP-RS485)

No.	Signal	Description
1	TB	Connect with B- short circuit enabled terminal
2	B-	Connect Modbus bus B
3	A+	Connect Modbus bus A
4	TA	Connect with A+ short circuit enabled terminal
5	PE	connect TP shield

2.2.3 Modbus-RS232

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interface (suitable for GW-MODB-DP-RS232)					
	Pin Signal 1 NC 2 TxD 3 RxD 4 NC 5 GND 6-9 NC		Description		
			Hang in the air		
			Connect user device RxD		
			Connect user device TxD		
			Hang in the air		
			Connect user device GND		
			Hang in the air		
	Note: user should make RS232 cable based on interface definition				

PROFIBUS DP bus interface 2.2.4

> Pin Signal

Description



http://www.microcyber-fieldbus.com



1-2	NC	Hang in the air		
3	RxD/TxD-P	Receive/send data, wire B (red color)		
4	CNTR-P	Repeater direction control		
5	DGND	Data ground (VP reference voltage)		
6	VPa	Power supply +5V (e.g. used for bus terminator)		
7	NC	Hang in the air		
8	RxD/TxD-N	Receive/send data, wire A (green color)		
9	NC	Hang in the air		

2.2.5 PROFIBUS address configuration interface



Address dial switch	Description
16 bits rotary knob dial switch x10	Each scal represents 10, range 0-160;
10 bits rotary knob dial switch x1	Each scal represents 1, range 0-9;
Note: When address is bigger	than 125_fixed address is 125

Note: when address is bigger than 125, fixed address is 125. As shown in the figure, address=3*10+7*1=37

2.2.6 LED



LED name	Color	Description
Power	green	device power supply LED
Online	yellow	PROFIBUS in data-exch state
Offline	Red	PROFIBUS not in in data-exch state
TxD	Green	Modbus send LED
RxD	yellow	Modbus receive LED

2.2.7 Spcial function interface



No.	Terminal name	Terminal usage	
1	MS	Modbus master-slave exchange Off: G0306-MS On: G0306-SS	
2 Not Used		Not in use	
3	Not Used	Not in use	
4 Not Used		Not in use	



Section 3.Working Principle

G0306 Modbus to DP Gateway supports both Modbus RTU and PROFIBUS DP. It is PROFIBUS DP slave device. when serving as Modbus master (G0306-MS), it can connect at most 31 Modbus slave station into PROFIBUS PA network theoretically (it should be 485 bus environment, and we suggest less than 10 Modbus slave device to ensure communication quality).



Figure 5 Gateway System Connection Diagram

3.1 Gateway as Modbus Master (G0306-MS)

Working mechanism of G0306 Modbus to DP gateway MS is by model configuration to reaize data conversion from Modbus data to DP data. Each module can configurate one Modbus message. There are totally 39 slots and 209 modules. Among them, 1 and 2 slot has fixed function. There are another 37 slots available. Each slot can configurate one module, which means it can configurate at most 37 Modbus messages.





3.2 Gateway as Modbus slave station (G0306-SS)

G0306-SS working mechanism is to realize the mapping from Profibus input and output relief area to Modbus storage area separately via module configuration. This makes it easier for Modbus master to read required data from corresponding Modbus storage area.



Figure 7 gateway diagram (G0306-SS)

G0306-SS has 20 slots and 67 modules in all. Among them, slot 1 and 2 has fixed function and there are other 18 slots can be used. Each slot can configure one module. That is to say at most 18 kinds mapping relation from Profibus input output relief area to Modbus storage area can be built.

G0306-SS is the same as other Modbus slave device, having four Modbus storage area:

Table 1 Modbus storage area

Storage indentification	Name	Туре	Modbus master read/write	Storage cell address scope
Охххх	coil	Bit	Read/write	00001~01952 , totally 1952bit=244byte
1xxxx	Discrete magnitude input	Bit	Read only	10001~11952 , totally 1952bit=244byte
4xxxx	Holding register	Word	Read only	40001~40122 , totally 122word=244byte
Зхххх	Input register	Word	read/write	30001~30122 , totally 122word =244byte



Section 4.Gateway Configuration

4.1 **Topological Structure**

4.1.1 Network Topology

G0306 Modbus to DP gateway use RS485 transmission technology, with rate from 9.6kbit/s to 12Mbit/s. All devices are connected to one bus, with the same rate. There can be at most 32 stations (master or slave) in a bus segment. There's a power bus terminator in each bus segment's front and end. Two bus terminators both have always power-on supply to ensure error-free operation. Bus terminator is always connected to device or connector (Note: this gateway PROFIBUS terminal does not have bus termination. Please use connector with terminator.) . If there are more than 32 stations or network need expansion, it's necessary to use a repeater to connect each bus segment.



Figure 8 RS485 Transmission Technology Wiring and Bus Terminator

4.1.2 Cable and Connector

For different applications, there are different cables (type A-D) for connection between devices or device and network compents (e.g. segmented coupler, connector and repeater). When using RS485, PI suggests cable A.

Transmission Rate(kbit/s)	Each bus segmented scope(m)				
9.6, 19.2, 45.45, 93.75	1200				
187.5	1000				
500	400				
1500	200				
3000, 6000, 12000	100				
The values are suitable for A type cable with following features:					
Impedance: 135Ω~165Ω ca	pacitance: ≤20pF/m				
loop resistance: ≤110Ω/km wire	diameter: >0.64mm				
cable sectional area: >0.34mm ²					

4.2 Set Gateway Address

Note: This gateway does not support setting device address via Set_Address Service, but



only support hardware address.

First, please set address when power off.

PROFIBUS address configuration interface includes two dial switches, which are used for setting PROFIBUS address.

Setting Methods:

PROFIBUS bus address= (x10 value of dial switch) *10+ (x1 value of dial switch) E.g.:



PROFIBUS address =3*10+7=37

4.3 Gateway circulation configuration

Profibus device cyclic configuration is realized by GSD file. Profibus network master actuates device initialization process by GSD file. Master will send configurated data and input utput dataconfiguration to slave station. If no errors, it will begin cyclic data exchange state.

4.3.1 GSD file specification

GSD includes software and hardware version, bus baud rates, cyclic data exchange info etc. Since the gateway has MS and SS difference, Microcyber applies two device ID for G0306-MS and G0306-SS. User can choose GSD file based on actual configuration (refer to 2.2.7).

(1) G0306-MS GSD file specification

GSD name for G0306-MS: MCYB0F1A.GSE .

This GSD includes 39 slots, 209 modules and it supports 237 user parameters at

most.

• Module description

Table 3 G0306-MS GSD Module Description

Module no.	Module name	Input data length(byte)	Output data length (byte)	Description
1	empty	0	0	Empty Module
2	status	1	0	Modbus communication status module
3	control	0	1	Modbus communication control module
4	read 8 bits(0xxxx)	1	0	To use function code 1 to read 8 coil data from a certain Modbus slave station
5	read 8 bits(1xxxx)	1	0	To use function code 2 to read 8 discrete magnitude from a certain Modbus slave station
6	read 16 bits(0xxxx)	2	0	To use function code 1 to read 16 coil data from a certain Modbus slave station
7	read 16 bits(1xxxx)	2	0	To use function code 2 to read 16 discrete magnitude from a certain Modbus slave station
8	read 24 bits(0xxxx)	3	0	To use function code 1 to read 24 coil data from a certain Modbus slave station
9	read 24 bits(1xxxx)	3	0	To use function code 2 to read 24 discrete magnitude from a certain Modbus slave station
10	read 32 bits(0xxxx)	4	0	To use function code 1 to read 32 coil data from a certain Modbus slave station
11	read 32 bits(1xxxx)	4	0	To use function code 2 to read 32 discrete magnitude from a certain Modbus slave station
12	read 40 bits(0xxxx)	5	0	To use function code 1 to read 40 coil data from a certain Modbus slave station
13	read 40 bits(1xxxx)	5	0	To use function code 2 to read 40 discrete magnitude from a certain Modbus slave station
14	read 48 bits(0xxxx)	6	0	To use function code 1 to read 48 coil data from a certain Modbus slave station
15	read 48 bits(1xxxx)	6	0	To use function code 2 to read 48 discrete magnitude



Module no.	Module name	Input data length(byte)	Output data length (byte)	Description
				from a certain Modbus slave station
16	read 56 bits(0xxxx)	7	0	To use function code 1 to read 56 coil data from a certain Modbus slave station
17	read 56 bits(1xxxx)	7	0	To use function code 2 to read 56 discrete magnitude from a certain Modbus slave station
18	read 64 bits(0xxxx)	8	0	To use function code 1 to read 64 coil data from a certain Modbus slave station
19	read 64 bits(1xxxx)	8	0	To use function code 2 to read 64 discrete magnitude from a certain Modbus slave station
20	read 72 bits(0xxxx)	9	0	To use function code 1 to read 72 coil data from a certain Modbus slave station
21	read 72 bits(1xxxx)	9	0	To use function code 2 to read 72 discrete magnitude from a certain Modbus slave station
22	read 80 bits(0xxxx)	10	0	To use function code 1 to read 80 coil data from a certain Modbus slave station
23	read 80 bits(1xxxx)	10	0	To use function code 2 to read 80 discrete magnitude from a certain Modbus slave station
24	read 88 bits(0xxxx)	11	0	To use function code 1 to read 88 coil data from a certain Modbus slave station
25	read 88 bits(1xxxx)	11	0	To use function code 2 to read 88 discrete magnitude from a certain Modbus slave station
26	read 96 bits(0xxxx)	12	0	To use function code 1 to read 96 coil data from a certain Modbus slave station
27	read 96 bits(1xxxx)	12	0	To use function code 2 to read 96 discrete magnitude from a certain Modbus slave station
28	read 104 bits(0xxxx)	13	0	To use function code 1 to read 104 coil data from a certain Modbus slave station
29	read 104 bits(1xxxx)	13	0	To use function code 2 to read 104 discrete magnitude from a certain Modbus slave station
30	read 112 bits(0xxxx)	14	0	To use function code 1 to read 112 coil data from a certain Modbus slave station
31	read 112 bits(1xxxx)	14	0	To use function code 2 to read 112 discrete magnitude from a certain Modbus slave station
32	read 120 bits(0xxxx)	15	0	To use function code 1 to read 120 coil data from a certain Modbus slave station
33	read 120 bits(1xxxx)	15	0	To use function code 2 to read 120 discrete magnitude from a certain Modbus slave station
34	read 128 bits(0xxxx)	16	0	To use function code 1 to read 128 coll data from a certain Modbus slave station
35	read 128 bits(1xxxx)	10	0	magnitude from a certain Modbus slave station
30	read 136 bits(UXXXX)	17	0	To use function code 1 to read 136 coll data from a certain Modbus slave station
31	read 114 bite(Organi)	1/	0	magnitude from a certain Modbus slave station
38	read 144 bits(UXXXX)	18	0	To use function code 1 to read 144 coll data from a certain Modbus slave station
39	read 144 bits(1xxxx)	18	0	and the second s
40	read 152 bits(UXXXX)	19	0	certain Modbus slave station
41	read 152 bits(1xxxx)	19	0	To use function code 2 to read 152 discrete magnitude from a certain Modbus slave station
42	read 160 bits(0xxxx)	20	0	ro use function code 1 to read 160 coil data from a certain Modbus slave station
43	read 160 bits(1xxxx)	20	0	To use function code 2 to read 160 discrete magnitude from a certain Modbus slave station
44	read 168 bits(UXXXX)	21	0	certain Modbus slave station
45	read 168 bits(1xxxx)	21	0	To use function code 2 to read 168 discrete



Module no.	Module name	Input data length(byte)	Output data length (byte)	Description
				magnitude from a certain Modbus slave station
46	read 176 bits(0xxxx)	22	0	To use function code 1 to read 176 coil data from a certain Modbus slave station
47	read 176 bits(1xxxx)	22	0	To use function code 2 to read 176 discrete magnitude from a certain Modbus slave station
48	read 184 bits(0xxxx)	23	0	To use function code 1 to read 184 coil data from a certain Modbus slave station
49	read 184 bits(1xxxx)	23	0	To use function code 2 to read 184 discrete magnitude from a certain Modbus slave station
50	read 192 bits(0xxxx)	24	0	To use function code 1 to read 192 coil data from a certain Modbus slave station
51	read 192 bits(1xxxx)	24	0	To use function code 2 to read 192 discrete magnitude from a certain Modbus slave station
52	read 200 bits(0xxxx)	25	0	To use function code 1 to read 200 coil data from a certain Modbus slave station
53	read 200 bits(1xxxx)	25	0	To use function code 2 to read 200 discrete magnitude from a certain Modbus slave station
54	read 208 bits(0xxxx)	26	0	To use function code 1 to read 208 coil data from a certain Modbus slave station
55	read 208 bits(1xxxx)	26	0	To use function code 2 to read 208 discrete magnitude from a certain Modbus slave station
56	read 216 bits(0xxxx)	27	0	To use function code 1 to read 216 coil data from a certain Modbus slave station
57	read 216 bits(1xxxx)	27	0	To use function code 2 to read 216 discrete magnitude from a certain Modbus slave station
58	read 224 bits(0xxxx)	28	0	To use function code 1 to read 224 coil data from a certain Modbus slave station
59	read 224 bits(1xxxx)	28	0	To use function code 2 to read 224 discrete magnitude from a certain Modbus slave station
60	read 232 bits(0xxxx)	29	0	To use function code 1 to read 232 coil data from a certain Modbus slave station
61	read 232 bits(1xxxx)	29	0	To use function code 2 to read 232 discrete magnitude from a certain Modbus slave station
62	read 240 bits(0xxxx)	30	0	To use function code 1 to read 240 coil data from a certain Modbus slave station
63	read 240 bits(1xxxx)	30	0	To use function code 2 to read 240 discrete magnitude from a certain Modbus slave station
64	read 248 bits(Uxxxx)	31	0	To use function code 1 to read 248 coil data from a certain Modbus slave station
60	read 248 bits(1xxxx)	31	0	magnitude from a certain Modbus slave station
00	read 256 bits(0xxxx)	32	0	certain Modbus slave station
67	read 200 bits(1xxxx)	32	0	magnitude from a certain Modbus slave station
00	read 1 Words(4xxx)	2	0	certain Modbus slave station
70	read 2 Words (Avery)	Δ	0	certain Modbus slave station
74	read 2 Words (4XXX)	4	0	certain Modbus slave station
71	read 2 Words (3XXX)	4	0	certain Modbus slave station
72	read 3 words(4xxx)	6	0	certain Modbus slave station
73	read 3 words(3xxxx)	6	0	certain Modbus slave station
/4	read 4 vvords(4xxxx)	8	U	cortain Modbus slave station
75	read 4 Words(3xxxx)	8	0	To use function code 4 to read 4 register data from a



Module no.	Module name	Input data length(byte)	Output data length (byte)	Description
				certain Modbus slave station
76	read 5 Words(4xxxx)	10	0	To use function code 3 to read 5 register data from a certain Modbus slave station
77	read 5 Words(3xxxx)	10	0	To use function code 4 to read 5 register data from a certain Modbus slave station
78	read 6 Words(4xxxx)	12	0	To use function code 3 to read 6 register data from a certain Modbus slave station
79	read 6 Words(3xxxx)	12	0	To use function code 4 to read 6 register data from a certain Modbus slave station
80	read 7 Words(4xxxx)	14	0	To use function code 3 to read 7 register data from a certain Modbus slave station
81	read 7 Words(3xxxx)	14	0	To use function code 4 to read 7 register data from a certain Modbus slave station
82	read 8 Words(4xxxx)	16	0	To use function code 3 to read 8 register data from a certain Modbus slave station
83	read 8 Words(3xxxx)	16	0	To use function code 4 to read 8 register data from a certain Modbus slave station
84	read 9 Words(4xxxx)	18	0	To use function code 3 to read 9 register data from a certain Modbus slave station
85	read 9 Words(3xxxx)	18	0	To use function code 4 to read 9 register data from a certain Modbus slave station
86	read 10 Words(4xxxx)	20	0	To use function code 3 to read 10 register data from a certain Modbus slave station
87	read 10 Words(3xxxx)	20	0	To use function code 4 to read 10 register data from a certain Modbus slave station
88	read 11 Words(4xxxx)	22	0	To use function code 3 to read 11 register data from a certain Modbus slave station
89	read 11 Words(3xxxx)	22	0	To use function code 4 to read 11 register data from a certain Modbus slave station
90	read 12 Words(4xxxx)	24	0	To use function code 3 to read 12 register data from a certain Modbus slave station
91	read 12 Words(3xxxx)	24	0	To use function code 4 to read 12 register data from a certain Modbus slave station
92	read 13 Words(4xxxx)	26	0	To use function code 3 to read 13 register data from a certain Modbus slave station
93	read 13 Words(3xxxx)	26	0	To use function code 4 to read 13 register data from a certain Modbus slave station
94	read 14 Words(4xxxx)	28	0	To use function code 3 to read 14 register data from a certain Modbus slave station
95	read 14 Words(3xxxx)	28	0	To use function code 4 to read 14 register data from a certain Modbus slave station
96	read 15 Words(4xxxx)	30	0	a certain Modbus slave station
97	read 15 Words(3xxxx)	30	0	a certain Modbus slave station
98	read 16 Words(4xxxx)	32	0	a certain Modbus slave station
99	read 16 Words(3xxxx)	32	0	To use function code 4 to read 16 register data from a certain Modbus slave station
100	read 18 Words(4xxxx)	36	0	To use function code 3 to read 18 register data from a certain Modbus slave station
101	read 18 Words(3xxxx)	36	0	To use function code 4 to read 18 register data from a certain Modbus slave station
102	read 20 Words(4xxxx)	40	0	To use function code 3 to read 20 register data from a certain Modbus slave station
103	read 20 Words(3xxxx)	40	0	To use function code 4 to read 20 register data from a certain Modbus slave station
104	read 22 Words(4xxxx)	44	0	I o use function code 3 to read 22 register data from a certain Modbus slave station
105	read 22 Words(3xxxx)	44	0	To use function code 4 to read 22 register data from



Module no.	Module name	Input data length(byte)	Output data length (byte)	Description
				a certain Modbus slave station
106	read 24 Words(4xxxx)	48	0	To use function code 3 to read 24 register data from a certain Modbus slave station
107	read 24 Words(3xxxx)	48	0	To use function code 4 to read 24 register data from a certain Modbus slave station
108	read 26 Words(4xxxx)	52	0	To use function code 3 to read 26 register data from a certain Modbus slave station
109	read 26 Words(3xxxx)	52	0	To use function code 4 to read 26 register data from a certain Modbus slave station
110	read 28 Words(4xxxx)	56	0	To use function code 3 to read 28 register data from a certain Modbus slave station
111	read 28 Words(3xxxx)	56	0	To use function code 4 to read 28 register data from a certain Modbus slave station
112	read 30 Words(4xxxx)	60	0	To use function code 3 to read 30 register data from a certain Modbus slave station
113	read 30 Words(3xxxx)	60	0	To use function code 4 to read 30 register data from a certain Modbus slave station
114	read 32 Words(4xxxx)	64	0	To use function code 3 to read 32 register data from a certain Modbus slave station
115	read 32 Words(3xxxx)	64	0	To use function code 4 to read 32 register data from a certain Modbus slave station
116	read 34 Words(4xxxx)	68	0	To use function code 3 to read 34 register data from a certain Modbus slave station
117	read 34 Words(3xxxx)	68	0	To use function code 4 to read 34 register data from a certain Modbus slave station
118	read 36 Words(4xxxx)	72	0	To use function code 3 to read 36 register data from a certain Modbus slave station
119	read 36 Words(3xxxx)	72	0	To use function code 4 to read 36 register data from a certain Modbus slave station
120	read 38 Words(4xxxx)	76	0	To use function code 3 to read 38 register data from a certain Modbus slave station
121	read 38 Words(3xxxx)	76	0	To use function code 4 to read 38 register data from a certain Modbus slave station
122	read 40 Words(4xxxx)	80	0	To use function code 3 to read 40 register data from a certain Modbus slave station
123	read 40 Words(3xxxx)	80	0	To use function code 4 to read 40 register data from a certain Modbus slave station
124	read 42 Words(4xxxx)	84	0	To use function code 3 to read 42 register data from a certain Modbus slave station
125	read 42 Words(3xxxx)	84	0	a certain Modbus slave station
120	read 44 Words(4xxxx)	88	0	a certain Modbus slave station
127	read 46 Words(3XXXX)	88	0	a certain Modbus slave station
120	read 46 Words(4XXX)	92	0	a certain Modbus slave station
129		92	0	a certain Modbus slave station
130	read 48 Words(4XXX)	96	U	a certain Modbus slave station
131	read 50 Words (3XXXX)	96	0	a certain Modbus slave station
132	read 50 Words(4XXX)	100	0	a certain Modbus slave station
133	read 52 Words (3xxxx)	100	0	a certain Modbus slave station
134	read 52 Words(4XXXX)	104	0	a certain Modbus slave station
135	reau 52 words(3XXXX)	104	0	To use function code 4 to read 52 register data from



Module no.	Module name	Input data length(byte)	Output data length (byte)	Description
				a certain Modbus slave station
136	read 54 Words(4xxxx)	108	0	To use function code 3 to read 54 register data from a certain Modbus slave station
137	read 54 Words(3xxxx)	108	0	To use function code 4 to read 54 register data from a certain Modbus slave station
138	read 56 Words(4xxxx)	112	0	To use function code 3 to read 56 register data from a certain Modbus slave station
139	read 56 Words(3xxxx)	112	0	To use function code 4 to read 56 register data from a certain Modbus slave station
140	read 58 Words(4xxxx)	116	0	To use function code 3 to read 58 register data from a certain Modbus slave station
141	read 58 Words(3xxxx)	116	0	To use function code 4 to read 58 register data from a certain Modbus slave station
142	read 60 Words(4xxxx)	120	0	To use function code 3 to read 60 register data from a certain Modbus slave station
143	read 60 Words(3xxxx)	120	0	To use function code 4 to read 60 register data from a certain Modbus slave station
144	write 8 bits(0xxxx)	0	1	To use function code 15 to write 1~8 coil data into a certain Modbus slave station
145	write 16 bits(0xxxx)	0	2	To use function code 15 to write 1~16 coil data into a certain Modbus slave station
146	write 24 bits(0xxxx)	0	3	To use function code 15 to write 1~24 coil data into a certain Modbus slave station
147	write 32 bits(0xxxx)	0	4	To use function code 15 to write 1~32 coil data into a certain Modbus slave station
148	write 40 bits(0xxxx)	0	5	To use function code 15 to write 1~40 coil data into a certain Modbus slave station
149	write 48 bits(0xxxx)	0	6	To use function code 15 to write 1~48 coil data into a certain Modbus slave station
150	write 56 bits(0xxxx)	0	7	To use function code 15 to write 1~56 coil data into a certain Modbus slave station
151	write 64 bits(0xxxx)	0	8	To use function code 15 to write 1~64 coil data into a certain Modbus slave station
152	write 72 bits(0xxxx)	0	9	To use function code 15 to write 1~72 coil data into a certain Modbus slave station
153	write 80 bits(0xxxx)	0	10	To use function code 15 to write 1~80 coil data into a certain Modbus slave station
154	write 88 bits(0xxxx)	0	11	To use function code 15 to write 1~88 coil data into a certain Modbus slave station
155	write 96 bits(UXXXX)	0	12	certain Modbus slave station
150	write 104 bits(0xxxx)	0	13	a certain Modbus slave station
157 0	write 122 bits(0xxxx)	0	14	a certain Modbus slave station
150	write 120 bits(0xxxx)	0	15	a certain Modbus slave station
159	write 136 bite(0xxxx)	0	10	a certain Modbus slave station
100	write 136 bits(0xxxx)	0	17	a certain Modbus slave station
167	write 152 bits(0xxxx)	0	10	a certain Modbus slave station
102	write 160 bits(UXXXX)	U	19	a certain Modbus slave station
164	write 169 bits(0xxxx)	0	20	a certain Modbus slave station
104		U	21	a certain Modbus slave station
165	write 176 bits(0xxxx)	0	22	To use function code 15 to write 1~176 coil data into



Module no.	Module name	Input data length(byte)	Output data length (byte)	Description
				a certain Modbus slave station
166	write 184 bits(0xxxx)	0	23	To use function code 15 to write 1~184 coil data into a certain Modbus slave station
167	write 192 bits(0xxxx)	0	24	To use function code 15 to write 1~192 coil data into a certain Modbus slave station
168	write 200 bits(0xxxx)	0	25	To use function code 15 to write 1~200 coil data into a certain Modbus slave station
169	write 208 bits(0xxxx)	0	26	To use function code 15 to write 1~208 coil data into a certain Modbus slave station
170	write 216 bits(0xxxx)	0	27	To use function code 15 to write 1~216 coil data into a certain Modbus slave station
171	write 224 bits(0xxxx)	0	28	To use function code 15 to write 1~224 coil data into a certain Modbus slave station
172	write 232 bits(0xxxx)	0	29	To use function code 15 to write 1~232 coil data into a certain Modbus slave station
173	write 240 bits(0xxxx)	0	30	To use function code 15 to write 1~240 coil data into a certain Modbus slave station
174	write 248 bits(0xxxx)	0	31	To use function code 15 to write 1~248 coil data into a certain Modbus slave station
175	write 256 bits(0xxxx)	0	32	To use function code 15 to write 1~256 coil data into a certain Modbus slave station
176	write 1 Words(4xxxx)	0	2	使用功能码 16 往某Modbus 从站写入 1 个寄存器数据 To use function code 16 to write 1 register data into a certain Modbus slave station
177	write 2 Words(4xxxx)	0	4	To use function code 16 to write 2 register data into a certain Modbus slave station
178	write 3 Words(4xxxx)	0	6	To use function code 16 to write 3 register data into a certain Modbus slave station
179	write 4 Words(4xxxx)	0	8	To use function code 16 to write 4 register data into a certain Modbus slave station
180	write 5 Words(4xxxx)	0	10	To use function code 16 to write 5 register data into a certain Modbus slave station
181	write 6 Words(4xxxx)	0	12	To use function code 16 to write 6 register data into a certain Modbus slave station
182	write 7 Words(4xxxx)	0	14	To use function code 16 to write 7 register data into a certain Modbus slave station
183	write 8 Words(4xxxx)	0	16	To use function code 16 to write 8 register data into a certain Modbus slave station
184	write 9 Words(4xxxx)	0	18	To use function code 16 to write 9 register data into a certain Modbus slave station
185	write 10 Words(4xxxx)	0	20	To use function code 16 to write 10 register data into a certain Modbus slave station
186	write 11 Words(4xxxx)	0	22	I o use function code 16 to write 11 register data into a certain Modbus slave station
187	write 12 Words(4xxxx)	0	24	To use function code 16 to write 12 register data into a certain Modbus slave station
188	write 13 Words(4xxxx)	0	26	To use function code 16 to write 13 register data into a certain Modbus slave station
189	write 14 vvords(4xxxx)	0	28	a certain Modbus slave station
190	write 15 Words(4xxxx)	0	30	a certain Modbus slave station
191	write 16 Words(4xxxx)	0	32	a certain Modbus slave station
192	write 18 Words(4xxxx)	0	36	I o use function code 16 to write 18 register data into a certain Modbus slave station
193	write 20 Words(4xxxx)	0	40	a certain Modbus slave station
194	write 22 Words(4xxxx)	0	44	a certain Modbus slave station



Module no.	Module name	Input data length(byte)	Output data length (byte)	Description
195	write 24 Words(4xxxx)	0	48	To use function code 16 to write 24 register data into a certain Modbus slave station
196	write 26 Words(4xxxx)	0	52	To use function code 16 to write 26 register data into a certain Modbus slave station
197	write 28 Words(4xxxx)	0	56	To use function code 16 to write 28 register data into a certain Modbus slave station
198	write 30 Words(4xxxx)	0	60	To use function code 16 to write 30 register data into a certain Modbus slave station
199	write 32 Words(4xxxx)	0	64	To use function code 16 to write 32 register data into a certain Modbus slave station
200	force single bit (05H Command)	0	1	To use function code 5 to write 1 coil data into a certain Modbus slave station
201	set single word (06H Command)	0	2	To use function code 6 to write 1 register data into a certain Modbus slave station
202	8Bits MODBUS Slaves Status	1	0	To read 8 bits Modbus slave station status
203	8Bytes MODBUS Slaves Status	8	0	To read 8 bytes Modbus slave station status
204	16Bits MODBUS Slaves Status	2	0	To read 16 bits Modbus slave station status
205	16Bytes MODBUS Slaves Status	16	0	To read 16 bytes Modbus slave station status
206	24Bits MODBUS Slaves Status	3	0	To read 24 bits Modbus slave station status
207	24Bytes MODBUS Slaves Status	24	0	To read 24 bytes Modbus slave station status
208	32Bits MODBUS Slaves Status	4	0	To read 32 bits Modbus slave station status
209	32Bytes MODBUS Slaves Status	32	0	To read 8 bytes Modbus slave station status

As shown in table above, there are four types of the 209 modules:

- a) Empty module (module 1)
- b) Modbus communication module (module 4-201)
- c) Control module (module 3)
- d) Overall state module (module 2) and detailed state module (202-209)

Slot 1 is fixed as overall state module (module 2), and Slot 2 is fixed as Control module (module 3). Other37slots are free for configuration.

Note: if there's detailed state module (module 202-209) requirement, detailed state module can onlybeputin last valid slot (E.g. Modbus module uses 5 slots, then slot 1 is the overall state module, slot 2 is control module and slot 3-7 is Modbus communication module. Slot 8 is the last valid slot in this example. If detailed state module is required, put It there).

Modbus configuration is realized by user parameters, which are names as **device user parameter**. Besides this 3 modules, all others has user parameter for configuration, which are named as **module user parameter**.

• Device user parameter

This part includes Modbus baud rate, checkout information, data update mode, write in mode, master sending interval, interval time and with /without slave state checkout etc.

No.	Parameter name	Description
1	Baudrate	0:300 bps 1:600 bps 2:1200 bps 3:2400 bps 4:4800 bps

Table 4 G0306-MS Device User Parameter



		5:9600 bps 6:19200 bps
		7:38400 bps
	D ::	8:57600 bps
2	Parity	U:8 bit, no check, 1 stop bit (8Bits, No Parity, 1 stop bit) 1:8 bit, even parity check, 1 stop bit (8Bits, Even Parity, 1stop
		bit)
		2:8 bit, odd parity check, 1 stop bit (8Bits, Odd Parity, 1stop bit)3:8 bit, no check, 2 stop bits (8Bits, No Parity, 2stop bits)
3	MODBUS Slave Monitoring	When this parameter is not 0, detailed state module must be
		0: no state monitoring (NoMonitoring)
		1:8 bit state monitoring (8BitsMonitoring)
		2:8 byte state monitoring (8BytesMonitoring)
		4:16 byte state monitoring (16BytesMonitoring)
		5:24 bit state monitoring (24BitsMonitoring)
		6:24 byte state monitoring (24BytesMonitoring)
		8:32 byte state monitoring (32BytesMonitoring)
4	Data Update Mode	1: after all MD response (All Items End)
5	Writing Mode	2: after each MD response (Each Item End)
Ŭ		1:write when data changes(Write on change)
6	Master Send Interval	0: slave response send (Salve Response)
		1:same interval send (Same Interval)
		Send interval and response timeout are both set by interval time
		value.
7	Interval Limer Value	1.10m2
7	Interval Timer Value	1:10ms 2:20ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms 8:80ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms 8:80ms 10:100ms 12:120ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms 8:80ms 10:100ms 12:120ms 15:150ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms 8:80ms 10:100ms 12:120ms 15:150ms 20:200ms 25:20ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms 8:80ms 10:100ms 12:120ms 15:150ms 20:200ms 25:250ms 30:300ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms 8:80ms 10:100ms 12:120ms 15:150ms 20:200ms 25:250ms 30:300ms 35:350ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms 8:80ms 10:100ms 12:120ms 15:150ms 20:200ms 25:250ms 30:300ms 35:350ms 40:400ms 45:450ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms 8:80ms 10:100ms 12:120ms 15:150ms 20:200ms 25:250ms 30:300ms 35:350ms 40:400ms 45:450ms 50:500ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms 8:80ms 10:100ms 12:120ms 15:150ms 20:200ms 25:250ms 30:300ms 35:350ms 40:400ms 45:450ms 50:500ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms 8:80ms 10:100ms 12:120ms 15:150ms 20:200ms 25:250ms 30:300ms 35:350ms 40:400ms 45:450ms 50:500ms 60:600ms 65:650ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms 8:80ms 10:100ms 12:120ms 15:150ms 20:200ms 25:250ms 30:300ms 35:350ms 40:400ms 45:450ms 50:500ms 55:550ms 60:600ms 65:650ms 70:700ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms 8:80ms 10:100ms 12:120ms 15:150ms 20:200ms 25:250ms 30:300ms 35:350ms 40:400ms 45:450ms 50:500ms 55:550ms 60:600ms 65:650ms 70:700ms 75:750ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms 8:80ms 10:100ms 12:120ms 15:150ms 20:200ms 25:250ms 30:300ms 35:350ms 40:400ms 45:450ms 50:500ms 55:550ms 60:600ms 65:650ms 70:700ms 75:750ms 80:800ms 85:850ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms 8:80ms 10:100ms 12:120ms 15:150ms 20:200ms 25:250ms 30:300ms 35:350ms 40:400ms 45:450ms 50:500ms 55:550ms 60:600ms 65:650ms 70:700ms 75:750ms 80:800ms 85:850ms 90:900ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms 8:80ms 10:100ms 12:120ms 15:150ms 20:200ms 25:250ms 30:300ms 35:350ms 40:400ms 45:450ms 50:500ms 55:550ms 60:600ms 65:650ms 70:700ms 75:750ms 80:800ms 85:850ms 90:900ms 95:950ms
7	Interval Timer Value	1:10ms 2:20ms 3:30ms 4:40ms 5:50ms 6:60ms 8:80ms 10:100ms 12:120ms 15:150ms 20:200ms 25:250ms 30:300ms 35:350ms 40:400ms 45:450ms 50:500ms 55:550ms 60:600ms 65:650ms 70:700ms 75:750ms 80:800ms 85:850ms 90:900ms 95:950ms 100:1000ms

dule user parameter

Parameter here are related with actual Modbus slave device, including slave device address, register starting address that need read and write data , Quantity of Outputs etc.

Table 5 G0306-MS Module (4-143, 176-199) User Parameter Table



1	MODBUS Slave Address	Modbus Slave Address, 0-255。
2	Starting Address	Register starting address that need read and write data

Table 6 G0306-MS Module (144-175) User Parameter Table

No.	Parameter name	Description
1	MODBUS Slave Address	Modbus Slave Address, 0-255。
2	Starting Address	Register starting address that need read and write data
3	Quantity of Outputs	Quantity of Outputs

Table 7 G0306-MS Module 200 User Parameter Table

No.	Parameter name	Description
1	MODBUS Slave Address	Modbus Slave Address, 0-255
2	Output Address	Output address of written data

Table 8 G0306-MS Module 201 User Parameter Table

No.	Parameter name	Description
1	MODBUS Slave Address	Modbus Slave Address, 0-255
2	Register Address	Output address of written data

Note: table 4-7 only list revisable user parameter of these modules, not all. For example, a certain module's Modbus function code, register quantity for read and write data, bytes are not listed here.

Table 9 G0306-MS Detailed State Module (202-203) User Parameter Table

Parameter length	Parameter default	Description
8 bytes	0x01,0x02,0x03,0x04,0x05,0x06,0x07,0x08	Each byte represents a Modbus (to be tested) slave device address.

Table 10 G0306-MS Detailed State Module (204-205) User Parameter Table

Parameter length	Parameter default	Description
16 bytes	0x01,0x02,0x03,0x04,0x05,0x06,0x07,0x08, 0x09,0x0a,0x0b,0x0c,0x0d,0x0e,0x0f,0x10	Each byte represents a Modbus (to be tested) slave device address.

Table 11 G0306-MS Detailed State Module (206-207) User Parameter Table

Parameter length	Parameter default	Description
24 bytes	0x01,0x02,0x03,0x04,0x05,0x06,0x07,0x08, 0x09,0x0a,0x0b,0x0c,0x0d,0x0e,0x0f,0x10, 0x11,0x12,0x13,0x14,0x15,0x16,0x17,0x18	Each byte represents a Modbus (to be tested) slave device address.

Table 12 G0306-MS Detailed State Module (208-209) User Parameter Table

Parameter length	Parameter default	Description
32 bytes	0x01,0x02,0x03,0x04,0x05,0x06,0x07,0x08, 0x09,0x0a,0x0b,0x0c,0x0d,0x0e,0x0f,0x10, 0x11,0x12,0x13,0x14,0x15,0x16,0x17,0x18, 0x19,0x1a,0x1b,0x1c,0x1d,0x1e,0x1f,0x20	Each byte represents a Modbus (to be tested) slave device address.

(2) G0306-S GSD file specification

GSD file name for G0306-SS is MCYB0F19.GSE.

This GSD file contains 20 slots, 67 modules and it supports at most 237 userspecification.



Module description

Table 13 G0306-SS GSD module description

No.	Module name	Input data length(bytes)	output data length(bytes)	Description
1	empty	0	0	Empty module
2	status	1	0	Modbus communication state module
3	control	0	1	Modbuscommunication control module
4	Input:8 bits(0xxxx)	1	0	Make 1 byte input data map to Modbus 0xxxx storage area in order
5	Input:16 bits(0xxxx)	2	0	Make 2 byte input data map to Modbus 0xxxx storage area in order
6	Input:24 bits(0xxxx)	3	0	Make 3 byte input data map to Modbus 0xxxx storage area in order
7	Input:32 bits(0xxxx)	4	0	Make 4 byte input data map to Modbus 0xxxx storage area in order
8	Input:40 bits(0xxxx)	5	0	Make 5 byte input data map to Modbus 0xxxx storage area in order
9	Input:48 bits(0xxxx)	6	0	Make 6 byte input data map to Modbus 0xxxx storage area in order
10	Input:56 bits(0xxxx)	7	0	Make 7 byte input data map to Modbus 0xxxx storage area in order
11	Input:64 bits(0xxxx)	8	0	Make 8 byte input data map to Modbus 0xxxx storage area in order
12	Input:72 bits(0xxxx)	9	0	Make 9 byte input data map to Modbus 0xxxx storage area in order
13	Input:80 bits(0xxxx)	10	0	Make 10 byte input data map to Modbus 0xxxx storage area in order
14	Input:88 bits(0xxxx)	11	0	Make 11 byte input data map to Modbus 0xxxx storage area in order
15	Input:96 bits(0xxxx)	12	0	Make 12 byte input data map to Modbus 0xxxx storage area in order
16	Input:104 bits(0xxxx)	13	0	Make 13 byte input data map to Modbus 0xxxx storage area in order
17	Input:112 bits(0xxxx)	14	0	Make 14 byte input data map to Modbus 0xxxx storage area in order
18	Input:120 bits(0xxxx)	15	0	Make 15 byte input data map to Modbus 0xxxx storage area in order
19	Input:128 bits(0xxxx)	16	0	Make 16 byte input data map to Modbus 0xxxx storage area in order
20	Input:1 Word(4xxxx)	2	0	Make 2 byte input data map to Modbus 4xxxx storage area in order
21	Input:2 Words(4xxxx)	4	0	Make 4 byte input data map to Modbus 4xxxx storage area in order
22	Input:3 Words(4xxxx)	6	0	Make 6 byte input data map to Modbus 4xxxx storage area in order
23	Input:4 Words(4xxxx)	8	0	Make 8 byte input data map to Modbus 4xxxx storage area in order
24	Input:5 Words(4xxxx)	10	0	Make 10 byte input data map to Modbus 4xxxx storage area in order
25	Input:6 Words(4xxxx)	12	0	Make 12 byte input data map to Modbus 4xxxx storage area in order
26	Input:7 Words(4xxxx)	14	0	Make 14 byte input data map to Modbus 4xxxx storage area in order
27	Input:8	16	0	Make 16 byte input data map to Modbus



No.	Module name	Input data length(bytes)	output data length(bytes)	Description
	Words(4xxxx)			4xxxx storage area in order
28	Input:9 Words(4xxxx)	18	0	Make 18 byte input data map to Modbus 4xxxx storage area in order
29	Input:10 Words(4xxxx)	20	0	Make 20 byte input data map to Modbus 4xxxx storage area in order
30	Input:11 Words(4xxxx)	22	0	Make 22 byte input data map to Modbus 4xxxx storage area in order
31	Input:12 Words(4xxxx)	24	0	Make 24 byte input data map to Modbus 4xxxx storage area in order
32	Input:13 Words(4xxxx)	26	0	Make 26 byte input data map to Modbus 4xxxx storage area in order
33	Input:14 Words(4xxxx)	28	0	Make 28 byte input data map to Modbus 4xxxx storage area in order
34	Input:15 Words(4xxxx)	30	0	Make 30 byte input data map to Modbus 4xxxx storage area in order
35	Input:16 Words(4xxxx)	32	0	Make 32 byte input data map to Modbus 4xxxx storage area in order
36	Output:8 bits(1xxxx)	0	1	Make 1 byte output data map to Modbus 1xxxx storage area in order
37	Output:16 bits(1xxxx)	0	2	Make 2 byte output data map to Modbus 1xxxx storage area in order
38	Output:24 bits(1xxxx)	0	3	Make 3 byte output data map to Modbus 1xxxx storage area in order
39	Output:32 bits(1xxxx)	0	4	Make 4 byte output data map to Modbus 1xxxx storage area in order
40	Output:40 bits(1xxxx)	0	5	Make 5 byte output data map to Modbus 1xxxx storage area in order
41	Output:48 bits(1xxxx)	0	6	Make 6 byte output data map to Modbus 1xxxx storage area in order
42	Output:56 bits(1xxxx)	0	7	Make 7 byte output data map to Modbus 1xxxx storage area in order
43	Output:64 bits(1xxxx)	0	8	Make 8 byte output data map to Modbus 1xxxx storage area in order
44	Output:72 bits(1xxxx)	0	9	Make 9 byte output data map to Modbus 1xxxx storage area in order
45	Output:80 bits(1xxxx)	0	10	Make 10 byte output data map to Modbus 1xxxx storage area in order
46	Output:88 bits(1xxxx)	0	11	Make 11 byte output data map to Modbus 1xxxx storage area in order
47	Output:96 bits(1xxxx)	0	12	Make 12 byte output data map to Modbus 1xxxx storage area in order
48	Output:104 bits(1xxxx)	0	13	Make 13 byte output data map to Modbus 1xxxx storage area in order
49	Output:112 bits(1xxxx)	0	14	Make 14 byte output data map to Modbus 1xxxx storage area in order
50	Output:120 bits(1xxxx)	0	15	Make 15 byte output data map to Modbus 1xxxx storage area in order
51	Output:128 bits(1xxxx)	0	16	Make 16 byte output data map to Modbus 1xxxx storage area in order
52	Output:1 Word(3xxxx)	0	2	Make 2 byte output data map to Modbus 3xxxx storage area in order
53	Output:2 Words(3xxxx)	0	4	Make 4 byte output data map to Modbus 3xxxx storage area in order



No.	Module name	Input data length(bytes)	output data length(bytes)	Description
54	Output:3 Words(3xxxx)	0	6	Make 6 byte output data map to Modbus 3xxxx storage area in order
55	Output:4 Words(3xxxx)	0	8	Make 8 byte output data map to Modbus 3xxxx storage area in order
56	Output:5 Words(3xxxx)	0	10	Make 10 byte output data map to Modbus 3xxxx storage area in order
57	Output:6 Words(3xxxx)	0	12	Make 12 byte output data map to Modbus 3xxxx storage area in order
58	Output:7 Words(3xxxx)	0	14	Make 14 byte output data map to Modbus 3xxxx storage area in order
59	Output:8 Words(3xxxx)	0	16	Make 16 byte output data map to Modbus 3xxxx storage area in order
60	Output:9 Words(3xxxx)	0	18	Make 18 byte output data map to Modbus 3xxxx storage area in order
61	Output:10 Words(3xxxx)	0	20	Make 20 byte output data map to Modbus 3xxxx storage area in order
62	Output:11 Words(3xxxx)	0	22	Make 22 byte output data map to Modbus 3xxxx storage area in order
63	Output:12 Words(3xxxx)	0	24	Make 24 byte output data map to Modbus 3xxxx storage area in order
64	Output:13 Words(3xxxx)	0	26	Make 26 byte output data map to Modbus 3xxxx storage area in order
65	Output:14 Words(3xxxx)	0	28	Make 28 byte output data map to Modbus 3xxxx storage area in order
66	Output:15 Words(3xxxx)	0	30	Make 30 byte output data map to Modbus 3xxxx storage area in order
67	Output:16 Words(3xxxx)	0	32	Make 32 byte output data map to Modbus 3xxxx storage area in order

As shown in table above, the 67 modules can be devided into 4 kinds:

- a) Empty module (module 1)
- b) Overall status module (module 2)
- c) Control module (module 3)
- d) Modbus mapping module (module 4-67). Among them, slot 1 is fixed as overall status module (module 2), slot 2 is fixed as control module (module 3) and the rest 18 slots can be set freely based on requirements.

Modbus communication configuration is realized by user parameter, which isnamed **device user parameter**. Besides the first three modules, all other modules have user parameter for configuration, which is named **module user parameter**.

• Device user parameter

This part contains Modbus communication baud rate, parity message and whether it has Modbus slave status inspection etc.

ltem	Parameter	Description
1	Baudrate	3:2400 bps 4:4800 bps 5:9600 bps

Table 14 G0306-SS device user parameter table



		6:19200 bps 7:38400 bps 8:57600 bps
2	Parity	 0:8 bit, no parity, 1stop bit(8Bits, No Parity, 1stop bit) 1:8 bit, even parity, 1 stop bit (8Bits, Even Parity, 1stop bit) 2:8 bit, odd parity, 1 stop bit (8Bits, Odd Parity, 1stop bit) 3:8 bit, no parity, 2 stop bit (8Bits, No Parity, 2stop bits)
3	MODBUS Slave Device Address	This is to set address for current gateway serving as Modbus slave. Scope: 1-247.

• Module user parameter

The parameter is related with Modbus storage and data length. Parameter value is related with modules, without modification. For example, "Input:24 bits(0xxxx)" module user parameter is 0x00, 0x03, which shows this module is related with Modbus 0storage area, with 3 bytes data.

• Modbus storage area and Profibus input output data relief area mapping relation Table 15 Modbus storage area and Profibus input output data relief area mapping relation

Module	Corresponding	input output	Storage unit
	Modbus	data max	address
	storage area	length	scope
Input:8 bits(0xxxx) ~ Input:128 bits(0xxxx)	Coil 0xxxx	244 bytes=1952bit	0~1951
Output:8 bits(1xxxx) ~ Output:128 bits(1xxxx)	Discrete magnitude input 1xxxx	244 bytes =1952bit	0~1951
Input:1 Word(4xxxx) ~ Input:16	Holding register	244 bytes	0~121
Words(4xxxx)	4xxxx	=122word	
Output:1 Word(3xxxx) ~ Output:16	Input register	244 bytes	0~121
Words(3xxxx)	3xxxx	=122word	

4.3.2 Installation of GSD

Take Siemens STEP 7 Software, G0306-MS as an example, choose any project, open hardware configuration, choose "Options Install GSD File...", and it will open the GSD file window.



stall GSD File	es			×
E <u>n</u> stall GSD	Files:		from the directory	
F:\DP-Gatew	ay\GSD			<u>B</u> rowse
File MCYBOF1A.GS	Release	Version	Languages English	
GO3O6 MODBU	S to DP Gate	way (GW-MC	DDB-DP-*****)	
<u>I</u> nstall	<u></u>	now Log	Select All Deselect All	
	1			

Figure 9 GSD File Window

Click "Browse..." and choose the path for GSD file. It will list all the GSD files in the present path, choose the GSD file and click "Install". Keep clicking "Yes", until Figure 10 is shown.



Figure 10 Successful Installation

G0306-SS GSD file uses the same lead-in method.

4.3.3 Use GSD file

After successful installation for GSD, the gateway shall appear in the tree list at the right side of the hardware configuration window.



BestW Config - [51/MATIC 400(1) (Configuration) DP_Gateway] Beston Edit [Insert ELC Yew Options Window Help					_ D ×
(0) VE2	-		a -		크고
1 PS 405 20A PROFIBUS(1): DP master system (1)		<u>F</u> ind:	1		<u>M† M</u> ‡
		Profil	Standard		-
			ROFIBUS DP	Field Devices	-
II MPI/DP			🗄 🦲 General		
			± 🛄 Switchii ± 🦲 I/O	ng Devices	
			🖹 🦲 Gateway		
			E Micr	ocyber	
			E- 🗰 🖸	0306 MODBUS to DF Gate Universal module	way
				empty	
				control	
				read 8 bits(Oxxxx)	
	-			read 8 bits(1xxxx) read 16 bits(0xxxx)	
				read 16 bits(1xxxx)	
(0) UR2				read 24 bits(Oxxxx)	
S. Module Order number Firmware MPI address I add 9 address Comment	1			read 32 bits(Oxxxx)	
1 PS 405 20A 6EST 405-0RA01-0AA0				read 32 bits(1xxxx) read 40 bits(0xxxx)	
				read 40 bits(1xxxx)	
4 CPU 412-2 DP 6EST 412-2XJ05-0AB0 V5.3 2				read 48 bits(Oxxxx) read 48 bits(1xxxx)	
17 W7/2P 2 4094*			 	read 56 bits(Oxxxx)	
5				read 56 bits(1xxxx) read 64 bits(0xxxx)	
			[read 64 bits(1xxxx)	
8				read 72 bits(Oxxxx) read 72 bits(Ixxxx)	-1
	_	1			
		GW-MODB	-DP-****		₹ <u></u>
J					
Press F1 to get Help.		1			Chg //

Figure 11 Correctly Installed Devices

Drag gateway to DP bus, and it will show the prosperities window automatically. Here shall the user configure the requested address, and we choose address 10.

perties - P	ROFIBUS inter	face G0306 MODBUS to DP Gatew		
General	Parameters			
<u>A</u> ddress:	10			
Transmissi	ion rate: 1.5	Mbps		
Subnet:	t networked -		Ne	2W
PROFIBUS (I) I.5 Mb	ps	Prope	rties
			De	elete

Figure 12 Device property configuration

Click "OK" to finish adding gateway.

Choose the gateway in the configuration image, the device's configuration shall be shown in the left bottom side of the window, shown as following.



BigHW Config - [SIMATIC 400(1) (Configuration) DP_Gateway] Big Sation Edit Inset B.C. Yew Options Window Help D c2 S- Big Fig. (25) Big Fi	X X
Image: Second	Eind: Profil Standard Profil Standard Profil Standard Ganaral
Image: Control in the second	read 16 bits (Lamar) - read 24 bits (Damar) - read 24 bits (Damar) - read 32 bits (Damar) - read 32 bits (Damar) - read 40 bits (Damar) - read 40 bits (Damar) - read 40 bits (Damar) - read 40 bits (Damar) - read 46 bits (Damar) - read 72 bits (Damar)

Figure 13 Device Configuration

In the hardware configuration, the configuration shall do related modify according to specific request, in order to form configuration information of gateway's input output data with Modbus data.

G0306-SS GSD file uses the same lead-in method.

The following is an example for gateway usage instruction.

(1) How to use G0306-MS GSD file

• Configuration of device user parameter

As shown in Figure 14, right-click of gateway device and choose Device-specific parameters.

Parameters	Value		
] 🔄 Station parameters			
E Contraction Contractions			
- <u>≡</u> 1.Baudrate:	9600		
- <u>≡</u> 2.Parity:	8Bits, No Parity, 1stop bit		
- III 3.MODBUS Slave Monitoring:	No Monitoring		
- I 4.Data Update Mode:	All Items End		
- ≝ 5. Writing Mode:	Write always		
- = 6.Master Send Interval:	Same Interval 40ms		
□ □ □ 7.Interval Timer Value:			
└─ <u>──</u> User_Prm_Data (0 to 4)	05,00,00,41,04		

Figure 14 G0306-MS Configuration of Device User Parameter



Here all parameters mentioned in table 4 can be revised. User should do it according to actual situation. For example, time interval value is related with baudrate, slave response time, quantity of device. Improper configuration will lead to no response or error response from slave.

• Configuration gatway module instruction

As mentioned in 4.3.1(1), this gateway GSD includes 39 slots, 209 modules and support 237 user parameter at most. Please refer to Table 4. for each module's illustration.

Slot 1 is fixed as overall state module (module 2), slot 2 is fixed as control module (module 3) and the rest 37 slots can be configurated by users.

For example, configuration of "read 24 bits(0xxxx)" module (module 8) putting into slot 3: select slot 3, and in the right device lists double click "read 24 bits(0xxxx)" to add it into slot 3. Ther are also user parameter for configuration, and the methods are as below.

This gateway forms Modbus message list based on actual configurated module order. Following content will introduce how to use each module.

• Overall state module (module 2)

This module shows each Modbus message actual state on the basis of Modbus message list.

B7: odd-even check B6:CRC check		B5: response timeout	B4-B1: expectional response code	B0: send/receive
0: current slave odd-even check correct	0: current slave CRC correct	0: current slave response no timeout	Refer to appendix A.3	0:send
1: current slave odd-even check wrong	1: current slave CRC wrong	1: current slave respons timeout		1:receive

Table 16 Overall Module Format

a) B0: Send /receive



Figure 15 Send Receive State Exchange Diagram

As shown in figure above, after power on , it's on state 1. As Modbus message list runs normally, it will change as figure above. When sending, it's 0. When receiving, it's 1.

b) B4-B1: Unexceptional response code

The 4 bits are to show current Modbus message unexceptional response code. Please refer to appendix A.3 for details.

Note: there's a special usage for the 4 bits, that is if slave command configurated by a certain slot is not configurated to check it in detailed state module (202-209), then it will set unexceptional response code as F.

c) B5: Response timeout

This means to follow the setting of interval parameter and interval time value parameter sent by device user parameter master. If user device does not have timeput response, then it's on 1. Modbus message list pointer points to next Modbus message.



d) B6: CRC check

When gateway receives a MODBUS response message and there's mistake on CRC check, it's 1. At this time, the gateway considers MODBUS response data not reliable and performs no exchange with PROFIBUS corresponding data.

e) B7: Even-odd check

When gateway receives data and finds even-odd check wrong, it's 1. At this time, the gateway considers MODBUS response data not reliable and performs no exchange with PROFIBUS corresponding data.

• Control Module (module 3)

This module is used for dispatching Modbus message. User can start or stop Modbus scan by this module, also the adjustment of write only or read only or skipping current Modbus message etc.

B7: force reset	B6:stop waiting	B5:error checking	B4-B3:retain	B2:write command	B1:read command	B0: stop/start
0: normal execution	0: normal execution	0: enable error check		0: permit writing	0: permit reading	0: start Modbus scan
1:reset	1:skip waiting	1: forbid error check		1: forid writing	1:forid reading	1: stop Modbus scan

Table 17 Control Module Format

f) B0: stop/start

In default, when start, it scans Modbus message list. User can set it as 1, that is to stop Modbus message scan.

g) B1: read command

In default, it allows gateway to send Modbus read command. User can set i t as 1, that is to stop sending Modbus read command (01H, 02H, 03H, 04H command).

h) B2: write command

In default, it allows gateway to send Modbus write command. User can set i t as 1, that is to stop sending Modbus write command (05H, 06H, 0FH, 10H command).

i) B5: error check

In default, it enables error check. User can set it as 1, that is to stop error check, which can be used to clear previous wrong information.

j) B6: stop waiting

In device user parameter, when master sending interval parameter is set as same time interval sending and the value is non-terminable waiting for response, this configuration is valid. User can set i t as 1 to jump waiting. Then Modbus message list will scan next Modbus message.

k) B7: enforcement restoration

To set it can enfore to reset Modbus message list to first Modbus message.

• Example: Read xxxmodule (module 4-67)

these modules can use function code 1 (or 2) to read any bit coil data.

Take "read 24 bits(0xxxx)" module as an example, it uses function code 1 (or 2) to read any 24 bit coil data.



HW Config - [SIMATIC 400(1) (Configuration) DP_Gateway]			
메레 Station Edit Insert PLC View Options Window Help			_ 8 ×
D 🚅 🖫 🖳 🎒 🖻 🖻 🛍 🏛 👔 🔁 🚼 📢			
			ㅋㅋㅋ
	Find:		nthi
II MPT/DP TRUFIBUS(I): DF master system (I)	D		land in the second
5	Frotil	Standard	-
6		empty	-
		status	
		read 8 hits (0xxxx)	
		read 8 bits(1xxxx)	
		read 16 bits(Oxxxx)	_
		read 16 bits(1xxxx)	
		read 24 bits(Oxxxx)	
		read 24 bits(lxxxx)	
		read 32 Bits(UXXXX)	
		read 40 bits(0xxxx)	
		read 40 bits(1xxxx)	
		read 48 bits(Oxxxx)	
-		🔤 🚺 read 48 bits(1xxxx)	
		read 56 bits(Oxxxx)	
		read 56 bits(lxxxx)	
(10) GO306 MODBUS to DP Gatew		read 64 bits (1999)	
		read 72 bits(Oxxxx)	
5 JP ID Order Munder / Designation I Add & Address Comment		read 72 bits(1xxxx)	
2 8D0 control 0		read 80 bits(0xxxx)	
3 24DI read 24 bits(Dxxxx) 13		read 80 bits(lxxxx)	
		read 66 bits (UXXXX)	
5		read 96 bits(0xxxx)	
6		read 96 bits(1xxxx)	
		🔤 🚺 read 104 bits(Oxxxx)	1
9		read 104 bits (1xxxx)	
10	•	1 12 12 10 11 10 12 /0	•
11	1		Ť.
12			
13			
	D.	1	Ch .
ress na to get neip.			Lung .

a) Add "read 24 bits(0xxxx)" module, shown as Figure 16:

Figure 16 Add"read 24 bits(0xxxx)"Module

For example, to put this module into slot 3. Select slot 3, double click "read 24 bits(0xxxx)"module. IB1...3is Profibus input data address distributed by master, corresponding with Modbus 24bits coil (0xxxx) data.

b) Configuration of "read 24 bits(0xxxx)" module user arameter, shown as Figure 17:



Figure 17 Configuration of "read 24 bits(0xxxx)" Module User Parameter

Double click slot 3"24 DI"or"read 24 bits(0xxxx)"or"1...3"; choose"Parameter Assigement"to finish the setting of MODBUS Slave Address and Starting Address.



Slave Address: address sent from this Modbus communication module to Modbus slave, corresponded with first byte of MODBUS message.

Starting Address: 0xxxx starting address to read. Note: message coil starting address 00000 corresponds with device 00001 address. Other will be put off bu turn.

"1.MODBUS Slave Address:" \Rightarrow type MODBUS slave address 10, as shown in Figure 17 "2.Starting Address:" \Rightarrow type will-read coil 0xxxx starting address 00021, set the address as 20 \Rightarrow "OK", shown as Figure 17.

c) Corresponding relation of PROFIBUS address and Modbus address

As shown in Figure 18.IB3 are input data address for this Modbus module that distributed by PROFIBUS master, corresponded with 24 bits (0xxxx) read by this MODBUS message.



Figure 18 Corresponding Relation of PROFIBUS Address and Modbus Address

• Example: Read xxx module (module 68-143)

These modules can use function code 3 (or 4) to read any character register data. Take"read 4 Words(3xxxx)" module as an example, this module use function code 3(or 4) to read 4 characters register data.

a) Add "read 4 Words(3xxxx)" module, as shown in Figure 19:



Figure 19 Add"read 4 Words(3xxxx)"Module

For example, to put this module into slot 4: select slot 4 and double click"read 4 Words(3xxxx)" module. IB512...519 is input data address for gateway distributed by Profibus master, corresponded with Modbus 4 characters register data.



b) Configuration of "read 4 Words(3xxxx)" module user parameter, as shown in Figure 20

W Config - [SIMATIC 400(1) (Configuration) DP_Gateway]			
	-		-1-1
(0) UR2	-		
1 PS 405 20A PROFIBUS(1):	DP master system (1)	<u>fina</u>	1 0.01
		Profil Standard	-
4 CPU 412-2 DP		read 1 Words (4xxxx)	
	G0306	read 1 Words (3xxxx) read 2 Words (4xxxx)	
5		- 📕 read 2 Words (3xxxx)	
		read 3 Words (4xxxx) read 3 Words (3xxxx)	
	Properties - DP ID		×
	Address / ID Parameter Assignment	1	
			11
	- Station parameters	Value	
	Device-specific parameters		
	- I.MODBUS Slave Address:	11	
	Hex parameter assignment		
	User_Prm_Data (0 to 5)	08,04,00,05,00,04	
(10) G0306 MODBUS to DP Gatew			
1 8DI status 0	-		
2 8D0 control	k l		
3 24DI read 24 bits (0xxxx) 13			
4 211 Fead 4 Words (JXXXX) 512519			
6			
7			
8	-		
10	OK	Cancel Help	
11			Es
12 13			
		1	
Press F1 to get Help.			.hg //,

Figure 20 Configuration of "read 4 Words (3xxxx)" Module User Parameter

Double click "211"or"read 4 Words(3xxxx)"or"512...519" in slot 4 and choose "Parameter Assigement", to finish MODBUS Slave Address and Starting Address parameter setting. **Slave Address:** Address sent from this Modbus communication module to Modbus slave, corresponed with this MODBUS message's first byte.

Starting Address: 3xxxx starting address to read. Note: in message, register starting address 30000 corresponds with device 30001 address. The others are put off by turn. "1.MODBUS Slave Address:" \Rightarrow type MODBUS slave address 11, as shown in Figure 20 "2.Starting Address:" \Rightarrow type will-read register 3xxxx's starting address 30006 and set address as $5\Rightarrow$ "OK", shown in Figure 20.

c) Corresponding relation of PROFIBUS address and Modbus address As shown in Figure 21, IB512...IB519 is input data address for this module distributed by PROFIBUS master, corresponded with this MODBUS message 4 Words (3xxxx).



Figure 21 Corresponding Relation of PROFIBUS Address and Modbus Address

• Example: Use Write xxx Bits Module (Module 144-175)

These modules can use function code 15 to write data into any bit coil.

e.g., "write 16 bits(0xxxx)" module uses function code 15 to write data into 16 bits coil.



And the second s	on gate insore	Erc Tiew Obnous Mindow He	1200 L						-
Þ,		9 40 R 10 🛍 🛍 🌔 🗖	₩.				0		
0) 1	UR2	1				<u> </u>		-	
201002	PS 405	20A	PROFIBUS (1)	: DP master	system (1)		Find:		<i>i</i> n
							Profil	Standard	
				🚡 (10) G030					
								read 52 Hords (4	(XXXX)
2	1/P			G0306				read 52 Hords ((vvvv)
2	M 51/15				4			read 54 Words (NANAA)
	-							read 56 Words (4	(xxxx)
_								read 56 Words (3	(xxxx)
								read 58 Words (4	(xxxx)
								read 58 Words (3	(xxxx)
								🚺 read 60 Words (4	(xxxx)
								read 60 Words (3	виник)
								write 8 bits (0x	(жжж)
								write 16 bits (C	(xxxx)
								write 24 bits (C	(жжжя)
								write 32 bits (C	(xxxx)
						-		write 40 bits (C	(XXXX)
						•		write 48 bitsU	XXXX)
_								write 56 bits(XXXX)
								write 04 bits(XXXXX)
	(10) G0306	MODBUS to DP Gatew					1. A C C C C C C C C C C C C C C C C C C	a nince is bits (c	hanna J
	(10) 60306	MODBUS to DP Gatew	la se	Lasaren erret	1			write 80 hits@)xxxx)
	(10) G0306	MODBUS to DP Gatew	I Add	Q Address	Comment)xxxx))xxxx))xxxx)
	(10) G0306	MODBUS to DP Gatew Order Number / Designation status	I Add	Q Address	Comment			write 80 bits() write 88 bits() write 96 bits())xxxx))xxxx))xxxx))xxxx)
	(10) G0306 DP ID 8DI 8D0 24DI	MODBUS to DP Gatew Order Number / Designation status control mud 62 bits (Commun)	0	Q Address	Comment			write 80 bits(C write 88 bits(C write 96 bits(C write 96 bits(C write 104 bits)	deere deere deere deere deere deere deere deere deere deere deere deere deere deere deere deere deere deere deere de de de de de de de de de de de de de
	(10) G0306 DP ID 8DI 8D0 24DI 211	MODBUS to DP Gatew Order Number / Designation status control read 24 bits(Oxxxx) road 4 Words(Suruw)	I Add 0 13	Q Address 0	Comment			write 80 bits(C write 88 bits(C write 96 bits(C write 96 bits(C write 104 bits) write 112 bits(C)xexx))xexx))xexx) (0xxxx) (0xxxx)
	(10) G0306 DP ID 8DI 8D0 24DI 211 1500	MODBUS to DP Gatew Order Number / Designation status control read 24 bits (Dxxxx) read 4 Words (3xxxx) with 0 bits (Dxxxx)	I Add 0 13 512519	Q Address 0	Comment			write 80 bits(C write 86 bits(C write 96 bits(C write 104 bits) write 112 bits write 112 bits write 120 bits	DREER DREER
	(10) G0306 DP ID 8DI 8D0 24DI 211 16D0	MODBUS to DF Gatew . Order Number / Designation status control read 24 bits (Dxxxx) read 4 Words (3xxxx) write 18 bits (Dxxxx)	I Add 0 13 512519	Q Address 0 12	Comment			<pre></pre>	herer) herer) herer) herer) (Orerer) (Orerer) (Orerer) (Orerer)
	(10) 60306 DP ID 8DI 8D0 24DI 211 16D0	MODBUS to DP Gatew . Order Number / Designation status control read 24 bits(Onxnx) read 4 Words(Snxnx) with 15 bits(Onxnx)	I Add 0 13 512519	Q Address 0 12	Comment			<pre></pre>	DEEEE DEEEE DEEEE DEEEE DEEEE (OEEEEE (OEEEEE (OEEEEE (OEEEEEE)
	(10) 60306 DP ID 8DI 8D0 24DI 211 16D0	MODBUS to DF Gatew . Order Number / Designation status control. read 24 bits (Denne) read 44 bits (Denne) write 16 bits (Denne)	I Add 0 13 512519	Q Address 0 12	Comment			 write 80 bits() write 86 bits() write 96 bits() write 104 bits() write 112 bits() write 120 bits() write 120 bits() write 126 bits() write 126 bits() write 126 bits() 	DEEEE DEEEE DEEEE DEEEE DEEEE DEEEE DEEEE DEEEE DEEEE DEEEE DEEEE
	(10) 60306 8DI 8D0 24DI 211 16D0	MODBUS to DF Gatew . Order Number / Designation status control read 24 bits(Daxax) read 4 Words(Saxax) write 15 bits(Daxax)	I Add 0 13 512519	Q Address 0 12	Comment			<pre>- write 80 bits() - write 80 bits() - write 96 bits() - write 104 bits, - write 120 bits, - write 120 bits() - write 120 bits() - write 136 b</pre>	DEEEEE) DEEEEE) DEEEEE) DEEEEE) (DEEEEEE) (DEEEEEE) (DEEEEEE) (DEEEEEE) (DEEEEEEE) (DEEEEEEE)
	(10) G0306 DP ID 8DI 8D0 24DI 211 16D0	MODBUS to DF Gatew . Order Number / Designation status control read 24 bits (Danner) read 44 Words (Sanner) write 16 bits (Danner)	I Add 0 13 512519	Q Address 0 12	Comment			<pre>write 80 bits() write 86 bits() write 86 bits() write 104 bits() write 104 bits() write 112 bits write 112 bits write 120 bits() write 136 bits()</pre>	DREER) DREER) DREER) DREERS) (DREERS) (DREERS) (DREERS) (DREERS) (DREERS) (DREERS) (DREERS) (DREERS) (DREERS)
	(10) 60306 DF ID 8DI 8DD 24DI 2111 16DD	MODBUE to DF Gatew . Order Number / Designation status control read 24 bits (Doxon) read 4 Words (Saxon) write 15 bits (Doxon)	I Add 0 13 512519	Q Address 0 0 12	Comment			<pre>write 80 bits() write 80 bits() write 86 bits() write 104 bits() write 120 bits() write 120 bits() write 120 bits() write 120 bits() write 136 bits() write 136 bits() write 146 bits() write 146 bits() write 152 bits() write 152 bits()</pre>	DREER) DREER) DREER) DREER) (DREERS) (DREERS) (DREERS) (DREERS) (DREERS) (DREERS) (DREERS) (DREERS) (DREERS)
- - - - - - - - - -	(10) 60306 P ID 8DI 24DI 211 16D0	MODBUS to DF Gatew . Order Number / Designation status control. read 24 bits (Danna) read 4 Words (Sanna) write 16 bits (Danna)	I Add 0 13 512519	Q Address 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Comment			write 80 bits(write 86 bits() write 96 bits() write 104 bits(write 112 bits write 112 bits write 120 bits write 128 bits write 136 bits write 144 bits write 144 bits	DREER) DREER) DREER) DREER) (DREER) (DREER) (DREER) (DREER) (DREER) (DREER) (DREER) (DREER) (DREER)
	(10) 60306 DF ID 8DI 24DI 2411 16D0	MODEUS to DF Gatew Order Number / Designation status control. read 24 bits(Denne) read 4 Hords(Sanne) write 16 bits(Denne)	I Add 0 13 512519	Q Address 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Comment			write 80 bits(write 86 bits(write 96 bits(write 104 bits) write 112 bits write 120 bits write 20 bits write 20 bits write 20 bits write 136 bits write 144 bits	DEEXX) DEEXX) DEEXX) DEEXX) (DEEXX) (DEEXX) (DEEXX) (DEEXX) (DEEXX) (DEEXX) (DEEXX) (DEEXX)
	(10) 60306 DP ID 601 600 24DI 211 1600	MODEUS to DF GatewOrder Number / Designation status control. read 24 bits(Dannes) write 18 bits(Dannes)	I Add 0 13 512519	Q Address 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Comment			<pre>write 80 bits() write 86 bits() write 86 bits() write 104 bits() write 104 bits() write 112 bits write 120 bits() write 136 bits()</pre>	DEEEE DEEEEE DEEEEE (DEEEEE) (DEEEEE) (DEEEEE) (DEEEEE) (DEEEEE) (DEEEEE) (DEEEEE)

a) Add "write 16 bits(0xxxx)" module, shown in Figure 22:

e.g., put the module in slot 5, select slot 5, and double-click on "write 16 bits(0xxxx)" module. QB1...2 is output data addresses of the gateway assigned by Profibus master station, corresponding to 16 bits (0xxxx) data written by Modbus.

b) Configure user parameters of "write 16 bits(0xxxx)" module, shown in Figure 23:



Figure 23 Configure User Parameters of "write 16 bits(0xxxx)" Module

Double-click on "16DO" or " write 16 bits(0xxxx)" or "1...2" in slot 5; Select "Parameter Assignment", complete parameter settings of slave station address (MODBUS Slave



Address), starting address (Starting Address) and coil quantities (Quantity of Outputs).

Slave Address: Refer to Modbus slave station's address via which Modbus communication module sends message to Modbus slave station, corresponding to the first byte of Modbus message.

Starting Address: Refer to the starting address of 0xxxx to be written. Note: Register starting address 00000 in message is corresponding to address 00001 in device, others follow.

Quantity of Outputs: Refers to the bit number written into 0xxxx by Modbus message.

"1.MODBUS Slave Address: "⇒Type MODBUS slave address 10, shown in Figure 23.

"2.Starting Address:" \Rightarrow Type starting address 00021 of coil 0xxxx to be written, set address as 20 \Rightarrow "OK", shown in Figure 22.

"3.Quantity of Outputs:" \Rightarrow Type coil number 16 to be written \Rightarrow "OK", shown in Figure 23.

c) Corresponding relations between PROFIBUS address and Modbus address

As shown in Figure 23, QB1, QB2 is PROFIBUS output address of Modbus module assigned by ROFIBUS master station, total 2 bytes, corresponding to 16 continuous coils of Modbus device written by the Modbus module. 2 bytes (16 bits) value in QB1 and QB2 of PROFIBUS master station is written into 0xxxx data area of Modbus device by the Modbus module. Here starting address is 00020; PRODIBUS QB1, QB2 is written into 00021 ~ 00036 of Modbus device.



Figure 24 Corresponding Relations between PROFIBUS Address and Modbus Address

• Example: Use Write xxx Bytes Module (Module 176-199)

These modules can use function code 16 to write data into any register.

e.g., "write 4 Words(4xxxx)" module uses function code 16 to write data into 4 registers.



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(10) GO 0 DP I 1 8DI	306 MODBUS to DP Gatew . Order Number / Desi status	I Add	Q Address	Comment	× ×			write 1 Words (4xxxx) write 2 Words (4xxxx) write 3 Words (4xxxx) write 4 Words (4xxxx) write 5 Words (4xxxx) write 6 Words (4xxxx) write 7 Words (4xxxx)
(10) GO DP I 1 SDI 2 SDO	306 MODBUS to DP Gatew Order Number / Desi status control	I Add	Q Address	Comment		7		write 1 Words (4xxxx) write 2 Words (4xxxx) write 3 Words (4xxxx) write 4 Words (4xxxx) write 5 Words (4xxxx) write 6 Words (4xxxx) write 8 Words (4xxxx) write 8 Words (4xxxx)
(10) GO DP I 1 SDI 2 SDO 3 24DI	306 MODBUS to DP Gatew Order Number / Desi status control read 24 bits(Oxxxx)	I Add 0 13	Q Address O	Commerxt				write 1 Words (4xxxx) write 2 Words (4xxxx) write 3 Words (4xxxx) write 5 Words (4xxxx) write 5 Words (4xxxx) write 6 Words (4xxxx) write 8 Words (4xxxx) write 9 Words (4xxxx)
(10) GO DP I 1 8DI 2 8DO 3 24DI 4 211	306 MODBUS to DP Gatew . Order Number / Desi status control read 24 bits (Daxax) read 4 Words (Saxax)	I Add 0 13 512519	Q Address	Commert		×		write 1 Words (4xxxx) write 2 Words (4xxxx) write 3 Words (4xxxx) write 4 Words (4xxxx) write 5 Words (4xxxx) write 6 Words (4xxxx) write 8 Words (4xxxx) write 9 Words (4xxxx) write 9 Words (4xxxx) write 10 Words (4xxxx)
(10) 60 DP I 1 8DI 2 8DO 3 24DI 4 211 5 16DO	306 MODBUS to DF Gatew Order Number / Desi status control read 24 bits (Duxnux) write 18 bits (Duxnux)	I Add 0 13 512519	Q Address 0 12	Commerat				<pre>write 1 Words (%accor) write 3 Words (%accor) write 3 Words (%accor) write 3 Words (%accor) write 5 Words (%accor) write 6 Words (%accor) write 7 Words (%accor) write 8 Words (%accor) write 8 Words (%accor) write 10 Words (%accor) write 11 Words (%accor)</pre>
(10) 60 DP I 1 8DI 2 8DO 3 24DI 4 211 5 16DO 8 227 7	306 MODBUS to DP Gatew Order Number / Desi status control read 24 bits (Doxnox) read 24 Words (Sanox) write 16 bits (Doxnox) write 16 bits (Doxnox)	I Add 0 13 512519	Q Address 0 12 512519	Comment				write 1 Words (Saccac) write 2 Words (Saccac) write 3 Words (Saccac) write 3 Words (Saccac) write 5 Words (Saccac) write 6 Words (Saccac) write 8 Words (Saccac) write 8 Words (Saccac) write 9 Words (Saccac) write 10 Words (Saccac) write 11 Words (Saccac) write 12 Words (Saccac) write 12 Words (Saccac) write 12 Words (Saccac)
(10) GO DP I BUI 2 8D0 3 24DI 4 211 5 16D0 6 227 7 8	306 MODBNS to DP Gatew Status control read 24 bits (Dxxxx) write 16 bits (Dxxxx) write 4 Words (3xxxx)	I Add 0 13 512519	Q Address 0 12 512519	Conmert		рания и на		write 1 Words (4xxxx) write 2 Words (4xxxx) write 3 Words (4xxxx) write 4 Words (4xxxx) write 5 Words (4xxxx) write 6 Words (4xxxx) write 8 Words (4xxxx) write 9 Words (4xxxx) write 10 Words (4xxxx) write 12 Words (4xxxx) write 12 Words (4xxxx) write 12 Words (4xxxx) write 13 Words (4xxxx)
(10) 60 DP I 1 8DI 2 8D0 3 24DI 4 211 5 16D0 6 227 7 8 9	306 MODBUS to DF Gatew Status control. read 24 bits (Dunnu) read 4 Words (Sunnu) write 15 bits (Dunnu) write 4 Words (Annuu)	I Add 0 13 512519	Q Address 0 12 512519	Commerat		у У		write 1 Words (Saccac) write 2 Words (Saccac) write 3 Words (Saccac) write 3 Words (Saccac) write 5 Words (Saccac) write 6 Words (Saccac) write 7 Words (Saccac) write 8 Words (Saccac) write 8 Words (Saccac) write 10 Words (Saccac) write 11 Words (Saccac) write 13 Words (Saccac) write 13 Words (Saccac) write 13 Words (Saccac) write 13 Words (Saccac) write 14 Words (Saccac)
(10) G0 DP I 1 8DI 2 6D0 3 24DI 5 16D0 6 227 7 7 8 9 10	306 MODBUS to DP Gatew Order Number / Desi status control read 24 bits(Doxnox) read 24 Words(Saxox) write 16 bits(Doxnox) write 4 Words(Asxox)	I Add 0 13 512519	Q Address 0 12 512519	Comment				write 1 Words (Saccac) write 2 Words (Saccac) write 3 Words (Saccac) write 3 Words (Saccac) write 5 Words (Saccac) write 6 Words (Saccac) write 8 Words (Saccac) write 9 Words (Saccac) write 9 Words (Saccac) write 9 Words (Saccac) write 11 Words (Saccac) write 11 Words (Saccac) write 12 Words (Saccac) write 14 Words (Saccac) write 14 Words (Saccac) write 14 Words (Saccac)
(10) G0 D PI 1 8DI 2 8D0 3 24DI 4 211 5 16D0 6 227 7 8 9 10 11	306 MODBUS to DP Gatew Order Number / Desi status control read 24 bits (Duxax) vrite 16 bits (Duxax) vrite 4 Words (Busax)	I Add 0 13 512519	Q Address 0 12 512519	Comment 				write 1 Words (Sacacz) write 3 Words (Sacacz) write 3 Words (Sacacz) write 4 Words (Sacacz) write 5 Words (Sacacz) write 6 Words (Sacacz) write 8 Words (Sacacz) write 9 Words (Sacacz) write 9 Words (Sacacz) write 11 Words (Sacacz) write 11 Words (Sacacz) write 12 Words (Sacacz) write 13 Words (Sacacz) write 13 Words (Sacacz) write 13 Words (Sacacz) write 13 Words (Sacacz) write 15 Words (Sacacz)
(10) G0 DP I 2 8D0 3 24DI 4 211 5 1600 6 227 7 8 9 10 11 12	306 MODBUS to DF Gatew Status control read 24 bits (Darmar) read 4 Words (Saxars) write 15 bits (Darmar) write 4 Words (Armar)	I Add 0 13 512519	Q Address 0 12 512519	Commerst				write 1 Words (Sacaz) write 2 Words (Sacaz) write 3 Words (Sacaz) write 5 Words (Sacaz) write 5 Words (Sacaz) write 6 Words (Sacaz) write 8 Words (Sacaz) write 8 Words (Sacaz) write 10 Words (Sacaz) write 10 Words (Sacaz) write 11 Words (Sacaz) write 13 Words (Sacaz) write 13 Words (Sacaz) write 13 Words (Sacaz) write 14 Words (Sacaz) write 14 Words (Sacaz) write 14 Words (Sacaz)

a) Add "write 4 Words(4xxxx)"Module, shown in Figure 25:

Figure 25 Add "write 4 Words(4xxxx)"Module

e.g., put the module in slot 6, select slot 6, and double-click on " write 4 Words(4xxxx)" module. QB512...519 is output data addresses of the gateway assigned by Profibus master station, corresponding to data of 4-word register (4xxxx) data written by Modbus.



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3 2401 read 24 bits (0xxxx) 13 4 211 read 44 bits (0xxxx) 512519 5 1600 rrite 16 bits (0xxxx) 12 6 227 write 4 Words (0xxxx) 512519 7 10 10 11 10 11 10 11 11 10 11 11 12 13 10 11	2 8D0 control 0	
1 100 vrite 16 bits (0xxxx) 12 6 227 write 4 Words (0xxxx) 512519 7	3 24DI read 24 bits (0xxxx) 13 4 211 read 4 Words (3xxxx) 512 519	
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7 8 9	6 227 write 4 Words(4xxxx) 512519	
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b) Configure user parameters of "write 4 Words(4xxxx)" module, shown in Figure 26:

Figure 26 Configure User Parameters of "write 4 Words(4xxxx)" Module

Double-click on "227" or " write 4 Words(4xxxx)" or "512...519" in slot 6; Select "Parameter Assignment", complete parameter settings of slave station address (MODBUS Slave Address) and starting address (Starting Address).

Slave Address: Refer to Modbus slave station's address via which Modbus communication module sends message to Modbus slave station, corresponding to the first byte of Modbus message.

Starting Address: Refer to the starting address of 4xxxx to be written. Note: Register starting address 400000 in message is corresponding to address 40001 in device, others follow.

"1.MODBUS Slave Address: "⇒Type MODBUS slave address 11, shown in Figure 26.

"2.Starting Address:" \Rightarrow Type starting address 00006 of register 0xxxx to be written, set address as 5 \Rightarrow "OK", shown in Figure 26.

c) Corresponding relations between PROFIBUS address and Modbus address

As shown in Figure 27, QB512..QB519 is PROFIBUS output address of Modbus module assigned by ROFIBUS master station, total 8 bytes, corresponding to 4 Words (4xxxx) of Modbus device written by the Modbus message.





Figure 27 Corresponding Relations between PROFIBUS Address and Modbus address

• Example: Use Write Single Coil Module (Module 200)

Module "force single bit (05H Command)" can use function code 5 to write data into some coil.

a) Add "force single bit (05H Command)"Module, shown in Figure 28:



Figure 28 Add "force single bit (05H Command)"Module

e.g., put the module in slot 7, select slot 7, and double-click on " force single bit (05H Command)" module. QB3 is output data address of the gateway assigned by Profibus master station, corresponding to data of 1-bit (0xxxx) data written by Modbus.



b) Configure user parameters of "force single bit (05H Command)" module, shown in Figure 29:

Image: [SIMATIC 400(1) (Configuration) DP_Gateway] Image: [Simatric 400(1) (Configuration) DP_Gateway] Image: [Simatri 400(1) (Configuration) DP_Gateway] <th></th> <th></th> <th></th> <th>- 0 × - 8 ×</th>				- 0 × - 8 ×
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Image: 10 colored with the second	operties - DP ID Address / II) Parameter Assignment Parameters Station parameters Device-specific parameters 2.output Address: 2.output Address: User_Prm_Data (0 to 5) 0K		Value 10 23 0A,05,00,17,00,00 Cancel Help	
Press F1 to get Help.				

Figure 29 Configure User Parameters of "force single bit (05H Command)" Module

Double-click on "8DO" or " force single bit (05H Command)" or "3" in slot 7; Select "Parameter Assignment", complete parameter settings of slave station address (MODBUS Slave Address) and output address (Output Address).

Slave Address: Refer to Modbus slave station's address via which Modbus communication module sends message to Modbus slave station, corresponding to the first byte of Modbus message.

Output Address: Refer to the output address of 0xxxx to be written. Note: Coil output address 00000 in message is corresponding to address 00001 in device, others follow.

"1.MODBUS Slave Address: "⇒Type MODBUS slave address 10, shown in Figure 29.

"2.Output Address:" \Rightarrow Type output address 00024 of coil 0xxxx to be written, set address as 23 \Rightarrow "OK", shown in Figure 29.

c) Corresponding Relations between PROFIBUS Address and Modbus Address

As shown in Figure 29, QB3 is PROFIBUS output address of Modbus module assigned by ROFIBUS master station, total 1 byte, corresponding to single coil (0xxxx) of Modbus device written by the Modbus message. The Modbus module sends Modbus command 05 based on QB3 value, set single coil 0xxxx of the Modbus device to 1 or 0. Here single coil output address is 00023, if QB3=0, send command to set single coil 00024 to 0; If QB3 \neq 0, send command to set single coil 00024 to 1.





Figure 30 Corresponding Relations between PROFIBUS Address and Modbus Address

• Example: Use Write Single Register Module (Module 201)

Module "set single word (06H Command)" can use function code 6 to write data into some register.

a) Add "set single word (06H Command)"Module, shown in Figure 31:



Figure 31 Add "set single word (06H Command)" Module

e.g., put the module in slot 8, select slot 8, and double-click on " set single word (06H Command)" module. QB520...QB523 is output data address of the gateway assigned by Profibus master station, corresponding to data of 1-bit register (4xxxx) written by Modbus.



- _ 🗆 🗙 HW Config - [SIMATIC 400(1) (Configuration) — DP_Gateway] _ 8 × D 🚅 🐎 🔍 🗞 🎒 Pa 😤 🏙 🏜 🚯 📼 💥 🎌 -믜뇌 (0) UR Find mimi PROFIBUS(1): DP master system (1) PS 405 20A * Profil Standard -🚡 (10) G030 DF DF MFI/DF write 30 Words (4xxxx) 11 write 32 Words(4xxxx) force single bit (05H Command) 82 *\$1* set single word (O6H Command) 8Bits MODBUS Slaves Status 8Bytes MODBUS Slaves Status 16Bits MODBUS Slaves Status 16Bytes MODBUS Slaves Status rties - DP ID X Address / ID Parameter Assignment Parameters Value Station parameters E 1.MODBUS Slave Address: E 2.Register Address: 11 • (10) GO306 MODBUS to DP Gatew 🗄 🔄 Hex parameter assignment —≝ User_Prm_Data (0 to 5) 0B,06,00,0A,00,00 DP I. 8DI Order Number / Desi.. I Add. . Q Address status 810 control 24DI read 24 bits(Oxxxx) read 4 Words (3xxxx) 512...519 4 write 16 bits(Oxxxx) 16D0 . 519 6 227 write 4 Words(4xxxx) 7 810 single bit (05H C set single word (O6H C 8 10 OK Cancel Help 13 Cha Insertion possible
- b) Configure user parameters of "set single word (06H Command)" module, shown in Figure 32:

Figure 32 Configure User Parameters of "set single word (06H Command)" Module

Double-click on "1AO " or " set single word (06H Command)" or "520...521" in slot 8; Select "Parameter Assignment", complete parameter settings of slave station address (MODBUS Slave Address) and output address (Register Address).

Slave Address: Refer to Modbus slave station's address via which Modbus communication module sends message to Modbus slave station, corresponding to the first byte of Modbus message.

Register Address: Refer to the register address of 4xxxx to be written. Note: Coil output address 40000 in message is corresponding to address 40001 in device, others follow.

"1.MODBUS Slave Address: "⇒Type MODBUS slave address 11, shown in Figure 32.

"2. Register Address:" \Rightarrow Type register address 40011 of register 4xxxx to be written, set address as 10 \Rightarrow "OK", shown in Figure 32.

c) Corresponding Relations between PROFIBUS Address and Modbus Address

As shown in Figure 33, OB520...521 IS PROFIBUS output data address of Modbus module assigned by PROFIBUS master station, total 2 bytes, corresponding to 1 byte register (4xxxx) of Modbus device written by the Modbus message.





Figure 33 Corresponding Relations between PROFIBUS Address and Modbus Address

- Example: Use xxx Bits Modbus Slave Monitoring Module (Module 202, 204, 206, 208)
- a) Configure user parameters of "3.MODBUS Slave Monitoring" device, shown Figure 34:

Parameters Station parameters Device-specific parameters E 1.Baudrate: E 2.Parity: E 3.MOOBUS Slave Monitoring: E 4.Data Update Mode: E 5.Writing Mode: E 6.Master Send Interval: F .Interval Timer Value: C Her parameter assignment	Value 9600 86lits, No Parity, 1stop bit 8 Bits Monitoring Each Item End Write always Same Interval 100ms
User_Prm_Data (0 to 4)	05,00,01,42,0A

Figure 34 Configure User Parameters of "3.MODBUS Slave Monitoring" Device

As shown in Figure 34, to use xxx bits Modbus slave monitoring module, corresponding Modbus slave monitoring parameters shall be configured in device user parameters. Here to configure "8 Bits Monitoring", corresponding "8Bits MODBUS Slaves Status" module shall be used.

b) Add "8Bits MODBUS Slaves Status" Module, shown in Figure 35:



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4	CPU 4	412-2 DP						🚽 📕 write 30 Words(4xxxx)	-
12	DP			50				write 32 Words(4xxxx)	
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5								🚽 📕 set single word (O6H Comm	and)
I R									s
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								16Bits MODBUS Slaves Statu	45
								16Bytes MODBUS Slaves Stat	tus
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S	DP I	Order Number / Designation	I Add	Q Address	Comment		DP 1	tigured Stations /O slaves	
1 81	DI	status	0			<u> </u>	- DP//	AS-i	
2 81	DO	control		0			DP/I	A Link	
3 24	4DI	read 24 bits(Oxxxx)	13				- ENCO	DDER	
4 2	11	read 4 Words (3xxxx)	512519				- 🛅 ET 2	200B	
5 10	6JU	write 16 bits(Uxxxx)		1Z			- 🛄 ET 2	2000	
7 01	21	write 4 mords (4xxxx)		512519			- 🛄 ET 2	200eco	
	10 10	rat single word (D6H Command)		520 521			- 🛄 ET 2	200iS	
	nt	BBits MODBUS Slaves Status	4	020			- ET 2	200iSP	v 1
10							1 77 6	1000	
11									
12						_			<u>_</u>
13						-			
		-	-	-					
Press F1 to get	Help.						[Chg /

Figure 35 Add "8Bits MODBUS Slaves Status" Module

Previously described, this kind of module must be put after all the Modbus communication modules, so according to previous examples, slot 1-8 already have corresponding modules, then "8Bits MODBUS Slaves Status" module shall be put into slot 9. Select slot 9, double-click "8Bits MODBUS Slaves Status" module. IB4 is input data address of gateway assigned by Profibus master station, total 1 byte, shall be corresponding to Modbus device status to be monitored.

c) Configure user parameters of "8Bits MODBUS Slaves Status" module, shown in Figure 36:



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Batom Edit Inset DLC Vew Options Window Hep Image: Sever Option Parameter Assignment Image: Sever Option Parameter Sever Options Image: Sever Option Parameter Sever Options Sever Options Parameter Sever Options Image: Sever Option Parameter Sever Options Se	Value Value 10,11,03,04,05,06,07,08
(10) 00306 MODBUS to DF Gatew S D P I 0 00306 MODBUS to DF Gatew 1 601 2 600 3 2401 2 600 3 2411 4 211 5 1600 6 227 7 800 6 126 9 801 8 1A0 9 801 8 1A0 11 11 12 12	Cancel Help
Press F1 to get Help.	Chg

Figure 36 Configure Slave Address to Be Monitored

As shown in Figure 36, each device corresponds to 1 byte module user parameter. In the previous example, total two slave stations (10, 11) is configured, so write the two addresses into to the module user parameter.

After running procedure, monitor status of slave station 10 and 11 in PROFIBUS address IB4, shown in the table below:

Table	18	status	of	slave	station	10	and	11	monitored in	۱P	ROF	BUS	address	IB4
labio	10	otatuo		01010	olution	10	unu		mornitor ou m		1.01	1000	adarooo	

B7	B6	B5	B4	B3	B2	B1	B0
Not use here	Communication Status of Address 11	Communication Status of Address 10					
						0: no response	0: no response
						1: with response	1: with response

Gateway B0=0, indicates the gateway sends command to Modbus slave station of address 10 based on current configuration, but timeout no response from slave station or not link slave station of address 10.

B0=1, indicates the gateway sends command to Modbus slave station of address 10 based on current configuration, and the gateway can receive correct response message from slave station.

Meaning of other bits is similar, only different monitoring slave addresses.

Note: if slave quantity is less than monitoring quantity, then configuration order of slave station address shall be from low to high, and configured quantity shall be the same with actual slave station quantity (e.g., in this example, there are 2 slave stations, but the configured module can monitor 8 slave stations, then addresses of the two slave stations can only be configured in B0 and B1. Address order can be reversed, such as B1 monitor address 10, B0 monitor address 11).



- Example: Use xxx Bits Modbus Slave Monitoring Module (Module 203, 205, 207, 209)
- a) Configure user parameters of "3.MODBUS Slave Monitoring" device, shown in Figure 37:

–[≝] 1.Baudrate:	9600
_ 🗐 2.Parity:	8Bits, No Parity, 1stop bit
- 3.MODBUS Slave Monitoring:	8 Bytes Monitoring
–≝ 4.Data Update Mode:	Each Item End
—🗐 5.Writing Mode:	Write always
—🗐 6.Master Send Interval:	Same Interval
LE 7.Interval Timer Value:	100ms
🗄 🔄 Hex parameter assignment	
└── User_Prm_Data (0 to 4)	05,00,02,42,0A

Figure 37 Configure User Parameters of "3.MODBUS Slave Monitoring" Device

As shown in Figure 37, to use xxx bits Modbus slave monitoring module, corresponding Modbus slave monitoring parameters shall be configured in device user parameters. Based on previous 6 examples, here to configure "8 Bits Monitoring", corresponding "8Bits MODBUS Slaves Status" module shall be used.

b) Add "8Bits MODBUS Slaves Status" Module, shown in Figure 38:



HW Config - [SIMATIC 400(1) (Configuration) DP_G.	ateway]				×
	99 10				سر نگنگ
(0) 152				-	ㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋㅋ
1 PS 405 204	PROFTBUS (). DP moste	r system (1)		Find: Mt Mi
	11011000				Profil Standard
		🚠 (10) G0	30		
4 CPU 412-2 DP					write 30 Words (4xxxx)
IZ DP		1			write 32 Words(4xxxx)
II MPI/DP		G0306	<u> </u>		force single bit (USH Command)
<u>−</u>					Set Single word (UBA Lommand)
					BRutes MODBUS Slaves Status
					16Bits MODBUS Slaves Status
					16Bytes MODBUS Slaves Status
					24Bits MODBUS Slaves Status
					24Bytes MODBUS Slaves Status
					32Bits MODBUS Slaves Status
					32Bytes MODBUS Slaves Status
					庄 🚡 DF/DF Coupler
					🗄 🚡 DP/RS232C Link
				-1	E B-B-MM/V34
				F	E m DP/DP Coupler, Release 2
					+ Compatible PRUFIBUS DP Slaves
(10) GO306 MODBUS to DP Gatew					Clarad-Loop Controller
	(i	1	(-		Configured Stations
S Dr L Urder Number / Designation	1 Add	Q Address	Lomment		DP VO slaves
2 8D0 control	·	n		-	- DP/AS-i
3 24DI read 24 bits (0xxxx)	13				DP/PA Link
4 211 read 4 Words (3xxxx)	512519				ENCODER
5 16D0 write 16 bits(0xxxx)		12			EI 2008
6 227 write 4 Words (4xxxx)		512519			EI 2000
7 8D0 force single bit (05H Command)		3			ET 200900
8 1AO set single word (O6H Command)		520521		_	- ET 200iSP
9 23 8Bytes MODBUS Slaves Status	411				
10				-	
12				-	t _s
13				-	
	-				
Insertion possible					Chg //

Figure 38 Add "8Bits MODBUS Slaves Status" Module

Previously described, this kind of module must be put after all the Modbus communication modules, so according to previous examples, slot 1-8 already have corresponding modules, then "8Bits MODBUS Slaves Status" module shall be put into slot 9. Select slot 9, double-click "8Bits MODBUS Slaves Status" module. IB4...11 is input data address of gateway assigned by Profibus master station, total 8 bytes, each byte shall be corresponding to Modbus device status to be monitored.

c) Configure user parameters of "8Bits MODBUS Slaves Status" module, shown in Figure 39:



HW Config - [SIMATIC 400(1) (Configuration) DP_Gatewa Configuration Edit Insert PLC View Options Window Help	[Ye		
	N2		
	T.		
(0) UR2	<u>^</u>		
1 PS 405 20A PROI	FIBUS(1): DP master system (1)	Find:	nt ni
		Profil Standard	-
	Table (10) 6030	Donne localda e	
4 CPU 412-2 DP		write 30 Words (4xxxx)	
	CONTRACT OF CONTRACT.	write 32 Words (4xxxx)	- 13
II MPI/DP	Properties - DP ID		and)
		tatus	
	Address / ID Parameter Assignment	(Statu:	5
	Descentario	Statu	5
	Parameters	State	15
	Hex parameter assignment	Statu	5
	User Prm Data (0 to 7)	10.11.03.04.05.06.07.08 State	15
		Statu	5
		Stati	15
(10) GO306 MODBUS to DP Gatew			
S DP I Order Number / Designation I A			
1 8DI status 0			
2 8D0 control			
3 24DI read 24 bits(Oxxxx) 1			
4 211 read 4 Words (3xxxx) 512.	1		
5 16D0 write 16 bits(0xxxx)			
6 227 write 4 Words (4xxxx)	OK	Cancel Help	
7 800 torce single bit (05H Command)			
0 IAU set single word (UbH Command)	520521	- ET 200iSP	-
10		1 77 000T	الشري
11		T T	
12			
13			
Insertion possible			Chg /

Figure 39 Configure Slave Address to Be Monitored

As shown in Figure 39, each device corresponds to 1 byte module user parameter. In the previous example, total two slave stations (10, 11) is configured, so write the two addresses into to the module user parameter.

After running procedure, can monitor status of 8 slave stations in PROFIBUS address IB4...11. Because in this example there are only two slave stations, then IB4 is status of slave station 10, and IB5 is status of slave station 11.

B7: Parity Check	B6:CRC Check	B5:Reserved	B4-B1:Exception Response Code	B0:Response Timeout
0:Current slave parity is correct	0:Current slave CRC is correct		See details in Appendix A.3	0:Current slave response is not timeout
1: Current slave parity is incorrect	1: Current slave CRC is incorrect			1:Current slave response is timeout

Table 19 Status of Some Slave Station Monitored

This part is different from general state module, each byte is fixed to indicate slave station, status of each slave station can be checked in detail.

Note: if slave quantity is less than monitoring quantity, then configuration order of slave station address shall be from low to high, and configured quantity shall be the same with actual slave station quantity (e.g., in this example, there are 2 slave stations, but the configured module can monitor 8 slave stations, then addresses of the two slave stations can only be configured in the first two bytes. Address order can be reversed, such as IB5 monitor address 10, IB4 monitor address 11).

(2) How to Use GSD File of G0306-SS

• Configure Device User Parameter

As in figure 13, right click on the gateway device, and select "Properties" \rightarrow "Parameter Assignment".



arameters	Value	
🔄 Station parameters		
🔁 🔄 Device-specific parameters		
-E 1. Baudrate:	9600	
—≝ 2. Parity:	8Bits, No Parity, 1	stop bit
└ 3.MODBUS Slave Device Address:	trate: ty: 3US Slave Device Address: neter assignment 1	
🕂 🦲 Hex parameter assignment		

Figure 40 Configure User Parameters of G0306-SS Device

Here all the parameters mentioned in Table 14 can be modified. The user shall modify based actural status. Baud rate that the gateway as Modbus slave staion, verify and Modbus slave address, etc. can be configured.

• Brief Introduction of Configuring Gateway

Introduced by Chapter 4.3.1 (2), GSD of the gateway includes 20 slots, 67 modules, support 237 user paramters at most. Please refer to Table 13 for each module's illustration.

Slot 1 is fixed as overall state module (module 2), slot 2 is fixed as control module (module 3) and the rest 20 slots can be configurated by users.

For example, configuration of "Input: 24 bits(0xxxx)" module (module 6) putting into slot 3: select slot 3, and in the right device list, double click"Input: 24 bits(0xxxx)" to add it into slot 3.

This gateway forms Modbus storage area based on actual configurated module order. Following content will introduce how to use each module.

• Overall State Module (Module 2)

This module real time displays sending and receiving status of gateway message and check whether messege received is abnormal. Abnormal status cannot be eliminated automatically, until eliminating error mark. Method to eliminate error mark refers to control module (module 3)

B7: Parity Check	B6:CRC Check	B5:Reserved	B4-B1:Exception Response Code	B0:Send/Receive
------------------	--------------	-------------	----------------------------------	-----------------



0:Current slave parity is	0:Current slave CRC is	Not apply	See details in	0:Send message or wait for
correct	correct		Appendix A.3	receiving
1: Current slave parity is incorrect	1: Current slave CRC is incorrect	Not apply		1:Send or process message

a) B0: Send/ Receive



Figure 41 Sending/Receiving Status Transition Diagram

Because G0306-SS is salve station, the gateway automatically turns into the status to wait for receiving after power-up.

b) B4-B1: Exception Response Code

After the gateway receives the message sent by master station, there's no transition error, but the gateway cannot perform master station command or cannot response correctly, the gateway will response with "Exception Response Code". Details are shown in Appendix A.3.

c) B6: CRC Check

When the gateway receives the message with CRC check error, place it in "1". Then the gateway thinks the message is unreliable, don't perform the command and don't response the message.

d) B7: Parity Check

When the gateway receives the data with character parity check error, place it in "1". Then the gateway thinks the MODBUS response data is unreliable, don't perform the command and don't response the message.

• Control Module (Module 3)

This module is used to control Profibus output and eliminate error mark.

B7: Eliminate Error Mark	B6-B1: Reserved	B0:Profibus Output Enable
0: No eliminating		0: Prohibit Profibus output data to enter Modbus 1xxxx and 3xxxx
1: Eliminate error marks B7~B1		1: Enable Profibus ouput data enter Modbus 1xxxx and 3xxxx

Table 20 Format of Control Module



a) B0: Profibus Output Enable

Control Profibus output data whether to enter Modbus 1xxxx and 3xxxx storage area. All initial storage area data is 0.

b) B7: Eliminate Error Mark

If "1", eliminate B7-B1 bits of over state module. If "0", recheck whether exeption message is received.

• Example: Use Input xxx bits Module (Module 4-19)

To use these modules can correspond the data of Modbus storage area 0xxxx to Profibus input area lx.y. The user may use function codes 1, 5, 15 to operate Modbus storage area 0xxxx.

Take "Input:32 bits(0xxxx)" module as an example, the module corresponds 32 coils of Modbus storage area 0xxxx to Profibus input area.

a) Add "Input: 32 bits(0xxxx)" Module, show in Figure 42:



Figure 42 Add "Input:32 bits(0xxxx)" Module

For example, put the module into slot 3, double click "Input: 32 bits(0xxxx)" module. IB1-IB4 are input data address configured to the gateway by Profibus master station, conresponding to Modbus coils 00001-00032.





b) Correspondence between Modbus Storage Area 0xxxx and Profibus Input Area

Figure 43 Corresponding Relations between Modbus Storage Area 0xxxx and Profibus Input Area

Note: IBO corresponds to overall state module. Modbus side coil addresss is certain to begin from 00001. When another input xxx bits module is inserted, Modbus coil addresses is assigned in order. For example, insert another "input: 32 bits (0xxxx)" module, addresses are 00033-00064, corresponding to IB5-IB8 of Profibus.

• Example: Use Output xxx bits module (Module 36-51)

To use these modules can correspond the data of Profibus output area Qx.y. to Modbus storage area 1xxxx. The user may use function code 2 to operate Modbus storage area 1xxxx.

Take "Output: 32 bits (1xxxx)" module as an example, the module writes 4-byte data of Profibus output area into 32 coils of Modbus storage area 1xxxx.



) - coopt 412-21		
Station Rit Treat PIC View Ontions Winds	U Wele		
and Station Bart Insert Int Yiew Options Eindo	w Ueth		
D 😅 🐂 🖷 🐘 🎒 🛍 🛍 🗓 🗖	I 🚟 №?		
		_	
(0) VR2		Find	mtmil
1 PS 405 20A	PROFIBUS(1): DP master sy	stem (1)	1 <u>NIN</u>
	孟 (125) 60	3 Profil	Standard 💌
4 S CPU 412-2 DP			Input:4 Words (4xxxx)
12 DP	come III		Input:5 Words (4xxxx)
II MPI/DP	GU306		Input:6 Words(4xxxx)
5			Input:7 Words (4xxxx)
			Input:8 Words (4xxxx)
			Input: 9 Nords (4xxxx)
			Trput: 11 Words (4xxxx)
			Input: 12 Words (4xxxx)
			Input: 13 Words (4xxxx)
			🚺 Input: 14 Words (4xxxx)
			- Input:15 Words(4xxxx)
			Input: 16 Words (4xxxx)
22-20000 (301)			Output:8 bits(1xxxx)
			Output: 10 Dits (1xxxx)
S DP ID Order Number / Designation	I Add Q Address Co	mment	Output: 32 bits (1xxxx)
1 8DI status	0		Output:40 bits(1xxxx)
2 8D0 control	0		- 🚺 Output:48 bits(1xxxx)
3 32D0 Output:32 bits(1xxxx)	14		- 🚺 Output:56 bits(1xxxx)
4			Output:64 bits(1xxxx)
6			Uutput:72 bits(1xxxx)
7			
8			<u> </u>
9			
1 ,			
Press F1 to get Help.			Chg //

a) Add "Output:32 bits(1xxxx)" Module, shown in Figure 44:

Figure 44 Add "Output: 32 bits(1xxxx)" Module

For example, put the module into slot 3, select slot 3, double click "Output: 32 bits(1xxxx)" module. QB1-QB4 are output data address configured to the gateway by Profibus master station, conresponding to Modbus coils 10001-10032.

(Dutput Area					
Р			G0306-SS			M
R O F I B U S M A S T E R	Profibus write only	Profibus output area Qx.y Profibus write only QB1: QB2: QB3: QB4:	D A T A E T T R A G	Modbus storage area 1xxxx Modbus read only 10008~10001 10016~10009 10024~10017 10032~10025	02H read comm.	O D B U S M A S T E R
			E			

b) Corresponding Relations between Modbus Storage Area 1xxxx and Profibus Output Area

Figure 45 Corresponding Relations between Modbus Storage Area 1xxxx and Profibus Output Area

Note: QB0 corresponds to control module. Modbus side coil addresss is certain to begin from 10001. When another input xxx bits module is inserted, Modbus coil addresses is



assigned in order. For example, insert another "Output: 32 bits (1xxxx)" module, addresses are 10033-10064, corresponding toQB5-QB8 of Profibus.

• Example: Use Input xxx bits module (Module 20-35)

To use these modules can correspond the data of Modbus storage area 4xxxx to Profibus input area lx.y. The user may use function codes 3, 6, 16 to operate Modbus storage area 4xxxx.

Take "Input: 4 Words (4xxxx)" module as an example, the module corresponds 4 registers of Modbus storage area 4xxxx to Profibus input area.

📲 HT Config - [SIEATIC 400(1) (Configuration) G0306_412-2]							
🖬 Station Edit Insert FLC View Options Window Help							
(n) 182		▲ ====	: 미치				
		Find:	nt ni				
1 I I'S 405 20A	TRUTIDUS(I). DF Master system (I)						
	👗 (125) G03	Profil	Standard 💌				
4 CPU 412-2 DP			Input:48 bits(0xxxx)				
1 12 1 DP	100		Input:56 bits(0xxxx)				
II MPI/DP	G0306		Input:64 bits(0xxxx)				
5			- 🚺 Input:72 bits(0xxxx)				
			Input:80 bits(0xxxx)				
			Input:88 bits(0xxxx)				
			Input:96 bits(0xxxx)				
			Input:104 bits(0xxxx)				
			Input: 112 bits (Oxxxx)				
			Input: 120 bits (0xxxx)				
		-1	Input: 128 bits (Uxxxx)				
	۱.		Input: 1 Word (4xxxx)				
			Trant'3 Words (4xxxx)				
▲ ■ (125) G0306-SS			Tuput: 4 Words (4xxxx)				
			Input: 5 Words (4xxxx)				
S DP ID Order Number / Designation	I Add Q Address Comment		Input:6 Words (4xxxx)				
1 8DI status	0		Input:7 Words(4xxxx)				
2 8D0 control	0		Input:8 Words(4xxxx)				
3 211 Input: 4 Words (4xxxx)	512519		Input:9 Words (4xxxx)				
4			Input:10 Words(4xxxx)				
5							
			_				
			₹ <u>≺</u>				
9							
	<u>+ </u>						
J Insertion nossible		12	Cha				
Tuser crow bossible			ung //				

a) Add "Input: 4 Words(4xxxx)" module, shown as Figure 46:

Figure 46 Add "Input: 4 Words (4xxxx)" Module

For example, put the module into slot 3, select slot 3, double click "Input: 4 Words (4xxxx)" module. IW512- IW519 are input data address configured to the gateway by Profibus master station, conresponding to Modbus register 40001-40004.



mpa								
P R			G0306-SS					
0						0		
F		Profibus input area	D	Modbus storage area		D		
1		IWx.y	А	4xxxx		В		
В		Profibus read only	Т	Modbus read/write		U		
U		IW/512.	A	40001		S		
S		I W 312.	F	40001				
		IW514:	<u> </u>	40002	03H read comm.	М		
М	Profibus read only	IW516:	Т	40003		А		
Α	V	111/510	<hr/> R	40004	06H write comm	S		
S		1W 518:	Υ Α	40004		Т		
Т					10H write comm	E		
Е			E G			R		
R								

b) Corresponding Relations between Modbus Storage Area 4xxxx and Profibus Input Area

Figure 47 Corresponding Relations between Modbus Storage Area 4xxxx and Profibus Input Area

Note: Modbus side register addresss is certain to begin from 40001. When another input xxx bits module is inserted, Modbus register addresses is assigned in order. For example, insert another "Input: 4 Words (4xxxx)" module, addresses are 40005-40008, corresponding to IW520-IW527 of Profibus.

• Example: Use Output xxx bits module (Module 52-67)

To use these modules can correspond the data of Profibus output area Qx.y. to Modbus storage area 3xxxx. The user may use function code 4 to operate Modbus storage area 3xxxx.

Take "Output: 4 Words (3xxxx)" module as an example, the module writes 8-byte data of Profibus output area into 4 registers of Modbus storage area 3xxxx.



HT Config - [SILATIC 400(1) (Configuration)	G0306	412-21	-		J •		
Station Edit Insert PLC View Options Window	Help						_ 8 ×
	99 10						
(n) 102				-			미치
1 PS 405 204	PROFTBUS	(1) [.] DP master	system (1)		Find:		M1 M1
		Y			Profil	Standard	
		(125)	G03		<u></u>	Istandard	
4 CPU 412-2 DP						Outp	1t:128 bits(1xxxx 🔺
		G0306				Outp	it:1 Words(3xxxx)
5						Outp	it:3 Words (3xxxx)
R T						🚺 Outp	it 4 Words (3xxxx)
						- Outp	it:5 Words (3xxxx)
						- Outp	1t:6 Words(3xxxx)
						- Outp	it:8 Words(3xxxx)
						- Outp	it:9 Words(3xxxx)
				_		- 🚺 Outpu	at:10 Words (Зжжжж
				<u> </u>		- Outp	it:11 Words (Зжжж
				<u> </u>		Output Output	it:12 Words (3xxxx
← → (125) G0306-SS						- Outp	it:14 Words (Зжиж
	1	1	1	- 6		- Outp	it:15 Words (Зжжжж
S DP ID Order Number / Designation	I Add	Q Address	Comment			Outp	it:16 Words (3xxxx
2 8D0 control		0		-		DP/DP Coupl	er
3 227 Output: 4 Words (3xxxx)		512519					luk
4						E B-B-MS/V33	
5						🗄 🚡 DP/DP Coupl	er, Release 2 💌
	-			_			
8							€ <u>≺</u>
9				-			
	1				J		
Insertion possible				1			Chg //.

a) Add "Output: 4 Words (3xxxx)" module, shown as Figure 48:

Figure 48 Add "Output: 4 Words (3xxxx)" module, shown as Figure 48 For example, put the module into slot 3, select slot 3, double click "Output: 4 Words (3xxxx)" module. QW512- QW519 is output data address configured to the gateway by Profibus master station, conresponding to Modbus register 30001-30004.

P R O F I B U S Profibus write only A Profibus write only C M Profibus write only C M Profibus write only C C C C C C C C C C C C C	5	Storage Area 3	XXXX				
O F Profibus output area QWx.y D Modbus storage area 3xxxx B QW512: A QW512: QW514: QW516: T QW518: A A 30001 QW518: A	P R			G0306-SS			М
	O F I U S M A S T E R	Profibus write only	Profibus output area QWx.y Profibus write only QW512: QW514: QW516: QW518:	D A T A E X T R A N G E	Modbus storage area 3xxxx Modbus read only 30001 30002 30003 30004	04H read comm.	O D U S M A S T E R

b) Corresponding Relationship between Profibus Output Area and Modbus Storage Area 3xxxx

Figure 49 Corresponding Relations between Profibus Output Area and Modbus Storage Area 3xxxx

Note: Modbus side register addresss is certain to begin from 30001. When another output xxx bits module is inserted, Modbus register addresses is assigned in order. For example,



insert another "Output: 4 Words (3xxxx)" module, addresses are 30005-30008, corresponding to QW520-QW527 of Profibus.

• Precautions for Use

When using G0306 Modbus to DP Gateway, the following points are easy to be mistaken. Please pay high attention when using.

- 1 After switching function between G0306-MS and G0306-SS, the device has to be power up again.
- 2 There is a 16-bit address dip switch, but it shall be calculated based on decimal system. For example: 16-bit knob is 0xB, 10-bit knob is 5, then the address is 11 (0xB) *10+5*1=115.
- 3 Detailed diagnostic function of G0306-MS is realized by configuring device user parameter "MODBUS slave station status monitoring" as well as the gateway module "XXX bit/byte MODBUS slave station monitoring module". If the configured parameter of the MODBUS slave station status monitoring is not 0, then the last position of all configurated modules shall be configured the corresponding "xxx bit/byte Modbus slave station monitoring module".



Section 5.Maintenance

• Simple Maintenance

Table 21 Status List for LED Indicating Light

LED Indicating Light	Color	Normal Status	Exception Status	Exception Reason	Correction Method
Power	Green	Keep on	Off	Power fault	Check power supply and connection
				Internal fault	Contact technical support
				Configuration error	Test whether there's exception or no hardware configuration
Ordina			Ott	Address error	Test whether the address matches configuration
Online	Yellow	Keep on		Environment fault	Test whether DP bus connection is correct, and terminal matching is correct
			Internal fault	Contact technical support	
				Configuration error	Test whether there's exception or no hardware configuration
0.6511:00	ine Red Off On	0.7	Address error	Test whether the address matches configuration	
Offline		Oli	On	On	Environment fault
				Internal fault	Contact technical support
				Not connect Modbus device	Connect Modbus device correctly
TxD	Green	Flash	Off	Configuration error	Test whether module parameters are configured correctly
			011	Power fault	Check power supply and connection
		Internal fault	Contact technical support		
	Not connect Modbus device	Connect Modbus device correctly			
RxD	RxD Yellow Flash Off	Off	Configuration error	Test whether module parameters are configured correctly	
				Power fault	Check power supply and connection
			Internal fault	Contact technical support	

- Daily maintenance means cleaning device only.
- Fault maintenance: Please return to the factory if there's fault.
- Configuration error: the following configuration errors will not lead to device's DP side offline, but Modbus communication will be abnormal.

Table 22 Test List for Configuration Errors

No.	Exception Pheonomena	Exception Reason	Correction Method
1	Transmit error of partial Modbus commands	Gross state module configuration error	Gross state module is only allowed to be configured in 1st slot, cannot be in the other slots.
2	Transmit error of partial Modbus commands	Control module configuration error	Control module is only allowed to be configured in 2nd slot, cannot be in the other slots.
3	Transmit error of partial Modbus commands	Slave station monitoring module of G0306-M isn't configured to the end.	Please configure slave station monitoring module, corresponding to "MODBUS slave station state monitoring" parameter, to the last effective slot, don't configure it in the middle of communication module.
4	Transmit error of partial Modbus commands	"MODBUS slave station state monitoring" parameter of G0306-M is not matched with the configured slave station monitoring module.	Please use the slave monitoring module nominated by "MODBUS slave station state monitoring" parameter. If "MODBUS slave station state monitoring" parameter doesn't need slave station monitoring module, please



			don't configure it.
5	After transmitting all the configured Modbus commands, a few bytes of data are still been transmitted.	"MODBUS slave station state monitoring" parameter of G0306-M is not matched with the configured slave station monitoring module. And the module's length is longer than the parameter's length.	Please configure slave monitoring module into correspondence with "MODBUS slave station state monitoring" parameter



Section 6. Technical Specifications

6.1 Basic Parameters

Working Voltage	24VDC(±20%)
Rated Current	I _{24V} :≤60mA
Working Temperature	-20°C~70°C
Storage Temperature	-40°C~70°C
Humidity Range	5%~95%RH
Modbus Physical Interface	RS485 (Configurable Terminal) / RS232
Modbus Character Transfer Mode	RTU mode

6.2 Performance Index

Protection Grade	IP20 for outer case grade
Electromagnetic	Complied with GB/T 18268.1-2010
Compatibility	FF terminal test method is complied with GB/T 18268.23-2010

6.3 Physical Characteristics

Weight Structure Material 0.2kg Case: ABS; Clip: POM; Paint: Polyester epoxy resin

6.4 Default Communication Parameters

General Default Comn	General Default Communication Parameters				
Baud Rate	9600				
Data Bit	8				
Stop Bit	1				
Verification	NO				
G0306-MS Default Cor	mmunication Parameters				
MODBUS Slave Station State Monitoring	NO				
Data Updating Mode	After response of all MD				
Writing Mode	Always write				
Master Transmit Interval	Slave station's reply is transmitted				
Interval Time Value	500ms				
Slot	Slot 1: gross state module; slot 2: control module; slot 3~39: no module				
G0306-SS Default Con	G0306-SS Default Communication Parameters				
Modbus Slave Add.					

6.5 Supportive Modbus Function Code

1	Read coil
2	Read discrete input
3	Read holding register value
4	Read input register value
5	Write single coil
6	Write single register
15	Write multiple coils
16	Write multiple register values



Appendix A Modbus Communication Protocol

Declaration: Modbus technical details are not required when using G0306 Modbus to DP Gateway. This appendix only provides Modbus communication protocol for user reference.

A.1 Modbus Communication Protocol

- Modbus protocol is mainly used for the communication between the controllers. Modbus protocol provides communication between two controllers or between controller and other devices connected on networks (e.g., Ethernet). At present, a lot of devices adopt Modbus communication protocol standards.
- According to 7 layer network model of international ISO/OSI, standard Modbus protocol has defined communication physical layer, link layer and application layer; Physical layer: Define asynchronous serial communication standard based on RS232 and RS485;

Link layer: Stipulate medium access control based on station number recognition, master/slave mode;

Application layer: Stipulate information specification (or message format) and communication service function.



Figure 50 Modbus Protocol Model

3) At present, a lot of Modbus devices are based on RS232/485. There is also changed Modbus network communication, with only Modbus application layer (information specification), but lower layer is the other communication protocol, e.g., Modbus network communication based on Ethernet +TCP/IP, Modbus network based on wireless spread spectrum communication and so on.

A.2 Points of Modbus Protocol

- 1) Modbus is a master/slave communication protocol. Master station takes initiative to send a message, only the slave station with the same address, as that in the message, may return response message to the master station.
- 2) Message with address 0 is broadcasting mode, slave station no need to response.
- 3) Modbus specifies two character transfer modes: ASCII mode, RTU (binary) mode; the two transfer modes cannot mix.

%This product can only be used for RTU mode

Table 23 Character Transfer Mode Table



Character	RTU Mode	ASCII Mode
Coding	Binary	ASCII (Printed character: 0-9, a-z, A-Z)
Each Character Bits	Starting bit: 1BIT	Starting Bit: 1BIT
Data Bit	Data bit: 8BITS	Data bit: 7BITS
Verification Bit	Parity bit (optional): 1 bit	Parity bit (optional): 1 bit
Stop Bit	Stop bit: 1 or 2	Stop bit: 1 or 2
Message Verification	CRC(Cyclic Redundancy Check)	LRC(Longitudinal Redundancy Check)

1) Transmission Error Check

- Transmission error check is verified by parity check and redundancy check.
- When check has error, message handling stops, slave station no longer continues communication, and not responds to the message;
- Once communication error occurs, a message will be regarded as unreliable; if Modbus master station has not received the reply from slave station after a certain period, "communication error has occurred" judgment will be made.
- 2) Level of message (character) uses CRC-16 (Cyclic Redundancy Check)
- 3) Modbus message RTU format

Table 24 Modbus Message RTU Format

Message Interval Time ≥ 3.5 Characters	Address	Function Code	Data	CRC Check	Message Interval Time ≥
5.5 Characters	1*byte	1*byte	N*bytes	2*bytes	3.5 Characters

A.3 Modbus Exception Response

- If slave station receives master request without a communication error, but cannot execute or response correctly, the slave station will return an "exception response".
- 2) Message format of exception response

Example: Master station sends a request message, function code is 01, 1 coil value 0x04A1 is read.

Table 25 Request Message Sent by Master Station (Hex)

Slave Address	Function Code	Starting Address Hi	Starting Address Lo	Quantity of Coils Hi	Quantity of Coils Lo	CRC
0A	01	04	A1	00	01	XXXX
Bocausa a	oil mavim	um address of t	bo clave station		$v01$ λ 1 is howo	nd tho

Because coil maximum address of the slave station is 0x0400, 0x04A1 is beyond the maximum address. The slave station returns exception response as below (Note: Maximum bit of function code is 1.)

Table 26 Response Message Returned by Slave Station (Hex)

Slave Address	Function Code	Exception Code	CRC
0A	81	02	XXXX

3) Exception Response Code

Table 27 Modbus Exception Response Code

Code	Name	Meaning
0x01	ILLEGAL FUNCTION	The function code received in the query is not an allowable action for the addressed slave station. If there's query sent, this code indicates no programming function previously.
0x02	ILLEGAL DATA ADDRESS	The data address received in the query is not an allowable address for the addressed slave station.
0x03	ILLEGAL DATA VALUE	A value contained in the query data field is not an allowable value for the addressed slave station.
0x04	SLAVE DEVICE FAILURE	An unrecoverable error occurred while the server (or slave station) was attempting to perform the requested action.

A.4 Modbus Storage Area

Storage areas of controller related to Modbus (or Modbus device) is marked by 0xxxx, 1xxxx, 3xxxx, 4xxxx.

Table 28Modbus Storage Are

Storage Area Sign	Name	Туре	Read/Write	Storage Unit Address (Decimal)



0xxxx	Coil	bit	Read/Write	00001~0xxxx xxxx: related to device
1xxxx	Discrete Input	bit	Read only	10001~1xxxx xxxx: related to device
Зхххх	Input Register	Byte	Read only	30001~3xxxx xxxx: related to device
4xxxx	Holding/Output Register	Byte	Read/Write	40001~4xxxx xxxx: related to device

A.5 Modbus Function Codes

There are three categories of MODBUS Functions codes: public function codes, userdefined function codes, and reserved function codes.

- 1) Public Function Codes
- Are well defined function codes
- guaranteed to be unique
- validated by the MODBUS.org community
- publicly documented
- have available conformance test
- MB IETF RFC documented
- includes both defined public assigned function codes as well as unassigned function codes reserved for future use
- 2) User-defined Function Codes
- there are two ranges of user-defined function codes, i.e. 65 to 72 and from 100 to 110 decimal
- user can select and implement a function code that is not supported by the specification
- there is no guarantee that the use of the selected function code will be unique
- if the user wants to re-position the functionality as a public function code, he must initiate an RFC to introduce the change into the public category and to have a new public function code assigned
- 3) Reserved Function Codes
- Function Codes currently used by some companies for legacy products and that are not available for public use







A.5.1 01 (0x01) Read Coils

Table 29 Master Station Request Message Format (Hex)

Slave Address	Function Code	Coil Starting Address Hi	Coil Starting Address Lo	Coil Quantity Hi	Coil Quantity Lo	CRC
11	01	00	13	00	25	XXXX

Function: Read slave station coil 0xxxx status

Note: In message, coil starting address 00000 is corresponding to address 00001 in the device, and others follow.

This example: Read 17(0x11) slave station's coil, starting address=0x0013=19, corresponding to device address 00020; coil quantity=0x0025=37; end address=00020+37-1=00056.

So function of this request message is: Read 17(0x11) slave station's coil 00020-00056, total 37 coil status.

Table 30 Slave Station Response Message Format (Hex)

Address	Function Code	Byte Count	Coil Status 20-27	Coil Status 28-35	Coil Status 36-43	Coil Status 44-51	Coil Status 52-56	CRC
11	01	05	CD	6B	B2	0E	1B	XXXX

Function: Return coil 0xxxx status from slave station

This example: 0xCD=11001101, corresponding to 00020-00027; 0x6B=01101011, corresponding to 00028-00035; 0xB2=10110010, corresponding to 00036-00043; 0x1B=00011011, corresponding to 00052-00056.

A.5.2 02 (0x02) Read Discrete Inputss

Table 31 Master Station Request Message Format (Hex)

Slave	Function	Starting Address	Starting Address	Quantity of	Quantity of	CRC
Address	Code	Hi	Lo	Inputs Hi	Inputs Lo	
11	02	00	C4	00	16	XXXX

Function: Read slave station discrete input 1xxxx status

Note: In message, discrete input starting address 00000 is corresponding to address 10001 in the device, and others follow.

This example: Read 17(0x11) slave station discrete input, starting address=0x00C4=196, corresponding to device address 10197; quantity of discrete input =0x0016=22; end address=10197+22-1=10218.

So function of this request message is: Read 17(0x11) slave station discrete input 10197-10218, total 22 discrete inputs.

Table 32 Slave Station Response Message Format (Hex)

Address	Function Code	Byte Count	Discrete Input 10197-10204	Discrete Input 10205-10212	Discrete Input 10213-10218	CRC
11	02	03	AC	DB	35	XXXX

Function: Return discrete input 1xxxx status from slave station

A.5.3 03 (0x03) Read Holding Registerss

Table 33 Master Station Request Message Format (Hex)

Slave Address	Function Code	Register Starting Address Hi	Register Starting Address Lo	Quantity of Register Hi	Quantity of Register Lo	CRC
11	03	00	6B	00	03	XXXX

Function: Read slave station holding register 4xxxx value Note: In message, register starting address 00000 is corresponding to address 40001 in the device, and others follow.

This example: Read 17(0x11) slave station holding register value, starting address=0x006B=107, corresponding address 40108; quantity of registers =0003; end address=40108+3-1=40110.

So function of this request message is: Read 17(0x11) slave station value of 3 holding registers, 40108—40110.

 Table 34 Slave Station Response Message Format (Hex)

Slave Function Byte Register Register Register Register Register CRC



Address	Code	Count	40108 Hi	40108 Lo	40109 Hi	40109 Lo	40110 Hi	40110 Lo	
11	03	06	02	2B	01	06	2A	64	XXXX
Function: Return value of holding register 40108-40110 from slave station; (40108)									

=0x022B, (40109)=0x0106, (40110)=0x2A64.

A.5.4 04 (0x04) Read Input Registers

 Table 35 Master Station Request Message Format (Hex)

Slave	Function	Register Starting	Register Starting	Quantity of	Quantity of	CRC
Address	Code	Address Hi	Address Lo	Registers Hi	Registers Lo	
11	04	00 08		00	01	XXXX

Function: Read slave station input register 3xxxx value

Note: In message, register starting address 00000 is corresponding to address 30001 in the device, and others follow.

This example: Read 17(0x11) slave station input register value, starting address=0x0008=0008, corresponding address 30009; quantity of registers =0001; end address=30009.

So function of this request message is: Read 17(0x11) slave station value of 1 input register 30009.

Table 36 Slave Response Message Format (Hex)

Slave Address	Function Code	Byte Count	Input Register Hi	Input Register Lo	CRC
11	04	02	01	01	XXXX

Function: Return value of input register 30009 from slave station; (30009) =0x0101

A.5.5 05 (0x05) Write Single Coil

Table 37 Master Station Request Message Format (Hex)

Slave Address	Function Code	Coil Address Hi	Coil Address Lo	ON/OFF Sign	ON/OFF Sign	CRC
11	05	00	AC	FF	00	XXXX

Function: Write No.17 slave station coil 0xxxx value.

Note: In message, coil starting address 00000 is corresponding to address 00001 in the device, and others follow.

ON/OFF Sign=0xFF00, set coil to be ON.

ON/OFF Sign=0x0000, set coil to be OFF.

This example: Starting address=0x00AC=172, corresponding address in device is 00173. So function of this request message is: ON state is written by No.17 slave station coil 00173.

 Table 38 Slave Response Message Format (Hex, return original message)

Slave Address	Function Code	Coil Address Hi	Coil Address Lo	ON/OFF Sign	ON/OFF Sign	CRC
11	05	00	AC(172)	FF	00	XXXX

Function: Original message returns after ON is written by No.17 slave station coil 0173.

A.5.6 06 (0x06) Write Single Register

Table 39 Master Station Request Message Format (Hex)

Slave Address	Function Code	Register Address Hi	Register Address Lo	Data Value Hi	Data Value Lo	CRC		
11	06	00	87(135) 03 9E					
Function: Write value of single holding register 4xxxx. In message, register starting								
address 00000 is corresponding to address 40001 in the device, and others follow.								
This example: Write value of single holding register 40136 from No.17 slave								

station=0x039E.

Table 40 Slave Station Response Message Format (Hex, return original message)

Slave Address	Function Code	Register Address Hi	Register Address Lo	Data Value Hi	Data Value Lo	CRC
11	06	00	87(135)	03	9E	XXXX



Function: After writing value of single holding register 40136 from No. 17 slave station=0x039E, return original message.

A.5.7 15 (0x0F) Write Multiple Coils

Table 41 Master Station Request Message Format (Hex)

Slave Address	Function Code	Coil Address Hi	Coil Address Lo	Quantity of Coils Hi	Quantity of Coils Lo	Byte Count	Coil State 20-27	Coil State 28-29	CRC
11	0F	00	13	00	0A	02	CD	00	XXXX

Function: Write multiple contiguous coils 0xxxx as ON/OFF state.

Note: In message, coil starting address 00000 is corresponding to address 00001 in the device, and others follow.

This example: Write multiple coils of 17(0x11) slave station, coil starting address=0x0013=19, corresponding address 00020; quantity of coils=0x000A=10; end address=00020+10-1=00029.

So function of this request message is: write value of 10 coils 00020-00029 from 17 (0x11) slave stations; inside, address 00020-00027 are written 0xCD, address 00028-00029 are written 0x00.

 Table 42 Slave Station Response Message Format (Hex)

Slave Address	Function Code Coil Address Hi		Coil Address Lo	Quantity of Coils Hi	Quantity of Coils Lo	CRC
11 0F		00	13	00	0A	XXXX

Function: Return coil address and quantity.

A.5.8 16 (0x10) Write Multiple Registers

Table 43 Master Station Request Message Format (Hex)

Address	Function Code	Register Address Hi	Register Address Lo	Quantity of Registers Hi	Quantity of Registers Lo	Byte Count	Data Hi	Data Lo	Data Hi	Data Lo	CRC
11	10	00	13	00	0A	02	CD	00			XXXX

Function: Reset value of multiple holding registers 4xxxx.

Note: In message, holding register starting address 40000 is corresponding to address 40001 in the device, and others follow.

This example: Reset value of multiple holding registers from 17(0x11) slave station, register starting address=0x0087=135, corresponding address 40136; quantity of coils=0x0002=2; end address=40135+2-1=40137.

So function of this request message is: Reset value of 2 holding registers from 17(0x11) slave station; address 40136 is written 0x0105, address 40137 is written 0x0A10.

Table 44 Slave Station Response Message Format (Hex)

Address	Function Code	Register Address Hi	Register Address Lo	Quantity of Registers Hi	Quantity of Registers Lo	CRC
11	10	00	87	00	02	XXXX

Function: Return register address and quantity.



Appendix B Model Selection Table of G0306 Modbus to DP Gateway

GW-MODB-DP		G0306 Mod	30306 Modbus to DP Gateway			
		Code	Modbus Physical Interface			
		RS485	RS485 Interface			
		RS232	RS232 Interface			
GW-MODB-DP - RS485 ——Sample						

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