Thank you for purchasing Modbus Card. This manual contains instructions and warnings that should be followed during the installation, operating and storage of the card. Please keep this manual for further reference.

Special Precautions
- If the card must be stored prior to installation; storage must be in a dry place.
- The admissible storage temperature range is from -10ºC to +70ºC.

1. Product Overview
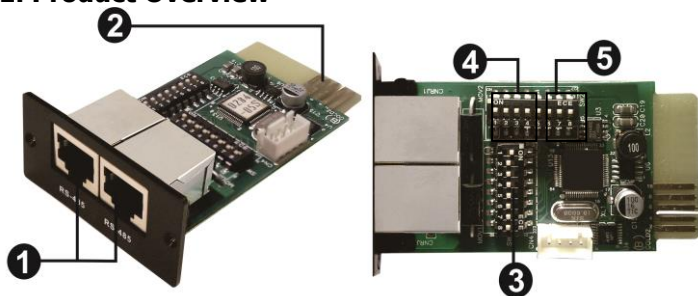
❶ RS-485 port
❷ Golden finger
❸ Address switch
❹ Communication setting
❺ Resistance switch

2. Product Introduction

Note: Default setting for baud rate is 19200bps.

1) For single inverter application: Equipped with Modbus card, hybrid inverter is connected to energy meter with RS485 communication port. It's to arrange self-consumption via Modbus card to control power generation and battery charging of the inverter.
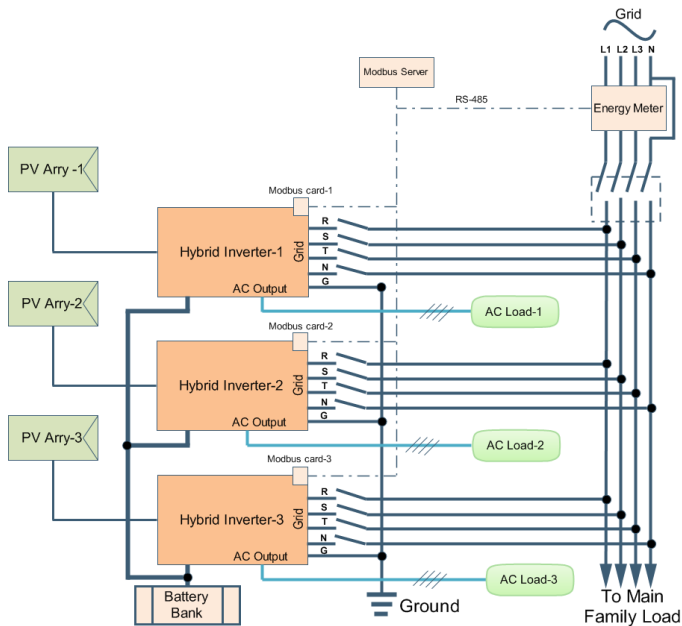

3KW inverter   10KW inverter
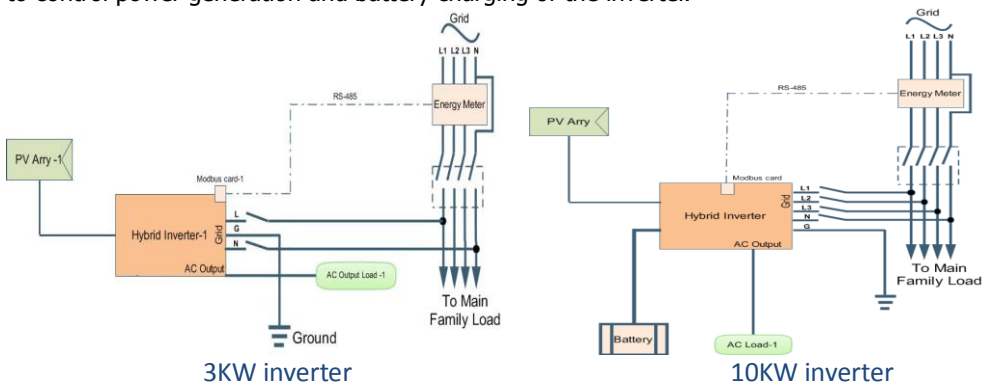
2) For three-inverter application: Equipped with Modbus card, three hybrid inverters are connected to energy meter with RS485 communication port. As a control center, Modbus server will control power generation and battery charging of three inverters via Modbus card for successful self-consumption.
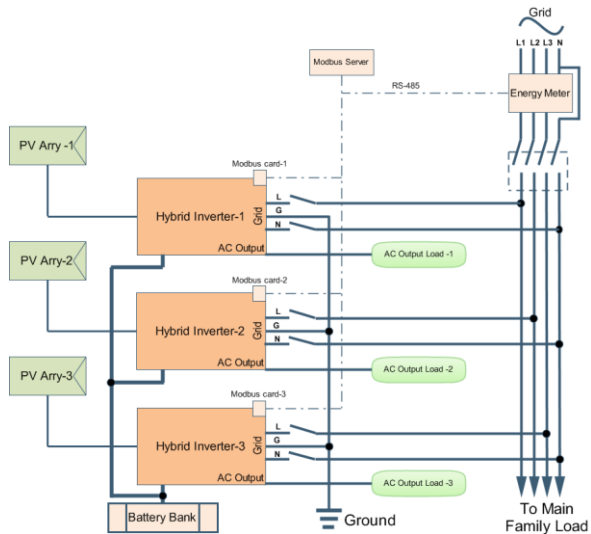

3KW inverter

10KW inverter

3. Installation and Operation

Follow below steps to install and use this modbus card:

1.   Configure Modbus ID (Refer to section 4.1 for the details)
2.   Configure communication format (Refer to section 4.2 for the details)
3.   Install modbus card into inverter.
4.   Configure and Connect inverter. If connecting single inverter, please refer to section 5 for the details. If connecting three inverters, please refer to section 6 for details.

4. Configuration

4.1 Machine ID Configuration
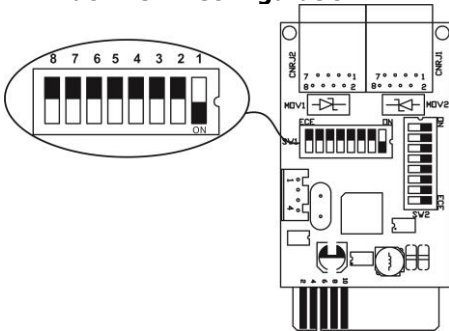
There are eight bits to present ID of each card. Use SW1 to set machine ID. From left to right, it's 8 to 1. As shown, when the switch is pushed down, the bit is set to "one". Otherwise, the bit is set as zero. The ID of modbus card is set to 0x01 as chart. Please check appendix for detailed ID no. and SW1 setting.

4.2 Hardware Setting
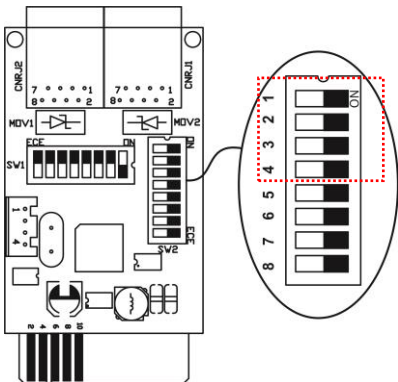
Function	Bit Setting		Meaning
Working mode	# 2	# 1	
	OFF	OFF	Working in server mode
	ON	ON	Working in single mode (Reset total feed-in power to zero)
	ON	OFF	Working in single mode (Reset feed-in power to zero in each phase. Only apply for 3-phase inverter)
Parity check	# 4	# 3	
	OFF	OFF	Even parity
	ON	OFF	Odd parity
	OFF	ON	No parity check 1 stop bits (Default)
	ON	ON	No parity check 2 stop bits

4.3 RS-485 Resistance Configuration
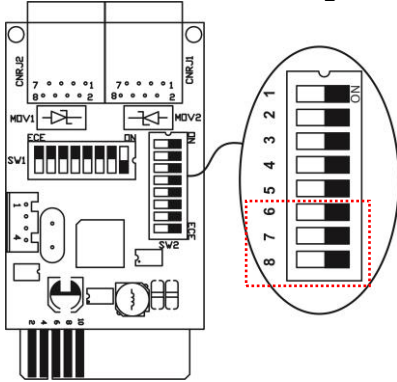
Function	Bit #	Setting	Meaning
Push up resistance	# 6	ON	Enable (Default)
		OFF	Disable
Push down resistance	# 7	ON	Enable (Default)
		OFF	Disable
Terminate resistance	# 8	ON	Enable (Default)
		OFF	Disable

4.4 Interface Configuration
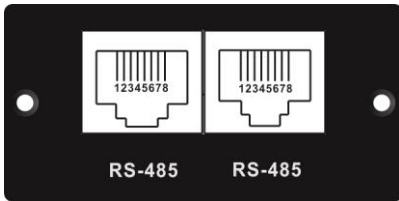
RS-485 Pin Configuration

Pin	Function
4	RS-485 - B
5	RS-485 - A
8	GND

5. Single Inverter Connection
5.1. Configuration
CAUTION: Before wiring connection, make sure that configurations of modbus card and energy meter are the same.
1) Energy meter configuration
   Setting parameters:

Name	modbus ID	bate rate(bps)	parity check	stop bit
Energy meter	1	19200	NONE	1

A.   Enter set-up mode before setting up all parameters.

   To enter set-up mode, press [E◄] button for 3 seconds until password screen appears.

Setting-up is password-protected. It's requested to enter correct password (default '1000') before proceeding. If an incorrect password is entered, the screen will display "Err".

B. Set up modbus ID (modbus address) as 001.

1		From main menu, press M▲ or P▼ to jump to modbus address (Addr). Press E↵ to enter options.
2		Press M▲ or P▼ to enter numbers. The range is from 0 to 247.

C. Set up baud rate as 19.2K Hz

1		From main menu, press M▲ or P▼ to jump to Baud Rate. Press E↵ to enter Baud Rate options.
2		The current setting will flash.
3		Press M▲ or P▼ to view all options in order. There are four options available to choose: 2.4k, 4.8k, 9.6k, 19.2k and 38.4k.

4		When 19.2k is displayed, press to confirm setting. Then, press to return to main menu.

D. Set up parity as NONE

1		From the main menu, press or to jump to Parity (PArI). Press to enter Parity options.
2		The current setting will flash. Press or to view all options in order. There are three options available to choose: EVEN, ODD and NONE.
3		When NONE is displayed, press to confirm setting. Then, press to return to main menu.

E. Set up stop bit as 1

1		From the main menu, press or to jump to STOP (StoP). Press to enter Stop options.
2		The current setting will flash. Press or to view all options in order. There are two options available to choose: 1 or 2.
3		When 1 is displayed, press to confirm setting. Then, press to return to main menu.

2) Modbus card configuration

Setting parameters:

Name	modbus ID	bate rate(bps)	parity check	stop bit
Modbus card	1	19200	NONE	1
	Set up modbus card working in single mode. (Refer to section 4.2.)			

① Reset total feed-in power to zero
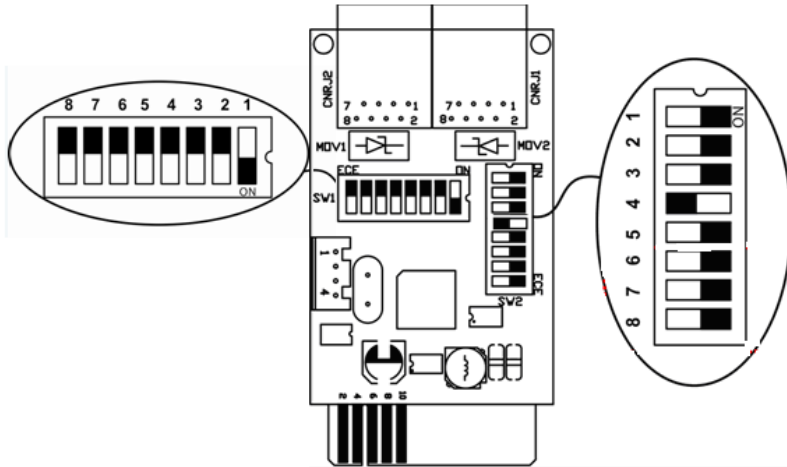
② Reset feed-in power to zero in each phase. (Only apply for 3-phase inverter)
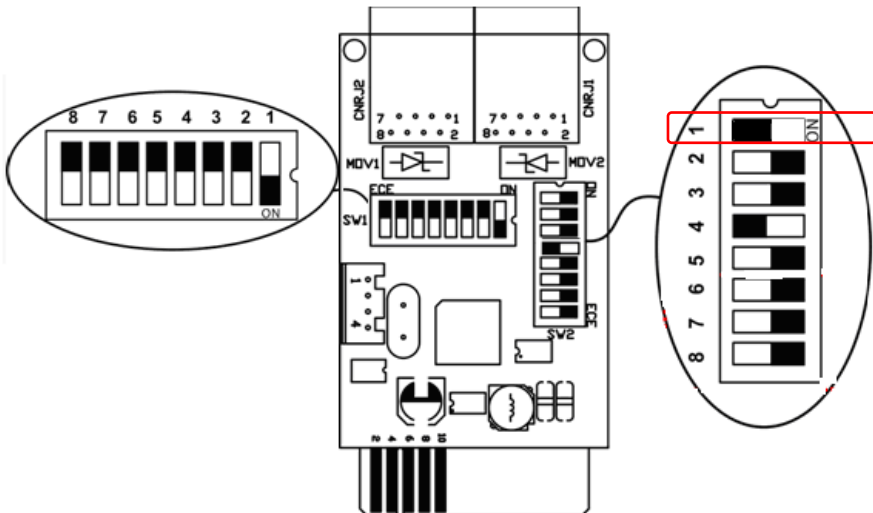
3) Inverter configuration

Setting parameters:

   A. PV energy supply priority setting: Grid-Tie with backup (II)

   B. Set up AC-charging duration at night such as "00:00-05:00" as default.
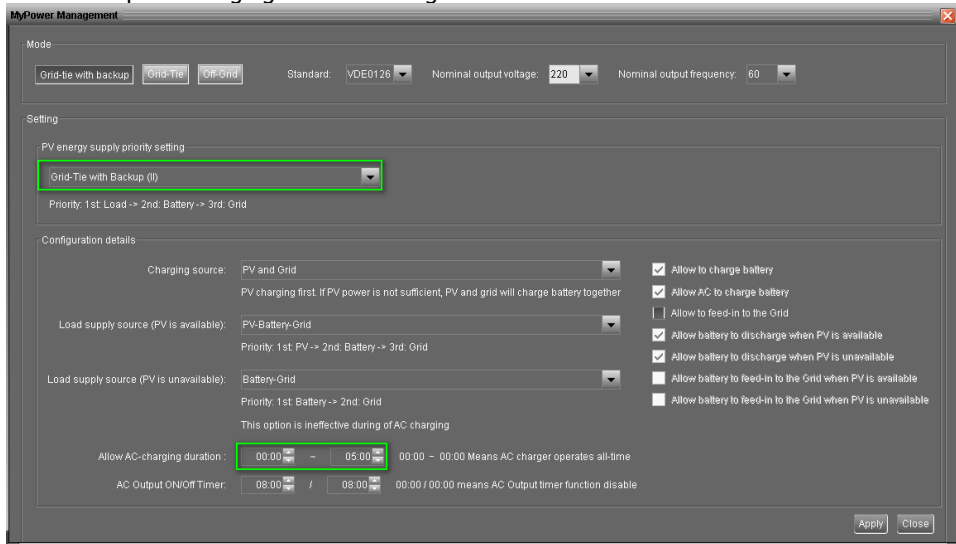
5.2. Wiring Connection

   Please follow below chart for wiring connection between RJ45 and energy meter:

Single inverter connection
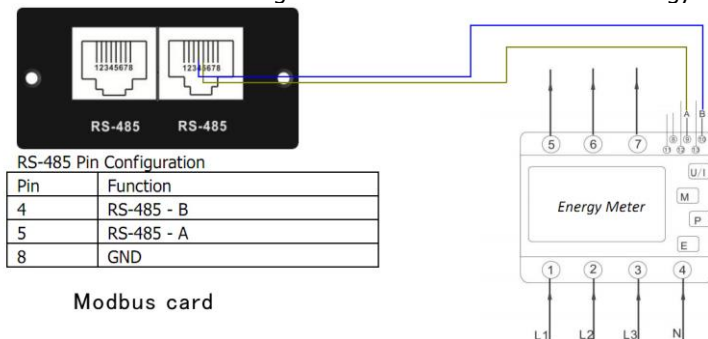
6 Three-inverter Connection

6.1. Configuration

CAUTION: Make sure that all modbus addresses are different in the modbus network and modbus cards are working in server mode.

1) **Energy meter configuration** (Refer to section 5.1 for the details)

   Setting parameters:

Name	modbus ID	bate rate(bps)	parity check	stop bit
Energy meter	1	19200	NONE	1

2) **Modbus card configuration**

   Setting parameters for Modbus card No. 1:

Name	modbus ID	bate rate(bps)	parity check	stop bit
Modbus card	2	19200	NONE	1
No. 1	Setting modbus card in server mode. (Refer to section 4.2)			
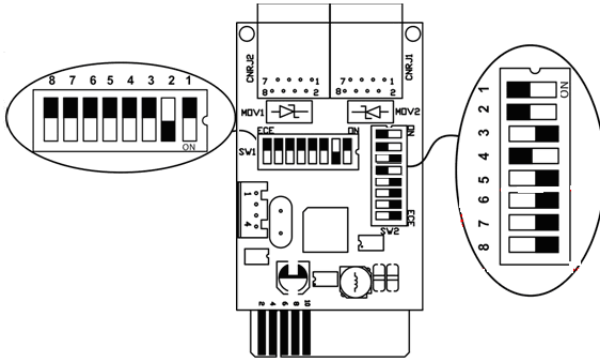
Setting parameters for Modbus card No. 2:

Name	modbus ID	bate rate(bps)	parity check	stop bit
Modbus card	3	19200	NONE	1
No. 2	Setting modbus card in server mode. (Refer to section 4.2)			
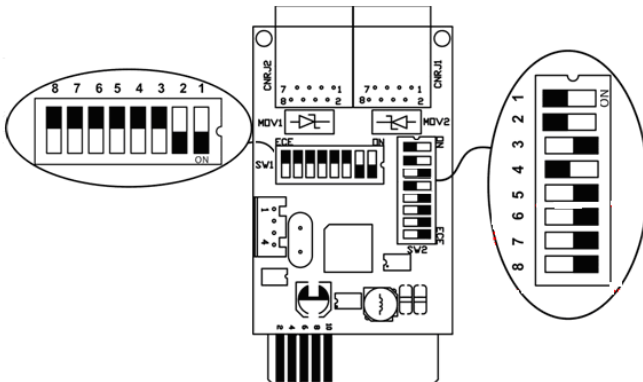
Setting parameters for Modbus card No. 3:

Name	modbus ID	bate rate(bps)	parity check	stop bit
Modbus card	4	19200	NONE	1
No. 3	Setting modbus card in server mode. (Refer to section 4.2)			
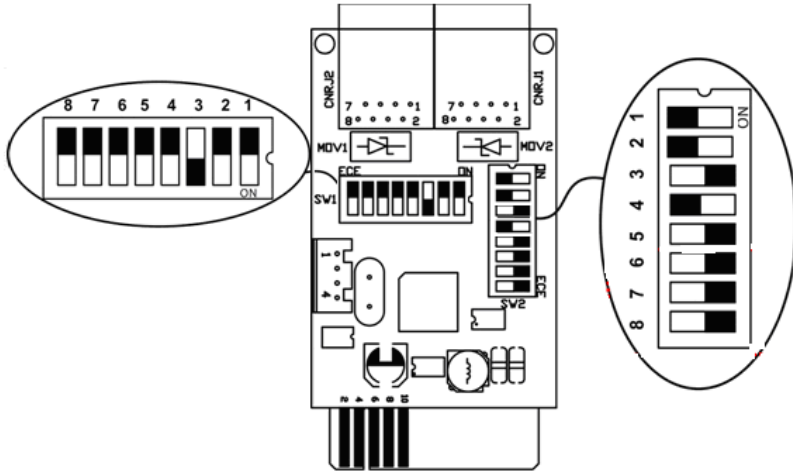
3) Inverter configuration (Refer to section 5.1 inverter configuration for the details)
Set hybrid inverter parameter:
   A. PV energy supply priority setting: Grid-Tie with backup (II)
   B. Set up AC-charging duration at night such as "00:00-05:00" as default.
6.2. Wiring Connection (Check section 5.2 for first modbus wiring to energy meter)
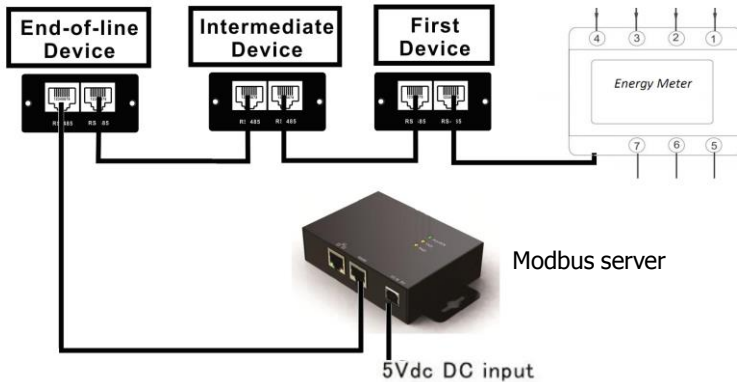
Three-inverter connection with modbus server

APPENDIX: Machine ID Configuration Table (SW1) √=ON ×=OFF

| SW1 ID	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7	Bit 8
1	√	×	×	×	×	×	×	×
2	×	√	×	×	×	×	×	×
3	√	√	×	×	×	×	×	×
4	×	×	√	×	×	×	×	×
5	√	×	√	×	×	×	×	×
6	×	√	√	×	×	×	×	×
7	√	√	√	×	×	×	×	×
8	×	×	×	√	×	×	×	×
9	√	×	×	√	×	×	×	×
10	×	√	×	√	×	×	×	×
11	√	√	×	√	×	×	×	×
12	×	×	√	√	×	×	×	×
13	√	×	√	√	×	×	×	×
14	×	√	√	√	×	×	×	×
15	√	√	√	√	×	×	×	×
16	×	×	×	×	√	×	×	×
17	√	×	×	×	√	×	×	×
18	×	√	×	×	√	×	×	×
19	√	√	×	×	√	×	×	×
20	×	×	√	×	√	×	×	×
21	√	×	√	×	√	×	×	×
22	×	√	√	×	√	×	×	×
23	√	√	√	×	√	×	×	×
24	×	×	×	√	√	×	×	×
25	√	×	×	√	√	×	×	×
26	×	√	×	√	√	×	×	×
27	√	√	×	√	√	×	×	×
28	×	×	√	√	√	×	×	×
29	√	×	√	√	√	×	×	×
30	×	√	√	√	√	×	×	×
31	√	√	√	√	√	×	×	×
32	×	×	×	×	×	√	×	×
33	√	×	×	×	×	√	×	×
34	×	√	×	×	×	√	×	×
35	√	√	×	×	×	√	×	×
36	×	×	√	×	×	√	×	×
37	√	×	√	×	×	√	×	×
38	×	√	√	×	×	√	×	×
39	√	√	√	×	×	√	×	×

40	×	×	×	√	×	√	×	×
41	√	×	×	√	×	√	×	×
42	×	√	×	√	×	√	×	×
43	√	√	×	√	×	√	×	×
44	×	×	√	√	×	√	×	×
45	√	×	√	√	×	√	×	×
46	×	√	√	√	×	√	×	×
47	√	√	√	√	×	√	×	×
48	×	×	×	×	√	√	×	×
49	√	×	×	×	√	√	×	×
50	×	√	×	×	√	√	×	×
51	√	√	×	×	√	√	×	×
52	×	×	√	×	√	√	×	×
53	√	×	√	×	√	√	×	×
54	×	√	√	×	√	√	×	×
55	√	√	√	×	√	√	×	×
56	×	×	×	√	√	√	×	×
57	√	×	×	√	√	√	×	×
58	×	√	×	√	√	√	×	×
59	√	√	×	√	√	√	×	×
60	×	×	√	√	√	√	×	×
61	√	×	√	√	√	√	×	×
62	×	√	√	√	√	√	×	×
63	√	√	√	√	√	√	×	×
64	×	×	×	×	×	×	√	×
65	√	×	×	×	×	×	√	×
66	×	√	×	×	×	×	√	×
67	√	√	×	×	×	×	√	×
68	×	×	√	×	×	×	√	×
69	√	×	√	×	×	×	√	×
70	×	√	√	×	×	×	√	×
71	√	√	√	×	×	×	√	×
72	×	×	×	√	×	×	√	×
73	√	×	×	√	×	×	√	×
74	×	√	×	√	×	×	√	×
75	√	√	×	√	×	×	√	×
76	×	×	√	√	×	×	√	×
77	√	×	√	√	×	×	√	×
78	×	√	√	√	×	×	√	×
79	√	√	√	√	×	×	√	×
80	×	×	×	×	√	×	√	×
81	√	×	×	×	√	×	√	×

82	×	√	×	×	√	×	√	×
83	√	√	×	×	√	×	√	×
84	×	×	√	×	√	×	√	×
85	√	×	√	×	√	×	√	×
86	×	√	√	×	√	×	√	×
87	√	√	√	×	√	×	√	×
88	×	×	×	√	√	×	√	×
89	√	×	×	√	√	×	√	×
90	×	√	×	√	√	×	√	×
91	√	√	×	√	√	×	√	×
92	×	×	√	√	√	×	√	×
93	√	×	√	√	√	×	√	×
94	×	√	√	√	√	×	√	×
95	√	√	√	√	√	×	√	×
96	×	×	×	×	×	√	√	×
97	√	×	×	×	×	√	√	×
98	×	√	×	×	×	√	√	×
99	√	√	×	×	×	√	√	×
100	×	×	√	×	×	√	√	×
101	√	×	√	×	×	√	√	×
102	×	√	√	×	×	√	√	×
103	√	√	√	×	×	√	√	×
104	×	×	×	√	×	√	√	×
105	√	×	×	√	×	√	√	×
106	×	√	×	√	×	√	√	×
107	√	√	×	√	×	√	√	×
108	×	×	√	√	×	√	√	×
109	√	×	√	√	×	√	√	×
110	×	√	√	√	×	√	√	×
111	√	√	√	√	×	√	√	×
112	×	×	×	×	√	√	√	×
113	√	×	×	×	√	√	√	×
114	×	√	×	×	√	√	√	×
115	√	√	×	×	√	√	√	×
116	×	×	√	×	√	√	√	×
117	√	×	√	×	√	√	√	×
118	×	√	√	×	√	√	√	×
119	√	√	√	×	√	√	√	×
120	×	×	×	√	√	√	√	×
121	√	×	×	√	√	√	√	×
122	×	√	×	√	√	√	√	×
123	√	√	×	√	√	√	√	×

124	×	×	√	√	√	√	√	×
125	√	×	√	√	√	√	√	×
126	×	√	√	√	√	√	√	×
127	√	√	√	√	√	√	√	×
128	×	×	×	×	×	×	×	√
129	√	×	×	×	×	×	×	√
130	×	√	×	×	×	×	×	√
131	√	√	×	×	×	×	×	√
132	×	×	√	×	×	×	×	√
133	√	×	√	×	×	×	×	√
134	×	√	√	×	×	×	×	√
135	√	√	√	×	×	×	×	√
136	×	×	×	√	×	×	×	√
137	√	×	×	√	×	×	×	√
138	×	√	×	√	×	×	×	√
139	√	√	×	√	×	×	×	√
140	×	×	√	√	×	×	×	√
141	√	×	√	√	×	×	×	√
142	×	√	√	√	×	×	×	√
143	√	√	√	√	×	×	×	√
144	×	×	×	×	√	×	×	√
145	√	×	×	×	√	×	×	√
146	×	√	×	×	√	×	×	√
147	√	√	×	×	√	×	×	√
148	×	×	√	×	√	×	×	√
149	√	×	√	×	√	×	×	√
150	×	√	√	×	√	×	×	√
151	√	√	√	×	√	×	×	√
152	×	×	×	√	√	×	×	√
153	√	×	×	√	√	×	×	√
154	×	√	×	√	√	×	×	√
155	√	√	×	√	√	×	×	√
156	×	×	√	√	√	×	×	√
157	√	×	√	√	√	×	×	√
158	×	√	√	√	√	×	×	√
159	√	√	√	√	√	×	×	√
160	×	×	×	×	×	√	×	√
161	√	×	×	×	×	√	×	√
162	×	√	×	×	×	√	×	√
163	√	√	×	×	×	√	×	√
164	×	×	√	×	×	√	×	√
165	√	×	√	×	×	√	×	√

166	×	√	√	×	×	√	×	√
167	√	√	√	×	×	√	×	√
168	×	×	×	√	×	√	×	√
169	√	×	×	√	×	√	×	√
170	×	√	×	√	×	√	×	√
171	√	√	×	√	×	√	×	√
172	×	×	√	√	×	√	×	√
173	√	×	√	√	×	√	×	√
174	×	√	√	√	×	√	×	√
175	√	√	√	√	×	√	×	√
176	×	×	×	×	√	√	×	√
177	√	×	×	×	√	√	×	√
178	×	√	×	×	√	√	×	√
179	√	√	×	×	√	√	×	√
180	×	×	√	×	√	√	×	√
181	√	×	√	×	√	√	×	√
182	×	√	√	×	√	√	×	√
183	√	√	√	×	√	√	×	√
184	×	×	×	√	√	√	×	√
185	√	×	×	√	√	√	×	√
186	×	√	×	√	√	√	×	√
187	√	√	×	√	√	√	×	√
188	×	×	√	√	√	√	×	√
189	√	×	√	√	√	√	×	√
190	×	√	√	√	√	√	×	√
191	√	√	√	√	√	√	×	√
192	×	×	×	×	×	×	√	√
193	√	×	×	×	×	×	√	√
194	×	√	×	×	×	×	√	√
195	√	√	×	×	×	×	√	√
196	×	×	√	×	×	×	√	√
197	√	×	√	×	×	×	√	√
198	×	√	√	×	×	×	√	√
199	√	√	√	×	×	×	√	√
200	×	×	×	√	×	×	√	√
201	√	×	×	√	×	×	√	√
202	×	√	×	√	×	×	√	√
203	√	√	×	√	×	×	√	√
204	×	×	√	√	×	×	√	√
205	√	×	√	√	×	×	√	√
206	×	√	√	√	×	×	√	√
207	√	√	√	√	×	×	√	√

208	×	×	×	×	√	×	√	√
209	√	×	×	×	√	×	√	√
210	×	√	×	×	√	×	√	√
211	√	√	×	×	√	×	√	√
212	×	×	√	×	√	×	√	√
213	√	×	√	×	√	×	√	√
214	×	√	√	×	√	×	√	√
215	√	√	√	×	√	×	√	√
216	×	×	×	√	√	×	√	√
217	√	×	×	√	√	×	√	√
218	×	√	×	√	√	×	√	√
219	√	√	×	√	√	×	√	√
220	×	×	√	√	√	×	√	√
221	√	×	√	√	√	×	√	√
222	×	√	√	√	√	×	√	√
223	√	√	√	√	√	×	√	√
224	×	×	×	×	×	√	√	√
225	√	×	×	×	×	√	√	√
226	×	√	×	×	×	√	√	√
227	√	√	×	×	×	√	√	√
228	×	×	√	×	×	√	√	√
229	√	×	√	×	×	√	√	√
230	×	√	√	×	×	√	√	√
231	√	√	√	×	×	√	√	√
232	×	×	×	√	×	√	√	√
233	√	×	×	√	×	√	√	√
234	×	√	×	√	×	√	√	√
235	√	√	×	√	×	√	√	√
236	×	×	√	√	×	√	√	√
237	√	×	√	√	×	√	√	√
238	×	√	√	√	×	√	√	√
239	√	√	√	√	×	√	√	√
240	×	×	×	×	√	√	√	√
241	√	×	×	×	√	√	√	√
242	×	√	×	×	√	√	√	√
243	√	√	×	×	√	√	√	√
244	×	×	√	×	√	√	√	√
245	√	×	√	×	√	√	√	√
246	×	√	√	×	√	√	√	√
247	√	√	√	×	√	√	√	√