SI-M Communication Option Card Application Manual

TECO ELEC.& MACH.CO.,LTD.

Version: 01

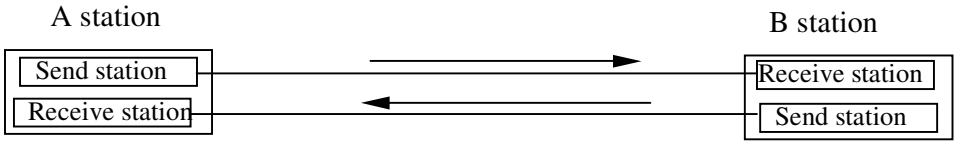
CONTENTS

Key Words

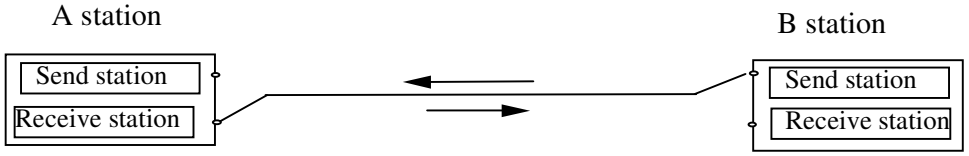
• Full Duplex, Half Duplex

According to the direction of information transmission, serial communication includes Full Duplex and Half Duplex.

1. Full Duplex: Data is received and transmitted on different lines. Both sides can receive and send the message at the same time.



2. Half Duplex: Data is received and transmitted on one line. Both sides can't receive/send the message at the same time.



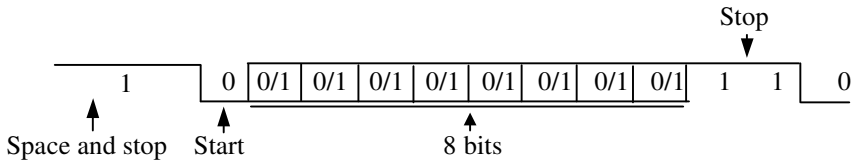
• Point-to-point, Point-to-multiple and Multiple-to-multiple

1. Point-to-point: There are only one sender and one receiver on the transmission line.
2. Point-to-multiple: There are one sender and many receivers on the transmission line.
3. Multiple-to-multiple: There are many senders and receivers on the transmission line.

• Serial Transmission Speed

A bit per second is used to express the speed of the serial transmission.

• Format of the Serial Transmission



1. General

SI-M interface card is used to communicate PLC with the inverter, using PLC as master and 7200GS as slave.

2. Communication Criterion

1. SI-M interface card can use RS-232, RS-422 or RS-485 communication interface.

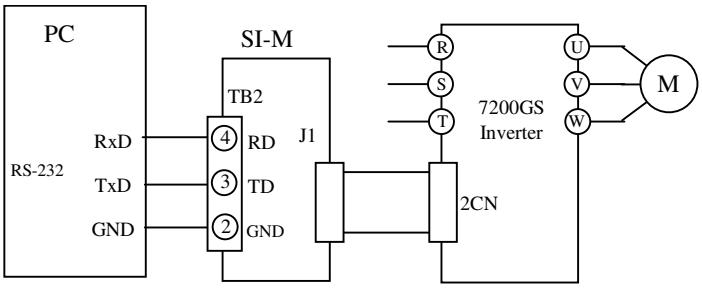
RS-232, RS-422 and RS-485 Comparison Table

	RS-232	RS-422	RS-485
Status	Point-to-point, Full Duplex	Point-to-multiple, Full Duplex	Multiple-to-multiple, Half Duplex
Transmission Distance	15m	1200m	1200m
Signal	Positive and Negative Voltage Signal 1: -3~ -15V Signal 0: +3~ +15V	Voltage differential Signal 1: Voltage of positive is higher than that of negative Signal 0: Voltage of negative is higher than that of positive	

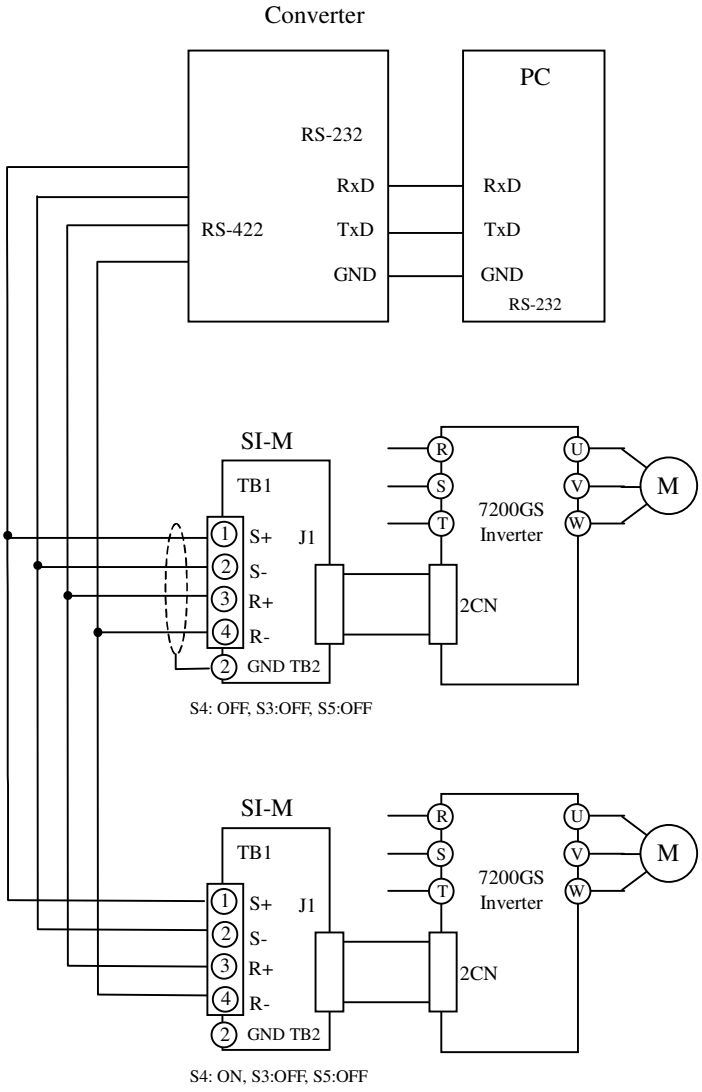
2. Modbus RTU mode
3. Communication Mode
    1. Baud rate: 2400/ 4800/ 9600bps (set by SI-M interface card)
    2. Parity check: No Parity Check
    3. Stop bit: 2 bits
    4. Data length: 8 bits

3. Connection

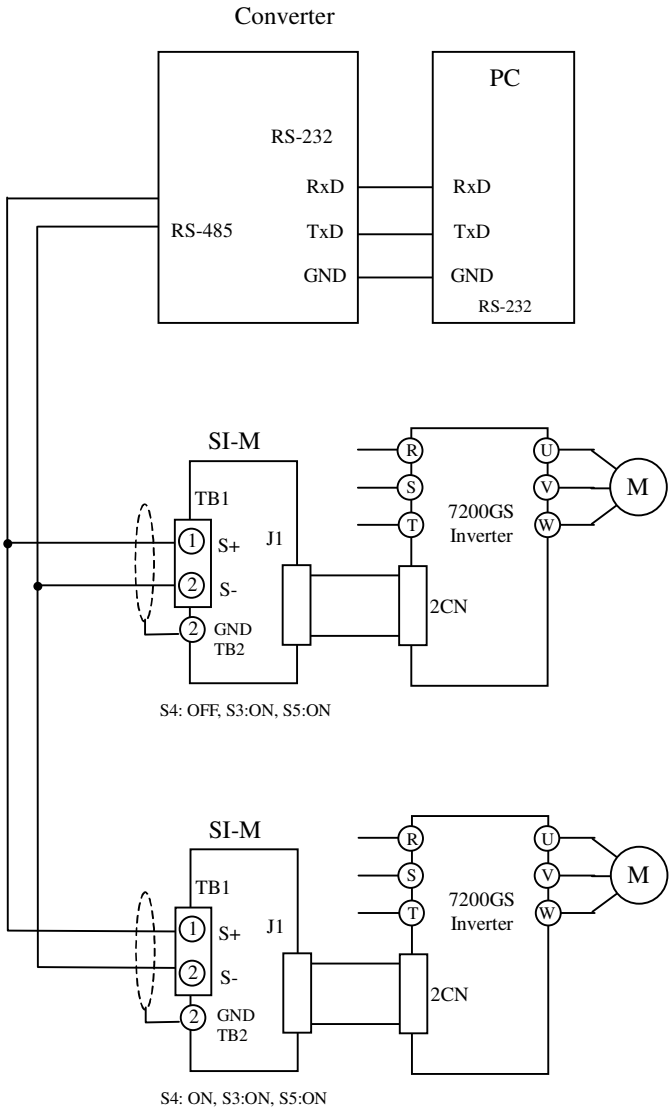
1. RS-232 line:



2. RS-422 line:



2. RS-485 line:


Converter
PC
RS-232
RxD
TxD
GND
RS-485
RxD
TxD
GND
RS-232
SI-M
TB1
S+
S-
GND
TB2
J1
R
S
T
U
V
W
M
7200GS
Inverter
2CN
S4: OFF, S3:ON, S5:ON
SI-M
TB1
S+
S-
GND
TB2
J1
R
S
T
U
V
W
M
7200GS
Inverter
2CN
S4: ON, S3:ON, S5:ON

4. DIP Switches and LED instruction

1. Switch1 (S1) Instruction

Bit	Status	Content
1	2^0	Station address is exclusive, range from 01 to 31, it can connect 31 transceivers
2	2^1	
3	2^2	
4	2^3	
5	2^4	
6	–	–
7	OFF	Keep the error in the Inverter
	ON	Delete the error when resetting
8	–	–

2. Switch2 (S2) Instruction

Bit	Status	Content			
1	Baud rate	First bit	Second bit	Baud rate	Time-out
		OFF	OFF	2400bps	2s
2		OFF	ON	4800bps	2s
		ON	OFF	9600bps	2s
3	OFF	Controlled by RTS (RS-422/485)			
	ON	No RTS (RS-232)			
4	OFF	Reserved (please set it OFF)			

3. Switch3, Switch5 (S3, S5) Instruction

S3 status	S5 status	Content
ON	ON	RS-485 line
OFF	OFF	RS-422 line

4. Switch4 (S4) Instruction

Status	Content
ON	Terminal resistance is used
OFF	Terminal resistance is not used

5. LED instruction

○ ER light Communication Error: ER LED ON
Communication OK: ER LED OFF

5. Inverter Parameters about Communication

1. Select the operating command of inverter

Sn-08= × × 0 × Sn-04= × × × ×	GS inverter operates according to the command from PLC.
Sn-08= × × 1 × Sn-04= × × 0 ×	GS inverter operates according to the command from circuit terminal
Sn-08= × × 1 × Sn-04= × × 1 ×	GS inverter operates according to the command from digital operator.

2. Select the frequency command

Sn-08= × × × 0 Sn-04= × × × ×	The frequency command is from PLC.
Sn-08= × × × 1 Sn-04= × × × 0	The frequency command is from control terminal 13 and 14 of inverter
Sn-08= × × × 1 Sn-04= × × × 1	An-01 is the frequency command.

3. Waiting for Communication

If the RUN/STOP or frequency command comes from PLC and there is no communication, the digital operator of inverter displays “Comm. Stand by” and flashes. It will flash until SI-M option card receives data from PLC.

4. Operation of communication error

Sn-08= 0 0 × ×	The digital operator displays fault message and the inverter decelerates to stop according to Bn-02.
Sn-08= 0 1 × ×	The digital operator displays fault message and the inverter coasts to stop.
Sn-08= 1 0 × ×	The digital operator displays fault message and the inverter decelerates to stop according to Bn-04.
Sn-08= 1 1 × ×	The digital operator displays flashing alarm message and the inverter remains running.

6. Installation Procedures

1. Turn off the power supply of PLC and inverter, insert SI-M into 2CN.
2. Set DIP Switch of SI-M according to the communication setting.
3. Connect PLC and SI-M.
4. Provide inverter with power and set parameter of inverter.
5. Provide PLC with power.

7. Modbus Communication Protocol

1. In Modbus protocol RTU mode, one message consists of slave address, function code, date and CRC-16. All of which are sent in order. 3.5 characters identify the start and end of each message.

T1 T2 T3 T4*	Slave Address	Function Code	Data	CRC-16	T1 T2 T3 T4*

* T1-T4: byte time

Bit format is shown below:

Start	1	2	3	4	5	6	7	8	Stop	Stop

(1) Slave address

Set the address of each inverter according to S1 of SI-M interface card, with the range from 01 to 31.

The entire message is sent from Master can be received by all the slaves connected together, but only the slave with identical message will execute.

(2) Function code

Function Code	Function
03H	Read the message of the Holding register
10H	Write the message into the holding register

(3) Data

As each function code has different messages, we will discuss them in “Message Format”.

(4) CRC-16

CRC-16 Generation Procedure.

A. Load a 16-bit register with FFFFH. Call this the CRC register.

B. Exclusive OR the first 8-bit byte of the message with the low order byte of the 16-bit CRC registers, putting the result in the CRC register.

C. Shift the CRC register one bit to the right (toward the LSB), zero filling the MSB. Extract and examine the LSB.

D. If LSB is 0, repeat procedure C (another shift).
If LSB is 1, Exclusive OR the CRC register with the polynomial value A001H.

E. Repeat procedure C, D until eight shifts has been performed. While this is done, a complete byte will have been processed.

F. Repeat procedure B-E to the following byte of the message until all bytes of the message is processed.
Now, the value of CRC register is the CRC-16 data.

G. When the CRC is placed into the message, it upper and lower bytes must be swapped.

2. Response Message

(1) Please consult “message model” about response message.

(2) If there is no response message, the inverter should send message after receiving the order 20ms later.

(3) The inverter will have no response message in the following:

A. While checking up the error (Parity error, Framing error, Overrun error or CRC-16 error) during receiving data.

B. The slave address of the message is not equal to that of SI-M interface card.

8. Message Format

SI-M communication cards support two Modbus functions only.

Function	Code	Description	Host Query		Inverter Return	
			Byte (Min.)	Byte (Max.)	Byte (Min.)	Byte (Max)
Read	03H	Read data from Holding register	8	8	7	37
Write	10H	Write data to Holding register	11	41	8	8

1. Read: read data from holding register

Host Query

Slave Address		05H
Function Code		03H
Head Address	High Byte	00H
	Low Byte	01H
Access Count (*1)	High Byte	00H
	Low Byte	01H
CRC-16	Low Byte	D4H
	High Byte	4EH

Inverter Return (Normal)

Slave Address		05H
Function Code		03H
Data Byte Count		02H
Data Value	High Byte	00H
	Low Byte	01H
CRC-16	Low Byte	88H
	High Byte	44H

Inverter Return (Error Detected)

Slave Address		05H
80H + Function Code		83H
Error Code		01H
CRC-16	Low Byte	C1H
	High Byte	31H

*1 Host controller can read 16 registers at most in each message.

2. Write: write data to holding register

Host Query

Slave Address		05H
Function Code		10H
Head Address	High Byte	00H
	Low Byte	01H
Access Count (*1)	High Byte	00H
	Low Byte	01H
Data Byte Count (*2)		02H
Data Value	High Byte	00H
	Low Byte	01H
CRC-16	Low Byte	54H
	High Byte	81H

Inverter Return (Normal)

Slave Address		05H
Function Code		10H
Head Address	High Byte	00H
	Low Byte	01H
Access Count (*1)	High Byte	00H
	Low Byte	01H
CRC-16	Low Byte	51H
	High Byte	8DH

Inverter Return (Error Detected)

Slave Address		05H
80H + Function Code		90H
Error Code		06H
CRC-16	Low Byte	8DH
	High Byte	C3H

*1 Host controller can write 16 registers at most in each message.
*2 The number of message bytes is twice as that of holding registers

9. Holding Register List

1. Control Data Register (Read/Write): it is used to control the inverter.

Address	Function		Comment
0001H	0	0: Stop, 1: Run	Operation Signal
	1	0: Forward Run, 1: Reverse run	
	2	External Fault Signal: 0: No action, 1: Action	
	3	Fault Reset Signal: 0: No action, 1: action	
	4	Multi-function Input 5 setting: 0: no action, 1: action	
	5	Multi-function Input 6 setting: 0: no action, 1: action	
	6	Multi-function Input 7 setting: 0: no action, 1: action	
	7	Multi-function Input 8 setting: 0: no action, 1: action	
	8		
	9		
	A		
	B		
	C		
	D		
	E		
	F		
0002H	Frequency Command: (100/1Hz)		
0009H	0	Multi-function Output ⑨-⑩ Signal	Multi-function Output
	1	Multi-function Output ㉕-㉗ Signal	
	2	Multi-function Output ㉖-㉗ Signal	
	3		
	4		
	5		
	6		
	7		
	8		
	9		
	A		
	B		
	C		
	D		
	E		
	F		

2. Monitor Data Register (Read-only): it is used to watch the status of the inverter.

Address	Function		Comment
0020H	0	During Running	Inverter Status
	1	Reverse Running	
	2	Inverter Operation Ready	
	3	Major Fault	
	4	Parameter Setting Error	
	5	Status of Multi-function Output ⑨-⑩	
	6	Status of Multi-function Output ㉕-㉗	
	7	Status of Multi-function Output ㉖-㉗	
	8		
	9		
	A		
	B		
	C		
	D		
	E		
	F		
0021H	0	Overcurrent	Fault Content 1
	1	Overvoltage	
	2	Overload	
	3	Overheat	
	4		
	5	Broken Fuse	
	6		
	7	External Fault	
	8	Control Circuit Fault	
	9	Motor overload	
	A		
	B	Power Loss or MC Detective	
	C	Low Voltage	
	D		
	E		
	F		

0022H	0	Parameter Setting Error	Data link
	1	Writing Mode Error	
	2	Parameter No. Error	
	3	Parameter Value out of Range	
	4	Incorrect Parameter Setting	
	5	Fault of NV-RAM	
	6	The Command Has not Been Received	
	7	Fault of BCC	
	8	Fault of DP-RAM	
	9		
	A		
	B		
	C		
	D		
	E		
	F		
0023H	Frequency Reference (100/1Hz)		
0024H	Output Frequency (100/1Hz)		
0027H	Output Current (10/1A)		
0028H	Output Voltage (1/1V)		
0029H	Master Speed Frequency A/D Conversion (1023/10V)		
002AH	Auxiliary Frequency A/D Conversion (1023/10V)		
002BH	The number of scan		
002CH	0	During Running	Inverter Status
	1	Zero Speed	
	2	Agreed Frequency	
	3	Agreed Frequency Setting	
	4	Frequency Detection 1	
	5	Frequency Detection 2	
	6	Inverter Operation ready	
	7	During Undervoltage Detection	
	8	During Base Block	
	9	Frequency Reference Mode	
	A	Control Command	
	B	Overtorque Detection	
	C	Frequency Reference Missing	
	D	Braking Transistor Fault	
	E	Fault	
	F	Communication Fault	

002DH	Multi-function Output Monitor		
0031H	DC voltage of Main Circuit (1/1V)		
0032H	Output Power (10/1kW)		
0033H	1-3	Previous Fault	Fault Monitor
	4-7	Previous 2 Fault	
	8-B	Previous 3 Fault	
	C-F	Previous 4 Fault	
003DH	0	CRC Error	Fault Communication
	1	Data length Error	
	2	--	
	3	Parity Error	
	4	Over Rate	
	5	Message Format Error	
	6	Time-out Error	
	7	--	
003EH	DP-RAM Defective Address		
003FH	DP-RAM Defective Data		
0040H	0	SI-M card S1-①	DIP Switch
	1	SI-M card S1-②	
	2	SI-M card S1-③	
	3	SI-M card S1-④	
	4	SI-M card S1-⑤	
	5	SI-M card S1-⑥	
	6	SI-M card S1-⑦	
	7	SI-M card S1-⑧	
	8	SI-M card S2-①	
	9	SI-M card S2-②	
	A	SI-M card S2-③	
	B	SI-M card S2-④	
	C		
	D		
	E		
	F		

3. Holding register of inverter parameter: inverter parameters and the address of holding register

1 During PRGM mode, all the holding registers can be read or written. During DRIVE mode, holding registers are read-only except those for An and Bn.

2. 7200 GS inverter has four control modes. SI-M card can be used under V/F (**GP**) or Sensorless (**SL**). Parts of parameters have different meanings in these modes. The parameters marked with **GP** or **SL** only can be used under V/F or Sensorless mode.

0100H	–	Inverter Capability Selection		(Sn-01)
0101H	–	V/F Pattern Selection		(Sn-02)
0102H	–	0	0000: Setting and reading of An, bn, Cn and Sn enabled 0101: Setting and reading of An enabled. Reading of bn, Cn, Sn and enabled 1110: Contents Initialization (2-wire) 1111: Contents Initialization (3-wire)	(Sn-03)
		1		
		2		
		3		
0103H	–	0	0: Frequency Command = Control Circuit Terminals ⑬-⑭	(Sn-04)
			1: Frequency Command = Frequency Command 1 (An-01)	
		1	0: RUN/STOP Command = Control Circuit Terminals	
			0: RUN/STOP Command = Digital Operator	
		2	0: Ramp to Stop	
			1: Coasting to Stop	
		3	0: Full-range DC Injection Braking Stop	
			1: Coasting to Stop (Timer Function Provided)	
0104H	–	0	0: Stop key effective during operation from control terminal	(Sn-05)
			0: Stop key ineffective during operation from control terminal	
		1	0: Reverse Run Enabled	
			1: Reverse Run Not Enabled	
		2	0: Control Input Terminal ①-⑧ are scanned twice	
			1: Control Input Terminal ①-⑧ are scanned once	
		3	0: Selection of item to be analog output (terminals ㉑-㉒)	
			1: Selection of item to be analog output (terminals ㉑-㉒)	
0105H		0	00: S-curve = 0.2 second 01: S-curve = 0.0 second (No S curve)	(Sn-06)
		1	10: S-curve = 0.5 second 11: S-curve = 1.0 second	
		2	0: Reference Command Has Forward Characteristics	
			0: Reference Command Has Reverse Characteristics	
		3	0: Stop by Reference Input when Frequency Reference is Missing	
			1: Operation to Continue with 80% of Frequency Reference When Frequency Reference Is Missing	
0106H	–	0	0: Overtorque Detection Disabled	(Sn-07)
			1: Overtorque Detection Enabled	
		1	0: Enabled Only If at Agreed Frequency	
			1: Enabled During Operation (Except During DC injection)	
		2	0: Operation Continued After Overtorque Is Detected	
			1: Coast to Stop If Overtorque Is Detected	
	SL	3	0: Overtorque Detection with Current	
			1: Overtorque Detection with Torque	

0107H	-	0	0: Frequency Reference Input by Option Card		(Sn-08)
			1: Frequency Reference input by Digital Operator or Control Circuit Input Terminals.		
		1	0: RUN/STOP Command Input by Option Card		
			1: RUN/STOP Command Input by Digital Operator or Control Circuit Input Terminals		
		2	Stop Method while SI-M error occurred	00: Deceleration to stop (time: bn-02) 01: Coasting to Stop 10: Deceleration to stop (time: bn-04) 11: Continue to Run	
		3			
0108H	-	0	0: Analog Output (terminal ㉑-㉒) depends on Sn-05 4th digit and Sn-09 2nd digit.		(Sn-09)
			1: Analog Output (terminal ㉑-㉒) is set by SI-M card.		
		1	0: Analog Output (terminal ㉑-㉒)		
			1: Analog Output (terminal ㉑-㉒)		
		2	----		
	SL	3	0: No Slip Compensation during Regenerating		
			1: Slip Compensation during Regenerating		
0109H	-	0	0: Stall Prevention During Acceleration Enabled		(Sn-10)
			1: Stall Prevention During Acceleration Disabled		
		1	0: Stall Prevention During Deceleration Enabled		
			1: Stall Prevention During Deceleration Disabled		
		2	0: Stall Prevention During Running Enabled		
			1: Stall Prevention During Running Disabled		
		3	0: Deceleration Time During Stall Prevention = Bn-02		
			1: Deceleration Time During Stall Prevention = Bn-04		
010AH	-	0	----		(Sn-11)
		1	0: Fault Contact is Not Energized During Retry Operation		
			1: Fault Contact is Energized During Retry Operation		
		2	0: Operation Stopped by Momentary Power Loss Detection		
			1: Operation Continues after Momentary Power Loss		
		3	----		
010BH	-	0	0: External Fault Input: NO-contact input		(Sn-12)
			1: External Fault Input: NC-contact input		
		1	0: External Fault signal: Always Detected		
			1: External Fault signal: Detected During Running Only		
		2	Stop Method for External Fault	00: Deceleration to stop (time: bn-02) 01: Coasting to Stop 10: Deceleration to stop (time: bn-04) 11: Continue to Run	
		3			
010CH	-	00: V/f Control Mode 01: Sensorless Vector Control Mode 10: PID with Auto Energy-saving Control Mode 11: V/f + PG Closed Control Mode			(Sn-13)
010DH	-	0	0: Motor Overload Protection (OL1): Effective		(Sn-14)
			1: Motor Overload Protection (OL1): Ineffective		
		1	0: Motor Overload Protection: Standard Motor		
			1: Motor Overload Protection: Inverter Duty Motor		

010DH	–	2	0: Motor Overload Protection: Standard Time Constants (8 minutes)		(Sn-14)
			1: Motor Overload Protection: Standard Time Constants (5 minutes)		
		3	0: Inverter Overload (OL2) Protection: 103% Continuous, 150% for 1 minute.		
			1: Inverter Overload (OL2) Protection: 113% Continuous, 123% for 1 minute.		
010EH	–	00-FF: Terminal ⑤ Function			(Sn-15)
010FH	–	00-FF: Terminal ⑥ Function			(Sn-16)
0110H	–	00-FF: Terminal ⑦ Function			(Sn-17)
0111H	–	00-FF: Terminal ⑧ Function			(Sn-18)
0112H	–	00-0F: Terminal ⑯ Function			(Sn-19)
0113H	–	00-0F: Terminal ⑨-⑩ Function			(Sn-20)
0114H	–	00-0F: Terminal ㉕-㉗ Function			(Sn-21)
0115H	–	00-0F: Terminal ㉖-㉗ Function			(Sn-22)
0116H	–	0: English Is Used in LCD Operator 1: Chinese Is Used in LCD Operator			(Sn-23)
0118H	–	0	0: Positive/Negative Values of Frequency Reference of AI-14B Option Card Determine FWD/REV Operation.		(Sn-25)
			1: Only Positive Value of Frequency Reference is allowed in AI-14B Option Card.		
		1	----		
		2	----		
		3	----		
0119H	–	Digital Reference Card (D1-08) Freq. Reference Set Mode		0000: BCD 1% Resolution 0001: BCD 0.1% Resolution 0010: BCD 0.01% Resolution 0011: BCD 1Hz Resolution 0100: BCD 0.1Hz Resolution 0101: BCD 0.01Hz Resolution 0111: Binary Input 255/100% 1000: Binary Input (Input Value Displayed in Decimal on Operator)	(Sn-26)
011AH	–	0	0: Combination 1 of Digital Output Card DO-08		(Sn-27)
			1: Combination 2 of Digital Output Card DO-08		
	GP	1	Digital Pulse Monitor card PO-36F (F: inverter output frequency)	000: Pulse Frequency = 1F 001: Pulse Frequency = 6F 010: Pulse Frequency = 10F 011: Pulse Frequency = 12F 100: Pulse Frequency = 36F	
		2			
		3			
011BH	–	0	Analog Monitor Card AO-12 Channel 1 Output	00: Output Frequency (Max Freq./100%) 01: Output Current (Rated Current/100%) 10: Output Voltage (Cn-01/100%) 11: DC voltage 400V/100%(220V) 800V/100%(440V)	(Sn-28)
		1			
		2	Analog Monitor Card AO-12 Channel 2 Output	00: Output Frequency (Max Freq./100%) 01: Output Current (Rated Current/100%) 10: Output Voltage (Cn-01/100%) 11: DC voltage 400V/100%(220V) 800V/100%(440V)	
		3			

0200H	–	Input Voltage	(Cn-01)
0201H	–	Max Output Frequency	(Cn-02)
0202H	–	Max Output Voltage	(Cn-03)
0203H	–	Max Voltage Frequency	(Cn-04)
0204H	–	Middle Output Frequency	(Cn-05)
0205H	–	Voltage at Middle Output Frequency	(Cn-06)
0206H	–	Min Output Frequency	(Cn-07)
0207H	–	Voltage at Min Output Frequency	(Cn-08)
0208H	–	Motor Rated Current	(Cn-09)
0209H	–	DC Injection Braking Starting Frequency	(Cn-10)
020AH	–	DC Braking Current	(Cn-11)
020BH	–	DC Injection Braking Time at Stop	(Cn-12)
020CH	–	DC Injection Braking Time at Start	(Cn-13)
020DH	–	Frequency Command Upper Bound	(Cn-14)
020EH	–	Frequency Command Lower Bound	(Cn-15)
020FH	–	Frequency Jump Point 1	(Cn-16)
0210H	–	Frequency Jump Point 2	(Cn-17)
0211H	–	Frequency Jump Point 3	(Cn-18)
0212H	–	Jump Frequency Width	(Cn-19)
0213H	–	Digital Operator Display Unit	(Cn-20)
0214H	–	Frequency Agree Detection Level	(Cn-21)
0215H	–	Frequency Agree Detection Width	(Cn-22)
0216H	–	Carrier Frequency Upper Limit	(Cn-23)
0217H	–	Carrier Frequency Upper Limit	(Cn-24)
0218H	–	Carrier Frequency Proportional Gain	(Cn-25)
0219H	–	Overtorque Detection Level	(Cn-26)
021AH	–	Overtorque Detection Time	(Cn-27)
021BH	–	Stall Prevention Level During Acceleration	(Cn-28)
021CH	–	Constant HP Area Stall Prevention	(Cn-29)
021DH	–	Stall Prevention Level During Running	(Cn-30)
021EH	–	Motor Phase-to phase Resistance	(Cn-31)
021FH	**GP**	Torque Iron Loss	(Cn-32)
	SL	Motor Leakage Inductance (Ls)	
0220H	**GP**	Torque Compensation Limit	(Cn-33)
	SL	Torque Limit	
0221H	–	Motor No Load Current	(Cn-34)
0222H	–	Slip Compensation Delay Time	(Cn-35)
0223H	–	Number of Auto Restart Attempt	(Cn-36)
0224H	–	Power Loss Ride-thru Time	(Cn-37)

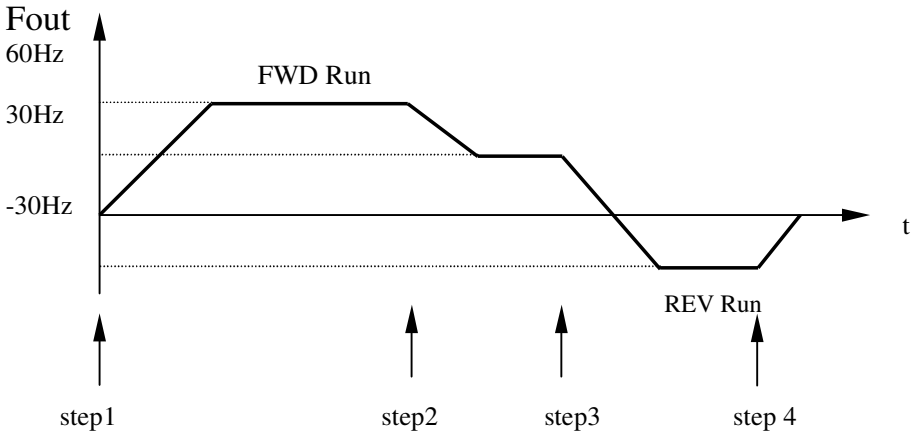
0225H	–	Speed Search Detection level	(Cn-38)
0226H	–	Speed Search Time	(Cn-39)
0227H	–	Min Baseblock Time	(Cn-40)
0228H	–	V/F Curve in Speed Search	(Cn-41)
0229H	–	Voltage Recovery Time	(Cn-42)
0400H	–	Frequency Command 1	(An-01)
0401H	–	Frequency Command 2	(An-02)
0402H	–	Frequency Command 3	(An-03)
0403H	–	Frequency Command 4	(An-04)
0404H	–	Frequency Command 5	(An-05)
0405H	–	Frequency Command 6	(An-06)
0406H	–	Frequency Command 7	(An-07)
0407H	–	Frequency Command 8	(An-08)
0408H	–	Jog Command	(An-09)
0500H	–	Acceleration Time 1	(bn-01)
0501H	–	Deceleration Time 1	(bn-02)
0502H	–	Acceleration Time 2	(bn-03)
0503H	–	Deceleration Time 2	(bn-04)
0504H	–	Analog Frequency Command Gain	(bn-05)
0505H	–	Analog Frequency Command. Bias	(bn-06)
0506H	–	Auto Torque Boost Gain	(bn-07)
0507H	–	Rated Slip of Motor	(bn-08)
0508H	–	Energy Saving Gain	(bn-09)
0509H	–	Monitor No. After Power on	(bn-10)
050AH	–	Multi-Function Analog Output AO1 Gain	(bn-11)
050BH	–	Multi-Function Analog Output AO2 Gain	(bn-12)

10. Fault code: Address 3DH

Fault Code	Fault	Cause
01H	Function-code fault	Function-code of PLC is not 03 or 10H
02H	Holding register code fault	Address of the holding register fault
03H	The number of holding register fault	Read/write number of holding register overruns
21H	Message setting fault	Message setting overruns
22H	Write mode fault	• PLC tries to write Sn, Cn during running • PLC tries to write parameters during UV • PLC tries to write parameters (except Sn-02, Sn-03) during CPF04 • PLC tries to write parameters during dealing the information • PLC tries to write Cn-02~08 when Sn-02 ≠ F or FF • PLC tries to write message that only can be read
31H	CPU of inverter fault	• I/O PORT GUPX=1 • Internal RAM detection fault (55H,AAH) • External RAM detection fault (55H,AAH) • PROM and detection fault
32H	DP-RAM fault 1	• Mode detection fault (CPF23) • Identify fault (CPF23) • Wait for INTL over 5s (CPF23) • BB circuit fault (CPF02) • NV-RAM, SRAM fault (CPF03)
33H	DP-RAM fault 2	• BCC detection fault (CPF23)

11.Communication Example

We can use PLC to control 7200GS inverter with address 05 by RS-232, RS422/485 communication mode, as follows:



1. Let the inverter forward run by 60Hz.
2. Let the inverter forward run by 30Hz.
3. Let the inverter reverse run by 30Hz.
4. Let the inverter coast to stop.

Setting steps is listed as follows:

1. SI-M option card DIP Switch setting:

S1: 1 2 3 4 5 6 7 8
ON OFF ON OFF OFF – OFF –

Address 05 keep error into inverter

S2: 1 2 3 4
OFF ON ON OFF

Baud rate 9600bps no RTS control Reserved

2. Parameter setting
   Sn-08: 0000

3. Do as follows:

• Step 1

Master (PLC)

Slave Address		05H
Function Code		10H
Head Address	High byte	00H
	Low byte	01H
Access Count	High byte	00H
	Low byte	02H
Data Byte Count		04H
Data Value 1	High byte	00H
	Low byte	01H
Data Value 2	High byte	17H
	Low byte	70H
CRC-16	Low byte	78H
	High byte	87H

Slave (inverter)

Slave Address		05H
Function Code		10H
Head Address	High byte	00H
	Low byte	01H
Access Count	High byte	00H
	Low byte	02H
CRC-16	Low byte	11H
	High byte	8CH

The 1st byte 0001H is transmitted to address 0001H of inverter for forward running.

The 2nd byte 1770H is transmitted to address 0002H of inverter for running at 60Hz.

- Frequency command is set with conversion 100/1Hz. And it needs modifying to be hexadecimal.
  For example: If frequency command is 60Hz, 60 x 100 = 6000. The data written to inverter is 1770H (hexadecimal value of 6000)

• Step 2

Master (PLC)

Slave Address		05H
Function Code		10H
Head Address	High byte	00H
	Low byte	01H
Access Count	High byte	00H
	Low byte	02H
Data Byte Count		04H
Data Value 1	High byte	00H
	Low byte	01H
Data Value 2	High byte	0BH
	Low byte	B8H
CRC-16	Low byte	71H
	High byte	D1H

Slave (Inverter)

Slave Address		05H
Function Code		10H
Head Address	High byte	00H
	Low byte	01H
Access Count	High byte	00H
	Low byte	02H
CRC-16	Low byte	11H
	High byte	8CH

The 1st byte 0001H is transmitted to address 0001H of inverter for forward running.

The 2nd byte 0BB8H is transmitted to address 0002H of inverter for running at 30Hz.

• Step 3

Master (PLC)

Slave Address		05H
Function Code		10H
Head Address	High byte	00H
	Low byte	01H
Access Count	High byte	00H
	Low byte	02H
Data Byte Count		04H
Data Value 1	High byte	00H
	Low byte	03H
Data Value 2	High byte	0BH
	Low byte	B8H
CRC-16	Low byte	D0H
	High byte	11H

Slave (Inverter)

Slave Address		05H
Function Code		10H
Head Address	High byte	00H
	Low byte	01H
Access Count	High byte	00H
	Low byte	02H
CRC-16	Low byte	11H
	High byte	8CH

The 1st byte 0003H is transmitted to address 0001H of inverter for reverse running.

The 2nd byte 0BB8H is transmitted to address 0002H of inverter for running at 30Hz.

• Step 4

Master (PLC)

Slave Address		05H
Function Code		10H
Head Address	High byte	00H
	Low byte	01H
Access Count	High byte	00H
	Low byte	01H
Data Byte Count		02H
Data Value 1	High byte	00H
	Low byte	00H
CRC-16	Low byte	95H
	High byte	41H

Slave (Inverter)

Slave Address		05H
Function Code		10H
Head Address	High byte	00H
	Low byte	01H
Access Count	High byte	00H
	Low byte	01H
CRC-16	Low byte	51H
	High byte	8DH

The 1st byte 0000H is transmitted to address 0001H of inverter for stopping.