7200MA

RS-485 MODBUS Communication

Application Manual

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7200MA MODBUS Application Notes

1. Brief Introduction：

   This manual describes the communication methods
   between TECO frequency inverter 7200MA and host controllers(PC,PLC ..).

2. Software Standard：

   ① Using RS-485 Interface

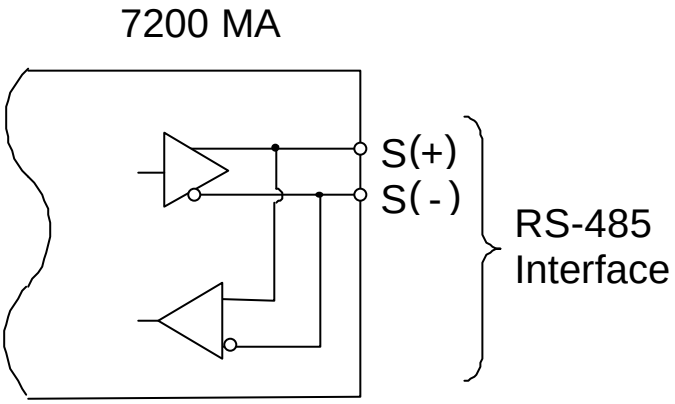
   ② MODBUS RTU mode protocol

   ③ Communication Format：(Setting by Inverter's parameter)

   Transfer Speed：1200/2400/4800/9600 bps (Setting by parameter Sn-37)

   Parity：no parity/even parity/odd parity (Setting by parameter Sn-38)

3. Wiring Terminal：



4. Related parameters for MODBUS communication：

(1) Node address

Sn-36 =1~31 ---------- Inverter Node address (Default = 1)

(2) Transfer Speed (baud rate)

Sn-37 = 0 ---------- 1200 Bps

= 1 ---------- 2400 Bps (Default = 1)

= 2 ---------- 4800 Bps

= 3 ---------- 9600 Bps

(3) Data Parity

Sn-38 = 0 ---------- No Parity (Default = 0)

= 1 ---------- Even Parity

= 2 ---------- Odd Parity

(4) Stopping method while RS485 Communication Fault

Sn-39 = 0 ---------- Decelerating to stop by Bn-02 (Default = 0)

= 1 ---------- Coasting to stop

= 2 ---------- Decelerating to stop by Bn-04

= 3 ---------- Continuous operation (Can be stop by STOP Key)

(5) Time-out Check

Cn-27 = 00.0 s ---------- Don't care

= 01.0 s ---------- Checked error (Default = 01.0 s)

5. Inverter connected with host controller：

(1) Operation procedure

① Inverter power turn on，Set the related parameters

② Connect inverter and host controller

③ Host controller sends communication message

(2) Communication status indication of inverter

We can set the Run/Stop command (Sn-04) or Frequency Reference (Sn-05) by RS485. Inverter will display "Alarm RS-485" if it does not receive any message from host controller after power on 5 seconds. This display will disappear while inverter had received messages from host controller.

We can set Time-out Check. Inverter will display "Alarm RS-485" if it does not receive any message in Time-out (Cn-27).

Parameter Sn-39 will decide the "Alarm RS-485" display format.

Sn-39 = 0，Decelerate to stop by Bn-02 ("Alarm RS-485" light up)

= 1，Coasting to stop ("Alarm RS-485" light up)

= 2，Decelerate to stop by Bn-04 ("Alarm RS-485" light up)

= 3，Continuous operation ("Alarm RS-485" flash)

6. Description of MODBUS communication：

(1) In MODBUS RTU mode protocol，one message has 4 parts：

include Slave Address、Function Code、Data and CRC-16 Character.

The interval between two messages needs 3.5 characters transferring time.

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

T1~T4：3.5 characters transferring time at least

(2)Data bit format for MODBUS RTU mode

Even/Odd Parity	start	1	2	3	4	5	6	7	8	parity	stop
No Parity	start	1	2	3	4	5	6	7	8	stop	stop

(3) Slave Address

Parameter Sn-36 can set the node address of each inverter (1~31).

Every slave stand can receive the message sent from host controller.

Only the corresponding one returns the message to master.

IF the slave address of receiving message is 0, all slave stands will execute this command but do not return the message to master.

This message can only use for Run/Stop, Fault Reset (Address 0000H) and Frequency Reference (Address 0001H).

(4) Function Code

Code	Function	Remark
03H	Read Data from Holding Register	————
08H	Loop Test	————
10H	Write Data to Holding Register	slave address can be 0

(5) Data Character

Detail descriptions will be discuss later because it depends on different Function Code.

(6) CRC-16 Character(16-bit binary value)

CRC-16 Generation Procedure：

① Load a 16-bit register with 0xFFFF. Call this the CRC register.

② Exclusive OR the first 8-bit byte of the message with the low order byte of the 16-bit CRC register, putting the result in the CRC register.

③ Shift the CRC register one bit to the right(toward the LSB), zero filling the MSB. Extract and examine the LSB.

④ If the LSB is 0, repeat Step③ (another shift). If the LSB is 1, Exclusive OR the CRC register with the polynomial value 0xA001.

⑤ Repeat Step③ and Step④ until eight shifts have been performed. When this is done, a complete 8-bit byte will have been processed.

⑥ Repeat Step② ⑤ for the next 8-bit byte of the message. Continue doing this until all bytes have been processed. The final result of the CRC register is the CRC value.

⑦ When the CRC is placed into the message, its upper and lower bytes must be swapped.

(7) Inverter return messages

① Please refer to the "Message Format" in next page about inverter returning messages for more detail descriptions.

② It needs 5ms to return messages after inverter had received normal message from host controller.

③ In next two cases, inverter does not return any message：

- There are any error detection in received data message (parity error, framing error, overrun error or CRC-16 error).
- Slave Address character is different to parameter Sn-36 (Inverter Slave No.).

7. Message Format：

7200MA supports 3 MODBUS Function Codes only.

Table1 Message Length

Function	Code	Description	Host Query		Inverter Return	
			Byte (Min.)	Byte (Max.)	Byte (Min.)	Byte (Max.)
Data Read	03H	Read Data from Holding Register	8	8	7	37
Loop Test	08H	Loop Test	8	8	8	8
Data Write	10H	Write Data to Holding Register	11	41	8	8

(1) Read Holding Register Command(Item 8:Holding Register Tag List)

Host Query

Slave Address		01H
Function Code		03H
Head Address	High Byte	00H
	Low Byte	00H
Access Count	High Byte	00H
	Low Byte	01H
CRC-16	Low Byte	84H
	High Byte	0AH

(*1)

Inverter Return(Normal)

Slave Address		01H
Function Code		03H
Data Byte Count		02H
Data Value	High Byte	00H
	Low Byte	00H
CRC-16	Low Byte	B8H
	High Byte	44H

Inverter Return(Error Detected)

Slave Address		01H
80H+Function Code		83H
Error Code		03H
CRC-16	Low Byte	01H
	High Byte	31H

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

(2) Loop Test Command(Test inverter communication status)

Host Query

Slave Address		01H
Function Code		08H
Test Code	High Byte	00H
	Low Byte	00H
Test Data	High Byte	AAH
	Low Byte	55H
CRC-16	Low Byte	5EH
	High Byte	94H

(*1)

Inverter Return(Normal)

Slave Address		01H
Function Code		08H
Test Code	High Byte	00H
	Low Byte	00H
Test Data	High Byte	AAH
	Low Byte	55H
CRC-16	Low Byte	5EH
	High Byte	94H

Inverter Return(Error Detected)

Slave Address		01H
80H+Function Code		88H
Error Code		01H
CRC-16	Low Byte	87H
	High Byte	C0H

*1 Test Data can be any random value.

(3) Write Holding Register Command (*4)

Host Query

Slave Address		01H
Function Code		10H
Head Address (*3)	High Byte	00H
	Low Byte	00H
Access Count	High Byte	00H
	Low Byte	01H
Data Byte Count(*2)		02H
Data Value	High Byte	00H
	Low Byte	01H
CRC-16	Low Byte	67H
	High Byte	90H

(*1)

Inverter Return(Normal)

Slave Address		01H
Function Code		10H
Head Address	High Byte	00H
	Low Byte	00H
Access Count	High Byte	00H
	Low Byte	01H
CRC-16	Low Byte	01H
	High Byte	C9H

Inverter Return(Error Detected)

Slave Address		01H
80H+Function Code		90H
Error Code		03H
CRC-16	Low Byte	0CH
	High Byte	01H

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

*2. Data Byte Count = 2 * Access Count

*3. If Slave Address of Host Query message is 0, all slave stands will execute this command but do not return the message to master. This message can only use for Run/Stop, Fault Reset (0000H) and Frequency Reference (0001H).

*4. Change 7200MA to PRG Mode, write data to address 0900H, we can save parameter value to E^2PROM.

8. Holding Register Tag List：

(1) Control Data Register(Read/Write)

Address	Bits	Function Description
0000H(*1)	0	0：STOP； 1：RUN
	1	0：Forward； 1：Reverse
	2	External Fault； 0：Clear； 1：Set
	3	Fault Reset； 0：Clear； 1：Set
	4	Reserved
	5	Reserved
	6	Reserved
	7	Reserved
	8	1：PRG Mode→DRV Mode，Auto-Reset to 0； 0：Invalid
	9	1：DRV Mode→PRG Mode，Auto-Reset to 0； 0：Invalid
	10	Reserved
	11	Reserved
	12	Reserved
	13	Reserved
	14	Reserved
	15	Reserved
0001H(*1)	Host Link Frequency Reference：7530H/100%(30000/100%=Cn-02)	
0002H	Reserved	
0003H	Reserved	
0004H	Reserved	
0005H	Analog Output 1 Command：10V/100.0%	
0006H	Analog Output 2 Command：10V/100.0%	

*1. Control Data Register can be used for Slave Address ‘ 0’ write-in message.

Address	Bits	Function Description
0007H	0	Relay Output(RA-RB-RC) Command；0：Clear；1：Set
	1	Digital Output(DO1) Command；0：Clear；1：Set
	2	Digital Output(DO2) Command；0：Clear；1：Set
	3	Reserved
	4	Reserved
	5	Reserved
	6	Reserved
	7	Reserved
	8	Reserved
	9	Reserved
	10	Reserved
	11	Reserved
	12	Reserved
	13	Reserved
	14	Reserved
	15	Reserved
0008H	Reserved	
0009H	Reserved	
000AH	Reserved	
000BH	Reserved	
000CH	Reserved	
000DH	Reserved	
000EH	Reserved	
000FH	Reserved	

(2) Monitor Data Register(Read Only)

Address	Bits	Function Description
0020H	0	1：Running
	1	1：Zero Speed
	2	1：Reverse
	3	1：Inverter Ready
	4	1：DRV Mode；　0：PRG Mode
	5	1：440V Series；　0：220V Series
	6	1：Inverter Alarm
	7	1：Inverter Fault
	8	1：Reserved
	9	1：Reserved
	10	1：Reserved
	11	1：LCD Digital Operator
	12	0001：Parameter Setting Invalid 0010：Multi-Function Digital Input Parameter Setting Invalid 0011：Auto-Run Mode Parameter Setting Invalid 0100：V/F Pattern Parameter Setting Invalid 0101：Frequency Limit Parameter Setting Invalid 0110：Jump Frequency Parameter Setting Invalid 0111：PG Parameter Setting Invalid 1000：Reserved 1001：Reserved 1010：Reserved 1011：Reserved 1100：Reserved 1101：Reserved 1110：Reserved 1111：Reserved
	13	
	14	
	15	

Address	Bits	Function Description
0021H	0	1：Under Voltage Fault(UV1)
	1	1：Over Current Fault (OC)
	2	1：Over Voltage Fault (OV)
	3	1：Over Heat Fault (OH)
	4	1：Motor Over Load Fault (OL1)
	5	1：Inverter Over Load Fault (OL2)
	6	1：Output Over Torque Fault (OL3)
	7	1：External Fault 3(EF3)
	8	1：External Fault 5(EF5)
	9	1：External Fault 6(EF6)
	10	1：External Fault 7(EF7)
	11	1：External Fault 8(EF8)
	12	1：EEPROM Fault(CPF04)
	13	1：CPU A/D Fault(CPF05)
	14	1：Ground Fault(GF)
	15	1：PG Over Speed Fault
0022H	0	1：PG Speed Deviation Alarm
	1	1：PG Line Alarm
	2	1：Braking Resistor Over Heat Alarm
	3	1：RS-485 Communication Alarm
	4	Reserved
	5	Reserved
	6	Reserved
	7	Reserved
	8	Reserved
	9	Reserved
	10	Reserved
	11	Reserved
	12	Reserved
	13	Reserved
	14	Reserved
	15	Reserved

Address	Bits	Function Description		
0023H	0	1：Under Voltage Alarm(UV)		
	1	1：Over Voltage Alarm(OV)		
	2	1：Over Heat Alarm(OH)		
	3	1：Over Torque Alarm(OL3)		
	4	1：Two Line Terminal 1,2 External Alarm(EF)		
	5	1：Base Block Alarm(BB)		
	6	1：EEPROM Alarm		
	7	1：External Alarm 3(EF3)		
	8	1：PG Over Speed Alarm		
	9	1：PG Speed Deviation Alarm		
	10	1：PG Line Alarm		
	11	1：Braking Resistor Over Heat Alarm		
	12	1：RS-485 Communication Alarm		
	13	Reserved		
	14	Reserved		
	15	Reserved		
0024H	Frequency Reference		(30000/100%)	100%=Cn-02
0025H	Output Frequency		(30000/100%)	100%=Cn-02
0026H	PG Speed Feedback		(1000/100.0%)	100.0%=Cn-02
0027H	Output Current		0.1A/1	
0028H	DC Voltage		1V/1	
0029H	Analog Input VIN Value		10V/100.0%	
002AH	Analog Input AIN Value		20mA/100.0%	
002BH	Analog Input AUX Value		10V/100.0%	

Address	Function	Description	
002CH	Digital Input Status	0	1：Close(DI 1)
		1	1：Close(DI 2)
		2	1：Close(DI 3)
		3	1：Close(DI 4)
		4	1：Close(DI 5)
		5	1：Close(DI 6)
		6	1：Close(DI 7)
		7	1：Close(DI 8)
		8	Reserved
		9	Reserved
		10	Reserved
		11	Reserved
		12	Reserved
		13	Reserved
		14	Reserved
		15	Reserved
002DH	Analog Output AO1Value	10V/100.0%	
002EH	Analog Output AO2Value	10V/100.0%	
002FH	Digital Output Status	1	1：Close(RA-RB-RC)
		2	1：Close(DO1-DOG)
		3	1：Close(DO2-DOG)
		4	Reserved
		5	Reserved
		6	Reserved
		7	Reserved
		8	Reserved
		9	Reserved
		10	Reserved
		11	Reserved
		12	Reserved
		13	Reserved
		14	Reserved
		15	Reserved

(3) Inverter Parameter Register(Read/Write)

Address	Parameter	Unit
0101H	Sn-01 (Inverter capacity selection)	–
0102H	Sn-02 (V/F curve selection)	–
0103H	Sn-03 (Operator display)	–
0104H	Sn-04 (Run Source selection)	–
0105H	Sn-05 (Frequency Command selection)	–
0106H	Sn-06 (Stopping method selection)	–
0107H	Sn-07 (Priority of stopping)	–
0108H	Sn-08 (Prohibition of REV run)	–
0109H	Sn-09 (Output frequency Up/Down function)	–
010AH	Sn-10 (Frequency command characteristics Selection)	–
010BH	Sn-11 (Scanning times at input terminal)	–
010CH	Sn-12 (Over torque detection selection)	–
010DH	Sn-13 (Output voltage limit selection)	–
010EH	Sn-14 (Stall prevention during Accel. function selection)	–
010FH	Sn-15 (Stall prevention during Decel. function selection)	–
0110H	Sn-16 (Stall prevention during running function selection)	–
0111H	Sn-17 (Fault retry setting)	–
0112H	Sn-18 (Operation selection at power loss)	–
0113H	Sn-19 (Zero speed braking operation selection)	–
0114H	Sn-20 (External fault ③ contact selection)	–
0115H	Sn-21 (External fault ③ detection selection)	–
0116H	Sn-22 (External fault operation selection)	–
0117H	Sn-23 (Motor overload protection selection)	–
0118H	Sn-24 (Vin, Ain function selection)	–
0119H	Sn-25 (DI ⑤ function Selection)	–
011AH	Sn-26 (DI ⑥ function Selection)	–
011BH	Sn-27 (DI ⑦ function Selection)	–
011CH	Sn-28 (DI ⑧ function Selection)	–
011DH	Sn-29 (Aux function selection)	–
011EH	Sn-30 (RA-RB-RC function selection)	–
011FH	Sn-31 (DO1 function selection)	–
0120H	Sn-32 (DO2 function selection)	–
0121H	Sn-33 (AO1 function selection)	–
0122H	Sn-34 (AO2 function selection)	–
0123H	Sn-35 (Pulse output multiplier selection)	–

Address	Parameter	Unit
0124H	Sn-36 (Inverter Address)	–
0125H	Sn-37 (RS-485 communication baud rate setting)	–
0126H	Sn-38 (RS-485 communication transmission parity setting)	–
0127H	Sn-39 (RS-485 communication Fault stop selection)	–
0128H	Sn-40 (PG speed control function)	–
0129H	Sn-41 (Operation selection at PG open circuit)	–
012AH	Sn-42 (Operation selection at PG large speed deviation)	–
012BH	Sn-43 (Operation selection at PG over speed deviation)	–
012CH	Sn-44 (Operation mode selection during Auto Run)	–
012DH	Sn-45 (Auto Run mode operation selection 1)	–
012EH	Sn-46 (Auto Run mode operation selection 2)	–
012FH	Sn-47 (Auto Run mode operation selection 3)	–
0130H	Sn-48 (Auto Run mode operation selection 4)	–
0131H	Sn-49 (Auto Run mode operation selection 5)	–
0132H	Sn-50 (Auto Run mode operation selection 6)	–
0133H	Sn-51 (Auto Run mode operation selection 7)	–
0134H	Sn-52 (Auto Run mode operation selection 8)	–
0135H	Sn-53 (Auto Run mode operation selection 9)	–
0136H	Sn-54 (Auto Run mode operation selection 10)	–
0137H	Sn-55 (Auto Run mode operation selection 11)	–
0138H	Sn-56 (Auto Run mode operation selection 12)	–
0139H	Sn-57 (Auto Run mode operation selection 13)	–
013AH	Sn-58 (Auto Run mode operation selection 14)	–
013BH	Sn-59 (Auto Run mode operation selection 15)	–
013CH	Sn-60 (Auto Run mode operation selection 16)	–
013DH	Sn-61 (Applied torque mode)	–
013EH	Sn-62 (Language selection)	–
013FH	Sn-63 (Parameter Copy)	–
0140H	Sn-64 (PID Function)	–
0141H	Sn-65 (Brake resistor protection)	–

Address	Parameter	Unit
0200H	Cn-01 (Input Voltage)	0.1V
0201H	Cn-02 (Max. Output Frequency)	0.1Hz
0202H	Cn-03 (Max. Output Voltage)	0.1V
0203H	Cn-04 (Rated Frequency)	0.1Hz
0204H	Cn-05 (Middle Output Frequency)	0.1Hz
0205H	Cn-06 (Voltage at Middle Output Frequency)	0.1V
0206H	Cn-07 (Min. Output Frequency)	0.1Hz
0207H	Cn-08 (Voltage at Min. Output Frequency)	0.1V
0208H	Cn-09 (Motor Rated Current)	0.1A
0209H	Cn-10 (No Load Current of Motor)	1%
020AH	Cn-11 (Rated Slip of Motor)	0.10%
020BH	Cn-12 (Line to Line Resistor of Motor)	0.001
020CH	Cn-13 (Torque Compensation of Core Loss)	1W
020DH	Cn-14 (DC Injection Braking Starting Frequency)	0.1Hz
020EH	Cn-15 (DC Braking Current)	1%
020FH	Cn-16 (DC Injection Braking Time at Stop)	0.1s
0210H	Cn-17 (DC Injection Braking Time at Start)	0.1s
0211H	Cn-18 (Frequency Command Upper Bound)	1%
0212H	Cn-19 (Frequency Command Lower Bound)	1%
0213H	Cn-20 (Frequency Jump Point 1)	0.1Hz
0214H	Cn-21 (Frequency Jump Point 2)	0.1Hz
0215H	Cn-22 (Frequency Jump Point 3)	0.1Hz
0216H	Cn-23 (Jump Frequency Width)	0.1Hz
0217H	Cn-24 (Number of Auto Restart Attempt)	1
0218H	Cn-25 (Stall Prevention During Acceleration)	1%
0219H	Cn-26 (Stall Prevention During Running)	1%
021AH	Cn-27 (Communication Fault Detection Time)	0.1s
021BH	Cn-28 (LCD Digital Operator Display Unit)	1
021CH	Cn-29 (Freq. Agree Detection Level During Accel.)	0.1Hz
021DH	Cn-30 (Freq. Agree Detection Level During Decel.)	0.1Hz
021EH	Cn-31 (Frequency Agree Detection Width)	0.1Hz
021FH	Cn-32 (Over Torque Detection Level)	1%
0220H	Cn-33 (Over Torque Detection Time)	0.1s
0221H	Cn-34 (Carrier Frequency Setting)	1
0222H	Cn-35 (Speed Search Detection Level)	1%
0223H	Cn-36 (Speed Search Time)	0.1s

Address	Parameter	Unit
0224H	Cn-37 (Min. Base Block Time)	0.1s
0225H	Cn-38 (V/F Curve in Speed Search)	1%
0226H	Cn-39 (Low Voltage Alarm Detection Level)	1V
0227H	Cn-40 (Slip Compensation Primary Delay Time)	0.1s
0228H	Cn-41 (S-curve Characteristic Time at Accel. Start)	0.1s
0229H	Cn-42 (S-curve Characteristic Time at Accel. End)	0.1s
022AH	Cn-43 (S-curve Characteristic Time at Decel. Start)	0.1s
022BH	Cn-44 (S-curve Characteristic Time at Decel. End)	0.1s
022CH	Cn-45 (PG Parameter)	0.1P/R
022DH	Cn-46 (Pole no. of Motor)	2P
022EH	Cn-47 (ASR Proportional Gain 1)	0.01
022FH	Cn-48 (ASR Integral Gain 1)	0.1s
0230H	Cn-49 (ASR Proportional Gain 2)	0.01
0231H	Cn-50 (ASR Integral Gain 2)	0.1s
0232H	Cn-51 (ASR Upper Bound)	0.1%
0233H	Cn-52 (ASR Lower Bound)	0.1%
0234H	Cn-53 (Excessive Speed Deviation Detection Level)	1%
0235H	Cn-54 (Over Speed Detection Level)	1%
0236H	Cn-55 (PID Integral Upper Bound)	1%
0237H	Cn-56 (PID Primary Delay Time Constant)	0.1s

Address	Parameter	Unit	
0400H	An-01 (Frequency Command 1)	0.01Hz	*1
0401H	An-02 (Frequency Command 2)	0.01Hz	*1
0402H	An-03 (Frequency Command 3)	0.01Hz	*1
0403H	An-04 (Frequency Command 4)	0.01Hz	*1
0404H	An-05 (Frequency Command 5)	0.01Hz	*1
0405H	An-06 (Frequency Command 6)	0.01Hz	*1
0406H	An-07 (Frequency Command 7)	0.01Hz	*1
0407H	An-08 (Frequency Command 8)	0.01Hz	*1
0408H	An-09 (Frequency Command 9)	0.01Hz	*1
0409H	An-10 (Frequency Command 10)	0.01Hz	*1
040AH	An-11 (Frequency Command 11)	0.01Hz	*1
040BH	An-12 (Frequency Command 12)	0.01Hz	*1
040CH	An-13 (Frequency Command 13)	0.01Hz	*1
040DH	An-14 (Frequency Command 14)	0.01Hz	*1
040EH	An-15 (Frequency Command 15)	0.01Hz	*1
040FH	An-16 (Frequency Command 16)	0.01Hz	*1
0410H	An-17 (Jog Frequency Command)	0.01Hz	*1

Address	Parameter	Unit	
0500H	Bn-01 (Acceleration Time 1)	0.1s	*1
0501H	Bn-02 (Deceleration Time 1)	0.1s	*1
0502H	Bn-03 (Acceleration Time 2)	0.1s	*1
0503H	Bn-04 (Deceleration Time 2)	0.1s	*1
0504H	Bn-05 (Analog Frequency Cmd. Gain (Voltage))	0.1%	*1
0505H	Bn-06 (Analog Frequency Cmd. Bias (Voltage))	0.1%	*1
0506H	Bn-07 (Analog Frequency Cmd. Gain (Current))	0.1%	*1
0507H	Bn-08 (Analog Frequency Cmd. Bias (Current))	0.1%	*1
0508H	Bn-09 (Multi-Function Analog Input Gain)	0.1%	*1
0509H	Bn-10 (Multi-Function Analog Input Bias)	0.1%	*1
050AH	Bn-11 (Auto Torque Boost Gain)	0.1	*1
050BH	Bn-12 (Monitor 1)	1	*1
050CH	Bn-13 (Monitor 2)	1	*1
050DH	Bn-14 (Multi-Function Analog Output AO1 Gain)	0.01	*1
050EH	Bn-15 (Multi-Function Analog Output AO2 Gain)	0.01	*1
050FH	Bn-16 (PID Detection Gain)	0.01	*1
0510H	Bn-17 (PID Proportional Gain)	0.01	*1
0511H	Bn-18 (PID Integral Time)	0.01s	*1
0512H	Bn-19 (PID Differential Time)	0.01s	*1
0513H	Bn-20 (PID Bias)	1%	*1
0514H	Bn-21 (1‘ st Step Time Under Auto Run Mode)	0.1s	*1
0515H	Bn-22 (2‘ nd Step Time Under Auto Run Mode)	0.1s	*1
0516H	Bn-23 (3‘ rd Step Time Under Auto Run Mode)	0.1s	*1
0517H	Bn-24 (4‘ th Step Time Under Auto Run Mode)	0.1s	*1
0518H	Bn-25 (5‘ th Step Time Under Auto Run Mode)	0.1s	*1
0519H	Bn-26 (6‘ th Step Time Under Auto Run Mode)	0.1s	*1
051AH	Bn-27 (7‘ th Step Time Under Auto Run Mode)	0.1s	*1
051BH	Bn-28 (8‘ th Step Time Under Auto Run Mode)	0.1s	*1
051CH	Bn-29 (9‘ th Step Time Under Auto Run Mode)	0.1s	*1
051DH	Bn-30 (10‘ th Step Time Under Auto Run Mode)	0.1s	*1
051EH	Bn-31 (11‘ th Step Time Under Auto Run Mode)	0.1s	*1
051FH	Bn-32 (12‘ th Step Time Under Auto Run Mode)	0.1s	*1
0520H	Bn-33 (13‘ th Step Time Under Auto Run Mode)	0.1s	*1
0521H	Bn-34 (14‘ th Step Time Under Auto Run Mode)	0.1s	*1
0522H	Bn-35 (15‘ th Step Time Under Auto Run Mode)	0.1s	*1
0523H	Bn-36 (16‘ th Step Time Under Auto Run Mode)	0.1s	*1

Address	Parameter	Unit	
0524H	Bn-37 (Timer Function ON Delay Time)	0.1s	*1
0525H	Bn-38 (Timer Function OFF Delay Time)	0.1s	*1
0526H	Bn-39 (Energy Saving Gain)	1%	*1
0900H	Save An、Bn、Sn、Cn into EEPROM	—	*2

*1. These parameters can be written in DRV mode or PRG mode.

*2. Writing data 0000H to this address in PRG mode can save parameter to E^2PROM.

※ All parameters can be read in PRG mode or DRV mode, but some parameters can be written in PRG mode only.

9. Error Code :

Code	Description	Possible Cause
00H	CRC Code Error	CRC Word (High or Low Byte) Error
01H	Function Code Error	Function Code is not equal to 03H, 08H or10H.
02H	Register Address Error	Register Address is not in the range that can be accessed.
03H	Data Value Error	Data Value is over rage in writing message.
04H	Parameter Save Failure	Can not save into EEPROM.
06H	Parameter Save Busy	Saving into EEPROM is doing.
Not Response	UART Error	Parity,Overrun,Frame Error
Not Response	Data Format Error	Data String is not correct.

10. Example of RS-485 communication application：

Firstly, Set Inverter parameters

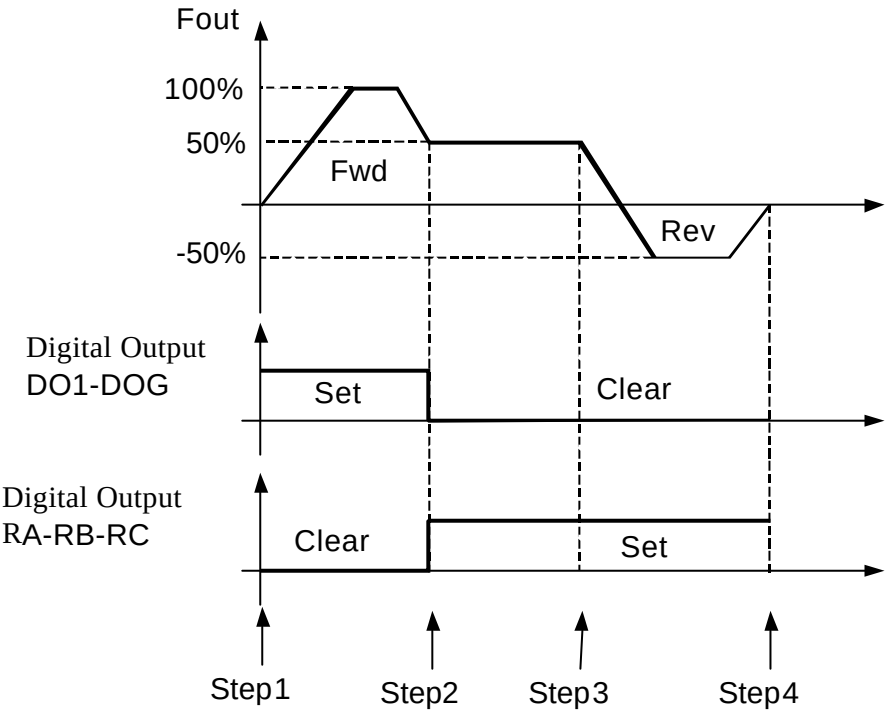
Sn-36 = 5 (Inverter Slave Address),Sn-37,Sn-38,Sn-39,Cn-27.

Sn-04 = 2 (Run/Stop by RS-485)

Sn-05 = 2 (Frequency Reference by RS-485)

Sn-30 = 22 (RA Output by RS-485), Sn-31 = 22 (DO1Output by RS-485)

Secondly, Host Controller can control the inverter 7200MA via RS-485 serial communication by executing the following procedures:



(1) Run 7200MA forward with 100% Speed. Set DO1-DOG.

(2) Run 7200MA forward with 50% Speed. Clear DO1-DOG. Set RA-RB-RC.

(3) Run 7200MA reverse with 50% Speed. Set RA-RB-RC.

(4) Stop 7200MA. Set RA-RB-RC.

Step 1

Host Query

Slave Address		01H
Function Code		10H
Head Address	High Byte	00H
	Low Byte	00H
Access Count	High Byte	00H
	Low Byte	08H
Data Byte Count		10H
Data Value1	High Byte	00H
	Low Byte	01H
Data Value2	High Byte	75H
	Low Byte	30H
Data Value3	High Byte	00H
	Low Byte	00H
Data Value4	High Byte	00H
	Low Byte	00H
Data Value5	High Byte	00H
	Low Byte	00H
Data Value6	High Byte	00H
	Low Byte	00H
Data Value7	High Byte	00H
	Low Byte	00H
Data Value8	High Byte	00H
	Low Byte	02H
CRC-16	Low Byte	6CH
	High Byte	49H

Inverter Return

Slave Address		01H
Function Code		10H
Head Address	High Byte	00H
	Low Byte	00H
Access Count	High Byte	00H
	Low Byte	08H
CRC-16	Low Byte	C1H
	High Byte	CFH

Data Value1 of Address 0000H = 0001H: Run 7200MA Forward.

Data Value2 of Address 0001H = 7530H: Speed Reference 100% (corresponding to Maximum Frequency Cn-02).

Data Value8 of Address 0007H = 0002H:Set DO1-DOG.

※ When inverter received this message, it will start and accelerate to 100% speed in forward direction, digital output terminal DO1-DOG Set.

Step 2

Host Query

Slave Address		01H
Function Code		10H
Head Address	High Byte	00H
	Low Byte	00H
Access Count	High Byte	00H
	Low Byte	08H
Data Byte Count		10H
Data Value1	High Byte	00H
	Low Byte	01H
Data Value2	High Byte	3AH
	Low Byte	98H
Data Value3	High Byte	00H
	Low Byte	00H
Data Value4	High Byte	00H
	Low Byte	00H
Data Value5	High Byte	00H
	Low Byte	00H
Data Value6	High Byte	00H
	Low Byte	00H
Data Value7	High Byte	00H
	Low Byte	00H
Data Value8	High Byte	00H
	Low Byte	01H
CRC-16	Low Byte	FDH
	High Byte	2EH

Inverter Return

Slave Address		01H
Function Code		10H
Head Address	High Byte	00H
	Low Byte	00H
Access Count	High Byte	00H
	Low Byte	08H
CRC-16	Low Byte	C1H
	High Byte	CFH

Data Value1 of Address 0000H = 0001H: Run 7200MA Forward.

Data Value2 of Address 0001H = 3A98H: Speed Reference 50%

Data Value8 of Address 0007H = 0001H: Set RA-RB-RC.

※ When inverter received this message, it will start and decelerate to 50% speed in forward direction, digital output terminal DO1-DOG clear, digital output RA-RB-RC set.

Step 3

Host Query

Slave Address		01H
Function Code		10H
Head Address	High Byte	00H
	Low Byte	00H
Access Count	High Byte	00H
	Low Byte	08H
Data Byte Count		10H
Data Value1	High Byte	00H
	Low Byte	03H
Data Value2	High Byte	3AH
	Low Byte	98H
Data Value3	High Byte	00H
	Low Byte	00H
Data Value4	High Byte	00H
	Low Byte	00H
Data Value5	High Byte	00H
	Low Byte	00H
Data Value6	High Byte	00H
	Low Byte	00H
Data Value7	High Byte	00H
	Low Byte	00H
Data Value8	High Byte	00H
	Low Byte	01H
CRC-16	Low Byte	7FH
	High Byte	2FH

Inverter Return

Slave Address		01H
Function Code		10H
Head Address	High Byte	00H
	Low Byte	00H
Access Count	High Byte	00H
	Low Byte	08H
CRC-16	Low Byte	C1H
	High Byte	CFH

Data Value1 of Address 0000H = 0003H: Run 7200MA Reverse.

Data Value2 of Address 0001H = 3A98H: Speed Reference 50%

Data Value8 of Address 0007H = 0001H: Set RA-RB-RC.

※ When inverter received this message, it will start and decelerate to 50% speed in reverse direction, digital output terminal DO1-DOG clear, digital output RA-RB-RC set.

Step 4

Host Query

Slave Address		01H
Function Code		10H
Head Address	High Byte	00H
	Low Byte	00H
Access Count	High Byte	00H
	Low Byte	00H
Data Byte Count		02H
Data Value1	High Byte	00H
	Low Byte	00H
CRC-16	Low Byte	A6H
	High Byte	50H

Inverter Return

Slave Address		01H
Function Code		10H
Head Address	High Byte	00H
	Low Byte	00H
Access Count	High Byte	00H
	Low Byte	01H
CRC-16	Low Byte	C1H
	High Byte	CFH

Data Value1 of Address 0000H = 0000H: Stop 7200MA

※ When inverter received this message, it will stop and decelerate to zero speed, digital output terminal DO1-DOG and RA-RB-RC do not change their status.