Chapter 10 **MODBUS Communication Protocol**

10.1 Applicable scope

1. Applicable series: EM760 series
2. Applicable network: Support the “single-master multi-slave” communication network with MODBUS-RTU protocol and RS-485 bus.

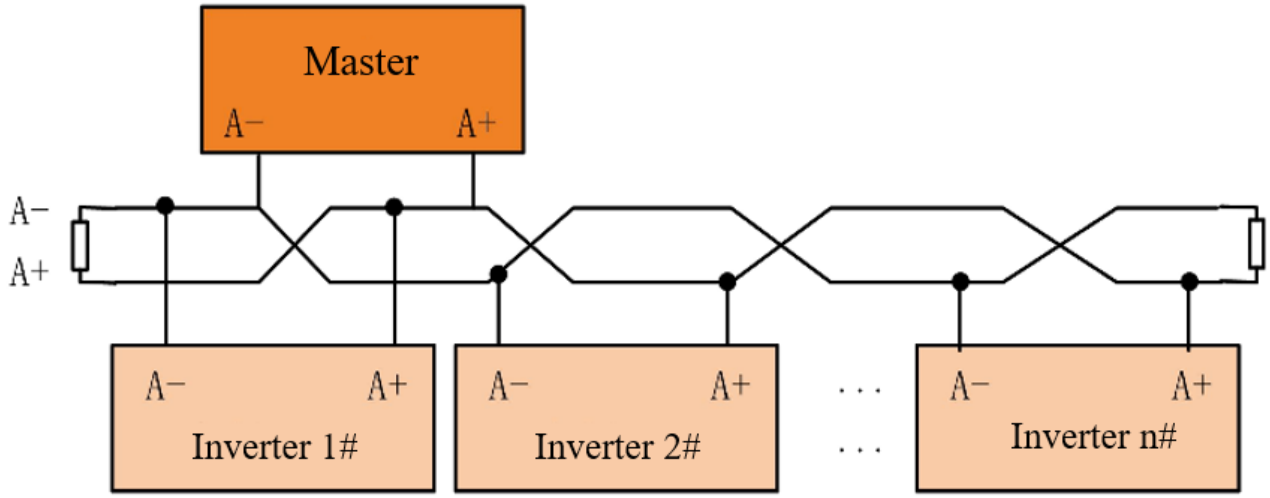

Fig. 10-1 Schematic Diagram of Communication Network

10.2 Interface mode

RS-485 asynchronous half-duplex communication mode, with the least significant bit sent first;

RS-485 network address: 1-247; 0 is the broadcast address;

Default data format of RS-485 terminal: 1-8-N-1[2] (1-8-E-1, 1-8-O-1, 1-8-N-2, 1-8-E-2 and 1-8-O-2 are optional);

Default baud rate of RS-485 terminal: 9600bps (options: 4800bps, 19200bps, 38400bps, 57600bps and 115200bps);

It is recommended to use twisted-pair shielded cable as the communication cable to reduce the impact of external interference on communication.

[2]*: 1-8-N-1, meaning 1 start bit - 8 characters per byte of data - no parity - 1 stop bit. E: even parity. O: odd parity.*

10.3 Protocol Format

10.3.1 Message format

As shown in the figure below, a standard MODBUS message includes a start tag, RTU (Remote Terminal Unit) message, and end tag.

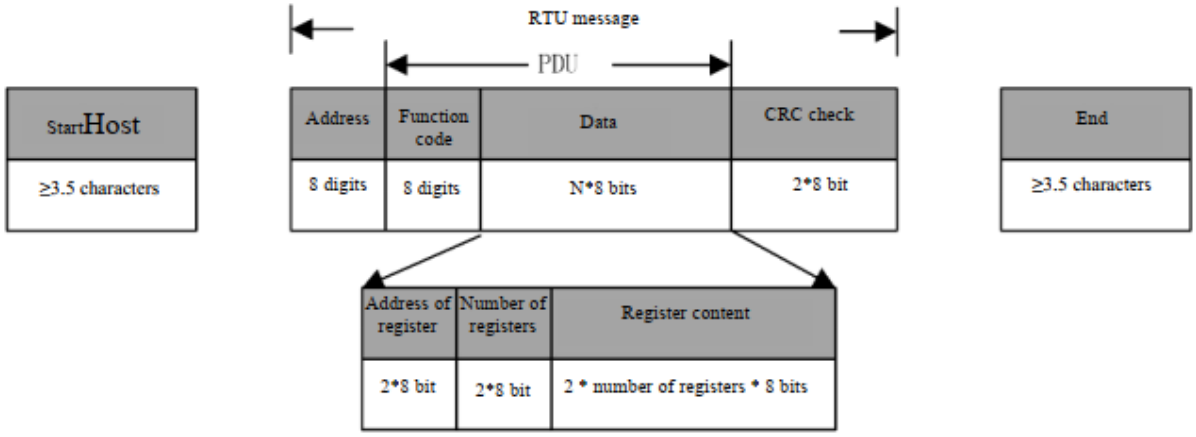

Fig. 10-2 Schematic Diagram of Message Frame in RTU Mode

The RTU message includes the address code, PDU (Protocol Data Unit) and CRC[3] check. The PDU includes the function code and data part (mainly including the register address, number of registers, register content and the like; the detailed definitions of function codes are different, as shown in 11.3.3).

[3]: *The low byte of CRC check is in front of the high byte*

10.3.2 Address code

Address Range	Purpose
1~247	Slave
0	Broadcast

10.3.3 Function code

The classification of MODBUS function codes is shown in the figure below.

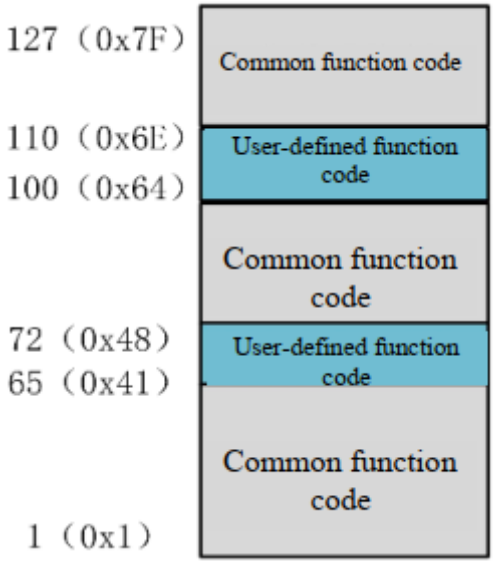

Fig. 10-3 Classification of MODBUS function codes

As shown in the table below, EM760 series products mainly involve **common function codes**. For example, 0x03 is to read multiple registers or status words, **0x06** is to write a single register or command, 0x10 is to write multiple registers or commands, and 0x08 is for diagnosis.

In addition, for some specific functions, such as register writing (RAM) without EEPROM storage, the **user-defined function codes** include 0x41 for writing of a single register or command (without saving), and 0x42 for writing of multiple registers or commands (without saving).

When the abnormal valid data is received from a device, a related abnormality message will be returned (see 11.3.7 Exception response). The abnormality function code is defined to distinguish the abnormal data from normal communication data. Corresponding to the normal request function code, the **abnormality function code = request function code + 0x80**.

Table 10-1 Function Code Definitions of EM760 Series Product

Function code	Abnormality function code	Function
03	83	This function code is used to read multiple registers or status words.
41	C1	This function code is used to write a single register or command without saving.
42	C2	This function code is used to write multiple registers or commands without saving.
08	88	This function code is used for diagnosis.
06	86	This function code is used to write a single register or command.
10	90	This function code is used to write multiple registers or commands.

PDU parts are detailed in the following sections, depending on various functions.

10.3.3.1 0x03: function code used to read multiple registers or status words

In the remote terminal unit, this function code is used to read the content in the continuous block of the holding register. The request PDU describes the starting register address and the number of registers.

The register data in the response message is divided into two bytes in each register. The first byte of each register includes high-order bits and the second byte includes low-order bits.

- Request PDU

Function code	1 byte	**0x03**
Starting Address	2 bytes	0x0000~0xFFFF
Number of registers	2 bytes	1~16

- Response PDU

Function code	1 byte	**0x03**
Number of bytes	1 byte	2×N*
Register value	N*×2 bytes	

N* = number of registers

- Error PDU

Error code	1 byte	**0x83**
Exception code	1 byte	01, 02, 03 or 04

Below is an example of a request to read the registers F19.00 to F19.05 (relevant information about the last protection):

Request		Respond			
Domain name	(0X)	Domain name (normal)	(0X)	Domain name (abnormal)	(0X)
Function code	03	Function code	03	Function	83
Starting address Hi	13	Number of bytes	0C	Exception code	03 (example, the same below)
Starting address Lo	00	Register value Hi (F19.00)	00		
Number (Hi) of registers	00	Register value Lo (F19.00)	11		
Number (Lo) of registers	06	Register value Hi (F19.01)	00		
		Register value Lo (F19.01)	00		
		Register value Hi (F19.02)	00		
		Register value Lo (F19.02)	00		
		Register value Hi (F19.03)	01		
		Register value Lo (F19.03)	2C		
		Register value Hi (F19.04)	00		
		Register value Lo (F19.04)	00		
		Register value Hi (F19.05)	00		
		Register value Lo (F19.05)	00		

According to the returned data, the “17 (0011H): temperature sensor abnormality protection” of the inverter is enabled, in which the output frequency is 0.00Hz, the output current is 0.00A, the bus voltage is 300V (012CH), the acceleration and deceleration status is “standby”, and the working time is 0 hour.

★: **At present, the function code 0x03 of MODBUS protocol supports the reading of multiple function codes across groups. However, it is recommended not to read them across groups in the case of no special requirements, so the customer’s software does not need to be upgraded after our products are upgraded.**

10.3.3.2 0x41: function code used to write a single register or command (without saving)

In the remote terminal unit, this function code is used to write a single non-holding register.

The request PDU describes the address to be written to the register.

The normal response is the response made to the request, which is returned after the register content is written.

- Request PDU

Function code	1 byte	**0x41**
Address of register	2 bytes	0x0000~0xFFFF
Register value	2 bytes	0x0000~0xFFFF

- Response PDU

Function code	1 byte	**0x41**
Address of register	2 bytes	0x0000~0xFFFF
Register value	2 bytes	0x0000~0xFFFF

- Error PDU

Error code	1 byte	**0xC1**
Exception code	1 byte	See Table 6-26

Below is an example of a request to change the main frequency source A (7001H) to "-50.00%":

Request		Respond			
Domain name	(0x)	Domain name (normal)	(0x)	Domain name (abnormal)	(0x)
Function	41	Function	41	Function	C1
Register address Hi	70	Register address Hi	70	Exception code	03
Register address Lo	01	Register address Lo	01		
Register value Hi	EC	Register value Hi	EC		
Register value Lo	78	Register value Lo	78		

★ This function code cannot be used to change the parameters of the attribute "○" (it cannot be changed during operation). That is, only the parameters of the attribute "●" (it can be changed during operation) can be changed. Otherwise, the error code 1 will be returned.

10.3.3.3 0x42: function code used to write multiple registers or commands (without saving)

In the remote terminal unit, this function code is used to write consecutive non-holding register blocks (1 to 16 registers).

The value requested to be written is described in the request data field. The data of each register is divided into two bytes.

In the normal response, the function code, starting address and number of registers written will be returned.

- Request PDU

Function code	1 byte	**0x42**
Starting Address	2 bytes	0x0000~0xFFFF
Number of registers	2 bytes	1~16
Number of bytes	1 byte	2×N*
Register value	N*×2 bytes	

N* = number of registers

- Response PDU

Function code	1 byte	**0x42**
Starting Address	2 bytes	0x0000~0xFFFF
Number of registers	2 bytes	1~16

- Error PDU

Error code	1 byte	**0xC2**
Exception code	1 byte	See Table 6-26

Below is an example of a request to set the acceleration time 1 (F00.14) to 5.00 and deceleration time 1 (F00.15) to 6.00:

Request		Respond			
Domain name	(0x)	Domain name (normal)	(0x)	Domain name (abnormal)	(0x)
Function	42	Function	42	Function	C2
Starting address Hi	00	Starting address Hi	00	Exception code	03
Starting address Lo	0E	Starting address Lo	0E		
Number (Hi) of registers	00	Number (Hi) of registers	00		
Number (Lo) of registers	02	Number (Lo) of registers	02		
Number of bytes	04				
Register value Hi (F00.14)	01				
Register value Lo (F00.14)	F4				
Register value Hi (F00.15)	02				
Register value Lo (F00.15)	58				

★ This function code cannot be used to change the parameters of the attribute "○" (it cannot be changed during operation). That is, only the parameters of the attribute "●" (it can be changed during operation) can be changed. Otherwise, the error code 1 will be returned.

10.3.3.4 0x08: function code for diagnosis

The Modbus function code 08 involves a series of tests to check the communication system between the client (master station) and server (slave station), or internal error statuses of the server.

The test to be executed is defined by the sub-function code fields of two bytes in the request. The server makes responses properly.

Copy the function codes and sub-function codes. Some diagnoses will enable the remote terminal unit to return the corresponding data through the data field in normal response.

Under normal circumstances, when the diagnosis function is sent to the remote terminal unit, the user program in this remote terminal unit will not be affected. Diagnosis can't access user logic such as discrete magnitude and the register. The error counter in the remote terminal unit can be remotely reset by applying some functions.

The main diagnosis function used by our company is line diagnosis (0000), which is used to test the normal communication between the host and slave. The normal response to a request to return query data is to return the same data. At the same time, the function codes and sub-function codes are also copied.

- Request PDU

Function code	1 byte	**0x08**
Sub-function code	2 bytes	0x0000~0xFFFF
Data	2 bytes	0x0000~0xFFFF

- Response PDU

Function code	1 byte	**0x08**
Sub-function code	2 bytes	0x0000~0xFFFF
Data	2 bytes	0x0000~0xFFFF

- Error PDU

Error code	1 byte	**0x88**
Exception code	1 byte	See Table 10-4

- Sub-function code

Sub-function	Meaning	Data field (request)	Data field (response)
0000	Return query data	Any	Copy request data
…			

0000: return the data transferred in the request data field in the response. All messages should be consistent with the request message.

The following table is an example of requesting the remote terminal unit to return query data. The sub-function code 0000 is used.

The returned data is sent in the two-byte data field (0xA537).

Request		Respond			
Domain name	(0x)	Domain name (normal)	(0x)	Domain name (abnormal)	(0x)
Function	08	Function	08	Function	88
Sub-function code Hi	00	Sub-function code Hi	00	Exception code	03
Sub-function code Lo	00	Sub-function code Lo	00		
Data Hi	A5	Data Hi	A5		
Data Lo	37	Data Lo	37		

10.3.3.5 0x06: function code used to write a single register or command

In the remote terminal unit, this function code is used to write a single holding register.

The request PDU describes the address to be written to the register.

The normal response is the response made to the request, which is returned after the register content is written.

- Request PDU

Function code	1 byte	**0x06**
Address of register	2 bytes	0x0000~0xFFFF
Register value	2 bytes	0x0000~0xFFFF

- Response PDU

Function code	1 byte	**0x06**
Address of register	2 bytes	0x0000~0xFFFF
Register value	2 bytes	0x0000~0xFFFF

- Error PDU

Error code	1 byte	**0x86**
Exception code	1 byte	See Table 10-4

Below is an example of a request to change the drive control mode of the motor 1 (F00.01) to "1: SVC".

Request		Respond			
Domain name	(0x)	Domain name (normal)	(0x)	Domain name (abnormal)	(0x)
Function	06	Function	06	Function	86
Register address Hi	00	Register address Hi	00	Exception code	03
Register address Lo	01	Register address Lo	01		
Register value Hi	00	Register value Hi	00		
Register value Lo	01	Register value Lo	01		

★ The function code 0x06 cannot be used if modified frequently, in order to avoid damage to the inverter.

The user-defined function code 0x41 "change without saving" corresponds to the standard common function code 0x06. Its definition is the same as that of the corresponding standard function code (the same request, response and error PDU). The difference is that when the slave responds to this user-defined function code, the corresponding value of RAM is changed only and not stored in EEPROM (holding register).

For the function codes (e.g. F00.07) that are often modified, it is recommended to use the function code 0x41 (you can change the main frequency source A by directly setting 7001H, as detailed in 10.3.4), to avoid damage to the inverter. The specific operation is as follows.

Request		Respond	
Domain name	(0x)	Domain name (normal)	(0x)
Function	41	Function	41
Register address Hi	00	Register address Hi	00
Register address Lo	07	Register address Lo	07
Register value Hi	13	Register value Hi	13
Register value Lo	88	Register value Lo	88

Once the set frequency (F00.07) is set to 50.00Hz, the above data will be valid but not be stored in EEPROM. That is, the inverter will run at 50.00Hz after change but at the frequency before change if powered on again.

10.3.3.6 0x10: function code used to write multiple registers or commands

In the remote terminal unit, this function code is used to write consecutive register blocks (1 to 16 registers).

The value requested to be written is described in the request data field. The data of each register is divided into two bytes.

In the normal response, the function code, starting address and number of registers written will be returned.

- Request PDU

Function code	1 byte	**0x10**
Starting Address	2 bytes	0x0000~0xFFFF
Number of registers	2 bytes	1~16
Number of bytes	1 byte	2×N*
Register value	N*×2 bytes	

N* = number of registers

- Response PDU

Function code	1 byte	**0x10**
Starting Address	2 bytes	0x0000~0xFFFF
Number of registers	2 bytes	1~16

- Error PDU

Error code	1 byte	**0x90**
Exception code	1 byte	See Table 10-4

Below is an example of a request to write 00 01 and 00 03 into two registers starting from F03.00 (i.e. setting the Y1 and Y2 output terminal function):

Request		Respond			
Domain name	(0x)	Domain name (normal)	(0x)	Domain name (abnormal)	(0x)
Function	10	Function	10	Function	90
Starting address Hi	03	Starting address Hi	03	Exception code	03
Starting address Lo	00	Starting address Lo	00		
Number (Hi) of registers	00	Number (Hi) of registers	00		
Number (Lo) of registers	02	Number (Lo) of registers	02		
Number of bytes	04				
Register value Hi (F03.00)	00				
Register value Lo (F03.00)	01				
Register value Hi (F03.01)	00				
Register value Lo (F03.01)	03				

★ The function code 0x10 cannot be used if modified frequently, in order to avoid damage to the inverter.

10.3.4 Register address distribution

Table 10-2 Detailed Definition of Register Address of MODBUS Protocol

Address Space		Description	
Function code 0000H - 6F63H		For the function code FXX.YY, the high order is hexadecimal of XX and the low order is hexadecimal of YY. For example, the address of F00.14 is 000EH (00D=00H, 14D=0EH).	
Function code (not saved after power-down) 8000H-EF63H		When the parameters are set with the function code 0x06 or 0x10, the function that "the settings are valid immediately and not saved after power-down" can be realized in the form of "original address +8000H". For example, the corresponding address of F00.14 is 800EH (=000EH+8000H).	
Control command (**write only**) 7000H ~ 71FFH	7000H control word	0000H	Invalid command
		0001H	Forward running
		0002H	Reverse running
		0003H	JOG forward
		0004H	JOG reverse
		0005H	Deceleration to stop
		0006H	Stop the controller quickly
		0007H	Free stop
		0008H	Reset protection
		0009H	+/- input switching
		000BH	JOG stop

		Others to 00FFH	Reserved
	7001H	Communication percentage setting of main channel frequency A	-100.00% to 100.00% (100% = maximum frequency)
	7002H	Communication percentage setting of auxiliary channel frequency B	-100.00% to 100.00% (100% = maximum frequency)
	7003H	Torque communication setting	-200.00% to 200.00% (100% = digital torque setting)
	7004H	Communication setting of process PID setting	-100.00%~100.00%
	7005H	Communication setting of process PID feedback	-100.00%~100.00%
	7006H	Voltage setting of VF separation mode	0.00% to 100.00% (digital setting reference)
	7007H~7009H	Reserved	
	700AH	Communication percentage setting of upper frequency limit	0.00% to 200.00% (digital setting reference)
	700BH	Communication percentage setting of upper frequency limit of torque control	0.00% to 200.00% (digital setting reference)
	700CH	Linear speed input for inertia compensation	0.00% to 100.00% (digital setting reference)
	700DH~700EH	Reserved	
	700FH	Master-slave communication setting	-100.00% to 100.00% (maximum reference)
	7010H~7013H	Reserved	
	7014H	External protection	Protection input of external device (including option card)
	7015H	Communication setting of main channel frequency A	0.00 to maximum frequency
	7016H	Communication setting of auxiliary channel frequency B	0.00 to maximum frequency
	7017H	Communication setting of upper frequency limit	0.00 to maximum frequency
	7018H	Communication setting of upper frequency limit of torque control	0.00 to maximum frequency

	7019H	Communication setting of upper torque limit of speed control	0.0 to 250.0% (based on 100.0% or direct sending)	
	701AH	Communication setting 1	Communication setting by M1 terminal, communication address option 701AH	
	701CH~71FFH	Reserved		
Working status 7200H - 73FFH	7200H status word 1	Bit7 to 0 running status	00H	Parameter setting
			01H	Slave running
			02H	JOG running
			03H	Self-learning running
			04H	Slave stop
			05H	JOG stop
			06H	Protection status
			07H	Factory self-inspection
			08H~0FFH	Reserved
		Bit15-8 protection information	00H	Normal running of inverter
			xxH	Inverter protection status, where “xx” is the protection code
	7201H status word 2	Bit0 setting direction	1	- setting is valid
			0	+ setting is valid
		Bit1 running direction	1	Reverse frequency output
			0	Forward frequency output
		Bit3 to 2 running mode	00	Speed control mode
			01	Torque control mode
			10	Reserved
			11	Reserved
		Bit4 parameter protection	1	Valid parameter protection
			0	Invalid parameter protection
		Bit6~5	Reserved	
		Bit8 to 7 setting mode	00	Keyboard control
			01	Terminal control
			10	Communication control

			11	Reserved						
		Bit9	Reserved							
		Bit10 warning	0	No warning						
			1	Warning status (see 7230H for details)						
		Bit15~10	Reserved							
	7202H monitoring frequency +/- status word 1 (1: -; 0: +)	Bit0	Output frequency							
		Bit1	Input frequency							
		Bit2	Synchronization frequency							
		Bit3	Reserved							
		Bit4	Estimate feedback frequency							
		Bit5	Estimated slip frequency							
		Bit6	Load rate							
		Bit15~7	Reserved							
	7203H	Output frequency								
	7204H	Output voltage								
	7205H	Output power								
	7206H	Running speed								
	7207H	Bus voltage								
	7208H	Output torque								
	7209H	Digital input 1	15	14	13	12	11	10	9	8
			*	*	*	*	*	*	*	*
			7	6	5	4	3	2	1	0
			*	*	*	X5	X4	X3	X2	X1
	720AH	Digital input 2	15	14	13	12	11	10	9	8
			VX8	VX7	VX6	VX5	VX4	VX3	VX2	VX1
			7	6	5	4	3	2	1	0
			*	*	*	*	*	*	AI2	AI1
	720BH	Digital output 1	15	14	13	12	11	10	9	8
			*	*	*	*	*	*	*	*
			7	6	5	4	3	2	1	0
			*	*	*	*	*	Y1	*	R1

	720CH	Digital output 2	15	14	13	12	11	10	9	8
			VY8	VY7	VY6	VY5	VY4	VY3	VY2	VY1
			7	6	5	4	3	2	1	0
			*	*	*	*	*	*	*	*
	720DH	Previous two protections								
	720EH	Previous three protections								
	720FH	Last protection								
	7210H	Output frequency of the last protection								
	7211H	Output current of the last protection								
	7212H	Bus voltage of the last protection								
	7213H	Running status of the last protection								
	7214H	Working time of the last protection								
	7215H	Set acceleration time								
	7216H	Set deceleration time								
	7217H	Cumulative length								
	7218H	Reserved								
	7219H	UP/DOWN offset frequency symbol (0/1: +/-)								
	7224H	Output current								
	7225H	Set frequency								
	7228H	Cumulative power-on time								
	722FH	Fault No.								
	7230H	Warning number	0: no warning; others: current warning sign							
	Other - 73FFH	Reserved								
Product information 7500H - 75FFH	7500H	Performance software S/N 1	Corresponding to the function code F12.22							
	7501H	Performance software S/N2	Corresponding to the function code F12.23							
	7502H	Functional software S/N 1	Corresponding to the function code F12.24							
	7503H	Functional software S/N 2	Corresponding to the function code F12.25							
	7504H	Keyboard software serial number 1	Corresponding to the function code F12.26							
	7505H	Keyboard software serial number 2	Corresponding to the function code F12.27							
	7506H	Serial No. 1	Corresponding to the function code F12.28							
	7507H	Serial No. 2	Corresponding to the function code F12.29							

	7508H	Serial No. 3	Corresponding to the function code F12.30
	7509H~75FFH	Reserved	
Others	Reserved		

10.3.5 Definition of frame data length

The PDU part of the RTU frame of the MODBUS message is able to read/write 1-16 registers. For different function codes, the actual length of the RTU frame varies, as detailed in the table below.

Table 10-3 Correspondence between RTU Frame Length and Function Code

Function code (0x)	RTU frame length (bytes)			Maximum length (Byte)
	Request	Normal response	Exception response	
03	8	$5+2N_r$[4]	5	37
41(06)	8	8	5	8
08	8	8	5	8
42(10)	$9+2N_w$[5]	8	5	41

[4]: $N_r \leq 16$, indicating the number of requests to read registers;

[5]: $N_w \leq 16$, indicating the number of requests to write registers.

[6]: $N_w+N_r \leq 16$;

10.3.6 CRC check

The low byte of CRC check is in front of the high byte.

The transmitter first calculates the CRC value, which is included in the sent message. Upon receiving the message, the receiver will recalculate the CRC value and compare the calculated value with the received CRC value. If the two values are not equal, it means that there is an error in the sending process.

Calculation process of CRC check:

(1) Define a CRC register and assign an initial value, FFFFH.

(2) Perform the XOR calculation with the first byte of the transmitted message and the value of the CRC register, and store the result in the CRC register. Starting from the address code, the start bit and stop bit are not involved in calculation.

(3) Extract and check the LSB (the least significant bit of the CRC register).

(4) If the LSB is 1, each bit of the CRC register is shifted to the right by one bit, and the most significant bit is supplemented by 0. Perform the XOR calculation of the value of the CRC register and A001H, and store the result in the CRC register.

(5) If the LSB is 0, each bit of the CRC register is shifted to the right by one bit, and the most significant bit is supplemented by 0.

(6) Repeat the steps 3, 4, and 5 until 8 shifts are completed.

(7) Repeat the steps 2, 3, 4, 5 and 6 to process next byte of the transmitted message, until all bytes of the transmitted message are processed.

(8) After the calculation, the content of the CRC register is the value of CRC check.

(9) In a system with limited time resources, it is recommended to perform CRC check by the table lookup method.

The simple function of CRC is as follows (programmed in C language):

```
unsigned int CRC_Cal_Value(unsigned char *Data, unsigned char Length)
{
    unsigned int crc_value = 0xFFFF;
    int i = 0;
    while(Length--)
    {
crc_value ^= *Data++;
for(i=0;i<8;i++)
{
if(crc_value & 0x0001)
{
crc_value = (crc_value>>1)^ 0xa001;
                }
else
{
crc_value = crc_value>>1;
                }
}
}
return(crc_value);
}
```

This only describes the theory of CRC check and requires a long execution time. Especially when the check data is long, the calculation time will be too long. Thus, the following two table lookup methods are applied for 16-bit and 8-bit controllers, respectively.

- CRC16 lookup table for the 8-bit processor: (The high byte in the final result of this program is in front. Please reverse it during sending.)

```
const Uint8 crc_l_tab[256] = {
0x00,0xC1,0x81,0x40,0x01,0xC0,0x80,0x41,0x01,0xC0,0x80,0x41,0x00,0xC1,0x81,0x40,
0x01,0xC0,0x80,0x41,0x00,0xC1,0x81,0x40,0x00,0xC1,0x81,0x40,0x01,0xC0,0x80,0x41,
0x01,0xC0,0x80,0x41,0x00,0xC1,0x81,0x40,0x00,0xC1,0x81,0x40,0x01,0xC0,0x80,0x41,
```

```
0x00,0xC1,0x81,0x40,0x01,0xC0,0x80,0x41,0x01,0xC0,0x80,0x41,0x00,0xC1,0x81,0x40,
0x01,0xC0,0x80,0x41,0x00,0xC1,0x81,0x40,0x00,0xC1,0x81,0x40,0x01,0xC0,0x80,0x41,
0x00,0xC1,0x81,0x40,0x01,0xC0,0x80,0x41,0x01,0xC0,0x80,0x41,0x00,0xC1,0x81,0x40,
0x00,0xC1,0x81,0x40,0x01,0xC0,0x80,0x41,0x01,0xC0,0x80,0x41,0x00,0xC1,0x81,0x40,
0x01,0xC0,0x80,0x41,0x00,0xC1,0x81,0x40,0x00,0xC1,0x81,0x40,0x01,0xC0,0x80,0x41,
0x01,0xC0,0x80,0x41,0x00,0xC1,0x81,0x40,0x00,0xC1,0x81,0x40,0x01,0xC0,0x80,0x41,
0x00,0xC1,0x81,0x40,0x01,0xC0,0x80,0x41,0x01,0xC0,0x80,0x41,0x00,0xC1,0x81,0x40,
0x00,0xC1,0x81,0x40,0x01,0xC0,0x80,0x41,0x01,0xC0,0x80,0x41,0x00,0xC1,0x81,0x40,
0x01,0xC0,0x80,0x41,0x00,0xC1,0x81,0x40,0x00,0xC1,0x81,0x40,0x01,0xC0,0x80,0x41,
0x00,0xC1,0x81,0x40,0x01,0xC0,0x80,0x41,0x01,0xC0,0x80,0x41,0x00,0xC1,0x81,0x40,
0x01,0xC0,0x80,0x41,0x00,0xC1,0x81,0x40,0x00,0xC1,0x81,0x40,0x01,0xC0,0x80,0x41,
0x01,0xC0,0x80,0x41,0x00,0xC1,0x81,0x40,0x00,0xC1,0x81,0x40,0x01,0xC0,0x80,0x41,
0x00,0xC1,0x81,0x40,0x01,0xC0,0x80,0x41,0x01,0xC0,0x80,0x41,0x00,0xC1,0x81,0x40
};
constUint8 crc_h_tab[256] = {
0x00,0xC0,0xC1,0x01,0xC3,0x03,0x02,0xC2,0xC6,0x06,0x07,0xC7,0x05,0xC5,0xC4,0x04,
0xCC,0x0C,0x0D,0xCD,0x0F,0xCF,0xCE,0x0E,0x0A,0xCA,0xCB,0x0B,0xC9,0x09,0x08,0xC8,
0xD8,0x18,0x19,0xD9,0x1B,0xDB,0xDA,0x1A,0x1E,0xDE,0xDF,0x1F,0xDD,0x1D,0x1C,0xDC,
0x14,0xD4,0xD5,0x15,0xD7,0x17,0x16,0xD6,0xD2,0x12,0x13,0xD3,0x11,0xD1,0xD0,0x10,
0xF0,0x30,0x31,0xF1,0x33,0xF3,0xF2,0x32,0x36,0xF6,0xF7,0x37,0xF5,0x35,0x34,0xF4,
0x3C,0xFC,0xFD,0x3D,0xFF,0x3F,0x3E,0xFE,0xFA,0x3A,0x3B,0xFB,0x39,0xF9,0xF8,0x38,
0x28,0xE8,0xE9,0x29,0xEB,0x2B,0x2A,0xEA,0xEE,0x2E,0x2F,0xEF,0x2D,0xED,0xEC,0x2C,
0xE4,0x24,0x25,0xE5,0x27,0xE7,0xE6,0x26,0x22,0xE2,0xE3,0x23,0xE1,0x21,0x20,0xE0,
0xA0,0x60,0x61,0xA1,0x63,0xA3,0xA2,0x62,0x66,0xA6,0xA7,0x67,0xA5,0x65,0x64,0xA4,
0x6C,0xAC,0xAD,0x6D,0xAF,0x6F,0x6E,0xAE,0xAA,0x6A,0x6B,0xAB,0x69,0xA9,0xA8,0x68,
0x78,0xB8,0xB9,0x79,0xBB,0x7B,0x7A,0xBA,0xBE,0x7E,0x7F,0xBF,0x7D,0xBD,0xBC,0x7C,
0xB4,0x74,0x75,0xB5,0x77,0xB7,0xB6,0x76,0x72,0xB2,0xB3,0x73,0xB1,0x71,0x70,0xB0,
0x50,0x90,0x91,0x51,0x93,0x53,0x52,0x92,0x96,0x56,0x57,0x97,0x55,0x95,0x94,0x54,
0x9C,0x5C,0x5D,0x9D,0x5F,0x9F,0x9E,0x5E,0x5A,0x9A,0x9B,0x5B,0x99,0x59,0x58,0x98,
0x88,0x48,0x49,0x89,0x4B,0x8B,0x8A,0x4A,0x4E,0x8E,0x8F,0x4F,0x8D,0x4D,0x4C,0x8C,
0x44,0x84,0x85,0x45,0x87,0x47,0x46,0x86,0x82,0x42,0x43,0x83,0x41,0x81,0x80,0x40
};
```

```
Uint16CRC(Uint8 * buffer, Uint8 crc_len)
{
Uint8 crc_i,crc_lsb,crc_msb;
Uint16 crc;
crc_msb = 0xFF;
crc_lsb = 0xFF;
while(crc_len--)
{
crc_i = crc_lsb ^ *buffer;
buffer ++;
crc_lsb = crc_msb ^ crc_l_tab[crc_i];
crc_msb = crc_h_tab[crc_i];
}
crc = crc_msb;
crc = (crc << 8) + crc_lsb;
return crc;
}
```

- CRC16 lookup table for the 16-bit processor: (The high byte in the final result of this program is in front. Please reverse it during sending.)

```
const Uint16 crc_table[256] = {
0x0000,0xC1C0,0x81C1,0x4001,0x01C3,0xC003,0x8002,0x41C2,0x01C6,0xC006
,0x8007,0x41C7,0x0005,0xC1C5,0x81C4,0x4004,0x01CC,0xC00C,0x800D,0x41CD
,0x000F,0xC1CF,0x81CE,0x400E,0x000A,0xC1CA,0x81CB,0x400B,0x01C9,0xC009
,0x8008,0x41C8,0x01D8,0xC018,0x8019,0x41D9,0x001B,0xC1DB,0x81DA,0x401A
,0x001E,0xC1DE,0x81DF,0x401F,0x01DD,0xC01D,0x801C,0x41DC,0x0014,0xC1D4
,0x81D5,0x4015,0x01D7,0xC017,0x8016,0x41D6,0x01D2,0xC012,0x8013,0x41D3
,0x0011,0xC1D1,0x81D0,0x4010,0x01F0,0xC030,0x8031,0x41F1,0x0033,0xC1F3
,0x81F2,0x4032,0x0036,0xC1F6,0x81F7,0x4037,0x01F5,0xC035,0x8034,0x41F4
,0x003C,0xC1FC,0x81FD,0x403D,0x01FF,0xC03F,0x803E,0x41FE,0x01FA,0xC03A
,0x803B,0x41FB,0x0039,0xC1F9,0x81F8,0x4038,0x0028,0xC1E8,0x81E9,0x4029
,0x01EB,0xC02B,0x802A,0x41EA,0x01EE,0xC02E,0x802F,0x41EF,0x002D,0xC1ED
,0x81EC,0x402C,0x01E4,0xC024,0x8025,0x41E5,0x0027,0xC1E7,0x81E6,0x4026
,0x0022,0xC1E2,0x81E3,0x4023,0x01E1,0xC021,0x8020,0x41E0,0x01A0,0xC060
```

```
,0x8061,0x41A1,0x0063,0xC1A3,0x81A2,0x4062,0x0066,0xC1A6,0x81A7,0x4067
,0x01A5,0xC065,0x8064,0x41A4,0x006C,0xC1AC,0x81AD,0x406D,0x01AF,0xC06F
,0x806E,0x41AE,0x01AA,0xC06A,0x806B,0x41AB,0x0069,0xC1A9,0x81A8,0x4068
,0x0078,0xC1B8,0x81B9,0x4079,0x01BB,0xC07B,0x807A,0x41BA,0x01BE,0xC07E
,0x807F,0x41BF,0x007D,0xC1BD,0x81BC,0x407C,0x01B4,0xC074,0x8075,0x41B5
,0x0077,0xC1B7,0x81B6,0x4076,0x0072,0xC1B2,0x81B3,0x4073,0x01B1,0xC071
,0x8070,0x41B0,0x0050,0xC190,0x8191,0x4051,0x0193,0xC053,0x8052,0x4192
,0x0196,0xC056,0x8057,0x4197,0x0055,0xC195,0x8194,0x4054,0x019C,0xC05C
,0x805D,0x419D,0x005F,0xC19F,0x819E,0x405E,0x005A,0xC19A,0x819B,0x405B
,0x0199,0xC059,0x8058,0x4198,0x0188,0xC048,0x8049,0x4189,0x004B,0xC18B
,0x818A,0x404A,0x004E,0xC18E,0x818F,0x404F,0x018D,0xC04D,0x804C,0x418C
,0x0044,0xC184,0x8185,0x4045,0x0187,0xC047,0x8046,0x4186,0x0182,0xC042
,0x8043,0x4183,0x0041,0xC181,0x8180,0x4040};
Uint16 CRC16(Uint16 *msg , Uint16 len){
Uint16 crcL = 0xFF , crcH = 0xFF;
Uint16 index;
while(len--){
index = crcL ^ *msg++;
crcL = ((crc_table[index] & 0xFF00) >> 8) ^ (crcH);
crcH = crc_table[index] & 0xFF;
}
return (crcH<<8) | (crcL);
}
```

10.3.7 Exception response

When the master station sends a request to the slave station, the master station expects a normal response. Query of the master station may result in one of the following four events:

- If a request without communication error is received from the slave station and can be processed properly, a normal response will be returned by the slave station.
- If the slave station does not receive a request due to communication errors, no message will be returned. This will be regarded as a timeout by the slave station.
- If the slave station receives a request but detects a communication error (parity, address, frame error, etc.), no response will be returned. This will be regarded as a timeout by the slave station.

- If the slave station receives a request without communication error but cannot process the request (e.g. a request to read the non-existent register), the slave station will return an exception response and the master station will be informed of the actual error.

The exception response message has two fields different from those of the normal response:

- Function code field: In the normal response, the slave station copies the function code of the original request in the corresponding function code field. The MSB values of all function codes are 0. In the exception response, the MSB of the function code is set to 1 by the slave station. That is, **the exception response function code = normal response function code + 0x80**.
- Data field: The slave station can return the data from the data field in the normal response and exception code in the exception response. The defined exception codes are detailed in the table below.

Table 10-4 Definitions of Exception Codes

Exception code	Item	Meaning
01H	Illegal function	The function code received by the slave station (inverter) is beyond the configured range (see 11.3.3 Function codes).
02H	Illegal data address	The data address received by the slave station (inverter) is not allowed. In particular, the combination of the start address of the register and the transmission length is invalid (see 11.3.4 Register address distribution).
03H	Illegal data frame	The slave station (inverter) has detected the incorrect query data frame length or CRC check.
04H	Slave protection	When the slave station (inverter) tries to execute a requested operation, an unrecoverable error occurs. This may be caused by the logic error, failure to write to the EEPROM, etc.
05H	Data over-range	The data received by the slave station (inverter) is not between the minimum and maximum values of the corresponding register.
06H	Parameter read-only	The current register is read-only and cannot be written.
07H	Unchangeable parameter in running	When the inverter is in the running status, the current register cannot be written. If necessary, please shut down the inverter.
08H	Parameter protection by password	The current register is protected by a password.

10.4 Protocol Description

10.4.1 Definition of inter-frame and intra-frame time interval

A complete MODBUS message contains not only the necessary data units, but also the starting and ending tags. Thus, as shown in Fig. 10-2 or Fig. 10-4, the idle level with a transmission time of 3.5 characters or more is defined as the starting and ending tag. If there is an idle level with a transmission time of more than 1.5 characters during message transmission, the transmission will be deemed exceptional.

Specific starting/ending and exception intervals are related to the baud rate, as detailed in Table 6-27. If the baud rate is 9600bps and the sampling period is 1ms, the starting and ending time interval is the idle level of 4ms or more (3.5×10/9600=3.64≈4), and the exceptional data interval is the idle level in which the interval of data bits of one frame is greater than or equal to 2ms (1.5×10/9600=1.56≈2) and less than 4m (the idle level of normal data bits is less than or equal to 1ms).

Table 10-5 Correspondence between Time Interval and Baud Rate (t_{adjust}=1ms)

Baud rate (bps)	Starting and ending time interval $T_{interval}$ (t_{adjust})	Exception interval $T_{exception}$ (t_{adjust})	Remarks
4800	8	4	The idle level of 3ms or less is allowed for a normal frame. When the idle level is 8ms or greater, it indicates the end of a frame of data.
9600	4	2	The idle level of 1ms or less is allowed for a normal frame. When the idle level is 4ms or greater, it indicates the end of a frame of data.
19200	2	1	The idle level of less than 1ms is allowed for a normal frame. When the idle level is 2ms or greater, it indicates the end of a frame of data.
Higher	**1**	**1**	**When an idle level of 1ms appears, it indicates the end of a frame.**

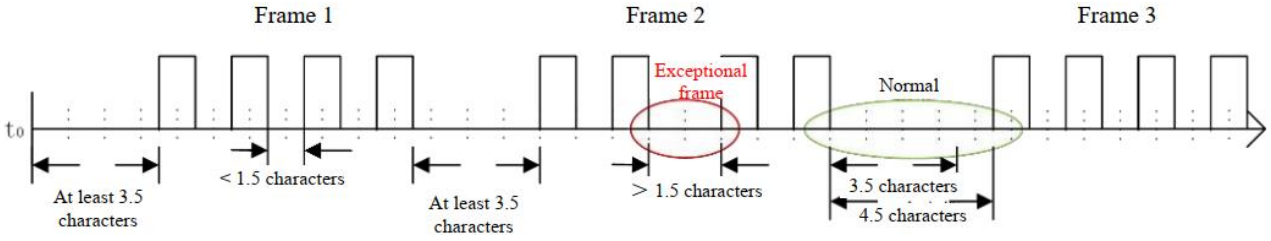

Fig. 10-4 Schematic Diagram of Normal and Exceptional Data Frames

10.4.2 Data frame processing

Upon receiving a frame data, the system will first perform preprocessing to determine whether it is a legal frame sent to this machine and check whether the data is correct, followed by final processing. If the received frame is not legal, the data will not be sent back. If the received frame is legal but incorrect, the corresponding exceptional message frame will be sent back.

Legal frame: Meet the address (local or broadcast) and length (not less than 3) requirements.

Correct frame: It is a legal frame with a correct memory address. The memory content is within the defined range and can be processed at present.

10.4.3 Response delay

The response delay (depending on the function code F10.04) is defined as the time interval from the reception of valid data frame[7] (data in the RS-485 network, different from the command sent by the keyboard) to data parsing and return. Since the starting and ending characters are defined in the standard protocol, it is impossible to avoid response delay, at least "3.5-character time interval + 1 ms (chip stabilization time of 485 protocol, t_{wait2})". The specific minimum time interval is related to the baud rate. If the baud rate is 9600bps, the minimum response delay is 5ms (3.5×10/9600+1=4.64≈5).

If the communication data involves EEPROM operation, the time interval will be longer.

[7]: Valid data frame: Sent by the external master station (not keyboard) to this machine. The function code, length and CRC of the data are correct.

Table 6-36 shows the data sending segment (t_{send}), sending end segment (t_{wait1}), 75176-to-sending wait segment (t_{wait2}), data return segment (t_{return}), and 75176-to-receiving wait segment (t_{wait3}).

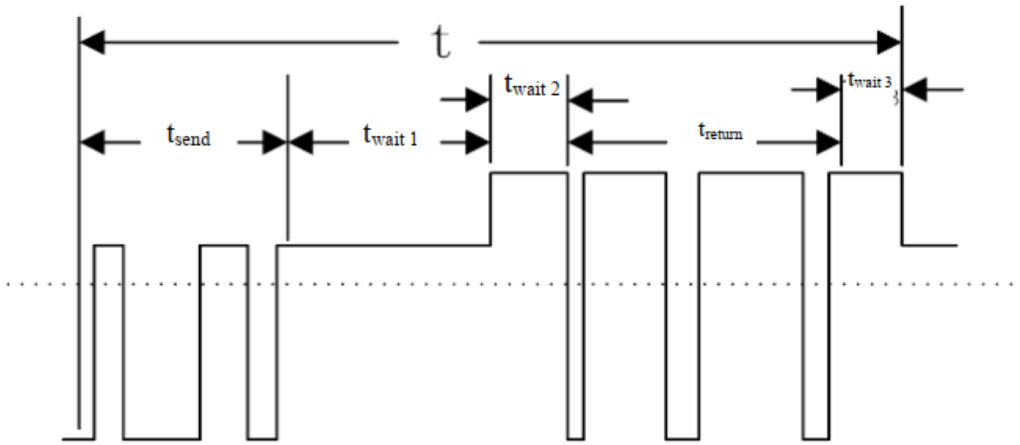

Fig. 10-5 Timing Parse Diagram of Complete Data Frame

10.4.4 Communication timeout

The communication time interval △t is defined as the period from the previous reception of valid data frames by the slave station (inverter) to next reception of valid data frames. If △t is greater than the set time (depending on the function code F10.03; this function is invalid if set to 0), it will be regarded communication timeout.

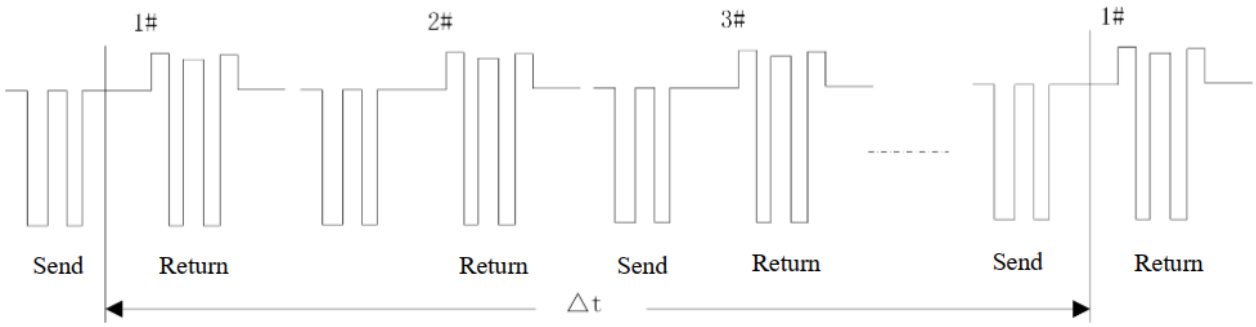

Fig. 10-6 Schematic Diagram of 485 Network Link Data

10.5 Examples

1) Forward running of inverter

Send: 01 41 70 0000 01 E6 C5

Return: 01 41 70 0000 01 E6 C5 (normal)

Return: 01 C1 04 70 53 (exception, assuming a slave protection)

	Send		Normal Return		Exception Return	
*	Frame header	≥3.5 characters (idle)				
1	Address	01	Address	01	Address	01
2	Function code	41	Function code	41	Function code	C1

3	Register address Hi	70	Register address Hi	70	Exception code	04 (assumption)
4	Register address Lo	00	Register address Lo	00	CRC check Lo	70
5	Register value Hi	00	Register value Hi	00	CRC check Hi	53
6	Register value Lo	01	Register value Lo	01		
7	CRC check Lo	E6	CRC check Lo	E6		
8	CRC check Hi	C5	CRC check Hi	C5		
*	Tail	≥3.5 characters (idle)				

2) Free stop of inverter

Send: 01 41 70 0000 07 66 C7

Return: 01 41 70 0000 07 66 C7 (normal)

Return: 01 C1 04 70 53 (exception, assuming a slave protection)

	Send		Normal Return		Exception Return	
*	Frame header	≥3.5 characters (idle)				
1	Address	01	Address	01	Address	01
2	Function code	41	Function code	41	Function code	C1
3	Register address Hi	70	Register address Hi	70	Exception code	04 (assumption)
4	Register address Lo	00	Register address Lo	00	CRC check Lo	70
5	Register value Hi	00	Register value Hi	00	CRC check Hi	53
6	Register value Lo	07	Register value Lo	07		
7	CRC check Lo	66	CRC check Lo	66		
8	CRC check Hi	C7	CRC check Hi	C7		
*	Tail	≥3.5 characters (idle)				

3) Command word for change of set frequency (e.g. 50.00Hz/1388H) (F00.04=7)

Send: 01 41 70 15 13 88 3B 97

Return: 01 41 70 15 13 88 3B 97 (normal)

Return: 01 C1 04 70 53 (exception, assuming a slave protection)

	Send		Normal Return		Exception Return	
*	Frame header	≥3.5 characters (idle)				
1	Address	01	Address	01	Address	01

2	Function code	41	Function code	41	Function code	C1
3	Register address Hi	70	Register address Hi	70	Exception code	04 (assumption)
4	Register address Lo	15	Register address Lo	15	CRC check Lo	70
5	Register value Hi	13	Register value Hi	13	CRC check Hi	53
6	Register value Lo	88	Register value Lo	88		
7	CRC check Lo	3B	CRC check Lo	3B		
8	CRC check Hi	97	CRC check Hi	97		
*	Tail	≥3.5 characters (idle)				

1) Read the information of last protection (read the function codes F19.00-F19.05)

Send: 01 03 13 00 00 06 C1 4C

Return: 01 03 0C 00 11 00 00 00 00 01 2C 00 00 00 00 53 5B (normal)

Return: 01 83 04 40 F3 (exception, assuming a slave protection)

	Send		Normal Return		Exception Return	
*	Frame header	≥3.5 characters (idle)				
1	Address	01	Address	01	Address	01
2	Function code	03	Function code	03	Function code	83
3	Starting address Hi	13	Number of bytes	0C	Exception code	04 (assumption)
4	Starting address Lo	00	Register value Hi (F19.00)	00	CRC check Lo	40
5	Number (Hi) of registers	00	Register value Lo (F19.00)	11	CRC check Hi	F3
6	Number (Lo) of registers	06	Register value Hi (F19.01)	00		
7	CRC check Lo	C1	Register value Lo (F19.01)	00		
8	CRC check Hi	4C	Register value Hi (F19.02)	00		
9			Register value Lo (F19.02)	00		
10			Register value Hi (F19.03)	01		
11			Register value Lo (F19.03)	2C		
12			Register value Hi (F19.04)	00		
13			Register value Lo (F19.04)	00		
14			Register value Hi (F19.05)	00		
15			Register value Lo (F19.05)	00		
16			CRC check Lo	53		
17			CRC check Hi	5B		
*	Tail		≥3.5 characters (idle)			

2) Check whether the line is connected.

Send: 01 08 00 00 AA 55 5E 94

Return: 01 08 00 00 AA 55 5E 94 (normal)

Return: 01 88 04 47 C3 (exception, assuming a slave protection)

	Send		Normal Return		Exception Return	
*	Frame header	≥3.5 characters (idle)				
1	Address	01	Address	01	Address	01
2	Function	08	Function	08	Function code	88
3	Sub-function code Hi	00	Sub-function code Hi	00	Exception code	04 (assumption)
4	Sub-function code Lo	00	Sub-function code Lo	00	CRC check Lo	47
5	Data Hi	AA	Data Hi	AA	CRC check Hi	C3
6	Data Lo	55	Data Lo	55		
7	CRC check Lo	5E	CRC check Lo	5E		
8	CRC check Hi	94	CRC check Hi	94		
*	Tail	≥3.5 characters (idle)				

3) Change the carrier frequency (F00.23) to 4.0kHz. (use the function code 0x06 as such function codes are expected to be stored in EEPROM after change)

Send: 01 06 00 17 00 28 39 D0

Return: 01 06 00 17 00 28 39 D0 (normal)

Return: 01 86 04 43 A3 (exception, assuming a slave protection)

	Send		Normal Return		Exception Return	
*	Frame header	≥3.5 characters (idle)				
1	Address	01	Address	01	Address	01
2	Function code	06	Function code	06	Function code	86
3	Register address Hi	00	Register address Hi	00	Exception code	04 (assumption)
4	Register address Lo	17	Register address Lo	17	CRC check Lo	43
5	Register value Hi	00	Register value Hi	00	CRC check Hi	A3
6	Register value Lo	28	Register value Lo	28		
7	CRC check Lo	39	CRC check Lo	39		
8	CRC check Hi	D0	CRC check Hi	D0		
*	Tail	≥3.5 characters (idle)				

Chapter 11 **Function Code Table**

Function code	Function code name	Parameter description	Unit	Default setting	Attribute	Communication address
F00	Basic function parameter group					
F00.01	Drive control mode of motor 1	0: V/F control (VVF) 1: Speed sensorless vector control (SVC) 2: Speed sensor vector control (FVC)		0	○	0x0001
F00.02	Options of command source	0: keyboard control (LOC/REM indicator ON) 1: terminal control (LOC/REM indicator: OFF) 2: communication control (LOC/REM indicator: flicker)		0	○	0x0002
F00.03	Options of terminal control mode	0: terminal RUN (running) and F/R (forward/reverse) 1: terminal RUN (forward) and F/R (reverse) 2: terminal RUN (forward), Xi (stop) and F/R (reverse) 3: terminal RUN (running), Xi (stop) and F/R (forward/reverse)		0	○	0x0003
F00.04	Options of main frequency source A	0: digital frequency setting F00.07 1: AI1 2: AI2 3: AI3 4: AI4 (expansion card) 5: high frequency pulse input (X7) 6: main frequency communication setting (percentage) 7: main frequency communication setting (direct frequency)		0	○	0x0004
F00.05	Options of auxiliary frequency source B	0: digital frequency setting F00.07 1: AI1 2: AI2 3: AI3		0	○	0x0005

		4: AI4 (expansion card) 5: high frequency pulse input (X7) 6: auxiliary frequency communication setting (percentage) 7: auxiliary frequency communication setting (direct frequency) 10: process PID 11: simple PLC				
F00.06	Options of frequency source	0: main frequency source A 1: auxiliary frequency source B 2: main and auxiliary operation results 3: switching between main frequency source A and auxiliary frequency source B 4: switching between main frequency source A and main and auxiliary operation results 5: switching between auxiliary frequency source B and main and auxiliary operation results 6: Auxiliary frequency source B + feedforward calculation (winding application)		0	○	0x0006
F00.07	Digital frequency setting	0.00 to maximum frequency F00.16	Hz	50.00	●	0x0007
F00.08	Options of main and auxiliary operation	0: main frequency source A + auxiliary frequency source B 1: main frequency source A - auxiliary frequency source B 2: larger value of main and auxiliary frequency sources 3: smaller value of main and auxiliary frequency sources 4: main frequency source A - auxiliary frequency source B 5: main frequency source A + auxiliary frequency source B		0	○	0x0008
F00.09	Reference options of auxiliary frequency source B in main and auxiliary operation	0: relative to the maximum frequency 1: Relative to main frequency source A		0	○	0x0009
F00.10	Gain of main frequency source	0.0~300.0	%	100.0	●	0x000A
F00.11	Gain of auxiliary frequency source	0.0~300.0	%	100.0	●	0x000B
F00.12	Synthetic gain of main and auxiliary frequency sources	0.0~300.0	%	100.0	●	0x000C

F00.13	Analog adjustment of synthetic frequency	0: synthetic frequency of main and auxiliary channels 1: AI1 * synthetic frequency of main and auxiliary channels 2: AI2 * synthetic frequency of main and auxiliary channels 3: AI3* synthetic frequency of main and auxiliary channels 4: AI4* synthetic frequency of main and auxiliary channels 5: High frequency pulse (PULSE) * synthetic frequency of main and auxiliary channels		0	○	0x000D
F00.14	Acceleration time 1	0.00~650.00(F15.13=0) 0.0~6500.0(F15.13=1) 0~65000(F15.13=2)	s	15.00	●	0x000E
F00.15	Deceleration time 1		s	15.00	●	0x000F
F00.16	Maximum frequency	1.00~600.00	Hz	50.00	○	0x0010
F00.17	Options of upper frequency limit control	0: set by F00.18 1: AI1 2: AI2 3: AI3 4: AI4 (expansion card) 5: high frequency pulse input (X7) 6: Communication setting (percentage) 7: Communication setting (direct frequency)		0	○	0x0011
F00.18	Upper frequency limit	Lower frequency limit F00.19 to maximum frequency F00.16	Hz	50.00	●	0x0012
F00.19	Lower frequency limit	0.00 to upper frequency limit F00.18	Hz	0.00	●	0x0013
F00.20	Running direction	0: consistent direction 1: opposite direction		0	●	0x0014
F00.21	Reverse control	0: Allow forward/reverse running 1: Prohibit reversing		0	○	0x0015
F00.22	Duration of forward and reverse dead zone	0.00~650.00	s	0.00	●	0x0016

F00.23	Carrier frequency	1.0-16.0 (rated power of the inverter: less than 4kW) 1.0-10.0 (rated power of the inverter: 5.5-7.5kW) 1.0 - 8.0 (rated power of inverter 11 - 45kW) 1.0 - 4.0 (rated power of inverter 55 - 90kW) 1.0 - 3.0 (rated power of inverter 110 - 560kW)	kHz	2.0	●	0x0017
F00.24	Automatic adjustment of carrier frequency	0: Invalid 1: valid 1 2: valid 2		1	○	0x0018
F00.25	Noise suppression of carrier frequency	0: Invalid 1: Noise suppression mode 1 of carrier frequency 2: Noise suppression mode 2 of carrier frequency		0	○	0x0019
F00.26	Noise suppression width	1~20		1	●	0x001A
F00.27	Noise suppression intensity	0-10: Noise suppression mode 1 of carrier frequency 0-4: Noise suppression mode 2 of carrier frequency		0	●	0x001B
F00.28	Options of motor parameter group	0: parameter group of motor 1 1: parameter group of motor 2		0	○	0x001C
F00.29	User password	0~65535		0	○	0x001D
F00.30	Model selection	0: G type 1: P type		0	○	0x001E
F00.31	Frequency resolution	0: 0.01Hz; 1: 0.1Hz (speed unit: 10rpm)		0	○	0x001F
F00.32	Frequency point corresponding to the lower limit of carrier frequency	0.00~F0.33	Hz	20.00	○	0x0020
F00.33	Frequency point corresponding to the upper limit of carrier frequency	10.00~150.00	HZ	50.00	○	0x0021
F00.34	Lower limit of carrier frequency	1.0~F00.23	kHz	2.0	○	0x0022

F00.35	Inverter supply voltage selection	0: 380V 1: 440V 2: 480V 3: 600V 4: 690V		0	○	0x0023
F00.36	Start/stop channel selection for communication control	0: Modbus 1: Profinet 2: EtherCAT 3: CANopen 10: All protocols are valid		0	○	0x0024
F00.37	Communication-specific channel selection			0	○	0x0025
F00.38	Parameter locking function selection	0: Locked for all command channels 1: Only the keyboard locked		0	○	0x0026
F00.39	Single-brush and double-brush PWM switch control	0: Single-brush 1: Double-brush 2: Automatic switch		0	○	0x0027
F01	Parameter group of motor 1					
F01.00	Motor type	0: ordinary asynchronous motor 1: variable-frequency asynchronous motor 2: permanent magnet synchronous motor		0	○	0x0100
F01.01	Rated power of electric motor	0.10~650.00	kW	Depending on the motor type	○	0x0101
F01.02	Rated voltage of motor	50~2000	V	Depending on the motor type	○	0x0102
F01.03	Rated current of motor	0.01 to 600.00 (rated power of motor: ≤ 75 kW) 0.1 to 6000.0 (rated power of motor: > 75 kW)	A	Depending on the motor type	○	0x0103
F01.04	Rated frequency of motor	0.01~600.00	Hz	Depending on the motor type	○	0x0104
F01.05	Rated speed	1~60000	rpm	Depending on the motor type	○	0x0105
F01.06	Motor winding connection	0: Y 1: Δ		Depending on the motor type	○	0x0106

F01.07	Rated power factor of motor	0.600~1.000		Depending on the motor type	○	0x0107
F01.08	Motor efficiency	30.0~100.0	%	Depending on the motor type	○	0x0108
F01.09	Stator resistance of asynchronous motor	1 to 60,000 (rated power of motor: ≤ 75 kW) 0.1 to 6,000.0 (rated power of motor: > 75 kW)	mΩ	Depending on the motor type	○	0x0109
F01.10	Rotor resistance of asynchronous motor	1 to 60,000 (rated power of motor: ≤ 75 kW) 0.1 to 6,000.0 (rated power of motor: > 75 kW)	mΩ	Depending on the motor type	○	0x010A
F01.11	Leakage inductance of asynchronous motor	0.01 to 600.00 rated power of motor: ≤ 75 kW) 0.001 to 60.000 (rated power of motor: > 75 kW)	mH	Depending on the motor type	○	0x010B
F01.12	Mutual inductance of asynchronous motor	0.1 to 6,000.0 (rated power of motor: ≤ 75 kW) 0.01 to 600.00 (rated power of motor: > 75 kW)	mH	Depending on the motor type	○	0x010C
F01.13	No-load excitation current of asynchronous motor	0.01 to 600.00 rated power of motor: ≤ 75 kW) 0.1 to 6,000.0 (rated power of motor: > 75 kW)	A	Depending on the motor type	○	0x010D
F01.14	Magnetic saturation coefficient 1 of asynchronous motor	10.00~100.00	%	87.00	○	0x010E
F01.15	Magnetic saturation coefficient 2 of asynchronous motor	10.00~100.00	%	80.00	○	0x010F
F01.16	Magnetic saturation coefficient 3 of asynchronous motor	10.00~100.00	%	75.00	○	0x0110
F01.17	Magnetic saturation coefficient 4 of asynchronous motor	10.00~100.00	%	72.00	○	0x0111
F01.18	Magnetic saturation coefficient 5 of asynchronous motor	10.00~100.00	%	70.00	○	0x0112
F01.19	Stator resistance of synchronous motor	1 to 60,000 (rated power of motor: ≤ 75 kW) 0.1 to 6,000.0 (rated power of motor: > 75 kW)	mΩ	Depending on the motor type	○	0x0113
F01.20	d-axis inductance of synchronous motor	0.01 to 600.00 rated power of motor: ≤ 75 kW) 0.001 to 60.000 (rated power of motor: > 75 kW)	mH	Depending on the motor type	○	0x0114
F01.21	q-axis inductance of synchronous motor	0.01 to 600.00 rated power of motor: ≤ 75 kW) 0.001 to 60.000 (rated power of motor: > 75 kW)	mH	Depending on the motor type	○	0x0115

F01.22	Counter electromotive force of synchronous motor	10.0-2000.0 (counter electromotive force of rated speed)	V	Depending on the motor type	○	0x0116
F01.24	Encoder type	0: ABZ gain encoder 1: UVW gain encoder 3: SinCos encoder 4: Rotary transformer		0	○	0x0118
F01.25	Encoder line count	1~65535		1024	○	0x0119
F01.26	Zero-pulse phase angle of encoder	0.0~359.9°		0.0	○	0x011A
F01.27	AB pulse phase sequence	0: forward 1: reverse		0	○	0x011B
F01.28	UVW encoder phase sequence	0: forward 1: reverse		0	○	0x011C
F01.29	UVW initial offset phase angle	0.0~359.9°		0.0	○	0x011D
F01.30	Pole pairs of rotary transformer	1~65535		1	○	0x011E
F01.31	High-frequency filter coefficient of encoder	0-15		10	○	0x011F
F01.32	Detection time of speed feedback disconnection	0.0~10.0 (0.0: inactive detection of speed feedback disconnection)		1.0	○	0x0120
F01.33	Speed feedback filtering time	0.000~0.100	s	0.002	○	0x0121
F01.34	Motor parameter self-learning	0: No operation 1: static self-learning of asynchronous motor 2: rotation self-learning of asynchronous motor 3: Self-learning of asynchronous motor encoder 10: No operation (when permanent magnet synchronous motor is selected) 11: static self-learning of synchronous motor 12: rotary self-learning of synchronous motor 13: encoder self-learning of synchronous motor		0	○	0x0122

F02	Input terminal function group					
F02.00	Options of X1 digital input function	0: no function 1: terminal running (RUN) 2: running direction (F/R) 3: stop control in three-line operation 4: forward jog (FJOG) 5: reverse jog (RJOG) 6: terminal UP 7: terminal DOWN 8: clear UP/DOWN offset 9: free stop 10: reset fault 11: multi-segment speed terminal 1 12: multi-segment speed terminal 2 13: multi-segment speed terminal 3 14: multi-segment speed terminal 4 15: multi-segment PID terminal 1 16: multi-segment PID terminal 2 17: multi-segment torque terminal 1 18: multi-segment torque terminal 2 19: acceleration and deceleration time terminal 1 20: acceleration and deceleration time terminal 2		1	○	0x0200
F02.01	Options of X2 digital input function			2	○	0x0201
F02.02	Options of X3 digital input function			11	○	0x0202
F02.03	Options of X4 digital input function			12	○	0x0203
F02.04	Options of X5 digital input function			13	○	0x0204
F02.05	Options of X6 digital input function			14	○	0x0205
F02.06	Options of X7 digital input function			10	○	0x0206
F02.07	Options of AI1 digital input function			0	○	0x0207
F02.08	Options of AI2 digital input function			0	○	0x0208
F02.09	Options of AI3 digital input function			0	○	0x0209
F02.10	Options of AI4 digital input function (expansion card)			0	○	0x020A
F02.11	Options of X8 digital input function (expansion card)			0	○	0x020B
F02.12	Options of X9 digital input function (expansion card)			0	○	0x020C
F02.13	Options of X10 digital input function (expansion card)			0	○	0x020D

<table>
<tr><td>F02.14</td><td>Reserved</td><td colspan="8"></td><td></td><td>0</td><td>×</td><td>0x020E</td></tr>
<tr><td colspan="2">21: Acceleration and deceleration prohibition
22: operation pause
23: external fault input
24: Switching of RUN command to keyboard
25: switching of RUN command to communication
26: Frequency source switching
27: clearing of regular running time
28: speed control/torque control switching
29: torque control prohibition
30: motor 1/motor 2 switching
31: resetting of simple PLC status (running from the first segment, with the running time cleared)
32: simple PLC time pause (keep running at current segment)
33: Zero-servo command</td><td colspan="8">34: counter input (≤250Hz)
35: high-speed count input (≤100kHz, only valid for X7)
36: count clearing
37: length counter input (≤250Hz)
38: High-speed length counting input (≤100kHz, only valid for X7)
39: length clearing
40: pulse input (≤ 100 kHz, only valid for X7)
41: process PID pause
42: process PID integral pause
43: PID parameter switching
44: PID positive/negative switching
45: stop and DC braking
46: DC braking at stop
47: immediate DC braking
48: fastest deceleration to stop
50: external stop</td><td colspan="3">51: switching of main frequency source to digital frequency setting
52: switching of main frequency source to AI1
53: Switching of main frequency source to AI2
54: switching of main frequency source to AI3
55: Switching of main frequency source to high-frequency pulse input
56: switching of main frequency source to communication setting
57: inverter enabling
69: Reserving prohibited xor
89: Reset feedforward
121: External material cutoff signal
122: Wiring detection signal
123: Brake reset terminal</td><td></td></tr>
<tr><td rowspan="3">F02.15</td><td rowspan="3">Positive/negative logic 1 of digital input terminal</td><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td><td rowspan="3"></td><td rowspan="3">*0000000</td><td rowspan="3">○</td><td rowspan="3">0x020F</td></tr>
<tr><td>*</td><td>X7</td><td>X6</td><td>X5</td><td>X4</td><td>X3</td><td>X2</td><td>X1</td></tr>
<tr><td colspan="8">0: positive logic is valid in the closed state/invalid in the open state
1: negative logic is valid in the closed state/invalid in the open state</td></tr>
<tr><td rowspan="3">F02.16</td><td rowspan="3">Positive/negative logic 2 of digital input terminal</td><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td><td rowspan="3"></td><td rowspan="3">00000000</td><td rowspan="3">○</td><td rowspan="3">0x0210</td></tr>
<tr><td>X11</td><td>X10</td><td>X9</td><td>X8</td><td>AI4</td><td>AI3</td><td>AI2</td><td>AI1</td></tr>
<tr><td colspan="8">0: positive logic is valid in the closed state/invalid in the open state
1: negative logic is valid in the closed state/invalid in the open state</td></tr>
</table>

F02.17	Filtering times of digital input terminal	0-100; 0: no filtering; n: sampling every nms		2	○	0x0211
F02.18	X1 valid delay time	0.000~650.00	s	0.000	●	0x0212
F02.19	X1 invalid delay time	0.000~650.00	s	0.000	●	0x0213
F02.20	X2 valid delay time	0.000~650.00	s	0.000	●	0x0214
F02.21	X2 invalid delay time	0.000~650.00	s	0.000	●	0x0215
F02.22	X3 valid delay time	0.000~650.00	s	0.000	●	0x0216
F02.23	X3 invalid delay time	0.000~650.00	s	0.000	●	0x0217
F02.24	X4 valid delay time	0.000~650.00	s	0.000	●	0x0218
F02.25	X4 invalid delay time	0.000~650.00	s	0.000	●	0x0219
F02.26	Minimum input pulse frequency	0.00 to maximum input pulse frequency F02.28	kHz	0.00	●	0x021A
F02.27	Minimum input setting	–100.0~+100.0	%	0.0	●	0x021B
F02.28	Maximum input pulse frequency	0.01~100.00	kHz	50.00	●	0x021C
F02.29	Maximum input setting	–100.0~+100.0	%	100.0	●	0x021D
F02.30	Pulse input filtering time	0.00~10.00	s	0.10	●	0x021E
F02.31	Options of analog input function	Ones place: AI1 0: analog input 1: digital input (0 below 1V, 1 above 3V, the same as last time under 1-3V)		0000D	○	0x021F

		Tens place: AI2; as above Hundreds place: AI3; as above Thousands place: AI4 (expansion card); as above				
F02.32	Options of analog input curve	Ones place: Options of AI1 curve 0: curve 1 1: curve 2 2: curve 3 3: curve 4 Tens place: AI2 curve selection; as above Hundreds place: AI3 curve selection; as above Thousands place: AI4 curve selection; as above		3210D	○	0x0220
F02.33	Minimum input of curve 1	0.00~F02.35	V	0.10	●	0x0221
F02.34	Minimum input setting of curve 1	–100.0~+100.0	%	0.0	●	0x0222
F02.35	Maximum input of curve 1	F02.33~10.00	V	9.90	●	0x0223
F02.36	Maximum input setting of curve 1	–100.0~+100.0	%	100.0	●	0x0224
F02.37	Minimum input of curve 2	-10.00~F02.39	V	0.10	●	0x0225
F02.38	Minimum input setting of curve 2	–100.0~+100.0	%	0.0	●	0x0226
F02.39	Maximum input of curve 2	F02.37~10.00	V	9.90	●	0x0227
F02.40	Maximum input setting of curve 2	–100.0~+100.0	%	100.0	●	0x0228
F02.41	Minimum input of curve 3	0.00V~F02.43	V	0.10	●	0x0229

F02.42	Minimum input setting of curve 3	–100.0~+100.0	%	0.0	●	0x022A
F02.43	Input of inflection point 1 of curve 3	F02.41~F02.45	V	2.50	●	0x022B
F02.44	Input setting of inflection point 1 of curve 3	–100.0~+100.0	%	25.0	●	0x022C
F02.45	Input of inflection point 2 of curve 3	F02.43~F02.47	V	7.50	●	0x022D
F02.46	Input setting of inflection point 2 of curve 3	–100.0~+100.0	%	75.0	●	0x022E
F02.47	Maximum input of curve 3	F02.45~10.00	V	9.90	●	0x022F
F02.48	Maximum input setting of curve 3	–100.0~+100.0	%	100.0	●	0x0230
F02.49	Minimum input of curve 4	-10.00~F02.51	V	-9.90	●	0x0231
F02.50	Minimum input setting of curve 4	–100.0~+100.0	%	-100.0	●	0x0232
F02.51	Input of inflection point 1 of curve 4	F02.49~F02.53	V	-5.00	●	0x0233
F02.52	Input setting of inflection point 1 of curve 4	–100.0~+100.0	%	-50.0	●	0x0234
F02.53	Input of inflection point 2 of curve 4	F02.51~F02.55	V	5.00	●	0x0235
F02.54	Input setting of inflection point 2 of curve 4	–100.0~+100.0	%	50.0	●	0x0236
F02.55	Maximum input of curve 4	F02.53~10.00	V	9.90	●	0x0237
F02.56	Maximum input setting of curve 4	–100.0~+100.0	%	100.0	●	0x0238
F02.57	AI1 filtering time	0.000~10.000	s	0.100	●	0x0239
F02.58	AI2 filtering time	0.000~10.000	s	0.100	●	0x023A

F02.59	AI3 filtering time	0.000~10.000	s	0.100	●	0x023B
F02.60	AI4 filtering time (Expansion card)	0.000~10.000	s	0.100	●	0x023C
F02.61	AD sampling hysteresis	0~50		2	○	0x023D
F02.62	Selection of analog input AI1 type	0: 0~10V 3: -10~10V 4: 0~5V		0	○	0x023E
F02.63	Selection of analog input AI2 type	0: 0~10V 1: 4~20mA 2: 0~20mA 4: 0~5V		1	○	0x023F
F02.64	Analog input AI3 type selection	0: 0~10V 1: 4~20mA 2: 0~20mA 4: 0~5V		0	○	0x0240
F02.65	Analog input AI4 type selection (expansion card)	0: 0~10V 2: Reserved 3: -10~10V 4: 0~5V		2	○	0x0241
F03	Output terminal function group					
F03.00	Options of Y1 output function	0: no output 1: inverter running (RUN) 2: up to output frequency (FAR) 3: output frequency detection FDT1 4: output frequency detection FDT2 5: reverse running (REV)		1	○	0x0300
F03.01	Options of Y2 output function			3	○	0x0301
F03.02	Options of R1 output function (EA-EB-EC)			7	○	0x0302

<table>
<tr><td>F03.03</td><td>Options of R2 output function (RA-RB-RC)</td><td colspan="8">6: jog
7: inverter fault</td><td></td><td>8</td><td>〇</td><td>0x0303</td></tr>
<tr><td>F03.04</td><td>Reserved</td><td colspan="8"></td><td></td><td>0</td><td>〇</td><td>0x0304</td></tr>
<tr><td colspan="2">8: inverter ready to run
9: reach the upper frequency limit
10: reach the lower frequency limit
11: valid current limit
12: valid overvoltage stall
13: complete simple PLC cycle
14: reach the set count value
15: reach the specified count value
16: reach the length
17: motor overload pre-alarm
18: inverter overheat pre-alarm</td><td colspan="8">19: reach the upper limit of PID feedback
20: reach the lower limit of PID feedback
21: analog level detection ADT1
22: analog level detection ADT2
24: undervoltage state
25: motor overheat pre-alarm
26: up to the set time
27: zero-speed running
38: off-load
39: Zero-speed running 2
40: Current reached
41: Torque reached</td><td colspan="3">42: up to the speed
47: PLC output
59: Sleep indicator
67: Brake control
68: Material cutoff detection output
69: FDT1 lower limit (pulse)
70: FDT2 lower limit (pulse)
71: FDT1 lower limit (pulse, invalid in JOG)
72: FDT2 lower limit (pulse, invalid in JOG)
73: Overcurrent status
86: STO failure indication</td><td></td></tr>
<tr><td rowspan="3">F03.05</td><td rowspan="3">Options of output signal type</td><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td><td rowspan="3"></td><td rowspan="3">0000</td><td rowspan="3">〇</td><td rowspan="3">0x0305</td></tr>
<tr><td>*</td><td>*</td><td>*</td><td>*</td><td>R2</td><td>R1</td><td>Y2</td><td>Y1</td></tr>
<tr><td colspan="8">0: level 1: single pulse</td></tr>
<tr><td rowspan="3">F03.06</td><td rowspan="3">Positive/negative logic of digital output</td><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td><td rowspan="3"></td><td rowspan="3">000000</td><td rowspan="3">〇</td><td rowspan="3">0x0306</td></tr>
<tr><td>*</td><td>R4</td><td>R3</td><td>*</td><td>R2</td><td>R1</td><td>Y2</td><td>Y1</td></tr>
<tr><td colspan="8">0: positive logic is valid in the closed state/invalid in the open state
1: negative logic is valid in the closed state/invalid in the open state</td></tr>
<tr><td>F03.07</td><td>Options of Y2 output type</td><td colspan="8">0: ordinary digital output 1: high frequency pulse output</td><td></td><td>0</td><td>〇</td><td>0x0307</td></tr>
<tr><td rowspan="3">F03.08</td><td rowspan="3">Output status control in jog</td><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td><td rowspan="3"></td><td rowspan="3">00000</td><td rowspan="3">〇</td><td rowspan="3">0x0308</td></tr>
<tr><td>*</td><td>*</td><td>*</td><td>REV</td><td>FDT 2</td><td>FDT 1</td><td>FAR</td><td>RUN</td></tr>
<tr><td colspan="8">0: valid in jogging 1: invalid in jogging</td></tr>
</table>

F03.09	Y1 valid delay time	0.00~650.00	s	0.00	●	0x0309
F03.10	Y1 invalid delay time	0.00~650.00	s	0.00	●	0x030A
F03.11	Y2 valid delay time	0.00~650.00	s	0.00	●	0x030B
F03.12	Y2 invalid delay time	0.00~650.00	s	0.00	●	0x030C
F03.13	R1 valid delay time	0.00~650.00	s	0.00	●	0x030D
F03.14	R1 invalid delay time	0.00~650.00	s	0.00	●	0x030E
F03.15	R2 valid delay time	0.00~650.00	s	0.00	●	0x030F
F03.16	R2 invalid delay time	0.00~650.00	s	0.00	●	0x0310
F03.17	Single pulse time of Y1 output	0.001~30.000	s	0.250	●	0x0311
F03.18	Single pulse time of Y2 output	0.001~30.000	s	0.250	●	0x0312
F03.19	Single pulse time of R1 output	0.001~30.000	s	0.250	●	0x0313
F03.20	Single pulse time of R2 output	0.001~30.000	s	0.250	●	0x0314
F03.21	Options of analog output M1	0: running frequency (absolute value) 1: set frequency (absolute value) 2: output torque (absolute value) 3: set torque (absolute value)		0	○	0x0315
F03.22	Options of analog output M2			2	○	0x0316
F03.23	Y2 high frequency pulse output function			11	○	0x0317
4: output current			15: length value			

<table>
<tr><td colspan="2">5: Output voltage
6: bus voltage
7: output power
8: AI1
9: AI2</td><td>10: AI3
11: AI4 (expansion card)
12: High frequency pulse input (100.00% corresponds to the maximum frequency, and 0.00% corresponds to the minimum frequency)
13: Communication setting 1
14: count value</td><td colspan="3">16: PID output
18: PID feedback
19: PID setting
30: Communication setting 2
31: Communication setting 3
32: Speed loop output</td><td></td></tr>
<tr><td>F03.24</td><td>Frequency corresponding to 100% of Y2 high frequency pulse output</td><td>0.00~100.00</td><td>kHz</td><td>50.00</td><td>●</td><td>0x0318</td></tr>
<tr><td>F03.25</td><td>Frequency corresponding to 0% of Y2 high frequency pulse output</td><td>0.00~100.00</td><td>kHz</td><td>0.00</td><td>●</td><td>0x0319</td></tr>
<tr><td>F03.26</td><td>Filtering time of Y2 high frequency pulse output</td><td>0.00~10.00</td><td>s</td><td>0.10</td><td>●</td><td>0x031A</td></tr>
<tr><td>F03.27</td><td>M1 output bias</td><td>-100.0~100.0</td><td>%</td><td>0.0</td><td>●</td><td>0x0311</td></tr>
<tr><td>F03.28</td><td>M1 output gain</td><td>-9.999~9.999</td><td></td><td>1.000</td><td>●</td><td>0x0312</td></tr>
<tr><td>F03.29</td><td>M2 output bias</td><td>-100.0~100.0</td><td>%</td><td>0.0</td><td>●</td><td>0x0313</td></tr>
<tr><td>F03.30</td><td>M2 output gain</td><td>-9.999~9.999</td><td></td><td>1.000</td><td>●</td><td>0x0314</td></tr>
<tr><td>F03.31</td><td>Control logic options of PLC output terminal</td><td>D7 D6 D5 D4 D3 D2 D1 D0
* R4 R3 * R2 R1 Y2 Y1
0: No output 1: Output</td><td></td><td>000000</td><td>●</td><td>0x0315</td></tr>
<tr><td>F03.32</td><td>Options of R3 output function (expansion card)</td><td>For details, refer to introduction to F03.02</td><td></td><td>0</td><td>○</td><td>0x0316</td></tr>
<tr><td>F03.33</td><td>Options of R4 output function (expansion card)</td><td>For details, refer to introduction to F03.02</td><td></td><td>0</td><td>○</td><td>0x0317</td></tr>
<tr><td>F03.34</td><td>Output type selection of analog quantity M1</td><td rowspan="2">0: 0~10V
1: 4~20mA
2: 0~20mA</td><td></td><td>0</td><td>○</td><td>0x0318</td></tr>
<tr><td>F03.35</td><td>Output type selection of analog quantity M2</td><td></td><td>1</td><td>○</td><td>0x0319</td></tr>
<tr><td>F04</td><td colspan="6">Start/stop control parameter group</td></tr>
</table>

F04.00	Start-up method	0: direct start 1: start of speed tracking		0	○	0x0400
F04.01	Start frequency	0.00~50.00	Hz	0.00	○	0x0401
F04.02	Start frequency hold time	0.00-60.00, 0.00 is invalid	s	0.00	○	0x0402
F04.03	Starting current of DC braking	0.0 to 100.0 (100.0 = rated current of motor)	%	50.0	○	0x0403
F04.04	Starting time of DC braking	0.00~30.00, 0.00 invalid	s	0.00	○	0x0404
F04.06	Pre-excitation current	10.0~500.0 (100.0 = no-load current)	%	100.0	○	0x0406
F04.07	Pre-excitation time	0.00~10.00	s	0.10	○	0x0407
F04.08	Speed tracking mode	Ones place: Tracking start frequency 0: maximum frequency 1: stop frequency 2: power frequency Tens place: Selection of search direction 0: search only in command direction 1: Search in the opposite direction if the speed cannot be found in the command direction		01	○	0x0408
F04.10	Deceleration time of speed tracking	0.1~20.0	s	2.0	○	0x040A
F04.11	Speed tracking current	30.0-150.0 (100.0 = rated current of inverter)	%	50.0	○	0x040B
F04.12	Speed tracking compensation gain	1.00~10.00		1.00	○	0x040C
F04.14	Acceleration and deceleration mode	0: linear acceleration and deceleration 1: acceleration and deceleration of continuous S curve 2: acceleration and deceleration of intermittent S curve		0	○	0x040E
F04.15	Starting time of S curve in acceleration	0.00 to system acceleration time/2 (F15.13=0) 0.0 to system acceleration time/2 (F15.13=1) 0 to system acceleration time/2 (F15.13=2)	s	1.00	●	0x040F
F04.16	Ending time of S curve in acceleration		s	1.00	●	0x0410

F04.17	Starting time of S curve in deceleration		s	1.00	●	0x0411
F04.18	Ending time of S curve in deceleration		s	1.00	●	0x0412
F04.19	Stop mode	0: slow down to stop 1: free stop		0	○	0x0413
F04.20	Starting frequency of DC braking in stop	0.00 to maximum frequency F00.16	Hz	0.00	○	0x0414
F04.21	DC braking current in stop	0.0 to 100.0 (100.0 = rated current of motor)	%	50.0	○	0x0415
F04.22	DC braking time in stop	0.00~30.00 0.00: invalid	s	0.00	○	0x0416
F04.23	Demagnetization time for DC braking in stop	0.00~30.00	s	0.50	○	0x0417
F04.24	Flux braking gain	100-200 (100: no flux braking)		100	○	0x0418
F04.26	Start mode after failure/free stop	0: start according to F04.00 setting mode 1: start of speed tracking		0	○	0x041A
F04.27	Second confirmation of terminal start command	0: Not required for confirmation 1: to be confirmed 2: Way 2 for no confirmation (no confirmation is made even upon fault resetting)		0	○	0x041B
F04.28	Minimum valid output frequency	0.00~50.00 (0.00: function invalid)	Hz	0	○	0x041C
F04.29	Zero speed check frequency	0.00~5.00	Hz	0.25	●	0x041D
F04.30	Initial magnetic pole search mode of synchronous motor	0: Invalid 1: Mode 1		1	●	0x041E
F04.32	Gain of low-frequency excitation current regulation	0.0~300.0	%	100		0x0420
F04.33	Switching time of low-frequency excitation current regulation	0.00~10.00	s	0		0x0421
F05	V/F control parameter group					
F05.00	V/F curve setting	0: straight line V/F		0	○	0x0500

		1: multi-point broken line V/F 2: 1.3-power V/F 3: 1.7-power V/F 4: square V/F 5: VF complete separation mode (Ud = 0, Uq = K * t = voltage of separation voltage source) 6: VF semi-separation mode (Ud = 0, Uq = K * t = F/Fe * 2 * voltage of separation voltage source)				
F05.01	Frequency point F1 of multi-point VF	0.00~F05.03	Hz	0.50	●	0x0501
F05.02	Voltage point V1 of multi-point VF	0.0~100.0 (100.0 = Rated voltage)	%	1.0	●	0x0502
F05.03	Frequency point F2 of multi-point VF	F05.01~F05.05	Hz	2.00	●	0x0503
F05.04	Voltage point V2 of multi-point VF	0.0~100.0	%	4.0	●	0x0504
F05.05	Frequency point F3 of multi-point VF	F05.03 to rated frequency of motor (reference frequency)	Hz	5.00	●	0x0505
F05.06	Voltage point V3 of multi-point VF	0.0~100.0	%	10.0	●	0x0506
F05.07	Voltage source of VF separation mode	0: digital setting of VF separation voltage 1: AI1 2: AI2 3: AI3 4: high frequency pulse (X7) 5: PID 6: Communication setting Note: 100% is the rated voltage of the motor.		0	○	0x0507
F05.08	Digital setting of VF separation voltage	0.0 to 100.0 (100.0=Rated voltage of motor)	%	0.0	●	0x0508

F05.09	Rise time of VF separation voltage	0.00~60.00	s	2.00	●	0x0509
F05.10	Compensation gain of V/F stator voltage drop	0.00~200.00	%	100.00	●	0x050A
F05.11	V/F slip compensation gain	0.00~200.00	%	100.00	●	0x050B
F05.12	V/F slip filtering time	0.00~10.00	s	1.00	●	0x050C
F05.13	Oscillation suppression gain	0~20000		300	●	0x050D
F05.14	Oscillation suppression cutoff frequency	0.00~600.00	Hz	55.00	●	0x050E
F05.15	Droop control frequency	0.00~10.00	Hz	0.00	●	0x050F
F05.16	Energy saving rate	0.00~50.00	%	0.00	●	0x0510
F05.17	Energy saving action time	1.00~60.00	s	5.00	●	0x0511
F05.18	Flux compensation gain of synchronous motor	0.00~500.00	%	100.00	●	0x0512
F05.19	Filtering time constant of flux compensation of synchronous motor	0.00~10.00	s	0.50	●	0x0513
F05.20	Change rate of VF separate power supply setting	–50.00~50.00	%	0.00	●	0x0514
F06	Vector control parameter group					
F06.00	Speed proportional gain ASR_P1	0.00~100.00		12.00	●	0x0600
F06.01	Speed integral time constant ASR_T1	0.000~30.000 0.000: no integral	s	0.250	●	0x0601
F06.02	Speed proportional gain ASR_P2	0.00~100.00		10.00	●	0x0602
F06.03	Speed integral time constant	0.000~30.000	s	0.300	●	0x0603

	ASR_T2	0.000: no integral				
F06.04	Switching frequency 1	0.00 to switching frequency 2	Hz	5.00	●	0x0604
F06.05	Switching frequency 2	Switching frequency 1 to maximum frequency F00.16	Hz	10.00	●	0x0605
F06.07	Filtering time constant of speed loop output	0.000~0.100	s	0.001	●	0x0607
F06.08	Vector control slip gain	10.00~200.00	%	100.00	●	0x0608
F06.09	Upper limit source selection of speed control torque	0: set by F06.10 and F06.11 1: AI1 2: AI2 3: AI3 4: AI4 (expansion card) 5: Communication setting (percentage) 6: Take the maximum values of AI2 and AI3 7: Take the minimum values of AI2 and AI3		0	○	0x0609
F06.10	Upper limit of speed control motor torque	0.0~250.0	%	165.0	●	0x060A
F06.11	Upper limit of speed control brake torque	0.0~250.0	%	165.0	●	0x060B
F06.12	Excitation current proportional gain ACR-P1	0.00~100.00		0.50	●	0x060C
F06.13	Excitation current integral time constant ACR-T1	0.00~600.00 0.00: no integral	ms	10.00	●	0x060D
F06.14	Torque current proportional gain ACR-P2	0.00~100.00		0.50	●	0x060E
F06.15	Torque current integral time constant ACR-T2	0.00~600.00 0.00: no integral	ms	10.00	●	0x060F
F06.17	SVC zero-frequency processing	0: braking		2	○	0x0611

		1: not processed 2: seal the tube				
F06.18	SVC zero-frequency braking current	50.0-400.0 (100.0 is the no-load current of the motor)	%	100.0	○	0x0612
F06.20	Voltage feedforward gain	0~100	%	0	●	0x0614
F06.21	Flux weakening control options	Asynchronous motor Ones place: Asynchronous flux weakening mode 0: No PI adjustment output Non-zero: PI adjustment output Tens place: Output voltage limiting method of asynchronous motor in the flux weakening mode 0: F06.22 output voltage limiting according to bus voltage 1: F06.22 output voltage limiting according to rated voltage Synchronous motor Ones place: Synchronous motor flux weakening mode 0: Invalid 1: direct calculation 2: automatic adjustment Tens place: Output voltage limiting method of synchronous motor in the flux weakening mode 0: F06.22 output voltage limiting according to bus voltage 1: F06.22 output voltage limiting according to rated voltage		12	○	0x0615
F06.22	Flux weakening voltage	70.00~100.00	%	100.00	●	0x0616
F06.23	Maximum flux weakening current of synchronous motor	0.0-150.0 (100.0 is the rated current of the motor)	%	100.0	●	0x0617
F06.24	Proportional gain of flux weakening regulator	0.00~60.00		0.50	●	0x0618
F06.25	Integral time of flux weakening regulator	0.001~6.000	s	0.200	●	0x0619
F06.26	MTPA control options of synchronous motor	0: Invalid 1: valid		1	○	0x061A
F06.27	Self-learning gain at initial position	0~200	%	100	●	0x061B

F06.28	Frequency of low frequency band of injection current	0.00-100.00 (100.00 is the rated frequency of the motor)	%	10.00	●	0x061C
F06.29	Injection current of low frequency band	0.0-200.0 (100.0 is the rated current of the motor)	%	40.0	●	0x061D
F06.30	Regulator gain of low frequency band of injection current	0.00~10.00		0.50	●	0x061E
F06.31	Regulator integral time of low frequency band of injection current	0.00~300.00	ms	10.00	●	0x061F
F06.32	Frequency of high frequency band of injection current	0.00-100.00 (100.00 is the rated frequency of the motor)	%	20.00	●	0x0620
F06.33	Injection current f high frequency band	0.0-30.0 (100.0 is the rated current of the motor)	%	8.0	●	0x0621
F06.34	Regulator gain of high frequency band of injection current	0.00~10.00		0.50	●	0x0622
F06.35	Regulator integral time of high frequency band of injection current	0.00~300.00	ms	10.00	●	0x0623
F06.36	Magnetic saturation coefficient of synchronous motor	0.00~1.00		0.60	○	0x0624
F06.37	Stiffness coefficient of speed loop	0~20		11	●	0x0625
F06.40	Amplitude of injected reactive current of synchronous motor	-50.0~+50.0	%	10.0	○	0x0628
F06.41	Open-loop low-frequency processing of synchronous motor	0: VF 1: IF 2: IF in start and VF in stop 3: Throughout SVC		0	○	0x0629
F06.42	Open-loop low-frequency processing range of synchronous motor	0.0~50.0	%	8.0	○	0x062A
F06.43	IF injection current	0.0~600.0	%	80.0	○	0x062B

F06.44	Time constant of pull-in current of magnetic pole	0.0~6000.0	ms	1.0	○	0x062C
F06.45	Initial lead angle of magnetic pole	0.0~359.9	°	0.0	○	0x062D
F06.46	Speed tracking proportional gain of synchronous motor	0.00~10.00		1.00	○	0x062E
F06.47	Speed tracking integral gain of synchronous motor	0.00~10.00		1.00	○	0x062F
F06.48	Filtering time constant of speed tracking of synchronous motor	0.00~10.00	ms	0.40	○	0x0630
F06.49	Speed tracking control intensity of synchronous motor	1.0~100.0		5.0	○	0x0631
F06.50	Speed tracking control threshold of synchronous motor	0.00~10.00		0.20	○	0x0632
F06.51	Rise time of injected active current of synchronous motor	0.1~50.0	s	5.0	○	0x0633
F06.52	Linear transition code value of compensation in dead zone	1~1000		15	○	0x0634
F06.53	Excitation current setting for frequency switching from F3 to F4	0.0~100.0	%	50.0	●	0x0635
F06.54	Switching frequency 3	0.00~50.00	HZ	6.00	○	0x0636
F06.55	Switching frequency 4	0.00~60.00	HZ	10.00	○	0x0637
F06.56	Steady load torque and current setting	0.0~150.0	%	30.0	○	0x0638
F06.57	Filtering time constant of current	0.001~5.000	ms	0.350	○	0x0639
F06.58	Start injection pulse width	0.020~5.000	ms	0.050	○	0x063A
F06.59	Switching frequency 1	0.00~F06.60	HZ	0.00	○	0x063B
F06.60	Switching frequency 2	0.00~(F06.54/2)	HZ	1.00	○	0x063C

F06.61	Current setting for self-learning at the initial position	0.10~1.25		0.90	○	0x063D
F06.62	Speed ring proportion for rotation self-learning	0.00~100.00		2.00	○	0x063E
F06.63	Speed ring integral time for rotation self-learning	0.000~30.000	s	0.150	○	0x063F
F06.64	Acceleration time for rotation self-learning	5.00~100.00	s	20.00	○	0x0640
F06.65	Deceleration time for rotation self-learning	5.00~100.00	s	20.00	○	0x0641
F06.66	Asynchronous motor type selection	0: Built-in permanent magnet synchronous motor 1: Surface-mounted permanent magnet synchronous motor 2: Permanent magnet direct drive motor		0	○	0x0642
F06.67	Excitation current MTPA calculation gain	0.0~300.0	%	20.0	●	0x0643
F06.68	Excitation current flux weakening calculation gain	0.0~300.0	%	20.0	●	0x0644
F06.69	Start compensation angle	0~360	°	0	○	0x0645
F06.70	Expanded counter electrodynamic potential filtering factor 1	0.000~1.732		0.279	●	0x0646
F06.71	Expanded counter electrodynamic potential filtering factor 2	0.000~1.732		0.578	●	0x0647
F06.72	Minimum estimated frequency of synchronous motor SVC	0.01~100.00	HZ	0.50	○	0x0648
F06.73	Low frequency band ID-specific gain	0~500.0	%	100.0	●	0x0649
F06.74	Smooth switching times	1~1000		20	●	0x064A
F06.75	Speed toggle-hold times	1~2000		100	●	0x064B
F06.76	Low-speed correction factor of stator resistor of asynchronous motor	10.0~500.0	%	100.0	●	0x064C

F06.77	Low speed correction factor of rotor resistor of asynchronous motor	10.0~500.0	%	100.0	●	0x064D
F06.78	Slip gain switching frequency of asynchronous motor	0.10~Fmax	Hz	5.00	○	0x064E
F06.79	Speed ring differential time constant ASR_Td1	0.000~10.000	S	0	●	0x064F
F06.80	Speed ring differential time constant ASR_Td	0.000~10.000	S	0	●	0x0650
F06.81	Speed ring differential limit	0.0~150.0	%	0	●	0x0651
F06.82	Filtering time constant of bus voltage	0.0~1500.0	ms	8.0	●	0x0652
F07	Protection function setting group					
F07.00	Protection shield	E20 | E22 | E13 | E06 | E05 | E04 | E07 | E08 0: valid protection 1: shielded protection		00000000	○	0x0700
F07.01	Motor overload protection gain	0.20~10.00		1.00	●	0x0701
F07.02	Motor overload pre-alarm coefficient	50~100	%	80	●	0x0702
F07.03	Motor temperature sensor type	0: No temperature sensor 1: PT100 2: PT1000 3: KTY84-130/150 4: PTC-130/150		0	●	0x0703
F07.04	Motor overheat protection threshold	0~200	℃	110	●	0x0704
F07.05	Motor overheat pre-alarm threshold	0~200	℃	90	●	0x0705

F07.06	Bus voltage control options	Ones place: Instantaneous stop/no-stop function options 0: Invalid 1: deceleration 2: deceleration to stop Tens place: Overvoltage stall function options 0: invalid 1: valid		10	○	0x0706
F07.07	Voltage of overvoltage stall control	110.0~150.0(380V,100.0=537V)	%	134.1	○	0x0707
F07.08	Instantaneous stop/no-stop operating voltage	60.0 to instantaneous stop/no-stop recovery voltage (100.0 = standard bus voltage)	%	76.0	○	0x0708
F07.09	Instantaneous stop/no-stop recovery voltage	Instantaneous stop/no-stop recovery voltage~100.0	%	86.0	○	0x0709
F07.10	Check time for instantaneous stop/no-stop recovery voltage	0.00~100.0	s	0.50	○	0x070A
F07.11	Current limit control	0: Invalid 1: limit mode 1 2: limit mode 2		2	○	0x070B
F07.12	Current limit level	20.0-180.0(100.0 = the rated current of inverter)	%	150.0	●	0x070C
F07.13	Quick current limit options	0: Invalid 1: valid		0	○	0x070D
F07.14	Number of retries after failure	0~20, 0: disable retry after failure		0	○	0x070E
F07.15	Options of digital output action in retries after failure	0: no action 1: action		0	○	0x070F
F07.16	Interval of retries after failure	0.01~30.00	s	0.50	●	0x0710
F07.17	Restoration time in retries after failure	0.01~30.00	s	10.00	●	0x0711
F07.18	Options of retries after failure	E08 * E07 * E02 E06 E05 E04 0: allow retry after failure 1: disable retry after failure		000000	○	0x0712
F07.19	Action option 1 after failure	E21 E16 E15 E14 E13 E12 E08 E07 0: free stop 1: stop according to stop mode		00000000	○	0x0713

F07.20	Action option 2 after failure	E28	E27	E25	E23		0000	○	0x0714
		0: free stop		1: stop according to stop mode					
F07.21	Options of load loss protection	0: Invalid		1: valid			0	●	0x0715
F07.22	Load loss detection level	0.0~100.0				%	20.0	●	0x0716
F07.23	Load loss detection time	0.0~60.0				s	1.0	●	0x0717
F07.24	Options of load loss protection action	0: free stop		1: stop according to stop mode			1	○	0x0718
F07.25	Motor overspeed detection level	0.0-50.0 (reference: maximum frequency F00.16)				%	20.0	●	0x0719
F07.26	Motor overspeed detection time	0.0-60.0, 0.0: disable motor overspeed protection				s	1.0	●	0x071A
F07.27	AVR function	0: Invalid		1: valid		%	1	○	0x071B
F07.28	Stall fault detection time	0.0-6000.0 (0.0: no stall fault detection)				s	0.0	○	0x071C
F07.29	Stall control intensity	0~100				%	20	○	0x071D
F07.30	Instantaneous stop/no-stop deceleration time	0.00~300.00				S	20.00	○	0x071E
F07.32	Options of retries after failure 2	E10	E13	E15	E16	*	E19	E20	*		11111111	○	0x0720
		0: allow retry after failure				1: disable retry after failure							
F07.34	Encoder disconnection detection percentage	0~150.0								%	100.0	○	0x0722
F07.35	Protection shield 2	*	*	*	*	*	E15	E18	E81		000	○	0x0723
		0: valid protection				1: shielded protection							
F07.36	Options of retries after failure 3	*	*	*	*	*	*	E09	E17		11	○	0x0724
		0: allow retry after failure				1: disable retry after failure							
F07.37	Initial voltage for saving upon power disconnection	60.0~F07.38								%	76.0	○	0x0725
F07.38	Electrification voltage reading and determination	F07.37~100.0								%	86.0	○	0x0726

F07.39	Delay time of electrification reading and determination	0~100.0	S	5.00	○	0x0727
F07.40	Delay time of steady undervoltage determination	50~6000	ms	20	○	0x0728
F07.41	Selection of input phase loss detection method	0: Software detection 1: Hardware detection 2: Simultaneous software and hardware detection		0	○	0x0729
F07.42	Setting value of current for determining short to ground	0.00~100.0	%	20.0	○	0x072A
F07.43	Warning shield	* * * * * C32 C31 C30		00000000	○	0x072B
		0: Warning valid 1: Warning shielded				
F07.44	Upper limit of current for output phase loss detection	10.0~100.0	%	30.0	○	0x072C
F07.45	Times of output phase loss detection	1~60000		10	○	0x072D
F07.46	Times of determining ILP hardware detection	5~10000		100	●	0x072E
F07.47	Soft start disconnection delay time	20~1000	mS	400	○	0x072F
F07.50	STO fault resetting	0: manual resetting 1: automatic resetting		0	○	0x0732
F08	Multi-segment speed and simple PLC					
F08.00	Multi-segment speed 1	0.00 to maximum frequency F00.16	Hz	0.00	●	0x0800
F08.01	Multi-segment speed 2	0.00 to maximum frequency F00.16	Hz	5.00	●	0x0801
F08.02	Multi-segment speed 3	0.00 to maximum frequency F00.16	Hz	10.00	●	0x0802

F08.03	Multi-segment speed 4	0.00 to maximum frequency F00.16	Hz	15.00	●	0x0803
F08.04	Multi-segment speed 5	0.00 to maximum frequency F00.16	Hz	20.00	●	0x0804
F08.05	Multi-segment speed 6	0.00 to maximum frequency F00.16	Hz	25.00	●	0x0805
F08.06	Multi-segment speed 7	0.00 to maximum frequency F00.16	Hz	30.00	●	0x0806
F08.07	Multi-segment speed 8	0.00 to maximum frequency F00.16	Hz	35.00	●	0x0807
F08.08	Multi-segment speed 9	0.00 to maximum frequency F00.16	Hz	40.00	●	0x0808
F08.09	Multi- speed 10	0.00 to maximum frequency F00.16	Hz	45.00	●	0x0809
F08.10	Multi-segment speed 11	0.00 to maximum frequency F00.16	Hz	50.00	●	0x080A
F08.11	Multi-segment speed 12	0.00 to maximum frequency F00.16	Hz	50.00	●	0x080B
F08.12	Multi-segment speed 13	0.00 to maximum frequency F00.16	Hz	50.00	●	0x080C
F08.13	Multi-segment speed 14	0.00 to maximum frequency F00.16	Hz	50.00	●	0x080D
F08.14	Multi-segment speed 15	0.00 to maximum frequency F00.16	Hz	50.00	●	0x080E
F08.15	Simple PLC running mode	0: stop after a single run 1: stop after a limited number of cycles 2: run at the last segment after a limited number of cycles 3: continuous cycles		0	●	0x080F
F08.16	Limited number of cycles	1~10000		1	●	0x0810
F08.17	Simple PLC memory options	Ones place: Stop memory options 0: no memory (from the first segment) 1: memory (from the moment of stop) Tens place: Power-down memory options 0: no memory (from the first segment) 1: Memory (from the power-down moment)		0	●	0x0811
F08.18	Simple PLC time unit	0: s (second) 1: min (minute)		0	●	0x0812
F08.19	Setting of the first segment	Ones place: Running direction options		0	●	0x0813

		0: forward 1: reverse Tens place: Acceleration and deceleration time options 0: acceleration and deceleration time 1 1: acceleration and deceleration time 2 2: acceleration and deceleration time 3 3: acceleration and deceleration time 4				
F08.20	Running time of the first segment	0.0~6000.0	s/min	5.0	●	0x0814
F08.21	Setting of the second segment	Same as F08.19		0	●	0x0815
F08.22	Running time of the second segment	0.0~6000.0	s/min	5.0	●	0x0816
F08.23	Setting of the third segment	Same as F08.19		0	●	0x0817
F08.24	Running time of the third segment	0.0~6000.0	s/min	5.0	●	0x0818
F08.25	Setting of the fourth segment	Same as F08.19		0	●	0x0819
F08.26	Running time of the fourth segment	0.0~6000.0	s/min	5.0	●	0x081A
F08.27	Setting of the fifth segment	Same as F08.19		0	●	0x081B
F08.28	Running time of the fifth segment	0.0~6000.0	s/min	5.0	●	0x081C
F08.29	Setting of the sixth segment	Same as F08.19		0	●	0x081D
F08.30	Running time of the sixth segment	0.0~6000.0	s/min	5.0	●	0x081E
F08.31	Setting of the seventh segment	Same as F08.19		0	●	0x081F
F08.32	Running time of the seventh segment	0.0~6000.0	s/min	5.0	●	0x0820
F08.33	Setting of the eighth segment	Same as F08.19		0	●	0x0821
F08.34	Running time of the eighth segment	0.0~6000.0	s/min	5.0	●	0x0822

F08.35	Setting of the nineth segment	Same as F08.19		0	●	0x0823
F08.36	Running time of the ninth segment	0.0~6000.0	s/min	5.0	●	0x0824
F08.37	Setting of the tenth segment	Same as F08.19		0	●	0x0825
F08.38	Running time of the tenth segment	0.0~6000.0	s/min	5.0	●	0x0826
F08.39	Setting of the eleventh segment	Same as F08.19		0	●	0x0827
F08.40	Running time of the eleventh segment	0.0~6000.0	s/min	5.0	●	0x0828
F08.41	Setting of the twelve segment	Same as F08.19		0	●	0x0829
F08.42	Running time of the twelfth segment	0.0~6000.0	s/min	5.0	●	0x082A
F08.43	Setting of the thirteenth segment	Same as F08.19		0	●	0x082B
F08.44	Running time of the thirteenth segment	0.0~6000.0	s/min	5.0	●	0x082C
F08.45	Setting of the fourteenth segment	Same as F08.19		0	●	0x082D
F08.46	Running time of the fourteenth segment	0.0~6000.0	s/min	5.0	●	0x082E
F08.47	Setting of the fifteenth segment	Same as F08.19		0	●	0x082F
F08.48	Running time of the fifteenth segment	0.0~6000.0	s/min	5.0	●	0x0830
F09	PID function group					
F09.00	PID setting source	0: digital PID setting 1: AI1 2: AI2 3: AI3 4: AI4 (expansion card) 5: PULSE, high-frequency pulse (X7) 6: Communication setting		0	○	0x0900

F09.01	Digital PID setting	0.0 to PID setting feedback range F09.03		0.0	●	0x0901
F09.02	PID feedback source	1: AI1 2: AI2 3: AI3 4: AI4 (expansion card) 5: PULSE, high-frequency pulse (X7) 6: Communication setting 7: Reserved 8: output torque		1	○	0x0902
F09.03	PID setting feedback range	0.1~6000.0		100.0	●	0x0903
F09.04	PID positive and negative action selection	Ones place: 0: positive 1: negative Tens place: Direction selection of positive and negative action follow-up command 0: Not follow 1: Follow		0	○	0x0904
F09.05	Proportional gain 1	0.00~100.00		0.40	●	0x0905
F09.06	Integral time 1	0.000 - 30.000, 0.000: no integral	s	2.000	●	0x0906
F09.07	Differential time 1	0.000~30.000	ms	0.000	●	0x0907
F09.08	Proportional gain 2	0.00~100.00		0.40	●	0x0908
F09.09	Integral time 2	0.000 - 30.000, 0.000: no integral	s	2.000	●	0x0909
F09.10	Differential time 2	0.000~30.000	ms	0.000	●	0x090A
F09.11	PID parameter switching conditions	0: no switching 1: switching via digital input terminal 2: automatic switching according to deviation		0	●	0x090B

		3: Automatic switching by frequency				
F09.12	PID parameter switching deviation 1	0.00~F09.13	%	20.00	●	0x090C
F09.13	PID parameter switching deviation 2	F09.12~100.00	%	80.00	●	0x090D
F09.14	Initial PID value	0.00~100.00	%	0.00	●	0x090E
F09.15	PID initial value holding time	0.00~650.00	s	0.00	●	0x090F
F09.16	Upper limit of PID output	F09.17~+100.0	%	100.0	●	0x0910
F09.17	Lower limit of PID output	–100.0~F09.16	%	0.0	●	0x0911
F09.18	PID deviation limit	0.00-100.00 (0.00: invalid)	%	0.00	●	0x0912
F09.19	PID differential limit	0.00~100.00	%	5.00	●	0x0913
F09.20	PID integral separation threshold	0.00-100.00 (100.00% = invalid integral separation)	%	100.00	●	0x0914
F09.21	PID setting change time	0.000~30.000	s	0.000	●	0x0915
F09.22	PID feedback filtering time	0.000~30.000	s	0.000	●	0x0916
F09.23	PID output filtering time	0.000~30.000	s	0.000	●	0x0917
F09.24	Upper limit detection value of PID feedback disconnection	0.00-100.00; 100.00 = invalid feedback disconnection	%	100.00	●	0x0918
F09.25	Lower limit detection value of PID feedback disconnection	0.00-100.00; 0.00 = invalid feedback disconnection	%	0.00	●	0x0919
F09.26	Detection time of PID feedback disconnection	0.000~30.000	s	0.000	●	0x091A
F09.27	PID sleep control options	0: Invalid 1: sleep at zero speed 2: sleep at lower frequency limit 3: sleep with tube sealed		0	●	0x091B

F09.28	Sleep action point	0.00-100.00 (100.00 corresponds to the PID setting feedback range)	%	100.00	●	0x091C
F09.29	Sleep delay time	0.0~6500.0	s	0.0	●	0x091D
F09.30	Wake-up action point	0.00-100.00 (100.00 corresponds to the PID setting feedback range)	%	0.00	●	0x091E
F09.31	Wake-up delay time	0.0~6500.0	S	0.0	●	0x091F
F09.32	Multi-segment PID setting 1	0.0 to PID setting feedback range F09.03		0.0	●	0x0920
F09.33	Multi-segment PID setting 2	0.0 to PID setting feedback range F09.03		0.0	●	0x0921
F09.34	Multi-segment PID setting 3	0.0 to PID setting feedback range F09.03		0.0	●	0x0922
F09.35	Lower limit of feedback voltage	Lower limit of feedback voltage to 10.00	V	10.00	●	0x0923
F09.36	Upper limit of feedback voltage	0.00 to upper limit of feedback voltage	V	0.00	●	0x0924
F09.37	Options of integral action within the set change time of PID	0: Always calculate the integral term 1: Calculate the integral term after the F09.21 set time is reached 2: Calculate the integral term when the error is less than F09.38		0	●	0x0925
F09.38	Input deviation of integral action within the set change time of PID	0.00~100.00	%	30	●	0x0926
F09.39	Wake-up option	0: target pressure F09.01* coefficient of wake-up action point 1: Wake-up action point (F09.30)		0	○	0x0927
F09.40	Coefficient of wake-up action point	0.0-100.0 (100% corresponds to PID setting)	%	90.0	●	0x0928
F09.41	Pipeline network alarm overpressure	0.0 to pressure sensor range F09.03	bar	6.0	●	0x0929
F09.42	Overpressure protection time	0-3600 (0: invalid)	s	0	●	0x092A
F09.43	PID reverse limit	0: Invalid 1: valid		0	○	0x092B
F09.44	Sleep mode options	0: Sleep at sleep frequency (F09.45) 1: Sleep at sleep action points (F09.28)		0	○	0x092C

F09.45	Sleep frequency	0.00 to upper frequency limit F00.18	Hz	30.00	●	0x092D
F09.46	PID feedback increment	0~100		5	●	0x092E
F09.47	PID non-responsive feedback interval	0.00~600.00	bar	0.02	●	0x092F
F10	Communication function group					
F10.00	Local Modbus communication address	1-247; 0: broadcast address		1	○	0x0A00
F10.01	Baud rate of Modbus communication	0: 4800 1: 9600 2: 19200 3: 38400 4: 57600 5: 115200		1	○	0x0A01
F10.02	Modbus data format	0: 1-8-N-1 (1 start bit + 8 data bits + 1 stop bit) 1: 1-8-E-1 (1 start bit + 8 data bits + 1 even parity check bit + 1 stop bit) 2: 1-8-O-1 (1 start bit + 8 data bits + 1 odd parity check bit + 1 stop bit) 3: 1-8-N-2 (1 start bit + 8 data bits + 2 stop bits) 4: 1-8-E-2 (1 start bit + 8 data bits + 1 even parity check bit + 2 stop bits) 5: 1-8-O-2 (1 start bit + 8 data bits + 1 odd parity check bit + 2 stop bits)		0	○	0x0A02
F10.03	Communication timeout	0.0s-60.0s; 0.0: invalid (valid for the master-slave mode)	s	0.0	●	0x0A03
F10.04	Modbus response delay	1~20	ms	2	●	0x0A04
F10.05	Options of master-slave communication function	0: Invalid 1: valid		0	○	0x0A05

F10.06	Master-slave options	0: slave 1: Host (broadcast transmission)		0	○	0x0A06
F10.07	Data sent by host	0: output frequency 1: set frequency 2: output torque 3: set torque 4: PID setting 5: output current		1	○	0x0A07
F10.08	Proportional factor of slave reception	0.00-10.00 (multiple)		1.00	●	0x0A08
F10.09	Host sending interval	0.000~30.000	s	0.200	●	0x0A09
F10.12	Communication address of CANopen expansion card	1~127		1	○	0x0A0C
F10.14	Delay time of communication card process data response	0.0~200.0	ms	0.0	○	0x0A0E
F10.15	Baud rate of communication between the expansion card and the bus	Ones place: CANopen 0: 125K 1: 250K 2: 500K 3: 1M Tens place: Reserved		23	○	0x0A0F
F10.17 ~ F10.31	Selection of data type received by PZD2~PZD16	When data 65535 is displayed, it means the current PZD remains unused; when other data, say 4609, is displayed, it means the currently selected function code is F18.01 (18D=12H, 01D=01H, 1201H=4609D).		65535	○	0x0A11
F10.32 ~ F10.46	Selection of data type sent by PZD2~PZD16			65535	○	
F10.47	Communication card status	Ones place: Reserved Tens place: CANopen		000	×	0x0A2F

		0: Initialization 1: Pre-operation 2: Operation 3: Stop 4: CANopen communication abnormality 5: Modbus communication abnormality 6: Factory testing Hundreds place: Reserved				
F10.48	Communication card software version				×	0x0A30
F10.49	Quantity of process data received	1~16		2	×	0x0A31
F10.50	Quantity of process data sent	1~16		2	×	0x0A32
F10.51	Selection of address setting mode for process data	0: Keyboard setting 1: Master station configuration		0	×	0x0A33
F10.52	Selection of communication card manual resetting	0: Invalid 1: valid		0	×	0x0A34
F10.56	Options of 485 EEPROM writing	0-10: default operation (for commissioning) 11: writing not triggered (available after commissioning)		0	○	0x0A38
F10.57	Enabling of SCI sending timeout resetting	0: invalid resetting 1: valid resetting		1	●	0x0A39
F10.58	Delay time of SCI sending timeout resetting	110~10000		150	●	0x0A3A
F10.61	SCI response option	0: Reply to both read and write commands 1: Reply to write commands only 2: No reply to both read and write commands		0	○	0x0A3D
F10.62	CANopen self-check identification code	0~65535		0	×	0x0A3E

F11	User-selected array (for details, refer to the user's manual or the complete function table)					
F11.00	User-selected parameter 1	The displayed content is Uxx.xx, which means that the Fxx.xx function code is selected. When the function code F11.00 is enabled, the keyboard displays U00.00, indicating that the first selected parameter is F00.00.		U16.00	●	0x0B00
F11.01	User-selected parameter 2			U00.01	●	0x0B01
F11.02	User-selected parameter 3			U00.02	●	0x0B02
F11.03	User-selected parameter 4			U00.03	●	0x0B03
F11.04	User-selected parameter 5			U00.04	●	0x0B04
F11.05	User-selected parameter 6			U00.07	●	0x0B05
F11.06	User-selected parameter 7			U00.14	●	0x0B06
F11.07	User-selected parameter 8			U00.15	●	0x0B07
F11.08	User-selected parameter 9			U00.16	●	0x0B08
F11.09	User-selected parameter 10			U00.18	●	0x0B09
F11.10	User-selected parameter 11			U00.19	●	0x0B0A
F11.11	User-selected parameter 12			U00.29	●	0x0B0B
F11.12	User-selected parameter 13			U02.00	●	0x0B0C
F11.13	User-selected parameter 14			U02.01	●	0x0B0D
F11.14	User-selected parameter 15			U02.02	●	0x0B0E
F11.15	User-selected parameter 16			U03.00	●	0x0B0F
F11.16	User-selected parameter 17			U03.02	●	0x0B10
F11.17	User-selected parameter 18			U03.21	●	0x0B11
F11.18	User-selected parameter 19			U04.00	●	0x0B12

F11.19	User-selected parameter 20			U04.20	●	0x0B13
F11.20	User-selected parameter 21			U05.00	●	0x0B14
F11.21	User-selected parameter 22			U05.03	●	0x0B15
F11.22	User-selected parameter 23			U05.04	●	0x0B16
F11.23	User-selected parameter 24			U08.00	●	0x0B17
F11.24	User-selected parameter 25			U19.00	●	0x0B18
F11.25	User-selected parameter 26			U19.01	●	0x0B19
F11.26	User-selected parameter 27			U19.02	●	0x0B1A
F11.27	User-selected parameter 28			U19.03	●	0x0B1B
F11.28	User-selected parameter 29			U19.04	●	0x0B1C
F11.29	User-selected parameter 30			U19.05	●	0x0B1D
F11.30	User-selected parameter 31			U19.06	●	0x0B1E
F11.31	User-selected parameter 32			U19.12	●	0x0B1F
F12	Keyboard and display function group					
F12.00	M.K multi-function key options	0: ESC 1: forward jog 2: reverse jog 3: forward/reverse switching		0	○	0x0C00

		4: quick stop 5: free stop				
F12.01	Options of stop function of STOP key	0: valid only in keyboard control 1: with all command channels valid		1	○	0x0C01
F12.02	Parameter locking	0: do not lock 1: reference input not locked 2: all locked, except for this function code		0	●	0x0C02
F12.03	Parameter copying	0: No operation 1: parameter upload to keyboard 2: Download parameters to inverter (excluding F01 and F14) 3: Download parameters to inverter		0	○	0x0C03
F12.09	Load speed display coefficient	0.01~600.00		30.00	●	0x0C09
F12.10	UP/DOWN acceleration and deceleration rate	0.00: automatic rate 0.01~500.00	Hz/s	5.00	○	0x0C0A
F12.11	Options of UP/DOWN offset clearing	0: do not clear 1: clear in non-running state 2: clear when UP/DOWN invalid		0	○	0x0C0B
F12.12	Options of UP/DOWN power-down saving of offset	0: do not save 1: save (valid after the offset is modified)		1	○	0x0C0C
F12.13	Power meter resetting	0: do not clear 1: clear		0	●	0x0C0D
F12.14	Restoration of default setting	0: No operation 1: restoration of factory defaults (excluding the motor parameters, inverter parameters, manufacturer parameters, running and power-on time record) 2: restoration of factory defaults (including motor and application macro parameter)		0	○	0x0C0E
F12.15	Cumulative power-on time (h)	0~65535	h	XXX	×	0x0C0F

F12.16	Cumulative power-on time (min)	0~59	min	XXX	×	0x0C10
F12.17	Cumulative running time (h)	0~65535	h	XXX	×	0x0C11
F12.18	Cumulative running time (min)	0~59	min	XXX	×	0x0C12
F12.19	Rated power of inverter	0.40~650.00	kW	Depending on the motor type	×	0x0C13
F12.20	Rated voltage of inverter	60~690	V	Depending on the motor type	×	0x0C14
F12.21	Rated current of inverter	0.1~1500.0	A	Depending on the motor type	×	0x0C15
F12.22	Performance software S/N 1	XXX.XX		XXX.XX	×	0x0C16
F12.23	Performance software S/N2	XX.XXX		XX.XXX	×	0x0C17
F12.24	Functional software S/N 1	XXX.XX		XXX.XX	×	0x0C18
F12.25	Functional software S/N 2	XX.XXX		XX.XXX	×	0x0C19
F12.26	Keyboard software serial number 1	XXX.XX		XXX.XX	×	0x0C1A
F12.27	Keyboard software serial number 2	XX.XXX		XX.XXX	×	0x0C1B
F12.28	Serial No. 1	XX.XXX		XX.XXX	×	0x0C1C
F12.29	Serial No. 2	XXXX.X		XXXX.X	×	0x0C1D
F12.30	Serial No. 3	XXXXX		XXXXX	×	0x0C1E
F12.31	LCD language options	0: Chinese 1: English		0	●	0x0C1F
F12.33	Running status display parameter 1 of Mode 1 (LED stop status display parameter 5)	0.00~99.99		18.00	●	0x0C21
F12.34	Running status display parameter 2 of Mode 1 (LED stop status display parameter 1)	0.00~99.99		18.01	●	0x0C22

F12.35	Running status display parameter 3 of Mode 1 (LED stop status display parameter 2)	0.00~99.99		18.06	●	0x0C23
F12.36	Running status display parameter 4 of Mode 1 (LED stop status display parameter 3)	0.00~99.99		18.08	●	0x0C24
F12.37	Running status display parameter 5 of Mode 1 (LED stop status display parameter 4)	0.00~99.99		18.09	●	0x0C25
F12.38	LCD large-line display parameter 1	0.00~99.99		18.00	●	0x0C26
F12.39	LCD large-line display parameter 2	0.00~99.99		18.06	●	0x0C27
F12.40	LCD large-line display parameter 3	0.00~99.99		18.01	●	0x0C28
F12.41	Options of UP/DOWN zero crossing	0: prohibit zero crossing 1: allow zero crossing		0	○	0x0C29
F12.42	Frequency setting of digital potentiometer	0.00 to maximum frequency 00.16	HZ	0.00	×	0x0C2A
F12.43	Digital potentiometer torque setting	0.00-|Digital torque setting F13.02|	%	0.0	×	0x0C2B
F12.46	ACLib version number			XXX.XX	×	0x0C2E
F12.45	UP/DOWN function selection	D7 Channel sharing; D6 Range limitation; D5 Keyboard; D4 Communication; D3 High-speed pulse; D2 Analog quantity; D1 Digital frequency; D0 Multi-segment speed 0: Invalid 1: valid		00100010	○	0x0C2D

F12.47	Any address	0~65535		28673	●	0x0C2F
F13	Torque control parameter group					
F13.00	Speed/torque control options	0: Speed control 1: Torque control		0	○	0x0D00
F13.01	Options of torque setting source	0: digital torque setting F13.02 1: AI1 2: AI2 3: AI3 4: AI4 (expansion card) 5: high frequency pulse input (X7) 6: Communication setting (Full range of the items 1-6, corresponding to F13.02 digital torque setting)		0	○	0x0D01
F13.02	Digital torque setting	-200.0 to 200.0 (100.0 = the rated torque of motor)	%	100.0	●	0x0D02
F13.03	Multi-segment torque 1	-200.0~200.0	%	0.0	●	0x0D03
F13.04	Multi-segment torque 2	-200.0~200.0	%	0.0	●	0x0D04
F13.05	Multi-segment torque 3	-200.0~200.0	%	0.0	●	0x0D05
F13.06	Torque control acceleration and deceleration time	0.00~120.00	s	0.05	●	0x0D06
F13.08	Upper frequency limit options of torque control	0: set by F13.09 1: AI1 2: AI2 3: AI3 4: AI4 (expansion card) 5: high frequency pulse input (X7) 6: Communication setting (percentage) 7: Communication setting (direct frequency setting)		0	○	0x0D08

F13.09	Upper frequency limit of torque control	0.00 to maximum frequency F00.16	Hz	50.00	●	0x0D09
F13.10	Upper frequency limit offset	0.00 to maximum frequency F00.16	Hz	0.00	●	0x0D0A
F13.11	Static friction torque compensation	0.0~100.0	%	0.0	●	0x0D0B
F13.12	Frequency range of static friction compensation	0.00~50.00	Hz	1.00	●	0x0D0C
F13.13	Dynamic friction torque compensation	0.0~100.0	%	0.0	●	0x0D0D
F13.18	Reverse speed limit options	0~100	%	100	●	0x0D12
F13.19	Speed priority enabling of torque control	0: Disable 1: Enable		0	●	0x0D13
F14	Parameter group of motor 2					
F14.00	Motor type	0: ordinary asynchronous motor 1: variable-frequency asynchronous motor 2: permanent magnet synchronous motor		0	○	0x0E00
F14.01	Rated power of electric motor	0.10~650.00	kW	Depending on the motor type	○	0x0E01
F14.02	Rated voltage of motor	50~2000	V	Depending on the motor type	○	0x0E02
F14.03	Rated current of motor	0.01 to 600.00 (rated power of motor: ≤ 75 kW) 0.1 to 6000.0 (rated power of motor: > 75 kW)	A	Depending on the motor type	○	0x0E03
F14.04	Rated frequency of motor	0.01~600.00	Hz	Depending on the motor type	○	0x0E04
F14.05	Rated speed	1~60000	rpm	Depending on the motor type	○	0x0E05
F14.06	Motor winding connection	0: Y 1: Δ		Depending on the motor type	○	0x0E06
F14.07	Rated power factor of motor	0.600~1.000		Depending on the motor type	○	0x0E07
F14.08	Motor efficiency	30.0~100.0	%	Depending on the motor type	○	0x0E08
F14.09	Stator resistance of asynchronous motor	1-60000 (rated power of motor: ≤ 75kW) 0.1 to 6000.0 (rated power of motor: > 75 kW)	mΩ	Depending on the motor type	○	0x0E09

F14.10	Rotor resistance of asynchronous motor	1-60000 (rated power of motor: ≤ 75 kW) 0.1 to 6000.0 (rated power of motor: > 75 kW)	mΩ	Depending on the motor type	○	0x0E0A
F14.11	Leakage inductance of asynchronous motor	0.01 to 600.00 (rated power of motor: ≤ 75 kW) 0.001 to 60.000 (rated power of motor: > 75 kW)	mH	Depending on the motor type	○	0x0E0B
F14.12	Mutual inductance of asynchronous motor	0.1 to 6000.0 (rated power of motor: > 75 kW 0.01 to 600.00 (rated power of motor: > 75 kW)	mH	Depending on the motor type	○	0x0E0C
F14.13	No-load excitation current of asynchronous motor	0.01 to 600.00 (rated power of motor: ≤ 75 kW) 0.1 to 6000.0 (rated power of motor: > 75 kW)	A	Depending on the motor type	○	0x0E0D
F14.14	Flux weakening coefficient 1 of asynchronous motor	10.00~100.00	%	100.00	○	0x0E0E
F14.15	Flux weakening coefficient 2 of asynchronous motor	10.00~100.00	%	100.00	○	0x0E0F
F14.16	Flux weakening coefficient 3 f asynchronous motor	10.00~100.00	%	100.00	○	0x0E10
F14.17	Flux weakening coefficient 4 f asynchronous motor	10.00~100.00	%	100.00	○	0x0E11
F14.18	Flux weakening coefficient 5 f asynchronous motor	10.00~100.00	%	100.00	○	0x0E12
F14.19	Stator resistance of synchronous motor	1-60000 (rated power of motor: ≤ 75kW) 0.1 to 6000.0 (rated power of motor: > 75 kW)	mΩ	Depending on the motor type	○	0x0E13
F14.20	d-axis inductance of synchronous motor	0.01 to 600.00 (rated power of motor: ≤ 75 kW) 0.001 to 60.000 (rated power of motor: > 75 kW)	mH	Depending on the motor type	○	0x0E14
F14.21	q-axis inductance of synchronous motor	0.01 to 600.00 (rated power of motor: ≤ 75 kW) 0.001 to 60.000 (rated power of motor: > 75 kW)	mH	Depending on the motor type	○	0x0E15
F14.22	Counter electromotive force of synchronous motor	10.0-2000.0 (counter electromotive force of rated speed)	V	Depending on the motor type	○	0x0E16
F14.23	Initial electrical angle of synchronous motor	0.0-359.9 (valid for synchronous motor)			○	0x0E17
F14.24	Encoder type	0: ABZ gain encoder 1: UVW gain encoder		0	○	0x0E18

		2: Reserved (cable-economical UVW encoder) 3: Reserved (SinCos PG card) 4: Rotary transformer				
F14.25	Encoder line count	1~65535		1024	○	0x0E19
F14.26	Zero-pulse phase angle of encoder	0.0~359.9°		0.0	○	0x0E1A
F14.27	AB pulse phase sequence	0: forward 1: reverse		0	○	0x0E1B
F14.28	UVW encoder phase sequence	0: forward 1: reverse		0	○	0x0E1C
F14.29	UVW initial offset phase angle	0.0~359.9°		0.0	○	0x0E1D
F14.30	Pole pairs of rotary transformer	1~65535		1	○	0x0E1E
F14.31	Reserved					0x0E1F
F14.32	Detection time of speed feedback disconnection	0.0~10.0		1.0	○	0x0E20
F14.33	Speed feedback filtering time	0.000~0.100	s	0.002	○	0x0E21
F14.34	Motor parameter self-learning	0: No operation 1: static self-learning of asynchronous motor 2: rotation self-learning of asynchronous motor 3: Self-learning of asynchronous motor encoder 11: static self-learning of synchronous motor 12: rotary self-learning of synchronous motor 13: encoder self-learning of synchronous motor		0	○	0x0E22
F14.35	Drive control mode of motor 2	0: V/F control (VVF) 1: Speed sensorless vector control (SVC) 2: Speed sensor vector control (FVC)		0	○	0x0E23
F14.36	Speed proportional gain ASR_P1	0.00~100.00		12.00	●	0x0E24
F14.37	Speed integral time constant ASR_T1	0.000~30.000 0.000: no integral	s	0.250	●	0x0E25
F14.38	Speed proportional gain ASR_P2	0.00~100.00		10.00	●	0x0E26

F14.39	Speed integral time constant ASR_T2	0.000~30.000 0.000: no integral	s	0.300	●	0x0E27
F14.40	Switching frequency 1	0.00 to switching frequency 2	Hz	5.00	●	0x0E28
F14.41	Switching frequency 2	Switching frequency 1 to maximum frequency F00.16	Hz	10.00	●	0x0E29
F14.42	No-load current gain of motor 2	10.0~300.0	%	100.0	●	0x0E2A
F14.43	Filtering time constant of speed loop output	0.000~0.100	s	0.001	●	0x0E2B
F14.44	Vector control slip gain	50.00~200.00	%	100.00	●	0x0E2C
F14.45	Upper limit source selection of speed control torque	0: Set by F14.46 and F14.47 1: AI1 2: AI2 3: AI3 4: AI4 (expansion card) 5: Communication setting (percentage) 6: Take the maximum values of AI2 and AI3 7: Take the minimum values of AI2 and AI3		0	○	0x0E2D
F14.46	Upper limit of speed control motor torque	0.0~250.0	%	165.0	●	0x0E2E
F14.47	Upper limit of speed control brake torque	0.0~250.0	%	165.0	●	0x0E2F
F14.48	Excitation current proportional gain ACR-P1	0.00~100.00		0.50	●	0x0E30
F14.49	Excitation current integral time constant ACR-T1	0.00~600.00 0.00: no integral	ms	10.00	●	0x0E31
F14.50	Torque current proportional gain ACR-P2	0.00~100.00		0.50	●	0x0E32
F14.51	Torque current integral time constant ACR-T2	0.00~600.00 0.00: no integral	ms	10.00	●	0x0E33

F14.52	Stiffness coefficient of speed loop of motor 2	0~20		11	●	0x0E34
F14.53	SVC zero-frequency processing	0: braking 1: not processed 2: seal the tube		2	○	0x0E35
F14.54	SVC zero-frequency braking current	50.0-400.0 (100.0 is the no-load current of the motor)	%	100.0	○	0x0E36
F14.56	Voltage feedforward gain	0~100	%	0	●	0x0E38
F14.57	Flux weakening control options	0: Invalid 1: direct calculation 2: automatic adjustment		1	○	0x0E39
F14.58	Flux weakening voltage	70.00~100.00	%	100.00	●	0x0E3A
F14.59	Maximum field weakening current of synchronous motor	0.0-150.0 (100.0 is the rated current of the motor)	%	100.0	●	0x0E3B
F14.60	Proportional gain of flux weakening regulator	0.00~60.00		0.50	●	0x0E3C
F14.61	Integral time of flux weakening regulator	0.000~6.000	s	0.200	●	0x0E3D
F14.62	MTPA control option of synchronous motor	0: Invalid 1: valid		0	○	0x0E3E
F14.63	Self-learning gain at initial position	0~200	%	100	○	0x0E3F
F14.64	Frequency of low frequency band of injection current	0.00-100.00 (100.00 is the rated frequency of the motor)	%	10.00	●	0x0E40
F14.65	Injection current of low frequency band	0-200.0 (100.0 is the rated current of the motor)	%	40.0	●	0x0E41
F14.66	Regulator gain of low frequency band of injection current	0.00~10.00		0.50	●	0x0E42
F14.67	Regulator integral time of low frequency band of injection current	0.00~300.00	ms	10.00	●	0x0E43
F14.68	Frequency of high frequency band of injection current	0.00-100.00 (100.00 is the rated frequency of the motor)	%	20.00	●	0x0E44

F14.69	Injection current f high frequency band	0.0-30.0 (100.0 is the rated current of the motor)	%	8.0	●	0x0E45
F14.70	Regulator gain of high frequency band of injection current	0.00~10.00		0.50	●	0x0E46
F14.71	Regulator integral time of high frequency band of injection current	0.00~300.00	ms	10.00	●	0x0E47
F14.72	Open-loop low-frequency processing of synchronous motor	0: VF 1: IF 2: IF in start and VF in stop 3: Throughout SVC		0	○	0x0E48
F14.73	Excitation current setting for frequency switching from F3 to F4	0.0~100.0	%	50.0	●	0x0E49
F14.74	Switching frequency 3	0.0~50.00	Hz	6.00	○	0x0E4A
F14.75	Switching frequency 4	0.0~60.00	Hz	10.00	○	0x0E5B
F14.76	Steady load torque and current setting	0.0~150.0	%	30.0	●	0x0E5C
F14.77	Acceleration/deceleration time options of motor 2	0: the same as motor 1 1: acceleration and deceleration time 1 2: acceleration and deceleration time 2 3: acceleration and deceleration time 3 4: acceleration and deceleration time 4		0	○	0x0E4D
F14.78	Maximum frequency of motor 2	1.00~600.00	Hz	50.00	○	0x0E4E
F14.79	Upper frequency limit of motor 2	Lower limit frequency F00.19 to maximum frequency F14.78	Hz	50.00	●	0x0E4F
F14.80	V/F curve setting of motor 2	0: straight line V/F 1: multi-point broken line V/F 2: 1.3-power V/F 3: 1.7-power V/F 4: square V/F 5: VF complete separation mode (Ud = 0, Uq = K * t = voltage of separation voltage source) 6: VF semi-separation mode (Ud = 0, Uq = K * t = F/Fe * 2 * voltage of separation voltage source)		0	○	0x0E50
F14.81	Multi-point VF frequency F1 of motor 2	0.00~F14.83	Hz	0.50	●	0x0E51

F14.82	Multi-point VF voltage V1 of motor 2	0.0~100.0 (100.0 = Rated voltage)	%	1.0	●	0x0E52
F14.83	Multi-point VF frequency F2 of motor 2	F14.81~F14.85	Hz	2.00	●	0x0E53
F14.84	Multi-point VF voltage V2 of motor 2	0.0~100.0	%	4.0	●	0x0E54
F14.85	Multi-point VF frequency F3 of motor 2	F14.83 to rated frequency of motor (reference frequency)	Hz	5.00	●	0x0E55
F14.86	Multi-point VF voltage V3 of motor 2	0.0~100.0	%	10.0	●	0x0E56
F14.87	Stop mode of motor 2	0: Slow down to stop 1: free stop		0	○	0x0E57
F14.88	Start injection pulse width	0.020~5.000	ms	0.050	○	0x0E58
F14.89	Asynchronous motor type selection	0: Built-in permanent magnet synchronous motor 1: Surface-mounted permanent magnet synchronous motor 2: Permanent magnet direct drive motor	s	0	○	0x0E59
F14.90	Excitation current MTPA calculation gain	0.0~300.0	%	20.0	●	0x0E5A
F14.91	Excitation current flux weakening calculation gain	0.0~300.0	%	20.0	●	0x0E5B
F14.92	Start compensation angle	0~360	°	0	○	0x0E5C
F14.93	Expanded counter electrodynamic potential filtering factor 1	0.000~1.732		0.279	●	0x0E5D
F14.94	Expanded counter electrodynamic potential filtering factor 2	0.000~1.732		0.578	●	0x0E5E
F14.95	Minimum estimated frequency of synchronous motor SVC	0.01~100.00	Hz	0.50	○	0x0E5F
F14.96	Low-speed correction factor of stator resistor of asynchronous motor	10.0~500.0	%	100.0	●	0x0E60
F14.97	Low speed correction factor of rotor resistor of asynchronous motor	10.0~500.0	%	100.0	●	0x0E61

F14.98	Slip gain switching frequency of asynchronous motor	0.10~Fmax	Hz	5.00	○	0x0E62
F15	Auxiliary function group					
F15.00	Jog frequency	0.00 to maximum frequency F00.16	Hz	5.00	●	0x0F00
F15.01	Jog acceleration time	0.00~650.00(F15.13=0) 0.0~6500.0(F15.13=1) 0~65000(F15.13=2)	s	5.00	●	0x0F01
F15.02	Jog deceleration time		s	5.00	●	0x0F02
F15.03	Acceleration time 2		s	15.00	●	0x0F03
F15.04	Deceleration time 2		s	15.00	●	0x0F04
F15.05	Acceleration time 3		s	15.00	●	0x0F05
F15.06	Deceleration time 3		s	15.00	●	0x0F06
F15.07	Acceleration time 4		s	15.00	●	0x0F07
F15.08	Deceleration time 4		s	15.00	●	0x0F08
F15.09	Fundamental frequency of acceleration and deceleration time	0: maximum frequency F00.16 1: 50.00Hz 2: set frequency		0	○	0x0F09
F15.10	Automatic switching of acceleration and deceleration time	0: Invalid 1: valid		0	○	0x0F0A
F15.11	Switching frequency of acceleration time 1 and 2	0.00 to maximum frequency F00.16	Hz	0.00	●	0x0F0B
F15.12	Switching frequency of deceleration time 1 and 2	0.00 to maximum frequency F00.16	Hz	0.00	●	0x0F0C
F15.13	Acceleration and deceleration time unit	0:0.01s 1:0.1s 2:1s		0	○	0x0F0D
F15.14	Frequency hopping point 1	0.00~600.00	Hz	600.00	●	0x0F0E

F15.15	Hopping range 1	0.00~20.00, 0.00: Invalid	Hz	0.00	●	0x0F0F
F15.16	Frequency hopping point 2	0.00~600.00	Hz	600.00	●	0x0F10
F15.17	Hopping range 2	0.00~20.00, 0.00: Invalid	Hz	0.00	●	0x0F11
F15.18	Frequency hopping point 3	0.00~600.00	Hz	600.00	●	0x0F12
F15.19	Hopping range 3	0.00~20.00, 0.00: Invalid	Hz	0.00	●	0x0F13
F15.20	Detection width of output frequency arrival (FAR)	0.00~50.00	Hz	2.50	○	0x0F14
F15.21	Upper limit of output frequency detection FDT1	0.00 to maximum frequency F00.16	Hz	30.00	○	0x0F15
F15.22	Lower limit of output frequency detection FDT1	0.00 to maximum frequency F00.16	Hz	28.00	○	0x0F16
F15.23	Upper limit of output frequency detection FDT2	0.00 to maximum frequency F00.16	Hz	20.00	○	0x0F17
F15.24	Lower limit of output frequency detection FDT2	0.00 to maximum frequency F00.16	Hz	18.00	○	0x0F18
F15.25	Options of analog level detection ADT	0: AI1 2: AI3 1: AI2 3: AI4 (expansion card)		0	○	0x0F19
F15.26	Analog level detection ADT1	0.00~100.00	%	20.00	●	0x0F1A
F15.27	ADT1 hysteresis	0.00 to F15.26 (valid down in one direction)	%	5.00	●	0x0F1B
F15.28	Analog level detection ADT2	0.00~100.00	%	50.00	●	0x0F1C
F15.29	ADT2 hysteresis	0.00 to F15.28 (valid down in one direction)	%	5.00	●	0x0F1D
F15.30	Options of energy consumption braking function	0: Invalid 1: valid		0	○	0x0F1E
F15.31	Energy consumption braking voltage	110.0~140.0(380V,100.0=537V)	%	128.5	○	0x0F1F
F15.32	Braking rate	20-100 (100 means that duty ratio is 1)	%	100	●	0x0F20

F15.33	Operating mode with set frequency less than lower frequency limit	0: running at the lower frequency limit 1: Shutdown 2: zero-speed running		0	○	0x0F21
F15.34	Fan control	Ones place: Fan control mode 0: running after power-on 1: running at startup 2: intelligent operation, subject to temperature control Tens place: Electrification fan control 0: Run 1 minute first and then enter the fan control mode for running 1: Directly run in the fan control mode Hundreds place: Low-speed fan running mode enabled (above 200kW) 0: Low-speed running invalid 1: Low-speed running valid		101	○	0x0F22
F15.35	Overmodulation intensity	1.00~1.10		1.05	●	0x0F23
F15.36	Switching options of PWM modulation mode	0: invalid (7-segment PWM modulation) 1: valid (5-segment PWM modulation)		0	○	0x0F24
F15.37	Switching frequency of PWM modulation mode	0.00 to maximum frequency F00.16	Hz	15.00	●	0x0F25
F15.38	Options of dead zone compensation mode	0: no compensation 1: compensation mode 1 2: compensation mode 2		1	○	0x0F26
F15.39	Terminal jog priority	0: Invalid 1: valid		0	○	0x0F27
F15.40	Deceleration time for quick stop	0.00~650.00(F15.13=0) 0.0~6500.0(F15.13=1) 0~65000(F15.13=2)	s	1.00	●	0x0F28
F15.41	Output power display coefficient	50.00~150.00	%	100.0	●	0x0F29

F15.42	Output current display coefficient	50.00~150.00	%	100.0	●	0x0F2A
F15.43	Output voltage display coefficient	50.00~150.00	%	100.0	●	0x0F2B
F15.44	Current reaches the detection value	0.0~300.0 (100.0% corresponds to the rated current of motor)	%	100.0	●	0x0F2C
F15.45	Current reaches the hysteresis	0.0~F15.44	%	5.0	●	0x0F2D
F15.46	Torque reaches the detection value	0.0~300.0 (100.0% corresponds to the rated torque of motor)	%	100.0	●	0x0F2E
F15.47	Torque reaches the hysteresis	0.0~F15.46	%	5.0	●	0x0F2F
F15.48	Divided frequencies of encoder	1~256		1	●	0x0F30
F15.49	High-frequency filtering coefficient of PG card	0~255		0	●	0x0F31
F15.62	PG card feedback frequency filtering time	0.000~30.000	S	0.010	●	0x0F3E
F15.63	Speed reaches the rising limit	0.00~Fmax	HZ	30.00	●	0x0F3F
F15.64	Speed reaches the filtering time	0~60000	Ms	500	●	0x0F40
F15.65	Speed reaches the falling limit	0.00~Fmax	HZ	0.00	●	0x0F41
F15.66	Overcurrent detection level	0.1-300.0 (0.0: no detection; 100.0%: corresponding to the rated current of motor)	%	200.0	●	0x0F42
F15.67	Overcurrent detection delay time	0.00~600.00	s	0.00	●	0x0F43
F15.68	Market price	0.00~100.00		1.00	○	0x0F44
F15.69	Power-frequency load factor	30.0~200.0	%	90.0	○	0x0F45
F16	Customization function group					
F16.00	Industry application	0: Universal model 1: Water supply application macro 3: Winding and unwinding application		0	○	0x1000

		9: EM100 communication macro 10: EM303B communication macro				
F16.01	Set length	1~65535(F16.13=0) 0.1~6553.5(F16.13=1) 0.01~655.35(F16.13=2) 0.001~65.535(F16.13=3)	m	1000	●	0x1001
F16.02	Pulses per meter	0.1~6553.5		100.0	●	0x1002
F16.03	Set count value	F16.04~65535		1000	●	0x1003
F16.04	Specified count value	1~F16.03		1000	●	0x1004
F16.05	Set time of regular running	0.0-6500.0, 0.0 is invalid	min	0.0	●	0x1005
F16.06	Agent password	0~65535		0	○	0x1006
F16.07	Setting of cumulative power-on arrival time	0-65535; 0: disable the protection when the power-on time is up	H	0	○	0x1007
F16.08	Setting of cumulative running arrival time	0-65535; 0: disable the protection when the running time is up	H	0	○	0x1008
F16.09	Factory password	0~65535		XXXXX	●	0x1009
F16.10	Analog output percentage when the set length/design count is 0	0.00~100.00	%	0.00	○	0x100A
F16.11	Analog output percentage when the set length/design count is the set value	0.00~100.00	%	100.00	○	0x100B
F16.13	Set length resolution	0:1m 1:0.1m 2:0.01m 3:0.001m		0	○	0x100D
F16.14	Slot 1 type	0: No card		XXXX	×	0x100E

		1: PROFINET card 2: EtherCAT card 3: CANopen card 4~9: Reserved 10: Gain encoder PG card 11: Gain encoder PG card with UVW 12: Rotary transformer PG card 13: SinCos PG card 14: Gain encoder PG card with divided frequency 15~19: retention 20: IO expansion card 1 21~29: retention 30: PLC card				
F16.15	Slot 2 type	Same with slot 1		XXXX	×	0x100F
F16.16	Slot 1 software S/N 1	0.00~65.335		XXXX	×	0x1010
F16.17	Slot 1 software S/N 2	0.00~65.335		XXXX	×	0x1011
F16.18	Slot 2 software S/N 1	0.00~65.335		XXXX	×	0x1012
F16.19	Slot 2 software S/N 2	0.00~65.335		XXXX	×	0x1013
F17	Virtual I/O function group					
F17.00	VX1 virtual input function options	The same as the function options of digital input terminal of F02 group		0	○	0x1100
F17.01	VX2 virtual input function options			0	○	0x1101
F17.02	VX3 virtual input function options			0	○	0x1102

<table>
<tr><td>F17.03</td><td>VX4 virtual input function options</td><td rowspan="5"></td><td></td><td>0</td><td>○</td><td>0x1103</td></tr>
<tr><td>F17.04</td><td>VX5 virtual input function options</td><td></td><td>0</td><td>○</td><td>0x1104</td></tr>
<tr><td>F17.05</td><td>VX6 virtual input function options</td><td></td><td>0</td><td>○</td><td>0x1105</td></tr>
<tr><td>F17.06</td><td>VX7 virtual input function options</td><td></td><td>0</td><td>○</td><td>0x1106</td></tr>
<tr><td>F17.07</td><td>VX8 virtual input function options</td><td></td><td>0</td><td>○</td><td>0x1107</td></tr>
<tr><td>F17.08</td><td>Virtual input positive/negative logic</td><td><table><tr><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr><tr><td>VX8</td><td>VX7</td><td>VX6</td><td>VX5</td><td>VX4</td><td>VX3</td><td>VX2</td><td>VX1</td></tr></table>0: positive logic is valid in the closed state/invalid in the open state
1: negative logic is valid in the closed state/invalid in the open state</td><td></td><td>00000000</td><td>○</td><td>0x1108</td></tr>
<tr><td>F17.09</td><td>VX1-VX8 status setting options</td><td><table><tr><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr><tr><td>VX8</td><td>VX7</td><td>VX6</td><td>VX5</td><td>VX4</td><td>VX3</td><td>VX2</td><td>VX1</td></tr></table>0: the VXn status is the same as VYn output status
1: status set by F17.10</td><td></td><td>00000000</td><td>○</td><td>0x1109</td></tr>
<tr><td>F17.10</td><td>VX1-VX8 status setting</td><td><table><tr><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr><tr><td>VX8</td><td>VX7</td><td>VX6</td><td>VX5</td><td>VX4</td><td>VX3</td><td>VX2</td><td>VX1</td></tr></table>0: Invalid
1: valid</td><td></td><td>00000000</td><td>●</td><td>0x110A</td></tr>
<tr><td>F17.11</td><td>VX1 valid delay time</td><td>0.00~650.00</td><td>s</td><td>0.00</td><td>●</td><td>0x110B</td></tr>
<tr><td>F17.12</td><td>VX1 invalid delay time</td><td>0.00~650.00</td><td>s</td><td>0.00</td><td>●</td><td>0x110C</td></tr>
<tr><td>F17.13</td><td>VX2 valid delay time</td><td>0.00~650.00</td><td>s</td><td>0.00</td><td>●</td><td>0x110D</td></tr>
<tr><td>F17.14</td><td>VX2 invalid delay time</td><td>0.00~650.00</td><td>s</td><td>0.00</td><td>●</td><td>0x110E</td></tr>
</table>

<table>
<tr><td>F17.15</td><td>VX3 valid delay time</td><td colspan="8">0.00~650.00</td><td>s</td><td>0.00</td><td>●</td><td>0x110F</td></tr>
<tr><td>F17.16</td><td>VX3 invalid delay time</td><td colspan="8">0.00~650.00</td><td>s</td><td>0.00</td><td>●</td><td>0x1110</td></tr>
<tr><td>F17.17</td><td>VX4 valid delay time</td><td colspan="8">0.00~650.00</td><td>s</td><td>0.00</td><td>●</td><td>0x1111</td></tr>
<tr><td>F17.18</td><td>VX4 invalid delay time</td><td colspan="8">0.00~650.00</td><td>s</td><td>0.00</td><td>●</td><td>0x1112</td></tr>
<tr><td>F17.19</td><td>VY1 virtual output function options</td><td colspan="8" rowspan="8">The same as the function options of Y1 digital output terminal of F03 group</td><td></td><td>0</td><td>○</td><td>0x1113</td></tr>
<tr><td>F17.20</td><td>VY2 virtual output function options</td><td></td><td>0</td><td>○</td><td>0x1114</td></tr>
<tr><td>F17.21</td><td>VY3 virtual output function options</td><td></td><td>0</td><td>○</td><td>0x1115</td></tr>
<tr><td>F17.22</td><td>VY4 virtual output function options</td><td></td><td>0</td><td>○</td><td>0x1116</td></tr>
<tr><td>F17.23</td><td>VY5 virtual output function options</td><td></td><td>0</td><td>○</td><td>0x1117</td></tr>
<tr><td>F17.24</td><td>VY6 virtual output function options</td><td></td><td>0</td><td>○</td><td>0x1118</td></tr>
<tr><td>F17.25</td><td>VY7 virtual output function options</td><td></td><td>0</td><td>○</td><td>0x1119</td></tr>
<tr><td>F17.26</td><td>VY8 virtual output function options</td><td></td><td>0</td><td>○</td><td>0x111A</td></tr>
<tr><td>F17.27</td><td>Virtual output positive/negative logic</td><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td><td></td><td>00000000</td><td>○</td><td>0x111B</td></tr>
<tr><td></td><td></td><td>VX8</td><td>VX7</td><td>VX6</td><td>VX5</td><td>VX4</td><td>VX3</td><td>VX2</td><td>VX1</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td colspan="8">0: positive logic is valid in the closed state/invalid in the open state
1: negative logic is valid in the closed state/invalid in the open state</td><td></td><td></td><td></td><td></td></tr>
<tr><td>F17.28</td><td>Control options of virtual output terminal</td><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td><td></td><td>11111111</td><td>○</td><td>0x111C</td></tr>
<tr><td></td><td></td><td>VX8</td><td>VX7</td><td>VX6</td><td>VX5</td><td>VX4</td><td>VX3</td><td>VX2</td><td>VX1</td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td colspan="8">0: Depending on the status of terminal X1-X5
1: depending on the output function status</td><td></td><td></td><td></td><td></td></tr>
</table>

F17.29	VY1 valid delay time	0.00~650.00	s	0.00	●	0x111D
F17.30	VY1 invalid delay time	0.00~650.00	s	0.00	●	0x111E
F17.31	VY2 valid delay time	0.00~650.00	s	0.00	●	0x111F
F17.32	VY2 invalid delay time	0.00~650.00	s	0.00	●	0x1120
F17.33	VY3 valid delay time	0.00~650.00	s	0.00	●	0x1121
F17.34	VY3 invalid delay time	0.00~650.00	s	0.00	●	0x1122
F17.35	VY4 valid delay time	0.00~650.00	s	0.00	●	0x1123
F17.36	VY4 invalid delay time	0.00~650.00	s	0.00	●	0x1124
F17.37	Virtual input terminal status	VX8 VX7 VX6 VX5 VX4 VX3 VX2 VX1 0: Invalid 1: valid		00000000	×	0x1125
F17.38	Virtual output terminal status	VX8 VX7 VX6 VX5 VX4 VX3 VX2 VX1 0: Invalid 1: valid		00000000	×	0x1126
F18	Monitoring parameter group					
F18.00	Output frequency	0.00 to upper frequency limit	Hz	0.00	×	0x1200
F18.01	Set frequency	0.00 to maximum frequency F00.16	Hz	0.00	×	0x1201
F18.02	PG feedback frequency	0.00 to upper frequency limit	Hz	0.00	×	0x1202

F18.03	Estimate feedback frequency	0.00 to upper frequency limit					Hz	0.00	×	0x1203
F18.04	Output torque	-200.0~200.0					%	0.0	×	0x1204
F18.05	Torque setting	-200.0~200.0					%	0.0	×	0x1205
F18.06	Output current	0.00 to 650.00 (rated power of motor: ≤ 75 kW) 0.0 to 6500.0 (rated power of motor: > 75 kW)					A	0.00	×	0x1206
F18.07	Output current percentage	0.0-300.0 (100.0 = the rated current of inverter)					%	0.0	×	0x1207
F18.08	Output voltage	0.0~690.0					V	0.0	×	0x1208
F18.09	DC bus voltage	0~1200					V	0	×	0x1209
F18.10	Simple PLC running times	0~10000						0	×	0x120A
F18.11	Simple PLC operation stage	1~15						1	×	0x120B
F18.12	PLC running time at the current stage	0.0~6000.0						0.0	×	0x120C
F18.14	Load rate	0~65535					rpm	0	×	0x120E
F18.15	UP/DOWN offset frequency	0.00 to 2 * Maximum frequency F00.16					Hz	0.00	×	0x120F
F18.16	PID setting	0.0 to PID maximum range						0.0	×	0x1210
F18.17	PID feedback	0.0 to PID maximum range						0.0	×	0x1211
F18.18	Power meter: MWh	0~65535					MWh	0	×	0x1212
F18.19	Watt-hour meter: kWh	0.0~999.9					kWh	0.0	×	0x1213
F18.20	Output power	0.00~650.00					kW	0.00	×	0x1214
F18.21	Output power factor	-1.000~1.000						0.000	×	0x1215
F18.22	Digital input terminal status 1	X5	X4	X3	X2	X1		XXX	×	0x1216
		0/1	0/1	0/1	0/1	0/1				
F18.23	Digital input terminal status 2	AI3	AI2	AI1	X5	X4		XXX	×	0x1217
		0/1	0/1	0/1	0/1	0/1				

F18.24	Digital input terminal status 3	AI4	*	X10	X9	X8		XXX	×	0x1218
		*	0/1	0/1	0/1	0/1				
F18.25	Output terminal state 1	*	R2	R1	Y2	Y1		XXX	×	0x1219
		0/1	0/1	0/1	0/1	0/1				
F18.26	AI1	-100.0~100.0					%	0.0	×	0x121A
F18.27	AI2	0.0~100.0					%	0.0	×	0x121B
F18.28	AI3	0.0~100.0					%	0.0	×	0x121C
F18.29	AI4	-100.0~100.0					%	0.0	×	0x121D
F18.30	Output terminal state 2	*	*	*	R3	R4		XXX	×	0x121E
		0/1	0/1	0/1	0/1	0/1				
F18.31	High-frequency pulse input frequency: kHz	0.00~100.00					kHz	0.00	×	0x121F
F18.32	High-frequency pulse input frequency: Hz	0~65535					Hz	0	×	0x1220
F18.33	Count value	0~65535						0	×	0x1221
F18.34	Actual length	0~65535					m	0	×	0x1222
F18.35	Remaining time of regular running	0.0~6500.0					min	0.0	×	0x1223
F18.36	Rotor position of synchronous motor	0.0~359.9°						0.0	×	0x1224
F18.37	Rotary transformation location	0~4095						0	×	0x1225
F18.38	Motor temperature	0~200					℃	0	×	0x1226
F18.39	VF separation target voltage	0~690					V	0	×	0x1227
F18.40	VF separation output voltage	0~690					V	0	×	0x1228

F18.41	View any address			0	×	0x1229
F18.42	Random carrier frequency display	1000~16000	HZ	0	×	0x122A
F18.51	PID output	-100.0~100.0	%		×	0x1233
F18.58	Feedback pulse high	0~65535		0	×	0x123A
F18.59	Feedback pulse low	0~65535		0	×	0x123B
F18.60	Inverter temperature	-40~200	℃	0	×	0x123C
F18.67	Saved electric energy (MWH)	Cumulative energy saving MWH	MWh	0~65535	×	0x1243
F18.68	Saved electric energy (KWH)	Cumulative energy saving KWH	kWh	0.0~999.9	×	0x1244
F18.69	Saved electric charge (1,000 yuan)	High cumulative cost saving (*1000)		0~65535	×	0x1245
F18.70	Saved electric charge (yuan)	Low cumulative cost saving		0.0~ 999.9	×	0x1246
F18.71	Power-frequency power consumption MWh	Power-frequency power consumption MWH	MWh	0~65535	×	0x1247
F18.72	Power-frequency power consumption KWh	Power-frequency power consumption KWH	kWh	0.0~999.9	×	0x1248
F19	Fault record group					
F19.00	Last fault category	0: No failure Refer to Chapter 6 “Faults and Solutions” for fault codes.		0	×	0x1300
F19.01	Output frequency in failure	0.00 to upper frequency limit	Hz	0.00	×	0x1301
F19.02	Output current in failure	0.00 to 650.00 (rated power of motor: ≤ 75 kW) 0.0 to 6500.0 (rated power of motor: > 75 kW)	A	0.00	×	0x1302
F19.03	Bus voltage in failure	0~1200	V	0	×	0x1303

F19.04	Running status in failure	0: not running 1: forward acceleration 2: reverse acceleration 3: forward deceleration 4: reverse deceleration 5: constant speed in forward running 6: reverse constant speed in reverse running		0	×	0x1304
F19.05	Working time in failure	0.00~6553	h	0	×	0x1305
F19.06	Previous fault category	Same as F19.00 parameter description		0	×	0x1306
F19.07	Output frequency in failure		Hz	0.00	×	0x1307
F19.08	Output current in failure		A	0.00	×	0x1308
F19.09	Bus voltage in failure		V	0	×	0x1309
F19.10	Running status in failure	Same as F19.04 parameter description		0	×	0x130A
F19.11	Working time in failure		h	0	×	0x130B
F19.12	Last two fault categories	Same as F19.00 parameter description		0	×	0x130C
F19.13	Output frequency in failure		Hz	0.00	×	0x130D
F19.14	Output current in failure		A	0.00	×	0x130E
F19.15	Bus voltage in failure		V	0	×	0x130F
F19.16	Running status in failure	Same as F19.04 parameter description		0	×	0x1310

F19.17	Working time in failure		h	0	×	0x1311
F27	Winding/unwinding application macro parameter group					
F27.00	Application macro	0: Winding mode 1: Unwinding mode 2: Wire drawing mode 3: Straight wire drawing machine mode		0	○	0x1B00
F27.01	Feedforward gain action channel	0: feedforward gain * set source B 1: Feedforward gain * set source A 2: Feedforward gain * 10V		1	○	0x1B01
F27.02	Feedforward gain input mode	0: No change in feedforward gain 1: 0.00 to upper limit of feedforward gain 2: - upper limit of feedforward gain to + upper limit of feedforward gain		1	○	0x1B02
F27.03	Feedforward control	Ones place: Feedforward reset option 0: Automatic reset 1: Terminal reset Tens place: Feedforward power-off stop option 0: Save after power failure 1: Not save after power failure Hundreds place: Options of continuous feedforward calculation 0: Not calculate 1: Calculate		10	○	0x1B03
F27.04	Upper limit of feedforward gain	0.00~500.00	%	500.00	○	0x1B04
F27.05	Initial feedforward gain	0.00~500.00	%	50.00	●	0x1B05
F27.06	Feedforward gain filter time	0~1000	ms	0	●	0x1B06
F27.07	Feedforward range 0	0.00 to feedforward range 1	%	4.00	●	0x1B07
F27.08	Feedforward range 1	Feedforward range 0 to feedforward range 2	%	12.00	●	0x1B08
F27.09	Feedforward range 2	Feedforward range 1 to feedforward range 3	%	23.00	●	0x1B09

F27.10	Feedforward range 3	Feedforward range 2 to feedforward range 4	%	37.00	●	0x1B0A
F27.11	Feedforward range 4	Feedforward range 3 to feedforward range 5	%	52.00	●	0x1B0B
F27.12	Feedforward range 5	Feedforward range 4 to 100.00	%	72.00	●	0x1B0C
F27.13	Soft start increment	0.00~50.00	%/S	0.60	●	0x1B0D
F27.14	Feedforward increment 1	0.00~50.00	%/S	0.11	●	0x1B0E
F27.15	Feedforward increment 2	0.00~50.00	%/S	0.30	●	0x1B0F
F27.16	Feedforward increment 3	0.00~50.00	%/S	0.75	●	0x1B10
F27.17	Feedforward increment 4	0.00~50.00	%/S	1.55	●	0x1B11
F27.18	Feedforward increment 5	0.00~50.00	%/S	4.00	●	0x1B12
F27.19	Feedforward increment 6	0.00~50.00	%/S	11.00	●	0x1B13
F27.20	Material cutoff control mode	Ones place: Disconnection detection mode 0: Automatic detection 1: External signal Tens place: Material cutoff detection control 0: Detect when the output is greater than the lower limit of material cutoff detection 1: no detection Hundreds place: Material cutoff handling mode 0: Protection of terminal action only 1: Delayed stop and trip protection 2: Material cutoff protection 3: Automatic reset after protection shutdown 4: Material cutoff detection terminal output only 5: Automatic reset of material cutoff detection terminal Thousands place: Brake mode 0: mode 0 1: mode 1 Myriabit: Reverse unwinding mode 0: No speed limit 1: Reverse speed limit by F27.24		01201	○	0x1B14

F27.21	Material cutoff detection delay	0.0~10.0	S	6.0	●	0x1B15
F27.22	Lower limit of material cutoff detection after parking	0.00~60.00	Hz	5.00	●	0x1B16
F27.23	Time of continuous running after material cutoff	0.0~60.0	S	10.0	●	0x1B17
F27.24	Frequency of continuous running after material cutoff	0.00~Fmax	Hz	5.00	●	0x1B18
F27.25	Brake signal output frequency	0.00~FUP	Hz	2.50	●	0x1B19
F27.26	Braking signal duration	0.0~100.0	S	5.0	●	0x1B1A
F27.27	Minimum frequency of wiring detection	0.00~20.00	Hz	10.00	●	0x1B1B
F27.28	Judgment time for invalid cable signal	0.1~20.0	S	10.0	●	0x1B1C
F27.29	Judgment time for valid cable signal	0.1~20.0	S	2.0	●	0x1B1D
F27.30	Filtering time for material cutoff detection	1~100	ms	5	●	0x1B1E
F27.31	Mask bit of fault	* * * * * * E43 E44 0: valid protection 1: shielded protection		00	○	0x1B1F
F27.36	Current value of feedforward gain	-500.0~500.0	%	0.00	×	0x1B24
F45	Modbus free mapping parameter group					
F45.00	Enable Modbus communication free mapping	0: Invalid 1: valid		0	●	0x2D00
F45.01	Source address 1	0~65535	-	0	●	0x2D01
F45.02	Mapping address 1	0~65535	-	0	●	0x2D02

F45.03	Read gain 1	0.00~100.00	-	1.00	●	0x2D03
F45.04	Source address 2	0~65535	-	0	●	0x2D04
F45.05	Mapping address 2	0~65535	-	0	●	0x2D05
F45.06	Read gain 2	0.00~100.00	-	1.00	●	0x2D06
F45.07	Source address 3	0~65535	-	0	●	0x2D07
F45.08	Mapping address 3	0~65535	-	0	●	0x2D08
F45.09	Read gain 3	0.00~100.00	-	1.00	●	0x2D09
F45.10	Source address 4	0~65535	-	0	●	0x2D0A
F45.11	Mapping address 4	0~65535	-	0	●	0x2D0B
F45.12	Read gain 4	0.00~100.00	-	1.00	●	0x2D0C
F45.13	Source address 5	0~65535	-	0	●	0x2D0D
F45.14	Mapping address 5	0~65535	-	0	●	0x2D0E
F45.15	Read gain 5	0.00~100.00	-	1.00	●	0x2D0F
F45.16	Source address 6	0~65535	-	0	●	0x2D10
F45.17	Mapping address 6	0~65535	-	0	●	0x2D11
F45.18	Read gain 6	0.00~100.00	-	1.00	●	0x2D12
F45.19	Source address 7	0~65535	-	0	●	0x2D13
F45.20	Mapping address 7	0~65535	-	0	●	0x2D14
F45.21	Read gain 7	0.00~100.00	-	1.00	●	0x2D15
F45.22	Source address 8	0~65535	-	0	●	0x2D16
F45.23	Mapping address 8	0~65535	-	0	●	0x2D17

F45.24	Read gain 8	0.00~100.00	-	1.00	●	0x2D18
F45.25	Source address 9	0~65535	-	0	●	0x2D19
F45.26	Mapping address 9	0~65535	-	0	●	0x2D1A
F45.27	Read gain 9	0.00~100.00	-	1.00	●	0x2D1B
F45.28	Source address 10	0~65535	-	0	●	0x2D1C
F45.29	Mapping address 10	0~65535	-	0	●	0x2D1D
F45.30	Read gain 10	0.00~100.00	-	1.00	●	0x2D1E
F45.31	Source address 11	0~65535	-	0	●	0x2D1F
F45.32	Mapping address 11	0~65535	-	0	●	0x2D20
F45.33	Read gain 11	0.00~100.00	-	1.00	●	0x2D21
F45.34	Source address 12	0~65535	-	0	●	0x2D22
F45.35	Mapping address 12	0~65535	-	0	●	0x2D23
F45.36	Read gain 12	0.00~100.00	-	1.00	●	0x2D24
F45.37	Source address 13	0~65535	-	0	●	0x2D25
F45.38	Mapping address 13	0~65535	-	0	●	0x2D26
F45.39	Read gain 13	0.00~100.00	-	1.00	●	0x2D27
F45.40	Source address 14	0~65535	-	0	●	0x2D28
F45.41	Mapping address 14	0~65535	-	0	●	0x2D29
F45.42	Read gain 14	0.00~100.00	-	1.00	●	0x2D2A
F45.43	Source address 15	0~65535	-	0	●	0x2D2B
F45.44	Mapping address 15	0~65535	-	0	●	0x2D2C

F45.45	Read gain 15	0.00~100.00	-	1.00	●	0x2D2D
F45.46	Source address 16	0~65535	-	0	●	0x2D2E
F45.47	Mapping address 16	0~65535	-	0	●	0x2D2F
F45.48	Read gain 16	0.00~100.00	-	1.00	●	0x2D30
F45.49	Source address 17	0~65535	-	0	●	0x2D31
F45.50	Mapping address 17	0~65535	-	0	●	0x2D32
F45.51	Read gain 17	0.00~100.00	-	1.00	●	0x2D33
F45.52	Source address 18	0~65535	-	0	●	0x2D34
F45.53	Mapping address 18	0~65535	-	0	●	0x2D35
F45.54	Read gain 18	0.00~100.00	-	1.00	●	0x2D36
F45.55	Source address 19	0~65535	-	0	●	0x2D37
F45.56	Mapping address 19	0~65535	-	0	●	0x2D38
F45.57	Read gain 19	0.00~100.00	-	1.00	●	0x2D39
F45.58	Source address 20	0~65535	-	0	●	0x2D3A
F45.59	Mapping address 20	0~65535	-	0	●	0x2D3B
F45.60	Read gain 20	0.00~100.00	-	1.00	●	0x2D3C
F45.61	Source address 21	0~65535	-	0	●	0x2D3D
F45.62	Mapping address 21	0~65535	-	0	●	0x2D3E
F45.63	Read gain 21	0.00~100.00	-	1.00	●	0x2D3F
F45.64	Source address 22	0~65535	-	0	●	0x2D40
F45.65	Mapping address 22	0~65535	-	0	●	0x2D41

F45.66	Read gain 22	0.00~100.00	-	1.00	●	0x2D42
F45.67	Source address 23	0~65535	-	0	●	0x2D43
F45.68	Mapping address 23	0~65535	-	0	●	0x2D44
F45.69	Read gain 23	0.00~100.00	-	1.00	●	0x2D45
F45.70	Source address 24	0~65535	-	0	●	0x2D46
F45.71	Mapping address 24	0~65535	-	0	●	0x2D47
F45.72	Read gain 24	0.00~100.00	-	1.00	●	0x2D48
F45.73	Source address 25	0~65535	-	0	●	0x2D49
F45.74	Mapping address 25	0~65535	-	0	●	0x2D4A
F45.75	Read gain 25	0.00~100.00	-	1.00	●	0x2D4B
F45.76	Source address 26	0~65535	-	0	●	0x2D4C
F45.77	Mapping address 26	0~65535	-	0	●	0x2D4D
F45.78	Read gain 26	0.00~100.00	-	1.00	●	0x2D4E
F45.79	Source address 27	0~65535	-	0	●	0x2D4F
F45.80	Mapping address 27	0~65535	-	0	●	0x2D50
F45.81	Read gain 27	0.00~100.00	-	1.00	●	0x2D51
F45.82	Source address 28	0~65535	-	0	●	0x2D52
F45.83	Mapping address 28	0~65535	-	0	●	0x2D53
F45.84	Read gain 28	0.00~100.00	-	1.00	●	0x2D54
F45.85	Source address 29	0~65535	-	0	●	0x2D55
F45.86	Mapping address 29	0~65535	-	0	●	0x2D56

F45.87	Read gain 29	0.00~100.00	-	1.00	●	0x2D57
F45.88	Source address 30	0~65535	-	0	●	0x2D58
F45.89	Mapping address 30	0~65535	-	0	●	0x2D59
F45.90	Read gain 30	0.00~100.00	-	1.00	●	0x2D5A