Modbus

User Manual

MOONS'

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Shanghai AMP & MOONS' Automation Co.,Ltd

Contents

1 Introduction of Modbus Protocol Communication

Modbus Communication protocol was first developed by Modicon Company. It is a bus protocol widely used in industrial field by adopting the master-slave communication mode, that is, only the host can initiate a request and the slave equipment provides the requested data to the host or performs the operation requested in the query. The master-slave query response mechanism is shown in the figure below.
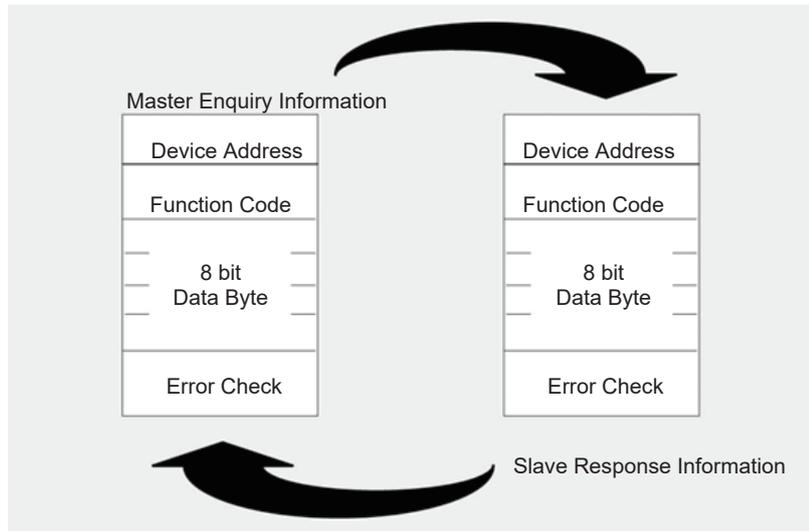
The host can access the slave devices by specifying the node address, or access all the slave devices by sending broadcast messages. The slave device only responds to its own queries and does not respond to broadcast queries.

Modbus communication protocol is an application layer message transmission protocol, including RTU. ASCII and TCP. The standard Modbus protocol physical layer interface includes RS232, RS485 as well as Ethernet.

Both Modbus RTU and Modbus ASCII are in serial transmission mode. Among them, Modbus RTU adopts binary representation and compact data structure, with high communication efficiency and wide application. Modbus ASCII adopts ASCII code transmission and uses special characters as the start and end identification of its bytes. Its transmission efficiency is much lower than that of Modbus RTU protocol.

Modbus TCP is a kind of communication transmitted through industrial Ethernet TCP/IP network. Modbus data transmission provides real-time communication between client and server connected to Ethernet TCP/IP network.

2 Modbus Data Frame Structure

2.1 Modbus RTU Data Frame Structure

Modbus RTU protocol establishes the query message by putting the slave device address (or broadcast), the function code defining the requested operation, the data to be sent as well as CRC verification into the host query. The response message in slave device also uses Modbus RTU message structure, including the slave device address, the function code requesting operation, the data to be sent as well as CRC check. If there is fault when receiving the information or slave cannot operate the requested action, the slave machine will send an abnormal information as a response. Modbus RTU data frame structure is as follows:

ADU

Address Domain	Function Code	Data Domain	CRC Check
1 byte	1 byte	n bytes	2 bytes

PDU
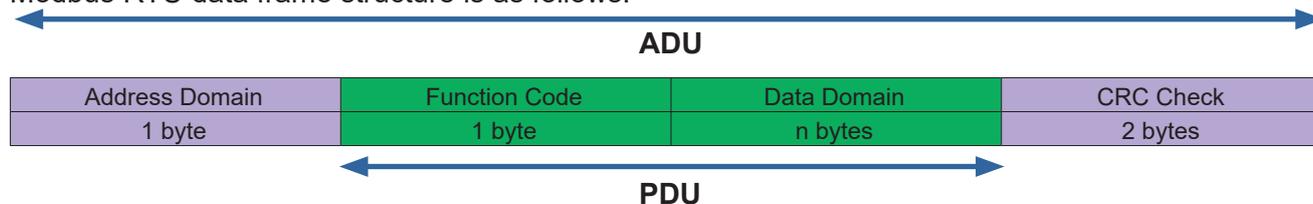
2.2 Modbus TCP Data Frame Structure

Modbus TCP protocol is based on Modbus RTU protocol, yet it adds MBAP (Modbus Application Protocol Header) message header on that basis. As TCP is service based on reliable connection, there is no CRC check in Modbus TCP protocol. All the sending and receiving by Modbus TCP ADU depends on TCP transmission control protocol, whose port number is 502. Modbus TCP data frame structure is as follows:

Modbus TCP/IP ADU

MBAP Header	Function Code	Data Domain
7 byte	1 byte	n bytes

PDU

Affair Identifier	Protocol Identifier	Length	Unit Identifier
2 bytes	2 bytes	2 bytes	1 byte

Domain	Description	Clients	Server
Affair Identifier	Identification Code of Modbus Request/Response Transaction	Client starts	Server copies from the received request
Protocol Identifier	0 represents Modbus Protocol	Client starts	Server copies from the received request
Length	Number of Bytes including Unit Identifier and Data Field	Client starts (requests)	Server (Response) starts
Unit Identifier	Slave address	Client starts	Server copies from the received request

Affair Identifier: Used for transaction pairing. The Modbus server copies the requested transaction identifier in the response.

Protocol Identifier: Modbus protocol identifier is 0x0000.

Length: This includes unit identifier and number of bytes of PDU. The unit is byte.

Unit Identifier: The server IP address identification code, which is set by the Modbus client in the request, must return the same value in the response.

Notes:

　　ADU：Application Data Unit　　PDU：Protocol Data Unit

3 Modbus Wiring

3.1 Modbus RTU Wiring

Modbus RTU protocol uses RS-232 or RS-485 physical layer. Using RS-485 physical layer can configure 1-32 slave machine address to form RS-422/RS-485 network topology. Generally, 120 Ω terminal resistance is connected in parallel at the physically connected end device. Modbus RTU supports full-duplex and half-duplex connection mode. Usually we recommend using full-duplex connection mode to build communication network.
RS422 full-duplex four-wire system wiring mode is shown in the figure:
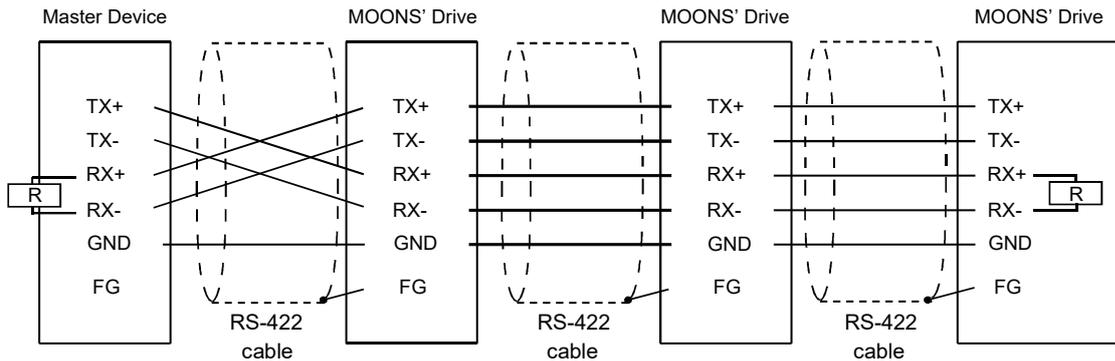
RS485 half-duplex two-wire system wiring mode is shown in the figure:
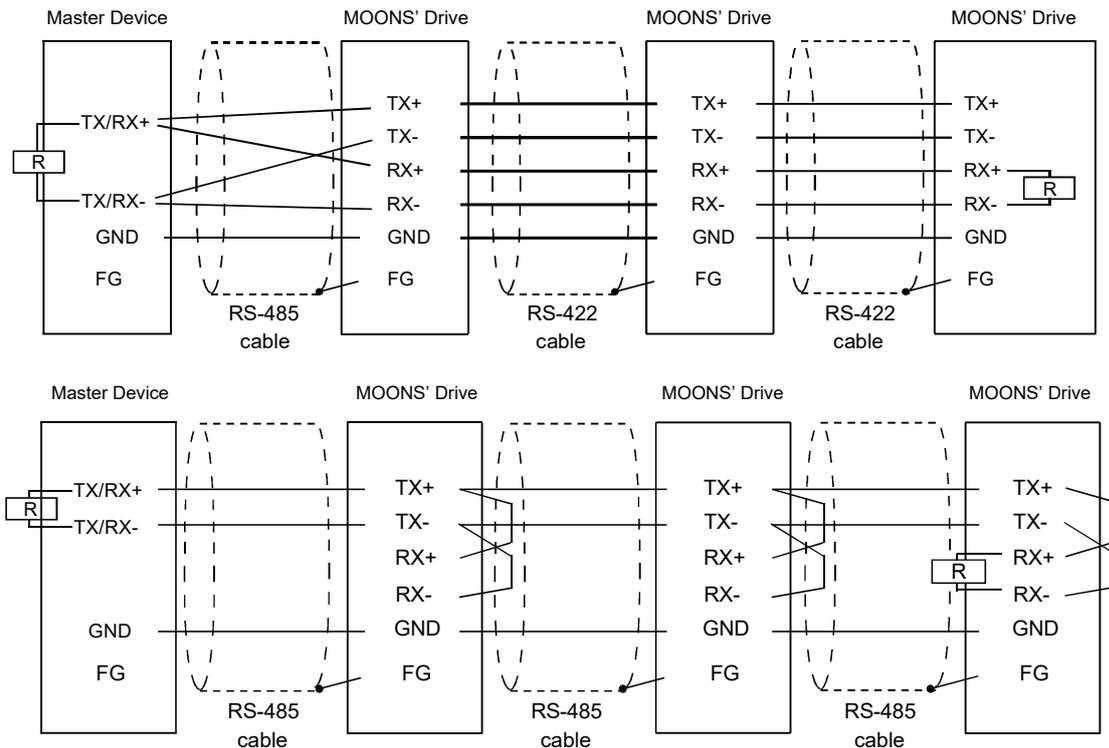
Notes: R represents 120Ω terminal resistor

3.2 Modbus TCP Wiring

All products supporting Modbus TCP communication protocol use RJ45 connector, which conforms to 100 base-tx (100Mbps) and can be connected with standard class 5 or above as well as straight-through network cable.

4 Modbus Configuration

4.1 Modbus RTU Configuration

Download the debugging software of corresponding products from MOONS' website (https://www. moonsindustries.com/) and configure the parameters of Modbus RTU communication through it.

4.1.1 Master Communication Parameter Configuration

1. Baud Rate: In accordance with the slave
2. Data bit: 8 bit data bit
3. Stop bit: 1 bit stop bit
4. Check bit: no check bit

4.1.2 MOONS' Drive Communication Parameter Configuration on Slave Device

1. Slave Device Address

In the same network, each slave device has a unique address. Only the slave device that meets the address requirements will respond to the command sent by the master device. Modbus address "0" is the broadcast address, which cannot act as a slave device address. Under Modbus RTU communication protocol, the scope of slave device address is 1 to 32. If the drive of communication address setting knob switch is installed, the address is set through the knob switch. If the knob switch is not installed on the drive, then it is set by configuration software or by SCL command DA.

2. Baud Rate

The master and slave devices must set at the same baud rate.If the drive of baud rate setting dial switch is installed, then the baud rate is set through the dial switch. If there is not, then it should be set by configuration software or through SCL command BR. The relationship between BR command parameter and baud rate is listed as follow:

    1: 9600bps
    2: 19200bps
    3: 38400bps
    4: 57600bps
    5: 115200bps

3. Power-on Working Mode

Configure the operating mode of the drive after power on. Set through SCL command PM. The corresponding relationship between PM command parameter value and working mode in Modbus RTU communication mode is as follows:

    8: After power on, the driver is in enable working mode.
    9: After power on, the drive is in the working mode that conduct the Q programming automatically.
    10:After power on, the drive is in non-enable working mode.

4. Communication Protocol

Configure 32-bit data high-and-low byte discharge sequence and RS-485 communication full-duplex/half-duplex connection mode. It is set by configuration software or by SCL command PR. The corresponding relationship between PR command parameter value and communication protocol is as follows:

    5: Half-duplex Connection Mode, Big Endian
    133: Half-duplex Connection Mode, Little Endian
    261: Full-duplex Wiring Mode, Big Endian
    389: Full-duplex Connection Mode, Little Endian

Notes:

   Big Endian indicates that the high 16-bit data of 32-bit data is arranged at the low address end of memory while the low 16-bit data of all is arranged at the high address end of memory.

   Little Endian indicates that the low 16-bit data of 32-bit data is arranged at the low address end of memory while the high 16-bit data of all is arranged at the high address end of memory.

4.2 Modbus TCP Configuration

Download the debugging software of corresponding product at MOONS' website (https://www. moonsindustries.com/) and configure the parameters of Modbus TCP communication through the software.

4.2.1 Client Communication Parameter Configuration

1. Customer IP address: IP address that is in the same network segment with server

2. Port number: Server`s port number that uses Modbus TCP communication, fixed with 502

4.2.2 Server MOONS' Drive Communication Parameter Configuration

1. Server IP Address

In the same network, each slave device has a unique IP address and only the server that meets the address requirements will respond to the client`s request order. If the drive of the IP address selection switch is installed, then the IP address is set through the switch. If the IP address selector switch is not installed on the drive, then it is set through the configuration software, which allows you to change the IP address corresponding to each gear of the switch.

2. Power-On Working Mode

Configure the operating mode of the drive after power on. Set through SCL command PM and the PM command parameter value is the same as that in Modbus TCP communication mode.The corresponding relationship between working modes is as follows:

  8: After power on, the driver is in enable working mode.

  9: After power on, the drive is in the working mode that conduct the Q programming automatically.

  10: After power on, the drive is in non-enable working mode.

3. Communication Protocol

Configure the high and low byte arrangement order of 32-bit data. It can be set by configuration software or by SCL command PR. The corresponding relationship between PR command parameter value and data codes is as follows:

  5：Big Endian

  133：Little Endian

Notes:

  Big Endian indicates that the high 16-bit data of 32-bit data is arranged at the low address end of memory while the low 16-bit data of all is arranged at the high address end of memory.

  Little Endian indicates that the low 16-bit data of 32-bit data is arranged at the low address end of memory while the high 16-bit data of all is arranged at the high address end of memory.

5 Function Code Modbus supports

The Modbus function codes MOONS` drive supports are as follows:

0x03: Read hold register

0x06: Write a single register

0x10: Write multiple registers

5.1 Function Code 0x03: Read hold register

Read single or multiple holding registers, which can be max. up to 50 while the broadcast command is not supported.

e.g. Read the drive status with slave address 1 and the register address is 40002, when we assume that the register value is 0x0009.

Command Message(Master)				Response Message(Slave)		
Function	Data	Number of Bytes		Function	Data	Number of Bytes
Slave Address	01H	1		Slave Address	01H	1
Function Code	03H	1		Function Code	03H	1
Starting Data Address	00H(High) 01H(Low)	2		Number of Data (In Byte)	04H	1
Number of Data (In word)	00(High) 01(Low)	2		Content of Starting Data Address 40002	00H(High) 09H(Low)	2
CRC Check Low	D5H	1		CRC Check Low	78H	1
CRC Check High	CAH	1		CRC Check High	42H	1

Master sends: 01 03 00 01 00 01 D5 CA

Slave replies: 01 03 02 00 09 78 42

The data format returned by the exception is: 01 83 XX CRC_L CRC_H

Among them,

XX = 01H means does not support to read the function code 03H;
XX = 02H means illegal register;
XX = 03H means illegal data area;
XX = 11H means register does not support read or write

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Number of Register	CRC Check
Modbus RTU	None	01	03	00 01	00 01	D5 CA
Modbus TCP	00 00 00 00 00 06 01	None	03	00 01	00 01	None

The Modbus RTU/TCP message returned by the slave station equipment is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	03	02	00 09	78 42
Modbus TCP	00 00 00 00 00 05 01	None	03	02	00 09	None

5.2 Function Code 0x06: Write a single register

Write a single holding register. When a broadcast command is used, all the same registers of the slave devices on the bus perform to write operations.

For example, write the motor running speed to the drive whose slave device address is 11. The register address is 40030. Assuming that the motor speed is set to 12.5 rps, write the data bit 12.5*240 = 3000, which is converted to hexadecimal 12CH.

Command Message(Master)				Response Message(slave)		
Function	Data	Number of Bytes		Function	Data	Number of Bytes
Slave Address	0BH	1		Slave Address	0BH	1
Function Code	06H	1		Function Code	06H	1
Starting Data Address	00H(High) 1DH(Low)	2		Starting Data Address	00H(High) 1DH(Low)	2
Content of Data	01(High) 2C(Low)	2		Content of Data	01(High) 2C(Low)	2
CRC Check Low	19H	1		CRC Check Low	19H	1
CRC Check High	2BH	1		CRC Check High	2BH	1

Master sends: 0B 06 00 1D 01 2C 19 2B

Slave replies: 0B 06 00 1D 01 2C 19 2B

The data format returned by the exception is: 0B 86 XX CRC_L CRC_H
Among them,

XX = 01H, does not support to write in function code 06H
XX = 02H, illegal register
XX = 03H, illegal data area
XX = 12H, register does not support read or write
XX = 13H, set value exceeds the scope

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Data Content	CRC Check
Modbus RTU	None	0B	06	00 1D	01 2C	19 2B
Modbus TCP	00 00 00 00 00 06 0B	None	06	00 1D	01 2C	None

The Modbus RTU/TCP message returned by the slave station equipment is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Data Content	CRC Check
Modbus RTU	None	0B	06	00 1D	01 2C	19 2B
Modbus TCP	00 00 00 00 00 06 0B	None	06	00 1D	01 2C	None

5.3 Function Code 0x10: Write multiple registers

Write single or multiple holding registers, with a maximum of 50 registers allowed. When a broadcast command is used, the same registers of all slave devices on the bus perform to write operations.

e.g. Write the target distance to the drive with the slave address of 10. The register addresses are 40031 and 40032. Assuming that the target distance is 30000, it is converted into hexadecimal 7530H. It transmits in Big Endian encoding.

Command Message(Master)				Response Message(slave)		
Function	Data	Number of Bytes		Function	Data	Number of Bytes
Slave Address	0AH	1		Slave Address	0AH	1
Function Code	10H	1		Function Code	10H	1
Starting Data Address	00H(High) 1EH(Low)	2		Starting Data Address	00H(High) 1EH(Low)	2
Number of Data (In word)	00H(High) 02H(Low)	2		Number of Data (In word)	00(High) 02(Low)	2
Number of Data (In byte)	04H	1		CRC Check Low	20H	1
Content of First Data Address	00H(High) 00H(Low)	2		CRC Check High	B5H	1
Content of Second Data Address	75H(High) 30H(Low)	2				
CRC Check Low	70H	1				
CRC Check High	8FH	1				

Master sends: 0A 10 00 1E 00 02 04 00 00 75 30 70 8F
Slave replies: 0A 10 00 1E 00 02 20 B5

The data format returned by the exception is:

0A 90 XX CRC_L CRC_H

Among them, XX = 01H: does not support to write in function code 10H

XX = 02H: Illegal register

XX = 03H: Illegal data area

XX = 12H: Register does not support writing in

XX = 13H: Set value is out of range

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	0A	10	00 1E	00 02	04	00 00 75 30	70 8F
Modbus TCP	00 00 00 00 00 0B 0A	None	10	00 1E	00 02	04	00 00 75 30	None

The Modbus RTU/TCP message returned by the slave station equipment is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	0A	10	00 1E	00 02	20 B5
Modbus TCP	00 00 00 00 00 06 0A	无	10	00 1E	00 02	None

6 SCL Command Code Table

6.1 Operation Code

In the Modbus register table, register 40125 is defined as the operation code register. If we write corresponding operation code to register 40125, then it operates the corresponding movement of operation code. The operation code that supports is listed as below:

SCL Command Encoding Table							
Function	SCL	Opcode	Parameter 1	Parameter 2	Parameter 3	Parameter 4	Parameter 5
Alarm Reset	AX	0xBA	×	×	×	×	×
Start Jogging	CJ	0x96	×	×	×	×	×
Stop Jogging	SJ	0xD8	×	×	×	×	×
Encoder Function [1*]	EF	0xD6	0,1,2 or 6	×	×	×	×
Encoder Position	EP	0x98	Position	Position	×	×	×
Feed to Length with Speed Change [2*]	FC	0x6D	I/O Point	Condition	×	×	×
Feed to Double Sensor [1*]	FD	0x69	I/O Point 1	Condition 1	I/O Point 2	Condition 2	×
Follow Encoder [1*]	FE	0xCC	I/O Point	Condition	×	×	×
Feed to Length	FL	0x66	×	×	×	×	×
Feed to Sensor with Mask Distance	FM	0x6A	I/O Point	Condition	×	×	×
Feed and Set Output	FO	0x68	I/O Point	Condition	×	×	×
Feed to Position	FP	0x67	×	×	×	×	×
Feed to Sensor	FS	0x6B	I/O Point	Condition	×	×	×
Feed to Sensor with Safety Distance	FY	0x6C	I/O Point	Condition	×	×	×
Jog Disable [1*]	JD	0xA3	×	×	×	×	×
Jog Enable [1*]	JE	0xA2	×	×	×	×	×
Motor Disable	MD	0x9E	×	×	×	×	×
Motor Enable	ME	0x9F	×	×	×	×	×
Seek Home	SH	0x6E	I/O Point	Condition	×	×	×
Set Position	SP	0xA5	Position	Position	×	×	×
Filter Input [1*]	FI	0xC0	I/O Point	Filter Time	×	×	×
Filter Select Inputs [1*]	FX	0xD3	×	×	×	×	×
Step Filter Freq [1*]	SF	0x06	Frequency	×	×	×	×
Analog Deadband [1*]	AD	0xD2	0.001 V	×	×	×	×
Alarm Reset Input [1*]	AI	0x46	Function ('1' ..' 3')	I/O Point	×	×	×
Alarm Output [1*]	AO	0x47	Function ('1' ..' 3')	I/O Point	×	×	×
Analog Scaling [1*]	AS	0xD1	×	×	×	×	×
Define Limits [1*]	DL	0x42	1..3	×	×	×	×
Full Closed-loop Control Switch	XM	0x54	0..1	×	×	×	×
Set Output	SO	0x8B	I/O Point	Condition	×	×	×
Wait for Input	WI	0x70	×	×	×	×	×

Queue Load & Execute	QX	0x78	1..12	×	×	×	×
Wait Time	WT	0x6F	0.01 sec	×	×	×	×
Find Home [3*]	FH	0xDB	-4..35	×	×	×	×
Stop Move & Kill Buffer, Max Decel	SK	0xE1	×	×	×	×	×
Stop Move & Kill Buffer, Normal Decel	SKD	0xE2	×	×	×	×	×

Notes: "x" in the table means do not use

[1*]: M3 series product does not support this operation code   [2*]: Only suits for STP-D and M3 series products   [3*]: Only suits M3 series product

E.g. In MOONS` product SCL command "FL" means conducting relative position control. In Modbus, writing "0x66" in register 40125 (that is FL`s Opcode in register table) means conducting relative position control.

For detailed operation code function, please refer to HOST COMMAND REFERENCE brochure.

6.2 I/O Command Code

The coding of digital input/output port and status is shown in the table below.

Character	Hex	Description
'0'	0x30	Z-phase signal for encoder
'1'	0x31	Digital input/ output port 1
'2'	0x32	Digital input/ output port 2
'3'	0x33	Digital input/ output port 3
'4'	0x34	Digital input/ output port 4
'5'	0x35	Digital input/ output port 5
'6'	0x36	Digital input/ output port 6
'7'	0x37	Digital output port 7
'8'	0x38	Digital output port 8
'9'	0x39	Digital output port 9
':'	0x3A	Digital output port 10
';'	0x3B	Digital output port 11
'<'	0x3C	Digital output port 12
'L'	0x4C	Low-level (Optocoupler on)
'H'	0x48	High-level (Optocoupler off)
'R'	0x52	Rising edge of the signal
'F'	0x46	Rising edge of the signal

E.g. In MOONS` product SCL command "FS1F". In Modbus, when write "0x6B" in register 40125, "0x31" in register 40126 and "0x46" in register 40127, they conduct the same control.

7 Modbus Example Program

MOONS` different product series have different register address. When it is in use, one can change the register address according to different product series in the following example program.

7.1 Position Control Example Program

The slave station equipment address is 1. Set the acceleration, deceleration, speed and target position. The corresponding MOONS` SCL commands are as follows:

SCL Command	Set Values	Unit	Register Address	Hexadecimal Format Register Address	Write in Register Value	Explanation
AC	100	Rps/sec	40028	00 1B	600	The default acceleration is 100 and it needs to write 600 in register 40028 (0x0258).
DE	100	Rps/sec	40029	00 1C	600	The default deceleration is 100 and it needs to write 600 in register 40029 (0x0258).
VE	1	Rps	40030	00 1D	240	The default velocity is 1 and it needs to write 240 in register 40030 (0x00F0).
DI	200000	Counts	40031,40032	00 1E, 00 1F	200000	The default aim position is 200000 and it needs to write 200000in 40031 and 40032 (0x00030D40).

Then:

Notes: Before reading the following message, please read the conversion relationship in note 1and the message format in Appendix

Acceleration for planned curves pre write-in (40028)= 600 (0x0258) while deceleration (40029)= 600 (0x0258). Velocity (40030)= 240(0x00F0) and target location (40031, 40032)= 200000(0x00030D40). Note that for the different PR mode, there is difference of high and low bits in 32 bit register input data. Its message is as follows:

If PR = 5, in Big Endian mode:

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	10	00 1B	00 05	0A	02 58 02 58 00 F0 00 03 0D 40	CD 83
Modbus TCP	00 00 00 00 00 11 01	None	10	00 1B	00 05	0A	02 58 02 58 00 F0 00 03 0D 40	None

The Modbus RTU/TCP message returned by the slave station equipment is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	MBAP Message HeaderRegister Amount	CRC Check
Modbus RTU	None	01	10	00 1B	00 05	70 0D
Modbus TCP	00 00 00 00 00 06 01	None	10	00 1B	00 05	None

If PR=133, that is in Little Endian Mode:

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	10	00 1B	00 05	0A	02 58 02 58 00 F0 0D 40 00 03	7B 9A
Modbus TCP	00 00 00 00 00 11 01	None	10	00 1B	00 05	0A	02 58 02 58 00 F0 0D 40 00 03	None

The Modbus RTU/TCP message returned by the slave station equipment is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	10	00 1B	00 05	70 0D
Modbus TCP	00 00 00 00 00 06 01	None	10	00 1B	00 05	None

Write in command code (40125) data 0x0067 (FP) and execute the absolute position control

The Modbus RTU/TCP message sent by the host is as follows: // **Execute relative movement and SCL command FL**//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Number of Bytes	CRC Check
Modbus RTU	None	01	06	00 7C	00 66	C8 38
Modbus TCP	00 00 00 00 00 06 01	None	06	00 7C	00 66	None

Write in command code (40125) data 0x0067 (FP) and execute the absolute position control

The Modbus RTU/TCP message sent by the host is as follows: // **Execute absolute movement, SCL command FP**//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Number of Bytes	CRC Check
Modbus RTU	None	01	06	00 7C	00 67	09 F8
Modbus TCP	00 00 00 00 00 06 01	None	06	00 7C	00 67	None

Write in command code register (40125) data 0x00E1 (SK) and execute the stop control

The Modbus RTU/TCP message sent by the host is as follows: // **Stop at the maximum deceleration and SCL command SK**//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Number of Bytes	CRC Check
Modbus RTU	None	01	06	00 7C	00 E1	88 5A
Modbus TCP	00 00 00 00 00 06 01	None	06	00 7C	00 E1	None

Read the target location register(40031,40032) and its message lists as follow:

The Modbus RTU/TCP message sent by the host is as follows: //**Read the register 40031, 40032**//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Number of Bytes	CRC Check
Modbus RTU	None	01	03	00 1E	00 02	A4 0D
Modbus TCP	00 00 00 00 00 06 01	None	03	00 1E	00 02	None

Notes:

1. When reading and writing MODBUS message, pay attention to the conversion relationship between register addresses. For example, register 40125 is converted to 0x007c, i.e

    40125-40000-1=124(0x007C)

2. Difference between PR = 5 mode and PR = 133 mode:

    In order to write the target location Di = 200000 to the target location register (40032, 40031),

    that is, to the 32-bit register address 200000(0x030D40)

    • in PR = 5, i.e. Big Endian mode, it means that the 32-bit data written is high, and the 16-bit data is discharged at the low address end of the memory. The 16-bit data is arranged at the high address end of the memory

    • in PR = 133, i.e. Little Endian mode, it means that the 32-bit data written is low, and the 16-bit data is discharged at the low address end of the memory,The high 16-bit data is placed at the high address end of the memory

3. Speed, acceleration / deceleration register parameter set value unit

    • the set value of speed register parameter is 1/240 RPS

    • set value of acceleration / deceleration register parameter, unit: 1/6 RP

7.2 Velocity Control Example Program

The slave machine`s address is 1 and set the acceleration, deceleration as well as velocity, the corresponding MOONS` SCL commands are as below:

SCL Command	Set Values	Unit	Register Address	Hexadecimal Format Register Address	Write in Register Value	Explanation
JA	100	Rps/sec	40047	00 2E	600	The default acceleration is 100 and needs to write 600 (0x0258) in register 40047
JL	100	Rps/sec	40048	00 2F	600	The default deceleration is 100 and needs to write 600 (0x0258) in register 40048
JS	10	Rps	40049	00 30	2400	The default velocity is 10 and needs to write 2400 (0x0960) in register 40049

Then:

The default acceleration (40047) in writing in planned curves data 0x0258 while deceleration (40048) data 0x00258 and velocity (40049) data 0x0960

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	10	00 2E	00 03	06	02 58 02 58 09 60	20 23
Modbus TCP	00 00 00 00 00 0D 01	None	10	00 2E	00 03	06	02 58 02 58 09 60	None

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	10	00 2E	00 03	E0 01
Modbus TCP	00 00 00 00 00 06 01	None	10	00 2E	00 03	None

Write the command operation code register (40125) data 0x0096 (CJ), that is to execute the start Jog control

The Modbus RTU/TCP message sent by the host is as follows: //**Write 00 96 in register 40125**//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Data Content	CRC Check
Modbus RTU	None	01	06	00 7C	00 96	C8 7C
Modbus TCP	00 00 00 00 00 06 01	None	06	00 7C	00 96	None

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Data Content	CRC Check
Modbus RTU	None	01	06	00 7C	00 96	C8 7C
Modbus TCP	00 00 00 00 00 06 01	None	06	00 7C	00 96	None

Write the command operation code register (40125) data 0x00D8 (SJ), that is to execute the stop Jog control

The Modbus RTU/TCP message sent by the host is as follows: //**Write 00 D8 in register 40125**//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Data Content	CRC Check
Modbus RTU	None	01	06	00 7C	00 D8	48 48
Modbus TCP	00 00 00 00 00 06 01	None	06	00 7C	00 D8	None

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Data Content	CRC Check
Modbus RTU	None	01	06	00 7C	00 D8	48 48
Modbus TCP	00 00 00 00 00 06 01	None	06	00 7C	00 D8	None

7.3 Homing Control Example Program

The slave station equipment address is 1 and the Electronic Gear EG= 10000 Pulses/r. Set the acceleration/ deceleration back to the origin as well as the first speed, the second speed and the torque limit using hard limit back to the origin mode. The corresponding MOONS` SCL command is as follows:

SCL Command	Set Values	Unit	Register Address	Hexadecimal Format Register Address	Write in Register Value	Explanation
HA1	20	Rps/sec	40357,40358	01 64,01 65	120	The default set acceleration/deceleration is 20 and needs to write 120 (0x00000078) into register 40357, 40358
HL1	0	Rps/sec	40359,40360	01 66,01 67	0	Reserve
HV1	5	Rps	40361,40362	01 68,01 69	1200	The default set of the first velocity is 5 and needs to write 1200 (0x000004B0) into register 40361, 40362
HV2	1	Pulses	40363,40364	01 6A,01 6B	240	The default set of second velocity is 1 and needs to write 240 (0x000000F0) into register 40363, 40364
HO	5000	Pulses	40365,40366	01 6C,01 6D	5000	The default set of the homing deviation is 5000 and needs to write 5000 (0x00001388) into register 40365, 40366
HC	70	%	40279,40280	01 16,01 17	700	The torque limit of default hard limit returning to origin mode is 70% and it needs to write 700 (0x000002BC) into registr 40279, 40280

Then:

The default write homing of acceleration and deceleration (40357, 40358) is data 0x00000078 and the data of the first velocity (40361, 40362) is 0x000004B0 while for the second velocity (40363, 40364) is data 0x000000F0. The homing deviation (40365, 40366) IS DATA 0X00001388. Note the difference of PR mode and the difference between high0bit and low-bit when putting in data in the 32-bit register and the result is that below:

If PR = 5, in Big Endian mode:

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	10	01 64	00 0A	14	00 00 00 78 00 00 00 00 00 00 04 B0 00 00 00 F0 00 00 13 88	66 26
Modbus TCP	00 00 00 00 00 1B 01	None	10	01 64	00 0A	14	00 00 00 78 00 00 00 00 00 00 04 B0 00 00 00 F0 00 00 13 88	None

The Modbus RTU/TCP message returned by the slave station equipment is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	10	01 64	00 0A	00 2D
Modbus TCP	00 00 00 00 00 06 01	None	10	01 64	00 0A	None

If PR = 133, in Little Endian mode:

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	10	01 64	00 0A	14	00 78 00 00 00 00 00 00 04 B0 00 00 00 F0 00 00 13 88 00 00	96 68
Modbus TCP	00 00 00 00 00 1B 01	None	10	01 64	00 0A	14	00 78 00 00 00 00 00 00 04 B0 00 00 00 F0 00 00 13 88 00 00	None

The Modbus RTU/TCP message returned by the slave station equipment is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	10	01 64	00 0A	00 2D
Modbus TCP	00 00 00 00 00 06 01	None	10	01 64	00 0A	None

Write in command operation code register (40125)and the data is 0x00DB (FH). When we write parameter register (40126) with data 0x0001. This chooses the first homing mode to execute homing control.

The Modbus RTU/TCP message sent by the host is as follows: //**Write 00 DB in register 40125 while 00 01 in register 40126**//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	10	00 7C	00 02	04	00 DB 00 01	45 25
Modbus TCP	00 00 00 00 00 0D 01	None	10	00 7C	00 02	04	00 DB 00 01	None

The Modbus RTU/TCP message returned by the slave station equipment is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	10	00 7C	00 02	80 10
Modbus TCP	00 00 00 00 00 06 01	None	10	00 7C	00 02	None

When choosing the first to fourth homing mode, it needs to set the maximum torque of motors when the origin return is in process. Through hard limit it will be returned to the origin mode. The torque limit of 100% corresponds to 1 time of the related torque of the motor.

The default write of the maximum torque (4027940280) with data 0x000002bc are in the process of returning to the origin, that is, execute according to the maximum 70% of the motor rated torque. The message is as follows:

If PR=5, that is to say, under the Big Endian mode:

The Modbus RTU/TCP message sent by the host is as follows: //**Write 000002BC in register 40279, 40280 **//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	10	01 16	00 02	04	00 00 02 BC	7F C8
Modbus TCP	00 00 00 00 00 0B 01	None	10	01 16	00 02	04	00 00 02 BC	None

The Modbus RTU/TCP message returned by the slave station equipment is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	10	01 16	00 02	A1 F0
Modbus TCP	00 00 00 00 00 06 01	None	10	01 16	00 02	None

If PR = 133, in Little Endian mode:

The Modbus RTU/TCP message sent by the host is as follows: //**Write 02BC0000 in register 40279, 40280 **//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	10	01 16	00 02	04	02 BC 00 00	BF 45
Modbus TCP	00 00 00 00 00 0B 01	None	10	01 16	00 02	04	02 BC 00 00	None

The Modbus RTU/TCP message returned by the slave station equipment is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	10	01 16	00 02	A1 F0
Modbus TCP	00 00 00 00 00 06 01	None	10	01 16	00 02	None

Note:

1. When the homing return mode chooses the self-defined first to fourth homing mode, after the motor has returned to the mechanical origin, it will continue to move for a period. When the movement completes, the motor current location is 0.

2. When the 1st to the 35th homing modes defined in CiA402 are selected as the homing mode, the motor stops moving after returning to the mechanical origin and is powered on. The current position of motor is the value of the origin offset.

3. The signal input ports of the origin sensor and limit sensor are set in the digital I/O interface of Luna software.

7.4 Example Program of Inner Q Programming Control

7.4.1 Example Program of MOONS'Drive Internal Q programming

Line	Label	Cmd	Param1	Param2	Comment
1		WT	2		延时2秒
2		RX	1	0	1号用户寄存器赋值0，初始化设置为0
3		RX	2	11	2号用户寄存器赋值11，设定判断条件1
4		RX	3	12	3号用户寄存器赋值12，设定判断条件2
5		EP	0		编码器位置清零
6		SP	0		指令位置清零
7	Label3	CR	1	2	比较用户寄存器1和2的值
8		QJ	E	#Label1	判断两个寄存器的值是否相等，若相等，则跳转到Label1，若不相等，则向下执行
9		CR	1	3	比较用户寄存器1和3的值
10		QJ	E	#Label2	判断两个寄存器的值是否相等，若相等，则跳转到Label2，若不相等，则向下执行
11		QG	#Label3		跳转到Label3
12	Label1	RM	4	A	将4号用户寄存器的值传送到A寄存器，A寄存器的值为位置控制模式下的加速度
13		RM	5	B	将5号用户寄存器的值传送到B寄存器，B寄存器的值为位置控制模式下的减速度
14		RM	6	V	将6号用户寄存器的值传送到V寄存器，V寄存器的值为位置控制模式下的速度
15		RM	7	D	将7号用户寄存器的值传送到D寄存器，D寄存器的值为位置控制模式下的目标位置/距离
16		FP			执行绝对运动
17		QG	#Label3		跳转到Label3
18	Label2	RM	4	A	将4号用户寄存器的值传送到A寄存器，A寄存器的值为位置控制模式下的加速度
19		RM	5	B	将5号用户寄存器的值传送到B寄存器，B寄存器的值为位置控制模式下的减速度
20		RM	6	V	将6号用户寄存器的值传送到V寄存器，V寄存器的值为位置控制模式下的速度
21		RM	8	D	将8号用户寄存器的值传送到D寄存器，D寄存器的值为位置控制模式下的目标位置/距离
22		FP			执行绝对运动
23		QG	#Label3		跳转到Label3

7.4.2 Variable Contrast Table of Q Programming

Function	Mapping User Registers	Register Address	Default Curve Parameters	Unit	Write user register value	Explanation
Acceleration	4	4006, 40068	100	Rps/sec	600	Set Value = Acceleration * 6
Deceleration	5	40069, 40070	100	Rps/sec	600	Set Value = Deceleration * 6
Velocity	6	40071, 40072	1	Rps	240	Set Value = Velocity * 240
First Target Location	7	40073, 40074	200000	Counts	200000	1:1 relationship
Second Target Location	8	40075, 40076	-200000	Counts	-200000	1:1 relationship
Operation Code	1	40061, 40062				judge, operate

7.4.3 MOONS'Setting on Drives compatible with Modbus

Other settings are described as above, but the internal Q programming function of the drives needs to be applied and PM = 9 needs to be set (or in the configuration interface → control mode).

Select SCL/Q and check Modbus → Q program interface and check power on to automatically execute Q program and then download it to the drive. That is, after the drive powers on, the Q program is automatically executed from the first program segment.

7.4.4 Modbus Read/Write Operation

1) If PR = 133, then it is in Little Endian mode

Pre-read the data of user register 1 (40061, 40062), 2 (40063, 40064) and 3 (40065, 40066)

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	03	00 3C	00 06	05 C4
Modbus TCP	00 00 00 00 00 06 01	None	03	00 3C	00 06	None

从站设备返回Modbus RTU/TCP报文如下：

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	03	0C	00 00 00 00 00 0B 00 00 00 0C 00 00	E9 B3
Modbus TCP	00 00 00 00 00 0F 01	None	03	0C	00 00 00 00 00 0B 00 00 00 0C 00 00	None

Pre-write user register 4 (40067, 40068) data 600, user register 5 (40069, 40070) data 600 (0x00000258), user register 6 (40071, 40072) data 240 (0x000000F0), user register 7 (40073, 40074) data 200000 (0x00030D40) as well as user register 8 (40075, 40076) data -200000 (0xFFFCF2C0).

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	10	00 42	00 0A	14	02 58 00 00 02 58 00 00 00 F0 00 00 0D 40 00 03 F2 C0 FF FC	DC FC
Modbus TCP	00 00 00 00 00 1B 01	None	10	00 42	00 0A	14	02 58 00 00 02 58 00 00 00 F0 00 00 0D 40 00 03 F2 C0 FF FC	None

Pre-write the user register 1 (40061, 40062) data 11(0x000B) and judge from the inner Q programme in drive, whether the data in register1 is equal to that in register 2. If so, then run to the target position 200000.

The Modbus RTU/TCP message sent by the host is as follows: //**Write 40061, 40062**//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	10	00 3C	00 02	04	00 0B 00 00	81 2C
Modbus TCP	00 00 00 00 00 0B 01	None	10	00 3C	00 02	04	00 0B 00 00	None

Or //**Write 40061**//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Data Content	CRC Check
Modbus RTU	None	01	06	00 3C	00 0B	08 01
Modbus TCP	00 00 00 00 00 06 01	None	06	00 3C	00 0B	None

Pre-write the user register 1 (40061, 40062) data 12(0x0000C) and judge from the inner Q programme in drive, whether the data in register 1 is equal to that in register 3. If so, then run to the target position -200000.

The Modbus RTU/TCP message sent by the host is as follows: //**Write 40061, 40062**//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	10	00 3C	00 02	04	00 0C 00 00	30 ED
Modbus TCP	00 00 00 00 00 0B 01	None	10	00 3C	00 02	04	00 0C 00 00	None

Or: //**Write 40061**//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Data Content	CRC Check
Modbus RTU	None	01	06	00 3C	00 0C	49 C3
Modbus TCP	00 00 00 00 00 06 01	None	06	00 3C	00 0C	None

Pre-read the data in user register 4(40067, 40068). Q programme can put the content of user register 4 into acceleration register A.

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	03	00 42	00 02	64 1F
Modbus TCP	00 00 00 00 00 06 01	None	03	00 42	00 02	None

Pre-read the data in user register 4(40069, 40070). Q programme can put the content of user register 5 into deceleration register B.

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	03	00 44	00 02	84 1E
Modbus TCP	00 00 00 00 00 06 01	None	03	00 44	00 02	None

Pre-read the data in user register 6 (40071, 40072). Q programme can put the content in user register 6 into velocity register V.

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	03	00 46	00 02	25 DE
Modbus TCP	00 00 00 00 00 06 01	None	03	00 46	00 02	None

Pre-read the data in user register 7 (40073, 40074). Q programme can put the content in user register 7 into location register D.

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	03	00 48	00 02	44 1D
Modbus TCP	00 00 00 00 00 06 01	None	03	00 48	00 02	None

Pre-read the data in user register 8 (40075, 40076). Q programme can put the content in user register 8 into location register D.

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	03	00 4A	00 02	E5 DD
Modbus TCP	00 00 00 00 00 06 01	None	03	00 4A	00 02	None

Read the status register (40002) and it can reveal the drive`s running status. For example, if the feedback information is 0x4001, it means Q programme is running and the drive is in enable status. For details please see "Host Command Reference Brochure". Its message is as follows:

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	03	00 01	00 01	D5 CA
Modbus TCP	00 00 00 00 00 06 01	None	03	00 01	00 01	None

The Modbus RTU/TCP message returned by the slave station equipment is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	03	02	40 01	48 44
Modbus TCP	00 00 00 00 00 05 01	None	03	02	40 01	None

Read the line number of Q programme currently executes (40018)

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	03	00 11	00 01	D4 0F
Modbus TCP	00 00 00 00 00 06 01	None	03	00 11	00 01	None

Read the acceleration(40028), deceleration(40029), velocity(40030), target location (40031, 40032) of the planned curves.

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	03	00 1B	00 05	F5 CE
Modbus TCP	00 00 00 00 00 06 01	None	03	00 1B	00 05	None

2) If PR = 5, then it is in Big Endian mode

Pre-read the data of user register 1 (40061, 40062), 2(40063, 40064) and 3 (40065, 40066)

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	CRC Check
Modbus RTU	None	01	03	00 3C	00 06	05 C4
Modbus TCP	00 00 00 00 00 06 01	None	03	00 3C	00 06	None

The Modbus RTU/TCP message returned by the slave station equipment is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	03	0C	00 00 00 00 00 00 00 0B 00 00 00 0C	36 B4
Modbus TCP	00 00 00 00 00 0F 01	None	03	0C	00 00 00 00 00 00 00 0B 00 00 00 0C	None

Pre-write the user register 4 (40067, 40068) data 600, user register 5 (40069, 40070) data 600 (0x00000258), user register 6 (40071, 40072) data 240 (0x000000F0), user register 7 (40073, 40074) data 200000(0x00030D40) and user register 8 (40075, 40076) data -200000 (0xFFFCF2C0)

The Modbus RTU/TCP message sent by the host is as follows:

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	10	00 42	00 0A	14	00 00 02 58 00 00 02 58 00 00 00 F0 00 03 0D 40 FF FC F2 C0	BF 30
Modbus TCP	00 00 00 00 00 1B 01	None	10	00 42	00 0A	14	00 00 02 58 00 00 02 58 00 00 00 F0 00 03 0D 40 FF FC F2 C0	None

Pre-write the user register 1 (40061, 40062) data 11 (0x000B). The Q programme inside the drive judges whether the data in register 1 is equal to that in register 2. If yes, then run to the aim position 200000.

The Modbus RTU/TCP message sent by the host is as follows: //**Write 40061, 40062**//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	10	00 3C	00 02	04	00 00 00 0B	B1 29
Modbus TCP	00 00 00 00 00 0B 01	None	10	00 3C	00 02	04	00 00 00 0B	None

Or: //**Write 40061**//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Data Content	CRC Check
Modbus RTU	None	01	06	00 3C	00 0B	08 01
Modbus TCP	00 00 00 00 00 06 01	None	06	00 3C	00 0B	None

Pre-write the user register 1 (40061, 40062) data 12 (0x0000C). The Q programme inside the drive judges whether the data in register 1 is qual to that in register 3. If yes, run to the aim position -200000.

The Modbus RTU/TCP message sent by the host is as follows: //**Write 40061, 40062**//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Register Amount	Number of Bytes	Data Content	CRC Check
Modbus RTU	None	01	10	00 3C	00 02	04	00 00 00 0C	F0 EB
Modbus TCP	00 00 00 00 00 0B 01	None	10	00 3C	00 02	04	00 00 00 0C	None

Or: //**Write 40061**//

Modbus Protocol Type	MBAP Message Header	Address Code	Function Code	Register Address	Data Content	CRC Check
Modbus RTU	None	01	06	00 3C	00 0C	49 C3
Modbus TCP	00 00 00 00 00 06 01	None	06	00 3C	00 0C	None

Appendix 1 Function Code Message Format

Function Code 0x03 reads the Keep Register:

Query Message:

QUERY Field Name	Example (Hex)
Slave Address	11
Function	03
Starting Address Hi	00
Starting Address Lo	6B
No. of Points Hi	00
No. of Roints Lo	03
Error Check (LRC or CRC)	—

Response Message:

RESPONSE Field Name	Example (Hex)
Slave Address	11
Function	03
Byte Count	06
Data Hi (Register 40108)	02
Data Lo(Register 40108)	2B
Data Hi(Register 40109)	00
Data Lo(Register 40109)	00
Data Hi(Register 40110)	00
Data Lo(Register 40110)	64
Error Check (LRC or CRC)	—

Function Code 0x06 writes a single register

Query Message:

QUERY Field Name	Example (Hex)
Slave Address	11
Function	06
Register Address Hi	00
Register Address Lo	01
Preset Data Hi	00
Preset Data Lo	03
Error Check (LRC or CRC)	—

Response Message:

RESPONSE Field Name	Example (Hex)
Slave Address	11
Function	06
Register Address Hi	00
Register Address Lo	01
Preset Data Hi	00
Preset Data Lo	03
Error Check (LRC or CRC)	—

Function Code writes multiple Register

Query Message:

QUERY	
Field Name	Example (Hex)
Slave Address	11
Function	10
Starting Address Hi	00
Starting Address Lo	01
No. of Registers Hi	00
No. of Registers Lo	02
Byte Count	04
Data Hi	00
Data Lo	0A
Data Hi	01
Data Lo	02
Error Check (LRC or CRC)	—

Response Message:

PESPONSE	
Field Name	Example (Hex)
Slave Address	11
Function	10
Starting Address Hi	00
Starting Address Lo	01
No. of Registers Hi	00
No. of Registers Lo	02
Error Check (LRC or CRC)	—

Appendix 2 Modbus abnormal Response and Code

Query Message:

```
QUERY

Byte    Contents              Example

1       Slave Address         0A
2       Function              01
3       Starting Address Hi   04
4       Starting Address Lo   A1
5       No. of Coils Hi       00
6       No. of Coils Lo       01
7       LRC                   4F
```

Abnormal Response Message

```
EXCEPTION RESPONSE

Byte    Contents              Example

1       Slave Address         0A
2       Function              81
3       Exception Code        02
4       LRC                   73
```

In the above example, the slave machine address is 10 (0AH) and the function code of reading coil status is 01. The address the master visits the coil is 1245(04A1H) while the coil amount is 1(0001H).

If the slave machine does not exist such coil address, then return an abnormal response to the master in abnormal code 02, which means this register address is illegal.

MOONS` drive abnormal response code table:

Code(Hex)	Name	Meaning
01	Function Code not support	The function machine does not support this function code
02	Illegal Register	The function machine does not support this function code
03	Illegal Data Area	Register for visit is 0
11	Register does not support read	The register address for visit does not support read
12	Register does not support write in	The register address for visit does not support write in
13	The set value exceeds the scope	The value for writing in exceeds the setting scope for the register

Appendix 3 CRC Check

The CRC area of cyclic redundancy check is 2 bytes, including a 16-bit binary data. The CRC value is calculated by the transmitting device and the calculated value is attached to the message.

When receiving information, the receiving device recalculates the CRC value and compares the calculated value with the received actual value in the CRC area. If they are different, an error is generated.

At the beginning of CRC, set all 16-bits of the register to "1" and then put the data of two adjacent 8-bit bytes into the current register.The 8-bit data of each character is used to generate CRC and the start-bit, stop-bit as well as parity-bit are not added to CRC.

When generating CRC, XOR operation is performed between every 8-bit data and the value of the register. The result is shifted to the right by one bit (in the direction of LSB) and uses "0" to fill in MSB. LSB is tested and if LSB is "1", it will be XOR with the preset fixed value. If LSB is "0", no XOR operation will be performed.

Repeat the above process until the shift is 8 times. After the 8th shift, the next 8-bit data is XOR with the current value of the register. After the information is processed, the final value in the deposit is the CRC value.

The process to generate CRC:

1. Set the 16-bit CRC register as FFFFH

2. The first 8-bit data performs XOR operation with the lower 8-bit of CRC register and puts the result into CRC register.

3. Shift CRC register to the right by 1-bit, fill MSB with zero and check LSB.

4. (If LSB = 0): repeat 3 and move right for 1-bit.

   (If LSB=1): CRC register dores XOR operation with A001H

5. Repeat 3 and 4 until 8 shifts are completed and the processing of 8-bit bytes is completed

6. Repeat steps 2 to 5 and process the next 8-bit data until all bytes are processed

7. The final value of CRC register is the register value.

8. When putting the CRC value into the message, the upper 8 bits and the lower 8 bits shall be placed separately. Put the CRC value into the message. When sending the 16-bit CRC value in the message, send the low 8 bits first and then the high 8 bits.

If CRC value is 1241:

Addr	Func	Data Count	Data	Data	Data	Data	CRC$_{Lo}$	CRC$_{Hi}$
							41	12
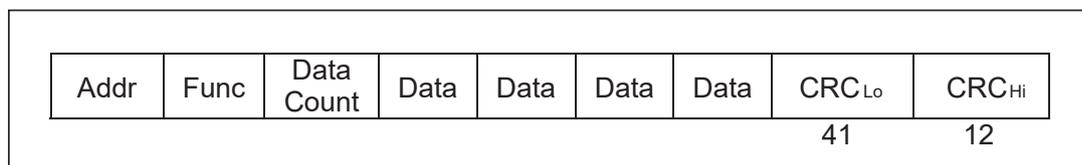
For example:

Various possible CRC values are loaded in two columns. One column is in the high 8-bit area of 16-bit CRC, which is the CRC value (0-256)

The another kind is the low 8-bit area, which is the low-bit value of CRC.

The CRC obtained by this method is faster than that of calculating a new CRC value for each new character in the buffer.

Note: This function internally exchanges high/low bytes in CRC and its bytes have been exchanged in the returned CRC value.

Hence, the CRC value returned by this function can be directly transmitted in the information.

Example Programme:

The function takes 2 independent variables:

unsigned char *puchMsg ; To generate a CRC value, point the pointer to the buffer containing binary data

unsigned short usDataLen ; Number of Bytes in the Buffer.

This function returns CRC as a type "unsigned short". "unsigned short"。

The Function CRC generates

unsigned short CRC16(puchMsg, usDataLen)

unsigned char *puchMsg ; /*Calculate CRC according to the number of bytes from the CRC*/

unsigned short usDataLen ; /* quantity of bytes in message */

{

unsigned char uchCRCHi = 0xFF ; /* Initialize high byte */

unsigned char uchCRCLo = 0xFF ; /* Initialize low byte*/

unsigned uIndex ; /*CRC Table*/

while (usDataLen—) /*Through the data buffer*/

{

uIndex = uchCRCHi ^ *puchMsgg++ ; /*Calculate CRC*/

uchCRCHi = uchCRCLo ^ auchCRCHi[uIndex] ;

uchCRCLo = auchCRCLo[uIndex] ;

}

 return (uchCRCHi << 8 | uchCRCLo) ;

Appendix 4 Modbus/RTU 16-bit CRC Check Example Program

```csharp
using System;
using System.Collections.Generic;
using System.Text;


namespace Modbus
{
    public static class Utility
    {
        private static readonly ushort[] m_CrcTable =
        {
            0X0000, 0XC0C1, 0XC181, 0X0140, 0XC301, 0X03C0, 0X0280, 0XC241,
            0XC601, 0X06C0, 0X0780, 0XC741, 0X0500, 0XC5C1, 0XC481, 0X0440,
            0XCC01, 0X0CC0, 0X0D80, 0XCD41, 0X0F00, 0XCFC1, 0XCE81, 0X0E40,
            0X0A00, 0XCAC1, 0XCB81, 0X0B40, 0XC901, 0X09C0, 0X0880, 0XC841,
            0XD801, 0X18C0, 0X1980, 0XD941, 0X1B00, 0XDBC1, 0XDA81, 0X1A40,
            0X1E00, 0XDEC1, 0XDF81, 0X1F40, 0XDD01, 0X1DC0, 0X1C80, 0XDC41,
            0X1400, 0XD4C1, 0XD581, 0X1540, 0XD701, 0X17C0, 0X1680, 0XD641,
            0XD201, 0X12C0, 0X1380, 0XD341, 0X1100, 0XD1C1, 0XD081, 0X1040,
            0XF001, 0X30C0, 0X3180, 0XF141, 0X3300, 0XF3C1, 0XF281, 0X3240,
            0X3600, 0XF6C1, 0XF781, 0X3740, 0XF501, 0X35C0, 0X3480, 0XF441,
            0X3C00, 0XFCC1, 0XFD81, 0X3D40, 0XFF01, 0X3FC0, 0X3E80, 0XFE41,
            0XFA01, 0X3AC0, 0X3B80, 0XFB41, 0X3900, 0XF9C1, 0XF881, 0X3840,
            0X2800, 0XE8C1, 0XE981, 0X2940, 0XEB01, 0X2BC0, 0X2A80, 0XEA41,
            0XEE01, 0X2EC0, 0X2F80, 0XEF41, 0X2D00, 0XEDC1, 0XEC81, 0X2C40,
            0XE401, 0X24C0, 0X2580, 0XE541, 0X2700, 0XE7C1, 0XE681, 0X2640,
            0X2200, 0XE2C1, 0XE381, 0X2340, 0XE101, 0X21C0, 0X2080, 0XE041,
            0XA001, 0X60C0, 0X6180, 0XA141, 0X6300, 0XA3C1, 0XA281, 0X6240,
            0X6600, 0XA6C1, 0XA781, 0X6740, 0XA501, 0X65C0, 0X6480, 0XA441,
            0X6C00, 0XACC1, 0XAD81, 0X6D40, 0XAF01, 0X6FC0, 0X6E80, 0XAE41,
            0XAA01, 0X6AC0, 0X6B80, 0XAB41, 0X6900, 0XA9C1, 0XA881, 0X6840,
            0X7800, 0XB8C1, 0XB981, 0X7940, 0XBB01, 0X7BC0, 0X7A80, 0XBA41,
            0XBE01, 0X7EC0, 0X7F80, 0XBF41, 0X7D00, 0XBDC1, 0XBC81, 0X7C40,
            0XB401, 0X74C0, 0X7580, 0XB541, 0X7700, 0XB7C1, 0XB681, 0X7640,
```

```
        0X7200, 0XB2C1, 0XB381, 0X7340, 0XB101, 0X71C0, 0X7080, 0XB041,

        0X5000, 0X90C1, 0X9181, 0X5140, 0X9301, 0X53C0, 0X5280, 0X9241,

        0X9601, 0X56C0, 0X5780, 0X9741, 0X5500, 0X95C1, 0X9481, 0X5440,

        0X9C01, 0X5CC0, 0X5D80, 0X9D41, 0X5F00, 0X9FC1, 0X9E81, 0X5E40,

        0X5A00, 0X9AC1, 0X9B81, 0X5B40, 0X9901, 0X59C0, 0X5880, 0X9841,

        0X8801, 0X48C0, 0X4980, 0X8941, 0X4B00, 0X8BC1, 0X8A81, 0X4A40,

        0X4E00, 0X8EC1, 0X8F81, 0X4F40, 0X8D01, 0X4DC0, 0X4C80, 0X8C41,

        0X4400, 0X84C1, 0X8581, 0X4540, 0X8701, 0X47C0, 0X4680, 0X8641,

        0X8201, 0X42C0, 0X4380, 0X8341, 0X4100, 0X81C1, 0X8081, 0X4040
    };
    /// <summary>
    /// Calculate Longitudinal Redundancy Check.
    /// </summary>
    /// <param name="data">The data used in LRC</param>
    /// <returns>LRC value</returns>
    public static byte CalculateLrc(byte[] data)
    {
        if (data == null)
        {
            throw new ArgumentNullException("data");
        }
        byte lrc = 0;
        foreach (byte b in data)
        {
            lrc += b;
        }
        lrc = (byte)((lrc ^ 0xFF) + 1);
        return lrc;
    }


    /// <summary>
    /// Calculate Cyclical Redundancy Check
    /// </summary>
    /// <param name="data">The data used in CRC</param>
    /// <returns>CRC value</returns>

    public static byte[] CalculateCrc(byte[] data)
```

```csharp
        {
            if (data == null)
            {
                throw new ArgumentNullException( "data" );
            }
            ushort crc = ushort.MaxValue;
            foreach (byte b in data)
            {
                byte tableIndex = (byte)(crc ^ b);
                crc >>= 8;
                crc ^= m_CrcTable[tableIndex];
            }
            return BitConverter.GetBytes(crc);
        }
    }
}
```

The following is the calling method:

```csharp
byte[] _Data = new byte[] { 0x31, 0x32};
byte[] _Crc = Modbus.Utility.CalculateCrc(_Data);
//result: _Crc = { 0x95, 0xf5 }
```

Appendix 5 Modbus Register Table

ST&STAC&STM&SWM Series				
Register	**Access**	**Data Type**	**Description**	**SCL Register**
40001	Read Only	SHORT	Alarm Code (AL)	f
40002	Read Only	SHORT	Status Code (SC)	s
40003	Read Only	SHORT	Immediate Expanded Inputs (IS)	y
40004	Read Only	SHORT	Driver Board Inputs (ISX)	i
40005..6	Read Only	LONG	Encoder Position (IE, EP)	e
40007..8	Read Only	LONG	Immediate Absolute Position (IP)	l
40009..10	Read Only	LONG	Absolute Position Command (SP)	P (Capital)
40011	Read Only	SHORT	Immediate Actual Velocity (IV0)	v
40012	Read Only	SHORT	Immediate Target Velocity (IV1)	w
40013	Read Only	SHORT	Immediate Drive Temperature (IT)	t
40014	Read Only	SHORT	Immediate DC Bus Voltage (IU)	u
40015..16	Read Only	LONG	Immediate Position Error (IX)	x
40017	Read Only	SHORT	Immediate Analog Input Value (IA)	a
40018	Read Only	SHORT	Q Program Line Number	b
40019	Read Only	SHORT	Immediate Current Command (IC)	c
40020..21	Read Only	LONG	Relative Distance (ID)	d
40022..23	Read Only	LONG	Sensor Position	g
40024	Read Only	SHORT	Condition Code	h
40025	Read Only	SHORT	Analog Input 1 (IA1)	j
40026	Read Only	SHORT	Analog Input 2 (IA2)	k
40027	Read Only	SHORT	Command Mode (CM)	m
40028	R/W	SHORT	Point-to-Point Acceleration (AC)	A
40029	R/W	SHORT	Point-to-Point Deceleration (DE)	B

ST&STAC&STM&SWM Series

Register	Access	Data Type	Description		SCL Register
40030	R/W	SHORT	Velocity (VE)		V
40031..32	R/W	LONG	Point-to-Point Distance (DI)		D
40033..34	R/W	LONG	Change Distance (DC)		C
40035	R/W	SHORT	Change Velocity (VC)		U
40036	Read Only	SHORT	Velocity Move State		n
40037	Read Only	SHORT	Point-to-Point Move State		o
40038	Read Only	SHORT	Q Program Segment Number		p
40039	Read Only	SHORT	Reserved		
40040	Read Only	SHORT	Reserved		
40041..42	R/W	LONG	Position Offset		E
40043	R/W	SHORT	Miscella neous Flags		F
40044	R/W	SHORT	Reserved		
40045..46	R/W	LONG	Input Counter		I
40047	R/W	SHORT	Jog Accel (JA)		
40048	R/W	SHORT	Jog Decel (JL)		
40049	R/W	SHORT	Jog Velocity (JS)		J
40050	R/W	SHORT	Accel/Decel Current	STM Series (CA)	
			Max Velocity	ST Series (VM)	
40051	R/W	SHORT	Continuous Current (CC)		N
40052	R/W	SHORT	Idle Current (CI)		
40053	R/W	SHORT	Steps per Revolution		R
40054..55	R/W	LONG	Pulse Counter		S
40056	R/W	SHORT	Analog Position Gain (AP)		X
40057	R/W	SHORT	Analog Threshold (AT)		Y
40058	R/W	SHORT	Analog Offset (AV)		Z

ST&STAC&STM&SWM Series

Register	Access	Data Type	Description	SCL Register
40059..60	R/W	LONG	Accumulator	0
40061..62	R/W	LONG	User Defined Register 1	1
40063..64	R/W	LONG	User Defined Register 2	2
40065..66	R/W	LONG	User Defined Register 3	3
40067..68	R/W	LONG	User Defined Register 4	4
40069..70	R/W	LONG	User Defined Register 5	5
40071..72	R/W	LONG	User Defined Register 6	6
40073..74	R/W	LONG	User Defined Register 7	7
40075..76	R/W	LONG	User Defined Register 8	8
40077..78	R/W	LONG	User Defined Register 9	9
40079..80	R/W	LONG	User Defined Register 10	:
40081..82	R/W	LONG	User Defined Register 11	;
40083..84	R/W	LONG	User Defined Register 12	<
40085..86	R/W	LONG	User Defined Register 13	=
40087..88	R/W	LONG	User Defined Register 14	>
40089..90	R/W	LONG	User Defined Register 15	?
40091..92	R/W	LONG	User Defined Register 16	@
40093..94	R/W	LONG	User Defined Register 17	[
40095..96	R/W	LONG	User Defined Register 18	\
40097..98	R/W	LONG	User Defined Register 19	]
40099..100	R/W	LONG	User Defined Register 20	^
40101..102	R/W	LONG	User Defined Register 21	_
40103..104	R/W	LONG	User Defined Register 22	`

ST&STAC&STM&SWM Series

Register	Access	Data Type	Description	SCL Register
40105	R/W	SHORT	Brake Release Delay (BD)	
40106	R/W	SHORT	Brake Engage Delay (BE)	
40107	R/W	SHORT	Idle Current Delay (CD)	
40108	Read Only	SHORT	Reserved	
40109	Read Only	SHORT	Reserved	
40110	R/W	SHORT	Analog Filter Gain (AF)	
40111..124	Read Only	LONG	Reserved	
40125	R/W	SHORT	Command Opcode	
40126	R/W	SHORT	Parameter 1	
40127	R/W	SHORT	Parameter 2	
40128	R/W	SHORT	Parameter 3	
40129	R/W	SHORT	Parameter 4	
40130	R/W	SHORT	Parameter 5	

STB Series

Register	Access	Data Type	Description	SCL Register
40001	Read Only	SHORT	Alarm Code (AL)	f
40002	Read Only	SHORT	Status Code (SC)	s
40003	Read Only	SHORT	Reserved	y
40004	Read Only	SHORT	Drive Digital output (IS）	i
40005..6	Read Only	LONG	Encoder Position (IE, EP)	e
40007..8	Read Only	LONG	Immediate Absolute Position (IP)	l
40009..10	Read Only	LONG	Absolute Position Command (SP)	P (Capital)
40011	Read Only	SHORT	Immediate Actual Velocity (IV0)	v
40012	Read Only	SHORT	Immediate Target Velocity (IV1)	w
40013	Read Only	SHORT	Immediate Drive Temperature (IT)	t
40014	Read Only	SHORT	Immediate DC Bus Voltage (IU)	u
40015..16	Read Only	LONG	Immediate Position Error (IX)	x
40017	Read Only	SHORT	Reserved	
40018	Read Only	SHORT	Q Program Line Number	b
40019	Read Only	SHORT	Immediate Current Command (IC)	c
40020..21	Read Only	LONG	Relative Distance (ID)	d
40022..23	Read Only	LONG	Sensor Position	g
40024	Read Only	SHORT	Condition Code	h
40025	Read Only	SHORT	Reserved	
40026	Read Only	SHORT	Reserved	
40027	Read Only	SHORT	Command Mode (CM)	m
40028	R/W	SHORT	Point-to-Point Acceleration (AC)	A
40029	R/W	SHORT	Point-to-Point Deceleration (DE)	B
40030	R/W	SHORT	Velocity (VE)	V

STB Series

Register	Access	Data Type	Description	SCL Register
40031..32	R/W	LONG	Point-to-Point Distance (DI)	D
40033..34	R/W	LONG	Change Distance (DC)	C
40035	R/W	SHORT	Change Velocity (VC)	U
40036	Read Only	SHORT	Velocity Move State	n
40037	Read Only	SHORT	Point-to-Point Move State	o
40038	Read Only	SHORT	Q Program Segment Number	p
40039	Read Only	SHORT	Reserved	
40040	Read Only	SHORT	Reserved	
40041..42	R/W	LONG	Position Offset	E
40043	R/W	SHORT	Miscella neous Flags	F
40044	Read Only	SHORT	Reserved	
40045..46	R/W	LONG	Input Counter	I
40047	R/W	SHORT	Jog Accel (JA)	
40048	R/W	SHORT	Jog Decel (JL)	
40049	R/W	SHORT	Jog Velocity (JS)	J
40050	R/W	SHORT	Accel/Decel Current (CA)	
40051	R/W	SHORT	Running Current (CC)	N
40052	R/W	SHORT	Idle Current (CI)	
40053	R/W	SHORT	Steps per Revolution (EG)	R
40054..55	R/W	SHORT	Pulse Counter	S
40056	R/W	SHORT	Analog Position Gain (AP)	X
40057	R/W	SHORT	Analog Threshold (AT)	Y
40058	R/W	SHORT	Analog Offset (AV)	Z
40059..60	Read Only	LONG	Accumulator	0

STB Series

Register	Access	Data Type	Description	SCL Register
40061..62	R/W	LONG	User Defined Register 1	1
40063..64	R/W	LONG	User Defined Register 2	2
40065..66	R/W	LONG	User Defined Register 3	3
40067..68	R/W	LONG	User Defined Register 4	4
40069..70	R/W	LONG	User Defined Register 5	5
40071..72	R/W	LONG	User Defined Register 6	6
40073..74	R/W	LONG	User Defined Register 7	7
40075..76	R/W	LONG	User Defined Register 8	8
40077..78	R/W	LONG	User Defined Register 9	9
40079..80	R/W	LONG	User Defined Register 10	:
40081..82	R/W	LONG	User Defined Register 11	;
40083..84	R/W	LONG	User Defined Register 12	<
40085..86	R/W	LONG	User Defined Register 13	=
40087..88	R/W	LONG	User Defined Register 14	>
40089..90	R/W	LONG	User Defined Register 15	?
40091..92	R/W	LONG	User Defined Register 16	@
40093..94	R/W	LONG	User Defined Register 17	[
40095..96	R/W	LONG	User Defined Register 18	\
40097..98	R/W	LONG	User Defined Register 19	]
40099..100	R/W	LONG	User Defined Register 20	^
40101..102	R/W	LONG	User Defined Register 21	_
40103..104	R/W	LONG	User Defined Register 22	`
40105	R/W	SHORT	Brake Release Delay (BD)	

STB Series

Register	Access	Data Type	Description	SCL Register
40106	R/W	SHORT	Brake Engage Delay (BE)	
40107	R/W	SHORT	Idle Current Delay (CD)	
40108	Read Only	SHORT	Reserved	
40109	Read Only	SHORT	Reserved	
40110	R/W	SHORT	Analog Filter Gain (AF)	
40111..124	Read Only	LONG	Reserved	
40125	R/W	SHORT	Command Opcode	
40126	R/W	SHORT	Parameter 1	
40127	R/W	SHORT	Parameter 2	
40128	R/W	SHORT	Parameter 3	
40129	R/W	SHORT	Parameter 4	
40130	R/W	SHORT	Parameter 5	
40131	R/W	SHORT	Hyperbolic Smoothing Gain (HG)	
40132	R/W	SHORT	Hyperbolic Smoothing Phase (HP)	
40133	R/W	SHORT	Smoothing filter frequency (SF)	
40134	R/W	SHORT	Node High Byte Address	
40135	R/W	SHORT	Motor Detail	
40136	Read Only	SHORT	Reserved	
40137	Read Only	SHORT	Reserved	
40138	R/W	SHORT	Control Mode (CM)	
40139	R/W	SHORT	Operation Mode (PM)	
40140	R/W	SHORT	Servo Enable (SI)	
40141	R/W	SHORT	Alarm Reset (AI)	
40142	R/W	SHORT	Define Limits Input (DL)	
40143	R/W	SHORT	Alarm Output (AO)	

STB Series

Register	Access	Data Type	Description	SCL Register
40144	R/W	SHORT	Brake Output (BO)	
40145	R/W	SHORT	Motion Output (MO) Y3，Y4，Y5，Y6	
40146	Read Only	SHORT	Reserved	
40147	Read Only	SHORT	Reserved	
40148	R/W	SHORT	Low Voltage (LV)	
40149	R/W	SHORT	Baud Rate (BR)	
40150	R/W	SHORT	Protocol (PR)	
40151	R/W	SHORT	Transmit Delay (TD)	
40152..40200	Read Only	LONG	Reserved	

STF Series

Register	Access	Data Type	Description	SCL Register
40001	Read Only	SHORT	Alarm Code (AL)	f
40002	Read Only	SHORT	Status Code (SC)	s
40003	Read Only	SHORT	Reserved	y
40004	Read Only	SHORT	Drive Digital output (IS）	i
40005..6	Read Only	LONG	Reserved	
40007..8	Read Only	LONG	Immediate Absolute Position (IP)	l
40009..10	Read Only	LONG	Absolute Position Command (SP)	P (Capital)
40011	Read Only	SHORT	Reserved	v
40012	Read Only	SHORT	Immediate Target Velocity (IV1)	w
40013	Read Only	SHORT	Immediate Drive Temperature (IT)	t
40014	Read Only	SHORT	Immediate DC Bus Voltage (IU)	u
40015..16	Read Only	LONG	Immediate Position Error (IX)	x
40017	Read Only	SHORT	Immediate Analog Input Value (IA)	a
40018	Read Only	SHORT	Q Program Line Number	b
40019	Read Only	SHORT	Immediate Current Command (IC)	c
40020..21	Read Only	LONG	Relative Distance (ID)	d
40022..23	Read Only	LONG	Sensor Position	g
40024	Read Only	SHORT	Condition Code	h
40025	Read Only	SHORT	Analog Input 1 (IA1)	j
40026	Read Only	SHORT	Analog Input 2 (IA2)	k
40027	Read Only	SHORT	Command Mode (CM)	m
40028	R/W	SHORT	Point-to-Point Acceleration (AC)	A
40029	R/W	SHORT	Point-to-Point Deceleration (DE)	B
40030	R/W	SHORT	Velocity (VE)	V

STF Series

Register	Access	Data Type	Description	SCL Register
40031..32	R/W	LONG	Point-to-Point Distance (DI)	D
40033..34	R/W	LONG	Change Distance (DC)	C
40035	R/W	SHORT	Change Velocity (VC)	U
40036	Read Only	SHORT	Velocity Move State	n
40037	Read Only	SHORT	Point-to-Point Move State	o
40038	Read Only	SHORT	Q Program Segment Number	p
40039	Read Only	SHORT	Reserved	r
40040	Read Only	SHORT	Phase Error	z
40041..42	R/W	LONG	Position Offset	E
40043	R/W	SHORT	Miscella neous Flags	F
40044	Read Only	SHORT	Reserved	G
40045..46	R/W	LONG	Input Counter	I
40047	R/W	SHORT	Jog Accel (JA)	
40048	R/W	SHORT	Jog Decel (JL)	
40049	R/W	SHORT	Jog Velocity (JS)	J
40050	R/W	SHORT	Accel/Decel Current (CA)	
40051	R/W	SHORT	Running Current (CC)	N
40052	R/W	SHORT	Idle Current (CI)	
40053	R/W	SHORT	Steps per Revolution (EG)	R
40054..55	R/W	SHORT	Pulse Counter	S
40056	R/W	SHORT	Analog Position Gain (AP)	X
40057	R/W	SHORT	Analog Threshold (AT)	Y
40058	R/W	SHORT	Analog Offset (AV)	Z
40059..60	R/W	LONG	Accumulator	0

STF Series

Register	Access	Data Type	Description	SCL Register
40061..62	R/W	LONG	User Defined Register 1	1
40063..64	R/W	LONG	User Defined Register 2	2
40065..66	R/W	LONG	User Defined Register 3	3
40067..68	R/W	LONG	User Defined Register 4	4
40069..70	R/W	LONG	User Defined Register 5	5
40071..72	R/W	LONG	User Defined Register 6	6
40073..74	R/W	LONG	User Defined Register 7	7
40075..76	R/W	LONG	User Defined Register 8	8
40077..78	R/W	LONG	User Defined Register 9	9
40079..80	R/W	LONG	User Defined Register 10	:
40081..82	R/W	LONG	User Defined Register 11	;
40083..84	R/W	LONG	User Defined Register 12	<
40085..86	R/W	LONG	User Defined Register 13	=
40087..88	R/W	LONG	User Defined Register 14	>
40089..90	R/W	LONG	User Defined Register 15	?
40091..92	R/W	LONG	User Defined Register 16	@
40093..94	R/W	LONG	User Defined Register 17	[
40095..96	R/W	LONG	User Defined Register 18	\
40097..98	R/W	LONG	User Defined Register 19	]
40099..100	R/W	LONG	User Defined Register 20	^
40101..102	R/W	LONG	User Defined Register 21	_
40103..104	R/W	LONG	User Defined Register 22	`
40105	R/W	SHORT	Brake Release Delay (BD)	

STF Series

Register	Access	Data Type	Description	SCL Register
40106	R/W	SHORT	Brake Engage Delay (BE)	
40107	R/W	SHORT	Idle Current Delay (CD)	
40108	Read Only	SHORT	Reserved	
40109	Read Only	SHORT	Reserved	
40110	R/W	SHORT	Analog Filter Gain (AF)	
40111	Read Only	SHORT	Reserved	
40112	Read Only	SHORT	Alarm Code Upper (AL1)	
40113	Read Only	SHORT	Reserved	
40114	R/W	SHORT	Motor Number	
40115	R/W	SHORT	Load Ratio	
40116..118	Read Only	SHORT	Reserved	
40119	R/W	SHORT	Filter Input 3#	
40120	R/W	SHORT	Filter Input 4#	
40121	R/W	SHORT	Filter Input 5#	
40122	R/W	SHORT	Filter Input 6#	
40123	R/W	SHORT	Filter Input 7#	
40124	R/W	SHORT	Filter Input 8#	
40125	R/W	SHORT	Command Opcode	
40126	R/W	SHORT	Parameter 1	
40127	R/W	SHORT	Parameter 2	
40128	R/W	SHORT	Parameter 3	
40129	R/W	SHORT	Parameter 4	
40130	R/W	SHORT	Parameter 5	
40131	R/W	SHORT	Hyperbolic Smoothing Gain (HG)	
40132	R/W	SHORT	Hyperbolic Smoothing Phase (HP)	
40133	R/W	SHORT	Smoothing filter frequency (SF)	

STF Series

Register	Access	Data Type	Description	SCL Register
40134	R/W	SHORT	Node High Byte Address	
40135	R/W	SHORT	Motor Detail	
40136	R/W	SHORT	Step Mode (SZ)	
40137	R/W	SHORT	Step Filter	
40138	R/W	SHORT	Control Mode (CM)	
40139	R/W	SHORT	Operation Mode (PM)	
40140	R/W	SHORT	Servo Enable (SI)	
40141	R/W	SHORT	Alarm Reset (AI)	
40142	R/W	SHORT	Define Limits Input (DL)	
40143	R/W	SHORT	Alarm Output (AO)	
40144	R/W	SHORT	Brake Output (BO)	
40145	R/W	SHORT	Motion Output (MO) Y3，Y4，Y5，Y6	
40146	R/W	SHORT	Anti-Resonance Filter Frequency (CF)	
40147	R/W	SHORT	Anti-Resonance Filter Gain (CG)	
40148	R/W	SHORT	Low Voltage (LV)	
40149	R/W	SHORT	Baud Rate (BR)	
40150	R/W	SHORT	Protocol (PR)	
40151	R/W	SHORT	Transmit Delay (TD)	
40152..159	Read Only	SHORT	Reserved	
40160	R/W	SHORT	Max Acceleration (AM)	
40161	Read Only	SHORT	Reserved	
40162	R/W	SHORT	Address (DA)	
40163	Read Only	SHORT	Reserved	
40164	R/W	SHORT	Jog Change Velocity (JC)	

STF Series

Register	Access	Data Type	Description	SCL Register
40165..166	Read Only	SHORT	Reserved	
40167	R/W	SHORT	Homing Acceleration 1 (HA1)	
40168	R/W	SHORT	Homing Acceleration 2 (HA2)	
40169	R/W	SHORT	Homing Acceleration 3 (HA3)	
40170	R/W	SHORT	Homing Deceleration 1 (HL1)	
40171	R/W	SHORT	Homing Deceleration 2 (HL2)	
40172	R/W	SHORT	Homing Deceleration 3 (HL3)	
40173	R/W	SHORT	Homing Velocity 1 (HV1)	
40174	R/W	SHORT	Homing Velocity 2 (HV2)	
40175	R/W	SHORT	Homing Velocity 3 (HV3)	
40176..181	Read Only	SHORT	Reserved	
40182	R/W	SHORT	Alarm Mask (MA)	
40183	R/W	SHORT	Jerk Time (JT)	
40184	Read Only	SHORT	Reserved	
40185..186	R/W	SHORT	Homing Distance (HO)	
40187..40199	Read Only	SHORT	Reserved	
40200	R/W	SHORT	Sub Model Number	
40201	R/W	SHORT	Customer Motor Hyperbolic Gain (MZA)	
40202	R/W	SHORT	Customer Motor Hyperbolic Phase (MZB)	
40203	R/W	SHORT	Customer Motor Max Current (MZC)	
40204	R/W	SHORT	Customer Motor Torque (MZD)	
40205	R/W	SHORT	Customer Motor Inertia (MZE)	
40206	R/W	SHORT	Customer Motor Rated Torque 1 (MZF)	
40207	R/W	SHORT	Customer Motor Rated Torque 2 (MZG)	

STF Series

Register	Access	Data Type	Description	SCL Register
40208	R/W	SHORT	Customer Motor Rated Inertia 1 (MZH)	
40209	R/W	SHORT	Customer Motor Rated Inertia 2 (MZI)	
40210	R/W	SHORT	Customer Motor Voltage (MZJ)	
40211	R/W	SHORT	Customer Motor Resistance (MZK)	
40212	R/W	SHORT	Customer Motor Inductance (MZL)	
40213	R/W	SHORT	Customer Motor Name 1 (NZA Lower)	
40214	R/W	SHORT	Customer Motor Name 2 (NZA Upper)	
40215	R/W	SHORT	Customer Motor Name 3 (NZB Lower)	
40216	R/W	SHORT	Customer Motor Name 4 (NZB Upper)	
40217	R/W	SHORT	Customer Motor Name 5 (NZC Lower)	
40218	R/W	SHORT	Customer Motor Name 6 (NZC Upper)	
40219	R/W	SHORT	Customer Motor Name 7 (NZD)	
40220	R/W	SHORT	MOONS' Motor Hyperbolic Gain (MYA)	
40221	R/W	SHORT	MOONS' Motor Hyperbolic Phase (MYB)	
40222	R/W	SHORT	MOONS' Motor Max Current (MYC)	
40223	R/W	SHORT	MOONS' Motor Torque (MYD)	
40224	R/W	SHORT	MOONS' Customer Motor Inertia (MYE)	
40225	R/W	SHORT	MOONS' Motor Rated Torque 1 (MYF)	
40226	R/W	SHORT	MOONS' Motor Rated Torque 2 (MYG)	
40227	R/W	SHORT	MOONS' Motor Rated Inertia 1 (MYH)	
40228	R/W	SHORT	MOONS' Motor Rated Inertia 2 (MYI)	
40229	R/W	SHORT	MOONS' Motor Voltage (MYJ)	
40230	R/W	SHORT	MOONS' Motor Resistance (MYK)	
40231	R/W	SHORT	MOONS' Motor Inductance (MYL)	
40232	R/W	SHORT	MOONS' Motor Name 1 (NYA Lower)	
40233	R/W	SHORT	MOONS' Motor Name 2 (NYA Upper)	
40234	R/W	SHORT	MOONS' Motor Name 3 (NYB Lower)	

STF Series

Register	Access	Data Type	Description	SCL Register
40235	R/W	SHORT	MOONS' Motor Name 4 (NYB Upper)	
40236	R/W	SHORT	MOONS' Motor Name 5 (NYC Lower)	
40237	R/W	SHORT	MOONS' Motor Name 6 (NYC Upper)	
40238	R/W	SHORT	MOONS' Motor Name 7 (NYD)	
40239..40250	Read Only	SHORT	Reserved	

Notes: 40201~40250 parameter is the motor configuration parameter. Among all, 40201~40219 is self-defined motor parameter while 40225~40243 is MOONS' standard motor parameter. These parameters are for internal use. For details, please contact MOONS'.

SSDC/SS/RS/SSM/TSM/TXM Series

Register	Access	Data Type	Description	SCL Reg
40001	Read Only	SHORT	Alarm Code (AL) Alarm code low 16-bit	f
40002	Read Only	SHORT	Status Code (SC)	s
40003	Read Only	SHORT	Reserved	
40004	Read Only	SHORT	Drive Digital output (IS)	i
40005..6	Read Only	LONG	Encoder Position (IE, EP)	e
40007..8	Read Only	LONG	Immediate Absolute Position (IP)	l
40009..10	Read Only	LONG	Absolute Position Command (SP)	P (Capital)
40011	Read Only	SHORT	Immediate Actual Velocity (IV0)	v
40012	Read Only	SHORT	Immediate Target Velocity (IV1)	w
40013	Read Only	SHORT	Immediate Drive Temperature (IT)	t
40014	Read Only	SHORT	Immediate DC Bus Voltage (IU)	u
40015..16	Read Only	LONG	Immediate Position Error (IX)	x
40017	Read Only	SHORT	Immediate Analog Input Value (IA)	a
40018	Read Only	SHORT	Q Program Line Number	b
40019	Read Only	SHORT	Immediate Current Command (IC)	c
40020..21	Read Only	LONG	Relative Distance (ID)	d
40022..23	Read Only	LONG	Sensor Position	g
40024	Read Only	SHORT	Condition Code	h
40025	Read Only	SHORT	Analog Input 1 (IA1)	j
40026	Read Only	SHORT	Analog Input 2 (IA2)	k
40027	Read Only	SHORT	Command Mode (CM)	m
40028	R/W	SHORT	Point-to-Point Acceleration (AC)	A
40029	R/W	SHORT	Point-to-Point Deceleration (DE)	B
40030	R/W	SHORT	Velocity (VE)	V

SSDC/SS/RS/SSM/TSM/TXM Series

Register	Access	Data Type	Description	SCL Reg
40031..32	R/W	LONG	Point-to-Point Distance (DI)	D
40033..34	R/W	LONG	Change Distance (DC)	C
40035	R/W	SHORT	Change Velocity (VC)	U
40036	Read Only	SHORT	Velocity Move State	n
40037	Read Only	SHORT	Point-to-Point Move State	o
40038	Read Only	SHORT	Q Program Segment Number	p
40039	Read Only	SHORT	Reserved	
40040	Read Only	SHORT	Phase Error	z
40041..42	R/W	LONG	Position Offset	E
40043	R/W	SHORT	Miscella neous Flags	F
40044	R/W	SHORT	Current Command (GC)	G
40045..46	R/W	LONG	Input Counter	I
40047	R/W	SHORT	Jog Accel (JA)	
40048	R/W	SHORT	Jog Decel (JL)	
40049	R/W	SHORT	Jog Velocity (JS)	J
40050	R/W	SHORT	Max Velocity (VM)	
40051	R/W	SHORT	Continuous Current (CC)	N
40052	R/W	SHORT	Peak Current (CP)	
40053	R/W	SHORT	Steps per Revolution (EG)	R
40054..55	R/W	LONG	Pulse Counter	S
40056	R/W	SHORT	Analog Position Gain (AP)	X
40057	R/W	SHORT	Analog Threshold (AT)	Y
40058	R/W	SHORT	Analog Offset (AV)	Z
40059..60	Read Only	LONG	Accumulator	0

SSDC/SS/RS/SSM/TSM/TXM Series

Register	Access	Data Type	Description	SCL Reg
40061..62	R/W	LONG	User Defined Register 1	1
40063..64	R/W	LONG	User Defined Register 2	2
40065..66	R/W	LONG	User Defined Register 3	3
40067..68	R/W	LONG	User Defined Register 4	4
40069..70	R/W	LONG	User Defined Register 5	5
40071..72	R/W	LONG	User Defined Register 6	6
40073..74	R/W	LONG	User Defined Register 7	7
40075..76	R/W	LONG	User Defined Register 8	8
40077..78	R/W	LONG	User Defined Register 9	9
40079..80	R/W	LONG	User Defined Register 10	:
40081..82	R/W	LONG	User Defined Register 11	;
40083..84	R/W	LONG	User Defined Register 12	<
40085..86	R/W	LONG	User Defined Register 1	=
40087..88	R/W	LONG	User Defined Register 14	>
40089..90	R/W	LONG	User Defined Register 15	?
40091..92	R/W	LONG	User Defined Register 16	@
40093..94	R/W	LONG	User Defined Register 17	[
40095..96	R/W	LONG	User Defined Register 18	\
40097..98	R/W	LONG	User Defined Register 19	]
40099..100	R/W	LONG	User Defined Register 20	^
40101..102	R/W	LONG	User Defined Register 21	_
40103..104	R/W	LONG	User Defined Register 22	`
40105	R/W	SHORT	Brake Release Delay (BD)	

SSDC/SS/RS/SSM/TSM/TXM Series

Register	Access	Data Type	Description		SCL Reg
40106	R/W	SHORT	Brake Engage Delay (BE)		
40107	R/W	SHORT	Idle Current Delay (CD) (Only for SSDC)		
40108	Read Only	SHORT	Accel/Decel Current (CA) (Only for SSDC)		
40109	Read Only	SHORT	Firmware version		
40110	R/W	SHORT	Analog Filter Gain (AF)		
40111	Read Only	SHORT	Reserved		
40112	Read Only	SHORT	Alarm Code High bit (AL1)		
40113..118	Read Only	LONG	Reserved		
40119	R/W	SHORT	Filter Input 3# (FI3) (Only for SSDC)		
40120	R/W	SHORT	Filter Input 4# (FI4) (Only for SSDC)		
40121	R/W	SHORT	Except for SSDC	Filter Input 1#	
			SSDC	Filter Input 5# (FI5)	
40122	R/W	SHORT	Except for SSDC	Filter Input 2#	
			SSDC	Filter Input 6# (FI6)	
40123	R/W	SHORT	Except for SSDC	Filter Input 3#	
			SSDC	Filter Input 7# (FI7)	
40124	R/W	SHORT	Except for SSDC	Filter Input 4# (not SSM)	
			SSDC	Filter Input 8# (FI8)	
40125	R/W	SHORT	Command Opcode		
40126	R/W	SHORT	Parameter 1		
40127	R/W	SHORT	Parameter 2		
40128	R/W	SHORT	Parameter 3		
40129	R/W	SHORT	Parameter 4		
40130	R/W	SHORT	Parameter 5		
40131	Read Only	SHORT	Reserved		
40132	Read Only	SHORT	Reserved		
40133	R/W	SHORT	Smoothing filter frequency (SF)		
40134	R/W	SHORT	Address Upper (AU) (SS only)		
40135	R/W	SHORT	Motor Detail		
40136	R/W	SHORT	Step Mode/Input noise filter (SZ)		

SSDC/SS/RS/SSM/TSM/TXM Series

Register	Access	Data Type	Description	SCL Reg
40137	Read Only	SHORT	Reserved	
40138	R/W	SHORT	Control Mode set (CM)	
40139	R/W	SHORT	Operation Mode (PM)	
40140	R/W	SHORT	Servo Enable (SI)	
40141	R/W	SHORT	Alarm Reset (AI)	
40142	R/W	SHORT	Define Limits Input (DL)	
40143	R/W	SHORT	Alarm Output (AO)	
40144	R/W	SHORT	Brake Output (BO)	
40145	R/W	SHORT	Motion Output (MO) Y3，Y4，Y5，Y6	
40146	Read Only	SHORT	Reserved	
40147	Read Only	SHORT	Reserved	
40148	R/W	SHORT	Low Voltage (LV)	
40149	R/W	SHORT	Baud Rate (BR)	
40150	R/W	SHORT	Communication Protocol (PR)	
40151	R/W	SHORT	Transmit Delay (TD)	
40152	Read Only	SHORT	Reserved	
40153	R/W	SHORT	Position Proportional Gain (KP)	
40154	R/W	SHORT	Position Derivative Gain (KD)	
40155	R/W	SHORT	Derivative Filter factor (KE)	
40156	R/W	SHORT	Velocity Proportional Gain (VP)	
40157	R/W	SHORT	Velocity Integral Gain (VI)	
40158	R/W	SHORT	Acceleration Feed-forward (KK)	
40159	R/W	SHORT	Torque Command Filter (KC)	
40160	R/W	SHORT	Max Acceleration (AM)	

SSDC/SS/RS/SSM/TSM/TXM Series

Register	Access	Data Type	Description		SCL Reg
40161	R/W	SHORT	Position Fault Window (PF)		
40162	R/W	SHORT	Address (DA)		
40163	R/W	SHORT	Analog Velocity Gain (AG)		
40164	R/W	SHORT	Jog Change Velocity(JC)		
40165	R/W	SHORT	Jog Mode (JM)		
40166	R/W	SHORT	Analog Torque Gain (AN)		
40167	R/W	SHORT	Homing Acceleration 1 (HA1)		
40168	R/W	SHORT	Homing Acceleration 2 (HA2)		
40169	R/W	SHORT	Homing Acceleration 3 (HA3)		
40170	R/W	SHORT	Homing Deceleration 1 (HL1)		
40171	R/W	SHORT	Homing Deceleration 2 (HL2)		
40172	R/W	SHORT	Homing Deceleration 3 (HL3)		
40173	R/W	SHORT	Homing Velocity 1 (HV1)		
40174	R/W	SHORT	Homing Velocity 2 (HV2)		
40175	R/W	SHORT	Homing Velocity 3 (HV3)		
40176	R/W	SHORT	Hard-Stop Current Limit (HC)		
40177	R/W	SHORT	Pulse Complete Timing (TT)		
40178	R/W	SHORT	TSM, SSM series	Tach Output (TO)	
			SS Series	Dumping Power (DP)	
40179	R/W	SHORT	Dynamic Position Error Count (PL)		
40180	R/W	SHORT	In-Position Timing (PE)		
40181	R/W	SHORT	In-Position Counts (PD)		
40182	R/W	SHORT	Alarm Mask (MA)		
40183..187	Read Only	LONG	Reserved		
40188..189	R/W	LONG	Homing Distance (HO) (Only for SSDC)		

SSDC/SS/RS/SSM/TSM/TXM Series

Register	Access	Data Type	Description	SCL Reg
40190..191	Read Only	LONG	Full closed-loop Encoder Position(EQ) (Only for SSDC)	
40192..195	Read Only	LONG	Reserved	
40196	R/W	SHORT	Communication Watchdog Enable (ZE) (Only for SSDC)	
40197	R/W	SHORT	Communication Watchdog Time (ZS) (Only for SSDC)	
40198	R/W	SHORT	Communication Watchdog Action (ZA) (Only for SSDC)	
40199	Read Only	SHORT	Model Number (Only for SSDC) (MV)	
40200	Read Only	SHORT	Sub Model (Only for SSDC) (MV1)	

M2 Series

Register	Access	Data Type	Description	SCL Register
40001	Read Only	SHORT	Alarm Code (AL) Alarm code low 16-bit	f
40002	Read Only	SHORT	Status Code (SC)	s
40003	Read Only	SHORT	Drive Digital output（IO）	y
40004	Read Only	SHORT	Drive Digital output（IS）	i
40005..6	Read Only	LONG	Encoder Position (IE, EP)	e
40007..8	Read Only	LONG	Immediate Absolute Position (IP)	l
40009..10	Write	LONG	Absolute Position Command (SP)	P (Capital)
40011	Read Only	SHORT	Immediate Actual Velocity (IV0)	v
40012	Read Only	SHORT	Immediate Target Velocity (IV1)	w
40013	Read Only	SHORT	Immediate Drive Temperature (IT)	t
40014	Read Only	SHORT	Immediate DC Bus Voltage (IU)	u
40015..16	Read Only	LONG	Immediate Position Error (IX)	x
40017	Read Only	SHORT	Immediate Analog Input Value (IA)	a
40018	Read Only	SHORT	Q Program Line Number	b
40019	Read Only	SHORT	Immediate Current Command (IC)	c
40020..21	Read Only	LONG	Relative Distance (ID)	d
40022..23	Read Only	LONG	Sensor Position	g
40024	Read Only	SHORT	Condition Code	h
40025	Read Only	SHORT	Analog Input 1 (IA1)	j
40026	Read Only	SHORT	Analog Input 2 (IA2)	k
40027	Read Only	SHORT	Command Mode (CM)	m
40028	R/W	SHORT	Point-to-Point Acceleration (AC)	A
40029	R/W	SHORT	Point-to-Point Deceleration (DE)	B

M2 Series

Register	Access	Data Type	Description	SCL Register
40030	R/W	SHORT	Velocity (VE)	V
40031..32	R/W	LONG	Point-to-Point Distance (DI)	D
40033..34	R/W	LONG	Change Distance (DC)	C
40035	R/W	SHORT	Change Velocity (VC)	U
40036	Read Only	SHORT	Velocity Move State	n
40037	Read Only	SHORT	Point-to-Point Move State	o
40038	Read Only	SHORT	Q Program Segment Number	p
40039	Read Only	SHORT	Reserved	
40040	Read Only	SHORT	Phase Error	z
40041..42	R/W	LONG	Position Offset	E
40043	R/W	SHORT	Miscella neous Flags	F
40044	R/W	SHORT	Current Command (GC)	G
40045..46	R/W	LONG	Input Counter	I (Capital)
40047	R/W	SHORT	Jog Accel (JA)	K (Capital)
40048	R/W	SHORT	Jog Decel (JL)	L
40049	R/W	SHORT	Jog Velocity (JS)	J
40050	R/W	SHORT	Max Velocity	M
40051	R/W	SHORT	Continuous Current (CC)	N
40052	R/W	SHORT	Peak Current (CP)	O (Capital)
40053	Read Only	SHORT	Reserved	
40054..55	R/W	LONG	Pulse Counter	S (Capital)
40056	R/W	SHORT	Analog Position Gain (AP)	X
40057	R/W	SHORT	Analog Threshold (AT)	Y
40058	R/W	SHORT	Analog Offset (AV)	Z

M2 Series

Register	Access	Data Type	Description	SCL Register
40059..60	Read Only	LONG	Accumulator	0
40061..62	R/W	LONG	User Defined Register 1	1
40063..64	R/W	LONG	User Defined Register 2	2
40065..66	R/W	LONG	User Defined Register 3	3
40067..68	R/W	LONG	User Defined Register 4	4
40069..70	R/W	LONG	User Defined Register 5	5
40071..72	R/W	LONG	User Defined Register 6	6
40073..74	R/W	LONG	User Defined Register 7	7
40075..76	R/W	LONG	User Defined Register 8	8
40077..78	R/W	LONG	User Defined Register 9	9
40079..80	R/W	LONG	User Defined Register 10	:
40081..82	R/W	LONG	User Defined Register 11	;
40083..84	R/W	LONG	User Defined Register 12	<
40085..86	R/W	LONG	User Defined Register 13	=
40087..88	R/W	LONG	User Defined Register 14	>
40089..90	R/W	LONG	User Defined Register 15	?
40091..92	R/W	LONG	User Defined Register 16	@
40093..94	R/W	LONG	User Defined Register 17	[
40095..96	R/W	LONG	User Defined Register 18	\
40097..98	R/W	LONG	User Defined Register 19	]
40099..100	R/W	LONG	User Defined Register 20	^
40101..102	R/W	LONG	User Defined Register 21	_
40103..104	R/W	LONG	User Defined Register 22	`

M2 Series				
Register	**Access**	**Data Type**	**Description**	**SCL Register**
40105	R/W	SHORT	Brake Release Delay (BD)	
40106	R/W	SHORT	Brake Engage Delay (BE)	
40107	Read Only	SHORT	Reserved	
40108	Read Only	SHORT	Reserved	
40109	Read Only	SHORT	Firmware version	
40110	R/W	SHORT	Analog Filter Gain (AF)	
40111	Read Only	SHORT	Reserved	
40112	Read Only	SHORT	Alarm Code High bit (AL1)	
40113	R/W	SHORT	Jog Change (JC1)	
40114	R/W	SHORT	Jog Change (JC2)	
40115	R/W	SHORT	Jog Change (JC3)	
40116	R/W	SHORT	Jog Change (JC4)	
40117	R/W	SHORT	Jog Change (JC5)	
40118	R/W	SHORT	Jog Change (JC6)	
40119	R/W	SHORT	Jog Change (JC7)	
40120	R/W	SHORT	Jog Change (JC8)	
40121	R/W	SHORT	X9 Input Filter	
40122	R/W	SHORT	X10 Input Filter	
40123	R/W	SHORT	X11 Input Filter	
40124	R/W	SHORT	X12 Input Filter	
40125	R/W	SHORT	Command Opcode	
40126	R/W	SHORT	Parameter 1	
40127	R/W	SHORT	Parameter 2	
40128	R/W	SHORT	Parameter 3	
40129	R/W	SHORT	Parameter 4	

M2 Series

Register	Access	Data Type	Description	SCL Register
40130	R/W	SHORT	Parameter 5	
40131	R/W	SHORT	Global Gain (KP)	
40132	R/W	SHORT	Global Gain1 (KG)	
40133	R/W	SHORT	Proportional Gain (KF)	
40134	R/W	SHORT	Damping Gain (KD)	
40135	R/W	SHORT	Velocity Gain (KV)	
40136	R/W	SHORT	Integral Gain (KI)	
40137	R/W	SHORT	Inertia Feed forward Gain (KK)	
40138	R/W	SHORT	Jerk Filter(KJ)	
40139	R/W	SHORT	Velocity Mode Proportional Gain (VP)	
40140	R/W	SHORT	Velocity Mode Integral Gain (VI)	
40141	R/W	SHORT	Damping Filter Gain (KE)	
40142	R/W	SHORT	Current Filter Gain (KC) PID	
40143	R/W	SHORT	Control Mode (CM)	
40144	R/W	SHORT	Secondary Control Mode (CN)	
40145	R/W	SHORT	Operation Mode (PM)	
40146	R/W	SHORT	Jog Mode (JM)	
40147	R/W	SHORT	Hard-Stop Current Limit (HC)	
40148	R/W	SHORT	Max Acceleration (AM)	
40149	Read Only	SHORT	Encoder Resolution (ER)	
40150	Read Only	SHORT	Reserved	
40151	Read Only	SHORT	Steps-Rev (EG)	
40152	R/W	SHORT	Electronic Ration Numerator (EN)	
40153	R/W	SHORT	Electronic Ration Denominator (EU)	

M2 Series

Register	Access	Data Type	Description	SCL Register
40154	Read Only	SHORT	Step Mode (SZ)	
40155	R/W	SHORT	Position Fault (PF)	
40156	R/W	SHORT	Dynamic Position Error Count (PL)	
40157	R/W	SHORT	In-Position Counts (PD)	
40158	R/W	SHORT	In-Position Timing (PE)	
40159	R/W	SHORT	Pulse Complete Timing (TT)	
40160	R/W	SHORT	Analog Velocity Gain (AG)	
40161	R/W	SHORT	Analog Torque Gain (AN)	
40162	R/W	SHORT	Analog Offset 1 (AV1)	
40163	R/W	SHORT	Analog Offset 2 (AV2)	
40164	R/W	SHORT	Analog Type (AS)	
40165	R/W	SHORT	Analog Deadband 1 (AD1)	
40166	R/W	SHORT	Analog Deadband 2 (AD2)	
40167	R/W	SHORT	Analog Deadband (AD)	
40168	R/W	SHORT	Analog Function (FA)	
40169	R/W	SHORT	Servo Enable (SI)	
40170	R/W	SHORT	Alarm Reset (AI)	
40171	R/W	SHORT	Define Limits Input (DL)	
40172	R/W	SHORT	Motion Input X7，X8，X9，X10	
40173	R/W	SHORT	Alarm Output (AO)	
40174	R/W	SHORT	Brake Output (BO)	
40175	R/W	SHORT	Motion Output (MO) Y3，Y4，Y5，Y6	
40176	Read Only	SHORT	Reserved	

M2 Series

Register	Access	Data Type	Description	SCL Register
40177	R/W	SHORT	Communication Protocol (PR)	
40178	R/W	SHORT	Transmit Delay (TD)	
40179	R/W	SHORT	Baud Rate (BR)	
40180	R/W	SHORT	Communication Address (DA)	
40181	R/W	SHORT	Velocity value (VR)	
40182	R/W	SHORT	Tach-out Count (TO)	
40183	R/W	SHORT	Torque Value (TV)	
40184	R/W	SHORT	Parameters Lock (PK)	
40185	R/W	SHORT	Default Display (DD) LED	
40186	R/W	SHORT	Mask Alarm (MA)	
40187	R/W	SHORT	Homing Acceleration 1 (HA1)	
40188	R/W	SHORT	Homing Acceleration 2 (HA2)	
40189	R/W	SHORT	Homing Acceleration 3 (HA3)	
40190	R/W	SHORT	Homing Deceleration 1 (HL1)	
40191	R/W	SHORT	Homing Deceleration 2 (HL2)	
40192	R/W	SHORT	Homing Deceleration 3 (HL3)	
40193	R/W	SHORT	Homing Velocity 1 (HV1)	
40194	R/W	SHORT	Homing Velocity 2 (HV2)	
40195	R/W	SHORT	Homing Velocity 3 (HV3)	
40196	R/W	SHORT	Regen Resistor Value (ZR)	
40197	R/W	SHORT	Regen Resistor Continuous Wattage (ZC)	
40198	R/W	SHORT	Regen Resistor Time Constant (ZT)	
40199	Read Only	SHORT	Reserved	
40200	Read Only	SHORT	Reserved	

M3 Series

Register	Access	Data Type	Units	Description	SCL Register
40001..002	Read Only	LONG	——	Alarm Code (AL)	f
40003..004	Read Only	LONG	——	Status Code (SC)	s
40005	Read Only	SHORT	——	Digital Output Status (IO)	y
40006	Read Only	SHORT	——	Digital Input Status (IS)	i
40007..008	Read Only	LONG	pulses	Immediate Absolute Position (IP)	l
40009..010	Read Only	LONG	pulses	Secondary Encoder Position (EQ)	
40011..012	Read Only	LONG	pulses	Encoder Position (EP)	e
40013..014	Read Only	LONG	pulses	Internal Use	
40015	R/W	SHORT		Reserved	
40016	Read Only	SHORT	rev	Encoder Multi-turn Data	
40017	Read Only	SHORT	1/240rps	Immediate Actual Velocity (IV)	v
40018	Read Only	SHORT	1/240rps	Immediate Target Velocity (IV1)	w
40019	Read Only	SHORT	0.1℃	Immediate Drive Temperature (IT)	t
40020	Read Only	SHORT	0.1℃	Immediate DSP Temperature (IT1)	
40021	Read Only	SHORT	0.1℃	Immediate Encoder Temperature (IT2)	
40022	Read Only	SHORT	0.1V	Immediate DC_Bus Voltage (IU)	u
40023..024	Read Only	LONG	pulses	Immediate Position Error (IX)	x
40025	R/W	SHORT		Reserved	
40026	Read Only	SHORT	mv	Analog Input 1 (IA1)	j
40027	Read Only	SHORT	mv	Analog Input 2 (IA2)	k
40028	R/W	SHORT	mv	Analog Output 1 (OA1)	T
40029	R/W	SHORT	mv	Analog Output 2 (OA2)	W (Capital)
40030	Read Only	SHORT	——	Q Program Line Number	b

M3 Series

Register	Access	Data Type	Units	Description	SCL Register
40031	Read Only	SHORT	0.1%	Immediate Current Command (IC)	c
40032	Read Only	SHORT	0.1%	Q Current (IQ)	q
40033..034	Read Only	LONG	pulses	Relative Distance (ID)	d
40035..036	Read Only	LONG	pulses	Sensor Position	g
40037	Read Only	SHORT	——	Condition Code	h
40038	Read Only	SHORT	——	Control Mode	m
40039	Read Only	SHORT	——	Velocity Move State	n
40040	Read Only	SHORT	——	Point-to-Point Move State	o
40041	Read Only	SHORT	——	Q Segment Number	p
40042	Read Only	SHORT	——	Model Number	
40043	Read Only	SHORT	——	Sub Model	
40044	Read Only	SHORT	——	DSP Firmware Version	
40045	Read Only	SHORT	——	FPGA Firmware Version NO	
40046	Read Only	SHORT	——	FPGA Firmware Version LA	
40047..048	R/W	LONG	pulses	Input Counter	I (Capital)
40049..050	R/W	LONG	pulses	Pulse Counter	S (Capital)
40051	R/W	SHORT	——	Internal Use	
40052..053	Read Only	LONG	s	Power Up Seconds	
40054..055	Read Only	LONG	times	Power On Times	
40056	Read Only	SHORT	——	Encoder Firmware Version	
40057	R/W	SHORT	——	Internal Use	
40058	Read Only	SHORT	——	Internal Use	
40059	Read	SHORT	——	Internal Use	
40060	R/W	SHORT	1%	Internal Use	

M3 Series

Register	Access	Data Type	Units	Description	SCL Register
40061	R/W	SHORT	pulses	Internal Use	
40062	R/W	SHORT	ms	Internal Use	
40063	R/W	SHORT	——	Internal Use	
40064	R/W	SHORT	——	Internal Use	
40065	R/W	SHORT	0 ~ 3000	Torque Limit Dynamic CW	Y
40066	R/W	SHORT	0 ~ 3000	Torque Limit Dynamic CCW	Z (Capital)
40067..68	Read Only	LONG	——	Alarm Code	r
40069	Read Only	SHORT	——	Alarm Buffer 0	
40070	Read Only	SHORT	——	Alarm Buffer 1	
40071	Read Only	SHORT	——	Alarm Buffer 2	
40072	Read Only	SHORT	——	Alarm Buffer 3	
40073	Read Only	SHORT	——	Alarm Buffer 4	
40074	Read Only	SHORT	——	Alarm Buffer 5	
40075	Read Only	SHORT	——	Alarm Buffer 6	
40076	Read Only	SHORT	——	Alarm Buffer 7	
40077..78	Read Only	LONG	s	Alarm Buffer 8	
40079..80	Read Only	LONG	s	Alarm Buffer 9	
40081..82	Read Only	LONG	s	Alarm Buffer 10	
40083..84	Read Only	LONG	s	Alarm Buffer 11	
40085..86	Read Only	LONG	s	Alarm Buffer 12	
40087..88	Read Only	LONG	s	Alarm Buffer 13	
40089..90	Read Only	LONG	s	Alarm Buffer 14	
40091..92	Read Only	LONG	s	Alarm Buffer 15	
40093..94	Read Only	LONG	——	Alarm Buffer 16	

M3 Series

Register	Access	Data Type	Units	Description	SCL Register
40095..96	Read Only	LONG	——	Alarm Buffer 17	
40097..98	Read Only	LONG	——	Alarm Buffer 18	
40099..100	Read	LONG	——	Alarm Buffer 19	
40101..102	Read Only	LONG	——	Alarm Buffer 20	
40103..104	Read Only	LONG	——	Alarm Buffer 21	
40105..106	Read Only	LONG	——	Alarm Buffer 22	
40107..108	Read Only	LONG	——	Alarm Buffer 23	
40109..110	Read Only	LONG	——	Alarm Buffer 24	
40111..112	Read Only	LONG	——	Alarm Buffer 25	
40113..114	Read Only	LONG	——	Alarm Buffer 26	
40115..116	Read Only	LONG	——	Alarm Buffer 27	
40117..118	Read Only	LONG	——	Alarm Buffer 28	
40119..120	Read Only	LONG	——	Alarm Buffer 29	
40121..122	Read Only	LONG	——	Alarm Buffer 30	
40123..124	Read Only	LONG	——	Alarm Buffer 31	
40125	R/W	SHORT	——	Command Opcode	
40126	R/W	SHORT	——	Parameter 1	
40127	R/W	SHORT	——	Parameter 2	
40128	R/W	SHORT	——	Parameter 3	
40129	R/W	SHORT	——	Parameter 4	
40130	R/W	SHORT	——	Parameter 5	
40131..132	Read Only	LONG	——	Accumulator	0
40133..134	R/W	LONG	——	User Register 1	1
40135..136	R/W	LONG	——	User Register 2	2
40137..138	R/W	LONG	——	User Register 3	3

M3 Series

Register	Access	Data Type	Units	Description	SCL Register
40139..140	R/W	LONG	——	User Register 4	4
40141..142	R/W	LONG	——	User Register 5	5
40143..144	R/W	LONG	——	User Register 6	6
40145..146	R/W	LONG	——	User Register 7	7
40147..148	R/W	LONG	——	User Register 8	8
40149..150	R/W	LONG	——	User Register 9	9
40151..152	R/W	LONG	——	User Register 10	:
40153..154	R/W	LONG	——	User Register 11	;
40155..156	R/W	LONG	——	User Register 12	<
40157..158	R/W	LONG	——	User Register 13	=
40159..160	R/W	LONG	——	User Register 14	>
40161..162	R/W	LONG	——	User Register 15	?
40163..164	R/W	LONG	——	User Register 16	@
40165..166	R/W	LONG	——	User Register 17	[
40167..168	R/W	LONG	——	User Register 18	\
40169..170	R/W	LONG	——	User Register 19	]
40171..172	R/W	LONG	——	User Register 20	^
40173..174	R/W	LONG	——	User Register 21	_
40175..176	R/W	LONG	——	User Register 22	`

M3 Series—P0 Group(PID）

Register	Access	Data Type	Units	Range	Description	SCL Register
40177..178	R/W	LONG	——	0 ～ 2	Tuning Mode Selection (UM)	
40179..180	R/W	LONG	——	0 ～ 10	Load Type (LY)	
40181..182	R/W	LONG	——	0 ～ 100	Inertia Ratio (NR)	
40183..184	R/W	LONG	——	1 ～ 20	1st Mechanical Stiffness Level (KG)	
40185..186	R/W	LONG	——	1 ～ 20	2nd Mechanical Stiffness Level (KX)	
40187..188	R/W	LONG	0.1Hz	0 ～ 20000	1st Position Loop Gain (KP)	
40189..190	R/W	LONG	ms	0 ～ 30000	1st Position Loop Integral Time Constant (KI)	
40191..192	R/W	LONG	ms	0 ～ 30000	1st Position Loop Derivative Time Constant (KD)	
40193..194	R/W	LONG	0.1Hz	0 ～ 40000	1st Position Loop Derivative Filter (KE)	
40195..196	R/W	LONG	0.01%	-30000 ～ 30000	Velocity Feedforward Gain (KL)	
40197..198	R/W	LONG	0.1Hz	0 ～ 40000	Velocity Feedforward Filter (KR)	
40199..200	R/W	LONG	0.01%	-30000 ～ 30000	1st Velocity Command Gain (KF)	
40201..202	R/W	LONG	0.1Hz	0 ～ 30000	1st Velocity Loop Gain (VP)	
40203..204	R/W	LONG	ms	0 ～ 30000	1st Velocity Loop Integral Time Constant (VI)	
40205..206	R/W	LONG	0.01%	0 ～ 20000	Acceleration Feedforward Gain (KK)	
40207..208	R/W	LONG	0.1Hz	0 ～ 40000	Acceleration Feedforward Filter (KT)	
40209..210	R/W	LONG	0.1Hz	0 ～ 40000	1st Torque Command Filter (KC)	
40211..212	R/W	LONG	0.1Hz	0 ～ 20000	2nd Position Loop Gain (UP)	
40213..214	R/W	LONG	ms	0 ～ 30000	2nd Position Loop Integral Time Constant (UI)	
40215..216	R/W	LONG	ms	0 ～ 30000	2nd Position Loop Derivative Time Constant (UD)	

M3 Series—P0 Group(PID）

Register	Access	Data Type	Units	Range	Description	SCL Register
40217..218	R/W	LONG	0.1Hz	0 ～ 40000	2nd Position Loop Derivative Filter (UE)	
40219..220	R/W	LONG	0.01%	-30000 ～ 30000	2nd Velocity Command Gain (UF)	
40221..222	R/W	LONG	0.1Hz	0 ～ 30000	2nd Velocity Loop Gain (UV)	
40223..224	R/W	LONG	ms	0 ～ 30000	2nd Velocity Loop Integral Time Constant (UG)	
40225..226	R/W	LONG	0.1Hz	0 ～ 40000	2nd Torque Command Filter (UC)	
40227..228	R/W	LONG	0.1Hz	0 ～ 20000	Full Closed-loop Position Loop Gain (XP)	
40229..230	R/W	LONG	ms	0 ～ 30000	Full Closed-loop Position Loop Integral Time Constant (XI)	
40231..232	R/W	LONG	ms	0 ～ 32767	Full Closed-loop Position Loop Derivative Time Constant (XD)	
40233..234	R/W	LONG	0.1Hz	0 ～ 40000	Full Closed-loop Position Loop Derivative Filter (XE)	
40235..236	R/W	LONG	0.01%	-30000 ～ 30000	Full Closed-loop Velocity Command Gain (XF)	
40237..238	R/W	LONG	0.1Hz	0 ～ 30000	Full Closed-loop Velocity Loop Gain (XV)	
40239..240	R/W	LONG	ms	0 ～ 30000	Full Closed-loop Velocity Loop Integral Time Constant (XG)	
40241..242	R/W	LONG	0.1Hz	0 ～ 40000	Full Closed-loop Torque Command Filter (XC)	
40243..244	R/W	LONG	——	0 ～ 4	Automatic Gain Switching Method (SD)	O (Capital)
40245..246	R/W	LONG	pulses	0 ～ 2147483647	Use Position Error as the Condition (PN)	
40247..248	R/W	LONG	1/240rps	0 ～ 24000	Use Actual Speed as the Condition (VN)	

M3 Series—P0 Group(PID）

Register	Access	Data Type	Units	Range	Description	SCL Register
40249..250	R/W	LONG	0.1%	0 ～ 3000	Use Actual Torque as the Condition (TN)	
40251..252	R/W	LONG	ms	0 ～ 10000	Gain Switching Waiting Time 1 (SE1)	
40253..254	R/W	LONG	ms	0 ～ 10000	Gain Switching Waiting Time 2 (SE2)	
40255..256	R/W	LONG	——	0 ～ 3	Velocity Feedback Filter (LR)	
40257..258	R/W	LONG	——	0 ～ 1	Self-adapting Filter Switch (AE)	
40259..260	R/W	LONG			Reserved	

M3 Series—P1 Group(Configuration)

Register	Access	Data Type	Units	Range	Description	SCL Register
40261..262	R/W	LONG			Reserved	
40263..264	R/W	LONG	——	1,2,7,11,15,21	Main Control Mode (CM)	
40265..266	R/W	LONG	——	1,2,7,11,15,21	Secondary Control Mode (CN)	
40267..268	R/W	LONG	——	8 ~ 10	Operation Mode When Power-up (PM)	
40269..270	R/W	LONG	——	1 ~ 2	Speed Control Clamp Mode (JM)	
40271..272	R/W	LONG	——	0 ~ 1	Full Closed-loop Control Switch (XM)	
40273..274	R/W	LONG	0.1%	-3000 ~ 3000	Torque Command of Internal Torque Mode (GC)	G
40275..276	R/W	LONG	0.1%	0 ~ 3000	1st Torque Limit (CC)	
40277..278	R/W	LONG	0.1%	0 ~ 3000	Target Value of Torque Arrival (CV)	
40279..280	R/W	LONG	0.1%	0 ~ 3000	Torque Limit of Hardstop Homing (HC)	
40281..282	R/W	LONG	ms	0 ~ 30000	Current Foldback Continuous Time (CL)	
40283..284	R/W	LONG	——	0 ~ 5	Torque Limit Method (LD）	
40285..286	R/W	LONG	——	0 ~ 1	Rotational Direction Setup (RN)	
40287..288	R/W	LONG			Reserved	
40289..290	R/W	LONG	——	1 ~ 511	Communication Protocol (PR)	
40291..292	R/W	LONG	ms	0 ~ 20	Transmit Delay (TD)	
40293..294	R/W	LONG	——	1 ~ 5	RS-485 Baud Rate (BR)	
40295..296	R/W	LONG	——	0 ~ 32	RS-485 Address (DA)	
40297..298	R/W	LONG	——	1 ~ 127	CANopen/IP Node ID (CO)	
40299..300	R/W	LONG	——	0 ~ 7	CANopen Baud Rate	
40301..302	R/W	LONG	Ω	10 ~ 32000	Regeneration Resistor Value (ZR)	

M3 Series—P1 Group(Configuration)

Register	Access	Data Type	Units	Range	Description	SCL Register
40303..304	R/W	LONG	W	1 ～ 32000	Regeneration Resistor Wattage (ZW)	
40305..306	R/W	LONG	ms	0 ～ 8000	Regeneration Resistor Time Constant (ZT)	
40307..308	R/W	LONG	——	0 ～ 1	Keypad Setting Lock (PK)	
40309..310	R/W	LONG	——	0 ～ 20	Default Display (DD)	
40311..312	R/W	LONG	——	0 ～ 4294967295	Alarm Mask (MA)	
40313..314	R/W	LONG	0.1%	0 ～ 3000	2nd Torque Limit (CX)	
40315..316	R/W	LONG	0.1%	0 ～ 3000	3rd Torque Limit (CY)	
40317..318	R/W	LONG	0.1%	0 ～ 3000	4th Torque Limit (CZ)	
40319..320	R/W	LONG	ms	0 ～ 30000	Motor Stall Protection Time (HT)	
40321..322	R/W	LONG	——	0 ～ 5	Dynamic Brake Sequence when Servo Off (YV)	
40323..324	R/W	LONG	——	0 ～ 3	Dynamic Brake Sequence when Fault Occurs (YR)	
40325..326	R/W	LONG	ms	0 ～ 30000	Dynamic Brake Action Time during Deceleration of Servo Off (YM)	
40327..328	R/W	LONG	ms	0 ～ 30000	Dynamic Brake Action Time during Deceleration when Fault Occurs (YN)	
40329..330	R/W	LONG	——	0 ～ 1	Main Power Phase Lost Detecting (OT)	
40331..332	R/W	LONG	0.1%	0 ～ 3000	Current Ramp Limit (RT)	
40333	R/W	SHORT			Reserved	
40334	R/W	SHORT			Reserved	

M3 Series—P2 Group(Trajectory)

Register	Access	Data Type	Units	Range	Description	SCL Register
40335..336	R/W	LONG	1/6(rps/s)	1 ～ 30000	Max Brake Deceleration (AM)	
40337..338	R/W	LONG	1/240rps	0 ～ 24000	Max Velocity (VM)	M
40339..340	R/W	LONG	1/6(rps/s)	1 ～ 30000	Jog Accel (JA)	K (Capital)
40341..342	R/W	LONG	1/6(rps/s)	1 ～ 30000	Jog Decel (JL)	L
40343..344	R/W	LONG	1/240rps	-24000 ～ 24000	Jog Velocity (JS)	J
40345..346	R/W	LONG	1/6(rps/s)	1 ～ 30000	Point-to-Point Accel (AC)	A
40347..348	R/W	LONG	1/6(rps/s)	1 ～ 30000	Point-to-Point Decel (DE)	B
40349..350	R/W	LONG	1/240rps	0 ～ 24000	Point-to-Point Velocity (VE)	V Capital
40351..352	R/W	LONG	pulses	-2147483647 ～ 2147483647	Point-to-Point Distance (DI)	D
40353..354	R/W	LONG	pulses	-2147483647 ～ 2147483647	Point-to-Point Change Distance (DC)	C (Capital)
40355..356	R/W	LONG	1/240rps	0 ～ 24000	Point-to-Point Change Velocity (VC)	U Capital
40357..358	R/W	LONG	1/6(rps/s)	1 ～ 30000	Homing Accel /Decel (HA1)	
40359..360	R/W	LONG			Reserved	
40361..362	R/W	LONG	1/240rps	0 ～ 24000	Homing Velocity 1 (HV1)	
40363..364	R/W	LONG	1/240rps	0 ～ 24000	Homing Velocity 2 (HV2)	
40365..366	R/W	LONG	pulses	-2147483647 ～ 2147483647	Homing Offset (HO)	
40367..368	R/W	LONG	1/240rps	-24000 ～ 24000	Internal Velocity Control: Speed 1 (JC1)	
40369..370	R/W	LONG	1/240rps	-24000 ～ 24000	Internal Velocity Control: Speed 2 (JC2)	
40371..372	R/W	LONG	1/240rps	-24000 ～ 24000	Internal Velocity Control: Speed 3 (JC3)	
40373..374	R/W	LONG	1/240rps	-24000 ～ 24000	Internal Velocity Control: Speed 4 (JC4)	

M3 Series—P2 Group(Trajectory)

Register	Access	Data Type	Units	Range	Description	SCL Register
40375..376	R/W	LONG	1/240rps	-24000 ～ 24000	Internal Velocity Control: Speed 5 (JC5)	
40377..378	R/W	LONG	1/240rps	-24000 ～ 24000	Internal Velocity Control: Speed 6 (JC6)	
40379..380	R/W	LONG	1/240rps	-24000 ～ 24000	Internal Velocity Control: Speed 7 (JC7)	
40381..382	R/W	LONG	1/240rps	-24000 ～ 24000	Internal Velocity Control: Speed 8 (JC8)	
40383..384	R/W	LONG	ms	0 ～ 125	Jerk Time (JT)	
40385..386	R/W	LONG	ms	0 ～ 1000	Jerk Filter (KJ)	
40387..388	R/W	LONG	ms	0 ～ 125	Interpolation Filter (FF)	
40389..390	R/W	LONG	1/240rps	0 ～ 24000	Velocity Limit of Torque Mode (VT)	
40391	R/W	SHORT			Reserved	
40392	R/W	SHORT			Reserved	
40393	R/W	SHORT			Reserved	
40394	R/W	SHORT			Reserved	
40395	R/W	SHORT			Reserved	
40396	R/W	SHORT			Reserved	
40397	R/W	SHORT			Reserved	
40398	R/W	SHORT			Reserved	

M3 Series—P3 Group(Encoder & Step/Dir)

Register	Access	Data Type	Units	Range	Description	SCL Register
40399..400	R/W	LONG	——	1 ～ 2147483647	Electronic Gear Ratio – Numerator (EN)	
40401..402	R/W	LONG	——	1 ～ 2147483647	Electronic Gear Ratio - Denominator (EU)	
40403..404	R/W	LONG	0.1μs	0 ～ 32000	Pulse Input Noise Filter (SZ)	
40405..406	R/W	LONG	——	0 ～ 31	Pulse Input Setting (PT)	
40407..408	R/W	LONG	pulses	0 ～ 2147483647	Position Error Limit (PF)	
40409..410	R/W	LONG	pulses/ rev	200 ～ 131072	Command Pulses per Revolution (EG)	R
40411..412	R/W	LONG	——	0 ～ 1	Second Encoder Direction (PV)	
40413..414	R/W	LONG			Reserved	
40415..416	R/W	LONG			Reserved	
40417..418	R/W	LONG	rev	1 ～ 100	Hybrid Deviation Clear Setting (XT)	
40419..420	R/W	LONG	pulses	0 ～ 2147483647	Hybrid Deviation Fault Threshold (XO)	
40421..422	R/W	LONG	pulses/ rev	200 ～ 100000	Second Encoder Resolution (XR)	
40423..424	R/W	LONG	——	0 ～ 256	Pulses Output Mode (PO)	
40425..426	R/W	LONG	——	0 ～ 13107200	Pulse Output Gear Ratio - Numerator (ON)	
40427..428	R/W	LONG	——	0 ～ 13107200	Pulse Output Gear Ratio - Denominator (OD)	
40429..430	R/W	LONG	——	0 ～ 3	Absolute Encoder Usage (ES)	
40431..432	R/W	LONG	——	0 ～ 1	Electronic Gearing Switch (PU)	
40433	R/W	SHORT			Reserved	
40434	R/W	SHORT			Reserved	
40435	R/W	SHORT			Reserved	
40436	R/W	SHORT			Reserved	

M3 Series—P3 Group(Encoder & Step/Dir)

Register	Access	Data Type	Units	Range	Description	SCL Register
40437	R/W	SHORT			Reserved	
40438	R/W	SHORT			Reserved	
40439	R/W	SHORT			Reserved	
40440	R/W	SHORT			Reserved	

M3 Series—P4 Group(Analog)

Register	Access	Data Type	Units	Range	Description	SCL Register
40441..442	R/W	LONG			Reserved	
40443..444	R/W	LONG	1/240rps	0 ～ 24000	Analog Input Velocity Gain (AG)	
40445..446	R/W	LONG	0.1%	0 ～ 3000	Analog Input Torque Gain (AN)	
40447..448	R/W	LONG	mv	-10000 ～ 10000	Analog Input 1 Offset (AV1)	
40449..450	R/W	LONG	mv	-10000 ～ 10000	Analog Input 2 Offset (AV2)	
40451..452	R/W	LONG	mv	0 ～ 255	Analog Input 1 Deadband (AD1)	
40453..454	R/W	LONG	mv	0 ～ 255	Analog Input 2 Deadband (AD2)	
40455..456	R/W	LONG	0.1Hz	1 ～ 20000	Analog Input 1 Filter (AF1)	
40457..458	R/W	LONG	0.1Hz	1 ～ 20000	Analog Input 2 Filter (AF2)	
40459..460	R/W	LONG	mv	-10000 ～ 10000	Analog Input 1 Threshold (AT1)	
40461..462	R/W	LONG	mv	-10000 ～ 10000	Analog Input 2 Threshold (AT2)	
40463..464	R/W	LONG	——	0 ～ 1	Velocity Limit Setting of Torque Control (FA1)	
40465..466	R/W	LONG			Reserved	
40467..468	R/W	LONG			Reserved	
40469..470	R/W	LONG			Reserved	
40471..472	R/W	LONG			Reserved	
40473..474	R/W	LONG	——	1 ～ 32000	Analog Output 1 Scale (OS1)	
40475..476	R/W	LONG	——	1 ～ 32000	Analog Output 2 Scale (OS2)	
40477..478	R/W	LONG	——	0 ～ 5	Analog Output 1 Function (XA1)	
40479..480	R/W	LONG	——	0 ～ 5	Analog Output 2 Function (XA2)	
40481	R/W	SHORT			Reserved	
40482	R/W	SHORT			Reserved	
40483	R/W	SHORT			Reserved	
40484	R/W	SHORT			Reserved	

M3 Series—P4 Group(Analog)

Register	Access	Data Type	Units	Range	Description	SCL Register
40485	R/W	SHORT			Reserved	
40486	R/W	SHORT			Reserved	
40487	R/W	SHORT			Reserved	
40488	R/W	SHORT			Reserved	
40489	R/W	SHORT			Reserved	
40490	R/W	SHORT			Reserved	

M3 Series—P5 Group(I/O)

Register	Access	Data Type	Units	Range	Description	SCL Register
40491..492	R/W	LONG	——	0 ～ 46	Digital Input 1 Function (MU1)	
40493..494	R/W	LONG	——	0 ～ 46	Digital Input 2 Function (MU2)	
40495..496	R/W	LONG	——	0 ～ 46	Digital Input 3 Function (MU3)	
40497..498	R/W	LONG	——	0 ～ 46	Digital Input 4 Function (MU4)	
40499..500	R/W	LONG	——	0 ～ 46	Digital Input 5 Function (MU5)	
40501..502	R/W	LONG	——	0 ～ 46	Digital Input 6 Function (MU6)	
40503..504	R/W	LONG	——	0 ～ 46	Digital Input 7 Function (MU7)	
40505..506	R/W	LONG	——	0 ～ 46	Digital Input 8 Function (MU8)	
40507..508	R/W	LONG	——	0 ～ 46	Digital Input 9 Function (MU9)	
40509..510	R/W	LONG	——	0 ～ 46	Digital Input 10 Function (MUA)	
40511	R/W	SHORT			Reserved	
40512	R/W	SHORT			Reserved	
40513	R/W	SHORT			Reserved	
40514	R/W	SHORT			Reserved	
40515	R/W	SHORT			Reserved	
40516	R/W	SHORT			Reserved	
40517	R/W	SHORT			Reserved	
40518	R/W	SHORT			Reserved	
40519..520	R/W	LONG	——	0 ～ 36	Digital Output 1 Function (MO1)	
40521..522	R/W	LONG	——	0 ～ 36	Digital Output 2 Function (MO2)	
40523..524	R/W	LONG	——	0 ～ 36	Digital Output 3 Function (MO3)	
40525..526	R/W	LONG	——	0 ～ 36	Digital Output 4 Function (MO4)	
40527..528	R/W	LONG	——	0 ～ 36	Digital Output 5 Function (MO5)	
40529..530	R/W	LONG	——	0 ～ 36	Digital Output 6 Function (MO6)	
40531	R/W	SHORT			Reserved	

M3 Series—P5 Group(I/O)

Register	Access	Data Type	Units	Range	Description	SCL Register
40532	R/W	SHORT			Reserved	
40533	R/W	SHORT			Reserved	
40534	R/W	SHORT			Reserved	
40535	R/W	SHORT			Reserved	
40536	R/W	SHORT			Reserved	
40537	R/W	SHORT			Reserved	
40538	R/W	SHORT			Reserved	
40539..540	R/W	LONG	ms	0 ～ 32000	Move Command Waiting Time When Brake Release (BD)	
40541..542	R/W	LONG	ms	0 ～ 32000	Servo-off Brake Engage Waiting Time (BE)	
40543..544	R/W	LONG			Reserved	
40545..546	R/W	LONG	——	0 ～ 10	Home Sensor (HX)	
40547..548	R/W	LONG	ms	0 ～ 8000	Digital Input 1 Filter (FI1)	
40549..550	R/W	LONG	ms	0 ～ 8000	Digital Input 2 Filter (FI2)	
40551..552	R/W	LONG	ms	0 ～ 8000	Digital Input 3 Filter (FI3)	
40553..554	R/W	LONG	ms	0 ～ 8000	Digital Input 4 Filter (FI4)	
40555..556	R/W	LONG	ms	0 ～ 8000	Digital Input 5 Filter (FI5)	
40557..558	R/W	LONG	ms	0 ～ 8000	Digital Input 6 Filter(FI6)	
40559..560	R/W	LONG	ms	0 ～ 8000	Digital Input 7 Filter (FI7)	
40561..562	R/W	LONG	ms	0 ～ 8000	Digital Input 8 Filter (FI8)	
40563..564	R/W	LONG	ms	0 ～ 8000	Digital Input 9 Filter (FI9)	
40565..566	R/W	LONG	ms	0 ～ 8000	Digital Input 10 Filter (FIA)	
40567..568	R/W	LONG	pulses	0 ～ 2147483647	Dynamic Follow Error Threshold (PL)	
40569..570	R/W	LONG	pulses	0 ～ 32000	In-position Output Threshold (PD)	

M3 Series—P5 Group(I/O)

Register	Access	Data Type	Units	Range	Description	SCL Register
40571..572	R/W	LONG	ms	0 ～ 32000	Time Constant of Motion Output Condition (PE)	
40573..574	R/W	LONG	ms	0 ～ 20000	Pulse Complete Timing (TT)	
40575..576	R/W	LONG	1/240rps	24 ～ 480	Zero Speed Width (ZV)	
40577..578	R/W	LONG	1/240rps	24 ～ 24000	Speed Coincidence Width (VR)	
40579..580	R/W	LONG	1/240rps	0 ～ 24000	Target Value of AT-speed (VV)	
40581..582	R/W	LONG	0.1%	0 ～ 3000	Torque Arrival Width (TV)	
40583..584	R/W	LONG	pulses	-2147483647 ～ 2147483647	Near Target Position (DG)	
40585..586	R/W	LONG	pulses	-2147483647 ～ 2147483647	Positive Software Limit (LP)	
40587..588	R/W	LONG	pulses	-2147483647 ～ 2147483647	Negative Software Limit (LM)	
40589..590	R/W	LONG	——	-4 ～ 35	Homing Method (HE)	

MDX Series

Register	Access	Data Type	Description	SCL Register
40001	Read Only	SHORT	Alarm Code (AL)	f
40002	Read Only	SHORT	Status Code (SC)	s
40003	Read Only	SHORT	Reserved	
40004	Read Only	SHORT	Drive Digital In/Out	i
40005..6	Read Only	LONG	Encoder Position (IE, EP)	e
40007..8	Read Only	LONG	Immediate Absolute Position (IP)	l
40009..10	Read Only	LONG	Reserved	
40011	Read Only	SHORT	Immediate Actual Velocity (IV0)	v
40012	Read Only	SHORT	Immediate Target Velocity (IV1)	w
40013	Read Only	SHORT	Immediate Drive Temperature (IT)	t
40014	Read Only	SHORT	Immediate DC Bus Voltage (IU)	u
40015..16	Read Only	LONG	Immediate Position Error (IX)	x
40017	Read Only	SHORT	Immediate Analog Input Value (IA)	a
40018	Read Only	SHORT	Q Program Line Number	b
40019	Read Only	SHORT	Immediate Current Command (IC)	c
40020..21	Read Only	LONG	Relative Distance (ID)	d
40022..23	Read Only	LONG	Sensor Position	g
40024	Read Only	SHORT	Condition Code	h
40025	Read Only	SHORT	Analog Input 1 (IA1)	j
40026	Read Only	SHORT	Analog Input 2 (IA2)	k
40027	Read Only	SHORT	Command Mode (CM)	m
40028	R/W	SHORT	Point-to-Point Acceleration (AC)	A
40029	R/W	SHORT	Point-to-Point Deceleration (DE)	B
40030	R/W	SHORT	Velocity (VE)	V

MDX Series

Register	Access	Data Type	Description	SCL Register
40031..32	R/W	LONG	Point-to-Point Distance (DI)	D
40033..34	R/W	LONG	Change Distance (DC)	C
40035	R/W	SHORT	Change Velocity (VC)	U
40036	Read Only	SHORT	Velocity Move State	n
40037	Read Only	SHORT	Point-to-Point Move State	o
40038	Read Only	SHORT	Q Program Segment Number	p
40039	Read Only	SHORT	Reserved	
40040	Read Only	SHORT	Phase Error	z
40041..42	R/W	LONG	Position Offset	E
40043	R/W	SHORT	Miscellaneous Flags	F
40044	R/W	SHORT	Current Command (GC)	G
40045..46	R/W	LONG	Input Counter	I
40047	R/W	SHORT	Jog Accel (JA)	
40048	R/W	SHORT	Jog Decel (JL)	
40049	R/W	SHORT	Jog Velocity (JS)	J
40050	R/W	SHORT	Max Velocity (VM)	M
40051	R/W	SHORT	Continuous Current (CC)	N
40052	R/W	SHORT	Peak Current (CP)	O (Capital)
40053	Read Only	SHORT	Reserved	
40054..55	R/W	LONG	Pulse Counter	S
40056	R/W	SHORT	Analog Position Gain (AP)	X
40057	R/W	SHORT	Analog Threshold (AT)	Y
40058	R/W	SHORT	Analog Offset (AV)	Z
40059..60	Read Only	LONG	Accumulator	0

MDX Series

Register	Access	Data Type	Description	SCL Register
40061..62	R/W	LONG	User Defined Register 1	1
40063..64	R/W	LONG	User Defined Register 2	2
40065..66	R/W	LONG	User Defined Register 3	3
40067..68	R/W	LONG	User Defined Register 4	4
40069..70	R/W	LONG	User Defined Register 5	5
40071..72	R/W	LONG	User Defined Register 6	6
40073..74	R/W	LONG	User Defined Register 7	7
40075..76	R/W	LONG	User Defined Register 8	8
40077..78	R/W	LONG	User Defined Register 9	9
40079..80	R/W	LONG	User Defined Register 10	:
40081..82	R/W	LONG	User Defined Register 11	;
40083..84	R/W	LONG	User Defined Register 12	<
40085..86	R/W	LONG	User Defined Register 13	=
40087..88	R/W	LONG	User Defined Register 14	>
40089..90	R/W	LONG	User Defined Register 15	?
40091..92	R/W	LONG	User Defined Register 16	@
40093..94	R/W	LONG	User Defined Register 17	[
40095..96	R/W	LONG	User Defined Register 18	\
40097..98	R/W	LONG	User Defined Register 19	]
40099..100	R/W	LONG	User Defined Register 20	^
40101..102	R/W	LONG	User Defined Register 21	_
400103..104	R/W	LONG	User Defined Register 22	`
40105	R/W	SHORT	Brake Release Delay (BD)	

MDX Series

Register	Access	Data Type	Description	SCL Register
40106	R/W	SHORT	Brake Engage Delay (BE)	
40107	Read Only	SHORT	Reserved	
40108	Read Only	SHORT	Reserved	
40109	Read Only	SHORT	Firmware version	
40110	R/W	SHORT	Analog Filter Gain (AF)	
40111	Read Only	SHORT	Reserved	
40112	Read Only	SHORT	Alarm Code High bit (AL1)	
40113	R/W	SHORT	Jog Change（JC1）	
40114	Read Only	SHORT	Reserved	
40115	Read Only	SHORT	Reserved	
40116	Read Only	SHORT	Reserved	
40117	Read Only	SHORT	Reserved	
40118	Read Only	SHORT	Reserved	
40119	Read Only	SHORT	Reserved	
40120	Read Only	SHORT	Reserved	
40121	R/W	SHORT	X3 Input Filter	
40122	R/W	SHORT	X4 Input Filter	
40123	R/W	SHORT	X5 Input Filter	
40124	R/W	SHORT	X6 Input Filter	
40125	R/W	SHORT	Command Opcode	
40126	R/W	SHORT	Parameter 1	
40127	R/W	SHORT	Parameter 2	
40128	R/W	SHORT	Parameter 3	
40129	R/W	SHORT	Parameter 4	
40130	R/W	SHORT	Parameter 5	
40131	R/W	SHORT	Jerk Time (JT)	
40132	Read Only	SHORT	Reserved	

MDX Series

Register	Access	Data Type	Description	SCL Register
40133	R/W	SHORT	Proportional Gain (KF)	
40134	R/W	SHORT	Damping Gain (KD)	
40135	R/W	SHORT	Velocity Gain (KV)	
40136	R/W	SHORT	Integral Gain (KI)	
40137	R/W	SHORT	Inertia Feed forward Gain (KK)	
40138	R/W	SHORT	Jerk Filter (KJ)	
40139	R/W	SHORT	Velocity Mode Proportional Gain (VP)	
40140	R/W	SHORT	Velocity Mode Integral Gain (VI)	
40141	R/W	SHORT	Damping Filter Gain (KE)	
40142	R/W	SHORT	Current Filter Gain (KC)	
40143	R/W	SHORT	Control Mode (CM)	
40144	Read Only	SHORT	Reserved	
40145	R/W	SHORT	Operation Mode (PM)	
40146	R/W	SHORT	Jog Mode (JM)	
40147	R/W	SHORT	Hard-Stop Current Limit (HC)	
40148	R/W	SHORT	Max Acceleration (AM)	
40149	Read Only	SHORT	Encoder Resolution (ER)	
40150	Read Only	SHORT	Reserved	
40151	Read Only	SHORT	Steps-Rev (EG)	
40152	Read Only	SHORT	Reserved	
40153	Read Only	SHORT	Reserved	
40154	RO	SHORT	Step Mode (SZ)	
40155	R/W	SHORT	Position Fault (PF)	
40156	R/W	SHORT	Dynamic Position Error Count (PL)	

MDX Series

Register	Access	Data Type	Description	SCL Register
40157	R/W	SHORT	In-Position Counts (PD)	
40158	R/W	SHORT	In-Position Timing (PE)	
40159	R/W	SHORT	Pulse Complete Timing (TT)	
40160	R/W	SHORT	Analog Velocity Gain (AG)	
40161	R/W	SHORT	Analog Torque Gain (AN)	
40162	R/W	SHORT	Analog Offset 1 (AV1)	
40163	R/W	SHORT	Analog Offset 2 (AV2)	
40164	R/W	SHORT	Analog Type (AS)	
40165	R/W	SHORT	Analog Deadband 1 (AD1)	
40166	R/W	SHORT	Analog Deadband 2 (AD2)	
40167	R/W	SHORT	Analog Deadband (AD)	
40168	R/W	SHORT	Analog Function (FA)	
40169	R/W	SHORT	Servo Enable (SI)	
40170	R/W	SHORT	Alarm Reset (AI)	
40171	R/W	SHORT	Define Limits Input (DL)	
40172	Read Only	SHORT	Reserved	
40173	R/W	SHORT	Alarm Output (AO)	
40174	R/W	SHORT	Brake Output (BO)	
40175	R/W	SHORT	Motion Output (MO) Y3，Y4，Y5，Y6	
40176	Read Only	SHORT	Reserved	
40177	R/W	SHORT	Communication Protocol (PR)	
40178	R/W	SHORT	Transmit Delay (TD)	
40179	R/W	SHORT	Baud Rate (BR)	
40180	R/W	SHORT	Communication Address (DA)	

MDX Series

Register	Access	Data Type	Description	SCL Register
40181	R/W	SHORT	Velocity value (VR)	
40182	Read Only	SHORT	Reserved	
40183	R/W	SHORT	Torque Value (TV)	
40184	R/W	SHORT	Torque Limit (TL)	
40185	Read Only	SHORT	Reserved	
40186	R/W	SHORT	Mask Alarm (MA)	
40187	R/W	SHORT	Homing Acceleration 1 (HA1)	
40188	R/W	SHORT	Homing Acceleration 2 (HA2)	
40189	R/W	SHORT	Homing Acceleration 3 (HA3)	
40190	R/W	SHORT	Homing Deceleration 1 (HL1)	
40191	R/W	SHORT	Homing Deceleration 2 (HL2)	
40192	R/W	SHORT	Homing Deceleration 3 (HL3)	
40193	R/W	SHORT	Homing Velocity 1 (HV1)	
40194	R/W	SHORT	Homing Velocity 2 (HV2)	
40195	R/W	SHORT	Homing Velocity 3 (HV3)	
40196	Read Only	SHORT	Reserved	

BLDC Series

Register	Access	Data Type	Description	SCL Register
40001	Read	SHORT	Alarm Code (AL)	f
40002	Read	SHORT	Status Code (SC)	s
40003	Read	SHORT	Reserved	y
40004	Read	SHORT	Driver Board Inputs (IS)	i
40005..6	Read	LONG	Reserved	e
40007..8	Read	LONG	Reserved	l
40009..10	Write	LONG	Reserved	P (Capital)
40011	Read	SHORT	Immediate Actual Velocity (IV0)	v
40012	Read	SHORT	Reserved	w
40013	Read	SHORT	Immediate Drive Temperature (IT)	t
40014	Read	SHORT	Immediate Bus Voltage (IU)	u
40015..16	Read	LONG	Reserved	x
40017	Read	SHORT	Immediate Analog Input Value (IA)	a
40018	Read	SHORT	Reserved	b
40019	Read	SHORT	Immediate Current Command (IC)	c
40020..21	Read	LONG	Reserved	d
40022..23	Read	LONG	Reserved	g
40024	Read	SHORT	Reserved	h
40025	Read	SHORT	Reserved	j
40026	Read	SHORT	Reserved	k
40027	Read	SHORT	Command Mode (CM)	m
40028	R/W	SHORT	Reserved	A
40029	R/W	SHORT	Reserved	B
40030	R/W	SHORT	Reserved	V (Capital)
40031..32	R/W	LONG	Reserved	D
40033..34	R/W	LONG	Reserved	C

BLDC Series

Register	Access	Data Type	Description	SCL Register
40035	R/W	SHORT	Reserved	U (Capital)
40036	Read	SHORT	Velocity Move State	n
40037	Read	SHORT	Reserved	o
40038	Read	SHORT	Reserved	p
40039	Read	SHORT	Reserved	r
40040	Read	SHORT	Reserved	z
40041..42	R/W	LONG	Reserved	E
40043	R/W	SHORT	Reserved	F
40044	R/W	SHORT	Reserved	G
40045..46	R/W	LONG	Reserved	I
40047	R/W	SHORT	Jog Accel (JA)	K (Capital)
40048	R/W	SHORT	Jog Decel (JL)	L
40049	R/W	SHORT	Jog Velocity (JS)	J
40050	R/W	SHORT	Reserved	
40051	R/W	SHORT	Running Current (CC)	N
40052	R/W	SHORT	Reserved	
40053	R/W	SHORT	Reserved	R
40054	R/W	SHORT	Reserved	S (Capital)
40055	R/W	SHORT	Reserved	W
40056	R/W	SHORT	Reserved	X
40057	R/W	SHORT	Reserved	Y
40058	R/W	SHORT	Analog Offset (AV)	Z (Capital)
40059..60	R/W	LONG	Accumulator	0
40061..62	R/W	LONG	User Defined Register 1	1
40063..64	R/W	LONG	User Defined Register 2	2
40065..66	R/W	LONG	User Defined Register 3	3

BLDC Series

Register	Access	Data Type	Description	SCL Register
40067..68	R/W	LONG	User Defined Register 4	4
40069..70	R/W	LONG	User Defined Register 5	5
40071..72	R/W	LONG	User Defined Register 6	6
40073..74	R/W	LONG	User Defined Register 7	7
40075..76	R/W	LONG	User Defined Register 8	8
40077..78	R/W	LONG	User Defined Register 9	9
40079..80	R/W	LONG	User Defined Register 10	:
40081..82	R/W	LONG	User Defined Register 11	;
40083..84	R/W	LONG	User Defined Register 12	<
40085..86	R/W	LONG	User Defined Register 13	=
40087..88	R/W	LONG	User Defined Register 14	>
40089..90	R/W	LONG	User Defined Register 15	?
40091..92	R/W	LONG	User Defined Register 16	@
40093..94	R/W	LONG	User Defined Register 17	[
40095..96	R/W	LONG	User Defined Register 18	\
40097..98	R/W	LONG	User Defined Register 19	]
40099..100	R/W	LONG	User Defined Register 20	^
40101..102	R/W	LONG	User Defined Register 21	_
400103..104	R/W	LONG	User Defined Register 22	`
40105	R/W	SHORT	Reserved	
40106	R/W	SHORT	Reserved	
40107	R/W	SHORT	Reserved	
40108	R/W	SHORT	Reserved	
40109	R/W	SHORT	Reserved	

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Register	Access	Data Type	Description	SCL Register
40110	R/W	SHORT	Analog Filter Gain	
40111..124	R/W	LONG	Reserved	
40125	R/W	SHORT	Command Opcode	
40126	R/W	SHORT	Parameter 1	
40127	R/W	SHORT	Parameter 2	
40128	R/W	SHORT	Parameter 3	
40129	R/W	SHORT	Parameter 4	
40130	R/W	SHORT	Parameter 5	

Appendix 6 Drive Alarming and Status Code

1. Alarming Code

The alarming code is used to express the current alarming information by the drive. User can reach the detailed alarming information by enquiring the alarming code register. Each bit of the alarming code register represents different alarming information. When one bit is set 1, it means the drive is in the alarming status of its definition. The detail definition of each bit can refer to the following table.

Stepping Drive Alarming Code Table of Stepping System：

Register	Bit	STAC	ST	STF/STB	STM/SWM	RS/SSM/TSM/TXM	SSDC/SS
40001	0	*Position Error out of Limit*					
	1	CCW Direction Limit Prohibited					
	2	CW Direction Limit Prohibited					
	3	*Drive over-temperature*					
	4	*Release Failure*	*Drive Internal Voltage Error*				
	5	*Drive Over-voltage*					
	6	*Drive under Voltage*	Drive under Voltage				
	7	*Drive Over-current*					
	8	*Motor Winding Switch*					
	9	*Motor Encoder Error*	Reserve			*Motor Encoder Signal Error*	
	10	Abnormal Communication					
	11	Parameter Save Error					
	12	Command the motor to run when it is not enabled					
	13	Abnormal Motor Resistance	Reserve			Motor Heavy Load Status	
	14	Q Programme for calling is empty					
	15	Reserve				Memory Error	
40112	0	Reserve					*Release Failure*

Servo M2/MDX Drive Alarming Code Table：

Register	Bit	M2	MDX
40001	0	*Position Error out of Limit*	
	1	CCW Direction Limit Prohibited	
	2	CW Direction Limit Prohibited	
	3	*Drive over temperature*	
	4	*Drive internal Voltage Error*	
	5	*Drive over-voltage*	
	6	*Drive low Voltage*	Drive under voltage
	7	*Drive over current*	
	8	*Hall Signal Error*	
	9	*Encoder Signal Error*	
	10	Abnormal Communication	
	11	Parameter Save Error	
	12	Release Failure	Internal Use
	13	Heavy Load Status	
	14	*The called Q segment is empty*	
	15	Command the motor to run when it is not enabled	
40112	0	*Drive Main Circuit Power Input Phase Loss*	Reserve
	1	*STO Prohibited*	Reserve
	2	Reserve	Reserve
	3	*Motor Velocity exceeds the Limit Value*	Reserve
	4	Drive under Voltage	Reserve

Servo M3 Drive Alarming Code (Main Code) Table:

Register	Bit	Explanation		Bit	Explanation
40001 40002	0	*Position Error out of Limit*		16	Drive main Circuit Power Input Phase Loss
	1	CCW Direction Limit Prohibited		17	*STO Prohibited*
	2	CW Direction Limit Prohibited		18	*Reserve*
	3	*Overtemperature*		19	*Motor Velocity exceeds Limit*
	4	*Internal Error*		20	Drive under Voltage
	5	*Power Voltage over Range*		21	*Emergency Stop*
	6	*Reserve*		22	*Second Encoder not connected*
	7	*Drive over Current*		23	*Full closed-loop Hybrid Deviation Over Limit*
	8	Reserve		24	Absolute Encoder Battery under Voltage
	9	*Motor Encoder not connected*		25	Absolute Position Loss
	10	Abnormal Communication		26	Absolute Position Overflow
	11	Reserve		27	*Reserve*
	12	Release Failure		28	*Absolute Encoder Multi-turn Error*
	13	Motor heavy Load Protection		29	*Abnormal Motor Action Protection*
	14	Reserve		30	*EtherCAT Communication Error*
	15	Abnormal Start Alarm		31	Homing Parameter Configuration Error

Servo M3 Drive Alarming Code (auxiliary code) Table:

Register (40001..02) Bit	Explanation	Register (40067..68) Bit	Explanation
3	*Overtemperature*	*5*	*Drive Processor over Temperature*
		6	*Drive Power Module over Temperature*
		7	*Motor over Temperature*
4	*Internal Error*	*8*	*Parameter read Failure*
		9	*Inside Voltage Error*
		10	*Reserve function and keep "0"*
		11	*Reserve function and keep "0"*
		12	*FPGA Error*
		13	*Parameter Save Failure*
		14	*Motor Encode Communication Error*
5	*Power Voltage over Scope*	*15*	*Drive over Voltage*
		16	*Drive Low Voltage*
7	*Over-current*	*2*	*Low-end over Current*
		3	*High-end over Current*
		4	*Reading over Current*
15	Abnormal Start Warning	17	The motor commands its operation when it is not enabled.
		18	The motor commands its operation when it is not enabled.
		19	I/O Signal Function Multiplex
29	*Motor Movement Abnormal Protection*	*24*	*Motor Locked-rotor Protection*
		25	*Motor Anti-collision Protection*

DC brushless BLD Drive Alarming Code Table

Register	Bit	Explanation
40001	0	Reserve
	1	Reserve
	2	Reserve
	3	*Drive over Temperature*
	4	*Drive Inside Voltage Error*
	5	*Drive over Voltage*
	6	*Drive Low Voltage*
	7	*Drive over Current*
	8	*Winding open-circuit*
	9	*Hall Signal Error*
	10	Abnormal Communication
	11	Parameter Save Failure
	12	Stop Enable Status
	13	Motor Heavy-load Status
	14	*Storage Error*
	15	Reserve

Note: The alarm items in italics and bold font in the above table represent that the drive reports a fault. When a fault alarm occurs, the motor will stop enabled.

2. Status Code

The status code is used to indicate the drive`s current working status. Users can understand the specific status information by querying the status register. Each bit of the state code register represents different status information. When a bit is set to 1, it indicates that the drive is in the state defined by the bit. Specifically, the definition of each bit can be referred to the following table.

Step and Servo M2/MDX Drive Status Code Table:

Register	Bit	Explanation
40002	0	Enable
	1	Sampling (Software oscilloscope function on)
	2	The drive reports a failure
	3	Moving in Place
	4	Running
	5	Jogging
	6	Decelerating
	7	Wait for the Input Signal (e.g. follow WI command)
	8	Parameter Saving
	9	Drive reports alarming
	10	Homing
	11	Wait time (e.g. follow WT/WD command)
	12	Internal Use
	13	Encode checking
	14	Q Programme Running
	15	Initialization (stepping system), Servo ready (servo system)

Servo M3 Drive Status Code Table:

Register	Bit	Explanation	Bit	Explanation
40003 40004	0	Servo Enable	16	CSP following
	1	Sampling (Luna software oscilloscope function opens)	17	Consistent Speed
	2	The drive reports a failure	18	Zero Speed
	3	Moving in place	19	Torque Arrival
	4	Running	20	Consistent Torque
	5	Jogging	21	The second set of gain is in operation.
	6	Decelerating	22	The second control mode is in operation.
	7	Wait for Input Signal (e.g. follow WI command)	23	Velocity Arrival
	8	Parameter saving	24	Homing completes
	9	The drive reports an alarm	25	Reserve
	10	Homing	26	Reserve
	11	Wait time (e.g. follow WT/WD command)	27	Reserve
	12	Internal Use	28	Reserve
	13	Encoder checking	29	Reserve
	14	Q programme running	30	Reserve
	15	Servo ready	31	Reserve

DC brushless BLD Drive Status Code Table:

Register	Bit	Explanation
40002	0	Enable
	1	Reserve
	2	Drive Alarm
	3	Reserve
	4	Reserve
	5	Jogging
	6	Decelerating
	7	Reserve
	8	Reserve
	9	Drive Alarming
	10	Reserve
	11	Reserve
	12	内部使用
	13	Reserve
	14	Reserve
	15	Reserve

Note: When the drive appears to alarm because of error, the drive error and the alarming status will be set 1 simultaneously.

Appendix 7 MOONS' Drive Model on supporting Modbus/RTU Protocol

Series	Model	Firmware Version
TSM Series	TSM11Q-xxx	After 1.05E
	TSM17Q-xxx	After 1.05A
	TSM23Q-xxx	After 1.05A
	TSM24Q-xxx	After 1.05A
SSM Series	SSM17Q-xxx	After 1.05A
	SSM23Q-xxx	After 1.05A
	SSM24Q-xxx	After 1.05A
TXM Series	TXM24Q-xxx	After 1.05A
SS Series	SS03-Q-x	After 1.06A
	SS05-Q-x	After 1.06A
	SS10-Q-x	After 1.06A
RS Series	RS03-Q-x	After 1.06A
	RS06-Q-x	After 1.06A
STM Series	STM11Q-xxx	After 1.20G
	STM17Q-xxx	After 1.06G
	STM23Q-xxx	After 1.06G
	STM24QF-xxx	After 1.06E
SWM Series	SWM24QF-xxx	After 1.06F
ST Series	MSST5-Q-xx	After 1.06D
	MSST10-Q-xx	After 1.06D
STB Series	MSSTB05-R	After 1.05L
	MSSTB10-R	After 1.05L
STF Series	STF03-R	After 1.00C
	STF05-R	After 1.00C
	STF06-R	After 1.00C
	STF10-R	After 1.00C
	STF05-R-H	
	STF10-R-H	
STAC Series	MSSTAC5-Q-xx-2V	After 1.06B
M2 Series	M2DV-XXXXR	After 1.00C
	M2DC-XXXXR	After 1.00R
	M2DC-XXXXR-H	After 1.01D
M3 Series	M3DV-XXXXRX	After 1.00G
MDX Series	MDXXXXXXXR	After 1.07D
BLDC Series	BLD05-R	After 1.11Q
	BLD10-R	After 1.01P

Appendix 8 MOONS' Drive Model on supporting Modbus/TCP Protocol

Series	Model	Firmware Version
TSM Series	TSM23XXG-D/IP	
	TSM23X3B-D/IP	After 2.00E
	TSM34Q-XDG	After 1.06D
	TSM34IP-XDG	After 1.06D
TXM Series	TXM24Q-3EG	
	TXM24IP-3EG	
	TXM24X3B-IP/IPE	After 2.00E
	TXM34Q-XDG	After 1.06D
	TXM34IP-XDG	After 1.06D
SSDC Series	SSDC03-D/IP	After 1.01B
	SSDC06-D/IP	After 1.01B
	SSDC10-D/IP	After 1.01B
STF Series	STF03-D/IP	After 1.00C
	STF05-D/IP	After 1.00C
	STF06-D/IP	After 1.00C
	STF10-D/IP	After 1.00C
M2 Series	M2DV-XXXXE	After 1.00Q
	M2DV-XXXXD	After 1.00Q
	M2DV-XXXXIP	After 1.00Q
	M2DC-XXXXD	After 1.00R
	M2DC-XXXXIP	After 1.00R
	M2DC-XXXXD-H	After 1.01D
	M2DC-XXXXIP-H	After 1.01D
MDX Series	MDXLXXXXXD	After 1.07E
	MDXLXXXXXIP	After 1.07E

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