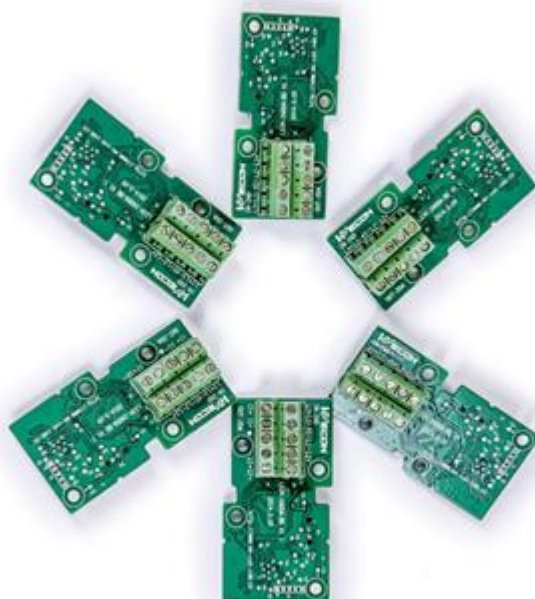




WECON

LX3V-ETH-BD

User manual



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1. The installation instructions

Before the installation make sure that the PLC host and the equipment connected to bd board have been powered off. Please install the BD module in the corresponding position of the PLC, and lock the four standard screws. In case of the dust interference, please cover BD right part by PLC's cover.

Note:

- 1) Install the board firmly on the PLC. Poor contact may cause malfunction.
- 2) The suggested tightening torque is 0.3-0.6 N.m.

Warning:

- 1) Disconnect the power supply before installing/removing the board and wiring in case of electric shock or product damage.
- 2) The After completing the installation and wiring, do not replace the PLC top cover before turning on the power.

Supported version:

LX3VP: 25103 , 16050; LX3VE: 25201, 16050.

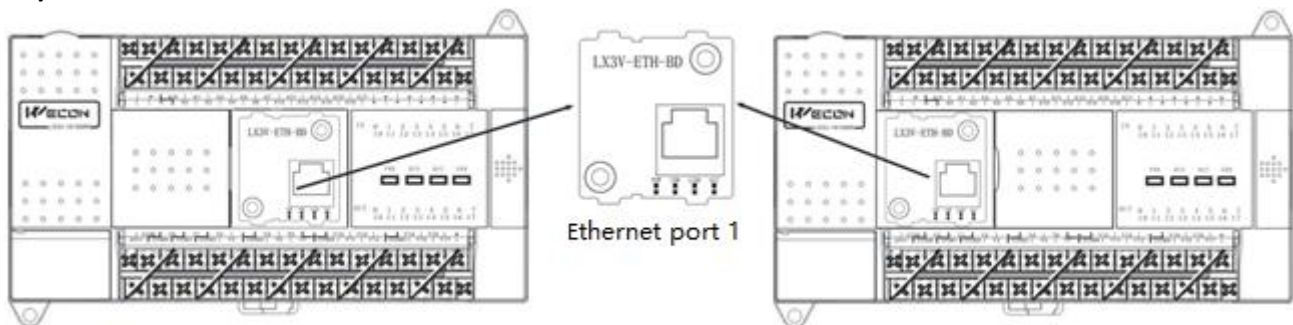
LX3VP: 25105、16000 or higher version, LX3VE: 25203, 16000 or higher version.

2. Key Features

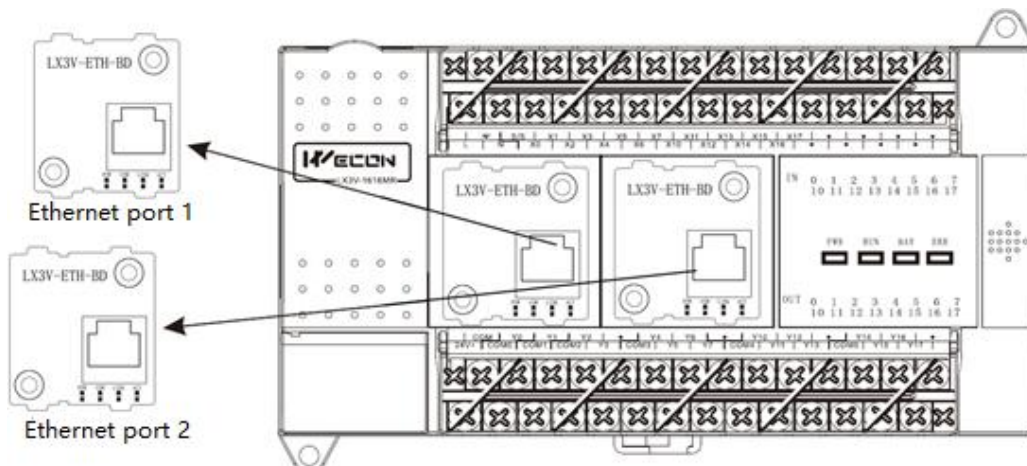
- 1) Maximum number of connections 8, regardless of master and slave.
- 2) The current protocol only supports: MODBUS-TCP.

3. The shape and terminal description

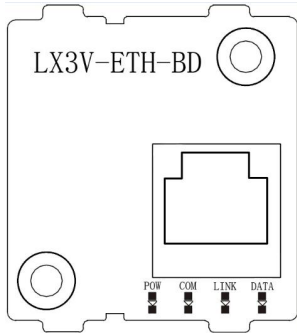
1) The case of one BD board



2) The case of two BD board



3) Light



POW: power light, normal state is always bright when connected.

COM: the flicker frequency corresponds to communication with plc.

DATA: data light blinks if the communication with network is ok

LINK: when connect to the network then the light is lit, if the connect is not ok, there will be exterminated or chaotic situation.

Note:

When the power light and the com light blink simultaneously (1 Hz), that means the PLC does not support Ethernet BD.

4. The use of instructions

4.1 RS instruction

Table 4- 1

Name	Function	16 bit	Pulsed	Instruction format	Steps
RS2	Transfer serial data	√	No	RS2 S m D n n1	11

Table 4- 2

Operand	Bit device				Word device									
	X	Y	M	S	K	H	KnY	KnM	KnS	T	C	D	V	Z
S												√		
m					√	√						√		
D												√		
n					√	√						√		
n1					√	√						√		

- 1) **S** is the address of slave (high byte) and communication command (low byte, defined by MODBUS protocol);
- 2) **m** is the starting address number of the slave;
D is the length of the data (read or write), the unit is word. (The specific setting is shown in the following table 4-2);

Table 4- 2

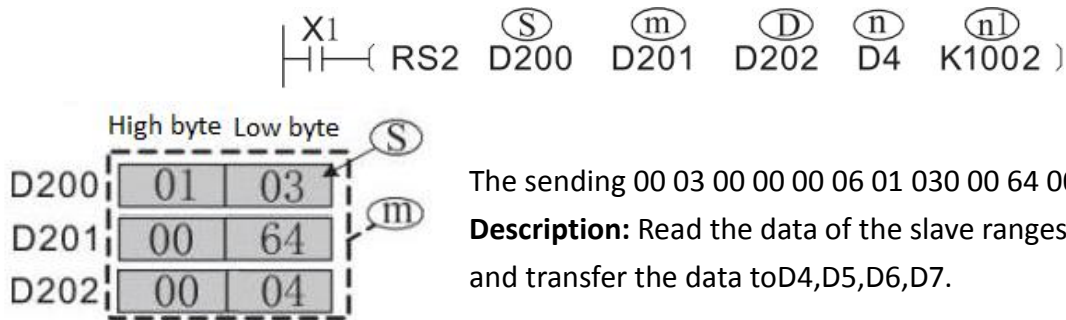
Function code	Length	Length (HEX)
Write coils	1968	0x7B0
Read coils	2000	0x7D0
Write registers	123	0x7B
Read registers	125	0x7D

- 3) **n** is the starting address of the storage unit for reading or writing data, occupying the subsequent address unit, and the length is determined by the “D”;
- 4) **n1** is the connection number corresponding to the Ethernet port connection number (specific settings is shown as the following table 4-3).

Table 4- 3

Ethernet port 1		Connection number	Ethernet port 2		Connection number
RS2 instruction	Connection 1	1000	RS2 instruction	Connection 1	1100
	Connection 2	1001		Connection 2	1101
	Connection 3	1002		Connection 3	1102
	Connection 4	1003		Connection 4	1103
	Connection 5	1004		Connection 5	1104
	Connection 6	1005		Connection 6	1105
	Connection 7	1006		Connection 7	1106
	Connection 8	1007		Connection 8	1107

If **n1** is set as k1002, then RS2 is configured for Ethernet port 1 , connection 3. When x1 is ON, the data is shown as below.



Instruction format:

00 03(numbers of transmission), means has sent 3 times;

00 06(the length of Modbus instruction, like 01 03 00 64 00 04;

01 03(station number and function code); 00 64(starting address0; 00 04(the length of address)

4.2 CPAVL Instructions

Table 4- 4

Name	Function	16 bit	Pulsed	Instruction format	Steps
CPAVL	Communication port parameters	√	No	CPAVL S D M	11

Table 4- 5

Operand	Bit device				Word device									
	X	Y	M	S	K	H	KnY	KnM	KnS	T	C	D	V	Z
S												√		
D			√											
M					√	√								

- 1) **S** is the starting address of the D device parameter table ranges from D0 to D7999. (try to store in the latched area in case of data loss).
- 2) **D** is the starting address of the M device parameter table ranges from M0 to M3071. ((try to store in the latched area in case of data loss).
- 3) **M** is the connection number, set the number according to the Ethernet port. (See the table below for specific settings).

Table 4- 6

Connection number description		
CPAVL instruction	port	Connection number
	Ethernet port 1	1000
	Ethernet port 2	1100

Note:

Only need one CPAVL instruction to configure multiple connections. The RS instruction needs to be used for the corresponding connection

5. Ethernet parameter settings

The parameters of LX3V-ETH-BD module are configured by the CPAVL instruction. The specific address of the D device and M device in the CPAVL instruction is shown in the following table.

5.1 D Device

Table 5- 1

Word address	D device	Description	Others	Read or write
S+0	Version		Parameters for BD module	R
S+1	IP for BD module	IP Section 1		R/W
S+2		IP Section 2		R/W
S+3		IP Section 3		R/W
S+4		IP Section 4		R/W
S+5	Port	Default value is K502		R/W
S+6	Gateway	Gateway section 1		R/W
S+7		Gateway section 2		R/W
S+8		Gateway section 3		R/W
S+9		Gateway section 4		R/W
S+10	Subnet mask	Subnet mask section 1		R/W
S+11		Subnet mask section 2		R/W
S+12		Subnet mask section 3		R/W
S+13		Subnet mask section 4		R/W
S+14	MAC	MAC section 1		R
S+15		MAC section 2		R
S+16		MAC section 3		R

S+17		MAC section 4		R
S+18		MAC section 5		R
S+19		MAC section 6		R
S+20	Reserved			R/W
S+21	Total disconnect time *1	When plc serves as slave, and there is no communication within specific time, then the communication will be disconnected. Unit: S (seconds), Default: 0 (10 seconds)		R/W
S+22	Number of connections (max 8)			R/W
S+23	Protocol	Communication protocol	Parameters for connection 1	R/W
S+24	Slave IP	IP section 1		R/W
S+25		IP section 2		R/W
S+26		IP section 3		R/W
S+27		IP section 4		R/W
S+28	Port	Default is K502		R/W
S+29	Reserved			R/W
S+30	Command send interval	Default is 0.1 ms		R/W
S+31	Reserved			R/W
S+32	Disconnect time	When plc serves as slave, and there is no communication within some time, then the communication will be disconnected. Unit: S (seconds), Default: 0 (10 seconds)		R/W
S+33	Reserved			R/W
S+34	Timeout			R/W
S+35	Protocol	Communication protocol	Parameters for connection 2	R/W
S+36	Slave IP	IP section 1		R/W
S+37		IP section 2		R/W
S+38		IP section 3		R/W
S+39		IP section 4		R/W
S+40	Port	Default is K502		R/W
S+41	Reserved			R/W
S+42	Command send interval	Default is 0.1 ms		R/W
S+43	Reserved			R/W
S+44	Reserved			R/W
S+45	Reserved			R/W
S+46	Timeout			R/W

S+47
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*1. Disconnect time : only LX3VP(25105,16003) and LX3VE (25203,16003) or higher version can support this function.

Disconnect time : When plc serves as slave, and there is no communication within specific time(it can be configured in the program), then the communication will be disconnected.

When the disconnect time of each slave device is non-zero, then the "disconnect time" of each slave device is used.

When the disconnect time of each slave device is non-zero, and the "total disconnect time" is not zero, then the "total disconnect time" is used.

1) IP, gateway, subnet mask settings example

For example the IP address is 192.168.1.35, set as follows:

Word address		Decimal	Hexadecimal
1	The IP address of BD module	192	C0
2		168	A8
3		1	01
4		35	23

MAC display description: 192.168.1.35 51-5b-a8-59-55-68 dynamic

device	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
D314	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0051
D315	1	1	0	1	1	0	1	0	0	0	0	0	0	0	0	0	005B
D316	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	00A8
D317	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0059
D318	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0055
D319	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0068

2) Number of connections

The maximum number of connections is 8

The setting of connection number: The number of settings should be the same as the number of connections.

If the connection number is exceeded, user will get error code in D8067 (means the value is exceeded)

3) Protocol setting

Table 5- 2

Protocol	Value
MODBUS-RTU Slaves	02H
MODBUS-RTU Main site	20H

When LX3V-ETH-BD serves as a slave, user could switch the master equipment.

The specific situation is: when the Ethernet BD serves as a slave, and reach the number of of connection, one of the master equipment is disconnected, user could connect another master device.

Note:

No need to configure IP address when LX3V-ETH-BD serves as a slave.

5.2 M Device

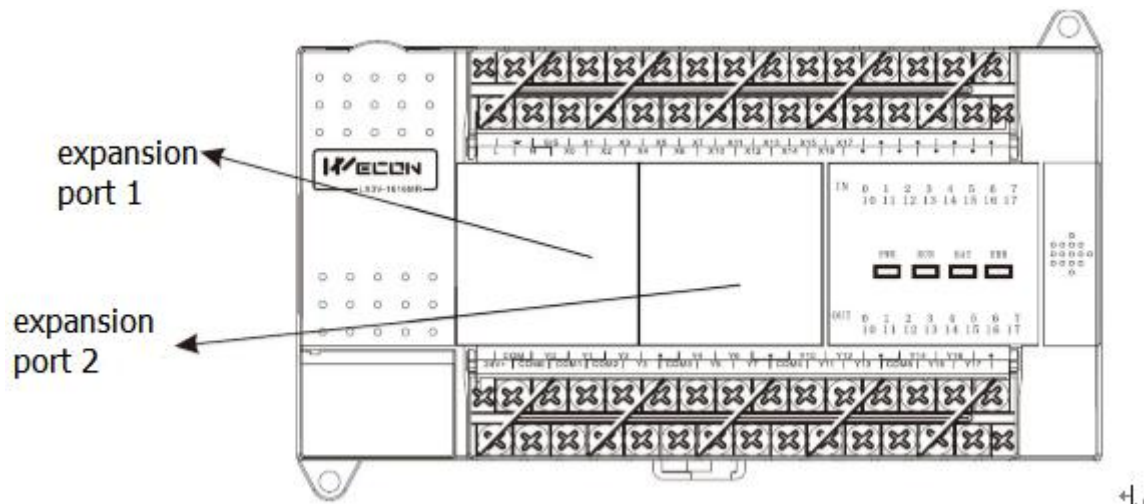
Bit address	Description	
D+0	Reserved	connection 1 Configuration
D+1	Instruction execution	
D+2	Instruction execution state	
D+3	Communication error flag	
D+4	Reserved	
D+5	Reserved	
D+6	Reserved	
D+7	Reserved	
D+8	Reserved	
D+9	Timeout flag	
D+10	Reserved	connection 2 Configuration
D+11	Instruction execution	
D+12	Instruction execution state	
D+13	Communication error flag	
D+14	Reserved	
D+15	Reserved	
D+16	Reserved	
D+17	Reserved	
D+18	Reserved	
D+19	Timeout flag	
D+20

5.3 Special device description

When BD board is properly installed and there is no problem with BD board, user could check the BD Board model in D8170 and D8171.

Table 5- 3

Special address	Description
D8170	Expansion port 1 BD Board Model
D8171	Expansion port 2 BD Board Model



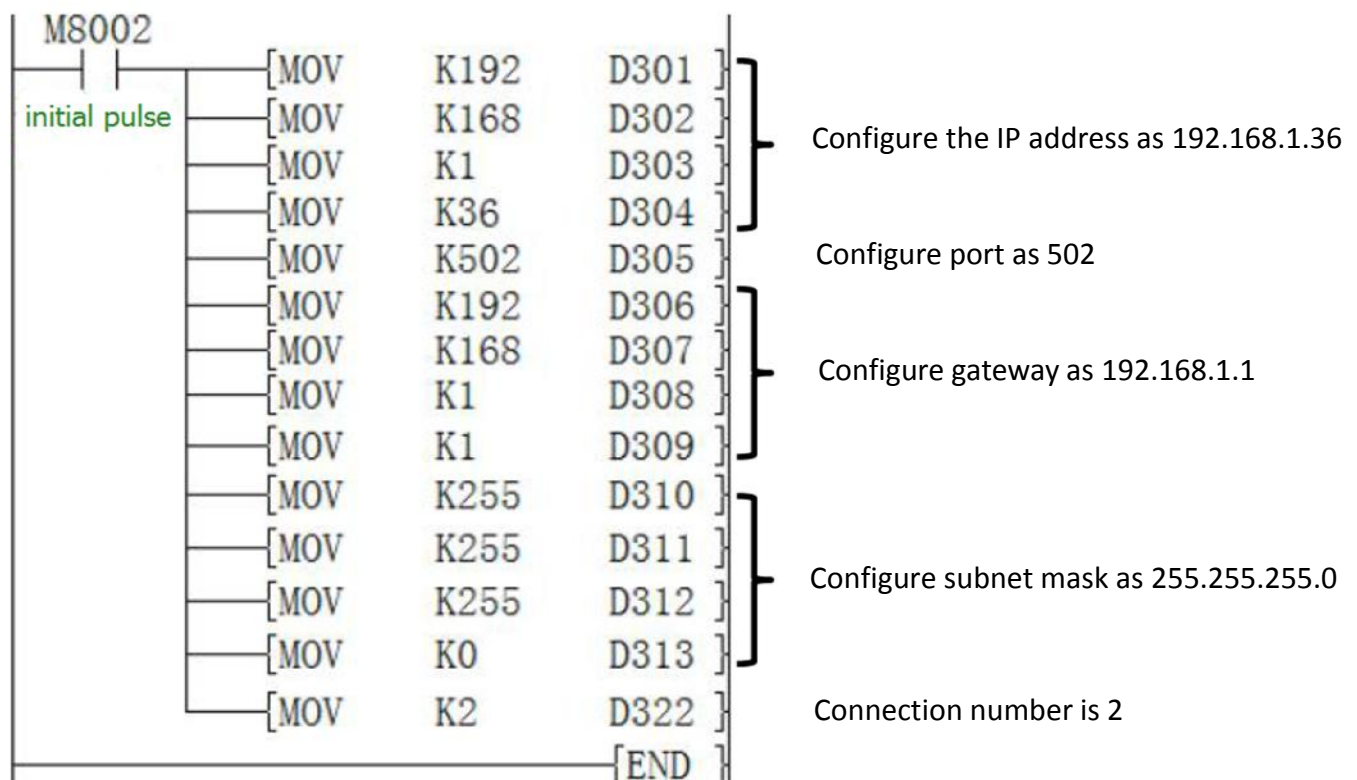
Note:

The special device could display all BD board model. As the picture shown above, the Ethernet BD model is HFF20 (K-224) according to the position.

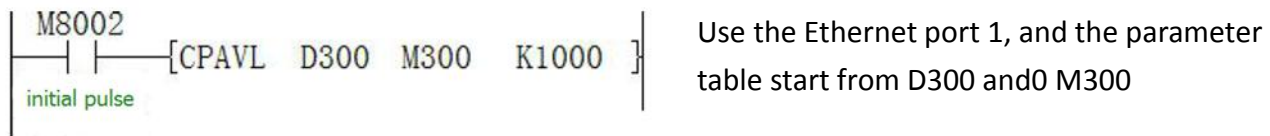
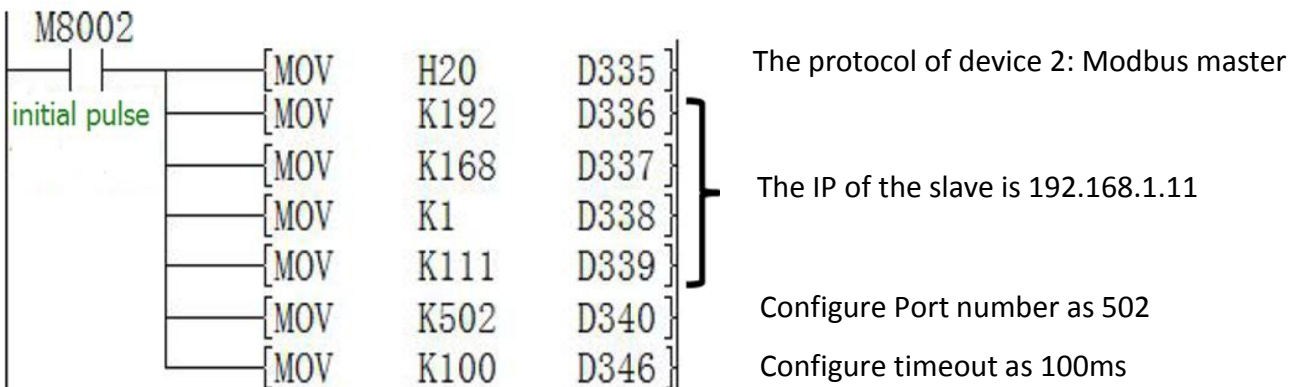
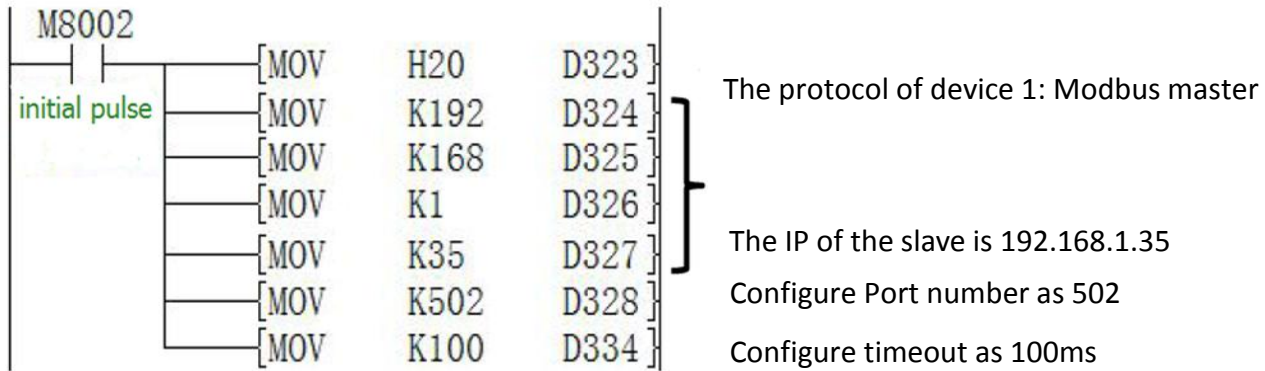
6.Examples

6.1 MODBUS Master

1) Ethernet parameter setting

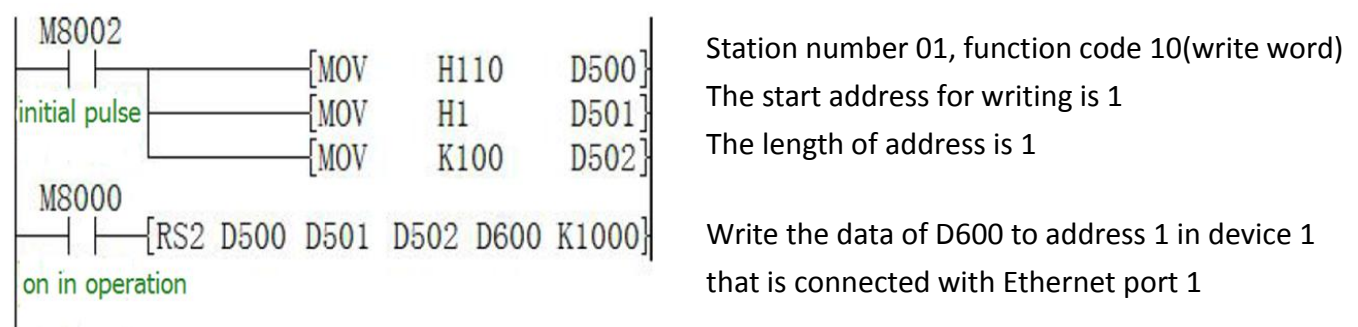


2) The parameter setting of two devices connected with the LX3V-ETH-BD

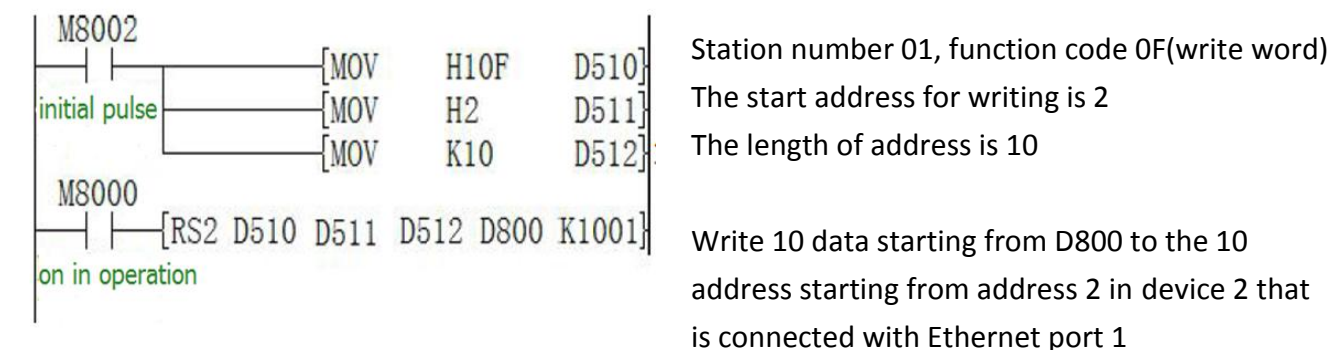


3) Send and receive data to two connected devices

● Device 1

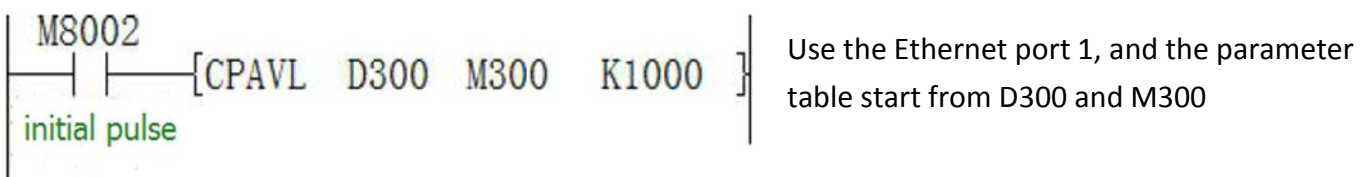
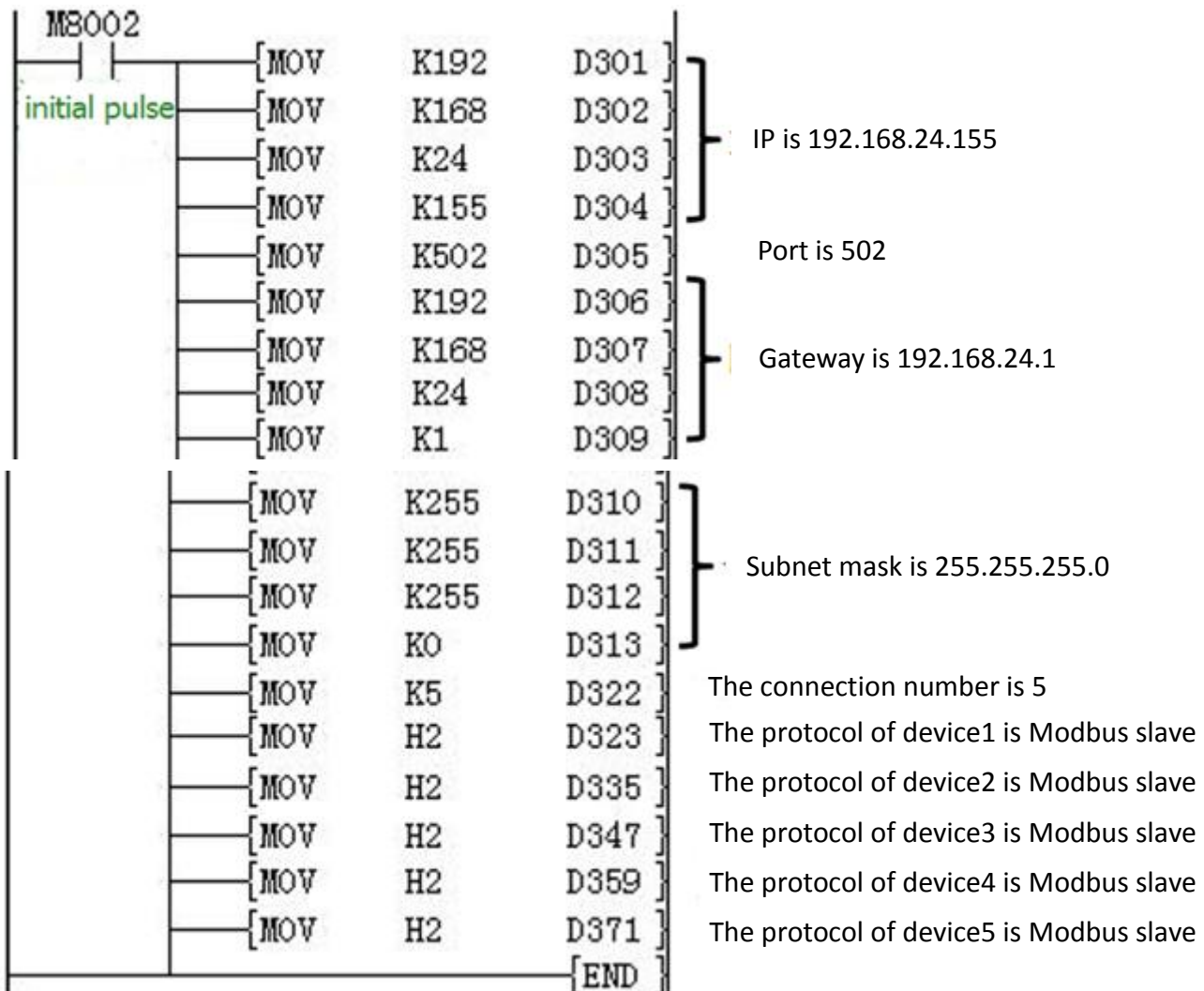


● Device 2



6.2 MODBUS Slave

1) The parameter setting of LX3V-ETH-BD:



7.Error Code Description

If an error occurs in the module communication, the special address M8063 is set to 1, and the special address D8063 will display the error code.

Table 7- 1

Error code	Value	Description	Value	Description
	0	MODBUS Slave address is set incorrectly	20	Ethernet disconnected
	1	Data frame length is incorrect	21	Lan cable disconnect (Yellow LED and green LED extinguished)
	2	wrong address	22	Ethernet connection failed
	3	CRC Verification error (No CRC check)	23	Ethernet connection timeout
	4	Command code is not supported	40	Interaction error between host and bd board
	5	Accept timeout	41	
	6	data error	42	
	7	Buffer overflow	43	
	8	Frame error	44	
	9	Send timeout	45	
	10-19	interaction error between host and bd board	46	
			47	

Error code display description

Table 7- 2

Address	Display value description	
D8063	Expansion port 1 Conn 1	10000+ error code
	Expansion port 1 Conn 2	10100+ error code
	Expansion port 1 Conn 3	10200+ error code
	Expansion port 1 Conn 4	10300+ error code
	Expansion port 1 Conn 5	10400+ error code
	Expansion port 1 Conn 6	10500+ error code
	Expansion port 1 Conn 7	10600+ error code
	Expansion port 1 Conn 8	10700+ error code
	Expansion port 2 Conn 1	20000+ error code
	Expansion port 2 Conn 2	20100+ error code
	Expansion port 2 Conn 3	20200+ error code
	Expansion port 2 Conn 4	20300+ error code
	Expansion port 2 Conn 5	20400+ error code
	Expansion port 2 Conn 6	20500+ error code
	Expansion port 2 Conn 7	20600+ error code
	Expansion port 2 Conn 8	20700+ error code

Example: D8063 display 10121(means Ethernet is disconnected in Expansion port 1 connection 2.