WECON

LX3V-4DA

Module

Wecon Technology Co.,Ltd.

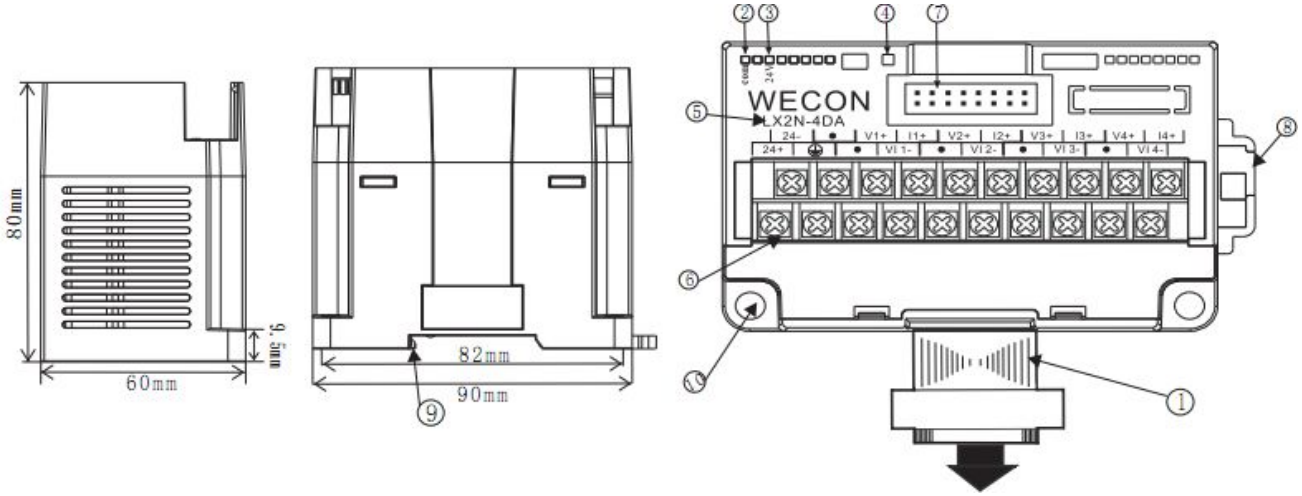
Website: http://www.we-con.com.cn/en/
Technical Support: liux@we-con.com.cn
Skype: fcwkkj
Phone: 86-591-87868869

LX3V-4DA Extension module

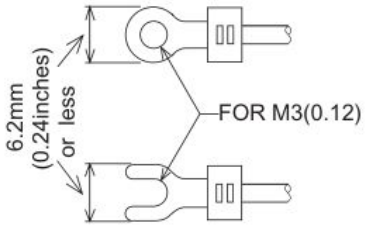
1.Introduction

- The LX3V-4DA analog special function block has four output channels. The output channels take a digital value and output an equivalent analog signal. This is called a D/A conversion. The LX3V-4DA has maximum resolution of 12bits.
- The selection of voltage or current based input/output is by user wiring. Analog ranges of -10 to 10V DC (resolution:5mV), or 0 to 20mA (resolution: 20μA) maybe selected independently for each channel.
- Data transfer between the LX3V-4DA and the LX3V main unit is by buffer memory exchange. There are 32 buffer memories (each of 16 bits) in the LX3V-4DA.

2.External dimensions and parts



① Extension cable and connector
② Com LED:Light when communicating
③ Power LED:Light when getting power
④ State LED:Light when normal condition
⑤ Module name
⑥ Analog signal output terminal
⑦ Extension module interface
⑧ DIN rail mounting slot
⑨ DIN rail hook
⑩ Mounting holes(φ4.5)

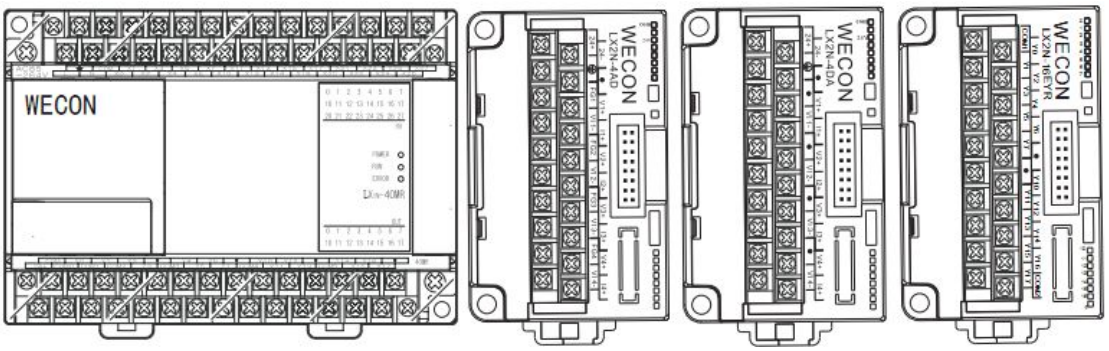


- Be sure to use the crimp-style terminals that satisfy the dimensional requirements shown in the left figure.
- Apply 0.5 to 0.8 N·m (5 to 8 kgf·cm) torque to tighten the terminals. Firmly tighten the terminals to prevent abnormal operation.

3. Installation and wiring

CONNECTION TO PROGRAMMABLE CONTROLLER
Various special blocks controlled by the FROM/TO commands, such as the analog input blocks high-speed

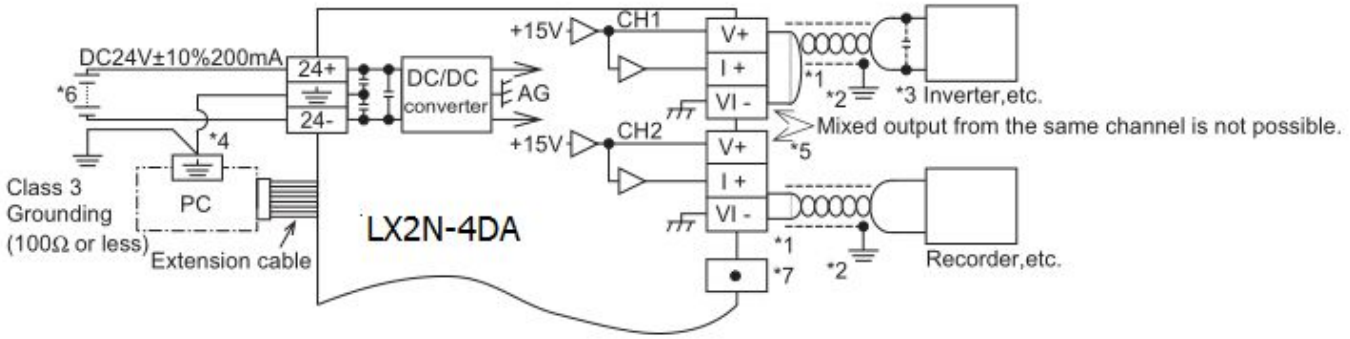
counter blocks, etc. can be connected to the LX3V programmable controller (MPU), or connected to the right side of the other extension blocks or units. Up to 16 special blocks can be connected to a single MPU in the numeric order of No. 0 to No.15.



LX3V-40MR LX3V-4AD LX3V-4DA LX3V-16EYR

Main Extension module

WIRING: The terminal layout shown below may differ from the actual layout. For the correct terminal layout, refer to section 2 External Dimensions and Parts.



*1: Use a twisted pair shielded cable for the analog output. This cable should be wired away from power lines or any other lines which could induce noise.

*2: Apply 1-point grounding at the load side of the output cable (class 3 grounding: 100Ω or less).

*3: If electrical noise or a voltage ripple exists at the output, connect a smoothing capacitor of 0.1 to 0.47μF, 25V.

*4: Connect the ⏚ terminal on the LX2N-4DA with the ⏚ terminal on the MPU of the programmable controller.

*5: Shorting the voltage output terminal or connecting the current output load to the voltage output terminal may damage the LX2N-4DA.

*6: The 24V DC service power of the programmable controller can also be used.

*7: Do not connect any unit to the unused terminal ·

4.Allocation of buffer memories (BFM)

BFM	Description	
#0(E)	Output mode select. Factory setting H0000	
#1	Output data Channel CH1	Channel output value,default:0
#2	Output data Channel CH2	
#3	Output data Channel CH3	
#4	Output data Channel CH4	
#5(E)	Holding mode	
#6	Reserved	
#7	reserved	
#8(E)	Offset/gain setting command CH1,CH2 default :H0000	
#9(E)	Offset/gain setting command CH3,CH4 default :H0000	
#10	Offset data CH1*1	Unit:mV or μA Default offset value:0 Default gain value:+5000, Output mode 0
#11	Gain data CH1*2	
#12	Offset data CH2*1	
#13	Gain data CH2*2	

#14	Offset data CH3*1	
#15	Gain data CH3*2	
#16	Offset data CH4*1	
#17	Gain data CH4*2	
#18,#19	Reserved	
#20(E)	Initialize ,default:0	
#21E	I/O characteristics adjustment inhibit (Initial value 1)	
#22-#28	Reserved	
#29	Error states	
#30	K3020 identification code	
#31	Software version	

(1)Channel Select

The value of BFM #0 switches the analog output between voltage and current on each channel. It takes the form of a 4 digit hexadecimal number. The first digit will be the command for channel1 (CH1), and the second digit for channel 2 (CH2) etc. The numeric values of these four digits respectively represent the following items:

O=1:Sets the current output mode(+4mA to +20mA);
O=2:Sets the current output mode(-20mA to 20mA);
O=3:Channel OFF;

Example:H3310
CH1:voltage range(-10V to 10V);
CH2:voltage range(+4mA to +20mA) ;
CH3CH4 :Channel OFF;

(2)[BFM #5]: Data holding mode: While the programmable controller is in the STOP mode, the last output value in the RUN mode will be held. To reset the value to the offset value, write the hexadecimal value in BFM #5 as follows:

O=0:Holds the output
O=1:Reset to the offset value.

Example:H0011.....CH1 and CH2=offset value,CH3 and CH4=output holding.

(3)[BFM #8 and #9] Offset/gain setting command: Changes offset and gain values of channels CH1 through CH4 by writing 1 to the corresponding Hex digits of BFM #8 or #9. The current values will be valid until this command is output.

BFM#8 BFM#9

O=0:No change done
O=1:Change data value.

(4) [BFM #10 through #17] Offset/gain data: The offset and gain values are changed by writing new data to BFM #10 through #17. The units of the data to be written is mV or μA. The data should be written and then BFM #8 and #9 set. Note that the data value will be rounded down to the nearest 5mV or 20μA.
(5) [BFM #20] Initialize: When K1 is written in BFM #20, all values will be initialized to the factory-settings.(Note that the BFM #20 data will override the BFM #21 data.) This initialize function is convenient if you have an error in adjustment.

(6) [BFM #21] I/O characteristics adjustment inhibit: Setting BFM #21 to 2 inhibits the user from inadvertent adjustment of I/O characteristics. The adjustment inhibit function, once set, will be valid until the Permit command (BFM #21=1) is set. The initial value is 1 (Permit). The set value will be retained even after power-off.

(7) [BFM #29] Error status: When an error occurs, use the FROM command to read out the details of the error.

Bit	Name	Status when bit is set to “1" (turned on)	Status when bit is set to ”0" (turned off)
b0	Error	Error if any of b1 through b4 is turned on	No error
b1	O/G error	Offset/gain data in EEPROM is abnormal or a data setting error occurs	Offset/Gain data normal
b2	Power supply error	24V DC power failure	Power supplied normally
b3	Hardware error	Defective D/A converter or other hardware	Non-detective hardware
b10	Range error	The digital input or analog output value is out of the specified range	The input or output value is in the specified range.
b12	G/O Adjustment prohibit status	BFM #21 is not set to “1".	Adjustable status (BFM #21 = 1)

(8)[BFM #30]The identification code for a special block is read using the FROM command.The identification code for the LX3V-4DA unit is K3020.The MPU can use this facility in the program to identify the special block before commencing any data transfer from and to the special block.

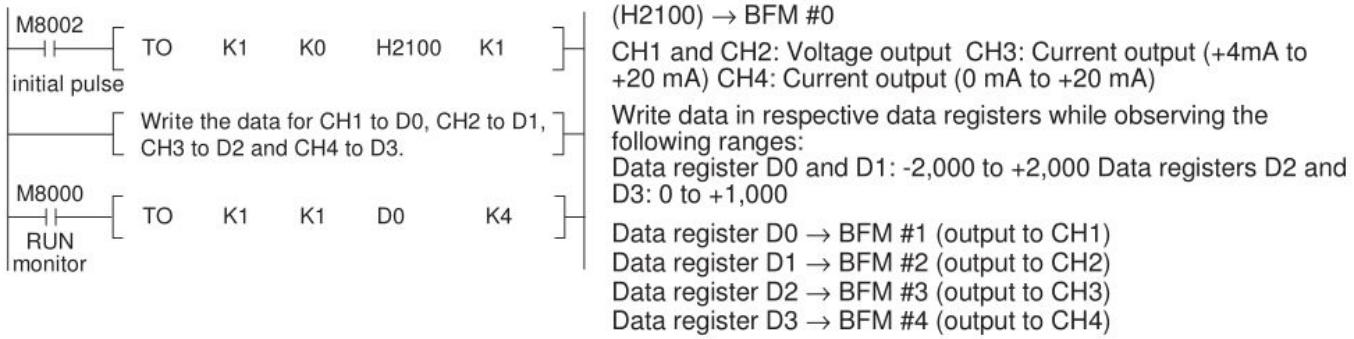
Note : BFM #’s marked E/(E).

- Values of BFM #0, #5, and #21, (marked E) are stored in EEPROM memory of the LX3V-4DA. BFM #10 to #17 are copied to EEPROM when the gain/offset setting command BFM #8, #9 is used. Also, BFM #20 causes resetting of the EEPROM memory. The EEPROM has a life of about 10,000 cycles (changes), so do not use programs which frequently change these BFM’s.
- A mode change of BFM #0 automatically involves a change of the corresponding offset and gain values. Because of the time needed to write the new values to the internal EEPROM memory, a delay of 3 s is required between instructions changing BFM #0 and instructions writing to the corresponding BFM #10 through BFM #17.
- Therefore, a delay timer should be used before writing to BFM #10 through #17.

5.Operation and program examples

If the factory-set I/O characteristics are not changed and the status information is not used, you can operate the LX3V-4DA using the following simple program. For the FROM and TO commands, refer to the FX Programming Manual.

CH1 and CH2:Voltage output mode(-10V to +10V);
CH3:Current output mode(+4mA to +20mA) ;
CH4 :Current output mode(0mA to +20mA);



5.1 Operation procedure

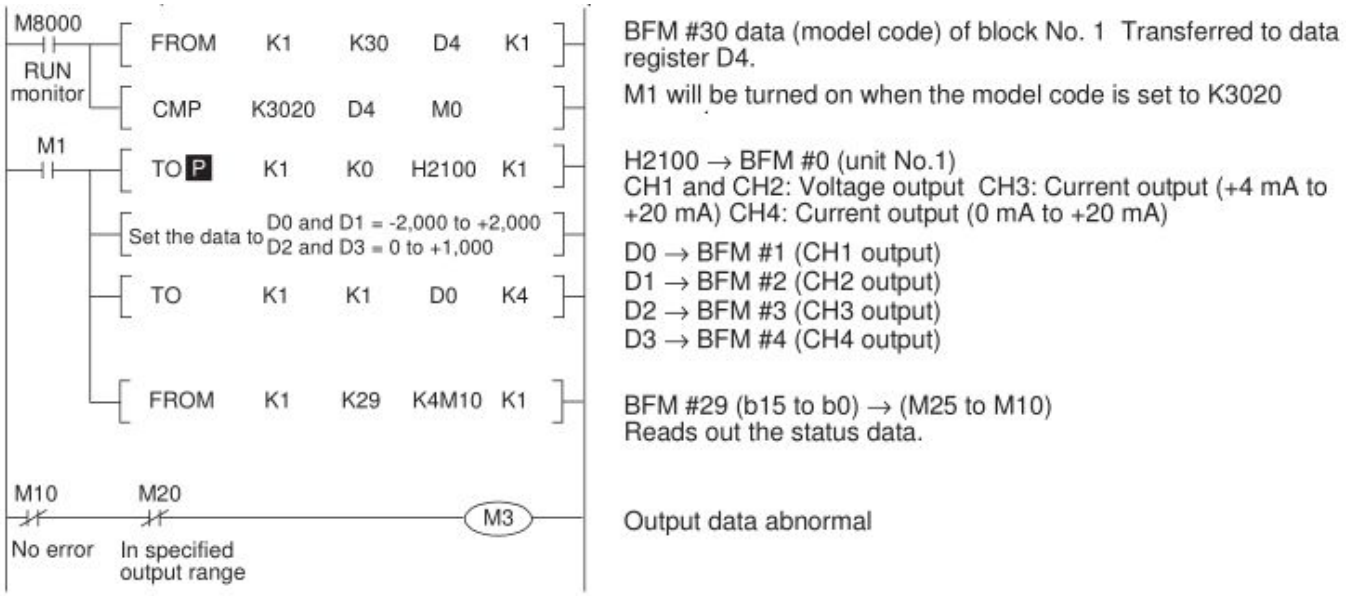
(1) Turn off the power of the MPU, and then connect the LX3V-4DA. After that, wire the I/O lines of the LX3V-4DA.

ç (2) Set the MPU to STOP, and turn on the power. Write the above program then switch the MPU to RUN.
é (3) Analog values will be sent from D0 (BFM #1), D1 (BFM #2), D2 (BFM #3), and D3 (BFM #4) to the respective output channels of the LX3V-4DA. When the MPU is in STOP, the analog values set before stopping the MPU will remain output. (The output will be held);

(4) When the MPU is in STOP, the offset values can also be output. For a detailed description, refer to Section 5.

5.2 Program example

For the following program, CH1 and CH2 of the LX3V-4DA connected at special block position No. 1 are used as voltage output channels, CH3 as a current output channel (+4 mA to +20 mA), and CH4 as a current output channel (0mA to +20 mA). When the MPU is in STOP, the output will be held. In addition, the status information is used.



6.Caution regarding operation

(1)Check whether the output wiring and/or expansion cables are properly connected on LX3V-4DA analog special function block.

(2) Check that the LX3V system configuration rules have not been broken, i.e. the number of blocks does not exceed 8 and the total system I/O is equal or less than 256 I/O.é

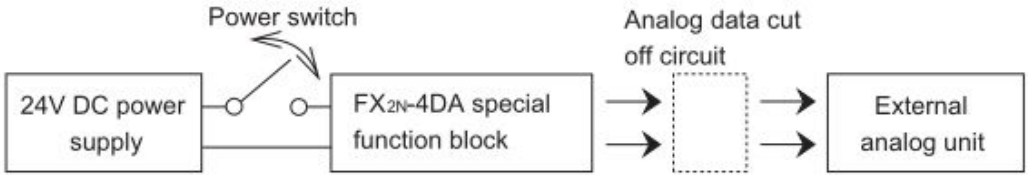
(3) Ensure that the correct output mode has been selected for the application.

(4) Check that there is no power overload on either the 5V or 24V power source, remember the loading on the LX3V MPU or a powered extension unit varies according to the number of extension blocks or special function blocks connected.ê

(5) Put the main processing unit into RUN.

(6) After turning on or off the 24 VDC power for analog signals, the analog output may fluctuate for approximately 1 second. This is due to time delays in the power supply from the MPU or differences in start time. For this reason,be sure to take preventive measures so that this output fluctuation will not affect the external units.

[Example of preventive measure]

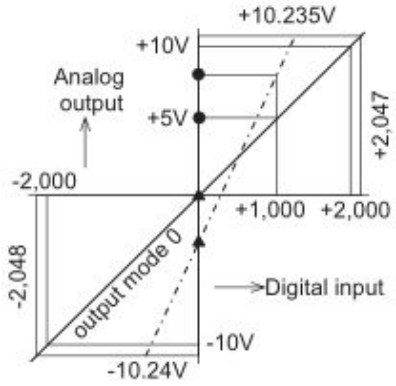


7.Adjustment of I/O characteristics

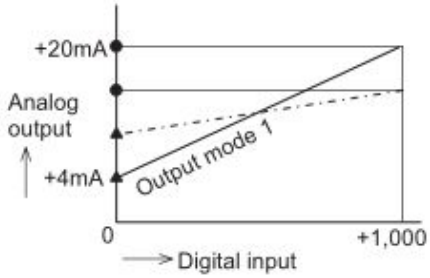
1.I/O characteristics

The standard characteristics (factory default) are shown by the solid lines in the figure below. These characteristics can be adjusted according to the conditions of the user's system.

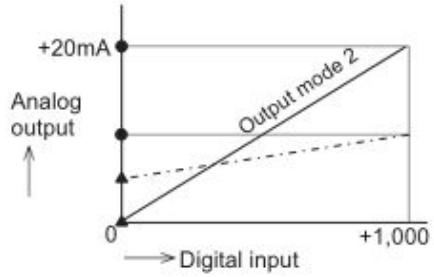
Standard characteristics of voltage output



Standard characteristics of current output (+4mA to +20mA)



Standard characteristics of current output (0mA to +20mA)



● . . . Gain value : Analog output value when the digital input is +1,000
▲ . . . Offset value : Analog output value when the digital input is 0

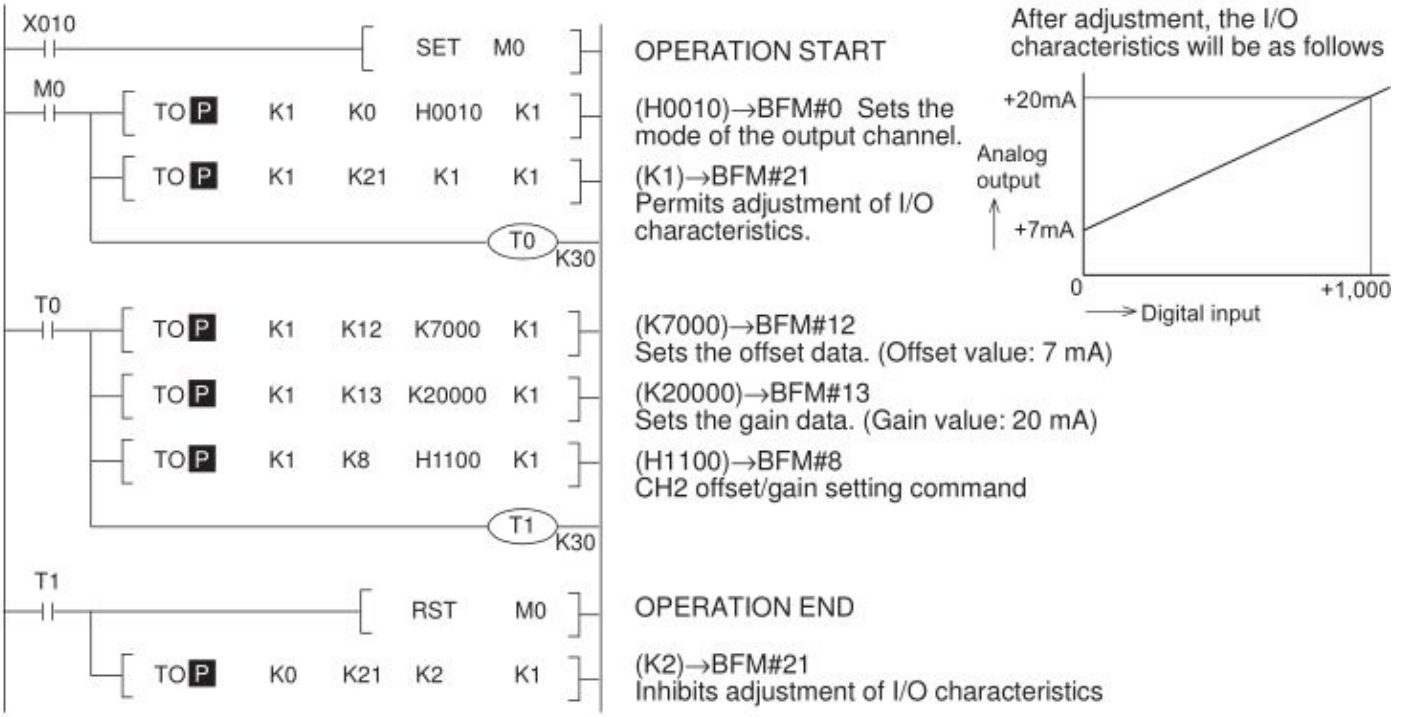
When the slope of the I/O characteristic line is steep: Slight changes to the digital input will greatly increase or reduce the analog output.

When the slope of the I/O characteristic line is gentle: Slight changes to the digital input will not always change the analog output.

2. Adjustment of I/O Characteristics

- To adjust the I/O characteristics, set the offset and gain of the LX3V-4DA either using push button switches connected to input terminals of the programmable controller or using the forced on/off function of a programming panel. To change the offset and gain, just change the conversion constants of the LX3V-4DA. Metering of the analog output is not needed for adjustment, however a program should be created in the MPU.

- An example program for adjustment is shown below. The example shows that for channel CH2 of LX3V-4DA block No.1, the offset value is changed to 7 mA, and the gain value to 20 mA. Note that for CH1, CH3, and CH4.



8.Outline of FROM and TO

Outline of FROM and TO commands: For a detailed description, refer to the FX Programming Manual.

m1 : Special unit or block number (K0 to K7, numbered from the MPU)

m2 : Buffer memory head address (K0 to K31)

(D•) : Head device number of destination data. T, C, D, KnM, KnY, KnS, V, and Z can be used to designate the head device. Each device number can be qualified using an index.

n : Number of transfer points (K1 to K32) (K1 to K16 for 32-bit command)

m1,m2,n : Same as above

(S•) : Head device number of source data. T, C, D, KnX, KnM, KnY, KnS, V, Z, K, and H can be used to designate the head device. Each device number can be qualified using an index.

- When X010 and X011 are off, transfer will not be executed, therefore the destination data value will not be changed.

9. Troubleshooting

If the LX3V-4DA does not operate properly, check the following items:

(1) Check the external wiring. Refer to section 3 of this manual.

(2) Check status of the POWER indicator lamp (LED) of the LX3V-4DA.
On: The extension cable is properly connected.
Off or flash : Check connection of extension cable. Also check the 5 V power supply capacity.

(3) Check status of the 24 V power indicator lamp (LED) of the LX3V-4DA.
On : 24 VDC is supplied.

Off : Supply 24 VDC (+10%) to the LX3V-4DA.è

(4) Check the status of the D/A conversion indicator lamp (LED) of the LX3V-4DA.
Flash: D/A conversion is normal.
On or off : The ambient conditions are not suitable for the LX3V-4DA, or the LX3V-4DA is defective.ê

(5) Check that the external load resistance connected to each analog output terminal does not exceed the capacity of the LX3V-4DA drive (voltage output: 2kΩ to 1 MΩ / current output: 500Ω).ë

(6) Check the output voltage or current value using a voltmeter or ammeter, and confirm that the output meets the I/O characteristics. If the output does not meet the I/O characteristics, adjust the offset and gain again. Refer to section 8.