# ELC-AN06AANN

Analog to Digital/Digital to Analog Converter Mixed Module

# Instruction Sheet

**WARNING**

⚠ This Instruction Sheet only provides descriptions for electrical specifications, general specifications, installation & wiring, troubleshooting and peripherals. For more information about the optional peripherals, please see ELC Application Manual.

⚠ This is an OPEN TYPE Controller. The ELC should be kept in an enclosure away from airborne dust, humidity, electric shock risk and vibration. Also, it is equipped with protective methods such as some special tools or keys to open the enclosure, so as to avoid the hazard to users and the damage to the ELC.

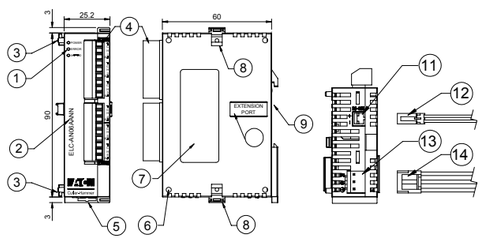
⚠ Never connect the AC main circuit power supply to any of the input/output terminals, as it will damage the ELC. Check all the wiring prior to power up. To avoid any electromagnetic noise, make sure the ELC is properly grounded ⏚.

## 1 INTRODUCTION

### 1.1 Model Explanation and Peripherals

Thank you for choosing Eaton Logic Controller (ELC) series products. The ELC-AN06AANN allows the connection of four analog inputs and 2 groups 12 bits digital outputs (voltage/current). The ELC transforms the input into a 12 bit digital signal and the output into a 2 points analog signal, which may then be manipulated using TO and FROM commands in the ladder logic program. There are 49 Controlled Registers (CR) in each module (each register is 16 bits). The Analog Input/Output Mixed Module of ELC-AN06AANN can read/write the data of analog input module by using commands FROM / TO via ELC program.

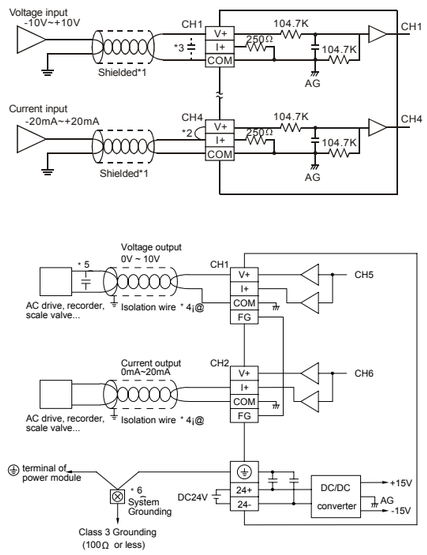
### 1.2 Product Profile and Outline




Units: mm

| | |
|---|---|
| 1 | Status indicator (Power, RUN and ERROR) |
| 2 | Model Name |
| 3 | Extension unit clip |
| 4 | Input/output terminal |
| 5 | DIN rail clip |
| 6 | Mounting hole of the extension unit |
| 7 | Nameplate |
| 8 | Extension unit clip |
| 9 | DIN rail (35mm) |
| 10 | Extension port |
| 11 | RS-485 Communication port |
| 12 | RS-485 Cable(standard accessory) |
| 13 | DC power input |
| 14 | Power input cable(standard accessory) |

### 1.3 External Wiring




**Note 1:** Please isolate analog input and other power wiring.

**Note 2:** If input connected current signal, please short circuit between V+ and I+ terminals.

**Note 3:** If wave of input terminal of loaded is too big that noise interferes wiring, please connect capacitance with 0.1~0.47μF 25V.

**Note 4:** Please isolate analog output and other power wiring.

**Note 5:** If wave of output terminal of loaded is too big that noise interferes wiring, please connect capacitance with 0.1~0.47μF 25V.

**Note 6:** Please connect ⏚ terminal of power module and ⏚ terminal of analog output module to system earth point and make system earth point be grounding or connects to machine cover.

**Warning:** DO NOT wire to the No function terminal.

## 2 STANDARD SPECIFICATIONS

### 2.1 Specifications

| FOUR CH. (A/D) CONVERTER | VOLTAGE INPUT | CURRENT INPUT |
|---|---|---|
| Power Supply Voltage | 24 VDC(20.4VDC~28.8VDC) ( –15% ~ +20%) | |
| Analog Input Channel | 4 channels per module | |
| Analog Output Range | ±10V | ±20 mA |
| Digital Data Range | ±2000 | ±1000 |
| Resolution | 12 bits($1_{LSB}$=5 mV) | 11 bits ($1_{LSB}$=20 μA) |
| Input Impedance | 200 KΩ and above | 250Ω |
| Overall Accuracy | ±0.5% of full scale of 25℃(77℉)<br>±1% of full scale during 0~55℃ (32~131℉) | |
| Response Time | 3 ms × channels | |
| Isolation Method | There is no Isolation between digital and analog circuitry. | |
| Absolution Input Range | ±15 V | ±32 mA |
| Digital Data Format | 2's complement of 16-bit, (13 Significant Bits) | |
| Average Function | Yes (CR#2~CR#5 can be set and the range is K1~K4096) | |
| Self diagnostic function Self Detection | Upper bound and lower bound detection per channel | |

| TWO CH. D/A CONVERTER | VOLTAGE OUTPUT | CURRENT OUTPUT |
|---|---|---|
| Analog Signal Output Channels | 2 channel per module | |
| Analog Output Range | 0~10V | 0~20 mA |
| Digital Data Range | 0~4000 | 0~4000 |
| Resolution | 12 bits ($1_{LSB}$=2.5 mV) | 12 bits ($1_{LSB}$=5 μA) |
| Output Impedance | 0.5Ω or lower | |
| Overall Accuracy | ±0.5% of full scale at 25℃(77℉)<br>±1% of full scale during 0~55℃ (32~131℉) | |
| Response Time | 3 ms × Channels | |
| Max. Output Current | 20 mA(1KΩ ~2MΩ ) | - |
| Tolerance Carried Impedance | - | 0 ~ 500Ω |
| Digital Data Format | 2's complement of 16-bit, (13 Significant Bits) | |
| Isolation Method | There is no Isolation between digital and analog circuitry. | |
| Protection | Voltage output has short circuit protection but short circuit for a long time may cause inner wiring damage and open circuit protection. | |
| Communication mode (RS-485) | MODBUS ASCII/RTU Mode. Communication baud rate of 4800 / 9600 / 19200 / 38400 / 57600 / 115200. For ASCII mode, date format is 7Bits, even, 1 stop bit (7 E 1). For RTU mode, date format is 8Bits, even, 1 stop bit (8 E 1). The RS-485 is disabled when the ELC-AN06AANN is connected in series to an ELC. | |
| Connect to ELC MPU in series | When ELC-AN06AANN modules are connected to an ELC, the modules are numbered from 0 - 7. 0 is the closest to the MPU and 7 is the furthest. The Maximum number of modules is 8 modules and they do not occupy any digital I/O points of the MPU. | |
| Maximum Power Consumption | 2W at 24 VDC (20.4VDC~28.8VDC) ( -15 % ~ +20 %) | |
| Environment Condition | Same as ELC. | |
| Static Electricity Prevention | Proper grounding and handling required of the unit and terminals | |

## 3 CR(CONTROLL REGISTER)

| ELC-AN06AANN | | | | | EXPLANATION |
|---|---|---|---|---|---|
| CR No | Parameter Comm. address | Latched | Register Name | | b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0 |
| #0 | H 40C8 | ○ | R | Model type | Data length is 8 bits (b7~b0). ELC-AN06AANN model code= H CC |
| #1 | H 40C9 | ○ | R/W | Input mode setting | CH6 CH5 CH4 CH3 CH2 CH1<br>Input mode setting: (CH1~CH4)<br>Mode 0: input voltage mode (-10V~+10V). Factory Setting is H0000.<br>Mode 1: input voltage mode (-6V~+10V).<br>Mode 2: input current mode (-12mA~+20mA).<br>Mode 3: input current mode (-20mA~+20mA).<br>Mode 4: Reserved<br>Output mode setting: (CH5~CH6)<br>Mode 0: output voltage mode (0V~10V).<br>Mode 1: output voltage mode (2V~10V).<br>Mode 2: output current mode (4mA~20mA).<br>Mode 3: output current mode (0mA~20mA). |
| #2 | H 40CA | ○ | R/W | CH1 average number | The number of readings used for "average" temperature on channels CH1~CH4. Setting range is K1~K4096 and factory setting is K10. |
| #3 | H 40CB | ○ | R/W | CH2 average number | |
| #4 | H 40CC | ○ | R/W | CH3 average number | |
| #5 | H 40CD | ○ | R/W | CH4 average number | |
| #6 | H 40CE | × | R | Average value of CH1 input signal | Display average value of CH1~CH4 input signal |
| #7 | H 40CF | × | R | Average value of CH2 input signal | |
| #8 | H 40D0 | × | R | Average value of CH3 input signal | |
| #9 | H 40D1 | × | R | Average value of CH4 input signal | |
| #10 | H 40D2 | × | R/W | CH5 output signal value | Output value of CH5~CH6, the setting range is K0~K4000. The factory setting is K0 and the unit is LSB. |
| #11 | H 40D3 | × | R/W | CH6 output signal value | |
| #12 | H 40D4 | × | R | Present value of CH1 input signal | Display present value of CH1~CH4 input signal |
| #13 | H 40D5 | × | R | Present value of CH2 input signal | |
| #14 | H 40D6 | × | R | Present value of CH3 input signal | |
| #15 | H 40D7 | × | R | Present value of CH4 input signal | |

| CR No | Parameter Comm. address | Latched | | Register Name | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #16~ #17 | | | | | Reserved | | | | | | | | | | | | | | | |
| #18 | H 40DA | ○ | R/W | To adj. OFFSET value of CH1 | Offset setting of CH1~CH4. Factory setting is K0 and unit is LSB.<br>Voltage input: setting range is K-1000 ~K1000<br>Current input: setting range is K-1000 ~K1000 | | | | | | | | | | | | | | | |
| #19 | H 40DB | ○ | R/W | To adj. OFFSET value of CH2 | | | | | | | | | | | | | | | | |
| #20 | H 40DC | ○ | R/W | To adj. OFFSET value of CH3 | | | | | | | | | | | | | | | | |
| #21 | H 40DD | ○ | R/W | To adj. OFFSET value of CH4 | | | | | | | | | | | | | | | | |
| #22 | H 40DE | ○ | R/W | To adj. OFFSET value of CH5 | Offset setting of CH5~CH6. Factory setting is K0 and unit is LSB.<br>The setting range is K-2000~K2000 | | | | | | | | | | | | | | | |
| #23 | H 40DF | ○ | R/W | To adj. OFFSET value of CH6 | | | | | | | | | | | | | | | | |
| #24 | H 40E0 | ○ | R/W | To adj. GAIN value of CH1 | GAIN setting of CH1~CH4. Factory setting is K1000 and unit is LSB.<br>Voltage input: setting range is K-800 ~K4000<br>Current input: setting range is K-800 ~K2600 | | | | | | | | | | | | | | | |
| #25 | H 40E1 | ○ | R/W | To adj. GAIN value of CH2 | | | | | | | | | | | | | | | | |
| #26 | H 40E2 | ○ | R/W | To adj. GAIN value of CH3 | | | | | | | | | | | | | | | | |
| #27 | H 40E3 | ○ | R/W | To adj. GAIN value of CH4 | | | | | | | | | | | | | | | | |
| #28 | H 40E4 | ○ | R/W | To adj. GAIN value of CH5 | GAIN setting of CH5~CH6. Factory setting is K2000 and unit is LSB.<br>The setting range is K-1600~K8000 | | | | | | | | | | | | | | | |
| #29 | H 40E5 | ○ | R/W | To adj. GAIN value of CH6 | | | | | | | | | | | | | | | | |
| #30 | H 40E6 | × | R | Error status | Data register stores the error status, refer to fault code chart for details. | | | | | | | | | | | | | | | |
| #31 | H 40E7 | ○ | R/W | Communication address setting | RS-485 communication address.<br>Setting range is K1~K255 and factory setting is K1 | | | | | | | | | | | | | | | |
| #32 | H 40E8 | ○ | R/W | Communication baud rate setting | Communication baud rate (4800, 9600, 19200, 38400, 57600 and 115200 bps). For ASCII mode, date format is 7Bits, even, 1 stop bit (7 E 1). For RTU mode, date format is 8Bits, even, 1 stop bit (8 E 1).<br>b0: 4800 bps (bit/sec), b1: 9600 bps (bit/sec). (factory setting)<br>b2: 19200 bps (bit/sec), b3: 38400 bps (bit/sec).<br>b4: 57600 bps (bit/sec), b5: 115200 bps (bit/sec).<br>b6~b13: Reserved, b14: switch between low bit and high bit of CRC code (only for RTU mode), b15: RTU mode. | | | | | | | | | | | | | | | |
| #33 | H 40E9 | ○ | R/W | Reset to factory setting and set characteristics adjustable priority | b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
| | | | | | CH6 | | CH5 | | CH4 | | | CH3 | | | CH2 | | | CH1 | | |
| | | | | | Example: Setting of CH1<br>1. When b0=0, user can set OFFSET and GAIN value of CH1 (CR#18, CR#24). When b0=1, inhibit user to adjust OFFSET and GAIN value of CH1 (CR#18, CR#24).<br>2. b1 means if characteristic register is latched. b1=0 (factory setting, latched), b1=1 (not latched).<br>3. b2: Set to 1 and ELC-AN06AANN will be reset to factory settings.<br>The setting of CH5~CH6, give CH5 setting for example:<br>b13, b12:<br>00: can be adjusted, latched, 01: can be adjusted, non-latched.<br>10: inhibit adjust, 11: reset to factory settings and clear b12, b13 to 0. | | | | | | | | | | | | | | | |
| ELC-AN06AANN | | | | | EXPLANATION | | | | | | | | | | | | | | | |
| #34 | H 40EA | ○ | R | System Version | Display software version in hexadecimal. Example: H 010A = version 1.0A. | | | | | | | | | | | | | | | |
| #35~#48 | | | | | System used | | | | | | | | | | | | | | | |

○ means latched.
× means non-latched.
R means can read data by using FROM command or RS-485.
W means can write data by using TO command or RS-485.
LSB (Least Significant Bit): 1. Voltage input: $1_{LSB}$=10V/2000=5mV. 2. Current input: $1_{LSB}$=20mA/1000=20μA.
3. Voltage output: $1_{LSB}$=10V/4000=2.5mV. 4. Current output: $1_{LSB}$=20mA/4000=5μA.

Explanation:

1. CR#0: The ELC model type.
2. CR#1: b11~b0 is used to set 4 inner channels working mode of analog input module (AD). b12~b15 is used to set 2 channels working mode of analog output module (DA). Every channel has four modes to set and can be set individually. For example: if setting CH1 to mode 0 (b2~b0=000), CH2 to mode 1(b5~b3=001), CH3: mode2 (b8~b6=010), CH4: mode 3(b11~b9=011). It needs to set b0~b11 to H688. If setting CH5: mode 2 (b13~b12=10), CH6: mode 1 (b15~b14=01), it needs to set b12~b15 to H5. The factory setting is H0000.
3. CR#2 ~ CR#5: Used to set the number of input readings used for the average temperature calculation. The available range is K1~K4096 and factory setting is K10.
4. CR#6 to CR#9: they are used to save the average value of input signal of CH1~CH4.
5. CR#10 ~ CR#11 are used to set the output value of CH5 and CH6. The setting range is K0~K4000. The factory setting is K0 and unit is LSB.
6. CR#12 ~ CR#15: they are used to save the present value of input signal of CH1~CH4.
7. CR#16, CR#17, CR#28, CR#29 are reserved.
8. CR #18~ CR #21: the content is the value of adjusting OFFSET value of CH1~CH4 if analog input voltage or current is 0 after it transfers from analog to digital. Voltage setting range: -5V~+5V(-1000$_{LSB}$~+1000$_{LSB}$). Current setting range: -20mA~+20mA (-1000$_{LSB}$~+1000$_{LSB}$).
9. CR #22~ CR #23: the content is the value of adjusting OFFSET value of CH5~CH6 if analog input voltage or current is 0 after it transfers from analog to digital. The factory setting is K0 and the unit is LSB. The setting range is -2000~+2000. Voltage setting range: -5V~+5V(-2000$_{LSB}$~+2000$_{LSB}$). Current setting range: -10mA~+10mA (-2000$_{LSB}$~+2000$_{LSB}$).
10. CR #24~ CR #27: That is the value of adjust GAIN value of CH1~CH4. That is the value of analog input voltage or current when conversion value from analog signal to digital is 4000. Voltage setting range: -4V~+20V(-800$_{LSB}$~+4000$_{LSB}$). Current setting range: -16mA~+52mA (-800$_{LSB}$ ~+2600$_{LSB}$). But it needs to notice that GAIN VALUE – OFFSET VALUE = +200$_{LSB}$~+3000$_{LSB}$ (voltage) or +200$_{LSB}$~+1600$_{LSB}$ (current). When this value under this range, the resolution of the input signal will be thin and the variation of value will be larger. When this value exceeds this range, the resolution of input signal will be thick and the variation of value will be smaller.
11. CR #28~ CR #29: That is the value of adjust GAIN value of CH5~CH6. That is the value of analog input voltage or current when conversion value from analog signal to digital is 2000. Voltage setting range: -4V~+20V(-1600$_{LSB}$~+8000$_{LSB}$). Current setting range: -8 mA ~+40 mA (-1600$_{LSB}$~+8000$_{LSB}$). But it needs to notice that GAIN VALUE – OFFSET VALUE = +400$_{LSB}$ ~+6000$_{LSB}$ (voltage/current). When this value under this range, the resolution of the input signal will be thin and the variation of value will be larger. When this value exceeds this range, the resolution of input signal will be thick and the variation of value will be smaller.
12. CR#30 is fault code. Please refer to the following chart.

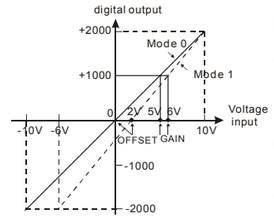
| Fault description | Content | b15~b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|
| Power source abnormal (Low voltage alarm) | K1(H1) | Reserved | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| User setting D/A output exceeds range | K2(H2) | | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Setting mode error | K4(H4) | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Offset/Gain error | K8(H8) | | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Hardware malfunction | K16(H10) | | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| Digital range error | K32(H20) | | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Average times setting error | K64(H40) | | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Command error | K128(H80) | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Note:** Each fault code will have corresponding bit (b0~b7). Two or more faults may happen at the same time. 0 means normal and 1 means having fault. | | | | | | | | | | |

13. CR#31: RS-485 communication address. Setting range is 01~255 and factory setting is K1.
14. CR#32: RS-485 communication baud rate: 4800, 9600, 19200, 38400, 57600 and 115200. b0:4800bps, b1:9600bps (factory setting), b2:19200bps, b3:38400 bps, b4:57600 bps, b5:115200 bps, b6~b13: Reserved, b14: switch between low bit and high bit of CRC code (only for RTU mode) b15: ASCII / RTU mode. For ASCII mode, date format is 7Bits, even, 1 stop bit (7 E 1). For RTU mode, date format is 8Bits, even, 1 stop bit (8 E 1).
15. CR#33 is used to set the inner function priority. For example: characteristic register. Output latched function will save output setting in the inner memory before loss power.
16. The corresponding parameters address H 40C8~H 40F9 of CR#0~CR#48 can provide user to read/write data by RS-485.
    a) Communication baud rate: 4800, 9600, 19200, 38400, 57600, 115200 bps.
    b) Communication format: ASCII mode is 7Bit, even bit, 1 stop bit (7 E 1). Communication format of RTU mode is 8Bit, even bit, 1 stop bit (8 E 1).
    c) Function code: 03H—read data from register. 06H—write a WORD into register. 10H—write many WORDs into register.

## 4 ADJUST A/D CONVERSION CHARACTERISTIC CURVE

### 4.1 Adjust A/D Conversion Characteristic Curve of CH1~CH4

**Voltage input mode**




Mode 0 of CR#1: GAIN=5V(1000$_{LSB}$), OFFSET=0V (0$_{LSB}$).

Mode 1 of CR#1: GAIN=6V(1200$_{LSB}$), OFFSET=2V (400$_{LSB}$).

GAIN: Voltage input value when digital output is 1000. Setting range is -4V~+20V(-800$_{LSB}$~ +4000$_{LSB}$)

OFFSET: Voltage input value when digital output is 0. Setting range: -5V~+5V(-1000$_{LSB}$ ~ +1000$_{LSB}$)

GAIN - OFFSET: Setting range is +1V~+15V (+200$_{LSB}$~ +3000$_{LSB}$)

**Current input mode:**




Mode 2 of CR#1: GAIN = 20mA(1000$_{LSB}$), OFFSET=4mA (200$_{LSB}$).

Mode 3 of CR#1: GAIN = 20mA(1000$_{LSB}$), OFFSET=0mA (0$_{LSB}$).

GAIN: Current input value when digital output is +1000. Setting range is -20 mA~+20 mA (-1000$_{LSB}$ ~ +1000$_{LSB}$ )

OFFSET: Current input value when digital output value is 0. Setting range is-16 mA ~+52 mA (-800$_{LSB}$ ~ +2600$_{LSB}$)

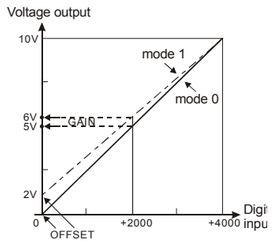
GAIN - OFFSET: Setting range is +4mA ~ +32mA (200$_{LSB}$~ +1600$_{LSB}$)

The chart above is to adjust A/D conversion characteristic curve of voltage input mode and current input mode. Users can adjust conversion characteristic curve by changing OFFSET values (CR#18~CR#21) and GAIN values (CR#24~CR#27) depend on application.

Voltage input: $1_{LSB}$=10V/2000=5mV. Current input $1_{LSB}$=20mA/1000= 20μA.

### 4.2 Adjust D/A Conversion Characteristic Curve of CH5~CH6

**Voltage output mode**




Mode 0 of CR#1: GAIN = 5V($2000_{LSB}$), OFFSET=0V ($0_{LSB}$)

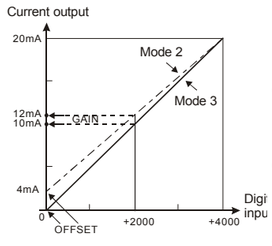
Mode 1 of CR#1: GAIN = 6V($2400_{LSB}$), OFFSET=2V ($800_{LSB}$).

GAIN: Voltage output value when digital input is K2000. Setting range is -4V~+20V(-$1600_{LSB}$ ~+8000 $_{LSB}$).

OFFSET: Voltage output value when digital input is K0. Setting range: -5V~+5V(-$2000_{LSB}$ ~ +2000 $_{LSB}$).

GAIN - OFFSET: Setting range is +1V~+15V(+$400_{LSB}$ ~ +6000 $_{LSB}$)

**Current output mode:**




Mode 2 of CR#1: GAIN = 12mA($2400_{LSB}$ ),OFFSET=4mA ($800_{LSB}$).

Mode 3 of CR#1: GAIN = 10mA($2000_{LSB}$), OFFSET=0mA ($0_{LSB}$).

GAIN: Current output value when digital input value is K2000. Setting range is -8 mA ~ +40 mA (-$1600_{LSB}$ ~+$8000_{LSB}$).

OFFSET: Current output value when digital input is K0. Setting range is -10 mA ~ +10 mA (-$2000_{LSB}$ ~+$2000_{LSB}$).

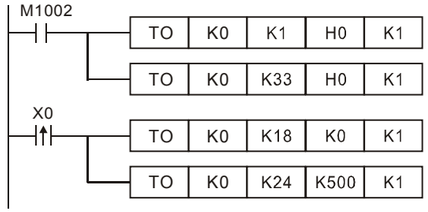
GAIN - OFFSET: Setting range is +2mA~+30mA(+$400_{LSB}$ ~+$6000_{LSB}$)

The chart above is to adjust D/A conversion characteristic curve of voltage output mode and current output mode. Users can adjust conversion characteristic curve by changing OFFSET values (CR#14~CR#15) and GAIN values (CR#18~CR#19) depend on application.

Voltage output: $1_{LSB}$=10V/4000=2.5mV., Current output: $1_{LSB}$=20mA/4000=5μA.

### 4.3 Program Example for Adjusting A/D Conversion Characteristics Curve

Example: setting OFFSET value of CH1 to 0V(=$K0_{LSB}$) and GAIN value of CH1 to 2.5V(=$K500_{LSB}$).



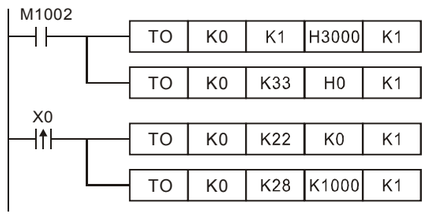

Writing H0 to CR#1 of analog input module no. 0 and set CH1 to mode 0 (voltage input -10V~+10V)

Writing H0 to CR#33 and allow to adjust characters of CH1.

When X0 switches from Off to On, $K0_{LSB}$ of OFFSET value will be wrote in CR#18 and $K500_{LSB}$ of GAIN value will be wrote in CR#24.

### 4.4 Program Example for Adjusting D/A Conversion Characteristics Curve

Setting OFFSET value of CH5 to 0V(=$K0_{LSB}$) and GAIN value of CH1 to 2.5V(=$K1000_{LSB}$).




Writing H3000 into CR#1 (b12~b15) of analog input/output module#0. Setting CH5 to mode 3 (current output 0mA~ +20mA).

Writing H0 into CR#33 (b12~b15) and allow CH5, CH6 to adjust characteristics.

When X0 switches from Off to On, $K0LS_B$ of OFFSET value will be wrote in CR#22 and $K1000_{LSB}$ of GAIN value $K1000_{LSB}$ will be wrote in CR#28.

## 5 INITIAL ELC START-UP

Lamp display:

1. Upon power-up, the ERROR LED will light for 0.5 seconds the POWER LED will light continuously.
2. No errors= POWER LED on and ERROR LED off.

   Low Voltage error (lower than 19.5V), ERROR LED will blink continuously till the power supply rises above 19.5V.
3. ELC-AN06AANN connected to ELC in series = RUN LED on MPU will be lit and A/D LED or D/A LED should blink.
4. After receiving the first RS-485 command the A/D LED or D/A LED will blink.
5. If the input or output exceeds the upper or lower bounds, then the ERROR LED will blink.
6. When main ELC and extension unit communicate time-out or abnormal interrupt, LED ERROR of extension unit will keep lighting.