1.3 External wiring

Note 1: Please isolate analog input and output power wiring.
Note 2: If connected to current signal, please short circuit between I+ and I- terminals.
Note 3: If noise is too loud, please connect FG to grounding.
Note 4: Please connect \( V_+ \) of power module and \( V_+ \) of analog input module to system earth point and make sure system earth point is grounding or connects to machine cover.
Note 5: If wave of input terminal is too big that noise interferes with signal, please connect capacitors with 0.1-0.47uf 25V.

1.4 Terminal of analog module layout

WARNING

- Do not disconnect while circuit is live unless area is known to be non-hazardous.
- Suitable for use in Class 1, Division 2, Groups A, B, C, D or Non-Hazardous locations only.
- Warning - Explosion hazard - Substitution of components may impair suitability for Class 1, Division 2.
- Warning - Explosion Hazard - Do not disconnect equipment unless power has been switched off or the area is known to be Non-Hazardous.

2 FUNCTION SPECIFICATIONS

2.1 Function Specifications

<table>
<thead>
<tr>
<th>CH1, CH2, CH3, CH4</th>
<th>VOLTAGE INPUT</th>
<th>CURRENT INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOUR CH. A/D MODULE</td>
<td>4 channel/module</td>
<td>1 channel/module</td>
</tr>
</tbody>
</table>

Power supply voltage: 24 VDC(20-40VDC)(-15 ~+20%)
Analog input range: 4 channels/module
Digital input range: 20.8KΩ and above
Resolution: 14 bits (1.25 mV)
Accuracy: ±0.005 of full scale at 25°C(±77°F)
Overall accuracy: ±0.1% of full scale during 0-55°C [32-131°F]
Response time: 0.2 sec or above
Isolation method: 8 isolation between digital area and analog area. There is no isolation among channels.
Isolation: Field to Digital Area: 500V Field to Analog Area: 500V Analog area to Digital Area: 500V Field to 240V GND: 500V
Absolute input range: ±57 V ±32 mA
Digital data format: 2’s complement of 16-bit, 13 Significant Bits
Average function: Yes (CR#20, CR#21 can be set and setting range is K1-1K).
Self diagnosis function: Upper and lower bound detection / channel.
Communication mode (RS-485): MODBUS ASCII/RTU Mode, Communication baud rate range of 4,800/9,600/19,200/38,400/57,600/115,200 bps. For ASI, 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). For RS-485, is disabled when the ELC-AN04ANN is connected in series to an ELC.
Connect to ELC in series: The input point of the first analog extension unit it connects to the nearest to the distant is from 0 to 7. The Max. is 8 modules and it won’t waste digital point.
Max. rated consuming power: 24V DC(20-40VDC) (-15 ~+20%) 2W, supply from external power.
Noise immunity: ESD (IEC61131-2, IEC 61000-4-2), 8-kV Air Discharge, EFT (IEC 61131-2, IEC 61000-4-4), 9-kV Digital I/O, 15-kV Analog & Communication I/O.

2.2 STANDARD SPECIFICATIONS

<table>
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<tr>
<th>ITEM</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
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<td>Power supply voltage</td>
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<td></td>
</tr>
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<td></td>
</tr>
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<td>Connect to ELC in series</td>
<td>The input point of the first analog extension unit it connects to the nearest to the distant is from 0 to 7. The Max. is 8 modules and it won’t waste digital point.</td>
<td></td>
</tr>
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<td></td>
</tr>
</tbody>
</table>
4. ADJUST A/D CONVERSION CHARACTERISTIC CURVE

4.1 Adjust A/D Conversion Characteristic Curve

Voltage input mode:

Mode 0 of CR#1: GAIN = 5V (4,000LSB), OFFSET = 0V (0LSB)

- Setting range is 4V ~ 20V (12,000LSB ~ 48,000LSB)
- Offset setting range is ±400LSB ~ ±16,000LSB
- Setting mode error = ±1LSB ~ ±4,000LSB

Mode 1 of CR#1: GAIN = 6V (4,800LSB), OFFSET = 2V

- Setting range is 6V ~ 12V (18,000LSB ~ 72,000LSB)
- Offset setting range is ±400LSB ~ ±16,000LSB
- Setting mode error = ±1LSB ~ ±4,000LSB

Mode 3 of CR#1: GAIN = 20mA (4,000LSB), OFFSET = 0mA

- Setting range is ±4mA ~ ±20mA (16,000LSB ~ 64,000LSB)
- Offset setting range is ±400LSB ~ ±16,000LSB
- Setting mode error = ±1LSB ~ ±4,000LSB

Mode 2 of CR#1: GAIN = 20mA (4,000LSB), OFFSET = ±4mA (800LSB)

- Setting range is ±4mA ~ ±20mA (16,000LSB ~ 64,000LSB)
- Offset setting range is ±400LSB ~ ±16,000LSB
- Setting mode error = ±1LSB ~ ±4,000LSB

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.

4.2 Program Example for Adjusting A/D Conversion Characteristics Curve

Setting OFFSET value of CH1 to 0V (=K0LSB) and GAIN value of CH1 to 2.5V (=K2000LSB).

1. Reading the data of model type from extension module K0 and distinguish if the data is H88 (ELC-Ana400NNN model type).
2. If the model type is ELC-Ana400NNN, the setting input mode is (CH1, CH3) = mode 0, (CH2, CH4) = mode 3.
3. Setting the average times of CH1 and CH2 are K32.
4. Reading the input signal average value of CH1~CH4 (4 data) saving in D20~D23.

Example:

```
M1000

D0 K0 K1 K2 K3 K4

M1002

H88 D0

TO K0 K1 K2 K3

TO K0 K2 K3 K4

END
```

5. INSTALLATION & WIRING

5.1 Installation of the DIN rail

The ELC can be secured to a cabinet by using the DIN rail that is 35mm high with a depth of 7.5mm. When mounting the ELC on the DIN rail, be sure to use the end bracket to stop any side-to-side motion of the ELC, thus to reduce the chance of the wires being pulled loose. At the bottom of the ELC a small retaining clip. To secure the ELC to the DIN rail, place it onto the rail and gently push up the clip.

To remove it, pull down the retaining clip and gently pull the ELC away from the DIN rail. As shown on the right:

When installing the ELC, make sure that it is installed in an enclosure with sufficient space (as shown on the right) to its surroundings so as to allow heat dissipation.

5.2 Wiring

Notes:
- Please use 22-16AWG (1.5mm) wiring (either single or multiple core) for I/O wiring terminals. The specification for the terminals is as shown on the left. ELC terminal screws should be tightened to 1.95 kg-cm (1.7 lb-in). Use Copper Conductor Only, 60/75 °C.
- I/O signal wires or power supply should not run through the same multi-wire cable or conduit.

Example:

```
FROM KD KD KD KD KD
```

### RELATED INSTRUCTIONS EXPLANATION

#### API

**Mnemonic** | **Operands** | **Function** | **Controllers**
--- | --- | --- | ---
70 | FROM | Read CR from Module | PB PC PD PE

**Operands:**
- m0: Number for special module (m0~7) m0: Number of CR (Register) of special module (m0~m28) that will be read
- s: Location to save read data
- w: Data words to read at one time

**Explanations:**
- ELC uses this instruction to read CR data of special modules.

#### API

**Mnemonic** | **Operands** | **Function** | **Controllers**
--- | --- | --- | ---
79 | TO | Write CR to Module | PB PC PD PE

**Operands:**
- m0: Number of special module (m0~7) m0: Number of CR (Register) of special module that will be written to (m0~m28)
- w: Data to write in CR
- n: Number of words to write one time

**Explanations:**
- ELC uses this instruction to write CR data of special modules.