2.1 Specifications

<table>
<thead>
<tr>
<th>FOUR CH. D/A MODULE</th>
<th>VOLTAGE OUTPUT</th>
<th>CURRENT OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply Voltage</td>
<td>24 VDC (20.4VDC<del>28.8VDC) (&lt;155%</del>&lt;200%)</td>
<td>0V~&lt;20mA</td>
</tr>
<tr>
<td>Analog Output Channel</td>
<td>4 channels / each module</td>
<td></td>
</tr>
<tr>
<td>Analog Output Range</td>
<td>0V~10V</td>
<td>0~20mA</td>
</tr>
<tr>
<td>Analog Output Range</td>
<td>0–1V</td>
<td>0–20mA</td>
</tr>
<tr>
<td>Digital Data Range</td>
<td>0–4,095</td>
<td>0–20mA</td>
</tr>
<tr>
<td>Resolution</td>
<td>12 bits (1LSB=5 mV)</td>
<td>12 bits (1LSB=5 mV)</td>
</tr>
<tr>
<td>Output Impedance</td>
<td>0.5Ω or lower</td>
<td></td>
</tr>
<tr>
<td>Overall Accuracy</td>
<td>±0.05% of full scale at 25°C (77°F)</td>
<td>±0.05% of full scale during 0<del>55°C (32</del>121°F)</td>
</tr>
<tr>
<td>Response Time</td>
<td>2 ms (max)</td>
<td></td>
</tr>
<tr>
<td>Max. Output Current</td>
<td>1mA (1KΩ~2MΩ)</td>
<td></td>
</tr>
<tr>
<td>Voltage Reference Impedance</td>
<td>&gt;100,000Ω</td>
<td></td>
</tr>
</tbody>
</table>

2.2 Standards Specifications

- **Isolation Method**: Isolation between digital area and analog area. But no isolation among channels.
- **Isolation**: Field to Digital Area: 500V
- **Protection**: Voltage output has short circuit protection but a long period short circuit may cause internal wire damage and open circuit protection.
- **Communication Mode (RS-485)**:
  - No communication format (4800, 19200, 38400, 57600)
  - Isolation between digital area and analog area. But no isolation among channels.
  - Communication format of RTU mode is 8-bit, even bit, 1 stop bit (8,E,1).
- **Connect to ELC MPU in Series**: If AN04NANN modules are connected to MPU, the modules are numbered from 0~4. 0 is the closest and 7 is the farthest to the MPU. The 8 modules is the max and they do not occupy any digital I/O points of the MPU.
- **Max. Rated Consuming Power**: 24 VDC (20.4VDC~28.8VDC) (<155%~<200%), 4.5W, supply from external power
- **Noise Immunity**:
  - ESD:IEC 61131-2, IEC 61000-4-2: 8kV Air Discharge
  - EFT:IEC 61131-2, IEC 61000-4-4: Power Lines: 2kV, 38kHz sinusoidal; 4kV, 400Hz
  - GBT15793.2, IEC 61000-4-2: 15kHz, 380kHz, 4kHz, 40kHz
- **Grounding**: The diameter of the grounding wire cannot be smaller than that of terminals 24V and 0V (if numerous ELCs are used at the same time, make sure that each ELC is grounded respectively to the ground pole).
- **Vibration/Shock Immunity**:
  - International Standard Regulations: IEC61131-2, IEC 68-2-6 (Test F2)
- **Agency Approvals**: UL508, Class I Div2, Operation temperature code: T5

2.3 External Wiring

- **Note 1**: Please isolate analog output and other power wiring.
- **Note 2**: In case of noise interference from power terminal input wiring, a signal line should be connected with 0.1~0.475μF capacitor 250V for noise filtering.
- **Note 3**: Please connect proper power module terminal to analog output module terminal to system earth point and make system earth point be grounded or connects to machine cover.

WARNING: DO NOT wire to non-functional terminals. Use Copper Conductor Only. 60/75°C.
K0 and unit is LSB. If output value equal to 0 after calculation, the adjustable range of analog output voltage or current is -2,000~+2,000.

Voltage adjustable range: -5V~+5V(2,000,000~+2,000,000).

Current adjustable range: -10mA~+10mA(-2,000,000~+2,000,000).

6. CR#02 ~ CR#27 are used to adjust the GAIN value of CH1 and CH4. The factory setting is K2000 and unit is LSB. If output value equal to 2000 after calculation, the adjustable range of analog output voltage or current is -1,600~+8,000.

Voltage adjustable range: -4V~+20V(-1,600~+8,000).

Current adjustable range: -8mA~+40mA(-1,600LSB~+8,000LSB).

Please be noticed that GAIN VALUE – OFFSET VALUE = +400LSB ~+6,000LSB (voltage or current). If the value difference comes up small (within range), the output signal resolution becomes larger and the variation is definitely smaller.

7. CR#38 is fault code. Please refer to the following chart.

K0 = 0 means normal and 1 means having fault.

8. CR#31 is used to set RS-485 communication address. The setting range is from 01 to 255. The factory setting is K1.

9. CR#32 is used to set RS-485 communication baud rate: 9600, 19200, 38400, 57600, 115200 bps. 50: 4800bps, b1: 9600bps, (factory setting) b2: 19200bps, b3: 38400bps, b4: 57600bps, b5: 115200bps, b6: 131: exchange low and high byte of CRC check code. (RTU mode only) b15:0 = ASCII mode, b15:1 = RTU mode. Communication format: ASCII mode is 7Bit, even bit, 1 stop bit (7,E,1). Mode 0 = 8Bit, even bit, 1 stop bit (8,E,1).

10. CR#39 is used to set the internal function priority. For example: characteristic register. Output latched function will save output setting to the internal memory before power loss.

11. CR#44 is software version of model type.

12. CR#35~CR#44 are used for system.

13. The corresponding parameters address HH032~HH045a of CR#00~CR#04 are provided for user to read/write data via 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 CR. 06H - write one WORD to CR.

4. Adjust D/A Conversion Characteristic Curve

Voltage output mode:

Mode 0 of CR1: 
- Gain = 5V(2,000,000), 
- Offset = 0V(0,000,000).

Mode 1 of CR1: 
- Gain = 6V(2,400,000), 
- Offset = 2V(800,000), 
- Gain = 10V(5,000,000), 
- Offset = 0V(0,000,000).

Gain: The setting range of voltage output value when digital input value is K2,000 should be 4V~+2V(1,600~+8,000).

Offset: 
- The setting range of voltage output value when digital input value is K2,000 should be -8V~+4V(5,000,000~+8,000).

Gain - Offset: 
- Setting range: +1V~+15V (+400V~+6,000).

Current output mode:

Mode 2 of CR1: 
- Gain = 12mA(2,400,000), 
- Offset = 4mA(800,000),

Mode 3 of CR1: 
- Gain = 10mA(5,000,000), 
- Offset = 0mA(0,000,000).

Gain: The setting range of current output when digital input value is K2,000 should be -5mA~+4mA(-1,600~+8,000).

Offset: 
- The setting range of current output when digital input value is K2,000 should be -10mA~+10mA(-2,000~+2,000).

Gain - Offset: 
- Setting range: +2mA~+3mA(+600LSB~+8,000LSB).

The charts above are D/A 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.

The value difference comes up small (within range), the output signal resolution becomes larger and the variation is definitely smaller.

5. Writing output setting CR#6 and CR#7 to D100 and D101. Analog output will vary with D100 and D101 value.

6. INSTALLATION & WIRING

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.

ELC is a small retaining clip. To secure the ELC to the DIN rail, place it onto the rail and gently push to make sure it is installed in an enclosure with sufficient space (as shown on the right). To remove it, pull down the retaining clip and gently pull the ELC away from the DIN rail. As shown on the right:

2. I/O signal wires or power supply should not run through the same multi-wire cable or conduit.

3. Writing H10 to CR#1 of analog output module. Setting CH1 to mode 0 (voltage output 0~+10V) and CH2 to mode 2 (current output 4mA~+20mA).

4. When converting, ERROR LED should blink if input or output exceeds the upper bound or below the lower bound.

Program example:

5. CR#32 is used to set RS-485 communication baud rate: 4,800, 9,600, 19,200, 38,400, 57,600, 115,200, 230,400, 460,800, 921,600 bits. 05: 4,800bps, b1: 9,600bps, (factory setting) b2: 19,200bps, b3: 38,400bps, b4: 57,600bps, b5: 115,200bps, b6: 230,400bps, b7: 460,800bps, b8: 921,600bps. 10: 10H to CR#33 and allow CH1 ~ CH2 mode to 2.

12. CR#35~ CR#48 are used for system.

9. CR#32 is used to set RS-485 communication baud rate: 4,800, 9,600, 19,200, 38,400, 57,600, 115,200, 230,400, 460,800, 921,600 bits. 05: 4,800bps, b1: 9,600bps, (factory setting) b2: 19,200bps, b3: 38,400bps, b4: 57,600bps, b5: 115,200bps, b6: 230,400bps, b7: 460,800bps, b8: 921,600bps. 10: 10H to CR#33 and allow CH1 ~ CH2 mode to 2.

5. Writing output setting CR#6 and CR#7 to D100 and D101. Analog output will vary with D100 and D101 value.