**Specification**

This product is an Analog Output Unit. CPM1A/CPM2A can connect 1 CPM1A-DA041 Analog Output Unit and 1 other Expansion I/O Unit.

The Analog Output Unit converts the digital input data to analog values. The analog values depend on the output signal ranges, as shown in the following diagrams.

-10 to 10 V

The hexadecimal values F448 to 0BB8 (~3000 to 3000) correspond to an analog voltage range of ~10 to 10 V. The entire output range is ~11 to 11 V. Specify a negative voltage as a two's complement.

0 to 20 mA

The hexadecimal values 0000 to 1770 (0 to 6000) correspond to an analog current range of 0 to 20 mA. The entire output range is 0 to 21 mA.

### Analog Output signal Ranges

<table>
<thead>
<tr>
<th>Output signal range</th>
<th>Conversion data</th>
<th>Allowable external output resistance</th>
<th>External output impedance</th>
<th>Accuracy</th>
<th>Isolation method</th>
<th>Conversion time</th>
<th>Current consumption</th>
<th>Weight</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>-10 to 10 V</td>
<td>16-bit binary (4-digit hexadecimal)</td>
<td>Voltage output: 2kΩ min</td>
<td>Voltage output: 0.5Ω max</td>
<td>±0.8% full scale</td>
<td>Photocoupler isolation between analog Output terminals and internal circuits. No isolation between analog Output signals</td>
<td>2 ms/point</td>
<td>3.3W max</td>
<td>200g max</td>
<td>86(W)×50(H)×90(D)mm</td>
</tr>
<tr>
<td>0 to 10 V</td>
<td>Full scale for -10 to 10V: F448 to 0BB8 Hex</td>
<td>Full scale for other ranges: 0000 to 1770 Hex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Safety Precaution

**Definition of Precautionary Information**

- **WARNING**: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**: Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury, or property damage.

**Warnings and Cautions**

- **WARNING**: Do not attempt to take any Unit apart while the power is being supplied. Doing so may result in electric shock.
- **WARNING**: Do not touch any of the terminals or terminal blocks while the power is being supplied. Doing so may result in electric shock.
- **WARNING**: Do not touch the components in any location in order to prevent any malfunction due to static electricity.
- **CAUTION**: When using the CPM1A-DA041 Analog Output Unit, a voltage (current) may be output momentarily from the output terminal when the power supply to the PC is turned OFF. Approximately 1.5V/6mA will be output for approximately 20ms after the power is turned OFF. If this causes a problem, provide countermeasure so that the power supply or output timing of external devices differs from the OFF timing of the power supply to the PC.

![Diagram showing Analog Output signal Ranges](image)

**Note:**

1. When CPU Unit is CPM2AH, the connection of CPM1A-DA041 and other Expansion Unit refer to operation manual of CPM2AH.
2. If CPM2AH connect 2 or 3 CPM1A-DA041 units, service power 24V can not be used.
Using Analog Output Unit

Connect the Analog Output Unit.

Set the output ranges.

Wire the analog output.

Write the range code.

Program operation in the ladder program.

Analog Outputs

CPU Unit

Analog Output Unit

Wiring Analog Output Devices

CPM1A-DA041 Terminal Arrangements

Setting Output Signal Range

Output signal ranges are set by writing a range code to the output word of the Analog Output Unit. The range code must be set for the Analog Output Unit to convert data.

The range code settings provide the combinations of signal ranges for the analog output as shown in the following table.

<table>
<thead>
<tr>
<th>DA output</th>
<th>Setting code</th>
<th>0000: 0 to +10V</th>
<th>0001: 0 to -10V</th>
<th>0101: 0 to 5V</th>
<th>0111: 0 to 20mA</th>
<th>1000: 4 to 20mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: open</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0: closed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Be sure to write the correct terminals.

Output Allocation

Output is allocated for the Analog Output Unit in the same way as other Expansion Units or Expansion I/O Units starting from the next word following the last allocated word on the CPU Unit.

When the last allocated word output on the CPU Unit or previous Expansion Unit or Expansion I/O Unit, the allocation will be as follows:

Analog Output1: Word n+1
Analog Output2: Word n+2
Analog Output3: Word n+3
Analog Output4: Word n+4

For example, in the following diagram an Analog Output Unit is connected to a CPU Unit with 30 I/O points.

Ladder Program

Specifying the Range Code

Specify the Output signal range by writing the range code to the Analog Output Unit's output word from the ladder program in the first cycle of program execution. The Analog Output Unit will start to convert analog Output values once the range code has been specified. Write the range code to the Analog Output Unit's output word in the first cycle of operation; the Analog Output Unit's output word is "n+1" and "n+2" when "n" is the last word allocated to the CPU Unit, or previous Expansion Unit or Expansion I/O Unit in the configuration.

Writing Analog Output Set Values

The ladder program can be used to write the data to the output word where the set value is stored. The output word will be "n+1", "n+2", "n+3" and "n+4" when "n" is the last output word allocated to the CPU Unit or previous Expansion Unit or Expansion Unit.

Programming Example

This programming example uses these ranges:

- Analog output: 1 to 5VDC, 0 to 20mA, 0 to 20mA, 0 to 10V
- Analog output 2: 0 to 20mA
- Analog output 3: 4 to 20mA
- Analog output 4: 0 to 10V

Word (n+1) and word (n+2) can be used for either the range code or the analog output set value.

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