MITSUBISHI

Digital-Analog Converter Module

User's Manual

(Hardware)

CL2DA2-B

Thank you very much for purchasing this product.

Prior to use, please read both this manual and detailed manual thoroughly and familiarize yourself with the product.

CC-Link/LT

MODEL	CL2DA-U-HW
MODEL CODE	13JP61
IB(NA)-0800290-A(0411)MEE	

●SAFETY PRECAUTIONS●

(Read these precautions before using.)

Please read this manual carefully and pay special attention to safety in order to handle this product properly.
These precautions apply only to this product. Refer to the user's manual of the CPU module used for a description of the PLC system safety precautions.
In ●SAFETY PRECAUTIONS●, precautions are classified into two categories: "DANGER" and "CAUTION".

⚠ DANGER	Procedures which may lead to a dangerous condition and cause death or serious injury if not carried out properly.
⚠ CAUTION	Procedures which may lead to a dangerous condition and cause minor or medium injury, or physical damage only, if not carried out properly.

Depending on circumstances, procedures indicated by **⚠ CAUTION** may also cause serious results.
In any case, it is important to follow the directions for usage.
Keep this manual handy so that you can take it out and read it whenever necessary and always forward it to the end user.

[DESIGN PRECAUTIONS]

⚠ DANGER

- Configure an interlock circuit in a sequence program so that the system operates safely using the communication status information in the event the data link falls into a communication problem.Otherwise, erroneous output and malfunction may result in accidents.

⚠ CAUTION

- Do not install control cables and communication cables together with the main circuit and/or power cables. Keep a distance of at least 100mm(3.94 inch). Doing so may cause malfunction due to noise interference.
- At power ON/OFF, voltage or current may instantaneously be output from the output terminal of the module.
  In such case wait until the analog output becomes stable to start controlling the external device.

[INSTALLATION PRECAUTIONS]

⚠ CAUTION

- Use the module in an environment shown in the “general specifications” in the detailed manual.
  Using it outside the general specifications may result in electric shock, fire or malfunction, or may damage or degrade the module.
- Do not directly touch the module’s conductive parts.
  Doing so could cause malfunction or failure of the module.
- Fix the module securely using a DIN rail or installation screws within the specified torque range.
  If the screws are too loose, the module may drop from its installation position, short circuit, or malfunction. If the screws are too tight, the screws may be damaged, which may cause the module to drop from its installation position or short circuit.

[WIRING PRECAUTIONS]

⚠ DANGER

- Be sure to shut off all phases of the external power supply used by the system before installation or wiring. Failure to do so may result in an electric shock or product damage.

⚠ CAUTION

- Terminal screws which are not to be used must be tightened always.
  Otherwise there will be a danger of short circuit against the bare solderless terminals.
- Perform correct wiring for the module by checking the rated voltage and terminal layout. Connecting to a power supply of incorrect voltage or faulty wiring may cause fire and/or failure.
- Fix terminal screws securely within the specified torque range. Loose terminal screws may cause fire and/or malfunction.
  If the terminal screws are too tight, it may cause short circuit or erroneous operation due to damage of the screws.
- Make sure foreign objects do not get inside the module, such as dust and wire chips. Failure to do so may cause fire, product failure or malfunction.

[STARTING AND MAINTENANCE PRECAUTIONS]

⚠ DANGER

- Do not touch terminals when the power is on. It may cause an electric shock or malfunction.
- Be sure to shut off all phases of the external power supply used by the system before cleaning or retightening the terminal screws. Failure to do so may cause failure or malfunction of the modules.

⚠ CAUTION

- Do not disassemble or modify the module. Doing so may cause failure, malfunction, injury, or fire.
- The module case is made of resin; do not drop it or subject it to strong shock. A module damage may result.
- Be sure to shut off all phases of the external power supply used by the system before mounting or dismounting the module to or from the panel. Failure to do so may cause failure or malfunction of the module.
- Touch the grounded metal to discharge the static electricity from the human body, before handling the module.
  Failure to do so may cause a failure or malfunctions of the module.

[DISPOSAL PRECAUTIONS]

⚠ CAUTION

- When disposing of this product, treat it as industrial waste.

Revisions

* The manual number is given on the bottom right of the top cover.

Print Date	*Manual Number	Revision
Nov.,2004	IB(NA)-0800290-A	First edition

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About the Manuals

The following manuals are also related to this product.
Order them if necessary.

Detailed Manual

Manual name	Manual No. (Model code)
Digital-Analog Converter Module User's Manual CL2DA2-B	SH-080418E (13JP31)

Related Manual

Manual name	Manual No. (Model code)
CC-Link/LT Master Module User's Manual QJ61CL12	SH-080351E (13JR62)
CC-Link - CC-Link/LT Bridge Module type AJ65SBT-CLB User's Manual	SH-080362E (13JR63)

Compliance with the EMC Directive and the Low Voltage Directive

For details on making Mitsubishi PLC conform to the EMC directive and low voltage instruction when installing it in your product, please see Chapter 3, "EMC Directive and Low Voltage Instruction" of the User's Manual (Hardware) of the CPU module to use.
The CE logo is printed on the rating plate on the main body of the PLC that conforms to the EMC directive and low voltage instruction.
By making this product conform to the EMC directive and low voltage instruction, it is not necessary to make those steps individually.

1. Overview

This user's manual explains the specifications, names and setting of parts, wiring and others of the CL2DA2-B digital-analog converter module (hereafter abbreviated to the “CL2DA2-B”), which is used as a remote device station in the CC-Link/LT system.
Confirm if the following is included in the package after unpacking.

Item name	Quantity
Digital-Analog Converter Module type CL2DA2-B	1

2. Specifications

2.1 Performance Specifications

The performance specifications of the CL2DA2-B are shown below. For general specifications, refer to the detailed manual.

<table>
<tr><td colspan="2">Item</td><td colspan="6">Specifications</td></tr>
<tr><td rowspan="2">Digital input</td><td>Voltage</td><td colspan="6">15-bit signed binary (-4096 to 4095)</td></tr>
<tr><td>Current</td><td colspan="6">15-bit signed binary (-96 to 4095)</td></tr>
<tr><td rowspan="2">Analog output</td><td>Voltage</td><td colspan="6">-10 to 10V DC (External load resistance 1kΩ to 1MΩ)</td></tr>
<tr><td>Current</td><td colspan="6">0 to 20mA DC (External load resistance 0 to 600Ω)</td></tr>
<tr><td colspan="2" rowspan="10">I/O characteristics, maximum resolution, accuracy (accuracy relative to maximum analog output value)</td><td></td><td>Analog output range</td><td>Digital input</td><td>Accuracy
Ambient temperature 25±5°C*1</td><td>Accuracy
Ambient temperature 0 to 55°C</td><td>Accuracy
Temperature coefficient*2</td><td>Max. Resolution</td></tr>
<tr><td rowspan="4">Voltage</td><td>-10 to 10V</td><td>-4000 to 4000</td><td>±0.2% (±20mV)</td><td>±0.4% (±40mV)</td><td rowspan="5">±80ppm/°C (±0.0080%/°C)</td><td>2.5mV</td></tr>
<tr><td>0 to 10V</td><td rowspan="3">0 to 4000</td><td rowspan="2">±0.2% (±10mV)</td><td rowspan="2">±0.4% (±20mV)</td><td>1.25mV</td></tr>
<tr><td>0 to 5V</td><td>1.0mV</td></tr>
<tr><td>1 to 5V</td></tr>
<tr><td rowspan="2">Current</td><td>0 to 20mA</td><td rowspan="2">0 to 4000</td><td rowspan="2">±0.2% (±40μA)</td><td rowspan="2">±0.4% (±80μA)</td><td>5μA</td></tr>
<tr><td>4 to 20mA</td><td>4μA</td></tr>
<tr><td colspan="2">Conversion speed</td><td colspan="6">200μs / 2 channels</td></tr>
<tr><td colspan="2">Output short-circuit protection</td><td colspan="6">Available</td></tr>
</table>

<table>
<tr><th colspan="2">Item</th><th>Specifications</th></tr>
<tr><td colspan="2">Absolute maximum output</td><td>Voltage: ±12 V, Current: +21mA</td></tr>
<tr><td colspan="2">Analog output points</td><td>2 channels / 1 module</td></tr>
<tr><td colspan="2">CC-Link / LT station type</td><td>Remote device station</td></tr>
<tr><td colspan="2">Number of occupied stations</td><td>2 stations in 16-point mode*3</td></tr>
<tr><td colspan="2">Isolation specifications</td><td>
<table>
<tr><th>Specific isolated area</th><th>Isolation method</th><th>Dielectric withstand voltage</th><th>Insulation resistance</th></tr>
<tr><td>Across communication system and analog output</td><td rowspan="3">Photocoupler isolation, Transformer isolation</td><td rowspan="3">500V AC for 1 minute</td><td rowspan="3">500V DC 10MΩ</td></tr>
<tr><td>Across power supply system and analog output</td></tr>
<tr><td>Between communication system and power supply system</td></tr>
<tr><td>Between channels</td><td>Not isolated</td><td>–</td><td>–</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Terminal block</td><td>Direct type 14-point terminal block (M3 screw)</td></tr>
<tr><td colspan="2">Applicable wire size</td><td>0.3 to 1.25mm^2</td></tr>
<tr><td colspan="2">Applicable crimping terminal</td><td>RAV1.25-3 (in conformance with JIS C 2805),
V1.25-3 (Japan Solderless Terminal Mfg. Co., Ltd.),
1.25-3, TG1.25-3 (NICHIFU TERMINAL INDUSTRIES Co., Ltd.)</td></tr>
<tr><td colspan="2">Module installation method</td><td>DIN rail installation, mounted by screws of type M4 × 0.7mm × 16mm or lager, Can be installed in six orientations.</td></tr>
<tr><td colspan="2">Applicable DIN rail</td><td>TH35-7.5Fe, TH35-7.5Al (in conformance with IEC 60715)</td></tr>
<tr><td rowspan="3">Module power supply*4</td><td>Voltage</td><td>24V DC (20.4V DC to 28.8V DC, ripple ratio: within 5%)</td></tr>
<tr><td>Current consumption</td><td>170mA</td></tr>
<tr><td>Current on startup</td><td>470mA</td></tr>
<tr><td colspan="2">Protection class</td><td>IP2X</td></tr>
<tr><td colspan="2">Weight</td><td>0.15kg</td></tr>
</table>

*1: Reference accuracy.

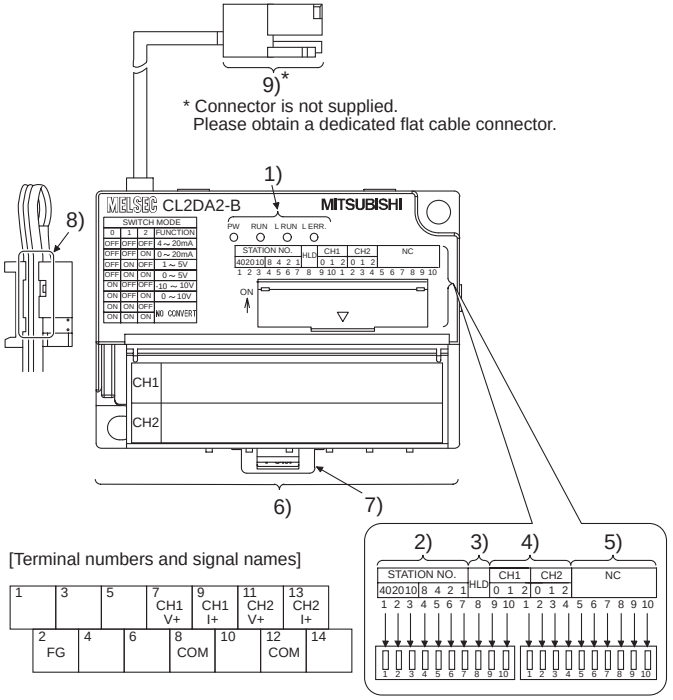
*2: Accuracy per temperature change of 1°C.

*3: No. of occupied I/O points (No. of occupied stations) differs depending on the last conversion-enabled channel.

*4: Power is supplied by a power supply module/adapter.

3. Names and Setting of Parts

The part names and descriptions of the CL2DA2-B are provided in this section.



No.	Name	Description	
1)	Operation status display LED	PW LED	ON : Power supply on OFF : The power supply is turned off The voltage drop is too large.
		RUN LED	ON : Normal operation Flickering : When the digital setting value is outside the range. The analog output setting switches for all channels are set to be conversion-disabled When the analog output setting switch or the HOLD/CLEAR setting switch has been changed during operation The NC switch is ON. OFF : Watchdog timer error Fault in hardware
		L RUN LED	ON : Normal communication OFF : Communication cutoff (timeout error)
		L ERR. LED	ON : When the digital setting value is outside the range The analog output setting switches for all channels are set to be conversion-disabled. When the analog output setting switch or the HOLD/CLEAR setting switch has been changed during operation Communication cutoff (timeout error) The analog output setting switches for all channels are set to be conversion-disabled. Flickering at regular intervals (0.4s): The station number setting switch was changed after power-on. Flickering at irregular intervals: The terminating resistor has not been attached yet. The module and/or connection cable are affected by noise. OFF : Normal communication

<table>
<tr><th>No.</th><th>Name</th><th>Description</th></tr>
<tr><td>2)</td><td>Station number setting switch</td><td>With “10”, “20” and “40”, set the ten’s place of the station number.
With “1”, “2”, “4” and “8”, set the one’s place of the station number.
Always set the station number within the range of 1 to 64.
Setting a number other than 1 to 64 generates an error and “L ERR.” LED turns on.
Duplication of the station number is not allowed.
(Factory default: All OFF)

<table>
<tr><th rowspan="2">Station number</th><th colspan="3">Ten’s place</th><th colspan="4">One’s place</th></tr>
<tr><th>40</th><th>20</th><th>10</th><th>8</th><th>4</th><th>2</th><th>1</th></tr>
<tr><td>1</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td></tr>
<tr><td>2</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>3</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>4</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td></tr>
<tr><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td></tr>
<tr><td>10</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td></tr>
<tr><td>11</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td></tr>
<tr><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td></tr>
<tr><td>64</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td></tr>
</table>

(Example) Set the switches as below when setting the station number to 32:

<table>
<tr><th rowspan="2">Station number</th><th colspan="3">Ten’s place</th><th colspan="4">One’s place</th></tr>
<tr><th>40</th><th>20</th><th>10</th><th>8</th><th>4</th><th>2</th><th>1</th></tr>
<tr><td>32</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
</table>
</td></tr>
<tr><td>3)</td><td>HOLD / CLEAR setting switch</td><td>Sets whether the analog value is held or cleared when communications are interrupted. (One setting for all channels)
OFF : CLEAR
ON : HOLD
(Factory default: OFF (CLEAR))</td></tr>
</table>

<table>
<tr><th>No.</th><th>Name</th><th>Description</th></tr>
<tr><td>4)</td><td>Analog output setting switch</td><td>Set the D/A conversion enable/disable selection and the output range for each channel.
Set unused channels to be conversion-disabled.

<table>
<tr><th colspan="2" rowspan="2">Output Range</th><th colspan="3">Setting switches</th></tr>
<tr><th>0</th><th>1</th><th>2</th></tr>
<tr><td rowspan="6">Conversion enable</td><td>4 to 20mA</td><td>OFF</td><td>OFF</td><td>OFF</td></tr>
<tr><td>0 to 20mA</td><td>OFF</td><td>OFF</td><td>ON</td></tr>
<tr><td>1 to 5V</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>0 to 5V</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>-10 to 10V</td><td>ON</td><td>OFF</td><td>OFF</td></tr>
<tr><td>0 to 10V</td><td>ON</td><td>OFF</td><td>ON</td></tr>
<tr><td colspan="2" rowspan="2">Conversion disable</td><td>ON</td><td>ON</td><td>OFF</td></tr>
<tr><td>ON</td><td>ON</td><td>ON</td></tr>
</table>
(Factory default: All OFF (4 to 20mA))</td></tr>
<tr><td>5)</td><td>NC</td><td>Use prohibited (Not available as the system uses it. Keep it to OFF. If turned ON, the RUN LED will flash.)</td></tr>
<tr><td>6)</td><td>Terminal block</td><td>Terminal block for I/O signal connections</td></tr>
<tr><td>7)</td><td>DIN rail hook</td><td>Used to mount the module to the DIN rail.</td></tr>
<tr><td>8)</td><td>Cable guide</td><td>A guide used for turning the CC-link/LT flat cable for the CL2DA2-B downward.</td></tr>
<tr><td>9)</td><td>CC-Link /LT interface connector</td><td>Connector for connection of the CC-Link/LT communication line or module power (Sold separately)</td></tr>
</table>

4. Loading and Installation

4.1 Handling Precautions

The following is handling precautions for the module.

(1) Tighten the mounting or terminal screws for the module to the specified torque as shown below.

Screw location	Tightening torque range
Module mounting screw (M4 screw)	78 to 108 N•cm
Terminal block terminal screw (M3 screw)	42 to 58 N•cm

(2) When using a DIN rail, attach the DIN rail taking the following items into consideration:

(a) Applicable DIN rail types (conform to IEC 60715)
TH35-7.5Fe
TH35-7.5Al

(b) Interval between the DIN rail's installation screws
Tighten the screws using a pitch of 200mm (7.87in.) or less when attaching a DIN rail.

(3) To attach the CL2DA2-B to the DIN rail, press the centerline area of the DIN rail hook beneath the module until a click is heard.

(4) Maintain some distance between the module and other structures or parts, at least 10mm (0.39in.) from the top and 60mm (2.62in.) from the bottom of the module, in order to ensure ventilation and to make replacement of the module easy if the CL2DA2-B is installed to a panel.

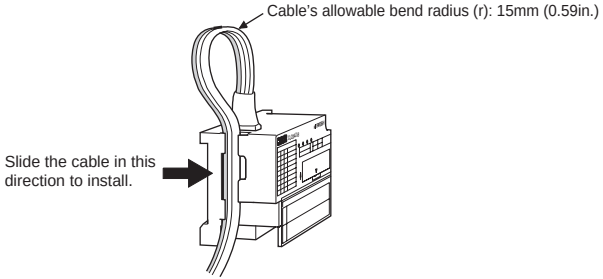
(5) Install the CL2DA2-B on a level surface.
If the surface is uneven, unnecessary force is applied to the printed circuit board, causing malfunctions.

5. Connection Cable Wiring

For wiring of the cable to be connected between the CL2DA2-B and the CC-Link/LT master module or the AJ65SBT-CLB, refer to the User's Manual of the CC-Link/LT master module or the AJ65SBT-CLB.

(1) To connect the CL2DA2-B to a VCTF or high flexible cable drop line, the CC-Link/LT flat cable of the CL2DA2-B must be processed to the length of 20cm (7.87in.) or less.

(2) The CC-Link/LT flat cable of the CL2DA2-B can be wired downward using a cable guide. The minimum allowable bend radius (r) is 15mm (0.59in.).



6. Wiring

6.1 Wiring Precautions

To obtain maximum performance from the functions of CL2DA2-B and improve the system reliability, an external wiring with high protection against noise is required.
The precautions when performing external wiring are as follows:

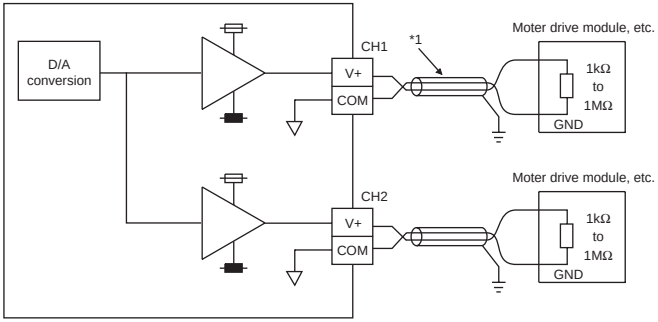
(1) Use separate cables for the AC and CL2DA2-B external output signals, in order to prevent the AC side surge or induction.

(2) Do not install cables together the main circuit line, high voltage cables and/or those connected to other than the PLC.
Noises, surges, or induction may affect the system.

(3) Ground the shield wires or shielded cables at one end on the external device side.

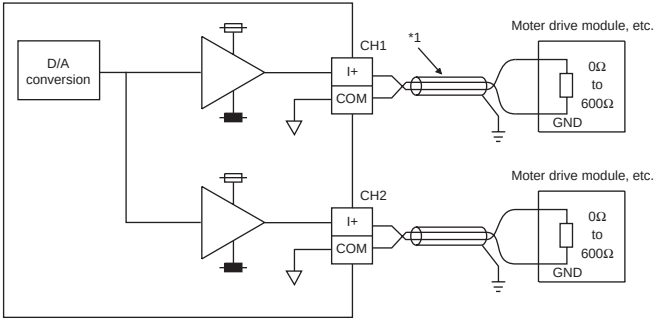
6.2 Wiring of Module with External Equipment

(1) For voltage output



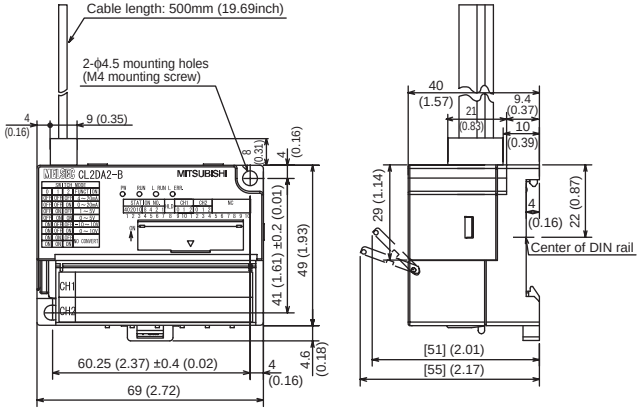
*1:Use a two-core twisted shield cable.

(2) For current output



*1:Use a two-core twisted shield cable.

7. External Dimensions



unit: mm (inch)

MEMO

Warranty

Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; machine damage or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

⚠For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi.
- This product has been manufactured under strict quality control. However, when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

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