PRO-iO2 Installation Guide

DR*-B*****/ DR*-D*****

Thank you for purchasing Pro-face's PRO-iO2 module. To ensure correct use of this module's features, be sure to read this Installation Guide and the PRO-iO2 User Manual.

Safety Precautions

This guide contains a variety of safety markings related to the safe and correct operation of this module. Be sure to read this guide and any related manuals carefully to fully understand how to correctly use this module's features.

■ Safety Symbols

This guide uses the following symbols for important information related to the safe and correct operation of this module. Please pay attention to these symbols and follow the instructions given.

Safety symbols and their meanings:

DANGER	A hazardous situation that will result in serious injury or even death if instructions are not followed.
WARNING	A potentially hazardous situation that could result in serious injury or even death if instructions are not followed.
CAUTION	A potentially hazardous situation that could result in minor injury or equipment damage if instructions are not followed.

DANGER

- An emergency stop circuit and an interlock circuit should be constructed outside of this module. Constructing these circuits inside this module may cause a runaway situation, system failure, or an accident due to module failure.
- A breakdown or malfunction in the output relay can lead to the output signal remaining ON or OFF. To prevent a module malfunction, be sure to install an external circuit or device that will monitor the signal status and guarantee system operation safety.
- Systems using this module should be designed so that output signals which could cause a serious accident are monitored from outside this module.
- This module is designed to be a general-purpose device for general industries, and is neither designed nor produced to be used with equipment or systems in potentially life-threatening situations. If you are considering using this module for special uses, including nuclear power control devices, electric power devices, aerospace equipment, medical life support equipment, or transportation vehicles, please contact your local PRO-iO2 distributor.

WARNING

- Whenever installing, dismantling, wiring and conducting maintenance or inspections, be sure to disconnect power to this module to prevent the possibility of electric shock or fire.
- Do not disassemble or remodel this module, since it may lead to an electric shock or fire.
- Do not use this module in an environment that contains flammable gases, since an explosion may occur.
- Do not use this module in an environment that is not specified in either this guide or the PRO-iO2 User Manual. Otherwise, an electric shock, fire, malfunction or other failure may occur.
- Because of the possibility of an electric shock or malfunction, do not touch any power terminals while the module is operating.
- If the PRO-iO2 module's lithium battery*1 is incorrectly replaced (i.e. its + and – sides are reversed), it may explode.

*1 廢電池請回收 *This mark is applicable only in Taiwan.*

⚠ CAUTION

- Communication cables or I/O signal lines must be wired separately from the main circuit (High-voltage, high-current line), high-frequency lines such as inverter lines and power lines. Otherwise, a malfunction may occur due to noise.
- Be sure to install this module according to directions in this guide and the PRO-iO2 User Manual. Improper installation may cause the module to malfunction or fail.
- Be sure to wire this module according to directions in this guide and the PRO-iO2 User Manual. Improper wiring may cause a malfunction, failure or electric shock.
- Do not allow foreign substances, including chips, wire pieces, water, or liquids to enter inside this module's case. Otherwise, a malfunction, failure, electric shock or fire may occur.
- Be sure this module is operated only by personnel trained in control system programming and design.
- Do not touch this module with wet hands or wipe it with a wet cloth. Doing so may cause a fire or an electric shock.
- Be sure to install a fuse, breaker etc. in each of the power, input and output circuits. Failure to do so can lead to a fire if an overload occurs.
- Power and voltage specifications vary depending on the PRO-iO2 module's model. Be sure to carefully read the directions in this guide and the PRO-iO2 User Manual before turning this module's power ON.
- When disposing off this module, be sure to do so according to your country's standards for industrial waste disposal.

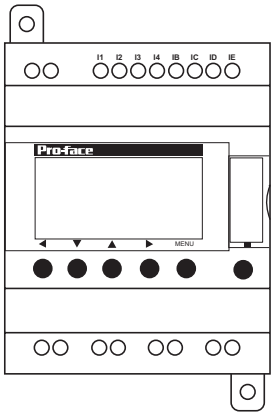
■ To Prevent PRO-iO2 module Damage

- Do not store or operate this module in either direct sunlight or excessively dusty or dirty environments.
- Because this module is a precision instrument, do not store or use it in locations where excessive shocks or vibration may occur.
- Do not cover this module's ventilation holes, or operate it in an environment that may cause it to overheat.
- Do not operate this module in locations where sudden temperature changes can cause condensation to form inside the module.
- Do not use paint thinner or organic solvents to clean this module.

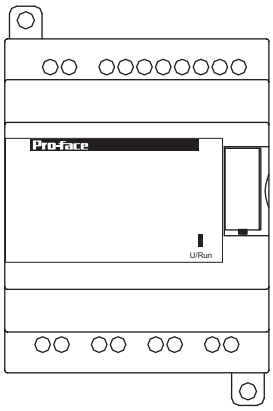
Package Contents

■ PRO-iO2 module *1

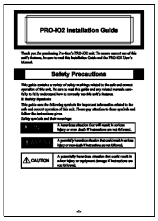
Model DR*-B*****



Model DR2-D*****



■ PRO-iO2 Installation Guide (English and Japanese)



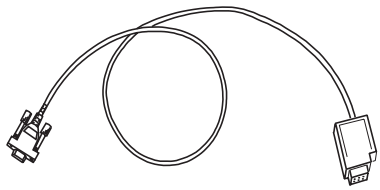
This module has been carefully packed, with special attention to quality. However, should you find anything damaged or missing, please contact your local PRO-iO2 distributor immediately.

Options

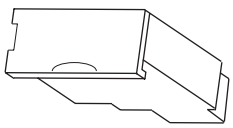
■ PRO-iO2 Editor (DR2-SFT01)

The PRO-iO2 User Manual's PDF file is included in this CD-ROM. Refer to this manual for details regarding PRO-iO2 Editor operation.
This manual can also be downloaded from:
http://www.pro-face.com/

■ PRO-iO2 Data Transfer Cable (DR2-CBL01)



■ PRO-iO2 Memory Pack *2 (DR2-MEM01)



**1 The size of the PRO-iO2 module varies depending on the number of I/O points.*

2 Use the Memory Pack to back up logic programs or transfer them to an another PRO-iO2 module. However, DR2-D*** modules can not use the PRO-iO2 Memory Pack.*

UL/c-UL Application Notes

Modules DR2-B121BD, DR2-B201BD, DR2-D101BD, DR2-D201BD, DR2-B121FU, DR2-B201FU, DR2-D101FU, DR2-D201FU, DR3-B101BD, DR3-B261BD, DR3-B101FU, and DR3-B261FU are UL/c-UL listed products.

UL File No. E220851

DR2-B121BD	(UL Registration Model No. :DR2-B121BD)
DR2-B201BD	(UL Registration Model No. :DR2-B201BD)
DR2-D101BD	(UL Registration Model No. :DR2-D101BD)
DR2-D201BD	(UL Registration Model No. :DR2-D201BD)
DR2-B121FU	(UL Registration Model No. :DR2-B121FU)
DR2-B201FU	(UL Registration Model No. :DR2-B201FU)
DR2-D101FU	(UL Registration Model No. :DR2-D101FU)
DR2-D201FU	(UL Registration Model No. :DR2-D201FU)
DR3-B101BD	(UL Registration Model No. :DR3-B101BD)
DR3-B261BD	(UL Registration Model No. :DR3-B261BD)
DR3-B101FU	(UL Registration Model No. :DR3-B101FU)
DR3-B261FU	(UL Registration Model No. :DR3-B261FU)

The PRO-iO2 module conforms to the following standards:

- **UL508 Electrical Control System for Industry**
- **CAN/CSA-C22.2, No.142-M1987 (c-UL listed) Electrical Control System for Industry**

<Notes>

Note the following when applying for UL recognition for equipment in which the PRO-iO2 module is installed.

- The PRO-iO2 module is designed to be used only when installed in other equipment.
- If the module is installed in an area with no air conditioning system, be sure to install it in a vertical panel using a DIN rail or mounting holes. Also, be sure the module is installed so it is at least 100 mm away from any adjacent structures or devices. If these requirements are not met, the heat generated by the module's internal components may cause the module to fail to meet UL standard requirements.
- The power supply connected to the module must be a UL/c-UL approved Class 2 power supply module or Class 2 transformer[*1].
  When a PRO-iO2 module under load is operated with a single power supply, the amount of current consumption and full-load current of the I/O modules must be within the rated load of a Class 2 power supply module or a Class 2 power supply transformer.
  Be aware that the number of points which can be turned ON simultaneously may be limited, depending on the amount of load and the load current value.

CE Marking Notes

Modules DR2-B121BD, DR2-B201BD, DR2-D101BD, DR2-D201BD, DR2-B121FU, DR2-B201FU, DR2-D101FU, DR2-D201FU, DR3-B101BD, DR3-B261BD, DR3-B101FU, and DR3-B261FU are CE marked products that conform to EMC directives EN55011 Class B, EN61000-6-2 and EN61131-2.

**1 Class 2 power supplies and Class 2 transformers should not exceed an output of 30V, and at 8A or less, should not exceed 100VA. (National Electrical Code)*

1 PRO-iO2 module Models

The features of each PRO-iO2 module (I/O points, LCD screen, etc.) will vary depending on the model. Some modules can be connected to the I/O extension module.

For how to identify your PRO-iO2 module's model number,

Reference *PRO-iO2 User Manual*

Model Number	Voltage	No.of Input/ Output Points	LCD Display Screen	I/O Extension Module *1
DR2-B121BD	24VDC	8/4	Yes	Not connectable
DR2-B201BD	24VDC	12/8	Yes	Not connectable
DR2-D101BD	24VDC	6/4	No	Not connectable
DR2-D201BD	24VDC	12/8	No	Not connectable
DR2-B121FU	100VAC to 240VAC	8/4	Yes	Not connectable
DR2-B201FU	100VAC to 240VAC	12/8	Yes	Not connectable
DR2-D101FU	100VAC to 240VAC	6/4	No	Not connectable
DR2-D201FU	100VAC to 240VAC	12/8	No	Not connectable
DR3-B101BD	24VDC	6/4 (14/10) *2	Yes	Connectable
DR3-B261BD	24VDC	16/10 (24/16) *2	Yes	Connectable
DR3-B101FU	100VAC to 240VAC	6/4 (14/10) *2	Yes	Connectable
DR3-B261FU	100VAC to 240VAC	16/10 (24/16) *2	Yes	Connectable

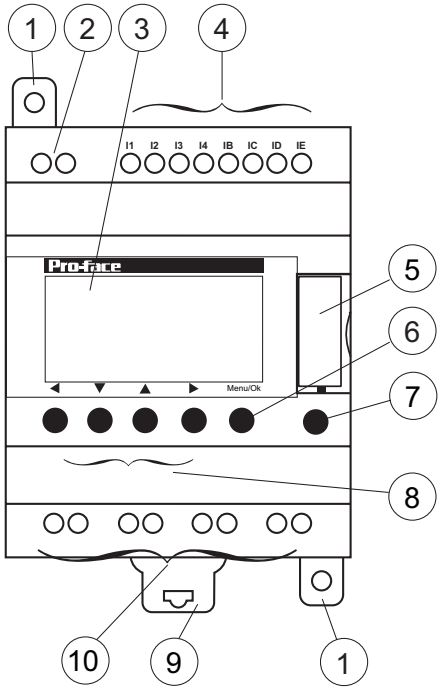
**1 For details about the I/O Extension Module,*

Reference *PRO-iO2 User Manual*, *PRO-iO2 I/O Extension Module Installation Guide*

**2 The figures in parentheses indicate the maximum number of input/output points when the I/O Extension Module is connected.*

- **Even though LCD display-equipped PRO-iO2 modules can be programmed using only the screen display, the easy-to-use PRO-iO2 Editor software (sold separately) is recommended for programming.**
- **You can test and debug logic programs via the PRO-iO2 Editor's simulation feature before actually downloading the program to your PRO-iO2 module.**

2 Module Part Names



(1) **Module attachment tab** (Retracting type)
Used to fasten the main module to the panel.

(2) **Power terminals**

(3) **LCD display screen**

(4) **Input terminals**[*1]
Depending on the model, PRO-iO2 modules have 6, 8, 12 or 16 input terminals.

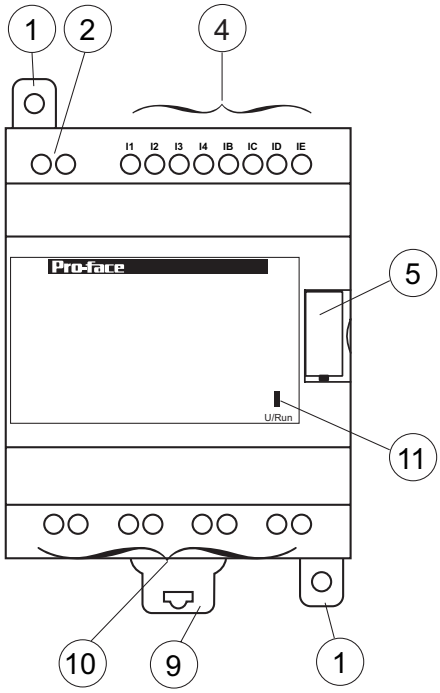
(5) **Connectors for PRO-iO2 Data Transfer Cable (DR2-CBL01) and PRO-iO2 Memory Pack (DR2-MEM01)**

(6) **Menu/Ok button**
Determines each setting or displays the menu screen.

(7) **Shift button**
While this button is held down and any of the Menu/Ok button and Z keys is pressed, a specified function is executed.
The specified functions are displayed at the bottom of the screen when the Shift button is pressed.

(8) **Z keys**
Used to move the cursor position. It can also function as a contact's open/close button when creating/modifying a logic programs.

(9) **DIN Rail detachment hook**
Used when detaching the main module from a DIN rail.



(10) **Relay output terminals**
Depending on the model, the PRO-iO2 Modules have 4, 8, or 10 output terminals.

(11) **U/Run LED**
RUN : Flashes slowly (3 times/sec.)
STOP : Lights
Error [*2]: Flashes quickly (5 times/sec.)

**1 The input terminals which can be used for the high-speed counter and analog comparator functions vary depending on the model. For details,*

Reference ***"6 Wiring"***

When the high-speed counter or analog comparator function is not used, these terminals can be used as standard input terminals. Note that their input specifications are different from other terminals. For details,

Reference ***"4 Specifications"***

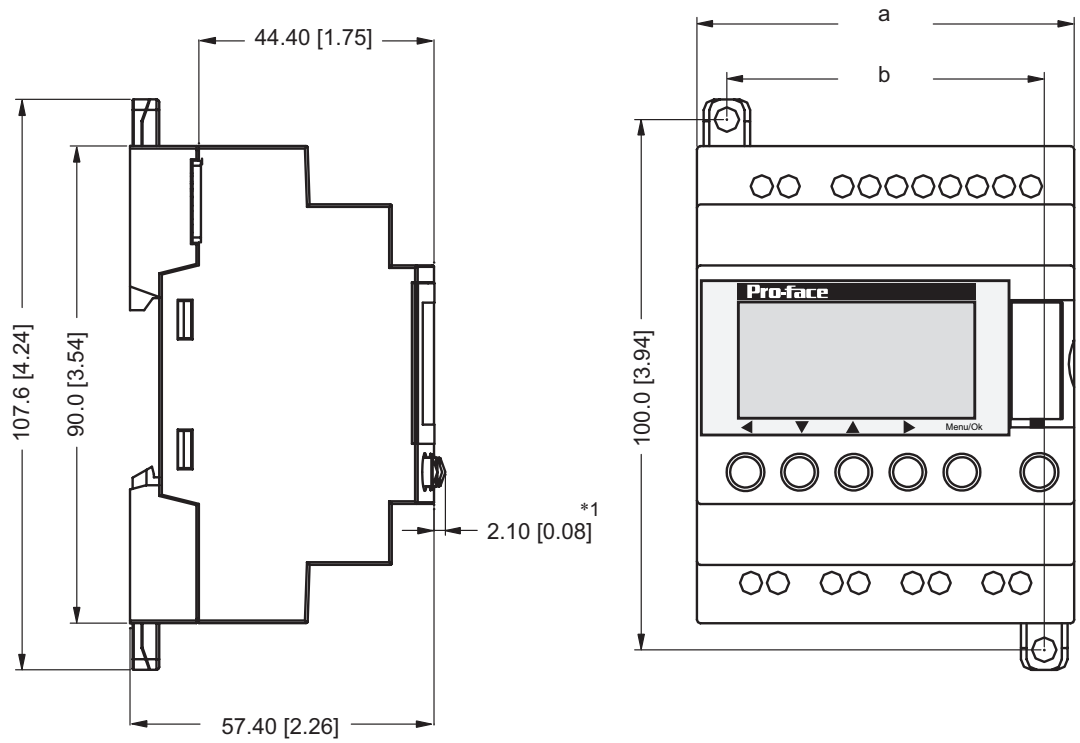
**2 For error details,*

Reference ***PRO-iO2 User Manual***

3 Dimensions

Unit: mm (in.)

The following dimensions are for the LCD display-equipped module. The dimensions of the module without an LCD screen are identical. .



External dimensions for “a” and “b” vary depending on the model, as shown below:

	DR*-*1****	DR*-*2****
a	71.2mm [2.80 in.]	124.6mm [4.91 in.]
b	59.9mm [2.36 in.]	113.3mm [4.46 in.]

When attaching the PRO-iO2 module to a panel, extend the module’s attachment tabs. When attaching the PRO-iO2 module to a DIN rail, retract the module’s attachment tabs.

1 DR2-D*** modules are not equipped with these operation buttons.*

4 Specifications

■ General

Model Number	DR*-****BD	DR*-****FU
Rated Voltage	24VDC	100VAC to 240VAC
Allowable Voltage Range	19.2VDC to 30VDC	85VAC to 264VAC
Rated Frequency	-	50/60Hz
Allowable Frequency Range	-	47Hz to 63Hz
Allowable Voltage Drop	1ms or less	10ms or less
Power Consumption	DR2-*1*1BD 3W DR2-*201BD 6W DR3-B101BD 3W (When the I/O Extension Module is connected) 8W DR3-B261BD 6W (When the I/O Extension Module is connected) 10W	DR2-*1*1FU 7VA DR2-*201FU 11VA DR3-B101FU 7VA (When the I/O Extension Module is connected) 12VA DR3-B261FU 12VA (When the I/O Extension Module is connected) 17VA
Insulation Endurance	1500VAC 5mA for 1 minute (Between output terminals and DIN rail)	
Insulation Resistance	500VDC 100MΩ or higher (Between output terminals and DIN rail)	
In-Rush Current	30A or less	
Ambient Tempreture	0ºC to 55ºC	
Ambient Humidity	95%RH or less (No condensation) Wet bulb temperature: 39ºC or less	
Atmoshperic Pressure (Operating Altitude)	800hPa to 1114hPa (At 2000m or less)	
Pollution Level	Level2	

■ DC Input (DR*-****BD)

Model Number		I1 to IA	IB to IG
Input Voltage		24VDC	
Rated Current		4mA	
Input Impedance		7.4kΩ (At ON)	12kΩ (At ON)
No. of Input Points		6 Points (DR*-*101BD)	
		8 Points (DR2-B121BD)	
		12 Points (DR2-*201BD)	
		16 Points (DR3-B261BD)	
Operating Voltage	ON Voltage	15VDC or more (2.20mA or more)	15VDC or more (1.20mA or more)
	OFF Voltage	5VDC or less (0.75mA or less)	5VDC or less (0.45mA or less)
Input Delay (Letters in parentheses indicate filter setting)	OFF -> ON	0.3ms (FAST)/ 3ms (SLOW)*1	3ms (Fixed)
	ON -> OFF	0.5ms (FAST)/ 5ms (SLOW)*1	5ms (Fixed)
Maximum Frequency*2		1kHz	-
Input Signal Display		via LCD (Models DR*-B***** only)	
Insulation Method		No insulation between input points, and between input points and power supply	

**1 The delay time varies depending on the input filter setting. This setting is common for all points.*

**2 The terminals used for the high-speed counter are I1 (up counter) and I2 (down counter).*

■ AC Input (DR*-****FU)

Input Voltage		100VAC to 240VAC
Rated Frequency		50/60Hz
Rated Current		0.6mA
Input Impedance		350kΩ
No. of Input Points		6 Points (DR*-*101FU)
		8 Points (DR2-B121FU)
		12 Points (DR2-*201FU)
		16 Points (DR3-B261FU)
Operating Voltage	ON Voltage	79VAC or more (0.1750mA or more)
	OFF Voltage	40VAC or less (0.05mA or less)
Input Delay	OFF -> ON	50ms
	ON -> OFF	50ms
Input Signal Display		via LCD (Models DR*-B***** only)
Insulation Method		No insulation between input points, and between input points and power supply

■ Relay Output

Output		Q1 to Q8	Q9, QA
Rated Output Voltage		5VDC to 30VDC, 24VAC to 250VAC	
No. of Output Points		4 Points (DR*-*1*1**)	
		8 Points (DR2-*201**)	
		10 Points (DR3-B261**)	
Load Current		8A/1 Point	5A/1 Point
Common		Independent Common*1	
Mechanical Lifetime		10 million operations	
Electrical Lifetime		100,000 operations at contact rated load	
Min. Open/Close Load		12V, 10mA	
Built-in Fuse		None	
Voltage Endurance		4kV (IEC60947-1, IEC60664-1)	
Output Signal Display		via LCD (Models DR*-B***** only)	
Short Circuit Protection		None	
Overvoltage and Overcurrent Protection		None	
Output Delay	OFF -> ON	10ms or less	
	ON -> OFF	5ms or less	

1 Only the DR3-B261 module's Q8, Q9, and QA share a single common terminal.*

■ Analog Comparator Input

No. of Input Channels	DR2-D201BD	2 (IB,IC)
	DR*-B1*1BD	4 (IB,IC,ID,IE)
	DR*-B2*1BD	6 (IB,IC,ID,IE,IF,IG)
Input Voltage Range	0V to 10V	
Resolution	8 bits	
Accuracy	Full-scale value ±5% (at 25ºC) Full-scale value ±6.2% (at 55ºC)*1	
Absolute Max Input	30VDC (Voltage)	
Input Filter	None	
Conversion Time	Unit cycle time	
Input Impedance	12kΩ	
Insulation Method	No insulation between analog input points, and between analog input section and power supply	
Cable Length	10 m max. (Shielded cable)	

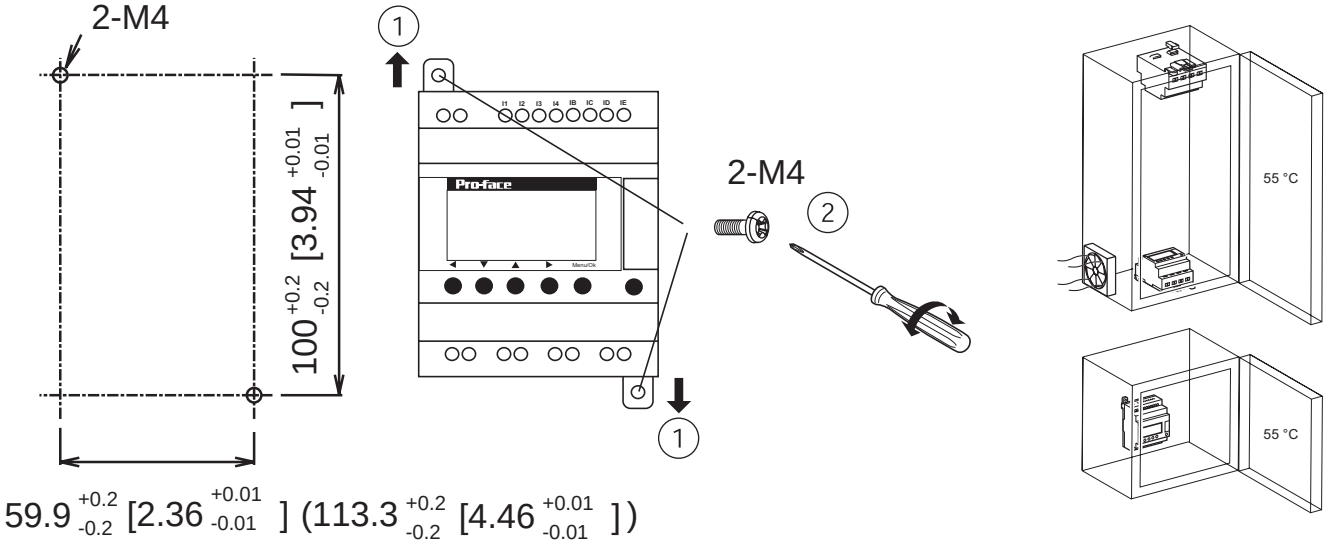
**1 This accuracy may not be possible in an environment with high noise levels.*

5 Installation

■ Direct Panel Installation

Create two attachment screw holes using the dimensions shown below, and position the module so that its module attachment tabs (Top and bottom) align with the attachment screw holes. Secure the module in place using M4 attachment screws, using a torque of 1 N•m. When installing the module with an orientation other than vertical (i.e. horizontal, etc.) be sure to also install a fan, as shown in the right-side figure.
The value in () indicates measurements used for DR*-*2**** PRO-iO2 modules.

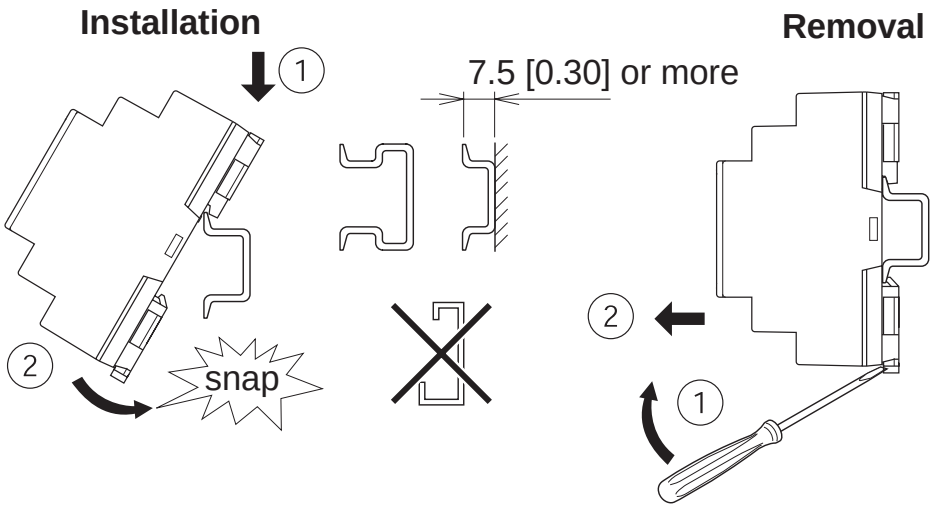
Unit: mm [in.]



■ DIN Rail Installation

Confirm that the DIN rail fastener hook is clipped in place and the module is held securely.
For module installation positioning,

Reference *PRO-iO2 User Manual*

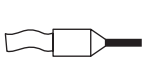
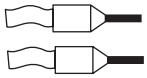
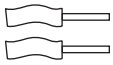


When attaching the PRO-iO2 module to a panel, extend the module's attachment tabs. When attaching the PRO-iO2 module to a DIN rail, retract the module's attachment tabs.

6 Wiring

■ Wiring

The following types of wires can be used:

Wire Type	Pin-type Terminal		Lay wire	Simple Wires	
					
mm^2	0.25 to 2.5	0.25 to 0.75	0.2 to 2.5	0.2 to 2.5	0.2 to 1.5
AWG*1	24 to 14	24 to 18	25 to 14	25 to 14	25 to 16

**1 AWG stands for "American Wire Gauge" and indicates conductor thickness.*

- ***Strip the wire's plastic covering to expose approximately 6.8mm of wire.***
- ***When using a lay wire, Pro-face recommends you install a blade-type or pin-type terminal connector.***
- ***The torque required to secure a wire to a terminal is 0.5 N•m.***

CAUTION

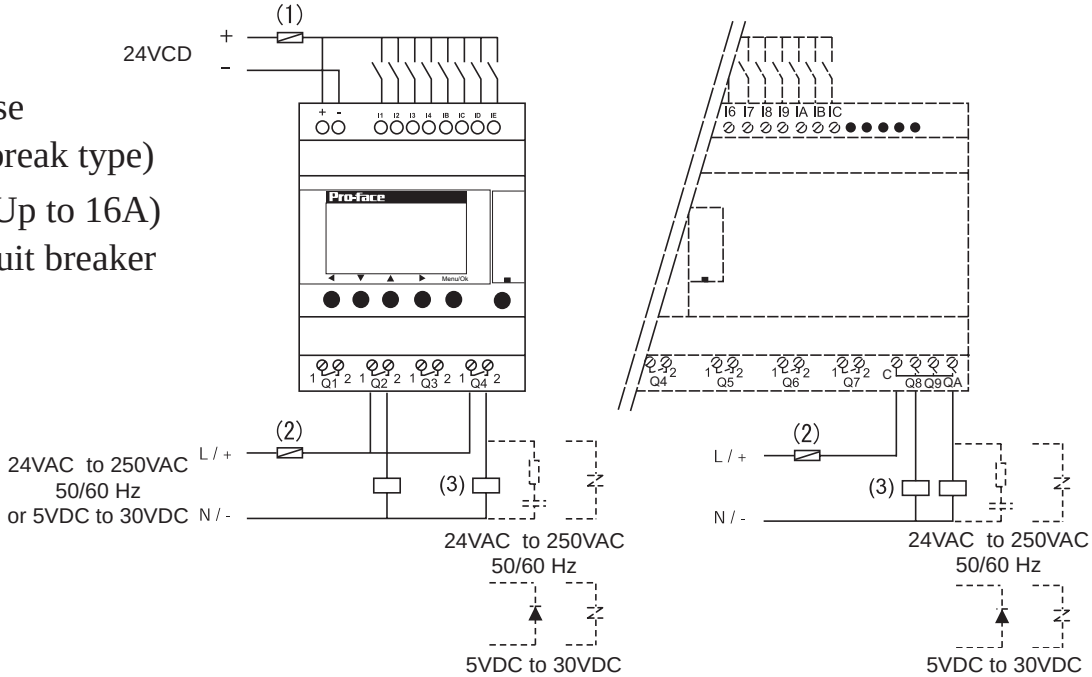
Power and voltage specifications may vary depending on your PRO-iO2 module's model. Be sure to carefully read this Installation Guide and the PRO-iO2 User Manual before turning the module's power ON.

■ DC Power Module (DR*-****BD)

(1) 1A Fuse (Fast-break type)

(2) Fuse (Up to 16A) or circuit breaker

(3) Load*1



**1 When operating devices with inductance loads, such as magnets and valves, Pro-face recommends you use a diode, surge killer or varistor.*

■ AC Power Module (DR*-****FU)

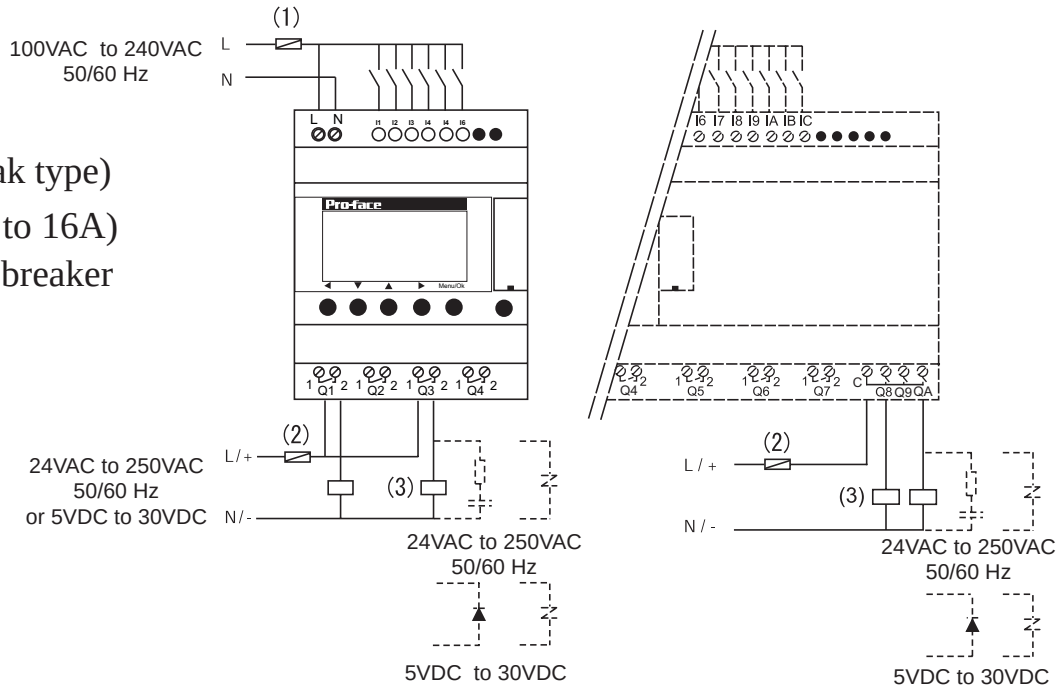
⚠ WARNING

There are two AC input terminals: L (Live, non-earthed), and N (Neutral, earthed). Be sure to connect the L terminal to the power supply's non-earthed terminal, and the N terminal to the power supply's earthed terminal.
If there is a fault in the power supply (E.g., the AC line and the earth line are shorted), the fuse connected to the L terminal will break and stop the flow of power.

(1) 1A Fuse
(Fast-break type)

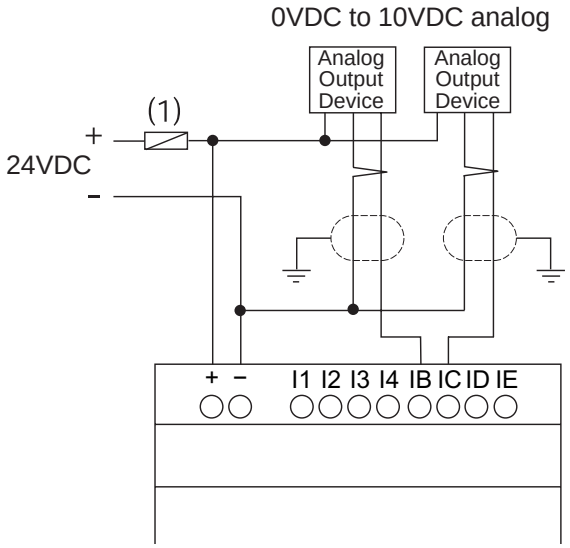
(2) Fuse (Up to 16A)
or circuit breaker

(3) Load*1

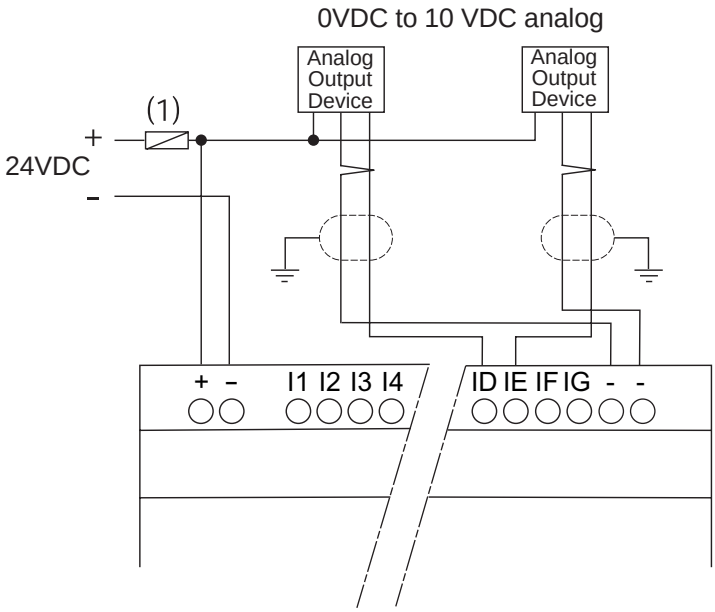


*1 When operating devices with inductance loads, such as magnets and valves, Pro-face recommends you use a diode, surge killer or varistor.

■ Analog Connection (DR*-B1*1BD)



■ Analog Connection (DR*-B2*1BD)



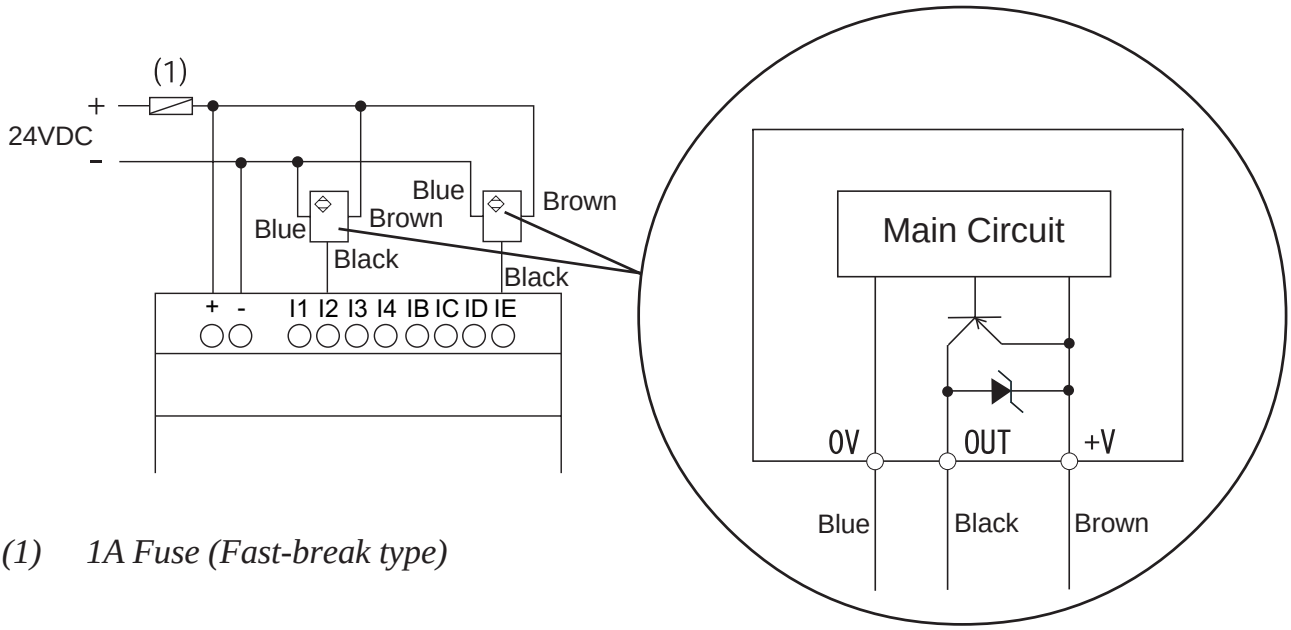
(1) 1A Fuse (Fast-break type)

Important

- ***Do not use negative voltages for the analog inputs. Doing so can damage the internal circuit.***
- ***The maximum length of the cable connected to an analog device is 10 m.***

■ Sensor Connection

The following diagrams show an example of a PNP output sensor connection.



(1) 1A Fuse (Fast-break type)

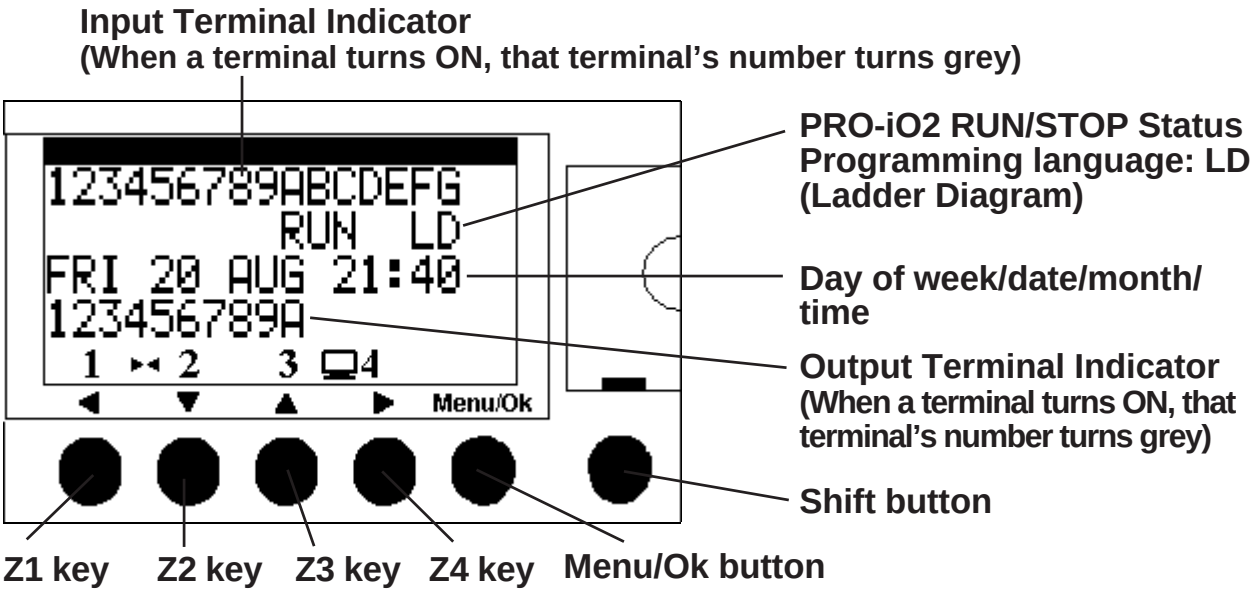
Important

- ***When connecting directly to this module's input circuit, be sure to use a PNP output sensor.***
  You cannot connect directly via a 2-wire sensor or an NPN-type sensor. For details about NPN-type sensor connections,
  Reference ***PRO-iO2 User Manual***

7 LCD Display and Menu Screen (DR*-B*****)

The PRO-iO2 LCD display shows the following RUN/STOP status and time information. Pressing the Menu/Ok button displays the Menu Screen.
The following settings can be entered using this screen.

(Pressing the Z1 key returns to the previous display screen.)



PROGRAMMING : Logic program monitoring can be performed in RUN mode. Logic program creation/update can be performed in STOP mode.
In RUN mode, "MONITORING" is displayed.

PARAMETER : Timer and Counter parameters can be changed even in RUN mode.

RUN/STOP : Select whether to run or stop the PRO-iO2 module.

CONFIGURATION : Designates the following settings (This function is disabled in RUN mode.):

PASSWORD : Designates the password needed to access the logic program. Press the Menu/Ok button to enable the setting, select a password using the Z1 to Z4 keys, and press the Menu/Ok button again to confirm the password. To cancel the setting, hold down the Shift button and then press the Menu/Ok button. Deleting the password will require the same password to be entered again. A valid password can be any four digit number (0000 to 9999).

FILT : Designates the input filter time. The module is designed only for a DC input filter. Select either SLOW (3ms to 5ms), or FAST (0.3ms to 0.5ms).

Zx=Keys : Designates whether the Z1 to Z4 keys on the panel's front face will be used in the logic program. Selecting "Yes" designates these keys can be used for input.

CYCLE & WATCHDOG : The WATCHDOG operates based on the setting selected from the following options when the scan time of the logic program exceeds the time specified in the CYCLE setting (1 x 10 ms to 9 x 10 ms):

- **INACTIVE** : Normal operation mode
- **ALARM** : Displays an alarm status. The alarm number for "Cycle time overflow" can be checked with the FAULT menu.
- **ERROR** : Stops the program (STOP mode). The alarm number for "Cycle time overrun" can be checked with the FAULT menu.

CLEAR PROG : Select if the logic program is to be deleted or not. (This function is disabled in RUN mode.)

TRANSFER : Transfers a logic program to or from the memory pack.

- **PRO-iO -> MEMORY** : From the PRO-iO2 module to the memory pack
- **MEMORY -> PRO-iO** : From the memory pack to the PRO-iO2 module

VERSION : Identifies the model and the version of the PRO-iO2 module.

FAULT : Allows users to check the alarm number of the current error or to cancel the error.

CHANGE D/H : Designates the year, month, day, and time. CAL corrects the time deviation for the week (-31 seconds to +31 seconds).

CHANGE SUMM/WINT : Sets the summer time from the following options: USA, GB, EUROPE, NO (no setting), and OTHER ZONE (manual setting)

SUMM represents summer daylight saving time and WINT represents winter daylight saving time. Use this setting only in countries that have adopted daylight saving time. In countries that have not adopted daylight saving time, be sure to select NO (no setting).

8 Contacts / Coils

■ Contacts

Symbol	Number	No. of Contacts	Description
I(i)	I1 to I* (i1 to I*)	*1	a contact (b contact) (physical input)
Z(z)*2	Z1 to Z4 (z1 to z4)	4	a contact (b contact) (Z key)
M(m)	M1 to MV (m1 to mV)	28	a contact (b contact) (Auxiliary coil)
Q(q)	Q1 to Q* (q1 to q*)	*1	a contact (b contact) (physical output)
T(t)	T1 to TG (t1 to tG)	16	a contact (b contact) (Timer)
C(c)	C1 to CG (c1 to cG)	16	a contact (b contact) (Counter)
K(k)*3	K1 (k1)	1	a contact (b contact) (High-Speed Counter)
V(v)	V1 to V8 (v1 to v8)	8	a contact (b contact) (Counter Comparator)
A(a)*4	A1 to A8 (a1 to a8)	16	a contact (b contact) (Analog Comparator)
H(h)*2	H1 to H8 (h1 to h8)	8	a contact (b contact) (Calendar)
W(w)*2	W1 (w1)	1	a contact (b contact) (Summer Time)

*1 *The number of contacts varies depending on the model.*

Reference *"4 Specifications"*

For the number of contacts when the I/O extension module is connected,

Reference ***PRO-iO2 I/O Extension Module Installation Guide***

*2 *For models DR*-B***** only. Not provided for models DR*-D*****.*

*3 *For models DR*-****BD only. Not provided for models DR*-****FU.*

*4 *For models DR*-B***BD and DR2-D201BD only. Not provided for models DR2-D101BD and DR*-***FU.*

■ Coils

Symbol	Coil	Description
⌊	Q, M	Normal coil
⌋	Q, M	Reverse display when condition is true (rising)
S	Q, M	Set coil
R	Q, M	Reset coil
TT	Timer	Starts timer
RT	Timer	Resets timer
CC(TK*2)	Counter (High-Speed Counter)	Counter (High-speed counter coil)
RC(RK*2)	Counter (High-Speed Counter)	Resets counter (High-speed counter reset coil)
DC	Counter	Designates count direction
TX*1	Text	Shows text
RX*1	Text	Hides text
TL*1	LCD backlight	Turns ON LCD backlight

*1 *For models DR*-B***** only. Not provided for models DR*-D*****.*

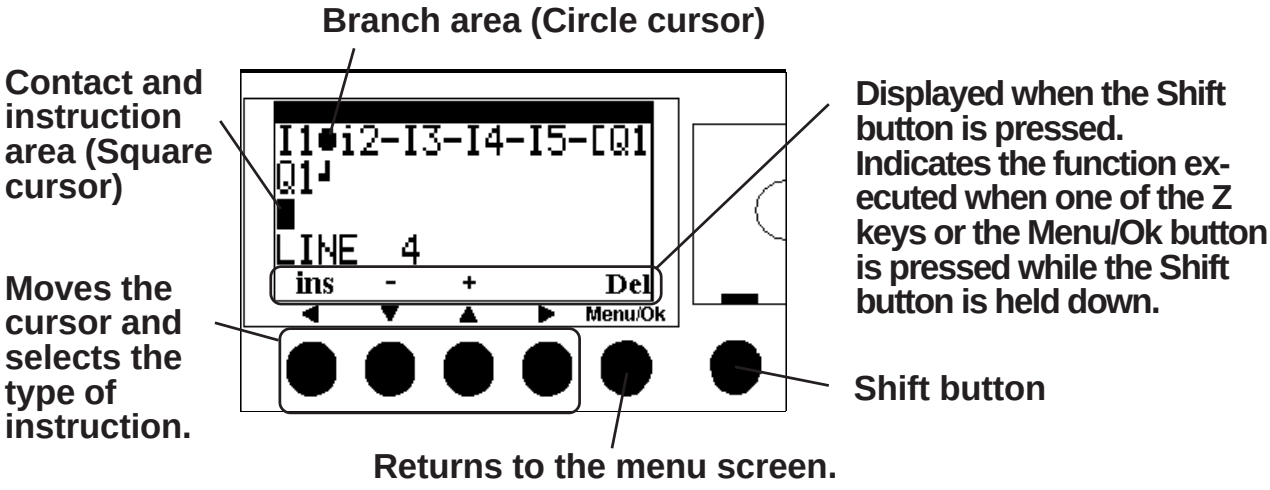
*2 *For models DR*-****BD only. Not provided for models DR*-****FU.*

9 Writing a Logic Program (DR*-B*****)

If you press the Menu/Ok button while the module's LCD screen shows time data, or is displaying RUN/STOP, the menu screen will appear.
Use the Z2/Z3 keys to select [PROGRAMMING], and press Menu/Ok button. This allows you to write to the logic program. If the logic program is running, STOP the program.

■ Ladder Program Screen Layout

A single rung (a line connecting two instructions) can have a maximum of five contact points and one coil, as shown below:



■ Shift Button Functions

Holding down the Shift button and then pressing the specified operation button allows the following operation including the insertion of a rung or branch.

When the cursor is in the contact and instruction area

Operation button	Displayed symbol	Description
Z1 key	ins.	Inserts a rung.
Z2 key	-	Scrolls through the instructions in the direction indicated by the negative sign.
Z3 key	+	Scrolls through the instructions in the direction indicated by the positive sign.
Z4 key	Param	Designates a parameter for each instruction.
Menu/Ok button	Del.	Deletes an instruction or rung.

When the cursor is in the branch area

Operation button	Displayed symbol	Description
Z1 key	←	Inserts a rung extension or a branch in the position indicated by that key's arrow.
Z2 key	↓	
Z3 key	↑	
Z4 key	→	
Menu/Ok button	Del.	Deletes a rung or branch.

■ Inserting an instruction

1. Moving to the instruction area

   Use the Z keys to move to the contact and instruction area. Hold down the Shift button and then press the "+" button (Z3 key), and I1 is displayed.

2. Entering the instruction

   Hold down the Shift button and then press the "+" button (Z3 key) or "-" button (Z2 key) to scroll through the available instructions. Find the instruction you want and release the Shift button.

3. Selecting the instruction number

   Use the Z4 key to position the cursor on the number. As in the case of entering the instruction, hold down the Shift button and press the "+" button (Z3 key) or "-" button (Z2 key) to scroll through the numbers. Find the number you want and release the Shift button.

■ Deleting instructions

To delete an instruction, position the cursor on the instruction, hold down the Shift button and press "Del." (Menu/Ok button).

■ Inserting branches

Use the Z keys to move the cursor to a branch area. Hold down the Shift button, and press one of the Z1 to Z4 keys where you want to insert a branch. A branch is created in the rung.

■ Deleting branches

Use the Z keys to move the cursor to a branch area. Hold down the Shift button and press the "Del." button (Menu/Ok button). The branch is deleted from the rung.

10 Memory Backup During Voltage Drop

When power is switched OFF, the auxiliary coil, timer, high-speed counter and counter values will automatically be written to and saved on the PRO-iO2 module's built-in EEPROM and will be saved for approximately 10 years. For how to set up this feature,

Reference *PRO-iO2 User Manual*

This feature is initially not enabled. Unless it is enabled (set), all data values will revert to their initial values when power is switched OFF.

Note

Please be aware that Digital Electronics Corporation shall not be held liable by the user for any damages, losses, or third party claims arising from the use of this product.

Digital Electronics Corporation
8-2-52 Nanko Higashi, Suminoe-ku, Osaka 559-0031, Japan
TEL: +81-(0)6-6613-3116
FAX: +81-(0)6-6613-5888
URL: http://www.pro-face.com/

