

I/O Modules, User Terminal Module, and SAnet Interface Module

for Infilex™ AC, Infilex™ GC, Infilex™ GD, PARAMATRIX™ 4, and Infilex™ BC I/O Control Unit

■ General

Model RY50XX series modules are connected to Infilex GC (multipurpose controller), Infilex GD (multipurpose data gathering panel), Infilex AC (AHU controller), PARAMATRIX 4, Infilex BC I/O control unit. The modules are varied as follows:

- I/O (input/output) modules
- UT (user terminal) module
- Integral type Operator Panel*
- SAnet I/F (interface) module

A desired combination of modules can be connected to Infilex GC basic unit, Infilex GD basic unit, or Infilex BC I/O control unit corresponding to the application or purpose. To Infilex AC basic unit, one I/O module and one UT module (or integral type Operator Panel) can be connected. For PARAMATRIX 4 basic module, standard combinations of I/O modules suitable for each model are available. Additional I/O modules are also connectable to the PARAMATRIX 4 basic module.

Note:

- * For details of integral type Operator Panel, refer to **Specifications/Instructions** of Operator Panel (AB-6546).

■ Features

- Compact design:
Small bodies of I/O, UT, and SAnet I/F modules allow installation in limited room inside a control panel.
- I/O module configuration:
Input and output types can be selected and the number of points to manage can be increased or decreased corresponding to the application or purpose.
To Infilex GC and Infilex GD with SAnet I/F module, Intelligent Component Series devices are connectable via SAnet network.
- Cooperation with Building Management System (BMS):
By connecting to our BMS, each building facility is centrally controlled.
- Autonomous distributed control:
Even if a trouble occurs in the BMS, Infilex AC, Infilex GC, Infilex GD, PARAMATRIX 4, and Infilex BC I/O control unit individually perform backup operation to distribute potential risks caused by malfunction of the BMS.
- Installation:
Screwless push-in terminals are provided on the I/O modules, modular jack is provided on UT module, and two terminal blocks are provided on the SAnet I/F module. This reduces the wiring workload.
Additionally, either DIN rail mount or screw mount is selectable.
- CE Marking certified product:
I/O modules, UT module, and SAnet I/F module Models RY50XX conform to all the applicable standards of CE Marking.



Safety Precautions

Please read instructions carefully and use the product as specified in this manual. Be sure to keep this manual nearby for quick reference.

Restrictions on Use

This product was developed, designed, and manufactured for general air conditioning use.
 Do not use the product in a situation where human life may be at risk or for nuclear applications in radiation-controlled areas. If you wish to use the product in a radiation-controlled area, please contact Azbil Corporation.
 Particularly when the product is used in applications like the following where safety is especially required, implementation of fail-safe design, redundant design, regular maintenance, etc., should receive appropriate consideration so that the product can be used safely and reliably.

- Safety devices for protecting the human body
- Start/stop control devices for transportation machines
- Aeronautical/aerospace machines

For system design, application design, instructions for use, or product applications, please contact Azbil Corporation.
 Azbil Corporation bears no responsibility for any result, or lack of result, deriving from the customer's use of the product.

■ Caution for Instrumentation Design

Considering unexpected failures or contingencies, be sure to design and check safety of the system and equipment.



■ Recommended Design Life (Recommended Period of Use)

It is recommended that this product be used within its design life. The design life is the period during which you can use the product safely and reliably based on the design specifications. If the product is used beyond this period, its failure ratio may increase due to time-related deterioration of parts, etc. The design life during which the product can operate reliably with the lowest failure ratio and least deterioration over time is estimated scientifically based on acceleration tests, endurance tests, etc., taking into consideration the operating environment, conditions, and frequency of use as basic parameters.



The design life of this product is 15 years.

The design life specified for this product assumes that maintenance, such as replacement of the limited-life parts, is carried out properly. Refer to the section on maintenance in this manual.





■ Warnings and Cautions

	WARNING	Alerts users that improper handling may cause death or serious injury.
	CAUTION	Alerts users that improper handling may cause minor injury or material loss.













■ Symbols

	Notifies users that specific actions are prohibited to prevent possible danger. The symbol inside ⊘ graphically indicates the prohibited action. (For example, the sign on the left means that disassembly is prohibited.)
	Instructs users to carry out a specific obligatory action to prevent possible danger. The symbol inside ● graphically indicates the actual action to be carried out. (For example, the sign on the left indicates general instructions.)

 WARNING

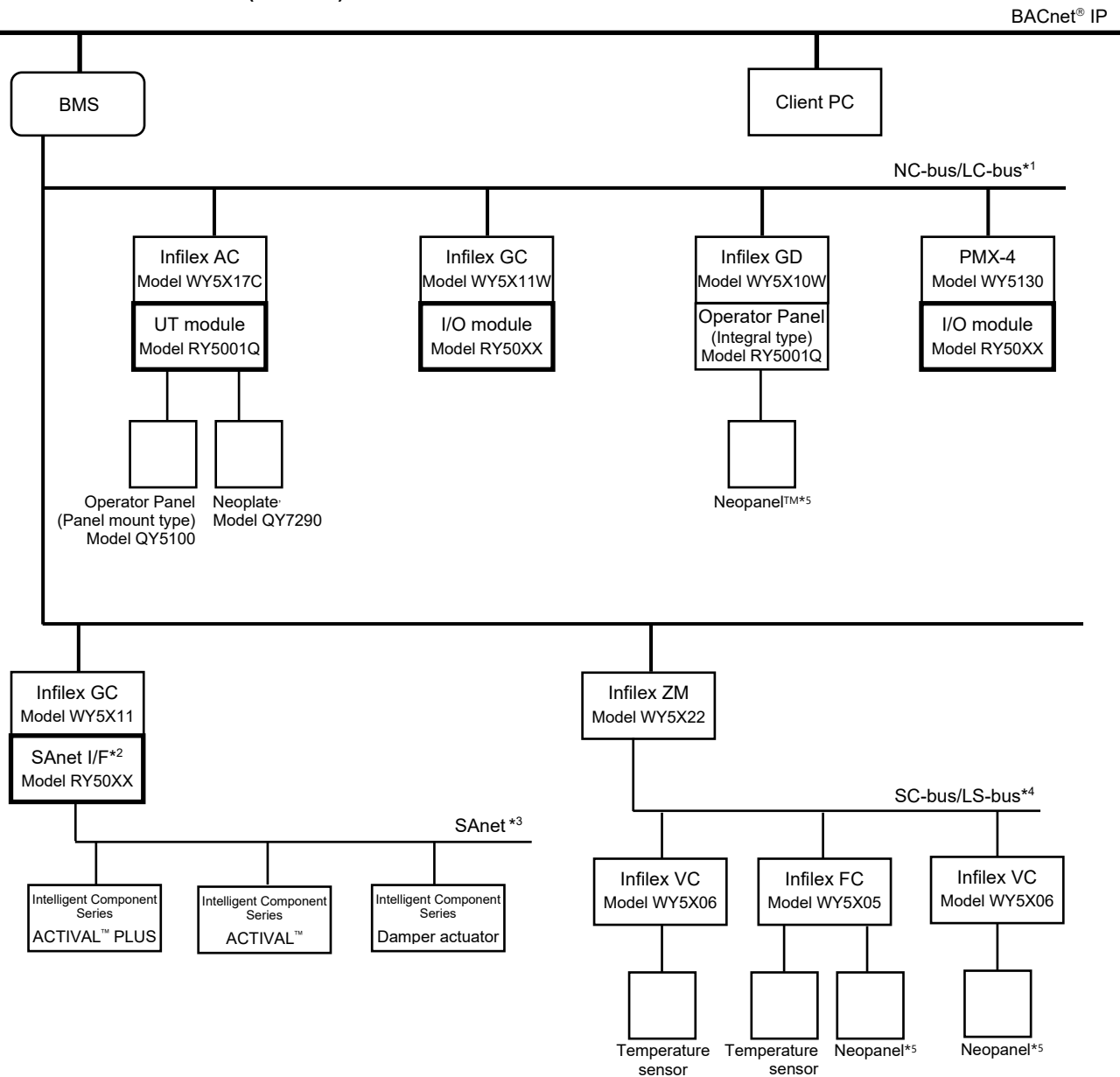
	Install this product in a place, such as a control cabinet, where only the administrator has access to it. Otherwise there is a danger of electric shock.
	Before wiring or maintenance, be sure to turn off the power to this product. Failure to do so may result in electric shock or device failure.
	Do not insert conductive objects through product ventilation holes. Doing so may cause electric shock.
	Do not touch electrically charged parts. Doing so may cause electric shock.

 CAUTION

	Take anti-lightning surge measures based on regional and building characteristics. Lightning may cause fire or critical damage to this product if protective measures are not taken.
	Keep this product in the package for storage. Failure to do so may damage or stain the product.
	Install, wire, and use this product according to the specifications stated in this manual. Failure to do so may cause fire or device failure.
	Take anti-noise measures if this product is installed in a location near source of electric noise. Failure to do so may cause malfunction or device failure.
	Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards. Failure to do so may cause fire or electric shock.
	After installing this product, check that it is steady and does not move. Otherwise it may fall or fail.
	All wiring must comply with applicable codes and ordinances. Otherwise there is a danger of fire.
	For wiring, strip the insulation from cables as specified in this manual. If the length of exposed wire is longer than specified, it may cause electric shock or short circuit between adjacent terminals. If it is too short, it may not make proper contact.
	Do not block the ventilation holes of this product. Doing so may cause device failure.
	Do not allow wire clippings, metal shavings, and other refuse to enter into the product. Doing so may cause fire or product damage.
	Do not disassemble this product. Doing so may cause device failure.
	Before cleaning the product, be sure to turn off the power to the product. Failure to do so may cause electric shock, device failure, or malfunction.

■ System Configuration

For BMS and devices that are compatible to I/O modules, UT module, and/or SAnet I/F module, ask our salesperson. System configuration that includes Inflex BC is different from the below example. Refer to **Specifications/Instructions of Inflex BC I/O Control Unit (AB-7163)** for details.



BMS: Building management system
 PMX-4: PARAMATRIX 4
 SAnet I/F: SAnet interface module

Notes:

- *1 For detailed specifications of NC-bus/LC-bus, refer to the **Specifications/Instructions** of the controllers connected to NC-bus/LC-bus.
- *2 SAnet I/F module is connectable to the NC-bus and IP communication models of Inflex GC/Inflex GD, not connectable to the LC-bus (LonTalk®) communication model.
- *3 For detailed specifications of SAnet, refer to **Installation Manual of Intelligent Component Series for SAnet Communication (AB-6713)**.
- *4 For detailed specifications of SC-bus/LS-bus, refer to the **Specifications/Instructions** of the SC-bus/LS-bus communication models of the sub-controllers. Note that SC-bus must be selected in combination with NC-bus, and that LS-bus must be selected in combination with LC-bus.
- *5 Neopanel2 (model QJ-1301) or Neopanel (model QY7205) can be connected.

Figure 1. System configuration example

■ **Hardware Configurations**

● **Infilex GC and Infilex GD**

Inputs and outputs of the Infilex GC/Infilex GD are configured by I/O modules which are directly connected to the Infilex GC/Infilex GD basic unit. UT module, integral type Operator Panel, and SAnet I/F module are also connectable to the basic unit. The following are the requirements to connect these modules to the basic unit. Infilex GC/Infilex GD hardware configuration must meet all of the three requirements below.

1. Number of I/O modules + UT module + integral type Operator Panel + SAnet I/F module ≤ 16
Note that 16 modules may not be connectable if the total current consumption exceeds the limit.
2. Number of UT module or Operator Panel (integrated type) ≤ 1
Note: It is not possible to use the UT module and the Operator Panel (integrated type) at the same time.
3. Number of SAnet I/F module ≤ 2

● **Infilex AC**

To Infilex AC model WY5117C1X0X/WY5317C0X00, one UT module or integral type Operator Panel is connectable. To Infilex AC model WY5117C140X/WY5317C0400, one I/O module (DO+DI, AO, or AI + Pt) is connectable in addition to one UT module or integral type Operator Panel. An I/O module without UT module or integral type Operator Panel is also connectable to Model WY5117C140X/WY5317C0400.

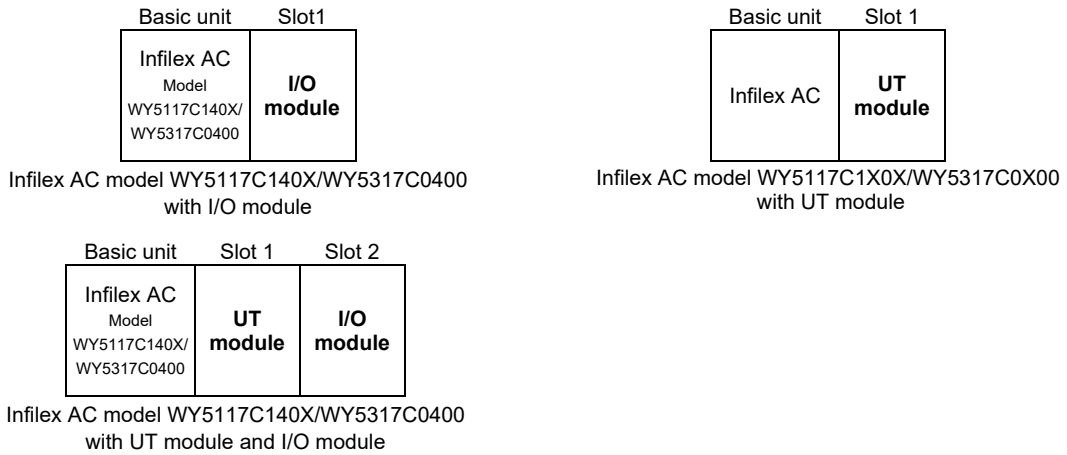


Figure 2. Hardware configuration examples

For details of the integral type Operator Panel, see **Specifications/Instructions of Operator Panel (AB-6546)**.

● **PARAMATRIX 4**

The I/O modules of PARAMATRIX 4 are determined by the PARAMATRIX 4 model to select. As inputs and outputs required for various chiller plant system differ, I/O modules are added to or deleted from the determined I/O modules if necessary. Up to 99 I/O points are assigned to PARAMATRIX 4.

For the I/O modules required for each PARAMATRIX 4 model, refer to the **Installation Manual of PARAMATRIX 4 (AB-7117)**.

● **Infilex BC I/O control unit**

Inputs and outputs of the Infilex BC I/O control unit are configured by I/O modules which are directly connected to the Infilex BC I/O control unit. UT module and integral type Operator Panel are also connectable to the Infilex BC I/O control unit.

The following are the requirements to connect these modules to the Infilex BC I/O control unit. Its hardware configuration must meet all of the two requirements below.

1. Number of I/O modules + UT module + integral type Operator Panel ≤ 16
Note that 16 modules may not be connectable if the total current consumption exceeds the limit.
2. Number of UT module + integral type Operator Panel ≤ 2, Number of integral type Operator Panel ≤ 1
Note that panel mount type Operator Panel is not connectable to UT module if integral type Operator Panel is connected.

■ Model Numbers

Model number	Description	Point type and number of I/O points to be used	Abbr. of modules	Connectable to:		
				GC/GD/BC	AC	PMX
RY50	Base model number	—	—	—	—	—
08	S 0000	I/O module for 8 digital inputs	DI	Yes	No	Yes
16	S 0000	I/O module for 16 digital inputs				
08	D 0000	I/O module for 8 relay outputs (N.O. contacts)	DO	Yes	No	Yes
16	D 0000	I/O module for 16 relay outputs (N.O. contacts)				
16	R 0000	I/O module for 8 relay outputs (N.O. contacts) + 8 digital inputs	DO+DI	Yes	Yes ^{*2,*3}	Yes
08	C 0000	I/O module for 8 relay outputs (N.O./N.C. contacts)	DOC	Yes	No	Yes
04	Y 0000	I/O module for 4 remote control relay outputs	RRD	Yes	No	No
04	T 0000	I/O module for 4 totalizer pulse inputs	TOT	Yes	No	Yes
16	T 0000	I/O module for 16 totalizer pulse inputs				
02	M 0000	I/O module for 2 voltage/current outputs	AO	Yes	Yes ^{*3,*6}	Yes
04	M 0000	I/O module for 4 voltage/current outputs				
02	A 0000	I/O module for 2 voltage/current inputs (high-speed type)	HAI	No	No	Yes
04	A 0000	I/O module for 4 voltage/current inputs	AI	Yes	No	Yes
04	P 0000	I/O module for 4 temperature inputs (Pt100)	Pt	Yes	No	Yes
04	P 000K	I/O module for 4 temperature inputs (Pt1000)				
04	J 0000	I/O module for 2 voltage /current inputs + 2 temperature inputs (Pt100)	AI+Pt	Yes	Yes ^{*3}	Yes
04	J 000K	I/O module for 2 voltage /current inputs + 2 temperature inputs (Pt1000)				
01	F 0000	I/O module for 1 Modutrol Motor output	MM	Yes	No	Yes
03	F 0000	I/O module for 3 Modutrol Motor outputs				
01	U 0000	User terminal (UT) module	UT	Yes	Yes	No
01	Q 0000	Operator Panel (integral type) ^{*11}	OP	Yes	Yes	No
01	E 0000	SAnet interface module ^{*12}	SAnet I/F	Yes ^{*8}	No	No

Point types

SOP: Status Only Point, CAP: Command with SAP, SCP: Status and COS (Change of Status) Point,
 SAP: Status Alarm Point, TTD: Totalizer Digital Point, OOA: ON/OFF/Auto Point,
 CCP: Command with COS Point, AOP: Alarm Only Point, HOL: HI/OFF/LO Command with COS Point

Devices to which I/O modules are connectable ("Yes" means connectable, "No" means not connectable.)

GC: Inflex GC / GD: Inflex GD / BC: Inflex BC I/O control unit

AC: Inflex AC

PMX: PARAMATRIX 4

Notes:

- *1 Since the DO module does not have any N.C. (normally close) contact, the DOC module is used for the OOA or HOL.
- *2 For DO+DI module connected to Inflex AC Model WY5117C140X/WY5317C0400, only 4 DI points and 4 DO points are available.
- *3 Only Inflex AC Models WY5117C140X and WY5317C0400 support the connection.
- *4 In the OOA transfer, ON/OFF is assigned to the first N.O./N.C. contact, and AUTO is assigned to the second N.O./N.C. contact. In the HOL transfer, HI/OFF is assigned to the first N.O./N.C. contact, and LO is assigned to N.O. of the second N.O./N.C. contact.

- *5 For the HOLm/f, 3 DO points (N.O./N.C. contacts) of the DOC module are required.
HI: N.O. contact of DI 1, OFF: N.C. contact of DO 2, LO: N.O. contact of DO 3
- *6 For AO module connected to Inflex AC Model WY5117C140X/WY5317C0400, voltage output (0-5 V, 0-10 V, 1-5 V, 2-10 V) is only available.
- *7 The software revision 19 and the later revisions of Inflex GC, Inflex GD, and Inflex BC I/O control unit support the connection.
- *8 For Inflex GC and Inflex GD, Model WY5111/WY5511 and Model WY5110/ WY5510 support the connection.
- *9 Inflex AC Models WY5117C140K and WY5117C1400 (the revision 04 and later revisions of software) support the connection.
- *10 Two points (for AO3 and AI) are assigned to 1 MM point in the point file.

The following shows the points corresponding to IO numbers.

	IO number	Point type
MM 1:	(1, 2)	(AO3, AI)
MM 2:	(3, 4)	(AO3, AI)
MM 3:	(5, 6)	(AO3, AI)

- *11 For details of integral type Operator Panel, refer to **Specifications/Instructions of Operator Panel (AB-6546)**.
- *12 SAnet I/F module enables Inflex GC and Inflex GD to connect to Intelligent Component Series devices via SAnet protocol.
- *13 Neopanel2 (model QJ-1301) or Neopanel without an airflow switching button (model QY7205_1_ _ _) can be connected.

■ Specifications

For the specifications of integral type Operator Panel, refer to **Specifications/Instructions of Operator Panel (AB-6546)**.

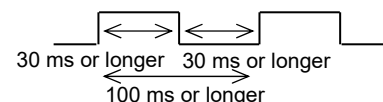
(1/2)

Item		Specification		
Environmental conditions	Rated operating conditions	Ambient temperature	0 °C to 50 °C	
		Ambient humidity	10 %RH to 90 %RH (Non-condensing)	
		Altitude	Max. 2,000 m	
		Vibration	Max. 5.9 m/s ² (at 10 Hz to 150 Hz) when connected to Inflex AC Max. 3.2 m/s ² (at 10 Hz to 150 Hz) when connected to Inflex GC, Inflex GD, PARAMATRIX 4, Inflex BC I/O control unit	
	Transport and storage conditions	Ambient temperature	-20 °C to 60 °C	
		Ambient humidity	5 %RH to 95 %RH (Non-condensing)	
		Vibration for storage	Max. 5.9 m/s ² (at 10 Hz to 150 Hz)	
		Vibration for transport	Max. 9.8 m/s ² (at 10 Hz to 150 Hz)	
Installation		Inside of control panel		
LED indication of SAnet I/F module		Communication status OFF: No data , idle Flashing: Sending/receiving data		
Backup in the event of power failure		Non-volatile memory backup		
Inputs of I/O modules	Digital input, totalizer pulse input*1	Current	5 mA DC (typ.)	
		Voltage	24 V DC (typ.)	
		Connectable output	Dry contact or open collector	
		Allowable contact ON-resistance	Max. 100 Ω	
		Allowable contact OFF-resistance	Min. 100 kΩ	
		Allowable ON residual voltage	Max. 3.0 V	
	Temperature input	Input signal	RTD (Pt100 (100 Ω/0 °C), Pt1000 (1000 Ω/0 °C))	
		Measuring range	-50 °C to 100 °C	
		Allowable setting range	0 °C to 100 °C / 0 °C to 50 °C / -20 °C to 80 °C / -20 °C to 30 °C / -50 °C to 100 °C	
	Voltage input	Input voltage range	0 V DC to 5 V DC / 0 V DC to 10 V DC / 1 V DC to 5 V DC / 2 V DC to 10 DC V	
		Input impedance	≥ Hcode 10: 1 MΩ (typ.) ≤ Hcode 09: 500 kΩ (typ.)	
	Current input	Input current range	4 mA DC to 20 mA DC	
		Input impedance	≥ Hcode 10: 23.5 Ω (typ.) ≤ Hcode 09: 250 Ω (typ.)	
	Voltage/current input (High-speed)*2	Insulation between channels	Insulated	
		Power feeding	24 V DC, max. 0.6 W (for a sensor in connection)	
		Measuring period	200 ms	
Outputs of I/O modules	Relay output (N.O. contact)	Output method	Relay output, N.O. contact (N.O. contacts share the same common line.)	
		Contact rating	Max. 24 V AC, 0.5 A (Inductive load: cosφ = 0.4 or more) Max. 24 V DC, 0.5 A	
		Minimum applicable load	5 V DC, 10 mA DC	
	Relay output (N.O./N.C. contact)	Output method	Relay output, N.O./N.C. contact	
		Contact rating	Max. 24 V AC, 1 A (Inductive load: cosφ = 0.4 or more) Max. 24 V DC, 1 A	
		Minimum applicable load	5 V DC, 100 mA DC	
	Voltage output	Output voltage range	0 V DC to 5 V DC / 0 V DC to 10 V DC / 1 V DC to 5 V DC / 2 V DC to 10 DC V	
		Minimum load resistance	10 kΩ	
	Current output	Output current range	4 mA DC to 20 mA DC	
		Maximum load resistance	500 Ω	
	Remote control relay output	Output method	Thyristor output	
		Output rating	Max. 24 V AC, 1.5 A	
		Connectable units	One remote control relay per point	
	Modutrol Motor output	Output method	Relay output, N.O. contact	
		Contact rating	Max. 24 V AC / 24 V DC, 1 A	
		Input signal	3-wire type feedback potentiometer Load resistance range: 100 Ω to 10 kΩ	

RTD: Resistance temperature detector

Notes:

*1 The pulse width and pulse intervals must satisfy three conditions shown in the right figure.



*2 Other specifications of the voltage/current input (high-speed) are the same as the specifications of the voltage input and of the current input.

(2/2)

Item		Specification	
Weight	I/O modules	DI module	160 g
		DO module	210 g
		DO+DI module	190 g
		DOC module	230 g
		RRD module	170 g
		TOT module	160 g
		AO module	170 g
		AI module	160 g
		HAI module	180 g
		Pt module	160 g
		AI+Pt module	160 g
		MM module	190 g
		UT module	160 g
	SAnet I/F module	170 g	
Material / color		Modified PPE / light gray	
Terminal connection	I/O modules	Screwless push-in terminals	
	UT module	Modular connector	
	SAnet I/F module	2 screwless push-in terminal blocks (detachable)	
Replacement part of SAnet I/F module		Fuse (Part No. 83957018-038)	

PPE: Polyphenylene ether

● Input/output specifications of UT module

Input to / output from:	Description	Specification	Connection	Wire specification
Digital user terminal	Temperature setting, air conditioning ON/OFF, etc.	Serial voltage transmission Transmission speed: 100 bps	Connector connection*1	LAN cable*2 Max. 50 m
Analog user terminal	Air conditioning ON/OFF, etc.	1 dry contact (instantaneous) Applied voltage/current: 12 V DC typ./ 10 mA DC typ.		
	LED output	Voltage output		
	Temperature setting input	Potentiometer input (1 kΩ to 10 kΩ)		

Notes:

*1 For connector connection, use Bel Stewart Connector's Plug: Model SS-37000-002.

This plug is also available at Azbil Corporation. (Part No. DY7207A0100, 100 pieces/set)

*2 LAN cable compliant with EIA/TIA-568 Category 3 or over (Φ0.5 mm x 4 pairs) is required.

For *1 and *2, the connector cable (regular cable: Part No. DY7210, short cable: Part No. DY7220) are available at Azbil Corporation.

● DP-bus specifications (for connection between UT module and the panel-mount type Operator Panel)

Item	Specification
Transmission system	RS-485
Transmission speed	4800 bps
The number of the bus	1 DP-bus connectable to Inflex GC, Inflex GD, Inflex AC, or Inflex BC I/O control unit
Transmission distance	10 m (modular cable length)

● SAnet specifications (for connection between SAnet I/F module and Intelligent Component Series devices)

Item	Specification
Transmission system	Voltage transmission (SAnet)
Transmission speed	1200 bps
Transmission distance	Transmission distance varies depending on the number of devices and the type of devices to be connected to. For details regarding the transmission distance, refer to Installation Manual of Intelligent Component Series for SAnet Communication (AB-6713) .

■ Wire Specifications

Item		Specification	Wiring length*1
I/O modules*3	Temperature input*2	JIS IV, JIS CVV, KPEV 1.25 mm ²	100 m
	Voltage/current input	JIS IV, JIS CVV, KPEV 1.25 mm ²	100 m
	Voltage/current output	JIS IV, JIS CVV, KPEV 0.9 mm ² , 1.25 mm ²	100 m
	Modutrol Motor output	JIS IV, JIS CVV, KPEV 1.25 mm ²	100 m
	Digital input	JIS IV, JIS CVV, KPEV 0.5 mm ² , 0.75 mm ² , 0.9 mm ² , 1.25 mm ²	100 m
	Relay output	JIS IV, JIS CVV, KPEV 1.25 mm ²	100 m
	Remote control relay output	JIS IV, JIS CVV, KPEV 1.25 mm ²	100 m
UT module		LAN cable	50 m (Remote Controller bus) 10 m (DP-bus)
SAnet I/F module*4		JIS IV, JIS CVV, JIS VCT 0.75 mm ² , 1.25 mm ² , 0.9 mm ²	Refer to Installation Manual of Intelligent Component Series for SAnet Communication (AB-6713) .

JIS: Japanese Industrial Standards

KPEV: Cable standard provided by Furukawa Electric Co., Ltd.

Notes:

*1 Wiring length shown above is the total wiring length from the modules to a device in connection, including the wiring to and from an external terminal block.

*2 RTD (Pt1000) temperature input is two-wire. Take the measuring error into account because the wire resistance causes measuring error. For instance, 1.25 mm² size wire causes approx. 0.1 °C measuring error every 10 m. Correct the measuring error by setting the controller.

*3 On the I/O modules, screwless push-in terminals are provided. Strip the wire sheath and connect the wires.

Sheath strip length: 8 mm (Pin terminal cannot be used.), button pressing force: 14 to 16 N

*4 For detailed specifications including wiring length of SAnet communication line, (24 V (~), GND (⊥), SAnet), refer to **Installation Manual of Intelligent Component Series for SAnet Communication (AB-6713)**.

On SAnet I/F module, 2 screwless push-in terminal blocks (manufactured by Phoenix Contact) are provided.

Sheath strip length: 10 mm (Pin terminal cannot be used.), button pressing force: 30 N

■ Dimensions

The following figure illustrates the image of Model RY5016D

Outline dimensions of the other I/O modules, UT module, and SAnet I/F module are the same as the following figure.

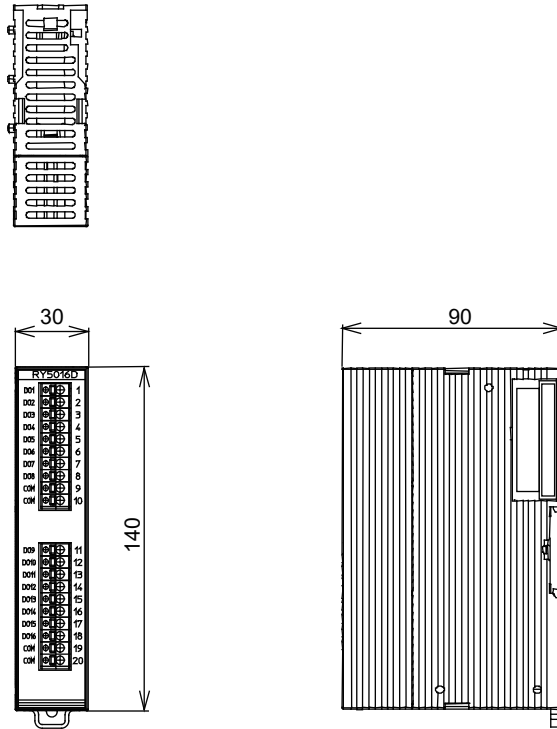


Figure 3. Dimensions of the I/O module model RY5016D (mm)

■ Installation

⚠ WARNING	
!	Install this product in a place, such as a control cabinet, where only the administrator has access to it. Otherwise there is a danger of electric shock.

⚠ CAUTION	
!	Install, wire, and use this product according to the specifications stated in this manual. Failure to do so may cause fire or device failure.
!	Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards. Failure to do so may cause fire or electric shock.
!	After installing this product, check that it is steady and does not move. Otherwise it may fall or fail.

IMPORTANT:	
•	After mounting the product on the DIN rail, check that it is securely fixed with all the holders of all the modules pushed up. Failing to fix it with holders may cause the product to fall off of the DIN rail resulting in malfunction or damage.

(Reference) For installation and maintenance space, refer to the specifications and operation manuals of the basic units (InflexGC, Inflex GD, Inflex AC, and PARAMATRIX4).

■ **Wiring**

⚠ WARNING

- !** Before wiring, be sure to turn off the power to this product.
Failure to do so may result in electric shock or device failure.

⚠ CAUTION

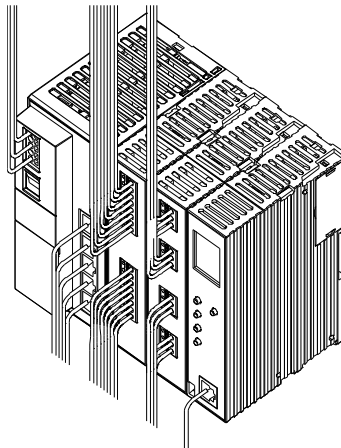
- !** Take anti-noise measures if this product is installed in a location near source of electric noise.
Failure to do so may cause malfunction or device failure.
- !** Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards.
Failure to do so may cause fire or electric shock.
- !** After installing this product, check that it is steady and does not move.
Otherwise it may fall or fail.
- !** Wiring must be performed in compliance with applicable standards such as the electrical equipment technical standards under the MITI and the Interior Wiring Code of JEAC.
Otherwise there is a danger of fire.
- !** For wiring, strip the insulation from cables as specified in this manual.
If the length of exposed wire is longer than specified, it may cause electric shock or short circuit between adjacent terminals. If it is too short, it may not make proper contact.

IMPORTANT:

- Incorrect wiring may cause the device to fail. Before turning on the power, check that all wires are correctly connected.
- Do not test the withstand voltage of this product. Applying a high voltage may cause the product to fail.
- If more than the rated voltage is accidentally applied to this product, replace the product with a new one.
Failure to do so may cause device failure.

● **Notes for wiring**

- Do not use unused terminals of this product as relay terminals. Doing so may cause failure.
- When supplying power from outside using a transformer to input/output ports, etc., install a protective circuit such as a breaker on the power supply source.
- Power wires must be routed separately from communication wires and signal wires.
Failure to do so may let noise invade the signal wire to cause communication errors.
- Do not hide the front of the product with the wires because it has areas for LED displays and to adjust the product. Draw the wires upward or downward of the product.
- After wiring, reconfirm that the wiring is done correctly.
- Use the specified cables.
- Take care that tension caused by the wired cables is not applied to the unit.

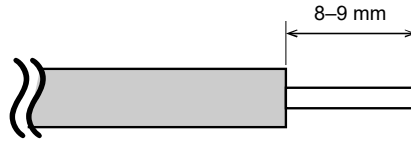


● **Wiring the terminal blocks**

Wiring method for Hcode10 or later

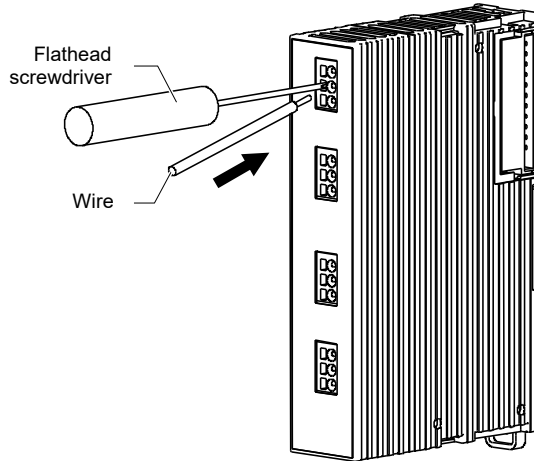
- (1) Strip 8–9 mm of sheath from the cable core wire.

Note: A sheath removal gauge is on the front face of the product.

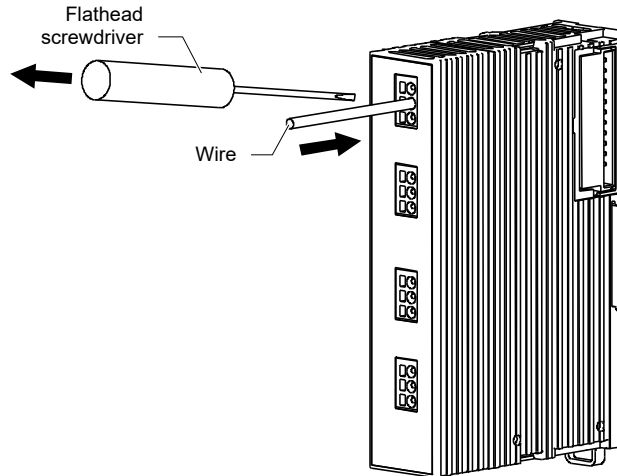


Make sure that no stray wires are on the sheath-removed part of the cable.

- (2) Insert a flathead screwdriver* into the screwdriver insertion slot (square hole) . While keeping the screwdriver there, insert the wire into the terminal (round hole) until it reaches the back end.

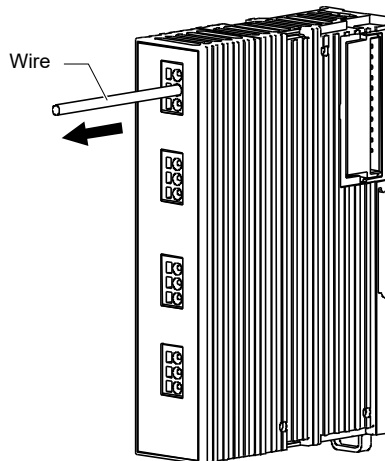


- (3) Pull out the screwdriver while holding the wire in.



- (4) Lightly pull on the wire to check that it does not come out.

Note: If you pull the wire diagonally, it may be disconnected.



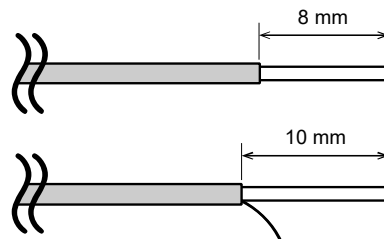
- (5) Check that there are no stray wires at the hole in which the wire was inserted.

* Recommended screwdriver: SZF 0-0,4×2,5 model 1204504 made by Phoenix Contact

Wiring method for Hcode09 or earlier

- (1) Strip 8 mm of sheath from the cable core wire.

For SAnet I/F, strip 10 mm of sheath.

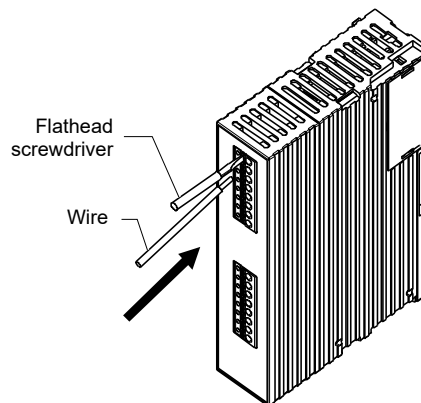


Make sure that no stray wires are on the sheath-removed part of the cable.

- (2) Pressing the button on the terminal block to the bottom with a flathead screwdriver and insert a wire, and then release the button.

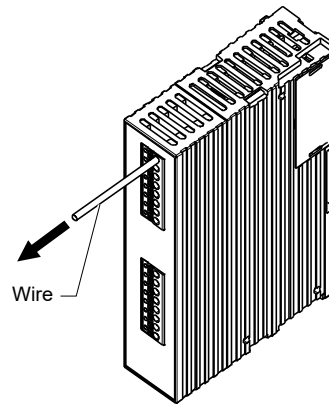
The button-pressing force is 17 N.

For SAnet I/F, the button-pressing force is 30 N.



- (3) Lightly pull on the wire to check that it does not come out.

Note: If you pull the wire diagonally, it may be disconnected.



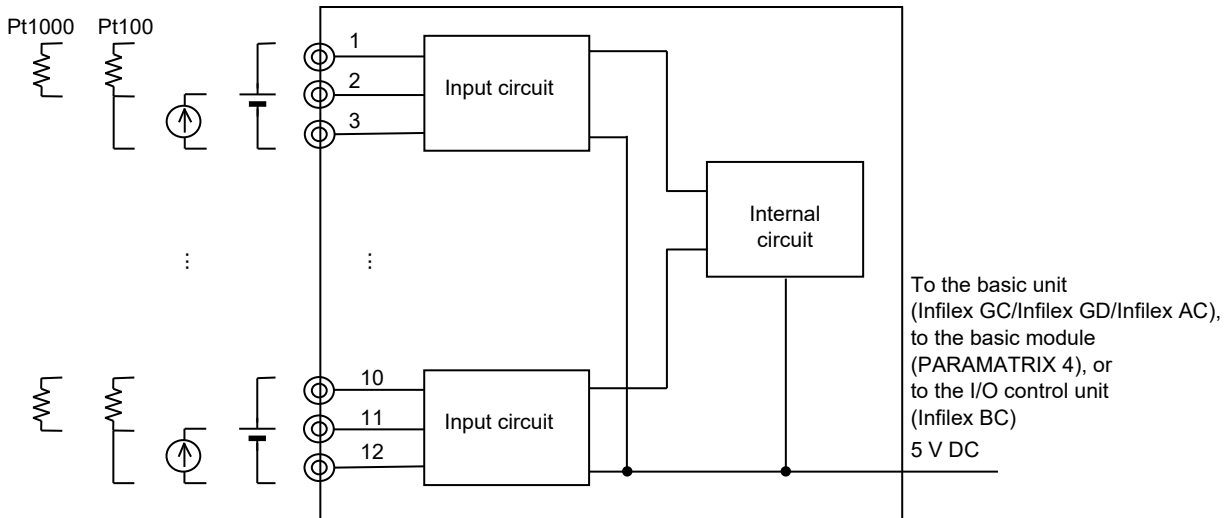
- (4) Check that there are no stray wires at the hole in which the wire was inserted.

● **AI module: Model RY5004A (Four voltage/current input points)**

Pt module: Model RY5004P (Four Pt input points)

AI+Pt module: Module RY5004J

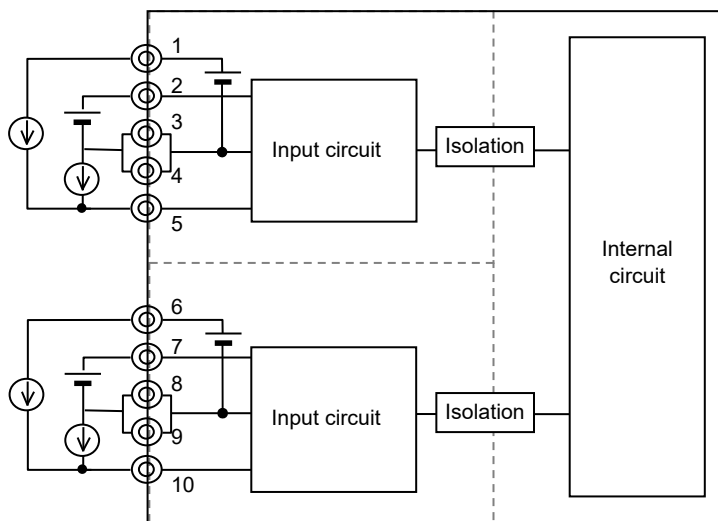
(Terminals 1 – 3 and 4 – 6: Two voltage/current input points, Terminals 7 – 9, 10 – 12: Two Pt input points)



Note: Consider isolation of devices in connection when wiring the voltage/current input line.

Figure 4. Wiring of AI module/ Pt module / AI+PT module

● **HAI module: Model RY5002A (Two voltage/current inputs)**



- - -: Items surrounded by dashed lines are isolated from others.

Figure 5. Wiring of HAI module

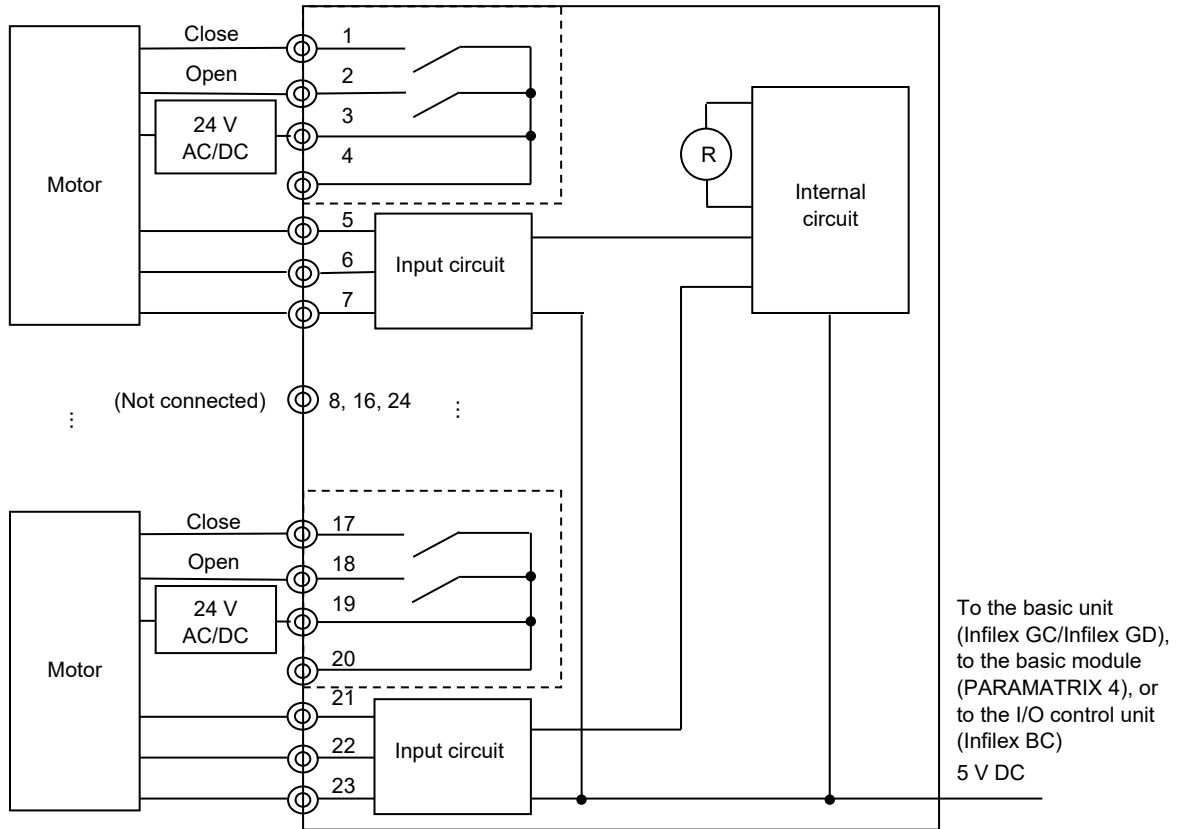
Table 1. Wiring details of voltage input and current input

Terminal		Voltage input wiring	Current input wiring		
1st input	2nd input		Current signal only	Common (two-wire) (sharing with power supply)	Current signal only (for HAI module feeding power to the device in connection*)
1	6			Current (-)	Power supply terminal (+) of the device in connection
2	7	Voltage (+)			
3	8	Voltage (-)			Power supply terminal (-) of the device in connection
4	9		Current (-)		Current (-)
5	10		Current (+)	Current (+)	Current (+)

Note:

* The device in connection must use the common line for power supply and 0 V signal. (Max. 24 V DC, 0.6 W power)

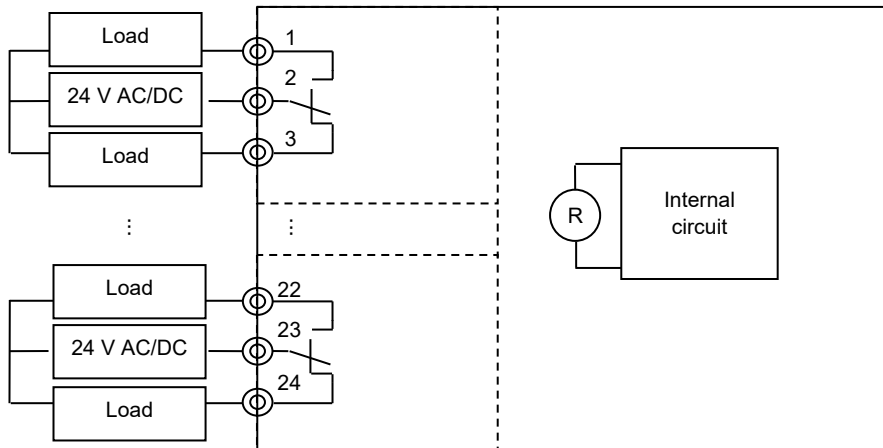
● **MM module: Model RY5001F/Model RY5003F**



- - -: Items surrounded by dashed lines are isolated from others.

Figure 6. Wiring of MM module

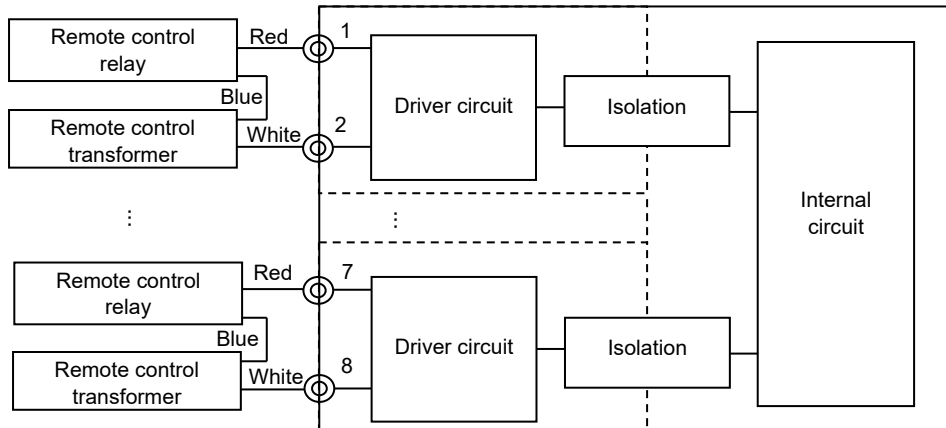
● **DOC module: Model RY5008C**



- - -: Items surrounded by dashed lines are isolated from others.

Figure 7. Wiring of DOC module

● RRD module: Model RY5004Y

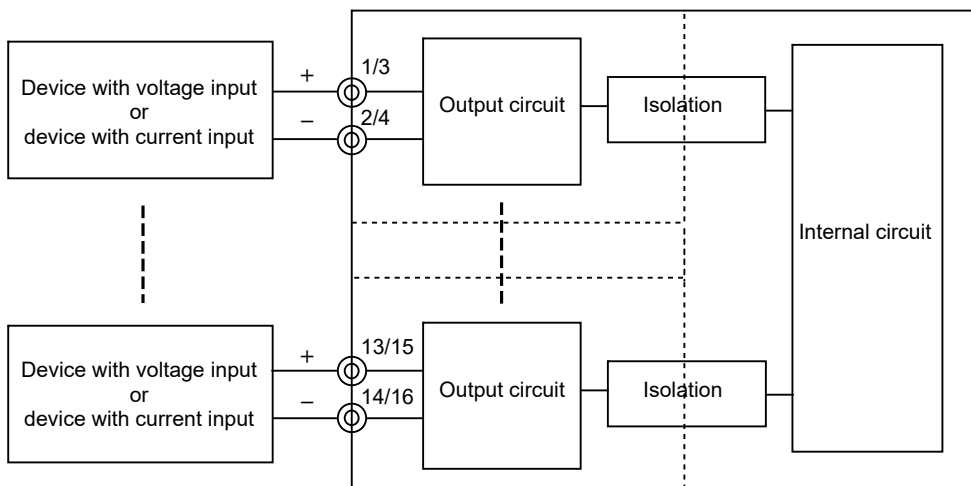


- - -: Items surrounded by dashed lines are isolated from others.

Figure 8. Wiring of RRD module

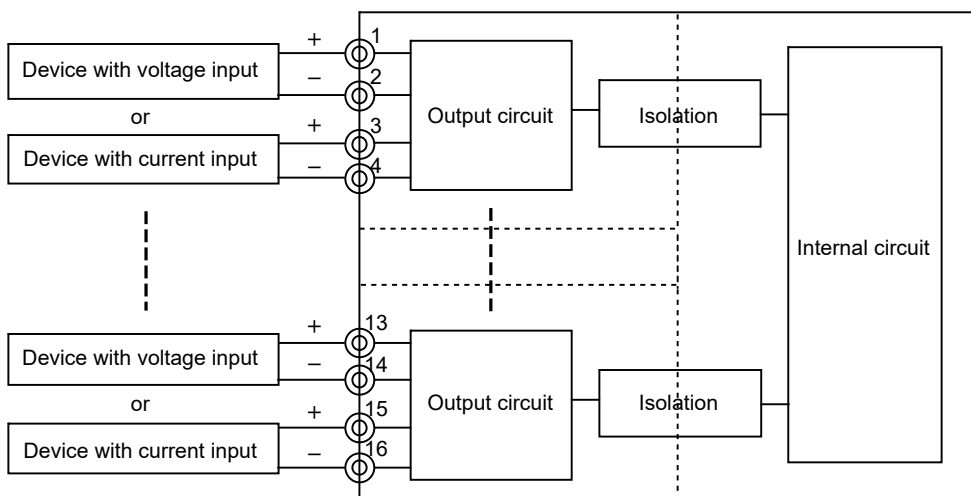
● AO module: Model RY5002M/R5004M

For Hcode10 or later



Note: 1. The areas enclosed by "- - -" lines are internally isolated.

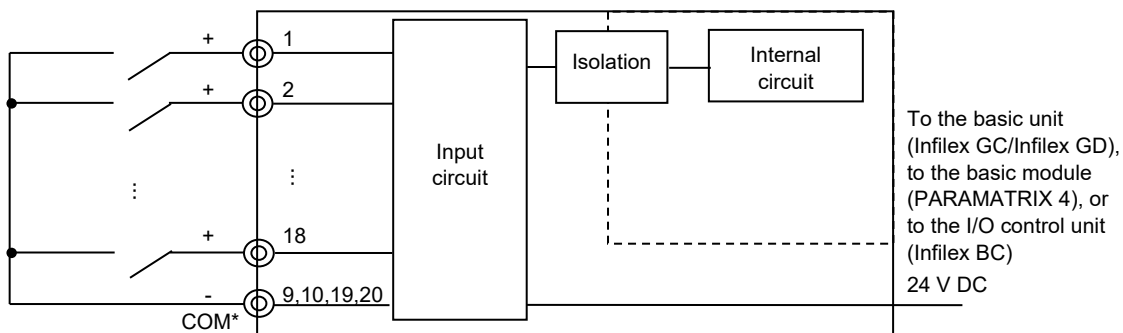
For Hcode09 or earlier



Note: 1. The areas enclosed by "- - -" lines are internally isolated.
2. Connecting voltage output and current output terminals is prohibited.

Figure 9. Wiring of AO module

- DI module: Model RY5008S/RY5016S
- TOT module: Model RY5004T/RY5016T



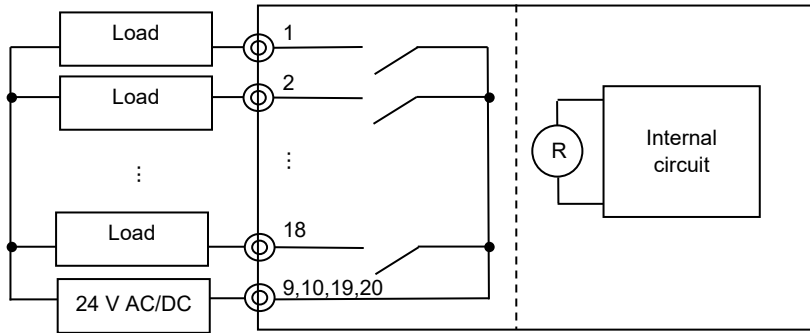
- - -: Items surrounded by dashed lines are isolated from others.

Note:

* The COM terminals of other DI and/or TOT modules cannot be used.

Figure 10. Wiring of DI module / TOT module

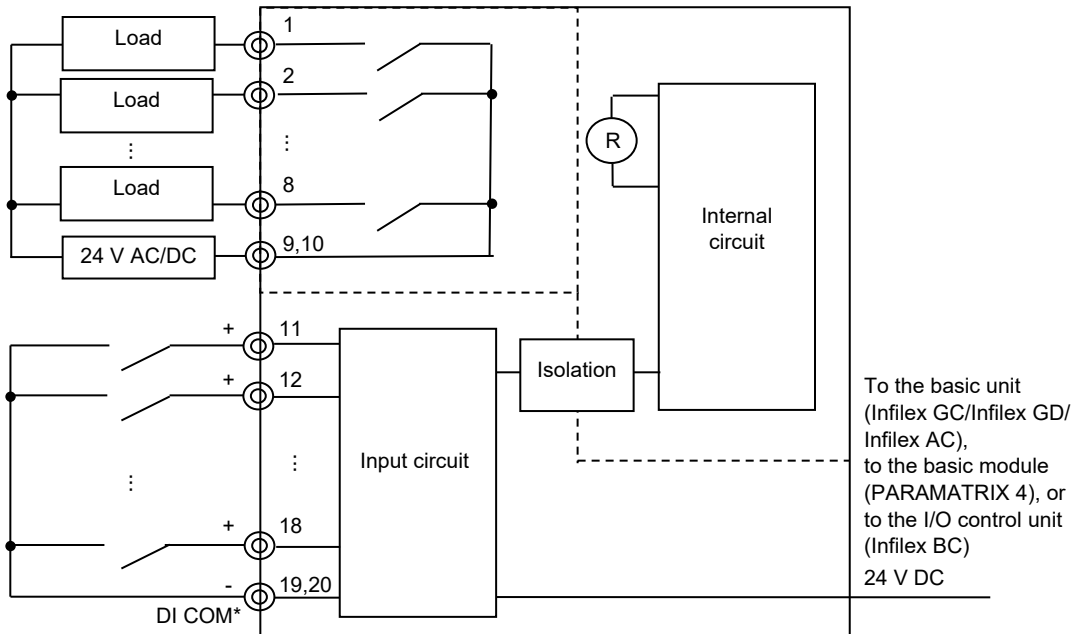
● DO module: Model RY5008D/R5016D



- - -: Items surrounded by dashed lines are isolated from others.

Figure 11. Wiring of DO module

● DO+DI module: Model RY5016R



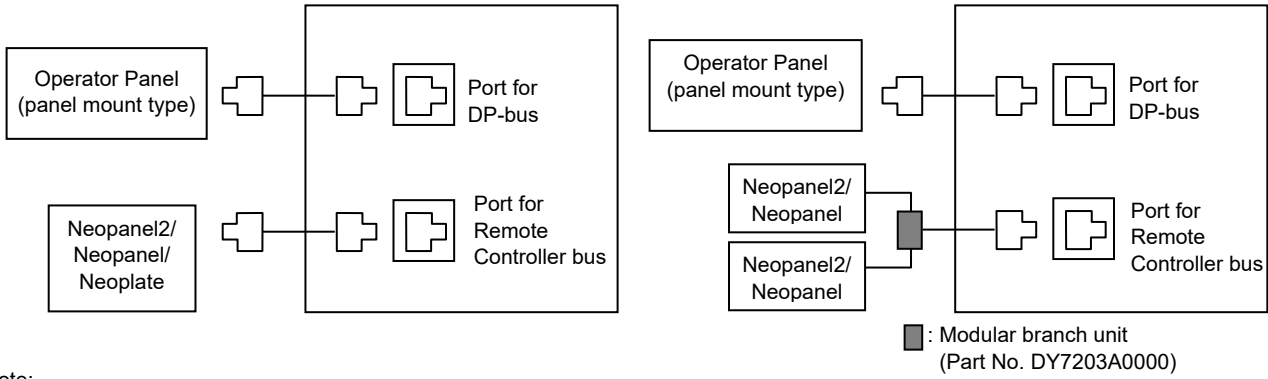
- - -: Items surrounded by dashed lines are isolated from others.

Notes:

* The COM terminals of other DO+DI module cannot be used.

Figure 12. Wiring of DO+DI module

● **UT module: Model RY5001U**



Note:

* For the restrictions on UT module connection, refer to **2. Restrictions on UT module connection** in the following section.

Figure 13. Wiring of UT module

● **Integral type Operator Panel: Model RY5001Q**

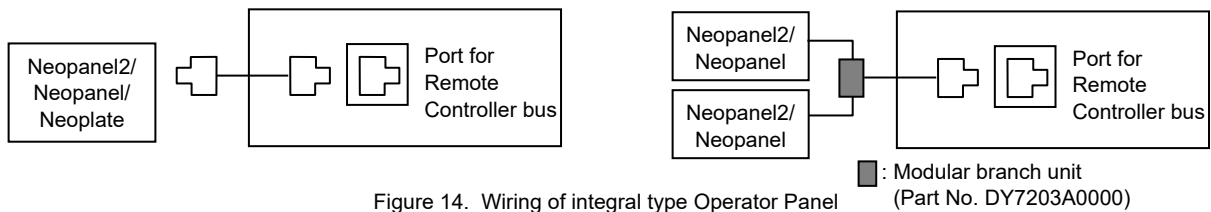
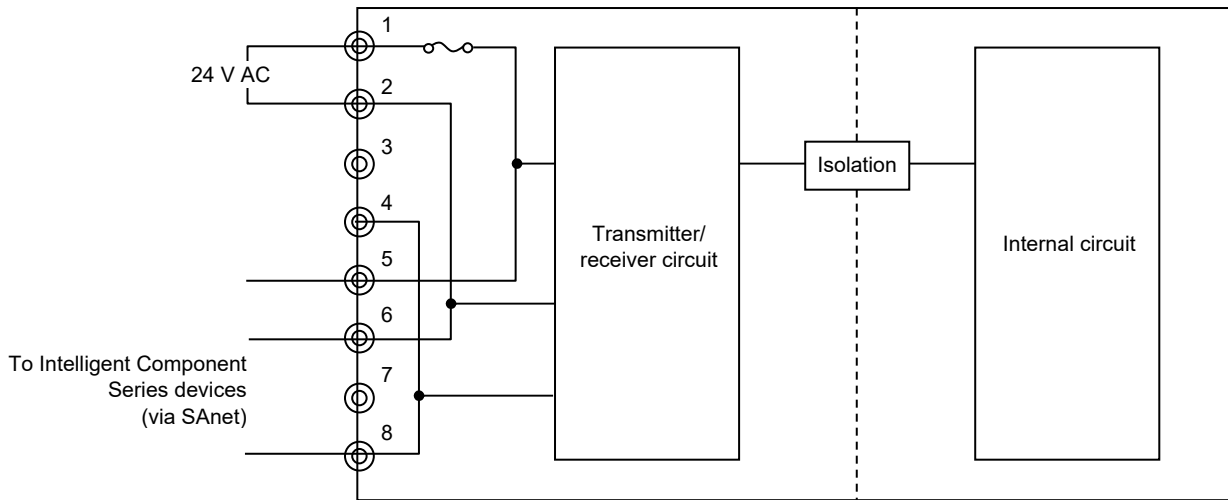


Figure 14. Wiring of integral type Operator Panel

● **SAnet I/F module: Model RY5001E**



Note:

* For details of requirements to connect devices via SAnet, refer to **Installation Manual of Intelligent Component Series for SAnet Communication (AB-6713)**.

Figure 15. Wiring of SAnet I/F module

■ Precautions for Configuring I/O Modules, UT Module, Integral Type Operator Panel, SAnet I/F Module

● Limited Supply Current

Up to 99 I/O points are available for each of the Inflex GC/Inflex GD basic unit, PARAMATRIX 4 basic module, and Inflex BC I/O control unit.

In addition to the limited I/O points, there are other restrictions on capacity of the power supplied by the basic unit (of Inflex GC/Inflex GD), basic module (of PARAMATRIX 4), and I/O control unit (of Inflex BC) to the connected I/O modules, UT module, integral type Operator Panel, and SAnet I/F module.

Note:

- * For SAnet I/F module, a separate isolation transformer (24 V AC) is required.

(1) Current to be supplied by the basic unit/basic module

The current supplied by Inflex AC is not limited.

5 V DC and 24 V DC are supplied by the Inflex GC/Inflex GD basic unit, the PARAMATRIX 4 basic module, and Inflex BC I/O control unit. (5 V DC and 24 V DC are isolated from each other.)

The following table shows the suppliable capacity and application of 5 V DC and 24 V DC power.

Table 2. Inflex GC/GD basic unit, Inflex BC I/O control unit

Power supply	Maximum of current to be supplied	Maximum of power to be supplied	Use of supplied power
5 V DC	1800 mA	15 W	I/O operation and relay drive
24 V DC	625 mA		I/O operation and DI circuit

Table 3. PARAMATRIX 4 basic module

Power supply	Maximum limit of current to be supplied	Maximum limit of power to be supplied	Use of supplied power
5 V DC	1800 mA	17 W	I/O operation and relay drive
24 V DC	625 mA		I/O operation and DI circuit

Requirements:

- The current of each power supply system must not exceed the maximum current to be supplied.
- Total power capacity (for both 5 V DC and 24 V DC) must not exceed the maximum power to be supplied.

Examples for Inflex GC, Inflex GD, Inflex BC I/O control unit

- 1) When supplying 1800 mA for 5 V DC power, up to 250 mA for 24 V DC power can be supplied.
- 2) When supplying 0 mA for 5 V DC power, up to 625 mA for 24 V DC power can be supplied.
- 3) When supplying 1000 mA for 5 V DC power, up to 416 mA for 24 V DC power can be supplied.

Examples for PARAMATRIX 4

- 4) When supplying 1800 mA for 5 V DC power, up to 333 mA for 24 V DC power can be supplied.
- 5) When supplying 400 mA for 5 V DC power, up to 625 mA for 24 V DC power can be supplied.
- 6) When supplying 1000 mA for 5 V DC power, up to 500 mA for 24 V DC power can be supplied.

(2) Totalizing consumption current of I/O modules, UT module, integral type Operator Panel, and SAnet I/F module

The number of I/O modules, UT module, integral type Operator Panel, and SAnet I/F module to be connected is determined by the total consumption current calculated from the basic capacities (shown in the table (1)) and additional capacities (shown in the table (2)). If the output of the modules cannot be specified, the number of modules to be connected is determined by the value calculated from the maximum consumption current (shown in the table (3)).

Basic capacities:

Consumption current necessary to operate the module under the following conditions.

- DO, DO+DI, and DOC modules: All the outputs must be OFF.
- AO module: All of the outputs must be the voltage output.
- HAI module: No I/O point must be used.
- Other modules: No conditions required.

Additional capacities:

Consumption current determined per use.

DO, DO+DI, DOC, AO, and HAI modules have the additional capacity.

① Basic capacities

Items	Max. number of I/O points	Power supply	
		5 V DC	24 V DC
Basic unit (Inflex GC/Inflex GD)	—	150 mA	0 mA
I/O control unit (Inflex BC)	—	150 mA	0 mA
Basic module (PARAMATRIX 4)	—	300 mA	0 mA
DI module	8	20 mA	40 mA
	16	20 mA	80 mA
DO module*1	8/16	20 mA	0 mA
DOC module*1	8	20 mA	0 mA
DO+DI module*1	16	20 mA	40 mA
TOT module	4	20 mA	20 mA
	16	20 mA	80 mA
RRD module	4	20 mA	0 mA
MM module	1	70 mA	0 mA
	3	150 mA	0 mA
AO module*1	2/4	40 mA	80 mA
AI module	4	20 mA	20 mA
HAI module	2	30 mA	50 mA
Pt module	4	20 mA	20 mA
AI+Pt module	4	20 mA	20 mA
UT module	—	20 mA	40 mA
Operator Panel (integral type)*2	—	30 mA	60 mA
SAnet I/F module	1	30 mA	0 mA

② Additional capacities of:

DO, DO+DI, and DOC modules

Maintain output	DO module: Add [5 V, 30 mA] per one output to the basic capacity.
	DO+DI module: Add [5 V, 30 mA] per one output to the basic capacity.
	DOC module: Add [5 V, 50 mA] per one output to the basic capacity.
Momentary output	Inflex GC, Inflex GD, PARAMATRIX 4, Inflex BC I/O control unit: Add [5 V, 100 mA] in total. (Additional capacity of the momentary output is not related to the number of momentary outputs.)

AO module

Current output	Add [24 V, 25 mA] per one output to the basic capacity.
----------------	---

HAI module

Power supply	Add [24 V, 45 mA] per one I/O point to the basic capacity.
--------------	--

③ Max. consumption current of each module

Items	Max. number of I/O points	Power supply	
		5 V DC	24 V DC
Basic unit (Inflex GC/Inflex GD)	—	150 mA	0 mA
I/O control unit (Inflex BC)	—	150 mA	0 mA
Basic module (PARAMATRIX 4)	—	300 mA	0 mA
DI module	8	20 mA	40 mA
	16	20 mA	80 mA
DO module	8	260 mA	0 mA
	16	500 mA	0 mA
DOC module	8	420 mA	0 mA
DO+DI module	16	260 mA	40 mA
TOT module	4	20 mA	20 mA
	16	20 mA	80 mA
RRD module	4	20 mA	0 mA
MM module	1	70 mA	0 mA
	3	150 mA	0 mA
AO module	2	40 mA	130 mA
	4	40 mA	180 mA
AI module	4	20 mA	20 mA
HAI module	2	30 mA	140 mA
Pt module	4	20 mA	20 mA
AI+Pt module	4	20 mA	20 mA
UT module	—	20 mA	40 mA
Operator Panel (integral type)*2	—	30 mA	60 mA
SAnet I/F module	1	30 mA	0 mA

Notes:

*1 Add the additional capacity to the basic capacity for the modules marked with "*1" when needed.

*2 For details of integral type Operator Panel, refer to **Specifications/Instructions of Operator Panel (AB-6546)**.

④ Calculation example:

If the following points are required for Inflex GC/Inflex GD, figure out necessary I/O modules and calculate their consumption current as described in the step 1 through 3.

Point type	Number of points
CAPm: 2 N.O. contact outputs	3
COPI	2
AOP	2
Pt100	3
AI (1-5 V input)	3
AO (current output)	2
AO (voltage output)	1

Step 1. Calculate points for each input/output type.

Contact outputs	$CAP (DO \times 2) \times 3 + COP (DO \times 1) \times 2 = 8$
Contact inputs	$CAP (DI \times 2) \times 3 + AOP (DI \times 1) \times 2 = 8$
Pt100	3
AI (1-5 V)	3
AO	3

Step 2. Select I/O modules suitable for the calculated points.

DO+DI module	1
Pt module	1
AI module	1
AO module with 4 outputs	1

Step 3. Calculate the total consumption current and power for 5 V DC/24 V DC supply voltage.

	Basic units, modules	Power supply	
		5 V DC	24 V DC
Basic capacity	Basic unit	150 mA	0 mA
	DO+DI module	20 mA	40 mA
	Pt module	20 mA	20 mA
	AI module	20 mA	20 mA
	AO module with 4 output points	40 mA	80 mA
Additional capacity	DO+DI (maintain)	30 mA x 2	0 mA
	DO+DI (momentary)	100 mA	0 mA
	AO (current output)	0 mA	25 mA x 2
Total		410 mA	210 mA
Power consumption	Total: 7.09 W	2.05 W	5.04 W

In this example, both the consumption current for each supply voltage (Max. 5 V DC: 1800 mA, 24 V DC: 625 mA) and the total consumption power (Max. 15 W) do not exceed the maximum limits.

You can thus make sure that the I/O modules are acceptable and that the required points are mountable.

If the output type cannot be specified, calculate the total consumption power from the maximum consumption current of each module. Total consumption current and power therefore are assumed as follows:

	Basic unit, modules	Power supply	
		5 V DC	24 V DC
Maximum consumption current	Basic unit	150 mA	0 mA
	DO+DI module	260 mA	40 mA
	Pt module	20 mA	20 mA
	AI module	20 mA	20 mA
	AO module	40 mA	180 mA
Total		490 mA	260 mA
Power consumption	Total: 8.69 W	2.45 W	6.24 W

● Restrictions on UT Module Connection

To Inflex AC/Inflex GC/Inflex GD basic unit or Inflex BC I/O control unit, one UT module is connectable. To the UT module, user terminal(s) (Neopanel2/Neopanel/Neoplate) is (are) connected through Remote Controller bus. For the hardware combinations of Neopanel2/Neopanel/Neoplate and UT module, refer to the table below.

Hardware combinations (Neopanel/Neoplate through Remote Controller bus)

Combination type	Neopanel2/ Neopanel Address 1	Neopanel2/ Neopanel Address 2	Neoplate
1	✓		
2	✓	✓	
3			✓

Notes:

- * Up to two Neopanel (Address 1 and Address 2) are connectable to the UT module. To connect two Neopanel2/Neopanel units, the modular branch unit (Part No. DY7203A0000) is required.
- * Only one Neoplate is connectable to the UT module.
- * Operator Panel (panel mount type) is connectable through DP-bus regardless of Neopanel2/Neopanel/Neoplate connection to UT module.

● Restrictions on Integral Type Operator Panel Connection

To the Inflex AC/Inflex GC/Inflex GD basic unit or Inflex BC I/O control unit, one integral type Operator Panel is connectable. To the integral type Operator Panel, user terminal(s) (Neopanel2/Neopanel/Neoplate) is (are) connected through Remote Controller bus. For the hardware combinations of Neopanel2/Neopanel/Neoplate and the integral type Operator Panel, refer to the table below.

Hardware combinations (connected to integral type Operator Panel through Remote Controller bus)

Combination type	Neopanel2/ Neopanel Address 1	Neopanel2/ Neopanel Address 2	Neoplate
1	✓		
2	✓	✓	
3			✓

Notes:

- * Up to two Neopanel2/Neopanel units (Address 1 and Address 2) are connectable to the integral type Operator Panel. To connect two Neopanel, the modular branch unit (Part No. DY7203A0000) is required.
- * Only one Neoplate is connectable to the integral type Operator Panel.
- * If integral type Operator Panel is connected to Inflex AC, UT module cannot be connected.

● Restrictions on SAnet I/F Module

To the Inflex GC/Inflex GD basic unit, up to two SAnet I/F modules are connectable.

Note:

- * SAnet I/F module is not connectable to the LC-bus (LonTalk) communication model of Inflex GC/Inflex GD.

■ Precautions for Connection of I/O Modules, UT Module, Integral Type Operator Panel, and SAnet I/F Module

IMPORTANT:

- Do not insert or remove I/O modules with the power ON. Doing so may cause failure.

● Address setting

After I/O modules, UT module, integral type Operator Panel, and SAnet I/F module are set up by our serviceperson, an address is automatically assigned to each of the modules based on their physical locations.

The addresses are sequentially assigned to the modules, from a module closer to the basic unit (of Inflex GC/Inflex GD/ Inflex AC), the basic module (of PARAMATRIX 4), or the control unit (of Inflex BC). At this time, if any of the modules (I/O modules, UT module, integral type Operator Panel, SAnet I/F module) is missing, an address will not be assigned to the missing module and the modules to which addresses are supposed to be assigned after the missing module.

(Missing of module means that the housing of a module exists, but the PCB (print-circuit board) is not mounted.)

The addresses are respectively saved into the non-volatile memory in their modules. Therefore, if an I/O module, UT module, integral type Operator Panel, or SAnet I/F module is replaced, automatic address setting of all the modules will be required again.

● Connection order (recommended)

The basic unit (of Inflex AC/Inflex GC/Inflex GD), the basic module (of PARAMATRIX 4), or the I/O control unit (of Inflex BC) supplies power to the I/O modules, UT module, integral type Operator Panel, and SAnet I/F module. In order to reduce the voltage drop, connection of a module having larger consumption current to the slot closer to the basic unit, the basic module, or the I/O control unit is recommended.

Connect I/O modules, UT module, integral type Operator Panel, and SAnet I/F module in the order shown below.

Basic unit, basic module, I/O control unit → DO modules (DO, DO+DI, DOC) → MM module → Other modules

■ **Maintenance**

For replacing fuse and battery (of the basic unit), ask our serviceperson.

● **Fuse replacement**

⚠ WARNING

! Before doing maintenance, be sure to turn off the power to this product.
Failure to do so may result in electric shock or device failure.

IMPORTANT:
Fuse must be replaced only by our serviceperson.

SAnet I/F module has a fuse. If this fuse breaks, it needs to be replaced by our serviceperson in the procedure below.

- 1) Disconnect the 24 V AC power of SAnet I/F module.
- 2) Hold the fuse holder on the front surface of SAnet I/F module, push on it while turning it 90° counterclockwise, and remove the fuse holder from SAnet I/F module.

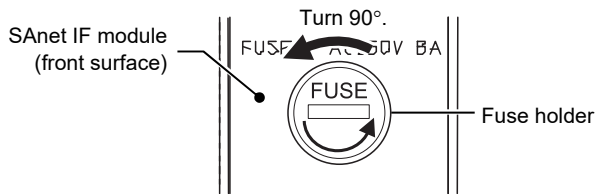


Figure 16. Fuse holder removal

- 3) Detach the broken fuse from the fuse holder to replace with the new one.

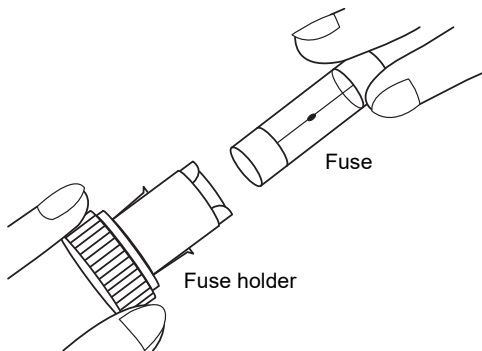


Figure 17. Fuse replacement

- 4) Attach the fuse holder to SAnet I/F module by meeting one of the tabs of the fuse holder with the opening of the mounting hole on SAnet I/F module.

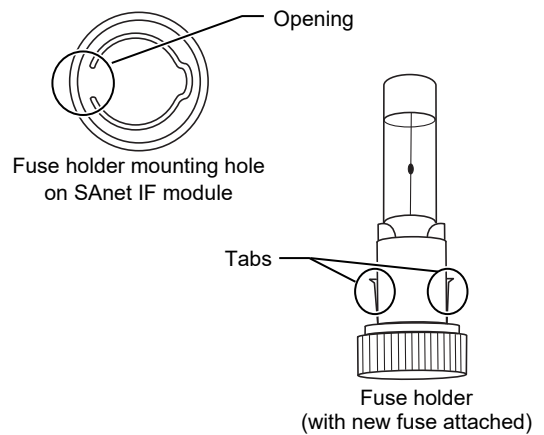


Figure 18. Attaching fuse holder to SAnet I/F module

- 5) Hold the fuse holder and push on it while turning it 90° clockwise to fix.

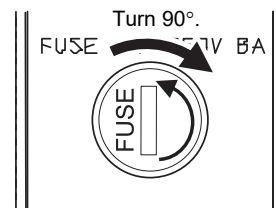


Figure 19. Fixing fuse holder to SAnet I/F module

■ **Disposal**

When this product is no longer needed, dispose of it as industrial waste in accordance with local regulations. Do not reuse all or part of this product.



Install this product in a panel cabinet.

This product complies with the following harmonised standards of the Electromagnetic Compatibility Directive (EMCD).

EMCD: EN 61326-1 Class A, Table 2 (for use in an industrial electromagnetic environment)

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AB-6527
Rev. 19.0 Dec. 2023
(J: AI-6527 Rev. 15.0)