Safety Control Unit

SF-C21

Related Information
■ General terms and conditions F-3
■ **SF4B** / **SF4B-G** ..... P.501~
■ **SF2B** ..... P.603~
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■ General precautions P.1595

Category 4 PLe SILCL3

panasonic.net/id/pidsx/global

The control category differs depending on the configuration and wiring of the external circuit.

CE
Certified
Certified by NRTL

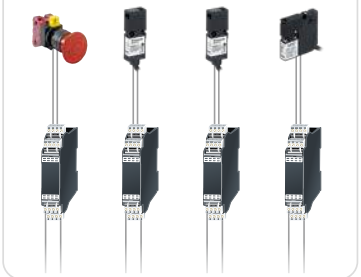
Creating safety circuits is easier than ever

Finding space to install and wire is easy

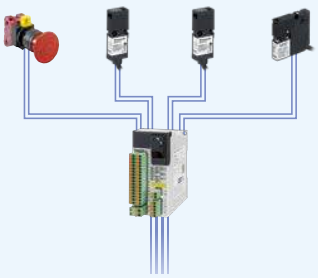
One SF-C21 can do the work of four safety relay units.
Simple to wire the units in the control panel!

Multi-point input / output
Saves space

Combining multiple units together requires complicated wiring and time-consuming checking!



Just one SF-C21 does the job!



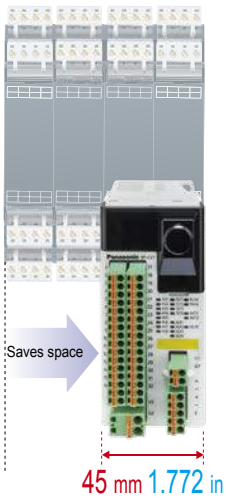
Easy to monitor status with a general-purpose PLC

Four auxiliary outputs (PNP semiconductor output) are provided. Using RS-485 communications (MODBUS RTU), various general-purpose control units (PLC, HMI, etc.) can monitor the **SF-C21** information such as the status, the selected logic, and any error status.

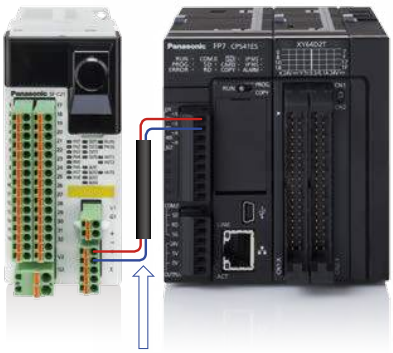
Note: Communication information can not be used for safety control.

Small, so the unit can be installed in a narrow space

Compact with a height 97 mm 3.819 in × width 45 mm 1.772 in.
It's easy to find installation space for the **SF-C21** unit.



Long-life semiconductor output (PNP) adopted for control output and auxiliary output



Shielded twisted pair cable

Absolutely no programming skills required.
Operation is easy - just select a preset logic

No programming skills required

Simply turn a switch to set

Eight preset logics, safety-certified and compatible up to control category 4 PLe, can be selected by simply turning the rotary switch.

8 preset logics

1	Overall stop control	5	Partial stop control 2
2	Parallel muting control	6	Two-hand control
3	Sequential muting control	7	OR control
4	Partial stop control 1	8	Operation mode selection control

* The logic customized by user can be stored in the logic No. 0.

Easy to set the "OFF delay"

The OFF delay time can be easily set by simply turning the rotary switch to any one of patterns.

Pattern No.	0	1	2	3	4	5	6	7	8	9
OFF delay time (sec.)	0	0.1	0.5	1	2	5	10	15	30	60

* The OFF delay time applies to control output 2. In case of setting the OFF delay time to control output 1, the "**Configurator SF-C**" software is needed.

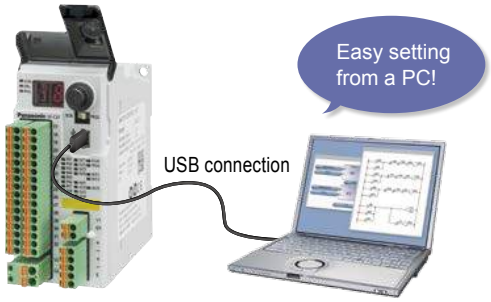
Password protection prevents inadvertent logic changes

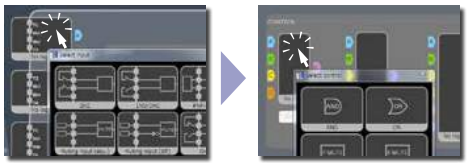
Application-based customization is easy

Easily customizable

Easy to create a reliable safety circuit

Use our "**Configurator SF-C**" software to build your own safety circuits of connected devices, control logic, output modes, etc. No programming skills required!

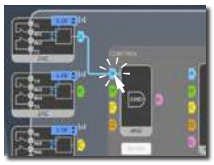




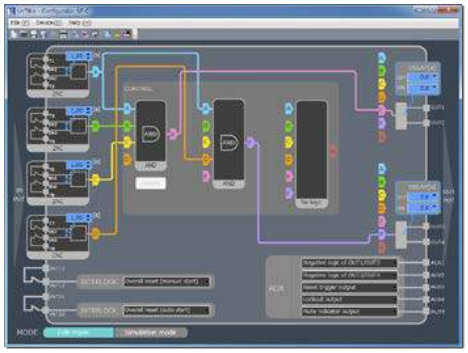
(1)Select a device to connect to

(2)Select an operation logic

Circuits are configured in three easy steps!



(3)Connect



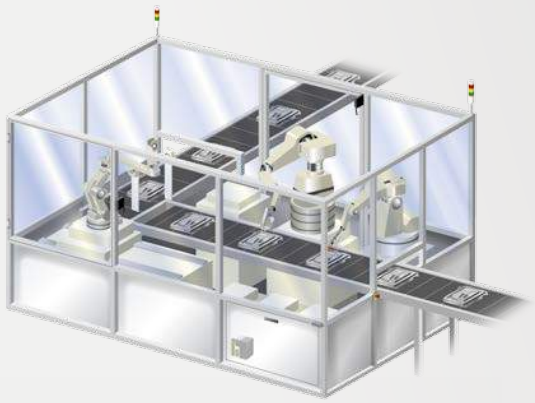
Customized logics are safety-certified too!

All possible logic combinations created with the "**Configurator SF-C**" software are already safety-certified by the certification bodies. The software also has a "simulation mode" to test if the prepared logic and safety circuit operates as intended. If the logic is not complete, the software will block its transfer to the **SF-C21** unit.

Note: Please read the instruction manual in advance when selecting or creating logics, and verify whether the combination of connecting devices and logicscomplies with each machine safety standard.

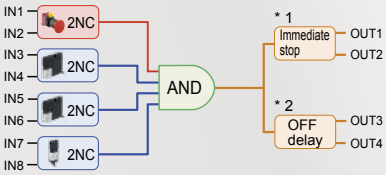
"**Configurator SF-C**" can be downloaded free of charge from our website.

8 preset logics compatible up to control category 4, PLe standards

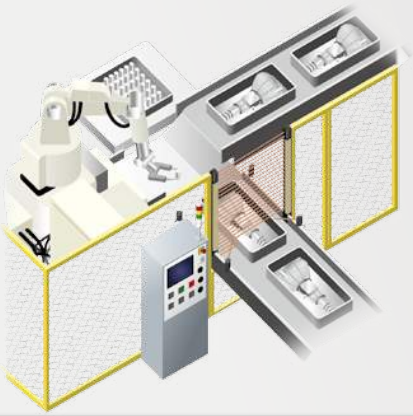


Overall stop control

When any connected input becomes OFF, the entire control output will be OFF.

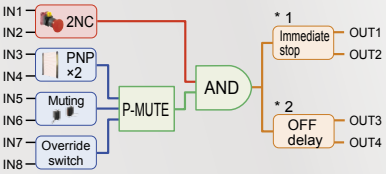


* 1 The delay time can be set using the **Configurator SF-C**.
* 2 The initial OFF delay is set to 0 seconds.



Parallel muting control

When the muting input becomes ON, the safety light curtain will be temporarily disabled.



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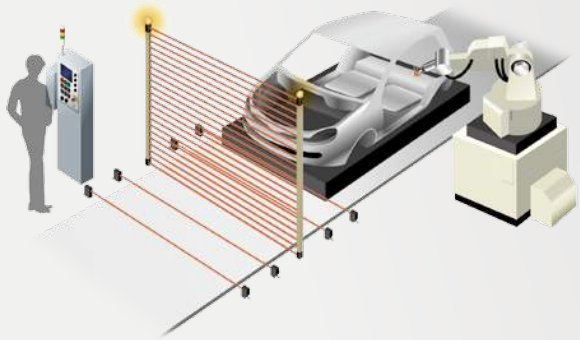
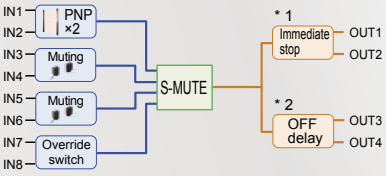


Sequential muting control

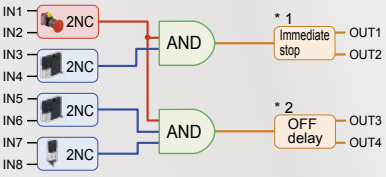
Only when the muting input becomes ON following a predefined sequence, the safety light curtain will be temporarily disabled.



* 1 The delay time can be set using the **Configurator SF-C**.
* 2 The initial OFF delay is set to 0 seconds.

Partial stop control 1

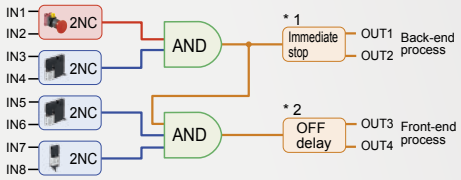
When the emergency stop input is OFF, the entire control output will be OFF. When any other input is OFF, its corresponding control output will be OFF.

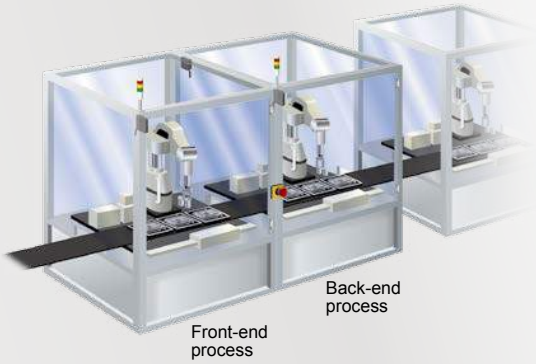


* 1 The delay time can be set using the **Configurator SF-C**.
* 2 The initial OFF delay is set to 0 seconds.

Partial stop control 2

When the emergency stop input or the input from the back-end process becomes OFF, the entire control output will be OFF. When the input from the front-end process becomes OFF, only its corresponding control output will be OFF.

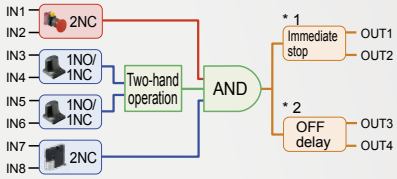


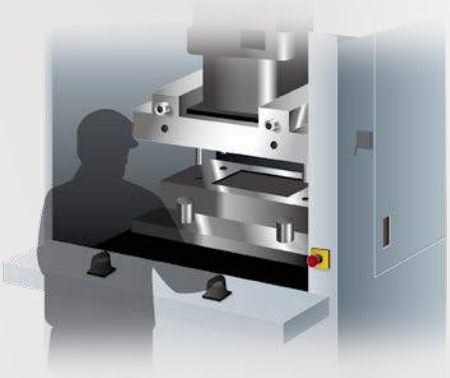


* 1 The delay time can be set using the **Configurator SF-C**. * 2 The initial OFF delay is set to 0 seconds.

Two-hand control

This control is applied when a two-hand operation switch is used for control. Only when both switches of the two-hand operation switch are operated within 0.5 sec., control output will be ON.

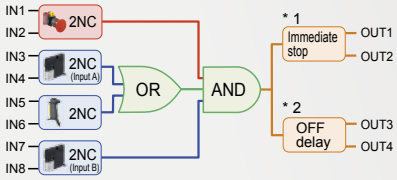


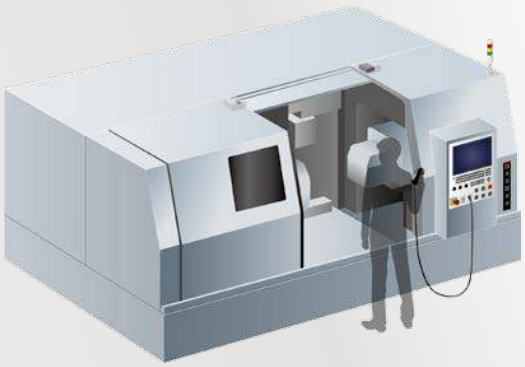


* 1 The delay time can be set using the **Configurator SF-C**.
* 2 The initial OFF delay is set to 0 seconds.

OR control

Even when the guard (input A) is OFF, if the enabling switch is ON the control output will be ON. If either the emergency switch or input B becomes OFF, the entire control output will be OFF regardless of the status of the input A and emergency switch.

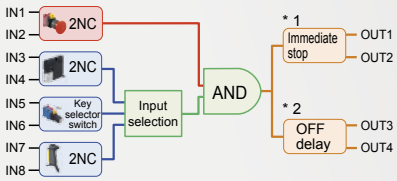


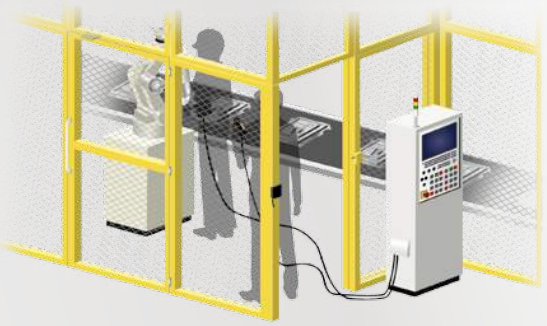


* 1 The delay time can be set using the **Configurator SF-C**. * 2 The initial OFF delay is set to 0 seconds.

Operation mode selection control

Only when mode selection using the key selector is followed by the enabling switch being turned ON, the control output will be ON regardless of the open / close status of the guard. Note that if the emergency stop switch is OFF, the entire control output will be OFF.





* 1 The delay time can be set using the **Configurator SF-C**. * 2 The initial OFF delay is set to 0 seconds.

Software tool Configurator SF-C

Enable flexible customization

The software provides highly flexible customization. You can create a logic of your own, change the input device types based on the preset logics, or customize logic data uploading from the **SF-C21** main unit. Changing the auxiliary output settings, as well as setting the ON delay / OFF delay time and muting state holding time are all very easy as well.
Created logics can be stored in a PC for convenient future use.

Settable items

- Input device selection
- Logic selection (up to three layers)
- Reset mode selection (auto / manual, overall / partial)
- Auxiliary output settings [Linkage to control output (positive logic and negative logic), monitor output of safety input, reset trigger output, lockout output, etc.]
- OFF delay time setting (0.0 to 60.0 sec, in 1/10 sec.)
- ON delay time setting [1 to 5,940 sec (99 min), in sec.]
- Muting valid time setting [1 to 5,940 sec (99 min), in sec.] or no limit
- Override valid time setting (1 to 600 sec, in sec.)
- RS-485 (MODBUS RTU) communication settings, etc.

Multilingual compatibility

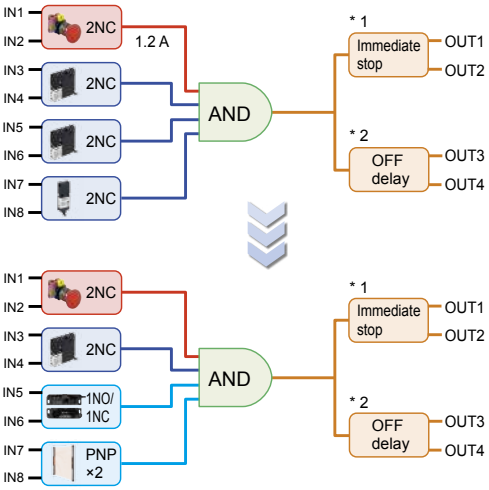
The **Configurator SF-C** supports seven languages: Japanese, English, Chinese, Spanish, French, Italian and Portuguese. Our products support users around the world by fulfilling their diverse needs, such as the empowerment of local staff and implementation of local safety schemes.

Problem

I want to use a safety light curtain and a magnetic switch, but can't find a suitable preset logic...

Solution

Use the AND control, a preset logic, as the base and change part of the safety input to a safety light curtain (PNP × 2) and a safety magnetic switch (1NO / 1NC).



* 1 The delay time can be set using the **Configurator SF-C**.
* 2 The initial OFF delay is set to 0 seconds.

Versatile functions

Input filter time setting

- OFF-ON filter: Avoid unstable operation caused by vibrations and/or bounce-back when closing guards.
- ON-OFF filter: Avoid unstable operation due to momentary blockages of a safety light curtain by operational vibrations, bugs, dust, and other causes.

Status monitoring function

The status of input and output devices connected to **SF-C21** can be monitored in real time through USB.

Simulation function

Whether the logic created by the user operates as intended can be verified via a software tool.

Incomplete transfer blocking function

The transfer of incomplete logics to **SF-C21** will be blocked and prevent potential hazards.

Note: Please read the instruction manual in advance when customizing logics, and verify whether the combination of connecting devices and logics complies with each machine safety standard.

"**Configurator SF-C**" can be downloaded free of charge from our website.

ORDER GUIDE

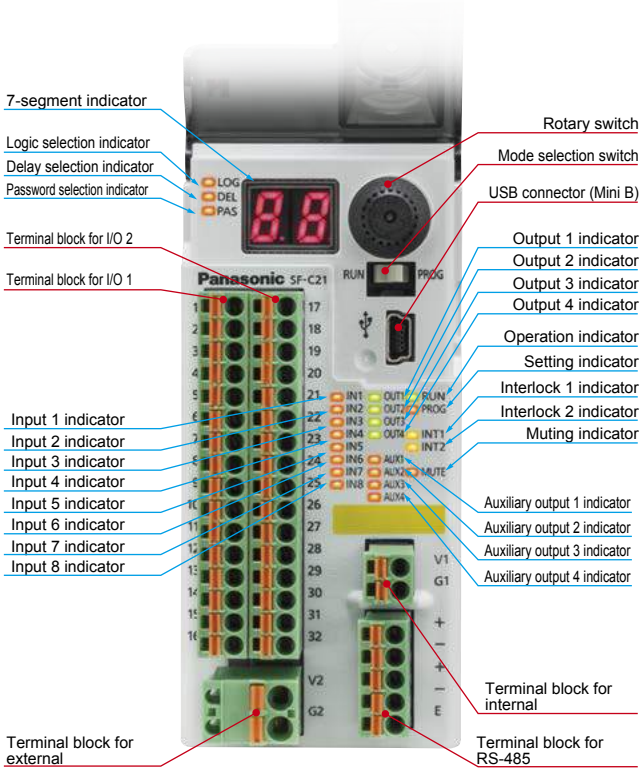
Product name	Appearance	Model No.	Number of input points		Number of output points	
			Safety input	Reset / EDM input	Control output	Auxiliary output
Safety control unit		**SF-C21**	2 × 4	2	2 × 2	4

SPECIFICATIONS

Item \ Product name / Model No.		Safety control unit **SF-C21**
Applicable standards	Safety	IEC 61508-1 to 7, EN 61508-1 to 7(SIL3), ISO 13849-1 (Up to Category 4, PLe), IEC 61131-2, IEC 61010-2-201, IEC 62061(SILCL3), UL 61010-1, UL 61010-2-201, UL 1998
	EMC	IEC 61000-6-2, IEC 61326-3-1, EN 55011
CE marking directive compliance		Machinery Directive, EMC Directive, RoHS Directive
Related standards		IEC 60947-1, IEC 60947-5-1, IEC 60947-5-2, IEC 60947-5-5, IEC 60947-5-8, IEC 61496-1, IEC TS 62046, ISO 13851
Supply voltage (Note 1, 2)	Power supply for internal	24 V DC $^{+10}_{-15}$ % Ripple P-P10 % or less
	Power supply for external	24 V DC $^{+10}_{-15}$ % Ripple P-P10 % or less
Current consumption (Note 1, 2)	Power supply for internal	200 mA or less
	Power supply for external	100 mA or less
Safety input (IN1 to IN8)		2 × 4 inputs, Rated voltage: Same as the voltage of the power supply for internal
	ON level / OFF level	Input voltage: 18 V, Input current: 3.5 mA / Input voltage: 5 V, Input current: 1.0 mA
	Rated input current / Input impedance	5 mA approx. / 4.7 KΩ approx.
	Duration of detectable ON state	10 ms or more
	Duration of undetectable OFF state	0.7 ms or less
Control output (OUT1 to OUT4)		PNP open-collector transistor with 2 outputs × 2 • Maximum source current: 300 mA / output • Applied voltage: Same as the voltage of the power supply for external • Residual voltage: 2.5 V or less • Leakage current: 100 µA or less (Including power supply OFF condition)
	Output mode	True: ON, False: OFF
	ON delay function / OFF delay function	Incorporated / Incorporated
	Short-circuit protection / Response time	Incorporated / OFF response: 10 ms or less, ON response: 100 ms or less
Auxiliary output (AUX1 to AUX4) (Non-safety output)		PNP open-collector transistor with 1 output × 4 • Maximum source current: 60 mA / output • Applied voltage: Same as the voltage of the power supply for external • Residual voltage: 2.5 V or less • Leakage current: 100 µA or less (Including power supply OFF condition)
	Output mode (Factory defaults)	AUX1: Negative logic of OUT1 / OUT2 (ON when OUT1 / OUT2 is OFF) AUX2: Negative logic of OUT3 / OUT4 (ON when OUT3 / OUT4 is OFF) AUX3: Reset trigger output (ON under reset release wait condition) AUX4: Lockout output (OFF when lockout)
	Output mode (Any of the auxiliary outputs can be customized using the software tool)	Negative logic of OUT1 / OUT2(ON when OUT1 / OUT2 is OFF) Positive logic of OUT1 / OUT2 (ON when OUT1 / OUT2 is ON) Outputs A, B, C, and D of diagnosis results of input blocks (ON when logic is true) Reset trigger output (ON under reset release wait condition) Muting indicator output (ON when muting / override) No output (normally OFF) Negative logic of OUT3 / OUT4 (ON when OUT3 / OUT4 is OFF) Positive logic of OUT3 / OUT4(ON when OUT3 / OUT4 is ON) Outputs E, F, and G of internal logic circuit diagnostic results (ON when logic is true) Lockout output (OFF when lockout) Monitor output in response to IN1 to IN8 (ON when input)
	Short-circuit protection / Response time	Incorporated / 10 ms or less
Muting indicator output		Semiconductor photo MOS relay output × 1 • Maximum load current: 60 mA • Supply voltage: Same as the voltage of the power supply for internal • Residual voltage: 2.5 V or less • Leakage current: 100 µA or less (Including power supply OFF condition)
	Output mode	ON when muting / override
	Short-circuit protection / Response time	Incorporated / 10 ms or less
Interlock function / Lockout release function		Incorporated / Incorporated
External device monitor function		Incorporated
Communication function (MODBUS RTU)		Interface: RS-485, Protocol: MODBUS RTU, Maximum transmission distance: 100 m 328.084 ft, Maximum number of units that can be connected: 8 units (slaves)
Logic selection function		No.0: Customization control No.1: Overall stop control No.2: Parallel muting control No.3: Sequential muting control No.4: Partial stop control 1 No.5: Partial stop control 2 No.6: Two-hand control No.7: OR control No.8: Operation mode selection control
Logic setting function		Input mode, control mode, output mode, reset mode, auxiliary output mode
Pollution degree / Excess voltage category		2 / II
Usable altitude (Note 3)		2,000 m 6561.680 ft or less
Startup time after power on		2 sec. or less
PFH_D (Note 4) / $MTTF_D$ (Note 4)		9.73 × 10^{-10} / More than 100 years
Environmental resistance	Degree of protection	IP20 (IEC) (must be installed in a control panel with protection IP54 or higher)
	Ambient temperature	–10 to +55 °C +14 to +131 °F (No dew condensation or icing allowed), Storage: –25 to +60 °C -13 to +140 °F
	Ambient humidity	30 to 85% RH, Storage: 30 to 85% RH
	Dielectric strength voltage / Insulation resistance	1,000 V AC for one min / 20 MΩ, or more, with 500 V DC megger (All inputs connected together - USB port, all inputs connected together - RS-485 port, USB port - RS-485 port, between all supply terminals connected together and enclosure, all outputs connected together - all input connected together, all outputs connected together - USB port, all outputs connected together - RS-485 port)
	Vibration resistance	5 to 8.4 Hz frequency, 3.5 mm 0.138 in half amplitude, 8.4 to 150 Hz frequency, Acceleration 9.8 m/s² (1 G), in X, Y and Z directions for two hours each (IEC/EN 60068-2-6)
	Shock resistance	147 m/s² (15 G) 11 ms in X, Y and Z directions three times each (IEC/EN 60068-2-27)
Connection method		Input / output and power supply: Detachable spring cage terminal blocks, RS-485: Detachable spring-cage terminal block, USB: Mini-B male
Maximum cable length		100 m 328.084 ft or less
Material		Main unit enclosure: Polycarbonate / ABS polymer alloy, Enclosure: Polycarbonate
Weight		Net weight: 190 g approx., Gross weight: 320 g approx.

Notes: 1) "Power supply for internal" is the power supply for safety input. "Power supply for external" is the power supply for control output / auxiliary output. The power supplies for internal and external are insulated.
2) The power supply unit connected to this device must satisfy the conditions below.
• Output voltage within 20.4 V to 26.4 V DC (Ripple P-P: 10% or less.)
• Power supply unit SELV (safety extra low voltage) / PELV (protected extra low voltage) conforming to the EMC Directive and Low-voltage Directive (In case CE Marking conformity is required.)
• Power supply unit conforming to the Low-voltage Directive and with an output of 100 VA or less • Power supply unit with an output holding time of 20 ms or more.
• Power supply unit corresponding to CLASS 2 (In case C-TÜV US Listing Mark conformity is required.)
3) Do not use or store this device in a pressurized environment beyond the atmospheric pressure at sea level.
4) PFH_D: Probability of dangerous failure per hour, $MTTF_D$: Mean time to dangerous failure (in years)

TERMINAL ARRANGEMENT DIAGRAM



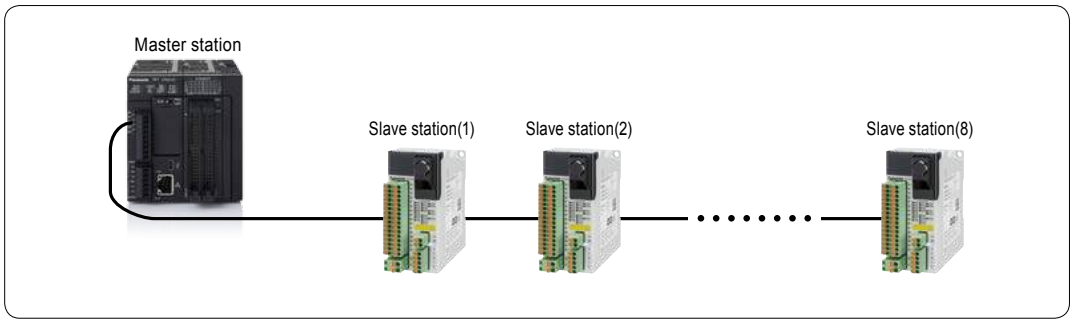
Terminal block name	Terminal No.	Terminal name	Function
Terminal block for I/O 1	1	IN1	Safety input 1
	2	T1	Safety input 1 / test output
	3	IN2	Safety input 2
	4	T2	Safety input 2 / test output
	5	IN3	Safety input 3
	6	T3	Safety input 3 / test output
	7	IN4	Safety input 4
	8	T4	Safety input 4 / test output
	9	MUTE1	Muting indicator output 1_1
	10	NC	Not connected
	11	INT11	Reset input 1 / test output
	12	INT12	Reset input 1
	13	AUX1	Auxiliary output 1
	14	AUX2	Auxiliary output 2
	15	AUX3	Auxiliary output 3
	16	AUX4	Auxiliary output 4
Power supply for external	V2	V2	Power supply for control output / power supply for auxiliary output (+V)
	G2	G2	Power supply for control output / power supply for auxiliary output (0V)

Terminal block name	Terminal No.	Terminal name	Function
Terminal block for I/O 2	17	IN5	Safety input 5
	18	T5	Safety input 5 / test output
	19	IN6	Safety input 6
	20	T6	Safety input 6 / test output
	21	IN7	Safety input 7
	22	T7	Safety input 7 / test output
	23	IN8	Safety input 8
	24	T8	Safety input 8 / test output
	25	MUTE2	Muting indicator output 1_2
	26	NC	Not connected
	27	INT21	Reset input 2 / test output
	28	INT22	Reset input 2
	29	OUT1	Control output 1
	30	OUT2	
	31	OUT3	Control output 2
	32	OUT4	
Power supply for internal	V1	V1	Power supply for safety input (+V)
	G1	G1	Power supply for safety input (0V)
RS-485	+	+	Transmission line (+)
	−	−	Transmission line (−)
	+	+	Transmission line (+)
	−	−	Transmission line (−)
	E	E	Terminal station setting

Note: For an input device requiring a separate power supply, such as a safety light curtain, use the same power supply as the power supply for internal.

RS-485 (MODBUS RTU) SPECIFICATIONS

With built-in RS-485, **SF-C21** can read out its status, error history, etc. to an external device such as a general-purpose PLC, using the MODBUS RTU protocol.
Up to eight **SF-C21** units can communicate with the external device as the master station.
The communication preference of MODBUS RTU is set with the DIP switch on the main unit or the software tool "**Configurator SF-C**".



Selection Guide
Safety Light Curtains
Safety Control Units
Safety Components
SF-C21
SF-C10

Types of data that can be read out

- Status (HIGH, LOW) of safety input and reset / EDM output
- Status (HIGH, LOW) of control output, auxiliary output, and muting indicator output
- Lockout history
- Logic No. change history

MODBUS RTU SPECIFICATIONS

Interface	RS-485
Max. transmission distance	100 m 328.084 ft
Communication address	1-247
Data length	8 bits (fixed)
Parity bit	Without / Odd / Even
Stop bit	1 bit / 2 bits
Communication speed	9,600 bps 19,200 bps 38,400 bps 57,600 bps 115,200 bps

MAIN BODY DIP SWITCH SPECIFICATIONS

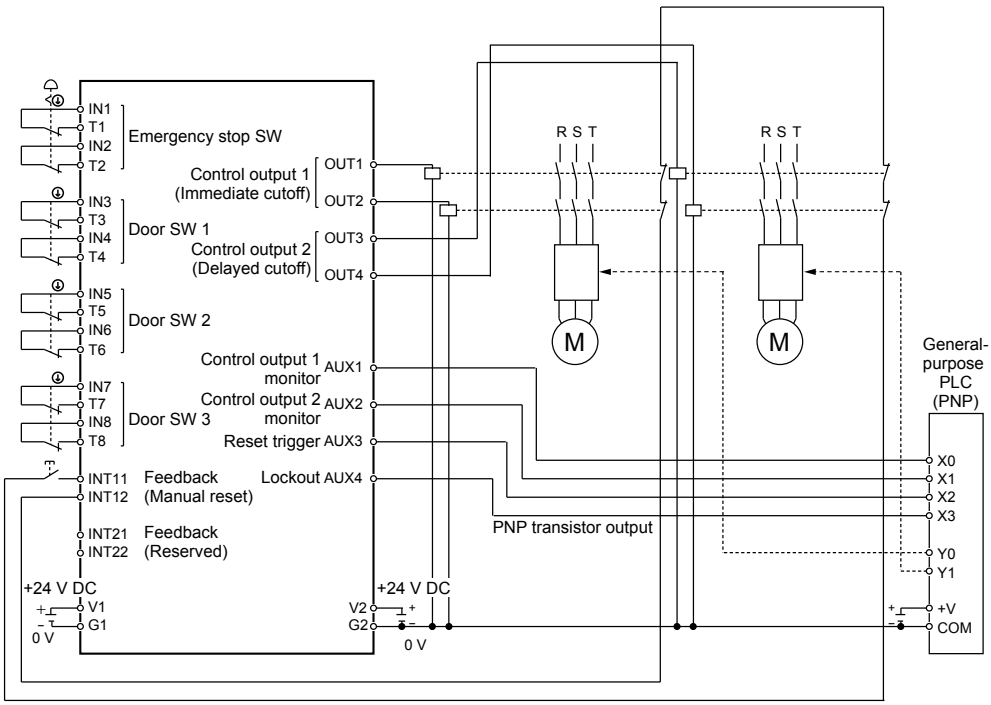
Switch No.	Setting item	Input status	
		OFF	ON
1	Communication preference settings	DIP switches take precedence	Software tools take precedence
2	Parity bit presence	With	Without
3	Parity bit type	Odd	Even
4	Stop bit	1	2
5	Communication address 1	SW5: OFF, SW6: OFF	
	Communication address 2	SW5: ON, SW6: OFF	
6	Communication address 3	SW5: OFF, SW6: ON	
	Communication address 4	SW5: ON, SW6: ON	
7	Communication speed	9,600 bps	19,200 bps
8	Reserved	—	—
9	Reserved	—	—
10	Reserved	—	—

Note: The **SF-C21** can not be controlled by an external device.

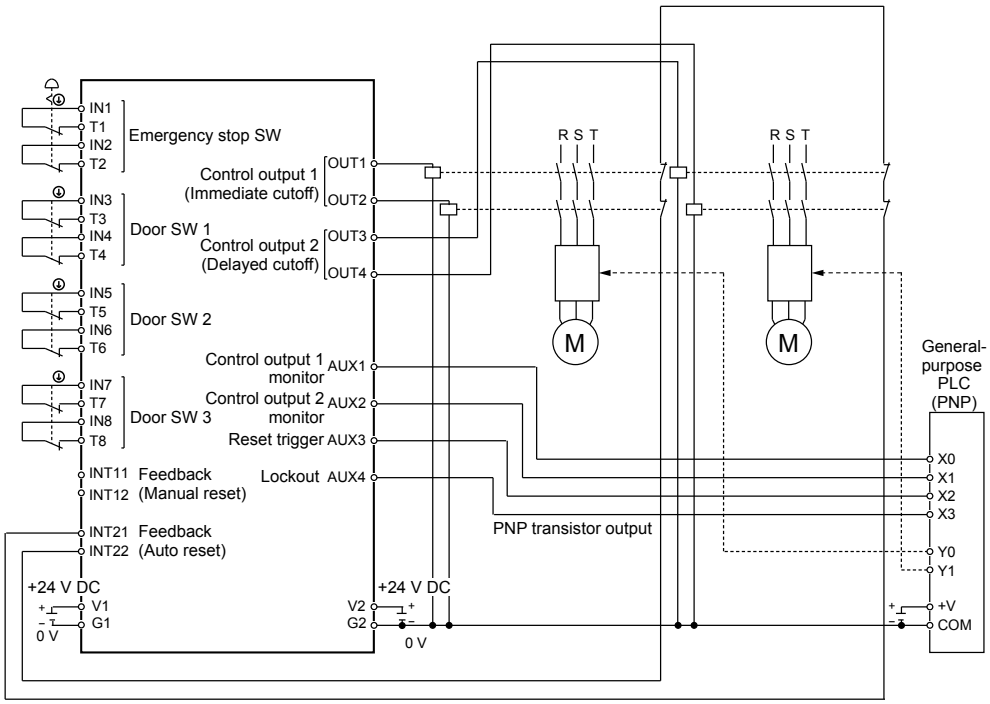
I/O CIRCUIT AND WIRING DIAGRAMS

Connection examples

Logic No.1 Overall stop control (Manual reset mode)



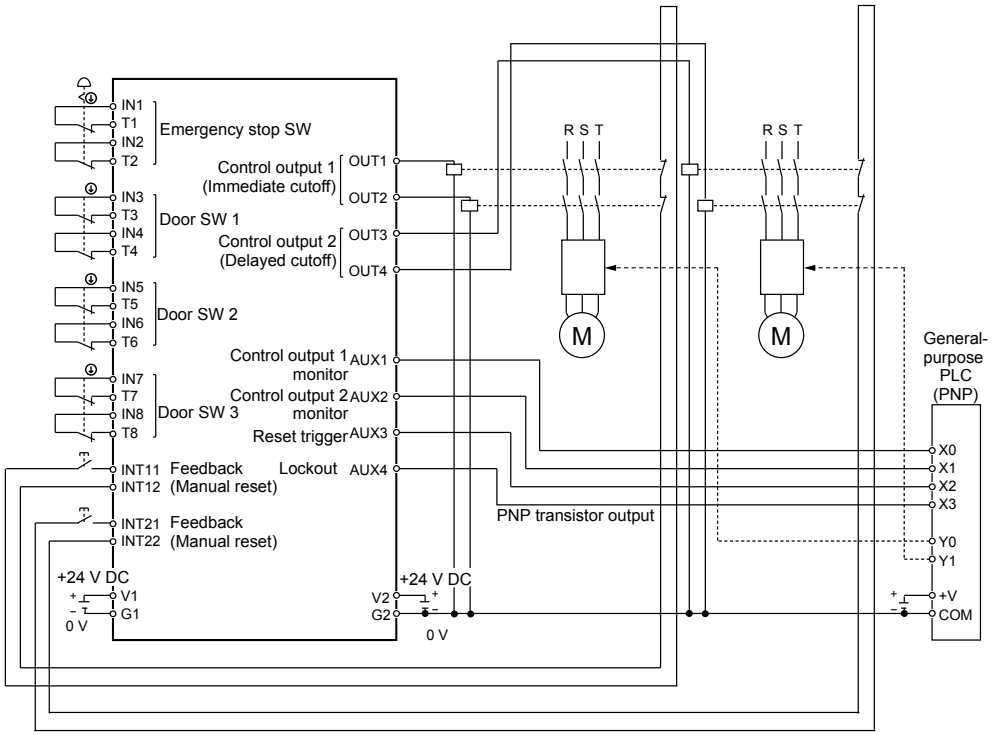
Logic No.1 Overall stop control (Auto reset mode)



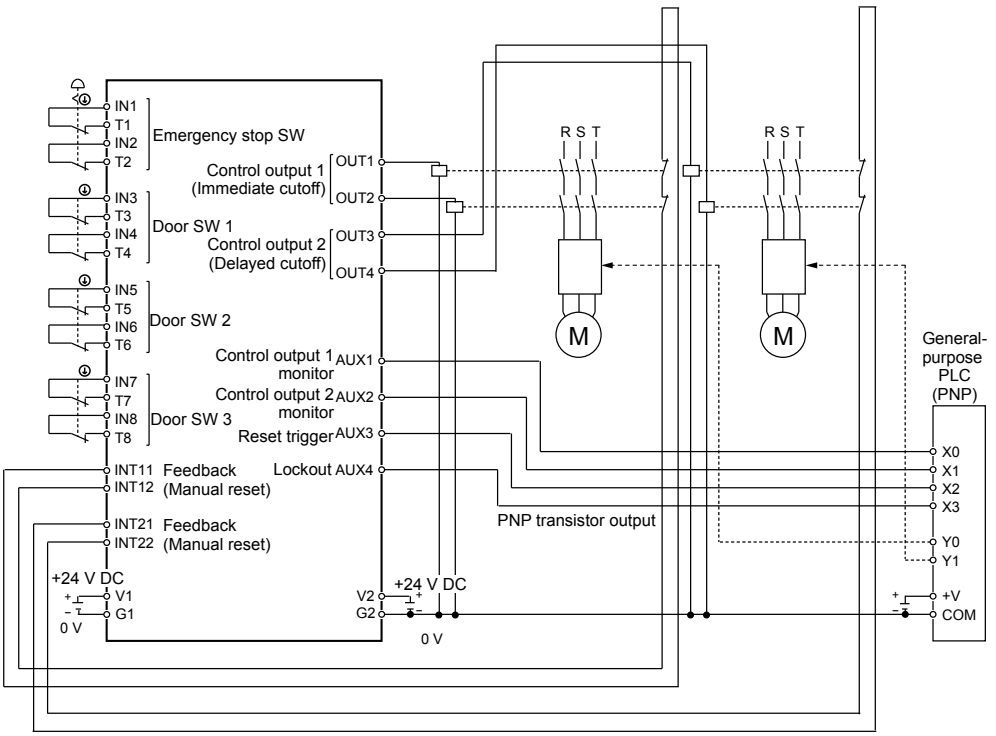
I/O CIRCUIT AND WIRING DIAGRAMS

Connection examples

Logic No.4 Partial stop control 1 (Manual reset mode)



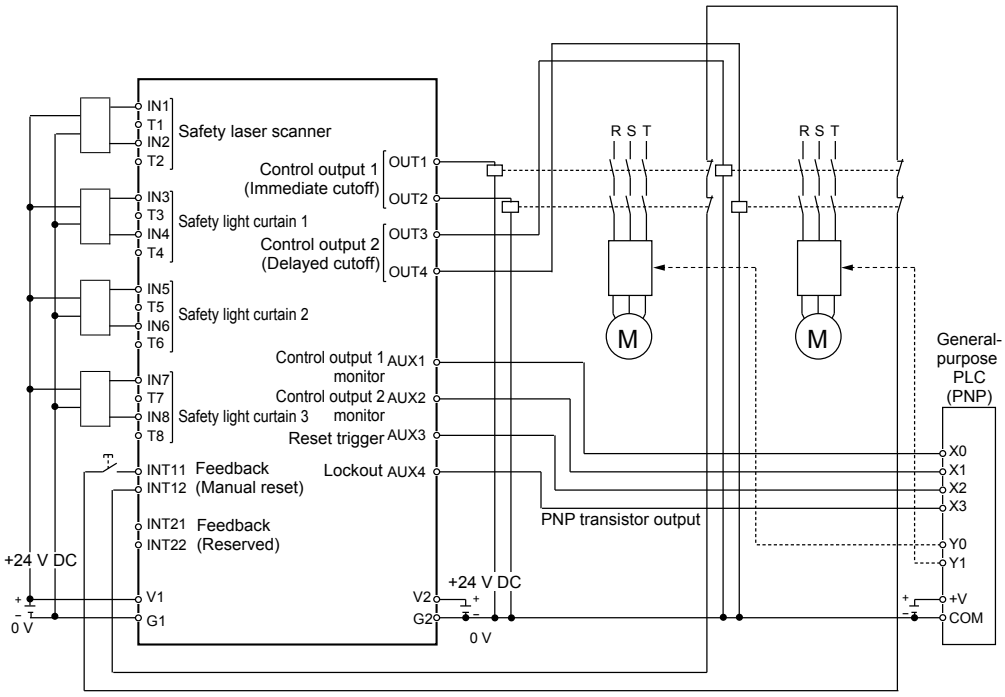
Customization example, based on logic No.4 Partial stop control 1 (Auto reset mode)



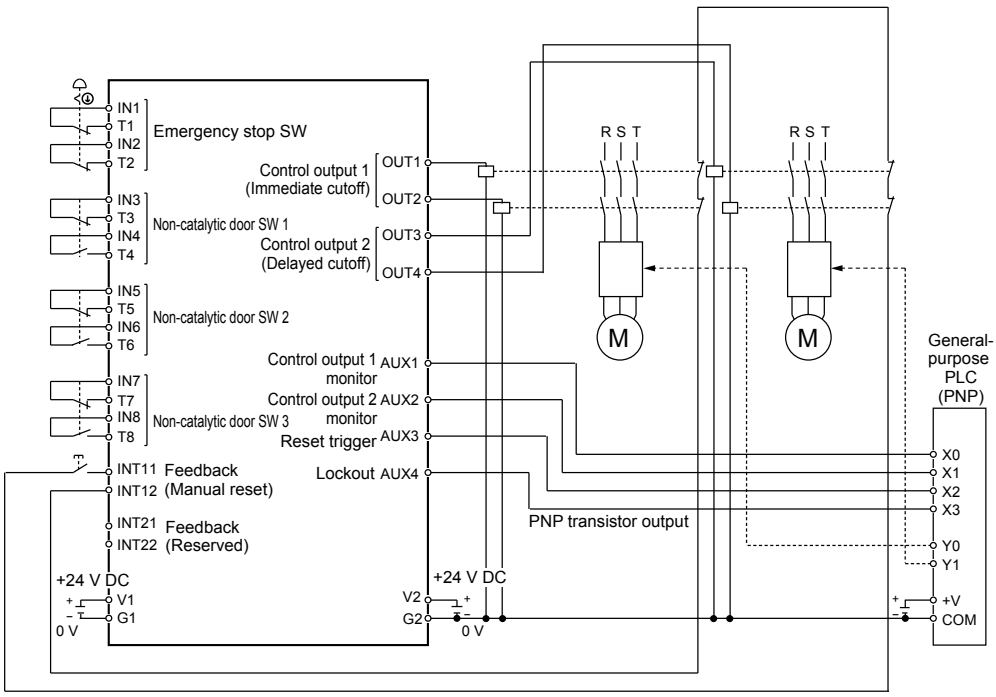
I/O CIRCUIT AND WIRING DIAGRAMS

Connection examples

Customization example, based on logic No.1 Total stop control (Manual reset, when all input devices are changed to PNP input × 2)

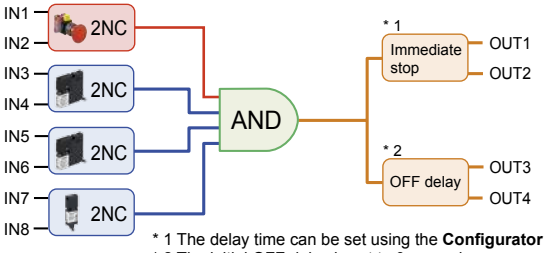


Customization example, based on logic No.1 Total stop control (Manual reset, when input 3 to 8 are changed to devices with 1NC / 1NO)



PRESET LOGICS SPECIFICATIONS

Logic No.1 Overall stop control



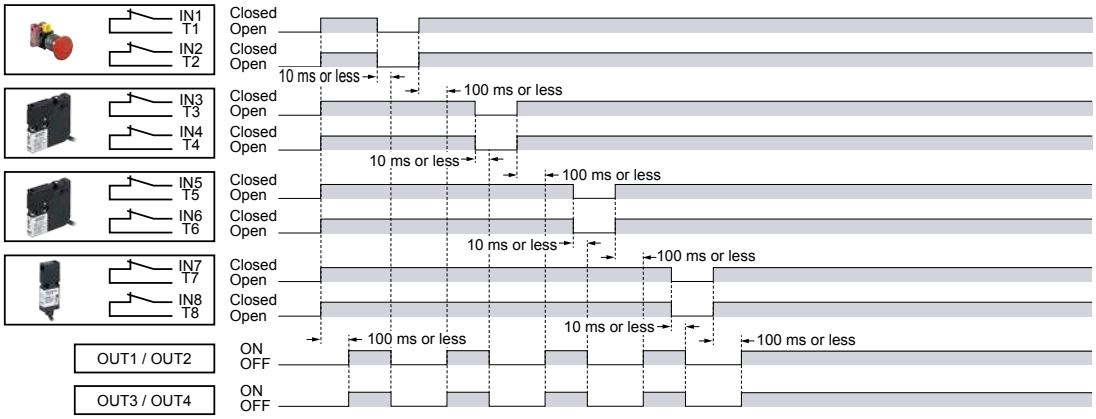
* 1 The delay time can be set using the **Configurator SF-C**.
* 2 The initial OFF delay is set to 0 seconds.

	I/O Function		Details
Safety input	IN 1 / IN 2		2NC contact input
	IN 3 / IN 4		2NC contact input
	IN 5 / IN 6		2NC contact input
	IN 7 / IN 8		2NC contact input
Control output	OUT1 / OUT2	Interlock	Overall reset (auto / manual)
		OFF delay	N/A
	OUT3 / OUT4	Interlock	Overall reset (auto / manual)
		OFF delay	0 sec. (factory defaults, Max. 60 sec.)
Auxiliary output	AUX1		Negative logic of OUT1 / OUT2
	AUX2		Negative logic of OUT3 / OUT4
	AUX3		Reset trigger
	AUX4		Lockout

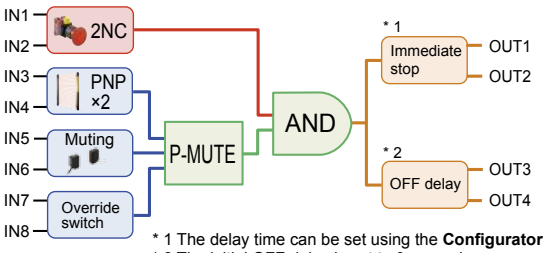
Time chart (When auto-reset)

ON response: 100 ms or less
OFF response: 10 ms or less

Note: When manually reset, ON in 100 ms or less after reset input (150 ms to 4 sec.) is entered.



Logic No.2 Parallel muting control



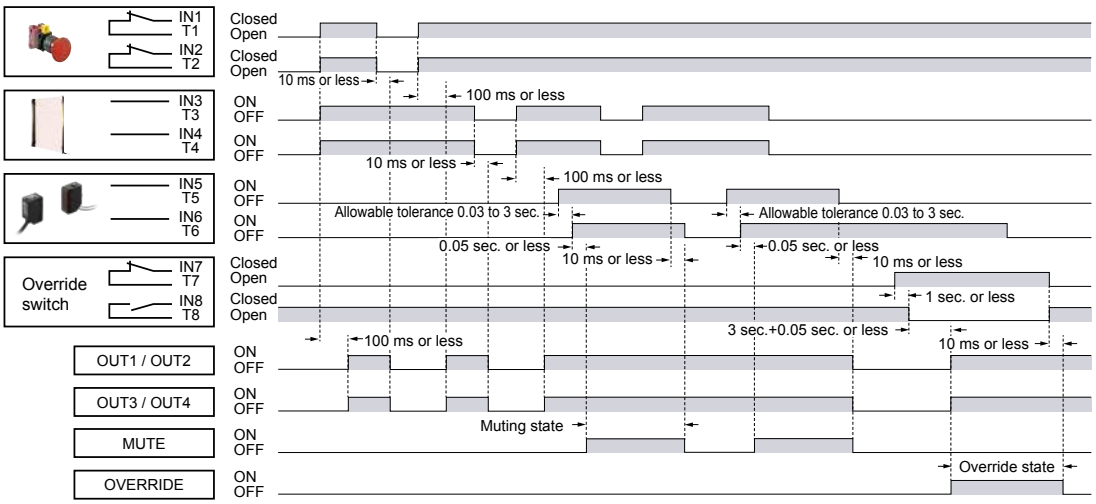
* 1 The delay time can be set using the **Configurator SF-C**.
* 2 The initial OFF delay is set to 0 seconds.

	I/O Function		Details
Safety input	IN 1 / IN 2		2NC contact input
	IN 3 / IN 4		PNP semiconductor input × 2 (equivalence)
	IN 5 / IN 6		Muting input (equivalence)
	IN 7 / IN 8		Override input
Control output	OUT1 / OUT2	Interlock	Overall reset (auto / manual)
		OFF delay	N/A
	OUT3 / OUT4	Interlock	Overall reset (auto / manual)
		OFF delay	0 sec. (factory defaults, Max. 60 sec.)
Auxiliary output	AUX1		Negative logic of OUT1 / OUT2
	AUX2		Negative logic of OUT3 / OUT4
	AUX3		Reset trigger
	AUX4		Lockout

Time chart (When auto-reset)

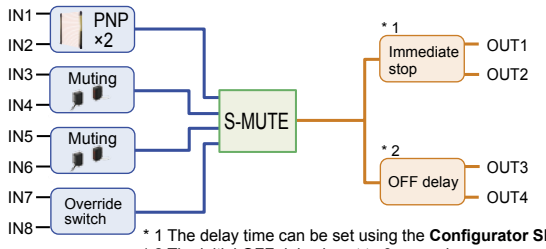
ON response: 100 ms or less
OFF response: 10 ms or less

Note: When manually reset, ON in 100 ms or less after reset input (150 ms to 4 sec.) is entered.



PRESET LOGICS SPECIFICATIONS

Logic No.3 Sequential muting control



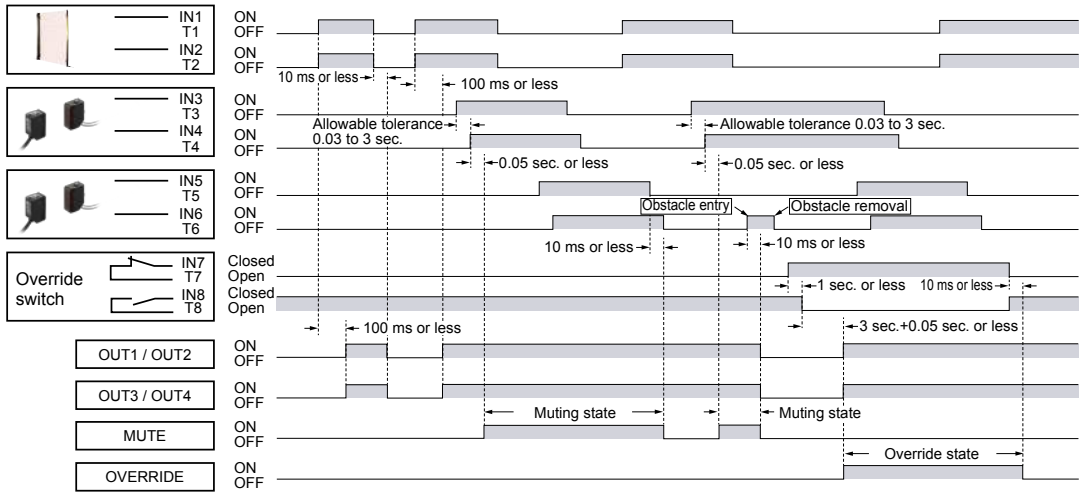
* 1 The delay time can be set using the **Configurator SF-C**.
* 2 The initial OFF delay is set to 0 seconds.

	I/O Function		Details
Safety input	IN 1 / IN 2		PNP semiconductor input × 2 (equivalence)
	IN 3 / IN 4		Muting input (equivalence)
	IN 5 / IN 6		Muting input (equivalence)
	IN 7 / IN 8		Override input
Control output	OUT1 / OUT2	Interlock	Overall reset (auto / manual)
		OFF delay	N/A
	OUT3 / OUT4	Interlock	Overall reset (auto / manual)
		OFF delay	0 sec. (factory defaults, Max. 60 sec.)
Auxiliary output	AUX1		Negative logic of OUT1 / OUT2
	AUX2		Negative logic of OUT3 / OUT4
	AUX3		Reset trigger
	AUX4		Lockout

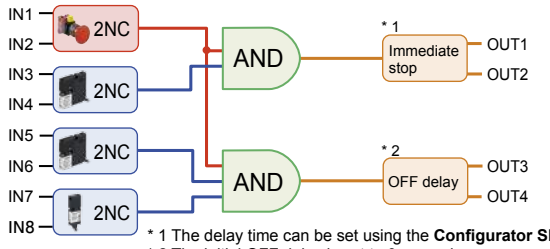
Time chart (When auto-reset)

ON response: 100 ms or less
OFF response: 10 ms or less

Note: When manually reset, ON in 100 ms or less after reset input (150 ms to 4 sec.) is entered.



Logic No.4 Partial stop control 1

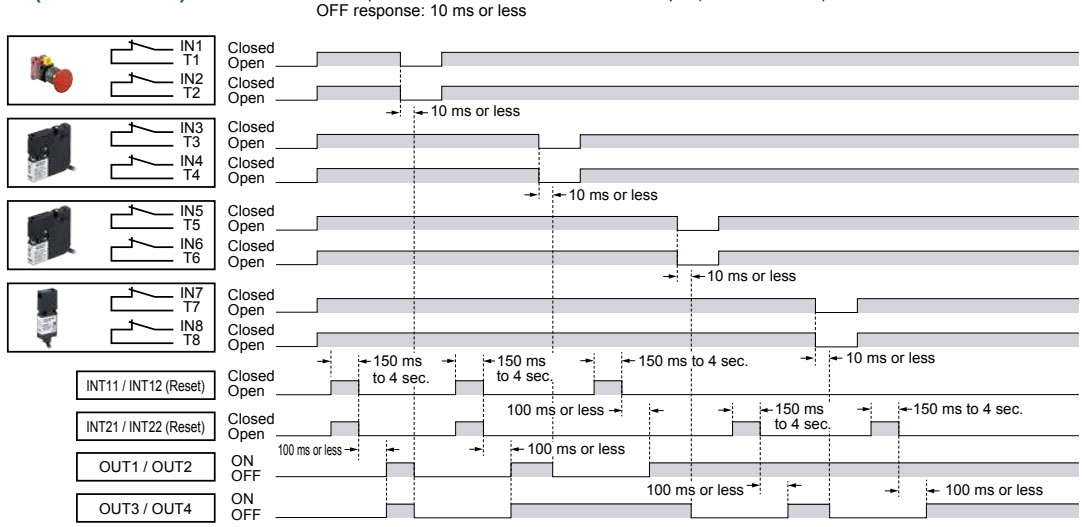


* 1 The delay time can be set using the **Configurator SF-C**.
* 2 The initial OFF delay is set to 0 seconds.

	I/O Function		Details
Safety input	IN 1 / IN 2		2NC contact input
	IN 3 / IN 4		2NC contact input
	IN 5 / IN 6		2NC contact input
	IN 7 / IN 8		2NC contact input
Control output	OUT1 / OUT2	Interlock	Partial reset (manual)
		OFF delay	N/A
	OUT3 / OUT4	Interlock	Partial reset (manual)
		OFF delay	0 sec. (factory defaults, Max. 60 sec.)
Auxiliary output	AUX1		Negative logic of OUT1 / OUT2
	AUX2		Negative logic of OUT3 / OUT4
	AUX3		Reset trigger
	AUX4		Lockout

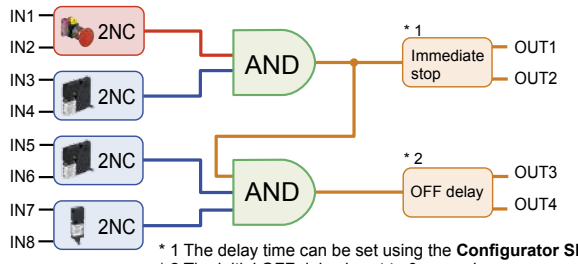
Time chart (Manual reset)

ON response: ON in 100 ms or less after reset input (150 ms to 4 sec.) is entered.
OFF response: 10 ms or less



PRESET LOGICS SPECIFICATIONS

Logic No.5 Partial stop control 2

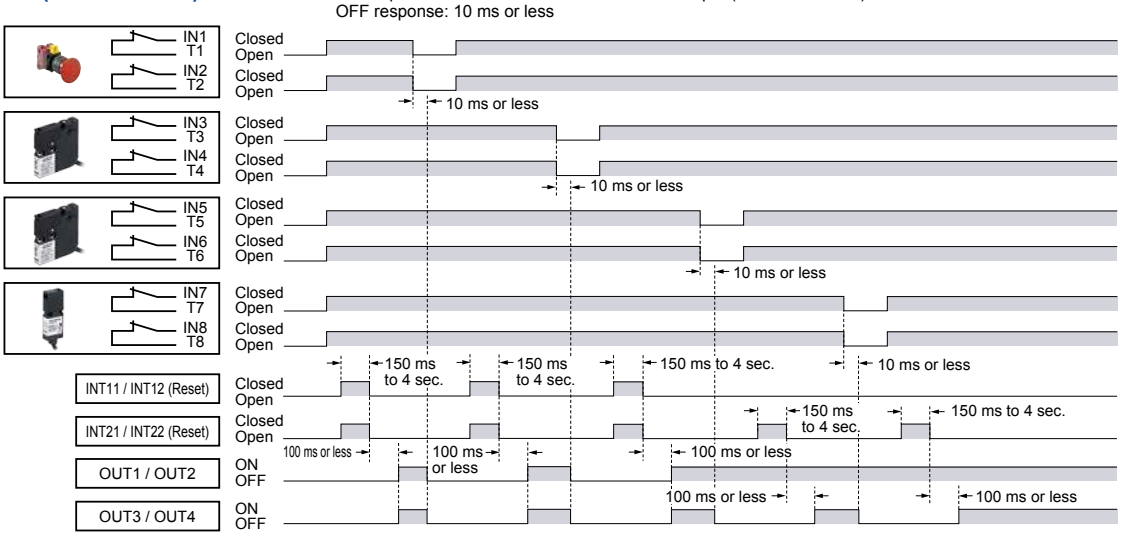


* 1 The delay time can be set using the **Configurator SF-C**.
* 2 The initial OFF delay is set to 0 seconds.

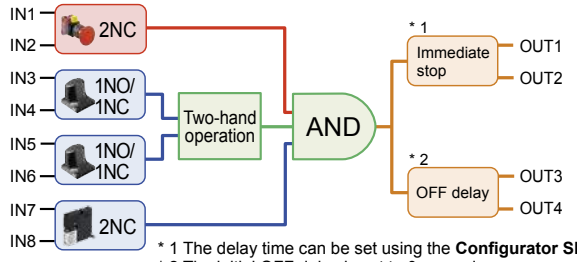
	I/O	Function	Details
Safety input	IN 1 / IN 2		2NC contact input
	IN 3 / IN 4		2NC contact input
	IN 5 / IN 6		2NC contact input
	IN 7 / IN 8		2NC contact input
Control output	OUT1 / OUT2	Interlock	Partial reset (manual)
		OFF delay	N/A
	OUT3 / OUT4	Interlock	Partial reset (manual)
		OFF delay	0 sec. (factory defaults, Max. 60 sec.)
Auxiliary output	AUX1		Negative logic of OUT1 / OUT2
	AUX2		Negative logic of OUT3 / OUT4
	AUX3		Reset trigger
	AUX4		Lockout

Time chart (Manual reset)

ON response: ON in 100 ms or less after reset input (150 ms to 4 sec.) is entered.
OFF response: 10 ms or less



Logic No.6 Two-hand control

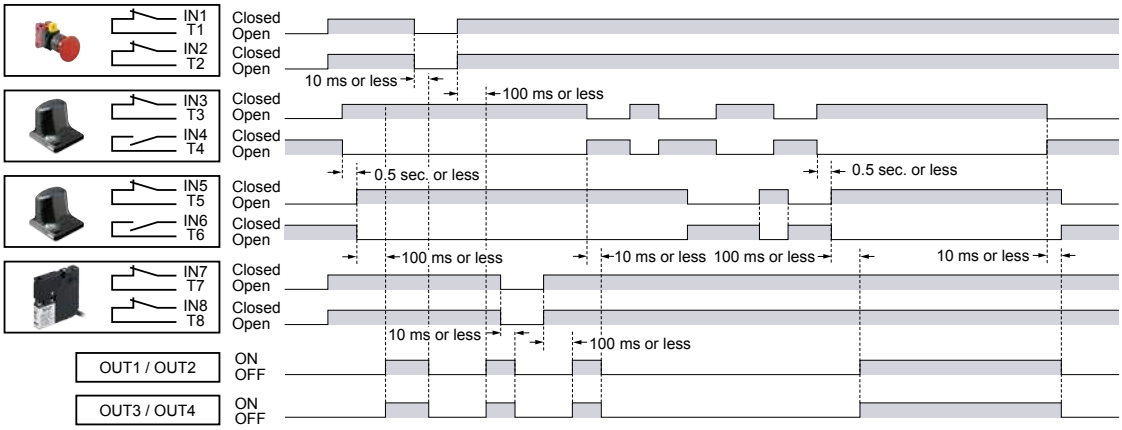


* 1 The delay time can be set using the **Configurator SF-C**.
* 2 The initial OFF delay is set to 0 seconds.

	I/O	Function	Details
Safety input	IN 1 / IN 2		2NC contact input
	IN 3 / IN 4		1NO / 1NC contact input
	IN 5 / IN 6		1NO / 1NC contact input
	IN 7 / IN 8		2NC contact input
Control output	OUT1 / OUT2	Interlock	Overall reset (auto / manual)
		OFF delay	N/A
	OUT3 / OUT4	Interlock	Overall reset (auto / manual)
		OFF delay	0 sec. (factory defaults, Max. 60 sec.)
Auxiliary output	AUX1		Negative logic of OUT1 / OUT2
	AUX2		Negative logic of OUT3 / OUT4
	AUX3		Reset trigger
	AUX4		Lockout

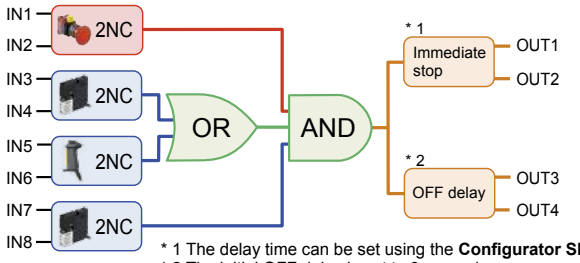
Time chart (When auto-reset)

ON response: 100 ms or less
OFF response: 10 ms or less
Note: ON in 100 ms or less after reset input (150 ms to 4 sec.) is entered.



PRESET LOGICS SPECIFICATIONS

Logic No.7 OR control



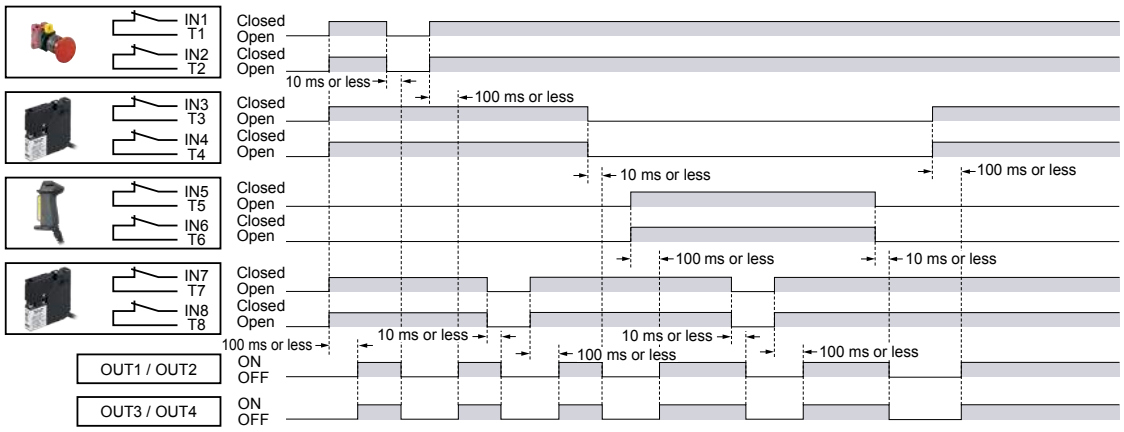
* 1 The delay time can be set using the **Configurator SF-C**.
* 2 The initial OFF delay is set to 0 seconds.

	I/O	Function	Details
Safety input	IN 1 / IN 2		2NC contact input
	IN 3 / IN 4		2NC contact input
	IN 5 / IN 6		2NC contact input
	IN 7 / IN 8		2NC contact input
Control output	OUT1 / OUT2	Interlock	Overall reset (auto / manual)
		OFF delay	N/A
	OUT3 / OUT4	Interlock	Overall reset (auto / manual)
		OFF delay	0 sec. (factory defaults, Max. 60 sec.)
Auxiliary output	AUX1		Negative logic of OUT1 / OUT2
	AUX2		Negative logic of OUT3 / OUT4
	AUX3		Reset trigger
	AUX4		Lockout

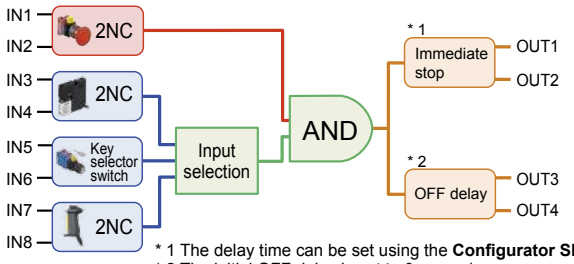
Time chart (When auto-reset)

ON response: 100 ms or less
OFF response: 10 ms or less

Note: ON in 100 ms or less after reset input (150 ms to 4 sec.) is entered.



Logic No.8 Operation mode selection control



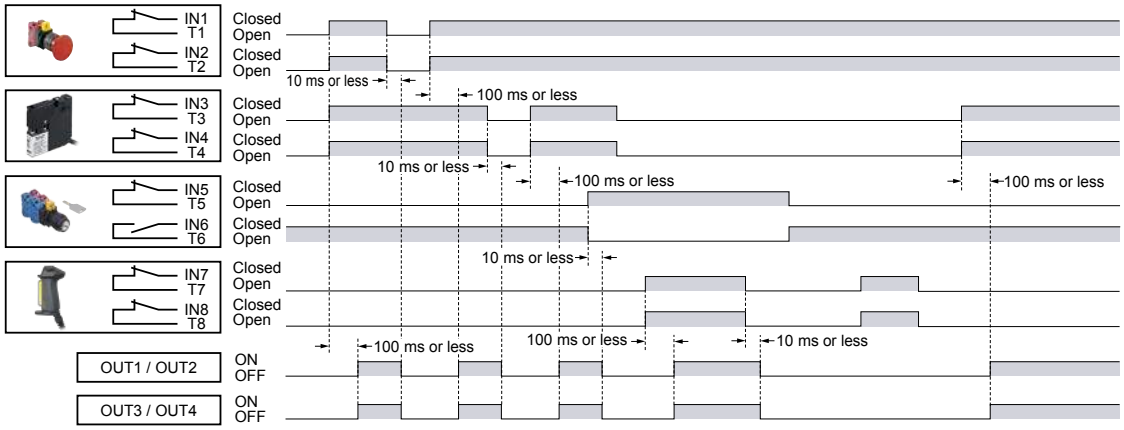
* 1 The delay time can be set using the **Configurator SF-C**.
* 2 The initial OFF delay is set to 0 seconds.

	I/O	Function	Details
Safety input	IN 1 / IN 2		2NC contact input
	IN 3 / IN 4		2NC contact input
	IN 5 / IN 6		Key selector input
	IN 7 / IN 8		2NC contact input
Control output	OUT1 / OUT2	Interlock	Overall reset (auto / manual)
		OFF delay	N/A
	OUT3 / OUT4	Interlock	Overall reset (auto / manual)
		OFF delay	0 sec. (factory defaults, Max. 60 sec.)
Auxiliary output	AUX1		Negative logic of OUT1 / OUT2
	AUX2		Negative logic of OUT3 / OUT4
	AUX3		Reset trigger
	AUX4		Lockout

Time chart (When auto-reset)

ON response: 100 ms or less
OFF response: 10 ms or less

Note: ON in 100 ms or less after reset input (150 ms to 4 sec.) is entered.



PRECAUTIONS FOR PROPER USE

Refer to the instruction manual for details.
The instruction manual can be downloaded from our website.

For the safety of the overall system and the conformity to the standards applicable in each region or country in which this device is installed, take actions on the customer's own responsibility.

- This device has been developed / produced for industrial use only.

Environment

- Do not use a mobile phone or a radio phone near this device.
- This device starts the performance after 2 seconds from the power ON. Have the control system started to function with this timing.
- Do not install this device in the following environments.
  1) The device is exposed to direct sunlight.
  2) Dew condensation may occur due to sudden changes in temperature.
  3) The ambient air contains corrosive or flammable gas.
  4) There is a high level of dust, metallic dust, or salt content.
  5) The device may be exposed to organic solvents such as benzene, thinner, or alcohol and/or strong alkaline substances such as ammonia or caustic soda, or any such substances exist in the ambient air.
  6) The device may be directly exposed to vibration or impact or to water drops.
  7) The device may be exposed to interference from nearby high-voltage lines, high-voltage equipment, power wires, motor equipment, an amateur radio station or other transmitter, or a device with large switching surges (the device must be placed at a distance of 100 mm 3.937 in or greater from any interference sources).

Wiring

Take countermeasure against the system to be applied for this device so as not to carry out the dangerous performance caused by the earth failure.
Failure to do so could cause invalid for the system stop, resulting in death or serious injury.

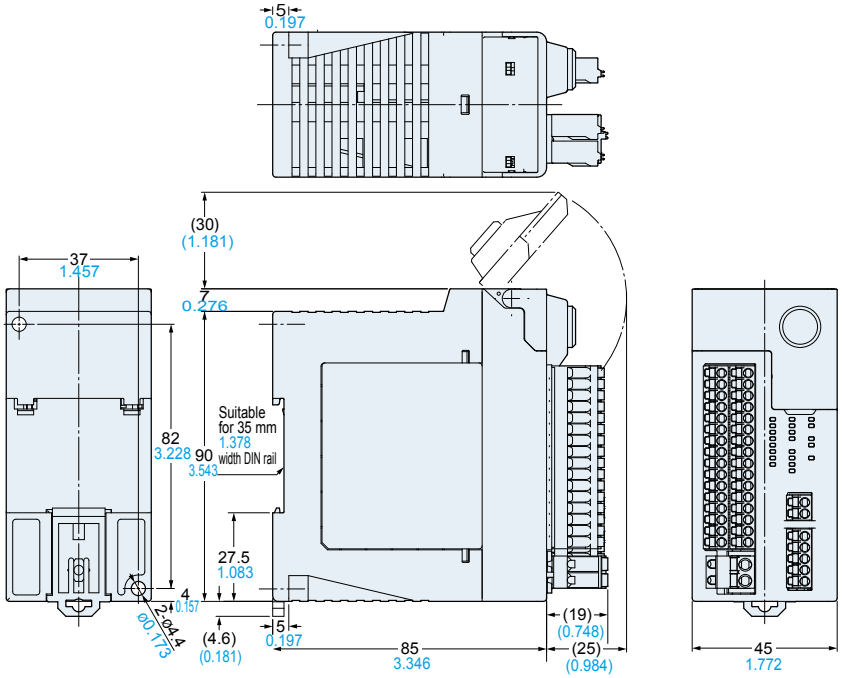
- Do not work on (connect or remove etc.) the device while the power is ON. Failure to follow this precaution could result in an electric shock.
- All electrical wiring should conform to the regional electrical regulations and laws. The wiring should be done by engineer(s) having the special electrical knowledge.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.
- Do not control the device only at one control output.

Machine designer, installer, employer and operator

- The machine designer, installer, employer and operator are solely responsible to ensure that all applicable legal requirements relating to the installation and the use in any application are satisfied and all instructions for installation and maintenance contained in the instruction manual are followed.
- Whether this device functions as intended to and systems including this device comply with safety regulations depends on the appropriateness of the application, installation, maintenance and operation. The machine designer, installer, employer and operator are solely responsible for these items.

DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.



MEMO