

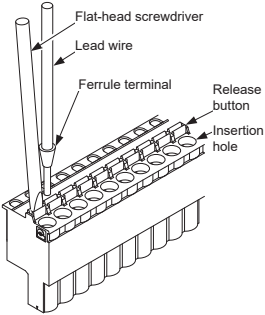
● Compatible terminals / wires

Terminal block name	Terminal block model No.	Ferrule terminal			Solid wire / twisted wire			
		With an insulation sleeve (mm ²)	Without an insulation sleeve (mm ²)	Terminal length (mm)	Solid wire (mm ²)	Twisted wire (mm ²)	AWG	Stripped wire length (mm)
Terminal block for I/O 1	FMC 1,5/16-ST-3,5	0.25-0.75	0.25-1.5	10	0.2-1.0	0.2-1.5	24-16	10
Terminal block for I/O 2								
Terminal block for internal power supply	FMC 1,5/2-ST-3,5	0.25-2.5	0.25-2.5	10	0.2-2.5	0.2-2.5	24-12	10
Terminal block for RS-485	FMC 1,5/5-ST-3,5							
Terminal block for external power supply	FKC 2,5/2-ST	0.25-2.5	0.25-2.5	10	0.2-2.5	0.2-2.5	24-12	10
Terminal block for RS-485	FKC 2,5/2-ST							

<Terminal block> Manufactured by Phoenix Contact

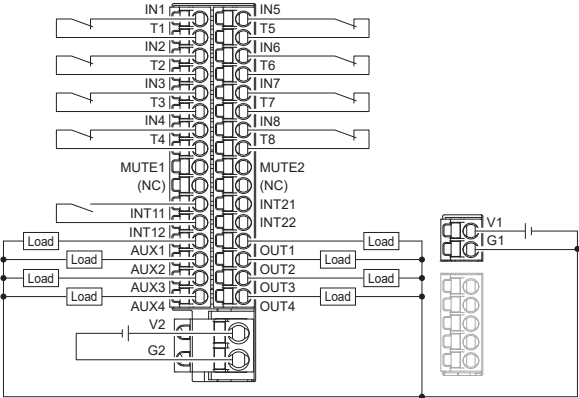
● Connecting to the terminal block

- When connecting to the terminal block, insert a solid wire or twisted wire (lead wire) with a ferrule (rod) terminal, as shown in the figure right, into the hole till it stops. (Ferrule terminals are not included in the product package.)
- The wire is locked when it is properly inserted. However, do not to pull the wire with an excessive force or the cable may break.
- When connecting a twisted wire (lead wire) without using a ferrule terminal, insert the wire to the innermost of the connecting hole while pressing the release button.
- To remove the wire, draw it out while pressing the release button.



7 WIRING DIMENSIONS

● Example: preset logic No.1 manual reset



8 COMMUNICATION FUNCTIONS

● MODBUS RTU specification

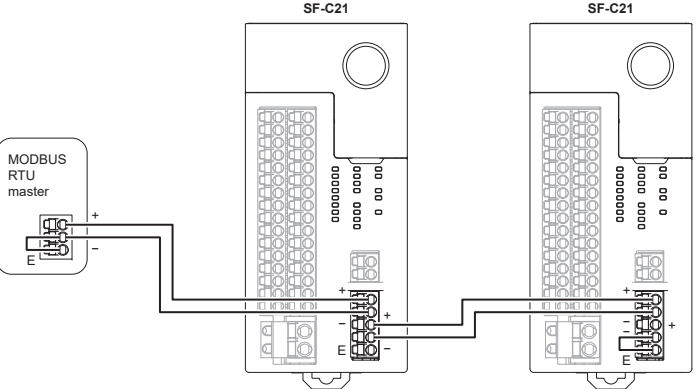
Item	Setting range	Factory default
Interface	RS-485	
Maximum transmission distance	100m	
Data length	8 bits	
Communication preference setting	Either DIP switches take or software tools take precedence	DIP switches take precedence
Parity bit presence	With or without	With
Parity bit type	Odd / Even	Odd
Stop bit	1 bit / 2 bits	1 bit
Communication address	1 to 247	1
Baudrate	9,600 bps 19,200 bps 38,400 bps 57,600 bps 115,200 bps	9,600 bps

● Settings of the DIP switch for RS-485

No.	Setting item	Input status	
		OFF	ON
1	Communication preference setting	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	
6	Communication address 2	SW5: ON, SW6: OFF	
7	Communication address 3	SW5: OFF, SW6: ON	
8	Communication address 4	SW5: ON, SW6: ON	
9	Baudrate	9,600 bps	19,200 bps
10	Not used	–	–
11	Not used	–	–
12	Not used	–	–



● Example of RS-485 wiring



<Reference>

- When the device is used as a terminal station, short-circuit the – terminal and E terminal.
- Use shielded twisted pair cables.
- The transmission line cables (shielded cables) should be connected in a cross-over fashion and grounded at one end.

9 FUNCTION

- For details on the functionality of this device (such as preset logic selection, interlocking, external device monitoring, and software tools), refer to “**SF-C21 Instruction Manual.**”

10 MAINTENANCE

<Reference>

- In the event of a failure or error, refer to “**SF-C21 Instruction Manual**” and provide the details to an authorized engineer.
- If the problem cannot be resolved internally, contact our office.
- Please make a copy of this checklist, check each inspection item in the respective square, and file the list for record.

● Daily inspection

WARNING	
Be sure to inspect the following items prior to operation and confirm that there is no error. Operating this device without inspection or in an error condition can result in death or serious injury.	
Check column	Inspection item
<input type="checkbox"/>	There is no defect, fold, or damage in the wiring.
<input type="checkbox"/>	The terminal blocks are free from dirt or foreign matter deposited on them.
<input type="checkbox"/>	The corresponding connectors have been connected securely.
<input type="checkbox"/>	The unit is securely installed to the DIN rail or securely mounted by means of machine screws.

● Periodic inspection (every six months)

WARNING	
Be sure to inspect the following items every six months and confirm that there is no error. Operating this device without inspection or in an error condition can result in death or serious injury.	
Check column	Inspection item
<input type="checkbox"/>	The structure of the machine does not obstruct any safety mechanism for stopping operation.
<input type="checkbox"/>	No modification has been made in the machine controls which obstructs the safety mechanisms.
<input type="checkbox"/>	The output of this device is correctly detected.
<input type="checkbox"/>	The wiring from this device is correct.
<input type="checkbox"/>	The actual number of operation cycle (time) of the limited lifetime parts (relay, etc.) is less than their rated operation cycles (time).
<input type="checkbox"/>	No screws or connectors of this device are loose.

● Inspection after maintenance

- Check all of the inspection items categorized as “**Daily inspection**” and “**Periodic inspection (every six months)**” if any of the following is true:

- When changes are made to the settings of the device.
- When any parts of this device are replaced.
- When some abnormality is felt during operation.
- When the device installation place or environment is changed.
- When the wiring method or wiring layout is changed.
- When a component or components of a FSD (Final Switching Device) to which the control output is connected are replaced.
- When FSD (Final Switching Device) setting is changed.

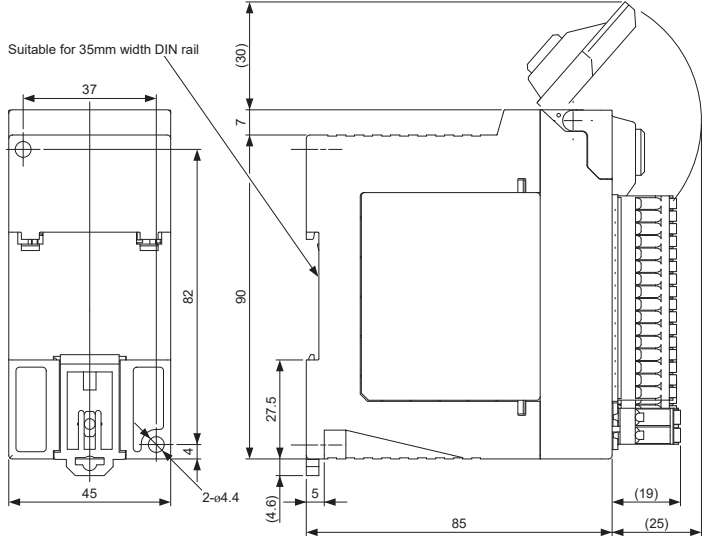
11 SPECIFICATIONS

Model No.		SF-C21
Supply voltage	Power supply for internal	24V DC ⁽¹⁾ Ripple P-P 10% or less
	Power supply for external	24V DC ⁽¹⁾ Ripple P-P 10% or less
Current consumption	Power supply for internal	200mA or less
	Power supply for external	100mA or less
Safety input (IN1 to IN8)		4 × 2 inputs Rated voltage: Same as voltage of the power supply for internal

ON level	Input voltage: 18V, Input current: 3.5mA				
OFF level	Input voltage: 5V, Input current: 1.0mA				
Rated input current	Approx. 5mA				
Input impedance	Approx. 4.7kΩ				
Duration of detectable ON state	10ms or more				
Duration of undetectable OFF state	0.7ms or less				
Control output (OUT1 to OUT4)	PNP open-collector transistor with 2 outputs × 2 <ul style="list-style-type: none">Maximum source current: 300mA / outputApplied voltage: Same as voltage of the power supply for externalResidual voltage: 2.5V or lessLeakage current: 100μA or less (Including power supply OFF condition)				
Output mode	True: ON, False: OFF				
ON delay function	Incorporated				
OFF delay function	Incorporated				
Short-circuit protection	Incorporated				
Response time	OFF response: 10ms or less, ON response: 100ms or less				
Auxiliary output (AUX1 to AUX4) (Non-safety output)	PNP open-collector transistor with 1 output × 4 <ul style="list-style-type: none">Maximum source current: 60mA / outputApplied voltage: Same as voltage of the power supply for externalResidual voltage: 2.5V or lessLeakage current: 100μA or less (Including power supply OFF condition)				
Output mode (Factory defaults)	AUX1: Negative logic output of OUT1 and/or OUT2 (ON when OUT1 and/or OUT2 are OFF) AUX2: Negative logic output of OUT3 and/or OUT4 (ON when OUT3 and/or OUT4 are OFF) AUX3: Reset trigger output (ON when reset condition is met) AUX4: Lockout output (OFF when lockout)				
Output mode Any of the auxiliary outputs can be customized using the software tools	<ul style="list-style-type: none">Negative logic output of OUT1 and/or OUT2 (ON when OUT1 and/or OUT2 are OFF)Negative logic output of OUT3 and/or OUT4 (ON when OUT3 and/or OUT4 are OFF)Positive logic output of OUT1 and/or OUT2 (ON when OUT1 and/or OUT2 are ON)Positive logic output of OUT3 and/or OUT4 (ON when OUT3 and/or OUT4 are ON)Diagnostic result output A, B, C, or D in response to input block 1 to 4 (ON when logic is true)Internal logic circuit diagnostic result output E, F, or G (ON when logic is true)Reset trigger output (ON when reset condition is met)Lockout output (OFF when lockout)Muting indicator output (When muting and/or when override ON)Monitor output in response to IN1 to IN8 (ON when input)No output (normally OFF)				
Short-circuit protection	Incorporated				
Response time	10ms or less				
Muting indicator output	Semiconductor photo MOS relay output × 1 <ul style="list-style-type: none">Maximum load current: 60mASupply voltage: Same as voltage of the power supply for internalResidual voltage: 2.5V or lessLeakage current: 100μA or less (Including power supply OFF condition)				
Output mode	When muting and/or when override ON				
Short-circuit protection	Incorporated				
Response time	10ms or less				
Interlock function	Incorporated				
Lockout release function	Incorporated				
External device monitor function	Incorporated				
Communication function (MODBUS RTU)	<ul style="list-style-type: none">Interface: RS-485Protocol: MODBUS RTUMaximum transmission distance: 100mMaximum number of units that can be connected: 8 units (slaves)				
Logic selection function	<ul style="list-style-type: none">No.0: Customizable controlNo.1: Overall stop controlNo.2: Parallel muting controlNo.3: Sequential muting controlNo.4: Partial stop control 1No.5: Partial stop control 2No.6: Two-hand controlNo.7: OR controlNo.8: Operation mode selection control				
Logic setting function	Input mode, control mode, output mode, reset mode, auxiliary output mode				
Pollution degree	2				
Overvoltage category	II				
Usable altitude	2,000m or less				
Startup time after power on	2 sec. or less				
Maximum cable length	100m				
Connection method	Input / output and power supply: Detachable spring cage terminal blocks RS-485: Detachable spring cage terminal block USB: Mini B male				
Weight (main unit only)	Approx. 190g				
Applicable standards	<table><tr><td>Safety</td><td>IEC 61508-1 to 7, EN 61508-1 to 7 (SIL3), ISO 13849-1:2015(Up to Category 4 and PLe), EN IEC 63000</td></tr><tr><td>EMC</td><td>IEC 61131-2, IEC 61010-2-201, IEC 62061 (SILCL3), UL 61010-1, UL 61010-2-201, UL 1998</td></tr></table>	Safety	IEC 61508-1 to 7, EN 61508-1 to 7 (SIL3), ISO 13849-1:2015(Up to Category 4 and PLe), EN IEC 63000	EMC	IEC 61131-2, IEC 61010-2-201, IEC 62061 (SILCL3), UL 61010-1, UL 61010-2-201, UL 1998
Safety	IEC 61508-1 to 7, EN 61508-1 to 7 (SIL3), ISO 13849-1:2015(Up to Category 4 and PLe), EN IEC 63000				
EMC	IEC 61131-2, IEC 61010-2-201, IEC 62061 (SILCL3), UL 61010-1, UL 61010-2-201, UL 1998				
Related standards	IEC 61000-6-2, IEC 61326-3-1, EN 55011 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				

Note: Do not use or store this device in a pressurized environment beyond the atmospheric pressure at the sea level.

12 DIMENSIONS (Unit: mm)



13 CE MARKING DECLARATION OF CONFORMITY

Itemized Essentials of EU Declaration of Conformity

Manufacturer's Name: Panasonic Industrial Devices SUNX Co., Ltd.
Manufacturer's Address: 2431-1, Ushiyama-cho, Kasugai, Aichi 486-0901, Japan
EU Representative's Name: Panasonic Marketing Europe GmbH Panasonic Testing Centre
EU Representative's Address: Winsbergring 15, 22525 Hamburg, Germany
Product: Safety Control Unit
Model Name: SF-C21
Trade Name: Panasonic
Application of Council Directive:

- 2006/42/EC Machinery Directive
- 2014/30/EU EMC Directive
- 2011/65/EU RoHS Directive

Applicable Standard(s):

- | | | |
|----------------|------------------|-------------------|
| - EN 62061 | - EN ISO 13849-1 | - EN 55011 |
| - EN 61000-6-2 | - IEC 61131-2 | - IEC 61010-2-201 |
| - IEC 61508-1 | - IEC 61508-2 | - IEC 61508-3 |
| - IEC 61508-4 | - EN IEC 63000 | |

Type Examination: Certified by TÜV SÜD Product Service GmbH Ridlerstrasse 65 80339 München Germany

14 UKCA MARKING DECLARATION OF CONFORMITY

Itemized Essentials of UK Declaration of Conformity

Manufacturer's Name: Panasonic Industrial Devices SUNX Co., Ltd.
Manufacturer's Address: 2431-1, Ushiyama-cho, Kasugai, Aichi 486-0901, Japan
Authorized Representative: Panasonic Testing Centre on behalf of Panasonic UK
Panasonic UK, a branch of Panasonic Marketing Europe GmbH
Maxis 2, Western Road, Bracknell, Berkshire, RG12 1RT
Product Name: Safety Control Unit
Trade Name: Panasonic
Model Number: SF-C20 Series
Statutory Instruments:

- 2008 No.1597 Supply of Machinery (Safety) Regulations 2008
- 2016 No.1091 Electromagnetic Compatibility Regulations 2016
- 2012 No.3032 RoHS Regulations 2012

Designated Standards:

- EN 62061	- EN ISO 13849-1
- EN 55011	- EN 61000-6-2
- IEC 61131-2	- IEC 61010-2-201
- IEC 61508-1	- IEC 61508-2
- IEC 61508-3	- IEC 61508-4
- EN IEC 63000	

Approved Body: Certified by TÜV SÜD Product Service GmbH Ridlerstrasse 65 80339 München Germany

Panasonic Industry Co., Ltd.
Panasonic Industrial Devices SUNX Co., Ltd.
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