Panasonic
INDUSTRY

Enable Grip Switch

SG-C1 SERIES

2025.1

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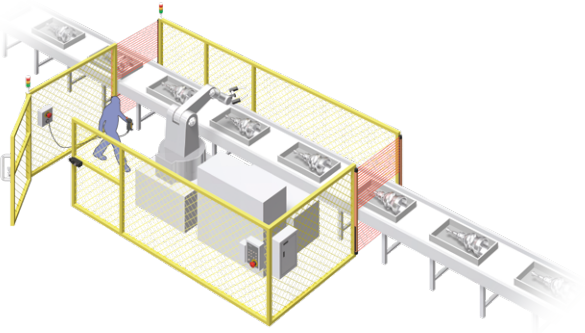
SG-C1 SERIES

Compact, light weight grip switches designed to fit comfortably in the hand

This product line includes models with control units suited to a variety of applications.



The compact, light weight grip profile was designed based on human engineering considerations.

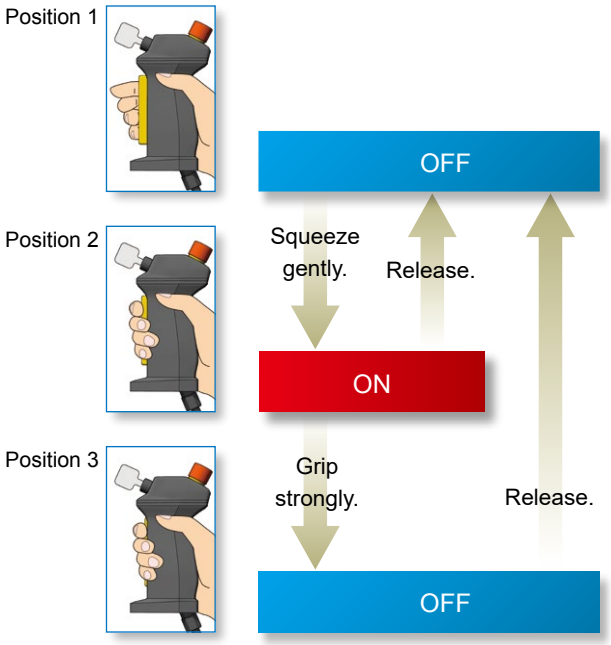
The compact profile fits the hand perfectly, ensuring comfortable operation. Thanks to its light weight design (**SG-C1-21**: approx. 140 g) and compact size, it is easy to hold even for individuals with small hands, and it can also be used in confined work locations.

Reduced impact during extended operation

We reduced the impact during extended operation by lowering the holding load in position 2 (ON).

Pleasant, clear button operation

Tactile clicking feedback allows easy recognition of switch operation when shifting from position 1 (contact OFF) to position 2 (contact ON).

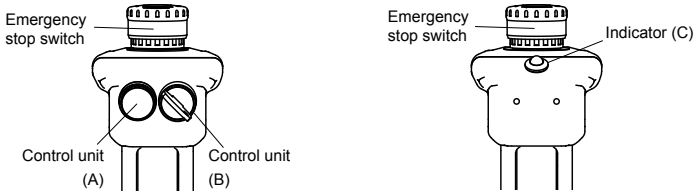


ORDER GUIDE

Enable grip switch

Contact configuration						Rubber boot material / Color	Wiring style	Model No.
3 position enabling switch	Push monitor switch	Additional control units: Emergency stop switch	Control unit (A)	Control unit (B)	Indicator (green) (C)			
2 contacts	With (1NC)	Without				Silicone rubber / (Yellow) (Note)	Solder terminal	**SG-C1-21**
		With (2NC)	Without		Without			**SG-C1-21-E**
					With			**SG-C1-21-EG**
		Without	Momentary pushbutton switch (2c)	Momentary pushbutton switch (2c)	Without			**SG-C1-21-MM**
		With (2NC)						**SG-C1-21-EMM**
				Key selector switch (2c)				**SG-C1-21-EMK**

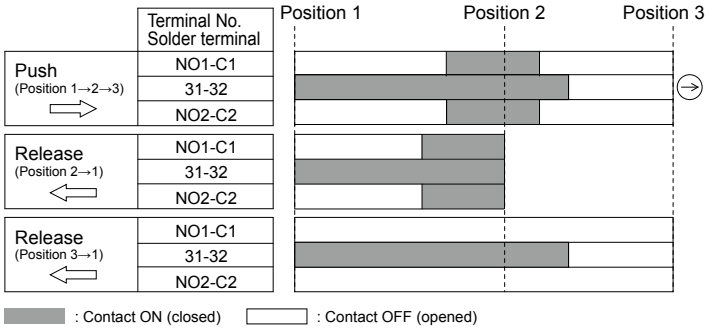
Additional control unit layout



Note: Silicone rubber: Can be used in general factories. Remains flexible in cold temperatures. Suitable in applications with a wide operating temperature range.

CONTACT CONFIGURATION / OPERATING PATTERNS

Grip switch (during operation of center of the rubber boot)



3 position enabling switch: 2 contacts; pin No.: NO1-C1, NO2-C2
Push monitor switch: 0, 1 contacts: pin No.: 31-32 (**SG-C1-21**□)

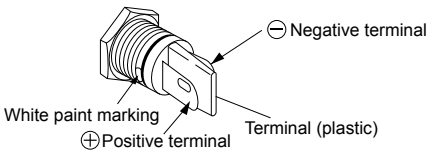
Note: Push monitor switch (terminal No.31-32) will be positive opening circuit (⊖) when the switch operates from position 2 to 3.
Use contacts of terminal No. NO1-C1 and NO2-C2 for the output of enabling system.
The above operating characteristics illustrate the performance when the center of the rubber boot is pressed. Pressing the edge activates one of the two 3 position enabling switches inside earlier than the other, and may cause a delay in the operation.

Key selector switch

Operator position & contact operation (top view)			
Position	Key removal position	↖ (Left)	↗ (Right)
Maintained 1 2	Removable in all positions	Left contact: NO1, NC1 Right contact: NO2, NC2 C1, C2	Left contact: NO1, NC1 Right contact: NO2, NC2 C1, C2

Indicator

Pay attention to the polarity of the power supply as **SG-C1-21-EG** do not contain a diode for protection against reverse polarity.
On solder terminal units, the terminal with a white paint marking is positive.



SPECIFICATIONS

Item \ Designation		Enable grip switch
Series		**SG-C1** series
Applicable standards		EN 60947-5-1, EN IEC 60947-5-8, GS-ET-22
Standards for use		ISO 12100 / EN ISO 12100, IEC 60204-1 / EN 60204-1, ISO 11161 / EN ISO11161, ISO 10218-1 / EN ISO 10218-1, ANSI / RIA / ISO 10218-1, ANSI / RIA R15.06, ANSI B11.19, ISO 13849-1: 2015 / EN ISO 13849-1: 2015, JIS C 8201-5-1, UL 508, CSA C22.2 No.14
Applicable regulations and certifications		CE Marking [Machinery Directive (2006/42/EC), RoHS Directive], UKCA Marking [Supply of Machinery (Safety) Regulations (2008 No.1597), RoHS Regulations], UL/c-UL Recognition, TÜV SÜD certification
Operating condition	Ambient temperature	-25 to +60 °C -13 to +140 °F (No dew condensation or icing allowed) Storage: -40 to +80 °C -40 to +176 °F
Operating condition	Ambient humidity	45 to 85 % RH
Operating condition	Pollution degree	3 (Inside 2)
Operating condition	Altitude	2,000 m 6,561.68 ft max.
Impulse withstand voltage (Uimp)		2.5 kV (Momentary pushbutton switch and key selector switch: 1.5 kV)
Rated insulation voltage (Ui)		250 V (Momentary pushbutton switch and key selector switch: 125 V) / Models with indicator: 30 V
Thermal current (Ith)		3 A (Emergency stop switch: 5 A)

Rated operational voltage (Ue) / Rated operational current (Ie) (Note)

Ie \ Ue				30 V	125 V	250 V
Grip switch	3 position enabling switch (Terminal No.: NO1-C1, NO2-C2)	AC	Resistive load (AC-12)	-	1 A	0.5 A
			Inductive load (AC-15)	-	0.7 A	0.5 A
		DC	Resistive load (DC-12)	1 A	0.2 A	-
			Inductive load (DC-13)	0.7 A	0.1 A	-
	Push monitor switch (Terminal No. 31-32)	AC	Resistive load (AC-12)	-	2.5 A	1.5 A
			Inductive load (AC-15)	-	1.5 A	0.75 A
		DC	Resistive load (DC-12)	2.5 A	1.1 A	0.55 A
			Inductive load (DC-13)	2.3 A	0.55 A	0.27 A
	Emergency stop switch (Terminal No. 1-2, 1-2)	AC	Resistive load (AC-12)	-	5 A	3 A
			Inductive load (AC-15)	-	3 A	1.5 A
		DC	Resistive load (DC-12)	2 A	0.4 A	0.2 A
			Inductive load (DC-13)	1 A	0.22 A	0.1 A
	Momentary pushbutton switch / Key selector switch (Terminal No. C1┬NO1 └NC1, C2┬NO2, └NC2)	AC	Resistive load (AC-12)	-	0.5 A	-
			Inductive load (AC-15)	-	0.3 A	-
		DC	Resistive load (DC-12)	1 A	0.2 A	-
			Inductive load (DC-13)	0.7 A	0.1 A	-

Electric shock protection class		Class II (IEC 61140), ⧈ (double insulated) (Models with indicator: Class III)
Operating frequency		1,200 operations/hour
B_{10d}		2,000,000 (EN ISO 13849-1: 2015, JIS B 9705-1 Annex C Table C.1)
Mechanical durability		Position 1⇒2⇒1: 1,000,000 operations min. Position 1⇒2⇒3⇒1: 100,000 operations min.
Electrical durability		100,000 operations min. (Rated operating load) 1,000,000 operations min. (AC / DC 24 V 100 mA)
Shock resistance		Malfunction: 150 m/s², Destruction: 1,000 m/s²
Free fall		1.0 m 3.281 ft 1 time (Based on IEC60068-2-32)
Vibration resistance		Malfunction: 5 to 55 Hz, half amplitude 0.5 mm 0.020 in Destruction: 16.7 Hz, half amplitude 1.5 mm 0.059 in
Protection	IP66 / IP67	Without additional switch and pilot light
Protection	IP65	With additional switch and/or pilot light
Conditional short-circuit current		50 A (250 V)
Short-circuit protective device		250 V AC, 10 A Fuse (IEC60127-1)
Direct opening force		60 N min. (Push monitor switch)
Direct opening travel		4.7 mm 0.185 in min. (Push monitor switch)
Actuator Strength (Entire button is pushed)		500 N min. (Grip switch)
Indicator (Note)		Green LED Rated Operating Voltage: DC 24 V ±10 % Rated current: 15 mA
Weight		**SG-C1-21**: Approx. 140 g , **SG-C1-21-E**: Approx. 150 g, **SG-C1-21-EG**: Approx. 155 g, **SG-C1-21-MM**: Approx. 155 g, **SG-C1-21-EMM**: Approx. 165 g, **SG-C1-21-EMK**: Approx. 170 g

Note: As for the type with pilot light, Ue (contact ratings) of all switches is only less than 30 V DC, and connect all switches to SELV (safety extra low voltage) or PELV (protective extra low voltage) circuit.

PRECAUTIONS FOR PROPER USE

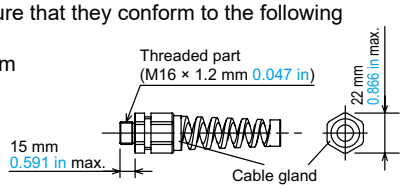
- This catalog is a guide to select a suitable product. Be sure to read the instruction manual of the product prior to its use.

- In order to avoid electric shock or fire, turn the power off before installation, removal, wire connection, maintenance, or inspection of the safety switch.
- Do not disassemble or modify the grip switch.
- When using the **SG-C1** series for safety-related equipment in a control system, refer to the safety standards and regulations in each country and region depending on the application purpose of the actual machines and installations to make sure of correct operation. Also, perform risk assessment to make sure of safety before starting operation.
- Do not tie the grip switch around the button with a tape or string to keep the switch in position 2. Doing so will prevent the grip switch from functioning as designed and is extremely dangerous. Systems that stop operation after the grip has been operated for a certain period of time and require the operator to grip it again are effective in preventing circumvention of the device's intended purpose.
- Please note that permanent installation of the grip switch at the machine is inadmissible.

- This device has been developed / produced for industrial use only.
- Use proper size wires to meet voltage and current requirements.
- Do not apply an excessive shock to the **SG-C1** series.
- When wiring, prevent dust, water, or oil from entering the grip switch.
- If used in wet locations, this device must be used with cable suitable for wet locations.
- When multiple safety components are connected in series, the EN ISO 13849-1: 2015 performance level will fall due to the deterioration in fault detection functionality.
- The suitability of control systems in which this product has been embedded must be verified in accordance with EN ISO 13849-2: 2012.
- **SG-C1** series is a device used for enabling a machine (robot, etc.) when teaching the machine in a hazardous area manually. Configure the enabling system so that the machine can operate when the switch is in position 2 and an additional "start" is pushed to initiate the operation.
- In order to ensure safety of the control system, connect each pair of the contacts of the 3 position enabling switch (terminal No. NO1-C1 and NO2-C2) to a discrepancy detection circuit such as a safety relay module. (ISO13849-1: 2015)
- The base and the plastic part of rubber boot frame are made of glass-reinforced ABS / PBT. The rubber boot is made of silicone rubber. The screw is made of iron. When cleaning the **SG-C1** series, use a detergent compatible with the materials
- As for momentary pushbutton switch and key selector switch of additional control unit, do not connect NO and NC contacts of a microswitch to different voltages or different power sources to prevent a dead short-circuit.
- Do not operate key selector switch of additional control unit without completely insertion of the key.
- The rubber boot may deteriorate depending on the operating environment and conditions.

Cable glands

- The product includes one cable gland. When purchasing replacements, ensure that they conform to the following dimensional range:
- Dimension diagram

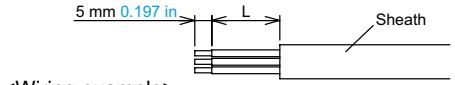


- Waterproofness: Use a cable gland that can maintain performance of IP67 or higher.
- Recommended connector: Model SKINTOP-BS-M16 × 1.5-B (manufactured by LAPP in Germany and imported by K.MECS Automation Inc.)
- Applicable cable diameter: Outer diameter of 4.5 to 10 mm 0.177 to 0.787 in

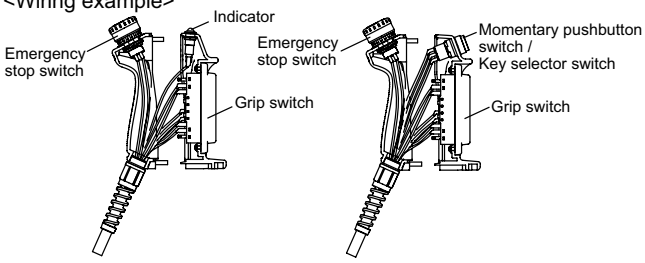
PRECAUTIONS FOR PROPER USE

Wire length inside the grip switch

Wire stripping length	Grip switch						Momentary pushbutton switch / Key selector switch			Emergency stop switch		Indicator	
	NO1	C1	31	32	NO2	C2	C	NO	NC	1	2	+	-
L (mm in)	40 1.575	45 1.772	50 1.969	60 2.362	85 3.346	80 3.150	120 4.724			110 4.331		115 4.528	



<Wiring example>



Applicable wire size in terminal

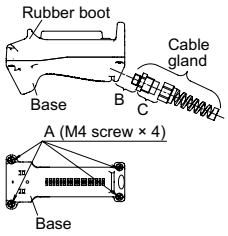
- If direct-mounted: 0.5 mm^2 (AWG20) or less
  Wire **SG-C1** series according to IEC60204-1
  Wiring Instruction

Wiring

- Solder the terminal at 310 to 350 °C 590 to 662 °F within 3 seconds using a 60 W soldering iron.
  Sn-Ag-Cu type is recommended when using lead free solder.
- When soldering, do not touch the **SG-C1-□** with the soldering iron. Also ensure that no tensile force is applied to the terminal. Do not bend the terminal or apply excessive force to the terminal.
- Use non-corrosive rosin flux.
- Because the terminal spacing is narrow, use protective tubes or heat shrinkable tubes to avoid burning of wire coating or short circuit.
- When using a stranded wire, make sure that adjoining terminals are not short-circuited with protruding core wires.
- Use copper wire 60 to 75 °C 140 to 167 °F only. (UL508)
- The wiring has to be installed according to GS-ET-22: 2016, 4.2.6.

Recommended screw tightening torque

Part being secured	Screw position	Screw tightening torque
For mounting rubber boot frame on the base (M4 screw × 4)	A	1.1 to 1.3 N·m
Cable gland to Grip switch Screw	B	2.7 to 3.3 N·m
Cable gland to cable gland	C	2.7 to 3.3 N·m

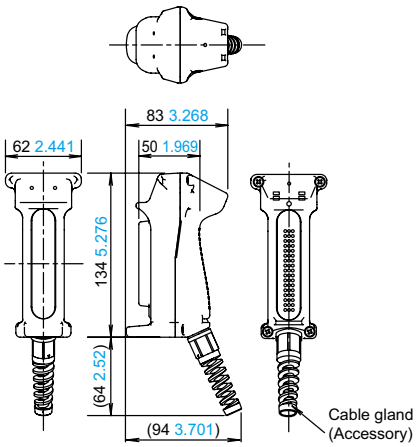


The B and C values in the above table reflect use of the recommended connectors listed above.
When using a cable gland other than the recommended model, check that part's tightening torque.

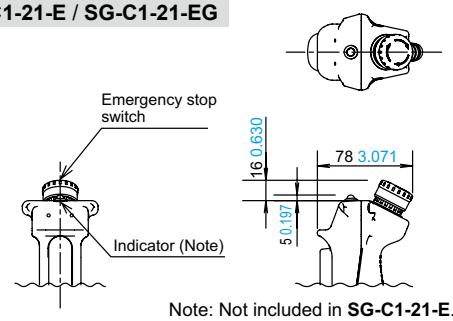
DIMENSIONS (Unit: mm in)

SG-C1-□ Enable grip switch

SG-C1-21

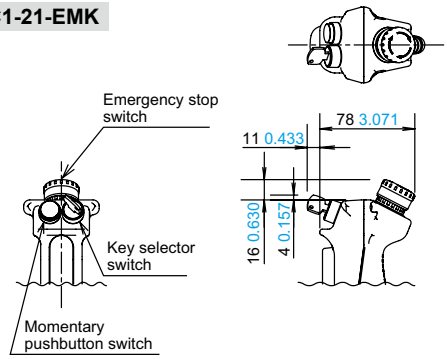


SG-C1-21-E / SG-C1-21-EG

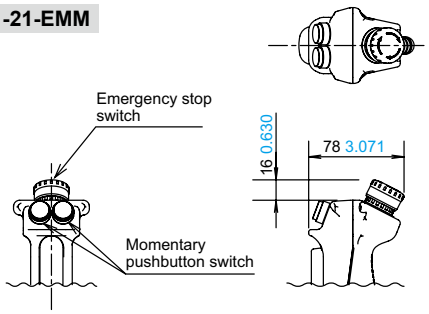


Note: Not included in **SG-C1-21-E**.

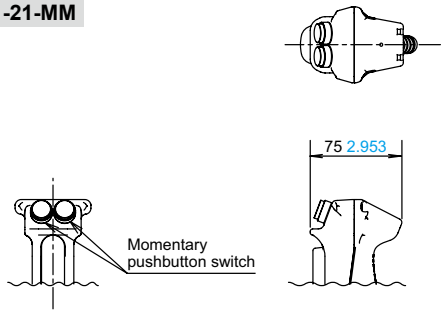
SG-C1-21-EMK



SG-C1-21-EMM



SG-C1-21-MM



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Panasonic INDUSTRY

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