Safety Contact Strip Controllers SCC-1DN-1224 & SCC-1DN-1224-ND Series

Installation and Operating Manual

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SCC-1DN-1224 & SCC-1DN-1224-ND

Safety Contact Strip Controllers

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1 IMPORTANT SAFETY MESSAGE

The Safety Contact Strip and Controller, when used together as a system, is an emergency stop device when applied, installed, operated, and maintained in accordance with the instructions in this manual. The design and construction of this device is in accordance with CEN - European Committee for Standardization for CEN member countries. This organization provides general information and guidelines on the proper methods for manufacturing this type of a device as it relates to machine safeguarding.

Whether a specific machine or other application and Safety Contact Strip and Controller installation fully comply with CEN pr EN 954-1 depends on several items including: the proper application, installation, maintenance and operation of the Safety Contact Strip and Controller. These items are the sole responsibility of the purchaser, installer and employer.

The employer is also responsible for the selection and training of the personnel necessary to properly install, operate and maintain the machine and its safety systems. For example, Safety Contact Strip and Controller should be installed, checked out and maintained only by a qualified person.

The user is that person(s) identified and designated by the employer as being appropriately trained and qualified to perform a specific procedure. Often the user is the installer, die setter, electrician, maintenance personnel, supervisor, or foreman, etc., involved with the setup, test and checkout of the machine and all safety devices.

Definition of Qualified Person

A person who, by possession of a recognized degree in an applicable field or a certificate of professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work. Reference ASME B30.2-2001

The equipment operator must receive specific, proper training on exactly which equipment is protected by the Safety Contact Strip and

Controller, the equipment's operating controls, warning signs and safety instructions. The equipment operator must thoroughly understand and follow the company's safety rules and always use the safeguards and proper hand tools provided by the employer. The equipment operator must notify management if the equipment, tooling or safety devices are not operating properly. Never use the equipment if it or the related safety equipment is not in proper working order.

The following additional requirements must be met before using the Safety Contact Strip Controller E-stop system.

- The equipment on which the Safety Contact Strip and Controller are installed must be capable of stopping motion anywhere in its stroke or cycle.
- Do not use a Safety Contact Strip and Controller:

  – on any device with inconsistent stopping time or inadequate control devices or mechanisms.

  – where the environment, such as corrosive chemicals, may degrade the efficiency of the Safety Contact Strip and Controller.
- When a Safety Contact Strip and Controller are installed on a machine or other piece of equipment as an emergency stop device, the employer has the responsibility to insure that all applicable federal, state and local Occupational Safety and Health Act (OSHA) requirements and other such rules, codes and regulations are satisfied.
- All safety-related machine control circuit elements, including pneumatic, electric or hydraulic controls, must be control reliable as defined by ANSI B11.19-2003, 3.14. All other machinery or equipment must meet OSHA Standard 1910.212 on general machine guarding plus any other applicable regulations, codes and standards.
- Do not use Safety Contact Strip and Controller to initiate machine or equipment motion.

- All brakes and other stopping mechanisms must be inspected regularly to ensure proper working order. If the stop mechanisms and associated controls are not working properly, the machine may not stop safely even though the Safety Contact Strip and Controller are functioning properly.
- Only qualified personnel must install and test the Safety Contact Strip and Controller. Do not perform any test or repairs other than those outlined in this manual. All electrical wiring must be installed in accordance with local electrical codes and regulations.
- The user must follow all procedures in this manual for proper operation of the Safety Contact Strip and Controller.

The enforcement of these requirements is beyond STI's control. The employer has the sole responsibility to follow the preceding requirements and any procedures, conditions and requirements specific to your machinery.

2 INTRODUCTION

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The STI Safety Contact Strip and Safety Contact Strip Controller, when connected together, provide the operator controls and switching electronics for an emergency stop system that can cover large areas of a machine, door, gate, etc. Applications include machinery, gates, fences, overhead and sliding doors and other equipment where easy operator access to an emergency stop actuator is needed.

Safety Contact Strips are watertight and are impervious to a large number of chemicals. They available in several profiles in lengths up to 6100mm in 10mm increments.

Six wiring configurations are available in all profiles.

1. "0" – configuration has no terminating resistor. This would be used as the first segment where additional segments are connected in series.
2. "1" – configuration includes the resistor, which is wired external to the Safety Contact Strip. This allows for additional strips to be installed in the future if required.
3. "2" – configuration includes the resistor enclosed and sealed within the strip. This unit must always be the last or the only unit in the system the resistor cannot be removed without compromising the integrity of the system.
4. "3" – QD configuration has no terminating resistor. This would be used as the first segment where additional segments are connected in series. One two wire lead exits each end of the profile one is fitted with a Female Quick-disconnect and the other is fitted with a Male Quick-disconnect.
5. "4" – QD Configuration consist of one two wire lead with Male Quick-disconnect and one resistor enclosed and sealed within

the strip. This unit must always be the last or the only unit in the system the resistor cannot be removed without compromising the integrity of the system.

6. "5" – QD This configuration has no terminating resistor. This would be used as the first segment where additional segments are connected in series. One two wire lead exits each end of the profile, one end has a two wire connection and the other is fitted with a Female Quick-disconnect.

3 THEORY OF OPERATION 3

The Safety Contact Strip Controller and Safety Contact Strip combine to make up a versatile and flexible emergency stop system for use in applications where a machine operator or setup person must have easy, contiguous access to an E-Stop actuator.

The Safety Contact Strip is consists of an aluminum mounting rail, a Safety Contact and a rubber profile into which the Safety Contact is inserted. The SGE Series edges have an integrated contact within the profile. The Safety Contact Strip has two wires connected at each end. In an application where a single strip is used, two wires from one end are connected to the Safety Contact Strip Controller, the two wires on the other end of the Safety Contact Strip are factory connected to an 8.2 K Ohm resistor.

4 DESCRIPTION OF CONTROLS

4.1. RELAY SAFETY OUTPUTS (OSSD'S)

The positive-guided relay outputs of the SCC-1DN-1224 and SCC-1DN-1224-ND are referred to as safety outputs. They are turned off when an object or person activates the Safety Contact Strip. Two Normally Open contacts are provided across terminals 13, 14 and 23, 24.

4.2. AUXILIARY RELAY OUTPUT SCC-1DN-1224

One Normally Open contact is provided across terminals 31, 32. This contact closes for 2 to 3 seconds whenever the Safety Contact Strip is activated. **These contacts must never be used in the safety circuit.**

4.3. AUXILIARY RELAY OUTPUT SCC-1DN-1224-ND

One Normally Open contact provided across terminals 31, 32. This contact remains closed as long as the safety contacts are open. (When the Safety Contact Strip is activated). **These contacts must never be used in the safety circuit.**

4.4. INDICATORS

There are four LED lamps on the SCC-1DN-1224 and SCC-1DN-1224-ND Safety Contact Strip Controller. Please see *Figure 5-2* for the physical location of each indicator. These LEDs are identified on the controller.

- *Green LED Power*

Indicates that main power has been applied to the controller. Upon removal of power, the green light will go out and the controller and Safety Contact Strip becomes inactive and the safety contacts are opened.

- *Yellow LED Actuate (Edge Activated)*

Indicates that the Safety Contact Strip is depressed. LED goes out upon removal of pressure from the Safety Contact Strip.

- *Red LED Fault Indication*

Indicates an open circuit in the Safety Contact Strip such as a broken/cut wire, a loose connection on terminals X1 and/or X2 on the controller terminal block, a missing or incorrect value of the terminating resistor at the end of the Safety Contact Strip, or any damage to the Safety Contact Strip that could cause an open circuit between terminals X1 and X2.

- *Yellow LED Auxiliary Relay SCC-1DN-1224 (Delay to Open)*

Indicates that the safety contact has been activated, causing the auxiliary contact to close. These contacts close when the safety contact is activated and are timed to open after about two to three (2 to 3) seconds. This could be used to reverse a door so long as doing so does not present a hazard.

- *Yellow LED Auxiliary Relay SCC-1DN-1224-ND (No Delay to Open)*

Indicates that the safety contact has been activated, causing the auxiliary contact to close. These contacts remain closed as long as the safety contact strip is activated.

5 MODES OF OPERATION

5.1. AUTOMATIC START MODE (FACTORY DEFAULT)

There is only one configurable option, the factory default for the unit is Automatic Start, (See *Figure 5-1*) when power is applied to the controller, the controller will initiate a start up self-check. When the self-check is complete the relays will close; pressing the Safety Contract Strip will cause the safety relays in the controller to transfer to the open state. When pressure is removed from the Safety Contract Strip, the relays will transfer back to the closed state.

Table 5-1 Wiring Connections for Automatic Restart

X1, X2	Connection to Safety Contact Strips
S11, S12	Jumper removed for Automatic Restart
B1+, B2–	Supply Voltage 24VDC
Z1, Z2	Reset Pushbutton or Momentary Key-switch. No connection required for automatic mode.
A1, A2	Supply Voltage 115 VAC 50/60 Hz
31, 32	Auxiliary Relay Contact - SCC-1DN-1224: Contacts close when Safety Contact Strip is operated and Delayed To Open after 2 to 3 seconds. - SCC-1DN-1224-ND: Contacts close when Safety Contact Strip is operated and remain closed until the Safety Contact Strip is returned to normal. These contacts must never be used in the safety circuit.
13, 14	Safety Relay Contact 1
23, 24	Safety Relay Contact 2

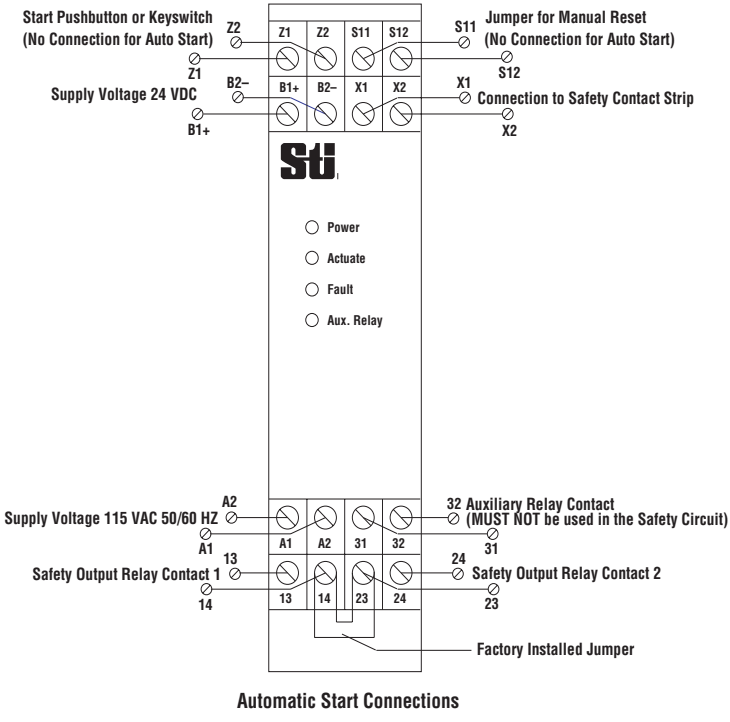


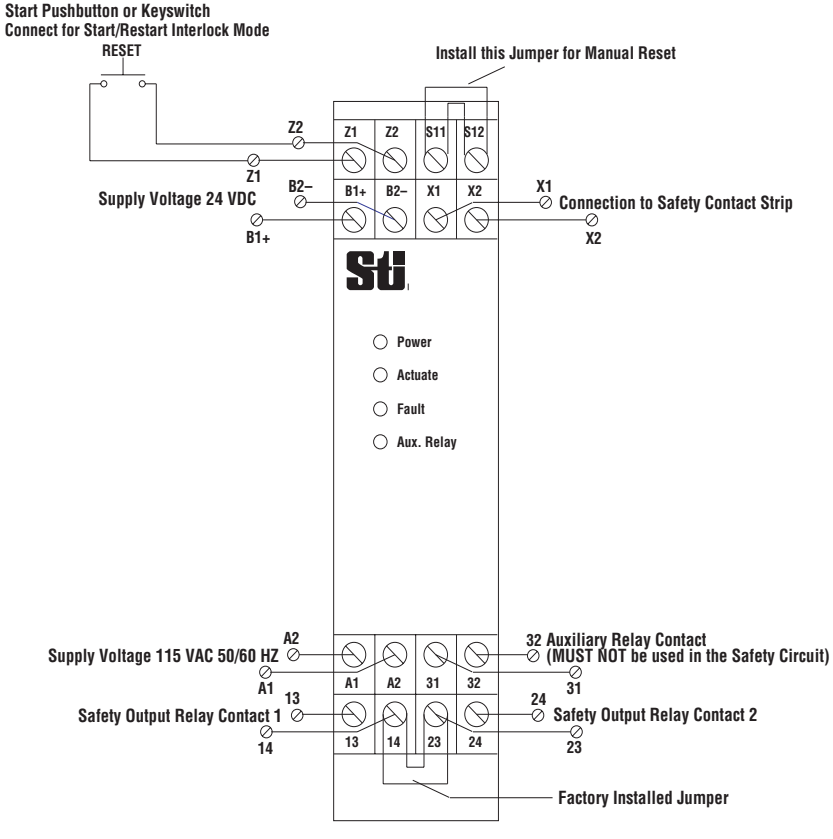
Figure 5-1 Automatic Restart Connection Diagram

5.2. START/ RESTART INTERLOCK MODE

By placing a jumper between terminals S11 and S12, (See *Figure 5-2*) the unit is configured to Start/ Restart Interlock mode. When the unit is configured to the Start/Restart Interlock mode, a reset push button or key-switch must be wired to terminals Z1 and Z2. When power is applied to the controller, the controller will initiate a start up self check, when the self check is complete the relays will remain in the open state until a reset pushbutton or key-switch is closed across terminals Z1 and Z2. When the reset is closed, the contacts will transition to the closed state. Pressing the Safety Contract Strip will cause the safety relays in the controller to transfer to the open state. When pressure is removed from the Safety contract Strip, the safety relays **will not** transfer back to the closed state until the pushbutton or key-switch is operated (Reset).

Table 5-2 Wiring Connections for Start/Restart Interlock

X1, X2	Connection to Safety Contact Strips
S11, S12	Install jumper for Manual Reset
B1+, B2–	Supply Voltage 24VDC
Z1, Z2	Reset Pushbutton or Momentary Key-switch
A1, A2	Supply Voltage 115 VAC 50/60 Hz
31, 32	Auxiliary Relay Contact - SCC-1DN-1224: Contacts close when Safety Contact Strip is operated and Delayed To Open after 2 to 3 seconds. - SCC-1DN-1224-ND: Contacts close when Safety Contact Strip is operated and remain closed until the Safety Contact Strip is returned to normal. These contacts must never be used in the safety circuit.
13, 14	Safety Relay Contact 1
23, 24	Safety Relay Contact 2



Start/Restart Interlock Connections

Figure 5-2 Start/Restart Interlock Connection Diagram

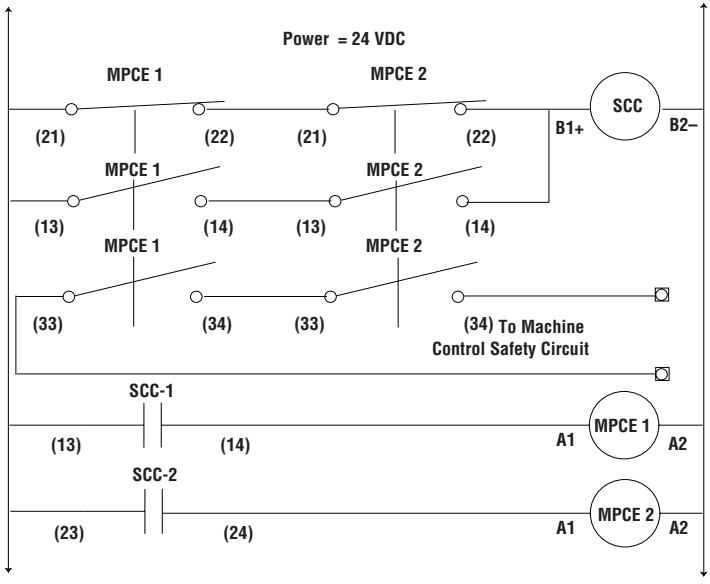


Figure 5-3 MPCE Connection Diagram

6 SPECIFICATIONS

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6.1. PERFORMANCE

Maximum Response Time: <30 ms

Indicators:

— Green LED = Power On
— Yellow LED = Sensor Activated
— Red LED #1 = Safety Circuit Interrupted
— Yellow LED = Auxiliary Relay Activated

6.2. ELECTRICAL

Supply Voltage: 120 VAC, 50mA, 5.8 VA or

24 VDC, 120mA, 2.9 VA

Input: 2-Wire, Safety Contact Strip with 8.2 K ohm resistor

Safety Outputs: 2 Safety Relays max. current and voltage

2.5A @ 250 VAC, 2.5 A @ 30VDC.

Auxiliary Output: 1 Aux. Output, max. current and voltage

2.5A @ 250 VAC, 2.5A @ 30VDC.

***Auxiliary outputs must never to be used in the safety circuit.**

Switching Times Safety Relay Outputs

— Response time < 30 ms;
— Release time 1 s

Switching Times Aux Relays:

***** These contact must never to be used in the safety circuit*.

— Response time 0.5 s
— Release time 3 s

6.3. MECHANICAL

Enclosure: Polyamide, Self extinguishing in accordance with UL 94-V2

DIN Rail Mount Dimensions:

Height . . . . . 99.0 mm (3.89in.)

Width. . . . . 22.5 mm (0.885in.)

Depth: . . . . . .114.0 mm (4.89in.)

Environmental Protection Rating: Housing: IP40; Terminal: IP20.

Operating Temperature: -25°C to +55°C

Approvals:

— Conforming to standards EN 954-1
— Category 3
— Other approvals: CE, TUV, BG

7 INSTALLATION

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7.1. MOUNTING

The SCC-1DN-1224 controller is a DIN rail mounted controller.

7.2. WIRING

Caution must be used when installing, connecting and operating the SCC-1DN-1224 and SCC-1DN-1224-ND Safety Contact Strip Controller and SCS Safety Contact Strip. Please observe all local electrical codes.

- When using 24 VDC, connect +24 VDC to terminal B1 and – 24VDC to terminal B2.
- When using 120 VAC, connect to terminals A1 and A2.

- Connect the two wires from the Safety Contact Strip to terminals X1 and X2 of the Controller. Polarity does not have to be observed.
- With the jumper wire is **installed** across terminals 14 and 23 (factory default) both safety relays are used in the safety output circuit only one machine primary control element (MPCE) is used. (*See "Figure 5-2 Start/Restart Interlock Connection Diagram" on page 14*) external fusing (not to exceed 4.0 amps) is required to protect internal safety relay contacts.
- With the jumper wire **removed** from terminals 14 and 23, each MPCE is individually wired. (See *"Figure 5-2 Start/Restart Interlock Connection Diagram" on page 5-14*) external fusing (not to exceed 4.0 amps) is required to protect internal safety relay contacts.

7.3. SETUP

Only qualified persons should install safety contacts.

7.3.1 PREPARING ALUMINUM RAIL

Drill 1/8 in. countersunk holes in the aluminum rail every 12 in. for mounting.

Figure 7-1 Aluminum Rail

7.3.2 MOUNTING THE ALUMINUM RAIL

Attach the aluminum-mounting rail to an even surface. The aluminum rail should be mounted only with rivets or countersunk screws.

Figure 7-2 Mounting Aluminum Rail

7.3.3 WIRE ROUTING

If the wire is to be fed through the aluminum rail, drill a 5/16 hole in the mounting rail. Be sure that the hole is properly de-burred to prevent damage to the wire.

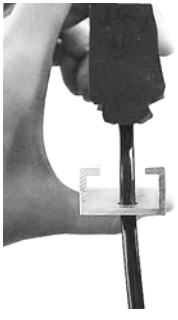

Figure 7-3 Feeding through Aluminum Rail

7.3.4 INSERTING THE PROFILE INTO ALUMINUM RAIL

(All Models Except # SCS1510, SGE125, SGE225, SGE245)

When inserting the rubber profile into the aluminum rail, liquid soap may be sprayed on the Safety Contact Strip to make it easier to install. Insert one side first, then insert the other side. Once the soap has evaporated the strip is securely fastened to the mounting rail.

Never use talcum, oils or other permanent lubrication agents.

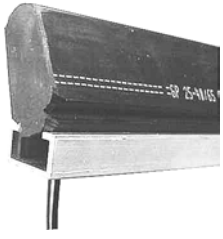

Figure 7-4 Inserting the Rubber Profile

7.3.5 WARNING: INCORRECT MOUNTING METHOD

Do not attempt to push or pull the Safety Contact Strip into the aluminum rail. This can cause damage to the safety contact.

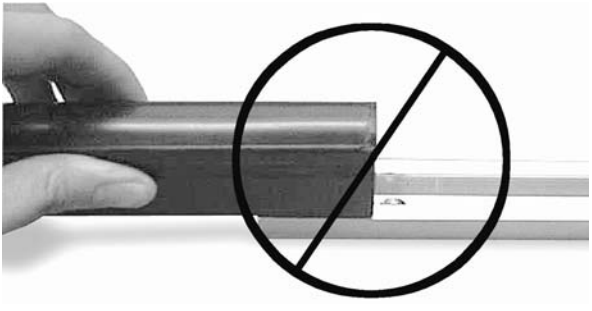

Figure 7-5 Incorrect Mounting Method

7.3.6 INSERTING THE PROFILE INTO ALUMINUM RAIL

(Models SCS1510 SGE125, SGE225, SGE245)

Figure 7-6 Safety Contact Strips in position

Please Note: The SCS1510,SGE125, SGE225, SGE245 (shown above), may be inserted into the track by sliding it into position, all others Safety Contact Strips must be installed as outlined in Section *7.3.4* above.

8 WARRANTY AND ADDITIONAL INFORMATION

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8.1. STI WARRANTY

STI warrants its products to be free from defects of material and workmanship and will, without charge, replace or repair any equipment found defective upon inspection at its factory, provided the equipment has been returned, transportation prepaid, within one year from the date of installation and not to exceed 18 months from date of factory shipment.

The foregoing warranty is in lieu of and excludes all other warranties not expressly set forth herein, whether expressed or implied by operation of law or otherwise including but not limited to any implied warranties of merchantability or fitness for a particular purpose. No representation or warranty, express or implied, made by any sales representative, distributor, or other agent or representative of STI which is not specifically set forth herein shall be binding upon STI. STI shall not be liable for any incidental or consequential damages, losses or expenses directly or indirectly arising from the sale, handling, improper application or use of the goods or from any other cause relating thereto and Sti's liability hereunder, in any case, is expressly limited to repair or replacement (at Sti's option) of goods.

Warranty is specifically at the factory or an STI authorized service location. Any on site service will be provided at the sole expense of the Purchaser at standard field service rates.

All associated equipment must be protected by properly rated electronic/electrical protection devices. STI shall not be liable for any damage due to improper engineering or installation by the purchaser or third parties. Proper installation, operation and maintenance of the product becomes the responsibility of the user upon receipt of the product.

8.2. TRADEMARKS

STI® is the registered trademark of Scientific Technologies, Inc.

8.3. REPAIRS

STI offers product repair service at our factory. If you need repairs made to any STI product Contact our Customer Service Department.

8.4. RETURNS

Whenever you return a product to STI (even if the product is in warranty) please Contact our Customer Service Department and request a Returned Goods Authorization number (RGA).