

Tapeswitch

A full spectrum of sensing and signaling products for protection, detection, and safety



SWITCH PRODUCTS

SAFETY & SIGNAL MATS

SENSING EDGES

SENSING BUMPERS

INTERFACE CONTROLLERS

LIGHT CURTAINS

CUSTOM DESIGNS



Welcome to Tapeswitch

We design and manufacture innovative sensing, switching, and control products for use in a wide range of safety and non-safety applications. Our products include ribbon switches, sensing edges and bumpers, safety mats, touch pads, controllers, and light curtains.

If a standard product just won't do the job, we offer extensive custom design services. We manufacture many specially-designed products, so if you do not find precisely what you need within our standard product offering, we can still most likely meet your exact application needs.

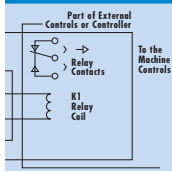
Whether you have an immediate requirement or are planning a long-term project, you can count on our mechanical and electrical engineers to come through for you.

If you would like to speak to someone, give us a toll-free call at **1-800-234-8273**. For general product information, ask for Customer Service, or if you have a specific application that requires technical assistance, ask for Application Engineering. You will get a person and not an automated menu.



Fail-Safe Interface Controllers

Connect ribbon switches, safety mats, sensing edges and bumpers to machine or process controls



2 ■ Using Controllers in Safety Applications

Understanding the fail-safe concept



3 ■ C6 Multifunction Interface Controller

Self-contained, supports up to 6 zones
NEMA enclosure with LED status display
88 to 264 Vac or 24 Vdc operation



4 ■ PRSU/4 Control Units

Meet safety category 3 as defined by EN 954-1
Accommodates 24 Vdc or Vac operation
Enclosure designed for DIN rail mounting



5 ■ PSSU Control Units

Suitable for high-risk automation and machine control
100-240 Vac or 24 Vdc
Wall mounting or DIN rail mounting models



6 ■ PSCU Control Units

Suitable for low-risk automation and machine control
100-240 Vac or 24 Vdc
Choice of 11-pin plug-in or DIN rail mounting

COMPATIBLE SENSING PRODUCTS

Tapeswitch offers a wide range of sensing products with 4-lead fail-safe wiring that are compatible with the controllers described in this catalog.

Ribbon Switches

Ribbon switches are normally-open momentary contact switches for sensing, control, and other low-power applications. They are the essence of simplicity and reliability.

These switches are manufactured in a continuous process capable of producing switches thousands of feet long. They are then cut to length and terminated, as required, to make the finished product.



Safety Mats

Pressure-sensitive safety mats protect both personnel and equipment. They feature “press at any point” actuation to continuously monitor for the presence of personnel or vehicles in the protected area.

Tapeswitch offers the widest product range in the industry. Models include: industrial duty ControlMats, puncture-resistant ArmorMats, extreme-duty Diamond Plate Mats, water-proof Safety Zone Mats, and anti-fatigue Comfort Zone Mats.



Sensing Edges

Sensing edges detect contact with personnel or equipment and can also provide a measure of cushioning to protect from injury or damage.

These products are available with many profiles, sensitivities, colors, and compression ranges. Various models provide pressure-sensitive activation with top and side forces, as well as activation with or without compression and with or without overtravel.



Pressure-Sensitive Bumpers

Sensing bumpers provide a large, compliant surface that protects both personnel and equipment by detecting contact or impact before damage is done.

Usually customized, bumpers are available in various sensitivities, profiles, colors, and lengths. Typical applications include mobile workstations, AGVs, conveyor systems, and large telescoping devices.



USING CONTROLLERS IN SAFETY APPLICATIONS

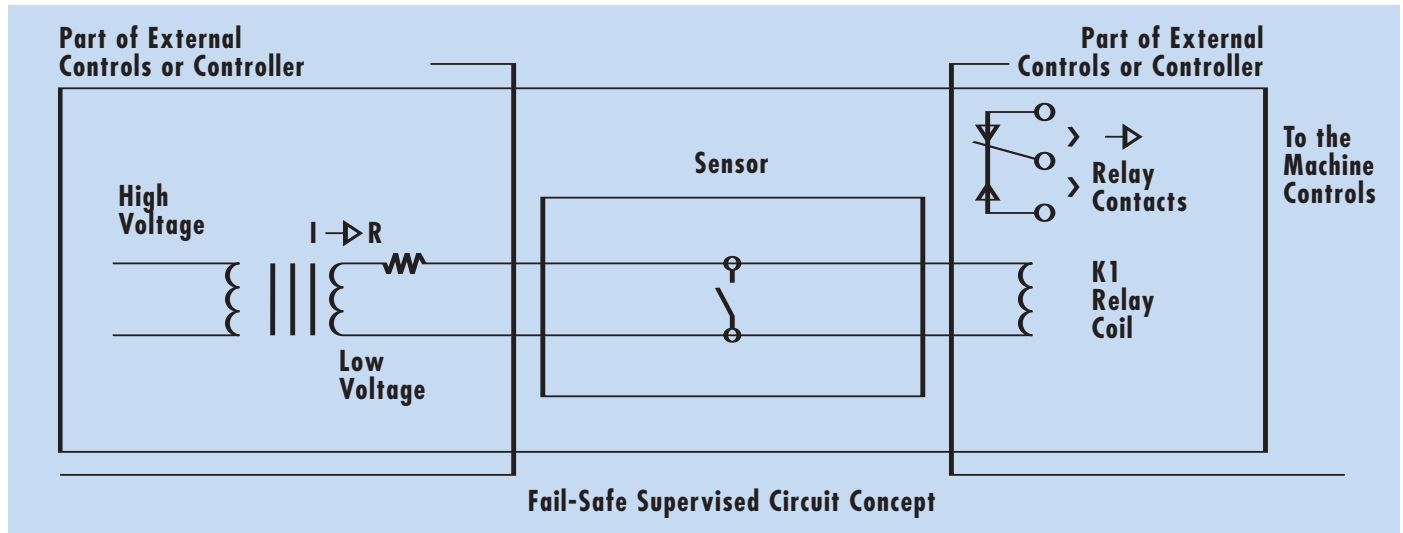
Understanding the fail-safe concept

Tapeswitch sensing mat, edges, and bumpers often provide the first-line of protection for personnel and equipment. They are highly sensitive and feature press-at-any-point actuation. Properly installed and connected, they continuously monitor contact. However, to properly function as safety devices, they must be installed with a fail-safe monitoring circuit as shown below or with an equivalent fail-safe methodology. **Tapeswitch Controllers Employ this Fail-Safe Concept.**

Understanding and Implementing the 4-wire Fail-Safe Concept

Principle of Safety

The fail-safe concept monitors the sensor status at all times. In the event of a failure, the fail-safe concept will simulate a protected position. The “protected” position is when the sensor is activated (closed) and the “normal” or “run” position is when the sensor is not activated (open).



- Normal Conditions — constant current flow (I) holding relay coil (K1) energized
- Loss of Power — no current flow (I) and relay coil (K1) is de-energized
- Actuation of Sensor — relay coil (K1) is shorted and de-energized
- Failure of Sensor in the closed position — relay coil (K1) is shorted and de-energized
- Failure of Sensor in the open position — (broken wire, severed switch or conductor) leaves no path for current flow (I) and relay coil (K1) is de-energized
- Resistor R — limits current flow through the sensor when actuated

Fail-Safe (4-wire)

Fail-Safe is a shorthand term used to mean Fail to a Safe condition. In machinery with known hazards, the system is fail-safe when any failure leaves the machinery in a safe condition. The 4-wire fail-safe concept is illustrated in the figure above. A small current is constantly flowing through the sensor at all times, holding the relay coil energized at all times. The machine controls, interrupt, or stop circuitry is connected to the contacts of this relay. If the sensor is actuated, the relay coil will be shorted, causing the relay to de-energize. A resistor in series provides current limiting from overdrawing the power supply and limits the current through the sensor in the actuated position. If the sensor fails in the closed position the relay will be shorted and cannot be energized until the failure is corrected. If the sensor fails in the open position, the current path for the relay coil no longer exists and the relay coil cannot be energized until the current path is restored and the failure corrected.

In addition to the safety aspects achieved with Fail-Safe, it also provides:

- Isolation of the machine controls and sensor(s)
- Isolation of high amperage and high voltage machine switching from the low voltage sensors
- Conversion of a normally open switch to required normally closed machine controls

C6 MULTIFUNCTION INTERFACE CONTROLLER

The **C6 Multifunction Controller** provides an interface between Tapeswitch low-voltage sensors and a machine or process control. It is designed to monitor up to six zones, consisting of 1 to 3 B-Series Light Curtains and/or 1 to 6 other sensing devices, including ribbon switches, sensing edges, bumpers, and switching mats. In addition, the C6 controller provides power to the B-Series emitter and receiver units and monitors the light curtain output signals.



Features & Benefits

- Controls up to 6 safety zones from one location
- Detects sensor, cabling or internal faults
- Automatic or manual reset or combination
- Visual status display of all zones
- Compatible with Tapeswitch sensing products

The **C6 Interface Controller** incorporates built-in fault protection. It automatically detects an open or short within the sensor or its connecting cable and can also detect internal failures.

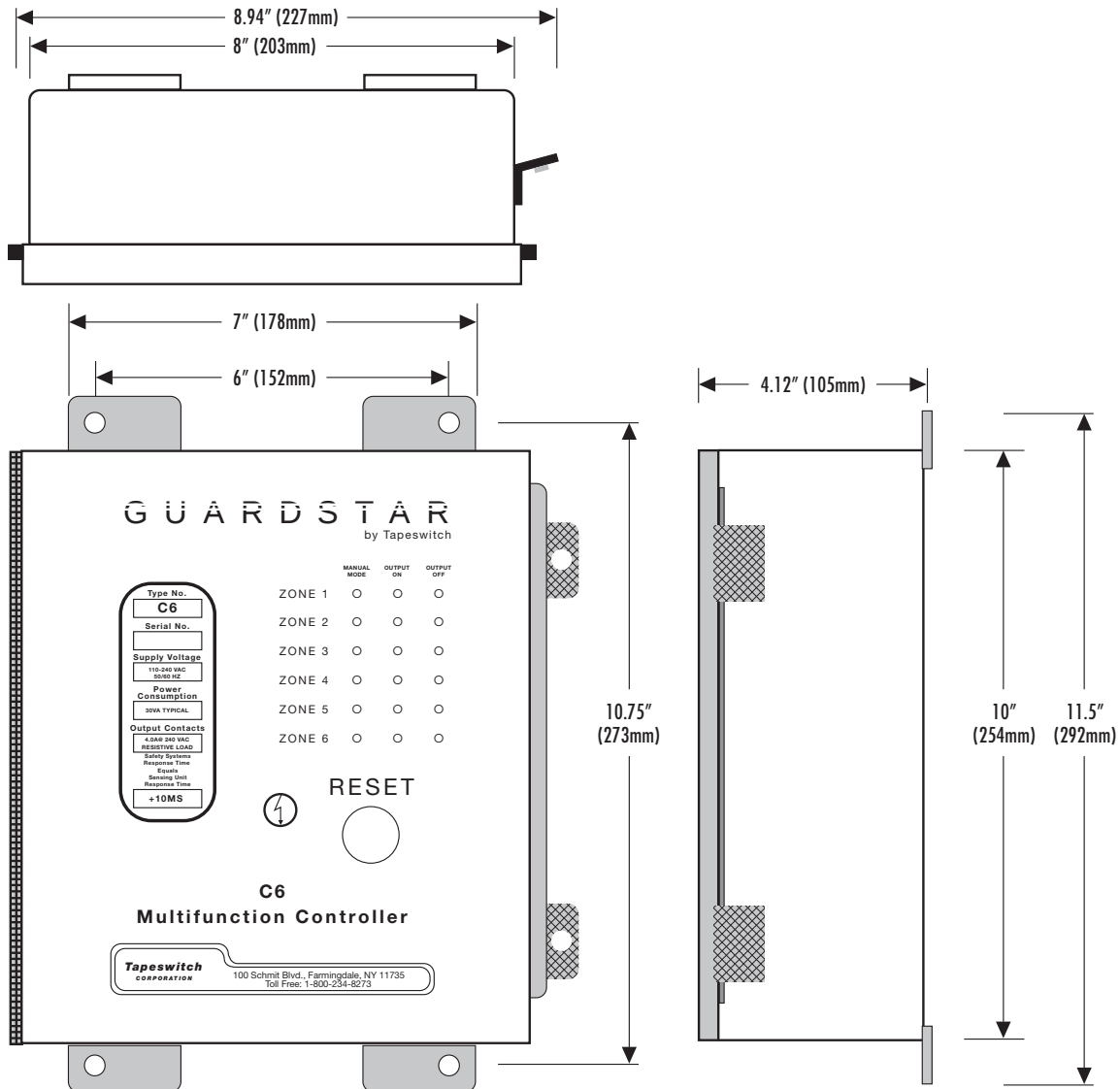
The C6 is a fully self-contained unit housed in a rugged metal enclosure. It is designed to be wall mounted and has six knockouts that accept standard 1/2" or 3/4" conduit. It will accept an input power source range of 88 to 264 Vac at an input frequency range of 47 to 63 Hz. The unit will also accept a regulated 24 Vdc supply.

Technical Specifications

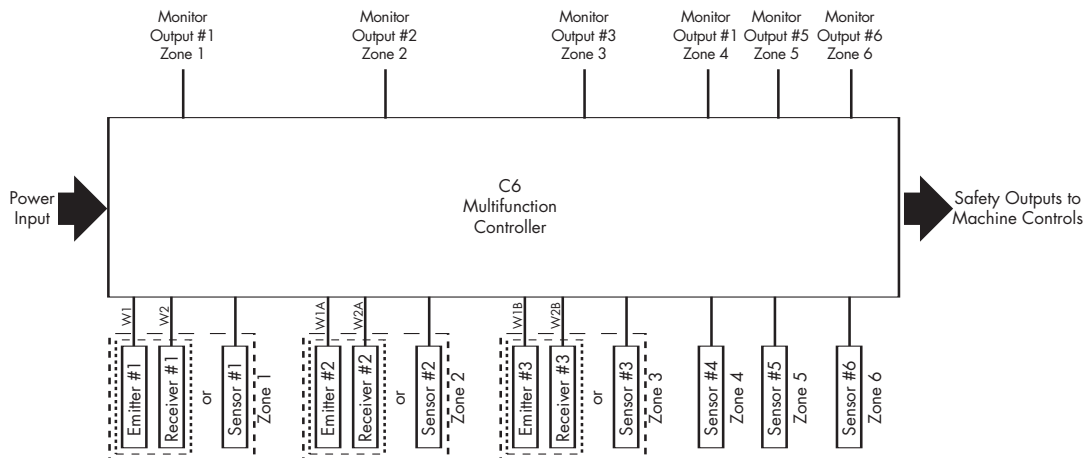
Supply Voltage	110/240 Vac 50/60 Hz or 24 Vdc
Power Consumption	30 VA typical
Enclosure Type	Metal wall mount
Protection Rating	NEMA 1 Standard / IP10, NEMA 12 Optional / IP52
Weight	9.5 lb (4.3 kg)
Reset Mode	Automatic (supplied), manual, or combination
Output Relays	Force guided safety relays
Output Contacts	6.0 A @ 240 Vac, resistive load
Monitor Output	Non-safety 6X (N/O or N/C, selectable), 10 A @ 250 Vac, resistive
Operating Temperature	32 to 122 °F (0 to 50 °C)
Response Time	10 ms

C6 MULTIFUNCTION INTERFACE CONTROLLER

C6 Multifunction Interface Controller



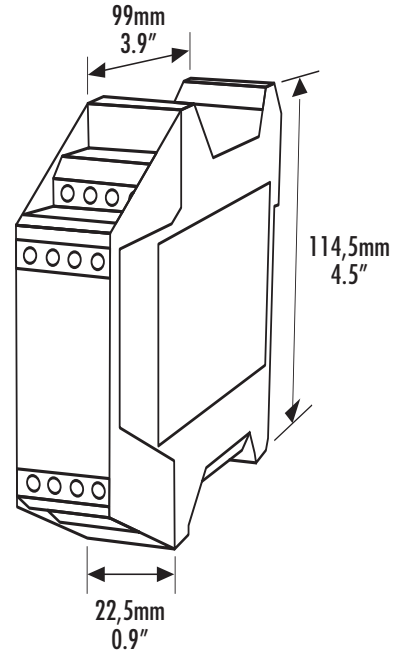
Block Diagram



PRSU/4 CONTROL UNITS

PRSU/4 Control Units can be used as safety devices for high-risk automation and machine control applications. They provide the highest level of safety offered by Tapeswitch, exceeding the requirements of category 3 as defined by EN 954-1. They also meet or exceed the safety content of the applicable OSHA, ANSI, and RIA Standards.

The **PRSU/4 Controller** has redundant safety output relays, is self-monitoring, and is rated Control Reliable, which means that any fault in the safety-critical components will be detected and the machine will be rendered inoperative until the fault is corrected. It is available in a DIN rail-mounted package. The unit operates from a 24 Vdc or Vac supply and features both manual and auto reset capability.



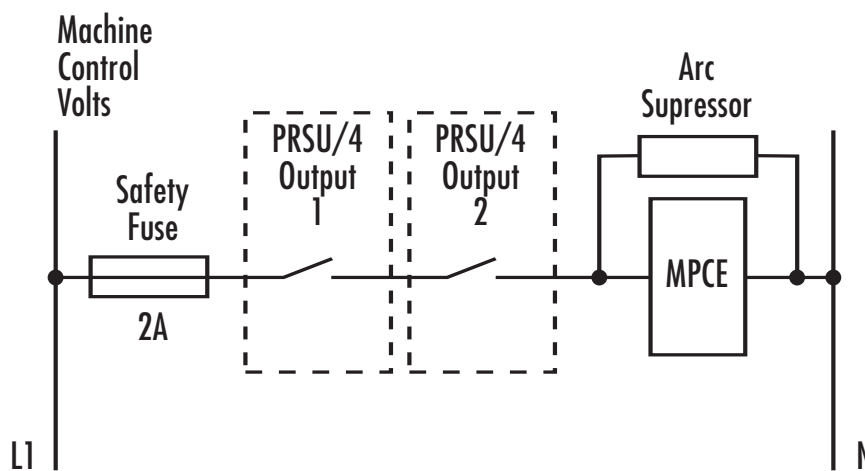
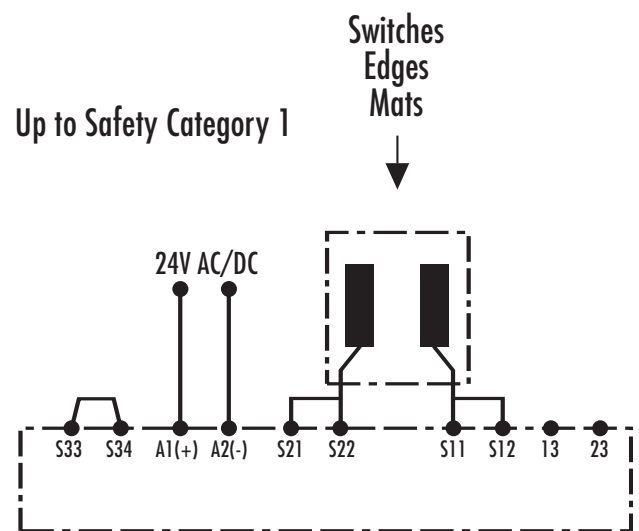
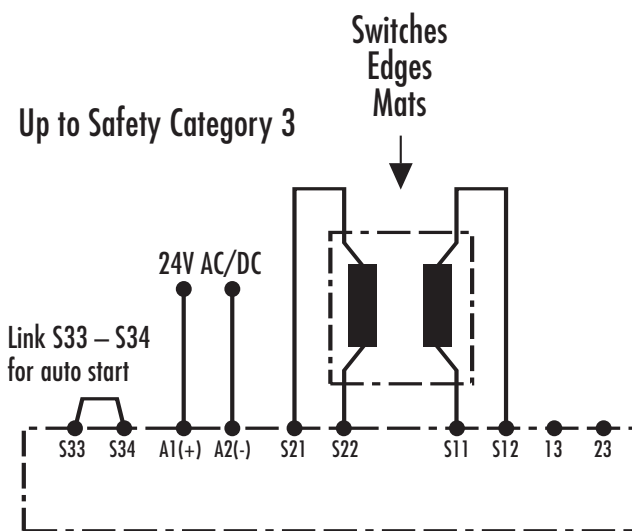
PRSU/4 Control units are designed to be used with Tapeswitch pressure sensitive sensors to form a complete safety system. They are compatible with all Tapeswitch sensing products, including ribbon switch, safety mats, sensing edges, and bumpers.

Features & Benefits

- Suitable for high-risk automation and machine control
- Self-monitoring design detects faults anywhere in the safety system components
- Meets or exceeds OSHA, ANSI, & RIA safety standards
- Automatic or manual reset capability
- DIN rail mounting

Technical Specifications

Safety Grade	Type 3 (EN-954-1)
Supply Voltage	24 Vdc or Vac
Power Consumption	5 VA
Enclosure Type	DIN rail mounting
Reset Mode	Automatic or manual (user selected)
Output Relays	Force guided safety relays, 3 x N/O Monitor relay, 1 x N/C
Response Time	<30 ms



Preferred wiring scheme for PRSU/4 to primary control element (MPCE)

PSSU CONTROL UNITS

The **PSSU** series of controllers can be used as safety devices for high-risk automation and machine control applications. They provide the highest level of safety offered by Tapeswitch, exceeding the requirements of category 3 as defined by EN 954-1, and meeting or exceeding the safety content of the applicable OSHA, ANSI, and RIA Standards.

PSSU controllers have redundant safety output relays, are self-monitoring, and are rated Control Reliable, which means that any fault in the safety-critical components will be detected and the machine will be rendered inoperative until the fault is corrected.



**Din Rail Mounted
PSSU/1, PSSU/2**



**Wall Mounted
PSSU/3, PSSU/4**



**Din Rail Mounted
PSSU/A, PSSU/A2**

PSSU controllers are available in wall-mounted and DIN rail-mounted versions. Other options include 110/240 VAC or 24 VDC operation and manual or auto reset.

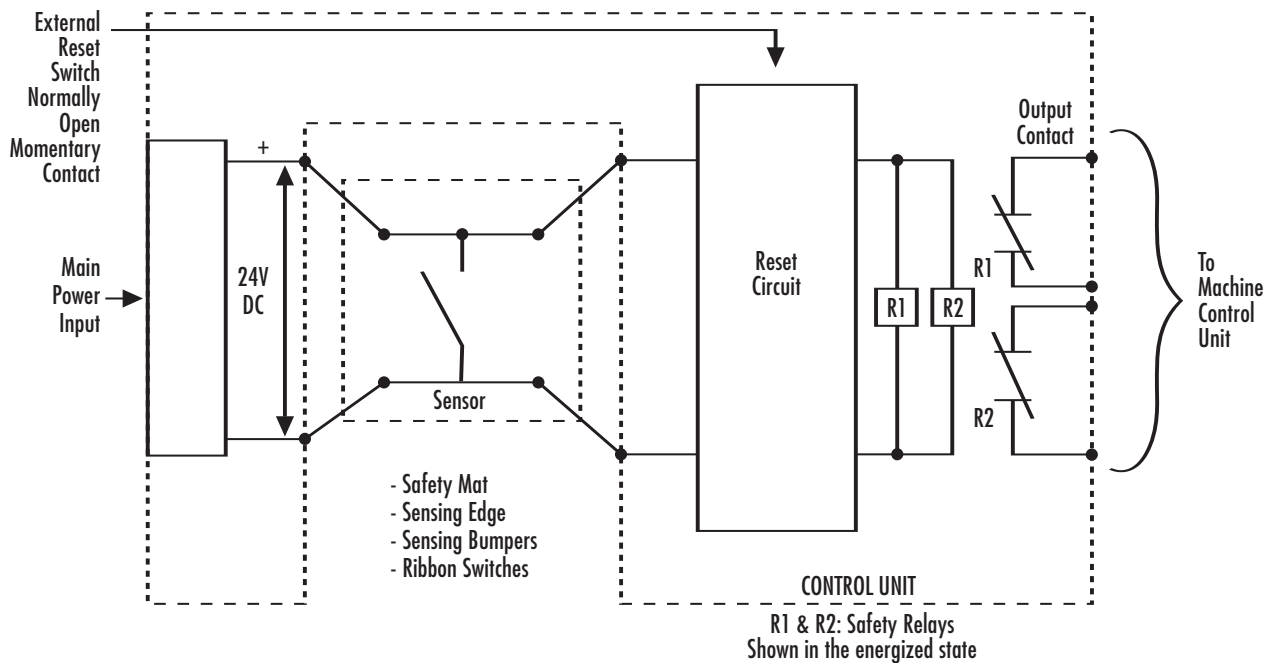
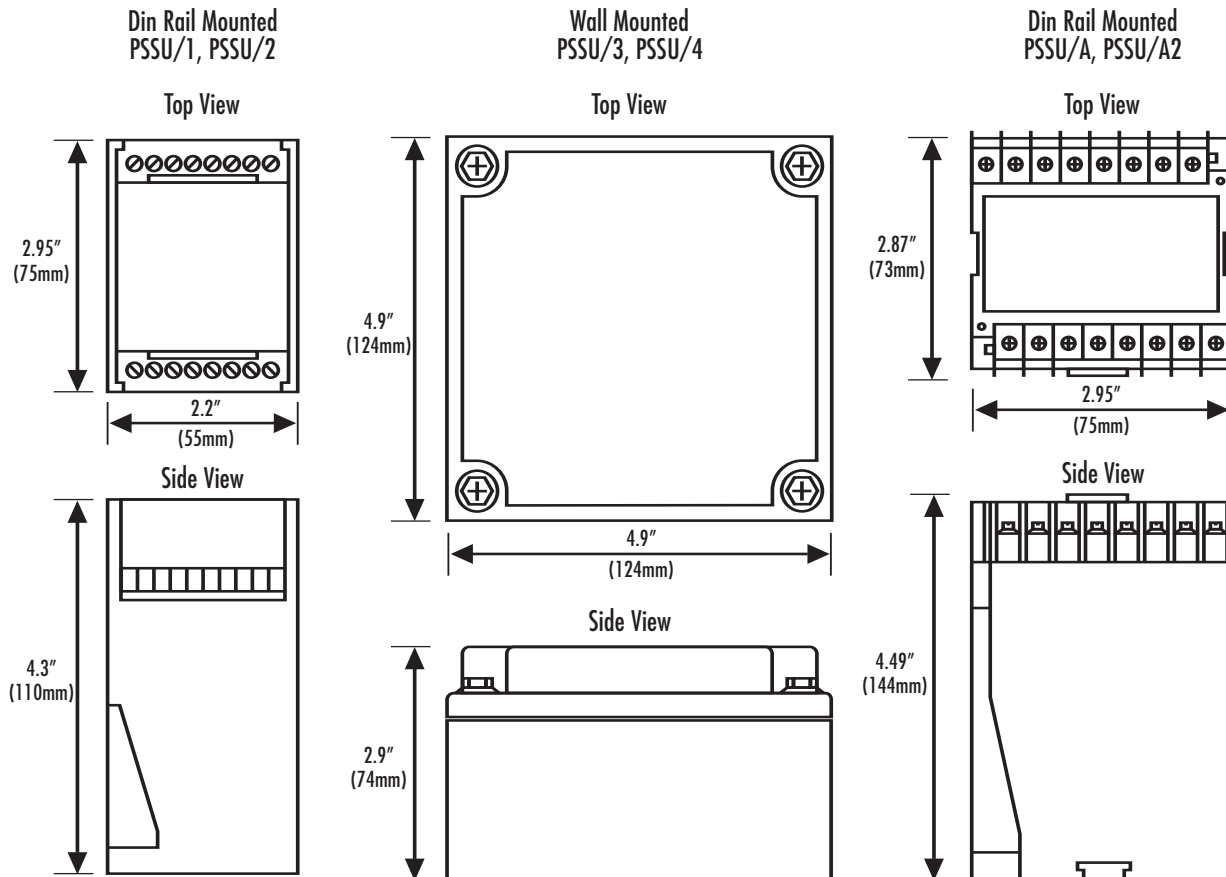
Features & Benefits

- Suitable for high-risk automation and machine control
- Self-monitoring design detects faults anywhere in the safety system components
- Meets or exceeds OSHA, ANSI, & RIA safety standards
- Automatic and manual reset versions
- Wall mounting or DIN rail mounting models

Technical Specifications

MODEL	PSSU/1	PSSU/2	PSSU/3	PSSU/4	PSSU/A	PSSU/A2
Supply Voltage	110/240 VAC 50/60 Hz	24 VDC	110/240 VAC 50/60 Hz	24 VDC	110/240 VAC 50/60 Hz	24 VDC
Power Consumption	6 VA	6 VA	6 VA	6 VA	6 VA	15 VA
Mounting	DIN Rail Mounting	DIN Rail Mounting	Wall Mounting	Wall Mounting	DIN Rail Mounting	DIN Rail Mounting
Reset Mode	Manual (Remote)	Manual (Remote)	Manual (Remote)	Manual (Remote)	Auto Reset	Auto Reset
Output Relay	2 x Safety Relays (force-guided contacts), Cross-monitored					
Output Contact Rating	6 A @ 240 V, Resistive, Non-Inductive					
Applications	Medium to High Risk Safety (Level of Risk Determined by Sensor)					
Safety Standard	Up to Level 2: DIN 31006-1, Level 2.2: DIN 31006, Category 3: EN 954-1 Control Reliable, Self-monitoring, UL and cUL listed					

PSSU CONTROL UNITS



PSCU CONTROL UNITS

The **PSCU Series of Controllers** can be used as safety devices for **low-risk** automation and machine control applications. These CE Certified controllers have a single form C output relay (normally open, common, normally closed). This output changes state when the connected sensor device is actuated and can be configured to remain in this state (latched with manual reset) or to automatically reset once the sensor is cleared. The PSCU can be configured for manual or auto-reset by the user.

PSCU Controllers may be ordered with 11-pin plug-in mounting (with or without a mounting base) or configured for DIN rail mounting.



**Din Rail Mounted
PSCU/1, PSSU/4**



**11 - Pin Plug-In
PSCU/2**

Features & Benefits

- Suitable for low-risk automation and machine control
- Available in AC and DC versions
- Choice of 11-pin plug-in or DIN rail mounting
- Automatic or manual reset configurable by user
- LED indicators show power and output status

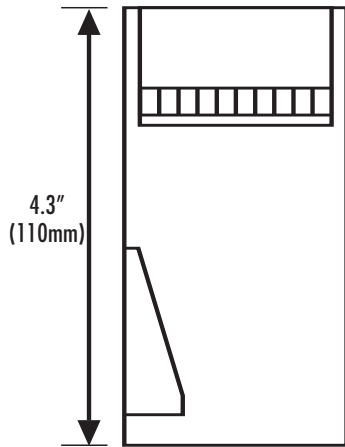
Technical Specifications

MODEL	PSCU/1	PSCU/2	PSCU/4
Supply Voltage	110/240 VAC 50/60 Hz	24 VDC	24 VDC
Mounting	DIN Rail Mounting	11-Pin Plug-In	DIN Rail Mounting
Reset Mode	Selectable Automatic or Manual (Remote)		
Output Relay	1 Form C, N/O or N/C, Non-Safety Relay		
Output Contact Rating	4 A @ 240 V, Resistive, Non-Inductive		
Applications	Control or Low-Risk Safety		
Safety Standard	Level 0: DIN 31006-2, Category 1: En 954-1		

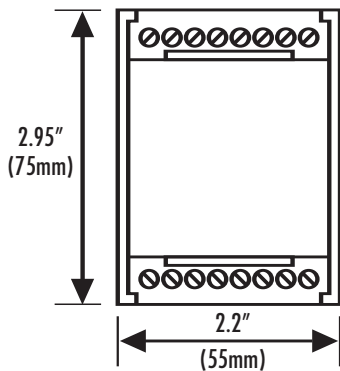
PSCU CONTROL UNITS

DIN Rail Mounted
PSCU/1, PSCU/4

Side View

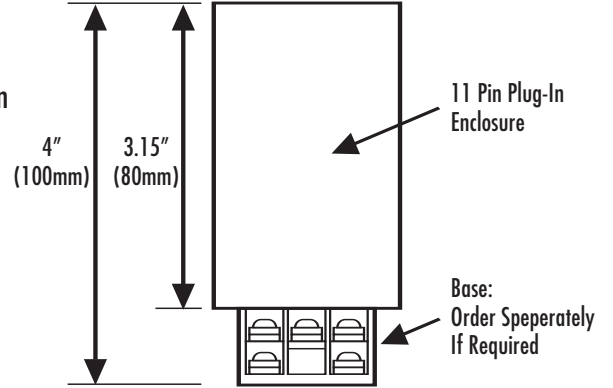


TopView

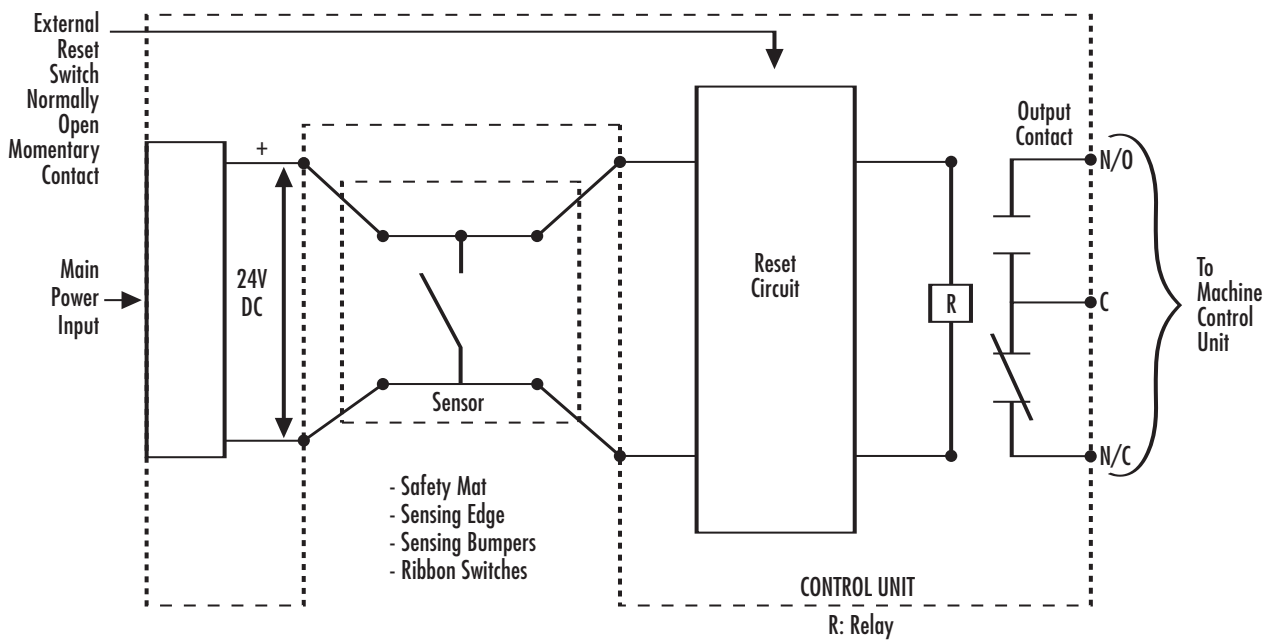
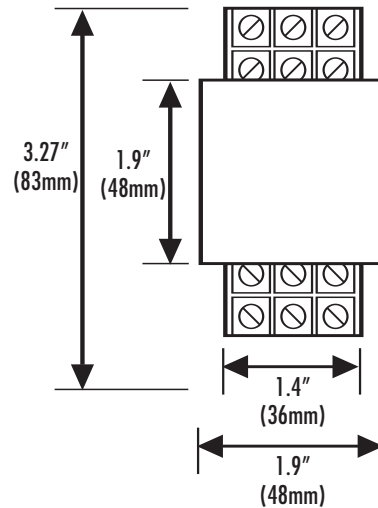


11-Pin Plug-In
PSCU/2

Side View



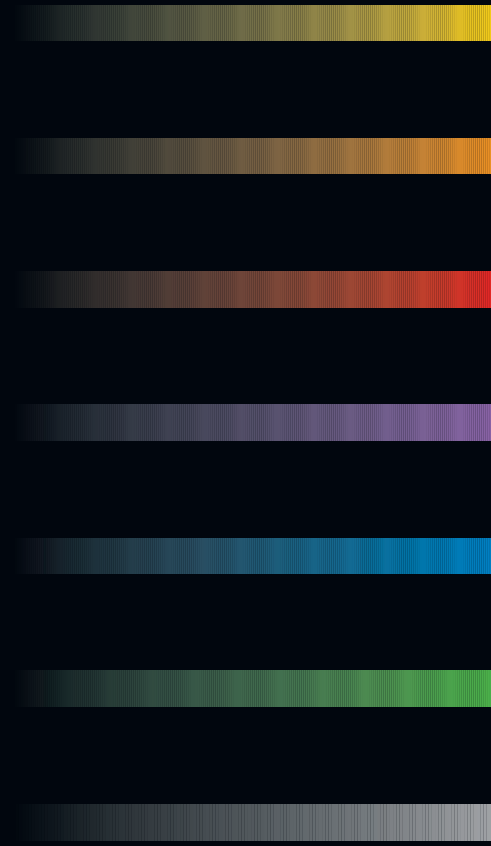
TopView



[illegible]



Because we are constantly improving our products, specifications are subject to change without notice.



A sample of industries we serve.



INDUSTRIAL



MILITARY



MINING



MEDICAL



TRANSPORTATION



ENTERTAINMENT

Please refer to our web site to locate your nearest representative.



Tapeswitch Corporation

100 Schmitt Boulevard, Farmingdale, NY 11735

www.tapeswitch.com • sales@tapeswitch.com • Tel: 631.630.0442 • Fax: 631.630.0454