



Each kit includes an AT-FM-10K Module, and two STB Touch Buttons



Each kit includes an AT-GM-13A or AT-HM-13A Module, and two STB Touch Buttons



**DUO-TOUCH SG Two-Hand-Control Kit Models with AT-FM-10K Safety Module**

Kits		Components			
Including 2 STB Touch Buttons & DUO-TOUCH SG Safety Module	Supply Voltage	DUO-TOUCH SG Safety Module	STB Touch Buttons		
			Model Number	Outputs	Cable/Connector*
ATK-VP6 (30 642 90)	24V dc	AT-FM-10K	STBVP6 (30 641 79)	PNP	4-wire 2 m integral cable
ATK-VP6Q5 (30 642 92)			STBVP6Q5 (30 641 81)		4-Pin M12 x 1
ATK-VR81 (30 642 87)	24V ac/dc		STBVR81 (30 641 90)	Relay	5-wire 2 m integral cable
ATK-VR81Q6 (30 642 89)			STBVR81Q6 (30 641 92)		5-Pin M12 x 1

**DUO-TOUCH SG Two-Hand-Control Kit Models with AT-GM-13A or AT-HM-13A Safety Module**

Kits		Components			
Including 2 STB Touch Buttons & DUO-TOUCH SG Safety Module	Supply Voltage	DUO-TOUCH SG Safety Module	STB Touch Buttons		
			Model Number	Outputs	Cable/Connector*
ATGMK-VP6 (30 682 75)	24V dc 115V ac	AT-GM-13A	STBVP6 (30 641 79)	PNP	4-wire 2 m integral cable
ATGMK-VP6Q5 (30 706 11)			STBVP6Q5 (30 641 81)		4-Pin M12 x 1
ATHMK-VP6 (30 682 77)	24V dc 230V ac	AT-HM-13A	STBVP6 (30 641 79)		4-wire 2 m integral cable
ATHMK-VP6Q5 (30 703 96)			STBVP6Q5 (30 641 81)		4-Pin M12 x 1

\* 9 m cables are available by adding suffix "W/30" to the kit model number including any cabled sensor (e.g., ATK-VP6 W/30). QD models require an accessory QD cable.

**Note:** For additional information, please refer to instruction manual EM001 (Duo-Touch SG Two-Hand-Control Safety Kit with AT-FM-10K Safety Module and STB Self-Checking Optical Touch Buttons) or instruction manual EM003 (Duo-Touch SG Two-Hand-Control Safety Kit with AT-GM-13A or AT-HM-13A Safety Module and STB Self-Checking Optical Touch Buttons).



## Important ... read this page before proceeding!

The Banner DUO-TOUCH SG Two-Hand-Control safety system provides a measure of protection for the operator against reaching danger zones during hazardous situations by locating the control actuating devices in a specific position and monitoring the actuating devices for specific conditions.

In Europe, the functions that the Banner DUO-TOUCH SG Two-Hand-Control safety system is intended to perform are regulated by the CEN (European Committee for Standardisation) and the CENELEC (European Committee for Electrotechnical Standardisation). Whether or not any particular DUO-TOUCH SG Two-Hand-Control system installation meets all applicable European and international requirements depends upon factors that are beyond the control of Banner Engineering Corp. These factors include the specific ways the safety module is applied, installed, wired, operated, and maintained.

The user and any personnel involved with the installation and use of this safety system must be thoroughly familiar with all applicable European and international standards. The standards, listed below, directly address the use of two-hand-control systems. Banner Engineering Corp. makes no claim regarding a specific recommendation of any organisation, the accuracy or effectiveness of any information provided, or the appropriateness of the provided information for a specific application.

The user has the responsibility to ensure that all local, national and international laws, rules, codes, and regulations relating to the use of this two-hand-control system are satisfied. Extreme care is urged that all legal requirements are met and that all installation and maintenance instructions contained in this manual are followed.

### Directives and Standards

ISO 12100-1 (EN 292-1)	“Safety of Machinery – Basic Concepts, General Principles for Design, Part 1: Basic Terminology, Methodology”
ISO 12100-2 (EN 292-2)	“Safety of Machinery – Basic Concepts, General Principles for Design, Part 2: Technical Principles and Specifications”
ISO 13851 (EN 574)	“Safety of Machinery – Two-Hand-Control Devices”
ISO 13849-1 (EN 954-1)	“Safety of Machinery – Safety-Related Parts of Control Systems, Part 1: General Principles for Design”
ISO 13855 (EN 999)	“Safety of Machinery – The Positioning of Protective Equipment”
IEC/EN 60204-1	“Electrical Equipment of Machines: Part 1: General Requirements” Also, request a type “C” standard for your specific machinery.

# DUO-TOUCH® SG – Two-Hand-Control Kits with STB Touch Buttons

## DUO-TOUCH SG Safety Module Description

A DUO-TOUCH SG Two-Hand-Control Safety Module may be used with:

- 2 Banner STB Self-Checking Optical Touch Buttons, each with one normally open and one normally closed relay output contact, or
- 2 Banner STB Self-Checking Optical Touch Buttons, each with two current-sourcing PNP outputs, or
- 2 mechanical push buttons with one normally open and one normally closed contact each (Form C contact)

If the machine operator removes one or both hands from the STB(s), the Duo-Touch SG relays de-energise, causing the output contacts to open. The relays will not re-energise until both STBs are deactivated and then simultaneously reactivated.

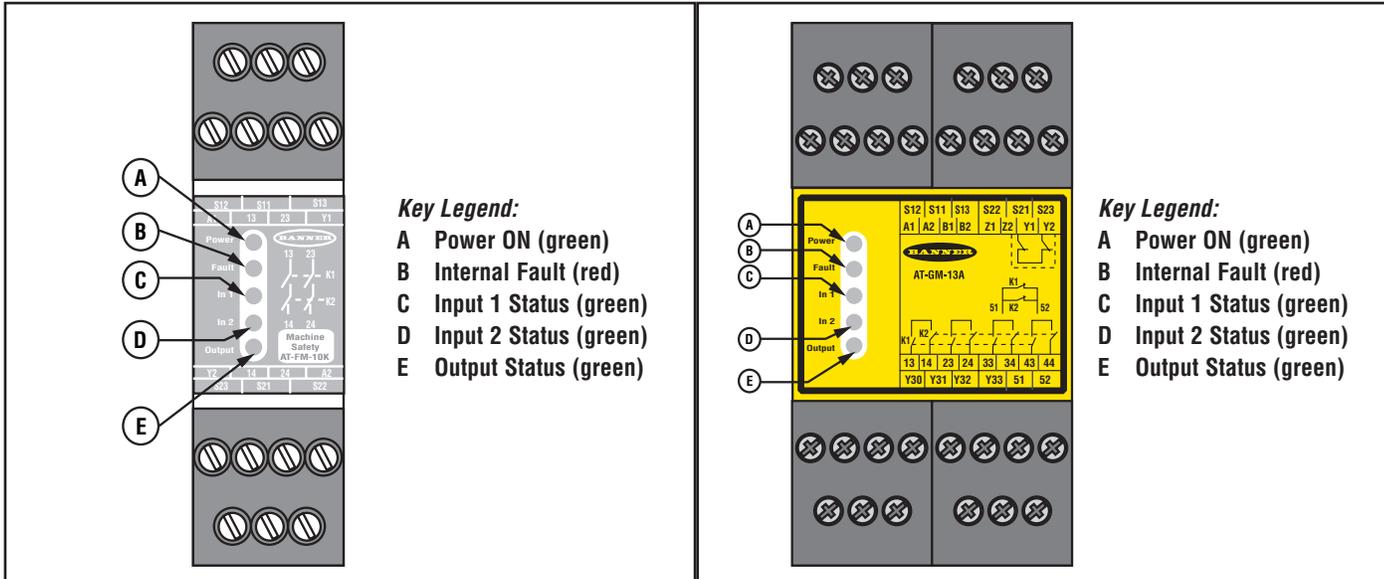
**The Duo-Touch SG Two-Hand-Control Kit system is certified to:**

- Type IIIC requirements of EN 574/ISO 13851 Safety of Machinery – Two-Hand-Control devices, and
- Category 4 requirements of EN 954-1/ISO 13849-1 Safety of Machinery – Safety-Related Parts of Control Systems – Part 1: General Principles of Design

The Safety Module's output signal consists of two sets (for AT-FM-10K), or four sets (for AT-GM-13A and AT-HM-13A) of redundant, positively guided (forced-guided) contacts (see Figure 5a-d page 8-9). Circuitry within the Safety Module monitors these internal contacts and prevents an output signal from occurring if a fault is detected. A feedback loop is offered for monitoring the status of the machine control elements.

**DUO-TOUCH SG Safety Module LED Indicators**

- Power On:** ON when power is applied
- Fault:** ON if simultaneity is not met or external wiring fault-Flashing when internal fault condition is detected
- Input 1 (2) Status:** ON if touch button is activated OFF when button is not activated Flashing if external wiring fault is detected
- Output Status:** ON if both relays (K1 and K2) are energised-Flashing if feedback error has occurred



**WARNING ... Point-of-Operation Guarding**

When properly installed, the DUO-TOUCH SG Two-Hand-Control Safety Module provides protection only for the hands of the machine operator. It may be necessary to install additional point-of-operation safeguarding, such as safety light curtains and/or hard guards, to protect personnel from hazardous machinery. **Failure to install point-of-operation guards on hazardous machinery can result in a dangerous condition which could lead to serious injury or death.**

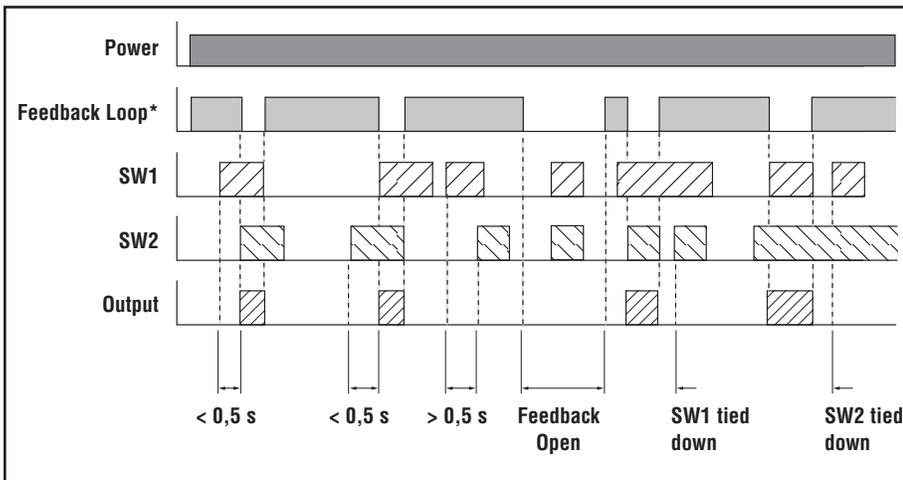
# DUO-TOUCH® SG – Two-Hand-Control Kits with STB Touch Buttons

## Theory of Operation

The input circuit of the DUO-TOUCH SG Safety Module requires simultaneous actuation of both two-hand-control actuators to generate an output signal. European standard ISO 13851 (EN 574) requires that the two hand controls be actuated within 0,5 seconds of each other.

The timing diagram in Figure 2 illustrates that an output signal from the DUO-TOUCH SG Safety Module occurs only if switch #1 (SW1) and switch #2 (SW2) are actuated within 0,5 seconds of each other. The total response time (from the time the devices are disengaged until the module's output contacts open) is: 0,035 seconds + 0,020 seconds = 55 milliseconds

The device output does not re-energise until both hand controls are disengaged, and then simultaneously re-actuated. This logic reduces the possibility of defeat of the two-hand-control by tying down one or both hand controls.



\* Feedback loop can remain closed at all times (if jumpered), when no monitoring contacts are available.

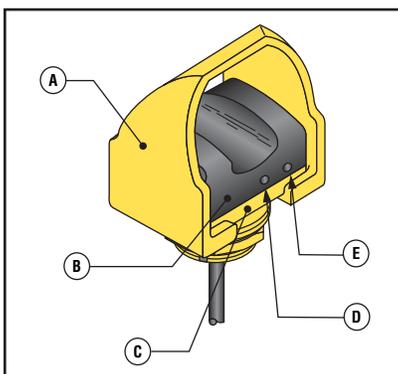
Figure 2. DUO-TOUCH SG timing diagram

## STB Touch Button Description

STB Self-Checking Optical Touch Buttons are identical in fit and form with the proven and popular OTB Series buttons. The internal design of the new buttons, however, based on diverse-redundant microcontrollers, allows the wiring to a Banner DUO-TOUCH SG Two-Hand-Control Safety Module designed and certified to Type IIIC per ISO 13851 (EN 574) (requiring 1 normally open and 1 normally closed contact per input channel).

The STB is a photoelectric “beam-break” activation device that incorporates a self-checking optical circuit designed to detect internal safety-critical faults. Both the emitter and receiver are continuously exercised and monitored via secondary photoelements. If a fault is detected, the microcontrollers will hold the outputs in the OFF state and flash a Fault LED to alert an operator.

All models are supplied with a yellow polypropylene field cover to prevent inadvertent switching.



### STB Touch Button LED Indicators

#### Power On (green):

ON when power is applied

#### Output, Fault (green):

ON when button is activated

OFF when button is not activated

Flashing when a fault condition is detected

#### Key Legend:

A Polypropylene Field Cover

B Black Polysulfone Upper Housing

C Yellow Fibre Reinforced PBT Base

D Output Fault LED

E Power ON/OFF LED

Figure 3. STB Touch Button features

# DUO-TOUCH® SG – Two-Hand-Control Kits with STB Touch Buttons

## Mechanical Installation

### Installation of the DUO-TOUCH SG Safety Module

The DUO-TOUCH Safety Module must be installed inside an enclosure. It is not designed for exposed wiring. It is the user's responsibility to house the Safety Module in an enclosure with IP54 rating, or better. The device mounts directly onto a standard 35-mm DIN rail.

### Installation of the STB Touch Button

The hand controls must be mounted in accordance with European standards ISO 13851 (EN-574) and ISO 13855 (EN 999), and any appropriate Type-C standard. ISO-13851 (EN-574) requires that the hand controls be mounted to protect them from accidental or unintentional operation. Use shields, covers, rings, collars, dividers, or similar protection to prevent accidental switch actuation and to discourage use of forearms or elbows. This standard also includes a detailed discussion of approaches to protection of hand controls.

#### *Prevention of defeat using hand and elbow of the same arm:*

In general, the buttons should be at least 550 mm (in a straight line) apart to avoid the operator using the hand and elbow of the same arm or operate both hand controls by the use of only one arm. Alternatively, the buttons should have a shield to prevent the operation by an elbow.

#### *Prevention of defeat using one hand:*

The hand controls must be arranged to require the use of both hands for simultaneous actuation, therefore, they should be at least 260 mm apart, to prevent operation by a single hand.

Figure 4 shows two examples for mounting the STB Touch Buttons. When mounted on top of the control bar, the protective field covers should be in place, as shown. For added protection, mount the STB Touch Buttons sideways under and behind a protective hood, rather than on top of the bar, leaving the field covers off. This side mount prevents the operator from positioning and leaving an object in the path of the beam, intentionally bypassing the safeguard.

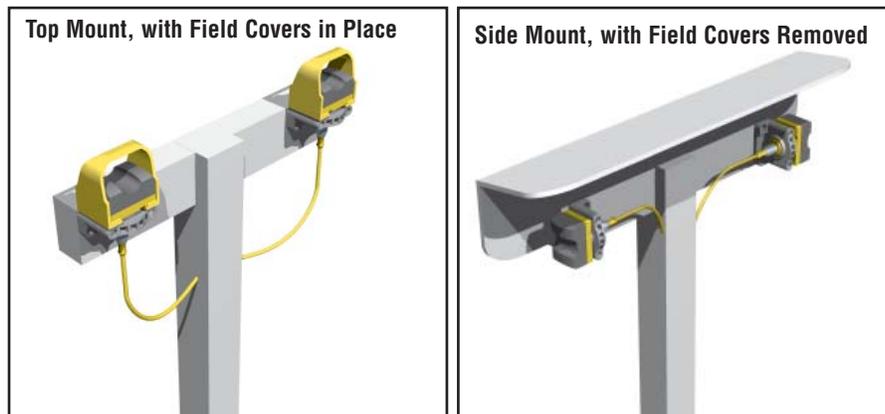


Figure 4. Install STB Buttons so that they are protected to prevent defeat or inadvertent actuation

# DUO-TOUCH<sup>®</sup> SG – Two-Hand-Control Kits with STB Touch Buttons

## Minimum Safety Distance

ISO 13855 (EN 999) – Safety of Machinery – The positioning of protective equipment in respect of approach speeds of parts of the human body.

Both hand controls must be located far enough away from the nearest hazard point that the operator cannot reach the hazard with a hand or other body part before the hazardous motion ceases. If no appropriate Type-C standard exists then the minimum distance shall be calculated using the general formula.

### General Formula

**S = K x T + C** where:

**S** is the minimum safety distance in millimetres, from the danger zone to the detection point, line or plane;

**K** is a constant in millimetres per second, derived from data on approach speeds of the body or part of the body: **K = 1600 mm per second**;

**T** is the overall response time in seconds;

**C** is an additional distance in millimetres, based on intrusion towards the danger zone prior to actuation; **C = 250 mm**.

Where machine specific European standards specify a different distance than the safety distance calculated using this standard then the greater of the distances shall be used as the minimum safety distance.

**Note:** Overall response time is the time between the physical initiation of the safety device and the machine coming to a stop or the risk being removed. The overall response time comprises a minimum of two phases:

**T = T<sub>1</sub> + T<sub>2</sub>** where:

**T<sub>1</sub>** is the maximum response time of the safety device between the physical initiation of the sensing function and the output signal switching devices being in the OFF state.

The DUO-TOUCH SG Safety Kit (AT-FM-10K, AT-GM-13A or AT-HM-13A Safety Module interfaced with STB Touch Buttons) has an output response time of 55-milliseconds.

**T<sub>2</sub>** is the response time of the machine, that is the time required to stop the machine or remove the risk after receiving the output signal from the safety device.

Note: If the risk from encroachment of the body or part of the body towards the danger zone is eliminated while the device is being actuated, e.g. by adequate shrouding, then C may be zero, with a minimum allowable distance for S of 100 mm.

### Example Minimum Safety Distance (S) Calculation

The following example illustrates the use of the formula to calculate the minimum safety distance:

**K** = 1600 mm per second

**T<sub>1</sub>** = 0,055 seconds

**T<sub>2</sub>** = 0,50 seconds (measured by a stop-time measuring device)

**C** = 250 mm

**S** = K x T + C (where T = T<sub>1</sub> + T<sub>2</sub>)  
= 1600 x (0,055 + 0,50) + 250  
= 1138 mm

In this example, both hand controls must be located no closer than 1138-mm from the nearest hazard point.



### WARNING ... Location of Touch Button Controls

**Hand controls must be mounted a safe distance from moving machine parts. It must not be possible for the operator or other non-competent persons to relocate them. Failure to establish and maintain the required safety distance could result in serious injury or death.**

## Electrical Installation

Because the DUO-TOUCH SG Safety Module interfaces to many types of machine controls, it is not possible to give exact wiring instructions here. The following guidelines are general in nature.

### Connection of Input Switches

The STBs are connected to the Duo-Touch SG module as shown in Figures 5a-d (on page 8-9). STB1 and STB2 both have one normally open and one normally closed output contact each, or two current-sourcing complementary outputs each, all capable of reliably switching 10-20 mA. Connect one STB to terminals S11, S12, S13 and the other to terminals S21, S22 and S23. If STBs with PNP outputs are used, the system must be supplied with 24V dc. Wire gauge for the switch connections is not specified.

### Connection of Power to the DUO-TOUCH SG Safety Module

The Safety Module requires a 24V ac or dc supply voltage. Power consumption of the Safety Module is approximately 4,5 VA. Use extreme caution whenever installing ac power. We recommend to use 1,2 to 1,7 mm<sup>2</sup> wire for power and output connections. A hand-operated supply disconnect (e.g. a circuit breaker) must be provided (per IEC/EN 60204). If activation devices other than STB Touch Buttons are used, they must share the same voltage supply with the Safety Module.

### Connection to the Machine to be Controlled

The wiring diagrams show a generic connection of the Safety Module's two (figure 5a) or four (figure 5d) redundant output contacts to machine primary control elements MPCE1 and MPCE2 or MPCE1, MPCE2, MPCE3 and MPCE4. An MPCE is defined as an electrically-powered element, external to the DUO-TOUCH SG, which directly controls the machine's normal operating motion so that it is the last (in time) to operate when motion is either initiated or arrested. Some older machines offer only one MPCE; for such machines, it is necessary to add at least a second MPCE to establish control reliability.

As shown in Figures 5a-d, a normally-closed force guided monitor contact from each of the two or four MPCEs must be connected in series across terminals Y1 and Y2. This feedback loop allows the circuit of the Safety Module to monitor the state of the MPCEs, and to prevent a successive machine cycle, if an MPCE fault is detected. When MPCE monitor contacts are not available, a jumper wire must be installed across terminals Y1 and Y2.

**IMPORTANT:** When a jumper wire is used, it is the user's responsibility to provide a control-reliable means of machine interface, (per ISO 13849 [EN 954]), to ensure that any single MPCE component failure will prevent a successive machine cycle.

# DUO-TOUCH<sup>®</sup> SG – Two-Hand-Control Kits with STB Touch Buttons

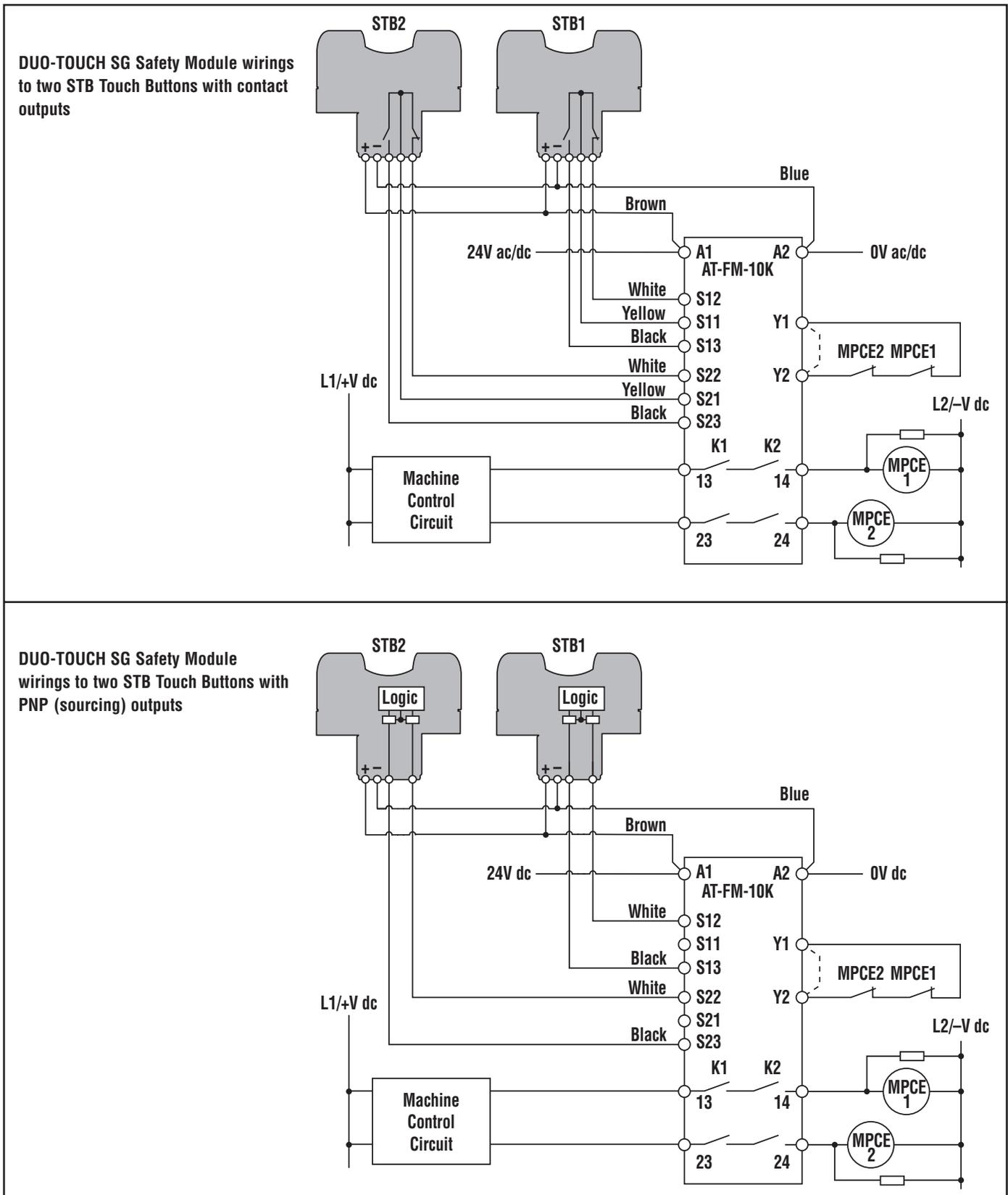


Figure 5a. AT-FM-10K DUO-TOUCH SG Safety Module wirings

# DUO-TOUCH<sup>®</sup> SG – Two-Hand-Control Kits with STB Touch Buttons

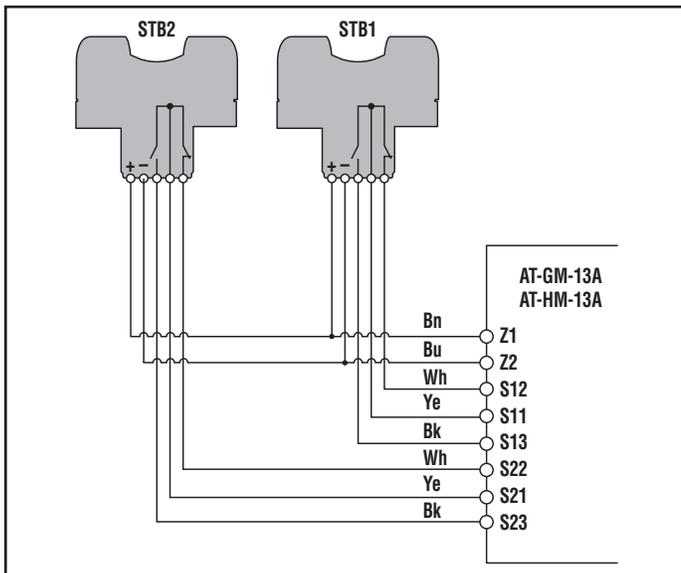


Figure 5b. Wiring to two STB Touch Buttons with contact outputs

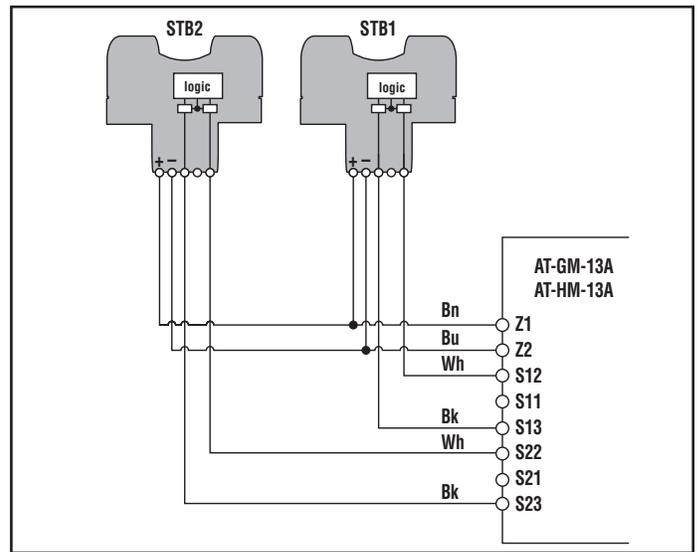


Figure 5c. Wiring to two STB Touch Buttons with PNP (sourcing) outputs

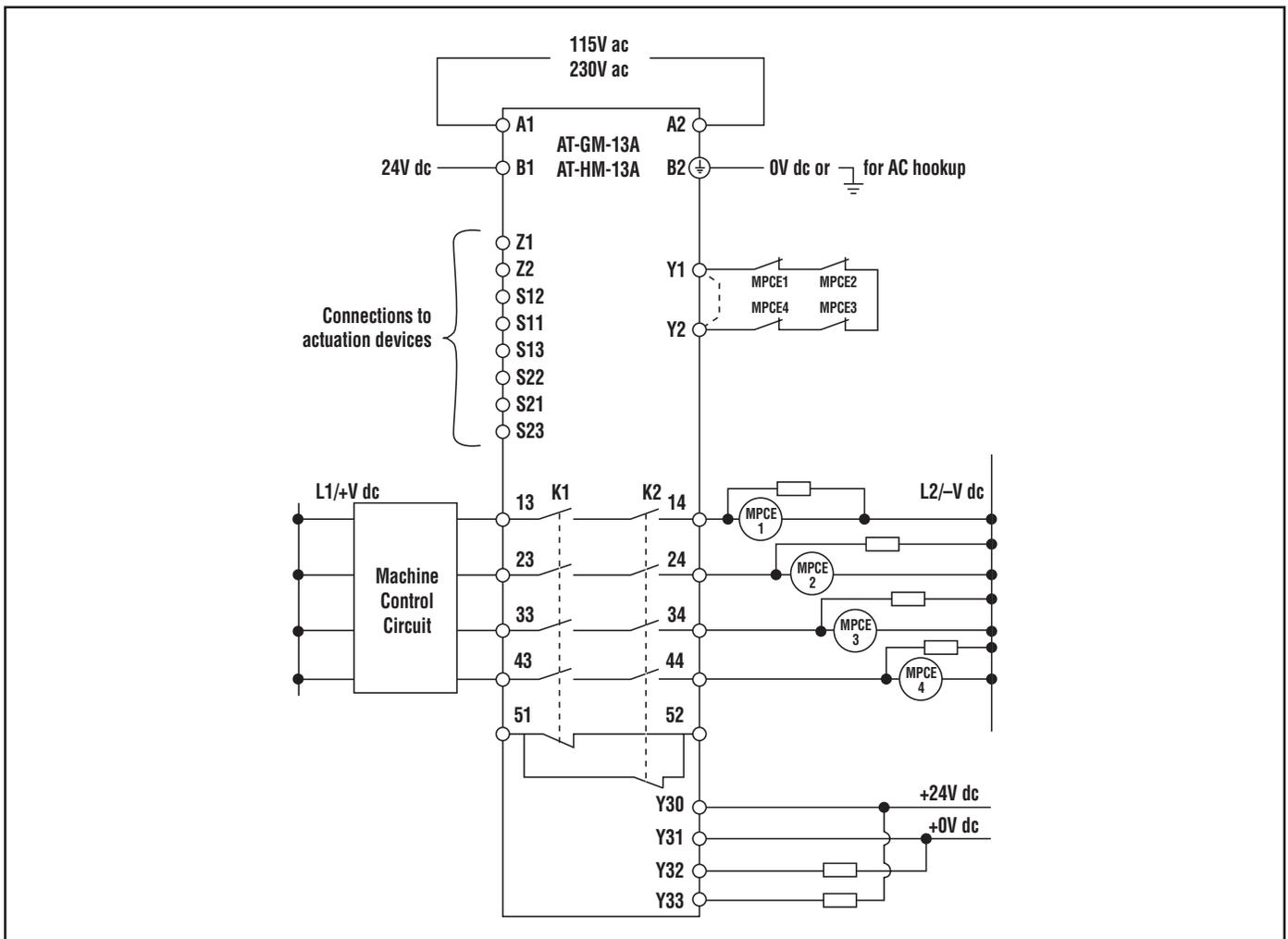


Figure 5d. AT-GM-13A, AT-HM-13A DUO-TOUCH SG Safety Module wirings

# DUO-TOUCH® SG – Two-Hand-Control Kits with STB Touch Buttons

## AT-FM-10K DUO-TOUCH SG Safety Module Specifications

<b>Supply Voltage and Current</b>	24V ac/dc ± 15% at 150 mA (with STBVR81 or other mechanical switches) 24V dc ± 15% at 150 mA (with STBVP6 buttons)
<b>Supply Protection Circuitry</b>	Protected against transient voltages and reverse polarity
<b>Output Configuration</b>	<b>Outputs (K1 and K2):</b> two redundant (total of four) safety relay (force-guided) contacts ## <b>Contact ratings:</b> <b>Maximum voltage:</b> 250V ac or 250V dc <b>Maximum current:</b> 6A ac or dc (resistive load) <b>Maximum power:</b> 1500 VA, 150 watts <b>Mechanical life:</b> 10.000.000 operations <b>Electrical life:</b> 150.000 cycles (typically at 1,5 kVA switching power) NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts.
<b>Output Response Time</b>	<b>AT-FM-10K output response time:</b> 35 milliseconds <b>DUO-TOUCH SG Kit (AT-FM-10K interfaced with STB buttons) output response time:</b> 55 milliseconds
<b>Input Requirements</b>	Outputs from two-hand-controls must each be capable of switching 10 to 50 mA at 18 to 30V dc.
<b>Simultaneity Monitoring Period</b>	500 milliseconds
<b>Status Indicators</b>	<b>4 green LED indicators:</b> Power ON Input 1 energised Input 2 energised Output <b>1 red LED indicator:</b> Fault
<b>Housing</b>	Polycarbonate
<b>Protection class (IEC-60529)</b>	IP20
<b>Mounting</b>	Mounts to standard 35 mm DIN rail track. Safety Module must be installed inside an enclosure rated IP54, or better.
<b>Vibration Resistance</b>	10 to 55Hz at 0,35 mm displacement per IEC 68-2-6
<b>Operating Conditions</b>	<b>Temperature:</b> 0° to +50°C <b>Maximum Relative Humidity:</b> 90% at +50°C (non-condensing)
<b>Dimensions</b>	See Figure 6 on page 13
<b>Safety Category</b>	Category 4 per ISO 13849-1 (EN 954-1); Type IIIC per ISO 13851 (EN 574)
<b>Certifications</b>	  Yes

# DUO-TOUCH® SG – Two-Hand-Control Kits with STB Touch Buttons

## AT-GM-13A and AT-HM-13A DUO-TOUCH SG Safety Module Specifications

<b>Supply Voltage and Current</b>	<b>A1-A2:</b> 115V ac (model AT-GM-13A) or 230V ac (model AT-HM-13A), ± 15%; 50/60 Hz <b>B1-B2:</b> 24V dc, ± 15%, 10% max. ripple
<b>Power Consumption</b>	Approx. 4 W/7 VA
<b>Supply Protection Circuitry</b>	Protected against transient voltages and reverse polarity
<b>Output Configuration (including Auxiliary N.C. output 51/52)</b>	<b>Outputs (K1 and K2):</b> four redundant (total of eight) safety relay (force guided) contacts <b>Contact ratings:</b> <b>Maximum voltage:</b> 250V ac or 250V dc <b>Maximum current:</b> 6A ac or dc (resistive load) <b>Maximum power:</b> 1500 VA, 150 watts <b>Mechanical life:</b> 50.000.000 operations <b>Electrical life:</b> 150.000 cycles (typically at 1,5 kVA switching power) NOTE: Transient suppression is recommended when switching inductive loads. Install suppressors across load. Never install suppressors across output contacts.
<b>Auxiliary Supply Voltage (for solid-state outputs)</b>	24V dc at 1 A (between Y30 and Y31)
<b>Auxiliary Solid-State Output Current</b>	500 mA max., short circuit protected (Y32 or Y31)
<b>Output Response Time</b>	<b>AT-GM-13A or AT-HM-13A output response time:</b> 35 milliseconds <b>DUO-TOUCH SG Kit (AT-..M-13A interfaced with STB buttons) output response time:</b> 55 milliseconds
<b>Input Requirements</b>	Outputs from actuating devices must each be capable of switching up to 20 mA at 12V dc.
<b>Simultaneity Monitoring Period</b>	500 milliseconds
<b>Z1/Z2 Courtesy Voltage</b>	24V dc at 150 mA (for STB button power)
<b>Status Indicators</b>	<b>4 green LED indicators:</b> Power ON Input 1 energised Input 2 energised Output <b>1 red LED indicator:</b> Fault
<b>Housing</b>	Polycarbonate
<b>Protection class (IEC-60529)</b>	IP20
<b>Mounting</b>	Mounts to standard 35 mm DIN rail track. Safety Module must be installed inside an enclosure rated IP54, or better.
<b>Vibration Resistance</b>	10 to 55Hz at 0,35 mm displacement per IEC 68-2-6
<b>Operating Conditions</b>	<b>Temperature:</b> 0° to +50°C <b>Maximum Relative Humidity:</b> 90% at +50°C (non-condensing)
<b>Dimensions</b>	See Figure 6 on page 13
<b>Safety Category</b>	Category 4 per ISO 13849-1 (EN 954-1); Type IIIC per ISO 13851 (EN 574)
<b>Certifications</b>	 Yes

# DUO-TOUCH® SG – Two-Hand-Control Kits with STB Touch Buttons

## STB Touch Button Specifications

<b>Supply Voltage and Current</b>	<b>STBVP6 Models:</b> 10 to 30V dc at 75 mA (exclusive of load) <b>STBVR81 Models:</b> 20 to 30V ac/dc at 75 mA
<b>Supply Protection Circuitry</b>	Protected against transient voltages and reverse polarity
<b>Output Configuration</b>	<b>STBVP6 Models:</b> Complementary PNP (sourcing) open-collector transistors <b>STBVR81 Models:</b> Complementary electromechanical relays
<b>Output Rating</b>	<b>STBVP6 Models (solid-state outputs):</b> <b>Maximum load:</b> 150 mA <b>Minimum on-state voltage:</b> supply voltage – 1.5V at full load <b>Off-state leakage current:</b> < 1 µA  <b>STBVR81 Models (electromechanical relays):</b> <b>Maximum voltage:</b> 150V dc, 125V ac <b>Maximum switching current:</b> 1A (resistive load) <b>Maximum switching power:</b> 60 VA, 30W (resistive load) <b>Mechanical life of relays:</b> 1 x 10 <sup>9</sup> operations <b>Electrical life of relays:</b> at 6V dc, 100 mA – approx. 5 x 10 <sup>7</sup> operations at 24V dc, 1A – approx. 3 x 10 <sup>6</sup> operations
<b>Output Protection</b>	All models protected against false pulse on power-up. Models with solid-state outputs have overload and short-circuit protection.
<b>Output Response Time</b>	20 milliseconds, maximum
<b>Indicators</b>	<b>2 green LED indicators:</b> <b>Power:</b> ON – power applied OFF – power off <b>Output/fault:</b> ON – button is activated OFF – button is deactivated Flashing – internal fault or blocked button on power-up detected
<b>Construction</b>	Totally encapsulated, non-metallic enclosure. Black polysulfone upper housing (see Application Note at the bottom of this table); fibre-reinforced PBT polyester base. Electronics fully epoxy-encapsulated. Supplied with polypropylene field cover.
<b>Protection class (IEC-60529)</b>	IP66
<b>Connections</b>	PVC-jacketed 2 m cables standard on integral-cable kits; or QD fitting, depending on model. Accessory QD cables required for QD models. <b>STBVP6Q5 Models:</b> 4-wire (4-pin M12 x 1 QD) <b>STBVR81Q6 Models:</b> 5-wire (5-pin M12 x 1 QD) Integral 9 m cables are also available; see model selection chart, page 1.
<b>Ambient Light Immunity</b>	Up to 100.000 lux
<b>EMI/RFI Immunity</b>	Highly resistant to both single and mixed EMI and RFI noise sources, per IEC 947-5-2.
<b>Operating Conditions</b>	<b>Temperature:</b> -20° to +50°C <b>Maximum relative humidity:</b> 90% at +50°C (non-condensing)
<b>Application Note</b>	<b>Environmental considerations:</b> The polysulfone upper housing will become brittle with prolonged exposure to outdoor sunlight. Window glass effectively filters longer wavelength ultraviolet light and provides excellent protection from sunlight. Avoid contact with strong alkalis. Clean periodically using mild soap solution and a soft cloth.

# DUO-TOUCH<sup>®</sup> SG – Two-Hand-Control Kits with STB Touch Buttons

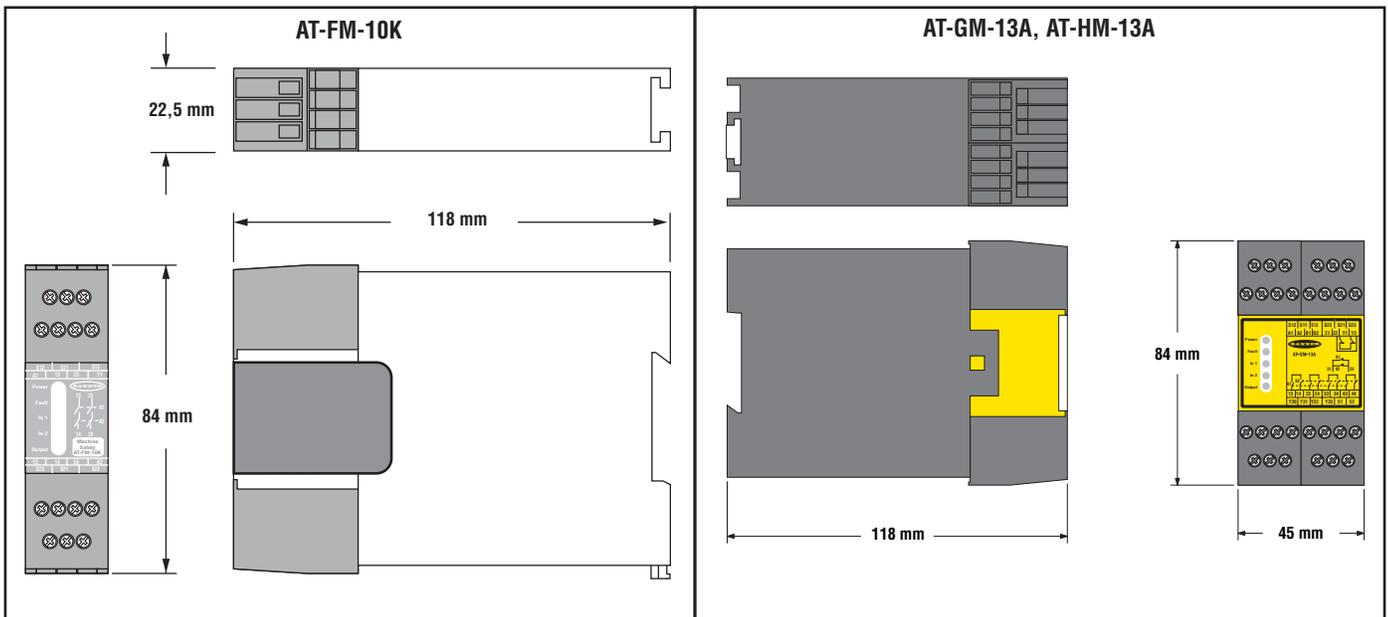


Figure 6. DUO-TOUCH SG Safety Module dimensions

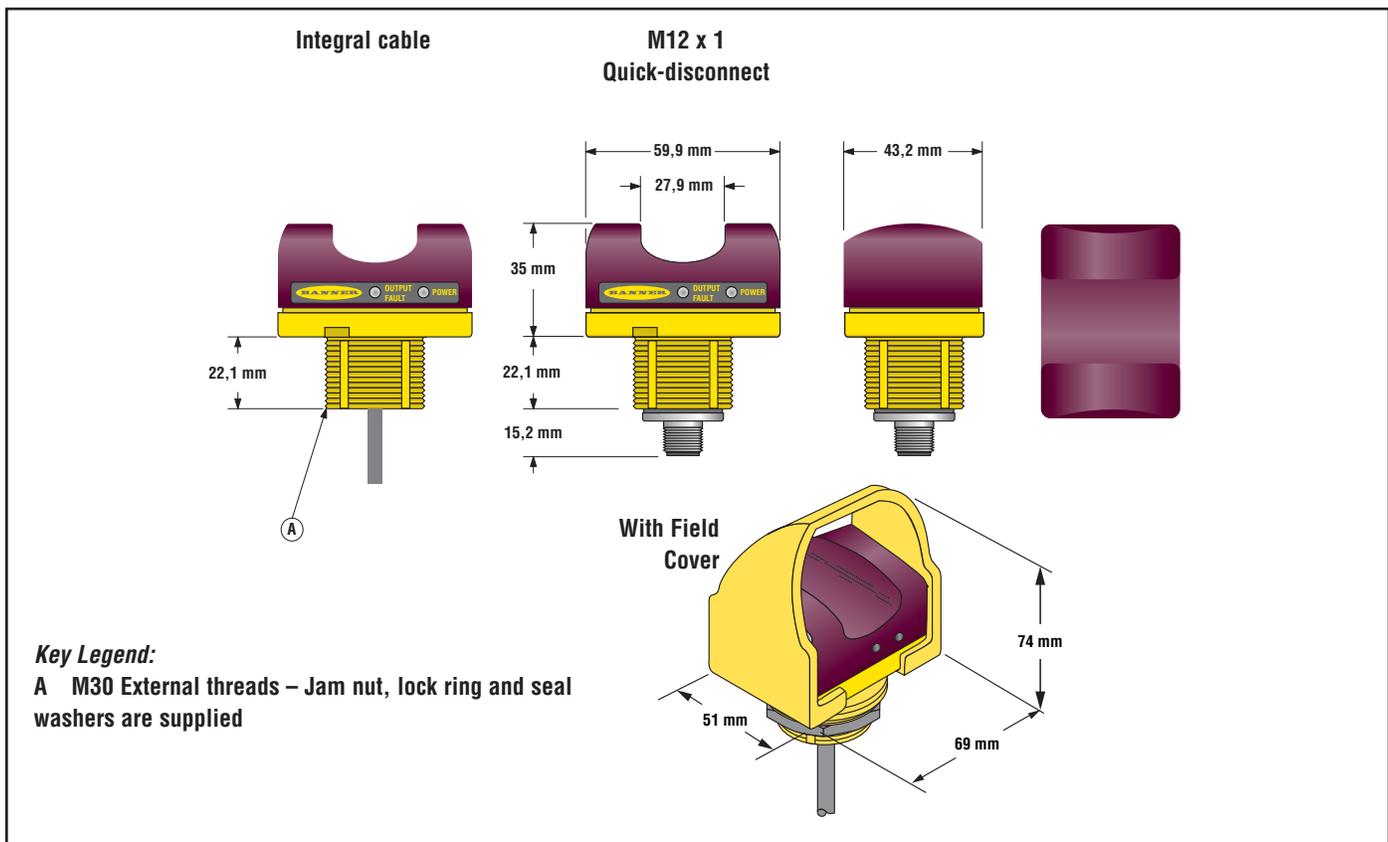


Figure 7. STB Touch Button dimensions

# **DUO-TOUCH<sup>®</sup> SG – Two-Hand-Control Kits with STB Touch Buttons**

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**Note:** For additional information, please refer to instruction manual EM001 (Duo-Touch SG Two-Hand-Control Safety Kit with AT-FM-10K Safety Module and STB Self-Checking Optical Touch Buttons) or instruction manual EM003 (Duo-Touch SG Two-Hand-Control Safety Kit with AT-GM-13A or AT-HM-13A Safety Module and STB Self-Checking Optical Touch Buttons).

**WARRANTY:** Banner Engineering Corp. warrants its products to be free from defects for one year. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture found to be defective at the time it is returned to the factory during the warranty period. This warranty does not cover damage or liability for the improper application of Banner products. This warranty is in lieu of any other warranty either expressed or implied.