Product Manual

- Continuous internal self-checking operation
- Redundant microcontroller-based photoelectric touch buttons
- Ergonomically designed to eliminate hand, wrist, and arm stresses associated with repeated switch operation; requires no physical pressure to operate
- High excess gain cuts through heavy contamination
- Immune to ambient light, EMI, and RFI interference
- LED power, output, and fault indicators
- Pre-installed field covers protect the device and prevent inadvertent activation

WARNING:
Not a Stand-Alone Safety Device.

STB Series Touch Buttons are self-checking ergonomic actuating devices, but are not, by themselves, safety devices. To be used in a safety application, two STBs must be interfaced with a type IIIC two-hand-control module, such as the Banner AT-FM-10K or a Banner Safety Controller, to meet all relevant safety requirements of the appropriate standards (for example, ISO13851).

Models

Model	Cable	Supply Voltage	Output Type	DUO-TOUCH® SG Compatibility
STBVP6	4-wire 2 m (6.5 ft) integral cable	10 V DC to 30 V DC	Complementary PNP	AT-FM-10K Two-Hand Control Module, XS/SC26 Safety Controllers, and SC10 Safety Controller
STBVP6Q	4-Pin 7/8 in-16UNF Quick Disconnect			
STBVP6Q5	4-Pin M12 Quick Disconnect			
STBVR81	5-wire 2 m (6.5 ft) integral cable	20 V AC/DC to 30 V AC/DC	Two Individual Complementary Relays	
STBVR81Q	5-Pin 7/8 in-16UNF Quick Disconnect			
STBVR81Q6	5-Pin M12 Quick Disconnect			

Models with a quick disconnect connector require a mating cable.

Important - Read This Before Proceeding

The user is responsible for satisfying all local, state, and national laws, rules, codes, and regulations relating to the use of this product and its application. Banner Engineering Corp. has made every effort to provide complete application, installation, operation, and maintenance instructions. Please contact a Banner Applications Engineer with any questions regarding this product.

The user is responsible for making sure that all machine operators, maintenance personnel, electricians, and supervisors are thoroughly familiar with and understand all instructions regarding the installation, maintenance, and use of this product, and with the machinery it controls. The user and any personnel involved with the installation and use of this product must be thoroughly familiar with all applicable standards, some of which are listed within the specifications. Banner Engineering Corp. makes no claim regarding a specific recommendation of any organization, the accuracy or effectiveness of any information provided, or the appropriateness of the provided information for a specific application.

Applicable U.S. Standards

ANSI B11 Standards for Machine Tools Safety

NFPA 79 Electrical Standard for Industrial Machinery

ANSI/RIA R15.06 Safety Requirements for Industrial Robots and Robot Systems

Applicable International Standards

ISO 13849-1 Safety of Machinery – Safety-Related Parts of Control Systems – Part 1: General Principles for Design

IEC 60947-5-2 Low Voltage Switchgear and controlgear, Control circuit devices and switching elements - Proximity switches

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EN 60947-5-3 Control circuit devices and switching elements – Requirements for proximity devices with defined behavior under fault conditions (PDDB)

EN 61508: 1-7 Functional safety of electrical/electronic/programmable electronic safety-related systems

ISO 13851 Two-Hand Control Devices – Principles for Design and Selection

IEC 62061 Safety of Machinery – Functional Safety of Safety-Related Control Systems

EU/UK Declaration of Conformity (DoC)

Banner Engineering Corp. herewith declares that these products are in conformity with the provisions of the listed directives and all essential health and safety requirements have been met. For the complete DoC, please go to www.bannerengineering.com.

Product	Directive
STB Self-Checking Optical Touch Buttons	EU: Machinery Directive 2006/42/EC
	UKCA: UKCA_REGULATION

Representative in EU: Spiros Lachandidis, Managing Director, **Banner Engineering BV** Park Lane | Culliganlaan 2F bus 3 | 1831 Diegem, BELGIUM

Representative in UK: Tony Coghlan, Managing Director, **Turck Banner LTD** Blenheim House | Blenheim Court | Wickford, Essex SS11 8YT | Great Britain

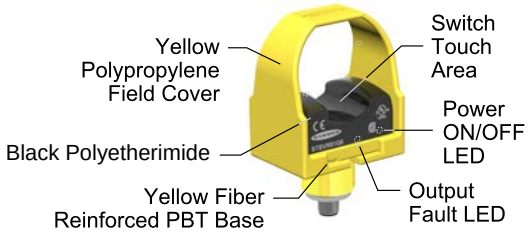
Overview

STB Self-Checking Optical Touch Buttons are touch-activated photoelectric devices designed to replace capacitive touch switches and mechanical push buttons. Their outputs activate while a finger is in the “touch area” (yoke) of the switch, interrupting the button’s infrared sensing beam.

Banner STB Series buttons are ergonomically designed to eliminate the hand, wrist, and arm stresses associated with mechanical push buttons. They require absolutely no physical pressure to operate. LED indicators light when power is on and outputs are activated.

All models are immune to EMI, RFI, and ambient light interference. STBs have a black polyetherimide upper housing and yellow PBT base. The 30 mm threaded base on all models provides easy mounting and easy retrofitting into existing applications. Rugged yellow polypropylene (TP) field covers are installed on all models to prevent inadvertent switch actuation due to objects (such as loose clothing or debris) which might accidentally block the sensing beam. The polypropylene material is capable of absorbing high impact (even at low temperatures) and is highly resistant to abrasion and to damage by most chemicals.

STB Touch Button features



WARNING:

- **Use adequate point-of-operation guarding**
- Failure to properly guard hazardous machinery can result in a dangerous condition that could lead to serious injury or death.
- When properly installed, a two-hand control safety device provides protection only for the hands of the machine operator. It might be necessary to install additional safeguarding, such as safety light curtains, additional two-hand controls, and/or hard guards, to protect all individuals from hazardous machinery.

STB Self-Checking Optical Touch Buttons are very similar to the proven and popular OTB Series buttons. The dual-microcontroller internal design of the STB buttons, however, allows the hookup to a Banner DUO-TOUCH SG Two-Hand-Control Safety Module, Banner Safety Controller, or other two-hand-control designed to meet Type IIIC requirements per ISO 13851 (requiring 1 normally open and 1 normally closed contact per input channel). These microcontrollers perform a continuous self-check. The emitter is continuously pulsed, and receiver response is checked accordingly by the microcontrollers. STB Series Touch Buttons are designed to immediately detect any internal component failure, go into a lockout mode, and indicate the failure with a flashing green Fault LED.

The STB outputs are not monitored by the STB circuitry, and have no external device monitoring feedback. Output monitoring must be accomplished by using an external device, such as a Type IIIC Two-Hand-Control module.

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STB Series Self-Checking Touch Buttons were designed primarily to provide the self-checking function required in control-reliable machine cycle initiation applications. STBs also are suitable for use anywhere mechanical push buttons or the original OTB Touch Buttons are used.

Both the solid-state and relay-output versions have complementary outputs and can be connected to switch power to equipment as long as the STB's switching voltage and current limits are not exceeded.

STBs must be connected to a type IIIC Two-Hand-Control circuit module, in most cases, when used to initiate potentially dangerous machine cycles.

Normal Operation

System Power-Up

When power is applied, the STB conducts a self-test to detect critical internal faults and prepares for Run Mode operation.

If the STB detects a critical fault, the outputs remain Off and the Output Fault LED flashes.

If no faults are detected, the STB enters Run mode and looks for a finger in the switch touch area.

Run Mode

If the infrared sensing beam is interrupted (a finger is detected), the Output Fault LED is on solid and the outputs turn On. When the beam is clear (the finger is removed), the Output Fault LED turns off and the outputs turn Off.

The STB continually runs internal checks for fault conditions. If a fault is detected, the outputs turn Off and the Output Fault LED flashes.

Fault

When a fault is detected, the outputs turn Off and the Output Fault LED flashes.

A power cycle may be necessary to clear the fault condition.

LED Indicators

STB Series Touch Button LED Indicators	
Power On (green)	Solid when power is applied
Output, Fault (green)	Solid when button is activated
	Off when button is not activated
	Flashing when a fault condition is detected

Application Information

The polyetherimide 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, hydrocarbons and fuels.

Clean periodically using mild soap solution and a soft cloth.

Installation

OSHA and ANSI require that the hand controls be mounted to protect them from accidental or unintentional operation. Protective field covers are installed to prevent accidental switch actuation and to discourage the use of forearms or elbows. European standard ISO 13851 includes a detailed discussion of approaches to protection of hand controls. The hand controls must be arranged far enough apart so that the operator cannot operate both hand controls by the use of one arm. Typically, this distance is not less than 550 mm (21.7 in) in a straight line, but using guards or alternate mounting arrangements can allow shorter distances, per ISO 13851. This standard also recommends that hand controls be arranged on a horizontal (or nearly horizontal) surface that is 1,100 mm (43.3 in) above the floor.

Consider ergonomic principles to avoid unnecessary fatigue in the installation of the hand controls. Install the touch buttons at a height and in a location that will be comfortable for the user. See ISO 13851 Two-Hand Control, ANSI B11.TR1—Ergonomic Guidelines, and EN894—Safety of Machinery—Ergonomic Requirements—Control Actuators for further information.

Banner Engineering also manufactures runbars with STB buttons installed. For more information, see p/n 131634.

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STB touch buttons mounted

CAUTION:
- **Install hand controls to prevent accidental actuation**
- It is not possible to completely protect the two-hand control system from defeat.
- OSHA regulations require the user to arrange and protect hand controls to minimize possibility of defeat or accidental actuation.

CAUTION:
- **Avoid installing hand controls in contaminated environments**—Severe contamination or other environmental influences could cause a slow response or false on condition of mechanical or ergonomic buttons.
- A slow response or false on condition could result in exposure to a hazard.
- The environment in which hand controls are installed must not adversely affect the means of actuation.

Two-Hand Control Safety Distance (Minimum Distance)

Install all hand controls 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. This is the separation distance (safety distance), and may be calculated as follows.

WARNING:
- **Mount hand controls at a safe distance from moving machine parts**
- Failure to establish and maintain the safety distance (minimum distance) could result in serious injury or death.
- Mount hand controls as determined by the applicable standard. The operator or other non-qualified persons must not be able to relocate the hand controls.

U.S. Applications

The Safety Distance formula, as provided in ANSI B11.19:

Part-Revolution Clutch Machinery (the machine and its controls allow the machine to stop motion during the hazardous portion of the machine cycle)

$$D_s = K \times (T_s + T_r + T_h) + D_{pf}$$

For Full-Revolution Clutch Machinery (the machine and its controls are designed to complete a full machine cycle)

$$D_s = K \times (T_m + T_r + T_h) + D_{pf}$$

D_s

the Safety Distance (in inches)

K

the OSHA/ANSI recommended hand-speed constant (in inches per second), in most cases is calculated at 63 in/s, but may vary between 63 in/s to 100 in/s based on the application circumstances;

not a conclusive determination; consider all factors, including the physical ability of the operator, when determining the value of K to be used.

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T_h

the response time of the slowest hand control from the time when a hand disengages that control until the switch opens;

T_h is usually insignificant for purely mechanical switches. However, T_h should be considered for safety distance calculation when using electronic or electromechanical (powered) hand controls.

For Banner Engineering Self-checking Touch Buttons (STBs), see the de-actuate time listed in the specification section of the STB Manual, p/n 64136.

T_m

the maximum time (in seconds) the machine takes to cease all motion after it has been tripped. For full revolution clutch presses with only one engaging point, T_m is equal to the time necessary for one and one-half revolutions of the crankshaft. For full revolution clutch presses with more than one engaging point, T_m is calculated as follows:

$$T_m = (1/2 + 1/N) \times T_{cy}$$

N = number of clutch engaging points per revolution

T_{cy} = time (in seconds) necessary to complete one revolution of the crankshaft

T_r

the response time of the safety monitoring device as measured from the time a stop signal from either hand control is received. For a Banner Engineering Safety Controller, the response time is obtained from the **Configuration Summary** tab in the Software.

T_s

the overall stop time of the machine (in seconds) from the initial stop signal to the final ceasing of all motion, including stop times of all relevant control elements and measured at maximum machine velocity.

T_s is usually measured by a stop-time measuring device. If the specified machine stop time is used, add at least 20% as a safety factor to account for brake system deterioration. If the stop-time of the two redundant machine control elements is unequal, the slower of the two times must be used for calculating the separation distance.

D_{pf}

Per ANSI B11.19, the adder to account for the distance that is possible for the individual to be reaching toward the hazard zone before a protective stop is initiated. For two-hand control applications where encroachment towards the hazard is not restricted, D_{pf} = 550 mm (21.65 in). When encroachment is obstructed (for example, shrouding the two-hand actuating controls, orientation of the work station, etc.), the reaching distance (d_{ds}) may be reduced to zero. D_{pf} is also known as "d_{ds}".

European Applications

The Minimum Distance Formula, as provided in EN 13855:

$$S = (K \times T) + C$$

S

the Minimum Distance (in millimeters)

K

the EN 13855 recommended hand-speed constant (in millimeters per second), in most cases is calculated at 1600 mm/s, but may vary between 1600 mm/s to 2500 mm/s based on the application circumstances;

not a conclusive determination; consider all factors, including the physical ability of the operator, when determining the value of K to be used.

T

the overall machine stopping response time (in seconds), from the physical initiation of the safety device to the final ceasing of all motion.

C

the added distance due to the depth penetration factor equals 250 mm, per EN 13855. ISO/DIS 13855:2022 increases the C factor (d_{ds}) to 550 mm. The EN 13855 **C** factor may be reduced to 0 if the risk of encroachment is eliminated, but the safety distance must always be 100 mm or greater.

Example Separation Distance Calculation

The following example illustrates the use of the formula to calculate the separation distance for a part-revolution clutch machine using shrouded STBVP6 buttons. This example uses 0.50 seconds as a typical value for T_s and 0.035 seconds for T_r and 0.010 seconds for T_h:

K = 63 in per second,
T_s = 0.50 seconds (measured by a stop-time measuring device)
T_r = 0.035 seconds
T_h = 0.010 seconds
$D_s = K \times (T_s + T_r + T_h) + D_{pf}$
= 63 (0.50 + 0.035 + 0.010)
= 34.4 in

In this example, both hand controls must be located no closer than 35 in from the nearest hazard point.

Wiring Diagrams

Cabled models only are shown. Quick-disconnect wiring is functionally identical. Connection of DC power is without regard to polarity.

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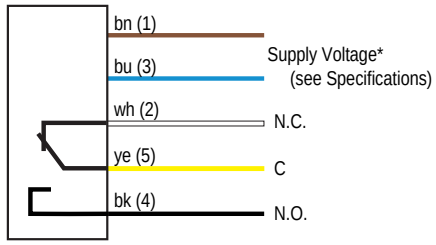
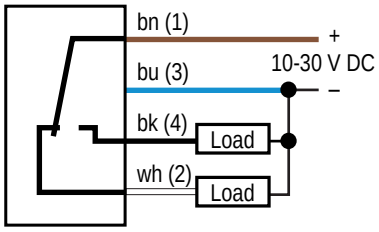
Electromechanical Relay Output Models



PNP (Sourcing) Solid-State Output Models

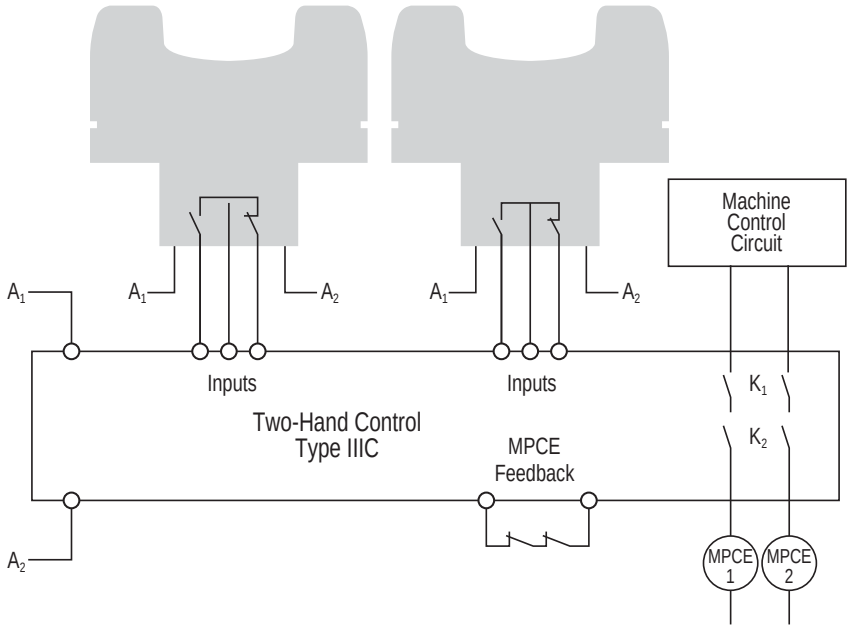


Wiring Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Gray or Yellow

* NOTE: Connection of DC power is without regard to polarity.

Generic interface of a relay-output STB Touch Button to a type IIIC two-hand-control module



Wiring Key

1 = Two-Hand Control Type IIIC Module
2 = Inputs
3 = MPCE feedback
4 = Machine control circuit

WARNING:
Safety Systems Used for Two-Hand-Control. In a two-hand-control/trip system that incorporates STB Touch Buttons as the actuation devices and functions as a safeguard, the anti-tiedown and simultaneity monitoring functions should not be performed by a non-safety-related device (for example, a PLC or PC). Per OSHA 29CFR1910.211(d)(62), the "safety system must...operate together as a unit, such that a single failure or single operating error will not cause injury to personnel due to point-of-operation hazards."

Refer to the appropriate standard to determine the requirements of a two hand-control/trip system when used for safeguarding.

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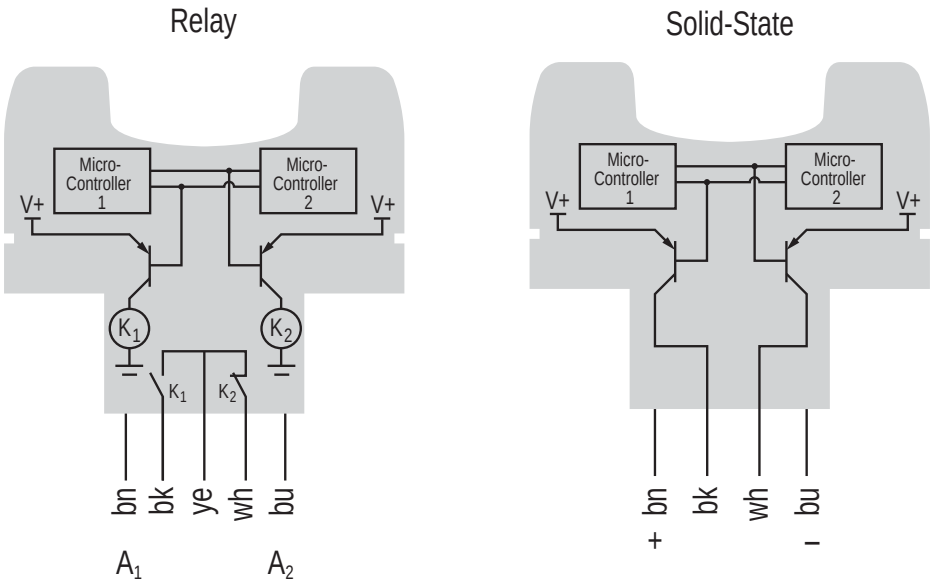
STB Touch Button block diagrams



Specifications

Supply Voltage and Current

STBVP6 models: 10 V DC to 30 V DC at 75 mA, typical

STBVR81 models: 20 V DC to 30 V DC, or 20 V AC to 30 V AC pk-to-pk (14 V AC to 21 V AC RMS)

Installations using a DC power supply must use a SELV-rated supply according to EN IEC 60950.

Installations using an AC supply must use an NEC Class 2-rated transformer.

Supply Protection Circuitry

Protected against reverse polarity and transient voltages

Output Configuration

STBVP6 models: Complementary PNP (sourcing) open-collector transistors

STBVR81 models: Complementary electromechanical relays

Output Rating

STBVP6 models (solid-state outputs):

Max. load: 150 mA
On-state max. output voltage (no load): +V(supply) − 1.5 V
Off-state leakage current: < 1 µA

STBVR81 models (electromechanical relays):

Max. switching voltage: 125 V DC/150 V AC
Max. switching current: 1 A at 24 V DC; 0.4 A at 125 V AC (resistive loads)
Max. resistive power: 24 W DC/50 VA AC

Mechanical life of relays: minimum 1×10^8 operations

Electrical life of relays: 1.5×10^5 cycles at 1 amp, 24 V resistive

Output Protection Circuitry

All models protected against false pulse on power-up. Models with solid-state outputs have overload protection.

Output Switching Times

	Actuate (Clear to Blocked)	De-Actuate (Blocked to Clear)
STBVP6	21 ms	10 ms
STBVR81	35 ms	25 ms[(1)]

Connections

PVC-jacketed 2 m (6.5 ft) cables or quick disconnect fitting, depending on model; integral 9 m (30 ft) cables are also available. Accessory cables required for quick disconnect models.

STBVP6 models: 4-wire (4-pin 7/8 in-16UNF or M12 quick disconnect)

STBVR81 models: 5-wire (5-pin 7/8 in-16UNF or M12 quick disconnect)

Environmental Rating

Meets NEMA 1, 3, 4, 4X, 12 and 13; IP66

Construction

Totally encapsulated, non-metallic enclosure. Black polyetherimide upper housing; fiber-reinforced PBT polyester base. Electronics fully epoxy encapsulated. Pre-installed polypropylene (TP) protective field cover.

Ambient Light Immunity

Up to 100,000 lux

Operating Conditions

0 °C to +50 °C (+32 °F to +122 °F)

90% at +50 °C maximum relative humidity (non-condensing)

Two-Hand Control System Note

When STBVP6 buttons are used with Two-Hand Control Modules or Safety Controllers (for example, XS/SC26-2, SC10-2) in a IIIC two-hand control system, the power supply to the STBVP6 buttons must be of the same voltage that is used to power the Two-Hand Control Module/Safety Controller and they must have a common supply return (that is, 0 V or ground).

(1) The De-Actuate (Blocked to Clear) values should be used for variable T_h in the Safety Distance calculations.

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Certifications

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Blenheim Court
Wickford, Essex SS11 8YT
GREAT BRITAIN

Safety Specifications

The STB Self-Checking Optical Touch Button is an IEC 61508 Type B device with a Systematic Capability of 3.

The STB meet the requirements of Cat. 4/PL e acc. to EN ISO 13849-1 and SIL 3 acc. to IEC 62061/IEC 61508 when interfaced with a IIIC Two-Hand Control Module (for example, AT-FM-10K) or an appropriate Safety Controller (for example, XS/SC26, SC10-2) configured as a IIIC Two-Hand Control system in order to be used in safety applications.

The STB Self-Checking Optical Touch Button is HFT = 1. When two devices are used in a Two-Hand Control system, then HFT = 2 is fulfilled.

Failure Rate Data (failures per hour)

Model Number	λ_S	λ_{DD}	λ_{DU}
STBVP6	2.02E-07	1.85E-07	1.74E-08
STBVR81	1.981E-07	1.805E-07	1.764E-08

Calculated Probability of Failure on Demand

Model Number	Proof Test Interval		PFH	PFD
	Years	Hours		
STBVP6	0.25	2,190	1.06E-09	1.16E-06
	0.5	4,380	1.06E-09	2.31E-06
	1	8,760	1.06E-09	4.63E-06
	2	17,520	1.06E-09	9.27E-06
	5	43,800	1.07E-09	2.33E-05
	10	87,600	1.08E-09	4.69E-05
	20	175,200	1.10E-09	9.53E-05
STBVR81	0.25	2,190	1.07E-09	1.17E-06
	0.5	4,380	1.07E-09	2.34E-06
	1	8,760	1.07E-09	4.68E-06
	2	17,520	1.07E-09	9.38E-06
	5	43,800	1.08E-09	2.36E-05
	10	87,600	1.09E-09	4.75E-05
	20	175,200	1.12E-09	9.65E-05

Mission time is 20 years.

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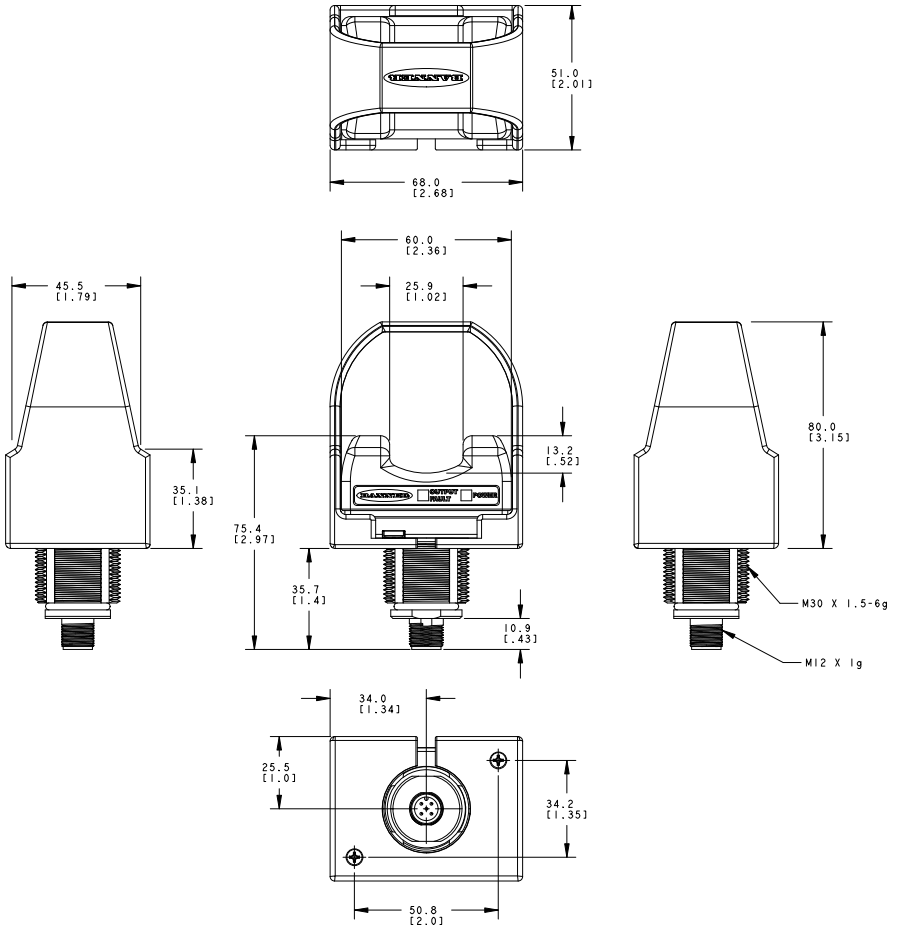
Dimensions

All measurements are listed in millimeters [inches], unless noted otherwise. The measurements provided are subject to change.

M12 Models



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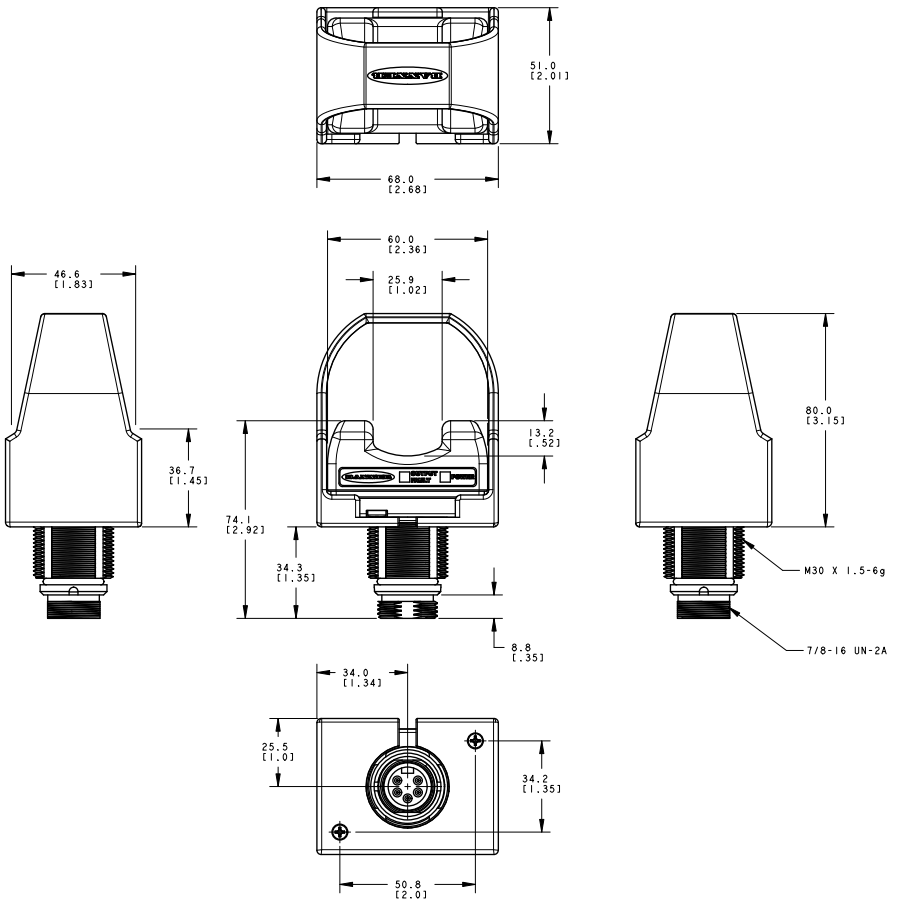
7/8 in-16UNF Models



Accessories

The STB Series Touch Buttons are actuation devices. To perform their safety function, these devices need to be connected to an appropriate safety monitoring device like an AT-FM-10K module or Banner Safety Controller.

Safety Controllers

Safety controller models

Non-Expandable Models	Expandable Models	Description
SC26-2	**XS26-2**	26 convertible I/O and 2 redundant solid-state safety outputs
SC26-2d	**XS26-2d**	26 convertible I/O and 2 redundant solid-state safety outputs with display
SC26-2e	**XS26-2e**	26 convertible I/O and 2 redundant solid-state safety outputs with Ethernet
SC26-2de	**XS26-2de**	26 convertible I/O and 2 redundant solid-state safety outputs with display and Ethernet
SC10-2roe		10 inputs, 2 redundant relay safety outputs (3 contacts each) (ISD and Ethernet compatible)
	XS26-ISDd	26 inputs, 2 redundant solid-state safety outputs with display, Ethernet, and 8 ISD channels

AT-FM-10K

Model	Description
AT-FM-10K	Monitors two actuation devices, 2 normally open (N.O.) redundant-output 6 amp contacts

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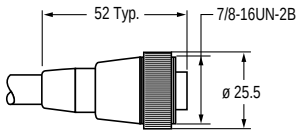
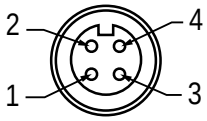
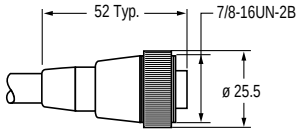
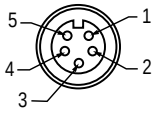
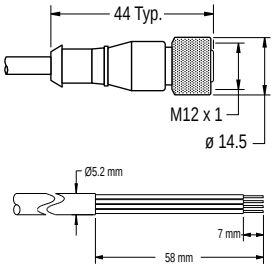
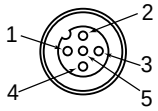
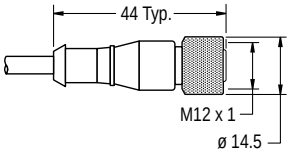
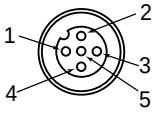
Cordsets

4-Pin Single-Ended 7/8-in Female Cordsets				
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**
MBCC-406	1.83 m (6 ft)	Straight		 1 = Brown 2 = White 3 = Blue 4 = Black
MBCC-412	3.66 m (12 ft)			
MBCC-430	9.14 m (30 ft)			

5-Pin Single-Ended 7/8-in Female Cordsets				
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**
MBCC-506	1.83 m (6 ft)	Straight		 1 = Black 2 = Blue 3 = Yellow 4 = Brown 5 = White
MBCC-512	3.66 m (12 ft)			
MBCC-530	9.14 m (30 ft)			

4-Pin Single-Ended M12 Female Cordsets					
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**	
MQDC-403	1 m (3.28 ft)	Straight			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Not used
MQDC-406	2 m (6.56 ft)				
MQDC-410	3 m (9.8 ft)				
MQDC-415	5 m (16.4 ft)				
MQDC-430	9 m (29.5 ft)				
MQDC-450	15 m (49.2 ft)				
MQDC-460	18.3 m (60 ft)				
MQDC-470	21 m (68.9 ft)				
MQDC-4100	30 m (98.43 ft)				

5-Pin Single-Ended M12 Female Cordsets				
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**
MQDC1-501.5	0.5 m (1.5 ft)	Straight		 1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray
MQDC1-503	0.9 m (2.9 ft)			
MQDC1-506	2 m (6.5 ft)			
MQDC1-515	5 m (16.4 ft)			
MQDC1-530	9 m (29.5 ft)			
MQDC1-560	18 m (59 ft)			
MQDC1-5100	31 m (101.7 ft)			

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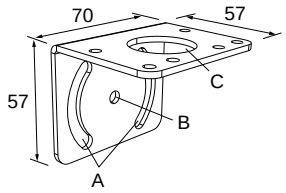
Mounting Brackets

SMB30MM

- 12-gauge stainless steel bracket with curved mounting slots for versatile orientation
- Clearance for M6 (¼ in) hardware
- Mounting hole for 30 mm sensor

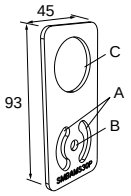
Hole center spacing: A = 51, A to B = 25.4
Hole size: A = 42.6 × 7, B = ø 6.4, C = ø 30.1



SMBAMS30P

- Flat SMBAMS series bracket
- 30 mm hole for mounting sensors
- Articulation slots for 90°+ rotation
- 12-gauge 300 series stainless steel

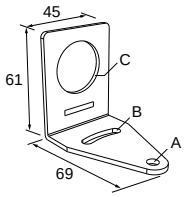
Hole center spacing: A=26.0, A to B=13.0
Hole size: A=26.8 × 7.0, B=ø 6.5, C=ø 31.0



SMB30A

- Right-angle bracket with curved slot for versatile orientation
- Clearance for M6 (¼ in) hardware
- Mounting hole for 30 mm sensor
- 12-gauge stainless steel

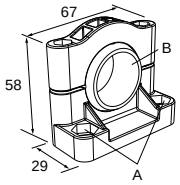
Hole center spacing: A to B=40
Hole size: A=ø 6.3, B= 27.1 × 6.3, C=ø 30.5



SMB30SC

- Swivel bracket with 30 mm mounting hole for sensor
- Black reinforced thermoplastic polyester
- Stainless steel mounting and swivel locking hardware included

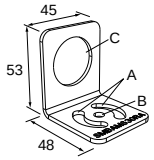
Hole center spacing: A=ø 50.8
Hole size: A=ø 7.0, B=ø 30.0



SMBAMS30RA

- Right-angle SMBAMS series bracket
- 30 mm hole for mounting sensors
- Articulation slots for 90°+ rotation
- 12-gauge (2.6 mm) cold-rolled steel

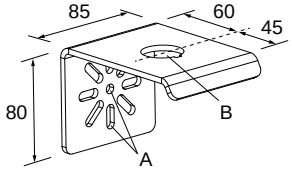
Hole center spacing: A=26.0, A to B=13.0
Hole size: A=26.8 × 7.0, B=ø 6.5, C=ø 31.0



SSA-MBK-EEC1

- Single 30 mm hole
- 8 gauge steel, black finish (powder coat)
- Front surface for customer-applied labels

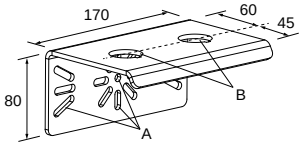
Hole size: A = ø 7 , B = ø 30



SSA-MBK-EEC2

- Two 30 mm holes
- 8 gauge steel, black finish (powder coat)
- Front surface for customer-applied labels

Hole size: A = ø 7 , B = ø 30



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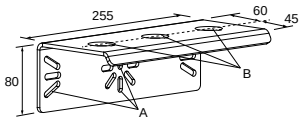
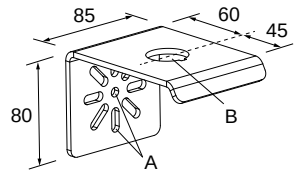
SSA-MBK-EEC3
- Three 30 mm holes
- 8 gauge steel, black finish (powder coat)
- Front surface for customer-applied labels

Hole size: A = ø 7 , B = ø 30



SSA-MBK-EEC1-SS
- Single 30 mm hole
- 8 gauge 316 stainless steel
- Front surface for customer-applied labels

Hole size: A = ø 7 , B = ø 30

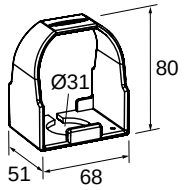
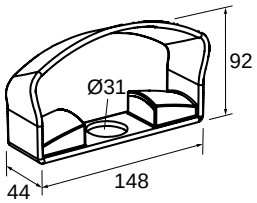


The SSA-MBK-EECx brackets offer:
- Horizontal and vertical (post) mounting
- Interchangeable positions of mounted devices (e.g. OTB/STB/VTB, E-Stop, K50s)

Replacement Field Covers

Field covers are designed to prevent inadvertent activation of optical touch buttons by objects that accidentally block the sensing beam. Field covers are constructed of rugged polypropylene and are highly resistant to abrasion and to damage by most chemicals.

Additional colors are available. Contact Banner Engineering for options.

Model	Description	
OTC-1-YW	Standard Yellow Field Cover	
OTCL-1-YW	Large Yellow Field Cover	

Product Support

Repairs

Contact Banner Engineering for troubleshooting of this device. **Do not attempt any repairs to this Banner device; it contains no field-replaceable parts or components.** If the device, device part, or device component is determined to be defective by a Banner Applications Engineer, they will advise you of Banner's RMA (Return Merchandise Authorization) procedure.

> **IMPORTANT:** If instructed to return the device, pack it with care. Damage that occurs in return shipping is not covered by warranty.

Contact Us

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For worldwide locations and local representatives, visit www.bannerengineering.com.

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