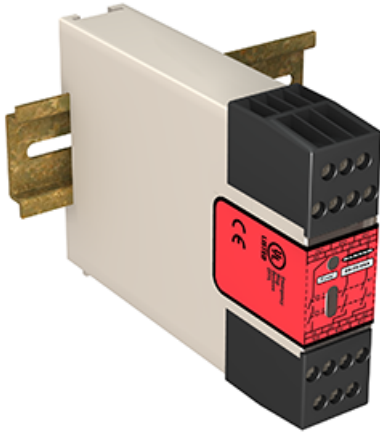


# ES-FA-9AA and ES-FA-11AA E-Stop Safety Modules



With 3 normally open safety outputs or 2 normally open safety outputs and 1 normally closed auxiliary output  
Original Instructions



- Monitors emergency stop devices, such as palm buttons and rope/cable pulls, and positive-opening safety switches used for guard/gate interlocking
- The safety inputs can monitor:
  - A +24V dc source switched by hard/relay contacts in single-channel hookup, or
  - Hard/relay contacts in a dual-channel hookup using terminals S11-S12 and S21-S22
- The ES-FA-9AA has three normally open output switching channels for connection to control-reliable power interrupt circuits
- The ES-FA-11AA has two normally open output switching channels for connection to control-reliable power interrupt circuits and one normally closed auxiliary output channel
- Automatic reset or monitored manual reset
- Design complies with standards ANSI B11.19, UL991, ISO 13850 (EN418), and ISO 13849-1 (EN954-1) (Safety Category 4)
- For use in functional stop category 0 applications per ANSI NFPA 79 and IEC/EN60204-1
- 6 or 7 amp safety output contacts, depending on model
- Plug-in terminal blocks
- 24V ac/dc operation

Models	Supply Voltage	Outputs	Output Contact Rating
ES-FA-9AA	24V ac/dc	3 Normally Open (NO)	6 A
ES-FA-11AA		2 Normally Open and 1 Normally Closed (NC)	7 A



### WARNING: Not a Stand-Alone Safeguarding Device

**This Banner device is not a stand-alone point-of-operation guarding device, as defined by OSHA regulations.** It is necessary to install point-of-operation guarding devices, such as safety light screens 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.**

## Important: Read this First

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 direct any questions regarding the use or installation of this product to the factory applications department at the telephone numbers or address found at <http://www.bannerengineering.com>.

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

Contact: Safety Director, AMT – The Association for Manufacturing Technology, 7901 Westpark Drive, McLean, VA 22102, Tel.: 703-893-2900

ANSI NFPA 79 Electrical Standard for Industrial Machinery

Contact: National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101, Tel.: 800-344-3555



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

Contact: Robotic Industries Association, 900 Victors Way, P.O. Box 3724, Ann Arbor, MI 48106, Tel.: 734-994-6088

### Applicable International Standards

ISO 12100-1 & -2 (EN 292-1 & -2) Safety of Machinery – Basic Concepts, General Principles for Design

ISO 13849-1 (EN 954-1) Safety-Related Parts of Control Systems

ISO 13850 (EN 418) Emergency Stop Devices, Functional Aspects – Principles for Design

IEC 60204-1 Electrical Equipment of Machines Part 1: General Requirements

Contact: Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112-5704, Tel.: 800-854- 7179

### Certificate of Adequacy

This Safety Module datasheet satisfies the requirements of Machinery Directive 2006/42/EC, Section 1.7.4 — instructions.

## Overview

An Emergency Stop Safety Module is used to increase the control reliability of an emergency stop circuit. As shown in the hookup drawings, the models ES-FA-9AA and ES-FA-11AA E-Stop Safety Modules are designed to monitor a 1-channel or 2-channel E-stop switch. A 2-channel E-stop switch has two electrically isolated contacts.



#### WARNING: Safety Categories

The level of safety circuit integrity can be greatly affected by the design and installation of the safety devices and the means of interfacing of those devices. **A risk assessment must be performed to determine the appropriate safety circuit integrity level or safety category as described by ISO 13849-1 (EN 954-1) to ensure the expected risk reduction is achieved and all relevant regulations and standards are complied with.**

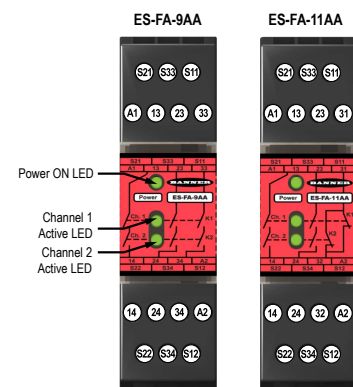


Figure 1. Features and Terminals

## Safety Circuit Integrity and ISO 13849-1 (EN954-1) Safety Circuit Principles

Safety circuits involve the safety-related functions of a machine that minimize the level of risk of harm. These safety-related functions can prevent initiation, or stop or remove a hazard. A failure of a safety-related function or its associated safety circuit may result in an increased risk of harm.

The integrity of a safety circuit depends on several factors, including fault tolerance, risk reduction, reliable and well-tried components, well-tried safety principles, and other design considerations.

Depending on the level of risk associated with the machine or its operation, an appropriate level of safety circuit performance must be incorporated. *ANSI/RIA R15.06 Industrial Robots, ANSI B11 Machine Tools, OSHA 29CFR1910.217 Mechanical Power Presses, and ISO 13849-1 (EN954-1) Safety-Related Parts of a Control System* standards provide details of the safety performance levels.

### Safety Circuit Integrity Levels

Safety circuits in International and European standards have been segmented into categories, depending on their ability to maintain their integrity in the event of a failure. The most recognized standard that details safety circuit integrity levels is ISO 13849-1 (EN954-1), which establishes five levels: Categories B, 1, 2, 3, and the most stringent, Category 4.

In the United States, the typical level of safety circuit integrity has been called "control reliability." Control reliability typically incorporates redundant control and self-checking circuitry and has been loosely equated to ISO 13849-1 Categories 3 and 4 (see CSA Z432 and ANSI B11.TR4).

If the requirements described by ISO 13849-1 (EN954-1) are to be implemented, a risk assessment must first be performed to determine the appropriate category, in order to ensure that the expected risk reduction is achieved. This risk assessment must also take into account national regulations, such as U.S. control reliability or European "C" level standards, to ensure that the minimum level of performance that has been mandated is complied with.