

# Mechanically Linked Contactors

Provide additional 10 or 18 amps carrying capability to any safety system



## Features

- For use with a safety device (e.g. a safety light screen or safety module/controller) which has solid state or hard contact outputs
- Provides three normally open safety contacts and one normally closed monitoring contact for any safety system
- Auxiliary contact blocks, either three or four normally open depending on the model, are available
- 24V dc or 120V ac coil voltage, depending on model
- 10 amp or 18 amp contact rating
- Generally used in pairs for safety function; normally closed contacts used for the monitoring function of a safety system (e.g. External Device Monitoring EDM)
- Standard DIN rail or flush-mounting

## Models

Model	Coil Voltage*	Safety Contacts	Monitoring Contacts	Contact Rating
11-BG00-31-A12060	120V ac	3 normally open	1 normally closed	10 amps (thermal)
11-BG00-31-D024	24V dc			10 amps (thermal)
BF1801A-12060	120V ac			18 amps** (inductive)
BF1801L-024	24V dc			18 amps** (inductive)

\* One Arc Suppressor is needed for each relay across the coil (see page 4)

\*\* NC contact is rated at 10 amps

## Overview

Contactors can take many forms, though the most common in a safety circuit are forced-guided, mechanically linked relays. The mechanical linkage between the contacts allows the device to be monitored by an external monitoring circuit for certain failures.

Depending on the application, the use of contactors can facilitate controlling voltage and current that differs from the output signal switching device (OSSD) outputs of the safety devices. Contacts can also be used to control an additional number of hazards by creating multiple safety stop circuits.



**WARNING . . .** These contactors are not point-of-operation guarding devices, 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 could lead to serious injury or death.**



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# Mechanically Linked Contactors

## 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 very 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 shown on the back cover.

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 below. 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

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

#### NFPA79 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 (EN292-1)** 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

**IEC/EN60204-1** Electrical Equipment of Machines: Part 1: General Requirements. (Also request a type “C” standard for specific machinery.)

**ISO 13849-1 (EN954-1)** Safety of Machinery – Related Parts of Control Systems: Part 1 General Principles for Design

**ISO 13856-1 (EN1760-1)** Safety of Machinery – Pressure-Sensitive Protective Devices: General Principles for Design and Testing

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

## Mechanical Installation

Flush-mount (clearance for M3 hardware) or mount to 35 mm DIN rail. Contactor must be mounted inside an enclosure rated NEMA3, IEC (IP54) or better.

## Electrical Installation

As the Contactors can interface to a multitude of machine control configurations, it is not possible to give exact wiring instructions for the output contacts. The following guidelines are general in nature.

Installation and wiring must be made by qualified personnel and must comply with the NEC (National Electrical Code), ANSI NFPA79 or IEC 60204-1, and all applicable local standards and codes.

Since the Contactors can switch high levels of energy, the user must consider and prevent the possibility of arc flash hazards. Arc flash can release dangerous amounts of heat and blast energy. When using low-voltage equipment (240V or less) being fed by small transformers (125kVA or less) the potential hazard is small, but the risk increases with higher voltage or larger transformers. The Contactors may be required to be located in such a manner that minimizes arc flash hazards. Refer to ANSI NFPA70E for more information.

To satisfy the requirements of Category 3 or 4 of ISO 13849-1 (EN 954-1) and Control Reliability (OSHA/ANSI), one normally closed mechanically linked (forced guided) contact from each Contactor must be monitored by the External Device Monitoring (EDM) function of the safety device. When redundant contactors are used, this will enable the detection of a failure, such as a welded contact, and prevent successive machine cycles. **It is the user's responsibility to monitor the contactors' normally closed contacts, to ensure that any single failure will not result in a hazardous condition and will prevent a successive machine cycle.**

### WARNING . . . Shock Hazard

**Always disconnect all power before making any wire connections.** Electrical installation and wiring must be made by qualified personnel and must comply with the NEC (National Electrical Code) and ANSI NFPA70E, ANSI NFPA79 or IEC 60204-1, and all applicable local standards and codes.

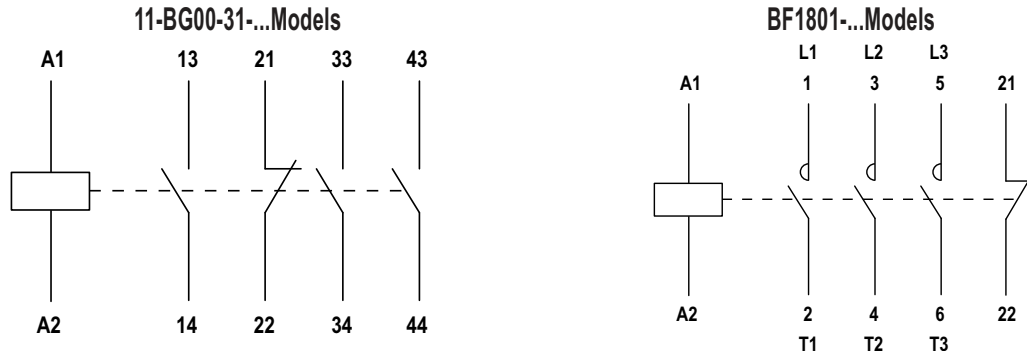
### WARNING . . . Not for Use As a Stand-Alone Safety Device

- 1. DO NOT connect E-stop switches, 2-hand-control switches, safety interlock switches, or similar devices directly to an individual contactor.**
- 2. ALWAYS connect the NC contact of these contactors to the monitoring input of the EDM that controls it.**



This Contactor does not have the circuitry required to perform a self-check. A single fault inside the unit or in external devices (like switches or E-stop buttons) can go undetected and create an unsafe condition. **Failure to properly connect these contactors to a Safety Device could result in serious injury or death.**

# Mechanically Linked Contactors

## Electrical Installation



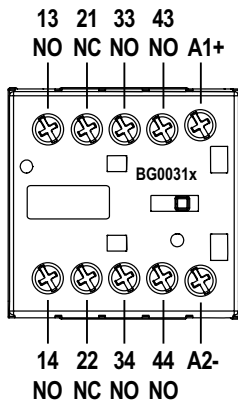
## Specifications

		11-BG00-31-D024	BF1801L-024	11-BG00-31-A12060	BF1801A-12060	
Input Voltage and Current		24V dc			120V ac	
		<b>Operating Voltage Limits</b> Pick-up: $(0.8-1.10) \times U_n$ Drop-out: $(0.2-0.55) \times U_n$				
Average Coil Consumption at 20° C	In-Rush	3.2 W	9 W	25 VA	70 VA	
	60 Hz Holding	3.2 W	9 W	3 VA	6.5 VA	
Output Configuration		Number of N.O. Contacts: 3 Number of N.C. Contacts: 1				
Output Ratings	Max. Voltage	690V				
	Max. Current	10 A (resistive)	18 A ( $\leq 440$ V; 55°C)	10 A (resistive)	18 A ( $\leq 440$ V; 55°C)	
Mechanical Life		20,000,000 operations				
Conventional Free Air Thermal Current I <sub>th</sub> ( $\leq 40^\circ$ C)		10 A	25 A	10 A	25 A	
Rated Insulation Voltage (U <sub>i</sub> )		690V				
Frequency Limit		25-40 Hz (derating for use at 61-400 Hz)				
Terminal Tightening Torque Min./Max.		0.8-1 Nm (0.59-0.74 lb/ft)				
Max. Wire Gauge (for 1 or 2 Wires)		18-12 AWG Flexible w/o Ferrule: 0.75-2.5 mm <sup>2</sup> Flexible w/ Ferrule: 2 x 1 or 1 x 2.5 mm <sup>2</sup>				
Output Response Time (ms)	Closing NO	18-25	42-58	12-21	8-24	
	Opening NO	2-3	7-13	9-18	10-20	
	Closing NC	3-5	11-17	17-26	17-30	
	Opening NC	11-17	32-42	7-17	7-18	
Environmental Rating		Rated NEMA 1, IEC IP20 Contactors must be installed inside an enclosure rated NEMA 3 (IEC IP54) or better				
Mounting		Mounts to standard 35 mm DIN-rail track or flush mount (4 screws)				
Operating Conditions		Temperature: -40° to +60°C (-40° to +122°F) operating; -55° to +70°C (-40° to +122°F) storage Max. Relative Humidity: 90% @ 50°C (non-condensing)				
Certifications		 				
Application Notes		There are no adjustments and no user-serviceable parts				

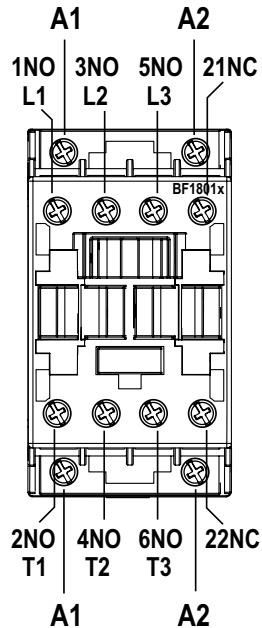
# Mechanically Linked Contactors

## Terminal Wiring Diagrams

11-BG00-31-...Models

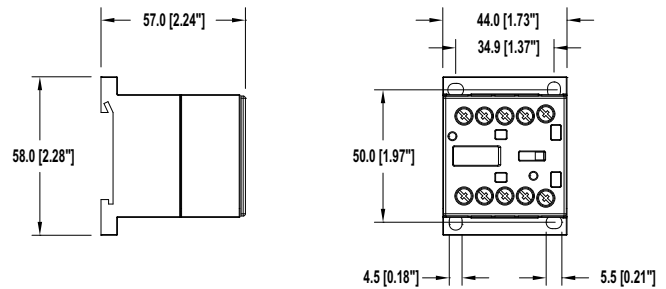


BF1801-...Models

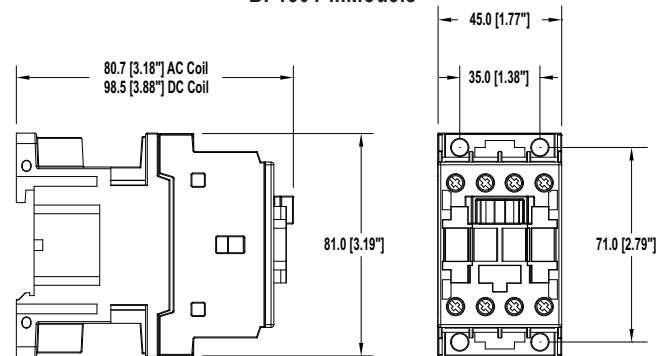


## Dimensions

11-BG00-31-...Models




BF1801-...Models



## Accessories and Replacement Parts




### Auxiliary Contacts for Mechanically Linked Contactors

Adds contacts to mechanically linked contactors.

Models	Safety Contacts	Mechanically Linked	Used with
 11-BGX10-40 (not shown)	4 normally open (N.O.)	No (Aux. only)	11-BG Series
	11-G484-30 (shown)	3 normally open (N.O.)	Yes

### Suppressors for Mechanically Linked Contactors

Extends the life of the actuating device, such as a screen or control module, that uses a mechanically linked contactor.

Models	Voltage	Used with
 11-BGX77-048	48V dc	11-BG00-31-D024
	11-BGX77-240	125-240V ac
 11-G318-48	48V dc	BF1801L-024
 BFX77-240	125-240V ac	BF1801A-12060



**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.