Overview

Guard locking switches are used to protect hazardous areas where a danger is not immediately removed after a stop request. On many machines removal of power of the motor or actuator will not necessarily cause a reliable and immediate stopping of the dangerous motion. Typical applications are: high inertia rotating machines, fast rotating machines, and machines where high pressure needs to be released from pneumatic valves.

Gates protected with guard locking switches are usually opened on exception basis. For example: to clear a jam or to regularly maintain the machine. This type of switch should not be used for frequent access during normal operation of the machine.

Guard locking switches use a solenoid to activate a lock which blocks or releases the tongue from the switch.

Rockwell Automation offers two different types of guard locking switches:

Power to Lock

When power is applied to the solenoid, the tongue is locked in the switch. When power is removed, the lock is released allowing the tongue to be extracted from the switch.

Power to Release

When power is applied to the solenoid the lock is released allowing the tongue to be extracted from the switch. When power is removed, the tongue is locked in the switch.

Why Use Power to Lock or Power to Release?

	Power to Lock	Power to Release
Advantage	When the power is removed from the cell after a "controlled stop," the doors unlock allowing maintenance personnel to go in easily.	Power is not applied to the switch all the time, only when the door needs to be opened. Sudden lose of power does not compromise safety of personnel, as the doors stay closed.
Disadvantage	Sudden lose of power will unlock the door allowing personnel to go in the hazardous area and the machine may not be stopped.	Loss of power will not unlock the door and maintenance personnel will not be able to go inside the cell.

Different methodologies can help decrease the risk that the danger is removed before the operator has access to the hazardous area:

Time based

The risk assessment process and stop time measurement will determine the maximum time for the machine to stop from its normal speed of operation. This time defines the delay between the request to open the gate and the authorization to access the zone by unlocking the gate by energizing (Power to Release) or de-energizing (Power to Lock) the solenoid.

This time delay can be implemented by using any of our time delay units such as the MSR178 or MSR138 safety relay or by software in one of our Safety PLC.

Stop motion

Another methodology is to measure when the motion is stopped. When the no-motion is detected, the lock is released to allow personnel to enter the hazardous zone.

The CU2, CU3, or MSR57 safety relay will be used to detect the motion is stopped.

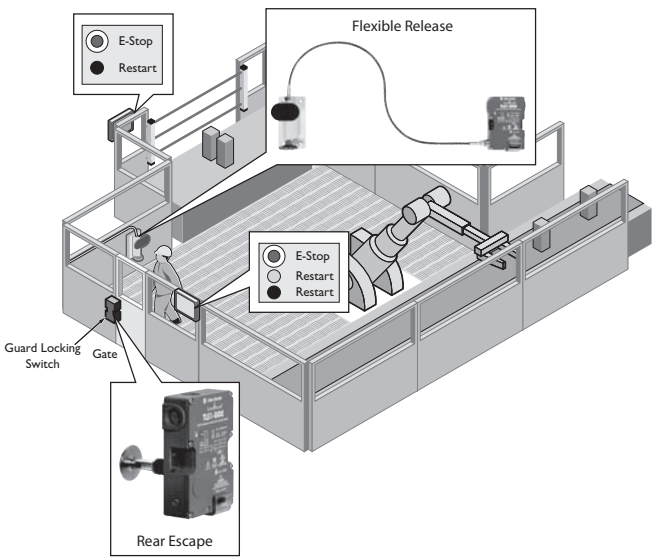
Safe speed conditions

In some applications, the user may need access while the machine is running at a safe speed. The MSR57P used with encoder technology can handle this application. It will verify the speed of the motion and allow access only if the speed does not exceed a preconfigured limit or otherwise the machine will enter a stop condition.

Typical Sequence of Actions

1. The operator requests to enter the hazardous area
2. A controlled or immediate stop of the machine is initiated
3. The machine is stopped: time delay expired or stop motion detected
4. The gate is unlocked by either energizing (Power to Release) or de-energizing (Power to Lock) the solenoid
5. The operator opens the gate and works in the hazardous area
6. The operator exits the hazardous area and closes the gate
7. The operator restarts the machine
8. The gate is locked by either de-energizing (Power to Release) or energizing (Power to Lock) the solenoid
9. The machine returns to its normal speed

Manual Override



In the situation where a person is still in the hazardous area, the door is locked and the machine restarts, the TLS guard locking switch product family provides two options for the person to escape the hazard (in addition of an Emergency Stop located outside of the hazardous area):

Option 1: Rear Escape (Not Latched)

A 40 mm push button is mounted on the back of the TLS and is accessible from the inside of the cell. Pushing the rear escape push button releases the lock mechanism inside the TLS guard locking switch allowing the door to be opened, the machine to stop and the person to escape the hazardous area.

Option 2: Flexible Release (Latched)

The flexible release push button accessory is designed to be installed inside the hazardous area to provide a means of escape for personnel who become trapped there. It provides remote access to the manual release mechanism within the TLS-GD2 switch in the event of an emergency situation. The flexible release can be retro-fitted to existing TLS1-GD2 and TLS3-GD2 switches or installed along with a new switch.

The unit is installed at an accessible height next to the guard door, inside the guarded area, while the TLS-GD2 can be mounted outside the guarded area. The flexible release is available with either a 1 m (3.28 ft) or a 3 m (9.84 ft) cable.

Pushing the black button on the flexible release, the movement of the cable activates the release mechanism within the switch, allowing the door to be opened, the machine to stop and the person to escape the hazardous area. The flexible release is then reset using the blue reset handle.

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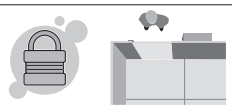
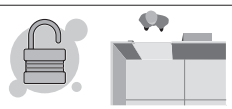
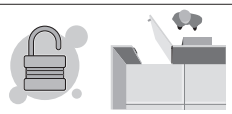
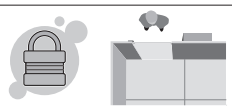
Guard Locking Switches

Overview

Selection Guide

Product	440G-MT		TLS1-GD2	TLS2-GD2	TLS3-GD2	Atlas 5
Holding Force	1600 N (360 lb)		2000 N (450 lb)			5000 N (1124 lb)
Housing Material	Metal		Plastic			Metal
Locking Mechanism	Power to Release		Power to Release	Power to Lock	Power to Release	Power to Release
Escape Release	None		Rear Escape and Flexible Release	None	Rear Escape and Flexible Release	None
Safety Contacts	2 N.C.	3 N.C.	2 N.C.			2 N.C.
Aux Contacts	2 N.O.	1 N.O.	1 N.O.			1 N.O.
Solenoid Monitoring	Direct Drive		1 N.O. & 1 N.C.		2 N.C.	2 N.C.

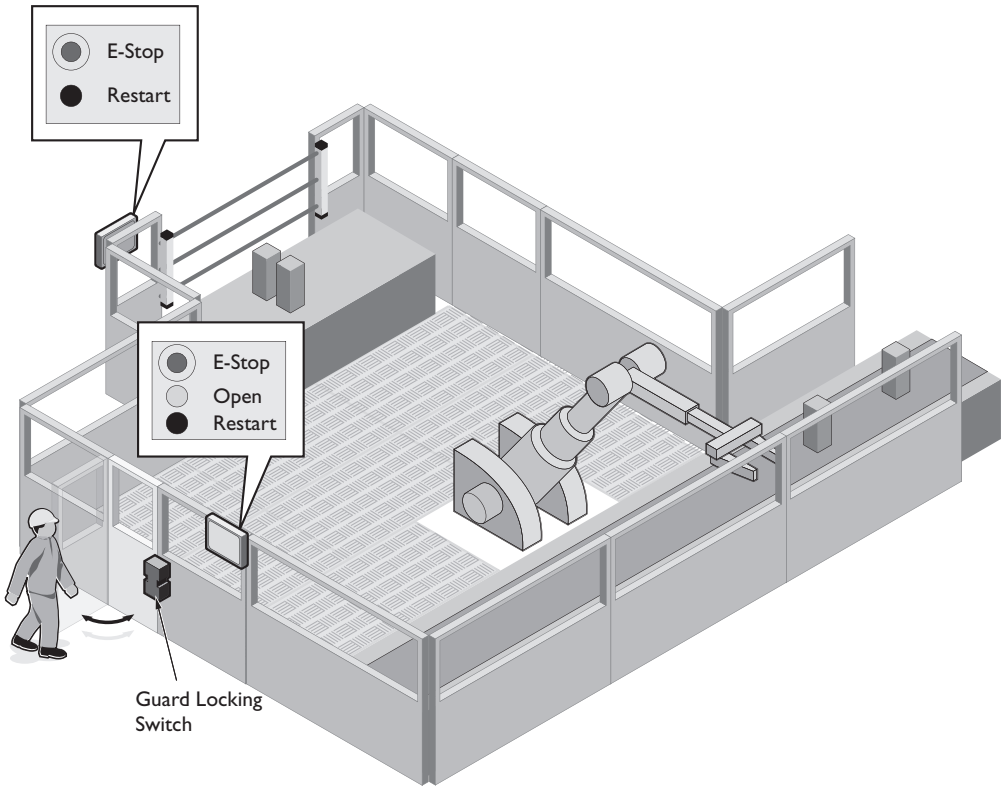
Typical Sequence of Actions and Contact Status

Step		440G-MT	TLS1	TLS2	TLS3	Atlas 5
Step 1—Hazardous Area Protected	**Solenoid Power**	**De-energized**	**De-energized**	**Energized**	**De-energized**	**De-energized**
	Solenoid Feedback A/B	Not Available	Closed/Open	Open/Closed	Closed/Closed	Closed/Closed
	Safety A/B	Closed	Closed	Closed	Closed	Closed
	Aux A (/B∗)	Open	Open	Open	Open	Open/Open
Step 2—Access to Hazardous Area Authorized	**Solenoid Power**	**Energized**	**Energized**	**De-energized**	**Energized**	**Energized**
	Solenoid Feedback A/B	Not Available	Open/Closed	Closed/Open	Open/Open	Open/Open
	Safety A/B	Open ∗	Closed	Closed	Closed	Closed
	Aux A (/B ❄)	Closed	Open	Open	Open	Open/Closed
Step 3—Access Authorized AND Door Open	**Solenoid Power**	**Energized**	**Energized**	**De-energized**	**Energized**	**Energized**
	Solenoid Feedback A/B	Not Available	Open/Closed	Closed/Open	Open/Open	Open/Open
	Safety A/B	Open	Open	Open	Open	Open
	Aux A (/B∗)	Closed	Closed	Closed	Closed	Open/Closed
Step 4—Gate Ready to Be Locked	**Solenoid Power**	**De-energized**	**De-energized**	**Energized**	**De-energized**	**De-energized**
	Solenoid Feedback A/B	Not Available	Closed/Open	Open/Closed	Closed/Closed	Closed/Closed
	Safety A/B	Open	Open	Open	Open	Open
	Aux A (/B∗)	Closed	Closed	Closed	Closed	Closed/Open
Step 5—Door Locked and Hazardous Area Protected	**Solenoid Power**	**De-energized**	**De-energized**	**Energized**	**De-energized**	**De-energized**
	Solenoid Feedback A/B	Not Available	Closed/Open	Open/Closed	Closed/Closed	Closed/Closed
	Safety A/B	Closed	Closed	Closed	Closed	Closed
	Aux A (/B∗)	Open	Open	Open	Open	Open/Open

∗ Direct drive of the contacts from the solenoid forces the safety contact to open even if the door is closed.
❄ Aux B solenoid auxiliary contact is available only on the Atlas 5 safety switch.

Allen-Bradley
Guardmaster®

Application Example



Operating Conditions

- The door is closed and locked with a 440G-MT safety switch.
- The robot is running.
- The GuardShield light curtain is muted when the robot is away from the assembly table.

Maintenance Conditions

- In order to clear the jam safely, the operator requests to unlock the door by activating the Open push button.
- The control system (MSR safety relay or SmartGuard 600) shuts down the robot and conveyor when the process conditions allow the robot and conveyor to be stopped without damaging the machine or the products (Controlled stop).
- When the robot and conveyor are stopped the control system allows the door to unlock by applying power to the solenoid in the 440G-MT safety switch.
- The maintenance person opens the door and clears the jam.
- When the task is done, the maintenance person exits the area, closes the door and activates the Restart push button.
- The control system restarts the robot and conveyor.

Remarks

- The safety mats are in place to avoid the machine restarting when the door is closed and the maintenance person is still in the hazardous area. Without the safety mats a Flexible Release can be mounted inside the hazardous area to unlock the door if this situation was to happen.
- The push of any E-Stop push buttons will stop the robot and the conveyor immediately (Immediate stop).

Guard Locking Switches

440G-MT

Description

The 440G-MT solenoid switch is a positive mode, tongue operated guard locking interlock switch that locks a machine guard closed until power is isolated while the guard is open. The guard may only be opened when a signal is applied to the internal solenoid which releases the lock mechanism. The 440G-MT locking mechanism is designed to withstand forces up to 1600 N (360 lb) and the die-cast alloy housing is ideal for use in harsh environments.

The 440G-MT solenoid switch is designed for machines that do not stop immediately or where premature interruption of the machine could cause damage to tooling and components or cause an additional hazard.

A 24V DC enhanced version is available with diagnostic output, which may be used by a control system to indicate whether a guard door is open or shut independently of the lock mechanism status. A built in LED further visually indicates the status of the switch as “door open,” “door shut and unlocked,” and “door shut and locked.”

This enhanced version is supplied with a metal manual override key to more easily enable manual unlocking in conditions when power is not available to electrically unlock the switch.

Features

- Mechanical lock
- High locking force—1600 N (360 lb)
- Heavy-duty die-cast alloy housing, ideal for harsh environments
- Diagnostic version available

Specifications

Safety Ratings						
Standards		EN954-1, ISO13849-1, IEC/EN60204-1, NFPA79, EN1088, ISO14119, IEC/EN60947-5-1, ANSI B11.19, AS4024.1				
Safety Classification		Cat. 1 Device per EN954-1 May be suitable for use in Cat 3 or Cat 4 systems depending on the architecture and application characteristics				
Functional Safety Data (related to Safety Contacts) ∗ **Note**: For up-to-date information, visit *http://www.ab.com/Safety/*		B10d: > 2 x 10^6 operations at min. load PFH_D: < 3 x10^{-7} MTTFd: > 385 years May be suitable for use in performance levels Ple or Pld systems (according to ISO 13849-1:2006) and for use in SIL2 or SIL3 systems (according to IEC 62061) depending on the architecture and application characteristics				
Certifications		CE Marked for all applicable directives, cULus, TÜV, and CCC				
Outputs						
Safety Contacts ❄		3 N.C. or 2 N.C. direct opening action				
Auxiliary Contacts		1 N.O. or 2 N.O.				
Thermal Current/I_{th}		10 A				
Rated Insulation Voltage		(Ui) 500V				
Switching Current @ Voltage, Min.		5 mA @ 5V DC				
Utilization Category						
A600/AC-15	(Ue)	600V	500V	240V	120V	
	(Ie)	1.2 A	1.4 A	3 A	6 A	
DC-13	(Ue)	24V				
	(Ie)	2 A				
Solenoid Characteristics						
Locking Type		Power to Release				
Holding Force, Max.		1600 N (360 lb)				
Power Supply		24V AC/DC or 110V AC or 230V AC				
Solenoid Power		13 W typical 100% ED				
Operating Characteristics						
Break Contact Force, Min.		6 N (1.35 lbf)				
Actuation Speed, Max.		160 mm (6.29 in.)/s				
Actuation Frequency, Max.		2 cycles/s				
Operating Radius, Min		60 mm (2.36 in.)				
Operating Life @ 100 mA load		1,000,000 operations				
Environmental						
Enclosure Type Rating		IP67				
Operating Temperature [C (F)]		-25…+60° (13…+140°)				
Physical Characteristics						
Housing Material		Painted zinc alloy				
Actuator Material		Stainless Steel				
Weight [g (lb)]		1400 (3.08)				
Color		Red				

∗ Usable for ISO 13849-1:2006 and IEC 62061. Data is based on the B10d value given and:
- Usage rate of 1op/10 mins., 24 hrs/day, 360 days/year, representing 51840 operations per year
- Mission time/Proof test interval of 38 years

❄ The safety contacts are described as normally closed (N.C.) i.e., with the guard closed, actuator in place (where relevant) and the machine able to be started.

Product Selection

Solenoid Voltage	Contact			Actuator Type	Cat. No.			
					M20 Conduit		Connector§	
	Safety	Auxiliary	Action		M20	1/2 inch NPT	12-Pin M23	8-Pin Micro (M12)♣
24V AC/DC	3 N.C.	1 N.O.	BBM	GD2 standard	**440G-MT47037**	440G-MT47039	440G-MT47041	440G-M3NBGDH-AC
				Fully-flexible	440G-MT47038	440G-MT47040	440G-MT47042	440G-M3NBBDH-AC
				—	440G-MT47007	440G-MT47008	**440G-MT47043**	—
	2 N.C.	2 N.O.	BBM	GD2 standard	440G-MT47044	440G-MT47046	440G-MT47048	—
				Fully-flexible	440G-MT47045	440G-MT47047	440G-MT47049	—
				—	440G-MT47010	440G-MT47011	440G-MT47050	—
24V DC with diagnostic function and metal override key	3 N.C.	1 N.O.	BBM	GD2 standard	440G-MT47149	440G-MT47150	440G-MT47151	—
				Fully flexible	440G-MT47152	440G-MT47153	440G-MT47154	—
				No actuator	440G-MT47155	440G-MT47156	440G-MT47157	—
	2 N.C.	2 N.O.	BBM	GD2 standard	440G-MT47158	440G-MT47159	440G-MT47160	—
				Fully flexible	440G-MT47161	440G-MT47162	440G-MT47163	—
				No actuator	440G-MT47164	440G-MT47165	440G-MT47166	—
110V AC/DC	3 N.C.	1 N.O.	BBM	GD2 standard	440G-MT47070	440G-MT47073	—	—
				Fully-flexible	440G-MT47071	440G-MT47074	—	—
				—	440G-MT47013	440G-MT47009	—	—
	2 N.C.	2 N.O.	BBM	GD2 standard	440G-MT47077	440G-MT47079	—	—
				Fully-flexible	440G-MT47078	440G-MT47080	—	—
				—	440G-MT47012	440G-MT47014	—	—
230V AC/DC	3 N.C.	1 N.O.	BBM	—	440G-MT47016	440G-MT47017	—	—
	2 N.C.	2 N.O.		—	440G-MT47015	440G-MT47024	—	—

§ For connector ratings see page 3-9.
♣ With an 8-pin micro (M12) connector, not all contacts are connected. See page 3-39 for wiring details.

Recommended Logic Interfaces

Description	Safety Outputs	Auxiliary Outputs	Time Delay	Terminals	Reset Type	Power Supply	Cat. Page No.	Cat. No.
Single-Function Safety Relays								
MSR127RP	3 N.O.	1 N.C.	—	Removable (Screw)	Monitored Manual	24V AC/DC	5-26	**440R-N23135**
MSR127TP	3 N.O.	1 N.C.	—	Removable (Screw)	Auto./Manual	24V AC/DC	5-26	**440R-N23132**
MSR126T	2 N.O.	None	—	Fixed	Auto./Manual	24V AC/DC	5-24	**440R-N23117**
MSR30RT	2 N.O. Solid State	1 N.O. Solid State	—	Removable	Auto./Manual or Monitored Manual	24V DC	5-16	440R-N23198
Specialty Safety Relays								
MSR178	3 N.O.	2 N.C.	0.5 s…30 min	Removable	Automatic	24V AC/DC, 115V AC or 230V AC	5-40	440R-M23227
CU2	2 N.O.	1 N.C.	0.1 s…40 min	Fixed	—	24V AC/DC	5-56	440R-S07281
CU3	2 N.O.	1 N.C.	—	Fixed	Automatic/Manual	110V AC	5-64	440R-S35002
Modular Safety Relays								
MSR210P Base 2 N.C. only	2 N.O.	1 N.C. and 2 PNP Solid State	—	Removable	Auto./Manual or Monitored Manual	24V DC from the base unit	5-82	440R-H23176
MSR220P Input Module	—	—	—	Removable	—	24V DC	5-86	440R-H23178
MSR310P Base	MSR300 Series Output Modules	3 PNP Solid State	—	Removable	Auto./Manual Monitored Manual	24V DC	5-102	440R-W23219
MSR320P Input Module	—	2 PNP Solid State	—	Removable	—	24V DC from the base unit	5-106	440R-W23218

Note: For additional Safety Relays connectivity, see page 5-12.
For additional Safety I/O and Safety PLC connectivity, see page 5-116.
For application and wiring diagrams, see page 10-1.

Guard Locking Switches

440G-MT

Connection Systems

Description	8-Pin Micro	12-Pin M23
Cordset	889D-F8AB-∗	889M-F12AH-∗
Patchcord	889D-F8ABDM-❄	889M-F12AHMU-‡

∗ Replace symbol with 2 (2 m), 5 (5 m), or 10 (10 m) for standard cable lengths.
❄ Replace symbol with 1 (1 m), 2 (2 m), 3 (3 m), 5 (5 m), or 10 (10 m) for standard cable lengths.
‡ Replace symbol with 0M3, (0.3 m), 0M6 (0.6 m), 1 (1 m), 2 (2 m) or 3 (3 m) for standard lengths.
Note: For additional information, see page 7-1.

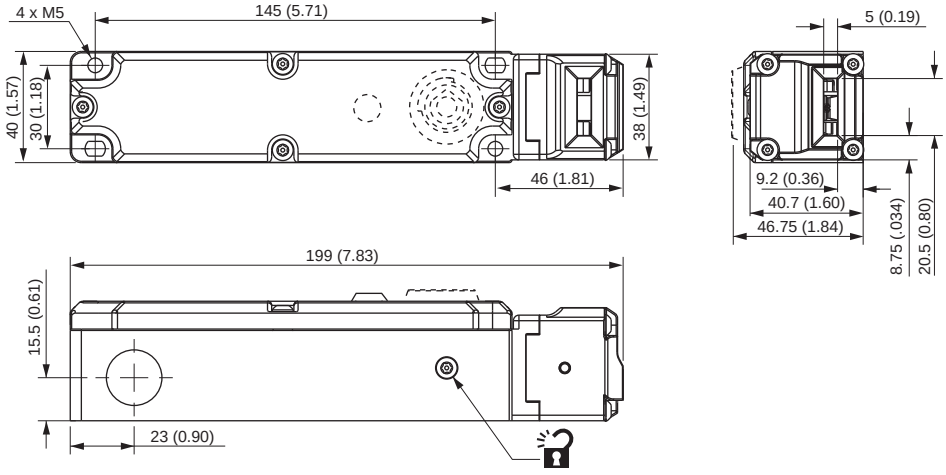
Accessories

Description		Dimensions	Cat. No.
	GD2 standard actuator	3-50	**440G-A27011**
	GD2 flat actuator		**440K-A11112**
	Fully flex actuator		**440G-A27143**
	Sliding bolt actuator		440G-A27163
	Extended flat actuator		**440K-A17116**
	Replacement Cover, No LED, No Override Key	—	440G-MT47120
	Replacement Cover, LED, Override Key		440G-MT47123
	Emergency Override Key (See Warning below.)	—	440G-A36026
	Dust Cover	—	440K-A17180

WARNING: Do not attach the Emergency Override Key to the 440G-MT switch.

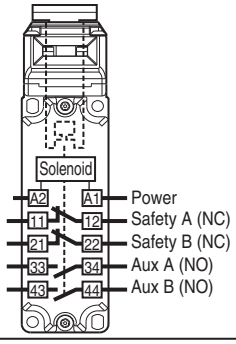
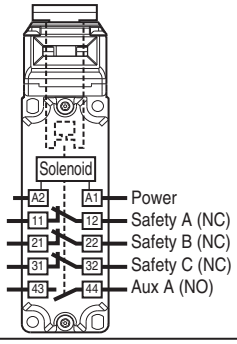
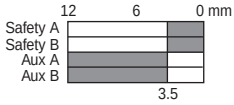
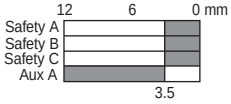
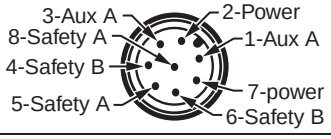
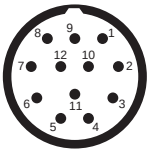
Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.



***Note**: 2D, 3D and electrical drawings are available on www.ab.com.*

Typical Wiring Diagrams

		2 N.C. & 2 N.O.	3 N.C. & 1 N.O.
Contact Configuration			
Contact Action □Open ■Closed		 BBM	 BBM
8-Pin Micro (M12)		—	
12-Pin M23 QD  Pin 11 not connected.	1 and 3	Solenoid Power	Solenoid Power
	4 and 6	Safety A	Safety A
	7 and 8	Safety B	Safety B
	2 and 5	Aux A	Safety C
	9 and 10	Aux B	Aux A
	12	Ground	Ground
8-Pin Cordset 889D-F8AB-∗	Brown Blue	—	Solenoid Power
	Grey Red	—	Safety A
	Yellow Pink	—	Safety B
	White Green	—	Aux A
12-Pin Cordset 889M-F12AH-∗	Brown Grey	Solenoid Power	Solenoid Power
	Pink Yellow	Safety A	Safety A
	White Red/Blue	Safety B	Safety B
	Blue Red	Aux A	Safety C
	Black Violet	Aux B	Aux A
Grey/Pink not connected.	Green	Ground	Ground

∗ Replace symbol with 2 (2 m), 5 (5 m) or 10 (10 m) for standard cable lengths.

Diagnostic Version

Actuator	LED Output Matrix	
	Solenoid Off	Solenoid On
In	Green	Amber
Out	Flashing Red	Red

Diagnostic Electrical Output

Actuator	Voltage
In	0V DC
Out	+24V DC

Electrical output independent of solenoid status. Maximum output is 100 mA.

Guard Locking Switches

TLS-GD2

Description

The TLS-GD2 is a positive mode, tongue operated guard locking interlock switch that locks a machine guard closed until power is isolated and ensures that it remains isolated while the guard is open. It has three safety (N.C.) contacts and two auxiliary (N.O.) contacts. The TLS-GD2 head has two entry slots and it can be rotated to provide four actuator entry points. A blanking plug is provided to seat the unused slot.

The guard may only be opened when a signal is applied to the TLS-GD2's internal solenoid which releases the lock mechanism. This signal can be via CU1 electronic timer relays or CU2 stopped motion detectors. Therefore the TLS-GD2 is ideal for machines which do not stop immediately or where premature interruption of the machine could cause damage to tooling and components or cause an additional hazard.

The TLS-GD2 is available in three types. The TLS-1 GD2 and TLS-3 GD2 incorporate a power-to-release function. Two manual release points with security screws allow the locked TLS-GD2 to be released in emergencies. An optional lid-mounted key-release style can also be supplied. The TLS-2 GD2 has a power-to-lock function. Each type of switch has five sets of contacts of various forms and are suitable for use with PLCs.

The TLS-1 GD2 and TLS-3 GD2 are both available with escape release options. They are intended for machine guarding with full body access. The switch is installed so that the escape release push button on the rear side is accessible from inside the hazardous area. This allows the intentional unlocking of the TLS-GD2 from inside a hazardous area, providing a means of escape for a person who may become trapped.

A stainless-steel actuator guide is fitted to protect the unit from actuator damage due to poor guard alignment or guard wear.

TLS-GD2 has an ingress protection rating of IP69K making it suitable for harsh washdown applications as found in the food and beverage, pharmaceutical, solar and semiconductor industries.

IMPORTANT: With the TLS-2 GD2 “power to lock” style, provisions may be required to ensure that a dangerous situation can not result from open circuit faults or power cuts.

Features

- Power to release or power to lock
- High locking force ≤2000 N (450 lb)
- Five contacts: 2 N.C. & 1 N.O. for door position monitoring 1 N.C. & 1 N.O. or 2 N.C. for lock monitoring
- Rotatable head: 4 possible key entry slots
- Conforms to EN 1088 & EN 60947-5-1
- Escape Release version available
- IP69K, suitable for high pressure, high temperature washdown

Specifications

Safety Ratings					
Standards		EN954-1, ISO13849-1, IEC/EN60204-1, NFPA79, EN1088, ISO14119, IEC/EN60947-5-1, ANSI B11.19, AS4024.1			
Safety Classification		Cat. 1 device per EN 954-1 dual channel interlocks suitable for Cat. 3 or 4 systems			
Functional Safety Data (related to Safety Contacts) ∗ **Note**: For up-to-date information, visit *http://www.ab.com/Safety/*		B10d: > 2 x 10^6 operations at min. load PFH_D: < 3 x10^{-7} MTTFd: > 385 years May be suitable for use in performance levels Ple or Pld systems (according to ISO 13849-1:2006) and for use in SIL2 or SIL3 systems (according to IEC 62061) depending on the architecture and application characteristics			
Certifications		CE Marked for all applicable directives, cULus, TÜV, and CCC			
Outputs					
Safety Contacts ❄		(TLS-1 & -2) 3 N.C. direct opening action (TLS-3) 4 N.C. direct opening action			
Auxiliary Contacts		(TLS-1 & -2) 2 N.O. (1 solenoid monitoring) (TLS-3 1 N.O.)			
Thermal Current I_{th}		10 A			
Rated Insulation Voltage		(Ui) 500V			
Switching Current @ Voltage, Min.		5 mA @ 5V DC			
Utilization Category					
A600/AC-15	(Ue)	600V	500V	240V	120V
	(Ie)	1.2 A	1.4 A	3.0 A	6.0 A
DC-13	(Ue)	24V			
	(Ie)	2 A			
Solenoid Characteristics					
Locking Type		TLS-1 & -3 Power-to-Release TLS-2 Power-to-Lock			
Holding Force, Max.		2000 N (450 lbf)			
Releasable Load, Max.		100 N (22.5 lbf)			
Power Supply		24V AC/DC or 110V AC or 230V AC (solenoid)			
Solenoid Power		Typically 7 W 100% ED			
Escape Release Button		Force max.: 50 N (11.25 lbs)			
Operating Characteristics					
Break Contact Force, Min.		20 N (4.5 lbf)			
Actuation Speed, Max.		160 mm (6.29 in.)/s			
Actuation Frequency, Max.		1 cycle/s			
Operating Radius, Min		160 mm (6.3 in.) [80 mm (3.15 in.) with flexible actuator]			
Operating Life @ 100 mA load		1,000,000 operations			
Environmental					
Enclosure Type Rating		IP66, IP67 and IP69K			
Operating Temperature [C (F)]		-20…+60° (-4…+140°)			
Physical Characteristics					
Housing Material		UL Approved glass-filled PBT			
Actuator Material		Stainless Steel			
Weight [g (lb)]		400 (0.88)			
Color		Red			

∗ Usable for ISO 13849-1:2006 and IEC 62061. Data is based on the B10d value given and:
- Usage rate of 1op/10mins., 24hrs/day, 360 days/year, representing 51840 operations per year
- Mission time/Proof test interval of 38 years

❄ The safety contacts are described as normally closed (N.C.) i.e., with the guard closed, actuator in place (where relevant) and the machine able to be started.

Product Selection

Type	Contacts		Solenoid		Actuator Type	Cat. No.			
						Conduit		Connector§	
	Safety	Auxiliary	Contacts	Voltage		M20	1/2 inch NPT Adaptor	12-Pin M23	8-Pin Micro (M12)♣
TLS-1 GD2 Power to Release	2 N.C.	1 N.O.	1 N.C. & 1 N.O.	24V AC/DC	—	**440G-T27121**	—	440G-T27233	440G-T2NBBPH-1R
					GD2 Standard	440G-T27251	440G-T27169	440G-T27234	—
					Fully Flex	440G-T27252	**440G-T27171**	440G-T27235	—
				110V AC/DC	—	440G-T27124	—	—	—
					GD2 Standard	440G-T27253	440G-T27172	—	—
					Fully Flex	440G-T27254	440G-T27174	—	—
				230V AC/DC	—	440G-T27123	—	—	—
TLS-2 GD2 Power to Lock	2 N.C.	1 N.O.	1 N.C. & 1 N.O.	24V AC/DC	—	**440G-T27127**	—	440G-T27239	440G-T2NBBPH-1L
					GD2 Standard	440G-T27255	440G-T27175	440G-T27240	—
					Fully Flex	440G-T27256	**440G-T27177**	440G-T27241	—
				110V AC/DC	—	440G-T27132	—	—	—
					GD2 Standard	440G-T27257	440G-T27178	—	—
					Fully Flex	440G-T27258	440G-T27180	—	—
				230V AC/DC	—	440G-T27129	—	—	—
TLS-3 GD2 Power to Release	2 N.C.	1 N.O.	2 N.C.	24V AC/DC	—	**440G-T27134**	—	440G-T27245	440G-T2NBBPH-2R
					GD2 Standard	440G-T27259	440G-T27181	440G-T27246	—
					Fully Flex	440G-T27260	440G-T27183	440G-T27247	—
				110V AC/DC	—	440G-T27138	—	—	—
					GD2 Standard	440G-T27261	440G-T27184	—	—
					Fully Flex	440G-T27262	440G-T27186	—	—
				230V AC/DC	—	440G-T27136	—	—	—
TLS-1 GD2 Power to Release with Escape Release	2 N.C.	1 N.O.	1 N.C. & 1 N.O.	24V AC/DC	—	440G-T21BNPM-1B	440G-T21BNPT-1B	440G-T21BNPL-1B	440G-T2NBNPH-1B
					GD2 Standard	440G-T21BGPM-1B	440G-T21BGPT-1B	440G-T21BGPL-1B	—
				110V AC/DC	—	440G-T21BNPM-4B	440G-T21BNPT-4B	—	—
					GD2 Standard	440G-T21BGPM-4B	440G-T21BGPT-4B	—	—
TLS-3 GD2 Power to Release with Escape Release	2 N.C.	1 N.O.	2 N.C.	24V AC/DC	—	440G-T21BNPM-2B	440G-T21BNPT-2B	440G-T21BNPL-2B	440G-T2NBNPH-2B
					GD2 Standard	440G-T21BGPM-2B	440G-T21BGPT-2B	440G-T21BGPL-2B	—
				110V AC/DC	—	440G-T21BNPM-5B	440G-T21BNPT-5B	—	—
					GD2 Standard	440G-T21BGPM-5B	440G-T21BGPT-5B	—	—

§ For connector ratings, see page 3-9.
♣ With an 8-pin micro connector, not all contacts are connected. See page 3-45 for wiring details.

WARNING:

To monitor **independently** the safety contact(s) and the solenoid feedback (TLS 1, 2 and 3):

- The 12-wire cordset 889M-F12AH-∗ must be used

AND

- For the TLS1 and TLS2: the jumper between 12 and 41 must be removed
- For the TLS3: the jumpers between 12 and 41 and 22 and 51 must be removed

WARNING:

Monitoring of safety contact(s) and the solenoid feedback (in series) is available, when jumpers are in place:

AND

- For the TLS1 and TLS2: by using pins 4 and 6 on the 12-pin, M23 receptacle or Pink and Yellow wires on the 12-wire cordset (889M-F12AH-∗)
- For the TLS3: by using pins 4 and 6 and pins 7 and 8 on the 12-pin, M23 receptacle or Pink and Yellow and White and Red/Blue wires on the 12-wire cordset (889M-F12AH-∗)

∗ Replace symbol with 2 (2 m), 5 (5 m), or 10 (10 m) for standard cable lengths.

Recommended Logic Interfaces

Description	Safety Outputs	Auxiliary Outputs	Time Delay	Terminals	Reset Type	Power Supply	Cat. Page No.	Cat. No.
Single-Function Safety Relays								
MSR127RP	3 N.O.	1 N.C.	—	Removable (Screw)	Monitored Manual	24V AC/DC	5-26	**440R-N23135**
MSR127TP	3 N.O.	1 N.C.	—	Removable (Screw)	Auto./Manual	24V AC/DC	5-26	**440R-N23132**
MSR126T	2 N.O.	None	—	Fixed	Auto./Manual	24V AC/DC	5-24	**440R-N23117**
MSR30RT	2 N.O. Solid State	1 N.O. Solid State	—	Removable	Auto./Manual or Monitored Manual	24V DC	5-16	440R-N23198
Specialty Safety Relays								
MSR178	3 N.O.	2 N.C.	0.5 s…30 min	Removable	Automatic	24V AC/DC, 115V AC or 230V AC	5-40	440R-M23227
CU2	2 N.O.	1 N.C.	0.1 s…40 min	Fixed	—	24V AC/DC	5-56	440R-S07281
CU3	2 N.O.	1 N.C.	—	Fixed	Automatic/Manual	110V AC	5-64	440R-S35002
Modular Safety Relays								
MSR210P Base 2 N.C. only	2 N.O.	1 N.C. and 2 PNP Solid State	—	Removable	Auto./Manual or Monitored Manual	24V DC from the base unit	5-82	440R-H23176
MSR220P Input Module	—	—	—	Removable	—	24V DC	5-86	440R-H23178
MSR310P Base	MSR300 Series Output Modules	3 PNP Solid State	—	Removable	Auto./Manual Monitored Manual	24V DC	5-102	440R-W23219
MSR320P Input Module	—	2 PNP Solid State	—	Removable	—	24V DC from the base unit	5-106	440R-W23218

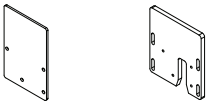
Note: For additional Safety Relays connectivity, see page 5-12.
For additional Safety I/O and Safety PLC connectivity, see page 5-116.
For application and wiring diagrams, see page 10-1.

Connection Systems

Description	8-Pin Micro (M12)	12-Wire, 12-Pin M23	9-Wire, 12-Pin M23§
Cordset	889D-F8AB-∗	889M-F12AH-∗	889M-FX9AE-∗
Patchcord	889D-F8ABDM-❄	889M-F12AHMU-‡	—

∗ Replace symbol with 2 (2 m), 5 (5 m), or 10 (10 m) for standard cable lengths.
❄ Replace symbol with 1 (1 m), 2 (2 m), 3 (3 m), 5 (5 m), or 10 (10 m) for standard cable lengths.
‡ Replace symbol with 0M3, (0.3 m), 0M6 (0.6 m), 1 (1 m), 2 (2 m) or 3 (3 m) for standard lengths.
§ The 9-wire cordset can be used only with the TLS3 versions.
Note: For additional information, see page 7-1.

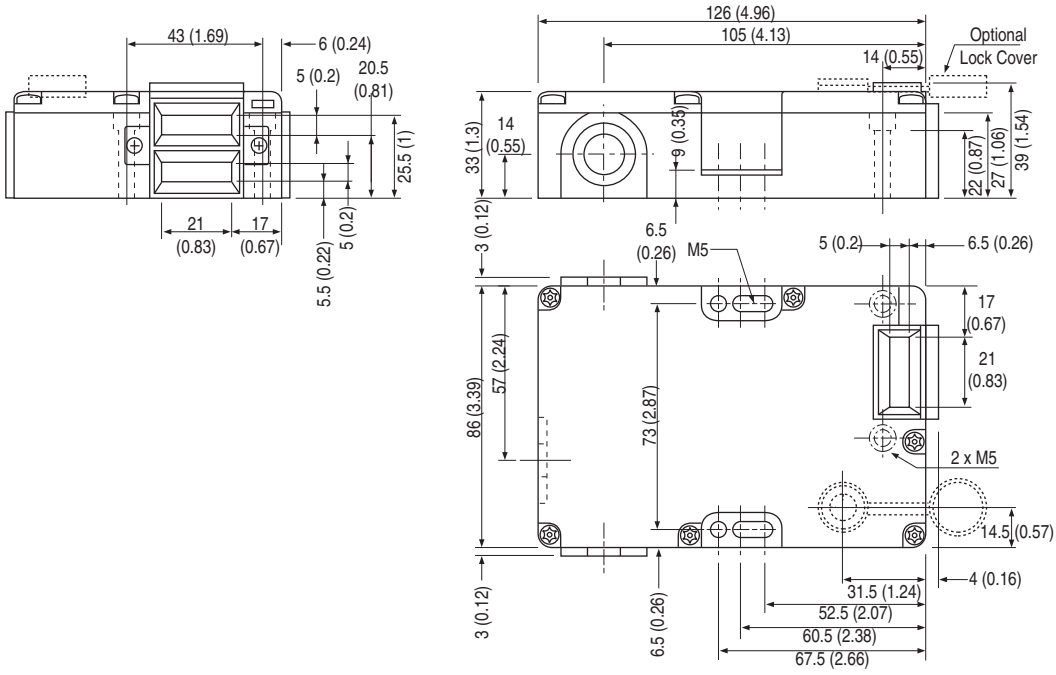
Accessories

	Description	Dimensions	Cat. No.
	GD2 standard actuator	3-50	**440G-A27011**
	GD2 flat actuator	3-51	**440K-A11112**
	Extended flat actuator	3-51	**440K-A17116**
	Fully flex actuator	3-50	**440G-A27143**
	Sliding bolt actuator not to be used with the Escape Release	3-55	440G-A27163
	Cover for TLS-1 with external override key for series D and earlier	—	440G-A27140
	Cover for TLS-3 with external override key for series D and earlier		440G-A27142
	Cover for TLS-1 with override key attached for series D and earlier		440G-A27207
	Cover for TLS-3 with override key attached for series D and earlier		440G-A27208
	Cover for TLS-1 with external override key for series E and later		440G-A27371
	Cover for TLS-3 with external override key for series E and later		440G-A27372
	Cover for TLS-1 with override key attached for series E and later		440G-A27373
	Cover for TLS-3 with override key attached for series E and later		440G-A27374
	Emergency Override Key (See Warning below.)	—	440G-A36026
	Flexible Release—1 m (3.28 ft) Cable	3-54	440G-A27356
	Flexible Release—3 m (9.84 ft) Cable		440G-A27357
	Dust Cover	—	440K-A17183
	Sliding Bolt	3-55	440K-AMDS
	Mounting Plate	3-55	440K-AMDSSMPB

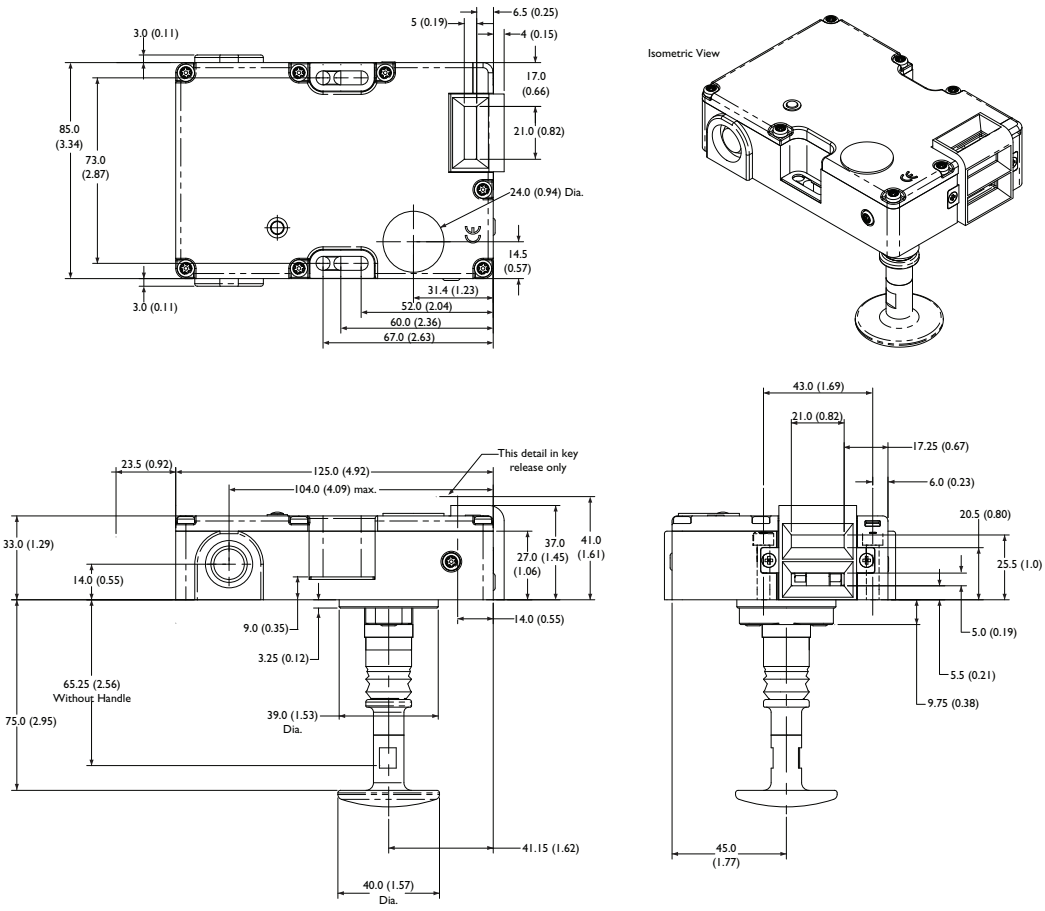
WARNING: Do not attach the Emergency Override Key to the TLS-GD2 switch.

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.

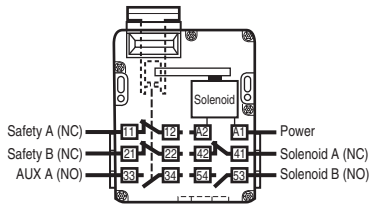
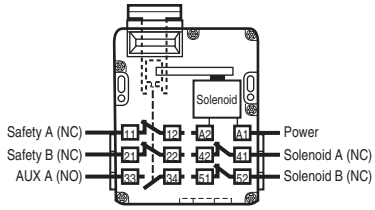
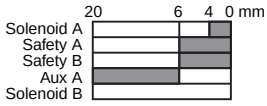
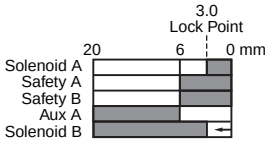
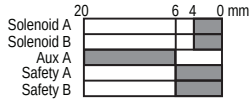
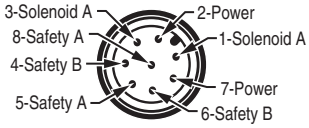
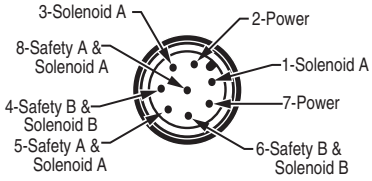


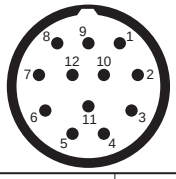
TLS-GD2 Escape Release



***Note**: 2D, 3D and electrical drawings are available on www.ab.com.*

Typical Wiring Diagrams

Red Switches	TLS1	TLS2	TLS3
Contact Configuration	 Jumper between 12 & 41		 Jumper between 12 & 41 and 22 & 51
Contact Action □Open ■Closed	 BBM	 BBM	 BBM
8-Pin Micro (M12)	 No jumper on 12-41.		 Jumper on 12-41 and 22-51.

12-Pin M23	1 and 3	Solenoid Power	1 and 3	Solenoid Power
	4 and 12	Safety A ❖	4 and 12	Safety A ❖
	7 and 8	Safety B	7 and 5	Safety B ❖
	9 and 10	Aux A	9 and 10	Aux A
	6 and 11	Solenoid A ❖	6 and 11	Solenoid A ❖
	2 and 5	Solenoid B	2 and 8	Solenoid B ❖

8-Pin Cordset 889D-F8AB-∗			
	Brown Blue	Solenoid Power	Solenoid Power
	Grey Red	Safety A	Safety A & Solenoid A
	Yellow Pink	Safety B	Safety B & Solenoid B
	White Green	Solenoid A	Solenoid A

12-Pin, 9-Wire Cordset 889M-FX9AE-∗ Pink/Yellow: Not connected				
	Can not be used.		Brown Blue	Solenoid Power
			White Green	Safety A & Solenoid A
			Yellow Grey	Safety B & Solenoid B
			Pink Red	Aux A

12-Pin, 12-Wire Cordset 889M-F12AH-∗				
	Brown Grey	Solenoid Power	Brown Grey	Solenoid Power
	Pink Green	Safety A ❖	Pink Green	Safety A ❖
	White Red/Blue	Safety B	White Red	Safety B ❖
	Black Violet	Aux A	Black Violet	Aux A
	Grey/Pink Yellow	Solenoid A ❖	Grey/Pink Yellow	Solenoid A ❖
	Blue Red	Solenoid B	Blue Red/Blue	Solenoid B ❖

∗ Replace symbol with 2 (2 m), 5 (5 m) or 10 (10 m) for standard cable lengths.
❖ See **WARNING** notes on page 3-41.

Guard Locking Switches

Atlas™ 5

Description

The Atlas 5 is a positive-mode, tongue-operated guard-locking interlock switch that locks a machine guard closed until power is isolated to ensure that it remains isolated while the guard is open. A heavy-duty switch, the Atlas 5 locking mechanism is designed to withstand forces up to 5000 N (1124 lb) and the die-cast alloy housing is ideal for use in harsh environments. A unique feature of the Atlas 5 is a patented self-aligning head that tolerates actuator or guard misalignment, making it particularly useful for heavy machine guards.

The Atlas 5 is designed for machines that do not stop immediately or where premature interruption of the machine could cause damage to tooling and components or cause an additional hazard. With 2 safety (N.C.) contacts and 2 auxiliary (N.O.) contact, Atlas 5 is ideal for PLC controlled machines.

Features

- Mechanical lock
- High locking force—5000 N (1124 lb)
- Heavy duty die-cast alloy housing ideal for harsh environments
- Patented self-aligning head tolerates actuator misalignment

Specifications

Safety Ratings			
Standards		EN954-1, ISO13849-1, IEC/EN60204-1, NFPA79, EN1088, ISO14119, IEC/EN60947-5-1, ANSI B11.19, AS4024.1	
Safety Classification		Cat. 1 Device per EN954-1 Dual channel interlocks suitable for Cat. 3 or 4 systems	
Functional Safety Data (related to Safety Contacts) ∗ **Note**: For up-to-date information, visit *http://www.ab.com/Safety/*		B10d: > 2 x 10^6 operations at min. load PFH_D: < 3 x10^{-7} MTTFd: > 385 years May be suitable for use in performance levels Ple or Pld systems (according to ISO 13849-1:2006) and for use in SIL2 or SIL3 systems (according to IEC 62061) depending on the architecture and application characteristics	
Certifications		CE Marked for all applicable directives, cULus, CSA, and TÜV	
Outputs			
Safety Contacts ❄		Atlas 5: 2 N.C. direct opening action; 1 N.O. direct opening action Atlas 5 trapped key (left hand): 2 N.C. direct opening action; 1 N.O. direct opening action	
Auxiliary Contacts		1 N.O.	
Thermal Current I_{Ith}		10 A	
Rated Insulation Voltage		(Ui) 500V	
Switching Current @ Voltage, Min.		5 mA @ 5V DC	
Utilization Category			
AC-15	(Ue)	240V	120V
	(Ie)	1.5 A	3 A
DC-13	(Ue)	24V	
	(Ie)	2 A	
Solenoid Characteristics			
Locking Type		Power to Release	
Holding Force, Max.		5000 N (1124 lbf)	
Power Supply		24V AC/DC or 110V AC or 230V AC (solenoid)	
Solenoid Power		13 W typical 100% ED	
Operating Characteristics			
Break Contact Force, Min.		12 N (2.7 lbf)	
Actuation Speed, Max.∗		160 mm (6.29 in.)/s	
Actuation Frequency, Max.		2 cycles/s	
Operating Radius, Min		300 mm end entry, 800 mm entry front	
Operating Life @ 100 mA load		1,000,000 operations	
Environmental			
Enclosure Type Rating		IP65	
Operating Temperature [C (F)]		-10…+60° (+14…+140°)	
Physical Characteristics			
Housing Material		Die-cast alloy	
Actuator Material		Stainless Steel	
Weight [g (lb)]		1200 (2.65)	
Color		Red	

∗ Usable for ISO 13849-1:2006 and IEC 62061. Data is based on the B10d value given and:
- Usage rate of 1op/10mins., 24hrs/day, 360 days/year, representing 51840 operations per year
- Mission time/Proof test interval of 38 years

❄ The safety contacts are described as normally closed (N.C.) i.e., with the guard closed, actuator in place (where relevant) and the machine able to be started.

Product Selection

Module Type	Actuator Type	Contact		Solenoid Contacts	Solenoid Voltage	Cat. No.			
						M20 Conduit		Connector§	
		Safety	Auxiliary			M20	1/2 inch NPT Adaptor	12-Pin M23	8-Pin Micro (M12)♣
Standard	Standard	2 N.C.	1 N.O.	2 N.C. & 1 N.O.	24V AC/DC	440G-L07264	440G-L07258	440G-L07298	440G-L2NNSDH-3N
					110V AC/DC	440G-L07263	440G-L07257	—	—
					230V AC/DC	440G-L07262	440G-L07256	—	—
LH Key Lock					24V AC/DC	440G-L07255	440G-L07249	440G-L07301	440G-L2NNSDH-38
					110V AC/DC	440G-L07254	440G-L07248	—	—
					230V AC/DC	440G-L07253	440G-L07247	—	—

§ For connector ratings, see 3-9.
♣ With an 8-pin micro connector, not all contacts are connected. See page 3-49 for wiring details.

Recommended Logic Interfaces

Description	Safety Outputs	Auxiliary Outputs	Time Delay	Terminals	Reset Type	Power Supply	Cat. Page No.	Cat. No.
Single-Function Safety Relays								
MSR127RP	3 N.O.	1 N.C.	—	Removable (Screw)	Monitored Manual	24V AC/DC	5-26	**440R-N23135**
MSR127TP	3 N.O.	1 N.C.	—	Removable (Screw)	Auto./Manual	24V AC/DC	5-26	**440R-N23132**
MSR126T	2 N.O.	None	—	Fixed	Auto./Manual	24V AC/DC	5-24	**440R-N23117**
MSR30RT	2 N.O. Solid State	1 N.O. Solid State	—	Removable	Auto./Manual or Monitored Manual	24V DC	5-16	440R-N23198
Specialty Safety Relays								
MSR178	3 N.O.	2 N.C.	0.5 s…30 min	Removable	Automatic	24V AC/DC, 115V AC or 230V AC	5-40	440R-M23227
CU2	2 N.O.	1 N.C.	0.1 s…40 min	Fixed	—	24V AC/DC	5-56	440R-S07281
CU3	2 N.O.	1 N.C.	—	Fixed	Automatic/Manual	110V AC	5-64	440R-S35002
Modular Safety Relays								
MSR210P Base 2 N.C. only	2 N.O.	1 N.C. and 2 PNP Solid State	—	Removable	Auto./Manual or Monitored Manual	24V DC from the base unit	5-82	440R-H23176
MSR220P Input Module	—	—	—	Removable	—	24V DC	5-86	440R-H23178
MSR310P Base	MSR300 Series Output Modules	3 PNP Solid State	—	Removable	Auto./Manual Monitored Manual	24V DC	5-102	440R-W23219
MSR320P Input Module	—	2 PNP Solid State	—	Removable	—	24V DC from the base unit	5-106	440R-W23218

Note: For additional Safety Relays connectivity, see page 5-12.
For additional Safety I/O and Safety PLC connectivity, see page 5-116.
For application and wiring diagrams, see page 10-1.

Connection Systems

Description	8-Pin Micro (M12)	12-Pin M23
Cordset	889D-F8AB-∗	889M-F12AH-∗
Patchcord	889D-F8ABDM-❄	889M-F12AHMU-‡

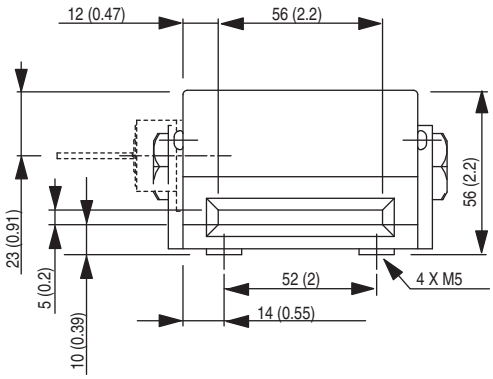
∗ Replace symbol with 2 (2 m), 5 (5 m), or 10 (10 m) for standard cable lengths.
❄ Replace symbol with 1 (1 m), 2 (2 m), 3 (3 m), 5 (5 m), or 10 (10 m) for standard cable lengths.
‡ Replace symbol with 0M3, (0.3 m), 0M6 (0.6 m), 1 (1 m), 2 (2 m) or 3 (3 m) for standard lengths.
Note: For additional information, see page 7-1.

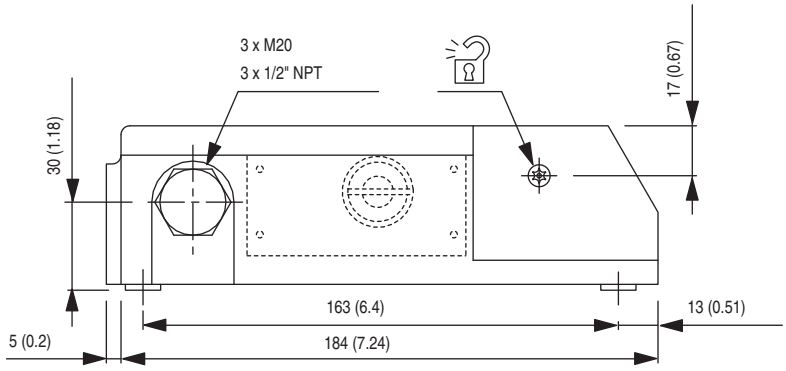
Accessories

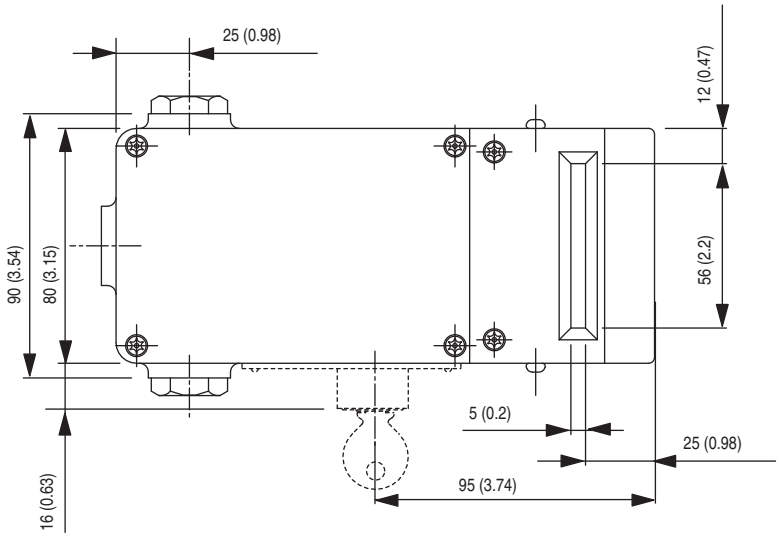
Description		Dimensions	Cat. No.
	Standard actuator	3-50	440G-A07136
	Atlas Replacement End Cap	—	440G-A07180
	Fully flex actuator	3-50	440G-A07269
	Dust Cover	—	440K-A17181

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.

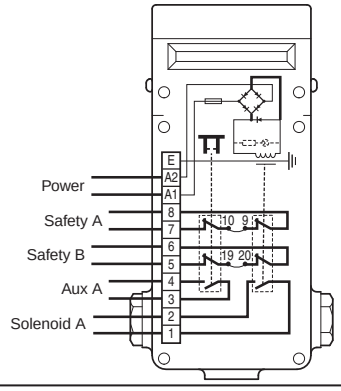
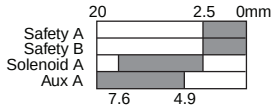
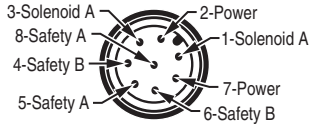
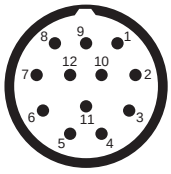






***Note**: 2D, 3D and electrical drawings are available on www.ab.com.*

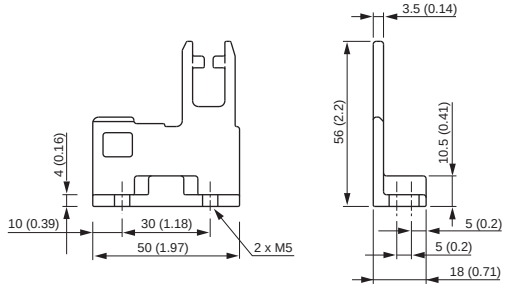
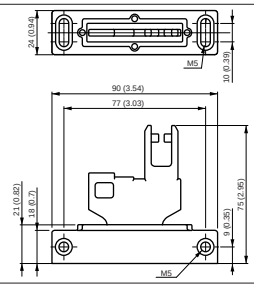
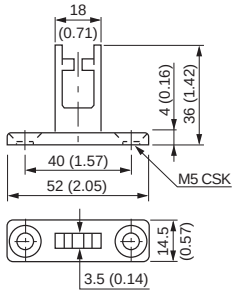
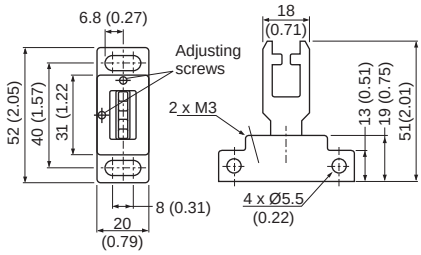
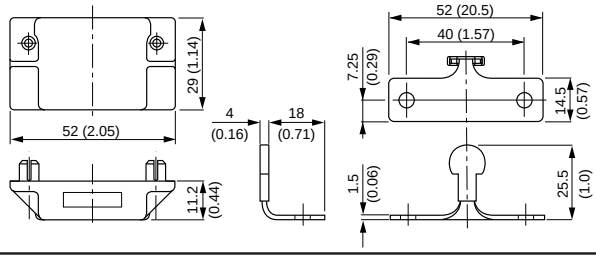
Typical Wiring Diagrams

		Atlas 5
Contact Configuration		
Contact Action □Open ■Closed		 BBM
8-Pin Micro (M12)		 Jumpers on 9-10 and 19-20.
12-Pin M23  Pin 11 not connected.	1 and 3	Solenoid Power
	4 and 6	Safety A
	7 and 8	Safety B
	2 and 5	Aux A
	9 and 10	Solenoid A
	12	Ground
8-Pin Cordset 889D-F8AB-∗	Brown Blue	Solenoid Power
	Grey Red	Safety A
	Yellow Pink	Safety B
	White Green	Solenoid A
12-Pin Cordset 889M-F12AH-∗	Brown Grey	Solenoid Power
	Pink Yellow	Safety A
	White Red/Blue	Safety B
	Blue Red	Aux A
	Black Violet	Solenoid A
	Green	Ground

∗ Replace symbol with 2 (2 m), 5 (5 m) or 10 (10 m) for standard cable lengths.

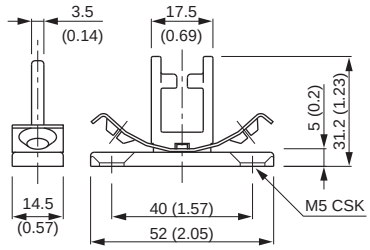
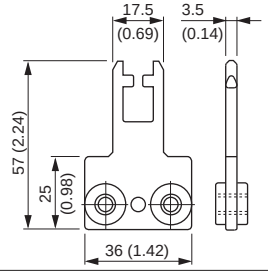
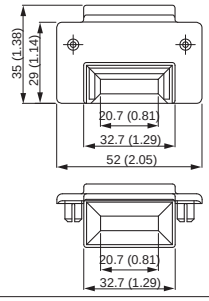
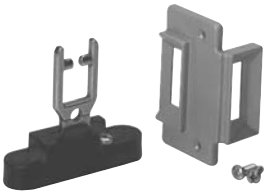
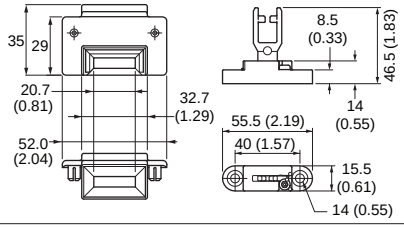
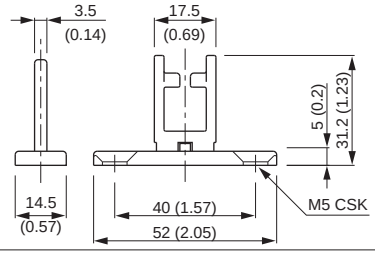
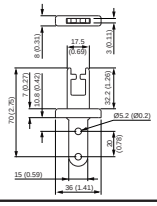
Accessories for Interlock and Guard Locking Switches

Actuators*

Item	Description	Approximate Dimensions [mm (in.)]	Cat. No.
	Standard actuator		440G-A07136
	Fully flex actuator		440G-A07269
	GD2 standard actuator		**440G-A27011**
	Fully flex actuator		**440G-A27143**
	Catch and Retainer Kit		440K-A11094

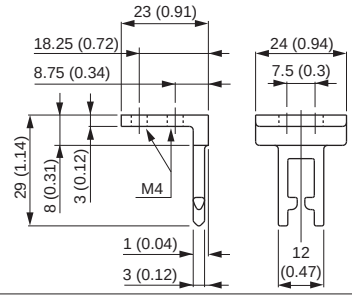
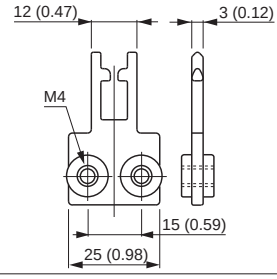
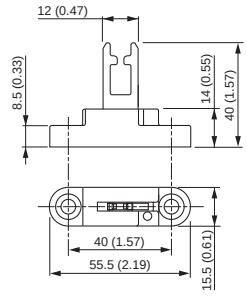
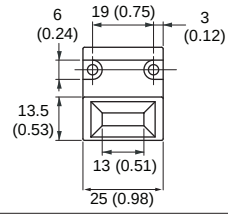
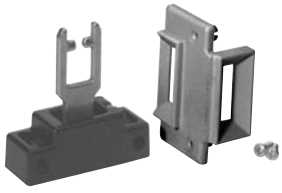
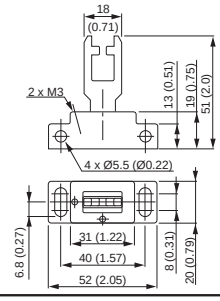
* See page 3-8 for Switch Compatibility table.

Actuators* (continued)

Item	Description	Approximate Dimensions [mm (in.)]	Cat. No.
	Standard actuator		**440K-A11095**
	GD2 flat actuator		**440K-A11112**
	Replacement Alignment Guide		440K-A11115
	Alignment guide with semi-flexible actuator		440K-A11144
	Standard actuator		440K-A11238
	Extended flat actuator		**440K-A17116**

* See page 3-8 for Switch Compatibility table.

Actuators* (continued)

Item	Description	Approximate Dimensions [mm (in.)]	Cat. No.
	90° actuator, not to be used with metal alignment guide		**440K-A21006**
	Flat actuator, not to be used with metal alignment guide		**440K-A21014**
	Metal alignment guide with semi-flexible actuator		440K-A21030
	Metal Alignment Guide		440K-A21069
	Alignment guide with fully-flexible actuator		440K-A27010

* See page 3-8 for Switch Compatibility table.

Beacons and Bulbs

Item	Description	Cat. No.
	Indicator, M20 Conduit Pilot Light—Amber Lens T-3 1/4 Insert Use T-3 1/4 Bulb (Sold Separately)	440A-A19001
	Indicator, M20 Conduit Pilot Light—Red Lens T-3 1/4 Insert Use T-3 1/4 Bulb (Sold Separately)	440A-A19002
	Indicator, 1/2 inch NPT Conduit Pilot Light—Amber Lens T-3 1/4 Insert Use T-3 1/4 Bulb (Sold Separately)	440A-A19005
	Indicator, 1/2 inch NPT Conduit Pilot Light—Red Lens T-3 1/4 Insert Use T-3 1/4 Bulb (Sold Separately)	440A-A19007
	Bulb, 24V for Conduit Pilot Light 2.8W T-3 1/4 Bulb, Miniature Screw Base	440A-A09056
	Bulb, 110V for Conduit Pilot Light 2.6W T-3 1/4 Bulb, Miniature Screw Base	440A-A09055
	Bulb, 240V for Conduit Pilot Light 0.75W T-3 1/4 Bulb, Miniature Screw Base	440A-A09054
	Red LED Bulb, 24V AC/DC for Conduit Pilot Light Bayonet Style Insert	800T-N319R
	Amber LED Bulb, 24V AC/DC for Conduit Pilot Light Bayonet Style Insert	800T-N319A
	Red LED Bulb, 120V AC for Conduit Pilot Light Bayonet Style Insert	800T-N320R
	Amber LED Bulb, 120V AC for Conduit Pilot Light Bayonet Style Insert	800T-N320A

Conduit Accessories

Item	Description	Cat. No.
	Blanking plug, M20 conduit	440A-A07265
	Cable Grip, M16 Conduit, Accommodates Cable Diameter 4…7 mm (0.27…0.16 in.)	440A-A09004
	Cable grip, M20 conduit, accommodates cable diameter 7…10.5 mm (0.27…0.41 in.)	440A-A09028
	Adaptor, conduit, M20 to 1/2 inch NPT, plastic	440A-A09042
	Adaptor, Conduit, 1/2 inch NPT to M16, Brass	440A-A09093
	Adaptor, Conduit, M16 to 1/2 inch NPT, Brass	440A-A09094

Accessories

Replacement and Dust Covers, Emergency Override, and Flex Release

Replacement Covers

Item	Description	Cat. No.
	Elf™	440A-A33085
	Cadet™	440A-A21115
	Trojan T15	440A-A11499
	Trojan 5 Standard Models Only	440A-A11495
	Trojan T5 GD2	440A-A11496
	Trojan T6 Standard Models Only	440A-A11497
	Trojan T6 GD2	440A-A11498
	440G-MT No LED, No Override	440G-MT47120
	440G-MT LED and Override	440G-MT47123
	Cover for TLS-1 with external override key for series D and earlier	440G-A27140
	Cover for TLS-3 with external override key for series D and earlier	440G-A27142
	Cover for TLS-1 with override key attached for series D and earlier	440G-A27207
	Cover for TLS-3 with override key attached for series D and earlier	440G-A27208
	Atlas Replacement End Cap	440G-A07180

Dust Covers

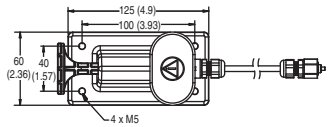
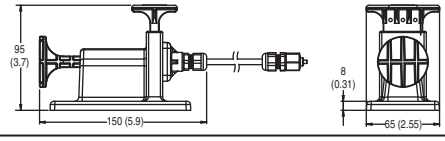
Item	Applicable Switch	Cat. No.
	Elf Cadet	440K-A17182
	Trojan T15, T5, and T6 All Models MT G2 440G-MT	440K-A17180
	TLS-GD2	440K-A17183
	Atlas 5	440K-A17181

Emergency Override

Item	Description	Cat. No.
	TLS-GD2/440G-MT Solenoid Emergency Override (See Warning below.)	440G-A36026

	WARNING: Do not attach the Emergency Override Key to the TLS-GD2/440G-MT switch.

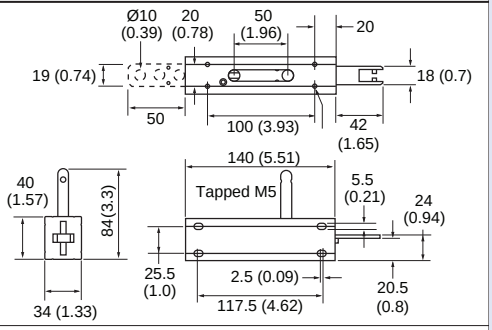
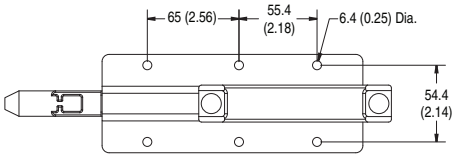
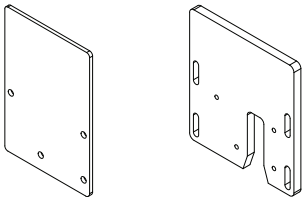
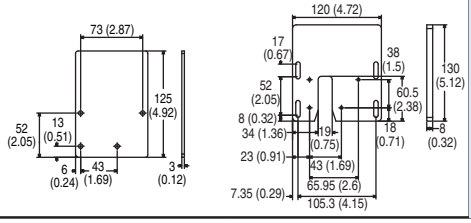
Flex Release

Item	Description	Approximate Dimensions [mm (in.)]	Cat. No.
	Flexible Release—1 m (3.28 ft) Cable		440G-A27356
	Flexible Release—3 m (9.84 ft) Cable		440G-A27357

Tools

Item	Description	Cat. No.
	Security Bit	440A-A09015
	Screwdriver Including Security Bit	440A-A09018

Door Handles

Item	Description	Dimensions [mm (in.)]	Cat. No.
	Sliding bolt actuator		440G-A27163
	Sliding Bolt		440K-AMDS
	Sliding Bolt Mounting Plate for TLS-GD2		440K-AMDSSMPB