Cable Pull Switches
Lifeline™ 4

Description

The Lifeline 4 cable/push button operated system can be installed along or around awkward machinery such as conveyors and provide a constant emergency stop access.

The Lifeline 4 is the only device of its kind to incorporate the following features in one unit making it the most versatile cable switch on the market.

1. The positive mode mechanism helps ensure that the contacts are immediately latched open on actuation and can only be reset by the intentional action of turning the blue reset knob. The design also protects against nuisance tripping and the effects of thermal expansion.
2. A mushroom head emergency stop button is included on the unit to provide E-Stop access even at the extreme ends of the span.
3. The cable status indicator makes the system easy to set up and maintain for spans up to 125 meters.
4. Four sets of contacts are provided: 2 N.C. + 2 N.O. or 3 N.O. + 1 N.O. contacts
5. Sealed to IP66 with rugged construction using die-cast alloy and stainless steel to withstand harsh conditions.

Features

- Switches up to 125 meter span
- Universal mounting and operation
- Lid mounted emergency stop button, designed to conform to ISO 850
- Switch lockout on cable pulled and cable slack
- Cable status indicator on switch lid

Lid mounted E-Stop button

A mushroom head emergency stop button is included on the unit to provide total E-Stop access even at the extreme ends of the span.

Cable status indicator on lid

The cable status indicator makes the system easy to setup and maintain for spans up to 125 meters.

Specifications

Safety Ratings

Standards	ISO 13850, EN ISO 12100, IEC 60947-5-1, IEC 60947-5-5
Safety Classification	Cat. 1 device per EN 954-1 May be suitable for use in Cat 3 or Cat 4 systems depending on the architecture and application characteristics
Functional Safety Data * **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 ❄	2 N.C. direct-opening action	3 N.C. direct-opening action
Auxiliary Contacts	2 N.O. direct-opening action	1 N.O. direct-opening action
Thermal Current I_{lth}	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			

Operating Characteristics

Cable Span Between Switches, Max.	75 m (246 ft) standard model and 75…125 m (146…410 ft) extended length model
Tensioning Force to Run Position	103 N (23.16 lbf) typical
Tensioning Force to Lockout	188 N (42.3 lbf) typical
Operating Force, Min.	<125 N (28.1 lbf) at 300 mm deflection
Actuation Frequency, Max.	1 cycle/s
Operating Life @ 100 mA load	1 x 10^6

Environmental

Enclosure Type Rating	IP66
Operating Temperature [C (F)]	-25…80° (-13…176°)

Physical Characteristics

Housing Material	Heavy-duty painted zinc-based die-cast alloy (LM24)
Indicator Material	Glass-filled nylon
Eye Nut Material	Stainless steel
Weight [g (lb)]	630 (1.38)
Color	Yellow body, blue reset button

* 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.

Note: It is recommended that the LRTS (Lifeline Rope Tensioning System) should be used with the Lifeline 4 cable rope switch.

Allen-Bradley
Guardmaster®

Product Selection

Cable Span	Safety Contacts	Auxiliary Contacts	Cat. No.				
			Conduits		Connectors✳		
			M20	1/2 inch NPT	12-Pin M23	8-Pin Micro❈	Connect to ArmorBlock Guard I/O 5-Pin Micro (M12)‡
75 m (246 ft)	2 N.C.	2 N.O.	**440E-L13137**	**440E-L13133**	440E-L13140	440E-L21BNYH	440E-L2NNNYS
	3 N.C.	1 N.O.	**440E-L13042**	**440E-L13043**	440E-L13141	—	—
75…125 m (146…410 ft)	2 N.C.	2 N.O.	440E-L13153	440E-L13155	440E-L13163	440E-L21BTYH	—
	3 N.C.	1 N.O.	440E-L13150	440E-L13152	440E-L13164	—	—

✳ For connector ratings, see page 3-9.
❈ For connection to ArmorBlock Guard I/O. With a 5-pin micro (M12) connector, not all contacts are connected. See page 4-15 for wiring details.
‡ With an 8-pin micro (M12) connector, not all contacts are connected. See page 4-15 for wiring details.

Recommended Logic Interfaces

Description	Safety Outputs	Auxiliary Outputs	Terminals	Reset Type	Power Supply	Cat. Page No.	Cat. No.
Single-Function Safety Relays for 2 N.C. Contact Switch							
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
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 5-4.
    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	5-Pin Micro (M12)	8-Pin Micro (M12)	12-Pin M23
Cordset	—	889D-F8AB-§	889M-FX9AE-§
Patchcord	889D-F5ACDM-✳	889D-F8ABDM-♣	889M-F12AHMU-➤

✳ Replace symbol with 0M3 (0.3 m), 1 (1 m), 2 (2 m), 3 (3 m), 5 (5 m), or 10 (10 m) for standard lengths.
§ 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 length.

4-Emergency Stop Devices

Allen-Bradley
Guardmaster®

Accessories

Description		Cat. No.
	Lifeline P. bolt	**440E-A17003**
	Lifeline tensioner spring	**440E-A13078**
	Replacement cover for Lifeline 4 cable/push button	440E-A13054
	Replacement cover for Lifeline 4 cable/push button, no E-Stop	440E-A17115
	Lifeline inside corner pulley	**440A-A17101**
	Lifeline outside corner pulley	440A-A17102
	Mounting bracket for Lifeline 4 cable/push button	440E-A17130
	Blanking plug, M20 conduit	440A-A07265
	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
	Screwdriver including security bit	440A-A09018

4-Emergency Stop Devices

4-12

Visit our website: www.ab.com/catalogs
Publication S117-CA001A-EN-P
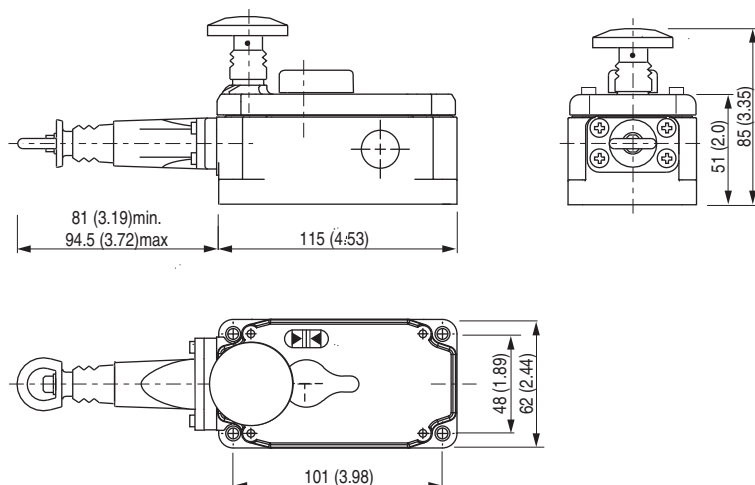
Allen-Bradley
Guardmaster®

Accessories (continued)

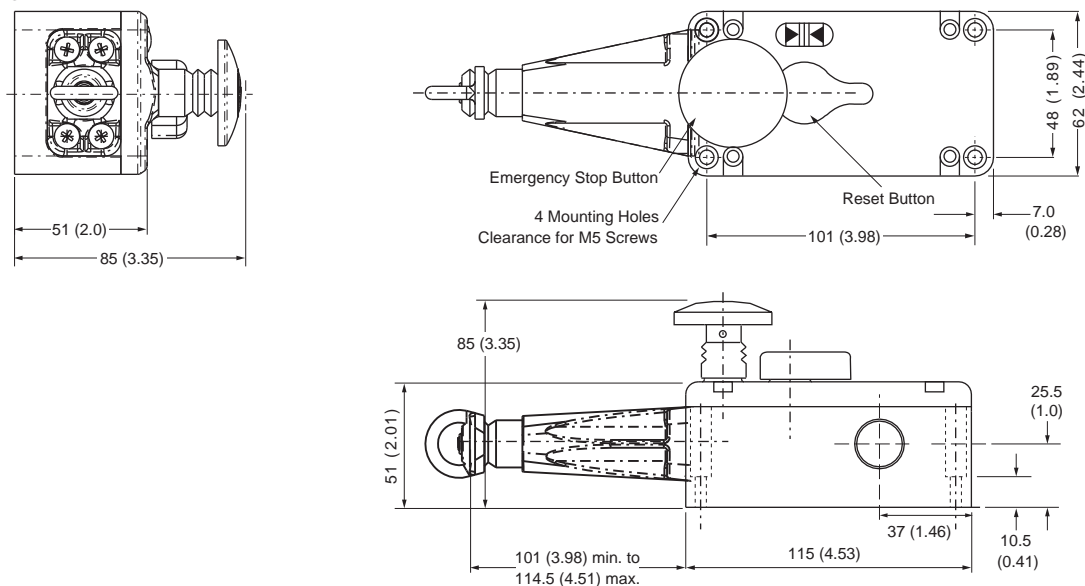| Description	Cat. No.
Indicator, M20 Conduit Pilot Light—Amber Lens T-3 1/4 Insert Use T-3 1/4 Bulb (Sold Separately)	440A-A19001
Indicator, 1/2in NPT Conduit Pilot Light—Amber Lens T-3 1/4 Insert Use T-3 1/4 Bulb (Sold Separately)	440A-A19005
Indicator, M20 Conduit Pilot Light—Amber Lens Bayonet Style Insert Use LED Bulb (Sold Separately)	440A-A17124
Indicator, 1/2in NPT Conduit Pilot Light—Amber Lens Bayonet Style Insert Use LED Bulb (Sold Separately)	440A-A17122
Indicator, M20 Conduit Pilot Light—Red Lens T-3 1/4 Insert Use T-3 1/4 Bulb (Sold Separately)	440A-A19002
Indicator, 1/2in NPT Conduit Pilot Light—Red Lens T-3 1/4 Insert Use T-3 1/4 Bulb (Sold Separately)	440A-A19007
Indicator, M20 Conduit Pilot Light—Red Lens Bayonet Style Insert Use LED Bulb (Sold Separately)	440A-A17125
Indicator, 1/2in NPT Conduit Pilot Light—Red Lens Bayonet Style Insert Use LED Bulb (Sold Separately)	440A-A17123
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

4-Emergency Stop Devices

Approximate Dimensions

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

Standard Model

81 (3.19)min.
94.5 (3.72)max
115 (4.53)
51 (2.0)
85 (3.35)
48 (1.89)
62 (2.44)
101 (3.98)
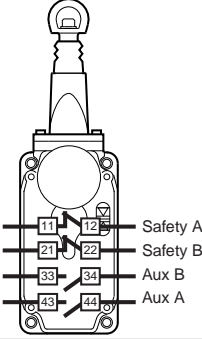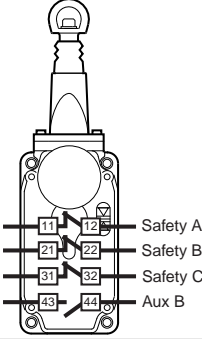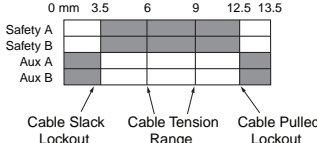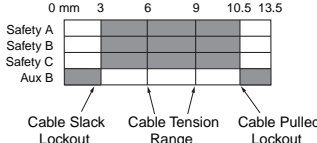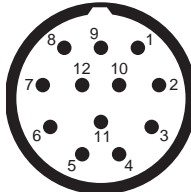
Extended Length Models (75…125 m cable span)

51 (2.0)
85 (3.35)
48 (1.89)
62 (2.44)
7.0 (0.28)
101 (3.98)

Emergency Stop Button

4 Mounting Holes
Clearance for M5 Screws

Reset Button

85 (3.35)
51 (2.01)
25.5 (1.0)
37 (1.46)
10.5 (0.41)
115 (4.53)
101 (3.98) min. to 114.5 (4.51) max.

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

4-Emergency Stop Devices

4-14

Visit our website: www.ab.com/catalogs

Publication S117-CA001A-EN-P

Allen-Bradley
Guardmaster®

Typical Wiring Diagrams

Description		2 N.C. & 2 N.O.	3 N.C. & 1 N.O.
Contact Configuration		11 12 — Safety A 21 22 — Safety B 33 34 — Aux B 43 44 — Aux A	11 12 — Safety A 21 22 — Safety B 31 32 — Safety C 43 44 — Aux B
Contact Action □Open ■Closed		0 mm 3.5 6 9 12.5 13.5 Safety A Safety B Aux A Aux B Cable Slack Lockout Cable Tension Range Cable Pulled Lockout	0 mm 3 6 9 10.5 13.5 Safety A Safety B Safety C Aux B Cable Slack Lockout Cable Tension Range Cable Pulled Lockout
8-Pin Micro (M12)		3-Ground 2-N/A 8-Safety A 1-Aux A 4-Safety B 5-Safety A 7-Aux A 6-Safety B	—
12-Pin M23 8 9 1 12 10 7 2 6 11 3 5 4 Pins 2, 5, 11 not connected	1-3	Safety A	Safety A
	4-6	Safety B	Safety B
	7-8	Aux A	Safety C
	9-10	Aux B	Aux A
	12	Ground	Ground
5-Pin Micro for ArmorBlock Guard I/O		5-Safety B 2-Safety A 1-Safety A 3-NA 4-Safety B	—
8-Pin Cordset 889D-F8AB-✳	Grey / Red	Safety A	—
	Yellow / Pink	Safety B	—
	White / Blue	Aux A	—
	Green	Ground	—
	Brown	Not Used	
12-Pin Cordset 889M-FX9AE-✳	Brown / Blue	Safety A	Safety A
	White / Green	Safety B	Safety B
	Yellow / Grey	Aux A	Safety C
	Pink / Red	Aux B	Aux A
	Green / Yellow	Ground	Ground

✳ Replace symbol with 2 (2 m), 5 (5 m), or 10 (10 m) for standard cable lengths.
❄ Replace symbol with 0F5 (0.5 ft) or 1F (1 ft) for standard cable lengths.

4-Emergency Stop Devices

Allen-Bradley
Guardmaster®

Cable Pull
Lifeline, 800F, MSR127, 100S
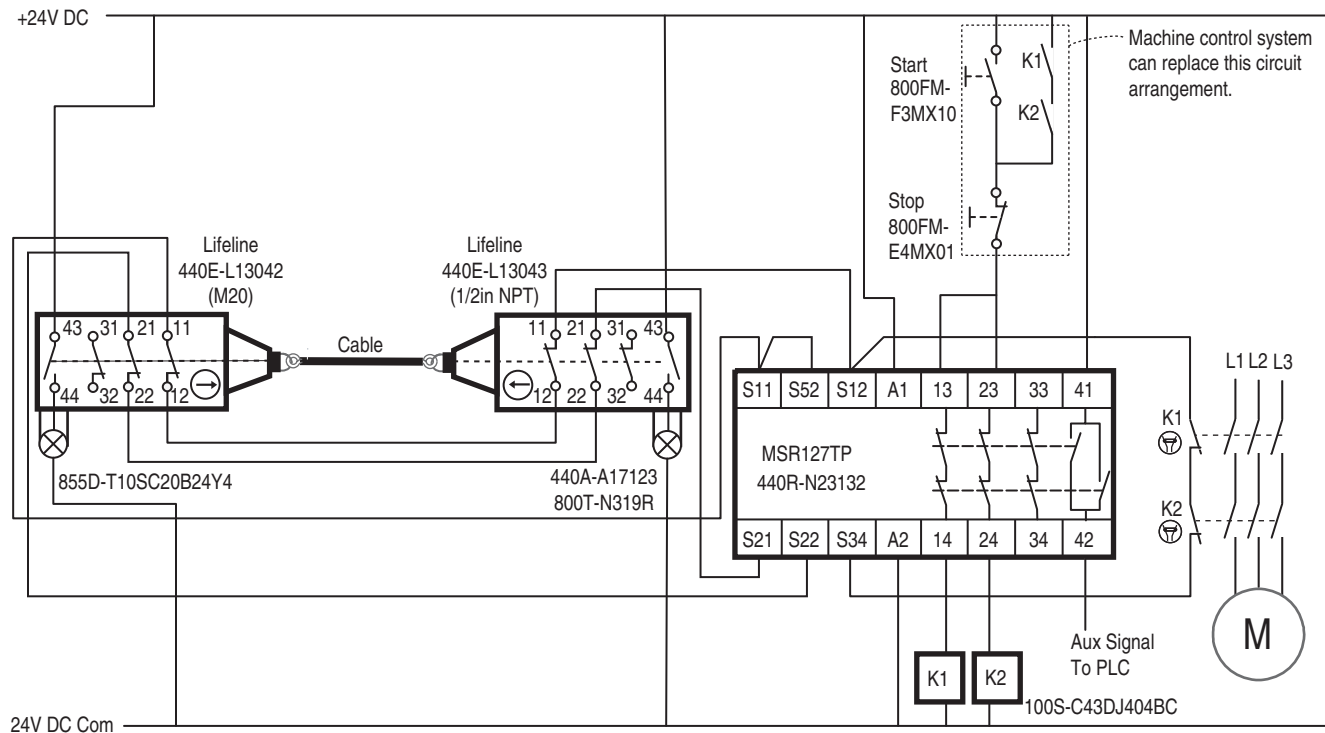
Circuit Status
Both Lifeline cable pull switches are taut and reset; their contacts are closed. The MSR127 safety relay is energized, as its inputs and monitoring circuits are satisfied. The motor is off and ready to run.

Operating Principle
Two cable pull switches are used to protect an area over 10 meters in length. Auxiliary lights provide indication as to which switch has been actuated to stop the motor. The difference between the two switches is the conduit thread and is shown for example purposes.
STARTING: Press the Start button to energize contactors K1 and K2. The motor starts and the two normally open contacts of K1 and K2 close to hold the circuit energized across the Start button.
STOPPING: Pull the Lifeline cable or press the e-stop button on the Lifeline switch to de-energize the outputs of the MSR127 and turn off the motor. To restart the motor, make sure the area is clear of hazards, pull out the e-stop button (if pressed) and rotate the reset knob on the Lifeline 4 to the Run position. Then press the Start button to start the motor. As an alternative, the motor can be stopped by pressing the Stop pushbutton. It can then be restarted by pressing the Start pushbutton.

Fault Detection
Upon successful completion of internal checks on power up, the MSR127 checks its input circuits. With both Lifeline switches reset, the MSR127 checks the output contactors through the S12/S34 circuit. If the contactors are off, the MSR127 energizes its outputs and turns on the contactors which turn on the motor. A short or open circuit fault in the Lifeline cable pull switches will be detected by the MSR127. If either the K1 or K2 faults in the energized state, the motor will be stopped by the other contactor and the fault will be detected by the MSR127 on the next attempt to restart. An internal fault in the MSR127 will be detected by itself. Depending on the type of fault, the result will be de-energization of the K1 and K2 contactors or prevention of re-start.

Ratings
The safety function initiated by the Lifeline cable pull switches meets the safety performance requirements of SIL CL 2 per IEC 62061:2005 and has Category 3 structure that can be used in systems requiring Performance Levels up to PLd per ISO 13849-1: 2006. The series connection of the Lifeline cable switches limits the circuit to SIL CL2 and Category 3. This circuit executes a Category 0 stop.

Allen-Bradley
Guardmaster®